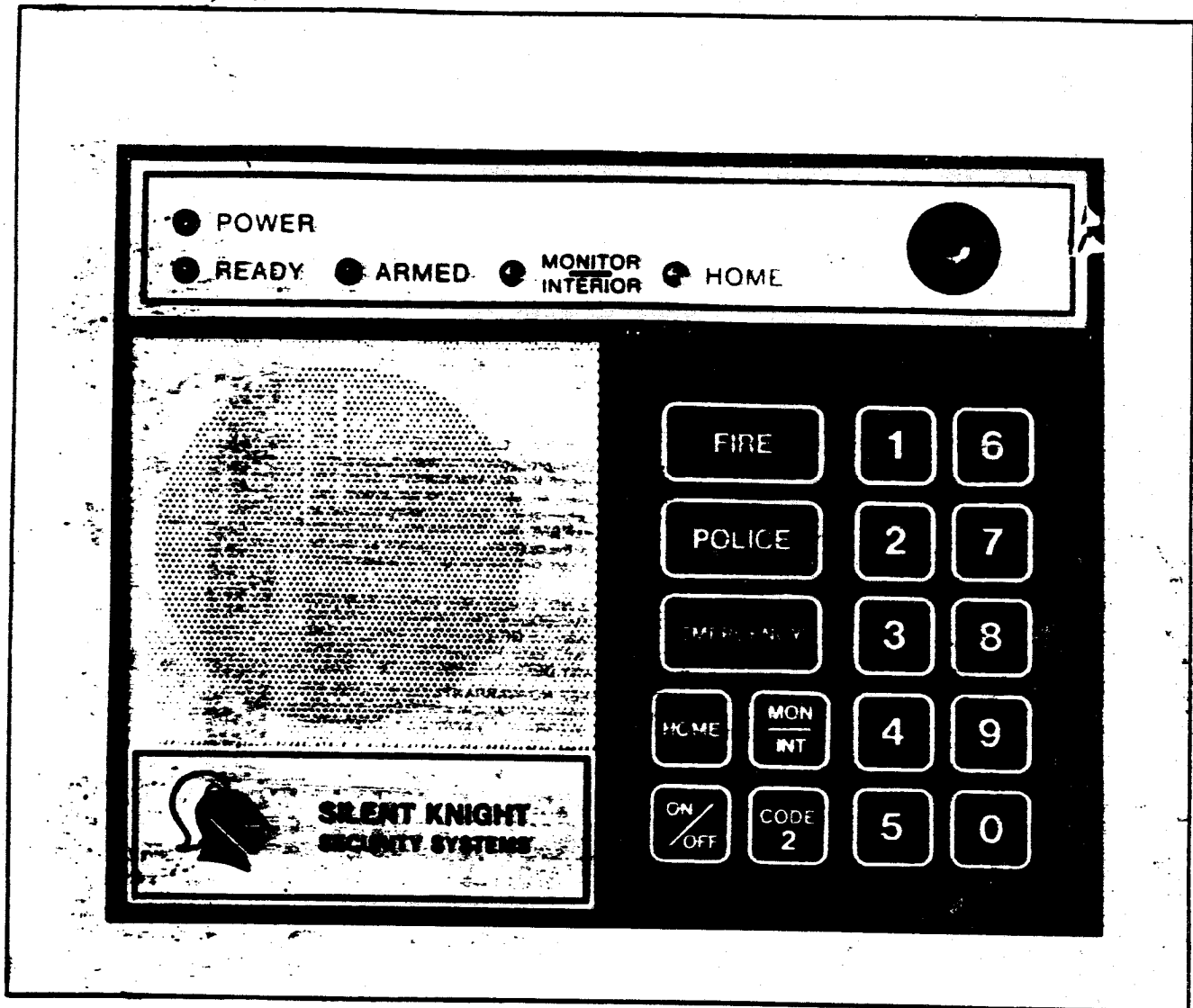


MODEL 3500

INSTALLATION MANUAL



IMPORTANT: Read complete introduction before beginning installation sequence.

SILENT KNIGHT
SECURITY SYSTEMS
DIVISION OF WAYCROSSE, INC.



1700 FREEWAY BLVD. NORTH
MINNEAPOLIS, MN 55430
TELEPHONE. 612/566/0510

MOUNTING

New Construction (Using the Model 3590 back box)

1) Use the two holes in the side of the back box to nail it to a stud, leaving enough of the box protruding past the stud, such that the edge of the box will be flush to the finished surface of the wall.

2) After the wall has been completed attach the mounting bracket using the (4) 1/4 inch self-tapping screws provided.

Note that the mounting bracket has a top and a bottom. The top catch hooks are smaller than the bottom.

3) Go to 6) [Old Construction]

New Construction (Using a 4 11/16 X 4 11/16 X 2 1/8 inch electrical box)

1) Nail the box flush to the stud. Mount the appropriately sized mud ring for the finished wall.

2) After the wall is finished attach the mounting bracket using the (4) 1/4 inch self-tapping screws provided

3) Go to 6) [Old Construction]

Old Construction

1) Place the back box on the wall and mark it's outline.

2) Carefully cut out the clearance hole.

3) After all the wires for the system have been run, attach the mounting bracket to the back box using the (4) 1/4 inch self-tapping screws provided.

Note that the mounting bracket has a top and a bottom. The top catch hooks are smaller than the bottom.

4) Pull the wires through the top wire access hole of the box and then slide it into the wall.

5) Using #6 or #8 pan head screws, secure the bracket to the wall.

6) Connect all external wiring to the connector pigtails of the 3500 as necessary. Connect the battery cables to the battery (observe polarity). At this time the "READY" light should be blinking. Now connect the A.C. transformer.

7) Use a 1/16th inch allen wrench or an Xcelite Model LN-21 1/16th inch driver to tighten two small allen screws on the bottom of the 3500's frame.

PROGRAMMING =====

The 3500 incorporates an electrically eraseable PROM which is used to store the Arm/Disarm codes and system options. Once programmed, this device will not lose it's memory even if all the power is removed from the unit. A programmer is not needed to program the PROM as all the data can be entered via the key pad digit switches. The PROM can be reprogrammed without removing it, or removing power.

When power is first applied to the 3500, it will be in the program mode and remain there for approximately one minute. During this time the (data as described below) can be entered using the key pad digit switches. If this data is not entered before the one minute has elapsed, the 3500 will automatically read the PROM and program itself with the data contained within. The PROM will come from the factory preprogrammed as follows:

Apartment code; 1-2-3-4
System Options; 3-4-5-6
Managers code; 9-8-7-6
Users code; 4-3-2-1

The following is a description of the data which must be programmed into the PROM:

Apartment code; The apartment code is used by the Model 3501 only and is not applicable for the 3500. However, when programming, the 4 digit apartment code must be entered even though it is not used.

System Options; There are twelve system options which must be programmed to configure the system.

Code 2; Code 2 is a 4 digit code used by the apartment manager or maintenance personnel to Arm/Disarm the intrusion circuits, reset alarms and to reprogram the PROM.

User's Code; The User's code is also 4 digits and is used for the same functions as the managers code with the exception that the User code can only access the PROM to change it's own code.

To Configure the System

- Step 1) Select the options from Table 1. Fill in () for each option.
- Step 2) Convert the options to digits from Table 2.
- Step 3) Fill in all the codes to be programmed on line provided marked [CODES].
- Step 4) Carefully follow the program instructions.

In Table 1 notice that the options have been split into four groups of three options each. Use Table 2 to convert the options for each group to a decimal digit.

TABLE 1

Option 1 () Interior touch switch enabled or disabled when the system is Armed.

Enter a (1) for disabled.
Enter a (0) for enabled.

Option 2 () Interior circuit to be instant or delayed. If selected to be delayed it will become instant when the "HOME" light is on.

Enter a (1) for instant.
Enter a (0) for delayed.

Option 3 () Emergency alarm to be audible or silent.

Enter a (1) for audible.
Enter a (0) for silent

Option 4 () Open/Close report (Model 3501 only)

Enter a (0)

Option 5 () Entrance delay of 15 seconds.

Enter a (1) for yes.
Enter a (0) for no.

Option 6 () Entrance delay of 30 seconds.

Enter a (1) for yes.
Enter a (0) for no.

Note: To select a 45 second Entrance delay, Enter a (1) for both Options 6 & 7.

TABLE 1 cont.

Option 7 () Silent Intrusion alarm, if caused by the "POLICE" touch switch.

Enter a (1) for yes.
Enter a (0) for no.

Option 8 () Code 2 controlled by the User code.

Enter a (1) for yes.
Enter a (0) for no.

Option 9 () Duress alarm when Disarming.

Enter a (1) for yes.
Enter a (0) for no.

Option 10 () Reset/Shutdown on all alarms including Fire.

Enter a (1) for yes.
Enter a (0) for no.

Option 11 () Reset/Shutdown on all alarms except Fire.

Enter a (1) for yes.
Enter a (0) for no.

Option 12 () Reset/Shutdown time.

Enter a (1) for 12 minutes.
Enter a (0) for 3 minutes.

EXAMPLE:

Option 1 (1) Option 2 (1)=3 Option 3 (0)	Option 4 (0) Option 5 (0)=4 Option 6 (1)	Option 7 (1) Option 8 (0)=5 Option 9 (1)
Option 10 (0) Option 11 (1)=6 Option 12 (1)		

If the options were selected as shown, the digits that would be entered on the CODES line for the options would be;
3-4-5-6.

TABLE 2

(1) (0) = digit 1 (0)	(0) (1) = digit 2 (0)	(1) (1) = digit 3 (0)
(0) (0) = digit 4 (1)	(1) (0) = digit 5 (1)	(0) (1) = digit 6 (1)
(1) (1) = digit 7 (1)	(0) (0) = digit 8 (0)	

Compare the 4 groups of 3 options that were selected in TABLE 1, to the groups of 3 in TABLE 2. Each group of 3 options will match a group in TABLE 2. Write down the digit associated with each group in sequence. You should end up with a four digit decimal number.

After you have converted the options to decimal digits, enter those, as well as the Code 2 and user code, on the line provided below. Enter the digits from left to right starting with the digit equal to Options 1-2 & 3. For simplicity the apartment code has already been filled in.

1-2-3-4
 |
 apart.
 code

1 2 1 CODES 1608
1 0 0
 |
 option
 codes

1 0 1 0
 |
 mgr's
 code

4 0 5 0
0 0 0 0
 |
 users
 code

To Program The PROM

Step 1) Connect power to the 3500.

Step 2) Make sure the "READY" light is flashing.

Step 3) Enter, in sequence (from left to right), all sixteen digits from the CODE line above.

Step 4) The "READY" light will stop flashing when the 16th digit is entered.

Note 1: If a mistake is made while in the main program mode verses the re-program mode, pressing the "ON/OFF" touch switch will cause the 3500 to go back to the beginning of the

pro-programming sequence. all previously entered data will be erased.

Note 2: If the above information has previously been programmed into the PROM and subsequently power has been turned off, it can be recalled instantly after power is restored, by pressing the "HOME" touch switch. This will cause the 3500 to "read" the PROM, program itself and cease flashing the "READY" light.

To Re-program Arm/Disarm Codes

The User's code and Code 2 can be re-programmed independently from each other, and from the rest of the data. To re-program the User code, press the digit (0) followed by the existing user code. The "READY" light will begin flashing and the 3500 will accept a new 4 digit user code, storing it in the PROM. Should you make a mistake while entering data in the re-program mode, pressing the "HOME" touch switch will clear any new digits that were entered and re-program the existing user code allowing you to start over.

To re-program Code 2, the "CODE 2" touch switch is pressed followed by the digit (0) and then the existing Code 2. The "READY" light will begin flashing and the 3500 will accept the new 4 digit Code 2. Again, if a mistake is made while entering the new code, pressing the "HOME" touch switch will clear the 3500.

Note: If Code 2 is under the control of the User code the 3500 must first be Armed or Disarmed, using the User code and the "CODE 2" Touch switch. (see Arming/Disarming & Resetting)

If the 3500 is placed in the re-program mode and new data is not entered, it will re-program itself with the old data, in approximately one minute.

Re-Programming All Data

Re-programming of all data stored in the PROM can be done in either of two manners:

- 1) Disconnecting all power from the 3500 and then reconnecting it.
- 2) Using Code 2 to reset the system in the following manner;

First, the "CODE 2" switch is pressed, followed by two digit (0's) and then the existing Code 2. This will place the 3500 in the same mode as if power has just been applied. The "READY" light will be flashing and the PROM will be waiting for all sixteen digits of information to be entered.

If, in one minute the 3500 is not re-programmed, it will re-program itself automatically.

OPERATION =====

DIGITAL KEYPAD

The digits 0 thru 9 are used to Arm and Disarm the Intrusion circuits, Reset alarms and Program or Re-program the following;

- 1) Apartment codes
- 2) System options
- 3) Code 2
- 4) User's code

There are seven function switches, which provide the following controls;

POLICE - generates an Intrusion alarm

FIRE - generates a Fire alarm.

EMERGENCY - generates an Emergency alarm.

NOTE: The alarm switches must be pressed and held for one second before an alarm will be generated.

HOME -switchs the delayed circuits to instant.

MON/INT - when the system is not Armed, it will activate the door monitor circuit. When the system is Armed, it will activate the interior circuit.

ON/OFF - turns off all 12 vdc power for accessories. Pressing the "ON/OFF" switch (twice), in rapid succession, and followed immediately by either the user code or Code 2, will turn off power. Pressing the "ON/OFF" switch when power is off, will turn the power back on.

CODE 2 - accesses Code 2.

There are four status LED's which provide the following;

POWER - indicates presence of AC power when ON. Flashes when the digital communicator is reporting.

READY - indicates status of the Intrusion circuits. Flashes when the system is in the program mode.

ARMED - indicates system armed status. Flashes when an Intrusion alarm has been activated, will remain flashing untill the system is disarmed.

HOME - indicates instant/delay status.

MON/INT - indicates status of door monitor and interior circuits.

INPUT DESCRIPTION =====See Figure 1=====

INSTANT INTRUSION - The instant intrusion input can be either normally-open, normally-closed or both. When the system is Armed, an activation of this input will cause an immediate INTRUSION alarm to be generated. The Intrusion alarm is characterized as follows;

Seperate distinct sound from the speaker.
Flashing "ARMED" light.
Automatic arming of the Interior circuit.
Activation of the Alarm output. Activation of digital dialer output.

When the system is not Armed, activation of this input will cause the "READY" light to go off and if the "MONITOR/INTERIOR" light is ON, it will cause the door monitor alert to sound.

DELAYED INTRUSION - The delayed intrusion input can be normally-open, normally-closed or both. If the "HOME" light is ON and the system is Armed, activation of this input will cause an immediate INTRUSION alarm. If the "HOME" light is OFF, arming the system will activate the Exit delay timer, allowing activation of this input during that time without causing an alarm. After the Exit delay time has elapsed, activation of this input will cause the Entrance delay alert tone to sound and will activate the entrance delay timer. If the system is not Disarmed before the Entrance delay time expires, an INTRUSION alarm will be generated.

When the system is not Armed, activation of this input will cause the "READY" light to go off and if the "MONITOR/INTERIOR" light is ON, it will cause the door monitor alert to sound.

The 3500 has a fixed EXIT delay of 60 seconds and a selectable ENTRANCE delay of 15, 30 and 45 seconds.

INTERIOR INTRUSION - The interior circuit can be normally-open, normally-closed or both. It is controlled by the system Armed status and the Monitor/Interior status, both of which must be ON before the Interior circuit will ARMED. If the Interior circuit is Armed, activation of this input will cause either an instant or delayed Intrusion alarm, depending on the selection of Option (2) and the status of the "HOME" light.

When the system is not Armed, but the "MONITOR/INTERIOR" light is ON, activation of this input will cause the "READY"

light to go OFF, but will not cause the door monitor alert to sound.

FIRE - The Fire circuit is a 24 hour normally-open circuit, activated by +12 vdc and is supervised by an end-of-line resistor. Activation of the Fire circuit will cause an immediate Fire alarm, characterized by it's distinct alarm sound and seperate output to the digital dialer. The Alarm output is also active with a Fire alarm.

NOTE: The Fire alarm sound will over-ride all other alarm sounds.

TROUBLE - If power is lost to the Fire circuit or if the wires are cut or grounded, the speaker will emit a one second tone, once a minute, in-dicating a Trouble condition exists in the Fire circuit. This will continue untill the trouble is cleared. The Trouble output will also activate the digital dialer.

OUTPUT DESCRIPTION =====See Figure 1=====

SMOKE DETECTOR POWER - This output supplies +12 vdc @ 250 ma.. If either the Code 2 or User code is entered when the 3500 is in a Fire alarm, this output will turn off for approximately 2 seconds, allowing the smoke detectors to reset if they have been cleared of smoke. This output will also turn off if the ON/OFF feature is used.

ACCESSORY POWER - This output supplies +12 vdc @ 250 ma. and is used to supply power to accessories such as motion detectors etc.. This output will turn off if the ON/OFF feature is used.

Alarm - The Alarm will switch from an open to Ground (-) whenever an audible alarm is generated. It will remain active untill the alarm is reset. It will not activate on silent alarms.

OPERATION =====

ARMING/DISARMING & RESETTING

The 3500 can be Armed or Disarmed using either the User code or Code 2. However, Code 2 can be placed under the control of the User code by selecting a (1) for Option 8. If this is the case, pressing the "CODE 2" switch and then entering the User code will enable Code 2. Code 2 will then remain enabled untill the User code is entered without using the "CODE 2" switch.

Example: Ms. Smith wants the maid to have access to her apartment while she is at work. However, the maid arrives after Ms. Smith leaves for work, and leaves the apartment

before Ms. Smith returns. As Ms. Smith wants the maid to have only limited access to the apartment, she has given her the Code 2 access code. When Ms. Smith leaves in the morning she will Arm the system by first pressing the "CODE 2" switch and then entering her User code. Code 2 is now enabled and can be used any number of times by the maid during the day. When Ms. Smith returns home that night, she will Disarm the system using just her User code. Code 2 is now disabled and will remain so until re-enabled by Ms. Smith.

TO ARM - To Arm the system with the User code, enter the 4 digit access code in sequence.

To Arm the system with Code 2, first press the "CODE 2" switch and then enter the 4 digit Code 2 access code.

The system will not Arm if the "READY" light is OFF, indicating an open intrusion loop.

TO DISARM or RESET AN ALARM -Disarming the system or resetting any alarm condition is identical to Arming.

An Intrusion alarm will reset when the access code is entered, regardless of the status of the activating input(s).

An Emergency alarm will not reset when the access code is entered if the activating input is still in an alarm state.

A Fire alarm will reset when the access code is entered if it's activating input is still in an alarm state, but will come back on in 2 seconds. This is because the 3500 will attempt to reset a smoke detector which is in alarm, by removing power for 2 seconds. If the smoke detector cannot reset, it will come back in alarm as soon as power is restored. In this case the user should use the ON/OFF feature to shutdown the alarm while waiting for the smoke to clear from the detector.

DURESS ALARM - A silent Duress alarm (forced Disarming of the system by an intruder) can be generated by the user when entering the access code, by preceeding the code with a digit (9).

Caution: If the Duress option is used, the digit (9) should not be used as either the first or the last digit of either the User code or Code 2, as to do so would greatly increase the chances of false alarms being generated.

FUSES (See Figure 2)

The 3500 has two 1 1/2 amp fast-blo fuses, one is located on the P.C. board next to the red battery lead. This fuse protects the internal electronics, as well as the external power for accessories and smoke detectors.

The second fuse is located in the red battery cable itself, and protects the 3500 from damage should the battery be

accidentally connected backwards.
MODEL 2370 DIGITAL COMMUNICATOR

Description - The 2370 reports three alarm channels and three status channels as follows:

	S.K FORMAT	SESCOA FORMAT
FIRE-----	Code 2 -	Code 1
INTRUSION----	Code 1 -	Code 3
EMERGENCY----	Code 3 -	Code 2
RESTORE -----	Code 7 -	Code 7
FIRE TROUBLE-	Code 8 -	Code 8
LOW BATTERY--	Code 8 -	Code 8

Mounting - With the components facing you, plug the 2370 on to the 12 pin male connector, which is located in the center of the 3500 P.C. board. The pins of the connector will pass through the bottom of the 2370 and into the red connector. Place the mounting hole, located in the left hand corner of the 2370 over the screw in the 3500, and secure with the #4 nut provided..

JUMPER OPTIONS - The 2370 has four jumper options label J1 thru J4 which alter the functions of the 2370 in the following manner:

J1 - Silent Knight (FSK) format. With this jumper left in, the 2370 will report alarm and status codes in the standard (pulsed tone) format.

When this jumper is cut, the 2370 will report in the Silent Knight (FSK) format, which is several times faster than the (pulsed format) and will only report to a Silent Knight Model 8520 receiver and then only if the 8520 is equipped with the FSK receiver board #5.

J2 - Silent Knight or SESCOA formats. With this jumper left, in the 2370 will report alarm and status codes to Silent Knight and Ademco receivers.

With this Jumper cut, the 2370 will report to SESCOA, and Franklin receivers.

J3 - Restore to Normal

When this jumper is left in, the 2370 will report only the alarm and status conditions, and will not report "Restore"

When this jumper is cut, the 2370 reports a "Restore" condition if:

a) The initiating alarm or status condition was present continuously during the reporting sequence.

b) The initiating condition is restored after the reporting sequence is completed. (Kissed-Off).

c) All other alarm and status inputs are also in their normal (non-alarm) states.

J4 - Telco Number Control.

When this jumper is left in, the 2370 will dial the telephone number and report the account code programmed in the second number location of the PROM.

When this jumper is cut, the 2370 will dial the telephone number and report the account code programmed in the first number location of the PROM.

PROGRAMMING THE PROM - A Model 5506 programmer is used when programming the telephone and account numbers. This information is programmed into the 82S126 PROM, which is provided with the 2370. The PROM is secured in a conductive foam pad for shipping to prevent damage by static electricity.

When programming the 2370 PROM, you will be using the Model 6423 programming section of the 5506 programming manual. The numbers 6423 then, should be entered for Step 0 in the programming sequence. Refer to the 6423 section of the 5506 programming manual for further programming instructions.

Note: The Model 2370 has the ability to operate using one of two telephone and account numbers. However it can only dial one number. It is desirable to leave one section of the PROM open for a future change in either the telephone number or the account number. For this reason you should skip (not program) the second telephone number and account number during programming.

Note: Remember to cut J4 on the 2370 and to restore that jumper if you ever need to use the second numbers.

PROM INSERTION - Once the PROM has been programmed, carefully insert it into the prom socket (the only empty socket on the board) with the notch on the PROM facing in the same direction as the other four I.C.'s.

F.C.C. REGISTRATION

Before connecting the Model 2370 to the telephone lines, the telephone company must be notified and provided with the following information;

- 1) Manufacturer (silent Knight Sec.)
- 2) Model Number 2370
- 3) FCC reg# AC698R-67314-AL-R
- 4) Ringer equivalence- 0.0B
- 5) Type of jack to be used- RJ31X

(
Note: The telephone company must also be notified if this device is permanently disconnected.

This device may not be directly connected to coin telephones or party lines.

The telephone company, under certain circumstances, may temporarily discontinue service and/or make changes in its facilities and services, which may affect the operation of this device. However, the telephone company is required to give adequate notice in writing of such changes or interruptions.

This device cannot be adjusted or repaired in the field; in case of trouble with this device, notify the installing company or return to:

Silent Knight Security Systems
1700 Freeway Blvd.
Minneapolis, Minn. 55430

LIGHTNING PROTECTION (See Figures 3&4)

As with any electronic equipment, precautions should be taken when installing the 3500 to protect against high energy transients which can be generated by lightning. The following steps, if observed, will provide the maximum protection against these transients.

1) Insure that the A.C. outlet that you intend to use for the Model 9221 plug-in transformer has a "good" connection to earth ground. This can be done at the outlet, using a digital voltmeter, by measuring the A.C. voltage between the "hot" side of the outlet and neutral, then comparing that voltage to the voltage reading made between the "hot" side and the ground connection. The difference between these two readings should not exceed .2 vac..

2) Verify at the breaker or fuse box, that there is a ground wire from the neutral buss bar in the box, to the main cold water pipe at a point closest to where the pipe enters the house. If there is a water meter at this point be sure that the ground wire is bonded to the pipe at both sides of the meter.

CAUTION: In newer construction the water supply pipe may be plastic. If this is the case, check to see if the breaker box has been bonded to a ground rod. If not, an electrician should be called and a ground rod driven into in a moist area close to the building and then bonded to the breaker box.

3) Verify that the neutral buss block in the breaker or fuse box, has a bonding screw connecting it to the box itself.

4) Install the Model 7891 transient suppressor and a shielded 18 gauge cable to the secondary side of the Model 9221 Class II transformer. Connect the shield and the ground wire of the Model 7891 under the screw which holds the cover to the outlet.

5) At the 3500, splice together the orange wire from the 3500 inter-connect cable and the black wire from the Model 7892 transient suppressor.

6) Secure the lug side of the 7892 and the shield from the transformer cable under a screw in the back of the box.

7) If the 2370 Digital Communicator is used, verify that the phone connector block at the point where the phone lines enter the building have Gas Tube lightning arrestors and not the carbon resistor type (if you have any doubt call the telephone company).

8) Verify that the phone block has a ground wire bonded either to the breaker box or to a cold water pipe.

CAUTION: If the ground wire from the phone block is connected to a cold water pipe, verify that that pipe is in turn grounded to the breaker box.

9) At the 2370, connect the Model 7872 transient suppressor between the red and green wires of the Model 7860 telephone inter-connect cable, and the earth ground screw at the back of the box. (see Figure 3)

Note: When running the telephone inter-connect cable between the 3500 and the RJ31X jack, and between the RJ31X jack and the phone block, avoid running these wires with house power lines.

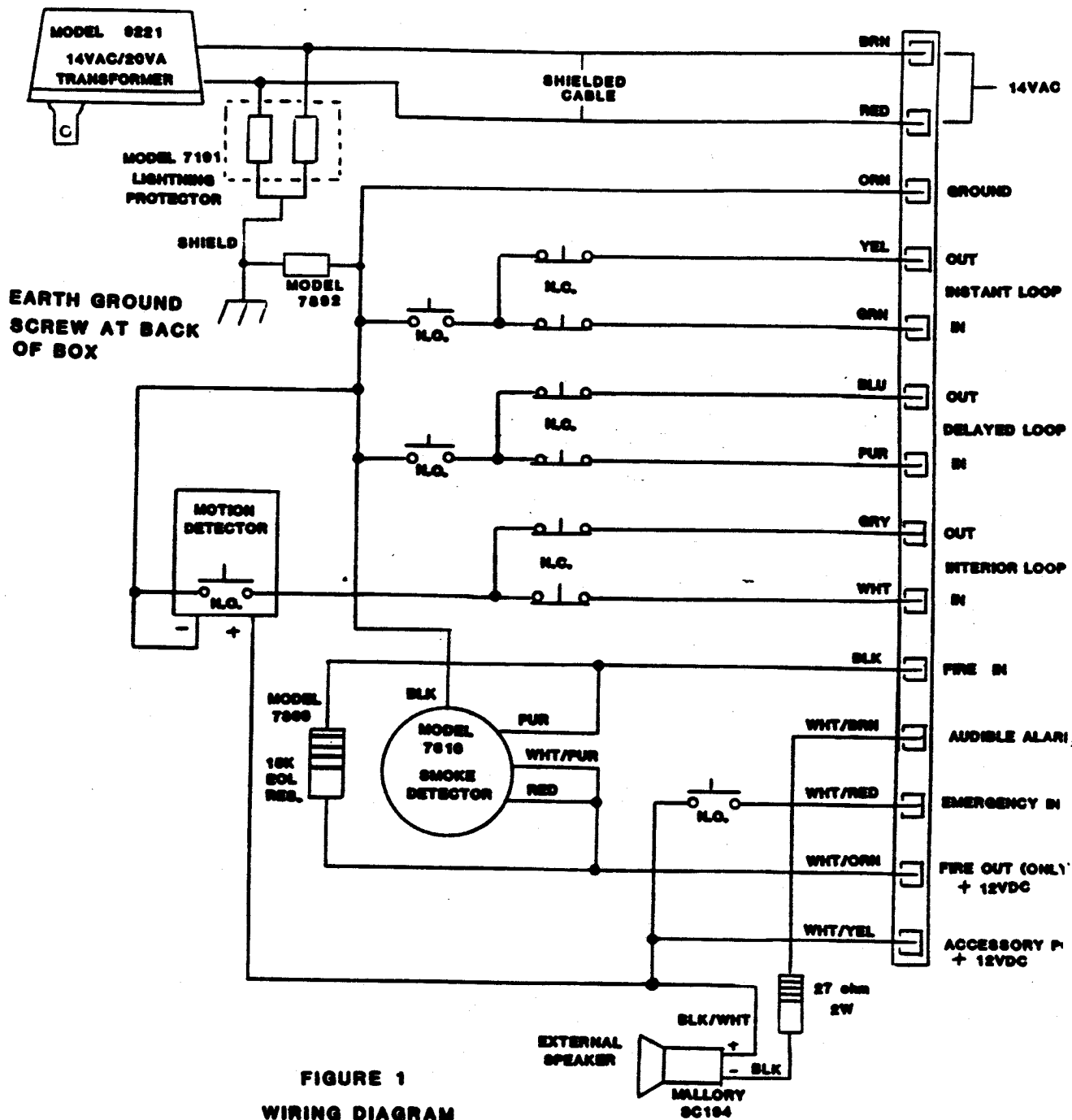


FIGURE 1
WIRING DIAGRAM

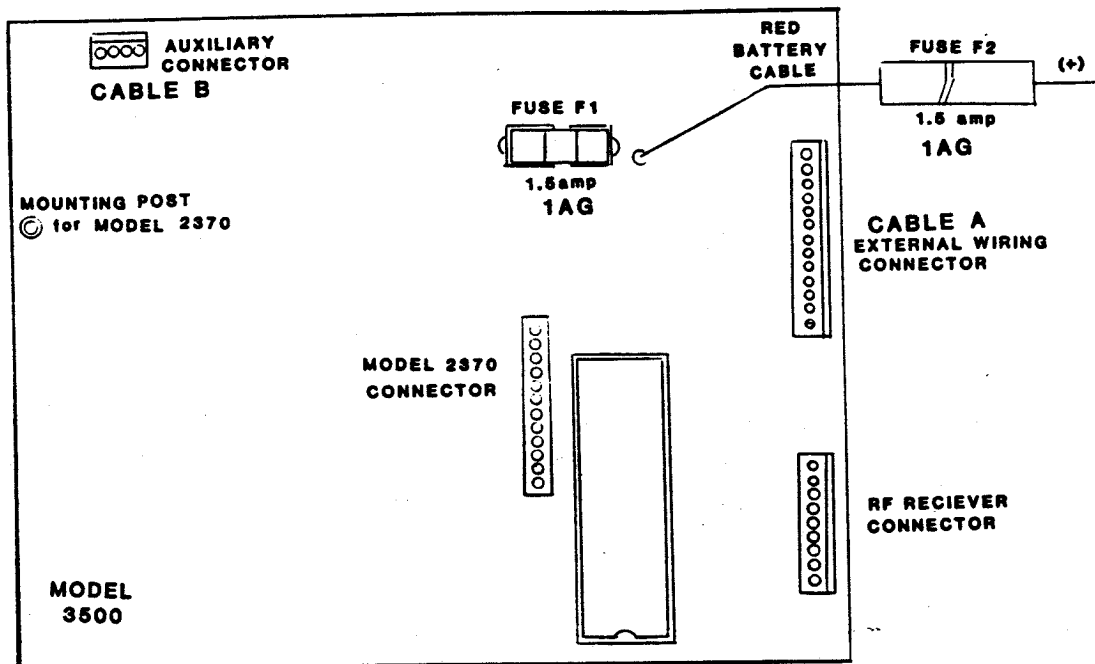


FIGURE 2

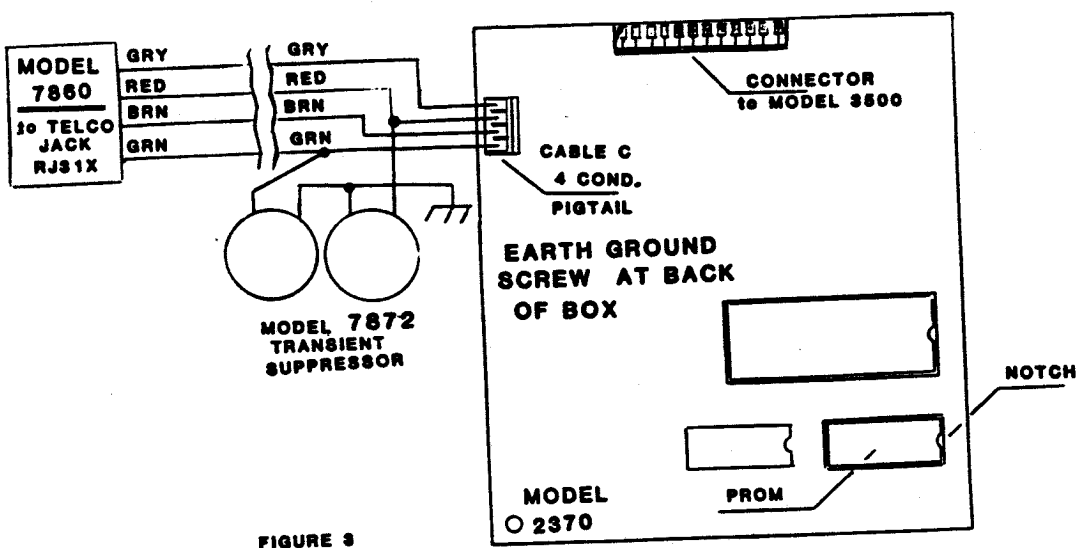


FIGURE 3

MODEL 7891 TRANSIENT SUPPRESSOR

The Silent Knight Model 7891 Transient Suppressor is designed to clamp to electrical ground, all the high voltage spikes coming from the A.C. Input that may be harmful to the control panel.

It is very important that this device be used, and installed correctly.

The two terminal spade lugs with the clamping diode should be attached to the transformer secondary coil. The common terminal spade lug with one end of each diode connected to it, should be installed in such a manner that it will have a good connection to electrical ground, using the screw that holds the receptical cover in place. When using this method of installation, it should be confirmed that the outlet cover screw is indeed electrical ground. To confirm this, use a volt meter to measure the voltage between one side of the outlet and the mounting screw. When you find a potential difference between the screw and one side of the outlet, then measure the voltage between one side of the outlet and the other. The voltage should be the same as the voltage read between the mounting screw and the hot side of the outlet.

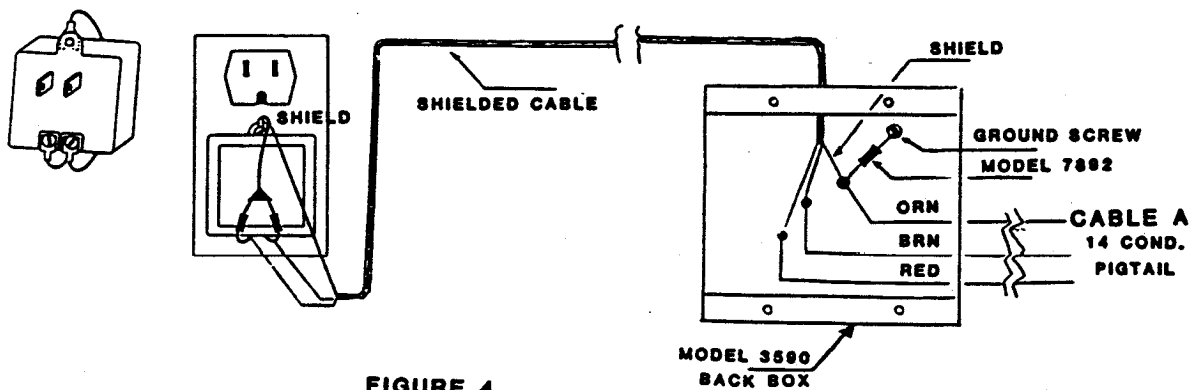


FIGURE 4

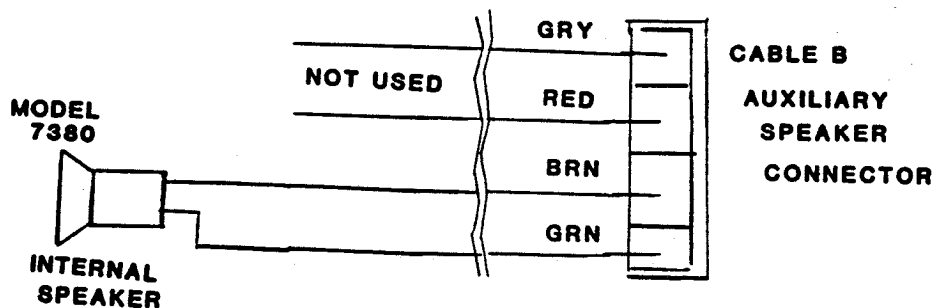


FIGURE 5

3500/RF INSTALLATION

When installing a model 3500 to be connected to a Silent Knight RF receiver, a model 3510 wire harness must be used instead of the cables supplied with the RF receiver. Either a model 1520L or 1522L receiver may be used.

When connecting the model 3510 wire harness to the RF receiver, be sure the harness is connected to pin #1 as shown in figure 6. The remaining zone outputs of the RF receiver will not be used.

When programming RF transmitters, select the desired zones to be activated as follows:

<u>RF Receiver</u>	<u>3500</u>
Zone 1	Instant Loop
Zone 2	Interior Loop
Zone 3	Delay Loop
Zone 4	Fire Circuit
Zone 5	Emergency Circuit

All hardwire circuits of the 3500 must be jumpered or connected to sensors in the normal manner. A 15K EOLR must also be connected across the fire circuit loop.

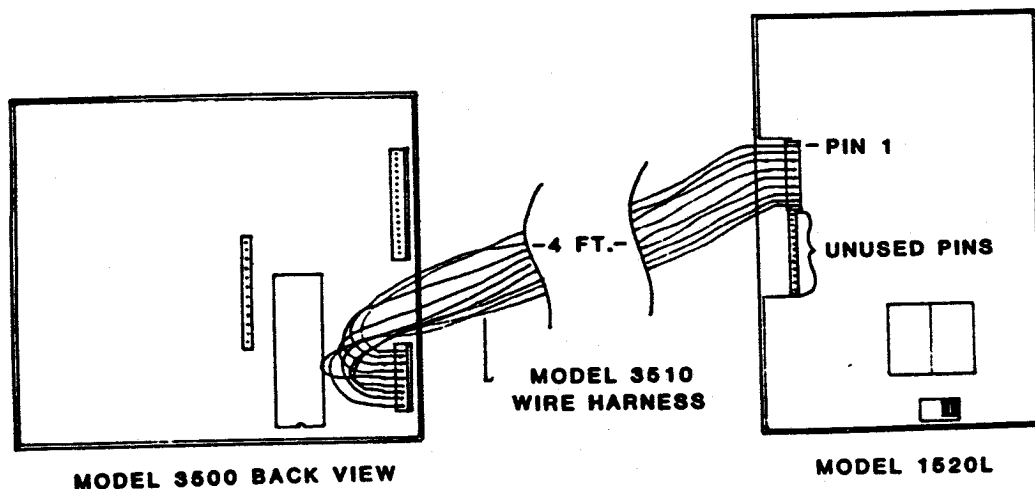


FIGURE 6