(32) 231-090-269

FEATURE DOCUMENT

BASIC ACD SERVICE FEATURE

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

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FEATURE DEFINITION AND DESCRIPTION

1. DEFINITION/INTRODUCTION

DEFINITION

1.01 The ***basic automatic call distribution (basic ACD) service*** feature provides automatic routing of incoming traffic to business customer agents to insure a uniform loading of the agents. Basic ACD service uses standard telephone sets and/or key telephone sets for agent position equipment.

INTRODUCTION

1.02 Operating companies using No. 1 or No. 1A Electronic Switching Systems (ESS) can offer customers economical basic ACD service with very little equipment on the customer's premises. ACD is made possible by the switching, call-processing, and translation capabilities of ESS. The 60A and 60B customer premises systems are not used with basic ACD service.

1.03 ACD systems distribute incoming calls uniformly to a number of agents, thus spreading the workload equitably to minimize caller delay and maintain higher agent efficiency. Basic ACD service can be provided with less customer premises equipment than with phase 1 and phase 2 ACD. [See references D(12) and D(15) in Part 19.] Basic ACD service typically can be used by customers requiring a small number of agent positions (typically less than 100) and/or requiring relatively less complex ACD service. This service, in its simplest form, can be provided with customer agent positions consisting of rotary or TOUCH-TONE® station sets (no buttons)) or, in a more complex form, as call directors with multibutton agent positions. Related hardware and software requirements at the ESS central office are dependent upon the number of feature options and arrangement of key telephone equipment specified by the customer.

1.04 All forms of basic ACD service (available first with CTX-6 generic program for No. 1 ESS and with 1AE1 generic program for No. 1A ESS) use multiline hunt (MLH) with uniform call distribution (UCD) hunting, line queueing, and delay announcements. This document describes three possible implementations of basic ACD service: (1) using standard station sets, (2) using 6-button key sets, and (3) using 10-button key sets. See Fig. 1, 2, and 3.

1.05 Basic ACD offers the customer all the benefits of ESS central-office-based telephone service plus flexible, modern features. There are features such as priority queueing and administrative capabilities which were made available with phase 1 ACD but can also be used with basic ACD service.

1.06 This document provides a general description of the basic ACD service offering. Table A is a guide to documents containing detailed information on ACD features. Features and options that may be included in a basic ACD-ESS system are listed in Table B.

2. USER PERSPECTIVE

2.01 The basic ACD system, when compared with XBAR ACD systems, provides better call handling performance for a customer with heavy incoming call characteristics (e.g., reservation centers, catalog sales, classified ads, etc.). It provides the capability to efficiently route incoming calls to agents in an MLH group or to functional groups where agents can make reservations, supply information on schedules and rates, or perform any service that the ACD customer wishes to provide. A limited number of traffic measurements used to evaluate ACD performance can be furnished to supervisory personnel so that the agent's work effort can be optimized. Refer to Fig. 1, 2, and 3 for layouts of the basic ACD customer/ESS central office.

2.02 The features of basic ACD service are grouped in five major functional categories: incoming call features, agent position features, supervisor position features, system features, and management information features. The generic program for which each feature was first available is shown in Table B.

A. Incoming Call Features

2.03 ***Order of Arrival Queueing***—A queue is assigned for the multiline hunt (MLH) group or for each functional group within an MLH group. If all agents serving a group are busy, an incoming call to that group is held on queue. As agents become available, the calls on queue of equal priority are served in order of arrival (first-in, first-out). The queue length can be specified for

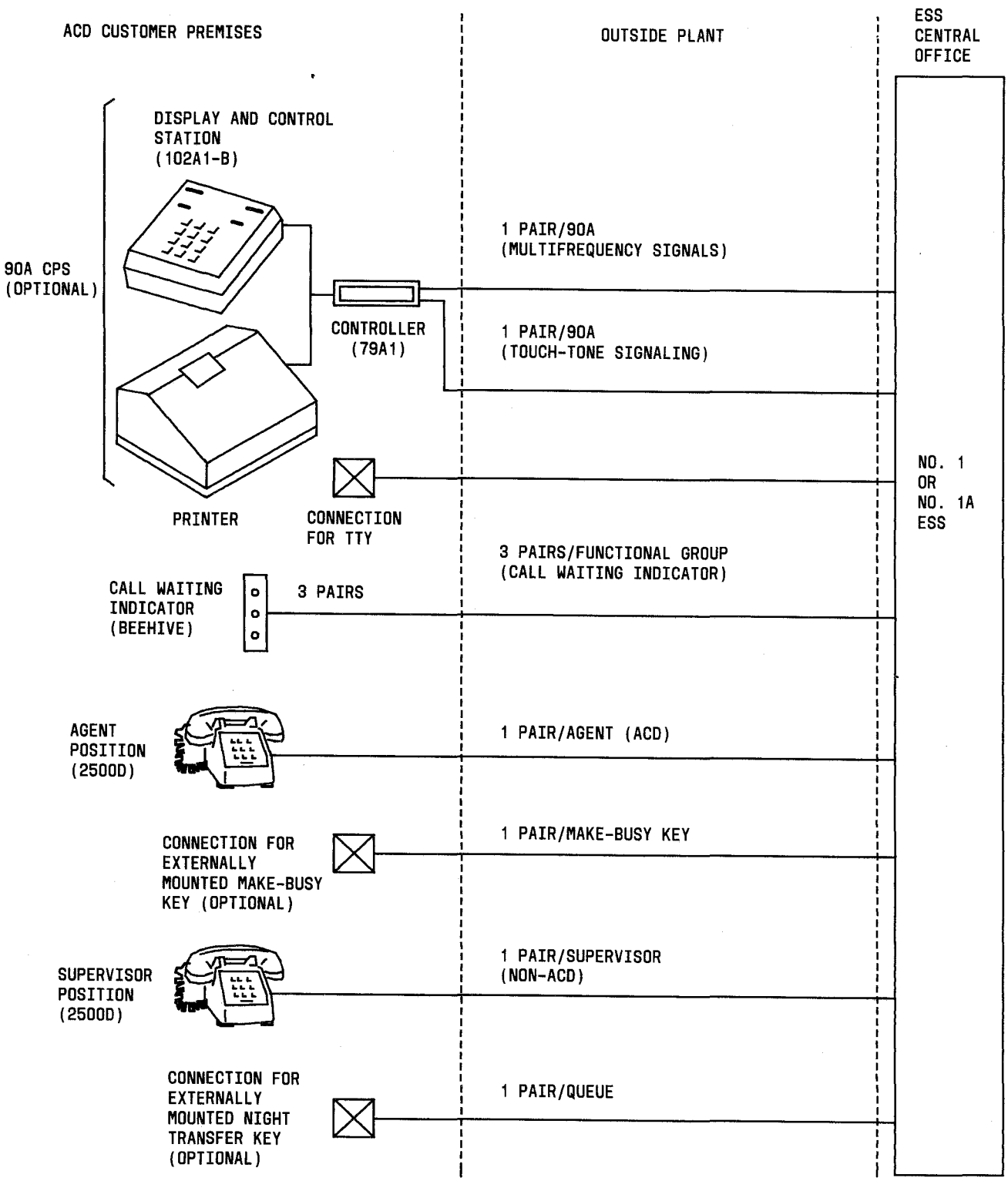


Fig. 1—Basic ACD Customer With Basic Telephone Sets

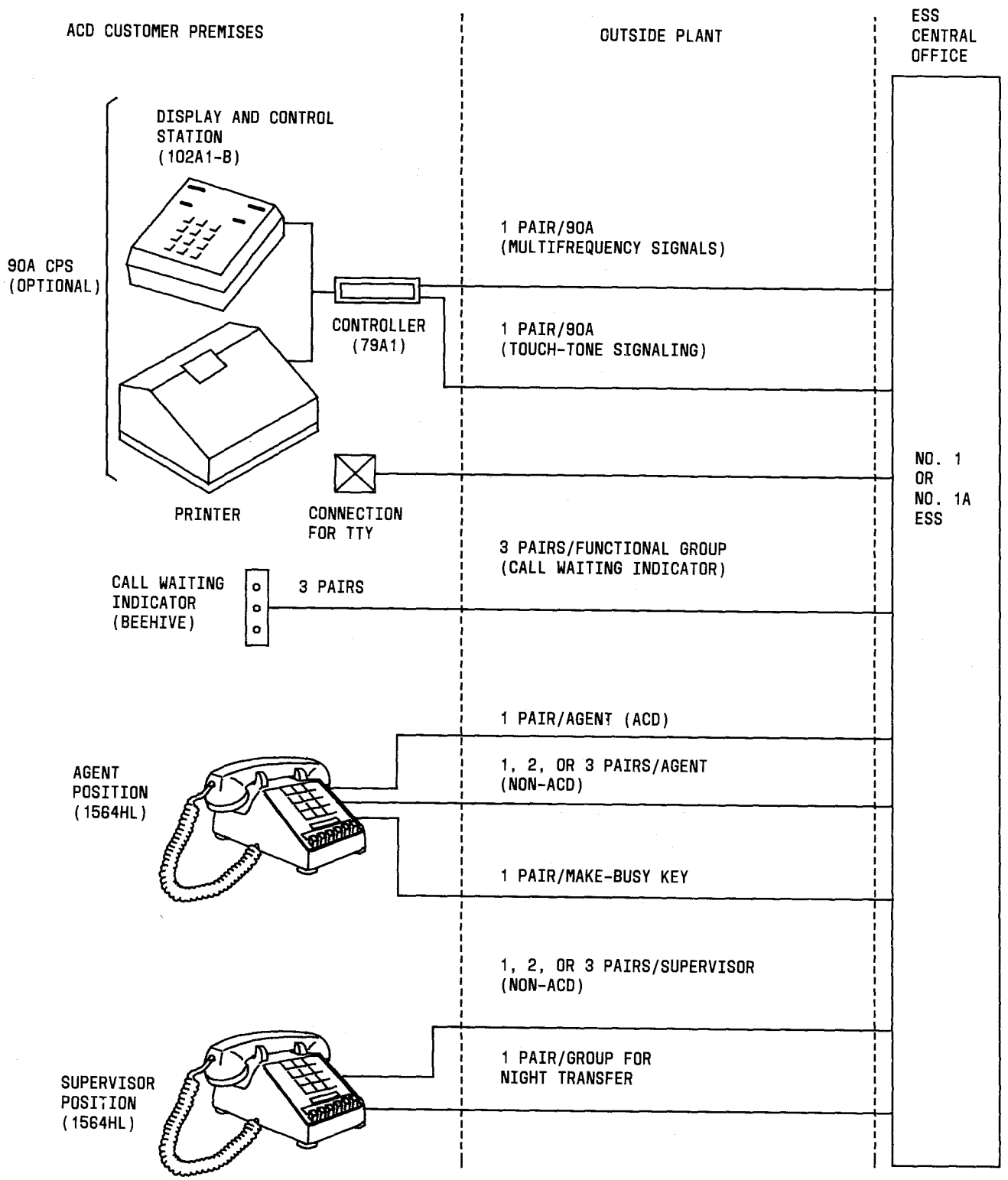


Fig. 2—Basic ACD Customer With 6-Button Key Telephone Sets

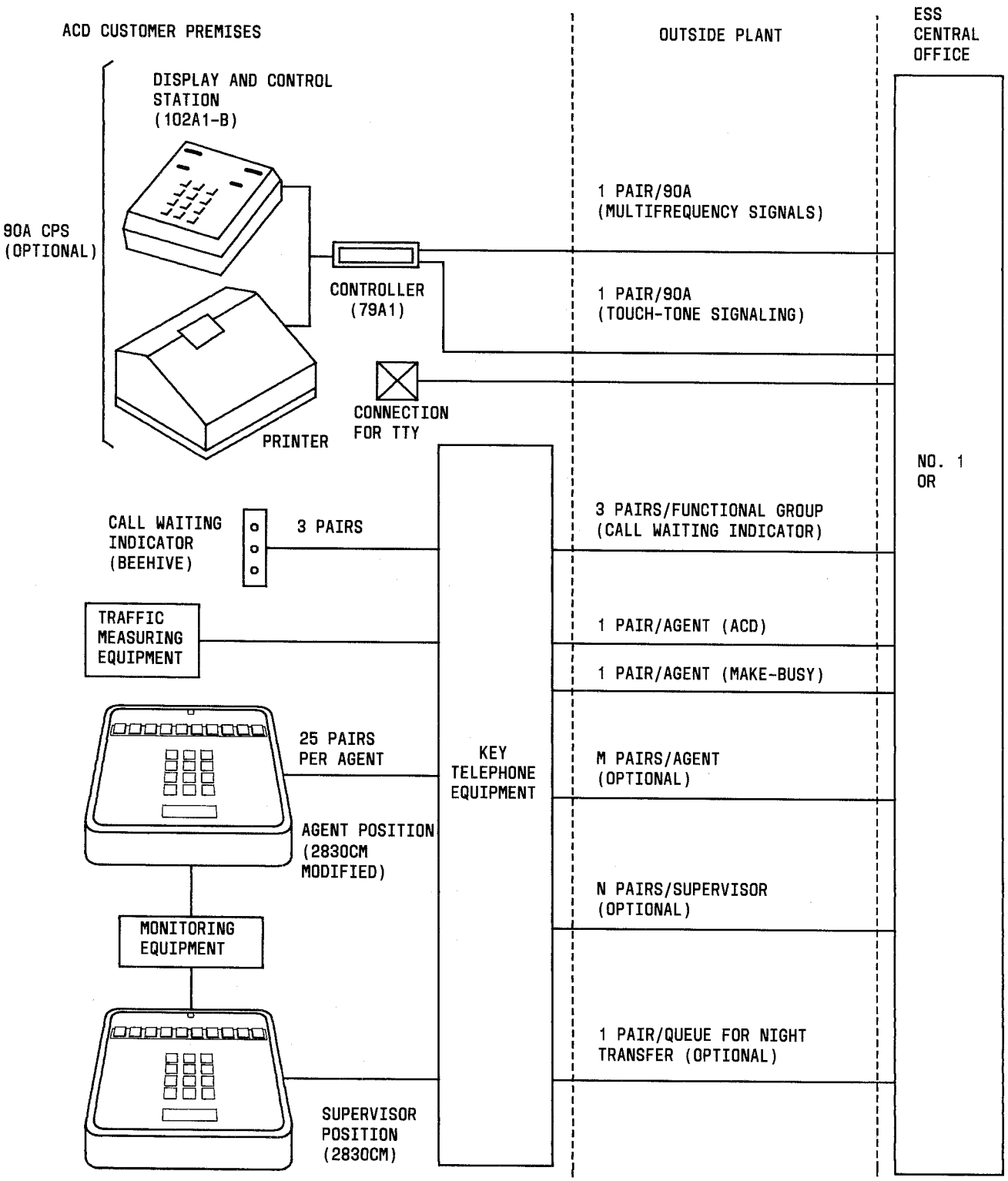


Fig. 3—Basic ACD Customer With 10-Button Key Telephone Sets

TABLE A

ACD DOCUMENT REFERENCES

FEATURE DOCUMENT OR SECTION NUMBER	TITLE	CONTENTS
231-090-082	Calls Waiting Lamps	Calls waiting lamps
231-090-123†	Delay Announcement	Delay announcements Music or silence option
231-090-167*	Queueing for Trunk and Lines	Queueing registers
231-090-180†	Multiline Groups — Hunting and No Hunting	UCD multiline group hunt Make-busy keys
231-090-336†	ACD Multiline Group Hunt	ACD multiline group hunt Load compensating packages Reporting group packages
231-090-338†	Tones and Announcements to Agents	Access to daily announcement
231-090-339†	ACD Queueing and Call Distribution to Agents	Alternate queueing intraflow Alternate server intraflow Interflow Night transfer service Priority calling Abandoned call search
231-090-340	Selected Traffic Data to Customer	Teletypewriter printouts for information management
231-090-411†	Interface with Common Systems Recorded Announcement Frame	Interface with CSRAF
231-090-414†	Interface with 90A-CPS and Coordinator CRT Terminal	Interface with 90A-CPS

* Changes planned

† When published

each functional group (CTX-7 and later in No. 1 ESS and 1AE1 and later in No. 1A ESS) and is changed by a service order.

2.04 ***Fixed Delay Announcement***—This feature provides an announcement to the calling party which indicates that there will be a delay before service can be provided. The feature is customer specified and is changeable by service order. After a call has been on queue and receiving audible ring for a predetermined length of time (the customer can specify 6, 12, 18, 24, 30, 36, or 42 seconds), the call is connected to an announcement channel and receives the announcement for 10 seconds. Following the announcement, the customer can specify that the call be connected to a silent termination, audible ring, or to an ACD customer-provided music source. After another predetermined length of time, measured from the end of the first delay announcement (same options

TABLE B

ACD FEATURES AND OPTIONS

	GENERIC PROGRAM FIRST AVAILABLE		FEATURE DESCRIPTION PARAGRAPH NUMBER
	NO. 1 ESS	NO. 1A ESS	
INCOMING CALL FEATURES			
Order of arrival queueing	CTX-6	1AE1	2.03
Fixed delay announcement — single	CTX-6	1AE1	2.04
Fixed delay announcement — multiple	CTX-7	1AE1	2.04
Music or silence on delay	1E3	1AE4	2.07
Load dependent first delay announcement	1E3	1AE4	2.05
Variable length delay announcement	1E4 with CRAF feature group	1AE4	2.06
Night transfer service	1E3 with ACD feature group	1AE4	2.08
Priority queueing	1E3 with ACD feature group	1AE4	2.09
Abandoned call search	1E3 with ACD feature group	1AE4	2.10
AGENT AND SUPERVISOR POSITION FEATURES			
(Agent and supervisor position features may vary widely depending upon local arrangement of the customer premises equipment as discussed in Part 2.)			2.12 THRU 2.15
SYSTEM FEATURES			
Uniform call distribution (UCD) to agents	CTX-6	1AE1	2.16
Functional group assignments	1E3 with ACD group	1AE4	2.20
System reconfiguration, display and control (90A CPS)	1E3 with ACD group	1AE4	2.21
Alternate traffic routing — intraflow/interflow	1E3 with ACD feature group	1AE4	2.22
Manual make-busy to outgoing traffic (with local arrangement)	CTX-6	1AE1	2.23
Beehive calls waiting indication	CTX-6	1AE1	2.24
Local power reserve (with local arrangement)	CTX-6	1AE1	2.25
MANAGEMENT INFORMATION FEATURES			
Selected traffic data to customer TTY	1E3 with CTRF feature group	1AE4	2.26

as above), the call can be connected to another announcement channel and receive a second announcement. A maximum of four unique delay announcements can be provided per queue. Delay announcement timing is customer specified and changeable via service order. Announcement content is determined and recorded by the ACD customer. Refer to reference D(8) in Part 19 for detailed information.

2.05 ***Flexible First Delay Announcement***—This feature 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 will be selected (by the ESS) based upon the calls-waiting indication thresholds. This feature is only available for the first delay announcement received by the calling party. Delay announcement timing is customer specified and changeable via service order. Announcement content is determined and recorded by the ACD customer. Refer to reference D(8) in Part 19 for detailed information.

2.06 ***Variable Length Delay Announcement***—This feature provides the capability to record delay announcements of variable lengths (up to 48 seconds). The variable length announcements can be used for all delay announcements including fixed or flexible first delay announcements. The variable length delay announcement feature requires access to the Common Systems Recorded Announcement Frame (CSRAF) and a generic program containing the CRAF feature group (see Table B). Refer to reference D(8) in Part 19 for detailed information.

2.07 ***Music on Delay Announcement***—Following the completion of the first delay announcement and between any subsequent announcements, the calling party can be connected to music. The music source is transmitted from customer-provided equipment. Refer to reference D(8) in Part 19 for detailed information.

2.08 ***Night Transfer Service***—An ACD customer can place an MLH group or functional group in the night service state by a variety of methods depending on local arrangement of equipment on the customer premises. When this feature is active, all calls normally directed to that MLH group or functional group are then forwarded to another functional group, another ACD, or to a group of telephones predesignated by the ACD customer. The alternate answering point designation can be changed by service order or by call forwarding variable if the night number is to a line or console. Key control of this feature requires an outside plant pair per functional group to the ESS.

2.09 ***Priority Queueing***—The ACD customer can designate that calls from specific trunk groups or to specific ACD directory numbers being placed on a queue for the called functional group or MLH group and answered by the first available ACD position before other waiting calls that are nonpriority. Calls having priority queueing are not intraflowed or interflowed except when night transfer service is activated. Priority designations are specified and changed by service order.

2.10 ***Abandoned Call Search***—This is a search performed on incoming foreign exchange and tie trunks that have received delay announcement(s) before connection is made to an agent. This feature prevents an incoming ACD call from being connected to an agent when the calling party has disconnected subsequent to hearing the announcement(s).

B. Agent Position Features

2.11 An incoming ACD call is received and processed on the agent telephone set. The agent set may be a basic telephone set [such as type 2500D (Fig. 1)] or a multibutton telephone set [such as a 6-button key type 1564Hl (Fig. 2) or a 10-button type 2830CM (Fig. 3)].

Basic Agent Telephone Sets

2.12 If each agent position consists of a basic station set, such as type 2500D (Fig. 1), the basic ACD system can function with many of the features usually available with more complex agent positions. The major limitation is the inability to place the position in a make-busy state. A simple switch can be mounted externally to the station set to provide the position make-busy option. Details of the make-busy options are provided in references A(3) and B(3) in Part 19. A second limitation is that only ACD incoming calls can be handled at such a position. However, when the make-busy switch or key is provided and is set for make-busy, non-ACD business customer calls can be received. Assistance from a supervisor can be obtained via add-on when the add-on feature is provided. [See reference A(9) in Part 19.] The night transfer service option is not available unless

an auxiliary switch is provided at the supervisor position. Also, headset operation can be provided.

Six-Button Agent Telephone Sets

2.13 If each agent position consists of a 6-button telephone set such as type 1564HL (Fig. 2.), more flexibility is provided. One of the buttons is the standard HOLD key; another button is assigned to the ACD line; and the remaining four buttons can be assigned in accordance with the customers' wishes. At least one of the remaining four buttons is usually assigned to a non-ACD line. One button can be assigned to the position make-busy function; or the make-busy function can be provided via an auxiliary switch installed externally to the telephone set. When headset operation is provided, the position make-busy functions also can be accommodated via two of the contacts in the externally mounted headset jack (contacts normally open when headset is plugged in). Details of the make-busy option are provided in references A(3) and B(3) in Part 19. One button should be used as a release key to disconnect incoming calls.

Ten-Button Agent Telephone Sets

2.14 If each agent position consists of a 10-button telephone set such as type 2830CM (Fig. 4), more flexibility is provided than with the 6-button set. See Fig. 3.

C. Supervisor Position Features

2.15 The supervisor position can consist of any of the telephone sets described for agent positions. The supervisor position can be connected to a non-ACD line and/or directly to agent positions via key telephone equipment described in reference A(11) and A(12) in Part 19. This position can be arranged to provide any of the functions of an agent position. Special agent monitoring equipment described in references A(12) and A(13) in Part 19 can be added. When no key is available on the supervisor set, night transfer service is possible with an auxiliary switch mounted externally to the set.

D. System Features

2.16 ***Uniform Call Distribution (UCD) to Agents***—UCD hunting is a scheme used with multiline hunt (MLH) groups to provide an even distribution of incoming calls among the available members of a hunt group. This is a terminating feature of the group; origination and disconnect are not affected by UCD hunting. The ESS selects a terminal where the hunt for an idle terminal is to begin. A circular hunt begins at that point and continues until an idle terminal is found. From that point, another circular hunt for the next idle terminal begins prior to the arrival of the next call. When the next idle terminal is found, it is left idle and becomes the new start point for the next hunt. If this agent position is no longer available at the time when the next call is received, the circular hunt continues from that point until an available agent is located. Details on UCD hunting are provided in references A(3) and B(3) in Part 19.

2.17 ***ACD Multiline Group Hunt***—This feature uses a form of UCD hunting to provide the capability of controlling the amount and direction of incoming traffic and adjusting the work force available for handling this traffic. The circular hunting scheme used for the UCD feature is modified to consult the functional group assignment blocks prior to determining the next available agent console. Calls are routed to the functional groups based on ***listed directory numbers (LDNs)*** and incoming trunk groups. Each functional group that an ACD customer has may be assigned a QTL (queueing for trunks and lines) queue. Calls seeking to terminate to the ACD are first placed on the queue via LDN routing and are unloaded as agents become available in a particular functional group.

2.18 When a call is unloaded from a queue, an ACD multiline group hunt is performed to locate an idle and available agent in the functional group. The call is then routed to that agent.

2.19 To perform an ACD multiline group hunt, a block of ***call store (CS),*** referred to as a functional group assignment block or functional group mask block, is used as an overlay for the multiline group activity block. The CS mask block has a bit layout parallel to the group activity block with each bit corresponding to a particular agent (terminal) in the multiline group. The system uses uniform call distribution plus a special overlay process (logical AND function) between a functional group mask block and the activity block to obtain an idle agent (terminal) which is assigned to the particular functional group. Details on the ACD

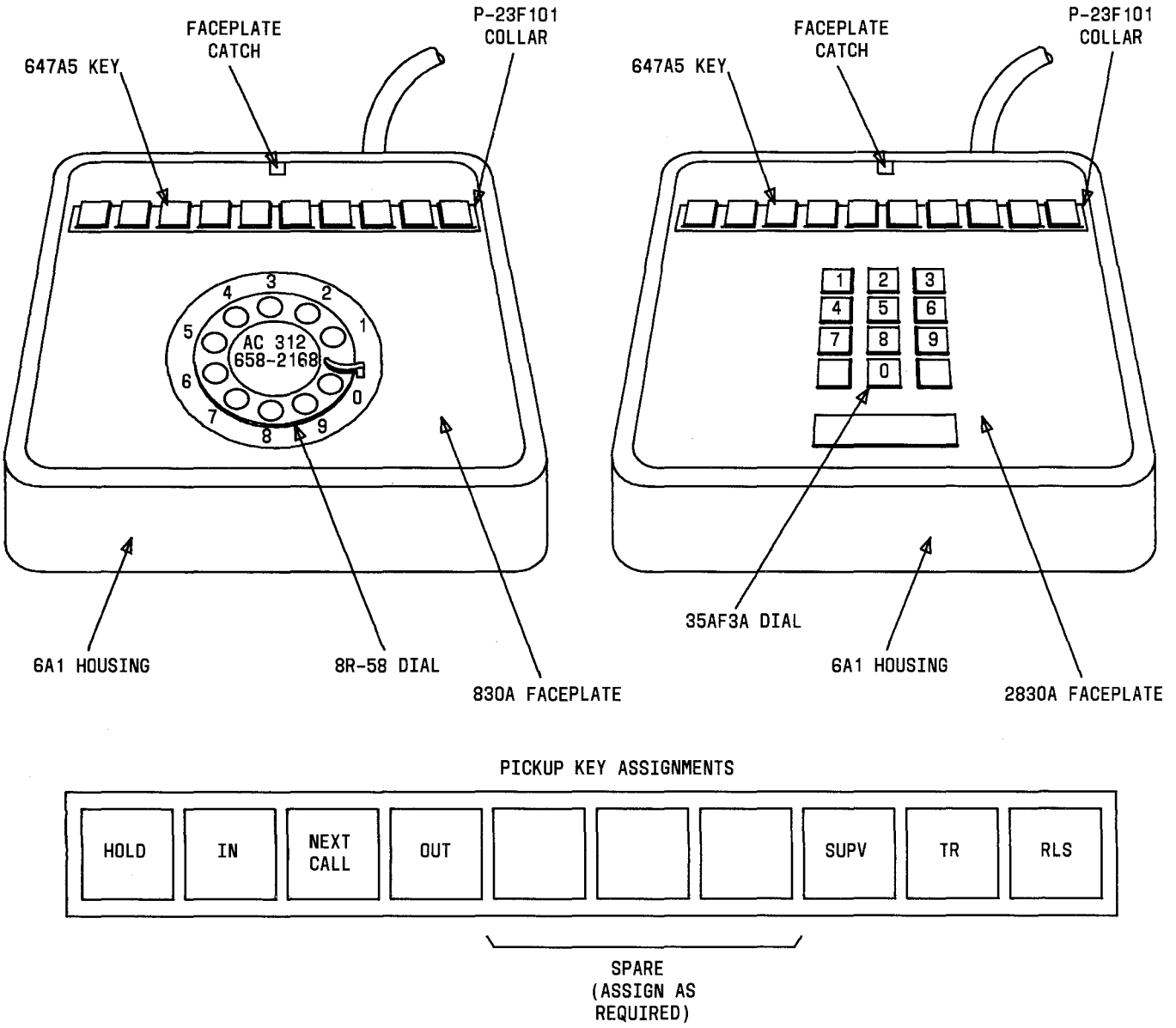


Fig. 4—Typical 10-Button Agent Telephone Sets

multiline group hunt feature are provided in reference D(9) in Part 19.

2.20 ***Functional Group Assignments***—Functional groups (splits) are groups of agents handling similar traffic from customer-specified trunk groups or listed directory numbers. An ACD customer may specify up to 30 functional groups. An additional functional group is reserved for TELCo maintenance purposes. Individual agents or groups of agents can be reassigned from one functional group to another by the customer via the 90A CPS (display and control station). Agent reconfiguration may also be accomplished with the aid of load compensating packages (LCPs). LCPs are predetermined agent position configurations that can be activated (via the 90A CPS) to accommodate changes in the volume of incoming ACD traffic because of lunch hours, holidays, weekends, etc. An ACD may have up to eight LCPs. A simple TOUCH-TONE telephone set can be used (instead of a 90A CPS) to assign or reassign

agents from one functional group to another; however, this arrangement will not provide the customer with a means of interrogating the system to verify (display) current agent assignments.

2.21 ***System Reconfiguration, Display, and Control***—Control and display of the system's configuration are performed via the 90A CPS display and control station. It uses a TOUCH-TONE pad to communicate with the ESS and receives data in the form of multifrequency tones. Information is displayed to the user on two numeric displays contained in the station. A hard copy of the displayed information may be obtained using an optional printer. The 90A CPS is used to:

(a) Reassign an individual agent position to another functional group

(b) Invoke a prestored pattern of agent positions to functional groups (LCP)

(c) Display and/or print the agent positions (extension numbers) in a particular functional group

(d) Display and/or print the functional group of a particular agent position

(e) Display and/or print the active LCP

(f) Display and/or print the value of individual or consecutive blocks of agent position incoming call peg count accumulators

(g) Zero individual or consecutive blocks of agent position incoming call peg count accumulators.

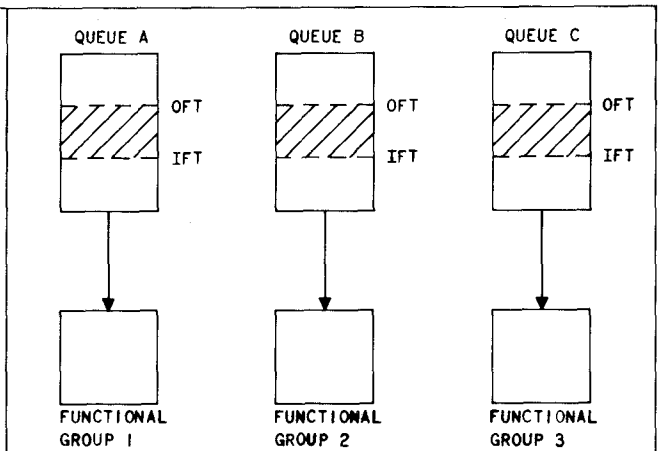
(h) Print agent consoles in a functional group that are not normally assigned it.

2.22 ***Alternate Traffic Routing***—Intraflow/Interflow—Alternate traffic routing may be performed between queues in a single ACD system or between ACD systems. Depending on the servers associated with the alternate queues, an alternate routed call will either be served by an agent in the same ACD (intraflow) or be served by an outgoing facility to a distant ACD (interflow). Alternate server intraflow/interflow (ASI) provides for the serving of calls on one functional group's queue by agents associated with another functional group in an alternate server pool when the first functional group is giving poor service (calls waiting longer than a customer specified threshold) and the second has available agents. All calls destined for a particular functional group are stored on its queue. Calls are served by agents in this or an alternate functional group in the order of their arrival on queue. Each functional group may have up to 29 functional groups in its alternate server pool that can provide assistance. ASI allows the customer to designate any combinaton of functional groups in the system to receive alternate routed traffic. For each functional group in the system, the customer can designate alternate functional groups (intraflow) or trunks (interflow) to which an incoming ACD call may be automatically redirected if the incoming call has been waiting on queue longer than a customer-designated threshold (outflow time trigger). Calls are routed to the alternate functional groups using a circular hunt; that is, all alternates have equal weight (no priority). An ACD call will be alternate routed when (1) the outflow time trigger in one functional group's queue is exceeded, (2) the inflow time trigger (another customer-specified threshold associated with the alternate queue and based on the longest waiting call in the alternate queue) is not exceeded, and (3) an idle server in the alternate functional group is available (an agent in the case of intraflow and an outgoing facility in the case of interflow). The outflow and inflow time triggers are established and changed via service order. Refer to Fig. 5 for an illustrated example of the ASI feature.

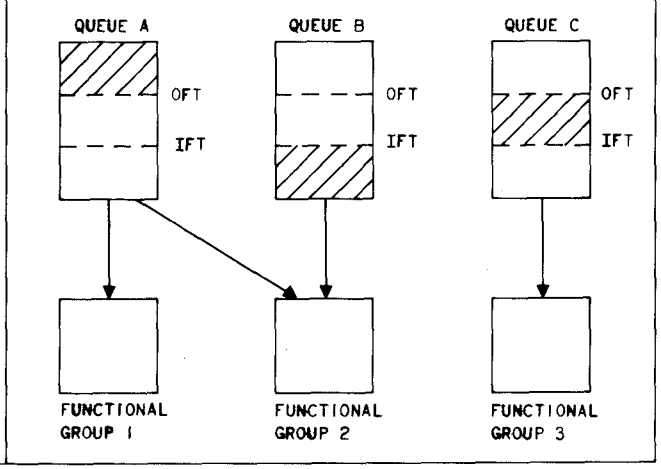
2.23 ***Manual Make-Busy to Outgoing Traffic***—This feature allows the ACD customer to enable/disable the outgoing mode on dial-up, 2-way trunk groups via key operation.

2.24 ***Beehive Calls Waiting Indication***—This feature provides a visual indication of up to three levels of the calls-waiting condition of a functional group of agents via sets of three TELCo-provided beehive lamps. These levels are based upon time in queue for the longest delayed call. The threshold for each level, specified in increments of 6 seconds (up to 42 seconds), is changeable by service order. The lamps for each level may be lighted singularly, such that only one is on at any level, or cumulatively (by on-premises wiring), such that when two or more thresholds are exceeded, the corresponding number of lamps is lighted. Details regarding the call waiting lamps are provided in reference A(1) in Part 19.

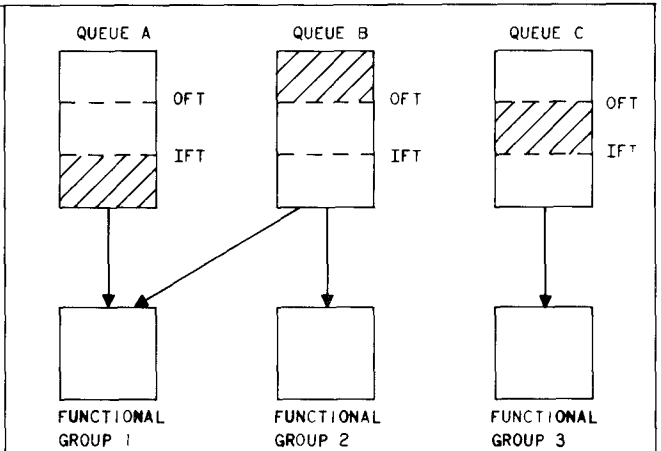
ATTENDANTS IN FUNCTIONAL GROUPS 1, 2, AND 3 ARE HANDLING INCOMING ACD CALLS (WAITING ON THEIR QUEUE) WITHIN THE SPECIFIED TIME REQUIREMENT



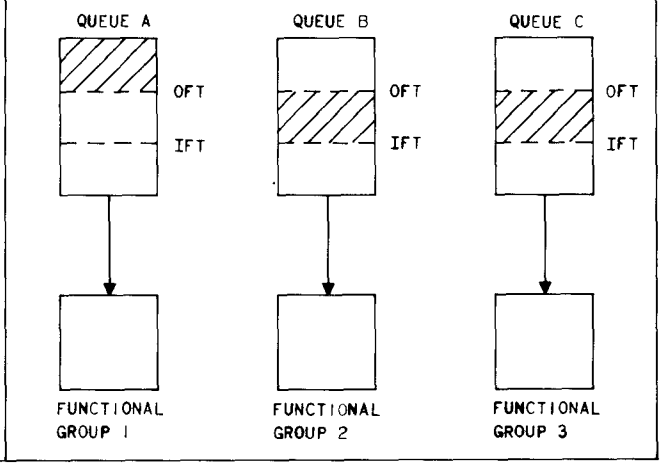
ATTENDANTS IN FUNCTIONAL GROUP 1 NEED HELP AND ARE RECEIVING ASSISTANCE FROM ATTENDANTS IN FUNCTIONAL GROUP 2



ATTENDANTS IN FUNCTIONAL GROUP 1 ARE PROVIDING ASSISTANCE TO ATTENDANTS IN FUNCTIONAL GROUP 2



ATTENDANTS IN FUNCTIONAL GROUP 1 NEED HELP BUT NO HELP IS AVAILABLE FROM OTHER FUNCTIONAL GROUPS



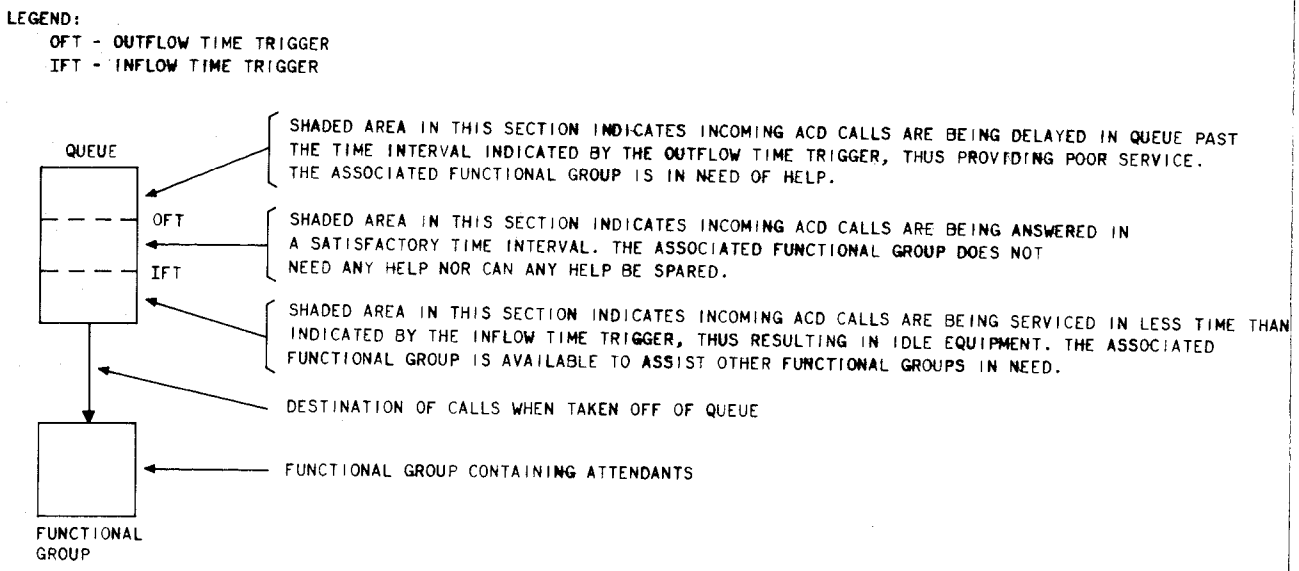


Fig. 5—Alternate Server Intraflow

2.25 ***Local Power Reserve***—Local battery reserve power can be made available for the key telephone and monitoring equipment as engineered and provided by the TELCo.

E. Management Information Features

2.26 ***Hard Copy Display (TTY)***—A TTY located on the customer premises (a system option) is connected over a dedicated path to 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 one-half 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 receive-only TTY, which is capable of printing ten characters per second. The following data can be supplied to the basic ACD customer once every one-half hour. Following each type of data listed is a letter or letters representing the function of that count (F for functional 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)

(i) Available and idle usage (F)

(j) Number of outgoing calls (T)

(k) Trunk group usage (T)

(l) Number of outgoing overflows (T)

(m) Trunk group maintenance usage (T)

(n) Number of calls intraflowed in (F)

(o) Number of calls intraflowed out (F)

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

(q) Number of outgoing extension calls (F)

(r) Extension talk time usage (F)

(s) Number of calls transferred in (F)

(t) Number of trouble reports. (T)

Details on the selected traffic data to customer (CTRF) feature are provided in references A(11) and D(22) in Part 19.

3. SYSTEM PERSPECTIVE

SOFTWARE DATA STRUCTURES

3.01 Table C lists the translations used with basic ACD service and the functions performed by each. Refer to documents, outlined in Table A, for detailed information on specific software engineering.

FEATURE OPERATION

3.02 When a call is made to one of the listed directory numbers (LDNs) assigned to the ACD customer, the directory number translator returns with the queue number onto which the call is to be loaded. If that queue number is in the night transfer state, then that incoming call will be routed to a night directory number. This night directory number may be in another functional group, in another ACD, or 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.

3.03 A call has priority if (1) the directory number dialed has the priority bit set in its directory number translation, or (2) the incoming line or trunk has the priority bit set in its line equipment number translation. 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

TABLE C

ACD TRANSLATION REQUIREMENTS

TRANSLATOR	INDICATES
Directory Number	Terminating major class Nonhunt lines Call store data requirements Functional group number for routing of calls Priority treatment Queueing for trunks Directory number queueing Simulated facilities for interflowing or INWATS Special line features Signal distributor point usage Ring type (must be nonzero)
Line Equipment Number	Originating major class Terminal numbers Call store data requirements Special billing directory numbers Priority calling feature for originating Centrex lines Capability to prevent terminating disconnect timing Ground start lines Special line features Special signal distributor point application Miscellaneous trunk distributor numbers for A and B relays Signal digit analysis requirements
Multiline Group Common Block	Multiline hunt type for ACD multiline group Functional groups and/or reporting groups in multiline group Number of functional groups Call store requirements Data group number Circular hunt

TABLE C (Cont)

ACD TRANSLATION REQUIREMENTS

TRANSLATOR	INDICATES
Unit Type	Unit type 54 auxiliary block for position make-busy keys, night key, and inhibit outflow key Unit type 55 auxiliary block for member number queue Delay announcement requirements Service-after-delay announcement requirement Special tone requirement Call waiting indicator requirements
Trunk Group Number	Trunk group type
TGN, TNN-TGN, and TNN-PEN	Multifrequency transmitter requirements One-way outgoing trunk requirements
Trunk Class Code Expansion Table	Multifrequency transmitter requirements One-way outgoing trunk requirements Delay announcement requirements
Centrex Common Block	Digit interpretation for 90A CPS requests Route index for trunk group Centrex group features
Route Index Expansion Table	Pseudo route index for multifrequency transmitter
Data Group and Mask Block	Program store backup for a particular call store mask block
Signal Data Analysis	Function of input signals Additional translation tables for variable key interpretation ACD consoles in a particular group
Alternate Server Pool	Converts alternate serve pool member number to a QTL queue number
Customer Traffic Label	3-character column labels for printing ACD summary report
Customer Traffic Group	Customer traffic count requirements

the end of the queue. After being placed on queue, the calling party is given audible ringing.

3.04 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 will receive a delay announcement. ACD customers may specify from one to four delay announcements per queue and the content of each message and the time intervals between announcements. Following the completion of the first delay announcement and between any subsequent announcements, the calling party can be connected to silence or music. When the calling party reaches the top of the queue and an agent is free, the calling party is served.

3.05 A facility that will provide the best service is then selected. This facility can be an agent position in the primary functional group (as specified by the LDN), an agent position in an alternate functional group (intraflow), or a trunk in an outgoing trunk group (interflow).

3.06 If the selected facility requires interflow (a trunk facility), a trunk is seized going to the distant central office (which may contain an ACD system) and outpulsing is performed. After receiving an answer report from the far-end, the talking path is then completed between the calling party and the agent. If the selected facility is not a trunk facility (i.e., an alternate functional group or the primary functional group), an ACD multiline hunt is performed to find an idle agent position.

3.07 Active queues (those which have at least one idle position in the associated functional group) are unloaded periodically. Before a call is unloaded from the queue, a UCD hunt or an ACD multiline group hunt must be performed to determine the idle agent position in the MLH group or the functional group. Each functional group is assigned a block of call store in the H8MRCC data area. 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 assigned and is reset (equal to 0) in all other functional groups.

3.08 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 the terminal (agent line) with which 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 that is assigned to that particular functional group.

3.09 When an idle position 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 position.

3.10 Before the connection is made to an agent, an abandoned call search is performed on all incoming foreign exchange and tie trunks that 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.

3.11 Ringing current is applied to the agent position until the attendant answers.

3.12 Once an ACD call has been terminated to an agent position, the attendant can provide the calling party with service.

3.13 Refer to individual documents, outlined in Table A, for detailed information on specific features.

FEATURE ATTRIBUTES

4. APPLICABILITY

4.01 The basic ACD service feature is provided on a per-customer group basis.

4.02 In addition to the TELCo advantages (as compared with XBAR customer premises systems) in maintaining and administering a conceptually simple system, the basic ACD customer benefits from small floor space requirements and the ability for system growth in small increments.

4.03 The basic ACD feature consists of many independent features that are combined to provide a complete system. Each feature option has the capability of being restricted by software and/or hardware modifications. Refer to documents, outlined in Table A, for detailed information on specific restriction capabilities.

5. LIMITATIONS AND RESTRICTIONS

ASSIGNMENT

A. Central Office Limitations

5.01 A No. 1/1A ESS central office may theoretically have a maximum of 63 ACD customers (basic, phase 1, and phase 2). The total number of functional groups handled by any single No. 1/1A ESS central office cannot exceed 255.

5.02 The maximum number of TTY channels that can be used per central office is three. This means that the central office can serve up to three CTRF customers requiring TTYs.

B. ACD Customer Limitations

5.03 A basic ACD customer can have 31 functional groups (including the maintenance functional group).

5.04 A basic ACD customer can have the following equipment maximums:

(a) One thousand agent and supervisor consoles

(b) Fifteen 90A CPS

(c) One teletypewriter channel.

6. COMPATIBILITY AND INTERACTIONS

COMPATIBILITY WITH OTHER FEATURES AND HARDWARE

6.01 ACD service is not compatible with the service link network (SLN). Offices equipped with the SLN that are candidates for providing ACD service do not require SLN removal. Instead, these offices must have a sufficient number of ringing and audible circuits that are provided on the trunk link network, not on the SLN.

6.02 Call pickup, don't answer transfer, and mechanical traffic registers are not compatible with queueing.

DYNAMIC INTERACTION WITH OTHER FEATURES AND HARDWARE

6.03 When ACD multiline group hunting is used with basic ACD service, the circular hunting scheme used for uniform call distribution (UCD) of calls to agents is modified to consult the functional group assignment blocks prior to determining the next available agent console. Each agent console appears to the system as a business customer-type station; thus, UCD hunting is necessary to provide basic ACD service.

7. COST FACTORS

7.01 Refer to documents, outlined in Table A, for detailed information on memory, processor time, and hardware cost factors.

7.02 Tables D and E list the feature groups (including base generic) and their associated feature packages required to implement the basic ACD feature.

8. AVAILABILITY

8.01 Table B lists the features available for use with basic ACD along with the generic program when each feature was first available.

CONSIDERATIONS FOR INCORPORATION OF FEATURE INTO SYSTEM

9. PLANNING

9.01 ESS-ACD offices that will use the 1E3 generic program are not required to be running on the SP-CTX-7, Issue 2.1, generic program before cutover.

9.02 Basic ACD service is not compatible with the SLN. Offices equipped with the SLN that are candidates for providing ACD service do not require SLN removal. Instead, these offices must have a sufficient number of ringing and audible circuits that are provided on the trunk link network, not on the SLN.

10. HARDWARE

A. Central Office

10.01 Central office interfacing equipment consists of line side equipment and trunk side equipment.

Line Side Equipment

10.02 A remote master scanner applique circuit (SD-1A210-01) is required to provide the connecting of miscellaneous circuits (special purpose control pairs). A remote signal distributor applique circuit (SD-1A228-01) is required to operate calls waiting lamps.

> ***Note:*** Because of the expected high calling rate on agent lines, the line link network should be deloaded for associated line equipment numbers on the same concentrator.

Trunk Side Equipment

10.03 Audible ring and recorded announcement circuits (SD-1A221-01) are required to provide connecting trunks with nonbarge-in delay announcements. Tone and recorded announcement circuits (SD-1A218-01) are required to connect music or silence to incoming ACD call lines while on queue. Two-way trunk circuits (SD-1A192-02) are required to operate the 90A CPS.

B. Customer Premises Equipment

10.04 The customer premises equipment varies significantly with customer requirements, as indicated in Part 2. The agent positions consist of basic or key telephone sets. Key telephone sets are described in 502- and 503-series Bell System Practices. Supervisor positions may be supported by key telephone equipment for monitoring as described in reference A(12) and A(13) in Part 19. Generally, all arrangements include calls waiting indicators. An optional 90A CPS, display and control station, is available for ACD administration.

11. DETERMINATION OF QUANTITIES

11.01 Refer to documents, outlined in Table A, for detailed information on determination of quantities.

12. ASSIGNMENTS AND RECORDS

INPUT AND RECORD KEEPING

12.01 Refer to documents, outlined in Table A, for detailed information on specific RC messages and record keeping requirements.

UNIFORM SERVICE ORDER CODES

12.02 Universal service order codes (USOCs) for basic ACD are provided in reference B(4) in Part 19.

13. NEW INSTALLATION AND GROWTH

13.01 Refer to documents, outlined in Table A, for detailed information on new installation and growth procedures.

14. TESTING

14.01 Refer to documents, outlined in Table A, for detailed information on specific testing procedures.

15. MEASUREMENTS

15.01 Refer to documents, outlined in Table A, for detailed information on specific measurement capabilities.

16. CHARGING

16.01 Refer to documents, outlined in Table A, for detailed information on specific charging procedures.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

ACD	Automatic call distribution (ACD) is an arrangement in which traffic arriving on a number of incoming trunks is distributed to a number of agents (attendants). ACD thus spreads the agent workload equitably to minimize caller delay and maintain higher agent efficiency.

TABLE D
ACD PROGRAM STORE MEMORY
FOR FEATURE LOADED GENERIC PROGRAMS 1E3 AND 1E4
IN NO. 1 ESS

	FEATURE GROUP		FEATURE PACKAGE				PACKAGE WORDS		CODE WORDS	
			NO.		ACRONYM	NAME				
	1E3	1E4	1E3	1E4			1E3	1E4	1E3	1E4
FIXED	Base Generic (9SB2)	Base Generic (9SB4)	3	3	CCAD*	Customer Changeable Speed Calling	960	960	894	894
			9	9	CTX*	Basic Centrex	10,368	10,368	10,261	10,261
			15	15	CX1X*	Centrex Tandem Tie Line	1,600	1,600	1,489	1,489
			16	16	HCTX*	Centrex 1B/2B Console	9,856	9,856	9,751	9,751
			35	35	SATT*	Centrex Satellite	896	896	793	793
			37	37	BQTL*	Basic QTL Queueing and Line Termination	2,688	2,688	2,572	2,572
			42	42	CQFX*	QTL Incoming FX Call Queueing	320	320	242	242
			44	44	QDAN*	ATL Delay Announcement	1,216	1,216	1,092	1,089

CONDITIONAL	ACD1		6		ACDT	Customer Data Collection	1,024		903	
		ACD2	4	4	ACD*	Automatic Call Distribution	2,432	2,432	2,118	2,118
			27	27	SIG*	TOUCH-TONE Key Signaling	320	320	226	226
			38	38	BAQI*	Basic AQI Intraflow for QTL Customers	192	192	87	87
			39	39	BASI*	Basic ASI Intraflow for QTL Customers	512	512	397	397
			40	40	BQNS*	Basic QTL Queueing Night Transfer Service	256	256	174	174
			41	41	BTRK*	Basic Intraflow QTL Trunk Termination Code	1,664	1,664	1,534	1,534
			43	43	GINF*	General Intraflow Logic for QTL Customers	576	576	429	429
			45	45	QPRI*	Priority QTL Queueing	192	192	110	110
				48	DDDT*	Direct Distance Dialing Terminations		256		139
				49	MIS1	Management Information System		2,368		2,266
				50	ACD2	Automatic Call Distribution Phase 2		3,584		3,410
	IRES	IRES	19	19	IRES	Inquiry and Response System	4,480	4,480	3,856	4,381
		CRAF		53	CRAF	Common Systems Recorded Announcement Frame		3,392		3,205
	CTRF		12		CTRF	Customer Traffic Data	2,048		1,916	
			24		OPSW	Outpulsing Switching Routines	192		118	

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

Note 1: The arithmetic difference between package words and code words is patch space.

Note 2: Each feature package contains two words of overhead that define the package name and size.

TABLE E
ACD PROGRAM STORE MEMORY
FOR FEATURE LOADED GENERIC PROGRAM 1AE4
IN NO. 1A ESS

	FEATURE GROUP	FEATURE PACKAGE			
		NO.	ACRONYM	NAME	CODE WORDS
FIXED	Base Generic (Core)	3	CCAD*	Customer Changeable Speed Calling	1,222
		9	CTX*	Basic Centrex	14,233
		15	CX1X*	Centrex Tandem Tie Line	3,028
		16	HCTX*	Centrex 1B/2B Console	14,081
		35	SATT*	Centrex Satellite	1,103
		37	BQTL*	Basic QTL Queueing and Line Termination	3,795
		42	CQFX*	QTL Incoming FX Call Queueing	362
		44	QDAN*	QTL Delay Announcement	1,704
CONDITIONAL	ACD1 / ACD2	6	ACDT	Customer Data Collection	1,120
		4	ACD*	Automatic Call Distribution	3,008
		27	SIG*	TOUCH-TONE Key Signaling	327
		38	BAQI*	Basic AQI Intraflow for QTL Customers	117
		39	BASI*	Basic ASI Intraflow for QTL Customers	584
		40	BQNS*	Basic QTL Queueing Night Transfer Service	246
		41	BTRK*	Basic Intraflow QTL Trunk Termination Code	2,155
		43	GINF*	General Intraflow Logic for QTL Customers	580
		45	QPRI*	Priority QTL Queueing	154
		48	DDDT*	Direct Distance Dialing Terminations	203
		49	MIS1	Management Information System	2,833
		50	ACD2	Automatic Call Distribution Phase 2	4,263
	IRES	19	IRES	Inquiry and Response System	5,929
	CRAF	53	CRAF	Common Systems Recorded Announcement Frame	4,059
	CTRF	12	CTRF	Customer Traffic Data	2,624
		24	OPSW	Outpulsing Switching Routines	139

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

Note 1: In 1AE4, code words are the same as package words; feature packages share a common patch space.

Note 2: The code words shown for feature package 48 and 50 are approximations and may be subject to change.

ASI	Alternate server intraflow (ASI) places calls only on their primary QTL queue but allows them to be serviced by agents associated with other queues belonging to the same alternate server pool.
CTFG	Customer traffic group (CTFG) is an arbitrary number assigned to a customer which is used to locate data that describes the counts to be collected and printed for that customer.
CTRF	Selected traffic data to customer is a collection of traffic counts related to a customer's agents, trunk groups, simulated facilities groups, and other miscellaneous counts. The counts are gathered at the ESS central office and transmitted to the customer's premises where they are printed out via a TTY.
Functional group	A functional group is a grouping of agents (within a multiline hunt group) assigned to handle one particular type of call.
LCP	Load compensating packages (LCP) are predetermined agent position configurations that can be activated via the 90A CPS to accommodate changes in the volume of incoming ACD traffic due to lunch hours, holidays, weekends, etc.
MIS	A management information system (MIS) is a system designed to measure and analyze agent and traffic data. Upon system evaluation, management personnel can be provided with displayed data to manage the work force more efficiently.
90A CPS	The 90A Customer Premises System consists of a display and control station (102A1-B), an optional printer, and controller (79A1). The 90A CPS is used to reconfigure functional groups, reporting groups, invoking prestored packages, and obtaining peg count information.
QTL queue	A "queueing for trunks and lines" queue is a block of call store that temporarily stores and keeps track of the order of arrival of incoming ACD calls until they can be serviced by an agent.

18. REASONS FOR REISSUE

18.01 Not applicable.

19. REFERENCES

19.01 The following documentation contains information pertaining to or affected by features in this document.

A. Bell System Practices

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

(2) Section 231-090-167—Queueing For Trunks and Lines Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(3) Section 231-090-180—MultilineGroups—Hunting and No Hunting Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(4) Section 231-118-331—Centrex-CO Recent Change Procedures for CTXCB CTXDI, CTXEXR, CXDICH, DITABS, DLG, FLXDG, FLXRD, and FLXRS (CTX-6 Through 1E5 Generic Programs)—2-Wire No. 1 Electronic Switching System (when published)

(5) Section 231-118-322—Line Recent Change Procedures (Non-Centrex and Centrex) (CTX-6, Issues 2 and 3 Generic Programs)—2-Wire No. 1 Electronic Switching System

(6) Section 231-118-334—Line Recent Change Procedures (Non-Centrex and Centrex) (CTX-6, Issue 7 Generic Program)—2-Wire No. 1 Electronic Switching System

(7) Section 231-118-335—Line RC Procedures for LINE, TWOPTY, MPTY, SCLIST, MLGH, ACT, and CFV (CTX-7 Through 1E5 Generic Programs)—2-Wire No. 1 Electronic Switching System (when published)

(8) Section 231-318-309—Centrex-CO Recent Change Procedures CTXCB, CTXDI, CTXEXR, CXDICH, DITABS, DGL, FLXDG, FLXRD, and FLXRS (Through 1AE5 Generic Program)—2-Wire No. 1A Electronic Switching System

(9) Section 966-102-100—Business Customer Service (Centrex and PBX-CO)—General Description

(10) Section 981-341-100—90A Customer Premises System for Use With Automatic Call Distributor Functional Group Administration—General Description Information.

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

(12) Section 512-240-100—Key Mountings—400-, 1400-, and 2400-Series—30, 60, 90 and 120 Line Sizes, Identification and Selection

(13) Section 518-310-405—Station Line Concentrators 235- and 236-Type Key Telephone Units, Identification and Connections.

B. AT&T Letters

(1) GL 74-08-166—Availability of No. 1 ESS (2-Wire) Programs and Features—CTX-8

(2) GL 74-11-227—ACD Service From No. 1 ESS Status Report

(3) GL 74-02-078 (EL 3098)—No. 1 ESS Development of Types of Hunting Arrangements and Make-Busy Keys for Multiline Hunt Groups

(4) GL 77-05-134—Illustration ACD-ESS Pricing and Tariff Guidelines.

C. Traffic Facilities Practices

(1) Division D, Section 10a(5)—Dial Facilities, No. 1 Electronic Switching System—General Information—Service Features

(2) Division D, Section 1a(5)—Dial Facilities, No. 1A Electronic Switching System—General Information—Service Features (when published)

(3) Division D, Section 10g—Dial Facilities, No. 1 Electronic Switching System—Program Stores

(4) Division D, Section 11f(6)—Dial Facilities, No. 1A Electronic Switching System—Processor Community Engineering, Unduplicated Call Store

(5) Division D, Section 11f(7)—Dial Facilities, No. 1A Electronic Switching System—Processor Community Engineering, Program Stores

(6) Division D, Section 10j—Dial Facilities, No. 1 Electronic Switching System

(7) Division D, Section 11h—Dial Facilities, No. 1A Electronic Switching System—Centrex (when published).

D. Other References

(1) Translation Guide—TG-1A

(2) Input Message Manuals IM-1A001 (No. 1 ESS) and IM-6A001 (No. 1A ESS)

(3) Output Message Manuals OM-1A001 (No. 1 ESS) and OM-6A001 (No. 1A ESS)

(4) Translation Output Configuration—PA-591003 (No. 1 ESS) and PA-6A002 (No. 1A ESS) (changes planned)

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

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

(7) Electronic Switching Systems, No. 1 ESS Trunk and Service Circuit Engineering Specification, J1A063A-1

(8) FD 231-090-123—Delay Announcements—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(9) FD 231-090-336—ACD Multiline Group Hunt Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(10) FD 231-090-338—Tones and Announcements to Agents Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(11) FD 231-090-339—ACD Queueing and Distribution to Agents—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(12) FD 231-090-399—Automatic Call Distribution (ACD) Feature, Phase II Description—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(13) FD 231-090-411—Interface With Common Systems Recorded Announcement Frame Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(14) FD 231-090-414—Interface With 90A CPS and Coordinator CRT Terminal Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems (when published)

(15) FD 231-190-334—Automatic Call Distribution (ACD) Feature, Phase I Description—2-Wire No. 1 Electronic Switching System, Issue A, December, 1976

(16) FD 231-190-336—ACD Multiline Group Hunt Feature—2-Wire No. 1 Electronic Switching System, Issue C, September, 1976

(17) FD 231-190-337—Automatic Call Distribution (ACD) Agent and Supervisory Position Features—2-Wire No. 1 Electronic Switching System, Issue B, January, 1977

(18) FD 231-190-338—No. 1 ESS ACD Zip Tone, City-of-Origin Announcement, and Delay Announcement Features—2-Wire No. 1 Electronic Switching System, Issue A

(19) FD 231-190-339—Queueing and Routing Control Algorithms Features—2-Wire No. 1 Electronic Switching System, Issue B

(20) Parameter Guide—PG-1

(21) FD 231-190-340—Selected Traffic Data to Customer Feature—2-Wire No. 1 Electronic Switching System, Issue B, December 1976.