This chapter describes how you can use the Program-to-Program Communications (PPC) Toolbox to send and receive low-level message blocks between applications.

The PPC Toolbox can be used by different applications located on the same computer or across a network of Macintosh computers. The PPC Toolbox is available only in System 7 or later. To test for the existence of the PPC Toolbox, use the `Gestalt` function, described in *Inside Macintosh: Operating System Utilities.*

Read this chapter if you want your application to transmit and receive data from other applications that support the PPC Toolbox. Applications that utilize the PPC Toolbox must be open and connected to each other to exchange data. The PPC Toolbox allows you to send large amounts of data to other applications; it is typically useful for code that is not event-based. The PPC Toolbox is called by the Macintosh Operating System and can also be called by applications, device drivers, desk accessories, or other programs.

The PPC Toolbox provides a method of communication that is particularly useful for applications that are specifically designed to work together and are dependent on each other for information. For example, suppose one user organizes large amounts of data using a database application and another user filters and plots the same data using a plotting application. If both applications use the PPC Toolbox, these two applications can directly transmit data to each other when both applications are open and connected to each other.

You can also use the PPC Toolbox if your application communicates with other applications using high-level events or Apple events, and your application allows the user to choose another application to communicate with. You can use a PPC Toolbox routine that provides a standard user interface to display a dialog box that lists other applications that are available to exchange information. See “Browsing for Ports Using the Program Linking Dialog Box” beginning on page 11-22 for detailed information. See the chapter “Event Manager” in *Inside Macintosh: Macintosh Toolbox Essentials* for information on high-level events, and see earlier chapters in this book for information on Apple events.

The PPC Toolbox uses the AppleTalk Data Stream Protocol (ADSP) and the Name-Binding Protocol (NBP). For detailed information on ADSP and NBP, see *Inside Macintosh: Networking.*

**Note**
The sample applications “store data,” “display data,” “send and receive,” “make memo,” and “spell quick” used in this chapter are not actual products of Apple Computer, Inc. They are used for illustrative purposes only. ◆

## About the PPC Toolbox

The PPC Toolbox provides you with the ability to

- exchange data with other open applications on the same computer or across a network of Macintosh computers
- browse through a listing of applications that are available to exchange data
- verify user identities for communication across a network

To utilize the PPC Toolbox to exchange data between open applications, each application involved must support the PPC Toolbox.

This chapter first defines the main elements of the PPC Toolbox and then discusses how to

- set up your application for communication
- use security features prior to establishing communication
- locate other applications that can exchange data
- initiate communication between applications
- accept or reject incoming communications requests
- transmit and receive data between applications
- terminate communication between applications

### Ports, Sessions, and Message Blocks

To initiate communication between applications, you must first open a port. A ***port*** is a portal through which your application can exchange information with another application. A port is designated by a port name and a location name.

A ***port name*** is a unique identifier for a particular application on a computer. The port name contains a name string, a type string, and a script code for localization. The ***location name*** identifies the location of the computer on the network. The location name contains an object string, a type string, and a zone. An application can specify an alias location name by modifying its type string.

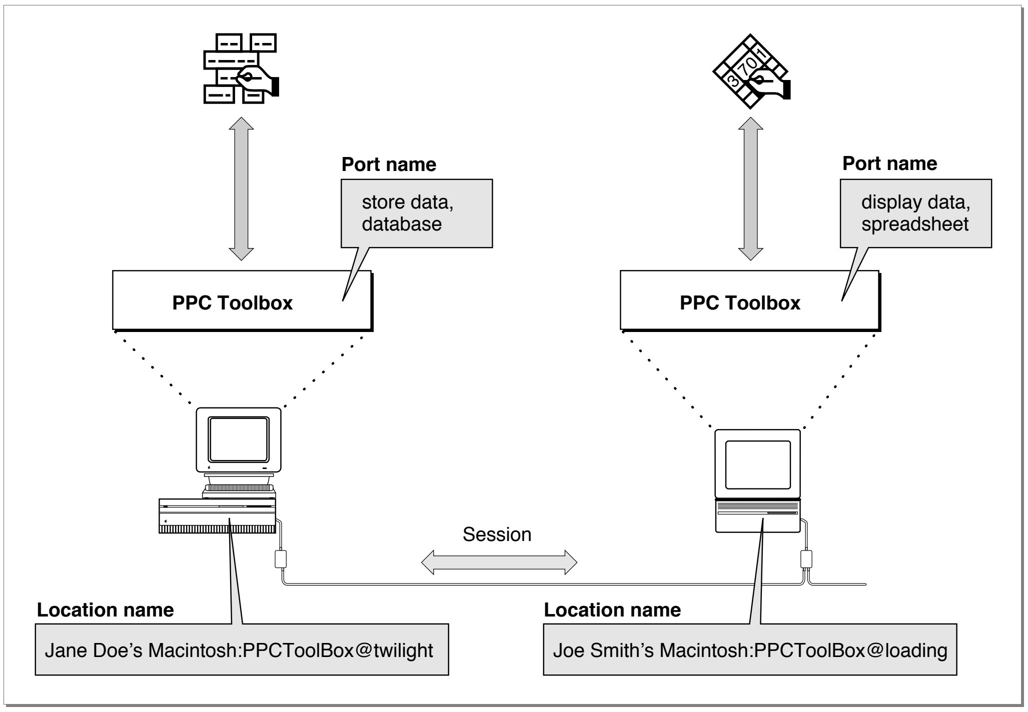
Your application can open as many ports as it requires as long as each port name is unique within a particular computer. See “Specifying Port Names and Location Names” beginning on page 11-17 for detailed information on port names and location names.

Through its port, an open application can communicate with another open application during a ***session.*** One port can support any number of communication sessions. During a session, an application sends and receives data in the form of a ***message block.*** The PPC Toolbox treats each block of data as a byte stream and delivers it in the same sequence in which it was sent.

The words *port name, location name, session,* and *message block* are programmatic terms. You should not use them in the user interface of your application or in your user documentation. Instead, refer to a file that contains executable code as an *application program.* An application program that opens and uses PPC ports supports *program linking.* When you *link* two application programs together, you are forming a *program link.* A link allows two application programs to communicate with each other—you *unlink* two application programs when you break the link between them. You can compare the link between two application programs to the communication established using telephones. For example, a program link is similar to a telephone connection that enables various forms of communication such as human-to-human, modem-to-modem, and facsimile machine–to–facsimile machine.

Figure 11-1 shows a database application on one computer that has initiated a session with a spreadsheet application located on another computer on the network.

**Figure 11-1** A PPC Toolbox session between two applications


Port name
store data, database
PPC Toolbox
Port name
display data, spreadsheet
PPC Toolbox
Session
Location name
Jane Doe's Macintosh:PPCToolBox@twilight
Location name
Joe Smith's Macintosh:PPCToolBox@loading

The database application's port name consists of "store data" (the name string) and "database" (the type string). Its location name consists of "Jane Doe's Macintosh" (the object string), "PPCToolBox" (the type string), and "twilight" (the AppleTalk zone).

The spreadsheet application's port name consists of "display data" (the name string) and "spreadsheet" (the type string). Its location name consists of "Joe Smith's Macintosh" (the object string), "PPCToolBox" (the type string), and "loading" (the AppleTalk zone).

## Setting Up Authenticated Sessions

Network communication must be active to initiate sessions with other computers across a network. The user must activate AppleTalk in the Chooser and enable program linking using the Sharing Setup control panel located in the Control Panels folder inside the System Folder. Figure 11-2 displays the icon for the Sharing Setup control panel.

**Figure 11-2** The icon for the Sharing Setup control panel

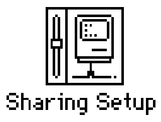
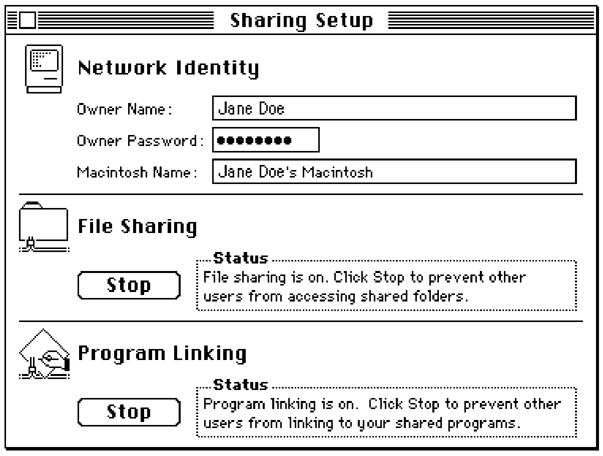


Figure 11-3 shows the Sharing Setup control panel.

**Figure 11-3** The Sharing Setup control panel



Owner Name: Jane Doe
Owner Password: ••••••••
Macintosh Name: Jane Doe's Macintosh

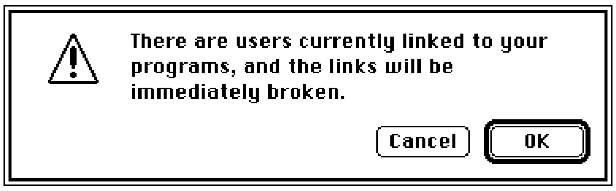
Status
File sharing is on. Click Stop to prevent other users from accessing shared folders.

Status
Program linking is on. Click Stop to prevent other users from linking to your shared programs.

To permit other computers to initiate sessions with the owner's computer, the owner of the computer must click the Start button underneath Program Linking (Start toggles with Stop). The Sharing Setup control panel then indicates "Program linking is on. Click Stop to prevent other users from linking to your shared programs." To prevent other computers from initiating sessions, an owner simply clicks Stop underneath Program Linking. The Sharing Setup control panel then indicates "Program linking is off. Click Start to allow other users to link to your shared programs." Clicking the Start or Stop button also enables or disables the transmission of incoming Apple events across the network.

If a user clicks the Stop button while there are active incoming sessions (sessions initiated by other users), an alert box (shown in Figure 11-4) appears on the user's screen.

**Figure 11-4** The session termination alert box


There are users currently linked to your programs, and the links will be immediately broken.

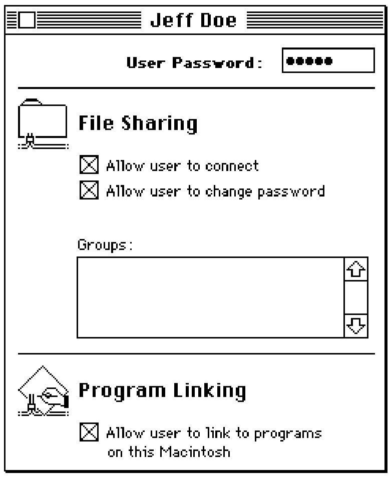
If a user clicks OK, all active sessions initiated by other users are immediately terminated. Note that it is still possible for the owner of the computer to initiate sessions, even though other users may not initiate sessions with the owner's computer.

The PPC Toolbox establishes the identity of users through the process of ***authentication.*** The authentication mechanism of the PPC Toolbox identifies each user through an assigned name and password. Each session initiated with a port that is located on a remote computer requires authentication (unless guest access is enabled) before a session is permitted. Sessions between applications located on the same computer never require authentication.

A computer's owner can establish access for other users and guests by opening the Users & Groups control panel located in the Control Panels folder. The Users & Groups control panel allows an owner to specify the names and passwords of other users whose computers can initiate sessions with his or her ports across the network. When the computer's owner opens the Users & Groups control panel, the Guest icon appears. If the owner's name is specified in the Sharing Setup control panel, an icon with the owner's name also appears.

To specify a particular new user, the owner chooses New User from the File menu. The owner should type in the user's name. When the owner opens a user icon in the Users & Groups control panel, the Finder displays the users and groups dialog box on the owner's screen. Figure 11-5 shows the users and groups dialog box for a particular user.

**Figure 11-5** The users and groups dialog box


Jeff Doe

User Password: ●●●●●

File Sharing

☒ Allow user to connect

☒ Allow user to change password

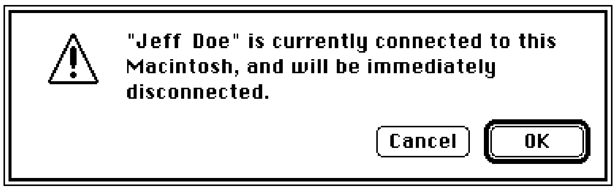
Groups:

Program Linking

☒ Allow user to link to programs on this Macintosh

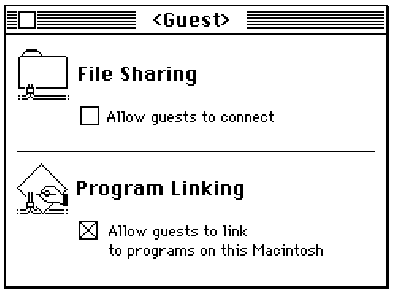
To permit authenticated session requests, the owner can specify a password for each user. The owner allows other users to utilize the PPC Toolbox by clicking the checkbox under Program Linking. If the owner clicks the checkbox again, all active sessions initiated by this particular user are immediately terminated. The user termination alert box (shown in Figure 11-6) is displayed as a warning.

**Figure 11-6** The user termination alert box


"Jeff Doe" is currently connected to this Macintosh, and will be immediately disconnected.

When the owner opens a Guest icon in the Users & Groups control panel, the Finder displays the guest dialog box on the owner's screen. Authentication is not required if the owner permits guest access. Figure 11-7 shows the guest dialog box.

**Figure 11-7** The guest dialog box



File Sharing

☐ Allow guests to connect

Program Linking

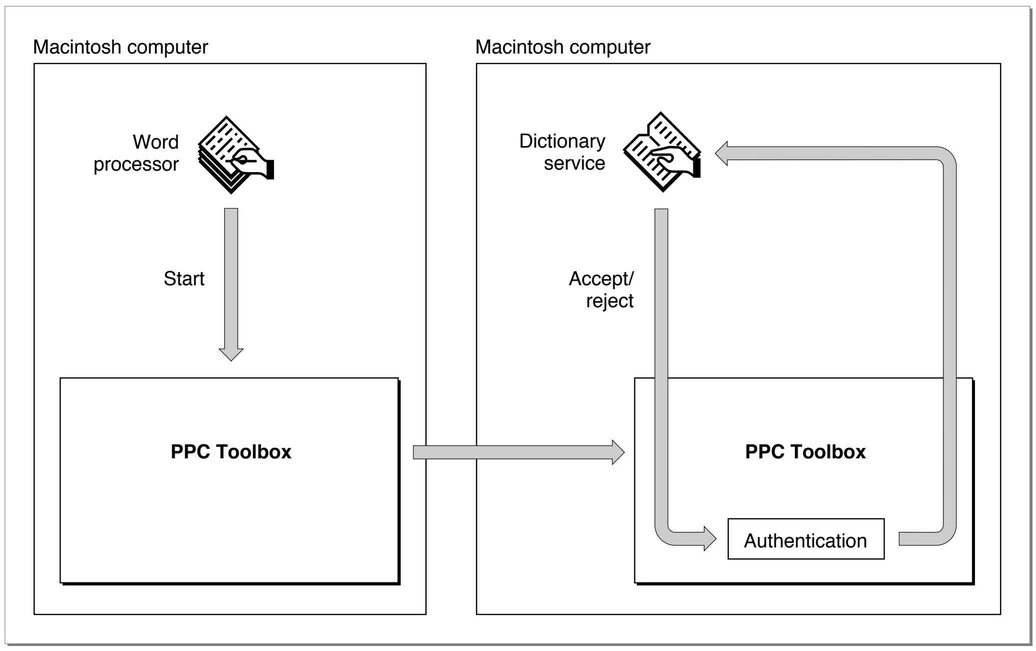
☒ Allow guests to link to programs on this Macintosh

By clicking the checkbox under Program Linking, the owner permits guests to communicate using the PPC Toolbox or Apple events.

Consider this example of the authentication process: one user decides to make a dictionary service available to other users. A second user wishes to employ this service in a word-processing program. Assuming both programs support the PPC Toolbox, the word-processing program attempts to gain access to the dictionary service that is open on the first user's computer by initiating a session. When the word-processing application requests a session, the PPC Toolbox attempts to authenticate the second user by requesting a user name and a password (unless guest access is enabled). If the authentication process verifies the user's identity and the dictionary application accepts the request for a session, a session is established and the second user can access the dictionary's data.

Figure 11-8 illustrates the authentication process that occurs when a user attempts to initiate a session.

**Figure 11-8** The PPC Toolbox authentication process



## Using the PPC Toolbox

This section describes how to

- use PPC Toolbox calling conventions
- open a port
- list all available port locations on the network

- indicate that a port is available to accept session requests
- initiate a session
- accept and reject session requests
- read and write data during a session
- end a session after data is transmitted and received
- close a port when it is no longer needed to transmit or receive data
- invalidate users

To begin, you must determine whether the PPC Toolbox is available on the user's computer system by using the `Gestalt` function with the selector `gestaltPPCToolboxAttr`. A `noErr` result code indicates that the PPC Toolbox is present.

The `Gestalt` function returns a combination of the following constants in the `response` parameter: `gestaltPPCToolboxPresent`, `gestaltPPCSupportsRealTime`, `gestaltPPCSupportsOutGoing`, and `gestaltPPCSupportsIncoming`.

The PPC Toolbox currently supports only sessions in real time. The `Gestalt` function returns `gestaltPPCSupportsRealTime` by default. If this bit is not set, you need to initialize the PPC Toolbox.

The `Gestalt` function returns `gestaltPPCSupportsOutGoing` to indicate support of outgoing sessions across a network of Macintosh computers. If this bit is not set, the user hasn't enabled AppleTalk in the Chooser.

The `Gestalt` function returns `gestaltPPCSupportsIncoming` if the user has enabled program linking in the Sharing Setup control panel. If this bit is not set, the user either hasn't enabled AppleTalk in the Chooser or hasn't enabled program linking in the Sharing Setup control panel.

Use the `PPCInit` function to initialize the PPC Toolbox.

```
err := PPCInit;
```

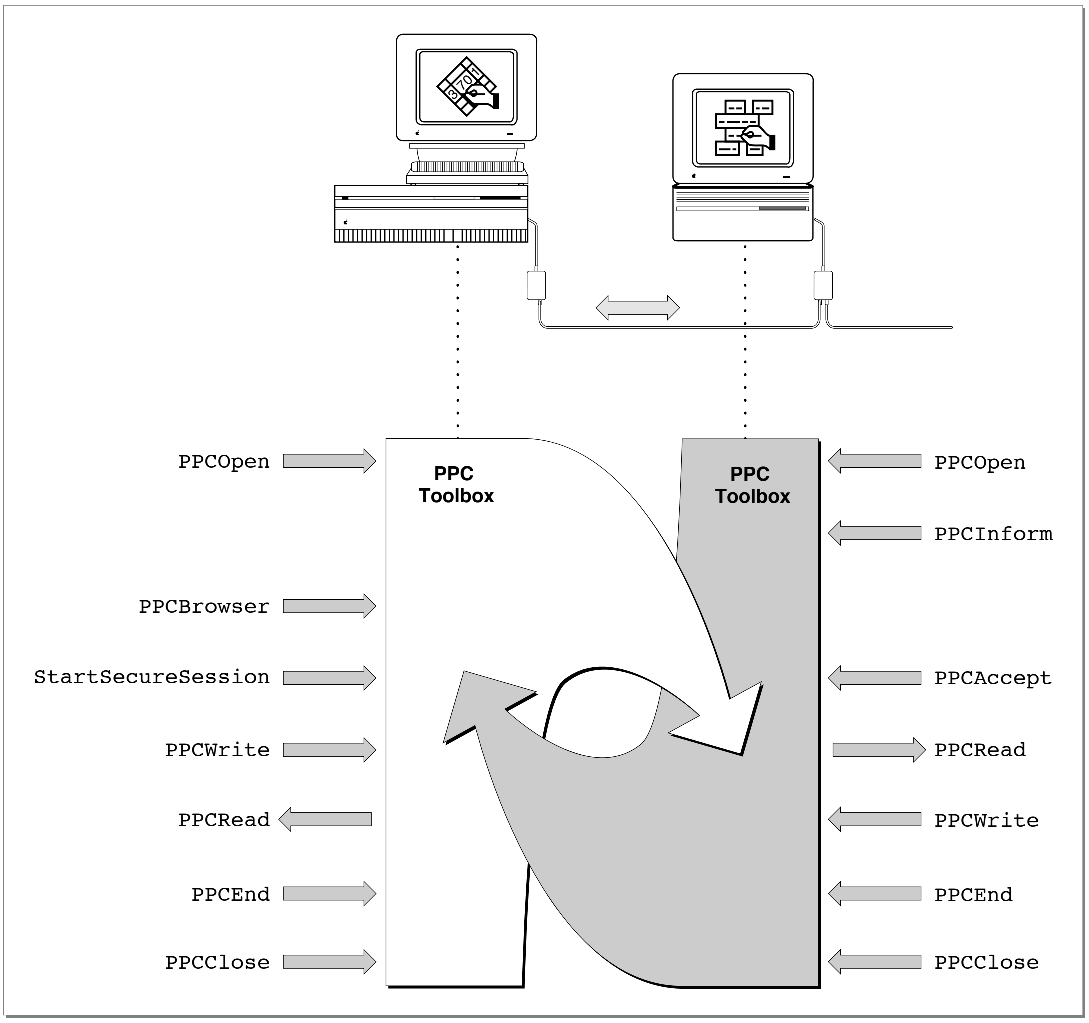
Listing 11-1 illustrates how you use the `PPCInit` function to initialize the PPC Toolbox.

**Listing 11-1** Initializing the PPC Toolbox using the `PPCInit` function

```
FUNCTION MyPPCInit: OSErr;
VAR
   PPCAttributes: LongInt;
   err:           OSErr;
BEGIN
   err := Gestalt(gestaltPPCToolboxAttr, PPCAttributes);
   IF err = noErr THEN           {PPC Toolbox is present}
   BEGIN
      IF BAND(PPCAttributes, gestaltPPCSupportsRealTime) = 0 THEN
      BEGIN
         MyPPCInit := PPCInit;   {initialize the PPC Toolbox}
         {test the attributes for the PPC Toolbox}
         err := Gestalt(gestaltPPCToolboxAttr, PPCAttributes);
      END;
      IF BAND(PPCAttributes, gestaltPPCSupportsOutGoing) <> 0 THEN
         {ports can be opened to the outside world}
      ELSE     {it's likely that AppleTalk is disabled, so you }
         ;     { may want to tell the user to activate AppleTalk }
               { from the Chooser}
      IF BAND(PPCAttributes, gestaltPPCSupportsIncoming) <> 0 THEN
         {ports can be opened with location names that the }
         { outside world can see}
      ELSE     {it's likely that program linking is disabled, so }
         ;     { you may want to tell the user to start program }
               { linking from the Sharing Setup control panel}
   END
   ELSE
      MyPPCInit := err;
END;
```

Figure 11-9 illustrates a spreadsheet application (on the left) that has initiated a session with a database application (on the right) to exchange data using the PPC Toolbox. This figure includes an example of the sequence of PPC Toolbox routines executed by these applications. Detailed descriptions of the functions appear in the sections that follow.

**Figure 11-9** Database and spreadsheet applications using the PPC Toolbox



To establish a session, each application must first open a port using the PPCOpen function. The spreadsheet application prepares to receive session requests by calling the PPCInform function.

Before initiating a session or opening a port, the database application can let the user browse through the list of available ports (using the PPCBrowser function). If the user decides to communicate with the spreadsheet application, the database application initiates a session with the spreadsheet application's port using the StartSecureSession function. After the PPC Toolbox authenticates the user name and password of the initiating port, the spreadsheet application accepts the session request (using the PPCAccept function).

Once the session is established, the applications exchange information in the form of message blocks (using the PPCRead and PPCWrite functions). During a session, an application can both read from and write message blocks to another application. After the information exchange is done, each application ends the session (PPCEnd) and then closes its port (PPCClose) when it quits.

The PPCOpen function returns a port reference number. The port reference number is a reference number for the port through which you are requesting a session. The database application uses the port reference number in subsequent calls to the StartSecureSession and PPCClose functions. The StartSecureSession function returns a session reference number. The session reference number is used to identify the session during the exchange of data. It is used in subsequent calls to the PPCWrite, PPCRead, and PPCEnd functions.

The PPCOpen function returns a port reference number that the spreadsheet uses in subsequent calls to the PPCInform and PPCClose functions. The PPCInform function returns a session reference number that is used in subsequent calls to the PPCAccept, PPCRead, PPCWrite, and PPCEnd functions.

## PPC Toolbox Calling Conventions

Most PPC Toolbox functions can execute synchronously (meaning that the application cannot continue until the function completes execution) or asynchronously (meaning that the application is free to perform other tasks while the function is executing). The PPC Toolbox functions that can only be executed synchronously include PPCInit, PPCBrowser, StartSecureSession, DeleteUserIdentity, and GetDefaultUser. All other PPC Toolbox functions can execute asynchronously or synchronously. Here's an example:

```
FUNCTION PPCFunction (pb: PPCParamBlockPtr;
                      async: Boolean): OSErr;
```

The pb parameter should point to a PPC parameter block. Set the `async` parameter to `TRUE` if you want the function to execute asynchronously; set it to `FALSE` if you want the function to execute synchronously.

**Note**
The `PPCInform`, `PPCRead`, and `PPCWrite` functions should always be executed asynchronously, because they require interaction from the other application in the session before they complete execution. ◆

The `PPCParamBlockRec` data type defines the PPC parameter block.

```
TYPE PPCParamBlockRec =
   RECORD
      CASE Integer OF
      0: (openParam:      PPCOpenPBRec);       {PPCOpen params}
      1: (informParam:    PPCInformPBRec);     {PPCInform params}
      2: (startParam:     PPCStartPBRec);      {PPCStart params}
      3: (acceptParam:    PPCAcceptPBRec);     {PPCAccept params}
      4: (rejectParam:    PPCRejectPBRec);     {PPCReject params}
      5: (writeParam:     PPCWritePBRec);      {PPCWrite params}
      6: (readParam:      PPCReadPBRec);       {PPCRead params}
      7: (endParam:       PPCEndPBRec);        {PPCEnd params}
      8: (closeParam:     PPCClosePBRec);      {PPCClose params}
      9: (listPortsParam: IPCListPortsPBRec);  {IPCListPorts }
                                               { params}
   END;
```

For an illustration of the fields of each individual parameter block (such as `PPCInformPBRec` or `IPCListPortsPBRec`), see Figure 11-18 on page 11-47.

Your application transfers ownership of the PPC parameter block (and any buffers or records pointed to by the PPC parameter block) to the PPC Toolbox until a PPC function completes execution. Once the function completes, ownership of the parameter block (and any buffers or records it points to) is transferred back to your application. If a PPC Toolbox function is executed asynchronously, your program cannot alter memory that might be used by the PPC Toolbox until that function completes.

A PPC Toolbox function that is executed asynchronously must specify `NIL` or the address of a completion routine in the `ioCompletion` field of the PPC parameter block. You should use the `ioResult` field to determine the actual result code when an asynchronously executed PPC Toolbox function completes.

If you specify `NIL` in the `ioCompletion` field, you should poll the `ioResult` field of the PPC parameter block after the function is called to determine whether the PPC function has completed the requested operation. You should poll the `ioResult` field within the event loop of your application. If the `ioResult` field contains a value other than `1`, the function has completed execution. Note that you must not poll the `ioResult` field at interrupt time to determine whether the function has completed execution.

If you specify a completion routine in the `ioCompletion` field, it is called at interrupt time when the PPC Toolbox function completes execution.

▲ **WARNING**
Completion routines execute at the interrupt level and must preserve all registers other than A0, A1, and D0–D2. (Note that MPW C and MPW Pascal do this automatically.) Your completion routine must not make any calls to the Memory Manager directly or indirectly, and it can't depend on the validity of handles to unlocked blocks. The PPC Toolbox preserves the application global register A5. ▲

You can write completion routines in C, Pascal, or assembly language. A completion routine declared in Pascal has this format:

```
PROCEDURE MyCompletionRoutine (pb: PPCParamBlockPtr);
```

The `pb` parameter points to the PPC parameter block passed to the PPC Toolbox function.

You may call another PPC Toolbox function from within a completion routine, but the function called must be executed asynchronously. It is recommended that you allocate parameter blocks of data type `PPCParamBlockRec` so that you may reuse the `pb` parameter to call another PPC Toolbox function from within a completion routine. For example, you should call either the `PPCAccept` function or the `PPCReject` function asynchronously from within a `PPCInform` completion routine to accept or reject the session request.

If your application is executing PPC Toolbox functions asynchronously, you may want to define your own record type to hold all data associated with a session. You can attach the data to the end of the parameter block. Here's an example:

```
TYPE
   SessRecHndl = ^SessRecPtr;
   SessRecPtr = ^SessRec;
   SessRec =
   RECORD
      pb:                  PPCParamBlockRec; {must be first }
                                             { item in record}
      thePPCPortRec:       PPCPortRec;
      theLocationNameRec:  LocationNameRec;
      theUserName:         Str32;
   END;
```

The additional data elements in your record can be accessed during execution of a completion routine by coercing the pb parameter to a pointer to your record type.

## Specifying Port Names and Location Names

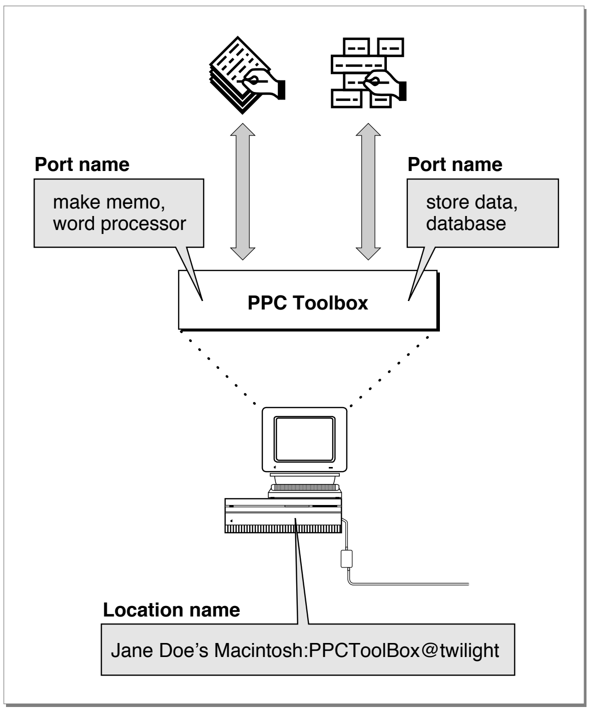
Before initiating a session, you must open a port to communicate with other programs. A port name and location name identify each port. An application can open as many ports as it requires as long as each port name is unique within a particular computer. You specify both the port name and the location name in the PPC parameter block.

Figure 11-10 illustrates a single Macintosh computer with two applications, and their corresponding port names and location names.

To open a port, you need to specify a port name. A port name consists of a name string, a type string, and a script code for localization. For example, you can designate "make memo" as the application's name string, "word processor" as its type string, and "smRoman" as its script code.

A port name is defined by a PPC port record. The PPC port record contains a script code, name string, port kind selector, and type string. The script code is an integer script identifier used for localization. The name string consists of a 32-byte character string that designates the application name. You should keep both the script code and the name string in a resource. The port kind selector is an integer that selects the kind of type string. You should make it consistent internationally. The type string can be either a 32-byte character string or a 4-character creator and a 4-character file type. See the chapter "Finder Interface" of *Inside Macintosh: Macintosh Toolbox Essentials* for information on creators and file types. See *Inside Macintosh: Text* for information on script codes and localization.

**Figure 11-10** Two Macintosh applications and their corresponding ports


Port name
make memo, word processor
Port name
store data, database
PPC Toolbox
Location name
Jane Doe's Macintosh:PPCToolBox@twilight

The `PPCPortRec` data type defines the PPC port record.

```
TYPE PPCPortRec =
   RECORD
      nameScript:        ScriptCode;       {script identifier}
      name:              Str32;            {port name in program }
                                           { linking dialog box}
      portKindSelector: PPCPortKinds;      {general category of }
                                           { application}
      CASE PPCPortKinds OF
                         ppcByString:      (portTypeStr: Str32);
                         ppcByCreatorAndType:
                                           (portCreator: OSType;
                                           portType: OSType);
   END;
```

The location name identifies the location of the computer on the network. The PPC Toolbox provides the location name when the user starts up the computer. The location name is specified in the standard Name-Binding Protocol (NBP) form, <*object string*>:PPCToolBox @<*AppleTalk zone*>. The object string is the name provided in the Sharing Setup control panel in the Control Panels folder. By default, the type string is "PPCToolBox". The AppleTalk zone is the zone to which the particular Macintosh computer belongs. For example, "Jane Doe's Macintosh:PPCToolBox@twilight" specifies the object string, type string, and AppleTalk zone for a particular computer.

The `LocationNameRec` data type defines the location name record. The `locationKindSelector` field can be set to `ppcNoLocation`, `ppcNBPLocation`, or `ppcNBPTypeLocation`.

```
TYPE LocationNameRec =
   RECORD
      locationKindSelector: PPCLocationKind;    {which variant}
      CASE PPCLocationKind OF
         {ppcNoLocation: storage not used by this value}
         ppcNBPLocation:
                        (nbpEntity: EntityName); {NBP name entity}
         ppcNBPTypeLocation:
                        (nbpType: Str32); {just the NBP type }
                                          { string for the }
                                          { PPCOpen function}
   END;
```

The `ppcNoLocation` constant is used when the location received from or passed to a PPC Toolbox function is the location of the local machine.

The `ppcNBPLocation` constant is used when a full NBP entity name is received from or passed to a PPC Toolbox function.

**Note**
You should assign an NBP value directly—do not pack it using `nbpSetEntity`. ◆

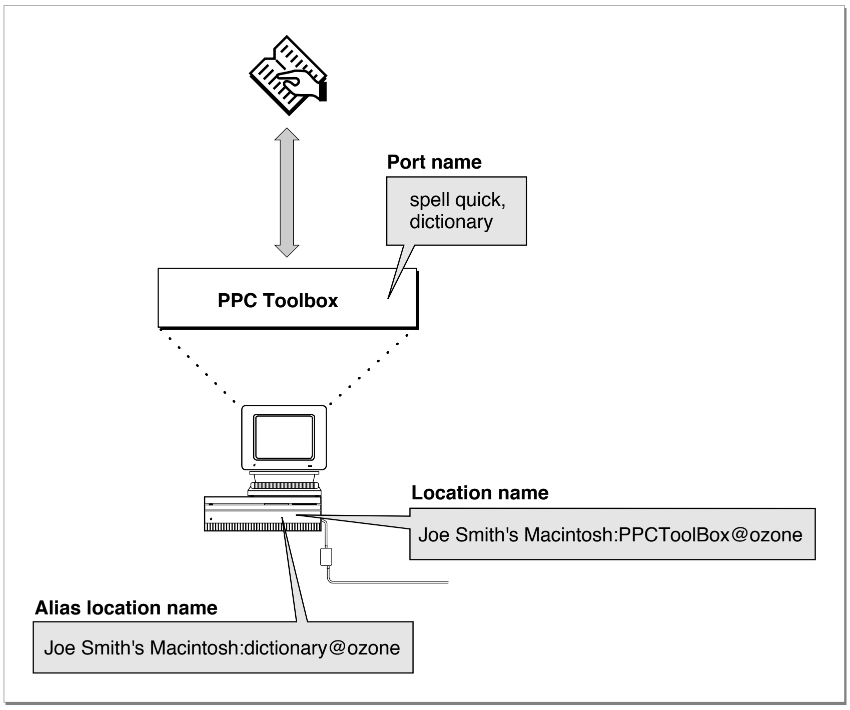
The `ppcNBPTypeLocation` constant is used only by the `PPCOpen` function when an alias location name is needed.

The NBP type to be used for the alias location name is passed in the location name record's `nbpType` field. Alias location names allow you to filter the NBP objects (Macintosh computers) displayed by the program linking dialog box (shown in Figure 11-12 on page 11-22) using the `PPCBrowser` function. See "Browsing for Ports Using the Program Linking Dialog Box" beginning on page 11-22 for information on the `PPCBrowser` function.

An alias location name could be used to advertise a service (such as a dictionary service) that is available to any application located on the network. For example, "Joe Smith's Macintosh: dictionary@ozone" specifies the object string, type string, and AppleTalk zone for a particular dictionary service.

To search for all dictionary services available within a zone, you use the `PPCBrowser` function and a filter. Figure 11-11 illustrates a Macintosh dictionary service application, its corresponding port name, and its alias location name.

**Figure 11-11** The PPC Toolbox and a dictionary service application


Port name
spell quick, dictionary
PPC Toolbox
Location name
Joe Smith's Macintosh:PPCToolBox@ozone
Alias location name
Joe Smith's Macintosh:dictionary@ozone

## Opening a Port

To open a port and associate a name with it, use the `PPCOpen` function. Listing 11-2 illustrates how you use the `PPCOpen` function to open a port. In this listing, the name is "Inside Macintosh" and the port type string is "Example". The location name is <*object string*>:PPC Example@<*AppleTalk zone*>.

**Listing 11-2** Opening a PPC port

```
FUNCTION MyPPCOpen(VAR thePortRefNum: PPCPortRefNum;
                   VAR nbpRegisteredFlag: Boolean): OSErr;
VAR
   thePPCOpenPBRec:        PPCOpenPBRec;
   thePPCPortRec:          PPCPortRec;
   theLocationNameRec:     LocationNameRec;
BEGIN
   WITH thePPCPortRec DO
   BEGIN
      {nameScript and name should be resources to allow }
      { easy localization}
      nameScript := smRoman;  {Roman script}
      name := 'Inside Macintosh';
      {the port type should always be hard-coded to allow the }
      { application to find ports of a particular type even }
      { after the name is localized}
      portKindSelector := ppcByString;
      portTypeStr := 'Example';
   END;
   WITH theLocationNameRec DO
   BEGIN
      locationKindSelector := ppcNBPTypeLocation;
      nbpType := 'PPC Example';
   END;
   WITH thePPCOpenPBRec DO
   BEGIN
      serviceType := ppcServiceRealTime;
      resFlag := 0;                     {must be 0 for 7.0}
      portName := @thePPCPortRec;
      locationName := @theLocationNameRec;
      networkVisible := TRUE;           {make this a visible }
                                        { entity on the network}
   END;
   MyPPCOpen := PPCOpen(@thePPCOpenPBRec, FALSE);{synchronous}
   thePortRefNum := thePPCOpenPBRec.portRefNum;
   nbpRegisteredFlag := thePPCOpenPBRec.nbpRegistered;
END;
```

The `PPCOpen` function opens a port with the port name and location name specified in the `name` and `location` fields of the parameter block. When the `PPCOpen` function completes execution, the `portRefNum` field returns the port reference number. You can use the port reference number in the `PPCInform`, `PPCStart`, `StartSecureSession`, and `PPCClose` functions to refer to the port you have opened.

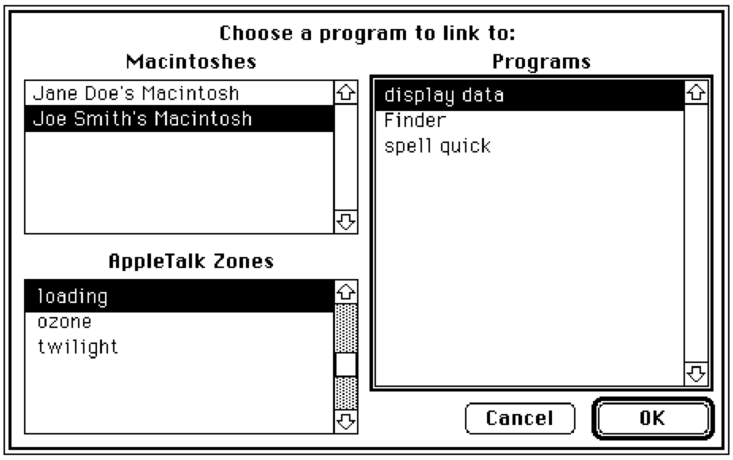
## Browsing for Ports Using the Program Linking Dialog Box

Before initiating a session, you can use either the `PPCBrowser` function or the `IPCListPorts` function to locate a port to communicate with.

Use the `PPCBrowser` function to display the program linking dialog box (shown in Figure 11-12) on the user's screen.

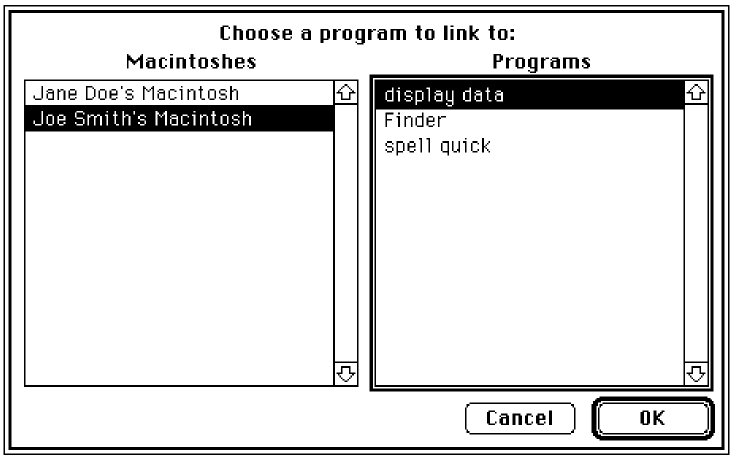
**Note**
Because this function displays a dialog box on the user's screen, you must not call the `PPCBrowser` function from an application that is running in the background. ◆

**Figure 11-12** The program linking dialog box



In the program linking dialog box, the user selects the computer, zone, and application. The zone list is not displayed if there is no network connection. Figure 11-13 shows the dialog box without the zone list.

**Figure 11-13** The program linking dialog box without a zone list



As shortcuts for the user, the program linking dialog box supports standard keyboard equivalents. Pressing Command-period or the Esc (Escape) key selects Cancel—pressing Enter or Return selects the OK button.

Each list is sorted in alphabetical order. As in the Chooser, the current list is indicated by a thick outline around its border. The program linking dialog box supports keyboard navigation and use of the arrow keys to select items from the current list. Pressing Tab or clicking the rectangle of another list switches the current list. Pressing Shift-Tab reverses the order in which the lists are selected. In addition, double-clicking an application name in the Programs list of the program linking dialog box is equivalent to clicking the OK button.

The `PPCBrowser` function allows users to browse for PPC ports.

```
err := PPCBrowser (prompt, applListLabel, defaultSpecified,
                   theLocation, thePortInfo, portFilter,
                   theLocNBPType);
```

If the `defaultSpecified` parameter is `TRUE`, the `PPCBrowser` function tries to select the PPC port specified by the parameters `theLocation` and `thePortInfo` when the program linking dialog box first appears. If the default cannot be found, the `PPCBrowser` function selects the first PPC port in the list.

An application can open multiple ports as long as each port name is unique within a particular computer. Unique ports can have duplicate name fields but different types. For example, you can designate "make memo" as the application's name string and "word processor" as its type string. You can also designate a separate port as "make memo" (the application's name string) and "text only" (its type string).

In such a case, the `PPCBrowser` function does a secondary sort based on the port type. Ports with a type selector of `ppcByCreatorAndType` are displayed before `ppcByString` ports, and types are sorted alphabetically within each type selector.

The `PPCBrowser` function uses the `IPCListPorts` function to obtain the list of existing ports on a particular computer within a particular zone. The `portFilter` parameter of the `PPCBrowser` function allows you to filter the list of PPC ports before it displays them in the program linking dialog box. If you set the `portFilter` parameter to `NIL`, the `PPCBrowser` function displays the names of all the existing PPC ports returned by the `IPCListPorts` function. If you do not set the `portFilter` parameter to `NIL`, you must set it to a pointer to a port filter function that you create.

Listing 11-3 illustrates how you use a sample port filter function. In this listing, the `MyBrowserPortFilter` function returns `TRUE` for ports with the port type string "Example".

**Listing 11-3** Using a port filter function

```
FUNCTION MyBrowserPortFilter(theLocationNameRec: LocationNameRec;
                             thePortInfoRec: PortInfoRec)
                             : Boolean;
BEGIN
   IF thePortInfoRec.name.portKindSelector = ppcByString THEN
      IF thePortInfoRec.name.portTypeStr = 'Example' THEN
         MyBrowserPortFilter := TRUE
      ELSE
         MyBrowserPortFilter := FALSE
   ELSE
      MyBrowserPortFilter := FALSE;
END;
```

The PPCBrowser function calls your filter function once for each port on the selected computer. Your function should return TRUE for each port you want to display in the program linking dialog box, and FALSE for each port that you do not want to display. Do not modify the data in the filter function parameters theLocationNameRec and thePortInfoRec.

The PPCBrowser function returns the selected port name in the parameter thePortInfo. The IPCListPorts function returns the port names in the area of memory pointed to by the bufferPtr field of the IPCListPorts parameter block. Both functions specify each port name in a port information record.

```
TYPE PortInfoRec =
   RECORD
      filler1:       SignedByte;       {space holder}
      authRequired:  Boolean;          {authentication required}
      name:          PPCPortRec;       {port name}
   END;
```

If the authRequired field returns TRUE, the port requires authentication before a session can begin. You should use the StartSecureSession function to initiate a session with this port. If this field returns FALSE, you can use either the PPCStart function or the StartSecureSession function to initiate a session. See "Initiating a PPC Session" beginning on page 11-29 for detailed information. The name field of the port information record specifies an available port name.

Listing 11-4 illustrates how you use the PPCBrowser function to display the program linking dialog box in order to obtain the location and name of a port chosen by the user. In this listing, the PPCBrowser function builds lists of zones (shown in the AppleTalk Zones list of the program linking dialog box), objects (shown in the Macintoshes list), and ports (shown in the Programs list). In this example, the PPCBrowser function next tries to default to object "Moof™" in the "Twilight" zone. If it matches the object and zone, it also tries to default to the port "Inside Macintosh" with the port type "Example".

Note that the data in the records `LocationNameRec` and `PortInfoRec` is used to match the names in the program linking dialog box. The data has nothing to do with the NBP type used by `NBPLookup` or the filtered PPC ports that show up in the program linking dialog box. The `NBPLookup` function uses the NBP type supplied in `theLocNBPType`. The PPC port names are filtered using the `MyBrowserPortFilter` function shown in Listing 11-3 on page 11-24.

**Listing 11-4** Browsing through dictionary service ports

```
FUNCTION MyPPCBrowser(VAR theLocationNameRec: LocationNameRec;
                      VAR thePortInfoRec: PortInfoRec): OSErr;
VAR
   prompt:              Str255;
   applListLabel:       Str255;
   defaultSpecified:    Boolean;
   theLocNBPType:       Str32;
BEGIN
   prompt := 'Choose an example to link to:';
   applListLabel := 'Examples';
   defaultSpecified := TRUE;
   WITH theLocationNameRec DO
   BEGIN
      locationKindSelector := ppcNBPLocation;
      WITH nbpEntity DO
      BEGIN
         objStr := 'Moof™';
         {typeStr is ignored}
         zoneStr := 'Twilight';
      END;
   END;
   WITH thePortInfoRec.name DO
   BEGIN
      {nameScript and name should be resources to allow easy }
      { localization}
      nameScript := smRoman;  {Roman script}
      name := 'Inside Macintosh';
      {the port type should always be hard-coded to allow the }
      { application to find ports of a particular type even }
      { after the name is localized}
      portKindSelector := ppcByString;
      portTypeStr := 'Example';
   END;
   {when building the list of objects (Macintoshes), }
   { show only those with the NBP type "PPC Example"}
   theLocNBPType := 'PPC Example';  {match this NBP type}
   MyPPCBrowser := PPCBrowser(prompt, applListLabel,
                              defaultSpecified,
                              theLocationNameRec,
                              thePortInfoRec,
                              @MyBrowserPortFilter,
                              theLocNBPType);
END;
```

## Obtaining a List of Available Ports

To generate a list of ports without displaying dialog boxes, you can use the `IPCListPorts` function. The `IPCListPorts` function allows you to obtain a list of ports on a particular computer within a particular zone. To obtain a list of ports, several steps are required. First, use the `GetZoneList` function to obtain a list of zones. Next, you must use the `PLookupName` function to obtain a list of computers with ports. After establishing the zone and the computer, you can use the `IPCListPorts` function to obtain the list of available ports. See *Inside Macintosh: Networking* for information on the `GetZoneList` and `PLookupName` functions.

Listing 11-5 illustrates how you use the `IPCListPorts` function to obtain a list of ports on a particular computer. This function returns a list of port information records in the buffer pointed to by the parameter `thePortInfoBufferPtr`. The actual number of port information records is returned in the parameter `theActualCount`.

**Listing 11-5** Using the `IPCListPorts` function to obtain a list of ports

```
FUNCTION MyIPCListPorts
         (theStartIndex: Integer;
          theRequestCount: Integer; VAR theActualCount: Integer;
          theObjStr: Str32; theZoneStr: Str32;
          thePortInfoBufferPtr: PortInfoArrayPtr): OSErr;
VAR
   theIPCListPortsPBRec:      IPCListPortsPBRec;
   thePPCPortRec:             PPCPortRec;
   theLocationNameRec:        LocationNameRec;
BEGIN
   {list all PPC ports at the specified location}
   WITH thePPCPortRec DO
   BEGIN
      nameScript := smRoman;
      name := '=';         {match all names}
      portKindSelector := ppcByString;
      portTypeStr := '=';  {match all types}
   END;
   WITH theLocationNameRec DO
   BEGIN
      locationKindSelector := ppcNBPLocation;
      WITH nbpEntity DO
      BEGIN
         {set NBP object from the list returned by NBPLookup}
         objStr := theObjStr;
         {set NBP type, in this example to "PPC Example"; if you }
         { don't supply your own NBP type, use "PPCToolBox"}
         typeStr := 'PPC Example';
         {set NBP zone from the list returned by GetZoneList}
         zoneStr := theZoneStr;
      END;
   END;
   WITH theIPCListPortsPBRec DO
   BEGIN
      startIndex := theStartIndex;
      requestCount := theRequestCount;
      portName := @thePPCPortRec;
      locationName := @theLocationNameRec;
      bufferPtr := thePortInfoBufferPtr;
   END;
   MyIPCListPorts := IPCListPorts(@theIPCListPortsPBRec, FALSE);
   theActualCount := theIPCListPortsPBRec.actualCount;
END;
```

The `IPCListPorts` function returns information about ports that are on the computer specified in the `locationName` field of the list ports parameter block. If you set the `locationName` field to `NIL` or if you set the `locationKindSelector` field in the location name record to `ppcNoLocation`, the `IPCListPorts` function returns only the port names for the local computer.

The `bufferPtr` field points to an area of memory that contains the requested port names. You are responsible for allocating enough memory to hold the requested port names. The buffer length must be equal to

```
sizeof(PortInfoRec) * requestCount
```

## Preparing for a Session

To communicate, you can open a port for your application and make it available to receive session requests, to initiate sessions, or both. Applications that are able to receive session requests can choose to accept or reject incoming session requests.

Before an application can accept and establish a session with another application, the PPC Toolbox authenticates the initiating user (unless guest access is enabled or the applications are located on the same computer). Once a session begins, the two applications can exchange data with each other.

### Initiating a PPC Session

Once you have established the name and the location of the port that you want to communicate with, you can initiate a session. You can use either the `StartSecureSession` function or the `PPCStart` function to initiate a session. The `StartSecureSession` function displays several dialog boxes to identify each user who requests a session. You may prefer to use the `PPCStart` function for low-level code such as that used for drivers, which typically do not provide a user interface. You may also prefer to use `PPCStart` when the application you are initiating a session with does not require authentication. The `IPCListPorts` and `PPCBrowser` functions return information about whether a particular port requires authentication.

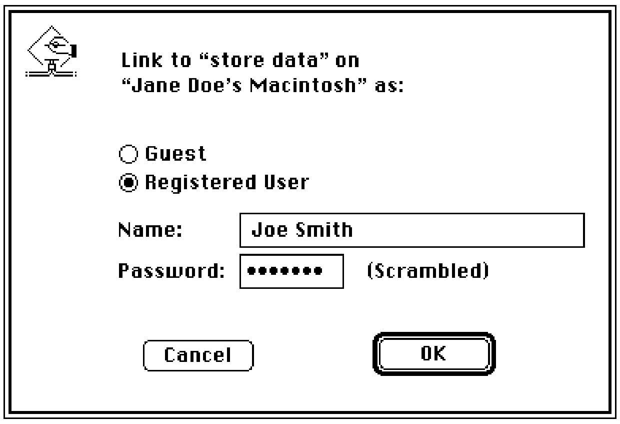
**Note**
Do not call the `StartSecureSession` function from an application that is running in the background, because the function displays several dialog boxes on the user's screen. ◆

The `StartSecureSession` function provides authentication services to identify each user who requests a session. This function combines the processes of prompting for user name and password and initiating a session into one synchronous procedure call. If authentication fails, the PPC Toolbox rejects the incoming session request.

```
err := StartSecureSession (pb, userName, useDefault, allowGuest,
                                guestSelected, prompt);
```

Set the `useDefault` parameter to `TRUE` if you want the `StartSecureSession` function to use the default user identity (described later in this section). If the default user identity cannot be authenticated, the `StartSecureSession` function displays a dialog box to allow a user to log on. Figure 11-14 shows the user identity dialog box.

**Figure 11-14** The user identity dialog box


Link to "store data" on
"Jane Doe's Macintosh" as:

○ Guest
◉ Registered User

Name: Joe Smith

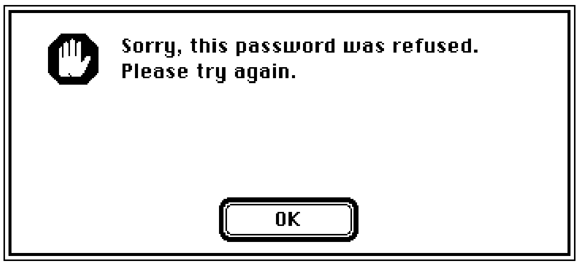
Password: ••••••• (Scrambled)

The `prompt` parameter of the `StartSecureSession` function allows you to specify a line of text that the dialog box can display. The `allowGuest` parameter specifies whether to enable the Guest radio button. If a port requires authentication, you should set this parameter to `FALSE`.

The `userName` parameter specifies the name of the user who is attempting to initiate a session. If the user name is not specified, the user identity dialog box appears on the user's screen with the owner name provided from the Sharing Setup control panel.

If the user enters an invalid password, the `StartSecureSession` function displays the dialog box shown in Figure 11-15.

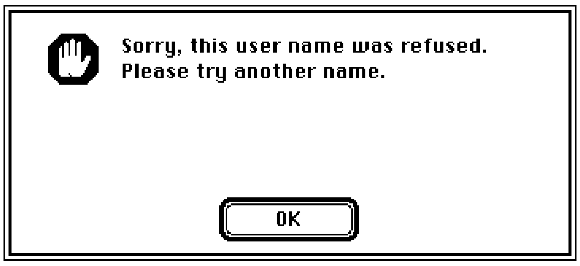
**Figure 11-15** The incorrect password dialog box


Sorry, this password was refused.
Please try again.

After the user clicks OK, the user identity dialog box reappears in the foreground so that the user can enter the password again.

If the user's name is invalid, the `StartSecureSession` function displays the dialog box shown in Figure 11-16.

**Figure 11-16** The invalid user name dialog box


Sorry, this user name was refused.
Please try another name.

After the user clicks OK, the user identity dialog box reappears so that the user can enter a new user name.

The `StartSecureSession` function remains in this loop until a secure session is initiated or the user clicks Cancel in the user identity dialog box. If a secure session is initiated, `StartSecureSession` returns the user reference number in the corresponding field in the `PPCStart` parameter block. The user reference number represents the user name and password. A user reference number of 0 indicates that a session has been initiated with guest access. See "Setting Up Authenticated Sessions" beginning on page 11-6 for more information.

Before your application quits, you need to invalidate all user reference numbers obtained with the `StartSecureSession` function except for the default user reference number and the guest reference number (0). See "Invalidating Users" on page 11-44 for detailed information.

Listing 11-6 illustrates how to use the `StartSecureSession` function to establish an authenticated session. This listing shows only one session, although your application may conduct multiple sessions at one time.

**Listing 11-6** Using the `StartSecureSession` function to establish a session

```
FUNCTION MyStartSecureSession(thePortInfoPtr: PortInfoPtr;
                              theLocationNamePtr: LocationNamePtr;
                              thePortRefNum: PPCPortRefNum;
                              VAR theSessRefNum: PPCSessRefNum;
                              VAR theUserRefNum: LongInt;
                              VAR theRejectInfo: LongInt;
                              VAR userName: Str32;
                              VAR guestSelected: Boolean): OSErr;
VAR
   thePPCStartPBRec: PPCStartPBRec;
   useDefault:       Boolean;
   allowGuest:       Boolean;
   err:              OSErr;
BEGIN
   WITH thePPCStartPBRec DO
   BEGIN
      ioCompletion := NIL;
      portRefNum := thePortRefNum;     {from the PPCOpen function}
      serviceType := ppcServiceRealTime;
      resFlag := 0;
      portName := @thePortInfoPtr^.name;  {from the PPCBrowser}
      locationName := theLocationNamePtr; {from the PPCBrowser}
      userData := 0;    {application-specific data that the }
                        { PPCInform function sees}
   END;
   {try to connect with default user identity}
   useDefault := TRUE;
   {highlight the Guest button appropriately}
   allowGuest := NOT thePortInfoPtr^.authRequired;
   err := StartSecureSession(@thePPCStartPBRec, userName,
                             useDefault, allowGuest,
                             guestSelected, stringPtr(NIL)^);
   IF err = noErr THEN
   BEGIN
      theSessRefNum := thePPCStartPBRec.sessRefNum;
      theUserRefNum := thePPCStartPBRec.userRefNum;
   END
   ELSE
      IF err = userRejectErr THEN
         {return rejectInfo from the PPCReject function}
         theRejectInfo := thePPCStartPBRec.rejectInfo;
   MyStartSecureSession := err;
END;
```

For low-level code such as that used for drivers (which typically do not provide a user interface), you can use the `PPCStart` function instead of the `StartSecureSession` function to initiate a session. You can also use the `IPCListPorts` function (instead of displaying the program linking dialog box) to obtain a list of ports.

If the `authRequired` field of the port information record contains `FALSE`, the port allows guest access. If the `authRequired` field of the port information record contains `TRUE`, use the `PPCStart` function and the user reference number obtained previously from the `StartSecureSession` function to reestablish an authenticated session.

You can also attempt to log on as the default user using the `GetDefaultUser` function to obtain the default user reference number and the default user name. The default user name is established after the owner starts up the computer.

```
err := GetDefaultUser (userRef, userName);
```

The `userRef` parameter is a reference number that represents the user name and password of the default user. The `userName` parameter contains the owner name that is specified in the Sharing Setup control panel.

The `GetDefaultUser` function returns an error when the default user identity does not exist (no name is specified in the Sharing Setup control panel) or the user is not currently logged on.

Listing 11-7 illustrates how you use the `PPCStart` function to initiate a session. The `PPCStart` function uses the port information record and the location name record to attempt to open a session with the selected PPC port.

**Listing 11-7** Initiating a session using the `PPCStart` function

```
FUNCTION MyPPCStart(thePortInfoPtr: PortInfoPtr;
                    theLocationNamePtr: LocationNamePtr;
                    thePortRefNum: PPCPortRefNum;
                    VAR theSessRefNum: PPCSessRefNum;
                    VAR theUserRefNum: LongInt;
                    VAR theRejectInfo: LongInt): OSErr;
VAR
   thePPCStartPBRec: PPCStartPBRec;
   userName:         Str32;
   err:              OSErr;
BEGIN
   WITH thePPCStartPBRec DO
   BEGIN
      ioCompletion := NIL;
      portRefNum := thePortRefNum;     {from the PPCOpen function}
      serviceType := ppcServiceRealTime;
      resFlag := 0;
      portName := @thePortInfoPtr^.name;  {destination port}
      locationName := theLocationNamePtr; {destination location}
      userData := 0;    {application-specific data for PPCInform}
   END;
   err := GetDefaultUser(thePPCStartPBRec.userRefNum, userName);
   IF err <> noErr THEN
      thePPCStartPBRec.userRefNum := 0;
   IF thePortInfoPtr^.authRequired AND
      (thePPCStartPBRec.userRefNum = 0) THEN
      {port selected doesn't allow guests & you don't have a }
      { default user ref number so you can't log on to this port}
      err := authFailErr
   ELSE  {attempt to log on}
      err := PPCStart(@thePPCStartPBRec, FALSE);
   IF err = noErr THEN
   BEGIN
      theSessRefNum := thePPCStartPBRec.sessRefNum;
      theUserRefNum := thePPCStartPBRec.userRefNum;
   END
   ELSE
      IF err = userRejectErr THEN
         {return rejectInfo from the PPCReject function}
         theRejectInfo := thePPCStartPBRec.rejectInfo;
   MyPPCStart := err;
END;
```

The port to which you wish to connect must have an outstanding `PPCInform` function to successfully start a session. You cannot initiate a session with a port that is not able to receive session requests.

If the port is open, has an outstanding `PPCInform` function posted, and accepts your session request, the `PPCStart` function returns a `noErr` result code and a valid session reference number. This session reference number is used to identify the session during the exchange of data.

## Receiving Session Requests

Your application can open as many ports as it requires as long as each port name is unique within a particular computer. A single port can support a number of communication sessions. To allow a port to receive session requests, use the `PPCInform` function. (Note that you must open a port to obtain a port reference number before calling the `PPCInform` function.) A port may have any number of outstanding `PPCInform` requests.

Listing 11-8 illustrates how you use the `PPCInform` function to allow a port to receive session requests. In this listing, the parameter `thePPCParamBlockPtr` points to a PPC parameter block record allocated by the application. The `portRefNum`, `autoAccept`, `portName`, `locationName`, `userName`, and `ioCompletion` parameters of the PPC parameter block record must be supplied. If you want to automatically accept all incoming session requests, you can set the `autoAccept` field in the `PPCInform` parameter block.

**Listing 11-8** Using the `PPCInform` function to enable a port to receive sessions

```
FUNCTION MyPPCInform(thePPCParamBlockPtr: PPCParamBlockPtr;
                     thePPCPortPtr: PPCPortPtr;
                     theLocationNamePtr: LocationNamePtr;
                     theUserNamePtr: stringPtr;
                     thePortRefNum: PPCPortRefNum): OSErr;
BEGIN
   WITH thePPCParamBlockPtr^.informParam DO
   BEGIN
      ioCompletion := @MyInformCompProc;
      portRefNum := thePortRefNum;  {from the PPCOpen function}
      autoAccept := FALSE;          {the completion routine }
                                    { handles accepting or }
                                    { rejecting requests}
      portName := thePPCPortPtr;
      locationName := theLocationNamePtr;
      userName := theUserNamePtr;
   END;
   MyPPCInform := PPCInform(PPCInformPBPtr(thePPCParamBlockPtr),
                              TRUE);   {asynchronous}
END;
```

A PPC parameter block record is used instead of a `PPCInform` parameter block record so that the same parameter block can be reused to make other PPC Toolbox calls from the `PPCInform` completion routine. The parameter block and the records it points to cannot be deallocated until all calls that use the parameter block and records have completed.

You should make the call to `PPCInform` asynchronously. For each function that you use asynchronously, you should provide a completion routine. The completion routine gets called at interrupt time when the `PPCInform` function completes.

Listing 11-9 illustrates a completion routine for a PPCInform function. You can use the data passed into your PPCInform completion routine (user name, user data, port name, and location name) to determine whether to accept or reject the session request.

**Listing 11-9** Completion routine for a PPCInform function

```
PROCEDURE MyInformCompProc(pb: PPCParamBlockPtr);
BEGIN
   IF pb^.informParam.ioResult = noErr THEN
   BEGIN
      {decide if this session should be accepted or rejected by }
      { looking at data supplied by the session requester}
      IF pb^.informParam.userData <> -1 THEN
         DoPPCAccept(pb)
      ELSE
         DoPPCReject(pb);
   END
   ELSE
      {use a global to tell the application that }
      { PPCParamBlockRec and the records it points to }
      { can be deallocated}
      gPBInUse := FALSE;
END;
```

When the PPCInform function completes, the MyInformCompProc procedure determines whether to accept or reject the incoming session request. It does this by calling PPCAccept or PPCReject, as described in the next section.

## Accepting or Rejecting Session Requests

Use the PPCAccept function or the PPCReject function to accept or reject an incoming session request.

▲ **WARNING**
If the PPCInform function (with the autoAccept parameter set to FALSE) returns a noErr result code, you must call either the PPCAccept function or the PPCReject function. The computer trying to initiate a session (using the StartSecureSession function or the PPCStart function) waits (hangs) until the session attempt is either accepted or rejected, or until an error occurs. ▲

Listing 11-10 illustrates how you use the `PPCAccept` function to accept a session request. This listing reuses the parameter block used in the `PPCInform` function, so the `sessRefNum` field already contains the session reference number needed by the `PPCAccept` function.

**Listing 11-10** Accepting a session request using the `PPCAccept` function

```
PROCEDURE DoPPCAccept(pb: PPCParamBlockPtr);
VAR
   err:  OSErr;
BEGIN {accept the session}
   pb^.acceptParam.ioCompletion := @MyAcceptCompProc;
   {the sessRefNum field is set by the PPCInform function}
   err := PPCAccept(@pb^.acceptParam, TRUE); {asynchronous}
END;
```

For each function that you use asynchronously, you should provide a completion routine. Listing 11-11 illustrates a completion routine for a `PPCAccept` function. This procedure gets called at interrupt time when the `PPCAccept` function completes. If there are no errors, it sets the global variable `gSessionOpen` to `TRUE`. The global variable `gPBInUse` is set to `FALSE` to inform the application that the parameter block and the records it points to are no longer in use.

You can use the session reference number in subsequent `PPCWrite`, `PPCRead`, and `PPCEnd` functions once a session is accepted.

**Listing 11-11** Completion routine for a `PPCAccept` function

```
PROCEDURE MyAcceptCompProc(pb: PPCParamBlockPtr);
BEGIN
   IF pb^.acceptParam.ioResult = noErr THEN
      {accept completed so the session is completely open}
      gSessionOpen := TRUE;
   {use a global to tell the application that PPCParamBlockRec }
   { and the records it points to can be deallocated}
   gPBInUse := FALSE;
END;
```

Use the `PPCReject` function to reject an incoming session request. Listing 11-12 illustrates how you use the `PPCReject` function to reject a session request.

This listing reuses the parameter block used in the `PPCInform` function, so the `sessRefNum` field already contains the session reference number needed by the `PPCReject` function.

**Listing 11-12** Rejecting a session request using the `PPCReject` function

```
PROCEDURE DoPPCReject(pb: PPCParamBlockPtr);
VAR
   err:  OSErr;
BEGIN {reject the session}
   WITH pb^.rejectParam DO
   BEGIN
      ioCompletion := @MyRejectCompProc;
      {the sessRefNum field is set by the PPCInform function}
      rejectInfo := -1;
   END;
   err := PPCReject(@pb^.rejectParam, TRUE); {asynchronous}
END;
```

Listing 11-13 illustrates a completion routine for a `PPCReject` function. This procedure is called at interrupt time when the `PPCReject` function completes. In this example, the global variable `gPBInUse` is set to `FALSE` to inform the application that the parameter block and the records it points to are no longer in use.

**Listing 11-13** Completion routine for a `PPCReject` function

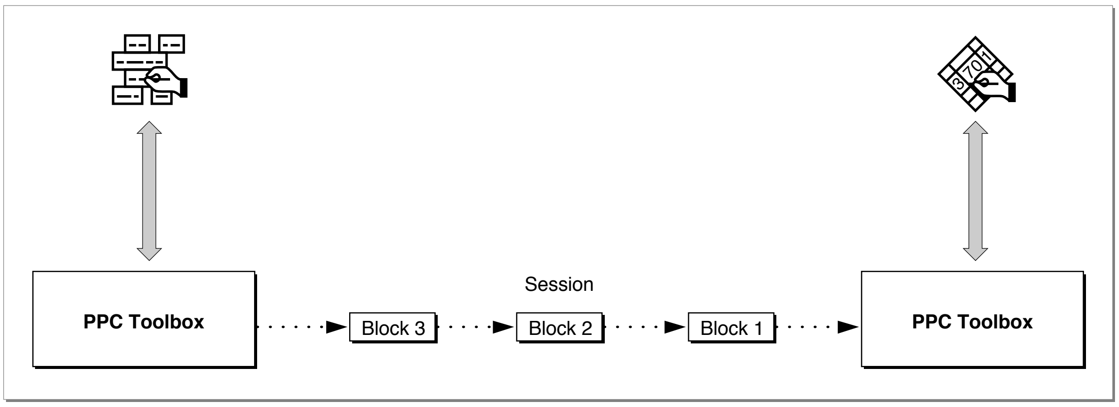
```
PROCEDURE MyRejectCompProc(pb: PPCParamBlockPtr);
BEGIN
   {use a global to tell the application that PPCParamBlockRec }
   { and the records it points to can be deallocated}
   gPBInUse := FALSE;
END;
```

## Exchanging Data During a PPC Session

After a session begins, each application can send data to and receive data from the other using a sequence of message blocks. The PPC Toolbox treats each message block as a byte stream and does not interpret the contents of the message block. The size of a message block can be between 0 and ($2^{32}$–1) bytes. The PPC Toolbox treats the buffer size as an unsigned long integer.

The PPC Toolbox delivers the message blocks in the same sequence as they are sent and without duplicates. In Figure 11-17, an application transmits message blocks during a session.

**Figure 11-17** Transmitting message blocks



For each message block, you specify a block creator, block type, and user data. The first `PPCWrite` function that you use to create a new message block sets the attributes for the block. The `PPCRead` function returns the block creator, block type, and user data attributes for the current message block when the call completes.

Although the PPC Toolbox does not interpret these attributes, they can give the receiving application information about how to process the contents of the message block. For example, a database application may specify, in the block creator field, a counter to indicate the block number (block number 20 of 30 total blocks). This application could also specify a code, such as `'DREC'`, in the block type field to indicate that the information it contains is a database record. In addition, this application could specify, in the user data field, the length of the message block.

## Reading Data From an Application

An application can both read from and write data to another application during a session. Use the `PPCRead` function during a session to read incoming blocks of data from another application.

Once a session is initiated, you should have a `PPCRead` function pending. You can issue a `PPCRead` function from inside a completion routine. This provides you with immediate notification if an error condition arises or the session closes.

The `blockCreator`, `blockType`, and `userData` fields are returned for the block you are reading. (These fields are set by the `PPCWrite` function.) To determine whether there is additional data to be read, check the `more` field. The value `FALSE` indicates the end of a message block.

Listing 11-14 illustrates how you use the `PPCRead` function to read data during a session.

**Listing 11-14** Using the `PPCRead` function to read data during a session

```
FUNCTION MyPPCRead(thePPCReadPBPtr: PPCReadPBPtr;
                     theSessRefNum: PPCSessRefNum;
                     theBufferLength: Size;
                     theBufferPtr: Ptr): OSErr;
BEGIN
   WITH thePPCReadPBPtr^ DO
   BEGIN
      ioCompletion := NIL;
      sessRefNum := theSessRefNum;  {from PPCStart or PPCInform}
      bufferLength := theBufferLength;
      bufferPtr := theBufferPtr;
   END;
   MyPPCRead := PPCRead(thePPCReadPBPtr, TRUE); {asynchronous}
END;
```

You should make any calls to `PPCRead` asynchronously. You can provide a completion routine that will be called when the `PPCRead` function has completed, or you can poll the `ioResult` field of the PPC parameter block to determine whether the `PPCRead` function has completed. A `PPCRead` completion routine can issue another asynchronous PPC Toolbox call or set global variables. If another PPC Toolbox call is made from a completion routine, then the `PPCRead` function must use a record of data type `PPCParamBlockRec` instead of type `PPCReadPBRec`.

Listing 11-15 illustrates a function that can be used to poll the `ioResult` field of a record of data type `PPCReadPBRec`. The function returns `TRUE` when the `PPCRead` function associated with `PPCReadPBRec` has completed.

**Listing 11-15** Polling the `ioResult` field to determine if a `PPCRead` function has completed

```
FUNCTION MyReadComplete(thePPCReadPBPtr: PPCReadPBPtr;
                        VAR err: OSErr): Boolean;
BEGIN
   err := thePPCReadPBPtr^.ioResult;
   MyReadComplete := err <> 1;
END;
```

## Sending Data to an Application

Use the PPCWrite function to send a message block during a session specified by the session reference number.

You should call the PPCWrite function asynchronously. You can provide a completion routine that will be called when the PPCWrite function has completed, or you can poll the ioResult field of the PPC parameter block to determine whether the PPCWrite function has completed. A PPCWrite completion routine can issue another PPC Toolbox call or set global variables. If another PPC Toolbox call is made from a completion routine, then the PPCWrite function must use a record of data type PPCParamBlockRec instead of type PPCWritePBRec. Note that message blocks are sent in the order in which they are written.

Listing 11-16 illustrates how you use the PPCWrite function to write data during a session.

**Listing 11-16** Using the PPCWrite function to write data during a session

```
FUNCTION MyPPCWrite(thePPCWritePBPtr: PPCWritePBPtr;
                   theSessRefNum: PPCSessRefNum;
                   theBufferLength: Size;
                   theBufferPtr: Ptr): OSErr;
BEGIN
   WITH thePPCWritePBPtr^ DO
   BEGIN
      ioCompletion := NIL;
      sessRefNum := theSessRefNum;  {from PPCStart or PPCInform}
      bufferLength := theBufferLength;
      bufferPtr := theBufferPtr;
      more := FALSE;           {no more data to read}
      userData := 0;           {application-specific data}
      blockCreator := '????'; {application-specific data}
      blockType := '????';    {application-specific data}
   END;
   MyPPCWrite := PPCWrite(thePPCWritePBPtr, TRUE); {asynchronous}
END;
```

The first PPCWrite function that you use to create a new message block sets the block creator, block type, and user data attributes for the block. These attributes are returned to the application when it reads from the message block. Set the more field to FALSE to indicate the end of the message block or set this field to TRUE if you want to append additional data to a message block.

Listing 11-17 illustrates a function that can be used to poll the `ioResult` field of a record of data type `PPCWritePBRec`. The function returns `TRUE` when the `PPCWrite` function associated with `PPCWritePBRec` has completed.

**Listing 11-17** Polling the `ioResult` field to determine if a `PPCWrite` function has completed

```
FUNCTION MyWriteComplete(thePPCWritePBPtr: PPCWritePBPtr;
                         VAR err: OSErr): Boolean;
BEGIN
   err := thePPCWritePBPtr^.ioResult;
   MyWriteComplete := err <> 1;
END;
```

## Ending a Session and Closing a Port

After data is written and read in, use the `PPCEnd` function to end the session (identified by the session reference number). You may receive an error if you use the `PPCEnd` function to end a session that has already been terminated.

Listing 11-18 illustrates how you use the `PPCEnd` function to end a session.

**Listing 11-18** Ending a PPC session using the `PPCEnd` function

```
FUNCTION MyPPCEnd(theSessRefNum: PPCSessRefNum): OSErr;
VAR
   thePPCEndPBRec: PPCEndPBRec;
BEGIN
   thePPCEndPBRec.sessRefNum := theSessRefNum;
   MyPPCEnd := PPCEnd(@thePPCEndPBRec, FALSE);     {synchronous}
END;
```

The `PPCEnd` function causes all calls to the `PPCRead` and `PPCWrite` functions to complete (with a `sessClosedErr` result code) and invalidates the session reference number. The `PPCEnd` function also releases any PPC Toolbox resources so that they can be reused.

Use the `PPCClose` function to close the port specified by the port reference number. When you close a port, all sessions associated with a port are ended. Any active asynchronous calls associated with a session then call their completion routines (if they have one).

Listing 11-19 illustrates how you use the `PPCClose` function to close a port.

**Listing 11-19** Closing a PPC port using the `PPCClose` function

```
FUNCTION MyPPCClose(thePortRefNum: PPCPortRefNum): OSErr;
VAR
   theClosePBRec: PPCClosePBRec;
BEGIN
   theClosePBRec.portRefNum := thePortRefNum;      {from PPCOpen}
   MyPPCClose := PPCClose(@theClosePBRec, FALSE);  {synchronous}
END;
```

In this example, the call to `PPCClose` is made synchronously.

## Invalidating Users

It is your responsibility to invalidate all user reference numbers obtained with the `StartSecureSession` function before your application quits. However, while your application remains open, you may want to keep track of a user reference number to start a session with a port, end it, and then later start another session with the same port.

Use the `DeleteUserIdentity` function to invalidate the user reference number for a particular user.

```
err := DeleteUserIdentity (userRef);
```

The `DeleteUserIdentity` function removes a user by invalidating the specified user reference number. Note that you cannot invalidate the guest reference number (0) and, in most cases, you should not dispose of the default user reference number.

Listing 11-20 illustrates how you use the `DeleteUserIdentity` function to invalidate a user reference number obtained from a `StartSecureSession` function. The sample code does not invalidate the user reference number if it is either the default user reference number or the guest reference number (0).

**Listing 11-20** Using the `DeleteUserIdentity` function to invalidate a user identity

```
FUNCTION MyDeleteNewUserRefNum(newUserRef: LongInt): OSErr;
VAR
   err:           OSErr;
   defUserRef:    LongInt;
   defUserName:   Str32;
BEGIN
   IF newUserRef <> 0 THEN
   BEGIN {user reference number passed was not the guest}
      err := GetDefaultUser(defUserRef, defUserName);
      IF err = noErr THEN
      BEGIN    {there is a default user}
         IF newUserRef <> defUserRef THEN
            {new user ref number isn't the default user ref num, }
            { so ok to delete}
            err := DeleteUserIdentity(newUserRef);
      END
      ELSE     {there is no default, so delete new user ref num}
         err := DeleteUserIdentity(newUserRef);
      MyDeleteNewUserRefNum := err;
   END
   ELSE {user reference number passed was the guest}
      MyDeleteNewUserRefNum := noErr;
END;
```

## PPC Toolbox Reference

This section describes the data structures and routines that are specific to the PPC Toolbox. The section “PPC Toolbox Routines” beginning on page 11-51 describes PPC Toolbox routines. “Application-Defined Routines” beginning on page 11-78 describes completion routines and port filter functions.

### Data Structures

This section describes the PPC parameter block, PPC port record, location name record, and port information record.

#### The PPC Toolbox Parameter Block

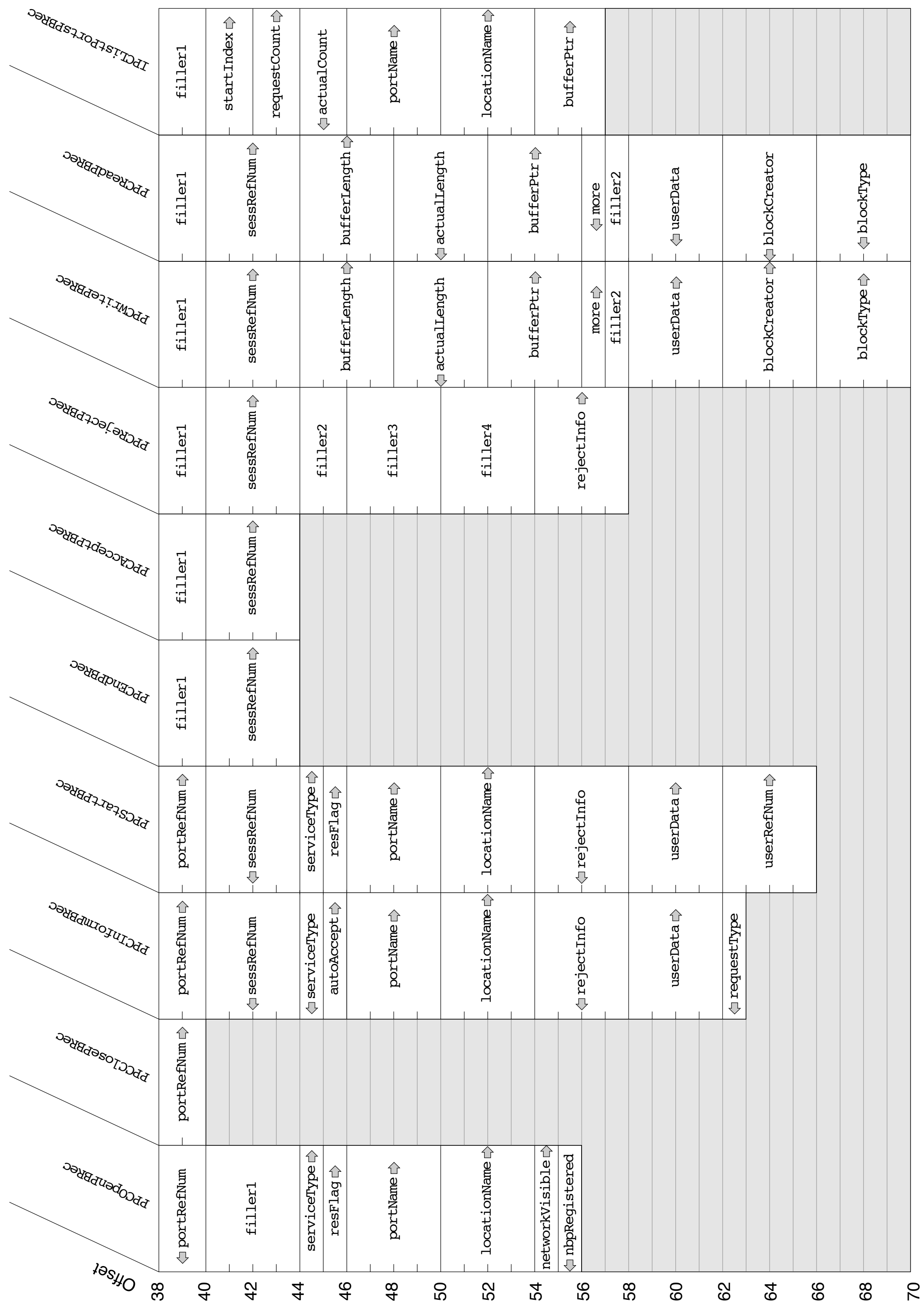
PPC Toolbox functions require a pointer to a PPC parameter block. You must fill out any fields of the parameter block that the specific PPC Toolbox function requires.

```
TYPE PPCParamBlockRec =
   RECORD
      CASE Integer OF
      0: (openParam:       PPCOpenPBRec);       {PPCOpen params}
      1: (informParam:     PPCInformPBRec);     {PPCInform params}
      2: (startParam:      PPCStartPBRec);      {PPCStart params}
      3: (acceptParam:     PPCAcceptPBRec);     {PPCAccept params}
      4: (rejectParam:     PPCRejectPBRec);     {PPCReject params}
      5: (writeParam:      PPCWritePBRec);      {PPCWrite params}
      6: (readParam:       PPCReadPBRec);       {PPCRead params}
      7: (endParam:        PPCEndPBRec);        {PPCEnd params}
      8: (closeParam:      PPCClosePBRec);      {PPCClose params}
      9: (listPortsParam:  IPCListPortsPBRec);  {IPCListPorts }
                                                { params}
   END;
```

Figure 11-18 on the next page shows the PPC Toolbox parameter blocks. Note that the reserved fields are not included in the illustration. The `qLink`, `csCode`, `intUse`, `intUsePtr`, and reserved fields are used internally by the PPC Toolbox. Your application should not rely on the PPC Toolbox to preserve these fields across calls.

Your application transfers ownership of the PPC Toolbox parameter block (and any buffers or records pointed to by the PPC Toolbox parameter block) to the PPC Toolbox until a PPC function is complete. Once the function completes, ownership of the parameter block (and any buffers or records it points to) is transferred back to your application. If a PPC Toolbox function is executed asynchronously, your program cannot alter memory that might be used by the PPC Toolbox until that function completes.

**Figure 11-18** The PPC Toolbox parameter blocks



A PPC Toolbox function that is executed asynchronously must specify `NIL` or the address of a completion routine in the `ioCompletion` field of the PPC parameter block. The `ioResult` field should be used to determine the actual result code when an asynchronously executed PPC Toolbox function completes. If you specify a completion routine in the `ioCompletion` field, it is called at interrupt time when the PPC Toolbox function completes execution. See page 11-78 for the routine declaration for a completion routine.

## The PPC Port Record

A PPC port name is defined by a PPC port record. The `PPCPortRec` data type defines the PPC port record.

```
TYPE PPCPortRec =
   RECORD
      nameScript:       ScriptCode;       {script identifier}
      name:             Str32;            {port name in program }
                                          { linking dialog box}
      portKindSelector: PPCPortKinds;     {general category of }
                                          { application}
      CASE PPCPortKinds OF
                        ppcByString:      (portTypeStr: Str32);
                        ppcByCreatorAndType:
                                          (portCreator: OSType;
                                          portType: OSType);
   END;
```

**Field descriptions**

| | |
|---|---|
| `nameScript` | An integer script code. |
| `name` | A string that designates the application name. |
| `portKindSelector` | An integer that selects the kind of type string (either `ppcByString` or `ppcByCreatorAndType`). |
| `portTypeStr` | If the `portKindSelector` field specifies `ppcByString`, the `portTypeStr` field contains a 32-byte character string. |
| `portCreator` | If the `portKindSelector` field specifies `ppcByCreatorAndType`, the `portCreator` field contains a 4-character creator code. |
| `portType` | If the `portKindSelector` field specifies `ppcByCreatorAndType`, the `portType` field contains a 4-character type code. |

To open a port, you need to specify a port name. As previously described, a port name consists of a script code, a name string, and a type string. For example, you can designate “smRoman” as the script code, “make memo” as the application’s name string, and “word processor” as its type string.

## The Location Name Record

A location name identifies the location of a computer on the network. A location name is specified in the standard Name-Binding Protocol (NBP) form, <*object string*>:PPCToolBox @<*AppleTalk zone*>. The object string is the name provided in the Sharing Setup control panel in the Control Panels folder. By default, the type string is "PPCToolBox". The AppleTalk zone is the zone to which the particular Macintosh computer belongs. For example, "Jane Doe's Macintosh:PPCToolBox@twilight" specifies the object string, type string, and AppleTalk zone for a particular computer.

The `LocationNameRec` data type defines the location name record. The `locationKindSelector` field can be set to `ppcNoLocation`, `ppcNBPLocation`, or `ppcNBPTypeLocation`.

```
TYPE LocationNameRec =
   RECORD
      locationKindSelector: PPCLocationKind;    {which variant}
      CASE PPCLocationKind OF
         {ppcNoLocation: storage not used by this value}
         ppcNBPLocation:
                        (nbpEntity: EntityName); {NBP name entity}
         ppcNBPTypeLocation:
                        (nbpType: Str32); {just the NBP type }
                                          { string for the }
                                          { PPCOpen function}
   END;
```

**Field descriptions**

`locationKindSelector`
: An integer that determines how the location is specified. You can use either of the constants `ppcNBPLocation` or `ppcNBPTypeLocation`. (The PPC Toolbox uses the constant `ppcNoLocation` when the location received from or passed to a PPC Toolbox function is the location of the local machine.)

`nbpEntity`
: If the `locationKindSelector` field specifies `ppcNBPLocation`, the `nbpEntity` field specifies a full NBP entity name.

`nbpType`
: If the `locationKindSelector` field specifies `ppcNBPTypeLocation`, the `nbpType` field specifies an alias location name. This location kind is used only by the `PPCOpen` function when an alias location name is needed.

**Note**
You should assign an NBP value directly—do not pack it using `nbpSetEntity`. ◆

## The Port Information Record

A port information record identifies whether a particular port requires authentication and specifies the port's port name. Both the `PPCBrowser` and `IPCListPorts` functions return information about ports using port information records. In addition, if you provide a port filter function, the PPC Toolbox provides information to your function about the current port in a port information record. The `PortInfoRec` data type defines a port information record.

```
TYPE PortInfoRec =
   RECORD
      filler1:       SignedByte;       {space holder}
      authRequired:  Boolean;          {authentication required}
      name:          PPCPortRec;       {port name}
   END;
```

**Field descriptions**

| | |
|---|---|
| `filler1` | Reserved. |
| `authRequired` | Specifies whether the port requires authentication. This field is `TRUE` if the port requires authentication before a session can begin. Otherwise, this field is `FALSE`. |
| `name` | Specifies an available port name. |

For information on the `PPCBrowser` and `IPCListPorts` functions, see page 11-52 and page 11-54, respectively. For information on port filter functions, see page 11-78.

## PPC Toolbox Routines

This section describes the routines for

- initializing the PPC Toolbox
- displaying the program linking dialog box
- listing available ports
- opening and closing a port
- starting and ending a session
- accepting and rejecting a session
- reading and writing data
- obtaining the default user reference number and name
- invalidating a user reference number

Result codes appear after each function where applicable.

## Initializing the PPC Toolbox

You use the `PPCInit` function to initialize the PPC Toolbox.

### PPCInit

Use the `PPCInit` function to initialize the PPC Toolbox.

```
FUNCTION PPCInit: OSErr;
```

**DESCRIPTION**

After initialization, most PPC Toolbox routines can execute either synchronously or asynchronously.

Note that a `noGlobalsErr` result code indicates that the PPC Toolbox is not loaded properly.

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `PPCInit` function are

| Trap macro | Selector |
|---|---|
| `_PPCBrowser` | $0000 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |

## Using the Program Linking Dialog Box

You can use either the `PPCBrowser` function or the `IPCListPorts` function to locate a port to communicate with. Use the `PPCBrowser` function to display the program linking dialog box. For the description of `IPCListPorts`, see page 11-54.

## PPCBrowser

Use the `PPCBrowser` function to display the program linking dialog box, which allows a user to select a port to communicate with.

```
FUNCTION PPCBrowser (prompt: Str255; applListLabel: Str255;
                     defaultSpecified: Boolean;
                     VAR theLocation: LocationNameRec;
                     VAR thePortInfo: PortInfoRec;
                     portFilter: PPCFilterProcPtr;
                     theLocNBPType: Str32): OSErr;
```

`prompt` A line of text that the `PPCBrowser` function displays as a prompt in the program linking dialog box. If you specify `NIL` or an empty string is passed, the default prompt "Choose a program to link to:" is used.

`applListLabel`
The title of the list of PPC ports. If you specify `NIL` or an empty string is passed, the default title "Programs" is used.

`defaultSpecified`
A value that determines which port is initially selected in the program linking dialog box. If you specify `TRUE`, you must provide information in the parameters `theLocation` and `thePortInfo`. In this case, the `PPCBrowser` function tries to select the PPC port specified by the parameters `theLocation` and `thePortInfo` when the program linking dialog box first appears. If you specify `FALSE`, the `PPCBrowser` function selects the first port in the list and you can leave the location name record and the port information record (in the parameters `theLocation` and `thePortInfo`) uninitialized.

`theLocation`
The port location. For information on this data structure, see "The Location Name Record" on page 11-49.

`thePortInfo`
The port name. For information on this data structure, see "The Port Information Record" on page 11-50.

`portFilter`
Determines how the list of PPC ports is filtered. If this parameter is `NIL`, the names of all existing PPC ports are displayed. If this parameter isn't `NIL`, it must be a pointer to a port filter function.

`theLocNBPType`
The NBP type passed to `NBPLookup` to generate the list of computers. If you specify `NIL` or an empty string is passed, the default, "PPCToolBox", is used.

**DESCRIPTION**

The `PPCBrowser` function builds the list of ports and then displays the program linking dialog box.

If you set the `defaultSpecified` parameter to `TRUE`, the `PPCBrowser` function tries to select the PPC port specified by the parameters `theLocation` and `thePortInfo` when the program linking dialog box first appears. The `locationKindSelector` field in the location name record must be set to the `ppcNoLocation` constant (which specifies the local computer) or the `ppcNBPLocation` constant (which specifies the NBP object and NBP zone). The `ppcNBPTypeLocation` constant is not supported for matching. When matching the location, only the object string and the zone string of the entity name are used—the type string is ignored. When matching the port, the entire PPC port record (script, name, and port type) is used in the port information record. The `authRequired` field of the port information record is ignored.

The parameter `theLocNBPType` of the `PPCBrowser` function specifies the NBP type passed to `NBPLookup` to generate the list of computers. If you specify `NIL` or an empty string is passed, the default, "PPCToolBox", is used. Note that the current computer is always included in the list of computers (even if a location with the specified type does not exist for it). If the parameter `theLocNBPType` contains either of the NBP wildcard characters (= or ≈), the `PPCBrowser` function returns a `paramErr` result code.

If the `PPCBrowser` function returns `noErr`, the parameters `theLocation` and `thePortInfo` specify the port chosen by the user. If the `PPCBrowser` function returns a `userCanceledErr` result code, the user clicked the Cancel button, and no port was selected. If the function returns a `memFullErr` result code, there was not enough memory to load the `PPCBrowser` package, and the dialog box did not appear.

**Note**
You must not call the `PPCBrowser` function from an application that is running in the background, since this function displays a dialog box on the user's screen. ◆

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `paramErr` | –50 | Illegal parameter |
| `memFullErr` | –108 | Not enough memory to load `PPCBrowser` package |
| `userCanceledErr` | –128 | User decided not to conduct a session |

**SEE ALSO**

For an example of the use of the `PPCBrowser` function, see Listing 11-4 on page 11-26. For an example of the program linking dialog box, see Figure 11-12 on page 11-22. For information on port filter functions, see page 11-78.

## Obtaining a List of Ports

Use the `IPCListPorts` function to generate a list of existing ports without displaying a dialog box. The `IPCListPortsPBRec` data type defines the parameter block used by the `IPCListPorts` function.

### IPCListPorts

Use the `IPCListPorts` function to generate a list of existing ports without displaying a dialog box.

```
FUNCTION IPCListPorts (pb: IPCListPortsPBPtr;
                       async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to an `IPCListPorts` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `startIndex` | `Integer` | Index to the port entry list |
| → | `requestCount` | `Integer` | Number of port names requested |
| ← | `actualCount` | `Integer` | Number of port names returned |
| → | `portName` | `PPCPortPtr` | Pointer to a `PPCPortRec` |
| → | `locationName` | `LocationNamePtr` | Pointer to a `LocationNameRec` |
| → | `bufferPtr` | `PortInfoArrayPtr` | Pointer to an array of `PortInfoRec` |

**DESCRIPTION**

If your application calls the `IPCListPorts` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

If you call the `IPCListPorts` function asynchronously, you must not change any of the fields in the parameter block until the call completes. The port name, location name, and buffer pointed to by `IPCListPortsPBRec` are owned by the PPC Toolbox until the call completes. These objects must not be deallocated or moved in memory while the call is in progress.

The `startIndex` field specifies the index to the list of ports on the remote machine from which the PPC Toolbox begins to get the list. In most cases, you'll want to start at the beginning, so set the `startIndex` field to 0. The `requestCount` field specifies the maximum number of port information records that can fit into your buffer.

The `actualCount` field returns the actual number of entries returned. Your program can use the `IPCListPorts` function repeatedly to obtain the entire list of ports. Ports that are not visible to the network are not included in the ports listing on a remote machine. (If you specify `FALSE` for the `networkVisible` field in the `PPCOpen` function, the port is not included in the listing of available ports across a network.)

The `portName` field must contain a pointer to a PPC port record that specifies which PPC ports to list. You can specify particular values in the PPC port record or you can use an equal sign (=) in the name or the `portTypeStr` fields as a wildcard to match all port names or port types.

The `locationName` field should contain a pointer to a location name record that designates the computer that contains the PPC ports you want returned. If the `locationKindSelector` field in the location name record is `ppcNoLocation` or if the `locationName` pointer is `NIL`, then the location is the local machine. If the `locationKindSelector` field in the location name record is `ppcNBPLocation`, then the location is a remote machine designated by the location name record's `nbpEntity` field.

The `IPCListPorts` function returns an array (list) of port information records in the area of memory pointed to by `bufferPtr`. Make sure that the buffer pointed to by the `bufferPtr` field is at least `sizeof(PortInfoRec) * requestCount`.

### ASSEMBLY-LANGUAGE INFORMATION

The trap macro and routine selector for the `IPCListPorts` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $000A |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `nameTypeErr` | –902 | Invalid or inappropriate `locationKindSelector` in location name |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `localOnlyErr` | –905 | Network activity is currently disabled |
| `sessTableErr` | –907 | PPC Toolbox is unable to create a session |
| `noResponseErr` | –915 | Unable to contact application |
| `badPortNameErr` | –919 | PPC port record is invalid |
| `networkErr` | –925 | An error has occurred in the network |
| `badLocNameErr` | –931 | Location name is invalid |

**SEE ALSO**

For an example of the use of the `IPCListPorts` function, see Listing 11-5 on page 11-28.

## Opening and Closing a Port

You open a port using the `PPCOpen` function and close a port using the `PPCClose` function.

### PPCOpen

You open a port using the `PPCOpen` function.

```
FUNCTION PPCOpen (pb: PPCOpenPBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCOpen` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| ← | `portRefNum` | `PPCPortRefNum` | Port reference number of port opened |
| → | `serviceType` | `PPCServiceType` | Service type requested—must be `ppcServiceRealTime` |
| → | `resFlag` | `SignedByte` | Reserved field—must be 0 |
| → | `portName` | `PPCPortPtr` | Pointer to a `PPCPortRec` |
| → | `locationName` | `LocationNamePtr` | Pointer to a `LocationNameRec` |
| → | `networkVisible` | `Boolean` | Make this port network visible |
| ← | `nbpRegistered` | `Boolean` | Port location was registered on the network |

**DESCRIPTION**

If your application calls the `PPCOpen` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

If you call the `PPCOpen` function asynchronously, you must not change any of the fields in the parameter block until the call completes. The port name and location name pointed to by the `PPCOpen` parameter block record are owned by the PPC Toolbox until the call completes. These objects must not be deallocated or moved in memory while the call is in progress.

The `portRefNum` field returns the PPC port identifier. Use this port reference number to initiate a session for this particular port. Set the `serviceType` field to indicate that this port accepts sessions in real time. For System 7, this field must always be set to the `ppcServiceRealTime` constant. You must set the `resFlag` field to 0.

The `portName` field must contain a pointer to a PPC port record that specifies the name of the PPC port to be opened.

The `locationName` field should contain a pointer to a location name record that designates the location of the PPC port to be opened. If the `locationName` pointer is `NIL`, then the default name PPC Toolbox is used. If a location name record is used, then the `locationKindSelector` field in the location name record must be `ppcNBPTypeLocation`, and an alias location name specified by the location name record's `nbpType` field is used.

The `networkVisible` field indicates whether the port should be made visible (for browsing as well as incoming network requests). If you specify `FALSE`, this port is not visible in the listing of available ports across a network (although it is still included within the local machine's listing of available ports).

The `nbpRegistered` field returns `TRUE` if the location name specified was registered on the network.

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `PPCOpen` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $0001 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector (1) |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

RESULT CODES

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `nameTypeErr` | –902 | Invalid or inappropriate `locationKindSelector` in location name |
| `noPortErr` | –903 | Unable to open port or bad port reference number |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `badReqErr` | –909 | Bad parameter or invalid state for this operation |
| `portNameExistsErr` | –910 | Another port is already open with this name |
| `badPortNameErr` | –919 | PPC port record is invalid |
| `badServiceMethodErr` | –930 | Service method is other than `ppcServiceRealTime` |
| `badLocNameErr` | –931 | Location name is invalid |
| `nbpDuplicateName` | –1027 | Location name represents a duplicate on this computer |

SEE ALSO

For an example of the use of the `PPCOpen` function, see Listing 11-2 on page 11-21.

## PPCClose

You use the `PPCClose` function to close the port specified by the port reference number.

```
FUNCTION PPCClose (pb: PPCClosePBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCClose` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `portRefNum` | `PPCPortRefNum` | Port reference number of port to close |

**DESCRIPTION**

If your application calls this function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

The `portRefNum` field specifies the PPC port identifier of the port to close. The port reference number must be a valid port reference number returned from a previous call to the `PPCOpen` function.

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `PPCClose` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $0009 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `noPortErr` | –903 | Bad port reference number |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |

**SEE ALSO**

For an example of the use of the `PPCClose` function, see Listing 11-19 on page 11-44.

## Starting and Ending a Session

You use the `PPCStart` or `StartSecureSession` function to initiate a session with another port, and you use the `PPCEnd` function to end a session.

## PPCStart

The `PPCStart` function initiates a session with the destination port specified in the name and location fields.

```
FUNCTION PPCStart (pb: PPCStartPBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCStart` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `portRefNum` | `PPCPortRefNum` | Port reference number of this session |
| ← | `sessRefNum` | `PPCSessRefNum` | Session reference number of this session |
| → | `serviceType` | `PPCServiceType` | Service type requested—must be `ppcServiceRealTime` |
| → | `resFlag` | `SignedByte` | Reserved field—must be 0 |
| → | `portName` | `PPCPortPtr` | Pointer to a `PPCPortRec` |
| → | `locationName` | `LocationNamePtr` | Pointer to a `LocationNameRec` |
| ← | `rejectInfo` | `LongInt` | Value from `PPCReject` if session was rejected |
| → | `userData` | `LongInt` | Application-specific data |
| → | `userRefNum` | `LongInt` | User reference number |

**DESCRIPTION**

If your application calls the `PPCStart` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time, since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

If you call the `PPCStart` function asynchronously, you must not change any of the fields in the parameter block until the call completes. The port name and location name pointed to by the `PPCStart` parameter block record are owned by the PPC Toolbox until the call completes. These objects must not be deallocated or moved in memory while the call is in progress.

You specify the PPC port identifier in the portRefNum field. The port reference number is a reference number for the port through which you are requesting a session. The value you specify must correspond to the port reference number returned from the PPCOpen function.

The sessRefNum field returns a session identifier. This number, which is provided by the PPC Toolbox, is used while data is being exchanged to identify a particular session. You must set the serviceType field to indicate that the session is to be connected in real time. For System 7, this field must always be set to the ppcServiceRealTime constant. You must set the resFlag field to 0.

The portName field must contain a pointer to a PPC port record. The locationName field should contain a pointer to a location name record or NIL. The PPC port record and the location name record specify the name and location of the PPC port to initiate a session with, and they are usually obtained from the PPCBrowser function. If the locationKindSelector field in the location name record is ppcNoLocation or if the locationName pointer is NIL, then the location is the local machine. If the locationKindSelector field in the location name record is ppcNBPLocation, then the location is a remote machine designated by the location name record's nbpEntity field.

If the ioResult field of the PPC parameter block returns a userRejectErr result code, the rejectInfo field contains the same value as the rejectInfo field in the PPCReject parameter block. The rejectInfo field is defined by your application.

The initiating port can specify any information in the userData field. The PPCInform function reports this data to the responding port upon its completion.

The userRefNum field specifies an authenticated user. The authentication mechanism of the PPC Toolbox identifies each user through an assigned name and a password. A user reference number of 0 indicates that you want to specify a guest.

#### ASSEMBLY-LANGUAGE INFORMATION

The trap macro and routine selector for the PPCStart function are

| **Trap macro** | **Selector** |
|---|---|
| _PPC | $0002 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `nameTypeErr` | –902 | `locationKindSelector` is not `ppcNBPLocation` or `ppcNoLocation` |
| `noPortErr` | –903 | Bad port reference number |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `localOnlyErr` | –905 | Network activity is currently disabled |
| `destPortErr` | –906 | Port does not exist at destination |
| `sessTableErr` | –907 | PPC Toolbox is unable to create a session |
| `noUserNameErr` | –911 | User name unknown on destination machine |
| `userRejectErr` | –912 | Destination rejected the session request |
| `noResponseErr` | –915 | Unable to contact application |
| `portClosedErr` | –916 | The port was closed |
| `badPortNameErr` | –919 | PPC port record is invalid |
| `networkErr` | –925 | An error has occurred in the network |
| `noInformErr` | –926 | `PPCStart` failed because target application did not have an inform pending |
| `authFailErr` | –927 | User's password is wrong |
| `noUserRecErr` | –928 | Invalid user reference number |
| `badServiceMethodErr` | –930 | Service method is other than `ppcServiceRealTime` |
| `guestNotAllowedErr` | –932 | Destination port requires authentication |

**SEE ALSO**

For an example of the use of the `PPCStart` function, see Listing 11-7 on page 11-34.

## StartSecureSession

The `StartSecureSession` function prompts for user name and password and calls `PPCStart`—all in one synchronous procedure call. Use the `StartSecureSession` function whenever a port destination requires authentication.

```
FUNCTION StartSecureSession (pb: PPCStartPBPtr;
                             VAR userName: Str32;
                             useDefault: Boolean;
                             allowGuest: Boolean;
                             VAR guestSelected: Boolean;
                             prompt: Str255): OSErr;
```

`pb` A pointer to a `PPCStart` parameter block.

`userName` A pointer to a 32-byte character string to be displayed as the user's name.

`useDefault`
A Boolean value that indicates whether you want the `StartSecureSession` function to use the default user identity (and possibly prevent the user identity dialog box from appearing). If so, specify `TRUE`; otherwise, specify `FALSE`.

`allowGuest`
: A Boolean value that determines whether the Guest radio button in the user identity dialog box is active (`TRUE`) or inactive (`FALSE`).

`guestSelected`
: Returns `TRUE` if the user has logged on as a guest.

`prompt`
: A line of text that the dialog box displays in place of the default prompt. Specify `NIL` or an empty string to use the default prompt.

**DESCRIPTION**

Your program fills out a parameter block just as though it were calling the `PPCStart` function. You specify all input fields in the parameter block except for the `userRefNum` field. The `userRefNum` field is returned when the `StartSecureSession` function successfully completes.

The `userName` parameter is a pointer to a 32-byte character string to be displayed as the user's name. If the Pascal string length is 0, the default user name is used. The default user name is the name specified in the Sharing Setup control panel. The default user name is returned in the `userName` buffer.

Set the `useDefault` parameter to `TRUE` if you want the `StartSecureSession` function to use the default user identity (and possibly prevent the user identity dialog box from appearing). The `allowGuest` parameter specifies whether the Guest radio button in the user identity dialog box is active. You usually set it to the inverse of the `authRequired` field in the port information record. For example, if `authRequired` is `TRUE`, then `allowGuest` should be set to `FALSE`.

The `guestSelected` parameter returns `TRUE` if the user has logged on as a guest. The `prompt` parameter of the `StartSecureSession` function allows you to specify a line of text that the dialog box can display. Specify `NIL` or an empty string for the `prompt` parameter to enable the PPC Toolbox to use the default prompt. The PPC Toolbox uses the default string "Link to <*port name*> on <*object string*> as:". The port name is obtained from the name string of the port name, and the object string is obtained from the object string of the location name.

**Note**
Do not call the `StartSecureSession` function from an application that is running in the background, because the function displays several dialog boxes on the user's screen. ◆

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `StartSecureSession` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $000E |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a `StartSecureParams` record |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `userCanceledErr` | –128 | User decided not to conduct a session |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `nameTypeErr` | –902 | `locationKindSelector` is not `ppcNBPLocation` or `ppcNoLocation` |
| `noPortErr` | –903 | Bad port reference number |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `localOnlyErr` | –905 | Network activity is currently disabled |
| `destPortErr` | –906 | Port does not exist at destination |
| `sessTableErr` | –907 | PPC Toolbox is unable to create a session |
| `noResponseErr` | –915 | Unable to contact application |
| `portClosedErr` | –916 | The port was closed |
| `badPortNameErr` | –919 | PPC port record is invalid |
| `noUserRefErr` | –924 | Unable to create a new user reference number |
| `networkErr` | –925 | An error has occurred in the network |
| `noInformErr` | –926 | `PPCStart` failed because target application did not have an inform pending |
| `badServiceMethodErr` | –930 | Service method is other than `ppcServiceRealTime` |
| `guestNotAllowedErr` | –932 | Destination port requires authentication |

**SEE ALSO**

For an example of the use of the `StartSecureSession` function, see "Initiating a PPC Session" beginning on page 11-29.

## PPCEnd

Use the `PPCEnd` function to end a session. This function completes all outstanding asynchronous calls associated with the session reference number.

```
FUNCTION PPCEnd (pb: PPCEndPBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCEnd` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `sessRefNum` | `PPCSessRefNum` | Session reference number of session to end |

**DESCRIPTION**

If your application calls the `PPCEnd` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

You provide a session identifier in the `sessRefNum` field to identify the session that you are terminating. The `PPCStart`, `StartSecureSession`, or `PPCInform` function returns the session reference number.

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `PPCEnd` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $0008 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `noSessionErr` | –908 | Invalid session reference number |

**SEE ALSO**

For an example of the use of the `PPCEnd` function, see Listing 11-18 on page 11-43.

## Receiving, Accepting, and Rejecting a Session

You use the `PPCInform` function to receive session requests. After the `PPCInform` function completes (with the `autoAccept` field set to `FALSE`), you must accept or reject the session request using the `PPCAccept` or `PPCReject` function.

### PPCInform

As long as a port has been opened, you can call the `PPCInform` function at any time. You can have any number of outstanding `PPCInform` functions.

```
FUNCTION PPCInform (pb: PPCInformPBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCInform` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). You should execute the `PPCInform` function asynchronously. |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `portRefNum` | `PPCPortRefNum` | Port reference number of this session |
| ← | `sessRefNum` | `PPCSessRefNum` | Session reference number of this session |
| ← | `serviceType` | `PPCServiceType` | Service type of this session |
| → | `autoAccept` | `Boolean` | If `TRUE`, session is accepted automatically |
| → | `portName` | `PPCPortPtr` | Pointer to `PPCPortRec`, may be `NIL` |
| → | `locationName` | `LocationNamePtr` | Pointer to `LocationNameRec`, may be `NIL` |
| | `userName` | `StringPtr` | Pointer to `Str32`, may be `NIL` |
| ← | `userData` | `LongInt` | Application-specific data |
| ← | `requestType` | `PPCSessionOrigin` | Network or local request |

**DESCRIPTION**

If your application calls the `PPCInform` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

If you call the PPCInform function asynchronously, you must not change any of the fields in the parameter block until the call completes. The port name, location name, user name, and buffer pointed to by the record of type PPCInformPBRec are owned by the PPC Toolbox until the call completes. These objects must not be deallocated or moved in memory while the call is in progress.

You provide the PPC port identifier in the portRefNum field. A PPCOpen function returns the port identifier. The sessRefNum field returns a session identifier.

The serviceType field indicates the service type. For system software version 7.0, this field always returns the ppcServiceRealTime constant.

If you set the autoAccept field to TRUE, session requests are automatically accepted as they are received. When the PPCInform function completes execution with a noErr result code and you set the autoAccept field to FALSE, you need to accept or reject the session.

▲ **WARNING**
If the PPCInform function (with the autoAccept parameter set to FALSE) returns a noErr result code, you must call either the PPCAccept function or the PPCReject function. The computer trying to initiate a session using the StartSecureSession function or the PPCStart function waits (hangs) until the session attempt is either accepted or rejected, or until an error occurs. ▲

The portName field must contain NIL or a pointer to a PPC port record. If the portName field contains NIL, then the name of the PPC port that initiated the session is not returned. If the portName field points to a PPC port record, then the PPC port record is filled with the name of the PPC port that initiated the session when the PPCInform function completes.

The locationName field must contain NIL or a pointer to a location name record. If the locationName field contains NIL, then the location of the PPC port that initiated the session is not returned. If the locationName field points to a location name record, then the location name record is filled with the location of the PPC port that initiated the session when the PPCInform function completes. If the locationKindSelector field of the location name record returned is ppcNoLocation, then the location is the local machine. If the locationKindSelector field of the location name record returned is ppcNBPLocation, then the location is a remote machine designated by the location name record's nbpEntity field.

The userName field must contain NIL or a pointer to a 32-byte character string. If the userName field contains NIL, then the user name string is not returned. If the userName field points to a 32-byte character string, then the 32-byte character string is filled with the name of the user making the session request (if authenticated) when the PPCInform function completes.

When the PPCInform function completes, the userData field contains the user data provided by the application making the session request. This field is transparent to the PPC Toolbox. The application can send any data in this field.

When the `PPCInform` function completes, the `requestType` field contains either `ppcRemoteOrigin` or `ppcLocalOrigin`, depending on whether the session request is initiated by a computer across the network or by a port on the same computer.

#### ASSEMBLY-LANGUAGE INFORMATION

The trap macro and routine selector for the `PPCInform` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $0003 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

#### RESULT CODES

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `noPortErr` | –903 | Unable to open port or bad port reference number |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `portClosedErr` | –916 | The port was closed |

#### SEE ALSO

For an example of the use of the `PPCInform` function, see Listing 11-8 on page 11-36.

## PPCAccept

Use the `PPCAccept` function to indicate that an application is willing to accept an incoming session request after a `PPCInform` function completes.

```
FUNCTION PPCAccept (pb: PPCAcceptPBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCAccept` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `sessRefNum` | `PPCSessRefNum` | Session reference number of session to accept |

DESCRIPTION

If your application calls the `PPCAccept` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

The `sessRefNum` field specifies a session identifier. Use the session reference number returned from the completed `PPCInform` parameter block to accept the session request.

ASSEMBLY-LANGUAGE INFORMATION

The trap macro and routine selector for the `PPCAccept` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $0004 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

RESULT CODES

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `noSessionErr` | –908 | Invalid session reference number |
| `badReqErr` | –909 | Bad parameter or invalid state for this operation |

SEE ALSO

For an example of the use of the `PPCAccept` function, see "Accepting or Rejecting Session Requests" beginning on page 11-37.

## PPCReject

Use the `PPCReject` function to reject a session request after a `PPCInform` function completes.

```
FUNCTION PPCReject (pb: PPCRejectPBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCReject` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `sessRefNum` | `PPCSessRefNum` | Session reference number of session to reject |
| → | `rejectInfo` | `LongInt` | Value to return if session is rejected |

#### DESCRIPTION

If your application calls the `PPCReject` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

The `sessRefNum` field specifies a session to be rejected. This must be a valid session reference number returned from a previous `PPCInform` function. The `rejectInfo` field is an optional field. The application receiving a session request may specify any data in this field. The initiating application receives this information in the `PPCStart` parameter block.

#### ASSEMBLY-LANGUAGE INFORMATION

The trap macro and routine selector for the `PPCReject` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $0005 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `noSessionErr` | –908 | Invalid session reference number |
| `badReqErr` | –909 | Bad parameter or invalid state for this operation |

**SEE ALSO**

For an example of the use of the `PPCReject` function, see page 11-39.

## Reading and Writing Data

The `PPCRead` function reads incoming data from an application, and the `PPCWrite` function writes data to an application during a session.

### PPCRead

Use the `PPCRead` function to read message blocks during a session.

```
FUNCTION PPCRead (pb: PPCReadPBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCRead` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). You should execute the `PPCRead` function asynchronously. |

**Parameter block**

| | | | |
|---|---|---|---|
| → | `ioCompletion` | `PPCCompProcPtr` | Address of a completion routine |
| ← | `ioResult` | `OSErr` | Result code |
| → | `sessRefNum` | `PPCSessRefNum` | Session reference number |
| → | `bufferLength` | `Size` | Length of data buffer |
| ← | `actualLength` | `Size` | Actual length of data read |
| → | `bufferPtr` | `Ptr` | Pointer to data buffer |
| ← | `more` | `Boolean` | `TRUE` if more data in this block to be read |
| ← | `userData` | `LongInt` | Application-specific data |
| ← | `blockCreator` | `OSType` | Creator of block read |
| ← | `blockType` | `OSType` | Type of block read |

**DESCRIPTION**

If your application calls the `PPCRead` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See "PPC Toolbox Calling Conventions" beginning on page 11-14 for detailed information.

If you call the `PPCRead` function asynchronously, you must not change any of the fields in the parameter block until the call completes. The buffer pointed to by the record of data type `PPCReadPBRec` is owned by the PPC Toolbox until the call completes. These objects must not be deallocated or moved in memory while the call is in progress.

The `sessRefNum` field specifies a session to read data from. This must be a valid session reference number returned from a previous `PPCStart`, `StartSecureSession`, or `PPCInform` function. The `bufferLength` and `bufferPtr` fields specify the length and location of a buffer the message block will be read into. Your application must allocate the storage for the buffer. The `actualLength` field returns the actual size of the data read into your data buffer.

The `more` field returns `TRUE` if the provided buffer cannot hold the remainder of the message block. Your application may read a message block in several pieces. It is not necessary to have a buffer large enough to read in the entire message block, so a message block can span multiple calls to the `PPCRead` function.

Upon completion of the `PPCRead` function, the `userData`, `blockCreator`, and `blockType` fields contain information regarding the contents of the message block. You specify these fields using the `PPCWrite` function.

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `PPCRead` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $0007 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| noErr | 0 | No error |
| notInitErr | –900 | PPC Toolbox has not been initialized yet |
| noGlobalsErr | –904 | System unable to allocate memory, critical error |
| noSessionErr | –908 | Invalid session reference number |
| badReqErr | –909 | Bad parameter or invalid state for this operation |
| sessClosedErr | –917 | The session has closed |

**SEE ALSO**

For an example of the use of the `PPCRead` function in conjunction with the `PPCWrite` function, see "Exchanging Data During a PPC Session" beginning on page 11-39.

## PPCWrite

Use the `PPCWrite` function to write message blocks during a session.

```
FUNCTION PPCWrite (pb: PPCWritePBPtr; async: Boolean): OSErr;
```

| | |
|---|---|
| `pb` | A pointer to a `PPCWrite` parameter block. |
| `async` | A value that specifies whether the function is to be executed asynchronously (`TRUE`) or synchronously (`FALSE`). You should execute the `PPCWrite` function asynchronously. |

**Parameter block**

| | | | |
|---|---|---|---|
| → | ioCompletion | PPCCompProcPtr | Address of a completion routine |
| ← | ioResult | OSErr | Result code |
| → | sessRefNum | PPCSessRefNum | Session reference number |
| → | bufferLength | Size | Length of data buffer |
| ← | actualLength | Size | Actual length of data written |
| → | bufferPtr | Ptr | Pointer to data buffer |
| → | more | Boolean | `TRUE` if more data in this block to be written |
| → | userData | LongInt | Application-specific data |
| → | blockCreator | OSType | Creator of block written |
| → | blockType | OSType | Type of block written |

**DESCRIPTION**

If your application calls the `PPCWrite` function asynchronously, you must specify in the `ioCompletion` field either the address of a completion routine or `NIL`. If you set `ioCompletion` to `NIL`, you should poll the `ioResult` field of the PPC parameter block (from your application's main event loop) to determine whether the PPC Toolbox has completed the requested operation. A value in the `ioResult` field other than 1 indicates that the call is complete. Note that it is unsafe to poll the `ioResult` field at interrupt time since the PPC Toolbox may be in the process of completing a call. See “PPC Toolbox Calling Conventions” beginning on page 11-14.

If you call the `PPCWrite` function asynchronously, you must not change any of the fields in the parameter block until the call completes. The buffer pointed to by the record of data type `PPCWritePBRec` is owned by the PPC Toolbox until the call completes. These objects must not be deallocated or moved in memory while the call is in progress.

The `sessRefNum` field specifies a session identifier. This must be a valid session reference number returned from a previous `PPCStart`, `StartSecureSession`, or `PPCInform` function.

The `bufferLength` and `bufferPtr` fields specify the length and location of a buffer the message block is sent to. If the `PPCWrite` function returns a `noErr` result code, the `actualLength` field returns the actual size of the message block that was written.

Set the `more` field to `TRUE` to indicate that you will be using the `PPCWrite` function again to append data to this message block. Set the `more` field to `FALSE` to indicate that this is the end of the data in this message block.

The initiating port can specify any information in the `userData` field. The `PPCRead` function reports this data to the responding port upon its completion.

Set the `userData`, `blockCreator`, and `blockType` fields for each message block that you create. These fields can give the receiving application information about how to process the contents of the message block. They are ignored when you append information to a message block.

#### ASSEMBLY-LANGUAGE INFORMATION

The trap macro and routine selector for the `PPCWrite` function are

| **Trap macro** | **Selector** |
|---|---|
| `_PPC` | $0006 |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a parameter block |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `noSessionErr` | –908 | Invalid session reference number |
| `badReqErr` | –909 | Bad parameter or invalid state for this operation |
| `sessClosedErr` | –917 | The session has closed |

**SEE ALSO**

For an example of the use of the `PPCWrite` function in conjunction with the `PPCRead` function, see "Exchanging Data During a PPC Session" beginning on page 11-39.

## Locating a Default User and Invalidating a User

You use the `GetDefaultUser` function to obtain a user reference number and the name of the default user. To invalidate a particular user name and corresponding password, use the `DeleteUserIdentity` function.

### GetDefaultUser

The `GetDefaultUser` function returns the user reference number and the name of the default user.

```
FUNCTION GetDefaultUser (VAR userRef: LongInt;
                         VAR userName: Str32): OSErr;
```

| | |
|---|---|
| `userRef` | If the `GetDefaultUser` function completes with no errors, then the `userRef` parameter returns the user reference number that represents the user name and password of the default user. |
| `userName` | The name of the default user. |

**DESCRIPTION**

The default user is specified in the Sharing Setup control panel. This function is useful if your application uses the `PPCStart` function to initiate a session with an application that does not support guest access.

If the `GetDefaultUser` function completes with no errors, then the `userRef` parameter returns the user reference number that represents the user name and password of the default user. The `userName` parameter must contain `NIL` or a 32-byte character string. If the `userName` parameter contains `NIL`, then the user name string is not returned. If the `userName` parameter is a 32-byte character string, the 32-byte character string contains the user name that is specified in the Sharing Setup control panel when the `GetDefaultUser` function completes (with no errors).

▲ **WARNING**
If you are using Pascal, you cannot pass `NIL` for the `userName` parameter. For example, you cannot pass `StringPtr(NIL)^` because Pascal performs range checking of string bounds. ▲

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `GetDefaultUser` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $000D |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a `GetDefaultUserParams` record |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `noDefaultUserErr` | –922 | User has not specified owner name in Sharing Setup control panel |
| `notLoggedInErr` | –923 | Default user reference number does not yet exist |

**SEE ALSO**

For an example of the use of the `GetDefaultUser` function, see Listing 11-20 on page 11-45.

## DeleteUserIdentity

To invalidate a particular user name and corresponding password, use the `DeleteUserIdentity` function.

```
FUNCTION DeleteUserIdentity (userRef: LongInt): OSErr;
```

| | |
|---|---|
| `userRef` | The reference number representing the user and password to be deleted. |

**DESCRIPTION**

The `DeleteUserIdentity` function deletes the user name and password corresponding to the user reference number.

**ASSEMBLY-LANGUAGE INFORMATION**

The trap macro and routine selector for the `DeleteUserIdentity` function are

| Trap macro | Selector |
|---|---|
| `_PPC` | $000C |

The registers on entry and exit for this routine are

**Registers on entry**

| | |
|---|---|
| A0 | Pointer to a `DeleteUserParams` record |
| D0 | Selector code |

**Registers on exit**

| | |
|---|---|
| D0 | Result code |

**RESULT CODES**

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `noUserRecErr` | –928 | Invalid user reference number |

**SEE ALSO**

For an example of the use of the `DeleteUserIdentity` function, see “Invalidating Users” on page 11-44.

## Application-Defined Routines

This section describes the routine syntax for completion routines and port filter functions.

### Completion Routines for PPC Toolbox Routines

Your application can provide a pointer to a completion routine in the `ioCompletion` field of a PPC parameter block. You can provide completion routines only for PPC Toolbox routines that you execute asynchronously.

### MyCompletionRoutine

You can provide a completion routine for a PPC Toolbox routine that you execute asynchronously.

```
PROCEDURE MyCompletionRoutine (pb: PPCParamBlockPtr);
```

| | |
|---|---|
| `pb` | A pointer to the PPC parameter block passed to the PPC Toolbox function. |

**DESCRIPTION**

If you specify a completion routine in the `ioCompletion` field of a PPC parameter block, it is called at interrupt time when the PPC Toolbox routine completes execution. The PPC Toolbox passes to your completion routine a pointer to the same PPC parameter block that your application passed to the PPC Toolbox routine.

▲ **WARNING**
Completion routines execute at the interrupt level and must preserve all registers other than A0, A1, and D0–D2. (Note that MPW C and MPW Pascal do this automatically.) Your completion routine must not make any calls to the Memory Manager, directly or indirectly, and it can't depend on the validity of handles to unlocked blocks. The PPC Toolbox preserves the application global register A5. ▲

**SEE ALSO**

For examples of completion routines, see Listing 11-9 on page 11-37, Listing 11-11 on page 11-38, and Listing 11-13 on page 11-39.

## Port Filter Functions

This section describes the port filter function that can be used by the `PPCBrowser` function.

### MyPortFilter

You can provide a pointer to a port filter function in the `portFilter` parameter of the `PPCBrowser` function.You can use a port filter function to refine the list of PPC ports that the `PPCBrowser` function displays in the program linking dialog box.

```
FUNCTION MyPortFilter (locationName: LocationNamePtr;
                       thePortInfo: PortInfoPtr): Boolean;
```

`locationName`
: A pointer to a location name record. This record specifies the location of the PPC port currently under consideration for display in the program linking dialog box.

`thePortInfo`
: A pointer to a port information record. This record specifies the port information for the PPC port currently under consideration for display in the program linking dialog box.

**DESCRIPTION**

The `PPCBrowser` function calls your port filter function once for each port before it adds that port to the dialog list. Your port filter function should return `TRUE` for each port that should be displayed in the program linking dialog box, and `FALSE` for each port that shouldn't be displayed.

**SEE ALSO**

For an example of a port filter function, see Listing 11-3 on page 11-24. For a description of the location name record, see page 11-49. For a description of the port information record, see page 11-50.

# Summary of the PPC Toolbox

## Pascal Summary

### Constants

```
CONST
   {gestalt selectors}
   gestaltPPCToolboxAttr      = 'ppc ';   {PPC Toolbox attributes}
   gestaltPPCToolboxPresent   = $0000;    {PPC Toolbox is present}
   gestaltPPCSupportsRealTime = $1000;    {real time only in system }
                                          { software version 7.0}
   gestaltPPCSupportsOutGoing = $0002;    {support of outgoing }
                                          { sessions across a network}
   gestaltPPCSupportsIncoming = $0001;    {user enabled program }
                                          { linking in Sharing Setup }
                                          { control panel}
   {service type)
   ppcServiceRealTime         = 1;        {real time only in System 7}
   {look-up type}
   ppcNoLocation              = 0;        {there is no PPCLocName}
   ppcNBPLocation             = 1;        {use AppleTalk NBP}
   ppcNBPTypeLocation         = 2;        {use just the NBP type, fill }
                                          { in the rest with default}
   {port type}
   ppcByCreatorAndType        = 1;        {port type is specified as }
                                          { standard creator and type}
   ppcByString                = 2;        {port type is in Pascal }
                                          { string format}
   {session request type returned in the PPCInform function}
   ppcLocalOrigin             = 1;        {session initiated on }
                                          { local computer}
   ppcRemoteOrigin            = 2;        {session initiated on }
                                          { remote computer}
```

## Data Types

```
TYPE
   PPCServiceType          = SignedByte;     {service type}
   PPCLocationKind         = Integer;        {look-up type}
   PPCPortKinds            = Integer;        {port type}
   PPCSessionOrigin        = SignedByte;     {local or remote}
   PPCPortRefNum           = Integer;        {port reference number}
   PPCSessRefNum           = LongInt;        {session reference number}

   LocationNamePtr = ^LocationNameRec;
   LocationNameRec =
   RECORD
      locationKindSelector: PPCLocationKind; {which variant}
      CASE PPCLocationKind OF                {ppcNoLocation: storage not }
                                             { used by this value}
         ppcNBPLocation:                     {NBP name entity}
                            (nbpEntity: EntityName);
         ppcNBPTypeLocation:(nbpType: Str32);{just the NBP type string }
                                             { for the PPCOpen function}
   END;
   PortInfoPtr = ^PortInfoRec;
   PortInfoRec =
   RECORD
      filler1:             SignedByte;       {space holder}
      authRequired:        Boolean;          {authentication required}
      name:                PPCPortRec;       {port name}
   END;

   PPCPortPtr = ^PPCPortRec;
   PPCPortRec =
   RECORD
      nameScript:          ScriptCode;       {script identifier}
      name:                Str32;            {port name shown in program }
                                             { linking dialog box}
         portKindSelector: PPCPortKinds;     {general category of }
                                             { application}
         CASE PPCPortKinds OF
            ppcByString:   (portTypeStr: Str32);{32 characters}
            ppcByCreatorAndType:             {4-character creator and type}
                           (portCreator: OSType; portType: OSType);
   END;
```

```
PPCParamBlockPtr = ^PPCParamBlockRec;
PPCParamBlockRec =
RECORD
   CASE Integer OF
   0: (openParam:       PPCOpenPBRec);       {PPCOPen params}
   1: (informParam:     PPCInformPBRec);     {PPCInform params}
   2: (startParam:      PPCStartPBRec);      {PPCStart params}
   3: (acceptParam:     PPCAcceptPBRec);     {PPCAccept params}
   4: (rejectParam:     PPCRejectPBRec);     {PPCReject params}
   5: (writeParam:      PPCWritePBRec);      {PPCWrite params}
   6: (readParam:       PPCReadPBRec);       {PPCRead params}
   7: (endParam:        PPCEndPBRec);        {PPCEnd params}
   8: (closeParam:      PPCClosePBRec);      {PPCClose params}
   9: (listPortsParam:  IPCListPortsPBRec);  {IPCListPorts params}
END;

PortInfoArrayPtr = ^PortInfoArray;
PortInfoArray    = ARRAY[0..0] OF PortInfoRec;

PPCOpenPBPtr = ^PPCOpenPBRec;
PPCOpenPBRec =
RECORD
   qLink:         Ptr;                 {private}
   csCode:        Integer;             {private}
   intUse:        Integer;             {private}
   intUsePtr:     Ptr;                 {private}
   ioCompletion:  PPCCompProcPtr;      {address of a }
                                       { completion routine}
   ioResult:      OSErr;               {completion of operation}
   reserved:      ARRAY[1..5] OF LongInt;
                                       {private}
   portRefNum:       PPCPortRefNum;    {PPC port identifier}
   filler1:          LongInt;          {space holder}
   serviceType:      PPCServiceType;   {real time only}
   resFlag:          SignedByte;       {reserved field}
   portName:         PPCPortPtr;       {name of port to be opened}
   locationName:     LocationNamePtr;  {location of port to be }
                                       { opened}
   networkVisible:   Boolean;          {port is visible for }
                                       { browsing}
   nbpRegistered:    Boolean;          {location name registered }
                                       { on network}
END;
```

```
PPCInformPBPtr = ^PPCInformPBRec;
PPCInformPBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
   portRefNum:       PPCPortRefNum;    {port identifier}
   sessRefNum:       PPCSessRefNum;    {session identifier}
   serviceType:      PPCServiceType;   {real time only}
   autoAccept:       Boolean;          {automatic session }
                                       { acceptance}
   portName:         PPCPortPtr;       {name of port that }
                                       { initiated a session}
   locationName:     LocationNamePtr;  {location of port that }
                                       { initiated a session}
   userName:         StringPtr;        {name of user that }
                                       { initiated a session}
   userData:         LongInt;          {application-defined}
   requestType:      PPCSessionOrigin; {local or remote}
END;

PPCStartPBPtr = ^PPCStartPBRec;
PPCStartPBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
   portRefNum:       PPCPortRefNum;    {identifier for requested }
                                       { port}
   sessRefNum:       PPCSessRefNum;    {session identifier}
   serviceType:      PPCServiceType;   {real time only}
   resFlag:          SignedByte;       {reserved field}
   portName:         PPCPortPtr;       {name of port to be opened}
   locationName:     LocationNamePtr;  {location of port to be }
                                       { opened}
   rejectInfo:       LongInt;          {rejection of session}
   userData:         LongInt;          {application-specific}
   userRefNum:       LongInt;          {specifies an authenticated }
                                       { user}
END;

PPCAcceptPBPtr = ^PPCAcceptPBRec;
PPCAcceptPBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
   filler1:          Integer;          {space holder}
   sessRefNum:       PPCSessRefNum;    {session identifier}
END;

PPCRejectPBPtr = ^PPCRejectPBRec;
PPCRejectPBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
   filler1:          Integer;          {space holder}
   sessRefNum:       PPCSessRefNum;    {session identifier}
   filler2:          Integer;          {space holder}
   filler3:          LongInt;          {space holder}
   filler4:          LongInt;          {space holder}
   rejectInfo:       LongInt;          {rejection of session}
END;

PPCWritePBPtr = ^PPCWritePBRec;
PPCWritePBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
   filler1:          Integer;          {space holder}
   sessRefNum:       PPCSessRefNum;    {session identifier}
   bufferLength:     Size;             {length of buffer to be }
                                       { written}
   actualLength:     Size;             {actual size of data written}
   bufferPtr:        Ptr;              {location of buffer to be }
                                       { written}
   more:             Boolean;          {additional data to be }
                                       { written}
   filler2:          SignedByte;       {space holder}
   userData:         LongInt;          {application-specific}
   blockCreator:     OSType;           {creator of block to be }
                                       { written}
   blockType:        OSType;           {type of block to be written}
END;

PPCReadPBPtr = ^PPCReadPBRec;
PPCReadPBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
   filler1:          Integer;          {space holder}
   sessRefNum:       PPCSessRefNum;    {session identifier}
   bufferLength:     Size;             {length of buffer to be read}
   actualLength:     Size;             {actual size of the data }
                                       { read}
   bufferPtr:        Ptr;              {location of buffer to be }
                                       { read}
   more:             Boolean;          {additional data to be read}
   filler2:          SignedByte;       {space holder}
   userData:         LongInt;          {application-specific}
   blockCreator:     OSType;           {creator of block to be read}
   blockType:        OSType;           {type of block to be read}
END;

PPCEndPBPtr = ^PPCEndPBRec;
PPCEndPBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
   filler1:          Integer;          {space holder}
   sessRefNum:       PPCSessRefNum;    {identifier of session to }
                                       { be terminated}
END;

PPCClosePBPtr = ^PPCClosePBRec;
PPCClosePBRec =
RECORD
   qLink:            Ptr;              {private}
   csCode:           Integer;          {private}
   intUse:           Integer;          {private}
   intUsePtr:        Ptr;              {private}
   ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                       { routine}
   ioResult:         OSErr;            {completion of operation}
   reserved:         ARRAY[1..5] OF LongInt;
                                       {private}
```

```
      portRefNum:       PPCPortRefNum;    {identifier of port to }
                                          { be closed}
   END;

   IPCListPortsPBPtr = ^IPCListPortsPBRec;
   IPCListPortsPBRec =
   RECORD
      qLink:            Ptr;              {private}
      csCode:           Integer;          {private}
      intUse:           Integer;          {private}
      intUsePtr:        Ptr;              {private}
      ioCompletion:     PPCCompProcPtr;   {address of a completion }
                                          { routine}
      ioResult:         OSErr;            {completion of operation}
      reserved:         ARRAY[1..5] OF LongInt;
                                          {private}
      filler1:          Integer;          {space holder}
      startIndex:       Integer;          {index to the port entry }
                                          { list}
      requestCount:     Integer;          {number of entries to }
                                          { be returned}
      actualCount:      Integer;          {actual number of port names}
      portName:         PPCPortPtr;       {list of port names}
      locationName:     LocationNamePtr;  {location of port names}
      bufferPtr:        PortInfoArrayPtr; {pointer to a buffer}
   END;
```

## PPC Toolbox Routines

### Initializing the PPC Toolbox

```
FUNCTION PPCInit: OSErr;
```

### Using the Program Linking Dialog Box

```
FUNCTION PPCBrowser         (prompt: Str255; applListLabel: Str255;
                             defaultSpecified: Boolean;
                             VAR theLocation: LocationNameRec;
                             VAR thePortInfo: PortInfoRec;
                             portFilter: PPCFilterProcPtr;
                             theLocNBPType: Str32): OSErr;
```

### Obtaining a List of Ports

```
FUNCTION IPCListPorts       (pb: IPCListPortsPBPtr; async: Boolean): OSErr;
```

### Opening and Closing a Port

```
FUNCTION PPCOpen            (pb: PPCOpenPBPtr; async: Boolean): OSErr;
FUNCTION PPCClose           (pb: PPCClosePBPtr; async: Boolean): OSErr;
```

### Starting and Ending a Session

```
FUNCTION PPCStart           (pb: PPCStartPBPtr; async: Boolean): OSErr;
FUNCTION StartSecureSession (pb: PPCStartPBPtr; VAR userName: Str32;
                             useDefault: Boolean; allowGuest: Boolean;
                             VAR guestSelected: Boolean; prompt: Str255)
                             : OSErr;
FUNCTION PPCEnd             (pb: PPCEndPBPtr; async: Boolean): OSErr;
```

### Receiving, Accepting, and Rejecting a Session

```
FUNCTION PPCInform          (pb: PPCInformPBPtr; async: Boolean): OSErr;
FUNCTION PPCAccept          (pb: PPCAcceptPBPtr; async: Boolean): OSErr;
FUNCTION PPCReject          (pb: PPCRejectPBPtr; async: Boolean): OSErr;
```

### Reading and Writing Data

```
FUNCTION PPCRead            (pb: PPCReadPBPtr; async: Boolean): OSErr;
FUNCTION PPCWrite           (pb: PPCWritePBPtr; async: Boolean): OSErr;
```

### Locating a Default User and Invalidating a User

```
FUNCTION GetDefaultUser     (VAR userRef: LongInt; VAR userName: Str32)
                             : OSErr;
FUNCTION DeleteUserIdentity (userRef: LongInt): OSErr;
```

## Application-Defined Routines

```
PROCEDURE MyCompletionRoutine
                            (pb: PPCParamBlockPtr);
FUNCTION MyPortFilter       (locationName: LocationNameRec;
                             thePortInfo: PortInfoRec): Boolean;
```

## C Summary

### Constants

```
CONST
enum {
   /*gestalt selectors*/
   #define gestaltPPCToolboxAttr 'ppc '   /*PPC Toolbox attributes*/
   gestaltPPCToolboxPresent   = $0000,    /*PPC Toolbox is present*/
   gestaltPPCSupportsRealTime = $1000,    /*real time only in system */
                                          /* software version 7.0*/
   gestaltPPCSupportsOutGoing = $0002,    /*support of outgoing */
                                          /* sessions across a network*/
   gestaltPPCSupportsIncoming = $0001     /*user enabled program */
                                          /* linking in Sharing Setup */
                                          /* control panel*/
};
enum {
   /*service type*/
   ppcServiceRealTime         = 1         /*real time only in System 7*/
};
enum {
   /*look-up type*/
   ppcNoLocation              = 0,        /*there is no PPCLocName*/
   ppcNBPLocation             = 1,        /*use AppleTalk NBP*/
   ppcNBPTypeLocation         = 2         /*use just the NBP type, fill */
                                          /* in the rest with default*/
};
enum {
   /*port type*/
   ppcByCreatorAndType        = 1,        /*port type is specified as */
                                          /* standard Mac creator and type*/
   ppcByString                = 2         /*port type is in Pascal */
                                          /* string format*/
};
enum {
   /*session request type returned in the PPCInform function*/
   ppcLocalOrigin             = 1,        /*session initiated on */
                                          /* local computer*/
   ppcRemoteOrigin            = 2         /*session initiated on */
                                          /* remote computer*/
};
```

## Data Types

```
typedef unsigned char PPCServiceType;        /*service type*/
typedef short PPCLocationKind;               /*look-up type*/
typedef short PPCPortKinds;                  /*port type*/
typedef unsigned char PPCSessionOrigin;      /*local or remote*/
typedef short PPCPortRefNum;                 /*port reference number*/
typedef long PPCSessRefNum;                  /*session reference number*/

struct PPCPortRec {
   ScriptCode nameScript;                    /*script identifier*/
   Str32 name;                               /*port name shown in program */
                                             /* linking dialog box*/
   PPCPortKinds portKindSelector;            /*general category of */
                                             /* application*/
   union
      Str32 portTypeStr;                     /*32 characters*/
      struct
         OSType creator;                     /*4-character creator and */
         OSType type;                        /* type*/
         } port;
      } u;
};
typedef struct PPCPortRec PPCPortRec;
typedef PPCPortRec *PPCPortPtr;

struct LocationNameRec {
   PPCLocationKind locationKindSelector;     /*which variant*/
   union {
      EntityName  nbpEntity;                 /*NBP name entity*/
      Str32       nbpType;                   /*just the NBP type string */
                                             /* for the PPCOpen function*/
      } u;
};

typedef struct LocationNameRec LocationNameRec;
typedef LocationNameRec *LocationNamePtr;

struct PortInfoRec {
   unsigned char  filler1;                   /*space holder*/
   Boolean        authRequired;              /*authentication required*/
   PPCPortRec     name;                      /*port name*/
};
```

```
typedef struct PortInfoRec PortInfoRec;
typedef PortInfoRec *PortInfoPtr;

typedef PortInfoRec *PortInfoArrayPtr;
typedef pascal Boolean (*PPCFilterProcPtr) (LocationNamePtr, PortInfoPtr);
/*procedures you need to write*/
/*ex: void MyCompletionRoutine(PPCParamBlkPtr pb)*/
/*ex: pascal Boolean MyPortFilter(LocationNamePtr, PortInfoPtr)*/
typedef ProcPtr PPCCompProcPtr;

#define PPCHeader \
   Ptr              qLink;                 /*private*/
   unsigned short   csCode;                /*private*/
   unsigned short   intUse;                /*private*/
   Ptr              intUsePtr;             /*private*/
   PPCCompProcPtr   ioCompletion;          /*address of a */
                                           /* completion routine*/
   OSErr            ioResult;              /*completion of operation*/
   unsigned long    Reserved[5];           /*private*/

struct PPCOpenPBRec {
   PPCHeader
   PPCPortRefNum  portRefNum;              /*PPC port identifier*/
   long           filler1;                 /*space holder*/
   PPCServiceType serviceType;             /*real time only*/
   unsigned char  resFlag;                 /*reserved field*/
   PPCPortPtr     portName;                /*name of port to be opened*/
   LocationNamePtr locationName;           /*location of port to be */
                                           /* opened*/
   Boolean        networkVisible;          /*port is visible for */
                                           /* browsing*/
   Boolean        nbpRegistered;           /*location name registered */
                                           /* on network*/
};

typedef struct PPCOpenPBRec PPCOpenPBRec;
typedef PPCOpenPBRec *PPCOpenPBPtr;

struct PPCInformPBRec {
   PPCHeader
   PPCPortRefNum    portRefNum;            /*port identifier*/
   PPCSessRefNum    sessRefNum;            /*session identifier*/
   PPCServiceType   serviceType;           /*real time only*/
   Boolean           autoAccept;             /*automatic session acceptance*/
   PPCPortPtr        portName;               /*name of port that */
                                             /* initiated a session*/
   LocationNamePtr   locationName;           /*location of port that */
                                             /* initiated a session*/
   StringPtr         userName;               /*name of user that */
                                             /* initiated a session*/
   unsigned long     userData;               /*application-defined*/
   PPCSessionOrigin  requestType;            /*local or remote*/
};

typdef struct PPCInformPBRec PPCInformPBPtr;

struct PPCStartPBRec {
   PPCHeader
   PPCPortRefNum     portRefNum;          /*identifier for requested */
                                          /* port*/
   PPCSessRefNum     sessRefNum;          /*session identifier*/
   PPCServiceType    serviceType;         /*real time only*/
   unsigned char     resFlag;             /*reserved field*/
   PPCPortPtr        portName;            /*name of port to be opened*/
   LocationNamePtr   locationName;        /*location of port to be opened*/
   unsigned long     rejectInfo;          /*rejection of session*/
   unsigned long     userData;            /*application-specific*/
   unsigned long     userRefNum;          /*specifies an authenticated user*/
};

typedef struct PPCStartPBRec PPCStartPBRec;
typedef PPCStartPBRec *PPCStartPBPtr;

struct PPCAcceptPBRec {
      PPCHeader
      short          filler1;             /*space holder*/
      PPCSessRefNum  sessRefNum;          /*session identifier*/
};

typedef struct PPCAcceptPBRec PPCAcceptPBRec;
typedef PPCAcceptPBRec *PPCAcceptPBPtr;

struct PPCRejectPBRec {
      PPCHeader
      short          filler1;             /*space holder*/
      PPCSessRefNum  sessRefNum;          /*session identifier*/
      short          filler2;            /*space holder*/
      long           filler3;            /*space holder*/
      long           filler4;            /*space holder*/
      unsigned long  rejectInfo;         /*rejection of session*/
};

typedef struct PPCRejectPBRec PPCRejectPBRec;
typedef PPCRejectPBRec *PPCRejectPBPtr;

struct PPCWritePBRec {
   PPCHeader
   short          filler1;               /*space holder*/
   PPCSessRefNum  sessRefNum;            /*session identifier*/
   Size           bufferLength;          /*length of buffer to be written*/
   Size           actualLength;          /*actual size of data written*/
   Ptr            bufferPtr;             /*location of buffer to be */
                                         /* written*/
   Boolean        more;                  /*additional data to be written*/
   unsigned char  filler2;               /*space holder*/
   unsigned long  userData;              /*application-specific*/
   OSType         blockCreator;          /*creator of block to be written*/
   OSType         blockType;             /*type of block to be written*/
};

typedef struct PPCWritePBRec PPCWritePBRec;
typedef PPCWritePBRec *PPCWritePBPtr;

struct PPCReadPBRec {
   PPCHeader
   short          filler1;               /*space holder*/
   PPCSessRefNum  sessRefNum;            /*session identifier*/
   Size           bufferLength;          /*length of buffer to be read*/
   Size           actualLength;          /*actual size of the data read*/
   Ptr            bufferPtr;             /*location of buffer to be read*/
   Boolean        more;                  /*additional data to be read*/
   unsigned char  filler2;               /*space holder*/
   unsigned long  userData;              /*application-specific*/
   OSType         blockCreator;          /*creator of block to be read*/
   OSType         blockType;             /*type of block to be read*/
};

typedef struct PPCReadPBRec PPCReadPBRec;
typdef PPCReadPBRec *PPCReadPBPtr;
```

```
struct PPCEndPBRec {
   PPCHeader
   short          filler1;                /*space holder*/
   PPCSessRefNum  sessRefNum;             /*identifier of session to */
                                          /* be terminated*/
};

typedef struct PPCEndPBRec PPCEndPBRec;
typedef PPCEndPBRec *PPCEndPBPtr;

struct PPCClosePBRec {
   PPCHeader
   PPCPortRefNum  portRefNum;             /*identifier of port to */
                                          /* be closed*/
};

typedef struct PPCClosePBRec PPCClosePBRec;
typedef PPCClosePBRec *PPCClosePBPtr;

struct IPCListPortsPBRec {
   PPCHeader
   short             filler1;             /*space holder*/
   unsigned short    startIndex;          /*index to the port entry list*/
   unsigned short    requestCount;        /*number of entries to */
                                          /* be returned*/
   unsigned short    actualCount;         /*actual number of port names*/
   PPCPortPtr        portName;            /*list of port names*/
   LocationNamePtr   locationName;        /*location of port names*/
   PortInfoArrayPtr  bufferPtr;           /*pointer to a buffer*/
};
typedef struct IPCListPortsPBRec IPCListPortsPBRec;
typedef IPCListPortsPBRec *IPCListPortsPBPtr;

union PPCParamBlockRec {
   PPCOpenPBRec      openParam;           /*PPCOpen params*/
   PPCInformPBRec    informParam;         /*PPCInform params*/
   PPCStartPBRec     startParam;          /*PPCStart params*/
   PPCAcceptPBRec    acceptParam;         /*PPCAccept params*/
   PPCRejectPBRec    rejectParam;         /*PPCReject params*/
   PPCWritePBRec     writeParam;          /*PPCWrite params*/
   PPCReadPBRec      readParam;           /*PPCRead params*/
   PPCEndPBRec       endParam;            /*PPCEnd params*/
   PPCClosePBRec     closeParam;          /*PPCClose params*/
   IPCListPortsPBRec listPortsParam;      /*IPCListPorts params*/
};

typdef union PPCParamBlockRec PPCParamBlockRec;
typdef PPCParamBlockRec *PPCParamBlockPtr;
```

## PPC Toolbox Routines

### Initializing the PPC Toolbox

```
pascal OSErr PPCInit        (void);
```

### Using the Program Linking Dialog Box

```
pascal OSErr PPCBrowser     (ConstStr255Param prompt,
                             ConstStr255Param applListLabel,
                             Boolean defaultSpecified,
                             LocationNameRec *theLocation,
                             PortInfoRec *thePortInfo,
                             PPCFilterProcPtr portFilter,
                             ConstStr32Param theLocNBPType);
```

### Obtaining a List of Ports

```
pascal OSErr IPCListPorts   (IPCListPortsPBPtr pb, Boolean async);
```

### Opening and Closing a Port

```
pascal OSErr PPCOpen        (PPCOpenPBPtr pb, Boolean async);
pascal OSErr PPCClose       (PPCClosePBPtr pb, Boolean async);
```

### Starting and Ending a Session

```
pascal OSErr PPCStart       (PPCStartPBPtr pb, Boolean async);
pascal OSErr StartSecureSession
                            (PPCStartPBPtr pb, Str32 userName,
                             Boolean useDefault, Boolean allowGuest,
                             Boolean *guestSelected,
                             ConstStr255Param prompt);
pascal OSErr PPCEnd         (PPCEndPBPtr pb, Boolean async);
```

### Receiving, Accepting, and Rejecting a Session

```
pascal OSErr PPCInform      (PPCInformPBPtr pb, Boolean async);
pascal OSErr PPCAccept      (PPCAcceptPBPtr pb, Boolean async);
pascal OSErr PPCReject      (PPCRejectPBPtr pb, Boolean async);
```

#### Reading and Writing Data

```
pascal OSErr PPCRead        (PPCReadPBPtr pb, Boolean async);
pascal OSErr PPCWrite       (PPCWritePBPtr pb, Boolean async);
```

#### Locating a Default User and Invalidating a User

```
pascal OSErr GetDefaultUser (unsigned long *userRef, Str32 userName);
pascal OSErr DeleteUserIdentity
                            (unsigned long userRef);
```

### Application-Defined Routines

```
void MyCompletionRoutine    (PPCParamBlockPtr pb);
pascal Boolean MyPortFilter (LocationNameRec locationName,
                             PortInfoRec thePortInfo);
```

## Assembly-Language Summary

### Trap Macros

#### Trap Macros Requiring Routine Selectors

`_Pack9`

| Selector | Routine |
|---|---|
| $0D00 | `PPCBrowser` |

`_PPC`

| Selector | Routine |
|---|---|
| $0000 | `PPCInit` |
| $0001 | `PPCOpen` |
| $0002 | `PPCStart` |
| $0003 | `PPCInform` |
| $0004 | `PPCAccept` |
| $0005 | `PPCReject` |
| $0006 | `PPCWrite` |
| $0007 | `PPCRead` |
| $0008 | `PPCEnd` |
| $0009 | `PPCClose` |

#### *Reading and Writing Data*

```
pascal OSErr PPCRead        (PPCReadPBPtr pb, Boolean async);
pascal OSErr PPCWrite       (PPCWritePBPtr pb, Boolean async);
```

#### *Locating a Default User and Invalidating a User*

```
pascal OSErr GetDefaultUser (unsigned long *userRef, Str32 userName);
pascal OSErr DeleteUserIdentity
                            (unsigned long userRef);
```

### Application-Defined Routines

```
void MyCompletionRoutine    (PPCParamBlockPtr pb);
pascal Boolean MyPortFilter (LocationNameRec locationName,
                             PortInfoRec thePortInfo);
```

## Assembly-Language Summary

### Trap Macros

#### *Trap Macros Requiring Routine Selectors*

`_Pack9`

| Selecto r | Routine |
|---|---|
| $0D00 | `PPCBrowser` |

`_PPC`

| Selector | Routine |
|---|---|
| $0000 | `PPCInit` |
| $0001 | `PPCOpen` |
| $0002 | `PPCStart` |
| $0003 | `PPCInform` |
| $0004 | `PPCAccept` |
| $0005 | `PPCReject` |
| $0006 | `PPCWrite` |
| $0007 | `PPCRead` |
| $0008 | `PPCEnd` |
| $0009 | `PPCClose` |

| Selector | Routine |
|---|---|
| $000A | `IPCListPorts` |
| $000C | `DeleteUserIdentity` |
| $000D | `GetDefaultUser` |
| $000E | `StartSecureSession` |

## Result Codes

| | | |
|---|---|---|
| `noErr` | 0 | No error |
| `paramErr` | –50 | Illegal parameter |
| `memFullErr` | –108 | Not enough memory to load `PPCBrowser` package |
| `userCanceledErr` | –128 | User decided not to conduct a session |
| `notInitErr` | –900 | PPC Toolbox has not been initialized yet |
| `nameTypeErr` | –902 | Invalid or inappropriate `locationKindSelector` in location name |
| `noPortErr` | –903 | Unable to open port or bad port reference number |
| `noGlobalsErr` | –904 | System unable to allocate memory, critical error |
| `localOnlyErr` | –905 | Network activity is currently disabled |
| `destPortErr` | –906 | Port does not exist at destination |
| `sessTableErr` | –907 | PPC Toolbox is unable to create a session |
| `noSessionErr` | –908 | Invalid session reference number |
| `badReqErr` | –909 | Bad parameter or invalid state for this operation |
| `portNameExistsErr` | –910 | Another port is already open with this name |
| `noUserNameErr` | –911 | User name unknown on destination machine |
| `userRejectErr` | –912 | Destination rejected the session request |
| `noResponseErr` | –915 | Unable to contact application |
| `portClosedErr` | –916 | The port was closed |
| `sessClosedErr` | –917 | The session has closed |
| `badPortNameErr` | –919 | PPC port record is invalid |
| `noDefaultUserErr` | –922 | User has not specified owner name in Sharing Setup control panel |
| `notLoggedInErr` | –923 | Default user reference number does not yet exist |
| `noUserRefErr` | –924 | Unable to create a new user reference number |
| `networkErr` | –925 | An error has occurred in the network |
| `noInformErr` | –926 | `PPCStart` failed because target application did not have an inform pending |
| `authFailErr` | –927 | User’s password is wrong |
| `noUserRecErr` | –928 | Invalid user reference number |
| `badServiceMethodErr` | –930 | Service method is other than `ppcServiceRealTime` |
| `badLocNameErr` | –931 | Location name is invalid |
| `guestNotAllowedErr` | –932 | Destination port requires authentication |
| `nbpDuplicate` | –1027 | Location name represents a duplicate on this computer |