

**SB4451A LINE TRANSFER CARD**

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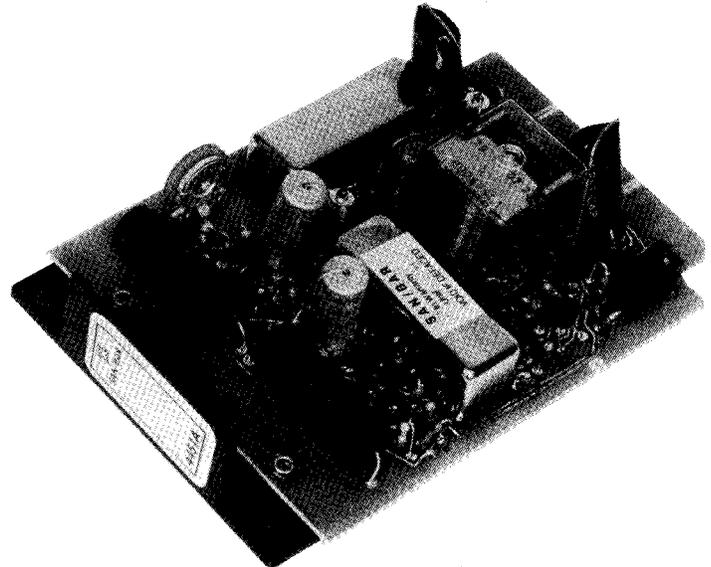


Fig. 1 4451A Card

**1. GENERAL**

1.1 This section provides circuit description, installation instructions and basic testing information for the San/Bar 4451A Line Transfer Card.

1.2 The 4451A provides for automatic transfer of a telephone line to a second telephone line after an adjustable amount of time has occurred. Before transfer, two telephone lines pass through the card to their respective telephones. Each telephone, and associated line pair, acts independently as a normal exchange line. During transfer, line No. 1 is connected to telephone No. 2. At the same instant telephone no. 1 is isolated and line no. 2 is optionally open circuited or seized with a 120 ohm resistor, depending on the strap option selected. Another strap option allows the card to operate from either -24VDC or -48VDC.

The 4451A components are installed on a standard 18 pin line card printed circuit board size. The card is highly compatible with existing key systems or may be installed in any of the San/Bar equipment mounting shelves as described in paragraph 4 "Mounting".

**2. SPECIFICATIONS**

2.1 List of applicable drawing

- (a) P.C. Board Assembly No..  
ED-4451-000
- (b) Schematic No. SD-4451-000 (Fig. 5)

- (c) Bill of Material No. BM-4451-000
- (d) Artwork No. AW-4451-000

2.2 Electrical Characteristics

- (a) Power Requirements: -40 to -59VDC  
or -20 to -30VDC
- (b) Current: 80 MA maximum  
10 MA idle (-24VDC)  
60 MA idle (-48VDC)
- (c) Operating Environment:  
Temperature -0°C to 50°C  
Humidity -0 to 95%  
Altitude --Sea Level to 14,000 ft.
- (d) Ringing detection: responds within  
200 ms. to ringing voltage of 65  
VAC r.m.s. or greater.
- (e) Transfer Time: Adjustable from 2 to  
60 seconds. Factory set at 10 seconds.
- (f) Transfer Back Time: 200 ±50 ms.  
after phone hangs up, or 6 to 20  
seconds after ringing stops.
- (g) Conditions for Transfer: transfer  
will not occur if:
  - 1) ringing is detected on line 2,
  - 2) line 2 is in use,
  - 3) line 1 answers before transfer.
 transfer occurs after time out only  
if none of the above is true and

ringing continues to be detected on line 1.

- (h) Strap options: two options are provided.  
-24V or -48V -- selected according to available power.  
A or B-- "A" leaves line 2 open ended upon transfer, "B" seizes line 2 upon transfer with a 120 ohm resistor.

### 2.3 Physical Characteristics

- (a) Dimensions: 5.3" x 3.5" x 1.4"  
(b) Weight:  
(c) Connector: 18 pin single-sided card-edge, 0.150" 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 may be stored for future installation.

### 4. MOUNTING

The San/Bar 4451A circuit card is the same physical size and has keying and position locking capabilities identical to the SB4000 line card. The card is mechanically compatible with mounting shelves designed for standard 3.5 inch, 18 pin, line cards.

- 4.1 For applicable equipment mounting shelves, see Figure 4.

### 5. INSTALLER CONNECTIONS

5.1 The recommended mounting shelf for the S/B 4451A is the San/Bar 315A or 317A. They can be used without modification. Figure 2 shows the general requirements needed to install the 4451A circuit card. Figure 3 shows the connection pattern for hookup to the 4451A card when installed in a 315A or 317A shelf and interfaced with a type 66 connecting block.

- 5.2 Strap options for the 4451A circuit card

are factory set for -48VDC and "B" position.

## 6. CIRCUIT DESCRIPTION

### 6.1 Incoming Call on Line 1.

Components R1, R2, C1, C2, CR1-CR4, and K1R form a ringing detect circuit on line 1. R6, R7, C4, C5, CR5-CR8, and K2R form a ringing detect circuit on line 2. Ringing on line 1 causes closure of the K1 contacts, which turns off Q2 and allows C3 and C6 to begin charging. C3, R5, and R8 form a time constant sufficiently long to hold Q2 off during the 4 second silent interval between rings. R11 is adjusted so that R 10, R11, and C6 form a time constant which allows the desired number of rings before threshold voltage is reached. Threshold is determined by the divider R 16 and R19. When the voltage at Q3-base exceeds that of Q4-base, Q3 turns on, turning on Q5 and Q6 and operating K3 to effect the transfer of line 1 to telephone 2.

### 6.2 Incoming Call on Line 2.

K2L and C10 form a loop current detect circuit for line 2. If ringing or loop current is detected in line 2, the contacts of K2 close, inhibiting transfer of the call by preventing C6 from reaching threshold voltage.

### 6.3 Call Answered on Line 1.

R15, C7, C8, CR11 - CR14, and IC1 form a loop current detect circuit for line 1. If loop current is detected in line 1 before transfer (i.e. before operation of K3), the photo transistor across pins 4 and 5 of IC1 switches on, which turns on Q1 and Q2 to prevent C6 from charging to threshold. Therefore, no transfer occurs. If loop current is detected in line 1 after transfer (i.e. after K3 operates), then in addition to Q1 and Q 2 being turned on, Q5 and Q6 are held on as well through R 18, CR15, and K3B.

### 6.4 Hang Up After Transfer.

After the transferred call is answered by telephone 2, the actuation of Q1 discharges C3, and the actuation of Q2 discharges C6. This prepares the circuit to reset quickly upon hang up of telephone 2. When telephone 2 is placed on hook, loop current ceases in line 1, and IC1 turns off. This removes the ground on CR15

through K3B, and Q5 turns off after a 200 msec time constant determined by C9 and R18. Then Q6 turns off, and K3 releases to return the circuitry to the idle condition.

7.1 If trouble is encountered with the operation of the 4451A card, check to assure that all installer connections and strap options have been properly made. Make certain that the 4451A card is making good connection with the mounting assembly card connector. If trouble persists use the procedure in paragraph 7.2 to determine whether or not the problem is in the 4451A circuit card.

7.2 Using a high impedance multimeter (Simpson 263 or equivalent) test the 4451A card as follows:

(a) Check the DC voltage at pin 17 referenced to pin 15. A nominal -24VDC or -48VDC should be measured. Verify that the strap option on the card is correct for the voltage measured.

- (b) With the telephones on hook, verify the presence of C.O. battery voltage across pins 14 (+) and 9(-) as well as across pins 3 (+) and 18 (-).
- (c) With the telephones off hook, verify that the battery voltages measured in part (b) above drop to a low level (3 to 15VDC)
- (d) Adjust R11 fully counter-clockwise. Place telephones on hook. If telephone 1 rings with an incoming call on line 1 and there is no incoming call on line 2, transfer of ringing to telephone 2 should occur within 3 rings. If not, the card is probably defective.

7.3 Field repairs involving replacement of components on the circuit card are not recommended. All San/Bar products are warranted for two years from the date of purchase. Should it be determined that the 4451A circuit card is defective, return it to San/Bar Corp.; 17422 Pullman St., Santa Ana, CA. 92705. For technical assistance call (714) 546-6500.

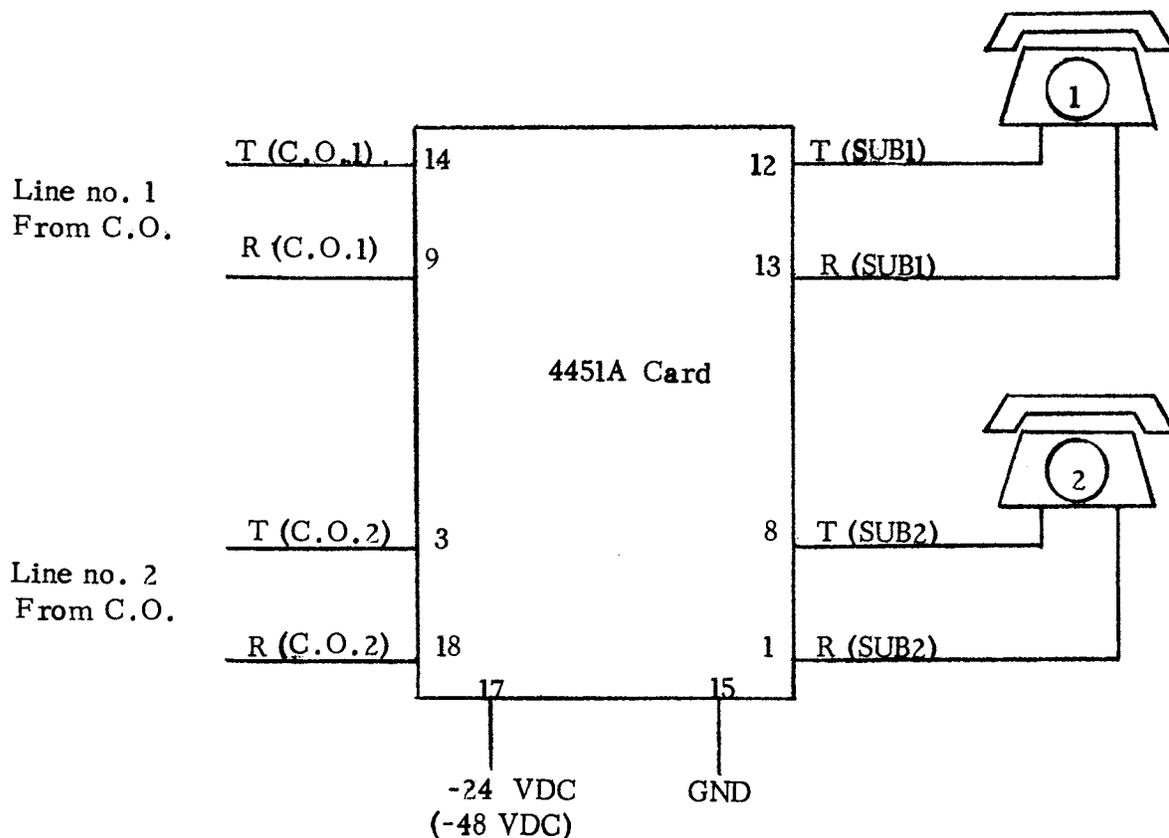
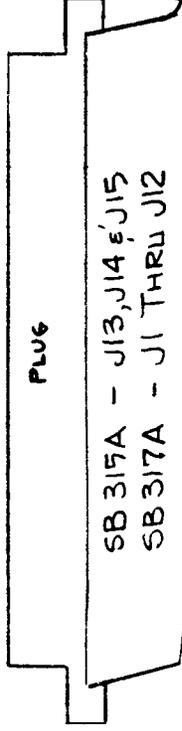
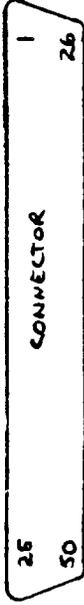


Fig. 2 Installation Information

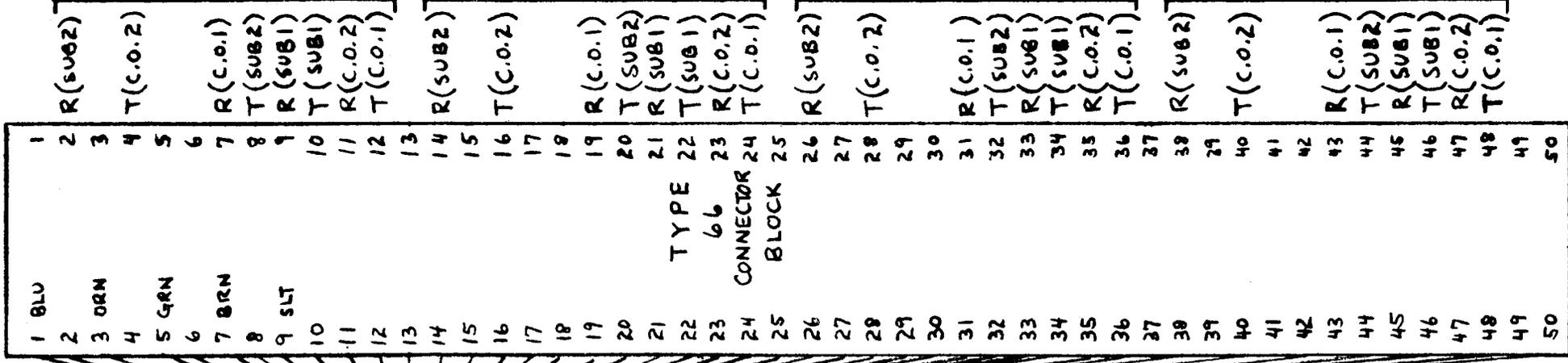


AMPHENOL AC-ARSD-SE-XX

XX DESIGNATES CABLE LENGTH MULTIPLIER FOR 5 FT. INCREMENTS

J13	J14	J15	TYPE 66 PIN NOS.
9	5	1	1-12
10	6	2	13-24
11	7	3	25-36
12	9	4	37-48

P.C.B. POSITION	CONN. NO.	TYPE 66 BLOCK PIN NOS.
1	J1	1-12
2	J2	13-24
3	J3	25-36
4	J4	37-48
5	J5	1-12
6	J6	13-24
7	J7	25-36
8	J8	37-48
9	J9	1-12
10	J10	13-24
11	J11	25-36
12	J12	37-48



INTERFACE CONNECTIONS FOR 4451A IN CARD CONN. POSITION 1, 5 OR 9 OF 315A OR 317A

INTERFACE CONNECTIONS FOR 4451A IN CARD CONN. POSITION 2, 6 OR 10 OF 315A OR 317A

INTERFACE CONNECTIONS FOR 4451A IN CARD CONN. POSITION 3, 7 OR 11 OF 315A OR 317A.

INTERFACE CONNECTIONS FOR 4451A IN CARD CONN. POSITION 4, 8 OR 12 OF 315A OR 317A.

Fig. 3 Installation Information

Model	No. of Cards	Conn. Type	Application	Wiring
S/B302A	(2)	18 Pin	Wall mounting or 105C apparatus box	None provided, install per figure 2
S/B 307A	(2)	40 Pin (Universal)		
S/B 315A	(12)	18 Pin	C.O. 23" rack or K.T.S. rack	Fully wired, no modification required see figure 2 and 3.
S/B 317A	(12)	40 Pin (Universal)	C.O. 23" rack or K.T.S. rack	Fully wired, no modification required see figure 2 and 3.
S/B 318A	(2)	18 Pin	7" K.T.S. rack	None provided, install per fig. 2
W.E.584	(15)	18 Pin	23" C.O. rack or K.T.S. rack	Isolate existing wires on pins 3 and 18, add new wires out to R66 block.

Fig. 4 Selection Table – Equipment Mounting Shelf

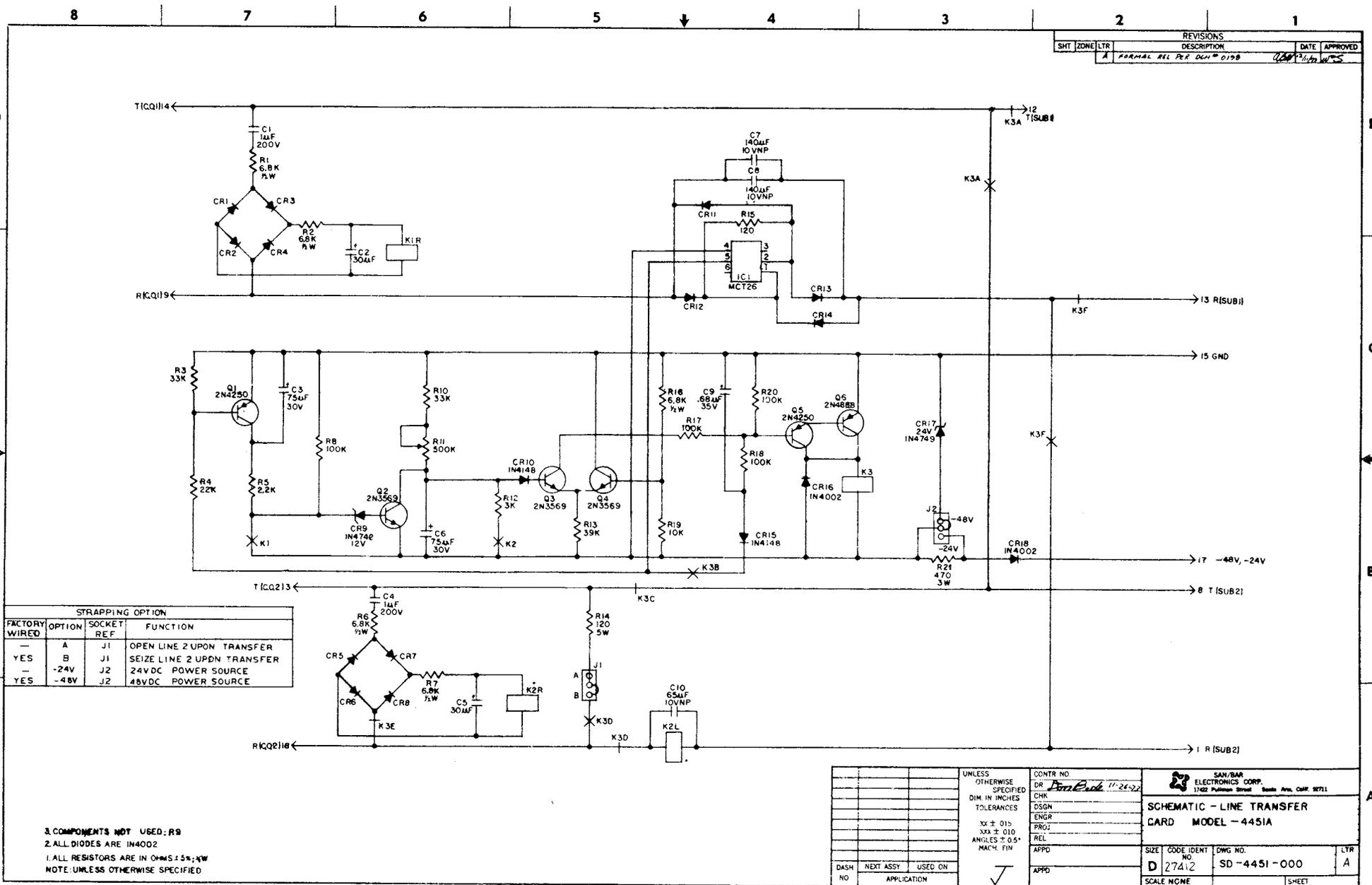


Fig. 5