SAN/BAR CORPORATION
Circuit Description
Installation Series

Section 6607A-800
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SB6607A-800
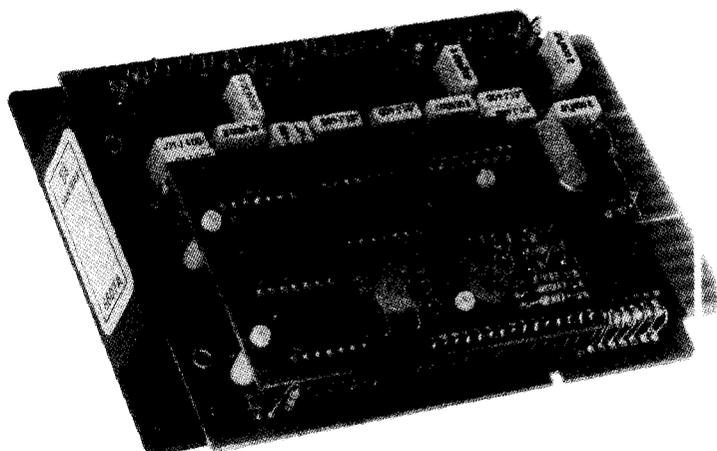## TOUCH TONE TO ROTARY DIAL CONVERTER

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1.0 GENERAL

1.1 The SB6607A-800 Touch Tone* to Rotary Dial Converter has been designed specifically to operate with the SB6607A Intercom System and the SB6609 Intercom System. The addition of the SB6607A-800 Touch Tone* to Rotary Dial Converter to either Intercom System, extends the applications of the system to provide for the use of Touch Tone* telephones with the Intercom System. When the Touch Tone* to Rotary Dial Converter is used, both Rotary Dial and Touch Tone* Dial equipped telephones may be used in the same installation.

1.2 This product is not generally applicable to other systems, due to its digital interface.

1.3 The unit is designed to be installed in standard key systems, see section 4.0 for details.

2.0 SPECIFICATIONS

2.1 List of Applicable Drawings
   a. P.C. Board assembly No. ED-6607-800, and 6607-801.
   b. Schematic No. SD-6607-800.
   c. Bill of Material No. BM-6607-800, and 6607-801.

2.2 Electrical Characteristics
   a. Power requirements -24VDC $\pm$ 3V
   b. Current 30ma.
   c. Operating environment
      Temperature 0°C to 50°C
      Humidity 0 to 90% Relative

FIGURE 1

   d. Signal detection time 22-39 msec.
   e. Signal tone burst 40 msec min., ignores 10 msec breaks within a valid burst.
   f. Will work with any DTMF telephone capable of -6dbm to 3dbm @ 30ma in a 50 ohm loop or less.
   g. Intertone burst greater than 10.6 msec.
   h. Detection frequency
      Low group 697, 770, 852, 941 Hz
      High group 1209, 1336, 1477 Hz
      Capture range -2.2 to -3.2 percent
                  +2.2 to +3.3 percent
   i. Signal to noise ratio 20db.
   j. Out of band rejection 30db.
   k. Outpulse rate 10 pulses per second, break 61% $\pm$ 2%. (20pps optional)
   l. Interdigit time 725 to 802 msec.
   m. Bridging Impedance: 2 k ohm to negative battery (200k ohm AC optional).

2.3 Physical Characteristics
   a. Dimensions: 4.75'' x 3.5'' x 1.25''.
   b. Weight: 4 oz. 115 grams.
   c. Connector: 18 pin single-sided card, edge tab 0.150'' spacing.
   d. Keying: slots between pin 5 & 6, and between pin 12 & 13.

3.0 INSPECTION

Inspect the unit thoroughly as soon as possible after delivery. If any part of the unit has been damaged in transit, report

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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 then be stored for future installation.

4.0 MOUNTING

The SB6607A-800 circuit card is the same physical size and has the same tab key and locking capability as the standard WE400 line card or SB4000 line card, and will mount in any standard Key Service Panels or KSU, such as SB319A, SB318A, SB6600A or SB6610B.

The SB318A is a two card mounting fixture, 4.25'' W x 7'' H, mounted adjacent to the SB6607 intercom. One slot could be used for SB6607-800 touch tone converter and the other slot may be used for the SB6607-400 Paging Coupler.
See section 5.1 for connections.

The SB319A is a 23'' W x 4.375'' H Key service panel; if a vacant slot is available a SB6607A-800 touch tone converter may be installed. See section 5.2 for connections.

The SB6607A-800 used in conjunction with an SB6609 Intercom, may be installed in the SB6610.

5.0 INSTALLER CONNECTIONS

5.1   Installing the SB6607A-800 touch tone converter in an SB318A mounting fixture for use with an SB6607A Intercom, requires the following steps:

a. Mount fixture SB318A adjacent to intercom SB6607A as shown in Figure 2.

b. Remove strap between TT opt 1 and TT opt 2 screw terminals of the SB6607-500 card cage.

c. Use insulated solid #22 or #24 gauge wire for all connections.

d. Spin-wrap or solder a wire to pin 17 of the 318 mounting fixture and connect the other end to screw terminal ''AB'' of the 6607 intercom.

e. Spin-wrap or solder a wire to pin 15 of the 318 mounting fixture and connect the other end to screw terminal ''AG'' of the 6607 intercom.

f. Spin-wrap or solder a wire to pin 9 of the 318 mounting fixture and connect the other end to screw terminal ''TT opt 1'' of the 6607 intercom.

g. Spin-wrap or solder a wire to pin 12 of the 318 mounting fixture and connect the other end to screw terminal ''TT BUSS'' of the 6607 intercom.

h. Spin-wrap or solder a wire to pin 13 of the 318 mounting fixture and connect the other end to screw terminal ''AUD DET'' of the 6607 intercom.

i. Spin-wrap or solder a wire to pin 14 of the 318 mounting fixture and connect the other end to screw terminal ''TT opt 2'' of the 6607 intercom.

5.2   The SB6607-800 may also be installed in a slot in a key service panel such as the SB319A, for use with the SB6607A Intercom. Jumpers must be placed between the distribution block of the SB6607A and the distribution block of the 319A. See Figure 3.

Pins of the SB319A card slot used are connected to points in the Intercom System as follows:

> Pin 9 to TT Opt 1
> Pin 12 to TT BUSS
> Pin 13 to AUD DET
> Pin 14 to TT Opt 2

Ground and negative battery are required at pins 15 and 17, respectively. These are normally bussed to all card slots in a key service panel.

5.3   The SB6607-800 and SB6609 Intercom will generally each be installed in a slot in a key service panel. Jumpers will have to be installed on the distribution block for the panel so that the following connections are made:

SB6607-800, pin 12 to SB6609, pin 13
SB6607-800, pin 14 to SB6609, pin 7
SB6607-800, pin 9 to SB6609, pin 1

Ground and negative battery are required at pins 15 and 17, respectively. These are normally bussed to all card slots in a key service panel.
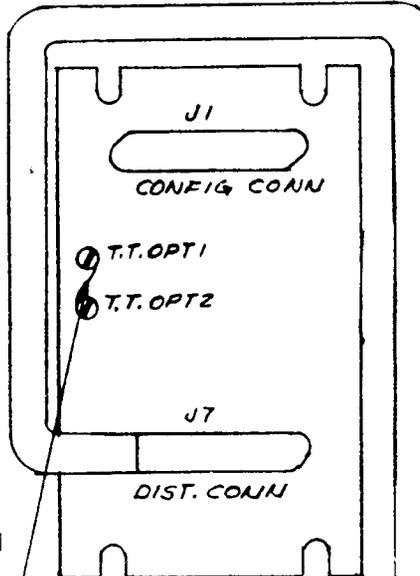
2
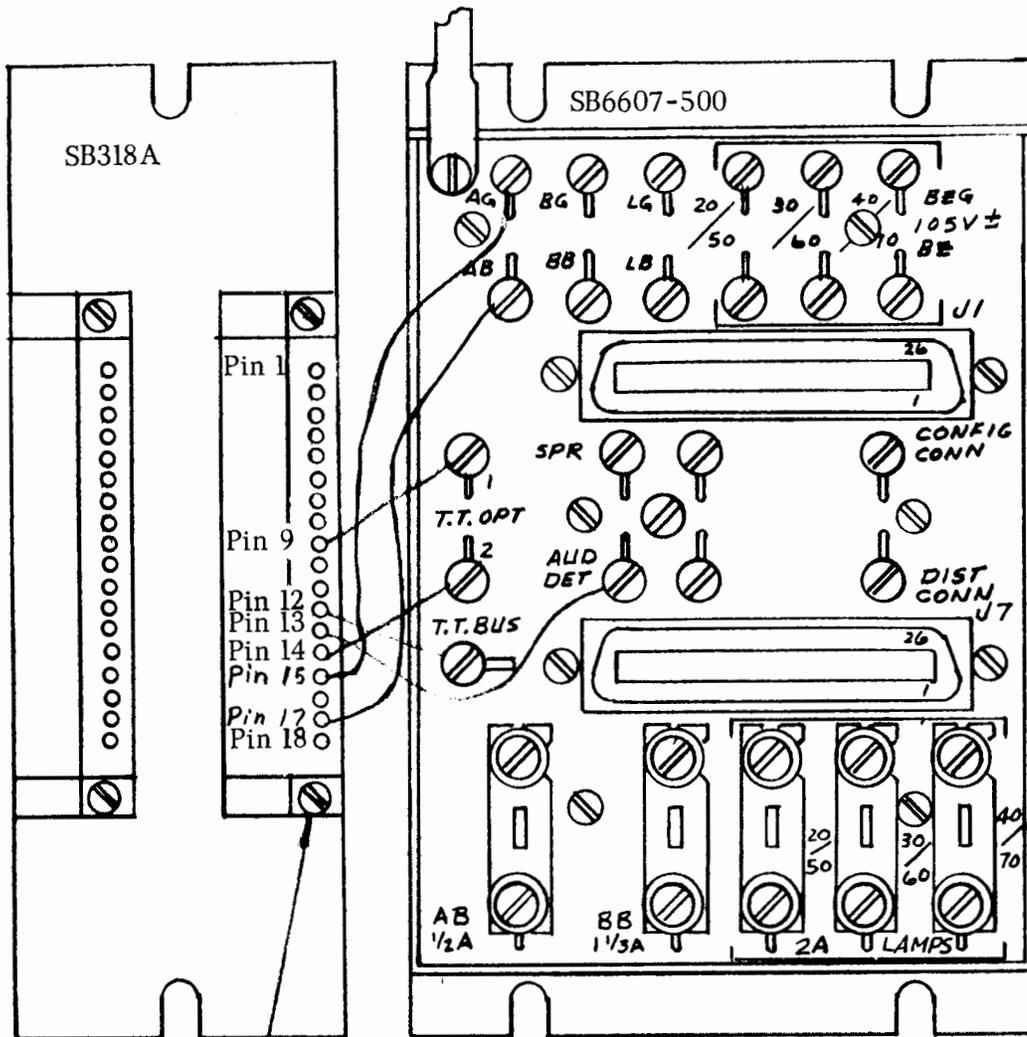
SB6607-800 Installed Here

**INTERCONNECTIONS USING
THE SB 318A PANEL**

1. Pin 17 to AB (A Battery)
2. Pin 15 to AG (A Battery GND)
3. Pin 9 to TT Opt 1.
4. Pin 12 to TT Buss
5. Pin 13 to AUD DET
6. Pin 14 to TT Opt 2.
7. Make sure on the distribution block that TT Opt 1 is connected to TT Opt 2.

FIGURE 2

3

FIGURE 3

4

SB6607A INTERCOM

DISTRIBUTION BLOCK OF
SB6607A INTERCOM
TYPE 66 (20/30/40 FRAME)

J1
CONFIG CONN

T.T. OPT 1
T.T. OPT 2

J7

DIST. CONN

VERIFY T.T. OPT 1 IS
CONNECTED TO T.T.
OPT 2 ON 20/30/40
WIRING FRAME

W-BL		
BL-W	R	1
W-O	T	2
O-W	LG	3
W-G	L	4
G-W	BZ2	5
W-BR	BZ1	6
BR-W	BZ4	7
W-S	BZ3	8
S-W	BZ6	9
		10
S-Y	BZ8	39
V-BL	BZ7	40
BL-V	BZ6	41
V-O	BZG	42
O-V	SPARE	43
V-G	SPARE	44
S-V	AG	45
V-BR	AB	46	AG
BR-V	AD	47	TTB
V-S	TTB	48	TT2
S-V	TT2	49	TT1
	TT1	50

NOTE: JUMPER IS REMOVED
BETWEEN 49 - 50

PART OF
DISTRIBUTION BLOCK
OF SB319A
SERVICE PANEL
TYPE 66

SB319A

14
9
12
13

INDICATES CONNECTOR
PIN NUMBERS OF CARD
SLOT CHOSEN FOR 6607A-800
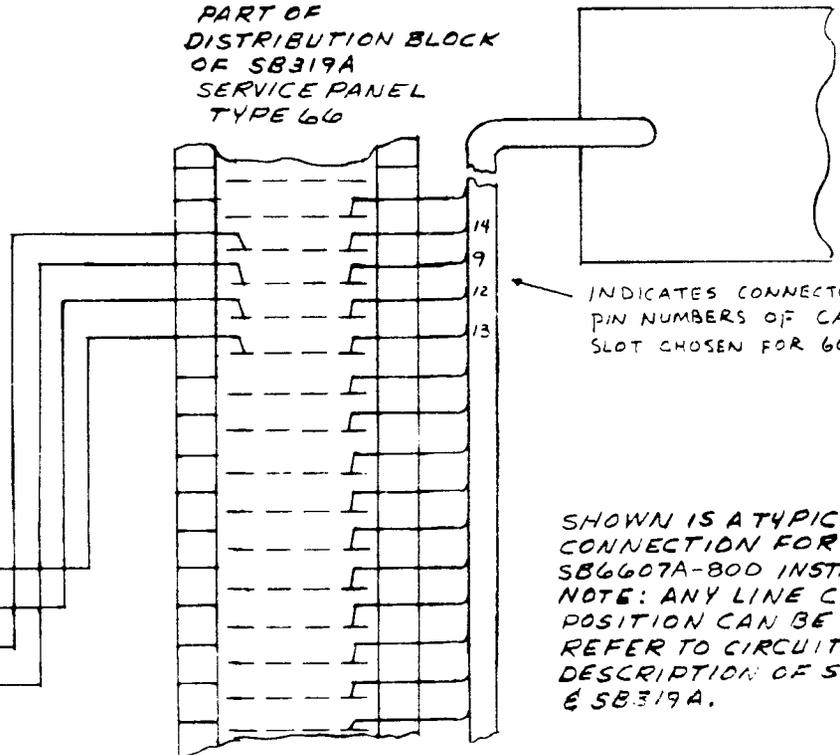
SHOWN IS A TYPICAL
CONNECTION FOR A
SB6607A-800 INSTALLATION.
NOTE: ANY LINE CARD
POSITION CAN BE USED.
REFER TO CIRCUIT
DESCRIPTION OF SB6607A
& SB319A.

FIGURE 4

FIGURE 5
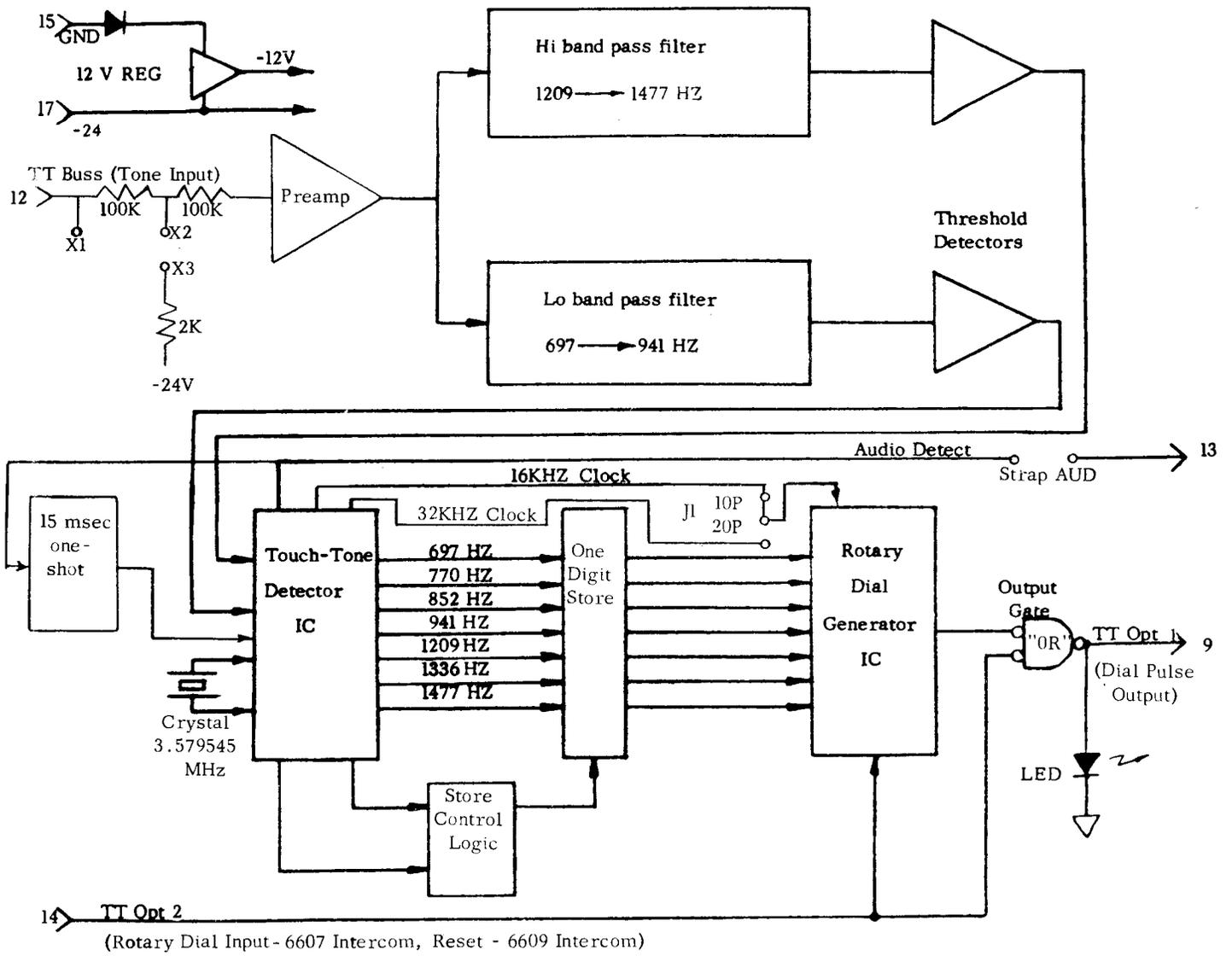
STRAP OPTION TABLE			
BRIDGING IMPEDANCE	2KΩ (DC) (Note 1)	Strap X1-X2-X3	IN
	200KΩ (AC) (Note 2)	Strap X1-X2-X3	OUT
Outpulsing Rate	10 pulses-per-second	J1	10P Position
	20 pulses-per-second	J1	20P Position
Audio Detect Signal (Note 3)	Appears at connector	Strap AUD	IN
	Does not appear at connector	Strap AUD	OUT

Notes: 1. For use with 6607 Intercom.

2. For use with 6609 Intercom.

3. Signal not required at connector for present Installations.

FIGURE 6

CD-6607-800A

5.4 Strap options; the following are optional features:

a. Bridging Impedance-**2k ohm** (to -24V)* or **200k ohm** (AC). Strap: **X1-X2-X3 installed for 2k ohm**. Use with the SB6607 Intercom requires **2k ohm**, while use with the SB6609 Intercom requires **200k ohm.**

b. Outpulsing Rate - 10 pulses-per-second* or 20 pulses-per-second. U-Link: 10P position - 10 pulses-per-second, 20P position - 20 pulses-per-second.

c. Audio Detect Signal - not brought out to connector* or brought out to connector. Strap in AUD position brings out signal. This signal is for future features in SB6607 Intercom, not required at present.

*Set at factory.

6.0 CIRCUIT DESCRIPTION

6.1 The SB6607A-800 Touch Tone to Rotary Converter works with the Call Supervisor Module SB6607-100 and Station Module Cards SB6607-200. (Discussion based on SB6607 Intercom.)

When a touch tone telephone goes off-hook in a group that is not busy, the station module card will transmit the off-hook status to the supervisor at the time that the supervisor tests the group. Hookswitch status appears on the access bus of the station module cards. The access bus appears as an input to the Touch Tone-to-Rotary Converter at TT opt 2. Off-hook status is routed by the converter to the TT opt 1 output, which is an input to the supervisor.

TT opt 1 goes "low" (to battery) when off-hook status is present. See the block diagram, Figure 4.

Touch Tone dialing is ready to commence when the supervisor directs the station module to turn on the dial tone. When the supervisor receives a low on TT opt 1, it turns on dial tone and also connects the Touch Tone Buss to the tip of the telephone. Signals on the TT Buss are amplified and split by a high band filter and a low band filter. The filters pass only the frequencies of the high group or low group and reject frequencies outside the band. After the

signals are filtered they go through a threshold detector to discriminate against noise and small signals. The outputs are squared logic levels which are fed to a touch tone detector LSI chip.

This LSI chip uses digital techniques to differentiate the various frequencies applied to it. When it detects signals in either the high or low band, the Audio Detect output becomes active. Audio Detect will trigger a one-shot with a nominal time-out of 15 msec. While this one-shot is active, further activity of the LSI chip is inhibited. This is done to prevent unwanted response of the chip to transients, caused by contact bounce in the Touch Tone key pad. (Note that provision has been made to bring out the Audio Detect signal—required only for future design features of the Intercom.)

After the 15 msec time-out, the chip will begin decoding the inputs. The resultant outputs reflect the digit detected, in a 2-out-of-7 code. Upon recognition of a valid digit, the outputs are loaded into one level storage. If the digit keyed is the first (tens) digit, the storage output is immediately presented to the Rotary Dial Generator chip. However, if the digit keyed is the second (units) digit, the storage output is held approximately 250 msec after the key is released before being presented as an input. This ensures proper operation of the hookswitch detection circuitry on intra-group calls.

The Rotary Dial Generator LSI chip stores the 2-out-of-7 code, and outputs a serial pulse train, simulating a rotary dial. More than one digit can be stored. Timing is controlled by a clock output from the tone detector chip. Selection of the 16KHZ clock results in a 10 pulse-per-second rotary output, while selection of the 32KHZ clock results in a 20pps output. The pulse train appears at TT opt 1, via the "OR" gate. The LED (light emitting diode) allows outpulsing to be observed.

7.0 TESTING

7.1 Testing the Touch Tone Converter in a 6607 Intercom is accomplished with a touch tone telephone that is known to be within manufacturers' specifications.

When this telephone goes off-hook (all other telephones on-hook) the LED on the converter will turn-on. Failure to turn-on would mean the connection of TT opt 2 and TT opt 1 has not been completed or connected incorrectly, refer to section 5 for proper connections.

If the LED turns on, the dial tone should be present at the receiver. The first digit dialed should cause the dial tone to disappear and the second digit should cause a ring-back or busy signal. The above failing would mean the touch tone buss may not be connected. When a valid tone pair is received, outpulsing may be observed on the LED.

Field repairs involving replacement of components within a module are not recommended. Defective units should be returned to:
SAN/BAR CORPORATION
17422 Pullman Street
Irvine, CA 92714

For technical assistance call:
(714) 546-6500.

CD-6607-800A