

## V-9923B CODE CALL UNIT

### INTRODUCTION

This manual provides instructions for identification, installation, operation, and technical assistance for the Valcom V-9923B Code Call Unit.

The V-9923B provides two or three digit code call paging via a loop start trunk port on a PABX or by the use of a spare line button on a key system.

The V-9923B code call unit complies with Part 68 of the FCC Rules and Regulations and has been granted FCC Registration #BAFUSA-68753-KX-N. The ringer equivalence is 0.1B and the unit requires a USOC RJ21X connector.

In accordance with FCC Rules and applicable tariffs, this code call unit may only be installed with the authorization of the owner of the host system.

The FCC Registration #BAFUSA-68753-KX-N, will be listed in the affidavits filed with the telephone company; it will also be recorded in the system log kept by installation and maintenance personnel. The local telephone company is to be notified of the FCC registration number when this code call unit is installed.

### SPECIFICATIONS

The V-9923B is capable of providing code signaling for paging purposes; it provides for "meet me" answer of code call and provides talk circuit and signaling tone.

#### Features

- Trunk level access on PABX's, station level answer
- Can be used with 1A2 type key systems
- 81 two digit codes or 729 three digit codes
- Uses rotary or tone dial signaling



- Dial tone to calling party
- Coded tone output for paging systems
- Switch controlled code verification tone
- Automatically discontinues code sending when answered
- Capable of being used with another V-9923B to provide two link operation
- Uses standard 1A2 key system voltages
- Mounts on the wall, in a key cabinet, or in the PABX Cabinet

#### Capacity

Each V-9923B Code Call Unit provides the necessary equipment for 1 link of code call. For an additional link of code call, another V-9923B is required (two links maximum).

#### Dimensions

7.1"H x 5.9"W x 2.1"D  
(18.03cm H x 14.99cm W x 5.33cm D)

#### Power Requirements

The Valcom V-9923B requires -24 Vdc talk battery and -24 Vdc signal battery. The current consumption and voltage range is shown in Table 1.

"B" Battery      -21.5 to -26 Vdc    125mA

#### Nominal Timing and Frequency

Table 1

Range	Idle	Operating
"A" Battery	-21.5 to -26 Vdc	65mA

## Specifications

The timing and frequency specifications of the Valcom V-9923B code call unit are shown in Table 2. Figure 1 is a timing chart showing the nominal timing of a code call.

**Table 2**

Dial Tone Frequency	180 Hz
Coded Tone Frequency	550 Hz
Time Tones Broadcast	370 ms
Time between tones in a sequence	500 ms
Time between digits in a sequence	1.5 sec
Time between series of digits	8 sec

The Valcom V-9923B will detect 20-30 Hz ringing on the answer port. The applied ringing voltage should be 75 to 125 Vac.

## DESIGN

The V-9923B provides two or three digit code call paging via a loop start trunk port on a PABX or by the use of a spare line button on a key system. Figure 2 is a simplified block diagram showing the code call unit and its connections.

**NOTE:** *The code call unit is designed so that it will complete a code call sequence before resetting and returning dial tone, even if all parties hang up.*

## Application

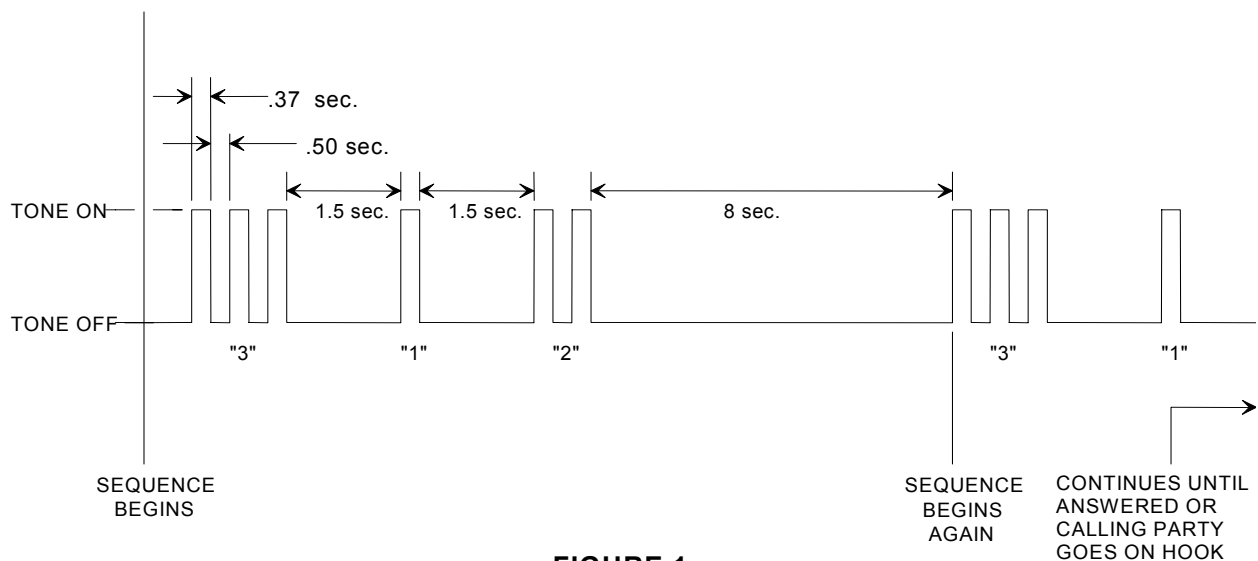
Key systems and PABX's used in:

- Department stores/shopping centers
- Hospitals, nursing homes
- Noisy locations, manufacturing plants
- Schools, universities

## Additional Materials Required

Additional equipment is required to complete a system when using the V-9923B. These items are:

- -24 Vdc power supply (if existing supply inadequate or non-existent)
- 66 type connecting block
- 25 pair cable with a female amphenol connector on one end
- twisted pair crossconnect wire



**FIGURE 1**

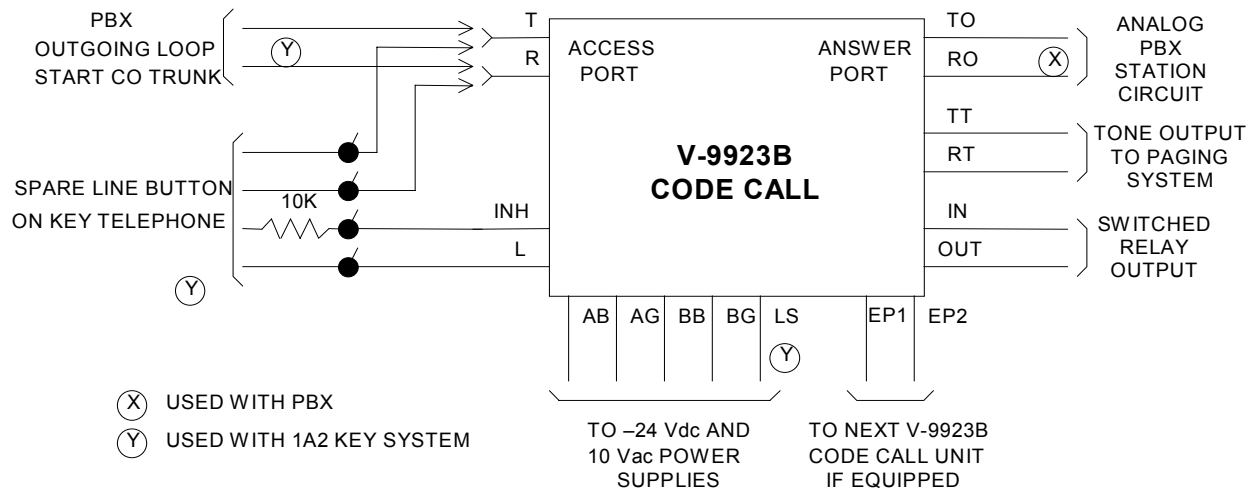


FIGURE 2

## INSTALLATION

### Precautions

All precautions have been taken at the factory to insure that the equipment functions properly when installed correctly. Please follow the precautions listed below before applying power to the equipment or the equipment may be damaged and the warranty voided.

- If power was previously connected, disconnect or remove power before inserting or removing unit from the amphenol connector.
- Exercise caution when crossconnecting wires that two adjacent terminals are not bridged together.
- Double check all connections before applying power.
- Use twisted pair wire for all connections.

### Mounting

The Valcom V-9923B code call unit may be mounted in a key cabinet relay rack or on the wall near the distribution frame. When choosing a location, it is necessary that the loop resistance of the PABX or key system are not exceeded.

Mount the unit in a vacant space in an equipment cabinet, rack, or key system cabinet, allowing enough room at the rear of the unit to plug in an amphenol connector. Mount a 66B type punchdown block near the unit and label it per Figure 3.

Run a 25 pair cable with a female connector from the unit to the connecting block. The cable should be terminated on the connecting block in standard color code order on a row of the connecting block. Verify

all connections before plugging the amphenol end of the cable into the V-9923B code call unit.

### Connections to PABX

The connections required to connect the V-9923B to a PABX are shown in Figure 4. The V-9923B requires a loop start trunk port from the PABX for access. If more than one link of code call is being provided, the second V-9923B would require a trunk also and the two trunks should be in a hunt group within the PABX. This arrangement allows access to the second V-9923B if the first V-9923B is in use.

**NOTE: ADVISE PERSONNEL USING CODE CALL UNIT TO ALWAYS WAIT FOR DIAL TONE FROM CODE CALL UNIT BEFORE DIALING IN CODE NUMBER!**

To answer the code call requires a station from the PABX. If two code call units are being used, two stations would be required and they would have to be in a rotary hunt group also.

### Connections to Key Systems

The connections required to connect the V-9923B to a 1A2 key system are shown in Figure 5. The T, R, A and L leads are multiplied to all phones in the system. Use a spare pick-up button and install a 10K Ohm 1/4 watt 5% resistor either in the phone or at the connecting block in series with the A lead from each phone. The V-9923B will discontinue the code call paging when it recognizes two phones off hook with two 10K Ohm resistors to ground on the A leads.

**NOTE: WHEN USING 1A2 KEY TELEPHONES, THE TO AND RO LEADS THAT WERE USED FOR PABX CONNECTION ARE NOT USED.**

## **Power Connections**

The connections required to connect the V-9923B to a power supply are shown in Figure 6. Correct polarity must be observed for the unit to function properly.

## **Output Connections**

The V-9923B contains a tone generator and isolation transformer to allow direct hook-up to the paging system amplifier. The tones are applied to the output in the coded sequence dialed into the unit. The tones appear on the TT, (BK/S, pin 29) and the RT (S/BK, pin 30) leads. If tones are not required as in the case of using claxton horns, bells, buzzers, lamps, etc. a contact closure is available. The contact is capable of handling 1 amp @ 125 Vac or 2 amps @ 30 Vdc. Higher current requirements should use the contact to operate a power relay, which would switch the load. The switched make contact input is the IN lead (BL/BK, pin 22) and the out lead is the OUT lead (BK/BL, pin 21).

When the switched output of the V-9923B is used to operate a DC slave relay, it is necessary to install a spike suppression diode in parallel with the coil of the relay. Refer to Figure 7 for the appropriate connections.

## **Option Switches**

Four option switches are located through the back of the unit near the amphenol.

Switch 1 sets either two or three digit operation.  
Switch 2 allows or disallows the calling party to hear the tones as they are sent.  
Switch 3 must be left in the ON position.  
Switch 4 is for flashing or solid lamp indication on access (1A2 key systems only).  
Refer to Figure 8 for Option Switch Settings.

## **Two Link Connection**

If more than one V-9923B is being used to provide two link operation, strap EP1 lead from first unit to EP2 lead of second unit. Strap EP2 lead of first unit to the EP1 lead of the second unit. A maximum of two links is all that is possible.

## **OPERATION**

The code call unit is accessed by placing a telephone or a resistive short across T and R. The unit will return dial tone to the calling party when it is ready to accept digits.

***NOTE: IN TWO LINK OPERATION, DIAL TONE WILL BE WITHHELD FROM THE SECOND LINK UNTIL THE CODE CALL ON FIRST LINK IS ANSWERED TO PREVENT TWO CODES BEING BROADCAST SIMULTANEOUSLY.***

The calling party then dials in a two or three digit number depending upon the position of dipswitch #1 on the code call unit. After the last digit the code call unit begins to transmit tone via the TT and RT leads and the contact on the IN and OUT leads closes in conjunction with the tones. The unit continues to broadcast the codes until it is released by the calling party going on hook or by someone answering the code call.

When the unit is being used by a PABX, the ringing voltage on the TO and RO leads from the PABX station releases the code call unit and connects the PABX trunk (access) to the PABX station (answer).

If the unit is being used with 1A2 key telephones, when the second party goes off hook on the code call button, the combined voltage drop across the 10K Ohm resistors in the A leads releases the code call unit.

The code call unit is designed so that it will finish broadcasting a code before returning dial tone and resetting even if answered in the middle of the code call sequence.

Figure 9 is a simplified schematic illustrating the main control functions contained in the V-9923B.

## **TECHNICAL ASSISTANCE**

When trouble is reported, verify power is being supplied to the unit and there are no broken connections. Be sure the amphenol is secure in the back of the unit and the cable is terminated correctly on the crossconnect block. Check voltages for proper polarity on crossconnect block. If a spare unit is available, continue to troubleshoot by substituting the spare unit for the suspected defective unit.

Assistance in troubleshooting is available from the factory. When calling, you should have a VOM, a telephone test set, and several clip leads available and be calling from the job site. Call (540) 563-2000 and ask for Technical Support, or call (540) 427-6000 for Valcom 24-hour Automated Support or visit our website at <http://www.valcom.com>.

Valcom equipment is not field repairable. Valcom, Inc. maintains service facilities in Roanoke, VA. Should repairs be necessary, attach a tag to the unit clearly stating company name, address, phone number, contact person, and the nature of the problem. Send the unit to:

**Valcom, Inc.  
Repair and Return Dept.  
5614 Hollins Road  
Roanoke, VA 24019-5056**

**TABLE 3  
TROUBLESHOOTING CHART**

PROBLEMS	PROBABLE CAUSES AND SOLUTIONS
No dial tone.	Verify power connections; check operation of unit by placing test telephone across the T and R leads and going off hook. If dial tone present, check wiring to key system or PABX. If no dial tone, check wiring of EP leads to other units. Verify that all grounds are common. Verify polarity of power connections. Replace unit.
No tone output.	Remove leads on the TT and RT leads on crossconnect block. Place call into the unit and verify with a telephone across TT and RT leads that tones are being broadcast. Listen to unit to hear relay operating during code.
Unit doesn't answer.	Verify ringing voltage appearing across the TO and RO leads if using PABX or that A lead is dropping below half of supply voltage if using key telephone.
Unit cuts off on answer.	Reverse station leads on TO and RO.

**VALCOM LIMITED WARRANTY**

Valcom, Inc. warrants its products to be free from defects in materials and workmanship under conditions of normal use and service for a period of one year from the date of shipment. The obligation under this warranty shall be limited to the replacement, repair or refund of any such defective device within the warranty period, provided that:

1. inspection by Valcom, Inc. indicates the validity of the claim,
2. the defect is not the result of damage, misuse, or negligence after the original shipment,
3. the product has not been altered in any way or repaired by others and that factory sealed units are unopened (A service charge plus parts and labor will be applied to units defaced or physically damaged),
4. freight charges for the return of products to Valcom are prepaid,
5. all units 'out of warranty' are subject to a service charge. The service charge will cover minor repairs (Major repairs will be subject to additional charges for parts and labor).

**This warranty is in lieu of and excludes all other warranties, expressed or implied, and in no event shall Valcom, Inc. be liable for any anticipated profits, consequential damage, loss of time or other losses incurred by the buyer in connection with the purchase, operation or use of the product.**

This warranty specifically excludes damage incurred in shipment. In the event a product is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved in accordance with the F.O.B. point.

Headquarters:  
Valcom, Inc.  
5614 Hollins Road  
Roanoke, VA 24019-5056  
Phone: (540) 563-2000  
FAX: (540) 362-9800

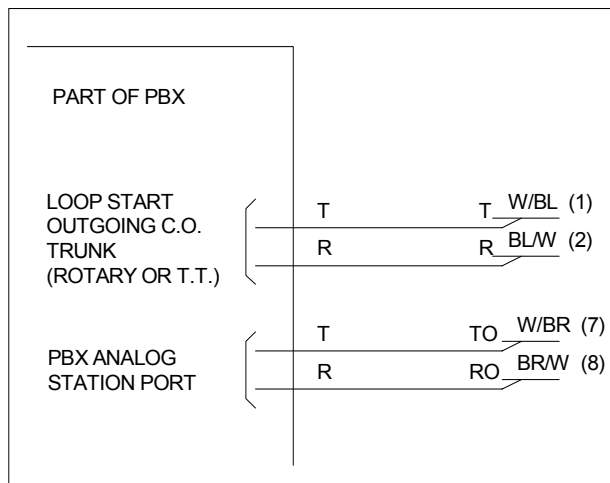
In Canada:  
CMX Corporation  
35 Van Kirk Drive #11 and 12  
Brampton, Ontario L7A1A5  
Phone: (905) 456-1072  
FAX: (905) 456-2269

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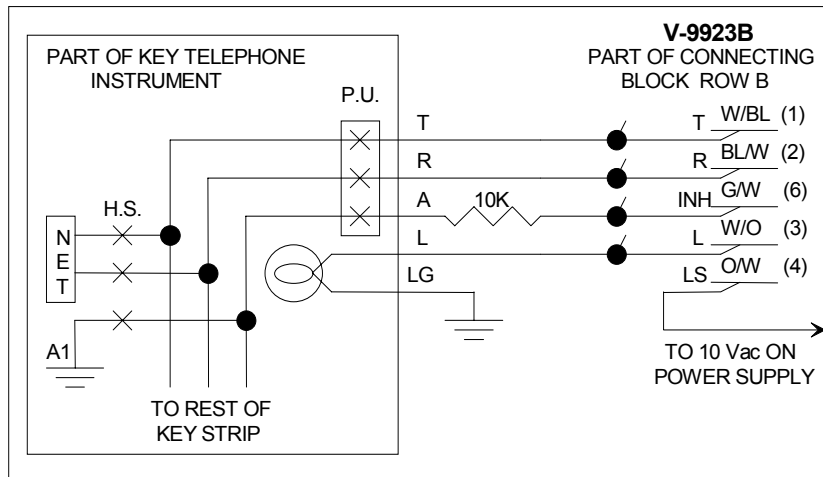
		A	B	C	D	E	F
PBX AND KEY SYSTEM INPUT	T	<u>W/BL</u>	<u>26</u>	—	1	—	—
	R	<u>BL/W</u>	<u>1</u>	—	2	—	—
	L	<u>W/O</u>	<u>27</u>	—	3	—	—
	LS	<u>O/W</u>	<u>2</u>	—	4	—	—
		<u>W/G</u>	<u>28</u>	—	5	—	—
ANALOG PBX ANSWER PORT	INH	<u>GW</u>	<u>3</u>	—	6	—	—
	TO	<u>W/BR</u>	<u>29</u>	—	7	—	—
		<u>BR/W</u>	<u>4</u>	—	8	—	—
		<u>W/S</u>	<u>30</u>	—	9	—	—
	RO	<u>S/W</u>	<u>5</u>	—	10	—	—
		<u>R/BL</u>	<u>31</u>	—	11	—	—
		<u>BL/R</u>	<u>6</u>	—	12	—	—
		<u>R/O</u>	<u>32</u>	—	13	—	—
		<u>O/R</u>	<u>7</u>	—	14	—	—
		<u>R/G</u>	<u>33</u>	—	15	—	—
		<u>G/R</u>	<u>8</u>	—	16	—	—
		<u>R/BR</u>	<u>34</u>	—	17	—	—
		<u>BR/R</u>	<u>9</u>	—	18	—	—
		<u>R/S</u>	<u>35</u>	—	19	—	—
		<u>S/R</u>	<u>10</u>	—	20	—	—
SWITCHED RELAY OUTPUT		OUT IN	<u>BK/BL</u>	<u>36</u>	—	21	—
	<u>BL/BK</u>		<u>11</u>	—	22	—	—
	<u>BK/O</u>		<u>37</u>	—	23	—	—
	<u>O/BK</u>		<u>12</u>	—	24	—	—
	<u>BK/G</u>		<u>38</u>	—	25	—	—
PC	<u>G/BK</u>	<u>13</u>	—	26	—	—	
	<u>BK/BR</u>	<u>39</u>	—	27	—	—	
	<u>BR/BK</u>	<u>14</u>	—	28	—	—	
TONE OUTPUT	TT RT	<u>BK/S</u>	<u>40</u>	—	29	—	—
		<u>S/BK</u>	<u>15</u>	—	30	—	—
		<u>Y/BL</u>	<u>41</u>	—	31	—	—
	<u>BL/Y</u>	<u>16</u>	—	32	—	—	
	<u>Y/O</u>	<u>42</u>	—	33	—	—	
	<u>O/Y</u>	<u>17</u>	—	34	—	—	
	<u>Y/G</u>	<u>43</u>	—	35	—	—	
	<u>G/Y</u>	<u>18</u>	—	36	—	—	
	<u>Y/BR</u>	<u>44</u>	—	37	—	—	
	<u>BR/Y</u>	<u>19</u>	—	38	—	—	
	<u>Y/S</u>	<u>45</u>	—	39	—	—	
	<u>S/Y</u>	<u>20</u>	—	40	—	—	
	<u>V/BL</u>	<u>46</u>	—	41	—	—	
	<u>BL/V</u>	<u>21</u>	—	42	—	—	
	EXPANSION CIRCUIT	EP1	<u>V/O</u>	<u>47</u>	—	43	—
EP2		<u>O/V</u>	<u>22</u>	—	44	—	—
		<u>V/G</u>	<u>48</u>	—	45	—	—
		<u>G/V</u>	<u>23</u>	—	46	—	—
POWER SUPPLY	AG	<u>V/BR</u>	<u>49</u>	—	47	—	—
	AB	<u>BR/V</u>	<u>24</u>	—	48	—	—
	BG	<u>V/S</u>	<u>50</u>	—	49	—	—
	BB	<u>S/V</u>	<u>25</u>	—	50	—	—

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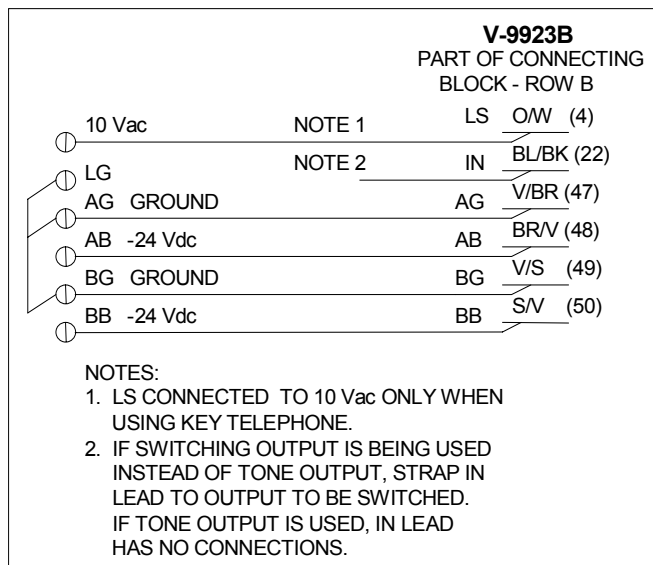
FIGURE 3



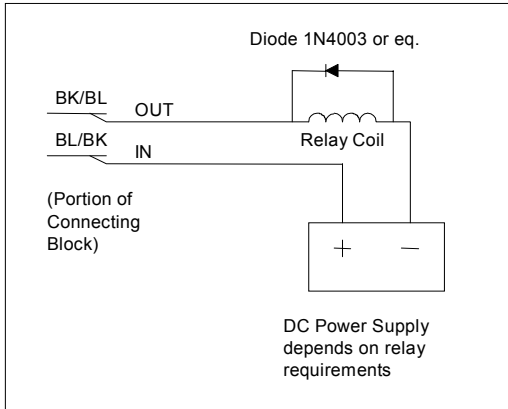
**FIGURE 4**  
**CONNECTIONS OF V-9923B TO PABX**



**FIGURE 5**  
**CONNECTION OF V-9923B TO KEY SYSTEM**



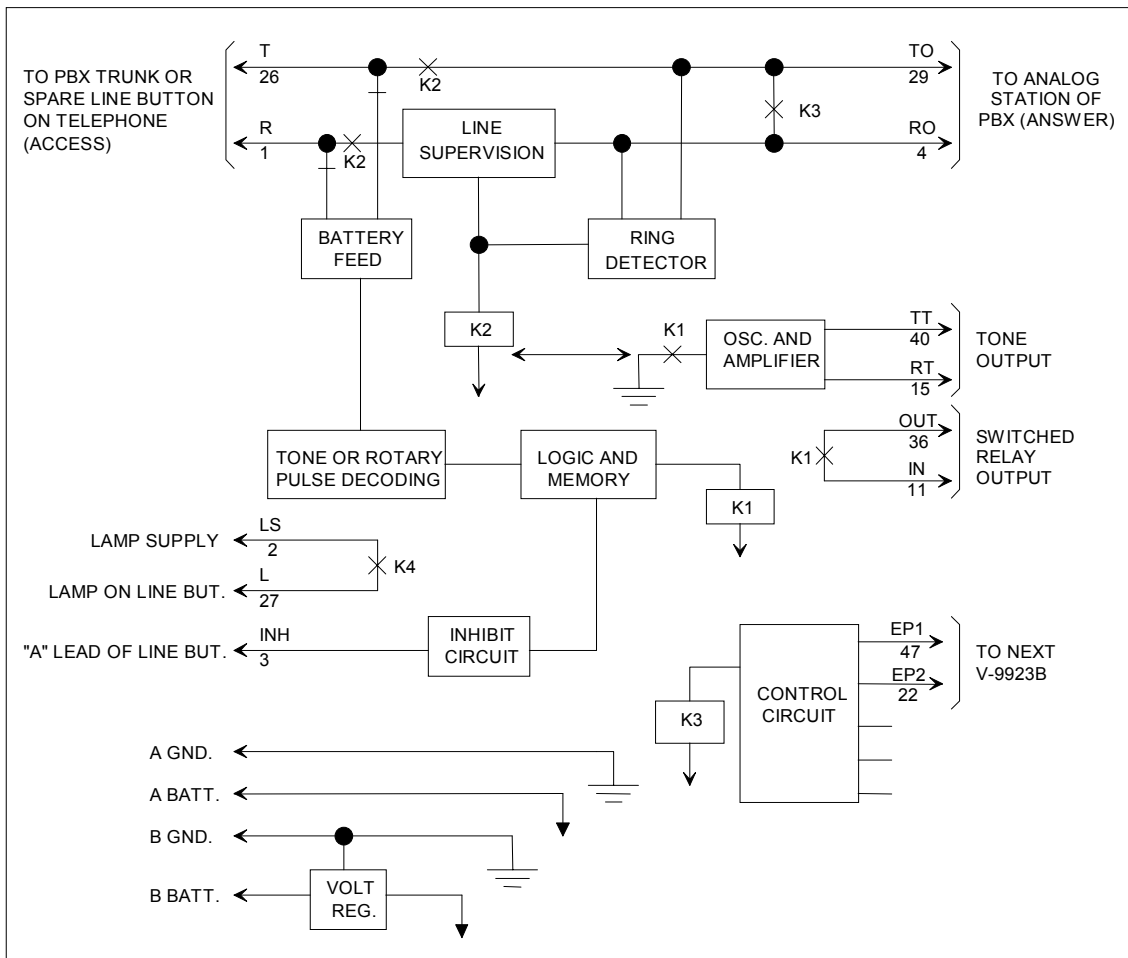
**FIGURE 6**  
**POWER SUPPLY CONNECTIONS**



**FIGURE 7**  
**CONNECTIONS OF V-9923B FOR**  
**OPERATING A DC SLAVE RELAY**

SW	OFF	ON
1	TWO DIGIT OPERATION	THREE DIGIT OPERATION
2	CODE VERIFICATION	NO CODE VERIFICATION
3	MUST BE IN THE ON POSITION	
4	FLASHING LAMP	SOLID LAMP
2 DIGIT CODES: 11-19, 21-29, .., 91-99		
3 DIGIT CODES: 111-119, 121-129, ....., 991-999		
OFF ON		

**FIGURE 8**  
**OPTION SWITCH SETTINGS**



**FIGURE 9**  
**V-9923B SIMPLIFIED SCHEMATIC**