FŌNSAFE™

TECHNICAL TRAINING

Student's Guide

Sprint

NOTICE

Complete Training Manual Part Number 46-964A
December 1994

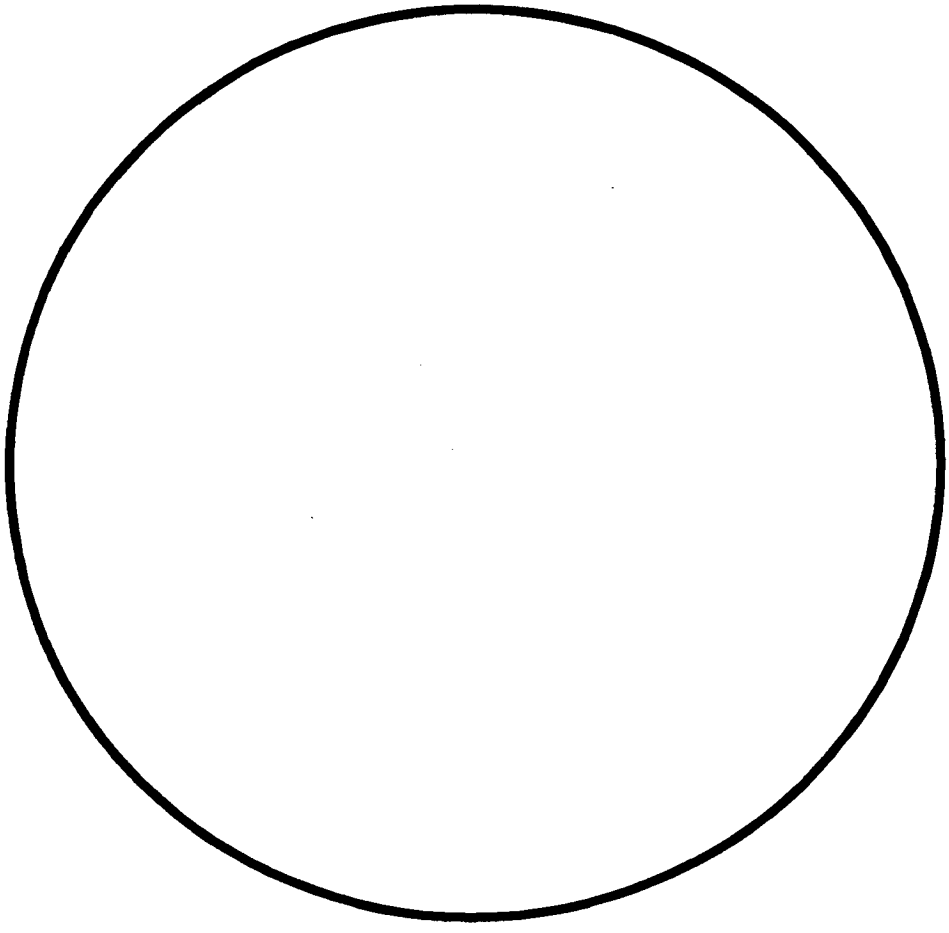
CONTENT

PART II: PRACTICAL EXERCISES

COURSE INTRODUCTION

- Goals for This Training Course
- About the Training
- Course Overview

▪ GOALS FOR THIS TRAINING COURSE



▪ ABOUT THE TRAINING

- Hands-on training
- Most work done in groups
- Stay with the trainer's pace
- Quizzes
- NBFAA Certification Test
- Honest feedback on the Course Evaluation

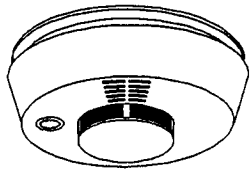
▪ COURSE OVERVIEW

- **Part I: System Basics**
- **Part II: Practical Exercises**
- **Part III: Review, Certification Test, & Course Evaluation**

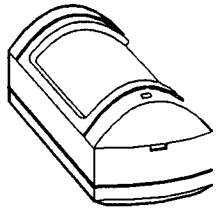
SYSTEM INTRODUCTION

- FŌNSAFE Kit
- FŌNSAFE System Features
- FŌNSAFE Communications Flow
- FŌNSAFE Specifications
- Quiz

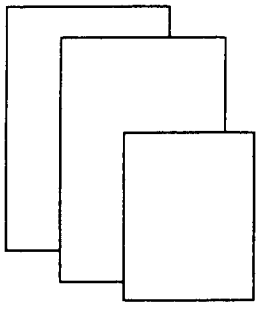
▪ FONSAFE KIT



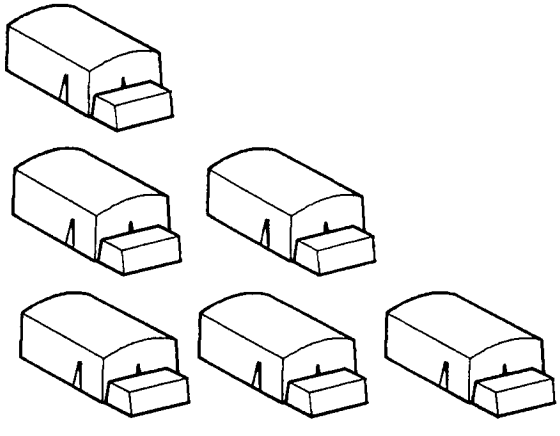
SMOKE SENSOR



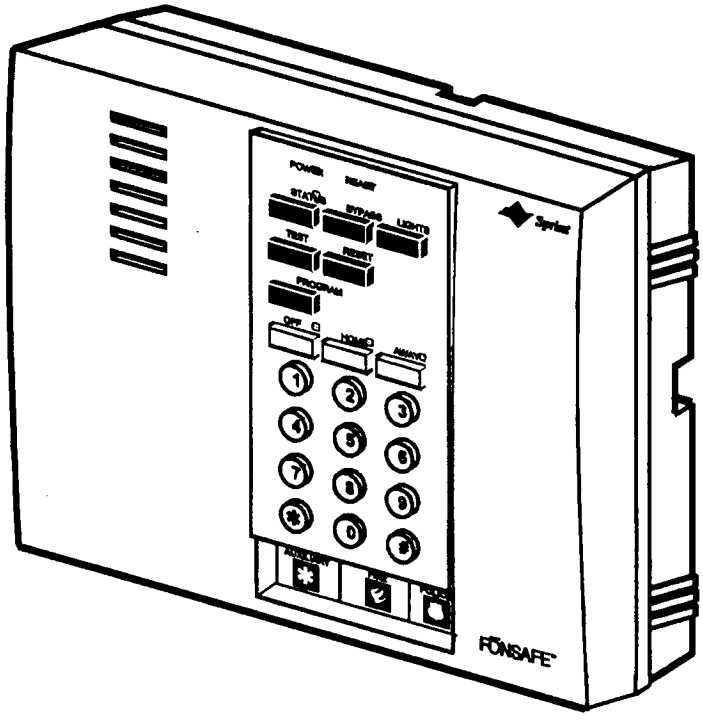
MOTION SENSOR



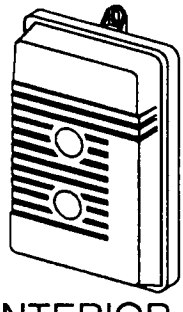
INSTALLATION &
OPERATIONS MANUALS



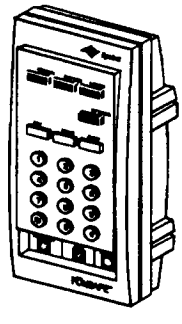
DOOR/WINDOW SENSORS



MASTER CONTROL UNIT(MCU)



WIRELESS INTERIOR SIREN (WIS)

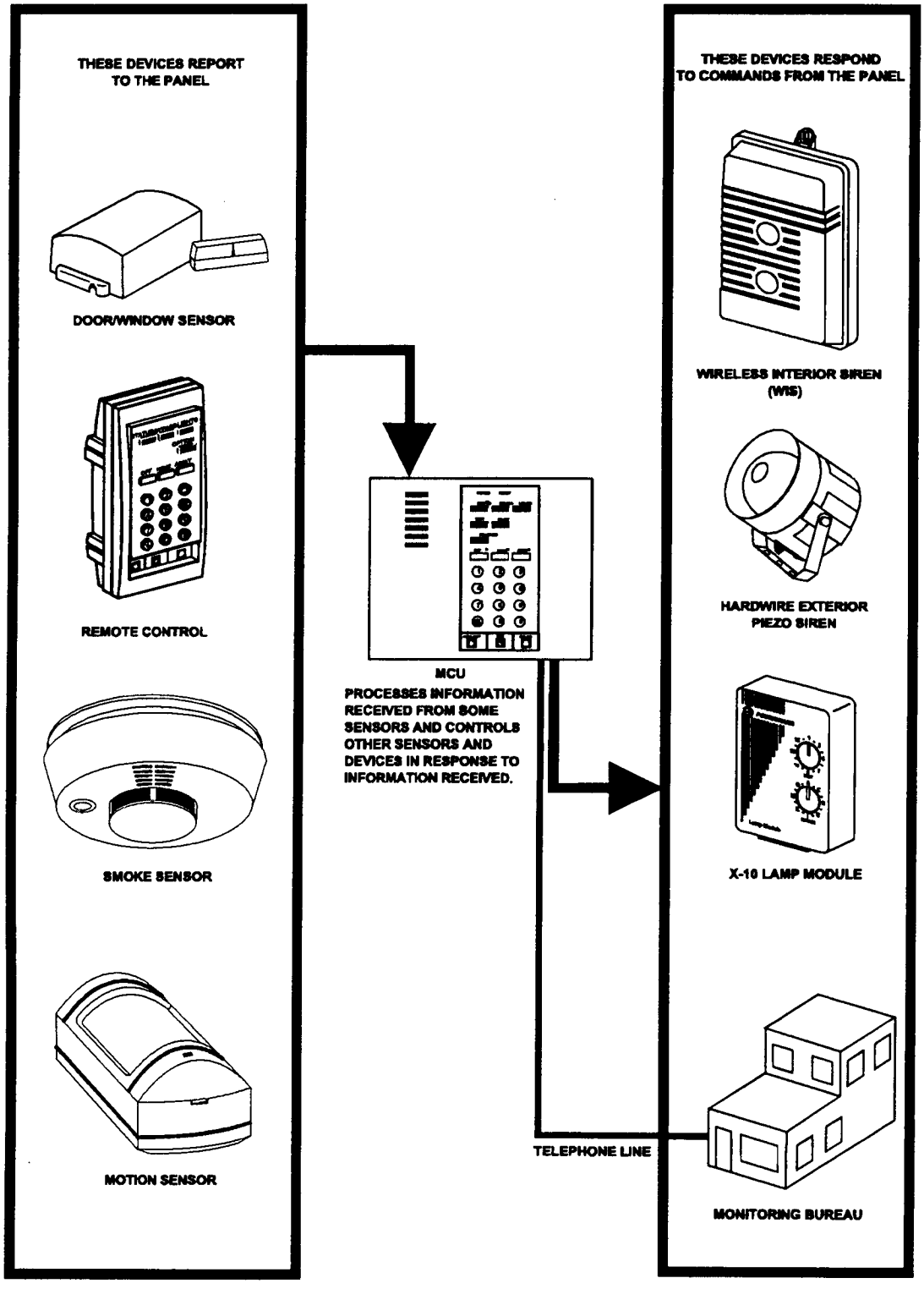


REMOTE CONTROL

▪ FONSAFE SYSTEM FEATURES

- Monitors up to 32 wireless sensors
- Patented Learn Mode technology
- Light control
- Appliance control
- Listen-in/Talk back
- Voice menu
- On/Off-premises phone control
- 24 hour backup battery (if fully charged)
- Single button arming
- Two user passwords

▪ FONSAFE COMMUNICATIONS FLOW



▪ FONSAFE SPECIFICATIONS

- Dimensions: 8.7" X 10.5" X 3"
- Weight: 5 lbs. 11 oz.
- Installation Options: table top or wall mount
- Main Operating Voltage: 110 VAC, 60 Hz (200 mA fuse)
- Backup Battery: 6 VDC, 3.2 Ah, rechargeable, sealed lead acid battery. Provides up to 24 hours with fully charged battery.
- MCU Memory: If AC power is lost, MCU memory may be saved for up to14 days.
- Zones: 32
- Radio Frequency: 319.508 MHz
- Nominal Range: 500' free air (152 m)
- Supervision: MCU receives supervisory transmission from each sensor every 64 minutes; sensors supervise their own battery voltage and notify the MCU if their battery voltage is low.
- Dialing Method: pulse or dual tone multi-frequency (DTMF)
- Standards/Approvals:
  UL 1023 Standard for household burglar alarm system units
  FCC Part 15 and FCC Part 68
  California Fire Marshall approval pending
- Operating Temperature: 40-100°F
- Maximum Relative Humidity: 70% non-condensing

▪ QUIZ

1. How many zones does the FONSAFE system have?

2. How many hours is the backup battery rated for when it is fully charged?

3. Name 3 FONSAFE features.

RADIO FREQUENCY BASICS

- FONSAFE System Integrity
- FONSAFE Wireless Advantages
- Why 319.5 MHz System Works
- FONSAFE Receiver Advantages
- Saabye's Pond Shows Dead Spots
- Dead Spots
- Phase Nulls
- Sensor Contention
- Sensor Transmission
- Learn Mode Sensor Technology
- The 58-Bit Sensor Transmission Format
- Quiz

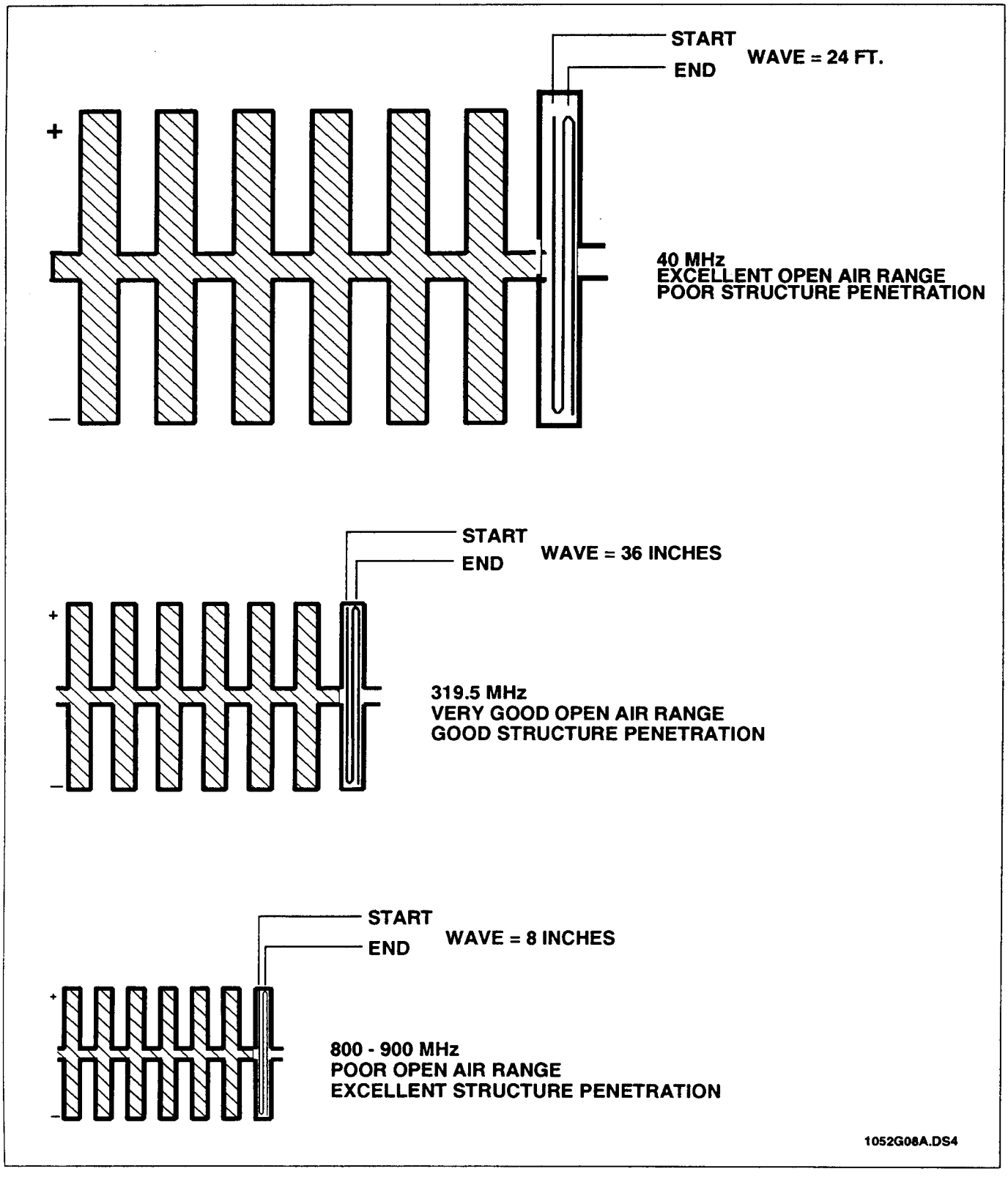
▪ FONSAFE SYSTEM INTEGRITY

- **Automatic sensor tests**
- **Sensor batteries monitored**
- **Fail safe arming**

▪ FONSAFE WIRELESS ADVANTAGES

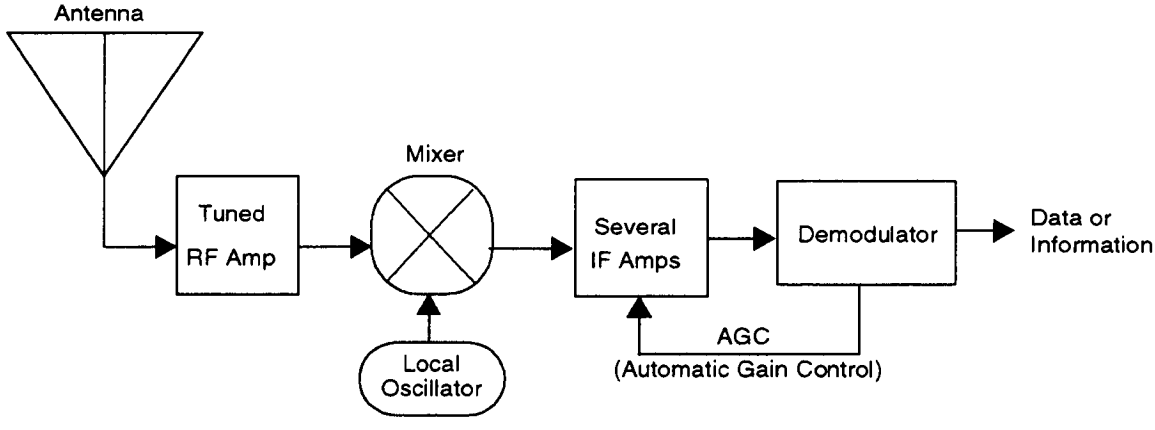
- Reliable RF technology
- Long range
- Individual point identification
- *Interactive* with CS-4000
- Supervised
- Fewer wires to run
- Quicker installations
- Fewer location restrictions
- Less drilling
- System easily removed from premises

▪ WHY 319.5 MHz WORKS



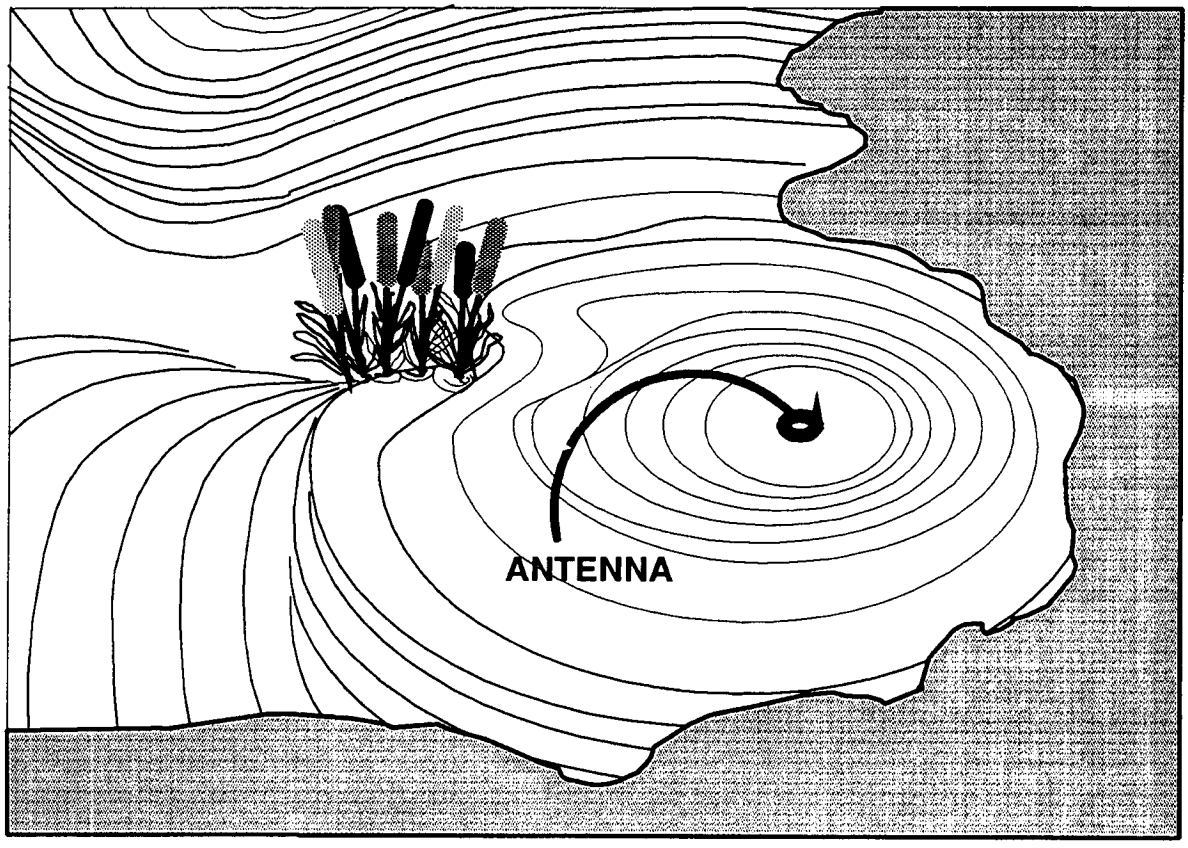
▪ FONSAFE RECEIVER ADVANTAGES

- **Spatial diversity, dual antenna**
- **Crystal-controlled receiver**
- **500 foot open air range**
- **Superheterodyne receiver**



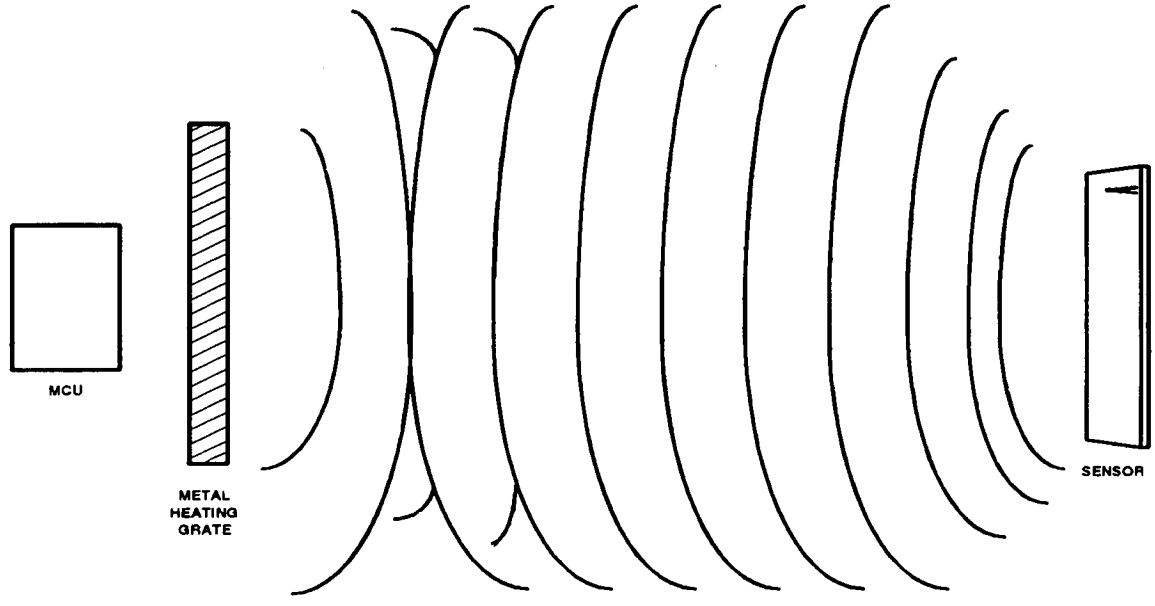
Superheterodyne Receiver Flowchart

▪ SAABYE'S POND SHOWS DEAD SPOTS



▪ DEAD SPOTS

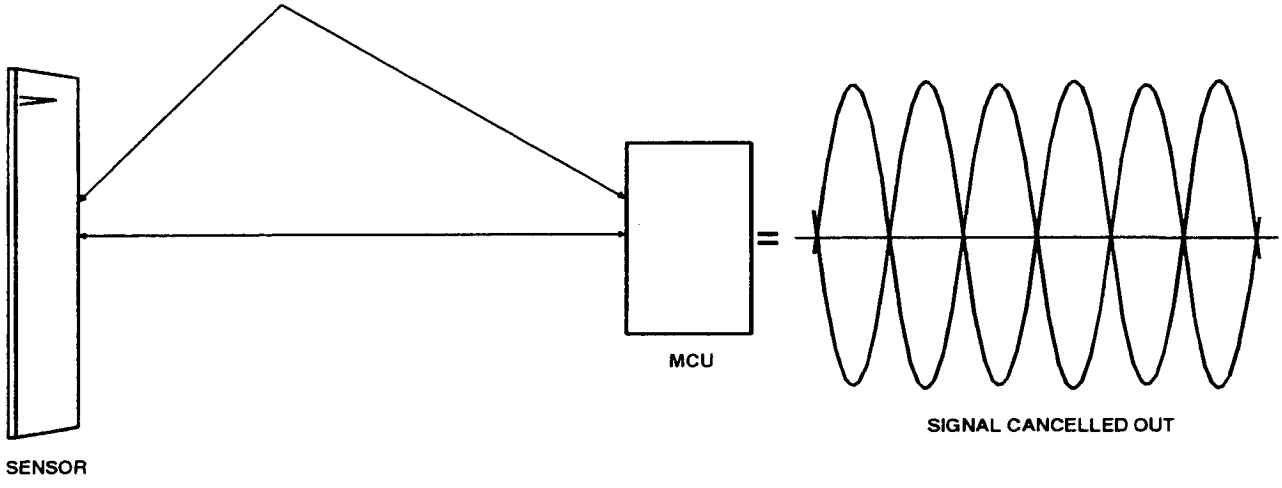
Occurs when a sensor's signal is reflected away from the receiver by a metallic object.



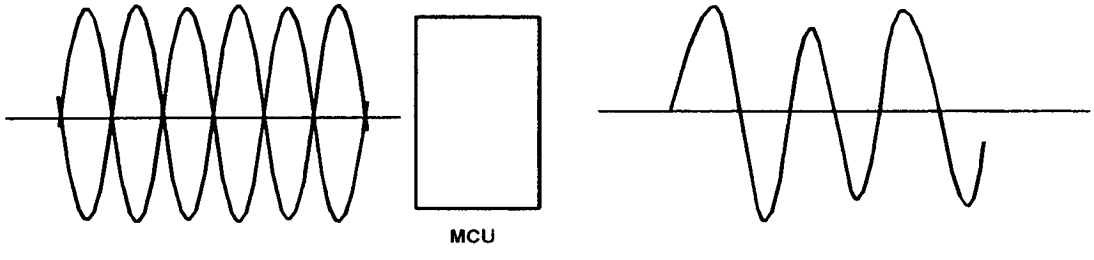
FŌNSAFE Solution: Spatial diversity, dual antenna system, narrow band width, and 319.5 MHz frequency.

▪ PHASE NULLS

The cancelling of the RF signal by a secondary wave arriving at the same time as the primary wave, so that it is 180° out of phase.

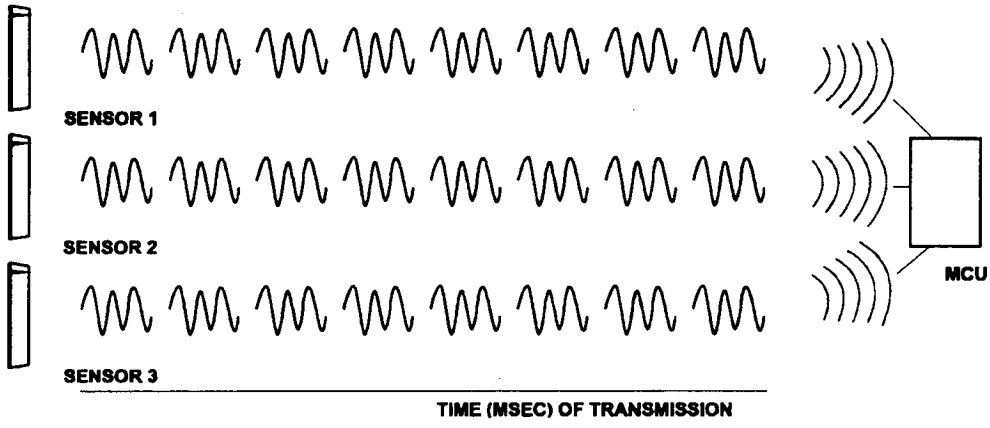


FŌNSAFE Solution: Spatial diversity, dual antenna system cancels phase nulls.

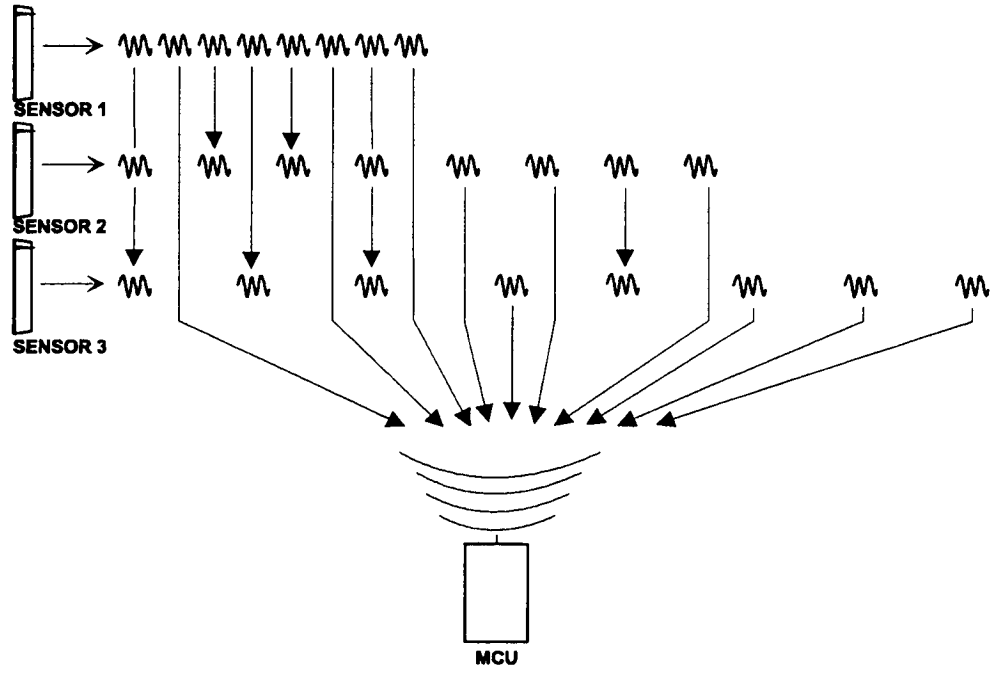


▪ SENSOR CONTENTION

Occurs when two or more sensors send a signal at the same time.

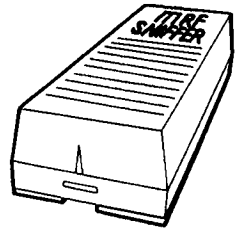


FONSAFE Solution: Sensors transmit multiple rounds of data at different timing intervals.



▪ SENSOR TRANSMISSION

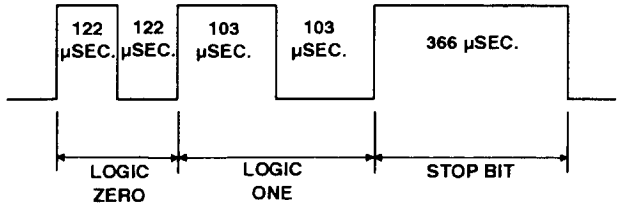
- 8 rounds for alarms and restorals
- 3 rounds every 64 minutes for supervisory reports
- RF Sniffer gives audio verification



▪ LEARN MODE SENSOR TECHNOLOGY

- **Patented 58 bit transmission format**
- **Prevents false alarms from other sources**
- **Individual point identification**
- **Preprogrammed**

LEARN MODE 58 BIT SENSOR TRANSMISSION FORMAT



EXAMPLE OF DATA OUTPUT PULSES

8865G29A.DS4

▪ THE 58 BIT SENSOR TRANSMISSION FORMAT

- Locks sensor transmission and MCU into same time frame
- Tells MCU real information is starting
- Reports sensor's custom identity (its *name*)
- Reports low battery status to MCU approximately 1 week before battery fully discharges
- Tells the MCU the sensor's status (open/ closed)
- Double checks the sensor's identity
- Signals end of transmission

▪ QUIZ

1. What Radio Frequency does the FONSAFE system use?
2. Name two advantages of the FONSAFE receiver.
3. Name two advantages of Learn Mode technology?

FONSAFE KIT

- MCU
- MCU Operations Exercise
- Static Electricity
- Door/Window Sensor
- Motion Sensor
- Smoke Sensor
- Wireless Interior Siren (WIS)
- Remote Control
- Quiz

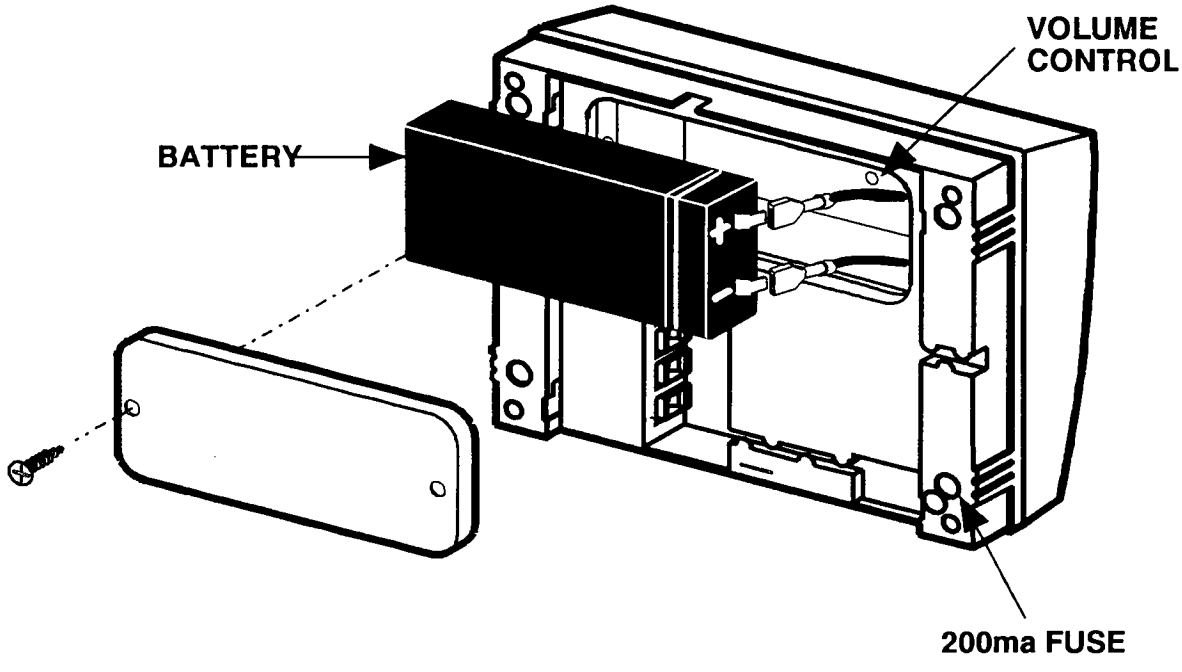
▪ MCU

- **Backup battery**
  - 6 VDC, 3.2 Ah
  - Rechargeable, sealed lead acid
  - Up to 24 hours of backup power if fully charged
  - Battery life rated at 3 - 5 years.
  - MCU memory retained for 14 days without AC power
- **Operating temperature is 40° - 100° F.**
- **Mounting**
  - Desktop and wall mounting 
  - Convenient location
  - Near center of home and within 50' of sensors
  - Near RJ-31X jack and outlet not controlled by a switch
  - On the same floor or above where most sensors are located

▪ MCU (CONT.)

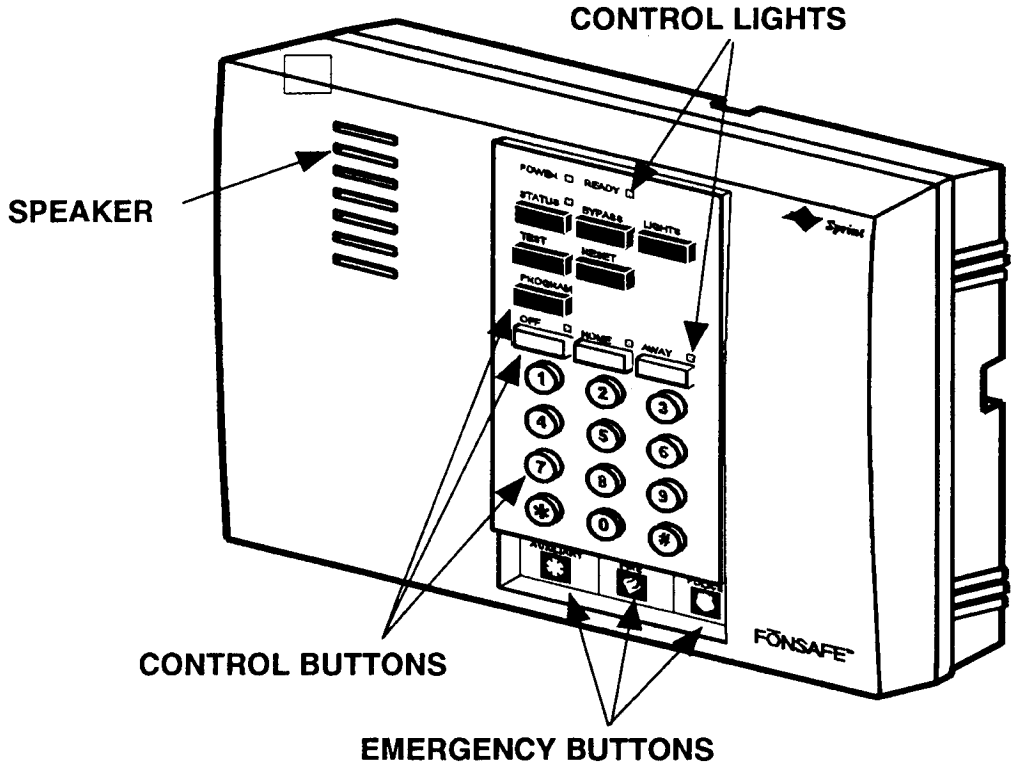
Task	Action
AC power to MCU	Plug MCU into a 110 volt outlet not controlled by a switch.
Connect backup battery	See figure below.
Set the master password	Enter a 4 digit password. Press **RESET.**
Set the time of day	Enter the time using 4 digits (01:00) Press **1** for a.m. or **2** for p.m.

POWER B-4 BAD, HOOK UP



▪ MCU (CONT.)

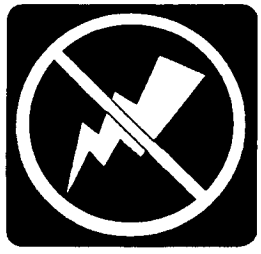
Control buttons, lights, and sounds



▪ MCU OPERATIONS EXERCISE

1. Connect backup battery.
2. Adjust volume control to low.
3. Enter master password and time.
4. Arm the system to HOME.
5. Arm the system to AWAY.
6. Disarm the system to OFF.
7. Determine the status of the system.

▪ STATIC ELECTRICITY



- **Small amounts of static electricity can damage any device with an intergrated circuit.**

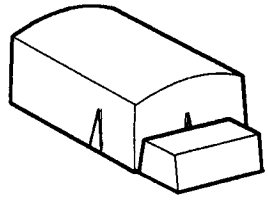
- **Touching a door can generate more than 30,000 volts of electricity.**

- **Avoid static electricity damage by:**
  - Touching bare, grounded metal before handling each sensor.
  - Wearing a grounding strap when working with sensors.
  - Touching the negative side of an installed battery.
  - Avoiding placing sensors on metal surfaces.

▪ TESTING SENSOR MOUNTING LOCATION

- **Perform the Sensor Chime Test before mounting sensors.**
- **Test sensors from their intended mounting location.**
- **Test sensors with MCU at its intended mounting location.**

▪ DOOR/WINDOW SENSOR

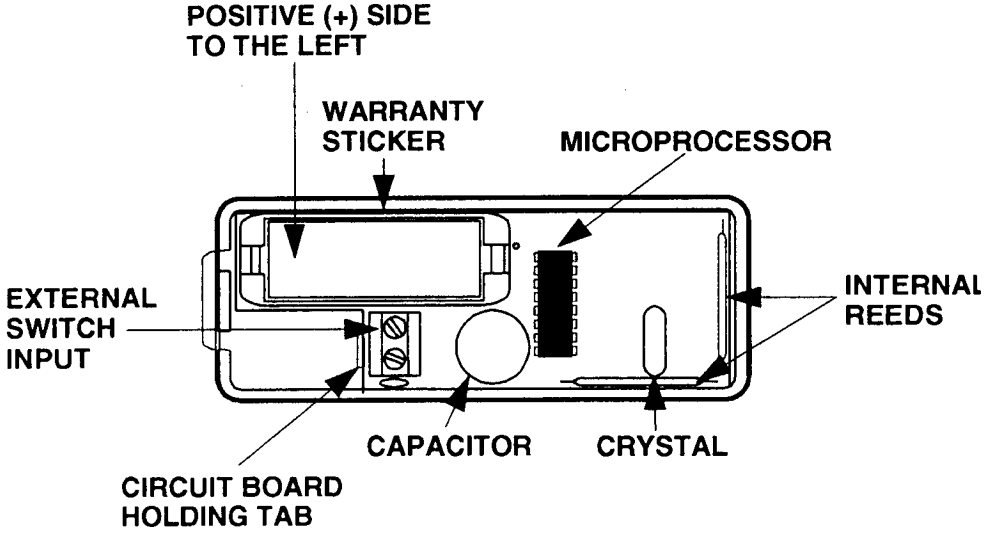


- **Battery**
  - 3.5 VDC lithium
  - 1 year life
- **Operating temperature is 10° -120° F.**
- **Mounting**
  - Avoid mounting sensors or magnets on any metallic surface.
  - Use spacers if metal can't be avoided.

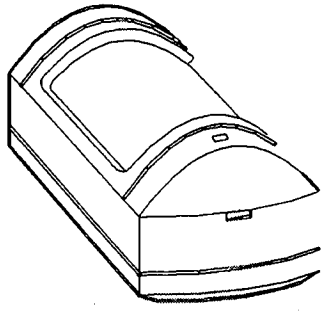
(OPTIONAL W/ PACK)

▪ DOOR/WINDOW SENSOR (CONT.)

• Circuit Board



▪ DS-924 MOTION SENSOR

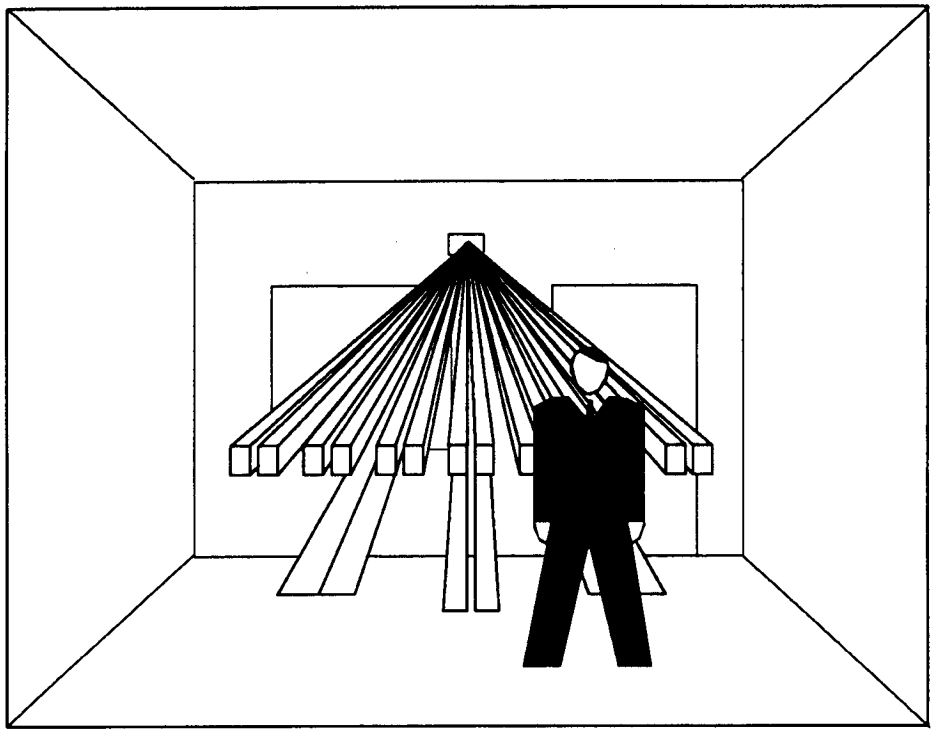


- **Battery**
  - 3.5 VDC lithium
  - 1 year life
- **Operating temperature is 10°-120°F.**
- **Mount sensors:**
  - so there is a reference point.
  - so an intruder is likely walk across detection pattern.
  - 5'-8' above the floor (6'8" optimum height).

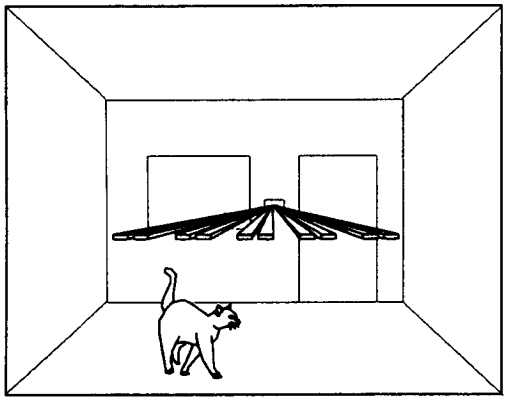
▪ MOTION SENSOR (CONT.)

- **Do not mount sensors:**
  - in direct or reflected sunlight.
  - where hot or cold air are directed at the sensor.
  - near intermittent heat sources.
- **Sensitivity Pins**
- **Walk Test**

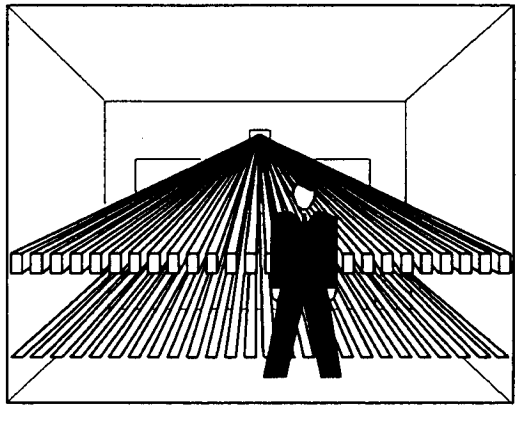
▪ MOTION SENSOR (CONT.)



Standard Broad Coverage Lens
35' X 40°

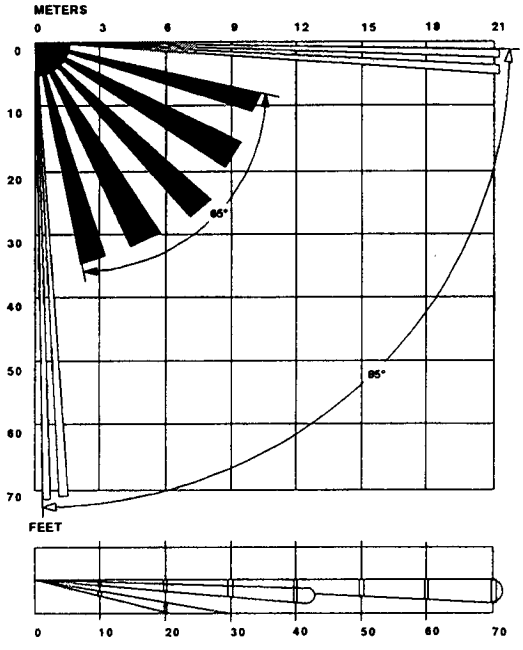


Broad Pet Avoidance
35' X 40'

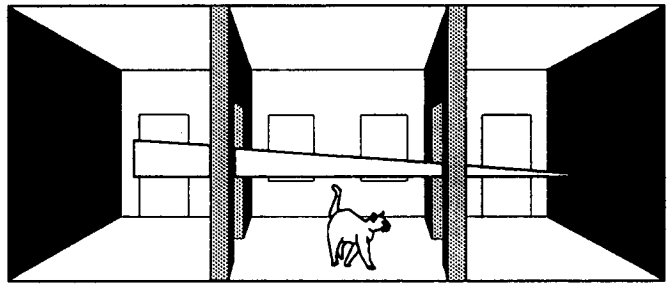


Dense Long Range Lens
35' X 110°

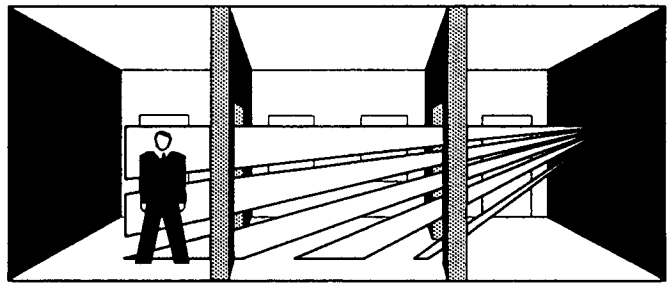
▪ MOTION SENSOR (CONT.)



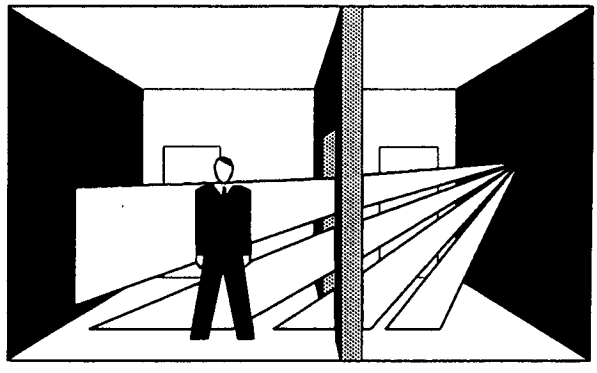
Dual Corridor
70' X 70'



Narrow Pet Avoidance
70' X 6'

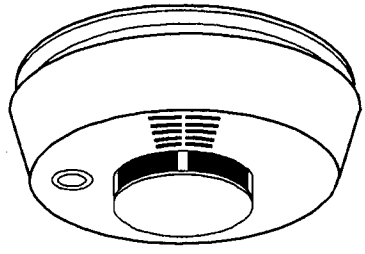


Long Range Barrier
70' X 6'



Standard Range Barrier
35' X 3'

▪ SMOKE SENSOR



- **Batteries**
  - Two 9V alkaline
  - 1 year battery life
- **Operating temperature is 40°-100°F.**
- **Outputs**
  - Emits short beep every minute for low batteries.
  - Emits short beep every minute if sensor is bad.
  - LED flashes rapidly during alarm.
  - LED flashes every 30-40 sec. under normal conditions.

▪ SMOKE SENSOR (CONT.)

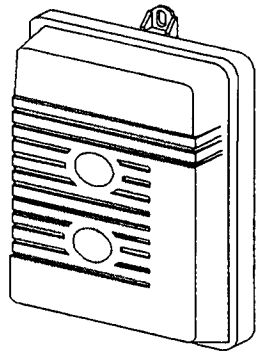
- **Mount sensors:**
  - at the top of all stairwells, except in basement.
  - at bottom of basement stairwell.
  - on ceiling whenever possible.
  - at least 4" from walls.
  - no more than 6" from ceiling on a wall.
  - in all hallways connecting bedrooms.

- **Do not mount sensors:**
  - in or near damp or humid areas.
  - near florescent lights.
  - in dusty or dirty areas.
  - near fresh air inlets/returns or excessively drafty areas.
  - where many insects are present.
  - in rooms with sloped, peaked, or gable ceilings. If this can't be avoided mount 3' from the highest point.

▪ SMOKE SENSOR (CONT.)

- **Testing**
  - Press and hold the test button for 20 sec.
- **Maintenance**
  - Replace batteries every 12 months.
  - Carefully vacuum smoke sensor's black meshed area every 12 months (MCU must be in Home Sensor Test Mode.).

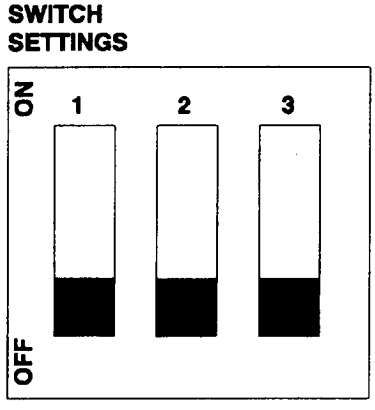
▪ WIRELESS INTERIOR SIREN (WIS)



- **Batteries**
  - 9 VDC (alkaline, lithium, or NiCad
  - 1 year battery life for alkaline and lithium✦
  - Beeps once every 60 seconds when the battery is low
- **Operating temperature is 40° - 100° F.**
- **Mounting**
  - Do not mount on a switch controlled outlet.

▪ WIS (CONT.)

• Setting DIP Switches



SWITCH 1
OFF = ALKALINE OR LITHIUM BATTERY
ON = NICAD RECHARGEABLE BATTERY

SWITCH 2
OFF = ALARM AND STATUS SOUNDS
ON = ALARM SOUNDS ONLY

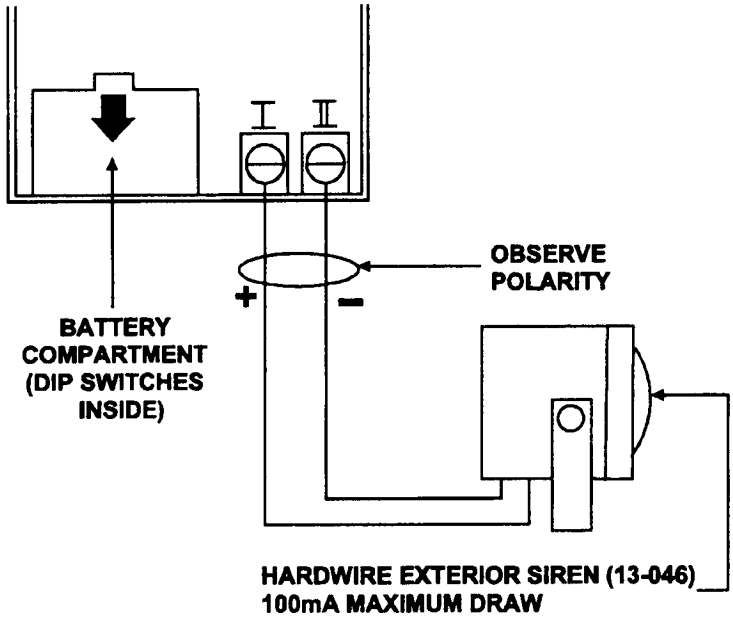
SWITCH 3
OFF = REMOTE SIREN SOUNDS IMMEDIATELY
ON = REMOTE SIREN 15 SECOND DELAY

• Changing WIS house code

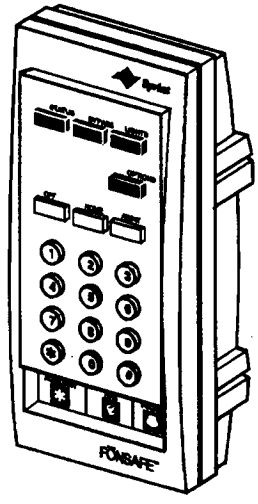
1. Unplug WIS.
2. Disconnect backup battery for 30 seconds.
3. Reconnect battery and plug in the WIS.
4. Reprogram house code at MCU.
5. Press STATUS button at MCU.

▪ WIS (CONT.)

- **Wiring optional Hardwire Exterior Siren**
  - Program WIS house code first.



▪ REMOTE CONTROL



- **Battery**
  - 3.5 VDC lithium
  - 1 year battery life
- **Operating temperature is 40°-100° F.**
- **Nonsupervised**
- **Includes a wall mount bracket**

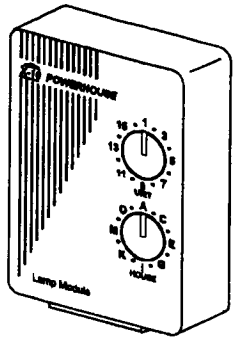
▪ QUIZ

1. How do you change the WIS house code? pg.42
2. Name 3 mounting guidelines for the Smoke Sensor.
3. Name 2 mounting guidelines for the Motion Sensor.
4. What is the purpose of the Remote Control?
5. What is the purpose of the Door/Window sensor date code? R.M.A.
6. What is the purpose of the RF Sniffer?
7. How many volts and amps is the MCU backup battery? 6v 3.2
8. Name two ways to avoid static electricity damage to sensor circuit boards.
9. What test should be performed before mounting sensors?
10. Where should the MCU and sensors be located when tested?

OPTIONAL COMPONENTS

- X-10 Lamp Module
- X-10 Appliance Module
- Sensors
- Quiz

▪ X-10 LAMP MODULE



- **Up to 300W incandescent lights.**
- **Programmable light control options:**
  - Emergency lighting in the event of a fire or break-in
  - Turn on lights when MCU is armed/disarmed
  - Turn lights on/off at different times
- **Do not use extension cords to connect several lamps to one module.**
- **Do not plug into a switch controlled outlet.**
- **Do not use to control appliances.**

▪ X-10 APPLIANCE MODULE

- **Rated for**
  - 15A for heaters, coffee pots, etc.
  - 1/3 HP for motors
  - 400W televisions
  - 500W lights
- **Can turn appliances on/off at user selected times.**
- **Can turn appliances on/off from MCU, Remote Control, and phone.**

▪ SENSORS

See the *Components* tabbed section of the training manual for information about the following sensors:

- **Recessed Door Mount Sensor**
- **Slimline Door/Window Sensor**
- **Freeze Sensor**
- **Fire Pull Station**
- **Shock Sensor**
- **Glass Guard Sensor**
- **Sound Sensor**
- **Rate of Rise Sensor**
- **Water Resistant Pendant Panic Button**
- **Pendant Panic Sensor**
- **Single and Double Button Panic**

▪ QUIZ

1. What is the maximum light bulb wattage that can be controlled by the X-10 Lamp Module?

2. Name 2 devices and their maximum power rating that can be controlled by the X-10 Appliance Module?

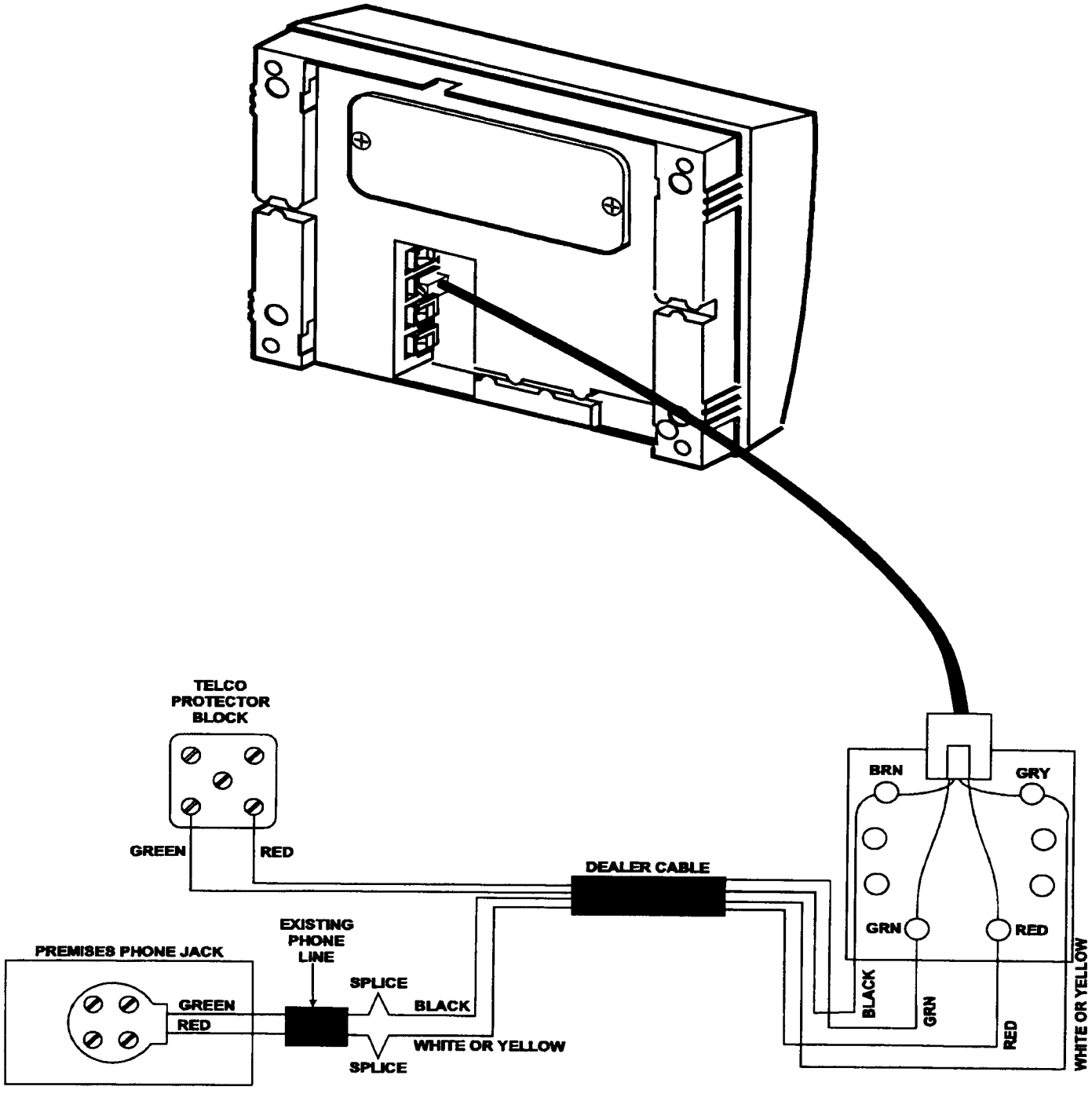
3. Name 2 programmable options for the X-10 Lamp Module.

PHONE WIRING

- Wiring Phone Line

TELCO TO INTERRUPTOR TO PHONE TO Home

▪ WIRING PHONE LINE



SENSOR PROGRAMMING

- Sensor Planning
- Sensor Location and Type Code
- Sensor Arming Level and Delay
- Home Sensor Test
- Sensor Programming Exercise
- Quiz

▪ SENSOR PLANNING

• Sensor Chime Test

• Tripping Sensors 🕮

COMPONENT	HOW TO TRIP
Motion Detector	• After making sure the motion detector hasn't seen motion for at least 3 minutes, turn the motion detector face up. Wave your hand in front of it several times. Place it face down again after the MCU has learned it. **OR** • Put the motion detector into walk test mode and walk in front of the detector.
Door/Window Sensor	• Pull the small magnet away from the sensor, then rejoin them.
Remote Control	• Press the 0 on the remote control keypad. **NOTE:** The MCU calls the remote control a keypad sensor.
Panic Button	• Press and hold the button on the panic button for at least 1 second. **NOTE:** The MCU calls the panic button a police emergency sensor.
Smoke Detector	• Press and hold the test button until the piezo sounds. Hold it 10 - 15 more seconds.

▪ SENSOR PLANNING (CONT.)

- **Record sensors on *Worksheet A* from the *Installation Manual:***
  - Door/Window Sensor for bedroom 1 with no delay
  - Door/Window Sensor for front door with delay
  - Door/Window Sensor connected to a hardwire ~~smoke~~ HEAT sensor with no delay
  - Motion Sensor for living room
  - Smoke Sensor for basement
  - Remote Control

▪ SENSOR LOCATION AND TYPE CODE

Location Description	Number	Location Description	Number	Location Description	Number
No description	0	Living Room	10	Downstairs	20
Bedroom 1	1	Dining Room	11	Hall	21
Bedroom 2	2	Guest Room	12	Front Hall	22
Bedroom 3	3	Laundry Room	13	Kitchen	23
Bedroom 4	4	Utility Room	14	Office	24
Master Bedroom	5	Front Door	15	Basement	25
Child's Bedroom	6	Back Door	16	Garage	26
Guest Bedroom	7	Garage Door	17	Attic	27
Bathroom	8	Basement Door	18	Closet	28
Master Bathroom	9	Upstairs	19	Den	29

Sensor	Sensor Code
Door	1
Window	2
Motion	3
Heat	4
Freeze	5
Flood	6
Glass Break	7
Utility	8

▪ SENSOR ARMING LEVEL AND DELAY

DOORS/WINDOWS THAT...	ARMING LEVEL
Open to outside	HOME
Lead to areas inside home (e.g., basement, closet)	AWAY

The Delay Option gives the owner time to enter or exit the home through an exterior door before an alarm goes off, when the system is armed.

IF SENSOR IS LOCATED	AND YOU	SELECT
On an EXTERIOR door	Need time to arm/disarm system	1
On an EXTERIOR door	DON'T need time to arm/ disarm system	2
On any other door or window		2

▪ HOME SENSOR TEST

WHEN TO USE	WHAT TO DO	WHAT HAPPENS
• To test all sensors, detectors, panic button, and remote control	• Press TEST.	• MCU announces: *PLEASE ENTER PASSWORD.*
	• Enter Master Password.	• MCU announces test menu options.
	• Press 2.	• MCU announces the total number of sensors, then names each one.
TRIP EACH SENSOR • Trip D/W Sensors: Open protected doors and windows. • Trip Smoke Detector: Press TEST button until detector starts to beep. Hold button 10 seconds more. • Trip Motion Detector: Leave area for 3 minutes, then walk in front of detector. **OR** Enable walk test mode, then walk in front of detector. • Trip Panic Button: Press the button for 4 seconds. • Trip Remote Control: Press any key.		Interior siren beeps as each sensor is tripped. MCU removes each sensor name from the list only after it tests OK.
If Sensor Test is OK, press RESET to exit.		MCU announces: *SENSOR TEST OK.*

NOTE: The system is temporarily disabled during testing. If you do not press RESET to exit test mode manually, test mode will be cancelled automatically after 30 minutes.

▪ SENSOR PROGRAMMING EXERCISE

1. Set visitor password to 4321.
2. Program the sensors recorded on the *Sensor Worksheet.*
3. Perform the Home Sensor Test.

▪ QUIZ

1. Which devices use a house code and what are their default house codes?

2. Why do you trip a sensor during programming?

3. When assigning an arming level to a Door/ Window Sensor, what is the difference between HOME and AWAY.

4. What is the Sensor Code used for?

5. What is the Delay Option used for?

6. Name the arming levels and explain what each level is used for.

7. What test should you perform before filling out the sensor worksheet and before you mount sensors?

8. What test should you perform after installing all sensors?

X-10 Module and WIS Programming

- X-10 Module Planning
- X-10 House Codes and Modes
- Module Tests
- WIS
- X-10 Module and WIS Programming Exercise
- Quiz

▪ X-10 MODULE PLANNING

- **Record X-10 Lamp Modules on *Worksheet B* in the *Installation Manual:***
  - Timed light that turns on at 6 p.m. and off at 11 p.m.
  - Motion Sensor light
  - Entry/Exit light
- **Record X-10 Appliance Modules on *Worksheet C* in the *Installation Manual:***
  - Timed appliance in the office that will turn on at 6 p.m. and turn off at 10 p.m.
  - Appliance in the kitchen that turns on at 4 p.m.
  - Untimed jacuzzi in master bedroom
  - Garage door opener ON
- **Set X-10 Module house codes**

▪ X-10 HOUSE CODES AND MODES

LAMPS DEFAULT 01
APPLIANCE MOD. 02

Housecodes				
	A = 01	E = 05	I = 09	M = 13
	B = 02	F = 06	J = 10	N = 14
	C = 03	G = 07	K = 11	O = 15
	D = 04	H = 08	L = 12	P = 16

LAMP MODULE MODE	IF YOU WANT TO TURN LAMP(S) ON AND OFF	LIGHT NUMBER
Untimed Light	Manually using the MCU, remote control, or TouchTone phone.	1 or 2
Motion Detector Light	Automatically when someone enters the room between 6 p.m. and 7 a.m. and passes by the motion detector.	3 or 4
Timed Light	At pre-set times: ON at 5 p.m., OFF at 10 p.m. ON at 6 p.m., OFF at 11 p.m. ON at 7 p.m., OFF at 12 Mid.	 5 6 7
Entry/ Exit Light	During Entry/Exit delay.	8
Alarm Memory Light	As a warning that an alarm was tripped (lamp will remain ON after siren shuts off).	9

OPTION APPLIANCE MODULE MODE	SELECT OPTION NUMBER
UNTIMED Turn ON as needed using: • Master Control Unit • Remote Control • TouchTone phone	1, 2, or 3
TIMED Select to turn ON and OFF at pre-selected times	4 through 9

▪ MODULE TESTS

- **X-10 Lamp Modules**
  - LIGHTS then light number
- **X-10 Appliance Modules**
  - OPTION then appliance number

▪ WIS

• Available house codes 001-255

Letter Code	Corresponding House Codes															
A	--	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
B	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
C	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
D	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
E	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
F	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
G	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
H	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
I	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
J	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
K	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
L	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
M	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
N	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
O	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
P	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

• STATUS to set house code

▪ X-10 Module and WIS Programming Exercise

1. Program X-10 Modules recorded on the *Lamp Module Worksheet.*
2. Program X-10 Modules recorded on the *Appliance Module Worksheet.*
3. Program a WIS, using the default house code.
4. Test all X-10 Modules.

▪ QUIZ

1. Name two X-10 Lamp Module Modes.
2. Name the X-10 Appliance Module Modes.
3. What is the default house code for the X-10 Lamp Module?
4. What is the default house code for the X-10 Appliance Module?
5. What is the default house code for the WIS?

PHONE PROGRAMMING

- Master Control Phone Options
- Phone Options Programming Exercise
- Quiz

▪ Master Control Phone Options

- **Control status**
  - HOME = unmonitored
  - AWAY = monitored
- **Phone line supervision status** [7]
  - OFF = Phone line not monitored
  - ON = Status message if phone line lost
  - ON Siren = Alarm if phone line lost
- **Remote access status**
  - ON = Can access MCU off premises
  - OFF = Cannot access MCU off premises
- **MCU commands from Program Mode:**
  - 7 1 = control status HOME, phone line OFF
  - 7 2 = control status AWAY, phone line OFF
  - 7 3 = control status AWAY, phone line ON
  - 7 4 = control status AWAY, phone line ON Siren
  - 7 9 = remote access toggles ON/OFF

75 = ON/OFF INTERROGATOR

R? - REMOTE ACCESS (? ?)

▪ PHONE OPTIONS PROGRAMMING EXERCISE

1. Set control status to AWAY with phone line supervision.
2. Set siren to ON when phone line is lost.
3. Set remote access to ON.

▪ QUIZ

1. What do the Master Control Phone Options let you control?

2. What should you set the control status to if the MCU is to be monitored? [illegible] 72, 73, 74
   71 - [illegible]

3. What should you set the phone line supervision to for a status message if phone line is lost?

TROUBLESHOOTING

- Troubleshooting Skills
- Commonly Asked Questions

- **TROUBLESHOOTING SKILLS**
  - **Reduces installation time**
  - **Reduces "go backs"**
  - **Increases customer satisfaction**

▪ COMMONLY ASKED QUESTIONS

Why doesn't the MCU seize the phone line?

TI PROGRAMMER IC

Why can't I dial out? The phone has a constant dial tone.

–

INSTALLATION

- Installation Exercise
- Installation Worksheet

▪ INSTALLATION EXERCISE

In this exercise, you are simulating an actual installation. Read this page before proceeding with the installation.

- Trainer will hand out a floor plan of the installation site.
- Review house plan carefully before picking up supplies from trainer.
- You may need to make changes to the installation due to oversights by your "boss/salesperson."
- Use any information you have to complete the exercise.
- Complete as much of the installation as you can in allotted time.
- Trainer will review your work and score every aspect of the installation.

▪ INSTALLATION EXERCISE CHECKLIST

- ❒ Review house plan (handout from Trainer).
- ❒ Pick up necessary equipment from Trainer.
- ❒ Plan system using the worksheets included in this section.
- ❒ Wire phone line.
- ❒ Power up MCU.
- ❒ Program visitor access code.
- ❒ Program sensors.
- ❒ Program X-10 Modules.
- ❒ Program the WIS.
- ❒ Wire the Hardwire Exterior Siren.
- ❒ Perform final system tests.
- ❒ Program master control phone options.

▪ INSTALLATION EXERCISE SENSOR WORKSHEET

1	2	3	4	5	6
Sensor Number	**Sensor/ Detector Type**	**Location Description**	**Location Number**	**Arming Level HOME/ AWAY**	**Delay 1 or 2**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

▪ INSTALLATION EXERCISE LAMP MODULE WORKSHEET

1	2	3	4	5	6	7
Type of Light	**Light Number**	**Location Description**	**Location Number**	**Owner-Set** On-Tm Off-Tm	**Delay 1 or 2**	**Mot Det Sensor Number**
Untimed	1					
Untimed	2					
Motion	3					
Motion	4					
Timed	5					
Timed	6					
Timed	7					
Entry/ Exit	8					
Alarm Memory	9					

▪ INSTALLATION EXERCISE APPLIANCE MODULE WORKSHEET

1	2	3	4	5
Type of Appliance	**Option Number**	**Location Description**	**Location Number**	**Owner-Set** On-Tm Off-Tm
Untimed	1			
Untimed	2			
Untimed	3			
ON	4			
ON	5			
Timed	6			
Timed	7			
Timed	8			
Timed	9			

▪ INSTALLATION WORKSHEET

1. List the guidelines for mounting a motion sensor.

2. What is the range of house codes available for the WIS?

3. List the guidelines for mounting a smoke sensor.

4. List the guidelines for mounting the MCU.

5. List the guidelines for mounting the D/W sensor.

6. What is the purpose of the Walk Test?

7. List the guidelines for using an X-10 Lamp Module.

8. List the guidelines for using an X-10 Appliance Module.

9. List the guidelines for mounting a Hardwire Exterior Siren.

10. What corrective actions should you take if a sensor cannot be learned into the MCU?

▪ INSTALLATION WORKSHEET

11. List the steps required for desktop installation of the MCU.

12. List the steps required for wall mounting the MCU.

13. List the steps required to mount the Remote Control.

14. How do you test lights controlled by an X-10?

15. How do you test appliances controlled by an X-10?

PROGRAMMING EXERCISE

Perform the programming exercises on the following page on your FONSAFE System.

▪ PROGRAMMING EXERCISE

1. Change the system time on the MCU.
2. Change the entry/exit delay time.
3. Change the siren time.
4. Delete a sensor from the MCU.
5. Change a sensor's description.
6. Change a sensor's arming level.
7. Change a D/W sensor's delay status.
8. Delete a light from the MCU.
9. Change a light's description.
10. Change the on/off time on a light.
11. Delete an appliance.
12. Change an appliance's description.
13. Change the on/off time on an appliance.
14. Change WIS house code.

TROUBLESHOOTING

List all possible troubleshooting techniques for each question. Use the Installation Manual, Operations Manual, and Additional Troubleshooting Techniques (at the end of this section).

▪ TROUBLESHOOTING WORKSHEET

When I am trying to learn a sensor, the MCU keeps repeating the Sensor Number and the sensor Location Number. Why?

Why isn't the monitoring bureau receiving any reports from the MCU?

▪ TROUBLESHOOTING WORKSHEET

Why doesn't a light using the X-10 Lamp Module work?

Why is the Motion Sensor causing false alarms?

▪ TROUBLESHOOTING WORKSHEET

Why can't I program Interrogator?

Why isn't the WIS producing sound or LED activity?

▪ ADDITIONAL TROUBLESHOOTING TECHNIQUES

This handout contains a summary of system troubleshooting techniques not covered in the *FONSAFE Installation Manual.*

MONITORING BUREAU REPORTING

Monitoring bureau is not receiving reports.

1. Check that the MCU account number, phone number, and STIME has been downloaded to the CS-4000.
2. Check that the DB-8 Cord is plugged into the RJ-31X Jack.
3. Check for proper wiring of the RJ-31X Jack.
4. Verify the phone number of the receiver line with the monitoring bureau operator. Reprogram the phone number and retest, if necessary.
5. Replace the RJ-31X Jack.
6. Replace the DB-8 Cord.
7. Check that the premises phone line is working.
8. Perform a phone test.

▪ ADDITIONAL TROUBLESHOOTING TECHNIQUES (CONT.)

LIGHTS

Light using X-10 Lamp Module does not work.

1. Check light bulb.
2. Check that the light switch on the lamp is turned ON.
3. Check that the lamp is plugged into an X-10 Lamp Module.
4. Check that the lamp is plugged into a non-switched outlet.
5. Check that the HOUSE dial on the X-10 Lamp Module matches the house code in MCU memory.
6. Check to see if the X-10 Lamp Module is programmed with the correct light number.

PHONES

Loss of dial tone on premises phones.

1. Check the RJ-31X Jack's wiring.
2. Replace the RJ-31X Jack.
3. Replace the DB-8 Cord.
4. Perform a phone test after troubleshooting the phone line.

Constant dial tone, preventing dial-out on-premises phones.

Polarity-sensitive phones exist on the premises. Reverse the wires you connected to the brown and gray wire terminals on the RJ-31X Jack.

▪ ADDITIONAL TROUBLESHOOTING TECHNIQUES (CONT.)

WIS

No sound or LED activity from WIS.

1. Check that the WIS is not plugged into a switch controlled outlet. Relocate, if necessary.
2. Move the WIS to a circuit that is not used by any other appliances.
3. Check that the DIP switches are correctly set on the WIS.
4. Check that the MCU is programmed with the correct house code.

SENSORS

The MCU does not respond to sensor activity. There are no alarm, chime, or sensor test sounds.

1. Check that the sensor battery is installed.
2. Check the sensor battery for low voltage. Replace battery, if necessary.
3. Check that the sensor is programmed into MCU memory. Program the sensor, if necessary.
4. Check that sensor is transmitting properly. Replace sensor if it is not transmitting or if it is runaway.
5. Mount the sensor in a different location.

REMOTE CONTROL

The MCU does not respond to Remote Control commands.

1. Operate Remote Control from different locations within the premises to identify areas of intermittent operation.
2. Check that the Remote Control is programmed into MCU memory.

OPERATIONS

- What Your Customers Need to Know
- Operations Worksheet
- Operations Exercise

▪ WHAT YOUR CUSTOMERS NEED TO KNOW

The following checklist is a guide of the features to discuss when demonstrating the system to your customer.

❒ MCU control buttons

❒ MCU control lights

❒ Arm/disarm

❒ Light control

❒ Appliance control

❒ Check and clear system status

❒ Bypass sensors and system faults

❒ Remote Control operation

❒ Phone control

❒ Passwords

❒ System tests

▪ OPERATIONS WORKSHEET

1. List the steps required to arm the system to **HOME** and describe what this arming level means.

2. What does single button arming mean?

3. After arming the system how should people exit the premises?

4. What are the common causes of false alarms?

5. Define master and visitor passwords and list the steps to change them.

6. What is the purpose of the Auxiliary, Fire, and Police buttons?

7. What is the purpose of the Home Sensor Test and how often should it be performed?

8. If the **READY** light is off, what should the user do?

▪ OPERATIONS WORKSHEET (CONT.)

9. List the steps required to cancel an alarm.

10. List the steps required to bypass an open sensor and describe what bypassing a sensor means.

11. What should a user do if they cannot remember their password?

12. What is the purpose of the Master Control Battery Test and how is it performed?

13. What should the user do if their Smoke Sensor beeps once per minute?

14. What is the purpose of the System Keypad Test and how is it performed?

15. What trouble messages should prompt the user to call their dealer?

▪ OPERATIONS EXERCISE

Do this exercise after completing the Operations Worksheet. Perform this demonstration exercise to your group as if you were really teaching your customer about the system.

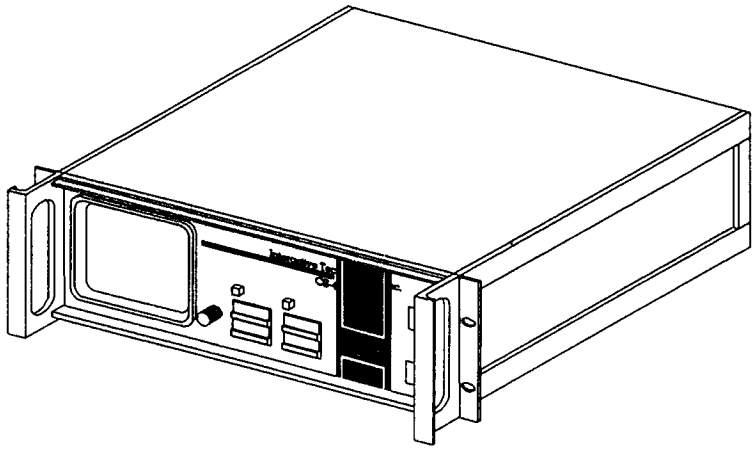
1. Arm the MCU to HOME, AWAY, then OFF.
2. Turn on a light.
3. Check the status of all X-10 Lamp Module controlled lights.
4. Turn on an X-10 Appliance Module.
5. Check the status of an X-10 Appliance Module from the Remote Control.
6. Turn on all X-10 Lamp Module controlled lights.
7. Perform two commands from an on-site phone.
8. Perform one system test and explain the other system tests.
9. Show the various functions of the RESET button.
10. Show how to cancel an emergency alarm and explain what may happen if the alarm isn't cancelled quickly enough.

CS-4000

Review this section on your own or with your group. The CS-4000 Exercise will be performed with the trainer.

- Introduction
- Setting Up a New MCU for Monitoring
- Programming the MCU
- CS-4000 Interactive Commands
- CS-4000 Exercise

▪ INTRODUCTION



Used to monitor and program the FONSAFE system

- Can view, update, and print MCU configuration
- Monitors other popular alarm panel formats
- Extensive on-line help
- 4 incoming phone lines
- 1 programming line
- 3 RS-232 ports

▪ SETTING UP A NEW MCU FOR MONITORING

Task	Action
FROM THE MCU: Enter Program Mode	At the MCU, press **PROGRAM.** Enter the 4 digit master password. Press **73** Notify monitoring bureau the MCU is prepared to become interactive.
FROM THE CS-4000: Become interactive with the MCU	From the monitoring bureau, call the installation site, and let the phone ring twice. Hang up. Call back within 5 seconds. The MCU will pick up on the second ring. Type **ANSWER 1.**
Download MCU account number	Type **ACCOUNT.**
Download MCU phone number	Type **PHONE.**
Download MCU times when supervisory and low battery reports are called in	Type **STIME.**
Disconnect from MCU	From the CS-4000, type **RELEASE.**

NOTES

The commands listed above are required for monitoring, however, other CS-4000 programming can be used at this time.

▪ PROGRAMMING THE MCU

Task	Action
Enter Program Mode	Press **PROGRAM** Enter the 4 digit master password. Call the monitoring bureau.
Put the MCU into the Interactive Mode	Press **8** on the MCU when you hear the phone ring. The Ready LED on the MCU blinks when the CS-4000 is interactive with the MCU.

NOTES

The procedure above can be used only after completing the procedure on the previous page, "Setting Up a New MCU for Monitoring."

▪ CS-4000 COMMANDS

Command	Definition
ACCOUNT	Controls account number stored in MCU.
ACCESS	Sets or finds the MCU's master password.
ALARMQ	Displays the MCU's last six alarms.
ARMLEV	Sets sensor arming level.
BYPASS	Bypasses a sensor in the MCU.
COMPLOG	Configures CS-4000 channel settings for ITICOMP records.
CPUTIME	Synchronizes MCU's time with CS-4000 time.
CUSTCODE	Sets MCU's customer code or verification code.
DELAY	Sets sensor in MCU to act as delayed sensor.
DELETE	Deletes sensor from MCU memory.
DESCRIPTION	Assigns description number to sensor.
ENTRY	Controls entry delay times in MCU.
EXIT	Controls exit delay times in MCU.
HELP	Provides information and examples of how to use commands.
PHONE	Enters primary phone number in MCU's memory.
PHONE2	Enters secondary phone number in MCU's memory.
PLEVEL	Controls arming level in MCU.
RELEASE	Updates MCU memory and disconnects from MCU.
RESTORE	Restores bypassed sensor in MCU.
STIME	Controls time that supervisory and low battery reports are calling into the monitoring bureau.
TIMEOUT	Controls length of time sirens will sound when activated.
TTONE	Enables or disables use of TouchTone dialing.
ZONES	Lists information from each sensor programmed into the MCU.

NOTES

See the "CS-4000 Installation and User Manual" for more information.

▪ CS-4000 EXERCISE

This exercise will be performed with the trainer.

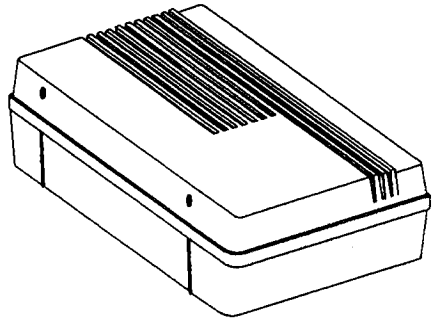
1. Set up a new MCU for monitoring.
2. View the list of sensors programmed into the MCU.
3. Change a description number on a sensor.
4. Request help on the DELAY command.

INTERROGATOR

Review this section on your own or in your group. The Interrogator Exercise will be performed with the trainer.

- Introduction
- Interrogator Components
- Wiring Interrogator
- Accessing Interrogator for Programming
- Required Programming Steps
- Interrogator Exercise

▪ INTRODUCTION



Lets the monitoring bureau listen-in and talk-back to a person on the premises after an alarm is reported.

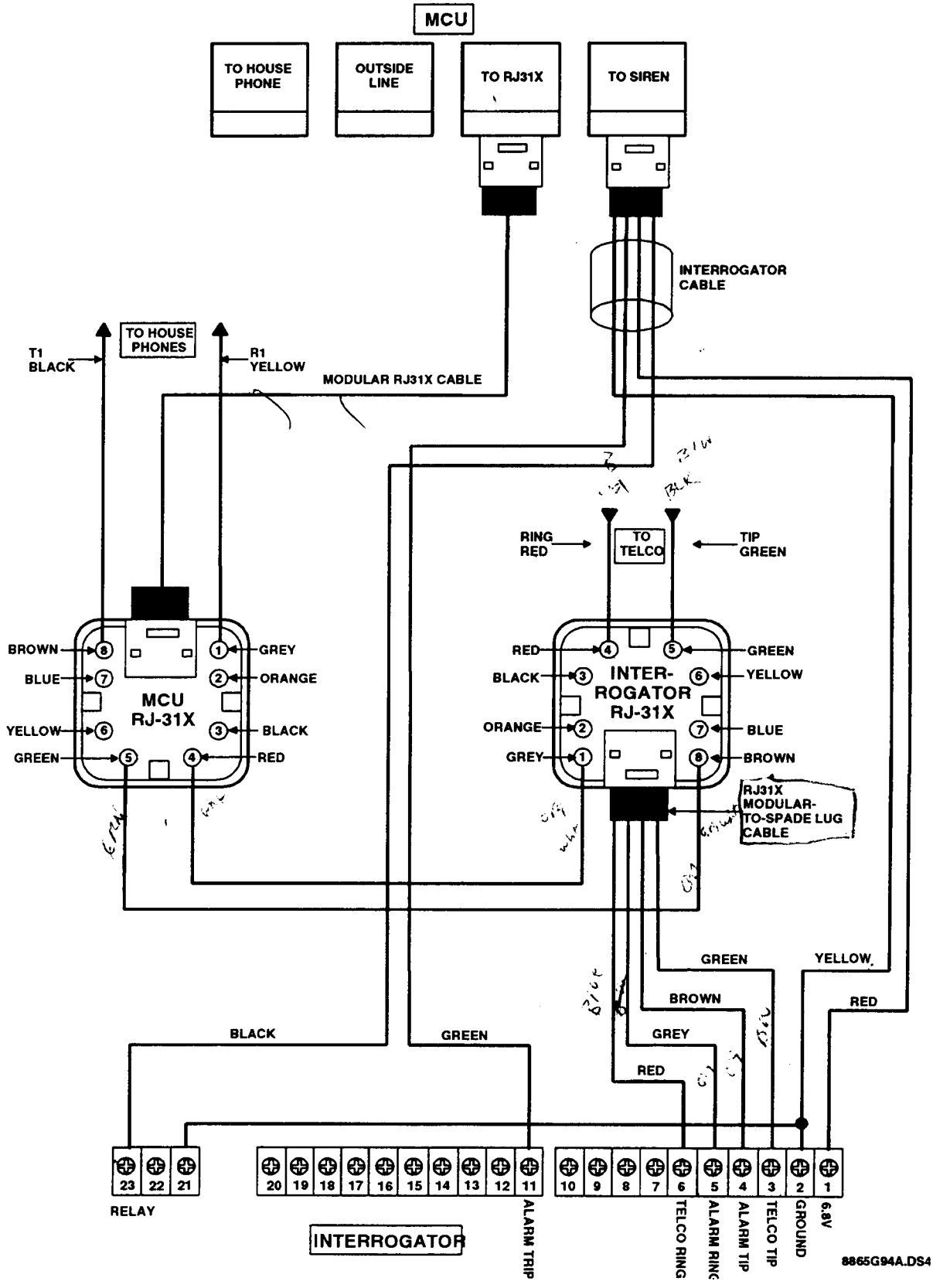
- Two-way voice module
- Half duplex 4 TALK 0 LISTEN 99 TERMINATE 7 EXTEND
- Supports up to 3 microphones
- WIS and exterior siren turn off when in listen-in or talk-back mode.
- Programming information stored in EEPROM
- Automatic phone line disconnect 1 1/2 MIN. APPROX.
- Operates on 6.8 Volts (FROM PANEL)

▪ INTERROGATOR COMPONENTS

Review the *Interrogator Module Installation Manual* to learn about the topics listed below.

- Circuit board
  - Microphone gain adjustment
  - Speaker volume adjustment
  - Terminal strips 1, 2, and 3
- Interrogator devices
  - Interrogator Microphone and Speaker
  - Drill Mount Microphone
  - Speaker Cover Microphone
- Wiring microphones and speakers
  - Handles up to 3 microphones
  - Always wire the ground lead (black & white wire) and shielded cable lead (bare wire) to Interrogator terminal 13 to reduce interference.

▪ WIRING INTERROGATOR



▪ PROGRAMMING

Review the *Interrogator Module Installation Manual* to learn about the topics listed below.

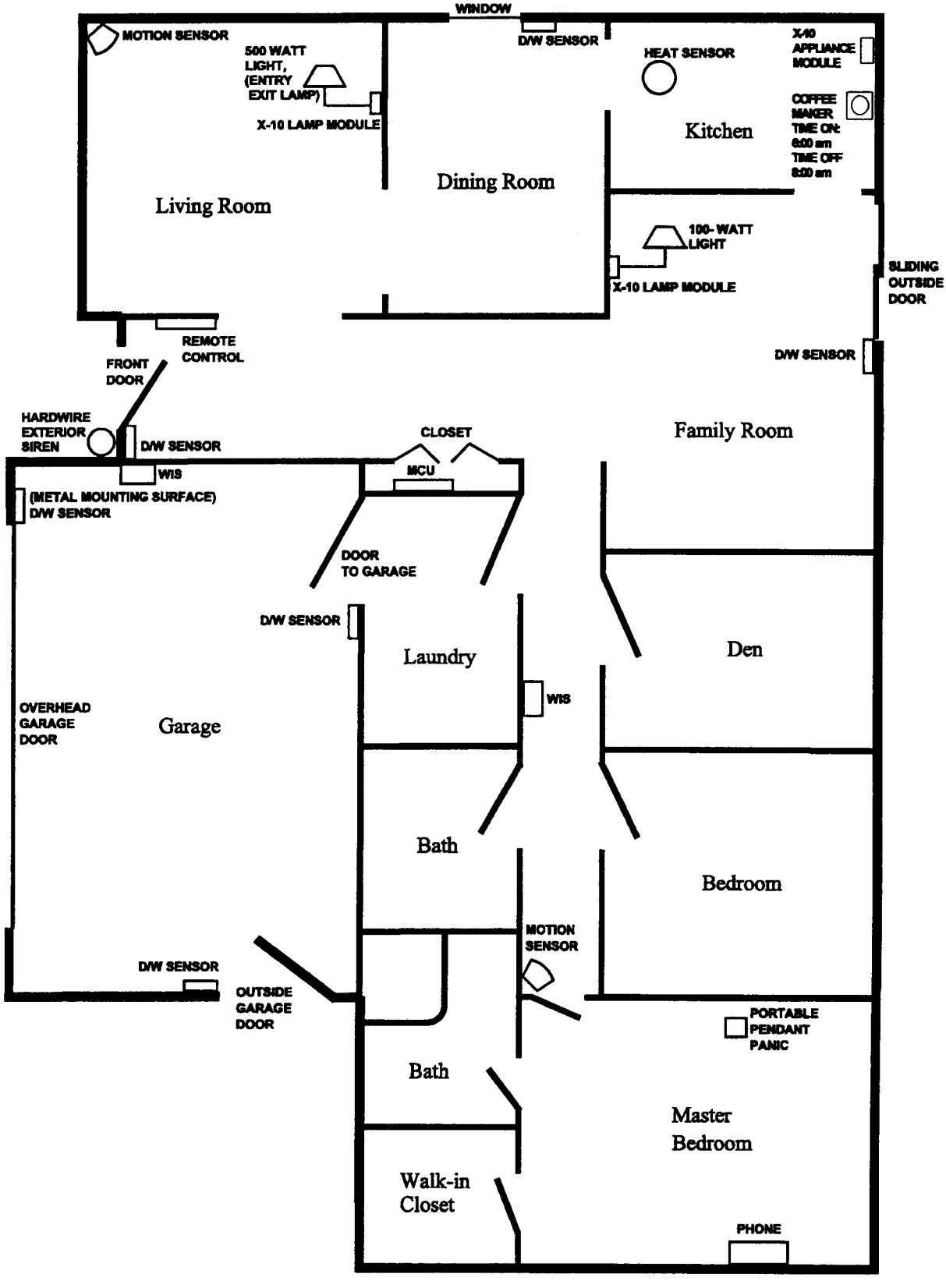
- All programming done from an off-premises phone.
- 2 Ring, Pause, 2 Ring Method
- 10 Ring Method
- Required programming steps to set up Interrogator

▪ INTERROGATOR EXERCISE

The Interrogator Exercise will be performed with the trainer.

1. Access Interrogator using the 2 Ring, Pause, 2 Ring Method.
2. Using the *Interrogator Module Installation Manual,* perform the required programming steps for setting up Interrogator.
3. Turn speaker ON.
4. Increase gain on microphone 1.
5. Change Interrogator password to 4321.
6. Test off-site access.

INSTALLATION FLOOR PLAN



INTERACTIVE TECHNOLOGIES, INC.
EDUCATIONAL SERVICES

COURSE CRITIQUE

The information you provide on this form will assist ITI in the evaluation and improvement of the courses currently offered and on the development of new courses. Please complete this form and return it to the instructor. Thank you for attending this class.

STUDENT INFORMATION

Student Name_____

Company Name_____

City_____ State_____ Zip_____

Course Description_____ Factory [ ] Regional [ ]

Course Dates_____

_____

Circle the number that best describes your answer:	**1 - Lowest**			**4 - Highest**
Instructor's Knowledge Level	1	2	3	4
Instructor's Organization	1	2	3	4
Organization of Course Materials	1	2	3	4
Value of Information Presented	1	2	3	4
Overall Perception of Course	1	2	3	4
Did This Course Meet Your Needs and Expectations?	1	2	3	4

How would you rate your ability to:

Install a Control Panel?	1	2	3	4
Program a Control Panel?	1	2	3	4
Program the Sensors?	1	2	3	4
Instruct a Customer in the System Operation?	1	2	3	4

In an effort to improve this course to better meet the needs of those attending training, we invite your comments and suggestions in the following areas:

What areas should be covered more thoroughly?

Was too much time spent on any subject?

Did the course offer enough hands-on time with the equipment?

How was this course beneficial to you?

What other related subjects would you be interested in taking courses on?

Additional Comments:

INSTALLATION EXERCISE

▪ SENSOR WORKSHEET

1	2	3	4	5	6
Sensor No.	**Sensor Type (D/W, Motion, Smoke, etc.)**	**Sensor Code (D/W Only)**	**Description Number**	**Arming Level (Home/Away)**	**Delay 1 or 2**
1	D/W	2	1	HOME OR 2	2
2					
3					
4					
5					

1 FOR DELAY
2 FOR INSTANT

Location Description	Number	Location Description	Number	Location Description	Number
No description	0	Living Room	10	Downstairs	20
Bedroom 1	1	Dining Room	11	Hall	21
Bedroom 2	2	Guest Room	12	Front Hall	22
Bedroom 3	3	Laundry Room	13	Kitchen	23
Bedroom 4	4	Utility Room	14	Office	24
Master Bedroom	5	Front Door	15	Basement	25
Child's Bedroom	6	Back Door	16	Garage	26
Guest Bedroom	7	Garage Door	17	Attic	27
Bathroom	8	Basement Door	18	Closet	28
Master Bathroom	9	Upstairs	19	Den	29

Sensor	Sensor Code
Door	1
Window	2
Motion	3
Heat	4
Freeze	5
Flood	6
Glass Break	7
Utility	8

▪ LAMP MODULE WORKSHEET

1	2	3	4	5	6	7
Type of Light	**Light Number**	**Location Description**	**Location Number**	**Owner-Set** **On-Tm Off-Tm**	**Delay 1 or 2**	**Mot Det Sensor Number**
Untimed	1					
Untimed	2					
Motion	3					
Motion	4					
Timed	5					
Timed	6					
Timed	7					
Entry/ Exit	8					
Alarm Memory	9					

▪ APPLIANCE MODULE WORKSHEET

1	2	3	4	5
Type of Appliance	**Option Number**	**Location Description**	**Location Number**	**Owner-Set** On-Tm Off-Tm
Untimed	1			
Untimed	2			
Untimed	3			
ON	4			
ON	5			
Timed	6			
Timed	7			
Timed	8			
Timed	9			

(4-9 TIMED)

▪ PROGRAMMING QUICK GUIDE

Press **PROGRAM.**
Enter **Master Password**, then:

FOR	TO	PRESS
TIME	**Change System Time**	**1, 1**
	Arm Timed Lights	**1, 2**
	Arm Timed Options	**1, 3**
	Change Entry/Exit Delay Time	**1, 4**
	Change Siren Time	**1, 5**
SENSORS/ DETECTORS	**Learn New Sensor/Detector**	**2, 1, 1**
	Delete Sensor/Detector	**2, 1, 2**
	Change Description	**2, 1, 3**
	Change Arming Level	**2, 1, 4**
	Change Delay Status	**2, 1, 5**
	Listen to Status	**2, 1, #**
MODULES	**Program or Change Lights**	**2, 2, 1**
	Program or Change Options	**2, 2, 2**
	Delete Lights	**2, 2, 3**
	Delete Options	**2, 2, 4**
HOUSECODES	**Change Lights Housecode**	**2, 2, 5, 1**
	Change Options Housecode	**2, 2, 5, 2**
	Listen to Housecode Description	**2, 2, 5, #**
	*OPTIONS	2253
PASSWORDS	**Change Master Password**	**3, 1**
	Change Visitor Password	**3, 2**

To exit from Program Mode at any time:
Press RESET, OFF.