



**IBM**

**Small Business**

**Computer Telephony Solution**

**Installation Guide**

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**Options**

*by IBM*

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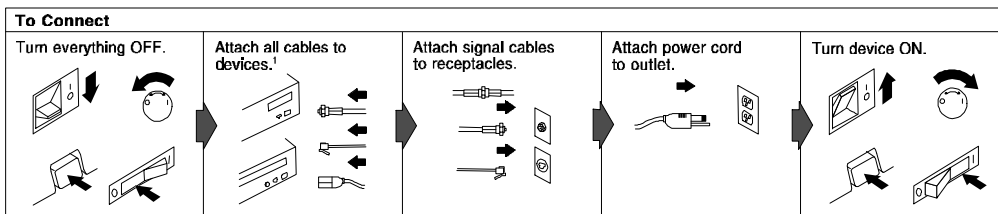


# 1. Safety Information

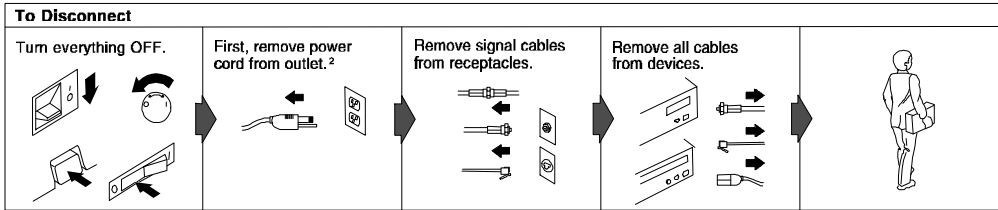


**DANGER:**

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



<sup>1</sup> In the U.K., by law, the telephone cable must be connected after the power cord.

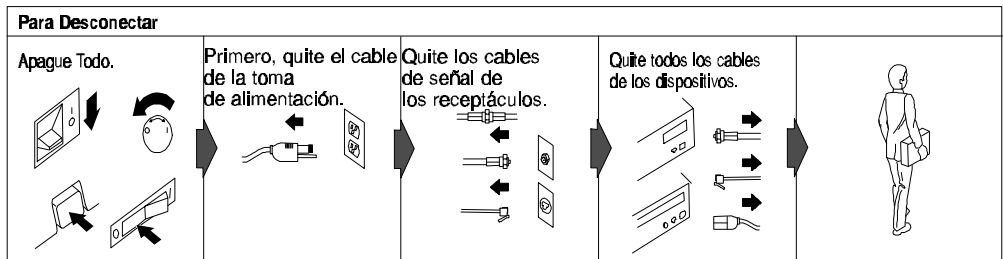
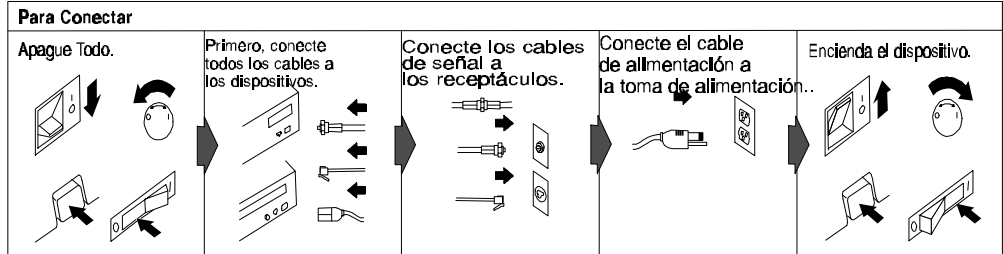


<sup>2</sup> In the U.K., by law, the power cord must be disconnected after the telephone line cable.



**PELIGRO:**

La corriente eléctrica de la alimentación, teléfono y cables de comunicación es **peligrosa**. Para evitar **peligro de descargas** cuando instale, mueva o abra las cubiertas de este producto o de un disp. conectado, conecte y desconecte los cables tal como se muestra a continuación.





To avoid a shock hazard, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

**To avoid shock hazard:**

- The power cord must be connected to a properly wired and earthed receptacle.
- Any equipment to which this product will be attached must also be connected to properly wired receptacles.

Pour éviter tout risque de choc électrique, ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.

**Pour éviter tout risque de choc électrique:**

- Le cordon d'alimentation doit être branché sur une prise d'alimentation correctement câblée et mise à la terre.
- D'autre part, tout le matériel connecté à ce produit doit également être branché sur des prises d'alimentation correctement câblées et mises à la terre.

Para evitar peligro de descargas, no contacte o desconecte ningún cable, ni realice ninguna instalación, mantenimiento o reconfiguración de este producto durante una tormenta eléctrica.

**Para evitar peligro de descargas:**

- El cable de alimentación debe estar conectado a una toma de alimentación adecuadamente cableada y con toma de tierra.
- Cualquier equipo al cual se conecte este producto debe estar también conectado a tomas de alimentación adecuadamente cableadas.
- Cuando sea posible, utilice una mano para conectar o desconectar los cables de señal para impedir que se produzcan posibles descargas eléctricas al tocar dos superficies con potencial eléctrico distinto.

## **DANGER**

- When using your telephone equipment basic safety precautions should always be followed to reduce the risk of fire, electrical shock, and injury to persons, including the following:
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

## 2. Introduction

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### 2.1 IBM Computer Telephony Solution (CTS) overview

The IBM CT-618 hardware and software comprise a complete Windows NT server-based phone system. This system is flexible and extensible; simply add additional CT-618 boards as your needs increase.

- The IBM Telephony Administration software provides a graphical interface for administrative functions, including line configuration, database maintenance and translation table editing.
- Individual phone users can perform calling operations through the telephone handset, or use the optional IBM Call Manager software to manage calls through their PC.
- The IBM VoiceMaster software provides a complete set of voice mail functions, including integrated messaging to allow e-mail and pager notification.

### 2.2 About this book

This manual is intended for the IBM Computer Telephony system administrator, and assumes that you are familiar with Windows NT operations and server administration, and with basic telephone and PC hardware installation.

The following topics are covered in this manual:

#### **IBM Computer Telephony Installation**

- Configuring your telephone wiring
- Installing IBM CT-618 boards
- Installing and configuring IBM Computer Telephony software

#### **IBM Telephony Administration**

- Creating/maintaining the company database
- Setting and maintaining line configuration information
- Modifying the CT-618 translation table

## Introduction

- Configuring voice mailboxes
- Setting up integrated messaging setup
- Using TAPI based applications with the IBM Computer Telephony Solution
- Collecting usage data with SMDR
- Troubleshooting
- Uninstalling

This book is also available on the IBM Telephony CD as an Adobe Portable Document Format (PDF) file. This file is located in the CD's Documentation/IBMCT folder, and will also be installed on your system, along with the Adobe Acrobat Reader, if you perform a typical installation (or select the Install Documentation option) during the installation process.

## 3. IBM Telephony Installations

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These installation instructions are intended for a typical **new** IBM Telephony installation. If you are **upgrading** a IBM Telephony system, refer to the Upgrade Installations section on page 19.

### 3.1 Prerequisite Hardware and Software

#### Server:

- 586/133mhz (Pentium) or higher with at least 64MB RAM, running Windows NT Server Software V4.0 (including service pack 3 or above).
- A CD-ROM and diskette drive are required for installation.
- A typical IBM Telephony installation will require at least 16MB disk space on the server. Additional disk space requirements are dependent on number of voice mail users and number and size of stored messages.

#### Clients:

- 486 (or higher) or Pentium with at least 16MB RAM, running Windows 95 or Windows NT.
- IBM Call Manager clients must have a server user account.
- Sound capability is required to play voice mail messages delivered by e-mail.

The IBM Telephony installation process should take approximately 45 minutes. Telephones will not be operational during parts of the installation process. You should schedule installation for a time when this will not affect phone users.

## 3.2 Preparing for New Installations

**Make sure the following are available before starting the installation process:**

- An Administrator account and password for the server (An account with administrator privileges is **not** sufficient.)
- A working trunk and extension available for testing purposes.
- Your server's name and IP address: \_\_\_\_\_ .
- During the firmware upgrade, you will need to boot your server in DOS (if not configured with this as a boot option, you will need a DOS boot disk).

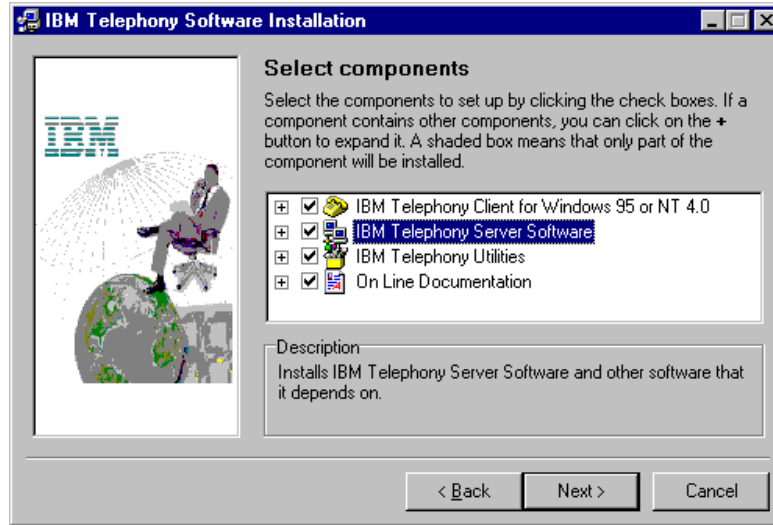
## 3.3 Installing Server Software and Utilities

IBM Telephony software installation is easy since the installation wizard will prompt you through the process. As the installation proceeds, you will be prompted for selections or input. When your entries are complete, click Next to proceed, or click Back to return to a previous screen and review/modify your entries. You can click Cancel to stop the installation.

1. **Log on to the NT server as ADMINISTRATOR.** (An account with administrator privileges is **NOT** sufficient for IBM Telephony installation.)
2. **Exit all programs, then insert the IBM Telephony Installation CD in the server to auto-run the installation wizard, (or double-click or run the file Setup.exe).**
3. The **Welcome** screen will display. After reading, click Next.
4. The **License Agreement** will display. If you agree with the license terms, click Next. If you do not agree, click Cancel to stop the installation.
5. **Select IBM Telephony Software components.** The Select Components window displays a list of components. Click the checkboxes to select the components you wish to install. Clicking on a plus sign (+) next to an item will expand it to display individual options for each group. If you select an item with sub-options, the sub-options will also be selected. You can customize your installation by expanding the upper level options by clicking on the plus sign, then selecting the sub-options desired.

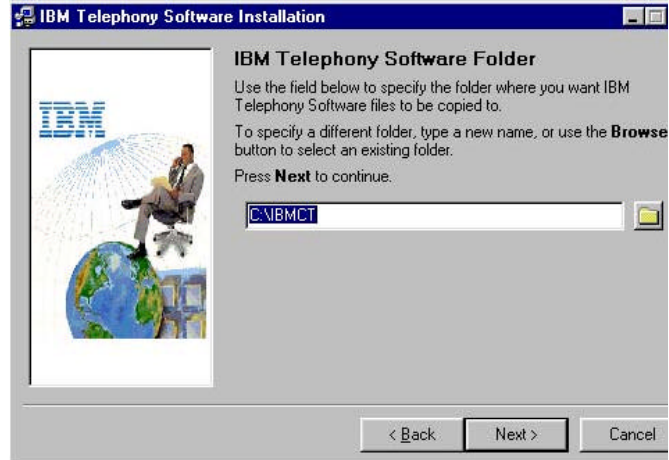
**For a typical installation, select the following:**

- IBM Telephony Client for Windows 95 or NT
- IBM Telephony Server Software
- IBM Telephony Utilities
- On-line Documentation



**At a minimum,** you must install the IBM Telephony Server Software and IBM Telephony Administration Utility.

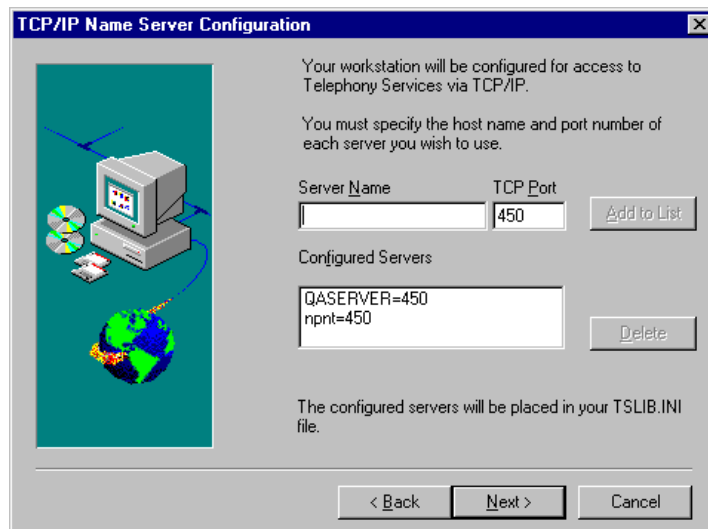
- a) When you have selected the components, click Next.
- b) The next windows displayed will prompt you for locations and names of software destination folders and Program Icons folder. You may accept the defaults (recommended) or modify these entries. Click Next on each of these windows.



The installation program will check for sufficient space, then copy files to your server.

## 2. Telephony Services installation

- a) The Welcome screen will display. After reading, click Next.
- a) The Telephony Services installation will require you to choose a destination for files. You may accept the defaults or modify these entries.





- b) Enter the server's IP address when prompted, then click OK.  
Note: If using a system with DHCP (Dynamic Host Configuration Protocol), make sure that you specify a static IP address, rather than accepting the automatic IP address assignment. Insert the Lucent license disk when requested, then click OK and remove diskette.
- c) When Telephony Services installation is complete, click OK.

## 2. Btrieve Workstation Engine Installation

- a) The Welcome screen will display. After reading, click Next.
- b) The Btrieve Technologies installation will prompt you for locations and names of the Btrieve Database folder and Program folder. You may accept the defaults or modify these entries.
- c) You may choose to view the Read Me file. Click finish when complete.

## 3. Telephony Services 32-bit Windows client installation.

- a) The Welcome screen will display. After reading, click Next.
- b) Check box to install Telephony Services Administration (required for security level 2).
- c) Select destination directory.
- d) Add server name, then click Next. The installer will verify locations and search for older versions of files.
- e) When complete, click OK.
- f) The Configuration Assistant will appear, displaying the suggested settings for your CT-618 boards. Click OK.

## 4. IBM VoiceMaster installation

- a) The Welcome screen will display. After reading, click Next.
- b) The License Agreement will display. After reading, click Next.
- c) The Release Notes will display. After reading, click Next.
- d) The selection window will display options for VoiceMaster and Voice Files. The selection boxes for both options **must** be checked.
- e) The next window displayed will prompt you for the Telephony server location. Make sure the information is correct, then click Next.
- f) The Voice files window will prompt for destination of voice files. Click Next.

- g) Click Next.
- h) When setup successfully completes, click Close.

**5. Acrobat Reader Installation**

- a) The Welcome screen will display. After reading, click Next.
- b) The License Agreement will display. If you agree with the license terms, click Next. If you do not agree, click Cancel to stop the installation.
- c) Choose destination folders for the Acrobat Reader software.
- d) Setup will continue. You will be prompted to view the read me file (optional). Click finish..
- e) When complete, click OK.

**6. If you are installing CT-618 boards, power down the server and install boards according to the Hardware Installation instructions on page 17. (If CT-618 boards are already installed in the server, power down the server and proceed to Step 7.)**

**7. Upgrade the CT-618 board firmware:**

**Note: If your server is set up as NTFS:** During the board firmware update process you will need to run in DOS mode. Since NTFS is not visible from DOS, you will need to access required files from a FAT partition or a diskette. If you are not installing the IBM Telephony software to a FAT partition, you will need to copy the following files from the IBMCT/SYSTEM folder to a FAT partition (or to a diskette):  
BOOTLOAD.HEX, MONITOR.HEX, NETPHO32.HEX and NL.EXE.

- a) Restart the server in DOS. (Note: A DOS window will not work.) You may need to boot with a DOS boot disk if your server is not set up to boot in DOS.
- b) Go to C:/IBMCT/SYSTEM (or the drive you selected during installation) and enter the following command from the DOS prompt:

```
NL -B -LNETPHO32.HEX
```

This loads the firmware using default I/O port and IRQ settings (I/O Port 3e0, IRQ 5). If not using these defaults, refer to *Specifying and changing board settings* on page 31 for instructions on specifying values

in this command, or enter NL -? at the DOS prompt for help with NL commands.

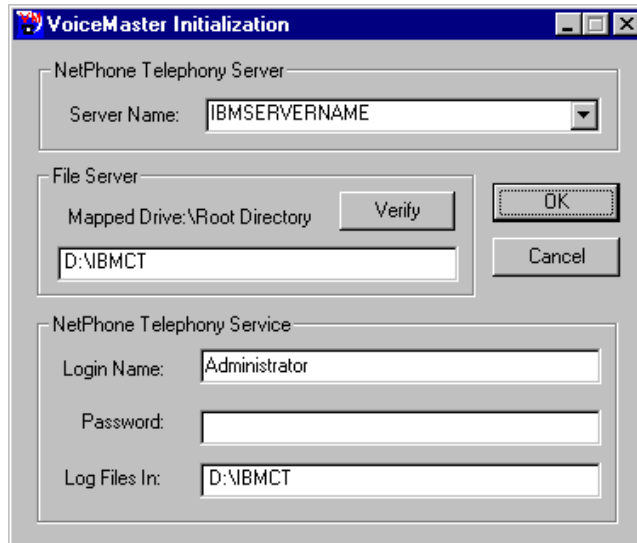
**Note:** If you have chosen an installation directory other than the default of C, then IBMCT/SYSTEM will be in that directory. If your server is set up as NTFS, use the files on the diskette you created earlier.

- 8. Restart server in Windows NT.**
- 9. Configure telephony services to autostart:**
  - a) From the Start menu, navigate to Programs/TSAPI Telephony Services/TSAPI Telephony Services Controller.
  - b) Check box for Auto Load.
  - c) Click Start (if not already running), then click Close (display should be: Status=Running, Startup=Automatic).
- 10. Test your installation.** You should have dial tone on an extension connected to the IBM Telephony server.

### **3.4 IBM VoiceMaster Startup and Configuration**

If you installed IBM VoiceMaster, you will need to start the VoiceMaster service and add voice mailboxes.

1. From the Start menu, navigate to Programs/IBM Computer Telephony/VoiceMaster/Register VoiceMaster Service. The IBM VoiceMaster Initialization window will display.
1. Edit the Mapped Drive:/Root Directory information if it is not correct. Click Verify to make sure this is a valid location.
2. You may enter a user name and password (it must be the same as that for the IBM Telephony server).
3. Click OK. You will be prompted to start the VoiceMaster service. Click Yes.
4. Add voice mailboxes:
  - a) From the start menu, navigate to Programs/IBM Computer Telephony/IBM VoiceMaster/VoiceMaster Administration.
  - b) Click Edit Mailbox List to open the IBM VoiceMaster Mailbox Administrator window.
  - c) Enter a mailbox (extension) number in the box (maximum 5 digits).
  - d) Click Add.
  - e) If successful, a confirmation message will display. An error message will



- display if you have entered an invalid mailbox ID.
- f) Click OK to acknowledge the confirmation.
  - g) Continue to add desired mailboxes. When you are finished, click Close.
5. When installations are complete, close the windows. You can test your installation by pressing \*6 on the handset. If your installation was successful, a IBM VoiceMaster dialog will play.

Refer to the IBM VoiceMaster Administration on-line help or the *IBM CTS Administration Guide* for additional setup and configuration information.

### 3.5 IBM Call Manager Installation

**Note:** Client accounts must be established on the server before IBM Call Manager is installed on client PCs.

IBM Call Manager Desktop Call Control will generally be installed on all PC clients, as well as the server. The client must have mapped drives to the IBM Telephony server and IBM VoiceMaster (if using IBM VoiceMaster voice mail).

1. Insert IBM Telephony CD in the client PC to autorun the installation utility (or run or double-click Setup.exe).
2. The Welcome screen will display. After reading, click Next.
3. The License Agreement will display. If you agree with the license terms, click Next. If you do not agree, click Cancel to stop the installation.
4. Click the checkbox for IBM Call Manager Client for Windows 95 or NT4.0, then click Next.
5. You will be prompted through the installation process. The windows displayed will prompt you for locations and names of the IBM CT Software Folder, Server System folder, and Program Icons folder. You may accept the defaults (recommended) or modify these entries.
6. When complete, click Exit and remove the IBM Telephony CD.

**Note:** IBM Call Manager clients can be installed over the network if the IBM Telephony CD is mounted in a drive accessible to the client PC, or if the

installation CD contents have been copied to an accessible directory (you may not use long directory names or spaces in the directory name).

### 3.6 IBM Call Manager Setup

The first time you run IBM Call Manager you will need to enter login information and setup directories.

1. From the Start menu, navigate to Programs/IBM Computer Telephony/IBM Call Manager.
2. When the login window displays, enter your user name, password and extension number. You can check the box to save this information, and you will not need to enter it the next time you log in. Click OK when done.
3. The Voice Mail Path window will display. If you are using IBM VoiceMaster voice mail, make sure the path information is correct. If you are not using IBM VoiceMaster, check "Do not use NetPhone voice mail". Click OK when done.
4. Refer to the IBM Call Manager on-line help and/or the *IBM Call Manager User's Guide* for more information.

#### If you have more than one IBM Computer Telephony server:

To allow a IBM Call Manager client to access multiple servers, the client's TSLIB.INI file must be edited to add the additional server names, as in the example below:

```
[Telephony Servers]
; This is a list of the servers offering Telephony
Services via TCP/IP.
; Either domain name or IP address may be used;
default port number is 450
; The form is: host_name=port_number   For example:
;
; tserver.mydomain.com=450
; 127.0.0.1=450
;
```

```

myservr=450
serv2=450
serv3=450
[Shared Admin]
; Instead of each workstation maintaining its own
list of servers, a shared
; tslib.ini file may be placed on a network file
system, for example:
;
; tslib.ini=n:\csta\tslib.ini
;
; This entry overrides the [Telephony Servers]
section, if any.

```

### 3.7 Finishing Your Installation

In order to complete your IBM Telephony installation and fully customize your system, you may need to perform some of the tasks listed below. Refer to the IBM CTS Administration Guide for assistance with these tasks.

- Voice mailbox administration
- Setting system and line information
- Voice mail to e-mail messaging
- Pager notification
- Installing and using SMDR call logging
- Using TAPI applications
- Customizing the translation table

### 3.8 Enabling NT Level 2 ( LOGON ) Security

Windows NT logon security requires users to enter a user name and password in order to access the system. To enable NT Level 2 security for users, the NT administrator will need to add user names to Telephony Services database,

configure logon access for IBMCT Utility and IBM VoiceMaster services, and change security level in the registry using the Set SecurityLevel Utility as described below.

#### **Add user names to the Telephony Services database**

1. From the Windows NT Start menu, navigate to Programs/TS Win32 Client/Telephony Services Admin.
2. In the Open Tserver window, select the default Tserver and Login (administrator). Click OK.
3. In the Telephony Services Administrator 32-bit window, click on Users in the SDB tree.
4. Click Create User from the Admin menu.
5. In the Information tab, enter the Login, Name, and Worktop name (if applicable) of each IBM Telephony user. (Note: Telephony Services user names must match NT Server user names). Click Apply to add each user.
6. Click OK when done and close the Telephony Services Administrator 32-bit window(s)

#### **Configure logon access for NetPhone Utility and IBM VoiceMaster services**

1. From the Start menu, navigate to Settings/Control Panel Services.
2. Select NetPhone Utility and double-click to open.
3. Under Log On As, click button for This Account.
4. For user name, enter Administrator (other names will not work, even if they have administrator privileges).

If IBM VoiceMaster is installed, repeat the above procedure for the IBM VoiceMaster service.

#### **Set security level**

1. From the Start menu, navigate to Programs/IBM Computer Telephony/Utilities/Set Security Level.
2. When the Set Security Level window displays, click Logon (level 2).
3. Click Apply, then Exit.
4. Reboot the IBM CTS NT Server or do the following:



- a) Stop all Telephony services Clients.
- b) Stop Service NetPhone Utility
- c) Stop Service TSAPI Telephony Services
- d) Start Service TSAPI Telephony Services
- e) Start Service NetPhone Utility



## 4. Upgrade Installations

---

These installation instructions are intended for a typical **upgrade** of an existing IBM Telephony installation. If you do not have an existing IBM Telephony installation, follow the instructions for new installations on page 7.

### 4.1 Preparing for Upgrade Installations

Make sure the following are available before starting the installation process:

- An Administrator account and password for the server (An account with administrator privileges is **not** sufficient.)
- You must use the default IBM Telephony administration utility password (NETPHONE). If you have changed the password, set it to NETPHONE. You can change it again after the upgrade installation is complete.
- During the firmware upgrade, you will need to boot your server in DOS (if not configured with this as a boot option, you will need a DOS boot disk).
- **If your server is set up as NTFS:** During the board firmware update process you will need to run in DOS mode. Since NTFS will not be visible from DOS, you will need to access required files from a diskette. Copy the following files from the installation CD's Server/Ibmct folder to a diskette: BOOTLOAD.HEX, MONITOR.HEX, NETPHO32.HEX and NL.EXE.
- IBM Telephony installation will install default company database files. To preserve your existing company database master files (company.dbf and company.mdx), copy them from the server's Ibmct folder to another folder.
- To retain your current line settings, rename NetPhone.ini. After installation, name the file back to NetPhone.ini. This will return your current line settings, as well as your current translation table. You must then update the translation table, using the default table supplied with this release (see page 25).
- If the IBM VoiceMaster service has been set to interact with the desktop, change this before upgrading.

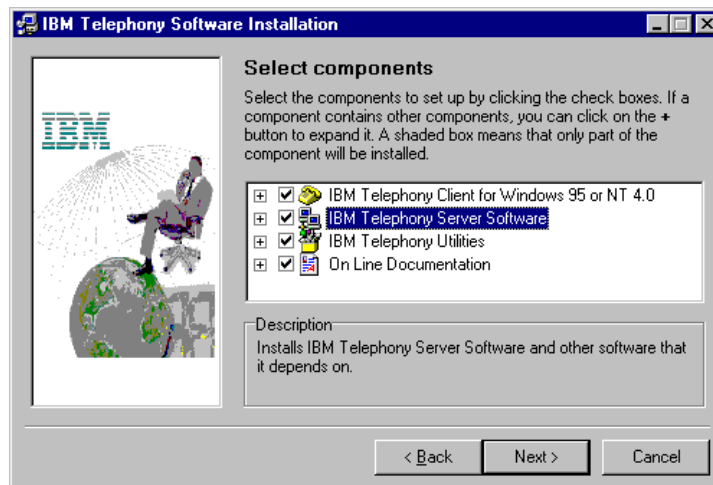
## 4.2 Upgrading Server Software and Utilities

IBM Telephony software installation is easy since the installation wizard will prompt you through the process. As the installation proceeds, you will be prompted for selections or input. When your entries are complete, click Next to proceed, or click Back to return to a previous screen and review/modify your entries. You can click Cancel to stop the installation.

1. **IMPORTANT: You must log on as ADMINISTRATOR, or your installation will not be successful.** (An account with administrator privileges is **not** sufficient.)
2. Go to the NT control panel (Start/Settings/Control Panel) and stop the NP618 driver (in the Devices folder) before starting installation. This will also stop the TSAPI Telephony Services and IBM VoiceMaster services.
3. **Exit all windows programs, then insert the IBM Telephony Installation CD in the server to auto-run the installation wizard (or double-click or run the file Setup.exe).**

The Welcome screen will display. Click Next to proceed to the IBM Telephony License Agreement. If you agree with the license terms, click Next. If you do not agree, click Cancel to stop the installation.

4. **Select IBM Telephony Software components.** When the Select Components window appears, click the checkbox to select components you



wish to install. Clicking on a plus sign (+) next to an item will expand it to display individual options for each group. If you select an item with sub-options, the sub-options will also be selected. You can customize your installation by expanding the upper level options by clicking on the plus sign, then selecting the sub-options desired. For a typical installation, select the following:

IBM Call Manager Client for Windows 95 or NT  
 IBM Telephony Server Software  
 IBM Telephony Utilities  
 On-line Documentation

**At a minimum**, you must install the IBM Telephony Server Software and IBM Telephony Administration Utility.

5. When you have selected the components, click Next.
6. The next windows displayed will prompt you for locations and names of the IBM Computer Telephony Software folder, Server System folder, and Program Icons folder. You may accept the defaults (recommended) or modify these entries, then click Next.
  - a) The installation program will then begin copying files and individual component installation routines will run.
7. **Telephony Services installation**
  - a) The Telephony Services installation will require you to choose a destination for files. You may accept the defaults or modify these entries.
  - b) Enter the server's IP address when prompted, then click OK. Note: If using a system with DHCP (Dynamic Host Configuration Protocol), make sure that you specify a static IP address, rather than accepting the automatic IP address assignment.
  - c) Insert the Lucent license disk when requested, then click OK and remove diskette.
8. **Btrieve Workstation Engine Installation**
  - a) The Btrieve Technologies installation will prompt you for locations and names of the Btrieve Database folder and Program folder. You may accept the defaults or modify these entries.
9. **Telephony Services 32-bit Windows client installation.**

- a) Check box to install Telephony Services Administration (required for security level 2).
  - b) Select destination directory.
  - c) Your server name will be displayed. The installer will verify locations and search for older versions of files. When complete, click Close.
  - d) The Configuration Assistant will appear, detecting any CT-618 boards installed in the server and the resources used. (You may wish to make a note of these resource assignments.) Click OK.
10. **IBM VoiceMaster installation** provides options for IBM VoiceMaster and Voice Files. If you want to retain customized dialog files, un-check the Voice Files selection box.
11. When setup successfully completes, click Close.
12. Power down the server.
13. **Upgrade the CT-618 board firmware:**

**Note: If your server is set up as NTFS:** During the board firmware update process you will need to run in DOS mode. Since NTFS is not visible from DOS, you will need to access required files from a FAT partition or a diskette. If you are not installing the IBM Telephony software to a FAT partition, you will need to copy the following files from the IBMCT/SYSTEM folder to a FAT partition (or to a diskette):  
BOOTLOAD.HEX, MONITOR.HEX, NETPHO32.HEX and NL.EXE.

- a) Restart the server in DOS. (Note: A DOS window will not work.) You may need to boot with a DOS boot disk if your server is not set up to boot in DOS.)
- b) Go to C:/IBMCT/SYSTEM (or the drive you selected during installation) and enter the following command from the DOS prompt:

```
NL -B -LNETPHO32.HEX
```

This loads the firmware using default I/O port and IRQ settings (I/O Port 3e0, IRQ 5). If not using these defaults, refer to *Specifying and changing board settings* on page 31 for instructions on specifying values in this command, or enter NL -? at the DOS prompt for help with NL commands.

**Note:** If you have chosen an installation directory other than the default of C, then IBMCT/SYSTEM will be in that directory. If your server is set up as NTFS, use the files on the diskette you created earlier.

**14. Restart server in Windows NT.**

**15. Configure telephony services to autostart:**

- a) From the Start menu, navigate to Programs/TSAPI Telephony Services/TSAPI Telephony Services Controller.
- b) Check box for Auto Load.
- c) Click Start (if not already running), then click Close (display should be: Status=Running, Startup=Automatic).

**16. Test your installation.** You should have dial tone on an extension connected to the IBM Telephony server.

### 4.3 Upgrading the Translation Table

The translation table supplied with this release has entries that support new product features. Since an upgrade installation does not replace your existing translation table, you must upgrade the table manually in order to take advantage of the new features. Refer to the *IBM Computer Telephony Administration Guide* for additional information about working with the CT-618 translation table.

1. Start the IBM Telephony Administration utility and go to the Translation Table tab.
2. Select Read from NetPhone from the Translations menu. This will read your current information.
3. Select Save to File from the Translations menu to save a reference copy of your file.
4. Select Read from File from the Translations menu, and read in the default table file (Default\_24.trn) supplied on the CD.
5. Make any desired edits (using your saved file as a reference for previous modifications).
6. When complete, select Write to NetPhone from the Translations menu to write the new information to the board.

**Tip:** You can use a file comparison program to compare your old translation table file with the default file. This will assist you in picking up your previous customizations.

#### 4.4 IBM VoiceMaster Startup and Configuration

If you installed IBM VoiceMaster, you will need to start the IBM VoiceMaster service and configure the voice mailboxes.

1. From the Start menu, navigate to Programs/IBM Computer Telephony/VoiceMaster/Register Voice Mail Service. The IBM VoiceMaster Initialization window will display, with the server path filled in. You must edit this if not the correct location. Click Verify to make sure this is a valid location. If you enter a user name and password, it must be the same as that for the IBM Telephony server.
2. Click OK. You will be prompted to start the VoiceMaster service. Click Yes.
3. When installation is complete, close the windows. You can test your installation by pressing \*6 on the handset. If your installation was successful, a IBM VoiceMaster dialog will play.

Refer to the *IBM CTS Administration Guide* for additional setup and configuration information.



# 5. Installing CT-618 Hardware

---

## 5.1 Unpacking the CT-618 Board

**CAUTION:** The CT-618 board is packed in antistatic material to protect it during shipment. To avoid damaging any highly static-sensitive components on the CT-618 board or the computer, be sure to reduce any static on your person. One way to do this is to touch the metal chassis of your computer. You can maintain grounding by wearing a wrist strap attached to the chassis.

1. Carefully lift the CT-618 board and other items out of the box by removing the inner protective carrier.
2. Remove the CT-618 board from its anti-static foam, holding it by the edges.
3. Check the CT-618 board for any visible signs of damage. If you find a problem, immediately notify your supplier and the carrier that delivered the CT-618 board.

Retain all packing materials and store in a safe place. If you should need to return the CT-618 board, pack it in the original (or equivalent) packing material.

## 5.2 Important Safety Information

**DANGER: The CT-618 board is to be installed only by authorized service personnel.**

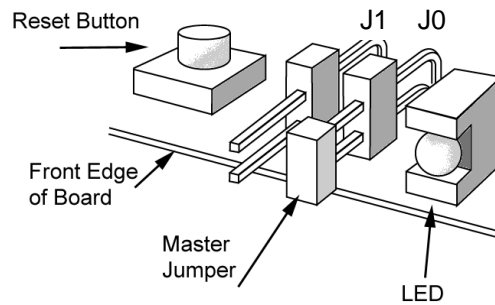
**DANGER: La carte CT-618 doit être installée par un technicien autorisé seulement.**

The board should only be installed in a computer that (1) has a proper fireproof enclosure in compliance with UL 1950 (3rd ed.), and (2) is connected to a socket-outlet with a protective earthing connection.

### 5.3 Installing the CT-618

1. Before you remove the computer cover, turn off the computer and unplug the unit from its power source (Please refer to section 1 - safety).
2. Remove the computer's cover according to the manufacturer's instructions.
3. Choose a full size, 16-bit ISA or EISA expansion slot. If you are installing more than one CT-618 board, they should be placed in adjacent slots for ease of cabling. The slot must not have any memory modules, CPU heat sinks, or anything else that sticks up and will interfere with the CT-618 PBX board.
4. Remove the slot cover(s) from the back of the computer.
5. If this is not the first (master) CT-618 PBX board, remove the master jumper located at the top edge of the board next to the green LED (see Figure 1). There must be only one master CT-618 PBX board in a PC. The others are slaves, and must have the master jumpers removed.

**Figure 1.** The master board must have a jumper installed as shown at right. Remove this jumper from all other boards in the system.



6. Carefully insert the CT-618 PBX board at an angle, inserting the RJ-21X Telco connector end in first, then sliding the other end into the card guide. The gold fingers on the board should not be visible when it is plugged in correctly. It may be easier to insert the CT-618 PBX board if you temporarily remove the RJ-21X wire clips (squeeze clip to release).
7. Screw the metal shielding bracket to the PC chassis.
8. If there are multiple CT-618 PBX boards in the server, plug the interboard cable into all CT-618 boards, making sure all prongs are connected.
9. Plug in the hold music cable if this is the first (master) CT-618 board in the system, and you want to provide music on hold from an external source. This connector is a standard (3.5mm) stereo jack. You can use a right angle

jack adapter to clear some Telco cables. Music on hold should be provided to additional boards either by using a splitter and additional audio cables, or by connecting additional audio sources directly to the boards.

10. Plug in the Telco cable and secure it with the two wire clips (optional). If using a cable with screws, remove the screws in the CT-618 board and use the cable screws to secure the cable.
11. Replace the PC's cover.
12. Reconnect the PC to the power source and start the PC. If the CT-618 green diagnostic LED is ON, the CT-618 board has passed a self-test and self-configuration check in your system, and has come up as a PBX with default settings. If the LED is not ON steadily, contact IBM customer support.

## 5.4 Adding boards to a IBM Computer Telephony system

**Note:** Do not install additional boards until you have upgraded your existing system to the current release.

### **Before you start:**

All CT-618 boards must be at the same firmware revision level in order to successfully perform a firmware upgrade. This can be ensured by upgrading only one board at a time. Boards may be upgraded in any DOS-bootable PC.

### **To upgrade and install additional boards in the server:**

1. Install new board(s) in a DOS-bootable PC. See Installing the CT-618 on page 28 for details.
2. Follow the firmware update process.
3. Power down the PC and remove the upgraded board(s).
4. Power down the IBM CTS.
5. Install the additional CT-618 board(s) you have upgraded. Make sure that only one board is a master board.
6. Restart the server.



## 5.5 Specifying and changing board settings

If you are **not** using default settings, you must specify your settings, as shown in the example below:

```
DOS> NL -P3e0 -Q5 -LNETPHO32.HEX
```

(Where "-P3e0" is I/O Port 3e0 and "-Q5" is IRQ 5.)

You can **change** your I/O port setting using the following command:

```
DOS> NL -P3e0 (current port) -R280 (new port)
```

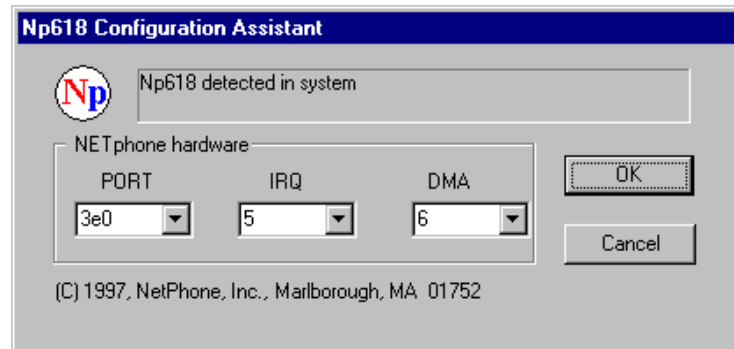
The following hardware resources are required (Hexadecimal values):

	Default	Acceptable
PORT	3E0	260, 280, 290, 2a0, 2b0, 2e0, 2f0, 300, 310, 390, 3e0
IRQ	5	5, b, c
DMA	6	5, 6, 7

Note that any I/O port changes must be reflected in the registry (see below).

## 5.6 Changing registry entries

During installation the NP618 Configuration assistant will display suggested settings for your CT-618 board(s), based on default settings and available



resources. If settings are acceptable, click OK. If these settings are unacceptable, or there is a conflict, you will need to change the registry entries for the CT-618 board.

**To change registry entries:**

1. From the Start menu, navigate to Programs/IBM Computer Telephony/Utilities/Change IBM Telephony Hardware Settings. The Configuration assistant will display. Use the scroll boxes to enter new values, then click OK. This will change the registry entries.
2. You must also change the board settings using the NL command (see above) or the administrator's handset (see page 73).

**5.6.1 CT-618 jumper settings**

<b>J1</b>	<b>J0</b>	
0	0	Slave board
1	0	Test Mode
0	1	Master board
1	1	Use I/O 3E0 (Emergency boot and reload)







## 6. Telephone Wiring

---

**DANGER:** If you are not experienced with telephone wiring/installation, you should only have wiring installation performed by a qualified telecom installation service.

**DANGER:** Le câblage téléphonique ne doit être effectué que par un technicien spécialisé

### 6.1 Safety instructions

- Always disconnect the Telco connector before touching the CT-618 board or before changing boards in the PC.
- Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

### 6.2 Wiring Configurations

In most cases, your incoming telephone service will be located in a wiring/telephone closet. A punch down block will be used to distribute the wiring to the individual lines and extensions, and a 25-pair cable is used to connect the punch down block to the CT-618 board (see RJ21X Telco connector pinout).

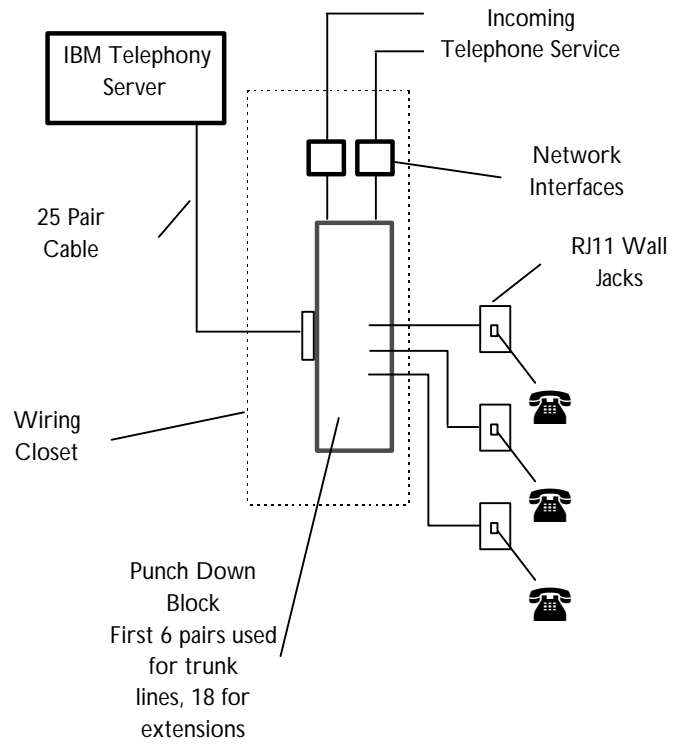
A typical telephone installation is illustrated in Figure 1.

You can also set up a demonstration configuration by connecting the IBM Computer Telephony server to a harmonica, as shown in Figure 2. Two phones can be wired to each RJ11 as illustrated in Figure 3.

In order to connect and configure your IBM Computer Telephony system you may need additional cables.

**Note:** To avoid noise pickup, do not wire telephone cable in parallel with an AC power source or computer cable unless the cable is shielded.

Figure 1: Typical Installation



The 12 port harmonica shown in Figure 2 has a 50-pin RJ-21 connector and is connected to the telephony server with 25 pair cable. This harmonica can be wired to support 6 trunk (central office) lines (Port 1 for trunks 1 & 2, Port 2 for trunks 3 & 4, Port 3 for trunks 5 & 6). The remaining ports can be used for a total of 18 extensions (Port 4 for extensions 1 & 2, Port 5 for extensions 3 & 4, etc.). Note that each RJ11 can be wired for two extensions as shown in Figure 3 below.

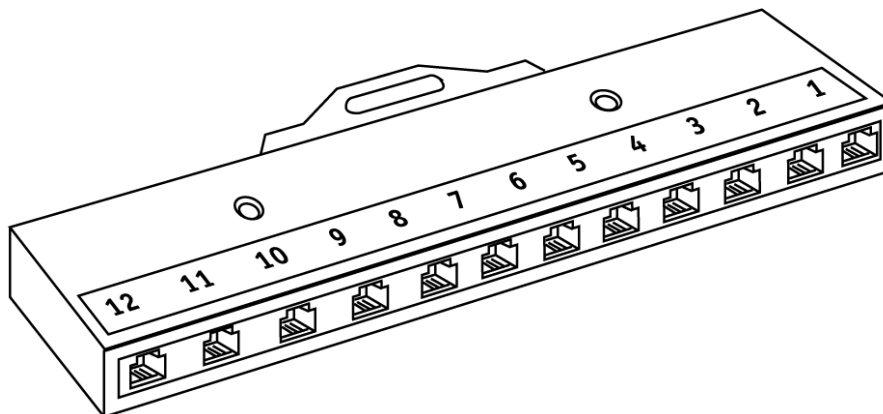


Figure 3: RJ11 wired for two phones

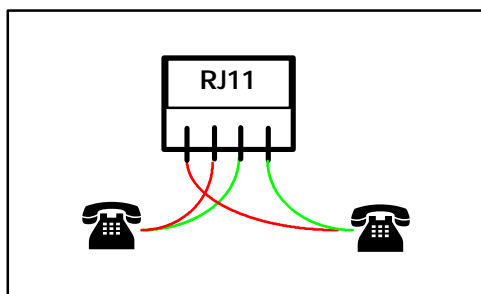


Figure 2: Harmonica (12 port) used for demonstration or lab configurations

## Telephone Wiring

# 7. IBM CT-618 Functions

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## 7.1 Incoming calls

An incoming call on a trunk rings the operator extension. After an adjustable number of rings the call is connected to the auto attendant message and permits the caller to dial an extension. After the message, the call is again sent to the operator extension. If the number of rings is set to 0, callers will immediately connect to the auto Attendant without the operator's extension ringing first.

## 7.2 Dialing calls

Dialing calls with IBM CT is similar to dialing with most Centrex or other business phone systems. The dialing instructions described below are the defaults supplied with the IBM CT system. You may find differences if your system has been reconfigured by your IBM CT Administrator.

### **Other Extensions**

To call another extension, enter the digits of the extension number.

### **Operator**

To place a call to the internal operator, press **0**.

### **Outside Calls**

To dial an outside local call press **9**, then the seven digits of the phone number you wish to call. To dial an outside long distance call press **9 + 1**, then the ten digits of the phone number you wish to call (provided that your extension has privilege to dial 1+10 digit calls).

### **911 Emergency Services**

To place a call to 911 emergency services, press **911**.

### **Directory Assistance**

To place a call to phone company directory assistance, press **9** plus the appropriate directory assistance number.

## 7.3 Call management

### Picking up ringing calls on other extensions

You can pick up any ringing extension within your pickup group by pressing \*5. A pickup group is any set of phone extensions forming part of a group, as assigned by the IBM CT Administrator, usually all extensions within one office or department.

### Placing calls on hold

Depressing and quickly releasing the switch hook (in less than one second) is called a "Flash." Flashing places the current call on hold and gives an acknowledge dial tone. You can then transfer or conference the call. The IBM CTS also supports handsets that have a "flash" button for this function.

### Picking up a held call

To pick up a call placed on hold, enter \*4 (pickup Held), or flash to reconnect. If you have more than one held call, the last call placed on hold is picked up first.

## 7.4 Transferring calls

### Announced transfers

You can make a screened (announced) transfer by:

1. Flash to place the call on hold.
2. Dial the transferee.
3. When connection is made, announce the caller to transferee.
4. If the transferee wants to speak with the caller, flash to place the transferee on hold.
5. Press \*8 to transfer the call.

### Blind transfers

You can transfer a caller without announcing the call (blind transfer).

1. Depress and quickly release the switch hook or use the flash button to place the call on hold.
2. Dial the transferee's number and hang up within five seconds. (If you do not complete the transfer within five seconds, you have hung up on

the number you are transferring to, and the call will ring back on your extension.

### **Creating a conference**

You can create a conference of held calls, with the option of including yourself in the conference.

1. Place calls to be conferenced on hold
2. Press **\*2** (Conference). This will create a conference of all held calls plus yourself. Press **\*8** to create a conference of held calls, but not include your extension.

## **7.4.1 Forwarding calls**

You can set your calls to forward to other extensions if your line is busy, not answered, or you do not wish to be disturbed.

### **Forward if Busy**

You can set your extension so that calls will forward to another extension if your line is busy.

To set *Forward if Busy* press **\*92** plus the extension calls will forward to. (Enter **\*88** in place of the extension number to forward calls to voice mail.) To cancel *Forward if Busy* press **\*92#**.

### **Forward Immediately**

To set your extension so that calls will *Forward Immediately* to another extension press **\*94** plus the extension calls will forward to. (Enter **\*88** in place of the extension number to forward calls to voice mail.) To cancel *Forward Immediately* press **\*94#**.

### **Forward if No Answer**

You can set your extension so that calls will forward if your extension does not answer.

To set your extension to Forward if No Answer press **\*96** plus the extension calls will forward to. (Enter **\*88** in place of the extension number to forward calls to voice mail.) To cancel *Forward if No Answer* press **\*96#**.





# 8. IBM CT System Administration

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The IBM CT administrator is responsible for the configuration and maintenance of the IBM CT system. Administration duties include:

- System Configuration - including setting trunk reservation and rotation, on-hold audio source, flash hook timing and digit play/quiet time.
- Line Configuration, including pickup group and class of service assignments.
- Creation and maintenance of the Company listing.
- Slave board configuration.
- Auto attendant message recording and maintenance.

## 8.1 Basic commands and utilities

### 8.2 Using the IBM CT Administration Utility

Most IBM CT administration functions are performed through the IBM CT administration utility. Certain commands may also be entered via the handset (that has a class of service with administrative privileges), and some functions can only be performed using a handset. Where applicable, both methods are included in this guide.

#### Starting the IBM CT Administration Utility

1. From the Start Menu, navigate to Programs/IBM Computer Telephony/Admin/IBM Telephony Administration Utility.
2. Enter the IBM CT Administrator password in the box provided (asterisks will appear in the box as you type), then click OK or press enter. Note that IBM CT passwords are case-sensitive.

Note: The default password supplied with the system is NETPHONE. It is strongly suggested that you change this password immediately.

Refer to the IBM CT Administration Utility on-line help and the IBM CTS Administration Guide for more information.







# 9. Uninstalling IBM Telephony Software

---

**Important:** Make sure IBM Telephony is not running before uninstalling.

IBM CT provides uninstall utilities for removing the executable files for IBM Telephony Server Software and IBM VoiceMaster. The uninstall utilities will remove the application files. Files created by the user, such as voice mail files, will not be removed. After running uninstall, you may remove these manually, along with the parent folders of such files.

**To uninstall the server software:**

1. Stop the NetPhone Utility and TSAPI Telephony services before starting installation.
2. From the Start menu, navigate to Programs/IBM Telephony/IBM Telephony Software Uninstall

**To uninstall IBM VoiceMaster software:**

From the Start menu, navigate to Programs/IBM Telephony/VoiceMaster/Unregister VoiceMaster Service.

1. Select Start/Settings/Control Panel/Add Remove Programs.
2. Select IBM VoiceMaster
3. Click Add/Remove.
4. The Uninstall Wizard will prompt you through the process of removing IBM VoiceMaster files.

**To uninstall IBM Call Manager:**

1. Use Windows explorer to navigate to the IBM CT folder on your PC.
2. Select and delete the IBM CT folder.

The uninstall utilities will remove the application files. Files created by the user, such as call logs, will not be removed. After running uninstall, you may remove these manually, along with the parent folders of such files.



# 10. Troubleshooting

---

If you encounter a problem during installation, check the following symptoms and suggestions

## **CT-618 green LED off or flashing**

- Make sure the PC power is on and that the board is plugged into the slot completely. The gold fingers on the board should not be visible when it is plugged in correctly.
- Make sure that jumper settings are correct.
- The board may be failing an internal self-test. Obtain the following system information prior to contacting technical support: PC manufacturer and model number, CPU type and speed, and the BIOS settings for the system clock and bus clock.

## **No Dial Tone on an Extension**

- Check that the cable is securely plugged into the CT-618 board.
- Check that your telephone is set to tone and not pulse generation.
- Try a different telephone that is known to work.

## **Dial tone but no DTMF tones on an extension**

- Check that the telephone is set to tone and not pulse generation.
- Try a different telephone that is known to work.
- Try swapping the tip and rings wires, as some old style phones will not produce DTMF tones if tip and ring are reversed.

## **Cannot access an outside line (fast busy)**

- Check that you have not inadvertently reserved all trunks for incoming calls. You can free all trunks by entering \*30 at the operator extension or through the IBM Telephony Administration Utility.
- Check that the RJ-21X cable is securely plugged into the CT-618 board.
- Check that the trunk is active and that the wiring is correct by connecting a telephone directly to the telephone company Network Interface.

- Remove the RJ-21X cable and measure the voltage between the tip and ring. If the voltage difference is less than 40 volts, contact the telephone company to have them correct the problem.
- When IBM Telephony server is powered down, line X1 and trunk 1 will still be available. If they are not, your phone wiring may be at fault.

**No audio while on hold**

- Connect headphones to the audio cable to make sure that there is audio playing
- Make sure that you have selected audio in your system configuration.

**Your new auto attendant recording doesn't play**

- ATTEND.MU is the correct file name for the auto attendant message.
- If you recorded a new message, make sure that you have copied the file RECORD.MU to ATTEND.MU in IBMCT/AUDIO.

**Unexpected results from calling operations**

- Verify which translation table information has been written to the IBM-CT618 board.
- Make sure that the translation table entries are correct. IBM Telephony does not validate the information entered in the translation table.

**Using Flash button to place call on hold hangs up call**

- Flash interval may need to be increased for your model of handset. Refer to the Administration Guide for information.

**Speaker phone not functioning**

- Some speakerphones do not operate properly with IBM CTS if used without batteries or an external power source, since they draw more current than the CT-618 can supply.



# 11. Help and Service Information

---

Before calling, please prepare for your call by following these steps.

## 11.1 Step 1: Troubleshooting

Please read the items in the troubleshooting section of this manual to see if you can resolve the problem.

## 11.2 Step 2: Preparing for the Call

To assist the technical support representative, have available as much of the following information as possible:

- Computer manufacturer and computer model.
- Option number.
- Option name.
- Serial number (if available).
- Proof of purchase (including date and place).
- Exact wording of the error message (if any)
- Description of the problem
- Hardware and software configuration information for your system

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

### 11.3 Step 3: Placing the Call to IBM

Technical support is available during the warranty period to answer any questions about your new IBM option. Support response time will vary depending on the number and nature of calls received.

Marketing, installation, and configuration support will be withdrawn from the PC Company HelpCenter 90 days after the option has been withdrawn from marketing.

If you call 90 days after the date of withdrawal or after your warranty has expired, you might be charged a fee. Additional support is available through the IBM PC Company automated Fax system, the PC Company Web Page, the PC Company Electronic Bulletin Board System and HelpWare offerings.

- The IBM web site at "<http://www.pc.ibm.com>"
- The IBM Fax system at (800) 426-3395 or (919) 517-0011
- The IBM BBS system at (919) 517-0001

For the support telephone and support hours by country, refer to the following table or to an optional enclosed technical support insert. If the number is not provided in the table or insert, contact your IBM reseller or IBM marketing representative.

Support 24 hours a day, 7 days a week	
Canada	1-800-565-3344
United States / Puerto Rico	1-800-772-2227

## 12. Product Warranty

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The following warranty information applies to products purchased in the United States, Canada, and Puerto Rico. For warranty terms and conditions for products purchased in other countries, see the enclosed Warranty insert, or contact your IBM reseller or IBM marketing representative.

International Business Machines Corporation Armonk, New York, 10504

### Statement of Limited Warranty

*The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them.*

*Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. If you have any questions, contact IBM or your reseller.*

**Machine: IBM CT-618 Adapter**

**Warranty Period\*: Three (3) years**

*\*Contact your place of purchase for warranty service information.*

### Production Status

Each Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

### **The IBM Warranty for Machines**

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications.

The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if authorized by IBM, will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

For IBM or your reseller to provide warranty service for a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade.

Many of these transactions involve the removal of parts and their return to IBM.

You represent that all removed parts are genuine and unaltered. A part that replaces a removed part will assume the warranty service status of the replaced part.

If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair it or replace it with one that is at least functionally equivalent, without charge. The replacement may not be new, but will be in good working order. If IBM or your reseller is unable to repair or replace the Machine, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user. However, for Machines which have a life-time warranty, this warranty is not transferable.

## Warranty Service

To obtain warranty service for the Machine, you should contact your reseller or call IBM.

In the United States, call IBM at **1-800-772-2227**.

In Canada, call IBM at **1-800-565-3344**.

You may be required to present proof of purchase.

IBM or your reseller will provide certain types of repair and exchange service, either at your location or at IBM's or your reseller's service center, to restore a Machine to good working order.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours.

You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service. You also agree to ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange.

## Product Warranty

You agree to:

1. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
2. where applicable, before service is provided --
  - a) follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
  - b) secure all programs, data, and funds contained in a Machine, and
  - c) inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

### **Extent of Warranty**

IBM does not warrant uninterrupted or error-free operation of a Machine.

The warranties may be voided by misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, removal or alteration of Machine or parts identification labels, or failure caused by a product for which IBM is not responsible.

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# 13. Appendix A: Notices

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## 13.1 Electronic Emission Notices

### **Federal Communications Commission (FCC) Statement**

**Note:** 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 in a commercial environment. 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. 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.

IBM is not responsible for any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

### **Industry Canada Class A Emission Compliance Statement**

This Class A digital apparatus complies with Canadian ICES-003.

### **Avis de conformité à la réglementation d'Industrie Canada**

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## 13.2 Telecommunication Notices

### Federal Communications Commission (FCC) and Telephone Company Requirements

1. This adapter complies with Part 68 of the FCC rules. A label is affixed to the adapter that contains, among other things, the FCC registration number, USOC, and Ringer Equivalency Number (REN) for this equipment. If these numbers are requested, provide this information to your telephone company.
2. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.
3. If the adapter causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance; if advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this product, contact your Authorized Reseller, or call IBM. In the United States, call IBM at **1-800-772-2227**. In Canada, call IBM at **1-800-565-3344**. You may be required to present proof of purchase.

The telephone company may ask you to disconnect the adapter from the network until the problem has been corrected, or until you are sure the adapter is not malfunctioning.

6. No customer repairs are possible to the adapter. If you experience trouble with the adapter, contact your Authorized Reseller or see Help and Service section of this manual for information.
7. This adapter may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.
8. When ordering network interface (NI) service from the local Exchange Carrier, specify service arrangement USOC RJ11C.

### 13.3 Canadian Department of Communications Certification Label

**NOTICE:** The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. 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. 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 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.**

**NOTICE:** 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 sum of the LOAD NUMBERS of all the devices does not exceed 100.

## Étiquette d'homologation du ministère des Communications du Canada

**AVIS :** L'étiquette du ministère des Communications du Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme à certaines normes de protection, d'exploitation et de sécurité des réseaux de télécommunications. Le ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunications. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêchent pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être effectuées par un centre d'entretien canadien autorisé désigné par le fournisseur. La compagnie de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause d'un mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

**Avertissement: l'utilisateur ne doit pas tenter de faire ces raccordements lui-même, il doit avoir recours à un service d'inspection des installations électriques ou à un électricien, selon le cas.**

**AVIS:** L'INDICE DE CHARGE (IC) assigné à chaque dispositif terminal indique, pour éviter toute surcharge, le pourcentage de la charge totale qui peut être raccordé à un circuit téléphonique bouclé utilisé par ce dispositif. L'extrémité du circuit bouclé peut consister en n'importe quelle combinaison de dispositifs pourvu que la somme des INDICES DE CHARGE de l'ensemble des dispositifs ne dépasse pas 100.

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# 15. Appendix C: Specifications

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## 15.1 PC Host Requirements

PC CPU Requirements	586-133 MHz (Pentium) with 64Mb RAM for minimum configuration
Bus Interface	ISA 16 bit
Cable Interface	50 Pin Telco (RJ-21X)
Power Required	+5V 1.6A, +12V 1.0A, -5V 0.1 A
Operating Temperature	10 Deg C Min / 40 Deg C Max
Storage Temperature	0 Deg C Min / 65 Deg C Max
Operating Humidity	20 to 80% relative, non-condensing

## 15.2 CT-618 Specifications

Number of Ports	6 Trunks / 18 Extensions
Switching	Digital Type Non-Blocking
Station Compatibility	Analog 2500 Series (Loop Start)
Station Interface Loop Limit	1200 Ohms Max
Station Impedance	600 Ohms
Trunk Impedance	600 Ohms
CO Min Leak Resistance	30,000 Ohms
System Crosstalk	>75 dB down
System Longitudinal Balance	>58 dB (200 to 3,000 Hz) on/off-hook
System Return Loss	>18 dB ERL
System Idle Circuit Noise	<20 dB <sub>rnC</sub>
Insertion Loss Station to Station	1 dB
Insertion Loss Station to Trunk	2 dB

### 15.3 RJ21X Telco connector pinout

Color	Function	Pin	Pin	Function	Color
BLU-WHT	Trunk 1 - Tip	1	26	Trunk 1 - Ring	WHT-BLU
ORN-WHT	Trunk 2 - Tip	2	27	Trunk 2 - Ring	WHT-ORN
GRN-WHT	Trunk 3 - Tip	3	28	Trunk 3 - Ring	WHT-GRN
BRN-WHT	Trunk 4 - Tip	4	29	Trunk 4 - Ring	WHT-BRN
SLT-WHT	Trunk 5 - Tip	5	30	Trunk 5 - Ring	WHT-SLT
BLU-RED	Trunk 6 - Tip	6	31	Trunk 6 - Ring	RED-BLU
ORN-RED	Ext 1 - Tip	7	32	Ext 1 - Ring	RED-ORN
GRN-RED	Ext 2 - Tip	8	33	Ext 2 - Ring	RED-GRN
BRN-RED	Ext 3 - Tip	9	34	Ext 3 - Ring	RED-BRN
SLT-RED	Ext 4 - Tip	10	35	Ext 4 - Ring	RED-SLT
BLU-BLK	Ext 5 - Tip	11	36	Ext 5 - Ring	BLK-BLU
ORN-BLK	Ext 6 - Tip	12	37	Ext 6 - Ring	BLK-ORN
GRN-BLK	Ext 7 - Tip	13	38	Ext 7 - Ring	BLK-GRN
BRN-BLK	Ext 8 - Tip	14	39	Ext 8 - Ring	BLK-BRN
SLT-BLK	Ext 9 - Tip	15	40	Ext 9 - Ring	BLK-SLT
BLU-YEL	Ext 10 - Tip	16	41	Ext 10 - Ring	YEL-BLU
ORN-YEL	Ext 11 - Tip	17	42	Ext 11 - Ring	YEL-ORN
GRN-YEL	Ext 12 - Tip	18	43	Ext 12 - Ring	YEL-GRN
BRN-YEL	Ext 13 - Tip	19	44	Ext 13 - Ring	YEL-BRN
SLT-YEL	Ext 14 - Tip	20	45	Ext 14 - Ring	YEL-SLT

BLU-VIO	Ext 15 - Tip	21	46	Ext 15 - Ring	VIO-BLU
ORN-VIO	Ext 16 - Tip	22	47	Ext 16 - Ring	VIO-ORN
GRN-VIO	Ext 17 - Tip	23	48	Ext 17 - Ring	VIO-GRN
BRN-VIO	Ext 18 - Tip	24	49	Ext 18 - Ring	VIO-BRN
SLT-VIO	n/c	25	50	n/c	VIO-SLT

**Notes:**

1. SLT (Slate) is sometimes referred to as GRY (Gray).
2. The Ext xx numbers correspond to the default extension numbering scheme, so that Ext 1 is extension 201 on the first CT-618 board, 219 on the second CT-618 board, etc.
3. The power down fail-safe mode of the CT-618 board connects Trunk 1 (Tip and Ring) to Ext 1 (Tip and Ring). For this reason, we recommend that Ext 1 be used for the Operator extension (201) in normal usage.

**15.4 PBX CT-618 Functions**

When first installed, the following default PBX keypad commands are in effect. Note that these defaults may change with subsequent versions of the IBM Telephony software.

**Normal extension handset dialing**

201-299	Place a call to extension 201 through 299.
9+7 digits	Connect to a trunk and dial a local call.
1+10 digits	Connect to a trunk and dial a non-local call.
9+11 digits	Connect to a trunk, wait for a dial tone, and dial all digits
911	Connect to a trunk, wait for dial tone and dial 911.
0	Place a call to the Operator (default is extension 201).
**	Listen to recorded IBM CT Help.
*2	Make all held calls a conference, joining the conference yourself (*2=*C - Conference).

*30+two digit parking station	Park a call.
*31+two digit parking station	Pick up parked call.
*4	Pick up a held call (*4=*G -Get Held).
*5	Pick up a ringing call from your pickup group .
*8	Make all held calls a conference and hang-up on the conference (*8=*T - Transfer Hang-up).
*6	Check voice mail messages (requires optional IBM VoiceMaster voice mail software).
*7	Leave voice mail message (requires optional IBM VoiceMaster voice mail software).
*92+digits of forward extension	Set call forward on busy (*92# to cancel).
*94+digits of forward extension	Set call forward immediately (*94# to cancel).
*96+digits of forward extension	Set call forward on no answer (*96# to cancel).
*11	Record a message (file RECORD.MU).
*12	Play a message (file RECORD.MU).
*13	Play the auto attendant message (file ATTEND.MU).

### Administration and Test Functions

Administration and test functions are performed from the Operator extension or an extension with administrator privileges (class of service 6).

8	Connect to a trunk and permit dialing an outside call.
*11	Record auto attendant message (RECORD.MU).
*12	Play RECORD.MU.

- \*13            Play current auto attendant message.
- #20-#26       Set number of rings before Auto-Attendant (0-6 respectively).
- #30-#36       Reserve trunks for incoming calls (0 through 6 trunks, respectively).
- #40-#50       Set the I/O port to one of the following respectively: 0x260, 0x280, 0x290, 0x2A0, 0x2b0, 0x2e0, 0x2f0, 0x300, 0x310, 0x390, 0x3e0. Used only for initial configuration when there is an I/O conflict. After the system is powered up and the green light is on, enable this feature by removing jumper J0 and installing jumper J1. Replace the jumpers immediately before trying to run the setup software.
- #71            Connect call to on hold audio.
- #83            Recalculate the number of trunks (when trunks have been added/removed).
- #85            Count number of trunks (will produce a beep tone for each trunk).
- #99            Set factory defaults (requires jumpers as above).





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