

# NEC

Use this manual to learn about the standard installation practices you should follow when installing your system.



## Standard Practices

This manual has been developed by NEC Unified Solutions, Inc. It is intended for the use of its customers and service personnel, and should be read in its entirety before attempting to install or program the system. Any comments or suggestions for improving this manual would be appreciated. Forward your remarks to:

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## Standard Practices

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### Site Environmental Guidelines

Install the common equipment in a clean, dry and secure location. Make sure the location is accessible only to authorized personnel. Control the environment within the following limits:

- Relative humidity between 5-95% (non-condensing)
- Temperature range between 40-100 degrees F (4-38 degrees C)

Your phone system is a computer system. Maintain the same environmental conditions as for any sophisticated computer system. This maximizes the system's life.

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### Site Location Guidelines

When choosing an installation site, make sure the site provides:

- Ample room to mount and maintain the common equipment
- At least 3 feet (915 cm) between the ceiling and the top of the common equipment cabinet
- Adequate ventilation and air circulation <sup>1</sup>
- An area free from static electricity, such as produced by dry copiers
- An area free from environmental interference, such as electromagnetic interference (EMI) caused by arc welders or other heavy machinery
- An area not subject to excessive vibration
- An area away from caustic (corrosive) chemicals
- A mounting location that will not flood

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<sup>1</sup> Take care not to block any air vents.

## **SITE REQUIREMENTS**

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### **Site Electrical Guidelines**

Each power supply requires a dedicated three-wire 120 V ac, 60Hz, 15 A circuit terminated in a NEMA 5-15R receptacle. Make sure the receptacle is close enough to the power supply. Do not stretch the cord when plugging it in.

If any other receptacles are on the same branch as a power supply, disable or clearly label them (to prohibit use). To prevent accidental shutdown, use a lock clip on the service panel.

Never use a three-prong to two-prong adaptor.

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### **Power Line Surge Protector**

Electrical surges, typically lightning transients are very destructive to customer terminal equipment connected to AC power sources. NEC Unified Solutions, Inc., recommends that a suitable surge protector be installed to protect the equipment.

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## Cable Routing Guidelines

Route station cable away from electrical interference sources. Typical sources are electric motors and fluorescent lights. Route the station cable at least 2 inches (5.1 cm) from:

- Electric light conductors
- Power circuit conductors
- Class 1 circuits <sup>1</sup>

### **CAUTION:**

Equipment modifications not expressly shown in the system installation manual void applicable warranties.

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## Grounding

Most systems require ground wires. These grounds are in addition to the AC circuit third-wire ground. Connect the grounds according to the instructions in the system's installation manual. Use only approved earth grounds. Make sure these grounds meet the requirements of local and national codes. For the best ground, make the ground wires as short as possible. Use the largest gauge ground wire that will fit in the provided ground lug.

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## Installing Optional Equipment

If installing optional equipment that requires 120 V AC, connect it to an AC circuit other than the power supply's dedicated AC line. This prevents transients from the optional equipment from coupling through the AC line into the system.

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<sup>1</sup> Refer to the national Electrical Code, Article 800, Communications Circuits

## SITE REQUIREMENTS

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### Connecting Test Equipment

Use an accurate, high input impedance digital voltmeter to measure system voltages. Do not connect other test equipment to any internal system part. This may damage the system, the test equipment or both.

**CAUTION:** Installing and operating the system outside of the site requirements stated above will decrease the system's reliability and void applicable warranties.

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### Static Precautions

Printed Circuit Boards (PCBs) are sensitive to static electricity. Use the following precautions to guard against static damage when installing or handling PCBs:

- During shipping, anti-static bags protect static sensitive PCBs. Keep the PCBs in these bags unless you use the proper anti-static precautions (see below).
- Do not use the bag as a holder for the PCB when it is outside the bag.
- When working with PCBs, keep the work area free of any objects that may contain a static charge. This includes plastic and metal objects.
- Discharge any accumulated body static before handling a PCB that is not in its anti-static bag. To discharge body static, touch a grounded object. Following discharge, attach a wrist strap grounded to a suitable ground.
- Never slide a PCB across a work surface.
- Minimize foot movement to prevent a charge buildup.

### **Type of Service**

Your system is designed for use on standard device telephone lines and connects to the telephone line by means of a standard jack, (e.g., Universal Service Order Codes (USOC) RJ11C). However for some types of analog and digital systems, associated Facility Interface Codes (FIC) and Service Order Codes (SOC) must be provided to the local telephone company when ordering service. Refer to the Specifications Table in each systems installation manual for service requirements and jack types. FCC compliant telephone cords, plugs and jacks are provided with this product.

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### **Notification to Telco**

The operating telephone company (telco) may request information about the system, such as type of service required as described above, or other information that can be found on the system label or in the system installation manual. The additional information required may be the manufacturer, FCC Registration Number, Product Identifier, Ringer Equivalence Number (REN) or Registered Jack.

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### **Ringer Equivalence Number (REN)**

(applies to loop start and ground start ports only)

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that may connected to a line, as determined by the total RENs, contact the local telephone company. For products registered after July 23, 2001, the REN is part of the Product identifier, located on the system label, that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For products registered prior to July 23, 2001 the REN is shown separately on the label.

## **Installation Training**

The installer should be a well qualified, experienced telecommunications technician. NEC Unified Solutions offers instruction for certified installation.

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## **Telephone Company Procedures**

The goal of the telephone company is to provide you with the best service it can. In order to do this, it may occasionally be necessary for them to make changes in their equipment, operations or procedures. If these changes might affect your service or the operation of your equipment, the telephone company will give you notice, in writing, to allow you to make any changes necessary to maintain uninterrupted service.

If you have any questions about your telephone line, such as how many pieces of equipment you can connect to it, the telephone company will provide this information upon request.

In certain circumstances, the telephone company may request information from you concerning the equipment you have connected to your telephone line. Please refer to the system installation manual, for identification or the location of the requested information.

**Restrictions on the Use of Registered Telephone Equipment**

This equipment cannot be used on public coin service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact your state public utility, public service commission, or corporate commission for further information.

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**If Problems Arise**

If any of your telephone equipment is not operating properly, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. If the telephone company notes a problem, they may temporarily discontinue service. When practical, they will notify you in advance of this disconnection. If advance notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

In the event repairs are ever needed on your system, they should be performed by NEC Unified Solutions or an authorized repair facility of NEC Unified Solutions. For information, contact:

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4 Forest Parkway  
Shelton, CT 06484  
[www.necunifiedsolutions.com](http://www.necunifiedsolutions.com)

### **Equal Access Requirements**

This equipment is capable of providing users access to inter-state providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes, or failure to provide equal access capabilities is a violation of the Telephone Consumers Act of 1990.

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### **Private Line Operations**

In order to connect this system to the private line network, you must provide the telephone company with the following:

- The quantities and USOC numbers of the required jacks
- The sequence in which you want to connect the trunks
- The Facility Interface Codes (by position)
- The ringer equivalence number or service code, as applicable (by position)

This information is in the Specifications table in each system's installation manual. The chart below shows you a sample of this information.

| <b>Type of Interface</b> | <b>USOC Jack Connector</b> | <b>REN/Service Code</b> | <b>Facility Interface Code</b> |
|--------------------------|----------------------------|-------------------------|--------------------------------|
| 2-Wire Loop              | RJ11C                      | 0.5B                    | 02LS2                          |

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### **Radio Frequency (RF) Susceptibility**

A strong radio frequency field may affect system operation. Following the installation and grounding procedures in the system manual minimizes RF susceptibility.

## **Radio Frequency Interference (RFI)**

This system generates, uses, and radiates radio frequency energy. Installing and operating the system in accordance with the system manuals minimizes this radio frequency energy. If not properly installed and operated, this equipment may cause RFI.

### **Class A Systems**

The following pertains to Class A systems. Refer to the Specifications table in the system installation manual for registration class.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at his own expense.

**CAUTION:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## **Radio Frequency Interference (Continued)**

### **Class B Systems**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful 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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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## **Customer Responsibility**

Do not modify this equipment unless specifically shown to do so in the installation manual. If a system malfunction occurs refer to the section "If Problems Arise" in this manual.

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## **Hearing Aid Compatibility**

This telephones provided with this system are hearing aid compatible (HAC/VC) as specified by the Federal Communications Commission (FCC) technical standard. Please refer to the FCC website for information regarding the responsibility of the consumer at: [www.fcc.gov](http://www.fcc.gov).

### **Direct Inward Dialing (DID)**

Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of the FCC's rules.

Proper answer supervision is when:

- A. This equipment returns answer supervision to the public switched telephone network (PSTN) when DID calls are:
  - Answered by the called station
  - Answered by the attendant
  - Routed to a recorded announcement that can be administered by the customer premises equipment (CPE) user.
  - Routed to a dial prompt
  
- B. This equipment returns answer supervision on all DID calls forwarded to the PSTN. Permissible exceptions are
  - A call is unanswered
  - A busy tone is received
  - A reorder tone is received

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### **Systems with LCR or ARS**

Your system may have Least Cost Routing (LCR) or Automatic Route Selection (ARS). These features are based on a defined set of telco network area and exchange codes. The telco may establish new area and exchange codes that your LCR or ARS options do not recognize. In this situation user access to the telephone network and new codes may be restricted. If this occurs please contact your installation company or NEC Unified Solutions, Inc. for information about upgrading your system to recognize newly established network area codes and exchange codes as they are placed into service.

### Notice

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department 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. 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 coordinated by a representative designated by the supplier. Any repairs or alterations 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.

## **Ringer Equivalence Numbers**

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

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## **Radio Frequency Interference (RFI)**

This digital apparatus does not exceed the Class A limits for radio emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

## TELCO REQUIREMENTS

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The National Electrical Code (NEC) requires the telco to provide primary protection devices on a customer's telephone lines. Check the entry point to be sure the installation has primary protection devices. If no such devices are present, notify the telco before proceeding with the installation.

### **WARNING:**

This electronic telephone system requires a primary protection device on the telco side of the demarcation point.



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