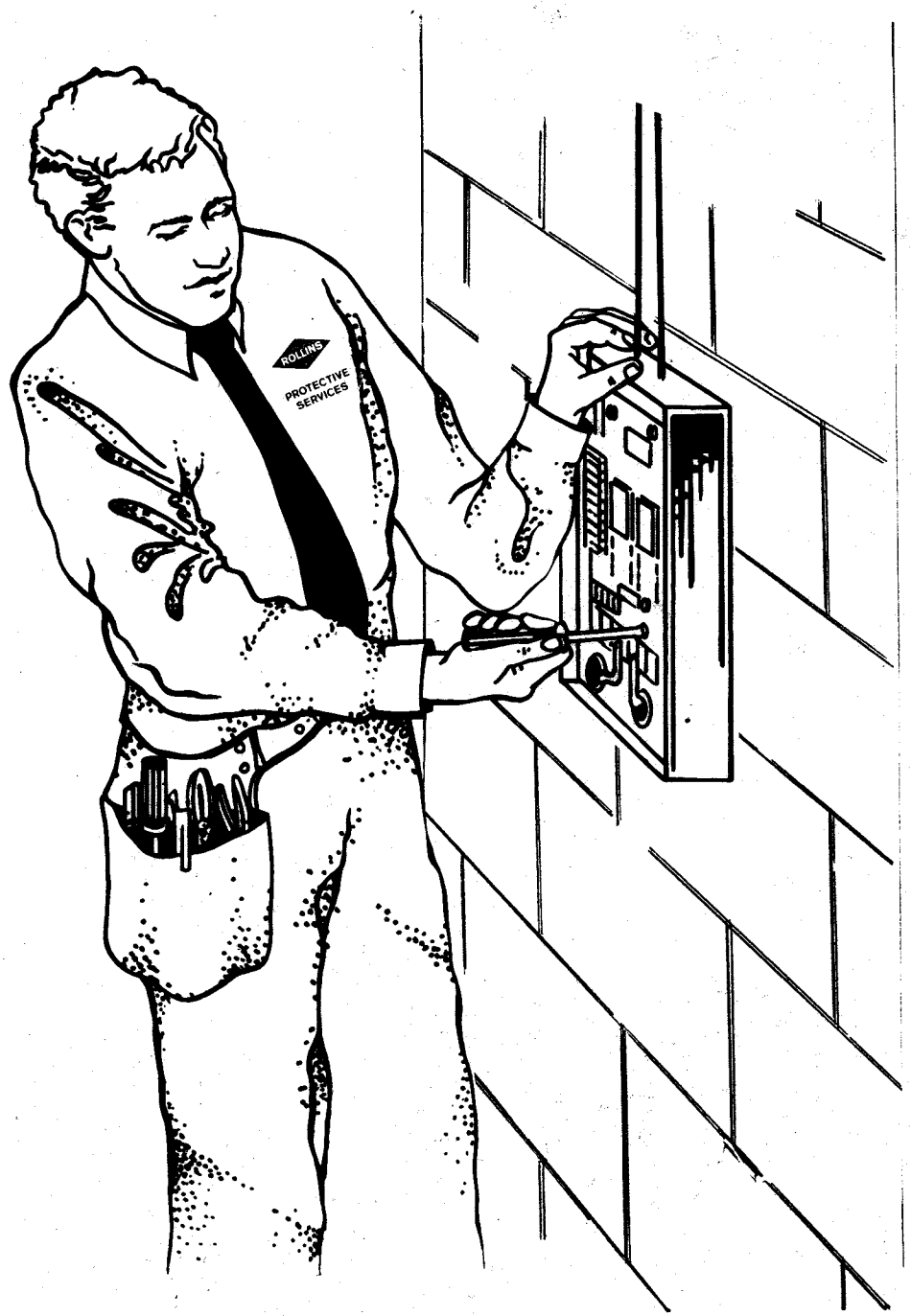
SYSTEM V
TECHNICAL MANUAL



ROLLINS®

PROTECTIVE SERVICES

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I. INTRODUCTION

This System V Service Manual is designed to give you all the information necessary to install, test, operate, and perform preventive maintenance on a residential Rollins System V.

It is assumed that the technician reading this manual has thoroughly familiarized himself or herself with the operation of the system. You cannot be expected to thoroughly understand how to install, perform preventive maintenance or troubleshoot the System V unless you already know how to use it.

If you are not yet very familiar with how to use the System V, then do the following before proceeding:

1. Get a System V Demonstration Kit with which to practice.

2. Set up the Demonstration Kit and all its components and practice all its functions including:

   2.1. How to arm and disarm every level of protection

   2.2. Know the difference between each protection level.

   2.3. Understand the Status sounds.

   2.4. Practice the Bypass feature.

   2.5. Try arming with a sensor violated to see and hear what happens.

   2.6. Set a Secondary Access Code.

   2.7. Become familiar with all three alarm sounds -- POLICE, FIRE and MEDICAL.

   2.8. Try the Silent Duress Code.

   2.9. Be sure you understand all display information on the Master Control Unit.

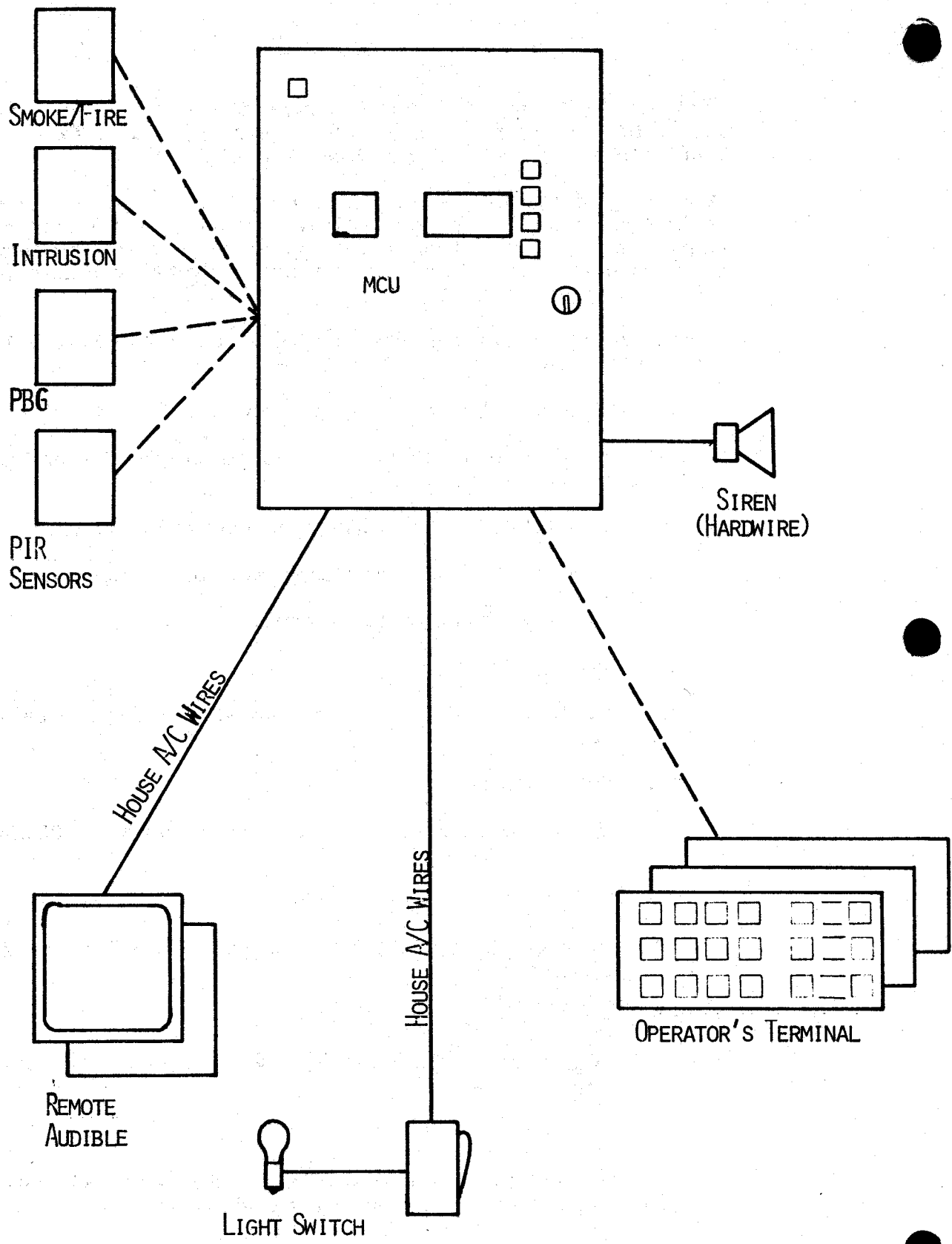
   2.10. Try a Sensor Test (Level 9).

   2.11. Practice changing the Programming of the Master Control Unit.

3. Get a copy of the customer's System V Operator's Manual and be sure you understand everything contained in it.

FIGURE 1

SYSTEM V ACCESSORIES



II. GETTING STARTED

Before we begin, there are some general principles with which you should become familiar. You should understand the various Protection Levels (arming levels) available and you must understand what is meant by Frequency Channel, System ID Code, and Sensor Number.

A. Protection Levels

Most security systems can be armed only to a couple of different levels of security. Typically they can be fully armed or armed with only the perimeter sensors giving protection. The Rollins System V has several arming levels and you need to understand each.

Level 0 - Disarm/Cancel (One long beep)

Perimeter intrusion sensors are OFF.
Interior intrusion sensors are OFF.
Special intrusion sensors are OFF.
Smoke/Heat detectors are ON with a delay.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 1 - Special (One short beep)

Perimeter intrusion sensors are OFF.
Interior intrusion sensors are OFF.
Special intrusion sensors are ON to trigger an INSTANT alarm.
Smoke/heat detectors are ON with a delay.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 2 - Sentinel/Chime (Two short beeps)

Perimeter intrusion sensors are ON to chime.
Interior intrusion sensors are OFF.
Special intrusion sensors are ON to trigger an INSTANT alarm.
Smoke/heat detectors are ON with a delay.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 3 - Home Awake (Three short beeps for duration of Exit/Entry Delay)

Perimeter intrusion sensors are ON with a pre-set Exit/Entry Delay.
Interior intrusion sensors are OFF.
Special intrusion sensors are ON to trigger an INSTANT alarm.
Smoke/heat detectors are ON with a delay.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 4 - Home Asleep (Four short beeps)

Perimeter intrusion sensors are ON to trigger an INSTANT alarm.
Interior intrusion sensors are ON to trigger an INSTANT alarm.
Special intrusion sensors are ON to trigger an INSTANT alarm.
Smoke/heat detectors are ON to trigger an INSTANT alarm.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 5 - Away Delay (Five short beeps for duration of Exit/Entry Delay)

Perimeter intrusion sensors are ON with a pre-set Exit/Entry Delay.
Interior intrusion sensors are ON to trigger an alarm after the pre-set Entry Delay.
Special intrusion sensors are ON to trigger an INSTANT alarm.
Smoke/heat detectors are ON to trigger an INSTANT alarm.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 6 - Away Instant (One long and one short beep)

Perimeter intrusion sensors are ON to trigger an INSTANT alarm.
Interior intrusion sensors are ON to trigger an INSTANT alarm.
Special intrusion sensors are ON to trigger an INSTANT alarm.
Smoke/heat detectors are ON to trigger an INSTANT alarm.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 7 - Away Instant Silent (One long and two short beeps)

Perimeter intrusion sensors are ON to trigger a SILENT INSTANT alarm.
Interior intrusion sensors are ON to trigger a SILENT INSTANT alarm.
Special intrusion sensors are ON to trigger an INSTANT (audible) alarm.
Smoke/heat detectors are ON to trigger an INSTANT (audible) alarm.
Panic Alarms are ON to trigger an INSTANT (audible) alarm.

Level 8 - MCU Communications Test (One long and three short beeps)

Perimeter intrusion sensors are OFF.
Interior intrusion sensors are OFF.
Special intrusion sensors are OFF.
Smoke/heat detectors are ON with a delay.
Panic Alarms are ON to trigger an INSTANT alarm.

Level 9 - Sensor Test (One long and four short beeps)

Perimeter intrusion sensors are OFF.
Interior intrusion sensors are OFF.
Special intrusion sensors are OFF.
Smoke/heat detectors are OFF.
Panic Alarms are OFF.

CAUTION: DO NOT ACTIVATE PROTECTION LEVEL 9 DURING AN A/C POWER FAILURE OR FOR TWO HOURS AFTER THE RESTORATION OF POWER.

Activation of the sensors listed below will cause an alarm 24 hours a day in Protection Levels 0 through 8.

1. The three Panic Alarms on the Operator's Terminal.

2. Fire and smoke sensors.

3. Personal Body Guards - either Police or Medical.

In addition to understanding the various levels of protection, it is important that you understand what we mean by Frequency Channel, System ID Code and Sensor Number. These are discussed below:

B. Frequency Channel

The System V is set on one of seven frequencies, designated as Frequency Channels 1 through 7 (See Figure 3, Section: Installation). The Master Control Unit's receiver and all associated transmitters used on a system must all have the same frequency channel to communicate with each other. The frequency channel for any system is established at the factory by the original equipment manufacturer.

Sensor numbers are pre-assigned to groups. The sensors within a particular group function the same way or cause the same alarm condition during the set protection level. For example, all exterior sensors will chime in Level 2 and will alarm in Level 6.

C. System ID Code

In addition to seven frequency channels, there are also four System ID Codes - 0, 1, 2, and 3 - available for each of the seven frequency channels. Thus, there are 28 different combinations available to you. You must program the system ID codes yourself for the Master Control Unit, Operator's Terminal, remote audibles, and all transmitters. We recommend you select System ID Code 0 as your standard selection, followed by the others, if you install multiple systems within range of each other.

Once the frequency channel and the system ID code have been chosen for a particular installation, every device installed on that installation must be programmed with that same information.

D. Sensor Number

One of the features that makes the System V so advanced is that there are over 50 "zones." This is enough zones so that each and every transmitter can be programmed to its own unique sensor number for identification.

Note: In this manual we will often use the term sensor or sensors, transmitter or transmitters. These are simply radio frequency transmitters. We will also use the term sensor number which is simply the identifying location number of that sensor.

The Master Control Unit (MCU) recognizes different sensor numbers as having different functions. For example, some are used for fire, some for intrusion, some for medical, etc.

In order for you to install a sensor (transmitter) you need to first pick the correct sensor number. Refer to the Sensor Designation chart on Page 26 and 27. For example, if you are installing a smoke or heat detector, you would need to program it with a sensor number from 20 to 27. A medical emergency sensor (PBG) should have a sensor number of either 10 or 11. A delayed entry door would have a sensor number of 34 to 37, etc. On newer model Master Control Units, the sensor groups are somewhat different. See Chart on Page 26.

Before proceeding, be sure you understand the purpose of all sensor numbers between 01 and 76. Be especially sure you understand the differences between the groups.

Sensor numbers higher than 76 have a predetermined use and are pre-programmed into the Master Control Unit's memory. Review the purpose of these sensor numbers, too.

A detailed description of all the sensor numbers and their respective purpose is provided on the Sensor Designation chart on Page .

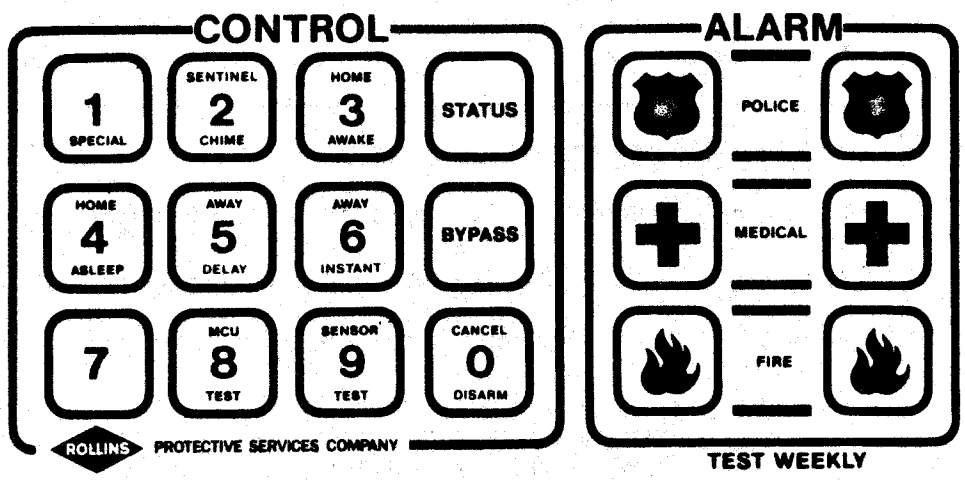
III. OPERATOR'S TERMINAL

A. Overview

The Operator's Terminal is used by the homeowner to give commands to the Master Control Unit. All arming, disarming and other commands are done with the Operator's Terminal (OT).

When a switch in the MCU is changed to the "Program Mode," the OT becomes the installer's programming tool (see Section VII PROGRAMMING THE MASTER CONTROL UNIT WITH THE OPERATOR'S TERMINAL).

The Operator's Terminal consists of two sections of touch-sensitive pads -- a CONTROL section and an ALARM section.



B. CONTROL Section

The CONTROL section is used to set the protection level. This section is made up of touchpads numbered 0 through 9, plus STATUS and BYPASS. To properly use the CONTROL section, it is necessary to know the four-digit access code combination. The system initially powers up with an access code of 1-2-3-4. This code is easily changed (see Section VII PROGRAMMING THE MASTER CONTROL UNIT WITH THE OPERATOR'S TERMINAL).

The four-digit access code must be entered before any changes can be made to the protection level. For example, to arm the system to Protection Level 1, enter the four-digit access code and then immediately press the digit "1." A single beep will be heard and a "1" will be displayed on the MCU's Protection Level display window. The system is now armed to Protection Level 1.

C. STATUS Touchpad

The STATUS touchpad is used to request an audible indication of the system's current protection level (or status). The table below outlines the audible responses for each level when the STATUS touchpad is pressed.

PROTECTION LEVEL	AUDIBLE RESPONSE
0 - Disarm/Cancel	One long beep
1 - Special	One short beep
2 - Sentinel/Chime	Two short beeps
3 - Home Awake	Three short beeps
4 - Home Asleep	Four short beeps
5 - Away Delay	Five short beeps
6 - Away Instant	One long & one short beep
7 - Away Instant Silent	One long & two short beeps
8 - MCU Communications Test	One long & three short beeps
9 - Sensor Test	One long & four short beeps

D. BYPASS Touchpad

To bypass sensors in the exterior protection groups:

Step 1: Disarm the system to Protection Level 0.

Step 2: Open the sensor that you want to bypass.

Step 3: Arm to desired protection level. The system refuses to arm by sounding a series of loud beeps and all the display windows on the MCU will flash.

Step 4: Immediately press BYPASS on the Operator's Terminal.

Step 5: The sensor is now bypassed and the sensor number will momentarily pause with the BYPASS display on the MCU.

The bypass procedure can be used to bypass more than one sensor at a time; however, this is not recommended. Motion detectors, PIR's, carpet traps and fire/smoke detectors cannot be bypassed.

E. ALARM Section

The ALARM touchpads are used to manually signal for help. The three panic alarms that can be triggered from the Operator's Terminal are POLICE, MEDICAL and FIRE. There are two touchpads for each alarm and both must be pressed simultaneously and held for two seconds to set off the alarm. This guards against accidental triggering of the alarms and makes the system more "child-proof." The table on the following page illustrates the MCU response when each of the dual touchpads are pressed.

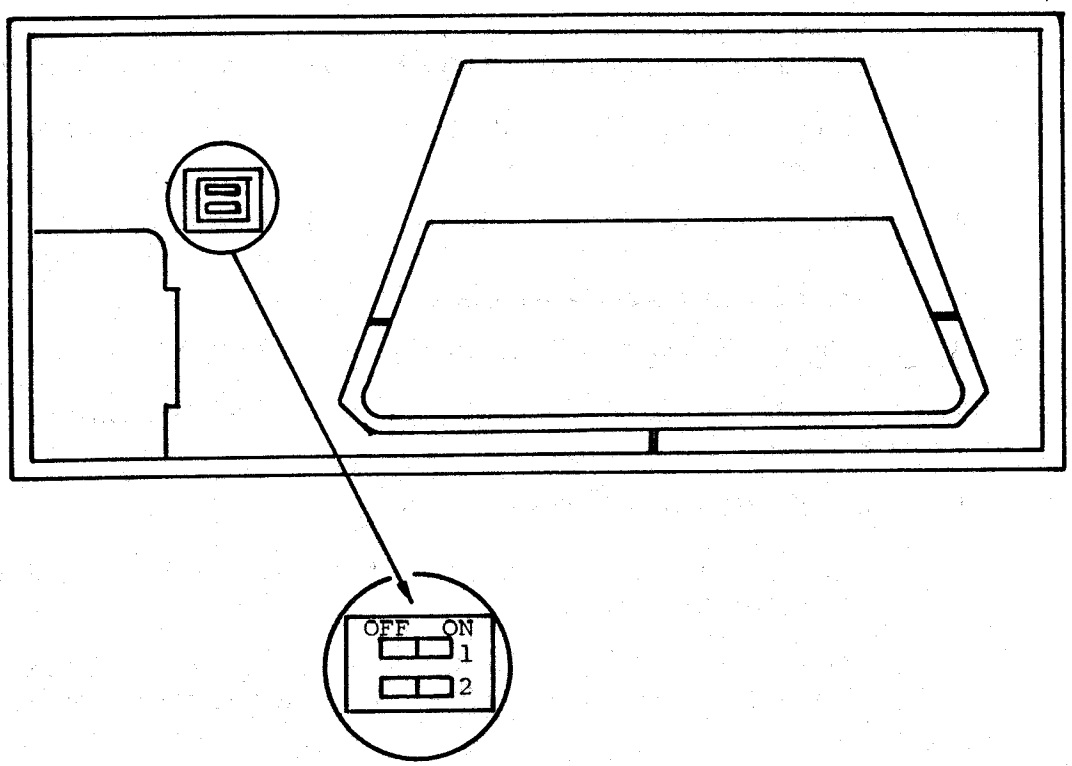
Alarm Pressed	Sensor Display	Audible Response
Police + Police	81	Fast, loud modulated tone
Medical + Medical	82	Slow, modulated tone
Fire + Fire	80	Continuous tone

For any of these conditions, the Rollins Alarm Monitoring Center is called by the digital dialer.

F. Programming the Operator's Terminal to System ID Code

You must program the Operator's Terminal to the correct system ID Code for this installation with the two dip switches on the back of the Operator's Terminal.

FIGURE 2



OPERATOR'S TERMINAL (REAR)

Select the correct system ID code using the following table:

SYSTEM ID CODE	SWITCH 1	SWITCH 2
0	OFF	OFF
1	OFF	ON
2	ON	OFF
3	ON	ON

IV. MASTER CONTROL UNIT

A. Overview (Refer to Figure 4 & 5)

The Master Control Unit (MCU) is the "brain" of the System V containing all the "intelligence." The MCU consists of the following elements:

1. Rechargeable emergency back-up battery.

2. Connection for siren modulator.

3. Built-in annunciator that produces alarm signals and status sounds.

4. Hardware which transmits audible alarm information via carrier current to the remote audibles that mimic alarm signal sounds.

5. UHF radio receiver for communication from each of the system's sensors, Operator's Terminal, and any Personal Body Guards.

6. Telephone line interface, modem, and digital dialer for communicating with the Rollins Alarm Monitoring Center.

7. Light Emitting Diode (LED) display windows indicating system status.

8. Microprocessors to coordinate all system functions.

9. Later models include ON/OFF switch.

B. AC/DC Power Indicator (Refer to Figure 4 , Item 16)

The green Power Indicator display provides the following information:

1. Steady Glow = AC Power is ON.

2. Flashing on and off = AC power is OFF, back-up battery is supplying power.

3. Not lit = System is on back-up battery power and passed the 15 minute power saver cut-off, or the system is totally shut down.

C. Protection Level Display (Refer to Figure 4 , Item 15)

The Protection Level display window will show at which protection level the system is armed (from 0 through 9). The window will also show "P" any time the MCU is in the Program mode. It will be in the Program mode only when you move the Program mode switch to ON or when the customer is setting a Secondary Access Code.

D. Sensor Number Display (Refer to Figure 4, Item 6)

The Sensor Number display will tell you what sensors are:

1. In Alarm
2. Have a Supervisory Condition
3. Have a Low Battery
4. Are in Bypass Mode

NOTE: Supervisory condition means that a sensor unit did not report to the MCU within the specified time.

You must watch the four LED status display windows as they sequence or scroll from one to the other. If one of these displays hesitates at any position more than a moment, then a sensor number will appear in the Sensor Number display window indicating which sensors have that condition. For example, if sensors 34 and 40 were in alarm, then when the Alarm display hesitates, both 34 and 40 would appear in the Sensor Number display window.

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INSTALLATION
I. INSTALLING THE OPERATOR'S TERMINAL

CAUTION: NEVER MOUNT THE OPERATOR'S TERMINAL WITHIN ACTIVATING RANGE OF PASSIVE INFRARED UNITS.

A. Location

Typical locations for mounting are near entry/exit doors and in or near the master bedroom.

Step 1: Secure the mounting bracket to the wall, narrow part at top and hollow side towards the wall.

NOTE: The mounting bracket is not centered on the back of the Operator's Terminal; it is off to one side. This must be taken into account when the Operator's Terminal is to be centered between two objects.

The best height for the Operator's Terminal is about five feet from the floor.

Step 2: Mount securely using molly bolts or plastic anchors.

Hang the Operator's terminal on the mounting bracket and be sure it is level.

Now that you have one Operator's Terminal installed and programmed to the correct system ID code, you should proceed with the installation of the Master ontorl Unit (MCU). Install any remaining Operator's Terminals after the MCU is installed.

B. System V Frequency Identification

Each component of the System V which depends on radio frequency for operation is identified by a colored dot. To make a complete system, the dots must be the same color on each component. Thus, if the MCU has a black dot, all transmitters must be identified by a black dot showing that all are on the same frequency.

There are eight operating frequencies for the System V. The following chart shows the frequency and code for that frequency.

Figure 3

Frequency Channel	Frequency	Color Dot or Dot with Frequency Imprinted
1	319 MHZ	Tan
2	340 MHZ	Red
3	344 MHZ	Orange
4	348 MHZ	Yellow
5	352 MHZ	Green
6	356 MHZ	Coral
7	360 MHZ	White

II. INSTALLING THE MASTER CONTROL UNIT

A. Location

Step 1: Many of the reception problems of the MCU can be avoided or reduced considerably by following these simple rules.

DO	DO NOT
1. Locate MCU centrally in the house.	1. Install in far corner of house.
2. Install in an area free of metal, mirrors and ductwork.	2. Put in cupboard with metal cans, behind mirror or ductwork.
3. Keep antennas upright	3. Bend antennas at any angle.
4. Check for foil type wallpaper before installation - bathrooms and kitchens have this most often.	4. Mount in room with foil type wallpaper or let the room with this type of wallpaper obstruct RF signal from distant sensors.
5. Keep the same antenna that came with the MCU when installing the system.	5. Swap antennas between different frequency systems.
6. Tighten antenna mounting screws at the time of installation.	6. Leave the antennas loose in sockets.

CAUTION: IT IS IMPORTANT TO BE FREE OF STATIC ELECTRICITY WHENEVER WORKING NEAR THE MCU CIRCUITRY. BE SURE TO DISCHARGE ANY STATIC BY TOUCHING THE MCU CABINET. KEEP IN CONTACT WITH THE CABINET WITH ONE HAND WHENEVER TOUCHING ANY COMPONENT ON THE BOARD. A GROUNDING STRAP MUST BE WORN WHEN WORKING WITH THE MCU.

Although the transmitters have a 350-foot range on open space, all transmitters should be installed within a 50-foot radius of the MCU location, if possible.

Step 2: Verify the availability of a 115-volt AC outlet.

Step 3: Install the RJ31X jack within five feet of the MCU location. See Accessories Section, Figure 35.

Step 4: Remove backplate from MCU.

Step 5: Level and mount the MCU mounting plate which is on the back of the case (See Figure 6).

The MCU can be mounted on a shelf, but wall mounting is best.

Mount the MCU near eye level so the displays can be easily viewed.

Choose a location away from metal, pipes and electrical wiring.

Mount the MCU plate securely, either directly to a stud with 1-1/2" screws, or with toggle bolts (Molly brand part #18L-452 or equivalent). If you choose to use plastic anchors, use #10-12 anchors with 1-1/2" #10 sheetmetal screws.

Replace MCU on backplate and tighten mounting hinge bolts.

Step 5: Connect back-up battery to leads form MCU power supply if not already connected.

Note: Polarity must be observed.

Step 6: Refer to Wiring Diagram, Figure 7.

To limit the amount of exposed wire around the MCU, push the excess power cord and telephone cord inside the wall before mounting the MCU.

CAUTION: NO WIRES SHOULD BE ALLOWED NEAR THE RADIO RECEIVER.

Be careful that no wires are pinched between the MCU and the wall.

Step 7: To ground the MCU, tie grounding point from MCU to electrical ground rod, if available. (Grounding rod is usually located at the power entry point of the house). Use copper clamp to attach wire to rod. (Ground wire size: 0-30 feet = #10; 30 + feet = #8).

If electrical ground rod does not exist, drive a 6-10 foot ground rod into soil and tie ground strap with copper clamp to rod.

Step 8: Be sure that the power terminal block is not connected to the MCU.

Step 9: Clear the MCU Random Acces Memory (RAM) by momentarily moving jumper clip to the right two connectors. Allow three seconds short. Return to the two left connectors. See Figure 4.

If the PC board is the later model, see NOTE on following page.

Step 10: Check to be sure Program Switch is on the left which is the OFF position.

Step 11: Leave phone plug disconnected for now.

Step 12: Insert the two antennas through the MCU top and into the receiver. Antennas should be vertical and clear of nearby metal wires, pipes, etc. Tighten the screws holding the antennas.

Step 13: Turn MCU on by plugging in the power terminal block. The MCU will respond as follows:

A short "screech" may, or may not sound.

Audible beeping will sound.

MCU Sensor Number display window will show "CS" (Check Sum).

Protection Level display window will show "0".

Step 14: Immediately move the MCU's Program Switch to the right (Program Mode). The MCU will respond as follows:
Later Model: Switch UP.

Protection level display will show "P".

The following preprogrammed snesor numbers will scroll through the Sensor Number Display Window:

77 - 80 - 81 - 82 - 83 - 86 - 91 - 92 - 94 - 95 - 96 - 97

Beeping will stop.

If there is any variation form the proper response, then proceed as follows:

Turn off the power.
Clear MCU RAM memory again.
Reapply power.
Repeat Steps 13 and 14.
If the CS display does not clear after the power-up and resetting, replace the MCU.

NOTE

The newer model printed circuit board used with System V MCU has a berg clip to clear the RAM (Random Access Memory) when reprogramming the system. See Figure 5, Item 4a.

By removing this clip we can clear the memory most of the time. However, when the memory persists, refuses to clear, you may take a short piece of wire and solder a 1 meg Ohm resistor in series with the wire and put an alligator clip on the end.

a. Ground clip to MCU Chassis.

b. Touch other end of the wire to the left pin of the RAM clear.

c. Turn on power switch and reload RAM.

This should readily clear the memory.

TAKE CARE NOT TO CONNECT POSITIVE VOLTAGE TO THE PINS AT 4A AS THIS WILL PERMANENTLY DAMAGE THE MASTER CONTROL UNIT.

Step 15: Obtain the Operator's Terminal that you already programmed with the correct system ID code for this installation.

Step 16: Using the Operator's terminal, program one sensor number which will be used at the installation site. Sensor number 34 is a good one to use since every installation will have a delayed entry door.

Press the STATUS touchpad.

Immediately press 3, then 4.

By doing this step you not only programmed sensor number 34 into the MCU's memory, but you also set the system ID code of the MCU to the same ID code that the Operator's Terminal was set.

The first use of an Operator's Terminal after the RAM is cleared sets the system ID code of the MCU.

Step 17: Watch the sensor numbers which cycle through the display window. Sensor 34 should appear along with the preprogrammed sensor numbers. If sensor number 34 does not appear, repeat Step 16.

Step 18: Move the MCU's Program Switch to the left (Operation Mode). On the newer models "UP" for program, "DOWN" for operation. Figure 5, Item 5.

Step 19: Now you must check to be sure every sensor you are about to install is going to be within range of the MCU's receiver. To do this, arm the MCU to Level 9. Take a known good transmitter set to the proper system ID code and also set to Sensor Number 34.

Take this transmitter everywhere in the building you plan to install a transmitter and test for reception from the exact location you are going to mount a sensor. For a valid range test hold the sensor from the battery end and be sure your body is not between the sensor and the MCU.

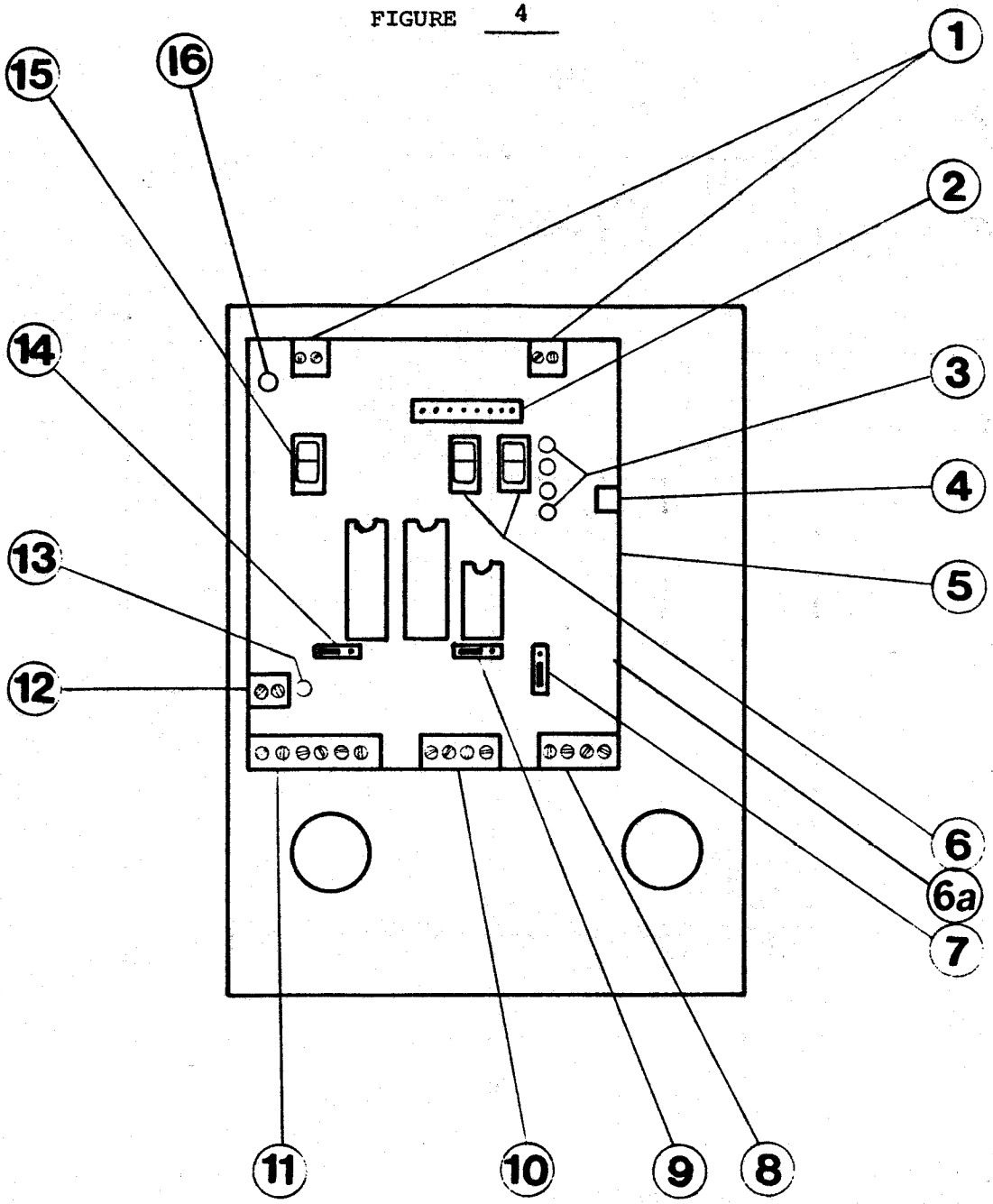
Step 20: Leave the MCU on Protection Level 0 for the rest of the installation.

Step 21: Don't finish programming the MCU now; wait until after you have installed all the sensors and then refer to the programming section of this manual.

B. Audio Amplifier

At this point, take your audio amplifier and connect it to the MCU. The audio amplifier can be a great help in completing the install and finding problem areas. See TROUBLESHOOTING section for detail information.

FIGURE 4

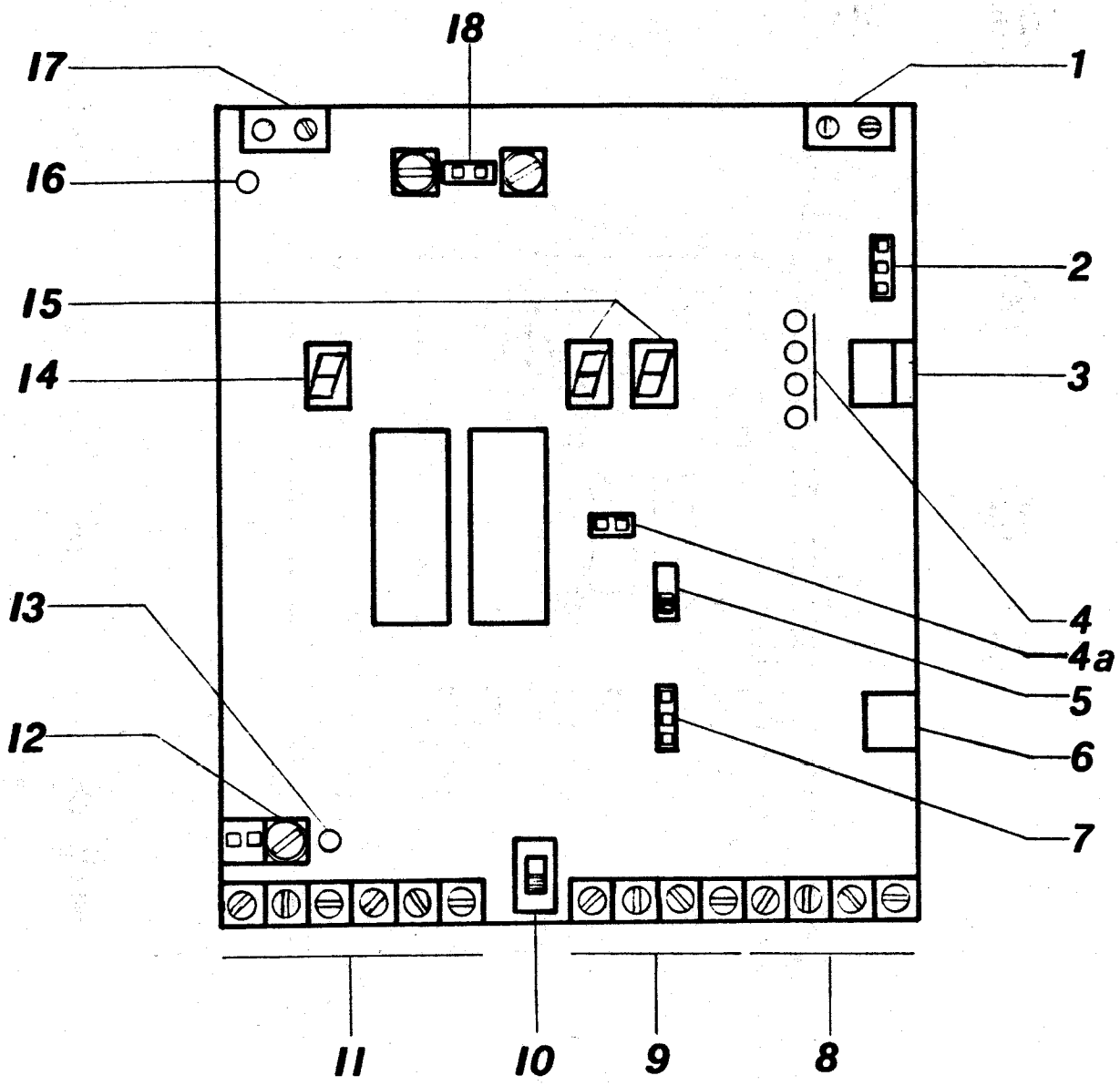


1. ANTENNA MOUNTING
2. TEST PINS
3. STATUS LIGHT EMITTING DIODES (LED) FROM TOP:
   A. ALARM LED
   B. SUPERVISORY LED
   C. LOW BATTERY LED
   D. BYPASS LED
4. TAMPER SWITCH
5. MCU CIRCUIT BOARD
6. SENSOR ADDRESS DISPLAY WINDOW

6A RESET SWITCH

7. ANNUNCIATOR OPTION PINS (ON OR OFF)
8. TELEPHONE TERMINAL BLOCK
9. RAM (RANDOM ACCESS MEMORY) CLEAR SWITCH
10. SOUND TERMINAL BLOCK
11. POWER TERMINAL BLOCK
12. SHOCK SENSOR CONNECTION
13. SHOCK TAMPER LED
14. PROGRAM SWITCH
15. PROTECTION LEVEL DISPLAY WINDOW
16. AC/DC POWER LED

FIGURE 5



1. Antenna Mounting
2. Audio Test - Center: Red Probe
   Bottom: Black Probe
3. Tamper Switch
4. Status LED's
   A. Alarm
   B. Supervisory
   C. Low Battery
   D. Bypass

4a. RAM (Random Access Memory) Clear Switch

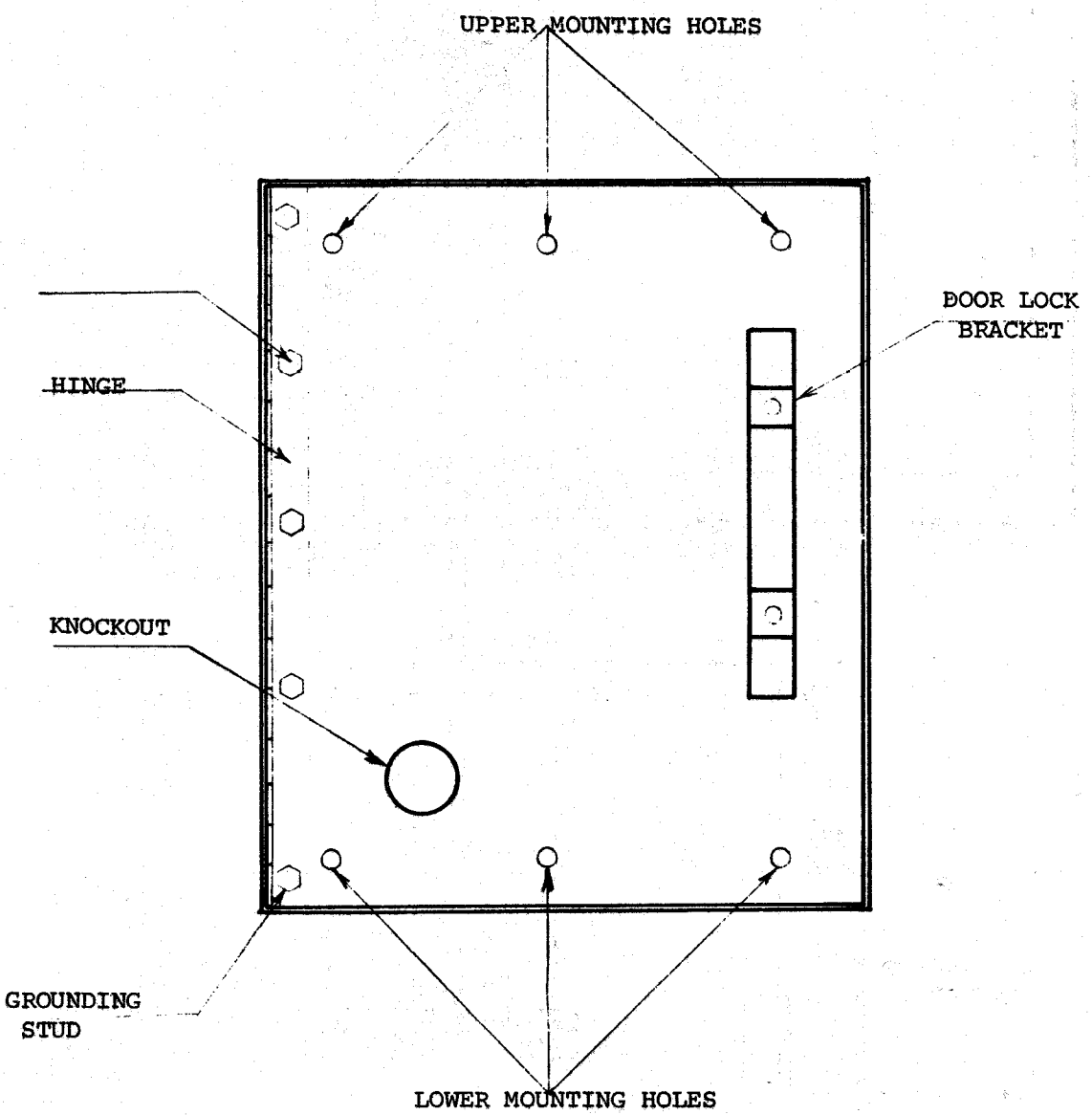
5. Program Switch - Up: Program
   Down: Operate
6. Reset Switch
7. Announciator Option Pin
8. Telephone Connections
9. Sound Terminal Block
10. Master Switch - Up: ON
    Down: OFF
11. Power Terminal Block
12. Shock Sensor Sensitivity Resistor
13. Shock - Tamper LED
14. Protection Level Display
15. Sensor Address Display
16. Power LED
17. Antenna Mounting
18. Receiver Strip

C. GROUNDING

For Ground distance of 30' or more, use #8 Solid Wire
For Ground distance of less than 30', use #10 Solid Wire.

1. Bring ground wire through knockout to grounding stud.
2. Connect a short multistrand (22-4) wire with all strands in a forked connector to the grounding stud.
3. Connect the other end of multistrand wire to bottom left corner of the MCU printed circuit board mounting screw.

FIGURE 6



4. Connect the solid wire (#8 or #10) to a good grounding point - such as electrical utility ground.
   CAUTION: DO NOT USE TELEPHONE COMPANY GROUND OR COLD WATER PIPE GROUND.
5. If grounding points are not available, drive a ground rod into the soil six to ten feet and attach ground wire to the rod with clamp.

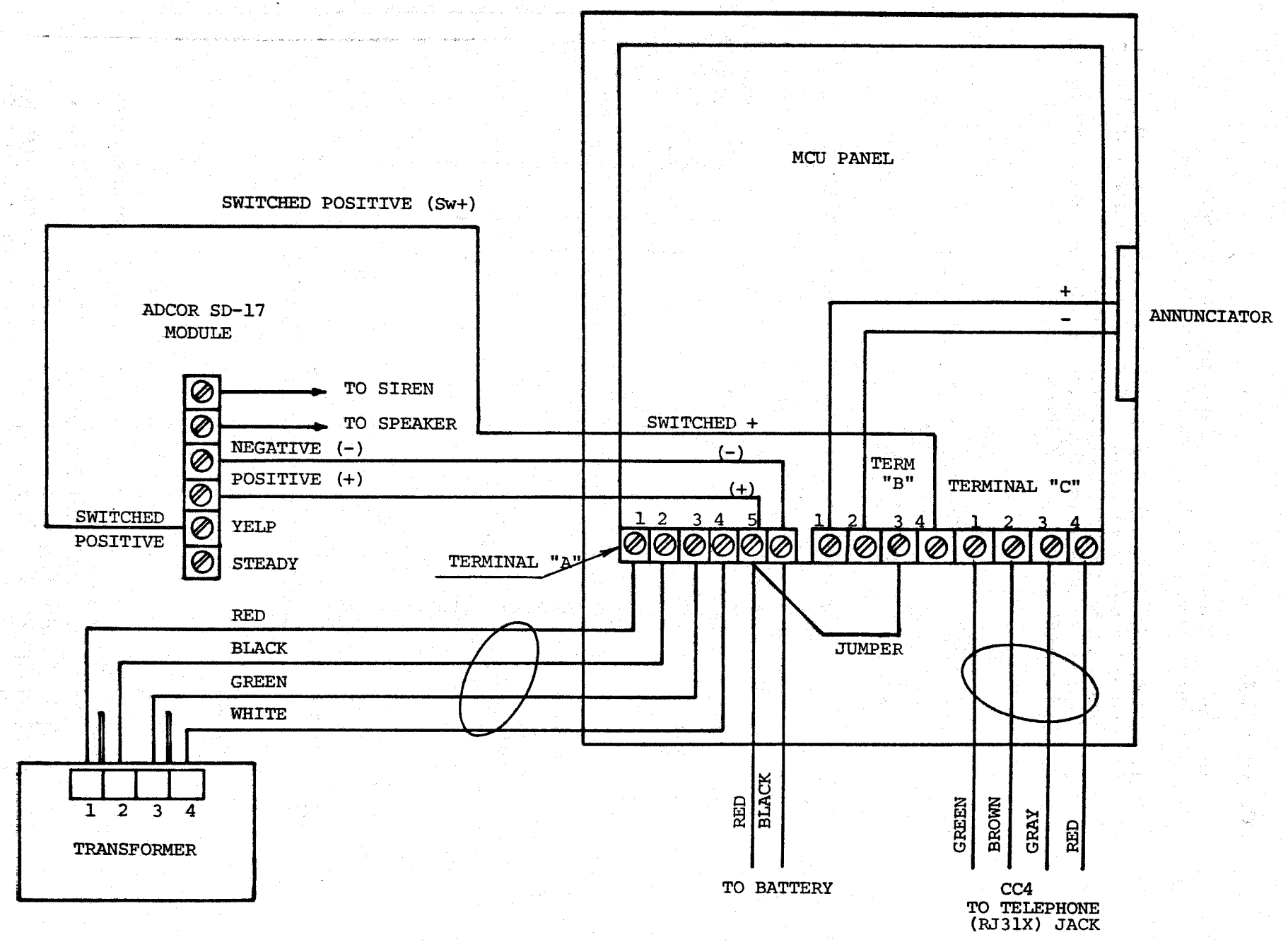

MCU PANEL
SWITCHED POSITIVE (Sw+)
ADCOR SD-17
MODULE
TO SIREN
TO SPEAKER
NEGATIVE (-)
POSITIVE (+)
YELP
STEADY
SWITCHED
POSITIVE
SWITCHED +
(-)
(+)
TERM
"B"
TERMINAL "C"
TERMINAL "A"
1 2 3 4 5
1 2 3 4
1 2 3 4
+
-
ANNUNCIATOR
RED
BLACK
GREEN
WHITE
JUMPER
1 2 3 4
TRANSFORMER
RED
BLACK
TO BATTERY
GREEN
BROWN
GRAY
RED
CC4
TO TELEPHONE
(RJ31X) JACK

FIGURE 7

III. MAGNETIC SENSORS AND AUXILIARY SENSORS

A. Overview - Magnetic Sensors

These transmitters are designed to protect doors, windows, gun cabinets, etc., anything that opens and closes. Each magnetic sensor contains a built-in magnetic reed switch and is designed to go into alarm by moving the supplied magnet away from the end of the magnetic sensor. The base of a magnetic sensor contains screw terminals that will accept normally open or normally closed hardwire devices (i.e., switches, carpet mats, motion detectors). (See Figures 14 and 15).

B. Overview - Auxilliary Sensors

The auxilliary sensor is the same as the magnetic sensor, except for two importnat differences. First, the auxilliary sensor may be activated only by external hardwire inputs to the screw terminals on the transmitter base. Second, the transmitter contains a repeater circuit that will repeat a violation transmission every 45 seconds as long as the violation exists. Auxilliary sensors are usually used for fire (sensor number 20 to 27) and medical Personal Body Guards (sensor number 10 to 17).

CAUTION: ANYTHING WIRED TO A MAGNETIC SENSOR OR AN AUXILLIARY SENSOR MUST GIVE A ONE SECOND MINIMUM ACTIVATION (OPEN OR CLOSURE) WHEN TRIPPED.

Each transmitter, or sensor, is programmed so it will transmit a specific number from 01 to 76. Each transmitter number is also programmed into the MCU's micro-processor memory. Because of this, each transmitter is able to identify itself to the MCU with its own unique number. The MCU can communicate to the Rollins Alarm Monitoring Center's computer the exact transmitter number which caused the alarm. The monitoring center personnel, in turn, can notify the proper authorities depending upon the transmitter number which initiated the alarm, and any special instructions pertaining to this account.

A magnetic sensor or an auxilliary sensor will transmit two signals during normal operation. When a door is opened, a "violation" signal is sent to the MCU. When the door is closed a "restore" signal is transmitted. These signals are sent whether the system is armed to not. If an attempt is made to arm the system when a sensor is in a violated state (door open, for example), the MCU will protest by emitting a series of continuous beeps and refuse to arm to the desired level. The sensor number of the violated sensor will also be displayed on the MCU's Sensor Number Window. The system can only be armed when all of the sensors used at a particular protection level are in the "restore" condition, or if the user deliberately bypassed one or more sensors.

C. Low Battery Detection

In addition to the "violation" and "restore" signals, sensors can transmit a signal to the MCU if their 9-volt batteries deteriorate to a level of 5.4 volts. This information can be sent to the Rollins Alarm Monitoring Center's computer during the next Supervisory report (see below). Batteries can normally be expected to last between 14 and 18 months. If a low battery is reported after only a few weeks of operation, the sensor could be causing an excessive power drain. In this case, a new sensor should be installed and the problem sensor checked out. The low battery indication is removed automatically when the MCU recieves a good battery report. Sensors will typically draw 20 A continuous current form the battery. Current will jump to 10mA for approximately 8/10ths of a second during transmission time.

D. Supervisory Reports

During a 24-hour time interim, each sensor sends three supervisory signals to the MCU. The MCU keeps track of these signals and notifies the monitoring center if no signals have been received from a particular sensor within 24 hours. The problem sensor also is displayed on the Sensor Number window of the MCU. The Supervisory indication will be removed automatically when the MCU receives a report from the missing sensor.

E. Programming Magnetic Sensors and Transmitters

CAUTION: BATTERY MUST BE REMOVED PRIOR TO PROGRAMMING, AND YOUR BODY GROUND STRAP CONNECTED TO THE P.C. BOARD.

Sensors are shipped on a certain frequency channel. Since sensors will arrive already set to their frequency, you need only program their system ID code and their sensor number.

Sensors are set to their correct system ID code and sensor number by cutting teeth on a small comb within each sensor. A comb has ten teeth. The eight inner teeth are used, since the two end teeth are used to support the comb.

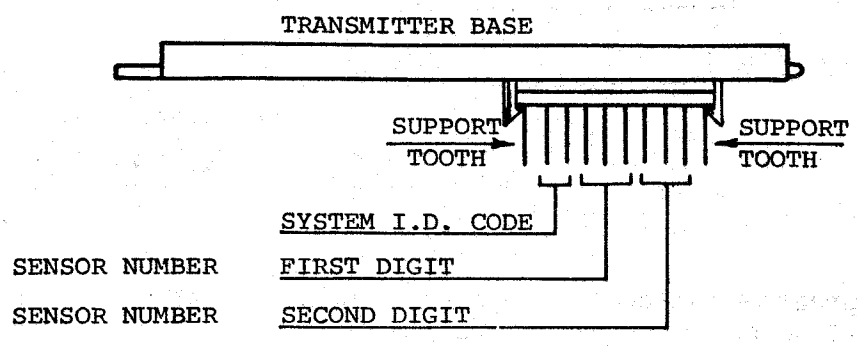
Counting the first support tooth as 1, how 2 and 3 are cut determines the system ID code; 4, 5, and 6 establish the first digit of the two-digit sensor number; and 7, 8, and 9 establish the second digit of the sensor number. Tooth 10 is the other outer support tooth. (See Figure 8).

F. Programming the System ID Code

To program the system ID code for each sensor, you must cut or leave intact Teeth 2 and 3 on the programming comb. All system ID codes must be the same for the installation. We recommend you choose System ID Code 0, followed by 1, 2, and 3 if you install more systems within transmission range.

FIGURE 8

PROGRAMMING THE SYSTEM ID CODE



Select the System ID code by cutting the proper teeth as follows:

System ID Code	Second Tooth	Third Tooth
0	Cut	Cut
1	Cut	Leave
2	Leave	Cut
3	Leave	Leave

G. Programming the Sensor Number

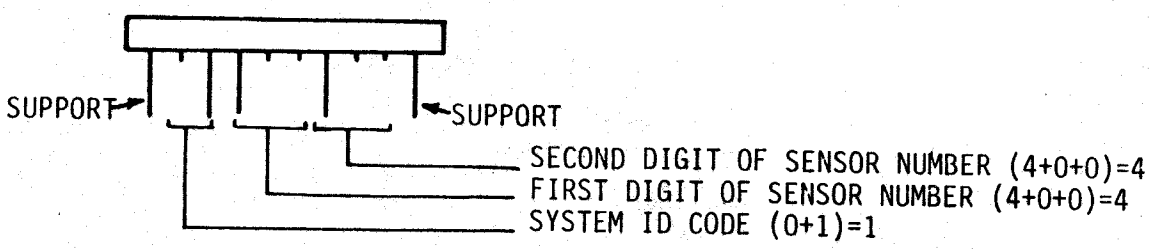
To program the two-digit sensor number for each transmitter, you must cut or leave intact Teeth 4, 5, 6, 7 and 8 on the programming comb. The sensor number will be different for each transmitter installed.

Select the sensor number digits by cutting the proper teeth for each digit as follows:

Digit	Tooth 4 or 7	Tooth 5 or 8	Tooth 6 or 9
0	Cut	Cut	Cut
1	Cut	Cut	Leave
2	Cut	Leave	Cut
3	Cut	Leave	Leave
4	Leave	Cut	Cut
5	Leave	Cut	Leave
6	Leave	Leave	Cut
7	Leave	Leave	Leave

Use Teeth 4, 5, and 6 for the first digit and Teeth 7, 8, and 9 for the second digit.

FIGURE 9

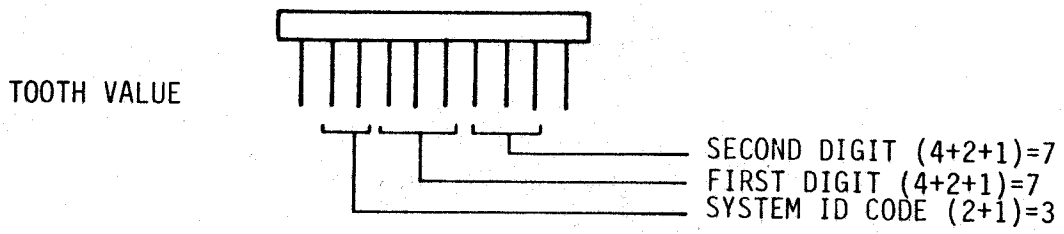


To program System ID Code 1 and sensor location number 44, the comb would be cut as shown above.

Programming Hint: You don't need the comb charts to figure out how to cut the teeth on a comb. You can use the system shown below if you prefer.

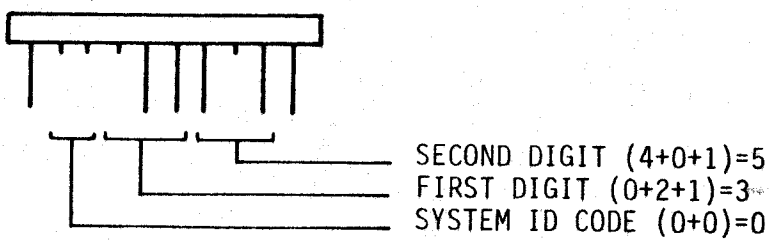
The teeth have values assigned to each one as shown below:

FIGURE 10



You add the values together of the group of teeth to determine the digits value. For example, with no teeth cut, the system ID code is 3 (2+1) and the first and second digits would both be 7 (4+2+1).

FIGURE 11



The above shows System ID Code 0 and sensor location number 35.

H. SENSOR DESIGNATIONS

E-PROM DATED 7/15/84 AND LATER

SENSOR	ACTIVE IN PROTECTION LEVEL										TOTAL	DESCRIPTION
	0	1	2	3	4	5	6	7	8	9		
01 - 05				X	X	X	X	X			5	Exterior
06 & 07	X	X	X	X	X	X	X	X	X		1	PBG - Police - Panic
07 & 17	X	X	X	X	X	X	X	X	X		1	PBG - Medical
10 & 11	X	X	X	X	X	X	X	X	X		2	Auxiliary
20 - 25	X	X	X	X	X	X	X	X	X		6	Fire
30 - 31		X	X	X	X	X	X	X			2	Special
12 - 16				X	X	X	X	X			5	Exterior
26 - 27				X	X	X	X	X			2	Exterior
32 - 37				X	X	X	X	X			6	Exterior
40 - 47				X	X	X	X	X			8	Exterior
50 - 57				X	X	X	X	X			8	Exterior
60 - 65				X	X	X	X	X			6	Exterior
66 - 67					X	X	X	X			2	Interior - Non-Restore
70 - 72					X	X	X	X			3	Interior - Non-Restore
73 - 76						X	X	X			4	Interior - Non-Restore
77	X	X	X	X	X	X	X	X	X			Low Battery - Ops. Terminal
80	X	X	X	X	X	X	X	X	X			Fire - Ops. Terminal
81	X	X	X	X	X	X	X	X	X			Police - Ops. Terminal
82	X	X	X	X	X	X	X	X	X			Medical - Ops. Terminal
83									X			MCU Test
86	X	X	X	X	X	X	X	X	X	X		Duress Code
91	X	X	X	X	X	X	X	X	X			MCU Low Battery
92		X	X	X	X	X	X	X				MCU Tamper - Impact Switch
96	X	X	X	X	X	X	X	X				Failure to Communicate Local
97												Dialer Checksum Error

I. SENSOR DESIGNATIONS

E-PROM PRIOR TO 6/5/84

	Active in Protection Level											
Sensor	0	1	2	3	4	5	6	7	8	9	62	Description
01-05			X	X	X	X	X				5	Exterior - PIR - Intrusion
06-07	X	X	X	X	X	X	X	X	X		2	PBG - Police
10-11	X	X	X	X	X	X	X	X	X		2	PBG - Medical
12-17	X	X	X	X	X	X	X	X	X		6	PBG - Lights
20-27	X	X	X	X	X	X	X	X	X		8	Fire, Heat Detector, Rate of Rise Detector
30-33		X	X	X	X	X	X	X			4	Special Intrusion Protection Active 24-hours
34-37				X	X	X	X	X			4	Exterior Intrusion Sensors
40-47	9 9			X	X	X	X	X			8	Exterior Intrusion Sensors
50-57				X	X	X	X	X			8	Exterior Intrusion Sensors
60-67					X	X	X	X			8	Interior Intrusion (Non-PIR's)
70-71					X	X	X	X			2	Interior Intrusion (Non-PIR's)
72-76					X	X	X	X			5	Interior Intrusion Sensors PIR's and Carpet Traps
77	X	X	X	X	X	X	X	X	X			Low Battery in Operator's Terminal
80	X	X	X	X	X	X	X	X	X			Fire Panic Alarm from Operator's Terminal
81	X	X	X	X	X	X	X	X	X			Police Panic Alarm from Operator's Terminal
82	X	X	X	X	X	X	X	X	X			Medical Panic Alarm from Operator's Terminal
83									X			MCU Test (Level 8)
86	X	X	X	X	X	X	X	X	X			Duress Alarm
91	X	X	X	X	X	X	X	X	X			Low Battery in MCU
92		X	X	X	X	X	X	X	X			Tamper Alarm in MCU
94	X	X	X	X	X	X	X	X	X			Receiver Integrity Signal
95	X	X	X	X	X	X	X	X	X			AC Power Restored/MCU Reset
96	X	X	X	X	X	X	X	X	X			Failure to Communicate (Local indication only)
97	X	X	X	X	X	X	X	X	X			Memory Failure in Dialer (Local indication only)
CS	X	X	X	X	X	X	X	X	X			Check Sum - Programming Failure (Local indication only)

F. CUSTOM PROGRAMMING

In some cases it is required to change the original power-up of the Master Control Unit. To assist you, the technician, in changing the transmitter grouping when a need arises for additional sensor numbers in certain groups, we added a chart to be used just for that purpose. After filling out the copy of this Special Programming Chart, it must be sent to Home Office, ATTN: Lamar Fuller. If the install is urgent, the changes will be accepted over the telephone by the Field Service Director. These changes of sensor groupings are accomplished by RAMC at the time of programming the telephone number into the MCU.

To: RAMC personnel
Subject: Custom Programming of System V from RAMC
Date: 5-4-1984
Time: _____
From: Lamar Fuller
_____, RPS branch #___, phone #_____
_____, RPS installer
CUSTOMER _____ phone _____
ADDRESS _____

For installation do the following changes from CS Receiver.
GROUP sensor #, group #, type
group 12 5 E
group 13 5 E
.....etc.....

Standard Power-up Table Matrix for Revision 9-13-83 EPROM
1st number is Group, 2nd number is Type
CHANNEL CONTROL(BY GROUP). SENSORS 00 -> 77.

	0	1	2	3	4	5	6	7
0		5C	5C	5C	5C	5C	1B	1B
10	2B	2B	2B	2B	2B	2B	2B	2B
20	3D	3D	3D	3D	3D	3D	3D	3D
30	4E	4E	4E	4E	5E	5E	5E	5E
40	5E	5E	5E	5E	5E	5E	5E	5E
50	5E	5E	5E	5E	5E	5E	5E	5E
60	6E	6E	6E	6E	6E	6E	6E	6E
70	6E	6E	6C	6C	6C	6C	6C	

MODIFIED Power-up Table Matrix for this customer
CHANNEL CONTROL(BY GROUP). SENSORS 00 -> 77.

	0	1	2	3	4	5	6	7
0								
10								
20								
30								
40								
50								
60								
70								

GROUP #
1 -POLICE (PBG)
2 -MEDICAL (PBG)
3 -INSTANT/DELAYED FIRE
4 -SPECIAL
5 -EXTERIOR
6 -INTERIOR

TYPE	MEANING
A -UNUSED	-Unsupervised, no close, no battery
B -PBG	-Unsupervised, no close, battery
C -PIR, Carpet trap	-Supervised, no close, battery
D -Smoke/fire	-Supervised, will send close, battery
E -Magnet/Relay	-Supervised, must have close for arm, battery

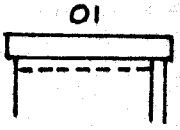
L. PROTECTION LEVELS & SYSTEM RESPONSE

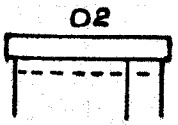
*Audible Alarm

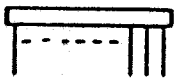
PROT. LEVEL	POLICE FIRE MEDICAL	SPECIAL	SENTINEL	EXTERIOR	INTERIOR	DELAY	INSTANT	SILENT	MCU TEST	SENSOR TEST	SMOKE/ FIRE DET.	PBG	LIGHTS
0	X										X DELAY	X	X
1	X	X					X				X DELAY	X	X
2	X	X	X								X DELAY	X	X
3	X	X		X		X					X DELAY	X	X
4	X	X		X	X		X				X INSTANT	X	X
5	X	X		X	X	X					X INSTANT	X	X
6	X	X		X	X		X				X INSTANT	X	X
7	X	X*		X	X		X	X			X INSTANT*	X	X
8	X								X		X INSTANT	X	X
9										X			

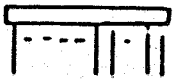
M. SENSOR/TRANSMITTER COMB CUTS

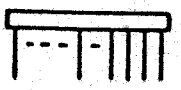
DRAWINGS OF COMB CUTS FOR SYSTEM ID CODE 00

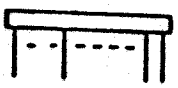
01 

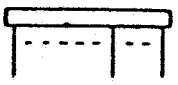
02 

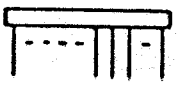
03 

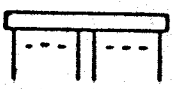
15 

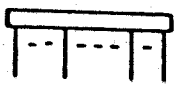
27 

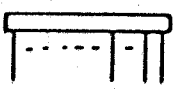
41 

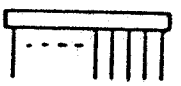
04 

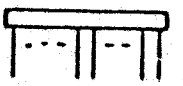
16 

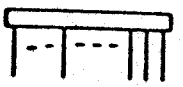
30 

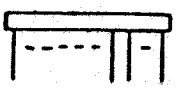
42 

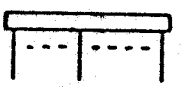
05 

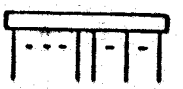
17 

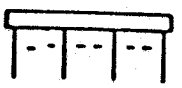
31 

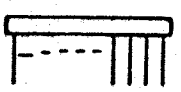
43 

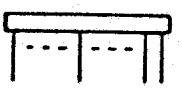
06 

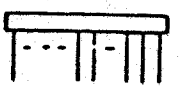
20 

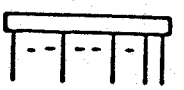
32 

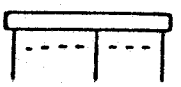
44 

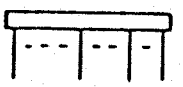
07 

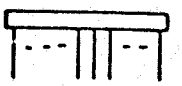
21 

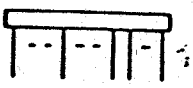
33 

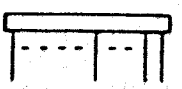
45 

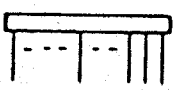
10 

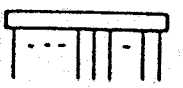
22 

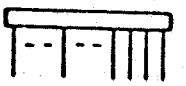
34 

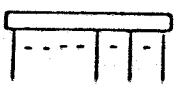
46 

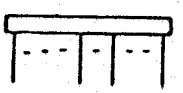
11 

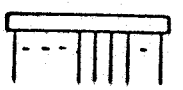
23 

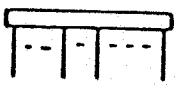
35 

47 

12 

24 

36 

50 

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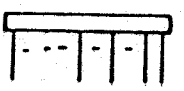
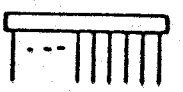
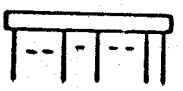
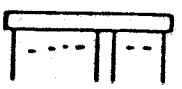
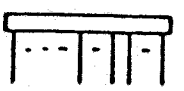
25 

37 

51 

14 

26 

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52

DRAWINGS OF COMB CUTS FOR SYSTEM ID CODE 00
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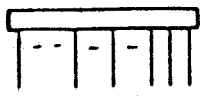
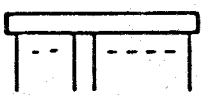
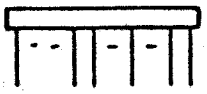
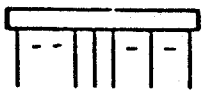
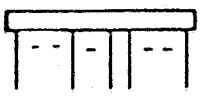
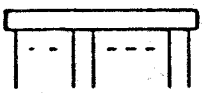
53 

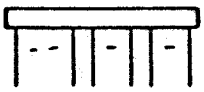
60 

65 

72 

54 

61 

66 

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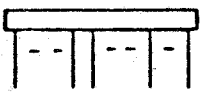
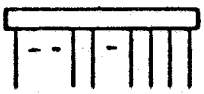
62 

67 

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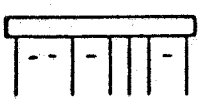
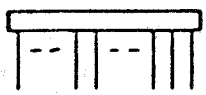
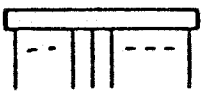
56 

63 

70 

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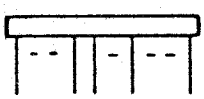
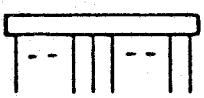
64 

71 

76 

DRAWINGS OF COMB CUTS FOR SYSTEM ID CODE 01

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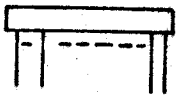

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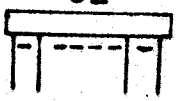

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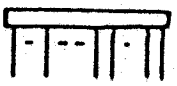

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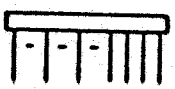

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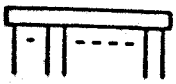

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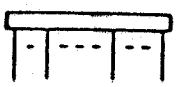

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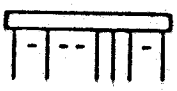

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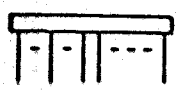

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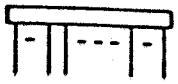

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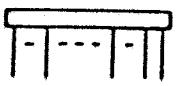

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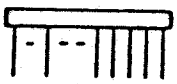

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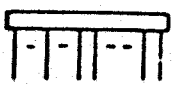

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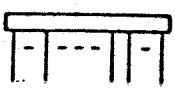

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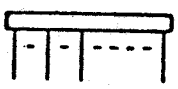

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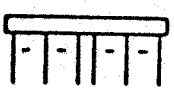

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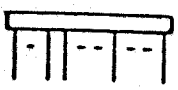

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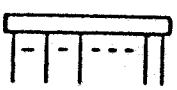

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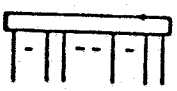

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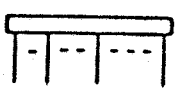

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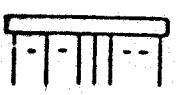

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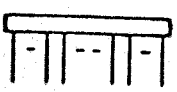

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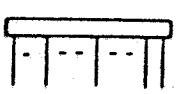

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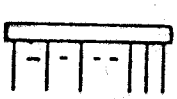

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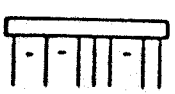

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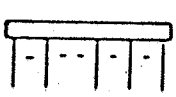

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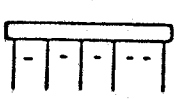

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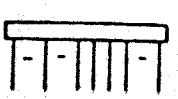

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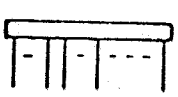

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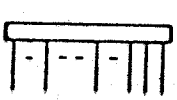

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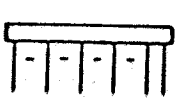

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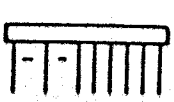

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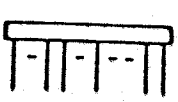

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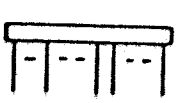

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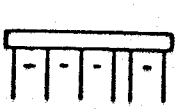

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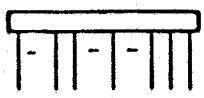
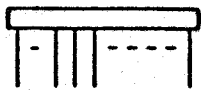
53 

60 

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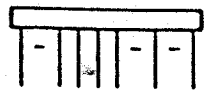
72 

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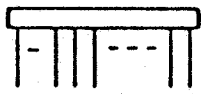
61 

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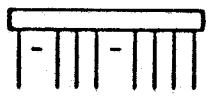
67 

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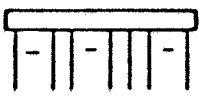
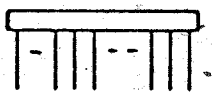
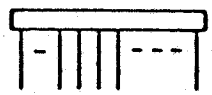
56 

63 

70 

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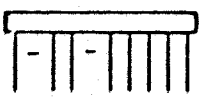
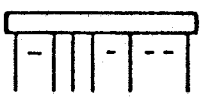
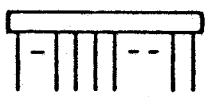
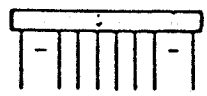
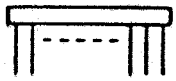
57 

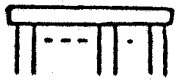
64 

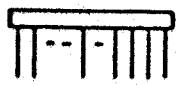
71 

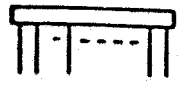
76 

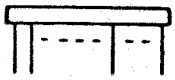
DRAWINGS OF COMB CUTS FOR SYSTEM ID CODE 02

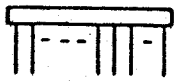
03 

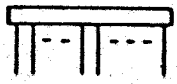
15 

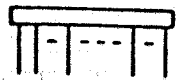
27 

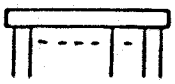
41 

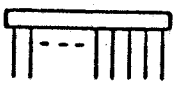
04 

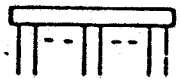
16 

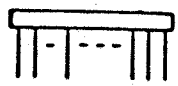
30 

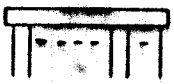
42 

05 

17 

31 

43 

06 

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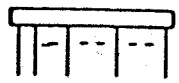
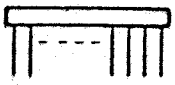
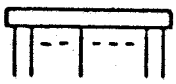
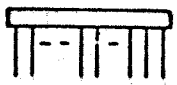
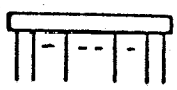
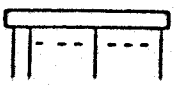
44 

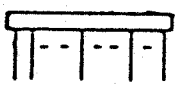
07 

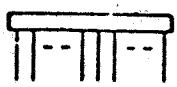
21 

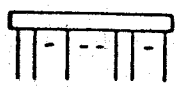
33 

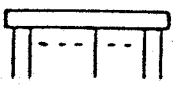
45 

10 

22 

34 

46 

11 

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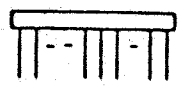
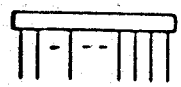
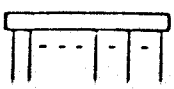
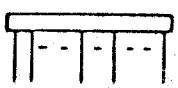
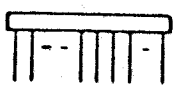
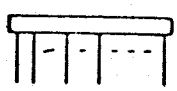
35 

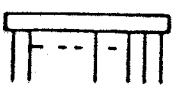
47 

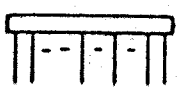
12 

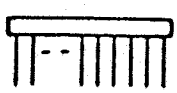
24 

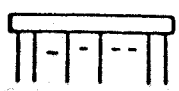
36 

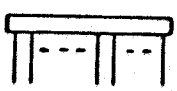
50 

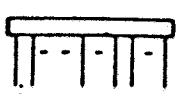
13 

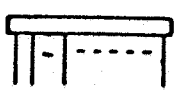
25 

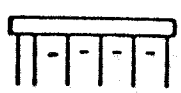
37 

51 

14 

26 

40 

52 

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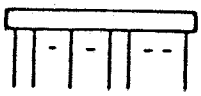
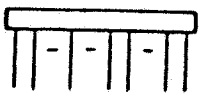
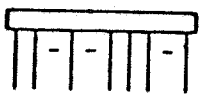
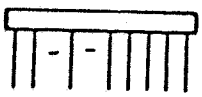
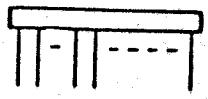
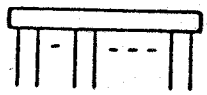
54 

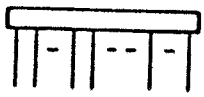
55 

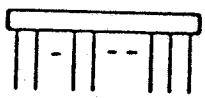
56 

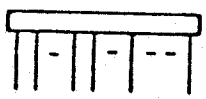
57 

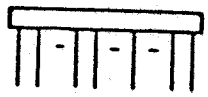
60 

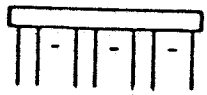
61 

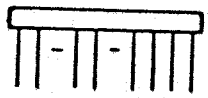
62 

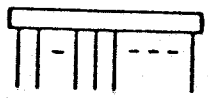
63 

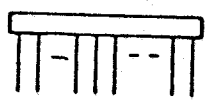
64 

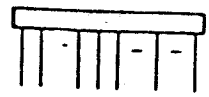
65 

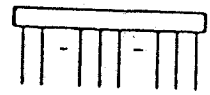
66 

67 

70 

71 

72 

73 

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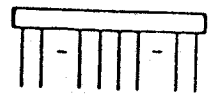
75 

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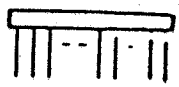
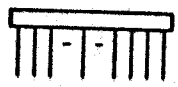
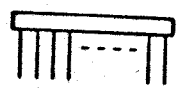
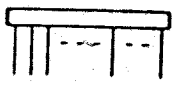
DRAWINGS OF COMB CUTS FOR SYSTEM ID CODE 03

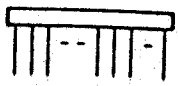
03 

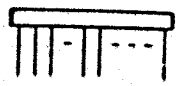
15 

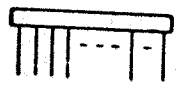
27 

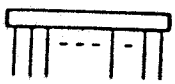
41 

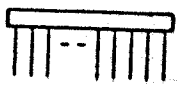
04 

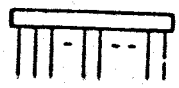
16 

30 

42 

05 

17 

31 

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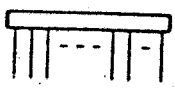
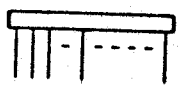
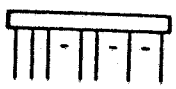
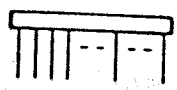
06 

20 

32 

44 

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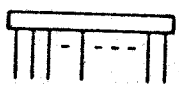
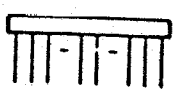
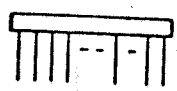
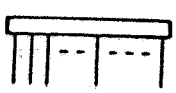
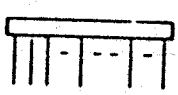
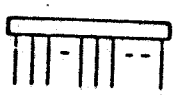
21 

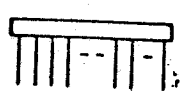
33 

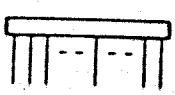
45 

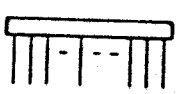
10 

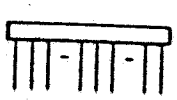
22 

34 

46 

11 

23 

35 

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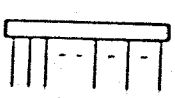
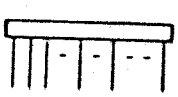
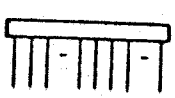
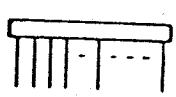
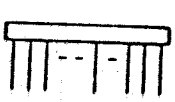
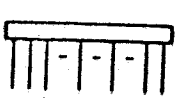
12 

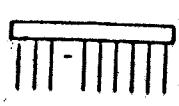
24 

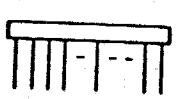
36 

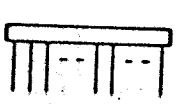
50 

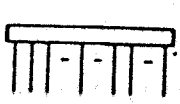
13 

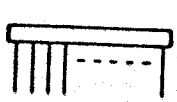
25 

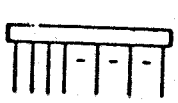
37 

51 

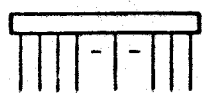
14 

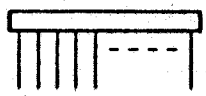
26 

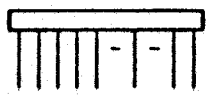
40 

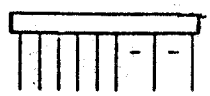
52 

DRAWINGS OF COMB CUTS FOR SYSTEM ID CODE 03
(continued)

53 

60 

65 

72 

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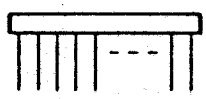
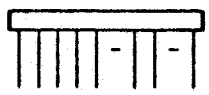
61 

66 

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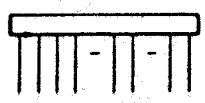
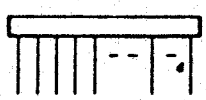
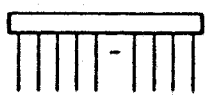
55 

62 

67 

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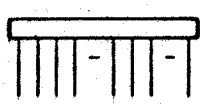
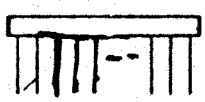
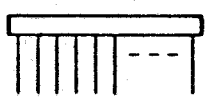
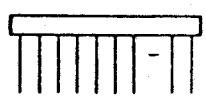
56 

63 

70 

75 

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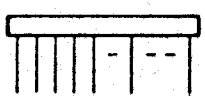
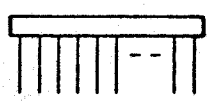
64 

71 

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IV. INSTALLING MAGNETIC SENSORS AND AUXILLIARY SENSORS

A. Location - Step by Step Instructions

CAUTION: IT IS IMPORTANT FOR YOU TO BE FREE OF STATIC ELECTRICITY WHEN REPLACING PC BOARD ON SENSOR BASE. FAILURE TO GROUND YOURSELF IMMEDIATELY BEFORE TOUCHING A COMB AND PC BOARD CAN DAMAGE THE CUSTOMER CHIP IN THE SENSOR.

Step 1: To remove the sensor cover, press on the cover bottom and disengage the tab from slot on back of sensor.

Step 2: Separate PC board from back of sensor by pulling the two apart.

Step 3: Remove battery.

Step 4: Program the sensor by cutting the proper teeth on a programming comb to create the desired system ID code and two-digit sensor number.

Use a very small pair of wire clippers to cut and remove the teeth. It is important to clip the teeth as close as possible to the spine which holds the teeth. The sensor numbers should be the ones indicated on the Sensor Number Location and Description Information form for this installation. See Page 69, Installation Section.

Step 5: Make sure that the system ID code teeth are toward the center of the base and away from the reed switch end. See Figure 10.

Step 6: Do not reinsert the PC board into the sensor back at this time, but it may be helpful to write the sensor number on the sensor back with a felt tip pen to keep track of the addresses. Also list information on the Sensor Number Location and Description Information form.

Step 7: Mount sensor bases at their respective openings using #6 x 1/2" screws if mounting on wood. Use #8-10 plastic anchors with #6 x 3/4" screws if mounting into dry wall or plaster.

To avoid damage, do not mount within five inches of the floor on doors.

Generally mount magnetic sensor on door, magnet or frame.

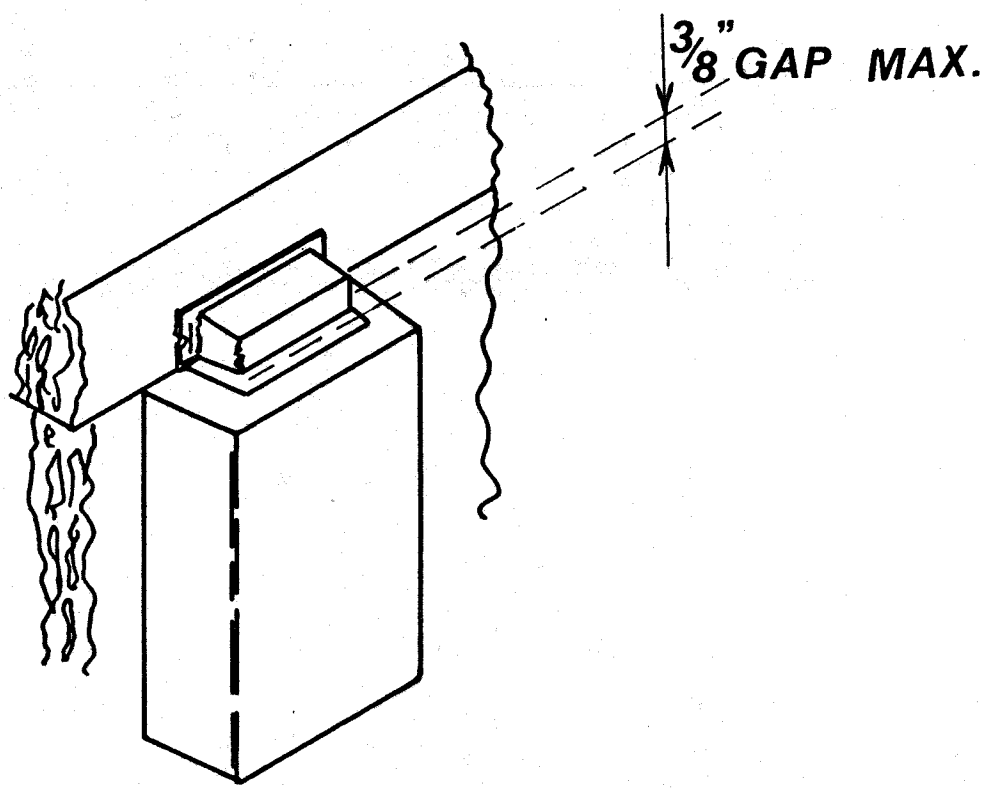
Use minimum 1/8" spacers to avoid mounting sensor or magnet on metal door or door frame. Use spacers if mounting on foil wallpaper. Keep magnet within 3/8" of magnetic sensor's reed switch.

For double doors, mount magnet on one door and magnetic sensor on the other.

The maximum distance between System V sensor/transmitter and the magnet is 3/8". In some cases, this distance cannot be achieved, either because of the gap between the door and the casing or because of the angle of the trim, preventing the magnet from pulling the reed switch closed. The reed switch is mounted in such a way on the base as to make it farther away from the magnet when the door is recessed away from the trim. In addition, the magnets are not too powerful.

REMEDY: Any time a magnet cannot be mounted at or within 3/8" of the sensor/transmitter, use a recessed Sentrol switch to correct the problem. This will alleviate the need for return trips and/or false alarms.

Figure 12



Sensors should be mounted vertically. Horizontal mounting is acceptable if satisfactory reception can be achieved. See Figures 14 and 15 if using external switches or sensors.

Mount sensor bases with screws. Avoid the use of double-stick tape.

Try to keep all transmitters within 50 feet of the MCU.

The preferred method to install sensor/transmitter is to use small screws (#6,½") and to nail the magnet to the surface of the opening to be protected. However, in some cases, this is not possible. When the installation calls ro an adhesive to be used, only two different types of glues can be used. No other manufacture or type is approved at this time.

Primary Adhesive:

Scotch-Grip Plastic Adhesive Number 4475.

Secondary Adhesive:

G.E. Silicon Glue

Step 8: Mount magnet using two #18 x 1/2" wire nails using a magnetic nail and brad driver. Notches are provided if you prefer to use screws.

Be sure magnet doesn't interfere with door or window opening.

Mount the magnet within 3/8" of end of cover center on end of the cover. Don't exceed 3/8" even if it seems to work properly.

Remember to use a plastic spacer if mounting on metal.

Mounting magnet with silicone glue (RTV) or two-sided tape is acceptable but not preferred.

Step 9: Replace the PC board into magnetic sensor back, make sure the magnet and reed switch is properly aligned and within 3/8".

Step 10: Replace sensor cover.

Step 11: Repeat Steps 7 through 9 for all sensors.

B. Interfacing Remote Devices to a Magnetic Sensor or an Auxilliary Sensor

The diagrams in Figures 16 and 17 illustrate how to wire a normally closed (opens on alarm) device and a normally open (closes on alarm) device to a transmitter (magnetic or auxilliary).

Note: When using magnetic switches, such as Ademco 39, mount the transmitter at least six inches away from the magnet to prevent interference.

Multiple normally closed devices would be wired in series all in the same line. Multiple normally open devices would be wired in parallel all to the same two screw terminals.

You can connect any normally closed or normally open magnetic switch, motion detector or carpet pad to a sensor as long as you follow these guidelines:

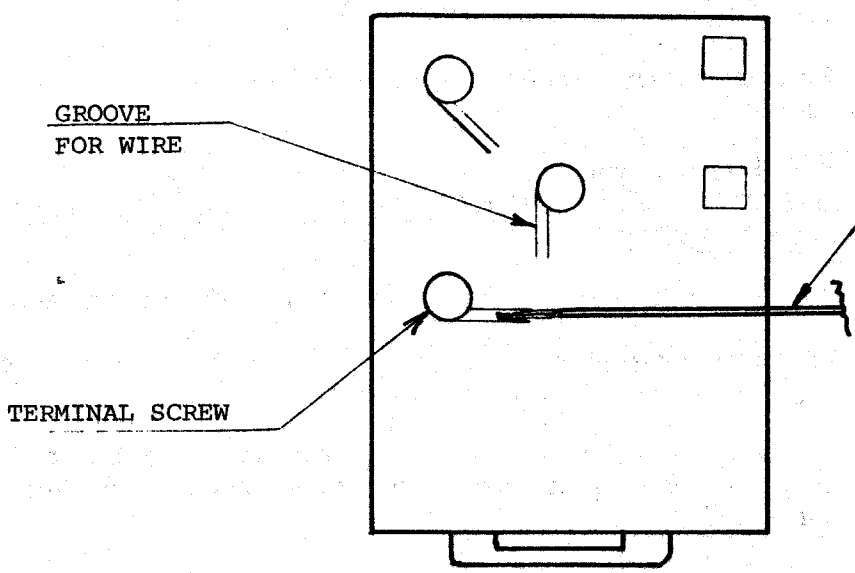
1. The device must supply a minimum full second open or closure on alarm. This is important! Don't attempt to connect fast pulse devices such as window bugs to a regular magnetic or auxilliary sensor.

2. Always use stranded wire -- never solid core wire.

3. Don't run wires within 18 inches of electrical wiring. Never run parallel to electrical wires -- cross them at a 90 degree angle.

FIGURE 13

C. TRANSMITTER MOUNTING PLATE



PUSH WIRE UNDER TERMINAL SCREW AND SECURE TIGHTENING SCREW CLOCKWISE.

FIGURE 14

D. N.O. LOOP WIRING

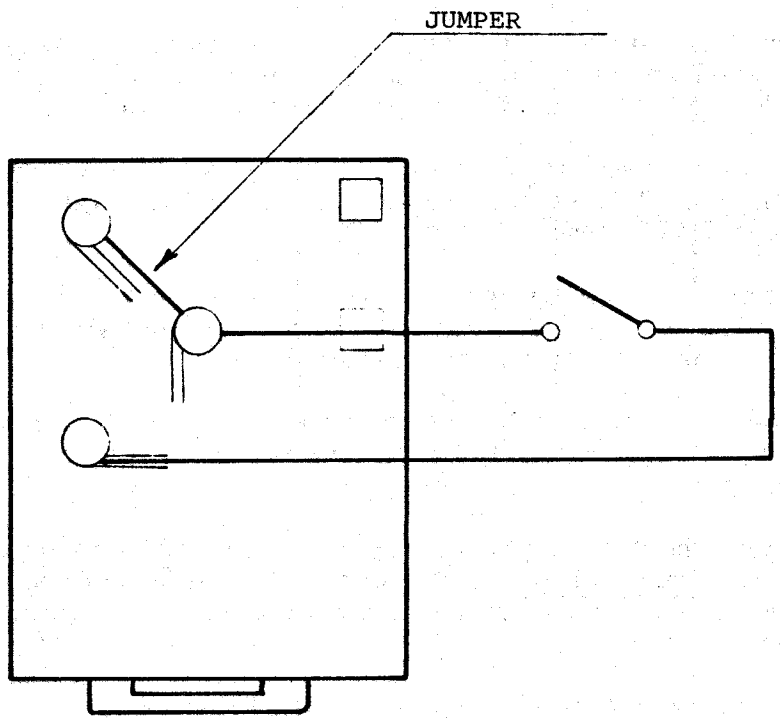
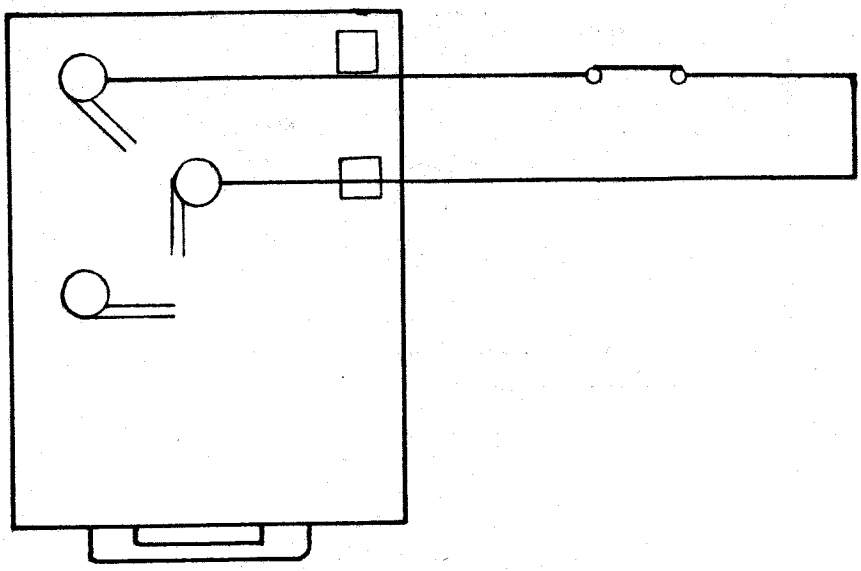


FIGURE 15

E. N.C. LOOP WIRING



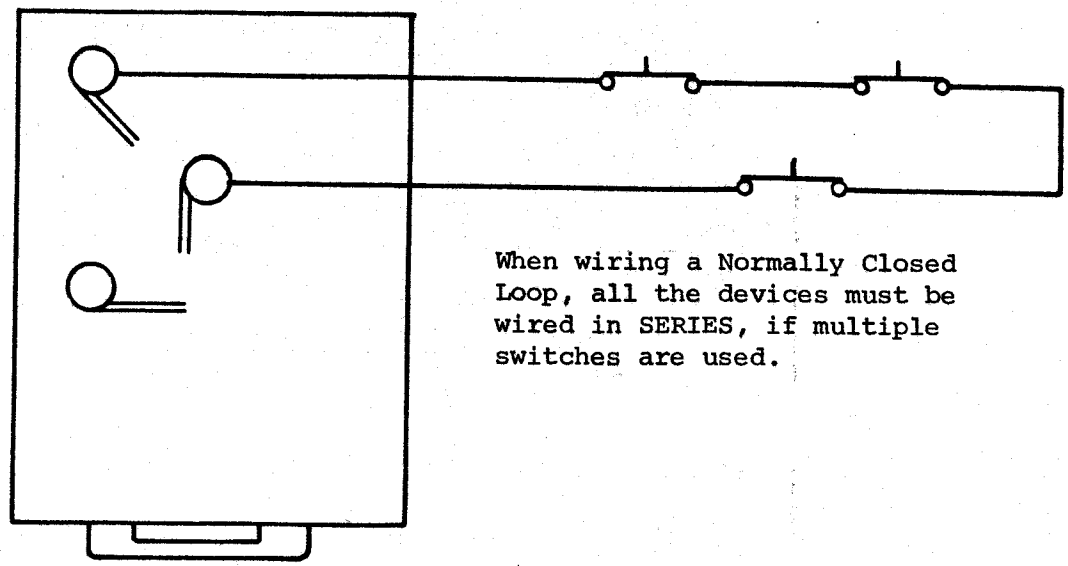
F. Multiple Switches and Devices

Each sensor/transmitter of System V is capable of accommodating more than one switch or device. However, extreme care must be taken when connecting these devices to the transmitter. An incorrectly connected switch may cause severe false alarm problems because during SUPERVISORY report from the transmitter, the report includes the condition of the switch - which, if OPEN, will become VIOLATION. The following drawings depict the connection for both Normally Open Loop and Normally Closed Loop.

Bear in mind that switches are marked as to their undisturbed condition, i.e. a normally open switch is Normally Open when nothing disturbs it. When a magnet is applied or plunger pushed in, it changes condition, thus a normally closed loop usually requires normally open switches and vice versa.

FIGURE 16

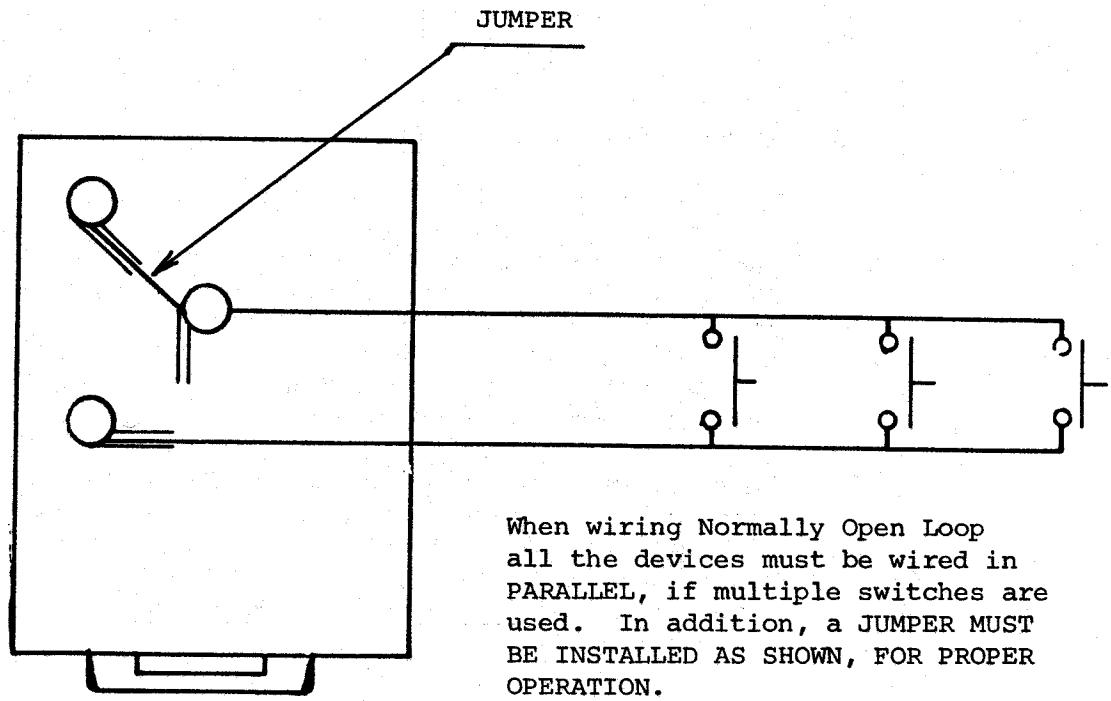
G. NORMALLY CLOSED LOOP



When wiring a Normally Closed Loop, all the devices must be wired in SERIES, if multiple switches are used.

FIGURE 17

H. NORMALLY OPEN LOOP



When wiring Normally Open Loop all the devices must be wired in PARALLEL, if multiple switches are used. In addition, a JUMPER MUST BE INSTALLED AS SHOWN, FOR PROPER OPERATION.

I. MCU AND SENSOR/TRANSMITTER RADIATION RECEPTION PATTERNS

The radiation patterns of the transmitters are shown on the following pages. Since the MCU antennas are vertically polarized, best reception is achieved when the transmitters are also mounted vertically.

Figure 20 shows the unit in the vertical plane, Figure 22 shows the unit laying flat, such as on a window sill or a ceiling, and Figure 21 shows the unit laying on its side, such as over a door or window frame.

Reviewing the patterns shows that there are advantages to using all three positions, BUT, the critical apsect is the azimuth position of the MCU to the transmitter front and top planes.

Vertical mounting of sensor/transmitter will assure a 99% problem free reception. In cases where vertical mounting is not possible, use the attached charts to determine if effective reception can be achieved with the desired position of the sensor/transmitter.

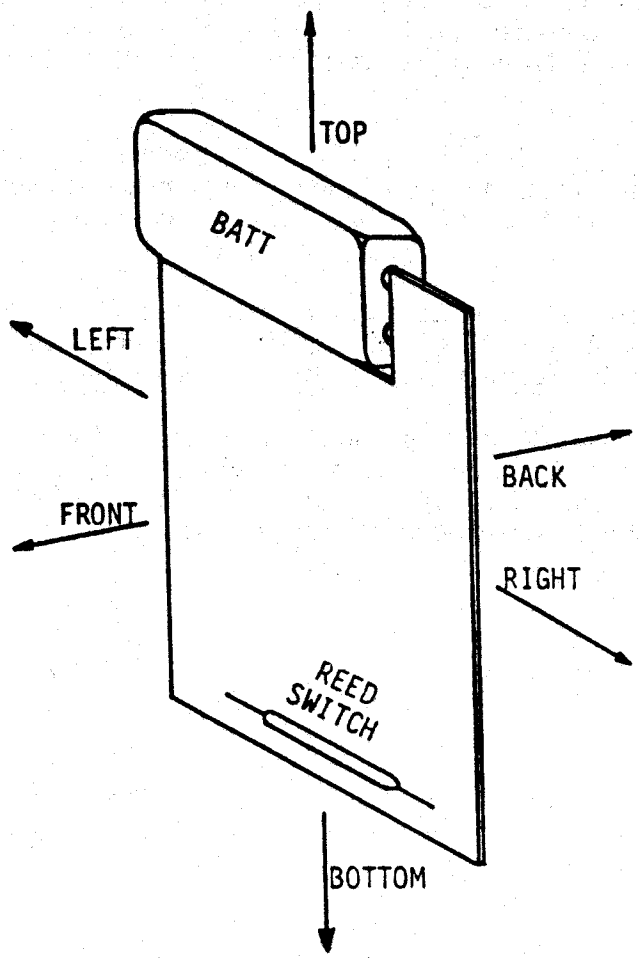


Figure 18 Definition of transmitter orientations.

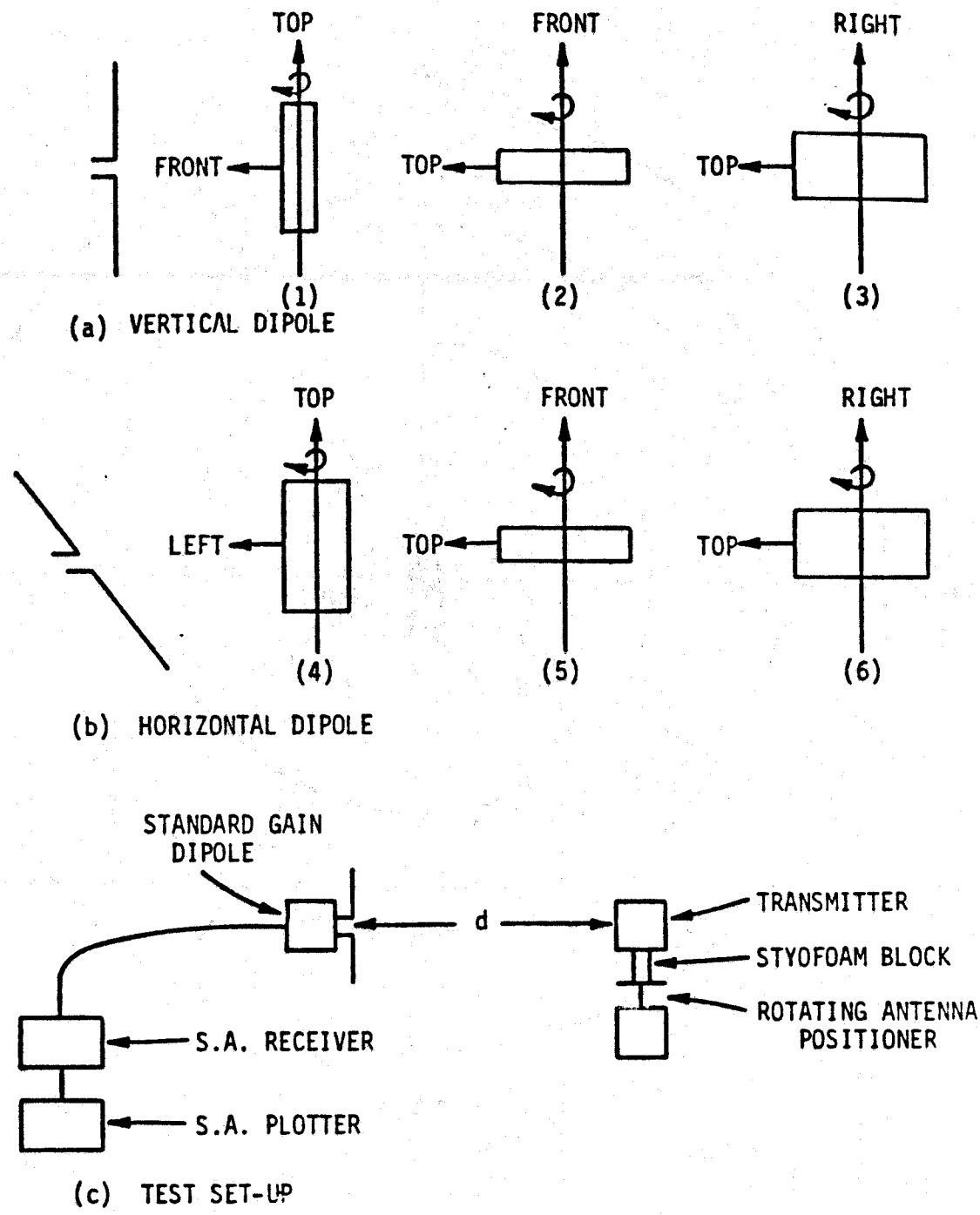


Figure 19 Transmitter orientations for antenna pattern measurements.

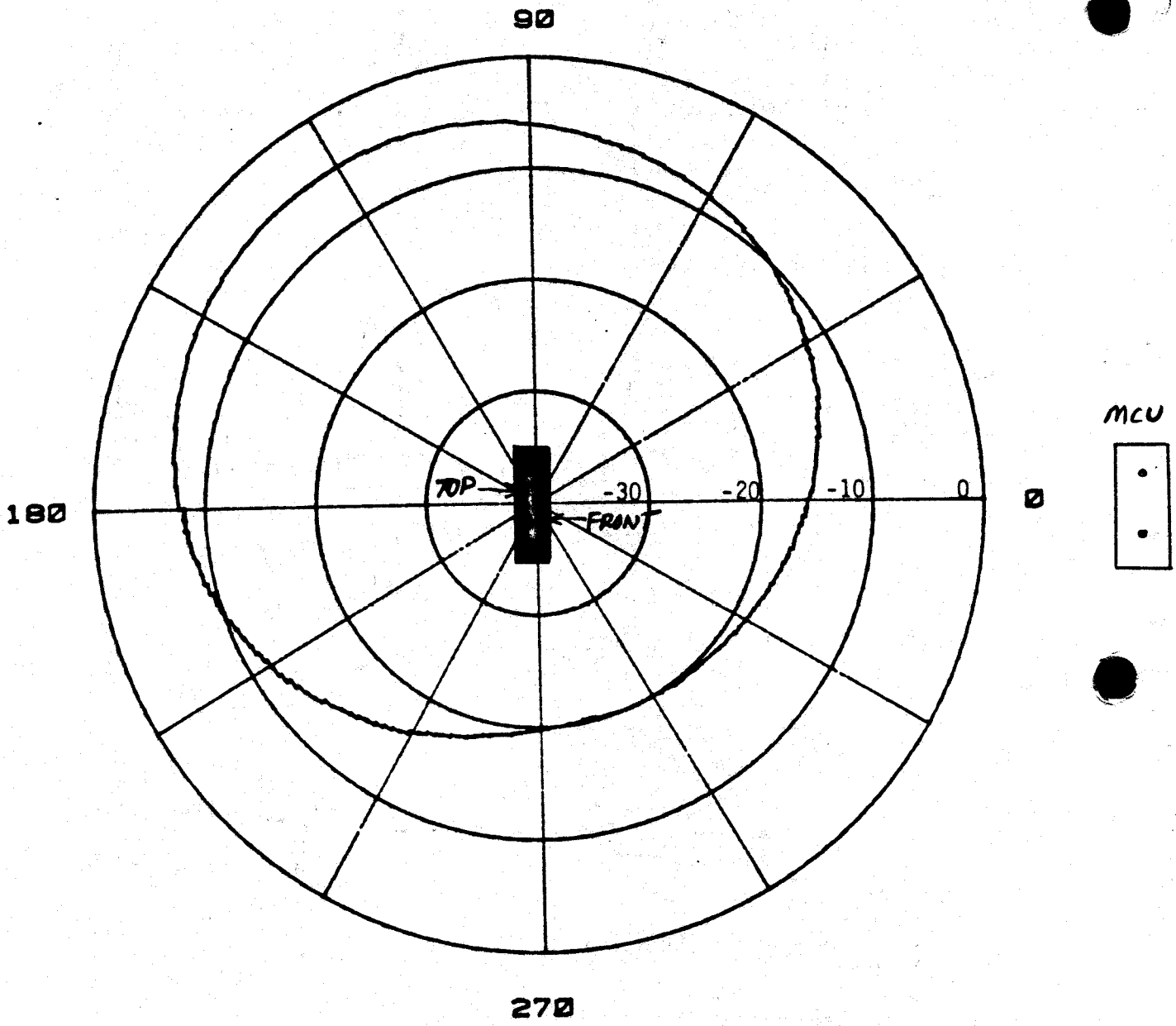


Figure 20 Pattern plot for transmitter orientation #1.

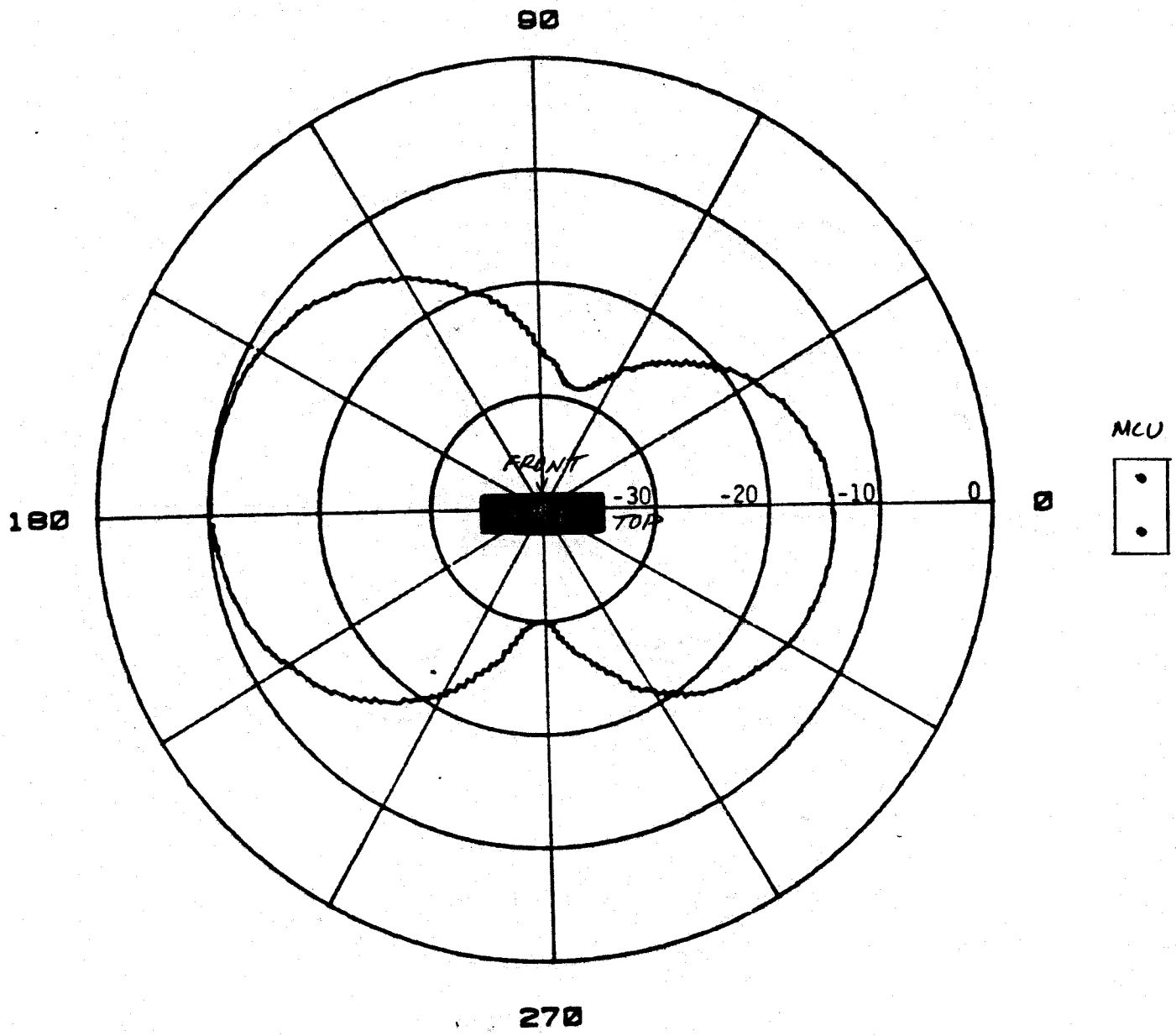


Figure 21 Pattern plot for transmitter orientation #2.

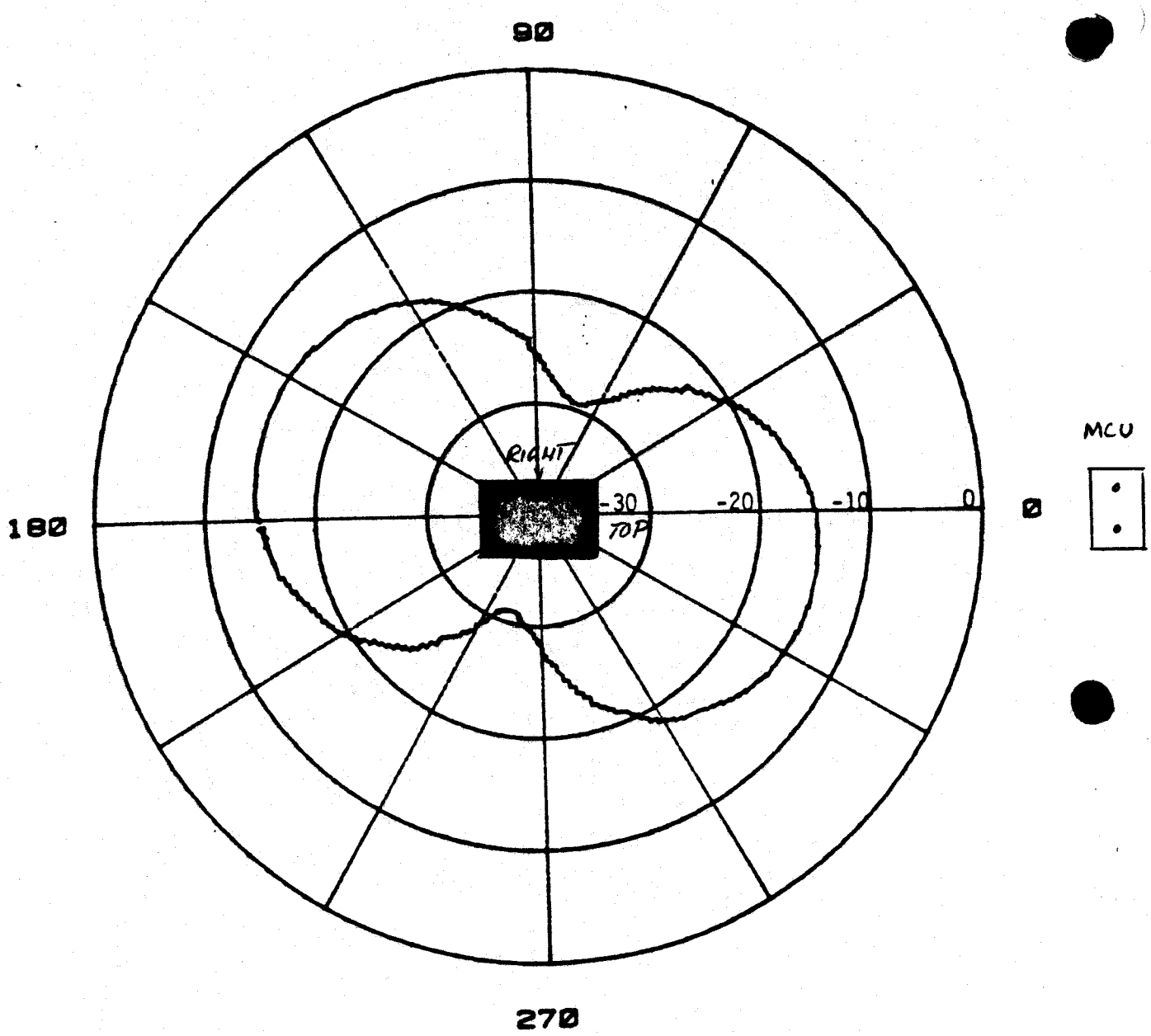


Figure 22 Pattern plot for transmitter orientation #3.

J. SYSTEM V PERSONAL BODYGUARD

The System V PBG has two functions:

1. To activate PANIC ALARM.

2. To activate AUTOMATIC LIGHT SWITCH.

To enable the activation of PANIC ALARM, the following must be accomplished:

a. Program the client's system ID into the PBG

b. Program 06 into the MCU.

c. Call RAMC to inform them of the pending PANIC activation, then activate the PANIC function with the PBG.

d. Call RAMC and ask what was recieved (Should be VIOLATION 06 - PANIC)

To enable the activation of the LIGHT function:

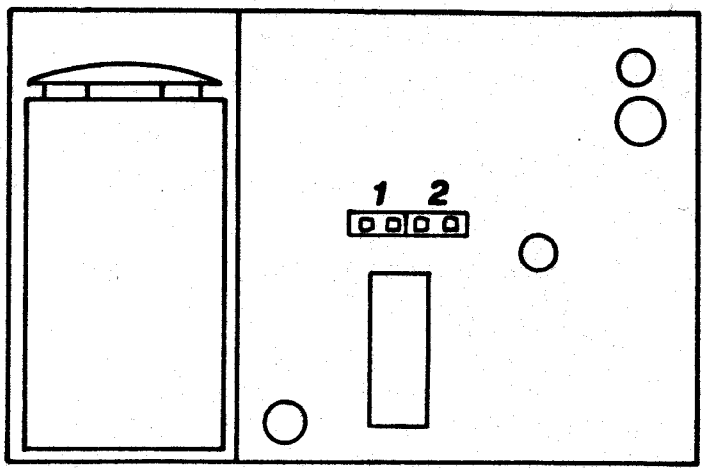
a. Program the client's system ID into PBG (if not already done)

b. Test function by pressing LIGHT button on the PBG. Automatic light switch should activate.

DO NOT PROGRAM 07 INTO MCU. IF YOU DO, THE LIGHT BUTTON WILL ALSO CREATE A FALSE ALARM.

FIGURE 23

SYSTEM V PERSONAL BODY GUARD



SELECT PROPER SYSTEM I.D. BY REMOVING OR INSTALLING THE BERG CLIP ON THE PROPER PINS.

SYSTEM I.D.	CLIP 1	CLIP 2
00	OFF	OFF
01	OFF	ON
02	ON	OFF
03	ON	ON

V. PROGRAMMING THE MASTER CONTROL UNIT

Now that you have the MCU, Operator's Terminal and various sensors installed, you can program the delays, access codes, sensor number of each transmitter, etc., into the MCU's memory.

Move the Program Switch to the right to place system in Program mode; at this time the letter "P" will appear in the Protection Level display window.

Make sure that the Operator's Terminal is set to the proper system ID Code.

Program the following items:

1. Sensor number of every sensor installed on the job, including intrusion sensors, fire sensors, auxilliary sensors, etc.

2. Panic Alarms and Personal Bodyguards.

3. Entry Delay Time.

4. Exit Delay Time.

5. Access Code.

6. Duress Code.

Refer to the Sensor Number Location and Description Information form for the sensor numbers for this installation. If the information form is not already filled out for you, then you must complete it before proceeding. Also be sure the Customer Emergency Data Sheet has been completed.

NOTE: When finished programming, move the MCU Program Switch back to the left (Operation Mode) position, or switch down on newer model MCU's.

A. Adding a Sensor (MCU must be in Program Mode and "P" showing in Protection Level Display Window).

Step 1: Press STATUS on the Operator's Terminal. This will momentarily clear the Sensor Number Display.

Step 2: Before the display starts to cycle through again, depress the two digits (i.e., 05, not 5) on the Operator's Terminal that make up the sensor number you wish to add.

No wait is required before entering STATUS and the next sensor number.

After adding all desired numbers, check the Sensor Number display window to be sure they are all there.

B. Deleting a Sensor or Pre-Programmed Sensor

Step 1: Press BYPASS on the Operator's Terminal.

Step 2: Immediately enter the two-digit sensor number to be deleted. No wait is required.

After deleting any sensors, check the Sensor Number display window to be sure they are gone.

C. Changing the Access Code (Preset to 1234)

Step 1: Press the two MEDICAL touchpads on the Operator's Terminal.

Step 2: Immediately enter the four digits to make up the desired access code.

Now wait for the "bouncing balls" to appear in the Sensor Number display window and for an audible beep from the MCU. This indicates the data was accepted.

If the bouncing balls do not appear, repeat the sequence.

NOTE: Except for adding and deleting sensors, changes do not take effect unless confirmed by the "bouncing balls." Entering the wrong number of digits or a number out of the accpetable range prevents the change from taking effect.

D. Changing the Duress Code (Preset to 1235)

Step 1: Press the two POLICE touchpads on the Operator's Terminal.

Step 2: Immediately enter the desired last two digits of the duress code. The first two digits remain the same as the first two digits in the access code (above).

Wait for the "bouncing balls" to confirm your choice.

To eliminate the duress function, delete pre-programmed sensor 86.

CAUTION: THE LAST TWO DIGITS OF THE DURESS CODE SHOULD BE TOTALLY DIFFERENT FROM ALL OTHER DIGITS OF THE ACCESS CODE. "99"

E. Changing the System ID Code

Note: You do not have to program the MCU's system ID code. It was automatically set to the system ID code that you set up in your Operator's Terminal when you programmed in the first sensor number (above).

System ✓

If you wish to change the system ID code, then do the following:

Step 1: Press the two FIRE touchpads on the Operator's Terminal.

Step 2: Immediately enter the two digits of the system ID Code.

Wait for the "bouncing balls."

The four System ID's are 00, 01, 02, and 03. The Operator's Terminal must then be changed to agree with the number entered to continue programming.

F. Changing Entry Delay Time (Preset at 32 seconds)

Step 1: Press both POLICE touchpads and then STATUS.

Step 2: Enter the two digit entry time (in seconds) from 4-45.

Wait for the "bouncing balls."

The number entered is rounded to a multiple of four seconds.

G. Changing Exit Delay Time (Preset at 32 seconds)

Step 1: Press both POLICE touchpads and then BYPASS.

Step 2: Enter the two digit exit time (in seconds) from 4-45.

Wait for the "bouncing balls."

The number entered is rounded to a multiple of four seconds.

Return system to operation mode.

H. Setting a Secondary Access Code

Your customer can set a secondary access code (for use by a babysitter, etc.) any time he wishes. The Program Switch in the MCU must be in the left or normal (Operation) position.

Step 1: Enter the primary access code.

Step 2: Immediately press STATUS.

Step 3: Immediately enter the desired four digit secondary access code.

VI. CONNECTING THE MCU TO THE MONITORING CENTER

Although you can program most of your MCU's functions using the Operator's terminal, you cannot program either the telephone number of the Monitoring Center's receiver or the customer's account number. These are programmed over the telephone lines by the operator at the Rollins Alarm Monitoring Center. The following steps assume you are going to connect the system to the Monitoring Center.

Step 1: Call the Rollins Alarm Monitoring Center.

Step 2: Tell the operator you wish to connect a new system.

Step 3: Tell the operator your name, branch and branch number.

Step 4: The operator will assign an account number. For example, if your branch number is "01" and you are connecting your first system the operator will assign this account number "008." Write the account number on the Customer Emergency Data Form and on the Sensor Number Location and Description Form.

Step 5: The operator will ask several questions from the Customer Emergency Data Form.

Step 6: Give the operator the telephone number to which the FJ31X jack is connected.

Step 7: Tell the operator how to access the long distance or local telephone network. For example, sometimes you must:

Dial the local number.

Dial "1" then the number.

Dial "120" then the number.

Dial "9" to get and outside line.

Any pauses needed?

Step 8: Hang up and wait for the operator to call you back from a special telephone.

Step 9: The operator will ask you to run an MCU Communciations Test by arming the system to Protection Level 8.

Step 10: The telephone line will go dead. You can hang up. The operator will now program the MCU for you. The telephone line will be reconnected to house telephones upon completion.

At the end of the programming procedure, all the sounds that the MCU is capable of emitting will sound off for one to three seconds, including the hardwire siren.

The following will be programmed:

Customer's Monitoring Center Account number.

The Monitoring Center's telephone number the MCU will dial.

Step 11: To make sure the telephone number and account number have been programmed correctly, initiate a MCU Communications Test (Level 8). The operator should call you back to verify the successful test within two minutes.

Step 12: Mail the Customer Emergency Data Form and the Sensor Number Location and Description Information form to the Monitoring Center.

Apply the MCU Data Card to the inside of the MCU cabinet door.

VII. TESTING YOUR WORK

After all the components of the system are in place and the MCU has been programmed, the entire system should be checked out using the procedures outlined in this section.

A. Protection Level Test/Status Test

Step 1: Disconnect the RJ31X jack if connected.

Step 2: Place each Operator's Terminal on its mounting bracket. This is important!

Step 3: Arm to each protection level from 1 to 7. Listen for proper status beeps.

Step 4: Push the STATUS touchpad at each level.

Step 5: Activate various sensors about the house. Be sure the sensors arm and disarm as appropriate for each protection level.

Step 6: Disarm to Level 0 between each arming, or go directly from one arming level to another.

Step 7: Repeat above steps from every Operator's Terminal location.

Step 8: Select Protection Level 0 to end test.

B. Testing the Secondary Access Code

Step 1: Following the procedure for entering a secondary access code from one of the Operator's Terminal. Try the secondary access code by arming the MCU to a new protection level to be sure it works properly.

Step 2: Now, make the secondary access code the same as the primary access code. To do this, enter the primary access code, push STATUS and then enter the primary access code again.

C. Sensor Test

The Sensor Test (Level 9) is used to verify a secure and reliable communications link between the MCU and each of the sensors at the installation site. It also allows testing of the communications link between each Operator's Terminal and the MCU and confirms the carrier current signal from the MCU to the remote audibles.

When the system is set to Level 9, it cannot call the Monitoring Center and affords no protection. Level 9 will automatically return to Protection Level 0 fifteen minutes after the initial selection of Level 9. This restores non-intrusion (fire, panic, etc.) protection.

Re-selecting Level 9 partially through the fifteen minutes does not restart the fifteen-minute timer over.

A remote audible requires a few seconds adjustment time between responses.

Sensors require a 1/2 second spacing between signals to avoid collision.

ACTION	CORRECT RESPONSE
Select Protection Level 9.	All the sensors you programmed, plus pre-programmed sensors 80, 81 and 82 should scroll through the Sensor Number display. Be sure everything is okay.
Activate each magnetic sensor two or three times, including all doors window, cabinets, etc.	You should hear a loud beep from all sirens as each sensor tests and its sensor number will be removed from the display.
Test each Passive Infrared (PIR) two or three times at various distances within its pattern.	Listen for the loud beep as you test each sensor.
Test each Smoke Sensor two or three times.	See Page 56 for details.
Test each Personal Body Guard two or three times.	Point out to your customer any poor reception areas within the house.
Activate all other sensors in the same manner.	Listen for the loud beep as test each sensor.
Activate all three Panic Alarms from <u>every</u> Operator's Terminal.	Numbers 80 (Fire), 81 (Police) and 82 (Medical) should be removed from the display.
Check to see if any sensor numbers still appear on the display.	If so, retest the sensors.

D. <u>Testing the Duress Code</u>

CAUTION: The policy at the Rollins Alarm Monitoring Center is to <u>never</u> cancel a Duress Code. The Police will be dispatched whenever a Duress Code is reported, even if a cancelled report is sent with it unless you called the Monitoring Center just <u>before</u> the duress code was used, identified yourself properly, and told them you were about to test the Duress Code.

Note: The installer must explain all functions and use of the Duress Code to the Customer.

The Duress Code allows the customer to silently summon the Police. This is done by entering the four-digit Duress Code followed by any protection level. The System V uses the Duress Code in the sam way as the regular Access Code but also silently calls the Monitoring Center.

The Duress Code will have the same first two digits as the customer's access code; the last two digits will be different. The Duress Code can be entered at any time, in any protection level, except Level 9. To activate the Duress Code:

ACTION	CORRECT RESPONSE
Call the Rollins Alarm Monitoring Center and inform them of the Duress Code test by identifying yourself and giving the correct customer account number. Ask the Monitoring Center's operator to call you back when the test comes through. Give the operator the correct telephone number.	Rollins Alarm Monitoring Center personnel authorize the Duress Code test and repeat correct account number being tested and the telephone number of the installation site.
Select any protection level by entering the Duress Code rather than the access code.	The MCU protection level should show the correct number. The Sensor Number display should show "86" when the red ALARM display is lit.
Enter the customer's access code + 0 from the Operator's Terminal.	MCU should disarm.
Wait for the Monitoring Center's Operator to call and confirm the receipt of an "86" alarm.	The Monitoring Center should call within two minutes to confirm a successful Duress Code test.

E. Back-Up Battery Check

Follow the actions below and verify the correct response to check the emergency power supply (back-up battery).

ACTION	CORRECT RESPONSE
Remove AC power to the MCU by unplugging the transformer.	The MCU display should remain lit. (If the display goes blank, then the MCU's battery fuse in the power supply has blown or the battery is below cut off voltage threshold, and must be replaced. All programmable memory may be lost.) After a few seconds the power LED in the upper left corner of the MCU will blink on and off. (It glows steady when the MCU is on AC power.)
Verify the the system will operate using only standby power by selecting 2 or 3 different protection levels. (Note: Do not select Level 9).	System responds just as it would if operating on AC power. Note: The remote audibles will not respond when the transformer is unplugged. Only the internal MCU annunciator or hardwired sirens will be heard.
Supply AC power by replugging the transformer into its outlet.	After a few seconds the green power LED in the upper left corner of the MCU will glow steadily again.

NOTE: The MCU has a power conservation procedure which will shut off the MCU visual displays after approximately fifteen minutes of drawing power from the standby battery.

F. Testing the Bypass Feature

The Bypass feature allows the user to exclude a selected sensor or sensors when selecting a protection level.

An example of its use would be if the customer wanted to protect the exterior of his home (Level 4), but leave his protected master bedroom windows open for ventilation at night.

ACTION	CORRECT RESPONSE
Select Protection Level "0".	MCU Protection Level display shows "0".
Deliberately open any exterior sensor and note its number.	The sensor is open and remains open.
Select Protection Level 3.	MCU will not change protection levels (Protection Level display = "0").
	All internal sirens emit a unique rhythmic beeping.
	The sensor number of the open sensor will be displayed on the MCU. (Note: If more than one sensor is violated, the sensor number of all violated sensors will be displayed.)
	All four Sensor Condition displays will blink simutaneously.
Select Protection Level 3 with the Operator's Terminal using the Bypass touchpad (Access Code + 3 + Bypass)	Beeping rhythm ceases.
Note: You must push the Bypass touchpad within two seconds of when the beeping starts.	All internal audibles at the site sound a series of three-beep groups for the duration of the exit delay time.
	The MCU Protection Level display reads "3".
	The numbers of any sensors which were bypassed when Protection Level 3 was selected are displayed on the MCU Sensor Number display when the Bypass display is lit.
Close and open the bypassed sensor or sensors a couple of times.	The bypassed sensor or sensors do not cause an alarm when closed and then opened again.

G. MCU Test

The MCU Test verifies a secure and reliable telepone communications link between the customer's MCU and the Rollins alarm Monitoring Center's Receiver.

ACTION	CORRECT RESPONSE
Verify the the telephone cord is plugged into the RJ31X jack.	If not, connect it now.
Notify the Rollins Alarm Monitoring Center of your testing.	Be sure they have a copy of the Rollins Alarm Monitoring Center Emergency Data Card.
Select Protection Level 8.	List for correct audible status response.
Observe MCU display.	Should show Protection Level 8. Also, the Sensor Number window should display "83" when the Alarm display is lit.
Wait two minutes for either of two indicators of a successful communications test.	Sirens will sound for three seconds at start of test. The system will periodically beep telling you that the test is still continuing. At completion M/C will cancel test, restore system to P.L. and sound local sirens for three seconds.
Return to Protection Level "0".	

SYSTEM V TECHNICAL MANUAL

INDEX

APPROVED SENSORS AND ACCESSORIES FOR SYSTEM V

I. PASSIVE INFRARED (PIR) MOTION SENSOR

A. Overview

A Passive Infrared (PIR) Sensor adapts to the environment in which it is placed and continually gathers information about that area. Any change in this stable environment caused by an object which emits a different degree of infrared heat energy is sensed and an alarm is generated.

The key to understanding passive infrared is the word "passive." PIR's adapt to the environment and wait, working on the principle of "thermal change." A PIR placed in an area having an average air temperature of 70^{O} F will establish this temperature as its "norm" after approximately one or two minutes. An intruder entering the protected area can be detected because the surface temperature of the human body (approximately 93^{O} F) may be different from the room's temperature. The heat you feel when you touch your skin is actually the infrared energy that is measured as heat. This heat energy differs from the "norm" of a given background area and so is detected as "thermal change."

B. Operational Description

The 92L35 intrusion detector is a low power consumption, relay output device. It is powered by a 9-volt alkaline battery.

The 92L35 consists of two modules -- an upper sensor module and a lower interface module. The sensor module provides and area of intrusion protection 35 feet long by 20 feet wide (see specifications). Within this area there are six individual zones. An intruder entering or leaving any one of these zones causes the sensor module to send a response to the interface module. The interface module receives the response from the sensor module and provides SPDT (normally open, normally closed) relay contact outputs to interface to a control panel, transmitter or protective loop.

A three-position toggle switch allows selection of a walk-test mode, an off mode, and a normal or relay output mode. In the walk-test mode, an LED will flash each time a response from the sensor is received. The off mode disables the interface module. In normal mode, a response from the sensor causes the relay to switch condition for approximately one second. Then it switches out of alarm and is held out of alarm for approximately two minutes. During this two-minute time, the 92L35 must not see any movement. This is necessary to conserve battery life. After the two-minute hold-out period, an intrusion into the protected area will cause the relay to switch into alarm.

Since the main feature of the 92L35 is low power consumption, it is necessary that the relay coil be non-supervised. Loss of power will not cause an alarm output.

Lower battery indication is provided by switching to the walk-test mode. If the walk-test LED does not flash, a low battery is indicated. The LED will not operate below 7-volts although the 92L35 will operate in the normal mode at 6-volts. It is important that the battery be checked periodically and replaced as soon as a low battery indication is observed.

C. Location Selection

Select a location that is most likely to intercept an intruder. Remember that passive infrared sensors are most sensitive to motion across the pattern and least sensitive to motion towards or away from the sensor. The following points should be considered when selecting the location:

1. All passive infrared detectors should be mounted so there is a reference point (wall) at the end of their pattern. If you must aim a detector into open space, its range may decrease. Walk test it to be sure you are getting the needed protection at the end of its pattern.

2. Mount these detectors so an intruder will most likely walk across the "fingers," not towards them.

3. Mount units level, or slightly down. Never allow units to tilt up. The lens is adjustable vertically and, to a smaller extent, horizontally.

4. Mount between four to eight feet high for best detection.

5. If the customer has pets, use PIR with Pet Alley. Notice when you study the patterns of the detector that its detection pattern never reaches the floor if aimed straight out. Thus a "pet alley" is created near the floor that will allow small pets to move about freely. Keep in mind when you select the detector's location that pets may jump on furniture.

6. Even though these PIR's are highly immune to false alarms you should, whenever possible, follow these standard locating guidelines:

   (a) Do attempt to mount on an outside wall facing in.

   (b) Don't aim at heating/air conditioning vents, wood stoves, fireplaces, etc., or any object which may change temperature rapidly.

   (c) Don't aim at moving objects (curtains, hanging displays, etc.)

   (d) Don't locate in direct sunlight.

   (e) Don't aim at solar heated walls or uninsulated metal walls.

(e) Don't aim a PIR at an Operator's Terminal.

(f) Don't aim a PIR at a delayed entrance door.

(g) Don't aim two PIR's toward the same spot.

D. Mounting

Step 1: Remove the cover by pushing the tab up and out.

Step 2: Remove the sensor module. Pull the plastic tab back and carefully pry the board off the stud. Do one side at a time.

CAUTION: DO NOT ATTEMPT TO LIFT SENSOR MODULE BY PULLING LENS ASSEMBLY.

Step 3: Remove the interface module by pulling the tab back and lifting the board off the studs.

Step 4: Mount the base to a flat surface using the keyhold slots provided.

Step 5: Mount the base in a corner using the round knockouts on the angled sides.

Step 6: After mounting, remove one of the rectangular knockouts for wire routing.

Step 7: Replace the interface module and sensor module.

E. Wiring

The 92L35 requires only two wires to interface the relay output to a control panel, transmitter or protective loop. Since it is powered by its own 9-volt battery, no additional wiring is necessary. See the label inside the front cover of the unit for the relay connections.

F. Walk Test/Sensitivity Adjustment

Step 1: The lens can be pointed at any vertical angle between horizontal and approximately 20 degrees down by pivoting the lens assembly. A horizontal adjustment of approximately 10 degrees is possible by sliding the lens assembly sideways. Point the lens toward the desired area of protection.

Step 2: Verify the area of protection by walking across the pattern. The edge of the pattern is accurately determined by the first LED indication moving into the protected area; therefore, it is necessary to walk into the area from both sides. Due to an overshoot response from the sensor, the LED may flash after exiting the actual pattern.

Step 3: Reposition the lens, if necessary, and repeat the walk test after each adjustment until the desired area of protection is achieved.

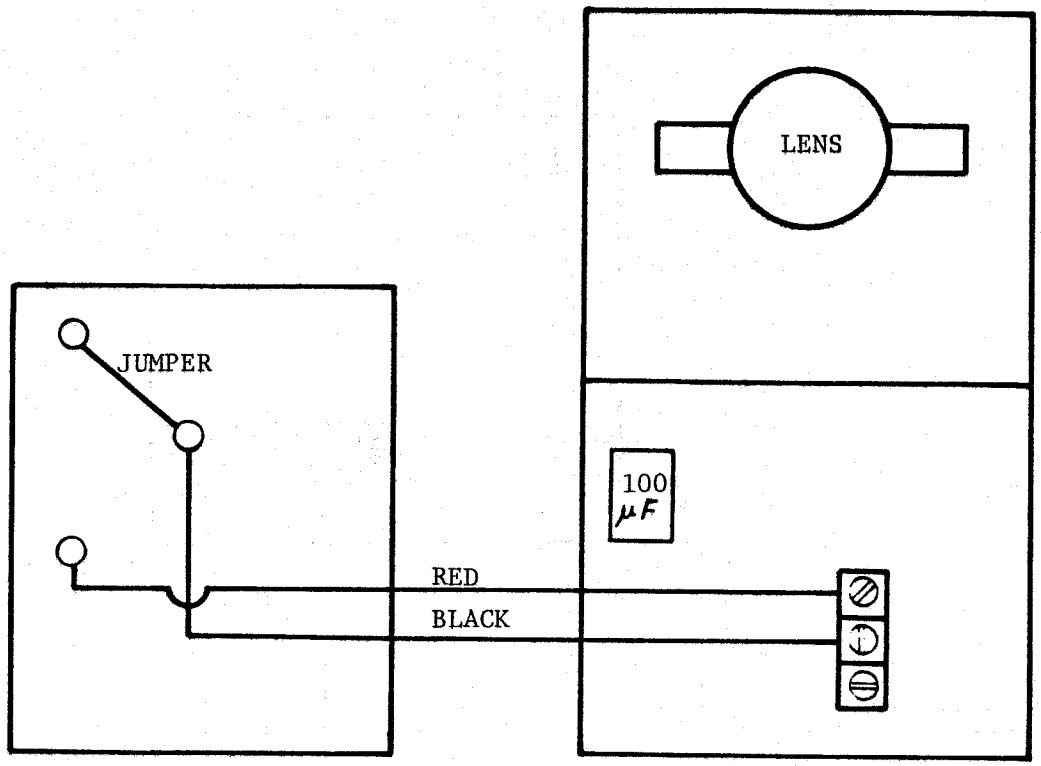
Step 4: Lock the lens assembly by tightening the locking screw on the pivot bracket and insure that the pivot brackets are flush w the edge of the sensor module board.

Step 5: Position the toggle switch to ON and replace the cover. To insure proper normaly mode operation, stand outside the protected area for at least two minutes. While monitoring the Master Control Unit, walk across the pattern. An alarm indication should be given.

PASSIVE INFRARED DETECTOR

Colorado Electro Optics (CEO) 92L Series

INSTALLATION INSTRUCTIONS

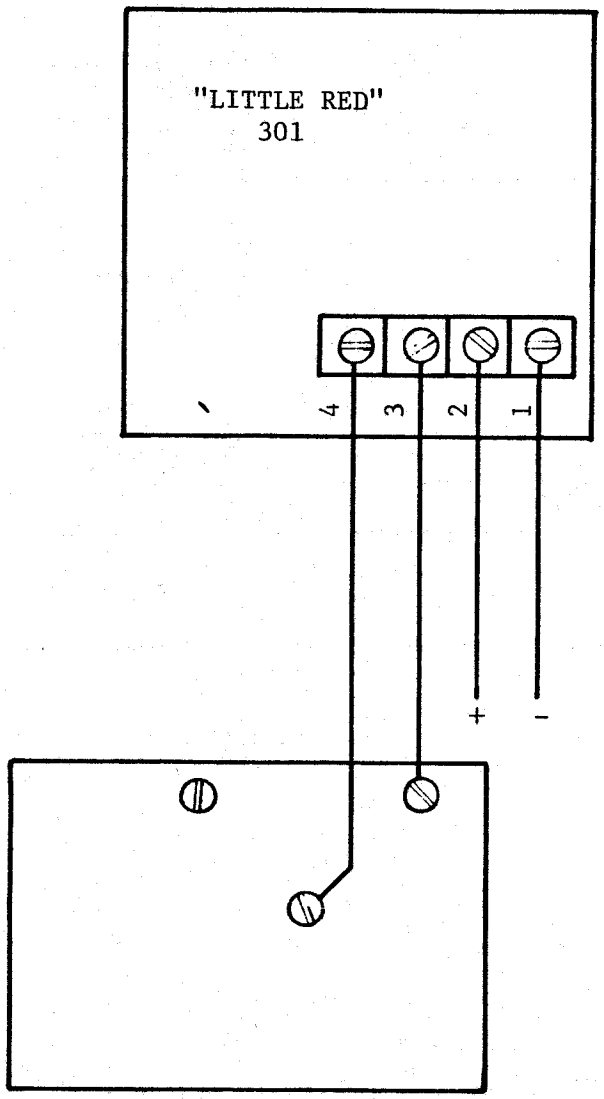


SPECIFICATIONS

Mounting:	Flat surface or corner
Size:	4: x 7-1/4" x 1-5/8"
Weight:	9.5g
Color:	Off-White
Detection method:	Passive Infrared
Range:	35 feet Typical
Sensitivity Adjustment:	Yes
Low Battery Indication:	Manual LED Check
Power Requirement:	9-volt Alkaline
Current Consumption:	30uA static; 30uA during alarm
	Form C, normally opened or normally closed; contact rating 130 volt or 50uA
Walk Test Indicator:	LED
Mounting Light:	4-8 Feet Typical
Pattern Adjustment:	20 Degrees vertical/10 degrees Horizontal
Area of Coverage	20 - 35 Feet

FIGURE 25

LITTLE RED 301 INSTALLATION INSTRUCTIONS



CONNECTING "LITTLE RED" 301 TO THE TRANSMITTER

TB 1	DC POWER, NEGATIVE	10.5 to 14.0 VDC
TB 2	DC POWER, POSITIVE	
TB 3	NORMALLY CLOSED CONTACT	
TB 4	NORMALLY CLOSED CONTACT	

II. SMOKE DETECTORS

A. Locating the Smoke Detector

For best results smoke detectors should be located at every level of the house. While it is not possible to get too specific about smoke detector location since each house has different design requirements, there are some guidelines that can be followed:

1. Stairways - A smoke detector should be located at the bottom of the basement stairwell(s). For all other levels, locate smoke detectors at the top of the stairwell.

2. Sleeping areas - A smoke detector should be located in any hallway servicing bedrooms. For maximum protection, place a smoke detector inside each bedroom.

3. Escape routes - Smoke detectors should be located along fire escape routes so that smoke can be detected before the route becomes impassable.

4. Mount detectors on either ceiling (preferred) or walls. When mounting on ceilings, make sure that the detector is at least four inches from any wall. The best place for a ceiling mount is as close to the middle of the room as possible. For wall mounting, make sure that the nearest edge of the detector is at least four inches from the ceiling. (The corner is "dead" air space).

5. Mount detectors only on inside walls.

6. Avoid mounting detectors on any sloped surface.

7. Do not put detectors in kitchens, bathrooms, hallways right outside a bathroom door, or any other place where there may be excessive smoke, steam, or heat.

8. The temperature range for this particular smoke sensor is 40^{O} to 100^{O} F. Do no place the sensor where these temperature limits will be exceeded.

B. Installation and Hook-Up

Mount directly onto wood surfaces using 1-1/2" screws. If mounting onto plaster or dry wall use Mollys or plastic anchors.

C. Testing Smoke Detectors

The following procedure can be used for testing. This procedure can be done now or you can wait until the final testing of the entire system.

Step 1: Make sure that the MCU is programmed with the sensor numbers of the smoke detector being installed. If they are not, progr. them into the MCU following the procedure outlined in Article V PROGRAMMING THE MASTER CONTROL UNIT (Installation Section).

Step 2: Arm the MCU to Level 9. The sensor numbers for the smoke detectors being tested should scroll through the MCU's Sensor number display along with the other sensor numbers.

Step 3: Press the test button on the smoke detector for 15 seconds. This should trigger the smoke alarm.

Optionally "canned smoke" or some other smoke source (smoldering hemp rope) can be used to test the detector. Use canned smoke sparingly, a one or two-second spray from 2-3 feet will be sufficient. Don't give a can to your customer. Too frequent use may affect detector sensitivity.

Step 4: Check the scrolling sensor numbers on the MCU. The sensor transmitted successfully if the detector's number is no longer among those displayed.

Step 5: It is a good idea to check the MCU fire alarm by setting off the detector. The MCU annunciator should sound with a steady loud sound. The smoke sensor will stop a few seconds after the test button is released.

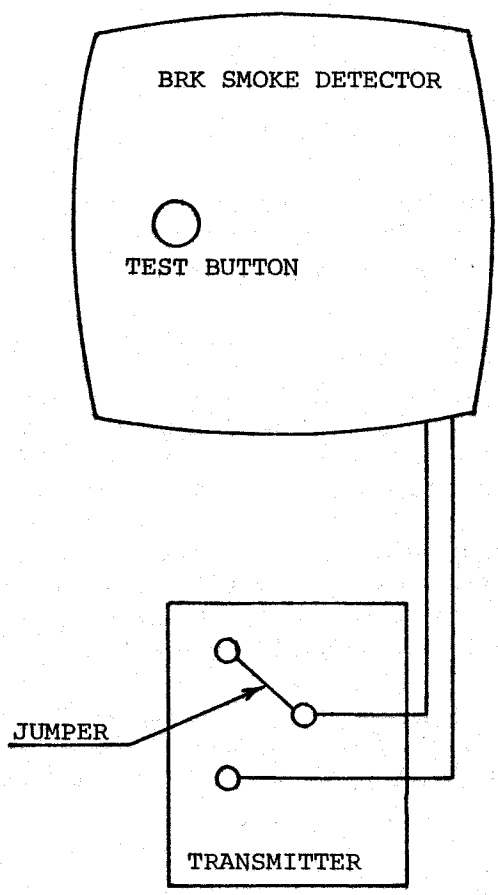
Note: Both the MCU and the smoke detector itself will sound alarms when the detector is activated. The MCU alarm is cancelled from the Operator's Terminal (access code + 0) and the smoke detector's alarm is cancelled by fanning the detector free of smoke or by releasing the test button.

If the telephone jack is plugged in, the Monitoring Center will receive the alarm. The Monitoring Center must always be informed before testing begins.

The smoke detectors transmit an alarm signal once every 45 seconds until the smoke is cleared and the detector is silenced.

FIGURE 26

D. INSTALLING THE BRK SMOKE DETECTOR



1. Connect brown wire from BRK to center post on transmitter.
2. Install jumper from top post to center post on transmitter.
3. Connect blue wire from BRK to bottom post on transmitter.
4. Remove all extra wiring from BRK.
5. Program transmitter to appropriate sensor number by cutting the program comb.

CAUTION: SEE PROGRAMMING SECTION OF INSTALLATION INSTRUCTION MANUAL FOR INSTRUCTIONS ON PROGRAMMING SENSORS.

6. Program sensor number into MCU.
7. Test for correct response in Level 9. See Page 4.

E. INSTALLING AND PROGRAMMING ESL 361 SMOKE DETECTOR

The ESL 361 Smoke Detector with the built-in transmitter is a quick and easy way to provide protection against smoke and fire.

1. INSTALLATION AND ACTIVATION

Determine the best location for the smoke alarm. Remove the mounting bracket from the smoke alarm by depressing the release tab marked "PRESS" (See Figure 26B) and then pivot away and free of the smoke alarm.

Use the bracket as a template to lcoate and mark the two mounting holes. drill two 3/16 inch diameter holes, and insert the plastic expansion anchors. Hold the bracket in place and thread the two screws (supplied) into the anchors. Be careful to correctly orientate the UP arrow on the bracket for correct positioning of the detector in wall mounting. Tighten the screws.

Now energize the smoke alarm by installing the supplied battery(ies) in the compartment. DO NOT force the battery(ies) in the compartment. The smoke alarm is designed to prevent improper battery installation and the terminasl are designated with a (+) and (-) to assist you in correct installation.

Caution should be observed during installation to prevent dust, hair and other foreign matters from contaminating the optical sensing mechanism.

2. PROGRAMMING

Install the detector on the bracket by hooking it at the top. Then swing it gently toward the release tab until it "snaps" into the lock position.

TEST the smoke alarm immediately after completing the installation.

2. PROGRAMMING (Continued)

To program the built-in transmitter, do the following:

STEP 1: Open smoke detector cover by pressing the release latch on the base.

STEP 2: After white cover swings away, the P.C. boards are exposed. See Figure 1 for detail.

STEP 3: Program System I.D. by setting dip switch Number 1 and 2.

		SW 1	SW 2
SYSTEM I.D.	00	OFF	OFF
	01	OFF	ON
	02	ON	OFF
	03	ON	ON

03

STEP 4: Program sensor numbers by setting dip switches 3, 4, 5, 6, 7, and 8.
Dip switches 3, 4, and 5 set the first digit.
Dip switches 6, 7, and 8 set the second digit of the sensor address.

The following chart shows the number combinations for the different sensor addresses.

DIGIT	SWITCH 3 or 6	SWITCH 4 or 7	SWITCH 5 or 8
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF
5	ON	OFF	ON
6	ON	ON	OFF
7	ON	ON	ON

FIGURE 26 A.

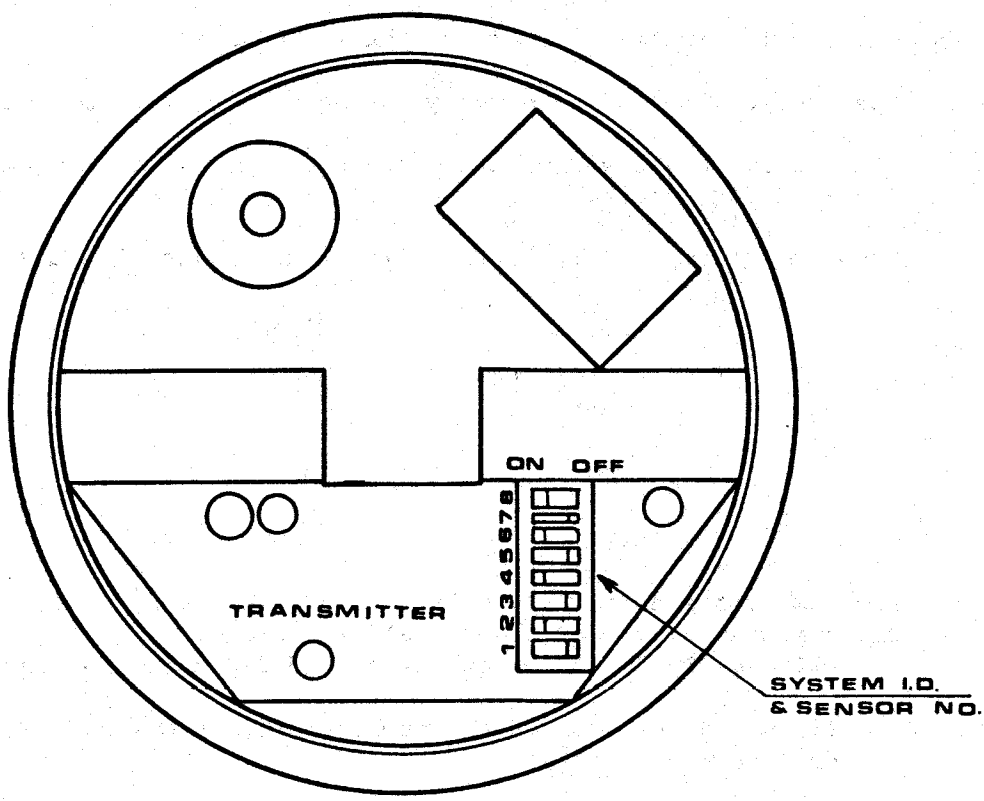
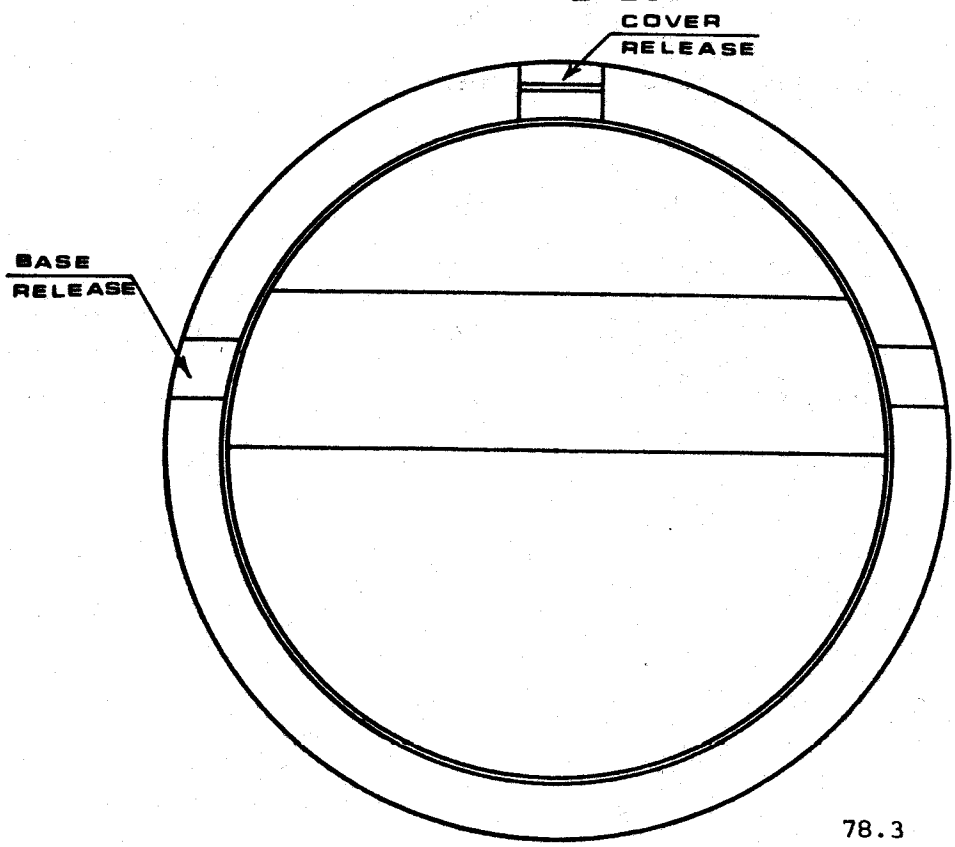


FIGURE 26B.



III. HEAT DETECTORS

A. Overview

The information on this page is general in nature. Be sure to read the specification sheets that come with the thermostats you select.

Heat detectors are designed to detect the heat caused by a fire. There are two types -- Fixed Temperature Theromstats and combination units called Rate-of-Rise Thermostats which include a fixed temperature thermostat in their design.

Either of these types of heat detectors can be connected to an auxiliary sensor. Both types are described below.

B. Fixed Temperature Thermostat

Fixed temperature thermostats detect the heat from a fire at certain temperatures, typically either 135° F or 190° F. The 135° F thermostats are ideal for normal room use. Use the 190° F thermostats where ambient temperatures exceed 100° F, such as in attics, boiler rooms and hot kitchens.

Typically Fixed Temperature Thermostats are UL-listed to permit spacing of 20 feet by 20 feet giving area coverage of 400 square feet per thermostat. Check the specifications of the thermostat you select.

C. Rate-of-Rise Thermostats

Rate-of-Rise/Fixed Temperature Thermostats are typically UL-listed for protecting spaces of 50 feet by 50 feet giving area coverage of 2,500 square feet. Like other thermostats, these will initiate an alarm signal when a fixed temperature is reached, typically 135° F or 190-200° F. In addition, since many fires grow rapidly in intensity resulting in fast rising temperatures, these detectors are designed to sense the rate at which temperature is changing. They will, therefore, respond to any increase in temperature which is abnormally fast. You must be careful not to mount rate-of-rise detectors too close to something that changes temperature fast, such as above an oven or near a heat duct, furnace or boiler.

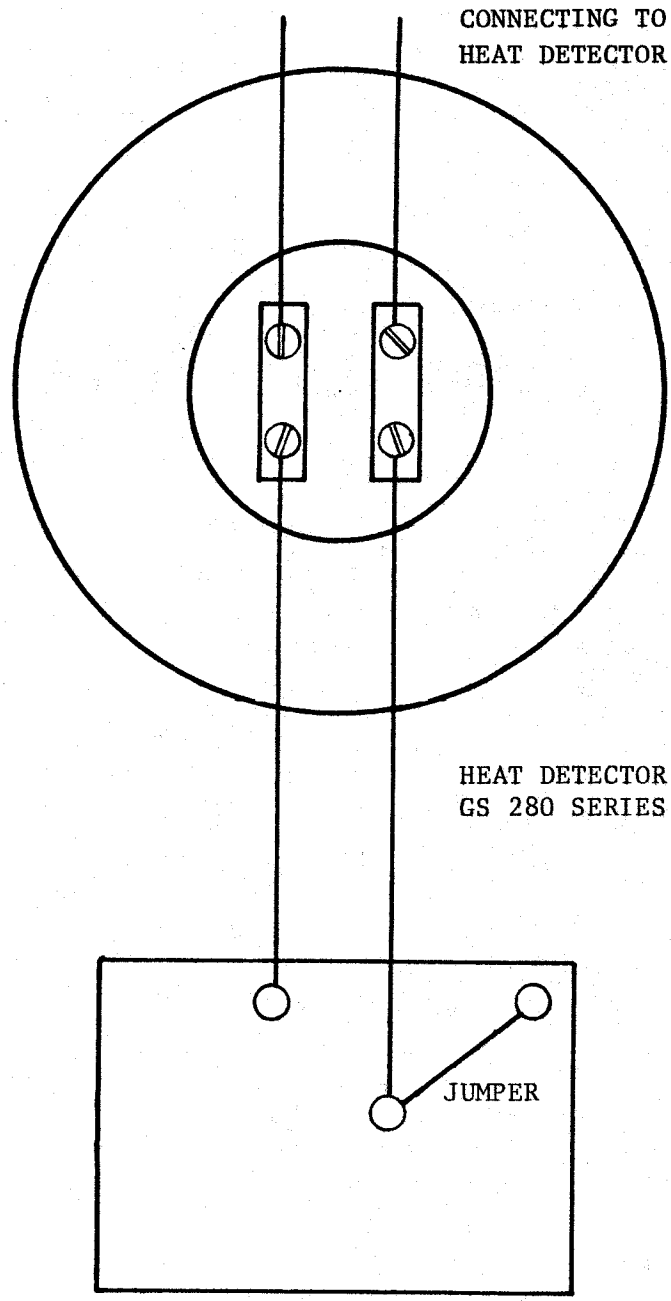
Rate-of-rise thermostats should not be tested with a match since this will necessitate replacing the unit. When tripped by rapid temperature increases, these thermostats will reset themselves as long as the fixed setting has not been reached.

D. Testing

Periodic testing of the thermostats is recommended. Heat from any convenient source such as a portable hair dryer is suggested.

FIGURE 27

CONNECTING THE HEAT DETECTOR, GS 280 SERIES OR ADEMCO 601, TO TRANSMITTER



CAUTION: JUMPER MUST BE IN PLACE TO AVOID FALSE ALARMS.

E. Installation

Thermostats are typically open circuit devices which supply a closure on alarm. They should be programmed to a smoke/fire sensor transmitter assigned to one of the fire channels of the System V sensor. The thermostats can be mounted in unheated areas such as garages and attic, but remember the sensor must be mounted in a heated area of the dwelling. Generally mount the sensor in the center of the area to be protected.

IV. SIRENS

A. Overview

Both alarm siren sounds and status beeps can be made to sound throughout the installation site by installing additional remote audibles. These will duplicate both the loud alarm sounds and the quieter status beeps. A hardwire exterior siren can also be installed outside if desired. It operates independently through a modulator powered by the MCU.

The remote audible is used as an extension of the MCU's built-in siren/annunciator in areas of the house where the MCU's siren and status sounds are difficult to hear. Any number can be installed and no wiring to the MCU is required. They are simply plugged into a live, non-switched, 115-volt wall outlet. The remote audible receives its signals from the MCU over the AC power line in the house. The remote audible will not work during a power failure, however, the siren/annunciator built into the MCU will. Any hardwire sirens will also work.

B. Programming the Remote Audible

Programming the remote audible is similar to programming the other devices with one exception -- you must program the system ID code.

Two types of remote audibles are in use -- "dip-switch" and "program pins" (see Figure 28).

C. Setting the Remote Audible's System ID Code (with Switches)

Step 1: To program the remote audible, it is necessary to slide the walnut frame off the unit by pulling it away from the side with the cord. Then, peel back the upper right-hand corner of the foam grill to expose the programming switch-block. Switches 1 and 2 are used to program the Frequency Channel. Switches 3 and 4 are used to program the system ID code.

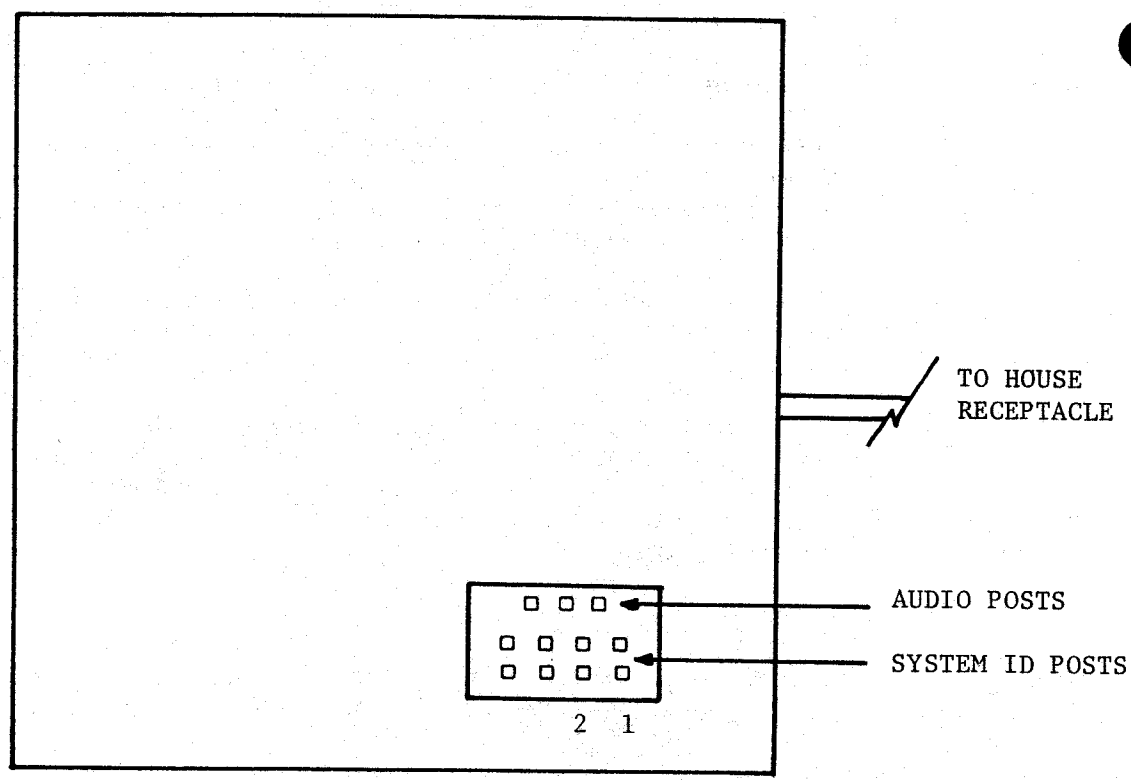
CAUTION: NEVER OPEN THE REMOTE AUDIBLE WHILE PLUGGED IN, A SERIOUS INJURY OR EVEN DEATH FROM ELECTRICAL SHOCK COULD RESULT.

Step 2: To set the Frequency Channel you must set switches 1 and 2 as follows:

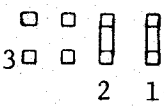
FREQUENCY CHANNEL	SWITCH 1	SWITCH 2
0	OFF	OFF
1	OFF	ON
2	ON	OFF
3	ON	ON

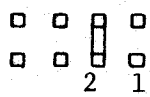
FIGURE 28

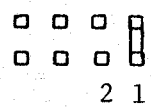
REMOTE AUDIBLE

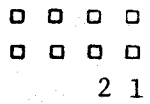


1. To program system ID code:

   (a) Both clips in place = ID 03 

   (b) Clip on post 2 = ID 02 

   (c) Clip on Post 1 = ID 01 

   (d) Clips not installed = ID 00 

2. To program audio:

   (a) Clip on audio posts on right = muted sound

   (b) Clip on audio posts on left = full sound

Unless you specified otherwise the system you are installing will have a Frequency Channel of 0, so both switches would be set to off.

Step 3: To set the system ID code, you must set switches 3 and 4 as follows:

SYSTEM ID CODE	SWITCH 3	SWITCH 4
0	OFF	OFF
1	OFF	ON
2	ON	OFF
3	ON	ON

Switches 5 to 8 are not used and can be left in any position.

D. Installing a Remote Audible

The remote audible can be plugged in and simply set on a counter or the floor or, if the customer prefers, wall mounted.

To wall mount, separate the wood frame from the metal chassis by sliding the two apart. This will expose the two keyhole mounting slots. Mount with Molly bolts or use plastic anchors. Slide the cover back over the chassis and plug in the remote audible.

E. Hardwire Exterior Siren

An exterior siren is designed to be mounted on the outside of the home but it may also be hardwired to the MCU. This siren also requires the use of an external siren adaptor kit.

This module supplies a fused 12-volt switched output or dry closure outputs so hardwire interior sirens and hardwire exterior sirens can be connected to the MCU. See Figure 30 for connecting SD17 siren driver (battery operated) module to MCU.

Step 1: Using two-sided tape, mount the SD17 to the right of the battery just below where the green lead connects. Orient the SD17 terminal strip up when mounting.

Step 2: Connect the black flying lead to the tab on the back of the built-in MCU siren board.

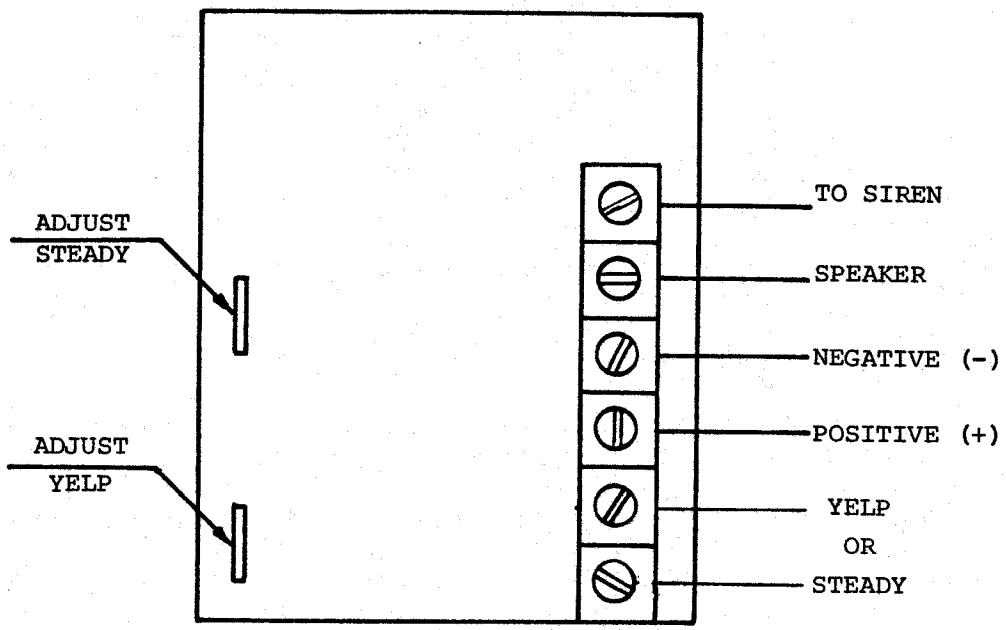
Step 3: Connect the red flying lead to the red battery lead.

Step 4: Connect external speaker to terminals on modulator.

Step 5: Activate MCU into alarm mode and adjust modulator to produce proper rate and range of wailing.

FIGURE 29

MODEL SD-17 ELECTRONIC SIREN DRIVER (BATTERY)



The SD-17 Siren Driver Module is used to connect external sirens to the System V Master Control Unit.

To install the SD-17, accomplish the following:

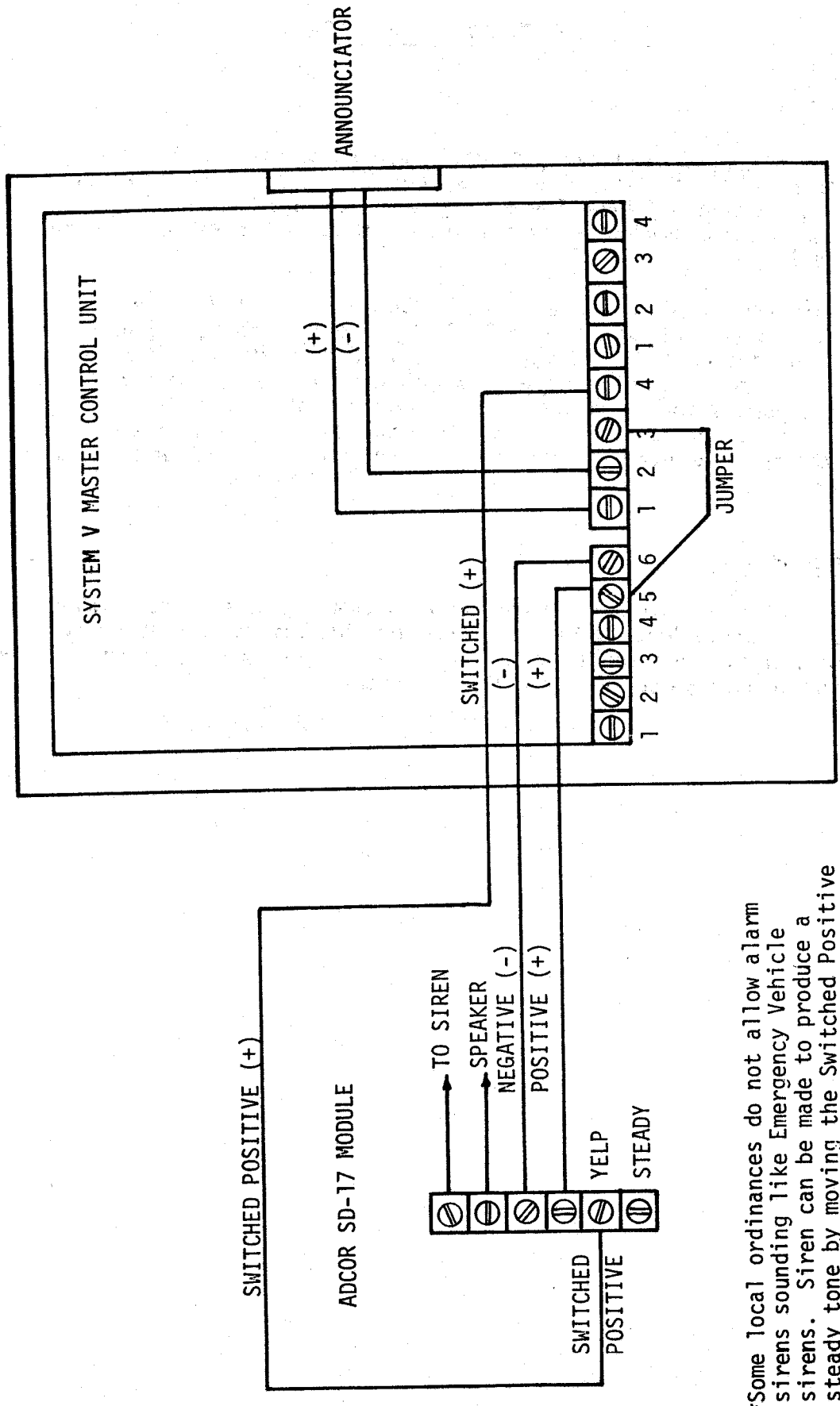
1. Connect 6VDC from MCU to "+" and "-" terminals.
2. Install jumper on MCU Strip "A" TB5 and Strip "B" TB3 (See Figure 30)
3. Connect switched (+) to Strip "B" TB4. (See Figure 30)*
4. Connect speaker to terminal block as shown.
5. Adjust rate of yelp and the pitch of the output at the appropriate controls.

Note: You may use 4 or 8 ohm speakers rated at 8 watts or higher.

*If steady sound is desired, connect to TB marked STEADY. In some cities, ordinances prohibit the use of yelp as it imitates police or other emergency vehicle sounds.

CONNECTING ADCOR SD-17 TO SYSTEM V TERMINAL STRIP

FIGURE 30



**Some local ordinances do not allow alarm sirens sounding like Emergency Vehicle sirens. Siren can be made to produce a steady tone by moving the Switched Positive (Sw+) wire from the YELP terminal to the STEADY terminal on the Adcor SD-17 module.

V. REMOTE LIGHT SWITCH

A. Overview

The carrier current lighting control system, or "remote light switch," is an accessory for the System V. It provides a means of turning on selected incandescent lighting circuits by signals generated by intrusion detectors, fire detectors, or Personal Body Guards.

The System V's Master Control Unit contains circuitry to generate a signal that is coupled to the AC wiring of the building. This signal is transmitted over the house wiring to Model 732 Carrier Current Light Switch Receivers, which have been installed to replace conventional switches in the light circuit that is to be controlled automatically. The light switch receiver is tripped immediately whenever the System V is activated by violation of the sensors.

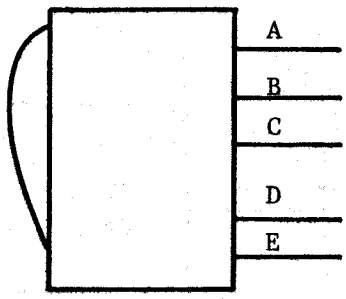
B. Restrictions

The lighting control system can only control lighting circuits which have a minimum load of 60-watt Tungsten filament bulb. Mercury vapor lamps, fluorescent lamps and lamps larger than 450-watts cannot be controlled by these light switches.

CONNECTING LIGHT SWITCHES

Single Light Switch

FIGURE 31

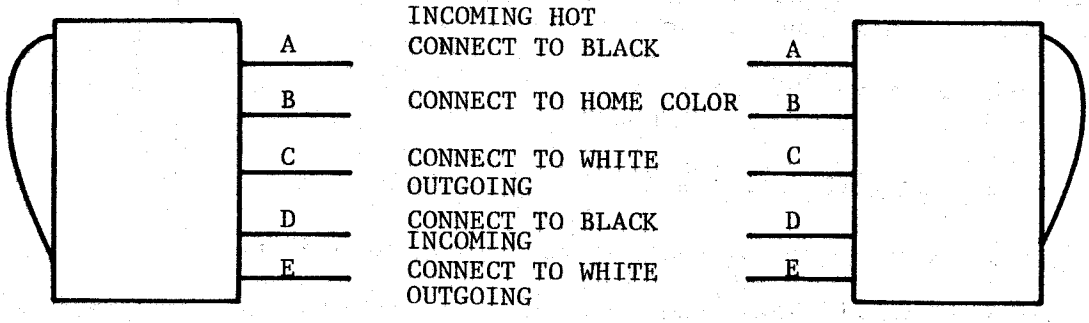


A — CONNECT TO HOUSE BLACK WIRE (INCOMING HOT)
B — DO NOT CUT - TAPE OFF
C — CONNECT TO HOUSE WHITE WIRE (OUTGOING COLD)
D — CONNECT TO BLACK (INCOMING HOT)
E — CONNECT TO HOUSE WHITE (OUTGOING COLD)

STEP 1: LOCATE HOT INCOMING WIRE (USUALLY BLACK)
STEP 2: CONNECT "A" AND D SIRES TO "HOT" INCOMING LINE (USUALLY BLACK)
STEP 3; TAPE OFF "B" WIRE
STEP 4: CONNECT C AND E WIRES TO OUTGOING COLD WIRE (USUALLY WHITE)
STEP 5: TEST

FIGURE 32

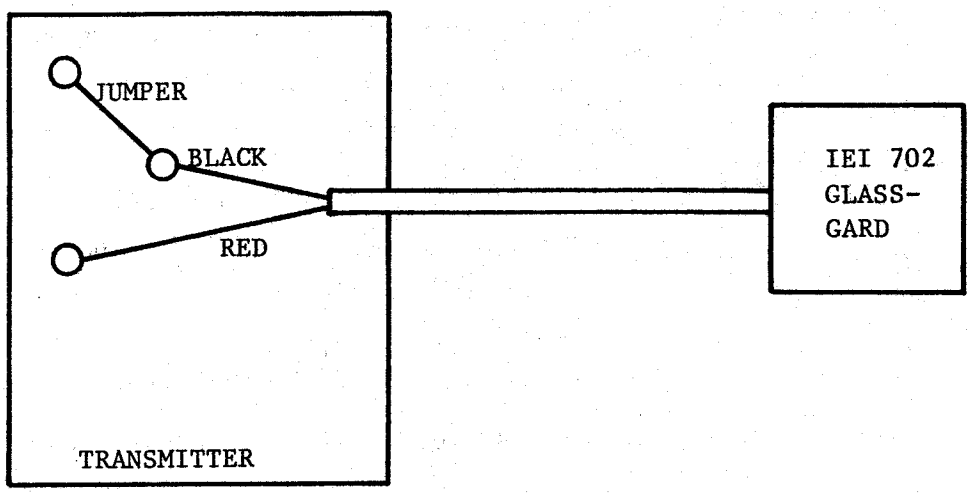
Three-Way Light Switch



STEP 1: LOCATE "HOT" INCOMING WIRE (USUALLY BLACK)
STEP 2: CONNECT "A" AND "D" WIRES TO "HOT" INCOMING LINE (USUALLY BLACK)
STEP 3: CONNECT B WIRE TO HOUSE COLOR
STEP 4: CONNECT C AND E WIRES TO OUTGOING COLD WIRE (USUALLY WHITE)
STEP 5: TEST

VI. GLASS-GARD (IEI) 702 INSTALLATION INSTRUCTIONS

FIGURE 33



A. INSTALLATION:

Use IEI-717 Adhesive. Clean glass thoroughly. Apply activator to both glass and sensor base. Allow 1-2 minutes to dry. Apply a small drop of adhesive to sensor base. Immediately position sensor on glass, press lightly until adhesive squeezes out from all sides. Hold in place for 15 seconds. To remove, take putty knife and strike unit carefully.

The only approved glue for use with IEI 702 Glass Gard is IEI Part No. 717 and Rollins Stock Nubmer 07634 N.

To test your work, use the IEI-712 Glass-Gard Tester.

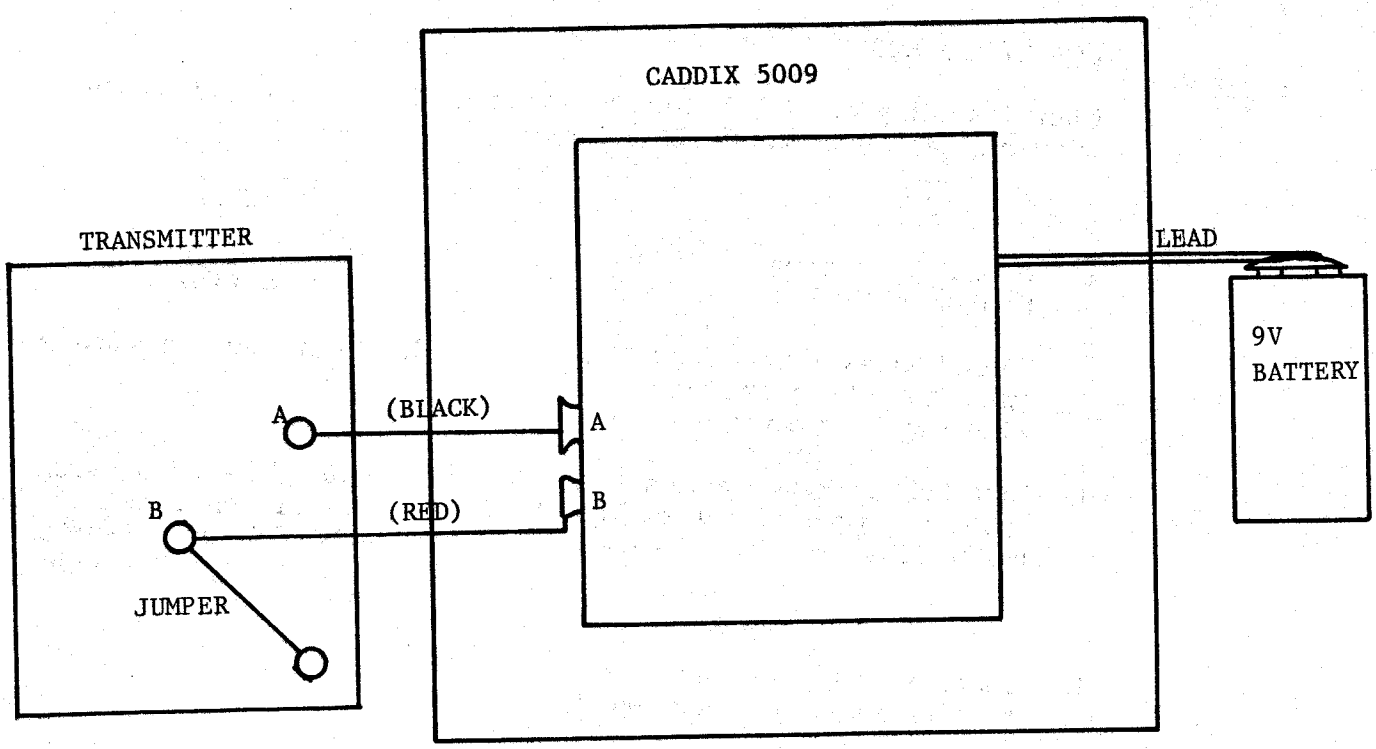
B. TESTING INSTRUCTIONS FOR THE IEI-712 GLASS-GARD TESTER

Using the IEI-712 Glass-Gard Tester is the only way to test the Glass-Gard without breaking glass.

1. Check that the batteries in the tester are good. Replace them if doubtful.
2. Check that the transducer surface is clean.
3. Check that the glass surface is clean near the Glass-Gard.
4. To get the best results, either wet the glass with water or with an ultrasonic couplant -- to couple the maximum signal into the glass.
5. Put the tester near the Glass-Gard to trigger it.
6. Hold the button in for at least 6 seconds when activating the tester. If the Glass-Gard does not trigger, re-check all units and try again. Try holding the tester flush to the glass and steady.

VII. CONNECTING CADDIX 5009 TO TRANSMITTER

FIGURE 34



TO INSTALL A CADDIX 5009 WITH THE ROLLINS SYSTEM V:

1. Connect 9-Volt alkaline battery to lead in Caddix 5009.
2. Install jumper in transmitter (see figure above).
3. Connect battery terminal A of Caddix 5009 to terminal A of the transmitter. (or black lead, if using a battery cap).
4. Connect battery terminal B of Caddix 5009 to terminal B of the transmitter. (or red lead, if using a battery cap).
5. Program sensor number by cutting comb in transmitter.
6. Program sensor number into MCU and test; adjust sensitivity of Caddix 5009 as needed.

VIII. TELEPHONE CONNECTION - RJ31X

LOCATING RJ31X

When installing an RJ31X (or the customer has one installed) the following practices should be followed:

DO

1. Install away from System V MCU.
2. "Fish" wires - CC4 Cord - to opposite side of the wall where MCU is mounted.
3. Install in hidden location i.e. attic, or opposite wall or mount inside MCU box on backplate.
4. Install in attic or basement directly above or below MCU.

DO NOT

1. Install at or around MCU.
2. Mount on the same wall even.
3. Run CC4 Cord parallel to power conductors such as 110 Volt house wiring or low voltage line going to MCU.

SYSTEM V TECHNICAL MANUAL

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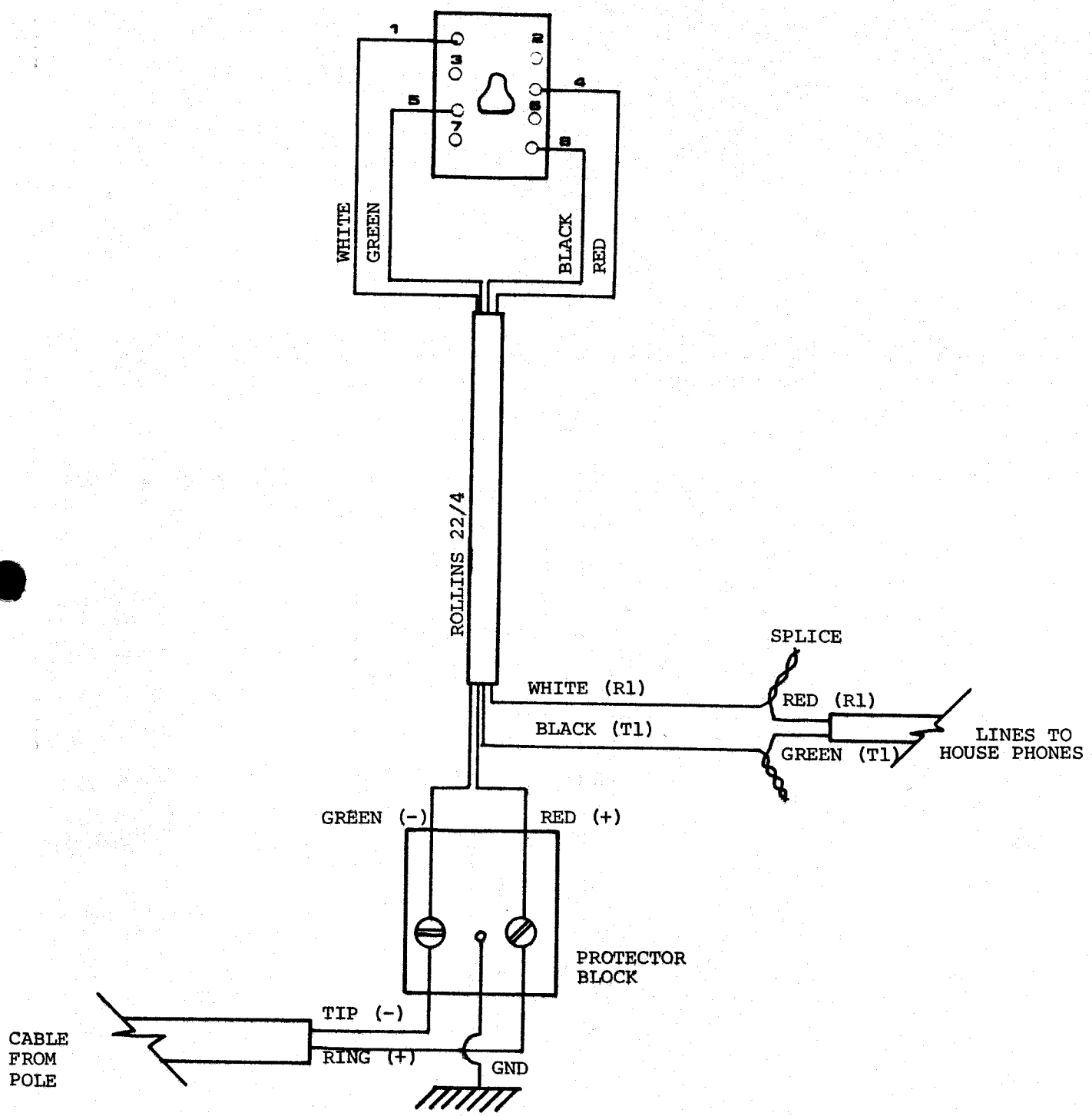
PREVENTIVE MAINTENANCE - Section 4

INSTALLATION OF RJ31X TO PROTECTOR BLOCK

FIGURE 35



SYSTEM V TECHNICAL MANUAL

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I. OPERATOR'S TERMINAL TROUBLESHOOTING

A. Tools Used:

1. All protection levels.
2. Audio Amplifier.
3. Volt-ohm meter.

B. Things to Look For:	Corrections:
Is the System ID correct?	Reset switches as needed.
Is the battery connected?	Reconnect as needed.
Is the Operator's Terminal on the same frequency channel as remainder of the system?	Replace with equipment on the proper frequency channel.
Does the Operator's Terminal emit an audible sound when touchpads are depressed?	Reconnect battery. Replace Operator's Terminal.
Is there excessive metal which could block the signal path to the MCU (i.e., foil wallpaper, foil-backed insulation; metal ductwork; pipes, large wall mirrors)?	Relocate Operator's Terminal.
Do the Operator's Terminal's Panic Alarm touchpads test correctly?	If not, replace.
Is the operator entering the proper access code?	Repeat access code slowly. Still no response, replace.
Does the access code have multiple identical digits (i.e. 1122 or 4444)?	For best results, four unique digits should make up the access code.
Has the Operator's Terminal been dropped or otherwise abused?	The Operator's Terminal should be mounted and left in place.
Does the Operator's Terminal produce a constant audible?	Replace Operator's Terminal.

Is the operator trying to control the system from outside the range of the receiver?	Operator's Terminal should be within 50-foot radius of the MCU.
Does a different Operator's Terminal work at the problem location?	Replace the problem Operator's Terminal.

II. MCU TROUBLESHOOTING

A. Audio Amplifier:

The audio amplifier is used as an installatin and service troubleshooting tool. It allows the installer to "hear" the signal being received at the MCU from sensors, PIR's and the Operator's Terminal.

Some audio amplifier uses are:

(a) Checking component transmission quality as "heard" by the receiver.

(b) Identifying optimum location for installing a transmitter.

(c) Troubleshooting for a "runaway" transmitter.

(d) Determining the difference between a "receiver" problem and a "transmitter" problem.

B. Troubleshooting the MCU:

Step 1: Attach the red and black test clip to the receiver connection on the MCU panel.

CAUTION: AVOID TOUCHING ANYTHING OTHER THAN THE RECEIVER CONNECTIONS WHEN ATTACHING AND REMOVING THE TEST CLIPS.

Step 2: Turn on the amplifier and adjust the volume.

Step 3: Watch for the following indications and response as indicated.

Observation	Response
Small amount of static "crackle" which is fairly constant when amplifier is turned on.	This is a normal response.
Opening a sensor causes a crisp, clear signal to be transmitted to the MCU. This signal is transmitted regardless of the protection level.	This is a normal response.
Closing a sensor causes a crisp, clear signal to be heard at the MCU. This signal is sent regardless of the protection level.	This is a normal response.

Observation	Response
System in Level 9, opening sensor or moving through the view of a PIR causes a crisp signal to be sent to the MCU.	The MCU and all remote audibles will beep once when the signal is heard. This is a normal response.
A "hum" sound will occur when test leads come near MCU circuit board: this is micro-processor operation noise and normal.	Keep test lead wiring away from MCU board to minimize pick-up.
Moving within view of a PIR causes a crisp, clear signal to be heard at the MCU. This signal is sent regardless of the protection level.	This is a normal response if there is a signal, pause, then another signal. Violation is not acknowledged.
Constant signal heard when amplifier is turned on (as if a sensor were being opened and closed rapidly).	Chances are good that a runaway transmitter is within range. Remove transmitter batteries one at a time to identify the constant transmitter.
No signal is heard when a sensor is opened or closed regardless of the sensor's proximity to the MCU.	Replace the sensor (assuming sensor battery is good).
Garbled signal is heard when the sensor is opened or closed or when PIR is transmitter.	Replace the programming comb if a sensor has a garbled signal (signal seems to break-up or be incomplete). Try moving the sensor to another location. Move PIR programming switches on and off a few times, then reprogram. Try moving the PIR to another location. Look for something which could obstruct the signal (i.e., metal doors, foil wallpaper, mirrors, any metal objects).

Observation	Response
Signal clash occurs if multiple sensors are opened or closed simultaneously. Two or more sensors transmitting at or near the same time can cause the MCU to hear a "garbled" signal. This can result in missed closing reports, or, in some cases, missed opening reports.	Allow one or two seconds between opening and closing signal to be sent. (Remember PIR's send two signals - open, then restore). Look for a PIR which transmits at or near the same time as a door that is opened or closed.

III. AUDIO AMPLIFIER -- ASSEMBLY AND USE

A. Materials List:

1. One Radio Shack #277-1008 Mini-amplifier with built-in speaker.
2. One 9-Volt Battery.
3. Two Radio Shack #270-372 Mini-Test Clips (one red; one black).
4. One Radio Shack #274-286 two-conductor, 1/8" miniature phone plug.
5. Two 10-12" pieces 24-22 gauge insulated wire.
6. One 1" piece of insulated tape or shrink tube.

B. Tools Required:

1. Wire Cutters
2. Soldering iron with fine point
3. Solder

C. Test Clips:

Red Test Clip Assembly

Note: Insert wire through the necessary openings in the plug and clips before soldering.

Step 1: If using shrink tube, slide tube over resistor and leads to insulate.

If using tape, wrap tape around resistor and leads to insulate.

Step 2: Disassemble the red test clip by straightening the hooked end of the clips and taking the unit apart.

Step 3: Solder the free end of the wire to the clip.

Step 4: Re-assemble the red test clip.

Black Test Clip Assembly

Note: Insert wire through the necessary opneings in the plug and clips before soldering.

Step 1: Solder one end of the second piece of wire to the plug ground.

Step 2: Disassemble the black test clip by straightening the hooked end of the clip and taking the unit apart.

Step 3: Solder the free end of the wire to the clip.

Step 4: Re-assemble the black test clip.

Note: Re-assemble the plug and insert it into the input jack of the amplifier.

IV. PIR TROUBLESHOOTING

Things to Look for:	Corrections:
Is there excessive metal which could block the signal path to the MCU (i.e., foil wallpaper, foil-backed insulation, metal ductwork, pipes, large wall mirrors)?	Relocate the PIR or MCU.
Does the transmitter signal the MCU when not interfaced to the sensor (separate sensor and transmitter; short left two pins of connector to force transmitter to signal).	If transmitter works, replace sensor (optics).
Is the PIR installed so as to avoid common sources of false alarms (i.e., appliances, heating/cooling equipment, hot/cold registers, fireplaces, moving objects, pets, direct sunlight, window/drapes)?	Relocate as needed.
Are there any other sensors which could be transmitting at the same time as the PIR?	Re-aim/relocate sensors so as to avoid "signal clash." See audio amplifier instructions.
Does a different PIR work properly in the problem location?	Replace problem PIR.
When installing a PIR, take care not to aim the sensing element in the direction where the Operator's Terminal is mounted. If the PIR "sees" the person while attempting to arm the system, the RF transmission from the Operator's Terminal will clash with the RF transmission from the PIR. As a result, the Master Control Unit may not receive a clear signal from either device.	Design the system so the PIR does not "view" the Operator's Terminal when it is in normal use.

V. GLASS BREAKAGE TROUBLESHOOTING

The Caddix glass breakage detectors were designed to discriminate the sound of breaking glass from other sounds. However, some alarm equipment used today emits noise which is very close to the frequency range of the breaking glass.

The following sounds can cause false alarms in GBD:

System V MCU Internal Announciator
Remote Audible
BRK Smoke Detector Warning Tone
Other Smoke Detectors' Warning Tone

To avoid glass breakage detector (GBD) false alarms:

1. Locate GBD at least 20' away from smoke detectors.
2. Instruct customer to plug in the Remote Audible in a different room from the GBD.
3. Install System V MCU as far as possible from GBD, but not closer than 15'.

In addition, in some homes, the acoustics are such that sounds are amplified especially in block structures with tile floors. It may not be possible to use GBD in that case so a PIR would be in order for proper protection.

VI. SENSOR/TRANSMITTER FAILURE TO RESTORE

Occasionally System V door mounted sensors fail to properly "restore" (i.e. provide closing signal to the MCU. The customer now has to go back and reopen and reclose the guilty sensor if he wants to arm the system. In most cases, the failure to show a closed sensor is caused by a vibrating reed switch. (As the door is being shut, the door vibrates, setting off the reed switch repeatedly), or a magnet that was mounted too far from the sensor.

FOR FREQUENTLY USED DOORS

1. Mount a Sentrol concealed contact switch such as the 1075 or 1055 series, into the door casing.

2. Mount the magnet into the door - properly lining up the magnet with the switch.

3. Install the transmitter then connect the switch per the System V Installation Manual. (Normally open or normally closed, according to the type of switch that was used).

When using magnetically activated sensor transmitter or switch on steel door or door frame, be aware of the following:

1. The magnetic field of the magnet tends to dissipate in the background steel, making the magnetic field too weak to hold the reed switch.

2. The door or door frame acts as a shield, preventing the activation of the reed switch altogether.

REMEDY:

1. Use wide gap magnetic switch with sleeve and move the transmitter away from shielding.

2. Use mechanical - plunger type switches to eliminate the effect of the steel on the protected surface.

VII. USE OF AIM 65 COMPUTER

PROCEDURE:

Purpose and use of AIM 65 computer in troubleshooting System V MCU and sensors.

To activate the AIM 65 Rockwell computer in analyzing System V, the following steps must be taken:

Step 1: Connect red lead to capacitor left leg above the receiver chip (adjacent to tamper switch).

Step 2: Connect black lead to negative side of receiver (the "-" on the capacitors on the receiver is a good negative).

Step 3: Plug in cord into wall outlet, and turn on AIM 65.

Step 4: Press 5 on keyboard.

Step 5: Enter time. (Military time, i.e. 14:36:00).

Step 6: Enter Command "2"

a. Print Ports "Y"
b. Print OT "Y"
c. Print Errors "Y"
d. # of Errors "4" (usually) See explanation below.

Step 7: Enter Command "1". (Record RF). The computer will start recording RF input from this point on.

The TRACE computer provides five (5) items per printed line for a sensor consisting of:

1. Time Group: - tells the time of the transmission.

2. Sensor Number - tells which sensor sent the message.

3. Battery Condition - In case of low battery, it will show an "L".

4. Open or Close State - This line will reveal the cause of false alarms. By reading "O" for Open or "C" for Close, it is easy to determine which transmitter caused the false alarm and at what time.

5. Number of Packets Sent - The sensor/transmitter normally sends eight (8) packets of redundant information. If there is a receiver problem, then the MCU will not hear all the packets. The Operator's Terminal will normally send two (2) packets of information identifying the keystroke. For the alarm keys Fire, Medical, and Police, the Operator's Terminal will send continuous packets of information until the user releases the dual alarm keys.

If there is a collision of sensors, then the TRACE computer will record the starting valid packets, the colliding packets as errors, and the ending valid packets.

In troubleshooting as well as in installations, the TRACE computer is an invaluable tool in eliminating problem areas in System V.

```
07:47:12  9  SRT  0605
07:47:12  8  SPC  0204
07:47:12  9  SRT  0405
07:47:13  9  SRT  0405
07:47:24  9  SRT  0405
07:47:24  KEY  5  1
07:47:25  KEY  3  1
07:47:25  9  SRT  0605
07:47:25  KEY  7  1
07:47:26  9  SRT  0405
07:47:26  9  SRT  0205
07:47:26  KEY  9  1
07:50:39  42C  7
07:53:49  9  SRT  0A07
07:53:59  420  7
07:53:54  42C  8
07:54:16  420  8
07:54:19  42C  8
07:59:38  410  8
07:59:42  9  SRT  0409
07:59:42  41C  7
08:00:06  420  8
08:00:36  340  8
08:00:46  43C  8
08:01:00  430  8
08:01:26  43C  7
08:02:06  60C  1
08:02:06  8  SPC  0605
08:02:06  01C  1
08:02:06  60C  3
08:02:06  00CL1
08:02:06  21C  1
```

6. Codes Used in Trace Computer:

07:47:13 Time in Hrs, Min, Sec

420 8 - Number of packets of messages sent
42C by sensor.

42 = Sensor Number
"C" = Closed
"O" = Open

Bits = The coding of packets (8 bits in sensor message in each packet and 8 packets, if good sensor, in each message).

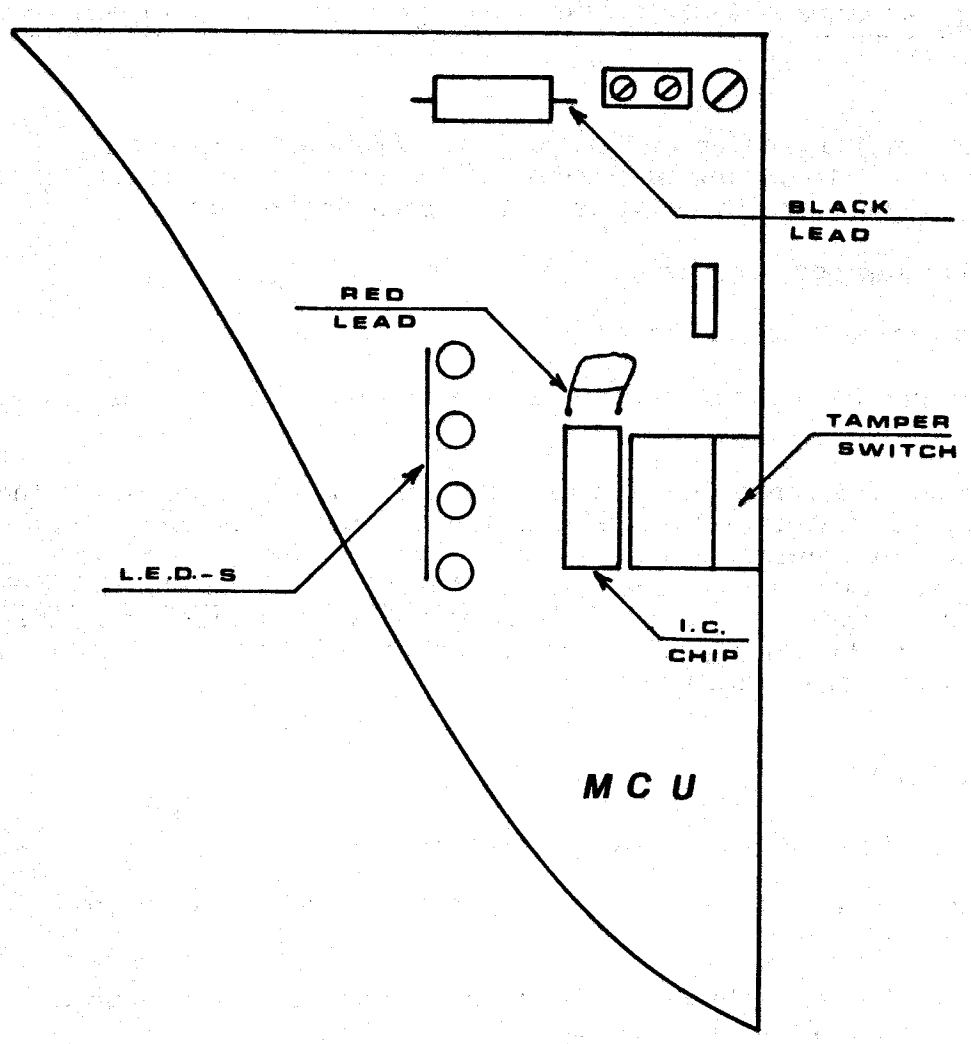
Packets = Number of times message sent by sensor or Operator's Terminal
8 Packets by Sensor
2 Packets by OT from control section (Continuous from OT ALARM section)

SRT = Short Message coding of packets too short.

SPC = Spacing in Message Improper.

"L" = The Letter "L" after the condition signal of "O" or "C" means Low Battery. This must be seen at least twice or on a full 8 packet message

FIGURE 35 A.



VIII. SYSTEM V SENSOR/TRANSMITTER ANTI-TAMPERING DEVICE

The sensor/transmitter in System V was designed to prevent unauthorized tampering or removal of the cover when the system is armed. There are three parts to the tampering device:

1. Shorting wire on the PC board.

2. Solder pads on PC board.

3. Conductive rubber glued to inside of sensor/transmitter cover.

To tamper the sensor/transmitter, the wire is cut on PC board then the conductive rubber pad will become the conductor "bridge" when the cover on the sensor/transmitter is installed. However, it was discovered that in some cases the CONDUCTIVE RUBBER WAS MISSING. In other cases, the cover still had the paper from the factory inside, preventing the closing of the circuit on the PC board. Consequently, a great many false alarms resulted.

PREVENTION:

1. Cut tamper wire only in critical areas.

2. Insure that conductive rubber pad is in place, and paper is removed.

3. Test the sensor/transmitter in Level 9 and in alarm mode to insure that false alarm will not occur.

IX. RECEPTION PROBLEMS - SYSTEM V

If you are having problems with reception when installing System V sensor/transmitters, you should check to see if the sensor/transmitters are mounted vertically or horizontally. The antenna on the sensor/transmitter will provide a better signal when mounted VERTICALLY. In most cases, the "dead area" or null will disappear simply by mounting the sensor/transmitter vertically.

Unless there is an overriding reason, always mount the sensor/transmitter vertically.

X. SUCCESSIVE SENSORS FALSE ALARMING IN SYSTEM V

In certain cases when System V false alarms in Level 3 or Level 5, two sensors show up at RAMC as being violated. In most cases only one of these sensors false alarmed.

The best way to explain this phenomena is to show the sequence of events leading up to the false alarm:

1. Client puts System V in delay (mostly Level 5).

2. Walks out the door - in effect violating this sensor and the MCU retains it as a violation.

3. System "sets-up" - or ready for alarm.

4. "Violation" occurs - alarm goes off but not only the currently violated sensor is reported to RAMC, but the one that was used as exit will be reported also since the MCU logic remembers it as a "violation."

To make troubleshooting more logical, follow these rules:

1. Find the exit that was used during the delay. It is unlikely that this sensor caused the alarm. (The number is usually in the 34-37 group).

2. The sensor number that was not the exit number caused the alarm.

Now you have the culprit. To find what caused the alarm, follow these rules:

1. Was it a violation? (Attempted Break-In) You can test the opening sensor several times to check this.

2. If not, check for the open in the sensing loop. Most of System V false alarms are generated when the sensor sends in the supervisory report. The transmitter reports three kinds of information as part of the supervisory report. These are:

   A. Battery Condition (if low)
   B. Open or Closed Device
   C. Whether the transmitter is present or operating

It is the "OPEN" report that will cause false alarm during SUPERVISORY reporting. When the Supervisory report comes in to the MCU as an "OPEN," the MCU will see is as an "OPEN" which becomes a violation since the MCU cannot differentiate between a supervisory open or a violation.

By following this guide, you can find any and all causes of false alarms in System V and eliminate it in the process.