

## CHAPTER 9

### ATTENDANT'S CONSOLE AND ATC INTERFACE GROUP

#### 9.1 INTRODUCTION

This chapter provides a functional description of the attendant's console (ATC) and its interface group.

#### 9.2 FUNCTIONAL DESCRIPTION

The ATC interface group is usually a direct trunk group with a KTI PCA installed in place of the first direct trunk interface PCA of the group. Each ATC in the system requires one KTI PCA (Figure 9-1 and Figure 9-2). In the cabinet, two pairs of standard house cabling connect through the 50-pin interface connector of the direct trunk group to the KTI PCA. Four wires (a voice-frequency pair and a data pair) connect the ATC to the cabinet.

The voice-frequency pair carries speech signals from the ATC to the KTI PCA. These signals are digitized and output on the intrashelf bus by the coder PCA in the group. The decoder PCA converts digitized voice-frequency signals to analog for output through the KTI PCA to the ATC. The KTI PCA supplies talk battery for the ATC voice loop. The ATC contains a hybrid and a sidetone circuit; this network enables the handset or headset to function as a standard telephone handset.

The data pair carries control and status signals between the KTI PCA and the ATC for exchange with the time division multiplexing (TDM) network control group. The ATC converts the serial data from the KTI PCA to parallel data for internal microprocessor use. The ATC also converts its internal parallel data format to serial for transmission on the KTI PCA. The KTI PCA converts the serial data from the ATC back to a parallel format for transmission on the intrashelf bus and the intershelf bus (ISB).

Two separate wire pairs supply ATC power. One pair supplies normal 24-Vac operating power. The other pair supplies lamp power by stepping down 117 Vac across a dedicated power transformer installed locally. A fifth wire grounds the ATC.

The ATC consists of three major subassemblies: top cover, frame assembly, and base assembly.

The ATC and the KTI PCA interconnect through a single data pair for commands and status information:

The following data is passed from the KTI PCA to the ATC:

- Loop select (LPS) lamp state (on, off, flash/rate)
- Time-of-day display data
- Tone control
- Class of service (COS) display data
- Trunk display group data and status
- Extension status

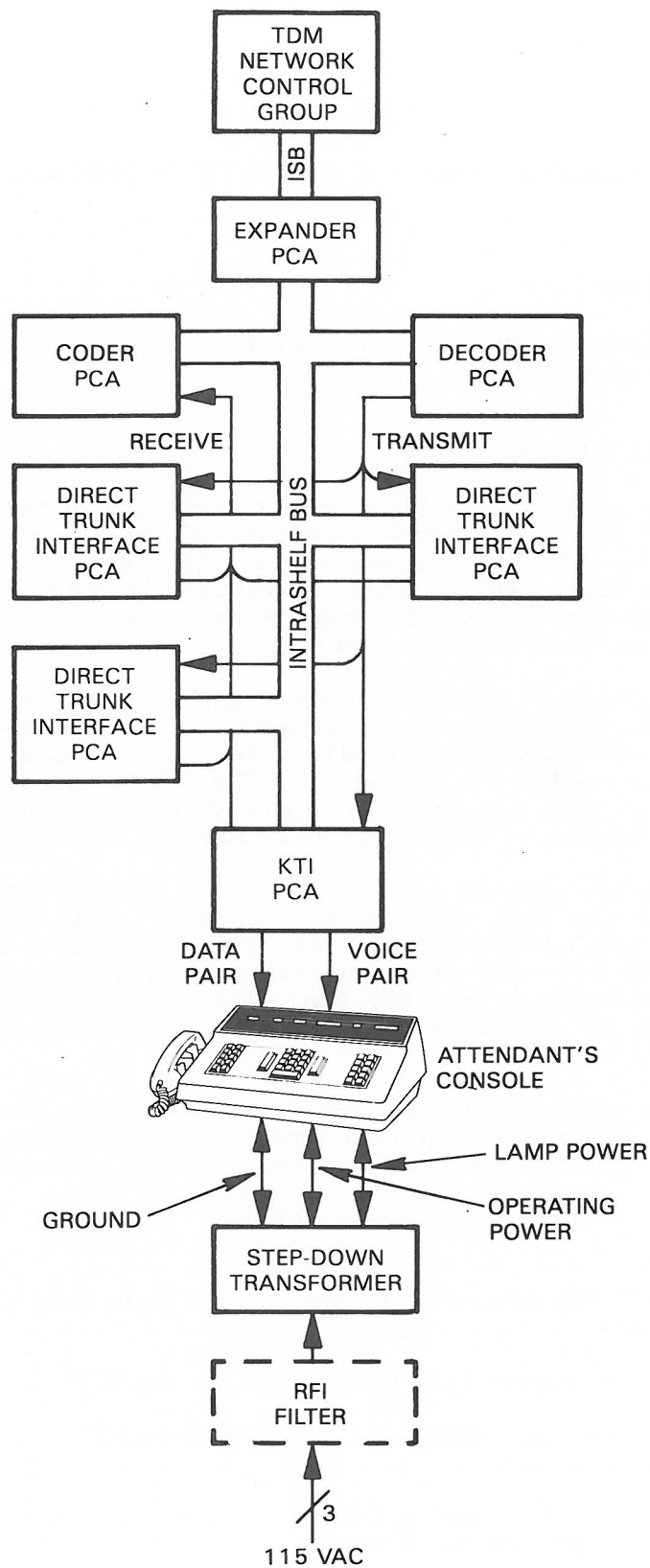
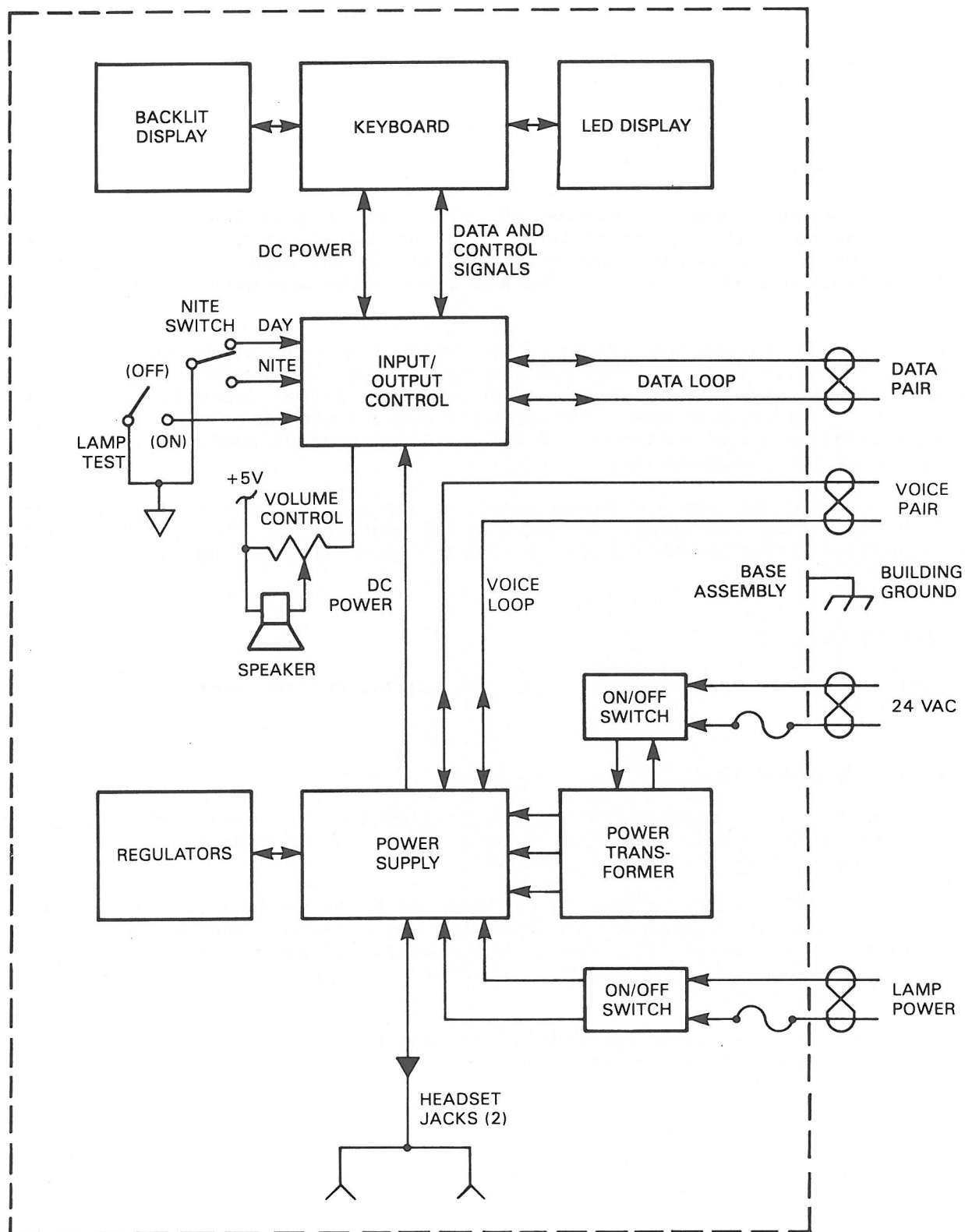


Figure 9-1. ATC Signal Flow

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Figure 9-2. ATC Block Diagram

The following data is passed from the ATC to the KTI PCA:

- System status, source, and system lamp state
- LPS button status
- Control button status
- Keyboard button status
- Night mode switch position
- Up/down status

For example, if the alarm tone sounds, the attendant may push SLNT. The ATC detects the change in the status of the button and outputs it through the KTI PCA to the computer. The computer interprets the status and sends an off command to the ATC audible channel circuits. The ATC decodes the command and silences the alarm tone.

The power supply in the ATC (Figure 9-2) supplies its operating voltages. In addition, the voice pair runs through the power supply. The power supply integrated circuit regulators are mounted on the frame assembly for heat dissipation. The input/output (I/O) circuits convert the data format from serial-to-parallel or parallel-to-serial for received control commands and transmitted status data, respectively.

The keyboard contains the ATC pushbuttons and lamps. The backlit display contains the remaining ATC lamps; the LED display contains the CLASS, NUMBER, and TIME displays. Pressing the lamp test switch causes all ATC lamps to light and all LEDs to turn on.

### 9.3 MAINTENANCE

This paragraph contains troubleshooting and removal and replacement procedures for the ATC.

#### 9.3.1 Troubleshooting

Do not use the troubleshooting procedures discussed in this paragraph until you are familiar with the ATC. Detailed information is available in the Attendant's Console Operating Manual (stock no. 300050).

Repairing the ATC quickly is important. When the fault has been isolated to the ATC, troubleshooting is directed to replacing lamps, fuses, hand/headset, power transformer, or the whole ATC. The troubleshooting procedures are provided in Table 9-1. Problems with the ATC may or may not be supported by a type 0009 error in the error table.

If a lamp is suspected to be defective, the lamp test should be performed. The LPS keys will light during the lamp test.

#### 9.3.2 Removal and Replacement

The following paragraphs contain information for removing and replacing the ATC, power transformer, top cover, fuses, and lamps. Also included are mechanical alignment procedures to be used when the top cover is replaced or put on a new base assembly.



Table 9-1. ATC Troubleshooting Procedures

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Totally inoperative (lamp test does not function)	ATC switched off	Switch on ATC.
	Power transformer unplugged	Connect power transformer to ac outlet.
	Loose connection or 10-pin connector block miswired	Tighten connections. Check wiring.
	ATC fuse blown	Remove top cover; replace fuse.
	Open lead in power transformer	Measure voltages on 10-pin connector.  Between terminals 9 and 10, should be 21 to 27 Vac.  Between terminals 6 and 7, should be 25 to 32 Vac.  If either voltage is absent, replace power transformer.
	ATC malfunction	Replace ATC.
ATC replaced but problem still exists	Check for symptoms below.	
No talk battery in headset	Headset	Replace headset.
	Wiring (voice-frequency pair)	Check wiring to ATC.
	KTI PCA assigned to ATC	Replace KTI PCA.
	-48V power distribution to KTI group	Refer to power distribution troubleshooting, paragraph 12.3.1.
	ATC malfunction	Replace ATC.

Table 9-1. ATC Troubleshooting Procedures (Cont.)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Function, key or indicator malfunctions (not caused by trunk or line faults)	Wiring (data pair)	Check wiring to ATC.
	KTI PCA assigned to ATC	Replace KTI PCA.
	Expander PCA on same shelf as KTI PCA	Replace expander PCA.
	ATC malfunction	Replace ATC.
	Computer common control	Refer to paragraph 3.5
Cannot complete call, or call is completed incorrectly on trunk calls only	Tone generator PCA	Replace tone generator PCA.
	Rotary sender PCA	Replace rotary sender PCA.
ATC cannot hear trunk or any station	KTI PCA assigned to ATC	Replace KTI PCA.
	Decoder PCA	Replace decoder PCA.
	ATC malfunction	Replace ATC.
	Expander PCA on same shelf as KTI and decoder PCAs	Replace expander PCA.
Trunk or any station cannot hear ATC	KTI PCA assigned to ATC	Replace KTI PCA.
	Coder PCA assigned to ATC	Replace coder PCA.
	Expander PCA on same shelf as KTI and coder PCAs	Replace expander PCA.
	ATC malfunction	Replace ATC.

Table 9-1. ATC Troubleshooting Procedures (Cont.)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Low voice at ATC from trunk or any station	Headset	Verify proper gain strapping. Replace headset.
	KTI PCA assigned to ATC	Replace KTI PCA.
	Decoder PCA assigned to ATC	Replace decoder PCA.
	ATC malfunction	Replace ATC.
Low voice at trunk or any station from ATC	Headset	Replace headset.
	KTI PCA assigned to ATC	Replace KTI PCA.
	Coder PCA assigned to ATC	Replace coder PCA.
	ATC malfunction	Replace ATC.
Noise at ATC from trunk or any station	KTI PCA	Replace KTI PCA.
	Coder PCA assigned to trunk or station	Replace coder PCA.
	Decoder PCA assigned to ATC	Replace decoder PCA.
Noise at trunk party (CBX originated)	KTI PCA	Replace KTI PCA.
	Decoder PCA for trunk	Replace decoder PCA.
	Coder PCA assigned to ATC	Replace coder PCA.
Fuse replaced, but blows when power is reapplied	Incorrect value	Install 3A fuse.
	ATC malfunction	Replace ATC.
	Faulty transformer	Replace transformer. Check transformer fuse (paragraph 9.3.2c).

Table 9-1. ATC Troubleshooting Procedures (Cont.)

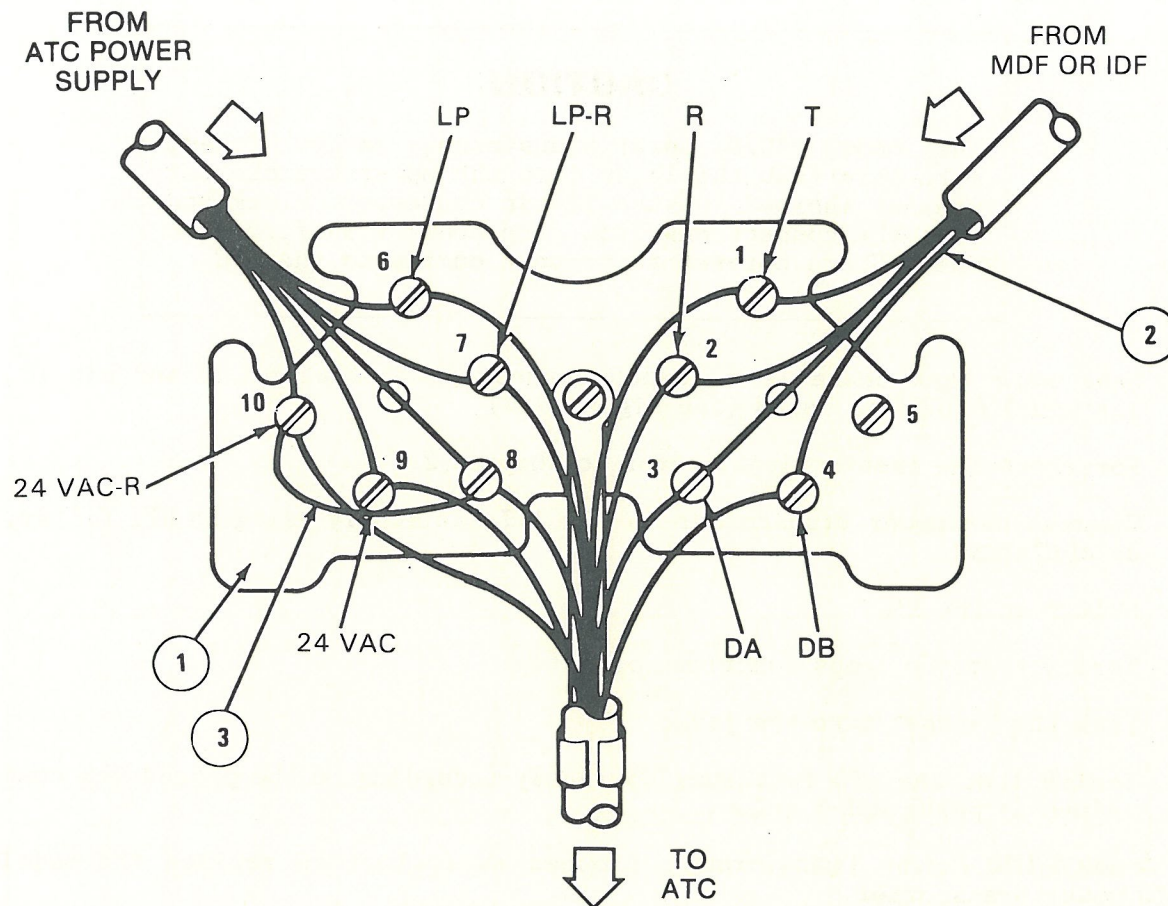
SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Lamp does not light during lamp test	Defective lamp*	Replace lamp.
Lamp(s) replaced but does not light during lamp test	ATC malfunction	Replace ATC.
None, or not all, segments of digits in CLASS-NUMBER-TIME display light during lamp test	ATC malfunction	Replace ATC.
ATC operating normally, but no audio tones	Volume turned down	Adjust volume control.
	ATC malfunction	Replace ATC.
Handset works on one side of ATC but not the other	ATC malfunction	Replace ATC.
ATC operating but lamp test does not work	ATC malfunction	Replace ATC.

\* If the cable connector from the base assembly to the frame assembly is removed, it could be reconnected backwards. This does not cause any damage, but when the ATC is switched on, the red indicator remains lighted and the ATC will not be operational. If this occurs, reverse the position of the connector.

a. ATC. Proceed as follows to replace the ATC:

1. Switch off the ATC and disconnect the power transformer from the 117-Vac supply.
2. Disconnect the handset from the console.
3. Disconnect the ATC from the 10-pin connector block (Figure 9-3).
4. Assemble the replacement ATC. (Refer to paragraph 2.6.1, ATC Installation.)
5. Connect the replacement ATC to the 10-pin connector block. (See Figure 9-3 for color coding and connections.)





TERMINAL NO.	FROM MDF OR IDF	FROM ATC POWER SUPPLY	ATC LINE CORD CONNECTIONS	FUNCTION
1	WHT/BLU	NOT USED	WHT/BLU	TIP
2	BLU/WHT	NOT USED	BLU/WHT	RING
3	WHT/ORN	NOT USED	WHT/ORN	DATA A
4	ORN/WHT	NOT USED	ORN/WHT	DATA B
5	NOT USED	NOT USED	NOT USED	NOT USED
6	NOT USED	BRN/WHT	BRN/WHT	LAMP POWER
7	NOT USED	WHT/BRN	WHT/BRN	LAMP POWER RETURN
8	NOT USED	WHT/SLT	WHT/SLT	GROUND
9	NOT USED	GRN/WHT	GRN/WHT	24 VAC
10	NOT USED	WHT/GRN	WHT/GRN	24 VAC RETURN

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Figure 9-3. ATC Connector Block

### CAUTION

The model 87070 power transformer is not fused; make sure that the leads from the power transformer are not shorted on the 10-pin connector block and that the connections from the power transformer to the ATC are correct to prevent damage to the ATC.

6. Make sure that there is a jumper connection between pin 8 and pin 10. The model 87070A is fused (see Figure 9-4).
  7. For grounding instructions, refer to Chapter 2.
  8. Connect the power transformer to its 117-Vac supply using an RFI filter, as applicable.
  9. Switch on the ATC.
  10. Verify that the lamps function correctly.
  11. Plug the handset into the jack.
  12. Verify that the ATC functions correctly according to the procedures contained in paragraph i below.
- b. Model 87070 Power Transformer. Proceed as follows to replace the model 87070 power transformer.
1. Switch off the ATC.
  2. Disconnect the power transformer from the 117-Vac supply.
  3. Disconnect the power transformer from the 10-pin connector block (Figure 9-3).
  4. Connect the cable on the replacement transformer to the 10-pin connector block. (See Figure 9-3 for color coding and connections.)
  5. Make sure that there is a jumper connection between pin 8 and pin 10.

### CAUTION

The model 87070 power transformer is not fused; make sure that the leads from the power transformer are not shorted on the 10-pin connector block and that the connections from the power transformer to the ATC are correct to prevent damage to the ATC.

6. Connect the replacement power transformer to the 117-Vac supply.
7. Switch on the ATC.

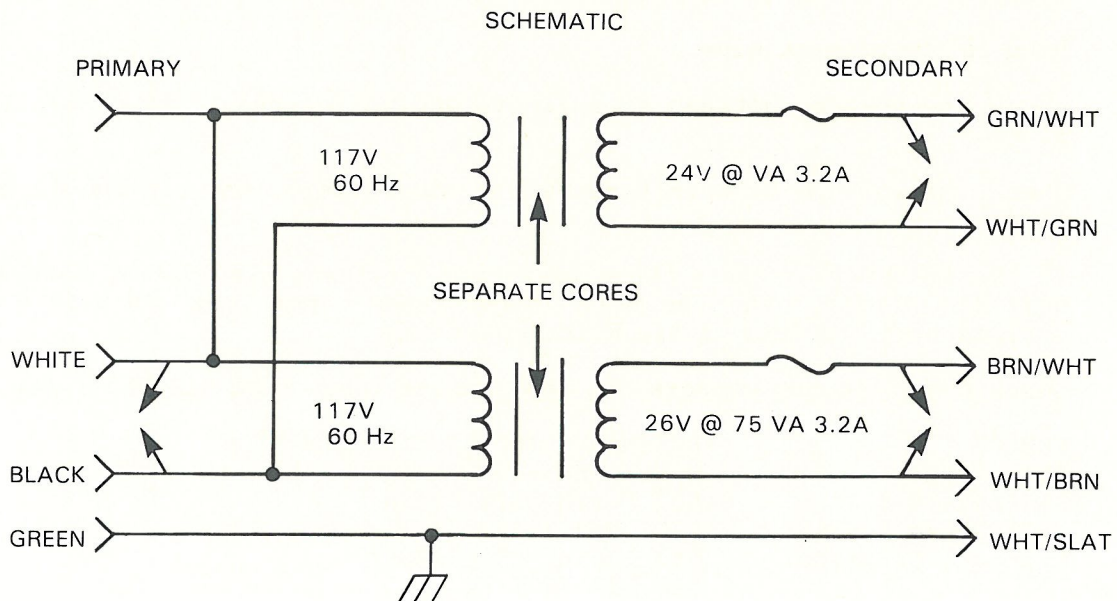
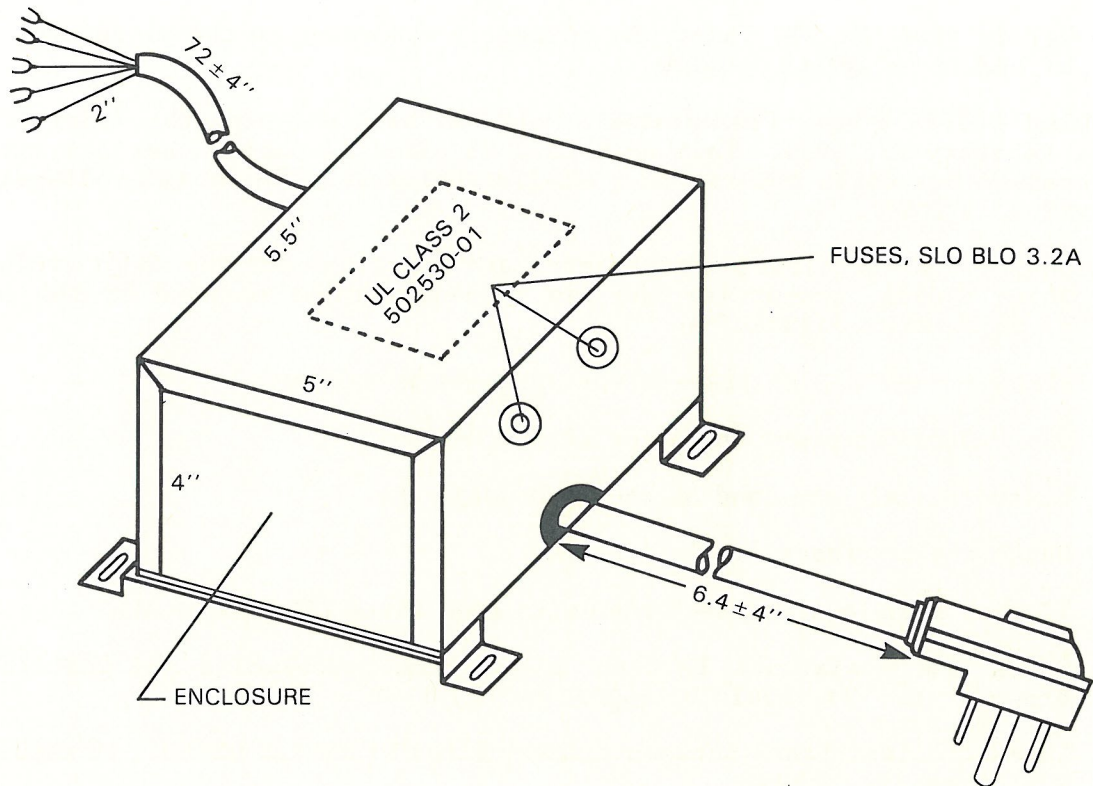


Figure 9-4. ATC Power Transformer (Model 87070A)

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8. Verify that the lamps function correctly.
9. Verify that the ATC functions correctly according to the procedures contained in paragraph i below.

c. Model 87070A Power Transformer. ROLM has been shipping the model 87070A since February 15, 1980. This unit is a UL class II device that consists of two transformer coils mounted in a single enclosure. The output voltages are individually fused.

Maintenance and installation techniques are identical for the model 87070 and the model 87070A, except for the two secondary fuses mounted on the model 87070A, as shown in Figure 9-4.

To replace a model 87070A transformer, proceed as follows:

1. Disconnect the power on the primary side.
2. Disconnect all the load on the secondary side.
3. Check the two fuses.
4. If they are blown, replace them with good fuses (SLO BLO 3.2A).
5. Check the resistance between white/green green/white and white/brown brown/white. It should be approximately 1 ohm.
6. Check the resistance between primary wires black and white. It should be approximately 3 ohms.
7. Check the resistance, which should be open, between white/slate and green/white, white/green, brown/white, white/green, black and white.
8. Plug in the primary side.
9. Check the voltage between green/white and white/green. It should be 27  $\pm$ 1 Vac.
10. Check the voltage between brown/white and white/brown. It should be 29  $\pm$ 1 Vac.
11. If the transformers pass these tests but the fuses blow again, return the unit for repair. Add the note "blows fuses under load" in part 6 (Description of Problem) of the ROLM repair tag.
12. Check the following vendors for replacement fuses (GMQ SLO BLO 3.7A):

- FUSCOM  
Dale Hubka  
415-657-FUSE  
2878 Prune Avenue  
Fremont, CA 94538

- BUSSMANN MANUFACTURING DIVISION  
McGraw-Edison Company  
502 Earth City Plaza  
P.O. Box 14460  
St. Louis, MO 63178  
314-527-3877

- Local Graybar



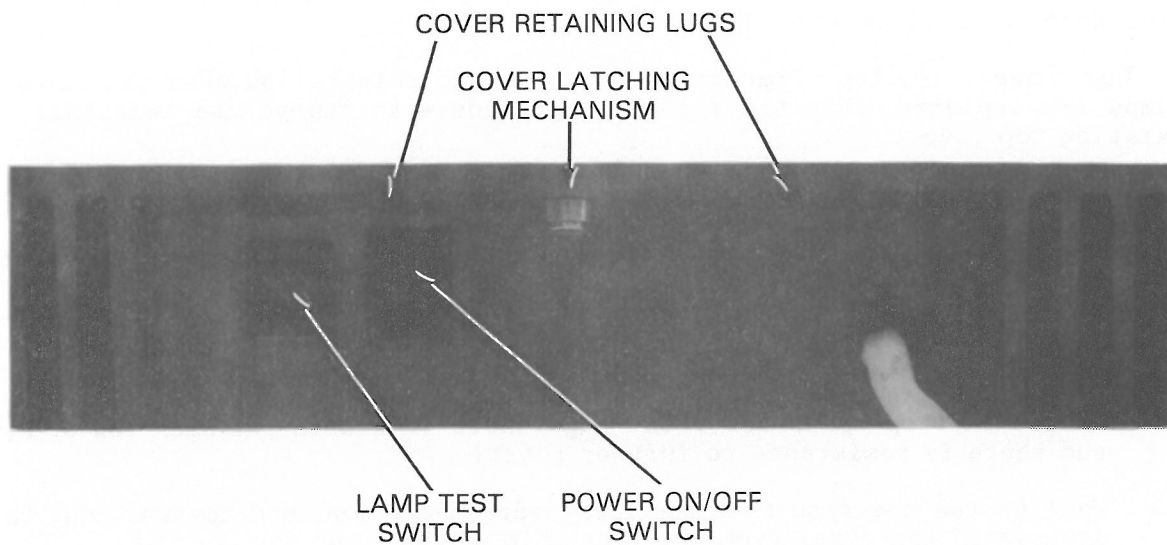
d. Headset Modification Before Replacement. Headsets used with the model 81300 ATC must be set to the high-gain position to function properly. This procedure is outlined in paragraph 2.6.1.

e. Top Cover. The top cover must be removed and reinstalled when the fuses or lamps are replaced. Use the following procedure to remove and reinstall the existing top cover:

1. Switch off the ATC.
2. Unscrew the top cover latching screw until the latching mechanism releases (Figure 9-5).
3. Face the console from the normal operating position and grasp the top on each side as shown in Figure 9-6.
4. Rotate the top about its front edge until it clears the back row of keys and there is resistance to further rotation.
5. Pull on the cover so that the front edge moves down and towards you; this disengages the cover from the front lip of the base.
6. When reinstalling the top cover, reverse steps 1 to 4. First, hook the front of the cover under the lip of the base, then lower the cover over the keys.
7. Make sure that the catch along the rear edge of the top cover is seated in the slots on either side of the latching screw before tightening the screw (Figure 9-5).

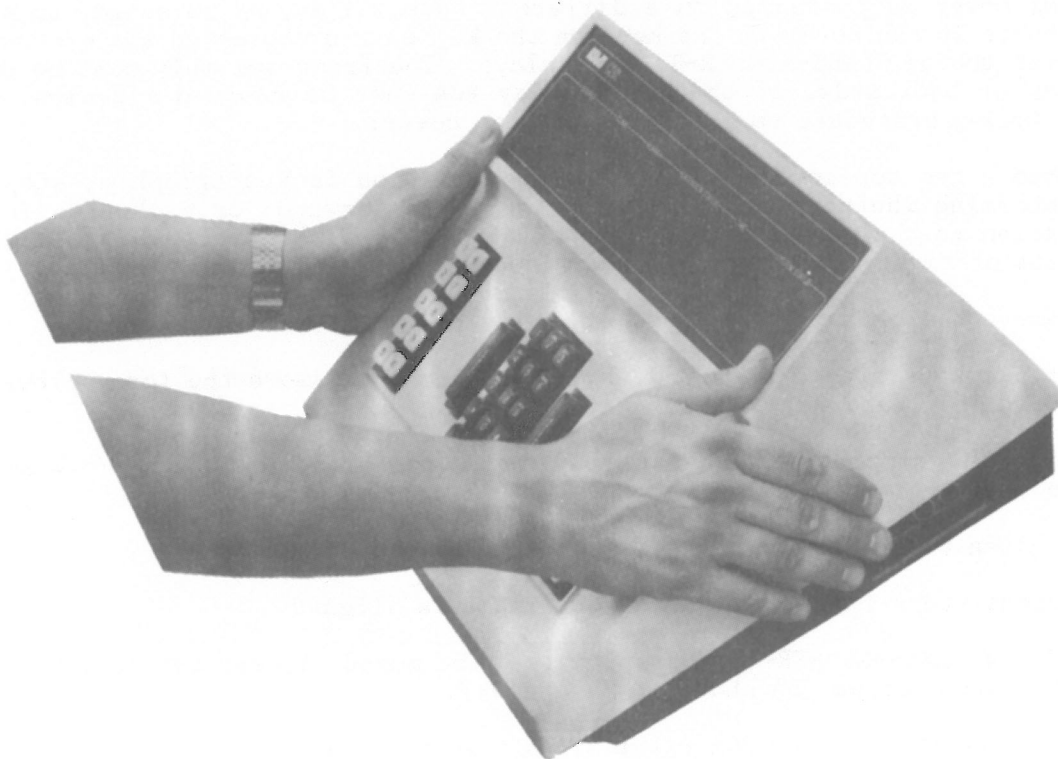
f. Aligning the Top Cover and Frame. When a new top cover is installed or the same cover is installed on a different base, it may be necessary to align the cutouts in the cover to the keys on the keyboard or to align the windows in the cover to the CLASS-NUMBER-TIME displays. The frame assembly must be moved forwards or backwards, or the LED display PCA must be removed sideways. Use the following procedure to install a new top cover:

1. When a new top cover is lowered into position (subparagraph e, step 6), determine whether the keys are to be moved forwards or backwards in relation to the cutouts and/or the CLASS-NUMBER-TIME display is to be moved left or right in relation to the windows.
2. Remove the top cover.
3. If the keys are to be moved, loosen but do not remove the four screws (A) shown in Figure 9-7.
4. Move the complete frame assembly backwards or forwards slightly as required.
5. Tighten the four screws.
6. Repeat steps 1 through 5 until the frame is aligned.
7. If the CLASS-NUMBER-TIME display is to be moved, loosen but do not remove the three screws (B) shown in Figure 9-7.
8. Move the LED display PCA right or left as required.



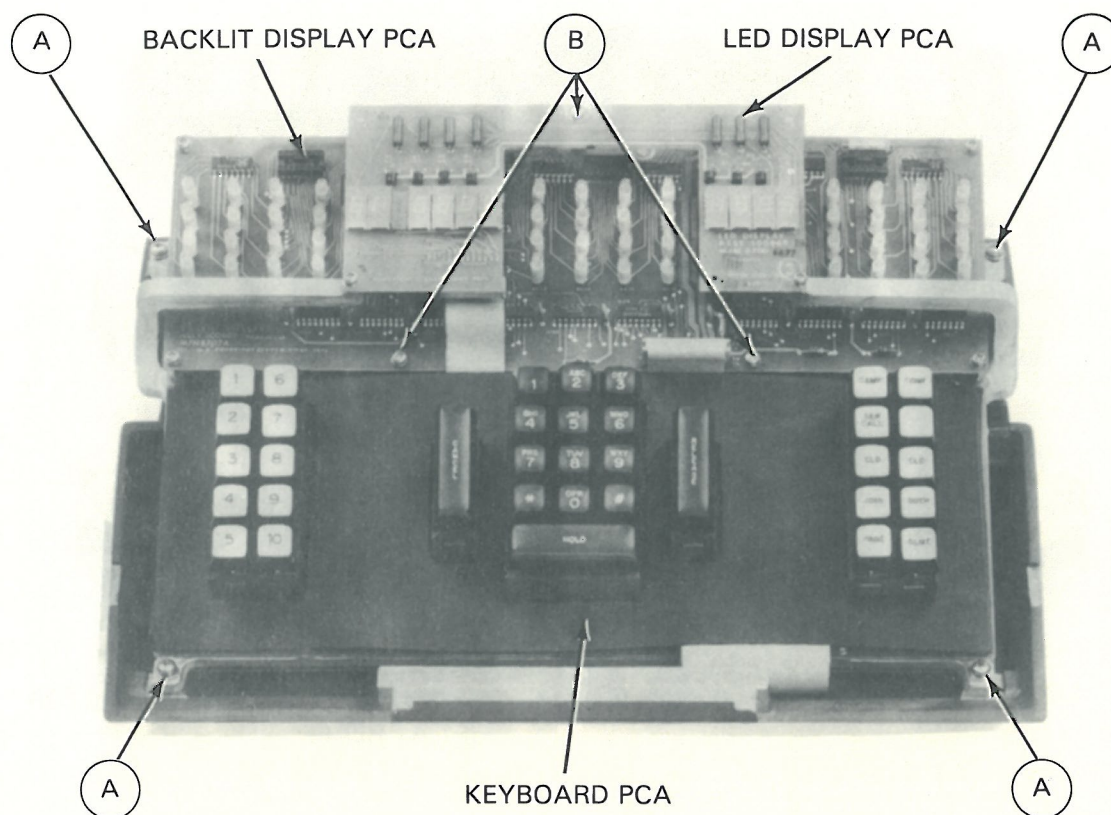
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Figure 9-5. ATC Rear View



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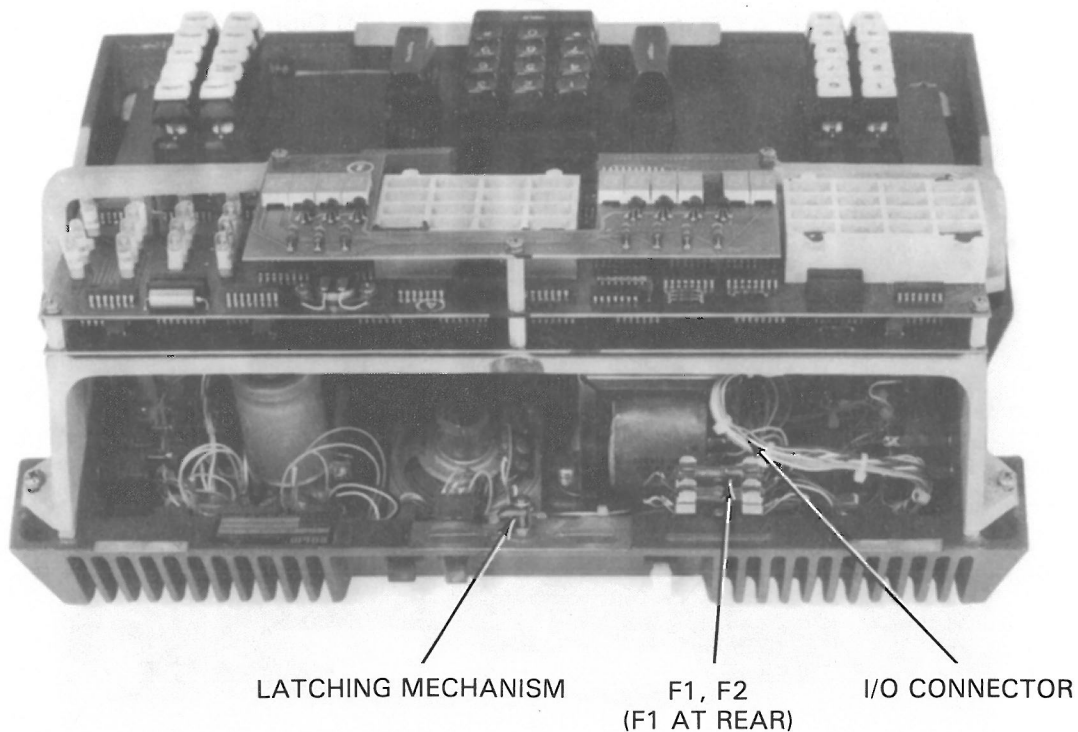
Figure 9-6. ATC Top Cover Removal



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Figure 9-7. ATC Alignment Screws

9. Tighten the three screws.
  10. Repeat step 1 and steps 7 through 9 until the display is aligned.
  11. Tighten the cop cover latching screw when the cover is finally replaced.
- g. Fuse Replacement. Proceed as follows to replace fuses:
1. Switch off the ATC.
  2. Remove the top cover.
  3. Identify the blown fuse (F1 or F2) (Figure 9-8).
  4. Replace the blown fuse with a fuse of the correct value:
    - F1: 3A, SB
    - F2: 3A, FB
  5. Reinstall the top cover.
  6. Switch on the ATC.
  7. Verify its operation according to the procedures contained in paragraph i below



Coluzzi 345-1

Figure 9-8. ATC Fuses

h. Lamps. There are two procedures for lamp replacement. The first is for replacing lamps on the backlit display PCA; the second is for replacing push button lamps.

### CAUTION

No hazardous voltages are exposed with the top cover removed and the power on. However, any metallic object dropped into the ATC or onto exposed components can cause damage.

Do not conduct a lamp test for longer than 15 seconds at any one time. (Damage may occur from overheating.)

1) Backlit Display Lamp. Proceed as follows to replace backlit display lamps:

1. Switch off the ATC.
2. Remove the top cover.
3. Switch on power and perform a lamp test to identify the bad lamp.
4. Switch off power.
5. Withdraw the lamp from its socket.



6. Align the replacement lamp to the socket and gently push it into place.
7. Reinstall the top cover, but don't tighten the cover down.
8. Turn on power and perform a lamp test. If the new lamp does not light, refer to the troubleshooting procedures in this chapter.
9. Tighten the top cover.

2) Push Button Lamp. Proceed as follows to replace a push button lamp:

1. Switch off power.
2. Remove the top cover.
3. Pull off the push button cap to reveal the lamp (Figure 9-9).
4. Push down on the push button collar to expose the lamp, then withdraw the lamp.
5. With the push button collar pushed down, align the replacement lamp to the socket so that the leads straddle the bridge.
6. Gently push the lamp into place and release the push button collar.
7. Reinstall the push button cap.
8. Reinstall, but do not tighten down, the top cover.
9. Switch on power.
10. Wait for the ATC NITE or green indicator to light.
11. Perform the lamp test. If the new lamp does not light or if the NITE or green indicators do not light (red indicator remains on), refer to the troubleshooting procedures in this chapter.
12. Tighten down the top cover.

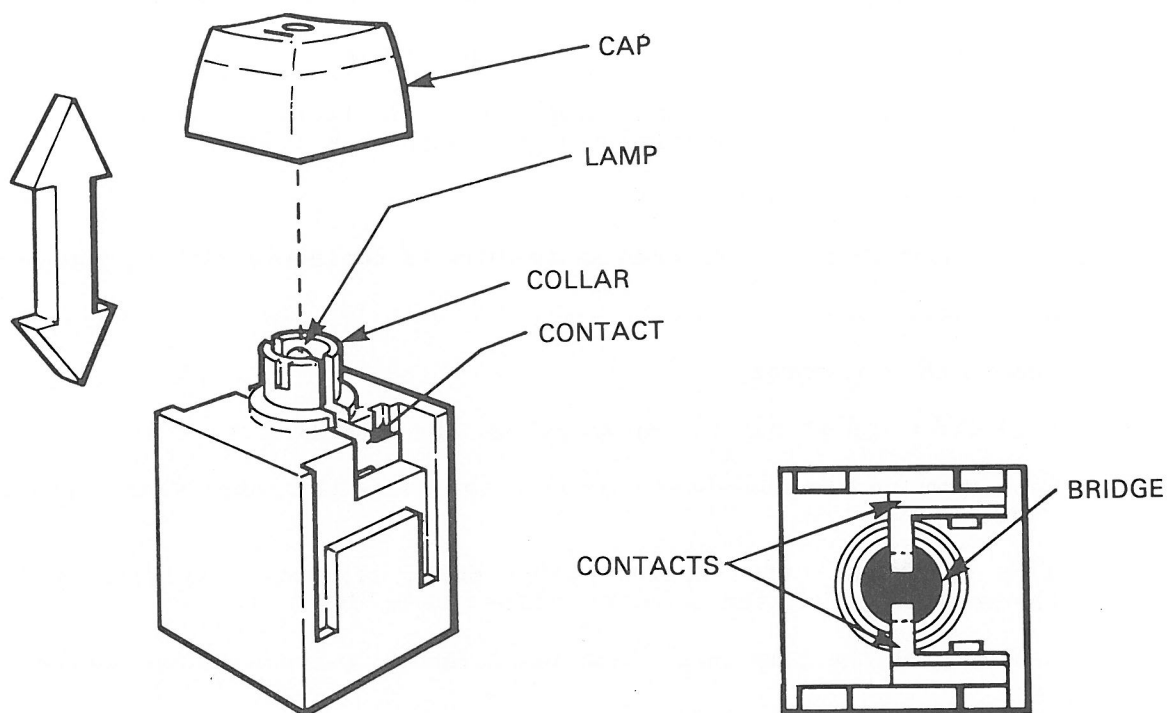
i. Verifying ATC Performance. It is not necessary to exercise all the features of the ATC to verify its performance.

If the ATC has been serviced or replaced during the customer's normal working hours, only the lamp test and the ATC self-test should be carried out. Any further checking can be done by the attendant.

When power is removed from the ATC and the system is otherwise operational, self-test detects and lists the ATC failure (error type 0009), if power is removed for longer than it takes self-test to cycle. When power is restored, the ATC resumes operation in the alarm state. (The ALARM indicator is lighted and the alarm tone sounds. This also occurs if the error condition was previously detected by self-test, regardless of how long power was removed.

Use the following procedure to verify that the ATC is functioning correctly:

1. Set the day/night mode switch to the day position (down).
2. Switch on power. The red indicator may light momentarily, but it should not remain lighted.



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Figure 9-9. ATC Push Button Lamp

3. If the ATC comes up in the alarm state, press the SLNT push button to silence the audible alarm.
4. Check that the time is displayed and updated within 60 seconds.
5. Carry out the lamp test and check that all lamps and indicators function.
6. Set the day/night switch to the night position (up).
7. Check that the NITE indicator is lighted.
8. Set the day/night switch to the day position (down).
9. If a paging system is installed, press PAGE and make a test announcement. (If zone paging is provided, the access code for a zone must be keyed before the paging system can be checked.)
10. Press each LPS button in turn.
11. Check that when the button is pressed, the lamp lights and dial tone is received.
12. Check that when the RELEASE button is pressed, the lamp turns off.
13. Place an outside trunk call and check two-way voice communication.
14. To provide a check for incoming calls, request the called party to call back.

15. Check the recall feature by calling time, placing it on hold, and allowing it to recall.
16. To check call splitting, place an outside call to yourself (incoming).
17. Pick up the call; if the music feature is installed, you should hear music. If not, the line will be silent.
18. On the same LPS button on which you picked up your own incoming call, dial out for time.
19. When you have the time connection, alternately press the CLG and CLD buttons. You should hear, respectively, music and time or nothing and time.
20. In systems having the music feature, press the BOTH button; you should hear music and time.
21. Recheck the function of the CLG and CLD buttons.
22. Press CANCEL and RELEASE.
23. Connect the service teleprinter.
24. Run self-test 7 (RDT 7).
25. When the test is completed, list the error table.
26. If there was a previous error type 0009, it should now be intermittent (I); otherwise, check that there is no error type 0009 listed.
27. If there are no other errors, clear the error table.
28. Disconnect the service teleprinter.
29. Set the day/night mode switch down or up as applicable.

