

**REFERENCE**  
**1A1 KEY TELEPHONE SYSTEM**  
**"TOUCH-TONE<sup>®</sup>" ADAPTERS**

**1. GENERAL**

**1.01** This section is reissued to change relay designation H3 to L3 for digit 8 in Table A.

**1.02** This issue of the section is based on the following drawings:

- SD-69529-01 Issue 6 (247B KTU)
- SD-69447-01 Issue 4 (247A KTU (MD))

If this section is to be used with equipment or apparatus reflecting later issues of the drawings, reference should be made to the SDs and CDs to determine the extent of the changes and the manner in which the section may be affected.

**2. IDENTIFICATION**

(a) **Purpose**

To convert TOUCH-TONE<sup>®</sup> signals to relay closures compatible with dial pulse communication systems.

(b) **Application**

- 2A Communication System
- 6A Key Telephone System

(c) **Ordering Guide**

- Unit, Telephone, Key 247B (Fig. 1, 2, and 3)
- Unit, Telephone, Key 247A (MD) (Fig. 4 and 5)

**Replaceable Components for the 247B**

- Pack, Circuit Y1 thru Y5 (ordered individually)

**Replaceable Components for the 247A**

- P48F439 Printed Wiring Board Assembly (PC1)
- P48F442 Printed Wiring Board Assembly (PC2)
- P48F445 Printed Wiring Board Assembly (PC3)

(d) **Design Features**

**247B**

- No installation adjustments required
- Replaceable circuit packs
- Responds only to valid TOUCH-TONE signals

**247A**

- Initial installation adjustments required
- Replaceable printed wiring boards
- Time-out circuit (with warning tone) to prevent false operation.

**3. INSTALLATION**

**3.01** Where possible, install adjacent to 207-type KTU in standard apparatus cabinets, relay racks, or panels used for 200-type KTUs.



*Before placing 247A KTU in service adjust H and L relays. (See 3.04).*

*Note:* On 2-talking link arrangements of the 6A Key Telephone System, the second link must be made busy.

**3.02** Power, 20-26 volts dc, must be provided from the associated system.

**3.03** Handling of 247A KTUs may result in damage to wire spring relays. After mounting, visually inspect all wire spring relays for:

- Improper position of contact springs
- Broken cards
- Improper position of cards.

**3.04** General information for adjusting H and L bias potentiometers is as follows:

(a) Rotating H or L bias potentiometer in the counterclockwise direction will decrease sensitivity of the circuit to a point where the relays will operate slowly or not at all. Rotating the potentiometers in the clockwise direction will increase sensitivity of the circuit to a point where more than one relay in the H or L group will operate from the same frequency.

(b) Depressing two adjacent horizontal dial buttons at the same time will only produce the low frequency tone for that horizontal row. Rows from top to bottom operate L1, L2, L3, and L4 relays, respectively.

(c) Depressing two adjacent vertical dial buttons at the same time will only produce the high frequency tone for that row. Rows from left to right operate H1, H2, and H3 relays, respectively.

**3.05** Procedure for adjusting H and L relay operation is as follows:

(a) Connect a telephone set equipped with a 12-button TOUCH-TONE dial to any convenient T and R terminals associated with TOUCH-TONE dial stations, so that the 247A KTU can be observed while operating dial buttons.

(b) Block TOA relay operated to prevent time-out.

(c) Adjust L relay as follows:

- (1) Remove handset
- (2) Depress any two adjacent horizontal dial buttons in the top row.
- (3) Adjust L bias potentiometer counterclockwise until L1 relay fails to operate.
- (4) Readjust potentiometer clockwise until only L1 relay operates properly.
- (5) Now successively depress two adjacent horizontal dial buttons in the other rows to observe the operation of L2, L3, and L4 relays. Readjust L bias potentiometer if necessary according to (3) and (4).

*Note:* If a readjustment is necessary, repeat tests for all L relays.

(d) Adjust H relay as follows.

(1) Follow same procedure as for L relay except that two adjacent vertical dial buttons are depressed and H bias potentiometer is adjusted.

(e) Operate each dial key individually, observing that the proper H and L relay combination is operating according to Table A. If necessary readjust the bias potentiometers.

(f) Remove blocking tool from TOA relay.

(g) Initiate several test calls to make sure that signaling occurs at the selected station.

(h) Remove telephone set used for tests from the line.

**3.06** To check the time-out feature, remove the handset of a TOUCH-TONE dial station and observe the time it takes to receive the interrupted warning tone. This should occur in 5 to 10 seconds.

◆ TABLE A ◆  
DIGIT SEQUENCE

DIGIT	FREQUENCIES TRANSMITTED	RELAYS OPERATED
1	1209 & 697	H1, L1
2	1336 & 697	H2, L1
3	1477 & 697	H3, L1
4	1209 & 770	H1, L2
5	1336 & 770	H2, L2
6	1477 & 770	H3, L2
7	1209 & 852	H1, L3
8	1336 & 852	H2, L3
9	1477 & 852	H3, L3
0	1336 & 941	H2, L4

*Note:* All high frequencies  $\pm 2$  cps; all low frequencies  $\pm 1$  cps.

#### 4. CONNECTIONS

**4.01** For connections refer to Section 512-534-400 for 2A Communication System (Business Interphone) and to Sections 518-410-400, 518-410-401, or 518-410-402 for Selector-Only Arrangement, Single-Talking Link Arrangement and Two-Talking Link Arrangements, respectively.

#### 5. MAINTENANCE

##### 247B KTU

**5.01** Maintenance is limited to replacement of circuit packs.

**5.02** To replace circuit packs (Fig. 3):

- (1) Loosen and swing open retaining strap.
- (2) Grasp D-ring and pull straight out of unit.
- (3) Align replacement with top and bottom slides and push forward until seated in connector.
- (4) Refasten retaining strap making sure all circuit packs are fully seated.

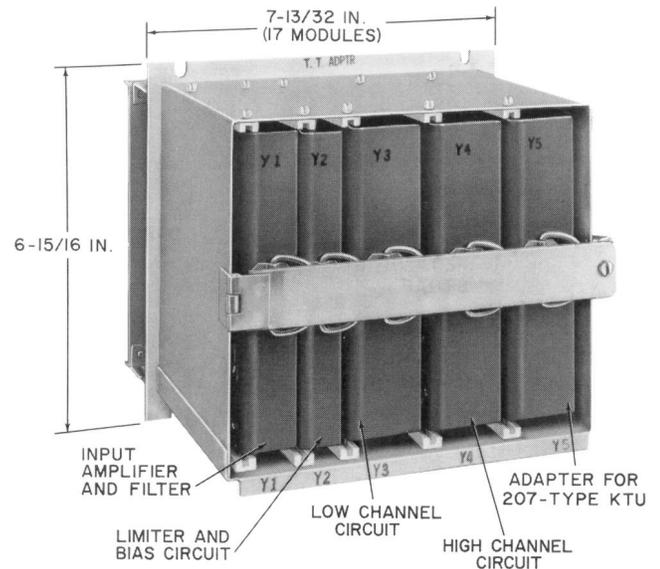
##### 247A KTU

**5.03** Maintenance should be limited to the following:

- (a) Checking relay portion of unit

*Note:* When checking relay portion of unit, all three printed board assemblies must be removed from unit to prevent possible damage to transistors.

- (b) Replacing of defective printed board assemblies.
- (c) Adjusting H and L bias potentiometers for Proper operation of H and L relays.



**Fig. 1—247B KTU, Front View**

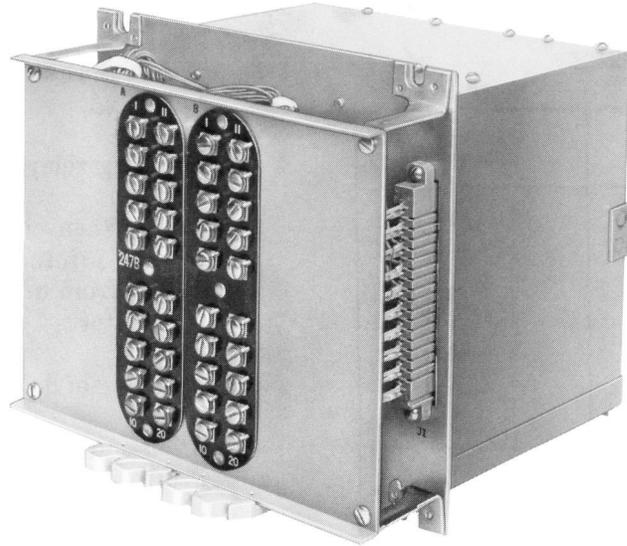


Fig. 2—247B KTU, Rear View

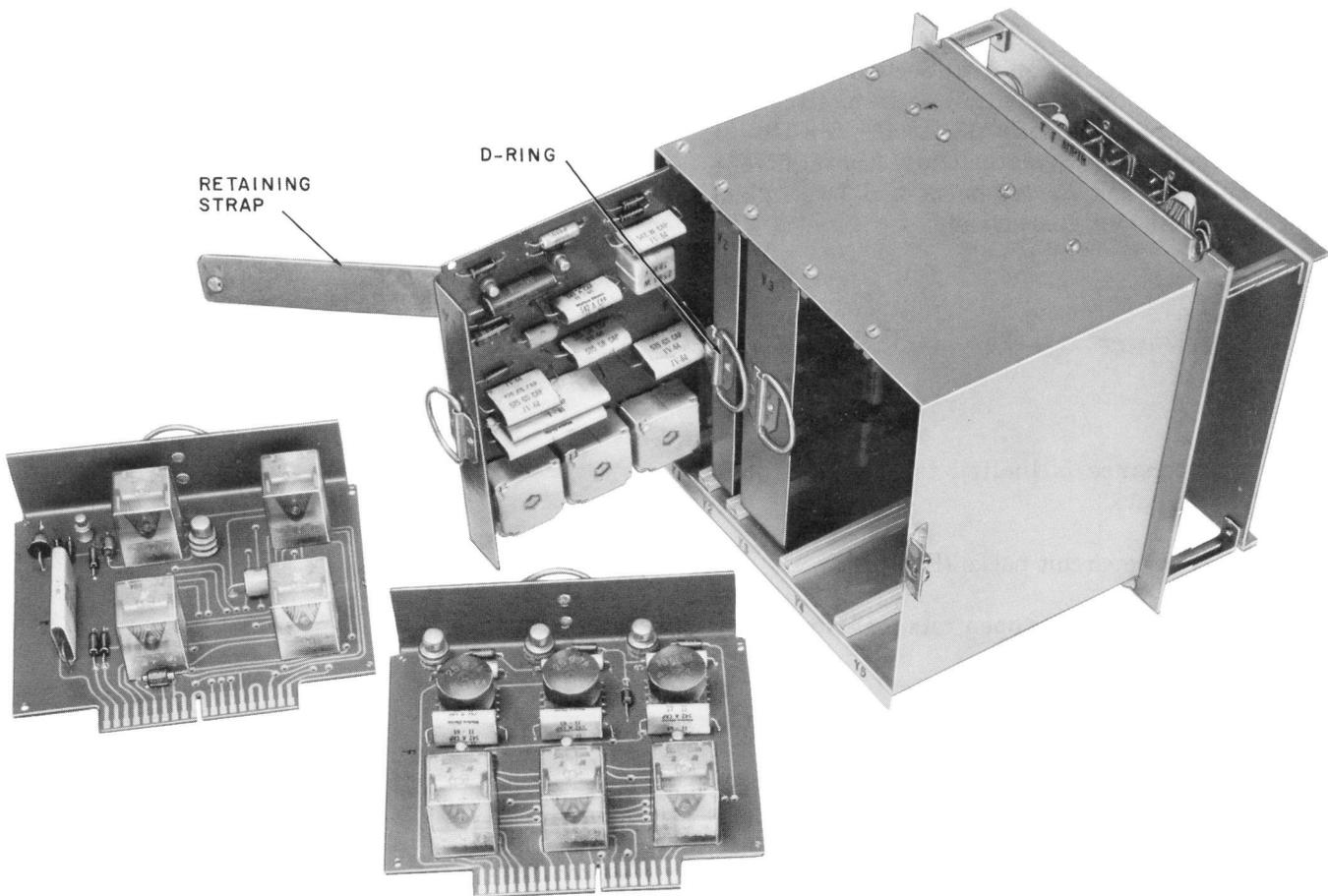


Fig. 3—247B KTU, Circuit Pack Removal

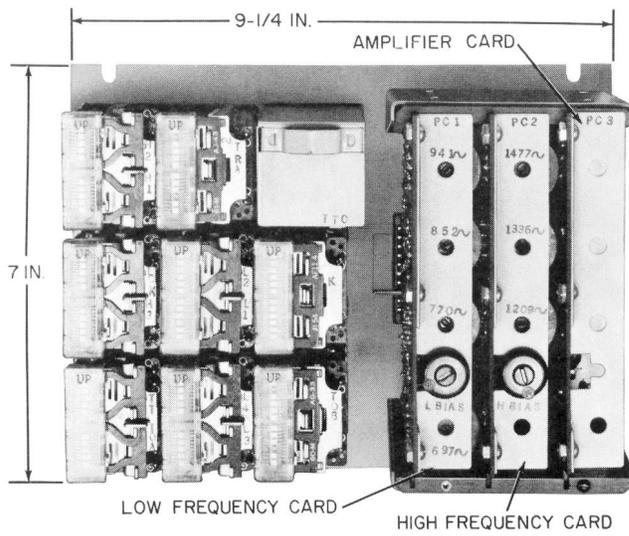


Fig. 4—247A KTU TOUCH-TONE Adapter, Front View

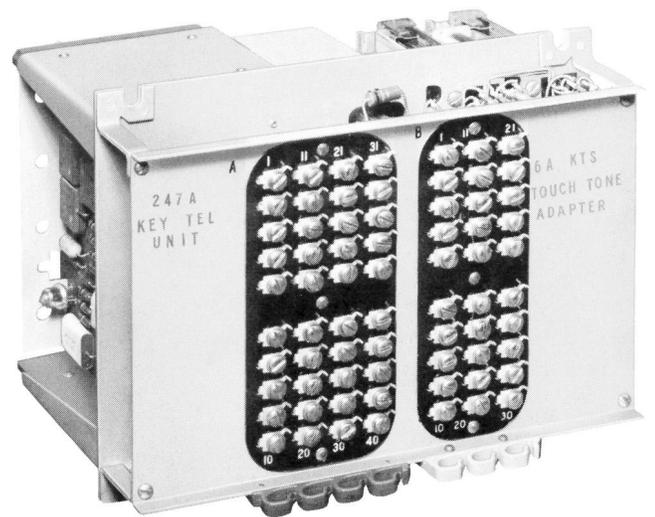


Fig. 5—247A KTU TOUCH-TONE Adapter, Rear View