

GE Healthcare

MARS™ V8

Ambulatory ECG System

Service Manual

Software Version 8
2083129-004 Revision D



MARS™ V8 Ambulatory ECG System
English
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Publication Information

The information in this manual applies only to the MARS Ambulatory ECG System Version 8 running service pack 4 or later. It does not apply to earlier product versions. Due to continuing product innovation, specifications in this manual are subject to change without notice.

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Revision	Date	Comments
A	25 October 2014	Internal release.
B	25 October 2014	Customer release.
C	15 May 2015	Updated the list of security keys (dongles) in Chapter 8, "Parts List" .
D	5 May 2017	Made the following changes: <ul style="list-style-type: none">• Changed supported software from SP4 to service pack 4 or later.• Added instructions to exclude MARS processes from AV software scans.• Corrected MARS Web Server default port.• Removed obsolete security keys.

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Service Manual Language Information

WARNING (EN)	<p>This service manual is available in English only.</p> <ul style="list-style-type: none"> • If a customer's service provider requires a language other than English, it is the customer's responsibility to provide translation services. • Do not attempt to service the equipment unless this service manual has been consulted and is understood. • Failure to heed this warning may result in injury to the service provider, operator, or patient, from electric shock, mechanical or other hazards.
ПРЕДУПРЕЖДЕНИЕ (BG)	<p>Това упътване за работа е налично само на английски език.</p> <ul style="list-style-type: none"> • Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод. • Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа. • Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациент в резултат на токов удар или механична или друга опасност.
警告 (ZH-CN)	<p>本维修手册仅提供英文版本。</p> <ul style="list-style-type: none"> • 如果维修服务提供商需要非英文版本，客户需自行提供翻译服务。 • 未详细阅读和完全理解本维修手册之前，不得进行维修。 • 忽略本警告可能对维修人员，操作员或患者造成触电、机械伤害或其他形式的伤害。
警告 (ZH-TW)	<p>本維修手冊只提供英文版。</p> <ul style="list-style-type: none"> • 如果客戶的維修人員有英語以外的其他語言版本需求，則由該客戶負責提供翻譯服務。 • 除非您已詳閱本維修手冊並了解其內容，否則切勿嘗試對本設備進行維修。 • 不重視本警告可能導致維修人員、操作人員或病患因電擊、機械因素或其他因素而受到傷害。
UPOZORENJE (HR)	<p>Ove upute za servisiranje dostupne su samo na engleskom jeziku.</p> <ul style="list-style-type: none"> • Ukoliko korisnički servis zahtijeva neki drugi jezik, korisnikova je odgovornost osigurati odgovarajući prijevod. • Nemojte pokušavati servisirati opremu ukoliko niste konzultirali i razumjeli ove upute. • Nepoštivanje ovog upozorenja može rezultirati ozljedama servisnog osoblja, korisnika ili pacijenta prouzročenim električnim udarom te mehaničkim ili nekim drugim opasnostima.
VAROVÁNÍ (CS)	<p>Tento provozní návod existuje pouze v anglickém jazyce.</p> <ul style="list-style-type: none"> • V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka. • Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah. • V případě nedodržování této varování může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.

Service Manual Language Information (cont'd.)

ADVARSEL (DA)	<p>Denne servicemanual findes kun på engelsk.</p> <ul style="list-style-type: none"> • Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse. • Forsøg ikke at servicere udstyret medmindre denne servicemanual har været konsulteret og er forstået. • Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk, mekanisk eller anden fare for teknikeren, operatøren eller patienten.
WAARSCHUWING (NL)	<p>Deze service manual is alleen in het Engels verkrijgbaar.</p> <ul style="list-style-type: none"> • Indien het onderhoudspersoneel een andere taal nodig heeft, dan is de klant verantwoordelijk voor de vertaling ervan. • Probeer de apparatuur niet te onderhouden voordat deze service manual geraadpleegd en begrepen is. • Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de gebruiker of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren.
HOIATUS (ET)	<p>Käesolev teenindusjuhend on saadaval ainult inglise keeles.</p> <ul style="list-style-type: none"> • Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest. • Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist. • Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.
VAROITUS (FI)	<p>Tämä huolto-ohje on saatavilla vain englanniksi.</p> <ul style="list-style-type: none"> • Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla. • Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen. • Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.
ATTENTION (FR)	<p>Ce manuel technique n'est disponible qu'en anglais.</p> <ul style="list-style-type: none"> • Si un service technique client souhaite obtenir ce manuel dans une autre langue que l'anglais, il devra prendre en charge la traduction et la responsabilité du contenu. • Ne pas tenter d'intervenir sur les équipements tant que le manuel technique n'a pas été consulté et compris. • Le non-respect de cet avertissement peut entraîner chez le technicien, l'opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres.

Service Manual Language Information (cont'd.)

<p>WARNUNG (DE)</p>	<p>Diese Serviceanleitung ist nur in englischer Sprache verfügbar.</p> <ul style="list-style-type: none"> Falls der Kundendienst eine andere Sprache benötigt, muss er für eine entsprechende Übersetzung sorgen. Keine Wartung durchführen, ohne diese Serviceanleitung gelesen und verstanden zu haben. Bei Zuwiderhandlung kann es zu Verletzungen des Kundendiensttechnikers, des Anwenders oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.
<p>ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)</p>	<p>Το παρόν εγχειρίδιο σέρβις διατίθεται στα αγγλικά μόνο.</p> <ul style="list-style-type: none"> Εάν το άτομο παροχής σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει υπηρεσίες μετάφρασης. Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό εκτός εάν έχετε συμβουλευτεί και έχετε κατανοήσει το παρόν εγχειρίδιο σέρβις. Εάν δεν λάβετε υπόψη την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στο άτομο παροχής σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.
<p>FIGYELMEZTETÉS (HU)</p>	<p>Ez a szerviz kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> Ha a vevő szerviz ellátója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészítése. Ne próbálja elkezdni használni a berendezést, amíg a szerviz kézikönyvben leírtakat nem értelmezték és értették meg. Ezen figyelmeztetés figyelmen kívül hagyása a szerviz ellátó, a működtető vagy a páciens áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.
<p>AÐVÖRUN (IS)</p>	<p>Þessi þjónustuhandbók er eingöngu fáanleg á ensku.</p> <ul style="list-style-type: none"> Ef að þjónustuveitandi viðskiptamanns þarfnast annars tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálþjónustu. Reynið ekki að afgreiða tækið nema þessi þjónustuhandbók hefur verið skoðuð og skilin. Brot á að sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklingi frá raflosti, vélrænum eða öðrum áhættum.
<p>PERINGATAN (ID)</p>	<p>Manual servis ini hanya tersedia dalam bahasa Inggris.</p> <ul style="list-style-type: none"> Jika penyedia jasa servis pelanggan memerlukan bahasa lain selain dari Bahasa Inggris, merupakan tanggung jawab dari penyedia jasa servis tersebut untuk menyediakan terjemahannya. Jangan mencoba melakukan servis terhadap perlengkapan kecuali telah membaca dan memahami manual servis ini. Mengabaikan peringatan ini bisa mengakibatkan cedera pada penyedia servis, operator, atau pasien, karena terkena kejut listrik, bahaya mekanis atau bahaya lainnya.

Service Manual Language Information (cont'd.)

AVVERTENZA (IT)	<p>Il presente manuale di manutenzione è disponibile soltanto in Inglese.</p> <ul style="list-style-type: none"> Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione. Si proceda alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto. Il non rispetto della presente avvertenza potrebbe far compiere operazioni da cui derivino lesioni all'addetto, alla manutenzione, all'utilizzatore ed al paziente per folgorazione elettrica, per urti meccanici od altri rischi.
警告 (JA)	<p>このサービスマニュアルは英語版しかありません。</p> <ul style="list-style-type: none"> サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。 このサービスマニュアルを熟読し、十分に理解をした上で装置のサービスを行ってください。 この警告に従わない場合、サービスを担当される方、操作員あるいは患者が、感電や機械的又はその他の危険により負傷する可能性があります。
경고 (KO)	<p>본 서비스 지침서는 영어로만 이용하실 수 있습니다.</p> <ul style="list-style-type: none"> 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우, 번역 서비스를 제공하는 것은 고객의 책임입니다. 본 서비스 지침서를 참고했고 이해하지 않는 한은 해당 장비를 수리하려고 시도하지 마십시오. 이 경고에 유의하지 않으면 전기 쇼크, 기계상의 혹은 다른 위험으로부터 서비스 제공자, 운전자 혹은 환자에게 위험을 가할 수 있습니다.
ЕСКЕРТУ (KK)	<p>Бұл қызмет көрсету бойынша нұсқаулығы тек ағылшын тілінде қолжетімді.</p> <ul style="list-style-type: none"> Тұтынушының қызмет провайдері ағылшын тілінен басқа тілдегі нұсқаны талап етсе, аудару бойынша қызметтерімен қамтамасыз ету тұтынушы жауапкершілігінде болуы тиіс. Бұл қызмет көрсету бойынша нұсқаулығын назарға алып, түсінбегенше, жабдыққа қызмет көрсетуден бас тартыңыз. Бұл ескертуді елемей қызмет провайдері, оператор немесе емделушінің электр шоғынан, механикалық немесе басқа қауіптер нәтижесінде жарақат алуына әкелуі мүмкін.
BRĪDINĀJUMS (LV)	<p>Šī apkalpotāju rokasgrāmata ir pieejama tikai angļu valodā.</p> <ul style="list-style-type: none"> Ja apkalpošanas sniedzējam nepieciešama informācija citā, nevis angļu, valodā, klienta pienākums ir nodrošināt tās tulkošanu. Neveiciet aprīkojuma apkopi, neizlasot un nesaprotot apkalpotāju rokasgrāmatu. Šī brīdinājuma neievērošana var radīt elektriskās strāvas trieciena, mehānisku vai citu risku izraisītu traumu apkopes sniedzējam, operatoram vai pacientam.
ĮSPĖJIMAS (LT)	<p>Šis eksploataavimo vadovas yra prieinamas tik anglų kalba.</p> <ul style="list-style-type: none"> Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba - ne anglų, numatyti vertimo paslaugas yra kliento atsakomybė. Nemėginkite atlikti įrangos techninės priežiūros, nebent atsižvelgėte į šį eksploataavimo vadovą ir jį supratote. Jei neatkreipsite dėmesio į šį perspėjimą, galimi sužalojimai dėl elektros šoko, mechaninių ar kitų paslaugų tiekėjui, operatoriui ar pacientui.

Service Manual Language Information (cont'd.)

ADVARSEL (NO)	<p>Denne servicehåndboken finnes bare på engelsk.</p> <ul style="list-style-type: none"> • Hvis kundens serviceleverandør trenger et annet språk, er det kundens ansvar å sørge for oversettelse. • Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått. • Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.
OSTRZEŻENIE (PL)	<p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.</p> <ul style="list-style-type: none"> • Jeśli dostawca usług klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta. • Nie należy serwisować wyposażenia bez zapoznania się i zrozumienia niniejszego podręcznika serwisowego. • Niezastosowanie się do tego ostrzeżenia może spowodować urazy dostawcy usług, operatora lub pacjenta w wyniku porażenia elektrycznego, zagrożenia mechanicznego bądź innego.
AVISO (PT-BR)	<p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> • Se o serviço de assistência técnica do cliente não for GE, e precisar de outro idioma, será da responsabilidade do cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • O não cumprimento deste aviso pode por em perigo a segurança do técnico, operador ou paciente devido a choques elétricos, mecânicos ou outros.
AVISO (PT-PT)	<p>Este manual técnico só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> • Se a assistência técnica do cliente solicitar estes manuais noutro idioma, é da responsabilidade do cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual técnico. • O não cumprimento deste aviso pode provocar lesões ao técnico, ao utilizador ou ao paciente devido a choques eléctricos, mecânicos ou outros.
AVERTISMENT (RO)	<p>Acest manual de service este disponibil numai în limba engleză.</p> <ul style="list-style-type: none"> • Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere. • Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service. • Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.
ПРЕДУПРЕЖДЕНИЕ (RU)	<p>Настоящее руководство по обслуживанию предлагается только на английском языке.</p> <ul style="list-style-type: none"> • Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует обеспечить перевод самостоятельно. • Прежде чем приступать к обслуживанию оборудования, обязательно обратитесь к настоящему руководству и внимательно изучите изложенные в нем сведения. • Несоблюдение требований данного предупреждения может привести к тому, что специалисты по обслуживанию, операторы или пациенты получат удар электрическим током, механическую травму или другое повреждение.

Service Manual Language Information (cont'd.)

UPOZORENJE (SR)	<p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"> Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge. Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo. Zanemarivanje ovog upozorenja može dovesti do povređivanja serviser, rukovaoca ili pacijenta usled strujnog udara, ili mehaničkih i drugih opasnosti.
VAROVANIE (SK)	<p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"> Ak zákazníkov poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka. Nepokúšajte sa o obsluhu zariadenia skôr, ako si neprečítate návod na obsluhu a neporozumiete mu. Zanedbanie tohto varovania môže vyústiť do zranenia poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanickým alebo iným nebezpečenstvom.
OPOZORILO (SL)	<p>Ta servisni priročnik je na voljo samo v angleškem jeziku.</p> <ul style="list-style-type: none"> Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod. Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli. Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.
ADVERTENCIA (ES)	<p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"> Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual. No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio. La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas o de otra naturaleza.
VARNING (SV)	<p>Den här servicehandboken finns bara tillgänglig på engelska.</p> <ul style="list-style-type: none"> Om en kunds servicetekniker har behov av ett annat språk än engelska ansvarar kunden för att tillhandahålla översättningstjänster. Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken. Om du inte tar hänsyn till den här varningen kan det resultera i skador på serviceteknikern, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror.
UYARI (TR)	<p>Bu servis kılavuzunun sadece İngilizcesi mevcuttur.</p> <ul style="list-style-type: none"> Eğer müşteri teknisyeni bu kılavuzu İngilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer. Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz. Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.

Service Manual Language Information (cont'd.)

<p>ЗАСТЕРЕЖЕННЯ (UK)</p>	<p>Дане керівництво з сервісного обслуговування постачається виключно англійською мовою.</p> <ul style="list-style-type: none"> • Якщо сервісний інженер потребує керівництво іншою мовою, користувач зобов'язаний забезпечити послуги перекладача. • Не намагайтеся здійснювати технічне обслуговування даного обладнання, якщо ви не читали, або не зрозуміли інформацію, надану в керівництві з сервісного обслуговування. • Недотримання цього застереження може призвести до травмування сервісного інженера, користувача даного обладнання або пацієнта внаслідок електричного шоку, механічного ушкодження або з інших причин невірної обслуговування обладнання.
<p>CẢNH BÁO (VI)</p>	<p>Tài Liệu Hướng Dẫn Sửa Chữa chỉ có bản tiếng Anh.</p> <ul style="list-style-type: none"> • Nếu các đơn vị cung cấp dịch vụ cho khách hàng yêu cầu một ngôn ngữ nào khác tiếng Anh, thì khách hàng sẽ có trách nhiệm cung cấp các dịch vụ dịch thuật. • Không được sửa chữa thiết bị trừ khi đã tham khảo và hiểu Tài liệu Hướng dẫn Sửa chữa. • Không tuân thủ những cảnh báo này có thể dẫn đến các tổn thương cho người thực hiện sửa chữa, người vận hành hay bệnh nhân, do sốc điện, các rủi ro về cơ khí hay các rủi ro khác.

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Manual Information

This chapter provides general information about this document (purpose, audience, and conventions), identifies related documents, prescribes precautions for the safe use of the system, details service responsibilities, and instructs you on how to locate security updates for third-party software approved for use with the system.

For an overview of the MARS system, see [Chapter 2, “System Overview and Setup”](#).

Manual Purpose

This manual provides technical information to service and technical personnel so they can install and maintain the MARS Ambulatory ECG System. Where necessary, the manual identifies additional sources for relevant information and/or technical assistance.

This manual is intended only for use with MARS version 8 and systems that have been qualified for use with MARS version 8 running service pack 4 or later. For earlier versions of MARS and systems supporting earlier versions, refer to the *MARS Ambulatory ECG System Service Manual* that originally shipped with your product.

See the *MARS V8 Operator's Manual* (PN 2083129-003) for the instructions necessary to operate the system safely in accordance with its function and intended use.

Intended Audience

This manual is intended to be used by trained GE Healthcare service personnel, approved third party service personnel, and local biomedical and IT personnel.

Documentation Conventions

The following conventions are used in this manual.

Typographical Conventions

Style	Definition
Bold Text	Indicates keys on the keyboard, text to enter, or hardware items such as buttons or switches on the equipment.
<i>Italicized-Bold</i> Text	Indicates software terms that identify menu items, buttons or options in various windows.
Ctrl+Esc	Indicates a keyboard operation. A (+) sign between the names of two keys indicates you press and hold the first key while pressing the second key once. For example, "Press Ctrl+Esc " means to press and hold down the Ctrl key while pressing the Esc key.
< Space >	Indicates that you must press the spacebar. When instructions are given for typing a precise text string with one or more spaces, the point where the spacebar must be pressed is indicated as: < Space >. The purpose of the < > brackets is to ensure you press the spacebar when required.
Enter	Indicates that you must press the " Enter " or " Return " key on the keyboard. Do not type " Enter ".
Note	Provides application tips or other useful information to ensure that you get the most from your system.

Illustrations

All illustrations in the manual are provided as examples only. Depending on system configuration, screen shots that appear in the manual may differ from the screens as they appear on your system.

All patient names and data are fictitious. Any similarity to actual persons is coincidental.

Regulatory and Safety Information

Regulatory and Safety Information outlines the responsibility of the manufacturer, general safety information for the user, and warnings and cautions relevant to this system.

The user should become familiar with the safety instructions, and read and understand all instructions before attempting to use this system.

Disregarding the safety information provided is considered abnormal use of the system.

Safety Conventions

The terms DANGER, WARNING, and CAUTION are used throughout this manual to point out hazards, and to designate a degree or level of seriousness. Familiarize yourself with their definitions and significance.

A **Hazard** is a source of potential injury to a person.

Convention	Definition
DANGER	Indicates an imminent hazard which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potential hazard or unsafe practice which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potential hazard or unsafe practice which, if not avoided, could result in minor personal injury or product/property damage.

Safety messages may be found throughout this manual.

Related Documents

Additional information can be found in the following documents:

Related Documents for the MARS Ambulatory ECG System

Part Number	Title
2083129-001	<i>MARS V8 Ambulatory ECG System Pre-Installation Guide</i>
2083129-002	<i>MARS V8 Ambulatory ECG System Installation Guide</i>
2083129-003	<i>MARS V8 Ambulatory ECG System Operators Manual</i>
2083129-005	<i>MARS V8 Web Server Installation Manual</i>
2083129-006	<i>MARS V8 Web Client Manual</i>
2083129-007	<i>MARS V8 UNIX to PC Conversion Guide</i>

Safety Information

The MARS Ambulatory ECG System is intended for use under the direct supervision of a licensed health care practitioner.

CAUTION:

U.S. federal law restricts this device to sale by, or on the order of, a physician.

To ensure patient safety, use only software and accessories manufactured or recommended by GE Healthcare. Contact GE Healthcare for information before installing any software or connecting any accessories that are not recommended in this manual.

CAUTION:

Installation of software or accessories not approved by GE Healthcare may damage the system or cause the loss or corruption of data.

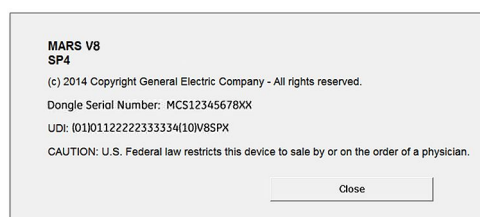
Service Information

Customers are responsible for the maintenance and repair, including equipment checkout, of the equipment on which they install the MARS Ambulatory ECG System. GE Healthcare Service can assist in the reinstallation and configuration of the MARS system as needed.

Regular maintenance, irrespective of usage, is essential to ensure that the MARS Ambulatory ECG Standalone, Client, and Server are always functional when required. Failure on the part of the responsible individual, hospital, or institution using the MARS system to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards. Customers who have upgraded existing systems on legacy GE-supplied hardware should refer to the MARS Service Manuals originally shipped with their product for information about the equipment, preventive maintenance, and disaster recovery.

Identification

In addition to the software version, a copyright statement, and a prescription statement, the MARS V8 **Information** screen displays two identifiers, as shown in the following screen capture:



Identifier	Description
Dongle Serial Number	The dongle serial number uniquely identifies the dongle used to authenticate the MARS V8 system. All software activation codes are linked to it, and it must be present in order to install, restore, or use the system.
UDI	The UDI (Unique Device Identification) uniquely identifies the MARS V8 medical device.

The **UDI** and **Dongle Serial Number** are both required when requesting service or support.

To access the **Information** screen, select **Help > About** from the MARS V8 menu.

Security Updates

The GE Healthcare *Product Security Database* is a web portal to communicate security-related information to customers. Access to the database is restricted to GE Healthcare customers and requires a Single Sign On (SSO) account. If you do not have an SSO account, you can sign up for one when you first access the portal.

The GE Healthcare *Product Security Database* contains information about security patches from third-party vendors of software contained in GE Healthcare products. This information includes the affected product and version, the patch identifier, the

patch assessment date, the patch assessment status, and the patch assessment details. When a patch has an approved status, you can download the patch from the third-party vendor and install it on the identified product. The database does not contain information about third-party patches that are not related to security.

The *Product Security Database* also allows access to Manufacturer's Disclosure Statement of Medical Device Security (MDS2) documents for GE Healthcare products.

To check on the latest information regarding validated security patches, do the following:

1. Browse to the GE Healthcare *Security* web site:

<http://prodsecdb.gehealthcare.com/>

The GE Healthcare **Single Sign On** page opens.

2. Enter your SSO user ID and password and click **Log In**.

The **Security** page opens.

NOTE:

If you do not have an SSO account, click **Sign Up** and follow the instructions to complete the registration for an SSO account. After the registration is complete, the account is generated and the **Security** page opens.

3. Expand **Product Security** and select **Product Vulnerability Database**.



The **Product Security Database** page opens.

4. Search the **Product Security Database** for security patches approved for use with your GE Healthcare product.

For more information, do any of the following:

- Review **Getting Started** at the bottom of the web page for a quick overview of using the database.
- Select **Help > FAQ** at the top of the web page for frequently asked questions about the database.
- Select **Help > Training Document** at the top of the web page for detailed instructions on using the database.

System Overview and Setup

This chapter provides a general overview of the MARS Ambulatory ECG System and its set up procedure. For a detailed description of the MARS system, refer to the *MARS V8 Pre-Installation Manual* (2083129-001). For a detailed description of the installation procedure, refer to the *MARS V8 Installation and Upgrade Guide* (2083129-002).

System Overview

The following sections provide an overview of MARS Ambulatory ECG System.

Intended Use

The MARS Holter Analysis Workstation is designed for the acquisition, analysis, edit, review, report, and storage of ambulatory and multi-parameter ECG data.

Results of the automated analysis are intended to assist the physician in the interpretation of the recorded data. This information is not intended to serve as a substitute for the physician overread of the recorded ECG data.

The MARS system is intended to be used by trained operators under the direct supervision of a licensed healthcare practitioner in a hospital or clinic environment.

Patient population includes both adult and pediatric (greater than 10Kg) human patient.

The MARS system provides the user arrhythmia studies and Holter analysis capabilities.

Data acquired may be used for the following indications:

- Evaluation of symptoms that may be caused by cardiac arrhythmia and/or conduction disturbances.
- Evaluation of symptoms that may be due to myocardial ischemia.
- Detection of ECG events that alter prognosis in certain forms of heart disease.
- Detection and analysis of pacemaker function and failure.
- Determination of cardiac response to lifestyle.
- Evaluation of therapeutic interventions
- Investigations in epidemiology and clinical trials.

General Description

The MARS Ambulatory ECG System is a multi-parameter analysis and review application that can be installed and run on customer-supplied systems that meet the hardware and software specifications provided in the *MARS V8 Pre-Installation Manual* (2083129-001).

System Configurations

The MARS application is available in three basic configurations designed to meet the needs and budgets of different environments:

- **Enterprise**
Designed for large, multi-department environments, the Enterprise line offers client/server systems that can acquire, analyze, review, and report on ECG data across a network. The clients connect to a central server that stores all ECG data; in the event the server is unavailable, the customer can store the data locally. In addition, Enterprise models support third-party and external system interfaces. Enterprise systems require a server and support up to 25 clients. Enterprise servers cannot acquire or analyze ECG data.
- **Department**
Designed for small clinics or single-department environments, the Department line offers client/server systems that acquire, analyze, review, and report on ECG data across a network. The clients connect to a central server that stores all ECG data; in the event the server is unavailable, the customer can store the data locally. In addition, Department models support third-party and external system interfaces. Department systems require a server and support from one (1) to five (5) clients. Unlike Enterprise systems, the customers can set up the Department server as an additional client and use it to acquire and analyze ECG data.
- **Office**
Designed for single-office environments, the Office line offers standalone systems that acquire, analyze, review, and report on ECG data independently. They do not connect with other MARS systems, so all data is stored locally. Customers can set up Office models to print to any supported network printer and to store patient reports on a MUSE system. However, they do not support interfaces to any other third-party or external systems.

Each configuration is available in multiple variations, each of which provides a different set of features. The following table identifies the available configurations, their variations, and their standard features. Availability differs by region. Consult with your GE Healthcare sales representative for a list of configurations and features available in your region.

Configuration	Variations	Standard Features
Servers	Enterprise	Holter acquisition
	Enterprise i	Enterprise plus Monitoring Full Disclosure acquisition
	Department	Core features
	Department i	Department plus Monitoring Full Disclosure acquisition
	Department Advanced	Core features plus ST Analysis, QT Analysis, HRV Analysis, Waterfall Display, and MARS to MUSE interface
	Department Advanced I	Department Advanced plus Monitoring Full Disclosure acquisition
Standalone	Office	Core features
	Office Advanced	Core features plus ST Analysis, QT Analysis, HRV Analysis, Waterfall Display, and MARS to MUSE interface
Clients	Client	Core features
	Client Advanced	Core features plus ST Analysis, QT Analysis, HRV Analysis, Waterfall Display, and MARS to MUSE interface
	Client Outreach	Acquisition and review only
	Client CIC	Acquisition and review of CARESCAPE CIC Pro or CARESCAPE Central Station data only

The customer is responsible for providing hardware and operating system that meet the MARS system requirements outlined in the *MARS V8 Pre-Installation Manual* (2083129-001). Consult with your GE Healthcare sales representative for a list of configurations currently available in your region.

Supported Operating Systems

The following table provides a high-level overview of the supported operating systems.

	Servers		Clients / Standalone		
	MARS	MARS Web	MARS Office	MARS Client	Web Client
Windows Server 2008 (R2 SP1) (64-bit) ¹	Y	Y			
Windows Server 2008 (SP2) (32-bit) ¹	Y	Y			
Windows 7 (SP1) (64-bit)			Y	Y	Y
Windows 7 (SP1) (32-bit)			Y	Y	Y
Windows 8.1 (32-bit or 64-bit)					Y

¹ Running the MARS server on a virtual machine is supported only on Windows Server 2008 (R2 SP1) (64-bit). It is not supported on Windows Server 2008 (SP2) (32-bit).

For a complete list of the supported operating systems and ancillary software components, refer to the *MARS V8 Pre-Installation Manual* (2083129-001).

Approved Software

The following software is approved for use on the MARS Ambulatory ECG System. The addition of non-approved software programs is not recommended or supported by GE Healthcare.

CAUTION:

DO NOT load any software other than that specified by GE Healthcare on the MARS Ambulatory ECG System. Installation of software not specified by GE Healthcare may damage the equipment or cause loss or corruption of data.

MARS Ambulatory ECG System Application

The MARS Ambulatory ECG System application acquires ECG data from electronic ECG recorders and patient monitors. The software provides:

- Multiple techniques of scanning for complex editing.
- Algorithm enhancement for more precise beat and noise detection.
- Up to 12 high-resolution trends simultaneously on one screen.
- Pre-configured standard final reports.
- Dual channel superimposition displayed at up to 240 times real-time.

NOTE:

Depending on which features were purchased with your MARS Ambulatory ECG System, you may need to use the MARS software activator to activate a feature before you can use it. See the *MARS V8 Operator's Manual* (2083129-003) for a list of features that require activation and information on how to activate them.

CardioSoft/CS Diagnostic System

The MARS Ambulatory ECG System is fully compatible with the CardioSoft/CS Diagnostic Systems. CardioSoft/CS client software can operate on a MARS Ambulatory ECG client or standalone workstation. The MARS Ambulatory ECG Server and CardioSoft/CS Servers are qualified to operate simultaneously on the same computer.

NOTE:

You cannot install CardioSoft/CS client software and CardioSoft/CS server simultaneously on the MARS Ambulatory ECG Server.

MARS Web Server

The MARS Web Upload Interface allows remote web clients to upload acquisition information to the MARS server using the Internet (via secure VPN) or the hospital's intranet. The MARS Server and MARS Web Server are qualified to operate simultaneously on the same computer.

InSite ExC

InSite ExC is a support application used by GE Healthcare to deploy remote services over the Internet to equipment behind the customer's firewall. It connects to the customer's existing outbound broadband Internet connection via a VPN tunnel, utilizes 128-bit Secure Socket Layer (SSL) encryption, and complies with existing firewall rules and Web proxies.

Access to the system is restricted to authorized GE personnel only. To ensure that only qualified and trained engineers can access the system, authorized GE Healthcare users will be required to log on with user name and password authentication, and all user and system interactions will be logged. GE Healthcare personnel comply with all patient privacy regulations as defined by applicable government agencies.

To set up and configure the InSite ExC connection, the customer's proxy server information—such as IP address, port number, and authentication protocols—is required.

Support for Virtual Machines

MARS servers and MARS Web servers can be run in virtual environments. However, MARS clients, MARS Web clients, and standalone workstations cannot be run in virtual environments; they must be run on physical PCs.

NOTE:

Do **NOT** install the MARS server on a virtual machine within the CARESCAPE Information Exchange (IX) network. The MARS server can be installed on a virtual machine only if it resides on the Enterprise network; the CARESCAPE IX network does not support MARS servers that are installed on virtual machines.

GE Healthcare Service Responsibilities

GE Healthcare Service supports the MARS Holter system running on the Windows operating systems as stated in this guide, regardless of whether that operating system is installed on a physical or virtual machine. However, GE Healthcare does not provide support for the installation or configuration of the virtual environment or for any feature set provided as part of that environment, such as high availability, fail over clusters, or SAN. To resolve issues specific to the virtual environment, the customer must contact the virtual machine software's vendor.

GE Healthcare Service reserves the right to request the VM's virtual hardware configuration and to request the allocation of additional CPU cores or memory to resolve performance-related issues.

Customer Responsibilities

Customers are responsible for the following when operating the MARS Holter system in a virtual environment:

- Providing virtual machines (VMs) that meet or exceed the physical hardware requirements for servers, as specified in the *MARS V8 Pre-Installation Manual*.
- Providing virtualization software that supports the MARS and MARS Web server operating systems and service packs, as specified in ["Supported Operating Systems" on page 24](#).
- Providing a USB redirect application on virtual machines that house the MARS server, to allow the server to access the USB dongle used to authenticate the MARS system, as described in [Appendix B, "Dongle Drivers"](#).

NOTE:

This is not required if the selected virtualization software natively supports USB redirection.

- Completing the setup and configuration of the virtual machine(s) on which the MARS server and/or MARS Web server will be installed prior to the arrival of the GE Healthcare installation engineer.

System Setup

The following sections outline the basic procedure for setting up the MARS client-server and standalone workstations. When necessary, you are instructed where to look for additional information.

Verifying Appropriate Voltage

WARNING:

CURRENT LEAKAGE — Electrical shock could result from component failure and lack of power isolation.

The MARS system is not intended for use in the patient vicinity. In the event this system is used in the patient vicinity, it must be configured in such a way that it and all of its electrically-connected peripheral devices are isolated from mains power to prevent excessive leakage current to the patient. All non-medical peripheral devices shall comply with IEC and ISO safety standards that are relevant to that equipment (i.e., IEC 60950, UL 60950).

Use of the SEER Light Connect device in the patient vicinity requires that these measures be observed.

To minimize the risk of current leakage and potential electric shock, do the following:

- Verify the voltage of the power source where the MARS Ambulatory ECG System will be located is appropriate for your geographic area (115V or 230V).
- Verify the PC on which you will install the MARS application is set for the correct voltage.

The power supplies of some PC are equipped with a voltage switch that allows users to toggle the power supply between 115V and 230V. If your system has such a

power switch, confirm it is set to the correct voltage for your power source. Failure to set the voltage switch to the proper input voltage may result in damage to the unit when connected to a power source.

If your system does not have a voltage switch, verify in the manufacturer's manual that the power supply automatically detects the power line voltage before you connect it to the power source.

Connecting the Equipment and Peripherals

Use the following guidelines for connecting the MARS System. Customers are responsible for all hardware connections. The following connection guide provides general information. For more detailed port and connection information, refer to the manufacturer's manual.

Configuration Interconnections

Device	Connection
Keyboard and Mouse	Connect to appropriate ports on the MARS workstation.
Monitor	Connect to the appropriate video port on the MARS workstation.
Security Key (dongle)	<p>Connect to a USB port on the MARS workstation. A Security Key is required for installation and use of the MARS application.</p> <p>NOTE: If installing MARS on a virtual machine, the security key drivers must be installed on the system where the key physically resides. See Appendix B, "Dongle Drivers", for details.</p>
SEER Light Connect or SEER 1000 or Multi-card Reader	Connect to a USB port on the MARS workstation.
Printer	<ul style="list-style-type: none"> Connect to the appropriate connection (USB or parallel) on the MARS workstation Connect to an AC power outlet.

Protecting Against Viruses

The customer is responsible for installing antivirus software if the MARS system will be connected to a network. The software's automatic protection option should be enabled, and its virus definitions must be kept current. Discuss virus protection with the hospital Information Systems (IS) department before installing the system on a network.

Although GE does not provide antivirus software, the MARS system was tested with **Norton Antivirus Corporate Edition v10** and **McAfee VirusScan Plus 2009**. Other antivirus products may be used, as long as they are qualified for the operating system and service pack on which they are used. However, GE cannot guarantee full compatibility with other antivirus programs and reserves the right to request that

antivirus software be turned off as needed to troubleshoot or diagnose problems affecting the MARS system.

NOTICE:

AVOIDANCE OF ERRORS — To avoid possible errors during the installation, disable any antivirus software before starting the MARS Installation.

To avoid possible errors while using the MARS installation, configure your antivirus software to exclude the following locations: C:\gemsit, its sub-folders, and your archive target folders.

If your antivirus software supports the exclusion of processes—such as Microsoft Forefront Client Security, Microsoft Forefront Endpoint Protection, Microsoft Security Essentials, and Kaspersky Anti-Virus—configure it to exclude the following processes:

- C:\gemsit\opt\MarsNT\bin\ekpro.exe
- C:\gemsit\opt\MarsNT\bin\ekpro_srvr.exe
- C:\gemsit\opt\MarsNT\bin\superapp.exe

Installing the MARS Application

After the equipment is connected and antivirus software installed, install the MARS Ambulatory ECG System application.

If you are installing the application for the first time, or if you are upgrading an earlier version of the application, refer to the *MARS V8 Installation and Upgrade Guide* (2083129-002).

If you rebuilding an existing system, see [Chapter 7](#), “System Rebuild”.

Connecting to the Network

After the MARS application has been installed, you are ready to connect the MARS clients and servers to the network. For details, see [Chapter 3](#), “Network Setup”.

Verifying the Installation

The final step in setting up the MARS Ambulatory ECG System is to verify it was installed correctly. For details, refer to “Verifying the Installation” in the *MARS V8 Installation and Upgrade Guide* (2083129-002). .

3

Network Setup

This chapter describes the sharing and security settings created by default during the MARS installation, explains how to add users to the default user group or how to add the MARS system to an existing domain, and tells you on where to find instructions to configure the MARS clients for connecting to the MARS server.

Folder Sharing and Security

During MARS installation, the following default accounts and folder shares are created:

Default Accounts

Account Type	Account Name	Description
Local Users	GEService	For GE remote support access (added to local Administrators Group)
	MUSEbkgnd	For MARS to MUSE communication
Local User Groups	MARSWORKGROUP	Includes MARS users who require access to the MARS folder shares

Default Folder Sharing and Security Permissions

MARS System	Folder	Sharing		Security	
		Group/Account	Permissions	Group/Account	Permissions
Server	\gemsit	MARSWORKGROUP	Full Control	MARSWORKGROUP	Full Control
	\gemsit\reports	MUSEbkgnd	Full Control	MUSEbkgnd MARSWORKGROUP	Full Control
Standalone	\gemsit\reports	MUSEbkgnd	Full Control	MUSEbkgnd	Full Control

NOTE:

For more information about the **MUSEbkgnd** account, see [“The MARS to MUSE Option” on page 36](#).

Setting Up Client Network Access

In a client-server configuration, all MARS users logged in at a MARS workstation require access to the `\gemsit` folder on the MARS server where the MARS slot and report files are saved.

When configuring a client-server system, you need to perform two tasks to set up network access on the client:

- Configure the OS network settings on the client and the server.
- Configure the MARS network settings on the client.

Configuring the OS Network Settings

The MARS installation program does two things to facilitate network access between clients and server:

- On servers, clients, and standalone systems, it creates a Windows user group named **MARSWORKGROUP**, which provides secure client access to the server's drive share.
- On servers, it creates a drive share called `x:\gemsit`, where `x:` is the MARS installation drive letter.
On a default installation, `x` is typically `c:\`. This drive share grants read, write, and execute permissions to any member of the **MARSWORKGROUP**, allowing the clients to read and write patient data on the server.

In order to take advantage of the user group and drive share to allow clients to access data on the server, all users of the client must be members of the **MARSWORKGROUP** on both the client and server. There are two methods to achieve this:

- Manually adding users to the **MARSWORKGROUP** on both the clients and the servers.
- Joining the MARS system to a domain.

Both options are described in more detail in the following sections.

NOTE:

For maximum security, a third option is available: the customer can limit drive share access by changing the share permissions for the `\gemsit` folder for individual users rather than for the entire **MARSWORKGROUP** or domain.

Adding Users to MARSWORKGROUP

When you manually add a user to the **MARSWORKGROUP** on both the MARS client and MARS server, the user name and password must match exactly on both systems. Any discrepancy will prevent that user from accessing the data on the server.

This method is not as complicated as joining the MARS system to a domain, but it is more labor intensive: it requires you to maintain users in multiple locations. Each time you add or modify a user account on a client, you must add or modify the corresponding account on the server.

Refer to the Windows documentation for instructions on how to add user accounts to a user group. Apply all changes to both the client and the server.

Joining the MARS System to a Domain

This method is more complicated than using the **MARSWORKGROUP** and local accounts, but it is less labor intensive: it allows you to maintain users in a single location—the domain controller. Any changes to user accounts on the domain controller are reflected on both the server and all clients on the domain. It also reduces the opportunity for conflicts between the clients and the server. The following process assumes that the customer already has a domain controller on the network.

The process of joining the MARS system to a domain consists of the following general tasks. Refer to the Windows documentation for detailed instructions for each task. Work with the local system administrator to modify the site's domain controller as necessary.

1. Add all MARS user accounts to the domain controller.
These users will be able to access any computer that allows access to the domain.
2. Add the MARS server and clients to the domain.
This allows any members of the domain to access both the client and the server.

NOTE:

You may also want to add standalone systems to the domain if you plan to exchange information with a MUSE system.

3. Add all the MARS domain user accounts to the **MARSWORKGROUP**.
This user group has read-write permissions to the `\gemsi` shared folder.
4. Verify that users on the client can view, select, and edit patient records on the server.
This confirms that the MARS system was successfully joined to the domain. Refer to the *MARS V8 Operators Manual* (2083129-003) for instructions on how to view, select, and edit patient records.

Configuring Network Settings on MARS Clients

MARS clients need to know the name or IP address of the MARS Server. This is configured on each client. Refer to the *MARS V8 Operator's Manual* (2083129-003) for more information on network setup for clients.

NOTE:

While you can configure a client for multiple MARS servers, it can only connect to and display the information from one server at a time.

Theory of Operation

This chapter describes the folders and services that are created when the MARS application is installed and provides an overview of four optional features: **MARS to MUSE Communication**, **CIC Interface**, and **Web Upload**.

MARS Folder Structure

During the MARS installation, the installer creates the \gemsit folder on the selected destination drive, typically drive c:. Within the \gemsit folder, the following sub-folders are also created:

\Gemsit Folder Structure

Sub-Folder	Description
AcqBackup	Temporary folder used during acquisition/analysis to back up corrupt files.
Idt	Includes files needed to support MARS Web. For more information, see “The Web Upload Option” on page 42 .
Opt	Holds the MARS Binary Application files.
reports	Stores the MARS Holter Reports. For more information see “Reports Folder” on page 34 .
Scratch	Holds a temporary copy of Slot File during analysis.
slots	Stores patient Holter and monitoring data acquired by the MARS System. For more information see “Slots Folder” on page 34 .
var	Stores MARS configuration, setup, and log files.
Xml	Not currently used.

Reports Folder

The `\reports` folder stores the Holter reports for all patients still active on the MARS system. When a patient is deleted, any reports associated with that patient are also deleted. The report folder is located at `c:\gemsit\reports`.

If purchased, the **MARS to MUSE** option can be used to permanently store reports on a MUSE system.

Slots Folder

Slot files store the patient data acquired by the MARS system. Slot file sizes are dynamic, with new slot files starting at 16 KB and growing in size to accommodate the data being acquired. This differs from earlier versions of MARS, which used static slot file sizes. The slot folder is located in `c:\gemsit\slots`.

Following is a list of slot file types and their associated file naming conventions:

Slot File Types and Names

Slot File Types	Devices Acquired From	Slot File Names
Acquired Monitoring Slot	CIC (data analyzed by MARS)	Acquiredslot0.h72c9.nat
Raw Monitoring Slot	CIC (stored in its raw state)	Monslot0.h72c.nrt
SEER Slot	SEER 12, SEER Light, SEER Light Extend, SEER MC, SEER 1000	Seerslot0.s48.nat
Tape Slot ¹	Tape	Tapeslot0.h48c3.nat

¹ Tape acquisition hardware is no longer supported, but you can import archived tape data into the MARS system.

On a MARS server or standalone system, the user selects the number and type of slots they want to create during the MARS installation. The MARS installer limits the total number of slot files you can create to 300. While the MARS system can accommodate more than this number, the MARS user or administrator should be aware that a large amount of slots can increase the amount of time it takes to display the **Patient Select List**. This is more apparent on clients that must poll across the network to obtain the **Patient Select List** from the server. To increase the number of slot files, or change the slot file type after the initial installation, see [Appendix A, "Slot File Tool User Guide"](#).

On MARS clients, 20 slots of each type are automatically created. The slot files on the client are only used when connectivity to the MARS server is lost. This allows the user to continue to acquire, store, and review data locally until connection to the server is reestablished. Once the connection is restored, the user is prompted to transfer the acquired data to the server.

The slot folder includes a **diskman.dat** file that contains an index of active slot files and reports. Any time new patient data is acquired, a patient is deleted, or a Holter report is saved, the system updates the **diskman.dat** file. The **mars_creatediskmandat** service reads the **diskman.dat** file when the application starts, and intermittently thereafter, and uses the information it contains to generate the MARS **Patient Select List**.

NOTE:

When patients are deleted from MARS, the system does not immediately delete the information from the file. Instead, it marks the record as available in the **diskman.dat** file. The system overwrites the record when new data is acquired.

MARS Services

During the MARS installation, the following services are created:

MARS Services

Service	Description	Option Req'd	Server	Client	Single
MARS.IDT.SlotFileCopier	Checks for patient data that was uploaded to the MARS Web server.	Web Upload	X		
mars_cicbedsync	Accesses the CARESCAPE IX network to keep the list of selected beds current in MARS.	CIC Interface		X	
mars_clientping	Unlocks open patient files, if the client using them goes down.		X		X
mars_creatediskmandat	Initializes the patient list and periodically updates to keep the list current. This service runs once upon system startup and then exits. It is responsible for creating the <code>diskman.dat</code> file.		X		X
mars_EkproSvr	Launches reanalysis of data when requested by client.		X		X
mars_monacqmon	Updates the ciclimit.ini file to restore the correct MARS-CIC acquisition entries in the event the connection between the MARS server and client fails.	CIC Interface		X	
mars_musesvr	Sends patient reports to a MUSE system.	MARS to MUSE	X		X

While all these services are created during initial installation, services that require the purchase and activation of an optional feature (**mars_musesvr**, **mars_cicbedsync**, **mars_monacqmon**, and **MARS.IDT.SlotFileCopier**) are initially stopped and their startup type is set to **Manual**. Activation of an option in MARS starts its service and changes its service startup type to **Automatic**.

For more information about the options associated with these services, refer to the following topics:

- [“The MARS to MUSE Option” on page 36](#)
- [“The CIC Interface Option” on page 36](#)
- [“The Web Upload Option” on page 42](#)

The MARS to MUSE Option

If you purchase the MARS to MUSE option, you can configure the MARS system to save Holter records to a GE Healthcare MUSE system. This requires that the user account configured to start the **generacq** service on the MUSE server have read and write access to the `\gemsit\reports` share on the MARS server or standalone workstation.

By default, the **MUSEBkgnd** account on the MARS server already has all the necessary permissions to the `\gemsit\reports` share. The easiest way to grant the appropriate permissions to the user account configured to start the MUSE **generacq** service is to create a local account on the MUSE server with the same user name and password as the **MUSEBkgnd** account on the MARS server.

If the account name or password is changed on either system, the MARS to MUSE option will break. Therefore, it is necessary to duplicate any changes to the account on both systems to ensure the option continues to work.

NOTE:

Do not modify the **generacq** logon account on the MUSE system to match the **MUSEBkgnd** account on the MARS system. You must always modify the account on the MARS system to match the account on the MUSE system.

If you choose to use a domain account for the MUSE **generacq** service instead, you must ensure that the domain account has access to the `\gemsit\reports` share (see [“Folder Sharing and Security” on page 29](#)).

The CIC Interface Option

The CIC Interface option allows the MARS system to acquire full disclosure (FD) data from bedside monitors connected to the GE Healthcare CARESCAPE Monitoring Network. The data collected from the bedside monitors are stored on a Central Information Center (CIC) that resides on the CARESCAPE Information Exchange (IX) network. Multiple CICs may reside on the same IX network.

Following is an overview of the MARS-CIC work flow:

1. The MARS client requests a list of available beds from a CIC.
2. On the MARS client, the user selects from the list which beds to monitor.
3. The MARS client's **mars_cicbedsync** service polls the CIC at regular intervals for patient information and available FD data for the selected beds.
4. On the MARS client, the user selects the bed(s) from which to acquire data.
5. The MARS client requests the FD data from the CIC where the data is stored.
6. The CIC transfers the stored FD data to the MARS client.
7. The MARS client temporarily stores and compresses the FD data.
8. The MARS client transfers the compressed FD data file to the MARS server, where it is available for review by all MARS clients.

The following sections provide more detail about the CIC Interface requirements, network connectivity, and restrictions.

Requirements for Using the CIC Interface

Before you can use the CIC Interface, certain requirements must be met by both the CIC and MARS systems.

The following requirements must be met by each CIC that will provide FD data to the MARS system:

- It must be a CIC Pro V5.1 or CARESCAPE Central Station V1.
- It must be licensed for full disclosure.
- It must have at least 10 minutes of stored FD data.

For more information, refer to the documentation that accompanied your CIC Pro or CARESCAPE Central Station system.

The following requirements must be met by each MARS client that will acquire FD data from the CIC:

- The client must have adequate disk space for the volume of FD data to be acquired. When the client downloads FD data, it temporarily compresses and stores the files locally before uploading them to the server. The client must have adequate free space for that data. For more information about the size of FD data files and their compression ratio, see [“Data File Sizes” on page 37](#).
- The client must be connected to the CARESCAPE IX network. You have two options for connecting the MARS client to the CARESCAPE IX network. See [“Network Connectivity” on page 37](#) for a description of each option.
- The CIC Interface option must be activated and configured on the client. This enables the client to begin acquiring FD data from the CIC. For more information, see [“Activating and Configuring the CIC Interface” on page 38](#).

Data File Sizes

Full Disclosure data file size varies depending on the number of channels and the number of hours acquired. On the CIC, a full 76-hour FD data file can be 1.0 to 1.5 GB, while a 24-hour FD data file is approximately one-third that size at 341 to 512 MB.

When MARS client acquires FD data from the CIC, it compresses the file and stores it in the MARS Slot File folder on the MARS server. While the amount of the compression varies depending on the quality and consistency of the data, it is approximately one-half the original file size. So, the storage requirements would range from approximately from 170–256 MB for a 24-hour record to 512–768 MB for a 76-hour record. Keep that in mind when sizing your disk drive.

Network Connectivity

The MARS clients that acquire data from the CIC can reside on either the hospital's Enterprise Network or on the CARESCAPE IX network.

- **MARS clients on the CARESCAPE IX network**

Clients on the IX network can communicate directly to the CIC, but they require a router to communicate to the MARS server, which is typically installed on the Hospital Enterprise Network. Data transfer on this network consists of:

- FD data transferred from the CIC(s) to the MARS client over the IX network.
- Acquired data transferred from the MARS client through the router to the MARS server on the Enterprise network.
- **MARS clients on hospital's Enterprise network**
Clients on the Enterprise network can communicate directly to the MARS server, but they require a router to communicate to the CIC on the IX network. Data transfer on the network consists of:
 - FD data transferred from the CIC on the IX network through a router to the MARS client on the Enterprise network.
 - Acquired data transferred from the MARS client to the MARS server across the Enterprise network.

MARS workstations requiring router access to either the IX network or the MARS server need a default gateway address and subnet mask assigned, depending on how the network design is implemented. For example, if the MARS workstation is on the IX network, it needs access to the MARS server on the Enterprise network, and the MARS server on the Enterprise network needs access to the MARS workstation on the IX network. This is shown in the following diagram:



In this example, the MARS client requires a default IP address for Gateway 1 and the MARS server requires a default address for Gateway 2.

Activating and Configuring the CIC Interface

Activating the CIC Interface option is done on the **System: Software Activator Setup** window and enables the CIC services that were installed with the MARS application. Configuring the CIC Interface option is done on the **System: CIC Configuration** window and identifies the IP addresses of the CICs and MARS servers with which the MARS client will communicate. For information on both processes, refer to the *MARS V8 Operator's Manual* (2083129-003).

Description of the CIC Services and Files

After the CIC Interface is activated and configured, it uses several files and services to initiate and track communication with the CIC. The following table provides additional information about those files and services:

Item	Description
Primary MARS server	The MARS server that contains the ciclimit.ini file. Only one primary server can exist .
Secondary MARS server	Any MARS server not designated as primary. Secondary servers contain the cic.ini file. Any number of servers may be designated as secondary.
ciclimit.ini	<p>Stored on the primary MARS server, this file contains information about the MARS clients currently connected to each CIC. This file is automatically updated as connections open and close. Following is an example of an entry in the file:</p> <p>3.62.121.1 = "MARSCLIENT02" "MARSCLIENT03" "MARSCLIENT05"</p> <p>This entry indicates that three MARS clients (MARSCLIENT02, MARSCLIENT03, and MARSCLIENT05) are connected to the CIC at 3.62.121.1.</p> <p>NOTE: If the connection between a MARS client and the server is lost, the client will not be able to access this file. In this case, the client will not be able to initiate communication with the CIC until the connection with the server is reestablished. If a download is in process when the connection is lost, the data will be stored locally on the client.</p>
cic.ini	<p>Stored on each secondary MARS server, this file contains an entry labeled CIC_PrimaryServer, which the secondary servers use to identify the IP address of the primary MARS server so they can locate the ciclimit.ini file.</p> <p>NOTE: This information is entered via the System: CIC Configuration window within the MARS application. Manual entry of data in this file is not needed or recommended.</p>

Item	Description
<i>mars_cicbedsync</i>	<p>This service is installed on each MARS client that acquires data from a CIC. It polls the CIC on the IX network using Port 9001 at regular intervals and returns the following information for all beds with available FD data on the Selected Bed List :</p> <ul style="list-style-type: none"> • Name of care unit • Bed number • Patient name • Patient ID • Start time (start of available FD data) • End time (end of available FD data) • Status (admitted or discharged) <p>Beds with no available FD information are not displayed in the MARS system.</p>
<i>mars_monacqmon</i>	<p>This service is installed on each MARS client that acquires data from a CIC. It periodically determines whether the client is connected to a CIC and either adds or deletes an entry in the ciclimit.ini file as necessary to ensure that the file accurately reflects the current CIC connection status.</p> <p>For information on configuring this service, refer to "Configuring the CIC Monitoring Service".</p>

Configuring the CIC Monitoring Service

When you activate the CIC Interface, the ***mars_monacqmon*** service is set to start automatically. By default, the service runs using the **Local Service** account. Because the service monitors connections between the MARS clients and CICs and updates the **ciclimit.ini** file, the service must be modified to run using an account with read and write access to the network share where the **ciclimit.ini** file is located.

The following procedure must be performed on each MARS client that will be set up to acquire FD data.

1. From the system desktop, select **Start > Run**.
The **Run** dialog box opens.
2. Type `services.msc` and press **Enter**.
The **Services** window opens.
3. Locate the ***mars_monacqmon*** service, right-click on it, and select **Properties** from the popup menu.
The **MARS_MONACQMON Properties** dialog box opens.
4. Select the **Log On** tab.
5. Select the **This Account** radio button and enter the name and password of the account this service should use to log on.

The logon account must be a user with Full Control permissions under both the **Sharing** and **Security** tabs for the `\gemsit` folder share on the MARS server. Any account can be used, including a domain account, as long as the

correct permissions have been set and the account and password exist on both the client and the server. It is recommended that the same account used by the ***mars_monacqmon*** service on all clients and that it be added to the **MARSWORKGROUP** user group on the MARS server. During installation, the **MARSWORKGROUP** user group is given the correct permissions to the `\gemsit` folder share.

6. After you enter the user name and password, click **OK**.
7. Click **OK** for any messages that open.
8. Restart the system.
9. Configure the MARS clients.

Refer to the *MARS V8 System Operator's Manual* (2083129-003) for information on configuring the clients.

CIC Performance

Excessive connections between MARS clients and a single CIC unit could potentially affect the performance of the CIC unit. Therefore, the MARS system implements two methods to limit a negative impact on CIC performance.

CAUTION:

GE Healthcare provides network services to recommend an appropriate network design to ensure the performance of the IX network and the CIC. DO NOT connect additional MARS clients to the IX network without first reviewing their impact to network and CIC performance with GE Healthcare.

CIC Connection Limits

The CIC Interface limits the number of concurrent connections: no more than three (3) MARS clients can connect to a single CIC unit concurrently. Before a MARS client can initiate a download from a CIC, it must verify that it will not exceed the maximum number of connections for that CIC.

To monitor these connections, the MARS system uses a file called ***ciclimit.ini***, located in the `\gemsit\var\MarsNT\system` directory on the MARS server. For large installation with multiple servers, one is designated as the primary server and the rest are designated as secondary servers. The ***ciclimit.ini*** file is stored only on the primary MARS server; the secondary servers contain a file called ***cic.ini***, which identifies the IP address of the primary server.

Before a MARS client acquires data from a CIC, it opens the ***ciclimit.ini*** file and counts the number of MARS clients already connected to the CIC. If the number of connected clients is already at the limit, a message displays on the client indicating that the limit has been reached. If the number of connected clients does not exceed the limit, the client adds its name to the entry for that CIC and begins the download. When the download is complete, the MARS client opens the ***ciclimitl.ini*** file and removes its name from the entry for that CIC to free up that CIC for another connection.

If the connection between a MARS client and server is lost, the MARS client will not be able to update its entry in the ***ciclimit.ini*** file. To correct this, the ***mars_monacqmon*** service runs periodically on each client and updates the ***ciclimit.ini*** file appropriately when the client/server connection is restored.

Network Usage

In addition to limiting the number of concurrent MARS connections to a single CIC, the CIC Interface also controls the flow of FD data to connected MARS clients.

If multiple beds are selected for acquisition from a single MARS client, the data is acquired sequentially. That is, the second bed is not acquired until the first bed completes. While network usage is longer, the amount of network bandwidth used is the same as a single bed acquisition.

If two or more MARS clients are acquiring bed data from different CICs at the same time, the data is acquired simultaneously. This uses a larger amount of network bandwidth than acquiring from a single CIC.

Due to the large size of FD files being transmitted, if more than one MARS workstation is accessing the IX network at the same time, network switches, routers, and trunks must be sized correctly to handle the additional traffic.

The Web Upload Option

The Web Upload Interface is a MARS option that allows remote clients to acquire Holter data and upload it to a central MARS Web Server. When the MARS Server detects new Holter data on the MARS Web Server, it copies the data for analysis, reporting, and archiving. The MARS Web Upload Interface is intended to be used by facilities that do not have the personnel, resources, or budget to conduct their own data analysis.

The following sections provide a high-level overview of the MARS Web Upload Option. For detailed installation instruction, operating instructions, and troubleshooting assistance, refer to the *MARS V8 Web Server Installation Manual* (2083129-005) and *MARS V8 Web Client Operator Manual* (2083129-006).

MARS Web Upload Components

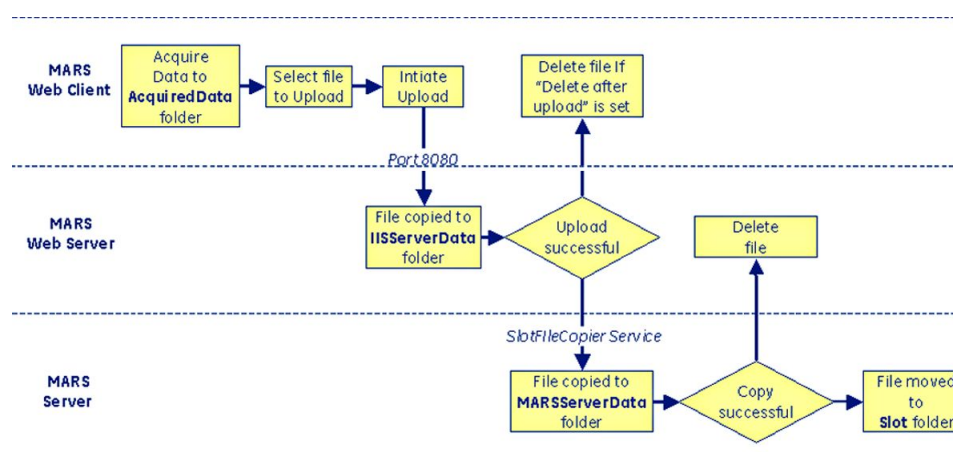
The MARS Web Upload Interface consists of three main components, each of which perform a different step in the process:

1. **MARS Web Client:** Acquires data at the user PC and transmits data to the MARS Web Server.
2. **MARS Web Server:** Receives data from the user PC.
3. **MARS Server:** Copies data from the MARS Web Server to the MARS Server.

NOTE:

The MARS Web server can be physically installed on the same PC on the MARS server.

The following diagram shows the high level data flow from the MARS Web client to MARS server.



The following information discusses each component in more detail. GE Healthcare recommends keeping default folders and ports to avoid adding complexity to the flow of data. Using the default settings simplifies troubleshooting and reduces service calls.

MARS Web Client

The MARS Web Client acquires data at the user's PC and transmits it to the MARS Web Server. Data acquired at the user PC is stored in a local folder specified in the Web Client settings on the PC. The default local folder is `c:\gemsit\idt\var\acquireddata`. This is created the first time the Web Client acquires Holter data. After the Web Client successfully acquires the data, it is compressed to reduce transmission times when uploaded to the Web Server.

Each Web Client must specify:

- IP address of the MARS Web server
- Server port to use for the MARS Web server (default 8089)

NOTE:

The server port specified on the Web Client is for data transmission only. The port that establishes the initial communication between the client and Web server is port 80.

- Archive folder path where the data files are stored locally (default acquired data)

MARS Web Server

The MARS Web Server temporarily holds the Holter data transmitted by the MARS Web Client. By default, the files are transmitted using port 8089.

NOTE:

If you change this port, you must reconfigure it on the MARS Web server and each Web client. Refer to the *MARS V8 Web Server Installation Manual* (2083129-005) for details.

Uploaded files are stored temporarily to a folder location identified as the `ArchiveFolderPath`, which is in `c:\gemsit\idt\var\IISServerData` by default. The default location can be changed by modifying the `holterstream.ini`

file, which is located in `c:\gemsit\var\MarsNt\idt_config` on the MARS Web server.

NOTE:

Due to the way the MARS system parses the folder path, the path must be entered using double slashes (\\) in place of a single slash (\). For example, in the `HolterStream.ini` file, you must enter the path `c:\gemsit\idt\var\IISServerData` as `"c:\\gemsit\\idt\\var\\IISServerData"` (including the quotation marks). This same pattern occurs in other places in the MARS system.



MARS Server

The MARS Server uses the **MARS.IDT.SlotFileCopier** service to move the Holter data from the MARS Web Server and make it available for review and analysis on the MARS system. For details, refer to ["Slot File Copier" on page 44](#).

Data successfully moved to the MARS Server is automatically deleted from the Web Server. If an open slot file is available on the MARS server, the data is moved from the **MARSServerData** folder and placed into the open file. If no slot files are open, the file remains in the **MARSServerData** folder and the display for the **Web Alert** icon that displays on each MARS client is changed to notify the user that there are pending files waiting for an open slot file. Once a slot becomes available, the file is automatically moved to the open slot file and deleted from the temporary folder.

MARS Web Upload Services and Files

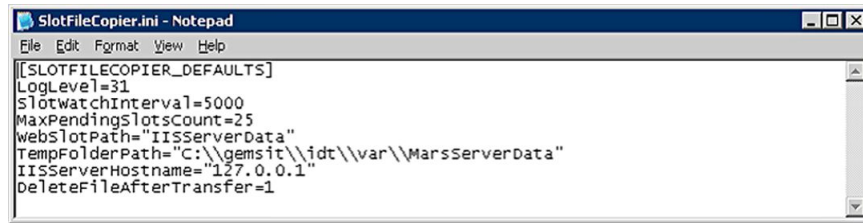
The MARS Web Upload option uses a couple of services and an ini file to control the communication between the MARS Web Client, MARS Web Server, and MARS Server.

Slot File Copier

The MARS Server uses the **MARS.IDT.SlotFileCopier** service to periodically poll the **IISServerData** folder on the MARS Web Server for new Holter data. When it finds new data, it copies the record to a temporary file located at `\gemsit\idt\var\MarsServerData` on the MARS Server. If there are available slots, it then moves the Holter data to the available slot and deletes both the temporary records on the MARS server and the MARS Web Server.

To determine the location of the MARS Web Server, the path and name of the folder where the Holter records are stored, the **MARS.IDT.SlotFileCopier** service reads the

values stored in \gemsit\var\MarsNT\idt_config\SlotFileCopier.ini on the MARS server.



The following table identifies the default values in the .ini file. The file can be modified as appropriate.

SlotFileCopier.ini File

Variable Name	Default Value	Description
Webslotpath	IIServerData	The name of the folder on the MARS Web Server used to temporarily store the uploaded data files from the Client. IIServerData is the default and you usually do not need to change it.
TempFolderPath	c:\\gemsit\\idt\\var\\MarsServerData	The path to the folder that temporarily stores the data files that copied from the Web Server to the MARS Server. MarsServerData usually does not need to change.
IIServerName	127.0.0.1	The IP address of the MARS Web Server. If the MARS Web Server is on the same server as MARS, you can use the default IP address. If it is on a separate server, you must enter the correct IP address.

NOTE:

If you modify the default values, you must enclose all values in quote marks ("").

The **MARS.IDT.SlotFileCopier** service must have full permission to move data from the **IIServerData** folder on the MARS Web Server.

One way to do this is to assign the **GEService** account as the logon account for the **MARS.IDT.SlotFileCopier** service on the MARS server. You must also duplicate the account on the MARS Web Server and assign **Full Control** permissions for **Sharing and Security** to the **IIServerData** folder. Changing the account or password in one location requires changing it in the other.

If you choose to use a domain account as the logon account for the **MARS.IDT.SlotFileCopier** service and the **IIServerData** folder share, assign account administrator privileges to the MARS server.

MARS.IDT.RemotingService

While the **MARS.IDT.SlotFileCopier** service controls communication between the MARS Server and MARS Web Server, **MARS.IDT.RemotingService**, which is installed on the MARS Web Server during installation, handles logon and communication between the MARS Web Client and the MARS Web Server. Configuration of **MARS.IDT.RemotingService** is automatic and does not require manual intervention.

MARS Web Alert

The MARS Web Upload uses the Web Alert icon to notify users when Web Upload files are waiting for an open slot file.



For the MARS Web Alert icon to display correctly, MARS users must have permissions to the `c:\gems\it\var\MarsServerData` folder on the MARS server. To do this, share the `MarsServerData` folder and assign the **MARSWORKGROUP** full control permissions for sharing and security.

Maintenance

A regular preventative maintenance program helps prevent unnecessary equipment and power failures and reduces possible health hazards. Because the customer owns the equipment on which the MARS Ambulatory ECG system resides, the sole responsibility for establishing and executing said maintenance program rests with the individual or institution using the equipment.

While the customer should refer to the manuals that accompanied their equipment for details, GE Healthcare recommends that the maintenance routine include the following:

- Visual inspection of the equipment for damage
- Cleaning the cooling fans and ventilation obstructions
- Cleaning the exterior and interior of the equipment
- Cleaning the equipment's peripherals, such as keyboard and monitors

Typically, these maintenance activities are performed annually and whenever internal assemblies are serviced.

NOTE:

Customers who upgraded legacy, GE-supplied hardware should refer to the documentation that accompanied the original equipment for maintenance information.

Backing Up and Storing Data

Before performing any service on the MARS Ambulatory ECG System or its components, it is recommended that you back up patient data and system configuration. This section describes how to archive Holter data, how to back up Holter data, and how to back up the system configuration.

Archiving Data

MARS is not intended for long term storage and provides two methods for saving data. It is highly recommended that MARS users establish a formal schedule or process to ensure data is archived or saved on a regular basis to limit loss of data in the event of a hard drive failure. Data and reports should be archived or saved as soon as possible after completing the analysis and creating the report to limit any exposure of the data to a system failure.

Use one of the following methods to save and store reports and data.

- **MARS Archive**

MARS provides an archive feature that allows you to save both Holter reports and Holter data to a CD, DVD, USB drive, or network share. Once archived, you can delete the report or data file from the MARS system. You can restore archived reports and data to the MARS system from the storage location. If you are saving to a network share, MARS users must have read and write permissions to it. Archives on network and local drives are limited to a maximum of 5000 records, regardless of available space on the drives. Once your system reaches this limit, you need to specify a new archive location before you can archive additional patient records. Each archive folder creates its own index file, which is updated each time a new report or slot file is archived.

NOTE:

The **Archive** and **Restore from Archive** features are described in the *MARS V8 Operator's Manual* (2083129-003).

- **MARS to MUSE**

Customers who have activated the MARS to MUSE option (see [“The MARS to MUSE Option” on page 36](#)) can store final Holter reports to a GE Healthcare MUSE system. Once the MARS reports are stored on the MUSE system, the Holter report can be viewed and printed from any MUSE client and is backed up as part of the MUSE database. The MUSE system does not store the raw Holter data. To store raw Holter data, you must use the MARS archive process.

MARS to MUSE requires installation of the MARS print formatter on the MUSE system in order to print full Holter Reports. In addition, the MUSE system must have read/write permissions to the `\gemsit\reports` folder on the MARS system. Contact GE Healthcare Technical Support or the local MUSE administrator for more information.

Backing Up Holter Data

Newly acquired data reside in slot files on the MARS server or MARS standalone system until it is archived. During this time the data and reports are stored locally and can be lost if the system fails. Customers concerned about data loss during this time should consider using a system with additional fault tolerance, such as RAID, to limit loss of data due to a single hard drive failure.

To back up Holter records, you need to back up the following folders:

- `C:\gemsit\reports`
- `C:\gemsit\slots`

NOTE:

Establishing a regular backup schedule is the customer's responsibility. You may use any backup utility in place at the customer site, as long you can restore the **reports** and **slots** folders on the MARS system when needed.

Backing Up the System Configuration

You should backup system setups after making a change to any item listed in the **System > System Setup** menu. Use the following procedure to back up the MARS system's setup files.

1. From the top menu in MARS, select **System > System Setup > Backup and Restore**.
2. Enter a name for the backup file and browse to the path where you want to store the backup file.

If you are saving to a network drive, map the drive share on the MARS system first so it is available in the list.

Additional instructions are included in the *MARS V8 Operator's Manual* (2083129-003).

To restore the system setups, follow instructions included in the *MARS V8 Operator's Manual* (2083129-003).

Safe Shutdown Procedures

Before performing any maintenance or replacing any peripherals, it is recommended that the computer hosting the MARS application be shut down. The following procedures describes how to shut down the system in a safe and controlled manner.

Shutting Down a MARS Client or Standalone Workstation

1. Close all patient tests.
2. Exit the MARS application.
3. Close any open browser windows or other applications.
4. Shut down the Windows operating system.

Depending on the configuration, shutting down the operating system typically turns off the equipment automatically.

Shutting Down a MARS Server

1. Before shutting down the MARS server, notify all MARS users of the scheduled shutdown.
2. Request users to close any open patient tests they are accessing on the MARS server.

NOTE:

Clients can continue to acquire data while the server is shutdown. Any newly acquired tests are stored locally on the client. As soon as the connection to the MARS server is re-established, any locally stored test is moved to the MARS server.

3. Exit the MARS application.

4. Close any open browser windows or other applications.
5. Shut down the Windows operating system.
Depending on the configuration, shutting down the operating system typically turns off the equipment automatically.

Checkout Procedures

Use the following checkout procedures as appropriate. For detailed instructions for performing any of the functional tasks (such as acquiring data, selecting patients, and so forth) refer to the *MARS V8 Operator's Manual* (2083128-003).

Visual Inspection

Before performing any functional checkout, conduct a thorough visual inspection for the following:

- Signs of cracks or any other visual damage to the case or monitor.
- Signs of fraying or damage to cords and cables.
- Bent prongs or pins in plugs, cables, and connectors.
- Secure seating of all cords, socketed components, and connectors.

If system was opened, you should also verify that the interior is free of excessive dust buildup. If necessary, use commercially available compressed air to clean, following manufacturer's instructions.

Acquisition Device Checkout Procedures

Whenever an acquisition device is added, replaced, or repaired, the checkout procedure appropriate for that device should be performed:

Acquisition Device Checkout Procedures

Device	Checkout Procedures
Multimedia Card Reader (external)	Multimedia Card Reader (See "Multimedia Card Reader" on page 50.)
OmniDrive (external)	OmniDrive (See "OmniDrive" on page 51.)
SEER LT Recorder (external)	SEER LT Recorder (See "SEER LT Recorder" on page 51.)
SEER 12 Recorder (external)	SEER 12 (See "SEER 12" on page 51.)
SEER 1000 Recorder (external)	SEER 1000 (See "SEER 1000" on page 51.)
SEER MC Recorder (external)	SEER MC (See "SEER MC" on page 51.)

Multimedia Card Reader

1. Insert a CompactFlash card and verify that the system recognizes it.
2. Confirm that you can view the contents of the card.
3. Confirm that you can open files from and save files to the card.
4. Confirm that you can acquire data into the MARS system from the card.

OmniDrive

1. Insert the card and verify that the **Download** screen opens.
2. Select **Start**.
3. Verify that the download completes.

SEER LT Recorder

1. Insert the card and click on the **Acquire Data** icon.
2. Verify that the **Download** screen opens.
3. Select **Start**.
4. Verify that the download completes.

SEER 12

1. Insert the card and click on the **Acquire Data** icon.
2. Verify that the **Download** screen opens.
3. Select **Start**.
4. Verify that the download completes.

SEER 1000

1. Connect SEER 1000 recorder to the MARS workstation using the USB cable.
2. Press the **Acquire Data** icon.
3. Verify that the **Download** screen opens.
4. Select **Start**.
5. Verify that the download completes.

SEER MC

1. Insert the card and click on the **Acquire Data** icon.
2. Verify that the **Download** screen opens.
3. Select **Start**.
4. Verify that the download completes.

System Checkout Procedures

A complete system functional checkout is required for non-FRU repairs and typically involve MARS setup and tasks that can be performed remotely or onsite. If performed remotely, the remote support engineer can confirm via remote access, or verify with the customer contact. For additional instructions, refer to the *MARS V8 Operator's Manual* (2083129-003).

Certain checkout procedures are performed only if the corresponding peripheral or option is present and activated.

Acquiring Data From SEER Card

1. Insert the card and click on the **Acquire Data** icon.
2. Verify that the **Download** screen opens.
3. Select **Start**.
4. Verify the download completes.

Acquiring Data from CIC

1. Open **Patient Select**.
2. Choose **Select Beds** from the **Data Types**.
3. Select a patient bed with full disclosure information available.
4. Click **Acquire Data**.
5. Verify that the monitoring data is acquired and displayed on the **Patient List** when complete.

Acquiring Data via MARS Web

1. Log on to the MARS Web Server from a Web Client.
2. Acquire data at the client.
3. Verify that the data is acquired on the client.
4. Verify that you can upload the acquired data from the client to the Web Server.
5. Verify that you can see the acquired data from a MARS workstation.

Transmitting to MUSE

1. Select the patient, select the tools, and then transmit to the MUSE system.
2. Verify data is transmitted to the MUSE system.

Archiving

1. Select the patient, go to **Tools**, and select **Archive**.
2. Select the patient and choose **Restore**.
3. Verify the patient is restored to the **Patient Select** screen.

Login

1. Have the user log on to the MARS system.
2. Verify the user is successfully able to log on.

Printing

1. Select a patient.
2. Select **Page Review** and select **Print**.
3. Verify the strip prints.

Selecting Patient Data from a Remote MARS

1. Go to **Data Type** and ensure that another MARS system is listed.
2. Verify remote MARS patient data is available in **Patient Select**.

Editing

1. Select a patient.
2. Verify you can edit the data.

Connecting Remotely

Use the following procedure to verify the system can be accessed for remote support.

1. Log on to the system using the remote configuration configured for that system (InSite ExC).
2. Confirm that you can access the customer's desktop via the remote connection.

Time Changes

MARS workstations not being used to acquire FD data from the CIC have no special date/time constraints. You can adjust Daylight Savings Time (DST) using the Windows Automatic DST function or you can manually adjust it twice a year, depending on customer preference.

Ideally, MARS workstations communicating with the Carescape IX network, for the purpose of acquiring FD information from the CIC, should have their time\date setting adjusted at the same time as the CIC's to ensure the time stamp on the data received from the CIC and displayed on MARS is the same.

There are three possible time settings/services that could cause the MARS time\date settings to change, independent of the CIC time setting:

- Windows Automatic DST setting
- Windows Time service
- Internet Time Sync

The user should be aware that any of the above automatically adjusts the time on the MARS workstation during DST and could cause the time on the CIC and MARS to differ by one hour until both the CIC and MARS daylight saving time adjustments are complete. If both DST adjustments are made during off peak hours, when you are not using MARS for FD acquisition, this may not present any noticeable timing issues.

Consult with your IT department or network administrator to determine if you should disable any of the above settings\services on the MARS workstation you are using for FD acquisition.

6

Troubleshooting

This chapter provides information to help you isolate, identify, and resolve problems with the MARS system, moving from the general to the specific.

NOTE:

If you cannot resolve an issue using the information in this chapter, contact technical support for additional assistance.

Initial Questions

If the MARS application is not working properly, start by asking yourself these basic questions to help narrow the cause of the problem.

- Are the unit and all peripherals turned on and connected?
If any system component is not turned on or properly connected, correct the condition to see if that resolves the problem.
- Have there been any changes in the use, location, or environment of the equipment that could cause the failure?
For example, has the equipment been moved to a location with an inadequate power source? If so, return the equipment to its original location to see if that resolves the problem.
- Has the unit been modified in any way, either in software or hardware?
For example, has any unapproved, third-part software been installed on the system? If so, uninstall the software to see if that resolves the problem.
- Is operator error the cause of the problem?
Try to repeat the user's scenario exactly and compare the process and results to the proper operation of the equipment as described in the system's operator's manual.

Visual Equipment Inspection

If running through the initial questions does not help resolve your problem, the next step is to visually inspect the equipment.

A thorough visual inspection of the equipment can save time. Small things—disconnected cables, foreign debris on circuit boards, missing hardware, loose components—can frequently cause symptoms and equipment failures that may appear to be unrelated and difficult to track.

Take the time to make all the recommended visual checks identified in the following visual inspection chart before starting any detailed troubleshooting procedures. If a failure condition is identified, that condition should be corrected before the user of the MARS system is resumed.

NOTE:

The following list of visual checks is provided as a guideline. Because customers own the equipment on which they installed the MARS application, they are responsible for the maintenance and troubleshooting of all hardware. Before performing any visual inspection of the equipment, the customer should be sure to review, understand, and follow any technical instructions that accompanied the equipment. For legacy systems that include GE-supplied hardware, customers should review the service manual that accompanied the legacy system for platform specific information.

Visual Inspection List

Area	Look for the following problems:
I/O Connectors and Cables	<ul style="list-style-type: none"> • Fraying or other damage • Bent prongs or pins • Cracked housing • Loose screws in plugs
Interface Cables	<ul style="list-style-type: none"> • Excessive tension or wear • Loose connection • Strain reliefs out of place
Circuit Boards	<ul style="list-style-type: none"> • Moisture, dust, or debris (top and bottom) • Loose or missing components • Burn damage or smell of over-heated components • Socketed components not firmly seated • PCB not seated properly in edge connectors • Solder problems: cracks, splashes on board, incomplete feed-through, prior modifications or repairs
Ground Wires/ Wiring	<ul style="list-style-type: none"> • Loose wires or ground strap connections • Faulty wiring • Wires pinched or in vulnerable position
Mounting Hardware	Loose or missing screws or other hardware, especially fasteners used as connections to ground panes on PCBs
Power Source	<ul style="list-style-type: none"> • Faulty wiring, especially AC outlet • Circuit not dedicated to system <p>(Power source problems can cause static discharge, resetting problems, and noise.)</p>

Log File Review

If visual inspection of the equipment did not isolate the cause of the problem, the next step would be to review the system's log files to identify both the exact point the error occurred and the conditions that led to the error. The MARS system provides several log files to record a variety of transactions. Understanding what each log file records will help you identify which log file to review. For example, if you encounter an issue during installation, you would want to review the installation log.

The following sections describe the log files found on the MARS server and client, the MARS Web Client, and the MARS Web Server.

MARS Server and Client

The following table defines the files that are found at `c:\gemsit\var\MarsNT\log` on the MARS server and client.

MARS Server and Client Log Files

Log File	Purpose
SlotFileCopier.log	Records activity between the <i>slotfilescopier</i> service and the Web Server.
SlotFileUtilErrLog.log	Records activity on the uploaded slot files on the MARS server.
Scribe.log ¹	Logs acquisition, analysis (ekpro) and file transfer of CIC data.
BedSync.log ¹	Logs <i>mars_cicbedsync</i> service operation.
MARS_install_eng ¹	MARS installation log in English.
MARS_install_sel ¹	MARS installation log in the selected language.

¹ These log files are located on both the MARS server and client.

MARS Web Client

The following table defines the log files that are found at `c:\gemsit\idt\var\log` on the MARS Web Client.

MARS Web Client Log Files

Log File	Purpose
Devmgrerrlogger.log	Records communications between the MARS Web client and the Holter device.
Webclientui.log	Records activity occurring on the Web Client.

MARS Web Server

The following table defines the log file that is found at `c:\gemsit\idt\var\log` on the MARS Web Server.

MARS Web Server Log File

Log File	Purpose
MarsHTTPSRemotingService	Records data upload transactions.

Specific Errors

The following sections list specific error conditions that have been identified for some optional MARS features. For each error condition, possible causes have been identified.

Specific MARS Web Upload Error Conditions

The following table lists some specific error conditions that have been identified with the MARS Web Upload option. For more detailed information, refer to the *MARS V8 Web Server Installation Manual* (2083129-005) and the *MARS V8 Web Client Operator's Manual* (2083129-006).

MARS Web Upload Errors

Problem	Possible Causes
User cannot log on	<ul style="list-style-type: none"> User using wrong logon account or password. User not set up in User List on MARS Web Server. User not specifying web server port in URL, if other than 80. User is using their Windows domain account to log on under Forms Authentication. The Default Web Site on the Web Server stopped. The MARS.IDT.RemotingService on the Web Server stopped. The Network Service account does not have permission to the gemsit folder on the Web Server. The correct version of ASP.NET (v1.1.4322) is not registered on the MARS Web Server.
Client software does not install	<ul style="list-style-type: none"> .NET Framework was not installed. User does not have rights to install new software. An earlier version of MARS Web Client was not uninstalled correctly. Contact GE Technical Support.
Data cannot be acquired on the Web Client	<ul style="list-style-type: none"> Wrong Drive Card letter is specified in Client Settings. Wrong Primary data drive is specified in Client Settings.
Data cannot be uploaded from the Web Client	The ArchiveFolderPath in the holterstream.ini file on the Web Server points to a folder that does not exist.

MARS Web Upload Errors (cont'd.)

Problem	Possible Causes
Data does not copy from Web Server to MARS Server	<ul style="list-style-type: none"> The MARS Web option is not activated on the MARS Server. MARS.IDT.Slotfilecopier service on the MARS Server is stopped. The GEService¹ user account is not set as the logon account for slotfilecopier service on the MARS Server. GEService¹ user account does not have Full Control permissions to IISServerData folder on the Web Server. Logon account for Slot File Copier Service is not part of the Administrators Group. The wrong IP address for the Web Server is in Slotfilecopier.ini or quotes are missing. The TempFolderPath in the SlotFileCopier.ini points to a folder that does not exist, or there is a syntax error in line entry (quotes and \). The WebSlotPath in the SlotFileCopier.ini does not point to the IISServerData folder, or quotes are missing in the line entry. The slots folder on the MARS Server is full. The Web Alert icon displays actions that are needed.
Web Alert icon on MARS client not working	MarsServerData folder on MARS server not shared to MARSWORKGROUP.
MARS Web client behavior is erratic	Internet Explorer Active X control security settings not enabled.

¹ **GEService** is the recommended account. If you use a different account, that account must meet both conditions listed here.

Specific CIC Interface Error Conditions

The following table lists some specific error conditions that have been identified with the CIC Interface option. For more detailed information, refer to the *MARS V8 Installation and Upgrade Manual* (2083129–002)

CIC Interface Errors

Problem	Possible Causes
MARS Acquisition Workstation cannot acquire data from CIC	<ul style="list-style-type: none"> • CIC Interface option is not activated on the MARS Client. • CIC that MARS is connecting to is not at v5 or higher. • CIC does not have full disclosure enabled. • CIC IP addresses specified in the CIC Configuration on MARS are wrong. Ping the CIC from MARS. • No connectivity between MARS workstations and CIC—no ping returned. • Bed was not moved into the Selected Bed list in CIC configuration on MARS. • Mars_cicbedsync service is not running on the MARS Workstation. • Mars_cicbedsync service on MARS Workstation is not set to automatic and does not restart during a reboot. • Default gateway set on the MARS client does not point to the correct router. Ping the router from the MARS system. • If one MARS workstation is able to access the CIC, compare its settings to the workstation that is unable to connect. <p>NOTE: Port 9001 must be open across the router for communication between the MARS system and the CIC.</p>
MARS Client on the IX network is unable to connect to the MARS Server	<ul style="list-style-type: none"> • Server name or IP address listed in the System Network Configuration on the MARS client is wrong. • User on MARS client is not in the MARSWORKSGROUP users group on both the MARS client and Server. • Share is set up incorrectly. The gemsit file share on the MARS server cannot be viewed from the MARS workstation. • Default gateway on the MARS client does not point to the router that is handling traffic to the MARS server on the Enterprise network. • Default gateway on the MARS server does not point to the router that is handling traffic to the MARS workstation on the IX network. <p>NOTE: File sharing ports must be open for communication between the MARS Client and MARS Server.</p>

System Rebuild

If a MARS System becomes corrupt, it may be necessary to rebuild it. This chapter describes that process for systems with MARS V8 running service pack 4 or later. For earlier versions of MARS, refer to the service manual that originally shipped with that system.

If the system being rebuilt also hosted other GE Healthcare applications (such as CardioSoft/CS, MARS Web Server, and so forth) refer to the manuals for those applications for instructions on backing up data, re-imaging the system, and reinstalling the application.

Process Overview

Following is an overview of the rebuild process.

1. Back up the MARS system, if possible.
This includes the MARS configuration and activator codes and the MARS `slots` and `reports` folders. For details, see [“Backing Up the MARS System” on page 62](#).
2. Remove the hardware key.
The key will be needed when reinstalling the MARS application. For more information, see [“Removing the Hardware Key \(Dongle\)” on page 63](#).
3. Re-image the system.
This returns the system to a state that meets the MARS hardware and software requirements. For more information, see [“Re-imaging the MARS Platform” on page 63](#).
4. Reinstall the MARS system.
This involves installing, configuring, and verifying the MARS application. If applicable, it also involves installing the MARS Web Upload system. For details, refer to [“Reinstalling the MARS System” on page 63](#).

Requirements

To rebuild a MARS system, you need the following equipment:

Required Equipment

Item	Description
MARS Application CD	The original MARS V8 Application CD is required to reinstall the MARS System.
External Storage	External storage media or network share is required to copy information from the original MARS system, such as system configurations, activation codes, and <code>slots</code> and <code>report</code> folders.
Dongle	The original dongle security key is required so the MARS system and options operate after the system is rebuilt.

Backing Up the MARS System

If accessible, the system data should be backed up prior to beginning the re-imaging process. The backups will be used to restore the data after the rebuild is complete.

Backing Up MARS Configuration and Activator Codes

Use the following instructions to save the system configuration and activator codes to an external backup device—such as a floppy disk drive, CD-ROM drive, or USB flash drive—before the rebuild begins:

1. Launch the MARS application.
2. Insert the storage media in the appropriate drive.
3. Select **System > System Setup > Backup and Restore**.
4. Select the **Backup Systems Setup** check box.
5. Complete the **Enter a name for the backup** field.
A name is required and can be up to 70 characters long. The name is used as the backup filename, which uses the format `xxx.mars`, where `xxx` is the name entered in this field.
6. Complete the **Enter comments for the backup** field.
Comments are optional and can be up to 70 characters long.
7. Click **Apply**.
8. Select the appropriate drive from the **Browse for Folder** dialog box and click **OK**.
The backup begins. When it is complete, the **Backup operation completed successfully** message opens.
9. Click **OK**.
The **Backup operation completed successfully** message closes.
10. Remove the storage media.

Backing Up MARS Slots and Reports Folders

To back up the patient data and reports currently stored on a MARS server or standalone system, copy the `c:\gemsit\slots` and `c:\gemsit\reports` folders to an external backup device—such as a floppy disk drive, CD-ROM drive, or USB flash drive—or to a network share before re-imaging the system. When reinstalling the MARS application, you are given the option of restoring these folders rather than creating new ones.

NOTE:

This procedure is not typically required for MARS clients, since patient data is only stored on clients when connectivity between the MARS client and server fails. In that situation, newly acquired data will be temporarily stored locally on the client. When rebuilding a MARS client, you may want to check the `c:\gemsit\slots` and `c:\gemsit\reports` folders to verify there are no records to back up.

Removing the Hardware Key (Dongle)

After you have finished backing up the MARS data, remove the hardware key (dongle) from the system you are re-imaging and store it in a safe location. This key will be required during the reinstallation of the MARS application after the system has been re-imaged.

Re-imaging the MARS Platform

Re-imaging the MARS platform is simply the process of restoring the system to a state that meets the hardware and software requirements of the MARS system type you are rebuilding (that is, a client, a server, or a standalone system). The process typically involves reformatting the hard drive, repairing damaged partitions, and reinstalling the operating system. Most commercial PCs come with either instructions for re-imaging the system or an image disk that restores the computer to its original factory state.

Because the customer owns the equipment on which the MARS application is installed, the customer is responsible for re-imaging the system. Refer to your equipment's original documentation for details.

If the customer is using legacy GE-supplied equipment, refer to the MARS service manual that originally shipped with the equipment for instructions to re-image the platform.

Reinstalling the MARS System

The process of reinstalling the MARS system consists of the following steps:

1. Re-partitioning the hard drive, if appropriate.
2. Reinstalling the application software.
3. Installing SEER Light Hookup, if required.

Each step is discussed in more detail in the following sections.

Reinstalling the Application Software

When reinstalling application software, you must always reinstall the MARS system software. If you are rebuilding a MARS server, you may also need to reinstall the MARS Web Server and/or Morpheus Hx software.

MARS System Software

To install the MARS system software, refer to the following procedures in the *MARS V8 Installation and Upgrade Guide* (PN 2083129-002):

1. Installing the MARS Application
2. Configuring the MARS System
3. Verifying the Installation

NOTE:

During the installation process, you have the opportunity to import the `slots` and `reports` folders that you backed up earlier.

MARS Web Server Software

NOTE:

You only need to reinstall the MARS Web Server software if you are rebuilding a MARS server on which the MARS Web Server was also installed. If you are rebuilding a MARS client or standalone system, or if the MARS Web Server was installed on its own hardware, you do not need to reinstall the MARS Web Server software.

To reinstall the MARS Web Server software, refer to the following procedures in the *MARS V8 Web Server Installation Manual* (PN 2083129-005):

1. Installing the MARS Web Server Software
2. Configuring the MARS Web Server
3. Configuring the MARS Server
4. Checkout and Troubleshooting

Reinstalling SEER Light Hookup Software

If you use SEER Light Connect to connect your SEER Light or SEER Light Extend Ambulatory Recorder/Controller directly to your MARS system, reinstall the SEER Light Hookup software. Refer to the SEER Light manual shipped with your device.

8

Parts List

The MARS Ambulatory ECG System is a software-only application. Customers are responsible for the maintenance, repair, and replacement of their equipment. Contact your equipment's manufacturer if you need to purchase replacement parts. Customers using legacy GE-supplied platforms can refer to the service manual originally shipped with the equipment for a list of replacement parts. There is no guarantee that parts for legacy hardware will still be available.

This chapter identifies the part numbers for optional peripherals and for the security keys (dongles) required to operate the MARS Ambulatory ECG System. To order these parts, contact the Service Parts department at the Technical Support Center.

Peripherals

GE Part Numbers for Peripherals

GE Part Number	Description	Qty
2008595-009	SEER Light Connect Device (Optional)	1
2027495-004	18-in-1 Memory Card Reader	1
2067634-165	SEER 1000 Connect (Optional)	1

Security Key (Dongle)

GE Part Number for Security Key (Dongle)

GE Part Number	Description	Qty
2020044-365	DRU - MARS USB SECURITY DONGLE	1

When ordering the security key (2020044-365) as a replacement for either an existing damaged, defective, or lost USB dongle or for an existing parallel dongle that is no longer supported, you must have the serial number of the existing dongle when you call GE Customer Service. GE uses this information to ensure that all existing entitlements (options) are transferred to the new dongle and that all licenses and GE systems are updated with the serial number of the new dongle.

The serial number of the existing dongle can be located from any of the following locations:

1. The label of the existing dongle (if available).
2. The original Option Activation Sheet.
3. The MARS application's **Help > About** menu.
4. The Windows registry of the system on which the MARS application was installed.
5. The GE Healthcare Service CRM System.
6. The GE Healthcare Option Activation Site (<http://oac.health.ge.com/oac/>).

MARS customers can use locations 1–3 to find the serial number. GE Service personnel can use locations 1–6.

GE Customer Service will ship the dongle with a new Option Activation Sheet. When you receive the Option Activation Sheet, you must insert the new dongle into an available USB port and apply the new activation codes. Refer to "Software Activators" in the *MARS V8 Ambulatory ECG System Operator's Manual* (2083129-003) for instructions.



Slot File Tool User Guide

The **Slot File Maintenance Utility** allows you to add and delete slot files in a MARS V8 system configured either as standalone or server.

The utility also facilitates reconfiguring the system's slot file repository location and allows you to remove slot file ownership. This document is intended for a service person or MARS administrator.

NOTE:

You cannot use the Slot File Tool with the MARS system running. Shut down the MARS system before using the Slot File Tool to make changes to the slot files.

NOTE:

If you are using the Slot File Tool to do maintenance, you should notify other users so they do not use the MARS system for acquisitions at the same time.

The Slot File Tool uses **MARS PC** registry data to:

- Verify if the **MARS PC** is installed on a particular machine.
- Verify if the appropriate mode of MARS PC is installed, because the tool can run only on **Server** or **Standalone** modes.
- Locate the Slot Files Directory (default: **<systemdrive>:\gemsit\slots**) to load and display them.

You can use the Slot File Tool to perform the following operations:

- Add a specified number of slot files to the Slot Files Directory, which MARS PC uses.
- Delete a specified number of slot files, a selected file, or all empty slot files from the Slot Files Directory.
- Delete the owner of a specified slot file.
- Change the Slot File Directory in the registry, which MARS PC uses.

The Slot File Tool is located in the **c:\gemsit\opt\MarsNt\bin** folder. To launch the application, double-click **SlotFileTool.exe**.

Understanding Slot File Size, Disk Capacity, and Performance

Before adding slots, consider the amount of available storage the slot files require and how the number of slot files may affect MARS system performance.

With MARS V8, slot files are no longer fixed sizes. Each slot file starts out at 16 KB and grows to fit the data as you acquire it. If the existing hard drive capacity is limited, use the following Disk Sizing guidelines to estimate the amount of maximum space the different slot files use. Plan the total number of slot files accordingly, so that even if all slots are at their maximum size, there is still 5 to 10 GB of free drive space left on the drive.

Calculating the minimum disk size consists of the following steps:

1. Determine which file types you will install
2. Determine the quantity for each type
3. Multiply the quantity for each type by the type's maximum file size
4. Sum the totals
5. Add 20 GB for OS, ancillary applications, and overhead.

NOTE:


The **Available** and **Free** values displayed under **Drive Capacity** are not used in the MARS V8 system. This information was originally intended to allow you to set a limit on the amount of drive space available for the Slot Files. With the dynamic nature of the slot files in the MARS V8 system, this becomes more difficult to calculate.

As the number of slot files increase, it may take longer for the **Patient List** to display. This is more noticeable for workstations operating at the lower range of the system hardware requirements. If a user, or users, complain of slow performance after adding slot files, consider reducing the number of slots.

NOTE:

Additional slots are not a substitute for a good archival process. MARS is not designed, and should not be used, for long-term storage.

Setting Slot Files Location

1. Click the ellipses button  under the **Slot File Location** section.
The **Browse for Folder** dialog box opens.
2. Locate the **Slot file directory** folder in the dialog box.
For most installations, the slots folder is located in **c:\gemsit**.
3. Click **OK**.
All the slot files within the selected folder are displayed showing the type, status, and size of each slot.
4. Select the **DATA_IS_AT**, located in **HKEY_LOCAL_MACHINE\SOFTWARE\GEMSIT\MARS\8.0**.
The **Slot File Location** defaults to the current slot folder location, as defined in the registry entry. This is the slot folder location the MARS system is currently

using to save data. There is no need to change this location. The slot file location is generally **c:\gemsit\slots**.

NOTE:

The **Set As Default Slot File Location** check box changes the entry in the registry setting. This is NOT RECOMMENDED and you should not perform this step. Use the tool only to add or delete slot files from the current slot folder location.

Adding Slots

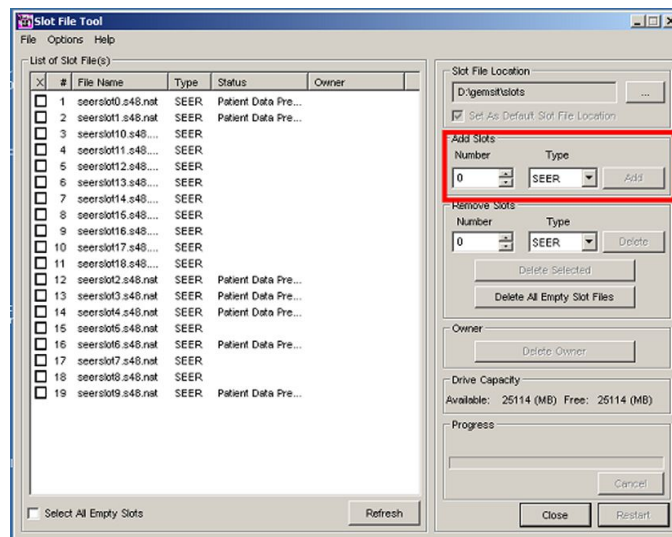
See [“Understanding Slot File Size, Disk Capacity, and Performance” on page 68](#) for more information about slot files.

1. Type a number (or use the up/down arrows to select a number) in **Add Slots>Number**.
The tool limits the number of slots to 255 for each slot type.
2. Select the slot type from **Type**.

Slot File Types

Slot File Type	Description
SEER	Stores data from SEER Light, SEER Light Extend, SEER MC, and SEER 12
TAPE*	Stores data from the 8500 Tape drive
MON	Stores raw, unanalyzed monitoring data
ACQ	Stores analyzed monitoring data
*The MARS system no longer acquires data from this tape drive, but you can restore archive tape recordings to these slots	

3. Click **Add**.
4. Empty slots are added to the bottom of the slot list.
Click the **Refresh** button to regroup the slot list by type.
5. To verify if the slots were created, go to the actual slot file location specified in the tool, and check that the slots are now there.
For example, default slot files path: **<MARS installation drive>\gemsit\slots**.
6. Restart the system if you are not performing another task.
See [“Restarting the System” on page 73](#) to restart the machine.



Deleting Slots

You cannot delete slots containing data.

Deleting Empty Slots

Use **Delete** in the **Remove Slots** section to delete empty slots of the slot type you choose. Slots are deleted starting from the bottom of the list.

1. Select the slot **Type** under the section **Remove Slots**.
2. Type a number (or use the up/down arrows to select a number) in **Remove Slots>Number**.

NOTE:

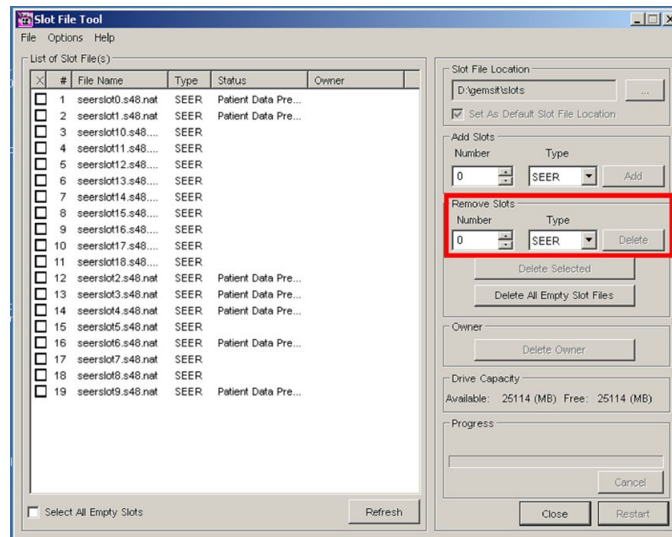
Enter a number from one (1) to the total number of empty slots in the file.

3. Click **Delete**.
The following message is displayed: **Are you sure you want to delete?**
4. Click **Yes** to delete the number of empty slot files you indicated.
5. The slots are deleted starting from the bottom of each slot type.
6. To verify that the slots were deleted, go to the actual slot file location specified in the tool and check that the slots are now gone.

For example, default slot files path: **<MARS installation drive>\gemsit\slots**.

7. If you are not performing another task, restart the system.

See ["Restarting the System"](#) on page 73 to restart the machine.



Deleting Selected Slots

Use **Delete Selected** in the **Remove Slots** section to delete specific empty slots from the list.

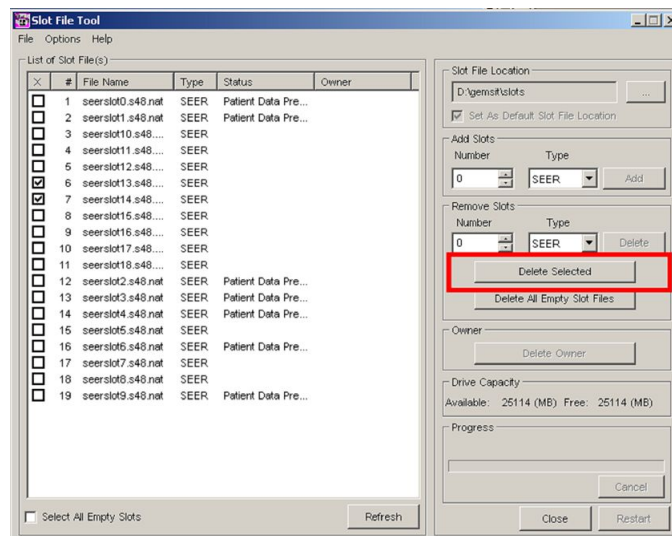
1. Select the check boxes in front of the empty slot(s) you want to delete.
2. Click **Delete Selected**.

The following message is displayed: **Are you sure you want to delete these <number of files selected> items?**

3. Click **Yes** to delete the selected slots.
4. The selected slots are deleted from the list.
5. To verify if the slots were deleted, go to the actual slot file location specified in the tool and check that the slots are now gone.

For example: default slot files path: **<MARS installation drive>\gemsit\slots**.

6. If you are not performing any more tasks, restart the system. See ["Restarting the System" on page 73](#) to restart the system.



Deleting All Empty Slots

Use **Delete All Empty Slot Files** in the **Remove Slots** section to delete all empty slots from the list.

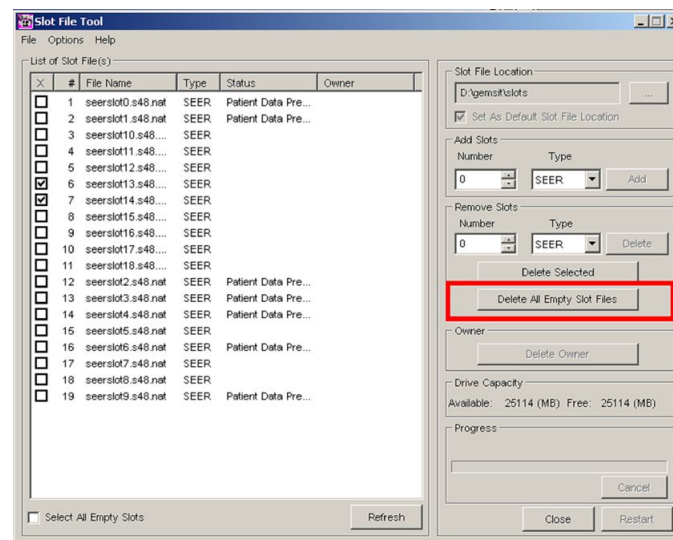
1. Click **Delete All Empty Slot Files**.

The following message is displayed: **Are you sure you want to delete?**

2. Click **Yes** to delete all of the empty slot files.
3. All empty slots are deleted from the list.
4. To verify if the empty slots were deleted, go to the actual slot file location specified in the tool and check that the slots are now gone.

For example, default slot files path: **<MARS installation drive>\gemsit\slots**.

5. If you are not performing any more tasks, restart the system. See [“Restarting the System” on page 73](#) to restart the system.



Deleting the Slot File Owner

A slot file is “locked” if someone is using it or the system crashes while someone was using the file. If a file has an owner, you cannot make changes to that file. Use **Delete Owner** in the **Owner** section to delete the owner from the selected slot file.

NOTE:

Make sure the owner is not really using the file before deleting them.

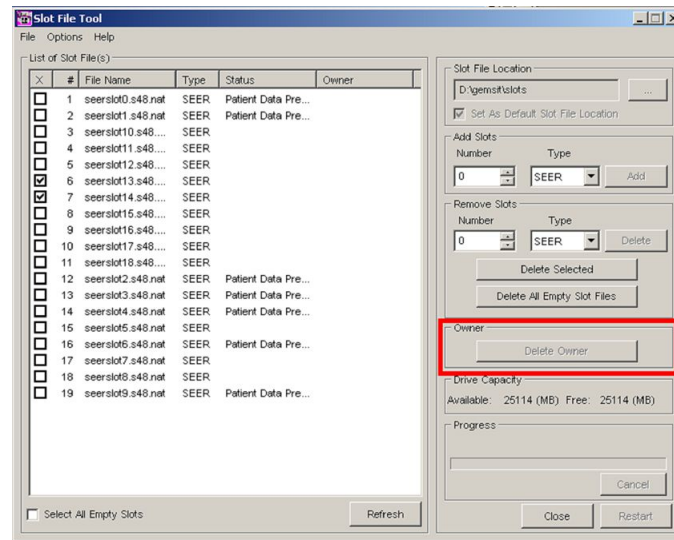
1. Highlight the row(s) that display owner information.
2. The **Delete Owner** button is enabled.
3. Click **Delete Owner**.

The following message is displayed: **Are you sure you want to delete owner?**

4. Click **Yes** to delete the owner from the slot file(s).

The owner information is deleted from the patient file in the list.

The tool also deletes the **small owner file** created in the **slot files directory**.



Restarting the System

After you complete changes to the MARS system, you need to restart the system.

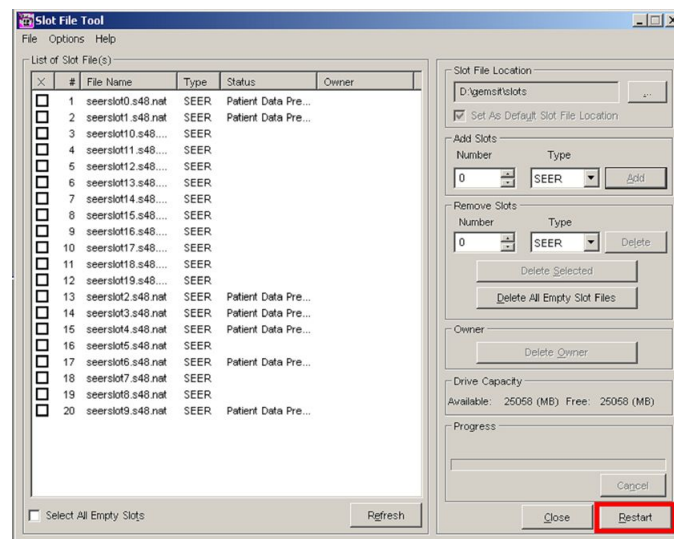
1. Click **Restart** or select **File->Restart** from the menu.

The following message is displayed: **Do you want to restart the computer now?**

2. Click **Yes** to restart or **No** if you do not want to restart the system at this time.

NOTE:

You should restart the system once after **Adding** or **Deleting** slots.



Closing the Slot File Tool

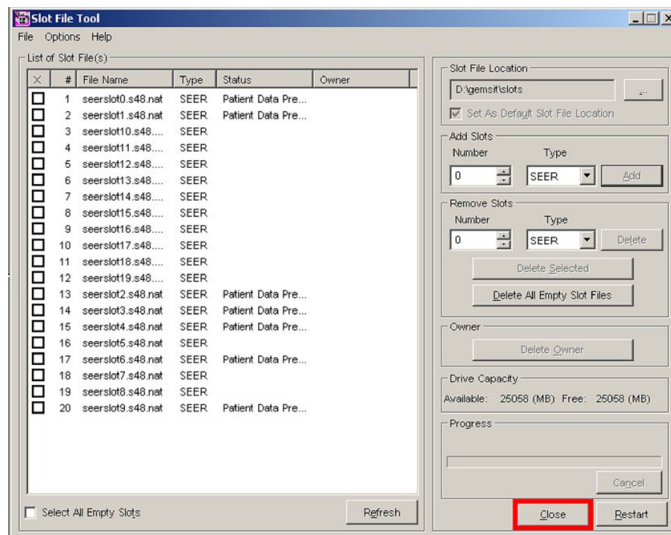
When you are finished making changes to the slot file, close the tool.

1. Click **Close** or select **File —>Close** from the menu.

The tool closes.

The following message is displayed: ***It is strongly recommended that you restart the system for the successful execution of MARS PC. Do you want to restart the system?***

2. Click **Yes** to restart the system or **No** to close the tool without restarting the system.



Dongle Drivers

The MARS system uses a USB dongle to authenticate the MARS V8 software. It is included in installation kits and in upgrade kits for versions earlier than 6.5. When upgrading systems running MARS version 6.5 or later, reuse the existing dongle.

Installing the Dongle Drivers

When installing the MARS software on a physical computer, the dongle drivers are installed automatically. However, when installing the MARS software on a virtual machine, the dongle drivers must be installed manually on the physical machine to which the dongle will be attached.

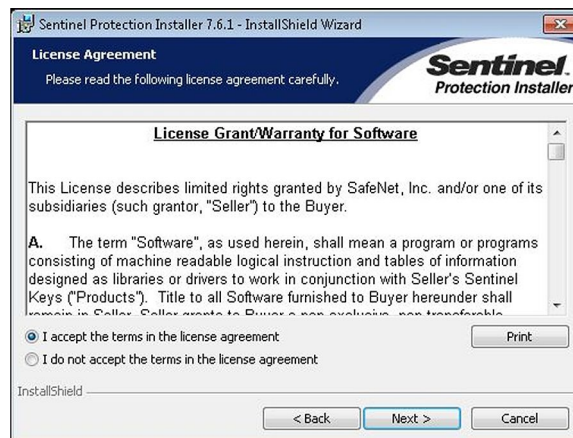
1. On the release media, locate the \SuperPro folder.
2. Double-click `Sentinel_Protection_Installer_7.6.1.exe`.

The installer's **Welcome** window opens.



3. Click **Next**.

The **License Agreement** window opens.



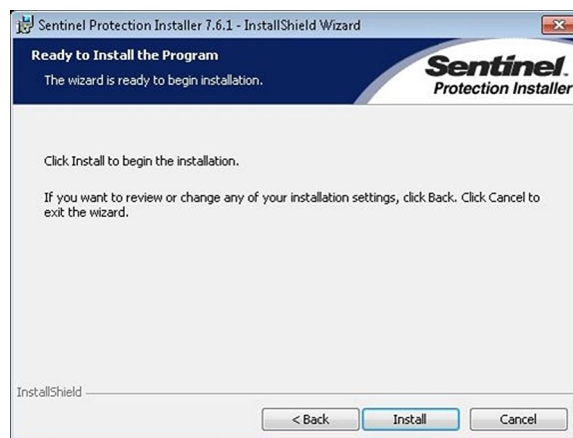
4. Review the agreement and then select **I accept the terms in the license agreement** and click **Next**.

The **Setup Type** window opens.



5. Select **Complete** and click **Next**.

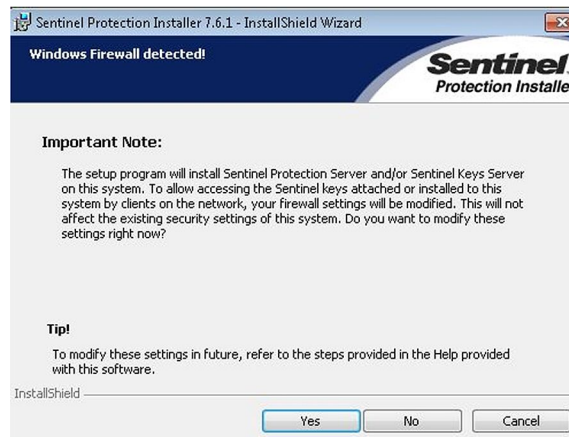
The **Ready to Install the Program** window opens.



6. Click **Install**.

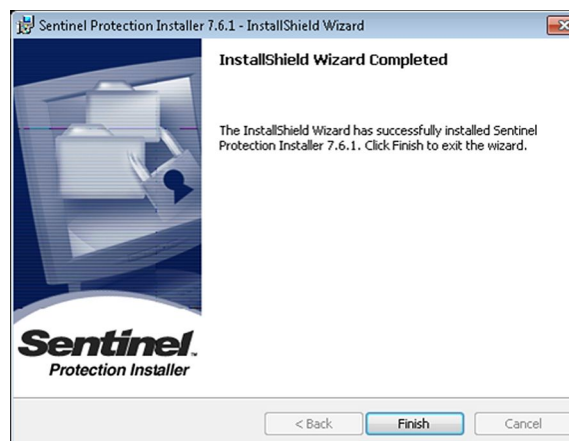
One of two things happens.

- If the Windows firewall is enabled, the **Windows Firewall detected!** window opens.



Skip to step 7.

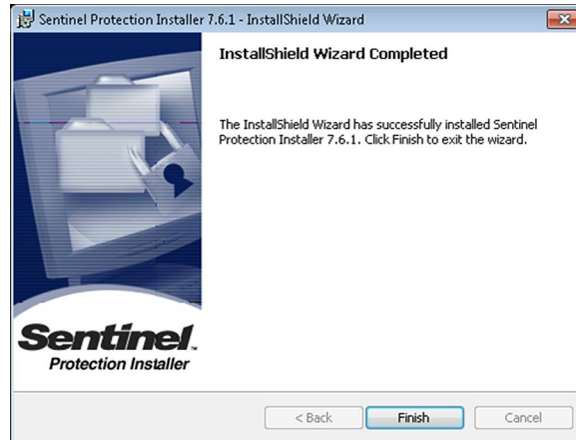
- If the Windows firewall is not enabled, the dongle drivers are installed. When the installation is complete, the **InstallShield Wizard Completed** window opens.



Skip to step 8.

7. If the **Windows Firewall detected!** window opens, click **Yes** to allow the dongle attached to the physical machine to be accessible over the network.

The dongle drivers are installed. When the installation is complete, the **InstallShield Wizard Completed** window opens.



Proceed to step 8.

8. On the **InstallShield Wizard Complete** window, click **Finish**.
The installer closes.
9. Open the **Windows Control Panel** and confirm that **Sentinel Protection Installer 7.6.1** was installed.

Optional Card Readers

MARS V8 systems running service pack 4 or later support two optional data card readers: the 18-in-1 Memory Card Reader and the OmniDrive Professional Card Reader (USB).

18-in-1 Memory Card Reader

The 18-in-1 Memory Card Reader (PN 2027495-004) is an optional peripheral that allows you to acquire ECG readings from the memory cards of all the Holter devices supported by the MARS Ambulatory ECG System. This chapter identifies the card reader's components and detail's its technical specifications.

Components



Card Reader Components

Item	Name	Description
1	Card Slot	Slot for CompactFlash Cards
2	Card Slots	Additional slots for other types of cards. Not used.
3	USB Port	Connect the USB connector to the port on the back of the card reader and the MARS Ambulatory ECG System.

Specifications

The following table provides the technical specifications for the optional 18-in-1 Memory Card Reader.

18-in-1 Memory Card Reader

Component	Description
Interface	USB 2.0 USB 1.1 compatible
Transfer Speed	Up to 480 Mbps, dependent on card and USB connection
Supported Card Types	<ul style="list-style-type: none"> • CompactFlash Type I • CompactFlash Type II • MicroDrive • MagicStor • SmartMedia • Memory Stick • Memory Stick Pro • Memory Stick Duo • Memory Stick Select • Memory Stick Pro Duo • Secure Digital (SD) • Secure Digital High Capacity (SDHC) • TransFlash (microSD) • Multimedia Card 4.0 (MMC Plus) • Multimedia Card (MMC) • Reduced Size MMC 4.0 (MMC Mobile) • Reduced Size MMC • xD
Dimensions (H x W x L)	0.68 x 2.30 x 3.94 inches 17.3 x 58.6 x 100 millimeters
Weight	2.54 ounces 72 grams
Power Consumption	DC 3.3V/5V 100 mA (maximum)
Operating Temperatures	+32° to +158° F 0° to +70° C
Operating Relative Humidity	50%
Storage Temperatures	-40° to +158° F -40° to +70° C
Storage Relative Humidity	5–95%

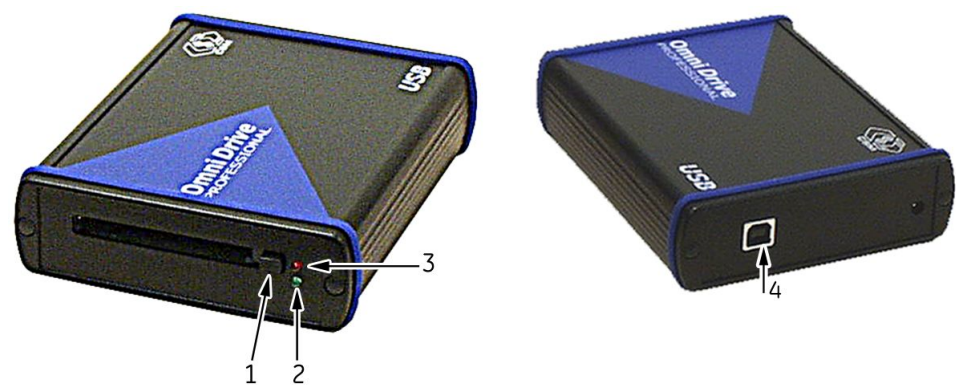
OmniDrive Professional Card Reader (USB)

The OmniDrive Professional Card Reader (USB) is no longer available from GE Healthcare. However, it is still supported for 32-bit operating systems, and the necessary drivers are automatically installed when the MARS system is installed on a 32-bit operating system.

Customers who require data acquisition from the Linear Flash (PCMCIA) card used by the SEER MC recorders should consider replacing these recorders with the SEER 12 Holter recorder. SEER 12 data is acquired using the 18-in-1 Memory Card Reader.

NOTE:
Due to slow transfer speeds, the OmniDrive reader cannot be used to acquire data from a SEER 12 Holter recorder.

Components



OmniDrive (USB)

Item	Name	Description
1	Card Eject Button	Push the button to eject the card.
2	Power On Indicator	Green LED is lit when power is on. (Power is applied through the USB cable.)
3	Busy Indicator	Red LED is lit when transferring data.
4	USB Connection	Connect the USB cable to the port on back of the OmniDrive and to a USB port on the MARS Ambulatory ECG System.

Specifications

The following table describes the specifications for the OmniDrive (USB) card reader.

OmniDrive Card Reader

PC Card Slots	1x Type II front slot
Interface	USB 1.1/2.0
Data Transfer Speed	Up to 1 MB/sec

OmniDrive Card Reader (cont'd.)

Supported Card Types	<ul style="list-style-type: none"> • SRAM • ATA Flash • ATA Hard Disk Type II • CompactFlash • SmartMedia • Secure Digital Cards • Multimedia Cards
Dimensions (HxWxL)	1.37 x 4.29 x 5.31 inches 35 x 109 x 135 millimeters
Weight	~10.58 ounces ~300 grams
Operating Temperature	32° — 158° F 0° — 70° C
Storage Temperature	-4° — 185° F -20° — 85° C
Humidity	90% maximum, non-condensing in ambient
Power Supply	DC 5 V from PC via USB 220 V / 110 V from optional AC power supply
Supported Operating Systems	Microsoft Windows 98, 98SE, ME, 2000, XP, Vista



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