

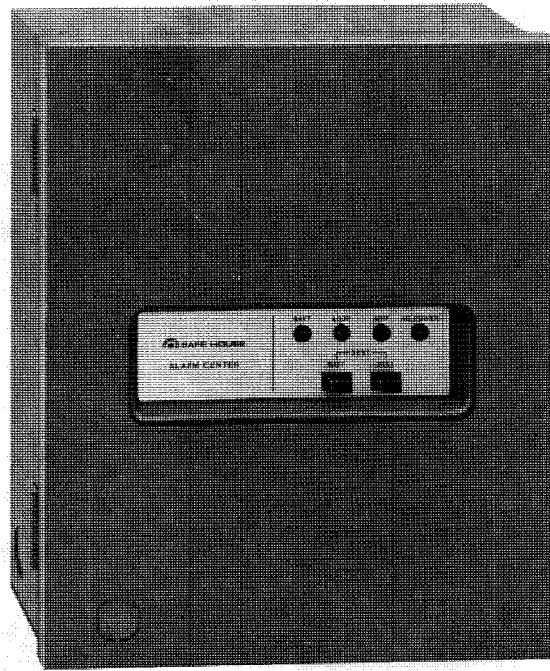
OWNER'S MANUAL

BURGLAR ALARM CENTER

PLEASE READ BEFORE
USING THIS EQUIPMENT

49-450A

* TRADEMARKS OF
TANDY CORPORATION



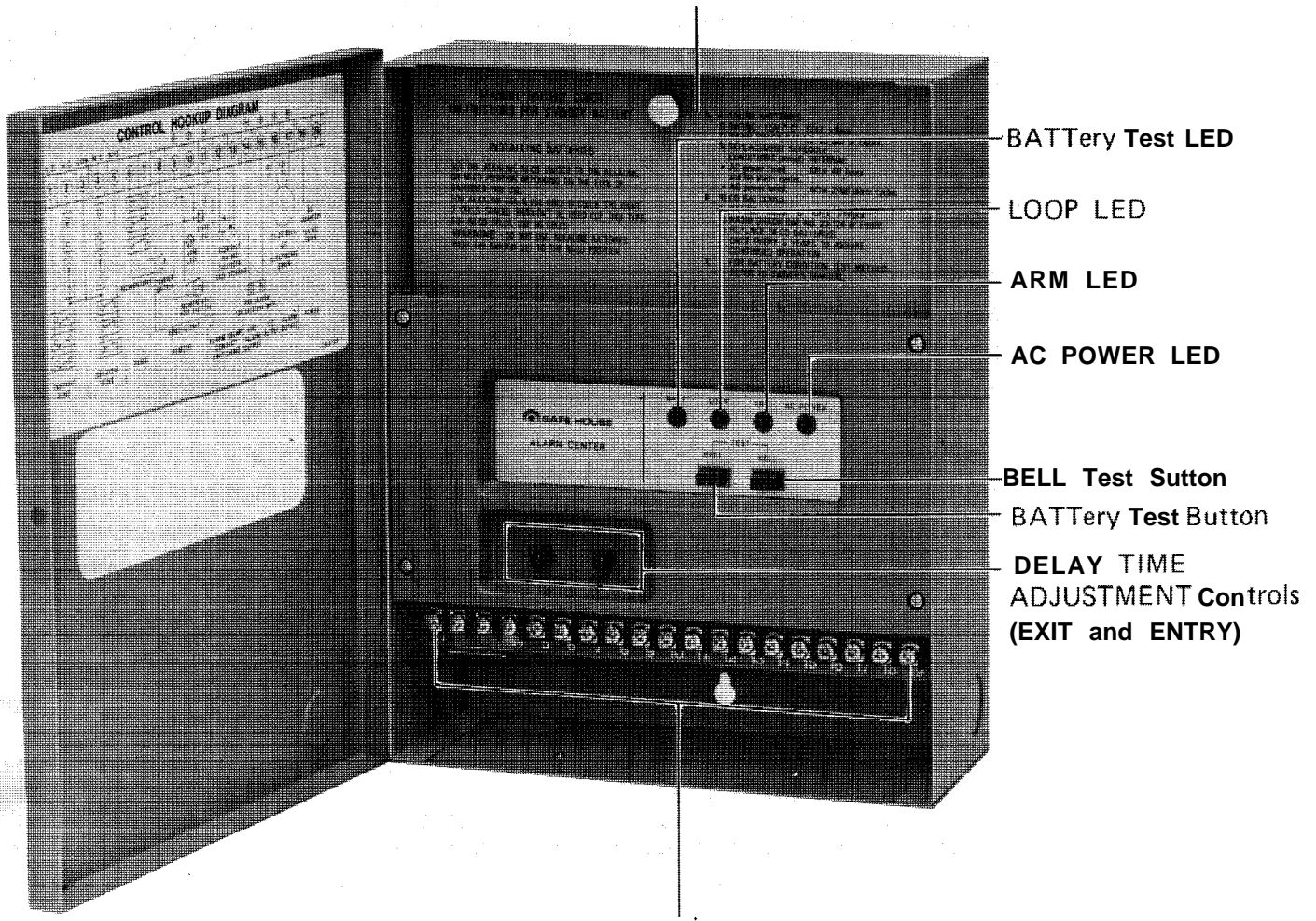
89690 ←
HARDWARE
INSTALL
REPAIRING
ELECTRIC
4.809

 **SAFE HOUSE**®*

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Battery Compartment



Connection Terminals (1-19)

No alarm system can prevent an intruder from entering your home or office. Alarm systems are designed to deter intruders and give a warning if one does attempt to enter the protected area. Careful planning and installation will help you achieve this goal,

For your own protection, we urge you to record the serial number of this unit in the space provided below. You'll find the serial number on the bottom of the unit.

Serial Number: 100637

Your SAFE HOUSE Alarm Center is a sophisticated perimeter alarm system. When properly installed, it will warn you if anyone attempts to make unauthorized entry into your home or office. Its many professional features make it compatible with nearly any intrusion sensing device or alarm sounding device. It can even activate a Security Telephone Dialer that will automatically call the police, a security service or a friend when the alarm is activated.

FEATURES

- ★ **2 Alarm “Trigger” Loops:** Instant and Delayed Alarm Loops are available with separate circuits for N.O. (normally open) and N.C. (normally closed) devices.
- ★ **Momentary Contact – Panic/Tamper Loop:** This additional loop can be connected to N.O. switches or sensing devices and will activate the Alarm Center anytime (whether it is armed or not). This is ideal for Panic/Tamper Switches or 24-hour protection of property inside the house (paintings, etc.). When this loop is violated, the entire Alarm Center is automatically armed.
- ★ **Battery Back-up:** The batteries will give you up to 40 hours of armed operation or 2 complete alarm cycles (5 minutes each), in case of a power failure. The system requires either 8 alkaline or 10 Nickel Cadmium C-Cell batteries. Nickel Cadmium batteries will automatically recharge inside the unit.
- ★ **Automatic Alarm Reset:** The Alarm Center will activate for 5 minutes, when a loop is violated, and then reset for future operation, if the loop has been returned to its normal state (open or closed). If the loop has not been returned to the normal state, the alarm will stop after 5 minutes, but the Alarm Center will not reset.
- ★ **Remote Arm/Disarm Connections:** Up to 10 remote switches, for arming and disarming the Alarm Center, can be connected anywhere you like (front or back entrances, upstairs, etc.).
- ★ **Entry/Exit Delay:** The Entry and Exit delay times are independently adjustable (0 to 40 seconds for entry delay and 0 to 45 seconds for exit delay). This will give you time to get out of the premises after arming the Alarm Center and time to disarm it after entering the premises (before the alarm devices are activated).
- ★ **Pre-alarm Circuit:** This circuit will activate a buzzer during the Entry Delay Time, to remind you to disarm the Alarm Center. Use of this circuit is optional. It will not work if the delay time is set to 0.
- ★ **External Alarm Output:** Powers 12V DC alarm devices (such as a bell, siren or strobe light), rated up to 1 Amp total.
- ★ **Battery Test LED:** Indicates the condition of the batteries, when the Battery Test Button is pressed.
- ★ **Loop LED:** This indicator lights when all loops are intact (in their normal state). There are connections for remote Loop LEDs for use with remote arm/disarm installations. This LED blinks during the Entry Delay Time, as a visual reminder to disarm the Alarm Center.
- ★ **Arm LED:** This LED lights when the Alarm Center is armed and blinks when the alarm has been triggered (even after the alarm has stopped sounding). It will continue to blink until you disarm the Alarm Center. This warns you there has been an alarm condition while you were away. An Arm LED can be included in a remote arm/disarm installation, also.
- ★ **AC Power LED:** Lights when AC power is present.
- ★ **Auxiliary Output:** Provides a constant 12V DC output to power auxiliary devices (such as a Security Telephone Dialer, Motion Detector or Keypad Remote Arming Center).
- ★ **Alarm Relay Contact Switching:** An internal N.O. relay, connected to these terminals, will close when the Alarm Center activates. This relay can be used as a switch to turn on a device (rated 1 Amp at 24V DC or 50 mA at 130V DC) that has its own power supply.

IMPORTANT: READ THIS MANUAL COMPLETELY BEFORE ATTEMPTING TO INSTALL YOUR ALARM SYSTEM. INSTALLATION IS NOT DIFFICULT, BUT REQUIRES ATTENTION TO DETAIL AND KNOWLEDGE OF THE SENSING DEVICES.

Alarm Center Operation and Connections (pages 6 – 15) tells you exactly what the Alarm Center (the “brain” of your system) can do.

System Planning and Installation (pages 16 – 30) not only tell you how to install the Alarm Center, but gives you information on the uses and installation of many different types of sensing devices (the “eyes and ears” of your system).

However, we do not intend to try to cover every possible device and application. You must study the instructions supplied with each separate device.

Some of the devices mentioned are not available at Radio Shack. We recommend you check the yellow pages for other security equipment stores, if you need additional equipment.

Radio Shack cannot be responsible for defects or errors in other manufacturers products and assumes no liability for damage to other products or the Alarm Center.

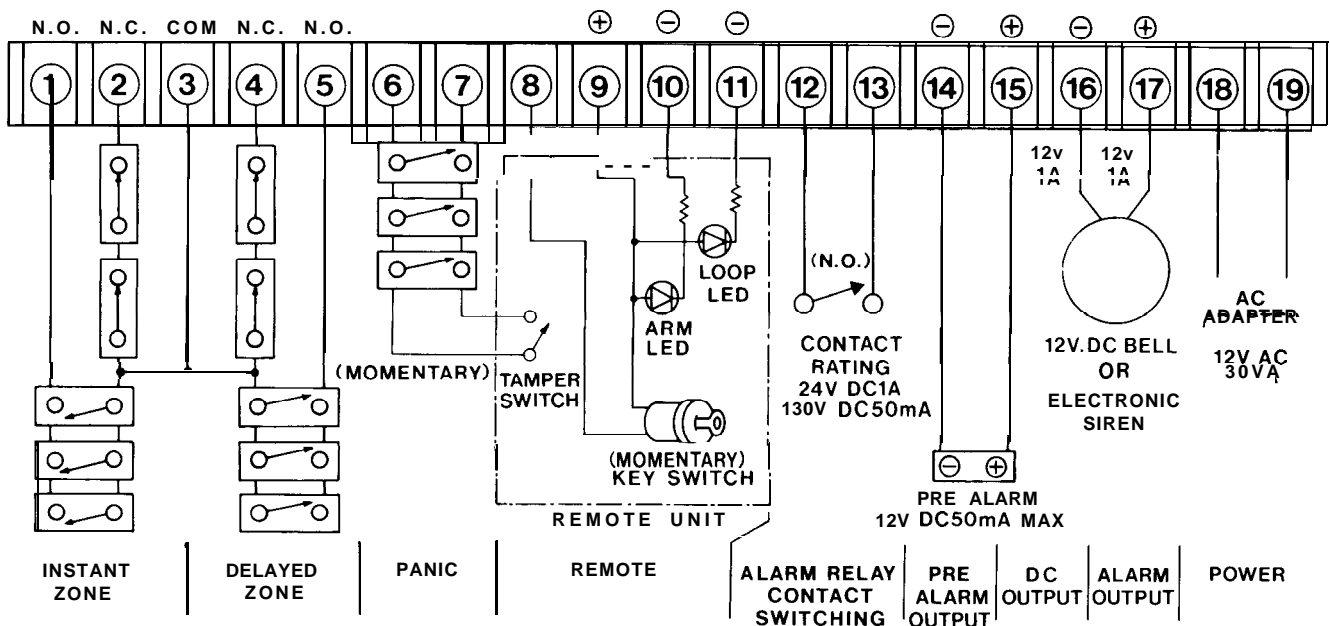
Every Alarm System installation is different, even though they all use many of the same components. Once You become familiar with the components, it's up to you to design the system that best suits your needs.

If you have problems, the people at your local Radio Shack store will be glad to help.

Remember, the amount of protection provided by the Alarm Center depends greatly on the care and imagination you use in the design and installation of the complete system.

Keep your system design as simple as possible but include all the protection you really need. Your alarm system is a detection device and a deterrent. It does not physically keep intruders out. You still need good locks, etc.

SYSTEM WIRING DIAGRAM



ALARM CENTER OPERATION AND CONNECTIONS

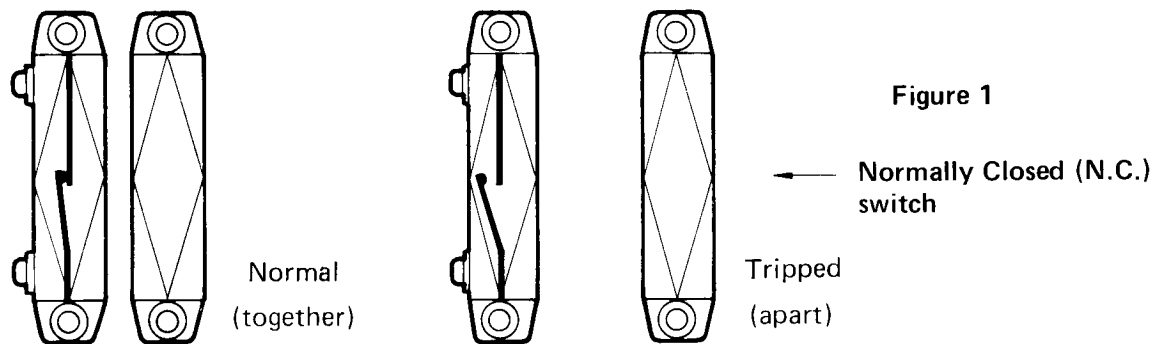
TYPES OF CIRCUITS

In electronics, **open** refers to a circuit that does not provide a complete path for the electricity (like a light switch that is OFF).

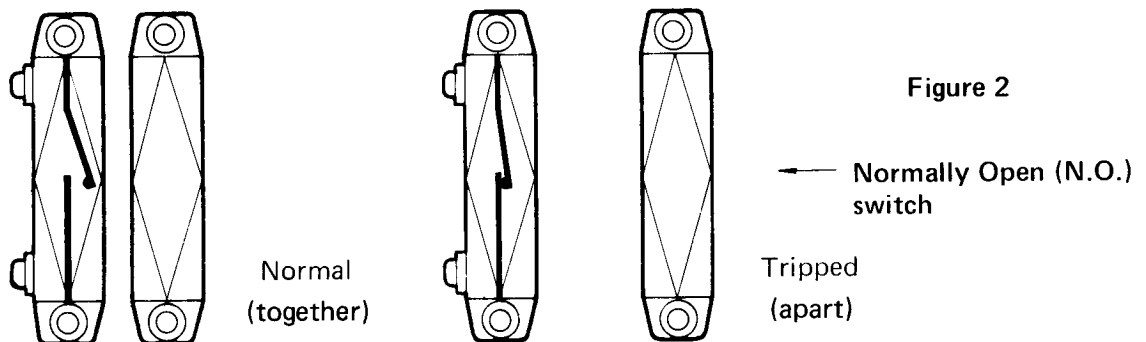
Closed refers to a circuit that does provide a path for the electricity (like a light switch that is ON).

In this manual you will see the terms normally closed (**N.C.**) or closed circuit and normally open (**N.O.**) or open circuit used to describe Alarm Center circuits and sensing devices (such as magnetic switches).

A **N.C.** (normally closed) alarm circuit is connected, in series, to a group of **N.C.** sensing devices. The alarm is activated any time **one** of the sensing devices is tripped and becomes **open** (See Fig. 1).



A **N.O.** (normally open) alarm circuit is connected, in parallel, to a group of **N.O.** sensing devices. The alarm is activated any time **one** of the sensing devices is tripped and becomes **closed**. (Series and parallel connections are explained on the next page.)



Many sensing devices are available in both N.O. and N.C. versions; this gives you great flexibility in the design of your system.

Note: N.C. circuits are used most often because they are considered **supervised**. This means if the circuit (loop) is broken or cut, the Alarm Center will be activated.

The terms **N.O. magnet switches** as used in this manual refer to normal (I.E. no alarm) condition of devices when they are installed in an alarm loop circuit with magnet close to the switch. However, magnetic switches as sold separately may be marked N.O. or N.C. when magnet is away from switch. Be careful to ensure that you obtain the correct type of switch for your application.

We will use many diagrams to show you how to connect your system. The symbols below will be used to represent N.O. and N.C. devices (Fig. 3).



Figure 3
Symbols of
N.C./N.O. Devices

Momentary is the term for a specific kind of N.O. switch that is closed only when you turn and hold a key (as in a car ignition switch) or press and hold a button (like a door bell button). Momentary closing of such switches will be used to arm and disarm the Alarm Center, and to activate the Alarm Center through the Momentary Contact Panic/Tamper Loop.

The Panic/Tamper Loop is always armed and can activate the Alarm Center any time power is supplied to the unit (AC or batteries). When this loop is tripped the entire Alarm Center is automatically armed.

ALARM ACTIVATION LOOPS (Terminals 1-7)

There is a summary drawing of all wiring connections inside the main panel of the Alarm Center.

The sensing devices are connected to the Alarm Center Terminals through a loop of 2-conductor twisted wire (such as our 278-860).

To make a loop with N.C. devices, you must connect them in **series**. This means you cut one of the conductors and connect the device "in-line" with that conductor (Fig. 4).

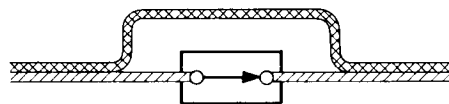


Figure 4
Normally Closed Device
connected in series

To make a loop with N.O. devices, you must connect them in **parallel**. This means you must connect both conductors to each device along the loop (Fig. 5).

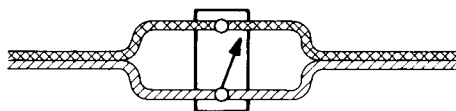


Figure 5
Normally Open Device
connected in parallel

In either case the loop is completed at the last sensing device in the loop (Fig. 6).

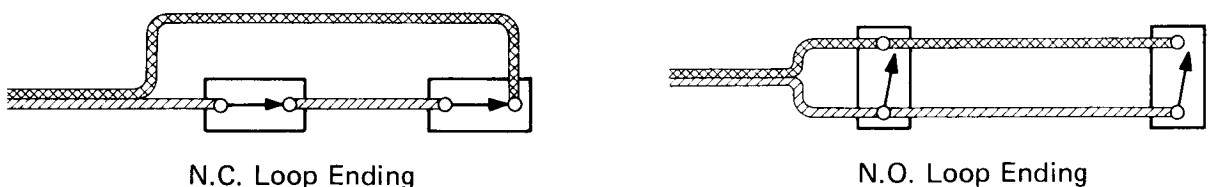


Figure 6

Your 49-450A Alarm Center is shipped with jumpers on the normally closed loops. The reason for this is that the LOOP LED (Indicator) will not light and the panel will not arm if either closed circuit loop is open. Both closed circuit loops must have a complete circuit. Remove the jumper(s) for the normally closed circuit loop(s) that you will use.

Examples

1. **Both normally closed loops (Instant and Delay) not used.** – Terminals 2 to 3 and 3 to 4 must have a jumper installed.
2. **Normally closed Instant loop not used.** – Terminals 2 and 3 must have a jumper installed. Remove jumper between terminals 3 and 4.
3. **Normally closed Delay loop not used.** – Terminals 3 and 4 must have a jumper installed. Remove jumper between terminals 2 and 3.
4. **Both closed loops used.** – Remove jumpers between terminals 2 to 3 and 3 to 4.

Instant Loop/N.O. – N.C. (Terminals 1 – 3)

The Instant Loop of your Alarm Center activates the alarm instantly, when one of the sensing devices is tripped. If you want a N.O. circuit, connect the wires to terminals 1 and 3. For a N.C. circuit, make connections to terminals 2 and 3 (Fig. 7).

Note. Terminal 3 is a common connection for all the loops (except the Momentary Loop).

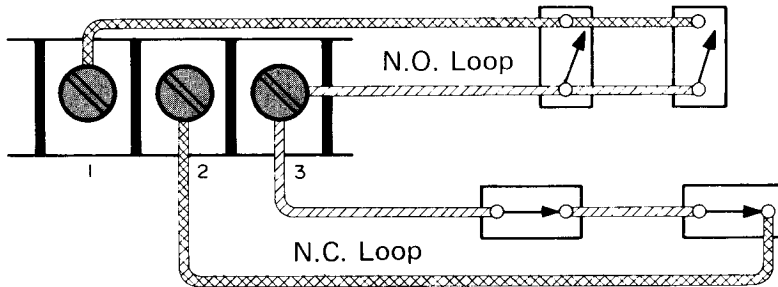


Figure 7
Instant Loop Connections

Delayed Loops/N.O. – N.C. (Terminals 3 – 5)

The Delayed Loops of your Alarm Center activate the alarm devices a preset length of time after a sensing device has been tripped (adjustable from 0 to 45 seconds for exit delay and from 0 to 40 seconds for entry delay). These Delay Times are set by the ENTRY and EXIT DELAY Controls. The delay time increases by about 4 seconds as you turn these controls one graduation clockwise. The purpose of such a delay is to give you time to leave the premises after you have armed the unit and time to disarm the unit when you enter the premises, before the alarm device is activated.

A N.C. Delayed circuit should be connected to terminals 3 and 4. A N.O. Delayed circuit should be connected to terminals 3 and 5 (Fig. 9).

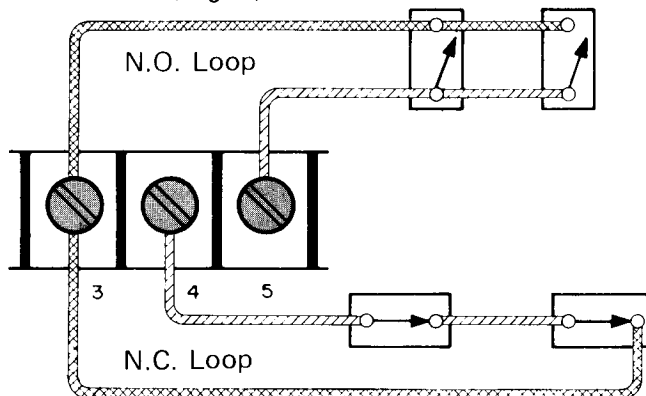


Figure 8
Delayed Loop Connections

Note: The Delay Time should be set for the shortest time possible that allows you to arm/disarm the Alarm Center before it activates.

The Delay Loop should be used for exit/entry doors when you do not have remote arm/disarm switches mounted outside the premises. All other sensing devices should be connected to the Instant Loop (for instant detection of an intruder). The Delay Loop will also act as an Instant Loop, if the DELAY Controls are set to 0. (See page 11)

Panic/Tamper Loop/N.O. (Terminals 6 – 7)

Terminals 6 and 7 are for the Momentary Loop. This is a special N.O. circuit that can activate the Alarm Center any time, whether it is armed or not. This circuit can be used for Panic/Tamper Switches (switches that activate the Alarm Center immediately, any time). It can also be used as a 24-hour protection circuit for valuable objects inside the home or office (art objects, etc.). When this loop is violated, the other loops of the Alarm Center are armed automatically.

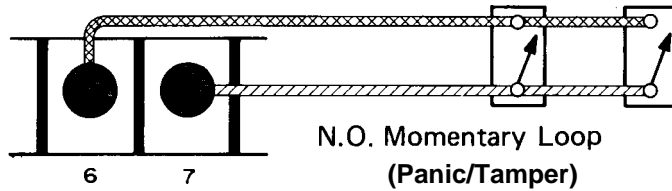


Figure 9
Panic/Tamper Loop
Connections

Note: The maximum loop resistance of Normally Closed loop is 500 ohm.
The minimum loop resistance of Normally Open loop is 50 kohm.

ALARM CENTER CONTROLS AND INDICATORS (Terminals 8-11)

ON THE ALARM CENTER

Arm/Disarm Switch (Terminals 8 – 9):

If you wish to arm and disarm the Alarm Center at the unit you will need to install a Momentary Contact Switch on the cabinet. We have provided a D-shaped knock-out plug in the lower corner of the cabinet door, for this purpose. We do not include this switch because some people prefer having remote arm/disarm switches, only (See pages 12 – 13).

After mounting the key switch in the cabinet door, connect it to Terminals 8 and 9. Each time you operate the switch (make momentary contact – closed) the Alarm Center will go from armed to disarmed or vice-versa (Fig. 10).

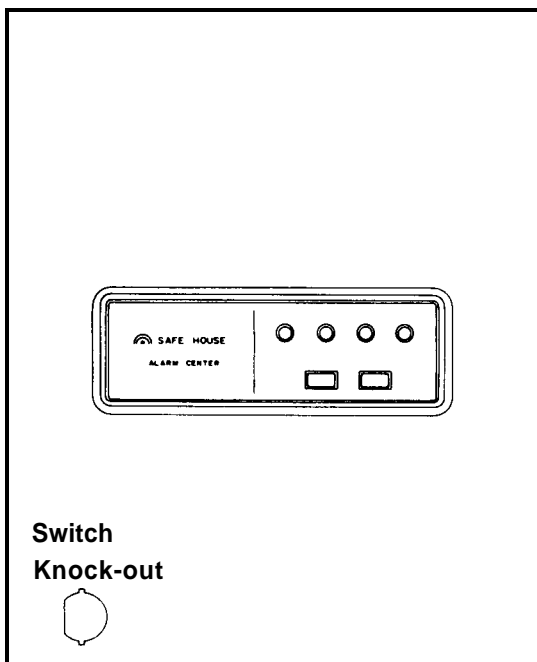


Figure 10

Switch Knock-out
for Mounting Key Switch

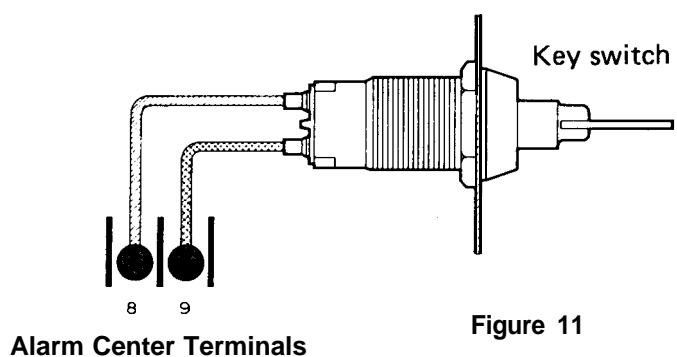


Figure 11

Key Switch
Connection

A key pad can be used instead of the key switch, if desired.

We recommend using a key switch or key pad, so the Alarm Center cannot be disarmed by an unauthorized person.

REMOTE CONTROLS AND INDICATORS

Arm/Disarm Switch (Terminals 8 and 9):

If you want to arm and disarm the Alarm Center from somewhere other than the alarm panel (such as outside the house or office) you can install Momentary Contact Switches at the entrances and connect them in a loop to Terminals 8 and 9 (Fig. 11). These switches must be connected in parallel so that operating any one of them will momentarily close the circuit and change the state of the Alarm Center (armed/disarmed). You can also install a remote switch inside the premises if you don't want to arm/disarm the Alarm Center at the unit.

In remote installation (outside the premises) you should install a Tamper Switch behind the Arm/Disarm Switch plate, to activate the Alarm Center if the plate is tampered with. The Tamper Switch should be a N.O. type and should be connected to the Tamper Loop, as shown on page 9.

REMOTE ARM and LOOP LEDs (Terminals 9 – 11).

If you have remote Arm/Disarm Switches, you will want remote ARM and LOOP LEDs, too.

Remote ARM LEDs must be connected to terminals 9 and 10; remote LOOP LEDs connected to terminals 9 and 11. The anode side of each LED must be connected to 9.

You can connect up to 10 each of the ARM and LOOP LEDs. They must be connected in parallel, with a 1.5 k ohm resistor in series with each LED (Fig. 15). Max rating applied for terminals 9, 10 and 11 is 12V 100 mA.

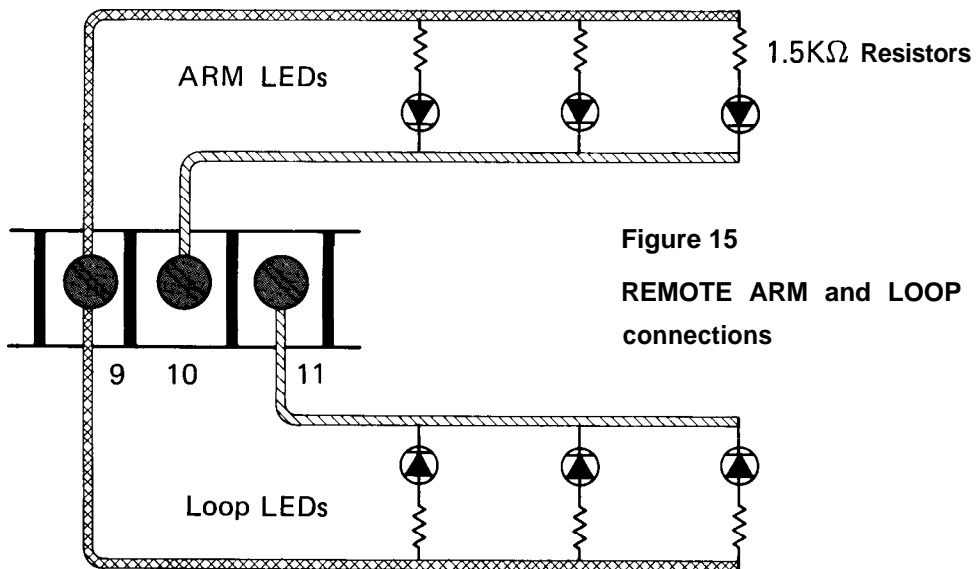
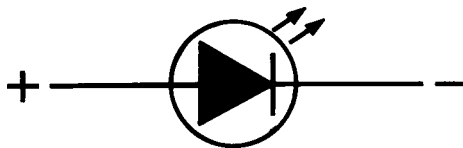


Figure 15

REMOTE ARM and LOOP LEDs connections

The polarity (+ and -) for the LED symbol is shown in figure.15



The polarity of the LED should be listed on the package.

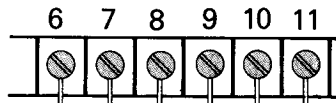
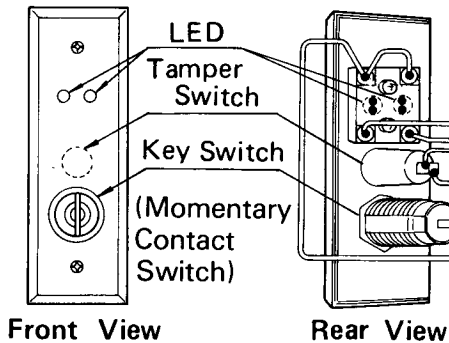
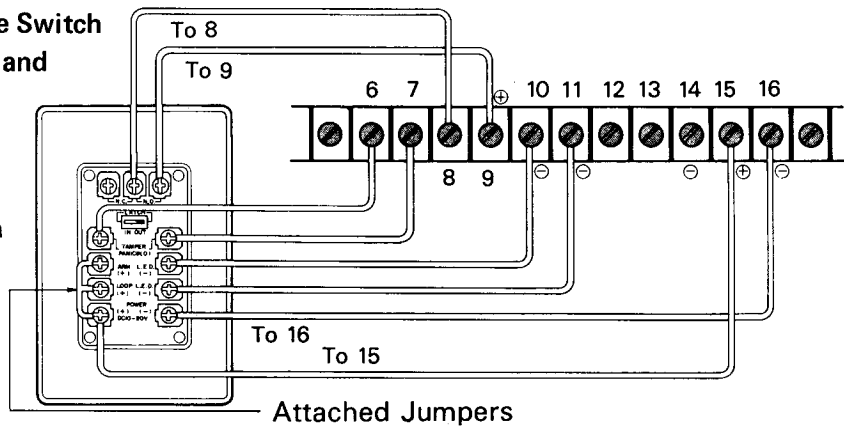
These LEDs will operate the same as the LEDs on the unit (See page 11).

If you have remote Arm/Disarm Switches, ARM LEDs and LOOP LEDs installed outside the premises, there is no need for Entry and Exit Delay Times. You should set the DELAY Control to 0.

There are switch units available that contain a Tamper Switch, LEDs with resistors already in place and a place for a Momentary Contact Key Switch. This type of unit will make remote installations much simpler (and neater, too).

Figure 16-a Digital Code Type Remote Switch Unit with Tamper Switch and LED (Cat. No. 49-535)

**49-535
Digital Key Switch**

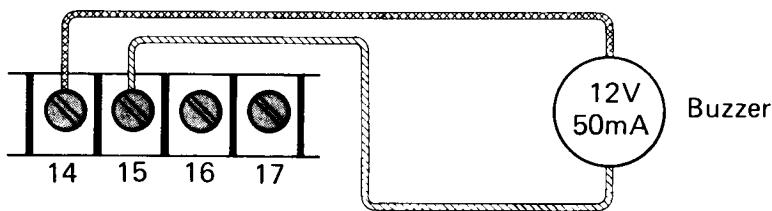


**Figure 16-b
Remote Switch Unit
with Tamper Switch and LED**

ALARM OUTPUTS (Terminals 12 – 17)
Pre-Alarm (Terminals 14 and 15)

A pre-alarm is a buzzer or other device that sounds during the Entry Delay Time. This could be used as a reminder to disarm the Alarm Center when you enter the premises. (Of course, if you have remote Arm/Disarm controls at the entrance(s) this probably won't be necessary.)

Pre-alarm devices must be connected to Terminals 14 and 15. They must be rated at 50 mA or less, at 12 volts. Terminal 14 is negative and 15 is positive.

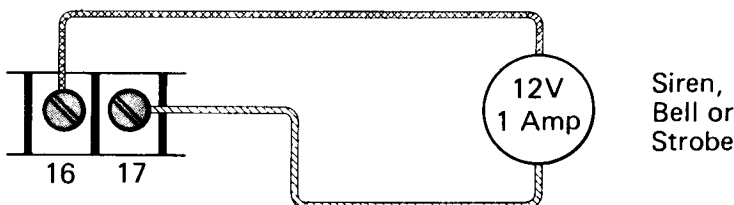


**Figure 17
Pre-Alarm
Connections**

Main Alarm (Terminals 16 and 17)

You can use any 12V DC devices for your main alarm (bell, siren, strobe light, etc.), as long as they are rated 1 Amp or less, total (Fig. 18). It is best to mount alarm devices outside of your home or office, but you must take precautions (a Tamper Switch or Vibration Detector) to ensure that they cannot be disabled without setting off the alarm. A second alarm inside the home or office, is recommend.

Both a sound device and a strobe light can be used to give sound and visual indications of where the alarm is coming from (the total current drawn must not exceed 1 Amp). Terminal 16 is ground and 17 is hot.



**Figure 18
Main Alarm Connections**

When the Alarm Center is activated, the alarm will sound for about 5 minutes. If the Loop is still violated at the end of 5 minutes, the alarm will stop, but the unit will not reset, if the loop has been restored to its normal state (open or closed) the Alarm Center will turn off, reset automatically and be ready to detect another intrusion attempt.

However, the ARM LED will flash until the unit is disarmed using the key switch or key pad; this is your warning that there has been an alarm condition.

Auxiliary (Terminals 15 and 16)

Terminals 15 and 16 provide a constant 12V DC output to power other devices (such as a Security Telephone Dialer – page 30). You can connect any 12V DC devices, as long as the total current drawn does not exceed 1A. Terminal 15 is hot and 16 is ground.

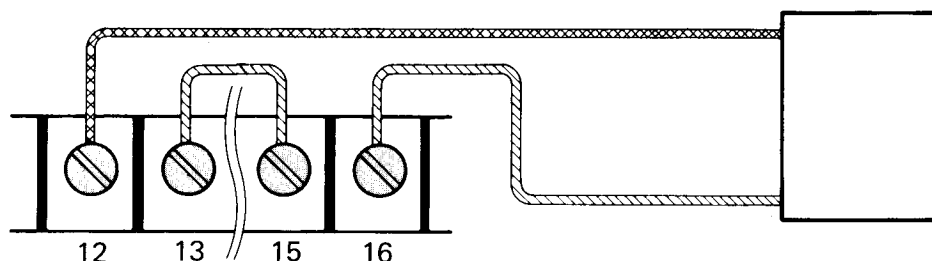


Figure 19
Telephone Dialer

If you are using Nickel-Cadmium batteries for back-up power and you have low AC line voltage (below 110 volts), do not connect any device to terminals 15 and 16 that requires more than 500 mA.

Alarm Relay Contact Switching (Terminals 12 and 13)

Terminals 12 and 13 are connected to an internal relay that “closes” when the Alarm Center activates. This relay can be used as a switch to turn ON any device that has its own power supply (or is using power from the Auxiliary Terminals of the Alarm Center, as shown above), as long as it is rated 1 Amp or less at 24V DC or 50mA or less at 130V DC.

In the drawing above, the Alarm Relay Contact is used to switch on the power from the Auxiliary Terminals to the alarm device (a Security Telephone Dialer).

Be sure to observe the current (Amp) limitations when using these terminals.

WARNING: A Security Telephone Dialer must not be programmed to place a call to a police station number unless it has been specifically designated for that purpose by the police department. Check with your local police department. It can be programmed to call a friend or security service you have contracted with and they can call the police for you.

POWER SUPPLY

AC Power (Terminals 18 – 19)

The output terminals on the power supply provided with your Alarm Center should be connected to Terminals 18 and 19. Then plug the power supply into a standard AC outlet. The AC outlet must always be ON (not connected to a wall switch, etc.). The rating for the power supply (included) is AC 12V 30VA.

WARNING: Do not plug in the AC power supply until your Alarm System is completely wired and you have double-checked all wiring. Failure to do so might result in damage to the Alarm Center and/or the accessories connected to it. It could also trigger a false alarm. In some locations, you can be fined for triggering false alarms.

The 12V AC power for your Alarm Center is supplied by a transformer (included). This transformer has a circuit breaker in it to protect itself from overload. If overload occurs, the breaker operates and the transformer stops supplying power. There’s a yellow RESET button on the lower part of the transformer. When the breaker activates, this button pops out. After removing the cause of overload, push the button lightly.

Battery Back-up

The Battery Back-up feature enables the Alarm Center to continue to protect your property during an AC power failure. The Battery Back-up uses either Alkaline (8 C-Cells) or Nickel Cadmium (10 C-Cells) batteries. Nickel Cadmium batteries will recharge automatically inside the Alarm Center (about 20 hours for a full charge).

ALKALINE BATTERIES:

1. Open the Battery Cover.
2. Set the ALKALINE/NI-CD Switch to ALKALINE; you'll have to position the metal plate as shown in Figure 20-a. No battery should be placed in the right two columns.
3. Install 8 Alkaline C-Cells in the left compartment, observing polarity.

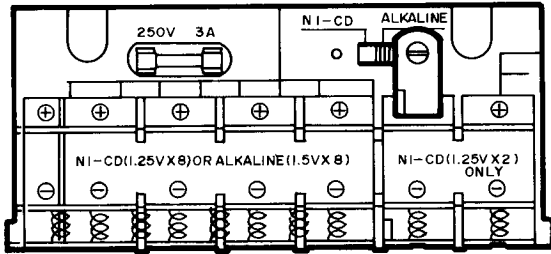


Figure 20-a

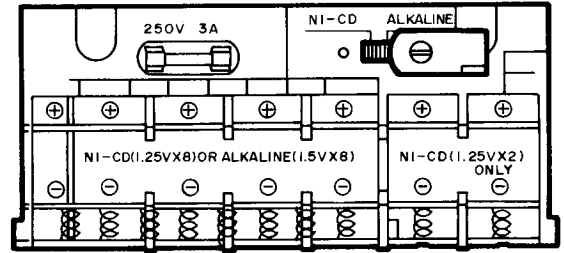


Figure 20-b

NICKEL CADMIUM BATTERIES:

1. Open the Battery Cover.
2. Slide the ALKALINE/NI-CD Switch to NI-CD and position the metal plate as shown in Figure 20-b.
3. Install 10 Nickel Cadmium C-Cells including right two columns, observing polarity.

Nickel Cadmium batteries will require about 20 hours for full charge. Recharging is automatic when AC power is applied. They should remain fully charged unless there has been an alarm condition or the batteries are defective.

IMPORTANT PRECAUTIONS

- ★ Observe proper polarity (+ and -) when installing the batteries. Improper installation might damage the Alarm Center, and would prevent the unit from activating during a power failure.
- ★ When using no batteries, be sure to set the switch to ALKALINE.
- ★ DO NOT SET THE SWITCH TO NI-CD WHILE USING ALKALINE BATTERIES – THE ALKALINE BATTERIES WILL EXPLODE!

AVERAGE BATTERY LIFE

With no current being drawn from terminals 15 and 16 (Auxiliary), fully charged Nickel-Cadmium batteries will give 4 hours armed service, plus one 5 minute alarm cycle. If current is being drawn from the Auxiliary terminals, the time will be less (depending on the amount of current drawn).

In either of the above cases, alkaline batteries will give longer back-up service.

BATTERY TEST

Push the BATT TEST button on the front panel. If the BATT LED lights, there is sufficient power. When the BATT LED does not light, replace (or recharge) the batteries. (The LED will not light if the fuse is blown.)

Test the batteries at least once a week. Clean the battery contacts with a clean cloth every two or three months.

WARNING: If you do not use the Battery Back-up feature, the Alarm Center will arm automatically when power is restored, after a power failure (even a momentary one). This could result in a false alarm, punishable by heavy fines in some areas.

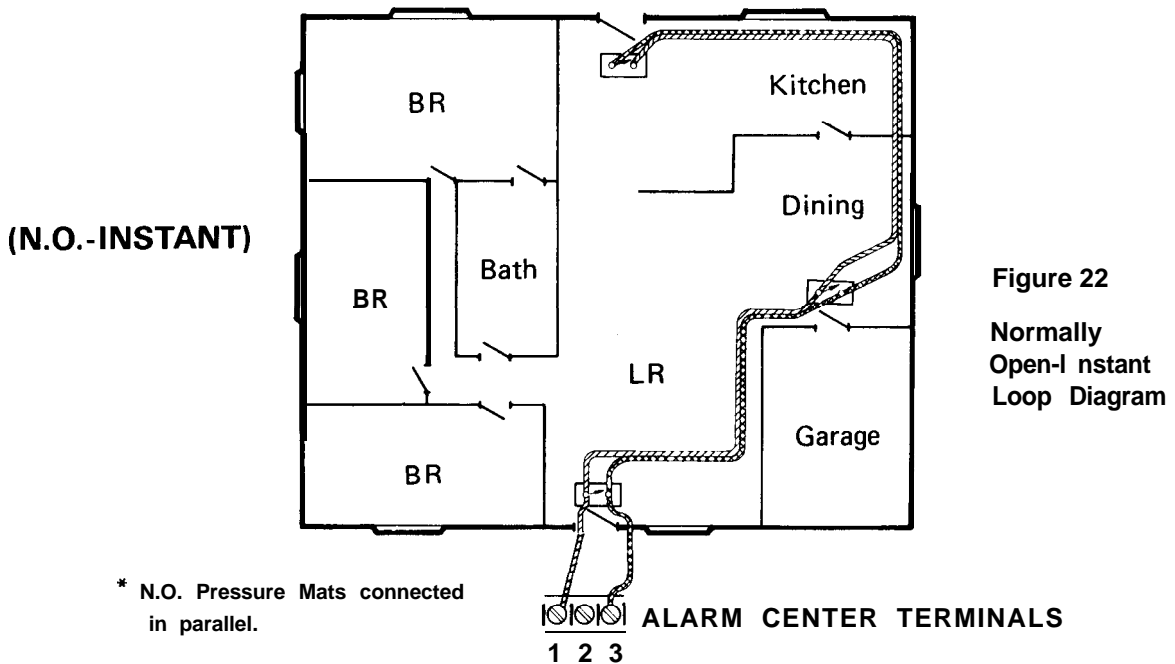
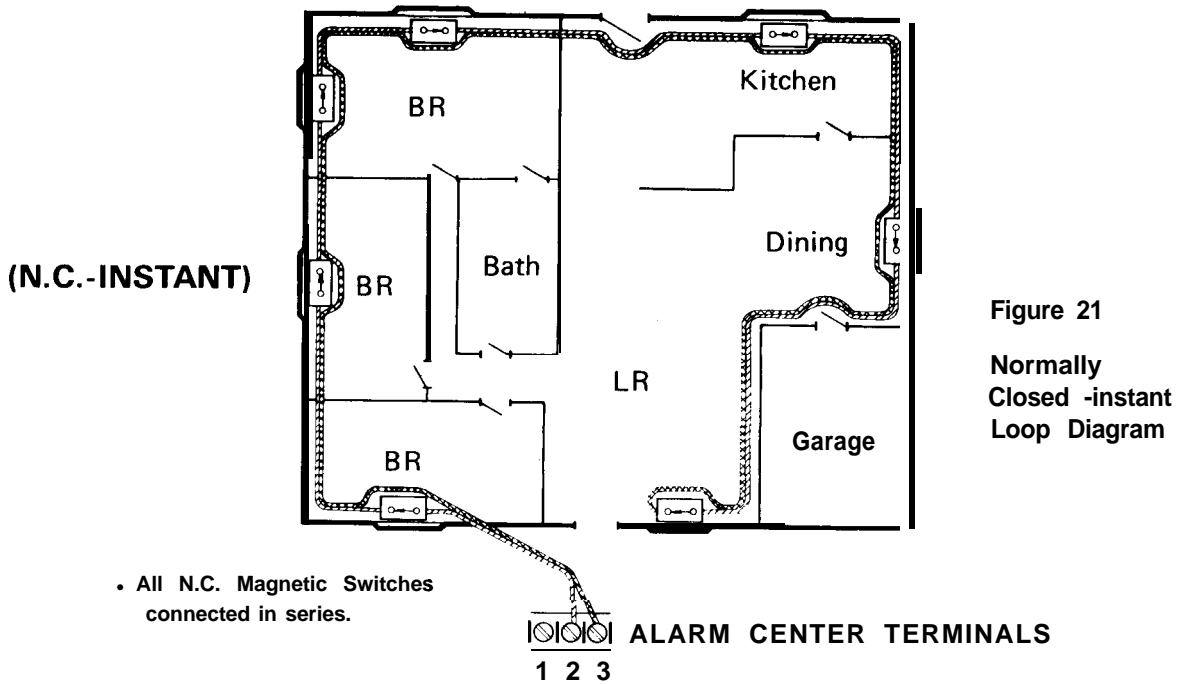
SYSTEM PLANNING

Before you make any connections or installations, you should make a detailed plan (with drawings) for your system. Trying to put all the wiring for a large system on one diagram will be complicated and messy. You might need to use a different diagram for each loop in the system.

The wiring should be hidden, not only for cosmetic reasons, but to improve the effectiveness of the system, also. Bells, sirens and lights mounted outside the protected area should be high – out of reach under normal circumstances. This will increase the range of the device and help prevent tampering. All wiring and devices outside the protected area should be protected by the Panic/Tamper Loop in some way.

The diagrams shown below and on the next few pages will give you an idea of how you might plan your system. Remember, your planning will determine the amount of protection the Alarm Center provides.

TYPICAL LOOP DIAGRAM



(N.C.-DELAYED)

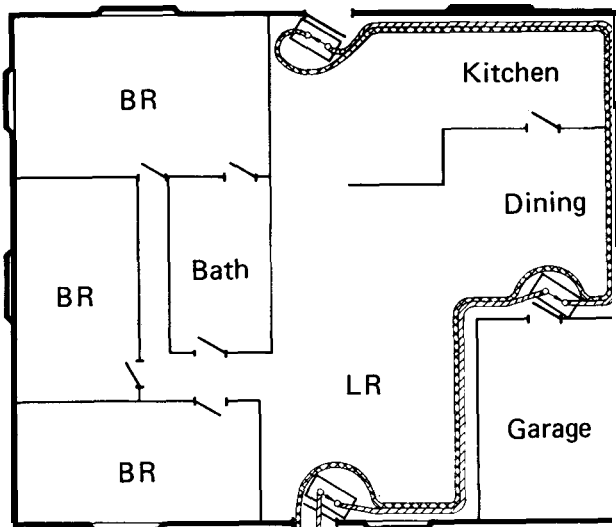


Figure 23
Normally
Closed-Delayed
Loop Diagram

- * N.C. Magnet Switches in series placed at entrances for Entry/Exit Delay.
- * N.O. Magnet Switches could be used, if desired. (Move connection from terminal 4 to 5.) Connect in parallel.

ALARM CENTER TERMINALS
3 4 5

(MOMENTARY "PANIC" LOOP-N.O.)

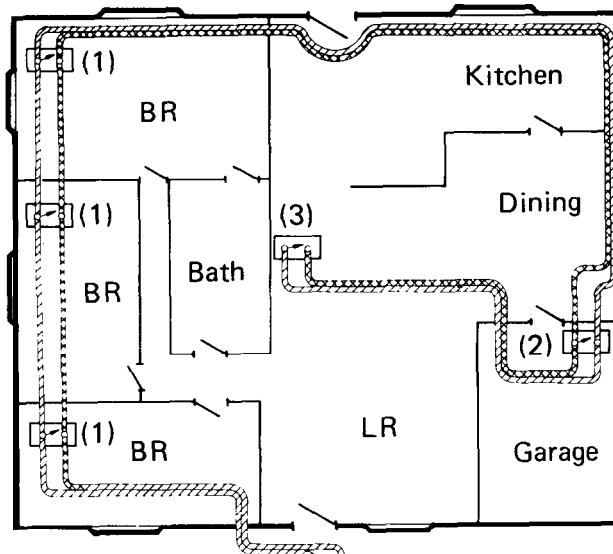


Figure 24
Momentary "PAN IC"
(N.O.) Loop Diagram

- (1) Panic Switch
- (2) Tamper Switch for Remote ARM/DISARM Controls
- (3) Vibration Detector on valuable object.
- * Connect in parallel.

ALARM CENTER TERMINALS
6 7

(TYPICAL WIRING DIAGRAM)

(REMOTE CONTROLS-INDICATORS)

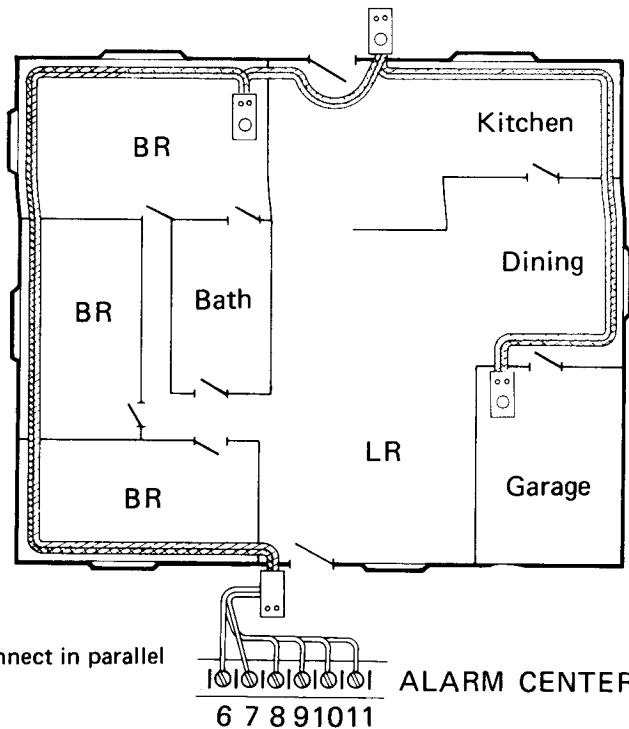


Figure 25
Remote Controls-Indicators Wiring Diagram

(ALARM OUTPUTS)

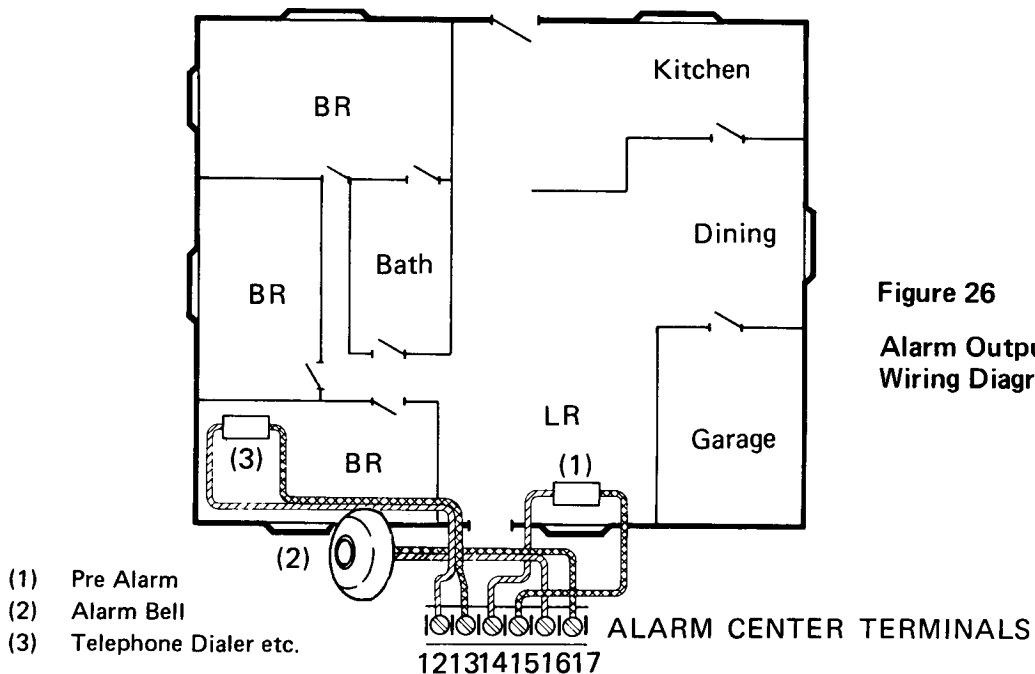


Figure 26
Alarm Outputs Wiring Diagram

INSTALLATION

PREPARATION

Important

For maximum security, do not discuss the location, installation or operation of your alarm system with anyone except the people authorized to use it. Such discussion could give potential intruders information on how to defeat your system.

The Alarm Center should be mounted where it cannot be seen by an intruder or visitor (such as in a closet or pantry). Never mount it in a garage, basement, or attic, where it would be subjected to temperature and humidity extremes.

ALARM CENTER INSTALLATION AND WIRING

Mounting the-cabinet

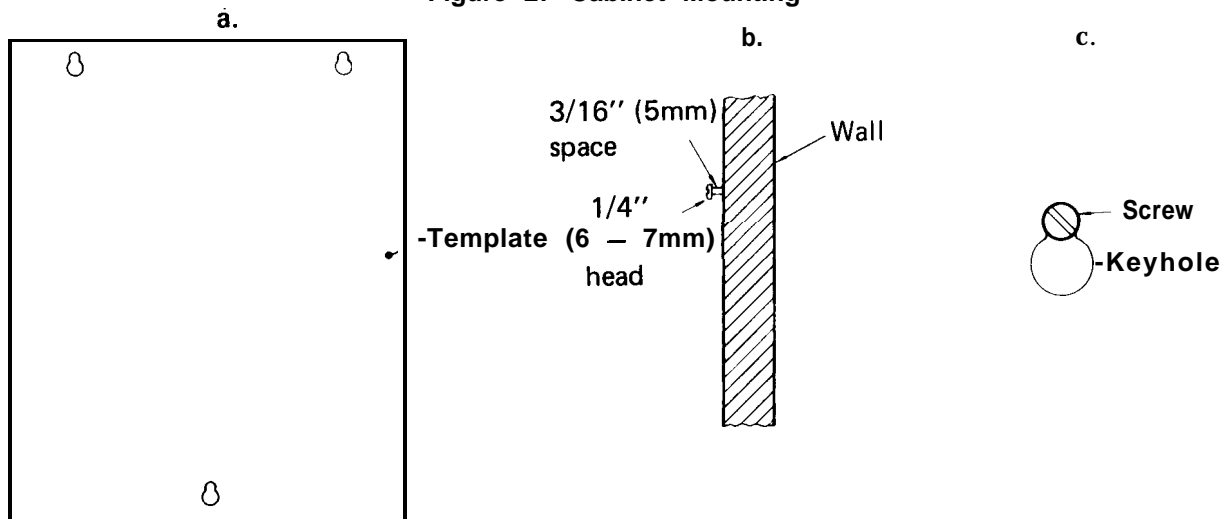
You can use the 3 “keyholes” on the back panel of the Alarm Center for mounting.

1. Mark the position for the 3 screws on the wall, using the template provided in this manual (page. 33). On plaster board walls use molley screws, if you can not drive the screws into a wall stud.
2. Insert three screws so that there is a 3/16” (5 mm) space between the wall and the screw head. The diameter of the screw head should be 1/4” (6 – 7 mm).

Note; Use the type screw appropriate for the mounting surface (wood screws, metal screws, anchor bolts, etc.).

3. Place the unit over the screws and pull down so that the screws engage the smaller part of the keyholes. Then tighten the screws to secure the unit.

Figure 27 Cabinet Mounting



Arm/Disarm Switch (Terminals 8 – 9)

To arm and disarm the unit you must install a momentary contact switch connected to Terminals 8 and 9. We recommend you use a key switch or key pad for extra security (see pages 9 – 10 for switch installation instructions). It can be installed in the cabinet or at a remote location.

Adapter Wiring

The 12-volt AC power for your Alarm Center is supplied by the Transformer (included). Make the connections as follows.

Note: Do not plug the Transformer into a wall plug until you have completed, and double-checked, all the system wiring. This could prevent errors or damage to the Alarm Center.

1. Depending on the installation of the unit, choose one of the knock-out plugs to run the wires through (Power and Loop Wires). Use a screwdriver to loosen and remove the plug (you might have to use more than one of the knock-outs, depending on how many and what size wires you use).
2. Run 18-gauge 2-conductor wire through the hole and connect it to terminals 18 and 19. If it is more than 20 ft (6m) from the Alarm Center, use 16 gauge wire.
3. Loosen the screw from the Jack (included) to remove the cover.
4. Solder the other end of the wire to the contacts of the Jack. (See the Figure below.)
5. Place the cover back on the Jack and tighten the screw.
6. Plug the Jack into the Transformer.
7. After completing and checking all wiring, plug the AC cord of the Transformer into a standard AC outlet that is always on (not controlled by a wall switch, etc.).

Note: Before you connect the power, make sure none of the Alarm Loops are tripped.

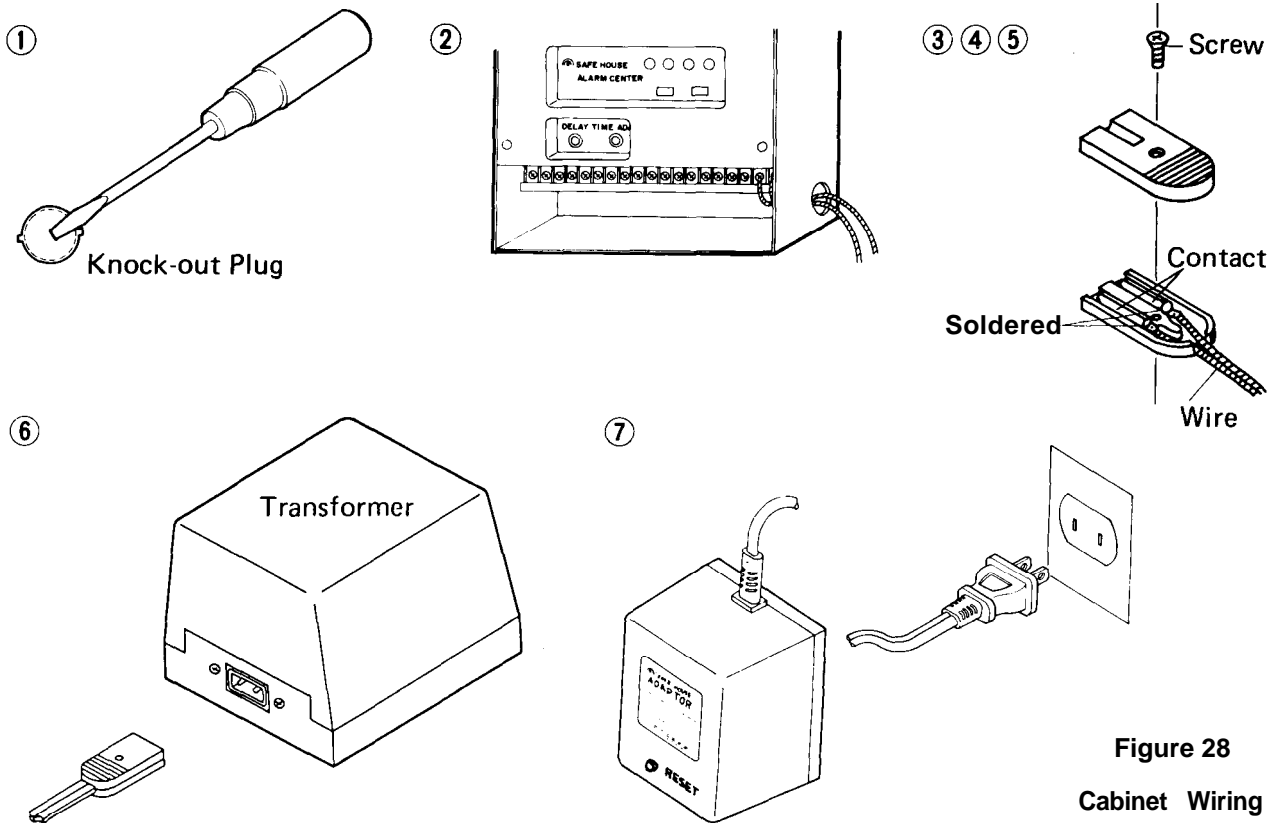
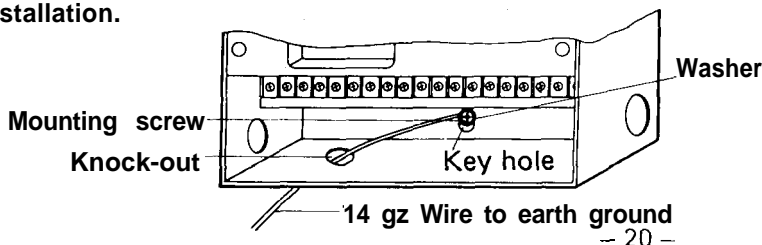


Figure 28
Cabinet Wiring

The alarm center should be connected to an earth ground. Run a strand of 14 gauge wire through one of the knock-outs and connect it to the mounting screw, as shown. Scrape away the paint around the keyhole before connecting, to assure electrical contact. Connect the other end of the wire to a metal, cold water pipe or other good earth ground. Be sure to follow local wiring codes in your installation.



SENSING DEVICES

Sensing devices are the eyes and ears of your alarm system. They send signals to your Alarm Center (when tripped) that activate the Alarm and warn that an intruder is trying to enter the protected area.

In the next few pages we will list the most common types of sensing devices and give you a brief description and tips on the uses and installation of each device.

We strongly recommend that you read this section completely and carefully before designing or installing your system.

However, we do not intend to try to cover every possible device and application. You must study the instructions supplied with each separate device.

Some of the devices mentioned are not available at Radio Shack. We recommend you check the yellow pages for other security equipment stores, if you need additional equipment.

Radio Shack cannot be responsible for defects or errors in other manufacturers products and assumes no liability for damage to other products or the Alarm Center.

Magnet Switches

The terms N.O. and N.C. magnet switches as used in this manual refer to normal (I.E. no alarm) condition of devices when they are installed in an alarm loop circuit with magnet close to the switch.

However, magnetic switches as sold separately may be marked N.O. or N.C. when magnet is away from switch. Be careful to ensure that you obtain the correct type of switch for your application.

These switches have two parts: the actual switch and a magnet that controls the switch. They are available in N.O. or N.C. models. When the two parts are close together ($\frac{1}{4}$ " 6mm or less), the switch will be in the "normal" position. When the two parts are separated, the switch is tripped and sets off the alarm.

Magnet Switches are excellent for use on doors, movable windows or anywhere you want the alarm to be activated when something is moved. Magnet Switches (N.O. type) can be connected to the 24-hour Panic/Tamper Loop, to protect paintings or other valuable objects. You should not protect door or window with this loop, because it is always armed.

The switch half of the unit should be mounted on the stationary surface (window sill, door frame, wall, etc.) and the magnet on the movable surface (door, window or valuable object).

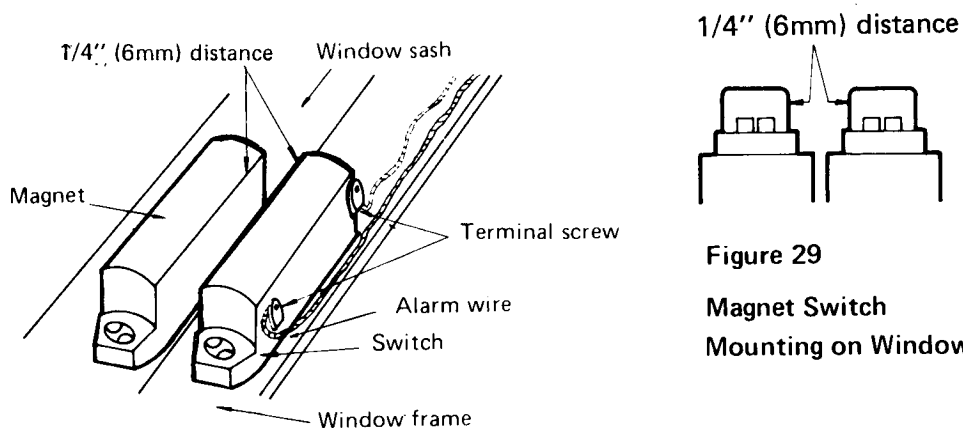


Figure 29
Magnet Switch
Mounting on Window

If the switch and magnet are not close enough together the switch will not work properly. You might be able to hear the switch click as the two parts are separated and brought together. If you do not, you might need to set them closer together.

Note: Some switches will not click and you will have to use a continuity checker or ohmmeter to check the operation. Connect the probes to the switch contacts. When using an ohmmeter, a minimum reading (near 0) means closed; a maximum reading means open.

Radio Shack carries a large selection of test equipment.

On some windows it will be difficult to mount the two parts close together because of the shape of the window frame or window sill. In this case you can use a piece of wood or other material to raise the magnet (or switch) so that the parts match properly. Radio Shack sells spacers for Magnet Switches.

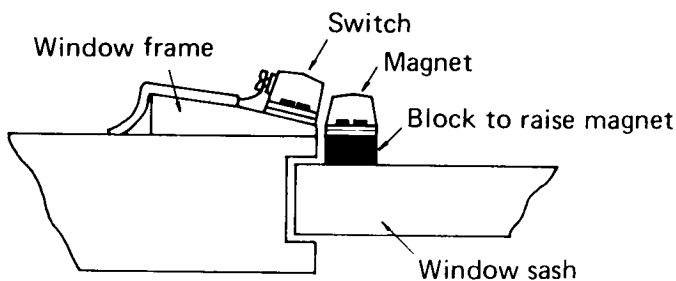
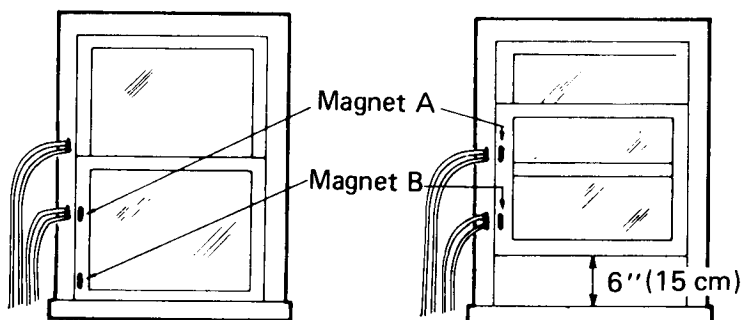


Figure 30

Raising the Magnet Level using a Spacer

You can use two Magnet Switches for an installation that allows you to open a window a few inches (for ventilation) and still activate the alarm if it is opened further. Disarm the unit before you open or close the window.

Do not allow an opening of more than 6 inches (15cm). Wider openings could allow an intruder to crawl in.



The two switches should be connected in parallel for N.C. devices and in series for N.O. devices, and then connected to the alarm circuit.

Figure 31

Magnet Switch Mounting with a few inches windows open

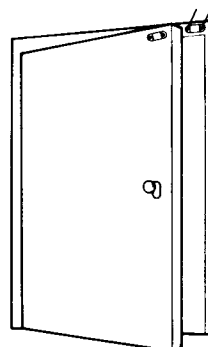


Figure 32

Magnet Switch Mounting on Door

When mounting Magnet Switches on doors, they should be positioned on the side away from the hinges (at the top or bottom). This will trip the switch with the least amount of door movement.

On metal windows and doors (or anywhere you cannot mount the Magnet Switch with screws) you can mount them using epoxy or rubber cement. If you use epoxy, make sure you have the units positioned properly. They will be very difficult to move, later.

If the metal has a high iron content the operation of the switch will be affected (the switch will have to be closer than $\frac{1}{4}$ " (6mm) from the magnet to be in the normal position). If the magnet will stick to the metal, the iron content is high.

In this case you should put spacers between the metal, and the magnet and switch before mounting (these spacers are available at Radio Shack). Always test to see if the switch works correctly after the parts are mounted (listen for the click or use a continuity checker or ohmmeter).

For protection of paintings or other valuable objects, the switch should be mounted on the wall behind the painting (or other object) and the magnet should be attached to the painting. Hang the painting so that the two parts are within the required distance. These devices should be connected to the 24-hour Panic/Tamper Loop, so they will activate Alarm Center any time the object is moved. This loop is always armed.

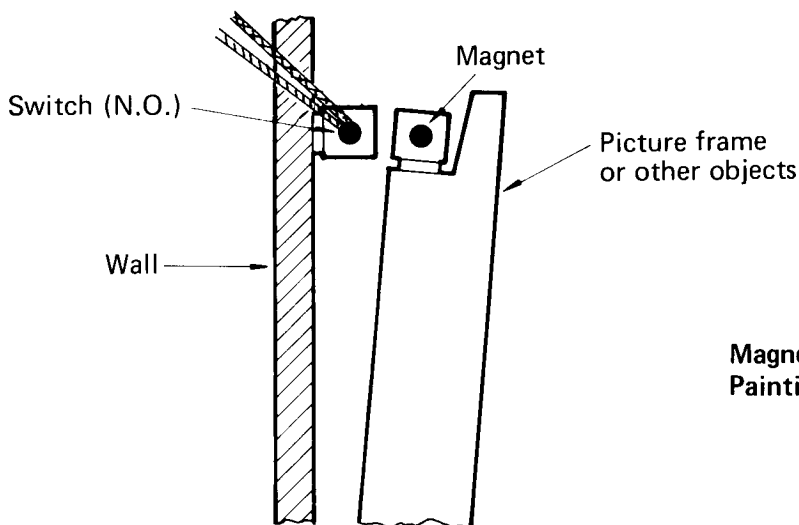


Figure 33

Magnet Switch Mounting for Painting

Metallic Foil Tape

Foil is used primarily on windows that are not movable (plate glass windows, glass inserts in doors, etc.). It is placed along the perimeter of the glass and is connected to a N.C. circuit. Then if the glass is broken the foil will be broken and the circuit will be tripped (open). You have probably seen this type of foil on store windows; it is just as effective for home use.

Foil is easily crimped or broken and can become tangled. Broken foil is difficult to patch and you should always apply it in one piece per window. A simple Foil Holder (described below) will make foil application much easier. Hang the foil above the window you are working on.

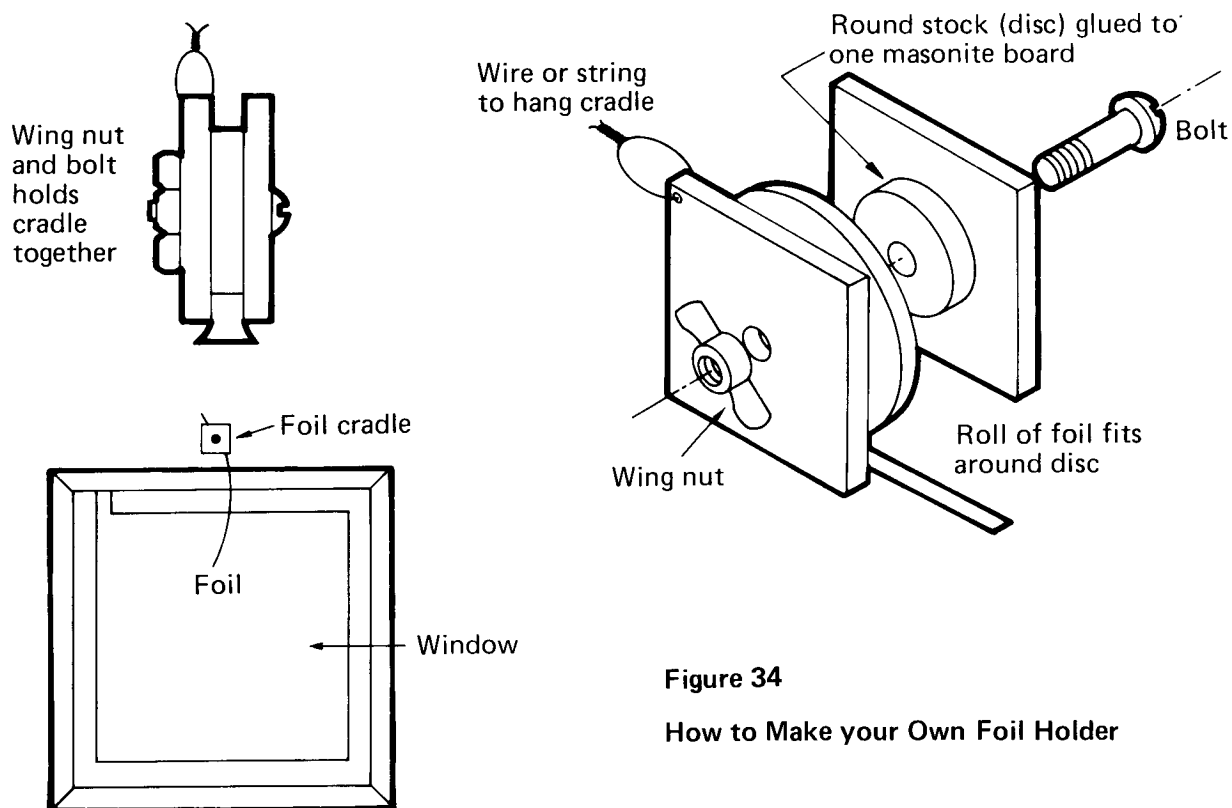


Figure 34

How to Make your Own Foil Holder

Before applying the foil, use benzene, a good cleaning solvent or freon solvent to make sure the window is clean and dry.

Note: These solvents can be flammable. Be sure to follow the manufacturer's instructions, exactly.

Then mark the path for the foil, using a grease pencil (or tailor's chalk) and a straight edge. **Mark on the outside of the glass, if possible.** The foil should go on the inside of the glass, 2 or 3 inches (5 – 7 cm) from the edge.

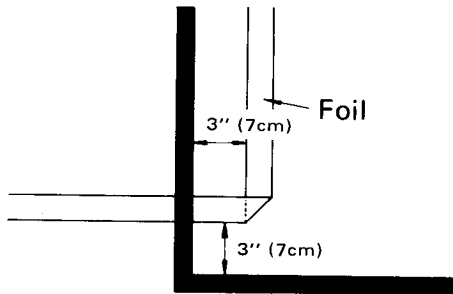
Note: The connection of the foil to the Alarm Center Loop is made via Block Connectors (see Fig. 36). A pair of these Connectors (self-adhesive) should be mounted on the edge of the glass where you want to make the wiring connection. **Plan the foil path with this in mind.**

As you apply the foil, take care to remove all air bubbles and wrinkles. A matchbook cover makes an excellent "squeegee" for this purpose.

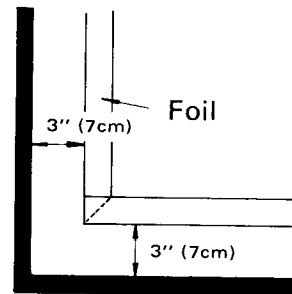
In order to apply the foil in a continuous piece on each window, turn the corners as shown.

Figure 35

How to Turn Window Foil



Turn 90° away from desired direction

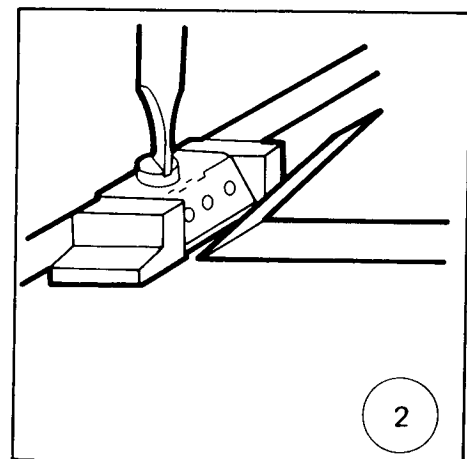
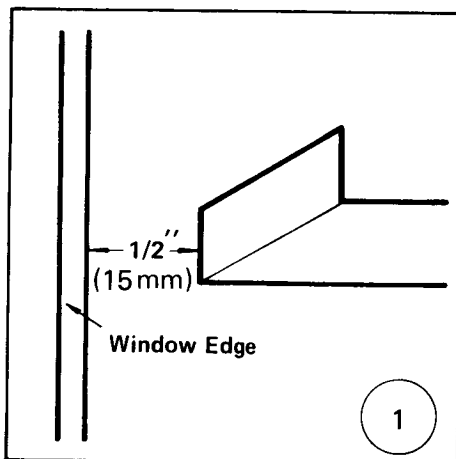


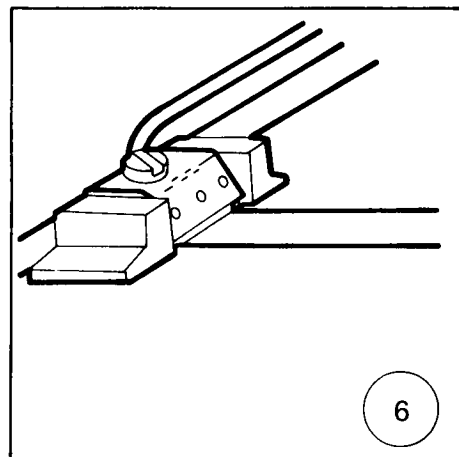
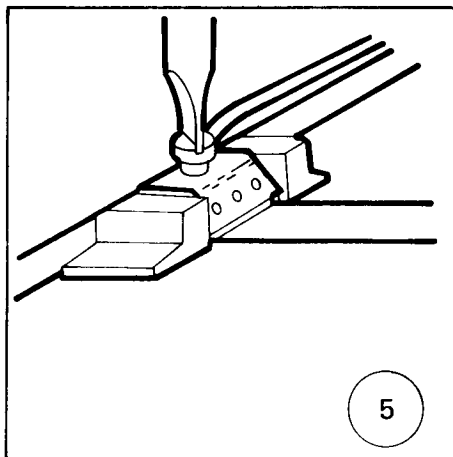
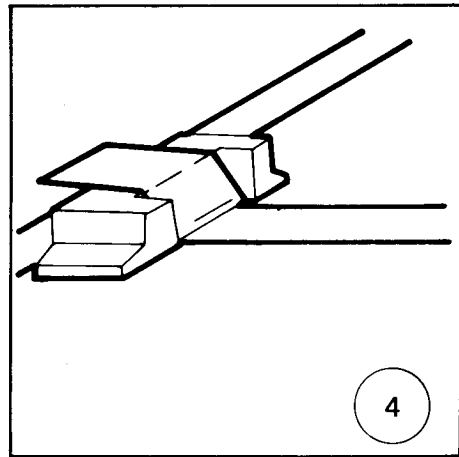
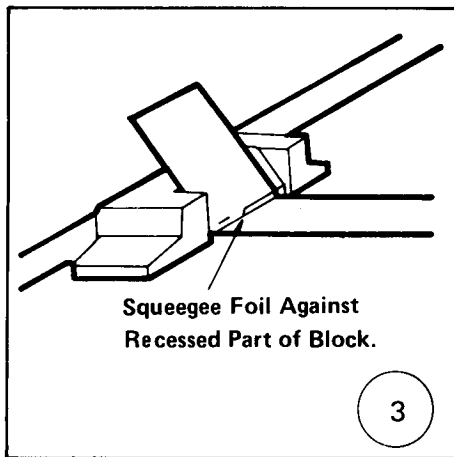
Fold over in desired direction and continue

BLOCK CONNECTOR INSTALLATION

1. Bring the foil to within 1/2 inch (15mm) of the window edge and leave 2 or 3 inches (5 – 7 cm) of excess foil. Be sure the glass is clean.
2. Remove the paper backing from two Block Connectors and place them next to the window frame with the sloped side facing the foil. Remove the screws and contact plates.
3. Squeegee the foil so that it touches the front edge of the Connector ramp. This will protect the foil where it leaves the glass.
4. Bring the foil up and over the screw hole to the other side of the Connector.
5. Replace the Contact Plate and insert the screw through the Plate and foil.
6. Finally, connect the two Block Connectors to a N.C. Loop in series.

Figure 36 Block Connector Installation





Note: After all the foil is applied, cover it with a clear varnish or acrylic nail polish, to seal and protect it.

FOIL ON SLIDING GLASS DOORS AND WINDOWS

Foil can also be used on sliding glass doors and windows, by using a Window Foil/Vibration Contact. With this device you can use the windows and doors normally, when the Alarm Center is disarmed. When the Alarm Center is armed, it will be activated if the window (or door) is opened or the glass is broken.

To install the Window Foil/Vibration Contact, mount the Spring Section on the moving door or window and the Contact Plate on the window sill or door frame. Position them so that they make firm contact when the door or window is closed.

Then connect the Spring Section Terminals to the Block Connectors; connect the Contact Plate Terminals to a N.C. circuit in series.

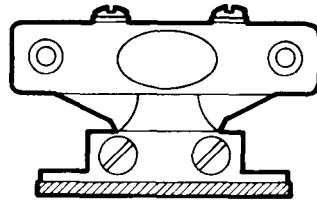
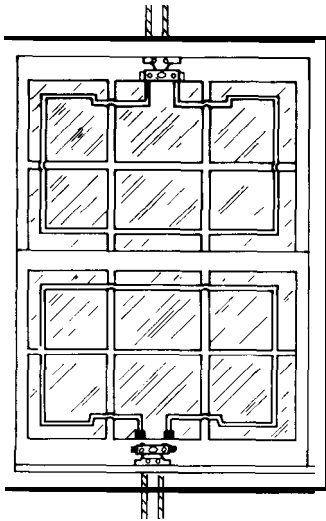
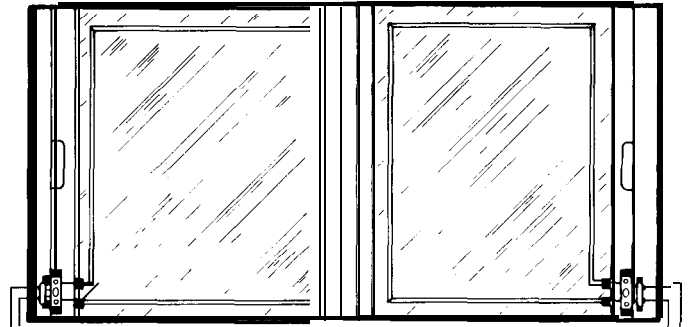


Figure 37

Installation of Window Foil/Vibration Contact



Note: Remember, if you are using the Window Foil/Vibration Contact, the door or window must be closed before arming the Alarm Center.

Plunger Switch

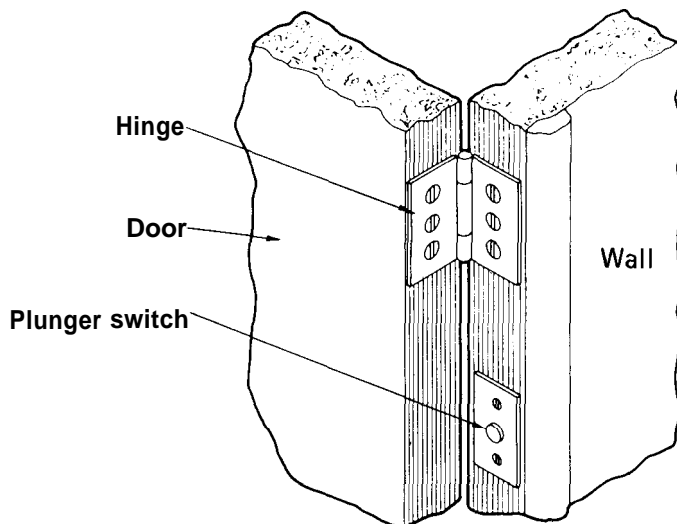
A Plunger Switch is made to be installed inside a door frame, on the side with the hinges. When the door is closed, the switch is in its normal state (open or closed). If the door is opened, the switch is tripped and the Alarm Center is activated. This type of switch cannot be seen when the door is closed.

If you install a Plunger Switch on a door or window that is exposed to the weather, put silicon caulking under the flange to protect the switch from water damage.

This type of switch can also be used on casement windows and sliding glass doors.

Figure 38

Plunger Switch Installation

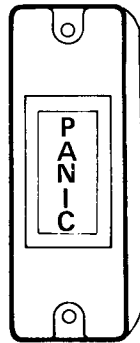


Panic Switch

A Panic Switch is a N.O. Momentary switch. It can be installed anywhere, but is usually put in bedrooms or the kitchen. The purpose of a panic switch is to allow a person to activate Alarm Center if they are in danger. These switches should be connected to the 24-hour Panic/Tamper Loop, so the Alarm can be activated any time. It is important that these switches be easy to reach (even in the dark). Violation of this loop arms the other loops of Alarm Center.

WARNING: You should not activate an alarm sounding device (bell or siren) when in a direct confrontation with an intruder. Activating the alarm in such case might panic the intruder and you could be injured. However, if you are using a silent alarm only (such as a Security Telephone Dialer), the alarm could be activated.

Figure 39



Panic Switch

Mercury Switch

Mercury is a metal that is liquid at normal temperatures. A Mercury Switch is constructed so that when the switch is moved the mercury shifts and opens or closes the circuit. This type of switch detects tilting and is used to protect specific objects.

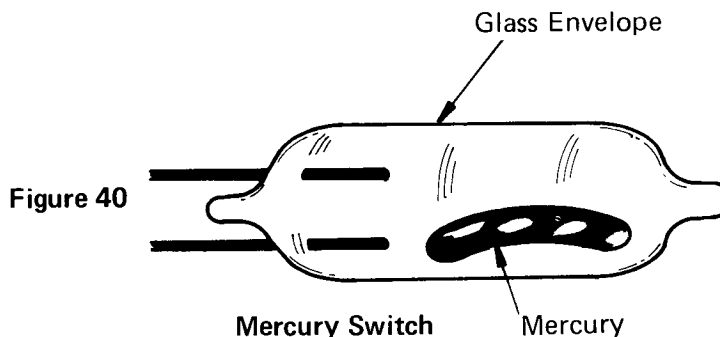


Figure 40

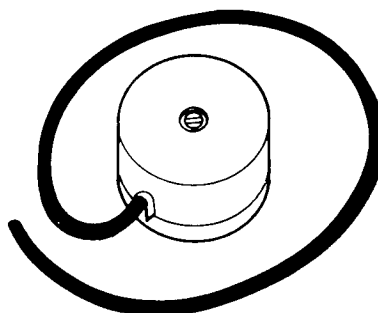
Glass Breakage Detector

This is a N.O. or N.C. device that activates the Alarm when glass is broken. Some of these are specialized Mercury Switches, as described above. There are others that actually detect the vibration of glass being broken.

These devices are attached directly to the glass and should be mounted about 3 inches (7cm) from the edge.

Figure 41

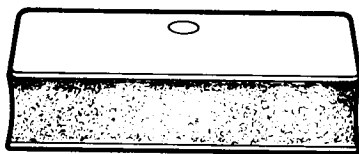
Glass Breakage Detector



Vibration Detector

These devices detect impact vibration on any surface. They are usually N.C. and can be used anywhere you want movement or vibration to activate the Alarm Center. These detectors usually have adjustable sensitivity.

Figure 42

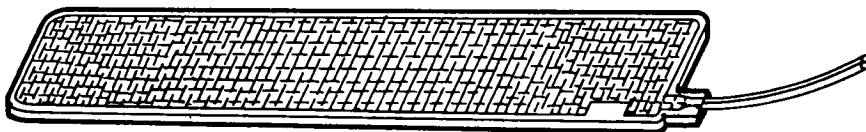


Vibration Detector

Pressure Mat

This is a device that sets off the Alarm when it is stepped on. They are usually placed under rugs near the entrance to the premises. Most often they are N.O.

Figure 43



Pressure Mat

Motion Detector

There are three types of Motion Detectors: Ultra-sonic, Infra-red and Micro-wave.

Ultra-sonic devices send out a high frequency sound (higher than you can hear). This sound bounces off the objects in the protected area and returns to the Detector. When something or someone moves in the protected area, the pattern of the sound waves returning to the Detector changes and the Alarm is tripped.

Infra-red devices are similar, except that they are sensitive to changes in infra-red light waves (heat) instead of sound waves.

Micro-wave devices work the same as Ultra-sonic, except they use radio waves (instead of ultra-sonic sound) to detect motion.

Many of these types of devices have an alarm sounder built-in or can be connected directly to bells or sirens. However, some of them can also be connected to an Alarm Loop in a complete protection system, like your Alarm Center, using an auxiliary relay or dialer contacts.

Some motion detectors are called **heads**. They have relay outputs only, and might require power from the Alarm Center or a separate power supply. These do not have a built-in sounder.

Infra-red Beam or PE (Photo Electric) Cell

These devices send out a narrow beam of light. The light is picked up by sensor (the light might be reflected back to or go directly to the sensor). When the beam of light is broken (by something moving between the source and sensor), the device is tripped. This type of device can be used to protect any entrance or opening.

Infra-red devices have one strong advantage – the infra-red beam is invisible. The best ones have pulsed beams and are the recommended type to use.

ALARM OUTPUT DEVICES (Terminals 12 – 17)

Pre-alarm Buzzer (Terminals 14 – 15)

A small buzzer or piezo sounder (50 mA or less at 12V DC) can be connected to terminals 14 and 15. It will sound during the Entry Delay Time to remind you to disarm the Alarm Center. If you have remote arm/disarm installations outside the premises, you will not need this device.

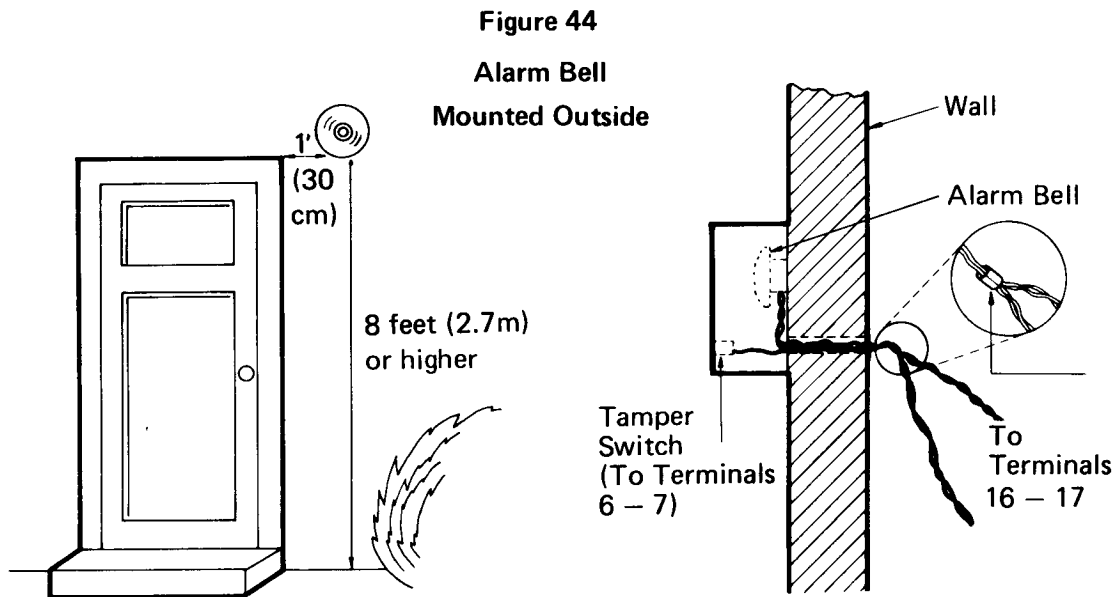
Bell, Siren or Strobo Light (Terminals 16 – 17)

The main purpose of a bell or siren is to scare an intruder away before he gets into the premises. Of course, they will also warn you and attract the attention of other people.

Connecting a Strobo light to these terminals can serve a double purpose: to scare away the intruder and give a visual indication (to the police, etc.) of where the alarm has been activated.

These devices should be connected to Terminals 16 and 17 of the Alarm Center and must be rated 1 Amp (total) or less at 12V DC.

If an alarm device is mounted outside the protected area, the installation should include a Tamper Switch (connected to the 24-hour Panic/Tamper Loop) that will activate the Alarm Center if anyone tries to disconnect it.



Security Telephone Dialer (Terminals 12 – 13)

This is a device that will call the police (or any telephone number you choose), when the Alarm Center is activated. In most cases Dialers can be connected to the Alarm Relay Contacts (terminals 12 and 13).

WARNING: Do not set a Dialer to call the police (or anyone else) without notifying them and getting their permission first. Some police departments do not allow Dialers to be programmed for their number and others have separate numbers just for this purpose. You will have to check local regulations before using any Dialer.

Some Dialers deliver a pre-recorded voice message to the desired number when activated. Other will send out an electronic signal to a private Security Service (there will be a fee for this service). For more information, call the police or a Security Service in your area.

Plug 'n Power Interface (Terminals 16 – 17)

Radio Shack's **Plug 'n Power** Burglar Alarm Interface is a device that can be connected to your Alarm Center. It will turn on any or all of the lights in your house or office (that are connected to **Plug 'n Power** modules), when the Alarm is activated. It can also be used to activate a remote bell, light, siren or Dialer.

The advantage of the **Plug 'n Power** Interface is that it does these things through "wireless" modules. This eliminates the need for special wiring, necessary in other systems.

Before you install your system, we recommend that you ask about the Burglar Alarm Interface (and all the other **Plug 'n Power** systems) at your local Radio Shack store.

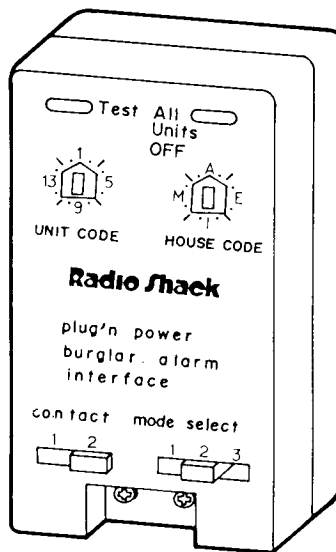


Figure 45

Plug'n Power Interface

Lightning

Lightning damage is uncommon, but it can occur in electronic devices. A lightning strike near, or directly to, the power line may cause an excessive surge of voltage that can damage the product. If you are concerned about it or live in an area with frequent and/or severe electrical storms, we suggest that you purchase a surge protector, such as our cat. no. 61-2790 or 61-2785 to help prevent against damage from power line surges.

TESTING and OPERATION SUMMARY

After you complete your alarm system, you must test it to be sure it works and that you understand its operation.

If you are using a Security Telephone Dialer, make arrangements with the person it will call before the test. You must not give them a false alarm. Also, during testing, we recommend that you connect a 12V DC light (that does not draw more than 1 Amp) to the Main Output Terminals, instead of a bell or siren, so you don't cause false alarms.

Now follow the steps below for testing the system.

1. Double check all wiring.
2. Plug the Transformer into a standard AC outlet. Remember, it must always be "live" (not connected to a wall switch, etc.).
The AC POWER, ARM, and LOOP LEDs should be on. If they are not, check the connections to terminals 18 and 19 and make sure the AC outlet is on.
Or check the fuse. If it is blown, replace the fuse. (See page 32.) Also check if the yellow reset button of the transformer pops out. If it does, there was an overload and the circuit breaker operated to stop supplying power. Remove the cause of the overload, then push the button slightly to reset the transformer.
3. Disarm the Alarm Center by operating the Momentary Contact Switch connected to terminals 8 and 9. The ARM LED should go off.
4. Install Back-up Batteries and check them.
5. The LOOP LED should be on, also. If it is not, one of the loops is not connected properly or one of the sensing devices is tripped.

First, make sure that all the devices are in their normal state (open or closed). If the LOOP LED is still off, check the circuits as follows. If the LOOP LED does not light, with all loops intact, you probably have a blown fuse.

NORMALLY OPEN CIRCUITS

Disconnect the wires from terminals 1 and 5. If the LOOP LED lights, one of the N.O. circuits is not wired correctly.

Reconnect the wires separately to determine if the Instant or Delay Loop (or both) is the problem.

NORMALLY CLOSED CIRCUITS

Connect a short piece of wire between terminals 2 and 3; then 3 and 4. If this lights the LED, the N.C. Instant (2 and 3) or N.C. Delay (3 and 4) circuit is the problem.

If the LOOP LED still doesn't light, connect 2 and 3, and 3 and 4 at the same time. The LED will light if both N.C. circuits are incorrectly wired.

Continue testing until you find the problem(s) and the LOOP LED is on.

6. Trip one of the loops. The LOOP LED should go off. Return the loop to its normal state.
7. Arm the system by operating the switch connected to terminals 8 and 9.
8. a) Activate the Instant Loop (N.O. or N.C.). The Main Alarm device (terminals 16 and 17) should come on immediately and remain on for 5 minutes; the ARM LED will begin flashing.
b) If the loop is restored to its normal state during the 5 minutes, the Alarm Center will reset (arm) at the end of the alarm cycle.
c) If the loop is still violated after 5 minutes, the Alarm Center will not reset until the loop is restored.
In either case the ARM LED should continue to flash until the Alarm Center is reset using the switch connected to terminals 8 and 9.
9. Return the Alarm Center to the armed state and activate the Delay Loop (N.O. or N.C.). The Pre-alarm device (Terminals 14 and 15) should begin to sound after the exist delay. After the set entry Delay Time the Main Alarm device (terminals 16 and 17) should come on and remain on for 5 minutes.

After 5 minutes the Alarm Center will function as described in b) and c) of step 8 above.

(Continued on page 32)

10. Now disarm the Alarm Center and trip the Panic/Tamper Loop. The Main Alarm device should come on and remain on for 5 minutes. Then the entire Alarm Center should be armed and should operate as described in steps 8 and 9 above. If the loop is still violated after 5 minutes, the Alarm Center will not reset (arm) until the loop is restored.
 11. Disarm the Alarm Center and press the BELL Button. The Main Alarm device should activate; it will go off when you release the button.
 12. Press the BATTERY TEST Button. The BATT LED will light if you have fresh batteries properly installed. (The LED will not light if the fuse is blown.)
- If everything checks out, disconnect the test light and reconnect the Main Alarm device(s) and begin using your system.

SPECIFICATIONS

| | |
|------------------------------------|---|
| Power Requirement: | 120 Volts AC 60 Hz 35 watts |
| Power Consumption when Armed: | Approximately 2 watts |
| Stand by Battery : | 8 C cell Alkaline (Cat. No23-551 or equiv.) or 10 C cell Nickel Cadmium (Cat. No. 23-124 or equiv.) Batteries |
| Exit Time Delay: | 0 – 45 sec. adjustable |
| Entry Time Delay: | 0 – 40 sec. adjustable |
| Automatic Alarm Reset: | 5 minutes |
| (NOTE: All times are approximate.) | |
| External Alarm Output: | 12 Volts DC 1 A max. |
| Aux DC Output: | 12 Volts DC 1 A max. |
| Alarm Relay Contact | 24 Volts DC 1 A max. |
| | 130 Volts DC 50 mA (contact capacity) |

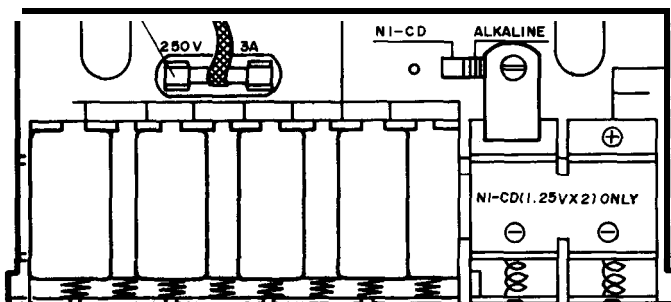
FUSE REPLACEMENT

1. Open the Battery Compartment.
2. Pull the red ribbon. The fuse will pop out.
3. Wrap the red ribbon around the new fuse and push it into the fuse holder.

CAUTION: Use a 3A, 250V fuse, only.

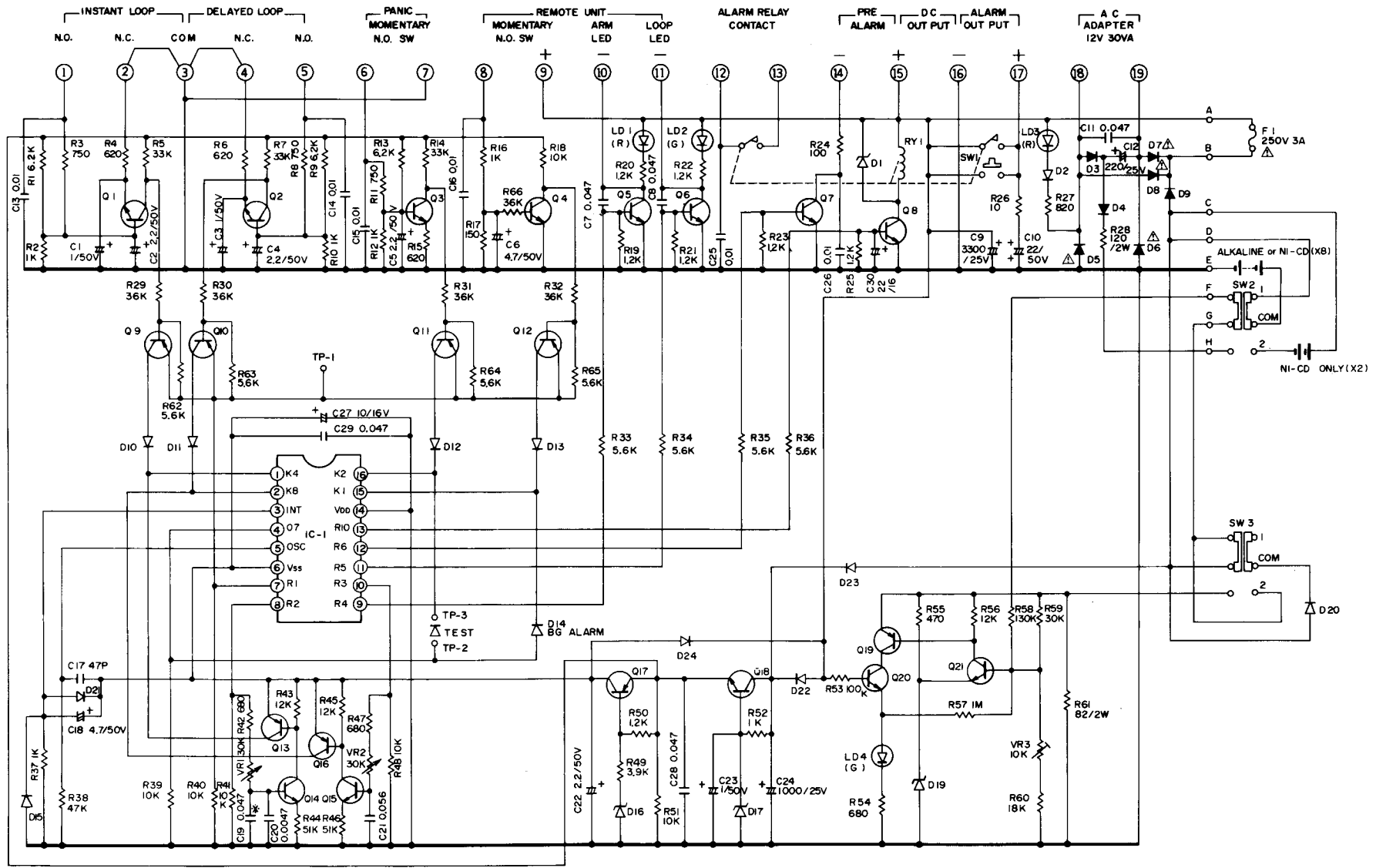
4. Close the Battery Compartment.

3A 250V FUSE



If you have a blown fuse, your Alarm is inoperative.

SCHEMATIC DIAGRAM



- SW 1 : BELL TEST (MOMENTARY PUSH)
- SW 2 : BATTERY
 -1 : ALKALINE
 -2 : NICKEL CADMIUM
- SW 3 : BATT TEST (MOMENTARY PUSH)
 -1 : NORMAL
 -2 : TEST

NOTES

1) ALL RESISTANCE VALUES ARE INDICATED IN OHMS, 1/4 WATT, 5%, UNLESS OTHERWISE NOTED.

K = 1,000 M = 1,000,000

2) ALL CAPACITANCE VALUES ARE INDICATED IN MICRO FARAD.

- D1 : 1N475A(16V 1W) OR EQUIV.
 D16,19 : RD4.3E(4.3V) OR EQUIV.
 D17 : RD9.1E OR RD10E OR EQUIV.
 D3,4 : 1N5391 OR EQUIV.
 D5,6,7,8,9 : MR500 OR EQUIV.
 D2,10~15,20,21,24 : KDS1555 OR EQUIV.
 D22,23 : SB140 OR EQUIV.

- IC-1 : TCS1002 (CUSTOM)
 Q1~4,7,14,15,18,20,21 : MPS9532 OR EQUIV.
 Q5,6 : 2SD400 OR EQUIV.
 Q8 : 2SC2274 OR EQUIV.
 Q9~13,16,17,19 : LA733 OR EQUIV.

NOTES:

* 1) THE VALUE OF C19 IS ADJUSTABLE FROM 0.047μF TO 0.039μF
 2) THE VALUE OF C20 IS ADJUSTABLE FROM 0 TO 0.01μF.

CAUTION: BECAUSE THE COMPONENTS MARKED BY Δ ARE CRITICAL FOR SAFETY, USE ONLY THOSE DESCRIBED ON PARTS LIST.

Your Safehouse™ Two-Sound Electronic Siren is a weather-proof, simple-to-install 12-volt DC warning device. It is capable of creating two distinct warning sounds (steady and rise-fall), depending on the wiring option you select. The siren is suitable for residential, commercial, or mobile alarm systems. (see the warning on the facing page).

SPECIFICATIONS

Horn-Speaker: ABS plastic, 5¼" (13 cm) diameter
Power Rating: 6 Watts nominal
Impedance: 8 ohms
Operating Voltage: 9-16.5 volts DC (12 volts nominal)
Current Drain: 550mA (max)
Tone: Rise-fall or steady (wiring selectable)
Output Level : 105 ± 5 dBA at 1 meter

INSTALLATION

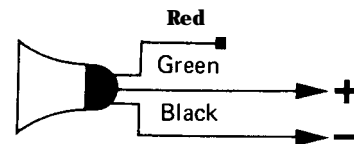
Because the Siren is weatherproof, you can install it outdoors. However, do not position the siren with its horn pointed upward so that it collects and retains moisture. In a mobile installation, be sure the siren is not mounted so that rain is forced into the horn when the vehicle is moving. Also, do not mount the siren directly above heating vents. The adjustable mounting bracket lets you position the siren as necessary.

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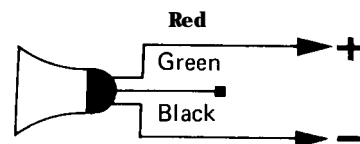
WI RING

Black wire: Connect to the negative (–) terminal of a 12-volt DC power source.
Red wire: For the rise-fall sound, connect to the positive (+) terminal of a 12-volt DC power source.
Green wire: For steady sound, connect to the positive (+) terminal of a 12-volt DC power source.

For Steady Tone



For Rise-Fall Tone



If your alarm system provides separate outputs for different alarm situations (fire and intrusion, for example), you can use a different alarm sound for each alarm situation. Connect the red wire to one alarm output and the green wire to the other. The negative (–) connection is usually common.