SB4415B
PRIVATE LINE COMMON BATTERY UNIT (AUTO RING-DOWN)

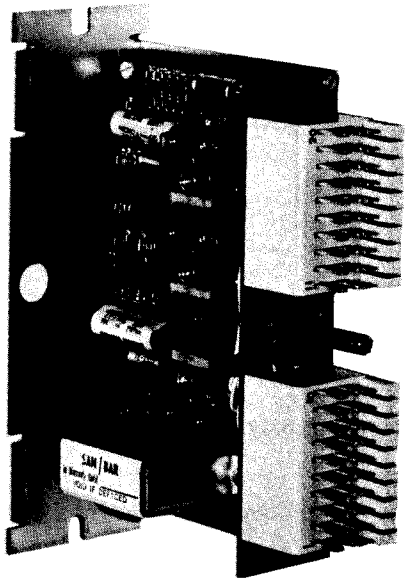


FIGURE 1

CONTENTS

1.0 GENERAL

The SAN/BAR Model 4415B Private Line Control Unit provides for the direct connection of two telephone stations, establishing a private "hot line" type of circuit. An off hook condition at one phone causes an interrupted ringing voltage to be sent down the tip-ring line to the other phone. Ring-back tone is simultaneously provided to the caller. The unit features ring trip during either the silent or ringing period and up to 1000 ohms of line loop resistance (including the telephone).

2.0 SPECIFICATIONS

2.1 List of Applicable Drawings

a) Schematic Drawing: SD-4415-000(Fig.4)
b) Equipment Drawing: ED-4415-100(Fig.5)

2.2 Electrical Specifications

a) Power Requirements: 24VDC ± 4VDC
105VAC ± 25VAC @ 20-30Hz
b) Current Consumption: 120mA maximum
c) Operating Temperature: 0°C to 60°C
d) Humidity: 0 to 90%
e) Maximum line loop Resistance: 1000 ohms including telephone set.
f) Ringing Period: one second ringing, three seconds silent.

2.3 Mechanical Specifications

a) Dimensions: (with cover) 6.88" H x 2.16"W x 5.00"D
b) Method of Connection: Two quick connect terminal strips.

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

4.0 MOUNTING

The SB4415B may be mounted either to a wall or within the standard seven inch framework of the key telephone unit.

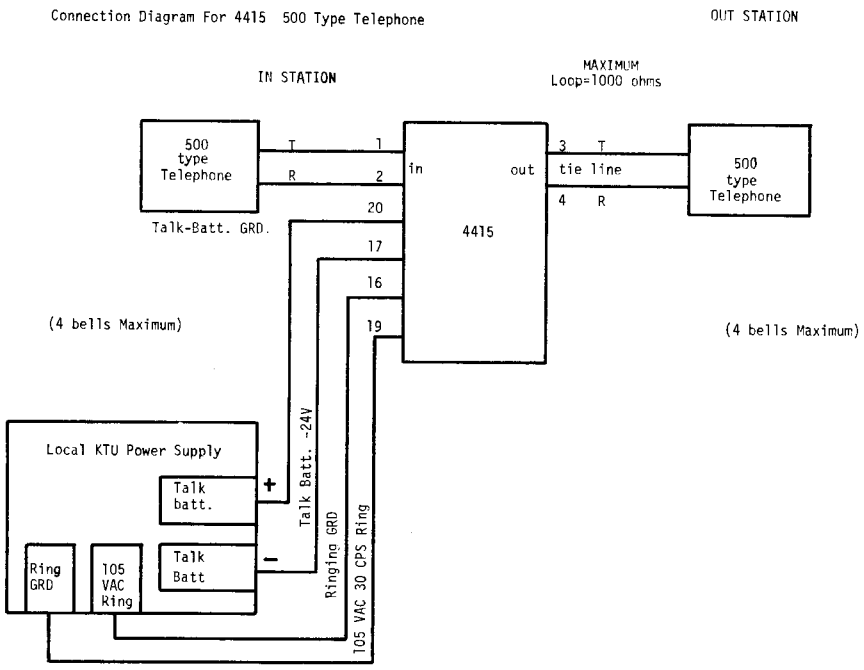


FIGURE 2

5.0 INSTALLER CONNECTIONS

a) Access to the terminal block is made by removing the cover, held on by a single fixing screw. A diagram showing the hook up information for two single line telephones is shown in figure 2. A diagram showing the hook up information for two key telephones is shown in Figure 3.

b) Locating of the spare relay contact pins may be found in the schematic, Figure 4. Contacts associated with the "E" relay will operate in coincidence with the ringing period, one second operated, three seconds released. The contacts associated with the "C" relay will operate during the "calling" period of the telephone connected to pins 1 and 2. The "calling" period is defined as the time period starting with an off-hook condition of the telephone initiating the call and ending with the off-hook condition of the answering party. The "D" relay will operate during the "calling" period of the telephone connected to pins 3 and 4.

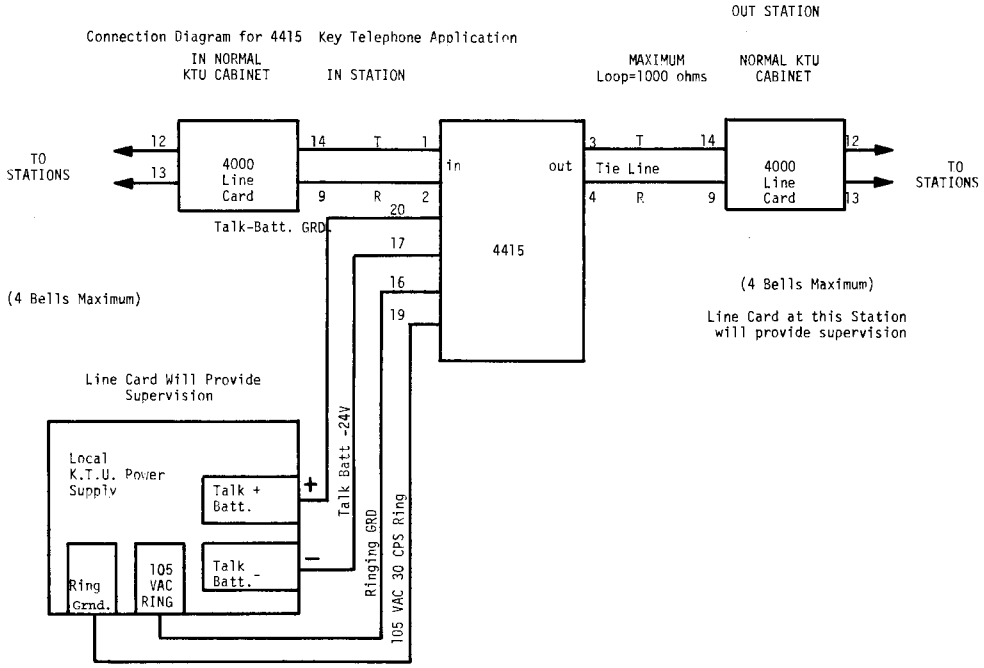
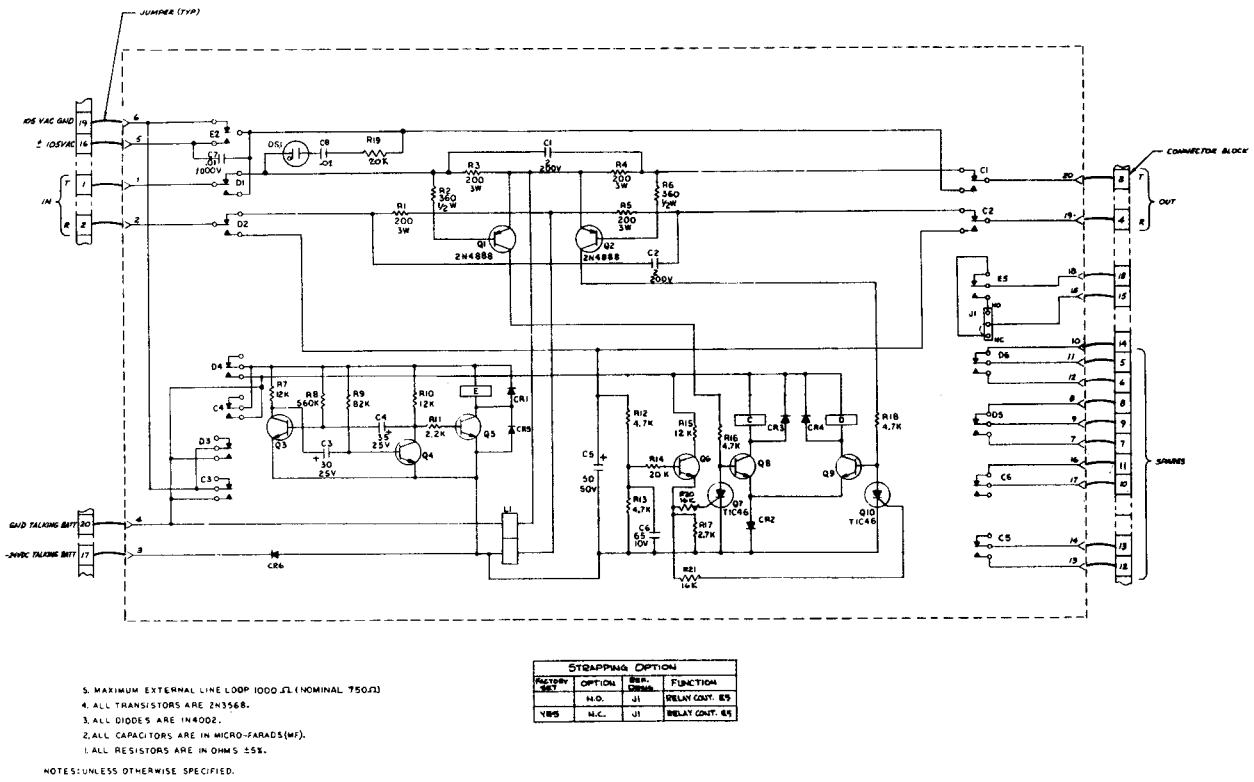


FIGURE 3



STRAPPING OPTION

FACTORY SET	OPTION	BRK. DIODE	FUNCTION
	N.O.	J1	RELAY CONT. E9
YES	N.C.	J1	RELAY CONT. E9

5. MAXIMUM EXTERNAL LINE LOOP 1000 Ω (NOMINAL 750Ω)
4. ALL TRANSISTORS ARE 2N3568.
3. ALL DIODES ARE IN4002.
2. ALL CAPACITORS ARE IN MICRO-FARADS(MF).
1. ALL RESISTORS ARE IN OHMS ±5%.

NOTES: UNLESS OTHERWISE SPECIFIED.

FIGURE 4

6.0 CIRCUIT DESCRIPTION

Please refer to the schematic drawing, Figure 4, for the following description.

6.1 Initiating A Call

When the telephone connected to pins 1 and 2 goes off hook, loop current flows through R3 and Q1 turns ON. Q1 turns on Q8, operating relay "C". Relay contacts C4 apply power to the astable flip-flop circuit described below to periodically operate the "E" relay. If, instead, the telephone connected to pins 3 and 4 goes off hook, loop current flows through R4 and Q2 turns ON. Q2 turns on Q9, operating relay "D". Relay contacts D4 apply power to the astable flip-flop circuit, described below and consisting of transistors Q3, Q4, & Q5.

6.2 Interrupter Circuit

Transistors Q3, Q4 and Q5 along with associated components form an astable flip-flop with a 25% duty cycle. Transistor Q5 operates relay "E" for one second, then releases it for three seconds, repeating the cycle so long as either contacts C4 or D4 are closed. Contacts E2 supply interrupted ringing voltage to the called telephone. Components C8 and DS1 supply ringback tone to the calling telephone.

6.3 Ring Trip

When the Telephone connected to pins 1 and 2 goes off hook, and the "C" relay is operated, the "tip" of the called telephone is grounded via pin 3, contacts C1, E2 and C3. The "ring" of the called telephone connected to pin 4 passes through the C2 contact, through R12, R13 and CR6 to -24VDC battery. The moment the called telephone goes off hook current flows through R12 and R13 to operate Q6 and thence Q7 and Q10. The silicon controlled rectifiers, Q7 and Q10, remain on so long as there is loop current. With Q7 on, Q8 is forced off and relay "C" releases to remove power from the interrupter circuit. The release of relay "C" restores the C1, C2 contacts to complete the connection to the calling party. Contacts C3 and C4 are also restored to their idle position to stop the interrupter circuit and disconnect the ringing generator.

7.0 TESTING

Should difficulty be encountered in getting the unit to operate after installation, the following troubleshooting steps may be used:

a) Verify that -24VDC is present at pin 17 with the volmeter referenced to pin 20.

b) Verify that 105VAC ringing voltage is present across pins 16 and 19.
c) Jumper pin 1 to pin 2 and verify that interrupted ringing voltage appears across pin 3 and 4.
d) Momentarily short pin 3 to pin 4 and verify that ringing voltage is no longer present across pins 3 and 4.
e) Move the jumper to pins 3 and 4 and verify that interrupted ringing voltage appears across pins 1 and 2.
f) Momentarily short pin 1 to pin 2 and verify that ringing voltage is no longer present across pins 1 and 2.

g) If you are not able to verify all of the tests above, the unit is defective and should be returned to SAN/BAR Corporation for repair or replacement.

The SB4415B is warranteed for 2 years from date of purchase against defects of workmanship and materials. Send defective units to SAN/BAR Corporation, 17422 Pullman St., Irvine, California 92714. For technical assistance call (714) 546-6500.

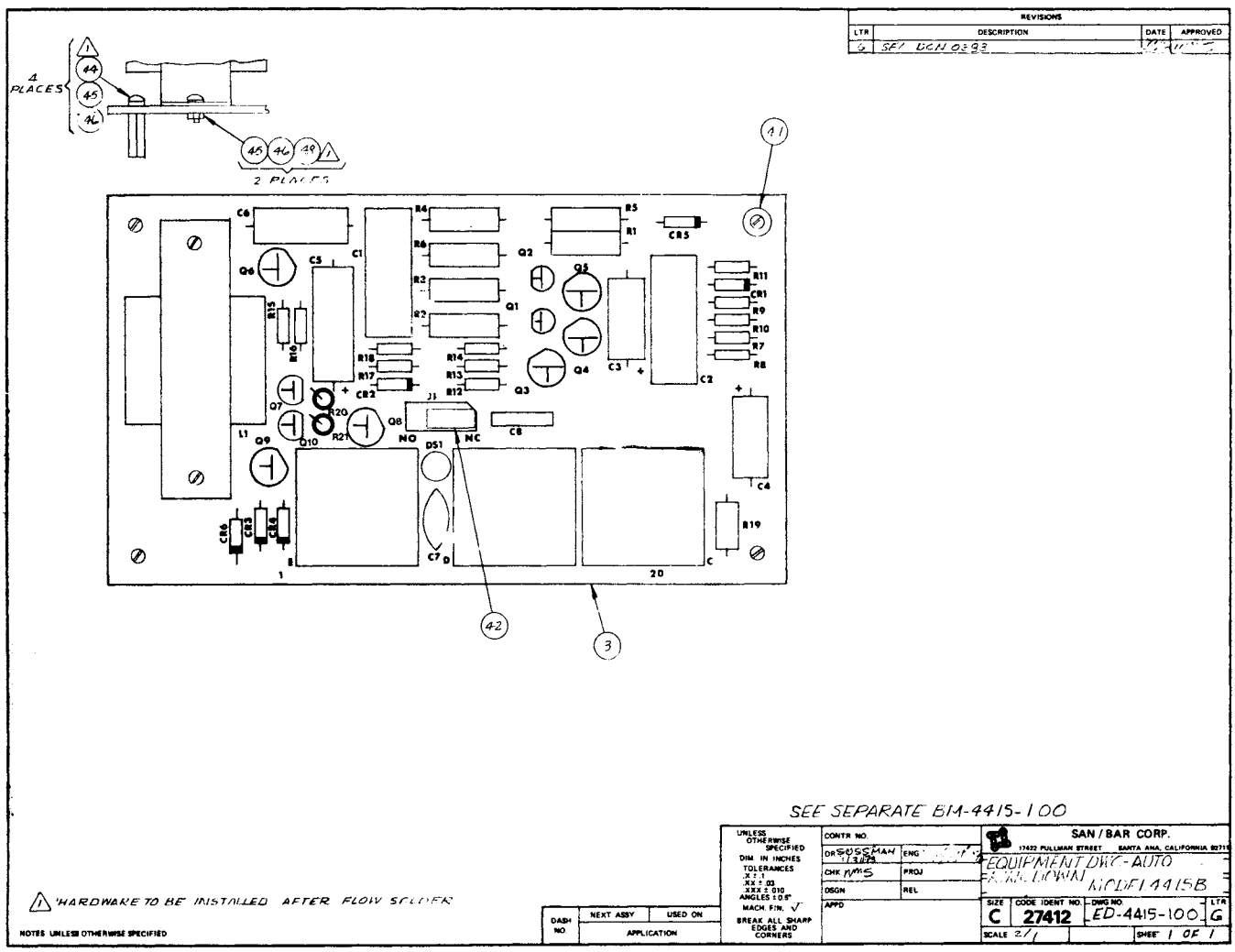
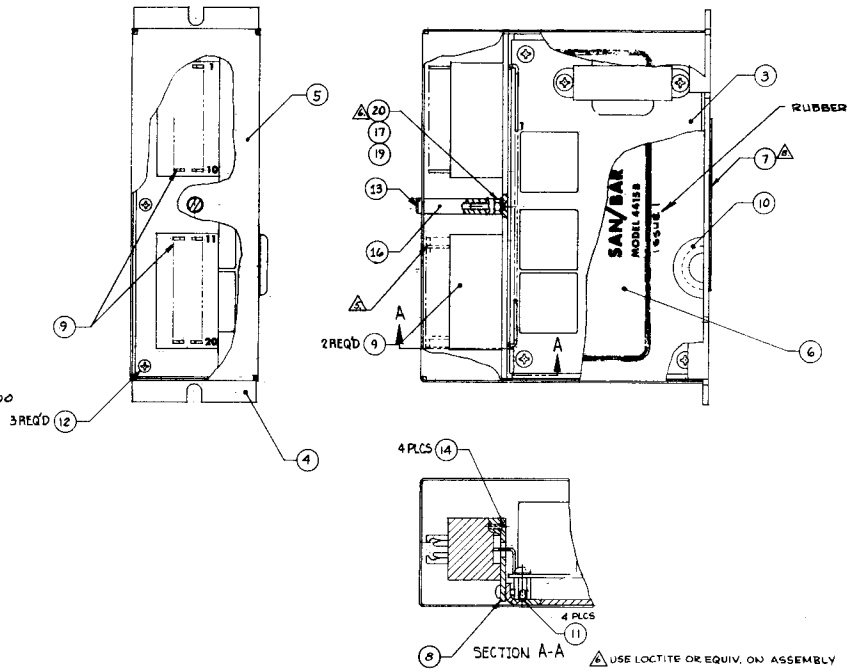
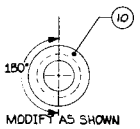


FIGURE 5

REVISIONS					
SHT	ZONE	LTR	DESCRIPTION	DATE	APPROVED
	B&B	A	1. ADDED WIRING INFORMATION BLOCK TO P/D 2. ADDED GEN/NOTE 5. 3. IN P/L CHANGED THE FOLLOWING: A. ITEM 11, .250 LONG WAS .375 LONG B. ITEM 13, P/N 8348 WAS 318-21-22 MODIFIED 1.250 WAS 1.375, H.H.SMITH WAS COMP DEVEL CO 4. IN P/L ADDED ITEM 16 & 17	7/11/72	
		B	SEE ADCN 0084 //	9/21/72	
		C	SEE DCN 0062 //	11/21/72	
		D	SEE DCN 0146	3/13/73	
		E	SEE DCN 0307	8/7/74	





SEE SEPARATE BILL OF MAT'L: BM-4415-000

ITEM	QTY	DESIG	PART No.	DESCRIPTION	MFR. or SPEC
21	1			SCREW FH 100° #6-32 x .625 LG	
20	1		SK0008	NAMEPLATE	
19	1			NUT, 6-32	
18	A/R		105-10	TUBING	ALPHA OR EQUIV
17	1		4415006	IDENTIFICATION LABEL	
16	1			WASHER, LOCK #6 INT STAR	
15	4			WASHERS-#6	
14	1		4415003	BOARD ASSEMBLY	
13	1		8348	SPACER - #6-32 x 1.250 LONG	H.H. SMITH
12	A/R		500-22	WIRE - STRANDED COND #24 AWG	STANDARD WIRE OR EQUIV
11	4			SCREW - F.H. 82° #4-40 SELF TAPPING .250 LONG	
10	1		2010007	CAPTIVE SCREW	
9	3			SCREW - PAN HEAD #4-40 x .250 LONG	
8	4			SCREW - PAN HEAD #6-32 x .250 LONG	
7	4		2321	SPACER	H.H. SMITH
6	4			SCREW - F.H. 100° #6-32 x .250 LONG	
5	1		2186	GROMMET	H.H. SMITH
4	2		R66-PC2-10	CONNECTOR BLOCKS	RELIABLE ELECTRIC CO.
3	1		4415005	COVER	
2	1		4415004-2	END PLATE	
1	1		4415004-1	CHASSIS	

PARTS LIST

SEE SEPARATE WL-4415-000

WIRE LIST (USE ITEM 15)	
ITEM 9	ITEM 3
FROM CONN. PIN Nos.	TO P.C. CARD POSITION Nos.
1	1
2	2
3	20
4	19
5	11
6	12
7	7
8	8
9	9
10	17
11	16
12	13
13	14
14	10
15	15
16	5
17	3
18	18
19	6
20	4

⚠6 USE LOCTITE OR EQUIV. ON ASSEMBLY

⚠7 IDENTIFY ITEM 3 CONNECTOR PINS USING TRANSFER LETTERS

4. BOND ITEM 10 ONTO ITEM 5 AFTER MODIFYING AS SHOWN USING ARON ALPHA QUICK SET ADHESIVE
5. CONNECT WIRES ONTO BOARD ASSEMBLY PRIOR TO INSTALLING INTO CHASSIS; INSTALL INTO CHASSIS AS SHOWN IN SECTION A-A AND SIDE VIEW.
2. INSTALL ITEM'S 9 ONTO ITEM 8 USING ITEM 14 FOUR PLACES.
1. INSTALL ITEM 15 ONTO EACH PIN OF ITEM 9 (2REQ'D) LEAVING APPROXIMATELY 2.5 TO 3.0 INCHES IN LENGTH.

NOTES: UNLESS OTHERWISE SPECIFIED

⚠8 INDICATE MODEL NO. & SERIAL NO. ON ITEM 7 (NAMEPLATE) USING TYPE WRITER

7.
NOTES: CON'T

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 5/17/72	
CHK	
DSGN	
ENGR	
PROJ	
REL	
APPD	
APPD	

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

ASSEMBLY
PRIVATE LINE COMMON BATTERY (AUTO RINGDOWN) MODEL 4415B

SIZE	CODE IDENT NO.	DWG NO.	LTR
D		ED-4415-000	E

SCALE 1/1 SHEET

FIGURE 6