

**POWER AND COMMUNICATION  
REQUIREMENTS FOR THE  
ALOHA SYSTEM**



**Version 1.0**

*Aloha*<sup>®</sup>

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# Table of Contents

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## Introduction

Overview .....	I-iii
AC Power Requirements .....	I-iii
Communication Cable Requirements .....	I-iv
Network Device Location .....	I-iv
Phone Line Requirements .....	I-iv
How This Book is Organized .....	I-v

## AC Power Requirements ..... 1-1

Preferred AC Power System.....	1-3
Conductors and Circuits .....	1-3
Data Communication Cables .....	1-4
AC Power Receptacles.....	1-4
Uninterrupted Power Supply (UPS).....	1-5
AC Power System Grounding.....	1-5
Aloha Power Panel Grounding .....	1-5
Aloha Branch Circuit Grounding .....	1-5
Alternate AC Power System .....	1-7
Conductors and Circuits .....	1-7
Uninterrupted Power Supply (UPS).....	1-7
AC Power Receptacles.....	1-8
Relaxed/Power Conditioned AC Power System .....	1-10
Non-dedicated Power Panel .....	1-10
Dedicated Circuits.....	1-10
Conductors and Circuits .....	1-10
Power Conditioners .....	1-11
Uninterrupted Power Conditioner (UPC) .....	1-11
AC Power Receptacles.....	1-11



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<b>Communication Cable Requirements.....</b>	<b>2-1</b>
Mechanical and Environmental Considerations .....	2-3
Lightning .....	2-3
Electrical Interference .....	2-3
Radio Frequency Interference .....	2-3
Shielded Cable vs. Metal Conduit .....	2-5
PVC Conduit.....	2-6
<b>Network Device Location.....</b>	<b>3-1</b>
Device Location Planning .....	3-3
Manager's Workstation/Ethernet Hub .....	3-4
User Workstation .....	3-5
Stand-alone (Remote) Printers.....	3-6
Cables and Connectors .....	3-7
Cable for Printers .....	3-7
Ethernet Plate/Jack and Connectors .....	3-7
<b>Phone Line Requirements .....</b>	<b>4-1</b>
Dedicated Phone Line .....	4-3
Phone Line Interference .....	4-4
<b>Index</b>	

# Introduction

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## Overview

The AC power, communication cable, and phone line requirements for the ALOHA® system hardware are discussed, in detail, in this manual.

## AC Power Requirements

There are three choices for the AC power requirements:

### Preferred AC Power System

The installation of a power distribution panel intended for the sole use of the Aloha POS system hardware is the preferred method of providing power. This method ensures that electrical noise produced by other equipment does not create interference for the Aloha POS system hardware.

### Alternate AC Power System

The power for the Aloha POS system hardware is provided directly from the main or source power panel. This option is recommended for existing construction where the current facilities do not justify the installation of a dedicated power panel.

### Relaxed/Power Conditioned AC Power System

When providing either of the above options is cost prohibitive and/or would require major structural changes, this method may be used.



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## **Communication Cable Requirements**

When designing the site, it is important to address mechanical and environmental issues that could affect the system hardware. The cabling must be protected from environment variables such as lightning, electrical interference, and radio frequency interference. The type of cable to use must also be determined. Grounded ferrous metal conduit is expensive to install but provides the best protection.

## **Network Device Location**

A map diagramming the location of the network hardware is vital when determining the number and types of cable runs between the workstations (POS terminals), the Ethernet hub, and the stand-alone printer devices.

## **Phone Line Requirements**

It is optimal to have two dedicated phone lines to the server; one line is needed for the Aloha Electronic Draft Capture application, and the other is used for remote communications.

# How This Book is Organized

The following chapters outline the power requirements for the Aloha system hardware:

## **Introduction**

This chapter is a basic introduction to the power system requirements for the Aloha system hardware.

## **Chapter 1: AC Power Requirements**

This chapter discusses the different options available when determining the AC power system to use for the Aloha system hardware installation.

## **Chapter 2: Communication Cable Requirements**

This chapter discusses the communication cable requirements for the Aloha system hardware. Discussions include mechanical and environmental considerations, shielded cable vs. metal conduit, and PVC conduit.

## **Chapter 3: Network Device Location**

This chapter discusses the network device location. Discussions include manager's workstation/Ethernet hubs, user workstations, and stand-alone printers. A list of recommended cables and connectors is also included.

## **Chapter 4: Phone Line Requirements**

This chapter discusses the phone line requirements for the Aloha system.

## **Index**



# AC Power Requirements

This chapter discusses the AC power requirements for the Aloha system hardware. There are three options: the Preferred AC Power System, the Alternate Power System, and the Relaxed/Power Conditioned AC Power System.

---

Preferred AC Power System.....	1-3
Conductors and Circuits .....	1-3
Data Communication Cables .....	1-4
AC Power Receptacles.....	1-4
Uninterrupted Power Supply (UPS).....	1-5
AC Power System Grounding.....	1-5
Aloha Power Panel Grounding .....	1-5
Aloha Branch Circuit Grounding .....	1-5
Alternate AC Power System .....	1-7
Conductors and Circuits .....	1-7
Uninterrupted Power Supply (UPS).....	1-7
AC Power Receptacles.....	1-8
Relaxed/Power Conditioned AC Power System.....	1-10
Non-dedicated Power Panel.....	1-10
Dedicated Circuits.....	1-10
Conductors and Circuits .....	1-10
Power Conditioners .....	1-11
Uninterrupted Power Conditioner (UPC) .....	1-11
AC Power Receptacles.....	1-11



## Chapter I

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# Preferred AC Power System

To ensure that electrical noise produced by other equipment does not create interference for the Aloha system hardware, all power conductors and equipment grounding conductors must be isolated from other power circuits in the facility. To accomplish this, the installation of a power distribution panel intended for the sole use of the Aloha system hardware is the preferred method of providing power. No other equipment should run off this circuit.

A dedicated power panel is not used to supply other electrical loads in the facility, and is supplied by a feeder run directly from the main or source panel for the facility.

Personal computers, and/or stand-alone devices are powered from a single circuit. All branch circuits include a separate neutral (ground conductor) and equipment grounding conductor, unless otherwise indicated.

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***The following information does not supplant national, state, or local electrical codes.***

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## Conductors and Circuits

A ferrous metal conduit with separate neutral and ground conductors is required for each branch circuit. Aluminum conduit is not acceptable.

If the length exceeds 100 feet, increase all conductors (including ground) one wire size for each additional 100 feet of length.

The neutral conductor from the main or source panel to the dedicated Aloha panel must be two sizes larger than the phase conductors. This is to accommodate the third harmonic current caused by switching power supplies in the Aloha user workstations, and to minimize the possibility of common mode noise occurring on the power distribution circuits.

All power distribution circuits must be installed in a dedicated ferrous metal conduit containing only the Aloha supply and ground conductors.

## Data Communication Cables

Separate ferrous metal conduits are required for data communication cables.

## AC Power Receptacles

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***NEC Article 250-74, Exception 4, permits installation of the isolated ground receptacles and isolated equipment grounding conductors specified in this section.***

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To maintain isolation of the equipment-grounding conductor from the conduit system, an isolated ground receptacle must be used. This type of receptacle (usually identified by an orange face) provides an insulating barrier between the equipment grounding terminal and the receptacle mounting strap. All branch circuits from the Preferred AC power panel must be terminated with isolated ground receptacles.

All AC power receptacles must be the isolating ground type. Standard receptacles bond the equipment-grounding terminal (green screw) to the receptacle mounting strap and metallic conduit when the receptacle is mounted to the box. This defeats the purpose of the isolated grounding system. No equipment bonding jumper is installed from the receptacle grounding terminal to the outlet box.

If a duplex receptacle is installed and only one socket is used, the unused socket should be disconnected to prevent the temptation of using the outlet for equipment such as floor buffers, vacuum cleaners, etc., that may produce extraneous ground currents.

Approved ground receptacle types are:

<b>Receptacle Type</b>	<b>NEMA P/N</b>
125V, 15A, Simplex	IG5-15RI
125V, 15A, Duplex	IG5-15R2

## Uninterrupted Power Supply (UPS)

Each Aloha system processor (provided with the Aloha equipment package) requires an approved UPS; however, the best way to protect the Aloha system is to have an approved UPS on the dedicated circuit.

## AC Power System Grounding

Proper grounding of the AC power system is critical to achieve a high degree of equipment performance and reliability. A separate equipment grounding system must be installed to minimize the introduction of electrical noise. The following outlines the specific grounding requirements:

### Aloha Power Panel Grounding

An insulated equipment grounding conductor (sized the same as the supply conductors) must be installed in the same conduit as the supply conductors from the main or source panel to the dedicated Aloha equipment panel. This equipment-grounding conductor is terminated on the ground bus in the main panel.

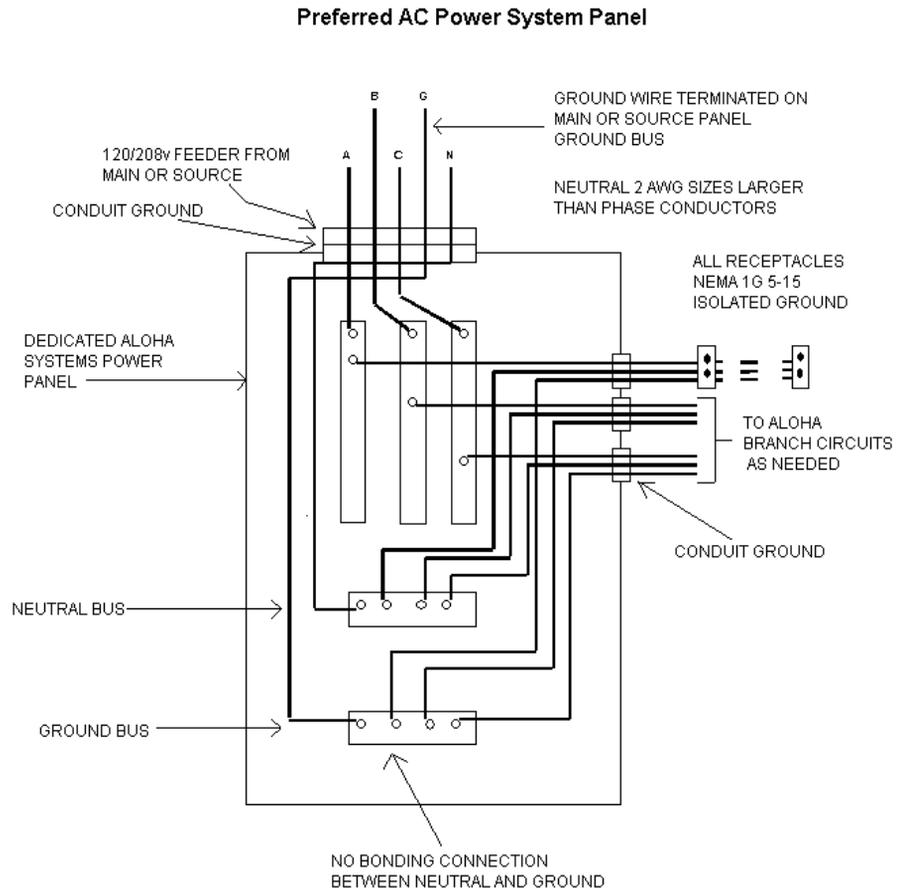
Install a ground bus at the Aloha equipment panel that is electrically isolated from the panel frame, and terminate the feeder equipment grounding conductor on this bus bar.

The metallic feeder conduit is used as the equipment grounding system for grounding the AC power panel frame, metallic conduit system, and metallic junction boxes.

### Aloha Branch Circuit Grounding

Each branch circuit from the dedicated power panel to the Aloha System Device receptacles must include a full sized (same as supply conductors) insulated equipment grounding conductor installed in the same conduit as the supply conductors. The conduit must be dedicated to the Aloha equipment.

Terminate the isolated grounding conductor on the isolated ground bus bar in the panel, and on the equipment grounding terminal of a NEMA 1G5-15 isolated grounding type receptacle.



*Figure 1-1*

*Figure 1-1* Display of a Preferred AC Power System Panel

# Alternate AC Power System

For existing construction where the existing facilities do not justify the installation of a dedicated power panel, an alternate method may be employed. This method provides power for the Aloha system hardware devices directly from the main or source power panel. It is imperative that system components are supplied from the main or source panel. No system component is to be supplied from any other power panel.

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***The following does not supplant national, state or local electrical codes.***

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## Conductors and Circuits

All Aloha system hardware and system processor(s) must be supplied with circuits that run directly from the main panel. No other equipment should run off circuits used by the Aloha system hardware.

Branch circuits must be installed in a dedicated ferrous metal conduit and include a full sized (same as the supply conductors) insulated equipment grounding conductor installed in the same conduit. Aluminum conduit is not an acceptable alternative to ferrous metal.

Terminate the isolated grounding conductors at the ground bus in the main or source panel. Do not terminate grounding conductors on any metallic conduit, water pipe, or ground rod.

## Uninterrupted Power Supply (UPS)

Each Aloha system processor (provided with the Aloha equipment package) requires an approved UPS; however, the best way to protect the Aloha system is to have an approved UPS on the dedicated circuit.

## AC Power Receptacles

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***NEC Article 250-74, Exception 4, permits installation of the isolated ground receptacles and isolated equipment grounding conductors specified in this section.***

---

To maintain isolation of the equipment-grounding conductor from the conduit system, an isolated ground receptacle must be used. This type of receptacle (usually identified by an orange face) provides an insulating barrier between the equipment grounding terminal and the receptacle mounting strap. All branch circuits from the Alternate AC power panel must be terminated with isolated ground receptacles.

All AC power receptacles must be the isolating ground type. Standard receptacles bond the equipment-grounding terminal (green screw) to the receptacle mounting strap and metallic conduit when the receptacle is mounted to the box. This defeats the purpose of the isolated grounding system. No equipment bonding jumper is installed from the receptacle grounding terminal to the outlet box.

If a duplex receptacle is installed and only one socket is used, the unused socket should be disconnected to prevent the temptation of using the outlet for equipment such as floor buffers, vacuum cleaners, etc., that may produce extraneous ground currents.

Approved ground receptacle types are:

Receptacle Type	NEMA P/N
125V, 15A, Simplex	IG5-15RI
125V, 15A, Duplex	IG5-15R2

### Alternate AC Power System Panel

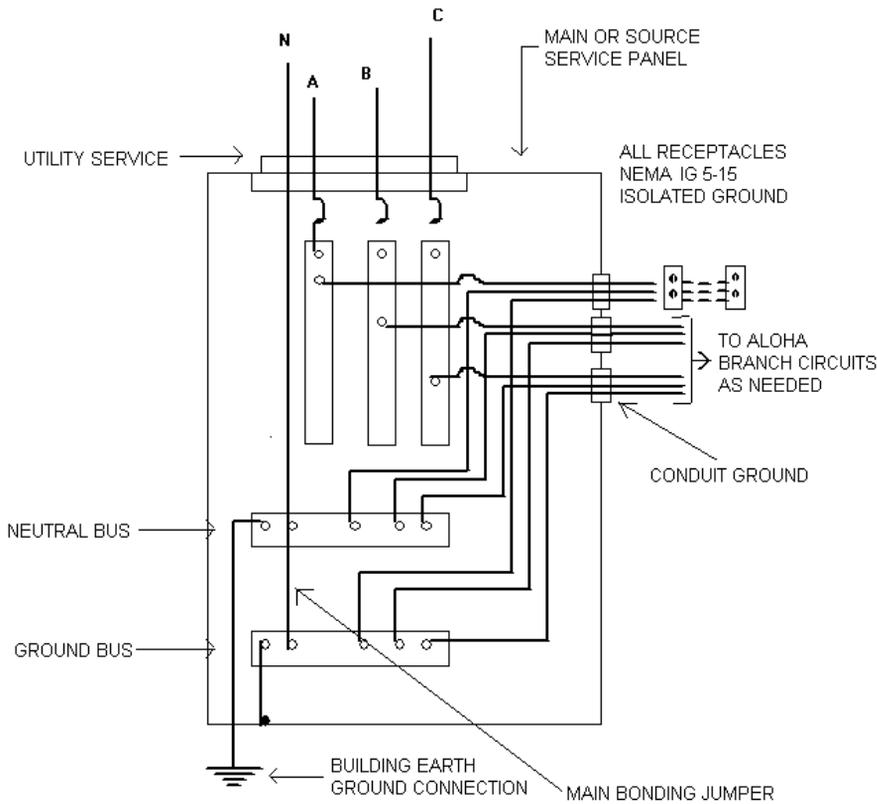


Figure 1-2

Figure 2.1 Display of an Alternate AC Power System Panel

# Relaxed/Power Conditioned AC Power System

When providing the Preferred or Alternate AC Power System is cost prohibitive and/or would require major structural changes, the Relaxed AC Power System may be used.

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***The Preferred or Alternate AC Power System is recommended for the Aloha system hardware.***

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## Non-dedicated Power Panel

Any power panel supplying heavy equipment within the facility should not be selected as the non-dedicated power panel supplying the Aloha equipment.

## Dedicated Circuits

Aloha AC power circuits must be dedicated for Aloha system equipment. These circuits must provide power to the Aloha system equipment only.

## Conductors and Circuits

All Aloha AC power branch circuits must originate from the same non-dedicated power panel equipped with an isolated ground bus that is electrically isolated from the panel frame. This panel must be provided with an insulated equipment grounding conductor (sized the same as the supply conductors) that is installed in the same conduit as the supply conductors from the main or source power panel.

Terminate the equipment-grounding conductor on the ground bus in the main or source panel, and on the isolated ground bus in the non-dedicated power panel.

The conduit used for the Aloha AC power circuits must be ferrous metallic. Flexible, rigid, or greenfield metallic conduit is acceptable. Aluminum conduit is not acceptable.

Each dedicated Aloha AC power circuit must include an M size (same as supply conductors) insulated equipment grounding conductor installed within the same dedicated conduit system as the supply conductors.

Terminate the ground conductor in the non-dedicated power panel, and on the grounding terminal of each isolated ground AC power receptacle.

## Power Conditioners

Aloha approved power conditioners are required at all Aloha remote printer locations (this is provided with the Aloha equipment package).

## Uninterrupted Power Conditioner (UPC)

Each Aloha personal computer requires an approved UPC.

## AC Power Receptacles

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***NEC Article 250-74, Exception 4, permits installation of the isolated ground receptacles and isolated equipment grounding conductors specified in this section.***

---

To maintain isolation of the equipment-grounding conductor from the conduit system, an isolated ground receptacle must be used. This type of receptacle (usually identified by an orange face) provides an insulating barrier between the equipment grounding terminal and the receptacle mounting strap.

Terminate all branch circuits from the Relaxed/Power Conditioned AC Power System panel to the isolated ground receptacles.

All AC power receptacles must be the isolating ground type. Standard receptacles bond the equipment-grounding terminal (green screw) to the receptacle

mounting strap and metallic conduit when the receptacle is mounted to the box. This defeats the purpose of the isolated grounding system. No equipment bonding jumper is installed from the receptacle grounding terminal to the outlet box.

If a duplex receptacle is installed and only one socket is used, the unused socket should be disconnected to prevent the temptation of using the outlet for equipment such as floor buffers, vacuum cleaners, etc., that may produce extraneous ground currents.

Approved ground receptacle types are:

<b>Receptacle Type</b>	<b>NEMA P/N</b>
125V, 15A, Simplex	IG5-15RI
125V, 15A, Duplex	IG5-15R2

# Communication Cable Requirements

This chapter provides information on selecting and installing the cables that connect Aloha hardware devices to the PC workstations and Ethernet LAN Hub.

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Mechanical and Environmental Considerations.....	2-3
Lightning .....	2-3
Electrical Interference .....	2-3
Radio Frequency Interference .....	2-3
Shielded Cable vs. Metal Conduit.....	2-5
PVC Conduit.....	2-6



## Chapter 2

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# Mechanical and Environmental Considerations

When designing the site, mechanical and environmental considerations need to be addressed. This helps to eliminate damage that can occur from disruptions caused by the environment or mechanical devices.

The possibility of mechanical damage to cables includes outdoor runs of cable since sunlight, rain, and mechanical flexing due to wind causes the cable to deteriorate. To protect cables, it is strongly recommended that a grounded ferrous metal conduit is used.

## Lightning

Lightning does not need to directly strike the cabling to cause damage or disruption to the system. Nearby lightning strikes produce strong electromagnetic fields that can induce voltages on the data transmission cables, possibly causing disruptions or damage. A grounded ferrous metal conduit should be employed for installations in geographical areas subject to frequent thunderstorm activity. If shielded cables are used, placing the cable runs as close to ground level as possible can reduce the effects of lightning.

## Electrical Interference

Electrical motors of various sizes are found in a typical restaurant site. A grounded ferrous metal conduit should be employed when cabling must be run at a distance less than two feet from motors that are 1/4 horsepower or smaller, or less than six feet from motors larger than 1/4 horsepower. Shielded cable can be considered if it is possible to maintain the above minimum distances.

## Radio Frequency Interference

The probability of radio frequency interference (RFI) varies in accordance with many factors, including transmitter power, location of the transmitter, materials used in the construction of the building, and physical placement of

the power and data transmission cables. Other possible causes of RFI include nearby amateur radios, CB radios, radio-dispatched trucks and taxis, cordless phones, and cordless headsets. As a general rule, a grounded ferrous metal conduit should be employed when the installation is within one mile of a broadcast transmitter of any type. As with lightning, the effects of RFI are minimized by placing the cable runs as close to ground level as possible.

# Shielded Cable vs. Metal Conduit

Two main goals when installing data transmission cables are to prevent mechanical damage and to prohibit disruptions due to outside electrical interference. In general, a properly grounded ferrous metallic conduit provides the best electrical and mechanical protection, but is more expensive to install, especially at an existing site. Selection of a grounded ferrous metal conduit vs. shielded cable requires consideration of both expense and the degree to which occasional disruptions can be tolerated.

All Aloha data transmission cables must be installed within a separate grounded ferrous metal conduit when non-shielded cable is used. Aluminum conduit is not an acceptable alternative as it provides little or no protection from Electromagnetic Interference (EMI). The use of conduit must be continuous throughout the system from junction box to junction box to ensure a proper ground return path.

No other power or communication cables should be run in the same conduit.

# PVC Conduit

PVC Conduit can be employed when cables must be buried below the floor level. When using PVC conduit, an Aloha approved shielded data transmission cable must be used. When installing PVC conduit in concrete flooring, the following guidelines apply:

- The PVC conduit should be located at least six inches below the surface of the floor.
- The PVC conduit should be located at least six inches from other nearby conduits.

If the PVC conduit run is in the middle of a metal conduit run, a ground wire must be run through the PVC conduit to connect the metal conduit together at both ends. This ensures a complete AC ground path for the metal conduit.

No other power or communication cables should be run in the same conduit.

# Network Device Location

This chapter discusses the location of the network hardware for the Aloha system. Discussions include the manager's workstation, the user workstation, and stand-alone printers. The last section lists the recommended cables and connectors for the Aloha hardware system.

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Device Location Planning .....	3-3
Manager's Workstation/Ethernet Hub .....	3-4
User Workstation .....	3-5
Stand-alone (Remote) Printers .....	3-6
Cables and Connectors .....	3-7
Cable for Printers .....	3-7
Ethernet Plate/Jack and Connectors .....	3-7



## Chapter 3

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# Device Location Planning

The layout of the installation site is the determining factor in network hardware location. A blueprint of the restaurant showing the locations of the hardware devices on the floor plan or riser diagram is required to determine the physical location of all devices in the Aloha system. From this, the number and types of cable runs between the user workstations (POS terminals), manager's workstation, Ethernet hub located in the manager's office (close to the manager's workstation), and stand-alone printer devices (broiler, fryer, expeditor, and beverage printers) can be determined.

An Aloha approved CAT5-10BaseT four-pair 24 gauge shielded or non-shielded cable is installed for all connections between the Ethernet hub, manager's workstation, and user workstations. The same cable is also used for all connections between the stand-alone printers and a user's workstation. Each Aloha POS terminal can drive one local printer and one stand-alone remote printer. If non-shielded cable is used, it is required to be installed in a grounded ferrous metal conduit.

When more stand-alone remote printers are required than the number of user workstations, additional RS232 Communication Boards can be added to a user workstation (provided with the Aloha hardware package).

# Manager's Workstation/Ethernet Hub

The hardware in the manager's office consists of a PC workstation (server), PC monitor, PC keyboard, modem, laser reports printer, an Ethernet hub, and an uninterrupted power supply.

Ethernet CAT5-10BaseT four-pair 24 gauge shielded or non-shielded cable from each user workstation is terminated in a patch panel next to the server computer. The manager's workstation is attached to the Ethernet hub and CAT5 patch cables are used from the hub to the patch panel to connect the terminals. Grounded ferrous metal conduit is required if non-shielded cable is used.

# User Workstation

A user workstation consist of a personal computer, touch screen monitor, magnetic credit card swipe reader, uninterrupted power supply and an RS232 cable connected local printer.

Ethernet CAT5-10BaseT four-pair 24 gauge shielded or non-shielded cable runs from each user workstation and is terminated at the patch panel located in the manager's office. Five feet of excess cable should be left outside the data cable junction box to allow for a sufficient length of cable for proper termination (POS terminals and manager's office). Grounded ferrous metal conduit is required if non-shielded cable is used.

The communication cable is terminated at the user workstation with a female RJ45 CAT5 plate/jack.

# Stand-alone (Remote) Printers

Stand-alone printers consist of broiler, fryer, expediter, beverage printers, etc. The number of printers varies per restaurant.

Ethernet CAT5-10BaseT four-pair 24 gauge shielded or non-shielded cable is used to connect stand-alone devices. The same pinouts used for the terminals are also used for the printer connections, attached in a point-to-point configuration to a user workstation. Five feet of excess cable should be left outside the data cable junction box to allow for a sufficient length of cable for proper termination.

# Cables and Connectors

The following is a list of recommended cables and connectors for the Aloha system hardware:

## Cable for Printers

Use Ethernet CAT5-10BaseT four-pair 24 gauge shielded or non-shielded cable for printers. Recommended manufacturers are Bertek or an equivalent manufacturer.

## Ethernet Plate/Jack and Connectors

An RJ45 CAT5 plate/jack is required for the user workstation cable termination. Mount one jack (in the wall) per terminals. Recommended manufacturers are Panduit's or an equivalent manufacturer. The part number is MUJC588 or MFPD1EL.

An RJ45 CAT5 plate/jack is required for the Ethernet hub cable termination. Recommended manufacturers are Panduit or an equivalent manufacturer. The part number is MFPD4EL or MFPD1E.



# Phone Line Requirements

This chapter discusses the phone line requirements for the Aloha system.

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Dedicated Phone Line .....	4-3
Phone Line Interference .....	4-4



## Chapter 4

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# Dedicated Phone Line

It is optimal to have two protected dedicated phone lines to the server to prevent damage that can be caused by mechanical and environmental factors. A dedicated phone line is not shared with any other device. One line is needed for the Aloha Electronic Draft Capture application. The second line is needed for remote communications by Aloha Technologies, LTD. for the use of Symantec's® pcANYWHERE.

# Phone Line Interference

Phone (PBX) systems can cause interference, cross talk, and roll-over onto these lines; therefore, the phone line must be a straight run from the d-mark to the phone jack. For additional security from external interference, shielded CAT5 cable should be used to run these lines. Using a UPS with phone line protection helps to prevent damage to the computer caused by lightning and other voltage producers.

# Index

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## A

- Alternate AC Power System 1-7
  - AC power receptacles 1-8
  - conductors and circuits 1-7
  - uninterrupted power supply 1-5, 1-7
- approved ground receptacle types 1-4, 1-8, 1-12

## B

- branch circuit grounding 1-5

## C

- communication boards 3-3

## D

- data transmission cables 2-5
- dedicated phone line 4-3

## E

- electrical interference 2-3
- equipment performance and reliability 1-5
- Ethernet cable 3-4, 3-5, 3-6
- Ethernet hub 3-3, 3-7
- Ethernet plate/jack and connectors 3-7

## H

- hub 3-7

## J

- junction box 3-6



## L

layout 3-3  
lightning 2-3

## M

manager's workstation 3-4  
mechanical and environmental considerations 2-3

## N

non-shielded cable 3-3, 3-4, 3-5, 3-6, 3-7

## P

patch cables 3-4  
patch panel 3-4, 3-5  
phone line interference 4-4  
pinouts 3-6  
power panel grounding 1-5  
Preferred Power System  
    AC power receptacles 1-4  
    AC power system grounding  
        branch circuit  
            grounding 1-5  
        power panel  
            grounding 1-5  
    conductors and circuits 1-3  
    data communication  
        cables 1-4  
    dedicated power panel 1-3  
    electrical noise 1-3  
printer cable 3-7  
PVC conduit 2-6

## R

radio frequency interference 2-3  
Relaxed/Power Conditioned AC Power System 1-10  
    AC power receptacles 1-11  
    conductors and circuits 1-10  
    dedicated circuits 1-10  
    non-dedicated power  
        panel 1-10

power conditioners 1-11  
uninterrupted power  
    conditioners 1-11

## S

shielded cable 2-3, 2-5, 3-3, 3-4, 3-5, 3-6, 3-7  
shielded data transmission cable 2-6  
stand-alone (remote) printers 3-6

## T

third harmonic current 1-3

## U

uninterrupted power supply 1-5, 1-7  
user workstation 3-5