GE Healthcare

Technical Publication

Vivid™ *iq*

CE 0197

Basic Service Manual

Direction Number: 5873028-1EN English

Rev. 6

Regulatory Requirement

Vivid *iq* omplies with regulatory requirements of the following European Regulation 2017/745 concerning medical devices.

CE 0197

This manual is a reference for the Vivid *iq*. It applies to all versions of the 206.x.x software for the Vivid *iq* ultrasound system.

GE Healthcare

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Revision history

Revision History

REV	DATE (YYYY/MM/DD)	REASON FOR CHANGE
Rev. 1	2021-10-25	Initial Release
Rev. 2	2022-08-12	Update connectivity setup in CH3 Update temperature warning contents in CH7 Update eDelivery software update in CH8 Update power cord table, ECG cables table, Printer table and System and Application USB table in CH9 Add ‘probe check’ in CH7 Add ‘Ethernet protection cable’ in CH3
Rev. 3	2022-10-21	Update '5717315-S' to '5717315-2-S' for battery Remove Section 4-3-5 'System Test' Add one Japan power cord Delete ‘Components and Functions (Theory)’ contents’, including system diagram. Update Charge Box graphics Update eDelivery section Delete ‘Battery Performance Check’
Rev. 4	2023-05-08	1. Remove loading the software, eDelivery -Software update (v204),loading the Base Image and Application Software, loading the Application Software Only, and Software Reload (As these contents have been covered in user manual 5872801-1EN) 2. Add battery replacement and disposition information
Rev. 5	2025-01-23	1. Add Standard Cart/Premium Cart related information 2. Update battery information content
Rev. 6	2025-07-15	1. Update carto interface setup to add digital streaming 2. Add service part 5974261-S Ergonomic P2D Probe Holder

List of Effected Pages (LOEP)

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Important precautions

Translation policy

English (EN)

WARNING

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.

Français (FR)

AVERTISSEMENT

Ce manuel de maintenance est disponible en anglais uniquement.

- Si un client de la personne responsable de la maintenance demande une langue autre que l'anglais, il est de la responsabilité du client de fournir les services de traduction.
- N'essayez pas d'effectuer vous-même la maintenance de l'équipement avant d'avoir préalablement lu et compris le manuel de maintenance.
- Le non-respect cet avertissement peut entraîner des blessures dues à un choc électrique, une défaillance mécanique ou à d'autres éléments dangereux chez la personne en charge de la maintenance, l'opérateur ou le patient.

Español (ES)

ADVERTENCIA

Este Manual de servicio está disponible en idioma inglés únicamente.

- Si un proveedor de servicio del cliente requiere un idioma distinto, es responsabilidad del cliente ofrecer servicios de traducción.
- No intente reparar el equipo a menos que haya consultado y comprendido este Manual de servicio.
- Si no presta atención a esta Advertencia, se pueden ocasionar lesiones al proveedor de servicio, al operador o al paciente por descarga eléctrica, por riesgos mecánicos o de otra índole.

WARNUNG

Deutsch (DE)

Dieses Wartungshandbuch ist nur auf Englisch verfügbar.

- Wenn der Kundendiensttechniker eines Kunden eine andere Sprache als Englisch benötigt, unterliegt es der Verantwortung des Kunden eine Übersetzung anfertigen zu lassen.
- Warten Sie das Gerät nur, wenn Sie dieses Wartungshandbuch gelesen und verstanden haben.
- Die Nichtbeachtung dieses Warnhinweises kann zu Verletzungen des Kundendiensttechnikers, Anwenders oder Patienten durch Stromschläge, mechanische oder andere Gefahren führen.

AVVERTENZA

italiano (IT)

Il presente Manuale di assistenza è disponibile solo in inglese.

- Se il fornitore di servizi di un cliente ne richiede una copia in una lingua diversa dall'inglese, è responsabilità del cliente fornire il servizio di traduzione.
- Non tentare di riparare l'apparecchio se questo Manuale di assistenza non è stato letto e compreso.
- Il mancato rispetto di questa avvertenza può comportare il rischio di lesioni al fornitore di servizi, all'operatore o al paziente causate da scosse elettriche o da pericoli di origine meccanica o di altro tipo.

WAARSCHUWING

Nederlands (NL)

Deze servicehandleiding is alleen beschikbaar in het Engels.

- Als de serviceleverancier van een klant vraagt om een andere taal dan Engels, is het de verantwoordelijkheid van de klant om een vertaalde versie te bieden.
- Probeer geen onderhoud aan de apparatuur uit te voeren tenzij deze servicehandleiding is geraadpleegd en begrepen.
- Het niet opvolgen van deze waarschuwing kan bij de serviceleverancier, de operator of de patiënt leiden tot letsel door elektrische schokken, mechanische of andere gevaren.

ADVERTÊNCIA

Português (PT-BR)

Este Manual de Manutenção está disponível apenas em Inglês.

- Caso um prestador de serviços do cliente solicite o manual em idioma diferente do inglês, é de responsabilidade do cliente o fornecimento de serviços de tradução.
- Não tente realizar a manutenção do equipamento antes de ler e compreender este Manual de manutenção.
- O não cumprimento desta advertência pode resultar em danos por choque elétrico e riscos mecânicos para o prestador de serviços, operador ou paciente.

HOIATUS!

Eesti (ET)

Service Manual (Hooldusjuhend) on saadaval ainult ingliskeelsena.

- Kui kliendi teenusepakkuja nõue on, et juhend oleks mõnes muus keeles, korraldab juhendi tõlkimise klient.
- Tutvuge enne seadme hooldustööde tegemist kindlasti juhendiga Service Manual (Hooldusjuhend).
- Selle nõude eiramise korral võib teenindaja, kasutaja või patsient saada elektrilöögi, samuti võivad kaasneda muud ohud.

OPOZORILO

Slovenščina (SL)

Ta servisni priročnik je na voljo samo v angleščini.

- Če ponudnik servisnih storitev za stranko potrebuje navodila v drugem jeziku, mora stranka sama poskrbeti za prevajanje.
- Ne poskušajte servisirati opreme, ne da bi prej prebrali in razumeli servisni priročnik.
- Če tega opozorila ne upoštevate, obstaja nevarnost električnega udara, mehanskih ali drugih nevarnosti in posledičnih poškodb ponudnika servisnih storitev, uporabnika opreme ali pacienta.

警告

日本語 (JA)

このサービスマニュアルは英語版のみ提供されています。

- お客様の保守担当者が英語以外のマニュアルを必要とされる場合は、お客様の負担にて翻訳サービスをご利用ください。
- 装置の保守を行う前に、必ずサービスマニュアルを読み、内容を理解してください。
- この警告に注意を払わない場合、保守担当者やオペレータ、患者に対して、電気ショック、機械またはその他の危険による傷害が発生する恐れがあります。

警告

简体中文 (ZH-CN)

本维修手册仅提供英文版。

- 如果客户需要其它语种版本，请自行翻译。
- 在维修机器前，请务必阅读并完全理解本维修手册。
- 若违反本警告，有可能会给维修提供商、操作员或患者带来电击伤害、机械损伤或其它危害。

VARNING

Svenska (SV)

Den här servicehandboken finns endast på engelska.

- Om en kunds servicetekniker kräver ett annat språk än engelska är det kundens ansvar att tillhandahålla en översatt version.
- Försök inte att utföra service på utrustningen om du inte har läst igenom och förstått den här servicehandboken.
- Om du inte tar hänsyn till den här varningen kan serviceteknikern, operatören eller patienten utsättas för elektriska stötar eller mekaniska eller andra faror, vilket kan leda till personskador.

警告

繁體中文 (ZH-TW)

此服務手冊僅推出英文版。

- 若客戶的維修人員需要英文以外的其他語言版本，客戶需自行負責提供翻譯服務。
- 在詳閱此服務手冊並充分理解其內容之前，請勿試圖開始維修設備。
- 若忽視此警告，可能導致維修人員、操作人員或病患因為觸電、機械問題或其他危險而受傷。

경고

한국어 (KO)

이 서비스 설명서는 영어로만 제공됩니다.

- 고객의 서비스 공급자가 영어 이외의 언어를 요구하는 경우 번역 서비스를 제공할 책임은 고객에게 있습니다.
- 이 서비스 설명서를 참조 및 이해하지 못한 경우 장비를 만지지 마십시오.
- 이 경고를 무시한 경우 서비스 공급자, 오퍼레이터 또는 환자가 감전, 기계적 위험 또는 기타 위험으로 인한 부상을 입을 수 있습니다.

ПРЕДУПРЕЖДЕНИЕ

На русском языке (RU)

Данное руководство по обслуживанию доступно только на английском языке.

- Если специалисту по техническому обслуживанию клиента требуется документация на каком-либо другом языке, ответственность за выполнение перевода возлагается на клиента.
- Приступайте к обслуживанию оборудования только после того, как изучите данное руководство по обслуживанию и полностью поймете его содержание.
- Несоблюдение данного требования может привести к травмированию специалиста по техническому обслуживанию, пользователя или пациента вследствие поражения электрическим током, механических и прочих повреждений.

OSTRZEŻENIE

Polski (PL)

Niniejszy podręcznik serwisowy jest dostępny wyłącznie w języku angielskim.

- Jeżeli dostawca usług klienta posługuje się językiem innym niż angielski, za zapewnienie usług tłumaczeniowych odpowiada klient.
- Przed przystąpieniem do czynności serwisowych należy zapoznać się z informacjami zawartymi w niniejszym podręczniku serwisowym i je zrozumieć.
- W przeciwnym wypadku dostawca usług, operator lub pacjent mogą odnieść obrażenia spowodowane porażeniem prądem elektrycznym, działaniem elementów mechanicznych lub innymi zagrożeniami.

ΠΡΟΕΙΔΟΠΟΙΗΣΗ

Ελληνικά (EL)

Το παρόν Εγχειρίδιο σέρβις διατίθεται μόνο στα Αγγλικά.

- Εάν ο πάροχος σέρβις του πελάτη απαιτεί γλώσσα εκτός των Αγγλικών, η παροχή μεταφραστικών υπηρεσιών αποτελεί ευθύνη του πελάτη.
- Μην επιχειρήσετε να επισκευάσετε τον εξοπλισμό εάν πρώτα δεν συμβουλευτείτε και κατανοήσετε το παρόν Εγχειρίδιο σέρβις.
- Σε περίπτωση μη τήρησης της παρούσας προειδοποίησης, ενδέχεται να προκληθεί τραυματισμός στον πάροχο σέρβις, το χειριστή ή τον ασθενή εξαιτίας ηλεκτροπληξίας καθώς και μηχανικών ή άλλων κινδύνων.

FIGYELMEZTETÉS

Magyar (HU)

A szervizkézikönyv kizárólag angol nyelven érhető el.

- Amennyiben az ügyfél szolgáltatójának nem felel meg az angol nyelvű dokumentáció, úgy a fordításról az ügyfélnek kell gondoskodnia.
- Kizárólag úgy lásson hozzá a berendezés karbantartásához, hogy elolvasta és megértette a szervizkézikönyvben foglaltakat.
- Ezen figyelmeztetés figyelmen kívül hagyása esetén a szolgáltató, a kezelő vagy a páciens áramütést, mechanikus sérülést vagy más veszély által okozott személyi sérülést szenvedhet.

VAROVANIE

Slovenčina (SK)

Táto servisná príručka je dostupná iba v anglickom jazyku.

- Ak poskytovateľ služieb zákazníkom vyžaduje iný jazyk ako anglický jazyk, jeho povinnosťou je zabezpečiť prekladateľské služby.
- Zariadenie nepoužívajte bez prečítania a porozumenia tejto servisnej príručky.
- Nedodržanie tejto výstrahy môže viesť k zraneniu poskytovateľa služieb, operátora alebo pacienta spôsobeného elektrickým šokom, mechanickým alebo iným nebezpečenstvom.

VÝSTRAHA

česky (CZ)

Tato servisní příručka je k dispozici pouze v angličtině.

- Pokud poskytovatel služby zákazníkovi požaduje jiný jazyk než angličtinu, je odpovědností zákazníka poskytnout služby překladu.
- Nepokoušejte se provádět servis zařízení, dokud si neprostudujete a neporozumíte servisní příručce.
- Nevěnování pozornosti této výstraze může způsobit poskytovateli služeb, obsluze nebo pacientovi úraz elektrickým proudem, mechanická nebo jiná nebezpečí.

UYARI

Türkçe (TK)

Servis Kılavuzu yalnızca İngilizce olarak mevcuttur.

- Müşterinin servis sağlayıcısı için kılavuzun İngilizce dışında başka bir dile çevrilmesi gerekiyorsa çeviri hizmeti sağlamak müşterinin sorumluluğudur.
- Bu Servis Kılavuzu'na bakıp talimatları anlamadan ekipmanı kullanmaya çalışmayın.
- Bu Uyarının göz ardı edilmesi servis sağlayıcısının, operatörün veya hastanın, elektrik çarpması, mekanik arıza ya da diğer tehlikeler nedeniyle yaralanmasına neden olabilir.

ADVARSEL

Dansk (DA)

Denne servicemanual fås kun på engelsk.

- Hvis en kundes tjenesteudbyder kræver et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelsesydelserne.
- Forsøg ikke at udføre service på udstyret, medmindre denne servicemanual er læst og forstået.
- Manglende overholdelse af denne advarsel kan medføre skade på serviceudbyderen, operatøren eller patienten som følge af elektrisk stød, mekaniske eller andre farer.

ADVARSEL

Norsk (NO)

Denne servicehåndboken er bare tilgjengelig på engelsk.

- Hvis en kundes tjenestetilbyder krever et annet språk enn engelsk, er det kundens ansvar å tilby oversettelsestjenester.
- Ikke forsøk å utføre service på utstyret før denne servicehåndboken er lest og forstått.
- Dersom det ikke tas hensyn til denne advarselen, kan det føre til skader på tjenestetilbyderen, operatøren eller pasienten fra elektrisk støt, mekaniske eller andre farer.

VAKAVA VAROITUS

Suomi (FI)

Tämä huolto-opas on saatavana vain englanniksi.

- Jos asiakkaan palveluntarjoaja tarvitsee oppaan jollain muulla kielellä, käännöspalveluiden hankkiminen on asiakkaan vastuulla.
- Laitetta ei saa huoltaa ellei huolto-oppaaseen ole sitä ennen tutustuttu huolellisesti.
- Jos tätä varoitusta ei noudateta, palveluntarjoaja, käyttäjä tai potilas saattaa saada sähköiskun, ja saattaa aiheutua mekaanisia tai muita vaurioita.

ПРЕДУПРЕЖДЕНИЕ

Български (BG)

Настоящото Сервизно ръководство се предлага само на английски език.

- Ако доставчикът на сервизни услуги на клиента изисква ръководство на език, който се различава от английския, клиентът има отговорност да осигури адекватен превод.
- Не правете опити за сервиз на оборудването, без да проверите и да разберете съветите в Сервизното ръководство.
- Неспазването на това предупреждение може да доведе до нараняване на доставчика на сервизни услуги, оператора или пациента вследствие на токов удар, механична или други опасности.

AVERTISMENT

Română (RO)

Acest manual de service este disponibil doar în engleză.

- Dacă furnizorul de servicii al unui client solicită altă limbă decât engleza, este responsabilitatea clientului să ofere servicii de traducere.
- Nu încercaţi să efectuaţi lucrări de service asupra echipamentului, în afară de cazul când aţi consultat acest manual de service şi l-aţi înţeles.
- Nerespectarea acestui avertisment poate avea ca rezultat rănirea furnizorului de servicii, a operatorului sau a pacientului ca urmare a electrocutării, pericolelor mecanice sau a altor pericole.

UPOZORENJE

Hrvatski (HR)

Ovaj servisni priručnik dostupan je samo na engleskom jeziku.

- Ako klijentov serviser zahtijeva jezik koji nije engleski, odgovornost klijenta je pružiti usluge prijevoda.
- Nemojte pokušavati servisirati opremu ako niste pročitali i razumjeli servisni priručnik.
- Ako ne poštujete ovo upozorenje, može doći do ozljede servisera, operatera ili pacijenta prouzročene strujnim udarom, mehaničkim i drugim opasnostima.

ĮSPĖJIMAS

Lietuvių k. (LT)

Šis priežiūros vadovas galimas tik anglų kalba.

- Jei kliento paslaugų teikėjas reikalauja kitos kalbos nei anglų, klientas atsako už vertimo paslaugos teikimą.
- Atlikite įrangos priežiūrą tik gerai susipažinę su priežiūros vadovu ir jį supratę.
- Nesilaikant šio įspėjimo galimas paslaugos teikėjo, operatoriaus ar paciento sužeidimas dėl elektros šoko, mechaninio ar kito pavojaus.

BRĪDINĀJUMS

Latviski (LV)

Šī apkalpes rokasgrāmata ir pieejama tikai angļu valodā.

- Ja klienta pakalpojumu sniedzējam ir nepieciešama cita valoda, kas nav angļu valoda, klienta pienākums ir nodrošināt tulkojumu.
- Nemēģiniet apkalpot aprīkojumu, ja apkalpes rokasgrāmata nav izlasīta un izprasta.
- Ja šis brīdinājums netiek ievērots, pakalpojumu sniedzējs, operators vai pacients var gūt traumas no elektrošoka vai var rasties mehānisks vai cita veida apdraudējums.

UPOZORENJE

Srpski (SR)

Ovaj priručnik za servisiranje dostupan je samo na engleskom jeziku.

- Ako klijentov serviser zahteva jezik koji nije engleski, odgovornost je na klijentu da pruži usluge prevođenja.
- Nemojte da pokušavate da servisirate opremu ako prethodno niste pročitali i razumeli ovaj priručnik.
- Ako ne poštujete ovo upozorenje, može doći do povređivanja servisera, operatera ili pacijenta uzrokovanog električnim udarom, mehaničkim i drugim opasnostima.

AVISO

Português (Portugal) (PT-PT)

Este manual de assistência está disponível apenas em inglês.

- Se o prestador de serviços de assistência do cliente necessitar do manual noutro idioma, a disponibilização dos serviços de tradução é da responsabilidade do cliente.
- Não tente reparar o equipamento se não tiver consultado e compreendido este manual de assistência.
- O não cumprimento das instruções constantes neste aviso pode resultar em ferimentos no prestador de serviços de assistência, no operador ou no paciente devido a choques eléctricos, perigos mecânicos ou outros problemas.

ПОПЕРЕДЖЕННЯ

Українська (UK)

Цей посібник із технічного обслуговування доступний лише англійською мовою.

- Якщо постачальнику послуг із технічного обслуговування потрібна інформація мовою, відмінною від англійської, відповідальність за надання послуг перекладу несе користувач.
- Технічне обслуговування обладнання можна виконувати лише після ознайомлення з посібником із технічного обслуговування та усвідомлення його змісту.
- Недотримання цього попередження може призвести до травм постачальника послуг, оператора або пацієнта, спричинених дією електричного струму, механічних або інших пошкоджень.

PERINGATAN

Bahasa Indonesia (ID)

Panduan Servis ini hanya tersedia dalam Bahasa Inggris.

- Jika penyedia layanan pelanggan memerlukan bahasa di luar Bahasa Inggris, maka pelanggan bertanggung jawab untuk memberikan layanan tersebut.
- Jangan mencoba menyervis peralatan ini, kecuali Panduan Servis ini telah dijadikan rujukan dan dipahami dengan baik.
- Kelalaian memperhatikan Peringatan ini dapat menyebabkan cedera terhadap penyedia layanan, operator, atau pasien akibat bahaya kejutan listrik, mekanik, dan bahaya lainnya.

คำเตือน

ไทย (TH)

คู่มือซ่อมบำรุงนี้มีเฉพาะภาษาอังกฤษเท่านั้น

- หากผู้ให้บริการของลูกค้าต้องการฉบับภาษาอื่นนอกเหนือจากภาษาอังกฤษ ลูกค้าต้องเป็นผู้รับผิดชอบในการจัดเตรียมคู่มือซ่อมบำรุงฉบับแปล
- โปรดอย่าซ่อมบำรุงอุปกรณ์โดยไม่ศึกษา และทำความเข้าใจคู่มือซ่อมบำรุงนี้
- หากไม่ปฏิบัติตามคำเตือนนี้อาจส่งผลให้ผู้ให้บริการ ผู้ใช้งานอุปกรณ์ หรือผู้ป่วยได้รับบาดเจ็บจากไฟฟ้าช็อต อันตรายจากกลไกของอุปกรณ์ หรืออันตรายอื่น ๆ

CẢNH BÁO

Tiếng Việt (VI)

Hướng dẫn sử dụng dịch vụ này chỉ sẵn dùng bằng tiếng Anh.

- Nếu nhà cung cấp dịch vụ của khách hàng yêu cầu ngôn ngữ khác ngoài tiếng Anh, thì khách hàng phải có trách nhiệm cung cấp các dịch vụ dịch thuật.
- Không được tìm cách sửa chữa thiết bị trừ khi đã tham khảo và hiểu rõ Hướng dẫn sử dụng dịch vụ này.
- Bỏ qua lời cảnh báo này có thể gây thương tích cho nhà cung cấp dịch vụ, nhân viên vận hành hoặc bệnh nhân do sốc điện, những nguy hiểm về máy móc hoặc yếu tố khác.

ЕСКЕРТУ

Қазақ тілінде (KK)

Осы қызмет көрсету нұсқаулығы тек ағылшын тілінде қолжетімді.

- Егер тұтынушылардың қызметтер жеткізушісі ағылшын тілінен басқа тілді талап етсе, аудару қызметтерімен қамтамасыз ету тұтынушының жауапкершілігіне кіреді.
- Осы қызмет көрсету нұсқаулығын түсініп, ол туралы кеңес алмайынша жабдыққа қызмет көрсетуге тырыспаңыз.
- Осы ескертуді орындамау электр тогының соғуы, механикалық немесе басқа да қауіптер салдарынан қызметтер жеткізушісінің, оператордың немесе емделушінің жарақаттануына алып келуі мүмкін.

BABALA

Tagalog (TL)

Available lamang sa Ingles ang Manwal ng Serbisyong ito.

- Kung ang kailangan lamang ng tagabigay ng serbisyo ng kustomer ng wika maliban sa Ingles , responsibilidad ng kustomer na magbigay ng serbisyo sa pagsasalin wika nito.
- Huwag subukan na iserbisyo ang mga kasangkapan maliban kung nakonsulta ang nauunawaan itong Manwal ng Serbisyo.
- Ang pagkabigong maunawaan ang Babalang ito ay maaring maging resulta ng pinsala sa tagabigay ng serbisyo, nagpapagana o pasyente mula sa pagkakakoryente, mekanikal o iba pang peligro.

VIÐVÖRUN

Íslenska (IS)

Þessi þjónustuhandbók er aðeins fáanleg á ensku.

- Ef þjónustuaðili viðskiptavinar þarf annað tungumál en ensku er það á ábyrgð viðskiptavinarins að veita þýðingarþjónustu.
- Ekki reyna að þjónusta búnaðinn nema þessir þjónustuhandbækur hafi verið skoðaðir og skilið.
- Ef ekki er gætt að þessari viðvörun getur það valdið meiðslum á þjónustuaðila, stjórnanda eða sjúklingi vegna raflosts, vélrænni hættu eða annarri hættu.

Damage in transportation

All packages should be closely examined at time of delivery. If damage is apparent, write “Damage In Shipment” on ALL copies of the freight or express bill BEFORE delivery is accepted or “signed for” by a GE representative or hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

Certified electrical contractor statement - For USA Only

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Healthcare personnel. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE’s electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE’s field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

Omission and errors

If there are any omissions, errors or suggestions for improving this documentation, contact the GE Healthcare Global Documentation Group with specific information listing the system type, manual title, part number, revision number, page number and suggestion details.

Mail the information to:

GE Medical Systems (China) Co., Ltd.
No. 19 Changjiang Road
Wuxi National Hi-Tech Dev. Zone
214028 Jiangsu China

GE employees should use TrackWise to report service documentation issues.

These issues will then be in the internal problem reporting tool and communicated to the writer.

Service Safety Considerations

DANGER — DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.

WARNING — Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.

For a complete review of all safety requirements, refer to Chapter 1, Safety Considerations section of the latest version of Vivid *iq* Proprietary Service Manual, Direction 5873028-1EN English.

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Table of Contents

System view

System view

Chapter 1

Introduction

This chapter describes important issues related to safely servicing the Ultrasound system. The service provider must read and understand all the information presented here before installing or servicing the units.

1-1 Overview

1-1-1 Contents in this chapter

1-2 Manual Overview

This manual provides installation and service information for the Vivid *iq* Ultrasound system. It is divided in ten chapters as shown below.

1-2-1 Contents in this manual

The manual is divided into ten chapters.

In the beginning of the manual, before chapter 1, you will find the *Revision overview*, the *Important precautions* including *Translation policy*, *Damage in transportation*, *Certified electrical contractor statement*, *Omission & errors*, *Service safety considerations* and *Legal notes*, and the *Table of Contents* (*TOC*).

An Index has been included after Chapter 10.

Table 1-1: Contents in this manual

Chapter number	Chapter title	Description
1.	Introduction	Contains a content summary and warnings.
2.	Site preparations	Contains pre-setup requirements for the Vivid *iq*.
3.	System Setup	Contains setup procedure with procedure checklist for the system.
4.	General Procedures and Functional Checks	Contains functional checks that must be performed as part of the installation, or as required during servicing and periodic maintenance.
5.	Components and Functions (Theory)	Contains block diagrams and functional explanations of the electronics.
6.	Service Adjustments	Contains instructions on how to make any available adjustments to the Vivid *iq*.
7.	Diagnostics/ Troubleshooting	Provides procedures for running diagnostic or related routines for the Vivid *iq*.

Table 1-1: Contents in this manual (Continued)

Chapter number	Chapter title	Description
8.	Replacement procedures	Provides disassembly procedures and reassembly procedures for all changeable FRU.
9.	Renewal Parts	Contains a complete list of replacement parts for Vivid *iq*.
10.	Care & Maintenance	Provides periodic maintenance procedures for Vivid *iq*.
N/A	Index	A quick way to the topic you're looking for.

1-2-2 Typical users of the Proprietary Service Manual

- GEHC Service Personnel (setup, maintenance, etc.)
- GEHC Online Center Personnel
- Licensed Hospital's Service Providers

1-2-3 Vivid *iq* models covered by this manual

Table 1-2: Vivid *iq* Model Designations

Model Number	Description
H48932BA	Vivid *iq* R6 PoC
H48932BB	Vivid *iq* v206 Standard
H48932BC	Vivid *iq* v206 Premium
H48932BD	Vivid *iq* v206 4D
H48942BE	Vivid *iq* v206 US PoC
H48942BF	Vivid *iq* v206 US Standard
H48942BG	Vivid *iq* v206 US Premium
H48942BH	Vivid *iq* v206 US 4D

NOTE: When not otherwise specified, the contents of this manual applies to all Vivid iq models.

1-3 Important conventions

1-3-1 Conventions used in book

Important conventions, used in this document, are described next.

1-3-1-1 Model designations

This manual covers the Vivid *iq* Ultrasound systems listed in:

1-2-3 ‘Vivid iq models covered by this manual’ on *page 1-5*.

1-3-1-2 Icons

Pictures, or icons, are used wherever they will reinforce the printed message. The icons, labels, and conventions used on the product and in the service information are described in this chapter.

1-3-1-3 Safety precaution messages

Various levels of safety precaution messages may be found on the equipment and in the service information. The different levels of concern are identified by a flag word that precedes the precautionary message. Known or potential hazards to personnel are labeled in one of three ways:

- DANGER
- WARNING
- CAUTION

Danger is used to indicate the presence of a hazard that will cause severe personal injury or death if the instructions are ignored.

Warning is used to indicate the presence of a hazard that can cause severe personal injury and property damage if instructions are ignored.

Caution is used to indicate the presence of a hazard that will or can cause minor personal injury and property damage if instructions are ignored. Equipment damage possible.

NOTE: Notes are used to provide important information about an item or a procedure.

NOTE: Be sure to read the notes; the information contained in a note can often save you time or effort.

1-3-2 Standard hazard icons

Important information will always be preceded by either the exclamation point (!) contained within a triangle, or the symbols for “Danger”, “Warning” or “Caution”, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could possibly cause harm. Even if a symbol isn’t used in this manual, it may be included for your reference.

Table 1-3: Standard hazard icons

	ELECTRICAL
	MECHANICAL
	RADIATION
	LASER
	HEAT
	PINCH

NOTE: Even if a symbol isn’t used on the product or in this manual, it may be included for your reference.

1-3-2-1 Standard Icons that indicate that a special procedure is to be used

Some others icons make you aware of specific procedures that should be followed.

Table 1-4: Standard Icons that indicates that a special procedure is to be used

Avoid Static Electricity	Tag and Lock Out	Wear Eye Protection
		
Hand Protection	**Foot Protection**	**Wear Eye Protection**
		

Be sure to read the notes; the information contained in a note can often save you time or effort.

1-4 Product icons

It is important to refer to the current revision of the Ultrasound system's User Manual for a full list of product labels prior to servicing the system.

1-5 Labels locations

1-5-1 Introduction

It is important to refer to the current revision of the Ultrasound system's User Manual for a full list of product labels prior to servicing the system.

Vivid *iq* labels are provided in English.

The labels are at the bottom of the system. The label content may be different for different regions and systems. Please refer to the labels on the system for the actual content.

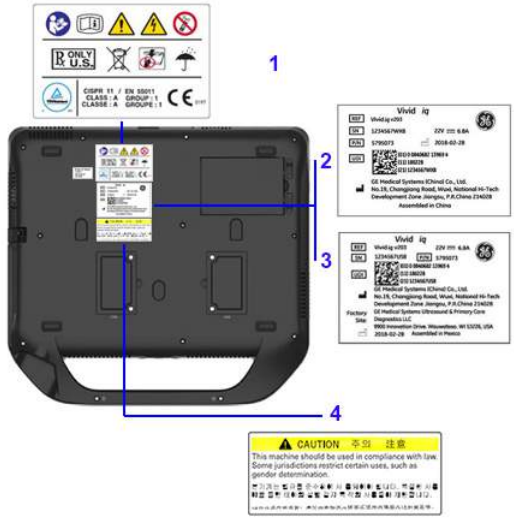

Figure 1-1. Vivid *iq* label location

1-5-1 Introduction(continued)

1. Safety label
2. Rating plate
3. Rating plate (for CKD version)
4. Gender warning label (For China, Korea and India only)

Table 1-5: Label Icons

Label/Icon	Purpose/Meaning	Location
	Every system has a unique marking for identification, the Unique Device Identification (UDI) Label. The UDI label consists of a series of alpha-numeric characters and barcode which uniquely identify the Vivid *iq* system as a medical device manufactured by General Electric. Scan or enter the UDI information into the patient health record as required by country-specific laws.	Rating plate
	Serial Number.	Rating plate

NOTE: If the new label is needed during the service activities, please click "Ask an Expert" to submit the case in the support central: http://supportcentral.ge.com/products/sup_products.asp?prod_id=44177.

1-6 Safety considerations

1-6-1 Contents in this section

1-6-2 Introduction

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture and intended use of the equipment.

1-6-3 Human Safety

- Operating personnel must not remove the system covers.
- Servicing should be performed by authorized personnel only.

Only personnel who have participated in a Vivid *iq* Training Seminar are authorized to service the equipment.

DANGER

DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.

WARNING

If the covers are removed from an operating Vivid *iq*, some metal surfaces may be warm enough to pose a potential heat hazard if touched, even while in shutdown mode.

1-6-3 Human Safety(continued)

WARNING

Because of the limited access to cabinets and equipment in the field, placing people in awkward positions, GE has limited the lifting weight for one person in the field to 16 KG (35 LBS). Anything over 16 KG (35 LBS) requires 2 people.

WARNING

Have two people available to deliver and unpack the Vivid *iq*.

Attempts to move the Ultrasound system considerable distances or on an incline by one person could result in injury or damage or both.

WARNING

Explosion Warning

DO NOT operate the equipment in an explosive atmosphere. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

WARNING

DO NOT substitute parts or modify equipment

Because of the danger of introducing additional hazards, ONLY install GE approved parts. DO NOT perform any unauthorized modification of the equipment.

WARNING

Ensure that the Ultrasound system is turned off and unplugged

Wait for at least 20 seconds for capacitors to discharge as there are no test points to verify isolation. The amber light on the OP panel ON/OFF button will turn off.

Ultrasound system components may be energized. Always refer to the Ultrasound system's Proprietary Service Manual for LOTO warnings and cautions

1-6-3 Human Safety(continued)

WARNING

Risk of electrical shock, Ultrasound system must be turned off and disconnected from power source. Cord must be controlled at all times.

Wait for at least 20 seconds for capacitors to discharge as there are no test points to verify isolation. The amber light on the OP panel on/off button will turn off.

Ultrasound System components may be energized. Always refer to the Ultrasound system's Proprietary Service Manual for LOTO warnings and cautions

WARNING

Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.

WARNING

Beware of possible sharp edges on all mechanical parts. If sharp edges are encountered, the appropriate PPE should be used to reduce the risk of injury.

WARNING

Wear all PPE including gloves as indicated in the chemical MSDS.

1-6-4 Mechanical safety

While the software install procedure is designed to preserve data, you should save any patient data, images, system setups to removable media or hardcopy before doing a software upgrade.

Ultrasound probes are highly sensitive medical instruments that can easily be damaged by improper handling. Use care when handling and protect from damage when not in use. **Do NOT** use a damaged or defective probe. Failure to follow these precautions can result in serious injury and equipment damage.

Never use a probe that has fallen to the floor. Even if it looks OK, it may be damaged.

When the Ultrasound system is raised for a repair or moved along any incline, use extreme caution since it may become unstable and tip over.

Take extra care when moving the system.

The Vivid *iq* weighs approximately 65 kg (144 lbs) or more, depending on installed peripherals, when ready for use. To avoid possible injury and equipment damage when transporting from one area of use to another:

- Be sure the pathway is clear.
- Limit movement to a slow careful walk.
- Use two or more persons to move the equipment on inclines or long distance.

Before you move or transport the Ultrasound system, make sure to lock the LCD monitor arm firmly and flip down the monitor to prevent damage to the Ultrasound system.

1-6-4 Mechanical safety(continued)

CAUTION

To avoid injury when you move the LCD monitor and the monitor arm, do not put your finger, hand, or object on the joint of the monitor or the monitor arm.

CAUTION

Ensure that nobody touches the console arm when moving the operator panel.

CAUTION

Do not move the Ultrasound system if the Operator Panel is in unlocked position.

CAUTION

Do not transport Vivid *iq* in a vehicle without locking the casters (wheels) and securing it as described in chapter 4.

CAUTION

Use protective glasses during drilling, filing smooth surfaces, and during all other work where eyes need protection.

CAUTION

Use safety shoes when doing work where there is any chance of foot injury.

1-6-4 Mechanical safety(continued)

CAUTION

Use protective gloves when working with sharp edges or when directed to wear PPE during a removal/replacement procedure.

CAUTION

Be careful not to pinch any of the cables.

NOTE: Special care should be taken when transporting the Ultrasound system in a vehicle:

- Before transporting, place the system in its special storage case.
- Lock the wheels (brake)
- Ensure that the system is firmly secured while inside the vehicle.
- Secure system with straps or as directed otherwise to prevent motion during transport.
- Prevent vibration damage by driving cautiously. Avoid unpaved roads, excessive speeds, and erratic stops or starts.

1-6-5 Electrical safety

1-6-5-1 Safe practices

Follow these guidelines to minimize shock hazards whenever you are using the Ultrasound system:

- To minimize shock hazard, the equipment chassis must be connected to an electrical ground.
- The Ultrasound system is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety ground.
- The power outlet used for this equipment should not be shared with other types of equipment.
- Both the system power cable and the power connector must meet international electrical standards


WARNING

Connecting a Vivid *iq* to the wrong voltage level will most likely destroy it.

1-6-5-2 Probes

Follow these guidelines before connecting a probe to the Ultrasound system:

- Inspect the probe prior to each use for damage or degradation to the:
  - housing
  - cable strain relief
  - lens
  - seal
  - connector pins
  - locking mechanism
- Do not use a damaged or defective probe.
- Never immerse the probe connector or adapter into any liquid.
- The system has more than one type of probe port. Use the appropriate probe port designed for the probe you are connecting.

1-6-5-3 Peripherals

Refer to the Patient Safety Environment section of the User's Manual for peripheral isolation information.

1-7 Dangerous procedure warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

DANGER

DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.

WARNING

If the covers are removed from an operating Vivid *iq*, some metal surfaces may be warm enough to pose a potential heat hazard if touched, even while in shutdown mode.

WARNING

Explosion Warning

DO NOT operate the equipment in an explosive atmosphere. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

WARNING

DO NOT substitute parts or modify equipment

Because of the danger of introducing additional hazards, ONLY install GE approved parts. DO NOT perform any unauthorized modification of the equipment.

WARNING

SHUT DOWN FORCEDLY OR PLUG IN/OUT ACDC INVALID MAY CAUSE THE DAMAGE OF SYSTEM FILES.

1-8 Lockout/Tagout (LOTO) requirements

Follow Lockout/Tagout requirements by ensuring you are in total control of the AC power plug at all times during the service process.

To apply Lockout/Tagout (LOTO):

1. Plan and prepare for shutdown.
2. Shutdown the equipment.
3. Isolate the equipment.
4. Remove/disconnect the battery, if present.
5. Apply Lockout/Tagout Devices.
6. Control all stored and residual energy.
7. Verify isolation.

All potentially hazardous stored or residual energy is relieved.

WARNING

Energy Control and Power Lockout for Vivid *iq*.

When servicing parts of the Ultrasound system where there is exposure to voltage greater than 30 volts:

1. Follow LOCK OUT/TAG OUT procedures.
2. Turn off the breaker.
3. Unplug the Ultrasound system.
4. Maintain control of the Ultrasound system power plug.
5. Wait for at least 30 seconds for capacitors to discharge as there are no test points to verify isolation.
6. Remove/disconnect the battery, if present.

Ultrasound System components may be energized.

1-9 Returning probes and repair parts

1-9-1 Overview

Equipment being returned must be clean and free of blood and other infectious substances. GE Healthcare policy states that body fluids must be properly removed from any part or equipment prior to shipment. GE Healthcare employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe).

The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that "items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care" are "regulated medical waste" for transportation purposes and must be transported as a hazardous material.

1-9-1 Overview(continued)

NOTE: The USER/SERVICE staff should dispose of all the waste properly, per federal, state, and local waste disposal regulations.

The Ultrasound system is not meant to be used for long-term storage of patient data or images. The user is responsible for the data on the system and a regular backup is highly recommended.

If the system is sent for repair, please ensure that any patient information is backed up and erased from the system before shipping. It is always possible during system failure and repair to lose patient data. GE is not responsible for the loss of this data.

If PHI (Patient Healthcare Information) data needs to be sent to GE employees for service purposes, GE will ascertain agreement from the customer. Patient information shall only be transferred by approved service processes, tools and devices restricting access, protecting or encrypting data where required, and providing traceability in the form of paper or electronic documents at each stage of the procedure while maintaining compliance with cross-border restrictions of patient information transfers.

1-10 EMC, EMI and ESD

1-10-1 What is EMC?

Electromagnetic compatibility describes a level of performance of a device within its electromagnetic environment. This environment consists of the device itself and its surroundings including other equipment, power sources and persons with which the device must interface. Inadequate compatibility results when a susceptible device fails to perform as intended due interference from its environment or when the device produces unacceptable levels of emission to its environment. This interference is often referred to as radio–frequency or electromagnetic interference (RFI/EMI) and can be radiated through space or conducted over interconnecting power of signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

1-10-2 CE Compliance

Vivid *iq* conforms to all applicable conducted and radiated emission limits and to immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements.

For applicable standards, refer to the Safety Chapter of the Ultrasound system User's Manual.

NOTE: For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh, clamps, are in good condition, installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.

1-10-3 Electrostatic discharge (ESD) prevention

WARNING

DO NOT touch any boards with integrated circuits prior to taking the necessary ESD precautions.

Always connect yourself, via an arm-wrist strap, to the advised ESD connection point located on the rear of the Ultrasound system (near the power connector).

Follow general guidelines for handling of electrostatic sensitive equipment.

WARNING

Risk of electrical shock, Ultrasound system must be turned off. Avoid all contact with electrical contacts, conductors and components. Always use non-conductive handles designed for the removal and replacement of ESD sensitive parts. All parts that have the potential for storing energy must be discharged or isolated before making contact.

1-11 Customer assistance

1-11-1 Contact information

If this equipment does not work as indicated in this service manual or in the user manual, or if you require additional assistance, please contact the local distributor or appropriate support resource, as listed below.

Before you call, identify the following information, and acquire image to send to the Customer Care team:

1. System ID serial number.
2. Software version.
3. Date and time of occurrence.
4. Sequence of events leading to issue.
5. Is the issue repeatable?
6. Imaging mode, probe, preset/application.
7. Media brand, speed, capacity, type.
8. Save secondary image capture, cine loop.

NOTE: Restart the application before resuming clinical scanning.

NOTE: The serial number can be found at the rear of the system.

1-11-2 Phone numbers for Customer Assistance

Table 1-6: Phone numbers for Customer Assistance

LOCATION	PHONE NUMBER	
USA GE Healthcare - GE Medical Systems Ultrasound Service Engineering 9900 Innovation Drive Wauwatosa, WI 53226	Service: On-site	1-800-437-1171
	Service Parts	1-800-558-2040
	Application Support	1-800-682-5327 or 1-262-524-5698
Canada	Phone:	1-800-668-0732
LATAM	Brazil Phone	3004-2525 (Capitais e Regiões metropolitanas) 08000 165 799 (Demais localidades)
	Mexico Phone	8002000111
	Colombia Phone	01 8000 181350
	Puerto Rico Phone	1-855-964-0639
	Argentina Phone	0800-222-4342
	Peru Phone	0800-5-4342
	Chile Phone	1888-0020-4342 800204302
Europe (OLC-EMEA) GE Ultraschall Deutschland Gmbh & Co. KG Beethovenstraße 239 Postfach 11 05 60, D-42655 Solingen Germany	OLC - EMEA Phone:	+49 (0) 212 2802 - 652 +33 1 3083 1300
	Fax:	+49 (0) 2122-8024-31
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1-11-3 System manufacturer

Table 1-7: System manufacturer

MANUFACTURER	PHONE NUMBER	FAX NUMBER
GE Medical Systems (China) Co., Ltd. No.19 Changjiang Road Wuxi National Hi-Tech Dev. Zone 214028 Jiangsu China	+86 510 85225888	+86 510 85226688

1-11-4 Authorized Representative

Table 1-8: Authorized Representative

AUTHORIZED REPRESENTATIVE
The location of the CE marking is shown in the Safety chapter of the User manual. EC REP Authorized EU Representative: GE Medical Systems SCS 283 rue de la Minière 78530 BUC, France

Chapter 2

Site Preparations

This chapter provides the information required to plan and prepare for the setup of an Ultrasound system. Included are descriptions of the facility and electrical needs to be met by the purchaser of the units.

2-1 Overview

2-1-1 Contents in this chapter

2-2 General Ultrasound system requirements

2-2-1 Contents in this section

2-2-2 Ultrasound system environmental requirements

2-2-2-1 If the Ultrasound system is very cold or hot

When unpacking the Ultrasound system, allow the temperature of the Ultrasound system to stabilize before powering up. The following table describes guidelines for reaching operational temperatures from storage or transport temperatures.

CAUTION

If the Ultrasound system is very cold or hot, do not turn on its power until it has had a chance to acclimate to its operating environment.

Table 2-1: System Acclimation Time Chart

Degree C	-4.5	-2	0.5	3	40	42.5	45	47.5	50	55	60
Degree F	23.9	28.4	32.9	37.4	104	108.5	113	117.5	122	131	140
hours	3	2	1	0	0	1	2	3	4	6	8

2-2-2-2 Environmental specifications for Ultrasound system

The system should be operated, stored, or transported within the parameters outlined below. Either its operational environment must be constantly maintained or the unit must be turned off.

Table 2-2: System Environmental Requirements

	Operational	**Storage**	**Transport (<16hrs.)**
Temperature	3° - 40°C 38° - 104°F	-5° - 50°C 23° - 122°F	-5° - 50°C 23° - 122°F
Humidity	30 - 80% non-condensing	10 - 90% non-condensing	10 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

CAUTION

Ensure that the probe face temperature does not exceed the normal operation temperature range.

CAUTION

The Vivid *iq* system and probe connector is not waterproof. Do not expose the device to water or any kind of liquid.

2-2-2-3 Cooling

The cooling requirement for a console Ultrasound system with monitor and on board peripherals, is up to 3800 BTU/h. This figure does not include cooling needed for lights, people, or other equipment in the room.

NOTE: Each person in the room places an additional 300 BTU/h demand on the cooling system.

2-2-2-4 Lighting

Bright light is needed for Ultrasound system installation, updates and repairs. However, operator and patient comfort may be optimized if the room light is subdued and indirect. Therefore a combination lighting system (dim/bright) is recommended. Keep in mind that lighting controls and dimmers can be a source of EMI which could degrade image quality. These controls should be selected to minimize possible interference.

2-2-3 Electrical requirements

2-2-3-1 General requirements

NOTE: GE Healthcare requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the Ultrasound system.

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

NOTE: Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound system is only a conduit.

2-2-3-2 Electrical requirements for the Ultrasound system

In the table below, the electrical specifications for the Ultrasound system includes monitor and on board peripherals.

Table 2-3: Electrical Specifications for Vivid *iq* system

Voltage	Tolerance	Power Consumption	Frequency
100-240 VAC	±10%	Max. 150VA	50/ 60HZ

2-2-3-3 Site circuit breaker

CAUTION

Power outage may occur. The Vivid *iq* requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you do not have any other equipment operating on the same circuit.

It is recommended that the branch circuit breaker for the Ultrasound system be readily accessible.

CAUTION

POWER OUTAGE MAY OCCURE.

The Vivid *iq* requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you DO NOT have any other equipment operating on the same circuit.

2-2-3-4 Site power outlets

A dedicated AC power outlet must be within reach of the Ultrasound system without extension cords. Other outlets adequate for the external peripherals, medical and test equipment needed to support this Ultrasound system must also be present within 1 m (3.2 ft.) of the Ultrasound system. Electrical installation must meet all current local, state, and national electrical codes.

2-2-3-5 Unit power plug

If the Ultrasound system arrives without a power plug, or with the wrong plug, you must contact your GE dealer or the installation engineer must supply what is locally required.

2-2-3-6 Power stability requirement

Table 2-4: Power stability requirement

IEC 61000-4-11 Voltage dips, short interruptions and voltage variations on mains supply	< 5%T (> 95% dip) for 0.5 cycle;	< 5%T (> 95% dip) for 0.5 cycle;	Mains power quality should be that of a typical commercial or hospital environment.
	40%T (60% dip) for 5 cycles;	40%T (60% dip) for 5 cycles;	
	70%T (30 dip) for 25 cycles;	70%T (30 dip) for 25 cycles;	
	< 5%T (>95% dip) for 5 sec	< 5%T (>95% dip) for 5 sec	

2-2-4 EMI limitations

Ultrasound systems are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. They also generate EMI. The Ultrasound system complies with limits as stated on the EMC label. However there is no guarantee that interference will not occur in a particular installation.

Possible EMI sources should be identified before the Ultrasound system is installed.

Electrical and electronic equipment may produce EMI unintentionally as the result of a defect. Some of these sources include:

- medical lasers
- scanners
- cauterizing guns
- computers
- monitors
- fans
- gel warmers
- microwave ovens
- light dimmers
- mobile phones
- in-house wireless phones (DECT phones)
- wireless computer keyboard and mouse
- air conditioning system
- High Frequency (HF) surgery equipment
- general AC/DC adapters

The presence of a broadcast station or broadcast van may also cause interference.

See: 2-2-4-1‘EMI prevention/abatement’ on *page 2-10* for EMI prevention tips.

2-2-4-1 EMI prevention/abatement

Table 2-5: EMI prevention/abatement

EMI RULE	DETAILS
Be aware of Radio Frequency sources	• Keep the Ultrasound system at least 5 meters (15 feet) away from other EMI sources. • Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Ground the Ultrasound system	Poor grounding is the most likely reason an Ultrasound system will have noisy images. Check grounding of the power cord and power outlet.
Replace all screws, Radio Frequency gaskets, covers, cores	• After you finish repairing or updating the Ultrasound system, replace all covers and tighten all screws. • Any cable with an external connection requires a magnet wrap at each end. • Install all covers. Loose or missing covers or Radio Frequency gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken Radio Frequency gaskets	If more than 20% or a pair of the fingers on an Radio Frequency gasket are broken, replace the gasket. Do not turn on the Ultrasound system until any loose metallic part is removed.
Do not place labels where Radio Frequency gaskets touch metal	Where applicable, never place a label where Radio Frequency gaskets meet the Ultrasound system. Otherwise, the gap created will permit Radio Frequency leakage. Or, if a label has been found in such a position, move the label.
Use GE specified harnesses and peripherals	The interconnect cables are grounded and require ferrite beads and other shielding. Also, cable length, material, and routing are all important; do not change from what is specified.
Take care with cellular phones	Cellular phones may transmit a 5 V/m signal; that could cause image artifacts.
Properly route peripheral cables	Where applicable, do not allow cables to lie across the top of the Card Rack or hang out of the peripheral bays. Loop the excess length for peripheral cables inside the peripheral bays. Attach the monitor cables to the frame.

2-2-5 Probes environmental requirements

2-2-5-1 Operation, storage and transport temperatures for probes

Probes should be operated, stored, or transported within the parameters outlined below.

Ensure that the probe face temperature does not exceed the normal operation temperature range.

Table 2-6: Probe Environmental Requirements

	Operational	Storage	Transport
Temperature	3° - 40° C 38° - 104° F	-5° - 50° C 23° - 122° F	-5° - 50° C 23° - 122° F
Humidity	30- 80% non-condensing	10 - 90% non-condensing	10 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

Check the room temperature before you use the probe.

Ensure that the probe face temperature does not exceed the normal operation temperature range.

NOTE: Refer to Table 2-1 on page 2-3 to determine the needed settlement time.

2-2-6 Time and manpower requirements

Site preparation takes time. Begin site preparation checks as soon as possible, if possible, six weeks before delivery, to allow enough time to make any changes.

2-3 Facility needs

2-3-1 Contents in this section

2-3-2 Purchaser responsibilities

The work and materials needed to prepare the site is the responsibility of the purchaser. Delay, confusion, and waste of manpower can be avoided by completing pre-installation work before delivery. Purchaser responsibility includes:

- Procuring the materials required
- Completing the preparations before delivery of the Ultrasound system
- Paying the costs for any alterations and modifications not specifically provided in the sales contract

NOTE: All electrical installations that are preliminary to the positioning of the equipment at the site prepared for the equipment must be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations, and testing must also be performed by qualified personnel. The products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these products must comply with the requirements of applicable electrical codes. The purchaser of GE equipment must only utilize qualified personnel to perform electrical servicing on the equipment.

The desire to use a non–listed or customer provided product or to place an approved product further from the Ultrasound system than the interface kit allows, presents challenges to the installation team. To avoid delays during installation, such variances should be made known to the individuals or group performing the installation at the earliest possible date (preferably prior to the purchase).

The ultrasound suite must be clean prior to delivery of the Ultrasound system. Carpet is not recommended because it collects dust and creates static. Potential sources of EMI (electromagnetic interference) should also be investigated before delivery. Dirt, static, and EMI can negatively impact Ultrasound system reliability.

2-3-3 Required facility needs

NOTE: *GE Healthcare requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the Ultrasound system.*

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

2-3-3 Required facility needs(continued)

NOTE: Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.

- Dedicated single branch power outlet of adequate amperage meeting all local and national codes which is located less than 2.5 m (8 ft.) from the unit's proposed location
- Door opening is at least 76 cm (30 in) wide
- Proposed location for unit is at least 0.5m (1.5 ft.) from the wall for cooling
- Power outlet and place for any external peripheral are within 2 m (6.5 ft.) of each other with peripheral within 1 m of the unit to connect cables.
- Power outlets for other medical equipment.
- Power outlets for test equipment within 1 m (3.2 ft.) of Ultrasound system.
- Clean and protected space to store probes (in their cases or on a rack)
- Material to safely clean probes (done with a plastic container, never metal)

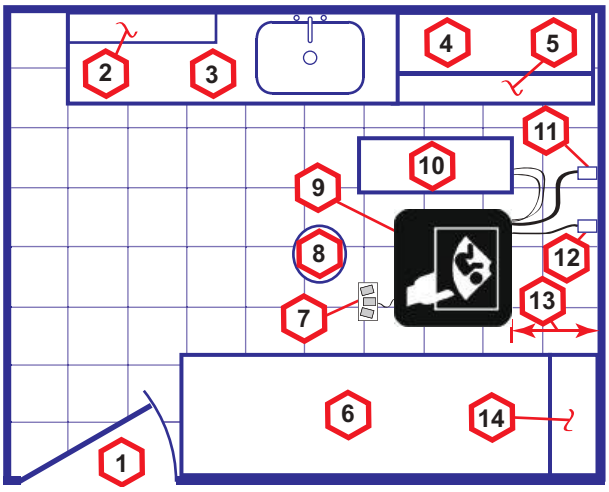
For the amperage requirements, see: 2-2-3'Electrical requirements' on *page 2-6*.

2-3-4 Desirable features

- Door is at least 92 cm (3 ft.) wide
- Circuit breaker for dedicated power outlet is easily accessible
- Sink with hot and cold water
- Receptacle for bio–hazardous waste, like used probe sheaths
- Emergency oxygen supply
- Storage for linens and equipment
- Nearby waiting room, lavatory, and dressing room
- Dual level lighting (bright and dim)
- Lockable cabinet ordered by GE for its software and proprietary manuals

2-3-5 Minimal floor plan suggestion

CSI 8x10



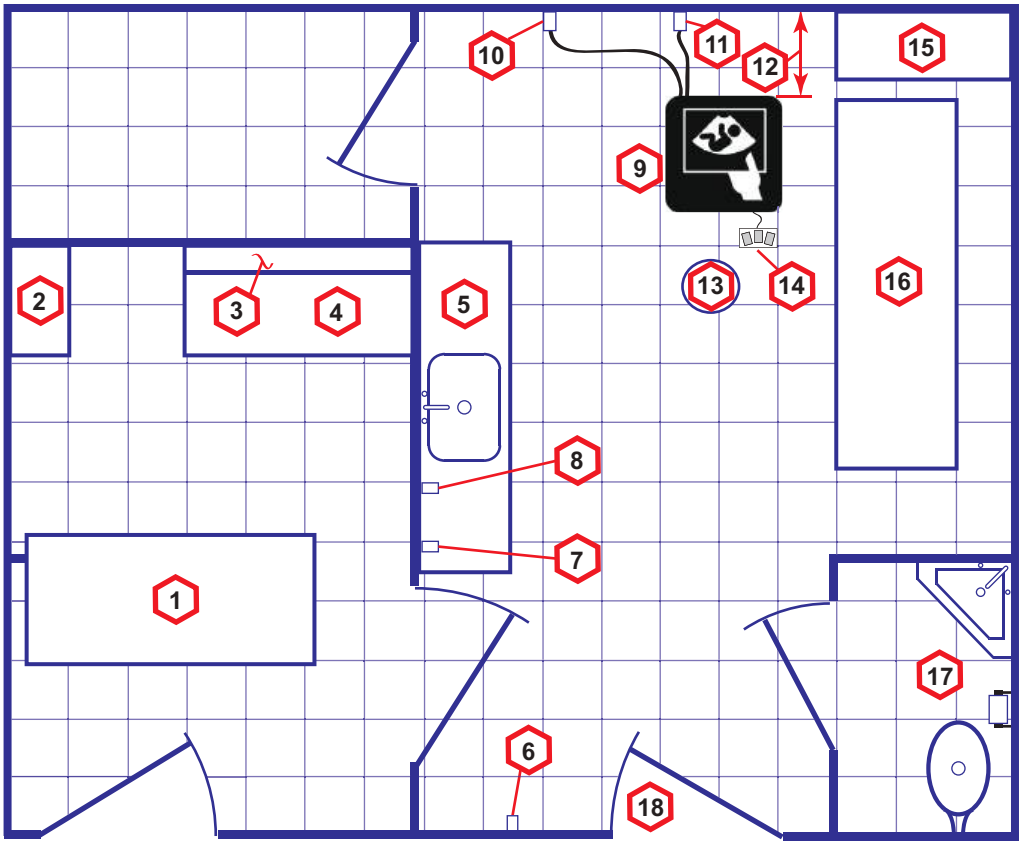
Scale:
Each square equals one square foot (app. 31 x 31 cm)

1. Door – at least 762 mm (30 inches)
2. Film Viewer
3. Counter Top, Sink with hot and cold water and Supplies Storage
4. Linen Supply
5. Probes/Supplies
6. Examination Table – 1930 x 610 mm (76 x 24 inches)
7. Footswitch
8. Stool
9. Ultrasound system
10. External Peripherals
11. Dedicated Power Outlet - Circuit Breaker protected and easily accessible
12. Network Interface
13. 457 mm (18 inches) distance of Ultrasound system from wall or objects
14. GE Cabinet for Software and Manuals

Figure 2-1. Minimal floor plan, 2.5 m x 3 m (8 by 10 foot)

2-3-6 Recommended floor plan suggestion

CSI 14x17

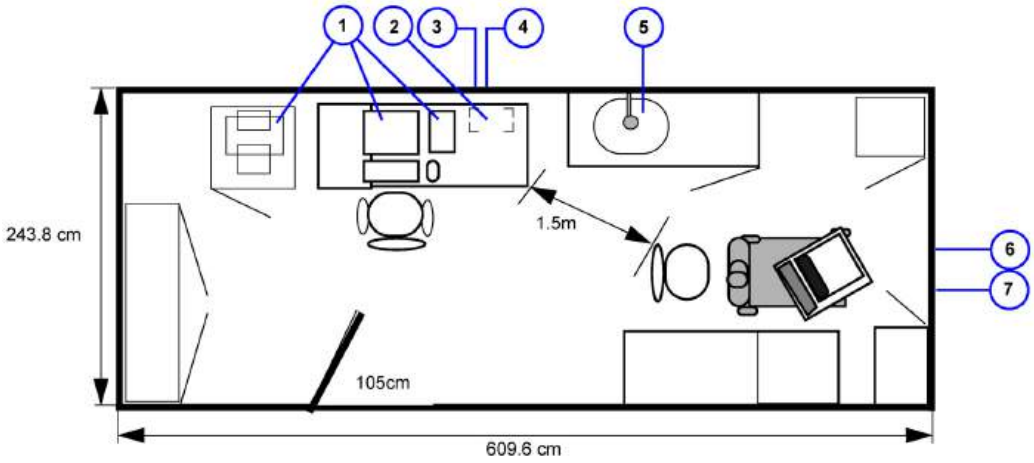


Scale: Each square equals one square foot (app. 31 x 31 cm)

1. Secretaries or Doctors Desk
2. File Cabinet
3. Film Viewer
4. Counter Top
5. Counter Top and Sink with hot and cold water
6. Overhead Lights Dimmer - Dual Level Lighting (bright and dim)
7. Emergency Oxygen
8. Suction Line
9. Ultrasound system
10. Dedicated Power Outlet - Circuit Breaker protected and easily accessible
11. Network Interface
12. 457 mm (18 inches) distance of Ultrasound system from wall or objects
13. Stool
14. Footswitch
15. Storage for Linens and Equipment
16. Examination Table – 1930 x 610 mm (76 x 24 inches)
17. Lavatory and Dressing Room
18. Door – at least 762 mm (30 inches)

Figure 2-2. A 14 by 17 foot recommended floor plan

2-3-7 Suggested floor plan, Ultrasound system, and EchoPAC PC in same room



1. EchoPAC PC workstation parts
2. UPS
3. Ethernet network wall outlet
4. 3x mains power outlets
5. Hot and Cold water
6. Dedicated mains power outlet
7. Ethernet network wall outlet

Figure 2-3. Suggested Room with EchoPAC PC workstation and Ultrasound Scanner

2-3-8 Networking setup requirements

2-3-8-1 Stand alone Ultrasound system (without network connection)

None.

2-3-8-2 Scanner connected to hospital's network

Supported networks:

100/1000 Mbit Ethernet/DICOM network (option)

2-3-8-3 InSite requirements

InSite requires an Ethernet connection via:

- 100/1000 Mbit Interface

2-3-8-4 Purpose of the DICOM network function

DICOM services provide the operator with clinically useful features for moving images and patient information over a hospital network.

Examples of DICOM services include the transfer of images to workstations for viewing or transferring images to remote printers.

As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues.

With DICOM, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

2-3-8-5 DICOM option setup requirements

To configure the Ultrasound system to work with other network connections, the site's network administrator must provide information to complete the form "Worksheet for DICOM Network Information". Ensure that there are no spaces in any field of the form.

See:

Entries must include:

- A host name, local port number, AE Title, IP address and Net Mask for the Ultrasound system.
- The IP addresses for the default gateway and other routers at the site for ROUTING INFORMATION.
- The host name, IP address, port and AE Title for each device the site wants connected to the Ultrasound system for DICOM APPLICATION INFORMATION. A field for the make (manufacturer) and the revision of the device, is also included. This information may be useful for error solving.

2-3-8-5 DICOM option setup requirements(continued)

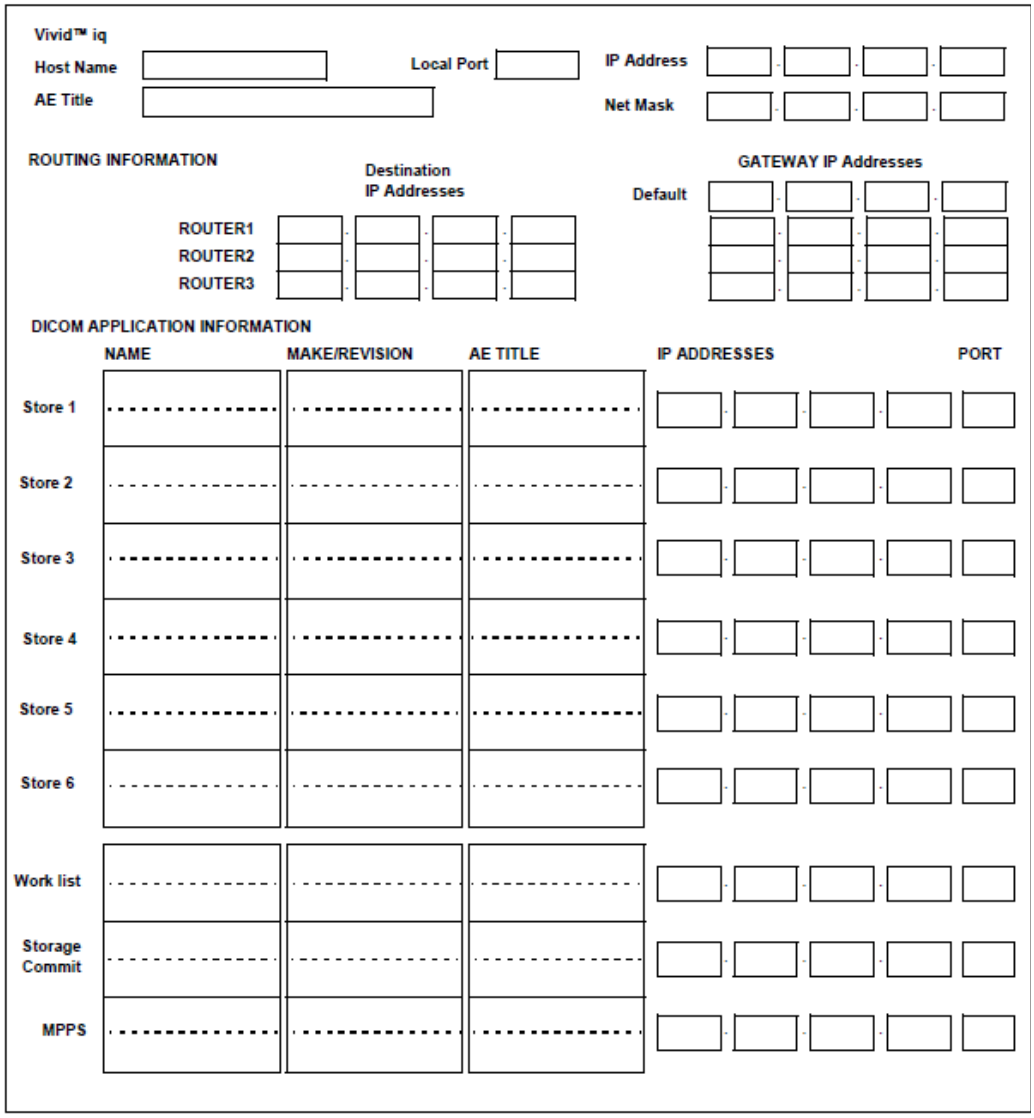


Figure 2-4. Worksheet for DICOM Network Information

2-3-8-6 Connectivity Installation Worksheet

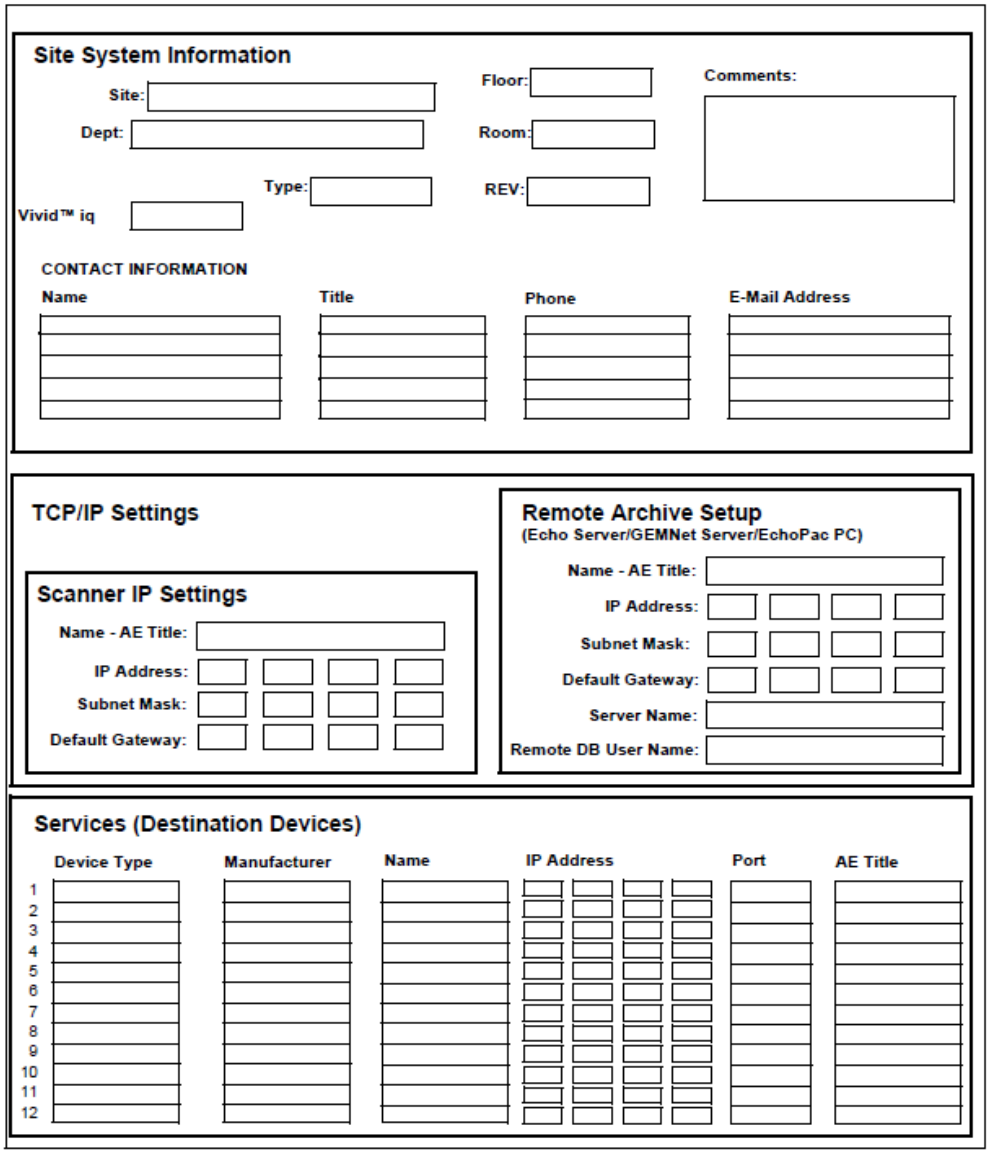


Figure 2-5. Connectivity Installation Worksheet

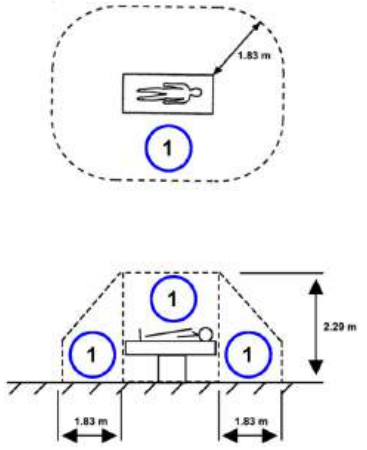
2-4 Environmental Dangers

Commercial devices such as laser cameras, printers, VCRs and external monitors, usually exceed allowable leakage current limits and, when plugged into separate AC outlets, are in violation of patient safety standards. Suitable electrical isolation of such external AC outlets, or providing the device with extra protective earth, will be required in order to meet UL60601-1 and IEC60601-1 / IEC60601-1-1 standards for electrical leakage.

2-4-1 Patient Vicinity UL60601-1 (USA)

2.12.20DV (UL60601-1:2003)

In area in which patients are normally cared for, the patient vicinity is the space with surfaces likely to be contacted by the patient or attendant who can touch the patient. This encloses a space within the room 1.83 m (6 ft.) beyond the perimeter of the bed (examination table, dental chair, treatment booth, and the like) in its intended location, and extending vertically 2.29 m (7.5 ft.) above the floor.



1. Patient environment

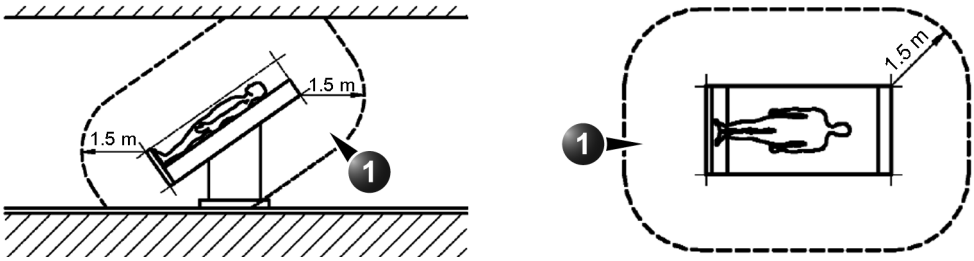
2-4-2 Patient Environment IEC60601-1 and ANSI AAMI ES60601-1

Sub Clause 3.79 and figure A.9 (IEC60601-1:2005 and ANSI AAMI ES60601-1:2005)

Such an area is an environment in which medical diagnosis, monitoring or treatment is carried out. It is very difficult to attach unique dimensions to the PATIENT ENVIROMENT.

In practice a distance of 2,5 m (8.2 ft.) above the floor on which the medical personnel stand and a horizontal distance of 1,5 m (4.9 ft.) have justified themselves as indicative of the dimensions of the Patient Environment.

The patient environment/vicinity will be depicted as a dashed line in this procedure. See example below.



1. Patient environment

Figure 2-6. Patient environment

Chapter 3

System Setup

This chapter contains information needed to install Vivid iq system.

Included is a procedure that describes how to receive and unpack the equipment and how to file a damage or loss claim.

How to prepare the facility and Ultrasound system of the actual installation, and how to check and test the Ultrasound system, probes, and external peripherals for electrical safety are also included in this procedure.

3-1 Overview

3-1-1 Contents in this chapter

3-2 Setup reminders

3-2-1 Average setup time

- Unpacking the Vivid *iq*: 20 minutes
- Set up Vivid *iq* options: 15 minutes
- DICOM Network Configuration: 30 minutes or more, depending on the configuration
- Installing Insite: 0.5 hour

The Vivid *iq* installation and functional checkout will take approximately 1 hour. Vivid *iq* consoles with optional equipment may take slightly longer.

3-2-2 Setup warnings

DANGER

WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DON'T TOUCH THE ULTRASOUND SYSTEM!

CAUTION

To prevent electrical shock, connect the unit to a properly grounded power outlet. **DO NOT** use a three to two prong adapter. This defeats safety grounding.

CAUTION

DO NOT wear the ESD wrist strap when you work on live circuits and more than 30 V peak is present.

CAUTION

DO NOT operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.

3-2-2 Setup warnings(continued)

1. There are no operator serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing.

NOTE: *For information regarding packing labels, refer to LABELS ON PACKAGE.*

2. After being transported, the unit may be very cold or hot. If this is the case, allow the unit to acclimate before you turn it on. It requires one hour for each 2.5°C increment it's temperature is below 3°C or above 40°C.

Equipment damage possibility. Turning the system on without acclimation after arriving at site may cause the system to be damaged.

If the Ultrasound system is very cold or hot, do not turn on its power until it has had a chance to acclimate to its operating environment.

The following table describes guidelines for reaching operational temperatures from storage or transport temperatures.

Table 3-1: System Acclimation Time Chart

Degree C	-4.5	-2	0.5	3	40	42.5	45	47.5	50	55	60
Degree F	23.9	28.4	32.9	37.4	104	108.5	113	117.5	122	131	140
hours	3	2	1	0	0	1	2	3	4	6	8

3-2-2 Setup warnings(continued)

CAUTION

Operator Manual(s)

The User Manual(s) should be fully read and understood before operating the Vivid *iq* and kept near the Ultrasound system for quick reference.

CAUTION

Acoustic Output Hazard

Although the ultrasound energy transmitted from the Vivid *iq* probe is within AIUM/NEMA standards, avoid unnecessary exposure. ultrasound energy can produce heat and mechanical damage.

3-3 Receiving and unpacking the equipment

3-3-1 Purpose of this section

This section describes how to receive and unpack Vivid *iq*.

3-3-2 Contents in this section

3-3-3 Warnings for receiving and unpacking

GENERIC CRT VERSION

CAUTION

Two people are needed to unpack the Ultrasound system because of its weight. Attempts to move the Ultrasound system considerable distances or on an incline by one person could result in injury or damage or both.

Two people are required whenever a part weighing 16 KG (35 LBS) or more must be lifted.

CAUTION

Remember to use relevant personal protecting equipment (PPE) during packing and unpacking. Check with your local EHS representative.

3-3-4 Receiving the Vivid *iq*

3-3-4-1 Overview

Improper handling during transportation may harm the equipment inside the package even if the package itself is undamaged.

3-3-4-2 Examine all packages

Examine package closely at time of delivery, as described in the procedure below.

Table 3-2: Examine all packages

Step	Task	Illustrations
1.	Is damage apparent? • If **YES**; continue with the instructions in 3-3-4-3 ‘Damage in transportation’ on *page 3-8*. • If **NO**; continue with the next step.	
2.	Continue with the instructions in 3-3-5 ‘Unpacking the Vivid iq’ on *page 3-9*.	

3-3-4-3 Damage in transportation

Follow this procedure if damage is apparent:

1. Write “Damage In Shipment” on ALL copies of the freight or express bill **BEFORE** delivery is accepted or “signed for “by a GE representative or hospital receiving agent.
2. Report the damage to the carrier.
   - Whether noted or concealed, damage **MUST** be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier.
   - A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

3-3-4-4 Vivid *iq* transportation box label

The Vivid *iq* transportation box label is located at the front of the transportation box.

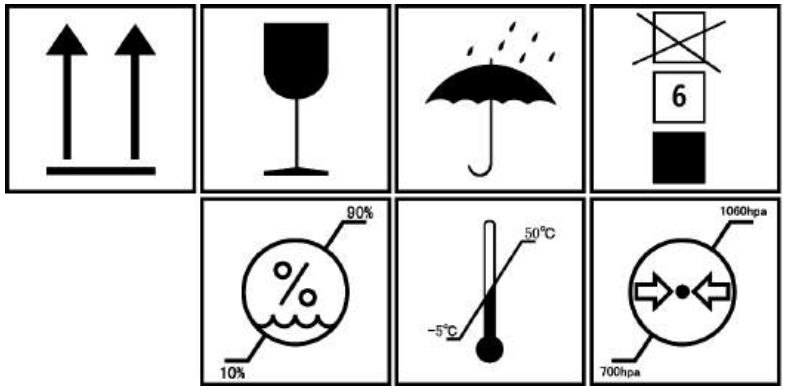


Figure 3-1. Vivid *iq* transportation box label

3-3-5 Unpacking the Vivid *iq*

When a new system arrives, check that any components are not damaged and are not in short supply. If shipping damage or shortage occurs, contact the address shown in Chapter 1.

CAUTION

Please carefully unpack the system, and do not dispose the package of Vivid *iq*, so that it can be reused for service.

NOTE: Please check the Vivid iq console is well assembly after unpacking the system.

Table 3-3: Unpacking the Vivid *iq*

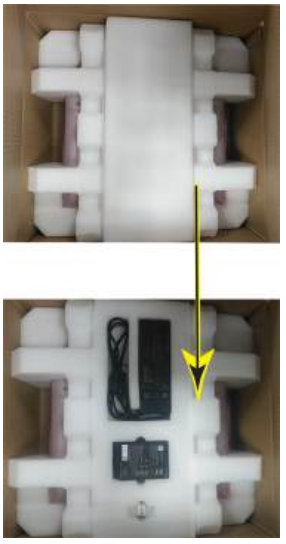
Step	Description	
1.	Tear the adhesive tape and open the box.	
2.	Take out the card kit and remove the foam cover of the accessory kit. Note: There is no USB flash drive designed in the accessory kit for Vivid iq v206.	

Table 3-3: Unpacking the Vivid *iq*

Step	Description	
3.	Take out the accessory kit and take the system out of the box.	
		
4.	Remove the foams and dust bag from the unit.	

Table 3-3: Unpacking the Vivid *iq*

Step	Description	
5.	Put the system on the inclined supporter.	
6.	Take out the battery from the accessory kit, remove the white sticker and stick the black strip.	
7.	Install the battery onto the system.	

3-3-5-1 Moving into Position

Please refer to User Manual on how to move the system.

3-3-6 Packing the Equipment

Please pack Vivid *iq* in the reverse order of unpacking.

3-4 Packing materials - recycling information

The packing materials for Vivid *iq* are recyclable:

- The Transportation Box is made of spruce or similar material. (“PHYTOSANITARY CERTIFICATE” included in all shipments to The People's Republic of China.)
- Lever lockings (hinges) are made of zinc plated steel.
- The inner reinforcements are made of Ethafoam (Polyethylene foam).
- The plastic foil is made of LDPE (Low Density Polyethylene).

3-5 Preparing for setup

3-5-1 Verify customer order

Compare items received by the customer to that which is listed on the delivery order. Report any items that are missing, back ordered, or damaged.

3-5-2 Physical inspection

Verify that the system arrived intact (visual inspection).

If the system has been damaged, please refer to 'Damage in transportation' on *page i-13* in the beginning of this manual.

3-5-3 EMI protection

The Vivid *iq* has been designed to minimize the effects of Electro-Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

See 2-2-4'EMI limitations' on *page 2-9* for more information about EMI protection.

3-6 Completing the setup

3-6-1 Purpose of this section

This section describes how to complete the installation of Vivid *iq*.

3-6-2 Contents in this section

3-6-3 System specifications

3-6-3-1 System requirements verification

- Verify that the site meets the requirements listed in Chapter 2.

  (See: 2-3‘Facility needs’ on *page 2-12*.)
- Verify that the specifications below don’t conflict with any on-site conditions.

3-6-3-2 Physical dimensions

Table 3-4: Physical dimensions of Vivid *iq*

Length	Width	Thickness	Depth
390	362	72	mm
15.4	14.3	2.8	Inches

3-6-3-3 Console Weight

- Weight: approx. 5 kg (11 lbs)

3-6-4 Electrical specifications


WARNING

Connecting a Vivid *iq* to the wrong voltage level will most likely destroy it.

3-6-4-1 Verification of the system's voltage setting

Verify that the mains voltage specified for the Vivid *iq* is available on-site.

The voltage setting for the Vivid *iq* is found on a label at the bottom of the Vivid *iq*.

3-6-4-2 Electrical specifications for Vivid *iq*

In the table below, the electrical specifications for Vivid *iq* includes monitor and on board peripherals.

Table 3-5: Electrical specifications for Vivid *iq*

Part Number	Description	Voltage	Tolerances	Power consumntion	Frequency
5795073	English version Vivid *iq*	100-240V	±10%	Max.150VA	50/60 Hz

3-6-5 Connections on the I/O Rear Panel

NOTE: Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC standards (e.g. IEC60950 for data processing equipment and IEC60601-1 for medical equipment). Furthermore, all complete configurations shall comply with the valid version of the system standard IEC60601-1. Everybody who connects additional equipment to the signal input part or signal output part of Vivid iq, configures a medical system, and is therefore responsible that the Ultrasound system complies with the requirements of the valid version of IEC60601-1. If in doubt, consult the technical service department or your local representative for GE.

3-6-5-1 Connect Ethernet

Connect the network cable to the Ethernet connector on the I/O Rear Panel.

The connector is located on the rear side of Vivid *iq*.

3-6-5-2 Connect USB Flash Drive

NOTE: USB Flash Drive approved for Vivid iq are verified for EMC performance according to EN55011 class B. The use of any other USB Flash Drive will compromise this verification, and may cause interference on Vivid iq itself, or on other electronic devices.

For approved models, please refer to Chapter 9.

NOTE: The Vivid iq does not support software encrypted USB stick.

Insert the USB Flash Drive in one of the USB ports on the Vivid *iq*.

3-6-6 Connecting probes

Please refer to User Manual on how to connect/disconnect a probe.

3-6-7 Powering the system

Please refer to User Manual on how to power the system.

3-7 System Configuration

3-7-1 Purpose of this section

This section describes how to configure the Vivid *iq*.

3-7-2 Vivid *iq* configuration

For complete instructions, refer to the latest revision of the Vivid *iq* User Manual, Chapter 4.

Information includes Selecting System Settings screen, Entering Location, Adjusting Date and Time, Selecting User Interface Language, Selecting Online Manual Language, Selecting Unites of Measure.

System view

3-7-3 Service Screen setup

3-7-3-1 Contents in this sub-section

3-7-3-2 Open Service Screen

Follow these steps to open the Service Screen:

1. Press **Config** on the shortcut bar and log on as **ADM**.
2. Press **Service** tab to view the **Service** screen.

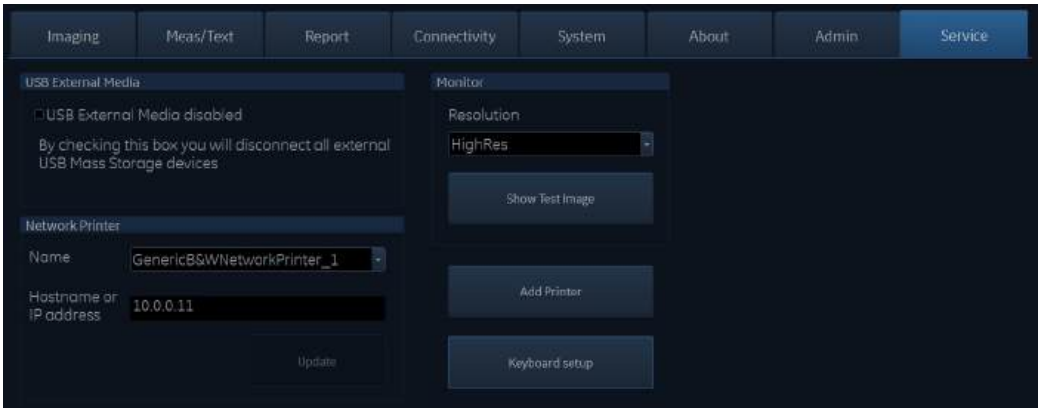


Figure 3-2. Service screen

3-7-3-3 Alphanumeric Keyboard configuration

NOTE: You don't need to perform this procedure if the alphanumeric keyboard is a US keyboard, since the default setting is set to US English keyboards.

Table 3-6: Select keyboard

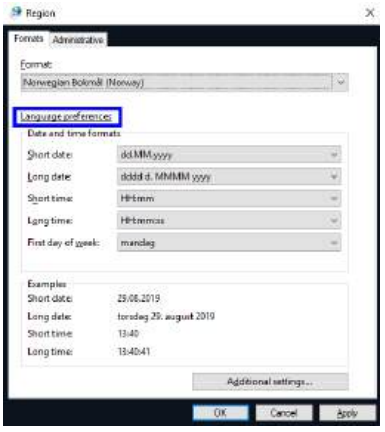
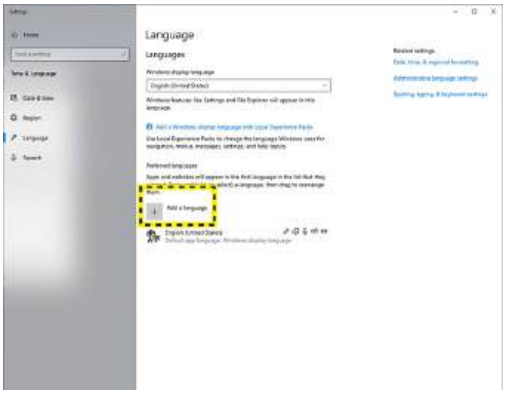
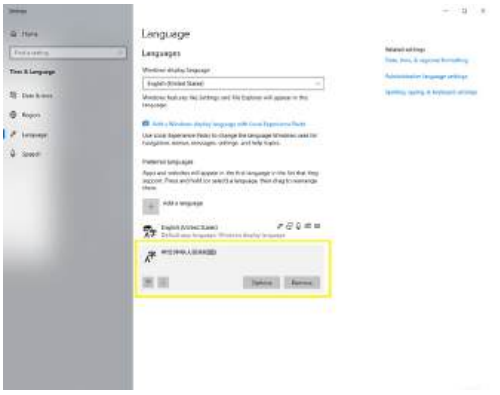
No.	Steps	Corresponding Graphic
1.	Select **Keyboard Setup** to get access to Keyboard Properties.	
2.	Select **Language Preferences**.	
3.	Select **Add a language**.	

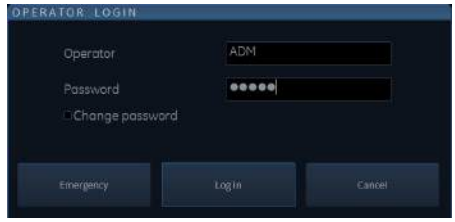
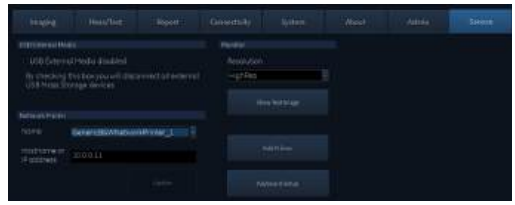
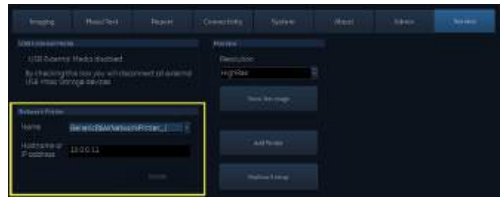
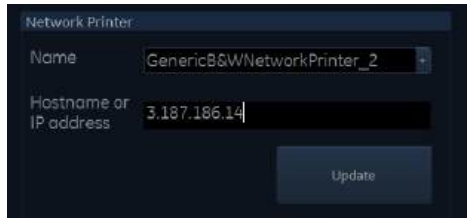
Table 3-6: Select keyboard

No.	Steps	Corresponding Graphic
4.	Select the desired language and press **Next**.	
5.	Select **Install**.	
6.	The desired language is listed and user can press **Alt+Shift** to change the input language.	

3-7-3-4 Add printer

Follow the instructions below to add a Network Printer:

Table 3-7: Add printer

No.	Steps	Corresponding Graphic
1.	Power up the Ultrasound System. and log on as **ADM**.	
2.	Press **Config** on the shortcut bar and select **Service** tab to open the Service Screen.	
3.	Under **Network Printer**, select the generic printer of your own choosing in the **Name** pulldown menu.	
4.	After selecting the generic printer name, type in the printerís **IP-address**, then press the **Set IP-address** button.	
5.	Restart the Ultrasound System before you continue.	
6.	Instructions for how to assign a printer to one of the printer keys,are described in the User Manual in ‘Printing configuration’ in the ‘Peripherals chapter’.	
7.	For verification, see ‘Printer checks’ in Chapter 4.	

3-8 Peripherals Installation

3-8-1 Overview

This section describes how to install and configure the peripherals validated for the Vivid *iq*.

The system supports external USB mouse and keyboard as well.

About the operation check-out of peripherals, 4-3-17 ‘Peripheral checks’ on *page 4-41*

Table 3-8: Vivid *iq* Peripherals

Description	Weight (kg)	Power	Control	Model
B/W USB Printer			USB port	Sony UP-D898MD Printer
Color USB Printer			USB port	Sony UP-D25MD Printer
3-Pedal Footswitch			USB port	MKF 2-MED GP26
USB Stick			USB port	USB Memory Stick
USB2.0 HDD			USB port	USB HDD 1T
ECG			ECG Port	ECG Cable

3-8-2 Furnished materials

This section describes the materials furnished with the Peripherals and with the system.

Retain the original carton and packing materials in case transport is needed in the future.

- B/W USB Printer

Table 3-9: Materials furnished with B/W Printer

Item	Description	Quantity	Note
1	Sony UP-D898 MD Printer	1	
2	Paper Roll	1	
3	USB cable	1	

- Color USB Printer

Table 3-10: Materials furnished with Color USB Printer

Item	Description	Quantity	Note
1	Sony UP-D25MD Printer	1	
2	Paper Roll	1	
3	AC Power Cord (local purchase)	1	
4	USB cable	1	

- USB Stick

Table 3-11: Materials furnished with USB Stick

Item	Description	Quantity	Note
1	USB Memory Stick	1	
2	Paper Roll	1	
3	USB cable	1	

3-8-2 Furnished materials(continued)

- USB 2.0 HDD

Table 3-12: Materials furnished with the USB 2.0 HDD

Item	Description	Quantity	Note
1	USB 2.0 HDD	1	
2	USB Cable	1	

- 3 Pedal Footswitch

Table 3-13: Materials furnished with the Footswitch

Item	Description	Quantity	Note
1	MKF 2-MED GP26 Footswitch	1	

3-8-3 Peripherals Installation Instructions

3-8-3-1 Sony UP-D25MD Printer Installation

3-8-3-1-1 Tools

No special tools needed.

3-8-3-1-2 Manpower

One person 5 min.

3-8-3-1-3 Preparations

1. Unpack the Sony UP-D25MD Printer.

3-8-3-1-4 Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable on the Printer.
3. Connect the power cord with the AC output in the wall outlet, then turn on the printer.
4. Connect USB cable to Vivid *iq* USB port.

Figure 3-3. Color Printer connection

3-8-3-2 UP-D898 MD Printer Installation

3-8-3-2-1 Tools

No special tools needed.

3-8-3-2-2 Manpower

One person 5 min.

3-8-3-2-3 Preparations

1. Unpack the UP-D898 MD Printer.

3-8-3-2-4 Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable on the Printer.
3. Connect the power cord with the AC output in the wall outlet, then turn on the printer.
4. Connect USB cable to Vivid *iq* USB port.

Figure 3-4. UP-D898 MD connection

3-8-3-3 Footswitch Installation

3-8-3-3-1 Tools

No special tools needed.

3-8-3-3-2 Manpower

One person 5 min.

3-8-3-3-3 Preparations

1. Unpack the Footswitch.
2. Ensure no physical damage.

3-8-3-3-4 Installation Procedure

1. Connect the Footswitch to the USB port on the Vivid *iq* system.

Figure 3-5. Connect Footswitch to the system

3-8-3-4 ECG

3-8-3-4-1 Tools

No special tools needed.

3-8-3-4-2 Manpower

One person 5 min.

3-8-3-4-3 Preparations

1. Unpack the ECG adapter cable.
2. Ensure no physical damage.

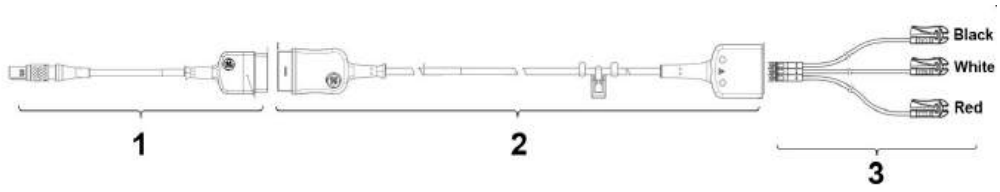
3-8-3-4-4 Installation Procedure without ECG Adapter Cable

1. Connect the ECG cable on the Vivid *iq* system.

Figure 3-6. Connect ECG to the system

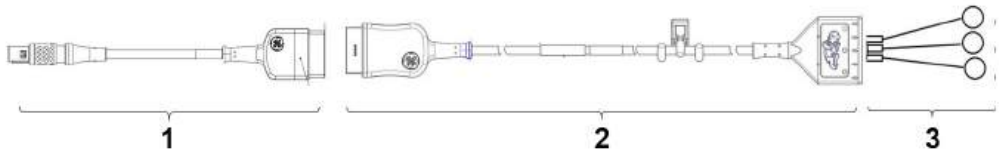
3-8-3-4-5Installation Procedure with ECG Adapter Cable

1. Connect the round connector of this ECG Adapter Cable to Vivid iq.
2. Connect the rectangular connector of this ECG Adapter Cable to Multi-Link 3-lead ECG Trunk cable.
3. Connect the leadwire set to the electrodes. Verify that the ECG signal appears on the ultrasound screen.



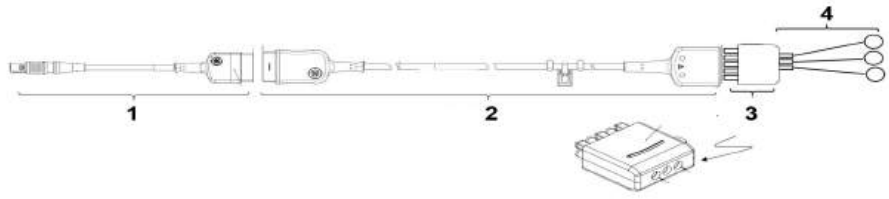
1. ECG Adapter Cable
2. ECG cable, adult
3. ECG lead set, adult

Figure 3-7. Adult Configuration



1. ECG Adapter Cable
2. ECG cable, neo
3. Lead electr, neo

Figure 3-8. Neonatal Configuration 1



1. ECG Adapter Cable
2. ECG cable, adult
3. Adapter, ECG 3-lead
4. Lead electr, neo

Figure 3-9. Neonatal Configuration 2

3-8-3-5 Ethernet protection cable

3-8-3-5-1 Tools

No special tools needed.

3-8-3-5-2 Manpower

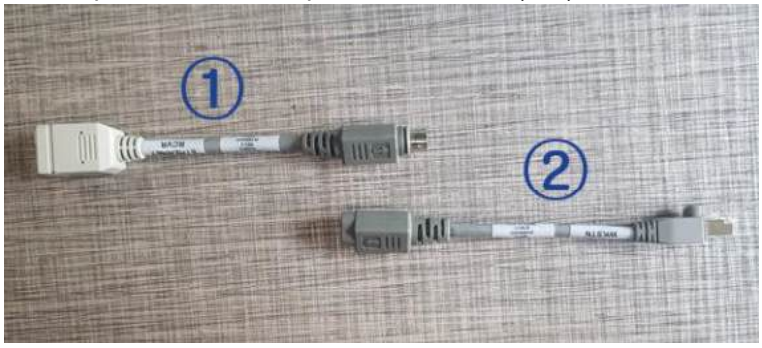
One person 5 min.

3-8-3-5-3 Preparations

1. Unpack the ethernet protection cable.

3-8-3-5-4 Installation Procedure for Ethernet protection cable

1. Prepare the Ethernet protection cables (two).



2. Combine two Ethernet cables.

   Green color: connect to Ethernet cable

   Red color: connect to Ethernet port of console

3-9 Software Options Configuration

3-9-1 Software Option Installation Procedure

NOTE: Not all features described in this section may be available or cleared for sale in all markets. Please contact with your local GE Ultrasound representative to get the latest information.

1. Power on the system.

NOTE: Keep the power cord connection during the installation.

2. After the power-up sequence is complete, press **Config** on the Shortcut Bar, and then select **Admin**.

WARNING

For Software Option Installation, the operator must login as Administrator.

3. In **System Admin** tab, select **New**.

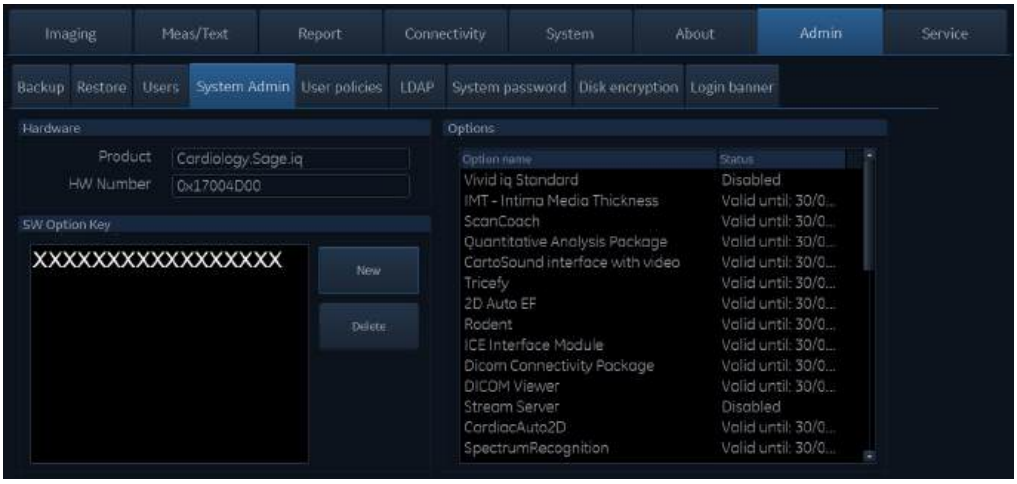


Figure 3-10. New Option Key

3-9-1 Software Option Installation Procedure(continued)

4. In the pop-up screen, input the new key and select **Save**.

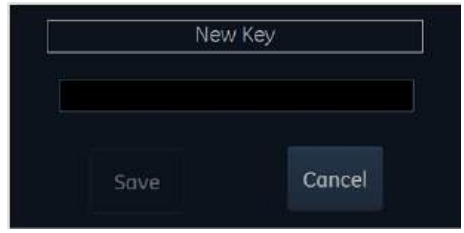


Figure 3-11. Dialog Window

NOTE: There is no need to restart the system after each installation, if several option keys are installed at one time. Select Cancel for the first several times, and select OK after the last installation to activate all the changes.

5. After the system is powered on, check the option status.

   The option status explanation:

   - Permanent: This option is enabled in the system.

6. Exit and check the function of the option installed.

3-10 Connectivity overview

3-10-1 Physical connection

There are several possible connection methods, as outlined below.

3-10-1-1 Stand-alone Vivid *iq*

No network connection needed.

3-10-1-2 “Sneaker Net” environment

No network connection needed.

Use removable media to move the data.

3-10-1-3 Wired Ethernet from Vivid *iq* to a workstation

Either of these situations may apply:

- Direct cable connection from Vivid *iq* to a workstation via a crossover cable.

  You will only need a crossover cable for the connection.

  a. Connect one end of the crossover cable to the network connector on the Vivid *iq*.

  a. Connect the other end to the network connector on the workstation.

- Connection via a Peer-to-Peer network.

  You will need a network hub and one crossover cable for each Ultrasound system / workstation.

- Connection via Hospital Network.

  You will need one crossover cable to connect the Vivid *iq* to a wall outlet on the hospital's network.

NOTE: You must use static IP addresses on all involved devices.

3-10-1-4 Connection from Vivid *iq* to a DICOM Server on a network

You will need on crossover cable.

1. Connect one end of the cable to the Ethernet connector on Vivid *iq*.
2. Connect the other end of the cable to the wall outlet.

NOTE: If a Peer-to-Peer network is connected to the hospital's network, you may connect the Vivid iq to the Peer-to-Peer network.

NOTE: You must use static IP addresses on all involved devices.

3-11 v206 Connectivity setup

3-11-1 Introduction

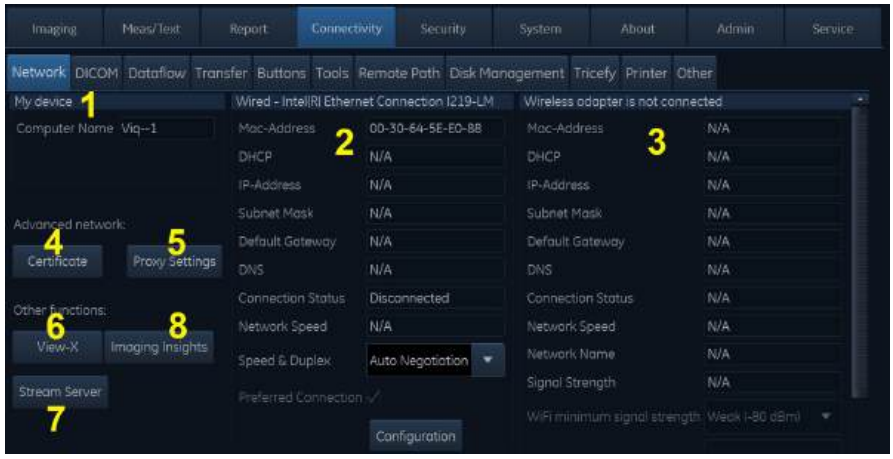
To be able to use the network functions when connected to a hospital network, the Vivid *iq* must have a proper network address.

- Before you can set up the Vivid *iq*, you need to collect some information.
- The Worksheet located near the end of Chapter 2 in this manual can be used for gathering this information (Refer to 2-3-8-5‘DICOM option setup requirements’ on *page 2-20*).
- The typical source for this information is the network administrator.

3-11-2 Contents in this Section

3-11-3 Network Screen

1. Press **Config** on the shortcut bar and login as **ADM**, refer to 4-2-6 ‘Logging on to Vivid iq as “ADM”’ on *page 4-12*.
2. Select **Connectivity** category and **Network** subgroup.
   The *Network* subgroup is displayed.



1. Section - **My Device**
   Computer name: is shown but not editable
2. Section - **Wired** network adapter. Fields are automatically populated from the network adapter settings. In order to change them, press the **Configuration** button of this area. Speed and Duplex can be selected on this page.
3. Section - **Wireless** network adapter. Fields are automatically populated from the network adapter settings. In order to changes them, press the **Configuration** button of this area.
   Note that both Wi-Fi minimal strength and strength warning can be selected on this page.
   Note that the **Preferred Connection** method (wired/wireless) can be selected by checking a box.
4. Certificate: Click this button to be able to enter certificates.
5. Proxy Settings: Configure network proxy settings.
6. View-X: Configure streaming source for View-X.
7. Streaming Server (Option): Configure streaming of live ultrasound image data.
8. Imaging Insights: Configure connection to the **Imaging Insights** server by providing device usage information.

Figure 3-12. Network subgroup

3. Select **Configuration** (in the Wired network section) to configure:
   - The IP address for the system
   - The subnet mask for the system
   - The IP address for the Default Gateway

   This is done at the Windows level.

NOTE: Save button is not needed since the setting now is saved automatically when user switches to another tab.

3-11-4 Certificate

3-11-4-1 How to import certificate

For DICOM TLS and Enterprise wireless configuration, certificate import is needed. User can import certificate as per the following procedures:

1. Press **Config** on the shortcut panel as ADM.
2. Go to **Connectivity -> Network** subgroup and click on the **Certificate** button.

   The **Cetificate Manager** window is displayed.

*NOTE: Certificate button is also accessible by **Security-> LDAP-> Certificate**.*

3. In the **Certificate Manager** window, select the folder where the certificate is to be imported to.
4. Click **Action**->**All Tasks**-> **Import...** from the drop-down menu.

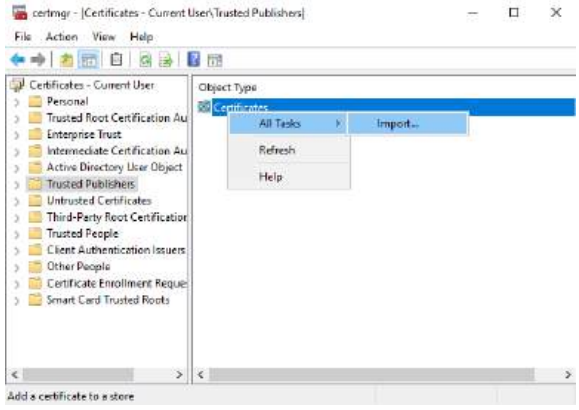


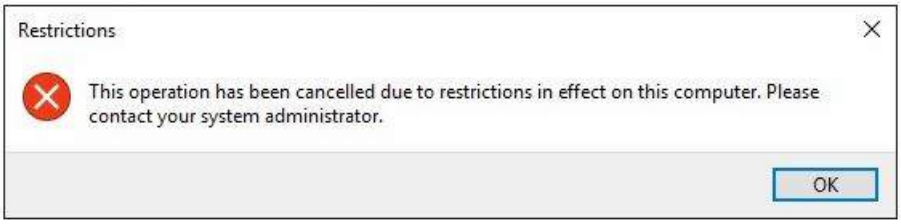
Figure 3-13. Import Certificate

3-11-4-1 How to import certificate(continued)

5. Press **'Next'** button on the pop-up welcome window.

Figure 3-14. Certificate Import Wizard

NOTE: If there is no dongle inserted, two warning boxes will appear, click "**OK**" to ignore them and continue importing; if a dongle is inserted, no warning boxes will appear.



3-11-4-1 How to import certificate(continued)

6. Press **Browse** to find the certificate file to import.

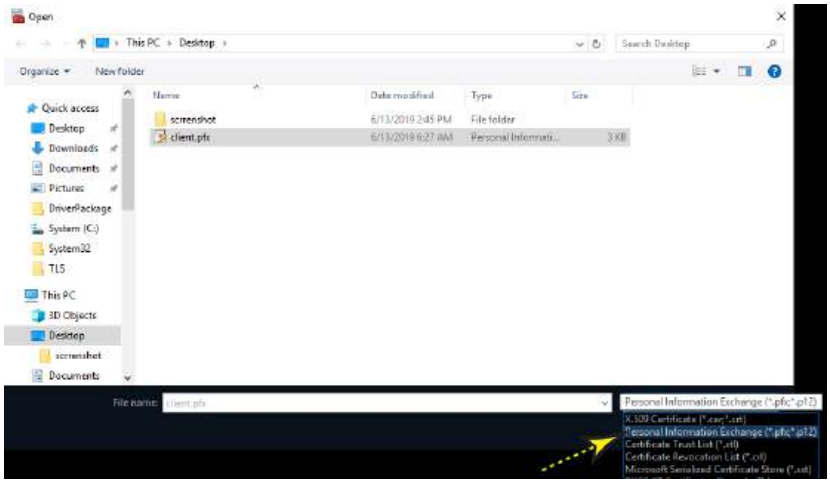


Figure 3-15. Import Certificate

NOTE: If importing a Client Certificate including a private key (e.g. in case of importing a certificate used for authenticating towards the DICOM server, the 'Provide Client Certificate' option) choose the certificate type from the list on the right of the 'File Name' box. Only the '.pfx' certificate is supported for Client certificates.*

7. Browse to the certificate file to import, select the file and press **'Next'** to confirm.

3-11-4-1 How to import certificate(continued)

8. (Optional) Enter the password and press the **'Next'** button to confirm the certificate import.

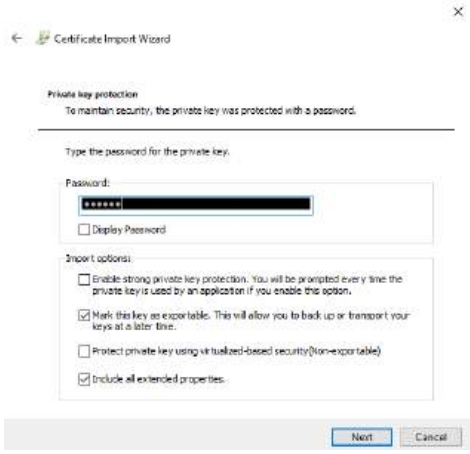


Figure 3-16. Import Options

9. Press the **'Next'** button to do the **Certificate Store**.

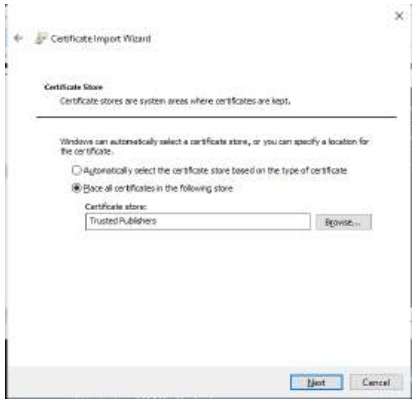


Figure 3-17. Certificate Store

3-11-4-1 How to import certificate(continued)

10. Press the **'Finish'** button.

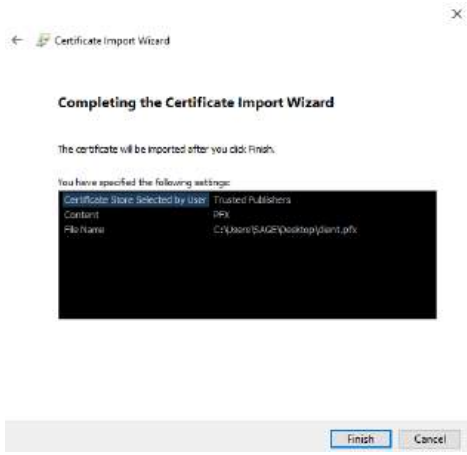


Figure 3-18. Completing the Certificate Import Wizard

11. A window is displayed to indicate the import was successful. Press **OK** to close the window.
12. Close the **Certificate Manager** window when finished.

3-11-4-2 How to delete certificate

1. Press **Config** on the shortcut panel as ADM.
2. Go to **Connectivity -> Network** subgroup and click on the **Certificate** button.

   The **Cetificate Manager** window is displayed.
3. In the **Certificate Manager** window select the certificate to delete.
4. Select the **Delete** from the **Action** drop-down menu to delete the certificate.
5. Press **Yes** to finally delete the certificate or **No** to keep it.

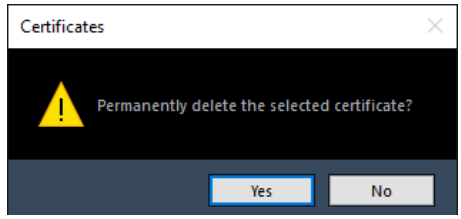


Figure 3-19. Delete the Certificate

3-11-4-3 How to select certificate

1. Press **Config** on the shortcut panel as administrator.
2. Select **Connectivity** category and the **DICOM** subgroup.
3. The **DICOM** sub group is displayed.

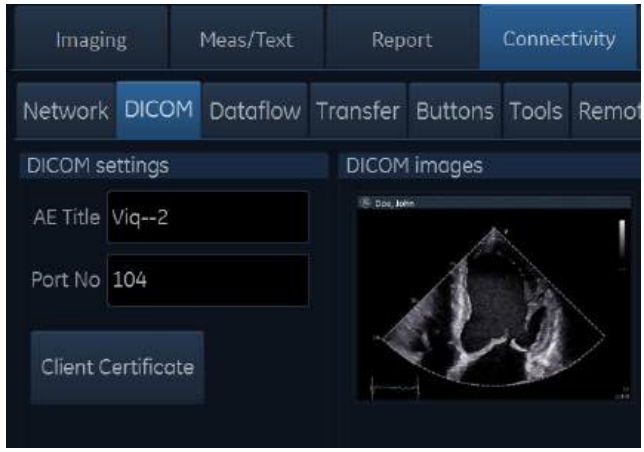


Figure 3-20. DICOM Subgroup

4. Click on the **Client Certificates**.
   The **Select Client Certificate** window is displayed.

3-11-4-3 How to select certificate(continued)

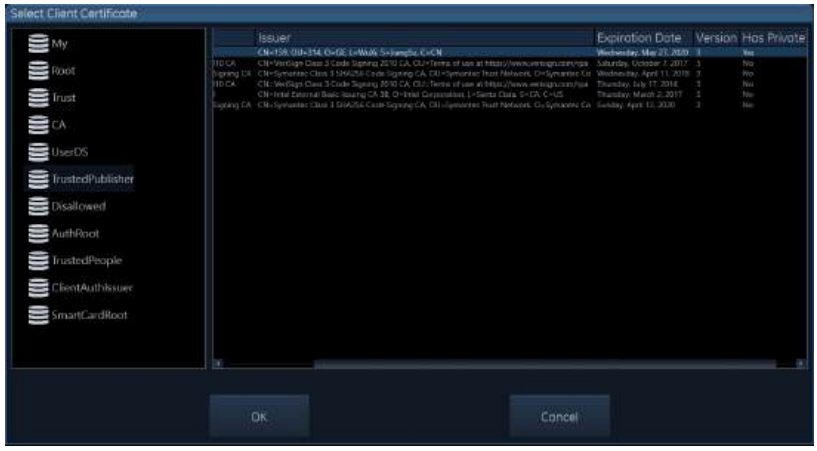


Figure 3-21. Select Client Certificate

NOTE: Only the certificate with a private key can be selected.

5. Select a folder and a certificate.
6. Press **OK** and the certificated is selected as the client certificate to use.

3-11-5 Network Proxy Settings

3-11-5-1 How to setup Network Proxy Settings

Press the **Proxy Settings** button on the **Connectivity > Network** configuration screen to show Network Proxy Settings dialog.

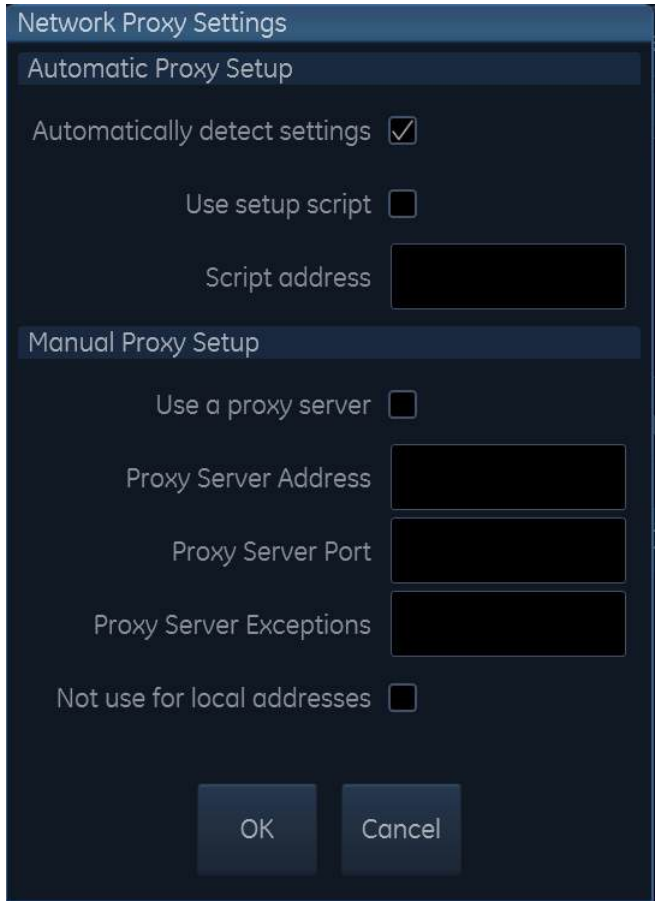


Figure 3-22. Network Proxy Settings window

3-11-5-2 Automatic Proxy Setup

Enable the *Automatically detect settings* option to use Web Proxy Auto-Discovery Protocol (WPAD) for detecting proxy settings. If the connected network requires a proxy and it provides that proxy via WPAD, the proxy will be automatically configured and used.

Enable the *User setup script* option and insert the network address of the script into the Script address box to setup script for your proxy configuration. This script may also be referred to as a .PAC file.

3-11-5-3 Manual proxy setup

Enable the *Use a proxy server* option to manually configure the proxy server. The manual configuration of a proxy requires you to have a specific IP address and port for the server that you want to use. This information should be entered in the *Proxy Server Address* and *Proxy Server Port* fields.

For addresses you do not want the system to use the proxy server on, enter web or IP addresses separated with a semicolon (;) in the *Proxy Server Exceptions* field.

Enable the *Not use for local addresses* option to bypass the proxy server when you connect to resources on your local network or intranet.

Click **OK** to save and apply network proxy settings or click **Cancel** to ignore the recent changes.

3-11-6 View-X

View-X is an option that enables streaming from an external video signal in a dedicated window on the system. The video signal is received by means of multimedia streaming over the IP network and without audio. For instructions to connect and set up View-X, consult the documentation for the device itself and the Service Manual.

Video streaming setup is described in 3-11-6-1 ‘Network Configuration for View-X’ on *page 3-50*.

In Side Bar, there is a Show View-X button to control the On/Off of streaming window. When toggled On a dedicated window showing the streamed video appears in the lower right corner by default.

NOTE: Network connection quality may impact streaming quality. Under ideal networking conditions a delay of approx. 1 sec will still persist.

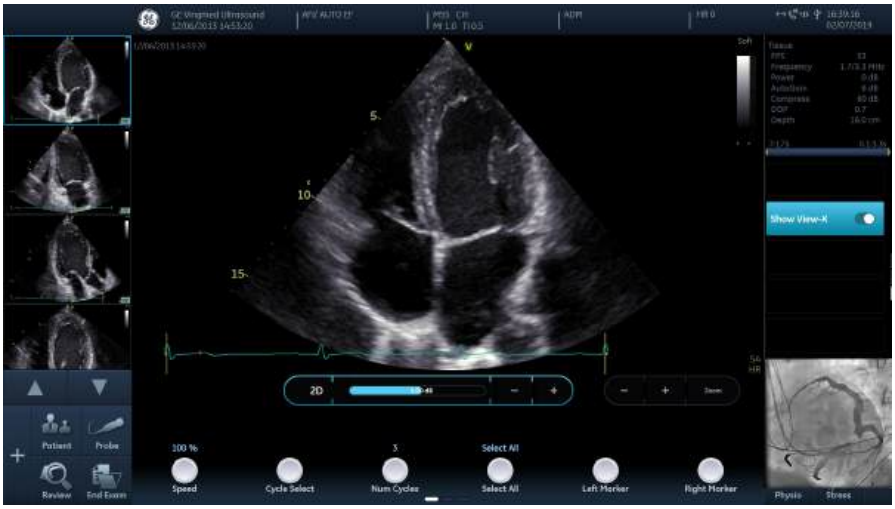


Figure 3-23. Scanning window with View-X on.

3-11-6-1 Network Configuration for View-X

Streaming source and client configuration is set through the **View-X** settings:

1. Press **Config** on the shortcut bar and log on as administrator if required.
2. Select the **Connectivity** category and the **Network** subgroup.
3. Select **View-X** (Figure 3-24).

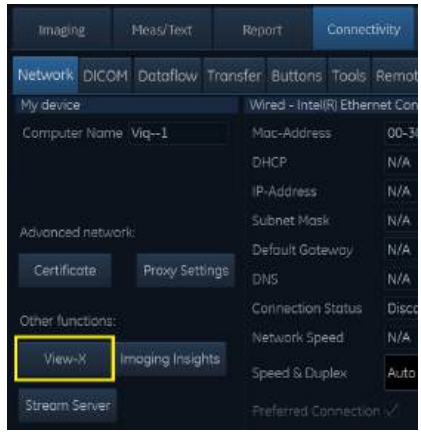


Figure 3-24. Video Streaming under network configuration.

4. Configure the *View-X* server and client as necessary.

3-11-6-1 Network Configuration for View-X(continued)

Figure 3-25. View-X Video streaming setup

3-11-7 View-X Direct

3-11-7-1 Activating View-X Direct

The View-X Direct button is available on the top right tray menu when Direct Connection is enabled in Config (default=enabled). See 3-11-7-3 ‘Enable Direct Connection’ on *page 3-54* for information related to Direct Connection, if needed.

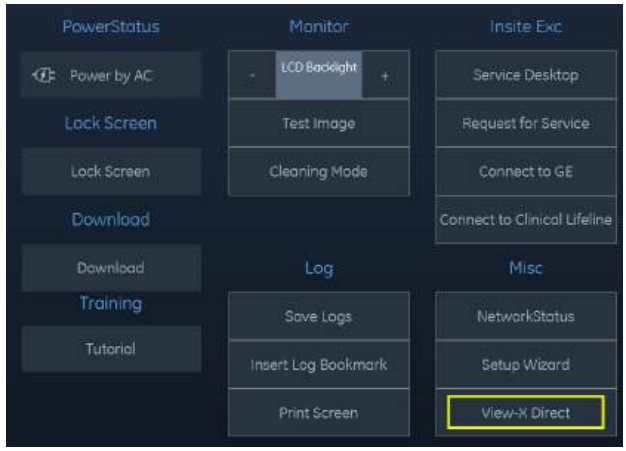


Figure 3-26. View-X Direct button on the Tray Menu

3-11-7-2 Typical Use Scenario

Prepare for examination:

- If needed, load worklist using the worklist dataflow while connected to the hospital network. It will still be available offline. Pull up the patient from Local Archive.
- If not using a network, start the exam with Patient name/ID in Local Archive. Connect to the Epiphan DVI Broadcaster:

1. Connect the Epiphan DVI Broadcaster to the ultrasound system with the crossover network cable.
2. Open the Utility tab and click View-X Direct to toggle on. This activates the IP addresses that allow the Epiphan DVI Broadcaster and the ultrasound system to communicate.
3. Complete the study.
4. Click View-X Direct to toggle off the setting.
5. To transfer the study, connect back to the hospital network and transfer the study/exam/patient from Local Archive as needed.

NOTE: The Epiphan DVI Broadcaster static IP address is 192.168.255.250 and the ultrasound system's underlying static IP address when View-X Direct is enabled is 192.168.255.249. These addresses cannot be changed while View-X Direct is active. When View-X Direct is not active, the system reverts to default TCP/IP settings.

3-11-7-3 Enable Direct Connection

Follow these sections to select the Direct Connection to the Epiphan DVI Broadcaster for video streaming.

1. Ensure that the network cable from the Epiphan DVI Broadcaster is connected to the ultrasound system, and that the Epiphan DVI Broadcaster is switched on.
2. On the ultrasound system, enter: **Config** > **Connectivity** > **Network** and activate **View-X**. The *View-X* dialog opens.

Figure 3-27. The Video Streaming dialog

3. Click the **Direct Connection** check box to activate direct connection to the Epiphan DVI Broadcaster.

3-11-7-3 Enable Direct Connection(continued)

Figure 3-28. Activate Direct Connection

Selecting *Direct Connection* enables the **View-X Direct** button on the Utility page which will set the ultrasound system to a static IP so it can connect to the factory default static IP on the Epiphan DVI Broadcaster.

4. Select **OK** to exit.
5. Log out of the ultrasound system.

3-11-8 Imaging Insights

Imaging Insights automatically collects DICOM data from GE and other vendors' ultrasound equipment or equipment fleet and displays system utilization and operator usage insights in a plotted dashboard. Operational insights include exam volumes, first and last exam time, probes utilization, exam type; operator usage data includes length of exam, scan mode, probes, and exam type. It helps optimize system and probe fleet investment plans, identify staff assignment and training needs, and monitor variability of staff usage patterns.

1. Press **Config** and log on as administrator.
2. Select the **Connectivity** category and the **Network** subgroup.

   The *Network* sheet is displayed.
3. Press **Imaging Insights** button and a window will pop up.

Figure 3-29. Imaging Insights button

3-11-8 Imaging Insights(continued)

4. Configure the server information from the pop-up window and then click **Check**.

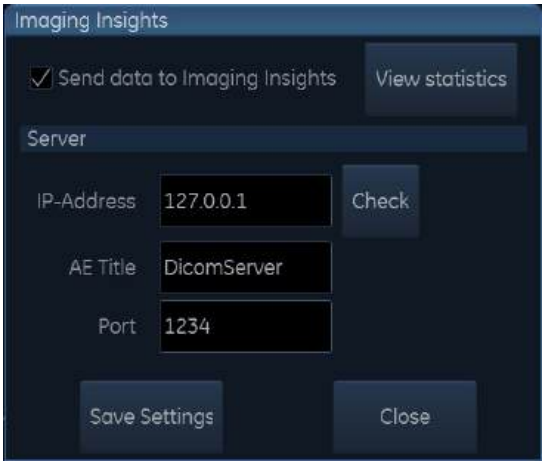


Figure 3-30. Server Configuration

- If the network connection to the server is OK, it will be illustrated by the “Pass“ sign, a green check mark .
  The “Fail“ sign indicates that the network connection is failing.
  Typical causes:
  - Network cable not connected
  - Configuration error(s)

5. Check **Send data to Imaging Insights** check box, then the data of this scanner will be sent to the Imaging Insights server.

*NOTE: If the doctor is doing the exam with patient information created, the data will be sent to server immediately when click **End Exam**: If the doctor is doing emergency scanning without creating patient information, the data will be sent to the server every two hours before system shutdown.*

*NOTE: User can press **View statistics** button to check whether the data is sent successfully or not.*

3-11-9 Data Streaming

*NOTE: The **StreamServer** option key should be installed to enable streaming live ultrasound data.*

NOTE: Only sector and TEE probes are supported for streaming live ultrasound data.

The system has the capability to stream live ultrasound image data (both 2D and 3D) over the network connection to enabled devices. To configure this capability perform the following steps:

3-11-9-1 Enable data streaming

1. Press **Config…** on the shortcut bar.
2. Select the tab **Connectivity**, then **Network.**
3. Press the **StreamSever** button.
4. Check **Enable Streaming** on the **Data Streaming Settings** dialog
5. Enter stream server **Port No.** (or use the default port).

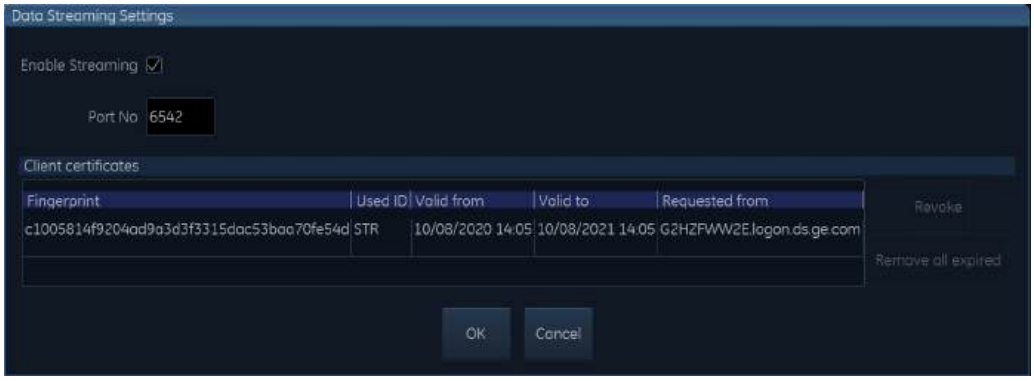


Figure 3-31. Data Streaming Settings

3-11-9-2 User setup for data streaming

Only a member of the group “ConsultingPhys” will have permission to receive streamed data.

See example of users who can receive streaming data below.

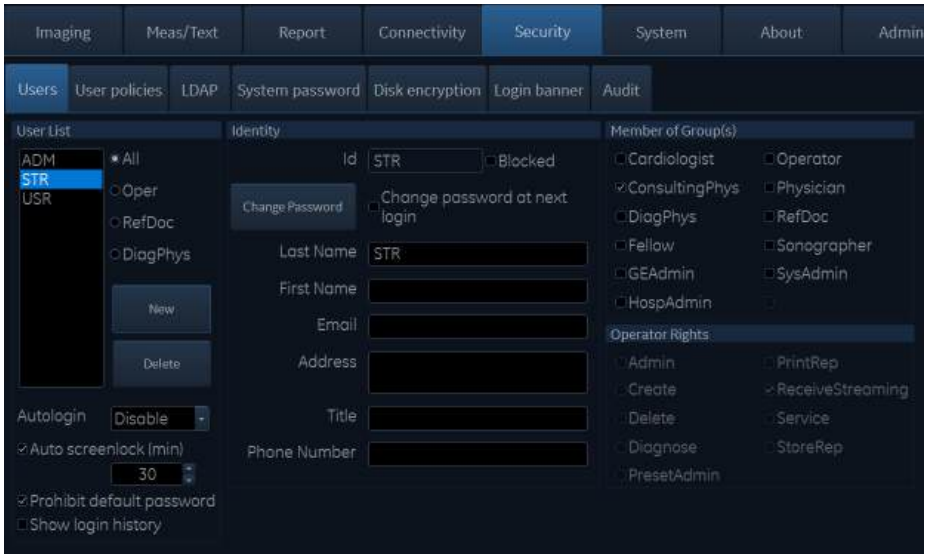


Figure 3-32. User setup for data streaming

If LDAP authentication is enabled, at least one of the LDAP groups that the user belongs to must be mapped to the group “ConsultingPhys” in order to allow the user to receive streamimg data.

3-11-9-2 User setup for data streaming(continued)

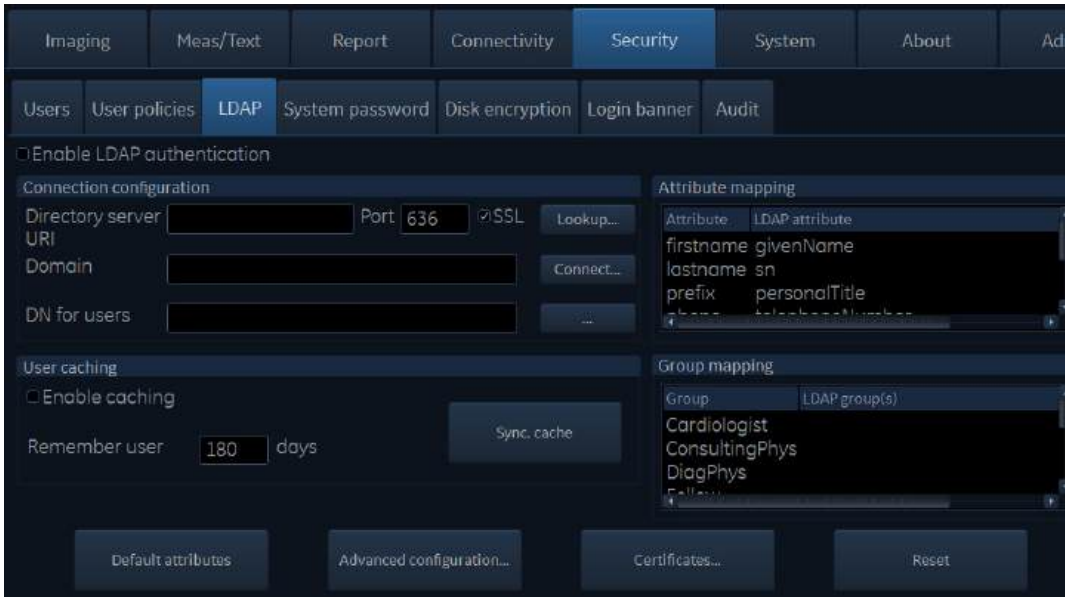


Figure 3-33. LDAP configuration

3-11-9-3 Authentication

Before an enabled device can receive streamed live ultrasound data, authentication is required to start. The user will be authenticated using both username/password and a PIN code generated by the system upon first connected. Subsequent connections will use a certificate generated after the first successful connection. The client will be asked to enter a PIN code if the client application has no valid client certificate. The system shows a dialog window with the PIN code (Figure 3-34).

After entering correct PIN code, client certificate will be issued and sent to client application automatically. The next attempts of connection do not require entering PIN code as long as the certificate is valid.

NOTE: The certificate will automatically expire after one year.

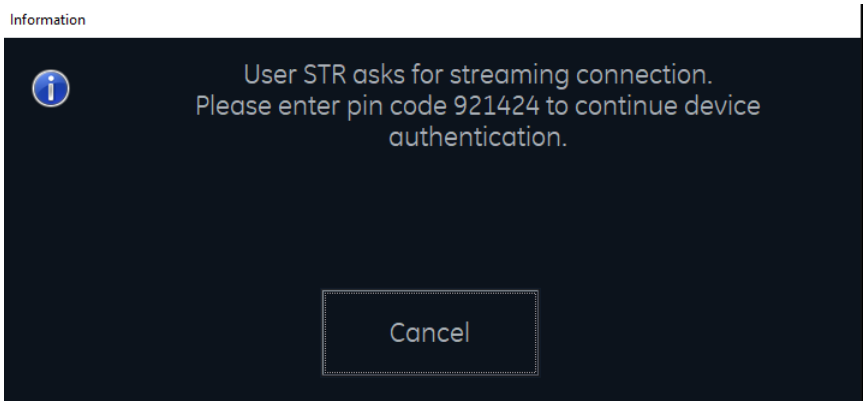


Figure 3-34. PIN code window

*NOTE: Operator can refuse streaming data by pressing **Cancel** button.*

3-11-9-4 Revoke Client certificate

All issued client certificates are listed in the *Data Streaming Settings* dialog. See 3-11-9-1 ‘Enable data streaming’ on *page 3-58*.

To revoke a client certificate:

1. Select a client certificate
2. Press **Revoke**

NOTE: At the next attempt to connect, this client will be asked for authentication again.

Press **Remove all expired** to clear the list of client certificates.

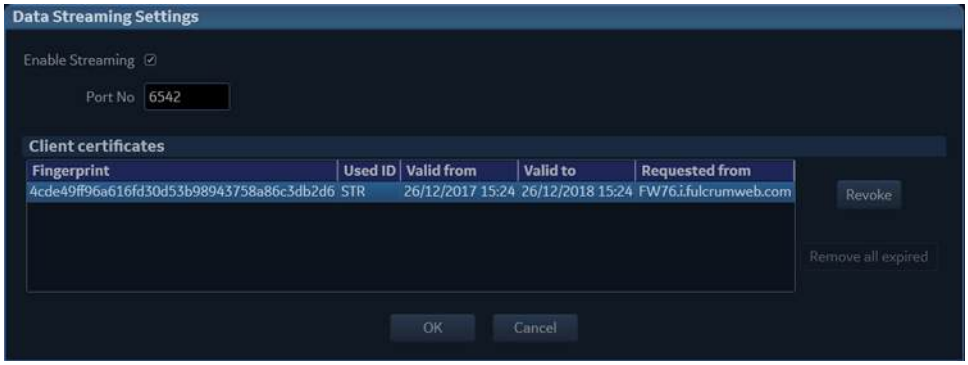


Figure 3-35. Client certificate example

3-11-10 Network Configuration

3-11-10-1 Wired Configuration Set-up

1. Connect system with network.
2. Select **Config**-> **Connectivity**-> **Network**-> **Configuration**.

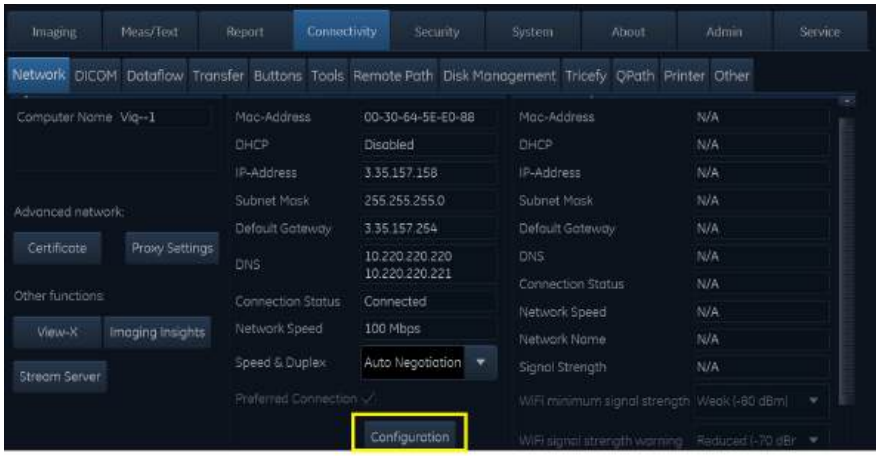


Figure 3-36. Network Settings

3-11-10-1 Wired Configuration Set-up(continued)

3. Select **Ethernet**.

Figure 3-37. Network Conection

4. Select **Properties** in the Local Area Connection Status window.

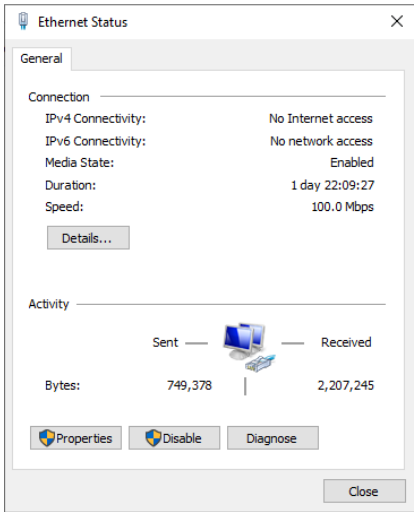


Figure 3-38. Connection Status

3-11-10-1 Wired Configuration Set-up(continued)

5. Select **Internet Protocol (TCP/IP)** from the terms, and then select **Properties**.

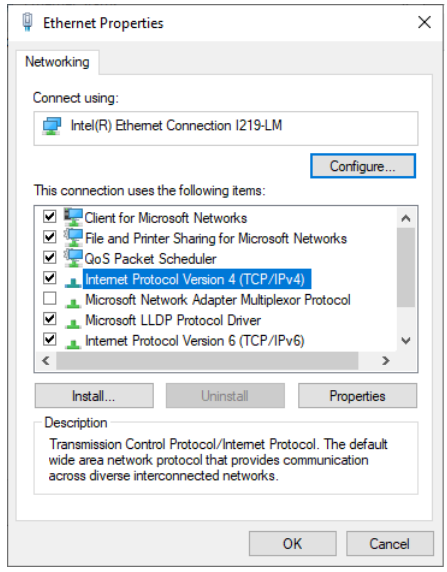


Figure 3-39. TCP/IP Protocol

3-11-10-1 Wired Configuration Set-up(continued)

6. Select **Obtain an IP address automatically** and **Obtain DNS server address automatically**, and then select **OK**.

*NOTE: If user wants to setup static IP address, input static address in **IP-Address box**, **Subnet Mask** and **Default Gateway box**.*

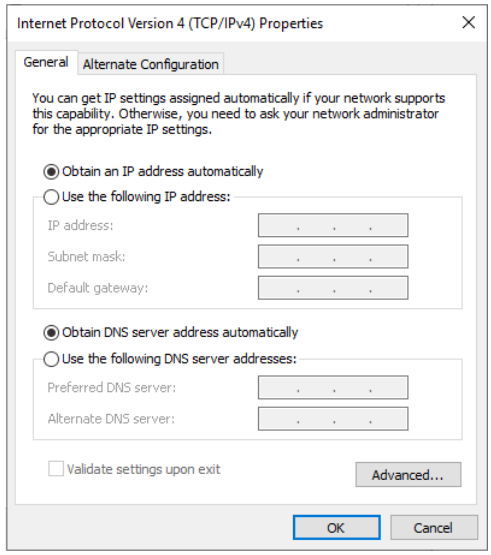


Figure 3-40. IP Address

7. The network icon at the bottom of the the screen displays as connected.

3-11-10-2 Wireless-LAN Network

The following procedure is used to configure the Ultrasound System for a wireless network environment. This procedure is required for every new wireless network.

NOTE: Do not use any type of wireless network adaptor other than a GE-approved adaptor.

3-11-10-2-1 Wireless protocols on Vivid *iq* Ultrasound Sysem

The following wireless protocols are supported:

- IEEE 802.11a
- IEEE 802.11b
- IEEE 802.11g
- IEEE 802.11n
- IEEE 802.11ac

The following security protocols are supported on the wireless interface:

- No authentification (Open)
- WPA2-Personal
- WPA-Personal
- WPA2-Enterprise
- WPA-Enterprise
- 802.1X

3-11-10-2-2 Configuring the Wireless Network Adaptor

Follow this procedure to configure the Wireless Network Adaptor:

1. Press **Config** and log on as **ADM**.
2. Select **Connectivity**.
3. Select the **Network** tab.
4. Click the **Configuration** button (see Figure 3-41).

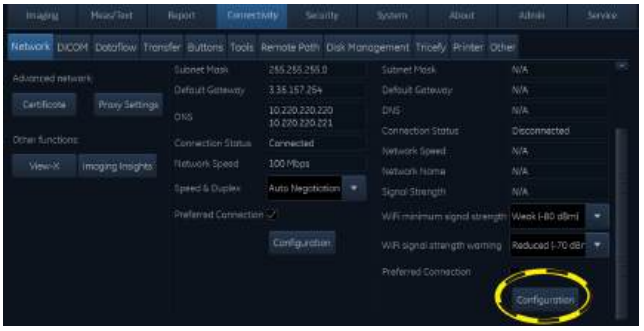


Figure 3-41. Connectivity - Network Tab

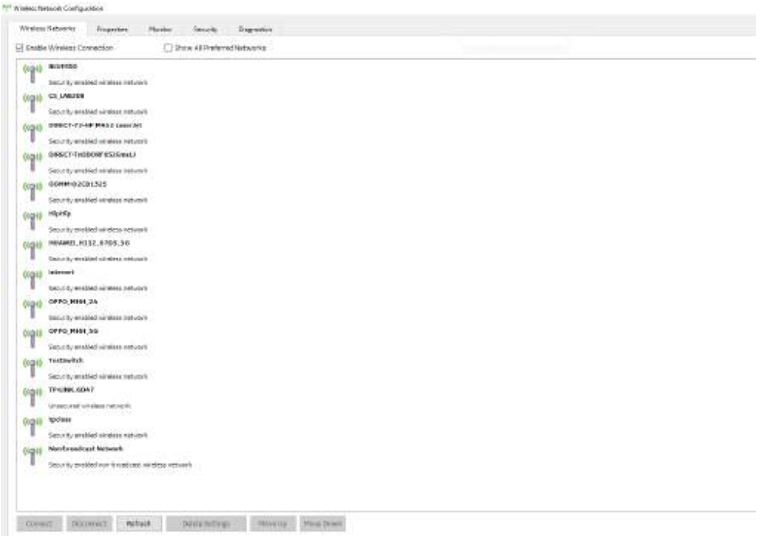


Figure 3-42. Wireless Settings Main Screen

3-11-10-2 Wireless-LAN Network(continued)

NOTE: If a wireless network adapter is not connected, or if the connected wireless network adapter is not the correct model, no wireless networks will be listed in the Wireless Settings page.

5. Either double-click or select the network you want to connect to, and press the **Connect** button.

   If this is the first time you attempt to connect to the network, a dialog will pop up on screen asking you to configure the network setting.

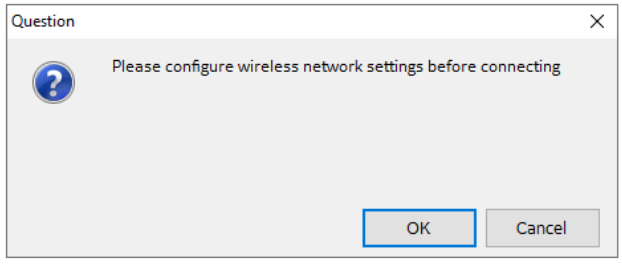


Figure 3-43. First Time Connection Dialog

6. Press **OK** in the dialog window. A new window for setting up your connection will open.

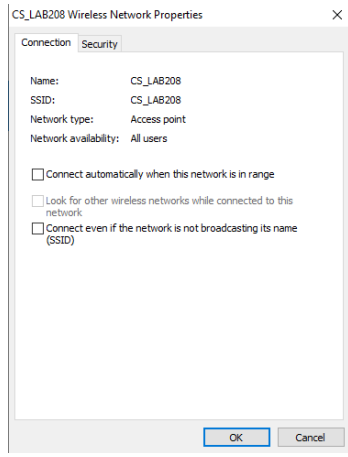


Figure 3-44. Network Settings Window - Connection

3-11-10-2 Wireless-LAN Network(continued)

7. Select check-boxes according to preference.

   If **Connect automatically when this network is in range** setting is selected, then this network will auto-connect when available, without needing to enter the **Wireless Settings** page.

8. Set up security options in the Security tab of connection setup dialog.

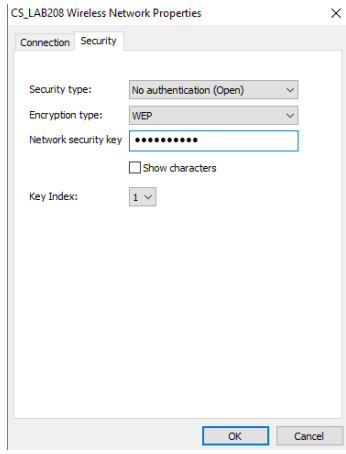


Figure 3-45. Network Settings Window - Security

3-11-10-2 Wireless-LAN Network(continued)

9. If the wireless network is to be configured for WPA/WPA2 Enterprise and a customer specific certificate is to be installed on the system, this can be done by use of the certificate dialog available from the **LDAP** config page.
   a. First go to **LDAP** config,

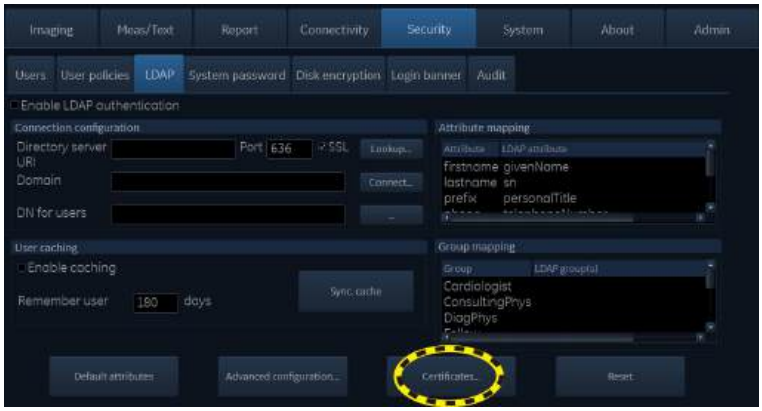


Figure 3-46. LDAP Config Screen

   b. Then click on the Certificates... button to open the Certificate dialog,

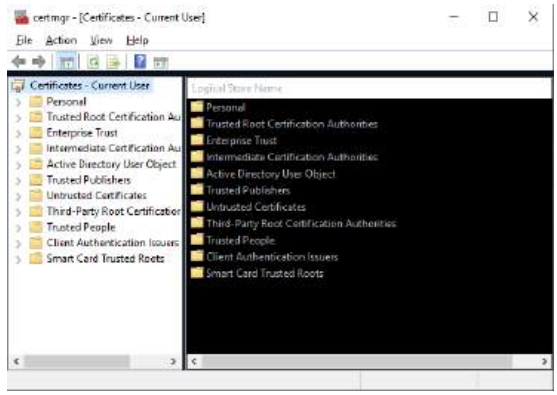


Figure 3-47. Certificate Dialog

3-11-10-2 Wireless-LAN Network(continued)

10. After you have finished setting up your connection press **OK**. The ultrasound system will then try to establish a connection to your network. A dialog will be shown on screen while this is in progress.

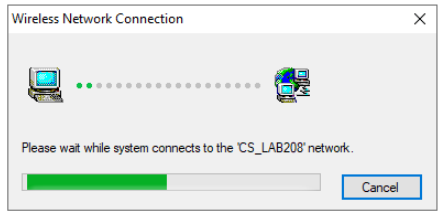


Figure 3-48. Connecting to Network Dialog

11. Once a connection has been established you will see the status **Connected** in the **Wireless Settings** page, next to the network you have connected to.

    All network connections that are configured will also be displayed with a star icon.

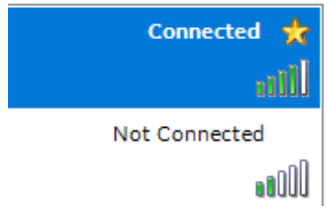


Figure 3-49. Connection Established

NOTE: The system is now connected to the desired Wireless Network. In future, as long as the same Wireless Network is available, connection will be automatic.

NOTE: Whenever connection to a new/different Wireless Network is required, it will be necessary to repeat all steps above.

3-11-11 DICOM

3-11-11-1 DICOM images

To configure DICOM images:

1. Press **Config** on the Touch panel and log on as **ADM**.
2. Select the **Connectivity** category and **DICOM** subgroup. The *DICOM* sheet is displayed.

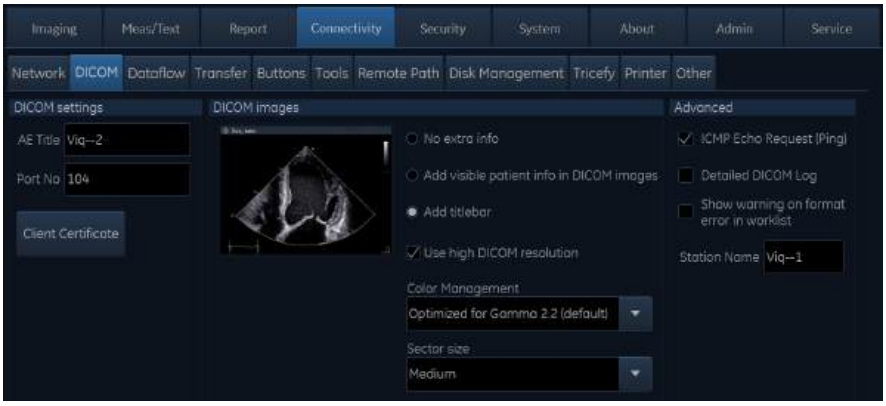


Figure 3-50. The DICOM sheet

From DICOM images the user can select between:

- **No extra info**
- **Add visible patient info in the DICOM images:** displays patient information (name, date of birth and ID) on DICOM images.
- **Add title bar:** adds the Title bar to the DICOM images. Must be enabled in order for images from the 4D Auto AVQ tool to contain traces, bullseye, 3D model and measurements as part of the stored DICOM Multiframe/Singleframe files when using a dataflow with RAW data disabled.

3-11-11-1 DICOM images(continued)

When **Use high DICOM resolution** is enabled, DICOM images are stored using a higher pixel density. Use this setting when exporting to systems accessed by high definition DICOM viewing stations.

NOTE: Using high DICOM resolution will double the file size of the DICOM data when using standard compression settings. Such files will consume more disk space and also slow down storage, recall and transfer of files.

Color management provides a selection of gamma settings for optimized representation of the Vivid images on DICOM workstations.

Sector size offers three different sizes of the 2D sector for viewing on DICOM work stations.

3-11-11-2 Changing the AE title and/or Port Number

1. Press **Config** on the shortcut bar and login as **ADM.**
2. Select **Connectivity** and **DICOM** tab.
3. Assign an **AE Title** to the Vivid *iq*. (AE stands for Application Entity. DICOM services use this to identify the Vivid *iq*.) AE Title is case-sensitive. This title may contain the Computer Name from the Network page, if desired. Maximum number of characters in AE Title is 16 characters.)

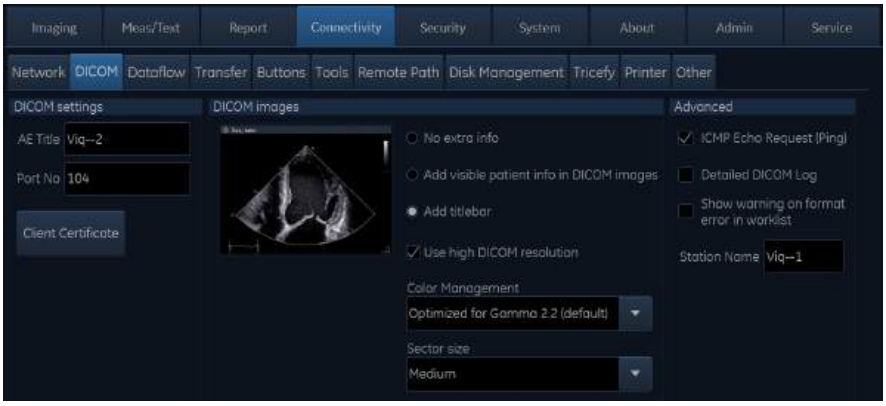


Figure 3-51. AE Title/Port No

4. If needed, edit the **Port Number**. '**104**' is typical.
5. To generate a detailed DICOM log file, select **Detailed DICOM Log**.
6. Save your changes and reboot the Vivid *iq*.

3-11-11-3 Set Server Settings

To be able to connect to a remote archive on a remote computer or server, you must configure Vivid iq to communicate with it.

The configuration is done by pressing **Servers** button in **Dataflow** tab.

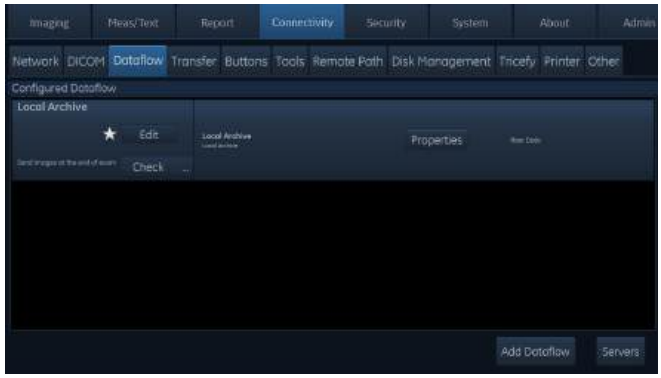


Figure 3-52. The Dataflow tab

3-11-11-3-1 To Add a Server in the Server Config List

Follow this procedure to add a server in the list:

1. Select **Add**.

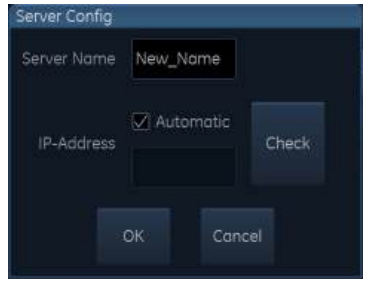


Figure 3-53. Server Config

2. Add the server's name in the *Server Name* field.
3. Add the server's IP address in the *IP-Address* field.
4. Select **Check** to verify that the server is found.

This check is a network Ping. A symbol to the right for the Check button indicates the result:

- A green check mark next to the Check button indicates that the IP-Address is found on the network.
- A red check mark indicates that the IP-Address can't be found.

Possible reasons:

- No network connection between the ultrasound system and the server.
- The wrong IP address.

3-11-11-3-2 To Modify the Setup for a Server in the List

NOTE: Both the pre-defined servers and new servers can be modified.

Follow this procedure to modify the setup for a server in the list:

1. Highlight the server you want to modify.
2. Select **Modify**.
3. Update the information as needed.
4. Select **Check** to verify that the server is found.

   This check is a network Ping. A symbol to the right for the Check button indicates the result:

   - A green check mark  next to the Check button indicates that the IP-Address is found on the network.
   - A red check mark  indicates that the IP-Address can't be found.

   Possible reasons:

   - No network connection between the ultrasound system and the server.
   - The wrong IP address.
5. Select **OK** to confirm your new settings, or **Cancel** to leave without doing any changes.

3-11-11-3-3 To Delete a Server from the List

Follow these steps to delete a server from the list:

1. Highlight the server you want to delete from the list.

NOTE: You can only delete extra servers. The predefined servers (listed on-screen) can be modified, but not deleted.

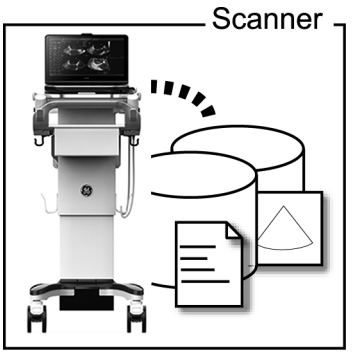
2. Select **Remove**.

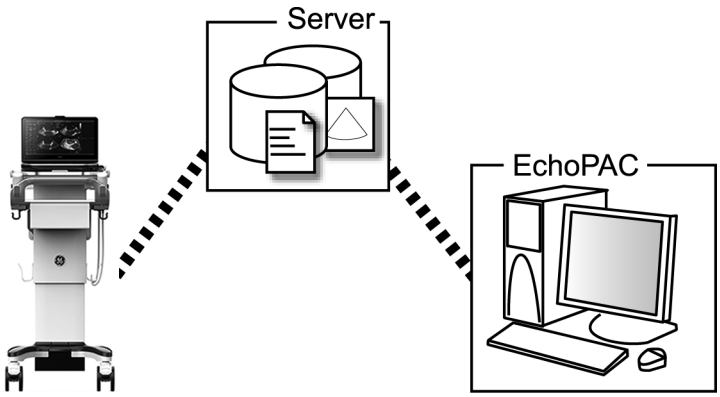
3-11-12 Dataflow

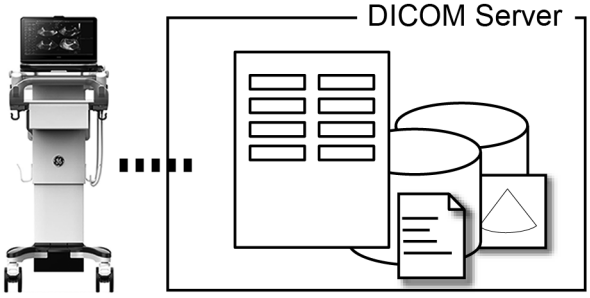
3-11-12-1 The dataflow concept

Communication between the Vivid *iq* ultrasound unit and other information providers on the network takes the form of dataflows. Selecting a dataflow will automatically customize the ultrasound unit to work according to the services associated with this dataflow. Each dataflow defines the location and format of patient information. Patient information can include demographic data and images, as well as reports, measurement and analysis data. By utilizing dataflows, the user can configure the Vivid *iq* ultrasound unit to optimally meet the connectivity needs of the facility, while keeping the user interface unchanged. The dataflow concept allows the flexibility of data to be obtained from various sources and allows data to flow to various output sources.

3-11-12-1-1 Dataflow examples

<table>
<tr><th colspan="2">Stand-alone scanner</th></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td>Acquisition:
Scanner dataflow: LocalArchive-Int.HD</td><td>Review:
Scanner dataflow: LocalArchive-Int.HD</td></tr>
<tr><td colspan="2">The local database is used for patient archiving. Images are stored to internal harddrive.</td></tr>
</table>

Scanner and Workstation in a network environment	
	
Acquisition: Scanner dataflow: **RemoteArch-Remote HD**	Review: Workstation dataflow: **RemoteArch-Remote HD**
In this scenario the Vivid *iq* is configured to work with an ImageVault patient demographics and image server in a network environment. Images are first saved on the local image buffer on the scanner and transferred to the server when saving the examination.	

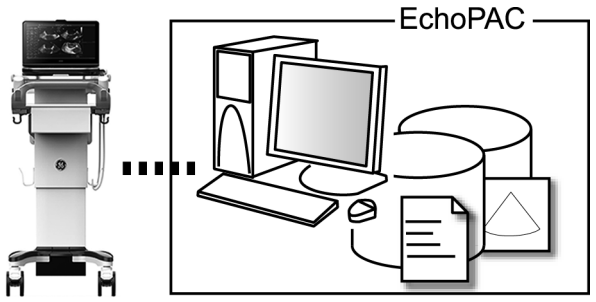
Scanner and DICOM server in a Network


Scanner and DICOM server in a Network

Scanner DICOM dataflows:

- **DICOM server**: images are stored to a DICOM server.
- **Local Archive - Int HD/DICOM Server**: the local archive is used for patient archiving. Images are stored to the internal harddrive and to a DICOM server.
- **Remote Archive - Remote HD/DICOM Server**: a remote database is used for patient archiving. Images are stored to a network image volume and to a DICOM server.
- **Worklist/Local Archive - DICOM Server/Int HD**: search in a DICOM Modality Worklist, the patient found is copied into local database. The patient information and the examination results are stored to the local database. Images are stored to a DICOM server and to an image volume on the local harddrive.
- **Worklist/Remote Archive - DICOM Server/Remote HD**: search in a DICOM Modality Worklist, the patient found is copied into a remote database. The patient information and the examination results are stored to a remote database. Images are stored to a DICOM server and to an image network volume.
- **DICOM Query/Retrieve**: retrieve images from a DICOM server based on query parameters.
- **Worklist/DICOM Query Retrieve - DICOM Server**: search in a DICOM Modality Worklist and retrieve images from a DICOM server based on query parameters. Images are stored to a DICOM server.
- **DICOM Query Retrieve - DICOM Server**: retrieve images from a DICOM server based on query parameters. Images are stored to a DICOM server.

Scanner and EchoPAC Software Only in a direct connect environment



Acquisition:	Review:
Scanner dataflow: **RemoteArch-Remote HD**	Workstation dataflow: **LocalArchive-Int.HD Share**

In this scenario the data is transferred from the Vivid *iq* to a dedicated EchoPAC Software Only workstation over the Ethernet (either in a peer-to-peer connection with a crossover cable, or in a network). The database from the EchoPAC Software Only is used as the master and images are stored directly to the EchoPAC Software Only internal harddrive. In this configuration the scanner is just an intermediate acquisition unit which after completion of a study, will not contain any patient information, measurements or images.
Up to three scanners can be connected to one EchoPAC Software Only if the workstation has the EchoPAC Share option enabled.

3-11-12-2 Dataflows available

A set of pre-defined dataflows is available on the unit as listed in the table below.

NOTE: Not all dataflow listed below are visible by default.

NOTE: The list of dataflow available is configurable.

Dataflow	Description
LocalArchive	The local database is used for patient archiving. Images are stored to internal harddrive.
LocalArchive / DICOM Server	The local archive is used for patient archiving. Images are stored to the internal hard drive and to a DICOM server. Some of the measurements are stored if DICOM SR is turned on.
EchoPAC Archive / DICOM Storage **Image Vault Archive / DICOM Storage**	A remote database (either on EchoPAC Software Only or a server) is used for patient archiving. Images are stored to a network image volume (either internal HD on EchoPAC Software Only or a server).
EchoPAC Archive / DICOM Storage	A remote database is used for patient archiving. Images are stored to a network image volume and to a DICOM server. Some of the measurements are stored if DICOM SR is turned on.
Worklist / LocalArchive / DICOM Storage	Search in a DICOM Modality Worklist, the patient found is copied into local database. The patient information and the examination results are stored to the local database. Images are stored to a DICOM server and to an image volume on the local harddrive. Some of the measurements are stored if DICOM SR is turned on.
Worklist / LocalArchive / DICOM Storage **Worklist / Image Vault Archive / DICOM Storage**	Search in a DICOM Modality Worklist, the patient found is copied into a remote database. The patient information and the examination results are stored to a remote database. Images are stored to a DICOM server and to an image network volume. Some of the measurements are stored if DICOM SR is turned on.
Worklist / Local Archive	Search in a DICOM Modality Worklist, the patient found is copied into the local database. The patient information and the examination results are stored to the local database. Images are stored to an image volume on the local harddrive.

Dataflow	Description
Worklist / Image Vault Archive	Search in a DICOM Modality Worklist, the patient found is copied into a remote database. The patient information and the examination results are stored to a remote database. Images are stored to an image network volume.
DICOM DVD Read only	Read DICOM images from the CD/DVD-drive. Read only dataflow, no data can be stored.
DICOM Storage	Store pure DICOM images to a DICOM device. Raw data may also be saved depending on the dataflow configuration. Some of the measurements are stored if DICOM SR is turned on.
DICOM Query Retrieve	Retrieve images from a DICOM server based on query parameters.
Worklist - DICOM Storage	Search in the DICOM Modality Worklist. Images are stored to a DICOM Server. Some of the measurements are stored if DICOM SR is turned on.
DICOM Query Retrieve / DICOM Storage	Retrieve images from a DICOM server based on query parameters. Images are stored to a DICOM server. Some of the measurements are stored if DICOM SR is turned on.
Worklist/DICOM Query Retrieve - DICOM Storage	Search in a DICOM Modality Worklist, retrieve images from a DICOM server based on query parameters. Images are stored to a DICOM server. Some of the measurements are stored if DICOM SR is turned on.
DICOM USB Read Only	Read DICOM data from an USB device. Read only dataflow, no data can be stored.
No Archive	Enables to perform an examination without storing the data to any archive.
Local Archive / Tricefy Store	The local archive is used for patient archiving.Images are stored to the local archive and to Tricefy. If DICOM SR is enabled, measurements are also sent to Tricefy.
Tricefy Store	Store images to Tricefy. If DICOM SR is enabled, measurements are also sent to Tricefy.
Local Archive - Tricefy Patient Share	The local archive is used for patient archiving.Images are stored to the local archive and to Tricefy. Images are also shared with the patient. If DICOM SR is enabled, measurements are also sent to Tricefy.

Dataflow	Description
Tricefy Patient Share	Store images to Tricefy and share them with the patient. If DICOM SR is enabled, measurements are also sent to Tricefy.
Tricefy QR / Tricefy Store	Search in Tricefy patients and examinations.Retrieve images from Tricefy. Images are stored to Tricefy. If DICOM SR is enabled,measurements are also sent to Tricefy.
Tricefy QR / Tricefy Patient Share	Search in Tricefy patients and examinations.Retrieve images from Tricefy. Images are stored to Tricefy and shared with the patient. If DICOM SR is enabled, measurements are also sent to Tricefy.
Worklist/Tricefy QR - Tricefy Store	Search in a DICOM Modality Worklist, retrieve images from Tricefy. Images are stored to Tricefy. If DICOM SR is enabled, measurements are also sent to Tricefy.
Worklist/Local Archive - Tricefy Store	Search in a DICOM Modality Worklist, the patient found is copied into the local archive. The patient information and the examination results are stored to the local database. Images are stored to Tricefy and to the local archive. If DICOM SR is enabled, measurements are also sent to Tricefy.

3-11-12-3 Dataflow selection

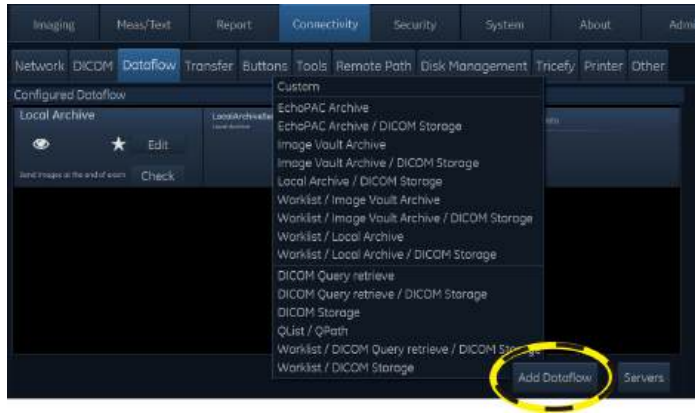
Select a dataflow from the *Archive* screen or configure the system with a **default** dataflow from the Configuration management package as described below.

3-11-12-3-1 Default dataflow selection

1. Press **Config** and log on as administrator if required.
2. Select the **Connectivity** category and **Dataflow** subgroup.

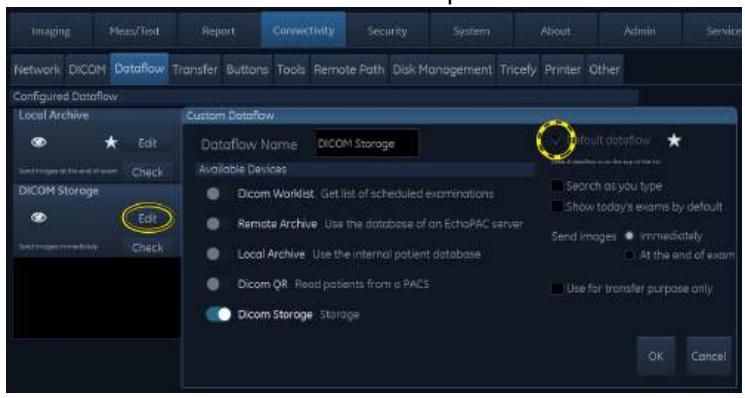
   The *Configured Dataflow* sheet is displayed.
3. Press **Add Dataflow** button and select the desired dataflow in the pull-down menu.

   The selected dataflow is displayed in the 'Configured Dataflow' list.



3-11-12-3-1 Default dataflow selection(continued)

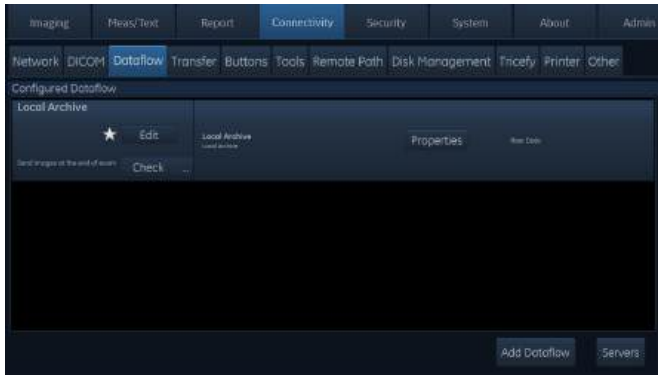
4. Press **Edit** button and check the option **Default dataflow.**



5. Press **OK** to close the window and there will be a star mark to indicate the default dataflow.

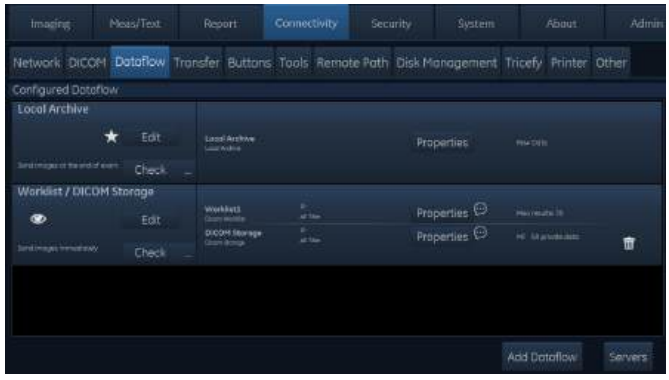
3-11-12-4 Worklist configure

1. Press **Config** on the shortcut bar and log on as **ADM**.
2. Select **Connectivity** and then select **Dataflow** tab.



3. Press **Add Dataflow** button and select the appropriate **Worklist** dataflow.

   In this example, Worklist - DICOM Storage is selected.



4. Select **Properties** for the **Worklist** to display the “Properties” dialog.

3-11-12-4 Worklist configure(continued)

5. In the **Properties** dialog, select the **IP-address** pull-down menu to select the Worklist Server.

   It is not possible to change the setting in the *IP-address* filed by editing it.

   To change the IP-Address settings, refer to 3-11-11-3 'Set Server Settings' on *page 3-76*.

   - Enter the DICOM server's **AE Title**. This entry is case sensitive and must match exactly.
   - Enter the DICOM server's **Port No.(Port number)**.
   - For some DICOM servers, the default Time-out setting (30) is too low.

6. Select **OK** to close the Worklist properties dialog and save changes.

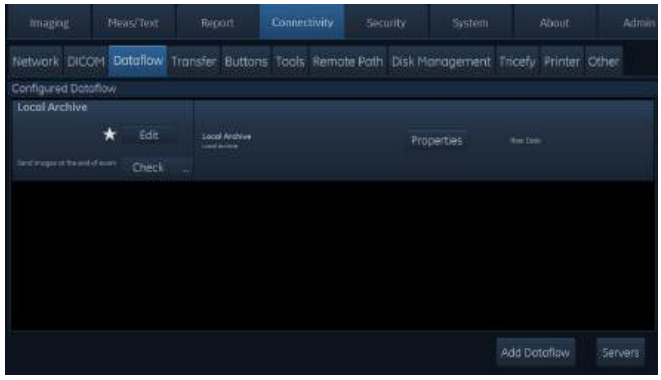
Search Criterias can be used to narrow the search in a Worklist.

Follow the steps below to change the Search Criteria parameters:

1. Select **Search Criteria** and a Search Criteria properties window appears.
2. Select the correct tag from the **Select Tag** pull-down menu.
3. If needed, type in the value.
4. Select **Update List.** to add search criteria.
5. To remove, select the search criteria to delete from the Name list box then select **Remove**.

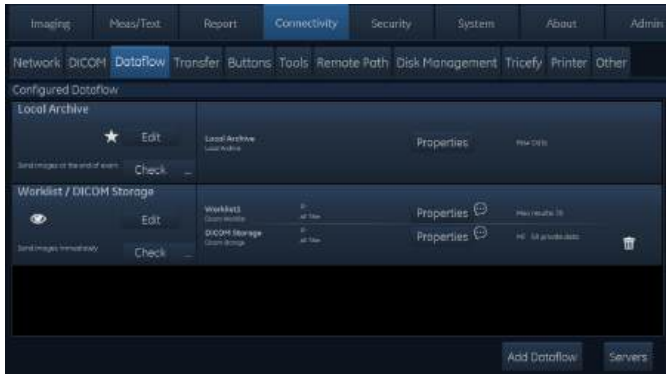
3-11-12-5 DICOM Storage configure

1. Press **Config** on the shortcut bar and log on as **ADM**.
2. Select **Connectivity** and then select **Dataflow** tab.



3. Press **Add Dataflow** button and select the appropriate **DICOM** dataflow.

   In this example, **Worklist - DICOM Storage** is selected.



3-11-12-5 DICOM Storage configure(continued)

4. Select **Properties** for the **DICOM Storage** to display the “Properties“ dialog.

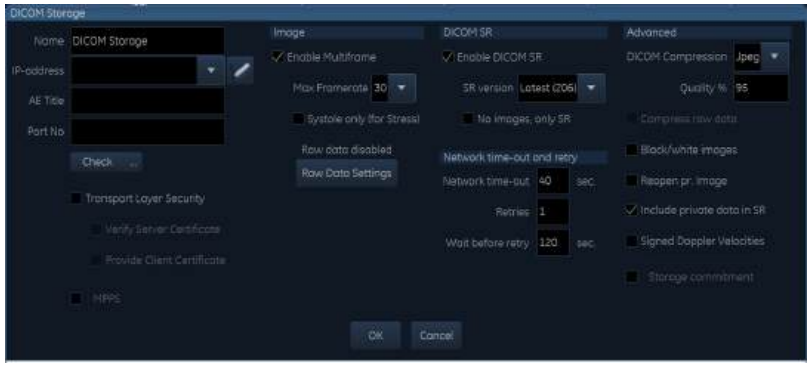


Figure 3-54. DICOM Storage Properties

5. In the **Properties** for **DICOM Storage**:
   - Select the server previously defined from the pull-down menu in the IP address field.
   - Enter the DICOM server **AE title**. This entry is case-sensitive and must match exactly.
   - Enter the DICOM server **Port No.**

   For some DICOM servers, the default Timeout setting may be too low.
6. When configuring the DICOM storage device, the following image settings are recommended to enter in the *Properties* window (Figure 3-54):
   - Check **Enable DICOM SR** if required.
   - Keep **Reopen pr. image** unchecked.
   - Keep **Raw data disabled**.
   - Set **Max Framerate** to 30.
   - Keep **Black/white images** unchecked.
   - Set **Compression** to JPEG.
   - Set **Quality** to 95.
   - Check **Enable Multiframe**.

3-11-12-5 DICOM Storage configure(continued)

Raw Data Settings gives you the ability to select which images to transfer in raw data format by mode:

Systole only (for Stress). When this setting is active, all stress images will be sent to the DICOM server showing only systole. The setting is selectable when transferring only multiframe (not raw data).

NOTE: *Setting **Compression** to None may result in long transfer time and cineloop with more than 500 frames will be truncated. If **Compression** is set to None, set **Max frame rate** to either 25 or 30 frames per second to reduce the risk of truncating loops.*

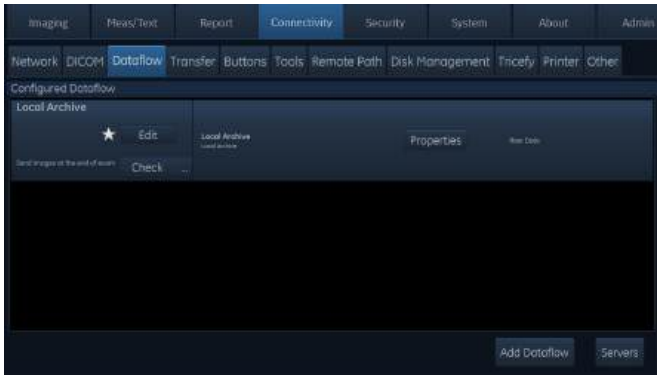
3-11-12-6 Query Retrieve Configure

The Query/Retrieve function makes it possible to search and retrieve DICOM data from a DICOM server for further analysis on the Vivid *iq*.

NOTE: You may have to set up Vivid iq as a destination on the server.

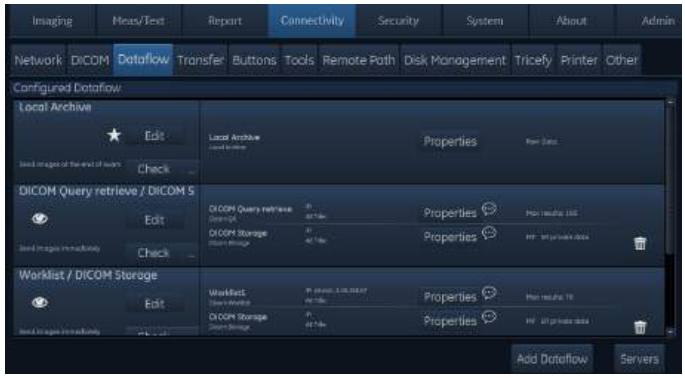
Follow the steps below to configure Query Retrieve:

1. Press **Config** on the shortcut bar and log on as ADM.
2. Select **Connectivity** and then select **Dataflow** tab.



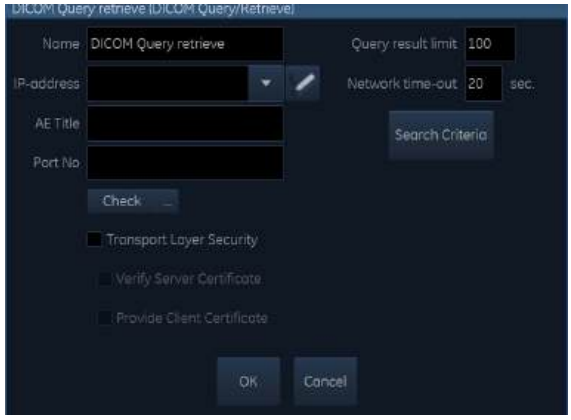
3. Press **Add Dataflow** button and select the appropriate **DICOM Query Retrieve** dataflow.

   In this example, **DICOM Query Retrieve - DICOM Storage** is selected.



3-11-12-6 Query Retrieve Configure(continued)

4. Select **DicomQR** and then select **Properties** to display the Properties dialog.



5. Select the IP-address down-arrow to choose the DICOM Query/Retrieve server from the pull down menu. In some cases, the server to use is the same as used for DICOM Storage.
6. Enter the correct AE Title and Port Number for the DICOM Query/Retrieve server in the respective fields in the Dicom QR's Properties screen.

3-11-12-7 Verify the Network Connection to a Device

Follow the steps below to do a First Test (TCP-IP Ping) of the network connection:

1. Highlight the device to be verified and select **Properties**.
2. Select the **"Check"** button to **Ping** the server.

NOTE: By selecting the "Check" button, a ping is sent to the remote server to see if it is accessible via the network. It is not a DICOM Echo (DICOM ping), so it does not check AE title or port number.

3. If the network connection to the server is OK, it will be illustrated by the “Pass“ sign, a green check mark  .

   The “Fail“ sign  indicates that the network connection is failing.

   Typical causes:

   - Network cable not connected
   - Configuration error(s)

3-11-13 Transfer

3-11-13-1 Transfer sources and destinations available

Dataflow	Description
DICOM USB	USB device defaulted to store DICOM data, but can also be configured to include raw data images as well as DICOM SR. No support for inclusion of other patient data.
DICOM DVD	DVD (or CD) device defaulted to store DICOM data, but can also be configured to include raw data images as well as DICOM SR. No support for inclusion of other patient data.
Export as XML	Media or remote path support from transfer of measurements and other parameters in XML format.
DICOM Print	Support for printing of images on a DICOM printer
Raw Data USB	USB device defaulted to store raw data but can also be configured to include DICOM images as well as DICOM SR. Support for inclusion of other patient data included for database transfer.
Raw Data DVD	DVD (or CD) device defaulted to store raw data but can also be configured to include DICOM images as well as DICOM SR. Support for inclusion of other patient data included for database transfer.

3-11-14 Buttons

You can assign print buttons via the **Connectivity -> Buttons** page.

3-11-14-1 Button configuration

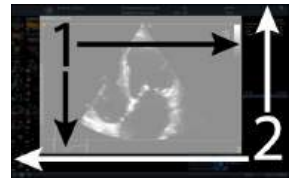
The **Print** tab on the shortcut bar can be configured to perform several actions (e.g. Video Print, Laser print, DICOM storage...etc.).

To configure the **P1/P2** button:

1. Select **Config** on the operation panel.
2. Select the **Connectivity** category and **Buttons** subgroup.

   The *Buttons* sheet is displayed.
3. In *Output Buttons* field select **P1**.
4. Select an output device in the *Available output* field and press the **Right arrow** button to assign the device to the selected button.

   The *Properties* window for the selected device is displayed, if configurable.
5. Adjust the device specific parameters and select **OK**.
6. Adjust the image specific parameters (see table below).

Image parameters	
Image frames	Select between: • **Single**: stores single frame only • **Multiple**: stores cineloops • **Secondary Capture**: stores a screen shot
Capture Area	Select between: 1. Video Area (1) 2. Whole Screen (2) 

To remove a device, select the device in the *Selected devices* field and press the **Left arrow** button.

3-11-15 Tools

3-11-15-1 Formatting removable media

CAUTION

The formatting process will erase any data present on the media.

To format removable media:

1. Insert the USB drive in the USB port.
2. Select **Config** on the Shortcut Bar.
3. If required, log on to the system.
4. Select the category **Connectivity** and select the tab **Tools** (Figure 3-55).
5. Select the removable media from the *Media* drop-down menu (CD-R, DVD-R or USB device).

*NOTE: Select **Refresh** if the media does not appear on the list.*

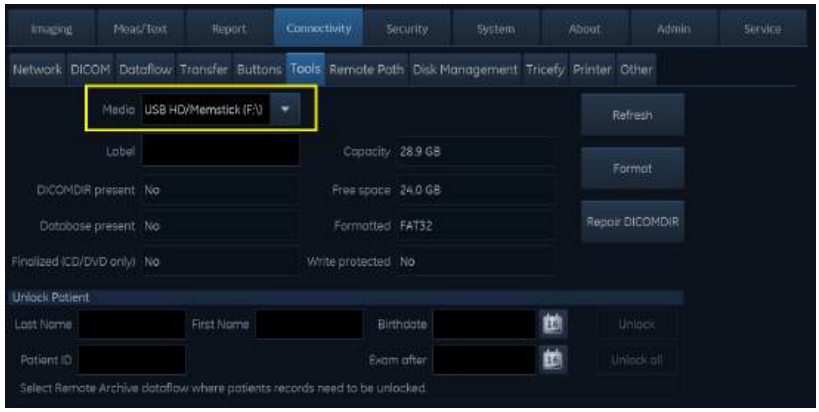


Figure 3-55. The Tools tab

3-11-15-1 Formatting removable media(continued)

6. Enter a name for the removable media in the *Label* field.

NOTE: Only the following characters and signs can be used when labelling a media: A - Z, a - z, 0 - 9, "_" and "-". Do not use more than 11 characters or signs. Do not use space.

7. Press **Format**.
   A confirmation window is displayed.

Figure 3-56. Formatting process

8. Select **YES** to continue.
9. Waiting for the display of the information window indicating that the formatting process is completed.

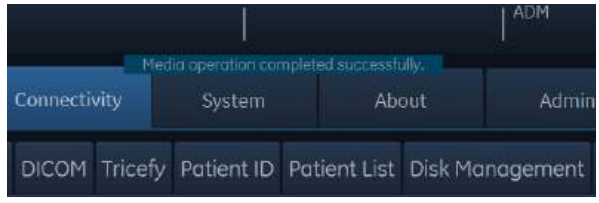


Figure 3-57. Formatting is completed

10. Eject the media as described below.

NOTE: Removable media used during Disk space management, Backup, Export, or Save as do not need to be formatted in advance as the formatting process is part of these procedures if required.

3-11-15-2 Unlock patients

If for any reason an examination is not properly finished, the patient record is locked and cannot be opened again unless it is unlocked.

To unlock patient records:

1. Press **Config** on the touch panel.
2. Select the **Connectivity** category and the **Tools** subgroup.
3. In the *Tools* sheet, select the patient record(s) to unlock.

   You can search for a specific patient record or a group of patient record using the searching filters.
4. Select **Unlock** to unlock the selected patient record(s) or select **Unlock all** to unlock all patient records listed.

   A *Confirmation* window is displayed.
5. Select **OK**.

3-11-16 Default remote path setting

The user can define a default remote path for a network shared folder (\\server-name\share-name). The default remote path can then be selected as a destination archive for the following operations:

- Export traces function in Q-Analysis
- Export of system error log file
- Export of report templates
- Save as function for images
- Save as function for reports

To define a default remote path:

1. Press **Config** and log on as administrator if required.
2. Select the **Connectivity** category and **Remote Path** subgroup.

   The *Remote Path* sheet is displayed.
3. In the *Export Path* section, enter a remote path of a shared folder on the network.

   To check the connection, press **Check**.
4. In the *Configurable Remote Path User* section enter the user name and password required to access the shared folder.

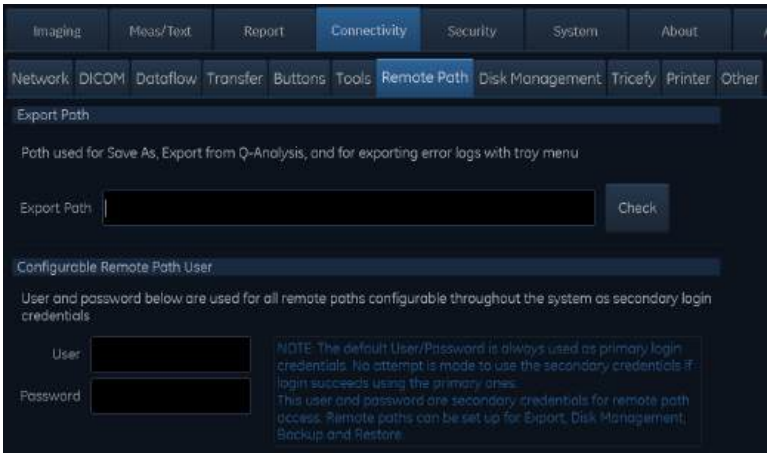


Figure 3-58. The Remote Path sheet

3-11-17 Disk Management

3-11-17-1 Introduction

The Disk management function allows the user to manage hard disk space while maintaining the patient database on the system. The Disk management function can be used to move, copy or delete images and move or copy reports from the oldest patient records. The Disk management function has also an auto-purge feature that will automatically delete images and reports that have already been copied if the local hard disk is getting full.

Three different disk management scenarios are possible depending on the system configuration:

- Disk management is set to **move** files: the user runs the Disk management function on a regular basis to move images and reports from older patient records to removable media or to a network volume. Using this setting, moved images and reports are deleted from the local hard drive and copied to the specified destination. This scenario prevents the local disk to fill up and keeps images and reports from the most recent patient records on the local disk. Using this scenario, the user can control what should remain on the system while keeping the disk free space at an operational level.
- Disk management is set to **copy** files: the user runs the Disk management function on a regular basis to copy images and reports from older patient records to removable media or to a network volume. To prevent the local disk to fill up, the auto-purge function automatically deletes files that were previously copied when the disk free space has reached the minimum allowed limit. This scenario lets the system automatically manage the disk space on the system.

3-11-17-1 Introduction(continued)

NOTE: When using this setting, the original images will be retrieved from the local hard drive as long as they are available there. When the images are deleted from the local hard drive by the auto-purge function, the copied images will be retrieved.

- Disk management is set to **delete** files: the user runs the Disk management function on a regular basis to delete images from older patient records.

NOTE: Ensure that you have established a data management protocol for your office/institution. The user MUST manage the removable media used when running Disk management by keeping a log and by creating a media filing system.

A person should be in charge of performing the process. The Disk management system can be set up so that a reminder is displayed at regular intervals.

It is always highly recommended to take a backup of moved/ copied files, which is the responsibility of the customer. The unit does not offer functionality for taking backup of images and reports saved on long-term storage media.

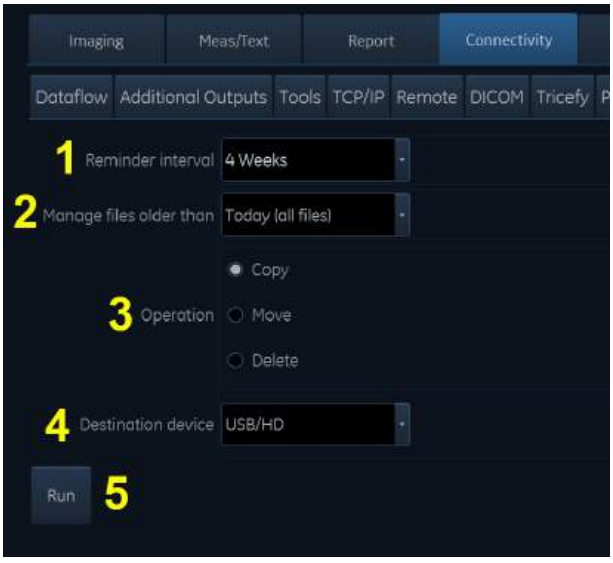
NOTE: It is recommended that users should do data management in a specific time interval.

3-11-17-2 Configuring the Disk management function

Configuration of the Disk management system can only be done by user with administration rights.

1. Press **Config**.
   If required log on as administrator.
2. Select the category **Connectivity**.
3. In the *Connectivity* category, select the sheet **Disk management**.

3-11-17-2 Configuring the Disk management function(continued)



1. Sets the reminder time interval for running Disk management.
2. Sets the files to be managed based on the examination dates.
3. Sets the Disk management to copy, move or delete images.
4. Sets the destination device.
5. Starts Disk management.

Figure 3-59. The Disk management sheet

3-11-17-2-1 Disk management schedule setting

1. Next to **Reminder interval**, specify the number of days/ weeks you want the system to prompt you to perform disk management.

   This setting should be set based on the activity of your office/institution.

3-11-17-2-2 Data management settings

1. Select a number of days, weeks or months next to **Manage files older than**. Only files older than the specified setting will be copied, moved or deleted.

   If **Today (all files)** is selected, all files will be copied or moved.

2. Next to **Operation** check:

   - **Copy**: the images and reports from the examinations older than the specified setting defined in step 1 are copied to the specified destination. Using this setting, the files will exist in two locations, the local hard drive and the destination.
   - **Move**: the images and reports from the examinations older than the specified setting defined in step 1 are copied to the specified destination, verified and then deleted from the local hard drive. Using this setting, the files will exist in one location, the destination media. They are removed from the local hard drive.
   - **Delete**: the images from the examinations older than the specified setting defined in step 1 are deleted from the hard drive.

3-11-17-2-3 Destination device setting

1. Next to **Destination device**, select a removable media or a network share folder.

NOTE: *When a network share folder is selected the path to the folder must be entered. Press **Check** to verify the connection.*

If using removable media, it is recommended to use dedicated media to the Disk management process. Removable media used for data backup must not be used when performing Disk management.

Do not use the same removable media on several systems.

3-11-17-3 Running the Disk management function

The Disk management function can be run at any time. In addition, the user may be prompted to run Disk management if the time since the last Disk management operation performed has reached the setting for the Reminder interval (see page 3-103), or if the local hard drive is about to be full.

Disk management can be run from the *Archive* screen (see below) or from **Config**/**Connectivity**/**Disk management** (Figure 3-59 *on page 3-103*).

3-11-17-3-1 Manual start of Disk management

1. Press **Patient**.
   The *Archive* screen is displayed.
2. Press **Disk management**.
   The *Disk management* window is displayed.

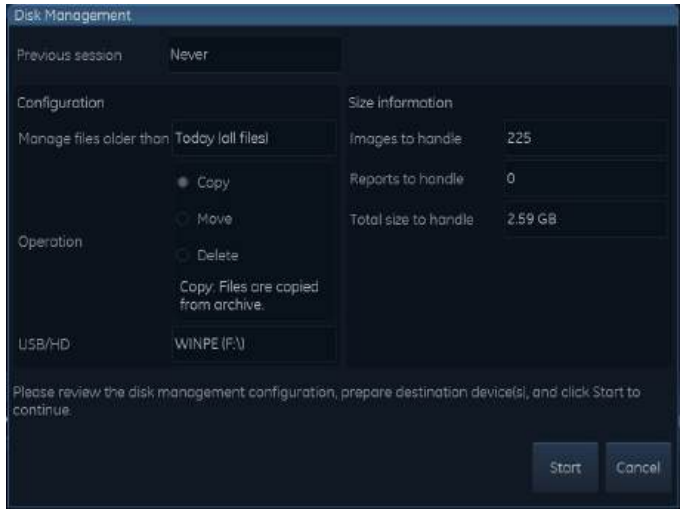


Figure 3-60. The Disk management window

3-11-17-3-1 Manual start of Disk management(continued)

The Disk management operation will either copy, remove or delete files from the local archives depending on the Disk management configuration (see page 3-102). Make sure the correct configuration is set.

Prepare the destination device(s). If a connected USB device is used, make sure the correct device is selected.

If using CD/DVD, the operation may require several disks as specified in the *Disk management* window. Make sure that the specified number of disks are available.

NOTE: CD/DVD do not need to be formatted.

3. Press **Start**.

   The *Disk management processing files* window is displayed showing progression of the process (Figure 3-61).

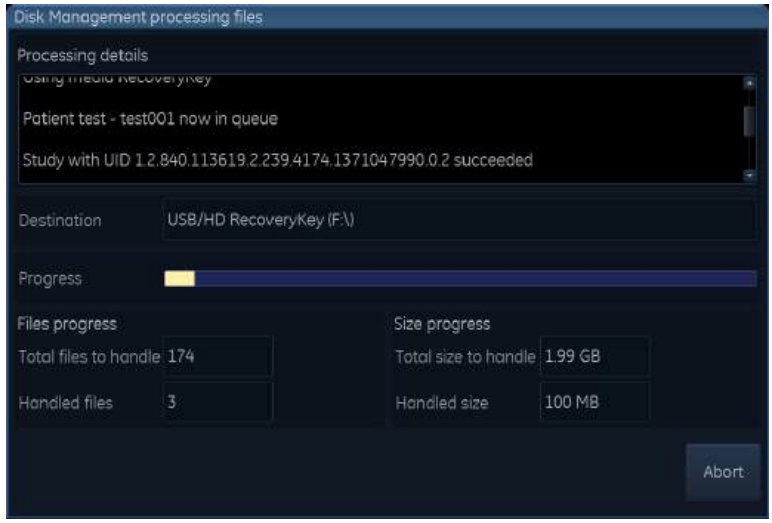


Figure 3-61. The Copying files window

3-11-17-3-1 Manual start of Disk management(continued)

If using CD/DVD as destination device, the system automatically formats the disks if required. If the media is formatted the user will be asked to enter a label for the media.

NOTE: The media label should have an identification of the system the Disk management is run from.

NOTE: Disk management is aborted if the destination device contains a database backup or exported patient data.

The information displayed on the *Disk management processing files* window is updated while the files are being copied.

4. If more than one media is necessary a dialogue window is displayed asking the user to insert a new media.

   Press **OK** after the new media is inserted.

   The operation is resumed.

5. When all the files are copied, the *Disk management completed* window is displayed (Figure 3-62), showing the list of processed examinations, the media used and a detailed log.

3-11-17-3-1 Manual start of Disk management(continued)

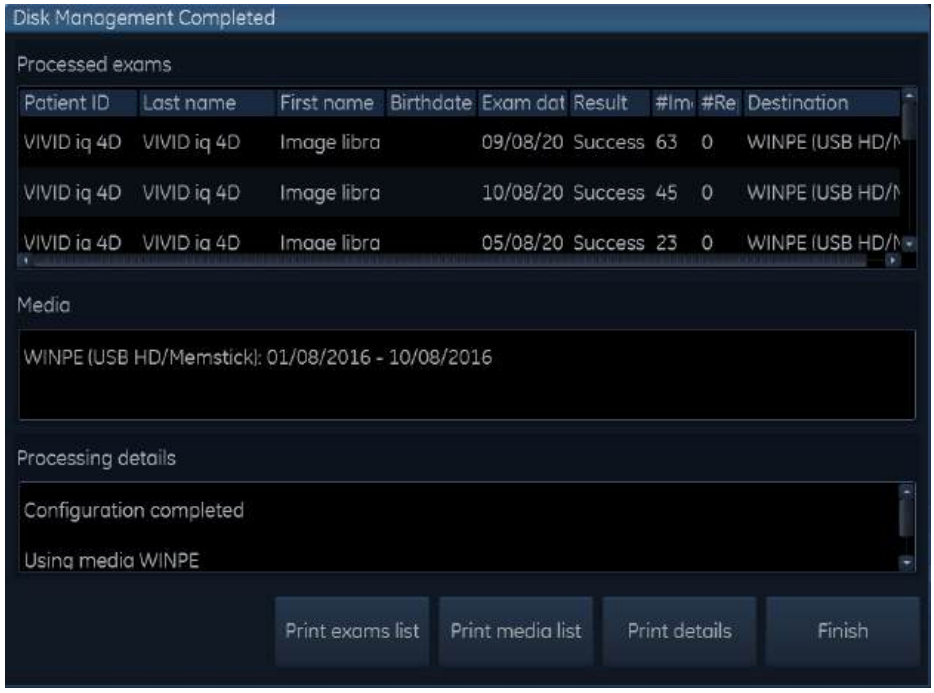


Figure 3-62. The Disk management completed window

3-11-17-3-1 Manual start of Disk management(continued)

- Select **Print exam list** to print the list of processed examinations.
- Select **Print media list** to print the list of media.
- Select **Print details** to print the detailed log.

6. Make sure that all media are physically labelled according to the list displayed in the *Disk management completed* window. The media label should also have an identification of the system the Disk management was run from.
7. Press **Finish** to complete the Disk management operation and file the media.

   A backup reminder window is displayed.

Figure 3-63. The Backup reminder window

8. Press OK.

3-11-18 Tricefy Uplink

Tricefy Uplink, an online platform for sharing and distributing medical images, enables physicians to archive, collaborate and share exam data with patients and colleagues. After registration, the studies can be archived and viewed in the cloud.

1. Archive securely in the cloud.
2. Access anytime from any device.
3. Share with patients instantly
4. Collaborate with colleagues easily.

Figure 3-64. How the Tricefy server works

3-11-18-1 To register a Tricefy account

1. Press **Config** on the shortcut bar.
2. If required, log on to the system.
3. Select the **Connectivity** category and the **Tricefy** subgroup.
   The *Tricefy* screen is displayed (see Figure 3-65).
4. Check the button "**Enable Tricefy**". A registration text field is displayed.
5. Type e-mail address and then press **Activate account**.
   At first connection, a registration letter will be sent to the provided e-mail address. Follow the instructions to complete the Tricefy Uplink registration.
6. After the account is successfully registered, press the **Test Connection** button. The account information is displayed, indicating account name, customer name and account status (see Figure 3-65).

Figure 3-65. The Tricefy Screen

NOTE: An icon in the bottom left corner of the title bar shows the Tricefy connection status.

The icon indicates that Tricefy Uplink is successfully connected.

The icon indicates that registration is incomplete.

The icon indicates that Tricefy Uplink is disconnected.

3-11-18-2 Configuration of Tricefy storage

The following dataflows are available for transfering images from the ultrasound system to the Tricefy cloud server:

Dataflow	Description
Local Archive / Tricefy Store	The local archive is used for patient archiving. Images are stored to the local archive and to Tricefy Uplink. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink.
Tricefy Store	Store images to Tricefy Uplink. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink
Local Archive / Tricefy Patient Share	The local archive is used for patient archiving. Images are stored to the local archive and to Tricefy. Images are also shared with the patient. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink.
Tricefy Patient Share	Store images to Tricefy and share them with the patient. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink.
Tricefy QR / Tricefy Store	Search in Tricefy Uplink patients and examinations. Retrieve images from Tricefy Uplink. Images are stored to Tricefy Uplink. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink.
Tricefy QR / Tricefy Patient Share	Search in Tricefy Uplink patients and examinations. Retrieve images from Tricefy Uplink. Images are stored to Tricefy Uplink and shared with the patient. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink.
Worklist / Tricefy QR / Tricefy Store	Search in a DICOM Modality Worklist, retrieve images from Tricefy Uplink. Images are stored to Tricefy Uplink. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink.
Worklist / Local Archive / Tricefy Store	Search in a DICOM Modality Worklist, the patient found is copied into the local archive. The patient information and the examination results are stored to the local database. Images are stored to Tricefy Uplink and to the local archive. If DICOM SR is enabled, measurements are also sent to Tricefy Uplink.

3-11-18-2 Configuration of Tricefy storage(continued)

Configure as follows before storing exams to Tricefy Uplink:

1. Press **Config** on the shortcut bar.
2. If required, log on to the system as **ADM**.
3. Select the **Connectivity** category and the **Dataflow** subgroup.

   The *Dataflow sheet* is displayed (see Figure 3-66).
4. Select the dataflow **Local Archive - Tricefy Store**.

NOTE: *Dataflows listed in the above table can also be selected as needed.*

5. Uncheck the **Hidden** button.

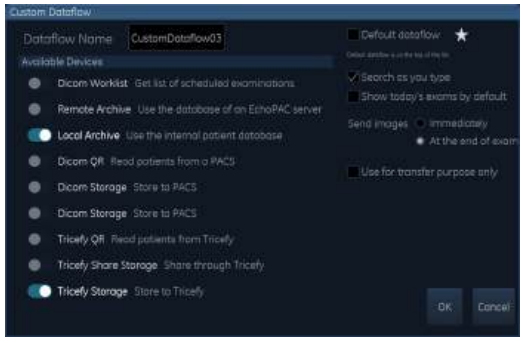


Figure 3-66. The Dataflow sheet

3-11-18-3 Storing an exam to Tricefy Uplink (Example 1)

1. In the *Patients/Exams* list, select dataflow **Local Archive - Tricefy Storage**.
2. Get back to scan and press **Store** key. The image is stored in the clipboard.
3. End the exam. The exam data will be sent to the Tricefy website (https://tricefy4.com/users/sign_in) in addition to the local archive.

3-11-18-4 Storing an exam to Tricefy Uplink (Example 2)

1. In the *Patients/Exams* list, select dataflow **Local Archive - TricefyPatientShare.**

NOTE: If TricefyPatientShare is selected as dataflow, the patient telephone number must be entered under patient data so that the patient will be informed automatically when images are uploaded to Tricefy Uplink.

NOTE: To share the exam results with more than one person, type several telephone numbers seperated by semicolon.

2. Get back to scan and press **Store** key. The image is stored in the clipboard.
3. End the exam. The exam data will be sent to Tricefy website (https://tricefy4.com/users/sign_in) in addition to the local archive.

*NOTE: If the **Direct Store** checkbox is checked in the Dataflow sheet, the selected image will be directly sent to the Tricefy website when pressing the **Store** key.*

3-11-18-5 How to export an existing exam from local archive to Tricefy

1. Press **Transfer** from the Patients/Exams list (see Figure 3-67).

The *Transfer screen* is displayed (see Figure 3-67).

2. Select **Local Archive** from *Source* drop-down menu. Select **Tricefy Storage** from *Destination* drop-down *menu*.
3. Press **Add to list** to make the selected items ready for transfer.
4. Press **Copy** (see Figure 3-68). The exam data is sent to the Tricefy website (https://tricefy4.com/users/sign_in).

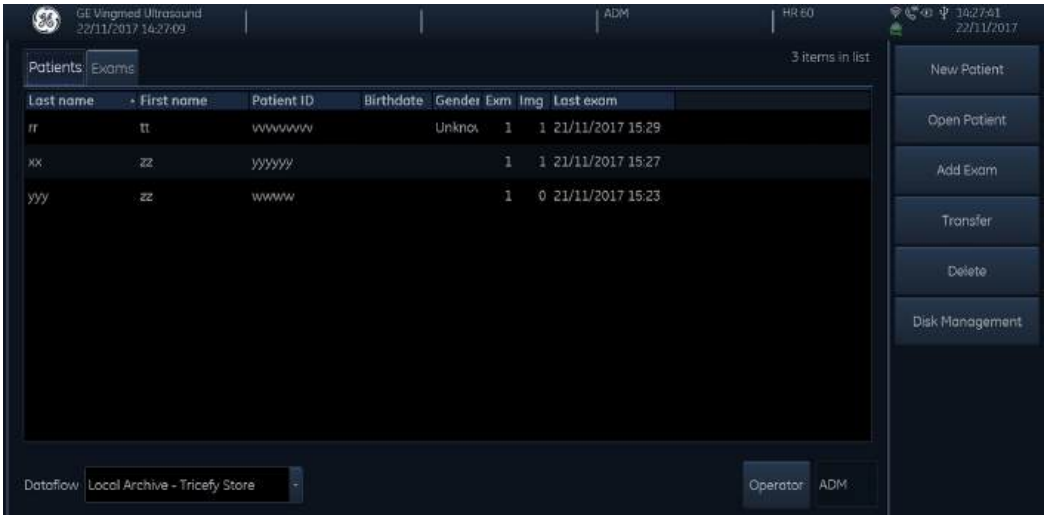


Figure 3-67. The Patients/Exams list

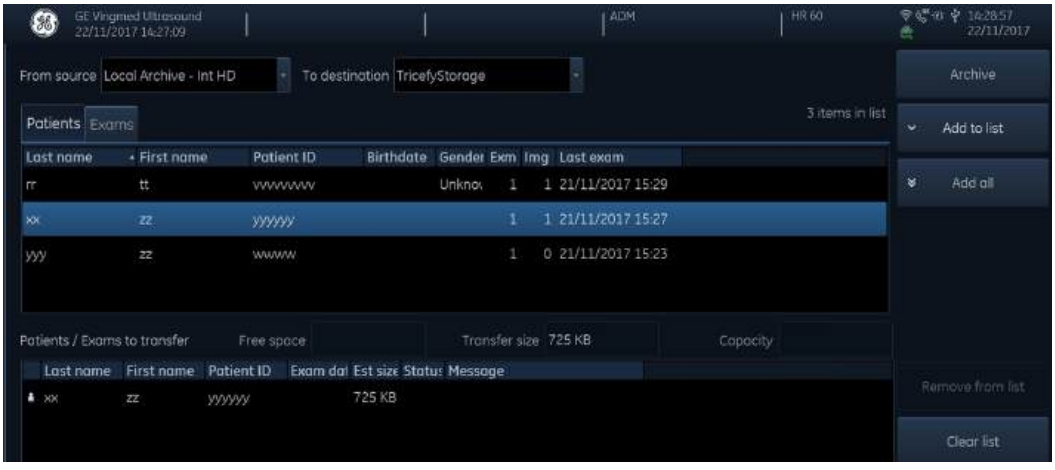


Figure 3-68. The Transfer screen

3-11-18-6 Accessing exams on the Tricefy web

Open the Tricefy website (https://tricefy4.com/users/sign_in). Log in with user credentials and access the exam results in the *Studies* tab.

3-11-18-7 Configuration of the P1 button

The P1 button can also be configured to store images directly to the Tricefy website. With this method one can send selected images instead of the whole exam, like shown in the two previous examples.

3-11-18-8 Configuring P1 button as TricefyStorage

1. Press **Utility/Config** on the Touch panel.
2. If required, log on to the system.
3. Select the **Connectivity** category and the **Additional Outputs** subgroup.
1. The *Additional output sheet* is displayed (see Figure 3-69).
2. In *Button* field select **P1**.
3. Select **TricefyStorage** from the *Available output* field and press the **Right arrow** button to assign it to the *Selected Output* field.

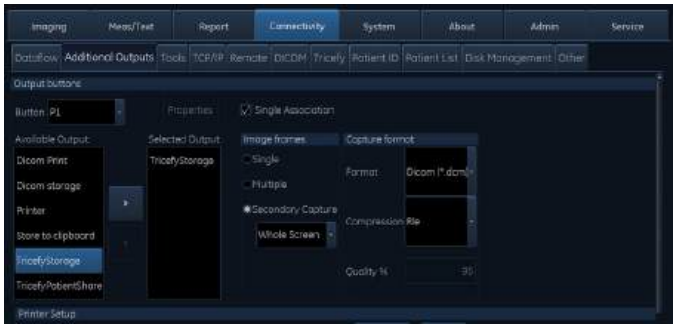


Figure 3-69. The Additional Outputs Sheet

4. Get back to scan and press **P1** button, the exam data will be sent to the spooler and kept there (press **Spooler** on the shortcut bar to see the data).

3-11-18-8 Configuring P1 button as TricefyStorage(continued)

5. End the exam. The exam data will be sent to the Tricefy website (https://tricefy4.com/users/sign_in).

*NOTE: If the **Single Association** button is unchecked in the Additional outputs sheet, the exam data will be directly uploaded to the Tricefy website when pressing P1 button, without being held on the spooler page.*

*NOTE: List of exam results sent to the Tricefy server will be displayed on the spooler page (press **Spooler** on the control panel to see the data).*

3-11-18-9 Configuring P1 button as TricefyPatientShare

1. Press **Utility/Config** on the Touch panel.
2. If required, log on to the system.
3. Select the **Connectivity** category and **Buttons** subgroup.
   The *Buttons output sheet* is displayed.
4. In the *Button* field select **P1**.
5. Select **TricefyPatientShare** in the *Available output* field and press the **Right arrow** button to assign it to the *Selected Output* field.

NOTE: The patient telephone number must be entered under patient data so that the patient will be informed automatically when images are uploaded to Tricefy Uplink.

NOTE: To share the exam results with more than one person, type several telephone numbers seperated by semicolon.

6. Get back to scan and press **P1** button. The exam data will be held on the spooler page.
7. End the exam. The exam data will be sent to the Tricefy website (https://tricefy4.com/users/sign_in).

3-11-18-9-1 Configuration of Tricefy QR

Tricefy QR, similar to DICOM Query Retrieve, enables users to check the exam results which are stored in the Tricefy website via scanner.

1. Log in to the Tricefy website (https://tricefy4.com/users/sign_in).
2. Enable Q/R for corresponding IP address matched with your ultrasound system from the *Uplinks* tab of the website.

NOTE: Contact your Tricefy Uplink representative to get support for any Tricefy website questions.

3. Press **Config** and log on to the system as **ADM**.
4. Select the **Connectivity** category and the **Dataflow** subgroup.
5. Select the dataflow **Tricefy QR -Tricefy Storage**.
6. Uncheck the **Eye** button and connect with Internet.
7. Go to patient page and select **Tricefy QR -Tricefy Storage**.

   The exam results stored in the Tricefy website will be displayed in the *Patients/Exams* list.

NOTE: Disable Q/R on the Tricefy website to prevent exam data being used by any other person logging in to the system with the same IP address.

3-11-19 Printer setup

Printers are configured in the **Connectivity>Printer** tab:

1. To select a printer, highlight it in the table.
2. Click **Preferences** to adjust Paper size and Orientation.
3. Click **Set as Report Printer** to use it for printing reports.
4. Click **Add Printer** and use the windows printer wizard to add one.

NOTE: Adding printer drivers is not possible

5. Click **Remove Printer** to remove printers from the list available for the scanner.
6. Click **Open Queue** to view jobs in the printer spooler.

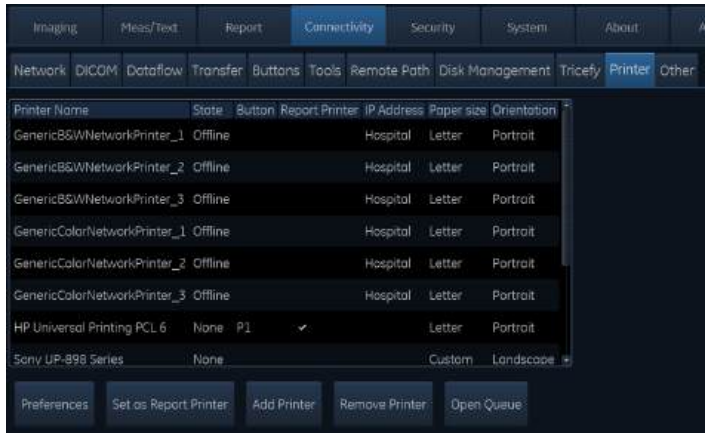


Figure 3-70. The Additional outputs sheet

3-11-20 Others

3-11-20-1 Patient ID

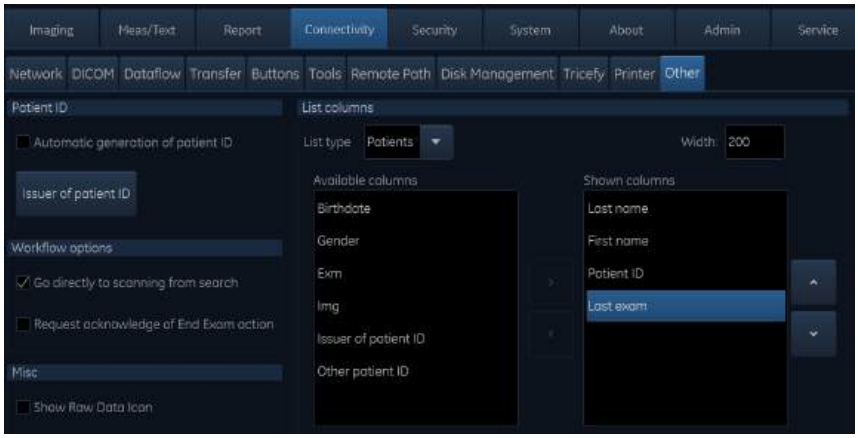


Figure 3-71. The Other sheet

Setting	Description
Automatic generation of patient ID	In the Archive screen, the issuer of a patient id may be specified for a patient id. ☑: A Patient ID is automatically generated by the system. ☐: A Patient ID is required and must be entered by the user when creating a new patient record in the archive.
Issuers of patient ID	In the Archive screen, the issuer of a patient id may be specified for a patient id. An issuer may be added, modified, or deleted. The issuer set as default will be used as issuer for all new patients that are created. In addition, in transfer between remote and local archive, two patients with same patient id, one with empty issuer and one with default issuer, are considered the same patient.

3-11-20-2 Workflow options

The following settings related to patient management can be adjusted in **Connectivity > Other** subgroup:

Setting	Description
Request acknowledge of End Exam action	☑: The user is asked to confirm action when ending an examination.
Go directly to scanning from search	☑: The unit goes directly to the *Scanning* screen after creating a patient record. ☐: The unit displays the *Patient info and exam* screen after creating a patient record for further information entry. The user must press **Patient** or one of the scanning keys on the Control panel to enter the *Scanning* screen.

3-11-20-3 Configuration of the Patient, Worklist and Examination list in the Archive screen

1. In the *List type* drop-down menu, select the list to edit.
2. To add a column to the list:
   - Select a column to display in the *Available columns* field and press  to add it to the list.
   - Press  /  to move the column.
3. To remove a column from the list:
   - Select the column to remove in the Show columns field and press .

NOTE: The columns First name, Last name, Patient ID, Last exam and Exam date cannot be removed for the lists.

3-12 Disk Management Setup

3-12-1 Introduction

The Disk Management function allows the user to manage hard disk space while maintaining the patient database on the Ultrasound system. The Disk Management function can be used to move, copy or delete images and move or copy reports from the oldest patient records. The Disk Management function has also an auto-purge feature that will automatically delete images and reports that have already been copied if the local hard disk is getting full.

For more information, refer to 3-11-17 ‘Disk Management’ on *page 3-101*.

3-12-2 Select Destination Device

Select a removable media, USB storage, or network share folder from the Destination Device pull-down menu.

3-12-3 Using Removable Media

If using removable media, it is recommended to use dedicated media to the Disk Management process. Don’t use Removable Media already used for data backup, when performing Disk Management.

Do not use the same Removable Media on different systems.

3-12-4 Set Remote Path for Disk Management

- To be able to select a network share folder in the Destination Device pull-down menu, the path must first be entered in the Remote Path field.
- To be able to set up the connection from the Vivid *iq* to the server, the correct User and Password must be entered both on the server side to allow access, and on the Vivid *iq* to be able to get access to the server.

Follow the steps below to setup the Remote Path:

1. Select the Disk Management screen.
2. Enter the path to the remote server in the Remote Path field, refer to the example below:

   Example:

   - The server name is: **BigStore**
   - The folder to use, is: **ImageArchive**

   Example procedure:

   a. Enter **\\BigStore\ImageArchive** in the Remote Path field.

   b. Press **Enter** on the external keyboard.

   The Remote Path will now be available for selection in the Destination Device pull-down menu.

NOTE: *The Computer Name for the Vivid iq is included at the end of the path.*

3. If not already done, select the Remote Path as the Destination Device.

3-12-5 Setup on the Remote Share

For setup on the Remote Share, see: ‘3-11-16 ‘Default remote path setting’ on *page 3-100*’.

3-12-6 Configure Remote Path User on the Vivid *iq*

To configure the Remote Path User on the Vivid *iq*,see ‘3-11-16 ‘Default remote path setting’ on *page 3-100*’.

3-13 Paperwork after setup

NOTE: During and after setup, the documentation (i.e. removable media with documentation, User Manuals, Installation Manuals, etc.) for the Vivid iq and the peripherals must be kept as part of the original Ultrasound system documentation. This ensures that all relevant safety and user information is available during the operation and service of the complete Ultrasound system.

3-13-1 Contents in this Section

3-13-2 User’s Manual(s)

Check that the correct User Manual(s) or remoable media with User Manuals, per software (SW) revision and language, is included with the Ultrasound system.

For a complete list of User’s Manuals for Vivid *iq*, refer to Chapter 9 in this manual.

3-13-3 Product Locator Installation Card

NOTE: The Product Locator Installation Card shown may not be the same as the provided Product Locator card.

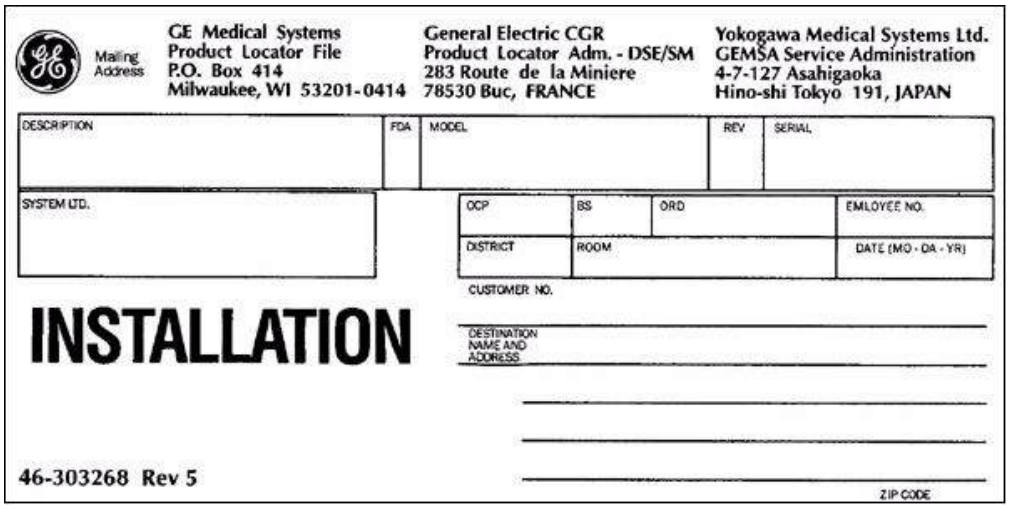


Figure 3-72. Product Locator Installation Card (Example)

3-14 CARTO® 3 Interface Setup

NOTE: Only the Vivid iq system installation is done by GE personnel. GE field engineers are not responsible for any of the CARTO® 3 installation for Protocol 2.0 . For Protocol 1.0, GE installs the video box.

NOTE: CARTO® 3 is installed by the BWI field engineer. The ultrasound setup and the connection between the Vivid and the CARTO® 3 should be done by the BWI Field Engineer.

NOTE: GE service only check the Vivid iq connection, contact with Biosense Webster, Inc. if need ICE catherter for troubleshooting. Any other related troubleshooting should be done on system together with Biosense Webster, Inc. service.

3-14-1 Overview

These versions of CARTO® 3 are supported by Vivid *iq*.

- Protocol 1.0: The video signal from the ultrasound system's HDMI Out port is connected to a video box. The video from the video box to the CARTO® 3 is distributed via a VGA cable.
- Protocol 2.0: The video signal is transferred through an Ethernet cable.

3-14-2 Contents in this chapter

3-14-3 Vivid *iq* ICE Configuration with CARTO® 3

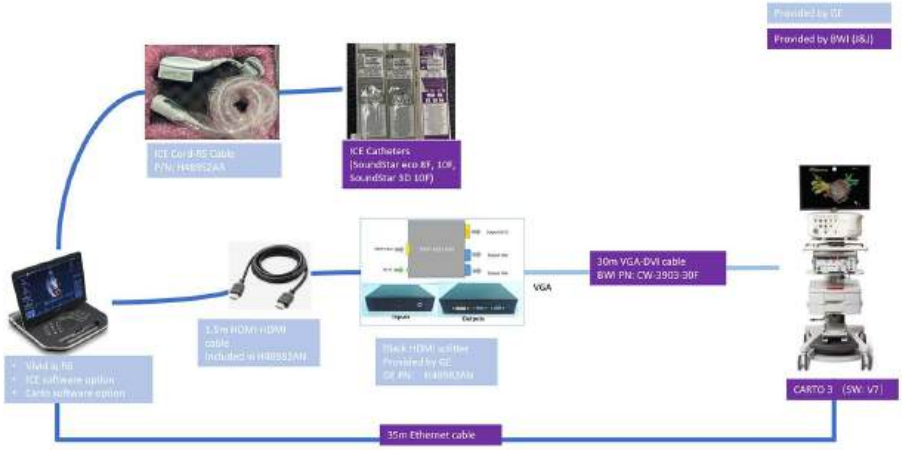


Figure 3-73. Vivid *iq* ICE configuration with CARTO® 3

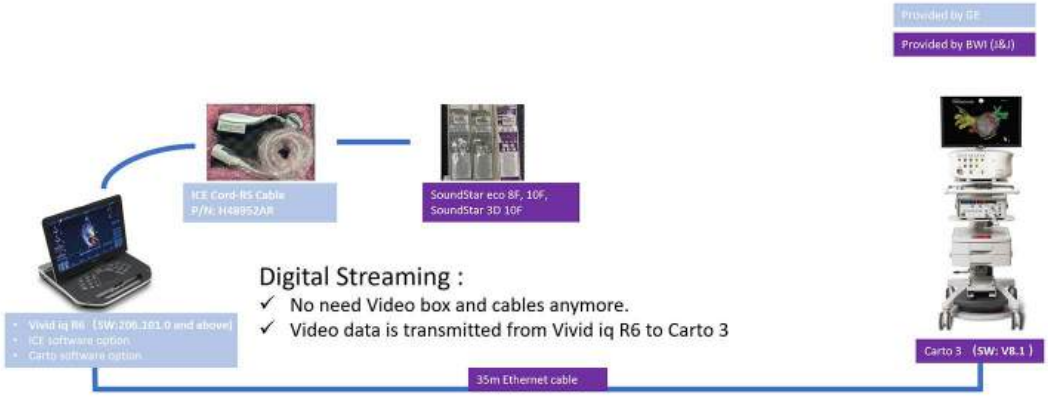


Figure 3-74. Vivid *iq* ICE configuration with CARTO® 3 (for 206.101.0 and above)

3-14-4 Prerequisites - CARTO® 3 Software Option

- The ultrasound system is delivered with the required software for communicating with CARTO® 3, but these options are not enabled by default, so they must be purchased and installed on the ultrasound system.
- The following software options are activated by an option key. The options are supplied according to the equipment purchased by the customer:
  - ICE Interface Module:

    This software option activates the software that supports the ICE catheters.
  - CartoSound Interface with video:

    This software option enables the workflow with CartoSound interface (used only with the SoundStar Catheter).

3-14-5 Install the CARTO® 3 Option Key

Install the Option Key on the ultrasound system.See 3-9-1 ‘Software Option Installation Procedure’ on *page 3-33 for more information.*

3-14-5-1 CARTO® 3 Feature - Software Connectivity

The following software options should be activated:

- ICE Interface Module:

  This software option activates software that supports the ICE catheters.
- CartoSound Interface with video:

  This software option enables the workflow with the CartoSound interface.

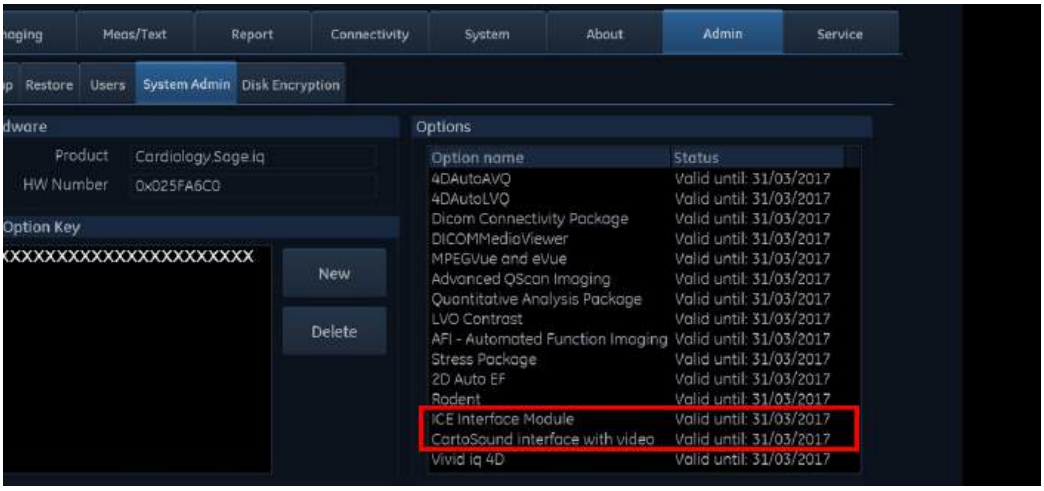


Figure 3-75. Options

3-14-6 Vivid *iq* Interfacing with CARTO® 3 - Protocol 2.0 (v206)

Starting from CARTO® 3 v7.4.1 together with Vivid *iq* version 206.101.0 and above, it is possible to use digital video streaming over an Ethernet cable (peer-to-peer LAN).

NOTE: Only a member of the group "ConsultingPhys" will have permission to receive streamed data. For more information, refer to "User setup for data streaming" in the "Vivid iq User Manual", direction number 5872801-1EN.

NOTE: To enable Data Streaming and adjust Two-factor Authentication, *See 3-11-9 'Data Streaming' on page 3-58 for more information.*

To check the software version on the ultrasound system,

NOTE: The Isolated HDMI video splitter can be used for CARTO® 3 with protocol 2.0.

The video signal is transferred through an Ethernet cable from the ultrasound system to the CARTO® 3 device. The Ethernet Cable is provided by BWI (not by GE).

You can optionally connect a monitor to the ultrasound system's HDMI Out port.

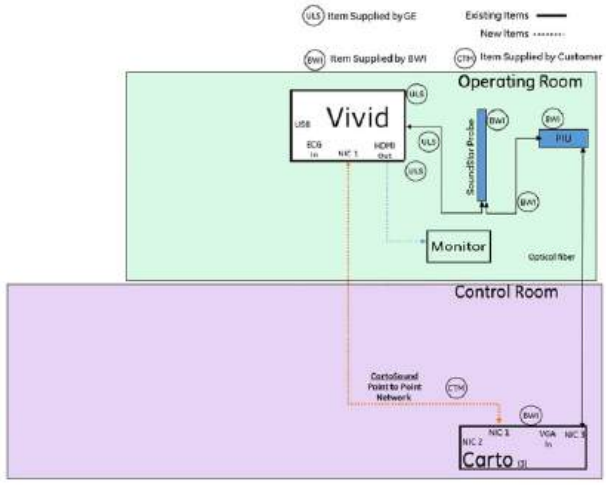


Figure 3-76. Vivid *iq* interfacing CARTO® 3 with protocol 2.0

3-14-6-1 Installation of CARTO® 3 - Protocol 2.0

1. Install the Option Key.

   For instructions, See 3-9-1 ‘Software Option Installation Procedure’ on *page 3-33 for more information.*
2. Make sure that the Ethernet cable is connected to the dedicated ethernet port on CARTO® 3 system and on the other end to the Vivid *iq* Ethernet port.

NOTE: The ultrasound system is delivered with the required software for communicating with CARTO® 3, but these options are not enabled by default, so they must be purchased and installed on the ultrasound system.

The following software options are activated by an option key. The options are supplied according to the equipment purchased by the customer:

1. ICE Interface Module:
   - This software option activates the software that supports the ICE catheters.
2. CartoSound Interface with video:
   - This software option enables the workflow with CartoSound interface (used only with the SoundStar Catheter).

3-14-7 Vivid *iq* Interfacing with CARTO® 3- Protocol 1.0

In addition to the Option Key mentioned earlier, this CARTO® 3 sollution requires the installation of a Isolated HDMI Splitter (the Video BOX for CVUS).

3-14-7-1 Content in the HDMI Splitter kit used for Protocol 1.0

Table 3-14:

Item	Part Name	GPN	FRU	QTY	Remark
1	Video Box for CVUS	5794927	5794927-S	1	Includes: • Isolated HDMI Splitter × 1 • HDMI to HDMI cable(1.5M) × 1 • DVI to HDMI cable(1.5M) × 1 • Power Adaptor × 1 • Power Cord × 1 

3-14-7-2 Ultrasound system interfacing with CARTO® 3 - Protocol 1.0

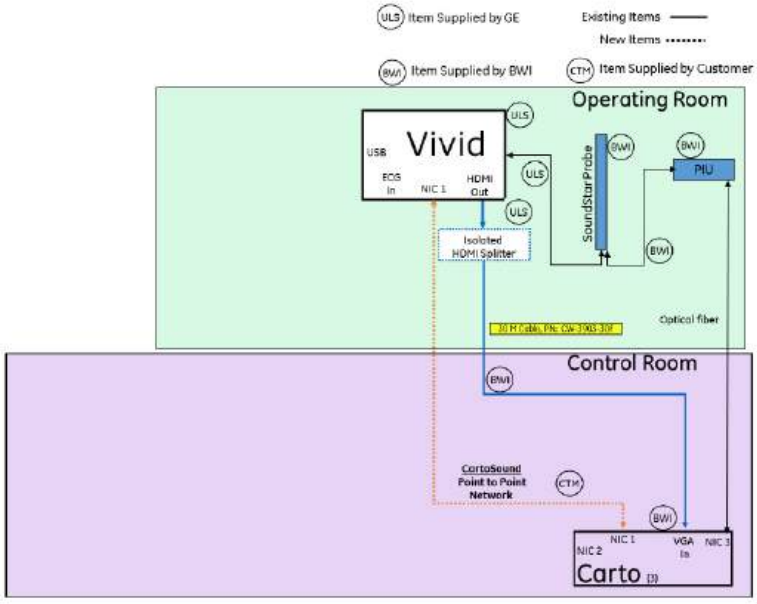


Figure 3-77. Ultrasound system interfacing with CARTO® 3

3-14-7-3 Ultrasound system interfacing with CARTO® 3 and an External Monitor - Protocol 1.0

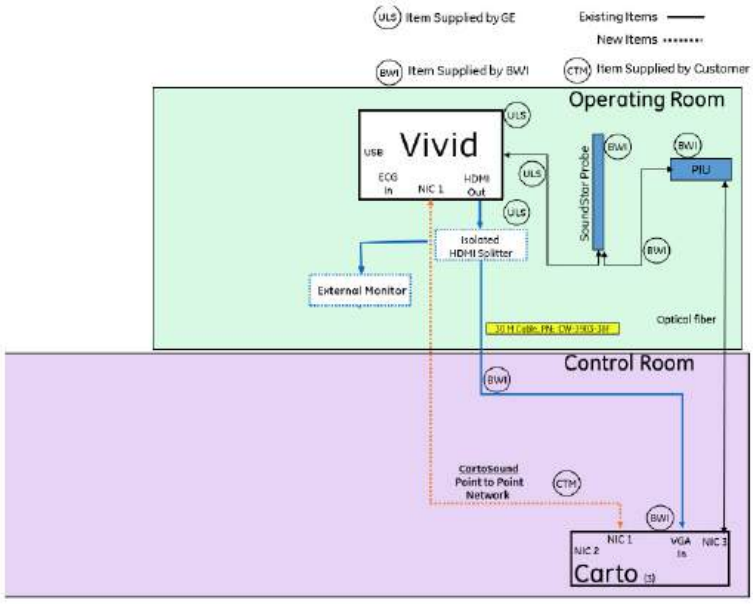


Figure 3-78. Ultrasound system interfacing with CARTO® 3 and an External Monitor

You can connect an additional monitor to the Isolated HDMI converter/splitter while being connected to CARTO® 3:

- Monitor with digital input
  - Connect to the DVI-D output
  - Resolution is 1920×1080 (complete Vivid *iq* monitor) - can only connect monitors accepting this resolution
- Analogue Monitor
  - Connect to the 2nd VGA output on the Isolated HDMI Splitter
  - Resolution is 800x600 (1440x1080 center area from the Vivid *iq* monitor cut, and scaled to 800x600)

NOTE: The two VGA outputs on the Isolated HDMI Splitter are identical.

3-14-7-4 Installation of CARTO® 3 - Protocol 1.0

DANGER

DO NOT CONNECT THE VIVID SYSTEM AND THE CARTO® 3 DIRECTLY WITH VIDEO CABLES.

USE THE ISOLATED HDMI SPLITTER.

A DIRECT CABLE CONNECTION MIGHT DAMAGE AND VOID SAFETY ISOLATION.

- Connect the HDMI cable to the HDMI port at the front of the Isolated HDMI Splitter and plug the other end of the cable into the Vivid *iq* system's HDMI port.
- Plug the mains power cord into the Isolated HDMI Splitter and then plug the other end of the mains cord into the mains power supply.
- Connect the VGA to DVI cable (provided by BWI) to one of the VGA output ports on the Isolated HDMI Splitter and plug the other end of the cable to the CARTO® 3 system.

NOTE: The VGA to DVI cable is to be connected to the CARTO® 3 by BWI (CARTO® 3) and GE Invasive service personnel respectively.

NOTE: The number in the figure below represents the step in the connecting procedure.

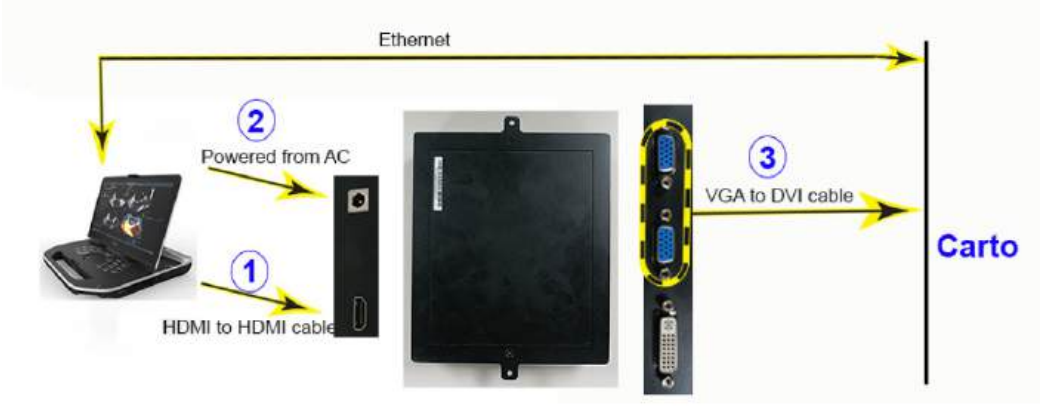


Figure 3-79. Vivid *iq* interfacing with the CARTO® 3 - Protocol 1.0

3-14-7-5 Important when Power On - Protocol 1.0

Ensure that the Isolated HDMI converter/splitter is switched off when you power up the Vivid *iq*.

3-14-8 Scanning

1. Start the ultrasound system.
2. Ensure the ICE Probe Interface Module and the CartoSound interface options are enabled.
3. Connect the ICEcord-RS to the ultrasound system.
4. Connect the ICE catheter to the ICEcord-RS and to the CARTO® 3 system.
5. Select the preset Carto on the ultrasound system to see the ICE image on the ultrasound system.
6. On the ultrasound system, select "CartoSound" from the shortcut bar.
7. Go back to the scanning screen, now the ultrasound system is ready to work with CARTO® 3.

Related Information: See 5-3 ‘CARTO® 3 Interface’ on *page 5-4 for more information.*

Related Information: See 5-3-6-6-1 ‘ICE Catheter’ on *page 5-14 for more information.*

3-15 Cart Setup

3-15-1 Overview

3-15-1-1 Contents in this chapter

3-15-1-2 Introduction

This chapter contains this information:

- How to setup Cart. Included are references to a procedure that describes how to receive and unpack the equipment and how to file a damage or loss claim.
  How to prepare the facility and unit of the actual setup, and how to check and test the unit and external peripherals for electrical safety are included in this procedure. Also included in this section are guidelines for transporting the unit to a new site.
- The procedures for mounting the system to Vivid *iq* and releasing the system from Cart.
- Explain the Cart’s concepts, component arrangement, and subsystem function.
- Describes how to test and adjust the functions. These tests are optional. You may use them to check the system for errors.
- Describes how to setup and run the tools that help Cart operation. Cart and board level diagnostics are run whenever power is applied. Some Service Tools may be run at the application level.

3-15-1-3 Safety Consideration

NOTE: Please refer to Chapter 1 and Chapter 2 for the safety information and site requirement for the Cart. Chapter 1 and Chapter 2 should be read before conducting any installation work on Cart.

CAUTION

The Cart weighs 41 kg (90 lb.) or more, depending on installed peripherals, when ready for use. Care must be used when moving it or replacing its parts.

Failure to follow the precautions listed below could result in injury, uncontrolled motion and costly damage.

ALWAYS:

- be sure the pathway is clear
- use slow, careful motions
- Limit movement to a slow careful walk.
- use two people when moving on inclines or lifting more than 16 kg (35 lbs)

WARNING

When the cart is raised for a repair or moved along any incline, use external caution since it may become unstable and tip over.

CAUTION

Do not move Cart with big incline angle.

CAUTION

The Cart is not water proof. Do not expose the Cart to water or any kind of liquid.

Never set liquids on the Cart to ensure that liquid does not drip into the unit.

CAUTION

Put peripherals in correct position to avoid Cart overload.

NOTE: Special care should be taken when transporting the Cart in a vehicle.

3-15-2 Set Up the Cart

3-15-2-1 Contents in This Section

3-15-2-2 Setup Reminders

3-15-2-2-1 Average Setup Time

Table 3-15: Average Installation Time

Description	Average Setup Time	Comments
Unpacking the cart	0.5 hour	
Cart options	0.5 hour	Dependant on the configuration that is required

The Cart has been designed to be setup and checked out by an experienced service technician in approximately four hours. Cart consoles with optional equipment may take slightly longer.

3-15-2-2-2 Setup Warnings

- Since the Cart weighs approximately 41 kg.(90 lb) without options, preferably two people should unpack it. Two people are also preferable for setting up any additional bulky items.
- There are no operator serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing and troubleshooting.

NOTE: *For information regarding packing labels, refer to LABELS ON PACKAGE.*

- After being transported, the unit may be very cold or hot. If this is the case, allow the unit to acclimate before you turn it on. It requires one hour for each 2.5°C increment it's temperature is below 10°C or above 30°C.

CAUTION

Equipment damage possibility. Turning the system on without acclimation after arriving at site may cause the system to be damaged.

Table 3-16: Acclimation Time

°C	60	55	50	45	40	35	30	25	20	15	10
°F	140	131	122	113	104	95	86	77	68	59	50
hrs	8	6	4	2	0	0	0	0	0	0	0

°C	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	41	32	23	14	5	-4	-13	-22	-31	-40
hrs	2	4	6	8	10	12	14	16	18	20

3-15-2-3 Safety Reminders

DANGER — WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DON'T TOUCH THE UNIT!

CAUTION — Two people should unpack the unit because of its weight. Two people are required whenever a part weighing 19kg (42 lb.) or more must be lifted.

CAUTION — If the unit is very cold or hot, do not turn on its power until it has had a chance to acclimate to its operating environment.

CAUTION — To prevent electrical shock, connect the unit to a properly grounded power outlet. Do not use a three to two prong adapter. This defeats safety grounding.

CAUTION — Do not use a 20 Amp to 15 Amp adapter on the 120 Vac unit's power cord. This unit requires a dedicated 20 A circuit and can have a 15A plug if the on board peripherals do not cause the unit to draw more than 14.0 amps.

CAUTION — Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.

CAUTION — OPERATOR MANUAL(S)
The User Manual(s) should be fully read and understood before operating the Cart and kept near the unit for quick reference.

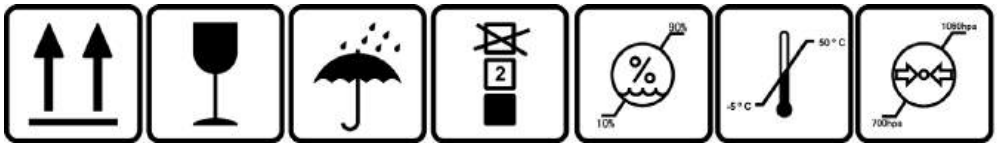


Figure 3-80. Environmental Labels

3-15-2-4 Receiving and Unpacking the Equipment

When a new Cart arrives, check that any components are not damaged and are not in short supply. If shipping damage or shortage occurs, contact the address shown in Chapter 1.

CAUTION

The crate with the Cart weighs approximately 58 kg. Be prepared for a sudden shift of weight as the unit is removed from its base (pallet).

3-15-2-4-1 Unpacking Cart

Table 3-17: Procedure to take out Cart

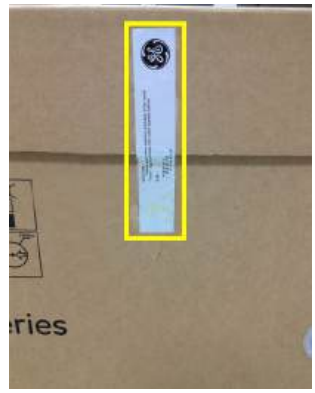
No.	Steps	Corresponding Graphic
1.	Tear the stop open mark.	
2.	Cut the two packing straps around the crate. *Note: To avoid injury, with one hand holding the strap clasp when cutting the strap.*	

Table 3-17: Procedure to take out Cart

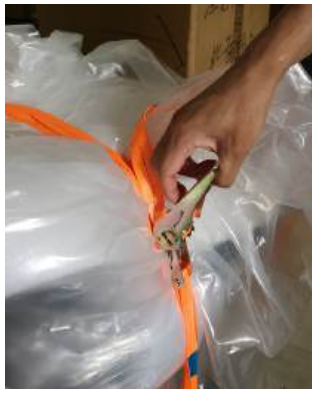
No.	Steps	Corresponding Graphic
3.	Open the carton cover and remove it.	
4.	Remove the corrugated board with foam at both sides.	
5.	Flip up the lock and remove the belt.	

Table 3-17: Procedure to take out Cart

No.	Steps	Corresponding Graphic
6.	Remove the barrier bag and cut the wrapping bag with scissor. Then remove all the foam that protect the system. *Note: It is recommended not to use knife to cut the wrapping bag to prevent any cable damage.*	 
7.	Lift the cart from the wooden pallet by two people.	

3-15-2-4-1 Unpacking Cart(continued)

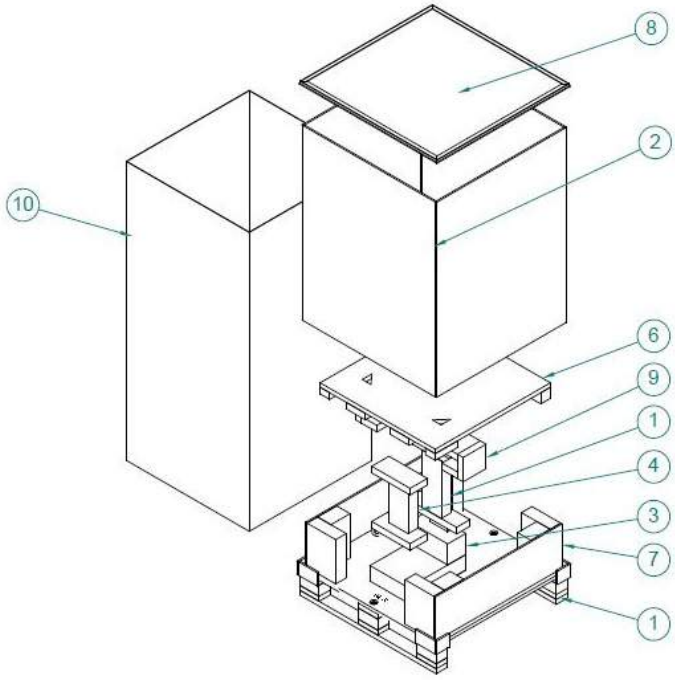


Figure 3-81. Remove Foam

1. Pallet with foam
2. Fefco 0501 BC-flute
3. Support foam 1
4. Support foam 2
5. Support foam 3
6. Top foam
7. Corrugated board with foam
8. ExPak type-P lid
9. Side foam
10. High-barrier bag

3-15-2-4-2 Moving into Position

CAUTION

Do not tilt the unit more than 5 degrees to avoid tipping it over.

In general, a single adult can move the Vivid *iq* along an even surface with no steep grades. At least two people should move the machine when large humps, grooves, or grades will be encountered. (It is better to pull from the rear rather than push from the front of the unit). Before moving, store all loose parts in the unit. Wrap transducers in soft cloth or foam to prevent damage.

Vivid *iq* is a compact and mobile machine, two people should move it over rough surfaces or up and down grades.

3-15-2-4-3 Product Locator Installation Card

NOTE: The Product Locator Installation Card shown in this manual may not be same as the provided Product Locator card.

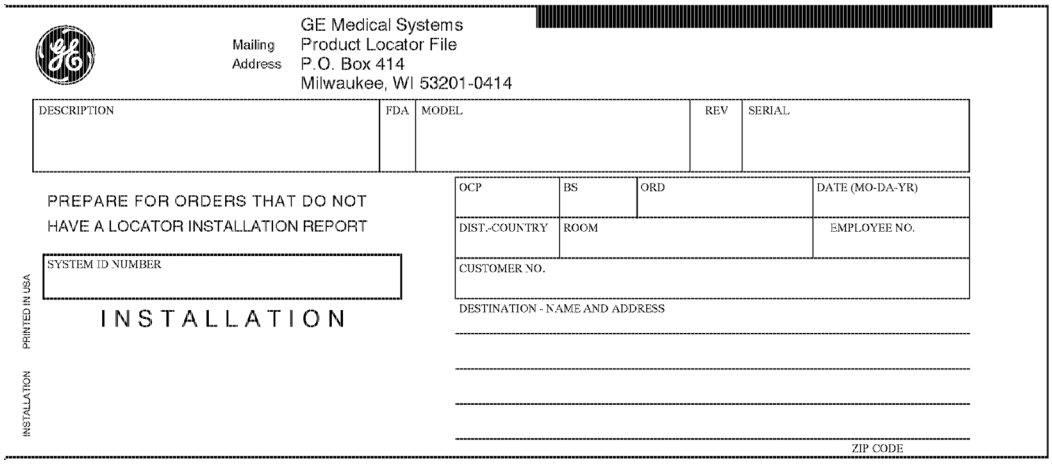


Figure 3-82. Product Locator Installation Card

3-15-2-5 Preparing for Installation

3-15-2-5-1 Verify Customer Order

Compare items received by the customer to that which is listed on the delivery order. Report any items that are missing, back ordered or damaged.

3-15-2-5-2 Electrical Specifications

Verify that Cart is set to the correct voltage.
The Voltage settings for the Cart is found on a label to the left of the Power switch and External I/O, on the rear of the system.

Connecting a Cart to the wrong voltage level will most likely destroy it.

Table 3-18: Electrical requirements for Cart

PARAMETER	AREA	LIMITS
Voltage Range	100-240V~	350VA
Power	All applications	More than or equal to 750 VA
Line Frequency	All applications	50/60Hz (±2Hz)
Power Transients	All applications	Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.
Decaying Oscillation	All applications	Less than 15% of peak voltage for less than 1 millisecond.

3-15-2-5-3 Connecting to the electrical outlet

WARNING

POWER OUTAGE MAY OCCUR. The ultrasound unit requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you DO NOT have other equipment operating on the same circuit.

The unit's power must be supplied from a separate, properly rated outlet to avoid risk of fire.

The power cord should not, under any circumstances, be altered to a configuration rated less than that specified for the current.

Only connect Vivid *iq* and mains-operated accessories to the appropriate wall outlet. DO NOT connect them to a single or multiple socket outlets, an extension cord, power strip or an adapter plug.

1. Ensure that the wall outlet is of appropriate type, and that the power switch is turned off. The system and cart can draw power from standard wall outlets in the country of use.
2. Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3. Attach the power plug to the system and secure it in place by using the retaining clamp.

CAUTION

Ensure that the retaining clamp for the power plug is fixed firmly.

CAUTION

Use caution to ensure that the power cable does not disconnect during system use.

4. Secure the power plug to the wall outlet.
5. If powered by AC/DC adaper, the power plug is an isolation means which used to isolate its circuits electrically from the SUPPLY MAINS.
6. If powered by cart, the main switch is an isolation means which used to isolate its circuits electrically from the SUPPLY MAINS.

The console can be supplied by the cart or the battery.

3-15-2-5 Preparing for Installation(continued)

WARNING

Use caution to ensure that the power cable does not disconnect during system use.

If the system is accidentally unplugged, data may be lost.

CAUTION

Do not position the system to make it difficult to operate the mains plug.

3-15-2-5-4 EMI Protection

This Unit has been designed to minimize the effects of Electro Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

3-15-2-5-5 Physical Dimension and Weight

The physical dimension of the Cart is summarized in Table 3-19 *on page 3-152* and Table 3-20 *on page 3-152*.

Table 3-19: Physical Dimensions of Generic Cart

	Height	Width	Depth
Mobile Cart	835±20 - 1115±20 mm (32.9±0.8 - 43.9±0.8inch)	524.9±10 mm (20.7±0.4 inch)	552.3±10 mm (21.7±0.4 inch)
• The weight of the mobile cart is 41 kg (99 lbs). • Max Weight: 65 kg (143 lbs.) with full configuration (Console, mobile cart, Multi-probe box, probes, charge box with batteries).			

Table 3-20: Physical Dimensions of Stadnard/Premium Cart

	Height	Width	Depth
Mobile Cart	846±20 - 1146±20 mm (33.3±0.8 - 45.1±0.8inch)	510±10 mm (20.1±0.4 inch)	510±10 mm (20.1±0.4 inch)
• The weight of the mobile cart is 31 kg (68 lbs). • Max Weight: 55kg (121 lbs.) with full configuration (Console, Mobile Cart, Multi-probe box, probes, charge box with batteries, DVD/printer shelf, rear handle with cable management).			

3-15-2-5-5 Physical Dimension and Weight(continued)

Figure 3-83. Overall Dimensions (for generic Cart)

Figure 3-84. Overall Dimensions (for standard/premium Cart)

3-15-2-6 Peripheral Installation

3-15-2-6-1 Install Printer on Generic Cart

Tools

- Common Hex driver
- common Phillips screwdriver

Needed Manpower

- 1 person, 5 minutes+travel

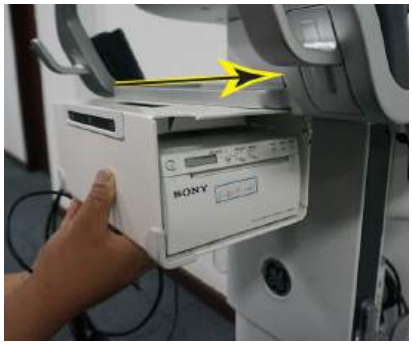
Preparations

- Turn off all the power supply.

Table 3-21: Mounting Procedure of Printer Shelf Assy

No.	Step	Corresponding Graphic
1.	Push the printer into the printer shelf.	
		
2.	Screw 4 screws.	

Table 3-21: Mounting Procedure of Printer Shelf Assy

No.	Step	Corresponding Graphic
3.	Connect the 2 cables to the printer.	
4.	Pull out the locks on both sides of the bottom of the lower table assy, and then rotate the locks 90° clockwise.	
5.	Push the printer shelf into the slot.	
6.	Repeat step 4 to lock the printer shelf.	
7.	Connect the cables to the cart.	

Removal Procedure

- Remove the new parts in the reverse order of installation.

3-15-2-6-2 Connect DVD-RW to Generic Cart

Tools

- NA

Needed Manpower

- 1 person, 8 minutes+travel

Preparations

- Shut down the system and switch off the main breaker.

Mounting Procedure

Table 3-22: Mounting Procedure of DVD-RW

No.	Step	Corresponding Graphic
1.	Put the DVD cover onto the DVD-RW if there is bracket on the shelf.	
2.	Connect the USB Cable to the DVD-RW.	
3.	Let the USB cable come out from the left side of the printer shelf and then push the DVD-RW into the slot of the printer shelf.	

Table 3-22: Mounting Procedure of DVD-RW

No.	Step	Corresponding Graphic
4.	Install the printer shelf to the cart.See 3-15-2-6-1 'Install Printer on Generic Cart' on *page 3-154 for more information.*	

Removal Procedure

Remove the new parts in the reverse order of installation.

Install Printer on the Standard Cart/Premium Cart

Purpose: This is a description on how to install the printer on the Standard Cart/Premium Cart.

3-15-2-6-3 Tools

- Common Phillips screwdrivers

3-15-2-6-4 Needed Manpower

- 1 person, 10 minutes + travel

3-15-2-6-5 Preparation

- Shut down the system and switch off the main breaker. Remove the system from the cart.

3-15-2-6-6 Install Procedure

Table 3-23: Install Procedure for Printer

No.	Steps	Corresponding Graphic
1.	Prepare a Printer Shelf.	

Table 3-23: Install Procedure for Printer

No.	Steps	Corresponding Graphic
2.	Install the two screws and Rear Bracket to the printer.	
		
		

Table 3-23: Install Procedure for Printer

No.	Steps	Corresponding Graphic
3.	Place the Printer in the Printer Shelf and completely push the Printer into the shelf. *Note: When pushing, you need to align the rear bracket with the slot in the printer shelf.*	
		
4.	Tighten two screws on the shelf.	

Table 3-23: Install Procedure for Printer

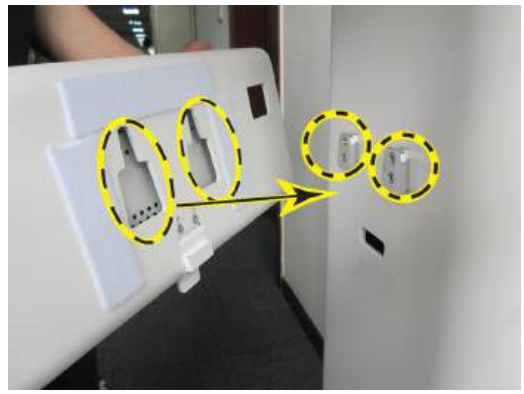
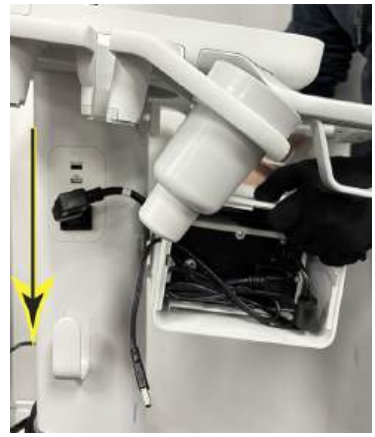
No.	Steps	Corresponding Graphic
5.	Connect the printer USB cable (a) and power cord (b) to the printer, manage the cables through the hole on the printer shelf. *Note: Please manage the printer USB cable and put it in the printer shelf.*	
6.	Align the 2 hooks on the upper column to the 2 holes on the shelf and press down the shelf until it mounts on column.	
		

Table 3-23: Install Procedure for Printer

No.	Steps	Corresponding Graphic
7.	Connect the printer USB cable (a), power cord (b) to the USB ports on the cart. *Note: Please connect the printer USB cable (a) to the printer dedicated USB port as shown in the picture.*	 

Table 3-23: Install Procedure for Printer

No.	Steps	Corresponding Graphic
8.	Install the Printer Shelf front cover and back cover.	   

Install DVD-RW on the Standard Cart/Premium Cart

Purpose: This is a description on how to install the DVD-RW on the Standard Cart/Premium Cart.

3-15-2-6-7 Tools

- Common Phillips screwdrivers

3-15-2-6-8 Needed Manpower

- 1 person, 5 minutes + travel

3-15-2-6-9 Preparation

- Shut down the system and switch off the main breaker. Remove the system from the cart.

3-15-2-6-10 Install Procedure

Table 3-24: Install Procedure for DVD-RW

No.	Steps	Corresponding Graphic
1.	Prepare a Printer Shelf.	
2.	Connect the USB cable to the DVD-RW.	

Table 3-24: Install Procedure for DVD-RW

No.	Steps	Corresponding Graphic
3.	Route the DVD-RW cable through the hole on the Printer/DVD-RW Shelf and push the DVD-RW to the end.	
		

Table 3-24: Install Procedure for DVD-RW

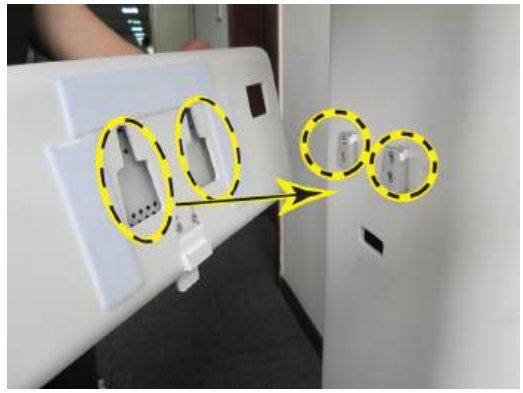
No.	Steps	Corresponding Graphic
4.	Align the 2 hooks on the upper column to the 2 holes on the shelf and press down the shelf until it mounts on column.	
		
5.	Connect the DVD-RW cable (c) to the USB ports on the cart. *Note: Please connect the DVD-RW cable (c) to any two USB ports as shown in the picture. Do not connect the DVD-RW cable to the USB port only for printer on the cart.*	

Table 3-24: Install Procedure for DVD-RW

No.	Steps	Corresponding Graphic
		

Table 3-24: Install Procedure for DVD-RW

No.	Steps	Corresponding Graphic
6.	Install the Printer Shelf front cover and back cover.	
		
		
		

Please refer to “Install Vivid iq cart 4PP assy”¯ in Vivid *iq* Mobile Cart User Instruction for 4PP Assy Installation of mobile cart.

3-15-2-7 Paperwork

NOTE: During and after setup, the documentation (i.e. User Manuals...) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

3-15-2-7-1 Product Locator Installation

3-15-2-7-2 User Manual

Check that the correct User Manual(s) for the Cart is included with the installation. Specific language versions of the User Manual may also be available. Check with your GE Sales Representative for availability.

3-16 Cart Using

3-16-1 Contents in This Section

3-16-2 Introduction

The Cart supports the ultrasound system as below:

- Vivid *iq*

The cart can supply power for the system and peripherals which are mounted to the cart.

3-16-3 Height Adjustment

Please refer to ‘Set Mobile Cart Height’ in Vivid *iq* Mobile Cart User Instruction for details.

3-16-4 Locking the Wheels

Please refer to ‘Lock/Unlock Wheels’ in Vivid *iq* Mobile Cart User Instruction for details.

3-16-5 Mounting the System to Cart

Please refer to ‘Lock Ultrasound System to Mobile Cart’ in Vivid *iq* Mobile Cart User Instruction for details.

3-16-6 Release the System from the Cart

Please refer to ‘Unlock Ultrasound System to Mobile Cart’ in Vivid *iq* Mobile Cart User Instruction for details.

3-16-7 Switch the Three Probes

The system can switch the probe between the three probe which are connected in the Cart Three Probes Box.

From the keyboard, press the Exam key. The Probe screen appears. Select the probe which you want.

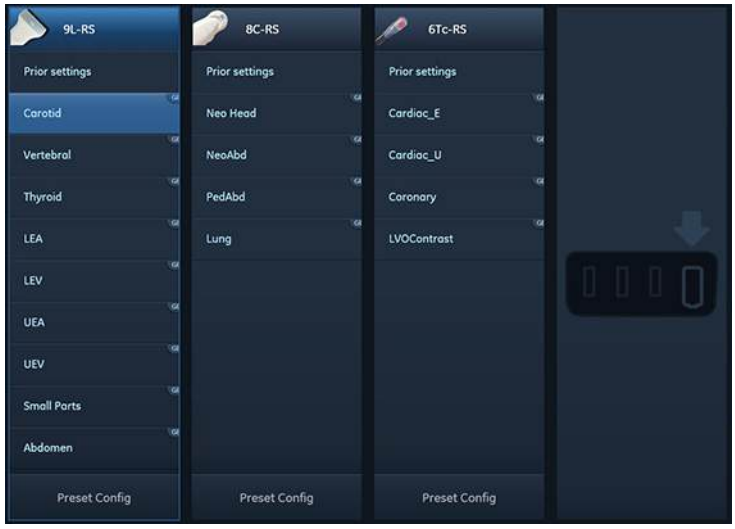


Figure 3-85. Probe Screen

NOTE: If the cart loses power, the factory default probe is the probe which is connected to the port.

3-16-8 System Operation

Vivid *iq* is supported on the Cart.

NOTE: To upgrade the system, release the system from the Cart and connect the USB Memory Stick or SD Card to the system directly.

NOTE: To power off the Cart, open the circuit breaker and then pull out the AC Power Cord from the wall AC outlet.

NOTE: Do not plug the AC Power into the wall in the state of closing the circuit breaker.

Chapter 4

General Procedures and Functional Checks

This chapter provides procedures for quickly checking major functions of the Vivid iq and diagnostics instructions using the built-in service software.

4-1 Overview

4-1-1 Purpose of this chapter

This chapter provides procedures for quickly checking major functions of the scanner and diagnostics instructions using the built-in service software.

4-1-2 Contents in this chapter

4-1-3 Special Equipment required

To perform these tests, you'll need any of the sector, linear, or convex probes. (Normally you should check all the probes used on the system).

4-2 General procedure

4-2-1 Overview

Some procedures are used more often than other. The intention with this section is to keep the most used procedures in one place.

4-2-1-1 Contents in this section

CAUTION

Ultrasound system requires all covers.

Operate this Ultrasound system only when all board covers and frame panels are securely in place. The covers are required for safe operation, good Ultrasound system performance and cooling purposes.

4-2-1-1 Contents in this section(continued)

Energy Control and Power Lockout for Vivid *iq*.

When servicing parts of the Ultrasound system where there is exposure to voltage greater than 30 volts:

1. Follow LOCK OUT/TAG OUT procedures.
2. Turn off the breaker.
3. Unplug the Ultrasound system.
4. Maintain control of the Ultrasound system power plug.
5. Wait for at least 30 seconds for capacitors to discharge as there are no test points to verify isolation.
6. Remove/disconnect the battery, if present.

Ultrasound System components may be energized.

4-2-2 Power ON/Boot Up

4-2-2-1 Warnings


DANGER

ALWAYS CONNECT THE ULTRASOUND SYSTEM TO A FIXED POWER SOCKET WHICH HAS THE PROTECTIVE GROUNDING CONNECTOR.


DANGER

NEVER USE A THREE-TO-TWO PRONG ADAPTER; THIS DEFEATS THE SAFETY GROUND.


DANGER

ENSURE THAT THE POWER CORD AND PLUG ARE INTACT AND THAT THE POWER PLUG IS THE PROPER HOSPITAL-GRADE TYPE (WHERE REQUIRED).


CAUTION

Ultrasound system requires all covers.

Operate this Ultrasound system only when all board covers and frame panels are securely in place. The covers are required for safe operation, good Ultrasound system performance and cooling purposes.


CAUTION

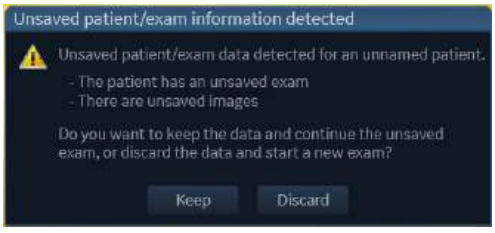
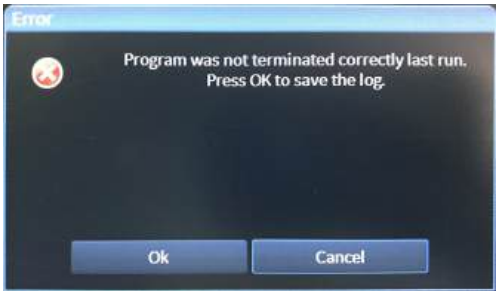
Use only power supply cords, cables and plugs provided by or designated by GE.

NOTE: Do not cycle the Circuit Breaker ON-OFF-ON in less than five (5) seconds. When turning OFF the Circuit Breaker, the Ultrasound system should de-energize completely before turning the circuit breaker ON.

4-2-2-2 System Messages

The following messages may appear during start-up. Please refer to the cause/action information provided when trying to resolve the issue.

Table 4-1: Messages

System Message	Cause/Action to Take
	Cause: Disk encryption is currently disabled. Action to Take: • Check the check-box, system will not show this warning at next start-up. • Uncheck the check-box, system will show this warning at next start-up. Click **Ok** to continue loading the system. *Note: Do Not Check the check-box without Customer's approval, or leave it unchecked.*
	Cause: 'ADM' or 'USR' exist with default passwords. Action to Take: • Check the check-box, system will not show this warning at next start-up. • Uncheck the check-box, system will show this warning at next start-up. Click **Ok** to continue loading the system.
	Cause: Unsaved patient/exam information detected. Action to Take: • Press **Keep** to keep the data and continue the unsaved exam. • Press **Discard** to discard the data and start a new exam.
	Cause: Program was not terminated correctly last run. Action to Take: • Press **Ok** to save the log. • Press **Cancel** to ignore the error.

4-2-2-3 Connect AC (mains) Power to Vivid *iq*

Connecting AC Power to the Vivid *iq* ultrasound unit, involves preliminary checks of the power cord, voltage level and compliance with electrical safety requirements.

1. Ensure that the wall outlet is of appropriate type, and that the Circuit Breaker is turned off.
2. Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3. Verify that the power cable is without any visible scratches or any sign of damage.
4. Verify that the on-site mains voltage is within the limits indicated on the rating label near the Circuit Breaker on the rear of the unit.
5. Connect the Power Cable's female plug to the Power Inlet at the rear of the unit.
6. Lock the plug in position with the Retaining Clamp (ACC Clamp).
7. Verify that the Mains Power Circuit Breaker is in OFF position, if not, switch it OFF.
8. Connect the Power Cable's other end (male plug) to a hospital grade mains power outlet with the proper rated voltage, and the unit is ready for Power ON/Boot Up.

4-2-2-4 Switch ON the AC Power to Vivid *iq*

1. Switch ON the Mains Power Circuit Breaker at the rear of the unit.

   You should hear a “click” from the relays in the AC Power and the unit is ready to boot.
2. Press once on the **On/Off** key on the Operator Panel to boot the unit.

   During a normal boot, you may observe that:

   a. The unit’s ventilation fan starts on full speed, but slows down after a few seconds (listen to the fan sound).

   b. Power is distributed to the peripherals, Operator Panel (Console), Monitor, Front End Processor and Back End Processor.

   c. Back End Processor and rest of scanner starts with the sequence listed in the next steps:

   d. Back End Processor is turned ON and starts to load the software.

   e. The Start Screen is displayed on the monitor.

   f. A start-up bar indicating the time used for software loading, is displayed on the monitor.

   g. The software initiates and sets up the Front End electronics and the rest of the instrument.

   h. The backlight in the keyboard is lit.

   i. As soon as the software has been loaded, either a 2D screen is displayed on the screen, indicating that a probe has been connected, or a No Mode screen is displayed, indicating that no probe has been connected.

NOTE: *Total time used for start-up is typical one and a half minutes or less. If starting after a power loss or a lock-up, the start-up time may be up to four minutes.*

4-2-3 Power shut down

When you switch off the Ultrasound system, the Ultrasound system performs an automatic shutdown sequence.

The SYSTEM - EXIT menu, used when switching off the Ultrasound system, gives you these choices:

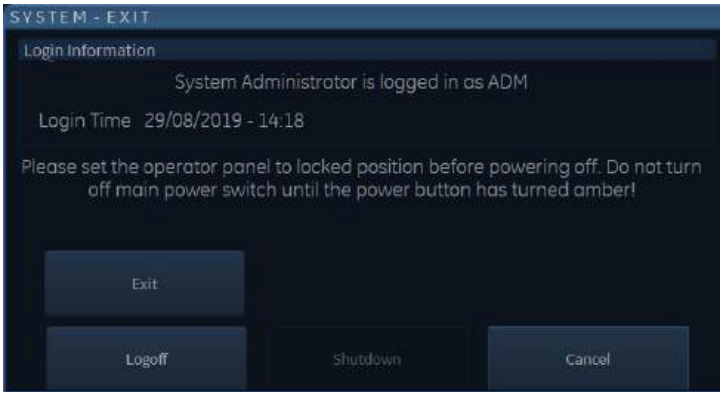


Figure 4-1. The Exit dialogue window

The SYSTEM - EXIT menu, used when switching off the Ultrasound system, gives you these choices:

- **Exit**

  (Only available when logged in as GE Service with Service Dongle)

  Select this button when you want to exit to the Windows Desktop.

NOTE: *If you need to restart Vivid iq when logged on to the Windows Desktop, ensure that you do a complete power down (Shut Down). This is required to power up the Front End Processor.*

- **Logoff**

  Use this button to log off the current user.

  The system remains ON and ready for a new user to log on.

  If the Logoff button is dimmed, it indicates that no user is logged on to the unit at the moment.

4-2-3 Power shut down(continued)

- **Shutdown**

  Use this button to shut down the system. The entire system will shut down. It is recommended to perform a full shutdown at least once a week.

  If the Shutdown button is dimmed, use the key-combination <Ctrl+Alt+Delete> to shut down the unit.

- **Cancel**

  Use this button to exit from the System-Exit menu and return to the previous operation.

CAUTION

DO NOT unplug and/or transport the unit until after the power off sequence has been completed. Failure to do so may result in corrupted patient files.

4-2-4 System battery LED Indicators Information

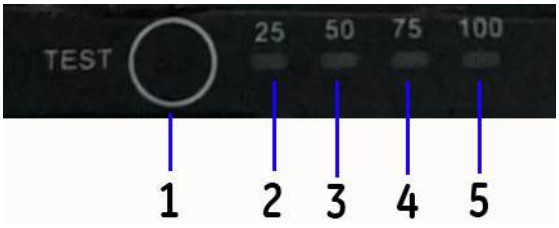


Figure 4-2. Charge box LED Indicators

- 1: Test Key
- 2, 3, 4, 5: LED indicators

LED indicators show different status of the system battery as shown below:

Table 4-2: System battery LED indicators information

LED	Color	Indication
LED2 ~ LED5	On	remaining capacity>=75%
LED2 ~ LED4	On	50%< =remaining capacity <75%
LED2 ~ LED3	On	25%<= remaining capacity <50%
LED2	On	remaining capacity <25%
LED2 ~ LED5	Off	EDV0=1

4-2-5 Charge box LED Indicators Information

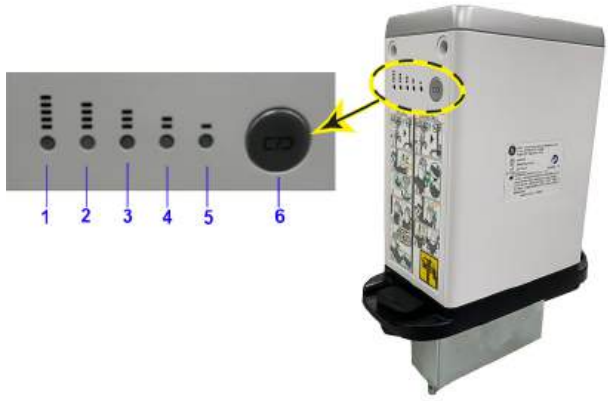


Figure 4-3. Charge box LED Indicators

- 1, 2, 3, 4, 5: LED indicators
- 6: Power Key

LED indicators show different status of the Charge Box as shown below:

Table 4-3: Charge box LED indicators information

LED	Color	Indication
LED1 ~ LED5	green	remaining capacity>90%
LED2 ~ LED5	green	70%< remaining capacity <=90%
LED3 ~ LED5	green	50%< remaining capacity <=70%
LED4 ~ LED5	green	30%< remaining capacity <=50%
LED5	green	10%< remaining capacity <=30%
LED5	flashing	remaining capacity <=10%

NOTE: When the AC power is ON, the LED indicators on the Charge Box will automatically display the remaining capacity. When the AC power fails or the AC cable is abruptly pulled out, you should press the Power Key on the Charge Box to show the remaining capacity of the charge box. In this case, the light of the LED indicators will only last for five minutes to save the battery power.

4-2-6 Logging on to Vivid *iq* as "ADM"

Press **Config** on the Shortcut Bar and log on as administrator if required.

It will bring up the **Operator Login** dialog where you must log on.

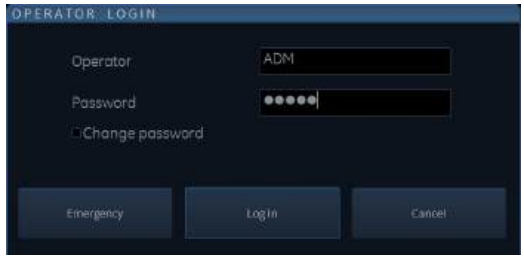


Figure 4-4. Operator Login Window

1. **Operator**: Select the operator.
2. **Password**: Enter Operator's password (optional).
3. Select the type of Login or Cancel.
   - **Emergency**: Stores data only from current patient examination.
   - **Log on**: Standard login.
   - **Cancel**: Cancel login.

By default, two users are defined, USR and ADM.

- USR

If you log on as **USR,** you will have access to perform setup tasks that a user may need to do during daily use.

By default, no password has been set for **USR**. Just type the name **USR**, and select **Login**.

- ADM

If you log on as **ADM**, you will have access to do general set-up, service adjustments, adjust network and connectivity settings.

By default, the password for **ADM** is **ulsadm**.

Select the name **ADM**, the password (**ulsadm**) and select **Login**.

NOTE: It is possible for the administrator (*ADM*) to establish new users and set unique passwords for each user, including a new password for ADM. If the login as ADM fails, contact the responsible person in the hospital to get access.

4-2-7 Service Key (SSA)

A Service Key and a proprietary GE Service password are necessary for use by GE Service when performing proprietary level diagnostics like accessing the desktop on the BEP. The password used with the GE service key changes at specific intervals.

The SSA key provides secure access for GE service personnel to advanced tools to service the system.

SSA is a class M key with the following characteristics:

- Access to all service features
- Access to Windows Desktop
- Key must be renewed every 30 days
- Tied to SSO
- Password locked via key pad

Please complete the course on GE Learning before using SSA:

Course name: Secure Service Access Training

Course ID: GEHC-SVCS-63061025

NOTE: Press 'I Agree' to enter the Maintenance Access Screen when below Information dialogue window appears. Press OK before the status bar completes, otherwise the system may enter scanning screen.

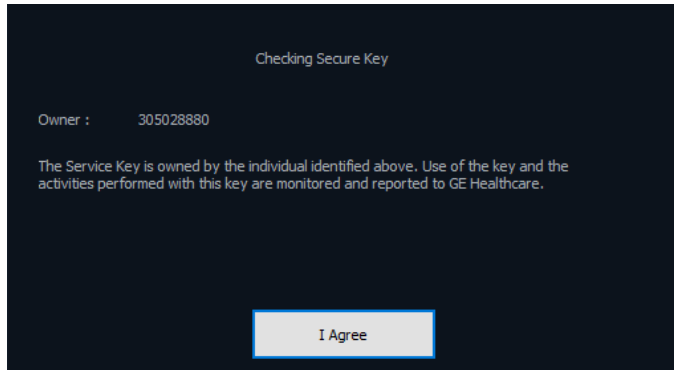


Figure 4-5. Service Key Information

4-2-8 Removable media

Refer to the latest revision of the User Manual to perform the following tasks:

- Using Removable Media
- Labeling Removable Media
- Formatting Removable Media
- Verifying Removable Media

4-2-9 Creating presets

Refer to the latest revision of the Vivid *iq* User Manual.

4-2-10 Archiving and loading presets

NOTE: Always save presets before any software reload. This ensures the presets loaded after the software reload are as up–to–date as possible.

All user presets except changes to Summary, Anatomy, and Biometry pages, can be saved on an DVD-R disk (or USB memory device) for reloading on the system.

NOTE: Presets should NOT be saved on the same USB memory device (or DVD-R disk) as images. The Archive Menu lists the images but does NOT list the presets stored on a USB memory device (or DVD-R disk).

4-2-10-1 Archiving Presets to a USB memory device (or DVD-R Disk)

1. Connect the USB memory device to the system's USB port, or insert an empty (blank) DVD-R disk into the DVD-RW.
2. Access to the Config/Admin Menu, and select Backup. The Backup sheet will be shown on the LCD display.

Figure 4-6. Backup Sheet

3. Select the item to Backup.
4. Enter backup destination or browse through the disk to locate the destination.
5. Select Backup. The backup status for each item is displayed on the Result column.

4-2-10-2 Loading Presets from a USB memory device (or DVD-R)

1. Connect the USB memory device or DVD-R with the archived Presets to the system.
2. Access to the Config/Admin Menu, and select Restore. The Restore sheet will be shown on the LCD display. See Figure 4-6 *on page 4-15*.
3. Select the items needed to be restored.
4. Select Restore. The system performs the restore and restarts.

4-2-11 Data Management

For more information, refer to the latest revision of the Vivid *iq* User Manual.

4-2-12 Backup

For more information, refer to the latest revision of the Vivid *iq* User Manual.

4-2-13 Deleting patient information

Before you dispose of the hard drive, or return the BEP to the local parts organization, make sure you remove ALL PATIENT DATA from the hard drive, given that the hard drive is still functional. In some countries, you may be required to delete all software from the disk before returning the hard drive to the parts warehouse. Follow your local policies.

Ensure that **All Patient Information** has been deleted before:

- shipping/returning the Ultrasound system
- returning the Back End Processor to the local parts organization/parts warehouse
- you dispose of the hard drive

GE employees: Follow GE°Øs procedures to complete Secure Wipe of Customer System Storage Media.

Other users of this manual: Contact GE Service for assistance to perform complete Secure Wipe of Customer System Storage Media.

4-2-14 Restore the factory defaults

For instructions, please see “Data Backup and Restore” in the User Manual.

NOTE: It is not suggested to manually delete the files in D:\Idunn\target\resources\idunn\userdefs.

WARNING

To avoid lacking of connecting to Local Archive, connecivity.res and IPSave *in D:\Idunn\target\resources\idunn\userdefs* could not be deleted.

4-2-15 Installation and Setup Procedure for Peripherals

Please refer to 3-8-3 ‘Peripherals Installation Instructions’ on *page 3-27*.

4-2-16 LCD Monitor position adjustment

Refer to User Manual for LCD Monitor position adjustment.

4-3 Functional checks

4-3-1 Overview

In this section, the functional checks for Vivid *iq* are described. Functional checks are used to verify that the product works as intended. Functional checks may also be used during troubleshooting.

4-3-2 Preparation

Turn on power to Vivid *iq*. For detailed description, 4-2-2 ‘Power ON/Boot Up’ on *page 4-5*

4-3-3 Control Panel

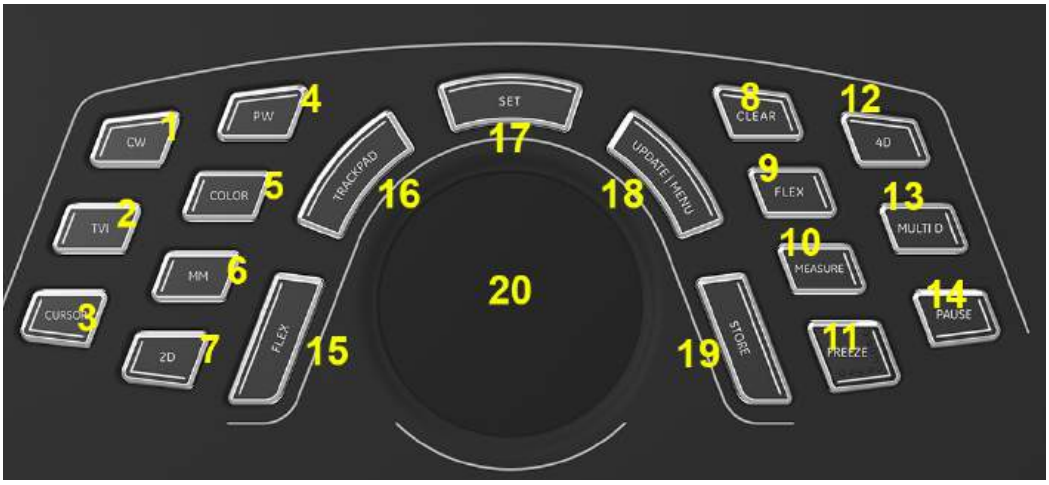


Figure 4-7. Control Panel Map

1. CW: Activate CW mode.
2. TVI: Activate TVI mode.
3. Cursor: Activate sample volume adjustment to adjust the sample volume location, length and angle.
4. PW: Activate PW mode.
5. Color: Activate Color Flow mode.
6. MM: Activate M mode.
7. 2D: Activate 2D mode.
8. Clear: Erase function.
9. Flex: Configurable with specific functions
10. Measure: Activate measurement function.
11. Freeze: Activate freeze mode.
12. 4D: Activate 4D mode.
13. Multid: Activate Multi-plane 4D.
14. Pause: Stop or restard a function, start/restart LOGIQ View.
15. Flex key: Configurable with specific functions
16. Trackpad key:
    - Toggles between trackpad functional groups.
17. Set key:
    - A select key which functions like the mouse left key.
    - When Pos/Size is selected, press the Set key to switch between Pos and Size.
18. Update/Menu key:
    - In Live duplex mode (Doppler or M-mode): Toggles Live/Freeze between the 2D image and the spectrum image.
    - A select key which functions like the mouse right key.
19. Store key: Store Cine loop or images
20. Trackpad:
    - Adjusts the selected control.
    - Moves the pointer.
    - Performs the selected control or highlighted menu item.

4-3-4 Performance Tests

4-3-4-1 Test Phantoms

The use of test phantoms is only recommended if required by your facility's (customer's) QA program.

4-3-5 2D Mode (B mode) Checks

4-3-5-1 Introduction

The 2D Mode is the system's default mode.

4-3-5-2 Preparations

- Connect one of the probes.
- Turn ON the scanner.

  The 2D Mode is displayed (default mode).

4-3-5-3 Adjust the 2D mode controls

The use of preset gives optimum performance with minimum adjustment. If necessary, the following controls can be adjusted to further optimize the 2D image:

- Press **Auto Tissue** on the Side Bar.
  - **Soft**: optimizes the radial and lateral uniformity and brightness of the tissue continuously in real-time.

    The mention "Soft" is displayed on the upper right corner of the image area
  - **Sharp**: further enhances the image display by optimizing the grayscale curve.

    The mention "Sharp" is displayed on the upper right corner of the image area

  The Auto Tissue setting (Soft or Sharp) can be turned on/off by pressing **Auto Tissue** on the Side Bar. The last used setting is then applied.

  The Auto Tissue settings are only available in live scanning and cannot be turned off when the image is stored.
- If available, press **Virtual Apex** (probe dependent) to improve near field imaging, allowing increased visibility up to the width of the full probe aperture close to the surface.

4-3-5-3 Adjust the 2D mode controls(continued)

- If available, press **Virtual Convex** (probe dependent) to provide a larger field of view in the far field.

  Activating Virtual Convex may change the TI and/or MI. Observe the output display for possible effects.
- Use the **Gain** and **TGC** controls to optimize the overall image.

  Gain increases or decreases the amount of echo information displayed. TGC compensates for depth-related attenuation in the image.

- Use the **Depth** control to adjust the range to be imaged.
- Use the **Frequency** control (move to higher frequencies) or the **Frame rate** control (move to lower frame rate) to increase resolution in image.
- Use the **Frequency** control (move to lower frequency) to increase penetration.
- Use the **Reject** control to reduce noise in the image.
- Use the **DDP** control to optimize imaging in the blood flow regions and make a cleaner, less noisy image.
- Use **UD Clarity** (Cardiac) or **UD Speckle reduce** (non-cardiac) to reduce image speckle. Extra care must be taken to select the optimal Speckle reduction level, as too much filtering of speckle can mask or obscure desired image detail.
- Adjust **Octave** to toggle between Fundamental and Harmonic mode.
- Press **Color maps** and select a gray map from the menu on screen.

4-3-6 M Mode Checks

4-3-6-1 M-Mode overview

This unit has three types of M-Mode:

- Conventional M-Mode (MM): displays a distance/time plot of a cursor line in the axial plane of the 2D-image.
- Anatomical M-Mode (AMM): displays a distance/time plot from a cursor line, which is independent from the axial plane. AMM is available in grayscale, color, TVI, Tissue Tracking, Strain rate and Strain modes.
- Curved Anatomical M-Mode (CAMM): displays a distance/time plot from a free-drawn cursor line. CAMM is available in grayscale, color, TVI, Tissue Tracking, Strain rate and Strain modes.

Conventional M-Mode can be combined with Color Mode.

4-3-6-2 Preparations

- Connect one of the probes to the scanner's left-most probe connector.
- Turn ON the scanner.

  The 2D Mode window is displayed (default mode).
- Press **MM** on the Operator panel to bring up an M-Mode picture on the screen.

  Use the trackpad to position the cursor over the required area of the image.

4-3-6-3 Adjust the M Mode controls

The use of preset gives optimum performance with minimum adjustment. If necessary, the following controls can be adjusted to further optimize the M-Mode display:

- Adjust **Horizontal sweep** to optimize the display resolution.
- Adjust **Gain** and **TGC** controls to adjust the range to be imaged.
- Use the **Frequency** (move to higher frequencies) or the **Frame rate** control (move to lower frame rate) to increase resolution in image.
- Adjust **Dynamic range** to optimize the useful range of incoming echoes to the available grayscale.
- Adjust **Compress** to further optimize the display.
- Adjust **Reject** to reduce noise while taking care not to eliminate significant low-level diagnostic information.

4-3-7 Color Mode Checks

4-3-7-1 Introduction

Color Flow screens are 2D or M Mode screens with colors representing blood or tissue movement.

Color Flow may be selected both from 2D mode or from M mode or a combination of these.

4-3-7-2 Preparations

- Connect one of the probes to the scanner's left-most probe connector.
- Turn ON the scanner.

  The 2D Mode window is displayed (default mode).

4-3-7-3 Select Color 2D Mode

1. From an optimized 2D image, press **Color.**
2. Use the trackpad to position the ROI frame over the area to be examined.
3. Press **Select**. The instruction **Size** should be highlighted in the trackpad status bar. Use the trackpad to adjust the dimension of the ROI.

4-3-7-4 Adjust the Color 2D Mode controls

- Adjust the **Active mode gain** to set the gain in the color flow area.

  Adjust **Scale** to the highest setting that provides adequate flow detection.

NOTE: *The scale value may affect FPS, Low Velocity Reject, and Sample Volume.*

Adjust **Low Velocity Reject** to remove low velocity blood flow and tissue movement that reduces image quality.

Adjust **Variance** to detect flow disturbances.

Adjust **Sample volume** (SV) to a low setting for better flow resolution, or a higher setting to more easily locate disturbed flows.

Adjust **Frequency** to optimize the color flow display. Higher settings improve resolution. Lower settings improve depth penetration and sensitivity. This does not affect the frequency used for 2D and M-Mode.

NOTE: *Frequency setting may affect FPS, SV and Low Velocity Reject.*

Adjust **Power** to obtain an acceptable image using the lowest setting possible.

NOTE: *The Power setting affects all other operating modes.*

Adjust the following settings to further optimize display of the image:

- Use **Invert** to reverse the color assignments in the color flow area of the display.

  Use **Tissue priority** to emphasize either the color flow overlay, or the underlying grey scale tissue detail.

  Use **Baseline** to emphasize flow either toward or away from the probe.

  Use **Radial** and **Lateral Averaging** to reduce noise in the color flow area. Radial and Lateral Averaging smooths the image by averaging collected data along the same horizontal line. An increase of the lateral averaging will reduce noise, but this will also reduce the lateral resolution.

4-3-7-5 Select Color M Mode

1. Select M Mode.
2. Use the trackpad to position the ROI frame over the area to be examined.
3. Press **Select**. The instruction **Size** should be highlighted in the trackpad status bar. Use the trackpad to adjust the dimension of the ROI.

4-3-7-6 Adjust the Color M Mode controls

- Adjust the Active mode gain to set the gain in the color flow area.

  Adjust **Scale** to the highest setting that provides adequate flow detection.

NOTE: *The scale value may affect FPS, Low Velocity Reject, and Sample Volume.*

Adjust **Low Velocity Reject** to remove low velocity blood flow and tissue movement that reduces image quality.

Adjust **Variance** to detect flow disturbances.

Adjust **Sample volume** (SV) to a low setting for better flow resolution, or a higher setting to more easily locate disturbed flows

Adjust **Frequency** to optimize the color flow display. Higher settings improve resolution. Lower settings improve depth penetration and sensitivity. This does not affect the frequency used for 2D and M-Mode.

NOTE: *NOTE: Frequency setting may affect FPS, SV and Low Velocity Reject.*

Adjust **Power** to obtain an acceptable image using the lowest setting possible.

NOTE: *The Power setting affects all other operating modes.*

Adjust the following settings to further optimize display of the image:

- Use **Invert** to reverse the color assignments in the color flow area of the display.

  Use **Tissue priority** to emphasize either the color flow overlay, or the underlying grey scale tissue detail.

  Use **Baseline** to emphasize flow either toward or away from the probe.

  Use **Radial** and **Lateral Averaging** to reduce noise in the color flow area. Radial and Lateral Averaging smooths the image by averaging collected data along the same horizontal line. An increase of the lateral averaging will reduce noise, but this will also reduce the lateral resolution.

4-3-8 PW/CW Doppler Mode Checks

4-3-8-1 Introduction

PW and CW Doppler are used to measure velocity (most often in blood).

Doppler mode can be done with a special pencil probe or with an ordinary probe. By using an ordinary probe, you can first bring up a 2D picture for navigation purpose and then add PW/CW Doppler.

4-3-8-2 Preparations

- Connect one of the probes to the scanner.
- See 4-3-12 ? Probe/Connectors Check ? on *page 4-35* for info about connecting the probes.

  For available probes, see 8-3-3 'Probe' on *page 8-12*:
- Turn ON the scanner

  The 2D Mode window is displayed (default mode).
- If needed, adjust the Display's Brightness and Contrast setting.

  Press **PW** or **CW** to start Pulsed Wave Doppler (PW) or Continuous Wave Doppler (CW).

  Use the trackpad to select the Area of Interest (Sample Volume) in PW or direction of interest in CW.

4-3-8-3 Adjust the PW/CW Doppler Mode controls

- Adjust the **Active Gain** to set the gain in the spectral Doppler area.
- Adjust **Low velocity reject** to reduce unwanted low velocity blood flow and tissue movement.
- In PW mode, adjust **Sample volume** to low setting for better resolution, or higher setting to more easily locate the disturbed flows. Adjustment of the Sample volume may affect the PRF (Nyquist limit) settings.

4-3-8-3 Adjust the PW/CW Doppler Mode controls(continued)

- Adjust the **Compress** setting to balance the effect of stronger and weaker echoes and obtain the desired intensity display.
- Adjust **Frequency** to optimize flow display. Higher setting will improve resolution and the lower setting will increase the depth penetration.

NOTE: Frequency and Frame rate settings may affect the Low Velocity Reject.

- Adjust **Power** to obtain an acceptable image using the lowest setting possible. This is particularly important in CW mode, as the energy duty cycle is 100% (constant).

NOTE: The Doppler Power setting affects only Doppler operating modes.

CAUTION Use all noise reduction controls with care. Excessive application may obscure low level diagnostic information.

Adjust the following settings to further optimize the display of the image.

- Use the **Horizontal sweep** to optimize the sweep speed.
- To view signal detail, adjust **Scale** to enlarge the vertical spectral Doppler trace. Velocity range directly controls the pulse repetition frequency, which is responsible for the setting of the Nyquist limit (the ability to detect maximum velocity without aliasing).
- Use **Invert** to reverse the vertical component of the spectral Doppler area of the display.
- Use **Quick angle** and **Angle correction** to steer the ultrasound beam to the blood flow to be measured (Not typically required during cardiac studies).
- Press **Auto** on the Operation Panel to activate Automatic Spectrum Optimization (ASO). ASO is used to automatically adjust baseline and scale of the PW/CW spectrum to optimize the spectral display. It will avoid the display of a folded spectrum and stretch the spectrum vertically as large as possible. ASO optimization is not continuous but performed instantaneously each time **Auto** is pressed.

4-3-9 Tissue Velocity Imaging (TVI) Checks

4-3-9-1 Introduction

TVI calculates and color codes the velocities in tissue. The tissue velocity information is acquired by sampling of tissue Doppler velocity values at discrete points. The information is stored in a combined format with grey scale imaging during one or several cardiac cycles with high temporal resolution.

4-3-9-2 Preparations

- Connect one of the probes, to the scanner's left-most probe connector.
- See 4-3-12 'Probe/Connectors Check' on *page 4-35* for info about connecting the probes.

  For available probes, see 8-3-3 'Probe' on *page 8-12*:
- Turn ON the scanner.

  The 2D Mode window is displayed (default mode).
- If needed, adjust the Display's Brightness and Contrast setting.

  Press **TVI**.

  Use the trackpad (assigned function: Pos) to position the ROI frame over the area to be examined.

  Press **Select**. The instruction Size should be highlighted in the trackpad status bar.

NOTE: *If the trackpad control pointer is selected, press **trackpad** to be able to select between Position and Size controls.*

Use the trackpad to adjust the dimension of the ROI.

4-3-9-3 Adjust the TVI Controls

The use of presets gives optimum performance with minimum adjustment. If necessary, the following controls can be adjusted to further optimize the TVI display:

- To reduce quantification noise (variance), the Nyquist limit should be as low as possible, without creating aliasing. To reduce the Nyquist limit: reduce the **Scale** value.

NOTE: The Scale value also affects the frame rate. There is a trade off between the frame rate and quantification noise.

- TVI provides velocity information only in the beam direction. The apical view typically provides the best window since the beams are then approximately aligned to the longitudinal direction of the myocardium (except near the apex). To obtain radial or circumferential tissue velocities, a parasternal view must be used. However, from this window the beam cannot be aligned with the muscle for all the parts of the ventricle.

NOTE: PW will be optimized for Tissue Velocities when activated from inside TVI.

4-3-10 Basic Measurements

*NOTE: The following instructions assume that you first scan the patient and then press **Freeze**.*

4-3-10-1 Check Distance and Tissue Depth Measurement

1. Press **Measure** once to display an active caliper.
2. Move the trackpad to position the active caliper at the start point (distance) or the most anterior point (tissue depth).
3. Press **Set** to fix the start point.
4. The system fixed the first caliper and displays a second active caliper.
5. Move the trackpad to position the second active caliper at the end point (distance) or the most posterior point (tissue depth).
6. Press **Set** to complete the measurement. The system displays the distance or tissue depth value in the measurement results window.

*NOTE: To toggle between active calipers, rotate **Cursor Select** button.*

4-3-11 Image Quality Check (IQC) preset for service

Image Quality Check (IQC) is intended to facilitate Image Quality checks during Quality Assurance Evaluation. Quality Assurance tests are used to determine whether a scanner is providing the same level of performance year after year.

By using the same setting year after year, this ensures that the data collection consistent, independently of who performs the test.

This preset only includes fundamental settings for 2D mode. Processing modes like SRI, Harmonics, etc., are turned off.

To do IQC, follow the steps below:

NOTE: The IQCforService is only visible when SSA key is connected to the system.

1. Press ***Probe*** button on the control panel.
2. Select the proper probe, and then select **IQCforService** in the Applications column.

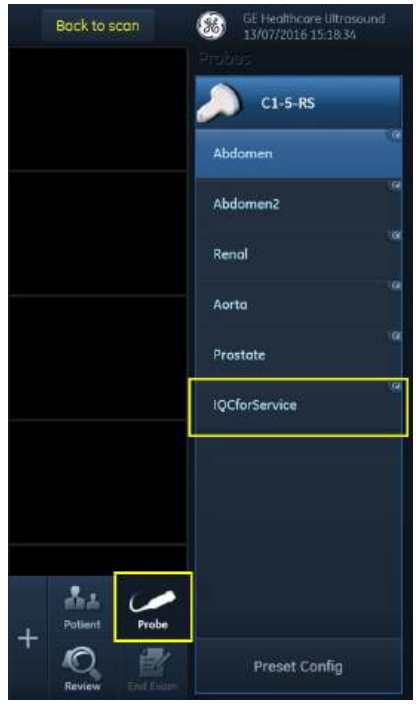


Figure 4-8. Image Quality Check

4-3-12 Probe/Connectors Check

NOTE: Probes can be connected at any time, whether the ultrasound system is ON or OFF.

CAUTION

TAKE THE FOLLOWING PRECAUTIONS WITH THE PROBE CABELS:

-KEEP AWAY FROM THE WHEELS

-DO NOT BEND

-DO NOT CROSS CABLES BETWEEN PROBES

4-3-12-1 To connect a Probe

1. Place the probe's carrying case on a stable surface and open the case.
2. Carefully remove the probe and unwrap the probe cable.
3. Put the porbe in the probe holder.

CAUTION

DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.

4. Hold the probe connector vertically with the cable pointing upward.
5. Slide the connector lock to the left (unlocked position).
6. Align the connector with the probe port and carefully push into place.
7. Slide the connector lock to the right position to secure the probe connector.
8. Carefully position the probe cable in the probe cord holder spot so it is free to move, but not resting on the floor.

Table 4-4: Probe and Connectors Checks

Step	Task	Expected Results
1	Press **Probe** on the Operating Panel.	A list of the connected probes will pop up on the screen.
2	If not already selected, use the trackball to select the desired probe.	An application menu for the desired probe is listed on the screen.
3	Press Probe on the Touch Panel and select Application.	The selected application starts.
4	Verify no missing channels.	All channels are functioning.

Table 4-4: Probe and Connectors Checks

Step	Task	Expected Results
5	Verify there's no EMI/RFI or artifacts specific to the probe.	No EMI/RFI or artifacts.
6	Test the probe in each active connector slot.	It will display pictorial data each time.
7	Do a leakage test on the probe.	It passes the test.
8	Repeat this procedure for all available probes.	

The Vivid *iq* console itself can only support the latest new probe connector, just like the third one in below picture:

Figure 4-9. RS type probe connector

1. Not match with Vivid *iq* console, only match with multi-probe box
2. Not match
3. Match
4. Not match

The Vivid *iq* console of Multi-Probe Ports ASSY can support the first and the third probe connectors in the above picture. In order to use the second and fourth probe connector, you need to disassemble the Vivid *iq* Cart Multi-probe Cable Hook.

Figure 4-10. Multi-probe Cable Hook

4-3-13 ECG Check

4-3-13-1 Introduction

The ECG capability on this Ultrasound system is intended for use as a trigger for measurements, but can also be viewed on the screen.

4-3-13-2 Parts needed

- ECG Pads (3 pc)
- ECG Cable Europe Kit (H48952AB) or US Kit (H48952AC)

4-3-13-3 Preparations

None

4-3-13-4 ECG Check

Table 4-5: ECG Checks

Step	Task	Expected Result(s)
1	Connect the ECG harness to the connector under the control panel.	The unit displays a straight curve along the bottom edge of the image sector on the screen.
2	Connect the three leads to an ECG simulator, or Fasten the three ECG Pads to your body and connect the three leads to respective ECG Pad.	When connecting, the signal on the screen will be noisy. When the connection is completed, a typical clean ECG signal is displayed.

4-3-14 Cineloop Check

4-3-14-1 Introduction

A cineloop is a sequence of images recorded over a certain time frame. When using ECG the time frame can be adjusted to cover one or more heart cycles. When frozen, the System automatically displays the cineloop boundary markers on either side of the last detected heart cycle.

4-3-14-2 Preparation

- Connect one of the probes to the Ultrasound system.
- See 4-3-12 ‘Probe/Connectors Check’ on *page 4-35* for info about connecting the probes

  For available probes, see 8-3-3 ‘Probe’ on *page 8-12*:
- Turn ON the scanner. The 2D Mode is displayed (default mode).

4-3-14-3 Using cineloop

4-3-14-3-1 Selection of a cineloop

1. Press **Freeze** on the Control Panel.

   The left and right markers are displayed on either side of the last detected heart cycle on the ECG trace.
2. Press **Pause** on the Control Panel.

   The selected heart beat is played back.
3. Press **Pause** to freeze the cineloop.
4. Scroll through the acquisition and find the sequence of interest by using trackpad.
5. Adjust **Cycle select** to move from heart beat to heart beat and select the heart cycle of interest.
6. Adjust **Num cycles** to select the number of heart beats to play back.
7. Adjust **Left marker** and **Right marker** to trim or expand the cineloop boundaries.
8. Press **Pause** to run the cineloop and **Store** to store the cineloop or **Freeze** to return to live scanning.

NOTE: Cineloop storage can be configured to store heart cycles with additional time before and after the R-wave and to display a preview before storage.

4-3-14-3-2 Adjustment of cineloop playback

1. Select Speed on the Shortcut Bar and adjust **Speed** to set the speed of the cineloop playback.

   The speed factor (%) is displayed on the right side of the ECG.

4-3-15 Back End Processor checks

- If all the previous tests have been passed successfully, the Back End Processor is most likely OK.

  If the Ultrasound system seems to be operating erratically, please refer to ‘Diagnostics/Troubleshooting’ on *page 6-1*.

4-3-16 Operator Panel Test

- The Operator Panel is tested when the Vivid *iq* is powered up as part of the start-up scripts, run at every start-up.

  For more info, please refer to ‘Diagnostics/Troubleshooting’ on *page 6-1*.

4-3-17 Peripheral checks

4-3-17-1 Printer checks

The internal printer is controlled from the **P1** key on the Vivid *iq* shortcut bar.

The factory default is:

- **P1** for the UP-D711MD printer

Table 4-6: Printer checks

Step	Task	Expected Result(s)
1	When scanning in 2D Color Mode, press Freeze to stop image acquisition.	Image scanning stops with the last picture on the screen.
2	Press P1 on the shortcut bar	The image displayed on the screen is printed on the assigned printer
3	Check if the print quality on the pictures from both printers are of expected quality.	

4-3-18 Mechanical Functions Checks

4-3-18-1 Operator Panel Movement

Please refer to:

- 4-2-16 ‘LCD Monitor position adjustment’ on *page 4-18*

4-3-18-2 Casters (Wheels) and Brakes Checks

Please refer to:

- 3-16-4 ‘Locking the Wheels’ on *page 3-173*

4-4 Power supply test & adjustments

4-4-1 Power Supply Test Procedure

There is no need to do any special tests on the Power Supplies if there don't seems to be a problem that may be related to the Power Supply.

4-4-2 Power Supply Adjustment

There are no adjustments on the power supply. The DC Power is self-regulated. If a voltage is outside the specified range, it means that something is wrong, either with the power supply itself or with a unit connected to that specific power outlet. When an error occur, the power will be turned off immediately.

4-5 Application Turnover Check List

Complete these checks before returning the Ultrasound system to the customer for use:

4-5-1 Software Configuration Checks

Table 4-7: Software Configuration Checks

Step	Task to do	Notes
1	Verify Date and Time is correct.	
2	Verify that Location (Hospital Name & Department) is correct.	
3	Verify Language settings are correct.	
4	Verify assignment of Printer Keys.	
5	Verify all of the customer's options are set up correctly.	Demo Option strings turn on

4-6 Site Log

Table 4-8: Site Log

DATE	SRVICE PERSON	PROBLEM	COMMENTS

Chapter 5

Service Adjustments

This chapter describes how to test and make adjustments to the Vivid iq. You can use these to test the system for errors.

5-1 Overview

5-1-1 Contents in this chapter

5-2 LCD Monitor adjustments

5-2-1 Purpose of this section

This section describes how to test and adjust the monitor. These tests are optional. You may use them to check the system for errors.

5-2-2 Monitor Adjustments

Please refer to User Manual for how to adjust the LCD Monitor Position and Brightness.

5-3 CARTO® 3 Interface

NOTE: Only the Vivid iq system installation is done by GE personnel. GE field engineers are not responsible for any of the CARTO® 3 installation for Protocol 2.0 . For Protocol 1.0, GE installs the video box.

NOTE: CARTO® 3 is installed by the BWI field engineer. The ultrasound setup and the connection between the Vivid and the CARTO® 3 should be done by the BWI Field Engineer.

NOTE: GE service only check the Vivid iq connection, contact with Biosense Webster, Inc. if need ICE catherter for troubleshooting. Any other related troubleshooting should be done on system together with Biosense Webster, Inc. service.

5-3-1 Overview

These versions of CARTO® 3 are supported by Vivid *iq*.

- Protocol 1.0: The video signal from the ultrasound system's HDMI Out port is connected to a video box. The video from the video box to the CARTO® 3 is distributed via a VGA cable.
- Protocol 2.0: The video signal is transferred through an Ethernet cable.

5-3-2 Contents in this chapter

5-3-3 General Description of CARTO® 3

CARTO® 3 is an electroanatomical mapping system by BWI used in EP labs mainly in ablation procedures in conjunction with ICE catheter.

When the ultrasound system is connected (through direct Ethernet connection) to a CARTO® 3 system, the user can initiate a CartoSound connection between the two systems.

As soon as the handshake between the ultrasound system and the CARTO® 3 system pass, the ultrasound system opens these communication channels:

- CARTO® 3 protocol channels:

  The CARTO® 3 protocol channels are used to communicate using XML messages between the two systems.
- Video streaming channel:

  The Video streaming channel is used to send the content on Vivid *iq* main screen to the CARTO® 3 system.
- Raw data streaming channel:

  The raw data streaming channel is used to send 2D raw data to the CARTO® 3 system.

5-3-4 CARTO® 3 Description

The CARTO® 3 System is an advanced imaging technology that utilizes electromagnetic technology to create real-time three-dimensional (3D) maps of a patient's cardiac structures.

The system is designed to help electrophysiologists navigate the heart by generating an accurate 3D map, as well as pinpointing the exact location and orientation of catheters in the heart during diagnostic and therapeutic procedures for patients suffering from heart rhythm conditions (cardiac arrhythmias).

During a therapeutic catheter ablation procedure, doctors insert a catheter through a small incision in the groin where it is then weaved up to the heart through a blood vessel in the leg. Once it reaches the heart, radiofrequency energy is delivered to specific areas of the heart wall to produce a small lesion, or scar, to block faulty electrical impulses that can cause heart rhythm disorders. The 3D image that ís generated by the system helps doctors steer the catheter to areas in the heart where RF energy needs to be administered.

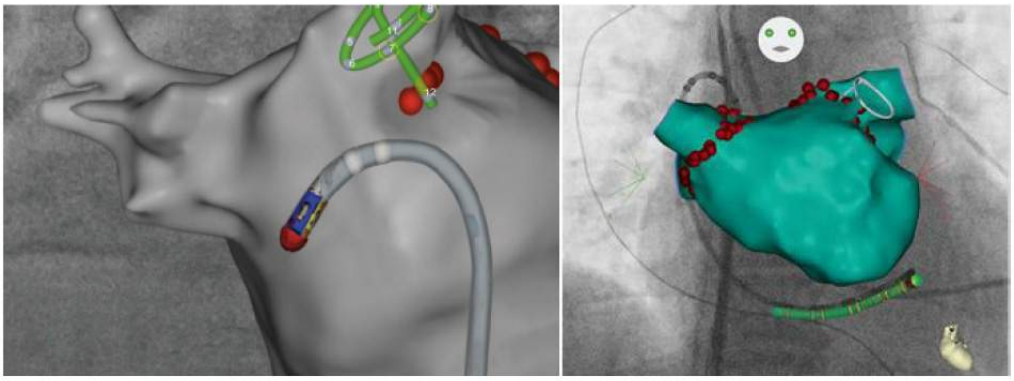


Figure 5-1. 3D maps generated by the CARTO® 3 System

The CARTO® 3 System is sold and provided by Biosense Webster.

5-3-4 CARTO® 3 Description(continued)

Figure 5-2. CARTO® 3 System

5-3-5 CARTO® 3 Connection Overview with Protocol 2.0

Starting from CARTO® 3 v8.x together with Vivid *iq* version 206.101.0 and above, it is possible to use digital video streaming in HD over the Ethernet cable (peer-to-peer LAN) and the isolated HDMI splitter is not used.

An external monitor may be connected to the HDMI Out port on the ultrasound system.

NOTE: Receiving images over peer-to-peer LAN connection is allowed only to members of the ConsultingPhys group. A user member of ConsultingPhys group must be available on the Vivid iq and the CARTO® 3 system must be configured to use this user when connecting to the Vivid iq.

For further details, please refer to CartoSound/SoundStar support in User Manual, Direction 5872801-1EN.

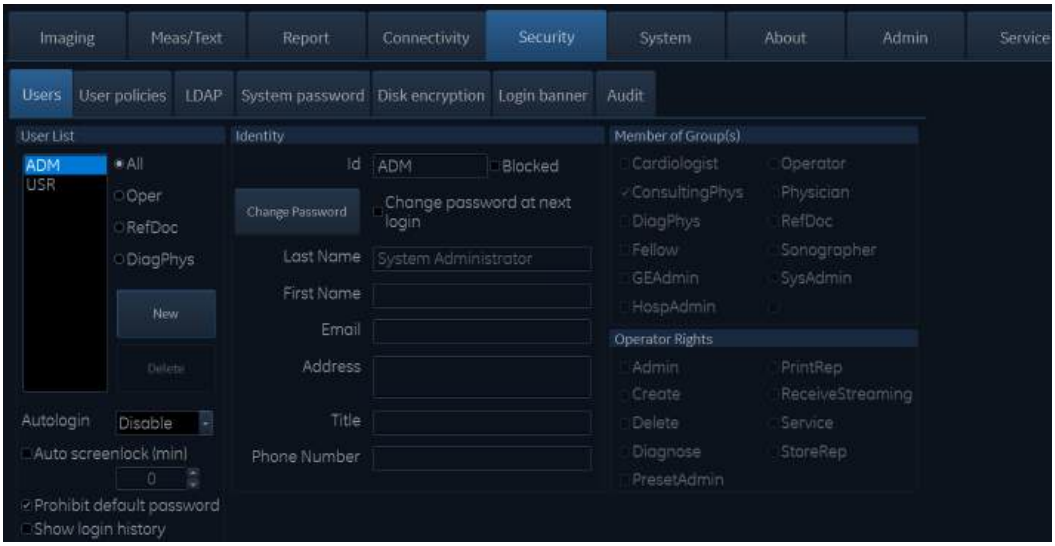


Figure 5-3. User setup for receiving images over peer-to-peer LAN connection

Related Information: See 3-14 ‘CARTO® 3 Interface Setup’ on *page 3-128 for more information.*

5-3-6 CARTO® 3 Connection Overview with Protocol 1.0

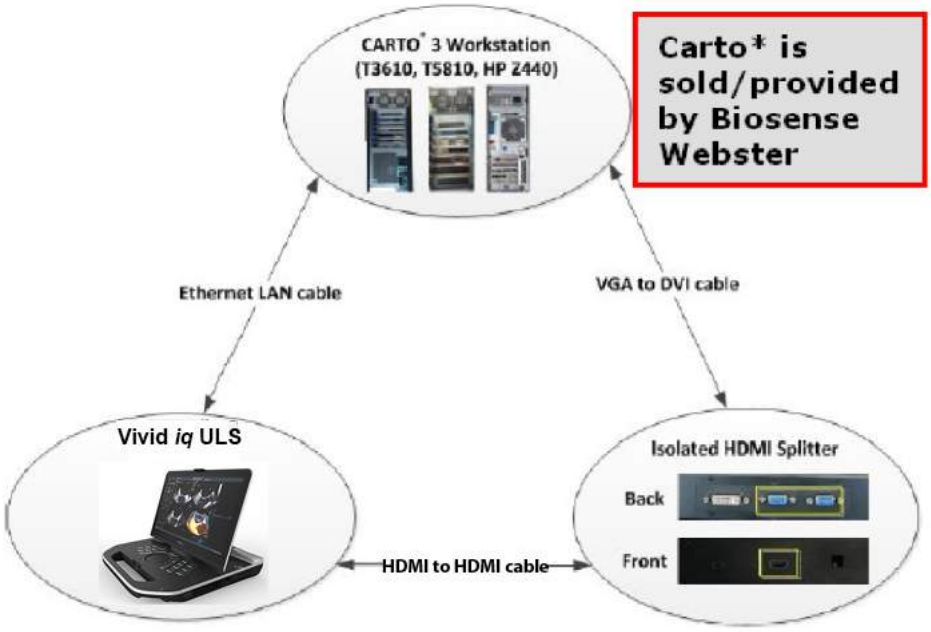


Figure 5-4. CARTO® 3 overview

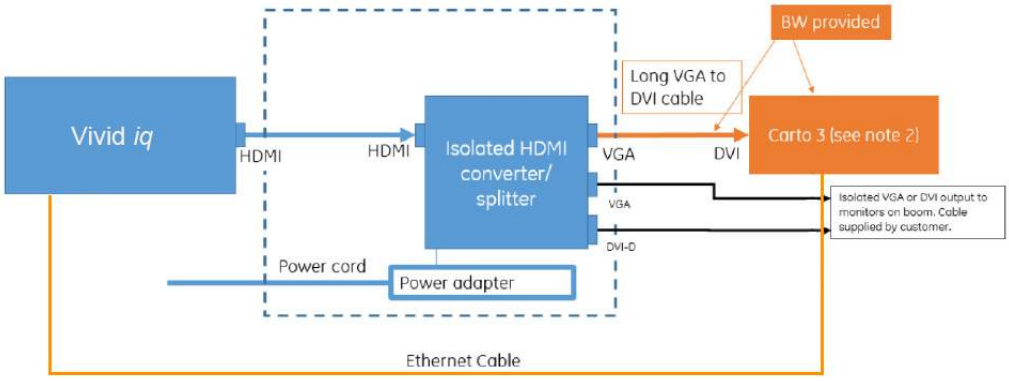


Figure 5-5. CARTO® 3 Connection diagram

Color Description:
- Blue items: Provided by GE
- Orange items: Provided by Biosense Webster, Inc
- Ethernet Cable: Provided by Biosense Webster, Inc

5-3-6 CARTO® 3 Connection Overview with Protocol 1.0(continued)

NOTE: The long VGA cable that connects isolated HDMI converter/ splitter to the CARTO® 3 system is supplied by Biosense Webster.

NOTE: Vivid iq is compatible with CARTO® 3 v6.0.60.70 or above.

5-3-6-1 HDMI Video Splitter Connector Overview (Used with Protocol 1.0)

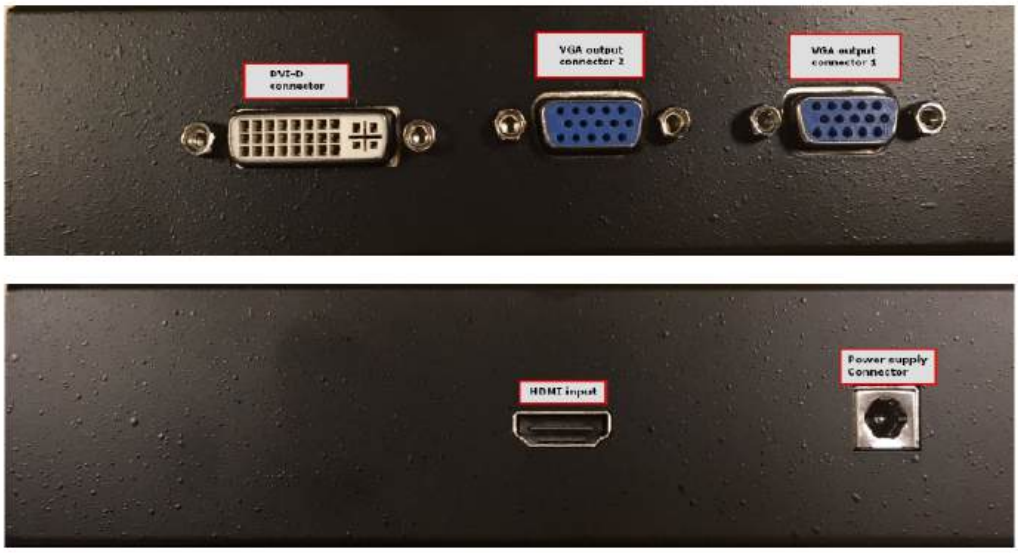


Figure 5-6. HDMI video splitter connector overview

WARNING

Advantech HDMI splitter Model number DVP-8211HM is the only splitter that is approved with Vivid *iq*.

5-3-6-2 Isolated HDMI Converter/Splitter Overview (Used with Protocol 1.0)

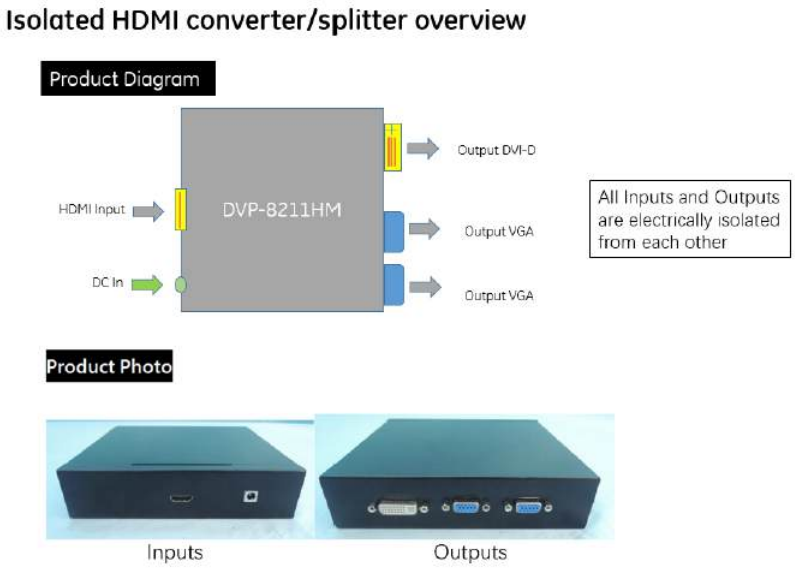


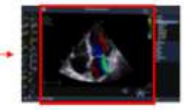
Figure 5-7. Isolated HDMI converter/splitter overview

5-3-6-3 Video Input Formats (Used with Protocol 1.0)

Specifications

Model	DVP-8211HM Isolated HDMI Splitter
Description	HDMI to VGA and DVI-D Down Converter
Feature	➢ Wall mounting plate supported ➢ Auto source format detection ➢ Dual converted VGA output
Input Interface	HDMI x 1
Output Interface	VGA x 2 / DVI-D x 1
Supported Video Input Format	**HDMI** 1920×1080p@60/50fps → Vivid provides 1920 x 1080 1920×1080p@30/25/24fps 1920×1080i@60/50fps 1280×720p@60/50fps 1280×1024p@60fps 1280×960p@60fps 1024×768p@60fps 800×600p@60fps 640×480p@60fps 720×480p@60fps 720×576p@50fps 720×480i@60fps 720×576i@50fps

5-3-6-4 Video Output Formats (Used with Protocol 1.0)

Supported Video Output Format	**DVI-D :** 1920×1080p@60/50fps → Digital Output follows the HDMI Input -> Vivid *iq* 1920×1080p@30/25/24fps 1920×1080i@60/50fps 1280×720p@60/50fps 1280×1024p@60fps 1280×960p@60fps 1024×768p@60fps 800×600p@60fps 640×480p@60fps 720×480p@60fps 720×576p@50fps 720×480i@60fps 720×576i@50fps **VGA** 800×600p@60fps (Cut the 1440*1080 center area from the input, and re-scale to 800*600) ① →  Scale image area down for **analogue video devices**, incl. Carto
Plug & Play	Support
Power Input	12V, 5A

① For input formats <1920x1080: center parts is cut and scaled to 800x600 (but is not fitting Carto)
For input format 800x600: No cutting and scaling

- **Digital video Output** has always the same resolution like the HDMI input.
- Both **Analog video Outputs** have always the resolution 800×600.

5-3-6-5 Optional Monitor Connection (Used with Protocol 1.0)

An additional optional monitor can be connected to the Isolated HDMI converter/splitter while being connected to CARTO® 3:

- Monitors with DVI connection
  - DVI-D input
  - Monitor resolution: requirement: 1920×1080 or higher
- Monitors with Analog VGA connection
  - Monitor must support resolution of 800×600

Related Information: See 3-14 ‘CARTO® 3 Interface Setup’ on *page 3-128 for more information.*

5-3-6-6 Component Overview

5-3-6-6-1 ICE Catheter

Intracardiac Echo (ICE): Ultrasound transducer is integrated into a catheter.

NOTE: The catheter is sterile, disposable, and licensed for single use only.

GE doesn't sell the ICE catheters. The ICE catheters are distributed by Biosense Webster. GE sells and services ICE cord-RS cable.

Refer to Table 5-1.for ICE catheter and Swiftlink ICE Cord-RS compatibility with your ultrasound system.

Table 5-1: Information for Acunav Swiftlink cable

SwiftLink	P/N	ICE Catheter
Acunav Swiftlink cable	S2423364-1	AcuNav 8F, AcuNav 10F, SoundStar 3D 10F, SoundStar eco 10F, SoundStar eco 8F

Table 5-2: ICE catheters

Item	Name	Image
1.	AcuNav8F	
2.	AcuNav10F	
3.	SoundStar3D 10F	

Table 5-2: ICE catheters

Item	Name	Image
4.	SoundStar eco 10F	
5.	SoundStar eco 8F	
6.	ICEcord-RS cable (R2423295)	

Related Information: See 3-14 ‘CARTO® 3 Interface Setup’ on *page 3-128 for more information.*

Chapter 6

Diagnostics/Troubleshooting

This chapter describes how to setup and run the tools and software that help maintain image quality and system operation. Very basic host, system and board levels are run whenever power is applied. Some Service Tools may be run at the application level.

6-1 Overview

6-1-1 Contents in this chapter

6-2 Service Safety Considerations

DANGER

DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.

WARNING

IF THE COVERS ARE REMOVED FROM AN OPERATING VIVID IQ SYSTEM, SOME METAL SURFACES MAY BE WARM ENOUGH TO POSE A POTENTIAL HEAT HAZARD IF TOUCHED, EVEN WHILE IN SHUT DOWN MODE.

WARNING

USE ALL PERSONAL PROTECTION EQUIPMENT (PPE) SUCH AS GLOVES, SAFETY SHOES, SAFETY GLASSES, AND KNEELING PAD, TO REDUCE THE RISK OF INJURY.

6-3 Gathering Troubleshooting Data

6-3-1 Overview

Problem images and system data (logs) can be acquired at the Ultrasound system or through service remote connectivity. Use this data to perform service at the Ultrasound system or to send it back to the manufacturer for analysis.

6-3-2 Collect Vital System Information

The following information is necessary in order to properly analyze data or images being reported as a malfunction or being returned to the manufacturer:

NOTE: This information is normally collected with Alt+D or Gather Logs.

Product Name = Vivid *iq*

From the **Config (F2) > About** screen:

Applications Software

- Software Version
- Software Revision
- Software Part Number
- Build Date

System Software

- System Software Version
- System Software Part Number
- System Software Build Date

6-3-3 Collect a Trouble Image with Logs

If the system should malfunction, press Save Logs or simultaneously press the Alt+D keys on the external keyboard. This will collect a screen capture of the monitor, system presets and several log files in a date and time stamped '.zip' file.

Figure 6-1. Tray menu

NOTE: This function may also be used to make a Print Screen (screen dump).

The Alt+D function is available at all times.

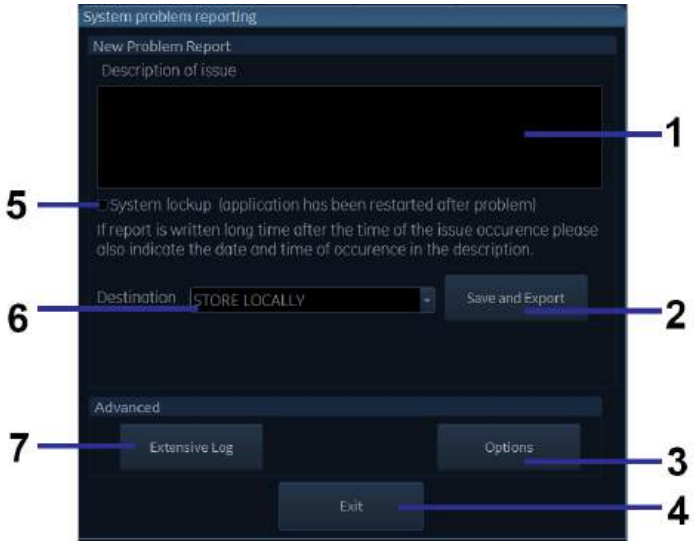
When Alt+D is pressed, a menu box appears that allows for;

- a place to enter a description of the issue
- a check box to indicate a System lockup
- a choice to Export to a pre-formatted removable media or save to the Export directory D: drive (for remote viewing through InSite).

NOTE: You MUST select one of the available devices as the destination device if it is to be different than the default Export directory on the hard drive.

The screen capture is a bitmap which eliminates the possibility of artifacts from compression.

6-3-3 Collect a Trouble Image with Logs(continued)



1. Type description of issue here
2. Select this button when ready to Save and Export
3. See 6-3-3-1 ‘Advanced Log Options’ on *page 6-6*
4. Exit
5. Select if you’ve had a system lockup (after restart)
6. Select where to store the report
7. See 6-3-3-1 ‘Advanced Log Options’ on *page 6-6*

Figure 6-2. System Problem Reporting (ALT+D dialog box)

6-3-3-1 Advanced Log Options

- **Extensive Log** enables the creation of a log file containing additional information for the selected functionality.
- **Options** enables creation of a log file based on a selected bookmark or for a user configurable time frame. Different type of information can be selected to be part of the log file.

6-4 Screen Captures

To capture screen images that can be used for diagnostic and troubleshooting purposes.

6-4-1 Capture a screen image using Print Screen button

A Print Screen button on the tray menu is available for quickly capturing the image displayed on the Ultrasound system. Images captured using this button are saved in the D:\export\Image using the JPEG (.jpg) formats.

6-4-2 Screen Capture using P1 Key

6-4-2-1 Configuring P1 key to screen capture

If the **P1** Key is not set to screen capture:

1. While on the Connectivity screen, with the Buttons tab displayed, go to the *Available Output* list.
2. From the list select **Store to clipboard.** Press [>] to add the selection to the **Selected Output** section.
3. Ensure that the **Button** section for **Image frames** is set to Whole Screen, secondary Capture and None Image Compression.
4. The **P1** Key should now be set up for whole screen capture, sending the screens to the image buffer (clipboard).

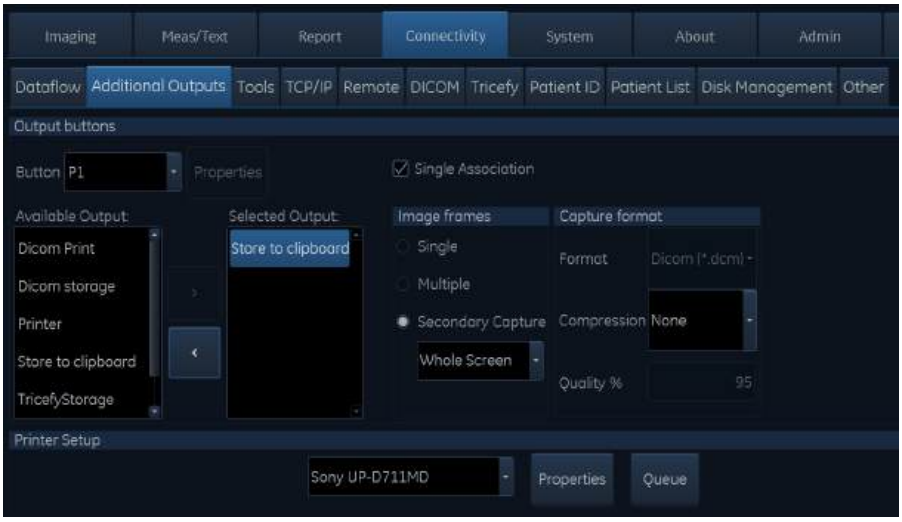


Figure 6-3. Configuring the P1 Key

6-4-2-2 Capturing a screen using P1 key

The following is a generic process to capture any screen from the scanner using P1 key:

1. Navigate to and display the image/screen to be captured.
2. Press **P1**. This will place a snapshot of the screen on the “clipboard” displayed at the bottom of the scan image display.

Figure 6-4. Select Image to Capture

3. Select and highlight the snapshot to be stored.

6-4-2-2 Capturing a screen using P1 key(continued)

4. Press ***Update/Menu*** key on the control panel and the system menu is displayed. Select **Save as**.

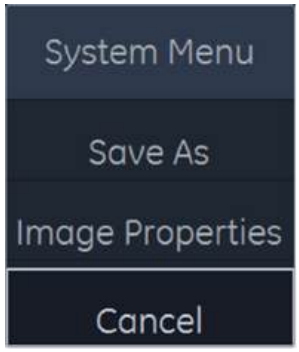


Figure 6-5. Menu > Save As

5. A Save dialog box will be opened. Choose the archive location to save image on the USB Drive or CD/DVD.

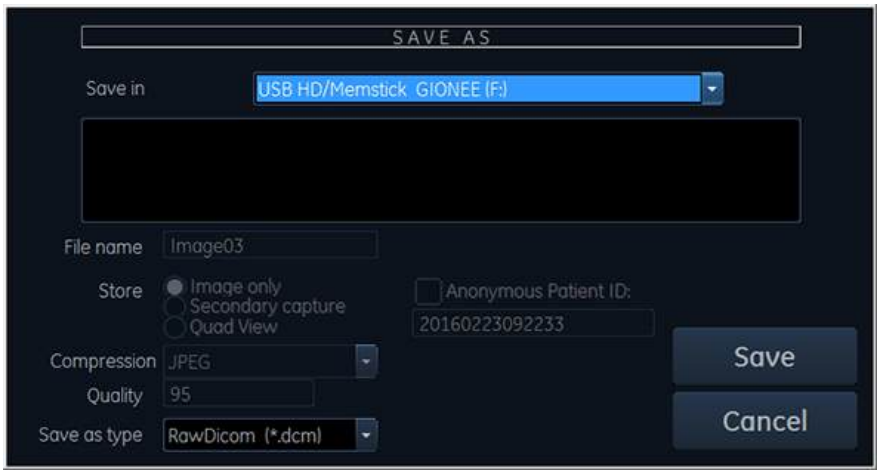


Figure 6-6. Save Dialog Box

NOTE: It is better to save the image in Jpeg format. Image of this format can be easily reviewed in the computer.

6-5 System Warning

6-5-1 Temperature exceeds threshold

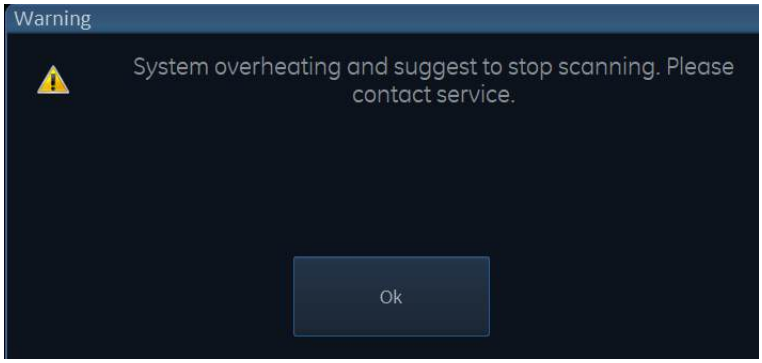


Figure 6-7. System overheating warning

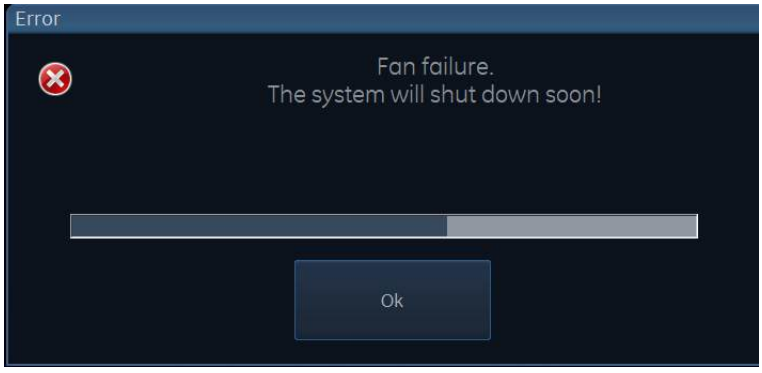


Figure 6-8. Fan failure error

6-5-1 Temperature exceeds threshold(continued)

- **Cause:**

  For v203 and above, if CPU temperature exceeds 100 degree or MST board temperature exceeds 85 degree, system will give overheat warning and shut down automatically.

  For v204.96.0 and above, if CPU temperature exceeds 90 degree or MST board temperature exceeds 80 degree, system will give overheat warning.

  For v204.96.0 and above, if CPU temperature exceeds 90 degree or MST board temperature exceeds 80 degree while at the same time if fan speed is extremely low or fan stops working, system will give warning of fan failure and shut down automatically.

- **What to do:**

  Shut down and check air filter and CPU blower.

6-6 Smart Service Interface

6-6-1 Purpose of this section

This section describes the features of the Service desktop. These are the different levels of access to the Service desktop:

- Service Basic access (Class A) - a user locally logged into the machine with Local Service Access privilege. This level provides limited access to Service desktop widgets and utilities.
- Service Expert, Pro, and Advanced access (Class C) Local - Depending on the purchase level,includes an option string to control access.
- GE Service access (Class M) and an SSA key. For users with local Service Access privileges, this level provides unrestricted access to all Service desktop widgets and utilities.
- Remote access - a user remotely accessing the Vivid *iq*. This level provides unrestricted access to all Service desktop widgets and utilities. Disruptive mode is limited to the user access privileges to Remote Service Access.

6-6-2 Disruptive mode

Disruptive mode is a way to control interruptions to operation of the Vivid *iq*. Disruptive mode is required whenever service performs a function that may disrupt a normal scan. Activating Disruptive mode results in a red message displayed on the task bar. This message indicates that the Vivid *iq* needs to be restarted once the service activity is complete. The message remains until the Vivid *iq* is restarted. This prevents patient scanning while the Vivid *iq* is not operating at an optimal status. For example, running a diagnostic may leave the Vivid *iq* in a state that is not good for imaging.

Specifically, Disruptive mode is required to run diagnostics, clean presets, and reset the patient database, and turn on Virtual Console Observation (VCO).

- When Disruptive mode is On, all service functionality on the Service desktop is allowed but user operation of the Vivid *iq* may be limited.
- When Disruptive mode is Off, some service functionality on the Service desktop is not available and user operation of the Vivid *iq* is normal.

Additionally, the ability to enable Disruptive mode depends on the logged in user.

- Local user - a user locally logged into the machine will be able to set the Vivid *iq* to Disruptive mode or allow a Disruptive mode request from a remote user through the Service desktop. The local user must have Authorize Remote Service Access to allow Disruptive mode. If the local user does not have this right, the remote user's request will be automatically denied
- Remote user - a user remotely accessing the Vivid *iq* will not be able to automatically switch Disruptive mode to On. The logged in user (user actually logged on to the Vivid *iq*) needs to have the ability to grant remote access. The logged in user will be notified through a dialog box and asked to allow Disruptive mode.

NOTE: *Change Password and Disk Defragment are not available for the remote user whether Disruptive mode is On or Off.*

For more information, see:6-6-2 'Disruptive mode' on *page 6-14*

6-6-3 Color statuses

Throughout the Service desktop, colors indicate the following:

- Green - Status is normal
- Orange - Status is a warning
- Red - Status is an error

6-6-4 Licenses

With Service Basic Access (Class A), these are the available options:

- HOME
- Utilities
  - Change Password
  - Delete Files
  - Gather Logs
  - Network Capture
  - SSA License
  - Thirty Party Licenses
- Options
- Agent Configuration

With Service Advanced (Class C), these are the available options:

NOTE: With a Class C license, options display according to these purchased level of access.

- HOME
- Diags
- DICOM
- Utilities
  - Change Password
  - Checkpoints
  - Delete Files
  - Disk Defragment
  - Disruptive Mode Utility
  - Gather Logs
  - Network Capture
  - SSA License
  - System Shutdown

6-6-4 Licenses(continued)

    - Thirty Party Licenses
    - Virtual Console Observation
- Options
- Agent Configuration

With Service Advanced plus Service Expert (Class C), the Clean Userdefs, Reset Patient Database,and Software Reload utilities are added to the Service Advanced options listed.

With Service Advanced and Service Expert plus Service PRO (Class C), the probe assessment tool (ePAT) diagnostic is added to the Service Advanced and Service Expert options listed.

With GE Service access (Class M) and an SSA key, these are the available options:

- HOME
- Diags
- DICOM
- Utilities
    - Change Password (not available through a remote connection)
    - Checkpoints
    - Clean Userdefs
    - Delete Files
    - Disk Defragment (not available through a remote connection)
    - Disruptive Mode Utility
    - Gather Logs
    - Network Capture
    - Reset Patient Database
    - Software Reload
    - SSA License
    - SSH
    - System Shutdown
    - Thirty Party Licenses
    - Virtual Console Observation
- Options
- Agent Configuration

6-6-5 Home

Home configurations vary depending upon the purchased service level.

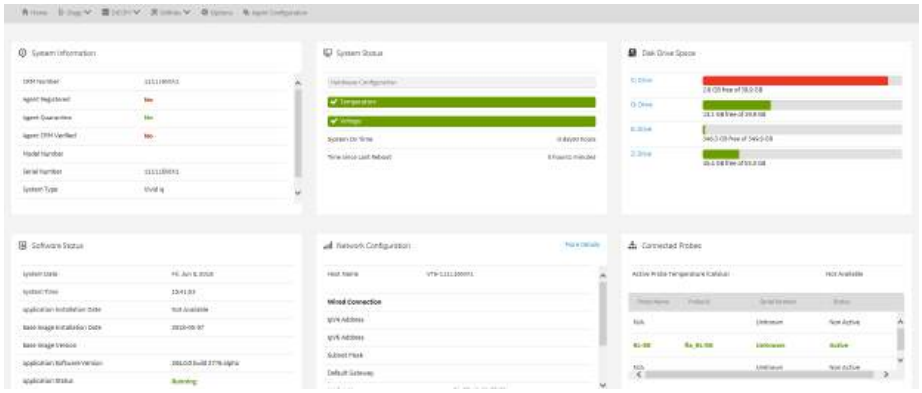


Figure 6-9. Home with Class C and Class M Access

For more information, see:

- 6-6-5-1 ‘System Information’ on *page 6-18*
- 6-6-5-2 ‘Software Status’ on *page 6-20*
- 6-6-5-3 ‘Connected Probes’ on *page 6-22*

6-6-5-1 System Information

System Information displays general information about the Vivid *iq*. When the Vivid *iq* has been successfully configured with the back office, these elements will have the corresponding values:

- **Agent Registered** will be **Yes**
- **Agent Quarantine** will be **No**
- **Agent CRM Verified** will be **Yes**

The information on **System Information** is available to all service class licenses.

To access **System Information**, navigate to **Service Desktop > Home**.

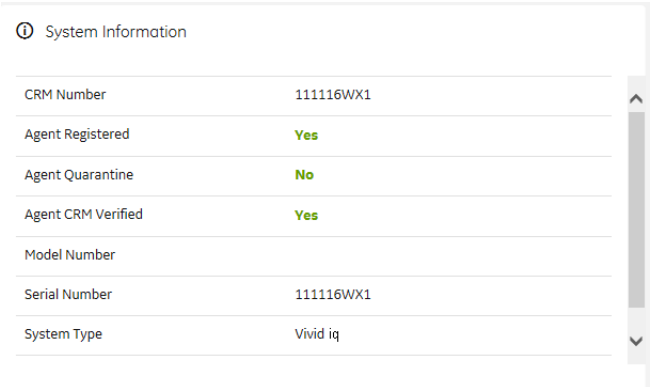


Figure 6-10. System Information

This table shows all the elements available on **System Information** with descriptions.

Table 6-1: System Information

Element	DESCRIPTION
CRM Number	Customer Relationship Management (CRM) number. System identifier assigned to the customer unit by the service region.
Agent Registered	Registered status of the agent. Valid values are: • Yes - The agent is registered in the back office. • No - The agent is not registered in the back office. • Not Available - The agent is not running or has not been configured.

Table 6-1: System Information

Agent Quarantine	Quarantine status of the agent. Valid values are: • Yes - The agent has more than one device registered with the same CRM Number in the back office. • No - The agent has one device registered with the listed CRM Number in the back office. • Not Available - The agent is not running or has not been configured.
Agent CRM Verified	CRM verified status of the agent. Valid values are: • Yes - The agent is verified in the back office. • No - The agent is not verified in the back office. • Not Available - The agent is not running or has not been configured.
Model Number	GE part number for the Vivid *iq*. The same number as listed on the rating plate.
Serial Number	Serial number of the Vivid *iq*. The same number as listed on the rating plate.
System Type	Product name of the Vivid *iq*.
Facility	Name of the hospital or facility where the Vivid *iq* is installed

For more information, see:6-6-5 ‘Home’ on *page 6-17*

6-6-5-2 Software Status

Use **Software Status** to view general information about the software installed on the Vivid *iq*.

The information on **Software Status** is available to all service class licenses.

To access **Software Status**, navigate to **Service Desktop > Home**.

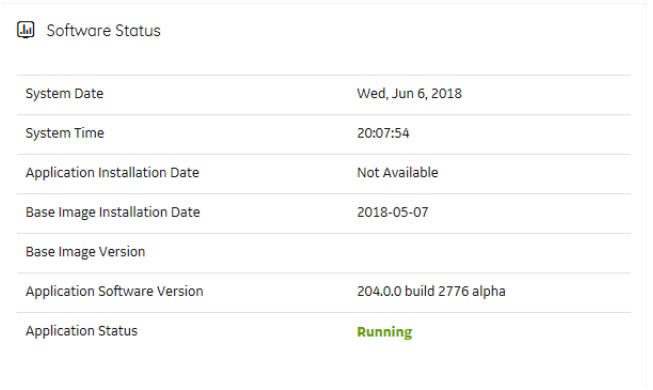


Figure 6-11. Software Status

This table shows all the elements available on **Software Status** with descriptions.

Table 6-2: Software Status

Element	DESCRIPTION
System Date	Current date in the format <day>, <month> <date> <year>.
System Time	Local time based on the last time the system desktop was refreshed in the format <hh:mm:ss>.
Application Installation Date	Date the application software was installed. The application software includes the Vivid *iq*product-specific software.
Base Image Installation Date	Date the base image software was installed. The base image software includes the Windows operating system and other supporting software.
Base Image Version	Version number of the base image software
Application Software Version	Version number of the application software
Application Status	Status of the application. Valid values are • Running • Stopped

6-6-5-2 Software Status(continued)

For more information, see:

- 6-6-5 ‘Home’ on *page 6-17*

6-6-5-3 Connected Probes

Connected Probes shows probes connected to the Vivid *iq*. The order on the user interface is top down matching the left-to-right order on the Vivid *iq*.

The information on **Connected Probes** is available to all service class licenses.

To access **Connected Probes**, navigate to **Service Desktop > Home**.

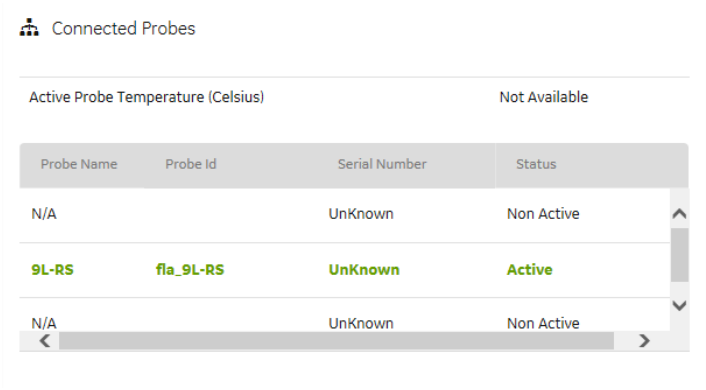


Figure 6-12. Connected Probes

This table shows all the elements available on **Connected Probes** with descriptions.

Table 6-3: Connected Probes

Element	DESCRIPTION
Active Probe Temperature (Celsius)	When available, temperature of the active probe. Not all probes report temperature. The most common probe to report temperature is the TEE probe.
Probe Name	Name of the probe connected to the Vivid *iq*.
Probe ID	Identifier of the probe connected to the Vivid *iq*.
Serial Number	Serial number of the probe connected to the Vivid *iq*. If the serial number of the probe is not available, then N/A displays.
Status	Statuses of the probe connected to the Vivid *iq*. Valid values are: • Active • Non Active

For more information, see:6-6-5 ‘Home’ on *page 6-17*

6-6-5-4 Utilities

Utilities configurations vary depending upon the service class.

For more information, see:

- 6-6-5-4-1‘Gather Logs’ on *page 6-24*
- 6-6-5-4-2‘Delete Files’ on *page 6-26*
- 6-6-5-4-3‘Change Password’ on *page 6-27*
- 6-6-5-4-4‘Third Party Software Licenses’ on *page 6-29*
- 6-6-5-4-5‘SSA License’ on *page 6-30*
- 6-6-5-4-6 ‘Network Capture’ on *page 6-32*
- 6-6-5-4-7 ‘Data Transfer’ on *page 6-35*

6-6-5-4-1Gather Logs

Gather Logs provides a way to collect system logs and place the log files in the D:\Service directory for retrieval by the online center. These log files do not include protected data such as crash dumps and keyboard shadow logs. The customer can collect logs (including protected data) using Alt+D when Protected Data is checked. Log files are compressed into a .zip file and the file path and name display.If the application software is not running, use the **Gather Logs** shortcut on the Windows desktop.

The information on **Gather Logs** is available to all service class licenses.

To access **Gather Logs**, select **Service Desktop > Utilities > Gather Logs.**

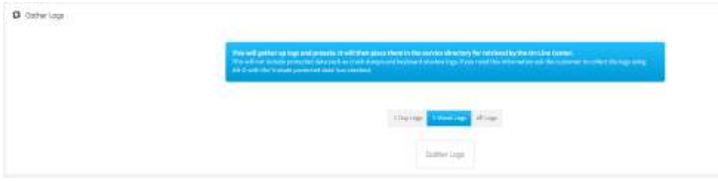


Figure 6-13. Gather Logs

This table shows all the elements available on **Gather Logs** with descriptions.

Table 6-4: Gather Logs

Element	DESCRIPTION
1 Day Logs	When selected, gathers log files for one day.
1 Week Logs	When selected, gathers log files for one week.
All Logs	When selected, gathers all available log files.
Gather Logs	Select to gather the log files for the selected time period.

To gather log files:

1. Navigate to select **Service Desktop > Utilities > Gather Logs.**
2. Select one of the following:
   - 1 Day Logs
   - 1 Week Logs
   - All Logs

6-6-5-4-1Gather Logs(continued)

3. Click **Gather Logs**. In the resulting dialog box, record the location of the log files and click **OK**.

- When the gather log operation is complete, click the notification icon in the banner to view the location of the log files.

For more information, see:

- 6-6-5-4 ‘Utilities’ on *page 6-23*

6-6-5-4-2Delete Files

Delete Files displays all the files and folders present in the D:\Service folder and allows for their deletion. Deleting unneeded files improves performance and reduces the need to defragment the disk drive.

The information on **Delete Files** is available to all service class licenses.

To access Delete Files, select **Service Desktop > Utilities > Delete Files.**

Figure 6-14. Delete Files

This table shows all the elements available on **Delete Files** with descriptions

Table 6-5: Delete Files

Element	DESCRIPTION
Delete Files	Displays the files that are available for deletion.
Delete	Deletes the selected files.

To delete files:

1. Navigate to select **Service Desktop > Utilities > Delete Files.**
2. Under **Delete Files**, select the available folders and files that you want to delete.
3. Click **Delete**.
4. In the resulting dialog box, click **Delete** and then click **OK**.

For more information, see:

- 6-6-5-4 ‘Utilities’ on *page 6-23*

6-6-5-4-3Change Password

Change Password allows you to change the password for a specified user type.

CAUTION

IF THE PASSWORD IS LOST, GE WILL NOT BE ABLE TO RECOVER OR RESET IT.LOSS OF A PASSWORD MAY RESULT IN THE LOSS OF PATIENT DATA.

The information on **Change Password** is available to all service class licenses. **Change Password** is not available through a remote connection.

To access **Change Password,** select **Service Desktop > Utilities > Change Password.**

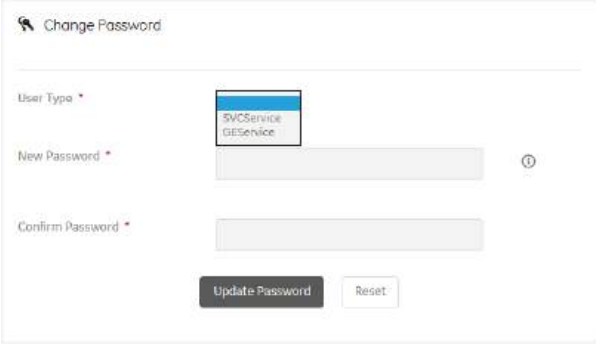


Figure 6-15. Change Password

This table shows all the elements available on **Change Password** with descriptions.

Table 6-6: Change Password

Element	DESCRIPTION
User Type	Type of user for the password reset.
New Password	Password.
Confirm Password	Password.
Update Password	Select to update the password.
Reset	Select to reset the information.

To change the password:

1. Navigate to select **Service Desktop > Utilities > Change Password.**
2. Under **User Type,** select the user.

6-6-5-4-3Change Password(continued)

NOTE: *Before changing the GEService password (the default is SvcForward123$), make sure the Vivid iq is connected to the network and the agent is configured. The GEService password is used to perform portions of remote service. If the password is changed and the system information is not updated, it may slow down remote service. Both file transfer and SSH depend on the GEService password.*

3. In **New Password** and **Confirm Password**, enter the new password.

CAUTION

GE WILL NOT BE ABLE TO RECOVER OR RESET CHANGED PASSWORDS.SECURELY RECORD THE NEW PASSWORD.

4. Click **Update Password**.
5. When a SVCService user password has been changed, reboot the Vivid *iq* to reflect the password change.

For more information, see:

- 6-6-5-4 ‘Utilities’ on *page 6-23*

6-6-5-4-4Third Party Software Licenses

Third Party Software Licenses displays the third-party software licenses used as part of the service platform

The information on **Third Party Software Licenses** is available to all service class licenses.

To access **Third Party Software Licenses,** select **Service Desktop > Utilities > Third Party Software Licenses**.

Figure 6-16. Third Party Software Licenses

For more information, see:

- 6-6-5-4 ‘Utilities’ on *page 6-23*

6-6-5-4-5SSA License

SSA License provides a way to do the following:

- When inserted, view the details of an SSA key.
- View the status of the service class options.
- Restore an SSA license when the SSA key is not validating or when a remote log in shows as a Class A user.

The information on **SSA License** is available to all service class licenses.

To access **SSA License**, select **Service Desktop > Utilities > SSA License.**

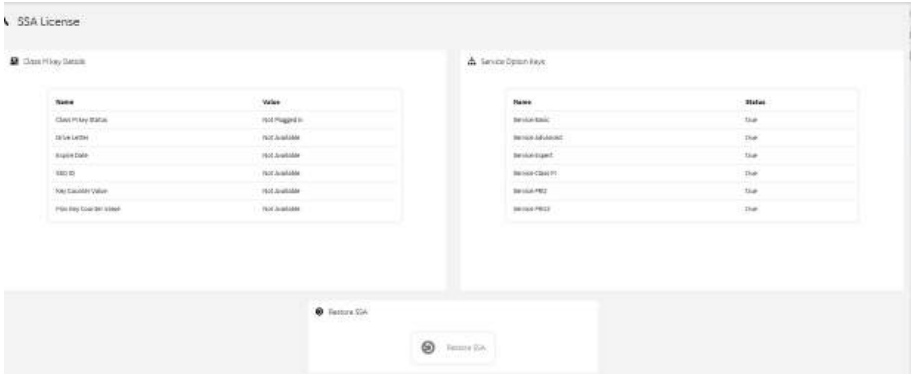


Figure 6-17. SSA License

This table shows all the elements available on **SSA License** with descriptions.

Table 6-7: SSA License

Element	DESCRIPTION
Class M Key Details	
Class M Key Status	Status of the SSA key. Valid values are: • Not Plugged In • Plugged In
Drive Letter	Drive where the SSA key is plugged into the Vivid *iq*
Expire Date	Date the SSA key is set to expire.
SSO ID	Identifier for the user assigned to the SSA key.
Key Counter Value	Number of times the SSA key has been used.
Max Key Counter Value	Number of remaining times the SSA key can be used.
Service Option Keys	

Table 6-7: SSA License

Name	Name of the service class option.
Status	Status of the access to the associated service class option. Valid values are: • True • False
Restore SSA	Restores the SSA license to the SSA key.

To view the Class M license information:

1. Insert the SSA key.
2. Navigate to **Service Desktop > Utilities > SSA License.**
3. Under **Class M key Details**, view the values. For example, the **SSO ID** for the user assigned to the SSA key.

   If **Not Available** displays for all of these values, the SSA key is not validating.

To restore an SSA key that is not validating:

1. Remove the SSA key from the Vivid *iq*.
2. If open, close the Service desktop.
3. Restart the Vivid *iq*.
4. Once the Vivid *iq* has restarted, plug in the SSA key.
5. Navigate to **Service Desktop > Utilities > SSA License**.
6. Click **Restore SSA**.
7. Check to see if the SSA key validates.

For more information, see:

- 6-6-5-4 ‘Utilities’ on *page 6-23*
- 6-6-5-4 ‘Utilities’ on *page 6-23*

6-6-5-4-6 Network Capture

Network Capture displays network traffic between the Vivid *iq* and configured devices. A network capture outputs two log files: one for main logging with no protected information and another including protected information. These log files are useful when debugging connectivity issues. Because these log files can be large, they are only kept for one week.

The information on **Network Capture** is available to all service class licenses.

To access **Network Capture**, select **Service Desktop > Utilities > Network Capture.**

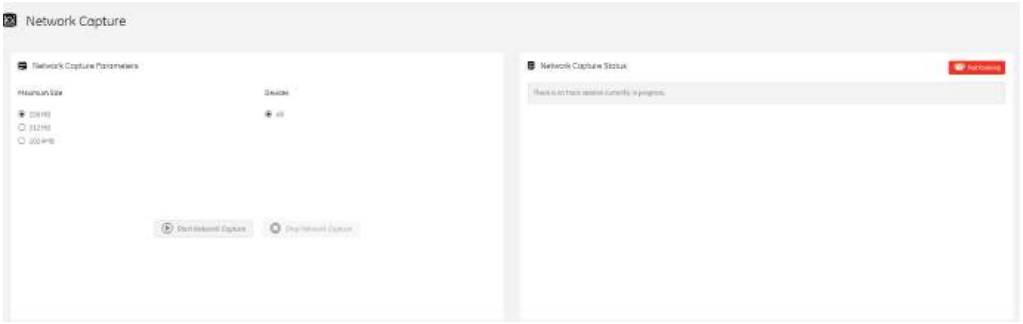


Figure 6-18. Network Capture

This table shows all the elements available on **Network Capture** with descriptions.

Table 6-8: Network Capture

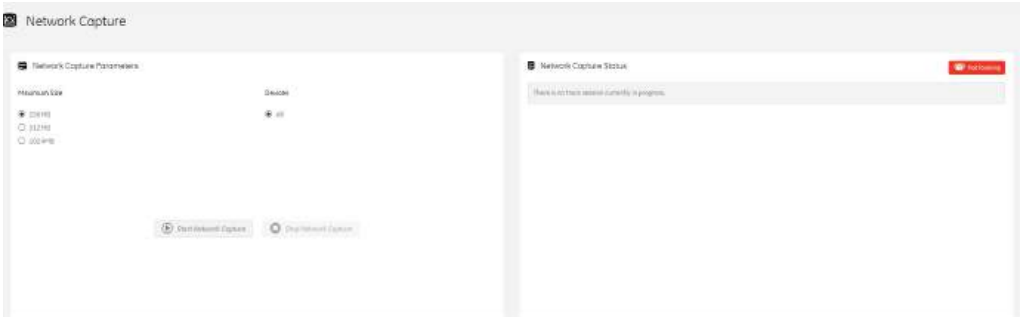
Element	DESCRIPTION
Network Capture Parameters	
Maximum Size	Allowed size of the generated log file. Valid value are: • 256MB • 512MB • 1024MB
Devices	DICOM-configured devices for which you want to capture information. If no additional devices are configured, only All will be available.
Start Network Capture	Select to start the process. This causes the network capture to start, enables the **Stop** button, and updates the **Network Capture Status** pane and changes the Status to **Running**.
Stop Network Capture	Select to stop the process..
Network Capture Status	

Table 6-8: Network Capture

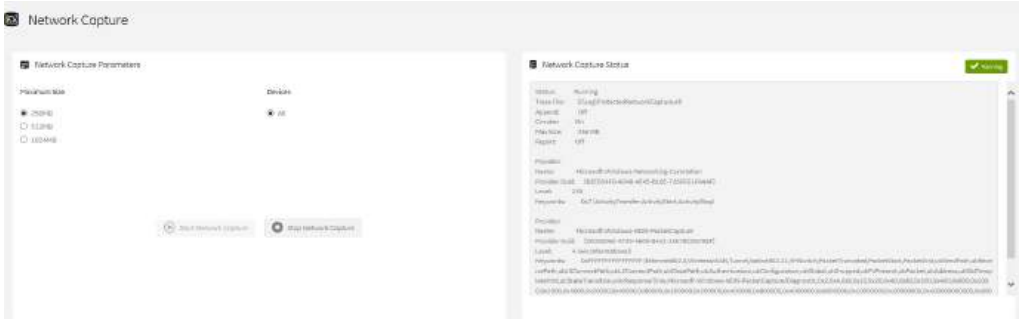
	Displays information about the status of the network capture. The language setting for this information is set in Windows and not through the Service desktop or Vivid *iq* application software.
	Displays the current status of the network capture. Valid values are: • Not Running • Running

To perform a network capture:

1. Navigate to **Service Desktop > Utilities > Network Capture.**



2. From **Network Capture,** do the following:
   - Under **Maximum Size**, select the allowed size of the generated log file.
   - Under **Devices**, select the DICOM-configured device for which you want to capture information. If no additional devices are configured, only **All** will be available.
3. Select **Start Network Capture** to start the process. This causes the network capture to start,enables the **Stop** button, and updates the **Network Capture Status** panel and changes the **Status** to **Running**.

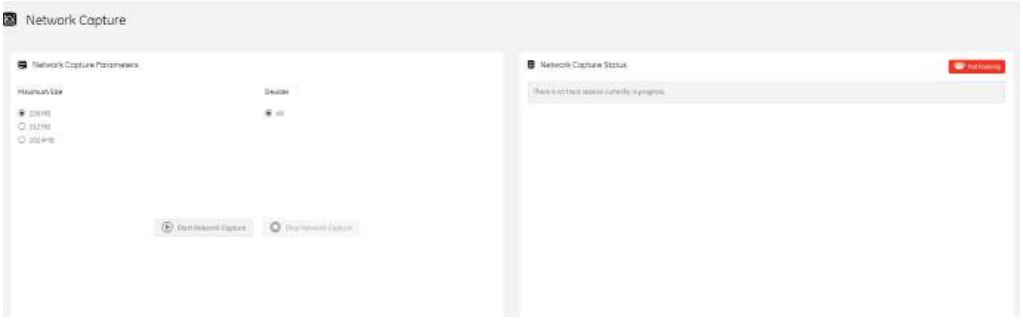


4. Click the **Stop** button to end data collection. Stopping is a two-step process:

6-6-5-4-6 Network Capture(continued)

- Stops the data collection and immediately closes the .etl file.

1. Collects additional diagnostic data that may help diagnose network issues. When the file is closed, you see “There is no trace session currently in progress”. When the remaining data is collected and the .cab file is closed, you are notified in the banner.



For more information, see:

- 6-6-5-4 ‘Utilities’ on *page 6-23*

6-6-5-4-7 Data Transfer

Data Transfer provides a way to do the following:

- View information about past transfers of (APM) information.
- Set up scheduled transfer of allowed data files from the Ultrasound system to the server.
- Manually transfer data files allowed data files from the Ultrasound system to the server.

The information on **Data Transfer** is available to all service class licenses.

To access **Data Transfer**, select **Service Desktop > Utilities > Data Transfer**.

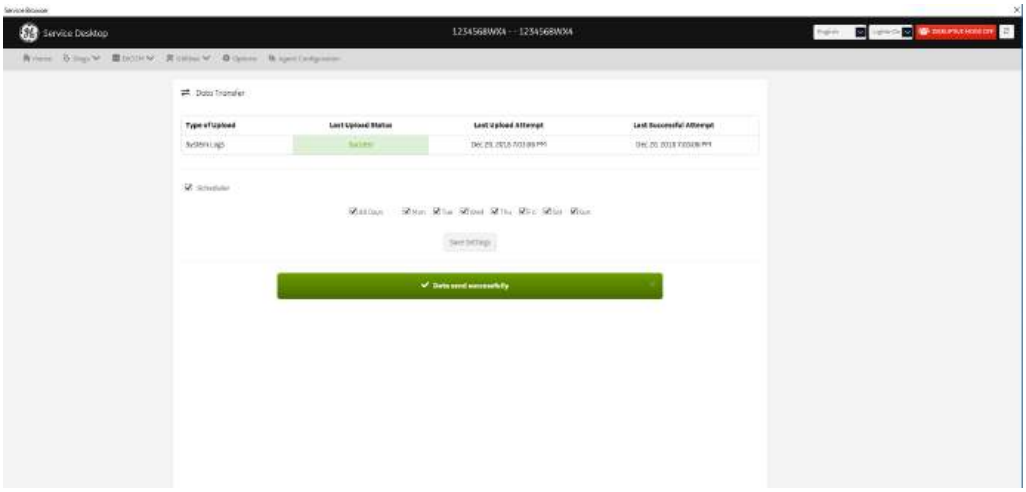


Figure 6-19. Data Transfer

This table shows all the elements available on **Data Transfer** with descriptions.

Table 6-9: Data Transfer

Element	DESCRIPTION
Type of Upload	Type of log file. For example, **Incremental Logs** or **Full Logs**. **Monitoring Logs, System Logs, and Windows Logs** are incrementally transferred when automatic transfer is enabled. To enable automatic transfer, navigate to **System Admin** and, under **Service**, check **Enable Automatic Request for Service**.
Last Upload Status	Whether the last log file upload was successful or not.

Table 6-9: Data Transfer

Last Upload Attempt	Date and time the last log file upload was attempted.
Last Successful Upload	Date and time the last log file was successfully uploaded.
Scheduler	When selected, enables the related day selections. For example, **All Days, Monday,** and **Tuesday.**
Save Settings	Saves the information.
Send All	Manually send the selected log files to the server.

To perform manual automatic data transfers:

1. Navigate to **Service Desktop > Utilities > Data Transfer**.
2. On **Data Transfer**, select **Scheduler,** and then select the days to perform the data transfer.
3. Click **Save Settings**.
4. To manually perform a data transfer, click **Send All**.

6-6-5-5 Options

Use **Options** to:

- View software options
- View software option details.
- Add (or delete) a valid option key, add a duplicate option key, not add an invalid option key, and ask for confirmation before deleting an option key.
- View software option key details. Key details are a list of options that are enabled by a particular key. Under **Available Keys**, highlight the option string, select Details and then view the options on the left side of the screen. Press **Show All** to view all of the activated options.

The information on **Options** is available to all service class licenses.

To access **Options**, navigate to **Service Desktop > Options.**

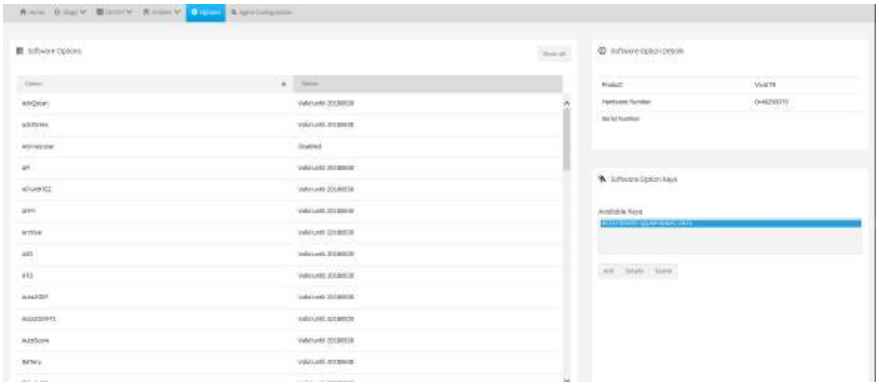


Figure 6-20. Options

This table shows all the elements available on **Options** with descriptions.

Table 6-10: Options

Element	DESCRIPTION
Software Options	
Option	Software options on the Vivid *iq*.
Status	Status of the options on the Vivid *iq*.
Software Option Details	
Product	Name of the product.

Table 6-10: Options

Hardware Number	Number for the hardware. The hardware number is the hash of the serial number that is used to generate the option key.
Serial Number	Serial number of the Vivid *iq*.
Software Option Keys	
Available Keys	List of the option keys installed on the Vivid *iq*.

6-6-5-6 Agent Configuration

Use **Agent Configuration** to:

- Edit and configure the following:
  - Enterprise host name in the agent
  - Enterprise port number in the agent
  - Proxy server in the agent
  - Proxy port in the agent
  - CRM number in the agent
  - Display name in the agent
- Set the serial number in the agent
- Enter the username and password for the proxy
- Reset the edited unsaved value
- Update contact details

The information on **Agent Configuration** is available to all service class licenses.

To access **Agent Configuration**, navigate to **Service Desktop > Agent Configuration.**

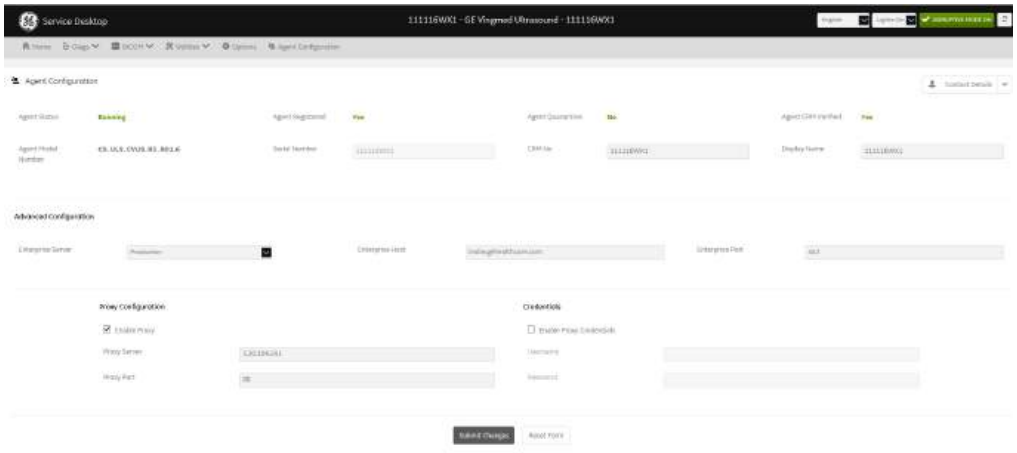


Figure 6-21. Agent Configuration

This table shows all the elements available on **Agent Configuration** with descriptions.

Table 6-11: Agent Configuration

Element	DESCRIPTION
Agent Configuration	

Table 6-11: Agent Configuration

Contact Details	Phone number for the person at the customer site a GE remote service engineer would contact. The phone number is entered during installation and reviewed at every service call to make sure the information is correct.
Agent Status	Status for the agent. Valid values are: • Running • Not Running
Agent Registered	Registered status of the agent. Valid values are: • Yes - The agent is registered in the back office. • No - The agent is not registered in the back office. • Not Available - The agent is not configured or running.
Agent Quarantine	Quarantine status of the agent. Valid values are: • Yes - The agent has more than one device registered with the same CRM Number in the back office. This scanner cannot send data back to GE or be remotely accessed. • No - The agent has one device registered with the listed CRM Number in the back office. • Not Available - The agent is not configured or running.
Agent CRM Verified	CRM verified status of the agent. Valid values are: • Yes - The agent is verified in the back office. • No - The agent is not verified in the back office. • Not Available - The agent is not configured or running.
Agent Model Number	GE part number for the Vivid *iq*. The same number as listed on the rating plate.
Serial Number	Serial number of the agent (read-only). If the agent is not registered with a serial number, this field is populated with the serial number of the Vivid *iq*. The serial number of the agent is tied to the serial number of the Vivid *iq*.
CRM No	Customer Relationship Management (CRM) number. System identifier assigned to the customer unit by the service region. CRM is pre-populated by adding Vivid *iq* to the CRM number. The CRM number of the Vivid *iq* is editable.
Display Name	Displayed name of the agent.
Advanced Configuration	
Enterprise Server	Name of the enterprise server.
Enterprise Host	Number of the enterprise host.
Enterprise Port	Number of the enterprise port.
Proxy Configuration	

Table 6-11: Agent Configuration

Enable Proxy	Enables the proxy server.
Proxy Server	When Enable Proxy is selected, name of the proxy server IP.
Proxy Port	When Enable Proxy is selected, number of the proxy server port.
Credentials	
Enable Proxy Credentials	Enables the proxy credentials.
Username	When **Enable Proxy Credentials** is selected, name of the user.
Password	When **Enable Proxy Credentials** is selected, password for the user.

6-7 Asset Performance Mangement(APM)

6-7-1 Overview

APM enables upload of system usage data for asset performance management purposes. The data contain protected health information.

When connected (APM is active), the Vivid *iq* system has the capability to transmit certain datasets to the General Electric (GE) Back Office. These data sets pertain to system utilization and are accessible via proprietary tools only. Upon request, General Electric can provide a complete listing of data sets gathered.

Data sets will be transmitted during the warranty period and when the Vivid *iq* system is under a maintenance contract with General Electric (GE). The requirement for data transfer is a signed service agreement with valid data transfer clauses.

The Field Engineer has the ability to stop the data transmission. The data transfer needs to be manually enabled by the Field Engineer if there is an active contractual agreement for the data transfer.

APM structure datasets (*.xml) are stored in the D:/CDFFile.

6-8 Probe Check

6-8-1 Introduction

Probe Check is a probe assessment tool that evaluates each probe element integrity by transmitting on one channel at the time and recording the lens reflection, while scanning in the air. During the test the probe lens should be clean because any gel residue might affect the test result. This test is intended to be used during the life of the probe to evaluate possible probe deterioration over time.

Activation of the Probe Check can be done manually from the probe/application menu, or run automatically when the probe/application is selected. The interval of the automatic test can be configured in the system configuration.

The Probe Check evaluates the ratio of weak elements to total element count and the overall reflection level from the probe lens. If the Probe Check fails, the user is still allowed to continue using the probe, but should then evaluate if the image quality is adequate for clinical use.

NOTE: Probe Check checks element integrity. There are other defects that can deteriorate probe performance that the Probe Check cannot detect, so the user should evaluate whether the probe performance is adequate regardless of the outcome of the test.

NOTE: GE is NOT responsible for the confirmation regarding the normal function of the ultrasound probe before use.

6-8-2 Supported probes

Table 6-12: Supported probes

Item	Probe Name
1.	C1-5-RS
2.	4C-RS
3.	8C-RS
4.	E8Cs-RS
5.	9L-RS
6.	12L-RS
7.	L4-20t-RS
8.	L8-18i-RS
9.	ML6-15-RS
10.	M5Sc-RS
11.	3Sc-RS
12.	6S-RS
13.	12S-RS
14.	6Tc-RS
15.	6VT-D
16.	10T-D
17.	9T-RS

The probes that currently have this test available have a button labelled **Test Probe** in the probe/application menu. To activate the test manually one should open the probe menu and select Preset **Config/Test Probe** at the bottom of the application list. The **Test Probe** button is then available in the application menu.

6-8-3 Probe Test Activation

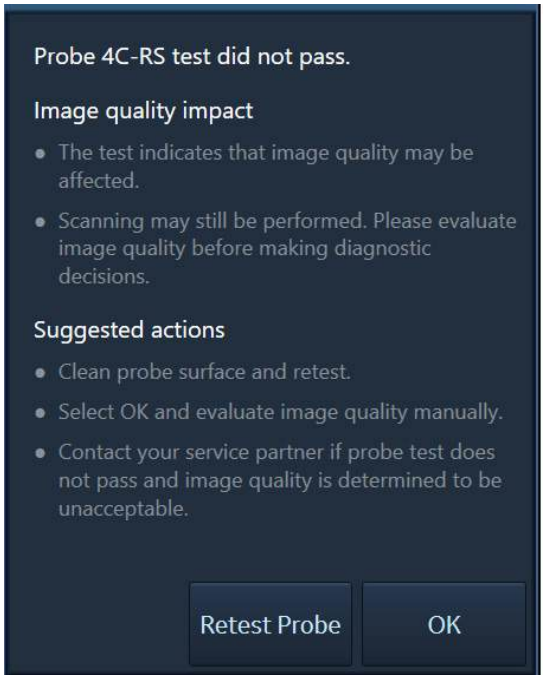
6-8-3-1 Auto Trigger

When the probe is connected to the scanner, the probe test will run automatically when you select probe/application. The interval between testing can be configured, and the test will run at probe/application selection when the previous test of the chosen probe type is older than the configured interval.

When the probe test is activated during probe/application selection, then “Probe Check: Checking probe, please wait...” is displayed in the info bar at the bottom of the screen, then “Loading Probe/Application, please wait...” and finally “Probe Check: Probe test passed” if the test passed.

6-8-3-1 Auto Trigger(continued)

However, if the test fails the following user dialog appears:



Probe Check Message:
Probe test did not pass

Image Quality impact information
- The test indicates that image quality may be affected.
- Scanning may still be performed. Please evaluate image quality before making diagnostic decisions.

Suggested actions:
- Clean probe surface and retest.
- Select OK and evaluate image quality manually.
- Contact your service partner if probe test does not pass and image quality is determined to be unacceptable.

Figure 6-22. Failed test user dialog

The dialog informs the user that the probe element integrity check failed, and image quality may be suboptimal.

6-8-3-1 Auto Trigger(continued)

If the lens is not clean, it should be cleaned, and the test should be repeated by selecting the **Retest Probe** button. Even if the test fails one can resume scanning by selecting the **OK** button. The image quality and the probe sensitivity should in that case be evaluated and judged whether it is acceptable for clinical use and diagnostic decisions.

If image quality is confirmed not acceptable, please contact your Service partner.

DO NOT allow the probe head to hang free. Any possible impacts to the probe head could result in irreparable damages to the probe.

For the failed test result, user should contact the Field Engineer(Hereinafter referred to as FE) immediately to evaluate the test result. FE will collect the below failure information:

- Console Name
- Console Serial Number
- Current SW revision
- Probe name
- Probe port number the probe connected
- The trigger mode of the diagnostic (Auto Trigger / Manual Trigger)
- Trigger interval for auto trigger (only for the auto trigger log)
- Start and end timestamp of the diagnostic activity
- User activity during probe check
- List the integrity of elements or smallest available patches of elements (elements sensitivity)
- Pass/Fail results of each element
- Pass/Fail result
- IQ impact code

6-8-3-1 Auto Trigger(continued)

With the remote control of the machine plus an authority of Class M or SSA dongle, FE can obtain the information more conveniently by exporting the test logfile. Press ALT+D to export the test report and store to the specific destination, there are 2 methods for exporting the report:

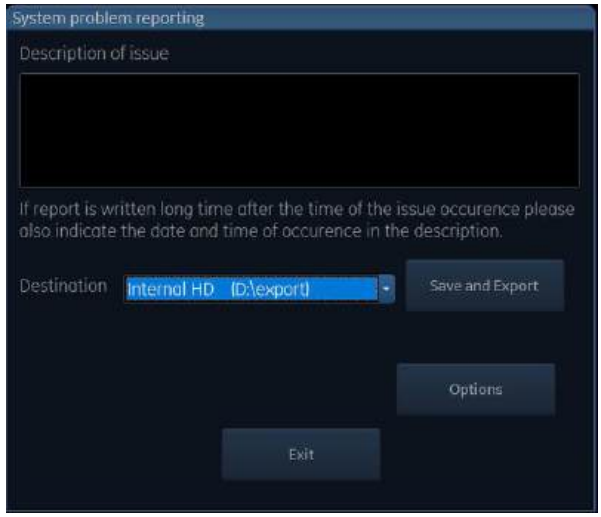


Figure 6-23. Export Reports

Complete Log: export all the files from D:\Log folder in the form of a compressed package.

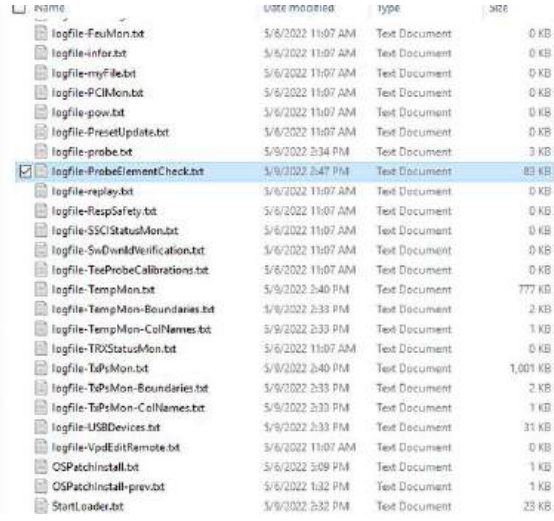


Figure 6-24. Complete Log

6-8-3-1 Auto Trigger(continued)

The file logfile-ProbeElementCheck record all the necesssary probe test information.

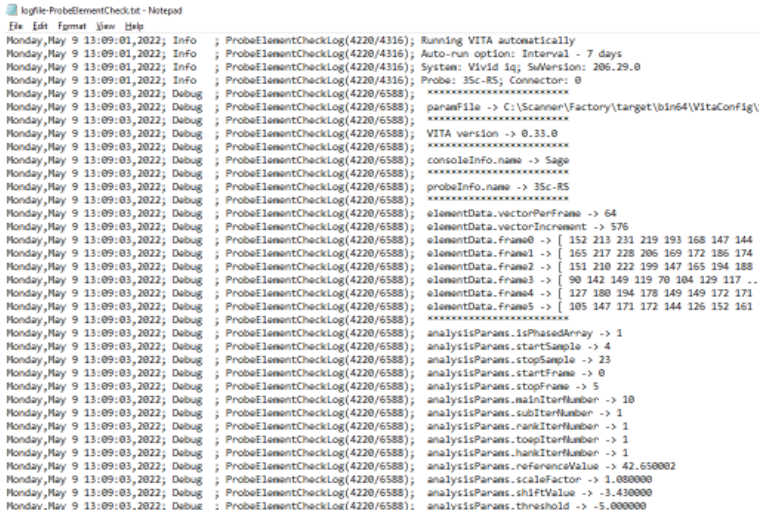


Figure 6-25. Logfile Information

After all information collected, FE will remotely instruct the user to cross check the probe to detect if the issue is about probe or about the system itself.

NOTE: Suggest to prepare at least 2 probes to conduct the cross check.

a. Clean probe surface and retest, if the test result passed, it shows the probe is OK for diagnose. If the test result failed, please continue with next step.

b. Test the probe with other probe port. If the test result passed, it shows the original probe port has error. If the probe tested failed, use another probe test again. If there is no another probe, call service and share the results indlucing no extra probe for testing.

NOTE: For Vivid iq without 4PP, please skip step 2 and use another probe to do cross check.

c. If another probe test passed, contact service to replace probe. For both test results failed, check if there have other failure node for probe port and MST board, follow probe port and MST board check steps.

6-8-3-1 Auto Trigger(continued)

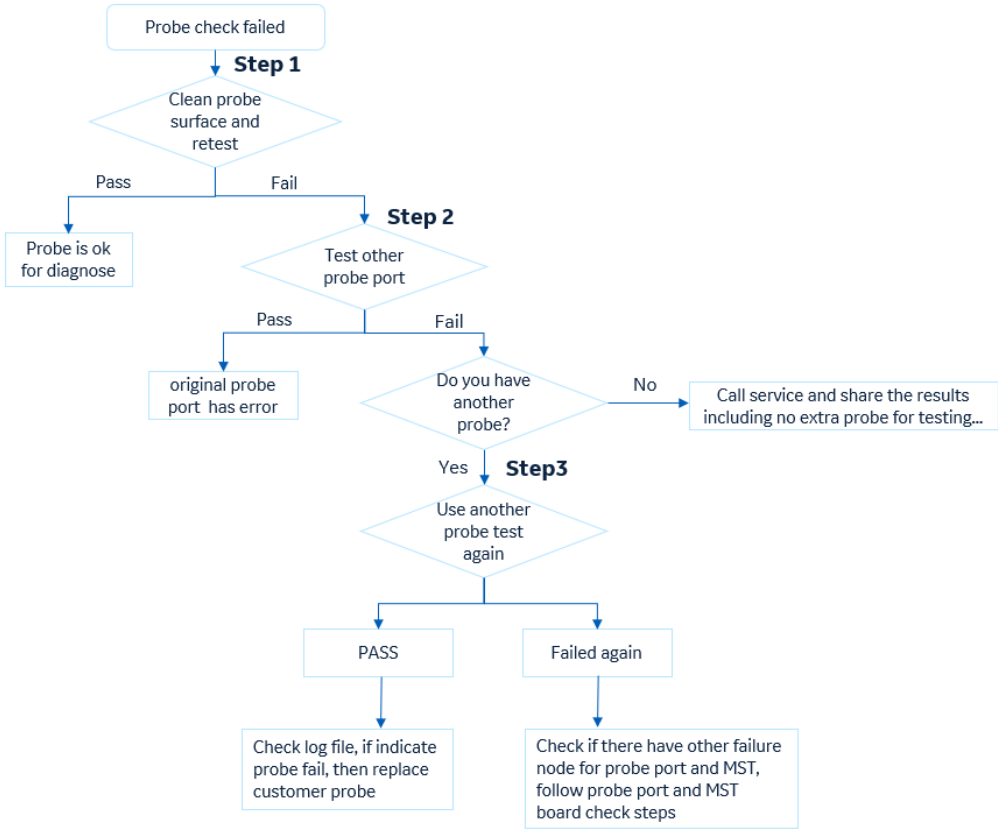


Figure 6-26. Cross check flowchart

NOTE: Currently probe check logfile doesn't record the probe SN, please remember the probe check time if use two type probe when doing cross check.

6-8-3-2 Auto Trigger interval configuration

The Probe Check frequency can be configured by entering **Config > Imaging > Probe Check** where one can select from five intervals:

- **Every exam:** probe check will be activated for each exam.

NOTE: Every exam is selected as default.

- **Once 1 day:** probe check will be activated upon probe/ application selection if it is more than one day since last time the check was performed.
- **Once 7 days**: probe check will be activated upon probe/ application selection if it is more than seven days since last time the check was performed.
- **Once 30 days:** probe check will be activated upon probe/ application selection if it is more than thirty days since last time the check was performed.
- **Never:** probe checking will never execute during probe/ application selection. If this choice is configured the user should run the test manually at regular intervals.

6-8-3-2 Auto Trigger interval configuration(continued)

Figure 6-27. Configuration screen for Probe Test interval

If the auto test frequency is set low in the configuration, it is recommended to run Probe Check manually on a regular basis and especially if the probe performance shows sign of image or sensitivity deterioration. For curved and linear probes, compromised probe elements will typically show up as a localized dark area at shallow depths. For phased arrays, all elements are used for all imaging directions, but fewer elements are used at shallow depths, so loss of elements is most likely to give reduced image intensity at shallow depths. The following three images illustrate this.

6-8-3-2 Auto Trigger interval configuration(continued)

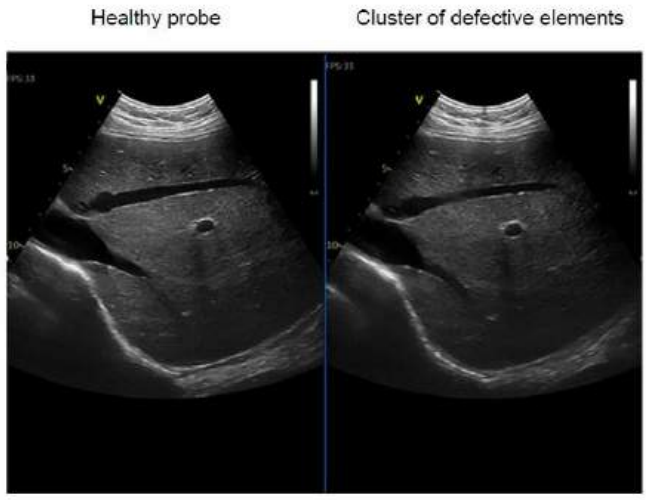


Figure 6-28. Example of image degradation for a curved probe

Figure 6-29. Example of image degradation for a linear probe

6-8-3-2 Auto Trigger interval configuration(continued)

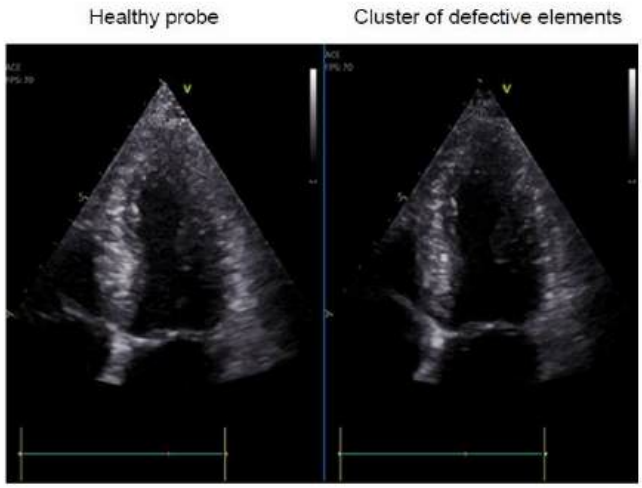


Figure 6-30. Example of image degradation for a phased array probe

6-8-3-3 Manual Trigger

Users can run the Probe Test manually at any time by entering the probe menu, selecting the probe to be tested, and then selecting the **Preset Config/Test Probe** button at the bottom of the application list. This menu displaying all applications will have a **Test Probe** button at the lower right corner if the Probe Test is available for the probe in question.

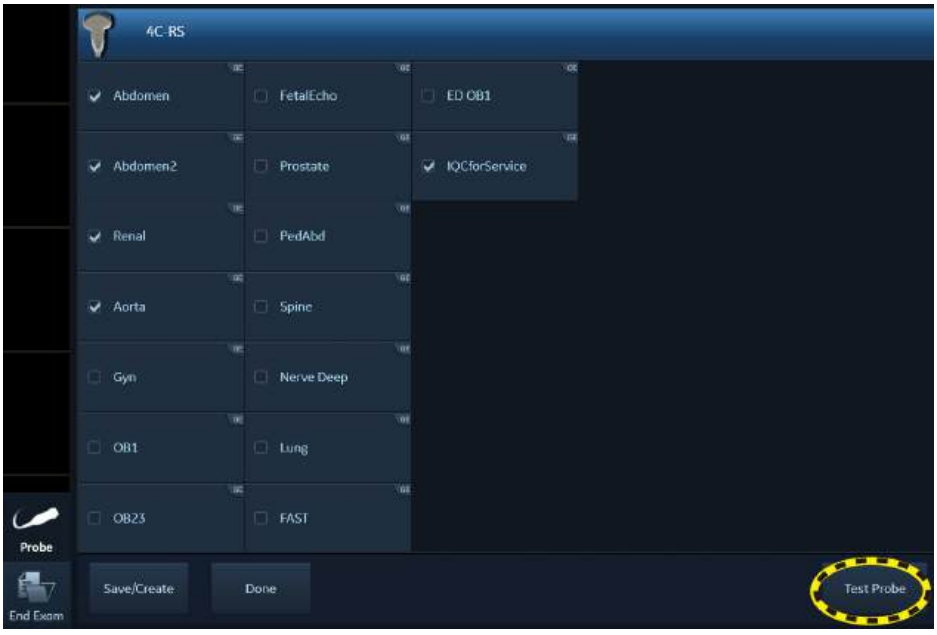
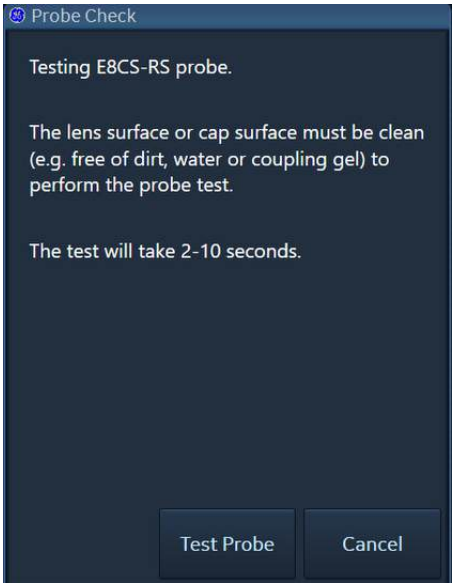


Figure 6-31. Manual Probe Test

6-8-3-3 Manual Trigger(continued)

After selecting the **Test Probe** button the following user dialog will appear:



Probe Check Message:
Probe test
The lens surface or cap surface must be clean (e.g.free of dirt, water or coupling gel) to perform the probe test.
The test will take 2-10 seconds.

Figure 6-32. Probe Test manual activation user dialog

After selecting **Test Probe** the probe test activates and the user feedback is the same as described for the automatically activated “Probe Test”.

6-9 Insite II Configuration

6-9-1 Insite II Configuration

1. On the ultrasound system, enter the Service Desktop.
2. On **Agent Configuration** page, choose **Production** as Enterprise Server in **Advanced Configuration** section.

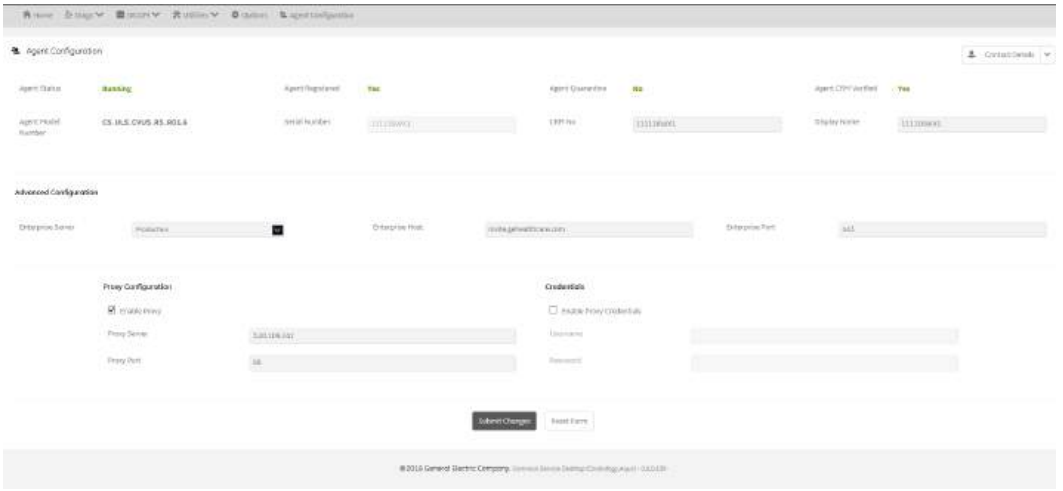


Figure 6-33. Server Type Configuration

6-9-1 Insite II Configuration(continued)

3. Enter **Proxy Server** and **Proxy Server Port** in **Proxy_Configuration**, then press **Submit Changes.**

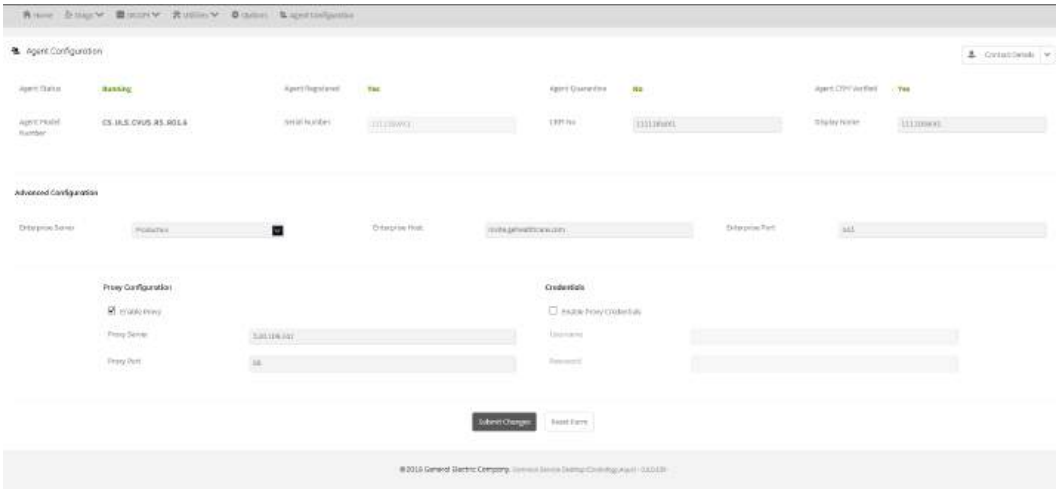


Figure 6-34. Proxy Configuration

4. In the server side, type the CRM No. of the system which the OLE would remotely connect to, and select **Get Started**.

NOTE: Remote server link:https://stg-ffa.am.health.ge.com/#/di/home.

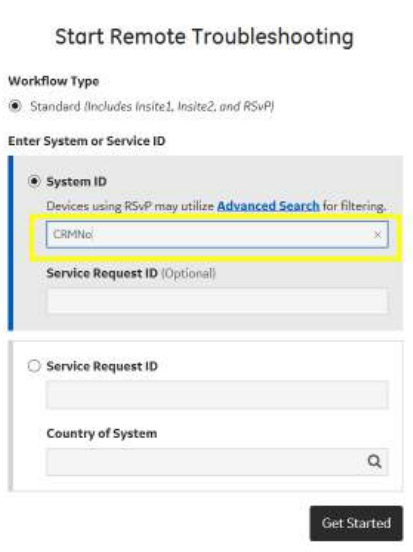


Figure 6-35. Input System ID

6-9-1 Insite II Configuration(continued)

5. Select **Connect**. Then the **Connect** page is displayed.

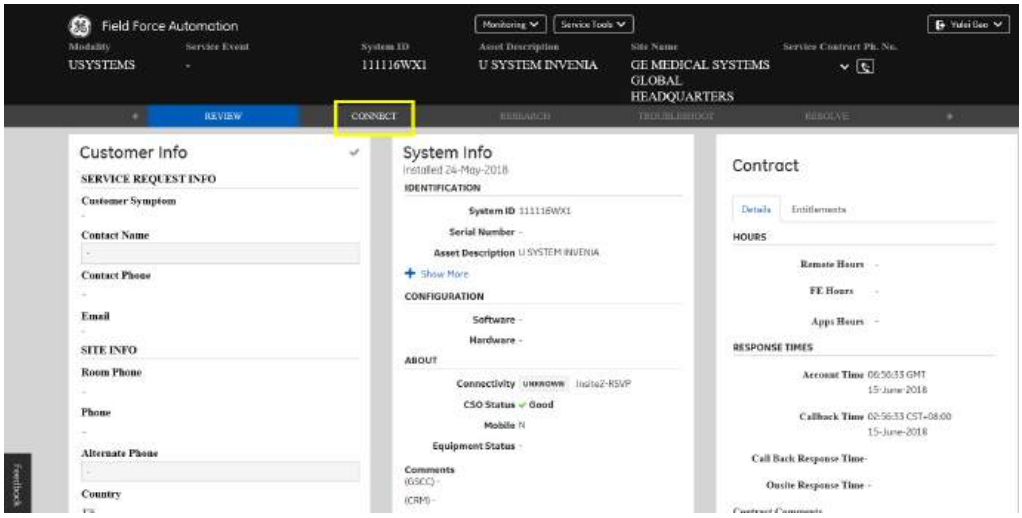


Figure 6-36. Connect Page

6. Select HTTPS to **Connect**. Then the OLE is remotely connected to the system.

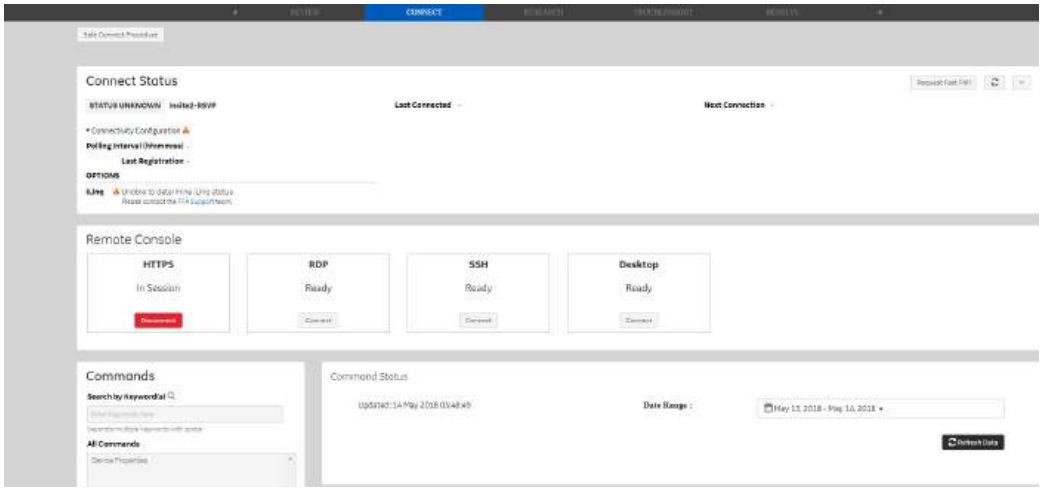


Figure 6-37. Select HTTPS to Connect

6-9-1 Insite II Configuration(continued)

7. Enter **Options** to add service option key.

NOTE: Please delete the added service option key when your service work is done.

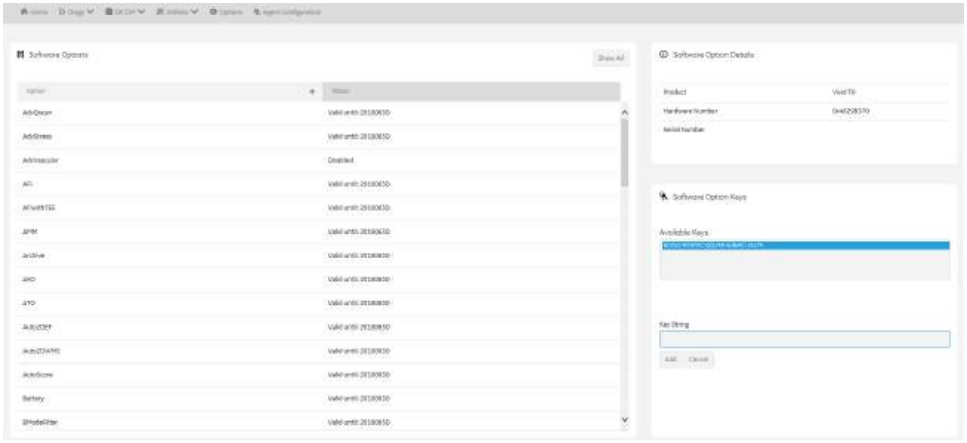


Figure 6-38. Add Service Option Key

8. Enter **Utility**-> **Disruptive Mode Utility**, select **Enable.**

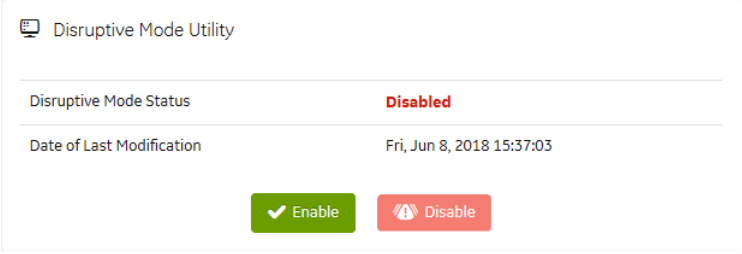


Figure 6-39. Enable Disruptive Mode

9. Customer will receive a request of Service side, select Yes to accept.
10. Service can do Remote Diagnostics successfully.
11. Press Power On/Off Switch, and choose **Shutdown** to shutdown the system and then restart the system.

6-9-2 Setup Wizard

Setup Wizard (Installation wizard) is a function to enable the operator to configure some common system settings when turning on the system for the first time after the software installation.

For Vivid iq, you can also enter Setup Wizard by clicking the **Setup Wizard** button on the tray menu.

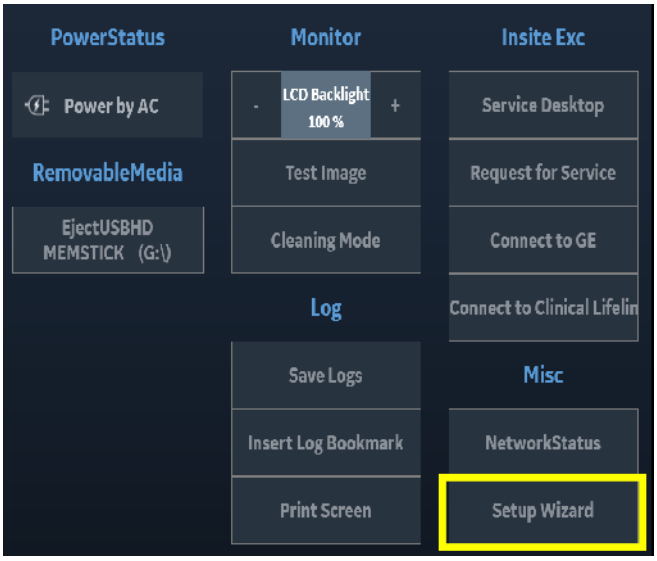


Figure 6-40. Enter Setup Wizard

6-9-2 Setup Wizard(continued)

1. Select the appropriate language for system language, manual language and input language from the drop-down list.

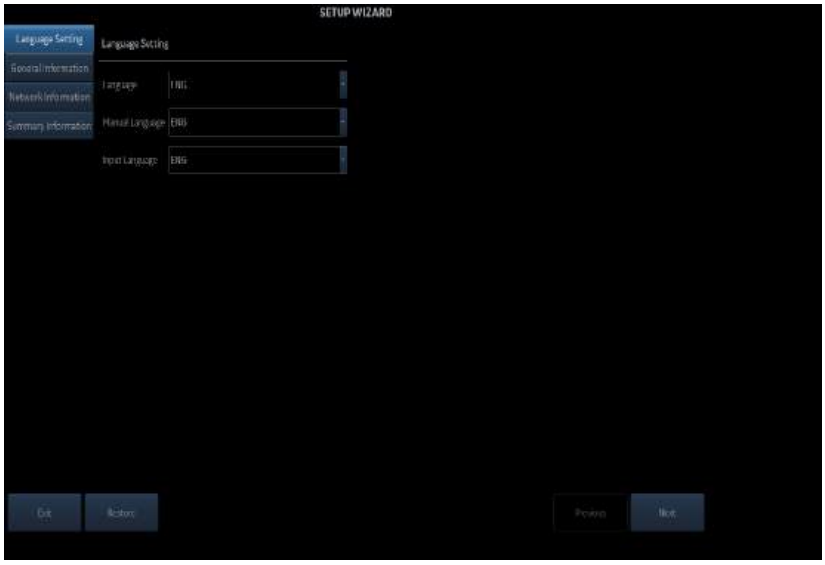


Figure 6-41. Language settings (1)

- If you do not change the language, press **Next** to continue.
- If you change the language setting, press **OK** to restart the system.

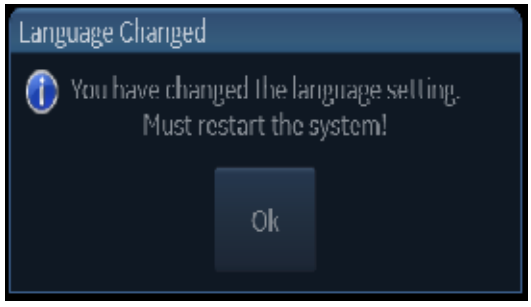


Figure 6-42. Language settings (2)

6-9-2 Setup Wizard(continued)

*NOTE: If you press **Previous**, you will go to the previous page.*

2. This screen shows the hospital and time information, and you can set the system date and time here.

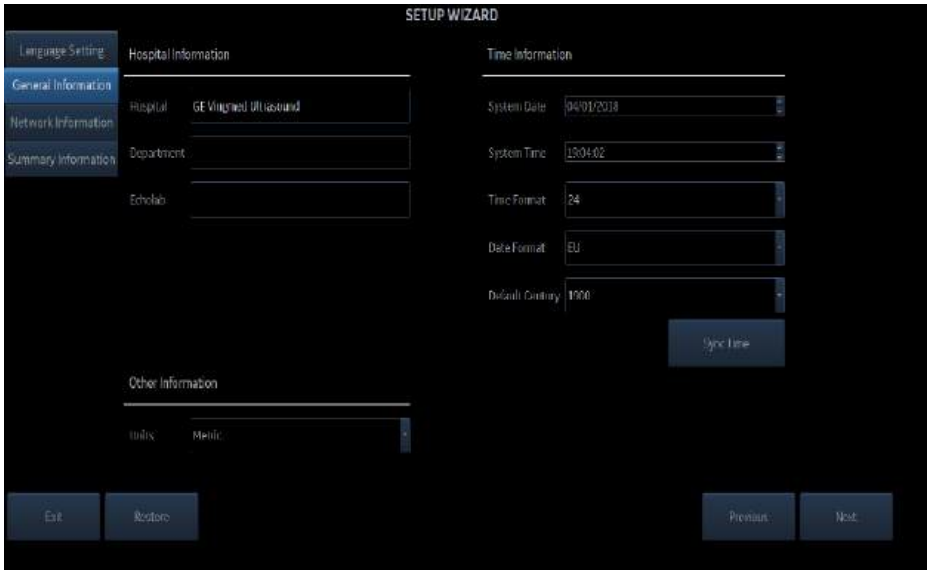


Figure 6-43. General Information

3. Press **Next** to continue.
4. The **Network Information** screen shows the configuration of wireless and local network:

6-9-2 Setup Wizard(continued)

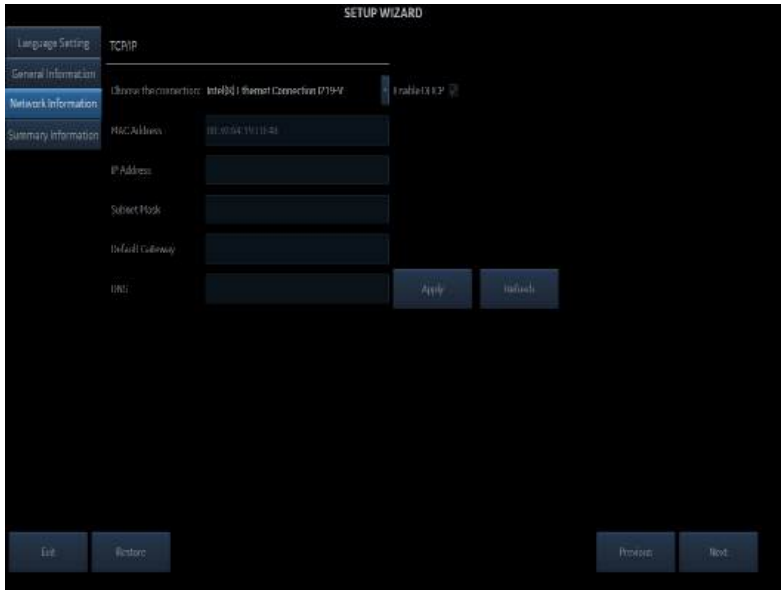


Figure 6-44. Network Information (1)

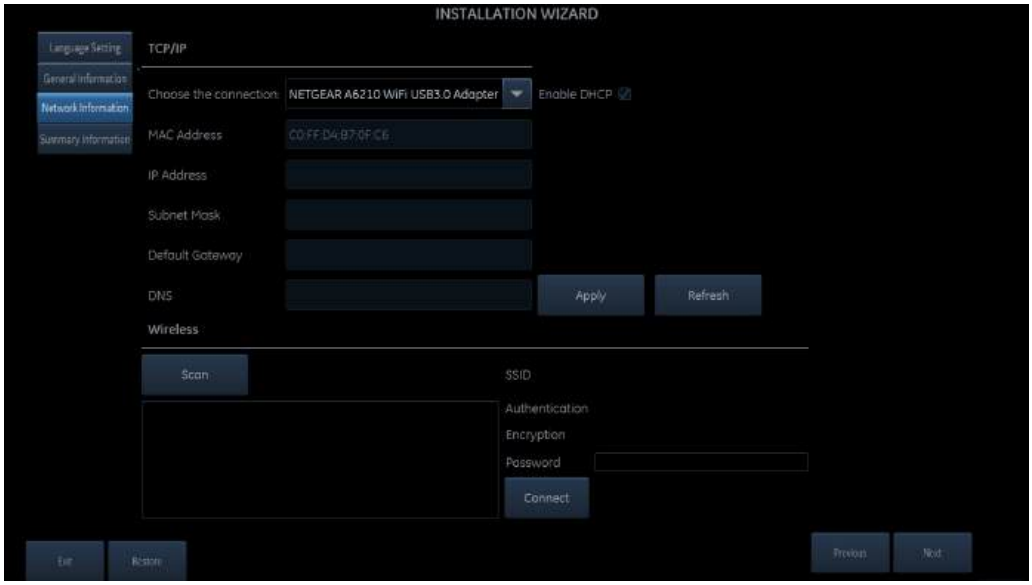


Figure 6-45. Network Information (2)

6-9-2 Setup Wizard(continued)

Table 6-13: Network settings

Preset Parameter	Description
Enable DHCP	Select to enable DHCP.

5. Press **Next** to continue.
6. This screen shows the report of the previous settings. You can export it to the file.

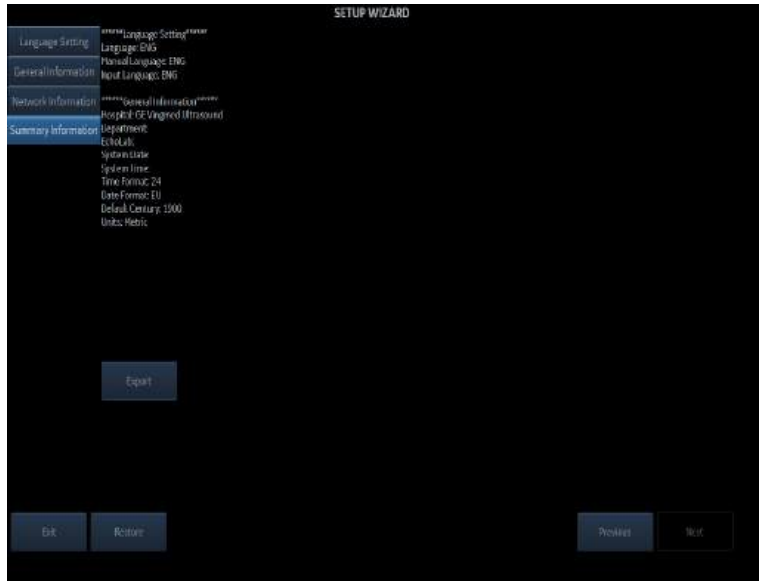


Figure 6-46. Summary Information

Press **Export** to store the report.

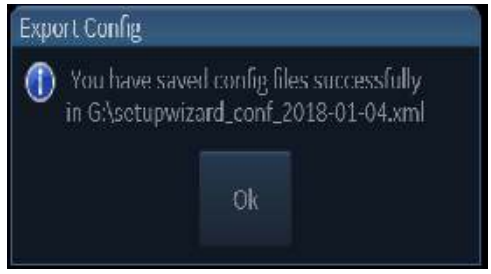


Figure 6-47. Export Summary

7. Press **Exit** to exit Setup Wizard.

6-10 Troubleshooting

6-10-1 Console Troubleshooting Trees

6-10-1-1 System Doesn't Boot

This is an overall diagram showing a recommended sequence for troubleshooting a no-boot situation.

NOTE: This troubleshooting tip is for online engineer.

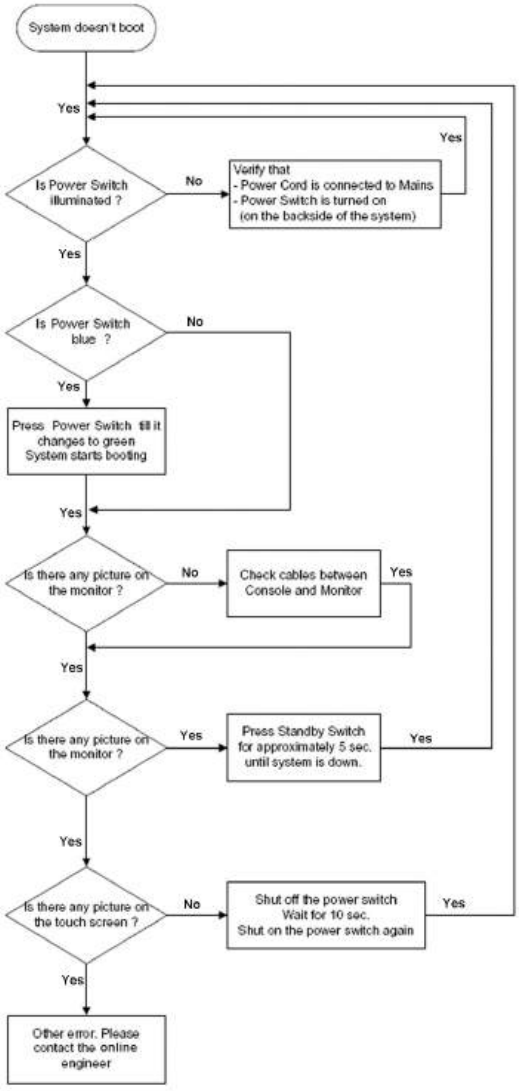


Figure 6-48. System Doesn't Boot

6-10-1-2 Noise Issue

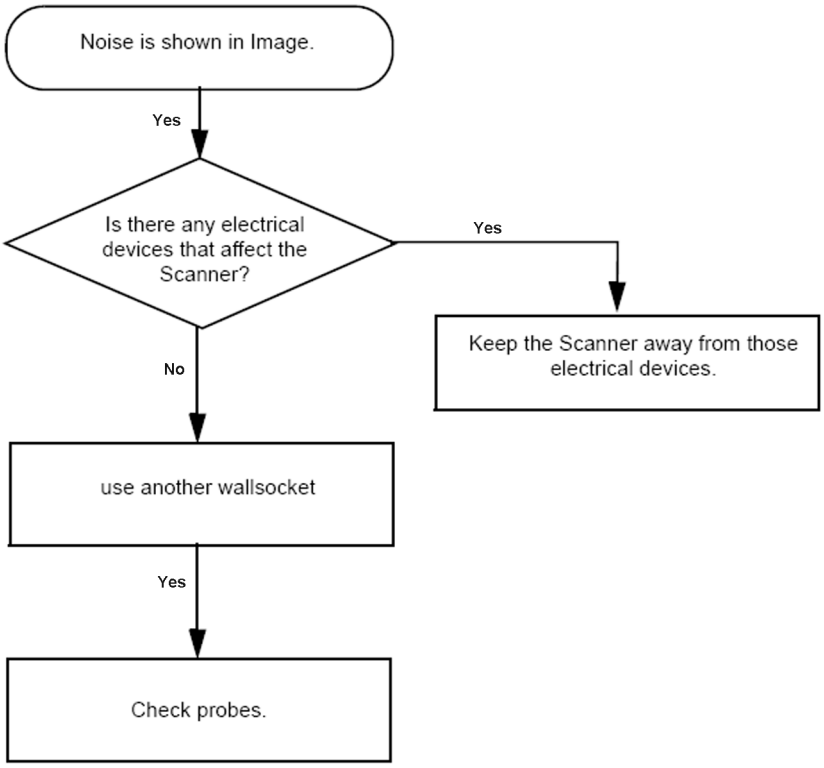


Figure 6-49. Noise Issue

6-10-1-3 View current battery status

Users can check the battery icons to know the battery type, battery capacity, battery working status, battery charging status and battery health on the title bar of the right upper corner.

NOTE: This feature is only supported for SW version 206.94.0 and above.

6-10-1-3-1 Battery type

Vivid *iq* can be powered by two different batteries. One is internal battery called scanner battery. The other one is installed inside charge box on cart, called cart battery. We use the following icons representing the battery type (Figure 6-50).

Figure 6-50. Scanner battery icon(left) and cart battery icon (right)

6-10-1-3-2 Battery capacity

We use the following icons to indicate the level of battery capacity. Take scanner battery icon as an example to explain.

Figure 6-51. Battery capacity levels

Table 6-14: Battery capacity icons

	This icon means the battery capacity is below 5%.
	This icon means the battery capacity is exceeding 5% and less than 15%.
	This icon means the battery capacity is exceeding 15% and less than 25%.
	This icon means the battery capacity is exceeding 25% and less than 50%.
	This icon means the battery capacity is exceeding 50% and less than 80%.
	This icon means the battery capacity is exceeding 80% and less than 100%.

6-10-1-3-3 Battery working status

We use the following icons to indicate the battery working status. Take scanner battery icon as an example to explain.

Figure 6-52. Battery working status icon

Table 6-15: Battery working status icons

	This icon means the battery is absent.
	This icon means the battery is working normally.
	This icon means there is an unknown error on battery.
	This icon means there is a permanent error on battery.

NOTE: If there is an unknown error detected on your battery, please restart the ultrasound system or contact GE HealthCare service representative.

NOTE: If there is a permanent error detected on your battery, it means your battery has reached its end of life or is damaged. Please replace with a new one.

6-10-1-3-4 Battery charging status

We use the following icons to indicate the battery charging status. Take scanner battery icon as an example to explain.

Figure 6-53. Battery charging status icon

Table 6-16: Battery charging status icons

	This icon means the battery is discharging.
	This icon means the battery is charging.

6-10-1-3-5 Battery health status

If the battery health is below 60%, a yellow exclamation mark will appear on battery icon. Take scanner battery icon as an example to explain.

Figure 6-54. Battery health status icon

NOTE: If battery health below 60%, it's recommended to replace a new one.

6-10-1-3-6 View current battery status from title bar

When the system is running on cart battery, there is a battery icon in the system title bar.

Figure 6-55. Running on cart battery

When the system is running on scanner battery, there is a battery icon in the system title bar.

Figure 6-56. Running on scanner battery

When the system is running by AC adapter without any battery installed, the AC adapter icon appears in the system title bar.

Figure 6-57. Charged by AC adapter

6-10-1-4 Battery Information Check

To view detailed information for scanner battery and cart battery, please select the tray menu from the right upper corner and press either of the battery buttons.

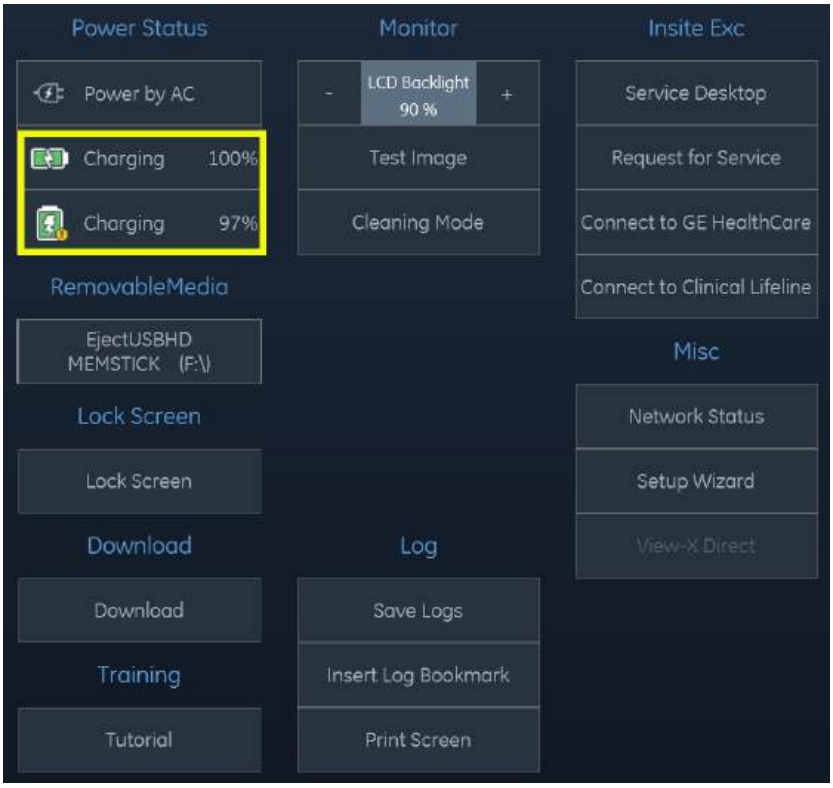


Figure 6-58. Battery Charging Icon

6-10-1-4 Battery Information Check(continued)

The pop-up window will show detailed battery information, including battery status, battery capacity and battery health for both scanner and cart.

Battery capacity is shown in percentage and battery health is shown by symbols. For cart battery, except the total capacity and total health, user can also check the battery status and battery health for each battery.

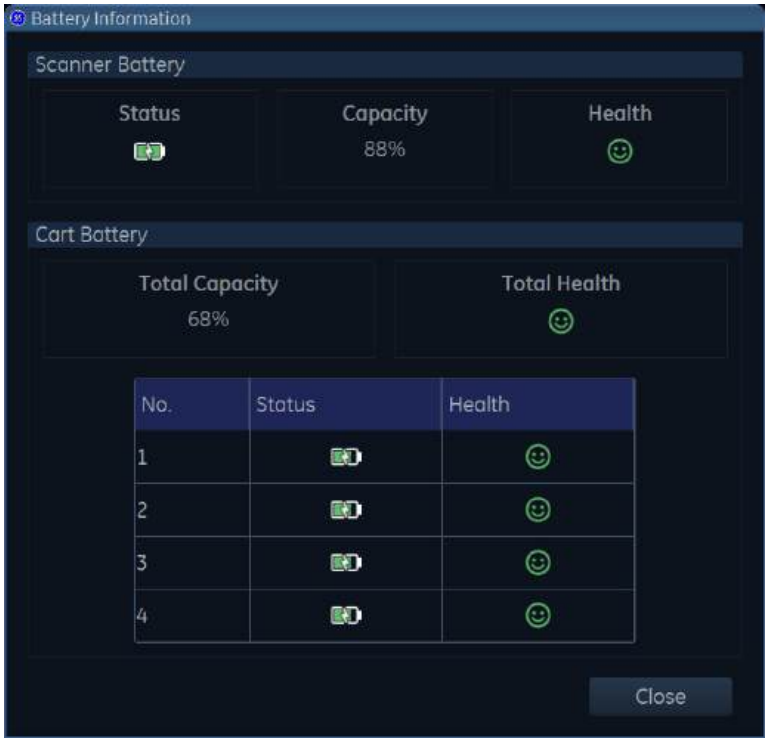


Figure 6-59. Battery Information Window

6-10-1-4 Battery Information Check(continued)

The following table will explain battery health icons.

Table 6-17: Battery Health Icons

	Green smile icon indicates the battery is in good health.
	Yellow icon indicates the battery health is below 60% and close to end of its life. Recommend to replace a new battery.
	Red sad icon indicates the battery has reached end of its life and can't be used for scanning. Replacement of a new battery is needed.
	This icon indicate state of health is not supported by current battery.

6-10-1-4 Battery Information Check(continued)

If the battery capacity is below 60%, there will be a warning message displayed on the lower part of battery information window to remind the user to replace a new battery.

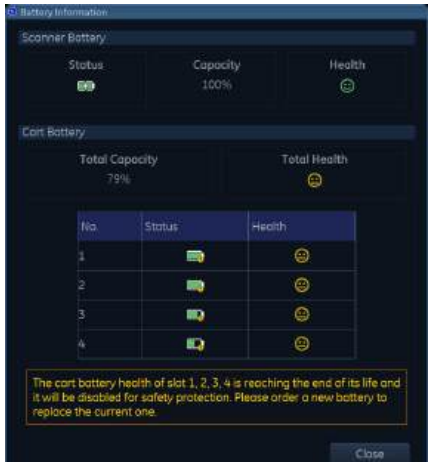


Figure 6-60. Battery Replacement Reminder (1)

If the battery has reached the end of its life and disabled for any further use, a warning message will be displayed on the lower part of battery information window to request the user to organize the replacement.

Figure 6-61. Battery Replacement Reminder (2)

Chapter 7

Replacement Procedures

This chapter includes instructions for installing and re-installing the software.

7-1 Overview

7-1-1 Contents in this chapter

7-2 Warnings and important information

7-2-1 Warnings

WARNING

Energy Control and Power Lockout for Vivid *iq*.

When servicing parts of the Ultrasound system where there is exposure to voltage greater than 30 volts:

1. Follow LOCK OUT/TAG OUT procedures.
2. Turn off the breaker.
3. Unplug the Ultrasound system.
4. Maintain control of the Ultrasound system power plug.
5. Wait for at least 30 seconds for capacitors to discharge as there are no test points to verify isolation.
6. Remove/disconnect the battery, if present.

Ultrasound System components may be energized.

WARNING

Because of the limited access to cabinets and equipment in the field, placing people in awkward positions, GE has limited the lifting weight for one person in the field to 16 KG (35 LBS). Anything over 16 KG (35 LBS) requires 2 people.

WARNING

DO NOT touch any boards with integrated circuits prior to taking the necessary ESD precautions.

Always connect yourself, via an arm-wrist strap, to the advised ESD connection point located on the rear of the Ultrasound system (near the power connector).

Follow general guidelines for handling of electrostatic sensitive equipment.

7-2-1 Warnings(continued)

NOTE: Use an ESD compatible work space or the ESD-kit during parts replacement.

WARNING

The waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately.

Please contact the manufacturer or other authorized disposal company to decommission your equipment.

WARNING

If the procedure of performing maintenance or replacing parts on the system is wrong, it could result in an unacceptable risk for the patient, user or service technician.

7-2-2 Returning/shipping probes and repair parts

Equipment being returned must be clean and free of blood and other infectious substances.

GE policy states that body fluids must be properly removed from any part or equipment prior to shipment. GE employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe). The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that "items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care" are "regulated medical waste" for transportation purposes and must be transported as a hazardous material.

7-3 Disassembly/Re-assembly

7-3-1 Warning and Caution

WARNING

ONLY QUALIFIED SERVICE PERSONNEL SHOULD REMOVE ANY COVERS OR PANELS. ELECTRICAL HAZARDS EXISTS AT SEVERAL POINTS INSIDE. BECOME THOROUGHLY FAMILIAR WITH ALL HAZARDOUS VOLTAGES AND HIGH CURRENT LEVELS TO AVOID ACCIDENTAL CONTACT

WARNING

Remove/disconnect the battery before disassembling or re-assembling the parts.

CAUTION

Do not wear the ESD wrist strap when you work on live circuits and more than 30V peak is present.

7-3-2 Tools needed for servicing Vivid *iq*

Table 7-1: Standard tools list for Vivid *iq*

No	Part Name	Part No.	Screw Description	Screwdriver Description
1	screw	5138465	Screw FH M2.5x5(NL)	Phillips #1
2	screw	2327793	Screw SJ2836-87 M3x8	Phillips #2
3	screw	5442136	Screw FH 2.5x14(NL)	Phillips #1
4	screw	5138468	Screw BN5687 M3x10(NL)	TORX #10
5	screw	5162727	Screw M3x25(NL)	TORX #10
6	screw	2327764	D2 SCREW M2x3(NYLOK)	Phillips #0
7	screw	2327785	D2 SCREW M2x4(NYLOK)	Phillips #0
8	screw	5148762	Screw FH M2x8(NL)	Phillips #0
9	screw	5446830	Screw FHE M3x14(NL)	Phillips #1
10	screw	2327782	Screw FH M3x3(NL)	Phillips #1
11	screw	5144997	Screw FH M3x6(NL)	Phillips #1
12	screw	5148969	Screw SFH M2.5x4(NL)	Phillips #1

NOTE: Please use the correct Screwdrivers listed in Table 7-1.

7-3-3 Overview of Vivid *iq*

Figure 7-1. System Overview (1)

Figure 7-2. System Overview (2)

7-3-3 Overview of Vivid iq(continued)

Figure 7-3. Peripheral/accessory connector panel

1. 2 USB ports (3.0)
2. ECG connector port
3. 4D probe connector port (for connecting 4D probe cable from cart)
4. 1 probe connector port
5. USB port (2.0) (for USB connection and connecting to cart)
6. Port for DC In (for AC Adapter and connecting to cart)
7. Network port
8. HDMI port
9. Security lock
10. 2 USB ports (2.0)

When in ICE mode (the dataflow of Patients is set as CartoSound Interface), the external resolution is 800x600, otherwise, the external resolution is 1920x1080.

7-3-4 Battery

Purpose: This is a description on how to remove and replace the Battery

7-3-4-1 Tools

- NA

7-3-4-2 Preparation

- Shut down the system and disconnect the power cord.

7-3-4-3 Needed Manpower

- 1 person, 2 minutes + travel

7-3-4-4 Removal Procedure

Table 7-2: Removal Procedure for Battery

No.	Steps	Corresponding Graphic
1.	Push up the battery lock to both ends of the slot with both thumbs.	
		

Table 7-2: Removal Procedure for Battery

No.	Steps	Corresponding Graphic
2.	Put the finger in the breach of the battery box to dig up it and remove it.	
		

7-3-4-5 Mounting Procedure

1. Install the new parts in the reverse order of removal.

7-3-5 Rubber and Cups

Purpose: This is a description on how to remove and replace the Cart Rubber and Cups.

7-3-5-1 Tools

- NA

7-3-5-2 Needed Manpower

- 1 person, 2 minutes + travel

7-3-5-3 Preparation

- Shut down the system and switch off the main breaker.

7-3-5-4 Removal Procedure

Table 7-3: Removal Procedure for Rubber and Cups

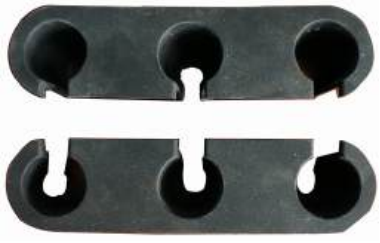
No.	Steps	Corresponding Graphic
1.	Remove the rubbers on both sides of the cart with hands.	
		
2.	Raise the screw pad with the screw driver on the gel holder.	

Table 7-3: Removal Procedure for Rubber and Cups

No.	Steps	Corresponding Graphic
3.	Unscrew the screw.	
4.	Remove the small part of the gel holder.	
5.	Remove the gel holder out of the lower table assy.	

7-3-5-5 Mounting Procedure

- Install the new parts in the reverse order of removal.

7-3-6 Power Box Assy

Purpose: This is a description on how to remove and replace the Cart Power Box Assy.

7-3-6-1 Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

7-3-6-2 Needed Manpower

- 1 person, 1 minutes + travel

7-3-6-3 Preparation

- Shut down the system and switch off the main breaker.

7-3-6-4 Removal Procedure

Table 7-4: Removal Procedure for Power Box Assy

No.	Steps	Corresponding Graphic
1.	Remove the power cable. *Note: When removing the power cable, grab the handle and pull out the cable connector from the AC power port.*	
2.	Disconnect 2 connectors.	
3.	Rotate and loose the 2 fasteners, and then pull out the power box.	
4.	Take down the power box with both hands.	

7-3-6-5 Mounting Procedure

- Install the new parts in the reverse order of removal.

7-3-7 Cart Cable Hook SVC Kit

Purpose: This is a description on how to remove and replace the Cart Cable Hook SVC Kit.

7-3-7-1 Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

7-3-7-2 Needed Manpower

- 1 person, 8 minutes + travel

7-3-7-3 Preparation

- Shut down the system and switch off the main breaker.

7-3-7-4 Removal Procedure

Table 7-5: Removal Procedure for Cart Cable Hook SVC Kit

No.	Steps	Corresponding Graphic
1.	Lift up the hook to remove it from the cart.	
2.	Unscrew 2 screws on the hook.	

Table 7-5: Removal Procedure for Cart Cable Hook SVC Kit

No.	Steps	Corresponding Graphic
3.	Repeat step 4 to remove other 3 hooks.	

7-3-7-5 Mounting Procedure

- Install the new parts in the reverse order of removal.

7-3-8 Charge Box

Purpose: This is a description on how to remove and replace the Charge Box.

7-3-8-1 Tools

- No special tools.

7-3-8-2 Needed Manpower

- 1 person, 2 minutes + travel

7-3-8-3 Preparation

- Shut down the system and switch off the main breaker.

7-3-8-4 Removal Procedure

Table 7-6: Removal Procedure for Charge Box

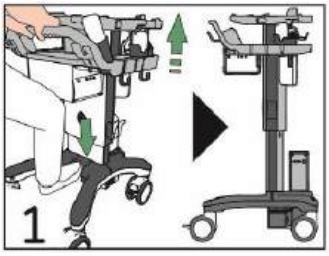
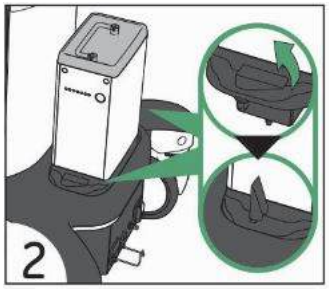
No.	Steps	Corresponding Graphic
1.	To adjust the height of the cart, hold the handle with both hands, step on the pedal and raise the height.	
2.	Flip up the 2 swell laths.	

Table 7-6: Removal Procedure for Charge Box

No.	Steps	Corresponding Graphic
3.	Carry the folding handle of the Charge Box to remove it from the cart.	
4.	Install the base back basket to the cart with both hands.	

7-3-8-5 Mounting Procedure

- Install the new parts in the reverse order of removal.

CAUTION

Use caution to avoid injuring hands when installing the Extended Life Battery.

7-3-9 Rubber and Cups Kit

Purpose: This is a description on how to remove and replace the Cart Rubber and Cups.

Tools

- NA

Needed Manpower

- 1 person, 2 minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Removal Procedure

Table 7-7: Removal Procedure for Rubber and Cups

No.	Steps	Corresponding Graphic
1.	Remove the rubbers on both sides of the cart with hands.	 

Table 7-7: Removal Procedure for Rubber and Cups

No.	Steps	Corresponding Graphic
2.	Remove the gel holder with hand.	
		

Mounting Procedure

- Install the new parts in the reverse order of removal.

7-3-10 Back Basket

Purpose: This is a description on how to remove and replace the Cart Back Basket.

Tools

- NA

Needed Manpower

- 1 person, 2 minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Removal Procedure

Table 7-8: Removal Procedure for Back Basket

No.	Steps	Corresponding Graphic
1.	Lift up the back basket to remove it from the cart.	
		

Mounting Procedure

- Install the new parts in the reverse order of removal.

7-3-11 Front Basket

Purpose: This is a description on how to remove and replace the Front Basket.

Tools

- NA

Needed Manpower

- 1 person, 2 minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Removal Procedure

Table 7-9: Removal Procedure for Front Basket

No.	Steps	Corresponding Graphic
1.	Lift up the front basket to remove it from the cart.	 

Mounting Procedure

- Install the new parts in the reverse order of removal.

7-3-12 Printer Shelf

Purpose: This is a description on how to remove and replace the Printer Shelf.

Tools

- NA

Needed Manpower

- 1 person, 10 minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Removal Procedure

Table 7-10: Removal Procedure for Printer Shelf

No.	Steps	Corresponding Graphic
1.	Grab the quick release lever and pull it out.	
2.	Lift up the Printer Shelf with both hands and remove it.	

Mounting Procedure

- Install the new parts in the reverse order of removal.

7-3-13 WIFI Bracket Assy

Purpose: This is a description on how to remove and replace the WIFI Bracket Assy.

Tools

- NA

Needed Manpower

- 1 person, 2 minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Removal Procedure

Table 7-11: Removal Procedure for WIFI Bracket Assy

No.	Steps	Corresponding Graphic
1.	Disconnect the USB cable from the USB hub.	
		
2.	Open the WIFI adapter bracket and take out the WIFI adapter with the cable.	

Table 7-11: Removal Procedure for WIFI Bracket Assy

No.	Steps	Corresponding Graphic
3.	Disconnect the USB cable from the WIFI adapter.	
4.	Pull out the WIFI bracket from the cart body using two hands.	
5.	WIFI bracket assy.	

Mounting Procedure

- Install the new parts in the reverse order of removal.

Chapter 8

Renewal Parts

This chapter lists the renewal parts available for the Vivid iq.

8-1 Overview

8-1-1 Contents in this chapter

8-2 List of Abbreviations

Table 8-1: List of Abbreviations

ABBREVIATION	DESCRIPTION
3D	THREE DIMENSIONAL
Assy	ASSEMBLY
FRU 1	Replacement part available in part hub
FRU 2	Replacement part available from the manufacturer (lead time involved)
KBD	Keyboard
LCD	Liquid Crystal Display
BnV	Brightness and Volume
TMST	Master Board

8-3 Renewal Parts (Spare Parts) Lists

8-3-1 AC Power Cord

Table 8-2: AC Power Cord

Item	HCAT#	Part Number	Part Name	Quantity	FRU
1.	H48502AT	6736103-2	PWR SPLY CRD BRAZIL 10A 250V STRAIGHT 2.5M	1	1
2.	H48502AW	6736105-2	PWR SPLY CRD EUROPE KOREA 10A 250V STRAIGHT 2.5M	1	1
3.	H48532AY	6736115-2	PWR SPLY CRD DENMARK HOSPITAL GRADE 10A 250V STRAIGHT 2.5M	1	1
4.	H48502AZ	6736109-2	PWR SPLY CRD ISRAEL 10A 250V STRAIGHT 2.5M	1	1
5.	H48512AA	6736111-2	PWR SPLY CRD JAPAN AND TAIWAN 15A 125V STRAIGHT 2.5M	1	1
6.	H48482AB	5177126-2	JAPAN CLASS AC POWERCORD FOR CART	1	1
7.	H48512AC	6736101-2	PWR SPLY CRD ARGENTINA 10A 250V STRAIGHT 2.5M	1	1
8.	H48512AD	6736102-2	PWR SPLY CRD ANZ 10A 250V STRAIGHT 2.5M	1	1
9.	H48512AE	6736104-2	PWR SPLY CRD CHINA 10A 250V STRAIGHT 2.5M	1	1
10.	H48512AF	6736107-2	PWR SPLY CRD UK IRELAND 10A 250V STRAIGHT 2.5M	1	1
11.	H48512AG	6736108-2	PWR SPLY CRD INDIA 6A 250V STRAIGHT 2.5M	1	1
12.	H48512AJ	6736113-2	PWR SPLY CRD SWITZERLAND 10A 250V STRAIGHT 2.5M	1	1
13.	H48512AK	6736114-2	PWR SPLY CRD UNITED STATES - CANADA 15A 125V STRAIGHT 4M	1	1
14.	H46712LW	6736114-3	PWR SPLY CRD UNITED STATES - CANADA 15A 125V STRAIGHT 4M	1	1

8-3-2 CRU List

Table 8-3: CRU List (for Console System)

Item	Part Number	Description	Corresponding graphic	RP
1.	5717315-2-S	Internal Battery		RP
2.	5693770-2S	Vivid iq ACDC adapter for SVC		
3.	5848545	ECG adapter cable kit		RP
4.	5863421	Ethernet protection cable		
5.	5434317	1TB mobile HDD		
6.	5786704-S	Sage Rubber foot		

Table 8-4: CRU List (for Generic Cart)

Item	Part Number	Part Name	Corresponding graphic	RP
1.	5748237	Rubber and Cups		RP
2.	5748236	Cart Cable Hook SVC Kit		RP
3.	5721308	Charge Box Note:When replacing a new charge box, please record the serial number of this new charge box in SR record for further track.	 	RP
4.	5721299-S	Power Box Assy		RP

Table 8-4: CRU List (for Generic Cart)

Item	Part Number	Part Name	Corresponding graphic	RP
5.	5721368-S	Cart Front basket SVC Kit		
6.	5721363-S	Cart Back basket SVC Kit		
7.	5721296-S	Cart base basket SVC Kit		
8.	5721296-S	Vivid *iq* Cart Power Box filter *Note: Refer to 5737130 Mobile Cart User Instruction for detailed replacement information.*		
9.	5721342 -2-S	Vivid *iq* Cart 4PP Assy Note: Refer to 5737130 Mobile Cart User Instruction for detailed replacement information.		
10.	5721453	Cart Printer Shelf Assy Note: Refer to 5737130 Mobile Cart User Instruction for detailed replacement information.		

Table 8-4: CRU List (for Generic Cart)

Item	Part Number	Part Name	Corresponding graphic	RP
11.	5946770-S	Printer shelf with package kit for Vivid *iq* Note: installed in generic cart and support 5449275-4 Transcend DVDRW kit and 5653589 LITEON eBAN 108 DVDRW kit Note: Refer to 5737130 Mobile Cart User Instruction for detailed replacement information.		
12.	5750520	Probe holder for P2D Kit		
13.	5974261-S	Ergonomic P2D Probe Holder		

Table 8-5: CRU List (for Standard & Premium Cart)

Item	Part Number	Part Name	Corresponding graphic	RP
1.	5941039-S	Vivid iq Premium Cart Assy_CRU *Note: Before replacing 5941039-S, first remove the option parts from the cart, then install these option parts back after replacing 5941039-S.* *Specific option parts are listed here for reference:* • *Charge box with 4 battery packs* • *4-probe Box and bracket* • *DVD/Printer shelf for DC/AC 898* • *Rubbers and Cups* • *Column hook* • *Cable hook* • *WIFI Bracket*		

Table 8-5: CRU List (for Standard & Premium Cart)

Item	Part Number	Part Name	Corresponding graphic	RP
2.	5941037-S	Vivid iq Standard Cart Assy_CRU *Note: Before replacing 5941037-S, first remove the option parts from the cart, then install these option parts back after replacing 5941037-S.* *Specific option parts are listed here for reference:* • *Charge box with 4 battery packs* • *4-probe Box* • *DVD/Printer shelf for DC/AC 898* • *Rubbers and Cups* • *Column hook* • *Cable hook* • *WIFI Bracket*		
3.	5954874	Vivid iq Cart Rubber and Cups Kit_CRU		
4.	5951369-S	Vivid iq Cart back basket_CRU		
5.	5954737-S	Vivid iq Cart Front Basket assy_CRU		

Table 8-5: CRU List (for Standard & Premium Cart)

Item	Part Number	Part Name	Corresponding graphic	RP
6.	5947849-S	Vivid iq Standard/Premium Charge Box Assy_CRU *Note: please refer to Charge box Instructions for Use 5954466 for detailed replacement information.*		
7.	5936564-S	LOGIQ e R9 Cart Printer & Printer Shelf_CRU *Note: installed in standard & premium cart and support 5449275-4 Transcend DVDRW kit.* *Note: Refer to 5947351 Mobile Cart User Instruction for detailed replacement information*.		
8.	5947852-S	Vivid iq Cart WIFI Bracket assy SVC kit		
9.	5945123-S	LOGIQ e R9 Battery Pack_CRU		

Table 8-5: CRU List (for Standard & Premium Cart)

Item	Part Number	Part Name	Corresponding graphic	RP
10.	5947732-S	Vivid iq cart 4PP SVC Kit *Note: Refer to 5954470 Cart 4PP Instruction for detailed replacement information.*		
11.	5947738-S	4PP bracket with rear handle SVC Kit *Note: Refer to 5954469 cart 4PP with rear handle for detailed replacement information.*		

8-3-3 Probe

Table 8-6: Probes for Vivid *iq*

Item	Part Name	Part Number	Center Image Frequency (MHz)	Qty	FRU
1.	4C-RS	5488477	1.5 - 5.0	1	1
2.	3Sc-RS	5433833	1.3 - 4.0	1	1
3.	M5Sc-RS	5718482	1.5 - 4.6	1	1
4.	6S-RS	5499316	3.0 - 7.0	1	1
5.	12S-RS	5499321	4.5 - 12.0	1	1
6.	9L-RS	5499511	3.0 - 9.0	1	1
7.	12L-RS	5499501	4.0 - 13.0	1	1
8.	ML6-15-RS	5499610	5.0 - 15.0	1	1
9.	8C-RS	5499508	4.0 - 8.0	1	1
10.	C1-5-RS	5499608	1.5 - 5.0	1	1
11.	6Tc-RS	5729431	3.0 - 8.0	1	1
12.	6VT-D	5729425	3.0 - 8.0	1	1
13.	E8Cs-RS	5670375	3.5 - 10.0	1	1
14.	P2D (RS type connector)	5729436	1.9	1	1
15.	L8-18i-RS	5499609	4.5 - 18.0	1	1
16.	9T-RS	5729433	3.0 - 10.0	1	1
17.	L4-20t-RS	5851518	4.0 - 20.0	1	1
18.	10T-D	5772436	5.0 - 10.0	1	1
19.	AcuNav UMBILICAL CORD-VIVID-I BT09	S2423364	NA	1	1

System view

8-3-4 ECG Cables

Table 8-7: ECG Cables

Applicable IB	Cate.	FRU to Order	Description
R1&R2	AHA(USA)-Adult	S2424549	TRUNK CABLE FOR USA-SERVICE KIT
		S2424557	LEAD WIRE KIT USA BLACK RED WHITE
	IEC(Europe)-Adult	S2424553	TRUNK CABLE FOR EUROPE
		S2424558	LEAD WIRE KIT EURO YELLOW, RED, GREEN
R1&R2&R3&R4&R6	AHA(USA)-Adult	5848545	ECG adapter cable kit
		2106305-001-S	ecg trunk cable, aha
		2106390-001-S	ecg leadwire set, aha
	AHA(USA)-Neo	5848545	ECG adapter cable kit
		2106306-001-S	ecg trunk cable, neonatal din 3-lead, aha
	IEC(Europe)-Adult	5848545	ECG adapter cable kit
		2106305-003-S	ecg trunk cable, iec
		2106390-003-S	ecg leadwire set, iec
	IEC(Europe)-Neo	5848545	ECG adapter cable kit
		2106306-003-S	ecg trunk cable, neonatal din 3-lead, iec
All	NA	5498097	ECG EXTERNAL(Stress)CBL-VIVID-I-H45021DE

8-3-5 Peripherals

Table 8-8: Accessories

Item	Part Number	Catalog Number	Description	Qty
1.	5824239	H48072BM	Vivid iq Inclined Supporter SVC part 	1
2.	5534825	H48572AB	HDMI to S-video adaptor	1
3.	5794927-S	H48982AN	Video BOX for CVUS SVC KIT 	1
4.	5863937	H48532BH	USB3.0 stick for Storage	1
5.	5151236	H41642LS	FOOT SWITCH -MED GP26	1
6.	5653589	H48532LJ	LITEON eBAU108 DVDRW Kit *Note:Support generic cart	1
7.	5962058-S	H48392DT	Transcend TS8XDVDS-K with original cable and without gasket *Note:Support both generic cart and standard &premium cart	1
8.	5449275-4	H48962CB	Transcend TS8XDVDS-K Note:Only Support standard &premium cart	1
9.	5728576	H48392AW	NetGear Wireless USB Adapter A6210 Kit	1
10.	5933000-S	H48392DE	Wireless USB Adapter A8000 *Note:For R6, Only support SW 206.74.0 and above. For R4, Only support SW 204.117.0 and above. For R3, Only support SW 203.109.0 and above. *Note:Refer to 5956044 Wireless USB Adapter A8000 Instruction for Use for detailed instation information.	1
11.	5446638	NA	Keeber 8G USB stick	1

Table 8-8: Accessories

Item	Part Number	Catalog Number	Description	Qty
12.	5717315-2-S	H48942AT	Vivid Compact Battery *Note: For sage console and charge box of generic cart	1
13.	5945123-S	H48942CP	LOGIQ e R9 Battery Pack_CRU *Note: For charge box of standard & premium cart	1

Table 8-9: Printer

Item	Catalog Number	Part Number	Description	Qty
1.	H48532AM	5389822	SONY UPD25 Color Printer kit	1
2.	H48542LY	5133106-2	SONY UPD25 Color Printer CHN kit	1
3.	H48542LZ	5133107-2	SONY UPD25 Color Printer USA kit	1
4.	H48552LA	5133108-2	SONY UPD25 Color Printer EUP kit	1
5.	H48552LB	5133109-2	SONY UPD25 Color Printer JPN kit	1
6.	H48312AN	5491253	SONY UPD25 Color Printer Brazil kit	1
7.	H48532AL	NA	SONY UP-D898MD BW Printer Kit	1
8.	H48492AF	5151259-2	SONY UP-D898MD Printer USA Kit	1
9.	H48492AG	5151261-2	SONY UP-D898MD Printer EU Kit	1
10.	H48492AH	5151262-2	SONY UP-D898MD Printer CHN Kit	1
11.	H48492AJ	5151263-2	SONY UP-D898MD Printer JPN Kit	1
11.	H48492AK	5495509-2	SONY UP-D898MD Printer BRA Kit	1
12.	H45541MJ	NA	COLOR LASER PRINTER 220V	1
13.	H45541MH	NA	COLOR LASER PRINTER 110V	1

Table 8-10: Biopsy Kit

Item	Catalog Number	Description	Qty
1.	E8385NA	4C-RS Biopsy Kit	1
2.	H4906BK	9L-RS Biopsy kit	1
3.	H40432LC	12L-RS Biopsy kit	1
4.	H46222LC	3Sc-RS Biopsy kit	1
5.	H40432LE	C1-5-RS Biopsy kit	1

System view

Table 8-10: Biopsy Kit

Item	Catalog Number	Description	Qty
6.	H40432LJ	ML6-15 Biopsy Kit	1
7.	H45561FC	M5S Biopsy Kit	1
8.	E8385MJ	E721 Starter Kit	1
9.	H45201BL (Only for v206)	L4-20t Verza biopsy starter kit	1

Table 8-11: System and Application USB for v206

Item	Part Number	Description	Qty
1.	5881794	Vivid IQ 206 System and Application Software USB	1

8-3-6 Manuals

The User Manuals and Release Notes in the supported languages, Advanced Reference Manuals (English and French), and the Basic Service Manual (English) are all included on a removable media.

The translated online versions of the User Manuals are included on the software UFD. These manuals are used for installation if the customer want to have other versions than the English version available on the Vivid *iq*.

Table 8-12: Manuals for Vivid *iq*

Item	Part Number	Description	Qty	FRU
1.	5872801-1EN	Vivid iq v206 User Manual - English	1	N
2.	5822849-1FR	Vivid iq v206 User Manual - French	1	N
3.	5822849-1ES	Vivid iq v206 User Manual - Spanish	1	N
4.	5822849-1DE	Vivid iq v206 User Manual - German	1	N
5.	5822849-1IT	Vivid iq v206 User Manual - Italian	1	N
6.	5822849-1NL	Vivid iq v206 User Manual - Dutch	1	N
7.	5822849-1PT-BR	Vivid iq v206 User Manual - Brazilian Portuguese	1	N
8.	5822849-1ET	Vivid iq v206 User Manual - Estonian	1	N
9.	5822849-1SL	Vivid iq v206 User Manual - Slovenian	1	N
10.	5822849-1JA	Vivid iq v206 User Manual - Japanese	1	N
11.	5822849-1ZH	Vivid iq v206 User Manual - Simplified Chinese	1	N
12.	5822849-1SV	Vivid iq v206 User Manual - Swedish	1	N
13.	5822849-1KO	Vivid iq v206 User Manual - Korean	1	N
14.	5822849-1RU	Vivid iq v206 User Manual - Russian	1	N
15.	5822849-1PL	Vivid iq v206 User Manual - Polish	1	N
16.	5822849-1EL	Vivid iq v206 User Manual - Greek	1	N
17.	5822849-1HU	Vivid iq v206 User Manual - Hungarian	1	N
18.	5822849-1SK	Vivid iq v206 User Manual - Slovakian	1	N
19.	5822849-1CZ	Vivid iq v206 User Manual - Czech	1	N
20.	5822849-1TR	Vivid iq v206 User Manual - Turkish	1	N
21.	5822849-1DA	Vivid iq v206 User Manual - Danish	1	N
22.	5822849-1NO	Vivid iq v206 User Manual - Norwegian	1	N

Table 8-12: Manuals for Vivid *iq*

Item	Part Number	Description	Qty	FRU
23.	5822849-1FI	Vivid iq v206 User Manual - Finnish	1	N
24.	5822849-1BG	Vivid iq v206 User Manual - Bulgarian	1	N
25.	5822849-1RO	Vivid iq v206 User Manual - Romanian	1	N
26.	5822849-1HR	Vivid iq v206 User Manual - Croatian	1	N
27.	5822849-1LT	Vivid iq v206 User Manual - Lithuanian	1	N
28.	5822849-1LV	Vivid iq v206 User Manual - Latvian	1	N
29.	5822849-1SR	Vivid iq v206 User Manual - Serbian	1	N
30.	5822849-1PT-PT	Vivid iq v206 User Manual - European Portuguese	1	N
31.	5822849-1UK	Vivid iq v206 User Manual - Ukrainian	1	N
32.	5822849-1ID	Vivid iq v206 User Manual - Indonesian	1	N
33.	5822849-1VI	Vivid iq v206 User Manual - Vietnamese	1	N
34.	5822849-1KK	Vivid iq v206 User Manual - Kazakh	1	N
35.	5872804-1EN	Vivid iq v206 Advanced Reference Manual - Engligh	1	N
36.	5872804-1FR	Vivid iq v206 Advanced Reference Manual - French	1	N
37.	5873028-1EN	Vivid iq v206 Basic Service Manual - English	1	N
38.	5882026	Vivid iq v206 eIFU pamphlet	1	N
39.	5881787-1EN	Vivid iq v204 to v206 Upgrade Instruction	1	N
40.	5882015	Vivid iq v206 UDOC Media	1	N

Chapter 9

Care and Maintenance

*This chapter describes **Care and Maintenance** on the Ultrasound system and peripherals. These procedures are intended to **maintain the quality** of the Ultrasound **system's performance**. Read this chapter completely and familiarize yourself with the procedures before performing a task.*

9-1 Overview

9-1-1 Contents in this chapter

9-2 Warnings

 DANGER	BE SURE TO DISCONNECT THE ULTRASOUND SYSTEM POWER PLUG AND OPEN THE MAIN CIRCUIT BREAKER BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.
 WARNING	If the procedure of performing maintenance or replacing parts on the system is wrong, it could result in an unacceptable risk for the patient, user or service technician.
 CAUTION	Practice good ESD prevention. Wear an anti–static strap when handling electronic parts and even when disconnecting/ connecting cables.
 CAUTION	Do not pull out or insert circuit boards while power is on.
 CAUTION	Do not operate this Ultrasound system unless all board covers and frame panels are securely in place. System performance and cooling require this.

9-3 Why do maintenance

9-3-1 Periodic maintenance inspections

It has been determined by engineering that your Vivid *iq* does not have any high wear components that fail with use, therefore no Periodic Maintenance inspections are mandatory.

However, some customers' Quality Assurance Programs may require additional tasks and or inspections at a different frequency than listed in this manual.

9-3-2 Keeping records

It is good business practice that ultrasound facilities maintain records of periodic and corrective maintenance. The Ultrasound Periodic Maintenance Inspection Certificate provides the customer with documentation that the Ultrasound system is maintained on a periodic basis.

A copy of the *Ultrasound Periodic Maintenance Inspection Certificate* should be kept in the same room or near the Ultrasound system.

9-3-3 Quality assurance

In order to gain accreditation from organizations such as the American College of Radiology (USA), it is the customer's responsibility to have a quality assurance program in place for each Ultrasound system. The program must be directed by a medical physicists, the supervising radiologist/physician or appropriate designee.

Routine quality control testing must occur regularly. The same tests are performed during each period so that changes can be monitored over time and effective corrective action can be taken.

Testing results, corrective action and the effects of corrective action must be documented and maintained on the site.

Your GE service representative can help you with establishing, performing and maintaining records for a quality assurance program. Contact GE for coverage and/or price for service.

9-4 Maintenance task schedule

9-4-1 How often should maintenance tasks be performed?

The Care and Maintenance task schedule (provided in Table 9-1 *on page 9-6*) specifies how often your Vivid *iq* should be serviced and outlines items requiring special attention.

NOTE: It is the customer's responsibility to ensure the Vivid iq care and maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.

Your GE Service Representative has an in-depth knowledge of your Vivid *iq* and can best provide competent, efficient service. Contact GE for coverage information and/or price for service.

The service procedures and recommended intervals shown in the Care and Maintenance Task Schedule assumes that you use your Vivid *iq* for an average patient load (10-12 per day) and not use it as a primary mobile Ultrasound system which is transported between diagnostic facilities.

NOTE: If conditions exist which exceed typical usage and patient load, then it is recommended to increase the periodic maintenance frequencies.

Table 9-1: Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Clean Probes	•*				* or before each use
Inspect AC Mains Cable			•		Mobile Ultrasound system: Check Weekly
Inspect Cables and Connectors			•		
Clean Console			•		
Clean LCD			•		
Console Leakage Current Checks				See Notes	Twice Annually

Table 9-1: Customer Care Schedule (Continued)

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Peripheral Leakage Current Checks				See Notes	Twice Annually
Surface Probe Leakage Current Checks				See Notes	Twice Annually
Endocavity Probe Leakage Current Checks				See Notes	Quarterly Annually
Surgical Probe Leakage Current Checks				See Notes	Quarterly Annually
Measurement Accuracy Checks				See Notes	Twice Annually
Functional Checks				See Notes	also after corrective maintenance

NOTE: The maintenance may require specialized equipment to complete.

NOTE: The periodic maintenances are not mandatory. The table above is for reference only.

9-5 Tools required

NOTE: For a list of required tools for servicing the Vivid iq, refer to chapter 8.

9-5-1 Standard GE tool kit

The following is a description of the “Standard” GE tool kit in the USA. Not all tools are required.

Table 9-2: Overview of GE-1 tool kit contents

Tool ID	Description	Tool ID	Description
9-45358	Pliers Retaining Ring	9-XL9971MM	Xcelite-hex Blade 1.27mm
9-4078	Scribe	9-XL9972MM	Xcelite-hex Blade 1.5mm
9-44572	Wrench Open End 3/8 - 7/16	9-XL9973MM	Xcelite-hex Blade 2 mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9974MM	Xcelite-hex Blade 2.5mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9975MM	Xcelite-hex Blade 3mm
9-45385	Pliers, Arc Joint 7 inch	9-XL9976MM	Xcelite-hex Blade 4mm
9-45378	Pliers, Slip Joint	9-XL9977MM	Xcelite-hex Blade 5mm
9-4518	Pliers, Long Nose, Miniature	9-XL991CM	Handle
9-4518	Pliers, Long Nose, Miniature	C2356E	Screw starter - Kedman Quick Wedge
9-44776	Ignition Wrench Set, 10 pc.	BLBO	Box - 18 Compartment
9-44601	Wrench, Adj., 4 inch	DWL4283T	Box - 5 Compartment
9-4151	Screwdriver, Blade, Stubby	9-41322	Pickup Tool, Claw type
9-41421	Screwdriver, Blade, Pocket clip	9-6757	6 pc Needle File Set
9-41594	Screwdriver, Blade 1/8 in. × 4 in.	9-9487	Utility Knife
9-41581	Screwdriver, Blade 3/16 in. × 4 in.	9-45341	Pliers Vice Grip 10 inch
9-39451	20' Steel Tape, locking Spring load	9-3001	Xacto Pen Knife

Table 9-2: Overview of GE-1 tool kit contents (Continued)

Tool ID	Description	Tool ID	Description
9-GH807	Ratchet, Offset, Slotted	9-HT62002	Solder Aid, Fork and Hook
68-412	Ratchet, Offset, Phillips	9-4099	Mirror, Round, Telescoping
9-GH130	Tapered Reamer	9-GH3001	Steel Rule Decimal 6 inch
9-41584	Screwdriver, slotted 1/4 in. × 6 in.	9-GH300ME	Steel Rule Metric 6 inch
9-4118	Screwdriver, Phillips #2, Stubby	9-XL9920	Xcelite-hex Blade.050 inch
9-41293	Screwdriver, Phillips #0	9-XL9921	Xcelite-hex Blade 1/16 inch
9-41294	Screwdriver, Phillips #1	9-XL9922	Xcelite-hex Blade 5/16 inch
9-41295	Screwdriver, Phillips #2	9-XL9923	Xcelite-hex Blade 3/32 inch
9-46677	Hex Keys, 20 pc., Metric	9-XL9924	Xcelite-hex Blade 1/8 inch
9-34701	1/4 in. Standard Socket set (19 pc)	9-XL9925	Xcelite-hex Blade 5/32 inch
9-43499	1/2 inch Socket 1/4 inch drive	9-XL9926	Xcelite-hex Blade 3/16 inch
9-4355	Flex Spinner	9-XL99764	Xcelite-hex Blade 7/64
9-43523	Breaker	9-XL99964	Xcelite-hex Blade 9/64
9-43531	6 inch Ext.	9-XLM60	Mini-screwdriver kit
9-65283	Case 8.5 in. × 4.5 in. × 2 in. Deep	9-45072	Pliers 6 inch Diagonal
9-46696	Hex Keys	9-XL100X	Wire Stripper/Cutter 5 inch - 100X
9-39829	Torpedo Level, Magnetic	9-XL87CG	Pliers - very fine needle nose-87CG
9-38461	Hammer, Ball Peen, 4 oz.	9-WEWDT-07	Weller-Soldering-Replacement Tip(1)
9-4280	Universal Joint 1/4 inch	9-WS175-E	Wiss - Surgical Scissors
9-WEW60P3	Weller - Soldering Iron, 3 wire	KH174	Hemostat 5 inch Straight
9-WECT5B6	Weller - Soldering Iron Tip	KH175	Hemostat 5 inch curved
9-WEWDP12	Weller - Desoldering Pump	9-Z9480121	Alignment tool (red)
93383	Flashlight Mini-Mag Lite (AAA Bat.)		
9-GH408	Tweezers		
21576	Brush - Bristle		

Table 9-2: Overview of GE-1 tool kit contents (Continued)

Tool ID	Description	Tool ID	Description
9-4516	Pliers 4 1/4 inch Diagonal		

9-5-2 GE-2 tool kit

Table 9-3: Overview of GE-2 tool kit contents

GE-2 Sears Kit (#99034)			
Tool ID	**Description**	**Tool ID**	**Description**
9-45381	Pliers, Arc Joint 9 1/2 inch	9-44067	Socket 1 1/16 in. for 1/2 in. drive
9-45092	Pliers, Linesman 8 1/2 inch	9-42679	Socket 10MM Hex for 1/2 in. drive (2273333)
9-42882	Punch, Pin 3/32 inch	9-44262	Extension 10 inch for 1/2 in. drive (2273405)
9-42884	Punch, Pin 5/32 inch	9-4258	3/8 inch to 1/2 inch Adapter
9-42886	Punch, Pin 1/4 inch	9-34374	3/8 inch Metric Socket Set - 12 PT
9-42973	Cold Chisel 1/2 inch	9-44311	16mm Socket 12 pt.
9-GH77	Center Punch Automatic	9-33485	Metal Socket Tray
9-GH890	File Handle, Adj.	9-33484	Metal Socket Tray
9-31276	File, Round, Bastard 8 inch	9-33484	Metal Socket Tray
9-31277	File, Half Round, Bastard 8 inch	9-52068	Tap and Drill Set
9-31263	File, Flat Mill 8 inch	9-52722	#6 Tap
21045C	Close Quarter Saw	9-52723	#8 Tap
9-44604	Wrench, Adj. 10 inch		High Speed Drill Set
9-41587	Screwdriver 5/16 inch × 8 inch		#36 Drill
9-41586	Screwdriver, Stubby 5/16 inch		#29 Drill
9-GH19512	Countersink 1/2 inch	9-44046	3/8 inch Socket Set
9-44741	12 PC Combination Wrench Set		

9-5-3 Special tools, supplies and equipment used for maintenance

Table 9-4: Overview of tool requirements for periodic maintenance

Tool / kit	Comments
Safety Analyzer	The safety Analyzer tool should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.
B/W Printer Cleaning Sheet	See printer user manual for requirements
Color Printer Cleaning Sheet	See printer user manual for requirements
Disposable Gloves	

9-6 System maintenance

9-6-1 Preliminary checks

The preliminary checks take about 15 minutes to perform. Refer to the Ultrasound system user documentation whenever necessary.

Table 9-5: System preliminary checks

Step	Item	Description
1.	Ask and Listen	Ask the customer if they have any problems or questions about the equipment.
2.	Paperwork	Fill in the top of Ultrasound Inspection Certificate (see Figure 9-5 *on page 9-38*). Record all probes and Ultrasound system options.
3.	Power up	• Turn the Ultrasound system power on and verify that all fans and peripherals turn on. • Watch the displays during power up to verify that no warning or error messages are displayed. • Where applicable, confirm that the battery is charged. If no AC Input present, use the internal battery.
4.	Probes	Verify that the Ultrasound system properly recognizes all probes.
5.	Displays	Verify proper display on the monitor.
6.	InSite	Where applicable, for Warranty and Contract Customers only: • Verify that InSite is functioning properly. • Ensure two-way remote communications.
7.	Review Error Logs	Where applicable, Error Logs can be reviewed via system diagnostics.
8.	Diagnostics	Optional.
9.	Presets	Backup all Customer Presets to an appropriate media.
10.	Image Archive	Back up the Image Archive onto appropriate media.

9-6-2 Functional checks

NOTE: See also Chapter 4

The functional checks take about 60 minutes to perform. Refer to the Ultrasound system user documentation whenever necessary.

9-6-2-1 System checks

Table 9-6: System functional checks

Step	Item	Description
1.	B-Mode	Verify basic B-Mode (2D) operation. Check the basic Ultrasound system controls that affect this mode of operation.
2.	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic Ultrasound system controls that affect this mode of operation.
3.	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic Ultrasound system controls that affect this mode of operation.
4.	M-Mode	Verify basic M-Mode operation. Check the basic Ultrasound system controls that affect this mode of operation.
5.	Probe Elements	Perform an Element Test on each probe to verify that all the probe elements and system channels are functional.
6.	Applicable Software Options	Verify the basic operation of all optional modes such as Contrast. Check the basic Ultrasound system controls that affect each options operation.
7.	Xmit/Recv Elements	Use the Visual Channel Utility on the loop connect to verify that all system xmit/recv channels are functional.
8.	Operator Panel test	Perform the Operator Panel Test Procedure.
9.	Keyboard	Do the interactive keyboard test.
10.	LCD	Verify basic LCD display functions. Refer to Chapter 3 of the User Manual.
11.	Software Menu check	Verify Software Menu display functions. Refer to Chapter 3 of the User Manual.
12.	Peripherals	See: 4-3-17 ‘Peripheral checks’ on *page 4-41*.
13.	Measurements	In measurement mode, make distance measurement, get result in result window. Verify the distance by graduate rule. Distance Accuracy should be within ±5%. (Name result from result window Result A, result from graduate rule Result B; Distance Accuracy = (Result B-Result A)/Result A)

9-6-2-2 Peripheral/option checks

If any peripherals or options are not part of the system configuration, the check can be omitted.

Refer to the User Manual for a list of approved peripherals/ options.

Table 9-7: GE approved peripheral/hardware option functional checks

Step	Item	Description
1.	Media	Verify media drive(s) read/write properlty. Clean if necessary.
2.	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
3.	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
4.	DICOM	Verify that DICOM is functioning properly. Send an image to a DICOM device.
5.	ECG	Verify basic operation with customer
6.	Footswitch	Verify that the footswitch is functioning as programed. Clean as necessary.
7.	DVD	Verify that the DVD is functioning properly. Clean heads and covers if necessary.

9-6-2-3 Mains cable inspection

Table 9-8: Mains Cable Inspection, As Appropriate

Step	Item	Description
1.	Unplug Cord	Disconnect the mains cable from the wall and Ultrasound system.
2.	Inspect	Inspect it and its connectors for damage of any kinds.
3.	Verify	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.

9-6-2-4 Cleaning the unit

WARNING

To avoid electrical shock, before cleaning, disconnect the system from the power supply and remove all the peripherals from the system.

Frequent and diligent cleaning of the Vivid *iq* ultrasound unit reduces the risk of spreading infection from person to person, and also helps to maintain a clean working environment.

The ultrasound unit requires regular care and maintenance to function safely and properly. The system requires weekly maintenance.

CAUTION

After cleaning, please inspect the system including functionality by live scan. If any defects are observed or malfunctions occur, do not operate the equipment but inform a qualified service person. Contact a Service Representative for information.

9-6-2-4 Cleaning the unit(continued)

CAUTION

When performing cleaning procedures, to prevent the risk of system damage, always observe the following precautions:

- Use only cleaning materials and solutions as recommended in the procedures described below.
- Do not spray any liquid directly onto the Vivid *iq* covers, LCD Display or control panel. In case of an accidential spill, please wipe immediatly and clean the surface and around keys.
- Do not allow any liquid to drip or seep into the system.
- Use only recommended cleaners or disinfectants on system surfaces. Immersion-type disinfectants are not approved for use on system surfaces.
- DO NOT scratch or press on the panel with any sharp objects, such as pencils or pens, as this may result in damage to the panel.
- Prior to cleaning, turn OFF power to the system and disconnect the mains cable. Remove all the peripherals from the system.
- Do not clean any ports of the system, such as USB ports, ECG connector port, probe ports, Ethernet Network port, HDMI port, etc.

9-6-2-4-1 Appropriate cleaning agents

For general cleaning of the system, we recommend to use non-abrasive soap and water solution.

No.	Cleaning agent	Manufacturer	Type
1	Cidex OPA	Advanced Sterilization Products	Solution
2	PDI Sani-Cloth Plus Germicidal Disposable Cloth (low Alcohol)	PDI Healthcare	Wipe
3	PDI Super Sani-Cloth Plus Germicidal Disposable Cloth (high Alcohol)	PDI Healthcare	Wipe
4	PDI Sani-Cloth HB (Germicidal, Alcohol free)	PDI Healthcare	Wipe
5	Sporicidin (Phenol)	Sporicidin International	Solution
6	DisCide - Recommended for clarity (63% ISOPROPYL)	Palmero healthcare	Solution
7	Asepti-Wipe II	ECOLAB INC	Wipe
8	Cavicde Surface Cleaner/Disinfectant	Metrex Research, Inc.	Solution
9	Clorox Disinfecting Wipes	Clorox	Wipe
10	Metrix Caviwipes	Metrex Research, Inc.	Wipe
11	PI-Spray Antibacterial Solution	Pharmaceutical Innovations Inc.	Spray
12	PI-Spray II Antibacterial Solution	Pharmaceutical Innovations Inc.	Spray
13	Sekusept	ECOLAB INC.	Solution
14	Revital-ox RESERT	STERIS	Solution
15	Tristel trio wipes	Tristel	Wipe
16	70% isopropyl alcohol		Solution

9-6-2-4-2 Cleaning procedures

Prior to cleaning any part of the system:

Turn off the system power, disconnect the power cord and all the peripherals.

9-6-2-4-3 Cleaning procedure with solution

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose solution. The cloth should be damp, not dripping wet.
2. Wipe the location where you want to clean. Do not spray any liquid directly onto the system. In case of an accidential spill, please wipe immediatly and clean the surface and around keys.
3. Wipe off excess cleaning agents.
4. If necessary, stubborn stains can be removed by moistening part of a cloth with water that does not contain impurities. Do not let any liquid drip into the system.

   Be sure to dry the system before closing the cover.

9-6-2-4-4 Cleaning procedure with spray

1. Make sure to sprinkle the spray onto a soft, non-abrasive folded cloth. The cloth should be damp, not dripping wet. Do not sprinkle the spray directly onto the system.
2. Repeat the steps 2 - 4 in 9-6-2-4-3 ‘Cleaning procedure with solution’ on *page 9-18* to clean the system.

9-6-2-4-5 Cleaning procedure with wipe

1. Open the package and take out the wipe.
2. Repeat the steps 2 - 4 in 9-6-2-4-3 ‘Cleaning procedure with solution’ on *page 9-18* to clean the system.

9-6-2-4-6 To clean the physical keys and power button

NOTE: Diligent cleaning of the physical keys and button will reduce the risk of spreading infection from person to person, and also helps to maintain a clean working environment.

1. Use a cotton swab to clean around the physical keys. Use a toothpick to remove solids between the physical key and the cabinet surface.

   When cleaning the operator control panel, make sure not to spill or spray any liquid on the physical keys, into the system cabinet, or in the probe connection receptacle. In case of an accidential spill, please wipe immediatly and clean the surface and around keys.

2. In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a soft, dust-free cloth. Wipe the surface of the console. Please ensure that no residue of liquid drips or remains on the keys to ensure proper cleaning and function. Allow to dry.

9-6-3 Physical inspection

NOTE: These features may not be present on all Ultrasound systems.

Table 9-9: Physical checks

Step	Item	Description
1.	Labeling	Verify that all Ultrasound system labeling is present and in readable condition.
2.	Scratches & Dents	Inspect the exterior for dents, scratches or cracks. .
3.	Input Power	Refer to: 9-6-2-3 ‘Mains cable inspection’ on *page 9-14*.
4.	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs.
5.	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
6.	Control Panel	Inspect keyboard and control panel. Note any damaged or missing items.
7.	Control Panel Lighting	Check for proper operation of all operator panel and Freeze Key light.

Table 9-9: Physical checks (Continued)

Step	Item	Description
8.	LCD	Inspect the LCD Display for scratches and bad pixels. Verify proper operation of Contrast and Brightness controls. Where applicable, confirm that the LCD arm allows: • swivelling the screen to the left and to the right • folding the screen to the locked position • release and adjustment backwards and forwards • can be adjusted in the up/down positions. Note: LCD Arm movement may vary and is not applicable to all Ultrasound systems.
9.	External I/O	Check all connectors for damage.
10.	Power and System Status Indicators	Check for proper operation of all Power and System Status Indicators.
11.	Battery	Where applicable, check that the battery is not damaged, does not leak, does not emit an odor, and is not deformed or discolored. Observe all warnings and cautions for battery handling, recharging, storing, and/or disposal,

9-6-4 Optional Diagnostic Checks

Optionally you can access the diagnostic software as described in Chapter 5 or 7. View the error logs and run desired diagnostics.

9-6-4-1 View the Log

1. Review the system error log for any problems.
2. Check the temperature log to see if there are any trends that could cause problems in the future.
3. Check the Configuration Log; update if needed.

9-6-5 Probe maintenance

9-6-5-1 Probe related checks

Table 9-10: System preliminary checks

Step	Item	Description
1.	Probe Holder	Clean probe holders. (they may need to be soaked to remove excess gel).
2.	Probes	Thoroughly check the Ultrasound system probe connectors and remove dust from inside the connector sockets if necessary. Visually check for bent, damaged or missing pins.
3.	Probes	Verify that the Ultrasound system properly recognizes all probes.

9-6-5-2 Basic probe care

The Ultrasound system user manuals and various probe handling cards provide a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

Ultrasound probes can be easily damaged by improper handling. See the User Manual and probe care cards for more details. Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

Any evidence of wear indicates the probe cannot be used.

Do a visual check of the probe pins and Ultrasound system sockets before plugging in a probe.

The Interoperative probes often have special considerations and individual probe user manuals. For Interoperative probes also refer to their separate user manuals.

9-6-5-3 Basic probe cleaning

Refer to the User's Manual for details on probe cleaning.

WARNING

To help protect yourself from blood borne diseases, wear approved disposable gloves. These are made of nitrile derived from vegetable starch to prevent allergic latex reactions.

CAUTION

Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty.

DO NOT soak or wipe the lens with any product not listed in the User Manual. Doing so could result in irreparable damage to the probe.

Follow care instructions that came with the probe.

CAUTION

Disinfect a defective probe before you return it. Be sure to tag the probe as being disinfected.

9-6-6 Battery Replacement and Disposition

Battery replacement every three years is recommended.

Contact a local Service Representative for the replacement of the battery. Used batteries will be discarded appropriately by GE.

NOTE: Disposing of the battery should meet local law and regulatory requirements.

NOTE: Dispose of the system according to local law and regulatory requirements.

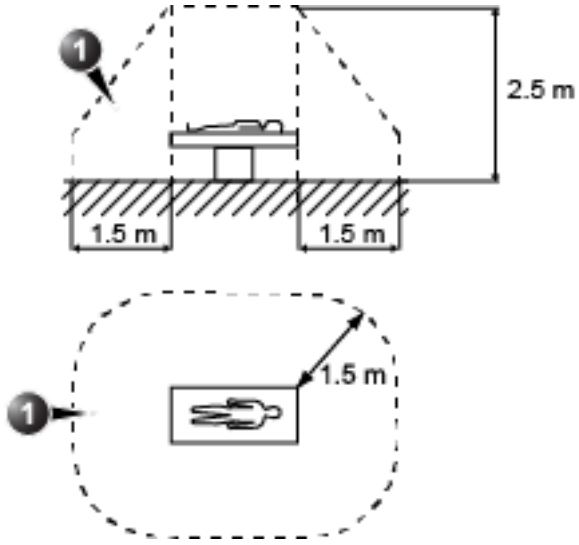
9-7 Electrical safety tests

9-7-1 Overview

NOTE: For all instructions in the "Electrical safety tests" section in case of using a UPS (uninterruptible power supply) the terms outlet, wall outlet, AC wall outlet and power outlet refer to the AC power outlet of the UPS. In case of further available AC (or DC) power outlets at the same used UPS, these must remain unused i.e. not connected to any other devices.

CAUTION

Please observe that some Uninterruptible Power Supplies (UPS) may not be medical devices! If the UPS is no medical device, it has to be located outside of the patient environment (according to IEC 60601-1 / UL 60601-1).



1. Patient environment

9-7-2 Safety test overview

The electrical safety tests in this section are based on and conform to IEC 60601-1 Medical Equipment Safety Standards. They are intended for the electrical safety evaluation of cord-connected, electrically operated, patient care equipment. If additional information is needed, refer to the IEC 60601-1 documents

WARNING

THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 12 MONTHS ACCORDING TO HISTORICAL DATA. ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE SAFETY INSPECTIONS MENTIONED ABOVE.

DANGER

TO MINIMIZE RISK OF ELECTRICAL SHOCK, ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE ELECTRICAL SAFETY INSPECTIONS AND TESTS.

DANGER

TO AVOID ELECTRICAL SHOCK, THE ULTRASOUND SYSTEM UNDER TEST **MUST NOT** BE CONNECTED TO OTHER ELECTRICAL EQUIPMENT. REMOVE ALL INTERCONNECTING CABLES AND WIRES. THE ULTRASOUND SYSTEM UNDER TEST MUST NOT BE CONTACTED BY USERS OR PATIENTS WHILE PERFORMING THESE TESTS.

CAUTION

Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.

9-7-2 Safety test overview(continued)

Prior to initiating any electrical test, the Ultrasound system must be visually inspected. Perform the following visual checks:

- Check for missing or loose enclosure covers that could allow access to internal live parts.
- Examine the mains cord, mains plug and appliance inlet for damaged insulation and adequacy of strain relief and cable clamps.
- Locate and examine all associated transducers. Inspect the cables and strain relief at each end. Inspect the transducer enclosure and lens for cracks, holes and similar defects.

Test the system, peripherals and probes for leakage current. Excessive leakage current can cause injury or death in sensitive patients. High leakage current can also indicate degradation of insulation and a potential for electrical failure. Do not use probes or equipment having excessive leakage current.

To minimize the risk that a probe may shock someone the customer should:

- Not use a probe that is cracked or damaged in any way.
- Check probe leakage current:
    - Based on your facilities QA program for surface probes.
    - Based on your facilities QA program for endocavitary probes.
    - whenever probe damage is suspected.

9-7-3 Leakage current limits

WARNING

Energy Control and Power Lockout for Vivid *iq*.

When servicing parts of the Ultrasound system where there is exposure to voltage greater than 30 volts:

1. Follow LOCK OUT/TAG OUT procedures.
2. Turn off the breaker.
3. Unplug the Ultrasound system.
4. Maintain control of the Ultrasound system power plug.
5. Wait for at least 30 seconds for capacitors to discharge as there are no test points to verify isolation.
6. Remove/disconnect the battery, if present.

Ultrasound System components may be energized.

CAUTION

Compare all safety-test results with safety-test results of previously performed safety tests (e.g. last year etc). In case of unexplainable abrupt changes of safety-test results consult experienced authorized service personnel or GE for further analysis.

The following limits are summarized for IEC 60601-1 Medical Equipment Safety Standards. These limits are GEMS standards and in some cases are lower than the above standards listed.

Table 9-11: Chassis Leakage Current Limits - Accessible Metal Surface

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
All (Except USA & Canada)	0.1 mA	0.5 mA	0.5 mA	0.5 mA
USA & Canada	0.1 mA	0.3 mA	0.3 mA	0.3 mA

Table 9-12: Type BF Applied Part Leakage Current Limits - Probes Surface

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
All	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

9-7-3 Leakage current limits(continued)

Table 9-13: Type CF Applied Part Leakage Current Limits - ECG Connections

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
All	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

NOTE: **Mains Applied refers to the sink leakage test where mains (supply) voltage is applied to the part to determine the amount of current that will pass (or sink) to ground if a patient contacted mains voltage.*

The following tests are performed at the factory and should be performed at the site. These tests are: chassis leakage current, and probe leakage current. All measurements are made with an electrical safety analyzer which should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.

Table 9-14: Equipment Type and Test Definitions

Applied Parts (AP)	Parts or accessories that contact the patient to perform their function. For ultrasound equipment, this includes transducers and ECG leads.	
Type BF	Body Floating or non-conductive ultrasound probes which are marked with the 'man in box' BF symbol. this includes all transducers.	
Type CF	Cardiac Floating or non-conductive intraoperative probes for direct cardiac contact and isolated ECG connections so marked with the 'heart in box' CF symbol.	
Sink Leakage	The current resulting from the application of mains voltage to the applied part. This test is required test for Type CF applied parts.	

9-7-4 Outlet test - wiring arrangement

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

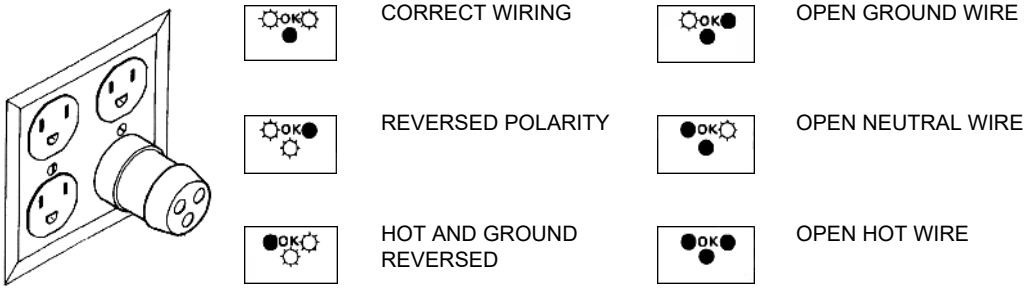


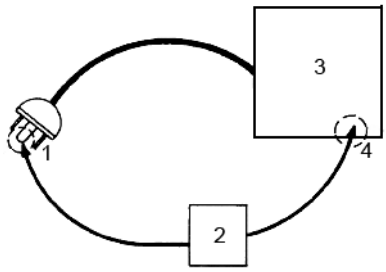
Figure 9-1. Typical alternate outlet tester

NOTE: No outlet tester can detect the condition where the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

9-7-5 Grounding continuity

DANGER ELECTRIC SHOCK HAZARD. THE PATIENT MUST NOT BE CONTACTED TO THE EQUIPMENT DURING THIS TEST.

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2** ohms. Reference the procedure in the IEC60601-1.



1. GROUND PIN
2. OHMMETER
3. Vivid *iq*
4. ACCESSIBLE METAL PART:
   - MONITOR HOUSING
   - PEAR PANEL CONNECTOR
   - ANY CASTER/WHEEL SUPPORT

Figure 9-2. Ground continuity test

9-7-6 Chassis leakage current test

DANGER ELECTRIC SHOCK HAZARD. WHEN THE METER'S GROUND SWITCH IS OPEN, DON'T TOUCH THE ULTRASOUND SYSTEM!.

CAUTION Equipment damage possibility. Never switch the Polarity and the status of Neutral when the Ultrasound system is powered ON. Be sure to turn the Ultrasound system power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the Ultrasound system may be damaged.

9-7-6-1 Generic procedure

The test verifies the isolation of the power line from the chassis. The testing meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading of current.

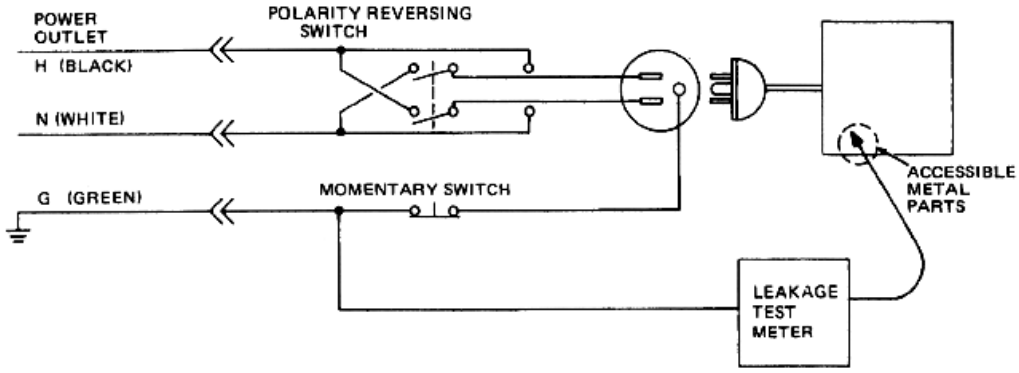


Figure 9-3. Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuos Leakage Currents and Patient, Auxiliary Currents

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test is plugged into the receptacle on the panel of the meter. This places the meter in the grounding conductor and the current flowing from the case to ground will be indicated in any of the current ranges. The maximum allowable limit for chassis source leakage is shown in Table 9-11 *on page 9-27*.

9-7-6-2 Data Sheet for enclosure Source Leakage Current

The test passes when all readings measure less than the value shown in Table 9-11 *on page 9-27*. Record all data on the PM Inspection Certificate.

Table 9-15: Typical Data Sheet for enclosure Source Leakage Current

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Speaker Cover	Test 2 Real Panel Metal Parts	Optional Test 3	Optional Test 4
Enter Name of tested peripheral here:						
ON	NORM	OPEN				
ON	NORM	CLOSED				
ON	REV	OPEN				
ON	REV	CLOSED				
OFF	NORM	OPEN				
OFF	NORM	CLOSED				
OFF	REV	OPEN				
OFF	REV	CLOSED				

9-7-7 Probe leakage current test

DANGER

DO NOT USE THE PROBE IF THE INSULATING MATERIAL HAS BEEN PUNCTURED OR OTHERWISE COMPROMISED.

INTEGRITY OF THE INSULATION MATERIAL AND PATIENT SAFETY CAN BE VERIFIED BY SAFETY TESTING ACCORDING TO IEC60601-1.

CAUTION

Equipment damage possibility. Never switch the Polarity and the status of Neutral when the Ultrasound system is powered ON. Be sure to turn the Ultrasound system power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the Ultrasound system may be damaged.

9-7-7-1 Definition

This test measures the current that would flow to ground from any of the probes through a patient who is being scanned and becomes grounded by touching some other grounded surface.

NOTE: Some leakage current is expected on each probe, depending on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. It is abnormal if no leakage current is measured. If no leakage current is detected, check the configuration of the test equipment.

9-7-7-2 Tools

For needed tools, see: 9-5 ‘Tools required’ on *page 9-8*.

9-7-7-3 Generic procedure on probe leakage current

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the probe must be active to find the worst case condition.

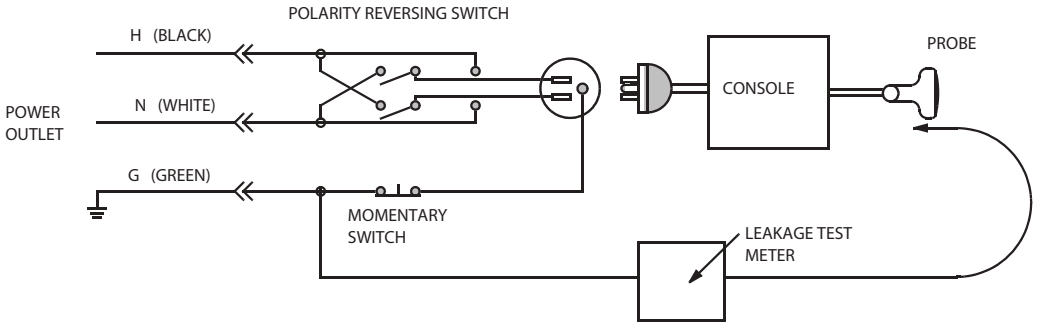


Figure 9-4. Set up for probe leakage current

NOTE: Each probe will have some amount of leakage current, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.

DANGER TO AVOID PROBE DAMAGE AND POSSIBLE ELECTRIC SHOCK, DO NOT IMMERSE PROBES INTO ANY LIQUID BEYOND THE LEVEL INDICATED IN THE PROBE USERS MANUAL. **DO NOT TOUCH THE PROBE, CONDUCTIVE LIQUID OR ANY PART OF THE UNIT UNDER TEST WHILE DOING THE TEST**.

9-7-7-4 Meter Procedure Using Probe Adapter

Follow the Safety Analyzer tool instruction to test each transducer for leakage current.

The electrical Safety Analyzer tool should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.

9-7-7-5 No Meter Procedure Using Probe Adapter

Follow the Safety Analyzer tool instruction to test each transducer for leakage current.

The electrical Safety Analyzer tool should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.

9-7-7-6 Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values shown in Table 9-12 *on page 9-27*. Record all data on the PM Inspection Certificate.

Table 9-16: Typical Data Sheet For Transducer Source Leakage Current

Transducer Tested:			
Unit Power	**Tester Power Polarity Switch**	**Tester GROUND or NUETRAL Switch**	**Measurement**
ON	NORM	OPEN	
ON	NORM	CLOSED	
ON	REV	OPEN	
ON	REV	CLOSED	
OFF	NORM	OPEN	
OFF	NORM	CLOSED	
OFF	REV	OPEN	
OFF	REV	CLOSED	

9-8 When there's too much leakage current …

9-8-1 AC/DC Fails

Where applicable, check the AC/DC adapter and its cable. Replace a new one if any portion is defective.

9-8-2 Chassis Fails

Check the ground on the power cord and plug for continuity. Ensure the ground is not broken, frayed, or intermittent. Replace any defective part.

Where applicable, tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

9-8-3 Probe Fails

Test the probe in another connector to isolate if the fault lies with the probe or the Ultrasound system. Or Change another probe to confirm if the fail is caused by console.

NOTE: Each probe will have some amount of leakage, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable leakage current for body surface contact probe differs from inter-cavity probe. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive leakage current is slot dependent, inspect the system connector for bent pins, poor connections, and ground continuity.

If the problem remains with the probe, replace the probe.

9-8-4 Peripheral Fails

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

9-8-5 Still Fails

If all else fails, begin isolation by removing the probes, external peripherals, then the on board ones, one at a time while monitoring the leakage current measurement.

9-8-6 New Unit

If the leakage current measurement tests fail on a new Ultrasound system and if situation can not be corrected, submit a Safety Failure Report to document the Ultrasound system problem. Remove Ultrasound system from operation.

9-8-7 ECG Fails

Inspect cables for damage or poor connections.

9-9 Inspection Paperwork

9-9-1 Ultrasound Inspection Forms

ULTRASOUND INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:

* Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

Figure 9-5. Ultrasound Inspection Certificate

* Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

9-9-1 Ultrasound Inspection Forms(continued)

FUNCTIONAL CHECKS

Functional Check (if applicable)	OK? or N/A
B-Mode Function	
Doppler Modes Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Opti ons	
Applicable Hardware Options	
Control Panel	
LCD	
Measurement Accuracy	
GE Approved Peripherals	

PHYSICAL INSPECTION AND CLEANING

Physical Inspection and Cleaning (if applicable)	Inspect	Clean
Console		
LCD		
External I/O		
Cables and Connectors		
GE Approved Peripherals (DVD-RW, Printer)		
Labeling (see User Manual for Labeling)		

COMMENTS:

_____ _____ _____
_____ _____ _____
_____ _____ _____
_____ _____ _____

Figure 9-6. Functional Checks

ELECTRICAL SAFETY

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground &wiring config.)				
Type BF Applied Part Leakage Current Limits- Probe				
enclosure Source Leakage Current - Chassis Leakage Current Limits				
Peripheral 1 Leakage Current				
Peripheral 2 Leakage Current				

PROBES

Probe Number (from previous page)	Max Value Allowed	Max Value Measured	OK?	Comments
Probe 1:				
Probe 2:				
Probe 3:				

Final Check. All system covers are in place. System scans with all probes as expected.

Accepted by: _____

Figure 9-7. Electrical Safety

9-10 Electrical Safety Tests Log

Table 9-17: Electrical safety tests log

Electrical test performed	Max value allowed	Value measured	OK?	Comments
Outlet (correct ground and wiring config.)				
System ground continuity				
Chassis source leakage current - probe				
Chassis source leakage current - wheel				
Chassis source leakage current - monitor				
Patient lead source leakage (lead to ground)				
Patient lead source leakage (lead to lead)				
Patient lead source leakage (isolation)				
Peripheral 1 leakage current				
Peripheral 1 ground continuity				
Peripheral 2 leakage current				

Table 9-17: Electrical safety tests log (Continued)

Electrical test performed	Max value allowed	Value measured	OK?	Comments
Peripheral 2 ground continuity				
Peripheral 3 leakage current				
Peripheral 3 ground continuity				

Table 9-18: Electrical safety tests (probes) log

Probe	Max value allowed	Max value measured	OK?	Comments

9-11 Cart Care & Maintenance

9-11-1 Contents in This Section

9-11-2 Overview

9-11-2-1 Purpose

This section describes **Care & Maintenance** on Cart. These procedures are intended to **maintain the quality** of Cart. Read this chapter completely and familiarize yourself with the procedures before performing a task.

9-11-2-2 Periodic Maintenance Inspections

It has been determined by engineering that your Cart system does not have any high wear components that fail with use, therefore no Periodic Maintenance Inspections are mandatory. Some Customers Quality Assurance Programs may require additional tasks and or inspections at a different frequency than listed in this manual.

CAUTION

Practice good ESD prevention. Wear an anti–static strap when handling electronic parts and even when disconnecting/ connecting cables.

DANGER

THERE ARE SEVERAL PLACES ON THE BACKPLANE, THE AC DISTRIBUTION, AND DC DISTRIBUTION THAT ARE DANGEROUS. BE SURE TO DISCONNECT THE SYSTEM POWER PLUG AND OPEN THE MAIN CIRCUIT BREAKER BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.

9-11-2-2 Periodic Maintenance Inspections(continued)

CAUTION

Do not pull out or insert circuit boards while power is ON.

CAUTION

Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.

9-11-3 Why do Maintenance

9-11-3-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Ultrasound Inspection Certificate (provided on 9-11-8 ‘Inspection Paper Work’ on *page 9-56*) provides the customer with documentation that the ultrasound scanner is maintained on a periodic basis.

A copy of the Ultrasound Periodic Maintenance Inspection Certificate should be kept in the same room or near the scanner.

9-11-3-2 Quality Assurance

In order to gain accreditation from organizations such as the American College of Radiology (USA), it is the customer’s responsibility to have a quality assurance program in place for each scanner. The program must be directed by a medical physicists, the supervising radiologist/physician or appropriate designee.

Routine quality control testing must occur regularly. The same tests are performed during each period so that changes can be monitored over time and effective corrective action can be taken.

Testing results, corrective action and the effects of corrective action must be documented and maintained on the site.

Your GE service representative can help you with establishing, performing and maintaining records for a quality assurance program. Please contact us for coverage information and/or price for service.

9-11-4 Maintenance Task Schedule

9-11-4-1 How often should care & maintenance tasks be performed?

The Care & Maintenance Task Schedule (provided on Table 9-19 *on page 9-46*) specifies how often your Cart should be serviced and outlines items requiring special attention.

NOTE: It is the customer's responsibility to ensure the Cart care & maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.

Your GE Service Representative has an in-depth knowledge of your Vivid *iq* ultrasound scanning system and can best provide competent, efficient service. Please contact us for coverage information and/or price for service.

Your GE Service Representative has an in-depth knowledge of your Vivid *iq* ultrasound scanning system and can best provide competent, efficient service. Please contact us for coverage information and/or price for service.

NOTE: If conditions exist which exceed typical usage and patient load, then it is recommended to increase the maintenance frequencies.

Table 9-19: Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Clean Probe Holders	X				
Inspect AC Mains Cable			X		Mobile Unit Check Weekly
Inspect Cables and Connectors			X		
Clean Console			X		
Inspect Wheels, Casters, brakes and Swivel Locks			X		Mobile Unit Check Daily
Check Control Panel Movement			X		Mobile Unit Check Daily
Console Leakage Current Checks				X	also after corrective maintenance
Peripheral Leakage Current Checks				X	also after corrective maintenance

Table 9-19: Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Surface Probe Leakage Current Checks				X	also after corrective maintenance
Endocavity Probe Leakage Current Checks				X	also after corrective maintenance
Transesphongeal Probe Leakage Current Checks				X	also after corrective maintenance
Surgical Probe Leakage Current Checks				X	also after corrective maintenance
Functional Checks				X	also after corrective maintenance

9-11-5 Tools Required

9-11-5-1 Standard GE Tool Kit

The following is a description of the “Standard” GE tool kit in the USA. Not all tools are required for PMs.

Please refer to 9-5-1 ‘Standard GE tool kit’ on *page 9-8* for the information.

9-11-5-2 Special Tools, Supplies and Equipment

Table 9-20: Overview of Requirement for Care & Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		
Leakage Current Ultrasound Kit	2113015	For 120V and 220V Units
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes anti–static mat, wrist strap and cables for 200 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
Safety Analyzer		The safety Analyzer tool should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.
CD-RW Media		For Vivid *iq*
B/W Printer Cleaning Sheet		See printer user manual for requirements
Color Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		

9-11-6 Safety Test

9-11-6-1 Input Power

Table 9-21: Main Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the mains cable from the wall and system.
2	Inspect	Inspect it and its connectors for damage of any kind.
3	Verify	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Verify	Inlet connector retainer is functional.

9-11-6-2 Cleaning

Table 9-22: General Cleaning

Step	Item	Description
1	Console	Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire console. Be careful not to get the cloth too wet so that moisture does not enter the console.
2	Probe Holder	Clean probe holders (they may need to be soaked to remove excess gel).

9-11-6 Safety Test(continued)

9-11-6-3 Physical Inspection

Table 9-23: Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition. refer to the Vivid *iq* User Manual for details.
2	Scratches & Dents	Inspect the console for dents, scratches or cracks.
3	Wheels & Brakes	Check all wheels and casters for wear and verify operation of foot brake, to stop the unit from moving, and release mechanism. Check all caster locks and caster swivel locks for proper operation.
4	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs.
5	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
6	External I/O	Check all connectors for damage and verify that the labeling is good.
7	Op Panel Lights	Check for proper operation of all operator panel and TGC lights.
8	Monitor Light	Check for proper operation of any monitor lights if available.
9	External Microphone	Check for proper operation of any external microphones by recording an audio test.

9-11-6-4 Outlet Test - Wiring Arrangement - USA & Canada

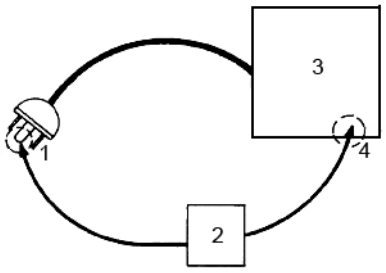
Please refer to 9-7-4 ‘Outlet test - wiring arrangement’ on *page 9-29* for the information.

9-11-6-5 Grounding continuity

DANGER

ELECTRIC SHOCK HAZARD. THE PATIENT MUST NOT BE CONTACTED TO THE EQUIPMENT DURING THIS TEST.

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2** ohms. Reference the procedure in the IEC60601-1.



1. GROUND PIN
2. OHMMETER
3. Vivid *iq*
4. ACCESSIBLE METAL PART:
   - MONITOR HOUSING
   - PEAR PANEL CONNECTOR
   - ANY CASTER/WHEEL SUPPORT

Figure 9-8. Ground continuity test

9-11-6-5-1 Meter Procedure

Follow these steps to test the ground wire resistance.

- Turn the Vivid *iq* unit OFF.
- Plug the unit into the meter, and the meter into the tested AC wall outlet.
- Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the Vivid *iq* unit.
- Set the meter's “FUNCTION” switch to the RESISTANCE position.
- Set the meter's “POLARITY” switch to the OFF (center) position.
- Measure and record the ground wire resistance.

9-11-6-6 Chassis Leakage Current Test

Please refer to 9-7-6 ‘Chassis leakage current test’ on *page 9-31* for the information.

9-11-6-7 Isolated Patient Lead (Source) Leakage - Lead to Lead

Refer to the procedure in the IEC 60601-1.

9-11-6-8 Isolated Patient Lead (Sink) Leakage-Isolation Test

Refer to the procedure in the IEC 60601-1.

CAUTION

Line voltage is applied to the ECG leads during this test. To avoid possible electric shock hazard, the system being tested must not be touched by patients, users or anyone while the ISO TEST switch is depressed.

NOTE: It is not necessary to test each lead individually or power condition combinations as required in previous tests.

Data Sheet for ECG Leakage Current:

The test passes when all readings measure less than the value shown in the table below. Record all data on the PM Inspection Certificate.

Table 9-24: Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit	
		Ground Open	Ground Closed
Patient Lead to Ground Leakage Current Test and Patient Lead to Lead Leakage Current Test	115V	10uA	10uA
	220/240V	500uA	10uA

Table 9-25: Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit
Patient Lead Isolation Current Test	115V	20uA
	220/240V	5mA

9-11-6-8 Isolated Patient Lead (Sink) Leakage-Isolation Test(continued)

Table 9-26:

ECG Power	Tester Polarity Switch	Tester Ground Switch	Tester Lead Selector				
			RL	RA	LA	LL	C
ON	NORM	CLOSED					
ON	REVERSE	CLOSED					
ON	NORM	OPEN					
ON	REVERSE	OPEN					
OFF	NORM	CLOSED					
OFF	REVERSE	CLOSED					
OFF	NORM	OPEN					
OFF	REVERSE	OPEN					

9-11-6-9 Probe Leakage Current Test

Please refer to 9-7-7 ‘Probe leakage current test’ on *page 9-33* for the information.

9-11-7 When There’s Too Much Leakage Current...

Please refer to 9-8 ‘When there's too much leakage current …’ on *page 9-36* for the information.

9-11-8 Inspection Paper Work

ULTRASOUND INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 6:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 7:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 8:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 9:	Frequency:	Scan Format*:	Model Number:	Serial Number:

*Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

9-11-8 Inspection Paper Work(continued)

FUNCTIONAL CHECKS **PHYSICAL INSPECTION AND CLEANING**

Functional Check (if applicable)	OK? or N/A		Physical Inspection and Cleaning (if applicable)	Inspect	Clean
B-Mode Function			Console		
Doppler Modes Function			Monitor		
CF-Mode Function			Touch Panel		
M-Mode Function			GE Approved Peripherals (CD-RW, MOD, Printers)		
Applicable Software Options			Probe Holders		
Applicable Hardware Options			External I/O		
Control Panel			Wheels, Brakes & Swivel Locks		
Measurement Accuracy			Cables and Connectors		
GE Approved Peripherals					

COMMENTS:

9-11-8 Inspection Paper Work(continued)

ELECTRICAL SAFETY

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground &wiring config.)				
System Ground Continuity				
Chassis Source Leakage Current - Probe				
Chassis Source Leakage Current - Caster				
Chassis Source Leakage Current - CRT				
Patient Lead Source Leakage (Lead to Ground)				
Patient Lead Source Leakage (Lead to Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Leakage Current				
Peripheral 1Ground Continuity				
Peripheral 2 Leakage Current				
Peripheral 2Ground Continuity				
Peripheral 3 Leakage Current				
Peripheral 3Ground Continuity				
PROBES				
Probe Number (from previous page)	**Max Value Allowed**	**Max Value Measured**	**OK?**	**Comments**
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				

Probe 7:				
Probe 8:				
Probe 9:				

Final Check. All system covers are in place. System scans with all probes as expected.

Accepted by:_____

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