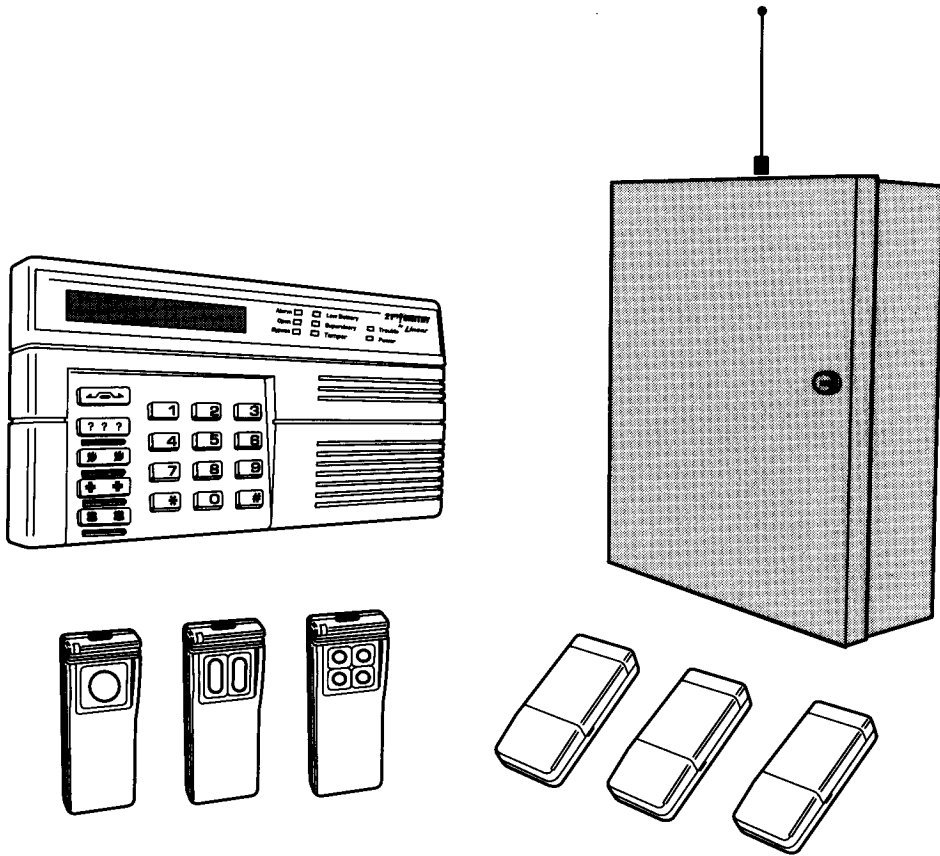


CP-90

Supervised Wireless Security Control/Communicator



Mechanical & Electrical Installation Instructions

Linear[®]

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INTRODUCTION

The CP-90 Supervised Wireless Security Control/Communicator represents a significant advancement in state-of-the-art fully supervised wireless security systems. Designed to meet or exceed the requirements of most UL residential burglar alarm installations, the control provides 64 separate zones of sensor input, 10 control outputs and a fully programmable digital communicator.

Inside, the CP-90 features Linear's latest narrow-band Superheterodyne radio receiver. The system can receive three radio formats including Linear's "S1" supervised wireless, "MegaCode™" and the "SX" RF transmission format.

Failure to install the control unit and accessories in accordance with the UL requirements voids the listing mark of Underwriters Laboratories.

Use this manual in conjunction with the CP-90 Programming Instructions (P/N 208254) when programming and testing the CP-90 system.

The following documents are included with the CP-90 system:

- ✓ CP-90 Mechanical & Electrical Installation Instructions (P/N 207416)
Complete installation instructions for the CP-90 system.
- ✓ CP-90 Programming Instructions (P/N 208254)
Complete programming instructions for the CP-90 system.
- ✓ CP-90 Programming Key (P/N 207418)
Multi-color fold out sheet summary of each CP-90 programming function, selector, value ranges and value defaults.
- ✓ CP-90 Programming Worksheet (P/N 207744)
Worksheet for the installer to enter the programming values for the CP-90 system. Blank spaces are provided to write in programmed values for later reference.
- ✓ CP-90 Installation Outline (P/N 208426)
A single sheet outline intended to guide the installing alarm dealer through the complete installation and programming of a CP-90 system.
- ✓ CP-90 Programming Template (P/N 208247)
An adhesive backed label to apply to the KD-90 keypad to aid in identifying the programming keys.
- ✓ CP-90 User's Guide (P/N 207417)
An end-user's guide detailing system operation. This manual is to be left at the installation site for the system user.
- ✓ CP-90 Registration Card (P/N 207847)
Postage paid card for the installing dealer to fill out and mail.

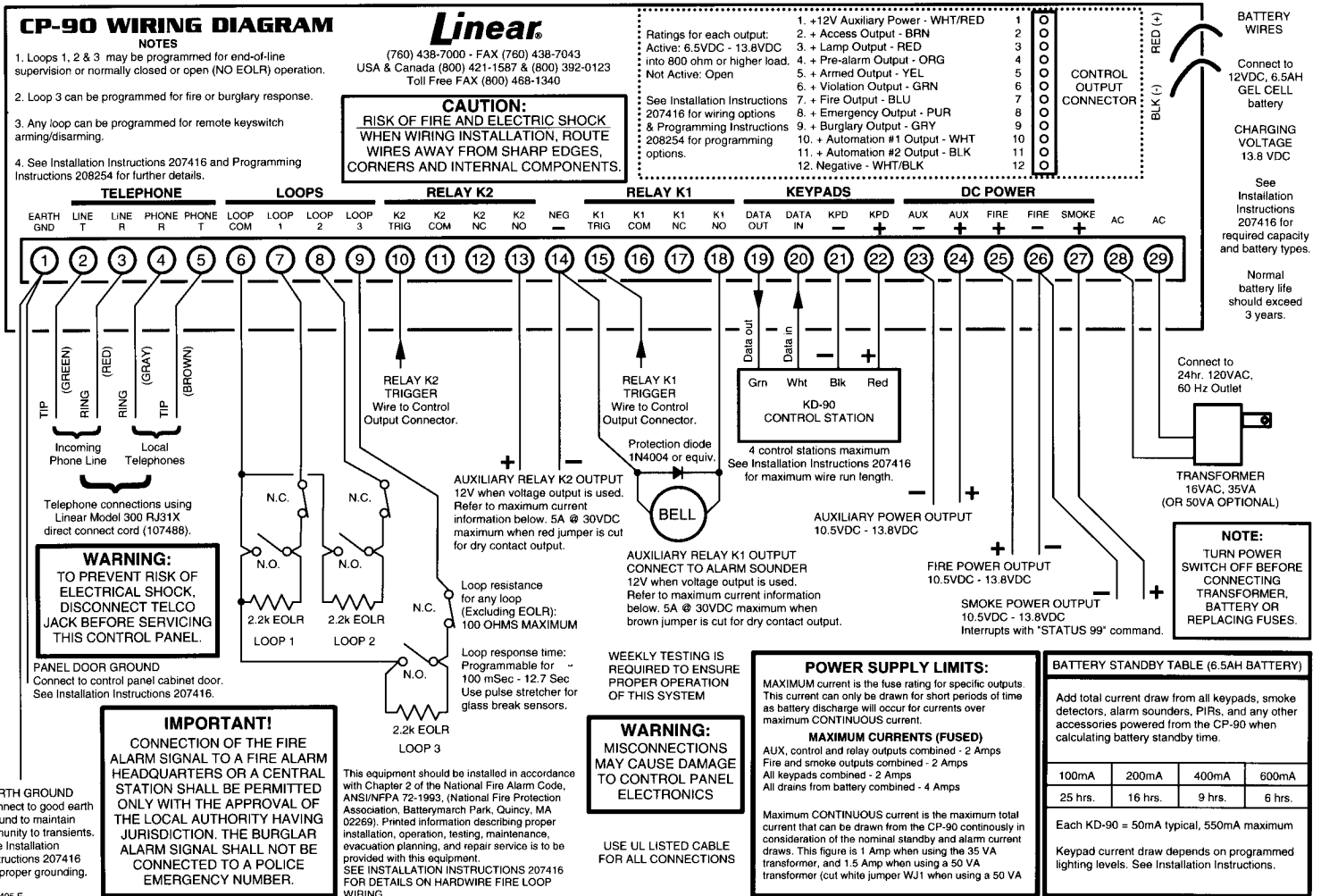


Figure 1. CP-90 Wiring Diagram (Same as on Panel Door)

TABLE OF CONTENTS

FEATURES & SPECIFICATIONS	2	SYSTEM POWER-UP	19
INSTALLATION OUTLINE	3	First Time Power-up	19
WIRELESS INSTALLATION TIPS	3	Restoring Factory Defaults	19
CP-90 ACCESSORIES	4	Internal Diagnostic Checks	19
KD-90 KEYPAD FEATURES	6	Watchdog Monitor	19
TK-90 WIRELESS KEYPAD FEATURES	7	CONTROL STATION OVERVIEW	20
PRE-INSTALLATION	8	Power-up Indications	20
Unpacking the System	8	Keypad Lighting	20
Planning the Installation	8	Keypad Supervision	20
Creating an Installation Floor Plan	8	Keypad Lockout Timer	20
Installation Examples	8	Programming Level Timer	20
CONTROL PANEL & ANTENNA	9	Control Station Operation	20
Mounting The CP-90 Control	9	SYSTEM ZONES	21
Antenna Hook-up	9	Exterior	21
KEYPAD INSTALLATION	10	Interior	21
Control Stations (Keypads)	10	Restricted Interior	21
PHONE LINE & LOOP WIRING	11	Fire	21
Communicator Phone Line	11	Emergency	21
Hardwire Loop Wiring	11	Police/Hold-up	21
Fire Loops	11	Arm/Disarm Toggle	21
Key Station Wiring	11	Delayed Remote Emergency	21
AUXILIARY RELAYS & CONTROL OUTPUT CONNECTOR	12	Delayed Remote Police/Hold-up	21
Auxiliary Relays	12	Guard Zone	21
Control Outputs	12	Environmental Type A	21
+12 VDC Auxiliary Power (White/Red Wire)	12	Environmental Type B	21
Negative Power Output (White/Black)	12	Environmental Type C	21
Fire Output (Blue Wire)	13	Chime Only Zone	21
Emergency Output (Purple Wire)	13	Automation #1	21
Burglary Output (Gray Wire)	13	Automation #2	21
Access Output (Brown Wire)	14	Access Only	21
Lamp Output (Red Wire)	14	Tx Type Transmitter Button Disable Zone	21
Pre-alarm Output (Orange Wire)	14	SECURITY LEVELS	22
Armed Output (Yellow Wire)	14	Programming Level (For Installers Only)	22
Violation Output (Green Wire)	15	Test Levels	22
Automation Output #1 (White Wire)	15	Disarm/Cancel and Low Security Levels	22
Automation Output #2 (Black Wire)	15	High Security Arming Levels	22
Installing Auxiliary Accessory Boards	15	KEYPAD SOUNDS	23
DC POWER & GROUND	16	Audible Signals and Sirens	23
Auxiliary Power Output	16	KEYPAD COMMANDS	24
Fire Power Output	16	Status Key Commands	24
Smoke Power Output	16	Special Keypad Commands	24
Earth Ground	16	TROUBLE DISPLAYS	25
Panel Door Ground	16	Sensor Trouble Codes	25
AC POWER & BACKUP BATTERY	17	Control Panel Trouble Codes	25
AC Transformer	17	Internal System Trouble Codes	25
Backup Battery	17	APPENDIX A	26
Automatic Backup Battery Testing	17	CP-90 Program Memory	26
Manual Backup Battery Testing	17	Changing the Program Memory Chip	26
OPTIONAL ACCESSORIES	18	INDEX	28
Audio Output Connector	18	LINEAR LIMITED WARRANTY	29
2-Way Audio Connector	18		

FEATURES & SPECIFICATIONS

CP-90 Control Board:

- ☆ Three (3) two-wire zones each supervised with a 2.2K Ohm end-of-line resistor.
- ☆ Sixty-one (61) fully supervised wireless zones.
- ☆ Three (3) keypad activated emergency zones.
- ☆ Thirty-two (32) Personal Access Codes available.
- ☆ Eighteen (18) programmable sensor zones.
- ☆ Nominal current drain: 100 mA. (main board only).
- ☆ EEPROM - Retains system programming and arm/disarm status during total power failure.
- ☆ Six (6) stage lightning and transient protection with four layer board technology.
- ☆ Two (2) general purpose Form "C" (5 amp DC) relays.
- ☆ Ten (10) alarm and control outputs.
- ☆ Low Battery detection and monitoring (11.2 Volts threshold).
- ☆ Supports up to four (4) hardwire and four (4) wireless Control Stations.
- ☆ Operating temperature range inside the enclosure: 32 to 122 degrees Fahrenheit (0 to +50 degrees Celsius).

Radio:

- ☆ High sensitivity Superheterodyne receiver: -106 dBm nominal sensitivity.
- ☆ Operates at 303.875 MHz.
- ☆ Receives Linear SX, S1 and MegaCode format transmitters.
- ☆ "F" connector for antenna connection - 1/4 wave whip antenna supplied.
- ☆ Maximum 3500' range. (Maximum distance is for comparative purposes only and may be significantly reduced when the equipment is installed in a typical home.)

Power Supply:

- ☆ 1 Amp regulated with supplied transformer - 1.5 Amp with 16.5 VAC 50VA transformer.
- ☆ Less than 200 millivolts peak-to-peak AC ripple.
- ☆ Regulated 13.8 Volts DC at rated output current.
- ☆ Reverse polarity protection on battery inputs.
- ☆ Float charging circuit: 13.8 Volts DC.
- ☆ Fused Outputs for:
 - Control Station power (3AG-2.0A)
 - Auxiliary output (3AG-2.0A)
 - Fire power (3AG-2.0A)

Battery (not supplied):

- ☆ Rechargeable 12 volt 6.5 Amp-hour lead acid. Charging circuit sized for up to two batteries.
- ☆ Maximum charging current into an 85% discharged battery: Limited to 380 mA.

Transformer:

- ☆ 120 volt 60 Hz U.L. Listed Class II plug-in transformer with 16.5 volt AC 35VA output. Optional 16.5 volt AC 50VA transformer for increased output capacity can be used.

Enclosure:

- ☆ Twenty (20) gauge locking metal cabinet with two (2) keys.
- ☆ Dimensions: 13" x 15.25" x 4"
- ☆ Color: Cool gray.

Digital Communicator:

- ☆ Touch-tone® or Rotary (pulse) dialing. Rotary speed 10pps (60% break, 40% make).
- ☆ FCC Registration number: EF4793-73085-AL-E.
- ☆ Ringer equivalence: 0.6B
- ☆ Reporting formats: 10, 20 and 40 PPS - 3x1, 4x1, 4x2 and 3x1 two line extended. BFSK, SIA (**SIA Format not tested by UL**) and SESCOA SuperSpeed.
- ☆ Primary, Secondary and Supervisory telephone numbers up to 24 digits.
- ☆ Reports full 64 zones and user ID's with SIA and SESCOA SuperSpeed
- ☆ Identifies up to 15 zones and users with two-line extended reporting formats.

Control Stations:

KD-90

- ☆ English language keypad with 2 line x 24 character back-lit LCD display.
- ☆ High intensity downlights for nighttime illumination.
- ☆ Four (4) wire plug-in connector hookup.
- ☆ Seventeen (17) button keypad with audible and tactile feedback.
- ☆ Surface mountable. Mounts to any standard single or double gang electrical box.
- ☆ Eight (8) LED's for system supervision status.
- ☆ Built-in 0.5 watt amplifier and speaker for system and alarm annunciation.
- ☆ Nominal current drain: 50 mA standby (LCD backlight off, down lights off, power LED on).
- ☆ Up to 4 per system.
- ☆ Dimensions: 8.25" x 4.5" x 1.5"
- ☆ Color: Cool gray.

TK-90

- ☆ Wireless keypad. Same 17 button keypad as KD-90 keypad.
- ☆ Battery Operated: Four (4) AA size alkaline batteries (supplied).
- ☆ Battery Life: three (3) years with four operations per day.
- ☆ High intensity LED (green) downlights for nighttime use.
- ☆ Same mounting, dimensions, color and style as the KD-90.

INSTALLATION OUTLINE

The following outline is intended to guide the installing alarm dealer through the complete installation of a CP-90 system.

Use the following outline in conjunction with this copy of the CP-90 Mechanical & Electrical Instructions to guide you through the CP-90 installation.

1. Unpack the system. Identify the system components (transformer, cable, antenna, etc.)
2. Plan the installation by creating an installation floor plan.
3. Mount the CP-90 control panel on the wall.
4. Connect the antenna.
5. Connect the cabinet door ground wire.
6. Connect wire runs to the CP-90 terminals.
 - A. Install a ground stake and run the ground wire or use a cold water pipe or the AC transformer GND terminal as ground for the CP-90.
 - B. Install the telephone jack and run the phone line.
 - C. Install any hardwired switch contacts and end-of-line resistors; run loop wires.
 - D. Install alarm bell or siren and connect to auxiliary relay(s).
 - E. Wire control output connector to auxiliary relay triggers.
 - F. Mount keypads and run wires to CP-90 control station terminals.
 - G. Mount any powered devices (PIR's, smokes) and run wires to CP-90 auxiliary, fire and smoke power terminals.
 - H. Turn CP-90 MASTER POWER switch **off** and connect the plug-in transformer.
 - I. Install the backup battery.
 - J. Install the VB-1 2-way audio board (optional).
7. Proceed to the CP-90 Programming Instructions (P/N 208254) to program and test the system.

WIRELESS INSTALLATION TIPS

When installing any wireless system, certain limitations must be considered. Low power wireless UHF transmitter signals will **not** broadcast equally through all types of construction materials. The CP-90 contains a very sensitive receiver that should allow placement of transmitters in almost all locations. Here are some general wireless guidelines that should be reviewed before beginning the installation. Follow these tips to create the best possible functioning wireless installation.

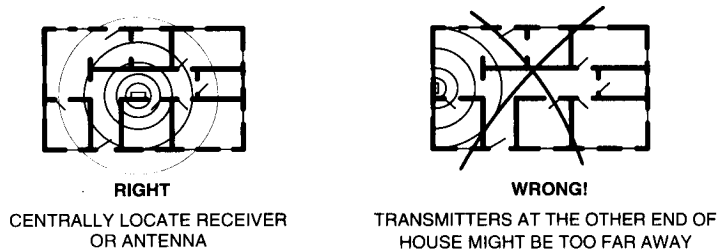


Figure 2. Receiver/Antenna Location

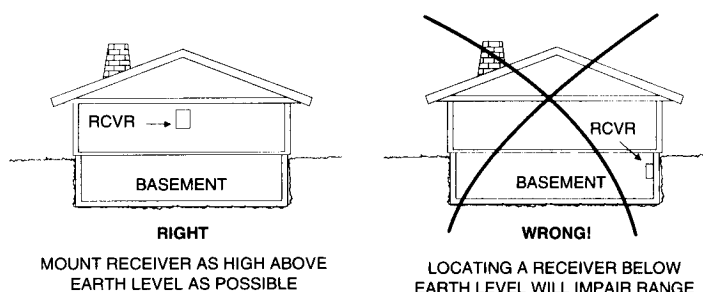


Figure 3. Height of Receiver/Antenna

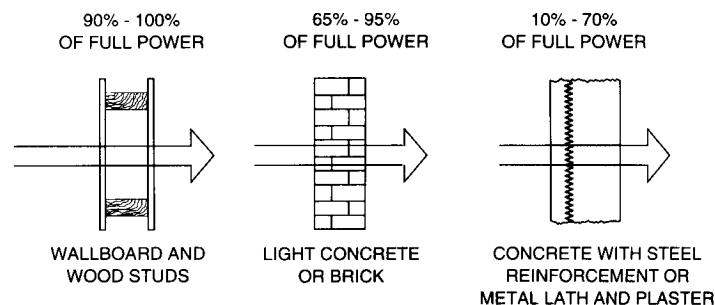


Figure 4. Transmission Through Obstacles

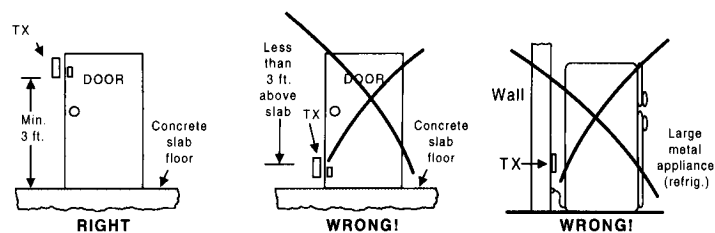
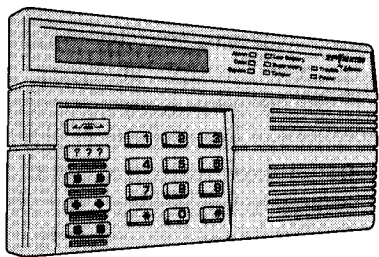
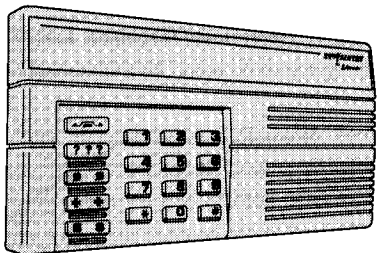


Figure 5. Transmitter Locations



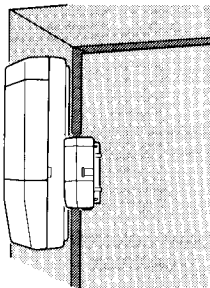
KD-90 ALPHANUMERIC KEYPAD

- ☆ Displays system status and information on two-line English display.
- ☆ Display can be customized by installer for each installation.
- ☆ Shows sensor and system condition on eight LED displays.
- ☆ Sounds system tones, beeps and local alarm sirens.
- ☆ Twelve keys for arming, disarming and changing security levels.
- ☆ STATUS and BYPASS keys for interrogating sensors and special arming.
- ☆ Three 24-hour activation keys for fire, medical, and panic.



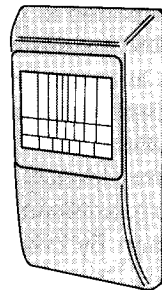
TK-90 WIRELESS KEYPAD

- ☆ Twelve keys for arming, disarming and changing security levels.
- ☆ STATUS and BYPASS keys for sounding system security level and special arming.
- ☆ Three 24-hour activation keys for fire, medical, and panic.
- ☆ Built-in automatic keyboard lighting system.
- ☆ Self-testing; sends its status to the control panel every hour.
- ☆ Internal battery condition is continuously monitored.
- ☆ Low battery condition sounded locally and messages sent to the control panel when batteries get low.



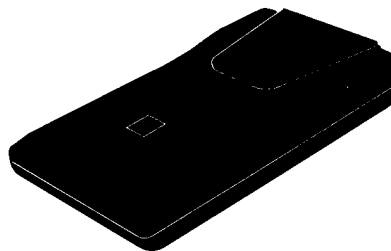
T-90D DOOR/WINDOW SENSOR

- ☆ Stationary sensor with dual built-in magnetic switches with adjustable magnet.
- ☆ Monitors opening of door, window, gun cabinet, drawer, garage door, stereo cabinet, etc.
- ☆ Built-in terminals for connection to external contacts.
- ☆ Self-testing; sends its status to the control panel every hour.
- ☆ Internal lithium battery condition is continuously monitored.
- ☆ Low battery messages sent to the control panel when the batteries get low.



TMD-90 MOTION DETECTOR

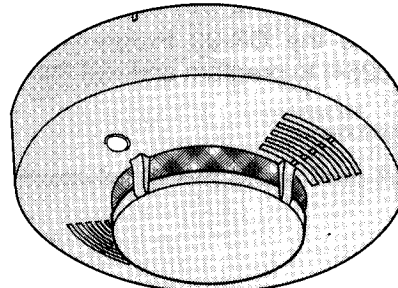
- ☆ Uses passive infrared heat detection to sense motion.
- ☆ Sends message to control panel when monitored area is entered.
- ☆ Self-testing; sends its status to the control panel every hour.
- ☆ Internal battery's condition is continuously monitored.
- ☆ Low battery messages sent to the control panel when battery gets low (12-18 months normal use).



ST-23A MONEY TRAP

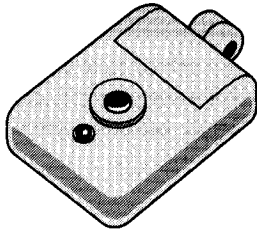
- ☆ For commercial cash register or cash drawer use.
- ☆ Money trap "hides" under a stack of bills for secrecy.
- ☆ Sends hold-up signal when bottom "bait" bill is removed.
- ☆ Built-in drawer motion sensor causes unit to send its status to the control panel when cash drawer is opened.
- ☆ Internal lithium battery condition is continuously monitored.
- ☆ Low battery messages sent to the control panel when batteries get low (5-8 years normal use).

→ **NOTE: Not tested by UL.**



TSD-90A SMOKE DETECTOR

- ☆ High quality smoke detector to monitor areas for the presence of smoke.
- ☆ Sends fire alarm message to the control panel when smoke is detected.
- ☆ Self-testing; sends its status to the control panel every hour.
- ☆ Internal 9-volt alkaline battery condition is continuously monitored.
- ☆ Sounds local beeps and sends low battery messages to the control panel when battery gets low (12-18 months).

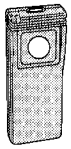


LMT-1 PORTABLE PANIC OR PERSONAL EMERGENCY SENSOR

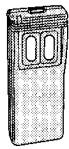
- ☆ Personal protection that can be activated 24-hours-a-day.
 - ☆ Can be worn on neck chain, key chain or carried in pocket.
- **NOTE: Not tested by UL.**

LMT-1 PORTABLE REMOTE CONTROL

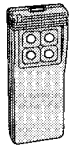
- ☆ Arms and disarms the control panel remotely.
 - ☆ Convenient way to use the system.
 - ☆ Carry one in each vehicle, or on a key chain.
- **Note: Not tested by UL.**



TX-91



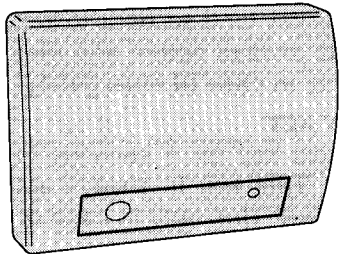
TX-92



TX-94

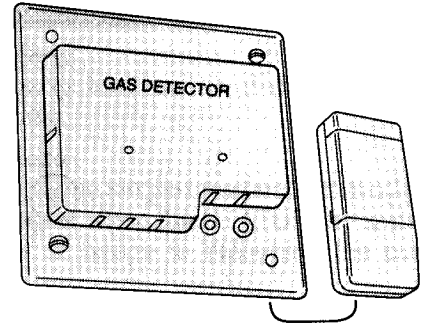
TX-91, TX-92 AND TX-94 PORTABLE SENSORS

- ☆ Each transmitter can be activated by pressing the pushbutton(s) on the front or by pressing the small pushbutton on the top.
- ☆ The bright red LED lights as the transmitter is activated.
- ☆ A belt holder and pocket clip are supplied to attach to the back of the transmitter.
- ☆ A cover plate is also provided to conceal the top pushbutton if required.
- ☆ The transmitters are supervised for low battery, alarm and status reporting.
- ☆ The transmitter is powered by two self-contained type 2032 3-volt lithium batteries (included).
- ☆ If the battery voltage goes below an acceptable level, a low battery report is sent with any alarm, test or status report to notify the receiver.



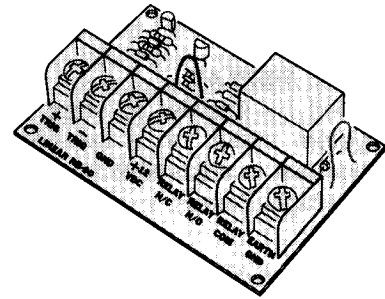
TGB-96 GLASS BREAK DETECTOR

- ☆ Glass break detector with a built-in supervised transmitter.
 - ☆ Unique decision making system which requires both audio emissions and shock vibrations of breaking glass to trigger an alarm transmission.
 - ☆ The transmitters are supervised for low battery, alarm and status reporting.
 - ☆ The transmitter and glass break detector is powered by two self-contained type 2450 3-volt lithium batteries (included).
 - ☆ If the battery voltage goes below an acceptable level, a low battery report is sent with any alarm, test or status report to notify the receiver.
- **NOTE: Not tested by UL.**



ENVIRONMENTAL DETECTOR WITH T-90D SENSOR

- ☆ Stationary sensor for connection to toxic gas detector, freezer thaw sensor, flood alarm, over-temperature detector, etc.
 - ☆ Active 24-hours-a-day.
 - ☆ Signals special alarm when environmental trouble occurs.
- **NOTE: Environmental detector shown is not manufactured or provided by Linear.**
- **NOTE: Environmental detector not tested by UL.**



RB-90 RELAY INTERFACE BOARD

- ☆ Designed to provide high current switching from low current control outputs.
 - ☆ Output contacts can be hot or dry (jumper selectable).
 - ☆ Negative can be earth ground or isolated (jumper selectable).
 - ☆ Can be triggered from a positive or negative signal.
 - ☆ On-board spark gaps provide protection from electrical surges.
- **NOTE: Not tested by UL.**

KD-90 KEYPAD FEATURES

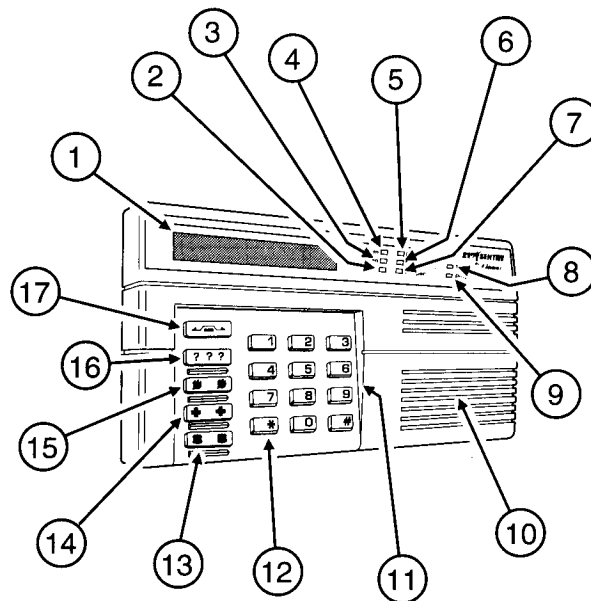


Figure 6. KD-90 Keypad Features

1. ALPHANUMERIC DISPLAY

Custom programmed by installer to show sensor number, locations and system status on a two-line alphanumeric display. Display contrast is adjustable by holding the * key and pressing 0-7 (0=high, 7=low).

2. BYPASS LIGHT

When checking the status of the system, this light shows that the sensor number displayed is bypassed and cannot cause an alarm.

3. OPEN LIGHT

When checking the status of the system, this light goes on to show an open door or window sensor.

4. ALARM LIGHT

Blinks when there has been an alarm. Stays blinking until the system is armed again. **Press STATUS "96" to display the alarm(s) in order of occurrence.**

5. LOW BATTERY LIGHT

When checking the status of the system, this light shows that the sensor number displayed has a low battery and the battery should be replaced.

6. SUPERVISORY LIGHT

When checking the status of the system, this light goes on to show that the sensor number displayed has not reported to the control panel in eight hours. Also lights during some trouble indications.

7. TAMPER LIGHT

When checking the status of the system, this light shows that the sensor number displayed has been tampered with. **Reset by pressing STATUS "97".**

8. TROUBLE LIGHT

Blinks when the system senses an abnormal condition. Press and hold the STATUS key for 1 second to display the trouble. **Press STATUS "97" to clear the indication.**

9. POWER LIGHT

Lights when system is normally powered from AC. Blinks when the system is being powered from its backup battery during an AC power failure or when the battery is low.

10. KEYPAD SPEAKER

Sounds the various system tones, beeps and sirens. Volume of each sound can be programmed independently for each keypad to three different levels or disabled.

11. NUMERIC KEYBOARD

Used to enter codes to control and interrogate the system.

12. * KEY

Resets the keyboard after a wrong key is pressed. Push this key before entering the next keyboard command.

13. POLICE/HOLD-UP KEY

Press and hold this key for 3 seconds to trigger police/hold-up alarm. **This key is always active and may be triggered at any time. Use only in case of emergency!**

14. EMERGENCY KEY

Press and hold this key for 3 seconds to trigger personal emergency alarm. **This key is always active and may be triggered at any time. Use only in case of emergency!**

15. FIRE KEY

Press and hold this key for 3 seconds to trigger the fire alarm. **This key is always active and may be triggered at any time. Use only in case of emergency!**

16. STATUS KEY

Press to display and sound the current security level. Press and hold for 1 second to display the current status of each sensor. Press and enter a two-digit sensor number to display the current status of that sensor.

17. BYPASS KEY

After arming the system, press and hold for 1 second to bypass all sensors that are open. Press and enter a two-digit sensor number to bypass a specific sensor.

TK-90 WIRELESS KEYPAD FEATURES

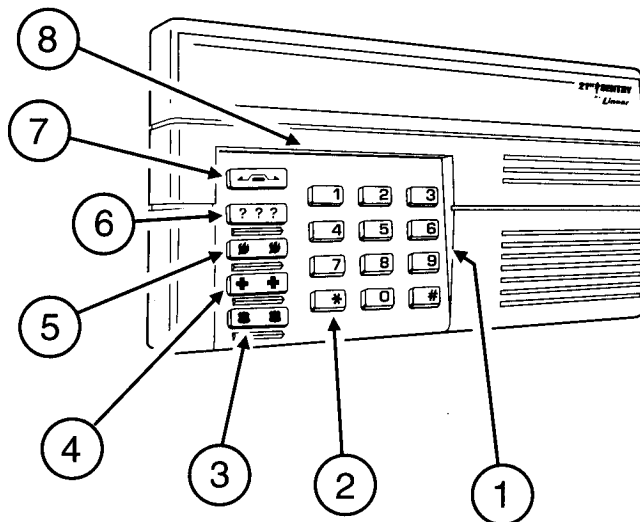


Figure 7. TK-90 Wireless Keypad Features

1. NUMERIC KEYBOARD

Used to enter codes to run and interrogate the system.

2. * KEY

Resets the keyboard after a wrong key is pressed. Push this key before entering the next keyboard command.

3. POLICE/HOLD-UP KEY

Press and hold this key for 3 seconds to trigger police/hold-up alarm. **This key is always active and may be triggered at any time. Use only in case of emergency!**

4. EMERGENCY KEY

Press and hold this key for 3 seconds to trigger personal emergency alarm. **This key is always active and may be triggered at any time. Use only in case of emergency!**

5. FIRE KEY

Press and hold this key for 3 seconds to trigger the fire alarm. **This key is always active and may be triggered at any time. Use only in case of emergency!**

6. STATUS KEY

Press and release to sound the current security level from a hardwired keypad.

7. BYPASS KEY

After arming the system, press and hold for 1 second to bypass sensors that are open. Press and enter a two-digit sensor number to bypass a specific sensor.

8. GREEN DOWNLIGHTS

When any key is pressed on the keypad, bright green downlights illuminate the keys. The lights will remain on for 15 seconds after the last key is pressed.

If the downlights flash and the keypad chirps as each key is pressed, the keypad batteries are low. Refer to the TK-90 Installation Instructions for further details.

IMPORTANT: Do not mount the TK-90 on a **metal** electrical box. The radio range will be reduced. Use a single- or double-gang **plastic** electrical box.

PRE-INSTALLATION

Unpacking the System

The CP-90 system package includes the following accessories:

Plug-in Transformer. Provides low voltage power to the control panel.

Whip Antenna. Standard local antenna that mounts on the CP-90 cabinet.

Control Output Cable. Used to connect control outputs to the on-board auxiliary relays. Also used to connect to external devices and indicators.

End-of-Line Resistors. Three 2.2K resistors are supplied for supervising each of the hardwired loops. **(EOL Resistors P/N 209414 required by UL for hardwire loops.)**

Mounting Screws & Anchors. Used to mount the CP-90 cabinet to the wall. Plastic screw anchors are provided for mounting on wallboard.

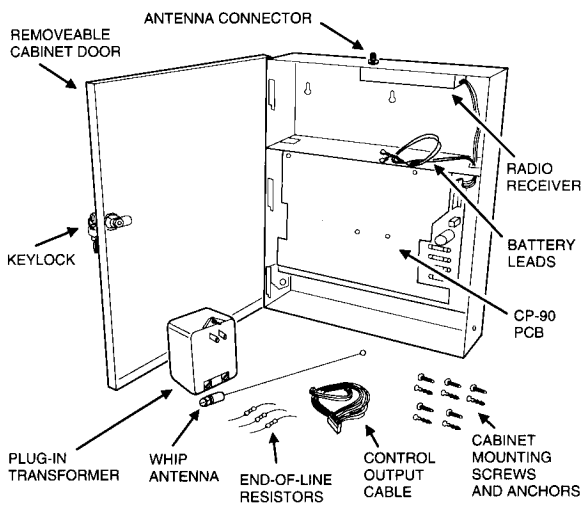


Figure 8. CP-90 System Pack

Planning the Installation

Consider the security needs of the premises to be protected. Through which doors or windows would an intruder most likely attempt to gain entrance? The front and rear doors should be considered, of course, followed by any doors or windows (including basement windows) that are poorly lighted or not visible from the street. If entry is gained through a window, to which areas would an intruder most likely go?

Creating an Installation Floor Plan

Draw a rough floor plan of the premises to be protected by the CP-90. Indicate all the doors and windows that are possible paths of intrusion and would require monitoring by a wireless transmitter or hardwired contact. Indicate locations for telephone, power, sirens, bells, strobes or any other external accessory devices.

NOTE: Up to 61 transmitters and three hardwired loops can be used with the CP-90 Control Panel.

Figures 9, 10, 11, & 12 are example floor plans of typical installations showing areas where protection is required. Also shown are the mounting locations for various accessory devices that can be used with the CP-90 system.

NOTE: For smoke detector installation requirements, refer to the Installation Instructions enclosed with the smoke detector.

Installation Examples

CP - CP-90 CONTROL
T - TRANSMITTER
CS - KEYPAD
P - PASSIVE INFRARED
S - SIREN
ST - STROBE LIGHT
KS - KEY STATION

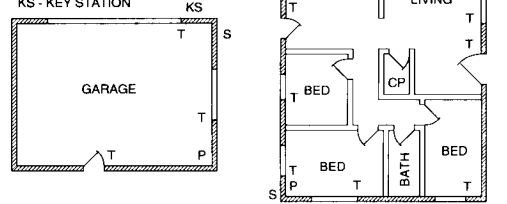


Figure 9. Small Residential Installation

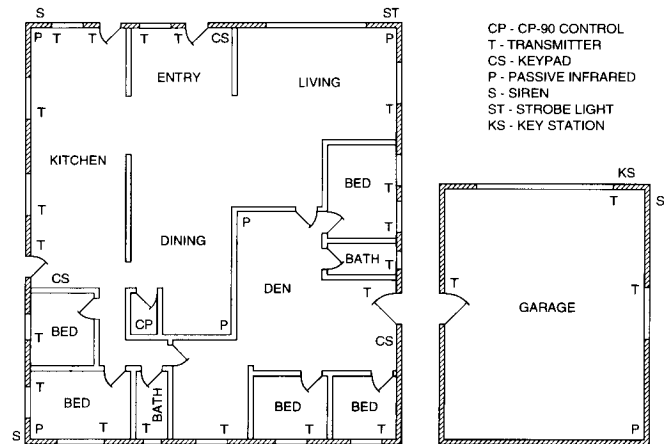


Figure 10. Large Residential Installation

CP - CP-90 CONTROL
T - TRANSMITTER
CS - KEYPAD
P - PASSIVE INFRARED
S - SIREN
ST - STROBE LIGHT

NOTE: THE CP-90 IS NOT UL LISTED FOR COMMERCIAL USE.

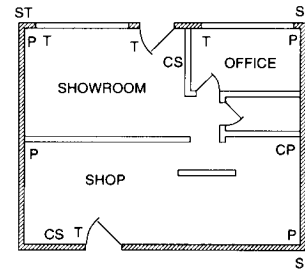
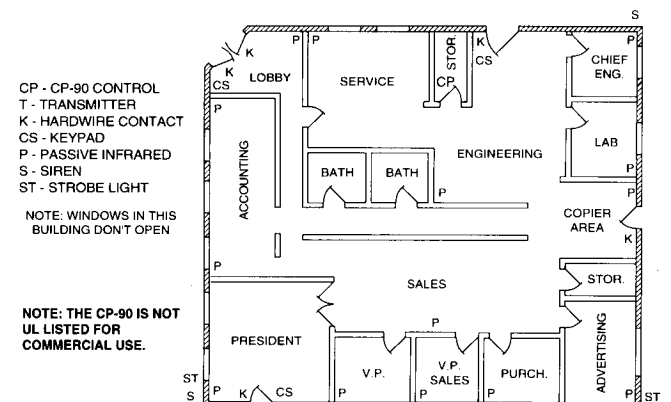


Figure 11. Small Commercial Installation



NOTE: WINDOWS IN THIS BUILDING DON'T OPEN

NOTE: THE CP-90 IS NOT UL LISTED FOR COMMERCIAL USE.

Figure 12. Large Commercial Installation

CONTROL PANEL & ANTENNA

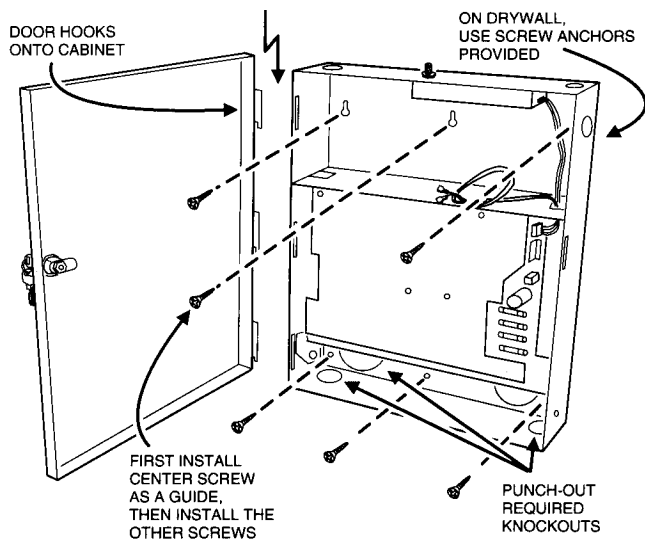


Figure 13. Mounting Cabinet

Mounting The CP-90 Control

- STEP 1** Decide on a good location (near power, telephone, good reception area and good wiring access) to mount the control panel. It should be a secure and dry location. The mounting area must remain between 32 and 122 degrees Fahrenheit year-around.
- STEP 2** The cabinet has seven small conduit knockouts on the sides, two large conduit knockouts on the rear and one small conduit knockout on the bottom. Punch out required knockouts.
- STEP 3** The cabinet has six mounting holes. Install one screw first for the top center hole. Hold the cabinet on the screw and mark the locations for the remaining screws. Install all of the supplied screws to firmly attach the cabinet to the wall.

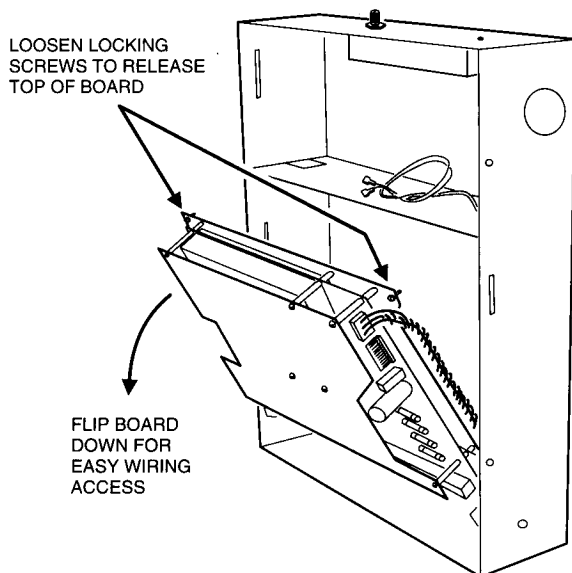


Figure 14. Lowering Board for Wiring Access

FOR MOST INSTALLATIONS USE THE STANDARD WHIP ANTENNA

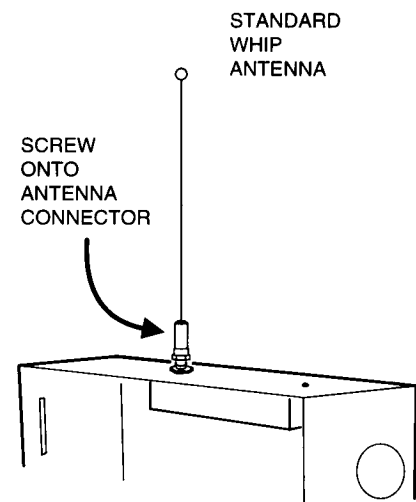


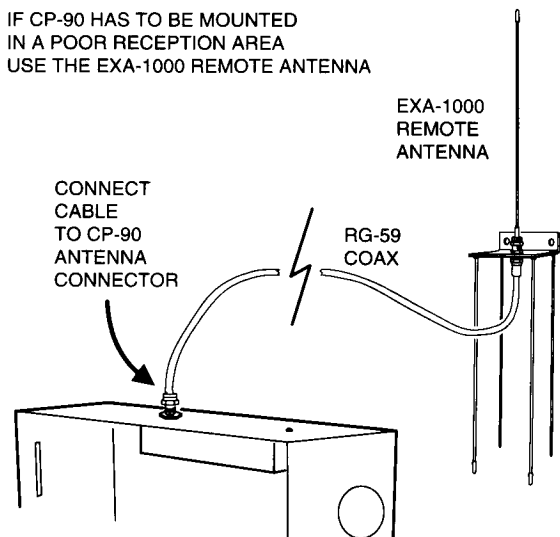
Figure 15. Local Whip Antenna Installation

Antenna Hook-up

In most installations the standard cabinet mounted wire whip antenna is sufficient. Screw the small antenna into the connector on the top of the CP-90 cabinet.

If the CP-90 must be located in an area that has poor radio reception or if it is going to be very far from some of the transmitters, use the EXA-1000 external antenna. Mount the EXA-1000 as high as possible, centrally located among the transmitters. Connect the COAX lead to the CP-90 connector.

IF CP-90 HAS TO BE MOUNTED IN A POOR RECEPTION AREA USE THE EXA-1000 REMOTE ANTENNA



WARNING!
DO NOT USE AN EXTERNAL AMPLIFIER BETWEEN THE ANTENNA AND THE CP-90. CONTACT LINEAR TECHNICAL SERVICES IF YOU HAVE A SPECIAL APPLICATION REQUIRING MORE RADIO RANGE.

Figure 16. Remote Antenna Installation

KEYPAD INSTALLATION

Control Stations (Keypads)

Up to four keypads can be used with each CP-90 system. Homerunning of wires for multiple keypads is not required if a larger size wire is used. See Figure 17 for wire size requirements and keypad wiring details.

NOTE: The minimum wire size allowed for UL installations is 22 AWG. For all installations, a minimum of one keypad is required.

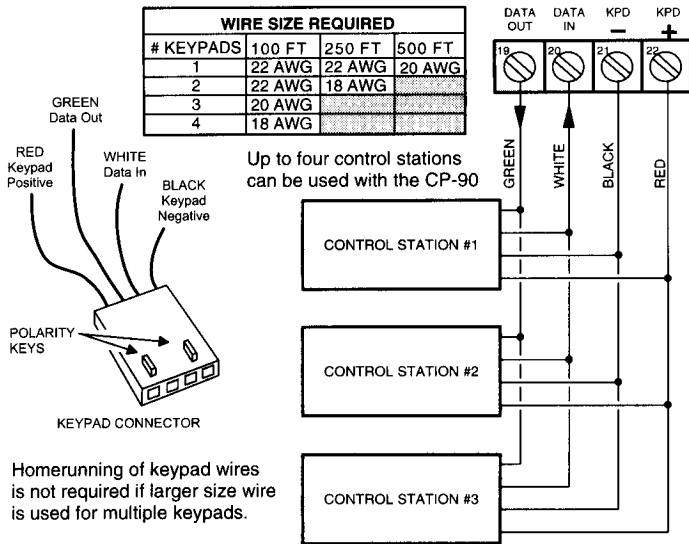


Figure 17. Control Station Wiring

The installation of each keypad used with a CP-90 system is very important. Improperly installed keypads can cause radio frequency interference that will reduce the effective radio range of the system or, in worst cases, prevent the CP-90's radio receiver from functioning altogether.

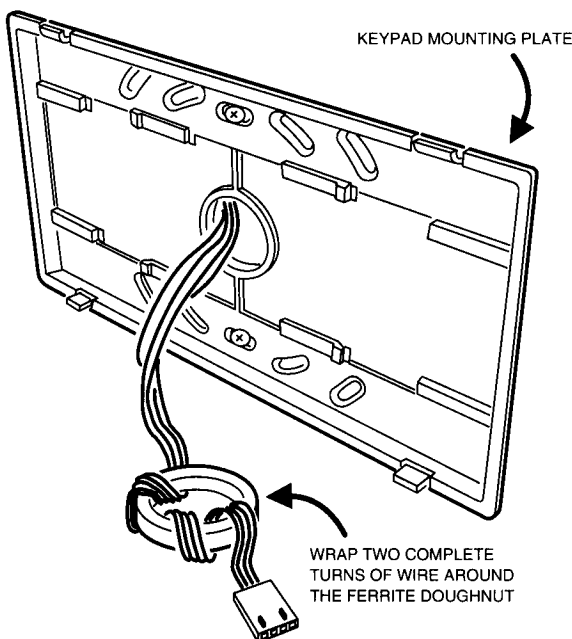


Figure 18. Properly Installed Ferrite Doughnut

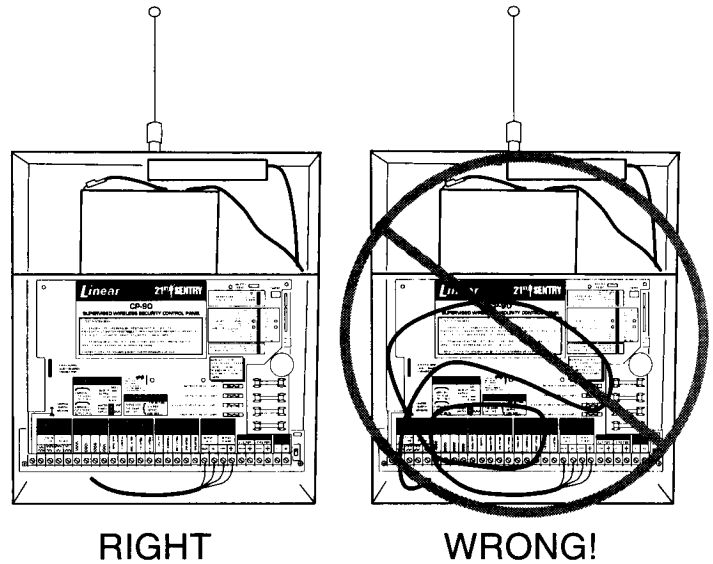


Figure 19. Proper Control Panel Wiring

Besides locating the keypad(s) in convenient and safe areas, there are three important rules that must be followed for reliable system operation:

- ✓ When installing a KD-90 LCD keypad, be sure to install the ferrite "doughnut" (Linear P/N 200489-003) onto the keypad wires behind the keypad (see Figure 18).
- ✓ Do not coil excess keypad wire or any other wire inside the CP-90 cabinet (see Figure 19).
- ✓ Make sure that the CP-90's local or EXA-1000 remote antenna is at least 10 feet from the nearest keypad (see Figure 20).

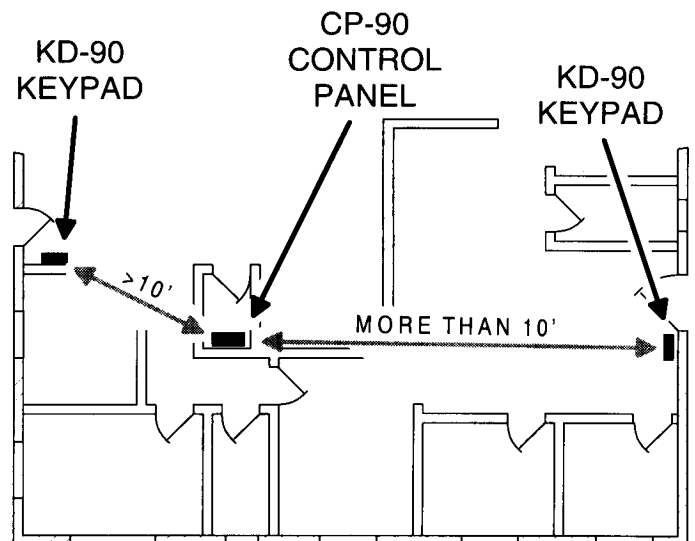


Figure 20. Keypads 10 Feet Minimum from Antenna

PHONE LINE & LOOP WIRING

Communicator Phone Line

Install a USOC RJ31-X or RJ38-X jack to the telephone system. Attach a Linear Model 300 or equivalent phone line cord to the communicator terminals on the CP-90 (see Figure 21). Plug the cord into the jack.

Both the incoming telephone lines and outgoing local telephones are connected to the control panel. When the communicator activates, all the telephones will be disconnected to prevent an off-hook telephone in the premises from blocking the communicator call.

Note: The LINE RING and LINE TIP terminals should read 45-50 volts when the communicator is idle, and 3-10 volts when the communicator is active.

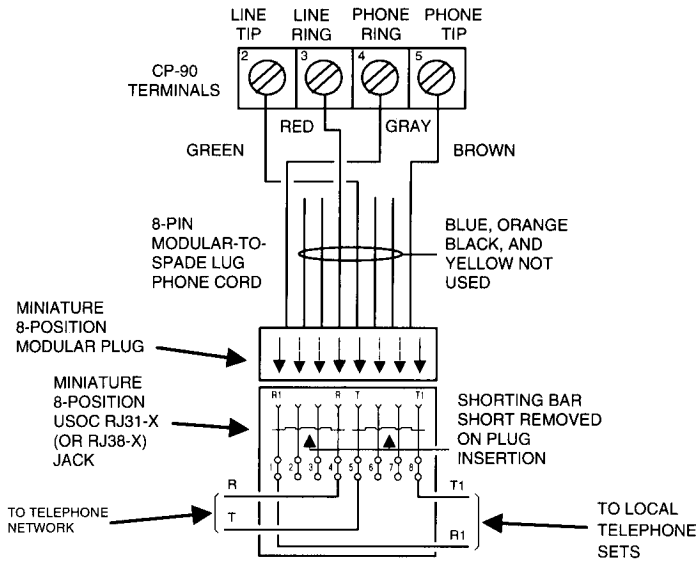


Figure 21. Telephone Connections

Hardwire Loop Wiring

The CP-90 supports three hardwired loops. Each loop may be either normally open, normally closed and with or without a 2.2K end-of-line resistor. The three loops share a common return terminal (see Figure 22).

End-of-line resistors are recommended to supervise the loops. With the resistor wired in series with the loop at the furthest, most remote end, any opening or shorting of the loop will cause a violation or trouble (programming option).

Fire Loops

Fire loops must have the end-of-line resistor installed in the loop after the last fire detection device in order to detect troubles or breaks in the loop (See Figure 23).

Key Station Wiring

A momentary key switch can be wired to one of the hardwire loop inputs to allow simple arming and disarming (see Figure 24). Program the loop for zone value 6 (see CP-90 Programming Instructions). The switch will cycle the unit between Security Levels 1 and 4.

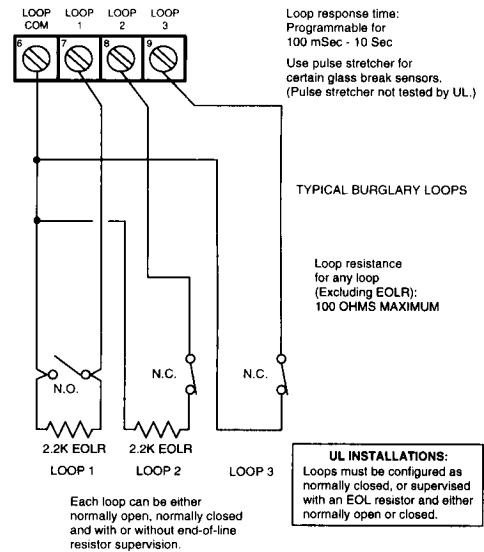


Figure 22. Hardwire Burglary Loop Wiring (UL Tested for Burglary Protection)

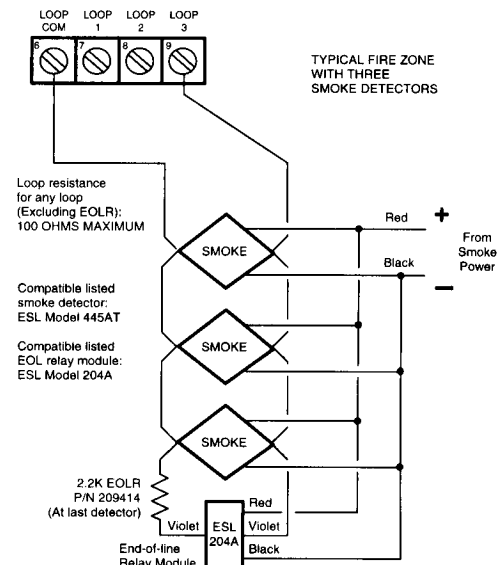


Figure 23. Hardwire Fire Loop Wiring (Not Tested for UL Installations)

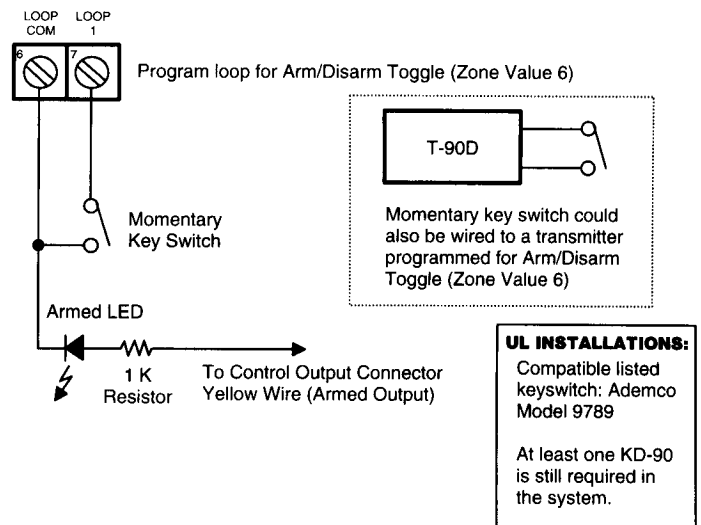


Figure 24. Key Station Wiring

AUXILIARY RELAYS & CONTROL OUTPUT CONNECTOR

Auxiliary Relays

The CP-90 has two relays built-in that are activated by applying a positive voltage (3 to 12 VDC) to their TRIG terminals.

When triggered, the relays provide +12 VDC out of the normally open contacts. The relays are fused at 2 Amps with the auxiliary power fuse.

The relay contacts can be changed to isolated Form C dry contact outputs by cutting the brown and/or red wire jumpers located on the terminal board (see Figure 29). The relay dry contacts are rated at 5 Amps

Connect the relay K1 and K2 TRIG terminals to the control output connector using the control output cable. **Multiple outputs can be wired to the same TRIG terminal.**

If more relay driven outputs are required for the installation, use the control outputs to trigger additional RB-90 Relay Interface boards (see Figure 37).

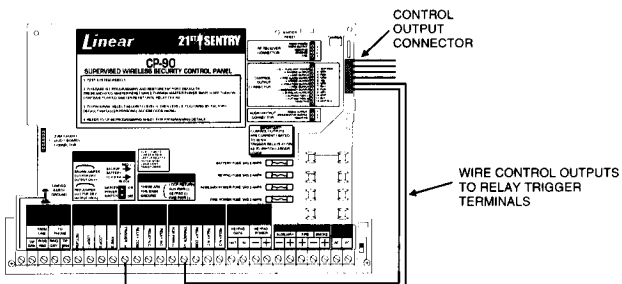


Figure 25. Control Output Connector Location

Control Outputs

The control output connector is the main source of alarm and auxiliary outputs. It has ten outputs that can be wired to the auxiliary relay TRIG terminals or connected to other devices. Auxiliary power is also available from the control output connector.

NOTE: Connect the outputs required for the installation. All the outputs do not have to be used.

The control output cable has the 12-position mating connector and 16" wire leads for electrical connections. See the table in Figure 26 for a description of the outputs.

NOTE: For UL installations, the control outputs have only been investigated for use as shown in Figures 27 and 28, all other use is supplementary.

Each output is solid state and current limited by a resistor. Each output can provide a low current source at +12 Volts maximum. These low current outputs (3.5 mA) can drive LED's directly (through a current limiting resistor) or trigger other devices and modules that contain their own high current driver circuitry.

Each output is over-current protected, but the output voltage will drop if too large a load is placed on the output. **Multiple outputs can be tied together to the same trigger terminal.**

NOTE: If a sensor or zone is programmed for silent alarms the violation output is the only control output that will trigger during an alarm caused by that sensor or zone.

CONTROL OUTPUT CONNECTOR SIGNALS			
PIN #	COLOR	FUNCTION	DESCRIPTION
1	WHITE /RED	+12 VDC AUXILIARY POWER	FOR POWERING AUXILIARY ACCESSORIES OUTPUT GOES THROUGH AUX. FUSE 2 AMPS MAXIMUM
2	BROWN	ACCESS OUTPUT	POSITIVE OUTPUT WHEN AN ACCESS CODE COMMAND IS ENTERED ON A KEYPAD
3	RED	LAMP OUTPUT	POSITIVE OUTPUT WHEN ENTRY OR EXIT DELAY BEGINS, OR ANY KEY IS PRESSED
4	ORANGE	PRE-ALARM OUTPUT	POSITIVE OUTPUT WHEN ENTRY DELAY BEEPS ARE SOUNDING
5	YELLOW	ARMED OUTPUT	POSITIVE OUTPUT WHEN SYSTEM IS ARMED, BLINKING OUTPUT DURING AND AFTER AN ALARM WHILE ARMED
6	GREEN	VIOLATION OUTPUT	POSITIVE OUTPUT DURING AND AFTER AN ALARM WHILE ARMED
7	BLUE	FIRE OUTPUT	POSITIVE OUTPUT WHEN FIRE ZONE IS IN ALARM (DEFAULT IS PULSING OUTPUT)
8	PURPLE	EMERGENCY OUTPUT	POSITIVE OUTPUT WHEN EMERGENCY ZONE IS IN ALARM
9	GRAY	BURGLARY OUTPUT	POSITIVE OUTPUT WHEN A BURGLARY ZONE IS IN ALARM
10	WHITE	AUTOMATION OUTPUT #1	POSITIVE OUTPUT WHEN AUTOMATION #1 ZONE IS TRIGGERED
11	BLACK	AUTOMATION OUTPUT #2	POSITIVE OUTPUT WHEN AUTOMATION #2 ZONE IS TRIGGERED
12	WHITE /BLACK	NEGATIVE	COMMON POWER SUPPLY NEGATIVE

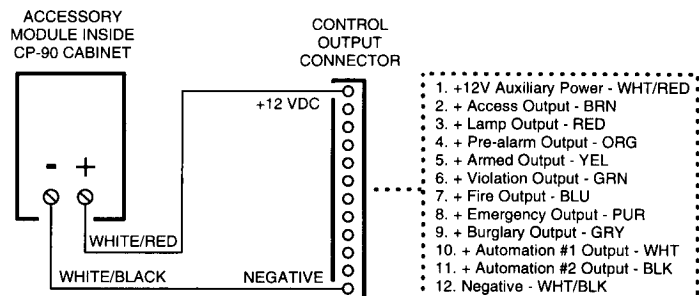
Figure 26. Control Output Connector Signals

+12 VDC Auxiliary Power (White/Red Wire)

This output is active 24-hours and is fused at 2 Amps with the auxiliary power fuse. This output is the same as the AUXILIARY + terminal. For powering relay boards, siren drivers and other modules from the CP-90. See Figure 27.

Negative Power Output (White/Black)

Common negative system ground. This output is the same as the AUXILIARY - terminal. For powering relay boards, siren drivers and other modules from the CP-90. See Figure 27.



Connect white/red +12 VDC OUTPUT wire and white/black NEGATIVE wire from Control Output to accessory module power input terminals.

NOTE: This power output is for powering modules inside the CP-90 cabinet. Power sensors (PIR's, etc.) from the AUXILIARY + terminal on the terminal strip. This output is not intended for UL installations.

AUXILIARY POWER OUTPUTS USED TO POWER AN ACCESSORY MODULE

Figure 27. Auxiliary Power Outputs

Fire Output (Blue Wire)

Activates when any sensor programmed to the Fire Zone or a keypad FIRE key triggers a fire alarm. The default programmed setting for this output causes a pulsed (one second on/off) output for five minutes. The cutoff time and pulsing options can be programmed. See the CP-90 Programming Instructions for details. Normally this output is connected to an auxiliary relay to control the main alarm sounder (siren or bell). See Figures 28 & 29.

Emergency Output (Purple Wire)

Activates when any sensor programmed to the Emergency Zone, Remote Panic/Emergency Zone or a keypad POLICE key triggers an emergency alarm. The default programmed setting for this output causes a steady output for five minutes. The cutoff time and output options (pulsing or steady) can be programmed. See the CP-90 Programming Instructions for details. Normally this output is connected to an auxiliary relay to control the main alarm sounder (siren or bell). See Figures 28 & 29.

NOTE: For UL installations, the Emergency output must not be connected.

Burglary Output (Gray Wire)

Activates when any sensor programmed to the exterior, interior or guard zones triggers an alarm. The default programmed setting for this output causes a steady output for five minutes. The cutoff time and output options (pulsing or steady) can be programmed. See the CP-90 Programming Instructions for details. Normally this output is connected to an auxiliary relay to control the main alarm sounder (siren or bell). See Figures 28 & 29.

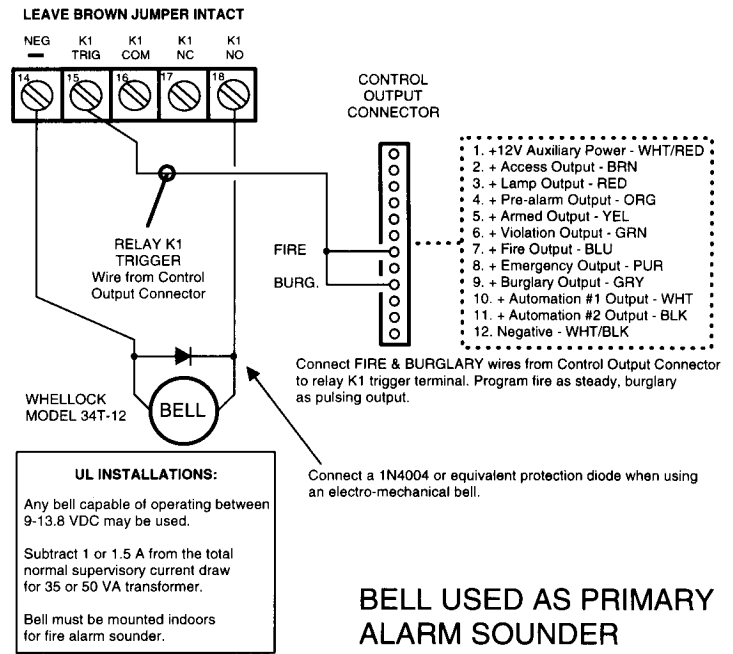


Figure 28. Fire/Burglary Combined Output Wiring (For UL Listed Installations)

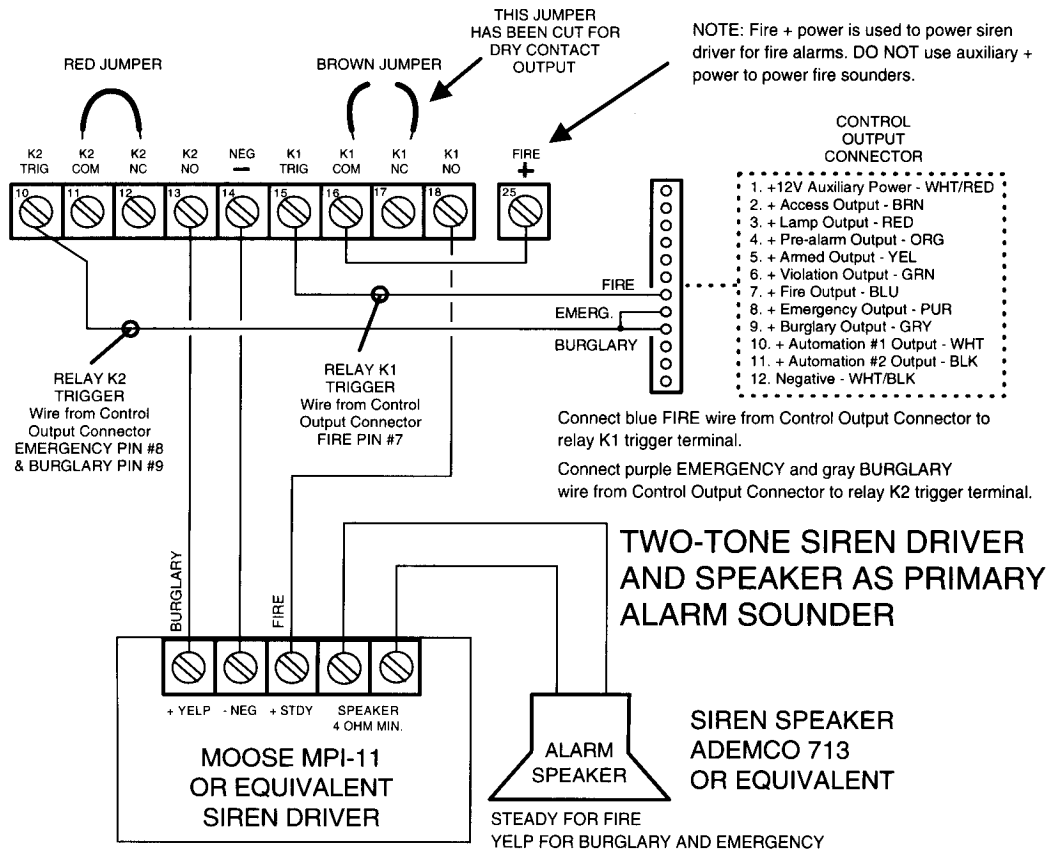


Figure 29. Fire/Burglary Output Wiring with Siren Driver (Not Intended for UL Listed Installations)

Access Output (Brown Wire)

Activates when a PAC that is programmed as an "Access Output PAC" or "Access Output Only PAC" is entered at a keypad. The default programmed setting for this output causes a steady output for five seconds. The length of time that this output stays activated is controlled by programming the "Access Output On-Time". See the CP-90 Programming Instructions for details. This output is normally used for activating an electric door strike through an auxiliary relay (see Figure 30).

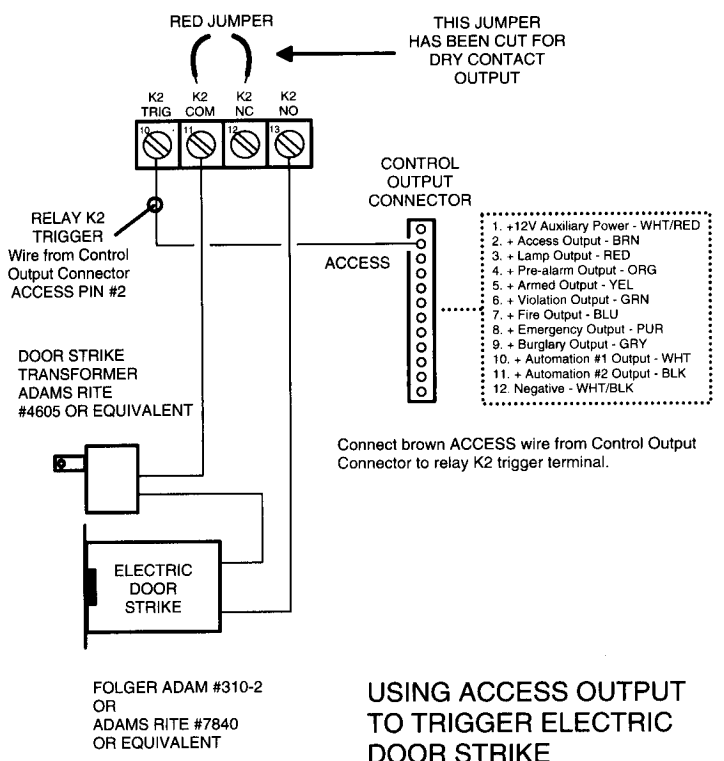


Figure 30. Access Output Wiring
(Supplementary Use Only in UL Installations)

Lamp Output (Red Wire)

Activates for two minutes when any keypad key is pressed and at the start of any exit or entry delay. For triggering a line carrier lamp module or auxiliary relay to turn on room lights for convenience and safety (see Figure 31).

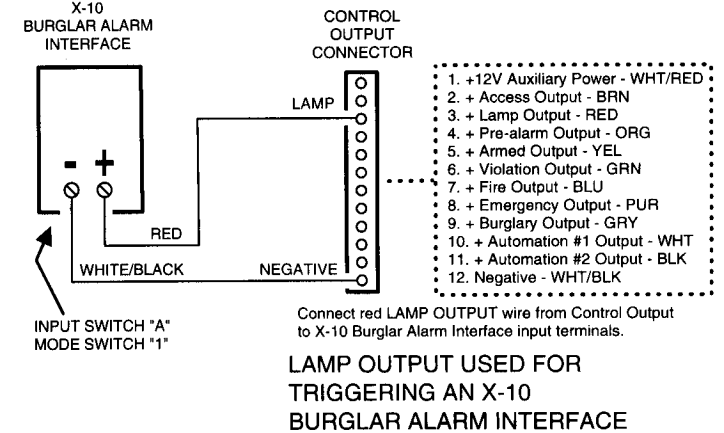


Figure 31. Lamp Output Wiring
(Supplementary Use Only in UL Installations)

Pre-alarm Output (Orange Wire)

Activates during the entry delay and during alarms. This output will activate regardless of the programmed settings for "Entry Delay Beeps On/Off" or if the individual keypads beep volumes are set to silent. Normally used to wire to a "sonalert" beeper or other type of remote sounder to supplement the keypad sounders. Alerts the user that there is a limited time to disarm the system before full alarm (see Figure 32).

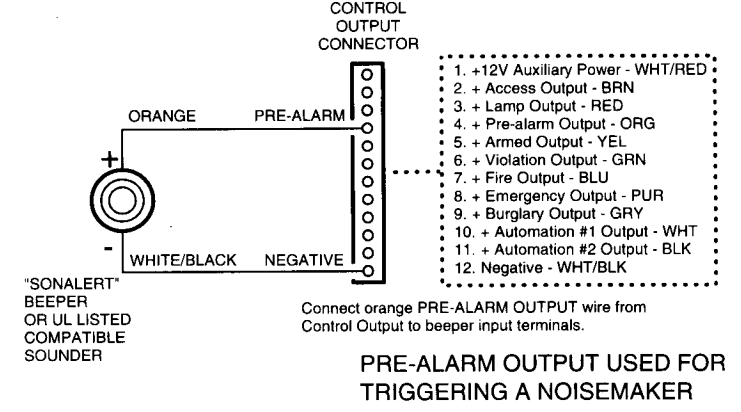


Figure 32. Pre-alarm Output Wiring
(Supplementary Use Only in UL Installations)

Armed Output (Yellow Wire)

Activates continuously as soon as the system is armed in Security Levels 2 through 6. Output flashes when the system is armed and any type of alarm has occurred. This output will continue to flash until the system is disarmed. Normally connected to a remote LED or to a light through an auxiliary relay. Useful for seeing the system status when the CP-90 is being armed and disarmed by a wireless transmitter (see Figure 33).

NOTE: Refer to Figure 24 for UL requirements.

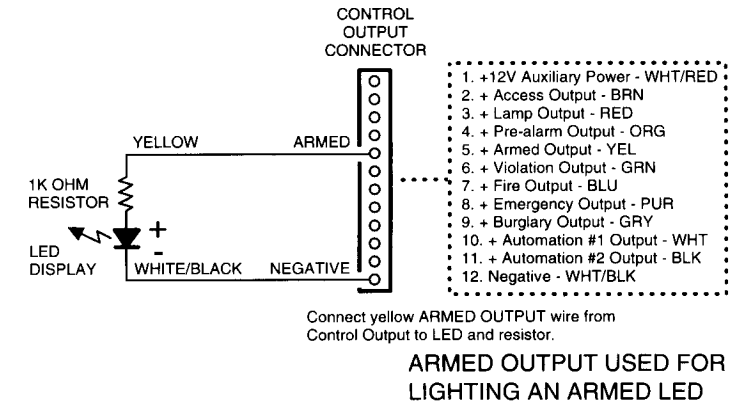


Figure 33. Armed Output Wiring
(Supplementary Use Only in UL Installations)

Violation Output (Green Wire)

Activates when any alarm is triggered and remains on until the system is disarmed to Security Level 0 or 1. Typically used to control an alarm strobe light through an auxiliary relay (see Figure 34).

NOTE: This output **does** activate when a sensor programmed as "silent alarm" triggers a silent alarm.

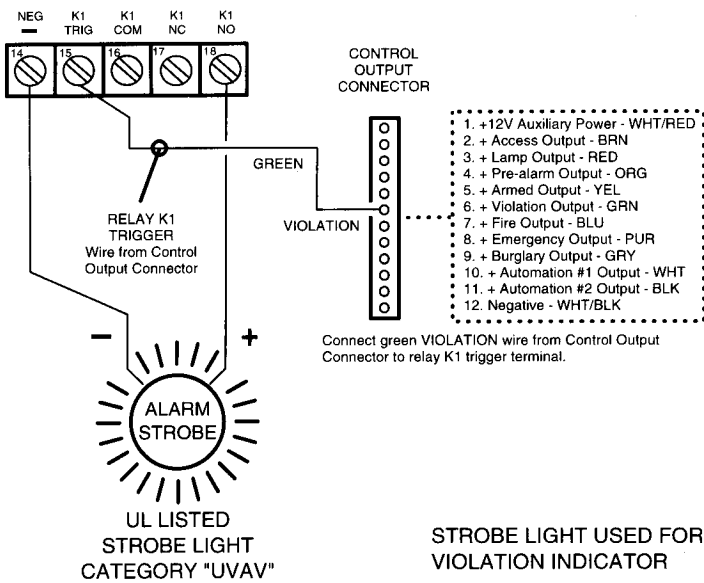


Figure 34. Violation Output Wiring
(Supplementary Use Only in UL Installations)

Automation Output #1 (White Wire)

Activates when a sensor that is programmed to the Automation #1 Zone is activated. The default programmed setting for this output causes a steady output for five seconds. The length of time that this output stays activated is controlled by programming the "Automation #1 Output On-Time". See the CP-90 Programming Instructions for details. This output is normally used for activating a home automation controller, but may be used for any remote control application. Use this output to trigger an auxiliary relay when switching large loads. See Figure 35.

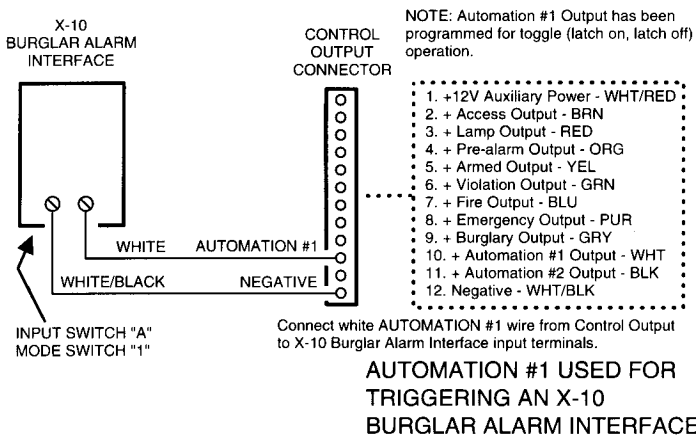


Figure 35. Automation #1 Output Wiring
(Supplementary Use Only in UL Installations)

Automation Output #2 (Black Wire)

Activates when a sensor that is programmed to the Automation #2 Zone is activated. The default programmed setting for this output causes a steady output for five seconds. The length of time that this output stays activated is controlled by programming the "Automation #2 Output On-Time". See the CP-90 Programming Instructions for details. This output is normally used for activating a home automation controller, but may be used for any remote control application. Use this output to trigger an auxiliary relay when switching large loads. See Figure 36.

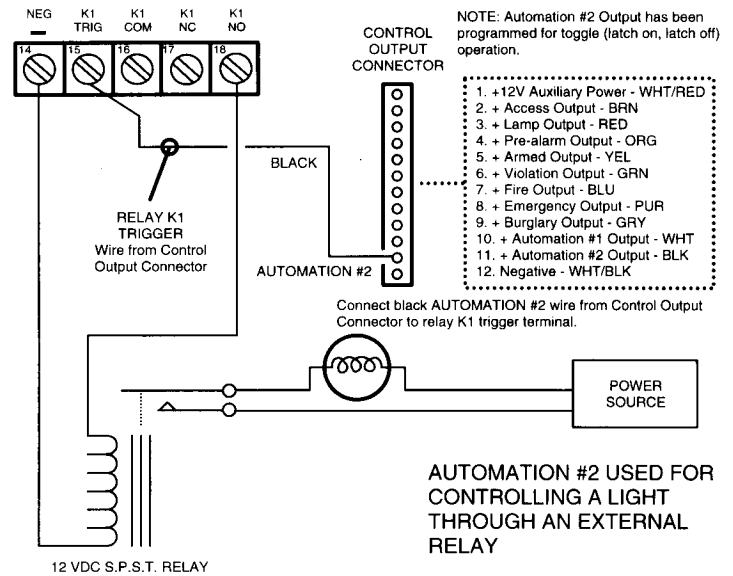


Figure 36. Automation #2 Output Wiring
(Supplementary Use Only in UL Installations)

Installing Auxiliary Accessory Boards

Relay boards, siren drivers and other types of auxiliary accessories can be used with the CP-90. They should be mounted behind the CP-90 circuit board, on the back wall of the control panel cabinet. See Figure 37 for an example of installed accessories inside the CP-90 cabinet.

Refer to the instructions provided with the accessory modules for hook-up information.

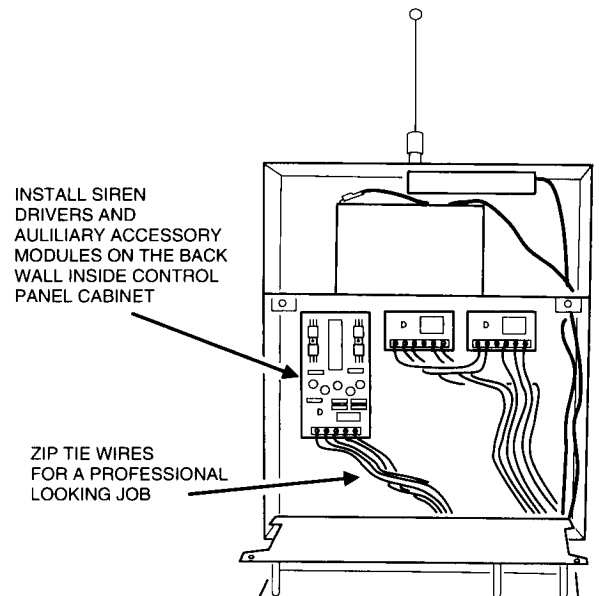


Figure 37. Example Auxiliary Accessory Installation

Auxiliary Power Output

Provides regulated 12 VDC for powering motion detectors, audio sound discriminators, siren drivers, etc. The auxiliary fuse protects this output (and the control output connector outputs), limiting the maximum current to 2 Amps. **Should this fuse ever blow, the TROUBLE light will flash and a "Supervisory Condition 75" will occur.** The communicator can also report this condition (programming option).

Fire Power Output

Provides regulated 12 VDC for powering fire system sounders. The fire power fuse protects this output, limiting the maximum current to 2 Amps. **Should this fuse ever blow, the trouble light will flash and a "Supervisory Condition 76" will occur.** The communicator can also report this condition (programming option).

Smoke Power Output

Provides regulated 12 VDC for powering smoke detectors. Latching smoke detectors can be reset by giving the keypad command STATUS "99". This interrupts the smoke power for three seconds.

The fire power fuse protects this output, limiting the maximum current to 2 Amps. **Should this fuse ever blow, the trouble light will flash and a "Supervisory Condition 76" will occur.** The communicator can also report this condition (programming option).

Earth Ground

NOTE: For UL installations, an earth ground must be installed in accordance with Article 250 of the National Electrical Code.

For the best ground, use size 14 gauge solid wire or larger to connect the EARTH GROUND terminal to an 8-foot copper ground rod. Locate the ground rod next to the Power and Telephone company rods and bond the rods together with a new clamp. **Do not disturb the clamps installed by the Power or Telephone Company.** See Figure 39.

Alternately, connect the EARTH GROUND terminal to a cold water pipe or to the GND terminal on the AC transformer (see Figure 41).

Panel Door Ground

For all UL fire/burglary installations, the CP-90 control panel's cabinet door must be grounded. Use the enclosed green grounding wire assembly and refer to the Figure 40.

Slide the push-on lug onto the middle door hinge tab and connect the spade lug to the CP-90 EARTH GROUND terminal.

*** WARNING:** When servicing the CP-90, be careful that the grounding wire lug does not contact any other wires or components inside the CP-90. Damage may result to the CP-90 if the ground wire contacts live circuits.

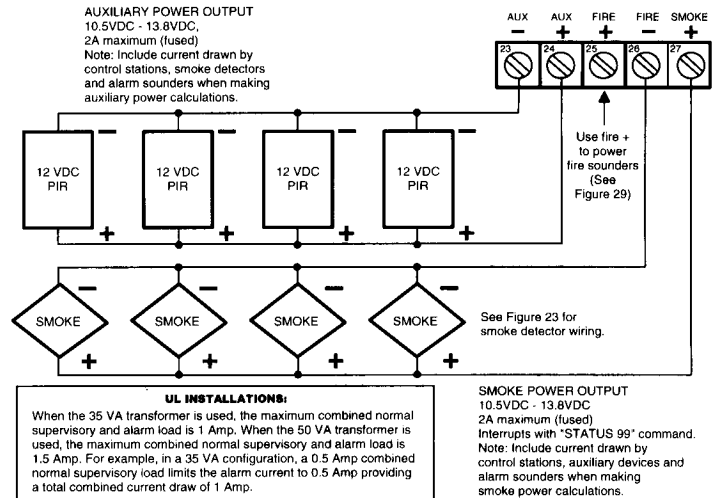


Figure 38. Auxiliary and Smoke Power Output Wiring

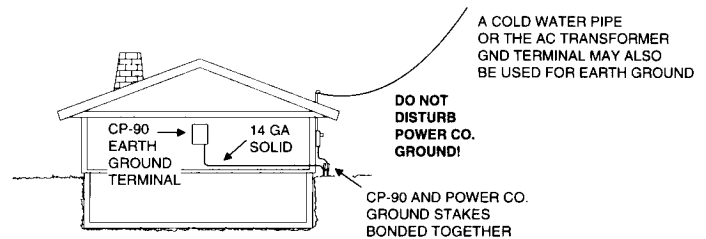


Figure 39. Earth Grounding

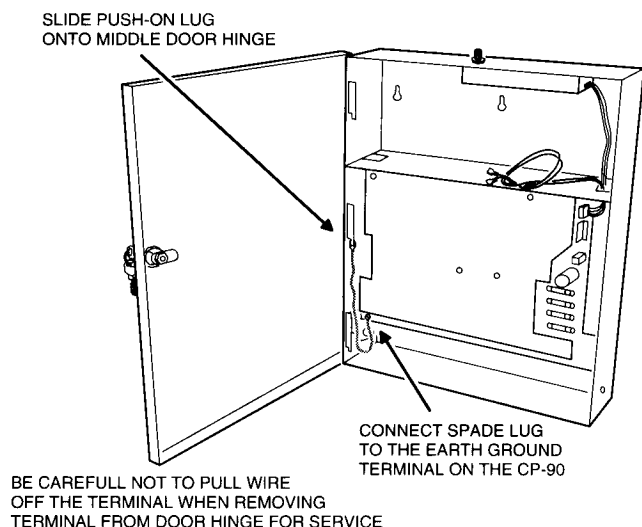


Figure 40. Panel Door Grounding

AC POWER & BACKUP BATTERY

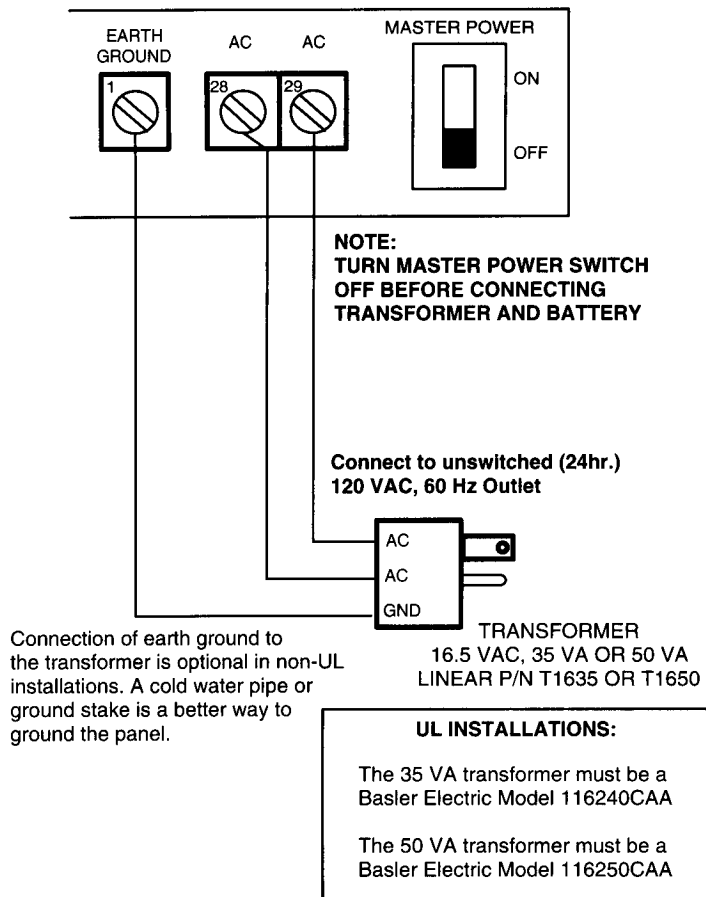


Figure 41. AC Transformer Connection

AC Transformer

The CP-90 system is powered by a 16.5 Volt, 35 VA or 50 VA, internally fused, UL listed, Class 2 transformer. This transformer is included with the CP-90 system pack.

*** WARNING! Never short the terminals of the transformer together. This will cause the internal fuse to blow. Never replace or substitute with a transformer of lower VA or voltage rating. The transformer must be connected to a 120 VAC 60 Hz unswitched (24 hour) power outlet not controlled by a wall switch.**

- STEP 1** Be sure that the CP-90 MASTER POWER switch is off (see Figure 41).
- STEP 2** Connect the transformer to the AC terminals of the CP-90 using size 18 gauge minimum two-conductor wire. **Maximum wire run is 50 feet.** See Figure 41.
- STEP 3** Connect the CP-90 EARTH GROUND terminal to the transformer GND terminal (optional).
- STEP 4** Plug transformer into AC outlet and secure with case screw (if provided).

NOTE: When using a 50 VA transformer, cut the white jumper wire WJ1. The jumper is located on the CP-90 circuit board, next to relay K2.

Backup Battery

The CP-90 is designed to use a 12 Volt 6.5 Amp-hour sealed lead acid battery. The control panel maintains a float charge on the battery at 13.8 volts. If AC power is removed, the battery will power the CP-90. The length of time the system can be powered by the battery depends on the total current draw of all the accessories and keypads. Refer to the Battery Standby Table (Figure 42) for approximate times and recommended battery types.

BATTERY STANDBY TABLE (6.5AH BATTERY)			
ADD TOTAL CURRENT DRAW FROM ALL ACCESSORIES			
100 mA	200 mA	400 mA	600 mA
25 Hrs.	16 Hrs.	9 Hrs.	6 Hrs.
EACH KD-90 = 50 mA TYPICAL, 550 mA MAXIMUM			
USE YUASA NP7-12, PANASONIC LCR 12V6.5BP, POWER-SONIC TC-1270			

Figure 42. Battery Standby Table

*** CAUTION! Do not reverse the battery leads. Red must go to the (+) terminal and black to the (-) terminal. Reversing the battery leads will blow the 4 Amp battery fuse. DO NOT SHORT THE BATTERY TERMINALS TO THE RADIO RECEIVER METAL CASE OR THE CONTROL PANEL CABINET!**

- STEP 1** Connect the battery leads. Red to (+), Black to (-).
- STEP 2** Place the battery on the cabinet shelf above the main circuit board (see Figure 43).

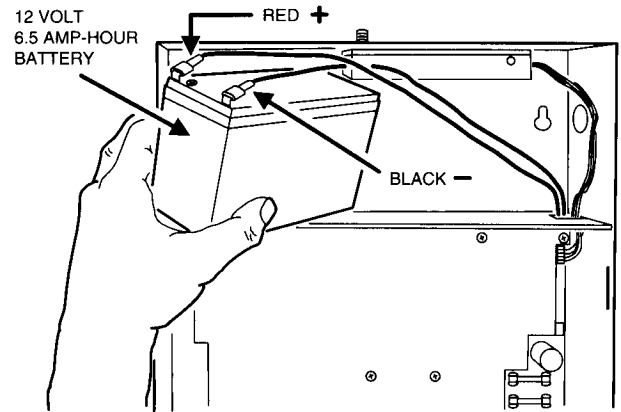


Figure 43. Backup Battery Installation

Automatic Backup Battery Testing

The CP-90 tests the backup battery every 24 hours. During the test, the system automatically reduces the battery charge current while monitoring the batteries voltage. **If the battery tests low, the TROUBLE LED will flash and a "Supervisory Condition 74" will occur.** The communicator can also report this condition (programming option).

Manual Backup Battery Testing

The CP-90 tests the backup battery when a manual STATUS "98" command is given. The actual test is performed the same as the automatic backup battery test. **If the battery tests low, the TROUBLE LED will flash and a "Supervisory Condition 74" will occur.** The communicator can also report this condition (programming option).

OPTIONAL ACCESSORIES

Audio Output Connector

The three-pin audio output connector provides two types of audio signals from the CP-90. These outputs are low level and can be listened to when connected to an audio amplifier (see Figure 44).

Radio output sound should be just hiss until transmitter is triggered.

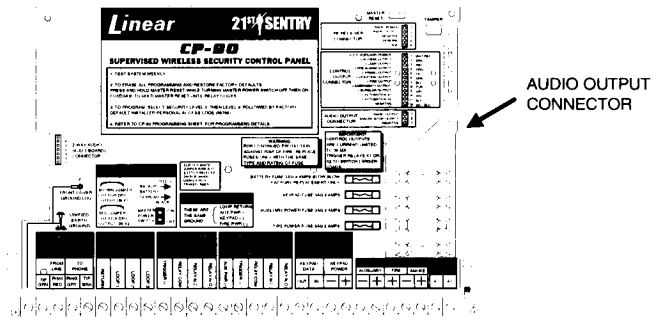
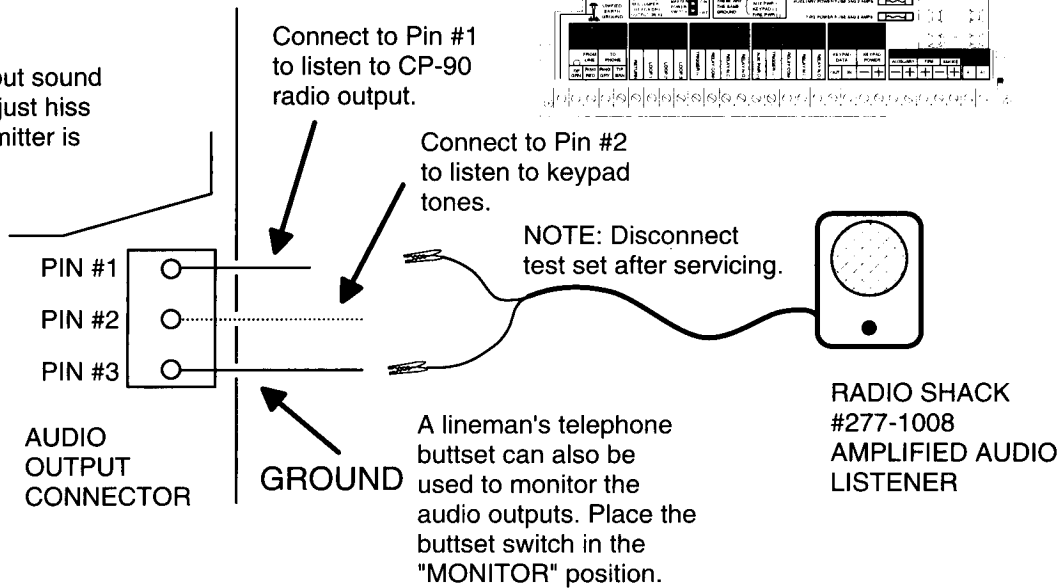
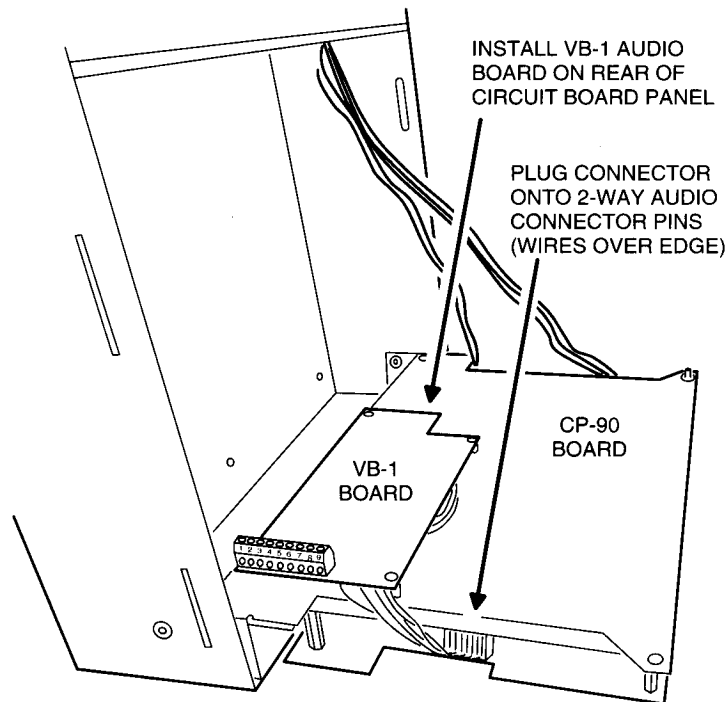


Figure 44. Audio Output Connector Used for Troubleshooting

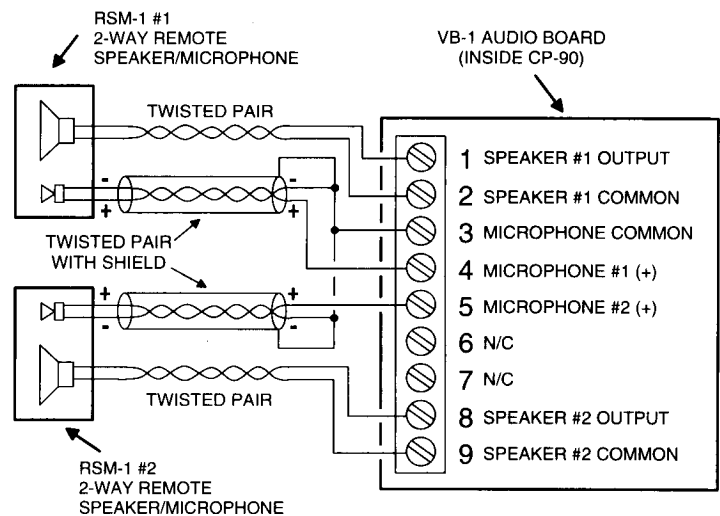
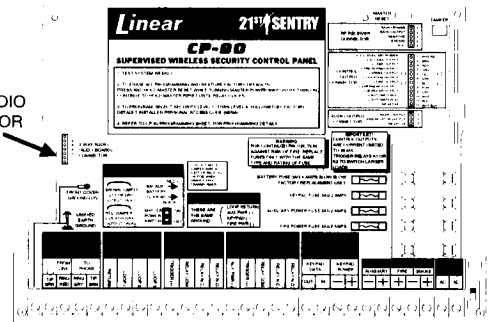
2-Way Audio Connector

This connector is for connection to Linear's VB-1 two-way audio board. The audio board allows audio listen-in and audio talk back from the central station through Linear's RSM-1 remote speaker/microphone. Install the VB-1 on the rear of the CP-90 circuit board panel (see Figure 45).

NOTE: Not tested by UL



2-WAY AUDIO CONNECTOR



ONE OR TWO RSM-1 SPEAKER/MICROPHONES CAN BE USED WITH THE VB-1 2-WAY AUDIO BOARD

Figure 45. 2-Way Audio Board (VB-1) Installation

SYSTEM POWER-UP

First Time Power-up

If the unit is new out-of-the-box, just turn the MASTER POWER switch on. The factory loaded defaults are already installed in memory.

Restoring Factory Defaults

If the unit has previously been programmed, and you want to reset the system back to the factory defaults, follow these steps:

- STEP 1** Turn the MASTER POWER switch off.
- STEP 2** Use a small tool to press and hold down the MASTER RESET switch (see Figure 46).
- STEP 3** Turn the MASTER POWER switch on while still holding down the MASTER RESET switch. Wait up to 45 seconds while still holding down the MASTER RESET switch. You should hear a relay click then chatter. The system now has the factory defaults installed.

NOTE: The MASTER RESET switch will not function if Master Reset Disable is turned on with programming Function 121.020 (see the CP-90 Programming Instructions for details).

Internal Diagnostic Checks

The CP-90 performs an automatic internal diagnostic check when the system is first powered up. The system checks itself to be sure everything is in order. The internal check takes about 10 seconds. If something is wrong, the keypad's TROUBLE LED will flash and a supervisory condition will occur. Press the STATUS button for one second to display the condition.

NOTE: When the system is first powered up, the keypad's TROUBLE light may flash. Press "STATUS 97" to clear the indication before proceeding.

Watchdog Monitor

While the system is operating, an internal "watchdog" circuit monitors the system. If for some reason (lightning strike, etc.) the system's memory is upset, the watchdog monitor will reset the system, restoring system integrity. If a watchdog reset occurs, the keypad's TROUBLE light will flash and a "Supervisory Condition 89" will occur. The security level will remain at the previously set level.

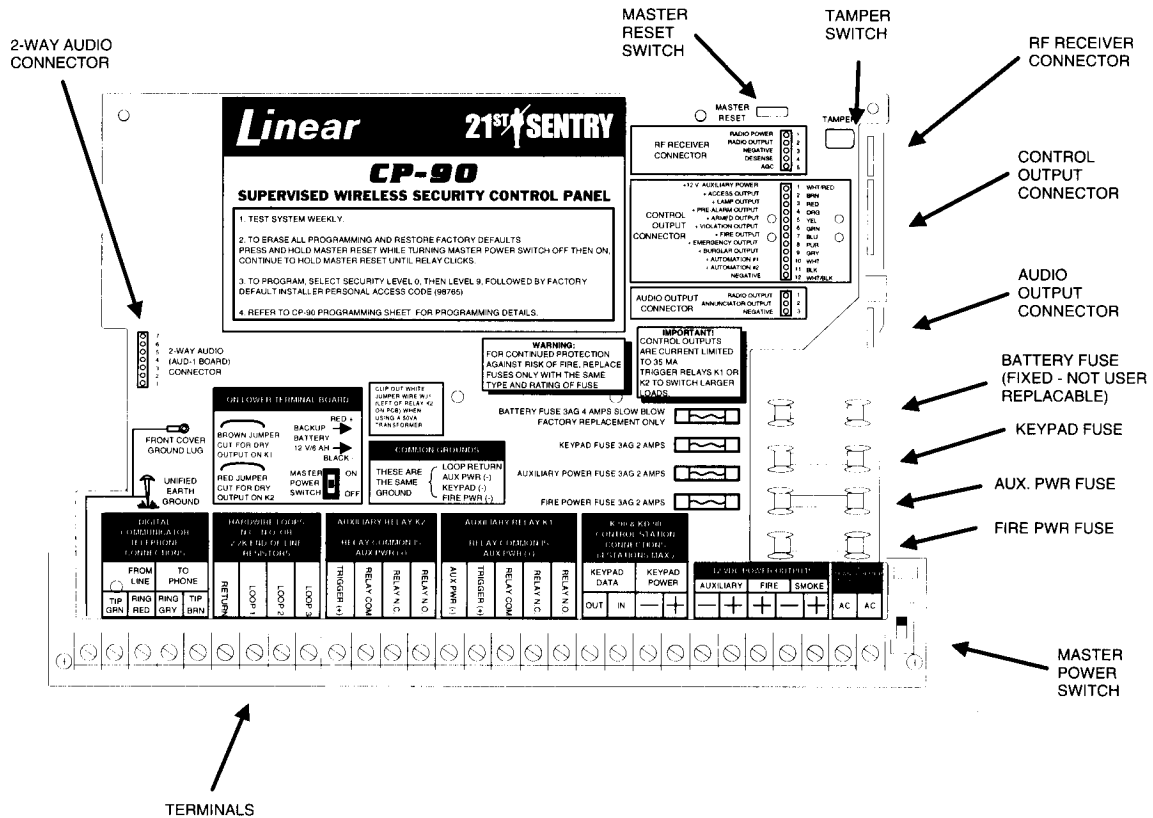


Figure 46. CP-90 Parts Location

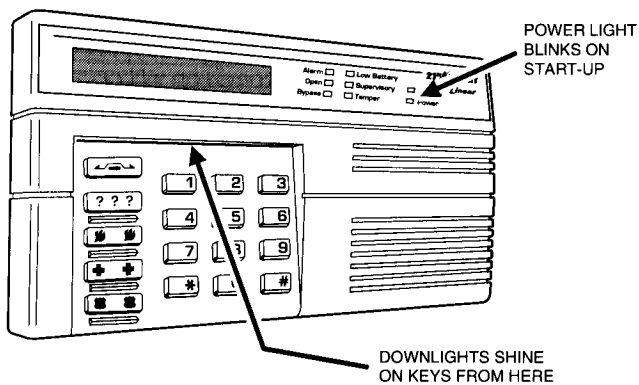


Figure 47. KD-90 Keypad

Power-up Indications

When the CP-90 MASTER POWER switch is turned on, the keypad's POWER LED will blink until the CP-90 initializes the keypads. This takes about 10-20 seconds.

NOTE: When the system is first powered up, the keypad's TROUBLE light may flash. Press "STATUS 97" to clear the indication before proceeding.

Keypad Lighting

Each keypad (except the wireless TK-90) has programmable downlights that light up the keys and programmable display lighting. Each keypad in the system can be programmed for different lighting levels. An active level is set when the keypad is in use. A standby level is set when the keypad is idle.

The keypad will automatically assume standby lighting level after 45 seconds of inactivity.

Keypad Supervision

Every minute, each keypad is checked by the CP-90 to be sure that it's still there. If the control finds a keypad missing, a "Supervisory Condition" will occur. Remaining keypads can display the condition and a central station trouble report will be sent (if programmed for that type of report).

Keypad Lockout Timer

Control station keypads have a five second timer that automatically locks out further keypad entries after an incorrect command sequence or access code is entered. The control station will automatically unlock five seconds after the last keystroke. **At any time during a keystroke sequence, the keypad and display may be reset, unlocked and cleared by pressing the * key.**

NOTE: If the keypad doesn't seem to respond to your commands, press * before entering the command again.

Programming Level Timer

While programming the CP-90 from a keypad, if no keystrokes are made for four minutes, the system will automatically leave the programming level mode.

Control Station Operation

Refer to the CP-90 User's Guide (P/N 207417) for complete details on system and control station operation. The following pages of this manual contain some basic CP-90 system information that should be understood before programming the CP-90.

SYSTEM ZONES

The following pages are similar to the information presented in the CP-90 User's Guide. This general information is presented so that the installer can become familiar with the CP-90's zones.

Each sensor installed in the system is programmed to a specific "sensor number" and "sensor zone".

The *sensor number* (01-64) identifies the specific sensor when displayed on the keypad(s) and to the central monitoring station (if system is monitored). This allows pin-point information about any sensor in the system.

The *sensor zone* determines how and when the Control Panel responds to signals from the sensor. Some sensors are armed all the time, others are armed only in certain security levels. Some sensors cause central station reports in certain security levels, some cause central station reports anytime their activated. The sensor's programmed zone along with other programming options determines this.

The sensor zones are:

Exterior

For perimeter doors and windows.

Interior

For motion detectors, mat switches, interior doors and other sensors that detect human presence inside the building.

Restricted Interior

For special interior areas that are not normally occupied during nighttime. Sensors used in this zone would be located in an attic, basement, inside a detached garage or other similar areas.

Fire

Continuously armed 24-hour zone for smoke detectors, heat sensors, pull stations, etc. Can also be triggered directly from keypad.

Emergency

Continuously armed 24-hour zone for personal emergency or other types of emergencies. Can also be triggered directly from keypad.

Police/Hold-up

Continuously armed 24-hour zone for panic, police or hold-up. Can also be triggered directly from keypad.

Arm/Disarm Toggle

++ Sensors programmed to this zone can arm and disarm the system. This zone alternately arms the system to Level 4 and disarms the system to Level 1. Automatic bypassing occurs if other sensors are open and auto-bypass is enabled. Hardwire loops can be programmed to this zone for keyswitch use.

Delayed Remote Emergency

Continuously armed 24-hour zone for medical or other types of emergencies. Portable sensor must be activated for 3 seconds to trigger emergency alarm. Use an LMT-1, TX-91, TX-92 or TX-94.

 **NOTE: LMT-1 Not tested by UL.**

Delayed Remote Police/Hold-up

Continuously armed 24-hour zone for panic, police or hold-up. Portable sensor must be activated for 3 seconds to trigger panic alarm. Use an LMT-1, TX-91, TX-92 or TX-94.

 **NOTE: LMT-1 Not tested by UL.**

Guard Zone

++ For protecting areas or objects that are not normally entered or moved when the burglary portion of the system is disarmed. Used for gun cabinets, artworks, museum pieces, liquor cabinets, etc. This zone is also suitable for glass break sensors. Local alarm will sound when this zone is armed; causes central station reports in Level 4 only.

Environmental Type A

++ Continuously armed 24-hour zone for environmental sensors (flood, freeze, etc.). Causes local annunciation, alarm and central station reports.

Environmental Type B

++ Continuously armed 24-hour zone for environmental sensors (flood, freeze, etc.). Causes local annunciation and alarm but no central station reports.

Environmental Type C

++ Continuously armed 24-hour zone for environmental sensors (flood, freeze, etc.). Causes local annunciation only.

Chime Only Zone

++ This zone causes a local chime when triggered. Can be used for wireless doorbell, mailbox mail detector, driveway vehicle sensor, etc. Active 24-hours in Security Levels 1, 2 and 3.

Automation #1

++ Sensors programmed for this zone cause the Automation Output #1 to activate on the control output connector. Output may be timed or toggle on/off (programming option).

Automation #2

++ Sensors programmed for this zone cause the Automation Output #2 to activate on the control output connector. Output may be timed or toggle on/off (programming option).

Access Only

++ Sensors programmed for this zone cause the Access Output to activate on the control output connector. Output may be timed or toggle on/off (programming option).

 **NOTE: ++ Indicates a supplementary zone type for UL Listed residential fire and burglar alarm.**

Tx Type Transmitter Button Disable Zone

This is a special zone used to disable desired buttons on TX type portable transmitters. Since all buttons on TX portable transmitters are entered at once when programming, this special zone disables unneeded transmitter buttons.

SECURITY LEVELS

The following pages are similar to the information presented in the CP-90 User's Guide. This general information is presented so that the installer can become familiar with the CP-90's security levels.

The CP-90 System can be armed (or disarmed) to different levels of security protection. Each security level arms or disarms a specific group of sensor zones.

The security levels are named after their most common use. When changing to a security level, the keypad will sound a level change gong then count a number of beeps (in groups of three) to match the selected level. The security levels are:

Programming Level (For Installers Only)

LEVEL 9 PROGRAMMING MODE (Gong & 9 beeps)

- Used to program the system from a keypad.
- Allows reviewing and changing of the program Functions, Selectors and Values.
- Press and hold the "★" key for 5 seconds to exit program mode.
- Mode exits automatically after 4 minutes of inactivity.

Test Levels

LEVEL 7 PHONE TEST (Gong & 7 beeps)

- Level 7 sends a telephone "test" message to the central monitoring station (if system is monitored).
- All intrusion detection is off.
- All 24-hour sensors (fire, panic and environmental) are armed.

LEVEL 8 SENSOR TEST (Gong & 8 beeps)

- Used to test each of the system's sensors.
- Activating sensor causes keypad beep.
- Display shows sensors that need to be tested.
- Pressing the STATUS button displays last sensor activated.
- Press STATUS again to resume displaying sensors to be tested.

Disarm/Cancel and Low Security Levels

LEVEL 0 DISARM/CANCEL (Gong only)

- All intrusion detection is off.
- All 24-hour sensors (fire, panic and environmental) are armed.
- Disarms system (cancels any alarm in progress).

LEVEL 1 GUARD/CANCEL (Gong & 1 beep)

- Guard Zone is armed (gun cabinet, safe, etc.) and will cause a local alarm only.
- All intrusion detection is off.
- All 24-hour sensors (fire, panic and environmental) are armed.
- Chime Only Zone is active.

LEVEL 2 CHIME (Gong & 2 beeps)

- A two-tone "chime" will sound whenever windows or an exterior door is opened.
- Guard Zone is armed (gun cabinet, safe, etc.) and will cause a local alarm only.
- All intrusion detection is off.
- All 24-hour sensors (fire, panic and environmental) are armed.
- Chime Only Zone is active.

High Security Arming Levels

LEVEL 3 HOME (Gong & 3 beeps)

- All windows and exterior doors are armed.
- All interior sensors are off.
- Delayed sensors allow "Secure Entry" when the user enters a PAC and rearms to Level 3, 5 or 6 during the entry delay.
- "Secure Exit" starts an exit delay for delayed sensors when the user enters a PAC and rearms to Level 3 from Level 3.
- Guard Zone is armed (gun cabinet, safe, etc.) and will cause a local alarm only.
- All 24-hour sensors (fire, panic and environmental) are armed.
- Chime Only Zone is active.

LEVEL 4 AWAY (Gong & 4 beeps)

- All sensors (interior and exterior) are armed.
- Delayed sensors allow timed exit and entry of premises without sounding an alarm.
- Guard Zone is armed (gun cabinet, safe, etc.) and will cause a local alarm and central station reports.
- All 24-hour sensors (fire, panic and environmental) are armed.

LEVEL 5 NIGHT (Gong & 5 beeps)

- All windows and exterior doors are armed.
- Delayed sensors allow "Secure Entry" when a user enters a PAC and rearms to Level 3, 5 or 6 during the entry delay.
- "Secure Exit" starts an exit delay for delayed sensors when the user enters a PAC and rearms to Level 5 from Level 5.
- Restricted interior sensors are armed (garage, downstairs interiors, other areas not normally entered at night).
- Guard Zone is armed (gun cabinet, safe, etc.) and will cause a local alarm only.
- All 24-hour sensors (fire, panic and environmental) are armed.

LEVEL 6 NIGHT SECURE (Gong & 6 beeps)

- All windows and exterior doors are armed as instant.
- Delayed sensors activate as "instant" unless "Secure Exit" is used.
- The system must be disarmed prior to entry or an instant alarm will occur.
- "Secure Exit" starts an exit delay for delayed sensors when the user enters a PAC and rearms to Level 6 from Level 6.
- Restricted interior sensors are armed (garage, downstairs interiors, other areas not normally entered at night).
- Guard Zone is armed (gun cabinet, safe, etc.) and will cause a local alarm only.
- All 24-hour sensors (fire, panic and environmental) are armed.

SECURITY LEVEL ARMING TABLE

	LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
✓ = ARMED * = ARMED INSTANT ▲ = CHIMES							
EXTERIOR			▲	✓	✓	✓	*
INTERIOR					✓		
RESTRICTED INTERIOR					✓	✓	✓
FIRE	✓	✓	✓	✓	✓	✓	✓
EMERGENCY	✓	✓	✓	✓	✓	✓	✓
POLICE/HOLD-UP	✓	✓	✓	✓	✓	✓	✓
REMOTE EMERGENCY	✓	✓	✓	✓	✓	✓	✓
REMOTE POLICE/HOLD-UP	✓	✓	✓	✓	✓	✓	✓
GUARD ZONE		✓	✓	✓	✓	✓	✓
ENVIRONMENTAL TYPE A	✓	✓	✓	✓	✓	✓	✓
ENVIRONMENTAL TYPE B	✓	✓	✓	✓	✓	✓	✓
ENVIRONMENTAL TYPE C	✓	✓	✓	✓	✓	✓	✓
CHIME ONLY		▲	▲	▲			

Figure 48. Security Level Arming Table

KEYPAD SOUNDS

The following pages are similar to the information presented in the CP-90 User's Guide. This general information is presented so that the installer can become familiar with the CP-90's keypad sounds.

Audible Signals and Sirens

Audible signals are used to sound system status, alert the user of an emergency and frighten away an intruder. The sounds come from the speakers in the hardwire keypads. The different sounds are:

Emergency Fire Alarm

Loud, rapid two-tone siren.

Emergency Intrusion Alarm

Loud, intermittent siren.

Personal Emergency Sounder

A two-tone high/low chime sound.

Police/Hold-up Emergency Alarm

Loud, high/low siren sound.

Environmental Alarm Sounder/Trouble Sounder

A short, single-tone beep repeated at 1 minute intervals. This sound is used for environmental alarms and for sensor/accessory low battery or supervisory trouble (Function 121-022). Silence by pressing the * key.

Accept Tones

A three-tone sound which indicates that the system has accepted a command.

Rejection Tones

Low volume, short two-tone sound which sometimes occurs when a keypad command is entered. It indicates that the command was not directly accepted. Normally this occurs when trying to arm the system with an open sensor. The sensor(s) must be closed or bypassed, then the system will arm.

Exit Delay Beeps

Short, single-tone beeps repeated at 1 second intervals during the exit delay. An exit delay allows time for you to leave the premises through a door programmed as "delayed". **The premises must be vacated before the exit delay time expires or an alarm will occur.**

Entry Delay Beeps

Short, single-tone beeps repeated at 1/2 second intervals during the entry delay. Entering the protected premises through an exterior door programmed for "delay" will start the entry beeps. **The system must be disarmed before the entry delay time expires or an alarm will occur.**

Entry Delay After Alarm Beeps

Short, two-tone beeps repeated at 1/2 second intervals during the entry delay after an alarm has occurred. **This is to alert you to exercise caution when entering the premises, as the intruder may still be present.**

Level Change Gong

A single gong tone sound that occurs after changing security levels.

Level Count Beeps

Short, low volume single-tone beeps that come after a level change gong or when the STATUS key is pressed. Count the number of beeps to determine the current security level.

Chime Tones

Low volume two-tone chime which indicates a door or window sensor has been opened when the system is armed in Level 2. Also used as sounder for the Chime Only Zone.

Sensor Test Beep

Loud single-beep heard when testing the sensors in Level 8 (Sensor Test Mode).

Ready to Program Sensor Tone

Low volume two-tone chime which indicates that the CP-90 is ready to program one or more RF sensors (Functions 001, 002 & 017 only).

Panel Connection Warning Chirps

If the keypad sounds continuous chirps, there is trouble in the connection between the keypad and the control panel. Check the keypad cable if this occurs.

KEYPAD COMMANDS

The following pages are similar to the information presented in the CP-90 User's Guide. This general information is presented so that the installer can become familiar with the CP-90's keypad sounds.

Status Key Commands



The STATUS key has four functions:

- ☞ If the STATUS key is pressed on a wireless keypad (keypad with no display), the current security level count beeps will sound from the hardwired keypads.
- ☞ If the STATUS key is pressed on a hardwired keypad (keypad with display), the current security level count beeps will sound and the display will show "— —". A sensor number or special keypad command can be entered. Entering a sensor number displays the current state of that sensor. Enter two digits for the sensor number (04 = Sensor #4).
- ☞ If the STATUS key is pressed and held for about 1 second, the display will cycle to show the status of all of the sensors. If all sensors are closed and no trouble conditions exist, the display will show "SYSTEM READY".
- ☞ If the STATUS key is pressed during the status display cycle, the display will freeze on the sensor displayed. Press STATUS again to restart the display cycling.

After using the STATUS key, the display will return to normal after 45 seconds of keypad inactivity.

Special Keypad Commands

Special keypad commands are used for resetting functions and performing system tests. **The system must be in Level 0 to use these commands.** The special keypad commands are:

- ☞ **??? → 8 → 0** ☞ Press STATUS then "80"
Sets clock minutes - enter two digits (01 = 1).
- ☞ **??? → 8 → 1** ☞ Press STATUS then "81"
Sets clock hours - enter two digits (01 = 1).
- ☞ **??? → 8 → 2** ☞ Press STATUS then "82"
Sets calendar day - enter two digits (01 = 1).
- ☞ **??? → 8 → 3** ☞ Press STATUS then "83"
Sets calendar month - enter two digits (01 = 1).
- ☞ **??? → 8 → 4** ☞ Press STATUS then "84"
Sets calendar year - enter two digits (01 = 1).
- ☞ **??? → 8 → 5** ☞ Press STATUS then "85"
Sets day of week - enter 01-07 (01=Sunday).
- ☞ **??? → 8 → 6** ☞ Press STATUS then "86"
Adjusts clock 1 second per day faster.
- ☞ **??? → 8 → 7** ☞ Press STATUS then "87"
Adjusts clock 1 second per day slower.
- ☞ **??? → 9 → 0** ☞ Press STATUS then "90"
Displays version of CP-90 firmware.
- ☞ **??? → 9 → 6** ☞ Press STATUS then "96"
Displays alarm memory of up to nine alarm events in order of occurrence.
- ☞ **??? → 9 → 7** ☞ **Press STATUS then "97"
Clears all trouble displays on the keypad.**
- ☞ **??? → 9 → 8** ☞ Press STATUS then "98"
Starts a manual system backup battery test.
- ☞ **??? → 9 → 9** ☞ Press STATUS then "99"
Resets latching wired smoke detectors.

TROUBLE DISPLAYS

The following pages are similar to the information presented in the CP-90 User's Guide. This general information presented so that the installer can become familiar with the CP-90's trouble codes.

Special situations will cause the TROUBLE light on the keypad(s) to blink. To identify the trouble, press and hold the STATUS key for one second. On a KD-90 keypad, the display will show a "Supervisory Code" and the trouble condition. **To clear troubles, fix the problem and press "STATUS 97" from Level 0.**

The system can identify trouble from three areas: Sensors and accessories (RF transmitters, hardwired loops and wired keypads), the control panel hardware (fuses, tamper, backup battery and AC power) and internal system functions (radio decoding, EEPROM memory and watchdog circuitry).

Sensor Trouble Codes

The table in Figure 49 shows the possible trouble codes that occur from sensors. These kind of trouble conditions can be corrected by taking the actions shown in the table.

Control Panel Trouble Codes

The table in Figure 50 shows the possible control panel trouble codes that might occur. These kind of trouble conditions can be corrected by replacing blown fuses and correcting the problem, etc.

Internal System Trouble Codes

The table in Figure 51 shows the possible internal system trouble codes that might occur under rare system conditions. If these kind of trouble codes show up more than once, call the Linear Technical Services Department for instructions.

SENSOR TROUBLE CODES (xx = SENSOR NUMBER)			
CODE #	DISPLAY DESCRIPTION	CAUSE	ACTION
4-64	SENSOR xx LOW BATTERY (Accompanied by an audible trouble warning in UL systems.)	Sensor has sent a low battery signal.	Replace battery in sensor number displayed. Trouble clears when sensor's battery is replaced.
4-64	SENSOR xx SUPERVISORY (Accompanied by an audible trouble warning in UL systems.)	Sensor has not reported to CP-90 in eight hours. May be caused by a missing or inoperative sensor or a radio reception problem.	Check the sensor's condition. Try the EXA-1000 remote antenna if reception is a problem.
1-64	SENSOR xx TAMPER	Sensor case has been opened and tamper has been reported to the CP-90.	Check the sensor's condition. Trouble indication must be cleared with "STATUS 97".
65-72	ACCESSORY xx SUPERVISORY (Accompanied by an audible trouble warning in UL systems.)	Accessory (keypad) has not reported to CP-90 in one minute. May be caused by an inoperative or missing keypad.	Check the keypad's condition. Check the keypad wiring.
65-72	ACCESSORY xx TAMPER	Accessory (keypad) has been removed from its mounting plate.	Check the keypad's condition. Trouble indication must be cleared with "STATUS 97".

Figure 49. Sensor Trouble Codes

CONTROL PANEL TROUBLE CODES			
CODE #	DISPLAY DESCRIPTION	CAUSE	ACTION
73	SUPERVISORY CODE 73 COMMUNICATION FAILURE	CP-90 has failed to fully connect to the central station after all call attempts.	Check the telephone connection. Check the telephone line.
74	SUPERVISORY CODE 74 PANEL LOW BATTERY	CP-90 has a low or missing control panel backup battery.	Check battery fuse, battery charge voltage and battery condition. May have been caused by lack of AC power.
75	SUPERVISORY CODE 75 PANEL AUXILIARY FUSE FAILURE	CP-90 auxiliary power fuse is blown or missing. Too much current has been drawn from auxiliary power output.	Replace auxiliary power fuse with a 2 Amp fuse.
76	SUPERVISORY CODE 76 PANEL FIRE FUSE FAILURE	CP-90 fire power fuse is blown or missing. Too much current has been drawn from fire power output.	Replace fire power fuse with a 2 Amp fuse.
78	SUPERVISORY CODE 78 PANEL POWER FAILURE	CP-90 has had a complete loss of AC and DC power.	Be sure transformer is connected to an unswitched outlet that provides power 24 hours-a-day.
79	SUPERVISORY CODE 79 PANEL TAMPER CONDITION	The CP-90 control panel cabinet has been opened.	Close the control panel door and reset the trouble indication with "STATUS 97".
80	SUPERVISORY CODE 80 PANEL AC POWER FAILURE	CP-90 has had a loss of AC power.	Be sure transformer is connected to an unswitched outlet that provides power 24 hours-a-day.
87	SUPERVISORY CODE 87 UNINSTALLED ACCESSORY	A keypad has been wired to the CP-90 but has not been installed into the system memory.	See Programming Instructions for how to install accessories with Function 21.

Figure 50. Control Panel Trouble Codes

INTERNAL SYSTEM TROUBLE CODES			
CODE #	DISPLAY DESCRIPTION	CAUSE	ACTION
77	SUPERVISORY CODE 77 PANEL RADIO FAILURE	The CP-90 has detected a problem in the radio receiver circuitry.	Call Technical Services if this happens more than once.
86	SUPERVISORY CODE 86 PANEL RAM CHECK ERROR	The CP-90 has detected a RAM memory error.	
88	SUPERVISORY CODE 88 EEPROM WRITE FAILURE	The CP-90 has detected an error when updating its memory.	
89	SUPERVISORY CODE 89 WATCHDOG MONITOR RESET	The CP-90 has detected abnormal operation of the control panel software and has restarted itself.	

Figure 51. Internal System Trouble Codes

CP-90 Program Memory

Computers run programs. Because the CP-90 is microprocessor controlled, it is very much like a computer. There is a memory chip in the CP-90 that contains the program that the microprocessor runs as it controls the system. This memory chip is called the *program memory*. The program memory functions like a program disk that runs on a computer. As Linear makes improvements and adds features to the CP-90, new versions of the CP-90 program will be released. New CP-90s are always built with the latest version program available. Existing CP-90s in the field can be upgraded by simply removing the old and inserting a new program memory chip.

Changing the Program Memory Chip

Perform the following steps in order to change the program memory chip inside the CP-90.

CAUTION: Turn the CP-90's MASTER POWER switch OFF and disconnect the backup battery before proceeding.

STEP 1 Remove circuit board Shield. Remove the seven screws from the Circuit board shield (see Figure 52). Carefully remove the shield and set it aside.

STEP 2 Remove circuit board from terminals. Using a 1/4" nutdriver or pliers, remove the five standoff posts from the circuit board. Disconnect the RF receiver connector. From the bottom edge of the circuit board, carefully pry the board free from the terminal board (see Figure 53). Be careful not to lose the five nylon spacers on the screw posts. Set the circuit board on your workbench or table.

STEP 3 Remove internal shield. Remove the two screws and nuts from the internal shield. Remove the front and back shield pieces (see Figure 54). Set the front and back shields aside.

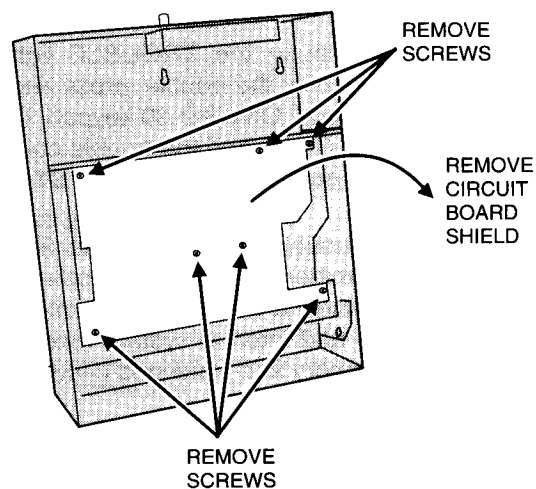


Figure 52. Removing Circuit Board Shield

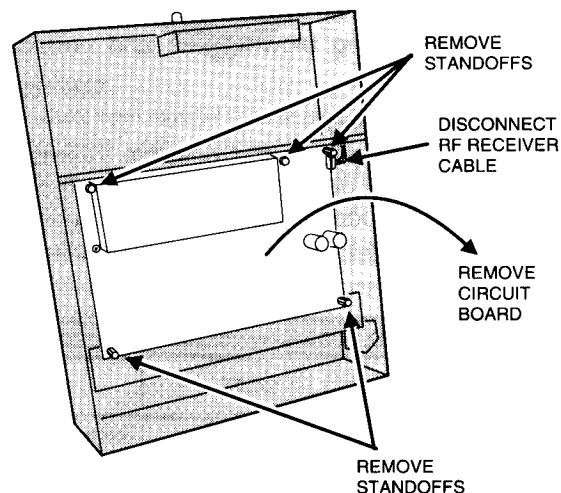


Figure 53. Removing Circuit Board from Terminal Board

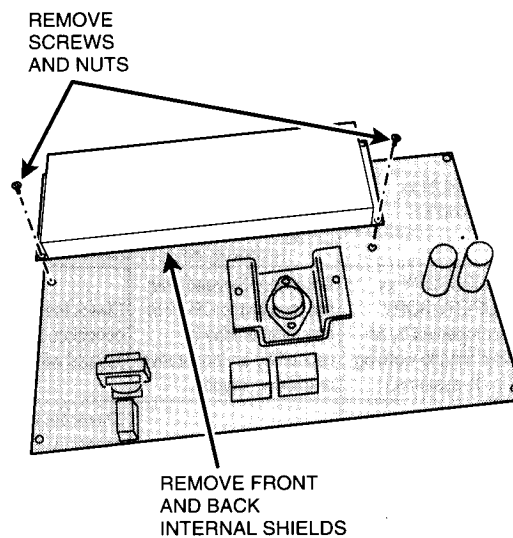


Figure 54. Removing Internal Shield

CAUTION: The program memory chips are very static sensitive. Touch a cold water pipe ground to discharge yourself before handling the new chip.

STEP 4 Remove program memory chip. Locate the proper chip. There are three large chips mounted vertically. The program memory chip is the center chip with a white version number label on it. With an IC removal tool or a small flat blade screwdriver, carefully lift or pry between the top side of the chip and the socket. The chip should slide out of the socket (see Figure 55).

STEP 5 Insert new program memory chip. Remove the new chip from its static protection foam. Verify that all the chip's pins are straight. Carefully insert the new chip into the socket with the notch on the chip towards the top edge of the circuit board. Be sure all the chip's pins are going into the socket correctly before pressing the chip firmly into the socket (see Figure 56).

Reverse Steps 3, 2 and 1 to:

- ✓ Reassemble the internal shield (be sure the small tabs go into the slots on the circuit board).
- ✓ Reconnect the circuit board to the terminal board and RF receiver connector.
- ✓ Replace the circuit board shield (be sure the master reset and tamper switch levers are aligned on the switches).

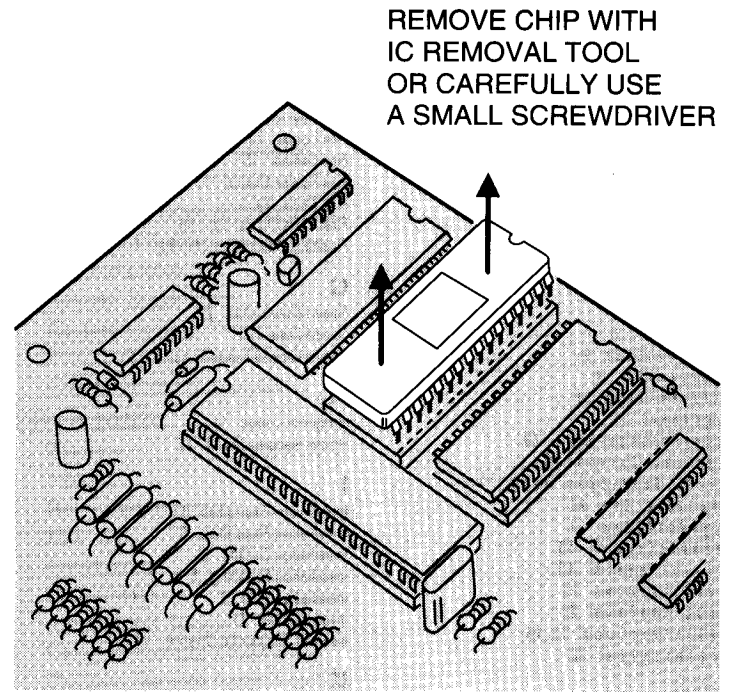


Figure 55. Removing Program Memory Chip

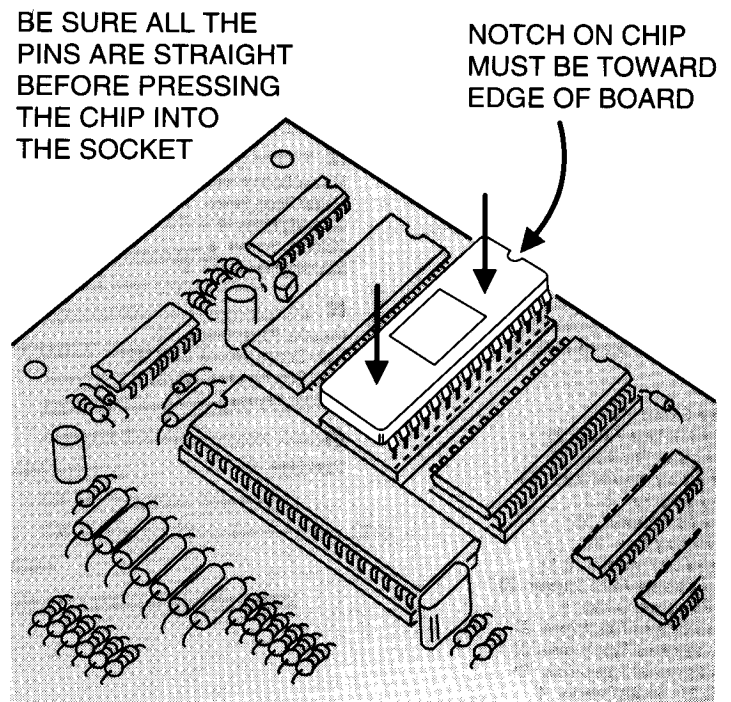


Figure 56. Inserting New Program Memory Chip

A

AC Power Failure 25
 AC Transformer 17
 Accept Tones 23
 Access Only Zone 21
 Access Output 14
 Accessories 4
 Accessory Supervisory Trouble 25
 Accessory Tamper 25
 Active Lighting Level 20
 Alarm Light 6
 Alphanumeric Display 6
 Antenna 8...9
 Antenna Height 3
 Antenna Installation 9
 Antenna Location 3
 Arm/Disarm Toggle 21
 Armed Output 14
 Audible Signals and Sirens 23
 Audio Output Connector 18
 Automatic Backup Battery Testing 17
 Automation #1 Zone 21
 Automation #2 Zone 21
 Automation Output #1 15
 Automation Output #2 15
 Auxiliary Accessories 15
 Auxiliary Fuse Failure 25
 Auxiliary Power Output 12, 16
 Away Security Level 22

B

Backup Battery 17
 Backup Battery Standby Table 17
 Backup Battery Testing 17, 24
 Basic Keypad Operation 23
 Basic System Information 21
 Burglary Output 13
 Bypass Key 6...7
 Bypass Light 6

C

Chime Only Zone 21
 Chime Security Level 22
 Chime Tones 23
 Clearing Trouble Displays 24
 Clock, Setting the KD-90 24
 Communicator Phone Line 11
 Control Output Connector 12
 Control Outputs 12
 Control Panel Installation 9
 Control Panel Location 3, 9
 Control Stations 10

D

DC Power 16
 Delayed Remote Emergency 21
 Delayed Remote Police/Hold-up 21
 Disarm/Cancel Security Level 22

E

Earth Ground 16...17
 EEPROM Write Failure 25
 Emergency Fire Alarm 23
 Emergency Intrusion Alarm 23
 Emergency Key 6...7
 Emergency Output 13
 Emergency Zone 21
 End-of-Line Resistors 8, 11
 Environmental Alarm Sounder 23
 Environmental Sensor 5
 Environmental Type A Zone 21
 Environmental Type B Zone 21
 Environmental Type C Zone 21
 ESL 371 Smoke Detector 4
 Exterior Zone 21

F

Factory Defaults 19
 Fire Fuse Failure 25
 Fire Key 6...7
 Fire Loops 11
 Fire Output 13
 Fire Power Output 16
 Fire Zone 21
 First Time Power Up 19
 Flashing Downlights (TK-90) 7

G

Green Downlights 7
 Guard Zone 21
 Guard/Cancel Security Level 22

H

Hardwire Loops 11
 Home Security Level 22

I

Installation Examples 8
 Installation Floor Plan 8
 Installation Outline 3
 Installation Planning 8
 Installation Tips 3
 Interior Zone 21
 Internal Diagnostic Checks 19

K

KD-90 Keypad 4, 6
 Key Station Wiring 11
 Keypad Installation 10
 Keypad Lighting 20
 Keypad Lockout Timer 20
 Keypad Speaker 6
 Keypad Supervision 20
 Keypad Wiring 10
 Knockouts 9

L

Lamp Output 14
 Level Change Gong 23
 Level Count Beeps 23
 LMT-1 Portable Sensor 5
 Low Backup Battery 25
 Low Battery Light 6

M

Manual Backup Battery Test 17, 24
 Master Reset Switch 19
 Mounting Holes 9
 Mounting Screws 8
 Mounting the Control 9

N

Negative Power Output 12
 Night Secure Security Level 22
 Night Security Level 22
 Numeric Keyboard 6...7

O

Open Light 6

P

Panel AC Power Failure 25
 Panel Auxiliary Fuse Failure 25
 Panel Door Ground 16
 Panel Fire Fuse Failure 25
 Panel Low Battery 25
 Panel Power Failure 25
 Panel Radio Failure 25
 Panel Tamper Condition 25
 Personal Emergency Sounder 23
 Phone Jack 11
 Phone Line Installation 11
 Phone Test Level 22
 Police/Hold-up Emergency Alarm 23
 Police/Hold-up Key 6...7
 Police/Hold-up Zone 21
 Power Failure 25
 Power Light 6
 Power-up Indications 20
 Pre-alarm Output 14
 Programming Level Timer 20
 Programming Mode 22

R

Radio Failure 25
 Radio Formats 2
 RB-90 Relay Interface Board 5
 Rejection Tones 23
 Remote Antenna 9
 Restoring Factory Defaults 19
 Restricted Interior Zone 21

S

Security Levels 22
 Sensor Low Battery 25
 Sensor Supervisory 25
 Sensor Tamper 25
 Sensor Test Beep 23
 Sensor Test Level 22
 Setting KD-90 Clock 24
 Siren Drivers 15
 Smoke Power Output 16
 Special Keypad Commands 24
 Special Trouble Displays 25
 Specifications 2
 ST-23A Money Trap 4
 Standby Lighting Level 20
 Status Key 6...7
 Status Key Commands 24
 Supervisory Light 6
 System Power Up 19
 System Zones 21

T

T-90D Sensor 4
 Tamper Condition 25
 Tamper Light 6
 Telephone Line 11
 Test Levels 22
 TGB-96 Glass Break Detector 5
 TK-90 Keypad 4
 TMD-90 Motion Sensor 4
 Transformer 8, 17
 Transmission Through Obstacles 3
 Transmitter Locations 3
 Trouble Display Codes 25
 Trouble Light 6, 16, 19
 TSD-90 Smoke Detector 4
 Two-way Audio Connector 18
 TX Button Disable Zone 21
 TX-91, TX-92 & TX-94 Portable Sensors 5

U

Uninstalled Accessory 25

V

Violation Output 15

W

Watchdog Monitor 19, 25
 Wiring Knockouts 9

Z

Zones 21

LINEAR LIMITED WARRANTY

This Linear product is warranted against defects in material and workmanship for twelve (12) months. The Warranty Expiration Date is labeled on the product. **This warranty extends only to wholesale customers** who buy direct from Linear or through Linear's normal distribution channels. **Linear does not warrant this product to consumers.** Consumers should inquire from their selling dealer as to the nature of the dealer's warranty, if any. **There are no obligations or liabilities on the part of Linear Corporation for consequential damages arising out of or in connection with use or performance of this product or other indirect damages with respect to loss of property, revenue, or profit, or cost of removal, installation, or reinstallation.** All implied warranties, including implied warranties for merchantability and implied warranties for fitness, are valid only until Warranty Expiration Date as labeled on the product. **This Linear Corporation Warranty is in lieu of all other warranties express or implied.**

All products returned for warranty service require a Return Product Authorization Number (RPA#). Contact Linear Technical Services at 1-800-421-1587 for an RPA# and other important details.

IMPORTANT !!!

Linear radio controls provide a reliable communications link and fill an important need in portable wireless signalling. However, there are some limitations which must be observed.

- * For U.S. installations only: The radios are required to comply with FCC Rules and Regulations as Part 15 devices. As such, they have limited transmitter power and therefore limited range.
- * Receivers may be blocked by radio signals that occur on or near their operating frequencies, regardless of code settings.
- * Changes or modifications to the CP-90 may void FCC compliance.
- * A receiver cannot respond to more than one transmitted signal at a time.
- * Infrequently used radio links should be tested regularly to protect against undetected interference or fault.
- * A general knowledge of radio and its vagaries should be gained prior to acting as a wholesale distributor or dealer, and these facts should be communicated to the ultimate users.

FCC NOTICE

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Relocate the CP-90 away from the TV/radio receiver.
- Plug the CP-90 into a different wall outlet so that the console is on a different branch circuit.
- Re-orient the TV/radio antenna.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

INDUSTRY CANADA NOTICE

The Industry Canada (IC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The IC does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alternations made by the user to this equipment, or equipment malfunctions may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The **Load Number (LN)** assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Number of all the devices does not exceed 100.

- The load number for the CP-90 SSC00017 is equal to 7.

For warranty service, repairs or information contact: 1-800-421-1587

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