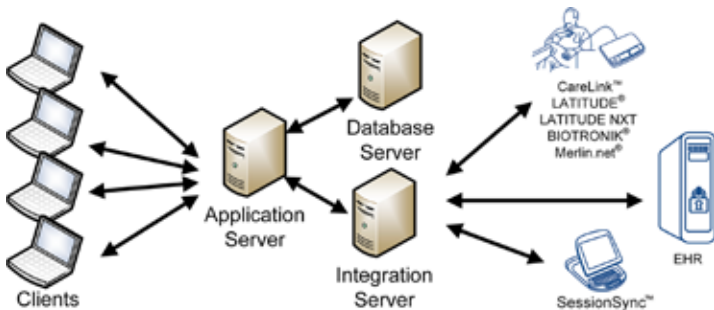


# TECHNICAL REQUIREMENTS

Paceart Optima™  
System 1.8

## PACEART™ SYSTEM CONFIGURATION #1: DISTRIBUTED MODEL WITH HL7®

Multiple workstations connecting to a central database — Mainspring™ Data Express installed using HL7

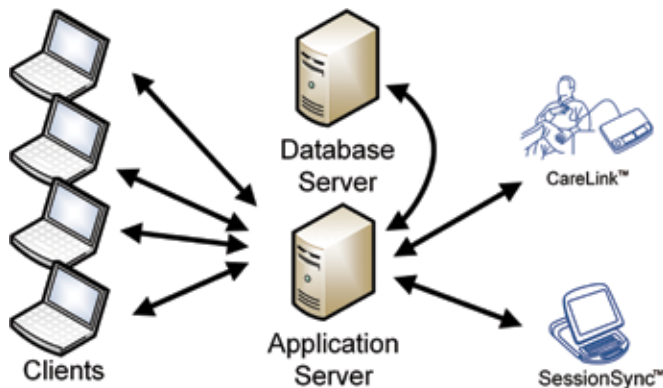


This is the default configuration that will provide a flexible, robust solution focused on end user performance. Separating the Application Server and Integration Server allows users to access system resources without interference from high integration workloads.

See **Workstation/Client Requirements**, **Application Server Requirements**, **Integration Server Requirements**, and **Database Server Requirements** tables on page 2 for hardware minimum configurations. See the **Virtual Environments** section on page 5 for additional notes when provisioning virtual servers. Size the CPU and memory for the system components to ensure acceptable system performance. The Database Manager will be needed for initial system configuration and upgrades; it is usually installed on the application server, but can be installed on any hardware as needed.

## PACEART SYSTEM CONFIGURATION #2: DISTRIBUTED MODEL (NO HL7)

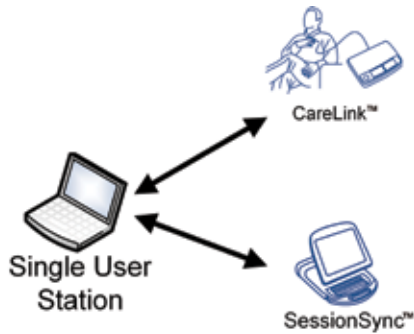
Multiple workstations connecting to a central database — Mainspring installed not using HL7



This is a simplified configuration that will provide a flexible cost effective solution focused on end user performance. The simplified integration installed on the same hardware as the Application Server reduces the need for an independent Integration Server. This simplified model is not robust enough to support the HL7 engine that is the core of our in-clinic connectivity framework. Mainspring functionality that does not leverage the HL7 engine will still be supported in this configuration.

See **Workstation/Client Requirements**, **Application Server Requirements**, **Integration Server Requirements**, and **Database Server Requirements** tables on page 2 for hardware minimum configurations. See the **Virtual Environments** section on page 5 for additional notes when provisioning virtual servers. Size the CPU and memory for the system components to ensure acceptable system performance. The Database Manager will be needed for initial system configuration and upgrades; it is usually installed on the application server, but can be installed on any hardware as needed.

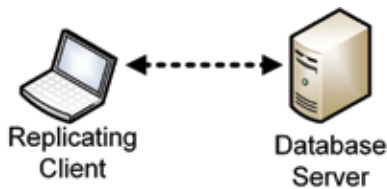
## PACEART SYSTEM CONFIGURATION #3: SINGLE USER INCLUDING MAINSPRING REPORT EXPORT (NO HL7)



This is a simplified configuration that is used in limited situations, intended for use by a single user. It is focused on convenience of administration and not end-user performance. There are limited situations where this type of configuration makes sense.

See **Replicating Client or Stand-alone Single User System Requirements** table below for hardware minimum configurations. Size the CPU and memory for the system components to ensure acceptable system performance. The Database Manager will be needed for initial system configuration and upgrades.

## PACEART SYSTEM CONFIGURATION #4: REPLICATING CLIENT



This is a simplified configuration that is used in limited situations, intended for use by a single user. It is focused on convenience of administration and portability and not end-user performance. The replicating client configuration is used to support a remote site that does not always have connectivity back to the main Paceart Optima system. These types of clients can be used to visit outreach clinics and then later use SQL Server replication to synchronize the new encounters with the main Paceart Optima system. There are limited situations where this type of configuration makes sense.

See **Replicating Client or Stand-alone Single User System Requirements** table below for hardware minimum configurations. Size the CPU and memory for the system components to ensure acceptable system performance. The Database Manager will be needed for initial system configuration and upgrades.

## WORKSTATION/CLIENT

### Requirements

#### Hardware (minimum)

Processor	Intel® Pentium® Core i3 CPU 2.40 GHz
System Memory	8 GB RAM
HDD Free Space	15 GB

#### Software

Operating System	<ul style="list-style-type: none"> <li>▪ Microsoft® Windows® 7 Professional Edition (64-bit)</li> <li>▪ Microsoft Windows 8.1 Professional Edition (64-bit)</li> <li>▪ Microsoft Windows 10 Professional Edition (64-bit)</li> </ul>
Microsoft Components	<ul style="list-style-type: none"> <li>▪ Microsoft .NET Framework 4.5.2</li> </ul>

#### Additional items required to use certain features

In-clinic Surface ECGs	<ul style="list-style-type: none"> <li>▪ Isolation Transformer</li> <li>▪ Paceart ECG Module</li> <li>▪ Universal Serial Bus USB port 2.0 (must be fully compatible with legacy 2.0)</li> </ul>
Programmer Import	<ul style="list-style-type: none"> <li>▪ Universal Serial Bus (USB) port</li> </ul>
TTM Acquisition	<ul style="list-style-type: none"> <li>▪ Paceart ECG Module</li> <li>▪ Analog or PBX phone line</li> <li>▪ Analog fax/voice Modem</li> <li>▪ Universal Serial Bus USB port 2.0 (must be fully compatible with legacy 2.0)</li> </ul>
Display Text Size	For proper display and function of the Paceart Client, the Windows display settings must be set to a text size of 100%.

# APPLICATION SERVER

## Requirements

### Hardware (minimum)

Processor	Intel Pentium Core i5 CPU 2.80 GHz*
System Memory	8 GB RAM†
HDD Free Space	80 GB**
Virtual Environments	System Memory must be provisioned as “dedicated” memory, and not dynamically allocated. See the Virtual Environments section below for additional notes when provisioning virtual servers.

### Software

Operating System	<ul style="list-style-type: none"> <li>Microsoft Windows Server® 2008 Standard Edition (64-bit)</li> <li>Microsoft Windows Server 2008 R2 Standard Edition (64-bit)</li> <li>Microsoft Windows Server 2012 Standard Edition (64-bit)</li> <li>Microsoft Windows Server 2012 R2 Standard Edition (64-bit)</li> <li>Microsoft Windows Server 2016 Standard Edition (64-bit)</li> <li>Microsoft Windows 7 Professional Edition SP1 (64-bit)</li> <li>Microsoft Windows 8.1 Professional Edition (64-bit)</li> <li>Microsoft Windows 10 Professional Edition (64-bit)</li> </ul>
Microsoft Components	<ul style="list-style-type: none"> <li>Microsoft .NET Framework 4.5.2</li> <li>Microsoft Core XML Services (MSXML) 6.0</li> <li>Microsoft IIS as specified in following table:</li> <li>Microsoft Core XML Services (MSXML) 4.0 SP2</li> <li>Microsoft Message Queue component</li> </ul>

Operating System	IIS Version
Microsoft Windows Server 2008 Standard Edition	7.0
Microsoft Windows Server 2008 R2 Standard Edition	7.5
Microsoft Windows 7 Professional Edition	7.5
Microsoft Windows Server 2012 Standard Edition	8.0
Microsoft Windows Server 2012 R2 Standard Edition	8.5
Microsoft Windows 8.1 Professional Edition	8.5
Microsoft Windows Server 2016 Standard Edition	10.0
Microsoft Windows 10 Professional Edition	10.0

### Additional items required to use certain features

Email, Faxing, and Paging	<ul style="list-style-type: none"> <li>Microsoft Windows Fax Services component</li> <li>56 kbps Fax Modem</li> <li>Connectivity to a Simple Mail Transfer Protocol (SMTP) email server</li> </ul>
Connectivity	<ul style="list-style-type: none"> <li>Network connectivity to Remote Systems (e.g., Medtronic CareLink™ Network)</li> <li>Network connectivity to HL7 integrated system</li> </ul>

\* See CPU Sizing table to determine best CPU for a specific implementation.  
 † See Memory Sizing table to determine memory configuration for a specific implementation.  
 \*\* Log file size will vary based on system activity. Configuration of daily log file can help manage disk space usage.

# APPLICATION SERVER MEMORY SIZING

## Application Server Requirements

It is recommended to configure the Application Server with eight GB of RAM as the minimum. Add one GB of RAM to the Application Server for each two concurrent users of the system and each two Mainspring interfaces (specifically SessionSync, Remote Monitoring Interfaces, HL7 Inbound, HL7 Outbound, One Stop Scheduling and Report Export). Even if the calculation indicates a larger number, the maximum memory that is needed on the application server is 20 GB.

# APPLICATION SERVER CPU SIZING

## Application Server Requirements

It is recommended to get a CPU with four cores. Assuming this is a dedicated server, additional cores will not add much to the overall application server performance. To increase the performance of the system it is recommended to increase the performance of the CPU (higher MHz, bigger L1/L2 cache, and fast front side bus speed) — instead of adding more cores.

# DATABASE SERVER

## Requirements

### Hardware (minimum)

Processor	Intel Pentium Core i5 CPU 2.80 GHz*
System Memory	8 GB RAM*
HDD Free Space	80 GB*
Virtual Environments	System Memory must be provisioned as "dedicated" memory, and not dynamically allocated. See the Virtual Environments section on page 5 for additional notes when provisioning virtual servers.

### Software

Operating System	<ul style="list-style-type: none"><li>Microsoft Windows Server 2008 Standard Edition (64-bit)</li><li>Microsoft Windows Server 2008 R2 Standard Edition (64-bit)</li><li>Microsoft Windows Server 2012 Standard Edition (64-bit)</li><li>Microsoft Windows Server 2012 R2 Standard Edition (64-bit)</li><li>Microsoft Windows Server 2016 Standard Edition (64-bit)</li><li>Microsoft Windows 7 Professional Edition (64-bit)</li><li>Microsoft Windows 8.1 Professional Edition (64-bit)</li><li>Microsoft Windows 10 Professional Edition (64-bit)</li></ul>
Microsoft Components <sup>†</sup>	<ul style="list-style-type: none"><li>Microsoft SQL Server 2008 R2 Express Edition (10 GB max database file size)</li><li>Microsoft SQL Server 2008 R2 Standard Edition</li><li>Microsoft SQL Server 2012 Express Edition (10 GB max database file size)</li><li>Microsoft SQL Server 2012 Standard Edition</li><li>Microsoft SQL Server 2014 Express Edition (10 GB max database file size)</li><li>Microsoft SQL Server 2014 Standard Edition</li><li>Microsoft SQL Server 2014 Enterprise Edition</li><li>Microsoft SQL Server 2016 Express Edition (10 GB max database file size)</li><li>Microsoft SQL Server 2016 Standard Edition</li></ul>

### Recommended Maintenance

Regular database backups are strongly recommended; the customer is responsible for ensuring they are being updated regularly.

\* See Microsoft documentation for recommendations.

<sup>†</sup> Database replication requires a full version of SQL Server on both the publisher and subscriber. See Microsoft documentation for additional limitations and considerations.

# INTEGRATION SERVER

## Requirements

### Hardware (minimum)

Processor	Intel Pentium Core i5 CPU 2.80 GHz*
System Memory	8 GB RAM <sup>†</sup>
HDD Free Space	80 GB**
Virtual Environments	System Memory must be provisioned as "dedicated" memory, and not dynamically allocated. See the Virtual Environments section on page 5 for additional notes when provisioning virtual servers.

### Software

Operating System	<ul style="list-style-type: none"><li>Microsoft Windows Server 2008 Standard Edition (64-bit)</li><li>Microsoft Windows Server 2008 R2 Standard Edition (64-bit)</li><li>Microsoft Windows Server 2012 Standard Edition (64-bit)</li><li>Microsoft Windows Server 2012 R2 Standard Edition (64-bit)</li><li>Microsoft Windows 7 Professional Edition (64-bit)</li><li>Microsoft Windows 8.1 Professional Edition (64-bit)</li><li>Microsoft Windows 10 Professional Edition (64-bit)</li></ul>
Microsoft Components	<ul style="list-style-type: none"><li>Microsoft .NET Framework 4.5.2</li><li>Microsoft Message Queue component</li></ul>

\* See CPU Sizing table to determine best CPU for a specific implementation.

<sup>†</sup> See Memory Sizing table to determine memory configuration for a specific implementation.

\*\* Log file size will vary based on system activity. Configuration of daily log file retention can help manage disk space usage.

## INTEGRATION SERVER ADDITIONAL REQUIREMENTS

Mainspring Data Express relies on a third-party HL7 integration engine developed by Corepoint Health. This integration engine is included as part of the Mainspring software installation. The Corepoint Health Integration Engine can be configured to use a local SQL Server Express Edition database for exclusive use by Corepoint on the integration server, or a remote database on a shared SQL Server.

The table below applies to the database server requirements if a remote database is configured. The integration server requirements listed above apply for either configuration.

### Database Server Hardware (recommended)

Processor	1 x 4 Core Processors (4 physical cores)
System Memory	16 GB RAM
HDD Free Space	350 GB, RAID10 configuration

### Database Server Software

Microsoft Components	<ul style="list-style-type: none"><li>▪ Microsoft SQL Server 2012 Standard Edition (SP1, Cumulative Update 5)</li><li>▪ Microsoft SQL Server 2012 Enterprise Edition (SP1, Cumulative Update 5)</li><li>▪ Microsoft SQL Server 2014 Standard Edition (SP3, Cumulative Update 1)</li><li>▪ Microsoft SQL Server 2014 Enterprise Edition (SP3, Cumulative Update 1)</li></ul>
----------------------	---

## INTEGRATION SERVER MEMORY SIZING

### Integration Server Requirements

When deciding on how much memory to configure on the Integration Server, 8 GB of RAM is the minimum. Add 8 GB of RAM if the HL7 interface engine will be used. Add an additional one GB of RAM for each configured interface (SessionSync, HL7 IDCO Inbound for Boston Scientific, HL7 IDCO Inbound for St. Jude Medical, HL7 IDCO inbound for Biotronik, HL7 IDCO Outbound, HL7 SIU inbound, CareLink Scheduling synchronization, CareLink transmission inbound, etc.).

## INTEGRATION SERVER CPU SIZING

### Integration Server Requirements

It is recommended to get a CPU with four cores, if not using HL7 integration. If the HL7 integration engine will be used, a total of eight cores is recommended. To increase the performance of the system it is recommended to increase the performance of the CPU (higher MHz, bigger L1/L2 cache, and fast front side bus speed). If the HL7 integration server is going to be under a high message load additional cores will help the overall system performance.

## VIRTUAL ENVIRONMENTS

### Supported Environments

VMware vSphere® Client version 6.0.0

VMware® vCenter Server™ versions 6.0.0

### Configuration Notes

- Paceart servers have resource usage patterns that can cause resource contention in a virtual environment. The use of one of the Distributed Model configurations described above is strongly recommended.
- Ensure that the virtual host has sufficient resources to support Paceart server resource requirements in addition to anticipated workload from other applications using the virtual environment.
- Memory must be provisioned as “dedicated” memory, and not dynamically allocated.
- Each server implemented in a virtual environment must conform to the requirements listed above based on the intended usage (application server, integration server, and database server).

# REPLICATING CLIENT OR STAND-ALONE SINGLE USER SYSTEM

## Requirements

### Hardware (minimum)

Processor	Intel Pentium Core i3 CPU 2.40 GHz
System Memory	16 GB RAM*
HDD Free Space	80 GB†

### Software

Operating System	<ul style="list-style-type: none"><li>▪ Microsoft Windows 7 Professional Edition (64-bit)</li><li>▪ Microsoft Windows 8.1 Professional Edition (64-bit)</li><li>▪ Microsoft Windows 10 Professional Edition (64-bit)</li></ul>
Microsoft Components	<ul style="list-style-type: none"><li>▪ Microsoft.NET Framework 4.5.2</li></ul>

### Additional items required to use certain features

In-clinic Surface ECGs	<ul style="list-style-type: none"><li>▪ Isolation Transformer</li><li>▪ Paceart ECG Module</li><li>▪ Universal Serial Bus (USB) port 2.0 (must be fully compatible with legacy 2.0)</li></ul>
Programmer Import	<ul style="list-style-type: none"><li>▪ Universal Serial Bus (USB) port</li></ul>
TTM Acquisition	<ul style="list-style-type: none"><li>▪ Paceart ECG Module</li><li>▪ Analog or PBX phone line</li><li>▪ Analog fax/voice Modem</li><li>▪ Universal Serial Bus (USB) port 2.0 (must be fully compatible with legacy 2.0)</li></ul>
Replicating Client	<ul style="list-style-type: none"><li>▪ Microsoft SQL Server (must be same version as used on the database server, see Database Server section for supported versions)</li></ul>

\*Increased memory will improve the user experience. Data access on large databases will become VERY slow on low memory systems.  
†Log file size will vary based on system activity. Configuration of daily log file retention can help manage disk space usage.

# DATABASE MANAGER

## Requirements

### Hardware (minimum)

Processor	Intel Pentium Core i3 CPU 2.40 GHz
System Memory	8 GB RAM
HDD Free Space	5 GB

### Software

Operating System	<ul style="list-style-type: none"><li>▪ Microsoft Windows 7 Professional Edition (64-bit)</li><li>▪ Microsoft Windows 8.1 Professional Edition (64-bit)</li><li>▪ Microsoft Windows 10 Professional Edition (64-bit)</li></ul>
Microsoft Components	<ul style="list-style-type: none"><li>▪ Microsoft Windows PowerShell® 2.0</li><li>▪ Microsoft SQL Server® (See Database Server section)</li><li>▪ MS SQL Server Command Line Utilities</li><li>▪ MS SQL Server Remote Management Objects</li><li>▪ MS SQL Server Shared Management Objects</li><li>▪ MS SQL Server System CLR Types</li><li>▪ MS SQL Server Native Client</li></ul>

# CARDIOVOICE™ TTM

## Workstation/Client Requirements

### Hardware (minimum)

Processor	Intel Pentium Core i3 CPU 2.40 GHz
System Memory	4 GB RAM
HDD Free Space	15 GB

---

### Software

Operating System	<ul style="list-style-type: none"><li>▪ Microsoft Windows 7 Professional Edition (32-bit)</li><li>▪ Microsoft Windows 8.1 Professional Edition (32-bit)</li></ul>
Microsoft Components	<ul style="list-style-type: none"><li>▪ Microsoft.NET Framework 4.5.2</li></ul>

---

### Additional items required to use certain features

CardioVoice TTM Assistant Hardware	<ul style="list-style-type: none"><li>▪ Intel Dialogic Voice Board (uses PCI Slot)</li><li>▪ Analog phone line</li></ul>
------------------------------------	--

## PACEART WEB ACCESS MODULE

### Browser Support

Microsoft Internet Explorer® 11 and above  
Mozilla Firefox® 52.0 and above  
Adobe Acrobat browser plug-in for report viewing

## NETWORK RECOMMENDATION

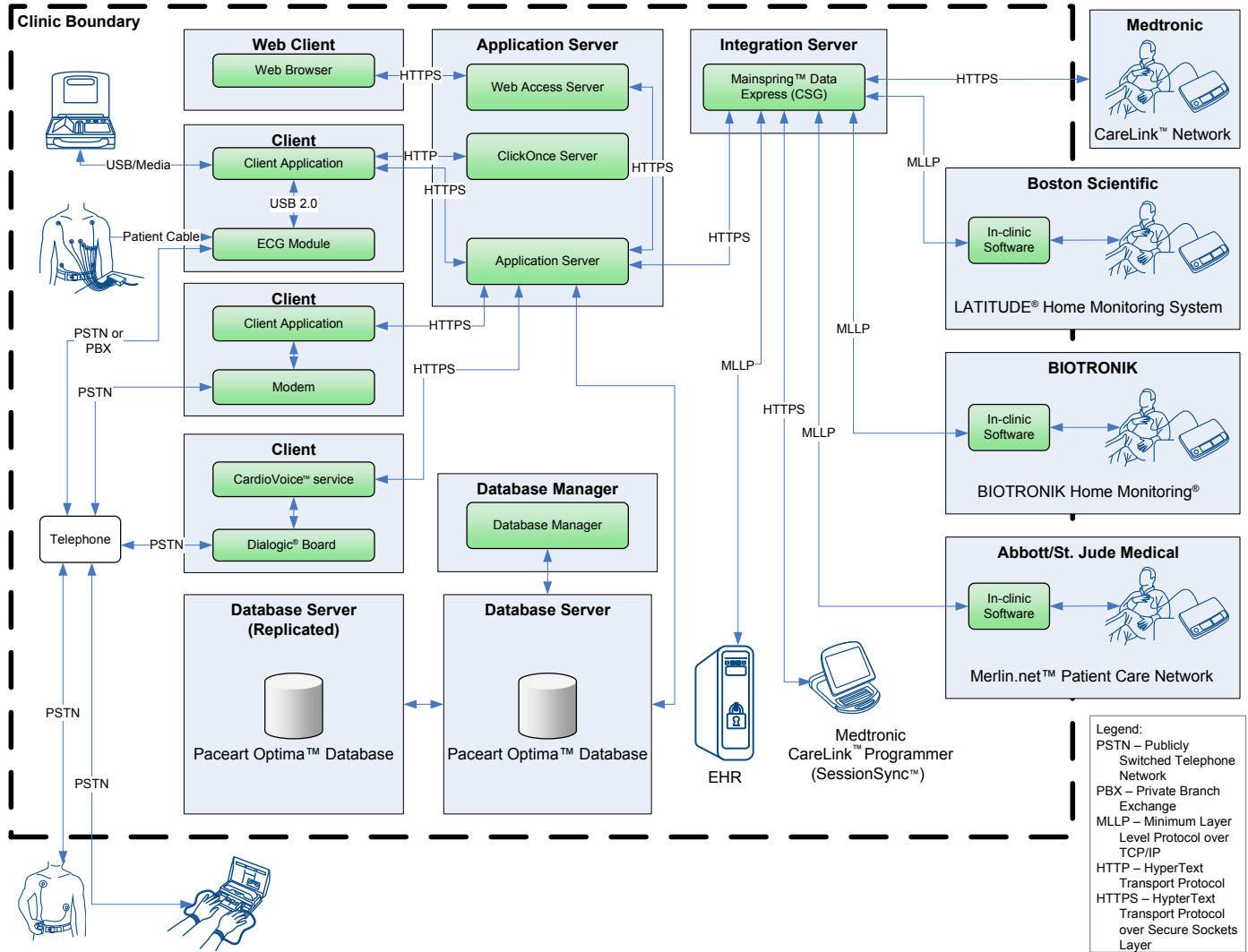
Replication over Wide Area Network (WAN) Connection	Bandwidth of 1 mbps or greater*
Paceart Client Local Area Network (LAN) Connection	Bandwidth of 100 mbps or greater Latency to Application Server ≤ 50 ms
Paceart Application Server Local Area Network (LAN) Connection	Bandwidth of 100 mbps or greater Latency to Database Server ≤ 20 ms
Paceart Database Server Local Area Network (LAN) Connection	Bandwidth of 100 mbps or greater Latency to Application Server ≤ 20 ms

---

### Printer Requirements

Printable Area	<ul style="list-style-type: none"><li>▪ 7.75" x 10.5" with 0.25" margins</li></ul>
Supported Paper Size	<ul style="list-style-type: none"><li>▪ 8.5" x 11"</li><li>▪ A4</li></ul>

\* Bandwidth and amount of data will affect total replication time.





## TECHNICAL SUPPORT ACCESS (UNITED STATES AND CANADA)

Contact PACEART Technical Support at [paceart.support@medtronic.com](mailto:paceart.support@medtronic.com) or

1-800-PACEART



[www.medtronic.com/manuals](http://www.medtronic.com/manuals)

Consult instructions for use on this website. Manuals can be viewed using a current version of any major Internet browser. For best results, use Adobe Acrobat Reader® with the browser.

### Brief Statement: Medtronic Paceart™ System

#### Intended Use

The Paceart system is intended for use as a 12-lead electrocardiograph, pacemaker artifact analyzer, and transtelephonic ECG receiving station. It also acts as a database for cardiac patients with or without pacemakers or implantable cardioverter defibrillators.

#### Contraindications

There are no known contraindications for the Paceart system.

*See the Paceart manuals for more detailed information regarding precautions and use of the system. For further information regarding Paceart, please call Medtronic at 1-800-722-3278 and/or consult the Medtronic website at [paceart.com](http://paceart.com).*

**Caution:** Federal law (USA) restricts this device to sale by or on the order of a physician.

Medtronic and the Medtronic logo are trademarks of Medtronic.  
™Third party brands are trademarks of their respective owners.  
All other brands are trademarks of a Medtronic company.

**Medtronic**  
710 Medtronic Parkway  
Minneapolis, MN 55432-5604  
USA

Toll-free in USA: 800.633.8766  
Worldwide: +1.763.514.4000

**[medtronic.com](http://medtronic.com)**

UC201710584b EN ©2018 Medtronic.  
Minneapolis, MN. All Rights Reserved.  
Printed in USA. 06/2018

**Medtronic**