

4448A DELAYED RINGING TRANSFER CARD

CONTENTS

| | Page |
|--------------------------------|------|
| 1. GENERAL | 1 |
| 2. SPECIFICATIONS | 1 |
| 3. INSPECTION | 2 |
| 4. MOUNTING | 2 |
| 5. INSTALLER CONNECTIONS | 2 |
| 6. CIRCUIT DESCRIPTION | 3 |
| 7. TESTING..... | 4 |

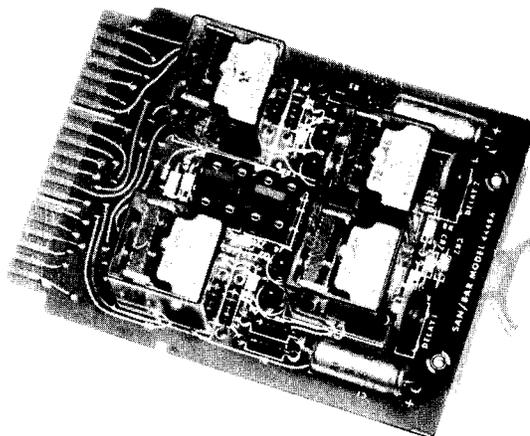


Fig. 1 4448A Card

1. GENERAL

1.1 This section provides circuit description, installation and basic testing information for the San/Bar 4448A Delayed Ringing Transfer Card.

1.2 The San/Bar 4448A Card (Fig. 1) provides for automatic transfer of the ringing signal from a principal telephone set to the attendant telephone station after a variable time-out period. Two identical and independent circuits are provided on the 4448A card, thus serving two pairs of telephone sets.

The 4448A card is a standard 4-inch, 40-pin printed circuit card designed for full compatibility with Key Telephone Systems.

2. SPECIFICATIONS

2.1 List of applicable drawings

- (a) P.C. Board Assembly No. ED 4448-000 (Fig. 5)
- (b) Schematic No. SD-4448-000 (Fig. 4)
- (c) Bill of Material No. BM-4449-000
- (d) Artwork No. AW-4448-000 (ref)

2.2 Electrical Characteristics

- (a) B-Battery Voltage: -20V to -26 VDC

- (b) B-Battery Current: 150 MA Max (75 MA/Ckt)
Idle Current—10 MA
- (c) Operating Environment:
Temperature—0°C to 50°C
Humidity—0 to 90%
Altitude—Sea level to 15,000 ft.
- (d) Ring Control: Control signal from the 4000 line card which initiates timing circuits.
OPEN—Idle or call answered
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) Line Ringing: Transfer of ringing voltages from the central office to the telephone ringers.
- (h) Local Ringing: Strapping option provides the following:
T—Steady ringing (105 VAC)
X—Steady buzzer (10 VAC)
W—Interrupter Signal
Option—W, is factory set.

- (i) Interrupter Control: Provides start control of interrupter motor.
- (j) Lamp Flash: Transfer of lamp flash signal from the 4000 line card thru the 4448A card to the telephone sets.
- (k) Busy Signal: Control signal (BL) required for a dial selective intercom system.
 OPEN—Idle condition
 GND—Attendant Busy.

2.3 Physical Characteristics

- (a) Dimensions: 5.3" x 3.5" x 1.4"
- (b) Weight: 8 oz nominal
- (c) Connector: 40-pin double side 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 4448A circuit card is the same physical size and has keying and locking capabilities identical to the WE 448 card. The card plugs into a mounting shelf equipped for standard 4-inch, 40-pin cards such as the SB317A. For mounting techniques, see the San/Bar Equipment mounting shelf brochure.

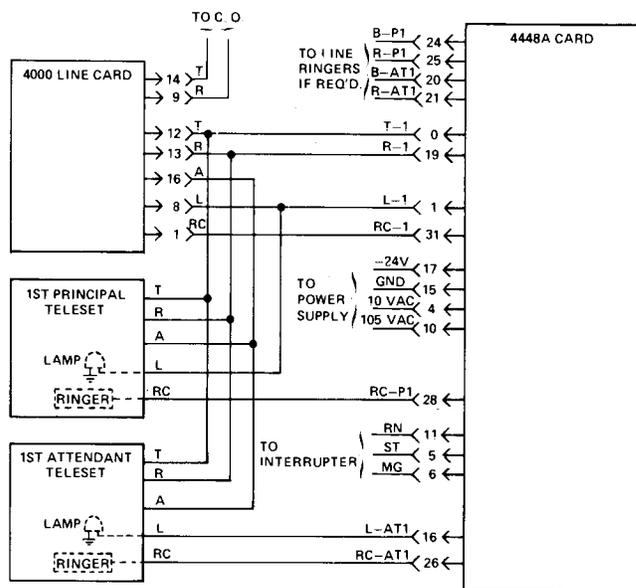


Fig. 2 Installation Connections

NOTES:

1. For proper operation, the line card must be strapped for option-V.
2. Only connections for circuit 1 of the 4448A card are shown, connections for circuit 2 are made in the same manner.

5. INSTALLER CONNECTIONS

5.1 The San/Bar 4448A card has pin assignments identical to the WE 448 card. Fig. 2 illustrates the typical connections to be made. Only circuit 1 connections are shown, however since circuit 2 is identical the connections are made in the same manner. To avoid damage to the card, careful attention must be given to the pin numbering of the shelf connector. Figure 3 illustrates pin numbering for a 40-pin connector.

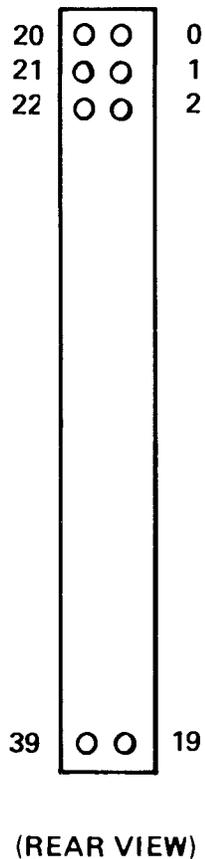


Fig. 3 Connector Pin Numbering

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-4448-000 as shown in Fig. 4. Only circuit 1 is described, however circuit 2 operates in the same manner.

6.1 Incoming Call

When there is an incoming call, the ring control (RC-1) 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-B thru K2-E operate, affording the following functions:

- (a) Grounding RC-1 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-C 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-1) to the attendant (L-AT1).
- (d) K2-B connects interrupter start control (ST) to motor ground (MG) thus starting the interrupter.
- (e) K2-D connects the ringing voltage (from the strapping block) thru contact K1-B to the ringing voltage output (RC-P1) for the principal station. Ringing voltage is also connected to the non-transferring common output (RC-PA1).
- (f) Since relay K1 has not energized yet, the line tip (T-1) and ring (R-1) are connected through K1-E and K1-C to the line ringer output for the principal station (B-P1, R-P1).

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-B through K2-E release, affording the following functions:

- (a) K2-C 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) K2-B disconnects ST and MG, thus stopping the interrupter.
- (d) K2-D 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-A thru K1-E operate, affording the following functions.

- (a) K1-D connects lamp flash to the lamp at the attendant station.
- (b) K1-E and K1-C transfer the line tip and ring from the principal line ringer to the attendant line ringer (B-AT1, R-AT1).
- (c) K1-B transfers the ringing voltage from the principal station to the attendant station (RC-AT1). Note that ringing voltage output, RC-PA1, does not transfer.
- (d) K1-A grounds the busy signal (BL-1) to the Dial Selection Intercommunicating System.

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 principal may initiate immediate transfer by grounding the immediate transfer control (C-1) 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.

7. TESTING

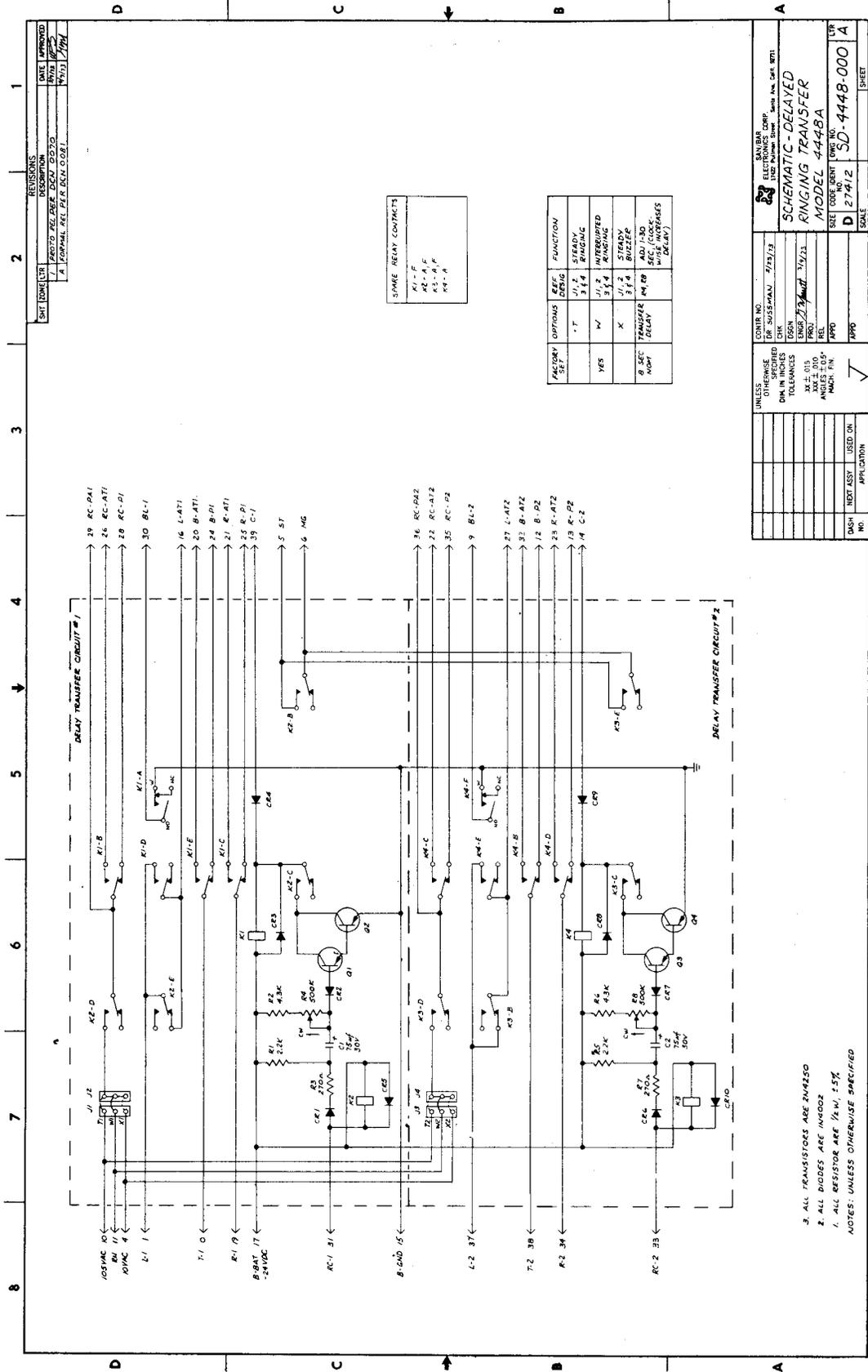
7.1 If trouble is encountered with the operation of the 4448A card, check that all installer connections and card strapping options have been properly made. Make certain that the 4448A card is making good connection with the shelf and connector, snap the card out and in several times. If trouble persists use the procedure in 7.2 to determine whether the 4448A 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 (if used)
- (d) Interrupted 105 VAC at pin 11 during ringing period.
- (e) 24 VDC between pins 15(+) and 31(-) during idle period, and 0 VDC during ringing period. This tests RC-1, repeat measurements between pins 15(+) and 33(-) for RC-2.
- (f) Interrupted 10 VAC at pin 1 during ringing period. This tests L-1, repeat measurement at pin 37 for L-2.
- (g) If line ringing is used, interrupted 50 VAC to 150 VAC between pins 0 and 19 during ringing period. This tests line 1 (T-1, R-1), repeat measurement between pins 38 and 34 for line 2 (T-2, R-2).

This completes the test of the input voltages to the 4448A card. If all the proper input voltages are present, the failure is most likely in the 4448A card. If an incorrect input voltage was detected, check for other possible system failures before replacing the 4448A 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.



SPARE RELAY CONTACTS

| |
|-----------|
| K1 - F |
| K2 - A, F |
| K3 - A, F |
| K4 - A |

| FACTORY SET | OPTIONS | DESIG | FUNCTION |
|-------------|-------------|-------|------------------------------|
| YES | *T | J1, 2 | STEADY RINGING |
| YES | W | J1, 2 | INTERLUDED |
| NO | X | J1, 2 | STEADY BUZZER |
| NO | 8 SEC DELAY | RM 08 | ADJ. 30 SEC. (LOCK-UP DELAY) |

| | | | | | |
|----------------------------|----------------|------------|-------------|-----------|--------------|
| CONTR. NO. | DATE | BY | CHK. | DATE | BY |
| DR. 5055-AN-1 | 7/13/73 | | | | |
| UNLESS OTHERWISE SPECIFIED | DIM. IN INCHES | TOLERANCES | XX ± 0.05 | XX ± 0.01 | ANGLES 0.05° |
| DASH | NOT ASSY | USED ON | APPLICATION | | |
| NO. | | | | | |

3. ALL TRANSISTORS ARE 2N4150
 2. ALL DIODES ARE 1N4002
 1. ALL RESISTORS ARE 1/4W, ±5%
 NOTES: UNLESS OTHERWISE SPECIFIED

| | | |
|--|-----------|-------------|
| DATE APPROVED | DATE | BY |
| 7/13/73 | | |
| DESCRIPTION | REVISIONS | |
| SCHEMATIC-DELAYED RINGING TRANSFER MODEL 4448A | | |
| SIZE CODE | IDENT | DWG. NO. |
| D | 27412 | SD-4448-000 |
| SCALE | | SHEET |
| | | A |

Figure 4

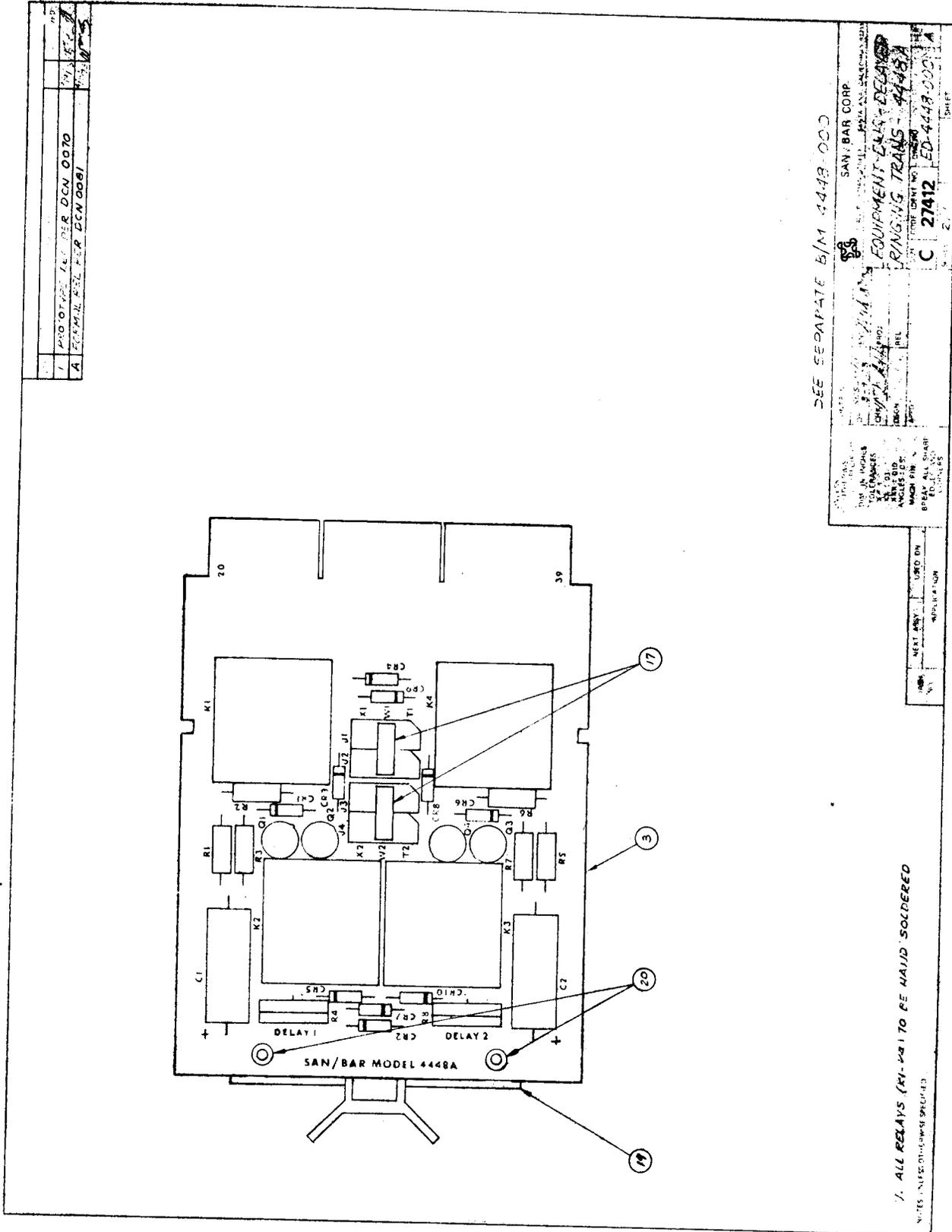


Figure 5