



IMAGING SYSTEM INSTALLATION GUIDE

Version 3.0

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System Design and Development
VISTA Imaging

Preface

This guide is written to assist IRM personnel to install the *VISTA* Imaging System V. 3.0 application. IRM personnel should have knowledge of workstations, Windows NT server and workstation software, and network component installation. This guide is intended to supplement (but not replace) installation manuals provided by the vendor of Imaging System components.

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Chapter 1 Introduction

1.1 The *VISTA* Imaging System

The *VISTA* Imaging System is an extension of the Veterans Health Information System Technology Architecture (*VISTA*) hospital information system that captures clinical images, scanned documents, and other non-textual data files and makes them part of the patient's electronic medical record. Image and text data are provided in an integrated manner that facilitates the clinician's task of correlating that data and making patient care decisions in a timely and accurate way.

The system is designed to provide the treating physician with a complete view of patient data, and at the same time allow consulting physicians to have access to that image and text data. It serves as a tool to aid communication and consultation among physicians -- whether in the same department, in different medical services, or at different sites.

The *VISTA* Imaging System is unique in that management of the medical images is an integral part of a hospital information system.

VISTA Imaging workstations located throughout the hospital capture and display a wide variety of medical images including...

- Cardiology
- Bronchoscopy
- GI endoscopy
- Hematology
- Surgical Pathology
- Surgery
- Dermatology
- Radiology

Note: It is anticipated that this list will broaden even more in the future.

1.1.1 The *VISTA* Imaging System Components

The *VISTA* Imaging System is composed of a variety of components, including...

- Magnetic RAID and optical disk jukebox servers
- Workstation hardware and software
- Image producing devices
- DICOM interfaces
- A network which integrates all these components with the *VISTA* Hospital Information System

The following overview describes the individual components:

Imaging Workstations: The imaging workstation platform is based on Pentium class systems containing a PCI or AGP video adapter with at least 4 MB RAM, and an optional image capture board. The use of a high-resolution XVGA color monitor allows the simultaneous display of images with clinical text. The workstation meets clinicians' needs for...

- True color displays of up to 16 million colors per pixel to handle pathology, dermatology, and endoscopy images
- Variable spatial and color/grayscale resolution
- Digital image capture on the workstations

Diagnostic Workstations: The diagnostic workstation is a Windows-NT based platform that meets the following basic requirements:

- Pentium III 800MHz (or better) processor
- 256-1000 MB RAM (minimum RAM depends on typical exam size)
- DOME Md4PCV or Md5PCX display adaptors
- 100 megabit (or better) network card (dependent on number of workstations at site)
- 1, 2, or 4 high-resolution grayscale monitors

A dedicated and properly configured workstation running VistARad software (described below) is suitable for primary diagnostic interpretation of radiology exams

Note: All equipment for use with the VistA Imaging System must be tested for compatibility and approved by the VistA Imaging project team. For a list of approved equipment, refer to the Imaging System Planning Document and Approved Equipment List, available at:
<http://vaww.va.gov/imaging/IMGplanproc.htm>.

Local Area Imaging Network: The *VISTA* Imaging System uses a local area network (LAN) to connect *VISTA* Imaging workstations to image file servers and to the main *VISTA* Hospital Information System that runs M. The local area network uses Fast Ethernet or Gigabit Ethernet technology.

RPC Broker: The *VISTA* RPC Broker software allows workstations to connect to the *VISTA* systems using the TCP/IP protocol and retrieve information from the *VISTA* database.

Imaging Servers: All images are stored on file servers that are on a network switch port separate from the *VISTA* HIS servers. This ensures that broadcast traffic does not adversely affect the performance of the *VISTA* HIS core systems. Multiple magnetic and optical disk file servers are used to store images.

Magnetic image file servers are used to store the most recently acquired and accessed image files. These are currently based on the latest Pentium class systems and run Windows NT Server Software. These servers were chosen for their...

- Speed

- Cost
- Simplicity
- Ability to support multiple protocols including TCP/IP
- Accessibility over wide-area networks and by dial-in

As more images are captured, older images should be moved to less expensive online storage media. Optical disk jukeboxes suit this purpose.

The *VISTA* Imaging System includes software to manage the automatic migration of files between magnetic and optical disk servers. Optical jukeboxes provide reasonably low per megabyte costs and good image retrieval performance. The cost of jukebox storage has been decreasing with technology advances.

Workstation Software: Workstations run the *VISTA* Imaging Display and Capture software. These windows-based applications allow...

- Acquisition of images
- Display of the complete multimedia online patient record

A number of *VISTA* packages are currently integrated with images, including...

- Medicine
- Surgery
- Laboratory
- Radiology
- CPRS
- Text Integration Utility (TIU), supporting Progress Notes and Consults

The *VISTA* Imaging System uses FileMan files on the *VISTA* servers. These files hold image information in M globals, including...

- Multimedia data type information
- Image location
- Image attributes
- Control information for the imaging software

Windows software, that runs on *VISTA* Imaging System workstations, use this information to access image files and control image display. *VISTA* Imaging workstations should also run security and virus protection software.

Diagnostic Workstation software: Diagnostic workstations run VistARad software. VistARad is used for the primary interpretation of digital images acquired by CR, CT, MRI, and other modalities. Using VistARad, you can locate and display current exams, prior (comparison) exams, and text-based reports.

VistARad is integrated with the Radiology package, and bases its exam lists on Status Code definitions stored in the Radiology package's Examination Status file (#72).

Optionally, workstations using low-resolution monitors can run VistARad software for non-diagnostic image review.

Note: Additional licensing fees are needed for workstations running the VistARad software without DOME hardware. For information, contact the VistA Imaging project team.

Instrument Interfaces: Images may be acquired from a number of different sources, including medical devices such as the following:

- Endoscopes
- Ultrasound scanners
- Video cameras which can be connected to microscopes or ophthalmoscopes
- Handheld still digital cameras
- X-ray scanners
- Interfaces to medical systems, such as CT Scanners, Computed Radiography capture modalities, commercial Picture Archiving and Communications Systems (PACS) and electrocardiogram systems
- Marquette MUSE EKG Management system

Some of these sources can send image data directly to the *VISTA* Imaging workstation. Others will require an interface device to communicate with the workstation. Still others communicate with a network system such as a DICOM interface system to transfer images to the *VISTA* Image Servers.

DICOM is the Digital Imaging and Communications in Medicine standard developed by the American College of Radiologists and the National Electrical Manufacturers Association. The DICOM standard brings open systems technology to the previously proprietary medical imaging market. Commercial pressures require DICOM to be universally supported by all radiology imaging equipment vendors. While earlier versions of the ACR-NEMA standard were originally developed for radiology imaging, this version of the DICOM standard is being adapted and extended to other medical imaging modalities. Currently, the American College of Cardiology, the American Society of Gastrointestinal Endoscopists, the College of American Pathologists, the American Dental Association (ADA), and the American Academy of Ophthalmology are working to include cardiology, endoscopy, pathology, dental and ophthalmology images in DICOM.

Background Processor Workstation: It is currently necessary to have at least one background processor workstation on the network to perform utility functions in the background such as copying image files to and from the Jukebox.

1.1.2 Workstation Placement

Clinical Workstations are typically located in a number of departments and patient care areas. Each site must decide where to locate their workstations based on the services that will be using them. The CPRS application will generally be run on the *VISTA* Imaging workstations.

Image input workstation locations may include the...

- Cardiology department
- Gastroenterology endoscopy lab
- Bronchoscopy examination room
- Surgical pathology reading room
- Hematology laboratory

- Dermatology and rheumatology clinics
- Operating room
- Radiology and nuclear medicine department

Image display workstations should be placed in conference areas, including...

- The auditorium
- Service conference rooms
- Ward conference areas

... As well as patient treatment areas on...

- Wards
- Clinics
- Emergency room
- Intensive care units

A larger monitor or projector should be used in conference areas. Special color image printers can be located in the medical media department, or another convenient location. Ordinary printers can be used to print images and reports from the **VISTA** Imaging.

A medical center may want to incrementally build their imaging system, serving a subset of medical services in the beginning and increasing the number of workstations gradually. There are clusters of services that see the same patients and need to share images to provide treatment. They often hold joint conferences weekly. Workstations will be best utilized if they address the needs of such clusters. Generally, all services need access to radiology images.

1.1.3 System Utilization Studies

In order to monitor workstation usage to meet regulatory requirements and for licensing purposes, the **VISTA** Imaging Project is logging a number of workstation statistics. This information also provides valuable feedback to the system developers and Information Resources Management (IRM) support staff. It may help determine the need for additional user training in particular areas or to assist in decisions related to the location of **VISTA** Imaging workstations.

1.1.4 Summary

The **VISTA** Imaging System has been received very well by its users, and serves as an incentive for clinicians to use the automated patient record system. The **VISTA** Imaging System is meeting real needs for integrated image and text data that cannot be met in other ways.

1.2 Site Requirements for Use of the VISTA Imaging System

1.2.1 Package Requirements

The **VISTA** Imaging System is designed to be used in conjunction with the following **VISTA** packages. Kernel, FileMan and RPC Broker are required packages the others will depend on the site's implementation requirements.

- Kernel V. 8.0
- FileMan V. 22
- RPC Broker 1.1
- Medicine V. 2.3– required for capturing images to the Medicine package.
- Laboratory V. 5.2 – required for capturing images to the Laboratory package.
- Radiology V. 5.0 – required for capturing images to the Radiology package.
- Surgery V. 3.0 – required for capturing images to the Surgery package.
- TIU V. 1.0 – required for capturing images to the Text Integration Utility package.
- PIMS V 5.3 - required for displaying Patient Profile report and patient security lookup.
- Health Summary 2.7 – required for displaying Health Summary report.

The software developers for the following patches have developed callable routines to support GUI applications such as the *VISTA* Imaging System. Please ensure that the following patches are installed for the packages with which *VISTA* Imaging will be used. During the install process a warning will be displayed for each of the patches that are missing. Patches are available via the National Patch Module on FORUM.

Patch Name:

DG*5.3*124
DG*5.3*249
DG*5.3*265
DG*5.3*276
DG*5.3*277
MC*2.3*30
SR*3.0*66
LR*5.2*121
TIU*1.0*47
TIU*1.0*63

1.2.2 User Access to Workstations

Access to the workstations must be restricted in order to prevent...

- Modifications to the workstation setup, files, and directory structures
- Filling of the disk with extraneous software and internet files

Methods are described in Appendix A of this document and in the *VISTA* Imaging System Security Guide.

1.2.3 Staffing Requirements

VA staffing guidelines recommend that a network of 50 workstations should have one FTEE to manage the workstations; a full time network manager may also be needed. An imaging network is similar. We have found that at least one FTEE is needed for a 50-workstation imaging network. A site with fewer workstations and servers may be able to reduce this to a minimum of one half FTEE. The *VISTA* Imaging System manager will need to be familiar with PC hardware, software, setup, and trouble-shooting. This individual should also be familiar with Windows NT and M. There is training available commercially, and within the VA, in these areas.

It is very important to have clinical ADP support staff to assist users in interfacing imaging devices and other systems to the *VISTA* Imaging workstations and network. They will need to provide training to clinicians using the system, especially during the first year of operation. At smaller imaging system installations, a single individual with appropriate background could both support the network and serve as the clinical ADP support person.

1.2.4 Contractors' Services

It is essential that sites provide maintenance on imaging components. Maintenance contracts provide this service with the minimum of VA staff time. VA staff will still need to be familiar with common problems. However, once the problem is identified, its resolution should become the contractor's responsibility.

It is important to have a "hot spare" workstation available at all times. *VISTA* Imaging workstations are used during medical procedures and clinical conferences. If a workstation is not available, this will interfere with the delivery of clinical care. This requires that IRM be ready to attend to trouble calls from imaging users immediately.

It is recommended that sites contract for installation of *VISTA* Imaging System core components, including NT file servers, jukebox and associated storage management software. The network operating system should be installed before delivery. It is also possible to purchase expertise in network installation, configuration, and maintenance. If this is done, be sure to require network documentation from the contractor.

1.2.5 Imaging System Approved Components

The *VISTA* Imaging System consists of a group of off-the-shelf components that are integrated to create a unique system. Some of these components are on the cutting edge of technology. For some components, there are many variations available in the market place. However, each variation has subtle differences that may not be known to their vendors.

The *VISTA* Imaging System is regulated by the FDA as a medical device. This means that all hardware used with *VISTA* Imaging must be tested by the *VISTA* Imaging Project Team. It also means that no modifications can be made in the field to *VISTA* Imaging software.

Therefore, the *VISTA* Imaging staff has carefully tested equipment and software that is recommended to be sure they meet specified requirements, and to determine a configuration to best allow integration with other components. *VISTA* Imaging staff maintain a list of tested and supported equipment, and require that sites use equipment from this list to receive VA support.

Note: All equipment for use with the *VISTA* Imaging System must meet specifications defined by the *VISTA* Imaging Project Team. Please see the *VISTA* Planning Document and Approved Equipment List.

Users may ask to run other software on an imaging workstation. For support and security reasons, we recommend some limitations on user access to the workstation. In any case, a site may choose to restrict its users from running other software, such as word processing, if this is felt not to be a cost-effective use of the imaging equipment.

Note: Additional software (such as word processors) is NOT to be installed on diagnostic workstations running VistARad. Only software expressly approved by the VistA Imaging Group team may be installed on diagnostic workstations running VistARad.

1.2.6 Reporting Problems

The *VISTA* Imaging System is a complex system. If you encounter problems that cannot be handled at the site, please document them in a NOIS call and contact the National *VISTA* Support desk. You will be referred to the *VISTA* Imaging support team.

1.3 Imaging System Evolution

1.3.1 Introduction

A hospital imaging system can be implemented at one time or incrementally over a period of time. Even if equipment is purchased and installed at one time, it is best to gradually add users and service functionality to the system. It takes time for the IRM staff to be trained and gain experience in how to support imaging technology. Also, it takes time for the initial users of the system to become comfortable enough with the applications to use them during procedures and conferences. Devices within services will need to be connected to workstations. Clinical advocates, or ADPACS, are very helpful in bringing together clinical image users and IRM staff to implement the capture of new image types. This is exciting and rewarding but does require effort on the part of IRM.

Begin by identifying an initial group of interested users who will share images. There are clusters of services that see the same patients and need to share images to provide treatment. For example, the G.I. endoscopy lab may examine a patient and perform a biopsy. The specimen is then sent to the laboratory service. The pathology report may indicate that surgery is necessary. Typically, these three services hold a weekly conference where they plan treatment for patients. Another group is those services participating in Tumor Board Conferences. Radiology images are used by everyone. EKGs are also of wide interest. Workstations will be best utilized if they address the needs of such clusters. Select such a cluster as the starting point.

The G.I., surgical pathology, surgery and radiology services are excellent candidates for initial users of the *VISTA* Imaging System. Workstations would be placed in the following areas:

- G.I. endoscopy suite
- Surgical pathology office
- Conference rooms
- Operating room suite

VISTA Imaging workstations should be installed where they will be most beneficial. It is useful to differentiate between those workstations that are used to capture images and those workstations that are used predominately to display images. Image capture workstations are placed near the source of the images, while image display workstations should be located in common areas (e.g., conference rooms, ICUs, shared ward offices, etc.). In addition, *VISTA* Imaging software can be loaded on workstations in clinicians' offices.

As imaging systems grow, they require...

- Expanded network capacity
- Additional image file server space
- A bigger optical disk jukebox
- Additional IRM management

1.3.2 Network Topology Requirements

Contact the VHA Architecture Planning Workgroup (APW) when planning network infrastructure for your site. The network subgroup can be reached by sending a mail message to the *VHA CIO APW Network sub-group* mail group on Exchange. Be sure to send a copy of any draft plans to the *VISTA* Imaging team for review.

1.3.3 File Servers and Jukebox Requirements

In order to estimate file server and jukebox requirements, it is important to consider image file size and image acquisition rates. Sites should contact their *VISTA* Implementation Manager for preparation of a *VISTA* Imaging System proposal. Further information to assist you in selecting appropriate hardware can be found in the *VISTA* Imaging System Planning Document.

1.3.4 Future Plans for the *VISTA* Imaging System

Imaging system technology is new, complicated, rapidly improving, and now affordable. PC processor and magnetic disk technology seems to double, in both speed and capacity, every 18 months. Ethernet has made an order of magnitude leap to 1000 Mbits/second. High-resolution diagnostic quality 2k x 2k display drivers and gray-scale monitor technology is now available for PCs. Jukebox hardware/software technology is becoming more available at reasonable prices. The DICOM standard that is well established for radiology equipment is being adopted by the other members of the medical imaging community. Off-the-shelf software is available for many image-related functions. All of these factors work to favor the incremental construction of the *VISTA* Imaging System that is being described in the following paragraphs.

The following list describes several major development efforts underway within the *VISTA* Imaging Project:

- New versions of *VISTA* Imaging System will be further enhanced to provide more features for the multimedia patient record. There will be more options to allow customized views and additional linkages between images and text. Additional types of data will be supported.
- Document management support will be expanded. A number of sites are interested in document imaging for medical records, clinical diagrams, or handwritten forms.
- Enhancements will be made to facilitate telemedicine and the routing of images to other sites.
- There will be increased integration with other *VISTA* packages.
- More interfaces with commercial image management systems.

Chapter 2 **VISTA** Imaging Core Infrastructure Installation

This chapter describes the installation process for the **VISTA** Image System. The following components will be installed:

- Windows NT Server for storage of images
- **VISTA** Hospital Information System Image Management Software
- Background Processor system and software
- **VISTA** Imaging workstation software
- OTG Disk Extender Jukebox Software
- Optional **VISTA** Imaging Components

See the DICOM Gateway Installation Guide for detailed instructions on installing and interfacing the **VISTA** Imaging DICOM Gateways with DICOM compliant modalities.

Please refer to the **VISTA** Imaging Planning Document and Approved Equipment List for information about sizing and procurement of equipment. This document can be downloaded from the **VISTA** Imaging web site at the following URL:

<http://vaww.va.gov/imaging>

2.1 Assumptions

To install all **VISTA** Imaging System components, the staff must have a working knowledge of Windows NT and **VISTA**.

This guide does not cover specific hardware platform installation and implementation instructions. It is intended to give IRM staff general uniform guidelines for configuring the **VISTA** Imaging System. Each hardware vendor is responsible for providing specific guidelines for installation and implementation of their hardware platform.

2.2 Imaging File Server Setup

2.2.1 Install and Configure Windows NT Server Software

According to VA Standards, each site should have only one resource domain and all servers should be configured as a member of the resource domain.

Configure each server as a standalone server (not as a Primary Domain Controller (PDC) or a Backup Domain Controller (BDC)). Make the server a member of the resource domain for the site.

Note the following information:

- According to VA Naming Conventions, your resource domain will be VHAxxx where xxx is the site's 3-character assigned name (e.g., VHAWIM is the resource domain name at

Wilmington). Some sites use the VISN domain as their resource domain. Their resource domain will be VHAXx where xx is the VISN number to which the site belongs (i.e., VHA05 is the domain Name for VISN5).

- Recommended Imaging file server name:

VHA + 3-letter site name + IMM + 1 digit (sequential)

i.e., VHAWASIMM1 or VHAWIMIMM1

- Recommended Cluster Name: (if you are using NT clustering)

VHA + 3-letter site name + CLU + 1 sequential digit for cluster number

The Imaging cluster number is usually set to “2” to allow the local Exchange cluster to begin with “1”.

i.e., VHAWASCLU2

Clusters are generally set-up by the imaging equipment vendor during the initial hardware and operating system installation.

2.2.2 Domain Trusts

Review the following information on domain trusts:

- In order to maintain a high level of application security and to protect unwanted access to patients' images, the *VISTA* Imaging servers should be configured member servers to the resource domain. Do not configure trusts to any other domain.
- All *VISTA* Imaging System users will log into the master domain for their site or VISN. Consult your VISN domain document for more detailed information. Image folders will be accessed through shares.

2.2.3 Creating Imaging Users

User accounts should be created in the master domain and computer resources will reside in the resource domain. No user accounts should reside in the local resource domain unless the site does not have a master/resource domain trust relationship with their VISN or other master domain. Where there are problems with the trust relationship, it may be acceptable to have service accounts created in the local resource domain. However, be aware that this must be documented as it may present problems when the conversion to *Windows 2000* is done.

Once user accounts are created in the master domain, access to local resources, such as network shares, is given by granting share access to the master domain account.

The following recommendations are given for creating imaging users (detailed instructions follow):

1. Create a master user account. This account will be used by the imaging application and will be given privileged access to the image shares. Individual user accounts or groups (other than the master user account) should not be granted any permissions to the image shares.

Do not share this account name and password with any users. This account name and password will also be stored in encrypted form in the Imaging Site Parameters file (2006.1) on the VISTA system. If the password is compromised for any reason, the site must change the password in the master NT domain user file and in the Imaging Site Parameter file (2006.1) on VISTA.

2. Create a master admin account. This account will be used to log into the imaging utility systems such as the Background Processor and DICOM Gateways. This account will have permissions for storing and retrieving files from the image shares.

Note: Previous recommendations were for the use of NT groups. Access to the shares was given to these groups. Under the VISTA Imaging System, the use of groups has been removed for several reasons including, security, ease of configuration, and the ability to quickly view who has access to the shares.

In the Master/VISN domain for the site, do the following:

1. Create an NT user account called VHAxxxIU (This account is also referred to as “the IU account” in this manual).

Note: xxx should be replaced with the assigned 3-character site name.

Properties

- User cannot change password
 - Password never expires
2. Assign the IU account a password that will not be known by any users of the system. The IU account will be used only by the imaging application to access the image shares. This account name and password will be added to the Imaging site parameter file during the VISTA File setup section of this manual. All users will logon to the workstation with their normal VISN domain account.
 3. Create a user called VHAxxxIA. (This account is also referred to as “the IA account” in this manual) Set the image admin account characteristics as follows:

Properties

- User cannot change password
- Password never expires

On each of the Imaging file servers, do the following:

1. Set up user rights for the master domain IU account that was just created. To set User Rights, in NT, start User Manager for Domains, open the *Policies* menu and select *the User Rights* menu option.

Policies/User Rights for the master domain IU account

- Access this computer from network

2. Set up user rights for the master domain IA account that was just created. To set User Rights, in NT, start User Manager for Domains, open the *Policies* menu and select *the User Rights* menu option.

Policies/User Rights for the master domain IA account

- Access this computer from network
- Backup files & Directories
- Restore files & Directories
- Logon Locally

2.2.4 Creating Folders and Shares

On the Imaging file servers:

1. Create an IMAGE folder that will contain all of your captured image files on the NT file server. We recommend having your images stored on a separate partition or disk than your NT operating system files to make it easier to recover from a corrupted partition.
2. If you divided your drive into multiple partitions, create an image folder on each of the partitions (except the operating system partition).
3. Share the image folder(s) as IMAGE n \$, where "n" is a sequential number beginning with 1 (e.g., IMAGE1\$ for the first partition, IMAGE2\$ for the second partition, etc.).

Note: The \$ at the end of image share name makes it a hidden share -- it will not show up in the browse list.

Use the following share and folder permissions:

Share Permissions

VH A_{xx} \VH A_{xxx} IU – Change control

VH A_{xx} \VH A_{xxx} IA, Administrators - Full control

(**Note:** Substitute xx and xxx with your VISN domain and site code)

File/Folder Permissions

Everyone (local NT group) - Change control
Administrators (local NT group) - full control

Note: It is important that you remove the *Everyone* group and the *VHAXX\Domain Admins* group from the Share permissions. These groups have full control by default.

2.2.5 Server Security

Because of patient confidentiality requirements, the VISTA Imaging System must maintain a high level of security for the image files and shares. The VISTA Imaging System, when configured properly, will not permit user access to shares where patient images reside. The application will manage its own connections to the shares when files are stored and retrieved. Individual users should not have access to browse image shares. Sites are required to follow these guidelines for configuring imaging file servers and shares.

There are several ways to administer security on the servers. Review the following information:

- At a minimum, you should check the number of shares that are being advertised from the server and be sure that the correct access privileges are given to shares and folders. This will prevent unauthorized access to files on the server and reduce the risk of virus attacks. Use NT Server Manager to review and modify shares on the imaging file servers. Ensure that there are no shares with permissions set to allow the *Everyone* NT group Full Control. This is the default when a share is created.
- Be sure to change any default account passwords such as guest and administrator.
- Virus protection software must be installed on the servers to protect imaging file servers against viruses. The VA currently recommends McAfee NetShield for NT File servers. See the MISS web site (<http://vaww.va.gov/miss>) for more information on installing NetShield.

2.3 VISTA Hospital Information System Management Software Setup

2.3.1 VISTA RPC Broker Installation

If your site does not already have VISTA RPC Broker installed, perform the following steps to install the Kernel Broker software on the VISTA server.

1. Use KIDS to install XWB1_x.KID (see broker documentation for details).
2. In the VAH UCI of your production account of the M system where you want VISTA Imaging workstations to login, use the M command `D STRT^XWBTCP(9200)` to start the broker listener job.

Note: Port 9200 is used as an example.

3. Add this command to the M system startup file in order to start the RPC Broker each time the M server(s) are rebooted.

2.3.2 Loading Imaging Package - Kids Installation

The VISTA Imaging System files and routines are distributed as a KIDS package named MAG3_0.KID. The VISTA site parameters are configured using the configuration utilities in the Background Processor that are described in the Background Processor section below. Please note that the MAG3_0.KID build does a check on the required applications and patches outlined in section 1.2.1. Follow these steps to load the VISTA Imaging Package and install KIDS:

Note:

- When placing imaging globals, be sure to journal all of MAG*. Failure to do so may compromise database integrity and you may encounter loss of patient image data when a backup is restored and journaling is rolled back.
- Before installing the KIDS package, ask all VistARad users to log out. If VistARad workstations are in use during a KIDS install, users may experience a transitory error and will need to exit and re-log on into Vista.

1. Copy the file MA3_0.KID to a folder on your M Server Computer.
2. Log into the M system.
3. Set your DUZ(0) variable to “@”.
4. Run the Kernel Installation & Distribution System (KIDS) Option.

The following is a screen capture of the Kernel Installation & Distribution System (KIDS) Option.

```

Select OPTION NAME: XPD MAIN          Kernel Installation & Distribution System

      Edits and Distribution ...
      Utilities ...
      Installation ...

Select Kernel Installation & Distribution System Option: INstallation

1      Load a Distribution
2      Verify Checksums in Transport Global
3      Print Transport Global
4      Compare Transport Global to Current System
5      Backup a Transport Global
6      Install Package(s)
      Restart Install of Package(s)
      Unload a Distribution

Select Installation Option: 1 Load a Distribution
Enter a Host File: MAG3_0.KID

KIDS Distribution saved on Mar 19, 2002@16:50:55
Comment: Vista Imaging v3.0 with VistARad

This Distribution contains Transport Globals for the following Package(s):
  IMAGING 3.0
Distribution OK!

Want to Continue with Load? YES//
Loading Distribution...

IMAGING 3.0

```

```
Use INSTALL NAME: IMAGING 3.0 to install this Distribution.
```

- 1 Load a Distribution
- 2 Verify Checksums in Transport Global
- 3 Print Transport Global
- 4 Compare Transport Global to Current System
- 5 Backup a Transport Global
- 6 Install Package(s)
Restart Install of Package(s)
Unload a Distribution

```
Select Installation Option: INstall Package(s)
```

```
Select INSTALL NAME: IMAGING 3.0 Loaded from Distribution 3/20/02@09:07:4
```

```
=> VistA Imaging v3.0 with VistARad ;Created on Mar 19, 2002@16:50:55
```

```
This Distribution was loaded on Mar 20, 2002@09:07:49 header of  
VistA Imaging v3.0 with VistARad ;Created on Mar 19, 2002@16:50:55  
It consisted of the following Install(s):
```

```
IMAGING 3.0  
Checking Install for Package IMAGING 3.0
```

```
Install Questions for IMAGING 3.0
```

```
Incoming Files:
```

```

2005 IMAGE
2005.02 OBJECT TYPE (including data)
2005.03 PARENT DATA FILE (including data)
2005.1 IMAGE AUDIT
2005.2 NETWORK LOCATION
2005.4 IMAGE HISTOLOGICAL STAIN (including data)
2005.41 MICROSCOPIC OBJECTIVE (including data)
2005.81 MAG DESCRIPTIVE CATEGORIES (including data)
2006.03 IMAGE BACKGROUND QUEUE
2006.031 IMAGE BACKGROUND QUEUE POINTER
2006.032 JUKEBOX
2006.033 OFFLINE IMAGES
2006.1 IMAGING SITE PARAMETERS
2006.17 MUSE VERSIONS (including data)
```

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2006.18	IMAGING USER PREFERENCE
2006.19	IMAGING USERS (including data)
2006.5	PACS MESSAGE
2006.51	DICOM DATA ELEMENT DICTIONARY
2006.511	DIAGNOSTIC INFO FIELD
2006.52	DICOM MESSAGE TEMPLATE DICTIONARY
2006.53	DICOM UID DICTIONARY
2006.531	EXTENDED SOP NEGOTIATION
2006.54	PDU TYPE
2006.55	DICOM WORKLIST PATIENT
2006.56	DICOM WORKLIST STUDY
2006.563	DICOM GATEWAY PARAMETER
2006.564	DICOM QUEUE
2006.57	DICOM HL7 SEGMENT
2006.571	DICOM RAW IMAGE
2006.572	EXAMINATION COMPLETE
2006.573	GE PACS QUERY/RETRIEVE
2006.574	DICOM IMAGE OUTPUT
2006.575	DICOM FAILED IMAGES
2006.5761	DICOM MESSAGE STATISTICS
2006.5762	DICOM INSTRUMENT STATISTICS
2006.5763	DICOM PACS STATISTICS
2006.5764	DICOM LOCAL INSTRUMENT STATISTICS
2006.577	DICOM FIFO QUEUE

2006.58 DICOM LOG

2006.581 INSTRUMENT DICTIONARY

2006.582 MODALITY TYPE DICTIONARY

2006.583 MODALITY WORKLIST DICTIONARY

2006.584 TCP/IP PROVIDER PORT LIST

2006.585 USER APPLICATION

2006.586 PROVIDER APPLICATION

2006.589 IMAGING SERVICE DICTIONARY

2006.592 DICOM UNDEFINED MODALITIES

2006.593 DICOM INCOMPLETE IMAGE

2006.599 DICOM Error Log

2006.63 MAG RAD LIST DATA ELEMENTS (including data)

2006.631 MAG RAD LISTS DEFINITION (including data)

2006.634 MAGJ ZLIST SEARCH

2006.65 MAG RAD PRIOR EXAMS LOGIC (including data)

2006.69 MAG VISTARAD SITE PARAMETERS

2006.79 DICOM ROUTINE COPY

2006.8 BP WORKSTATIONS

2006.81 IMAGING WINDOWS WORKSTATIONS

2006.82 IMAGING WINDOWS SESSIONS

2006.95 IMAGE ACCESS LOG

Incoming Mail Groups:

Enter the Coordinator for Mail Group 'OFFLINE IMAGE TRACKERS': DOE, JOE
JD

Want KIDS to Rebuild Menu Trees Upon Completion of Install? YES// NO

Chapter 2 - VISTA Imaging Core Infrastructure Installation

```
Want KIDS to INHIBIT LOGONs during the install? YES// NO
Want to DISABLE Scheduled Options, Menu Options, and Protocols? YES// NO

Enter the Device you want to print the Install messages.
You can queue the install by enter a 'Q' at the device prompt.
Enter a '^' to abort the install.

DEVICE: HOME//  TELNET
-----

Install Started for IMAGING 3.0 :
      Mar 20, 2002@09:10:41

Build Distribution Date: Mar 19, 2002

Installing Routines:
      Mar 20, 2002@09:10:45

Running Pre-Install Routine: PRE^MAGIPOST
I will setup the 'P-IMAGING' entry in the Terminal Type file.
I will setup an 'Imaging Workstation' entry in the Device file.

Installing Data Dictionaries:
      Mar 20, 2002@09:10:53

Installing Data: .
      Mar 20, 2002@09:10:58

Installing PACKAGE COMPONENTS:

Installing SECURITY KEY

Installing PRINT TEMPLATE

Installing INPUT TEMPLATE

Installing MAIL GROUP

Installing HL7 APPLICATION PARAMETER

Installing PROTOCOL
  Located in the MAG (IMAGING) namespace.
  Located in the MAG (IMAGING) namespace.
  Located in the MAG (IMAGING) namespace.

Installing REMOTE PROCEDURE

Installing OPTION
      Mar 20, 2002@09:11:04

Running Post-Install Routine: POST^MAGIPOST

  Select one of the following:

      T      Test
      P      PRODUCTION

Enter the type of account: P//

      Defining SITE PARAMETERS!

      You ARE: IMGDEM01.MED.VA.GOV
      Initial namespace: IG

Creating the MAG SERVER mail group.
```

```

Saving source code for Imaging...
Code saved for 25 routines.

Updating Routine file...

Updating KIDS files...

IMAGING 3.0 Installed.
      Mar 20, 2002@09:11:20

Install Message sent #12403
Install Completed

```

```

1      Load a Distribution
2      Verify Checksums in Transport Global
3      Print Transport Global
4      Compare Transport Global to Current System
5      Backup a Transport Global
6      Install Package(s)
      Restart Install of Package(s)
      Unload a Distribution

```

2.3.3 Device Setup

The following device and terminal type entries are automatically added to the M system during the Post initialization phase of the KIDS installation:

Terminal Type:

```

NAME: P-IMAGING          SELECTABLE AT SIGN-ON: NO
RIGHT MARGIN: 80        FORM FEED: #
PAGE LENGTH: 64         BACK SPACE: $C(8)
CLOSE EXECUTE: D CLOSE^MAGGTU5

```

Device:

Imaging Workstation (VMS systems only)

```

NAME: IMAGING WORKSTATION    $I: WS.DAT
ASK DEVICE: NO              ASK PARAMETERS: NO
LOCATION OF TERMINAL: BROKER   OPEN PARAMETERS: (NEWVERSION,DELETE)
SUBTYPE: P-IMAGING          TYPE: HOST FILE SERVER

```

Workstation Broker (Cache systems only)

```

NAME: IMAGING WORKSTATION    $I: WS.DAT
ASK DEVICE: NO              ASK PARAMETERS: NO
LOCATION OF TERMINAL: BROKER   OPEN PARAMETERS: "NWS"
SUBTYPE: P-IMAGING          TYPE: HOST FILE SERVER

```

2.4 Background Processor Installation

2.4.1 Introduction

The background processor software runs on a dedicated NT Workstation. It communicates with the *VISTA* database by using the *VISTA* RPC Broker.

- The purpose of the background processor is to manage the storage of clinical images at the time of capture to insure that they are archived onto secondary storage (the Optical Jukebox).
- The Image files are aged or purged from the primary storage (the file server cache) after a period of disuse. This period of time is site configurable.
- The Image files that have been purged off of the primary storage are restored to the magnetic file server cache when they are requested by *VISTA* Imaging workstation activity.
- The purpose of this automatic file migration between servers is to provide a cost-effective mechanism to accelerate access to clinical images while insuring long-term availability.

2.4.2 Functions

The background processor provides the following functions:

- Manages the file server share space
- Populates the file server magnetic cache with image files that have most recently been viewed. (by moving files from Jukebox to magnetic fileserver)
- Manages the archiving of newly captured images to the jukebox
- Provides a mechanism for ad hoc deleting of image files
- Provides a mechanism for creating abstracts of images
- Provides a mechanism for purging images from the magnetic file servers when they have not been accessed within a time frame established by the management tools at each *VISTA* site
- Background Processor Verifier validates integrity of the image database

2.4.2.1 Software Requirements

HIS/*VISTA*:

- *VISTA* Imaging System V. 3.0
- Broker 1.1 or later

Client/WorkStation:

- MagBPSetup.exe – Background processor installation program
- MagBPVSetup - Background Processor Verifier installation file

- Broker client agent 1.1 or later
- Windows NT 4.0
- PcAnywhere V. 8.0 or later (recommended for remote support)

2.4.2.1.1 Hardware

- Pentium Class PC
- 64MB RAM (minimum)
- 10/100 MB Network Interface Card

2.4.3 Distribution

The background processor is distributed with VISTA Imaging System. The VISTA Imaging KIDS package must be installed in order to run the Background Processor. The workstation files that are distributed are...

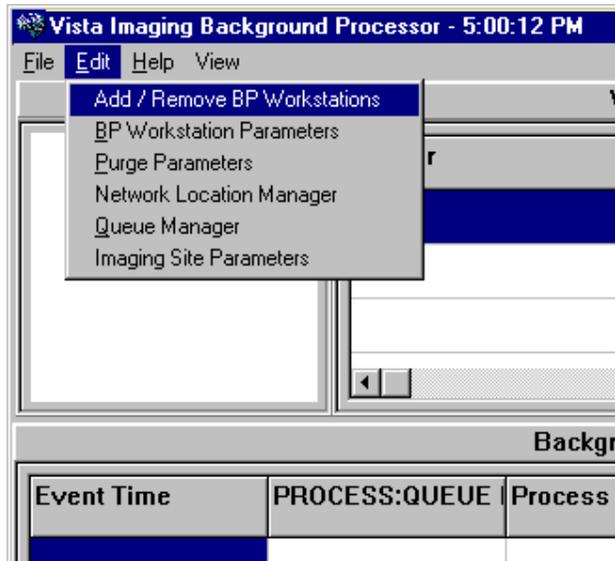
- MagBPSetup.exe - VISTA Imaging Background Processor installation software
- MagBPVSetup.exe – VISTA Imaging database verifier installation software

2.4.4 Installation Instructions

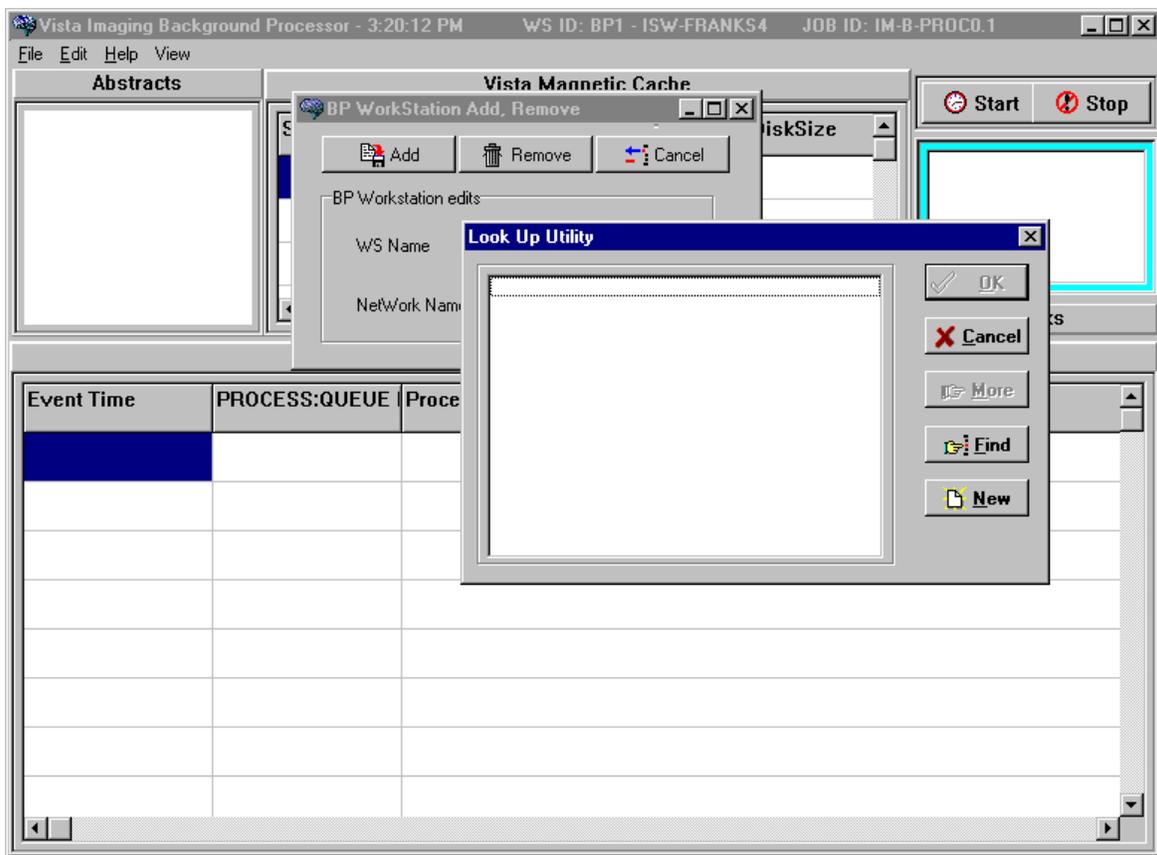
1. Create an entry for BROKERSERVER in the WINNT\SYSTEM32\DRIVERS\ETC\HOSTS file if one doesn't already exist. This entry should be mapped to the IP address of the production HIS where the Broker listener is running.
2. Copy MagBPSetup.exe and MagBPVSetup.exe to a temporary folder on the designated NT workstation
3. Launch the installation process by double clicking on these executables.
4. Accept the defaults during the installation process (recommended).
5. A shortcut to each of these applications is automatically created under *Start|Program Files|Vista Imaging Programs*. A Desktop shortcut can be created manually for convenience. The application executable for the Background Processor is MAGBTM.EXE. The application executable for the Background Processor Verifier is JBScanP1.exe and can be found in the *Program Files\Vista\Imaging\BackProc* folder.
6. After launching the Background Processor application, you will receive a message indicating that the background processor has not been configured. Ignore this for now. The configuration menus will still be available for use.



7. Create a Background Processor workstation entry using the *Add/Remove BP Workstations* menu option located on the main window.



You will be presented with the form shown below for creating or editing Background Processor Workstations.



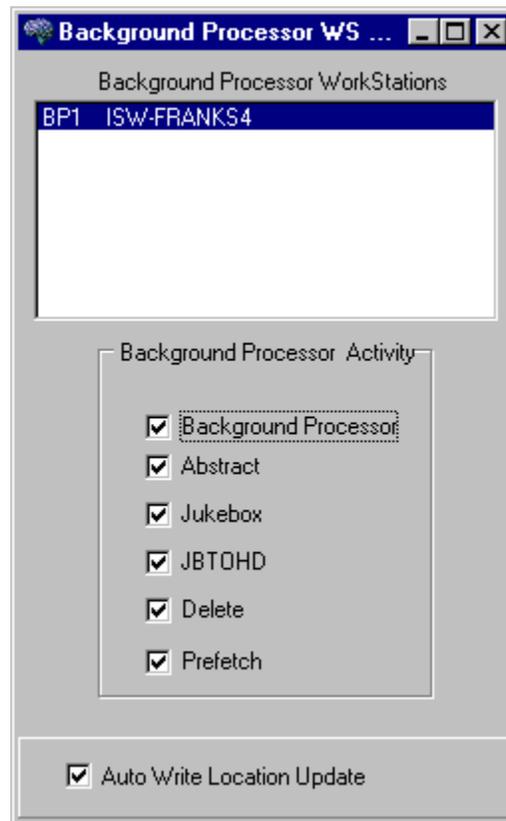
Click on the *New* button to add the background processor to the BP Workstations file (2006.8). The Network Name field will automatically be updated with the workstation's

computer (Netbios) name. Update the WS Name field with a 3-character background processor identifier.

example: BP1

Save the workstation record by clicking on the *Add* button (close the dialog by clicking on the *x*).

- Configure the Background Processor options from the *Edit|BP Workstation parameters* menu. This will enable the Background Processor for processing the different queue types. Check the box for *Background Processor* and select the queues that this Background Processor will poll. If a site has a single Background Processor, all boxes should be checked. Check the *Auto Write Location Update* box so the background processor will automatically set the *Current Image Write Location* (in file 2006.1) to the network location with the most available space. It will continuously adjust this value so all online shares fill at the same rate.



If there are multiple Background Processors, highlighting a Background Processor in the list will display its configuration options. Note that this form will not allow two Background Processors to be assigned the same activity. The parameters on this form update the database immediately. Any active Background Processors will use the new set of parameters at the top of the next cycle.

2.4.5 Imaging M File Setup

The following topics relate to configuring the Imaging M files on the *VISTA* Hospital Information System.

The Imaging files should be configured using the configuration utilities available on the *VISTA* Imaging Background Processor. These configuration utilities make it easy to modify the *VISTA* files and prevent users from entering invalid field data. See section 2.4 of this manual for detailed instructions on installing the Background Processor software. If a Background Processor will not be used at your site, then the files should be configured using the MAG SYS MENU option in *VISTA* (see section 2.4.5.2). Fileman should NOT be used to edit the Imaging files on *VISTA*.

Whether using the background processor or *VISTA* menu functions, the user must be assigned the MAG SYSTEM security key to install and configure the Imaging files. If using the *VISTA* menu option the user must also have their DUZ(0) set to an “@”.

2.4.5.1 Edit the Network Location file (2005.2) using the *VISTA* Background Processor Configuration Utility

(Skip this section if your site is not running a Background Processor)

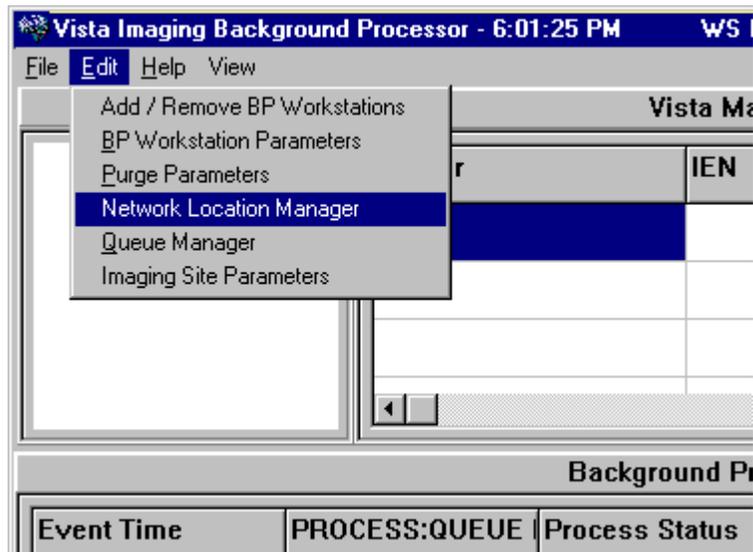
All file server folders to be used by the *VISTA* Imaging System for storing images must be listed in the Network Location file. Each one is assigned a logical name. Magnetic storage entries begin with “MAG”. All optical entries should start with “WORM”. All network locations (magnetic and optical) should be configured as “hashed” network locations. A hashed network location has a hierarchical directory structure for storing images. This structure is used so that all images will not be stored in a single folder. A hashed directory structure outperforms a non-hashed directory structure in an NT environment. The *VISTA* Imaging software uses a directory structure with 100 base file names or directories in each directory. The location of the file is calculated from the file name as shown below:

The file: BA123456.TGA

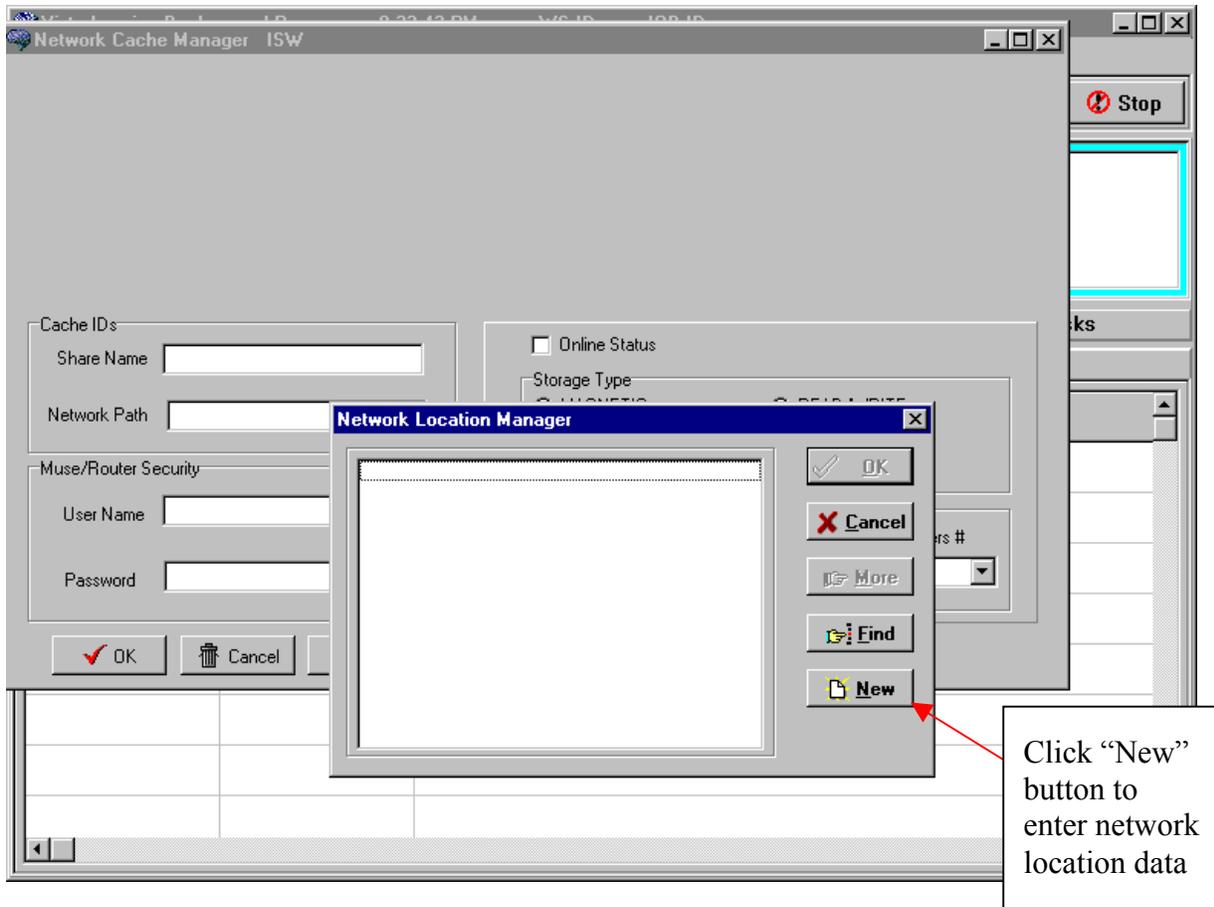
...would be stored in the folder: \BA\12\34

The full path to the file would be: \\VHAxxxCLUx\IMAGEx\$\BA\12\34\BA123456.TGA

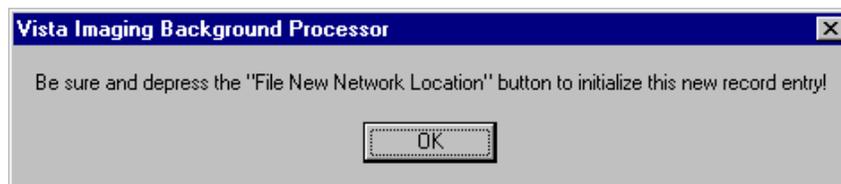
Open the Background Processor application and click on the *Edit|Network Location Manager* menu item.



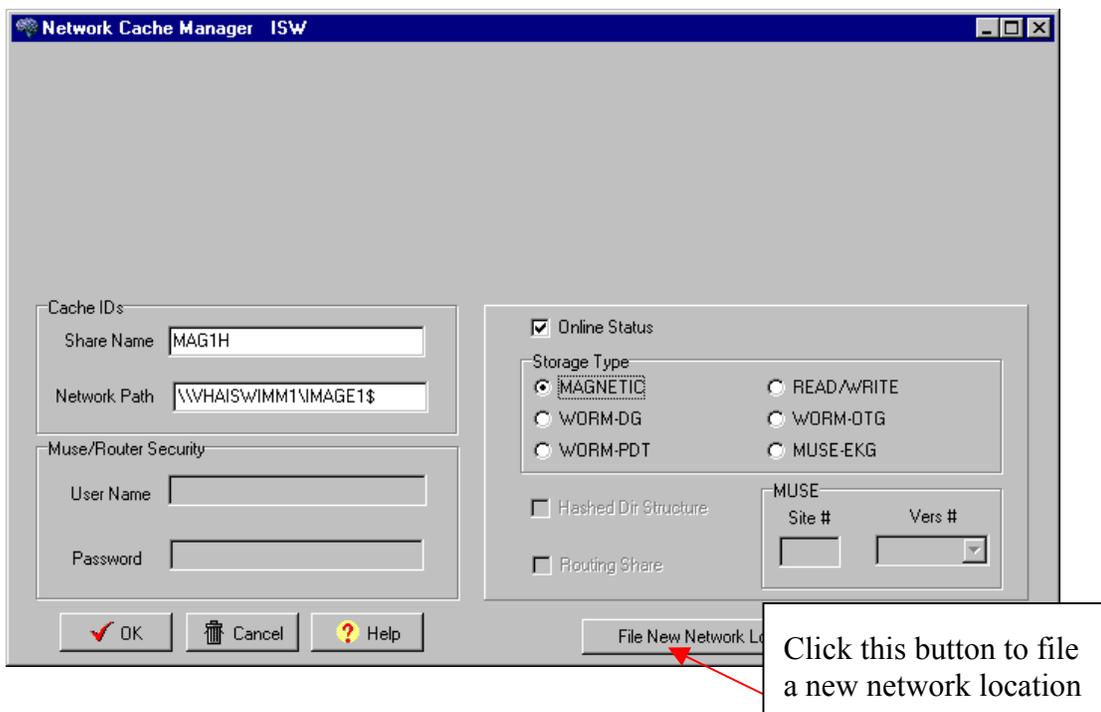
To add a new network location, click on the *New* button in the *NetworkLocationManager* dialog box.



The following 2 informational message boxes will appear:



When adding a new network location from the Background Processor configuration form, you must first enter the minimal set of required fields and then click the “File New Network Location” button. The required fields are: Share Name, Network Path, Online Status, and Storage Type.



Add an entry for MAG1H (the “H” indicates that it is a hashed location). The network path should point to your file server’s image share or the Cluster share if you are using MS clustering.

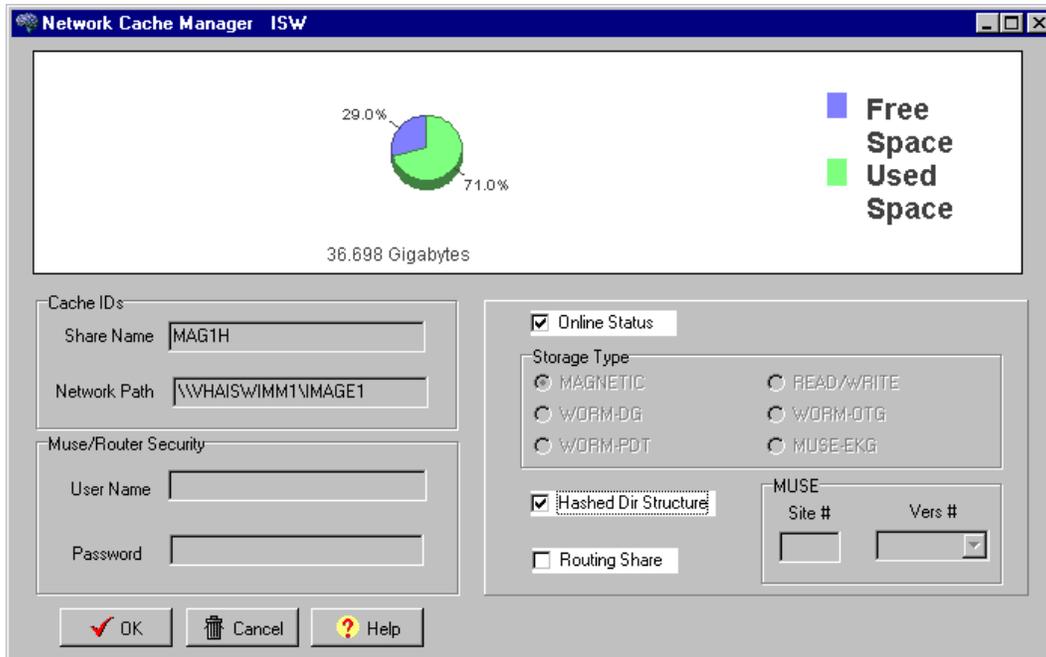
Network Location Examples:

Use	Logical Name (Share Name)	Physical Network Path
First Individual Server Share	MAG1H	\\VHAISWIMM1\image1\$ (\\server name\share name)
Second Individual Server Share	MAG2H	\\VHAISWIMM1\image2\$ (\\server name\share name)

OR

First Cluster Share	MAG1H	\\VHAISWCLU2\image1\$ (\\Cluster name\share name)
Second Cluster Share	MAG1H	\\VHAISWCLU2\image2\$ (\\Cluster name\share name)

If the network location is accessible, a magnetic share utilization graph is displayed. You can then update this location with all of the remaining data elements (**Note:** Only applicable fields are editable, i.e. Username and Password fields are only editable for MUSE EKG network location types).



If your site created multiple image shares, add a new network location for each of the remaining shares.

Note: If a share becomes unavailable at any time during operation, you can set it offline by changing its Online Status. This will flag VISTA Imaging workstation software to retrieve any images that reside on this share from the jukebox.

2.4.5.2 Edit the Network Location file (2005.2) using the VISTA Menu Option

(Skip this section if your site is running a Background Processor)

Note: This method is only used if the site does not have access to the Background Processor. The Background Processor has a windows interface for configuring the Network location file (see above). Do NOT use Fileman to add or edit network locations.

All file server folders to be used by the VISTA Imaging System for storing images must be listed in the Network Location file. Each one is assigned a logical name. Magnetic storage entries begin with “MAG”. All optical entries should start with “WORM”. All network locations (magnetic and optical) should be configured as “hashed” network locations. A hashed network location has a hierarchical directory structure for storing images. This structure is used so that all images will not be stored in a single folder. A hashed directory structure outperforms a non-

hashed directory structure in an NT environment. The VISTA Imaging software uses a directory structure with 100 base file names or directories in each directory. The location of the file is calculated from the file name as shown below:

The file: BA123456.TGA

...would be stored in the folder: \BA\12\34

The full path to the file would be: \\VHAxxxCLUx\IMAGEx\$\BA\12\34\BA123456.TGA

Use the VISTA option called *Enter/Edit Network Location* on the VISTA Imaging System Manager's Menu (MAG SYS MENU). Online help is available by responding to the fields with “?”.

Add an entry for MAG1H (the “H” indicates that it is a hashed location). The physical reference should point to your file server’s image share or the Cluster share if you are using MS clustering.

Network Location Examples:

Use	Logical Name (Share Name)	Physical Network Path
First Individual Server Share	MAG1H	\\VHAISWIMM1\image1\$ (\server name\share name)
Second Individual Server Share	MAG2H	\\VHAISWIMM1\image2\$ (\server name\share name)

OR

First Cluster Share	MAG1H	\\VHAISWCLU2\image1\$ (\Cluster name\share name)
Second Cluster Share	MAG1H	\\VHAISWCLU2\image2\$ (\Cluster name\share name)

Note: It is important that each physical reference entry in the network location file end with a “\”.

The following is a transcript of a Network Location edit session using the MAG SYS MENU option (**Note:** This option requires the MAG SYSTEM key and the DUZ(0) set to “@”):

```
Select OPTION NAME:   MAG SYS MENU           Imaging System Manager Menu

DS   Define Imaging Site Parameters
IW   Edit Image WRITE LOCATION only.
```

```

WF      Enter/Edit Background Processor Workstation File
NT      Enter/Edit Network Location
LS      Edit Network Location STATUS
PUR     Edit Imaging Purge Parameters
        Copy Routines to DICOM Gateway

Select Imaging System Manager Menu Option: NT  Enter/Edit Network Location

Select NETWORK LOCATION: MAG1H
Are you adding 'MAG1H' as a new NETWORK LOCATION (the 1ST)? No// Y (Yes)
NETWORK LOCATION PHYSICAL REFERENCE: \\VHAISWIMM1\IMAGE1\$
NETWORK LOCATION STORAGE TYPE: MAG MAGNETIC
NETWORK LOCATION: MAG1H//
STORAGE TYPE: MAGNETIC//
OPERATIONAL STATUS: 1// 1 On-Line
PHYSICAL REFERENCE: \\VHAISWIMM1\IMAGE1\$ Replace
HASH SUBDIRECTORY: Y YES
    
```

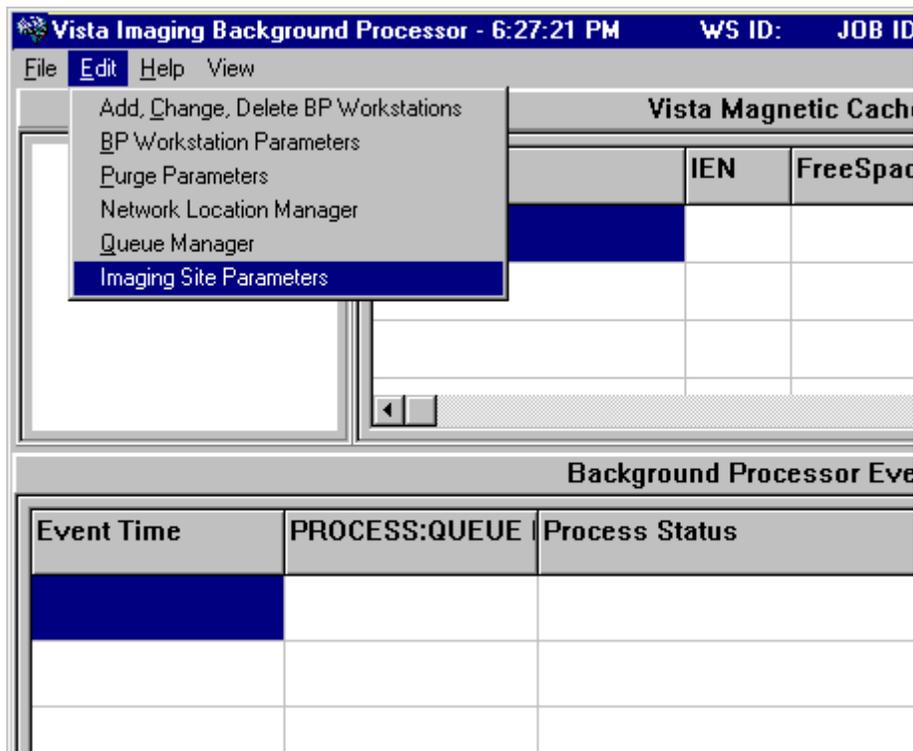
Note: For adding jukebox network locations, see the section on Jukebox Installation.

2.4.5.3 Edit the Imaging Site Parameter file (2006.1) using the Background Processor Configuration Utility

(Skip this section if your site is not running a Background Processor)

Each of the fields in the Site Parameter file (2006.1) reflect the system wide VISTA Imaging Parameters. The VISTA Imaging KIDS installation package sets defaults for most of the required fields.

Launch the Background processor application and select the *Edit|Imaging Site Parameters* menu.

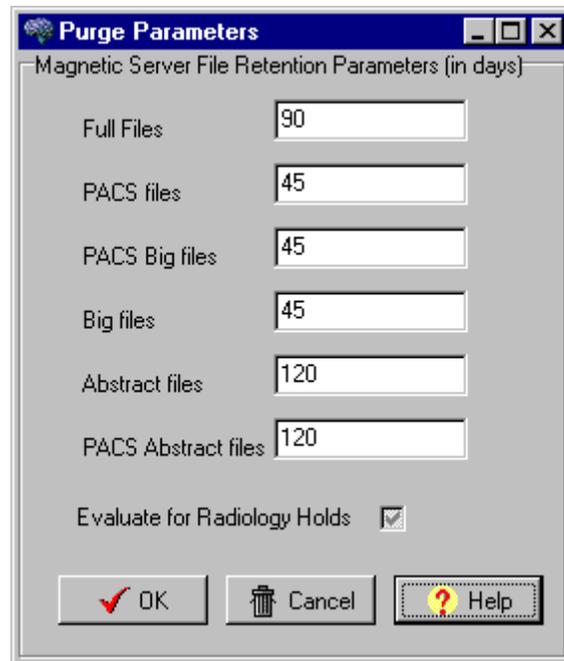


The Site Parameter edit form will display showing the current defaults. Enter F1 for context sensitive help on each field or click on the Help button for general help.

1. Update the *Net Username* and *Net Password* fields with the IU account information. Be sure to use the full username syntax for the IU username. i.e. VHA05\VHAWasIU
2. If your site will be interfacing with the Marquette MUSE EKG Management System, update the *Default MUSE site #* field with the appropriate MUSE site number. Most sites that have a MUSE server that serves EKG data to a single Medical Center would have the MUSE site number set to 1. If multiple sites are sharing a single MUSE server, each site could be assigned a unique MUSE site number by Marquette. In some cases a single shared MUSE database has been created to serve multiple Medical Centers. In this case all sites would most likely have a MUSE site number of 1.
3. It is important that the Jukebox shares and jukebox default be updated in this file. This will be done in the Jukebox Installation section of this guide.
4. Add the VISTA Imaging IRM staff member(s) and VISTA Imaging ADPAC to the local VISTA Imaging Mail group. They will need the MAG SYSTEM security key in order to be visible in the *members* list in the GUI. It is strongly recommended to leave the Remote Member G.IMGDEV@FORUM.VA.GOV in place. This mail group provides information to the VISTA Imaging Development and support teams on a monthly basis and also sends critical low free space messages. The site may wish to add their pager email address to the

Remote Members in order to receive pages on text capable pagers. The domain portion of the remote member's email address must be defined in Vista's Domain file.

5. The Current Namespace field is not editable (Please enter a NOIS call if your site desires a change to this field).
6. Edit the default Purge parameters. These are accessed from the *Edit|Purge Parameters* menu on the Background Processor main form. Each number entered represents the number of days a file type will remain on magnetic storage after its last user access. The default parameters should be a good starting point for each site. The number can be adjusted to find a good ratio of magnetic server free space to number of days image files remain online. Factors in determining this ratio are: number of studies performed, size of studies and amount of magnetic RAID storage purchased at the site.



2.4.5.4 Edit the Imaging Site Parameter file (2006.1) using the VISTA Menu Option

(Skip this section if your site is running a Background Processor)

Note: This method is only used if the site does not have access to the Background Processor. The Background Processor has a windows interface for configuring the Imaging Site Parameter file (see above). Do NOT use Fileman to edit the Imaging Site Parameter File.

Use the VISTA option called *Define Imaging Site Parameters* on the Imaging System Manager's Menu (MAG SYS MENU). This option allows you to define or edit the Imaging Site Parameters and requires the end-user to have a DUZ(0) set to "@". Online help is available by entering a "?" at any field prompt.

The following example is a transcript of the Imaging Site Parameter edit session using the MAG SYS MENU option. This menu requires the MAG SYSTEM key.

```
Select OPTION NAME:      MAG SYS MENU      Imaging System Manager Menu

  DS      Define Imaging Site Parameters
  IW      Edit Image WRITE LOCATION only.
  WF      Enter/Edit Background Processor Workstation File
  NT      Enter/Edit Network Location
  LS      Edit Network Location STATUS
  PUR     Edit Imaging Purge Parameters
          Copy Routines to DICOM Gateway

Select Imaging System Manager Menu Option: DS  Define Imaging Site Parameters

Define only the Imaging/MUSE Interface parameters? No//  NO

CURRENT NAMESPACE: DM//
IMAGE NETWORK WRITE LOCATION: MAG1H//
USE CAPTURE KEYS: FALSE//
SITE CODE:

The following two fields relate to the NT IMAGING PROFILE.
NET USERNAME: vhamaster\vhaiswiu//
NET PASSWORD: <Hidden>//

PACS interface fields:
PACS INTERFACE SWITCH:
PACS DIRECTORY:
PACS IMAGE WRITE LOCATION:
PCT FREE SPACE DICOM MSGS: 10//
RETENTION DAYS DICOM MSGS: 15//

The following fields relate to Jukebox functions
JUKEBOX DEFAULT:
PERCENT SERVER RESERVE:
NO AUTOWRITE UPDATE: AUTOWRITE UPDATE OK//
Select FILE TYPES: TXT//

The following fields relate to Imaging workstation parameters

TIMEOUT WINDOWS DISPLAY: 120//
TIMEOUT WINDOWS CAPTURE: 120//
DEFAULT USER PREFERENCE: SMITH,FRED (SETTING 1)//
DEFAULT MUSE SITE #:1
```

Note: The PACS fields prompts will not display unless you have a PACS system installed and the ^MAGDHL7 global exists.

Descriptions of important fields in the Imaging Site Parameters file (2006.1) are given below:

CURRENT_NAMESPACE: **W1**

Answer must be two characters in length. **This field is automatically assigned.**

Note: File 2006.19, Imaging Users, contains the assigned namespace for all medical centers.

ATTENTION: If you are installing the VISTA Imaging System in the live account and the test account, you must have a different namespace for the test account. You can use Z1 for your test account namespace.

IMAGE_NETWORK_WRITE_LOCATION: **MAG1H**

This is the current network location for image storage. All captured image files will be written to this location. This is a pointer to the Network Location File. This field is updated automatically by the background processor if the *NO AUTOWRITE UPDATE* field is set to *AUTOWRITE UPDATE OK*.

CAPTURE_KEYS:

This field controls whether the Image capture security keys will be used. If set to true, the appropriate keys must be assigned to each user to perform the appropriate Image capture. 'Capture' functionality and Procedure lookup functionality will not be allowed from the capture application if the user does not have the proper security key allocated. The Medicine procedure selection window will only display the types of procedures that the user has keys for.

NET_USERNAME:

This field must be set to the NT username for the IU account. Use the full NT account name with the domain prefix.

i.e. vha05\vhawasiu

NET_PASSWORD: **<hidden>**

This field must be set to the NT password for the IU account. It will be encrypted before it is stored in the system (**Note:** this field will not be echoed when it is typed in).

NO_AUTOWRITE_UPDATE: AUTOWRITE_UPDATE_OK// ??

This field enables or disables the *Autowrite* function of the background processor. This function evaluates the free space on each of the online magnetic shares and assigns the current *IMAGE NETWORK WRITE LOCATION* to the share with the greatest space available. The *PACS IMAGE WRITE LOCATION* is also updated for PACS sites.

JUKEBOX DEFAULT

Indicate the default jukebox to use; this is a pointer to the Imaging Jukebox file (2006.032). This only applies to sites with more than one jukebox share.

DEFAULT MUSE SITE

If your site will be interfacing with the Marquette MUSE EKG Management System, update the *Default MUSE site #* field with the appropriate MUSE site number. Most sites that have a MUSE server that serves EKG data to a single Medical Center would have the MUSE site number set to 1. If multiple sites are sharing a single MUSE server, each site could be assigned a unique MUSE site number by Marquette. In some cases a single shared MUSE database has been created to serve multiple Medical Centers. In this case all sites would most likely have a MUSE site number of 1.

Additional information regarding this file can be obtained from the *VISTA Imaging System Technical manual*.

2.4.6 Assign Imaging Menu Option and Security Keys

Menu Option:

Assign the Imaging menu option (MAG WINDOWS) to anyone who will be using the *VISTA* Imaging capture or display software. This *VISTA* option can be added to a user's secondary menu, or as a submenu to an existing option (i.e. Physician's Menu option). If you have programmer access, you do not need this option. The Kernel Broker software bypasses option checking if you have programmer access.

Security Keys:

There are several security keys included with the *VISTA Imaging System V.3.0* (Review the *VISTA Imaging System V.3.0 Security and Technical manuals* for detailed information on all security keys). Keys are assigned to anyone who will be performing system management duties (MAG SYSTEM), image delete operations (MAG DELETE), or image capture operations (MAG CAPTURE, MAGCAP MED, MAGCAP LAB, ...). A *VISTA* Imaging display user does not require any security keys to view images.

2.5 Imaging Workstation Setup

2.5.1 Overview of Installation of Imaging Workstation Software

Review the following information:

- Please verify that your workstation hardware is currently supported by the *VISTA* Imaging Project by reviewing a recent copy of the *VISTA* Imaging System Equipment List. This document can be downloaded from the *VISTA* Imaging web site at the following URL:

<http://vaww.va.gov/imaging>

- The following steps are required to load the operational *VISTA* Imaging System software onto the workstations:
 1. Load Windows NT workstation software with service pack 5 or greater.
 2. Install Kernel Broker client agent software.
 3. Install *VISTA* Imaging workstation software.
 4. Setup workstation default parameters in MAG.INI file.
 5. Install security and virus protection software.

Note: *VISTA* Imaging System is designed to provide advanced security against unauthorized access to patients' images. The windows API calls that are used to provide this security are designed for Windows NT. If Windows 95 or Windows 98 is used for access to images, call the *VISTA* Imaging support team to determine if your site's configuration can be modified to accommodate these operating systems. The use of Windows 95 or Windows 98 is not recommended and does not comply with current VHA guidelines.

2.5.2 Load Windows NT Workstation Software

Install Windows NT workstation and configure the TCP/IP protocol. The workstation display resolution should be set to 1024x768 or higher and the color palette should be set to True Color. The NT workstation software should be installed and configured similar to any other workstation in the Medical Center.

2.5.3 Install RPC Broker Client Software

The following summarizes the installation of the RPC Broker Client Agent software:

(See the RPC Broker installation manual for more detailed information)

1. Login to workstation as an administrator
2. Install the RPC Broker client agent software
 - a. Run XWB1_x\WS.EXE and follow the setup wizard. Answer "Yes" when given the option of running the Client Agent program on startup.
 - b. If you set up workstations to connect to a "server" with a generic name (i.e. BROKERSERVER) that is not resolved by DNS, you will need to create an entry the \WINNT\SYSTEM32\DRIVERS\ETC\HOSTS file. This will force an association between that generic name and the IP address that belongs to the *VISTA* server your Broker Listener is running on.

- c. If you set up workstations to connect to a server that can be resolved automatically through domain name server (DNS) (e.g. alpha3.yourva.gov), there is no need for you to make any entries in a workstation's HOSTS file.
- d. Reboot workstation

Sample Hosts file entry:

```
#hosts

152.128.1.14 Washington DHCPSEVER BROKERSERVER

#end hosts
```

Note: A single space should separate IP address and alias. There should be an entry for BROKERSERVER and DHCPSEVER in order to ensure backward compatibility with RPC Broker V. 1.0 applications. You should also have a blank line (LF) at the end of the file.

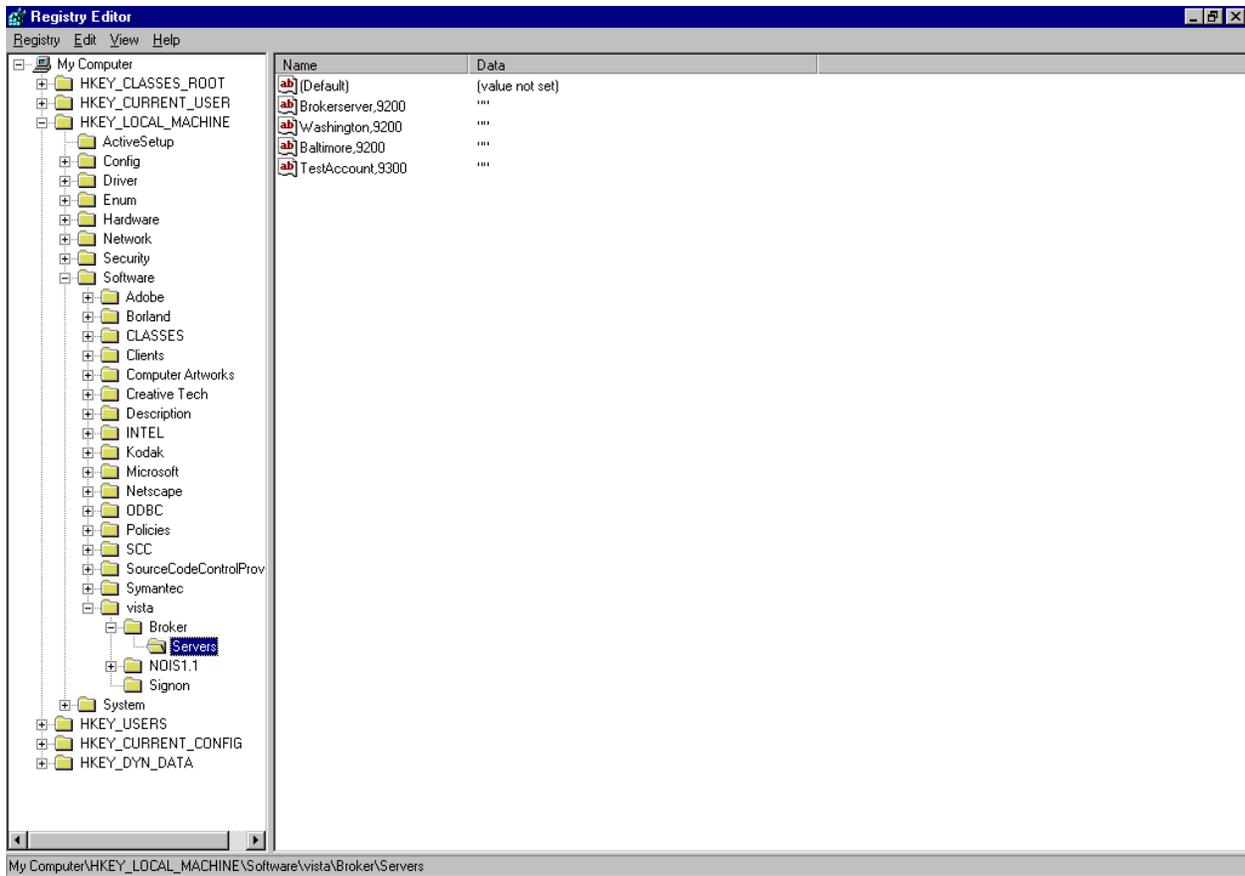
- e. Run the Kernel Broker test program

RPCTest.exe is a test program distributed and installed on your PC in the C:\Program Files\VISTA\BROKER folder when the Kernel Broker Client Agent software is installed. When executed, it can be used to test the connection to the VISTA System. This is valuable in troubleshooting problems with the VISTA Imaging System. Please review the Kernel Broker documentation for more information and examples on the test application.

2.5.4 Install the VISTA Imaging Workstation Software

The VISTA Imaging software installation will require between 40mb and 70mb of space on the workstation, depending on whether you install the sample images.

1. Run MagSetup2_5.exe on the workstation.
2. If you want demo/training images on the workstation, run the MagImage.exe program. These are useful for testing and demonstrating the capabilities of the VISTA Imaging Display software, and for training new users.
3. If you want to enable viewing of images at remote sites, you will need to make some changes to your Windows Registry and HOSTS file. The Registry can be edited with the ServerList.exe utility distributed with the Broker development toolkit or manually using regedit.exe. Use extreme caution when editing the registry manually. Improper changes can leave your system unstable or non-functional. See the RPC Broker system guide for detailed information on editing the registry.
 - The following is an example registry with multiple remote sites:



Note: A site may choose to replace the brokerserver entry with the site name for clarity.

- For each entry in the Servers section, you must be able to resolve the IP address. This can be done either by having an entry in the HOSTS file with the identical name or by resolving through DNS or WINS. Below is an example HOSTS file that corresponds to the above entries in the Servers section.

```
#HOSTS
152.128.12.44 Wilmington BROKERSERVER DHCPSEVER
152.128.11.23 Washington
152.128.32.29 Baltimore
152.128.189.92 TestAccount
#END
```

- Note that the HOSTS file has no file extension. It is located in the \WINNT\SYSTEM32\DRIVERS\ETC folder.

2.5.5 Autoupdating the Imaging Application

The autoupdate feature of the VISTA Imaging application allows for automatic installation of new versions of the VISTA Imaging workstation software. When a new version is available on the network, each user will be asked if they want to install the new version. The user has the option of performing the installation or continuing to use the older version. Autoupdate should be configured when the VISTA Imaging software is first loaded on the workstation. This will eliminate the need to reconfigure workstations after they have been installed throughout the Medical Center.

If it becomes necessary to install VISTA Imaging on system remotely, you can create an NT login script that checks for the existence of the VISTA Imaging software on the workstation and silently installs it if it doesn't exist. Be sure to remotely install a copy of the MAG.INI that is configured for autoupdates. This way the workstation will automatically update itself in the future.

Example NT login script:

```
@REM /* IMGInstl.bat - Sample NT login Script batch file for installing Vista Imaging.
@REM
@REM */
@REM
@echo off
@REM
@REM *****
@REM **      Check to see if Imaging already exists
@REM **      If not, install it silently
@REM **      and copy a version of MAG.INI with autoupdate changes

if not exist c:\winnt\MAG.INI copy \\<InstallServer>\<InstallShare>\MAG.INI c:\winnt

if not exist "c:\program files\vista\imaging\imgvwp10.exe" echo Installing Vista Imaging for the
first time... it'll only take a minute or so...

if not exist "c:\program files\vista\imaging\imgvwp10.exe"
\\<InstallServer>\<InstallShare>\MAGSETUP.EXE -s

echo done!

@rem *****
@rem *** end...
```

2.5.5.1 Steps to Enable AutoUpdating on the Workstation

Step 1: Create or identify two network folders that are accessible by VISTA Imaging users. At a minimum, set the share permission to READ access for the *Everyone* group. Further restrictions can be set at the folder level by giving the *Everyone* group READ access to the folder and files. Do not give the *Everyone* group Full Control to the share as this makes the share prone to certain viruses. These folders can NOT be on the Imaging file servers. If they are added as shares to the

Imaging file servers, they will create problems for the Imaging security components and Images will not be displayed. These new folders will be:

- A test folder

i.e., \\<servername>\<sharename>\UPDATES\TEST

- A distribution folder

i.e., \\<servername>\<sharename>\UPDATES\DISTRIB

The \TEST folder is for testing new VISTA Imaging releases before they are distributed to all workstations.

Note: Sites should have at least one VISTA Imaging workstation defined as a test station. Test workstations must update themselves from the Network \Test folder. Run the imaging application on the test station(s) for a period of time to insure there are no problems with the software at your site. Copy the MAGSETUP.EXE file into the \DISTRIB folder when you are confident that the software is running properly. All other workstations will then be updated.

The majority of VISTA Imaging workstations will update themselves from the \DISTRIB folder.

Step 2: Rename the workstation installation program (MagSetup2_5.exe) to MagSetup.exe.

Step 3: Copy MAGASET.EXE, MAGNET.INI, and MagSetup.exe to the \TEST Network folder.

Step 4: Copy MAGASET.EXE, MAGNET.INI and MagSetup.exe to the \DISTRIB Network folder.

Note: MAGASET.EXE and MAGNET.INI are distributed with the VISTA Imaging System as separate files or can be downloaded from the VISTA Imaging FTP site (VHAISWIMM4).

On each imaging workstation:

Step 5: Run MAGASET.EXE from the Network folder. Use the \TEST folder if this is to be an VISTA Imaging Test Workstation or the \DISTRIB folder for a user workstation.

MAGASET.EXE will ask if the user wants to setup the imaging application to autoupdate from this folder; it will display its full path and folder. The MAG.INI file will be modified by MAGASET.EXE to include the name of the Network folder in the [SYS_AutoUpdate] section.

Step 6: Run MAGSETUP.EXE from the Network folder. This will install the latest VISTA Imaging files on the workstation.

Now the VISTA Imaging System is setup for AutoUpdating.

Whenever you place a new copy of MagSetup.exe in the Network folder (either \TEST or \DISTRIB), each VISTA Imaging Workstation will prompt the user that “an update to Imaging exists” when the application is launched. The user can click “OK” to run the update or “Cancel” to not run it. If the user clicks “Cancel”, they will be prompted again each time VISTA Imaging is run, until they run the update.

2.5.5.1.1 Autoupdate Related Files

2.5.5.1.1.1 Autoupdate Related Workstation Files

The Autoupdate program will create the following entries in the MAG.INI file:

```
[SYS_AutoUpdate]
DIRECTORY=\\<servername>\<sharename>\UPDATES\DISTRIB
ComputerName=ISX-KAMLAB2
LASTUPDATE=2990521.1659
```

DIRECTORY: This will list the directory path where the MAGSETUP.EXE file was last executed on this workstation. Sites DO NOT change this entry. This is modified by the VISTA Imaging application.

LASTUPDATE: This is the date/time of the MAGSETUP.EXE that was last executed on this workstation. Sites DO NOT change this entry. This is modified by the VISTA Imaging application. The VISTA Imaging application will not run the update if the date of the MAGSETUP.EXE file is equal or less than the LASTUPDATE entry in its MAG.INI file.

2.5.5.1.1.2 Autoupdate Related Network Files

The MAGNET.INI file has to be copied to the network folder defined by the sites. (See above). It has only one entry:

```
[update_mode]
ForceUpdateAll=FALSE
```

The ForceUpdateAll entry will normally be set to FALSE. It is reserved for future use.

Note: The magnet.ini file must exist in the network folder.

2.5.5.1.1.3 Autoupdate Related VISTA Files

Imaging Windows Workstations (2006.81)

This M FileMan file holds information for each workstation on which VISTA Imaging is installed. It is updated by the VISTA Imaging application.

When MAGSETUP.EXE is run on a workstation, it performs tasks related to autoupdate:

- It reads the Network Computer Name and inserts that name into the MAG.INI file. This Network Computer Name will be used to identify the workstation in the IMAGING WINDOWS WORKSTATIONS FILE (2006.81).
- It inserts the file date/time of the MAGSETUP.EXE file into the MAG.INI file. This date is used by the VISTA Imaging application to determine if an update needs to be run on this workstation.

2.5.6 Edit the Imaging Workstation Configuration File with the MAGSYS Tool

The VISTA Imaging Workstation Configuration Editor controls many workstation settings for the VISTA Imaging System. This tool is meant for the system administrator and ADPAC.

The settings are saved in the MAG.INI file in the Windows folder. INI files are used by many applications to hold initialization parameters and application settings.

Note: Use of a text editor to change the entries is NOT RECOMMENDED.

Settings fall into two types:

- Settings that are fixed for the duration of the VISTA Imaging Session. The user has no ability to change these. Sections that have settings of this type are marked "**selectable at runtime NO**".
- Settings that the user is allowed to change, or allowed to select from the options defined by the system administrator. Sections that have settings of this type are marked "**selectable at runtime YES**".

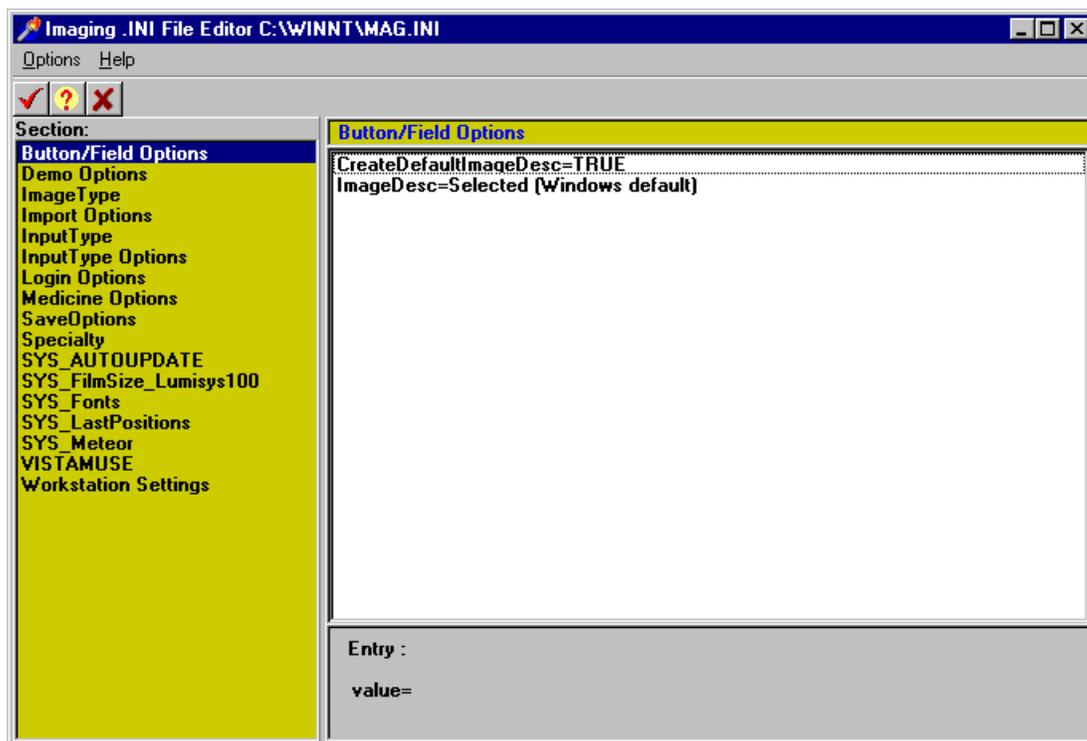
Once the VISTA Imaging software has been installed on the workstation, run MAGSYS.EXE from the Program Files\Vista\Imaging folder. Click on the VISTA button to log into the system.

Then click the Configure  button to launch the Imaging Workstation Configuration Editor. You must have the MAG SYSTEM key to use this utility.

Note the following:

- The section headers of the MAG.INI File appear in the list in the left pane of the window.
- Clicking on an item in the Section list will display the Section entries in the list to the right.

- Clicking on an item in the Section Entry list will display the current value in the edit fields at the bottom of the window.
- Use the radio buttons, pull-down lists, or data entry fields to change the value.



Description of [sections] and entries

[InputType] selectable at runtime YES

The VISTA Imaging System allows many types of image capture. This section of the MAG.INI files controls the input types that are allowed from a particular workstation. The following input types are supported:

- Lumisys 75 xray scanner
- Lumisys 150 xray scanner
- Vista: Truevision ATVista Image Capture Board.
- VistaInteractive Truevision Vista Image Capture Board. The user will be able to interact with the ATVista Board.

- Matrox Meteor Video Capture Board with Millenium VGA board
- TWAIN-compliant devices (devices that support a TWAIN interface)
- Import -- Import Mode allows the user to select an image that resides on a local or shared disk, and import it into the VISTA Imaging System. Three modes of import are supported:
 - "Copy to Server"
 - "Convert to TGA"
 - "Convert File Format to Default" (See the section [Import Options])

Note: All workstations are capable of Importing an Image from local or remote drives. No capture board or input device is necessary for importing images.

- SCANEKG - Twain device capture of 8 bit Color Images. (256 color). Size, resolution and orientation are optimized for EKGs.
- ScannedDocument - Twain device capture of 1 bit Document Images.

Each entry has a true/false switch that controls user access during a VISTA Imaging Capture Session. At least one device MUST have 'device=TRUE'. The default setting MUST be set to something other than NONE. The default setting defines that configuration that will be active when the application is launched.

1. To change values, click on the input type you wish to modify. You will see two radio buttons at the bottom of the window.
2. Select the TRUE or the FALSE button. The value will change in the file, for example, Lumisys75=TRUE. Only those entries set to TRUE are selectable by the user at runtime through the *Options|Configuration* menu option.

image for any abstracts that reside on the jukebox. It will not try to retrieve each abstract from the jukebox. This will significantly speed up the display of abstracts when a patient's record is selected. The user still has the option of viewing the full resolution image by clicking on the canned abstract image. To stop the display of Jukebox Abstracts set this entry = FALSE.

- Log Session Actions=FALSE default FALSE

A record of Actions performed by the user of the *VISTA* Imaging System display window can be saved by setting this entry = TRUE.

- VistaRad test mode=FALSE default FALSE

This option is reserved for future use.

- MUSE Enabled=TRUE default FALSE

Sites running the GE/Marquette MUSE interface can enable the EKG display by setting this to TRUE.

- MUSE Demo Mode=FALSE default FALSE

Not for general use. This setting is for Demonstrations given by the *VISTA* Imaging Implementation team. This should always be set to FALSE.

- Fake Name=Fake,PatientName default 'Fake,PatientName'

- Allow Fake Name= FALSE default FALSE

Used for demonstrations only. The Fake Name will be used on all *VISTA* Imaging Display windows and reports from *VISTA*. Only Textual changes are made. Images that have the patient name embedded in the image will still have the patient name visible in this type of demo. This mode of Demonstration should be used with caution because the patient's identifiers might appear if they are embedded in the image. The Images to be shown in a demonstration of this type should be viewed before hand to make sure the patient name is not visible. **This is not for general use.** System managers can use it for demos if they intend to use real patient data.

- Workstation Timeout minutes=0 default 0

This setting (if other than zero) will override the *VISTA* Imaging application timeout fields in the Imaging Site Parameters File. It applies to all *VISTA* Imaging applications that run on this workstation. i.e., Display, Capture, VistaRAD.

If this setting is 0 (zero) then the timeouts that are entered in the Imaging Site Parameters File will apply.

2. ListExisting

- Create Procedure stub first=FALSE default FALSE

If the VISTA Imaging workstation will always be associating the captured images with New medicine procedures, select Create New. This will set the Medicine procedure selection window default to 'Create /New' procedure.

If 'ListExisting' is selected, the medicine procedure selection window will default to showing a list of patient procedures for the selected Medicine SubSpecialty. The user will still be able to create a new procedure entry.

When a captured image is associated with a New medicine procedure, the medicine procedure isn't normally created until the first image is saved. If the user has a need to edit the medicine procedure text before the image is saved, set Create Procedure stub first=TRUE. The user will have to log into the VISTA Medicine Package to edit the procedure text.

[SYS_Autoupdate] selectable at runtime NO

Note: Entries are modified by the VISTA Imaging application. Do not modify these entries.

These entries control the VISTA Imaging System's autoupdate feature (See Section 2.5.5 in this guide for details).

- DIRECTORY=\\<server>\<share>\UPDATES\DISTRIB

This is the directory where VISTA Imaging updates will be copied. This entry is modified when MAGASET.EXE is run from the update directory.

- ComputerName=WAS-IMWS4D148

This is the Network Computer Name as defined in the Windows NT Network Settings. This entry is modified by MAGSETUP.EXE.

- LASTUPDATE=2970605.1458

This is the date/time of the last MAGSETUP.EXE file that was run on this workstation. It is modified by MAGSETUP.EXE.

[SYS_LastPositions] selectable at runtime NO

Note: Entries are modified by the VISTA Imaging application. Do not modify these yourself.

This is used by the VISTA Imaging System to record the last positions of the application's windows.

2. Follow the instructions below to test each specialty package. The VISTA Imaging System User Manual or online help contains more detailed instructions on use of the software.

2.5.8.1 Testing Medicine Package Interface

To test the Medicine Package Interface, follow these steps:

1. Launch the capture application.
2. Select the *Configurations|Configuration Settings* menu. Select the Medicine specialty Option to capture an image for your test patient. Your test patient must be entered as a “medical patient” in the Medicine package first.
3. Click on the “Select Medicine Procedure” button and select an existing procedure for your test or click the *New* button to create a “stub” procedure in the Medicine package.
4. You can perform this test with or without a video-input device; if you do not have a video device, use the "Import" option.
5. Enter a description that contains the word TEST so you can identify the image.
6. Save the image by clicking on the “Capture” button, and then on the “Image OK” button.
7. Click on the “study complete” button.
8. Use the Display Window and select the test patient. You should see the abstract for the image you just captured. You should be able to select this abstract and you will see the group window with one abstract.
9. Click on this abstract and the captured image should be displayed in full resolution. Clicking on the report button should display the report header information.
10. Verify that it is the image you just captured and that the quality is good.

2.5.8.2 Testing Radiology Package Interface

To test the Radiology Package Interface, follow these steps:

1. If your site is using the Radiology package for image capture, open the VISTA Imaging Capture program to capture an image for the test patient.
2. Select the *Configurations|Configuration Settings* menu. Select X-ray as the Image Type and Radiology as the Specialty.
3. You will need to set up a case number for the test patient; use the Radiology ordering process to do this. You may need assistance from someone who knows the radiology ordering and reporting process in detail.
4. Click on the “Select Radiology Exam” button and select a radiology exam for your test.

5. If you are using a scanner to capture an image, it must be properly set up for testing. You should also test using the other input types. In the case of *Import*, you do not need to have the capture device attached to the system. Image files are selected from a local drive.
6. View the image and report as described above.

2.5.8.3 Testing Anatomic Pathology Interface

To test the Anatomic Pathology Package Interface, follow these steps:

1. Open the Imaging Capture program to capture an image for the test patient.
2. Select Options|Configuration.
 - a. Select the *Configurations|Configuration Settings* menu. Select Laboratory as the Specialty.

Note: Prior to capturing, the test patient must have a Laboratory accession number. You will need to use the Laboratory package AP menu option on the VISTA HIS to create the accession number for the test patient. If you are unfamiliar with these options, ask for assistance from someone who knows the anatomic pathology ordering and processing steps.

- b. Click on the “Select Laboratory Specimen” button and select a specimen for your test.
 - c. To capture images under the Laboratory specialty, you will also need to specify the...
 - o Laboratory sub-specialty (i.e., Surgical Pathology, Cytology, Electron Microscopy, etc.)
 - o Accession year
 - o Accession number
3. Once this is provided, a window with a list of specimens will display and you must select the specimen that pertains to the image.
4. Capture an image from the camera, scanner, or import input source.
5. View the image as described above using the VISTA Imaging System display options.
6. Verify that the captured image displays correctly both as an abstract and as a full image.
7. View the reports.

2.5.8.4 Testing Surgery Package Interface

To test the Surgery Package Interface, follow these steps:

1. Open the VISTA Imaging Capture program to capture an image for the test patient.

Note: The test patient must have an operation in the system prior to capturing.

2. Select the *Configurations|Configuration Settings* menu.
3. Select Surgery as the Specialty.

4. Click on the “Select Surgery Case” button. A surgery case list will be displayed. Select the case for your test.
5. Capture an image from the camera, scanner, or import input source.
6. View the image as described above using the VISTA Imaging System display options.
7. Verify that the captured image displays correctly both as an abstract and as a full image. You should be able to see the surgery report when you click on the report button.

2.6 Jukebox Software Installation

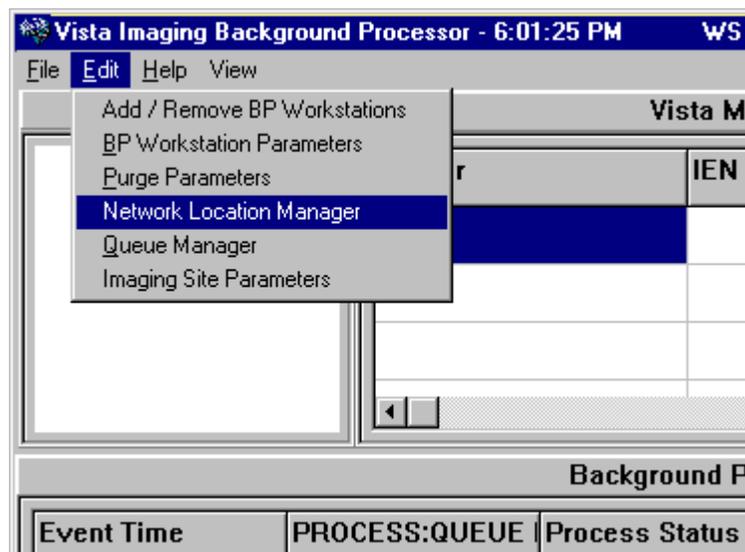
The Optical Technology Group (OTG) Disk Extender software is used to control file migration to and from the jukebox. When installed, the jukebox appears on the network as an NT share that can be accessed from any client workstation and the background processor. The share spans all platters in the jukebox, which gives the appearance of one large magnetic drive. NT directory style security is used to limit access to the share.

It is recommended that you have your jukebox hardware set up by the vendor. General instructions on installing and configuring OTG V. 4.2 are given in Appendix C.

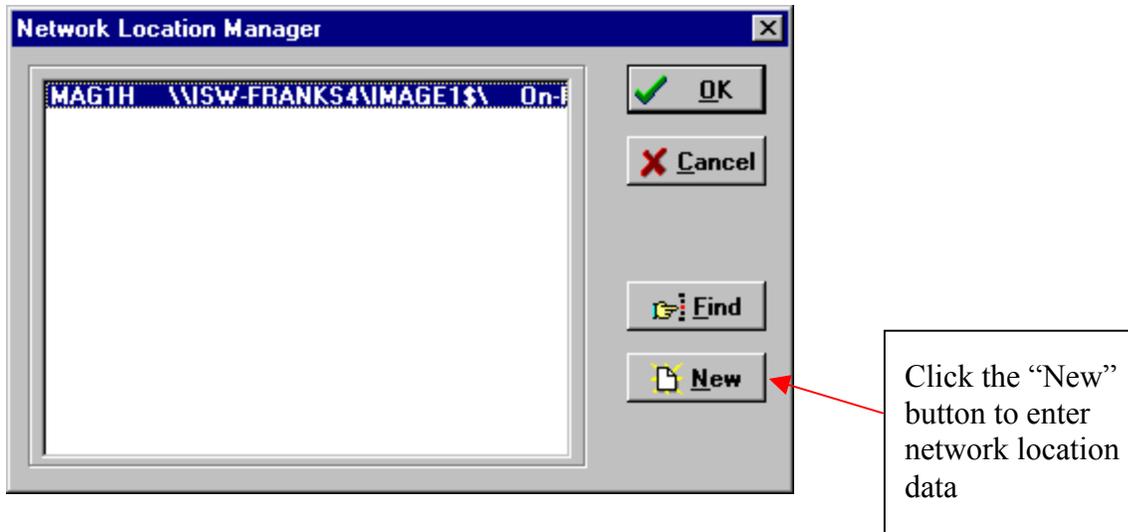
2.6.1 Updating VISTA Files for Jukebox using the Background Processor

In order for the Background Processor to copy files to and from the jukebox, a network location must be defined in the Network Location file (2005.2). Add the new network location by using the configuration utilities of the Background Processor.

1. Select *Edit\Network Location Manager* from the Background Processor menu.

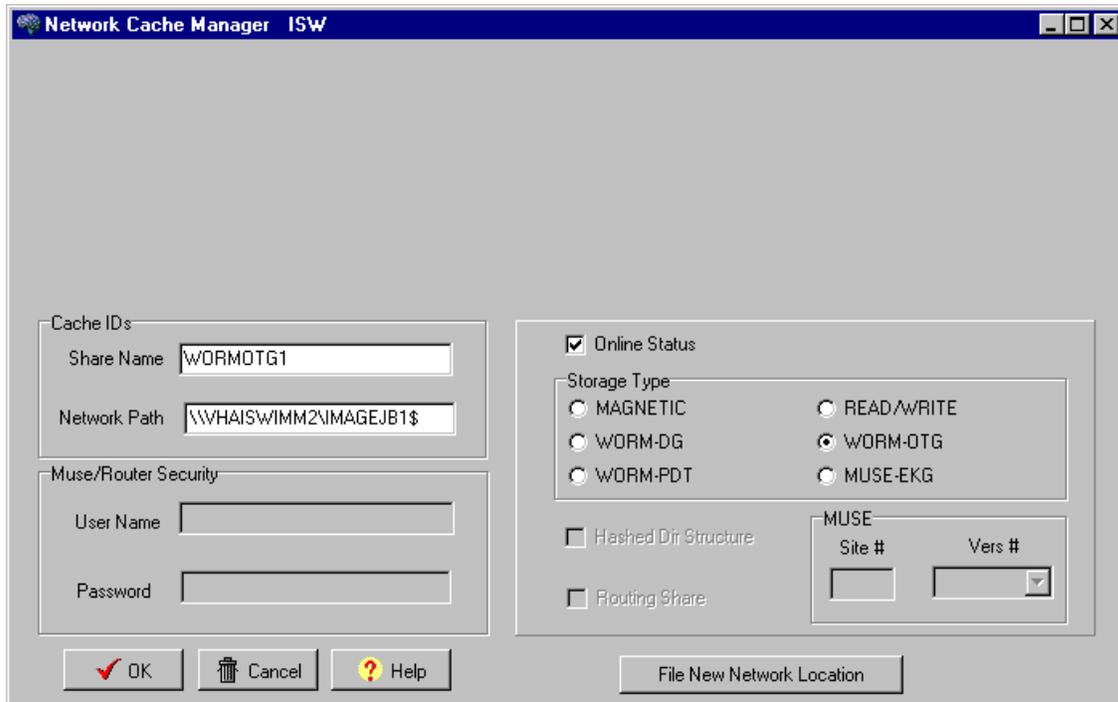


2. Click the New button to get to the *Network Cache Manager* window for adding network locations.



3. Specify WORMOTG1 for the network location *Share Name*.
4. Set the Operational Status to ONLINE.
5. Set the storage type to WORM-OTG.
6. Set the Physical reference to: [\\VHAxxxIMMx\IMAGEJB1\\$](#) (**Note:** Clustered jukeboxes would have the cluster name instead of the server name).

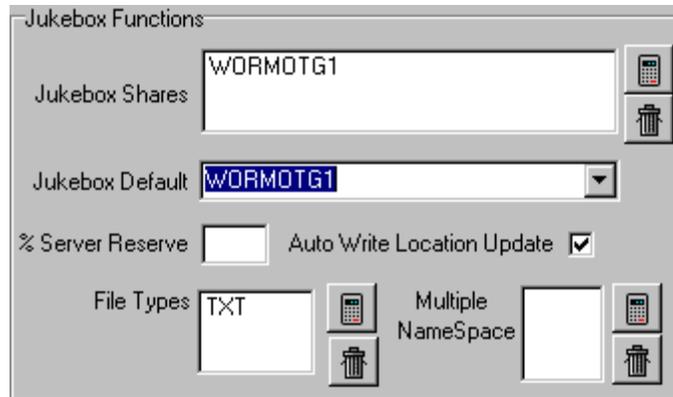
This network location points to the jukebox share that was created when the OTG jukebox software was installed. All images will be copied to this location for permanent storage. The Background processor will use this entry to determine the destination to which images will be copied. It copies images from the Imaging file servers where the image was captured to the jukebox platters.



7. Press the *File the Network Location* button to save the entry into the database.
8. After filing the entry into the database, check the box for *Hashed Dir Structure* (ignore the warning message box when modifying a new entry).
9. Click the OK button to save the change.

Now you must add an entry to the Jukebox file (2006.032) and modify the *Jukebox Default* field in the Imaging Site Parameters file (2006.1). This is done from the *Edit|Imaging Site Parameters* menu on the Background Processor.

10. Select *Edit|Imaging Site Parameters* menu and add this share to the *Jukebox Shares* edit box (click on the “Add” button to add Jukebox Shares).
11. Set it as the default jukebox location in the *Jukebox Default* drop down list.



2.7 Installing Optional Components

2.7.1 MUSE EKG Interface

VISTA Imaging System is capable of interfacing with the Marquette MUSE EKG Management system. EKGs are viewable from any VISTA Imaging workstation at the medical center. VISTA Imaging does not duplicate the storage of EKG data on the Imaging file servers. EKG waveforms and reports are retrieved directly from the MUSE server on demand.

When Marquette installs a MUSE server, they should follow the naming convention of VHAxxxMUS1 where xxx is the three-character site code.

2.7.1.1 Procedure for Sites Interfacing VISTA Imaging with the MUSE System

There are different procedures for installing the VISTA Imaging software depending on several factors. Use the procedure below that best matches the site's current status. These procedures are for sites that are running MUSE V. 5A or higher. Sites that are running an earlier version of the MUSE software can call the VISTA Imaging support team for specific configuration instructions.

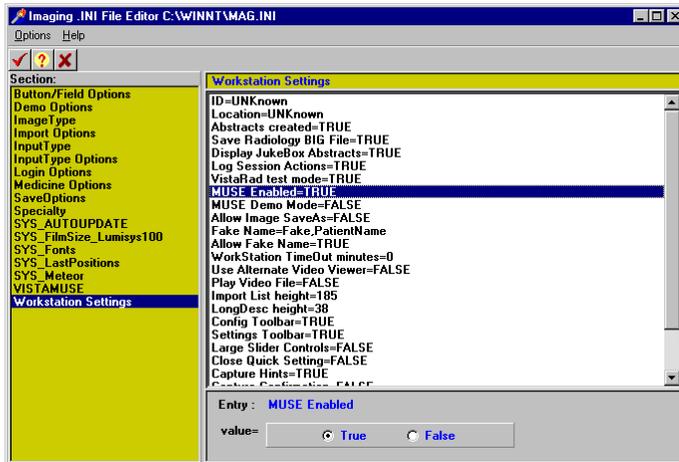
1. The following applies to all sites that are performing a first time install of the Imaging/MUSE interface software.

- a. On the MUSE server, log in with administrator permissions and perform the following:
 - Copy the Fmtopts.exe self-extracting zip file to a temporary folder. Launch the executable to extract all of the fmtopts.* files to the vol000\System\Sysinf folder on the MUSE server. If the files already exist on the server, you should back-up the existing files before replacing them.
 - Add a user to the MUSE Users group. For consistency, the VHAxx\VHAxxxIU account can be used. This is the account that the application will use when it connects to the MUSE shares. This username and password should not be given out to any users.

b. On the VISTA Imaging workstation...

- Use the MAGSYS.exe tool to set MUSE Enabled=TRUE in the Workstation Settings section of the MAG.INI file (see the *Imaging Workstation Configuration* section 2.5.6 for details on using the MAGSYS.EXE tool).

Sample Workstation Settings with *MUSE Enabled* option:



2. The following applies to sites that are interfacing the VISTA Imaging System to a MUSE server only and are not running any other VISTA Imaging Components (i.e. Clinical Imaging or DICOM).

- Install the Mag2_5.kid package on VISTA (see section 2.3.2).
- Use the MAG SYS MENU option in VISTA to configure the Imaging Site Parameters (2006.1) and Network Location (2005.2) files. Type ?? at any prompt to get help on each field (see sample session below).

```
Select OPTION NAME: MAG SYS MENU      Imaging System Manager Menu

DS      Define Imaging Site Parameters
IW      Edit Image WRITE LOCATION only.
WF      Enter/Edit Background Processor Workstation File
NT      Enter/Edit Network Location
LS      Edit Network Location STATUS
PUR     Edit Imaging Purge Parameters
        Copy Routines to DICOM Gateway

Select Imaging System Manager Menu Option: DS  Define Imaging Site Parameters
Define only the Imaging/MUSE Interface parameters? No// YES
NET USERNAME: vhaxx\vhaxxxiu
NET PASSWORD: apassword1
DEFAULT MUSE SITE #: 1
```

```
Add/Edit Muse Network Location: VHAXXXMUS1
Are you adding 'VHAXXXMUS1' as a new NETWORK LOCATION (the 6TH)? No// Y (Yes)
NETWORK LOCATION PHYSICAL REFERENCE: \\VHAXXXMUS1\VOL000\
NETWORK LOCATION STORAGE TYPE: MUSE-EKG
NETWORK LOCATION: VHAXXXMUS1//
PHYSICAL REFERENCE: \\VHAXXXMUS1\VOL000\ Replace
STORAGE TYPE: MUSE-EKG//
OPERATIONAL STATUS: ON On-Line
USER NAME: vha05\vhaxxxiu\
PASSWORD: apassword1
MUSE SITE #: 1
MUSE VERSION #: 5A

Add/Edit Muse Network Location: <CR>

DS      Define Imaging Site Parameters
IW      Edit Image WRITE LOCATION only.
WF      Enter/Edit Background Processor Workstation File
NT      Enter/Edit Network Location
LS      Edit Network Location STATUS
PUR     Edit Imaging Purge Parameters
        Copy Routines to DICOM Gateway

Select Imaging System Manager Menu Option:
```

Note:

- This option populates the Site Parameters file (2006.1) and the Network Location file (2005.2) so some fields may appear to be duplicates. File 2006.1 contains the site defaults while the file 2005.2 contains the items specific to each network location. In the case where a site is only implementing the MUSE interface (and not Clinical Imaging), these fields will be the same.
- The entry for USER NAME must belong to the MUSE Users local NT group on the MUSE server. The VHAXX\VHAXXXIU account can be used for consistency.
- Replace xx with your VISN domain name and xxx with your 3-character site code.

3. Sites that are interfacing the MUSE and are running other VISTA Imaging components (i.e. Clinical Imaging or DICOM).

Add an entry to the Network Location file (2005.2) on Vista. This entry will contain the configuration attributes for the MUSE EKG server. This entry should be added using the Background Processor configuration options. These options are available using the *Edit|Network Location Manager* menu on the Background Processor. (see section 2.4.5 for detailed instructions on adding network locations) The following attributes should be configured and customized to fit the site:

NETWORK LOCATION: VHAISWMUS1	PHYSICAL REFERENCE: \\VHAISWMUS1\VOL000\
OPERATIONAL STATUS: On-Line	STORAGE TYPE: MUSE-EKG
ROUTER: 0	USER NAME: vha05\vhaiswiu
PASSWORD: apassword1	MUSE SITE #: 1
MUSE VERSION #: 5A	

Note: The entry for USER NAME must belong to the MUSE Users local NT group on the MUSE server. The VHAxx\VHAxxxIU account can be added to that group for consistency. The *PASSWORD* entry will automatically be encrypted after it is entered into the system.

2.7.1.2 MUSE Error Codes

<100	Operating system error – Use the error lookup utility located on the Help menu of the VISTA Imaging Display and Imaging Capture applications
100	Memory allocation error
104	MUSE API not authorized for this installation – call GE/Marquette to enable the API on the MUSE server
1000 - 4999	BTRIEVE error – log a NOIS call to reach the VISTA Imaging Customer Support team
>5000	Report generator error – possible fntopts problem - log a NOIS call to reach the VISTA Imaging Customer Support team

2.7.2 CPRS GUI Interface

If you are running the CPRS GUI application, you can configure the CPRS 'Tools' menu option to automatically launch the VISTA Imaging Display or Capture application and load the images for the current CPRS patient. When you switch patients in CPRS, Images for the new CPRS patient will automatically be refreshed by the VISTA Imaging application.

You will also see images for a CPRS patient when viewing a Radiology report or TIU document within the CPRS application. When viewing the CPRS report list, an image icon indicates which reports have images attached. When a report with a linked image is selected, images for the patient will automatically be loaded into the VISTA Imaging group window if Imaging is running.

To configure the CPRS 'Tools' menu for the CPRS GUI client, run the XPAREDIT routine on the VISTA system; this routine is used when using the menu option XPAR EDIT PARAMETER. This menu option is part of the CPRS Manager Menu Option [ORMGR] and is locked by the XUPROG security key. Please review the CPRS Technical manual for a full menu path to this

option and appropriate definitions. The following illustrates a sample XPAREDIT session for adding the VISTA Imaging Display application to the CPRS 'Tools' menu.

```
Select OPTION NAME: ORMGR      CPRS Manager Menu
  CL   Clinician Menu ...
  NM   Nurse Menu ...
  WC   Ward Clerk Menu ...
  PE   CPRS Configuration (Clin Coord) ...
  IR   CPRS Configuration (IRM) ...

Select CPRS Manager Menu Option: IR  CPRS Configuration (IRM)
  OC   Order Check Expert System Main Menu ...
  TI   ORMTIME Main Menu ...
  UT   CPRS Clean-up Utilities ...
  XX   General Parameter Tools ...

Select CPRS Configuration (IRM) Option: XX  General Parameter Tools
  LV   List Values for a Selected Parameter
  LE   List Values for a Selected Entity
  LP   List Values for a Selected Package
  LT   List Values for a Selected Template
  EP   Edit Parameter Values
  ET   Edit Parameter Values with Template

Select General Parameter Tools Option: EP  Edit Parameter Values
      --- Edit Parameter Values ---

Select PARAMETER DEFINITION NAME: ORWT TOOLS MENU      CPRS GUI Tools Menu

ORWT TOOLS MENU may be set for the following:

   1  User          USR   [choose from NEW PERSON]
   2  Location      LOC   [choose from HOSPITAL LOCATION]
  2.5 Service      SRV   [choose from SERVICE/SECTION]
   3  Division     DIV   [choose from INSTITUTION]
   4  System       SYS   [IMGDEM01.MED.VA.GOV]
   9  Package      PKG   [ORDER ENTRY/RESULTS REPORTING]

Enter selection: 4  System  IMGDEM01.MED.VA.GOV

----- Setting ORWT TOOLS MENU for System: IMGDEM01.MED.VA.GOV -----
Select Sequence: 1
Name=Command:VistA Imaging Display="C:\Program Files\VistA\Imaging\IMGVWP10.EXE" %DFN %MREF %SRV
%PORT
```

Note: The path MUST be enclosed in double quotes – do not quote the parameters.

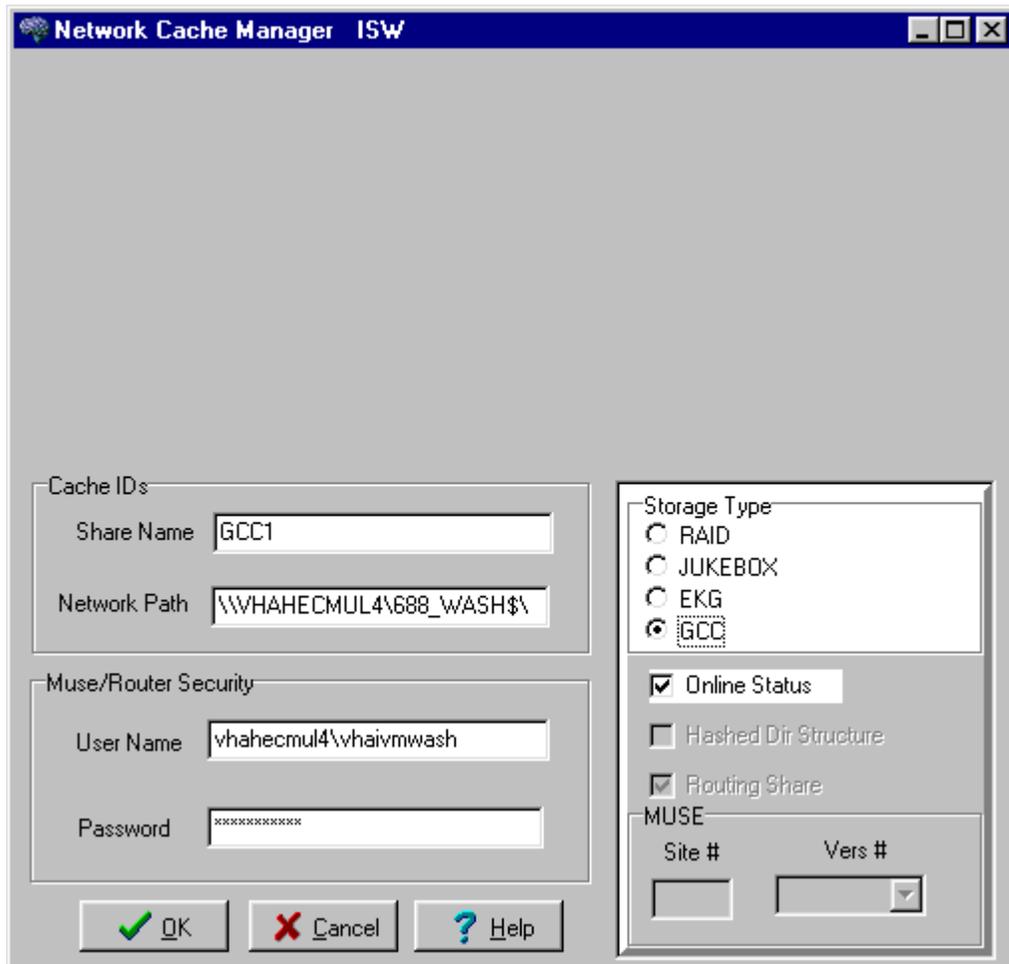
The VISTA Imaging Capture application can also be configured by adding another entry with the same attributes shown below except using TELE19N.EXE as the executable

2.7.3 Means Test Scanning to the HEC

2.7.3.1 Configuring VISTA Imaging to Copy Means Tests to the HEC

The VISTA Imaging Installation Guide contains examples on this subject. Review sections 2.4.5 Imaging M File Setup and section 2.4.5.1.

1. Use the Background Processor to create a new network location. On the Background processor workstation, use Edit[Network Location Manager] and select new. Respond to the following fields:
 - a. Share Name - provide a short identification (such as GCCn where n is a number)
 - b. Network Path - provide the full directory path obtained from HEC IRM. This field uses the Universal Naming Convention (UNC) file share name for the remote shared directory at the Health Eligibility Center (HEC) where the Means Test copies will be placed. For example, a typical path would be [\\VHAHECMUL4\123_XXXX\\$](#) where 123 is your site number and XXXX is a site abbreviation assigned by the HEC. Your site's username will be in the form: vhahecmul4\vhaivmXXXX where XXXX is your site abbreviation as assigned by the HEC (contact Gregory Brooks 404-235-1343). Your site will be assigned a password by the HEC.
 - c. Storage Type - select GCC
 - d. Online Status - will automatically be checked by default (do not modify)
 - e. User Name - provide the network user identification obtained from HEC IRM.
 - f. Password - provide the network password obtained from HEC IRM. Remember that the password is case sensitive.
 - g. Click the "OK" button when the above information is completed.
2. When a new GCC network location is added, it will be set to be UNHASHED (user cannot change) and it will be set as a ROUTER (user cannot change). Changes have been made to prevent users from checking the wrong boxes.
3. When setting up network locations, the software detects blank fields for Share Name, Network Path, and Storage Type and warns the user.
4. When an existing network location is brought up in the network location window, the default settings for HASH and ROUTER will be displayed. If these are not correct, the user must change the settings and save.



1. Edit the network Location for (2005.2) using the VISTA Background Processor Configuration Utilities.
2. Use the Background Processor to setup the default document location to point to the newly created network location. Use Edit|Imaging Site|Parameters and select the newly created network GCC location entry from the drop down list on GENERIC CARBON COPY (GCC) field.

Imaging Site Parameters

Admin values

Current Namespace: ZZ

Network Write Loc: MAG1H \\CUSTHIS\IMAGE1\$\

Generic Carbon Copy: GCC1 \\WHAHECMUL4\688_WAS

VistaRad Site Code:

Imaging Workstation Parameters

Use Capture Keys:

Timeout windows display: 122

Timeout windows capture: 121

Timeout Vista Rad:

Default User Preference: LIN.JEMMY (SETTING 1)

Default MUSE site #:

Local Imaging Mail Group

Members: FRANK.STUART

Remote Members: G.IMAGING DEVELOPMENT TEAM@FORUM.VA.GOV

PACS interface fields

Interface Switch:

Pacs Write Loc: MAG1H \\CUSTHIS\IMAGE1\$\

PCT FREE SPACE DICOM MSGS: 1

RETENTION DAYS DICOM MSGS: 15

Jukebox Functions

Jukebox Shares: Optical WORMOTG

Jukebox Default: WORMOTG

% Server Reserve: 5

Auto Write Location Update:

File Types: TXT

Multiple NameSpace:

NT Profiles

Net Username: CUSTHIS\custsupiu

Net Password: *****

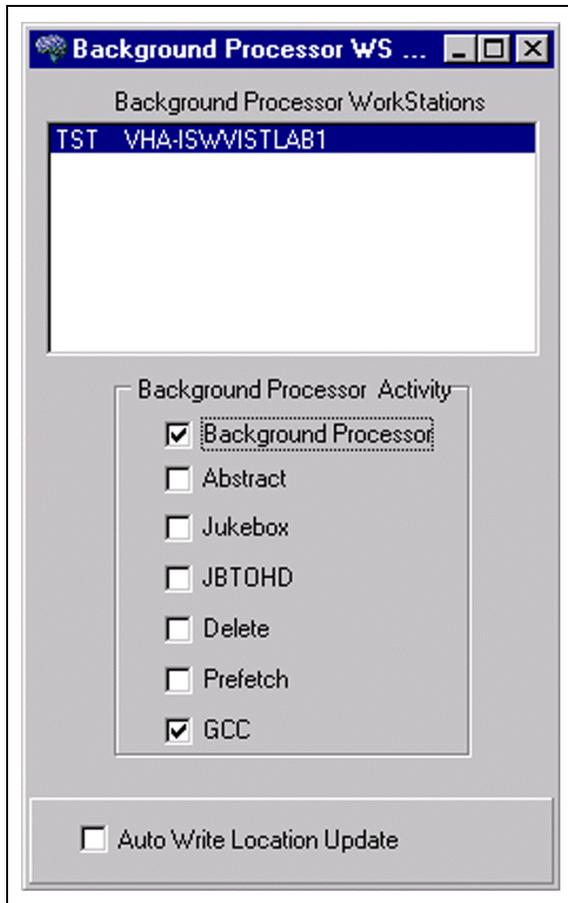
Error Messaging

Interval: 6

Last Message: JAN 04, 2002@15:10:03

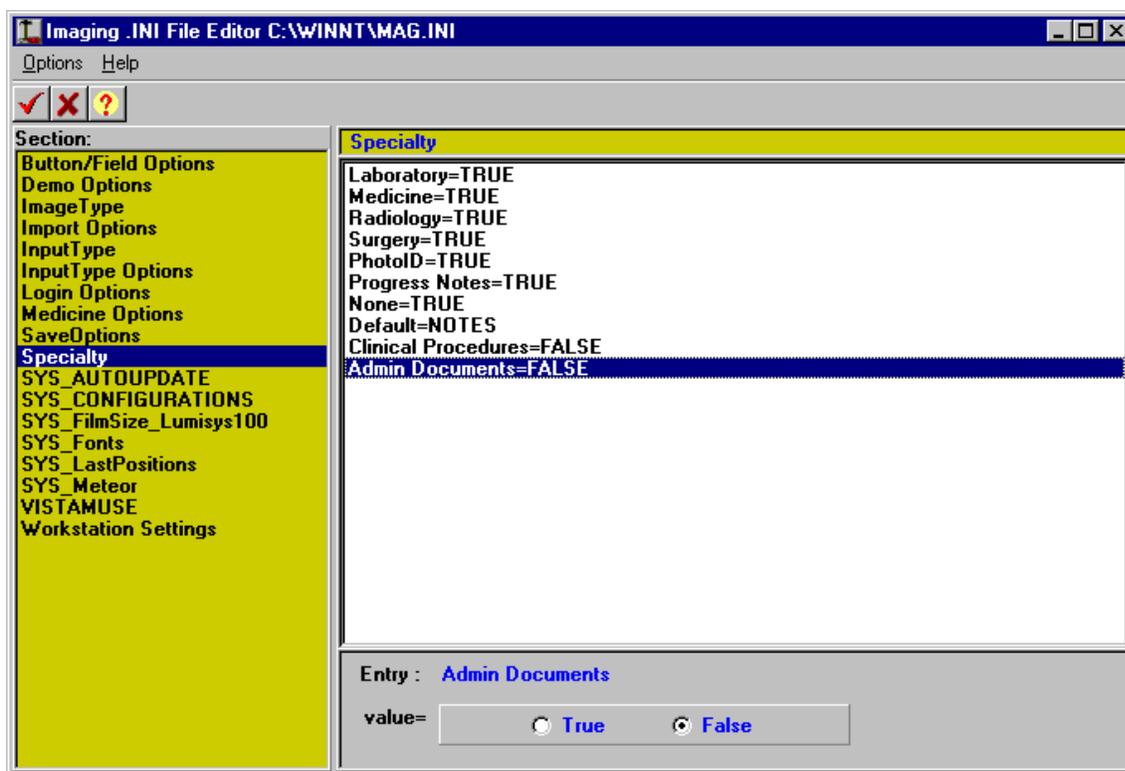
OK Cancel Help

3. Set-up the BP workstation to process the GCC queues (a new queue type). On the Background Processor workstation, use Edit\BP Workstation Parameters and click on the GCC radio button. Review the Imaging System Background Processor User Manual, Section 3.1.1.4 Operational Procedures.



2.7.3.2 Setting Up the Clinical Capture Workstation to Allow Means Tests Scanning Configuration

1. This step will configure the workstation to capture ADMIN images in TIFF format. The workstation configuration menu can be brought up by either using the MAGSYS.EXE application or, if the user has the appropriate security key (MAG SYSTEM) assigned, by starting the Clinical Capture software and selecting System Manager | Workstation Configuration Editor |
2. Click on Specialty in the list of items in the left of the window:



4. Double click on Admin Documents to change to TRUE
5. Verify that the following are all set to TRUE. If not, do so with the double click.
 - a. Click on Input Type and double click on ScannedDocument to change to TRUE.
 - b. Click on Image Type and double click on Document TIF G3 FAX to change to TRUE.
 - c. Click on the red check mark to save changes and exit.

The click on the Red check mark should return to the Capture software window.

Apply the setting by using...

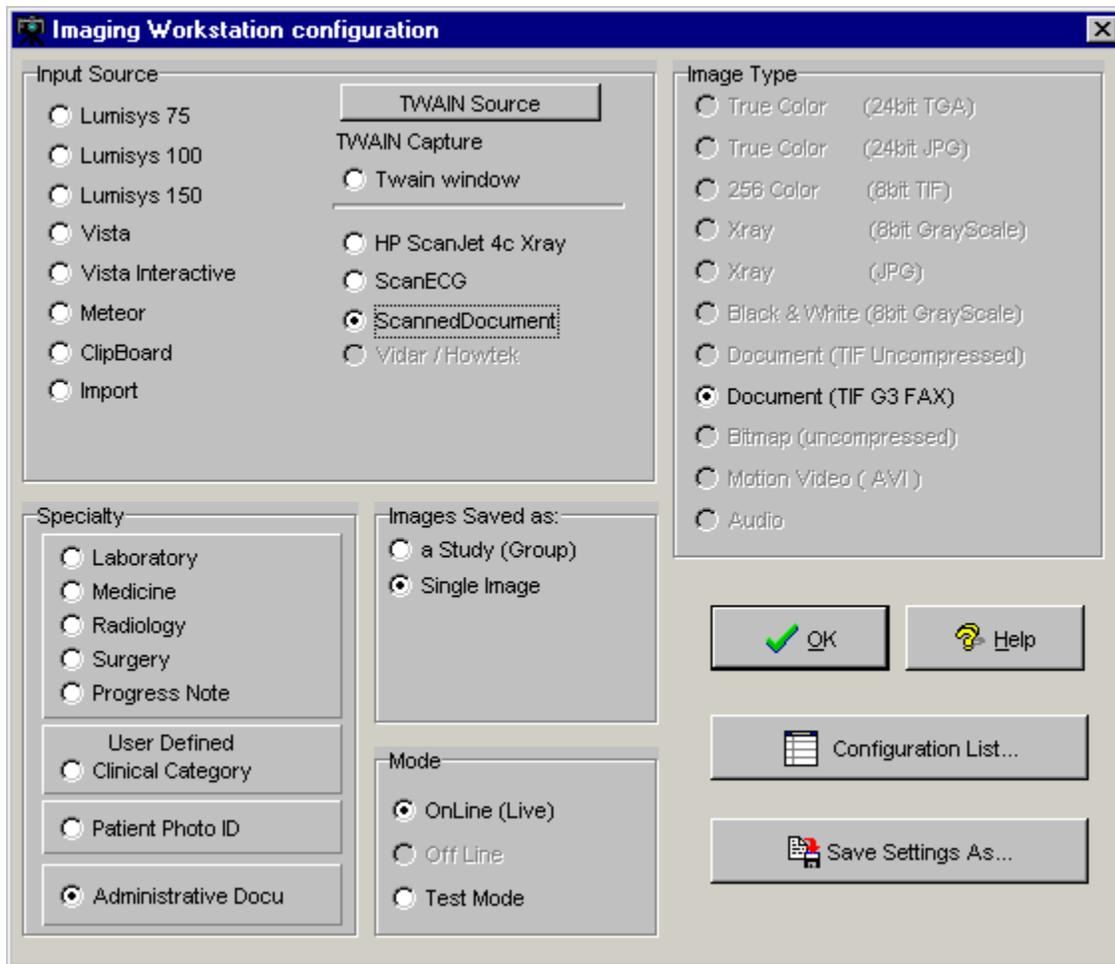
SYSTEM Manager|Apply Workstation Settings.|

This will put the setting into effect without the need to exit the application and reenter.

2.7.3.3 Configuring the Capture Workstation for Means Test Scanning

Set up a Capture button labeled "ADMIN" by using Configuration|Configuration Setting option. Set up an entry with the following components:

1. Under Input Source, select 'Scanned Document' under the TWAIN options.
2. Under Image Type, select Document (TIF G3 FAX).
3. Under Specialty, select Administrative Docu.
4. Under Images Saved As, select the appropriate entry (most likely single image capture).
5. Save these settings in a HOT BUTTON by selecting the 'Save Settings As', and assign a label such as 'ADMIN' or 'Means Test'.
6. Exit by pressing the OK button.



An additional Button will appear at the top of the Capture Window containing the name you selected: "ADMIN". When performing a capture, selecting from a drop down list (pick list) to select a Means Test pre-setup category and entering a date will complete the capture process. These will be shown by performing a scan session that follows.

2.7.3.4 Trouble-shooting Connection Problems with the HEC Directory

Check with the HEC to be sure that your initial test files have been copied there. If you are having problems copying a file to the HEC...

1. Be sure that the HEC Share is not mapped on your Background Processor. Connections will be made automatically.
2. Your password should be set not to expire.
3. Users should not be forced to change their passwords on the next login.

Verify the password with the HEC system administrator.

Chapter 3 VistARad Installation

3.1 Introduction

This chapter explains how to install and configure the VistARad workstation as a part of the VistA Imaging system. It contains the following information:

- Preliminary considerations
- VistARad workstation setup
- VistARad host setup
- Testing a VistARad installation

The installation and setup of VistARad host (“back end”) and workstation (client) software is a multi-part process. This chapter assumes that the persons responsible for VistARad installation have a working knowledge of M(umps), FileMan, VistA Imaging, and Windows NT Administration.

The Food and Drug Administration classifies VistARad as a medical device. As such, it may not be changed except as directed by the Vista Imaging SD&D group. Modifications to this software may result in an adulterated medical device under 21CFR820, the use of which is considered to be a violation of US Federal Statutes.

3.2 Preliminary Considerations

This section outlines requirements that need to be met before installing VistARad client software on workstations and before configuring VistARad routines on the VistA Host. It also includes information about running VistARad in “safe mode.”

3.2.1 Client Requirements

For each workstation where VistARad client software will be installed:

- The minimum requirements for diagnostic workstation hardware and network connections, listed in the VistA Imaging Planning Document and Approved Equipment List, must be met. This document is available at <http://vaww.va.gov/imaging/planning.pdf>.
- High-resolution monitors, their software drivers, and boards must be properly installed and configured.
- The following software must already be installed:

- Windows NT 4, Service Pack 6a
- Internet Explorer 5 or later
- McAfee VirusScan 4.5.0 or later
- KEA! VT, SmartTerm, or equivalent terminal emulation software

Note: For security purposes, all NT disk partitions should be formatted using NTFS. Do not use FAT file systems on the VistARad workstation.

Note: If you need to update from Internet Explorer 4, remove version 4 before installing the new version of Internet Explorer. Installing over version 4 may create problems with Internet Explorer or Windows NT Explorer.

The person installing VistARad client software needs:

- NT administrator privileges.
- The VistA Imaging version 3.0 CD containing the following software:

VistARad InstallShield (VistARad_Install.exe)
RPC (Kernel) Broker version 1.1 (XWB1_1WS.EXE)
Acrobat Reader 5.0 (rp505enu.exe)

3.2.2 VistA Hospital Information System (Host) Requirements

Before VistARad routines on the VistA Hospital Information System can be configured:

- The KIDS package containing VistA Imaging System files and routines (MAG3_0.Kid) must be installed on your VistA Hospital Information System.
- The assistance of the Radiology ADPAC or appropriate Radiology supervisory staff will be required to configure VistARad and the Radiology Package. For more information, see section 3.4.1.2.

3.2.3 Running VistARad in “Training Mode”

You can use VistARad in “training mode” when you want to make the software available for Staff Radiologist training purposes or before VistA configuration is complete.

To use VistARad in training mode, set the VistARad site parameter ENABLE STATUS UPDATE? to No (all workstations will be affected). When status updates are disabled **no file updates of any kind are made by VistARad**, making it safe to use on live exams during radiologist training/practice sessions.

3.3 VistARad Workstation Setup

The following sections explain how to install and configure the VistARad client software on each diagnostic workstation. The following topics are covered:

- Workstation preparation
- Software installation
- VistARad client software configuration

3.3.1 Workstation Preparation

Preferably, the following steps should be performed before the VistARad client software is installed; however, they can be performed after installation if necessary. Confirm that:

- Only approved software is installed on the workstation, as described in section 3.3.1.1.
- Diagnostic workstations must be excluded from automatic software update/inventory tracking packages, and any client software supporting these cannot be installed. For information about removing SMS™, see section 3.3.1.2.

Note: Because software distribution/inventory management tools can be used to install inappropriate or unapproved software without an administrator’s knowledge, client software for these tools cannot be installed on VistARad workstations. Instructions for the removal of Microsoft’s Systems Management Server™ (SMS) are detailed in the following section.

- Windows NT display settings used by diagnostic workstations should be optimized for the use of high-resolution monitors. For more information, see section 3.3.1.3.

3.3.1.1 Checking for Approved Software

Only the following programs are approved for use on a VistARad diagnostic workstation:

- VistARad client
- RPC (Kernel) Broker 1.1
- Acrobat Reader 4 or later
- KEA! VT, SmartTerm, or equivalent terminal emulation software
- McAfee VirusScan 4.5.0 or later
- Internet Explorer 5 or later
- Drivers for high-resolution monitors
- Windows NT 4, Service Pack 6a

Other software, such as Microsoft Office, or Vista’s CPRS, are not approved for use on VistARad diagnostic workstations and if present, **must be removed**.

3.3.1.2 SMS™ Exclusion

This section explains how to exclude VistARad workstations from the definitions used by Microsoft’s Systems Management Server™ (SMS) server, and explains how to remove SMS client software if it is inadvertently installed.

Note: The installation of unapproved components onto a VistARad diagnostic workstation will result in an adulterated medical device. The use of adulterated medical devices violates US Federal Law (21CFR820).

Performing the steps below will not only exclude VistARad workstations from SMS “pushes,” but will also exclude the workstations from automated inventorying.

3.3.1.2.1 Excluding Workstations from SMS

On the local SMS server, make the following changes to the Windows NT Registry:

1. Run regedit and navigate to the HKEY_LOCAL_MACHINE\Software\Microsoft\SMS\Components key.
2. Open the SMS_Discovery_Data_Manager subkey.
3. Enter each computer name to be excluded as a separate line for ExcludeServers.

3.3.1.2.2 Removing SMS Client Software

If SMS client software has been installed on a VistARad workstation, perform the steps below:

1. Confirm that the workstation has been added to the ExcludeServers list as described above.
2. On the VistARad workstation, navigate to C:\Winnt\MS\SMS\Core\Bin.
3. Run the cliunins.exe application to remove the SMS client software.

3.3.1.3 Configuration for High-Resolution Monitors

The default display settings used by Windows do not gracefully adjust to high-resolution monitors, and under certain circumstances, may reduce system performance. Make the following changes, described in detail below, to each workstation using high-resolution monitors:

- Set the system font size
- Set font size, colors, and visual effects using the Display Properties dialog
- Adjust mouse properties using the Mouse Properties dialog.

Note: The DOME software includes a program called **Dlgfix.exe** (“Dialog Fix”). Running this program causes some (but not all) system dialog boxes to appear on the left-hand monitor, so that they are not split between two monitors in a multi-headed system.

3.3.1.3.1 Setting System Font Size

Use the following steps to set the system font size:

1. Open the Display Properties dialog (right-click the desktop and click Properties), go to the Settings tab, and set the font size to Large.

Note: Changing this setting creates the LogPixels key in the registry. If you are prompted to reboot the computer after changing this setting, choose No.

2. Run regedit, and in the Windows NT Registry, use search (CTRL+F) to locate all instances of LogPixels. For each instance found, set the value to c0h (192 decimal).

Note: After changing LogPixels, the Font Size box in the Display Properties dialog (Settings tab) will appear as <no fonts>, and should not be changed. If this value is changed, you will need to reset LogPixels in the registry.

3. Reboot the computer.

3.3.1.3.2 Setting Display Properties

Use the Display Properties dialog (opened by right-clicking the desktop and clicking Properties) to set the following options.

Note: If you need to control screen configuration, resolution (desktop area) and refresh rates, use the DOME tab, not the Settings tab.

Tab	Option	Setting	Notes
Background	Wallpaper	None	Using a wallpaper may make desktop icons disappear.
Screen Saver	Screen Saver	Logon <i>recommended</i>	The Logon screen saver can be used to protect patient privacy and to extend monitor life.
DOME	Palette Options	Static Gray Palette	Use this setting to ensure that all available shades of gray are used to display images. Using other settings may adversely affect the diagnostic quality of displayed images.
Appearance	<i>These options can be changed to suit user's individual purposes. Recommended changes are listed in the next table.</i>		
Plus! Tab	Show window contents while dragging	disable (uncheck)	Leaving this option checked can impact performance of VistARad.
Settings	Colors	256	N/A

Note: For all options where a font can be specified, Arial, MS San Serif, or Tahoma is recommended.

Option (under Item box)	Setting
Active Title Bar	Font: 8 -10 pt Bold
Active Window Border	Size: 2 - 3
Application Background	Color: very dark gray
Caption Buttons	Size: 34
Icon	Size: 60 - 72, Font Size, 10 -14
Icon Spacing (horiz)	Size 80 -100
Icon Spacing (vert)	Size 80 - 100
Menu	Font: 8 - 10 pt Bold
Message Box	Font: 8 - 10 pt Bold

Option (under Item box)	Setting
Palette Title	Size: 26, 27 or smallest allowed Font: 7 - 9 pt
Scrollbar	Size: 34
Tooltip	Font: 7 pt.

After changes are made, you can use save your settings as a desktop scheme by clicking the “Save As” button, entering a name in the dialog that appears, and clicking OK.

3.3.1.3.3 Mouse Settings

Recommended changes to mouse settings are described below. These changes are made from the Mouse Properties dialog (Start | Settings | Control Panel | Mouse), and be can adjusted to suit individual users’ preferences.

- It is recommended that mouse pointer speed be adjusted to a relatively fast setting. Pointer speed can be set from the Motion tab.
- If your mouse drivers include optional pointer schemes, you can use the Pointer tab to select a scheme using larger pointer sizes.

3.3.2 Software Installation for Diagnostic Workstations

The steps below explain how to install:

- RPC Broker client software
- VistARad client software
- Acrobat Reader 5

These steps should be performed for each diagnostic workstation.

3.3.2.1 RPC (Kernel) Broker Client Installation

The RPC Broker allows the VistARad client software to communicate with the VistA host system. To install version 1.1 of the RPC Broker, use the steps below. For more detailed information, or if you are installing a more recent version, refer to the RPC Broker Installation Guide, available at <http://vista.med.va.gov/vdl/#infrastructure>.

1. Log into the workstation as an administrator, and ensure that no other programs are running.
2. Run XWB1_1WS.EXE and follow the steps in the setup wizard. Answer “Yes” when given the option of running the Client Agent program on startup.
3. If you set up workstations to connect to a server that can be resolved automatically through domain name server (DNS) (e.g. alpha3.yourva.gov), there is no need for you to make any entries in the workstation's HOSTS file.

If you set up workstations to connect to a server with a generic name (i.e. BROKERSEVER) that is not resolved by DNS, you will need to create an entry the \WINNT\SYSTEM32\DRIVERS\ETC\HOSTS file. This will force an association between that generic name and the IP address that belongs to the VISTA server your Broker Listener is running on.

Sample Hosts file entry:

```
#hosts
0.0.0.10 BROKERSEVER
#end hosts
```

Note: Use the IP address and alias of your site's VistA server where the RPC Broker Listener software is installed. A single space should separate IP address and alias. You should also have a blank line (LF) at the end of the file.

4. Reboot the workstation.
5. Test the connection to your server using the following steps:
 - a. Go to the C:\Program Files\VISTA\BROKER folder and run the RPCTest.exe program.
 - b. Enter your access and verify codes when you are prompted to log in. If you can log in, the connection works.

3.3.2.2 VistARad Client Installation

VistARad client software is available on the VistA Imaging version 3.0 CD. Steps for installing and updating the VistARad client software are provided below.

Once the VistARad client software has been installed, you will be able to start VistARad and view images, provided that:

- The RPC Broker software is running and a connection to the VistA host can be made.
- Image acquisitions for radiology exams have occurred.
- Users have a valid Access/Verify code, to which the MAGJ VISTARAD WINDOWS security key has been assigned.

However, until VistARad host setup procedures have been performed, you will be able to access images only by using the Patient Lookup option on the workstation, and radiologists will not be able to update exam status from VistARad.

3.3.2.2.1 Installing VistaRad Client Software

Use the following steps when installing the VistARad client software for the first time.

1. Log into the workstation as an administrator, and ensure that no other programs are running.
2. Run VistARad_Install.exe to start the InstallShield wizard.
3. After the Welcome Screen displays, click Next, and answer each prompt. Usually, all default values supplied by the wizard can be accepted.

Note: Choose the “Typical” option when you are prompted to select an installation type.

4. After reviewing the settings in the summary screen provided by the wizard, click Next to complete the installation.
5. After installation is complete, reboot the workstation.
6. Confirm that a shortcut to VistARad has been placed on the desktop and that VistARad can be accessed from the Windows Start menu (Start | Programs | VistA | Imaging | VistARad).

Refer to the VistARad User Guide for further instructions on how to use VistARad.

3.3.2.2.2 Updating VistaRad Client Software

Use the following steps when updating existing VistARad client software.

1. Log into the workstation as an administrator, and ensure that no other programs are running.
2. Run VistARad_Install.exe to start the InstallShield wizard.
3. After the Welcome Screen displays, select the Repair option, then click Next.
4. If you are asked to confirm the deletion of files in the VistARad program directory, click Yes for each prompt.
5. When the Maintenance Complete screen displays, click Finish to exit the wizard.
6. After installation is complete, reboot the workstation.
7. Confirm that the VistARad shortcuts on the desktop and in the Windows Start menu can be used to start the updated software.

Refer to the VistARad User Guide for further instructions on how to use VistARad.

3.3.2.3 Acrobat Reader 5 Installation

Acrobat Reader is used to display the online VistARad User Guide. While version 4 of Acrobat Reader is adequate, version 5 works more gracefully with high-resolution monitors. Acrobat Reader 5 is included on the VistA Imaging version 3.0 CD.

3.3.2.3.1 Installing Acrobat Reader 5

1. Log into the workstation as an administrator, and ensure that no other programs are running.
2. If an earlier version of Reader is installed, remove the earlier version. If you run into problems, refer to www.adobe.com/support for manual removal instructions.
3. Run rp505enu.exe and follow the steps in the setup wizard.
4. After Acrobat Reader 5 is installed, run the program and make the following changes to the Edit | Preferences dialog (press CTRL+K to open).
 - a. Under Options, clear the Display Splash Screen box. This will reduce the time it takes for Reader to start.
 - b. Under Updates, set the Check for Updates box to “Manually.” This will prevent Reader from automatically checking for updates via the Internet
5. Log into VistARad and use the Manager or Viewer Help menu to open the online help file. Size and position the window as desired. Your changes will be retained and used the next time the help file is opened.

3.3.3 VistARad Client Software Setup

After the VistARad client software is installed on a workstation, the following changes should be made.

- Set up windows properties, fonts, and preferences as described in section 3.3.3.1.
- Review/adjust case preset settings as described in section 3.3.3.2.

3.3.3.1 VistARad Manager Setup

The first time VistARad is started, the initial settings used by the Manager may be awkward for workstations using 2 or 4 monitors. These settings can be adjusted from the VistARad Manager window (to start VistARad, double-click the VistARad shortcut on the Windows NT desktop).

The following changes should be made:

- Define the fonts used by the Manager (in the VistARad Manager window, use Options | Font-All Windows).
- Resize and position the VistARad Manager window, the generic exam list window, the Update Status/Close Exam window, the Health Summary window, and the generic report window.
- Set Manager preferences (use Options | Settings). For information about Manager preferences, refer to the Customizing the Manager section in the VistARad User Guide (available as online help from the Help menu in the Manager).

Changes made to the Manager are specific to each user on a given workstation, and once set, will be retained.

3.3.3.2 Initial Preset Setup

Case presets determine the initial layout, window/level, scale, etc., of displayed exams in the VistARad Viewer. Case presets are applied based on the exam's modality. The Viewer includes pre-defined case presets for the following modalities: CR, CT, MRI, and ultrasound.

Case presets should be reviewed and adjusted in accordance with local service policy and/or user preference. Case presets can be reviewed from the VistARad Viewer window using the Settings | Case Preset menu option.

Note: Case presets are stored on a workstation-by-workstation basis. Any users of the workstation will have the same case presets.

For more information about case presets, refer to the VistARad User Guide.

3.3.4 Maintenance of High-Resolution Monitors

To provide consistent image viewing quality, monitors used for diagnostic purposes must be tested and calibrated regularly, and calibration records must be maintained. Calibration records may be requested for review by accreditation groups such as JCAHO.

Note: It is strongly recommended that you involve the expertise of your Biomedical Engineering staff in setting up and managing a quality control program for the diagnostic display devices.

When initially installed, all high-resolution monitors should be tested weekly, and test results should be documented and retained. Use the time that it takes to detect a reduction in display quality to establish a reasonable testing interval. For example, if it takes 3 weeks of testing to detect a loss of display quality any one of your site's high-resolution monitors, use 3 weeks as your subsequent testing interval for all monitors.

The ACR (American College of Radiology) has published a standard that provides calibration guidelines. The Digital Image Data Management Standard is available on the Internet at: www.acr.org.

Note: Since the results of the calibration function are stored in the DOME board, anytime either the DOME board or a monitor is replaced or altered (including adjusting the brightness or contrast controls), the monitor calibration function **must** be performed.

Several options may exist for monitor calibration. Most vendors of high-resolution monitors provide calibration hardware and software, as does DOME Imaging Systems. Follow the procedures described by the vendor of the calibration system you have selected.

3.4 VistA Server Setup for VistARad

This section describes the VistARad-related configuration settings that need to be made after the VistA Imaging KIDS package is installed for the first time on the VistA hospital information system.

3.4.1 Basic Configuration

The basic configuration of VistARad involves:

- Assigning menu options and security keys
- Adjusting status code definitions used for softcopy reading using the Radiology Package
- Enabling status updates for VistARad users
- Scheduling the job used to compile the Recent exams list

Note: For additional information about site parameters, custom exam list creation, and enabling prefetch, refer to section 3.4.2.

3.4.1.1 Menu Options, Update Capability & Security Keys

Users need to have the MAGJ VISTARAD WINDOWS secondary menu option assigned to their VistA login to use the VistARad software.

A user's capacity to lock exams and update exam status from VistARad is based on classifications defined using the Rad/Nuc Med Personnel menu in the Radiology Package.

- A user classified as "Staff" in the Radiology Package can lock exams and update exam status using VistARad.
- A user classified as "Resident" in the Radiology Package can lock exams, but cannot update exam status using VistARad.

The only security key associated with VistARad is the MAGJ SEE BAD IMAGES key. This key grants the ability to display images that would normally be withheld from viewing due to suspicions that the images are not properly associated with their reports or with the patient's medical record. This key should be assigned to one or two designated users to allow review of suspect images.

3.4.1.2 Activating Exam Lists and Status Updates

VistARad relies on the status codes defined in the Radiology Package to:

- Generate and organize exam lists
- Allow VistARad users to update exam status from "Examined" to "Interpreted"

If VistARad is being installed after the Radiology Package has been implemented, status code definitions for Imaging Types intended for soft-copy reading will need to be changed.

Note: The assistance of the Radiology ADPAC or appropriate Radiology supervisory staff is required to perform these tasks. The steps below outline the minimum entries needed to change status code definitions used for softcopy reading.

1. In the Radiology Package, access the RA SUPERVISOR menu.
2. Select the Examination Status Entry/Edit (RA EXAMSTATUS) option in the Utility Maintenance Files menu.
3. For each Imaging Type used for soft-copy reading, define or modify the “Interpreted” status.
 - a. For most of the prompts, the values you enter will be determined by the needs of your site. For detailed information about status codes and Imaging Types, refer to the Radiology/Nuclear Medicine ADPAC guide, available at <http://vista.med.va.gov/vdl>.
 - b. For the “Interpreted” status code to work properly with VistARad, the status code’s definition must include the following values (only the fields relating to VistARad are shown below).

VISTARAD CATEGORY: **D**
REQUIRED FOR CHANGE TO THIS STATUS: **RESIDENT OR STAFF**
ASK FOR INTERPRETING PHYSICIAN: **NO**

Note: These values will generate a Radiology data inconsistency report for *requiring* a field (Interpreting Physician Name) that is not *asked* for. In this situation, the report can be ignored because the required value for the field is updated automatically by VistARad (when a VistARad user indicates that an exam has been interpreted).

4. Adjust existing status codes:
 - a. For each of the Imaging Types that will be used for softcopy reading, the existing status code sequence will need to be changed to accommodate the addition of the “Interpreted” status. For example, a typical sequence used at many sites (prior to installing VistARad) is:

Waiting; Examined; Transcribed; Complete

Once the new status code has been created (as described in the previous step), and the sequence has been changed to accommodate the new code, the sequence would be:

Waiting; Examined; **Interpreted**; Transcribed; Complete

- b. For each existing examination status code that will be used for VistARad, assign the VISTARAD CATEGORY field that indicates how VistARad will treat the exam for the purpose of creating exam lists. Possible values are:

W	Waiting for Exam
E	Examined
D	Dictated/Interpreted
T	Transcribed

Usually, the Status Code and the VistARad Category value will use the same terminology. However, the Status Code name is a free-text value, and could be different from the VistARad Category. If this is the case, assign the Category value that corresponds to the equivalent stage within the flow of exam processing through the department. For example, an examination status code of “Not Yet Examined” would be assigned a VistARad Category of “W,” because “W” corresponds most closely to this workflow step.

Once changes are made, exams in the “Examined” state will appear on VistARad’s UnRead list. Exams remain on the UnRead list until VistARad updates the field “Interpreting Physician,” which causes the Exam Status value to advance to “Interpreted.” Interpreted exams are then removed from the UnRead list.

3.4.1.3 Enabling Status Updates

The ENABLE STATUS UPDATE field should be set to Yes when VistARad workstations are ready to be used for interpreting current exams.

Warning: Status updates should **not** be enabled until radiologists have had training and practice using VistARad, and appropriate planning and coordination with your Radiology Package ADPAC and Radiology department management has occurred.

To enable status updates:

1. From the VistARad System Options (MAGJ MAIN) menu, choose the E/E VistARad Site Parameters (MAGJ VISTARAD SITE PARAMETERS) option.
2. Enter a value for VISTARAD SITE NAME (this value is used as the primary key (IEN) for the file used to store VistARad site parameters. Value can be between 3 and 30 characters. Only one value can be defined.
3. Set ENABLE STATUS UPDATE? to YES.

At this point, a radiologist (a user defined as “Staff” in the Radiology Package) can update the status of a locked exam from “Examined” to the next higher status (usually “Interpreted”).

4. Type “^” to return to the VistARad System Options menu, or if desired, set values for other site parameters. For more information about specific site parameters, see section 3.4.2.1.

3.4.1.4 Setup for Pre-Compiled Recent Exam Lists

In most situations, the Recent exam list should be set up so that it is compiled in advance. Compiling the Recent exam list in advance allows the user quick access to the list, rather than making them wait until while the contents of the Radiology database are scanned.

The steps below explain how to schedule the job that is used to compile the Recent exam list. For information about how the UnRead exam list is compiled in advance, see section 3.4.1.5.

Note: To schedule jobs in TaskMan, you must be assigned the TaskMan Manager security (ZTMQ) key.

1. From the VistARad System Options (MAGJ MAIN) menu, use the E/E VistARad Site Parameters (MAGJ VISTARAD SITE PARAMETERS) option to specify values for the following fields.

BACKGROUND COMPILE EXAM LISTS
RECENT BKGND COMPILE INTERVAL
UNREAD BKGND COMPILE INTERVAL

For information about these fields, enter ?? at the prompt for or see section 3.4.2.1.

2. Access the TaskMan Management (TASK) menu and choose Schedule/Unschedule Options.
3. Select the MAGJ SCHED RECENT LIST COMPILE job.
4. In the Edit Option Schedule screen, set values for the following (sample user input is shown in bold):

```

                                Edit Option Schedule
Option Name: MAGJ SCHED RECENT LIST COMPILE
Menu Text: VISTARAD RECENT LIST COMPILE --          TASK ID:

QUEUED TO RUN AT WHAT TIME:  NOW
DEVICE FOR QUEUED JOB OUTPUT: <ENTER>
QUEUED TO RUN ON VOLUME SET:  <site dependent>
RESCHEDULING FREQUENCY:      2H (2 or 3 hours is recommended;
                                frequency must match RECENT
                                BKGRND COMPILE INTERVAL)
TASK PARAMETERS:              <ENTER>
SPECIAL QUEUEING:             S
```

5. Enter “S” at the COMMAND prompt to save the schedule.

3.4.1.5 About Pre-Compiled UnRead Lists

Like the Recent exam list, the UnRead exam list is also typically compiled in advance. However the job used to compile the UnRead list (IMAGING VISTARAD UNREAD LIST COMPILE) is not scheduled using TaskMan. Rather, the job is scheduled automatically the first time the UnRead list is opened from any VistARad workstation. In TaskMan, the name of the user that triggered the initial compilation of the UnRead list will appear as the person who scheduled the job.

After the initial compile, the job will pause, and then rerun using the time interval specified in the UNREAD BACKGROUND COMPILE INTERVAL site parameter. This job can be disabled by setting the BACKGROUND COMPILE EXAM LISTS site parameter to “No.” For more information about these site parameters, see section 3.4.2.1.

3.4.2 Detailed Configuration

The VistARad System Options Menu is used to set site parameters that control VistARad’s basic behaviors and to enhance performance, to create custom exam lists, and to review and manage VistARad’s prefetch capabilities.

```
Select OPTION NAME:  VistARad System Options

SITP  E/E VistaRad Site Parameters
ELIS  E/E VistaRad Exam Lists
PLIS  Print VistaRad List Definition
EPRF  E/E VistaRad Prefetch Logic
IPRF  Inquire Prefetch Logic
PPRF  Print VistaRad Prefetch Logic Table

Select VistARad System Options Option:
```

This section explains how to set up the options controlled by the VistARad System Options menu.

3.4.2.1 Setting VistARad Site Parameters

The VistARad Site Parameters file contains fields used to control basic aspects of how VistARad works. Changes made to these fields affect all VistARad workstations.

The VistARad Site Parameters file is accessed using the E/E VistARad Site Parameters (MAGJ VISTARAD SITE PARAMETERS) option in the VistARad System Options (MAGJ MAIN) menu. Each field is described below. Valid values are listed in parentheses. Variables are indicated in italics.

VISTARAD SITE NAME

(site name, between 3 and 30 characters)—Text value identifying the site. Used as the primary key (IEN) for the file used to store VistARad site parameters. Currently, only one name per site may be used. For consolidation sites, this means that all divisions using VistARad will use the same set of site parameters.

ENABLE STATUS UPDATE?

(Yes/No)—Grants a radiologist (a user defined as “Staff” in the Radiology Package) the capacity to update an exam’s status from “Examined” to “Interpreted.”

RECENT EXAMS DAYS LIMIT

(age of exam in days, range 2-99999)—Limits the contents of the Recent exams list to exams up to n days old, where n is the value for this field (the Recent exams list shows all exams having a status of Interpreted or Transcribed). Note that for most sites, exams are likely to be completed

within 3 to 4 working days of being interpreted, at which point they no longer show up on the Recent Exams list. If a limit is not set using this field, the system defaults to a value of 6.

UNREAD EXAMS DAYS LIMIT

(age of exam in days, range 2-99999)—Limits the contents of the UnRead exams list to exams up to n days old, where n is the value for this field. If a limit is not set using this field, the system defaults to a value of 30.

PREFETCH ACTIVE?

(Yes/No)— Turns prefetch on or off. Prefetch determines if archived exams meeting criteria for “prior exams” are retrieved from long-term storage when a patient is registered in the Radiology Package. When active, prefetch allows quick access to prior related exams, because the exams in question have already been copied to short term storage. When prefetch is not active, there will be a delay when a radiologist has to display a prior (archived) exam.

Note: Prefetch is dependent on the settings in the HL7 package. Prefetch logic, which determines what types of prior exams are retrieved, can be reviewed or changed. For more information about prefetch, see section 3.4.2.3.

LIST ONLY EXAMS HAVING IMAGES?

(Yes/No)—Determines if the UnRead, Recent, and All Active exam lists show all exams, or only those exams that have images available for display.

- Sites which have a mix of exams that do and do not have digital images may want to set this field to Yes in order to control the size of exam lists.
- The Patient Exams and All Patient Exams lists are not affected by this setting.
- If a custom list is defined using the “Pending” exam status, that list is affected by this setting.

ENABLE SERIES DISPLAY?

(Yes/No)—Controls how multi-series exams are presented in the Viewer. When enabled, each series within an exam will be displayed in a separate exam group window. When not enabled, all series in an exam will be displayed in a single group window.

- Workstation users have a separate preference that can be used to turn series processing on or off within the viewing session.
- This option does not affect exam presentation in the Stack Viewer.

BACKGROUND COMPILE EXAM LISTS?

(Yes/No)— The jobs used to compile the UnRead and Recent lists check the value of this field before they run. If this field is set to Yes, the jobs run normally. If this field is set to No, the jobs end (even though the jobs will reschedule themselves to run using their defined intervals, the net effect is that when this field is set to No, the UnRead and Recent lists are created only on demand).

- When the UnRead and Recent lists are created on demand (not pre-compiled), they will contain the most recent information available in the Radiology database. However, the process of retrieving the information may be lengthy for sites that handle a moderate to high number of exams.
- When the UnRead and Recent lists are compiled in advance, the lists can be retrieved very quickly. The possibility of the information in pre-compiled lists being outdated is minimized by the use of the UNREAD BKGND COMPILE INTERVAL and the RECENT COMPILE INTERVAL fields.

For information about scheduling the job used to compile the Recent list, refer to section 3.4.1.4.

UNREAD BKGND COMPILE INTERVAL

(number of minutes: range 2-15)—When BACKGROUND COMPILE EXAM LISTS is set to Yes, this field defines the number of minutes to wait between each successive compile of the UnRead exams list. If not specified, the default value used will be 6 minutes. For sites that tend to have more than 100 unread exams, it is recommended to use a value of 3 or 4 minutes; less than 100 unread exams, use 2 or 3 minutes.

Note: Exams that have advanced to a status of “Examined” after the UnRead list has been compiled will not appear until the next time the UnRead list is compiled. However, exams that are advanced to a status of "Interpreted" will be dropped from the UnRead list, even between compiles.

The initial compilation of the UnRead list is triggered by the user opening the UnRead list from a workstation. For more information, see section 3.4.1.5.

RECENT BKGND COMPILE INTERVAL

(number of minutes: range 30-240)—When BACKGROUND COMPILE EXAM LISTS is set to Yes, this field should match the defined interval used in TaskMan to create Recent lists. This field is used to provide a warning message to the VistARad user should it appear that the Background Compile has not run for more than the defined interval of time.

Note: Exams that have advanced to a status of “Complete” after the Recent list has been compiled will not be removed until the next time the Recent list is compiled. However, exams that have advanced to a status of "Transcribed" will be added to the Recent list, even between compiles.

For more information about compiling the Recent exam list, refer to the information in section 3.4.1.4.

REMOTE LIST ONLY REMOTE CACHE?

(N/A)—This field is reserved for future enhancements; leave blank.

SITE SENDS TO REMOTE CACHE

(N/A)— This field is reserved for future enhancements; leave blank (or answer “NO”).

Note: The next two fields are used to reduce the time it takes to create the Patient Exams list. Radiology Department personnel should be consulted when determining appropriate values for these fields (suggested values are included below). Note that the All Patient Exams list is not affected by these two fields.

PATIENT LIST LIMIT # YEARS

(number of years: range 2-20)— Use this field to control how far back in time the Patient Exams list should go. Greater efficiency in compiling this list is achieved by limiting the number of years to a "clinically useful" value of 5 to 7 years. When no value is defined for this field, the Patient Exams list will include the earliest exams on record for a patient (subject to maximum number of exams defined in PATIENT LIST LIMIT # EXAMS).

PATIENT LIST LIMIT # EXAMS

(number of exams: range 15-75)— Use this field to define the maximum number of exams that can appear in Patient Exams list. A recommended value would be about 30 to 40 exams. When no value is defined for this field, the Patient Exams list will include all exams on record for a patient (subject to maximum age of exams defined in PATIENT LIST LIMIT # YEARS).

UNREAD LIST PRIORITY SEQ

(sort order)— Defines the sort order used for the UnRead list. Based on four values indicating priority derived from the Radiology Exam order, file 75.1. The default order is:

Stat, Urgent, Pre-op, Routine

To achieve this ordering, the value for this field would be specified as:

S,U,P,R

Any sequence of these four letters may be defined (do not use spaces, all four letters must be used). Regardless of the sequence defined, the oldest exam in a given status is displayed first.

3.4.2.2 Defining Custom Exam Lists

Once basic configuration is complete, VistARad’s standard exam lists (UnRead, Recent and All Active) can be used to list all exams within a specific status category. For most sites, it is beneficial to further subdivide the pool of unread exams by defining custom exam lists. Custom exam lists allow VistARad workstations to reflect how the department’s interpretation work is distributed between radiology staff.

Once a custom list is defined and enabled, VistARad workstation users will be able to access the custom list using an option under the Viewer menu and/or a button that appears with the VistARad Manager window.

Note: The Imaging Coordinator will need to work with radiology management to design custom lists that are suitable for each site's needs.

3.4.2.2.1 Menu Options for Custom Lists

Custom exam list definitions can be accessed and changed from the VistARad System Options menu (MAGJ MAIN).

```

Select OPTION NAME: VRAD          VistARad System Options

SITP  E/E VistaRad Site Parameters
ELIS  E/E VistaRad Exam Lists
PLIS  Print VistaRad List Definition
EPRF  E/E VistaRad Prefetch Logic
IPRF  Inquire Prefetch Logic
PPRF  Print VistaRad Prefetch Logic Table

Select VistARad System Options Option:

```

The Print VistARad List Definition (MAGJ LIST INQUIRY) option is used to display existing exam list definitions. The following definitions are pre-defined and cannot be changed.

Exam List	Contains Exams With Status Of
UnRead	EXAMINED
Recent	INTERPRETED, TRANSCRIBED
All Active	EXAMINED, INTERPRETED, and TRANSCRIBED
Newly Interpreted	N/A (under development for future use)

The E/E VistARad Exam Lists (MAGJ E/E VISTARAD LISTS) option is used to create and edit custom exam lists.

Note:

Once created, custom lists cannot be deleted. However, all fields used to define custom lists can be re-defined, and the list itself can be disabled.

Do not create or edit exam list definitions directly using FileMan. Changes made using FileMan will not work.

3.4.2.2.2 Creating Custom Lists

Follow the steps below to create custom exam lists. For information about specific fields, use ?? at a prompt or refer to the descriptions in the following section.

1. From the VistARad System Options (MAGJ MAIN) menu, choose the E/E VistARad Site Parameters (MAGJ E/E VISTARAD LISTS) option.

2. At each prompt, enter values used to define the basic properties of the list you are creating. A sample screen is shown below, with user input in bold:

```

Select MAG RAD LISTS DEFINITION NAME: URGENT MR
  Are you adding 'URGENT MR' as
  a new MAG RAD LISTS DEFINITION (the 10TH)? No// Y (Yes)
NAME: URGENT MR//
LIST #: 10// (No Editing)
BUTTON LABEL: URGENT MR
LIST TYPE: U UNREAD
ENABLE LIST?: Y Y
Select COLUMN: CASE NUMBER
  WIDTH:
Select COLUMN: EXAM LOCK INDICATOR
  WIDTH:
Select COLUMN: PATIENT NAME
  WIDTH:
...
Select COLUMN:
Select SORT: IMAGE DATE/TIME
  1 IMAGE DATE/TIME
  2 IMAGE DATE/TIME-SORTABLE
CHOOSE 1-2: 2 IMAGE DATE/TIME-SORTABLE
REVERSE?: N NO
Select SORT: CASE NUMBER
Select SORT:
    
```

3. After defining basic properties, you will be prompted to create a search logic definition. Note that for custom list creation, you are saving a search logic *definition*, rather than saving search logic results.
 - a. Define the search logic, using terms based on values displayed in VistARad’s exam lists. A sample screen is shown below, with user input in bold:

```

...
NOTES: EXAM LOCK INDICATOR will not work for search logic;
REMOTE CACHE INDICATOR only works for Null/Not Null logic.

-A- SEARCH FOR MAGJ ZLIST SEARCH FIELD: MODALITY
-A- CONDITION: 5 EQUALS
-A- EQUALS: MR

-B- SEARCH FOR MAGJ ZLIST SEARCH FIELD: PRIORITY
-B- CONDITION: 5 EQUALS
-B- EQUALS: URGENT

-C- SEARCH FOR MAGJ ZLIST SEARCH FIELD:

IF: A B MODALITY EQUALS "MR" and PRIORITY EQUALS "URGENT"
OR:
...
    
```

- b. After defining search logic, you will be prompted to store your definition. Always enter the values indicated in bold below.

```

...
STORE RESULTS OF SEARCH IN TEMPLATE: TEMP
                                (Mar 08, 2002@12:50) User #131 File
#2006.634 SEARCH
DATA ALREADY STORED THERE...OK TO PURGE? NO// YES
DESCRIPTION:
  1>
...

```

- c. After storing your definition, cycle past the remaining prompts by pressing Enter (the remaining prompts are not used for custom lists).

```

...
SORT BY: CASE NUMBER//
START WITH CASE NUMBER: FIRST//
FIRST PRINT FIELD:
Heading (S/C): MAGJ ZLIST SEARCH SEARCH  Replace
DEVICE: TELNET      Right Margin: 80//
□>MAGJ ZLIST SEARCH SEARCH                      MAR 14,2002  10:34
PAGE 1
-----
                *** NO RECORDS TO PRINT ***
List Definition complete!

```

3.4.2.2.3 Fields Used to Define Custom Lists

NAME – Specifies new or existing list name. Name will appear in the Manager window's Preferences dialog. Name may be 3 to 75 characters in length.

BUTTON LABEL – Specifies the name that appears on the button used to open the custom list. Button Label may be 3 to 75 characters in length.

LIST TYPE – Determines what subset of exams to include in the custom list, based on the exam status. Choices are:

- U Unread exams only; Exam Status Category= E(xamined)
- R Recent exams; Status Categories D(ictated) & T(ranscribed)
- A All active exams; Categories E, D, & T
- P Pending exams; Category= W(aiting for Exam)
- N N/A -- internal use only, not available for custom list definition.

ENABLE LIST? – Set to Yes to make list available to end user, set to No to make list unavailable. This option can be used to retire outdated lists as well. Note that user has a separate option to show or hide enabled custom lists from the VistARad Manager.

Select COLUMN – Use this field to select each column you want to have included in the custom list (columns order is defined internally). For each column you select, you will be asked to specify a column width (if you do not specify a width, a default value will be used).

- Entering a ?? at this field will display a list of all available columns.

- A recommended set of columns to use initially is listed below. For information about the type of information these columns contain, refer to the VistARad User Guide.

CASE NUMBER
EXAM LOCK IND
PATIENT NAME
PATIENT ID
PRIORITY
PROCEDURE
IMAGE DATE/TIME
STATUS
NUMBER OF IMAGES
ONLINE STATUS
MODALITY
IMAGING LOCATION
INTERPRETING RADIOLOGISTS

Select SORT – Use this field to specify each column you want the list sorted by. Columns are sorted in ascending order. If you select a numeric or date-based column, you will have the option of reversing the sort order.

MODIFY SEARCH LOGIC – If you are modifying an existing list, this prompt will be displayed. If you need to modify the search logic, enter YES (you will have to re-enter the search logic in its entirety). Entering Yes will cause the existing logic to be deleted, and the prompts described below will be entered. Entering No will end the custom list definition process.

3.4.2.2.4 Defining Custom List Search Logic

Defining search logic is very similar to standard FileMan searches, in that you:

- Enter the search conditions (truth tests) to perform.
- Specify how the search conditions should be combined (link them together with logical **ANDs & ORs**) to select records.

Note: For detailed information, refer to Part I, Chapter 3 in the FileMan Getting Started manual.

When you are defining search logic for custom lists, be aware that:

- Your search criteria must be defined in terms of the displayed values in VistARad's exam lists (none of the values point to any actual file).
- When you are prompted to store your search, you must always enter the following values:

STORE RESULTS OF SEARCH IN TEMPLATE – Always enter TEMP. If another value is entered, search logic will not be saved.

OK TO PURGE? – Always enter Yes.

- When you are prompted to format your output, do not enter values for the prompts shown below (these fields are not applicable to the creation of custom lists).

DESCRIPTION
 SORT BY
 START WITH
 FIRST PRINT FIELD:
 Heading (S/C): MAGJ ZLIST SEARCH SEARCH Replace

3.4.2.3 Activating and Using Prefetch

Prefetch is used to reduce the amount of time needed to display prior related exams on the VistARad workstation. This section explains how prefetch works, and how to enable, view, and change prefetch logic.

3.4.2.3.1 How Prefetch Works

Prefetch is a process in which archived images for prior related radiology exams can be automatically retrieved to a faster storage device to speed subsequent display at a VistARad workstation. When prefetch is not active, a radiologist wishing to review an exam that has been archived will have to wait until the images are retrieved from the long-term archive. When prefetch is active, exams that qualify as prior related exams take no longer to retrieve than current exams. Prefetch is triggered by the “Register Patient for Exams” function of the Radiology Package (via HL7 message processing).

Rules for determining which exams to retrieve are defined in the MAG RAD PRIOR EXAMS LOGIC file (2006.65). This table maps the CPT code for the current exam to CPT codes of prior related exams of interest. For each prior CPT code mapped, the number and age of exams to prefetch can be specified.

A sample prefetch rule in the MAG RAD PRIOR EXAMS LOGIC file might be:

```

CURRENT CASE CPT GROUP:      71020-CHEST 2 VIEWS
MATCHING CPT GROUP:        71020-CHEST 2 VIEWS
VERSION LIMIT-PREFETCH:      2
MATCHING CPT GROUP:        71010-CHEST SINGLE VIEW
VERSION LIMIT-PREFETCH:      2
MATCHING CPT GROUP:        71250-CT THORAX W/O CONT
VERSION LIMIT-PREFETCH:      1
DAYS LIMIT-PREFETCH:        3650
MATCHING CPT GROUP:        71250-CT THORAX W CONT
VERSION LIMIT-PREFETCH:      1
DAYS LIMIT-PREFETCH:        3650

```

The equivalent logic would be:

If an exam with CPT Code 71020 is registered, search the archive and retrieve:

Up to 2 prior exams with CPT Code 71020; and
 Up to 2 prior exams with CPT Code 71010; and
 1 exam with CPT Code 71250 if exam is less than 10 years old; and
 1 exam with CPT Code 71260 if exam is less than 10 years old.

3.4.2.3.2 Enabling Prefetch

Use the following procedures to verify that Prefetch settings are all in place.

1. In the Protocol file (#101), use FileMan to verify that MAGJ PREFETCH/SEND ORM is defined as a Subscriber to the RA REG protocol. A sample Inquiry screen follows, showing the relevant fields in bold:

```
Select OPTION: INQUIRE TO FILE ENTRIES

OUTPUT FROM WHAT FILE: OPTION// 101  PROTOCOL  (2241 entries)
Select PROTOCOL NAME: RA REG
   1  RA REG      Rad/Nuc Med exam registered
   2  RA REG 2.3  Rad/Nuc Med exam registered for HL7 v2.3 message

CHOOSE 1-2: 1  RA REG      Rad/Nuc Med exam registered

ANOTHER ONE:
STANDARD CAPTIONED OUTPUT? Yes//  (Yes)
Include COMPUTED fields:  (N/Y/R/B): NO//  - No record number (IEN), no
Computed Fields

NAME: RA REG          ITEM TEXT: Rad/Nuc Med exam registered
TYPE: event driver    CREATOR: BARRIOS,LUCILLE
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION:  This protocol is triggered whenever a radiology/ Nuclear
Medicine exam is registered.  It executes code that creates an HL7 ORM message
consisting of PID, ORC, OBR and OBX segments.  The message contains all
relevant information about the exam, including procedure, time of
registration, procedure modifiers, patient allergies, and clinical history.

ITEM: MAGD SEND ORM
ENTRY ACTION: Q          TIMESTAMP: 58481,48067
SENDING APPLICATION: RA-SERVER-IMG  TRANSACTION MESSAGE TYPE: ORM
EVENT TYPE: 001         VERSION ID: 2.1
RESPONSE PROCESSING ROUTINE: Q
SUBSCRIBERS: MAGD SEND ORM
SUBSCRIBERS: MAGJ PREFETCH/SEND ORM
```

2. In the APPLICATION PARAMETER file (#771), verify that MAGJ CLIENT is set to “Active.” A sample Inquiry screen follows, showing the relevant fields in bold:

```

OUTPUT FROM WHAT FILE: PROTOCOL// HL7 APPLICATION PARAMETER

                                     (39 entries)
Select HL7 APPLICATION PARAMETER NAME: MAGJ-CLIENT      ACTIVE
ANOTHER ONE:
STANDARD CAPTIONED OUTPUT? Yes//      (Yes)
Include COMPUTED fields: (N/Y/R/B): NO// - No record number (IEN), no
Computed Fields

NAME: MAGJ-CLIENT                                     ACTIVE/INACTIVE: ACTIVE

```

3. In the VistARad Site Parameters file (#2006.69), set PREFETCH ACTIVE? to "YES".

3.4.2.3.3 Viewing and Changing Prefetch Logic

Prefetch rules can be edited and displayed from the VistARad System Options (VRAD) menu. Each of the options shown in bold are described below.

```

Select OPTION NAME: VRAD      VistARad System Options

SITP  E/E VistaRad Site Parameters
ELIS  E/E VistaRad Exam Lists
PLIS  Print VistaRad List Definition
EPRF  E/E VistaRad Prefetch Logic
IPRF  Inquire Prefetch Logic
PPRF  Print VistaRad Prefetch Logic Table

Select VistARad System Options Option:

```

E/E VistARad Prefetch Logic (MAGJ E/E PREFETCH LOGIC)

Use this option to define or edit prefetch logic. The logic consists of mapping the current exam CPT code to prior exams of interest by their CPT codes. For each mapping, indicate the number of prior exams to prefetch, and optionally also specify an age cutoff (i.e., to ignore exams older than the specified number of days).

Inquire Prefetch Logic (MAGJ INQUIRE PREFETCH LOGIC)

Use this option to review the prefetch logic defined for a particular CPT code.

Print VistARad Prefetch Logic Table (MAGJ PREFETCH PRINT)

Use this option to output the complete prefetch logic table.

3.5 Testing a VistARad Installation

This section explains how to confirm that VistARad functions properly within VistA Imaging. It assumes that the person performing the testing is familiar with the basic operation of VistARad.

Note: The steps in these sections can be used to verify proper integration of VistARad in your radiology department's workflow. It is expected that each site will also use their own requirements to verify that image display is of proper quality for diagnostic purposes.

3.5.1 Requirements for Testing

Before VistARad can be tested, the following steps must be completed:

- Status Codes for Imaging Types associated with softcopy reading must be set up and associated with VistARad status codes (using the Radiology Package).
- The VistARad site parameter ENABLE STATUS UPDATE must be set to Yes.
- VistARad client software must be installed on at least one diagnostic workstation.
- At least one test patient with an associated radiology procedure, with a status of "Examined," must be created.
- The person performing the testing will need to use an access/verify code that has been designated as "Staff" in the Radiology Package.

Note: If your site has chosen to use prefetch or custom lists, your site will need to establish standards and test for proper function of these features as well.

3.5.2 Performing Testing

Use the steps below to test VistARad. Note that many of these steps will rely on exam list updates which, depending on how VistARad is set up at your site, may take a few minutes to complete.

1. At a VistARad workstation, log in and open the UnRead list. Confirm that a test exam is present in the UnRead list, and that the value in the Status field is "Examined."
2. Open the test exam. Once the exam is displayed, reopen the UnRead list and confirm that your login initials appear in the Lock column.
3. In either the Viewer or the Stack Viewer, whichever is appropriate, adjust the test exam's display properties (scale, window/level, layout, etc.), and ensure that the images respond properly.
4. In the Viewer or the Stack Viewer, click  to open Update Status/Close Exams window, and update the status of the test exam to "Interpreted" (in the window, set "Interp" to Yes).

5. Confirm that the test exam appears on the Recent exam list, that your login initials are reflected in the “Interp By” field, and that the exam’s status is “Interpreted”.

Note: The addition of “Interpreted” exams to the Recent list is dependent on the re-compile of the UnRead exam list. It will take a few minutes for the exam to appear. (If your site is not compiling the UnRead list in advance, open the UnRead list, which compiles it on-demand, then open the Recent list.)

6. Use your site’s reporting tool to enter a report for the test exam. After entering the report, use the Recent or All Active list to confirm that the exam status has been updated to “Transcribed”.
7. Use your site’s reporting tool to verify the report for the test exam. After verifying the report, use the Recent or All Active list to confirm that the exam status has been updated to “Complete,” and that the report can be accessed.

Chapter 4 Installing Image Acquisition Devices

The *VISTA* Imaging System can acquire images from a number of different sources including...

- NTSC or PAL video sources
- Still digital cameras
- Document, color page, and transparency scanners
- X-ray film digitizers
- Import from storage device

The *VISTA* Imaging Capture Window allows images to be captured by the workstation using the following devices:

- Image Capture Boards (Matrox Meteor, Truevision ATVISTA)
- X-Ray Scanners (Lumisys)
- Color and Gray scale scanners with TWAIN interface
- Still Digital Cameras (these must have a TWAIN interface or be capable of downloading standard format images such as JPEG to a workstation)
- Import of standard format images from workstation's local hard drive (e.g., JPEG, TIF, TGA, BMP, etc.)

These will be described in the sections that follow.

4.1 Imaging System Video Inputs

4.1.1 Introduction

There are many types of medical equipment that produce video output appropriate for image capture. These include...

- Endoscopy cameras
- Ultrasound equipment
- Microscope cameras
- Cardiac catheterization systems
- Nuclear medicine devices
- Dental cameras

Note: Much of this equipment is described in the following section.

4.1.2 Workstation Video Capture Board Installation and Setup

The process of acquiring digital images by analog-to-digital conversion of the analog video signal is called “frame grabbing”. This process normally takes place in 1/30 second. A frame-grabbed standard NTSC video image consists of approximately 480 lines with 640 pixels per line. A pixel typically contains 24 bits for color (8 bits for red, 8 bits for green, and 8 bits for blue, for 16 million total colors) or 8 bits for black & white (256 shades of gray). Other pixel depths are possible.

The *VISTA* Imaging System supports several image capture boards as follows:

- The Matrox Meteor family of image capture boards operate in the Windows NT environment. The live video image is displayed on the workstation’s monitor and still images can be captured and saved. Currently, there are 4 supported Meteor cards. Descriptions are provided below. Be sure to select the board that supports your input format requirement. If you will be interfacing an RGB instrument to a Meteor II board, you will need to purchase a Meteor II/MC multichannel board. If you will be interfacing with a composite video device, you will need to purchase a Meteor II/S standard board.
 - The Matrox Meteor II/Standard board captures standard NTSC and PAL analog video in composite and S-Video (Y/C) formats. It is capable of handling color or black and white input. Captured images are 640x480x24 bits.
 - The Matrox Meteor II/Multi-Channel has the same basic specifications as the Meteor II except that it supports RGB format only.
 - The Matrox Meteor PPB is the older board that was designed to run in Pentium Pro workstations. The Matrox Meteor PPB board will accept S-Video or composite input. It is capable of handling color or black and white input. Captured images are 640x480x24 bits. This board has been discontinued by Matrox, but is still supported in this release of *VISTA* Imaging.
 - The Matrox Meteor PPB/RGB board has the same specifications as above except that it will accept RGB or composite input (S-Video is not supported on this board). This board has been discontinued by Matrox, but is still supported in this release of *VISTA* Imaging.
- The proper cable is needed for interfacing the Meteor capture board to the medical instrument. Cables can also be built by comparing the output pin configuration of the instrument to the input pin configuration of the Meteor board. The pin configuration of each is listed in the manuals that accompany the device. In some cases, cables may be purchased with the Meteor board.
- Previously, *VISTA* Imaging sites have purchased Truevision AT*VISTA* image capture boards were supported by the *VISTA* Imaging. Please review the *VISTA* Imaging Planning document on the *VISTA* Imaging web page for approved equipment. These are not recommended today because of security concerns.
- The *VISTA* Imaging System supports the import of still images and video AVI format images captured using commercial software. Be sure that the compression ratio used for AVI files is clinically acceptable.

- The *VISTA* Imaging team is currently testing other video capture boards that combine VGA display and capture capability. Captured images are 640x480x24 bits.

General Setup Guidelines: (Meteor specific instructions are in given in section 3.1.2.1)

1. Install Image Capture Board in Workstation. Follow vendor's instructions.
2. Locate the connector on the medical device that outputs a video signal.
3. Determine what type of signal is output (i.e., RGBSync, S-Video, or Composite).
4. Be sure that the image capture board can handle the type of output signal that is available.
5. Obtain a cable that will connect to the output connector of the video source and to the input connector on the image capture board. For Red-Blue-Green-Sync sources, you will need to compare the mapping of the signals to the pin numbers of the source connector and the capture board input connector. If they do not match, you will need to have a correct cable made; be sure to label the ends of the cable for the input source and image-capture board.

Review the following information:

- Meteor II/MC boards will handle Red-Green-Blue-Sync and composite. The Meteor Configuration parameters must be set for the input connector type, and whether the image is color or black and white.
- Meteor II/S boards will handle S-Video and Composite. The Meteor Configuration parameters must be set for the input connector type, whether the image is color or black and white.

(**Note:** for specific instructions on installing the Meteor II board, see Appendix B.)

- The ATVISTA Board will handle Red-Green-Blue-Sync input. If you have composite or S-Video input, you will need an RGB converter box such as a Truevision VID/IO box (no longer sold) to convert the signal.
 - Some signals lack proper horizontal or vertical synchronization for the image capture board. This has been observed especially with the ATVISTA board. These signals must be regenerated and converted to RGB format before being presented to the ATVISTA capture board. A Sony Frame Store device can be used for this purpose. The input signal is supplied to the Frame Store, and the RGBSync signal is obtained at the output. A four-lead BNC-to-DB9 cable should be used to connect the Frame Store output to the image capture board. The Alpha lead must be connected to a composite video output or S-Video Y luminance output to obtain black & white images.
6. Connect the cable to the video source and the image capture board.
 7. Use the configuration window under Options on the *VISTA* Imaging Capture Window to define your input source, save formats, and *VISTA* specialty report association. (See user

manual or online help.) If more than one configured device is used on a workstation, you should create a configuration button for each. This will make it easy to switch between configurations.

8. Use “test mode” to be sure you are getting input from the device. Test mode allows you to capture frames without connecting to *VISTA*.

4.1.2.1 Installing Matrox Meteor MIL32 drivers on an NT Workstation

1. Verify that the video display drivers are current. Matrox Millenium drivers should be at V. 3.30 or higher. Use the follow procedure to view the display settings:
 - a. Right click on the desktop.
 - b. Select “Properties” from the pop-up menu.
 - c. Click on the “Settings” tab.
 - d. Click on the “Advanced” tab.
 - e. Verify driver name and version numbers.

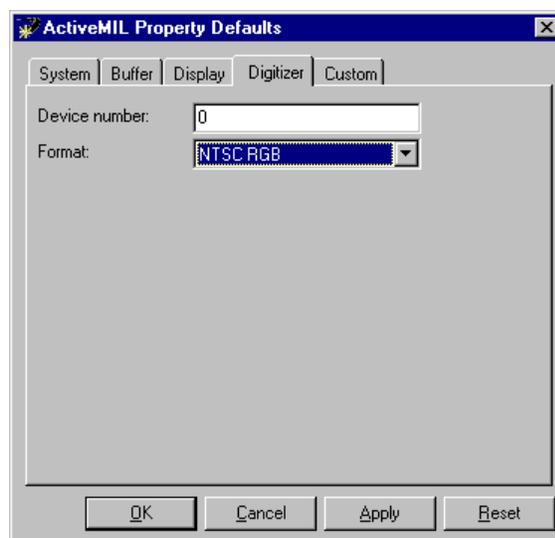
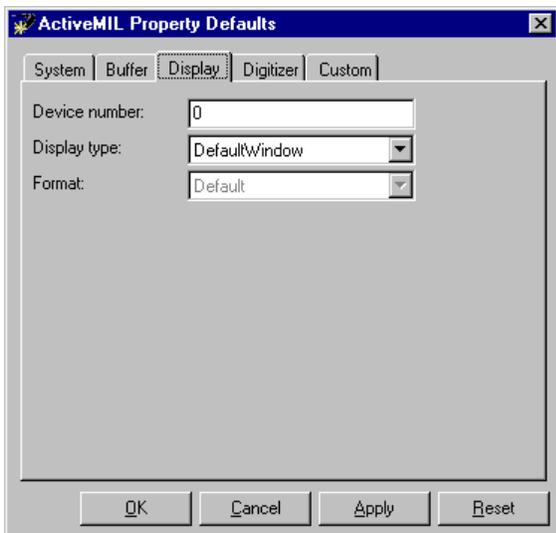
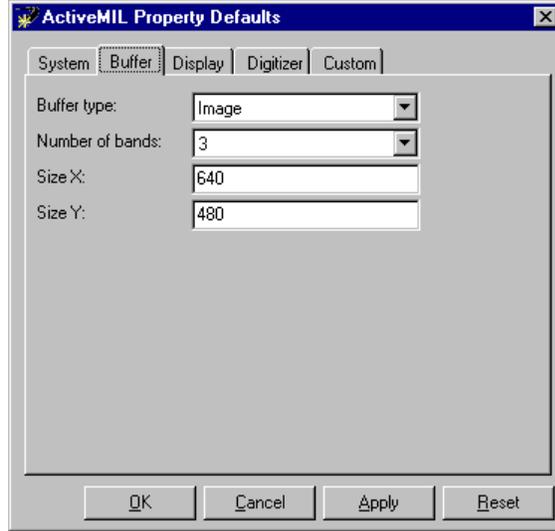
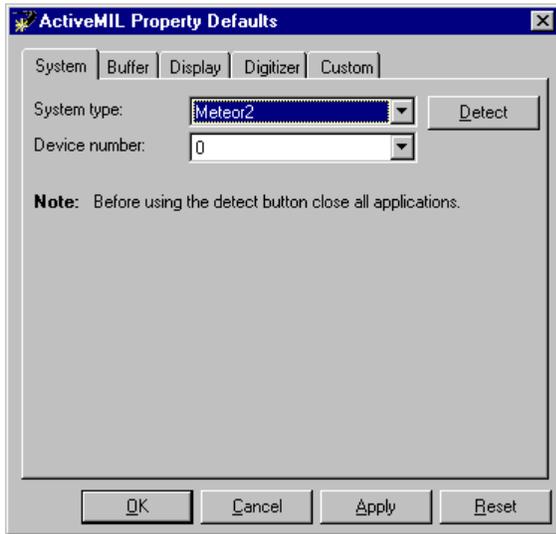
Requirements:

- MGA Millenium graphics card
 - Matrox Meteor, Matrox Meteor PPB, or Matrox Meteor II
1. Install a recent MGA Millenium driver. The Meteor board requires V. 3.3 or higher of the Millenium display driver. (After driver is installed, check for success by looking at *Display Properties* -> *Settings* tab->*Display Type*. Adapter type should be *MGA Millenium*)
 2. Copy the zipped file *MeteorRedist.exe* to the temp folder.
 3. Unzip the *MeteorRedist.exe* (94 files) (These will be unzipped to new folder *Matrox* under *\temp*)
 4. In a DOS window:
 - a. Set the default folder to *\temp\matrox* (*cd \temp\matrox*).
 - b. Type *setup ACTIVEMIL_REDISTRIBUTION*. (**Note:** the parameter is uppercase.) This will launch the Meteor Setup application that will prompt for a number of configuration settings.

- c. Accept the default destination folder on the Matrox Imaging Products window. Select Next.
 - d. Select the Meteor or Meteor II checkbox (whichever applies). Select Next.
 - e. On the Meteor setup window, Select the No checkbox (No floppy disk for the Mil-32 driver).
 - f. On the Matrox DMA Manager window select the 4.0 Mb checkbox. Select Next.
 - g. On the Matrox Imaging Products redistribution window, select *OK*. (A progress bar will appear as the software is installed.)
 - h. On the Matrox Imaging Products – Redistribution setup window, select Yes, I want to restart my computer now. Then, select Finish. (The system will reboot at this point.)
5. When the system reboots, copy the file *\temp\matrox\ActiveMILDefault.exe* to the *\program files\vista\imaging* folder if it doesn't already exist there.
 6. Run the *ActiveMILDefault.exe* file. This will allow you to change the settings of the board to fit specific camera and input types. The system type should always be set to Meteor or Meteor2 depending on the type of board being installed. (**Note:** RS170 format is used for black and white instruments such as Cardiac Cath systems.)
 - a. On the *ActiveMIL Property Defaults* window, select the System tab. Select the *Detect* button. The *System Type* will change from *Host* to *Meteor or Meteor2* (whichever applies). *Device Number* should be 0.
 - b. On the Buffer tab, set the *Buffer Type* to *Image*, *Number of Bands* to 3, *Size X* to 640, *Size Y* to 480.
 - c. On the Digitizer tab, set the *Device Number* to 0, set the *Format* to the format of the attached camera.
 - d. Select *OK*.

Note: Report any error messages to the Imaging Customer Support team by logging a NOIS call.

Example of the *ActiveMILDefaults* configuration windows:



4.1.2.2 Endoscopy Equipment

Endoscopy equipment generally produces RGB video signals. The Red/Green/Blue/Sync signals can be obtained from the back of the endoscopy video monitor and passed directly to the Meteor or ATVISTA image board. A four-lead BNC-to-DB9 cable should be used. Soon, some vendors will be supporting a DICOM interface to VistA. Check the **VISTA** Imaging web page for status information.

Note: Because of the invasive nature of the endoscopy procedure, the VISTA Imaging Workstation connected to the endoscopy equipment must have an isolation transformer with less than 100 micro amps leakage.

4.1.2.3 Color Video Cameras

Video cameras use CCD chips to produce an image from the input light. The CCD chip may vary in spatial resolution. Less expensive cameras use one (1) CCD chip to produce the image. More expensive cameras use three (3) CCD chips to improve the quality of color images.

The camera lens also affects image quality. Be sure that the video camera is equipped with a standard mount for the lens. The most common video camera lens mount is the C-mount; there are a variety of lenses available at reasonable cost for this mount. Other cameras may use the Fujinon or Nikon mount. In general, cameras are sold without the lens, allowing the purchaser to match the lens to the purpose of the camera. A lens that allows auto focus and auto iris is convenient. Good macro capability is necessary for close up work. The camera body (without the lens) may be placed on a microscope or other optical instrument equipped with a C-Mount adapter. Be sure these are parfocal so the user does not have to refocus when switching between microscope ocular and computer monitor display; this may require purchase of an additional adapter. Cameras should also be capable of being mounted on tripods.

Many color video cameras produce both RGBSync and composite NTSC signals. The RGBSync is often supplied by a DB9 female connector. A shielded cable should be used to pass the signals to the image capture board. For the ATVISTA board, use a DB9-to-DB9 cable; be sure that pins 1-7 are connected straight through, while pins 8 and 9 should be cut.

Some cameras produce Composite NTSC or S-video signals. Be sure the image capture board in the workstation supports this format.

4.1.2.4 Black and White Image Capture

Meteor: On the **VISTA** Imaging capture configuration window, select an Image Type of either Black and White or X-Ray. Run ActiveMilDefaults.exe on from the c:\Program Files\Vista\Imaging folder and set the Digitizer Format to "RS170" or "RS170 RGB". Use test mode to be sure your input is correct.

ATVISTA: In order to capture a black and white image, a black and white video signal must be provided to the alpha channel. This signal **must not contain color information**. If it does, the captured image will contain a very-fine cross-hatch pattern (every other pixel will be dark).

There are different methods to obtain the proper video signal, depending upon whether the video source is black and white, or color. In each case, a Truevision VIDI/O Box (or a Sony Frame Store) is required.

A black and white video camera that produces an NTSC Composite Video signal must be connected to a Truevision VIDI/O Box in order to produce the RGBSync signals that are required for pass-through video display. A five-lead BNC-to-DB9 cable should be used from the VIDI/O Box to the AT *VISTA* board. The NTSC composite black & white video signal is supplied to the input terminal of the VIDI/O Box and the RGBSync signal is obtained at the output. The Alpha lead must be connected to video loop output of the VIDI/O Box to obtain black & white images. The black and white composite video signal is then passed directly to the Alpha channel input. Turn off the 75-ohm video input termination on the VIDI/O Box.

4.1.2.5 VHS Video Tape

VHS Video cassette recorders (VCRs) store analog images at half of the NTSC resolution. For some applications, it is necessary to use VCRs. Some services will want to use VCRs in case *VISTA* or their workstation is down. A videotape input workstation can probably be shared among services.

Meteor: The Meteor board can process the signal directly from the VCR. On the *VISTA* Imaging Capture Configuration Window, use the standard settings for either black and white or color image capture.

ATVISTA: The ATVISTA board requires a Sony MPUF-100 Frame Store in order to properly synchronize the VCR video signal when it is in freeze-frame mode. The use of an ATVISTA board is not recommended for VCR image capture.

4.1.2.6 GI Endoscopy Interface Installation

Your GI laboratory must be using a video endoscopy unit in order to capture and digitize GI images. Fuji and Olympus units have been interfaced thus far to the *VISTA* Imaging System. There are two ways to acquire the image signal from video endoscopy equipment:

- The endoscopy unit may have a processor box which provides Red-Green-Blue-Sync analog output directly from four RGBS connectors, generally located on the back of the unit. This output can be fed to the Meteor or ATVISTA board input connector on the *VISTA* Imaging workstation using the appropriate cable.
- The endoscopy system will also display live video images on a monitor. The Red/Green/Blue/Sync signals can be obtained from the back of the endoscopy video monitor and passed directly to the Meteor or ATVISTA board input connector located in the *VISTA* Imaging workstation. A five-lead BNC-to-DB9 or BNC-to-BNC cable should be used. The fifth lead, the alpha channel, should not be connected.

WARNING: Because of the invasive nature of the endoscopy procedure, the VISTA Imaging workstation connected to endoscopy equipment must have an isolation transformer with less than 100 microamps leakage.

- It is also possible to capture the endoscopy procedure to videotape first, and then review the case to select still images for capture and distribution. This is not normally preferred because image fidelity is lost in the videotaping process (VHS video cassette recorders (VCRs) store analog images at half of the NTSC resolution), and because videotaping followed by capture requires more time. However, you may want to use VCRs in case VISTA or the VISTA Imaging workstation is not functioning (see the section on VCR interface instructions).

Note: Olympus EVIS systems do not support direct interfaces to VISTA Imaging at the present time. You will need to separately capture images to VISTA from the EVIS display monitor. Any future purchases should require DICOM interfaces.

4.1.2.7 Bronchoscopy Interface Installation

To interface an Olympus Bronchoscope system, attach a cable to the “video out” single BNC connector on the Olympus processor box.

METEOR: Run ActiveMilDefaults.exe on from the c:\Program Files\Vista\Imaging folder and set the Digitizer Format to NTSC. Use test mode to check your installation.

ATVISTA: The other end of the cable from the processor box should be connected to a VIDI/O box at the “video in” connector. Then a RGSB cable should be used to connect from the Red, Green, Blue, and Sync connectors of the VIDI/O box to the ATVISTA board, “INPUT” 9-pin connector in the workstation.

4.1.2.8 Cardiac Catheterization Laboratory

Images have been successfully captured from Vanguard film viewing stations, which include video cameras, and from Siemens Cath Lab Systems. All new systems should be purchased with DICOM interfaces.

In the case of a Vanguard film viewing station, images are generally captured at the time the procedure report is written. The Vanguard viewer’s black and white video camera outputs an NTSC composite video signal.

METEOR: Attach a cable to the Vanguard’s connector at one end and the Meteor’s RCA jack at the other. Run ActiveMilDefaults.exe on from the c:\Program Files\Vista\Imaging folder and set the Digitizer Format to RS170. Use test mode to check your installation.

ATVISTA: This must be connected using a 75-Ohm BNC cable to a Truevision VIDI/O box at the input terminal labeled “VIDEO INPUT”.

The ATVISTA board requires RGSync signals for pass-through video display. Therefore, a five-lead BNC-to-DB9 cable should be used from the VIDI/O Box to the ATVISTA board. The

Alpha lead must be connected to the video loop output of the VIDI/O Box to obtain black and white images.

The black and white composite video signal is then passed directly to the Alpha channel input via “video loop” output (Turn off the 75-ohm video input termination on the VIDI/O Box). The Red, Green, Blue, and Sync lines need to be connected to the Red, Green, Blue, and Sync outputs.

The Siemens Cath Lab system allows capture of images during the procedure. You will need to contact the vendor for information about connecting your Siemens Cath Equipment to the *VISTA* Imaging workstation in a manner similar to that done at the Washington DC VAMC.

4.1.2.9 Echocardiography (Echo)

Two methods have been used to capture echocardiography images. Echo images are best captured during the procedure because the image quality is best and the least amount of time is required of the technologist. This is done by pausing the ultrasound machine (Also done for making annotations). At this time, the user can capture the image on the *VISTA* Imaging workstation.

To interface all new ultrasound devices, use the Red-Green-Blue-Sync connectors on the back of the main processor of the echo/ultrasound system. Connect these using a BNC-to-9 pin cable to the Meteor or ATVISTA board in the workstation directly. This method captures a color image and is the preferred method.

If the above method cannot be used, you will need to acquire images from the video tape unit attached to the echocardiograph system. Attach a cable to the "video out" single BNC connector on the rear of the VCR that is connected to the echocardiography machine.

METEOR: Connect this cable to the Meteor board’s composite video port and configure the board for NTSC and RS170 using the ActiveMILDefaults utility in the c:\Program Files\Vista Imaging folder.

ATVISTA: Connect this cable to a Sony Frame Store unit at the “video in” connector (see Figure 3.3). From the Frame Store, use a BNC-to-9 pin cable to connect the four Red Green Blue Sync BNC connectors to the “INPUT” connector on the ATVISTA board.

Note: The quality of the video cassette recorder greatly determines the quality of the video signal presented to the image capture workstation.

4.1.2.10 Nuclear Medicine Medisys Interface

A frame grab can be done by connecting to the back of the Medisys viewing workstation. Please contact the *VISTA* Imaging team if you are trying to interface to a different nuclear medicine system.

4.1.2.11 Microscope Interfaces

4.1.2.11.1 Mounting a Camera on a Microscope

Image capture from a microscope requires the use of a video camera (without lens) on the camera mount of the microscope. Video cameras generally have a "C" mount. You will need an adapter for the microscope to mount the camera. These are commercially available from the microscope vendor or from third parties. It is important that the final assembly be "parfocal," (i.e., the image that is in focus when viewed through the oculars of the microscope must be in focus on the video monitor).

Some departments will already own video cameras for at least one microscope in their service. This may be used during conferences, and will still be required to serve this function. It is often possible to take a RGB analog signal off of the display monitor's output connectors. In this case, you will probably need a 9-pin to BNC cable. Connect the RED, GREEN, BLUE and SYNC BNC connectors to the monitor output connectors labeled R, G, B, and S. Attach the 9-pin connector to the Meteor or ATVISTA board "INPUT" connector. See section on Color Video Cameras for interfacing instructions.

4.1.2.11.2 Testing the Microscope Lighting and Connection to Cameras

To test the interface, use the test mode of the *VISTA* Imaging Capture window. Position a glass slide on the microscope stage and select a microscopic view. Be sure that the video camera attached to the microscope is turned on. At this point, the image on the microscope will appear on the image screen of the workstation. You should focus the image on the monitor. You can check to see if the setup is parfocal by looking at the image under the microscope. The light intensity required for viewing in the microscope may be too great for the camera optics, so you should adjust the light to produce a good-quality image on the monitor. If the image-screen is dark, then the video camera is probably turned off or the cable is not connected correctly. If your interface is to a video monitor, you should also see the image there.

4.1.2.11.3 Black and White Image Capture

There are some microscope specimens that are better captured in black and white. These should be captured using the Black & White (8-bit Gray Scale) Capture option. If the users are interested in research projects involving image analysis, 256 gray levels represent the current standard for research publications. A somewhat different interface method is required for black and white capture. See the section on Black and White Image Capture for interfacing instructions.

4.1.2.12 Dental Intraoral Probe Interface

Several intra- and extra-oral camera systems are being marketed.

The portion of the equipment that enters the patient's mouth is roughly the shape of a dental drill. The camera is connected to a system box that contains the electronic components and a light source. The system box usually outputs a composite video signal. A cable is connected from this output to the Matrox capture board to capture the dental image to *VISTA* Imaging.

The computer and camera systems must be connected to an isolation transformer. Consult with your BioMed Service for the specifics about the use of this equipment.

The VACO Dental Host project determined that the VistaCam camera created a high quality image for dentists. The features of this camera consisted of a/an...

- Multifunction footswitch (enables image transmission and tiling of multiple images into a single image)
- Auto-focus for both intraoral and extraoral image acquisition
- Stabilization of images (to prevent jitter)
- Two-piece construction. The camera disconnects from its base section so it can be quickly attached to another workstation.

4.2 Still Digital Cameras

Still digital cameras are an alternative to the color video cameras previously described. A major advantage is that they are completely portable and can be used to take hand-held pictures. With a Still Digital Camera, the camera can be taken to the patient, not the patient to the camera. In addition, they can produce higher resolution images.

Many still digital cameras record images on a Memory Card, and play them back into the computer. This may be done in several ways:

- A TWAIN interface
- Proprietary software which places the files on the local workstation
- By reading the files directly from the Memory Card storage device
- Via a composite video output, the image can be passed directly to an image capture board

In order to use the second or third approaches, the image files must be in a standard format.

First, install the software that came with the camera. Follow the vendor's instructions for setting up the camera and connecting it to the PC.

- If downloading capability is provided, after downloading images, use the **VISTA** Capture Window's import mode to import the images. This will tell you if the vendor is using standard file format. Users should record an image that contains the patient's identification information before recording clinical images. This will help prevent misidentification when the images are imported.
- If no download capability is available, you will need to use the TWAIN input mode described in the next section. Generally, this is slower for the user but still practical.

Note: There recently have been new developments in the area of digital cameras, allowing them to capture motion or still images. Please contact the *VISTA* Imaging staff for the latest information if you are considering buying a digital camera.

4.3 TWAIN Devices

4.3.1 Configuring a TWAIN Device

TWAIN interface software is device specific and is provided by the vendor. It should be installed with the device's software.

After installing the software supplied with your TWAIN device, select an option from the TWAIN capture list in the *VISTA* Imaging Capture Configuration Window.

The first choice, TWAIN Device, is general and will allow the user to configure the device at each use with a TWAIN interface window. You will probably want an Image Type of Truecolor (either TGA or JPG) for TWAIN cameras. If your camera has a resolution higher than 768 x486, you will probably want to use JPG.

If you are interfacing a document scanner, you will normally select the ScanDocument Input Source and TIFF G3 FAX Image Type settings in the configuration window of the *VISTA* Imaging Capture application.

The other options for TWAIN Input Sources are:

- HP Scan Jet 4C X-Ray
- Scan ECG
- Scanned Documents

Note: These options are pre-configured as described in the *VISTA* Imaging System User Manual.

4.3.2 Scanned Documents

The *VISTA* Imaging System supports single page scanners, multipage scanners with sheetfeeds, and dual sided scanners. All of these may be operated using the "Scanned Documents" setting; this provides a FAX-quality scan and supports multipage, dual-sides scanners.. If you want to customize the scanning parameters, then use the "TWAIN" setting and the user can set the parameters manually.

4.3.3 Color Page and Transparency Scanners

Any scanner with a standard TWAIN interface can be used as an input device to the *VISTA* Imaging system. The scanner will normally connect via a SCSI cable to the workstation that has onboard SCSI. We strongly recommend single-pass color scanners because the scanning time is about one third of a three-pass scanner. Also, some lamps are cooler and turn off when not in use to prolong the lamp's lifetime. Some scanners automatically adjust to the paper size. Some may provide special color-matching software. The resolution and scan modes required will

depend on the types of images to be scanned. Interpolated resolutions are calculated based on the highest scanned resolution.

4.4 Laser X-ray Film Digitizers

4.4.1 Configure Hardware and Install Drivers and Software

Configure the digitizer according to the manufacturer's instructions. Digitizers usually require a SCSI card or a proprietary card to transfer data from the digitizer to the workstation that will capture images. To operate with the *VISTA* Imaging System, the scanner must provide either TWAIN interface software, DICOM interface software, or Lumisys proprietary software by Lumisys Incorporated.

Several vendors have TWAIN-compliant X-ray scanners. These are capable of digitizing 8-bit or 12-bit pixels; however, the *VISTA* Imaging Capture window can only accept 8-bit images in the *VISTA* Imaging System.

4.4.2 Testing Scanner Software

TWAIN scanner software can be tested with the *VISTA* Imaging software or with off-the-shelf scanner software, such as Adobe Photoshop or Adobe Acrobat by Adobe Systems, Inc.

Lumisys scanners can be tested with the test applications that are sent with the scanner drivers.

Chapter 5 Workstation Furniture and Physical Security

5.1 Stationary Display Workstations

Some display workstations will be placed directly on work surfaces in areas such as ICUs, emergency rooms, and ward offices. In this case, you will need to be sure that the workstation is protected from spilled liquids; plastic keyboard protectors are useful for this purpose. Workstations should be purchased with desktop or tower cases whichever is appropriate for the environment.

In other locations, it is necessary to use commercially-available computer furniture. The furniture must be wide enough to accommodate the monitor(s); also, good airflow is important. Some commercial furniture will lock closed when not in use. In special circumstances (i.e., extra large display monitors for conference rooms), custom furniture must be built.

5.2 Mobile Display Workstation

Image capture workstations generally must be located near the patient in the procedure area and often must be able to roll around within a limited distance. In some cases there must be access to connect and disconnect the input device. Carts with two or three shelves and wheels are good for this purpose and suited to a number of clinical areas. The monitor is on the top shelf, where it is easily seen. A keyboard drawer is used on the middle shelf. The PC chassis is on the bottom shelf with any essential interface equipment.

5.3 Electrical Power Isolation Transformers

Workstations that are connected to invasive image capture equipment (i.e., operating room or endoscopy suites) should be equipped with electrical power isolation transformers. The isolation transformer should be able to supply at least 800 watts, maximum power. The maximum leakage current permitted is 100 microamps. Check with your Biomedical Engineering Department for isolation transformers and for leakage testing.

5.4 Securing Workstations

It is very important to secure the workstation components with security devices such as lock-down cables. Kits (Secure-It) where the cable simultaneously keeps anyone from opening the PC chassis and attaches all components to a permanent part of the work surface or furniture are particularly useful.

Chapter 6 Troubleshooting

6.1 Troubleshooting

Troubleshooting is required when one of the following problems occur during installation of the *VISTA* Imaging System:

- Cannot connect to the *VISTA* server
- Cannot display or capture images
- Slowness when displaying or capturing images

The following sections will describe how to easily troubleshoot these types of problems. For more information on troubleshooting the *VISTA* Imaging application, see the *VISTA* Imaging technical manual or log a NOIS call to reach the *VISTA* Imaging Customer Support team.

6.1.1 Cannot Connect to the *VISTA* Server

VISTA Imaging uses the RPC Broker to manage connections from the *VISTA* Imaging workstation to the *VISTA* Hospital Information System (HIS). The Infrastructure team maintains a web page with information on the RPC Broker, including a FAQ and troubleshooting section. The web site is located at: http://vista.med.va.gov/broker/docs/broker_faq.html

When troubleshooting connectivity problems, it is often necessary to use software tools to isolate the problem by a specific workstation function. A number of tools are available for testing:

- Network connectivity
- Connectivity to the Kernel Broker

Some of these tools are described in the following sections.

6.1.1.1 PING, TRACERT

The PING and TRACERT commands are available in the \WinNT\System32 folder on a workstation. Using these commands can help determine if the server name or IP address is reachable, or if a possible Routing problem exists. The local PC support person in IRM can assist with the usage of these commands and the local network IP addressing scheme.

6.1.1.2 RPCTEST.EXE

The RPCTEST.EXE file is located in the VISTA\BROKER directory. This file can be used to test the Broker Client Agent connection to the *VISTA* servers. Once this file is executed, the *VISTA* Access/Verify Code Window should be displayed. If it does not, one of the following (or a combination thereof) could be happening:

- The TCP Listener is not running on the *VISTA* servers
- An invalid IP address or listening port number was configured during the Broker Client Manager software installation on the workstation.

Note: Please review the Kernel Broker documentation on the usage of this executable file and installation of the Broker Client Agent software.

6.1.2 Cannot Display or Capture Images

The display and capture of images involves two separate network connections. The first connection is to the **VISTA** HIS. This connection is used to authenticate the user and retrieve patient, study and image information. The RPC Broker manages this connection. Troubleshooting for the RPC Broker is described above. The second connection is to the **VISTA** Imaging NT Fileservers. This connection is for storage and retrieval of image files. Some troubleshooting techniques are described in the sections below.

6.1.2.1 Error Code Lookup

An error code lookup utility is distributed with the **VISTA** Imaging System. A link to the utility is provided from the *Help* menu on the **VISTA** Imaging Display and Capture applications. Error codes are displayed during the application's execution in one of three ways.

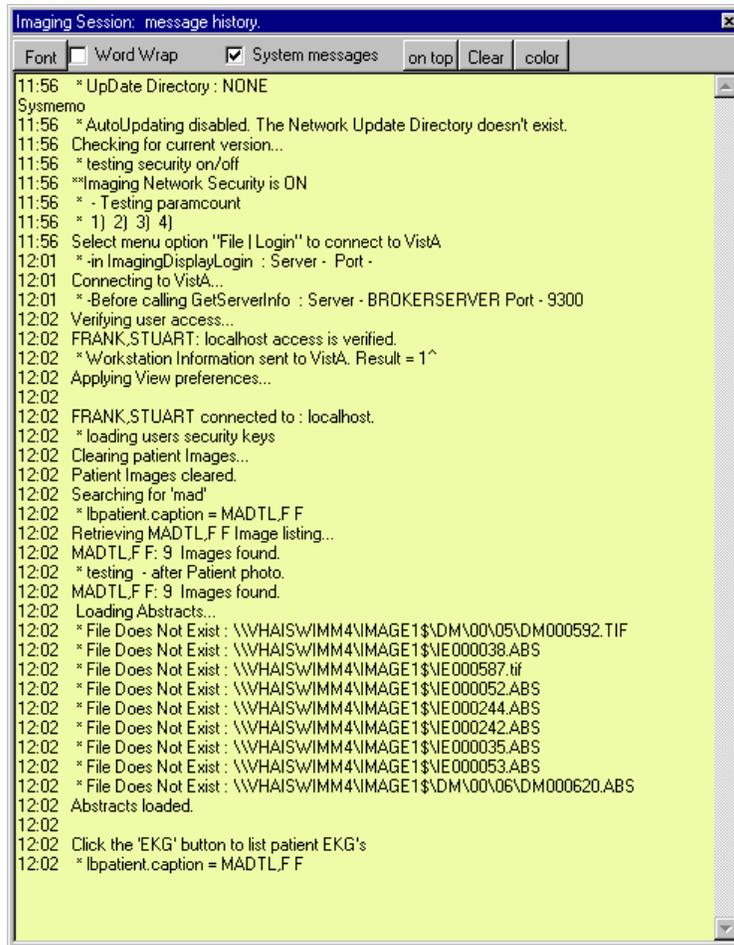
- A message on the status bar of the main **VISTA** Imaging display or capture windows
- A message pop-up window
- An entry in the message history list (see below)

6.1.2.2 Message History Window

To get program execution messages such as image server connection errors, click on the notepad button at the bottom left of the Imaging Display (or capture) window.



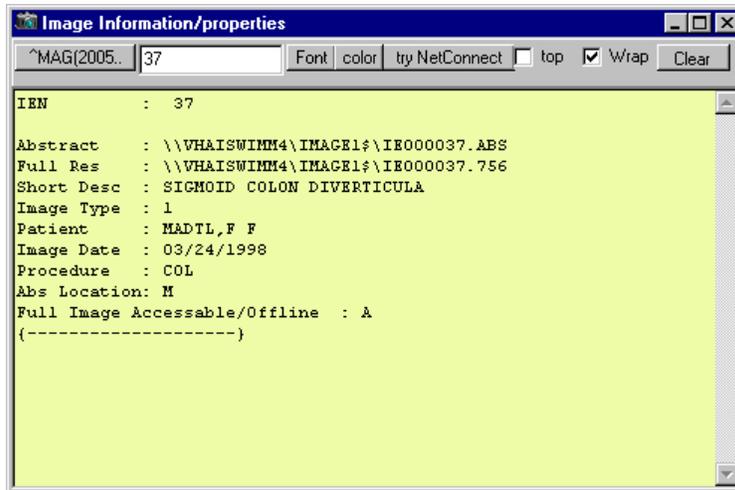
The following window will display showing the sequence of events that have occurred since the user signed into the application. The session below shows that the image files do not exist on the share that is being accessed. If there were a security access problem, the error code and descriptive message would have been displayed in the window as well.



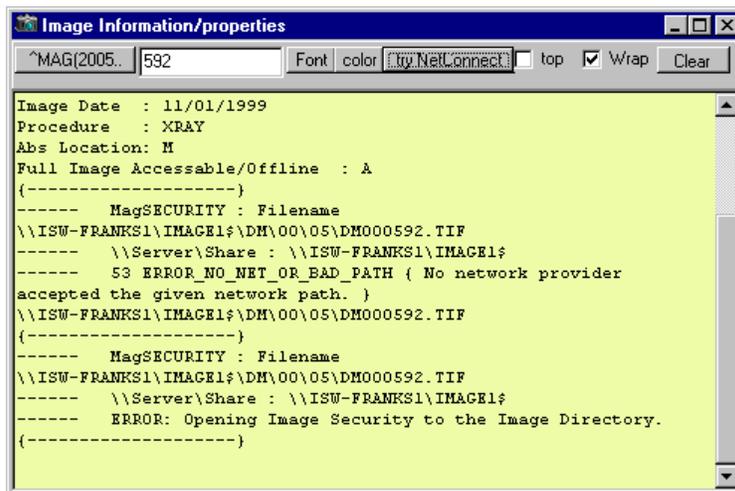
Note: System information such as path and file is only displayed for users with the MAG SYSTEM security key. Users without this key are shown all other non-system messages.

6.1.2.3 Image Information

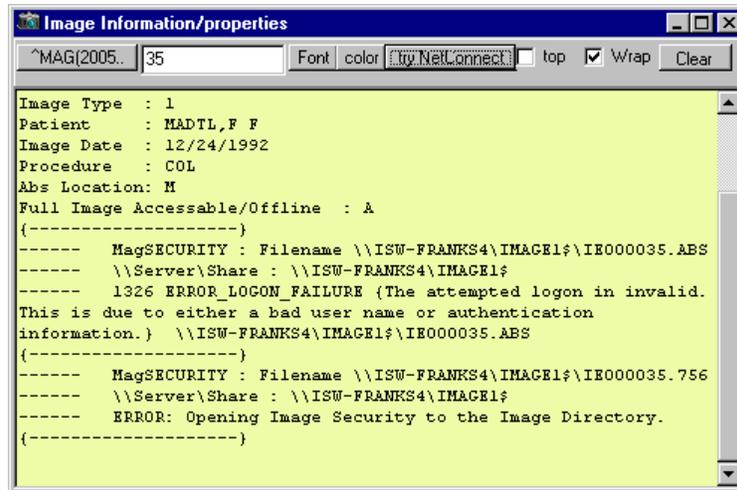
Sometimes it is helpful to get information on the image(s) that are not being displayed. In the abstract and group windows of Imaging Display, there is a pop-up menu option for getting image properties. When looking at an individual image abstract (not a group abstract), right click on the abstract to get the context menu. Click on *Image Info* to display the image properties window.



This window shows the full path to the image file and other image properties that are stored in the Image file (2005). It also displays the internal entry number (IEN) of the image record. The complete record can be displayed by pressing the **^MAG(2005..** button. Press the **try NetConnect** button to test the imaging security. A connection failure can indicate that the share name is invalid, inaccessible. (See below)



A failure can also indicate that the NT username and password in the Imaging Site Parameters file (2006.1) doesn't match the actual IU account username and password. (See below)



Note: This option requires the MAG SYSTEM security key.

6.1.2.4 VISTA Imaging Display, Demo Mode

The Imaging Display software has a demo option. Demo mode is designed to allow users to demonstrate the capabilities of the VISTA Imaging System without having to connect to a VISTA database. The Imaging team distributes a separate installation file called MagSetup.exe. This file includes several demo patient images. Demo mode can be useful for testing the workstation's video display settings such as color palette, pixels, fonts, and desktop settings. The option is accessed through the *Options|Demo Patient Images* menu.

6.1.2.5 VISTA Imaging Capture, Test Mode

The VISTA Imaging Capture software has a Test mode that allows testing of input devices (scanners, video capture boards, etc.). The Test mode features...

- Testing of the capture functions without a connection to the VISTA servers
- No requirement to identify patients

In addition, the image test file will not be saved. This mode is helpful when interfacing and testing new equipment.

To set the application to test mode, select *Test Mode* from the *Configuration|Configuration Settings* menu. (See below)



6.1.3 Slowness when Displaying or Capturing Images

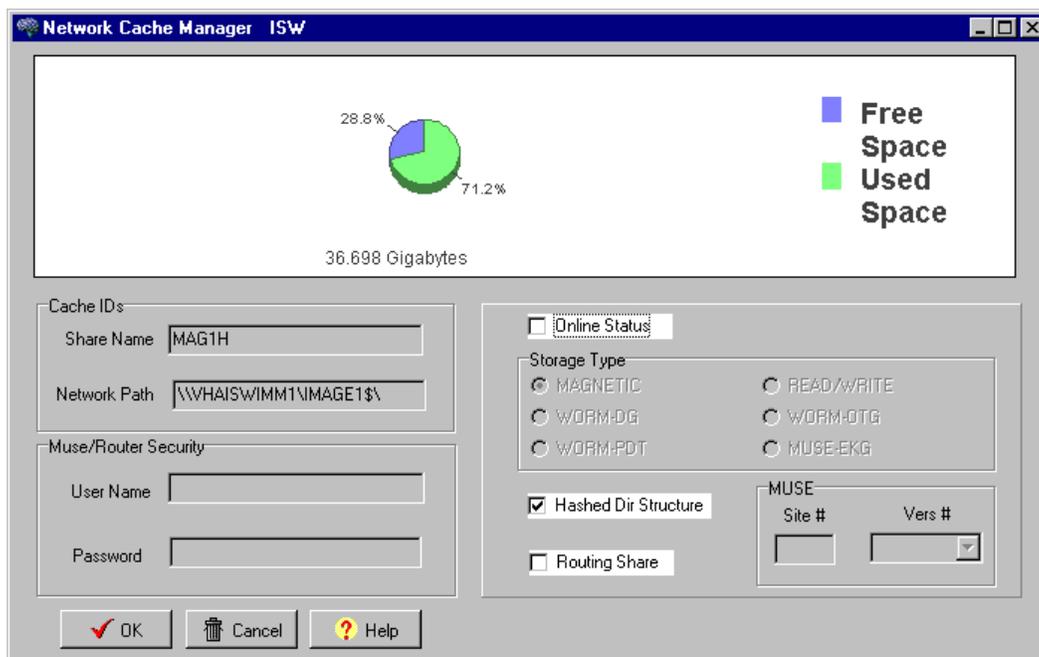
Slowness problems are usually related to the network infrastructure in the Medical Center. Isolate the problem by copying a 10-megabyte file from the server to the workstation. As a general rule of thumb, it should take 3 seconds or less to copy the file on a 100MB network. It should take 6 seconds or less to copy the file on a 10MB network. If it takes longer than that, there is a basic network problem outside of the *VISTA* Imaging application that must be resolved. Check to see that the server, the workstation and any switch that connects them are all set to full duplex. We have seen slowness occur when there is translation from full to half duplex and vice versa. Some switches are incapable of negotiating full duplex.

6.1.4 Other Helpful Hints

6.1.4.1 Editing the Network Location Status Field

The Network Location file keeps track of whether the server it refers to is online or offline. This is very useful in case of a malfunction or scheduled repair on that server. The *VISTA* Imaging software will check this field when retrieving files. If a unit is offline and there is a jukebox on the system, the image file will automatically be retrieved from the jukebox. If there is no jukebox, the file will not be retrieved but the workstation will handle the situation gracefully. It will not hang trying to connect to an offline server.

If your site has a background processor, use the Background Processor configuration tools to set a network location offline. To set a network location offline, select *Edit|Network Location Manager* from the background processor and un-check the *Online Status* check box.



If your site does not have a Background Processor, change the status for a network location using the “Edit Network Location STATUS” menu option from the *VISTA* Imaging System Manager Menu (MAG SYS MENU). You will see the following:

```

CHANGE a Magnetic Server STATUS
      OFF LINE =====> 0
      ON LINE =====> 1
Select NETWORK LOCATION: MAG1H          \\VHAISWIMM1\IMAGE1$
OPERATIONAL STATUS: ONLINE// 0 OFFLINE

```

Note: Select “0” to indicate that the unit is offline; 1 to indicate it is online and operational.

6.1.4.2 *VISTA* HIS Software Troubleshooting

VISTA Imaging software relies heavily on APIs or report routines supplied by other *VISTA* application package developers. These APIs are used to interface the *VISTA* Imaging System with Medicine, Surgery, Radiology, CPRS, TIU and Laboratory. If problems arise regarding the API being used, the Imaging application may display an information message regarding this error or the error will be recorded in the *VISTA* error trap routine. If any of these errors occur, please contact the *VISTA* Imaging Customer Support team by logging a NOIS call.

The *VISTA* Imaging application requires the “MAG WINDOWS” menu option assigned. The following message text will appear if a user does not have this menu option.



6.1.4.3 Other *VISTA* Imaging Troubleshooting Information

Review the manufacturer’s installation guide to find testing tools distributed with Imaging components such as scanners and capture boards.

See the *VISTA* Imaging System Technical Manual for additional troubleshooting guidelines.

Appendix A Security

A.1 Workstation Security

If configured properly, the **VISTA** Imaging software will control the users' access to image files on the file server. Under Windows NT 4.0, the **VISTA** Imaging software provides application-based protection for image files. This requires the application to have permissions to view and store images but denies individual user access to image files.

A.1.1 BIOS Changes

The workstation BIOS should be password protected to prevent users from changing the workstation settings. Some sites have reported that their users have modified the workstation BIOS and password protected the BIOS, making it unavailable for IRM staff to fix.

A.1.2 McAfee Virus Protection

The VA recommends VirusScan by McAfee Associates, Inc., for virus protection on workstations. McAfee Netshield should be used for **VISTA** Imaging file servers. Contact MISS for further details or visit their web site at: <http://vaww.va.gov/miss>

A.1.3 Windows NT

For Windows NT systems, a site can limit access to files and options on the workstation by using system policies and profiles. A description of these features is provided below (For more detailed information, see your Windows NT resource guide).

A.1.3.1 Managing User Work Environments

User work environments include the desktop items and settings, (i.e., screen colors, mouse settings, window size and position, and network and printer connections).

You can use the tools listed in the following sections to manage user work environments on a Windows NT network.

A.1.3.1.1 System Policy Editor

System policy enables you to control the user-definable settings in Windows NT user profiles, as well as system configuration settings. You can use the System Policy Editor to change desktop settings and restrict what users can do from their desktops.

A.1.3.1.2 Logon Scripts

A logon script is a batch file (.bat) or executable (.exe) file that runs whenever a user logs on at any type of workstation on the network. The script contains operating system commands (i.e., commands to make network connections or start applications).

A.1.3.1.3 Environment Variables

Environment variables specify the computer’s search path, directory for temporary files, and other similar information.

A.1.3.1.4 User Profiles

The user profile contains all user-definable settings for the work environment of a computer running Windows NT, including display settings and network connections. All user-specific settings are automatically saved into the Profiles folder within the system root folder (typically C:\winnt\profiles).

On computers running Windows NT Workstation or Windows NT Server, user profiles automatically create and maintain the desktop settings for each user’s work environment on the local computer. A user profile is created for each user when the user logs on to a computer for the first time.

User profiles provide several advantages to users:

- When users log on to their workstations, they receive the desktop settings as they existed when they logged off.
- Several users can use the same computer; and each user receives a customized desktop after logging on.

If you have a computer running Windows NT Server on your network, user profiles can be stored on a server so that user profiles can follow users to any computer running the Windows NT 4.0 on the network. These are called roaming user profiles. You can also assign mandatory user profiles to prevent users from changing any desktop settings (For more information about roaming user profiles and mandatory user profiles, see Chapter 3, “Managing User Work Environments” in Windows NT Server V. 4.0 Concepts and Planning).

A.1.3.1.4.1 Settings Saved in a User Profile

A user profile contains configuration preferences and options for each user (a snapshot of a user’s desktop environment).

The following table describes the settings in a user profile:

Source	Parameters Saved
Windows NT Explorer	All user-definable settings for Windows NT Explorer.
Taskbar	All personal program groups and their properties, all program items and their properties, and all Taskbar settings.

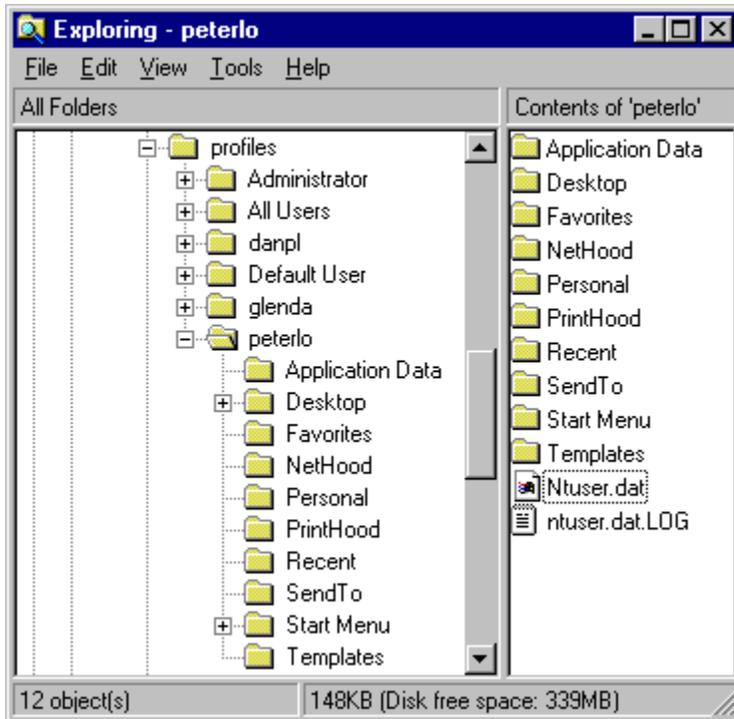
Source	Parameters Saved
Printers Settings	Network printer connections.
Control Panel	All user-defined settings made in Control Panel.
Accessories	All user-specific application settings affecting the user's Windows NT environment, including Calculator, Clock, Notepad, Paint, and HyperTerminal, among others.
Windows NT-based applications	Any application written specifically for Windows can be designed so that it tracks application settings on a per-user basis. If this information exists, it is saved in the user profile.
Online Help bookmarks	Any bookmarks placed in the Windows NT Help system.

A.1.3.1.4.2 Structure of a User Profile

User profiles are comprised of the profile directory, a cached copy of the Windows NT Registry HKEY_CURRENT_USER subtree, and the common program groups, contained in the All Users folder.

A.1.3.1.4.3 User Profile Folders

Every user profile begins as a copy of Default User, a default user profile stored on each computer running Windows NT Workstation or Windows NT Server. The Default User profile folder, user profile folders for each user, and All User profile folders are located in the Profiles folder in the system root (usually C:\Winnt). The Default User folder and individual user profile folders contain an Ntuser.dat file, plus a directory of links to desktop items.



Note: The user profiles folders contain links to various desktop items.

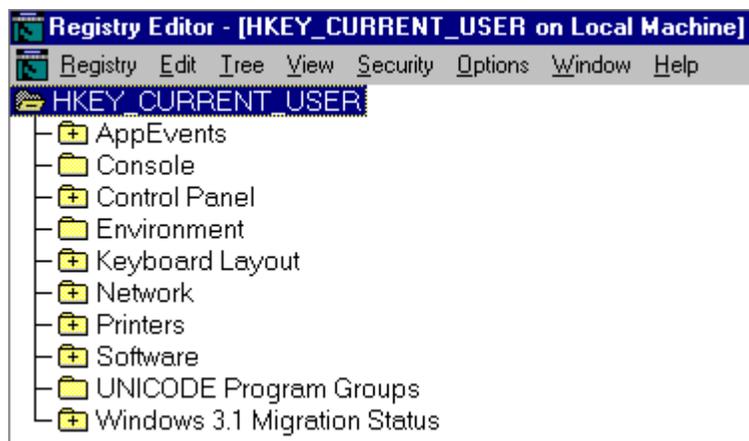
User Profile Folder	Contents
Application Data	Application-specific data, for example, a customer dictionary. Application vendors decide what data to store in the User Profile folder.
Desktop	Desktop items, including files and shortcuts.
Favorites	Shortcuts to program items and favorite locations.
NetHood	Shortcuts to Network Neighborhood items.
Personal	Shortcuts to program items.
PrintHood	Shortcuts to printer folder items.

User Profile Folder	Contents
Recent	Shortcuts to the most recently used items.
SendTo	Shortcuts to document items.
Start Menu	Shortcuts to program items.
Templates	Shortcuts to template items.

Note: The NetHood, PrintHood, Recent, and Templates folders are hidden and, by default, do not appear in Windows NT Explorer. To view these folders and their contents in Windows Explorer, click Options on the View menu, and then click “Show all files”.

A.1.3.1.4.4 NTuser.dat File

The NTuser.dat file is the registry portion of the user profile. NTuser.dat is a cached copy of the Windows NT Registry HKEY_CURRENT_USER subtree on the local computer. The registry is a database repository for information about the computer’s configuration, including the hardware, installed software, environment settings, and other information. In the registry, the settings that determine the work environment for the user who is currently logged on to the computer are stored in HKEY_CURRENT_USER.



All Users Folder

Note: Although they are not copied to user profile folders, the settings in the All Users folder are used with user profile folders to create the user profile.

The Windows NT platform supports two program group types:

- Common program groups are always available on a computer, no matter who is logged on. Only administrators can add, delete, and modify them.
- Personal program groups are private to the user who creates them.

Common program groups are stored in the All Users folder under the Profiles folder. The All Users folder also contains settings for the Desktop and Start menu.

On computers running Windows NT Workstation or Windows NT Server, only members of the Administrators group can create common program groups.

For information on adding new program groups, see "To add a new submenu to the Programs menu" in Windows NT Help.

Note: For more information on configuring NT policies and profiles, refer to the Windows NT Resource Guide.

A.1.4 Imaging Software

If configured properly, the *VISTA* Imaging software will connect automatically to the file server shares to store or retrieve images. The user who is logged into the workstation will not have access to those shares. The privileged username and password for the file server is retrieved by the *VISTA* Imaging application from the *VISTA* Imaging system.

e.g., The user logs into the workstation with their NT domain account (i.e. vha05\vhawassmithj). The *VISTA* Imaging display application is executed. When the user requests images for a particular patient, the application makes a connection to the file server using its privileged username and password and retrieves the files it needs. It then disconnects from the file server.

Note: It is very important that this be configured correctly to insure proper protection of patient confidentiality. Contact the *VISTA* Imaging support team with any questions.

A.1.5 Physical Protection

All systems should be physically locked to protect them from being stolen. Sites have reported many instances of equipment that has “disappeared” from its location.

A.1.6 Medical Center Policy

Many medical centers have a strict policy for users that will have access to clinical workstations. Any user that will obtain access to the system must sign a form that states the policy for the site.

A.2 Windows NT Server Security

Be sure to change the default passwords for the administrator, guest and anonymous user accounts. *VISTA* Imaging users will not log into the *VISTA* Imaging file servers; image files will be accessed only through shares.

A.2.1 Folder and Share Security

Folder and share security is used to control access to the image files. If the system is configured properly, only the *VISTA* Imaging application and the NT administrator (or equivalent) will have access to the folders and shares that contain images. All other users will not have access.

A.2.2 Hidden Shares

Hidden shares are used for image folders on the *VISTA* Imaging file server so they will not show up in the browse list of any client workstation.

Appendix B Backups

B.1 Backups

The *VISTA* Imaging System software saves medical images as part of the patient's electronic record. Because these medical images are part of a patient's medical record they are protected by the Federal Privacy Act. As images are captured, they are stored on magnetic servers and immediately copied to optical disk jukebox servers by the Background Processor. This ensures that there are initially two copies of each image. At some point, the image files will be aged off of the magnetic file servers and only one copy of each image will exist on the optical platters. Because of the possibility of an optical platter failure, a secondary backup of image files is necessary. There are currently two recommended methods for ensuring that two copies of each image always exist.

- Continuous incremental backup of the magnetic image shares – An initial full backup of the image share is performed at the initial imaging installation and subsequent nightly incremental backups are performed. **Tapes CANNOT be re-used!**
- Media copy options available in the OTG Disk Extender jukebox storage management software - OTG Disk Extender v3.2.x and v4.2.x come with utilities for creating copies of optical media. The software can be configured to manually copy media after a platter has been filled or automatically fill copy media as original media is written to. This option requires the site to purchase additional media to be used as copy media. This may create additional expense at the onset, but can save on FTEE labor expense in the event that a restore is necessary.

In addition to backing up the image shares, be sure to back up the following:

- NT Operating System
- Disk Extender SQL database (v3.2.x only)
- OTG Extended Drive MFT (v4.2.x)
- Background Processor
- DICOM gateways

The following table presents recommendations from the *VISTA* Imaging staff:

Equipment/ Software	Frequency	Type	Media Type	Comments
NT Operating System	Weekly	Full	Tape	
Disk Extender Extended Drive (This only applies to sites running 4.2.x of Disk Extender)	Daily	Full	Tape	Backup software should have “Open with intent to backup” option. This will backup the MFT for the extended drive.
SQL Database (master and DEX databases) (This only applies to sites running 3.2.x of Disk Extender)	Daily	Disk Dump	Disk	Performed late at night because it locks the database and should be performed prior to backing up the magnetic drives (See Jukebox section for details).
Magnetic Share Drives (use either this option OR the Jukebox option)	Daily	Incremental by date	Tape	Backup new images captured since the last backup was performed. Backup tapes should be stored off site. Do not overwrite media.

Equipment/ Software	Frequency	Type	Media Type	Comments
JukeBox (use either this option OR the Magnetic Share option)	Continuous	Media Copy	Optical	Use DE Media copy option. Be sure to remove platter from the write path before media copy is created if using option to copy full media. Remove platter from the write path before media copy removed from JB if using option to fill copy media as original media is written
DICOM Gateways	Initial installation and after any software changes or upgrades	Full	Tape	The DICOM Gateway stores transient data that should be initialized immediately upon restoring a backup. See the VISTA Imaging DICOM manuals for specific instructions on restore or enter a NOIS call for VISTA Imaging support
Background Processor	Initial Installation and after any software changes or upgrades	Full	Tape	Data is not stored on this system. Backups only required when any changes are made to the application software or operating system.

Note:

- Refer to the Backup Software manufacturer's manual for complete instructions on how to install and configure the backup utility software.
- Refer to the OTG System Guide on how to configure Media Copy.

Remember to backup other systems that produce images for the *VISTA* Imaging System (i.e., MUSE, PACS, Dental System).

Note: Prior to using the *VISTA* Imaging Background Processor Purge function, be sure that all the *VISTA* Imaging servers have been backed up according to the instructions above.

Appendix C OTG Disk Extender Software Installation and Configuration

C.1 Disk Extender 4.2.

OTG Disk Extender 4.2 is the latest version that is supported by the *VISTA* Imaging Project. Instructions for installation and configuration are given below.

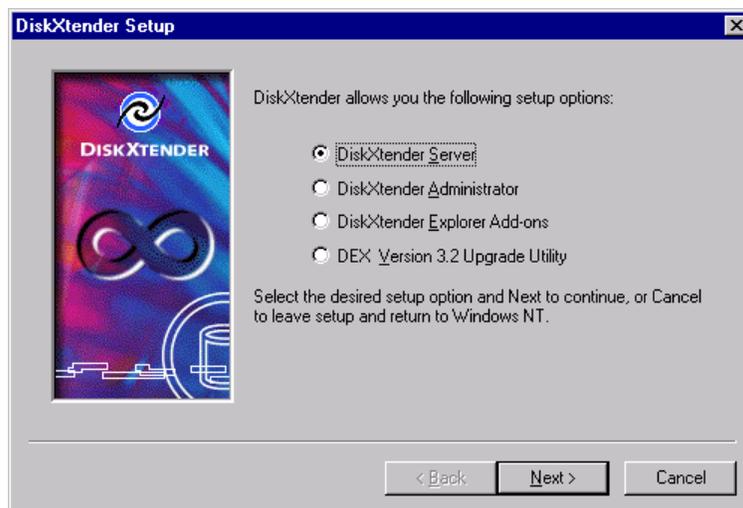
Note: If a site is installing or upgrading to Disk Extender 4.2, you must verify that the SCSI transfer rate on the SCSI interface card is not set higher than 10MB. Refer to the server or SCSI card manufacture instructions for setting the SCSI transfer rate. Most Adaptec cards can be set by typing CTRL/A during the system boot process.

C.1.1 Installing and configuring Disk Extender 4.2

Be sure that NT service pack 6a or higher is installed on the server before installing the software.

C.1.1.1 Install the software on the server

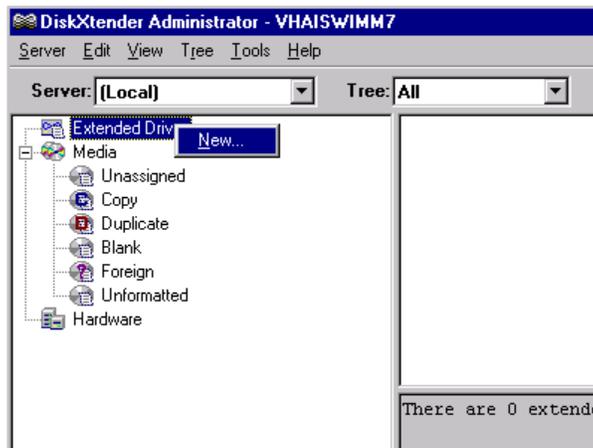
1. Install the Disk Extender software by running setup.exe on the distribution CD. Choose the Disk Xtender Server installation option.



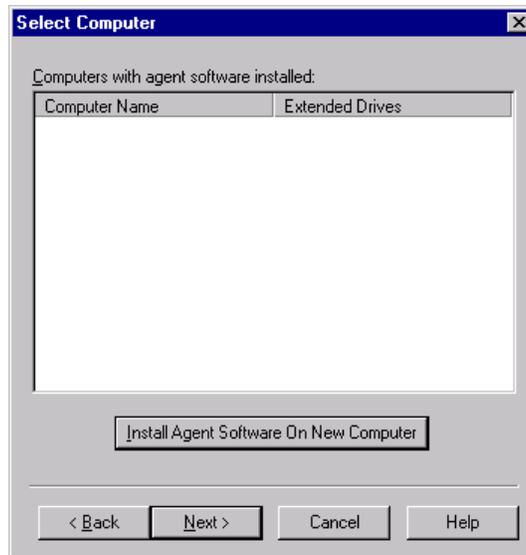
2. Use the default installation options.

C.1.1.2 Create the OTG Extended drive

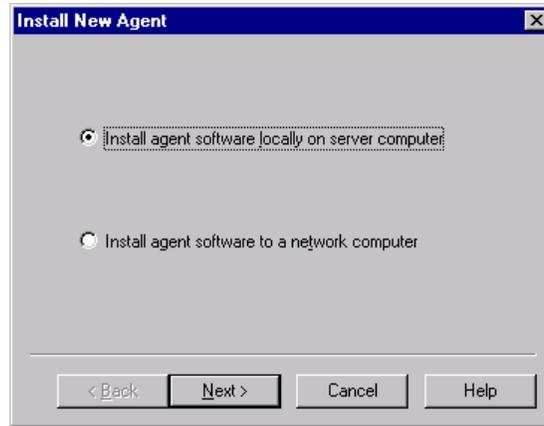
1. Upon completion of the software installation, start the DiskXtender Administrator application (Programs|DiskXtender Server|Administrator).
2. Right click on "extended drives" item in the tree view and click on "new" to start the new extended drive wizard.



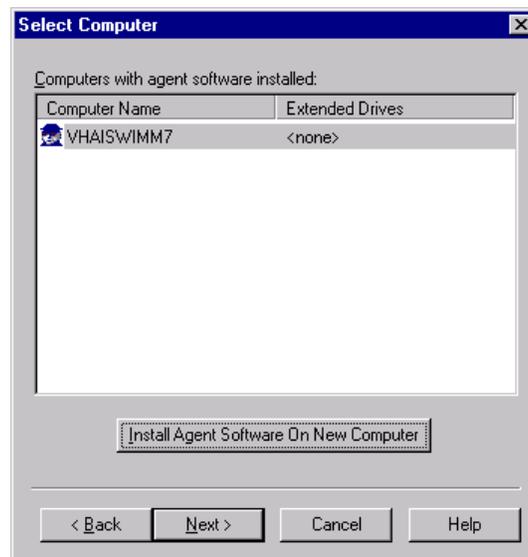
3. Select next.
4. Click on "install agent software on new computer" button.



5. Select the "install agent software locally on server computer" (default) and click the Next button.

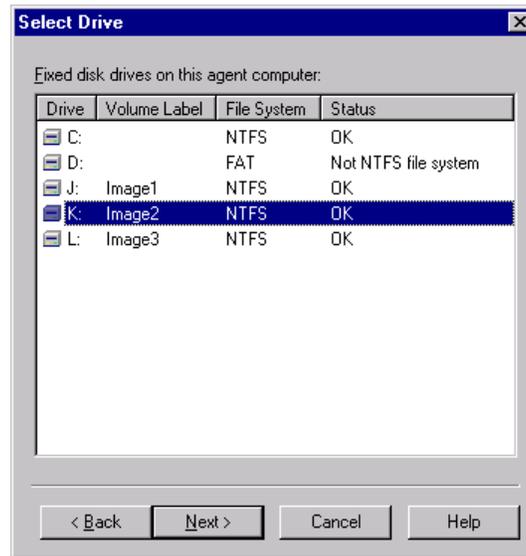


6. Click the Finish button and you will now see the extended drive in the list.

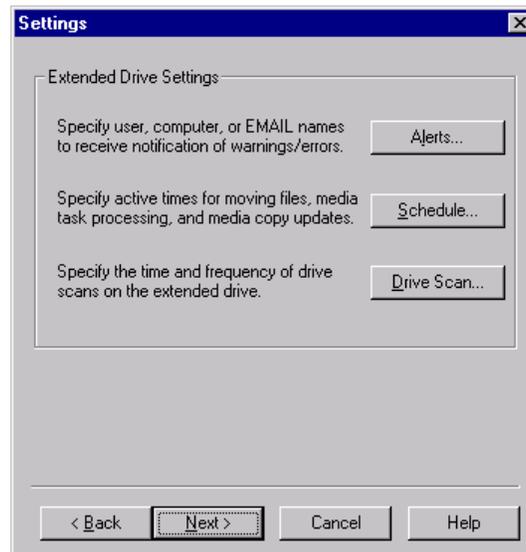


C.1.1.3 Configure Extended drive

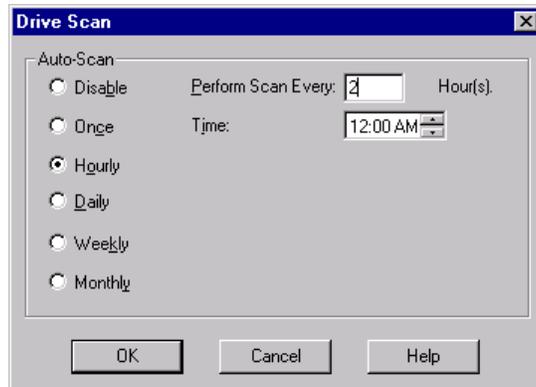
1. Click the Next button to complete the creation of the extended drive.
2. Select the drive to extend from the list of available drives.



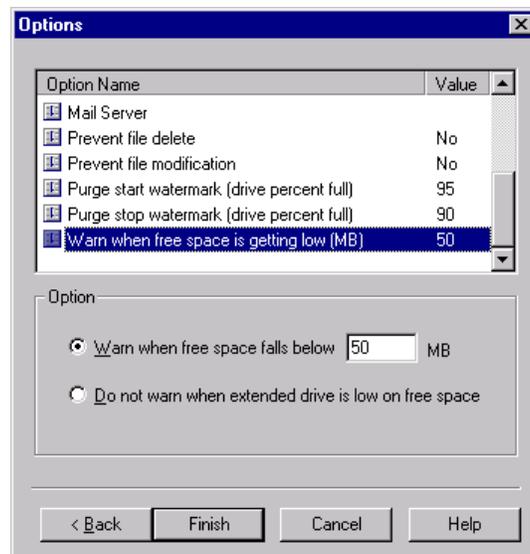
3. Click the Next button.
4. Click the Drive Scan button to configure drive scan options.



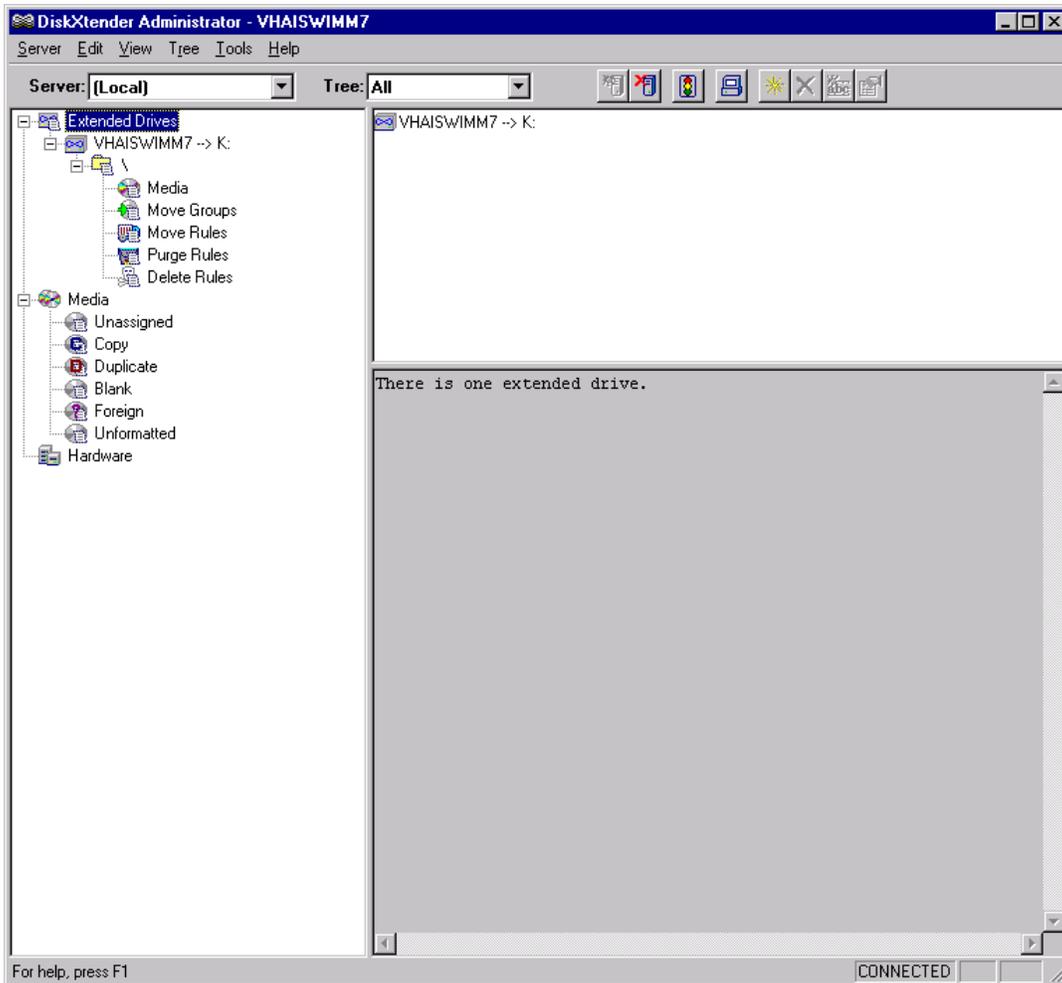
5. Select Hourly and set scan to run every 2 hours.



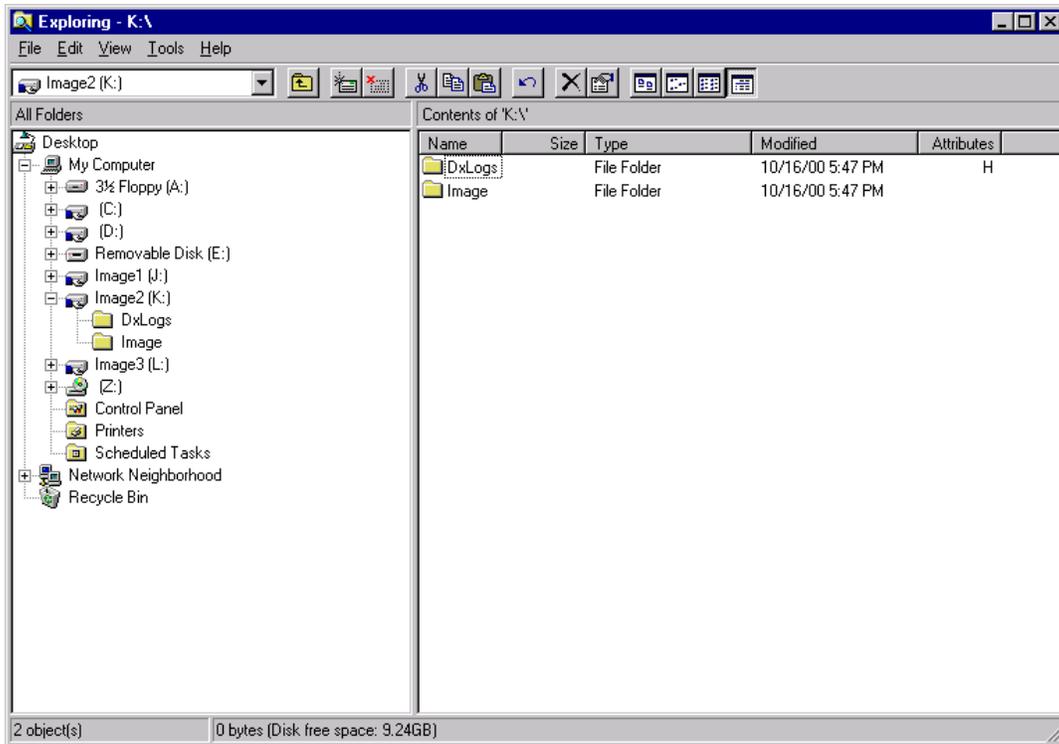
6. Click the OK button to close.
7. Select Next to get to Extended Drive Options.



8. Set the mail server to an available SMTP server (i.e. Gk-east.va.gov).
9. Set option to "Warn when free space is getting low" to 50MB.
10. Click the Finish button to complete the installation/configuration of the extended drive. The extended drive will now appear in the tree.



11. Using explorer, create a folder named *image* on the drive that was extended.

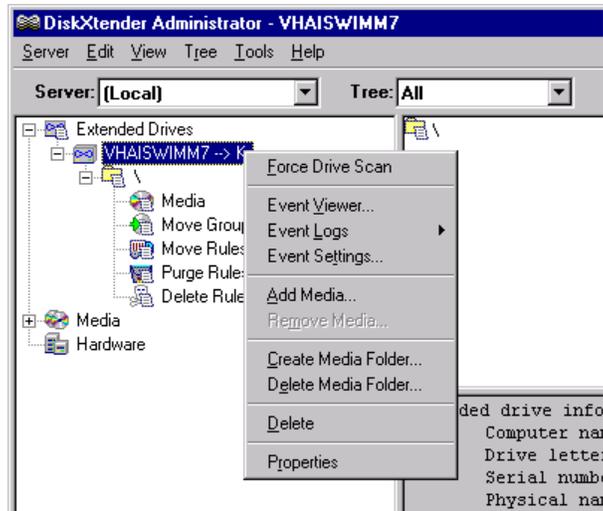


12. Share the drive as imagejb1\$ and configure the share permissions as:

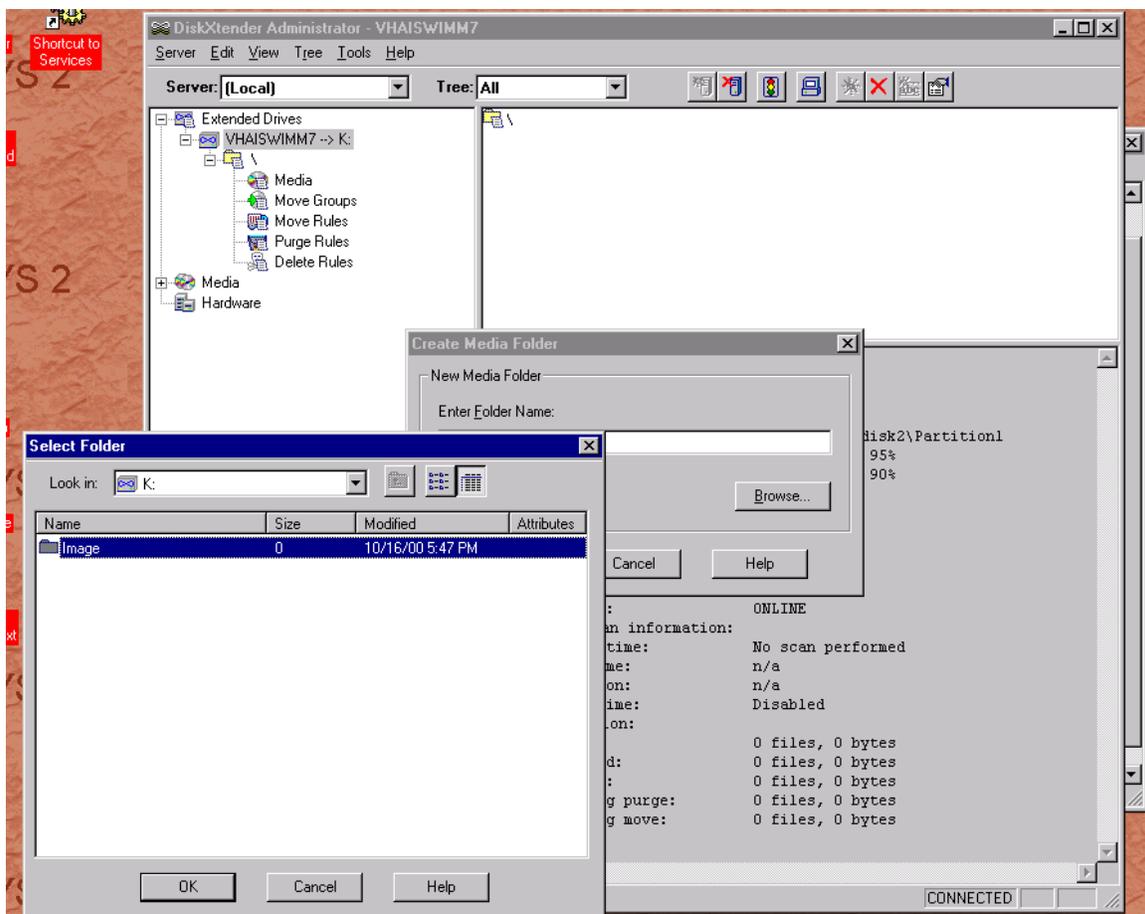
Administrators, vhaxxiu, vhaxxia - full control

Note: Be sure to remove the “everyone” group.

13. Right click on the extended drive and select "create media folder" from the pop-up menu.



14. Click on the browse button and select *image* from the folder list.



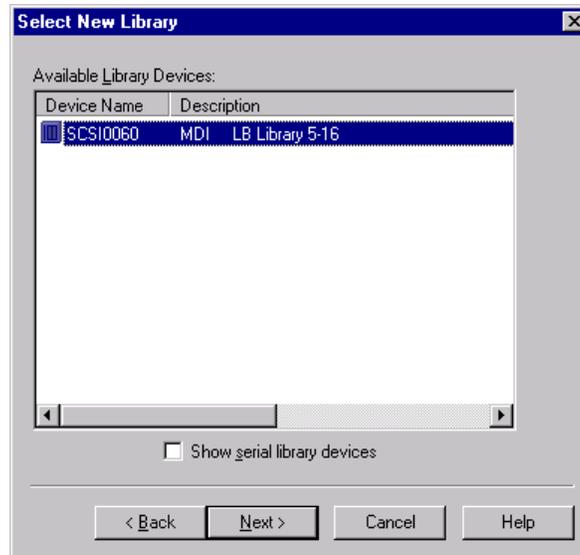
15. Click *OK* to add the media folder.
16. Delete the "\" media folder by right clicking on the extended drive and selecting "delete media folder" from the pop-up menu.

C.1.1.4 Add the Jukebox Hardware

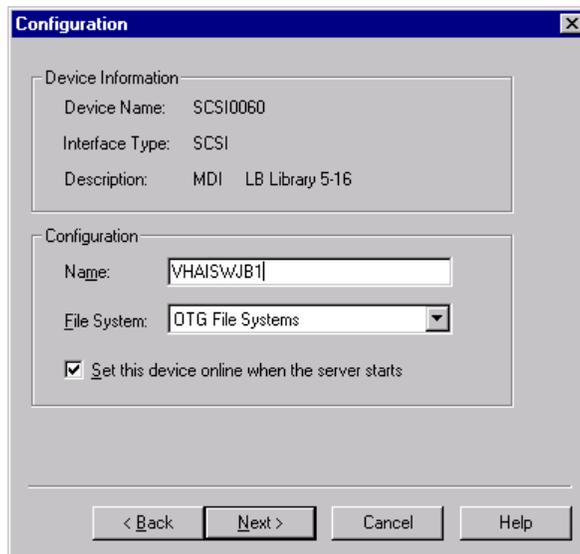
1. Right click on Hardware in the tree, click "New" to start the "Add New Hardware Device" wizard.
2. Select "library" if not already selected and click next.



3. Select your jukebox from the list and click "next".



4. Name the library vhaxxjb1 (...jb2 for second library...) Where xxx is the 3-character site code.
5. Use "otg file systems" for the file system type.

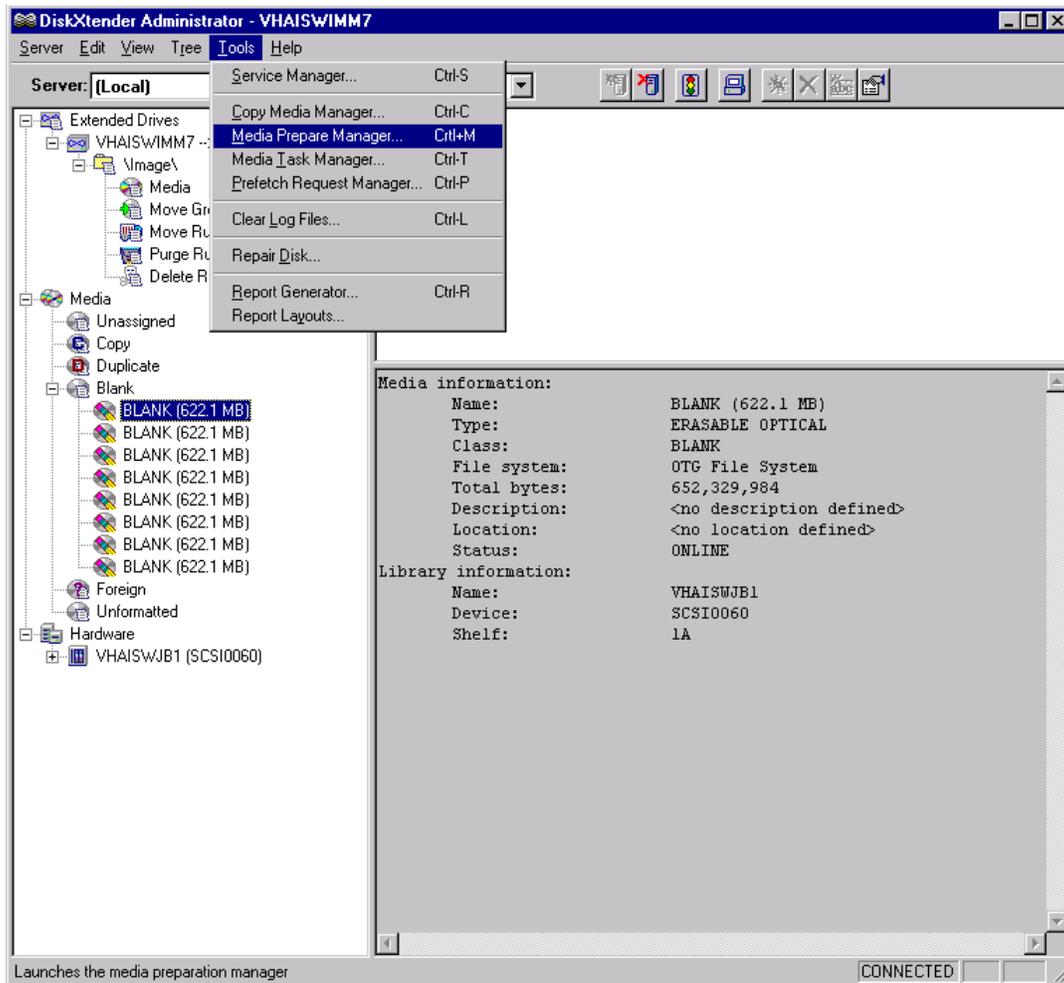


6. Click next.
7. Add drives by using the autoconfig option and answer "yes" to the "set drive online?" question (**Note:** if this is a clustered jukebox installation, use manual drive configuration).
8. Verify that all drives were added and click next.

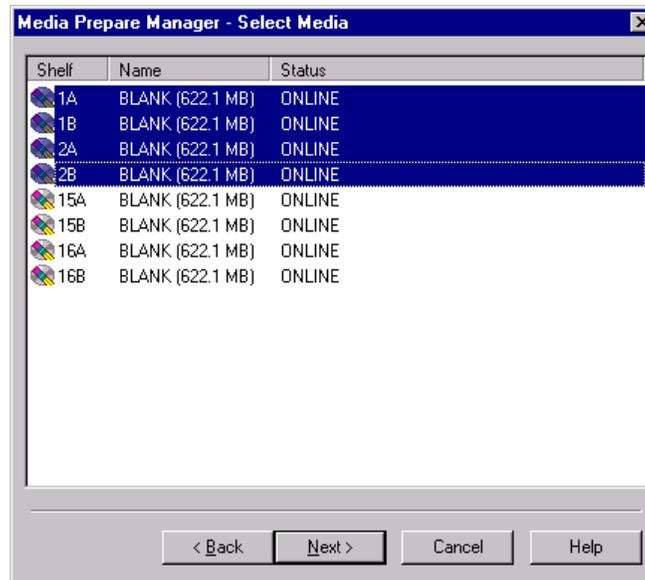
9. Enable all options for the drive and click next.
10. Set drive options (may need to update this) and click finish to complete the configuration of the jukebox hardware.
11. Reboot the system.

C.1.1.5 Media configuration

1. When the system boots, launch Disk Extender Administrator from the programs|Disk Extender Server menu.
2. Any media that had been loaded into the jukebox will appear as "Blank" in the media tree.
3. Click on the Tools|Media Prepare Manager menu to configure media.

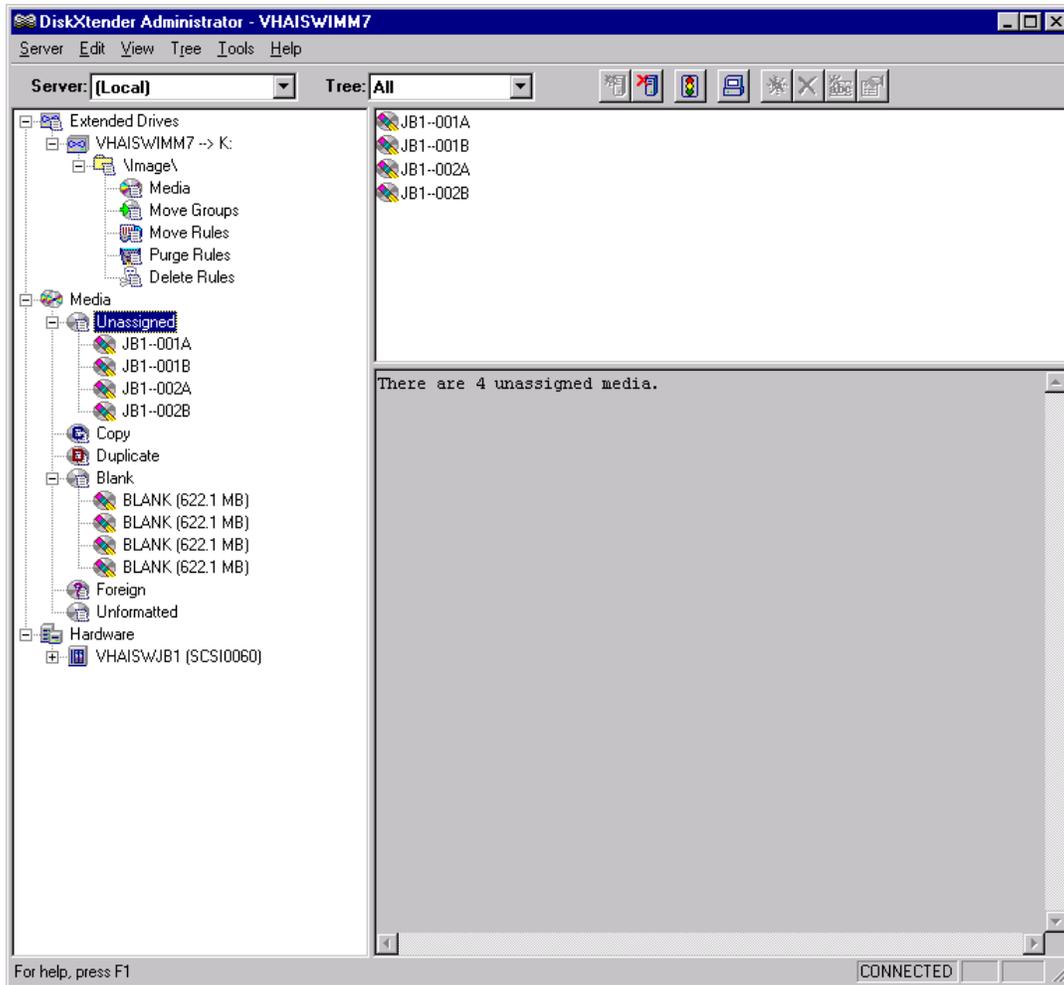


4. Select your jukebox from the list and click Next.
5. You will be given a list of media to prepare. Select the media to be configured for writing. If copy media will be reserved for copy media, deselect that media from the list and click Next.



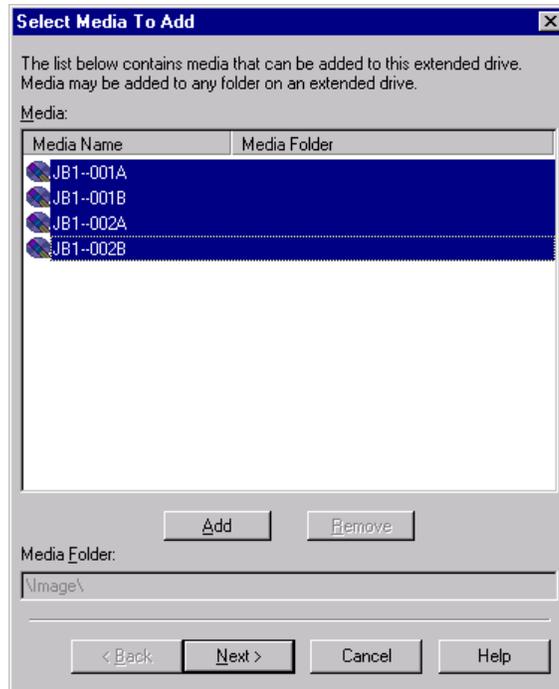
6. Formatting media is not necessary for Blank media. Use the "Do Not Format Selected Media" option and click Next.
7. Select "Label Selected Media" and use JB1- for the Label Prefix, 1 as the start number and 3 as the Number Width. The sample name should display as JB1-001
8. Click Next.
9. Select ASAP for "When To Process" and click Next.
10. Click Finish to begin media preparation.

Once media preparation is complete, all labeled media will appear in the "Unassigned" node of the "Media" tree.



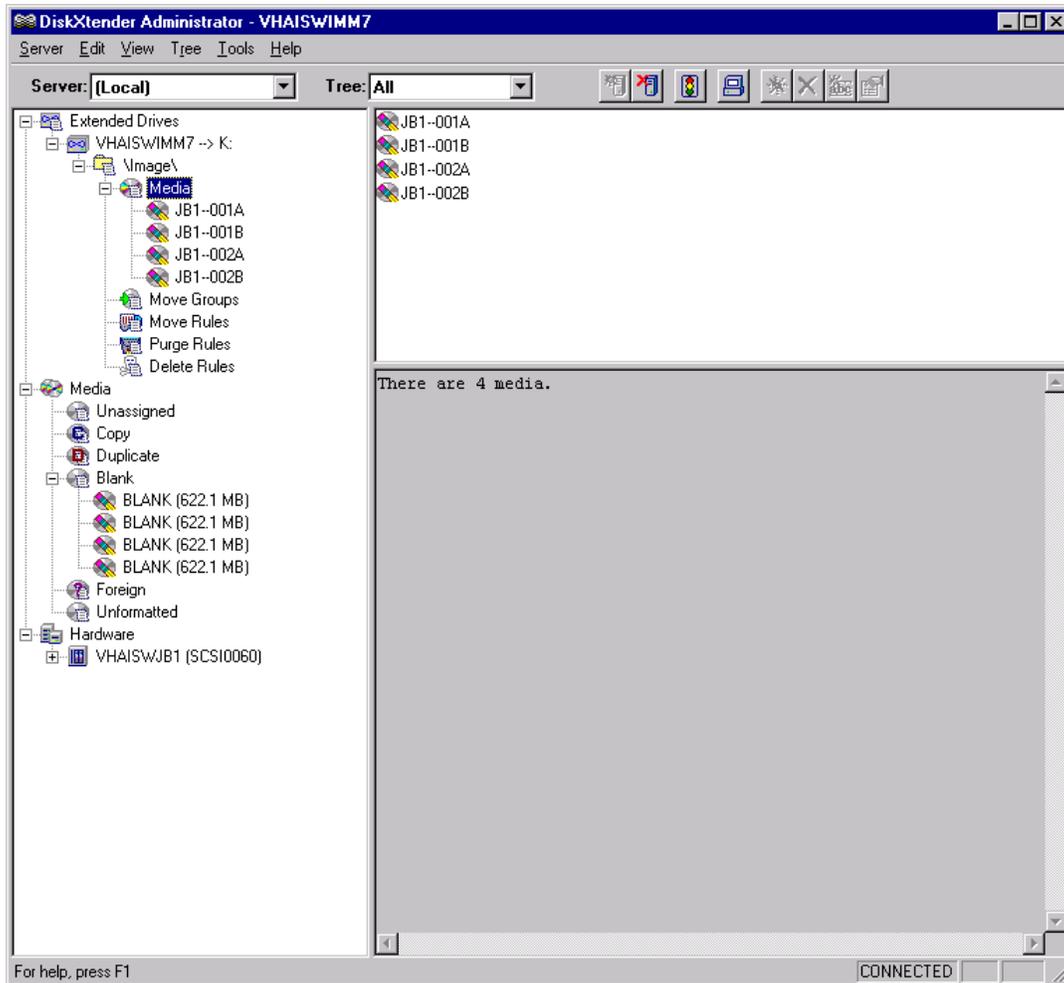
11. Add the unassigned media to the \image media folder:

- a. Right click on the "Media" entry in the \image\ media folder and select "Add Media" from the pop-up menu to bring up the Add Media wizard.
- b. Select all media from the list of available media (use multiple select).



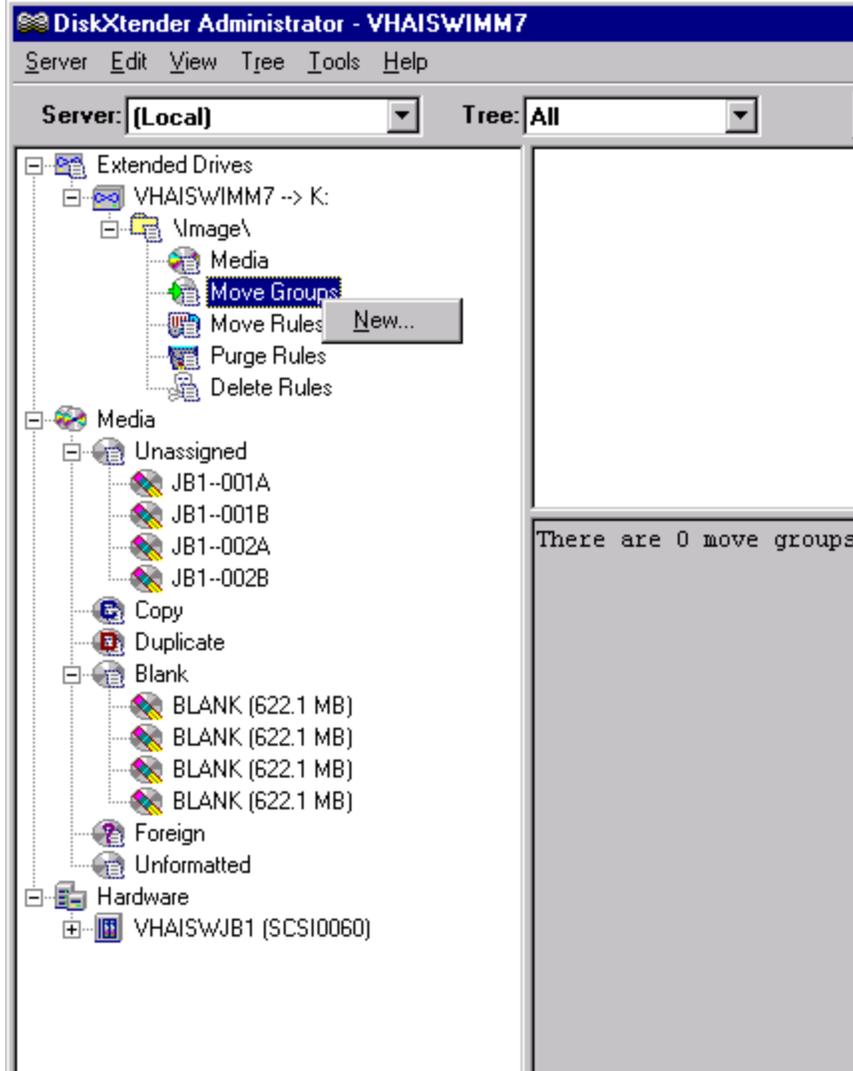
12. Click on the Add button (**Note:** This must be done before clicking Next).
13. Click on Next at the media restore options dialog.
14. Click on Finish to complete adding media to the \image\ media folder.

Media will now appear in the \image\ media tree.

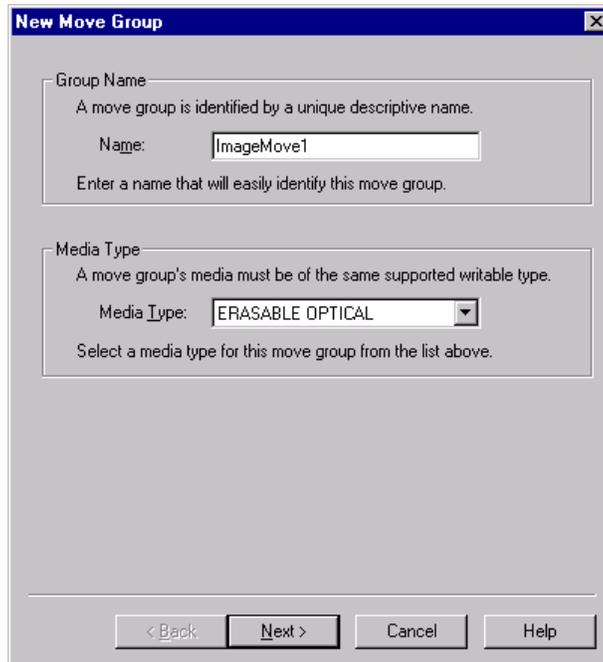


C.1.1.6 Create a Move Group

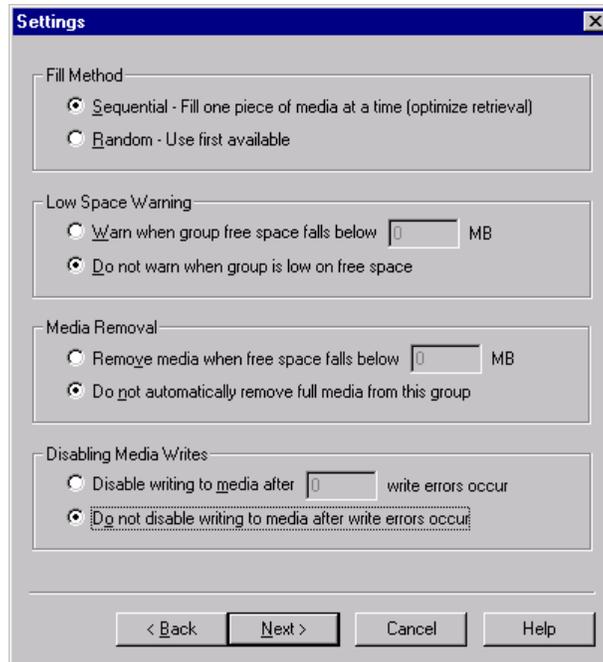
1. Right click on "Move Groups" item under the \image\ media folder.
2. Click on "New" to create a new move group.



3. Name the group `imagemove1` and use the default Media Type (Erasable Optical).



4. Click Next.
5. Click Add to select media to add to the move group.
6. Select all media (multiple select) and click *OK*.
7. Click Next.
8. Use the defaults for the group settings.



9. Click Next.
10. Select defaults for Automation and click Next.
11. Click on Finish to save the Move Group.

C.1.1.7 Create a Move Rule

Add a Move Rule for the \image\ media folder. Use all defaults.

C.1.1.8 Create a Purge Rule

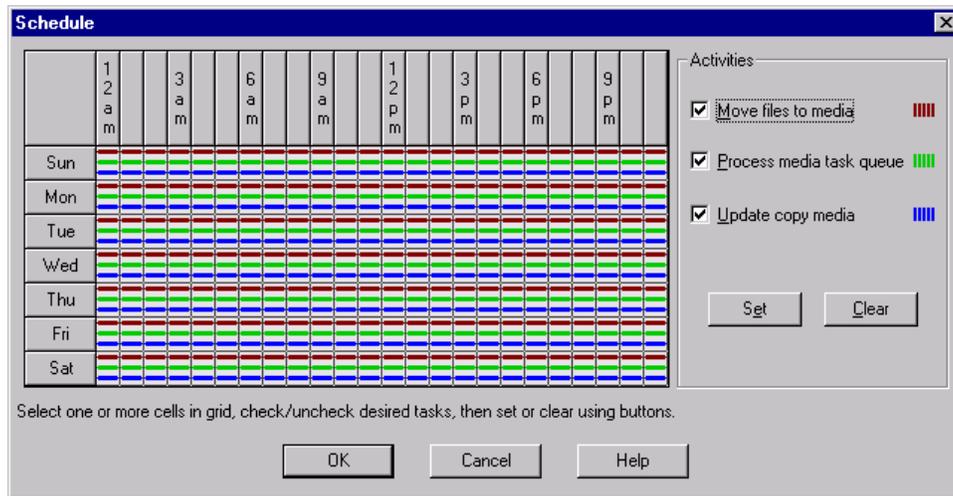
Add a Purge Rule for the \image\ media folder. Use all defaults.

Note: Do not add a Delete Rule.

C.1.1.9 Configure Server Schedules

1. Click on the Server|Properties menu in the Administrator application.

2. Click on the Settings Tab.
3. Click on the Schedule button.
4. Select entire grid (12am-12am) and click on the Set button to process all tasks at all times of the day.



5. Click on OK or Apply to apply changes.

C.1.1.10 Configure Server Alerts

1. Click on the Server|Properties menu in Administrator application.
2. Click on the Settings Tab.
3. Click on the Alerts button.
4. Click on the Add button.
5. Add e-mail, computer, or user information to receive alerts.
6. Click on *OK*.
7. If an e-mail address was entered, add an SMTP mail server to send the mail:
 - a. Click on the Options tab.
 - b. Enter a valid SMTP server name under the "Mail Server" option (i.e. gk-east.va.gov).

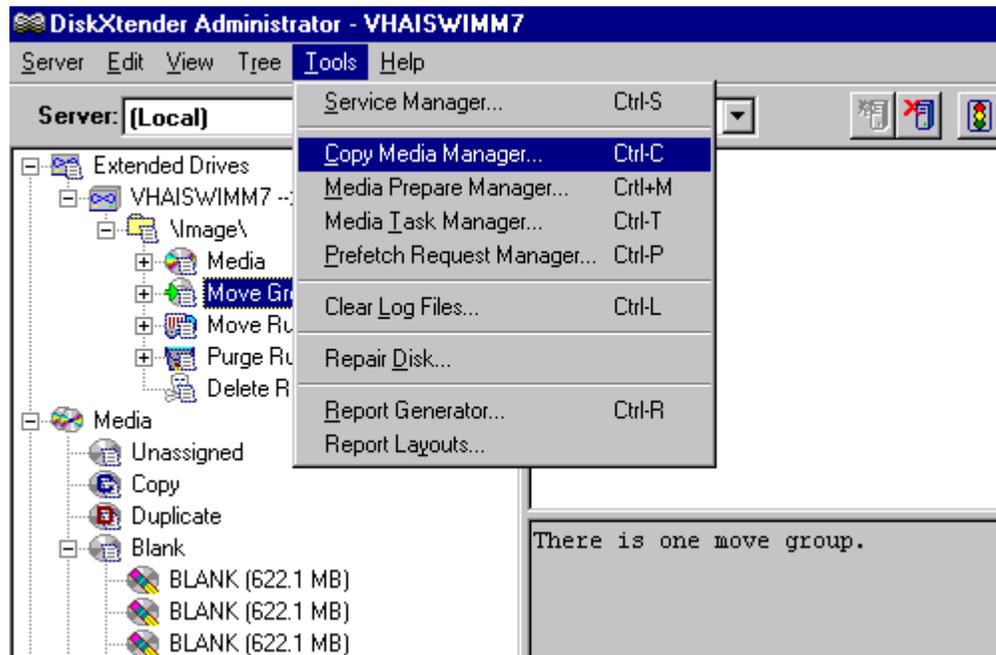
C.1.2 Media Copy

Media Copy can be used to create a second instance of each platter in the jukebox. When configured correctly it is an excellent method of creating and retaining a second copy of each image in the jukebox. *Media Copy* can essentially replicate each platter in the jukebox. Restoring media that has been damaged becomes an easy task. *Media Copy* can be used as an alternative to continuous incremental backups of the magnetic file servers. Detailed information on *Media Copy* can be found in the OTG 4.x system guide. General instructions are provided below.

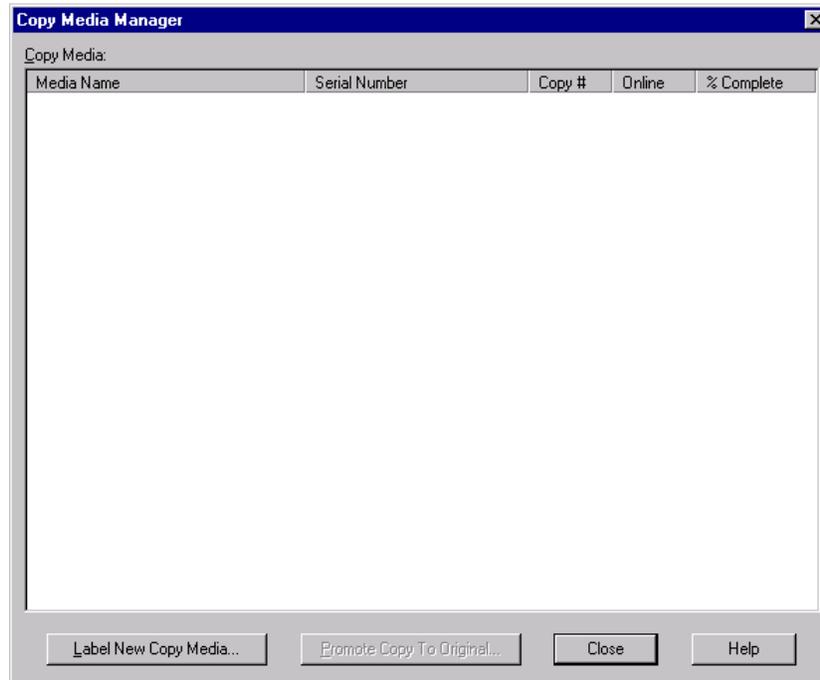
Reserve portion of the jukebox for copy media. Locate copy media in a separate area of the jukebox. For example, a site may choose to use the top 20 slots of the jukebox for copy media and work down. i.e. 480-500 on a 500 slot jukebox

C.1.2.1 Configuring Copy Media

1. Click on the Tools|Copy Media Manager menu.



The Copy Media Manager dialog will appear.

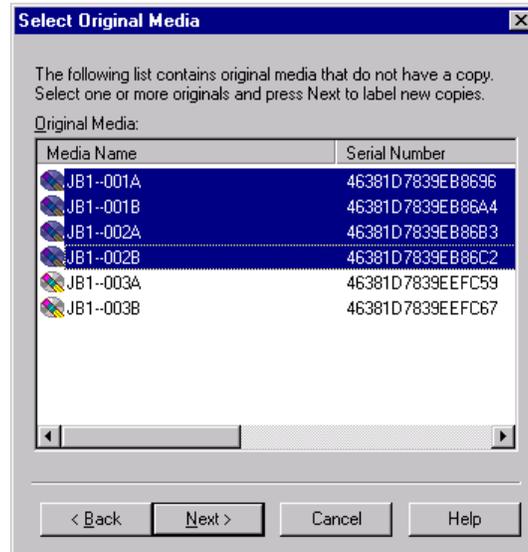


2. Click on "Label New Copy Media" button, which will launch the copy media wizard.
3. Select "Label first copy media" and click Next.



4. You will be presented with a list of media that does not currently have a copy associated with it. Select the media to be copied (use multiple select).

Note: only select the amount of media that you have copy media slots for. i.e. if you have 20 slots reserved for copy media, select 20 pieces of media at a time. (example shows 2 slots reserved for copy media)



5. Click Next.
6. Click finish to complete the copy media configuration.

Copy media will begin to appear in the "Copy Media Manager" list after the Disk Extender software labels the media.

In order to optimize drive usage during the day, the server event schedule should be modified to perform copy media updates during nighttime hours. To adjust the server schedule:

1. Click on the Server|Properties menu.
2. Click on the settings tab and click on the "Schedule..." button.
3. Select the region where copy media task should NOT be performed (i.e. 12am to 7am).
4. Un-check the "Update copy media" check box.

After the scheduled time has passed, verify that the media has been updated by comparing the properties of the original media and the copy media. Copy media will continuously get updated as the original media fills (according to the schedules set).

Before removing copy media from the jukebox, you MUST remove the original media from the move group in order to ensure that the copy media remains an exact replication of the original media.

C.1.2.2 Promoting copy media to original

1. Remove the original media from the extended drive's media tree (right click on media, click remove). Be sure to remove the A and B sides.

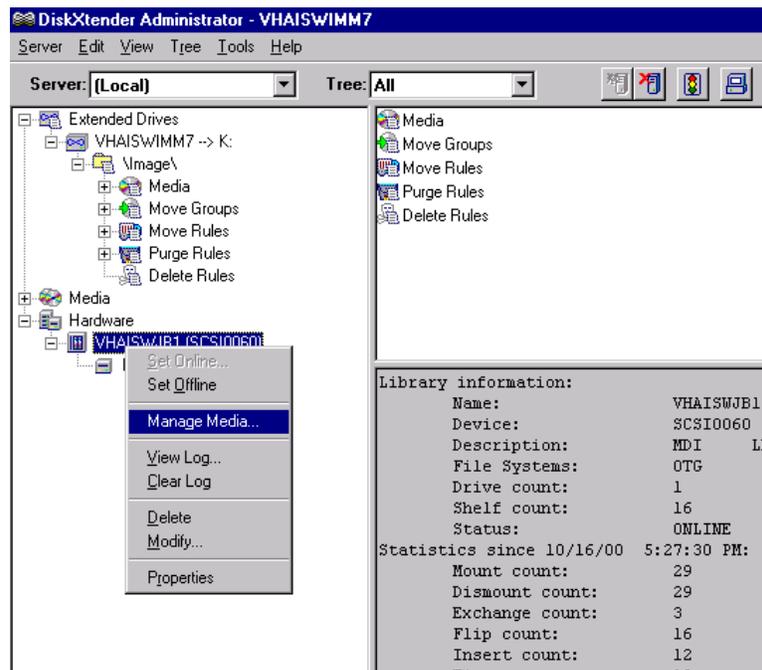
2. The media will now appear under "Unassigned" in the media tree. Right click on the media and delete it.
3. Eject the platter from the jukebox.
4. Insert the copy media into the slot that was freed above.
5. Launch "Copy media manager" from the tools menu.
6. Select the copy media to be promoted (multiple select is not allowed) and click on the "promote Copy To Original" Button. Be sure to promote both sides of the media..
7. Add the media to the extended drive and the move group as shown in sections C.1.3.2 and C.1.3.3.

C.1.3 Adding Media through the Mail Slot

Adding media is a 3-step process. (1) Insert media into the jukebox, (2) add the media to the extended drive, and (3) add media to the move group so it can be written to.

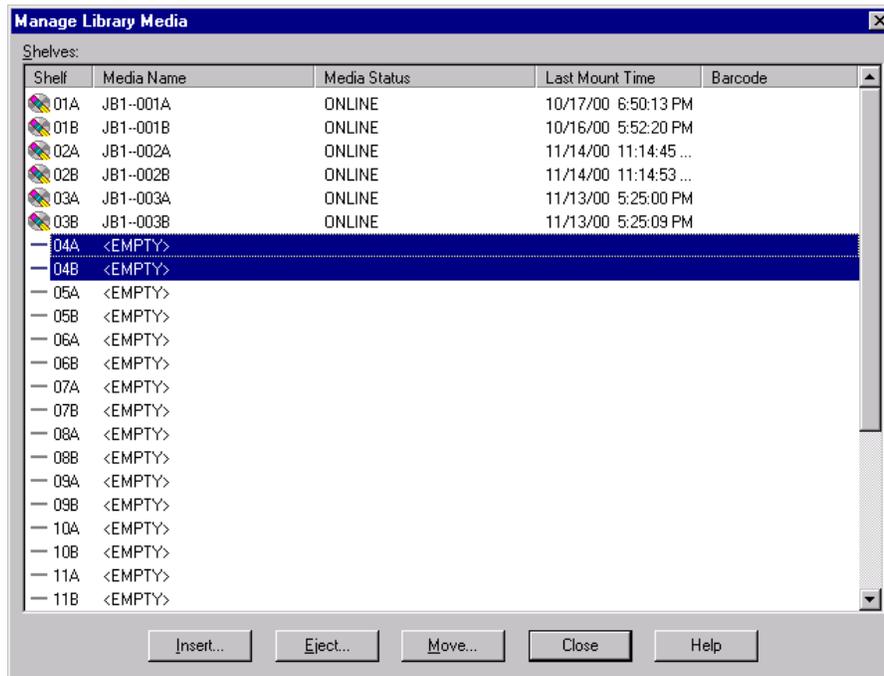
C.1.3.1 Inserting Media into the Jukebox

1. Right click on the jukebox under the Hardware tree.
2. Click on the "Manage Media..." menu option.



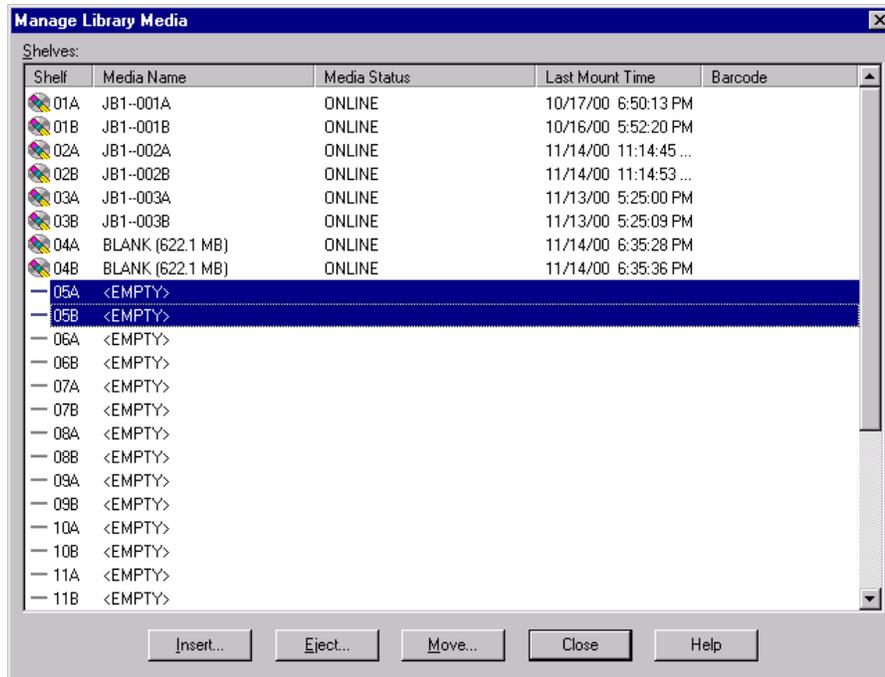
The Manage Library Media dialog will show a list of media and slot information.

3. Select the slot where the media will be in located by clicking an available slot number.



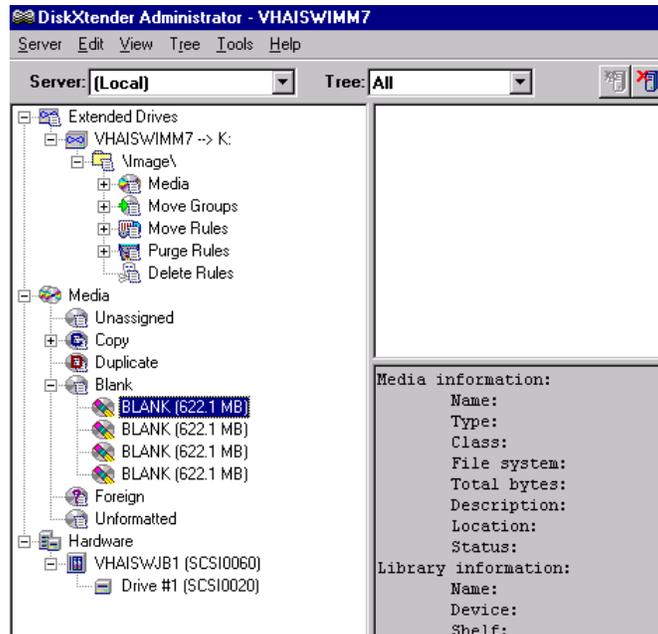
4. Click on the insert button.
5. Select "Insert media to specified shelves" and click *OK*.
6. Insert media into mail slot when prompted and click *OK*.

Media will now be inventoried and added to the list of online media (it will be listed as blank).



7. Click close button to exit from the media manager.

The media inserted will now appear in the blank media tree.

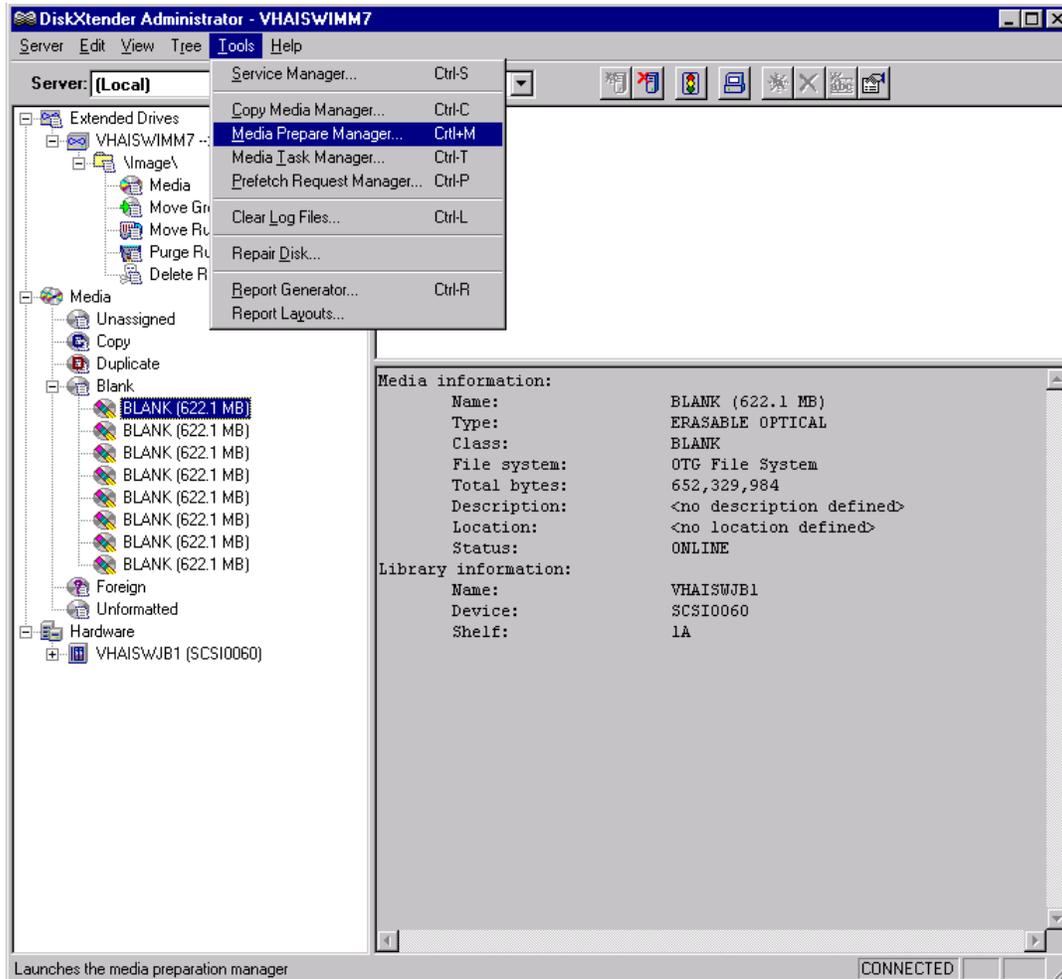


The media must now be added to extended drive and the move group. The following sections provide instructions on performing this task.

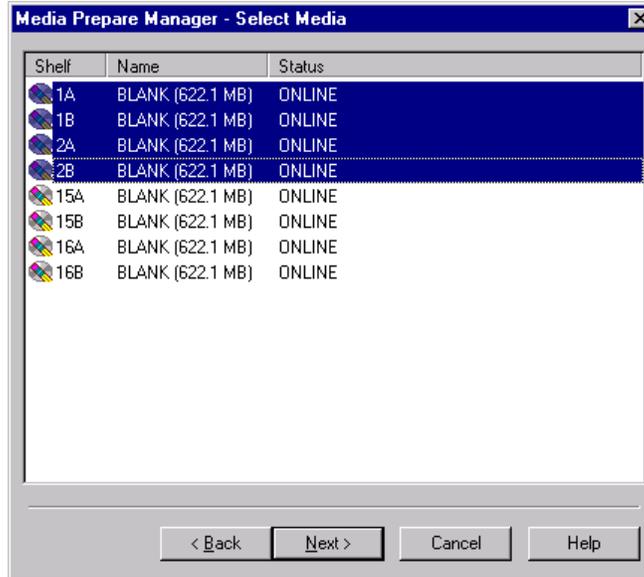
C.1.3.2 Adding Media to the Extended Drive

Any blank media that has been loaded into the jukebox will appear as "Blank" in the media tree. Follow the instructions below for adding the media to the extended drive.

1. Click on the Tools|Media Prepare Manager menu to configure media.

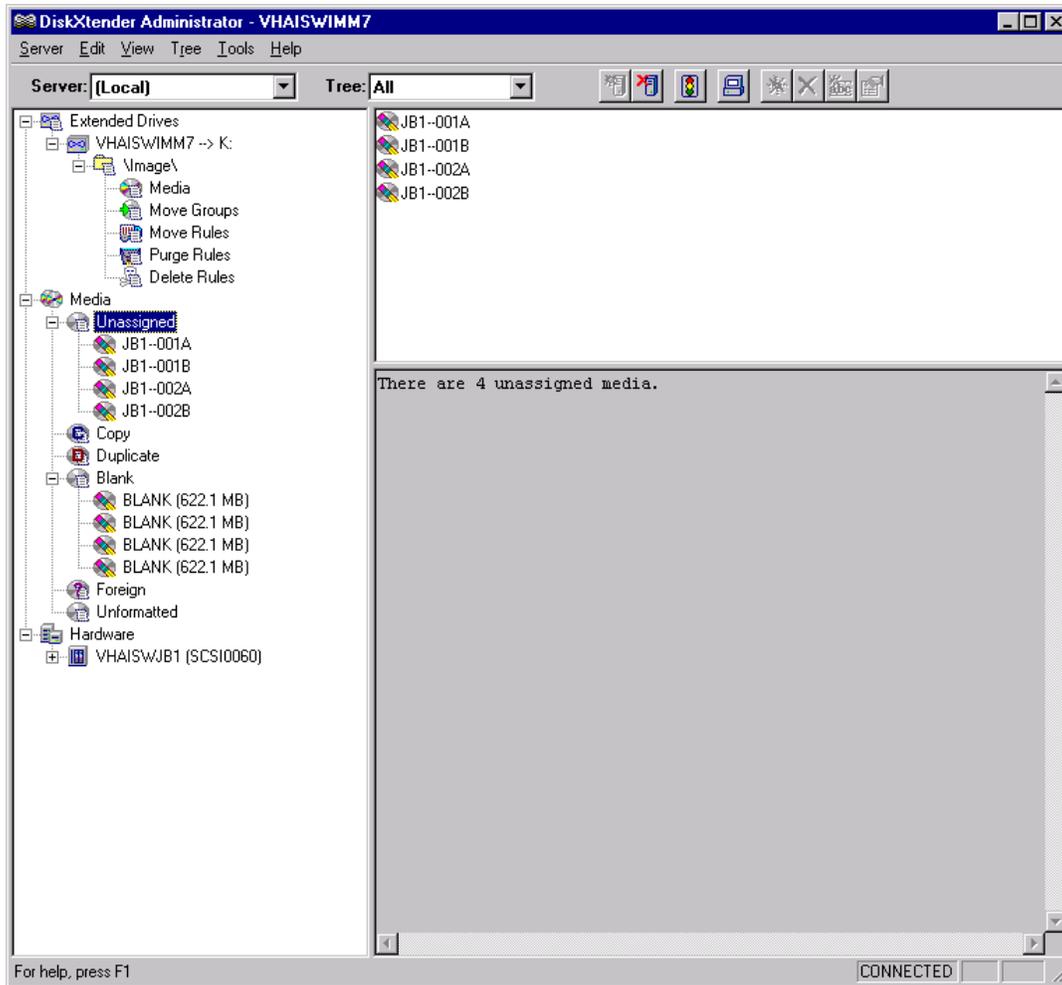


2. Select your jukebox from the list and click Next.
3. You will be presented with a list of media to prepare. Select the media to be configured for writing. If copy media will be reserved for copy media, deselect that media from the list.
4. Click Next.

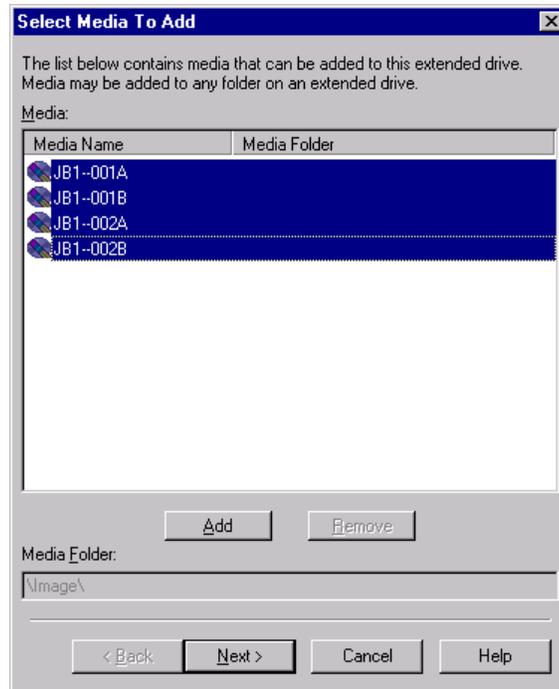


5. Formatting media is not necessary for Blank media. Use the "Do Not Format Selected Media" option and click Next.
6. Select "Label Selected Media" and use JB1- for the Label Prefix, 1 as the start number and 3 as the Number Width. The sample name should display as JB1-001.
7. Click Next.
8. Select ASAP for "When To Process" and click Next.
9. Click Finish to begin media preparation.

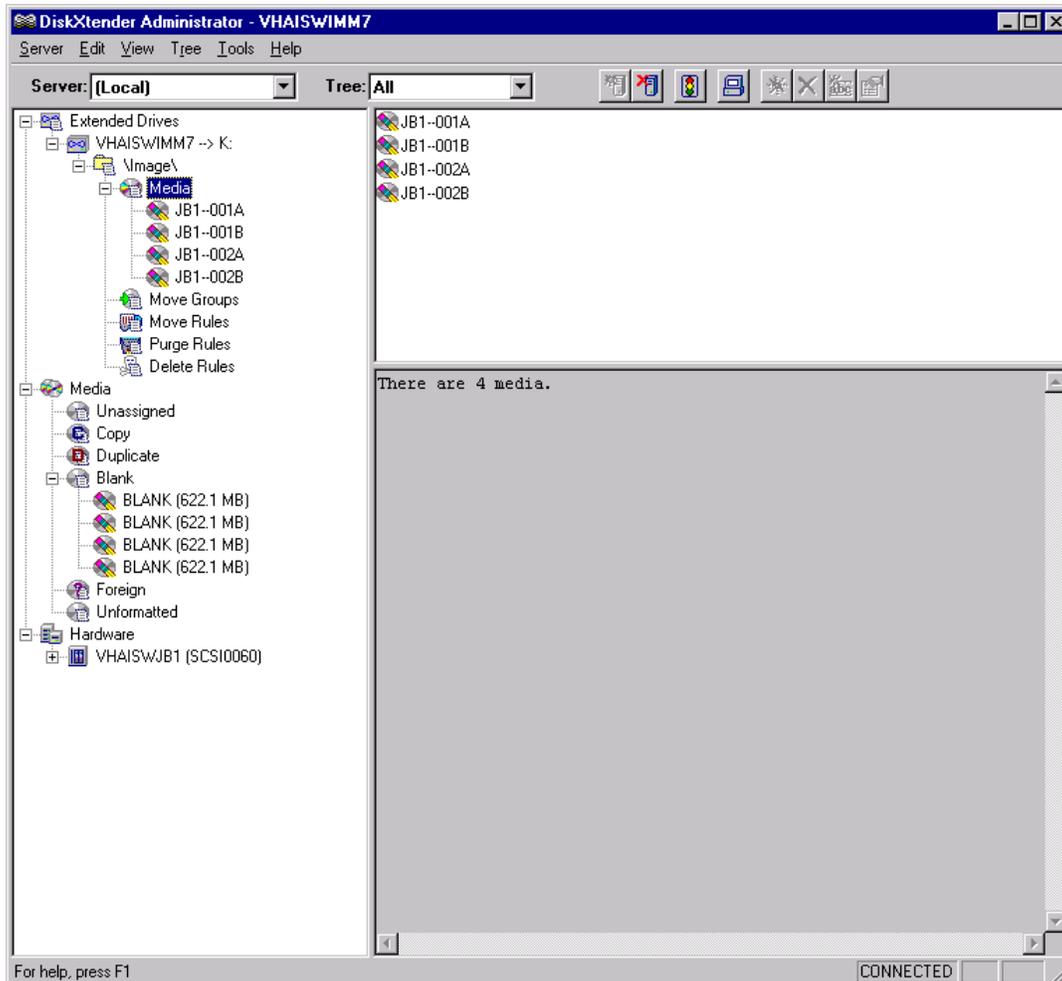
Once media preparation is complete, all labeled media will appear in the "Unassigned" node of the "Media" tree.



10. Add the unassigned media to the \image media folder:
 - a. Right click on the "Media" entry in the \image\ media folder and select "Add Media" from the pop-up menu to bring up the Add Media wizard.
 - b. Select all media from the list of available media (use multiple select).



11. Click on the Add button (**Note:** This must be done before clicking Next).
12. Click on Next at the media restore options dialog.
13. Click on Finish to complete adding media to the \image\ media folder.
14. Media will now appear in the \image\ media tree.



C.1.3.3 Adding Media to the Move Group

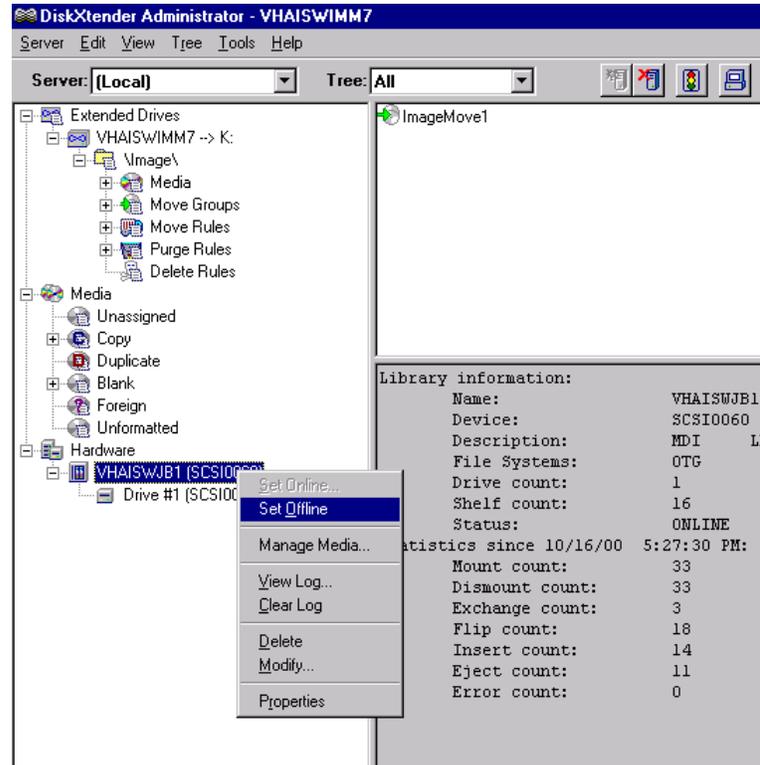
1. Double click on the ImageMove1 entry in the Move Groups tree.
2. Click on the Media tab.
3. Click on the Add button.
4. Select the media to add from the list of media that is in the \image\ extended drive but not currently in the move group.
5. Click on OK at the “Select Move Group Media” dialog.
6. Click on OK at the “Move Group Properties” dialog to apply the changes.

C.1.4 Jukebox/Media Inventory

To perform a jukebox inventory, you must set the jukebox offline. This makes the jukebox inaccessible for a period of time. Use caution when performing a jukebox inventory.

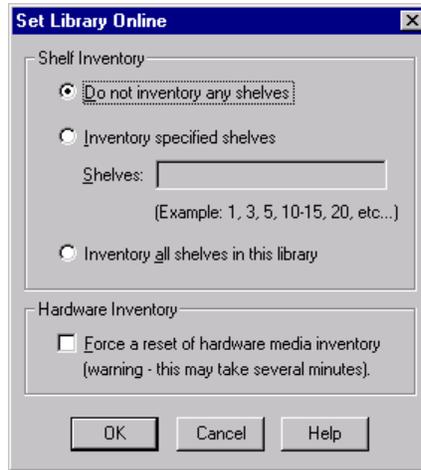
C.1.4.1 Steps for Performing a Jukebox/Media Inventory

1. Right click on the jukebox entry in the Hardware tree.
2. Click on "Set offline..."



3. Right click on the jukebox entry in the Hardware tree again.
4. Click on "Set online..."

The following dialog will appear:



5. Select "**do not inventory any shelves**" to skip the jukebox inventory.
6. Select "Inventory specified shelves" to select media to be inventoried.
7. Select "Inventory all shelves" to perform a complete inventory of the jukebox.

Note: This will take several hours to run, depending on the size of your library, density of your media and how many pieces of media are currently in the jukebox.

8. Select "Force a reset of the hardware inventory" if a hardware failure is suspected. This will also add to the inventory time.

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