

AT&T Co Standard

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50A. CUSTOMER PREMISES SYSTEM

TROUBLE-LOCATING PROCEDURES

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1. INTRODUCTION

1.01 This section provides information to locate troubles associated with the 50A Customer Premises System (CPS). This section is intended for use in analyzing trouble reports, identifying apparatus associated with a failure symptom, and isolating a faulty component.

1.02 This section is reissued to:

- Identify interface of 50A CPS with No. 2 Electronic Switching System (ESS) central office (CO)
- Change 840343339 network assembly to 841226038 network assembly which is used to delay hold release when 429B key telephone units (KTUs) are used in the system. Changes required to Table A
- Include circuit pack (CP) AE34 as a replacement for KTU 429B. Changes required to Table B

- Identify 400G KTU as a replacement for 400D KTU. Changes required to Table B
- Include Table C—Panel Test Failures.

1.03 The 50A CPS is an attendant(s) facility used with a No. 1 or No. 2 ESS CO to provide private branch exchange (PBX-type) and Centrex-type service.

1.04 The system consists of:

- (a) Console(s)
- (b) Modular panels equipped with CPs and KTUs
- (c) Power unit(s)
- (d) A centralized terminal field.

1.05 No switching is done at the equipment located on the customer premises. Switching occurs at the No. 1 or No. 2 ESS CO in response to signals from the console(s) or station sets. Equipment located on the customer premises provides supervisory functions.

1.06 This information supplements information in schematic drawings (SDs), circuit descriptions (CDs), and other sections (referenced in Part 3) which give a complete description of the 50A CPS.



*Notify console attendant(s) before starting trouble-locating procedures and after trouble is cleared.*

1.07 This issue of the section is based on drawings listed in Part 3. If this section is to be used with equipment or apparatus reflecting later issue(s) of the drawing(s), reference should be made to SDs and CDs to determine the extent of changes and the manner in which the section may be affected.

NOTICE

Not for use or disclosure outside the Bell System except under written agreement

**2. TROUBLE-LOCATING PROCEDURES**

**A. General**

**2.01** Consider the following factors when analyzing trouble.

- (a) Loop start.
- (b) A BLF (busy lamp field) lamp (when provided) lights only while the associated station is off-hook.
- (c) Station loops connect directly to the No. 1 or No. 2 ESS CO.
- (d) Console loops connect to the No. 1 or No. 2 ESS CO via 400D or 400G KTUs.
- (e) A JN1 or JM1 CP is mounted in each console. The HK6 CPs are located in the 722A modular panel(s). All other KTUs and CPs listed in Tables A and B are located in the 720A modular panels.
- (f) All consoles used with the system are equipped for TOUCH-TONE® calling.
- (g) The system provides one-way splitting. On an attendant-completed call, only the calling party can be split off the 3-way connection. The called party cannot be split off.
- (h) Multiconsole systems do not share KTUs or CPs, except HK6 and AE33 CPs (when provided).
- (i) With multiconsole direct station selection (DSS) or BLF only systems, separate power units are provided for each console.
- (j) Each power unit contains an interrupter.
- (k) The interrupter controls lamp flash (60 IPM) and lamp wink (120 IPM). It does not control the tone ringer.

**2.02** If commercial power fails on a system without a 104B power unit (battery reserve), stations are not affected but most console functions fail. (See Table A, failure symptoms for power units.)

**2.03** The procedure used to locate trouble assumes that:

- (a) The system is completely installed and has been working properly.
- (b) There is one trouble.
- (c) Trouble tests towards the 50A CPS, not towards the No. 1 or No. 2 ESS CO.
- (d) The power unit is connected to a properly functioning commercial 117V ac circuit.
- (e) The console(s) is being operated properly.

**2.04** Four loop test lamps are furnished with each 720A modular panel. Each loop test lamp duplicates the functions of a console loop key lamp and can be used to:

- (a) Distinguish a loop key lamp or trunk group busy (TGB) lamp fault (eg, will not light) from a lamp circuitry fault (KTUs, CPs, wiring).
- (b) Monitor the progress of a call.
- (c) Verify the idle state of a loop before replacing a CP or KTU.
- (d) Provide indications of loop status when circuit functions are simulated from the panel location.

**2.05** For example [2.04(d)], to test a loop key lamp flutter circuit from a 720A panel connecting block:

- (1) Short A and A1 terminals (loop test lamp steady).
- (2) Short tip (T) and ring (R) (console) terminals.
- (3) Remove A to A1 short. (Loop test lamp flutters.)
- (4) Remove T to R (console) short.
- (5) Momentarily short T and R (CO) terminals (loop test lamp extinguished).

**2.06** One monitor lamp is furnished with each 722A modular panel. The lamp (when

temporarily connected) duplicates a console(s) BLF lamp function and can be used to:

- (a) Distinguish a BLF lamp fault (eg, will not light) from a BLF lamp circuitry fault.
- (b) Verify the busy or idle condition of a station from the panel location.

**2.07** For example [2.06(a)], to test a station line busy circuit (part of HK6 CP) from a 722A panel connecting block:

- (1) Temporarily connect monitor lamp terminal to L terminal associated with idle station.
- (2) Short R terminal to T terminal of same station line. (Monitor lamp lights steadily.)
- (3) Remove temporary connections from monitor lamp to L terminals and R to T terminals.

**Note:** Two spare station line busy circuits are furnished with each fully equipped 722A panel and should be used as replacements for any defective station line busy circuits. This procedure will minimize the necessity for HK6 CP replacement. Tag defective circuit T, R, L terminals at 722A panel termination field so that it will not inadvertently be reused.

## B. Clearing Trouble

**2.08** Tables A and B show the method used to clear trouble. After each KTU or CP replacement, check to see whether or not the trouble is cleared. If the trouble is not cleared, replace the original KTU or CP and proceed to the next replacement or action in the clearing sequence.



**Make sure a replacement 400D or 400G KTU, JN1 CP, or JM1 CP has the same options (841226038 network and/or straps) as the KTU or CP being replaced.**

### 2.09 Table A

- (a) Lists failure symptoms.
- (b) Identifies main apparatus functions in the trouble area.

- (c) Shows the number of loops, consoles, or circuits per unit.
- (d) Identifies location of apparatus.

**Warning:** *Replace a blown fuse only with another fuse of the same type. (Spare fuses are located in each modular panel.) If the second fuse blows, refer to SDs and CDs (Part 3) to locate the fault.*

**2.10** When using Tables A and B to analyze which KTUs, CPs, or fuses may be involved with a fault, note that loop control is a main function of the HK5 CP (four loops), the AE32 CP (four loops), and the 400D or 400G KTU (one loop). The HK5 CP also provides common circuitry.

**2.11** The following example shows how Table A may be used to clear a trouble.

#### Example:

- (a) Trouble reported is "no wink indication" (when loop is held) on a loop key lamp.
- (b) Inspection shows remaining loop key lamps (when loops are held) wink normally.

Reference to Table A shows:

- The failure symptom is listed for the 429B KTU or AE34 CP.
- The 429B KTU or AE34 CP is located in a 720A panel.
- Removal of a 429B KTU or AE34 CP will affect two loop circuits.
- Replacement of the 429B KTU or AE34 CP associated with the loop reported to be in trouble should clear the trouble.

**2.12** Most of the 50A CPS circuits involve several KTUs/CPs. If the replacement procedure listed (or if a failure symptom does not appear) in Table A fails to remedy or isolate the trouble, refer to Table B.

### 2.13 Table B

## SECTION 540-580-302

- (a) Itemizes functions involved with the progress of an incoming (call announced privately or call not announced privately) or outgoing call.
- (b) Lists functions involved for establishing night service and the TGB lamp feature.
- (c) Lists verifications that should occur for each stage in the progress of a call.
- (d) Assigns a priority number to the trouble-clearing sequence for each verification failure.

**2.14** The AE32 CP is not used for loop control (2.10) with loops 0-3. If trouble reported is on one of these loops, ignore step number (replacement sequence) for the AE32 CP and proceed to the next higher numbered step in Table B.

**2.15** The JM1 CP is used with DSS console(s) only. With non-DSS systems, ignore step number (replacement sequence) for the JM1 CP and proceed to the next higher numbered step in Table B.

**2.16** When analyzing a call failure that occurs after an incoming call has been answered and a dial-tone connection established, use either the "call announced privately to the called party" or the "call not announced" part of Table B, but not both. The part used depends on which type call completion includes the reported trouble.

**2.17** The following example shows how Table B may be used to clear a trouble.

### *Example:*

- (a) Trouble reported is noisy transmission (after answer of an incoming call) between the attendant and the calling party. The trouble occurs when loop 0 is used.
- (b) The exact trouble is not listed in Table A.
- (c) A test call to the attendant advanced to the first stage in Table B where the trouble occurs (transmission) proves conversation *not* satisfactory (noisy) after answer.

Reference to Table B shows:

- Replacement of 400D or ♦400G♦ KTU first (Step 1) with a unit having the same options (2.08).
- The test call on loop 0 to the attendant console is still noisy after answer.
- Replacement of the new 400D or ♦400G♦ KTU with the original 400D or ♦400G♦ KTU.
- Step 2 in the trouble-clearing sequence does not apply for loop 0 (2.14).

**Caution:** *Removal of an HK5 CP from a 720A panel disables all console functions. (Notify attendant.)*

- Replacement of the HK5 CP (Step 3).
- The test call to the attendant console on loop 0 is satisfactory on answer.

### **2.18 ♦Table C**

- (a) Itemizes functions involved during testing of the 720A panel. Refer to Section 540-580-101 for detailed tests.
- (b) Lists verifications that should occur for each stage of the testing.
- (c) Assigns a priority number to the trouble-clearing sequence for each verification failure.♦

## **3. REFERENCES**

**3.01** Refer to the following sections for further information concerning the 50A CPS:

SECTION	TITLE
504-220-151	Telephone Consoles—121-, 131-, and 151-Types—Identification
540-580-101	50A Customer Premises System—Identification, Installation, Connections, and Installation Tests
540-580-301	Attendant and Station Equipment—Method of Operation—50A Customer Premises System

SECTION	TITLE	CD	Circuit Description
809-150-150	50A Customer Premises System Equipment Design Requirements— PBX Systems	CO	Central Office
		CP	Circuit Pack
981-300-100	50A Customer Premises System— General Descriptive Information	CPS	Customer Premises System
		DSS	Direct Station Selection
<b>3.02</b>	Refer to the following drawings for detailed 50A CPS circuit information:	ESS	Electronic Switching System
DRAWING	TITLE	KTU	Key Telephone Unit
SD-1E249-01,Iss 1	Attendant Console Circuit	PBX	Private Branch Exchange
SD-1E250-01,Iss 1	Console Control Circuit	R	Ring
SD-1E251-01,Iss 1	Line Busy Circuit	SD	Schematic Drawing
<b>3.03</b>	◆The following list of acronyms is used in this section:	T	Tip
BLF	Busy Lamp Field	TGB	Trunk Group Busy◆

TABLE A  
APPARATUS FAILURES

FAILURE SYMPTOMS OF MAIN APPARATUS FUNCTIONS	APPARATUS				REMARKS	
	REPLACE KTU/CP	REPLACE FUSE IN		LOCATION		ONE PROVIDED PER
		PANEL	POWER UNIT			
Cannot Pick up Loop No Hold No Temporary Hold No Release of Temporary Hold No Transmission No LOOP Key Lamp Wrong LOOP Key Lamp Signal No Tone Ringing	400D or 400G (See Note.)			720A Panel	Loop	Duplicate straps and 841226038 network connections if replacing 400D KTU. (See Note.)
No Wink (See Note.)	429B or AE34				Two Loops	HK5 provides common control functions for the console and loop control functions for loops 0-3.
No Wink No LOOP Key Lamp Flutter	430A				Console	
No Flash (CC Key) No Temporary Hold Cannot Cancel Night Service Interrupter Will Not Start No Loop Control	HK5			First 720A Panel	Console	
No Busy Station Lamp Control (DSS or BLF Only)	HK6			722A Panel		Two spare circuits are provided in each fully equipped (4 HK6 CPs) 722A panel.
No Loop Control	AE32			Supplementary 720A Panel	Four Supplementary Loops	AE32 provides loop control for four loops (except 0-3; see 2.14).
No Trunk Group Busy Lamp Signal	AE33			720A Panel	Two Consoles	Requires pair to ESS CO.
Cannot Split Incoming Call Off	JN1					Duplicate existing straps when replacing JN1 CP.
Cannot Split Incoming Call Off Cannot Signal Stations	JM1			Console	Console	Duplicate existing straps when replacing JM1 CP.

Note: Do not use 429B KTU with 400G KTU.

TABLE A (Cont)  
APPARATUS FAILURES

FAILURE SYMPTOMS OF MAIN APPARATUS FUNCTIONS	APPARATUS					REMARKS
	REPLACE KTU/CP	REPLACE FUSE IN		LOCATION	ONE LOCATION PER	
		PANEL	POWER UNIT			
No Lamp Signals Cannot Remove Night Service Cannot Split Incoming Call Off No Flash (CC Key) No Tone Ringing No Trunk Group Busy Indication Total System Failure			79B1	C E N T R A L I Z E D  T E R M I N A L  F I E L D	Two Consoles	Contains interrupter. Power unit is used on systems without DSS or BLF only.
Cannot DSS Stations No Lamp Signals Cannot Remove Night Service Cannot Split Incoming Call Off No Flash (CC Key) No Tone Ringing No Trunk Group Busy Indication Total System Failure			103B		Console	Contains interrupter. Power unit is used on systems with DSS or BLF only.
No Lamp Signals Cannot Cancel Night Service Cannot Split Incoming Call Off No Flash (CC Key) No Tone Ringing No Trunk Group Busy Indication Total System Failure			104B			Contains interrupter. Battery reserve maintains all system functions, except DSS or BLF only, if commercial power fails.
No Lamp Signals on One Loop Cannot Cancel Night Service No Hold on up to Four Loops No Flash (CC Key) No Trunk Group Busy Lamp Indication No Tone Ringing on Console		First 720A Panel			Four Loops	Total system failure occurs if -24V fuse blows first panel, except (1) DSS and BLF only (2) pick-up loops 4-13 still function.
No Lamp Signals on One Loop No Hold on up to Four Loops No Trunk Group Busy Lamp Indication No Tone Ringing-up to Four Loops No Flutter on All Systems No Temporary Hold No Flash (CC Key)		Supplementary 720A Panel			Four Loops	
No DSS or BLF Only Lamp Signals (up to 13 Stations)		722A Panel			50 DSS or BLF Only Stations	

TABLE B  
CALL FAILURES

TROUBLE REPORTED ON		TROUBLE-CLEARING STEPS											
FUNCTION	VERIFICATION	REPLACE								TEST			
		CIRCUIT PACKS OR KEY TELEPHONE UNITS										CONSOLE (STEP NO. AND CIRCUIT)	POWER UNIT INTERRUPTER
		400D	AE34**	430A	HK5	HK6	AE32	AE33	JM1	JN1			
ATTENDANT – COMPLETED INCOMING CALL TO STATION													
Incoming Signal	LOOP key lamp flashes at 60 ipm.	1	2		4							3 (LOOP Key Lamp)	5
	Tone ringer sounds.	1										2 (Tone Ringer)	
Answer (LOOP Key)	LOOP key lamp steady.	1	2		6		3					4 (LOOP Key) 5 (LOOP Key Lamp)	
	Tone ringer silenced.	1	2		4		3					5 (LOOP Key)	
Transmission	Conversation satisfactory.	1			3		2					4 (LOOP Key)	
Holding (HOLD Key)	Calling party on hold.	1	2	3	5		4					6 (HOLD Key)	
	LOOP key lamp winks at 120 ipm.	2	1	3	6		5					7 (HOLD Key) 4 (Interrupter)	
Dial-Tone Con- nection (CC Key, After Reentry of Held Call)	Dial tone heard.	3			1		2					4 (CC Key)	
	Calling party on hold.	3			1		2					4 (CC Key)	
ATTENDANT – COMPLETED INCOMING CALL TO STATION (CALL ANNOUNCED)													
Splitting (SPLT Key)	Dial tone silenced.								2	1		3 (SPLT Key)	

\* 400D or 400G KTU. Do not use 400G KTU with 429B KTU.

\*\* AE34 CP replaces 429B KTU.

TABLE B (Cont)

CALL FAILURES

TROUBLE REPORTED ON			TROUBLE-CLEARING STEPS												
FUNCTION	VERIFICATION		REPLACE								TEST				
			CIRCUIT PACKS OR KEY TELEPHONE UNITS										CONSOLE (STEP NO. AND CIRCUIT)	POWER UNIT INTERRUPTER	
			400D*	AE34**	430A	HK5	HK6	AE32	AE33	JM1	JN1				
ATTENDANT - COMPLETED INCOMING CALL TO STATION (CALL ANNOUNCED) (Cont)															
Dialing	DSS	DSS key lamp dark until station answers — then steady.					2					3		1 (DSS Key Lamp) 4 (DSS Key)	
		Ringing tone heard.	2			4		3				1		5 (DSS Key)	
	TOUCH-TONE Calling	BLF lamp dark until station answers — then steady.					2							1 (BLF Lamp)	
		Ringing tone heard.	2			4		3						1 (TOUCH-TONE Dial)	
Transmission		Conversation satisfactory between attendant and station.	1			3		2						4 (LOOP Key)	
Split Removal (CC Key)		Conversation satisfactory between attendant, station, and calling party.	2			1		3						4 (CC Key)	
Disconnect (DISC Key)		LOOP key lamp dark.	1	2		4								3 (DISC Key)	

\* 400D or 400G KTU. Do not use 400G KTU with 429B KTU

\*\* AE34 CP replaces 429B KTU

TABLE B (Cont)

## CALL FAILURES

TROUBLE REPORTED ON			TROUBLE-CLEARING STEPS											
FUNCTION	VERIFICATION	REPLACE										TEST		
		CIRCUIT PACKS OR KEY TELEPHONE UNITS										CONSOLE (STEP NO. AND CIRCUIT)	POWER UNIT INTERRUPTER	
		400D*	AE34**	430A	HK5	HK6	AE32	AE33	JM1	JN1				
ATTENDANT – COMPLETED INCOMING CALL TO STATION (CALL NOT ANNOUNCED)														
Dialing	DSS	DSS key lamp dark until station answers — then steady.					2				3		1 (DSS Key Lamp) 4 (DSS Key)	
		Ringing tone heard.	2			4		3			1		5 (DSS Key)	
	TOUCH-TONE Calling	BLF lamp dark until station answers — then steady.					2						1 (BLF Lamp)	
		Ringing tone heard.	2			4		3					1 (TOUCH-TONE Dial)	
Temporary HOLD (RLS Key)		LOOP key lamp flutters.	1	6	2	5		3					4 (LOOP Key Lamp)	
		LOOP key lamp dark when called station answers.	1											
ATTENDANT – ORIGINATED OUTGOING CALL														
Dial-Tone Connection (LOOP Key)		Dial tone heard.	1			3		2					4 (LOOP Key)	
		LOOP key lamp steady.	2	3		5		4					1 (LOOP Key Lamp)	

\* 400D or 400G KTU. Do not use 400G KTU with 429B KTU.

\*\* AE34 CP replaces 429B KTU.

TABLE B (Cont)

CALL FAILURES

TROUBLE REPORTED ON			TROUBLE-CLEARING STEPS											
FUNCTION	VERIFICATION		REPLACE								TEST			
			CIRCUIT PACKS OR KEY TELEPHONE UNITS								CONSOLE (STEP NO. AND CIRCUIT)	POWER UNIT INTERRUPTER		
			400D*	AE34**	430A	HK5	HK6	AE32	AE33	JM1			JN1	
ATTENDANT - ORIGINATED OUTGOING CALL (Cont)														
Dialing	DSS	DSS key lamp dark until station answers — then steady.					2				3		1 (DSS Key Lamp)	
		Ringing tone heard.	2			4		3			1		5 (DSS Key)	
	TOUCH-TONE Calling	BLF lamp dark until station answers — then steady.					2						1 (BLF Lamp)	
		Ringing tone heard.	2			4		3					1 (TOUCH-TONE Dial)	
Transmission		Conversation satisfactory.	1			3		2				4 (LOOP Key)		
Holding (HOLD Key)		Conversation silenced call put on HOLD.	1	2	3	5		4				6 (HOLD Key)		
		LOOP key lamp winks at 120 ipm.	2	1	3	6		5				7 (HOLD Key) 4 (Interrupter)		
Disconnect After Reentry of Held Call (DISC Key)		Steady LOOP key lamp goes dark.	1	2		3						4 (DISC Key)		

\* 400D or 400G KTU. Do not use 400G KTU with 429B KTU

\*\* AE34 CP replaces 429B KTU

TABLE B (Cont)

CALL FAILURES

TROUBLE REPORTED ON			TROUBLE-CLEARING STEPS											
FUNCTION	VERIFICATION	REPLACE										TEST		
		CIRCUIT PACKS OR KEY TELEPHONE UNITS										CONSOLE (STEP NO. AND CIRCUIT)	POWER UNIT INTERRUPTER	
		400D*	AE34**	430A	HK5	HK6	AE32	AE33	JM1	JN1				
NIGHT SERVICE (NOTES 1, 2, AND 3)														
Night Service (NITE Key)	Fixed	Established.				1							1 (NITE Key)	
		Canceled.				1							2 (NITE Key)	
	Trunk Answer From Any Station	Established.				1							2 (NITE Key) (Note 3)	
		Canceled.				1							2 (NITE Key)	
TRUNK GROUP BUSY														
Trunk Group Busy	Trunk group busy key lamp steady.								2				1 (Trunk Group Busy Key Lamp)	

Notes:

1. Establishing or canceling flexible night service does not involve the 50A CPS night circuit (part of HK5 CP) or NITE key.
2. Handset or headset must be inserted in console jacks for NITE key to function.
3. Night signal (bell, horn, etc) operates.

\* 400D or 400G KTU. Do not use 400G KTU with 429B KTU.

\*\* AE34 CP replaces 429B KTU.

◆ TABLE C ◆

PANEL TEST FAILURES†

TROUBLE REPORTED ON		TROUBLE-CLEARING STEPS										
FUNCTION	VERIFICATION	REPLACE								CHECK		
		CIRCUIT PACKS OR KEY TELEPHONE UNITS										
		400D*	AE34**	430A	HK5	HK6	AE32	AE33	JM1		JN1	
720A PANEL TESTING												
HOLD — Test T and R (CO) Momentarily Shorted	Test lamp winks at 120 ipm.	1	2									
HOLD — Test T and R (CO) Shorted Several Seconds	Test lamp extinguished.	1	2									
TEMPORARY HOLD — Test	Test lamp steadily lighted.	1	2		3							
	Test lamp flutters.	1	3	5	2		4					
	Test lamp extinguished.	1	2									
HOLD — Test	Test lamp steadily lighted.	1	2	4	3		5					
	Test lamp winking.	1	2									
	Test lamp extinguished.	1	2									
INCOMING CALL — Test	Dial-tone heard.				1		2					
	Dial-tone silenced.								(1)	(1)	Power to console (–24V, –11V, GRD) from 722A panel.	
	Test lamp flashes.	1	2									
FLASH — Test	Test lamp steadily lighted.	1	2									
	Dial tone interrupted.				1							

\* 400D or 400G KTU. Do not use 400G KTU with 429B KTU.

\*\* AE34 CP replaces 429B KTU.

† Refer to Section 540-580-101 for 720A panel tests.