4414B MANUAL SIGNALING-RINGDOWN TIE LINE UNIT

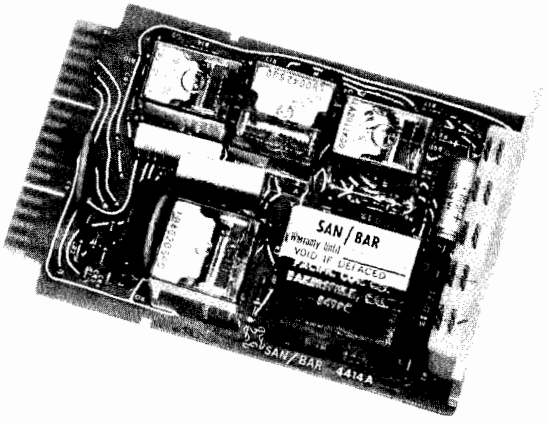


Figure 1 SB4414B

CONTENTS

1.0 GENERAL

1.1 This section provides circuit description, installation and basic testing information for the SAN/BAR 4414B Manual Signaling Ringdown Tie Line Unit.

1.2 The SAN/BAR 4414B (Figure 1) is designed to connect one telephone set through a private line to a complementary 4414B and a second telephone set at a distant location. A non-locking key on the telephone set, or an externally mounted key, in addition to the line pickup is required for signaling.

2.0 SPECIFICATION

2.1 List of applicable drawings:
- (a) P.C. Board Assembly No. ED-4414000
- (b) Schematic No. SD-4414001
- (c) Bill of material No. BM-4414-000

2.2 Electrical Characteristics

2.2.1 Model 4414B.
- (a) Talk Battery Nominal: 24VDC @50 M.A.
  Must Operate Range: 20 to 26 VDC.
- (b) Signal Battery Nominal:24VDC @ 100 M.A.
  Must Operate Range: 20 to 26 VDC.
- (c) Operating Environment: Temperature from 0°C to 50°C. Humidity to 90%
- (d) Current Consumption: There is no idle current consumption. Maximum current consumption is 60 MA.
- (e) Ringing generator voltage
- (f) 20 CPS Nominal: 105V rms
  20 CPS Minimum: 75V rms
  30 CPS Nominal: 120V rms
- (g) Maximum tip and ring loop:50 ohms
- (h) Maximum A. lead resistance: 50 ohms
- (i) Transmission Insertion Loss: 0.5 db @ 1 KHZ
- (j) Longitudinal Balance: 60 db
- (k) Return Loss Minimum: 27db
- (l) Shock/Vibration: Normal Shipping
- (m) Incoming call indicated by flashing of line lamp.
- (n) Busy indicated by steady lamp.
- (o) Time-Out optional intervals for unanswered incoming calls (10, 16, and 23 seconds)
- (p) Audible ringback signal option—calling party can hear a tone returned from the distant telephone.
- (q) Ringing ranges (ohms) with minimum leakage resistance of 20,000 ohms.
  20Hz 75- 92V rms 4000-5000 ohms
  30Hz 110-120V rms 5000-5400 ohms
- (r) Idle circuit termination to prevent unstable conditions where negative impedance repeaters are used to compensate voice frequency losses.

2.3 Physical Characteristics
- (a) Dimensions: 5-5/16" x 3-1/2" x 1-5/16".
- (b) Weight: 12 oz. approximately.
- (c) Key location: Card must be keyed with slots between pins 5 and 6, and between pins 12 and 13.

3.0 INSPECTION

3.1 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, make an operational check at once. 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 the future installation. If the system is to be installed at once, make an operational check after the installation is completed.

4.0 MOUNTING

SAN/BAR 4414B circuit card is the same physical size and has the same tab key and lock capability as standard line cards and will mount in any standard mounting shelf, including those employing front card edge locking devices.

5.0 INSTALLER CONNECTIONS

5.1 The SAN/BAR 4414B has all pin assignments compatible with shelf wiring for line cards.

The 4414B is designed expressly to install in a key telephone service unit module receptacles.

Hook-Up on Handle	4414 MANUAL RINGDOWN CIRCUIT CARD STRAPPING OPTIONS			
No Strapping		23 seconds	TIME OUT	
2 & 3	Z	16 seconds		
1 & 2	X	10 seconds		
7 & 8	W*	Interrupted Ring	Under Control of Time-Out Circuit (B Relay)	Audible Signal
6 & 7	T	Steady Ring		
5 & 7	V	Common with Relay Control		
7 & 8	S*	Common with Diode Matrix Control		
4 & 6	R	Steady Ring	Under Control of R Relay	
4 & 5	Q	Common with Relay Control		
4 & 6	N	Common with Diode Matrix Control		
9 & 10	M*	Audible Ringback Tone		

* Factory Strapped on KTU

Figure 2

Prior to insertion in the receptacle, however, it is necessary (see fig. 2) to install the necessary straps at the terminal board located at the rear of the front panel. Strapping on the circuit card must be effected to conform with the requirements for the following functions:

(1) Time out—10, 16 or 23 seconds
(2) Audible Ringback

6.0 CIRCUIT DESCRIPTION

See circuit schematic drawing 4414001 and assembly drawing 4414000.

The 4414B unit comprises three functional sections and a strapping section located at the rear of the front plastic panel. The functional sections are:

(a) Circuit status section (includes outgoing ring facility).
(b) Off hook sensor section.
(c) Incoming ring/interrupter section

6.1 Circuit Status Section

The tip and ring circuit from the pick up key assigned at the telephone set connects at pins 12 and 13 and is supplied with talk battery voltage through resistors R1 and R2 and the windings of the circuit bridging inductor T1 with capacitors C1 and C2 blocking the DC from the tie line circuit which connects at pins 14 and 9 respectively. Relay R (incoming ring) is associated with the bridge rectifier CR1, 2, 3 and 4, C3 and R4 respectively. An incoming ringing voltage (20 Hz or 30 Hz) energizes Relay R. The functioning of the relay contacts is described later in section 6.3.

Capacitor C4 and R3 are connected across the line circuit and offer an idle circuit termination of 900 ohms nominal value at voice frequencies when the telephone is on hook and ensures circuit stability when VF repeaters are employed. The same circuit impedance is very high at ringing frequencies and incurs minimum penalty. Applying a strap at pins 9 and 10 of TB1 extends audible ringback signal to the calling party. For satisfactory performance, however, the ringing supply must contain an audible component which is returned through capacitor C6.

Contacts R01 and R06 change over to break the circuit from the key telephone set and extend 105 VAC ringing voltage to the tie line circuit through pins 9 and 14 when Relay R (ringout) is energized by application of a ground via the signaling key at the telephone set location. Contacts A2 and A3 extend the telephone circuit to the tie line when Relay A is operated as described later. In addition, A3 (C type) breaks the idle circuit termination.

6.2 Off Hook Sensor Section

When the telephone instrument is off hook, a DC current flows through resistor R1 to the loop. This develops a voltage negative to ground at R1. This voltage produces a current through R5 and R6. The base of transistor Q1 is biased to cause Q1 to conduct. Relay A energizes and through its contacts provides the following functions:

(1) Extends the telephone set through make contacts A2 and A3 to the telephone loop.

(2) Removes the idle circuit termination R3 and C4 at break contact.
(3) Prepares for the operation of the outgoing ring by the signal key and R0 Relay, at make contact A4.
(4) Transfers teleset lamp circuit from lamp flash condition (incoming call) to lamp steady condition (busy) at break/make contact A1.
(5) Disables the Relay B circuit to interrupt or prevent an incoming ring at the break of the break/make contact of A6 and to discharge C5.
(6) Current flow through the coil of the A relay will cause LED (CR-10) to light. The LED serves as a busy circuit indicator for telephone installation or repair personnel.

6.3 Incoming Ring/Interrupter Section

The manner in which the R Relay is energized by an incoming ring is described in section 6.1 of this instruction; the function of its contacts are as follows:

(1) Contact R1 closes to prepare either 105VAC or Ground B supply for extension to Ringing Circuit contact # 1 of the line card.
(2) Contact R3 opens to interrupt capacitor discharge path to enable a charge to build up on capacitor C5 for time out purpose.
(3) Contact R4 closes to instigate operation of interrupter section.

When R4 closes the negative voltage at the base of Q2 increases and it conducts as do Q3 and Q4 respectively and relay B operates the break/make contact, B4 makes to hold relay B energized while the break contact removes the initial energizing circuit through R4. The B relay can only be functionally released by the telephone set going to the off hook condition or by the timing out action of C5, R8 and/or R9 if the calling party abandons an unanswered call.

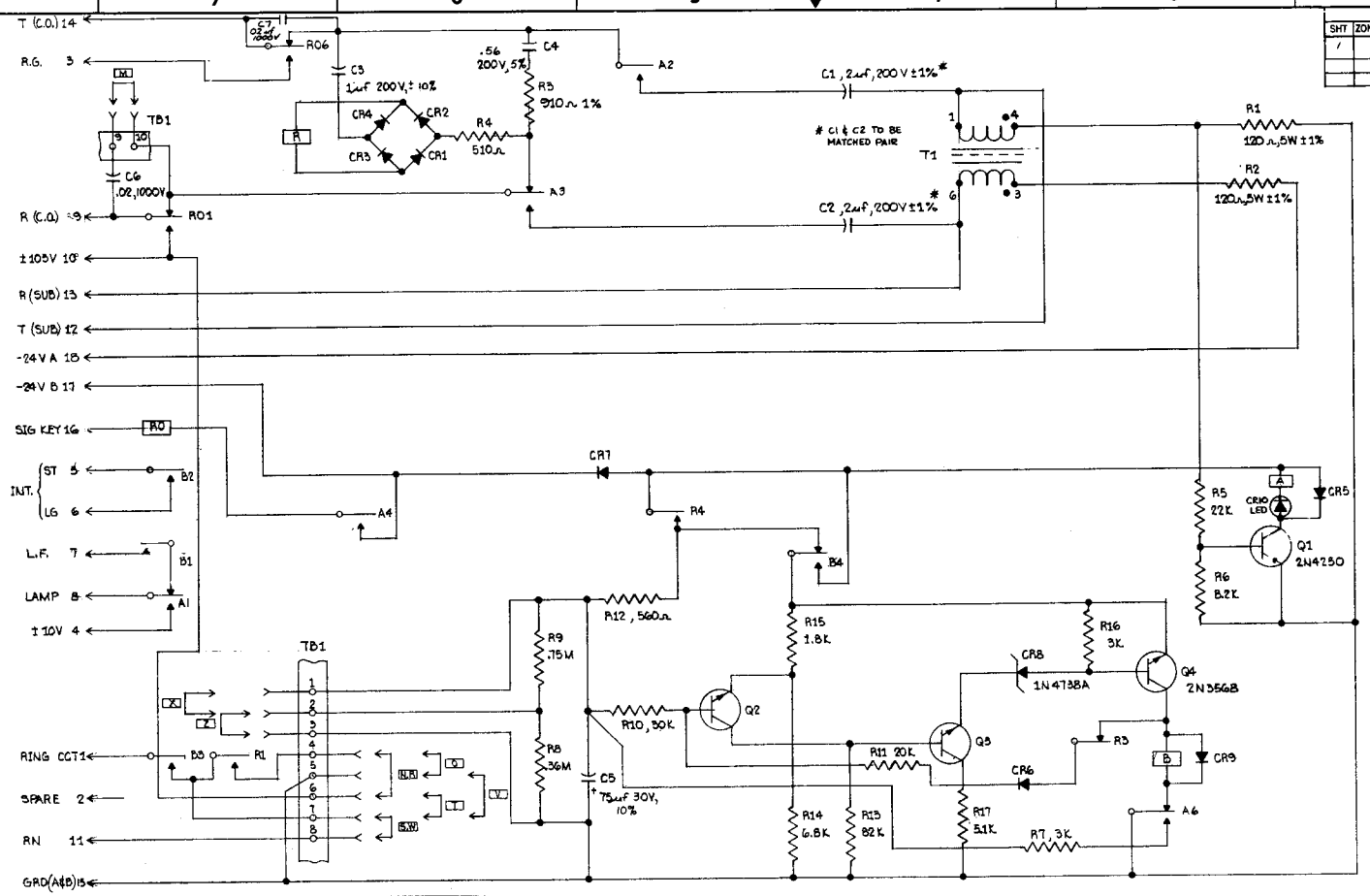
The other relay B contacts function as follows:

(1) Contact B2 starts up the interrupter motor located remotely in the system.
(2) Contact B1 extends the interrupted 10VAC lamp flash supply which appears at terminal 7 through the closed A1 contact (when phone on hook) through terminal 8 to the telephone set call lamp.
(3) Contact B3 exercises control of the ringing circuit through terminal 1 in conjunction with contact R1 to furnish the ringing options available at the strapping terminal block which are indicated on functional schematic drawing 4414002.

7.0 TESTING

7.1 If trouble is encountered with the operation of the SB4414B check that all installer connections and strappings have been properly made. Make certain that the SB4414B unit is making good connection with the mounting assembly card connector, snap the SB4414B in and out several times. If the trouble persists, follow the procedure set forth in paragraph 7.2.

7.2 Field repairs involving replacement of components within a module are not recommended. All SAN/BAR products are warranted for 2 years from the date of purhcase. Return to SAN/BAR Corporation, 17422 Pullman Street, Santa Ana, Calif. 92711; for technical assistance, call (714)546-6500.



STRAPPING OPTIONS			
WITHOUT Z OR X	23 SECONDS	TIME OUT	
Z	16 SECONDS		
X	10 SECONDS		
W *	INTERRUPTED RING	UNDER CONTROL OF TIME-OUT CIRCUIT (B RELAY)	AUDIBLE SIGNAL
T	STEADY RING		
V	COMMON WITH RELAY CONTROL		
S *	COMMON WITH DIODE MATRIX CONTROL		
R	STEADY RING	UNDER CONTROL OF R RELAY	
Q	COMMON WITH RELAY CONTROL		
N	COMMON WITH DIODE MATRIX CONTROL		
M *	AUDIBLE RINGBACK TONE		

* FACTORY STRAPPED ON KTU

NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE 1/4 WATT., 5%.
2. ALL TRANSISTORS ARE 2N3565.
3. ALL DIODES ARE 1N4002.

REVISIONS					
SHT	ZONE	LTR	DESCRIPTION	DATE	APPROVED
1		A	CHANGED C5 FROM 50V TO 30V REVISED "A" NUMBERS, ADDED TABLE "A"	8/8/72	
		B	SEE ADCN NO 0030	9/1/72	
		C	SEE ADCN NO 0033		
		D	SEE DCN NO 0061	9/19/72	

DASH NO.	NEXT ASSY	USED ON	
	APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES XX ± .015 XXX ± .010 ANGLES ± 0.5° MACH. FIN.

CONTR NO.
DR H. WILLIAMS JR 5/25/72
CHK
DSGN
ENGR
PROJ
REL
APPD
APPD 5/25/72

SAN/BAR ELECTRONICS CORP.
17422 Pullman Street Santa Ana, Calif. 92711

SCHEMATIC
4414B MANUAL SIGNALING RINGDOWN TIE LINE UNIT

SIZE	CODE IDENT NO.	DWG NO.	LTR
D		SD-4414-000	D
SCALE		SHEET	

Figure 3
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