

4450B DELAYED TRANSFER/MESSAGE WAITING CARD

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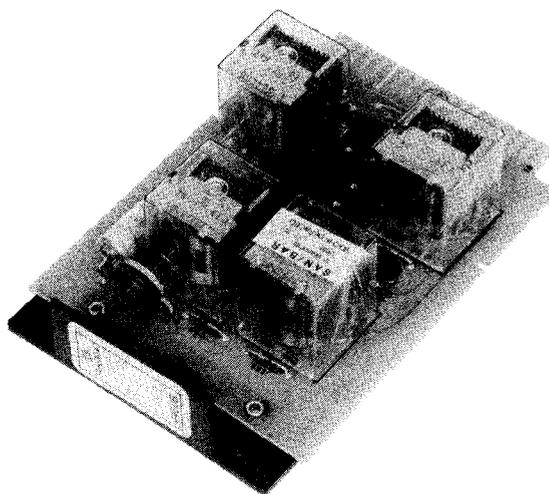


Fig. 1 4450B Card

IMPORTANT: READ CAREFULLY BEFORE INSTALLING CARD.

1. GENERAL

1.1 This section provides circuit description, installation and basic testing information for the San/Bar 4450B Delayed Transfer/Message Waiting Card.

1.2 The San/Bar 4450B card (Fig. 1) provides for automatic transfer of the ringing signal from a principal telephone set to the attendant telephone set after a variable time-out period. The 4450B also provides for a message waiting signal to the principal telephone station, set by the attendant by use of a dedicated non-locking line key. The two functions are independent and may be used separately, if desired.

The 4450B card is a standard 4-inch, 18-pin printed circuit card designed for use in Key Telephone Systems.

2. SPECIFICATIONS

2.1 LIST OF APPLICABLE DRAWINGS

- P.C. Board Assembly No. ED-4450-000
- Schematic No. SD-4450-000 (Fig. 4)
- Bill of Material No. BM-4450-000 (Ref.)
- Artwork No. AW-4450-000 (Ref.)

2.2 ELECTRICAL CHARACTERISTICS

- B-Battery Voltage: -20V to -26 VDC
- B-Battery Current: 145 MA max
Idle Current: 5 MA

c. Operating Environment:

Temperature — 0°C to 50°C

Humidity — 0 to 90%

Altitude — Seal level to 15,000 ft.

d. Ring Control: Control signal from the 4000 line card which initiates transfer timing circuits.

OPEN — Idle or call answered

GND — GND — Incoming call

e. Transfer Time: Adjustable 1-30 seconds factory set at 8 seconds nominally.

f. Immediate Transfer: Control signal (c) from the principal telephone set, providing no delay transfer.

OPEN — Delayed Transfer

GND — Immediate Transfer

g. Ringing Options: See section 5. for installation instructions. Two basic options are provided.

LR — Line Ringing (C.O.)

RC — Local Ringing, used with:

T — Steady ringing (105 VAC)

X — Steady buzzer

W — Interrupter signal

Options RC and W are factory set.

h. Lamp Flash: Transfer of lamp flash signal from the 4000 line card thru the 4450B card to the telephone sets.

- i. Attendant A-Lead: A-Lead function for the attendant teletest to the 4000 line card. (Required only when normal A-Lead from attendants line key is used as a message key).
- j. Message and Control Keys: Used to set message lamp.
 OPEN = Idle condition
 GND = Message waiting

2.3 PHYSICAL CHARACTERISTICS

- a. Dimensions: 5.3" x 3.5" x 1.4"
- b. Weight: 8 oz. nominal
- c. Connector: 18-pin single sided card-edge, .150" spacing
- d. Keying: Slots between pins 5 and 6, and between pins 12 and 13.

3. INSPECTION

Inspect the unit thoroughly, as soon as possible after delivery. If any part of the unit has been damaged in transit, report the extent of damage to the transportation company immediately. If the unit is to be stored for some time before installation, it is recommended that an operational check be made prior to storage. The purpose of this check is to make sure that the unit is in proper working order as received from the factory. If the check indicates satisfactory performance, the unit is to be stored for future installation.

4. MOUNTING

San/Bar 4450B circuit card is the same physical size and has keying and locking capabilities identical to the WE 400 line card. The card will plug into a mounting shelf equipped for standard 4-inch, 18-pin cards.

NOTE: CAUTION MUST BE USED IN INSTALLING THE CARD. INADVERTENTLY PLUGGING CARD INTO A LINE CARD POSITION MAY CAUSE CARD DAMAGE. CAREFULLY CHECK WIRING AND STRAPPING OPTIONS BEFORE INSTALLING.

5. INSTALLER CONNECTIONS

- 5.1 The San/Bar 4450B card installation connections are shown in Figs. 2 and 3. It is important to note that the pin assignments (or functions) change as a function of the strapping options.

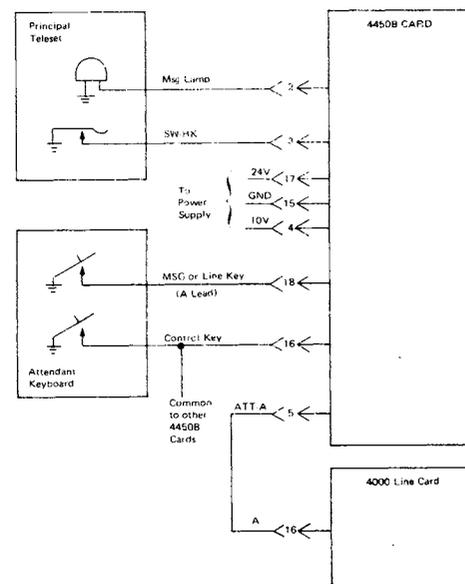


FIGURE 2

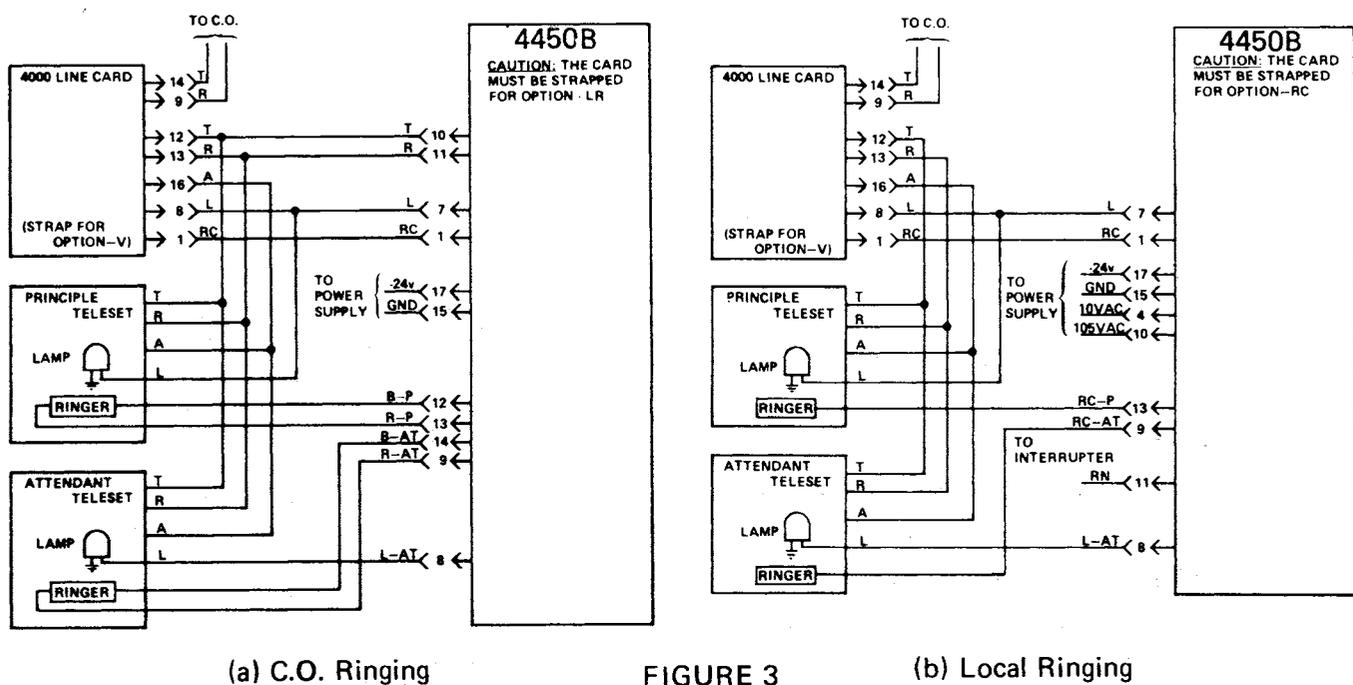


FIGURE 3

- 5.2 In areas of high thunderstorm activity the following information is offered:

Continued and extensive tests of card failure due to lightning surges indicates that the best protection is to have a separate earth ground (cold water pipe) for the KTS power supply and do not use an adjacent or easily available AC circuit ground for this purpose.

6. CIRCUIT DESCRIPTION

See schematic No. SD-4450-000 as shown in Fig. 4.

6.1 INCOMING CALL

When there is an incoming call, the ring control (RC) is grounded by the 4000 line card. Note that the 4000 line card must be strapped for ground ring control for proper operation. This ground action energizes K2 relay and contacts K2-D thru K2-F operate, affording the following functions:

- a. Grounding RC initiates the delay circuits by immediately charging up C1, which in turn slowly discharges thru R2, R4, R4 is a single turn potentiometer and clockwise rotation increases R4, thus increasing the delay time. Delays of 1 to 30 seconds may be set.
- b. K2-D connects relay K1 to Q1, Q2 switch combination. Q1, Q2 will switch when the potential across C1 reaches trigger level, thus energizing K1.
- c. K2-E opens the connection of lamp flash (L) to the attendant lamp (L-AT).
- d. Two options are provided for ringing: 1) LR for line ringing from the central office, or 2) RC for local ringing control. From the schematic, note that pins 9, 10, 11, 13, and 14 change functions with the above strapping options.

RC option: K2-F connects the local ringing voltages (thru the strapping blocks) thru contact K1-B to the ringing voltage output (RC-P) for the principal station. Ringing voltage is also connected to the non-transferring common output (RC-PA).

LR option: Since relay K1 has not energized yet, the line tip (T) and ring (R) are connected through K1-E and K1-B to the line ringer output for the principal station (B-P, R-P).

6.2 CALL ANSWERED AT PRINCIPAL STATION

When the incoming call is answered at the principal station, the 4000 line card removes ground from the ring control input. This

action terminates the delay function and de-energizes relay K2. Contacts K2-D through K2-F release, affording the following functions:

- a. K2-D disconnects K1, therefore K1 will remain unenergized and no ringing transfer takes place.
- b. K2-E connects lamp flash to the attendant which will indicate line busy.
- c. RC option: K2-F disconnects ringing voltage to the principal station.

6.3 CALL UNANSWERED AT PRINCIPAL STATION

If the incoming call is unanswered at the principal station, the delay circuit times out (in accordance with the setting of R4) in 1 to 30 seconds. Q1, Q2 will then conduct and energize relay K1. Contacts K1-B thru K1-E operate, affording the following functions:

- a. K1-C connects lamp flash to the lamp at the attendant station.
- b. LR option: K1-E and K1-B transfer the line tip and ring from the principal line ringer to the attendant line ringer (B-AT, R-AT). RC option: K1-B transfers the ringing voltage from the principal station to the attendant station (RC-AT). Note that ringing voltage output, RC-PA, does not transfer.

6.4 Call Answered at Attendant Station

When the call is answered at the attendant station, ring control is ungrounded by the line card. Relay K2 de-energizes which in turn de-energizes relay K1 by opening contact K2-C. The functions that occur are as described in section 6.2.

6.5 Immediate Transfer at Principal Station

If desired, the principle may initiate immediate transfer by grounding the immediate transfer control (C) thru the use of a turn key at the principal station. Relay K1 will be continuously energized, therefore all incoming calls will immediately ring at the attendant station but not at the principal station.

6.6 Message Waiting Circuit

This circuit is independent of the ringing transfer circuit. Control is directly from the attendant station keyboard and not thru any other cards in the KTS. The sequence of operation is as follows:

- a. Grounding of the message key (or line button A-Lead) energizes relay K3, thus operating contacts K3-B and K3-F. K3-B

connects the control key input to relay K-4. Contact K3-F applies ground to the Attendant A-Lead output which connects to the line card A-Lead input.

- b. Grounding the control key energizes relay K4, thus operating contacts K4-F and K4-C. K4-C connects 10 VAC to the message lamp at the telephone station. K4-F connects ground from the telephone stations switch hook to relay K4. Normally the control key is a momentary switch, therefore K4 is held energized only by the switch hook.
- c. The message lamp at the telephone station remains on until the principal station goes off-hook. Upon going off-hook, ground is removed from relay K4, thus de-energizing. Contacts K4-C and K4-F release, removing 10 VAC from the message lamp and opens the path between the SW-HK and K4, therefore when the station goes back to on-hook, the message lamp remains off until being reset by the attendant keys.

7. TESTING

- 7.1 If trouble is encountered with the operation of the 4450B card, check that all installer connections and card strapping options have been properly made. Make certain that the 4450-B card is making good connection with the shelf and connector, snap the card out and in several times. If trouble persists use the procedure in 7.2

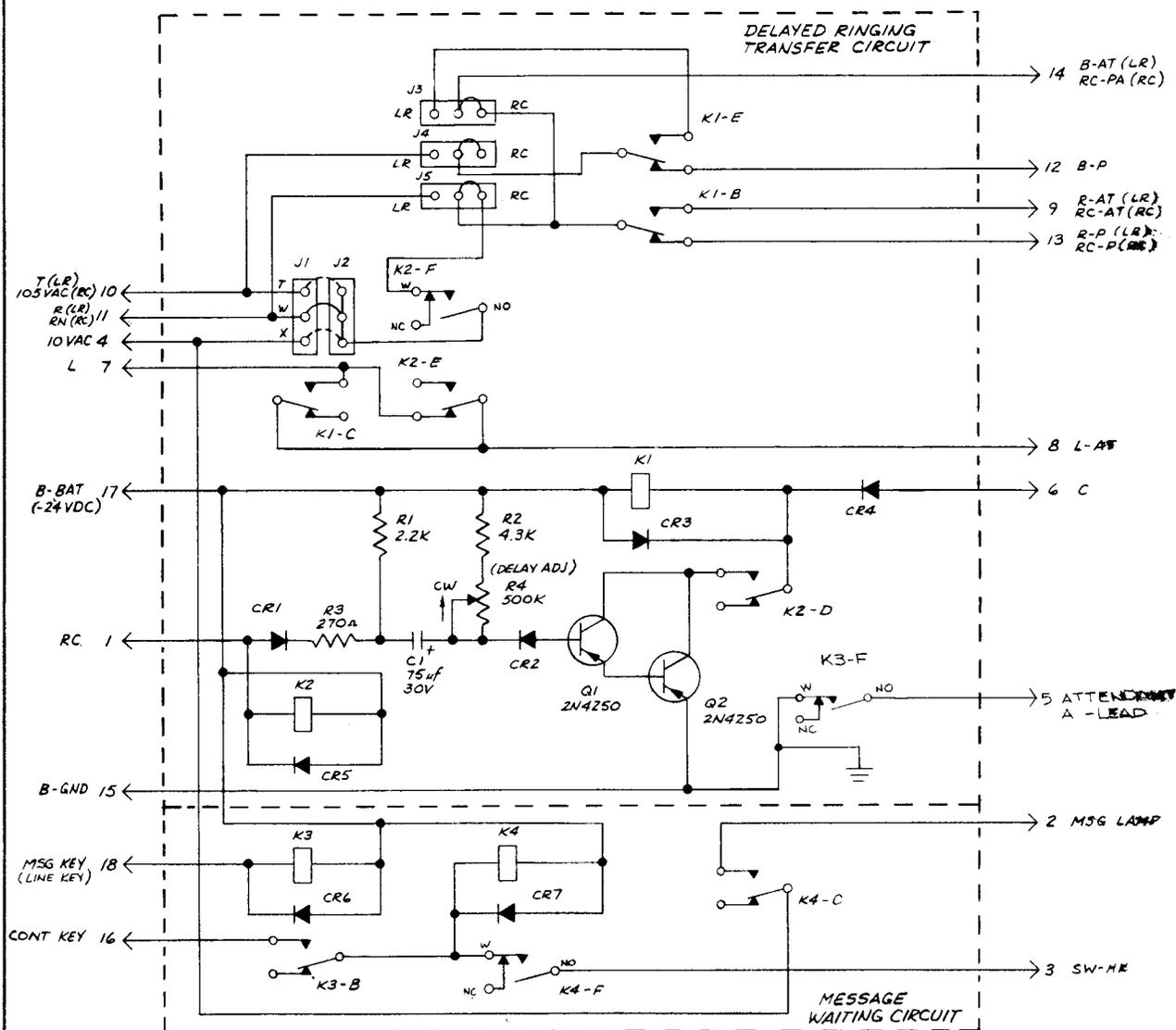
7.2 to determine whether the 4450B card has failed, or whether the problem is elsewhere in the system.

- 7.2 Using a multimeter (Simpson 263 or equivalent), verify that the following input voltages are present at the connector:
 - a. 24 VDC between pins 15(+) and 17(-)
 - b. 10 VAC at pin 4 (if used)
 - c. 105 VAC at pin 10 (RC option)
 - d. Interrupted 105 VAC at pin 11 during ringing period (RC option)
 - e. 24 VDC between pins 15 (+) and 1 (-) during idle period, and 0 VDC during ringing period. This tests the RC input.
 - f. Interrupted 10 VAC at pin 7 during ringing period. This tests the L input.
 - g. If line ringing is used (LR option), interrupted 50 VAC to 150 VAC between pins 10 and 11 during ringing period. This tests the line (T,R) input.

This completes the test of the input voltages to the 4450B card. If all the proper input voltages are present, the failure is most likely in the 4450B card. If an incorrect input voltage was detected, check for other possible system failures before replacing the 4450B card.

- 7.3 Field repairs involving replacement of components on the card are not recommended. All San/Bar products are warranted for 2 years from the date of purchase. Return to San/Bar Corporation, 17422 Pullman St., Santa Ana, California 92711. For technical assistance call (714) 546-6500.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
1	PROTO REL PER DCN 0069	4/8/73	W.P.S.
A	FORMAL REL PER DCN 0078	4/30/73	W.P.S.
B	INCORP DCN 0119	7/16/73	W.P.S.



RELAY CONTACTS
M1-A, D, E
M2-A, B, C
M3-A, C, D, E
M4-A, B, D, E

STRAPPING OPTIONS			
FACTORY SET	OPTION	REF DESIG	FUNCTION
	T	J1, J2	STEADY RINGING
YES	W	J1, J2	INTERMITTED RINGING
	X	J1, J2	STEADY BUZZER
	LR	J3, J4, J5	LINE RINGING (NOT EFFECTED BY OPTIONS T, W, X)
YES	RC		LOCAL RING CONTROL (USED WITH OPTIONS T, W, X)
0 SEC NOM	700MS DELAY	R4	ADJ 1-30 SECONDS COUNTERCLOCKWISE INCREASES DELAY

NOTE: PINN 9, 10, 11, 12 & M CHANGE ELEMENTS WITH TIME (LR) OR (RC) OPTIONS

- LINKING 3 PAIRS OF TERMINALS ON J3, J4 & J5.
- ALL DIODES ARE IN4002.
 - ALL RESISTORS ARE 1/2W, 5%.

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED		CONTR NO.		SAN / BAR CORP.	
DIM. IN INCHES		DR SUSSMAN	ENG J. J. Mott	13422 PULLMAN STREET SANTA ANA, CALIFORNIA 92711	
TOLERANCES		2-22-73	3/7/73	SCHEMATIC - DELAY TRANS	
X ± .1		CHK	PROJ	MSG WAITING - MODEL 4450B	
XX ± .03		DSGN	REL	SIZE	CODE IDENT NO. - DWG NO.
XXX ± .010		APPD		C	27412 - SD-4450-000
ANGLES ± 0.5°				SCALE	LTR
MACH. FIN. ✓					B
BREAK ALL SHARP EDGES AND CORNERS					SHEET

DASH NO.	NEXT ASSY	USED ON
		APPLICATION

FIGURE 4
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