RESOURCE AND PATIENT MANAGEMENT SYSTEM

Electronic Dental Record

(EDR)

Server, Operatory Hardware Recommendations & Configuration Guidelines

Version 6.5
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1.0   Background

Implementation of the IHS Electronic Dental Record (EDR) will require major changes to your dental clinic. Pilot testing of the EDR revealed that the only efficient method of employing this new software is to have point-of-service data entry capability. In other words, data entry must be accomplished in the operatory at the time of service, especially in the case of initial oral examinations. The large amount of additional data that the EDR can accept precludes the use of a printed data entry form that is given to a data entry clerk for entry into the EDR at a later date.

Point-of-service data entry requires that each operatory have a personal computer complete with a central processing unit (CPU), monitor(s), keyboard and mouse. Planning new operatory construction and retrofitting existing operatories to accept this new technology can be challenging. This document attempts to provide some recommendations on the specifications for both the EDR server and operatory computer hardware and software, along with guidelines on how the operatory hardware can be configured for optimum ergonomics, efficiency, and effectiveness.

These guidelines and recommendations were compiled using the expertise of information technology personnel, the observation of existing public and private sector dental operatories with this technology, and consultation with private sector dental design architects and equipment manufacturers.

1.1   Server Hardware Recommendations

1.1.1   Stand-Alone Server

The IHS has finalized the server specifications and required software that it will use for the EDR during implementation. All servers will use the Microsoft Windows 2003 Enterprise server for the operating system and Microsoft SQL 2005 for operating the EDR Enterprise software. For the those sites that connect to their RPMS server via a Wide Area Connection (WAN) a Microsoft Terminal Services server collocated with the EDR and RPMS server will be utilized to improve the performance of the EDR software. A maximum of 25 workstation connections will be allowed per Terminal Service server.

A site assessment will be performed for all facilities. The site assessment will provide the required information to properly size the servers for the proper implementation of the EDR.

The simplified categorization of the servers is listed below:

- Combined EDR and Image Server 1-25 workstation connections

- Combined EDR and Image Server 26-50 workstation connections

- EDR Server 51-75 workstation connections

- EDR Server 76 – 100 workstation connections

- Image Server

- Terminal Services Server (30 workstation connections maximum)

The EDR servers for 1-25 and 26-50 workstation connections will be able to operate the EDR database as well as the dental imaging database, both of which will utilize MS SQL 2005. For EDR servers with greater than fifty (50) workstation connections, a separate dental image server will be required to operate the dental image database, and it will be collocated with the EDR and RPMS servers.

IHS has arranged special pricing for the hardware and software through Dell Computers and IHS will assist the facilities selecting the hardware as well as configuring the hardware for operation of the EDR software and communication with the RPMS server through the use of EDR specific HL-7 interfaces.

Detailed Server specifications are listed in Appendix A.

1.1.2   Server Connected to a Storage Area Network

Many facilities have or are moving towards a Storage Area Network (SAN) design for their data storage/server requirements. A Storage Area Network (SAN) is architecture to attach remote computer storage devices (such as disk arrays) to servers in such a way that, to the operating system, the devices appear as locally attached. SANs often utilize a Fibre Optic Channel topology - an infrastructure specially designed to handle storage communications in a faster and more reliable manner than the traditional stand alone server. SANs also tend to enable more effective disaster recovery processes. A SAN could span a distant location containing a secondary storage array. This enables storage replication either implemented by disk array controllers, by server software, or by specialized SAN devices.

If your facility utilizes a SAN then the server specifications and implementation requirements may be different than that information provided in Appendix A.

1.2   Wired vs. Wireless

It is **NOT** recommended that the EDR be implemented on a wireless network. Knowledge gained during the EDR pilot testing demonstrated that wireless technology, at this time, cannot deliver the same speed of data transfer as a wired network that is required by many of the EDR commercial products. Therefore, if the EDR is implemented on a wireless network, software response time for data entry and display is slowed and becomes an impediment to productivity and efficiency in the operatory.

1.3   LAN vs. WAN Networks

The EDR server should be co-located with the RPMS server used by your facility. In instances where this results in the EDR user accessing the EDR server over a Wide Area Network (WAN), the EDR pilot testing indicated that a Terminal Services server should be used to increase response time over slower networks.

By utilizing a Terminal Services server in slower WAN environments response time and performance is improved by creating a telnet-like terminal session between the user and the EDR software. Only Graphical User Interface information travels over the WAN.

2.0   Dental Operatory Configuration

Before purchasing any hardware for the dental operatories it is imperative that an assessment be conducted to determine where and how the various pieces of the computer hardware (monitor(s) keyboard, mouse, CPU) will be placed in each operatory and connected to the EDR server. This assessment will allow the most efficient utilization of funds and result in the most ideal placement of computer hardware for each operatory.

There can be a significant difference in computer hardware placement between a not yet constructed dental operatory, and an existing one. This is especially true if the existing operatory has a concrete slab floor without a crawl space between the foundation and the floor.

2.1   Planning for New Construction

2.1.1   Computer Cabling

Ideally, all cabling for the computer hardware should be placed under or in the floor, (if on a concrete slab) in conduits approximately 2" in diameter. Most dental manufacturers recommend that conduits be run from the floor mounted cover at the foot of the dental chair that houses the dental chair's utility components, and from both the cabinets located at the 3 or 9 o'clock positions to the 12 o'clock cabinetry. Since the CPU frequently is located in the 12 o'clock cabinet, a conduit must be present that will allow the CPU to be connected to the local area network (LAN) and the EDR server. This is easy to configure and specify when planning the construction of a new dental clinic. See the following diagram from the A-dec Preference Collection Technical Packet Instructions and templates for installing the Preference Collection # 86.0142.00. The low voltage conduit is used for routing data cables and touchpad wires, not for line voltage.

= Line voltage conduit
= Low voltage conduit (2" diameter)
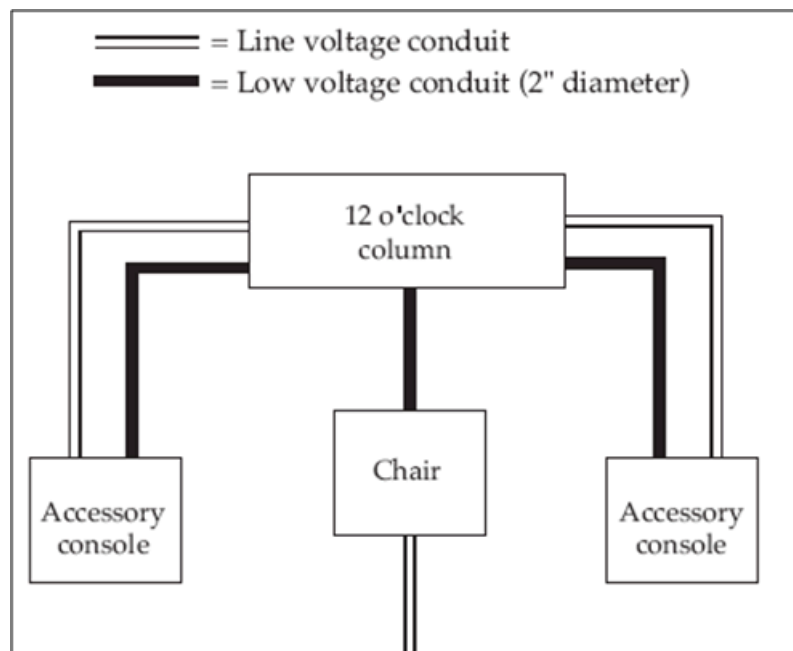
> **Note**: With the advent of newer cabling systems the diameter of the low voltage conduit can be significantly reduced in diameter size. The Rapid Run cabling system (www.rapidrun.com) uses a slender cable with break away flying leads that can be reattached to the cable after the cable is pulled to its destination. This can reduce the size of the conduit to ¾ of an inch. Larger conduits maybe required if other cabling is run in the same conduit simultaneously.

2.2 Computer Hardware Placement

Placement of the computer hardware is relatively easy when planning for new construction. Depending on the delivery system and cabinetry specified, the computer hardware can be placed just about anywhere it is convenient. However, there are some guidelines you may want to consider.

2.2.1 CPU

The best placement for the CPU is behind the head of the patient chair in a 12 o'clock type cabinet. This will minimize the length of the cables that will need to connect the CPU to the monitor(s).

2.2.2   Keyboard/Mouse

A wired keyboard is required but a wireless mouse is recommended. Cables will be hard to hide and using a wireless mouse will lead to a cleaner appearance in the operatory. The keyboard should be on a tray mounted to the 12 o'clock cabinetry just below the level of the monitor, and should swivel for easy use by either the dentist or the assistant. The keyboard can be fitted with a plastic form fitting pliable cover that can be cleaned to maintain infection control. Some clinics have found that using the normal plastic wrap used for infection control can be used successfully in wrapping the keyboards. The mouse and its charging stand can be placed on a nearby counter and covered when not in use.

2.2.3   Monitors

Two flat panel monitors per operatory are ideal.

The **first monitor** should be placed behind the head of the patient chair on a cabinet shelf and should swivel or rotate for easy viewing by either the dentist or the assistant. For example,

This monitor is primarily used by the dentist or assistant when entering data into the patient chart, making appointments or viewing digital radiographs. If A-dec cabinetry (5580) is used with the optional keyboard and monitor stand, a 15" LCD Flat panel VGA monitor is the largest monitor that can be housed in the A-dec 5580 12 o'clock module.

The **second monitor** should be placed on a swing arm that is attached to the patient chair. This monitor is primarily used for patient education, but can also be used to view digital radiographs. Do not forget to purchase a monitor at this location that has built in or add on speakers for displaying patient education videos.

> **Note:** A-dec now offers multiple LCD monitor mount designs that can meet your special requirements. Refer to http://www.a-dec.com/docs/Brochures/85600200.pdffor more information.

Consider a 17" or 19" LCD monitor with a native resolution of at least 1280 X 1024, 250 candela/sq meter (cd/M^2) of brightness, a 400:1 contrast ratio or better, and at least a 0.27 dot pitch or less. Removable screen covers can be purchased to protect the screen surfaces of the LCD monitors. These covers can be disinfected between patients without adversely affecting the LCD screen.

If funds are an issue and two, high quality monitors are not affordable, then the higher quality monitor should be mounted to the patient chair and the lower quality monitor placed behind the patient chair.
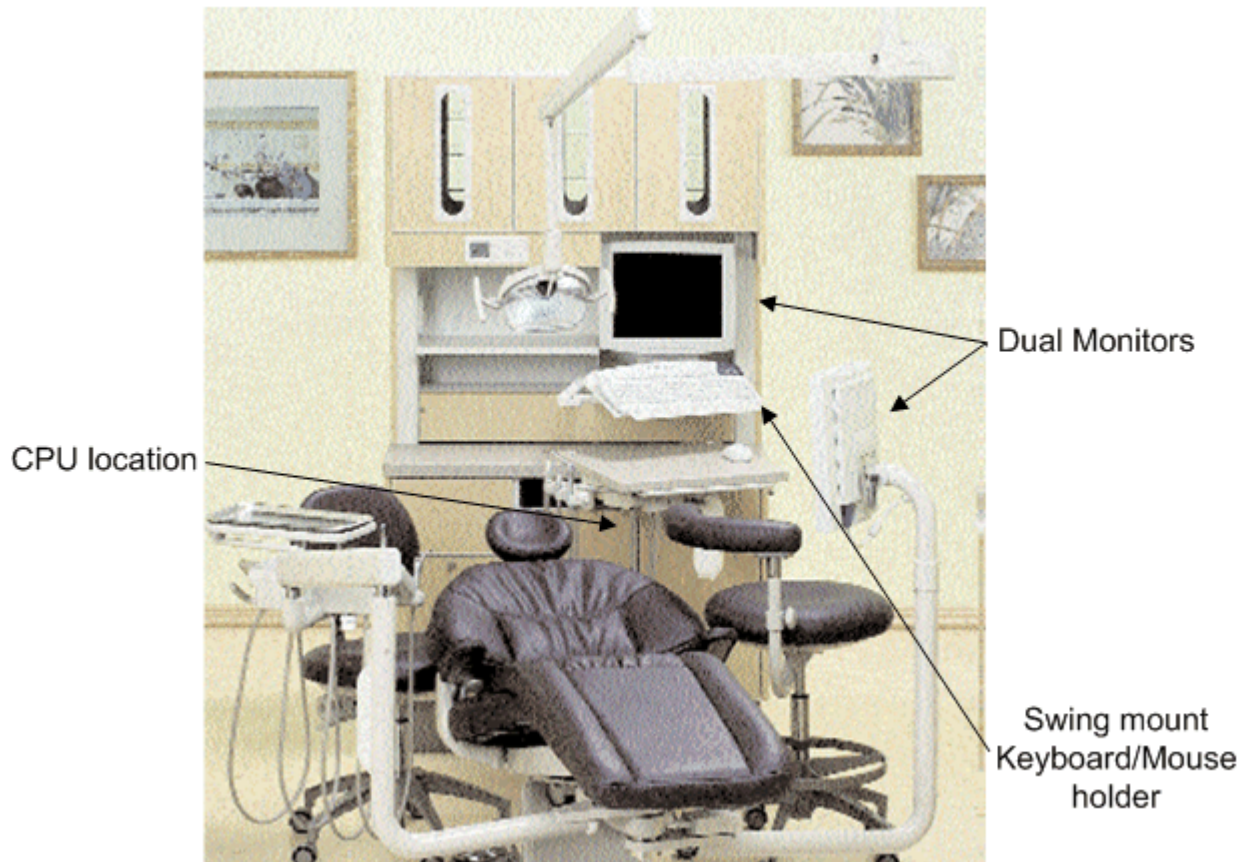

Figure 1:   Recommended placement of CPU, dual monitors, and keyboard/mouse in operatory.

2.3   Single Monitor/Keyboard/Mouse Installations

For those of you wanting to reduce costs further using a single monitor, keyboard, and mouse per operatory and have a swing arm configuration on your dental chair like the radius mount found on A-dec dental chairs, then it is recommend that you purchase the Ultra keyboard monitor and mouse adaptor from ICW dental (http://www.icwdental.com/lcd-arm/210/UL210-P2-KUB-QG.html) that can easily slip over the existing radius mount tube that is connected to the dental chair. For example,

The cost of this adaptor is $376. There are Keyboard, Video and Mouse (KVM) extenders that can make wiring easier and less complex. Check with your IT department for the proper configuration.

2.4   Retrofitting an Existing Operatory

Retrofitting an existing operatory for computer hardware can be very challenging and will require some compromises. If your clinic has a crawl space under the floor, then it is usually a simple matter of running the conduits and cabling under the floor. In this case you can configure the operatory hardware as described in Section 2.1, "Planning for New Construction."

If your clinic is on a concrete slab and you do not want to cut troughs into the concrete for the conduits, you will probably need to consider running your cables either across a false ceiling, through the walls or both. Here are some options you might consider.

- Placement of the **CPU** can be problematic, especially if you have the older type of cabinet at the head of the patient chair with a rear-delivery microcart. In this case you should look for a place for the CPU that will minimize the length of cable needed to reach the monitor(s). This might be next to the wall on which you plan to mount the monitor(s). You should consider housing the CPU in a small cabinet to protect it from aerosol in the operatory.

- The **keyboard** might be placed on a fixed tray mounted underneath the monitor, or on an extendable, swivel tray or countertop. In either case it should be easily accessible by the dentist or the assistant, when they are facing the monitor for data entry. For example,

To view the cabinet pictured and other storage solutions, go to this web site: http://www.cygnusinc.net.

When retrofitting, it may not be feasible or even possible to have two monitors in each operatory. However, here are a couple of options:

2.4.1   Two monitors per operatory

If you have one of the newer patient chairs, it might be designed to accept retrofitting with a swing arm on which to mount one monitor.

If you have the older type of patient chair that cannot be retrofitted with a swing arm, a monitor can be suspended from the ceiling for viewing by the patient (http://www.icwdental.com/lcd-arm/elite/ELR5120-CE5-QG.html). For example,

The ideal viewing distance is 15-18 inches in front of the patient. If you are running the cable up the wall and across a false ceiling, be aware of the 25-foot limit.

The other monitor could then be placed in a 12 o'clock cabinet or mounted on an extendable, swivel arm on the side wall. If mounting a monitor on a side wall, make sure this monitor can be placed in a position where the dentist or assistant can look directly at it without twisting, when entering data using the keyboard.

2.4.2   One monitor per operatory

If you can only have one monitor per operatory you can place it in the position that is most convenient for the patient, dentist and assistant. The main consideration under this circumstance is to make sure that the monitor can be moved into a position where the patient cannot view it. This will enable you to protect information not related to that patient (e.g., another patient's chart or radiographs, the appointment scheduler, etc.) that might be displayed on the screen. Also assure that the monitor can be positioned so either the dentist or assistant can enter data without having to turn or twist to see the monitor.

3.0   Operatory Hardware Recommendations

As previously mentioned, point-of-service data entry will require personal computers in each operatory. In some older operatories space may be an issue. However, the temptation to use laptop computers or tablet PCs should be resisted. The most important reason for avoiding laptops and tablets is that they do not possess the ideal screen resolution for viewing digital radiographs. In addition, laptops and tablets are hard to secure so that they are not "lost".

3.1   CPU

OptiPlex 755 Ultra Small Form Factor, Core 2 Duo E6550/2.33GHz,4M,VT,1333FSB (configured estimated price $ 1,110)

- Intel Core 2 Duo E6550/2.33GHz,4M,VT,1333FSB

- Microsoft Windows XP Pro, SP2, NTFS File System

- Hyper-threading feature ON

- 2GB,Non-ECC,800MHz DDR2,2X1GB

- Integrated Video, GMA3100 with a DVI-to-VGA "Y" Cable

- 80GB SATA 3.0Gb/s and 8MB DataBurst Cache

- Intel 10/100/1000 Network Card

- Internal Dell Business Audio Speaker

- 24X CDRW/DVD Combo, D-Mod, with Cyberlink PowerDVD

- 5 Yr Ltd Warranty + 5 Yr Same Day 4 Hr On-Site Service (M-F 8am - 6pm)

3.2   Keyboard and Mouse

The IHS Standard Operating Procedure (SOP) 06-36, *Wireless Network Security Standards*, states that "The use of wireless keyboards is not allowed on IHS networks or equipment." Therefore, we can no longer recommend the Gyration compact wireless keyboard for use. Instead, we recommend that you purchase a wired compact keyboard of your choice (e.g., Solidtek Mini Keyboard KB595P Est. cost $33.00; http://www.solidtekusa.com/mini.htm#KB595P).

You can still use the GO 2.4GHz Wireless Optical Air Mouse (retail price of $69.95; http://www.gyration.com/p-14-go-24ghz-optical-air-mouse.aspx).

3.3   Monitors

Consider a 15" or 17" or 19" LCD flat panel monitor with a native resolution of at least 1280 X 1024, 250 candela/sq meter (cd/M^2) of brightness, a minimum of a 400:1 contrast ratio or better, and at least a 0.27 dot pitch or less. Do not forget to purchase a monitor with speakers, if the monitor will be used to display patient education video clips. Removable screen covers can be purchased to protect the screen surfaces of the LCD monitors. The covers can be disinfected between patients without adversely affecting the LCD screen.

Remember: if A-dec cabinetry (5580) is used with the optional keyboard and monitor stand, a 15" LCD Flat panel VGA monitor is the largest monitor that can be housed in the A-dec 5580 12 o'clock module. Estimated costs:

- 15" LCD monitor without speakers is $195

- 17" LCD monitor without speakers is $289 (DELL UltraSharp 1708FP 17-in Flat Panel LCD Monitor with Height Adjustable Stand); with speakers $314 (Dell AS501 Sound Bar for Dell UltraSharp Monitors)

- 19" LCD monitor without speakers is $348 (DELL UltraSharp 1908FP 19-in Flat Panel LCD Monitor with Height Adjustable Stand, 5 yr warranty); with speakers $373 (Dell AS501 Sound Bar for Dell UltraSharp Monitors)

Older operatories with a cement slab floor that are being retrofitted may require that the monitor be mounted on a side wall. In those cases wall mounts with swivel arms will be needed; for example,


Wall mounts for 19" flat panel monitors usually cost approximately $455 each (http://www.icwdental.com/lcd-arm/210/index.html).

3.3.1 Dual Monitor Configuration

If you plan on using two monitors (one at the foot of the chair for the patient and one a the head of the chair for the dental personnel) and have purchased the recommended Dell computers that have Intel Integrated Video, GMA3100 video adaptor and are running Windows XP professional, the dual monitors can be operated from a single video card.

In order for this to work,

1. The facility must purchase a DVI-to-VGA video adaptor, which is essentially a video cable where one end is attached to the DVI output of the computer and then the cable splits (Y's) to a VGA and a DVI connector. Each monitor is connected to one of the connectors.

2. When the cables are connected, make sure that both monitors are recognized by the computer and operating system.

3. Go to Start-Control Panel. Locate the Intel GMA Driver and double click the icon. A dialog box similar to the following is displayed; for example,
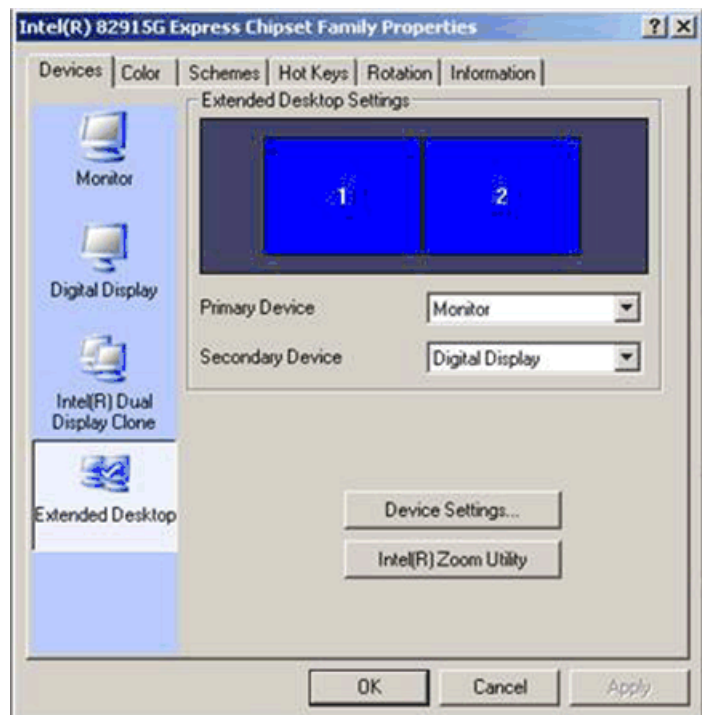
4. Select the Extended Desktop option, making sure that primary and secondary devices (monitors) are different. Then click OK.

With the Extended Desktop enabled,

- The user can drag Minimized widows *ONLY* to the right off the screen of the primary monitor, to the secondary monitor. The mouse icon will also move to the secondary monitor and allow the user to manage the window in whatever way they so desire on the second screen.

- The user then can move the mouse between monitors by moving the mouse to either the left on the secondary device or to the right on the primary device.

To move the window back from the secondary device to the primary device, the user must first minimize the window and then drag the window to the left off the screen, until it appears once again on the primary device.

3.4   Printer

The EDR will, from time to time, require the dental program to print documents contained in the EDR that include but are not limited to treatment plans, progress notes, and periodontal/tooth charting. Additionally, the printer should be capable of serving double-duty by being able to print rapidly digital radiographs and other digital images in great detail. The printer must

- be network capable
- print in color
- be capable of printing on both sides of single sheet of paper
- have excellent resolution
- print images rapidly
- require minimal maintenance

The printer that is recommended and will meet these requirements is the Xerox Phaser 8560 Color Printer, 30 ppm, 2400 Finepoint Image Quality, 256 MB Memory, Ethernet, USB, 1X525 Letter/Legal Input Tray, Two-Sided Printing (http://www.office.xerox.com/printers/color-printers/phaser-8560/spec-enus.html).

This printer uses ink sticks that can be purchased separately and requires a replacement of only one roller. The maintenance required is an occasional cleaning of a tray that traps excess wax from the roller assembly. The list price for this printer is $899.00 and the GSA price should be less.

The printer should be placed so that it is centrally located to the dental operatories and dental staff working in the clinic. The printer will require a network connection and electrical power. For those clinics that have multiple pods of dental chairs located in the clinic and if space is available, it might be appropriate to install dedicated printers for each pod of dental chairs.

3.5   Uninterruptible Power Supply

The computers located in the dental operatories are critical devices that need to remain operational during normal business hours and not suffer from power failures of intermittent or limited duration. Therefore, we are recommending the use of an Uninterruptible Power Supply (UPS) for each PC located in the dental operatory.

The APC Back-UPS ES 550 - UPS - 330 Watt - 550 VA 50/60 Hz AC 120 V 24 hour(s) (approx. $70.00) is sufficient to provide enough runtime for intermittent power outages lasting no more than 10 minutes.

For extended power outages the runtime of this UPS should be sufficient for the user to save any information and power down the computer gracefully.

4.0   Estimated Cost Per Operatory

As with the EDR server, there will be additional costs for installation and configuration of the personal computers, installation of the monitor mounts, and cabling, unless your local IT staff can accomplish those tasks.

Table 1. Estimated Hardware Costs per Dental Operatory

Item	Estimated Cost per Operatory
Central Processing Unit (CPU) including keyboard and mouse	$1,110.00
15" Flat Panel Monitor w/o speakers	$195.00
17" Flat Panel Monitor w/o speakers (optional)	$289.00
17" Flat Panel Monitor with speakers	$314.00
19" Flat Panel Monitor with speakers	$373.00
APC Back-UPS ES 550 - UPS	$70.00
Subtotal #1 (with 15" and 19" LCD monitors)	**$1,748.00**
Subtotal #1 (with 17" and 19" LCD monitors)	**$1,842.00**
Optional Costs:	
Monitor cable kit (for chairside monitors)	$100.00
Wall mount or ceiling mount for monitor	$450.00
Install monitors, wall\ceiling mounts, brackets and run cable from CPU to monitor	$200.00
Install cable drop	$170.00
Total #1 (with 15" and 19" LCD monitors)	**$2,668.00**
Total #2 (with 17" and 19" LCD monitors)	**$2,762.00**

5.0   Conclusion

Bringing state-of-the-art technology into the dental clinic can be exciting and rewarding. It can enhance patients' interest in their oral health and improve the quality of care. It will promote more of a shared responsibility between patient and doctor in addressing the patient's oral health needs.

6.0   Appendix: EDR Server Specifications

6.1   EDR Specification 1

DB & Image Server (1 - 25 workstation connections)
DB Server Only (1 - 25 workstation connections)

- Quad Core Xeon Processor, PE2950, no second processor, five (5) each 146GB hard drives, 5 Year Mission Critical Service.

- Includes Microsoft Windows Server 2003 R2 Enterprise Edition with 25 CALs, and Microsoft SQL Server 2005 Standard with 5 CALs

Table 6-1: EDR Specifications (1)

Base Unit	Quad Core Xeon E5410 Processor2x6MB Cache, 2.33GHz, 1333MHz FSB, PE2950 (223-4491)
Processor	Information, No Second Processor (311-1193)
Memory	8GB 667MHz (8x1GB), Dual Ranked DIMMs (311-6198)
Video Card	LOM NICs are TOE Ready (430-2968)
Video Memory	Riser with 3 PCIe Slots for PowerEdge 2950 (320-4607)
Hard Drive	146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug HardDrive (341-3031)
Hard Drive Controller	PERC6i SAS RAID Controller, 2x4 Connectors, Int, PCIe, 256MB cache, x6 Bkpl (341-5734)
Floppy Disk Drive	No Floppy Drive for x6 Backplane (341-3685)
Operating System	Windows Server 2003 R2 Enterprise Edition with SP2 Includes 25 CALs (420-7119)
NIC	ONBOARD BROADCOM 5708 1GBE NETWORKING (430-1764) CD-ROM or DVD-ROM
Drive	24X IDE CD-RW/DVD ROM Drive for PowerEdge 2950 (313-3934)
Sound Card	Bezel for PE 2950 (313-3920)
Speakers	1x6 Backplane for 3.5-inch Hard Drives (311-7936)
Documentation Diskette	Electronic Documentation and OpenManage DVD Kit (310-7415)

Additional Storage Products	Four 146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug Hard Drives (341-3922) • Feature Integrated SAS/SATA RAID 1/ RAID 5, PERC 6/i Integrated (341-5727) • Feature Universal Sliding Rapid/Versa Rails, includes Cable Management Arm (310-7412)
Service	• Dell Hardware Warranty Plus Onsite Service Initial YR (984-1399) • Dell Hardware Warranty, Extended Year(s) (984-1417) • Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, 4 Year Extended (983-3934) • ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (983-4124) • MISSION CRITICAL PACKAGE: Enhanced Services, 5 Year (989-9237) • Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, Initial Year (987-2830) Thank you choosing Dell ProSupport. For tech support, visit http//support.dell.com/ProSupport or call 1-800-945-33 (989-3439)
Installation	On-Site Installation Declined (900-9997)
Misc	• Redundant Power Supply with Y-Cord (310-9897) • 40GB Microsoft OS Partition Override (420-6966) • Power Cord, NEMA 5-15P to C14,15 amp, wall plug, 10 feet / 3 meter (310-8509) • Microsoft SQL Server 2005 Standard (5 CAL),OEM, NFI (420-5698)

6.2   EDR Specification 2

DB & Image Server (26 - 50 workstation connections)
DB Server Site (26 - 50 workstation connections)
DB Server Site (51 - 75 workstation connections)
Image Server

- Quad Core Xeon Processor, PE2950, no second processor, five (5) each 146 GB hard drives, 5 Year Mission Critical Service, with 1 SQL Server Socket.

- Includes Microsoft Windows Server 2003 R2 Enterprise Edition with 25 CALs, and Microsoft SQL Server 2005 Standard with 1 Socket

Table 6-2: EDR Specifications (2)

Base Unit	Quad Core Xeon E5410 Processor2x6MB Cache, 2.33GHz, 1333MHz FSB, PE2950 (223-4491)
Processor	Information, No Second Processor (311-1193)
Memory	8GB 667MHz (8x1GB), Dual Ranked DIMMs (311-6198)
Video Card	LOM NICs are TOE Ready (430-2968)
Video Memory	Riser with 3 PCIe Slots for PowerEdge 2950 (320-4607)
Hard Drive	146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug HardDrive (341-3031)
Hard Drive Controller	PERC6i SAS RAID Controller, 2x4 Connectors, Int, PCIe, 256MB cache, x6 Bkpl (341-5734)
Floppy Disk Drive	No Floppy Drive for x6 Backplane (341-3685)
Operating System	Windows Server 2003 R2 Enterprise Edition with SP2 Includes 25 CALs (420-7119)
NIC	ONBOARD BROADCOM 5708 1GBE NETWORKING (430-1764) CD-ROM or DVD-ROM
Drive	24X IDE CD-RW/DVD ROM Drive for PowerEdge 2950 (313-3934)
Sound Card	Bezel for PE 2950 (313-3920)
Speakers	1x6 Backplane for 3.5-inch Hard Drives (311-7936)
Documentation Diskette	Electronic Documentation and OpenManage DVD Kit (310-7415)

Additional Storage Products	Four 146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug Hard Drives (341-3922) • Feature Integrated SAS/SATA RAID 1/ RAID 5, PERC 6/i Integrated (341-5727) • Feature Universal Sliding Rapid/Versa Rails, includes Cable Management Arm (310-7412)
Service	• Dell Hardware Warranty Plus Onsite Service Initial YR (984-1399) • Dell Hardware Warranty, Extended Year(s) (984-1417) • Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, 4 Year Extended (983-3934) • ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (983-4124) • MISSION CRITICAL PACKAGE: Enhanced Services, 5 Year (989-9237) • Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, Initial Year (987-2830) Thank you choosing Dell ProSupport. For tech support, visit http//support.dell.com/ProSupport or call 1-800-945-33 (989-3439)
Installation	On-Site Installation Declined (900-9997)
Misc	• Redundant Power Supply with Y-Cord (310-9897) • 40GB Microsoft OS Partition Override (420-6966) • Power Cord, NEMA 5-15P to C14,15 amp, wall plug, 10 feet / 3 meter (310-8509) • Microsoft SQL Server 2005 Standard (1 Socket),OEM,NFI (420-5706)

6.3   EDR Specification 3

DB Server (76 - 100 workstation connections)

- Two (2) each Quad Core Xeon Processors, PE2950, five (5) each 146 GB hard drives, 5 Year Mission Critical Service, and 2 SQL Server Sockets.

- Includes Microsoft Windows Server 2003 R2 Enterprise Edition with 25 CALs, and Microsoft SQL Server 2005 Standard with 2 Sockets

Table 6-3: EDR Specifications (3)

Base Unit	Quad Core Xeon E5410 Processor2x6MB Cache, 2.33GHz, 1333MHz FSB, PE2950 (223-4491)
Processor	Quad Core Xeon E5410 Processor2x6MB Cache, 2.33GHz, 1333MHz FSB, PE2950 (311-7930)
Memory	8GB 667MHz (8x1GB), Dual Ranked DIMMs (311-6198)
Video Card	LOM NICs are TOE Ready (430-2968)
Video Memory	Riser with 3 PCIe Slots for PowerEdge 2950 (320-4607)
Hard Drive	146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug HardDrive (341-3031)
Hard Drive Controller	PERC6i SAS RAID Controller, 2x4 Connectors, Int, PCIe, 256MB cache, x6 Bkpl (341-5734)
Floppy Disk Drive	No Floppy Drive for x6 Backplane (341-3685)
Operating System	Windows Server 2003 R2 Enterprise Edition with SP2 Includes 25 CALs (420-7119)
NIC	ONBOARD BROADCOM 5708 1GBE NETWORKING (430-1764) CD-ROM or DVD-ROM
Drive	24X IDE CD-RW/DVD ROM Drive for PowerEdge 2950 (313-3934)
Sound Card	Bezel for PE 2950 (313-3920)
Speakers	1x6 Backplane for 3.5-inch Hard Drives (311-7936)
Documentation Diskette	Electronic Documentation and OpenManage DVD Kit (310-7415)
Additional Storage Products	Four 146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug Hard Drives (341-3922) • Feature Integrated SAS/SATA RAID 1/ RAID 5, PERC 6/i Integrated (341-5727) • Feature Universal Sliding Rapid/Versa Rails, includes Cable Management Arm (310-7412)

Service	• Dell Hardware Warranty Plus Onsite Service Initial YR (984-1399)
	• Dell Hardware Warranty, Extended Year(s) (984-1417)
	• Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, 4 Year Extended (983-3934)
	• ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (983-4124)
	• MISSION CRITICAL PACKAGE: Enhanced Services, 5 Year (989-9237)
	• Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, Initial Year (987-2830)
	Thank you choosing Dell ProSupport. For tech support, visit http//support.dell.com/ProSupport or call 1-800-945-33 (989-3439)
Installation	On-Site Installation Declined (900-9997)
Misc	• Redundant Power Supply with Y-Cord (310-9897)
	• 40GB Microsoft OS Partition Override (420-6966)
	• Power Cord, NEMA 5-15P to C14,15 amp, wall plug, 10 feet / 3 meter (310-8509)
	• Microsoft SQL Server 2005 (2 Socket), OEM, NFI (420-5707)

6.4   EDR Specification 4

Terminal Server HW (max is 25 workstation connections)

- Dual Core Xeon Processor, PE1950 III, no second processor, two

- (2) each 146 GB hard drives, 5 Year Mission Critical Service.

- Includes Microsoft Windows Server 2003 R2 Enterprise Edition with 25 CALs

Table 6-4: EDR Specifications (4)

Base Unit	Dual Core Xeon Processor E52056MB Cache, 1.86GHz, 1066MHz FSB, PE1950 III (223-6090)
Processor	Information, No Second Processor (311-1193)
Memory	4GB 667MHz (4X1GB), Dual Ranked Fully Buffered DIMMs (311-6154)
Video Card	LOM NICs are TOE Ready (430-2968)
Video Memory	Riser with 2 PCIe Slots for PowerEdge 1950 (320-4648)
Hard Drive	146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug HardDrive (341-3031)
Hard Drive Controller	PERC6i SAS RAID Controller 2x4 Connectors, Int, PCIe 256MB Cache (341-5781)
Operating System	Windows Server 2003 R2 Enterprise Edition with SP2 Includes 25 CALs (420-7119)
NIC	Dual Embedded Broadcom NetXtreme II 5708 Gigabit Ethernet NIC (430-1762) CD-ROM or DVD-ROM
Drive	24X IDE CD-RW/DVD ROM Drive for PowerEdge Servers, All OS (313-3918)
Sound Card	Bezel for PE 1950 (313-3937)
Speakers	1x2 Backplane for 3.5-inc Hard Drives (311-7958)
Documentation Diskette	Electronic Documentation and OpenManage DVD Kit (310-7962)
Additional Storage Products	146GB 15K RPM Serial-Attach SCSI 3Gbps 3.5-in HotPlug HardDrive (341-3031) • SAS/SATA RAID 1 PERC 6/i Integrated/SAS6/iR (341-5776) • Sliding Rapid/Versa Rails and Cable Management Arm, Universal (341-3090)

Service	• Dell Hardware Warranty Plus Onsite Service Initial YR (984-1519)
	• Dell Hardware Warranty, Extended Year(s) (984-1528)
	• Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, 4 Year Extended (983-6444)
	• ProSupport for IT: 7x24 HW / SW Tech Support and Assistance for Certified IT Staff, 5 Year (983-6634)
	• MISSION CRITICAL PACKAGE: Enhanced Services, 5 Year (990-0287)
	• Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch, Initial Year (987-5260)
	Thank you choosing Dell ProSupport. For tech support, visit http//support.dell.com/ProSupport or call 1-800-945-33 (989-3439)
Installation	On-Site Installation Declined (900-9997)
Misc	• Redundant Power Supply with Y-Cord (310-9929)
	• 40GB Microsoft OS Partition Override (420-6966)
	• Power Cord, NEMA 5-15P to C14,15 amp, wall plug, 10 feet / 3 meter (310-8509)

7.0   Contact Information

If you have questions or need further information about bringing technology into your dental clinic, please contact:

George Chiarchiaro, DDS, MHA; EDR Project Manager

Phone: (405) 951-3818

Email: george.chiarchiaro@ihs.gov

   -OR-

Dale Armstrong, DDS, MPH; EDR Deputy Project Manager

Phone: (520) 850-0262

Email: dale.armstrong@ihs.gov