



# HD Radio™ Importer User's Guide

**Software Release 3.0.5**  
**September 14, 2007**

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# 1 Scope

## 1.1 System Overview

The iBiquity Digital Corporation HD Radio™ system is designed to permit a smooth evolution from current analog amplitude modulation (AM) and frequency modulation (FM) radio to a fully digital in-band on-channel (IBOC) system. This system delivers digital audio and data services to mobile, portable, and fixed receivers from terrestrial transmitters in the existing medium frequency (MF) and very high frequency (VHF) radio bands. Broadcasters may continue to transmit analog AM and FM simultaneously with the new, higher-quality, and more robust digital signals, allowing themselves and their listeners to convert from analog to digital radio while maintaining their current frequency allocations.

## 1.2 Document Overview

This document provides a description of controls and indicators, system interconnection and operating procedures for the HD Radio Importer.



## 2 Referenced Documents

Not Applicable





## 3 Abbreviations, Symbols, and Conventions

### 3.1 Introduction

Section 3 presents the following items pertinent to a better understanding of this document:

- Abbreviations and Acronyms
- Presentation Conventions
- Mathematical Symbols
- System Parameters

*Note: A glossary defining the technical terms used herein is provided at the end of this document.*

### 3.2 Abbreviations and Acronyms

AAS	Advanced Application Services (AAS)
AES/EBU	Audio Engineers Society / European Broadcast Union
AM	Amplitude Modulation
EASU	Exciter Auxiliary Service Unit
FM	Frequency Modulation
IBOC	In-band On-channel
IIS	Internet Information Services
MF	Medium Frequency
MPA	Main Program Audio
MPS	Main Program Service
PAD	Program Associated Data
PSD	Program Service Data
QoS	Quality of Service
SIS	Station Information Service
SPS	Supplemental Program Service
VHF	Very High Frequency
WAN	Wide Area Network

### 3.3 Presentation Conventions

Unless otherwise noted, the following conventions apply to this document:

- Information enclosed in braces { } is either unavailable at the present time or subject to change.
- Glossary terms are presented in italics upon their first usage in the text.
- All vectors are indexed starting with 0.
- The element of a vector with the lowest index is considered to be first.
- In drawings and tables, the leftmost bit is considered to occur first in time.
- Bit 0 of a byte or word is considered the least significant bit.
- When presenting the dimensions of a matrix, the number of rows is given first (e.g., an  $n \times m$  matrix has  $n$  rows and  $m$  columns).
- In timing diagrams, earliest time is on the left.
- Binary numbers are presented with the most significant bit having the highest index.
- In representations of binary numbers, the least significant bit is on the right.



## 4 Overview

### 4.1 AAS Overview

With the advent of HD Radio, broadcast stations can now transmit their programs as a high quality digital signal. In addition to the Main Program Service (MPS) and Station Information Service (SIS), the HD Radio system also provides the capacity to transmit other digital services referred to as Advanced Application Services (AAS). Examples of AAS include multicast programming, electronic program guides, navigation maps, traffic information, multimedia programming and other content.

To meet the demands for AAS, the AAS framework has been created. The AAS framework provides a common infrastructure to: 1) Support the radio station in managing its bandwidth, 2) allow studio automation vendors, or other broadcast equipment manufactures, the ability to incorporate AAS into their product offerings, and 3) support the developers of AAS applications. For a description of the AAS framework see Reference **Error! Reference source not found.**

Figure 4-1 shows a block diagram of the AAS framework as part of the broadcast infrastructure. The 3 main elements are 1) the clients (e.g. service providers and administrators), 2) the Importer, and 3) the Exporter. This document focuses on the operational use of the Importer.

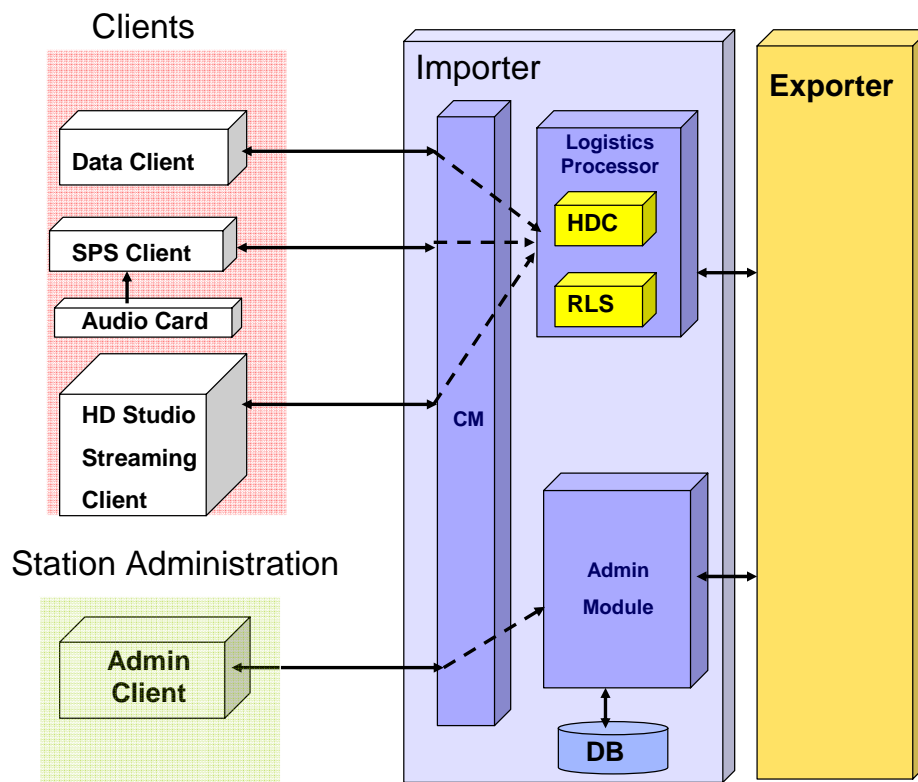


Figure 4-1 Importer Components and their interconnections

## 4.2 Importer Component Overview

The following paragraphs provide a brief description of the various Importer Components.

- *Importer Database:* The persistent data for the functioning of the Importer is stored in the Importer database. All the Administrative functionality is handled by interaction with this database. Importer components like the Connection Manager and the Logistics Processor write data about their functioning into the Importer Database.
- *Administration (Admin Module):* Administration is basically an offline activity to enable broadcast stations to configure the Importer according to their requirements. The Admin Module also communicates with the Exciter or Exporter to configure these sub-systems into the appropriate operational modes based on the desired service mode and bandwidth allocations. Finally, the Admin Module handles all the registration of service providers, services, and Importer configurations.
- *Logistics Processor:* The Logistics Processor is responsible for the data reception from the service providers in accordance with the specific protocol chosen for that particular service. For example, if the service is a multicast audio service, the Logistics Processor is responsible for the HDC encoding of the audio program. For data services, including PSD, the Logistics Processor is responsible for encoding the data using the Radio Link Subsystem (RLS). In addition to encoding data using the proper transmission protocol, the Logistics Processor is also responsible for managing the bandwidth and QoS for each service as defined in the configurations between the service provider and the broadcast station. It communicates with the Connection Manager as well as an Exciter or Exporter. It also communicates with the Importer Database in order to retrieve configuration information and save its performance data.
- *Connection Manager (CM):* The Connection Manager is responsible for managing the connections from the various services. It authenticates service providers and delivers the specific information regarding the configurations and services for each service provider. It provides the mechanism for service providers to deliver data services to the Importer. It allows multiple service providers to connect to the Importer and multiple services to be delivered by each service provider. The Connection Manager connects to the Importer Database for authentication information as well as to the Logistics Processor for bandwidth and QoS information.
- *Logging Service:* Although not shown in Figure 4-1, the Importer incorporates a logging package that allows the various components to write messages to a file. These messages can be informational (i.e. documenting certain events) or can indicate errors or warnings. This file can be very useful for failure analysis in case the Importer should cease to function properly. This logging package is implemented as a Windows “Service” and hence will start automatically on system start-up.
- *Control Panel:* Although not shown in Figure 4-1, the Importer software includes a module that can be used to control, configure, and monitor the main Importer components.

## 5 Hardware/Software Requirements

Not applicable.



## **6 Exciter Interconnections and Configuration**

Not applicable.





## 7 Installation and Configuration

This section describes how to install the Importer software, set the proper configurations, and obtain the proper license key.

### 7.1 Installation

The following steps should be taken to install the Importer software. The Importer software includes all executables and DLLs needed to operate the Importer. There are two installation options, 1) the standard install and 2) a silent install. The procedure only differs slightly between these two options and is outlined below:

1. The Importer can only be installed on a computer running Windows XP Professional Service Pack 2. Internet Explorer version 6.0 or above should be installed. If the “Web Admin” client is to be used, then IIS must also be installed. This must be done before the .NET framework is installed (Step 6).
2. Log onto the Importer with Administrative Privileges.
3. Copy the entire folder Importer3.0Install to the Importer. The folder structure must be maintained. The installation files can be found under the directory “Importer3.0Install”-

```
Importer3.0Install\DBAdmin\  
Importer3.0Install\Directx9Install\  
Importer3.0Install\DotNet-Framework\  
Importer3.0Install\ImporterSetup.exe  
Importer3.0Install\Importer Tools\  
Importer3.0Install\Importer\  
Importer3.0Install\MSDERelA\  
Importer3.0Install\MFC71.dll  
Importer3.0Install\msvcp71.dll  
Importer3.0Install\msvcr71.dll
```

4. If you have earlier versions of Importers and wish to keep the current Service Providers, Services and Configurations you must first run the DBAdmin tool (See Section 8.4) to save the database information to a file. After the installation is complete you can use the merge function of the DBAdmin tool to repopulate the new database. This tool can only be used with version 2.0 or later.
5. If this is a new installation, first install DirectX9 and .NET Framework by running the setup wizards found in:
  - Importer3.0Install\Directx9Install\DirectX9\dxsetup.exe.
  - Importer3.0Install\DotNet-Framework\dotnetfx-Framework1.1.exe.After the installations are complete, reboot the Importer.
6. Using the Windows Add/Remove Programs function in the control panel, remove all previous versions of the Importer and Importer Tools.
7. Run the Importer installation (Importer3.0Install \ImporterSetup.exe). To run a silent install run the ImporterSetup.exe from a command prompt or from the Start->Run menu and specify the target folder for the install using the -dir option, for example run  
Importer2.1Install\ImporterSetup.exe -dir “C:\Program Files\yourImporter”.  
Example:

```
ImporterSetup.exe -dir “C:\Program Files\Company Name\Importer”
```

**Note: During an upgrade process all service provider configuration information (e.g. contracts and SPS assignments) is lost, if you wish to keep this information first run the DBAdmin tool, see Step 4.**

### 7.1.1 Installation of Importer Clients

The Importer Clients include the Web Admin, SPS Capture Client, Generic Data Client, and the Streaming Client. These client applications are sample applications on how to use the Importer API. Follow these steps to install the Importer clients:

1. Log onto the Importer with Administrative Privileges.
2. Run the Importer Tools installation (Importer3.0Install \Importer tools\setup.exe). When running the silent install, you can specify the target folder for the install using the following options: Importer3.0Install\Importer\Setup.exe /s /v"/qn INSTALLDIR="C:\Program Files\your Importer tools"". Normally, the installation installs the WebAdmin, SPS Capture Client, Data Client, and Streaming client. To select a subset of these tools use the ADDLOCAL property. If the ADDLOCAL property is not set all components are installed.  
Example:  
ImporterTools>setup /s/v"/qn ADDLOCAL=WebAdmin INSTALLDIR="C:\Program Files\Company Name\Importer\ PREVINSTALLDIR="C:\Program Files\Company Name\Importer\""
3. Use the User Name: "Admin" and Password "admin" to log into the WebAdmin client. After the first login please change the user name and password for further security – Change the "Admin" user name and Password "admin".

## 7.2 Importer Configuration:

This section describes how to configure the various Importer components. To run the Importer Components, the user should be a **part of the Administrative group** on the Importer.

### 7.2.1 License Key

To obtain a new License Key, start the License Manager. This can be done from the start menu. To start the LicenseMgr from the start menu and following the path:

*Start Menu -> iBiquity Digital->Importer->LicenseMgr.*

When the LicenseMgr application is started the Window similar to Figure 7-1 is displayed. Press "Get Request Key" and a 48 character key is displayed, as shown in Figure 7-2. Email this key to ([importerkey@ibiquity.com](mailto:importerkey@ibiquity.com)). A 48 character activation key will be emailed back. Enter this key in the License Key data entry area (Figure 7-3) and press activate. The current License Status, Valid Until date and Tier, will be updated upon acceptance of a valid key (Figure 7-4). Press close to complete the process. Tier 1 licenses are fully functional Importers, while Tier 2 licenses are reduced functionality Importers (Only 1 SPS and no data services).

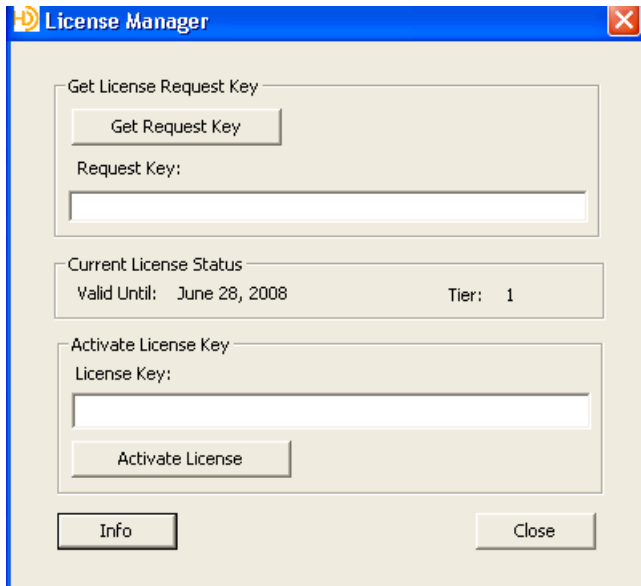


Figure 7-1 License Manager: initial dialog box

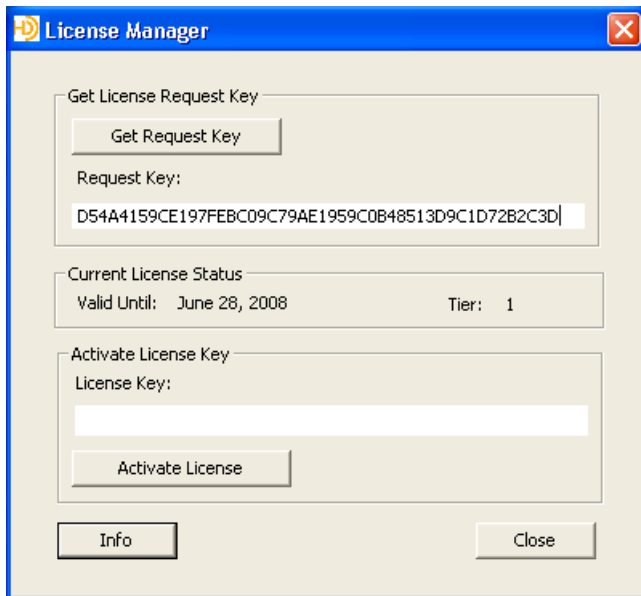


Figure 7-2 : License manager: Request key example.

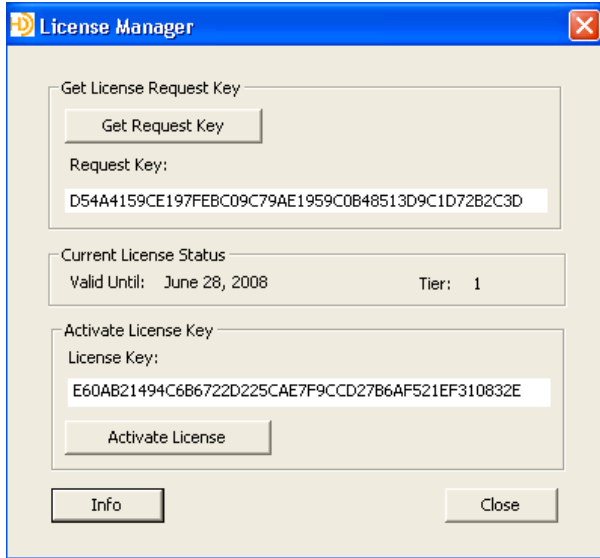


Figure 7-3: License Manager: Activate license key example.

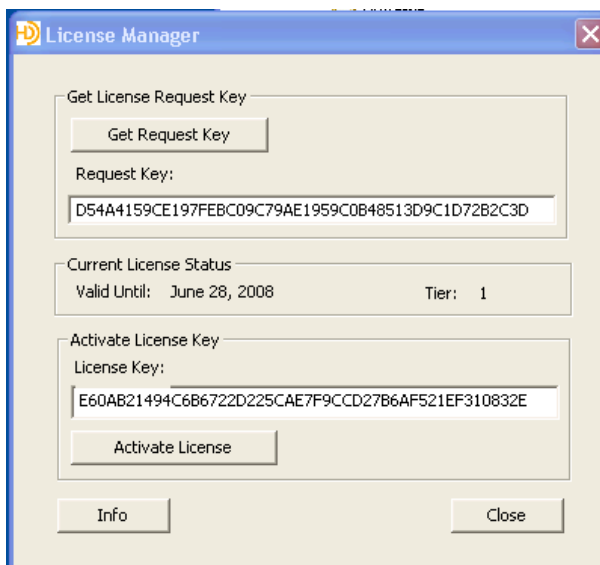


Figure 7-4 : License Manger: Valid license key acceptance example.

The Info Button displays information about the Activation Key; see Figure 7-5 for an example

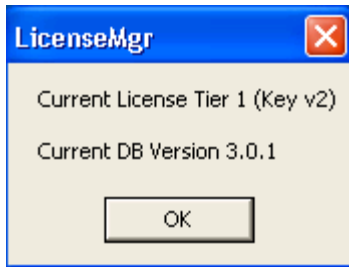


Figure 7-5 License Manager: Info Button

## 7.2.2 Importer Configuration

The Importer receives most of its run-time configuration parameters from the “importerCfg.xml” file shown below.

```
<EOC>
<Database dataSource = "(local)" catalog="IMPORTER_DB_2_0"/>
<Exporter ip="?.?.?.?" protocol="TCP" ctrlPort="8025"/>
<CM port="1010"/>
<LP port="1000" ip="127.0.0.1"/>
<Administrator ip="127.0.0.1" port="1600" xPort="1700"/>
</EOC>
```

The Database element and its various attributes set the location and name of the MS SQL database associated with the Importer. These attributes should not be altered during normal operation. In the Exporter element the attribute “ip” should be set to the IP address of the exciter/exporter the Importer will be communicating with. The protocol attribute is used to set the AAT packet transport method and is either TCP or UDP. TCP is the preferred method if the Exciter release (v2.2.5 or greater) supports it. Otherwise it should be set to UDP. The command and control interface is always bi-directional UDP and the “ctrlPort” attribute sets the UDP port number for sending messages to the Exporter. The return port is set in the Administrator element “xPort” attribute.

The CM element is used to set communication parameters for the Connection Manager. The port attribute is the port number the CM listens to for any client login.

The LP element is used to set communication parameters for the Logistics Processor. The ‘ip’ attribute sets the IP address of the machine where the LP is running. The ‘port’ attribute sets the port where the LP listens for data connections from the CM.

The Administrator element is used to set communication parameters for the Administrator module. The ‘ip’ attribute sets the IP address of the machine where the Administrator is running. The ‘port’ attribute sets the port where the Administrator communicates with the other Importer components.

All these parameters can be manipulated via the Control Panel application (See Section 8.3) eliminating the need for directly editing this XML file.

## 7.2.3 Logging Configuration

The various Importer components have the ability to log informational messages to a log file for failure analysis. The parameters for this logging function are set in the “LoggerCfg.xml” file and are shown below.

```

<Log ip="127.0.0.1" port="1800">
  <Server>
    <LogDirectory>..\log</LogDirectory>
    <LogFileName>importer.log</LogFileName>
    <MaxFileSize>200</MaxFileSize>
    <MaxFilesPerDay>10</MaxFilesPerDay>
    <NumberOfDaysToLog>4</NumberOfDaysToLog>
    <LogForward enable="true" ip="127.0.0.1" port="7701"/>
  </Server>

  <Logger name="Administrator" level="INFO" exclusive="false"/>
  <Logger name="ConnectionManager" level="INFO" exclusive="false"/>
  <Logger name="LogisticsProcessor" level="INFO" exclusive="false"/>
</Log>

```

The Log element is used to set the communication parameters for the log service. The ip attribute sets the IP address of the machine the logger is running on. The port attribute sets the port number where the various components send the logging messages. The Server element contains a number of other elements used to set the parameters for the log file management. The LogDirectory element specifies the location of the log file. The LogFileName element specifies the name of the log file. The MaxFileSize element specifies the maximum size of the log file in before it gets archived. The Logger Name element is used to set the log level for the various Importer components. The choices for the level attribute are: OFF, INFO, DEBUG1, DEBUG2, DEBUG3. The exclusive attribute states whether all log messages are printed for the selected level and below (exclusive="false") or just for the level selected (exclusive="true").

All these parameters can be manipulated via the Control Panel application (See Section 8.3 ) eliminating the need for directly editing this XML file.

## 8 Operating Procedures

### 8.1 Introduction

This section describes how to operate the Importer components individually as well as under the management of the Control Panel. It also describes the utilities available for the management (backup, restore, save, and merge) of the Importer database.

### 8.2 Starting and Running the Importer Components Individually

Once the Importer is configured to run, the various Importer components must be started in the correct order and then the desired service provider clients can be connected. The correct starting order is:

- Administrator
- Logistics Processor
- Connection Manager

The stopping order is the reverse of this, or:

- Connection Manager
- Logistics Processor
- Administrator

#### 8.2.1 Administrator

The first component that must be started is the Administrator. This can be started by double-clicking the executable file found at C:\Program Files\iBiquity Digital\Importer\Servers\Administrator.exe. Or alternatively from the start menu select

*Start Menu -> iBiquity Digital -> Importer -> Administrator*

When the application is started, a window similar to Figure 8-1 will appear.

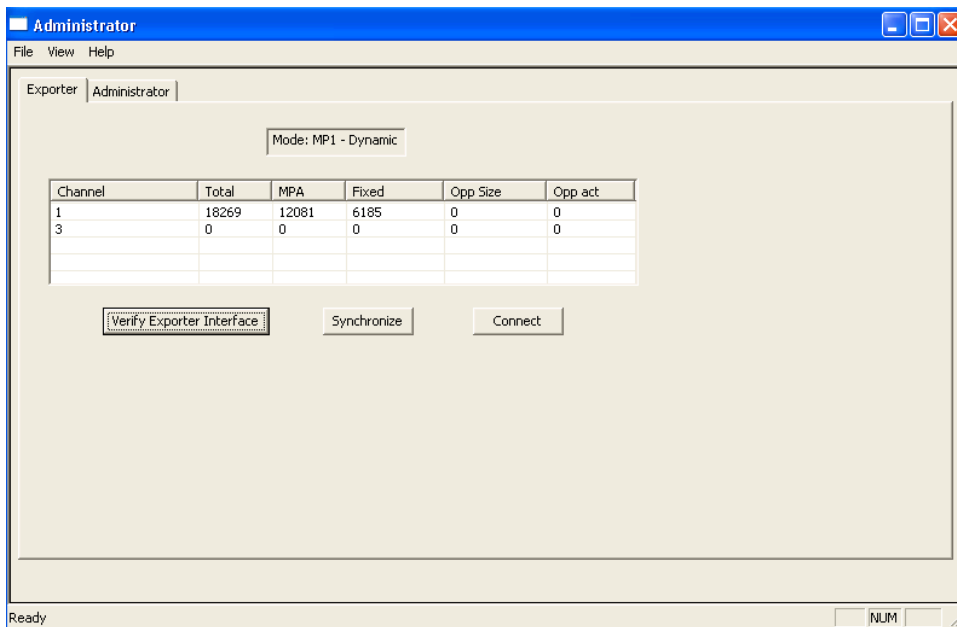


Figure 8-1 Administrator Main Window

If the Exciter/Exporter is not in the same configuration as the Importer the pop-up window in Figure 8-2 will appear

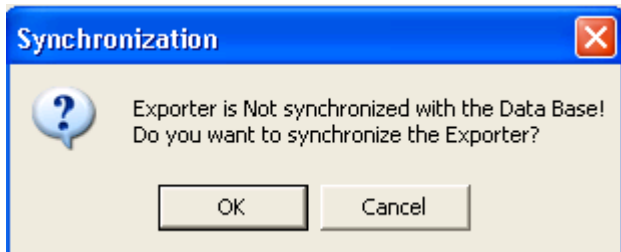


Figure 8-2 Administrator Synchronization Window

Press OK to reconfigure the Exciter/Exporter.

The “Verify Exporter Interface” button is used to verify both the Synchronization and Connection to the Exciter/Exporter. The “Synchronize” button is used to manually synchronize the Importer and Exciter/Exporter. The “Connect” is used to manually connect the Importer to the Exporter.

The Administrator can also be used to switch between stored configurations. The configurations can only be managed using an external Administrator client. For an example of an Administrator client, “Web Admin,” see Reference **Error! Reference source not found.** To use the Administrator to switch between configurations select the Administrator Tab and a Window similar to Figure 8-3 will be displayed.



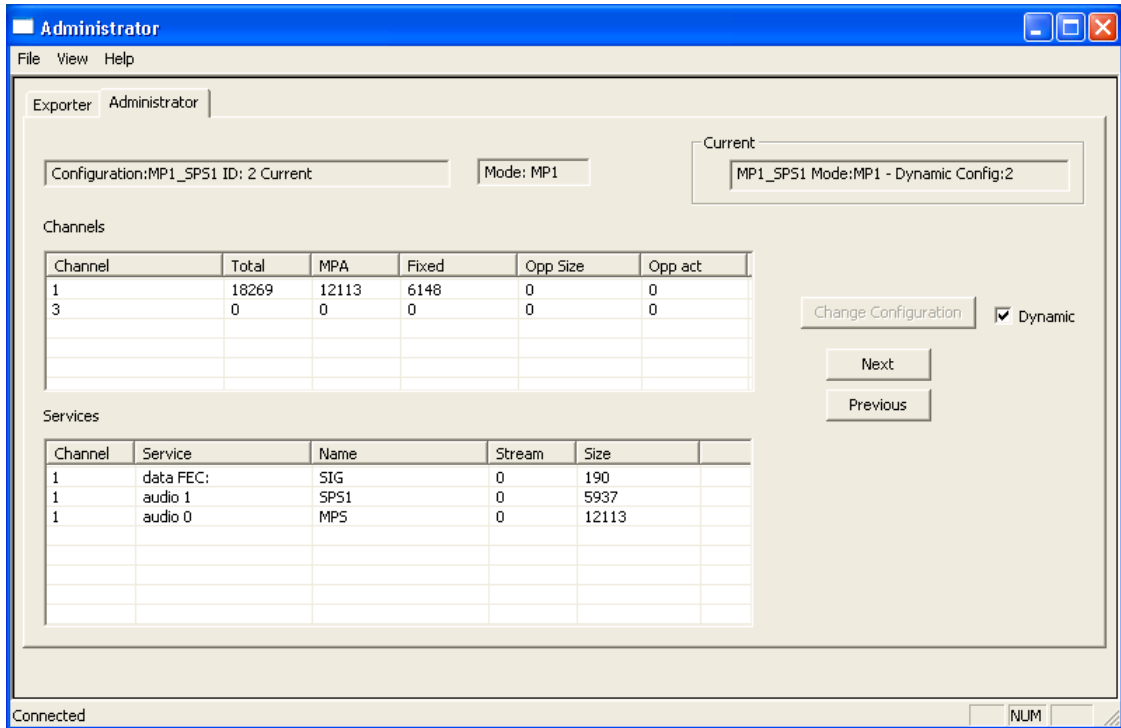


Figure 8-3 Administrator Window, Administrator Tab

This window displays the details of the stored configurations, starting with the current configuration. To display the details of the other configurations, press the Next or Previous buttons. To change the Importer configuration select “Change Configuration.” Checking the Dynamic box puts the Exciter/Exporter in the dynamic scaling and mode changing configurations and is highly recommended.

### 8.2.2 Logistics Processor

The next component that must be started is the Logistics Processor. This can be started by double-clicking the executable file found at C:\Program Files\iBiquity Digital\Importer\Servers\LogisticsProcessor.exe. Or alternatively from the start menu select

*Start Menu -> iBiquity Digital -> Importer -> LogisticsProcessor*

When the application is started, a window similar to Figure 8-4 will appear.

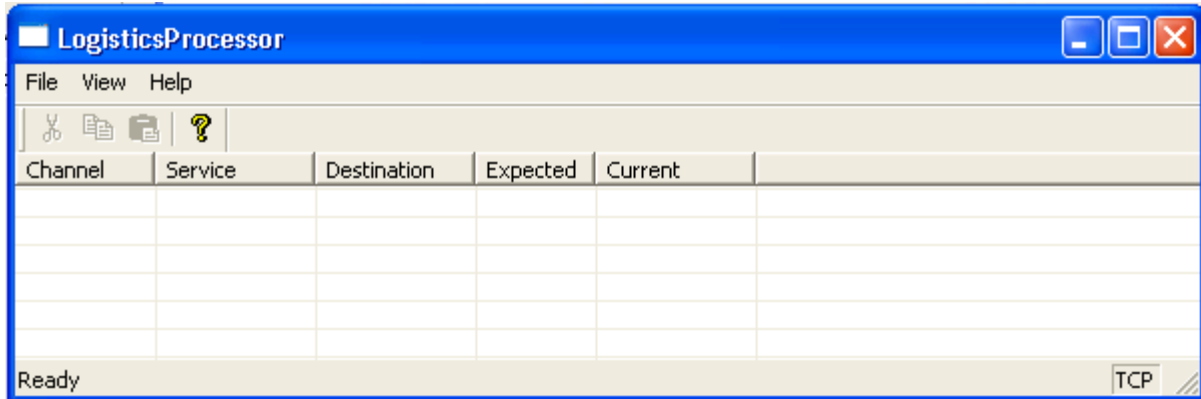


Figure 8-4 Logistics Processor Main Window

The Logistics Processor window displays information about the services connected to the Importer. For example, Figure 8-5 show the Logistics Processor display when both a data client and a SPS client are connected and broadcasting content.

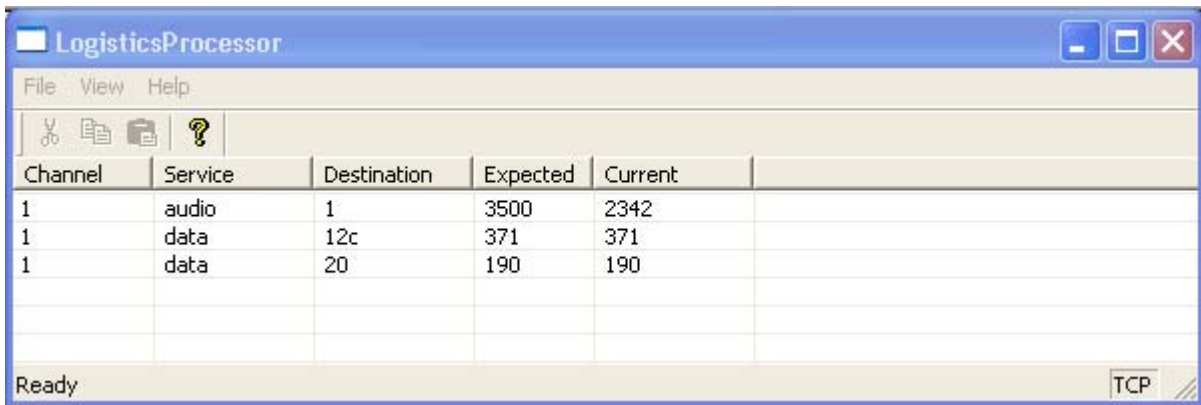


Figure 8-5 Logistics Processor display with clients broadcasting content.

The Channel column indicates the Logical Channel the client is broadcasting on. The Service column indicates whether it is an audio or data client. The Destination column indicates the Program number for SPS clients and the Port number for data clients. The Expected Column indicates the bandwidth allocated for that service and the Current column indicates the actual bandwidth being used.

### 8.2.3 Connection Manager

The last component to be started is the Connection Manager. This can be started by double-clicking the executable file found at: C:\Program Files\iBiquity Digital\Importer\Servers\ConnectionManager.exe. Or alternatively from the start menu select

*Start Menu -> iBiquity Digital -> Importer -> Connection Manager*

Once the application is started a Window similar to Figure 8-6 will be displayed.

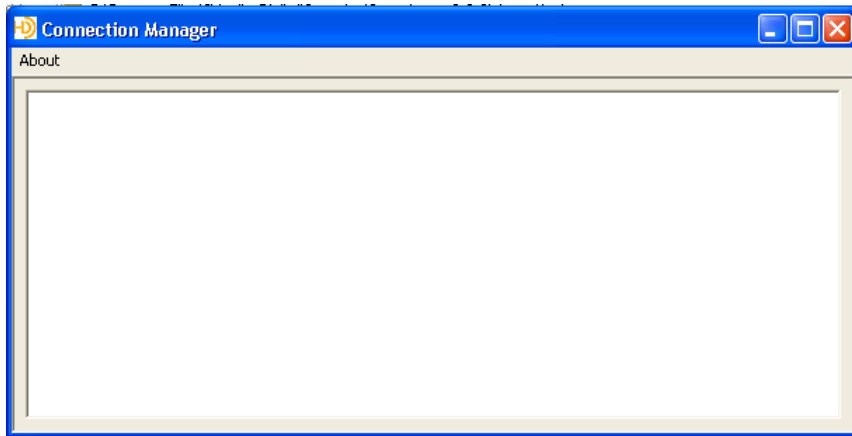


Figure 8-6 Connection Manager Main Window

Once client applications connect to the Importer, the Connection Manager window will display the connection information. An example of this is shown in Figure 8-7.

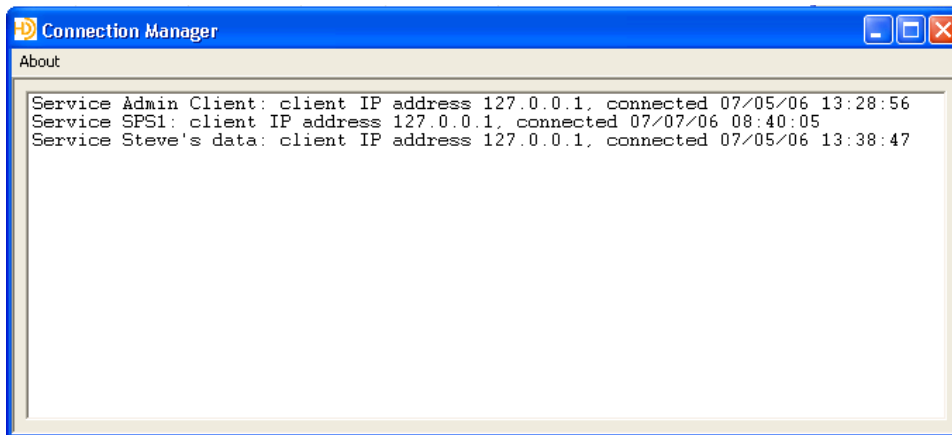


Figure 8-7 Connection Manager Window, after clients have been connected.

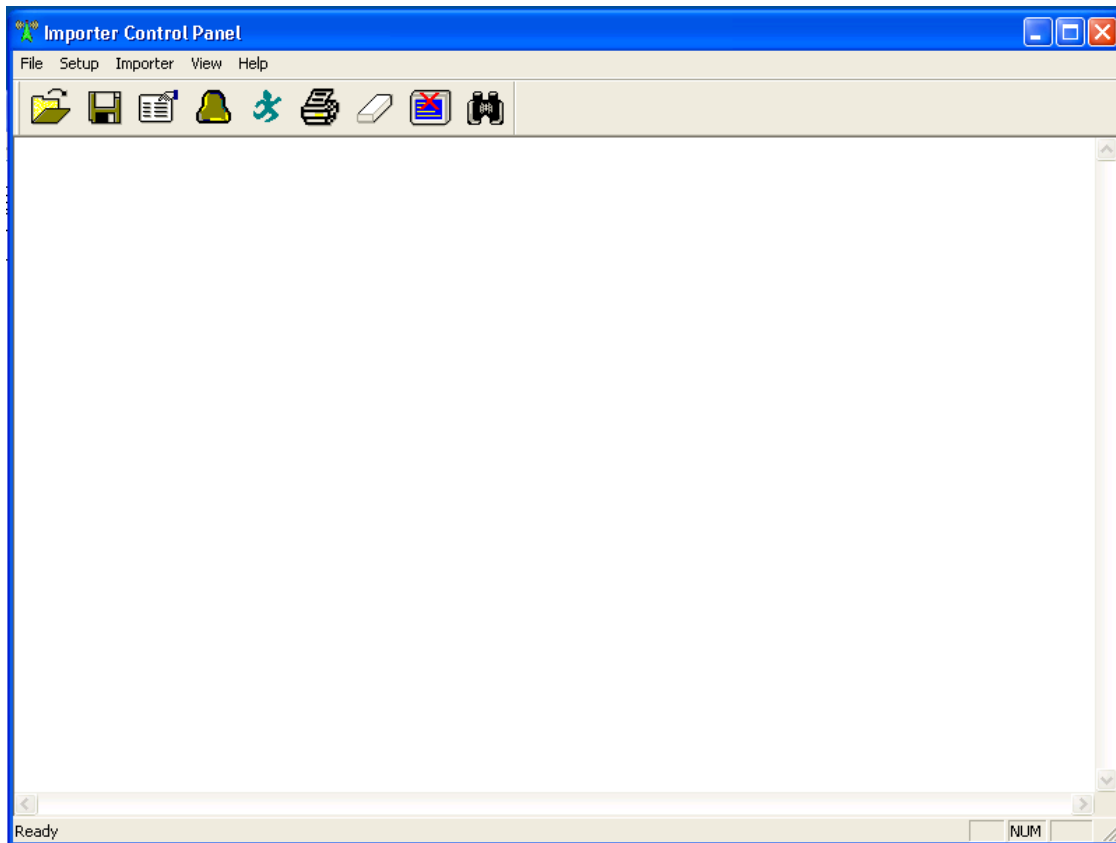
### 8.3 Control Panel

While each of the Importer components can be started individually, the recommended method to start, configure, and monitor the Importer is through the Control Panel. The Control Panel allows the hiding of the various Importer component windows, reducing the amount of clutter on the desktop. The Control Panel can also be used to set the Importer configuration information, eliminating the need to directly edit the XML configuration files. Finally, the Control Panel can be used to view and manipulate the log files created by the Importer components.

The Control Panel can be started by double-clicking desktop icon or the executable file found at: C:\Program Files\iBiquity Digital\Importer\Servers\ControlPanel.exe, or finally from the start menu select

*Start Menu -> iBiquity Digital -> Importer -> ControlPanel*

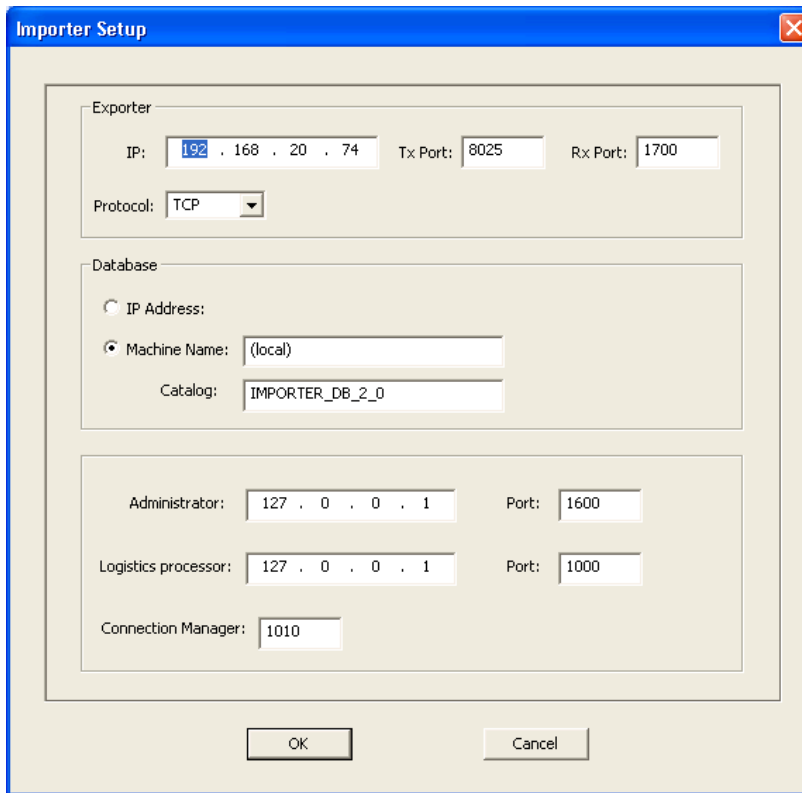
Once the application is started a Window similar to Figure 8-8 will be displayed.



*Figure 8-8 Control Panel Main Window.*

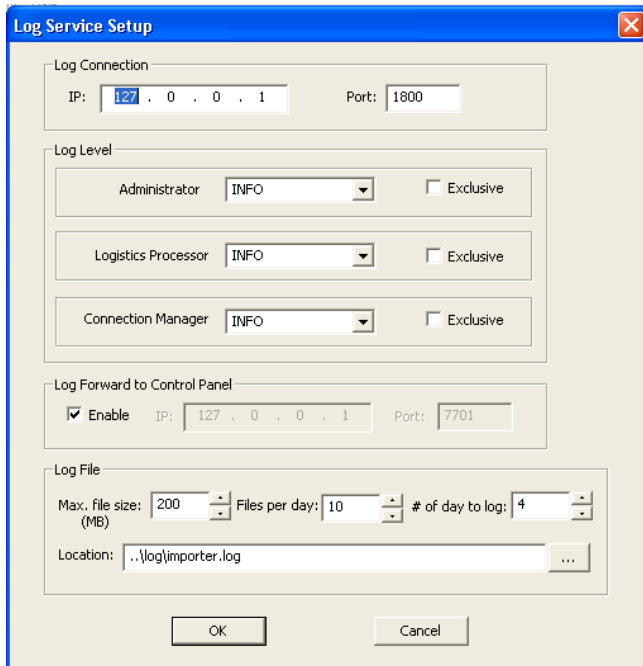
To close this window and only display an icon in the task tray, simply press X in the upper right hand corner. When the icon is green, it means the Importer components are running.

To edit the Importer configurations, press the Importer Setup icon or select Setup->Importer. A display box similar to Figure 8-9 will be displayed. From here all the Importer configuration items described in Section 7.2.2 can be edited and saved.



*Figure 8-9 Control Panel Importer Setup*

To edit the logging configurations, press the logging Setup icon or select Setup->Importer. A display box similar to Figure 8-10 will be displayed. From here all the logging configuration items described in Section 7.2.3 can be edited and saved.



*Figure 8-10 Control Panel Log Service Setup Dialog*

To start the Importer press the start Importer Icon or Importer->Start. To stop the Importer press the Stop Icon or Importer->Stop.

By default the log messages will be displayed in the control panel window. An example is shown in Figure 8-11. Error messages are displayed in Red, warnings in yellow and debug in black.

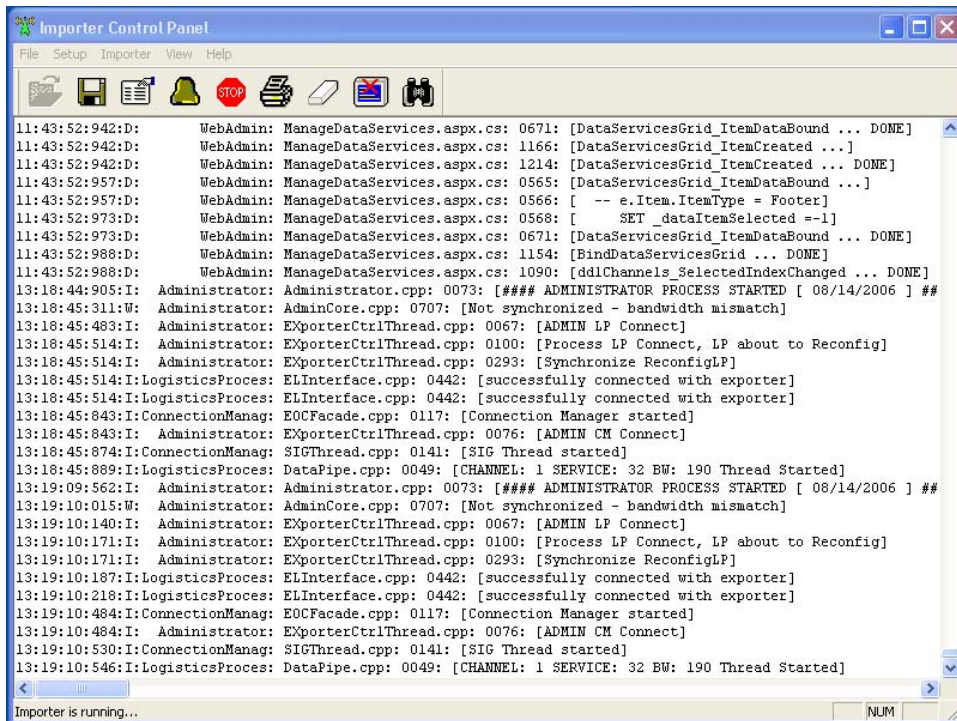


Figure 8-11 Control Panel with Log messages displayed.

To erase the contents of this window press the Eraser icon.

To save the contents of the window to a file press the file save icon.

To view a previously stored log file, press the file open icon. **Note: This can only be done when the Importer is not running.**

To enable or disable log messages, use the display icon.

To search for specific strings within a log file use the spyglass icon.

## 8.4 Database Management

The Users of the Importer may have customized their installation, added their Service Providers, Services, and configurations. This information is stored in the Importer database. The dBAdmin tool is provided so that this information is not lost and can be easily restored in situations where the system has crashed and a reinstall is required or during upgrades of the Importer software. The backups created using this tool should be stored in a safe location away from the Importer, so it is available when required. Backups can be taken manually in a scheduled manner like once a month or when major changes have been applied to the Importer configuration.

The Importer database can be backed up/restored or the user configuration information can be saved/merged. This backup and restore feature is used to backup up the Importer database in case of a system failure. The save and merge features are used when updating the Importer software.

This tool should be run on the Importer, by a user belonging to the Administrative group on the computer.

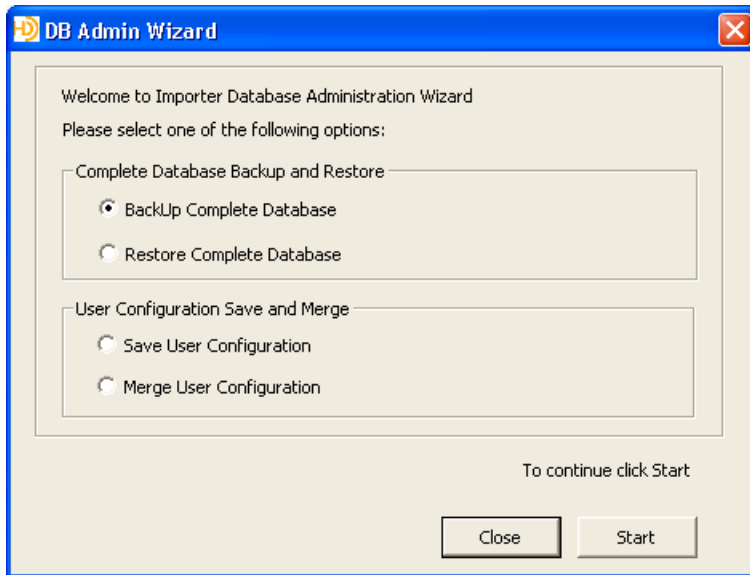
To start the *DBAdmin* tool, run the following application:

C:\Program Files\iBiquity Digital\Importer\servers\DBAdmin.exe

or if updating the Importer software, a Save should be performed before the installation, so run the application from the Install directory

C:\Installer\dBAdmin\DBAdmin.exe

Once the application is started a window similar to Figure 8-12 will appear. Follow the instructions presented in the ensuing screens to backup, restore, save, or merge the Importer database.



*Figure 8-12 Database Management Wizard Main Window.*

When using this tool all other Importer components should be shut down. The DB Admin tool uses Windows authentication to connect to the Database. Therefore the user logged on to Importer should be a **part of the Administrative group** on the Importer. When selecting any of the features (Backup, Restore, Save, or Merge) a window similar to Figure 8-13 will be displayed first. Select "(local) to connect to the SQL Server running on the Importer. Click Next. If the user has administrative access the various screens associated with the selected process will be displayed.



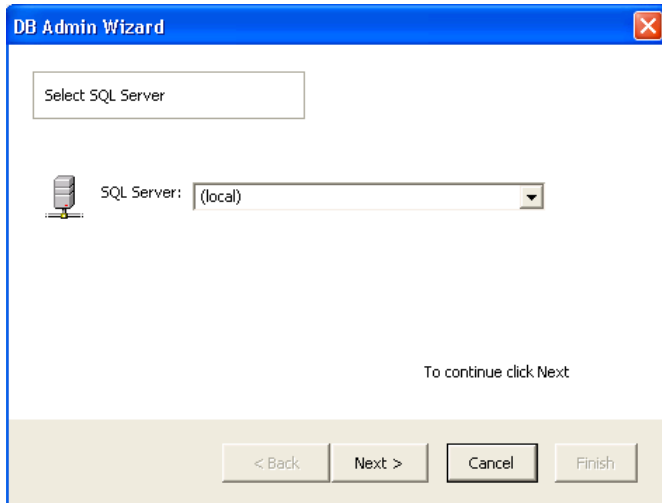


Figure 8-13 Database Management Wizard Authentication Window.

#### 8.4.1 Backup the Database:

Select “BackUp Importer Database” to back up the Database and click on “Start” and after the Authentication window is displayed, Figure 8-13, a dialog box similar to Figure 8-14 will appear. Enter and path and filename for the backup file. Make sure that the Backup file location is under the C: directory and not under a specific users directory. In the example shown in Figure 8-14, the location is in the personal folder of the current user and the backup cannot be created there. Instead select a directory directly under the C: drive. Make sure the Directory and the file name do not contain spaces. Alternately, a Network Drive can also be selected, example “\\server\share”. Click “Next” and a window similar to Figure 8-15 will appear.

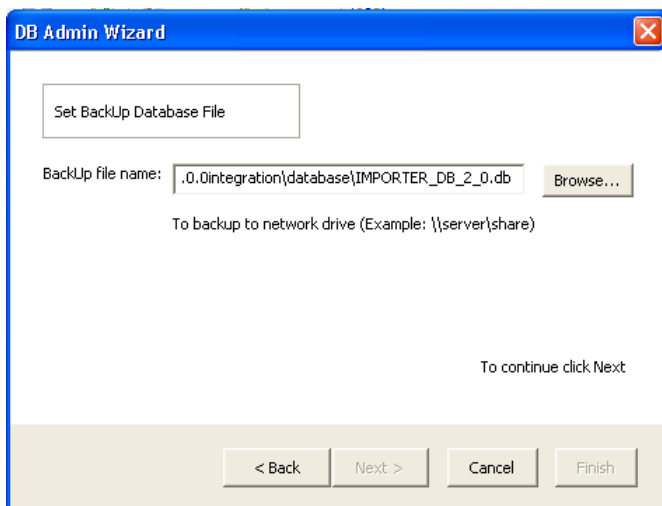


Figure 8-14 Database Management Wizard Backup Path.

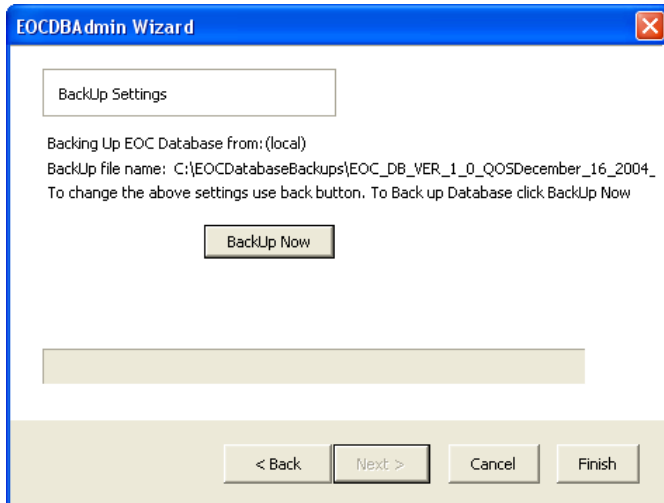


Figure 8-15 Database Management Wizard Backup Progress Screen.

Check the Back up Settings and click “BackUp Now” to start the back up of the EOC database. Click Finish when done.

#### 8.4.2 Restore the Database:

Select Restore Complete Database to restore the Database and click on “Start.”. After the Authentication window is displayed, Figure 8-13, a dialog box similar to Figure 8-16 will appear.

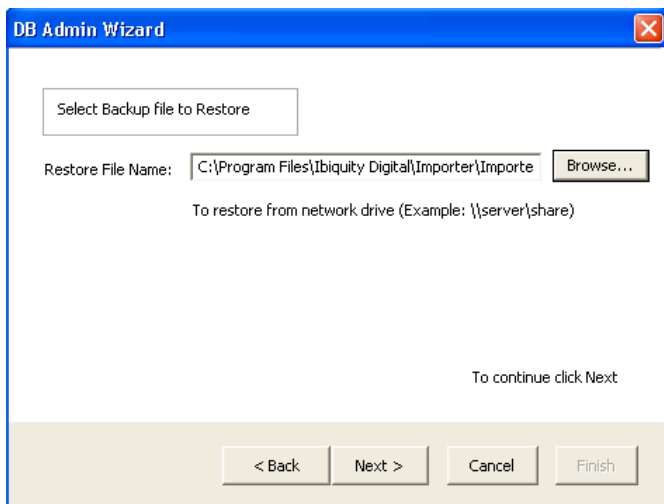


Figure 8-16 Path to Backup File

Check to see that the correct Server (local) is selected and the backup file is correct. Click Next and a window similar to Figure 8-17 is displayed. Click “Restore Now” to start the database restore. On completion click Finish to exit the Wizard.

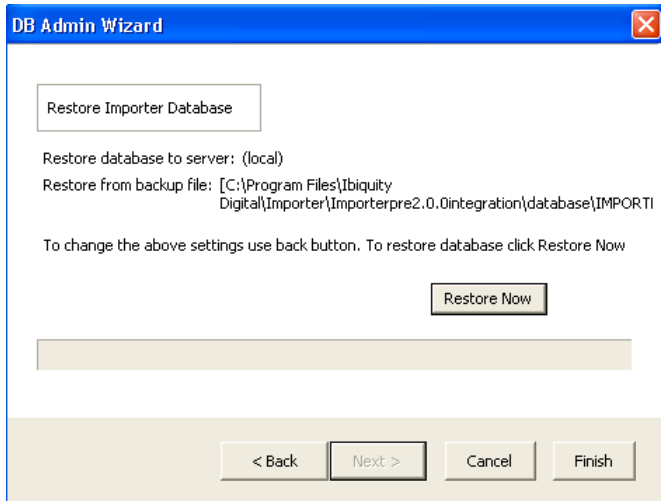


Figure 8-17 Restore Process Dialog

### 8.4.3 Save the Database

Select Save User Configurations to Save the user configuration information to a file and click on “Start.”. After the Authentication window is displayed, Figure 8-13, a dialog box similar to Figure 8-18 will appear.

Enter and path and filename for the save file and click Next and a window similar to Figure 8-19 will appear. Click “Save Now” to save the User configuration information. Finally, click Exit to finish.

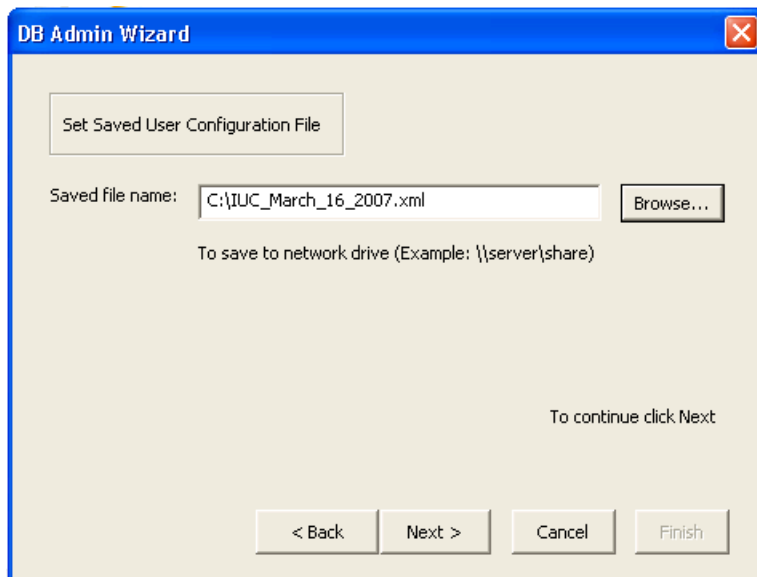


Figure 8-18 Database Management Wizard Save Path

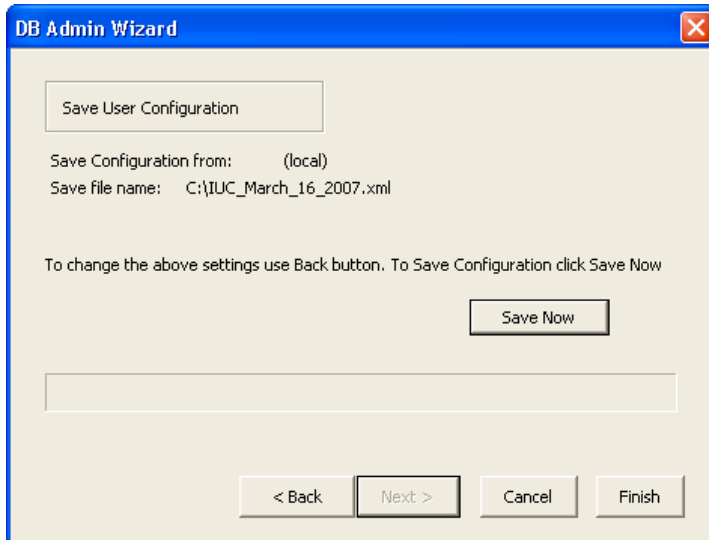


Figure 8-19 Database Management Save Progress

#### 8.4.4 Merge the Database

Select Merge User Configurations to merge the user configuration information into the new Importer database and click on “Start.”. After the Authentication window is displayed, Figure 8-13, a dialog box similar to Figure 8-20 will appear. Select the saved file to use. Click Next and a window similar to Figure 8-21 will be displayed.

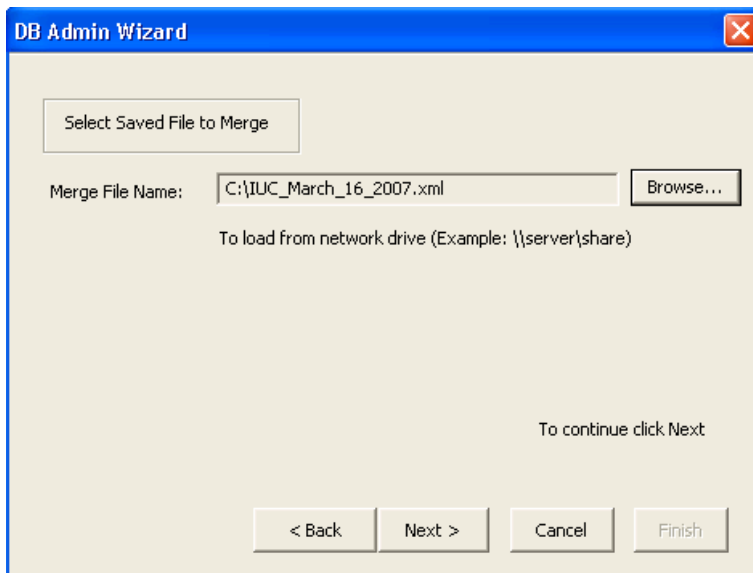


Figure 8-20 Database Management Merge dialog box

Click “Merge Now” to merge the User configuration information into the new database structure. Finally, click Exit to finish.

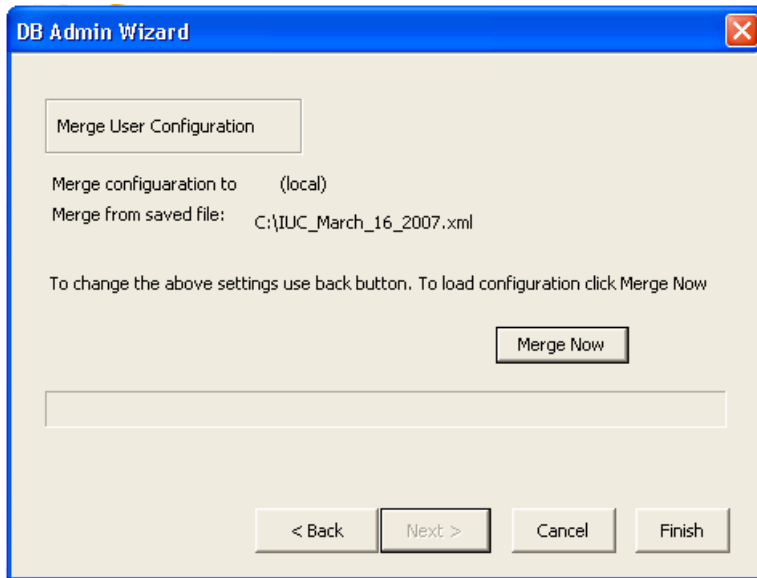


Figure 8-21 Merge progress dialog box

## 8.5 Changing Configurations

The Importer now allows Administrators the ability to dynamically change configurations, which may or may not have different services associated with the new configuration. While Importer versions greater than v2.x are a vast improvement over previous Importer versions, the dynamic nature of changing configurations is not totally seamless.

This section provides a few rules and guidelines when switching configurations.

1. When switching between any configurations that are not dynamic, all services or clients must be disconnected and reconnected.
2. When switching between hybrid and all-digital dynamic configurations, all services or clients must be disconnected and reconnected.
3. If a service or client is changing logical channels when configurations are being switched, these services or clients must be disconnected and reconnected.
4. If a data service or client's bandwidth is being reduced, be aware that significant latencies can occur as the Importer works to transmit all previously requested data packets at the reduced bandwidth
5. Depending on the type of bandwidth change being requested by an SPS service, outages will occur in the SPS service. These outages may last for up to a minute.