

INSTRUCTION MANUAL  
MODEL 937B  
UNATTENDED ANSWERING DEVICE  
S/N \_\_\_\_\_

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Liability under this warranty is limited to service, adjustment or replacement of defective parts (other than tubes, fuses or batteries) on any instrument or sub-assembly returned to the factory for this purpose, transportation charges prepaid.

This warranty does not apply to instruments or sub-assemblies subjected to abuse, abnormal operating conditions, or unauthorized repair or modification.

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## SPECIFICATIONS

Ring Signal Frequency .....	16 to 60 Hz.
Ring Signal Voltage .....	60 to 150 VAC maximum @ 16 Hz.
Ring Signal Duration .....	> 250 ms. @ 16 Hz. > 75 ms. @ 60 Hz.
Inter-Ring Time .....	5.5 seconds maximum
Insertion Loss .....	0.3 dBm @ -0.1 ma. to 25 ma. loop current.
Input Signal Level .....	Nominal -12 dBm @ 600 ohms balanced.
Input Signal Frequency .....	300 to 5000 Hz. for 1:1 transfer @ 600 ohms.
Timer .....	Adjustable 2 to 15 seconds per step; preset to 6 seconds per step. Nine step selectable for a maximum time of 135 seconds.
Logic Input Levels .....	Logic low < 3 VDC. Logic high > 8 VDC.
Relay Output .....	Gold clad; 1 A. @ 28 VDC; 0.5 A. @ 120 VAC res.
Power Requirements .....	117 VAC +/- 10 %, 60 Hz.
Physical .....	1 1/2 in.H X 3 1/2 in.W X 6 in.D

## GENERAL INFORMATION

### SCOPE:

The purpose of this manual is to facilitate the installation and operation of the Monroe Electronics, Inc. Model 937B Unattended Answering Device.

### GENERAL:

The Model 937B Unattended Answering Device is an autoanswer telephone line coupler intended to provide bidirectional telephone audio access to remote equipment that is not registered with the FCC for direct connection to the telephone line.

Standard features include:

- \* Integral FCC Part 68 Registered Telephone Coupler
- \* Selectable Answer Delay
- \* Selectable Disconnect on Loop Battery Break from Central Office or on fixed time period or both
- \* Control lines for locally forced connect and disconnect
- \* Auxiliary HOOK SWITCH status contact
- \* 117 VAC Operation
- \* Wall or panel mount enclosure
- \* Barrier strip terminals for easy connection

The Model 937B is intended primarily for use on telephone lines where the subscriber line loop current is interrupted by the Central Office when the calling party hangs up, however, it may also be used when it is acceptable to disconnect upon a fixed time period after answer (not to exceed 135 seconds) or when the coupler is to be placed under control of an external device.

## INSTALLATION INSTRUCTIONS

### General:

All connections are intended to be made on the barrier strip terminals with power removed from the 937B.

### Telephone Line Connection:

### Notice To Users:

Before connecting this device to your telephone line the following information must be supplied to your telephone company:

Model Number	3137B
Registration Number	AAK-99W-67353-VP-X
Ringer Equivalence	0.3B
Jack Number	RJ11C

## EXHIBIT J

### USER INSTRUCTIONS

THIS DEVICE HAS BEEN GRANTED A REGISTRATION NUMBER BY THE FEDERAL COMMUNICATIONS COMMISSION, UNDER PART 68 RULES AND REGULATIONS FOR DIRECT CONNECTION TO THE TELEPHONE LINES. IN ORDER TO COMPLY WITH THESE FCC RULES, THE FOLLOWING INSTRUCTIONS MUST BE CAREFULLY READ AND APPLICABLE PORTIONS FOLLOWED COMPLETELY:

1. DIRECT CONNECTION TO THE TELEPHONE LINES MAY BE MADE ONLY THROUGH THE STANDARD PLUG-ENDED CORD FURNISHED TO THE UTILITY-INSTALLED JACK. NO CONNECTION MAY BE MADE TO PARTY OR COIN PHONE LINES. PRIOR TO CONNECTING THE DEVICE TO THE TELEPHONE LINES, YOU MUST:
2. CALL YOUR TELEPHONE COMPANY AND INFORM THEM YOU HAVE AN FCC REGISTERED DEVICE YOU DESIRE TO CONNECT TO THEIR TELEPHONE LINES. GIVE THEM THE NUMBER(S) OF THE LINE(S) TO BE USED THE MAKE AND MODEL OF THE DEVICE, THE FCC REGISTRATION NUMBER AND RINGER EQUIVALENCE. THIS INFORMATION WILL BE FOUND ON THE DEVICE OR ENCLOSED WITH INSTRUCTIONS AS WELL AS THE JACK SUITABLE FOR YOUR DEVICE.

3. AFTER THE TELEPHONE COMPANY HAS BEEN ADVISED OF THE ABOVE YOU MAY CONNECT YOUR DEVICE IF THE JACK IS AVAILABLE, OR AFTER THE TELEPHONE COMPANY HAS MADE THE INSTALLATION.
4. REPAIRS MAY BE MADE ONLY BY THE MANUFACTURER OR HIS AUTHORIZED SERVICE AGENCY. UNAUTHORIZED REPAIRS VOID REGISTRATION AND WARRANTY. CONTACT SELLER OR MANUFACTURER FOR DETAILS OR PERMISSIBLE USER PERFORMANCE ROUTINE REPAIRS, AND WHERE AND HOW TO HAVE OTHER THAN ROUTINE REPAIRS PERFORMED.
5. IF, THROUGH ABNORMAL CIRCUMSTANCES, HARM TO THE TELEPHONE LINES IS CAUSED IT SHOULD BE UNPLUGGED UNTIL IT CAN BE DETERMINED IF YOUR DEVICE OR THE TELEPHONE LINE IS THE SOURCE. IF YOUR DEVICE IS THE SOURCE, IT SHOULD NOT BE RECONNECTED UNTIL NECESSARY REPAIRS ARE EFFECTED.
6. SHOULD THE TELEPHONE COMPANY NOTIFY YOU THAT YOUR DEVICE IS CAUSING HARM, THE DEVICE SHOULD BE UNPLUGGED. THE TELEPHONE COMPANY WILL, WHERE PRACTICABLE, NOTIFY YOU, THAT TEMPORARY DISCONTINUANCE OF SERVICE MAY BE REQUIRED. HOWEVER, WHERE PRIOR NOTICE IS NOT PRACTICABLE, THE TELEPHONE COMPANY MAY TEMPORARILY DISCONTINUE SERVICE, IF SUCH ACTION IS REASONABLY NECESSARY. IN SUCH CASES THE TELEPHONE COMPANY MUST (A) PROMPTLY NOTIFY YOU OF SUCH TEMPORARY DISCONTINUANCE, (B) AFFORD YOU THE OPPORTUNITY TO CORRECT THE CONDITION AND (C) INFORM YOU OF YOUR RIGHTS TO BRING A COMPLAINT TO THE FCC UNDER THEIR RULES.
7. THE TELEPHONE COMPANY MAY MAKE CHANGES IN ITS COMMUNICATIONS FACILITIES, EQUIPMENT, OPERATIONS OR PROCEDURES, WHERE SUCH ACTION IS REASONABLY REQUIRED IN THE OPERATION OF ITS BUSINESS AND IS NOT INCONSISTENT WITH FCC RULES. IF SUCH CHANGES CAN BE REASONABLY EXPECTED TO RENDER ANY CUSTOMER'S DEVICES INCOMPATABLE WITH TELEPHONE COMPANY FACILITIES, OR REQUIRE MODIFICATION OR ALTERATION, OR OTHERWISE MATERIALLY AFFECT ITS PERFORMANCE, WRITTEN NOTIFICATION MUST BE GIVEN TO THE USER, TO ALLOW UNINTERRUPTED SERVICE.

Telephone Connection:

Connect the modular phone plug at the end of the attached telephone line cord into the telephone company provided jack, RJ11C.

#### Audio Connection:

Telephone audio is available at barrier strip TB1 terminals 3 (+) and 4 (-) (see FIGURE 1). This is a bidirectional audio port.

The source impedance of this port is 600 ohms. The maximum audio level that should be introduced at this point is -9 dBm.

#### Auxiliary Relay Contact Connection:

A Form A relay contact is available at barrier strip TB1 terminals 5 and 6. This relay energizes (closes) when the Model 937B "answers" the incoming call and de-energizes (opens) when it disconnects.

Terminal 5	Common Contact
Terminal 6	Normally Open To Terminal 5

#### Set Connection:

Applying +12 VDC (from barrier strip TB1 terminal 8) to barrier strip TB1 terminal 7 will cause the 937B to seize the telephone line without an incoming call and not release it until the +12 VDC is removed.

### USER OPTIONS

Several plug-in jumpers on the Model 3137B Circuit Card permit the selection of user options. Refer to FIGURE 2 for assistance in locating these jumpers.

#### Answer Time:

A jumper must be installed at one of the nine positions of J1 to cause the device to automatically answer an incoming telephone call. As such, these nine positions permit the user to select from one to nine rings before answer.

NOTE: The device will answer after the number of selected rings. For example, if two rings before answer has been selected then the device will go to the OFF HOOK state at the end of the second ring.

NOTE: The simulated ring signal heard by the calling party may not accurately reflect the actual ring timing being delivered to the called station.



#### Disconnect Time:

A jumper must be installed at one of the nine positions of J2 to cause disconnection after a fixed period of time. This has been set at the factory to provide approximately time increments of approximately six seconds for each of the nine positions. As such, placing the jumper at J2 position 1 causes disconnection after 6 seconds, placing the jumper at J2 position 2 causes disconnection after 12 seconds, etc.

This permits a selection of incremental times up to 54 seconds (nominal). If longer OFF HOOK times are required, potentiometer R14 can be adjusted in the clockwise direction. A maximum time of 135 seconds (nominal) is achieved when this potentiometer is in the full clockwise position.

If disconnection on a fixed time basis is not desired then no jumper should be installed in one of the J2 positions.

CAUTIONARY NOTE: If no jumper is installed in one of the J2 positions then some other means of disconnect should be employed to guarantee disconnect. This may be by either external reset from a controlling device or by detection of loop battery interruption.

Disconnection upon detection of loop current interruptions (J4) and disconnection by fixed timeout (J2) may both be selected. In this circumstance the device will disconnect according to whichever signal occurs first.

#### Disconnection upon Detection of Loop Current Interruption:

Jumper J4 is used to select disconnection upon detection of a loop current interruption from the Central Office.

This is a two-position jumper and the jumper must be installed in one of the two available positions. Failure to place the jumper in one of the two available positions may result in improper operation of the device.

Jumper J4 must be installed in the position as described in FIGURE 2 for disconnection upon detection of loop current interruption or else it must be installed in the alternate position as described in FIGURE 2 if disconnection upon detection of loop current interruption is NOT desired.

Disconnection upon detection of loop current interruptions (J4) and disconnection by fixed timeout (J2) may both be selected. In this circumstance the device will disconnect according to whichever signal occurs first.

#### Answer/Signal Mode Selection:

Jumper J3 is installed and should remain installed for normal operation of this device. Jumper J3 should be removed only if an external device is to control answer and disconnect.

Jumper J3 can be removed to cause the device not to answer an incoming call. In this circumstance the answering device will close the auxiliary hook switch contact after the number of rings before answer (as selected by jumper J1) to signal an external device of the incoming call but will not terminate the telephone line (go OFF HOOK).

An external control device would instruct the Unattended Answering Device to answer the incoming call by taking the control line (3137B card edge pin D) to +V (nominally +12 VDC).

The external control device would maintain this control line at +V until it wanted to be disconnected from the telephone line. It would then remove the +V from the control input of the Unattended Answering Device. The Unattended Answering Device would disconnect from the telephone line immediately upon release of the control line by the external control device.

Disconnection upon loop current interruption by the central office should also be selected on J4 for proper resetting of the Unattended Answering Device in this mode.

TABLE 1  
 USER OPTIONS SETUP

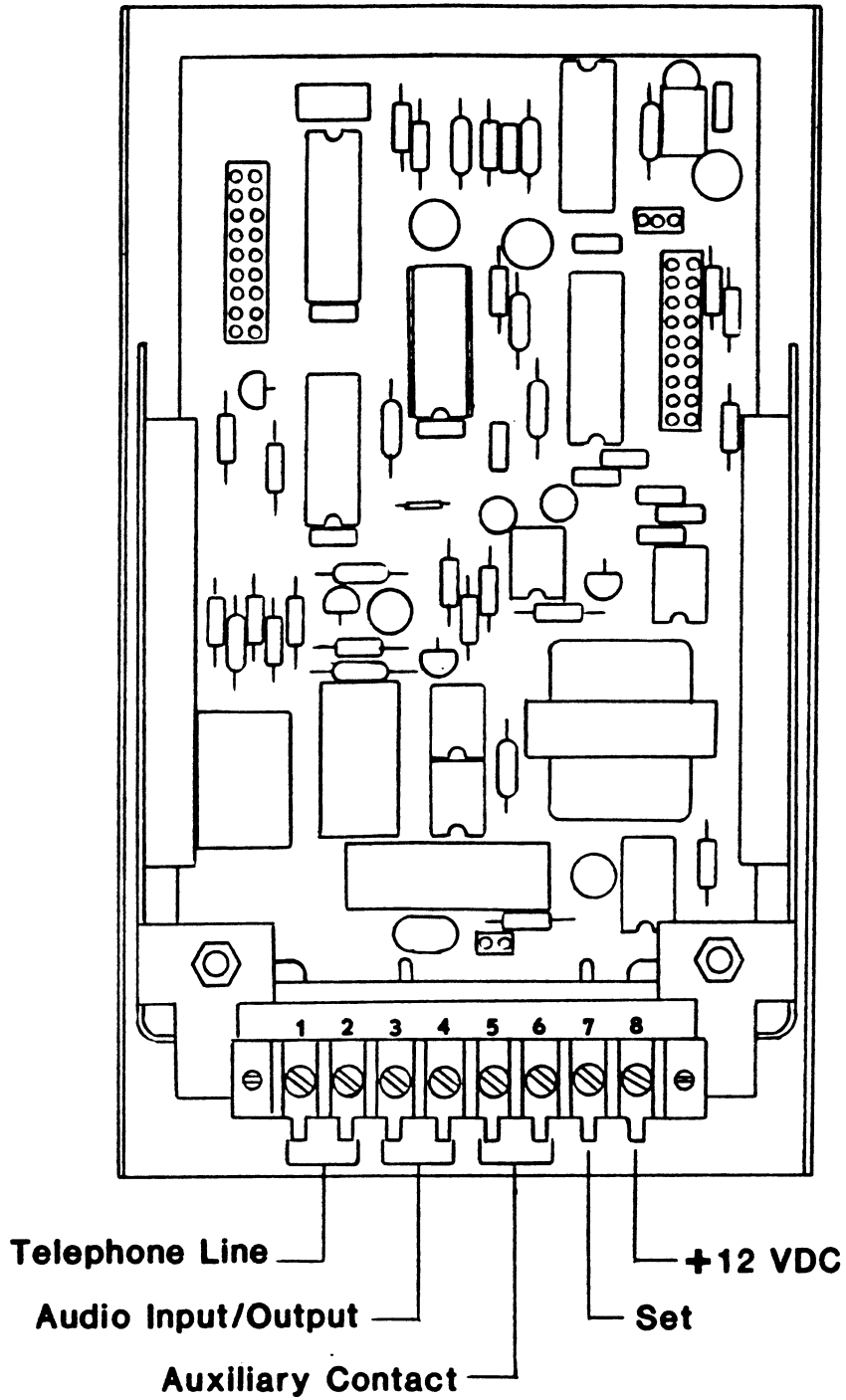
PROGRAM JUMPER	OPERATION
J1 PIN 1	1 OR 2 RINGS BEFORE ANSWER
J1 PIN 2	2 OR 3 RINGS BEFORE ANSWER
J1 PIN 3	3 OR 4 RINGS BEFORE ANSWER
J1 PIN 4	4 OR 5 RINGS BEFORE ANSWER
J1 PIN 5	5 OR 6 RINGS BEFORE ANSWER
J1 PIN 6	6 OR 7 RINGS BEFORE ANSWER
J1 PIN 7	7 OR 8 RINGS BEFORE ANSWER
J1 PIN 8	8 OR 9 RINGS BEFORE ANSWER
J1 PIN 9	9 OR 10 RINGS BEFORE ANSWER
J2 PIN 1	DISCONNECT IN 6 SECONDS
J2 PIN 2	DISCONNECT IN 12 SECONDS
J2 PIN 3	DISCONNECT IN 18 SECONDS
J2 PIN 4	DISCONNECT IN 24 SECONDS
J2 PIN 5	DISCONNECT IN 30 SECONDS
J2 PIN 6	DISCONNECT IN 36 SECONDS
J2 PIN 7	DISCONNECT IN 42 SECONDS
J2 PIN 8	DISCONNECT IN 48 SECONDS
J2 PIN 9	DISCONNECT IN 54 SECONDS
J3 INSTALLED	AUTOMATICALLY SEIZES LINE AFTER NUMBER OF RINGS DETERMINED BY JUMPER J1.
J3 REMOVED	SIGNALS INCOMING CALL WHEN AN INCOMING RING SIGNAL IS DETECTED BUT DOES NOT SEIZE LINE UNTIL EDGE CONNECTOR PIN D IS CONNECTED TO A +12 VDC SIGNAL AFTER RING DETECT.
J4 PINS 1 & 2	DISCONNECT ONLY WHEN CALLING PARTY HANGS UP. THERE MUST BE NO JUMPERS INSTALLED ON J2.
J4 PINS 2 & 3	DISCONNECTS ON TIMEOUT TIME SET BY JUMPER J2 AND TRIMMER R16.

TABLE 2  
3137B EDGE PINS

The Model 3137B installed in the 937B is plugged into a Monroe 3000RK 20-pin edge connector. Pin functions are listed below:

Pin Number	Function
1	Set input; momentarily ground to force 3137B to connect to telephone line without incoming call or hold at ground to keep from disconnecting.
3 & 7	Ground (circuit common).
4	Reset input; momentarily ground to disconnect or hold at ground to prevent 3137B from "answering". Grounding this input overrides all other 3137B functions except pin D.
5 & E	600 ohm audio input (and output) to (or from) the telephone line.
6	Ring detector input; connect to pin H to enable internal telephone ring detector for autoanswer operation.
9	Output to drive external 12 VDC relay whenever coupler is in the "off-hook" state. Goes low on "answer", high on "disconnect".
8 & J	+12 VDC supply input.
10	Common terminal of SPDT auxiliary relay output.
A	Hold input; ground to prevent the internal timer from running. Grounding this input will not seize the telephone line but will keep the timer from running thus preventing timeout disconnect until release.
D	Direct input to the "line seize" relay: +12 VDC on this pin will cause the 3137B to seize the telephone line and not release it until the +12 VDC is removed. Reset (pin 4) will not override this input.
F & H	Telephone line RING (red) and TIP (green) wires connect here.
K	Normally closed SPDT auxiliary relay contact.
L	Normally open SPDT auxiliary relay contact.

**937B TOP VIEW**



**FIGURE 1**

**BARRIER STRIP CONNECTIONS**

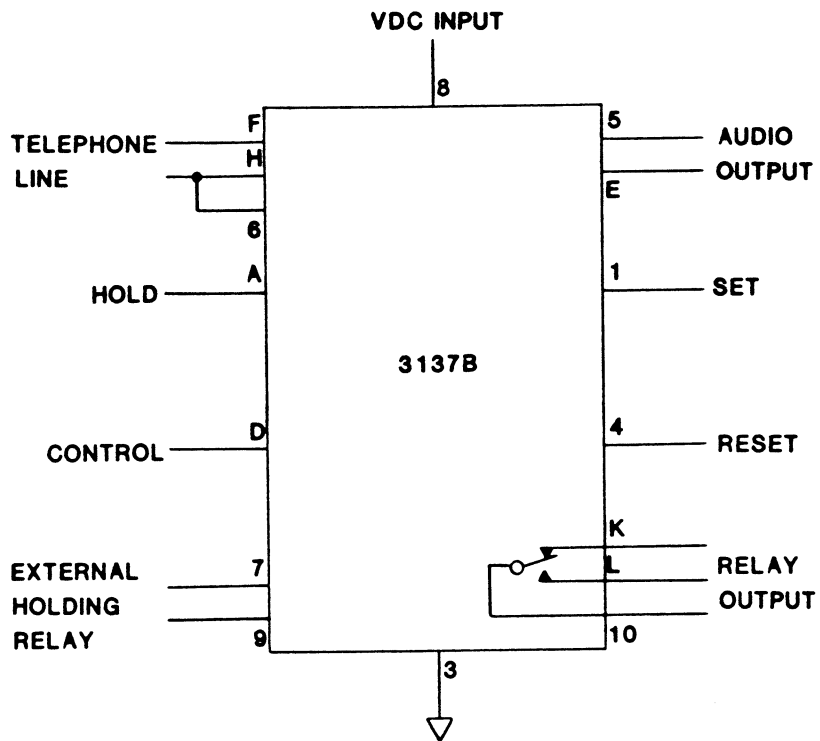
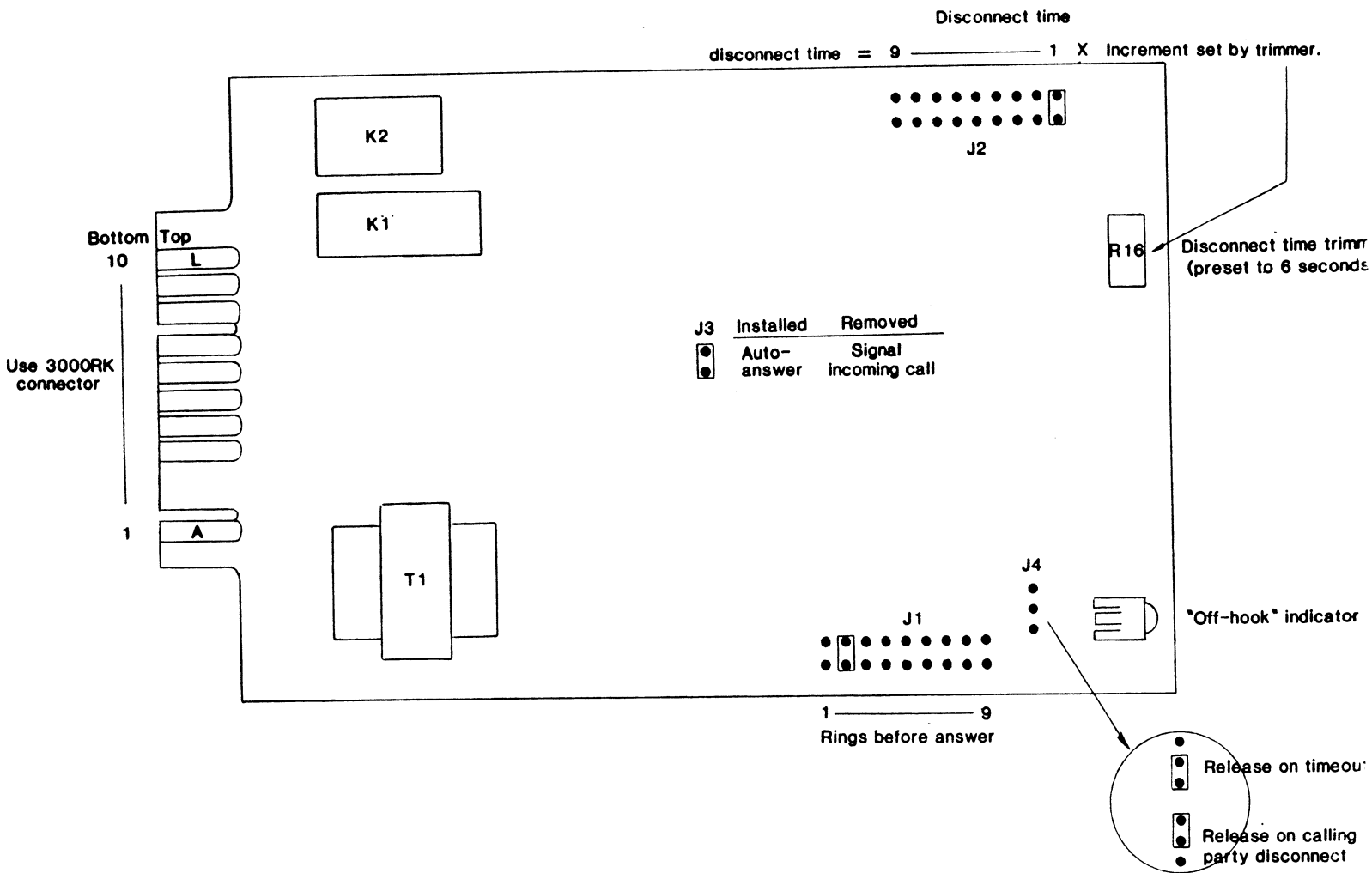


FIGURE 2

## OPERATION

The device will answer an incoming call after the number of rings prescribed by J1 and complete a bidirectional audio path between the telephone line and the non-network audio port.

It will remain on the line until the calling party disconnects and a loop battery interruption is given to the called party or until it times out as prescribed by jumper programming.

## THEORY OF OPERATION

A ring signal is applied to the telephone line by the central office.

This signal is passed from the telephone line to the ring detector circuit, A1, on the Model 3137B. A1 demodulates the envelope of the ring signal and passes each ring through PC1 and A2B to the ring counter, A3.

A3 is a 5-stage Johnson counter having ten decoded outputs. This counter is advanced each time a ring is detected from the telephone line.

The selected output of this counter (corresponding to the number of rings before answer) is passed through J1 to a latch, A4, which is then SET.

The SET condition at this latch causes K1 to energize by way of A2C, J3 and Q3. This seizes the telephone line.

At the same time that the setting of latch A4 operates K1, it also enables the disconnect oscillator, A2D.

A2D generates a clock pulse to the counter A6 which is advanced with each pulse from the oscillator.

The selected output of this counter is a reset pulse that passes through A5C, CR9 and A2E to reset the ring counter, A3 and the latch, A4. Resetting the latch A4 causes K1 to be deenergized (releasing the telephone line) and the disconnect time oscillator, A2D to be disabled and the disconnect time counter is reset via A5D.

If disconnection upon loop current interruption is selected then telephone loop current illuminates PC2 after K1 energizes.

When the current interruption is detected from the central office then the transistor of PC2 is turned OFF. This serves as a reset signal which is passed through A5B and CR8 to reset the system as in the circumstance of the reset on disconnect timer time out.

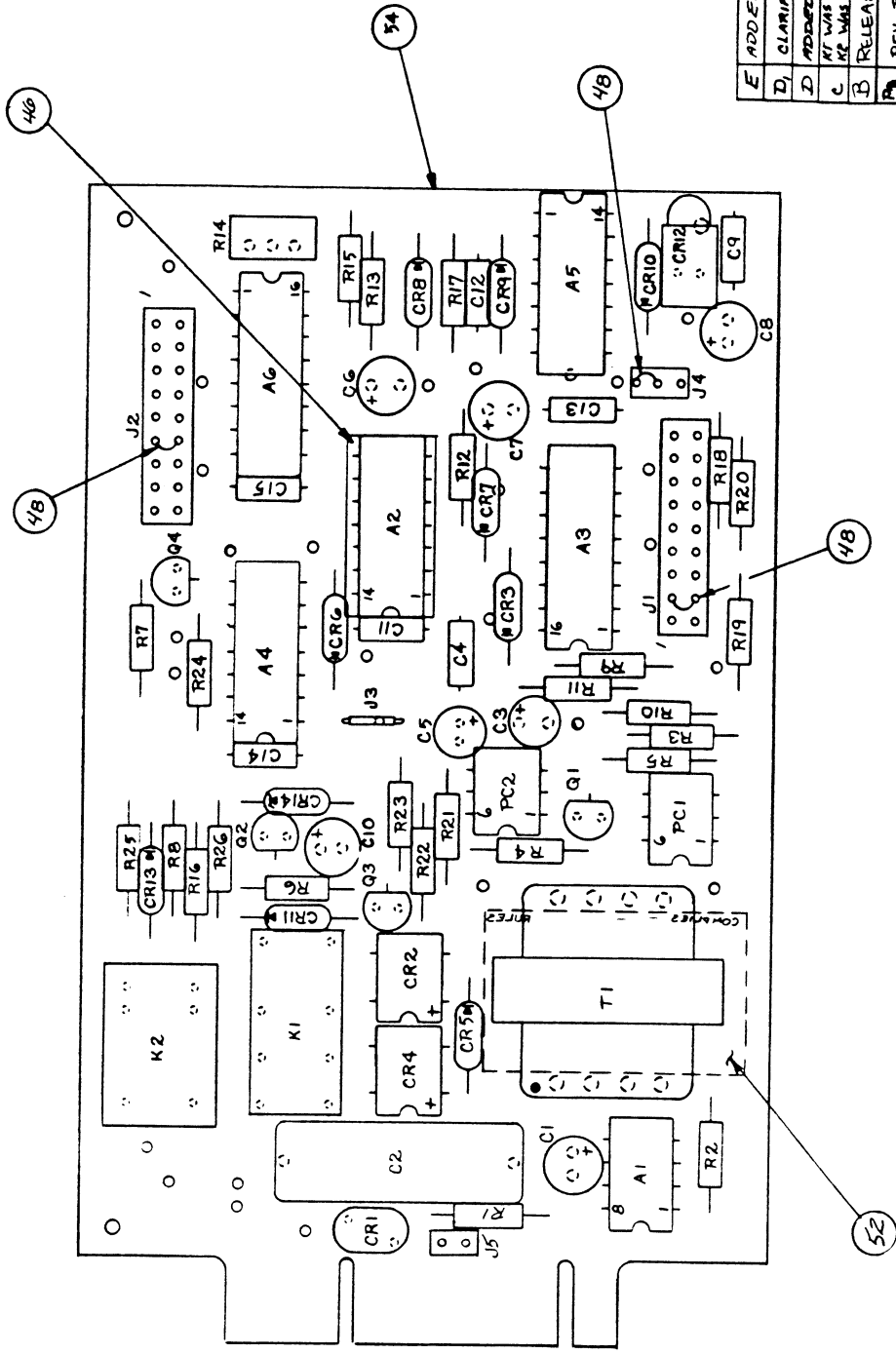
## DIAL TONE DISCONNECT OPTION

For telephone exchanges where the central office does not provide a current interruption on the calling party disconnect, return of dial tone can be used to force disconnect of the Model 3137B.

An optional Model 90417 Dial Tone Detector Module may be added to the 3137B for detection of continuous dial tone. The Model 90417 replaces the A2 IC., plugging directly into A2's socket and connecting two wires to J5. After detecting continuous dial tone for more than eight seconds the Model 90417 will reset the 3137B causing disconnect.







E	ADDED J5 & ITEM 46	JM 1-29-85
D	CLARIFY ITEM 48 POSITIONS	TOM 4-10-86
D	ADDED ITEM 52	JM 4-10-85
C	IT WAS TESTED/FIGURE WAS TOLERABLE	JM 8-19-85
B	RELEASED TO PROD	JM 4-23-85
A	REV. B/M	JM 1-29-85

REVISIONS		DATE
LOC LET.	SCALE	2:1
	DRAWN	S.Y.
	CHKD.	4/12/85
	APP'D.	4/12/85
	NO. REG.	9137

TOLERANCE UNLESS OTHERWISE SPECIFIED:  
 TWO PLACE DECIMAL 1.000  
 THREE PLACE DECIMAL 1.000  
 ANGULAR 1/16

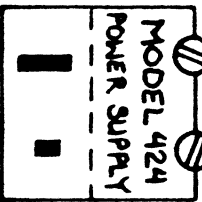
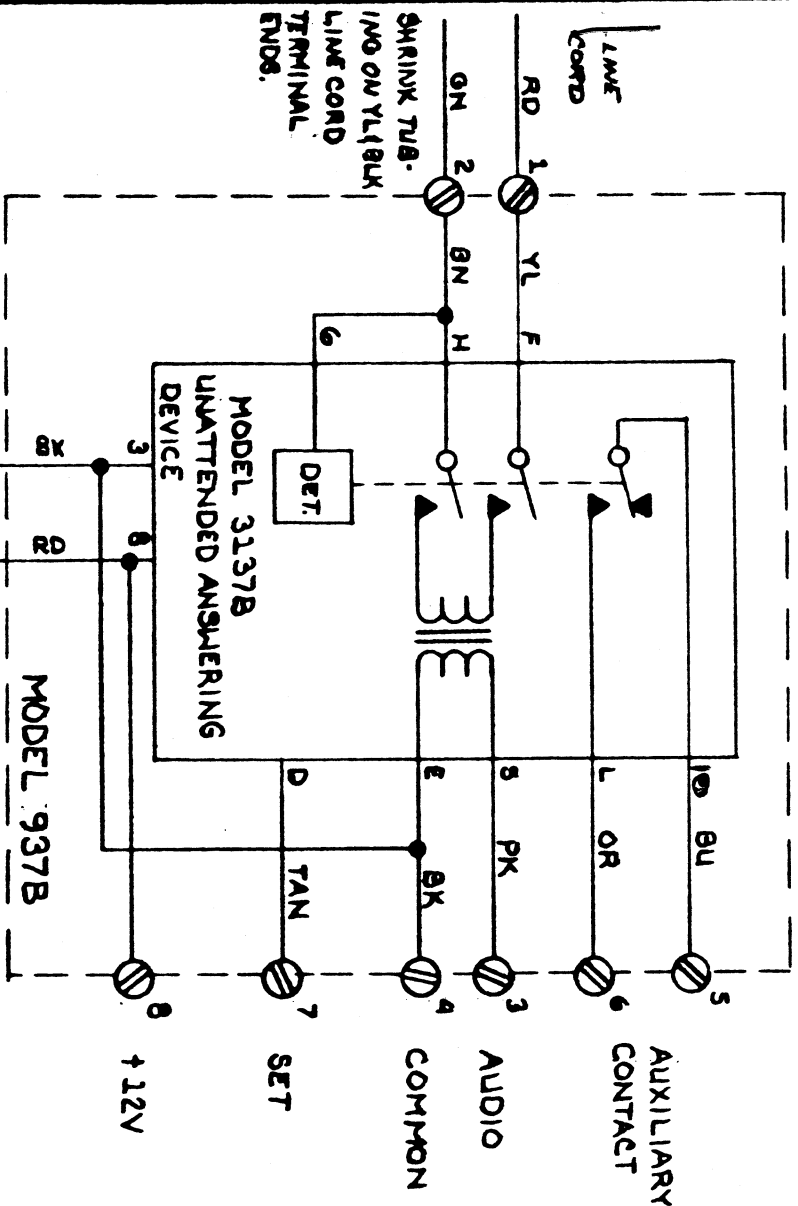
**MONROE ELECTRONICS, INC.**  
 LINCOLN, MASSACHUSETTS

**MODEL 3137B**  
**UNATTENDED ANSWERING DEVICE**

3137B/22  
 Sht. 1 of 4

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937B/1

A		LINE CORD WAS 3000R/22T		75M 2-20-86	
LOC.	LET.	SCALE	DATE	REVISIONS	
		~	7/29/85		
		DRAWN			
		CHK'D.			
		APP'D.			
		NO. REQ.			
		NEET ASSEMBLY			

MODEL 937B ANSWERING DEVICE

MONROE ELECTRONICS, INC.  
LIVERMOUTH, NEW YORK

TOLERANCE UNLESS OTHERWISE SPECIFIED:  
TWO PLACE DECIMAL ± .050  
THREE PLACE DECIMAL ± .008  
FRACTIONAL ± 1/64  
ANGULAR ± 18'

937B/1