

**FEATURE DOCUMENT**  
**4-WIRE DIRECT ACCESS LINE FEATURE**  
**2-WIRE NO. 1 ELECTRONIC SWITCHING SYSTEM**

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**NOTICE**

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**FEATURE DEFINITION AND DESCRIPTION****1. DEFINITION/INTRODUCTION****DEFINITION**

**1.01** The 4-wire direct access line (DAL) feature provides a full 4-wire connection for individual telephone stations, key telephone stations, or voice frequency data sets from a private network customer location to the private network switch. Direct access lines provide for calls to other private on-network customer locations or off-network Message Telecommunications System (MTS) stations served by the same or different ESS switch location.

**INTRODUCTION**

**1.02** The DAL feature, which is a private network offering, requires a 4-wire HILO network. Initial application is for Enhanced Private Switched Communications Service (EPSCS).

**1.03** This document describes the DAL feature operation for the No. 1 ESS 1E5 generic program only. Any additional feature capabilities provided by later generic programs will be included in future issues of this document.

**1.04** The DAL feature utilizes the 4-wire HILO network to provide full 4-wire connections for on-network calls. Each DAL terminates on the HILO trunk link network (TLN). Calls to/from a DAL are switched from/to another 4-wire trunk on the HILO TLN. Thus all switching is trunk-to-trunk (tandem type) switching. The 4-wire HILO network is detailed in the documentation listed in reference A(1) in Part 19.

**1.05** Stations connected to the private network via a DAL are assigned a 7-digit network number. There is no MTS number assigned.

**1.06** Since a DAL terminates directly on the HILO TLN, off-hook is sensed as a service request from the private network station and an access code is not required. DAL station calling is characterized by one of the following:

- (a) Three- and 7-digit dialing for calls to other stations on the private network and 10-digit dialing for calls to off-network stations.

- (b) Direct connect service—Off-hook results in a connection with a predetermined on- or off-network station. Dialing is not required.

**1.07** Off-network calling from a DAL station is always via 10-digit dialing [3-digit Numbering Plan Area (NPA) + 3-digit central office code (NXX) + 4-digit station number (XXXX)]. Direct connect service, also called off-hook calling, is provided via the direct connect feature, which is described in the documentation listed in reference A(2) in Part 19.

**2. USER PERSPECTIVE****CUSTOMER**

**2.01** Whenever DAL stations are provided with dialing capabilities (i.e., not direct connect service), 3-, 7-, or 10-digit dialing is normally permissible. Exact dialing patterns are determined when the private network is established and may be:

- (a) 3-digit dialing for private network operator access or certain other private network arrangements, such as meet-me conferencing. Three-digit dialing is optional on a per customer network basis. If this option is not selected, network operator access is via a unique 7-digit on-network number; access is never via dial "0".

- (b) 7-digit dialing for on-network calls (mandatory). Each on network station, and possibly the network operator, are assigned a unique 7-digit number for on-network calling.

- (c) 10-digit dialing for calls directed to off-network stations (mandatory). However, the off-network calling capability is optional per customer location; for DALs, this capability is applied on a per trunk group basis.

**2.02** DAL station dialing, when required, may be via rotary dial or TOUCH-TONE®.

**2.03** *DAL stations provided with direct connect service* originate a call by going off-hook. The call terminates to a predetermined on- or off-network number. This number is changeable only by a service order to the telephone company. Also, such DAL stations are normally not equipped with dials. Any calling capabilities requiring the dialing of digits or "flashing" the

switchhook are *not* available to DAL stations, whether the station has a dial or not. Switchhook flashing is ignored by the ESS.

### 3. SYSTEM PERSPECTIVE

#### SOFTWARE DATA STRUCTURES

##### A. Translations

**3.01** DALs are provided via SD-1A364-01 or -02 trunk circuits. These circuits require changes in the trunk class code expansion. The layout is given in Fig. 1. Additionally, standard trunk group translations (not shown) are also required to provide DALs.

	22	19	18	17	10	9	8	7	0
TRANSLATION FOURTH WORD		P N T=1			O P				CPI = 114

PNT - PRIVATE NETWORK TRUNK = 1 (YES)  
 OP - OPERATOR BIT- IF SET, TRUNK SCANNING IS MAINTAINED AS LONG AS THE DAL STATION IS OFF-HOOK (FOR A TERMINATING CALL). THE TRUNK CIRCUIT IS NOT IDLED UNTIL THE DAL STATION GOES ON-HOOK

CPI - CIRCUIT PROGRAM INDEX = 01110010  
 (DECIMAL 114) FOR A DAL

Fig. 1—Trunk Class Code Expansion Changes

##### B. Parameters

**3.02** The DAL feature requires DAL ringing (RR3) registers to permit station ringing via software control of the SD-1A364 trunk circuit. Parameters relating the quantity of DAL ringing registers provided and the starting address of the block of registers are contained in the I4REGS table (Fig. 2).

##### C. Call Store

**3.03** DAL ringing registers are assigned in No. 1 ESS variable call store. Each register is 17 words in length. Symbol Y4HRR3 in the generic program is the address of the 2-word Compool-defined DAL ringing register head table in fixed call store (Fig. 2). The register layout is given in Fig. 3.

The register identifier of a DAL ringing register is 19.

#### HARDWARE

**3.04** DALs are provided via SD-1A364-01 or -02 trunk circuit. Additionally, F-type single frequency (SF) signaling units are required.

**3.05** A DAL trunk circuit utilizes E&M type II signaling. Four leads are required to connect to the SF signaling unit; E, M, SB, and SG. There are four circuit states:

- 0—idle
- 1—continuity check-talk
- 2—ring
- 3—receive digits

A typical sequence for DAL station originations is 0-1-3-1-0-1-0. A typical sequence for DAL station terminations is 0-2-0-1-0.

**3.06** During the idle state, lead E is tied to -48V, lead SG is grounded, and the E-SG loop is open. Lead M is shorted to lead SB, transmitting off-hook toward the signaling facility. During the ring state, the E-SG and M-SB loops are open.

**3.07** DAL station off-hook, either to answer a call or to originate a call, is represented by a closure of the E-SG loop. This closure is generated by the near-end SF signaling unit and results in the saturation of the scanner point associated with the trunk circuit; this informs call processing of the off-hook. Contrariwise, DAL station on-hook is represented by an open on the E-SG loop. A change of the E-SG loop from closed to open represents DAL station disconnect. On a given call, the DAL station remains connected until on-hook, although the other party may have gone on-hook and the other connections associated with the call may have been released.

#### FEATURE OPERATION

##### A. General

**3.08** For a call terminating to a DAL, the directory number (DN) translation yields a route index

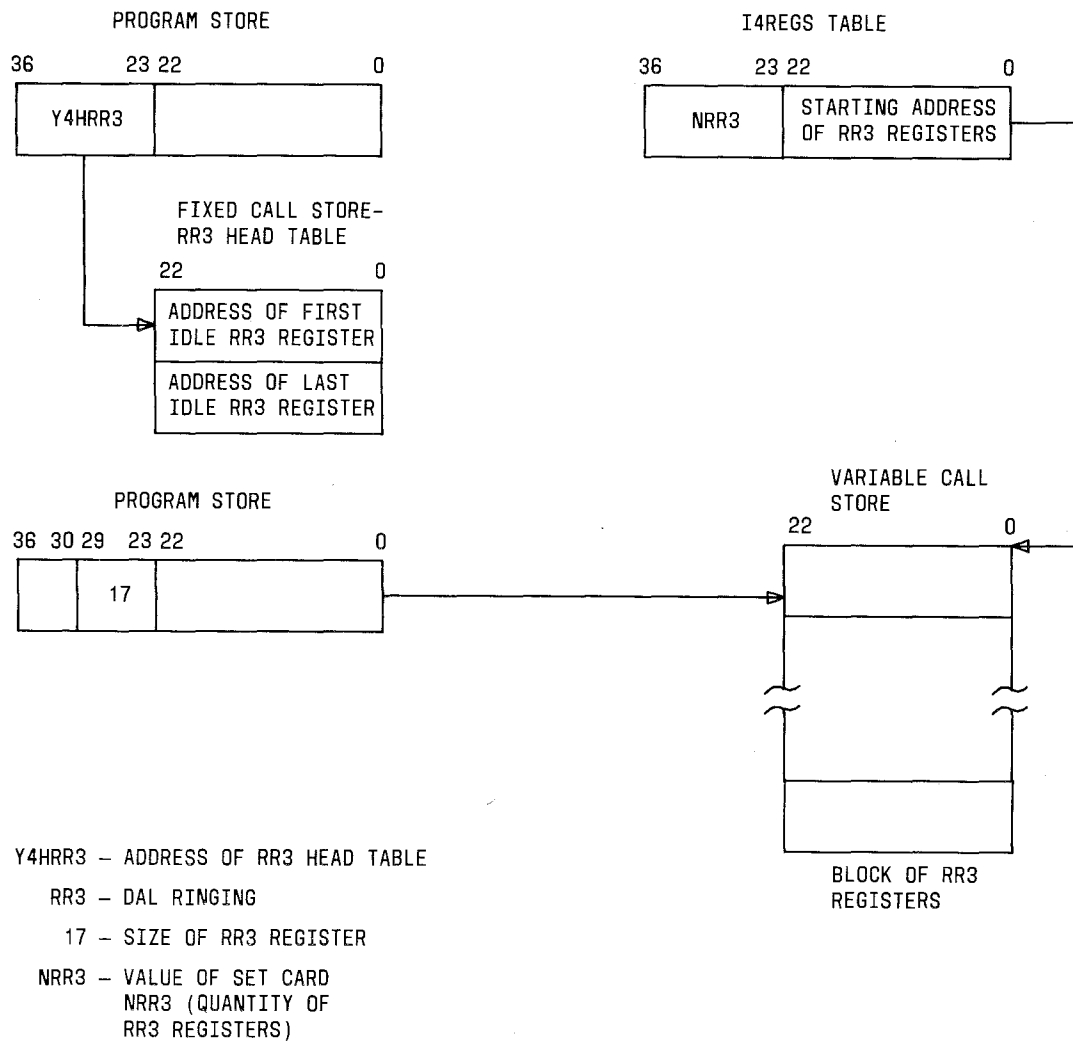


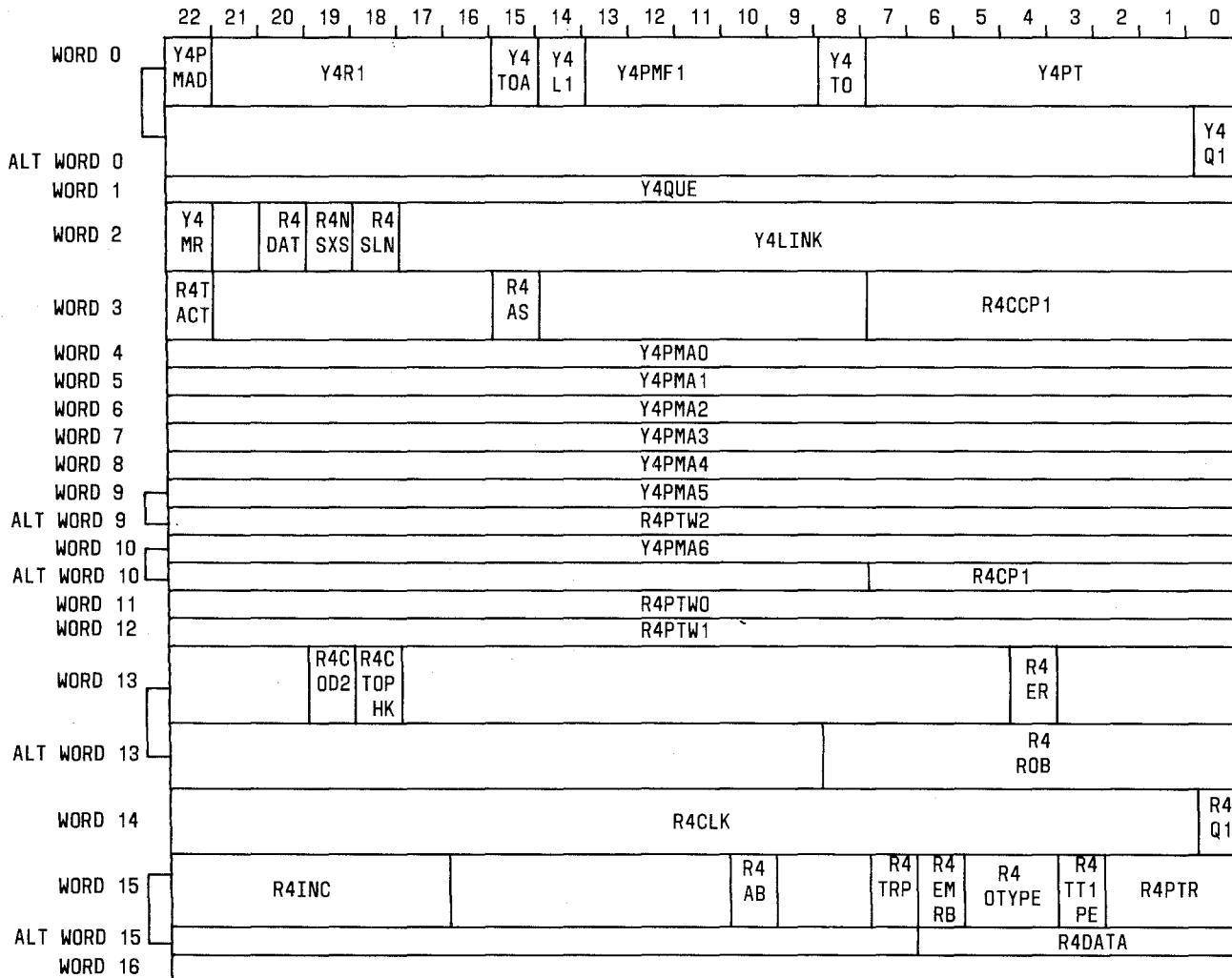
Fig. 2—Parameter and Call Store Layout for DAL Feature

which points to a trunk group containing a DAL or DALs for the called location. With the 1E5 generic program, the trunk group *must* contain only a single DAL if it is necessary to bill each DAL individually, access each DAL uniquely, or control the hunt on termination. Otherwise, the trunk group may contain multiple DALs.

**3.09** On a given call directed to a trunk group containing a single DAL, alternate routing may be used if the trunk group is busy. Alternate routing simply means that a new route index (and consequently a new trunk group) is yielded whenever the current trunk is busy. If all associated trunk groups are busy, busy tone is returned.

**3.10** On a given call directed to a trunk group containing multiple DALs, trunk hunting within the group is used whenever the first accessed DAL within the group is busy. With trunk hunting, the call is routed to the first idle DAL. If all DALs within the group are busy, alternate routing may be used. With multiple DALs in a single trunk group, there is no way to route a given call to a specific station, and trunk hunting is the only hunting arrangement available within the group. Also, for DAL station call originations, there is no way to uniquely identify the station placing the call; only the group is identified [via the DN associated with the screening line equipment number (LEN) assigned to the trunk group].

SECTION 231-190-133



NOTE: THE ITEMS SHOWN ARE UTILIZED FOR REGISTER INITIALIZATION. SOME ITEMS ARE NOT USED FOR CALL PROCESSING.

WORD 0 (STATE WORD).

Y4PT - PROGRAM TAG (= INDEX FOR PT TABLE).

Y4TO - TIMEOUT.

Y4PMFI - PATH MEMORY FORMAT INDICATION (REFLECTS PATH MEMORY IN REGISTER).

Y4LI - LINK INDICATOR (= 1, IF LINK WORD IS BEING USED TO LINK THE REGISTER WITH ANOTHER REGISTER).

Y4TOA - TIME OUT ANNEX

Y4RI - REGISTER IDENTIFIER (INDEX FOR TABLE CONTAINING PT TABLE ADDRESSES).

Y4PMAD - PATH MEMORY ANNEX (= 1, IF PATH MEMORY IS DISPLACED).

Y4QI - QUEUE INDICATOR (= 1, IF REGISTER IS ON A QUEUE OR IS IN GENERAL PURPOSE TIMING

WORD 1. (QUEUE WORD).

Y4QUE - QUEUE WORD (USED TO LINK THE CALL REGISTER IN A QUEUE).

WORD 2. (LINK WORD).

Y4LINK - LINK WORD CONTAINS ADDRESS OF REGISTER LINKED TO RR WHEN "Y4LI" = 1).

Y4MR - MASTER REGISTER (= 1, IF REGISTER IS MASTER REGISTER).

Y4SLN - SLN INDICATOR.

R4MSAS - NON-SXS CALL INDICATOR.

R4DAT - (= 1, ALLOW DON'T ANSWER TRANSFER (= 0, DON'T ALLOW). FOR INTRA, DAT = 1, IF 0C4CTX = 0 AND BIT 6 OF DNCL = 1 OR 04CTA = 1, 04DAT = 1 AND BIT 6 OF DNCL = 1. FOR INTER, DAT = 1 IF 04BDIN = 1 AND BIT 6 OF DNCL = 1

Fig. 3—DAL Ringing Register Layout (Sheet 1)

## WORD 3. (SCAN WORD).

R4CCP1 - CIRCUIT PROGRAM INDEX (CONTAINS CPI OF INCOMING TRUNK FOR INC CALL) OR ALL ZEROES.  
 R4AS - ANSWER SIGNAL (= 1, WHEN AN ANSWER SIGNAL IS TO BE RETURNED TO THE OUTSIDE OFFICE).  
 R4TACT - TIMING ACTIVITY (= 1 = ACTIVE, AFTER RINGING HAS BEEN SUCCESSFULLY CONNECTED AND REGISTER MAY BE TIMED-OUT.  
 = 0 = IDLE, RINGING NOT CONNECTED OR CONNECTION IS TO BE REMOVED).

## WORD 4.

Y4PMA0 - PATH MEMORY ANNEX 0.

## WORD 5.

Y4PMA1 - PATH MEMORY ANNEX 1.

## WORD 6.

Y4PMA2 - PATH MEMORY ANNEX 2.

## WORD 7.

Y4PMA3 - PATH MEMORY ANNEX 3.

## WORD 8.

Y4PMA4 - PATH MEMORY ANNEX 4. (UPON ENTRY FROM DAL OR DAT PROGRAM CONTAINS DNCL (= C(F4OUT 1) FROM DN TRANSLATION) BEFORE THE CIN TO CONNECT RINGING AND AUDIBLE FOR AN INTRA ON INCOMING CALL).

## WORD 9.

Y4PMA5 - PATH MEMORY ANNEX 5 (WHEN NOT USED FOR PBA: CONTAINS C(F4OUT4) OUTPUT FROM DN TRANSLATION (= 0 IF NO AUXILIARY CIRCUIT ASSOCIATED WITH TERMINATING LINE).

## WORD 10.

Y4PMA6 - PATH MEMORY ANNEX 6 (WHEN NOT USED FOR PMA: (CONTAINS C(F4OUT5) OUTPUT FROM DN TRANSLATIONS, (= 0, IF NOSCP1 IS ASSOCIATED WITH TERM LINE) OR (CONTAINS SPECIAL RINGING AUXM OF SPECIAL RING TRUNK FOR REVERTING RINGING).  
 R4CP1 - CIRCUIT PROGRAM INDEX (CONTAINS CP1 OF INCOMING TRUNK FOR CALL).

## WORD 11.

R4PTW0 - AUDIBLE PTW.

## WORD 12.

R4PTW1 - DAL (OUTGOING TRUNK) CPI.

## WORD 13.

R4ER - 1 = THE B RELAY OF THE SD - 1A364 CIRCUIT IS OPERATED.  
 R4TOPHK - 1 = THE INCOMING TRUNK IS OFF-HOOK (DONE BEFORE PIDENT RING GETS CONTROL OF THE CALL).  
 R4COD2 - 0 = TERMINATING PARTY GETS CODE 1 RINGING. 1 = TERMINATING PARTY GETS CODE 2 RINGING.  
 R4ROB - RELAY OPERATE BITS.

## WORD 14.

R401 - 1 = THIS REGISTER IS ON TIMING - A SPECIAL 200MS TIMING SCHEME FOR SPECIAL RINGING REGISTERS.  
 R4CLA - A NUMBER WHICH DETERMINES WHEN THIS REGISTER WILL TIME OUT. THIS NUMBER IS THE CURRENT VALUE OF THE 100MS COUNTER PERIOD PLUS THE NUMBER OF 100MS INTERVALS REQUIRED TO GIVE TIMING DESIRED.

## WORD 15.

R4PTR - POINTER TO RINGING TRANSITION SUBTABLE.  
 R4TYPE - SAME AS R4COD2. USED AS PART OF R4DATA.  
 R40TYPE - ORIGINATING PARTY TYPE: 00 = NOT REVERTING CALL. 01 = REVERTING, AC-DC RINGING. 10 = REVERT SUPERIMPOSED RINGING, CODE 1. 11 = REVERTING, SUPERIMPOSED RINGING, CODE 2.  
 R4EMRB - 1 = EMERGENCY RINGBACK CALL.  
 R4TRP - 1 = A RING TRIP HAS OCCURRED.  
 R4AB - 1 = AN ABANDON HAS OCCURRED.  
 R4INC - THE AMOUNT OF TIME REQUIRED FOR THE NEXT RINGING ON SILENT PERIOD (SPECIFIED IN NUMBER OF 100 INTERVALS).  
 R4DATA - INDEX TO RINGING TRANSITION TABLE. R4DATA CONTAINS R4EMRB, R40TYPE, R4TYPE, R4PTR.

## WORD 16. - PRESENTLY UNUSED.

Fig. 3—DAL Ringing Register Layout (Sheet 2)

**B. DAL Station Termination**

**3.11** Terminating calls to DAL stations indicated as "denied termination" do not utilize the DAL feature. Calls directed to such stations are routed to an announcement via normal DN translations.

**3.12** Signaling (actually station ringing) is controlled by the DAL feature package, which operates and releases the SD points associated with the applicable SD-1A364 trunk circuit. SD point operation controls the state of two relays in the trunk circuit, which results in alternately transmitting ground (2600 Hz) over the signaling facilities at a rate of two seconds on and four seconds off until answer or abandon. The SF signaling unit nearest the called station causes ringing in accordance with the ground signal. A central office ringing circuit is not used to ring a DAL station.

**3.13** DAL stations allowed to receive calls are identified in DN translations by a terminating major class code (TMAJ) of 28 (which causes entry into the DAL program). The DAL program seizes a peripheral order buffer (POB) and RR3 register. Audible ringing is returned to the calling party from the central office. The POB is loaded with orders to ring the DAL station and RR3 is loaded with the data required for ringing. Initially RR3 is loaded with "ringing" data. At POB execution, signal distributor points are operated for two seconds, which causes ringing for two seconds. RR3 is then placed on timing for four seconds, after which the ringing sequence is repeated.

**3.14** The DAL program recognizes DAL station answer (ringing trip) during either the ringing or silent interval (via the scanner point associated with the E-SG loop). After ringing is tripped, the audible ringing circuit and RR3 register utilized are released.

**3.15** If an incoming trunk used for a call directed to a DAL station abandons, the call if on queue is taken off-queue; if ringing is in progress, both audible and program-controlled ringing are stopped. All utilized facilities are released.

**3.16** On calls completed to a DAL station, the DAL station remains connected until on-hook (open E-SG loop). After on-hook, guard timing is performed.

**C. DAL Station Origination**

**3.17** DAL station call origination is essentially the same as other 4-wire private network call originations. The universal trunk scanner number-to-trunk network number (UTSN-to-TNN) translation yields the associated TNN; the TNN-to-peripheral equipment number (TNN-to-PEN) translation yields the applicable frame and bay numbers; the TNN-to-trunk group number (TNN-to-TGN) translation yields the TGN and trunk class code (TCC); the screening LEN is obtained from the TGN auxiliary block.

**3.18** Translation on the screening LEN yields the associated chart column, screening directory number, and an originating major class code (OMAJ). The DAL feature checks OMAJ to ascertain if it represents denied origination. If so, dial tone is not returned and a digit receiver is not attached to the call. If OMAJ represents a private network, trunk class code data is checked to ascertain the inpulsing type if any. If inpulsing is indicated, the appropriate digit receiver (dial pulse or dial pulse/TOUCH-TONE) is attached, dial tone is returned, and the call proceeds the same as other private network calls.

**3.19** DAL stations may utilize direct connect calling. In this case, dial tone is not returned and a digit receiver is not required; the indicated inpulsing type is "none". Details of direct connect calling are given in the documentation listed in reference A(2) in Part 19.

**FEATURE ATTRIBUTES**

**4. APPLICABILITY**

**4.01** The DAL feature is available as a part of the EPSCS feature group with the No. 1 ESS 1E5 and later generic programs. The DAL feature is a package and therefore loadable on a per office basis. This feature is not currently available with any generic programs for No. 1A ESS.

**4.02** The DAL feature is applicable on a per trunk group basis. With the 1E5 generic program, each DAL which requires a unique originating or terminating treatment also requires a separate trunk group. DALs (for a given customer) which require the same originating and terminating treatment may be in the same trunk



group. The associated trunk circuit must be an SD-1A364.

## 5. LIMITATIONS AND RESTRICTIONS

### OPERATIONAL

5.01 With the 1E5 generic program, if multiple DALs are assigned to a single trunk group, then:

- (a) A DAL station (within the group) originating a call cannot be uniquely identified.
- (b) A given DAL station (within the group) is accessible only via a trunk hunting sequence; a call cannot be routed to a specific DAL station.

### ASSIGNMENT

5.02 Each trunk group containing a DAL(s) is accessed by a route index obtained via DN translation. The associated DN **must** be a 7-digit private network number. If calling to a DAL station is via:

- (a) 7-digit dialing, the 7-digit private network number is the dialed DN.
- (b) The direct connect feature, the 7-digit private network number is obtained from a speed calling list.
- (c) 3-digit dialing, the 7-digit private network number is obtained via expansion of the dialed digits, using call type 28.

5.03 Each DAL trunk circuit must be assigned as 2-way.

## 6. COMPATIBILITY AND INTERACTIONS

### DYNAMIC INTERACTIONS WITH OTHER FEATURES AND HARDWARE

6.01 An office providing switching for EPSCS may also provide other services, such as Wide Area Telecommunications Service (WATS), Common Control Switching Arrangement (CCSA), and/or MTS. If EPSCS and CCSA are provided by the same office and if the DAL feature package is loaded, then the DAL feature is available for use with 4-wire CCSA customers. With CCSA, DAL station originations cause an automatic message

accounting (AMA) sample record (type of entry 09) to be generated whenever the AMA bit in the screening LEN translation is set.

## 7. COST FACTORS

### MEMORY

#### A. Fixed

7.01 The memory listed below is required whether or not the DAL feature is used:

- Generic program (program store): Approximately 30 words (18 words overhead and 12 words for "hooks").
- Parameter (program store): 3 words—1 word which contains the address of the RR3 head table; 1 word which contains the length of the RR3 registers; and 1 word in the I4REGS table.
- Call Store: 2 words for the RR3 head table.

#### B. Conditional

7.02 The memory listed below is required when the DAL feature is provided in the office:

- Generic program (program store): 342 decimal words loaded plus 2 words overhead and 104 words of patch memory for a total of 448 words.

#### C. Variable

7.03 The memory listed below is required when DALs are provided to a customer:

- Call Store: A block of variable call store to serve as RR3 registers. The size of the block equals 17 times the value of set card NRR3.
- Translation (program store):
  - (a) 3 or 4 words in LEN translations to provide screening LEN data for the associated trunk group. Trunk groups with different screening requirements must be assigned different screening LENs. Four

words are required if the direct connect feature is provided.

(b) Cost of the direct connect feature, if provided. See reference A(2) in Part 19 for details.

(c) 1 word in the DN subtranslator to deny call termination to a screening LEN. One word is required for each screening LEN utilized.

(d) One or more chart class column tables, depending upon the screening arrangement used. Each table is 33 or 65 words in length.

(e) 5 word in the rate and route pattern expansion table for each unique normalized office code utilized.

(f) 1 word in the number group number table for each unique number group number utilized.

(g) 6 words for DN translations.

(h) 2 words in the route index expansion for each route index utilized.

(i) 4 word for each trunk class code expansion utilized.

(j) 4 words for a trunk group number auxiliary block. This cost is per trunk group utilized.

(k) 1 word in the trunk network number-to-peripheral equipment number (TNN-to-PEN) subtranslator.

#### HARDWARE

7.04 Hardware costs are given in Part 10.

#### PROCESSOR TIME

7.05 The following cycle counts are for DAL station terminations requiring exactly two rings. Each additional ring requires 430 cycles.

(a) Network trunk-to-DAL—8425 cycles

(b) Access line-to-DAL—9800 cycles

(c) DAL-to-DAL—9750 cycles

(d) ONAL-to-DAL—8700 cycles.

7.06 The following cycle counts are for DAL station originations:

(a) DAL-to-network trunk—7275 cycles

(b) DAL-to-access line—7175 cycles

(c) DAL-to-DAL—9750 cycles

(d) DAL-to-ONAL—7450 cycles.

#### 8. AVAILABILITY

8.01 The DAL feature package is available as a part of the EPSCS feature group with the 1E5 and later generic programs. This feature is not available with any of the No. 1A ESS generic programs.

### CONSIDERATIONS FOR INCORPORATION OF FEATURE INTO SYSTEM

#### 9. PLANNING

9.01 No special planning is required to provide the DAL feature to a private network customer. However, a parameter update is required to allocate RR3 registers and the length of the ringing register queue. Additionally, floor space for F-type SF signaling units should be arranged.

#### 10. HARDWARE

10.01 DALs are SD-1A364-01 or -02 trunk circuits and are mounted on the HILO Universal Trunk Frame in accordance with J1A090BM. The order code is 11400; the circuit program index (CPI) is 114, and the supervisory program index (SPI) is 34. There are two circuits per unit. Each circuit requires two signal distributor (SD) points and two HILO universal trunk scanner points. There is one trunk network termination per circuit.

10.02 Because of component changes, the SD-1A364-01 trunk circuit is rated "manufacture discontinued." However, this circuit is functionally identical to the SD-1A364-02 trunk circuit.

**11. DETERMINATION OF QUANTITIES****HARDWARE**

**11.01** Each individual access station, key telephone station, and voice frequency data set connected to a 4-wire private network requires an SD-1A364 trunk circuit. These trunk circuits are provided on the basis of customer request. Normal provisioning for customer growth and equipment spares should be considered.

**11.02** DAL station dialing may be via dial pulse or TOUCH-TONE. Consequently, digit reception is normally via dial pulse/TOUCH-TONE receivers. If a given customer utilizes dial pulse for all DALs terminating on a given No. 1 ESS switcher, digit reception may be provided via dial pulse or dial pulse/TOUCH-TONE receivers, as determined locally. Digit receivers are engineered according to existing criteria given in reference C(2) in Part 19; an update may be required to accommodate DAL station originations.

**MEMORY**

**11.03** DAL ringing registers are allocated via parameter set card NRR3. The set card value is determined according to P.001 blocking, using hundred call seconds (CCS) computed as follows:

- (a) The number of DAL trunk circuits times
- (b) the average number of call attempts per hour per DAL times (c) the average holding time per attempt (default value is 13 seconds when exact data is not available) times (d) the call peak factor (high day/average busy season) times (e) 0.01 CCS factor.

**11.04** The limit of DAL ringing register queue entries is specified via parameter set card DRQ. The set card value is determined in accordance with Table A.

**12. ASSIGNMENT AND RECORDS****ASSIGNMENT RECOMMENDATIONS AND GUIDELINES**

**12.01** Whenever possible, all DALs for a given private network customer in a given office should be assigned to the same NXX and thousands group. This thousands group may also contain the screening DN's associated with screening LENs.

The given NXX must be unique in that No. 1 ESS machine; it may not be the same as an MTS NXX served by the EPSCS office and may not be the NXX for DALs of any other private network customers served by the same office.

**12.02** For a call terminating to a DAL, the trunk group containing the DAL(s) is accessed via a route index obtained by DN translation. The associated DN *must* be a 7-digit private network number. For a call originating from a DAL, the required screening LEN is contained in the trunk group translator; this screening LEN also has an associated DN. Thus, every DAL has two DN's; a 7-digit private network DN and a screening DN. Since the 7-digit private network DN is required for message detail data furnished to the customer, every screening LEN associated with a DAL is required to have a "special billing" DN, that is, in fact, the 7-digit private network DN.

**12.03** All DAL trunks must be assigned as 2-way trunks. DAL one-way incoming service is provided by assigning a denied terminating major class code (TMAJ) of 22 in the DN translation. DAL one-way outgoing service is provided by assigning a denied originating major class code (OMAJ) of 03 in the LEN translation.

**12.04** Except for the TMAJ 22, all DALs must have a TMAJ 28. Except for the OMAJ 03, all DALs must have an OMAJ 28 or 33.

**INPUT AND RECORD KEEPING****A. Translation Forms**

**12.05** The following ESS translation forms, detailed in reference C(1) in Part 19, are applicable to the DAL feature.

- (a) ESS 1101—Directory Number Record—Correlates directory numbers with line equipment numbers, including screening data.
- (b) ESS 1107—Supplementary Information Record—Contains pertinent data which could not be included on ESS 1101. This form is used for entries for the direct connect feature.
- (c) ESS 1202—Trunk Group Record: Provides TNN to trunk group and trunk member number translations for all trunks.

**TABLE A**  
**RINGING REGISTER QUEUE SIZE**

QUANTITY OF DAL RINGING REGISTERS	QUEUE SIZE	QUANTITY OF DAL RINGING REGISTERS	QUEUE SIZE
3	3	54	23
5	4	57	24
7	5	60	25
9	6	64	26
11	7	67	27
13	8	71	28
15	9	74	29
17	10	78	30
20	11	82	31
22	12	85	32
25	13	89	33
28	14	92	34
30	15	96	35
33	16	100	36
36	17	103	37
39	18	107	38
42	19	111	39
45	20	115	40
48	21	120	41
51	22	or more	

(d) ESS 1203A—Trunk Network Number Record:  
Relates the TNN to the trunk group and trunk frame location.

(e) ESS 1204—Trunk Class Code Data: Specifies data for trunk class code expansion tables. The private network trunk bit and the operator bit should be set. The CPI is 114.

(f) ESS 1208—Trunk Screening Group Record—Supplies the data required for trunk screening.

(g) ESS 1216—Trunk Group Supplementary Record: Provides proper input level (TP0 or TP2) for all HILO trunks.

(h) ESS 1220—Universal Trunk Frame (HILO) Record: Relates the HILO universal trunk equipment locations on a frame basis to the corresponding trunk network appearances and the HILO universal trunks assigned to these equipment locations.

(i) ESS 1304—Rate and Route Chart—Provides screening data for call routing.

(j) ESS 1305—Rate and Route Pattern Record—An office record which shows the relationship between the screening data on ESS 1304 and the route indexes on ESS 1303.

(k) ESS 1306—Line Class Code Record—Used to establish line class code (LCCs) for various types of service. Also used to establish LCCs for screening LENS. OMAJs and TMAJs combinations allowed with DAL LCCs are:

(1) OMAJ 03, TMAJ 28

(2) OMAJ 28, TMAJ 28

(3) OMAJ 33, TMAJ 28

(4) OMAJ 28, TMAJ 22

(5) OMAJ 33, TMAJ 22

(l) ESS 1400—Traffic Register Assignment Record—Used to request traffic measurements. Measurements are described in Part 15.

(m) ESS 1501 —Office Code Record—Assigns a normalized code to each NXX and assigns rate centers on a per 1000-number basis.

#### UNIFORM SERVICE ORDER CODES (USOCs)

**12.06** If a DAL station is provided with off-network calling privileges at the originating private network switch, the USOC is NLO (local off-network). The USOC for all other DAL service is NP1.

#### 13. NEW INSTALLATION AND GROWTH

**13.01** DAL growth/retrofit procedures are given in Fig. 4.

#### 14. TESTING

**14.01** Teletypewriter input and output messages, found in the No. 1 ESS Input Message Manual [reference C(4) in Part 19] and Output Message Manual [reference C(5) in Part 19], respectively, may be used to verify the DAL feature. These messages are given in Table B.

**14.02** Test calls may be made to verify proper operation of the DAL feature.

#### 15. MEASUREMENTS

**15.01** Standard trunk group measurements are available with DALs. DAL ringing register peg, overflow, and usage counts are available with type measurement code (TMC) 05. The applicable equipment group or office count numbers (EGOs) are:

- (a) EGO 398—Usage
- (b) EGO 399—Peg
- (c) EGO 400—Overflow

#### 16. CHARGING

**16.01** AMA records are not required for charging the DAL feature. In some cases a CCSA sample entry may be recorded on AMA tape. See Part 6.

### SUPPLEMENTARY INFORMATION

#### 17. GLOSSARY

**17.01** Not applicable.

#### 18. REASONS FOR REISSUE

**18.01** Not applicable.

#### 19. REFERENCES

##### A. Bell System Practices

(1) Section 231-090-366—Feature Document—HILO 4-Wire Switching Feature, 2-Wire No. 1 and No. 1A Electronic Switching Systems

(2) Section 231-090-173—Feature Document—Manual Line Service, 2-Wire No. 1 and No. 1A Electronic Switching Systems

(3) Sections 231-118-323—Trunk Translation Recent Change Procedures For TG, TGBVT, TRK, CFTRK, and TGMEM (CTX-6 through 1E5 Generic Programs)—2-Wire No. 1 Electronic Switching System

(4) Section 231-118-325—RC Procedures for PSWD, GENT, PSBLK, and SUBTRAN (CTX-6 through 1E5 Generic Programs)—2-Wire No. 1 Electronic Switching System

(5) Section 231-118-324—Rate and Route Translation Recent Change Procedures for NOCNOG, DNHT, NOGRAC, RATPAT, DIGTRN, CCOL, RI, CHRGX, DITABS, TNDM, IDDD, and TDXD (CTX-6 through 1E5 Generic Programs)—2-Wire No. 1 Electronic Switching System

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

(7) Section 231-190-127—Feature Document—Enhanced Private Switched Communications Service (EPSCS) Feature, 2-Wire No. 1 Electronic Switching System (when published.).

##### B. Circuit Descriptions and Schematic Diagrams

(1) CD- and SD-1A364-01 or -02.

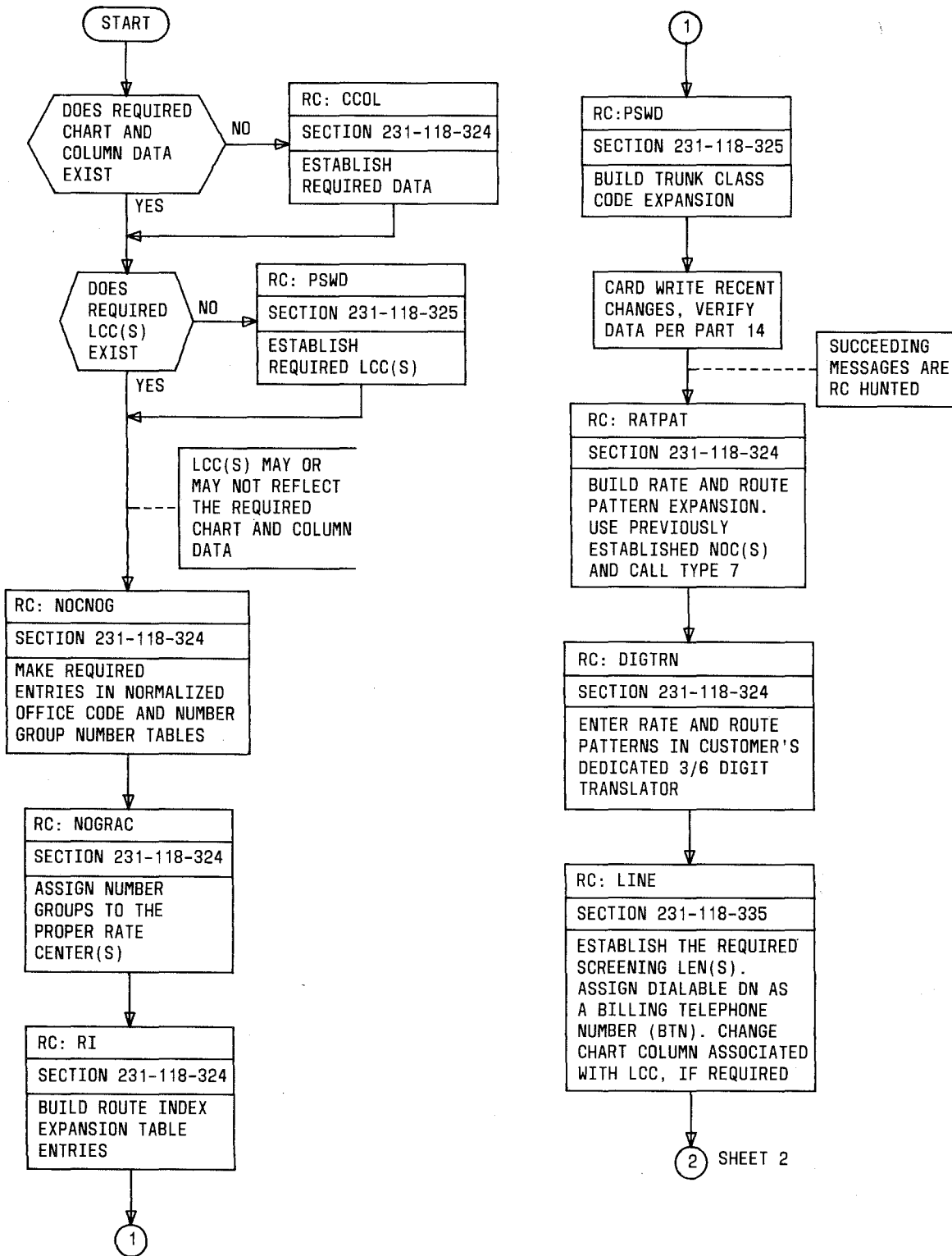
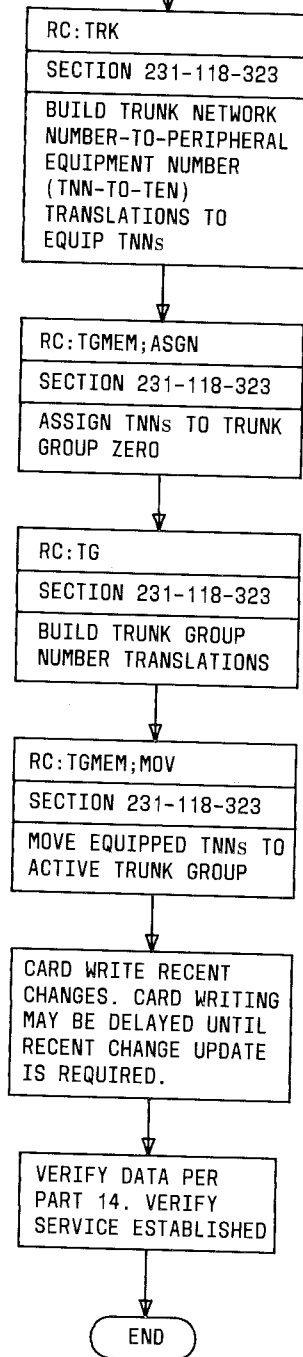


Fig. 4—DAL Feature Growth/Retrofit Procedures (Sheet 1)

2 SHEET 1



C. Other Documentation

- (1) Translation Guide TG-1A
- (2) Parameter Guide PG-1—No. 1 Electronic Switching System
- (3) Translation Output Configuration PA-591003—No. 1 Electronic Switching System
- (4) Input Message Manual, IM-1A001, No. 1 Electronic Switching System
- (5) Output Message Manual, OM-1A001, No. 1 Electronic Switching System.

Fig. 4—DAL Feature Growth/Retrofit Procedures (Sheet 2)

TABLE B

## DAL VERIFICATION INPUT/OUTPUT MESSAGES

TO VERIFY	USE TTY MESSAGE	SYSTEM RESPONSE
1. Rate Center assignments	T-READ	TWO2
2. Trunk class code expansion	TAG-TNN-TCL T-READ	TR21 TWO2
3. Route index assignments	VFY-EXP-	TRO5
4. Rate and route pattern number assignments	VFY-OFFC-	TRO4
5. Line and/or LEN assignments	VFY-LEN-	TR03
6. Trunk network numbers	VTY-TNN-	TR14
7. Trunk group numbers	VF-TKGN-	TR10



**FEATURE DOCUMENT**  
**4-WIRE DIRECT ACCESS LINE FEATURE**  
**2-WIRE NO. 1 ELECTRONIC SWITCHING SYSTEM**

Comments concerning content, usability, and adequacy of this feature document will be welcomed. This sheet may be removed and mailed directly to Bell System Practices Organization.

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