GE Healthcare

MAC™ Link
Resting ECG Analysis System
Service Manual

Software Version 1.0
2069704-002 F

MAC Link Resting ECG Analysis System
English

Publication Information

This document describes the MAC™ Link Resting ECG Analysis System, software Version 1.0, also referred to as the "product" "system", or "device". This document is intended to be used by trained operators in a hospital or medical professional's facility environment as well as in clinics, physician offices, outreach centers, or wherever ECG testing is performed to record ECG signals from surface electrodes, under the direct supervision of a licensed healthcare practitioner.

The document part number and revision are on each page of the document. The revision identifies the document's update level. The revision history of this document is summarized in the following table.

Revision	Date	Comments
A	7 August 2015	Internal release.
B	16 October 2015	Updated the following: • Added the missing FRUs.
C	11 January 2016	Update the following: • updated the images according to the modify to the host main board PWA.
D	28 April 2016	Update the following according to the maintenance project. • updated the service tool information • added WiFi filter function
E	23 June 2016	Update the following according to the maintenance project. • Add Install/Uninstall Plugin function in Service Tool • Add instruction to inform after replacing the host PWA, user should upgrade the software. • Add note to inform user to keep using the system after long time shut down.
F	17 April 2017	Added the new supplies and accessories manual information.

To access other GE Healthcare Diagnostic Cardiology documents, go to the Common Documentation Library (CDL), located at www.gehealthcare.com/documents, and click ***Cardiology***.

To access Original Equipment Manufacturer (OEM) documents, go to the device manufacturer's website.

All errors in this manual will be corrected in revised manuals. New manuals can be requested by the user.

Intended Use

The MAC™ Link Resting ECG Analysis System is intended to do the following:

- Acquire, analyze, display, and record electrocardiographic information from adult and pediatric populations.
- Deliver 3, 6, or 12 lead ECGs, and includes options to provide 12-lead ECG measurements and interpretative analysis.
- Have the option to transmit and receive ECG data from other networked systems.
- Be used under the direct supervision of a licensed healthcare practitioner and by trained operators.
- Be portable and may be used in hospitals, medical professional's facility, medical clinics, physician's offices, outreach centers, or other facilities designated for providing healthcare.

Intended User

The MAC™ Link Resting ECG Analysis System is intended to be used:

- By trained operators in a hospital or medical professional's facility environment as well as in clinics, physician offices, outreach centers, or wherever ECG testing is performed to record ECG signals from surface electrodes,
- Under the direct supervision of a licensed healthcare practitioner.

NOTE:

All illustrations in this document are provided as examples only. Depending on system configuration, screens in the document may differ from the screens on your system.

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

Service Manual Language Information

WARNING (EN)	This service manual is available in English only. • 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)	Това упътване за работа е налично само на английски език. • 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)	本维修手册仅提供英文版本。 • 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)	本維修手冊只提供英文版。 • 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)	Ove upute za servisiranje dostupne su samo na engleskom jeziku. • 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)	Tento provozní návod existuje pouze v anglickém jazyce. • 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)	Denne servicemanual findes kun på engelsk. • 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)	Deze service manual is alleen in het Engels verkrijgbaar. • 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)	Käesolev teenindusjuhend on saadaval ainult inglise keeles. • 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)	Tämä huolto-ohje on saatavilla vain englanniksi. • 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)	Ce manuel technique n'est disponible qu'en anglais. • 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.)

WARNUNG (DE)	Diese Serviceanleitung ist nur in englischer Sprache verfügbar. • 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.
ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)	Το παρόν εγχειρίδιο σέρβις διατίθεται στα αγγλικά μόνο. • 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.
FIGYELMEZTETÉS (HU)	Ez a szerviz kézikönyv kizárólag angol nyelven érhető el. • Ha a vevő szerviz ellátója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészíttetése. • Ne próbálja elkezdeni 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.
AÐVÖRUN (IS)	Þessi þjónustuhandbók er eingöngu fáanleg á ensku. • Ef að þjónustuveitandi viðskiptamanns þarfnast annars tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálaþjónustu. • 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.
PERINGATAN (ID)	Manual servis ini hanya tersedia dalam bahasa Inggris. • 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)	Il presente manuale di manutenzione è disponibile soltanto in Inglese. • 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)	このサービスマニュアルは英語版しかありません。 • 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)	본 서비스 지침서는 영어로만 이용하실 수 있습니다. • 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, 운영자 혹은 환자에게 위해를 가할 수 있습니다.
ЕСКЕРТУ (KK)	Бұл қызмет көрсету бойынша нұсқаулығы тек ағылшын тілінде қолжетімді. • 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 елемеу қызмет провайдері, оператор немесе емделушінің электр шогынан, механикалық немесе басқа қауіптер нәтижесінде жарақат алуына әкелуі мүмкін.
BRĪDINĀJUMS (LV)	Šī apkalpotāju rokasgrāmata ir pieejama tikai angļu valodā. • 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)	Šis eksploatavimo vadovas yra prieinamas tik anglų kalba. • 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 eksploatavimo 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)	Denne servicehåndboken finnes bare på engelsk. • 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)	Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim. • 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)	Este manual de assistência técnica só se encontra disponível em inglês. • 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)	Este manual técnico só se encontra disponível em inglês. • 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)	Acest manual de service este disponibil numai în limba engleză. • 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 şi 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)	Настоящее руководство по обслуживанию предлагается только на английском языке. • 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)	Ovo servisno uputstvo je dostupno samo na engleskom jeziku. • 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 servisera, rukovaoca ili pacijenta usled strujnog udara, ili mehaničkih i drugih opasnosti.
VAROVANIE (SK)	Tento návod na obsluhu je k dispozícii len v angličtine. • 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)	Ta servisni priročnik je na voljo samo v angleškem jeziku. • 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)	Este manual de servicio sólo existe en inglés. • 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)	Den här servicehandboken finns bara tillgänglig på engelska. • 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)	Bu servis kılavuzunun sadece İngilizcesi mevcuttur. • 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.)

ЗАСТЕРЕЖЕННЯ (UK)	Дане керівництво з сервісного обслуговування постачається виключно англійською мовою. • 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 невірного обслуговування обладнання.
CẢNH BÁO (VI)	Tài Liệu Hướng Dẫn Sửa Chữa chỉ có bản tiếng Anh. • 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.

Contents

1

Equipment Overview

This chapter provides a description of the product, its features, and the requirements necessary to operate the system.

Equipment Description

The MAC™ Link Resting ECG Analysis System is composed of a host module, acquisition module, optional docking station, power adapter, power cord, and accessories.

- The host module can obtain ECG data from an acquisition module via USB or Bluetooth.
- The host module can upload ECG data and download orders via Wi-Fi or LAN (if the optional docking station is purchased).
- Accessories include leadwires, a set of electrodes, and a communication cable.

Host

This section describes the appearance of the host module.

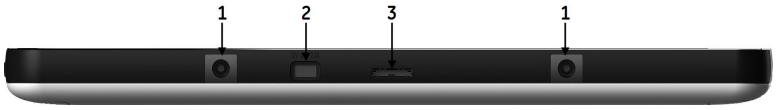
Front View

Item	Name	Description
1	Power LED	Indicates the host power supply states: • Solid green light indicates the host is plugged in and receiving external DC power supply. • No light (off) indicates there is no external DC power supply.
2	Battery LED	Indicates the various battery states of the host: • Solid orange light indicates the battery is charging. • Solid green light indicates the battery is full. • No light (off) indicates the battery is not charging.
3	Operating LED	Indicates the host operation status: • Solid green light indicates the host is powered on and running. • No light (off) indicates the host is powered off.

Side View

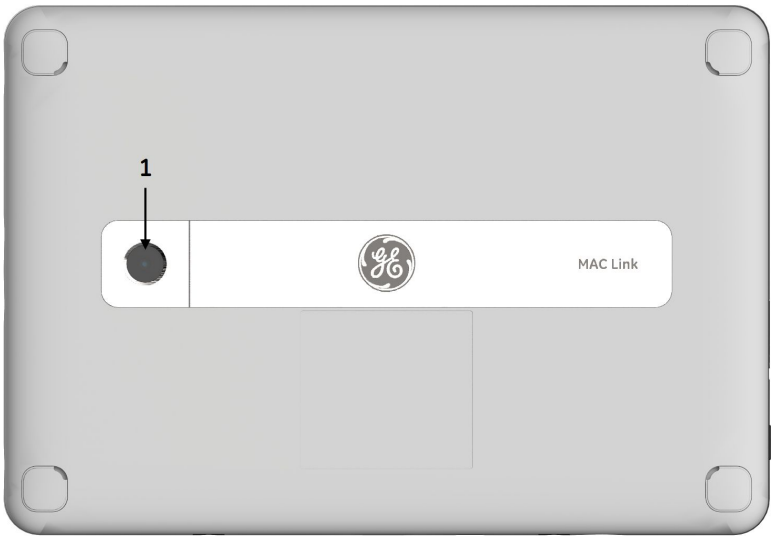
Item	Name	Description
1	Mirco SD card slot	Micro Secure Digital card slot. Insert the card as indicated by the icon. The system supports only Micro SD cards formatted for the FAT32 file systems.
2	Power button	Turns the host on and off.
3	Anti-theft lock	You can use this lock to connect the host device to the desk to keep the host device safe.

Rear View



Item	Name	Description
1	Guidepost slot	Slot to connect the host to the optional docking station.
2	AC power connector	Standard connector for the AC power cable.
3	Communication port	Connector for data communication with the acquisition module/optional docking station with a communication cable.

Bottom View



Item	Name	Description
1	Built-in scanner (optional)	Scanner used to scan a barcode.

Acquisition Module

This section describes the acquisition module.

WARNING:

PERSONAL INJURY-BURNS — Using unauthorized cables can cause high-frequency burns during defibrillation.

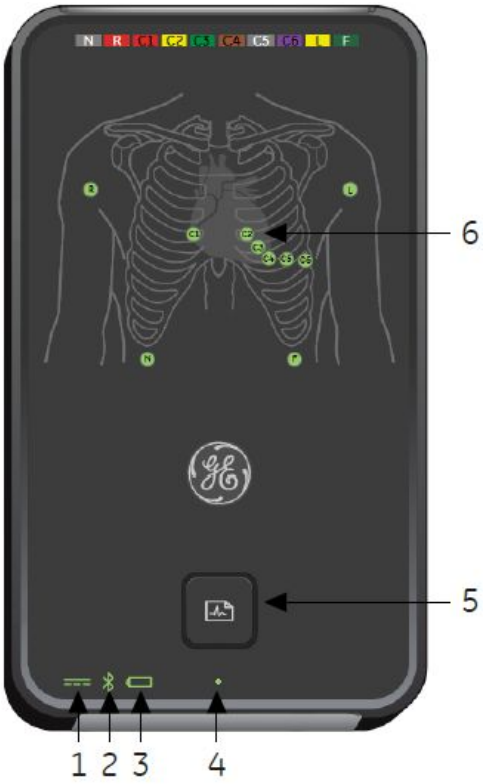
Use only acquisition cables and leadwires recommended by GE Healthcare for use with this device.

CAUTION:

DELAYED DIAGNOSIS — Improper connection of the leadwires will cause inaccuracies in the ECG.

Ensure the leadwires are connected properly. Trace each leadwire from its acquisition module label to its colored connector and then to its electrode to ensure that it is matched to the correct label lead wire connection location.

Front View



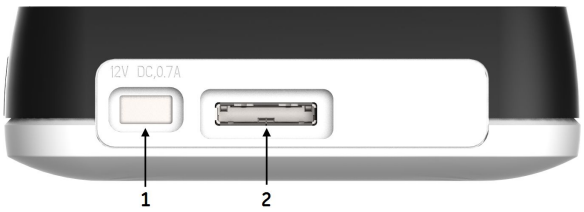
Item	Name	Description
1	Power LED	Indicates the acquisition module power supply states: • Solid green light indicates the acquisition module is plugged in and receiving power supply. • No light (off) indicates there is no external power supply.
2	Bluetooth signal LED	Indicates the Bluetooth connection status between the acquisition module and the host/optional docking station: • Solid blue light indicates the Bluetooth is connected. • Flashing blue light indicates the Bluetooth is ready for connecting. • No light (off) indicates the Bluetooth is not ready for connecting when the acquisition module powered on.

Item	Name	Description
3	Battery LED	Indicates the various battery states of the acquisition module: • Solid green light indicates the battery is ≥ 70% and not charging. • Solid yellow light indicates the battery is < 70% and not charging. • Solid red light indicates the battery is < 40% and not charging. • Flashing red light indicates the battery is < 20% and not charging. • Solid blue light indicates the battery is charging when the acquisition module is receiving the power. • Flashing blue light indicates the battery is not working correctly when the acquisition module is receiving the power. • No light (off) indicates the battery is full when the acquisition module is receiving the power.
4	Operating LED	Indicates the acquisition module operation status: • Solid green light indicates the acquisition module is running. • Flashing green light indicates the acquisition module is in low power mode. • Blinking green light indicates the power button has been held on for more than 2 seconds. You can release the power button to let the acquisition module shut down normally. • No light (off) indicates the acquisition module is powered down.
5	Acquisition button	Press to start acquiring an ECG. **NOTE:** This is not the power-up button.
6	Electrodes LEDs	Indicates the status of the electrodes LEDs: • Solid green lights of C1–C6, F, and L electrodes LEDs indicate the electrode is connected. • Solid red lights of C1–C6, F, and L electrodes LEDs indicate the electrode is not connected. • Solid red for all electrodes LEDs indicates the R electrode is not connected, or the F, L, and chest electrodes are not connected. • No light (off) for all electrodes LEDs indicates there is no ECG transmission between the acquisition module and the host.

Side View

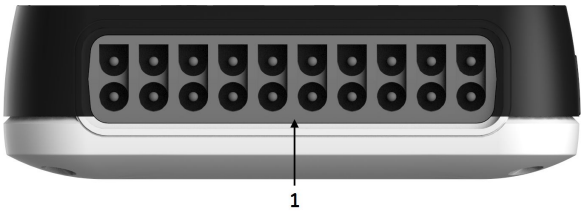
Item	Name	Description
1	Power button	Turns the acquisition module on and off.

Bottom View



Item	Name	Description
1	Power adapter connector	Connector for AC/DC power adaptor output.
2	Communication port	Connector for data communication with the host/optional docking station with a communication cable.

Rear View

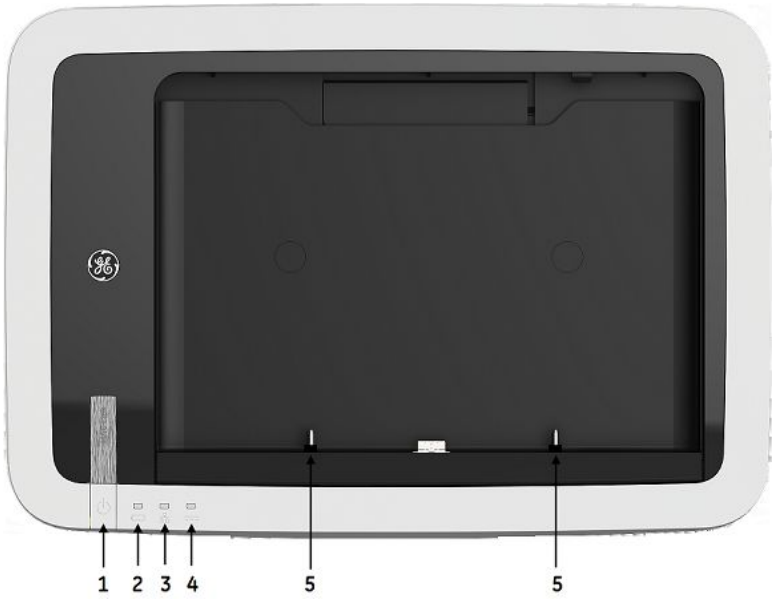


Item	Name	Description
1	ECG signal input connector	Connector for the acquisition cable.

Docking Station (Optional)

This section describes the docking station, which is an optional component. You can purchase it separately. Contact your local service personnel for detailed information.

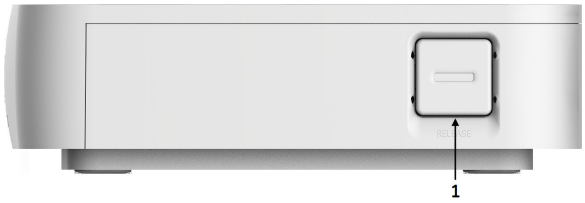
Front View



Item	Name	Description
1	Power button	Turns the host on and off.
2	Battery LED	Indicates various battery states of the docking station: • Solid green light indicates the battery is ≥ 70% and not charging. • Solid yellow light indicates the battery is < 70% and not charging. • Solid red light indicates the battery is < 40% and not charging. • Flashing red light indicates the battery is < 15% and not charging. • Solid blue light indicates the battery is charging. • Flashing blue light indicates the battery is missing or is not working correctly. • No light (off) indicates the battery is full if the docking station was receiving the power.
3	LAN connection LED	Indicates the LAN status: • Solid green light to the right of this port indicates a good Ethernet connection. • The flashing amber light to the left of this port indicates network traffic. The LED blinks if a LAN connection is available.

Item	Name	Description
4	Power LED	Indicates the docking station power supply status: • Solid green light indicates the docking station is receiving the external power. • No light (off) indicates the docking station is not receiving the external power.
5	Guidepost	Struts used to attach the host to the docking station.

Side View

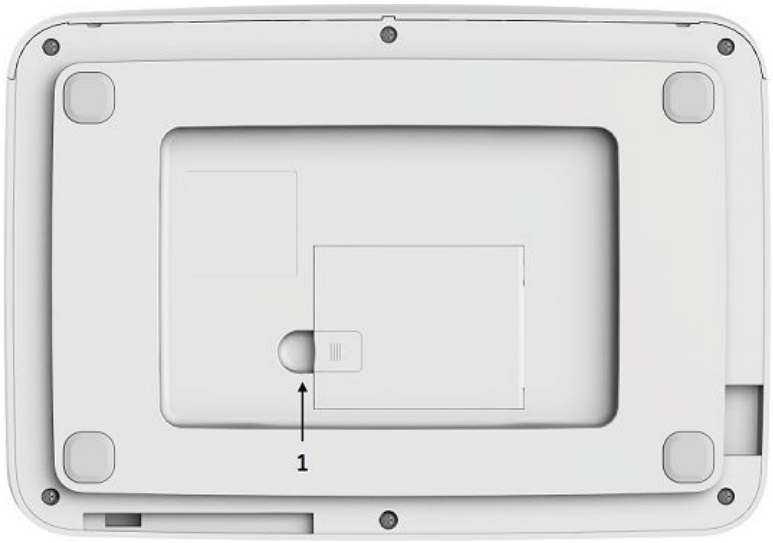


Item	Name	Description
1	Release button	Press to release the lock for fastening the host to the docking station.

Rear View

Item	Name	Description
1	LAN connection	RJ45 network connector.
2	Power adapter connector	Connector for AC/DC power adaptor output.
3	Acquisition module connector	Connects the acquisition module and the optional docking station.
4	USB connector	Universal Serial Bus connector for USB devices, such as an optional barcode reader or a USB laser printer.

Bottom View



Item	Name	Description
1	Battery	Rechargeable lithium-ion battery.

Power Adapter

NOTE:
The power adapter used in this system is in compliance with IEC 60601-1. To ensure patient safety, use only power adapters provided by GE Healthcare.

Setting Up the Equipment

If you purchased the optional docking station, setting up the system consists of the following procedures, and each procedure is described in more detail on the following pages:

1. "Inserting the Docking Station Battery"
2. "Attaching the Host to the Docking Station"
3. "Connecting the Acquisition Module"
4. "Connecting the Leadwires to the Acquisition Module"
5. "Connecting the Barcode Reader to the Docking Station"
6. "Connecting to a LAN to the System"
7. "Connecting an External Laser Printer to the System"
8. "Connecting the AC Power Adapter to the Docking Station"
9. "Turning on the System"
10. "Configuring the System"
11. "Testing the Device"
12. "Shutting Down the Device"

If you have not purchased the optional docking station, setting up the system consists of the following procedures:

1. "Connecting the Acquisition Module"
2. "Connecting the Leadwires to the Acquisition Module"
3. "Connecting the AC Power Adapter to the Docking Station"
4. "Turning on the System"
5. "Configuring the System"
6. "Testing the Device"
7. "Shutting Down the Device"

NOTE:

When using the touch screen of the host device, be aware of the following:

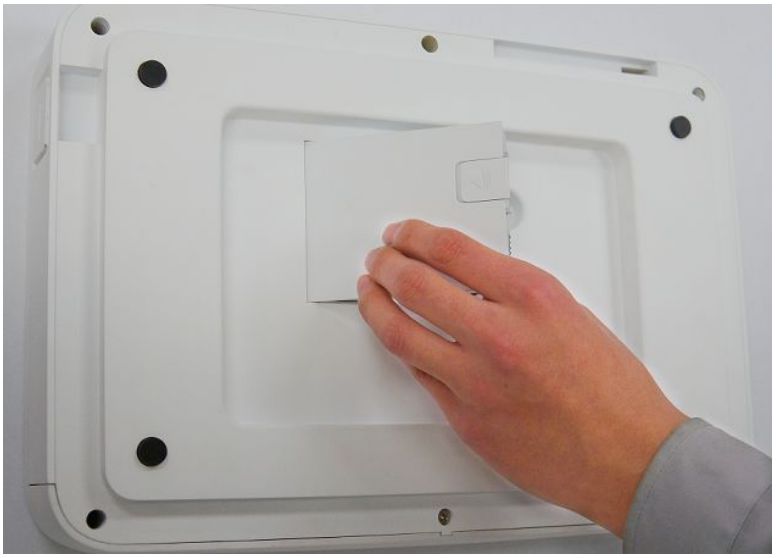
- If you touch the screen on the border, it is not activated.
- Pressing the screen with your finger is more effective than touching with your finger tip.

- Pay attention to the actual touch point. The touch point may look different from a different angle.

Inserting the Docking Station Battery

The docking station is shipped with a lithium-ion battery that charges when it is inserted into the docking station connected to AC power.

1. Gently turn over the docking station and find the empty battery compartment.
2. Insert the battery as shown in "Replacing the Docking Station Battery" on page 130.



NOTE:

The battery charges when it is inserted into the docking station that is connected to AC power. You can begin using the system after it is connected to AC power while the battery is charging.

Attaching the Host to the Docking Station

You can attach the host to the docking station matching the guidepost slots on the host to the guidepost on the docking station.

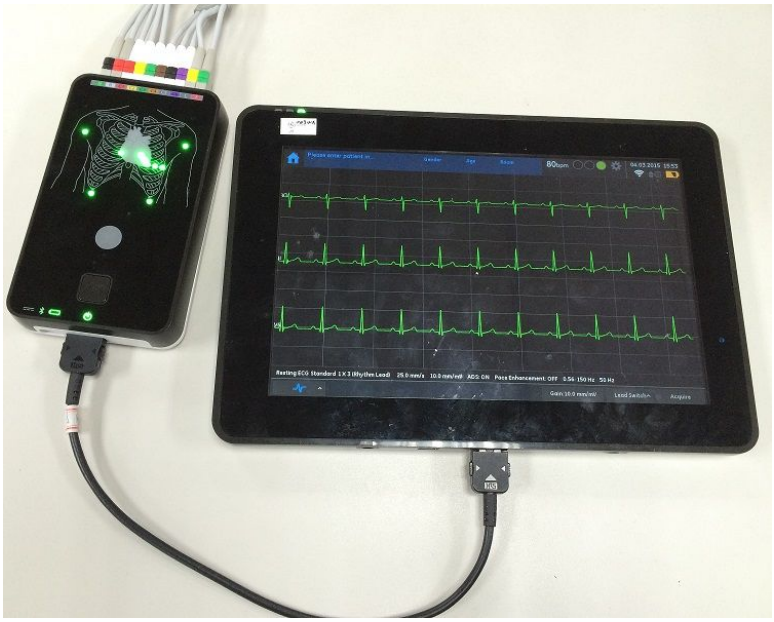
NOTE:
Do not use force or pressure to push and pull the guidepost

NOTE:
Do not use excessive rotational motion of the guidepost.

Connecting the Acquisition Module

You can connect the acquisition module to the host via a communication cable or Bluetooth connection to transfer ECG data in real time.

To connect the acquisition module to the host via a communication cable, you can connect the host with the acquisition module follows below graphic.



To connect the acquisition module to the host via Bluetooth, perform the following steps:

1. From the ***Main*** window, press ***Resting ECG*** to open the ***Resting ECG*** window.
2. On the right corner of screen, press the ***Bluetooth*** button to open the ***Bluetooth Device List*** panel.

3. Select the acquisition module you want to connect.

   NOTE:

   Each acquisition module has a configurable device name which is used as the Bluetooth name.

   By default, the name matches the serial number labeled on the back of the acquisition module.

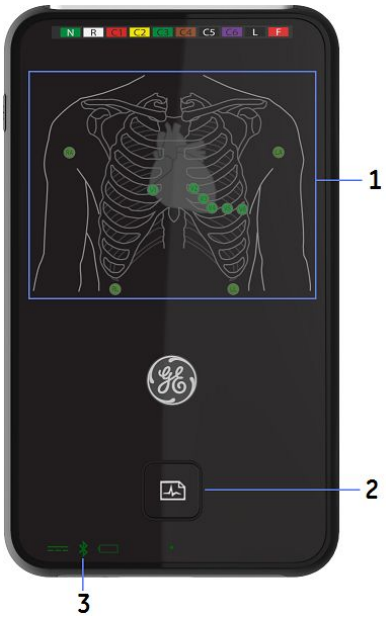
   You can also configure the device name to a more meaningful name in daily work such as ECG Room 1, ward 01, etc. In this case, it is recommended to update the label on the acquisition module to keep consistent.

4. Press ***Confirm*** to confirm the connection.
   The electrode LEDs lighted once the connection succeeds.

NOTE:

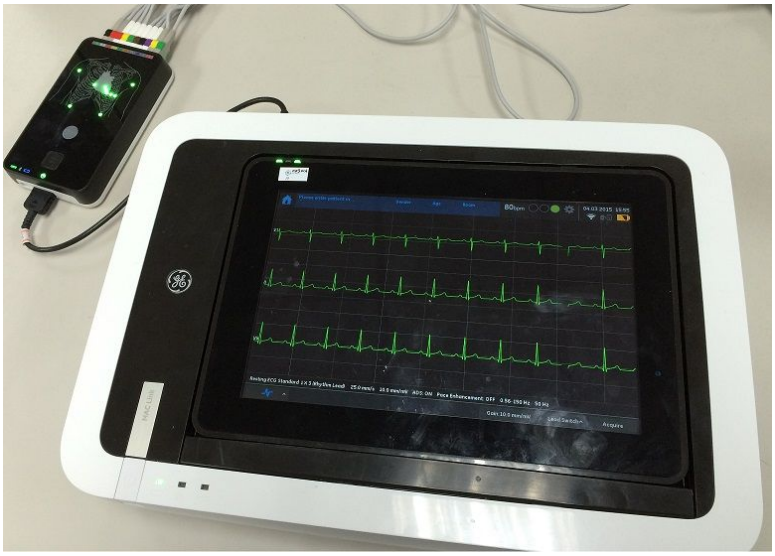
There are several approaches to confirm whether the selected acquisition module is the right one expected if the label is gone:

- Before connecting to the acquisition module, the electrode positioning LEDs (1) are shut down. Once the connection is set up, the LEDs turn to red if the electrodes are not connected to the patient, otherwise the corresponding LED will be green when good patient connection is established.
- Before connecting to the acquisition module, the Bluetooth signal LED (3) will be flashing blue. After the connection is set up, the LED will be solid blue.
- After connecting to the acquisition module, if you press the acquisition button (2), it can be observed on the host that the acquisition is started.



See "Communication Setup" on page 66 for detailed information on connecting the acquisition module via Bluetooth.

Connecting the acquisition module to the docking station via the communication cable allows you to transfer ECG data while charging the acquisition module.



Connecting the Leadwires to the Acquisition Module

Use the following instructions to connect your leadwires to the acquisition module.

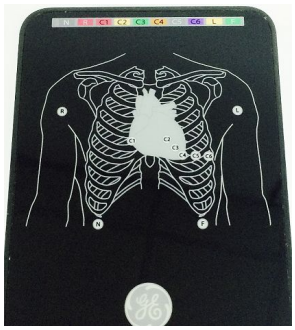
WARNING:

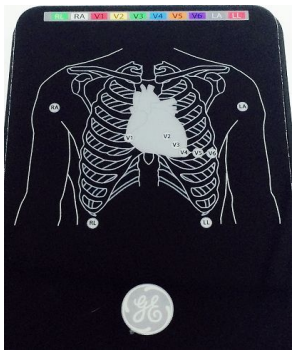
ELECTRIC SHOCK HAZARD — Connecting patient cables directly to the AC power outlet may result in electric shock to the patient, user, and bystanders.

Do not connect the patient cables directly to an AC power outlet. Connect patient cables only to the ECG Signal Input.

This system provides for two different standards of leadwires - ***AHA***, and ***IEC***. The acquisition module has labels on the interface for each standard. When you attach the leadwires to the acquisition module, make sure you match the tag on the leadwires to the label on the acquisition module.

IEC **AHA**





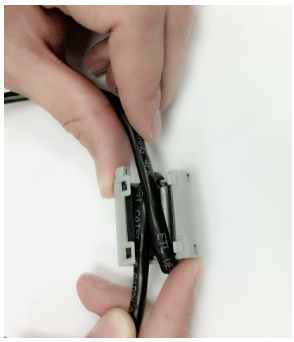
Connecting the Barcode Reader to the Docking Station

Connect the barcode reader to the USB port on the docking station.

Refer to the barcode reader's documentation for additional information.

NOTE:

To ensure the transmission quality, you need to intertwine a magnet ring to the cable as shown in the following graphic while connecting the barcode reader to the docking station.



NOTE:

You must configure the barcode settings for the site before using the reader.

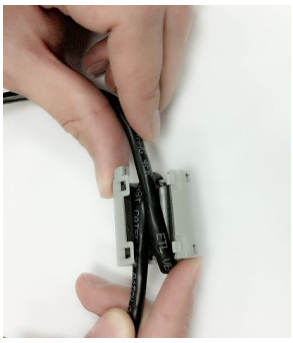
See the detailed information about the barcode reader settings in "Patient Setup" on page 74.

Connecting to a LAN to the System

Connect an Ethernet cable to the RJ45 network connector on the back of the device.

NOTE:

To ensure the transmission quality, you need to intertwine a magnet ring to the cable as shown in the following graphic while connecting the Ethernet cable to the docking station.



Connecting an External Laser Printer to the System

You can use this system with an external USB laser printer connected to its USB port or a network printer connected to its LAN connection.

You must use the printer away from the patient vicinity and it must:

- Be compliant with IEC60950 or equivalent standards
- Be compliant with the PCL5e language or higher
- Be compliant with the PJL language or higher (only the network printer)
- Have a minimum of 600 dpi resolution
- Have a minimum of 8 MB of memory

Refer to the printer's documentation for information on configuring the printer.

NOTE:
If connection problems occur while the printer is connected to the device, or the connected network printer is not compliant with PJL language, the following error is displayed: ***Printer Connection Failed.***

NOTE:
If you are using a network printer, save all reports before printing. The system may display the message: ***Obtain your report to verify the transmission was successful.*** This message may display whether the report prints or does not print. If the reports do not print, you can print the report again in ***File Manager***.

Refer to the printer manual for detailed printer setup information.

Connecting the AC Power Adapter to the Docking Station

Both the host and docking station can run using AC or battery power. When the host or docking station is plugged into an AC outlet, it uses AC power and charges the battery.

NOTE:
The system should be connected to an independent power socket and used alone in the patient environment.

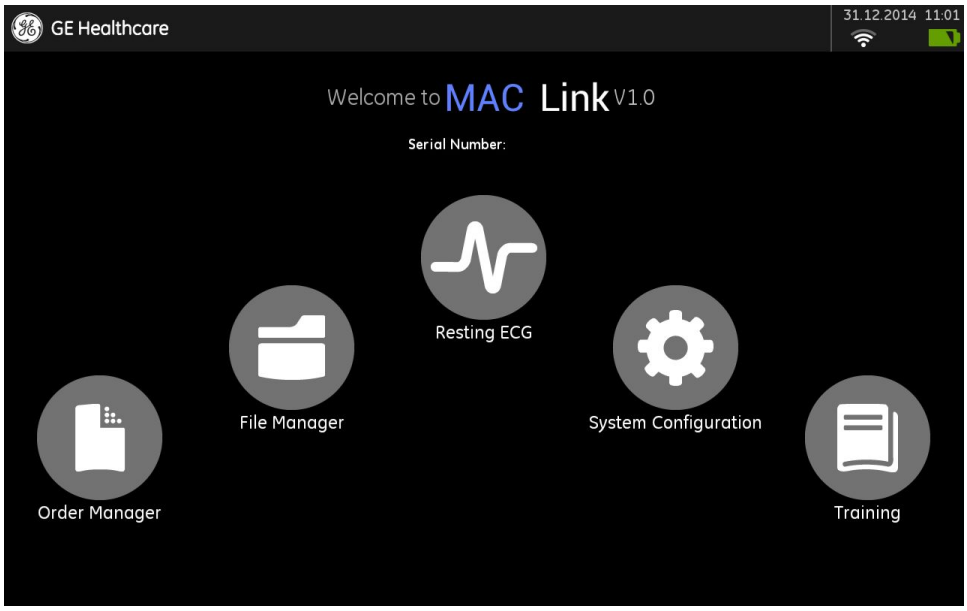
Use the following instructions to connect the device to an AC power outlet.

1. Connect the female end of the device's power cord to the AC power connector on the rear of the host or docking station.
2. Plug the male end of the power cord into an AC outlet.
3. Check the Power LED to make sure the device is receiving power from the AC outlet.

   For more information, see "Front View" on page 15 and "Front View" on page 21.

Turning on the System

Press and hold the **Power** button to turn on the host. Verify that the system's welcome screen is displayed with no errors, as shown in the following graphic.



NOTE:

If the host device has been shut down for more than one month, power on the system and let run for at least 3 hours before using. If the date or time is not correct, configure the system date and time as described in "Date/Time Setup" on page 81.

If you encounter any problems turning on the system, see "Troubleshooting" on page 141 for troubleshooting instructions.

Configuring the System

When the system is ready for operation, configure the system settings using the information in "System Configuration" on page 49.

If you are applying the same settings to multiple devices at the site, export the settings to a Micro SD card and use that card to import the settings to the other devices.

Testing the Device

After the system is set up and configured, test it completely before using it with patients. Test scenarios include:

- Conducting and printing a resting ECG
  Refer to *MAC Link Resting ECG Analysis System User Guide* for instructions on resting ECGs.
- Conducting and printing a full disclosure ECG
  Refer to *MAC Link Resting ECG Analysis System User Guide* for instructions on full disclosure ECGs.
- Conducting and printing an RR analysis
  Refer to *MAC Link Resting ECG Analysis System User Guide* for instructions on RR Analysis.
- Saving, importing, printing, deleting, transmitting, and exporting records to internal storage
  Refer to *MAC Link Resting ECG Analysis System User Guide* for instructions on using internal storage.

Shutting Down the Device

Perform the following actions to shut down the device.

1. Press and hold the **Power** button.

   A pop-up message is displayed to confirm shutting down the system.

2. Press ***OK***.

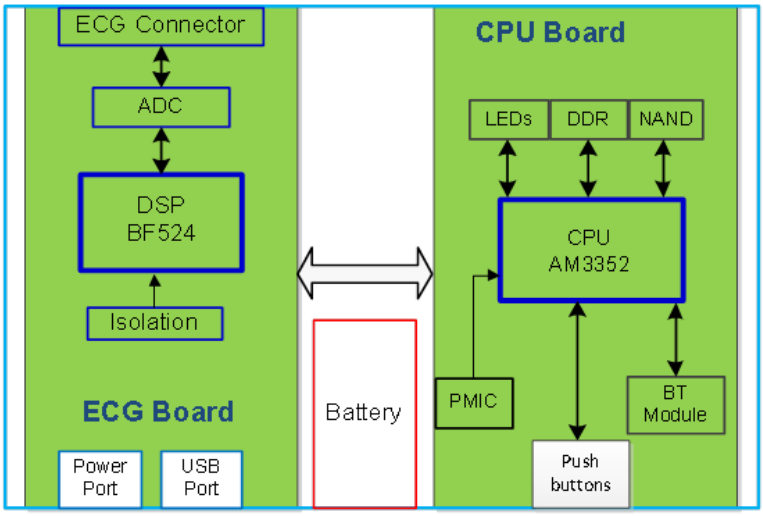
   Wait for a few seconds until the screen turns to black. Then your system has been shut down normally.

System Architecture

The following sections describe the system architecture of the MAC Link system.

Acquisition Module

Hardware Block Diagram



Hardware/Firmware Architecture

The hardware and firmware subsystems of the acquisition module include the following:

Hardware Subsystems

- CPU board
- ECG acquisition and power supply board
- Battery
- Housing

Firmware Subsystems

- CPU board image
- DSP image

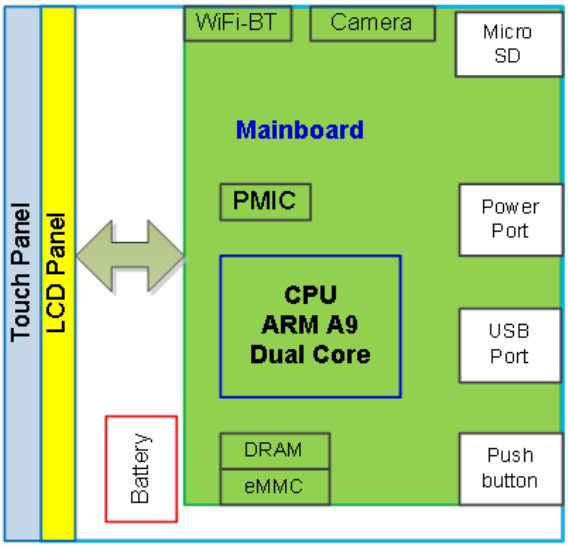
Product Interfaces

The acquisition module offers the following interfaces for connecting to external devices for data communication, software updates, and the control of workload devices:

Interface	Description
ECG cable connector	Connects to the ECG lead wires.
Communication port	Connects to the Host device or Docking Station by communication cable.
DC port	Connects to the AC/DC adapter.

Host

Hardware Block Diagram



Hardware/Firmware Architecture

The hardware and firmware subsystems of the host include the following:

Hardware Subsystems

- Main board
- Touch panel
- LCD
- Battery
- Support frame and housing

Firmware Subsystems

- Main board Image

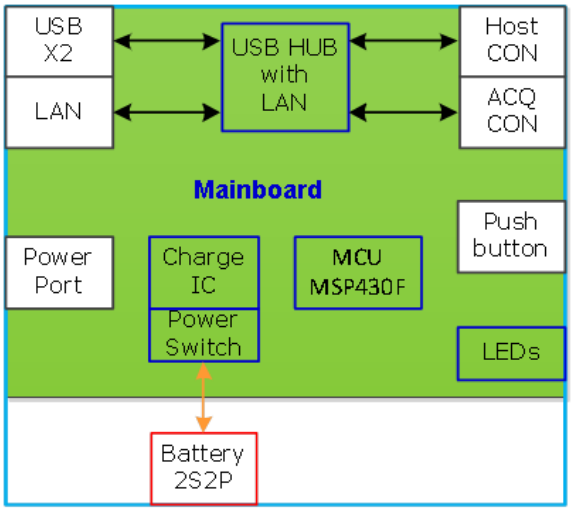
Product Interfaces

The host offers the following interfaces for connecting to external devices for data communication, software updates, and the control of workload devices:

Interface	Description
Micro SD card slot	Interfaces with a Secure Digital card, which stores ECGs, to flash the device with software updates.
Communication port	Connects to the Host device or Docking Station by communication cable.
DC port	Connects to the AC/DC adapter.

Docking Station

Hardware Block Diagram



Hardware/Firmware Architecture

The hardware and firmware subsystems of the docking station include the following:

Hardware Subsystems

- Main board
- Battery
- Housing

Firmware Subsystems

- MCU image

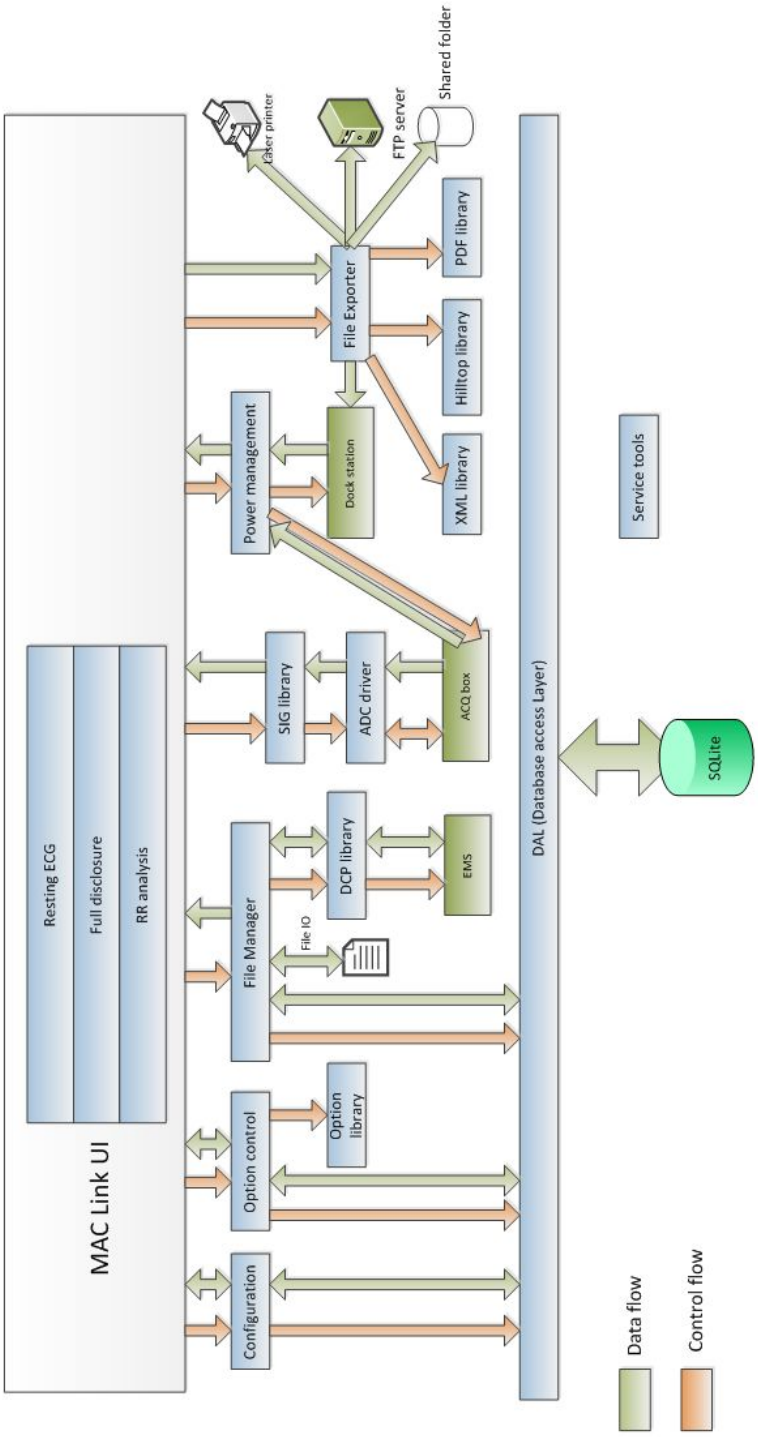
Product Interfaces

The docking station offers the following interfaces for connecting to external devices for data communication, software updates, and the control of workload devices:

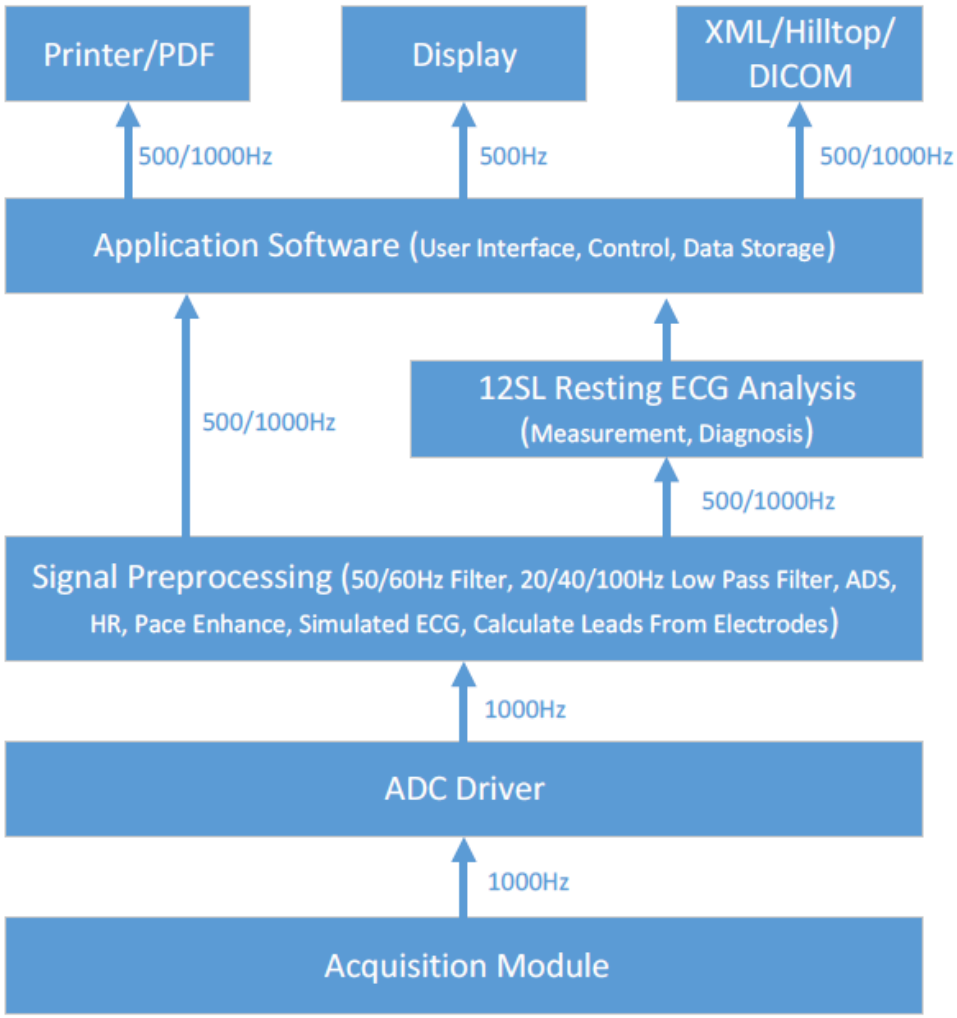
Interface	Description
USB connector	Connects to USB devices, including an optional barcode reader or an external USB keyboard.
RJ-45 port	Connects to networks via an Ethernet connector.
Acquisition box port	Connects to the acquisition box by communication cable.
Host port	Connects to the Host device.
DC port	Connects to the AC/DC adapter.

Software Architecture

Layered Structure of Application Software



ECG Data Flow with Sampling Rates

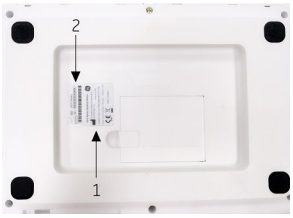


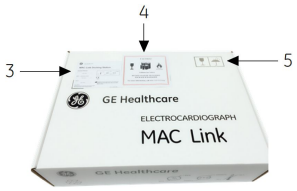
2

Equipment Identification

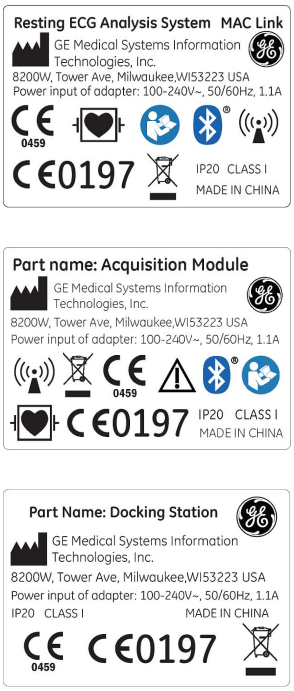
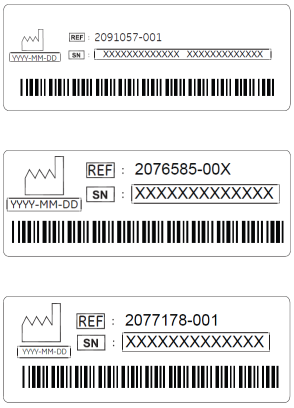
Every GE Healthcare product has labels that identify the product name, part number, manufacturing information, serial number, and other information. This information is required when contacting GE Healthcare for service or support.

Hardware and Packaging Label Locations

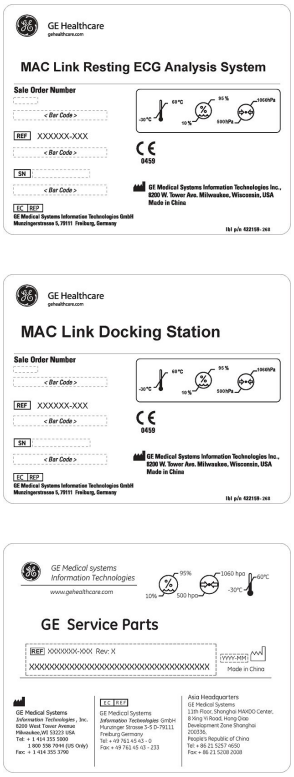
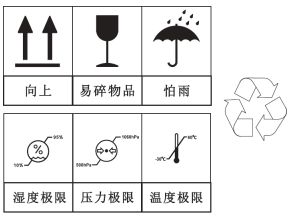




Label Descriptions on Hardware and Packaging

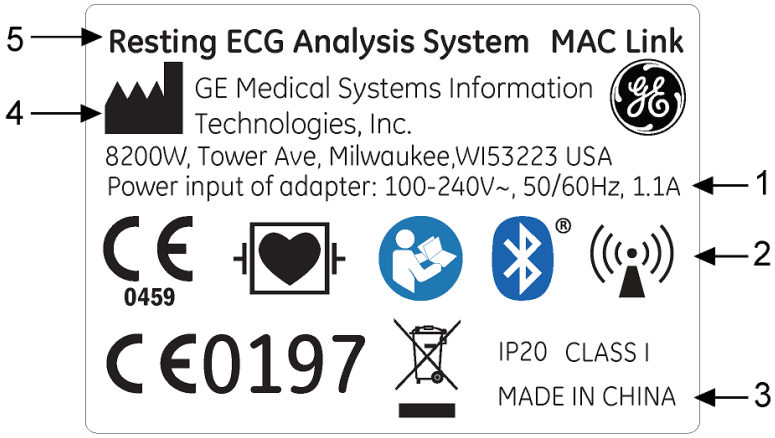
Item	Label	Location	Description
1		Bottom cover of the device	Product Label Identifies the device. See "Product Label" on page 45 for a description of the label contents.
2		Bottom cover of the device	Serial Number Label See "Serial Number Label" on page 47 for a description of the label contents.

Label Descriptions on Hardware and Packaging (cont'd.)

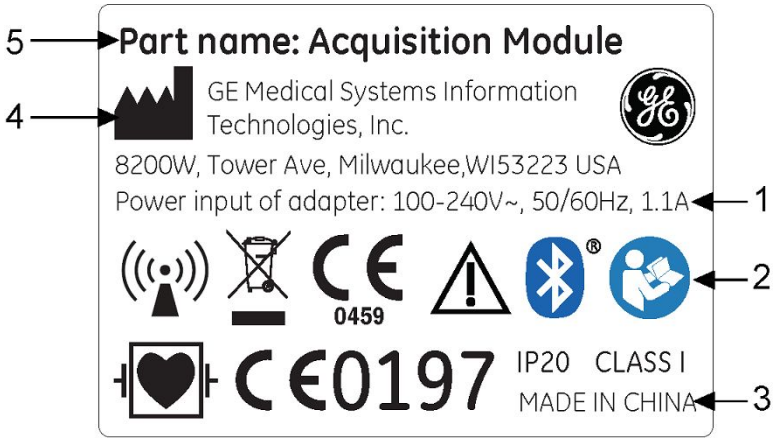
Item	Label	Location	Description
3		Located on the shipping package	Shipping Label Contains the following information: • Product description • Sales order number • Configuration number • Model number • Serial number • Storage conditions • Regulatory compliance • Country of Origin • EC Representative information
4		On the shipping package	Battery Shipping Label. FRAGILE - Lithium Ion batteries can cause fire if damaged.
5		On the shipping package	Environmental symbols required for shipping.

Product Label

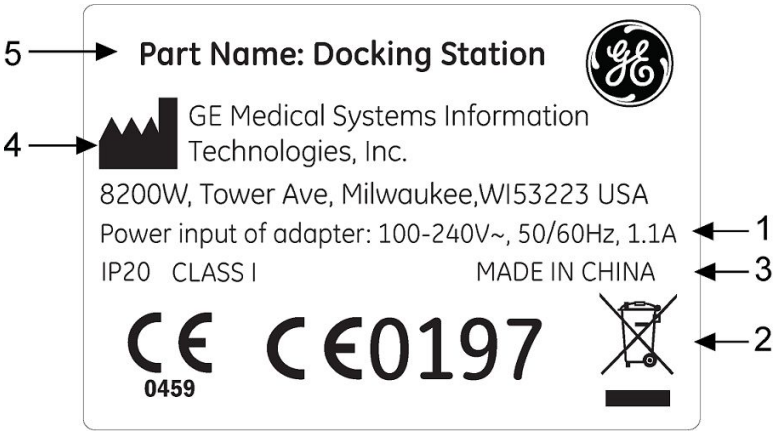
The product label is in the following format:



Host Device Product Label



Acquisition Module Product Label



Docking Station Product Label

Device Address Label and Rating Plate Format

Item	Description
1	Country of origin
2	Electrical rating of the device

Device Address Label and Rating Plate Format (cont'd.)

Item	Description
3	Symbols Refer to the *MAC Link Resting ECG Analysis System Safety And Regulatory Guide* for a description of the symbols used on this label.
4	Manufacturer name and address
5	Product description

Serial Number Label

The serial number label is in the following format:

Host Device Serial Number Label

Acquisition Module Serial Number Label

Docking Station Serial Number Label

Product Label Format

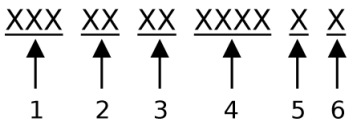
Item	Description
1	Product part number
2	Device serial number. The first three digits of the number are the product code. See "Serial Number Format" on page 48 for detailed information.

Product Label Format (cont'd.)

Item	Description
3	Product bar code
4	Date of manufacture in YYYY-MM or YYYY-MM-DD format

Serial Number Format

Each device has a serial number that uniquely identifies it and provides important information. You need the product code and the entire serial number before servicing or requesting support for your product. The serial number format is shown in the following illustration:



Serial Number Format

Item	Name	Description
1	Product Code	Three-letter code that uniquely identifies the product line.
2	Year Manufactured	Two-digit code identifying the year the device was manufactured. Values range from 00 to 99 For example: 00 = 2000, 04 = 2004, 05 = 2005 (and so on).
3	Fiscal Week Manufactured	Two-digit code identifying the week the device was manufactured. Values range from 01 to 52. GE Healthcare's fiscal weeks correspond to the calendar week. For example, 01 = first week in January.
4	Product Sequence	Four-digit number identifying the order in which this device was manufactured. Values range from 0001 to 9999.
5	Manufacturing Site	One-letter code identifying the site where the device was manufactured. For example, F = Milwaukee, N = Freiburg, P = Bangalore, W = Wuxi, H = Helsinki.
6	Miscellaneous Characteristic	One-letter code identifying manufacturing status. For example, P = device is a prototype, R = device was refurbished, U = device was upgraded to meet the specifications of another product code, A = device is in production.

3

System Configuration

System Configuration provides access to functions that allow you to customize the system settings and to utilities to help manage those settings. This chapter describes the settings managed by each function and the process followed by each utility.

CAUTION:

LOSS OF CONFIGURATION CHANGES — Changes to the configuration are not saved until you return to the Main Menu.

After making configuration changes, return to the ***Main Menu*** to ensure the changes are saved.

Setup Functions

Setup Functions include the following categories:

- "Basic Setup"
- "Resting Setup"
- "Full Disclosure Setup"
- "RR Analysis Setup"
- "Country Setup"
- "Communication Setup"
- "Patient Setup"
- "File Manager Setup"
- "Options Setup"
- "User Setup"
- "Order Setup"
- "Date/Time Setup"
- "Import/Export Setup"
- "Service Tool"

Depending on which options you purchased, some of these functions may not be available on your system.

Basic Setup

The ***Basic Setup*** function allows you to define the following information:

- ***Basic System Information***
- ***System Setup***
- ***High Security Mode***
- ***Printer Setup***
- ***Lead Sequence***

NOTE:
You must add physicians in ***User Setup*** before they can be selected as default physicians. For more information, see "User Setup" on page 79.

To access ***Basic Setup*** from the ***Main*** window, press ***System Configuration*** > ***Basic Setup***.

The following table describes each setting available on ***Basic Setup***.

Basic Setup - Basic System Information

Field	Description
Institution Name	The name of the institution.
Street	The street address of the institution.
City	The city where the institution is located.
Ordering Physician	The physician who ordered the ECG. Defaults on any patient records created on the system.
Referring Physician	The physician who referred the patient. Defaults on any patient records created on the system.
Attending Physician	The physician who is in charge of this patient while they are in the hospital. Defaults on any patient records created on the system.
Technician	The technician who conducted the ECG. Defaults on any patient records created on the system.
Site #	Site number where the device is located. (Defaults on any patient records created on the system). This field is required to store ECG reports on a cardiology information system such as the MUSE system.
Location	Location ID where the device is located. Defaults on any patient records created on the system.

Basic Setup - Basic System Information (cont'd.)

Field	Description
Cart #	Unique cart number of the device. Defaults on any patient records created on the system.
Test Patient (temporary)	Enables/disables simulated ECGs. When enabled, simulated waveforms are generated in the resting, arrhythmia, or RR Analysis ECG functions. This is useful for demonstration, training, or testing purposes. **NOTE:** This setting clears when the system is reset.

Basic Setup - System Setup

Field	Description
Power up mode	Determines which screen is displayed when the system is turned on. Available options are: • Resting ECG • Main Screen • File Manager • Order Manager **NOTE:** Depending on which options were purchased, some of these options may not be available on your system.
Default Resting ECG Mode	Determines which ECG mode is displayed when you enter the ECG acquisition window. Available options are: • 10s ECG Mode • Full Disclosure Mode • RR Analysis Mode **NOTE:** Depending on which options were purchased, some of these options may not be available on your system.
Sample Rate	Determines the report frequency. Available options are: • 500 Hz • 1000 Hz
ECG Grid	Determines whether a grid is displayed behind the waveforms. A grid may make reading the ECG easier. The default is ***on***.
Anti-Aliasing of ECG Waveforms	Determines whether anti-aliasing is applied to waveforms to reduce distortion caused by the video display. The default is ***on***.
Auto Connect to Acquisition Module	Determines whether the device automatically connects to the acquisition module. The default is ***off***, you need to manually connect the acquisition module every time when you enter the ***Resting ECG*** mode.

Basic Setup - System Setup (cont'd.)

Field	Description
Auto Connect Silent Mode	Determines whether the device popup the connection notification every time you enter the acquisition window. The default is ***off***. If ***Auto Connect Silent Mode*** is ***ON***, the system will connect the previous acquisition module every time you enter the acquisition window. **NOTE:** If ***ON*** is selected in ***Auto Connect to Acquisition Module*** field, ***OFF*** is automatically selected for ***Auto Connect Silent Mode*** field.
Acquisition Module Auto Standby	Determines whether the device automatically enters ***standby*** mode if it is inactive for a predefined time limit. This helps reduce power consumption and increases the life of the device. See also ***Acquisition Module Auto Standby Time***.
Acquisition Module Auto Standby Time	Identifies the amount of time, in minutes, that the device can remain inactive before it enters ***standby*** mode. ***Acquisition Module Auto Standby*** uses this field.
Host Auto Standby	Determines whether the device automatically enters ***standby*** mode if it is inactive for a predefined time limit. This helps reduce power consumption and increases the life of the device. See also ***Host Auto Standby Time***.
Host Auto Standby Time	Identifies the amount of time, in minutes, that the device can remain inactive before it enters ***standby*** mode. ***Host Auto Standby*** uses this field.
Host Auto Power Off	Determines whether the device automatically turns off if it is inactive for a predefined time limit. This helps reduce power consumption and increases the life of the device. See also ***Host Auto Power Off Time***. This field is available only if ***Host Auto Standby*** is enabled.
Host Auto Power Off Time	Identifies the amount of time, in minutes, that the device can remain inactive before it turns off. ***Host Auto Power Off*** uses this field.
The Theme of Playback	Determines the color scheme of the 10s ECG display. Available options are: • ***White*** - White background with red grid, black lead name and waveform. • ***Black*** - Black background with white grid, white lead name and green waveform. **NOTE:** The theme only impacts 10s ECG display.

Basic Setup - High Security Mode

Field	Description
High Security Mode	Enables/disables high security mode. You can activate it only if at least one user with ***Edit Users*** and ***Edit Setup*** privileges is configured with a password. When ***High Security Mode*** is enabled, users are prompted to enter an ID and password when logging on to the system. You must add each user in ***User Setup***. The following two fields are activated only when the ***High Security Mode*** is enabled.
Auto Logoff	Determines whether the device automatically logs off if it is inactive for a predefined time limit. This helps reduce power consumption and increases the life of the device.
Auto Logoff Time	Identifies the amount of time, in minutes, that the device can remain inactive before it logs off. ***Auto Logoff*** uses this field.

Basic Setup - Printer Setup

Field	Description
Add Network Printer	Press to add a new network printer. The following information is required: • Name • IP Address • Port
Edit	If you have a network printer in the list, you can press ***Edit*** to modify the following network printer setup: • Name • IP Address • Port
Printer Test	Press to test whether the printer setup is correct. • If you are connecting to a network printer, the following message is displayed at the bottom of the screen: ***Obtain your report to verify the transmission was successful.*** • If no message is received, you may need to check whether your printer setup is correct. You can contact your IT person for detailed information.

Basic Setup - Printer Setup (cont'd.)

Field	Description
Set As Default	Determines the default system printer: 1. Select the printer. 2. Press ***Set As Default***. A ***Yes*** displays in the ***Is Default*** column of the selected printer.
Delete	Deletes a printer you no longer need.

Basic Setup - Lead Sequence

Field	Description
Lead Sequence	Determines the lead sequence to use. Values are: • STANDARD • CABRERA
1–6 Rhythm Leads	Six fields that allow you to define the rhythm leads and their sequence. You can select the rhythm leads for all lead sequences.

Resting Setup

The ***Resting Setup*** option allows you to define:

- ***Display Settings***
- ***Algorithm Settings***
- ***Auto Actions***
- ***Printer Setup***

To access ***Resting Setup*** from the ***Main*** window, press ***System Configuration*** > ***Resting Setup***.

The following table describes each setting available on ***Resting ECG Setup***.

Resting Setup - Display Settings

Field	Description
Gain [mm/mV]	Sets the amplitude of the ECG signal. Measurement is in millimeters per millivolt and includes the following options: • 2.5 mm/mV • 5 mm/mV • 10 mm/mV • 20 mm/mV • 40 mm/mV • Automatic The larger the selected measurement, the larger the waveform. Only the representation of the waveform changes; signal strength is not affected. **NOTE:** If ***Automatic*** is selected, the system calculates the best gain based on the peak-to-peak amplitudes of all displayed leads and the selected display format.
Speed [mm/s]	Changes the speed of printing and the wiper bar movement across the display. Measurement is in millimeters per second (mm/s) and includes the following options: • 12.5 mm/s • 25 mm/s • 50 mm/s
Low Pass Filter [Hz]	Sets the maximum frequency to include in the waveform. Restricting frequencies can help eliminate noise in the waveform. Frequencies are measured in Hertz (Hz) and include the following options: • 20 Hz • 40 Hz • 100 Hz • 150 Hz Selecting a frequency eliminates signals above that frequency. For example, if you select 40, only signals that have a frequency of 40 Hz or lower are included in the waveform.
ADS	Toggles the anti-drift system (***ADS***) on and off. ***ADS*** helps reduce baseline drift.
Line Filter	Enables/disables the line filter defined in ***Country Setup***.

Resting Setup - Display Settings (cont'd.)

Field	Description
Display Formats for Landscape	Determines the display format of the resting ECG. Available values are: • 1x3 (columns x leads) • 4x3 (columns x leads) • 1x6 (columns x leads) • 2x6 (columns x leads)
Display Lead Group for 1x3	Determines which group of leads is displayed. The available values depend on which ***Display Format*** is selected. Available values are: • First 3 Rhythm Leads • 1st group • 2nd group • 3rd group • 4th group **NOTE:** This field is available when ***1x3 (columns x leads)*** is selected for ***Display Formats for Landscape***.
Display Lead Group for 1x6	Determines which group of leads is displayed. The available values depend on which ***Display Format*** is selected. Available values are: • 6 Rhythm Leads • 1st group • 2nd group **NOTE:** This field is available when ***1x6 (columns x leads)*** is selected for ***Display Formats for Landscape***.
Pace Enhancement	Increases the readability of a pacemaker ECG either by augmenting small pace pulses or by truncating large pace pulses. If enabled, pace enhancement is done in two steps: 1. Adds a marker (1.5 mV amplitude, 6 ms duration) to the electrode signal. 2. Limits the sum to 0.5 mV in the lead signal.
Hookup Advisor	Enables/disables the ***Hookup Advisor*** option, which visually indicates the quality of lead signals.

Resting Setup - Display Settings (cont'd.)

Field	Description
Preview before Analysis	Determines waveform preview options. Values include: • ***No*** Waveforms are never previewed. • ***Always*** Waveforms are always previewed. • ***Yellow electrodes*** Waveforms are previewed when the ***Hookup Advisor*** indicator displays a yellow electrode. • ***Red electrodes*** Waveforms are previewed when the ***Hookup Advisor*** indicator displays a red electrode.
ECG Acquisition	Determines the ECG acquisition mode. Values include: • ***Pre-Acquisition*** Uses the last 10 seconds of ECG data already stored in the system. • ***Post Acquisition*** Acquires 10 new seconds of ECG data after you press **Acquire**.

Resting Setup - Algorithm Settings

Field	Description
QTC Calculation	Determines which formula is used to correct QT calculations. Options are: • Bazett QTc = QT $\sqrt{HR/60}$ • Framingham QTc = QT + 154 (1 – 60/HR) • Fridericia QTc = QT $\sqrt[3]{HR/60}$ In all formulas, HR = Heart Rate. These are available only if the ***ME12*** or ***MI12*** option is activated.
Screening Criteria	Enables/disables the inclusion of the screen criteria. This setting is available only if the ***MI12*** option is activated. It is disabled by default.
Suppress normal statement	Enables/disables the inclusion of the normal statement. This setting is available only if the ***MI12*** option is activated.
Suppress abnormal/ borderline	Enables/disables the inclusion of the abnormal/borderline statements. This setting is available only if the ***MI12*** option is activated.
Suppress all statements	Enables/disables the inclusion of all statements. This setting is available only if the ***MI12*** option is activated.

Resting Setup - Algorithm Settings (cont'd.)

Field	Description
Suppress reason statement	Enables/disables the inclusion of reason statements. This setting is available only if the ***Screening Criteria*** field is enabled. It is enabled by default. **NOTE:** Reason statements are not yet available for all languages.
ACI-TIPI	Enables/disables the inclusion of the ***ACI-TIPI (Acute Cardiac Ischemia Time Insensitive Predictive Instrument)*** statement and enables the ***Chest Pain*** field on the ***Patient Information*** window. To include ACI-TIPI statements, the following conditions must be met: • ***MI12*** or ***ME12*** system option is activated • ***ACI-TIPI*** is enabled • ***Print interpretation*** is enabled • Patient data must include: gender, date of birth, and chest pain indication • Patient cannot be a pediatric patient (15 years or younger), as calculated from the date of birth For additional information, refer to the *ACI-TIPI Physician's Guide*.

Resting Setup - Auto Actions

Field	Description
Auto Print	Determines whether to automatically print the ECG report to the printer.
Auto Send	Determines whether to automatically send the ECG report to external devices. Available only if one of the communications options is activated. See "Options Setup" on page 78 for detailed information.
Auto Delete	Determines whether to automatically delete the ECG report that has already been sent. Available only if one of the communications options is activated. See "Options Setup" on page 78 for detailed information.

Resting Setup - Auto Actions (cont'd.)

Field	Description
Auto Summary	Determines whether to automatically summarize the ECG waveform and diagnostic report after acquisition. The ***Auto Summary*** and ***Auto Delete*** functions are incompatible.
Default Send Location	Configures the default ECG send location. Available only if one of the communications options is activated, and the ***Location*** field is configured in "Communication Setup" on page 66. See "Basic Setup" on page 50 for detailed information.

Resting Setup - Printer Setup

Field	Description
10s ECG Report Format for Laser printing	Determines how the 10s ECG report prints on an external laser printer. The options are: • Blank (Non-printing) • 1x10x12_25, 1 page: 1 column x 10s x 12 leads_25 mm/s, 1 page • 2x5x6_25, 1 page: 2 column x 5s x 6 leads_25 mm/s, 1 page • 2x5x6_50, 2 page: 2 column x 5s x 6 leads_50 mm/s, 2 pages • 2x10x6_25, 2 page: 2 column x 10s x 6 leads_25 mm/s, 2 pages • 4x2.5x3_25, 1 page: 4 column x 2.5s x 3 leads_25 mm/s, 1 page • 4x2.5x3_25_R1, 1 page: 4 column x 2.5s x 3 leads_25 mm/s+1 rhythm lead 10s, 1 page • 4x2.5x3_25_R3, 1 page: 4 column x 2.5s x 3 leads_25 mm/s+3 rhythm leads 10s, 1 page • Swedish H1–1 page, 2x(6 medians @ 50 mm/s)+6 leads 10s @ 12.5 mm/s
Detailed Report Format for Laser Printing	Determines how the ***Detailed Results*** report prints. If no format is selected, the report prints without the median report page. The options are: • Blank (Non-printing) • MEDIAN_50 • MEDIAN_25
Report Copies of Laser Report	Determines how many copies of the 10s ECG report prints on an external laser printer. Valid values range from 1 to 5.
Paper Size for Laser Report	Determines the page size of the report when it prints on a laser printer. Valid values are ***A4*** and ***Letter***.
Print Grids for Laser Report	Determines whether the grid prints on the report when printed on a laser printer.

Resting Setup - Printer Setup (cont'd.)

Field	Description
10s ECG Report Format for PDF	Determines how the 10s ECG report prints to a PDF file. The options are: • Blank (Non-printing) • 1x10x12_25, 1 page: 1 column x 10s x 12 leads_25 mm/s, 1 page • 2x5x6_25, 1 page: 2 column x 5s x 6 leads_25mm/s, 1 page • 2x5x6_50, 2 page: 2 column x 5s x 6 leads_50 mm/s, 2 pages • 2x10x6_25, 2 page: 2 column x 10s x 6 leads_25 mm/s, 2 pages • 4x2.5x3_25, 1 page: 4 column x 2.5s x 3 leads_25 mm/s, 1 page • 4x2.5x3_25_R1, 1 page: 4 column x 2.5s x 3 leads_25 mm/s+1 rhythm lead 10s, 1 page • 4x2.5x3_25_R3, 1 page: 4 column x 2.5s x 3 leads_25 mm/s+3 rhythm leads 10s, 1 page • Swedish H1–1 page, 2x(6 medians @ 50 mm/s)+6 leads 10s @ 12.5 mm/s
Detailed Report Format for PDF	Determines how the ***Detailed Results*** report prints. If no format is selected, the report prints without the median report page. The options are: • Blank (Non-printing) • MEDIAN_50 • MEDIAN_25
Paper Size for 10s ECG PDF Report	Determines the page size of the report when it prints to a PDF report. Valid values are ***A4*** and ***Letter***.
Print Interpretation for Laser Printing	Determines whether the ECG interpretation prints on the report.
Print Interpretation for PDF Report	Determines whether the ECG interpretation prints on a PDF report.

Full Disclosure Setup

The ***Full Disclosure Setup*** function allows you to define the following information:

- ***Display Settings***
- ***Printer Setup***

To access ***Full Disclosure Setup***, from the ***Main*** window, press ***System Configuration*** > ***Full Disclosure Setup***.

The following table describes each setting available on ***Full Disclosure Setup***.

Full Disclosure Setup - Display Settings

Field	Description
Gain [mm/mV]	Sets the amplitude of the ECG signal. Measurement is in millimeters per millivolt and includes the following options: • 2.5 mm/mV • 5 mm/mV • 10 mm/mV • 20 mm/mV • 40 mm/mV • Automatic The larger the selected measurement, the larger the waveform. Only the representation of the waveform changes; signal strength is not affected. **NOTE:** If ***Automatic*** is selected, the system calculates the best gain based on the peak-to-peak amplitudes of all displayed leads and the selected display format.
Acquisition Time	Determines the default acquisition time (in seconds) of full disclosure. Available value is 11–300.
Sweep Speed [mm/s]	Changes the speed of rhythm printing and the wiper bar movement across the display. Measurement is in millimeters per second (mm/s) and includes the following options: • 12.5 mm/s • 25 mm/s • 50 mm/s
Low Pass Filter [Hz]	Sets the maximum frequency to include in the waveform. Restricting frequencies can help eliminate noise in the waveform. Frequencies are measured in Hertz (Hz) and include the following options: • 20 Hz • 40 Hz • 100 Hz • 150 Hz Selecting a frequency eliminates signals above that frequency. For example, if you select 40, only signals that have a frequency of 40 Hz or lower are included in the waveform.
ADS	Toggles the anti-drift system (***ADS***) on and off. ***ADS*** helps reduce baseline drift.
Line Filter	Enables/disables the line filter defined in ***Country Setup***.

Full Disclosure Setup - Display Settings (cont'd.)

Field	Description
Display Formats for Landscape	Determines the display format of the full disclosure ECG. Available values are: • 1x3 (columns x leads) • 4x3 (columns x leads) • 1x6 (columns x leads) • 2x6 (columns x leads)
Display Lead Group for 1x3	Determines which group of leads is displayed. The available value depends on which ***Display Format*** is selected. Available values are: • First 3 Rhythm Leads • 1st group • 2nd group • 3rd group • 4th group **NOTE:** This field is available when ***1x3 (columns x leads)*** is selected for ***Display Formats for Landscape***.
Display Lead Group for 1x6	Determines which group of leads is displayed. The available value depends on which ***Display Format*** is selected. Available values are: • 6 Rhythm Leads • 1st group • 2nd group **NOTE:** This field is available when ***1x6 (columns x leads)*** is selected for ***Display Formats for Landscape***.
Pace Enhancement	Increases the readability of a pacemaker ECG either by augmenting small pace pulses or by truncating large pace pulses. If enabled, pace enhancement is done in two steps: 1. Adds a marker (1.5 mV amplitude, 6 ms duration) to the electrode signal. 2. Limits the sum to 0.5 mV in the lead signal.
Hookup Advisor	Enables/disables the ***Hookup Advisor*** option, which visually indicates the quality of lead signals.

Full Disclosure Setup - Display Settings (cont'd.)

Field	Description
Auto Summary	Determines whether to automatically summarize the ECG preview after acquisition.
Default Send Location	Configures the default ECG send location. Available only if one of the communications options is activated, and the ***Location*** field is configured in "Communication Setup" on page 66. See "Options Setup" on page 78 for detailed information.

Full Disclosure Setup - Printer Setup

Field	Description
Report Format for Laser printing	Determines how the full disclosure ECG report prints on an external laser printer. The options are: • 1x12_12_25 • 1x12_12_50 • 1x6_6_25 • 1x6_6_50 • 1x12_1_25 • 1x12_1_50 • 1x6_1_25 • 1x6_1_50
Report Format for PDF	Determines how the full disclosure ECG report prints to a PDF file. The options are: • 1x12_12_25 • 1x12_12_50 • 1x6_6_25 • 1x6_6_50 • 1x12_1_25 • 1x12_1_50 • 1x6_1_25 • 1x6_1_50

RR Analysis Setup

To access ***RR Analysis Setup*** from the ***Main*** window, press ***System Configuration*** > ***RR Analysis Setup***.

The following table describes each setting available on ***RR Analysis Setup***.

RR Analysis Setup

Field	Description
Gain [mm/mV]	Sets the amplitude of the ECG signal. Measurement is in millimeters per millivolt and includes the following options: • 2.5 mm/mV • 5 mm/mV • 10 mm/mV • 20 mm/mV • 40 mm/mV • Automatic The larger the selected measurement, the larger the waveform. Only the representation of the waveform changes; signal strength is not affected. **NOTE:** If ***Automatic*** is selected, the system calculates the best gain based on the peak-to-peak amplitudes of all displayed leads and the selected display format.
Sweep Speed [mm/s]	Changes the speed of printing and the wiper bar movement across the display. Measurement is in millimeters per second (mm/s) and includes the following options: • 12.5 mm/s • 25 mm/s • 50 mm/s
Low Pass Filter [Hz]	Sets the maximum frequency to include in the waveform. Restricting frequencies can help eliminate noise in the waveform. Frequencies are measured in Hertz (Hz) and include the following options: • 20 Hz • 40 Hz • 100 Hz • 150 Hz Selecting a frequency eliminates signals above that frequency. For example, if you select 40, only signals that have a frequency of 40 Hz or lower are included in the waveform.
ADS	Toggles the anti-drift system (***ADS***) on and off. ***ADS*** helps reduce baseline drift.
Line Filter	Enables/disables the line filter defined in ***Country Setup***.

RR Analysis Setup (cont'd.)

Field	Description
Analysis Lead	Selects the leads that record during the acquisition. Available options are: • I • II • III • aVR (this is displayed as ***-aVR*** if ***CABRERA*** is selected in ***Basic Setup***) • aVL • aVF • V1 • V2 • V3 • V4 • V5 • V6
Test Target	Selects the default acquisition target. Available values are: • 1 minute • 2 minutes • 3 minutes • 4 minutes • 5 minutes • 100 beats • 200 beats • 300 beats • 400 beats • 500 beats
Pace Enhancement	Increases the readability of a pacemaker ECG either by augmenting small pace pulses or by truncating large pace pulses. If enabled, pace enhancement is done in two steps: 1. Adds a marker (1.5 mV amplitude, 6 ms duration) to the electrode signal. 2. Limits the sum to 0.5 mV in the lead signal.
RR Table	Determines whether to display the RR table in the RR analysis report.
Default Send Location	Configures the default ECG send location. Available only if one of the communications options is activated, and the ***Location*** field is configured in "Communication Setup" on page 66. See "Options Setup" on page 78 for detailed information.

Country Setup

The ***Country Setup*** function allows you to define the following information:

- ***Language***
- ***Date Format***
- ***Time Format***
- ***Height/Weight Unit***
- ***Blood Pressure Unit***
- ***Line Filter***
- ***Lead Label***

To access ***Country Setup***, on the ***Main*** window, press ***System Configuration*** > ***Country Setup***.

The following table describes each setting available on ***Country Setup***.

Country Setup

Field	Description
Language	Determines the language the interface and reports use.
Date Format	Determines the format in which dates are displayed. Options are: • DD.MM.YYYY • MM/DD/YYYY • YYYY-MM-DD
Time Format	Determines whether the system uses a 12–hour or a 24–hour format.
Height/Weight Unit	Determines whether the system uses metric measurements (cm, kg) or American measurements (in, lb) for patient height and weight.
Blood Pressure Unit	Determines whether blood pressure is measured in millimeters of mercury (mmHg) or kilopascals (kPa).
Line Filter	Determines the frequency of the line filter. Options are 50 Hz and 60 Hz.
Lead Label	Determines whether the system labels leads using the standards of the International Electrotechnical Commission (IEC) or the American Heart Association (AHA).

Communication Setup

The ***Communication Setup*** function allows you to define the following information:

- ***File Auto Naming***
- ***Wi-Fi Setup***
- ***LAN Setup***
- ***Bluetooth Setup***
- ***Shared Folder Setup***

- ***FTP Setup***
- ***EMS/DICOM Setup***
- ***Location Setup***

NOTE:

Identify, analyze, evaluate and control the risk-related network security in your facilities, or it could result in previously unidentified risk when the device is connected to the IT network.

Stop the data transmission before changing to the IT network, or it could introduce some risks of data loss.

Changes to the IT network include:

- changes in the network configuration
- connection of additional items
- disconnection of items

To access ***Communication Setup***, from the ***Main*** window press ***System Configuration*** > ***Communication Setup***.

The following table describes each setting available on ***Communication Setup***.

Communication Setup - File Auto Naming

Field	Description
Auto Naming	Allows you to enable/disable the ***Automatic Naming*** function of the system. If OFF is selected for this field, the following check boxes are displayed to determine which items are needed for file naming: • ***Patient ID*** • ***Last Name*** • ***First Name*** • ***Date of Birth*** • ***Procedure*** • ***Export Date Time***

Communication Setup - Wi-Fi Setup

Field	Description
Wi-Fi	Allows you to enable/disable the ***Wi-Fi*** function of the system.
Scan Wi-Fi	Press to scan for a Wi-Fi network nearby. See "Wi-Fi Setup" on page 71 for detailed information.

Communication Setup - Wi-Fi Setup (cont'd.)

Field	Description
Add Wi-Fi	Press to manually add a Wi-Fi network. See "Wi-Fi Setup" on page 71 for detailed information.
WiFi Filter	Enable or disable Wi-Fi filter, default value is ***OFF***. When ***Wi-Fi filter*** is enabled, you can check the box before the Wi-Fi network you frequently use. The Wi-Fi network automatically moves to the top of the Wi-Fi list after it is checked. The selected Wi-Fi networks are sorted by signal strength descend. Current connected Wi-Fi network is displayed at the top of the list. After setting the filter, you can only see the selected Wi-Fi networks in the Wi-Fi connection panel.

Communication Setup - LAN Setup

Field	Description
LAN Setup	Allows you to enable/disable the ***LAN*** function of the system.
Obtain an IP address automatically (DHCP)	Determines whether the device automatically receives an IP address from the network. If ***ON*** is selected for this field, the system automatically configures the IP address. If ***OFF*** is selected for this field, you must configure the DHCP server to reserve a static IP address for the device. Contact your network administrator for assistance. This field is available when ***ON*** is selected for ***LAN*** field.
IP Address	Identifies the IP address of the device. If the ***Obtain an IP address automatically (DHCP)*** field is ***OFF***, you must define a unique IP address.
Subnet Mask	Identifies the subnet mask of the device. If the ***Obtain an IP address automatically (DHCP)*** field is ***OFF***, you must define a netmask.
Gateway	Identifies the IP address of the gateway for the device to use. If the ***Obtain an IP address automatically (DHCP)*** field is ***OFF***, you must enter the gateway's IP address.
Preferred DNS Server	Identifies the IP address of the primary DNS server used to resolve Internet domain names.
Alternate DNS Server	Identifies the IP address of the secondary DNS server used to resolve Internet domain names.

Communication Setup - Bluetooth Setup

Field	Description
Bluetooth	Allows you to enable/disable the ***Bluetooth*** function of the system.
Scan Bluetooth Device	Press to scan for an available Bluetooth device nearby. See "Bluetooth Setup" on page 73 for detailed information.

Communication Setup - Bluetooth Setup (cont'd.)

Field	Description
Unpair	Once you have updated your acquisition module, you need to ***Unpair*** the host device with the updated acquisition module and then pair the device again.
Set Device Name	Press to setup the name of paired device.

Communication Setup - Shared Folder Setup

Field	Description
Shared Folder	Determines whether ECG records can be exported to a shared folder. If this field is enabled, the following four fields become available (***Folder Path***, ***User Name***, ***Password***, and ***Domain***).
Folder Path	Determines the path of the shared folder. This field allows a maximum of 30 characters. The format is ***//Host/path***. ***Host*** can be the IP address or Device name. This field is available only if ***Shared Folder*** is activated.
User Name	Identifies the user name that the system uses to log on to the shared folder. The user must be set up on the domain with the appropriate permissions to access the shared directory. This field allows a maximum of 30 characters. This field is available only if ***Shared Folder*** is activated.
Password	Identifies the password that the system uses to log on to the shared folder. The password should contain only numeric, uppercase, and lowercase letters. This field allows a maximum of 30 characters. This field is available only if ***Shared Folder*** is activated.
Domain	Identifies the user's domain. This field allows a maximum of 30 characters. This field is available only if ***Shared Folder*** is activated.
Test Share Folder	Press to test whether the system is connected to the shared folder. This field is available only if ***Shared Folder*** is activated.

Communication Setup - FTP Setup

Field	Description
FTP	Determines whether ECG records can be exported to an FTP Server. If this field is enabled, the following five fields become available (***IP Address***, ***Port***, ***Anonymous Mode***, ***User Name***, and ***Password***).
Secured FTP	Determines whether to set the FTP as a secured FTP. This field is available only if ***FTP*** is activated.

Communication Setup - FTP Setup (cont'd.)

Field	Description
IP Address	Identifies the IP address of the device. This field is available only if ***FTP*** is activated.
Port	Identifies the port where the device should listen for incoming IP connections. This field is available only if ***FTP*** is activated.
Anonymous Mode	Allows you to enable/disable the ***Anonymous Mode*** function of the system. This field is available only if ***FTP*** is activated.
User Name	Identifies the user name the system uses to log on to the FTP server. The user must have write permission to the specific path of the FTP server. This field allows a maximum of 30 characters. This field is available only if ***FTP*** is activated and ***Anonymous Mode*** is off.
Password	Identifies the password the system uses to log on to the FTP server. The password should contain only numeric, uppercase, and lowercase letters. This field allows a maximum of 30 characters. This field is available only if ***FTP*** is activated and ***Anonymous Mode*** is off.
Test FTP	Press to test whether the system is connected to the FTP. This field is available only if ***FTP*** is activated.

Communication Setup - EMS/DICOM Setup

Field	Description
Download from	Determines how to download the orders. Available options are; • EMS • RIS
Server IP	Identifies the server name or IP address.
Port	Identifies the port where the device should listen for incoming IP connections.
Test DCP	Press to test whether the system is connected to the DCP server. This field is available only if ***EMS*** is selected in the ***Download from*** field. The test result is displayed as one of the following: • Successfully connected • Fail to connect **NOTE:** You need to connect your system to LAN or Wi-Fi before testing the connection.

Communication Setup - EMS/DICOM Setup (cont'd.)

Field	Description
Discover DCP Servers	Press to scan for an available DCP server nearby. This field is available only if ***EMS*** is selected in the ***Download from*** field.
Calling AE Title	Identifies the application entity title of service class user. This field is available only if ***RIS*** is selected in the ***Download from*** field.
Called AE Title	Identifies the application entity title of service class provider. This field is available only if ***RIS*** is selected in the ***Download from*** field.
Test RIS	Press to test whether the system is connected to the RIS. The test result is displayed as one of the following: • Successfully connected • Fail to connect This setting is available only if the ***DCOM*** option is activated. See "Options Setup" on page 78 for detailed information. **NOTE:** You need to connect your system to LAN or Wi-Fi before testing the connection.
SCP Storage Server IP	Identifies the server name of the SCP storage server. This setting is available only if the ***DCOM*** option is activated. See "Options Setup" on page 78 for detailed information.
Test SCP	Press to test whether the system is connected to the SCP. The test result is displayed as one of the following: • Successfully connected • Fail to connect **NOTE:** You need to connect your system to LAN or Wi-Fi before testing the connection.

Communication Setup - Location Setup

Field	Description
Location Setup	Identifies the locations displayed on the prompt when downloading orders. This typically is the device's location (see "Basic Setup" on page 50). If the device is used in multiple locations, enter multiple locations and separate them with commas: 1,3,10, and so on.

Wi-Fi Setup

Once you have enabled Wi-Fi and there is an available Wi-Fi network nearby, you may join the Wi-Fi using one of the following methods.

Automatically Join Wi-Fi

1. From the ***Main*** window press ***System Configuration*** > ***Communication Setup*** > ***Wi-Fi setup***.
2. Press ***Scan Wi-Fi***.

   All available Wi-Fi networks are listed on the right side of the panel with their signal strength.
3. Press the network you want to join.
   - If the network is unencrypted or you have already saved the password before, the system automatically joins the network.
     The Wi-Fi logo on the top right corner of the window turns white.
     You have successfully joined the Wi-Fi.
   - If the network is encrypted, the ***Password Entering*** window opens and you need to do the following steps:
     a. Enter the password of the Wi-Fi network.
     b. Press ***OK***.
        - If the password is correct, the system joins the Wi-Fi successfully and the password is saved automatically for your next use.
          The Wi-Fi logo on the top right corner of the window turns white.
          You have successfully joined the Wi-Fi.
        - If the password is not correct, the following message is displayed under the WiFi network name: ***Authentication problem***. Contact your IT person for the correct password.

Manually Join Wi-Fi

If you cannot find the Wi-Fi network you want to join by scanning, you can manually add the Wi-Fi network.

1. From the ***Main*** window press ***System Configuration*** > ***Communication Setup*** > ***Wi-Fi setup***.
2. Press ***Add Wi-Fi***.

   The ***WLAN*** window opens.
3. Enter the ***Network SSID***.

   Network SSID identifies the name of the Wireless Local Area Network (WLAN). This field allows a maximum of 32 characters.

   NOTE:
   The system can connect to any available network if ***Network SSID*** is not empty.

   The system connects to the enterprise network or Internet via infrastructure (wireless access point).
4. Select ***Wi-Fi security type***.

   Available options are:
   - ***None*** - Select this option to no security key.
   - ***WEP*** - Select this option for data encryption through a WEP key.

- ***WPA/WPA2 PSK*** - Select this option to use advanced encryption standard protocol.
- ***802.1x EAP***- Select this option to use 802.1x certification.

NOTE:

If you select ***None***, continue from step 10.

If you select ***802.1x EAP***, continue from step 5.

If you select ***WEP*** or ***WPA/WPA2 PSK***, continue from step 9.

5. Select ***PEAP*** as the ***EAP method***.
6. Select ***Phase 2 authentication***.

   Available options are:

   - ***None***
   - ***PAP***
   - ***MSCHAP***
   - ***MSCHAPV2***
   - ***GTC***
7. Enter the ***Identity***.
8. Enter the ***Anonymous identity***.
9. Enter the ***Password***.
10. Press ***Add***.
    - If the password is correct, the system joins the Wi-Fi successfully and the password is saved automatically for your next use.
      The Wi-Fi logo on the top right corner of the window turns white.
      You have successfully joined the Wi-Fi.
    - If the password is not correct, the following message is displayed under the WiFi network name: ***Authentication problem***. Contact your IT person for the correct password.

Bluetooth Setup

Once you have enabled Bluetooth and there is an available Bluetooth device nearby, you may connect to the Bluetooth device using the following steps:

NOTE:

To ensure communication quality during use, GE Healthcare recommends the distance between the acquisition module and the tablet is within 4 meters when using Bluetooth transmission.

1. From the ***Main*** window press ***System Configuration*** > ***Communication Setup*** > ***Bluetooth setup***.
2. Press ***Scan Bluetooth Device***.

   All available Bluetooth devices are listed on the right side of the panel.
3. Press the Bluetooth device to which you want to connect.

   At the center of the window, the following message is displayed: ***Pairing...***

   The system automatically pairs the Bluetooth device with your device.

4. You can press ***Unpair*** to disconnect with the Bluetooth device you have paired.
5. You can press ***Set Device Name*** to set a new name for the paired Bluetooth device.

Patient Setup

The ***Patient Setup*** function allows you to define the following information:

- ***Patient Information***
- ***Test Information***
- ***Barcode Scanner***

To access ***Patient Setup***, from the ***Main*** window press ***System Configuration*** > ***Patient Setup***.

The following table describes each setting available on ***Patient Setup***.

Patient Setup - Patient Information

Field	Description
Secondary ID	Determines whether a secondary patient ID is available when entering patient data and whether it is required. It can only be required if it is first enabled. On reports, it is labelled ***ID 2***.
Kanji Name	Determines whether the Kanji name field is available when entering patient data.
Last Name	Determines whether the patient's last name field is available when entering patient data. It can only be required if it is first enabled.
First Name	Determines whether the patient's first name field is available when entering patient data. It can only be required if it is first enabled.
Date of Birth	Determines whether the date of birth field is available when entering patient data.
Age	Determines whether the age field is available when entering patient data.
Height	Determines whether the height field is available when entering patient data.
Weight	Determines whether the weight field is available when entering patient data.
Gender	Determines whether the gender field is available when entering patient data.
Race	Determines whether the race field is available when entering patient data.
Phone	Determines whether the phone number field is available when entering patient data.
Pacemaker	Determines whether the pacemaker field is available when entering patient data.

Patient Setup - Patient Information (cont'd.)

Field	Description
Patient ID with Leading Zeros	Enables/Disables ***Leading "0"***. When the patient ID consists of numbers, the system automatically adds the Arabic numeral "0" before the IDs that do not meet the set length (the range is 3-30 according to the user). For example, if the set length of the patient ID is nine numbers, but the input patient ID is 123, then the system automatically adjusts the patient ID to 000000123.
Patient ID	Determines whether the patient ID is required. On reports, it is labelled ***ID***.
Last Name	Determines whether the patient's last name field is required when entering patient data.
First Name	Determines whether the patient's first name field is required when entering patient data.
Patient ID Length (3-30)	Defines the maximum length of the patient ID within the range of 3 to 30 characters.

Patient Setup - Test Information

Field	Description
Systolic BP	Determines whether the systolic blood pressure field is available when entering test information.
Diastolic BP	Determines whether the diastolic blood pressure field is available when entering test information.
Location	Determines whether the location field is available when entering test information.
Room	Determines whether the room field is available when entering test information.
Order Number	Determines whether the order number field is available when entering test information.
Indication	Determines whether the indication field is available when entering test information.
Ordering Physician	Determines whether the ordering physician field is available when entering test information.
Referring Physician	Determines whether the referring physician field is available when entering test information.
Attending Physician	Determines whether the attending physician field is available when entering test information.
Technician	Determines whether the technician field is available when entering test information. It can only be required if it is enabled.
Technician Name Required	Determines whether the technician field is required when entering test information.
Number of Medications	Determines the number of medications that you can enter into the test information window.

Patient Setup - Test Information (cont'd.)

Field	Description
Prompt	Allows you to define up to four custom fields.
Type	Allows you to define the type of the ***Prompt***. Options are: • Alphanumeric • Numeric • Yes/No/Unknown

NOTE:
The following ***Barcode Scanner*** field is available only when the following fields are enabled in ***Patient Information***:

- First Name
- Last Name
- Date of Birth
- Gender

Patient Setup - Barcode Scanner

Field	Description
Multiple Fields Barcode	Determines whether multiple fields barcode is available when entering patient data.
Total number of Characters	Identifies the total number of bytes on the barcode or magnetic strip.
Patient ID Offset	Identifies the position of the initial character of the patient ID.
Patient ID Length	Identifies the number of characters for the patient ID.
First Name Offset	Identifies the position of the initial character of the first name.
First Name Length	Identifies the number of characters for the first name.
Last Name Offset	Identifies the position of the initial character of the last name.
Last Name Length	Identifies the number of characters for the last name.
Year of Birth Offset	Identifies the position of the initial character of the year of birth.
Year of Birth Length	Identifies the number of characters for the year of birth.
Month of Birth Offset	Identifies the position of the initial character of the month of birth.
Month of Birth Length	Identifies the number of characters for the month of birth.
Day of Birth Offset	Identifies the position of the initial character of the day of birth.
Day of Birth Length	Identifies the number of characters for the day of birth.
Gender Offset	Identifies the position of the initial character of the gender.
Gender Length	Identifies the number of characters for the gender.

File Manager Setup

The ***File Manager Setup*** function allows you to define the following information:

- ***Sort Resting ECG Record List by***
- ***Sort Order List by***
- ***Sort Full Disclosure Record List by***
- ***Sort RR Analysis Record List by***
- ***Records per page***

To access ***File Manager Setup***, from the ***Main*** window press ***System Configuration*** > ***File Manager Setup***.

The following table describes each setting available on ***File Manager Setup***.

File Manager Setup

Field	Description
Sort Resting ECG Record List by	Determines how to initial sort the resting ECG record list. Available options are: • Patient Name • Acquisition Date Time • Patient ID • Order Number
Sort Order List by	Determines how to initial sort the order list. Available options are: • Patient Name • Patient ID • Location • Date Time • Status This setting is available only if ***FULL***, ***RRAN***, ***OCOM***, ***MCOM*** and ***DCOM*** options are activated. See "Options Setup" on page 78 for detailed information.
Sort Full Disclosure Record List by	Determines how to initial sort the full disclosure record list. Available options are: • Acquisition Date Time • Patient ID • Patient Name • Order Number This setting is available only if ***FULL***, ***RRAN***, ***OCOM***, ***MCOM*** and ***DCOM*** options are activated. See "Options Setup" on page 78 for detailed information.

File Manager Setup (cont'd.)

Field	Description
Sort RR Analysis Record List by	Determines how to initial sort the RR analysis record list. Available options are: • Acquisition Date Time • Patient ID • Patient Name • Order Number This setting is available only if ***FULL***, ***RRAN***, ***OCOM***, ***MCOM*** and ***DCOM*** options are activated. See "Options Setup" on page 78 for detailed information.
Records per page	Determines the number of records displayed on one page.

Options Setup

The ***Options Setup*** function allows you to activate options by entering ***Option Codes***, which are generated for a specific serial number and can only activate options on the device with that serial number.

All purchased options are activated when the system ships. If you purchase a new option or re-activate an option, use the following instructions:

1. From the ***Main*** window, press ***System Configuration*** > ***Options Setup***.
2. Enter the 12–figure activation code in the ***Option Code*** field.

   You can find activation codes for purchased options on the ***Active Code Summary Sheet*** provided with the system or with additional purchased options.
3. Press ***Save***.

   At the bottom of the window, the following message is displayed: ***Option Activated***.
4. Repeat step 2 to step 3 for any additional options you want to activate.
5. Press ***Save*** to save the configuration options.

The following table identifies the available options. You are given an activation code for each purchased option.

Options Setup

Code	Part No.	Description
FULL	2078569-005	Full Disclosure Mode
RRAN	2078569-004	RR Anaylsis Mode
ME12	2078569-001	12SL Measurement
MI12	2078569-002	12SL Measurement and Interpretation
OCOM	2078569-006	EMS Communication
MCOM	2078569-007	MUSE Communication

Options Setup (cont'd.)

Code	Part No.	Description
DCOM	2078569-008	DICOM
TIPI	2078569-003	ACI-TIPI

User Setup

The ***User Setup*** function allows you to define the following:

- User names
- User identification
- User roles
- User privileges

Users entered in setup can be selected for system defaults and patient information. If ***High Security Mode*** is enabled, anyone who uses the system must be set up as a user with a user ID, a password, and privileges to log on to the system. For more information on setting system defaults and enabling ***High Security Mode***, see "Basic Setup" on page 50.

To access ***User Setup***, from the ***Main*** window press ***System Configuration*** > ***User Setup***.

When you run ***User Setup***, the ***Edit User Lists*** window opens to offer four choices:

- Ordering Physicians
- Referring Physicians
- Attending Physicians
- Technicians

When you select one of these roles, a list of existing users with that role opens. You can now add, edit, and delete users.

The following table identifies the settings on ***User Setup***.

User Setup

Field	Description
First Name	Identifies the user's given name. This field is optional, but if used, allows a maximum of 20 alphanumeric characters.
Last Name	Identifies the user's surname. This field is required and allows a maximum of 40 alphanumeric characters.
MUSE ID	Defines the MUSE ID of the user.
User ID	Defines a unique ID for the user. If ***High Security Mode*** is enabled, the user needs to enter this ID to log on to the system. This field is required and allows a maximum of 30 alphanumeric characters.

User Setup (cont'd.)

Field	Description
Ordering Physician	Determines whether the user fills the role of ordering physician. If this is the role that was selected on the ***Edit User List*** window, this field is checked by default. You may select multiple roles, but you must select at least one role.
Referring Physician	Determines whether the user fills the role of referring physician. If this is the role that was selected on the ***Edit User List*** window, this field is checked by default. You may select multiple roles, but you must select at least one role.
Attending Physician	Determines whether the user fills the role of attending physician. If this is the role that was selected on the ***Edit User List*** window, this field is checked by default. You may select multiple roles, but you must select at least one role.
Technician	Determines whether the user fills the role of technician. If this is the role that was selected on the ***Edit User List*** window, this field is checked by default. You may select multiple roles, but you must select at least one role.
Password	Defines the password the user must enter along with the ***User ID*** to log on to the system if ***High Security Mode*** is enabled. This field must be between 6 and 30 alphanumeric characters.
Confirm Password	Confirms the password was entered correctly.
User Permissions	Allows users to edit the user permissions. These permissions are detailed in the following 6 fields.
Configuration	Enables/disables the user's ability to make system configuration changes.
Edit Users	Enables/disables the user's ability to edit user information.
Edit Date and Time	Enables/disables the user's ability to edit system date and time.
Edit Record	Enables/disables the user's ability to edit ECG records.
Delete Record	Enables/disables the user's ability to delete ECG records.
Send Record	Enables/disables the user's ability to send ECG records.

Order Setup

To access ***Order Setup***, from the ***Main*** window press ***System Configuration*** > ***Order Setup***.

The following table describes each setting available on ***Order Setup***.

Order Setup

Field	Description
Auto order deletion	Determines whether an order is deleted automatically when the acquisition of the order is finished. This field is NOT dependent on the ***Delete after transmit*** field on the ***Basic Setup*** window. Both fields operate independently.
Default order location	Identifies the locations when downloading orders. This is typically the device's location (see "Basic Setup" on page 50). If the device is used in multiple locations, enter multiple locations and separate them with commas: 1,3,10, and so on.

Date/Time Setup

The ***Date/Time Setup*** function allows you to configure the system's date and time settings.

To access ***Date/Time Setup***, from the ***Main*** window press ***System Configuration*** > ***Date/Time Setup***.

The following table describes each setting available on ***Date/Time Setup***.

Field	Description
Automatic date and time	Enables/disables the automatic date and time of the host device.
Time Server IP Address	Allows you to enter the time server IP address.
Time Zone	Determines which time zone is used for this device.
Host Device Date	Sets the current system date. The format of the fields depends on the date format selected on ***Country Setup***. For more information, see "Country Setup" on page 66.
Host Device Time	Sets the current system time. If the ***If the Automatic date and time*** field is set on ***Basic Setup***, any changes made to the time are overwritten during the next synchronization. For more information, see "Basic Setup" on page 50.
Test Time Server	Press to test whether the time server IP address is available.

Import/Export Setup

The ***Import/Export Setup*** function allows you to import/export the system configuration files.

Restore Factory Setting

Restore Factory Setting allows you to restore all the preferences and settings on the device, for example the Startup window, standby mode, and personal settings to the default factory settings.

No stored patient and ECG data is deleted during the restoring of default factory settings.

NOTICE:

DATA LOST — All the configuration information is lost after restoring to factory setting.

If you want to keep the configuration information, be sure to back it up before using the ***Restore Factory Setting***.

NOTICE:

DEVICE DAMAGE — Suddenly cutting off the power or restarting the device when you are restoring factory setting can cause loss or corruption of data, or even damage to the device.

Never disconnect your device to the main power when you are restoring factory setting.

Export Configuration

The ***Export Configuration*** function allows you to export saved settings from the device to a Micro SD card. You can then use the Micro SD card to import the settings to another device, simplifying the installation and configuration of multiple devices.

1. Insert the Micro SD card.
2. From the ***Main*** window, press ***System Configuration*** > ***Import/Export Setup***.

   The ***Import/Export Setup*** window opens.
3. In the ***Export Configuration*** field, press ***Export***.

   The ***Export Type Selection*** panel opens.
4. Enter the custom type name.

   You can define up to five export types.
5. Select the required type.
6. Press ***OK***.

   At the bottom of the screen, the following message is displayed: ***The configuration was successfully exported***.

   The configuration file exports to the Micro SD card by default. You can find the file using the following path:

   Micro SD card\Cardio\expconfig
7. Repeat Steps 3 to 6 to export all the saved configuration information you want to export.

Import Configuration

The ***Import Configuration*** function allows you to import up to five system setup files from another device that were exported to a Micro SD card. This feature is useful to sites with multiple systems that need to have the same or similar setups.

1. Insert the Micro SD card with the saved setup file.
2. From the ***Main*** window, press ***System Configuration*** > ***Import/Export Setup***.

   The ***Import/Export Setup*** window opens.

3. In the ***Import Configuration*** field, press ***Select***.

   The ***Configuration file list*** window opens.

   All the saved configuration files on the Micro SD card are listed in the window.

4. Press the configuration file you want to import.

   The system returns to the ***Import/Export Setup*** window, and the path of the file you selected displays below the ***Import Configuration*** field.

5. Press ***Import***.

   The following message is displayed: ***Are you sure you want to import the file?***

6. Press ***OK***.

   At the bottom of the screen, the following message is displayed: ***The file was successfully imported***.

7. Repeat Steps 3 to 6 to import all the saved configuration information you want to export.

System Configuration

The ***System Configuration*** function allows you to export your current System Configuration to a Micro SD card.

1. Insert the Micro SD card with the saved setup file.
2. From the ***Main*** window, press ***System Configuration*** > ***Import/Export Setup***.

   The ***Import/Export Setup*** window opens.

3. Do one of the following:

   - In the ***System Configuration*** field, press ***Export***.
     The ***Export*** window opens.
     Continue with step 4.
   - In the ***System Configuration*** field, press ***Print***.
     The ***Print*** window opens.
     Continue with step 5.

4. Select the configurations you want to export in the list and press ***OK***.

   An ***Exported Successfully*** message is displayed at the bottom of the screen.

5. Select the configurations you want to print in the list and press ***OK***.

   A ***Printed Successfully*** message is displayed at the bottom of the screen.

Service Tool

The ***Service Tool*** option allows service personnel to configure the following:

- Host Device
  - Serial Number
  - Diagnostics Tool
    - Display Test
    - Touch Panel Test

    - LAN Test
    - Wi-Fi Test
    - Battery Test
    - USB Test
    - SD Card Test
    - Flash Test
    - Service Report
  - SW Upgrade
  - Log
  - Engineering Tool
    - Batch Generation
    - Detailed Record Generation
    - Waveform Test
    - Lead Group Test
    - Import CSE Testing Data
- Acquisition Module

Refer to the *MAC Link Resting ECG Analysis System Service Manual* for details.

4

Service Setup

The diagnostic tests verify that the system operates properly. Run the diagnostic tests to check the operation for:

- Host Device
  - Display Screen
  - Touch Panel
  - LAN
  - Wi-Fi
  - Battery
  - USB
  - SD Card
  - Flash
- Acquisition Module
  - USB Connection Result
  - Bluetooth Connection Result
  - Watchdog
  - LED/Indicator
  - Patient Lead Wire
  - Speed

These diagnostic tests are useful tools for troubleshooting problems, and can be useful as part of system checkout procedures.

Accessing Service Tool

Use the following procedure to access ***Service Tool***.

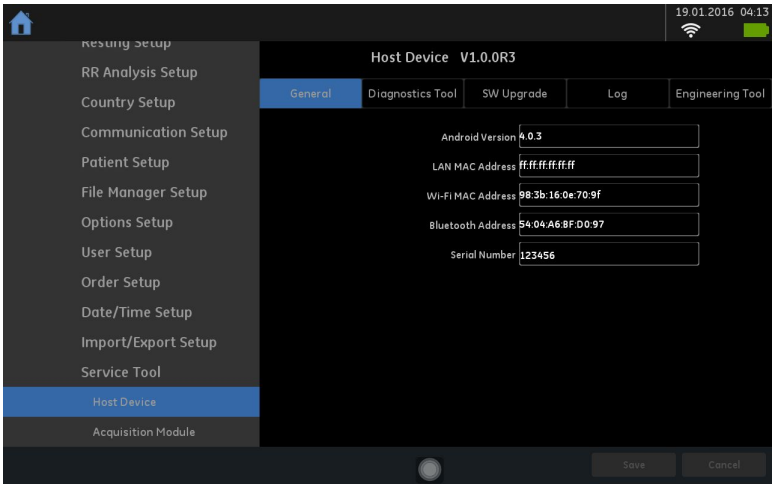
1. Power on the system by pressing the **Power** button.
2. On the ***Main Menu***, press ***System Configuration***.
3. Press ***Service Tool***.

   A window opens prompting you to enter the ***Service Password***.

Contact GE Healthcare support if you do not know the service password.

4. Type the service password and press ***OK***.

   The ***Service Tool*** opens.



Host Device

The following sections describes the service tool used for host device.

General

The ***General*** tab shows the general information for your host device in the following table.

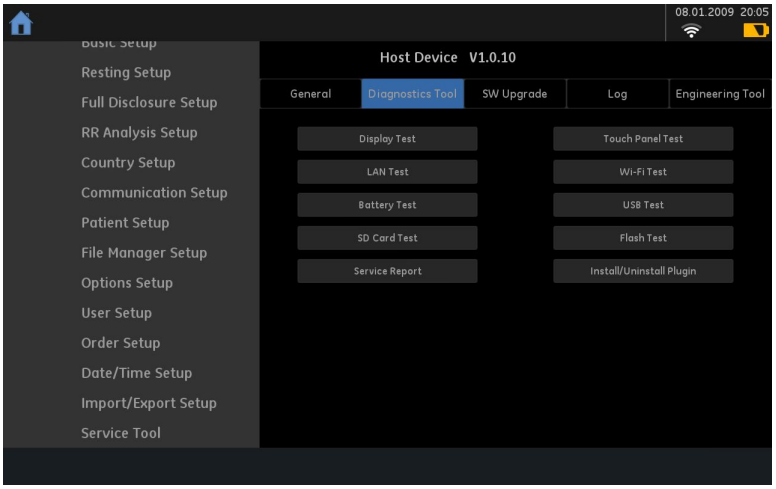
Item	Description
Android Version	Displays the Android system version used for this host device.
LAN MAC Address	Displays the Ethernet LAN mac address of the docking station. If the host device is not plugged into the docking station, ***ff:ff:ff:ff:ff:ff*** is displayed.
Wi-Fi MAC Address	Displays the Wi—Fi mac address of the host device.
Bluetooth Address	Displays the Bluetooth address of the host device.
Serial Number	Displays the unique serial number for the host device.

Diagnostics Tool

Use the ***Diagnostic Tool*** menu to perform functional diagnostic tests for the host device.

Accessing the Host Device Diagnostics Tools

1. Open the ***Service Tool*** as described in "Accessing Service Tool" on page 85.
2. Press ***Host Device*** under ***Service Tool*** to open the host device service setup in the panel on the right side of the window.
3. Press ***Diagnostic Tool*** to open the ***Diagnostic Tool*** panel.



The following sections describe how to perform the specific diagnostic tests. Proceed to the appropriate section for the test you need to perform.

Display Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Select ***Display Test***.

   The ***DISPLAY TEST*** window opens.
3. Select ***Start Test***.
4. Verify that the color band pattern (red, green, blue, white) scrolls down the screen.

   Pass the test if the pattern is replicated without discoloration.
5. After the color band pattern returns to the top, test complete window opens.
6. Select pass or fail:
   - If the test passed, press ***Yes***.
   - If the test failed, press ***No***.
     If the display test failed, replace the host device top cover assembly as described in "Replacing the Host Device Top Cover Assembly" on page 123.

Touch Panel Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Select ***Touch Panel Test***.

   The ***TOUCH PANEL TEST*** window opens.

3. Select ***Start Test***.

   The following window opens.

4. Press wherever the GE logo displays.

   Verify whether you can get all the GE logos.

5. Select pass or fail:

   - If the test passed, press ***Yes***.
   - If the test failed, press ***No***.
     If the touch panel test failed, replace the host device top cover assembly as described in "Replacing the Host Device Top Cover Assembly" on page 123.

LAN Test

1. Network Connectivity

   a. Connect the device to an active LAN.

      Ensure that the LAN is an active network. If you connect to an inactive network connection, the test result may be a false negative.

   b. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.

   c. Select ***LAN Test***.

   d. Select ***Test network***.

      The following message is displayed: ***Checking connectivity. Please wait.***

      Then the test results are displayed.

      - If the following message is displayed in the window, the test passes: ***System Connected to Network.***
      - If the following message is displayed in the window, and you are sure the system is connected to an active network, the test fails: ***Network Unavailable.***

Replace the mainboard PWA assembly as described in "Replacing Host Device Mainboard PWA" on page 120.

e. When the test is done, press anywhere out of the window to close the results window of the ***LAN Test***.

2. IP Address Connectivity

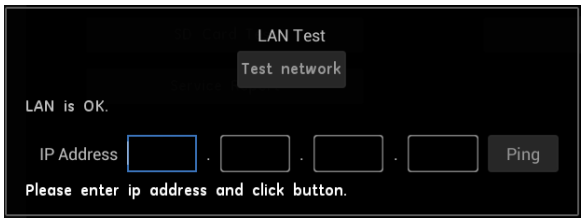
a. Connect the device to an active LAN.

Ensure that the LAN is an active network. If you connect to an inactive network connection, the test result may be a false negative.

b. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.

c. Select ***LAN Test***.

d. Type the ***IP Address*** in the ***IP Address*** field.



e. Press ***Ping*** to start the test.

- If the IP address connected successfully, the IP address connection status is displayed in the window.
- If the IP address ping is unsuccessful, the following message is displayed in the window: ***PING failed***. Contact your IT person for detailed information.

Wi-Fi Test

1. Connect the device to an active Wi-Fi.

Ensure that the Wi-Fi is an active network. If you connect to an inactive network connection, the test result may be a false negative.

2. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.

3. Select ***Wi-Fi Test***.

   The following window opens.

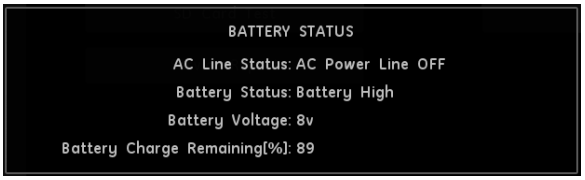
   The connected Wi-Fi network displays on the top of the window.

4. Type the ***IP Address*** in the ***IP Address*** field.
5. Press ***Ping*** to start the test.
   - If the IP address connected successfully, the IP address connection status is displayed in the window.
   - If the IP address ping is unsuccessful, the following message is displayed in the window: ***PING failed***. Contact your IT person for detailed information.
6. You can also setup the Wi-Fi Roaming in this window.
   - ***Wi-Fi Roaming***: enable or disable the Wi-Fi Roaming.
   - ***Wi-Fi Roaming Trigger***: If Wi-Fi signal strength is lower than the trigger, system starts to scan available Wi-Fi around, the trigger default value is ***-65 dBm***, range is ***-90 dBm*** to ***-50 dBm***.
   - ***Set Trigger***: Press to save the trigger value you set in ***Wi-Fi Roaming Trigger*** field.
   - ***Reset Trigger***: Press to reset the ***Wi-Fi Roaming Trigger*** value to default ***-65 dBm***.

Battery Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Select ***Battery Test***.

   A window similar to the one shown in the following illustration opens.



3. Note the battery status information and press anywhere out of the window to close the ***BATTERY STATUS*** window.

If the ***Battery Status*** was ***Failed***, replace the battery as described in "Replacing the Host Device Battery" on page 119.

USB Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Connect a USB keyboard to the USB port on the rear panel of the device.

   NOTE:
   The USB keyboard used for this test must match the language that is selected in setup.

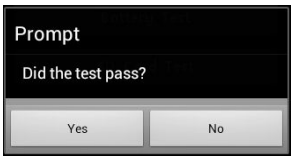
3. Select ***USB Test***.

   The following window opens.

4. Press any key on the USB keyboard and verify pass or fail:
   - If the character that is displayed in the ***Character Input*** field matches the key you pressed, the test passed.
   - If the character does not match the key you pressed, or no character is displayed in the ***Character Input*** field, the test failed.

5. When the test is done, press anywhere out of the window.

   The following window opens.

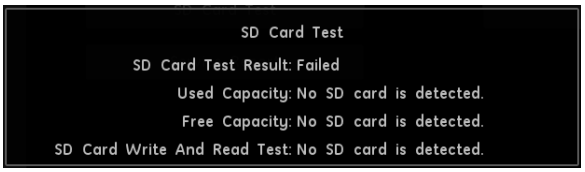


6. Do one of the following:
   - If the test passed, press ***Yes***.
   - If the test failed, press ***No***.
     Replace the mainboard PWA assembly as described in "Replacing Host Device Mainboard PWA" on page 120.

SD Card Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Select ***SD Card Test***.

   A window similar to the one shown in the following illustration opens.



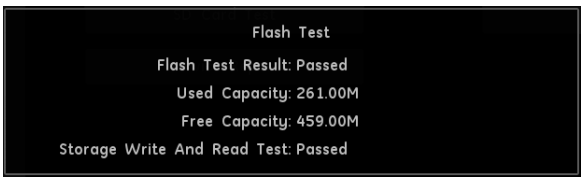
3. Note the SD card status information and press anywhere out of the window to close the ***SD CARD TEST*** window.

If the ***SD Card Test Result*** was ***Failed***, insert a new SD card into the SD card slot.

Flash Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Select ***Flash Test***.

   A window similar to the one shown in the following illustration opens.



3. Note the flash status information and press anywhere out of the window to close the ***FLASH TEST*** window.

If the ***Flash Test Result*** was ***Failed***, replace the mainboard PWA assembly as described in "Replacing Host Device Mainboard PWA" on page 120.

Service Report

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Select ***Service Report***.

   The message ***Service report create successfully.*** displays at the bottom of the screen.

   You can find the service report in the SD card you insert into the host device via the path ***/Removable/MicroSD/Cardio/ServiceReport.txt***.

Install/Uninstall Plugin

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Host Device Diagnostics Tools" on page 87.
2. Select ***Install/Uninstall Plugin***.

   This function is provided to support installing/uninstalling plug-in modules.

Software Upgrade

Software updates are provided on an SD card. Perform a software update for the host device and the operating system as described in this section.

Hardware Preparation

Before updating the host and the operating system, make sure you have the following hardware items by your side.

- The host device that needs to be updated
- USB cable for the host device and PC connection
- The magnet provided in the package
- The micro SD card provided in the package

- Micro SD card reader
- Windows PC

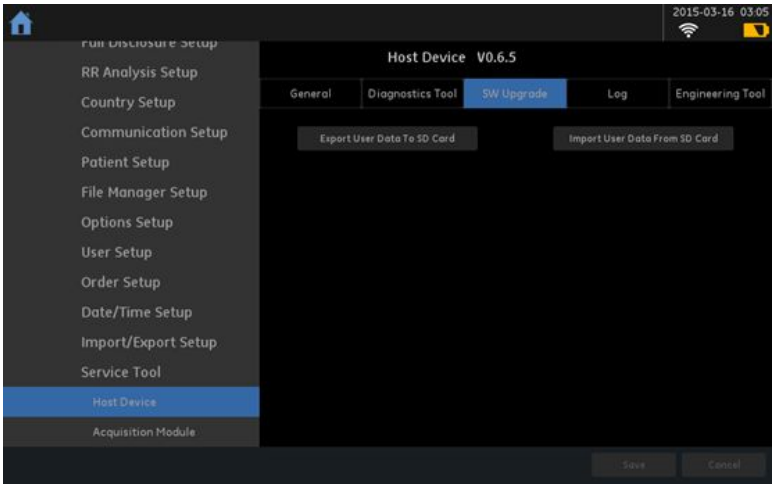
NOTE:
Connect the host device to the AC power during the upgrade.

1. Insert a new, blank micro SD card provided in the package into the SD card slot of the host device.

   NOTE:
   GE Healthcare recommends you to use a micro SD card with a capacity greater than 512M.

2. From the main window of the host, press ***System Configuration*** > ***Service Tool*** > ***Host Device*** > ***Software Upgrade***.

   You may need to use the service password to open the Service Tool; contact GE Healthcare service personnel for the password if you do not know what it is.

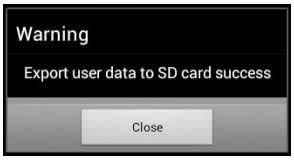


3. Press ***Export User Data To SD Card*** to back up user data to the micro SD card.

   The following pop-up is displayed.

4. Press ***Yes*** to confirm you want to export the user data to the SD card.

   The following pop-up is displayed after the data is successfully backed up.



5. Press ***Close*** to close the pop-pup.
6. Insert the micro SD card provided in the package into the computer.
7. Copy the file ***usbpcdriver.zip*** in ***SD card//Host/Upgrade*** to ***C:/USB/usbpcdriver/*** of the computer.
8. Unzip the ***pcusbdriver.zip*** to the folder.
9. Connect the host device to the computer via the USB cable.
10. Put the magnet on the back the of host, and near the power-up button.

11. Restart the host device.

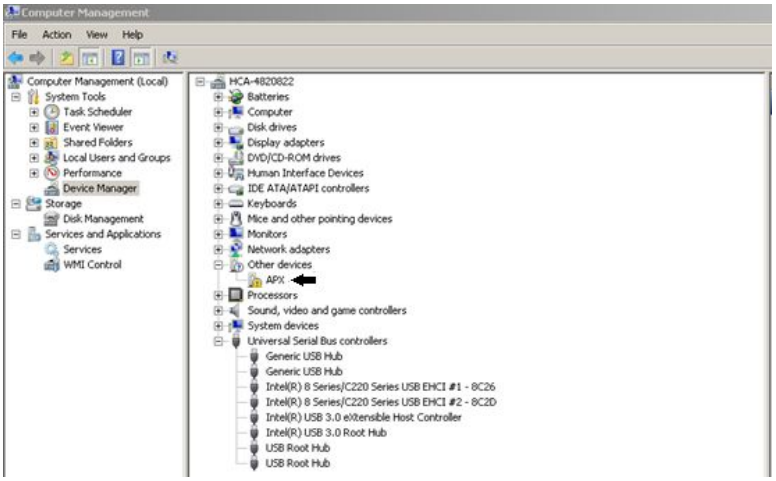
    The host now automatically turns into the boot mode, and the screen is back.

    NOTE:
    If this is the first time you are running the updating procedure, continue to step 12. If not, proceed to step 19.

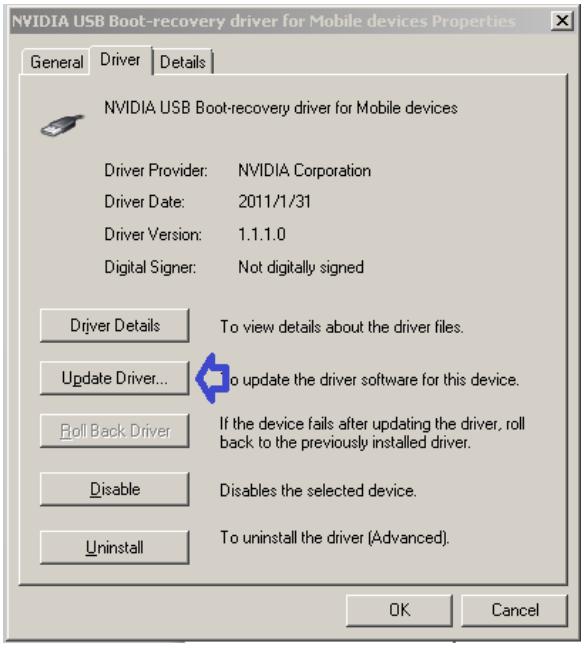
12. Using a mouse with the computer, right-click ***My Computer*** on the computer desktop, and select ***Manage***.

    The ***Computer Management*** window opens.

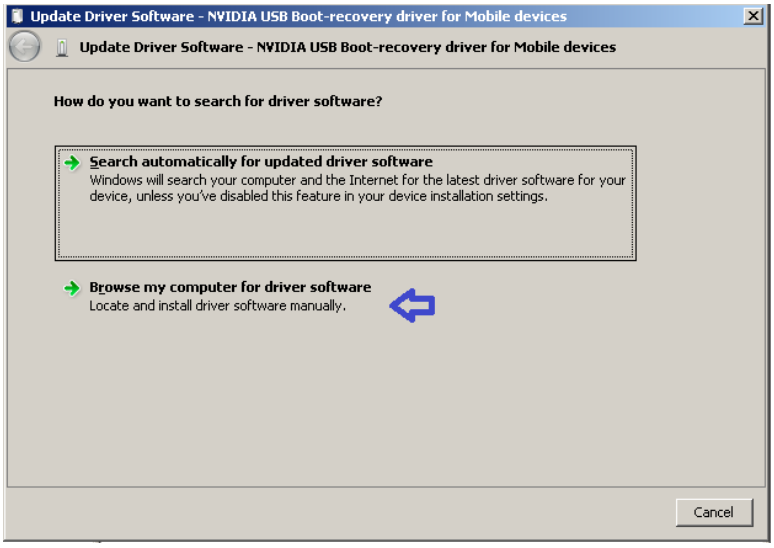
13. Click ***System Tools*** > ***Device Manager*** on the left panel, and then click ***Other devices***.



14. Right-click on ***APX*** and select ***Properties***.
    The following window opens.

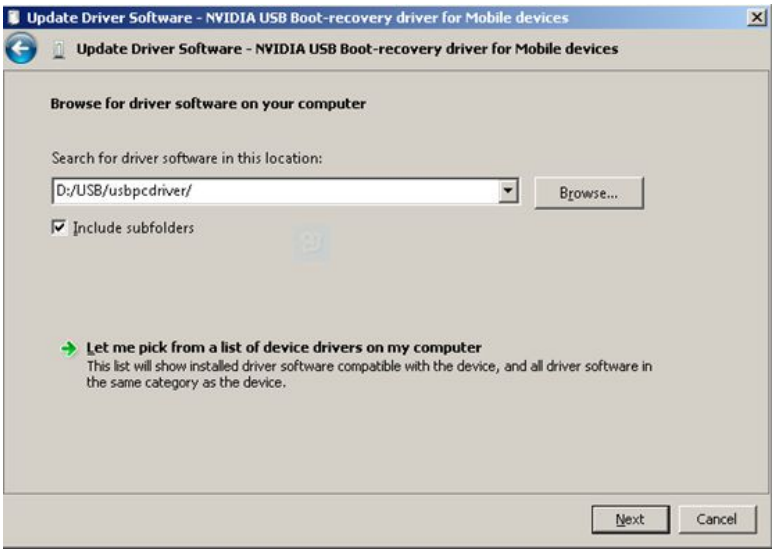


15. Click ***Update Driver***.
    The following window opens.



16. Click ***Browse my computer for driver software***.

    The following ***Update Driver Software*** window opens.



17. Click ***Browse*** to select the path where you unzipped the driver in step 7.
18. Click ***Next*** to finish the driver installation.
19. Copy and unzip the ***MACLink-Host-Software-Production.zip*** in the mirco SD card to the desktop of the computer.
20. Open the unzipped folder and double-click the ***nvflash_for_HC_img.bat*** file in the folder.

    The system automatically runs the updating routine of the host and operating system.

    NOTE:

    After clicking the ***nvflash_for_HC_img.bat*** file, the following message is displayed, it means the USB driver is not installed successfully, or the host is not in the boot mode: ***USB device not found***.

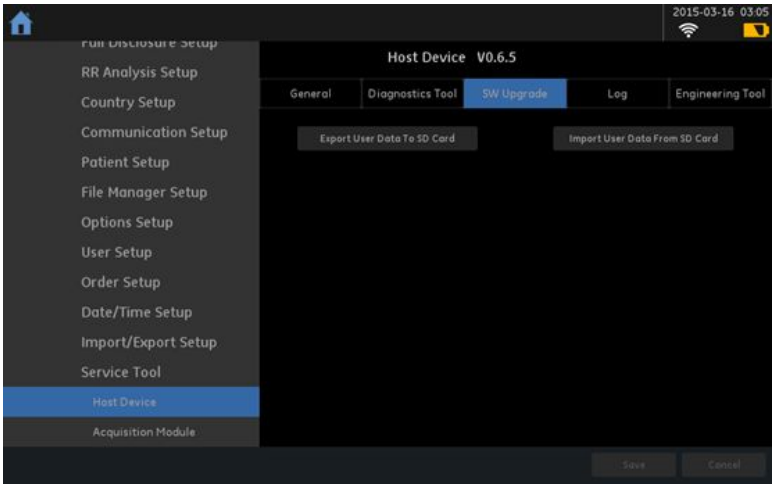
    To solve the issue, perform step 12 to step 18 to re-install the USB driver, and step 9 to 11 to re-enter the boot mode of the host.

21. After the update is completed, the following message is displayed: ***Press any key to continue***.

    The host restarts automatically.

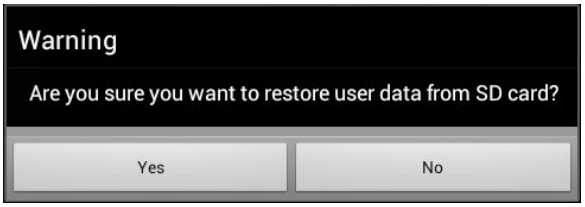
22. Insert the micro SD card you used to back up the user data in steps 1 to 3, into the SD card slot of the host.

23. From the main window of the host, press ***System Configuration*** > ***Service Tool*** > ***Host Device*** > ***Software Upgrade***.



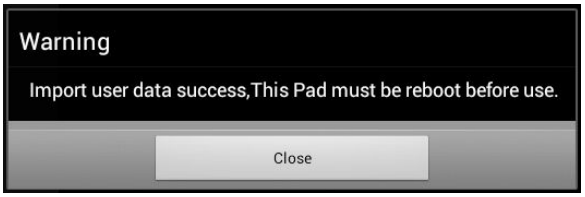
24. Press ***Import User Data From SD Card*** to import the user data back to the host.

    The following pop-up is displayed.



25. Press **Yes** to start importing the user data back to the host.

    The following pop-up is displayed after the data successfully imported.



26. Press ***Close*** to close the pop-up and reboot the host device.

    You have completed all the updates to the host and operating system.

Log

To export the ***Event Log*** of the host device, use the following steps:

1. Open the ***Service Tool*** as described in "Accessing Service Tool" on page 85.
2. Press ***Host Device*** under ***Service Tool*** to open the host device service setup in the panel on the right side of the window.
3. Press ***Log*** to open the ***Event Log Exporting*** panel.

4. Select a level of severity to log from the ***Event Log Level*** list:
   - Select ***Error*** to log only errors to the ***Event Log***.
   - Select ***Warning*** to log errors and warnings to the ***Event Log***.
   - Select ***Information*** to log errors, warnings, and information to the ***Event Log***.
5. Insert the micro SD card into the micro SD card slot on the front side of the host device.

   The gold contacts are face-up.
6. Press ***Export Log***.

   The current ***Event Log*** file is copied to a log directory on the micro SD card.

   NOTE:
   To access the log file, insert the SD card into an SD card reader that is connected to a computer with a Windows operating system and a text editor such as ***Notepad*** or ***WordPad***. If GE Healthcare technical service requests the ***Event Log*** for troubleshooting an issue, send the file as an email attachment.

Engineering Tool

The ***Engineering Tool*** options is used for engineering team to test and debug the host device.

Acquisition Module

The following sections describes the service tool used for acquisition module.

NOTE:
If your host device is not connected to an acquisition module, the acquisition module service tool is not available.

General

The ***General*** tab shows the general information for your acquisition module in the following table.

Item	Description
Acquisition Module Status	Displays the acquisition module connection status. • ***DISCONNECTED***: no acquisition module is connected to the host device. • ***CONNECTED***: acquisition module is connected to the host device. You can press ***Refresh*** to check the latest status.
Software Version	Displays the connected acquisition module software version.
Hardware Version	Displays the connected acquisition module hardware version.

Item	Description
Battery Remaining	Displays the following battery information of the connected acquisition module. • power remaining • voltage • charging status
Serial Number	Displays the unique serial number for the acquisition module.
Device Name	Displays the device name for the acquisition module. You can change it according to your request. Press ***Set*** to save your change.
Reset Configuration	Press to restore all the setting on the acquisition module to factory defaults.

Diagnostics Tool

Use the ***Diagnostic Tool*** menu to perform functional diagnostic tests for the acquisition module.

Accessing the Acquisition Module Diagnostics Tools

1. Open the ***Service Tool*** as described in "Accessing Service Tool" on page 85.
2. Press ***Acquisition Module*** under ***Service Tool*** to open the host device service setup in the panel on the right side of the window.
3. Press ***Diagnostic Tool*** to open the ***Diagnostic Tool*** panel.

   The following sections describe how to perform the specific diagnostic tests. Proceed to the appropriate section for the test you need to perform.

USB Connected Result

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Acquisition Module Diagnostics Tools" on page 100.
2. The ***USB Connected Result*** shows whether your acquisition module is connected to the host device via USB cable.
   - If the result displays ***OFF***, the acquisition module is not connected to the host device or is connected via Bluetooth.
   - If the result displays ***ON***, the acquisition module is connected to the host device via USB cable.
3. Press ***Connect*** to check the latest USB connected result.

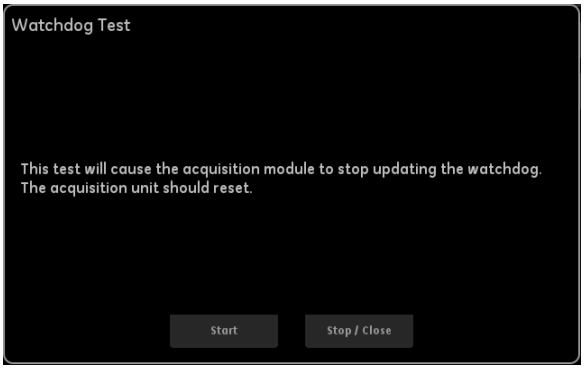
Bluetooth Connected Result

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Acquisition Module Diagnostics Tools" on page 100.
2. The ***Bluetooth Connected Result*** shows whether your acquisition module is connected to the host device via Bluetooth.
   - If the result displays ***OFF***, the acquisition module is not connected to the host device or is connected via USB cable.
   - If the result displays ***ON***, the acquisition module is connected to the host device via Bluetooth.
3. Press ***Connect*** to check the latest Bluetooth connected result.

Watchdog Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Acquisition Module Diagnostics Tools" on page 100.
2. Select ***Watchdog Test***.

   A window similar to the one shown in the following illustration opens.

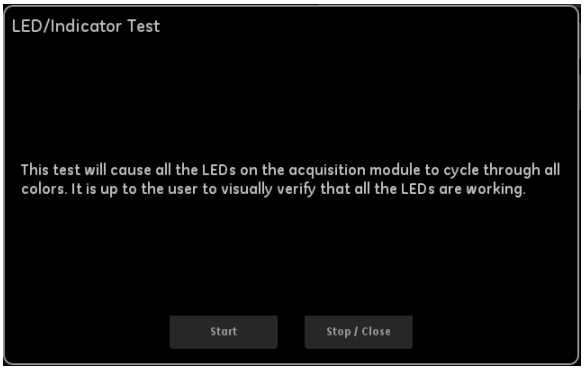


3. Press ***Start*** to start the test, and also you can press ***Stop/Cancel*** to stop the test or close the window during the test.

LED/Indicator Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Acquisition Module Diagnostics Tools" on page 100.
2. Select ***LED/Indicator Test***.

   A window similar to the one shown in the following illustration opens.

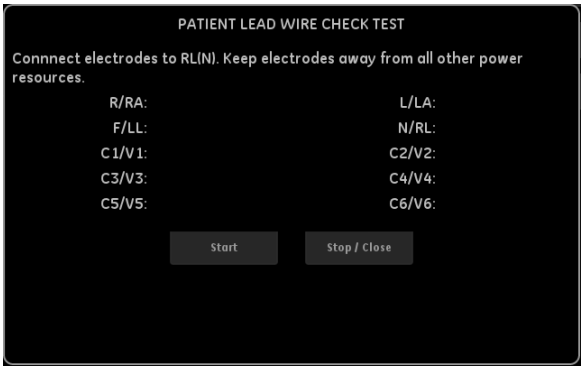


3. Press ***Start*** to start the test, and also you can press ***Stop/Cancel*** to stop the test or close the window during the test.

Patient Lead Wire Check

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Acquisition Module Diagnostics Tools" on page 100.
2. Select ***Patient Lead Wire Check***.

   A window similar to the one shown in the following illustration opens.



3. Press ***Start*** to start the test, and also you can press ***Stop/Cancel*** to stop the test or close the window during the test.

Speed Test

1. Open the ***Diagnostic Tool*** panel as described in "Accessing the Acquisition Module Diagnostics Tools" on page 100.
2. Select ***Speed Test***.

   A window similar to the one shown in the following illustration opens.

3. Press ***Start*** to start the test, and also you can press ***Stop/Cancel*** to stop the test or close the window during the test.

Software Upgrade

Software updates are provided on an SD card. Perform a software update for the acquisition module as described in this section.

Before updating, make sure you have the following hardware items by your side.

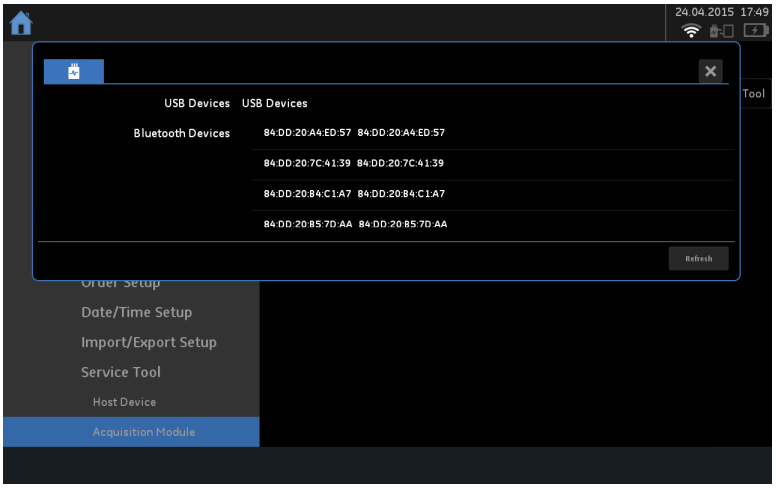
- An acquisition module that needs to be updated
- A host device
- Communication cable for Acquisition Module and Host connection
- Micro SD card
- Micro SD card reader
- Windows PC

NOTE:
Connect the acquisition module to the AC power during the upgrade.

1. Insert the micro SD card provided in the package into the SD card slot of the host device.
2. Connect the acquisition module with AC power adapter.
3. Connect the host device with the acquisition module via the communication cable.
4. From the main window of the host, press ***System Configuration*** > ***Service Tool*** > ***Acquisition Module*** > ***Software Upgrade***.

   You may need to use the service password to open the Service Tool; contact GE Healthcare service personnel for the password if you do not know what it is.

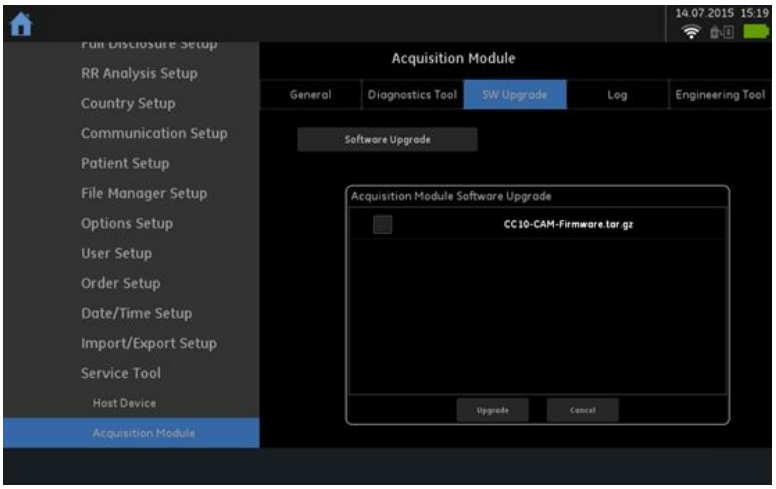
5. Press the connection icon on the right corner of the screen, and select ***USB Devices*** to connect to the acquisition module.



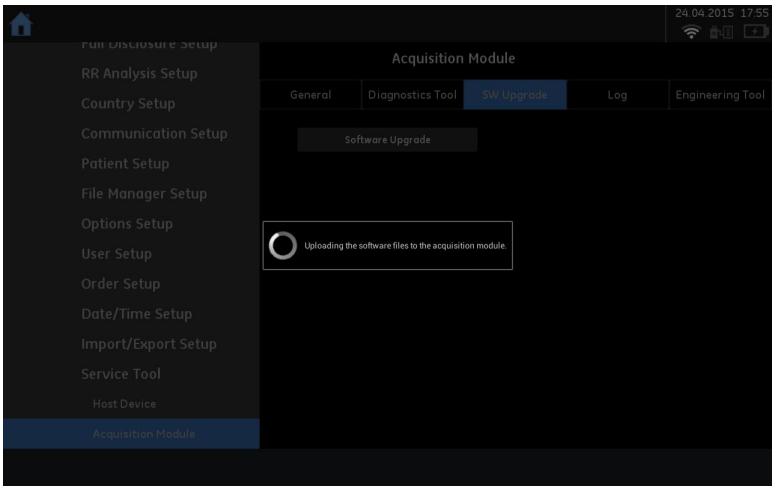
After the host device is connected to the acquisition module successfully, the ***Software Upgrade*** button becomes active or highlighted.

6. Press ***Software Upgrade*** in the window.

The following window opens.



7. Check the box in front of ***CC10-CAM-Firmware.tar.gz***, and press ***Upgrade***.
   The following window opens.



8. After the update is complete, the following information is displayed. Click ***Close*** to complete the upgrade.

Log

To export the ***Event Log*** of the acquisition module, use the following steps:

1. Open the ***Service Tool*** as described in "Accessing Service Tool" on page 85.
2. Press ***Acquisition Module*** under ***Service Tool*** to open the acquisition module service setup in the panel on the right side of the window.
3. Press ***Log*** to open the ***Event Log Exporting*** panel.
4. Select a level of severity to log from the ***Event Log Level*** list:

Level of Severity	**Types of Messages (Exported to the Event Log)**
Unknown	Log all messages to the ***Event Log***.
Fatal	Log the fatal messages to the ***Event Log***.
Critical	Log the critical messages to the ***Event Log***.
Error	Log the error messages to the ***Event Log***.
Warning	Log the warning messages to the ***Event Log***.
Notice	Log the notice messages to the ***Event Log***.
Information	Log the information messages to the ***Event Log***.

Level of Severity	Types of Messages (Exported to the Event Log)
Debug	Log the debug messages to the ***Event Log***.
Trace	Log the trace messages to the ***Event Log***.

5. Press ***Set*** to confirm your selection.
6. Insert the micro SD card into the micro SD card slot on the front side of the host device.

   The gold contacts are face-up.
7. Type the numbers of log files copies in ***Maximum Log Files*** field.

   The available value is 1–10.
8. Press ***Request***.

   The current ***Event Log*** file is copied to a log directory on the micro SD card.

   NOTE:
   To access the log file, insert the SD card into an SD card reader that is connected to a computer with a Windows operating system and a text editor such as ***Notepad*** or ***WordPad***. If GE Healthcare technical service requests the ***Event Log*** for troubleshooting an issue, send the file as an email attachment.

Engineering Tool

The ***Engineering Tool*** options is used for engineering team to test and debug the acquisition module.

5

Maintenance

This chapter addresses maintenance recommendations, required tools and supplies, FRU replacement procedures, and functional checkout procedures.

Recommended Maintenance

Regular maintenance, irrespective of usage, is essential to ensure that the equipment is always functional when required. Refer to *Supplies and Accessories Guide, Diagnostic Cardiology* for cleaning procedures. The system does not require any calibration procedures. GE Healthcare recommends that you perform electrical safety checks annually. For more information, see "Electrical Safety Checks" on page 137.

WARNING:

EQUIPMENT FAILURE AND HEALTH HAZARDS — Failure on the part of all responsible individuals, hospitals or institutions, employing the use of this system, to implement the recommended maintenance schedule, may cause equipment failure and possible health hazards

The sole responsibility rests with the individuals, hospitals, or institutions utilizing the system.

The manufacturer does not, in any manner, assume the responsibility for performing the recommended maintenance schedule, unless an Equipment Maintenance Agreement exists.

Required Tools and Supplies

The following tools are required to perform the procedures described in this chapter:

- ECG simulator
- Phillips #1 screwdriver
- Hexagonal screw drivers
- Current leakage tester
- Anti-static wrist strap
- *MAC™ Link Resting ECG Analysis System Service Manual*

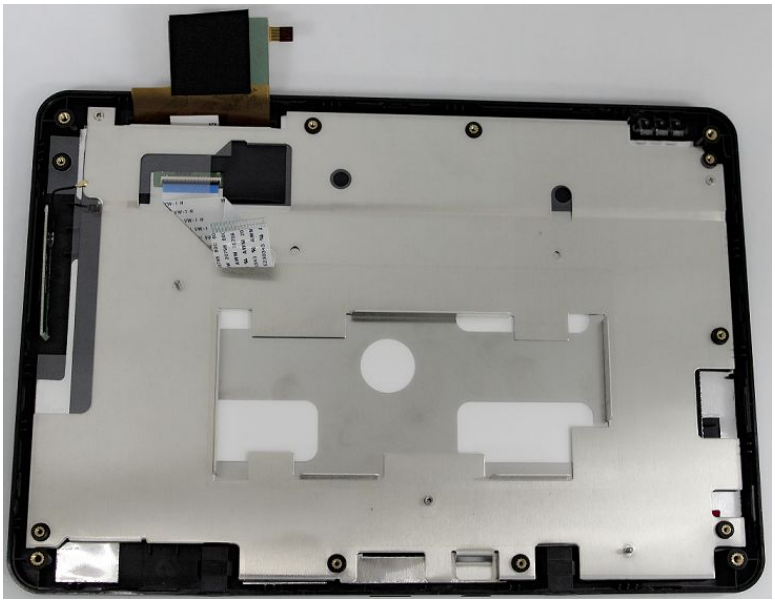
- *MAC™ Link Resting ECG Analysis System User Guide*
- *MAC™ Link Resting ECG Analysis System Safety and Regulatory Guide*

NOTE:
Always use an anti-static wrist strap while opening the device to avoid possible damage due to static electricity.

High-Level FRU Identification

This section describes the detailed identification of the system FRU.

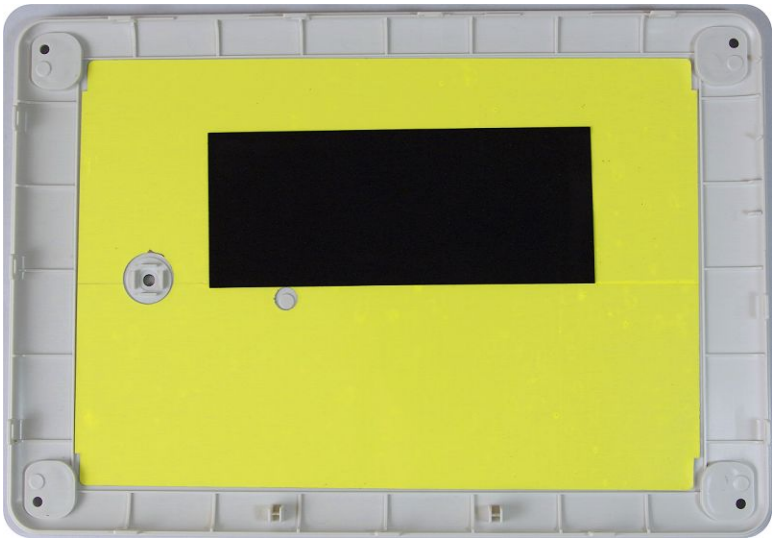
Host



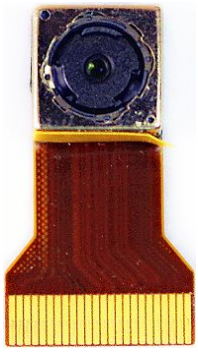
2084042-001 FRU Host Top Cover Assembly

2084044-001 FRU Host Main Board PWA

2084045-001 FRU Host Battery

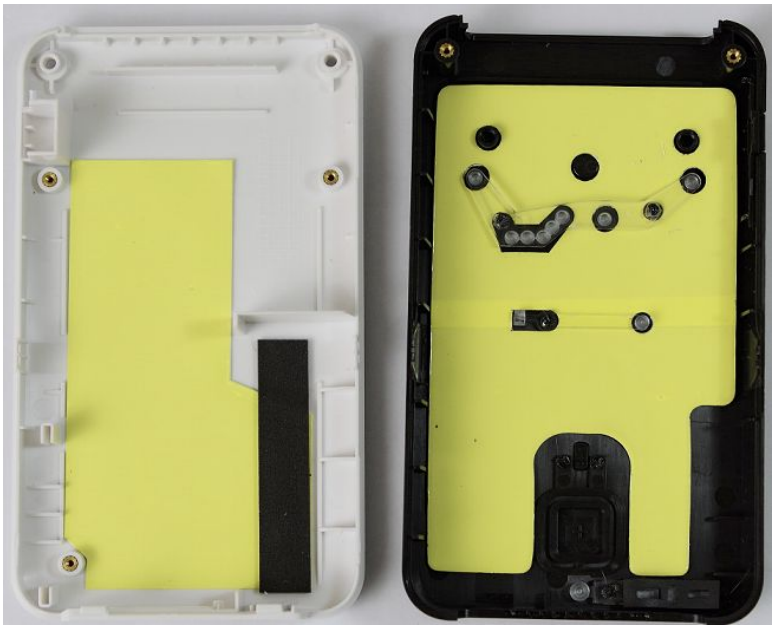


2084046-001 FRU Host Bottom Cover Assembly

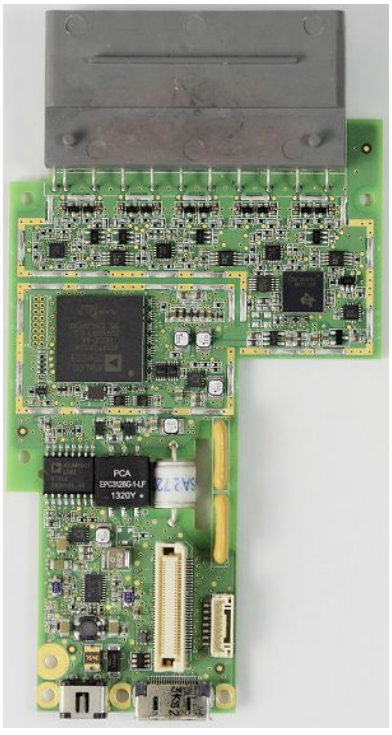


2086090-001 FRU Host Camera

Acquisition Module



2083815-001 FRU Acquisition Module Plastic Cover



2084034-001 FRU Acquisition Module AFE BOARD PWA

2084039-001 FRU Acquisition Module CPU BOARD PWA

2084035-001 FRU Acquisition Module Battery

Docking Station

2084050-001 FRU Docking Station Battery

2084052-001 FRU Docking Station Bottom Cover

2084053-001 FRU Docking Station Top Middle Cover

Accessories

2084055-001 FRU Screw Kit

2086088-001 FRU MAC Link Mini SD Card Software 1.0.0

2092280-001 FRU MAC LINK SOFTWARE UPGRADE TOOLS

2092275-001 FRU MAC LINK AC/DC ADAPTOR

2092276-001 FRU MAC LINK POWER CORD CN

2092277-001 FRU MAC LINK POWER CORD EU

2092278-001 FRU MAC LINK POWER CORD UK

2092279-001 FRU MAC LINK COMMUNICATION CABLE

FRU Replacement Procedures

The following sections provide the detailed procedures of replacing the host, acquisition module, and docking station FRUs.

Host Device

You can replace the following FRUs of the host device:

- Host Device Bottom Cover Assembly
- Host Device Camera
- Host Device Battery
- Host Device Mainboard PWA
- Host Device Top Cover Assembly

Preparing the Host for FRU Replacement

Prior to performing any disassembly procedures, perform the following steps:

NOTE:
Take strict precautions against electrostatic discharge damage while replacing field replaceable units.

1. Power off the system.
2. Disconnect the device from the AC/DC adapter.

Replacing the Host Device Bottom Cover Assembly

1. Pull out the four screw covers on the bottom cover with a slotted 2.0 screwdriver.

2. Remove the four screws from the bottom of the device with Phillips PH1 screw driver.

3. Slide the slotted 2.0 screwdriver into the corner of the host device to release the hook around the bottom cover assembly.

4. Open and remove the bottom cover assembly, you can see the following main PWA board.

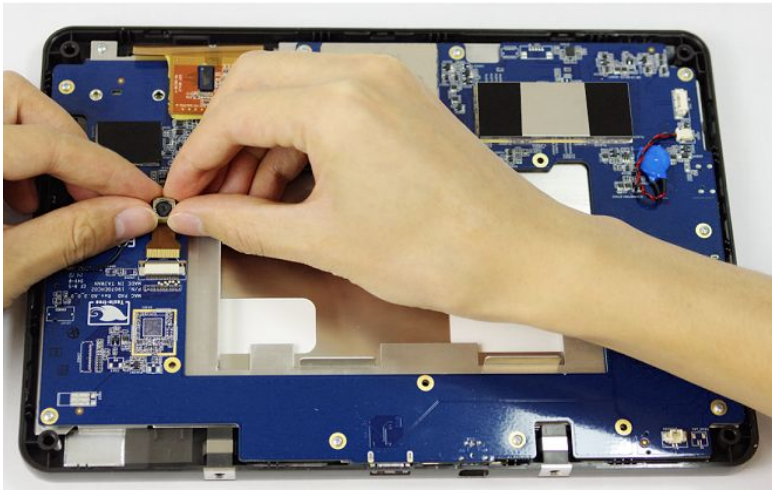
The Main PWA Board

5. Reassemble a new bottom cover assembly by reversing the steps for removal.
6. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.

Installing or Replacing the Host Device Camera

1. Remove the host device bottom cover assembly as instructed in "Replacing the Host Device Bottom Cover Assembly" on page 117.
2. To replace the camera, pull out the camera from the main board, and insert in a new one.



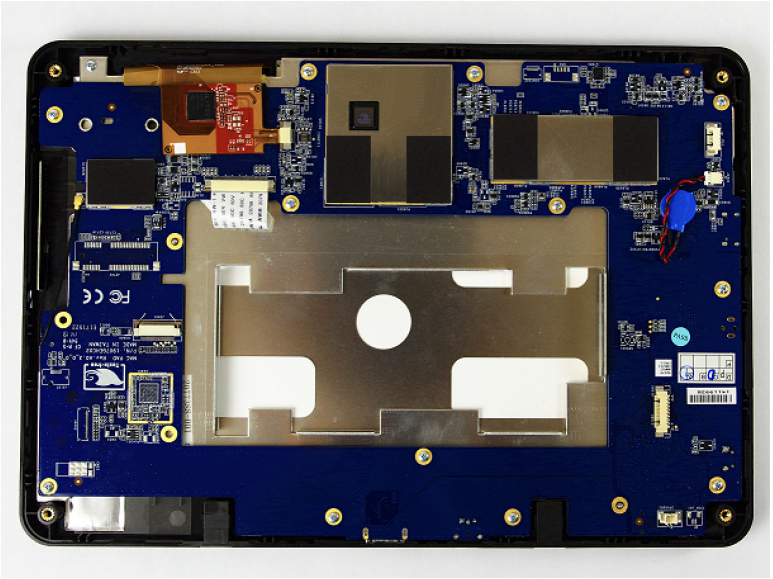
3. Reassemble the bottom cover assembly by reversing the steps for removal.
4. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.

Replacing the Host Device Battery

1. Remove the host device bottom cover assembly as instructed in "Replacing the Host Device Bottom Cover Assembly" on page 117.
2. Disconnect the host battery connector from the mainboard and remove the battery.

Disconnect the Host Battery Connector

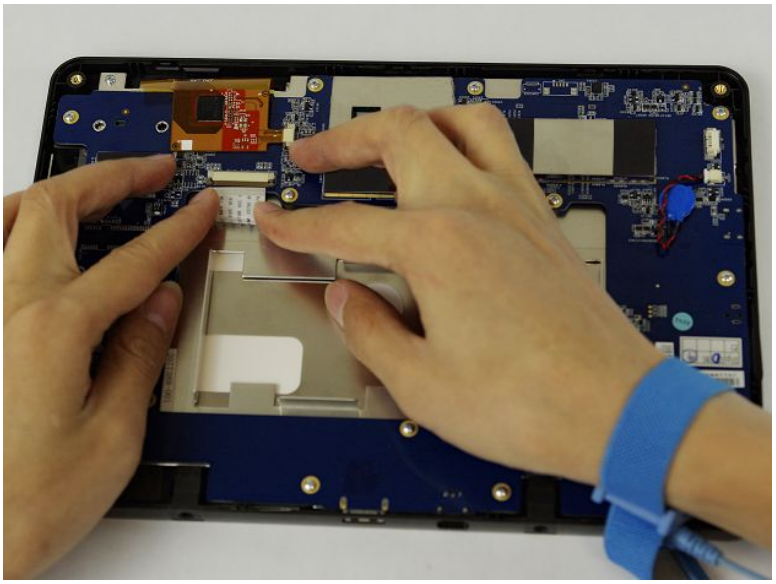


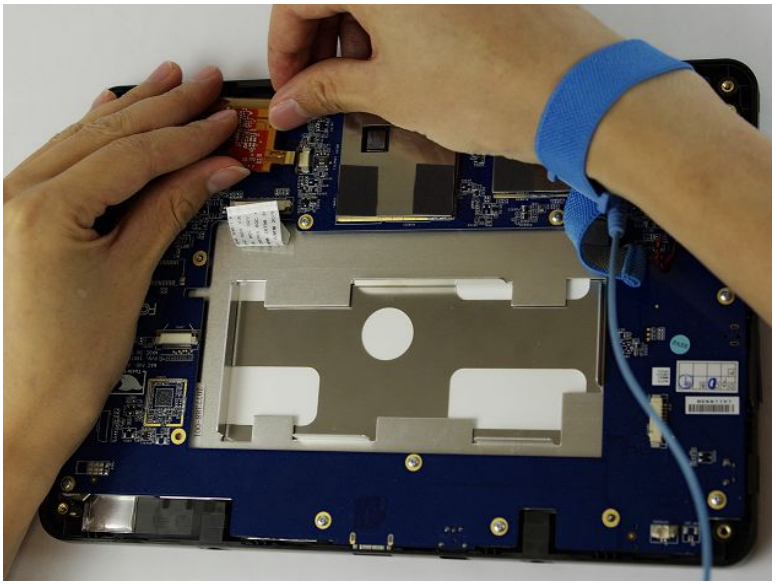
3. Reassemble a new host battery by reversing the steps for removal.
4. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.

Replacing Host Device Mainboard PWA

1. Remove the host device battery as instructed in "Replacing the Host Device Battery" on page 119.
2. Disconnect the LCD FPC cable from the mainboard.





3. Disconnect the touch panel FPC from the mainboard.

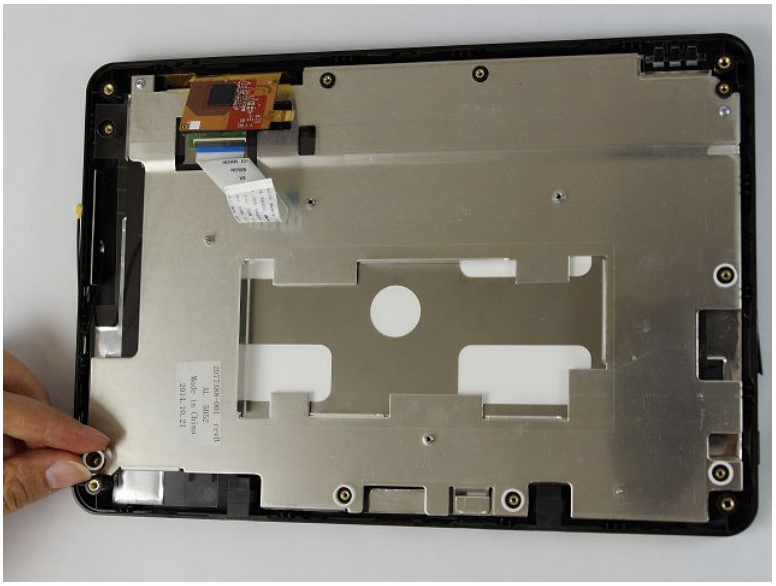
4. Remove the ten screws from the mainboard and pull out the mainboard with Phillips PH0 screw driver.

5. Reassemble a new mainboard by reversing the steps for removal.
6. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.
7. After replacing the host device mainboard PWA, perform the procedures of host device software upgrade in "Software Upgrade" on page 93.

Replacing the Host Device Top Cover Assembly

1. Remove the host device mainboard PWA as instructed in "Replacing Host Device Mainboard PWA" on page 120.
2. Remove the two screws on the support frame and pull out the host support frame.



3. Reassemble the host device by reversing the steps for removal.
4. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.

Acquisition Module

You can replace the following FRUs of the acquisition module:

- Patient Cables
- Acquisition Module Battery
- Acquisition Module Board PWA
- Acquisition Module Plastic Cover

Preparing the Acquisition Module for FRU Replacement

Prior to performing any disassembly procedures, perform the following steps:

NOTE:
Take strict precautions against electrostatic discharge damage while replacing field replaceable units.

1. Power off the system.
2. Disconnect the device from the AC/DC adapter.
3. Disconnect the patient cable from the device as described in "Replacing the Patient Cables" on page 124.

Replacing the Patient Cables

1. Disconnect the patient cables one-by-one from the acquisition module ECG connector as shown in the following photograph.

2. Connect a new set of patient cables to the acquisition module ECG connector.

   Make sure the cable marks are consistent with the mark on the acquisition module front cover.

Replacing the Acquisition Module Battery

1. Disconnect the patient cables one-by-one from the acquisition module ECG connector as described in "Replacing the Patient Cables" on page 124.
2. Remove the two screws from the bottom of the device with Phillips PH0 screw driver.

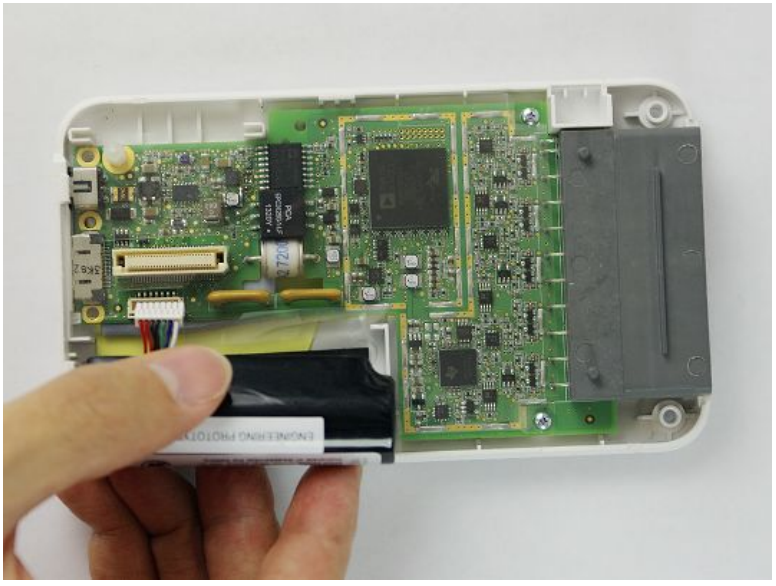
3. Turn the device right side up.

4. Open the acquisition module top cover assembly.

5. Remove the docking station battery as instructed

6. Pull up and disconnect the acquisition module CPU board from the acquisition module AFE board.

7. Press the battery connector lock and pull out the battery connector from the AFE board.



8. Remove the battery.

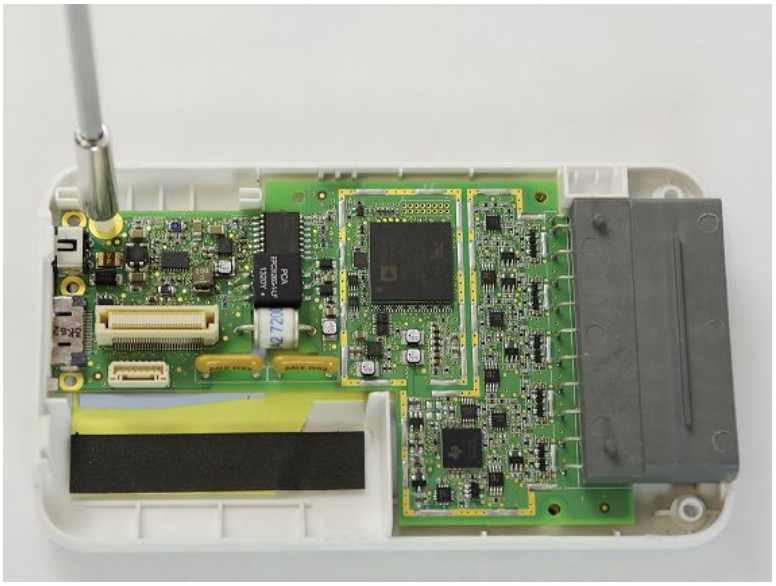
9. Reassemble a new battery by reversing the steps for removal.
10. Connect the patient cables to the acquisition module ECG connector.

    Make sure the cable marks are consistent with the mark on the acquisition module front cover.
11. Perform the applicable checkout procedures.

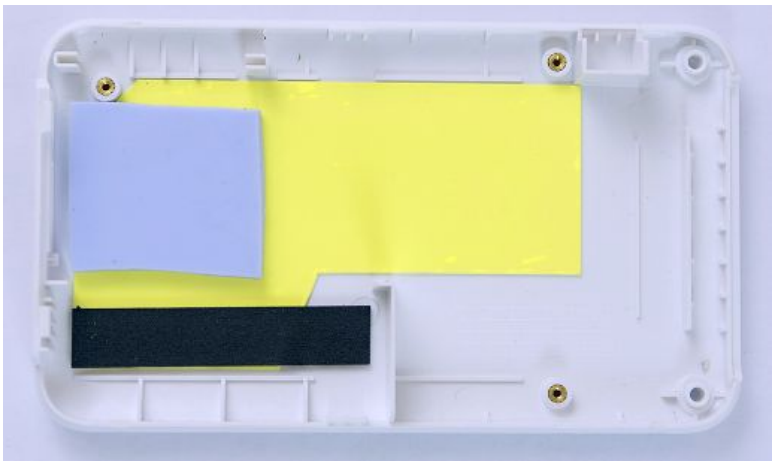
    See "Functional Checkout" on page 134.

Replacing the Acquisition Module Board PWA

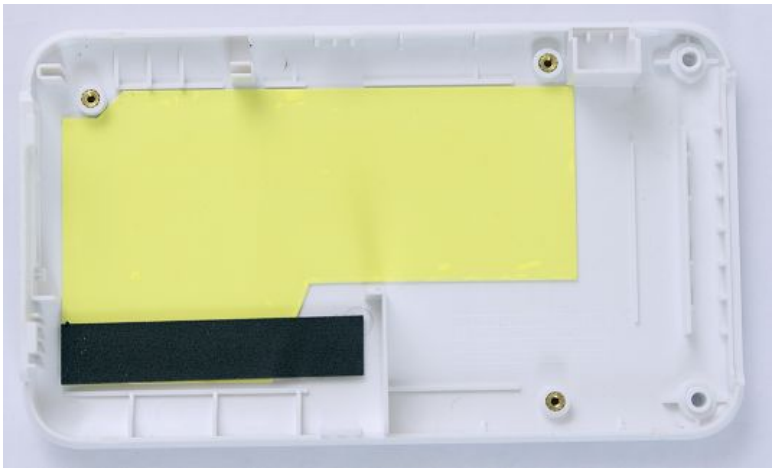
1. Remove the acquisition module battery as instructed in "Replacing the Acquisition Module Battery" on page 124.
2. Remove the two screws that affix the acquisition module AFE board to the bottom cover of the acquisition module.



3. Pull out the acquisition module AFE board from the bottom cover.



4. Pull out the isolation sheet from the bottom cover.



5. Reassemble the new acquisition module AFE board and acquisition module CPU board by reversing the steps for removal.
6. Connect the patient cables to the acquisition module ECG connector.

   Make sure the cable marks are consistent with the mark on the acquisition module front cover.
7. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.
8. After replacing the acquisition module CPU board, perform the procedures of acquisition module software upgrade in "Software Upgrade" on page 103.

Replacing the Acquisition Module Plastic Cover

1. Remove the acquisition module board PWA as instructed in "Replacing the Acquisition Module Board PWA" on page 127.
2. Replace the plastic cover assembly and reassemble the acquisition module by reversing the steps for removal.

3. Connect the patient cables to the acquisition module ECG connector.

   Make sure the cable marks are consistent with the mark on the acquisition module front cover.

4. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.

Docking Station

You can replace the following FRUs of the docking station:

- Docking Station Battery
- Docking Station Bottom Assembly
- Docking Station Top Middle Cover Assembly

Preparing the Docking Station for FRU Replacement

Prior to performing any disassembly procedures, perform the following steps:

NOTE:
Take strict precautions against electrostatic discharge damage while replacing field replaceable units.

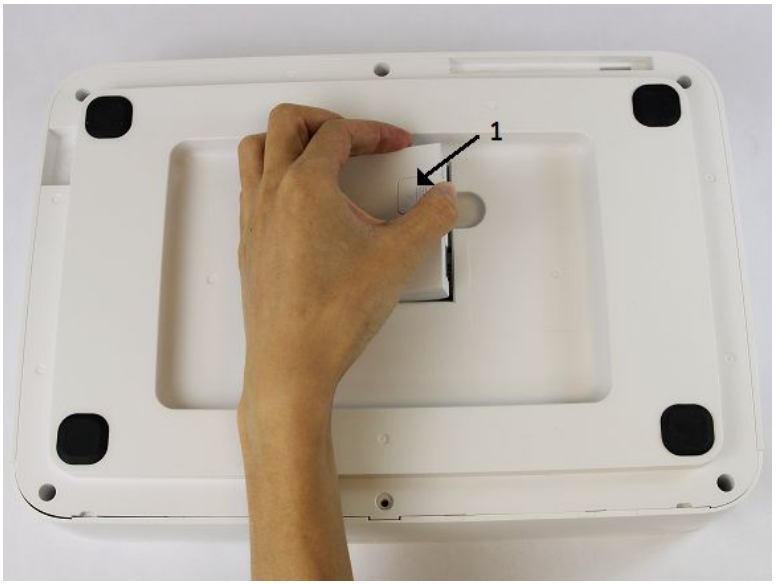
1. Power off the docking station.
2. Disconnect the device from the AC/DC adapter.

Replacing the Docking Station Battery

1. Disconnect the external USB device and Ethernet cable from the docking station.

2. Turn the device over.

3. Press the battery release tab (1) and raise the battery from its compartment to remove it.



WARNING:

ENVIRONMENTAL HAZARD — Improper disposal of the battery can cause environmental and health hazards.

Do NOT dispose of the battery by burning.

Follow local environmental guidelines concerning disposal and recycling.

4. Insert the new battery and press the latch until it snaps into place.
5. Perform the applicable checkout procedures.

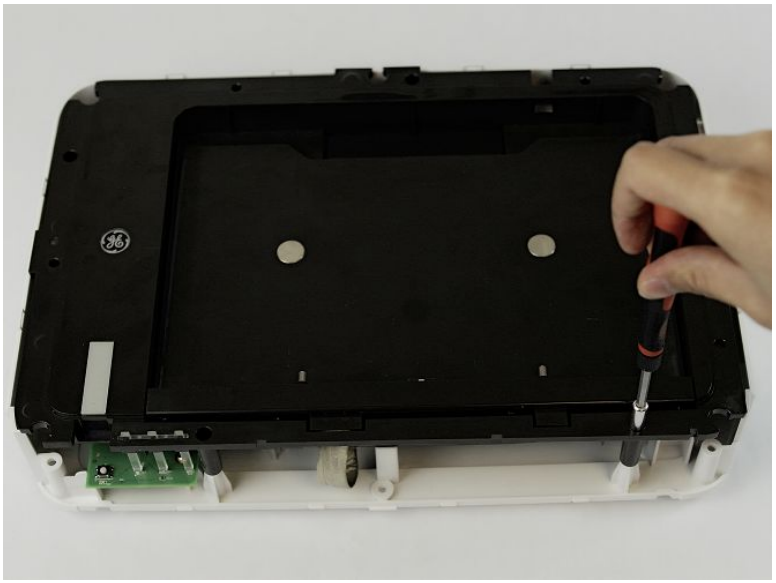
See "Functional Checkout" on page 134.

Replacing the Docking Station Bottom Assembly

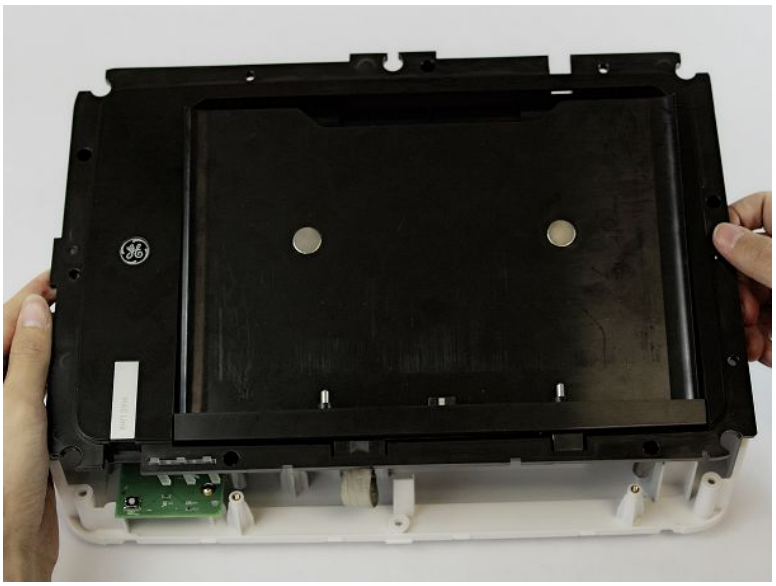
1. Remove the docking station battery as instructed in "Replacing the Docking Station Battery" on page 130.
2. Remove the six screws on the bottom cover with Phillips PH1 screw driver.

3. Turn the device over and remove the top cover.

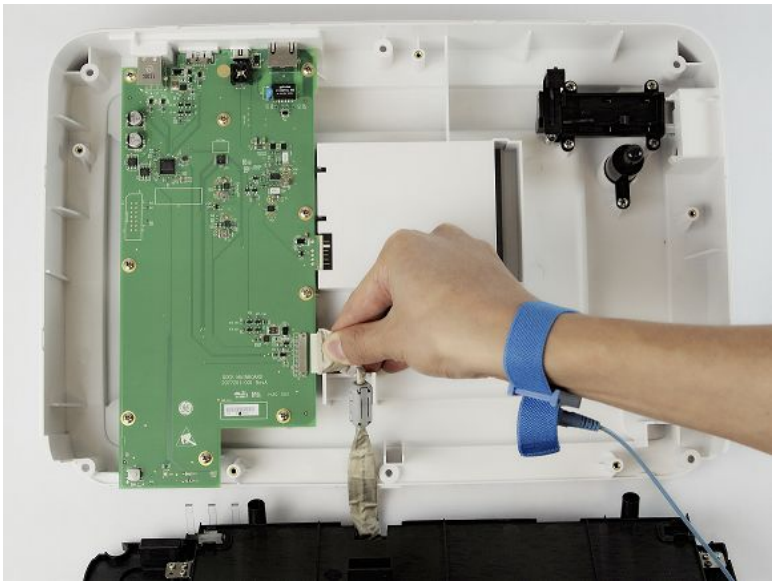
4. Remove the five screws on the middle cover with Phillips PH1 screw driver.



5. Pull out the middle cover from the bottom cover assembly.



6. Remove the FPC connector from the main PWA.



7. Replace a new docking station bottom assembly and reassemble the docking station by reversing the steps for removal.
8. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.

Replacing Docking Station Top Middle Cover Assembly

1. Remove the docking station battery as instructed in "Replacing the Docking Station Bottom Assembly" on page 131.
2. Replace the top middle assembly and reassemble the docking station by reversing the steps for removal.
3. Perform the applicable checkout procedures.

   See "Functional Checkout" on page 134.

Functional Checkout

The following checkout procedures apply to your system.

NOTE:
Complete the functional checkout every 12 months.

NOTE:
The FRU checkout procedure for any listed FRU also applies to its internal PCBs and components.

If there is an asterisk (*) listed in the following tables, perform the applicable component or system configuration procedures.

FRU replacement procedures are in previous sections of this chapter of the manual.

Basic System FRU Repairs

FRU Description	Visual Inspection	Functional Checkout Procedures
Host Device Bottom Cover Assembly	6, 7	1, 2, 3
Host Device Camera	Refer to Host Device Mainboard PWA	Refer to Host Device Mainboard PWA
Host Device Battery	5	1, 2, 3, 10
Host Device Mainboard PWA	6, 7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Host Device Top Cover Assembly	3, 6, 7	1, 2, 3
Patient Cable	1, 2, 7	1, 2, 3
Acquisition Module Battery	5	1, 2, 3
Acquisition Module Board PWA	6, 7	1, 2, 3
Acquisition Module Plastic Cover	6, 7	1, 2, 3
Docking Station Battery	5	n/a

Basic System FRU Repairs (cont'd.)

FRU Description	Visual Inspection	Functional Checkout Procedures
Docking Station Bottom Assembly	3, 6, 7	n/a
Docking Station Top Middle Cover Assembly	3, 6, 7	n/a

Non-FRU Repairs

FRU Description	Visual Inspection	Functional Checkout Procedures
No parts replaced	4, 5, 6, 7	1, 2, 3, 4, 5
Software update	n/a	1, 2, 3, 4, 5
Hardware upgrade	6, 7	1, 2, 3, 4, 5
Annual Electrical Safety Checkout	1, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Visual Inspection

Inspect the following for excessive wear and any signs of damage.

1. Check for broken patient cable/leadwires and out-of-date electrodes.
   a. Verify that patient cable/leadwires pass inspection.
   b. Verify that the electrodes pass inspection.
2. Discuss electrode placement, skin prep, and patient-related requirements with the ECG technician.

   Verify that the customer is following the procedures recommended in the user guide.

   For more information, refer to “Preparing the Patient” in the user guide for your system.
3. Verify that the LCD display filter passes inspection.

   Refer to “Visual Inspection” on page 142 for more information.
4. Verify that the AC power cord passes inspection.

   Refer to “Visual Inspection” on page 142 for more information.
5. Verify that the battery pack passes inspection.

   Refer to “Visual Inspection” on page 142 for more information.
6. Verify all harnesses and internal wiring are secure.

   Refer to “Visual Inspection” on page 142 for more information.
7. Verify fasteners are replaced and secure.

   Refer to “Visual Inspection” on page 142 for more information.

Functional Checkout Procedures

Perform the functional checkout procedures that are applicable to the replacement procedure performed.

Operational Checks

1. Verify that the system passes the power-up self-test.

   See "Power-Up Self-Test" on page 141 for more information. If a software update was performed, verify that the new version of software is displayed on the ***Main Menu*** screen.

2. Verify the rhythm strip recorded successfully.

   For more information, refer to "Recording a Resting ECG" in the user guide for your system.

3. Verify an ECG recorded successfully.

   For more information, refer to "Recording a Resting ECG" in the user guide for your system.

4. Verify the ECG was stored successfully.

   For more information, refer to "Managing Internal Storage" in the user guide for your system.

5. Verify that simulated ECG data was transmitted successfully to a receiving product.

   For more information, refer to "File Manager" in the user guide for your system.

Diagnostic Tests

The following section describes the diagnostic tests for the host device and acquisition module.

1. Verify that the display test was successful.

   See "Display Test" on page 87 for more information.

2. Verify that the touch panel test was successful.

   See "Touch Panel Test" on page 87 for more information.

3. Verify that the LAN test was successful.

   See "LAN Test" on page 88 for more information.

4. Verify that the Wi-Fi test was successful.

   See "Wi-Fi Test" on page 89 for more information.

5. Verify the battery test was successful.

   See "Battery Test" on page 91 for more information.

6. Verify that the USB test was successful.

   See "USB Test" on page 91 for more information.

7. Verify that the SD card test was successful.

   See "SD Card Test" on page 92 for more information.

8. Verify that the flash test was successful.

   See "Flash Test" on page 92 for more information.

Electrical Safety Checks

Verify that the current leakage test results meet requirements.

Perform electrical safety checks when indicated. All indicated electrical safety checks require a pass/fail indication for the steps performed. Record the measurement values in your debrief.

Electrical Safety Checks					
Step		**Condition[1]**	**UUT — ON[2]**	**Result**	**Leakage Current Limits**
Earth Leakage Current					
1	Forward Polarity	NC	_____ µA	Pass/Fail	500 µA
2	Neutral Open, Forward Polarity	SFC	_____ µA	Pass/Fail	1,000 µA
3	Neutral Open, Reverse Polarity	SFC	_____ µA	Pass/Fail	1,000 µA
4	Reverse Polarity	NC	_____ µA	Pass/Fail	500 µA
Enclosure Leakage Current					
1	Forward Polarity	NC	_____ µA	Pass/Fail	100 µA
2	Neutral Open, Forward Polarity	SFC	_____ µA	Pass/Fail	500 µA
3	Ground Open, Forward Polarity	SFC	_____ µA	Pass/Fail	500 µA
4	Ground Open, Reverse Polarity	SFC	_____ µA	Pass/Fail	500 µA
5	Neutral Open, Reverse Polarity	SFC	_____ µA	Pass/Fail	500 µA
6	Reverse Polarity	NC	_____ µA	Pass/Fail	100 µA
Patient Leakage Current To Ground					

Electrical Safety Checks					
Step		**Condition[1]**	**UUT — ON[2]**	**Result**	**Leakage Current Limits**
1	Forward Polarity	NC	_____ µA	Pass/Fail	10 µA
2	Neutral Open, Forward Polarity	SFC	_____ µA	Pass/Fail	50 µA
3	Ground Open, Forward Polarity	SFC	_____ µA	Pass/Fail	50 µA
4	Ground Open, Reverse Polarity	SFC	_____ µA	Pass/Fail	50 µA
5	Neutral Open, Reverse Polarity	SFC	_____ µA	Pass/Fail	50 µA
6	Reverse Polarity	NC	_____ µA	Pass/Fail	10 µA
Ground Continuity **NOTE:** Only necessary when the optional docking station is purchased.					Resistance
1	AC power cord ground prong to exposed metal surface (ground lug)	N/A	_____ Ω	Pass/Fail	Less than 200 mΩ

[1] NC = Normal Condition; SFC = Single Fault Condition; N/A = Not Applicable

[2] UUT = Unit Under Test

Conditioning the Host Device Battery Pack

To maintain the storage capacity of the battery pack installed in your device, GE Healthcare recommends that you condition the device's battery pack once every six months to reset the electronic fuel gauge inside the battery. A condition cycle consists of an uninterrupted "charge-discharge-charge" cycle.

You can condition the battery pack while it is installed in a device that you are not currently using to record tests on a patient.

1. Disconnect the AC power from the device.
2. Power on the system by pressing the ***Power*** button.
3. On the ***Main*** window, press ***System Configuration***.
4. Press ***Service Tool***.

   A window opens prompting you to enter the ***Service Password***.

   Contact GE Healthcare support if you do not know the service password.

5. Type the service password and press ***OK*** to open the ***Service Tool***.
6. Press ***Host Device*** under ***Service Tool*** to open the host device service setup in the panel on the right side of the window.
7. Press ***Diagnostic Tool*** > ***Battery Test*** to display the ***BATTERY STATUS*** window.
8. Allow the battery to discharge until the ***Battery Status*** displays ***Battery Low***.
9. Turn off the device and reconnect it to the AC power.
10. Allow the battery to fully charge.

    NOTE:
    A solid amber battery LED indicates the battery is charging. When the battery LED turns off, this indicates that the battery is fully charged.

11. Remove the AC power and turn on the device.
12. Leave the device on and allow the battery to discharge until the device shuts off.
13. Reconnect the AC power to the device, leaving it turned off, and allow the battery to fully recharge.

    When the amber battery LED indicator stops flashing and turns a solid amber, the battery is fully charged and the conditioning cycle is complete.

6

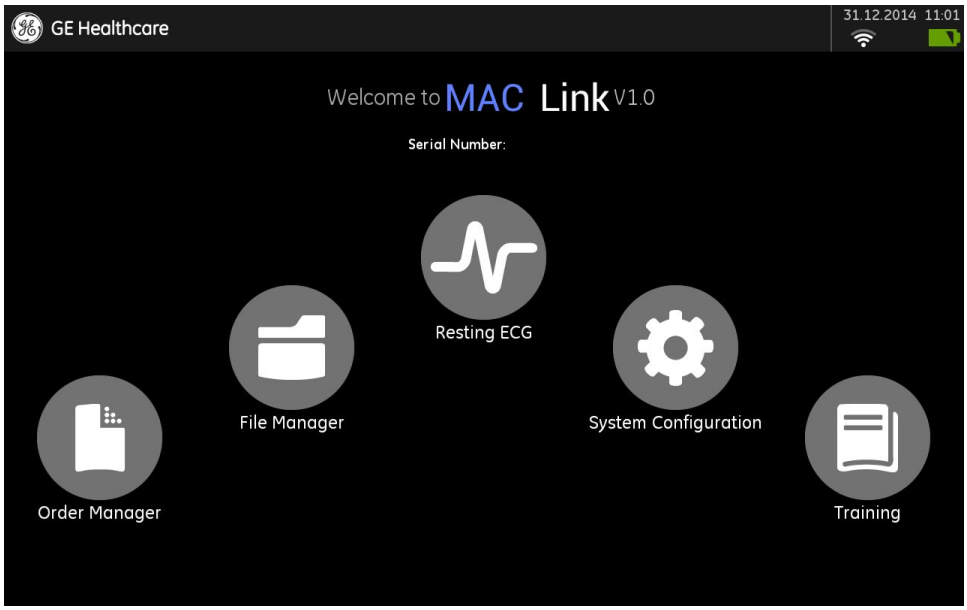
Troubleshooting

General Fault Isolation

Refer to the *MAC™ Link Resting ECG Analysis System User Guide*, Chapter 2, "Equipment Overview: Setting Up the Equipment" to verify operation of the device.

Power-Up Self-Test

On power-up, the system automatically runs an internal self-test. If all tests pass, you see the following start-up screen.



The next screen to open depends on the ***Power Up Mode*** selected in ***System Configuration***. The ***Resting ECG*** mode is the default ***Power Up*** mode.

If the equipment is not working properly, consider the following:

- Is the device turned on?
- Have there been any changes in the use, location, or environment of the equipment that could cause the failure?
- Has the equipment hardware or software been modified since the last use?

- Is operator error the cause of the problem?
  Try to repeat the scenario exactly and compare that to the proper operation of the equipment described in the manual.
- Is the host device fully charged?
- When connected to the AC wall outlet, does the green AC power light glow?

Poor Quality ECGs

Several factors can cause poor ECGs including:

- Factors in the environment.
- Inadequate patient preparation.
- Hardware failures related to the acquisition module.
- Leadwires, cables, or problems in the device.

Visual Inspection

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

NOTE:
Take the time to make all the recommended visual checks every 12 months.

Visual Inspection Checklist

Area	Look for the following problems
AC power cord	• Fraying or other damage • Bent prongs or pins • Cracked housing • Loose screws in plugs
Interface cables	• Excessive tension or wear • Loose connection • Strain reliefs out of place
Circuit boards	• 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 feedthrough, prior modifications or repairs

Visual Inspection Checklist (cont'd.)

Area	Look for the following problems
Ground wires/wiring	• Loose wires or ground strap connections • Faulty wiring • Wires pinched or in a vulnerable position
Fasteners	Loose or missing screws or other hardware, especially fasteners used as connections to ground planes on PCBs
Power source	• Faulty wiring, especially AC outlet • Circuit not dedicated to system **NOTE:** Power source problems can cause static discharge, resetting problems, and noise.
LCD display filter	Scratches, cracks, or an opaque display filter (transparent part of the keyboard bezel) that impair viewing
Battery pack	• Cracked, swollen, or leaky battery pack enclosure • Debris on battery pack electrical contacts
Micro SD card	• Cracked Micro SD card • Broken gold contacts • Dirt, scratches, or debris on contacts

Equipment Problems

ECG Data Noise

If the acquired ECG data displays unacceptable noise levels:

- Be sure the problem is not caused by poor skin preparation, placement, or condition of the electrodes when troubleshooting noise or signal quality.
  Careful skin preparation is the key to an interference-free ECG. Refer to the *Patient Preparation* chapter of the *MAC Link Resting ECG Analysis System User Guide*.
  Signal quality is indicated using ***Hookup Advisor***.
  Hookup Advisor can be turned on or off in the ECG menu. Select ***Main Menu*** > ***System Configuration*** > ***Resting Setup*** > ***Display Settings***.
- Check for defective or date-expired electrodes.
- Check for defective, broken, or disconnected leadwires.
- Run the ***Acquisition Module Tests*** in the ***Diagnostic*** menu and make sure all lead wires pass the noise test.

System Date/Time Troubleshooting

The Date and/or Time is wrong in system.

The recommended method is as follows:

1. Correct the settings in ***Date/Time Setup***.
2. Remove the power cord and battery, then power OFF the device.
3. Plug in the power cord and re-install the battery.
4. Power ON the device and check the Date and Time.

Frequently Asked Questions

NOTE:

Refer to the *System Configuration* information in the *MAC Link Resting ECG Analysis System User Guide* for this system.

Sending Patient Record

Q: What should I pay attention to when sending the patient record?

A: You should pay attention to the following points.

1. Before sending the patient record, you have to configure the server and location.

   You should configure the server first, and then the location.

   a. Select ***EMS*** or ***RIS*** in ***Order Download Setup*** before adding the location in ***Location Setup***.

   b. Configure the ***FTP Server*** in ***FTP Setup*** before adding the location in ***Location Setup***.

   c. Configure the ***Share Folder*** in ***Share Folder Setup*** before adding the location in ***Location Setup***.

   d. If you are sending the record to an SD card, you only need to add the SD card location in ***Location Setup***.

2. If the patient record fails to send, check the following:

   - Check whether the Wi-Fi connection is correct.
   - Check whether the configuration of the server location and port are correct.
   - If user name and password are required, check whether the user name and password are correct.

3. If the host device is connecting with the docking station via cable, check whether ***LAN*** is ***ON*** in ***LAN Setup***.

Network Printing

Q: I cannot print the report via the network printer.

A: Verify the following:

1. The network connection status.
   - If the network printer is connected with the system via Wi-Fi, reconnect the Wi-Fi and make sure the password is correct.
   - If the network printer is connected with the system via LAN.
     a. Make sure that ***LAN*** is ***ON*** in ***LAN Setup***.
     b. Disconnect the network cable and reconnect the cable.
2. Make sure the ***Network Printing*** is enabled in ***Printer Setup***, and ***Network Printer IP Address*** and ***Network Printer Port*** are correct.

   Press ***Printer Test*** to check whether the network printer is connected correctly.
3. Check the printer status.

Order Manager

Downloading Orders from EMS

Q: I cannot get orders from the EMS server in ***Order Manager***.

A: Verify the following:

1. The network connection status.
   - If the system is connected via Wi-Fi, reconnect the Wi-Fi and make sure the password is correct.
   - If the system is connected via LAN.
     a. Make sure that ***LAN*** is ***ON*** in ***LAN Setup***.
     b. Disconnect the network cable and reconnect the cable.
2. Check the ***Server IP*** and ***Port*** of the EMS system are configured correctly in ***Order Download Setup***, and press ***Test DCP*** to check whether the system can connect to the EMS server successfully.

   If not, check whether the EMS server is started.
3. Check whether there is any order on the EMS server.

Downloading Orders from RIS

Q: I cannot see orders from the RIS server in ***Order Manager***.

A: Verify the following:

1. Check whether the date of the system is the same with the day of the RIS server.
2. Check the RIS configuration in ***Order Download Setup*** is the same with the RIS server.
3. Check whether the RIS server is started.
4. Check whether there is any ECG order on the RIS server.

Test DCP

Q: I have correctly configured the EMS server, why does the ***Test DCP*** always fail?

A: Verify the following:

1. Check whether Wi-Fi is connected and the signal quality is good.
2. Check whether the EMS server is started.
3. Check whether the EMS system is logged in.
4. Check which department is open in the EMS system.
5. Check that the ***Default Order Location*** in ***Order Setup*** is the same department as on the EMS system.
6. If all of these above do not solve the problem, restart the EMS service and re-open the department.

Discover DCP

Q: I have correctly configured the EMS server and it is working normally, why does the ***Discover DCP*** always fail?

A: Verify the following:

- Check whether Wi-Fi is connected and the signal quality is good.
- If the Bluetooth is enabled, make sure to disable it.

Full Disclosure

Q: How can I get the 10s ECG in Full Disclosure?

A: Perform the following:

1. Navigate to the ***Full Disclosure*** window.
2. Press ***Acquire*** to acquire a Full Disclosure ECG.
3. Press ***Stop*** to turn to the ***Playback*** window.
4. Press ***Capture*** and select ***10s***.
5. Select the required waveform and press ***Complete***.

   The ***10s ECG Playback*** window opens and the record is saved to the device.

   You can get the record in ***File Manager***.

7

Parts List

Ordering Parts

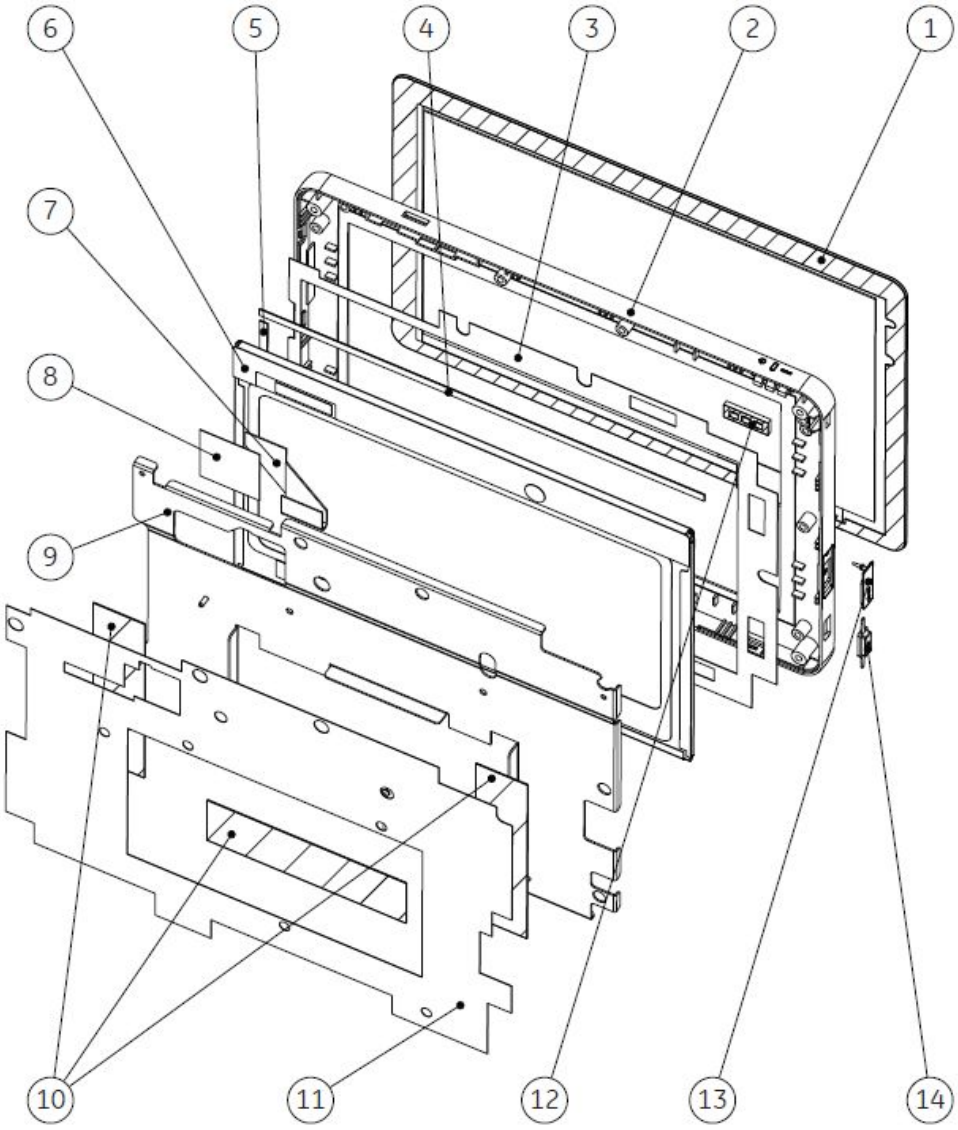
The FRU parts lists in this chapter supply enough detail for you to order parts for the assemblies, stand-alone FRUs, and FRU kits considered field serviceable. Only items, assemblies, and kits that have part numbers given in this chapter are available for purchase as FRUs. To order parts, contact GE Healthcare Service Parts.

Field Replaceable Units (FRUs)

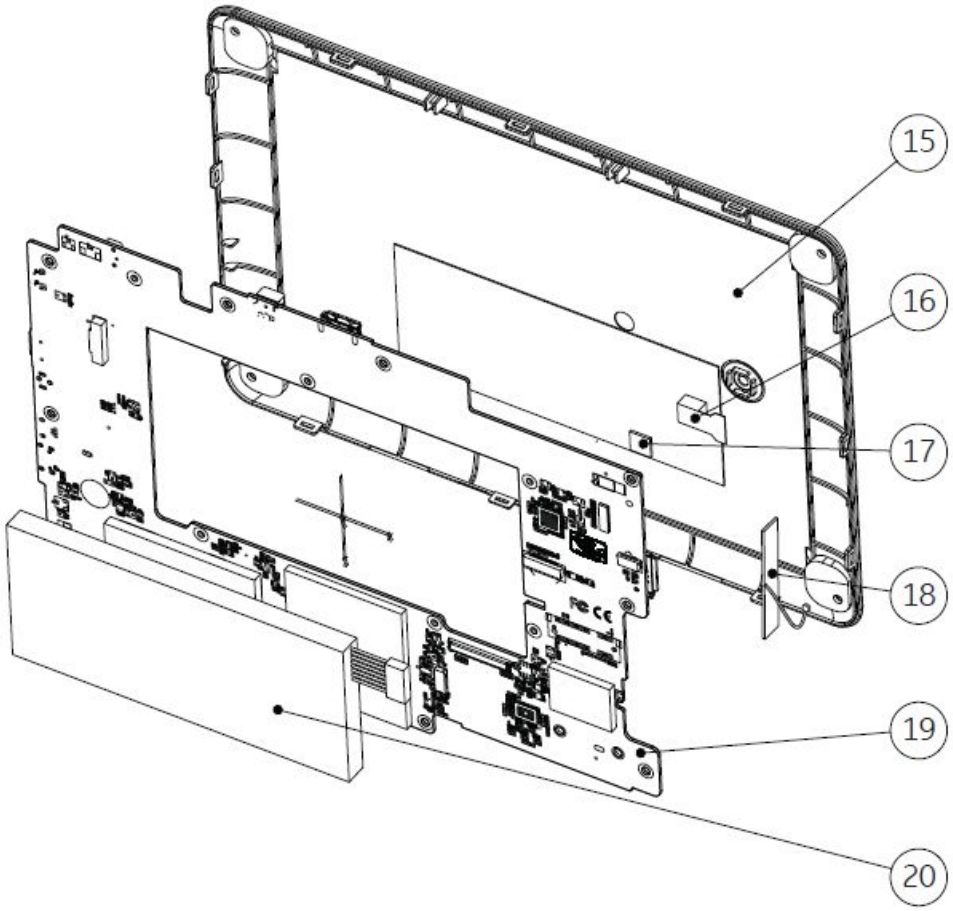
Upper Level Assembly Diagrams

The following diagrams identify the field replaceable units of the system. The numbers in the call-outs reference part descriptions found in "Upper Level Assembly Parts List" on page 152.

Host Device Diagrams

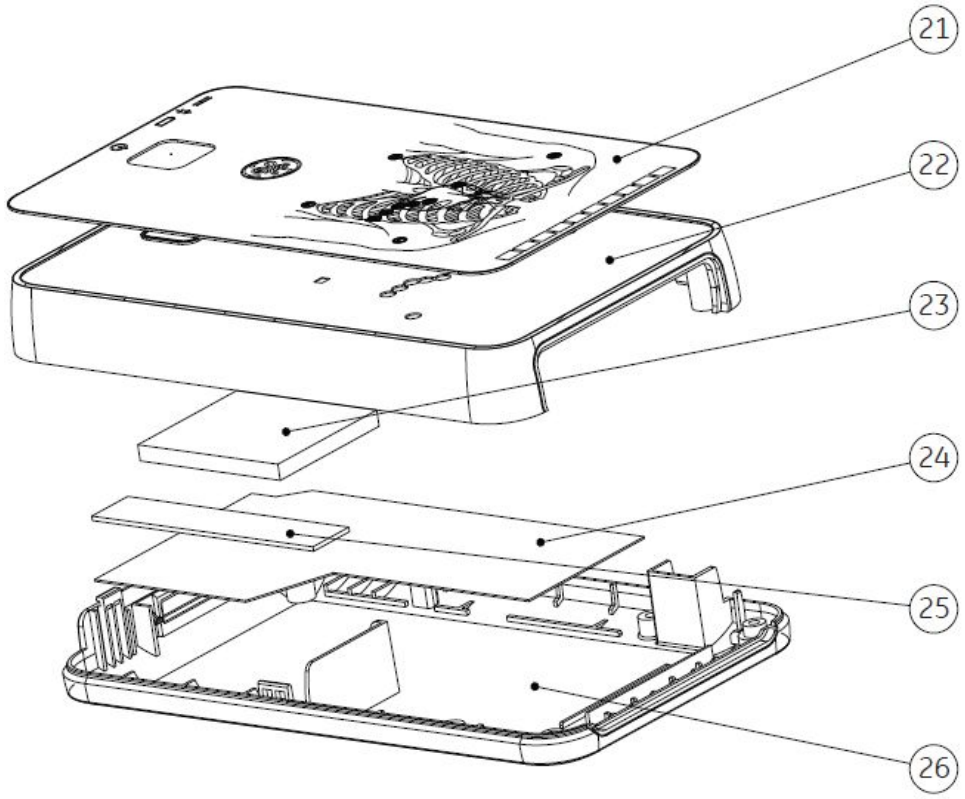


Host Device Top Cover Assembly

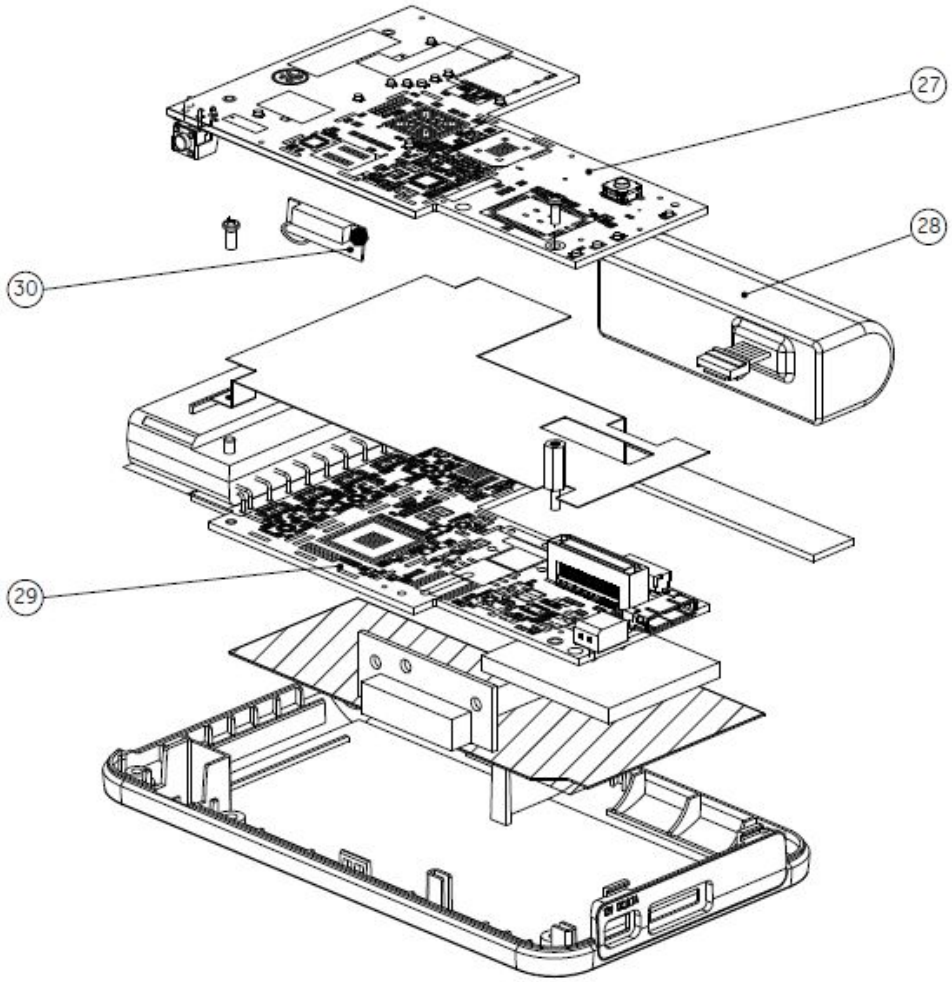


Host Device Main Board PWA, Battery, Camera and Bottom Cover Assemblies

Acquisition Module Diagrams

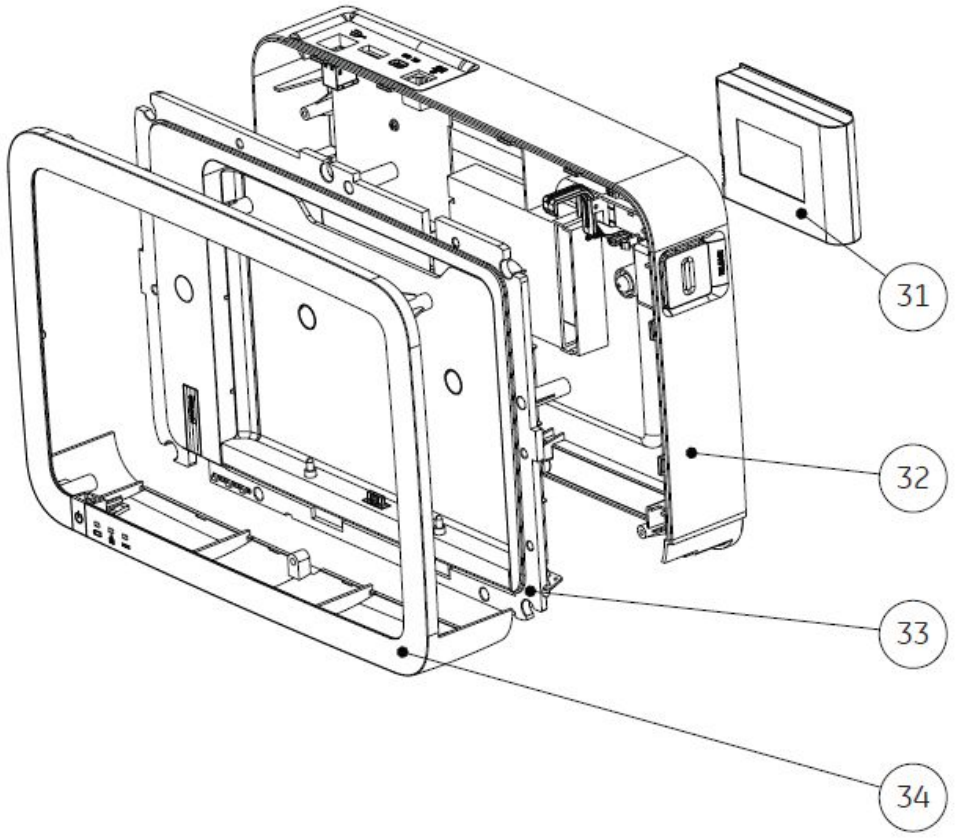


Acquisition Module Plastic Cover Assembly



Acquisition Module PWA and Battery Assembly

Docking Station Diagrams



Docking Station Cover and Battery Assemblies

Upper Level Assembly Parts List

The following table identifies the parts available for the system.

The numbers in the Item column refer to the call-outs from the diagrams found in "Upper Level Assembly Diagrams" on page 147.

The numbers in the Part Number column identify the GE Healthcare part number for orderable parts. Items without part numbers cannot be purchased independently of a FRU kit.

Upper Level Assembly

Item	Part Number	Item Description
1	2077384-001	HOST DEVICE TOUCH PANEL Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
2	2087776-001	HOST DEVICE TOP COVER SUB ASSEMBLY Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158

Upper Level Assembly (cont'd.)

Item	Part Number	Item Description
3	2077186-001	HOST DEVICE LCD THERMAL BOARD Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
4	2077185-001	HOST DEVICE LCD_GASKET_WIDE Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
5	2077386-001	HOST DEVICE LCD GASKET NARROW Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
6	2077387-001	HOST DEVICE LCD Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
7	2084201-001	HOST DEVICE LCD FFC CABLE Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
8	2083881-001	HOST DEVICE FPC FIXED TAPE Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
9	2077388-001	HOST DEVICE MAIN FRAME Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
10	2077181-001	HOST DEVICE MAIN FRAME GASKET Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
11	2083055-001	HOST DEVICE PLASTIC MB MYLAR Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
12	2077395-001	HOST DEVICE LIGHTING GUIDANCE GASKET Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158

Upper Level Assembly (cont'd.)

Item	Part Number	Item Description
13	2077381-001	HOST DEVICE SD CARD RUBBER Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
14	2076599-001	HOST DEVICE POWER BUTTON Included with: "FRU Host Device Top Cover Assembly, PN 2084042–001" on page 158
15	2077403-001	HOST DEVICE BOTTOM COVER ASSEMBLY Included with: "FRU Host Device Bottom Cover Assembly, PN 2084046-001" on page 159
16	2084177-001	HOST DEVICE CAMERA Included with: "FRU Host Device Camera, PN 2086090-001" on page 159
17	2084199-001	HOST DEVICE CAMERA GASKET Included with: "FRU Host Device Bottom Cover Assembly, PN 2084046-001" on page 159
18	2084200-001	HOST DEVICE WIRELESS ANTENNA Included with: "FRU Host Device Main Board PWA, PN 2084044-001" on page 158
19	2077398-001	HOST DEVICE MAIN BOARD PWA Included with: "FRU Host Device Main Board PWA, PN 2084044-001" on page 158
20	2077400-001	HOST DEVICE BATTERY Included with: "FRU Host Device Battery, PN 2084045-001" on page 158
21	2076606-001	ACQUISITION MODULE FILM AHA Included with: "FRU Acquisition Module Plastic Cover, PN 2083815-001" on page 159
	2077247-001	ACQUISITION MODULE FILM IEC Included with: "FRU Acquisition Module Plastic Cover, PN 2083815-001" on page 159

Upper Level Assembly (cont'd.)

Item	Part Number	Item Description
22	2077573-001	ACQUISITION MODULE TOP COVER ASSEMBLY Included with: "FRU Acquisition Module Plastic Cover, PN 2083815-001" on page 159
23	2083860-001	ACQUISITION MODULE THERMAL CONDUCTIVE SILICONE Included with: "FRU Acquisition Module Plastic Cover, PN 2083815-001" on page 159
24	2077190-001	ACQUISITION MODULE ALUMINIUM PLATE BOT Included with: "FRU Acquisition Module Plastic Cover, PN 2083815-001" on page 159
25	2077207-001	ACQUISITION MODULE BATTERY GASKET Included with: "FRU Acquisition Module Plastic Cover, PN 2083815-001" on page 159
26	2076605-001	ACQUISITION MODULE FRONT COVER Included with: "FRU Acquisition Module Plastic Cover, PN 2083815-001" on page 159
27	2076597-001	ACQUISITION MODULE CPU BOARD PWA Included with: "FRU Acquisition Module CPU Board PWA, PN 2084039-001" on page 160
28	2077568-001	ACQUISITION MODULE BATTERY Included with: "FRU Acquisition Module Battery, PN 2084035-001" on page 160
29	2077562-001	ACQUISITION MODULE AFE BOARD PWA Included with: "FRU Acquisition Module AFE Board PWA, PN 2084034-001" on page 160
30	2085144-001	ACQUISITION MODULE WIRELESS ANTENNA Included with: "FRU Acquisition Module CPU Board PWA, PN 2084039-001" on page 160
31	2037082-002	DOCKING STATION 7.4V, 4500MAH, LI-ION BATTERY PACK Included with: "FRU Docking Station Battery, PN 2084050-001" on page 160

Upper Level Assembly (cont'd.)

Item	Part Number	Item Description
32	2077179-001	DOCKING STATION BOTTOM COVER ASSEMBLY Included with: "FRU Docking Station Bottom Cover, PN 2084052–001" on page 161
33	2077241-001	DOCKING STATION MIDDLE COVER ASSEMBLY Included with: "FRU Docking Station Top Middle Cover, PN 2084053-001" on page 161
34	2077223-001	DOCKING STATION TOP COVER ASSEMBLY Included with: "FRU Docking Station Top Middle Cover, PN 2084053-001" on page 161
	2076595-001	M2X5 SCREW Included with: "FRU Screw Kit, PN 2084055-001" on page 161
	2076611-001	M2X12 SCREW Included with: "FRU Screw Kit, PN 2084055-001" on page 161
	2077199-001	M3X10 CROP SCREW Included with: "FRU Screw Kit, PN 2084055-001" on page 161
	2077408-001	SCREW COVER LEFT HOST Included with: "FRU Screw Kit, PN 2084055-001" on page 161
	2077407-001	SCREW COVER RIGHT HOST Included with: "FRU Screw Kit, PN 2084055-001" on page 161
	2037578-001	M3X8 MACHINE SCREW Included with: "FRU Screw Kit, PN 2084055-001" on page 161
	2037584-001	M4X16 SCREW Included with: "FRU Screw Kit, PN 2084055-001" on page 161
	2092168–001	MAC PAD Mini SD card Included with: "FRU MAC Link Mini SD card Software 1.0.0, PN 2086088-001" on page 161

Upper Level Assembly (cont'd.)

Item	Part Number	Item Description
	2077229-001	MAGNET Φ15X2.5 Included with: "FRU MAC Link Software Upgrade Tools, PN 2092280-001" on page 162
	2092167-001	MAC LINK USB DOWNLOAD CABLE Included with: "FRU MAC Link Software Upgrade Tools, PN 2092280-001" on page 162
	2081801-001	ACDC ADAPTOR Included with: "FRU MAC Link ACDC Adaptor, PN 2092275-001" on page 162
	2083678-002	PWR SPLY CORD SET, CHINA Included with: "FRU MAC Link Power Cord China, PN 2092276-001" on page 162
	2083678-003	PWR SPLY CORD SET, EUROPE Included with: "FRU MAC Link Power Cord Europe, PN 2092277-001" on page 162
	2083678-008	PWR SPLY CORD SET, UK Included with: "FRU MAC Link Power Cord United Kingdom, PN 2092278-001" on page 162
	2077325-001	MAC LINK USB CABLE Included with: "FRU MAC Link Communication Cable, PN 2092279-001" on page 163

FRU Host Device Top Cover Assembly, PN 2084042–001

The following table summarizes the items in the FRU Host Device Top Cover Assembly. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Host Device Top Cover Assembly, PN 2084042–001

Item	Description	Qty
1	HOST DEVICE TOUCH PANEL	1
2	HOST DEVICE TOP COVER SUB ASSEMBLY	1
3	HOST DEVICE LCD THERMAL BOARD	1
4	HOST DEVICE LCD GASKET WIDE	1
5	HOST DEVICE LCD GASKET NARROW	1
6	HOST DEVICE LCD	1
7	HOST DEVICE LCD FFC CABLE	1
8	HOST DEVICE FPC FIXED TAPE	1
9	HOST DEVICE MAIN FRAME	1
10	HOST DEVICE MAIN FRAME GASKET	1
11	HOST DEVICE PLASTIC MB MYLAR	1
12	HOST DEVICE LIGHTING GUIDANCE GASKET	1
13	HOST DEVICE SD CARD RUBBER	1
14	HOST DEVICE POWER BUTTON	1

FRU Host Device Main Board PWA, PN 2084044-001

The following table summarizes the items in the FRU Host Device Main Board PWA. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Host Device Main Board PWA, PN 2084044-001

Item	Description	Qty
18	HOST DEVICE WIRELESS ANTENNA	1
19	HOST DEVICE MAIN BOARD PWA	1

FRU Host Device Battery, PN 2084045-001

The following table summarizes the items in the FRU Host Device Battery. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Host Device Battery, PN 2084045-001

Item	Description	Qty
20	HOST DEVICE BATTERY	1

FRU Host Device Bottom Cover Assembly, PN 2084046-001

The following table summarizes the items in the FRU Host Device Bottom Cover Assembly. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Host Device Bottom Cover Assembly, PN 2084046-001

Item	Description	Qty
15	HOST DEVICE BOTTOM COVER ASSEMBLY	1
17	HOST DEVICE CAMERA GASKET	1

FRU Host Device Camera, PN 2086090-001

The following table summarizes the items in the FRU Host Device Camera. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Host Device Camera, PN 2086090-001

Item	Description	Qty
16	HOST DEVICE CAMERA	1

FRU Acquisition Module Plastic Cover, PN 2083815-001

The following table summarizes the items in the FRU Acquisition Module Plastic Cover. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Acquisition Module Plastic Cover, PN 2083815-001

Item	Description	Qty
21	ACQUISITION MODULE FILM AHA or ACQUISITION MODULE FILM IEC	1
22	ACQUISITION MODULE TOP COVER ASSEMBLY	1
23	ACQUISITION MODULE THERMAL CONDUCTIVE SILICONE	1
24	ACQUISITION MODULE ALUMINIUM PLATE BOT	1
25	ACQUISITION MODULE BATTERY GASKET	1
26	ACQUISITION MODULE FRONT COVER	1

FRU Acquisition Module AFE Board PWA, PN 2084034-001

The following table summarizes the items in the FRU Acquisition Module AFE Board PWA. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Acquisition Module AFE Board PWA, PN 2084034-001

Item	Description	Qty
29	ACQUISITION MODULE AFE BOARD PWA	1

FRU Acquisition Module Battery, PN 2084035-001

The following table summarizes the items in the FRU Acquisition Module Battery. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Acquisition Module Battery, PN 2084035-001

Item	Description	Qty
28	ACQUISITION MODULE BATTERY	1

FRU Acquisition Module CPU Board PWA, PN 2084039-001

The following table summarizes the items in the FRU Acquisition Module CPU Board PWA. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Acquisition Module CPU Board PWA, PN 2084039-001

Item	Description	Qty
27	ACQUISITION MODULE CPU BOARD PWA	1
30	ACQUISITION MODULE WIRELESS ANTENNA	1

FRU Docking Station Battery, PN 2084050-001

The following table summarizes the items in the FRU Docking Station Battery. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Docking Station Battery, PN 2084050-001

Item	Description	Qty
31	DOCKING STATION 7.4V, 4500MAH, LI-ION BATTERY PACK	1

FRU Docking Station Bottom Cover, PN 2084052–001

The following table summarizes the items in the FRU Docking Station Bottom Cover. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Docking Station Bottom Cover, PN 2084052–001

Item	Description	Qty
32	DOCKING STATION BOTTOM COVER ASSEMBLY	1

FRU Docking Station Top Middle Cover, PN 2084053-001

The following table summarizes the items in the FRU Docking Station Top Middle Cover. Item numbers correspond to the item numbers in the "Upper Level Assembly Diagrams" on page 147.

FRU Docking Station Top Middle Cover, PN 2084053-001

Item	Description	Qty
33	DOCKING STATION MIDDLE COVER ASSEMBLY	1
34	DOCKING STATION TOP COVER ASSEMBLY	1

FRU Screw Kit, PN 2084055-001

The following table summarizes the items in the FRU Screw Kit.

FRU Screw Kit, PN 2084055-001

Description	Qty
M2X5 SCREW	24
M2X12 SCREW	2
M3X10 CROP SCREW	4
SCREW COVER LEFT HOST	4
SCREW COVER RIGHT HOST	4
M3X8 MACHINE SCREW	23
M4X16 SCREW	6

FRU MAC Link Mini SD card Software 1.0.0, PN 2086088-001

The following table summarizes the items in the FRU MAC Link Mini SD card Software 1.0.0.

FRU MAC Link Mini SD card Software 1.0.0, PN 2086088-001

Description	Qty
Mini SD card	2

FRU MAC Link Software Upgrade Tools, PN 2092280-001

The following table summarizes the items in the FRU MAC Link Software Upgrade Tools.

FRU MAC Link Software Upgrade Tools, PN 2092280-001

Description	Qty
MAGNET Φ15X2.5	1
MAC LINK USB DOWNLOAD CABLE	1

FRU MAC Link ACDC Adaptor, PN 2092275-001

The following table summarizes the items in the FRU MAC Link Software Upgrade Tools.

FRU MAC Link ACDC Adaptor, PN 2092275-001

Description	Qty
ACDC Adaptor	1

FRU MAC Link Power Cord China, PN 2092276-001

The following table summarizes the items in the FRU MAC Link Power Cord China.

FRU MAC Link Power Cord China, PN 2092276-001

Description	Qty
Power Cord China	1

FRU MAC Link Power Cord Europe, PN 2092277-001

The following table summarizes the items in the FRU MAC Link Power Cord Europe.

FRU MAC Link Power Cord Europe, PN 2092277-001

Description	Qty
Power Cord Europe	1

FRU MAC Link Power Cord United Kingdom, PN 2092278-001

The following table summarizes the items in the FRU MAC Link Power Cord United Kingdom.

FRU MAC Link Power Cord United Kingdom, PN 2092278-001

Description	Qty
Power Cord United Kingdom	1

FRU MAC Link Communication Cable, PN 2092279-001

The following table summarizes the items in the FRU MAC Link Communication Cable.

FRU MAC Link Communication Cable, PN 2092279-001

Description	Qty
Communication Cable	1

A

Product Specifications

This section provides the product specifications for the MAC™ Link Resting ECG Analysis system.

Basic Parameters

Type of protection against electrical shock	Class I, internally powered equipment.
Degree of protection	Type CF defibrillation-proof applied part. The parts connecting to the patient is the applied parts of the system. For example, ECG cable and electrodes.
Degree of protection against harmful ingress of water	Ordinary Equipment (enclosed equipment without protection against ingress of water).
Power Input	Single phase, AC power, or internal battery.
Input Power	• Acquisition module: 15W • Host: 30W • Docking station: 60W

Basic Parameters (cont'd.)

Leakage	Earth Leakage Current: • Normal: 0.5 mA • Single Fault: 1 mA Shell Leakage Current: • Normal: 0.1 mA • Single Fault: 0.5 mA Patient Leakage Current: • Normal: DC 0.01 mA, AC 0.01 mA • Single Fault: DC 0.05 mA, AC 0.05 mA Patient Leakage Current (application with AC power): • Normal: 0.01 mA • Single Fault: 0.05 mA Patient Auxiliary Current: • Normal: DC 0.01 mA, AC 0.01 mA • Single Fault: DC 0.05 mA, AC 0.05 mA
Applications	12SL acquisition module with type CF defibrillation-proof applied part.
Degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide	This equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
Mode of operation	Continuous operation.
Module Classification	The acquisition module and host are handheld devices. The docking station is a portable device.
Internal Storage	Supports internal data storage. You can use the external mobile storage media (Micro SD card) to export data.
Linear Range and Dynamic Range	AC difference ±10 mV DC difference ±600 mV
Frequency Response	0.05 Hz - 150 Hz
Smallest Detectable Signal	10 Hz, 20 μVp-p
Common Mode Rejection Ratio	≥ 100 dB @ close line filter ≥ 120 dB @ open line filter
Input Impedance	> 10 MΩ, defibrillation-proof
Display	10.1 inches (25.7 cm) color TFT LCD
Display Options	ECG waveform, Real-time Heart Rate, Time/Date, Leadwire Mark, Speed, Gain, Filter Setup, Hook-up Advisor.
Recording Methods	Laser printer, digital storage, and transfer.

Basic Parameters (cont'd.)

Recording Speed (Time Base)	25 mm/s, 50 mm/s, ±5%
Sensitivity/Gain	2.5 mm/mV, 5 mm/mV, 10 mm/mV, 20 mm/mV, 40 mm/mV ±5%
Power Supply	AC power voltage: 100V - 240V, ±10% AC power frequency: 50 Hz - 60 Hz, ±3 Hz Internal rechargeable lithium-ion battery • Acquisition module: 3.6V, 2.15 Ah • Host: 7.4V, 3.7 Ah • Docking station: 7.2V, 4.3 Ah
Battery Life	5 hours continuous work with a full charge.
Charge Time	3.5 hours for depleted battery to 90% charged when system is powered off.
Physical Dimensions (mm)	Acquisition module: length ≤ 160 mm (6.3 in.), width ≤ 90 mm (3.5 in.), height ≤ 25 mm (1 in.) Host: length ≤ 260 mm (10 in.), width ≤ 175 mm (6.9 in.), height ≤ 25 mm (1 in.) Docking station: length ≤ 380 mm (15 in.), width ≤ 270 mm (10.6 in.), height ≤ 80 mm (3.1 in.)
Weight (g)	Acquisition module: ≤260g (0.5 lbs.) (with battery and without patient leadwires) Host: ≤1000g (2.2 lbs.) (with battery and without power adapter) Docking station: ≤3000g (6.6 lbs.) (with power cable and battery)
Warranty	1 year
Expected Service Life	7 years (according to IEC 60601-1: 2005)

Device Structures

Device Structure	The MAC™ Link Resting ECG Analysis System consists of an acquisition module, host, docking station (optional), power adapter, power cable, and accessories. The acquisition module can transfer ECG data to the host via wired/wireless methods. The host can upload ECG data and download orders from the Optima EMS system and upload ECG records to the Optima EMS system via wired/wireless methods. Device accessories include leadwires, a set of limb electrodes and chest electrodes, and a communication cable.
Functional Module	The MAC™ Link Resting ECG Analysis System provides resting ECG as the basic function module, and RR analysis, full disclosure ECG, and 12SL measurement and interpretation software as optional functions. The LED of the device is able to display ECG waveform, Real-time Heart Rate, Time/Date, Leadwire Mark, Speed, Gain, Filter Setup, Hook-up Advisor, and so forth.

Requirements - Environment

Storage and Transport	Temperature: -30°C - +60°C (-22°F - 140°F) Relative Humidity: 10% - 95% (non-condensing) Pressure: 500 hPa -1060 hPa **NOTE:** Avoid rain, snow ingress, and mechanical shock during transportation with common conveyance. Store in a ventilated warehouse without exposure to bright light and corrosive substance. Take the packaged device out of the packaging carton to check the power-on function if the device is stored for a duration of more than 6 months. Repack it after the test is complete.
Operation Environment	Temperature: +5°C - +35°C (41°F - 95°F) Relative Humidity: 25% - 95% (non-condensing) Pressure: 700 hPa - 1060 hPa External Power Source: AC 100V - 240V Supply Frequency: 50 Hz - 60 Hz Internal Power Source (internal rechargeable lithium-ion battery) • Acquisition Module: 3.6V, 2.15 Ah • Host: 7.4V, 3.7 Ah • Docking Station: 7.2V, 4.5 Ah

Requirements - Internal Battery

Battery Life	5 hours of continuous work when fully charged.
Battery Charging Hint	Solid red light indicates the internal battery is low.

Requirements - Miscellaneous

Digital Storage and Export	The system supports the transfer of ECG data to a Micro SD card, FTP server, and shared folder.
Laser Printer	The system supports printing ECG reports in A4 or letter size via either a network laser printer or a USB laser printer connected to the docking station.
Application Options	• 12SL Measurement and Interpretation • Full Disclosure ECG • RR Analysis • Communication • Barcode Scan

B

WiFi Country List

Countries apply their own regulations to both the allowable channels, allowed users, and maximum power levels within these frequency ranges.

American		Europe		Asia/Middle East	
Country	**Channel #**	**Country**	**Channel #**	**Country**	**Channel #**
Canada	11	Austria	13	China	13
USA	11	UK	13	India	13
Brazil	11	Germany	13	Thailand	13
Argentina	13	Czech	13	UAE	13
Chile	11	Poland	13	Indonesia	13
Mexico	11	Belgium	13	Korea	13
Panama	11	Denmark	13	Kuwait	13
		Finland	13	Singapore	13
		France	13	Vietnam	13
		Greece	13	Japan	1–13 for b/g 14 for b
		Ireland	13	Malaysia	13
		Italy	13		
		Luxembourg	13	**Oceania**	
		Netherlands	13	Australia	13
		Portugal	13	New Zealand	13
		Spain	13		
		Sweden	13	**Africa**	
		Cyprus	13	South Africa	13
		Estonia	13		
		Hungary	13	**Asia**	
		Latvia	13	Taiwan	11
		Lithuania	13		

American		Europe		Asia/Middle East	
Country	Channel #	Country	Channel #	Country	Channel #
		Malta	13		
		Slovakia	13		
		Slovenia	13		
		Russia	13		
		Belarus	13		
		Romania	13		
		Switzerland	13		
		Liechtenstein	13		
		Turkey	13		
		Iceland	13		
		Norway	13		

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