

ADVANTAGE PLUS®

Endoscope Reprocessing System | Instructions



Networking

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50098-715 Rev B

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This document covers the networking of the MEDIVATORS® ADVANTAGE PLUS® Endoscope Reprocessor computer, including component variations and benefits of each variation. Additional information can be obtained from Medivators Technical Support.

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INTRODUCTION

The ADVANTAGE PLUS reprocessor includes a built-in proprietary PC running the WES7 operating system (Windows Embedded Standard 7), and includes Medivators reprocessing software paired with SQL Server Express 2012.

- ADVANTAGE PLUS reprocessor software is installed for the current default user. User changes will affect the operation of the software.
- In the default configuration, ADVANTAGE PLUS reprocessor Lio software and SQL databases run locally; i.e. Lio software and SQL both run on the same computer.
- Network connectivity is not required to operate the ADVANTAGE PLUS reprocessor.

Connecting the ADVANTAGE PLUS reprocessor PC to the local area network allows implementation of additional features, including:

- SQL database backup off-machine.
- Simplified reporting functions and maintenance of endoscope and user lists.
- Ability to print cycle reports to a network printer.
- Connectivity with other Medivators devices / systems.
- Remote access.
- Ability to switch database configuration from local to central server.

NETWORK CONNECTION FEATURES

SQL Database Backup

The SQL databases are by default located on the local hard drives in a RAID1 configuration. Data is simultaneously written to both drives. The primary function of the RAID is to ensure that the operating system will continue to run if one of the RAID drives fails. The RAID1 configuration cannot be viewed as a database backup because catastrophic failure of both hard drives may result in the loss of the database files. To properly backup the databases, they must be automatically saved off-machine to a network share on a regular basis. In the event of a catastrophic equipment failure and the databases cannot be recovered from the local hard drives, data can be restored from the off-machine backup with a minimum of data loss.

Reporting Functions

On a non-networked machine, the nurse manager must be at the ADVANTAGE PLUS® Endoscope Reprocessor to use the Management program to export data for reports or to update endoscope and user lists. With a network connection, these functions can be performed from an office setting using another PC on the same local area network as the ADVANTAGE PLUS Reprocessor. However, this method is limited to connection to one ADVANTAGE PLUS Reprocessor. Management cannot switch between multiple ADVANTAGE PLUS Reprocessors.

Cycle Reports to Network Printer

If automatic printing of reprocessing cycle reports is desired, non-networked machines can make use of a local USB printer, one printer for each ADVANTAGE PLUS Reprocessor. Networking allows multiple ADVANTAGE PLUS Reprocessors to print to the same network printer, simplifying the hardware configuration.

Connectivity to Other Medivators Products and Devices

Network connectivity allows the exchange of data with ENDODRY® Storage Cabinets and the ENDORA® Endoscope Tracking System.

Remote Access

In situations where the operator has questions about the operation of the software, or if there are software-related problems on a machine, the issue can often be handled without the need for an on-site visit from a Medivators field service engineer (FSE) through the use of a remote access session. This is possible only if the PC is connected to the local area network and provided with Internet connection. For most domestic U.S. customers, Medivators uses GoToMyPC exclusively. A proprietary VPN configuration is available for remote access to Veterans Administration facilities. There is never a charge for this service.

No other methods of remote access are supported by Medivators.

Central Server

Switching the ADVANTAGE PLUS Reprocessors from local SQL operation to central server SQL operation allows multiple ADVANTAGE PLUS Reprocessors on the same local area network to operate using the same set of databases. This provides a level of database security not available to units running SQL locally, as the databases are directly under the control of the facility IT department. Use of central server simplifies database backup as well as nurse manager reporting and configuration activity.

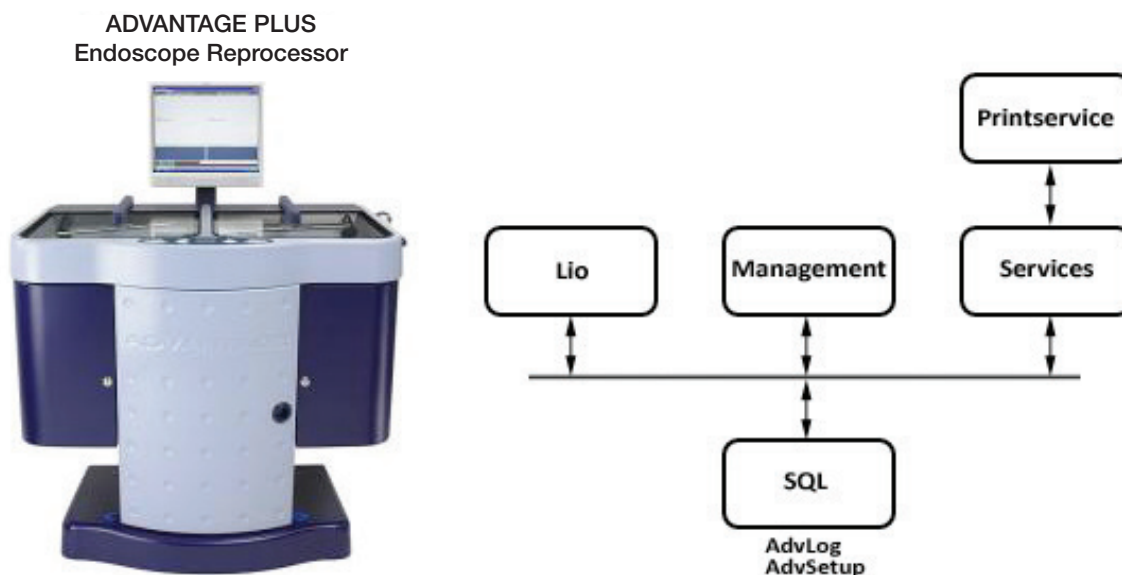
The facility provides hardware and software for central server operation, and is responsible for installation, operation, and maintenance of the server PC, SQL Server software, local area network, and databases in a central server configuration. The central server option can be implemented at the time of new ADVANTAGE PLUS Reprocessor installation or after ADVANTAGE PLUS Reprocessors have been in operation for a period of time. Legacy ADVANTAGE PLUS Reprocessor Windows XP units are not supported for central server operation. (WES7 upgrade is available.)

NETWORK OPTIONS

The Stand-Alone option is not actually a network option, but must be described here to understand some of the components mentioned in later sections. There are 6 network options, ranging from the most basic for database backup to the most complex which includes remote access and use of a central database server.

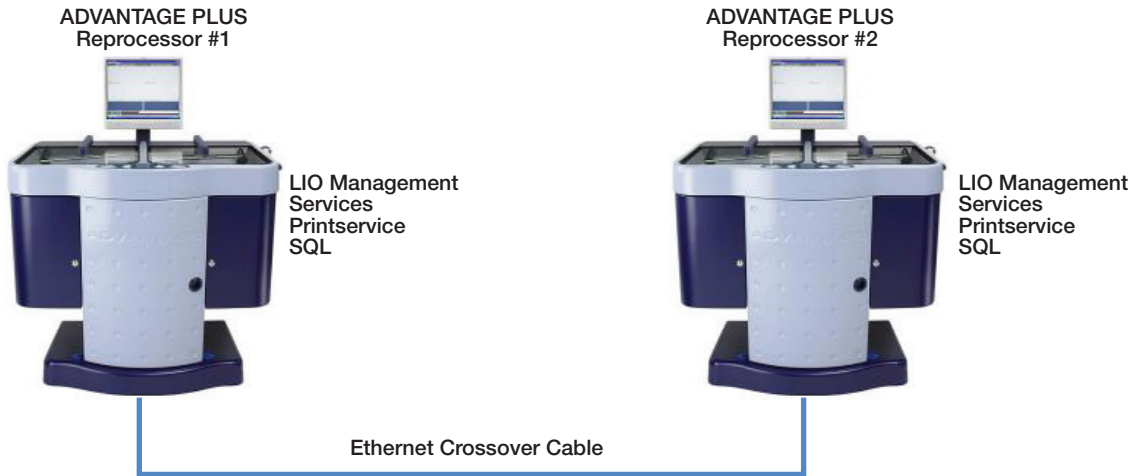
A. Stand-Alone

In a stand-alone configuration, the ADVANTAGE PLUS® Endoscope Reprocessor does not share data with any other device. A simple block diagram of the Lio software and its relationship to SQL is shown below.



- Lio is the reprocessing program and must always run locally.
- Management is used for reporting purposes, endoscope and user list administration, and machine configuration. In the stand-alone configuration, Management runs locally.
- Services moves data between SQL and Printservice for the automatic cycle report printing option. Services and Printservice must always run locally.
- SQL is the database application. SQL runs locally, with three ADV databases:
 - AdvLog:** Cycle and Event report database.
 - AdvSetup:** Endoscope, User, Physician, Parameter Set and System database.
 - AdvArchive:** Empty database, not shown in the above illustration.
- For reporting purposes and SQL database backup, a flash drive must be connected to the ADVANTAGE PLUS Reprocessor PC and the data manually saved to the flash drive. The flash drive is then disconnected from the PC and the data on the flash used as required by the nurse manager.
- If the Windows operating system requires reloading, the databases will be recovered from the hard drives, and restored following the reload. Database restoration from the hard drives results in no data loss, and is successful in the vast majority of cases. If restoration from the hard drives is not possible, restoration from an off-machine backup is required (network versions 1-5). In the case of central server configuration, databases are not local, so database restoration is not necessary (network version 6).
- Remote access is not possible in a stand-alone configuration.

B. Network Version 1

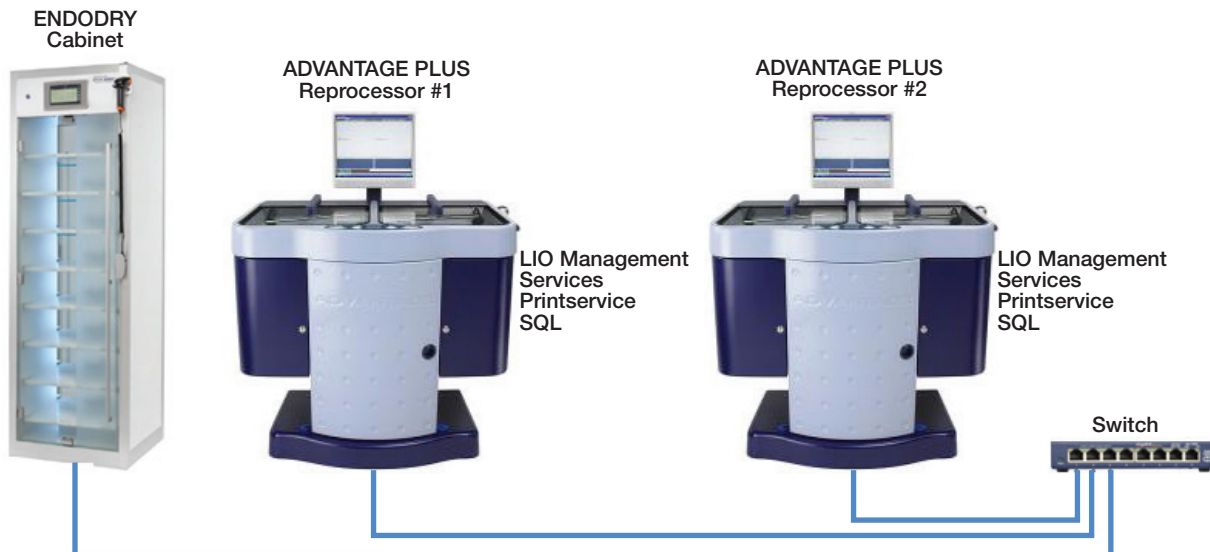


Connecting an Ethernet crossover cable between two ADVANTAGE PLUS® Endoscope Reprocessor PC's is the most basic form of network.

- Adv databases may be automatically backed up from one Adv to another.
- No other resources are shared.
- Adv computers are not connected to the facility network.

Theoretically, one ADVANTAGE PLUS Reprocessor could function as a central server, housing the databases for both machines. However, this configuration is not advised because the ADVANTAGE PLUS Reprocessor PC is designed to control a single machine, and the addition of SQL-related duties from other machines pushes the PC beyond the limits for which it was tested. Also, if the primary ADVANTAGE PLUS Reprocessor PC is not functional for some reason, the secondary machine would also be down since the databases would not be available.

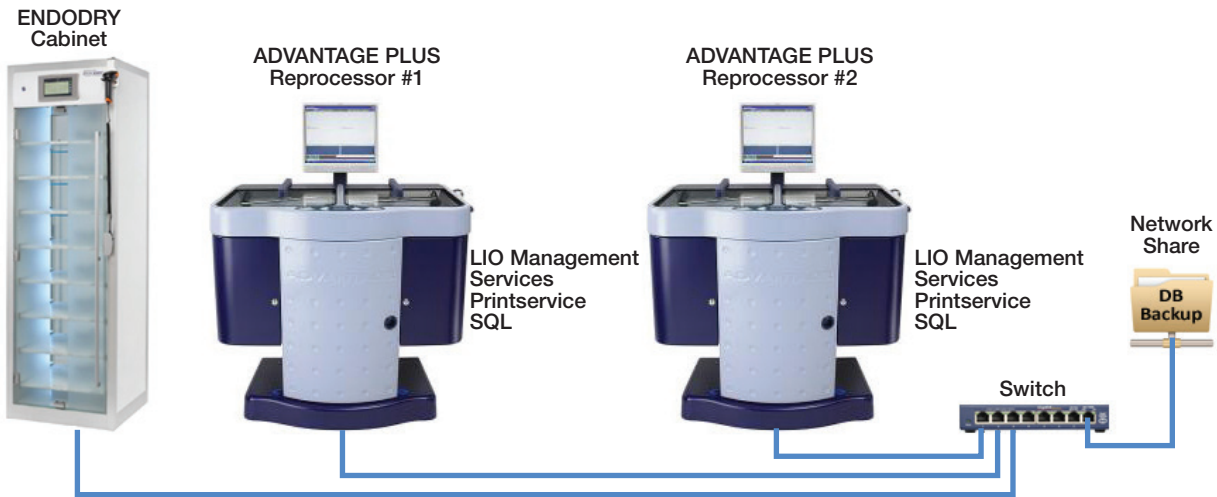
C. Network Version 2



Connecting ADVANTAGE PLUS Reprocessors via a switch allows connection between multiple machines.

- Adv databases may be automatically backed up from one Adv to another.
- ENDODRY® Cabinet communicates with the SQL database on one Adv.
- Adv may run endoSTOREManager, CERHost, and FTP connect applications for remote ENDODRY Cabinet administration.
- Adv computers are not connected to the facility network.

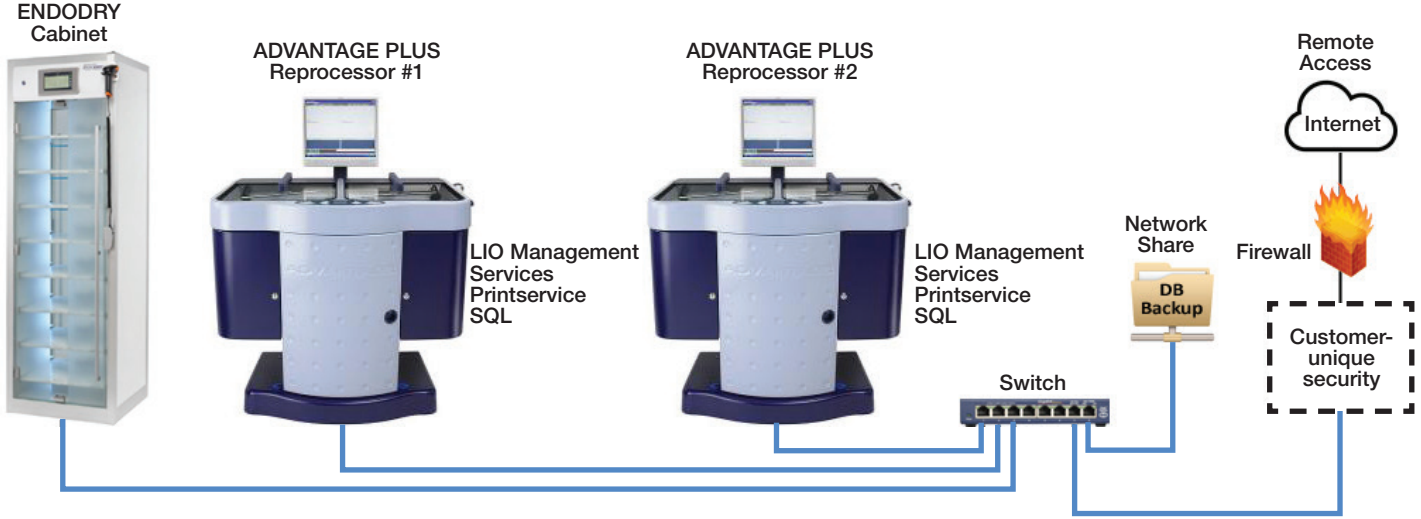
D. Network Version 3



In this configuration, the Mediators devices are incorporated into the facility network, primarily to back up the databases to a network share.

- Adv databases may be automatically backed up to a network share, a destination on the local area network made available by the facility IT department. SQL Backup and FTP is included on the ADVANTAGE PLUS® Endoscope Reprocessor PC for this purpose. Authentication is required for access to the share.
- ADVANTAGE PLUS Reprocessor PC IP addresses are DHCP by default, but may be fixed, reserved, or DHCP, under control of the facility DHCP server.
- Medivators does not equip the ADVANTAGE PLUS Reprocessor PC with a wireless network adapter, and use of a wireless NIC is not supported. Wireless network connections can be problematic and typically reduce the reliability of the machine.
- Additional information related to joining the ADVANTAGE PLUS Reprocessor to the local area network is found later in this document in the *Additional Information Section, page 10*.

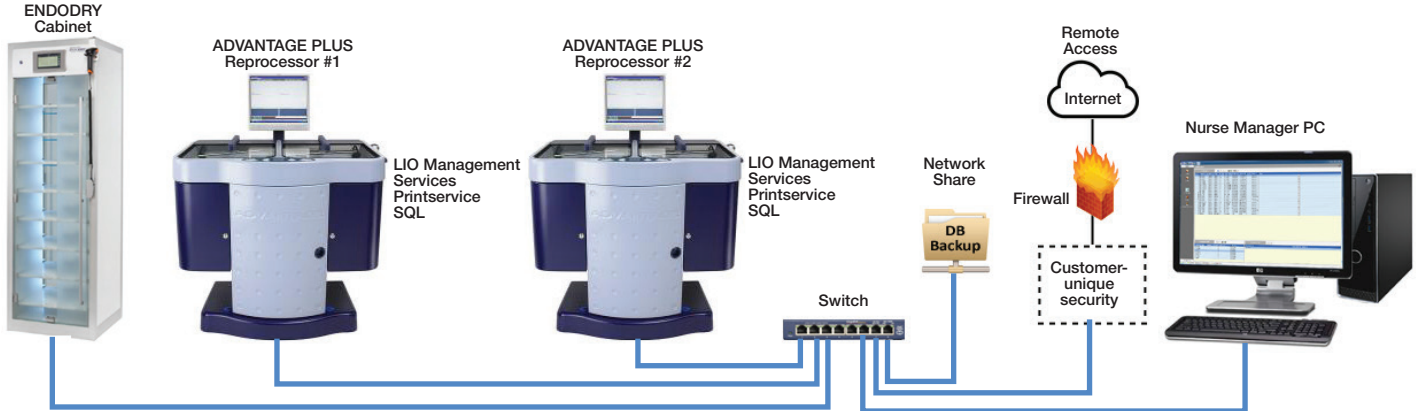
E. Network Version 4



This configuration adds one item to the version 3 configuration: Internet connection for remote access. Remote access allows a Medivators Technical Support Representative to connect to the PC to assist the operator with Lio-related questions, to troubleshoot problems, or to install updates.

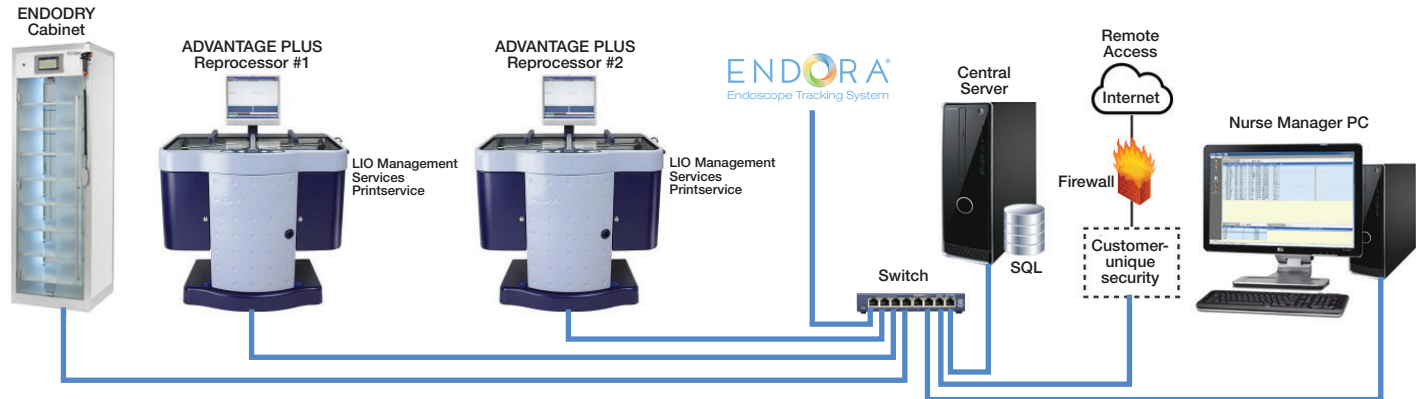
Every facility approaches Internet-related security in its own way; the dotted outline in the diagram represents security implemented by the facility IT department between the firewall and the devices on the network. Additional information is found later in this document in the *Additional Information Section, page 10*.

F. Network Version 5



The Nurse Manager PC is added to the diagram; the ENDODRY® Cabinet and ADVANTAGE PLUS® Endoscope Reprocessors may be administered from the Nurse Manager PC, physically located anywhere that has connection to the network. AdvManagement, endoSTOREManager, and CERHost software is required on the Nurse Manager PC. Registry edit rights are required. Software is available from Medivators upon request.

G. Network Version 6



Unlike the previous network versions, this version implements a major configuration change as well as the addition of hardware.

A central server PC has been added to the illustration, replacing the network share which was used for database backup. In this configuration, the local ADVANTAGE PLUS Reprocessor databases have been merged and moved to the central server (CS). The Adv databases are no longer local. Benefits of CS include:

- Databases are under direct control of the facility IT department, and are subject to the same control and security as all facility-maintained data.
- The facility IT department may use an existing enterprise solution for database backup.
- In case of an Adv Windows crash or hardware failure, the databases are not at risk since the files are not local.
- The nurse manager performs Adv reporting and administration functions from an office workstation; changes to the master endoscope and user lists are immediately available at all ADVANTAGE PLUS Reprocessors.
- The ENDORA® Endoscope Tracking System monitors endoscope-related activity via SQL connection to the central server. More information on the ENDORA system is available upon request.

ADDITIONAL CENTRAL SERVER INFO

With proper planning, ADVANTAGE PLUS® Reprocessors can be configured for central server operation at initial installation. Existing ADVANTAGE PLUS Reprocessors that have months or years of data in local databases may be converted to central server with the assistance of Medivators Technical Support. Additional documentation covering central server configuration is available from Medivators.

- From the ADVANTAGE PLUS reprocessor point of view, there is no definitive limit to the number of ADVANTAGE PLUS Reprocessors that can be connected to the same SQL databases. That limitation lies with the resources available to SQL.
- SQL Server 2012 (or more current) on the central server PC is required to ensure compatibility with the ADVANTAGE PLUS Reprocessor databases.
- The customer is responsible for installation, operation, and maintenance of the server PC, SQL Server software, databases, and the local area network.
- SQL central server or network-related problems will result in the ADVANTAGE PLUS Reprocessors being non-functional until the problems are resolved.
- ADVANTAGE PLUS Reprocessor warranty and contract coverage does not extend to the central server.
- ADVANTAGE PLUS Reprocessors running Windows XP are not supported for central server configuration. (WES7 upgrade is available.)

CENTRAL SERVER MINIMUM SPECIFICATIONS

The Central Server PC and SQL instance are provided and maintained by the customer.

- SQL Server 2012 or newer.
- SQL may be 32- or 64-bit.
- SQL may run on a physical or virtual server.
- SQL may have a named or unnamed instance.
- Dual core, 4GB RAM, 50GB database storage
(estimated ADVANTAGE PLUS Reprocessor db growth = 1GB / ADVANTAGE PLUS Reprocessor / year).
- A fixed or reserved IP address is required for persistent operation.
- Use of wireless network adapters is not supported.

ADDITIONAL INFORMATION

A. ADVANTAGE PLUS® Endoscope Reprocessor PC Hardware/Software

The system consists of an onboard PC running Windows 7 and Medivators software.

- **Computer** Proprietary PC with mini ITX motherboard and Intel processor. PC is physically connected to the frame of the ADVANTAGE PLUS reprocessor. Current production PC: 4GB RAM; (1) RJ45 Ethernet port; (4) external USB ports; no optical drive; DVI LCD display w/ audio.
- **Printer** Epson TM-U220 USB printer is an optional accessory. The Epson printer driver software is pre-installed. Use of a customer-supplied network printer is allowed but is not directly supported by Medivators.
- **Barcode Scanner** Symbol LS2208 1D scanner is an optional accessory. The scanner supports Code 39 symbology.
- **Antivirus software** Microsoft Security Essentials is installed by default. The customer may uninstall MSE and install antivirus software of their choice. Updates should be rolled out on a schedule that does not conflict with the running of reprocessing cycles. CPU usage should be monitored if third-party antivirus software is installed.
- **Operating system** Windows Embedded Standard 7.
- **Proprietary software** ADVANTAGE PLUS Reprocessor Lio, including Management software for configuration and reporting. Lio is installed for the current administrative user. Software upgrades are not automatically performed by Medivators.
- **Database software** Microsoft SQL Server 2012 Express.
- **Data encryption** Not supported.
- **PHI** The ADVANTAGE PLUS Reprocessor optionally saves the Patient ID in the database along with the associated reprocessing cycle information.. Viewed independently, the data contains no sensitive information, but some customers view any type of patient-related data as protected health information.
- **LAN adapter** On-board NIC with dynamic addressing. Fixed or reserved addressing may be used. Wireless networking is not supported.
- **Ports used**

LAN Connection	TCP	Port 49159	Inbound/outbound
LAN Connection	UDP	Port 1434	Inbound/outbound
- **Remote access** GoToMyPC is available for most domestic U.S. customers. Proprietary VPN is available for Veterans Administration customers. No other methods are supported.
- **Windows updates** Automatic Windows updates are turned off by default. If enabled on the local machine, automatic updates can cause a significant decrease in PC performance, and may trigger a Windows restart while the Medivators application is in use. The facility IT department is ultimately responsible for updates, and may roll out patches via WSUS (or similar) as long as the process does not initiate a restart during a reprocessing cycle or during scheduled maintenance events.
- **Database backup** SQL Backup and FTP is installed on the PC for automatic scheduled backup of local SQL databases. Local area connection of some type must be provided by the facility.

B. Placing the ADVANTAGE PLUS® Endoscope Reprocessor on Your Network

- The ADVANTAGE PLUS Reprocessor PC uses DHCP by default. You may configure for reserved or fixed IP address.
- If possible, use the default Windows local account (the ADV user for current machines). This is an Admin user, and the Lio software is installed for the current user only. Running Lio under a new user requires the Lio configuration to be migrated to the new user. Use of a VLAN may be necessary in order to use the local account and also have limited access to the network. If you must run Lio under a new user, contact Medivators Technical Support for information.
- Use of Active Directory generally means placing the PC on a domain, with all the restrictions for a domain user. The ADVANTAGE PLUS Reprocessor PC is not domain-ready; the computer should not be managed as though it were a workstation with multiple users, each with their own Windows logon. Security-related restrictions typically employed for multiple user workstations may negatively impact the operation of the computer.
- You may uninstall Microsoft Security Essentials (MSE) and install the antivirus software of your choice. Schedule for virus definition updates during off-hours, with no restart. Some antivirus programs can cause heavy CPU usage. Monitor the CPU usage to verify normal operation: 10% or less CPU usage when the machine is idle.
- Turn off Windows automatic updates, or choose to install during off-hours. Allowing Microsoft control of automatic updates can cause the system to become unresponsive to commands and may become basically unusable.
- Create an exception for the C:\Medivators folder. The folder contains utilities related to the operation of the Medivators Lio software. Some antivirus programs may flag files in the folder for quarantine or deletion. All files present on the device have passed Medivators qualification protocol.


For additional help and information:

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