GE HealthCare

Versana Premier/Versana Premier Lotus

General Service Manual

5928214-1EN Rev. 7

General Service Documentation.

GE HealthCare

Product Information

This Manual covers the software version of R3.x.x for Versana Premier/Versana Premier Lotus ultrasound system.

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Language Disclaimers

WARNING

English (EN)

This Service Manual is available in English only.

- If a customer's service provider requires a language other than English, it is the customer's responsibility to provide translation services.
- Do not attempt to service the equipment unless this Service Manual has been consulted and is understood.
- Failure to heed this Warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.

AVERTISSEMENT

Français (FR)

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.

ADVERTENCIA

Español (ES)

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.

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.

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.

Legal Notes

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 HealthCare 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.

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 HealthCare will use its own specially trained field engineers. All of GE HealthCare's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE HealthCare equipment shall only utilize qualified personnel (i.e. GE HealthCare 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 Ultrasound Global Documentation Group with specific information listing the system type, manual title, part number or direction number, revision number, page number and suggestion details.

Mail the information to:

GE HealthCare employees should use Post-Market Quality Management (PQM) to report service documentation issues.

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 pads, to reduce the risk of injury.

For a complete review of all safety requirements, refer to Chapter 1 in the Service Manual.

Revision History

Table -1 Revision History

Revision	Date (YYYY-MM-DD)	Reason for change
Rev. 1	2023-10-26	Initial Release.
Rev. 2	2023-10-30	Update to add India factory address.
Rev. 3	2024-03-26	Remove Tricefy Uplink and update graphics.
Rev. 4	2024-05-24	Update FRU list.
Rev. 5	2024-10-10	Update FRU list.
Rev. 6	2024-11-11	Update FRU list.
Rev. 7	2025-03-03	Update FRU list.

Please verify that you are using the latest revision of this document. Information pertaining to this document is maintained on MyWorkshop. If you need to know the latest revision, contact your distributor, local GE HealthCare Sales Representative or in the USA call the GE HealthCare Ultrasound Clinical Answer Center at 1 800 682 5327 or 1 262 524 5698.

Table of Contents

Chapter 1 - Introduction

Chapter 2 - Site Preparations

Chapter 3 - System Setup

Chapter 4 - General Procedures and Functional Checks

Chapter 5 - Components and Functions (Theory)

Chapter 6 - Service Adjustments

Chapter 7 - Diagnostics/Troubleshooting

Chapter 8 - Replacement Procedures

Chapter 9 - Renewal Parts

Chapter 10 - Care and Maintenance

Chapter 1
Introduction

In this section

Manual Overview

This manual provides installation and service information for the ultrasound system. It is divided into ten chapters as shown below.

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 ultrasound system.
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 care and 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 ultrasound system.
7.	Diagnostics/ Troubleshooting	Provides procedures for running diagnostic or related routines for the the ultrasound system.
8.	Replacement procedures	Provides disassembly procedures and reassembly procedures for all changeable FRU.
9.	Renewal Parts	Contains a complete list of replacement parts for the ultrasound system.
10.	Care & Maintenance	Provides care and maintenance procedures for the ultrasound system.
N/A	Index	A quick way to the topic you’re looking for.

Typical users of the Basic Service Manual

- GE HealthCare Service Personnel (setup, maintenance, etc.)
- GE HealthCare Online Center Personnel
- Licensed Hospital's Service Providers
- The Ultrasound System Users

Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the ultrasound system and also kept near the unit for quick reference.

NOTE
Probe information displayed on screen does not necessarily reflect the probes available on your ultrasound system. Please refer to the probe list for available probes and features.

Ultrasound system models covered by this manual

Table 1-2 Model Designations

Model Name	System SW
Versana Premier VA	R3.x.x
Versana Premier VS	R3.x.x
Versana Premier Lotus 4PP	R3.x.x
Versana Premier Lotus 5PP	R3.x.x

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

Important Conventions

Conventions used in book

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

Model designations

This manual covers the Versana Premier/Versana Premier Lotus Ultrasound systems listed in:

Ultrasound system models covered by this manual on page 13.

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.

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

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

CAUTION
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.

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

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.

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.

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.

Labels Locations

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.

Rating Plate Location

The ultrasound system labels are provided in English.

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

Figure 1-1 Label Location - example

Table 1-5 Label Icons

Label/Icon	Purpose/Meaning	Location
UDI (01) 0 0195278 69041 8 (11) 230206 (21) 1100000WX0	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 ultrasound 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
SN	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. (Please use Internet Explorer to open the link.)

Safety Considerations

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.

Human Safety

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

Only personnel who have participated in this ultrasound system's Training Seminar are authorized to service the equipment.

WARNING
Because of the limited access to cabinets and equipment in the field, placing people in awkward positions, GEHC 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 ultrasound system. Attempts to move the Ultrasound system considerable distances or on an incline by one person could result in injury or damage or both.

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 Basic Service Manual for LOTO warnings and cautions.

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.

Mechanical safety

WARNING
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.

WARNING
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.

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

WARNING
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.

CAUTION
Take extra care when moving the system.This ultrasound system weighs approximately 70 kg (140 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.

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

CAUTION
To avoid injury when you move the 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 this ultrasound system 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.

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.

Electrical safety

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 the ultrasound system to the wrong voltage level will most likely destroy it.

WARNING
DO NOT SERVICE OR DISASSEMBLE PARTS UNDER FRU UNIT LEVEL AT ANY CIRCUMSTANCES.

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.

Peripherals

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

Notice against user modification

Never modify this product, including system components, software, cables, and so on. User modification may cause safety hazards and degradation in system performance. All modification must be done by a GE HealthCare qualified person.

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 this ultrasound system, 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 HealthCare 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.

WARNING
AFTER UNPLUG POWER CORD, WAIT FOR AT LEAST 20 SECONDS FOR CAPACITORS TO DISCHARGE AS THERE ARE NO TEST POINTS TO VERIFY ISOLATION.

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 this ultrasound system.

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.

Ultrasound System components may be energized.

Returning Probes and Repair Parts

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.

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 HealthCare is not responsible for the loss of this data.

If PHI (Patient Healthcare Information) data needs to be sent to GE HealthCare employees for service purposes, GE HealthCare 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.

EMC, EMI and ESD

Electromagnetic Compatibility (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.

CE Compliance

The ultrasound system 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.

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.

Customer Assistance

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 log (Alt+D) 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.

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
Latin America	Service Application Support	1-800-321-7937 1-262-524-5698

LOCATION	PHONE NUMBER	
Europe (OLC-EMEA) GE Healthcare GmbH Peter-Müller-Straße 24-26 40468 Düsseldorf Germany	OLC - EMEA Phone:	+49 (0) 211 73744789 +33 1 3083 1300
	Fax:	+49 (0) 211 73744685
Online Services Ultrasound Asia	Phone: • Australia • China • India • Japan • Korea • Singapore	+(61) 1-800-647-855 +(86) 800-810-8188 +(91) 1800-425-8025 +(81) 42-648-2940 +(82) 2620 13585 +(95) 6277-3444

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

Authorized Representative

Table 1-8 Authorized Representative

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

AUTHORIZED REPRESENTATIVE
The location of the CE marking is shown in the Safety chapter of the User Manual. CH REP **Authorized Swiss Representative** GE Medical Systems (Schweiz) AG Europa-Strasse 31 8152 Glattbrugg, Switzerland

Factory Site

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

The product from below factory site can only be available in India:
Wipro GE Medical Device Manufacturing Private Limited
No. 4 Kadugodi Industrial Area, Sadarmangala, Whitefield
Bangalore, Karnataka, 560067 INDIA

Chapter 2
Site Preparations

In this section

General Ultrasound System Requirements

Ultrasound system environmental requirements

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.

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

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

Environmental Requirements

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.

NOTE
You may get an overheating message with regard to fan speed. Ensure adequate system/ room ventilation.

Table 2-2 System Environmental Requirements (including probes)

Element	Operational (with probe)	Storage	Transport
Temperature	3 ~ 40℃ (without battery) 37.4 ~ 104℉ (without battery) 10 ~ 30℃ (with battery) 50 ~ 86℉ (with battery)	-20 ~ 50℃ (without probes) -4 ~ 122℉ (without probes) -5 ~ 50℃ (with probes) 23 ~ 122℉ (with probes)	-20 ~ 50℃ (without probes) -4 ~ 122℉ (without probes) -5 ~ 50℃ (with probes) 23 ~ 122℉ (with probes)
Humidity	30% ~ 85% non-condensing	10% ~ 90% non-condensing	10% ~ 90% non-condensing

Element	Operational (with probe)	Storage	Transport
Pressure	700 ~ 1060hPa	700 ~ 1060hPa	700 ~ 1060hPa

NOTE
The operational temperature should be 18-30 degree while the system is connecting with RAB2-6-RS.

CAUTION
The system cannot be used in OXYGEN rich environment.

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

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.

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.

Electrical requirements

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.

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 the ultrasound system

Voltage	Tolerance	Power Consumption	Frequency
100-240 VAC	±10%	Max. 500VA	50/ 60HZ

Site circuit breaker

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

CAUTION
POWER OUTAGE MAY OCCURE.

The ultrasound system 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.

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.

Unit power plug

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

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	

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
- portable phones

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

See: *EMI prevention/abatement* on page 38 for EMI prevention tips.

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.

Probes environmental requirements

Operation, storage and transport temperatures for probes

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

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

Table 2-6 Probe Environmental Requirements

	Operational	Storage	Transport
Temperature	10° - 40° C 50° - 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

NOTE
The operational temperature should be 18-30 degree while the system is connecting with RAB2-6-RS.

CAUTION
Check the room temperature before you use the probe.

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

NOTE
Refer to *Table 2-1 System Acclimation Time Chart* on page 34 to determine the needed settlement time.

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.

Facility Needs

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 HealthCare 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.

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.

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: *Electrical requirements* on page 35.

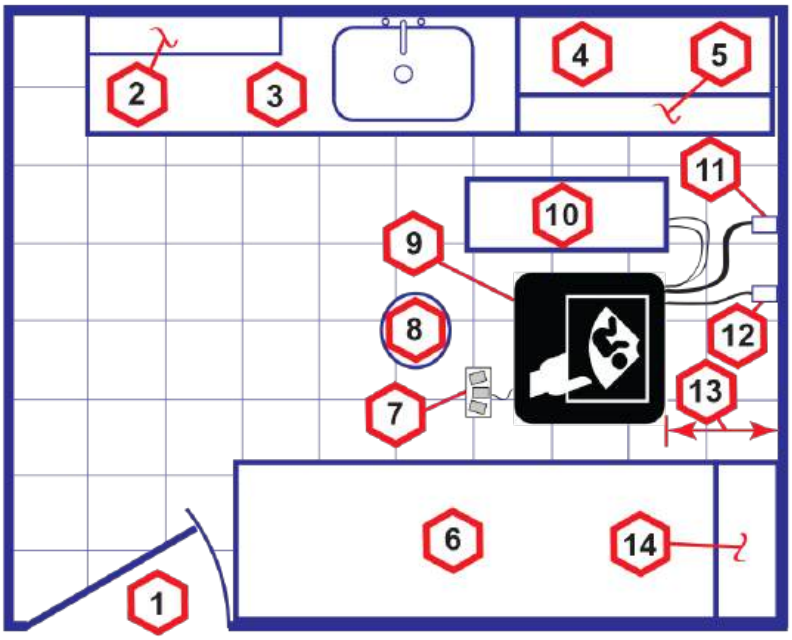
Desirable features

- 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 HealthCare for its software and proprietary manuals

Minimal floor plan suggestion

CSI 8x10

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



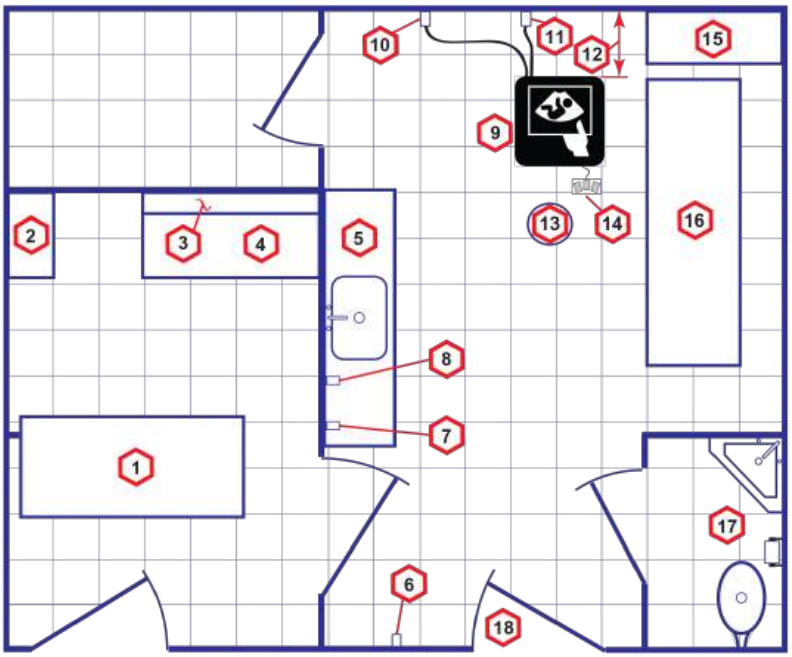
Scale: Each square equals one square foot (app. 31 x 31 cm)

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 GEHC Cabinet for Software and Manuals

Recommended floor plan suggestion

CSI 14x17

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

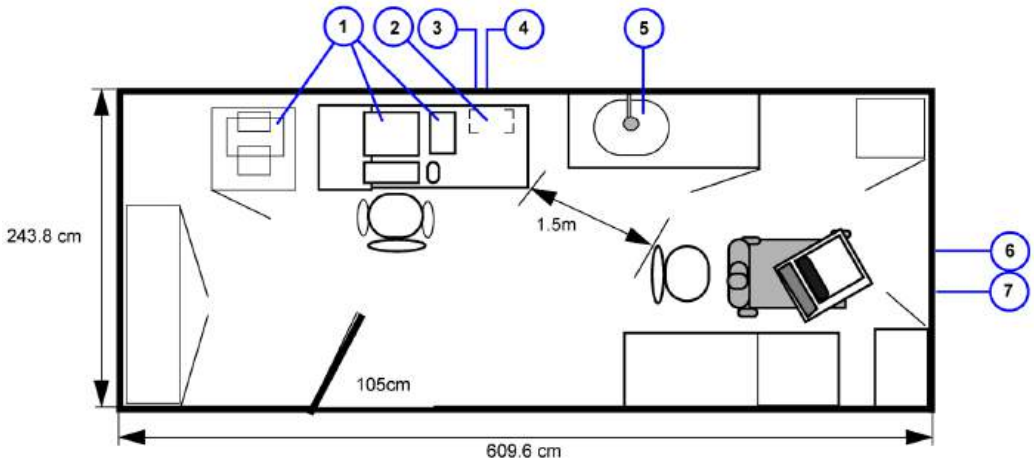


Scale: Each square equals one square foot (app. 31 x 31 cm)

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)

Suggested floor plan, Ultrasound system, and EchoPAC PC in same room

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



1. 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

Networking setup requirements

Stand alone Ultrasound system (without network connection)

None.

Scanner connected to hospital's network

Supported networks:

100/1000 Mbit Ethernet/DICOM network (option)

InSite requirements

InSite requires an Ethernet connection via:

- 100/1000 Mbit Interface

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.

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.

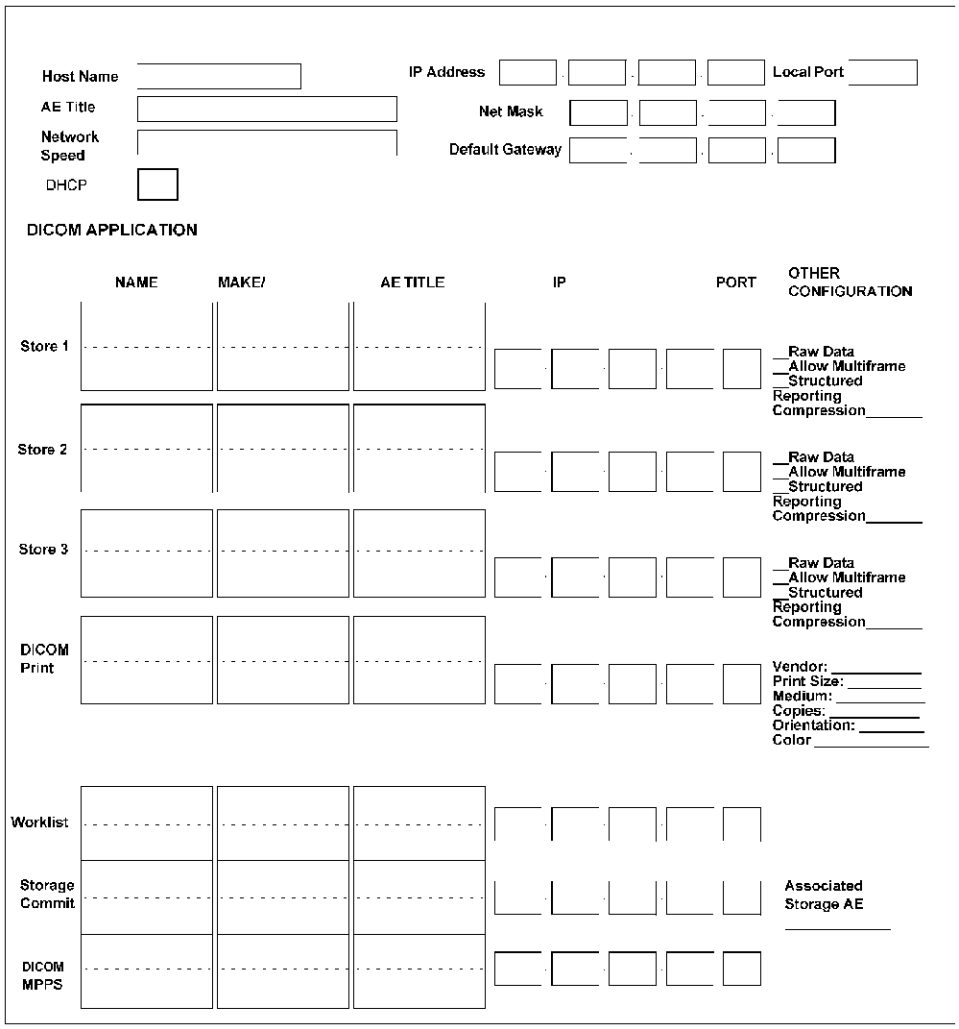
See:

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

maker (manufacturer) and the revision of the device, is also included. This information may be useful for error solving.

Figure 2-4 Worksheet for DICOM Network Information



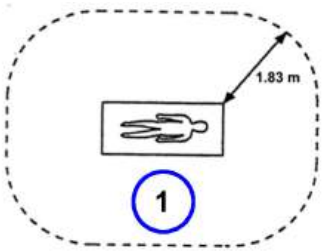
Environmental Dangers

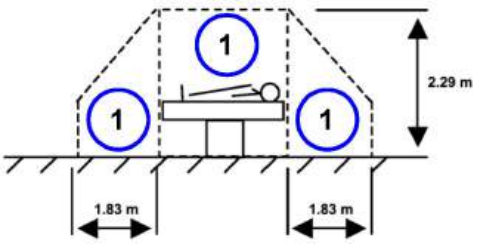
Commercial devices such as laser cameras, printers, VCRs and external monitors, usually exceed allowable leakage current limits and, when plugged into separate AC outlets, are in violation of patient safety standards. Suitable electrical isolation of such external AC outlets, or providing the device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

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.





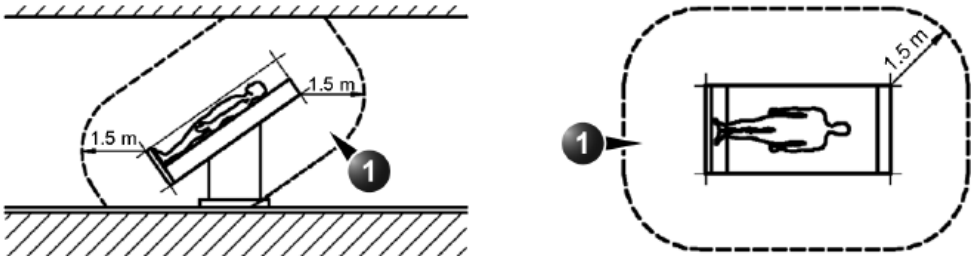
1. Patient environment

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.

Figure 2-5 Patient environment



1. Patient environment

Chapter 3
System Setup

In this section

Setup Reminders

Average setup time

- Unpacking the ultrasound system: 30 minutes
- Set up the ultrasound system options: 30 minutes
- DICOM Network Configuration: 30 minutes or more, depending on the configuration
- Install Insite: 0.5 hour

The ultrasound system installation and functional checkout will take approximately 1 hour. The ultrasound system consoles with optional equipment may take slightly longer.

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 wear the ESD wrist strap when you work on circuits.

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

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.

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

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.

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

Table 3-1 System Acclimation Time Chart

Degree C	50	45	40	35	30	25	20	15	10	5	0	-5
Degree F	122	113	104	95	86	77	68	59	50	41	23	23
hours	4	2	0	0	0	0	0	0	0	2	4	6

CAUTION
Operator Manual(s)

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

CAUTION
Acoustic Output Hazard

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

Receiving and Unpacking the Equipment

Purpose of this section

This section describes how to receive and unpack this ultrasound system.

Warnings for receiving and unpacking

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.

The Tilt indicator

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

To make it easier to detect if the handling during transportation has been improper, a set of Tilt indicator has been attached to the transportation box.

Table 3-2 Tilt Watch

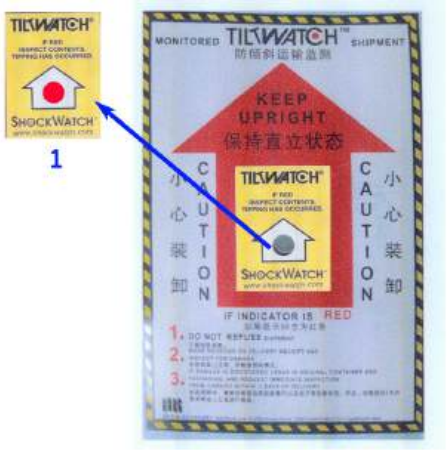
Description	Illustration
Tilt Watch	

Receiving the Ultrasound System

Examine all packages

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

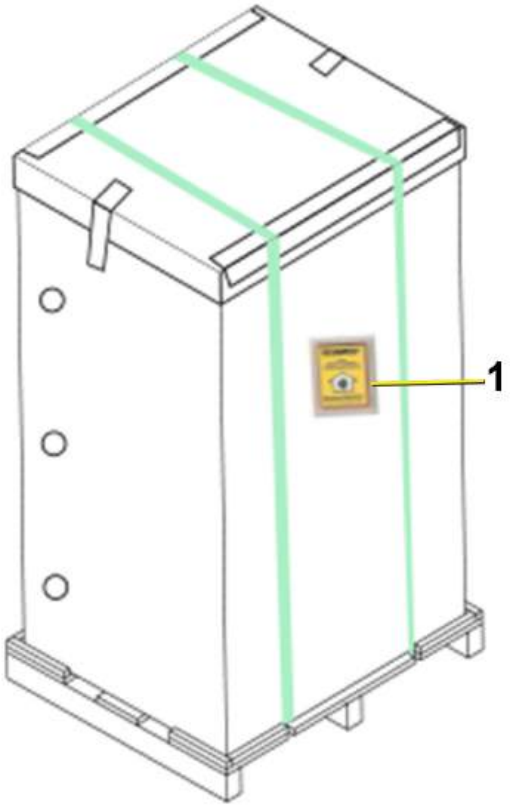
Table 3-3 Examine all packages

Step	Task	Illustrations
1.	Is damage apparent? • If YES; continue with the instructions in *Damage in transportation* on page 55. • If NO; continue with the next step.	
2.	Is the Tilt Indicator red colored inside the middle of the indicator? • If YES: The Tilt Indicator has been activated. Continue with the instructions in *Damage in transportation* on page 55 before you continue with the next step. • If NO: continue with the next step.	 1 - Red Color
3.	Continue with the instructions in *Unpacking the Ultrasound System* on page 58.	

Position of the Tilt indicator

The Tilt indicator has been attached to the transportation box as illustrated in the figure below.

Figure 3-1 Tilt indicator



1. Tilt Indicator

NOTE
Before cutting the straps, check Tilt Tag to make sure it has not been triggered. If damaged, report it to the carrier. If not, then cut the straps around the crate.

If Tilt Indicator has triggered or is missing

The purpose of the tilt indicator label is to alert people handling a product that it is sensitive to tipping and it must remain upright at all times. It is basically an active "Up Arrow" that changes color if the package is tipped 89 degrees or more from horizontal. These labels can be false activated if tipped less than 89 degrees, and shocked or vibrated at the same time. This event does occur, but is considered uncommon. If a package is received with an activated tilt indicator label, there is high degree of certainty it tipped 89 degrees or more from horizontal during shipment.

An activated tilt indicator label does not indicate if the package was simply “Tipped” (laid down with no impact shock) or “Tipped Over” (free fall, with an impact shock). Using both shock indicator labels and tilt indicator labels will help identify if a Tip Over impact shock occurred.

Table 3-4 Tilt Indicator has triggered or is missing

Step	Task
1.	If the Tilt Indicator is missing: Note on the shipping papers at the time of receipt that the Tilt Indicator label is missing. If the Tilt Indicator has triggered: Note on the shipping papers at the time of receipt that the Tilt Indicator label was activated.
2.	Inspect the product for possible concealed damage.

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 HealthCare 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.

The Ultrasound System transportation box label

The ultrasound system transportation box label is located at the front of the transportation box.

Figure 3-2 The Ultrasound System transportation box label 1

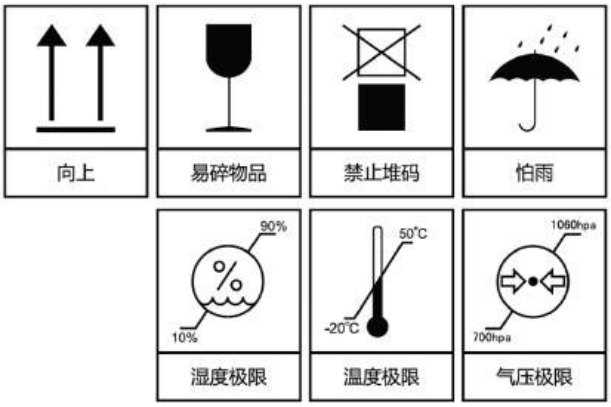
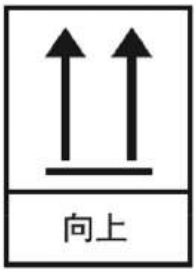
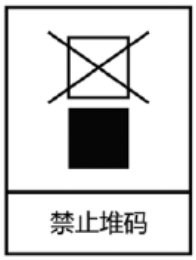
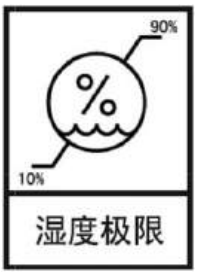
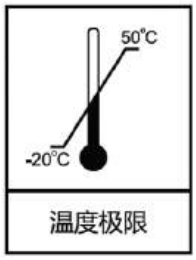
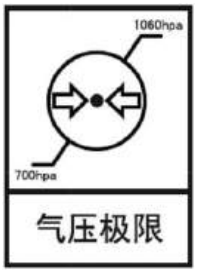


Figure 3-3 The Ultrasound System transportation box label 2

Table 3-5 Package Label Icons

Label/Icon	Purpose/Meaning	Location
	Keep this way up.	Package
	Fragile.	Package

Label/Icon	Purpose/Meaning	Location
	Keep it away from rain.	Package
	No stacking	Package
	Humidity Limitation	Package
	Temperature Limitation	Package
	Pressure Limitation	Package

Unpacking the Ultrasound System

When a new ultrasound 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 the ultrasound system, so that it can be reused for service.

CAUTION
Do not lift the unit by the Keyboard. Equipment damage may result.

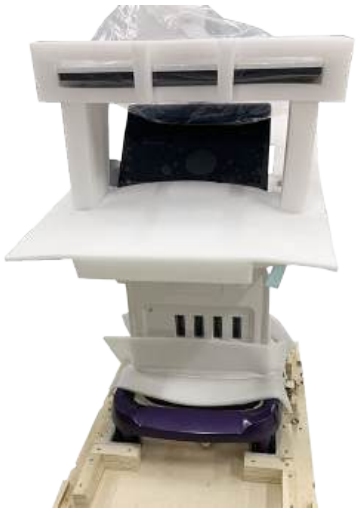
CAUTION
The crate with the ultrasound system weighs approximately 95kg. Be prepared for a sudden shift of weight as the unit is removed from its base (pallet).

NOTE
Please check the ultrasound system console is well assembly after unpacking the system.

Table 3-6 Unpacking the Ultrasound System

Step	Description	Corresponding Graphic
1	Cut off the packing strap around the crate. Note: To avoid injury, hold the strap clasp with one hand when cutting the strap.	
2	Remove the top cover.	

Step	Description	Corresponding Graphic
3	Remove the 3 plastic locks. Note: Rotate the inside plastic lock counterclockwise to remove it and then remove the outside lock	
4	Remove the outside shipping box.	
5	Remove the barrier bag from the unit. *Note: If the system is trasnported by aire, ignore this step.*	
6	Remove the PE bag only if the system is transported by air. *Note: If the system is trasnported by sea, ignore this step.*	
7	Remove the clear plastic (wrapped around the ultrasound system) from the unit. *Note: Different system may have different wrap film packaging status.*	
8	Cut the cable ties around the four wheels.	

Step	Description	Corresponding Graphic
9	Remove the foams beside the monitor and remove any additional packing material surrounding the system.	
10	Unlock the wheels, and then 2 people hold the front handle and rear handle to move the whole system on the ground.	

Moving into Position

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

Packing the Equipment

Please pack the ultrasound system in the reverse order of unpacking.

Packing Materials - Recycling Information

The packing materials for the ultrasound system 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).

Preparing for Setup

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.

Physical inspection

Verify that the system arrived intact (visual inspection).

If the system has been damaged, please refer to '*Damage in transportation*' section in the beginning of this manual.

EMI protection

The ultrasound system 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 *EMI limitations* on page 37 for more information about EMI protection.

Completing the Setup

Purpose of this section

This section describes how to complete the installation of the ultrasound system.

System specifications

System requirements verification

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

  (See: *Facility Needs* on page 40 .)
- Verify that the specifications below don't conflict with any on-site conditions.

Physical dimensions

Table 3-7 Physical dimensions of the ultrasound system

Height	Width	Depth	Unit
less than 1840	less than 600	less than 970	mm
less than 72.5	less than 23.62	less than 31.2	Inches

Console Weight

- Weight: less than 73 kg (160.94 lbs)

Electrical specifications

WARNING
Connecting the ultrasound system to the wrong voltage level will most likely destroy it.

Verification of the system's voltage setting

Verify that the mains voltage specified for the ultrasound system is available on-site.

Refer to the latest revision of the User Manual for a full list of product labels prior to serving the system.

Electrical specifications for the Ultrasound System

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

Table 3-8 Electrical specifications for the ultrasound system

Model Name	Voltage	Tolerances	Power consumption	Frequency
Versana Premier/Versana Premier Lotus VA	100-240V	±10%	Max.500VA	50/60 Hz
Versana Premier/Versana Premier Lotus VS				

Peripherals/Accessories Connector Panel

The ultrasound system peripherals and accessories can be properly connected using the side connector panel.

Figure 3-4 Peripheral/Accessory Connector Panel

Table 3-9 Peripheral/Accessory Connector Panel

No.	Electronic interface	Description (Interface standards / Data rate)
1	Diagnostic LED 1, 2, 3	System Diagnostic LED
2	Ethernet port	RJ45 network Connector, IEEE 802.3 10 Base-T, 100 Base-TX and 1000 Base-T
3	USB port	Type A USB port, USB 3.0, Max 5.0 Gbps, DC5V/500mA
4	HDMI port	Video/Audio port, HDMI, 1080P
5	Type-C USB port	Type-C USB port, USB 3.0, Max 3.0, Max 5.0 Gbps, DC5V/ 500mA

No.	Electronic interface	Description (Interface standards / Data rate)
6	Equalization conductor	The terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment.
7	Supply Mains Switch	Supply Mains Switch
8	AC Inlet	AC 100-240V, IEC C13 socket

Pin assignment for each connector

Table 3-10 Pin Assignments of USB

Pin No.	Signal
1	+5 VDC
2	DATA
3	DATA
4	GND

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 the ultrasound system, 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 HealthCare.

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 the ultrasound system.

Connect USB Flash Drive

NOTE
USB Flash Drive approved for the ultrasound system 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 the ultrasound system itself, or on other electronic devices.

For approved models, please refer to Chapter 9.

Insert the USB Flash Drive in one of the USB ports on the ultrasound system.

Connecting probes

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

Powering the system

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

NOTE
It is recommended to remove the protection film on the Touch Panel to avoid sensitivity issue during operation.

Connectivity Setup

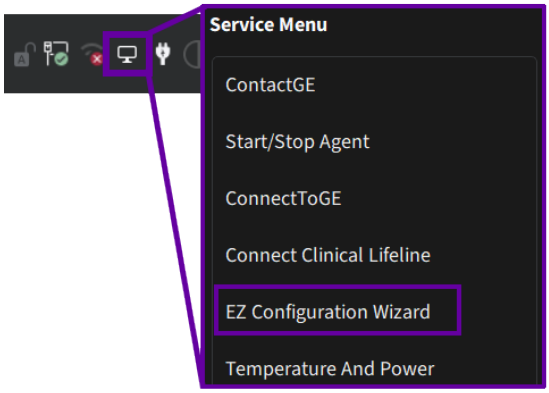
EZ Configuration Wizard

EZ Configuration 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.

NOTE
Password setting is required when turning on the system for the first time after the software installation.

User can also enter EZ Configuration Wizard by clicking the Insite icon at the top right of the screen.

Figure 3-5 Enter EZ Configuration Wizard



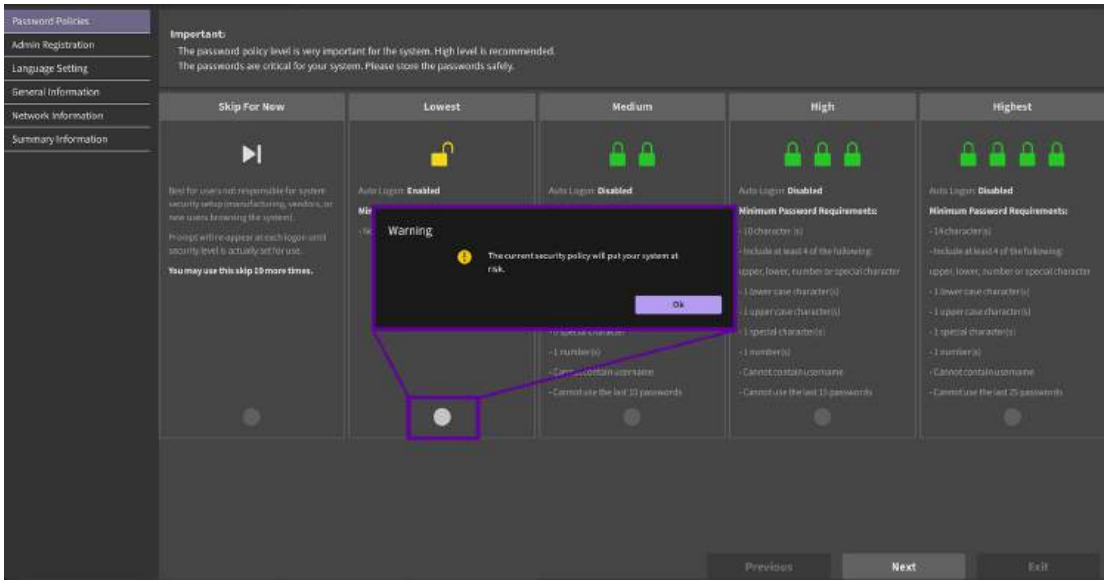
Then follow below steps to complete configuration.

1. Select password level in ***Password Policies*** or ***Skip For Now*** to setup later. User can change the policy level later by ***Utility*** > ***Admin*** > ***User policies***.
   Users can select the option ***Lowest***, ***Medium***, ***High*** or ***Highest*** for policy level. The complexity of the password will be differed by the policy level you selected.

   NOTE
   Password policy level setting is only required when turning on the system for the first time or after the software installation.

NOTE
When user select lowest, a warning will display to inform that the current security policy will put your system at risk.

Figure 3-6 Select password policy level



NOTE
If user select lowest level in password policies, ADM password can be empty during Admin Registration.

NOTE
Exit button is not activated in password policies setting, users are not able to exit the EZ Configuration Wizard in this step.

2. Set ADM password in ***Admin Registration***.

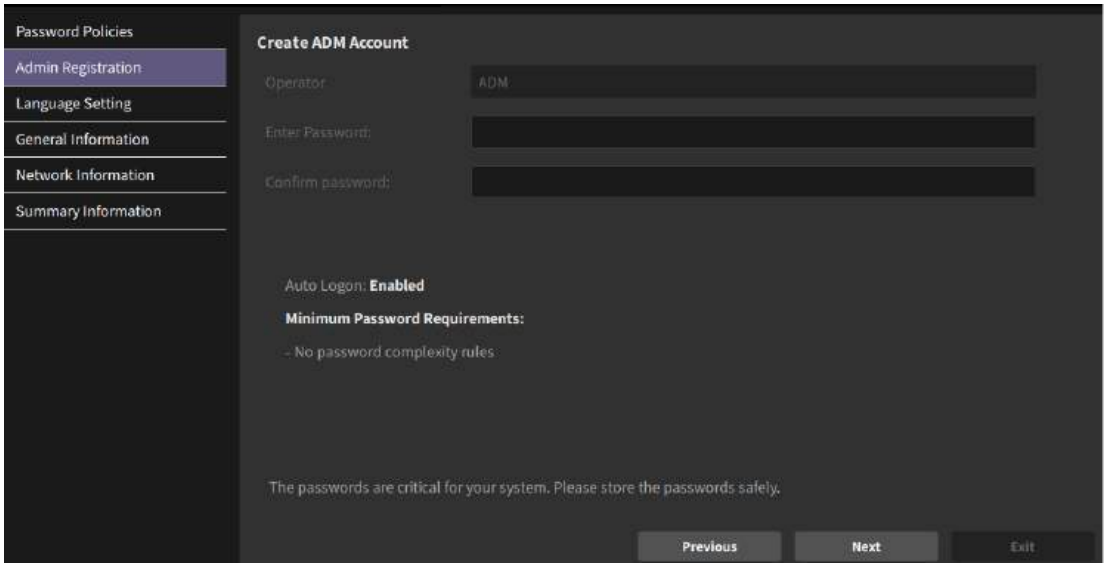
NOTE
Admin Registration is only required when turning on the system for the first time or after the software installation.

NOTE
Exit button is not activated in Admin Registration setting, users are not able to exit the EZ Configuration Wizard in this step.

NOTE
ADM password can be empty if password policy level is selected as LOWEST.

NOTE
A valid password must be at least 8 characters long and has a maximum length of 256 characters.

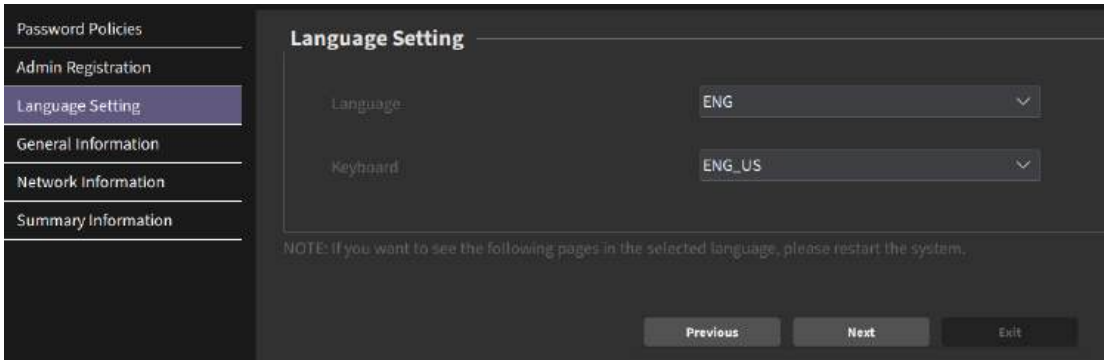
Figure 3-7 ADM password setting



If users did not set ADM password during system setup. User can also set operator password later by ***Utility*** > ***Admin*** > ***Users***.

3. Press ***Next*** to select the appropriate language for system language and keyboard language from the drop-down list.

Figure 3-8 System Language settings

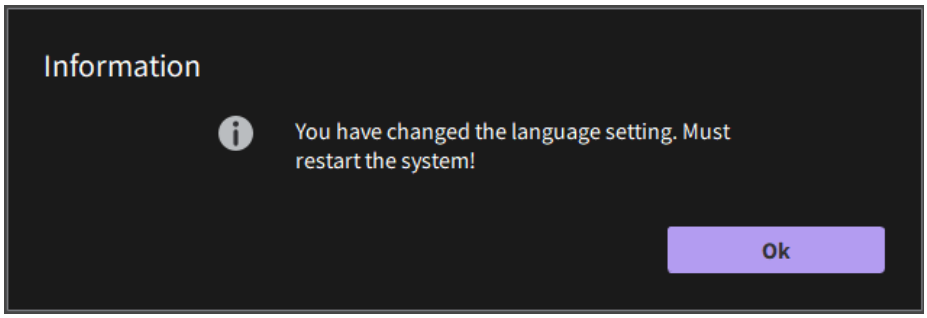


NOTE
All required setting after turning on system for the first time is done. If you select ***Exit***, you will be able to exit the EZ Configuration Wizard and start using your system.

- If you do not change the language, press Next to continue.
- If you change the language setting, a language setup window will display.

Set language and keyboard language, then press ***OK*** to restart the system.

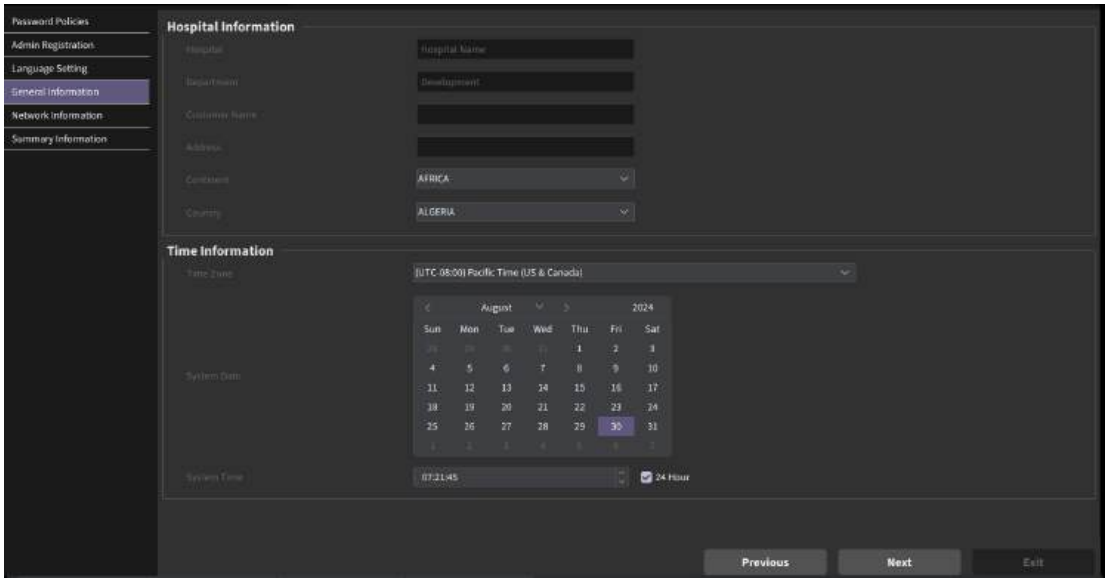
Figure 3-9 Language settings confirmation



NOTE
If you press ***Previous***, you will go to the previous page.

4. This screen shows the hospital and time information, you can set the system date and time on this page.

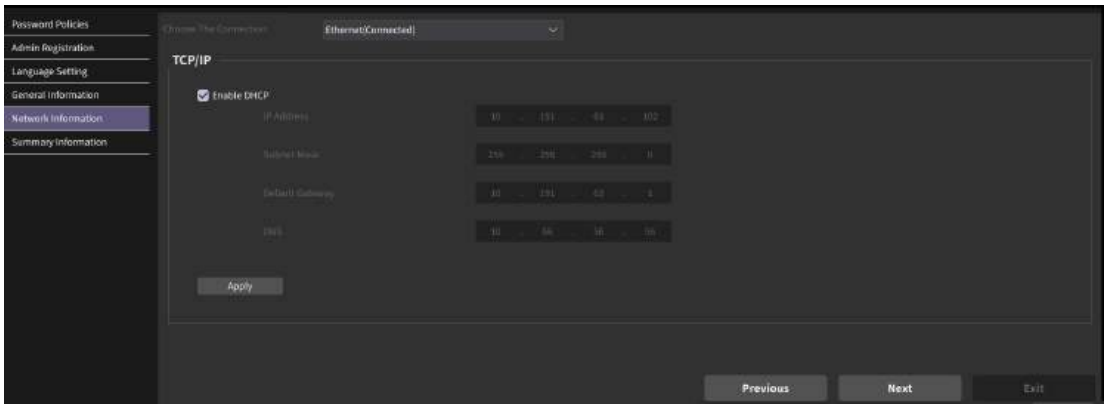
Figure 3-10 General Information



Press ***Next*** to continue.

5. The ***Network Information*** screen shows the configuration of wireless and local network.

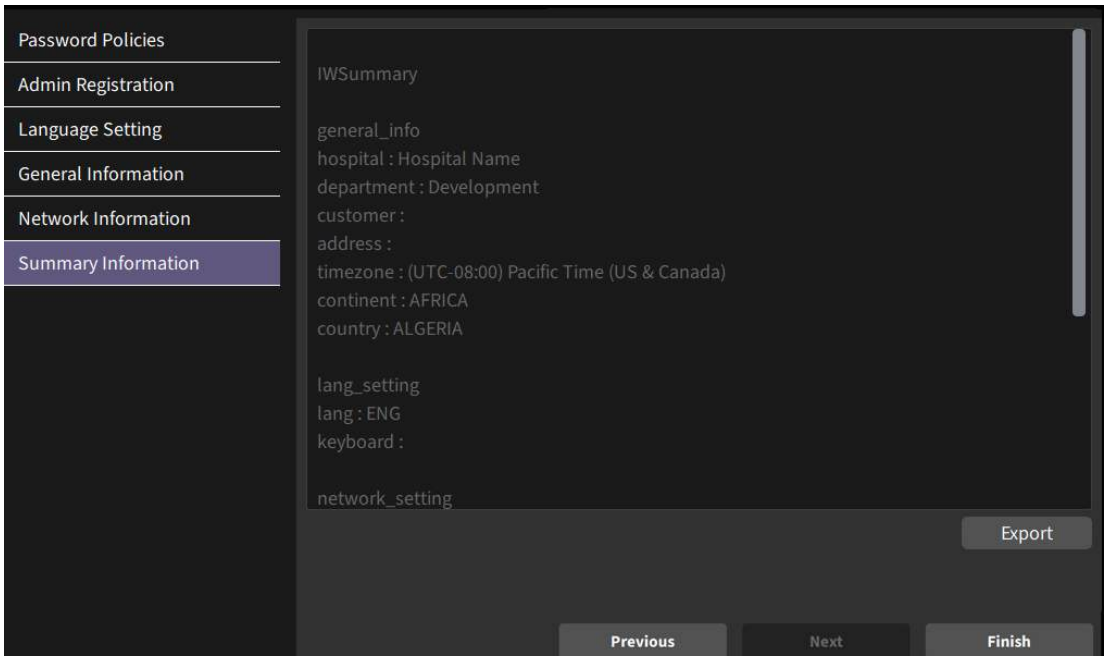
Figure 3-11 Network Information



Press ***Next*** to continue.

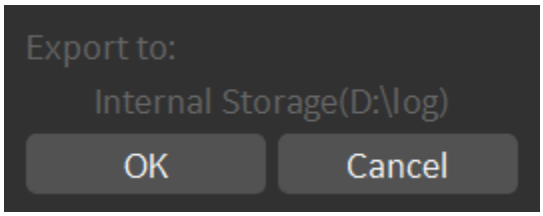
6. ***Summary Information*** shows the report of the previous settings. User can export it to the database.

Figure 3-12 Summary Information



Press ***Export*** and click ***OK*** to save the summary information.

Figure 3-13 Export Summary



7. Press ***Finish*** to exit ***EZ Configuration Wizard***. The system will display a warning to restart to activate your configuration. Press ***OK*** to restart.

   NOTE
   System will restart only after user configures ***EZ Configuration Wizard*** for the first time or new software version is installed.

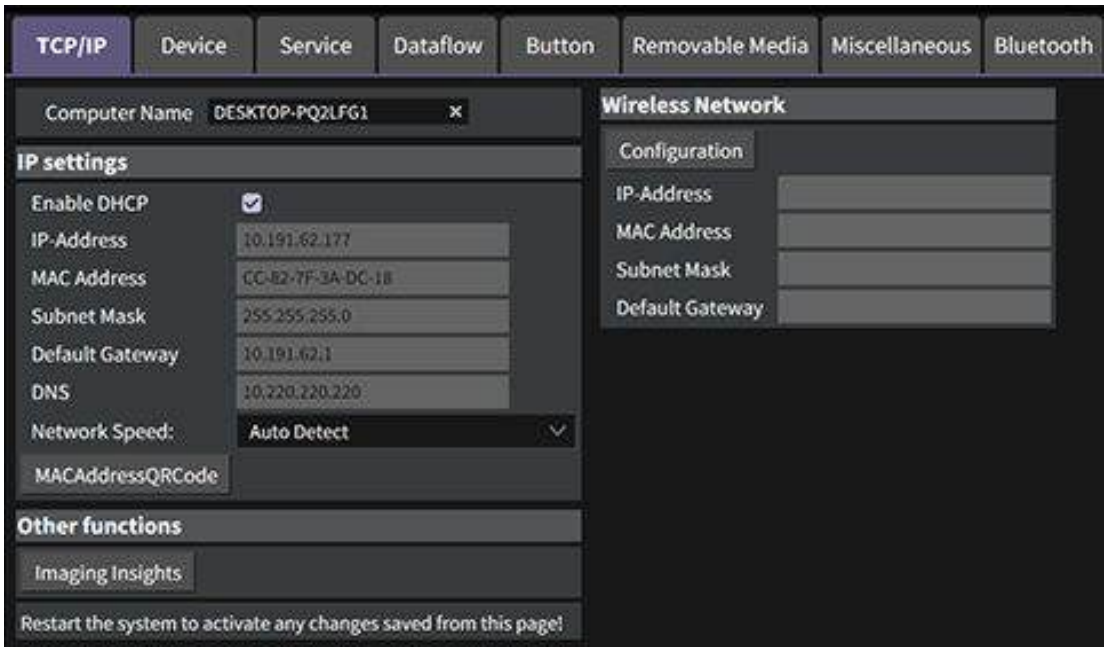
NOTE
For better security, it is recommended to change the passwords of these two accounts when using the device for the first time. Go to ***Utility*** > ***Service*** > ***Utilities*** > ***Change Password***, change the passwords of ***GEService*** and ***SVCservice***. The complexity of the new password cannot be lower than the password policy level that has been set (***Lowest***, ***Medium***, ***High*** or ***Highest***).

TCP/IP Screen

1. Press ***Utility*** on the touch panel and login as admin, refer to *Logging on to the Ultrasound System as "ADM"* on page 142.
2. Select ***Connectivity*** on the screen.

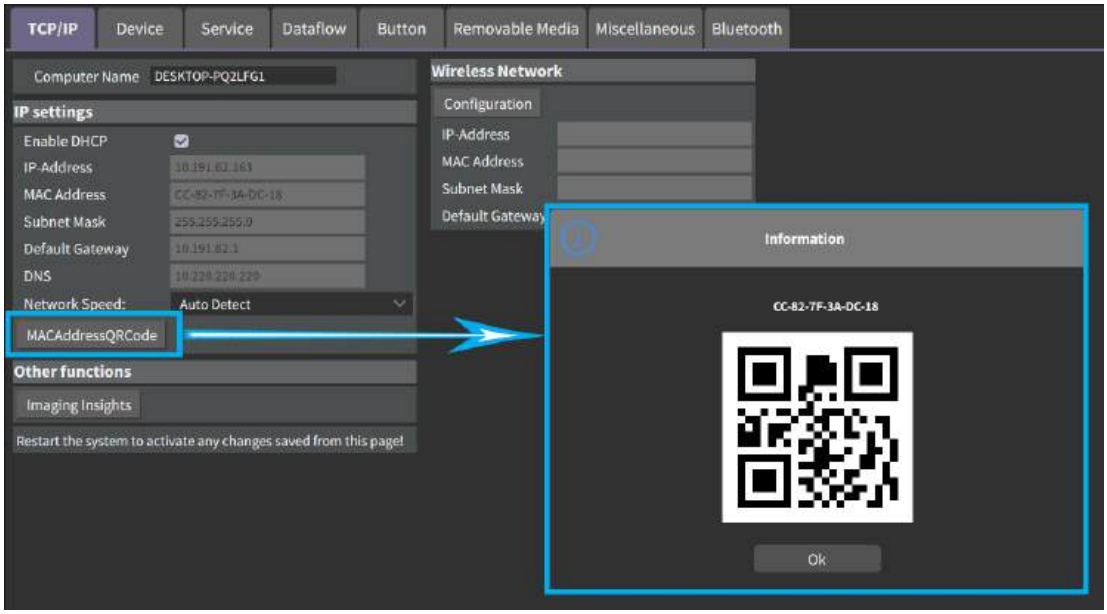
3. Select ***TCP/IP*** tab, the screen gives an overview of the network settings for the ultrasound system.

Figure 3-14 TCP/IP screen



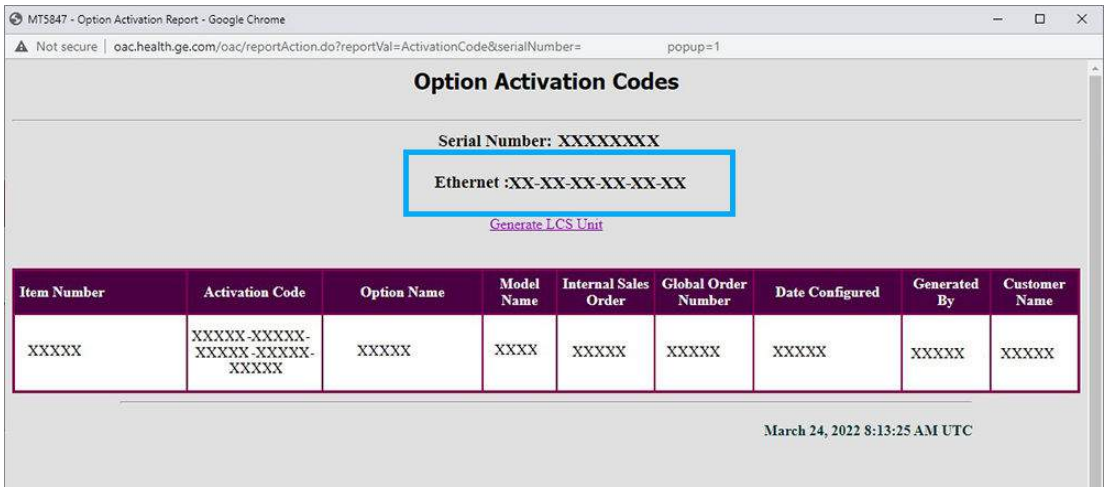
4. By clicking ***MACAddressQRCode***, there will be a QR code poping out on the screen. You can get MAC address here.

Figure 3-15 MAC Address QR Code



MAC Address can also be found in OAC system.

Figure 3-16 MAC Address in OAC system



NOTE
Restart the system to activate any changes saved from this page.

Computer Name

Computer Name: Type the unique name for the Ultrasound system (no spaces in name).

IP Setting

This configuration category enables users with administrative rights to set the TCPIP for the system and connected remote archive.

1. Type the name of the Ultrasound system in the ***Computer Nam***e field.
2. In the ***IP settings*** section, identify the ultrasound system to the rest of the network by one of the following:

   - Dynamic Host Configuration Protocol (***DHCP***) can be used provided your network supports the DHCP protocol.
   - Type the ***IP-Address***. In this case, uncheck the "Enable DHCP" box and enter the IP address, Subnet Mask and default Gateway. Contact your network administrator if you are unsure what values to enter.

   NOTE
   Do not set up the system with DHCP. The IP address MUST BE static for the diagnostic and DICOM to function correctly

3. Select the ***Network Speed***.
4. Press ***Save*** and restart the system.

NOTE
IP settings of wired/wireless network can be restored when restoring backups. The Versana Premier IP address MUST BE unique.

Table 3-11 IP settings

Preset Parameter	Description
Enable DHCP	DO NOT select this box to enable dynamic IP Address selection. NOTE: The system shall disable IP-Address, Subnet Mask, and Default Gateway when the user chooses to use DHCP.
IP-Address	Type the IP Address of the Ultrasound system. NOTE: IP stands for Internet Protocol. Every device on the network has a unique IP address.
MAC Address	Unique network card address. NOTE: Only available for MyComputer.
Subnet Mask	Type the subnet mask address. NOTE: The Subnet Mask is an IP address filter that eliminates communication/messages from network devices of no interest to your system.
Default Gateway	Type the default gateway address.
DNS	Type DNS address.
Network Speed	Select the network speed (Auto Detect, 10Mbps/Half/Full Duplex, 100Mbps/Half/Full Duplex, or 1000Mbps/Auto-negotiate).

Wireless Network
Table 3-12 Wireless Network

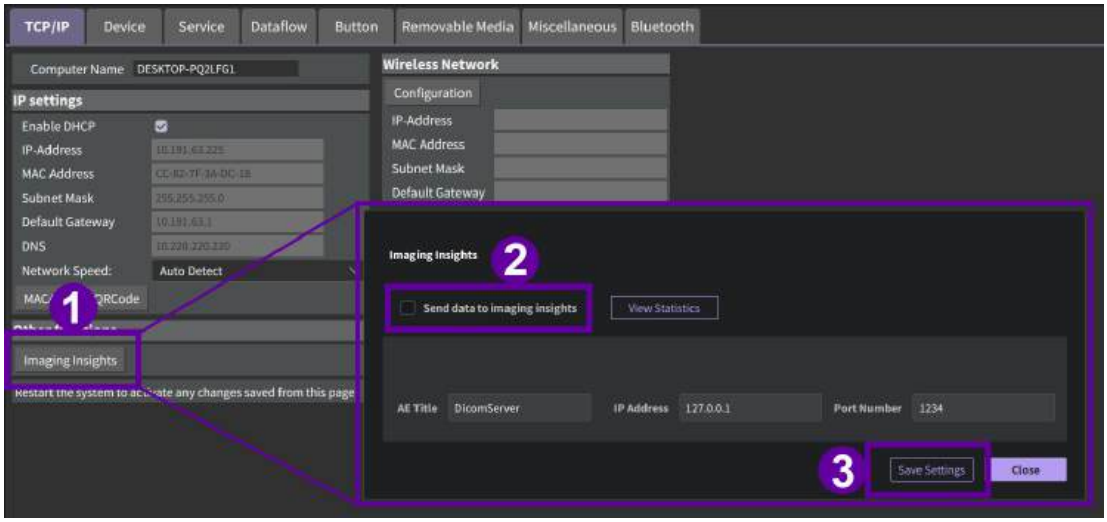
Preset Parameter	Description
Configuration	Press this button to set up wireless network.
IP-Address	Wireless Network IP Address of the Ultrasound system.
MAC Address	Unique network card address. NOTE: Only available for MyComputer.
Subnet Mask	Wireless Network subnet mask address.
Default Gateway	Wireless Network default gateway address.

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 ***Utility*** > ***Connectivity*** > ***TCP/IP*** > ***Imaging Insights*** to enter ***Imaging Insights*** configuration window.

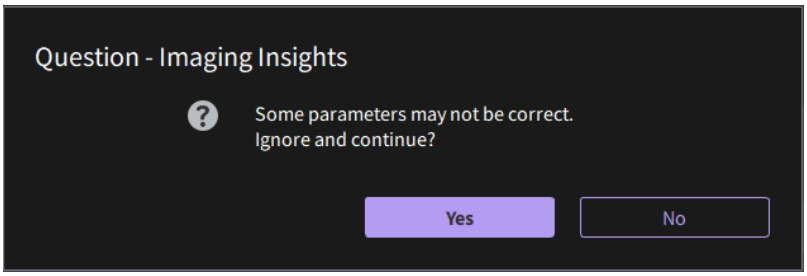
Figure 3-17 Imaging Insights button



2. Configure the server information in the pop-up window and then check ***Send data to Imaging Insights*** check box.
3. Click ***Save Settings*** to save the configuration and send data to ***Imaging Insights*** server.

   a. If the network connection to the server passes, data will be sent to server successfully.
   b. If the network connection to the server fails, a question will pop out for user.

Figure 3-18 Imaging Insights question



Typical failed causes:

- Network cable not connected.
- Configuration error(s).

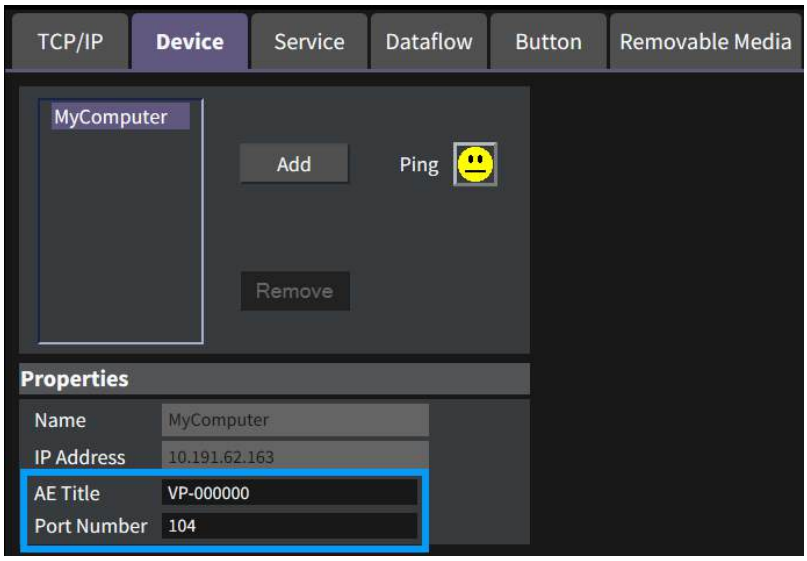
NOTE
If the user is doing the exam with patient information created, the data will be sent to the server immediately when the user clicks ***End Exam***: If the user is scanning without creating patient information, the data will be sent to the server every two hours before system shutdown.

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

Changing the AE title and/or Port Number

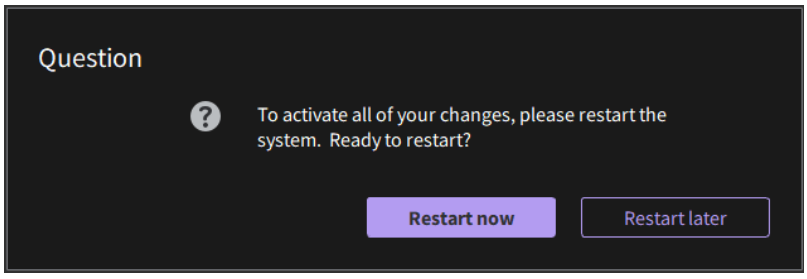
1. To change ***AE Title*** and/or ***Port Number***, edit the respective fields.

Figure 3-19 AE Title/Port Number



2. Select ***Save*** to store your changes. This will bring up a new warning screen.

Figure 3-20 Warning Message



3. Select ***Restart now*** to reboot the system to activate the settings or select ***Restart later*** continue with other TCPIP setup tasks.

Network setup

For network connection setup, See *Network Configuration* on page 242 for more information

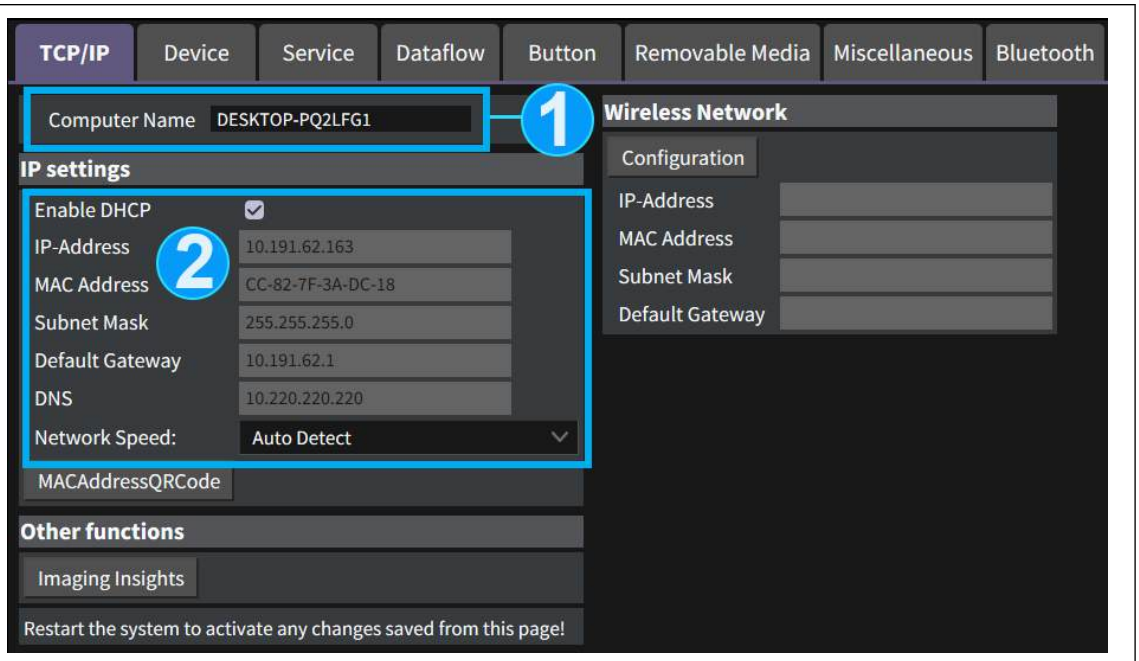
Setup connection to a DICOM server

The ultrasound system is configured to work with DICOM servers in a network environment. Images are first saved on the local image butter on the system. At the end of the examination the images are sent to the DICOM server via a DICOM spooler and to the local database, depending on dataflows.

To connect to the DICOM server, the following information has to be entered in the system.

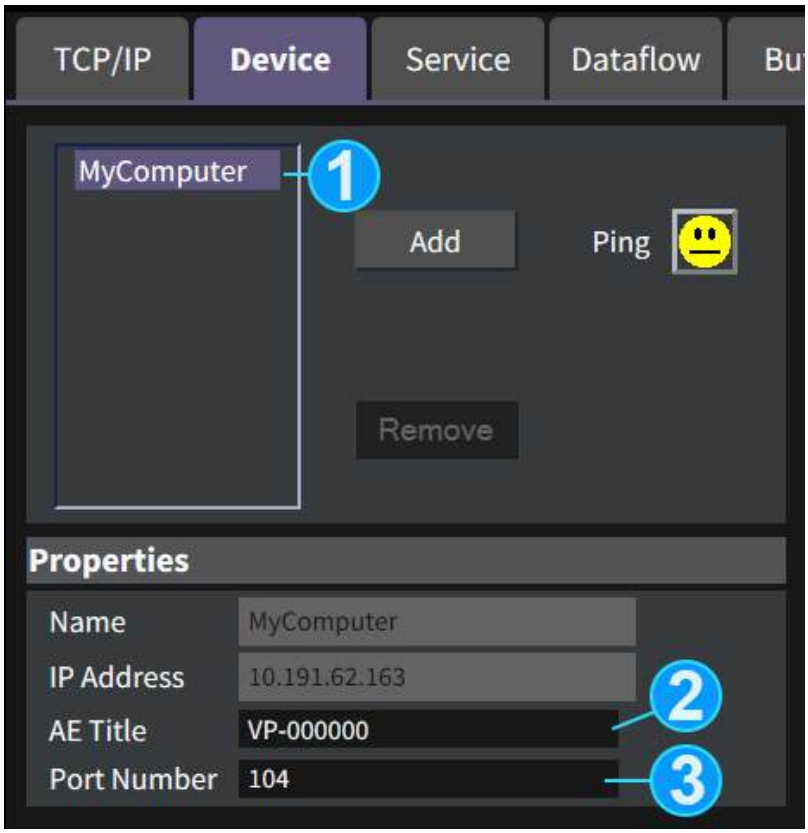
- The DICOM server IP address
- The DICOM server port number
- The DICOM server AE title (the server application's name)

Table 3-13 *Utility* > *ConnectivityTCP/IP* screen



1	Enter the ultrasound system computer name. This may be the same as the station name.
2	Enter the the ultrasound system IP address, subnet mask, default gateway, DNS and network speed. For automatic assignment of IP address, subnet mask, default gateway and DNS, select DHCP. Note: If possible, set the ultrasound system network Speed to match that of the Network switch. if in doubt, set it to AutoDetect. Otherwise, transfer times can be two or five times longer, during which the ultrasound system will appear to be locked up. (If the Hard Drive activity light on the front of the console is lit steady or blinks quickly, the ultrasound system is most likely not hung.)

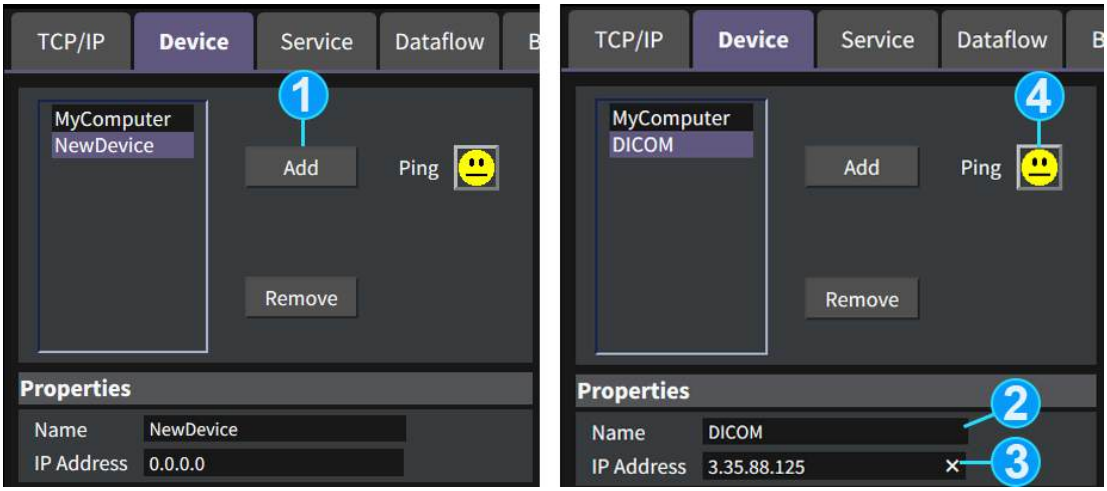
Table 3-14 *Utility* > *Connectivity* > *Device* screen



1	Select MyComputer.
2	Assign an AE title to the ultrasound system. (AE stands for Application Entity. DICOM services use this to identify the ultrasound system.) AE title is case-sensitive. This title may contain the Computer Name from the TCP/IP page, if desired. Note: It is NOT recommended to use the factory default. This is not prohibited, but more than one system with the same AE title can cause confusion.
3	Edit Port Number if needed. 104 is typical. Save your changes and reboot the system.

How to get the Ultrasound System to recognize another Device on the Network

Table 3-15 *Utility* > *Connectivity* > *Device* screen

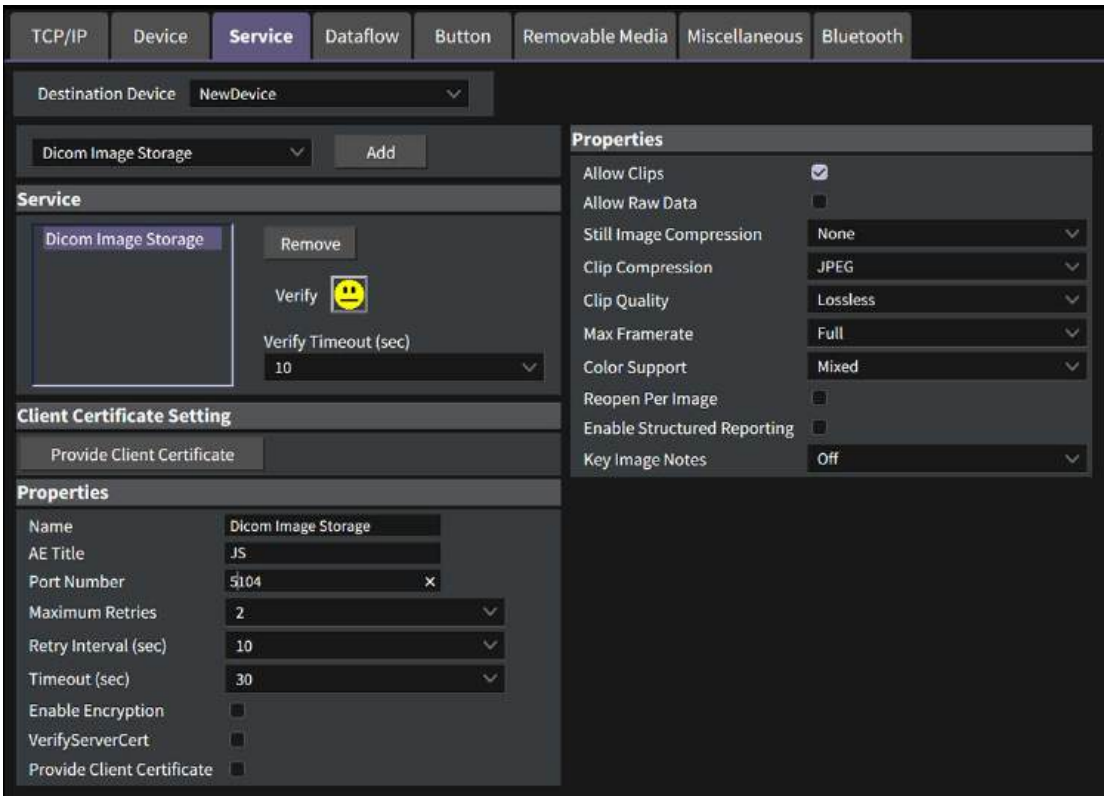


1	Select Add. The system creates a device called “NewDevice”.
2	Change the name to one of your choosing.
3	Enter the IP address of the device.
4	
	Save your changes and then press Ping. A “Smiley Face” indicates successful communication between your ultrasound system and the device. A “Frown” indicates failed communication. Check the following: • Is the device running? • Is it connected to the network? • Did you enter the right IP address?

How to Setup and Use a DICOM Image Storage/Network Storage Service

An Image Storage Service provides a place to store patient and exam data from Versana Premier/Versana Premier Lotusand corresponding images. The Image Storage Service, or the device that hosts it, is often called a Patient Archiving and Communication System (PACS).

Table 3-16 Setup an Image Storage Service



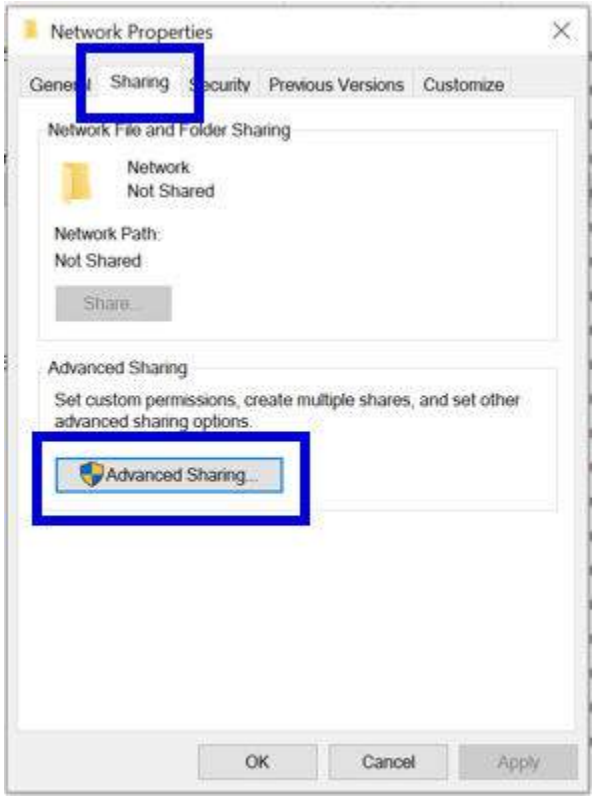
1	In Utility > Connectivity > Service, from the Destination Device drop-down menu, select the device on which the service resides. (This assumes you have already setup the device in the Device tab in *How to get the Ultrasound System to recognize another Device on the Network* on page 80.
2	From the Select Service Type to add drop-down menu, select DICOM Image Storage/ Network Storage and press Add.
3	Change the name of the service to the one you selected.
4	Enter the AE Title and port Number of the service. AE Title is case-sensitive. Enter the User Name & Password of the device, and then add the Share name of the folder in Shared Dir.
5	Save your changes and then press Verify. A “Smiley Face” indicates successful communication with the service. *Note: If you get a successful Ping (Smiley Face) at the device level but not at the service level, it is possible that the AE Title or Port Number of the service settings are incorrect. Ensure that these are correct then re-verify. Be sure that the service type (Store, Print, etc) is correct and supported by the device.*

Network storage for report

Create a share folder on local PC

1. Create a folder in the C root of local PC;
2. Right click on the folder created in C root, select ***Properties*** > ***Sharing*** > ***Advanced Sharing***....

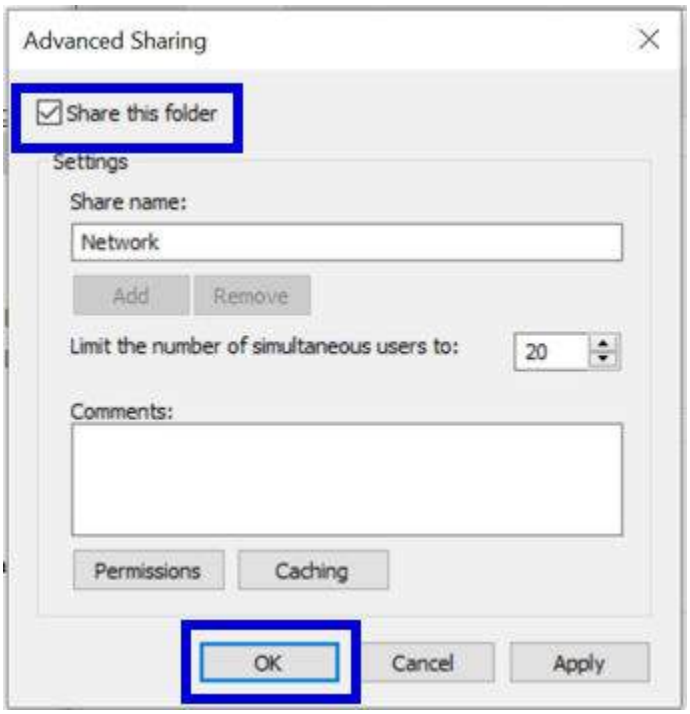
Figure 3-21 Properties



3. Select ***Yes*** on the pop-up message to continue.

4. Check ***Share this folder***, then click ***OK*** and close the window.

Figure 3-22 Share this folder



Add New Device on the Ultrasound System

Add a new device to the system, refer to *How to get the Ultrasound System to recognize another Device on the Network* on page 80.

Service setup on the ultrasound system

Complete service setup on the system, refer to *How to Setup and Use a DICOM Image Storage/Network Storage Service* on page 80

NOTE
Only use alphameric characters for the Shared Dir (in network storage) and image name (when store/export image). Please donìt use special characters, such as \, !, @, #, $, %, ^, &, *, (,), |, :, ;, <, >, ?, /, ~, [,], {, }.

Save report to the network storage

1. Create a report on the ultrasound system.
2. Select ***Save As*** to save the report.
3. Check the path of Save in, and click ***Save*** to save the report to the network storage.
4. The report will appear in the shared folder on local PC.

Dataflow

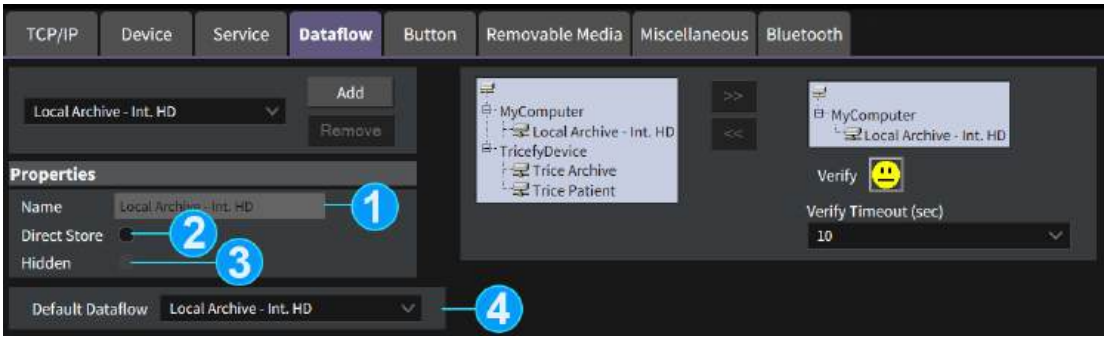
CAUTION
DO NOT rename the factory default dataflow.

A dataflow is a set of pre-configured services. When you select a dataflow, the ultrasound system automatically works according to the services associated with the dataflow. The Dataflow tab allows you to select and review information about dataflows. You can also create, change, and remove dataflows.

Set up dataflows for the services.

NOTE
You must be logged on as Administrator to use the Dataflow tab.

Table 3-17 Setup dataflow



1	Select the dataflow from the list.
2	Select to store data directly to archive (no buffer storage).
3	Select so that this dataflow does not appear as a Dataflow on the Patient menu.
4	Select to use this dataflow as the default dataflow when you start the system.

Button

You can assign print buttons via the ***Utility*** > ***Connectivity*** > ***Button*** page.

Assigning print buttons. First select the print button to configure on the upper, left corner of the page. Then select the device you want to add in the middle part of the page, under Available Input/Outputs. Then click on the right arrow in the top right corner of the page.

NOTE
You can configure each print key to multiple output devices/dataflows.

NOTE
Only attach one DICOM service per print key (e.g., PACS and DICOM printer). Multiple DICOM devices should be configured via a dataflow.

NOTE
When using a print key to send an image directly to a DICOM device, this causes a single DICOM association per image. Most devices (all known printers) work fine with this. However, some storage devices, such as ALI, Kodak Access, and Cemax, assume that the end of each association is the end of the exam and can result in a new folder for each image. In the Utility menu, select a single association or open PR for the desired DICOM storage device.

Figure 3-23 Botton Preset Menu

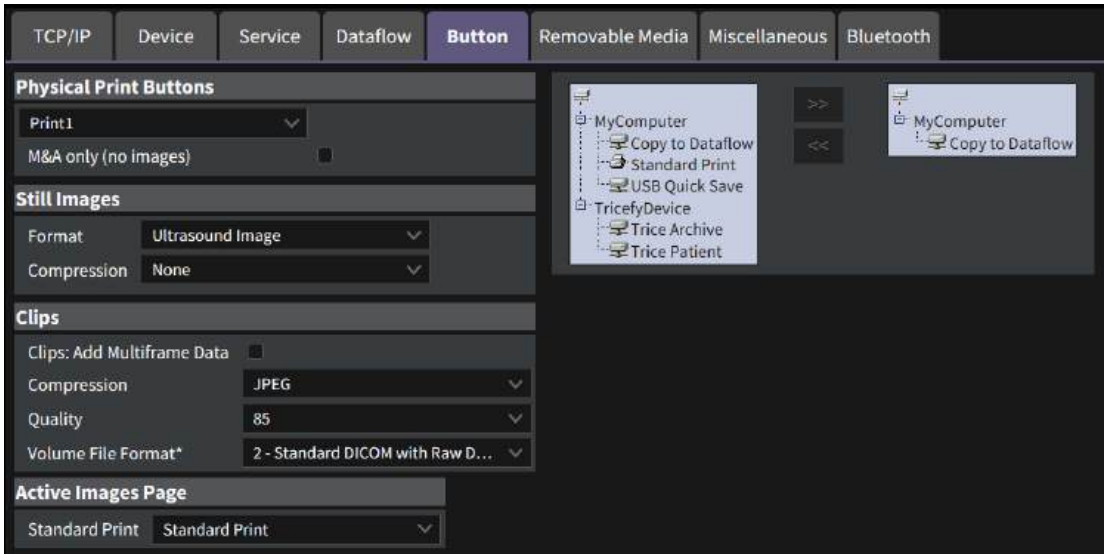


Table 3-18 Physical Print Buttons

Preset Parameter	Description
M&A only (no images)	Configures the system to send a DICOM structured report only; no image is generated or sent.

Table 3-19 Still Images

Preset Parameter	Description
Format	RawDICOM, DICOM, or M&A.
Compression	Always set to None.

Table 3-20 Cllips/Volumes

Preset Parameter	Description
Cllips: Add Multiframe Data	Checkbox

Preset Parameter	Description
Compression	None, RLE, JPEG
Quality	Lossless, 99, 98, 97, ... 50 Note: The default Compression for Clips is JPEG85. It is strongly recommended to keep the Compression set to JPEG85.
Volume File Format*	1 - Standard DICOM 2 - Standard DICOM with Raw Data 3 - Enhanced DICOM 2 & 3 (2 files)

Table 3-21 Active Images Page

Preset Parameter	Description
Standard Print	Lets you send to a Windows-based printer.

Removable Media

The Removable Media tab allows you to:

- Verify the DICOM directory on removable media.
- Verify the free space of the media.
- Verify that the media is finalized or unfinalized.
- Verify that the media is formatted or unformatted.

- Format removable media (rewritable CD/DVD or USB device).

Figure 3-24 Removable Media Preset Menu

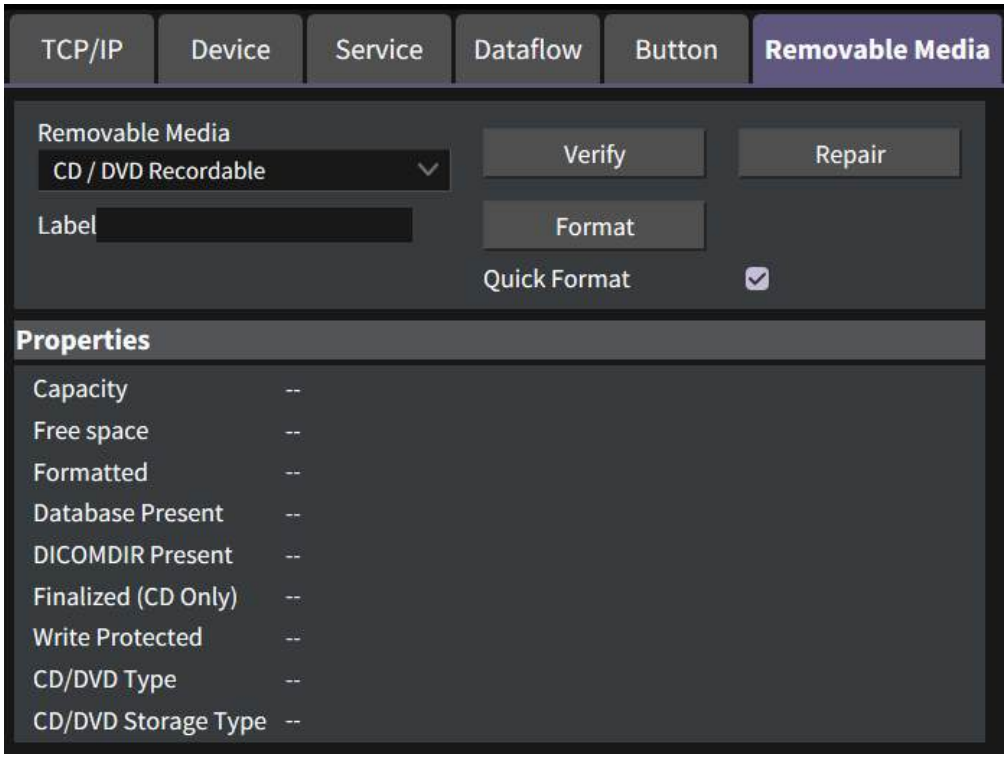


Table 3-22 Tools

Preset Parameter	Description
Removable Media	Select the removable media to format or verify.
Label	Type a label for a new removable media (free text).
Verify	• Select to verify DICOM directory on removable DICOM disk. • Verify the free space of the media. • Verify that the media is finalized or unfinalized. • Verify that the media is formatted or unformatted.
Repair	Select to repair external USB HDD not recognized issue.
Format	Select to format removable media.
Quick Format	To format the media quickly, check this box. If you uncheck this box, the media is formatted with a full format. New media should always be formatted with a full format.

The bottom of the screen lists properties of the selected media.

Formatting removable media

1. Select the removable media from the Media list.

2. Type a name for the removable media in the Label field.

   NOTE
   Do not use the following characters for labelling:

   \ / : ; . , * < > | + = [ ]
3. Select ***Format***. Confirm ***OK*** or ***Cancel***.
4. An information window confirms when the format has been completed. Select ***OK*** to exit.

Verifying removable media

1. Select the removable media from the Media list.
2. Select ***Verify***.

Miscellaneous

The Miscellaneous tab allows you to configure tools related to patient management and print and store options. You can specify default system functionality, such as whether patient ID is required when you archive data, or if you want the system to automatically search the archive for a patient when you enter patient data.

Figure 3-25 Miscellaneous Preset Menu

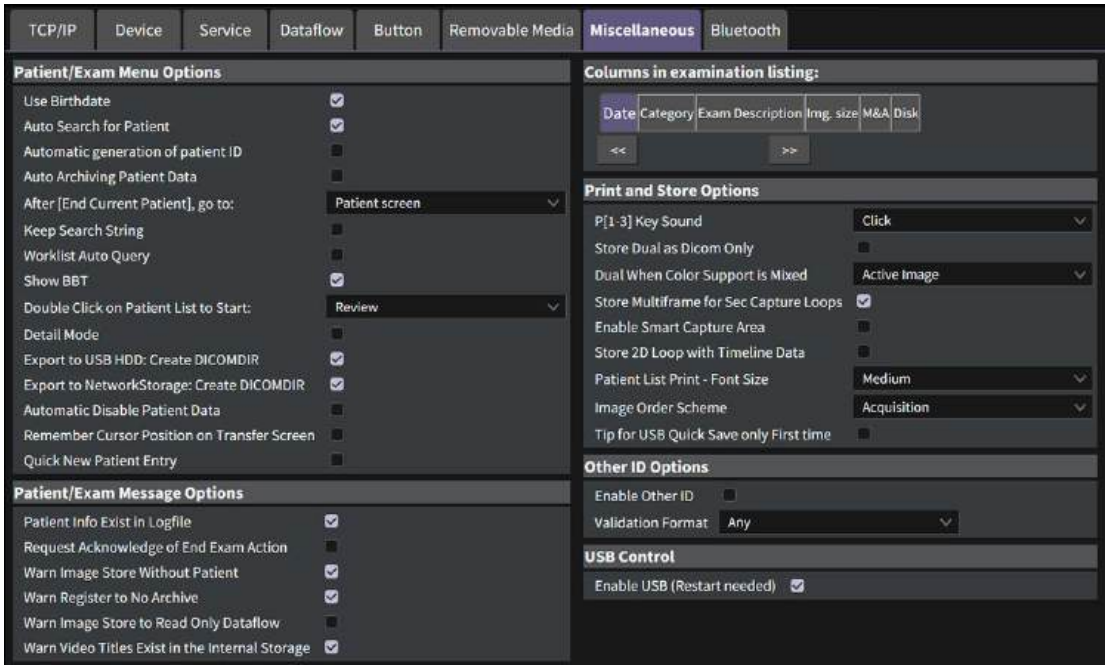


Table 3-23 Patient/Exam Menu Options

Preset Parameter	Description
Use birthdate	In the Patient information window, enter either the patient age or the birthdate:When selected, enter birth date, then the age is calculated.Whencleared, enter age (birth date field not available).
Auto search for patient	In the Search/Create Patient window: When selected, the system automatically searches through the selected patient archive, while the user enters patient information.When cleared, the automatic search tool is turned off. If you are trying to keep the past patient data confidential, DO NOT use this feature.
Automatic generation of patient ID	In the Search/Create Patient window: When selected, the Patient ID is notrequired when entering a new patient in the archive. The systemautomatically generates an ID number. When cleared, the Patient ID isrequired when entering a new patient in the archive.
Auto Archiving patient data	Archives patient data automatically.
After [End Current Patient], go to	Select go to Worklist screen or Patient screen when ending the current patient.
Keep Search String	Search string is kept rather than cleared.
Worklist Auto Query	Automatically queries the worklist server.
Show BBT	Show BBT field on the OB patient screen to input the basal body temperature.
Double click on patient list to start	Select Review or New Exam to display each time you double click on the patient name in the patient list on the Patient menu.
Detail Mode	Select to display Detail Mode, rather than Exam View, when you select the patient name in the patient list on the Patient menu. You can also type comments while in Detail Mode.
Export to USB HDD: Create DICOMDIR	Create DICOMDIR is a DICOM file format which contains how the directory and DICOM files structured for diagnostic portable media behave. It is important for portability between the ultrasound system to PACS. If you want to save exams to the USB Hard drive and look at it on the PACS, the DICOMDIR is a must.
Export to Network storage: Create DICOMDIR	
Automatic Disable Patient Data	Select to automatically disable patient data. If selected, locks the patient name, date of birth and gender (like Patient ID). The Factory Default for this preset is unchecked.
Remember Cursor Position on Transfer Screen	To set a default cursor location on the Data Transfer screen: Select the “Remember cursor position in the Transfer screen” preset and press Save. On the Data Transfer screen, move the cursor to the desired field. 1. Exit out of the Data Transfer screen. When returning to the Data Transfer screen, the cursor location is in the position your selected.

Preset Parameter	Description
Quick New Patient Entry	Select to store new patient automatically by pressing the Patient key.

Table 3-24 Patient/Exam Message Options

Preset Parameter	Description
Patient info exist in logfile	Check box to select.
Request acknowledge of End Exam action	When selected, the user is asked to confirm action when ending an examination.
Warn Image Store without Patient	Select to receive a warning when you press the Print key without an active patient.
Warn Register to No Archive	Select to receive a warning when you register a patient to the “No Archive” data flow. Select a different data flow for permanent storage of patient data.
Warn image store to Read Only dataflow	The system posts a warning message if you attempt to store images to a read-only Dataflow.
Warn video titles exist in the internal storage	The system posts a warning if the video titles exist on the internal DVR flash memory.

Table 3-25 Columns in examination listing:

Preset Parameter	Description
<< & >>	Select Date, Category, Exam Description, Img.size, M&A or Disk, then press << or >> to adjust the columns in exam list.

Table 3-26 Print and Store Options

Preset Parameter	Description
P[1-4] Key Sound	Select None, Click, Chimes, Ding, Ding-Dong, or Whoosh.
Store Dual as Dicom Only	Select to always store dual images as a DICOM (secondary capture) store, rather than Raw DICOM.
Dual When Color Support is Mixed	Dataflow Mixed is not available. While transferring dual images to the PACS, send black and white images as gray; send color images as color. Set up 2 services (one gray and one color), set up 2 dataflows, and set up 2 buttons. Each button needs to be tied to a different service. Select if you want to keep the user preset for Color Photometric Interpretation while in Dual mode.
Store Multiframe for Sec Capture Loops	Select if you want the CINE loop stored as secondary capture.
Enable Smart Capture Area	Check box to select.
Store 2D Loop with Timeline Data	Check box to select.

Preset Parameter	Description
Patient List Print-Font Size	Select font size.
Image Order Scheme	Select to Direct Store images in Acquisition Order, Scan Coach/Assistant Order, or Off. • Off. The clipboard on the Ultrasound system shows the image in the order it was acquired. Therefore, re-stored images appear where you'd expect. However, on the PACS system, images appear in arrival order or in image number order. • Acquisition. From the Ultrasound system perspective, the same as "Off." But on the PACS system (if based on image number order), images are displayed consistently with the way they are stored on the Ultrasound system. • Scan Assistant. You can define the storage order (reading order) via Scan Assistant Creator. Therefore, based on the order defined in Scan Assistant, images are re-ordered and displayed in this manner both on the Clipboard and on the PACS system.
Tip for USB Quick Save only First time	Check box to select.

Table 3-27 Other ID Options

Preset Parameter	Description
Enable Other ID	Not selected is the Default. If selected, allow entering Other ID, such as Citizen Service Number, Burger Service Number (BSN), National Health System (NHS) number, along with patient ID information on the Patient Screen.
Validation Format	If the Enable Other ID preset is selected, the system validates the format of "Other ID" when an ID is entered. Choose: NHS Number *** ** *****, Letters and Numbers, Numbers, or Any (no restriction)

Table 3-28 USB Control

Preset Parameter	Description
Enable USB (Restart needed)	Check box to select.

Bluetooth

To add a new bluetooth device,

1. Press ***Add New Device***.

2. Type the device name in the ***Name*** field.

Figure 3-26 Connectivity Bluetooth Preset Menu

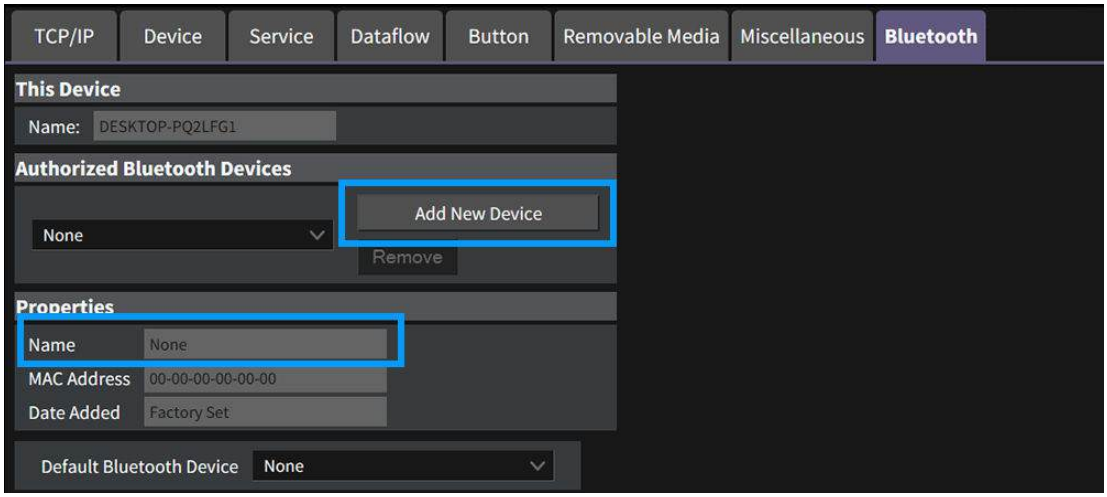


Table 3-29 Bluetooth

Preset Parameter	Description
Add New Device/Remove	Press Add new device to add a new device; press Remove to delete a device.
Properties: Name	Type the name of the device.
Properties: MAC Address	Unique network card address. *NOTE: Only available for MyComputer.*
Properties: Date Added	Display the new device added date.
Default Bluetooth Device	Select the default bluetooth device or None.

System Configuration

Purpose of this section

This section describes how to configure the ultrasound system.

The Ultrasound System configuration

For complete instructions, refer to the latest revision of this ultrasound system's User Manual, Chapter 3.

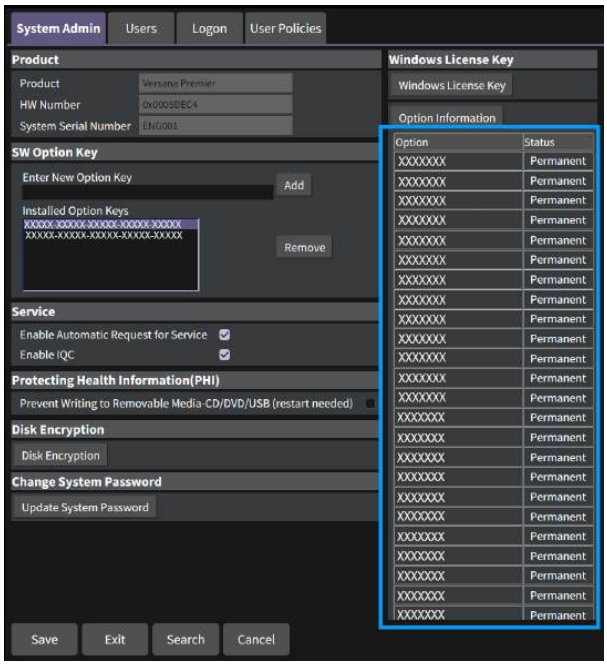
Information includes Entering Location, Adjusting Date and Time, Selecting User interface Language, Selecting Online Manual Language, Selecting Unites of Measure.

User Configurable Key

When the system is received, please check the software option installed on the system.

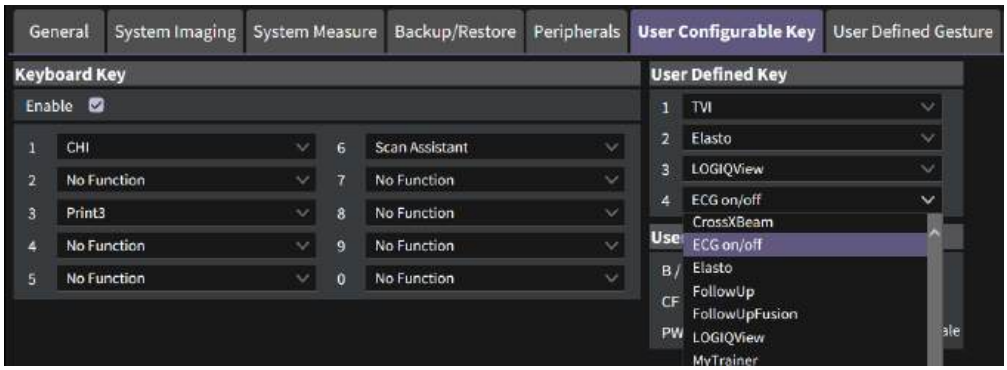
- Power on the system.
- Enter ***Utility*** > ***Admin*** > ***System Admin*** > ***Option Information*** to check the option status.

Figure 3-27 Check SW Option Status



To configure the user configurable key, enter ***Utility*** > ***System*** > ***User Configurable Key*** and assign the user configurable key.

Figure 3-28 Assign User Configurable Key



Peripherals Installation

This section describes how to install and configure the peripherals validated for the ultrasound system.

About the operation check-out of peripherals, see *Operator Panel Test* on page 188 for more information.

Table 3-30 Peripherals

Description	Control	Model
B/W USB Printer	USB port	Sony UP-D898MD Printer
USB Printer	USB port	Sony UP-D898DC Printer
Color USB Printer	USB port	Sony UP-D25MD Printer
3-Pedal Footswitch	USB port	Footswitch MKF 2-MED USB GP26
1-Pedal Footswitch	USB port	Whanam FSU-1000
USB Stick	USB port	USB stick
USB HDD	USB port	1TB mobile USB HDD
ECG	ECG Port	USB ECG Module
Wireless Adaptor	USB port	Wireless Adaptor
Bluetooth Adaptor	USB port	Bluetooth Adaptor
DVD RW	USB port	DVDRW kit with SW
USB Isolator	USB port	NA

Furnished materials

This section describes the materials 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 3-31 Materials furnished with B/W Printer

Item	Description	Quantity	Note
1	Sony UP-D898DC Printer	1	
2	Sony UP-D898MD Printer	1	
3	Paper Roll	1	
4	USB cable	1	

- Color USB Printer

Table 3-32 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	

- Printer Shelf
  Table 3-33 Materials furnished with the Printer Shelf

Item	Description	Quantity	Note
1	898DC/MD Printer Shelf	1	

- Printer USB Isolator
  Table 3-34 Materials furnished with the printer USB Isolator

Item	Description	Quantity	Note
1	Printer USB Isolator	1	

- USB Stick
  Table 3-35 Materials furnished with USB Stick

Item	Description	Quantity	Note
1	USB Stick	1	

- USB HDD
  Table 3-36 Materials furnished with the USB HDD

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

- Wireless Adaptor
  Table 3-37 Materials furnished with the Wireless Adaptor

Item	Description	Quantity	Note
1	1 Wireless Adaptor	1	

- Bluetooth Adaptor
  Table 3-38 Materials furnished with the Bluetooth Adaptor

Item	Description	Quantity	Note
1	1 Bluetooth Adaptor	1	

- Footswitch
  Table 3-39 Materials furnished with the Footswitch

Item	Description	Quantity	Note
1	1 Pedal Footswitch	1	
2	3 Pedal Footswitch	1	

- DVD RW
  Table 3-40 Materials furnished with the DVD RW

Item	Description	Quantity	Note
1	DVD RW	1	
2	USB cable	1	

Peripherals Installation Instruction

Sony UP-D898MD Printer Installation

Tools

Common Phillips screwdrivers

Manpower

One person 20 minutes + travel.

Preparations

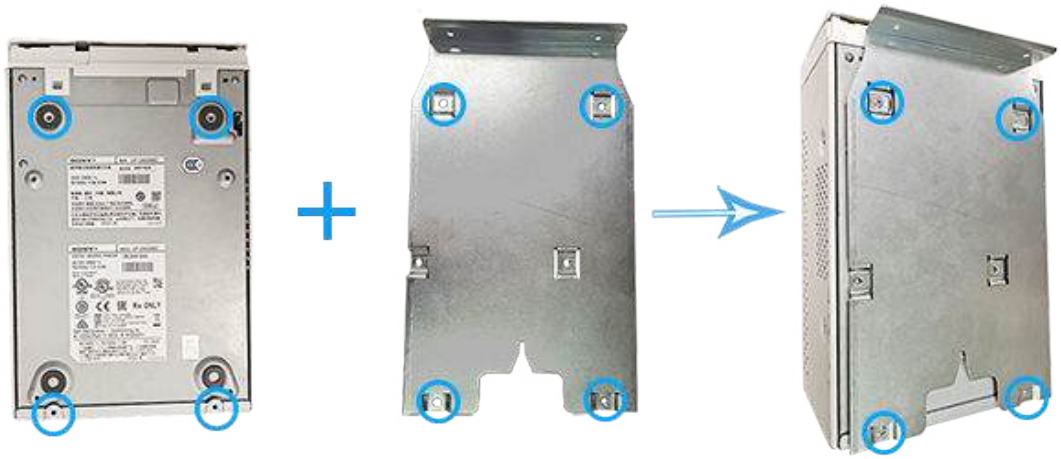
1. Unpack B/W Printer.
2. Ensure no physical damage.
3. Shut down the system and disconnect the power cord.

Installation Procedure

NOTE
The printer driver is customized for the ultrasound system at the factory, you do not need to change the settings.

1. Put the AC printer shelf on the bottom of the printer, and then screw 4 screws to fix the printer shelf.

Figure 3-29 Install printer to printer shelf

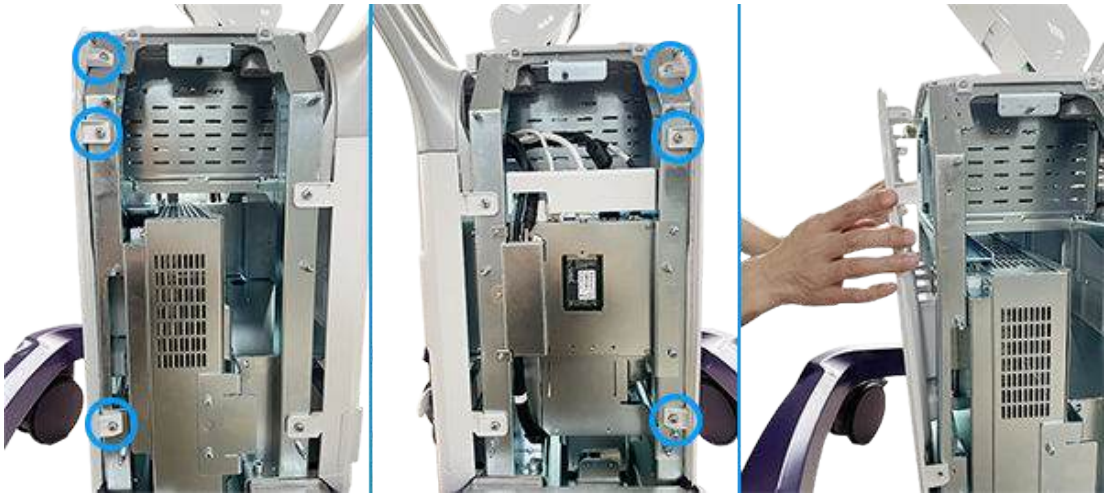


2. Remove the body left and right cover.

Figure 3-30 Remove body left and right cover

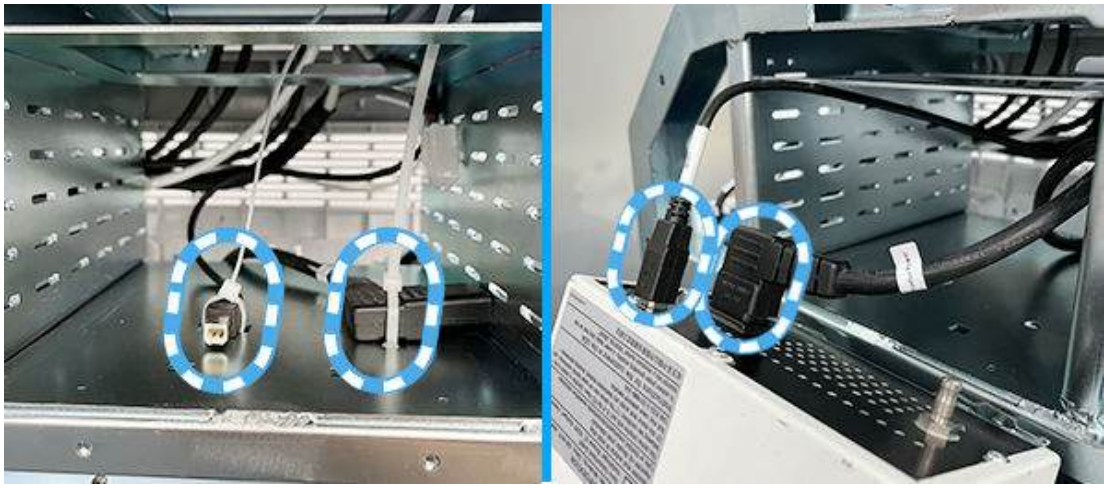
3. Unscrew 6 screws and remove the body front cover.

Figure 3-31 Remove the body front cover



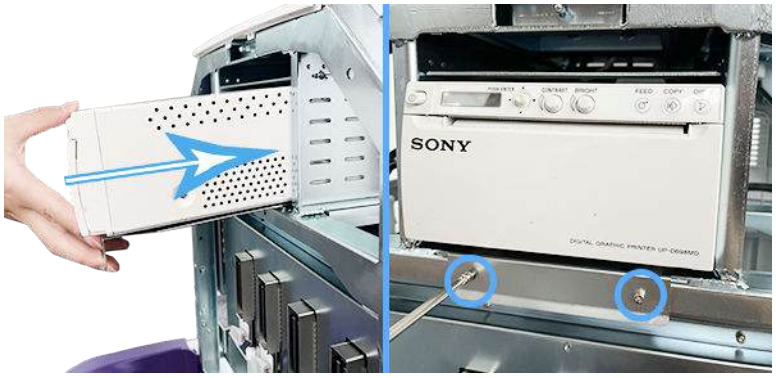
4. Cut the 2 cable clips, then connect the USB cable connector and the AC power cable connector.

Figure 3-32 Connectors for 898MD printer



5. Insert the printer to the system and screw 2 screws to fix the drawer on the system.

Figure 3-33 For 898MD printer

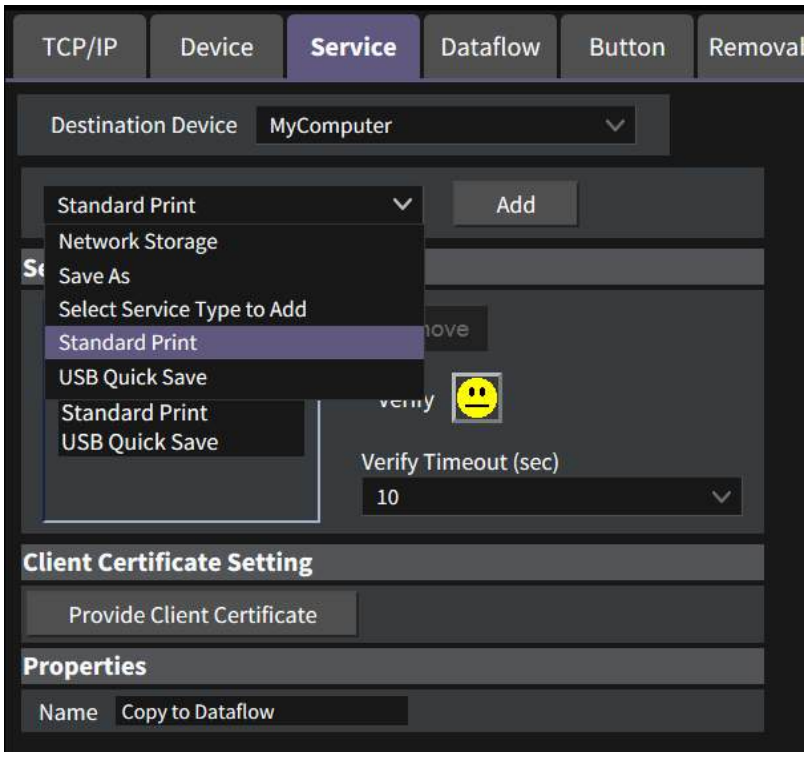


6. Remove the printer cover from body front cover.

Figure 3-34 Remove the printer cover

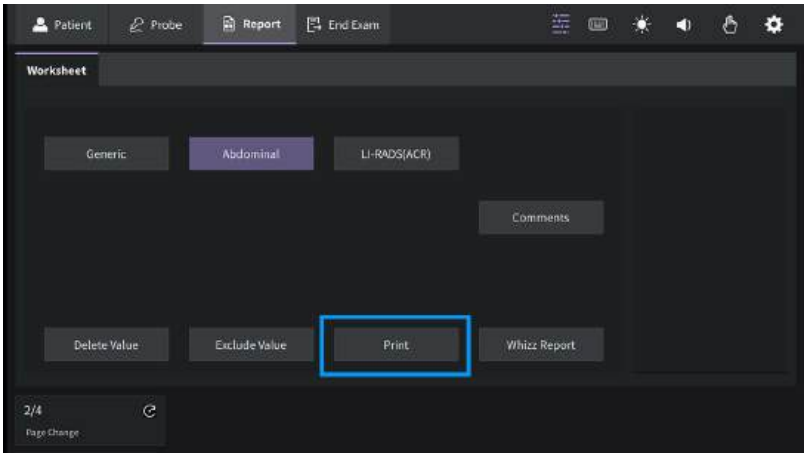
7. Install the body covers in the reverse order of removal.
8. Power on the system.
9. Press ***Utility*** on the Touch Panel.
10. Select ***Connectivity*** > ***Service***, add ***Standard Print***.

Figure 3-35 Service Tab



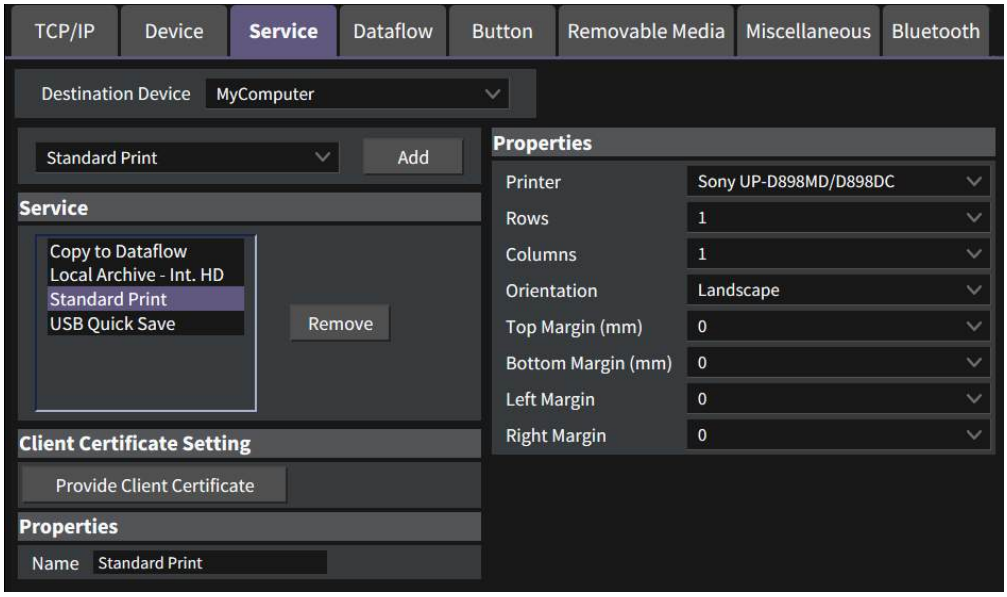
NOTE
The print key configured in this step also can be used as ***Print*** key in ***Worksheet***.

Figure 3-36 Print Key in Worksheet



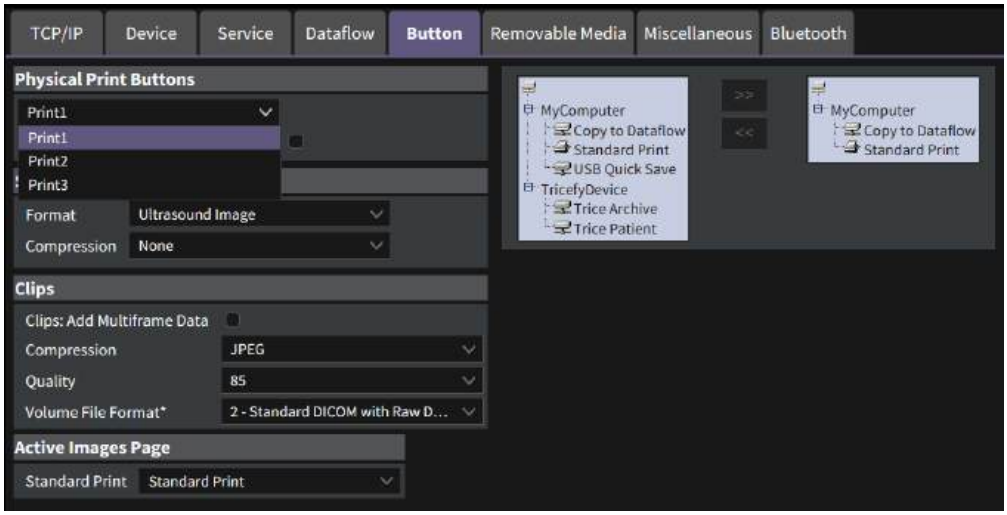
11. Highlight ***Standard Print*** in the Service list. Select the printer from the Printer pull-down Properties menu. Type the printer name in the Name Field. This name is used on the Button screen. Press ***Save***.

Figure 3-37 Select the Printer



12. Select ***Button***. Select the appropriate print key (Print1, Print2...) from the ***Physical Print Buttons*** selection. Select the printer from ***MyComputer*** column and press **>>** to move it to the Printflow View column. Press***Save***.

Figure 3-38 Select Button Tab

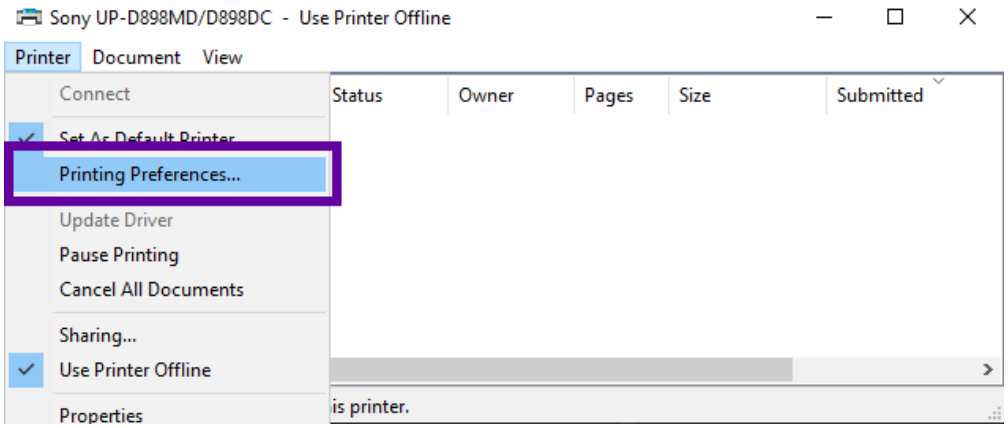


Set Printer Paper Size

Follow these steps to set up the paper size of the printer, take Sony UP-D898MD/D898DC as an example.

- Press ***Utility*** > ***System*** > ***Peripherals***. Select the ***UP-D898MD/D898DC*** from the pull-down menu under ***Standard Printer Properties***. Then Click ***Properties***.
- Click ***Printer*** > ***Printing Preferences***... at the menu of Properties Window.

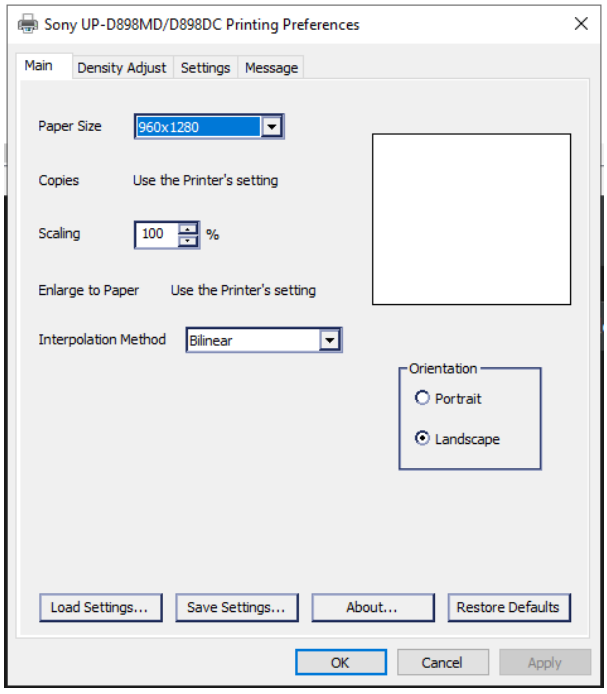
Figure 3-39 Printing Preferences...



- Select Paper Size. Press ***Apply***. Press ***OK***

Figure 3-40 Printing Preferences

Figure 3-40 Printer Paper Size



.

- Press ***Save***, then ***Exit***.

Printer Brightness Adjustment

Follow these steps to adjust the printer brightness, take Sony UP-D898MD as example.

Adjust by “BRIGHT” button on printer.

Figure 3-42 Printer Brightness adjustment

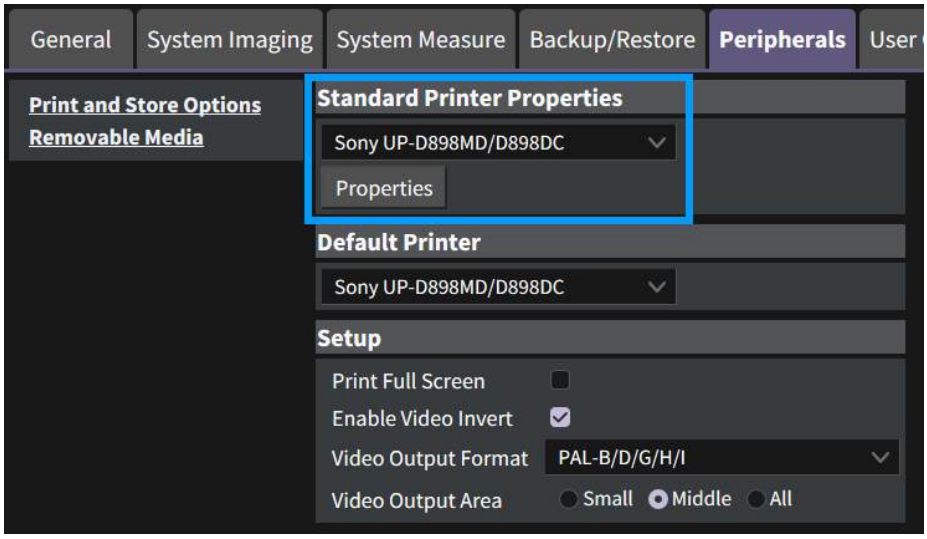
Adjust printer brightness by Printer Properties on the ultrasound system's user interface. Take Sony UP-D898MD/D898DC as example.

NOTE

For some commercial printers, user might not find brightness adjustment option from system user interface setting menu. It depends on the commercial printer driver itself. Please find brightness adjustment option on commercial printer’s own physical setting menu.

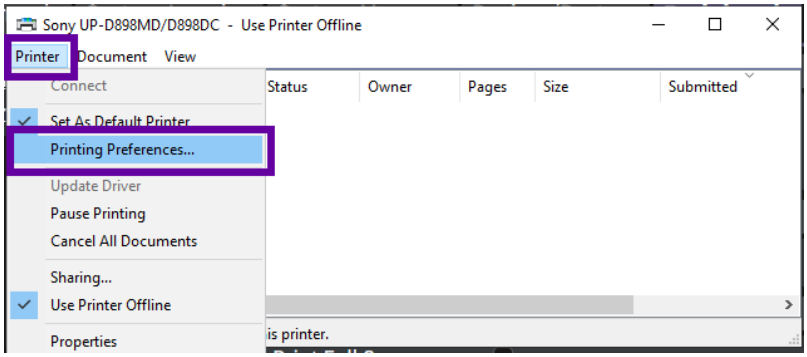
1. Set printer properties by ***UtilitySystem (on touch panel)Peripherals***. Select ***Sony UP-D898MD/D898DC*** from Standard Printer Properties list, and then press ***Properties***.

Figure 3-43 Properties



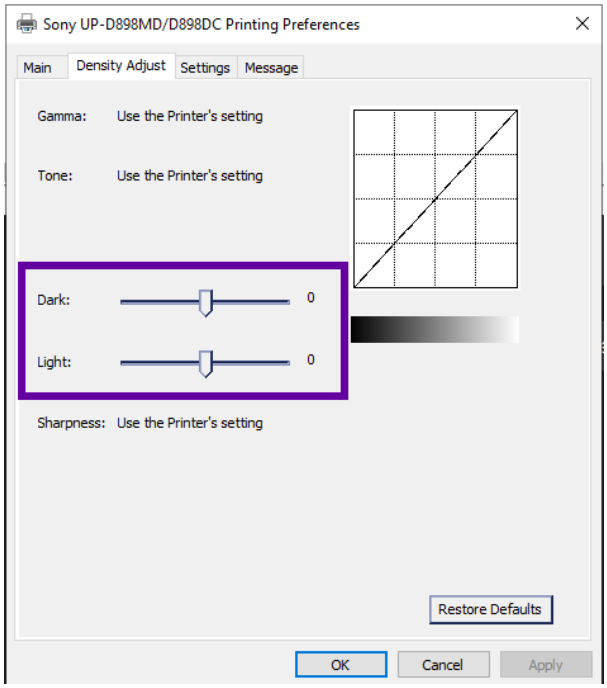
2. Select ***Printer*** > ***Printing Preferences*** to enter Printing Preferences setting.

Figure 3-44 Enter Printing Preferences



3. Select ***Density Adjust*** to adjust the brightness to the desired value. Then press ***OK*** to save.

Figure 3-45 Density Adjust



Sony UP-D898DC Printer Installation

Tools

Common Phillips screwdrivers

Manpower

One person 20 minutes + travel.

Preparations

1. Unpack B/W Printer.
2. Ensure no physical damage.
3. Shut down the system and disconnect the power cord.

Installation Procedure

NOTE
The printer driver is customized for the ultrasound system at the factory, you do not need to change the settings.

1. Put the DC printer shelf on the bottom of the printer, and then screw 4 screws to fix the printer shelf.

Figure 3-46 Install printer to printer shelf

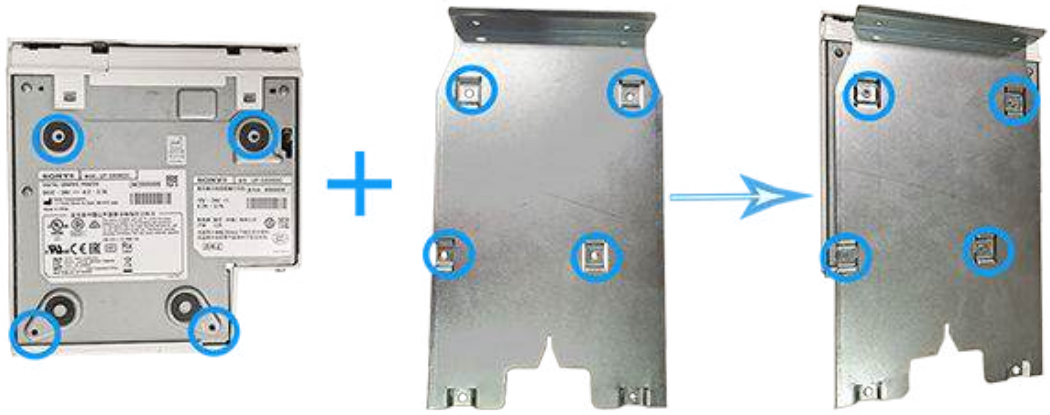
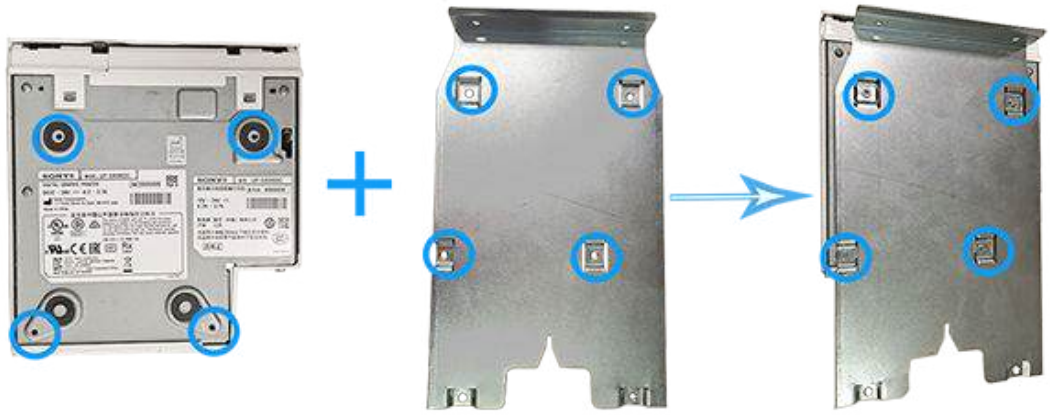


Figure 3-47 Install printer to printer shelf



2. Connect DC power cable connector and turn the ring until it is locked.

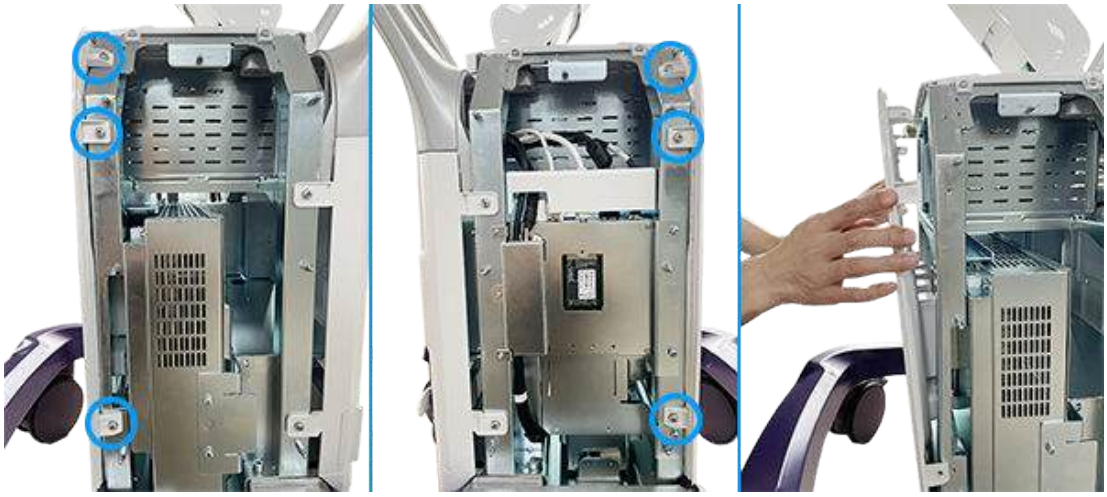
Figure 3-48 Connect printer power cable for 898DC

3. Remove the body left and right cover.

Figure 3-49 Remove body left and right cover

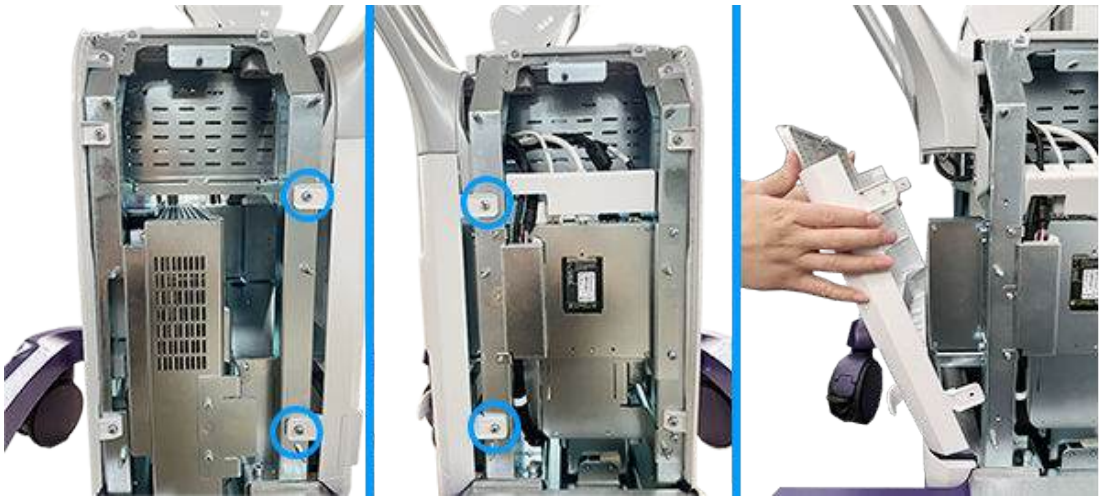
4. Unscrew 6 screws and remove the body front cover.

Figure 3-50 Remove the body front cover



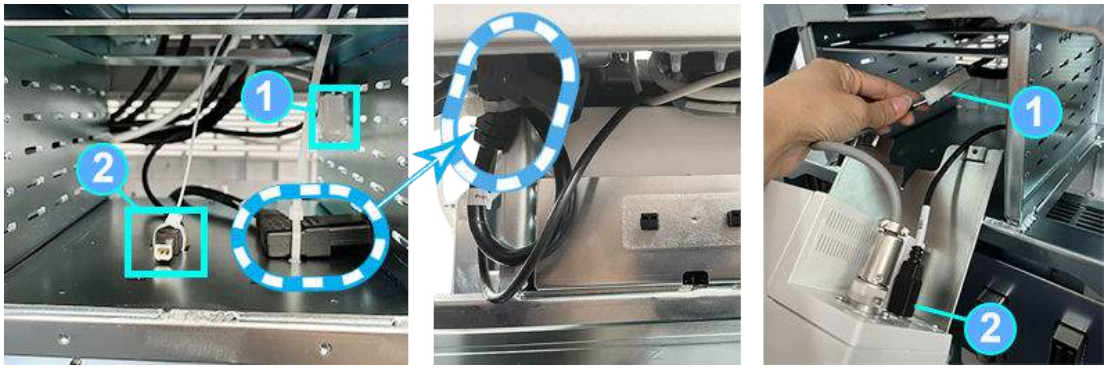
5. Unscrew 4 screws and remove the body back cover.

Figure 3-51 Remove the body back cover



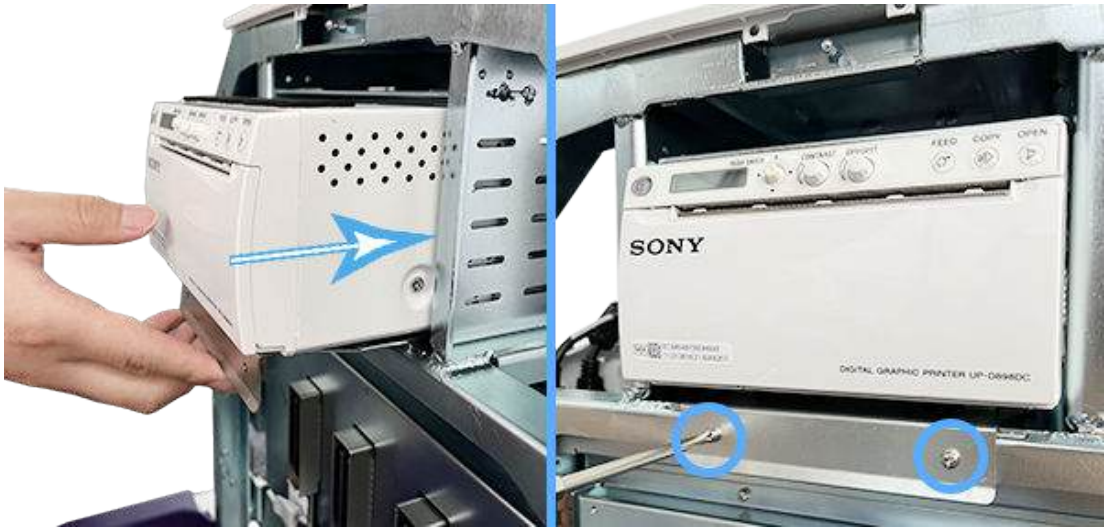
6. Cut the 2 cable clips. Then connect the connector of DC printer power extension cable and use a cable clip to tie the AC cable on the back of the system.

Figure 3-52 Connectors for 898DC printer



7. Insert the printer to the system and screw 2 screws to fix the drawer on the system.

Figure 3-53 For 898DC printer



8. Remove the printer cover from body front cover.

Figure 3-54 Remove the printer cover

9. Install the body covers in the reverse order of removal.

10. Complete the connectivity configuration refer to steps of *Sony UP-D898MD Printer Installation* on page 97.

Sony UP-D25MD Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the Sony UP-D25MD Printer.
2. Ensure no physical damage.

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, and then turn on the printer.
4. Connect USB cable to the ultrasound system isolated USB port.

Figure 3-55 Color Printer connection

5. Refer to the Connectivity configure steps of *Sony UP-D898MD Printer Installation* on page 97.

HP Universal Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

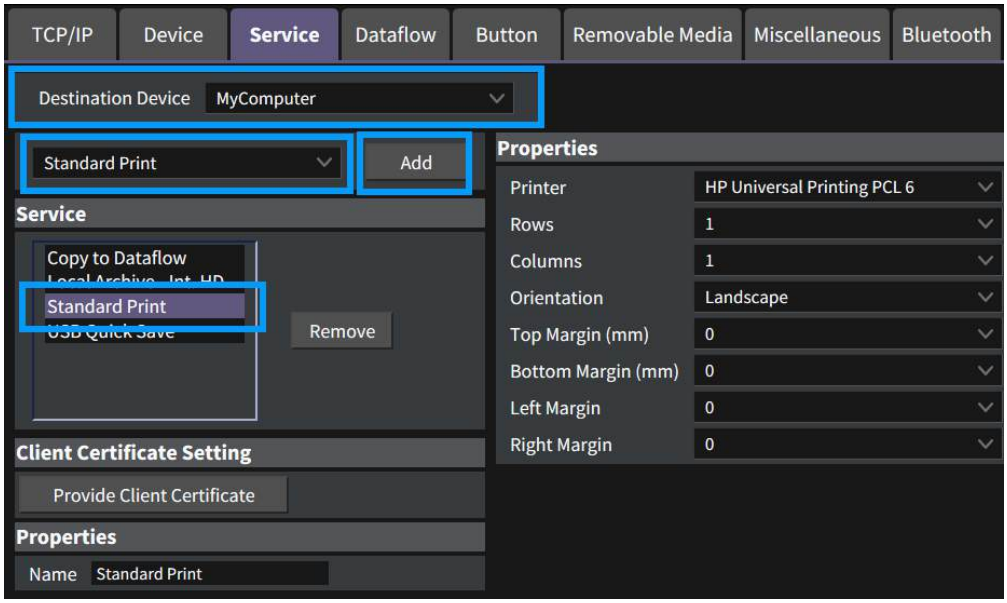
Preparations

Prepare the network connection.

Installation Procedure

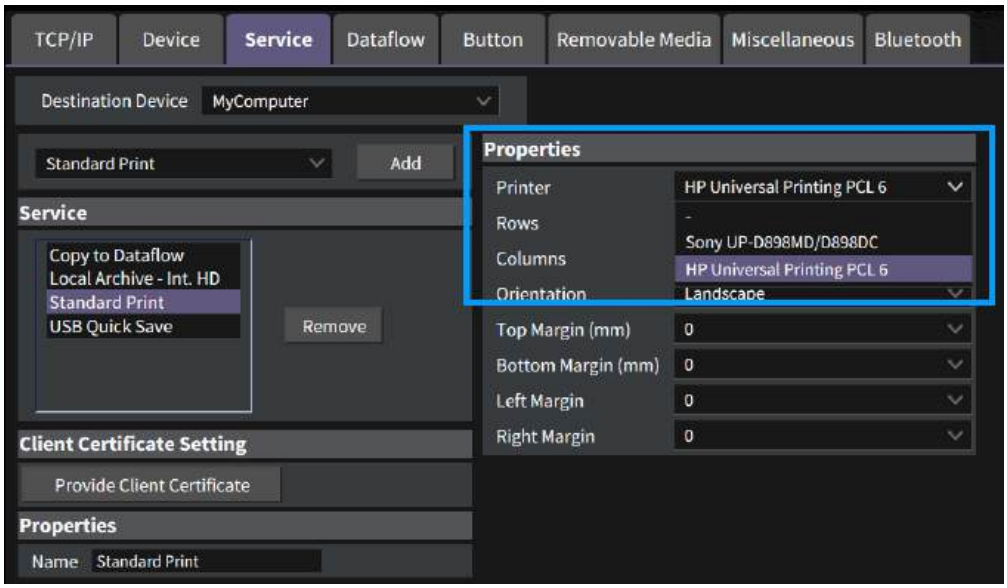
1. Press ***Utility*** > ***Connectivity*** > ***Service***. Select ***MyComputer*** as Destination Device. And Select ***Standard Print*** under Service box by default or Select Standard Print from drop-down menu and click ***Add***.

Figure 3-56 HP Universal Printer Installation 1



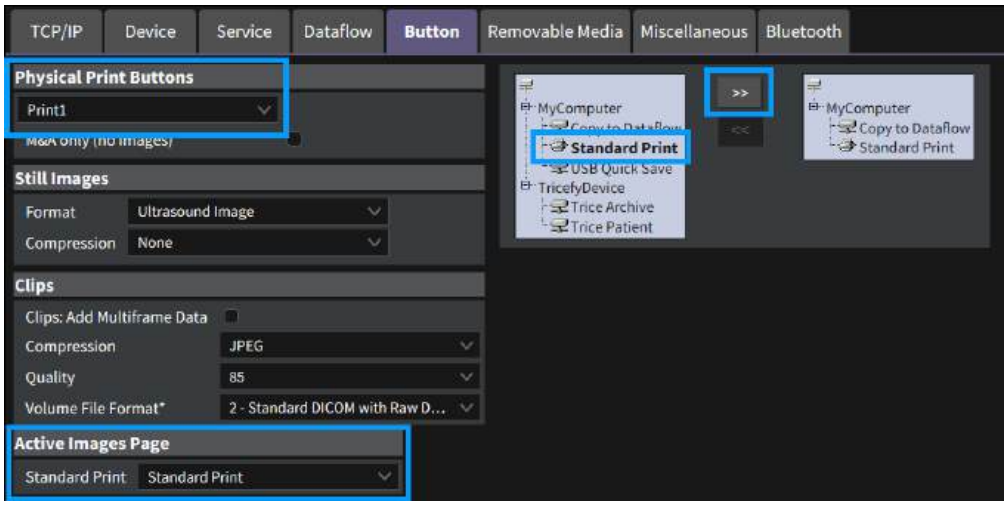
2. Select ***HP Universal Printing PCL 6*** in the ***Properties*** category.

Figure 3-57 HP Universal Printer Installation 2



3. Select ***Button***. Select the appropriate print key (Print1, Print2 or Print3) from the ***Physical Print Buttons*** selection. Select Standard Printer from ***MyComputer*** column and press >> to move it to the ***Printflow View*** column.

Figure 3-58 HP Universal Printer Installation 3

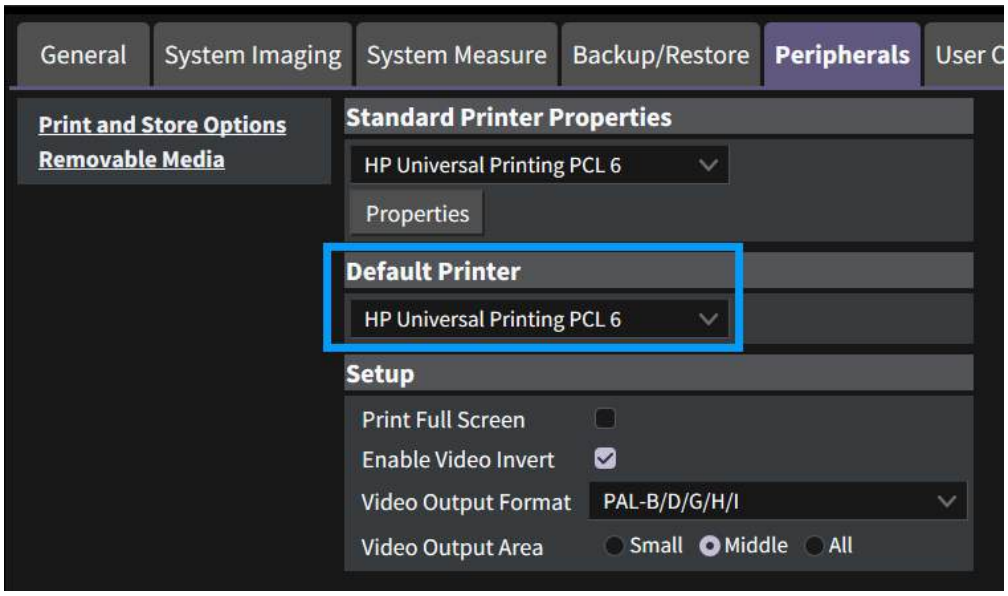


Click to assign Standard Print in the Active Images Page category. Press***Save***.

4. Press ***Utility*** > ***System*** > ***Peripherals***. Select ***HP Universal Printing PCL 6*** as the default printer.

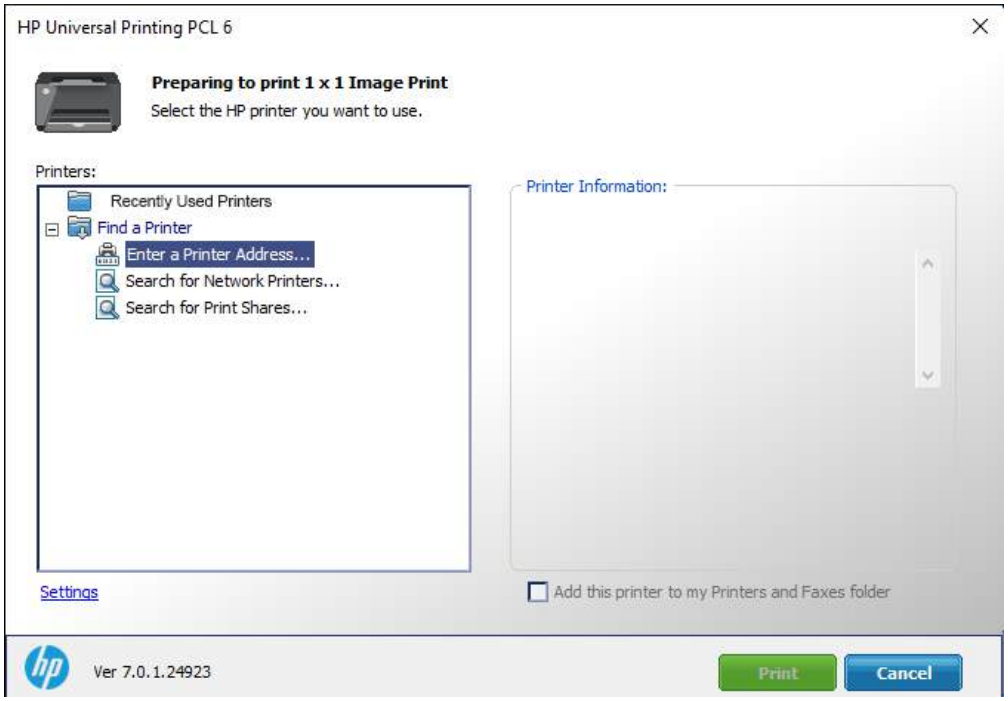
Press ***Save*** and exit Ultility page.

Figure 3-59 HP Universal Printer Installation 4



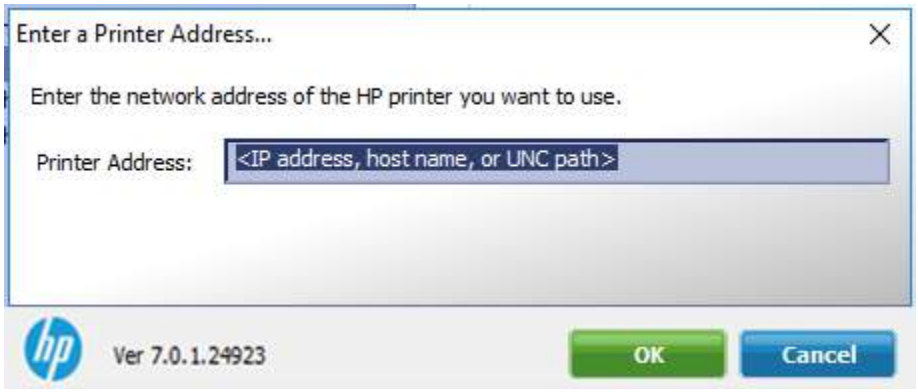
5. The first time the print button configured is pressed, a HP Universal Printing PCL 6 menu pops up. Select "***Enter a Printer Address...***".

Figure 3-60 Enter a Printer Address...



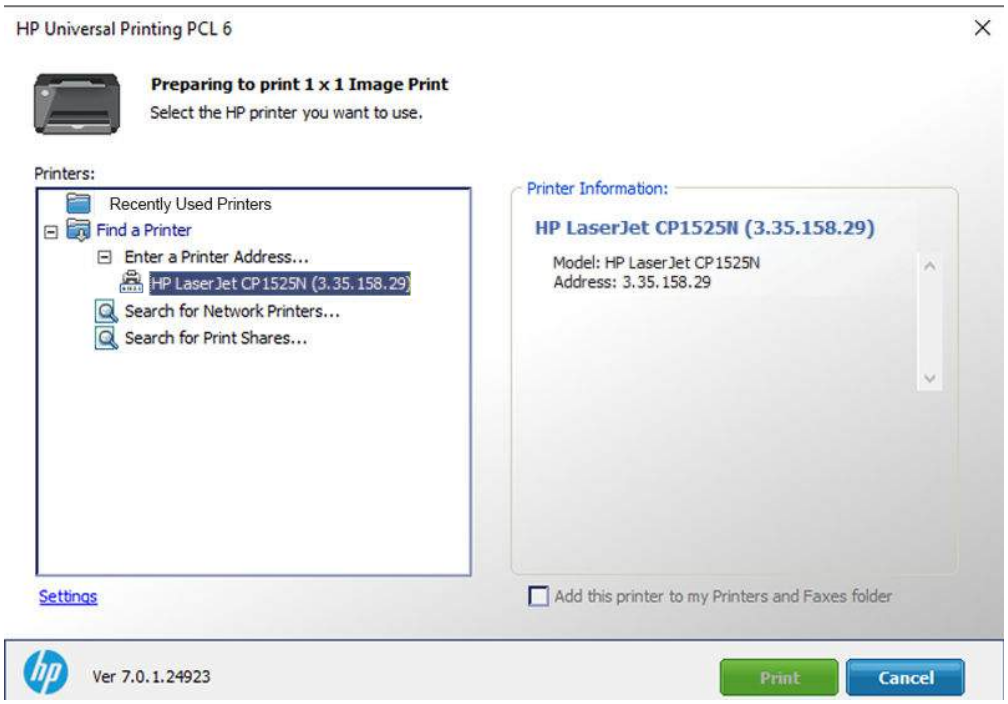
6. A window will pop out. Input a printer address and select ***OK***.

Figure 3-61 Input Printer Address



7. A confirmation will be displayed when the printer address is accepted.

Figure 3-62 Confirmation



Footswitch Installation

Tools

No special tools needed.

Manpower

One person 2 min.

Preparations

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

Installation Procedure

Connect the Footswitch to the USB port on the ultrasound system.

Figure 3-63 Connect Footswitch to the system 1

Figure 3-64 Connect Footswitch to the system2

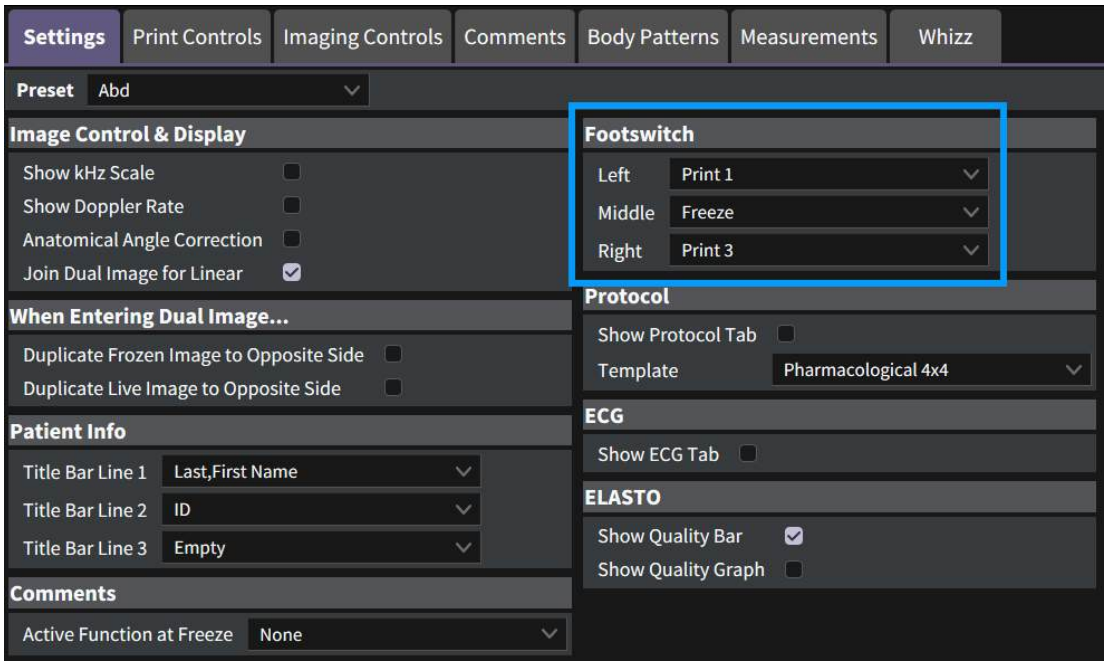
Configuring Footswitch

Footswitch supports these configurations: No Function, Freeze, Next Heartcycle, Prev Heartcycle, Print, Update, Next Step (Scan Coach), Previous Step (Scan Coach), Scan Assistant Pause/Resume.

Enter ***Utility*** > ***Application*** > ***Settings*** to configure the Footswitch functions.

NOTE
For single footswitch, please set in ***Middle*** tab.

Figure 3-65 Configuring Footswitch Functions



USB HDD Installation

Tools

No special tools needed.

Manpower

One person 2 min.

Preparations

1. Unpack the USB HDD.
2. Ensure no physical damage.

Installation Procedure

1. Connect the USB HDD to the USB port on the ultrasound system.

Figure 3-66 Connect HDD to the system

2. USB HDD is ready to use.

External ECG Installation

Tools

No special tools needed.

Manpower

One person 8 minutes + travel.

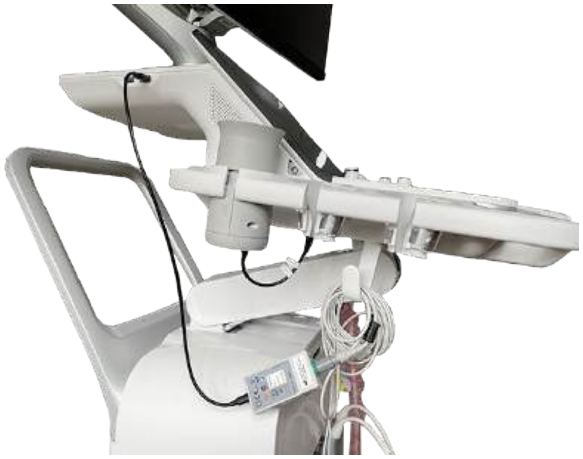
Preparations

1. Unpack the ECG Assy.
2. Ensure no physical damage.

Installation Procedure

1. Insert the ECG USB connector into the USB port.

Figure 3-67 Connecting ECG to the system



CAUTION
Install ECG Hardware Option before connecting the ECG trunk cable to the system.

NOTE
The conductive parts of the electrodes used in the applied part and their connectors (including neutral electrodes) should not touch any other conductive parts, including the earth.

2. Restart the system after ECG module is connected.

DVDRW Installation

Tools

Common Phillips screwdrivers

Manpower

One person 5 min.

Preparations

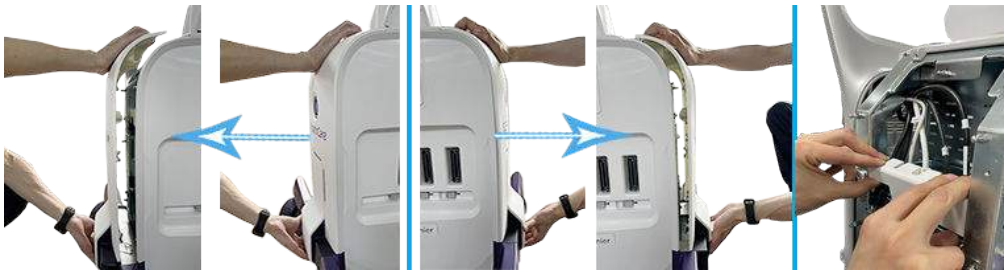
1. Unpack the DVDRW.
2. Ensure no physical damage.

Installation Procedure

1. Take out the DVDRW assy.

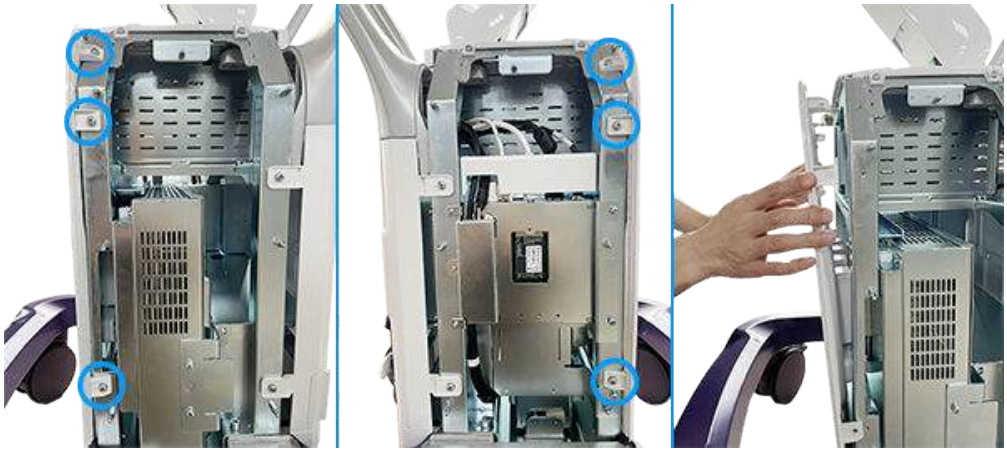
2. Remove the body right and left cover from the system and remove the cable retainer.

Figure 3-68 Remove the body right and left cover



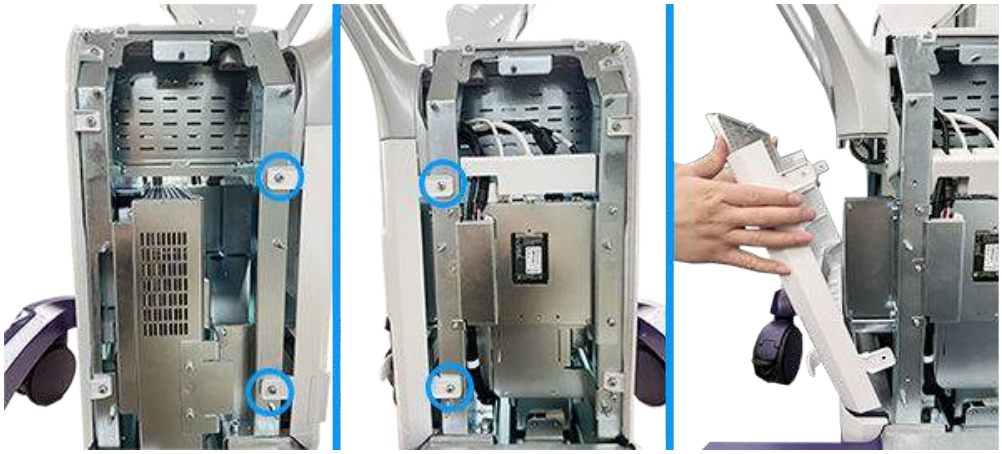
3. Unscrew 6 screws and remove the body front cover.

Figure 3-69 Remove the body front cover



4. Unscrew 4 screws and remove the body back cover.

Figure 3-70 Remove the body back cover



5. Insert the USB Y cable from the back side of the body to the DVD shelf, and insert the 2 USB connectors to the docking.

Figure 3-71 Install the cable to the system

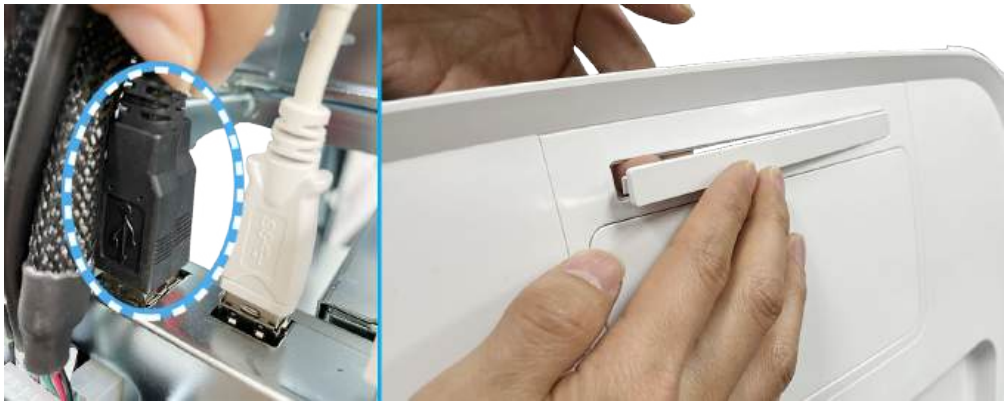
6. Connect the connector to the DVDRW and insert to the DVD shelf on the system.

Figure 3-72 Install the DVDRW to the system

7. Connect the 2 connectors on USB Y cable to the docking and remove the DVD cover on the body front cover.

NOTE
Be sure the two connectors on the USB Y cable are connected to the system at the same time.

Figure 3-73 Connect the USB Y cable



8. Install the body covers in the reverse order of removal.

Wireless Adapter

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the wireless adapter
2. Ensure no physical damage.

Installation Procedure

1. Connect the wireless adapter to the USB port on the ultrasound system.

Figure 3-74 Connect Wireless Adapter

2. Refer to the Wireless Network configure steps of *Wireless-LAN Network* on page 244.

Bluetooth Adapter

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the bluetooth adaptor
2. Ensure no physical damage.

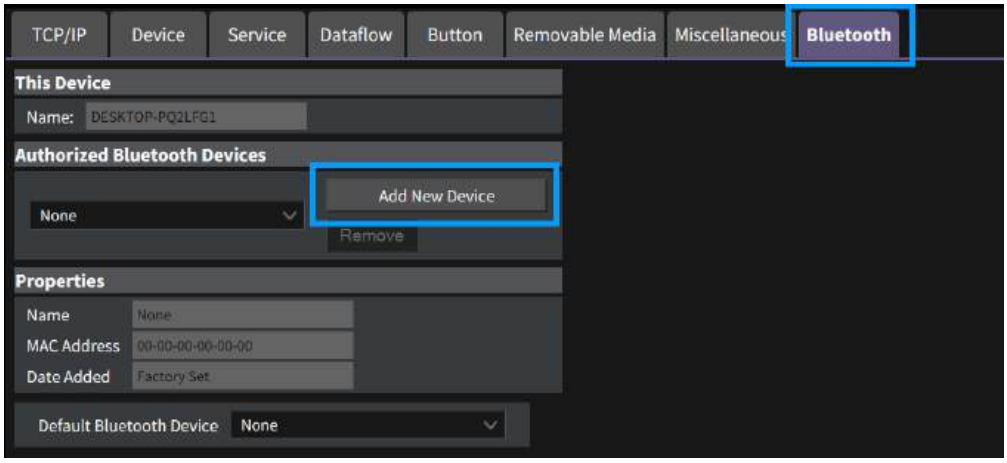
Installation Procedure

1. Connect the Bluetooth Adapter to the USB port on the ultrasound system.

Figure 3-75 Connect Bluetooth Adapter

2. Reboot the system.
3. After the power-up sequence is complete, press ***Utility*** on the Control Panel. Select ***Connectivity*** > ***Bluetooth***, click ***Add New Device***.

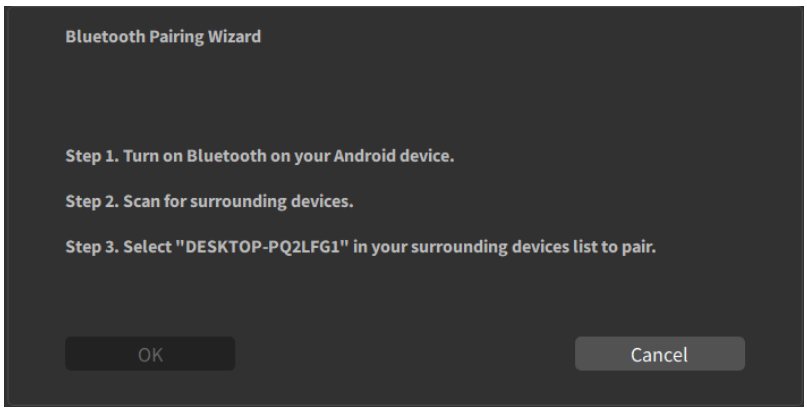
Figure 3-76 Add New Device



NOTE
For Bluetooth Adapter connection, the operator must login as Administrator.

4. Follow the Bluetooth pairing wizard to turn on Bluetooth on your mobile device. Scan for surrounding devices. Then select the device name of the ultrasound system in your surrounding device list to pair.

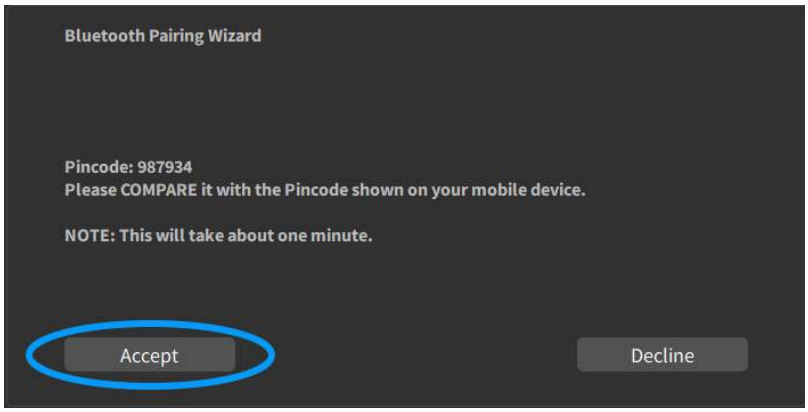
Figure 3-77 Bluetooth Pairing Wizard 1



NOTE
The ultrasound system does not support to pair with Apple device.

5. The Pincode is shown in the dialogue, click ***Accept*** to continue.

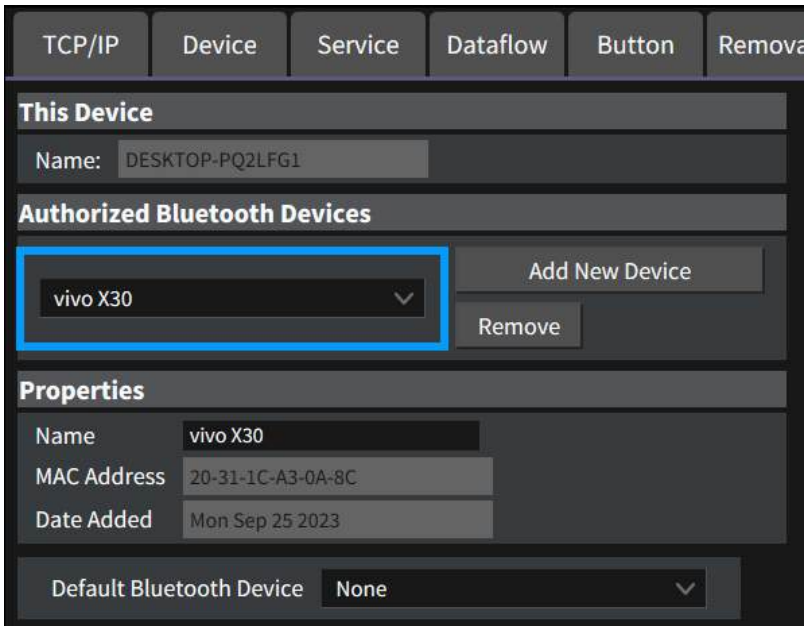
Figure 3-78 Bluetooth Pairing Wizard 2



6. On your mobile device a dialogue box should appear asking for permission to connect to the ultrasound system. Click ***PAIR*** and wait for the process to complete.

7. After pairing is done, the mobile device name appears in the ***Authorized Bluetooth Devices*** field.

Figure 3-79 Connected Successfully



Printer USB Isolator

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the AC isolation USB.
2. Ensure no physical damage.

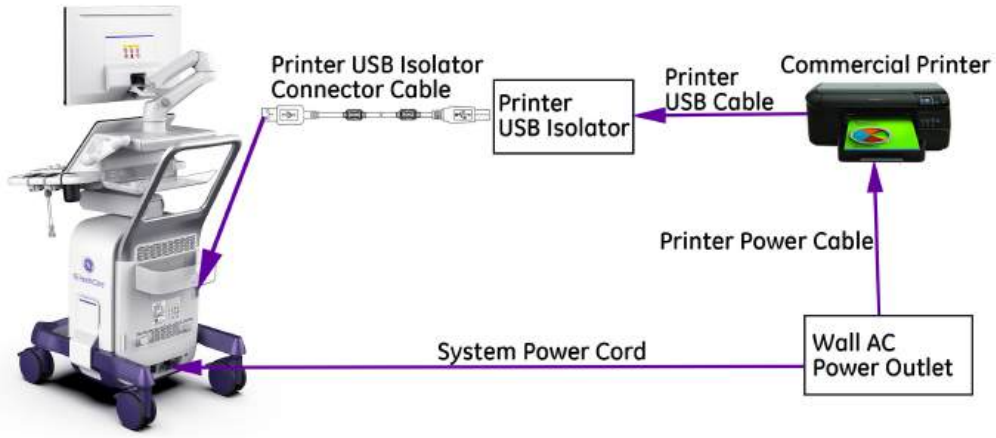
Installation Procedure

1. Insert the Mini USB side of the cable into the Printer USB Isolator.

Figure 3-80 Insert the USB connector into Printer USB Isolator

2. Insert the USB cable connector in one of the USB ports on the Ultrasound system.

Figure 3-81 Insert the USB cable into the Ultrasound system



NOTE
The Ultrasound system in above graphic is only for illustrational purposes. You can use the Printer USB Isolator on the desired Ultrasound system.

NOTE
For a detailed Printer USB Isolator overview of Versana Premier/Versana Premier Lotus system, refer to Proprietary Service Manual.

HDMI Extension Cable with Ferrite Core

Tools Needed for the Installation

No need.

Manpower

3 minutes, plus travel time.

Preparations

1. Unpack the Rear HDMI extension cable with ferrite cord.
2. Ensure no physical damage.

Install the HDMI Extension Cable with Ferrite Core

1. Unpack and take out the HDMI Extension Cable with Ferrite Core from the package.

Figure 3-82 HDMI Extension Cable with Ferrite Core

a. Male plug of the HDMI Extension Cable with Ferrite Core.
b. Female socket of the HDMI Extension Cable with Ferrite Core.

2. Insert the male plug of the HDMI Extension Cable with Ferrite Core into the rear HDMI port on the system.

3. Connect HDMI cable of external device to the female socket of the HDMI Extension Cable with Ferrite Core.

Figure 3-83 Install the HDMI Extension Cable with Ferrite Core on the system

Option Setup

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.

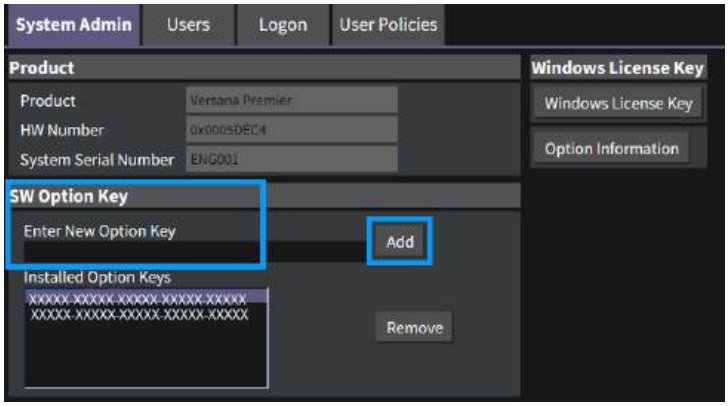
   NOTE
   Keep the power cord connection during the installation.

2. After the power-up sequence is complete, press Utility on the control panel, and then select ***Admin*** > ***System Admin***.

WARNING
For software Option Installation, the operator must login as Administrator.

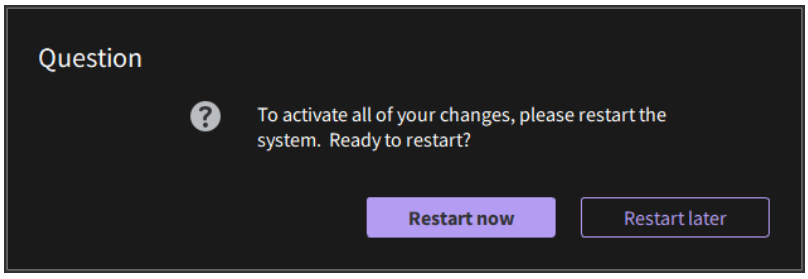
3. Enter the new SW Option Key and then select ***Add***.

Figure 3-84 New Option Key



4. To activate the changes, press ***Restart now*** to restart the system.

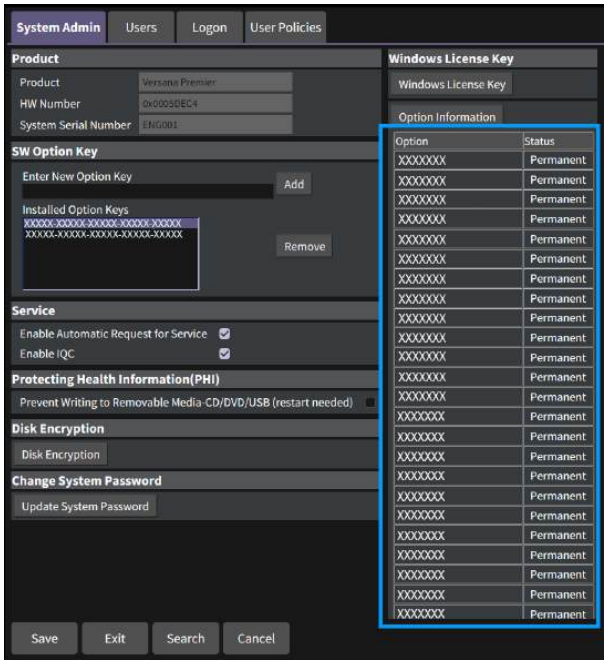
Figure 3-85 Dialog Window



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

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

Figure 3-86 Check Option Status



The option status explanation:

- Permanent: This option is enabled in the system.
- Disabled: This option is disabled in the system.

6. Configure the user define key in utility. On the screen, the user defined key name will be displayed.

Figure 3-87 User define key display on the screen

7. This completes the option installation of the ultrasound system.

NOTE
Installing corresponding hardware is a prerequisite of loading software option successfully. Please check below table for correspondence.

Table 3-41 Software Corresponding Hardware

Software Option	Hardware
4PP	4PP Front Cover Assy
DVDROM	DVD Writer Kit
3D_4D	4D Box Assy

After the setup completed, please backup the configuration. See *Backup and Restore Database, Preset Configurations and Images* on page 148 for more information.

Pasting Vet Caution Labels

Vet Caution Label can help users to identify use scenarios for the probe. Follow below steps to paste vet caution label to the probe as needed.

1. Fold the caution label in half together with the release paper.

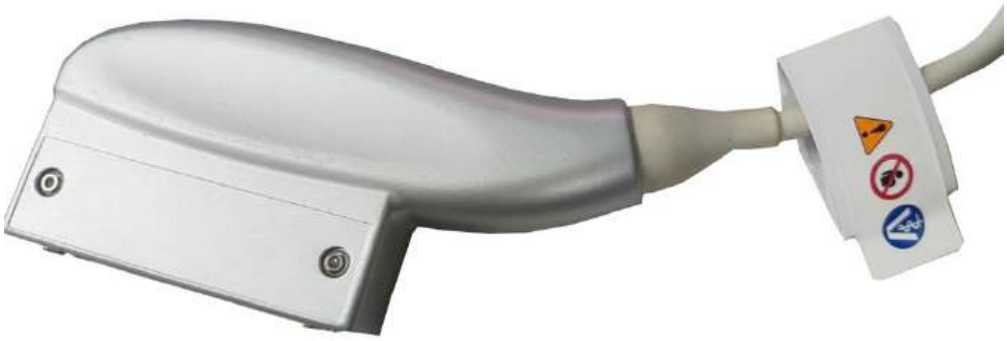
Figure 3-88 Fold the caution label in half

2. Remove the release paper from both ends.

Figure 3-89 Remove the release paper from both ends

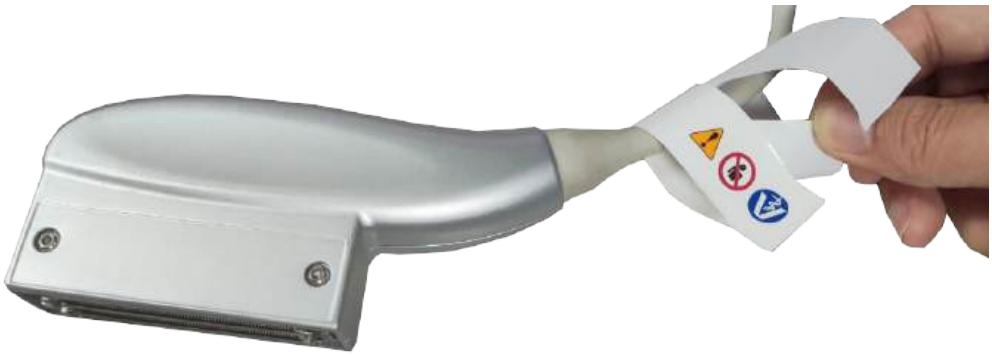
3. Wrap the caution label around the probe cable with both ends aligned.

Figure 3-90 Wrap the caution label around the probe cable



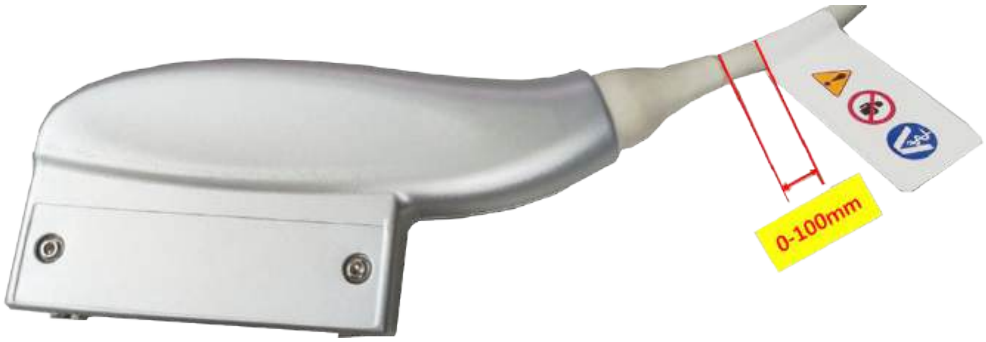
4. Remove the release paper completely as illustrated.

Figure 3-91 Remove the release paper



5. Adjust the position of the label with a distance of 0~100 mm between the caution label and the probe cable casing, then completely stick the label on the cable.

Figure 3-92 Completely stick the caution label on the cable



Paperwork after Setup

NOTE
During and after setup, the documentation (i.e. CDs with documentation, User Manuals, Installation Manuals, etc.) for the ultrasound system 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.

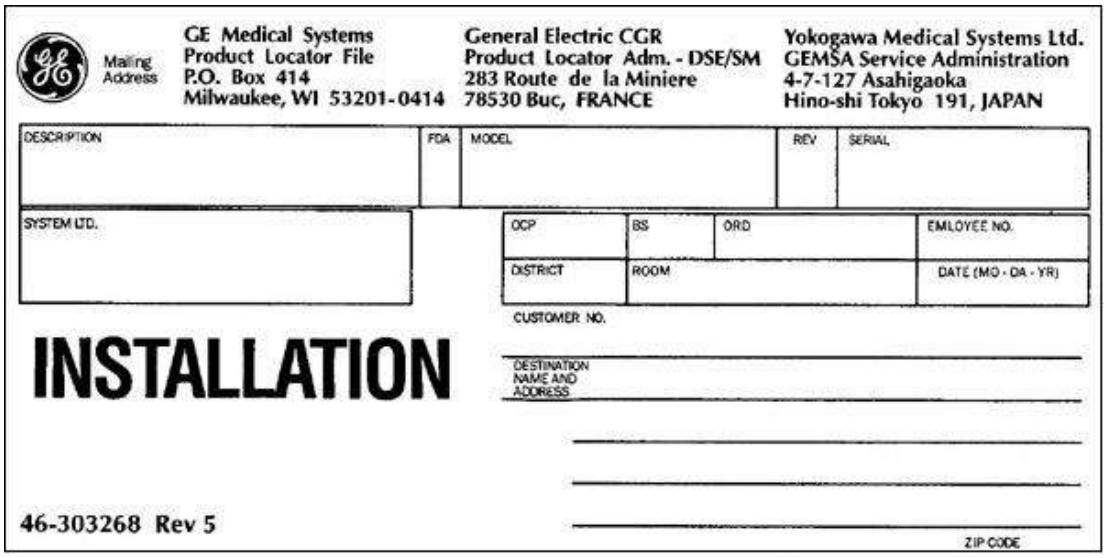
User's Manual(s)

User Check that the correct User Manual(s) for the system and software revision, is included with the installation. Specific language versions of the User Manual may also be available. Check with your GE HealthCare Sales Representative for availability.

Product Locator Installation Card

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

Figure 3-93 Product Locator Installation Card (Example)



Chapter 4
General Procedures and Functional Checks

In this section

General Procedures

Some procedures are used more often than other. The intention with this section is to keep the most used procedures in one place.

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.

WARNING
Energy Control and Power Lockout for the ultrasound system.

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.

Ultrasound System components may be energized.

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.

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).

Power ON/Boot Up

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.

Connect AC (mains) Power to the ultrasound system

Connecting AC Power to the ultrasound system, 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.

Switch ON the AC Power to the Ultrasound System

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.

   NOTE
   Diagnostic LEDs on the rear panel indicate the boot up status, refer to “Normal Status“ in *Table 7-17 Diagnostic LEDs* on page 252.

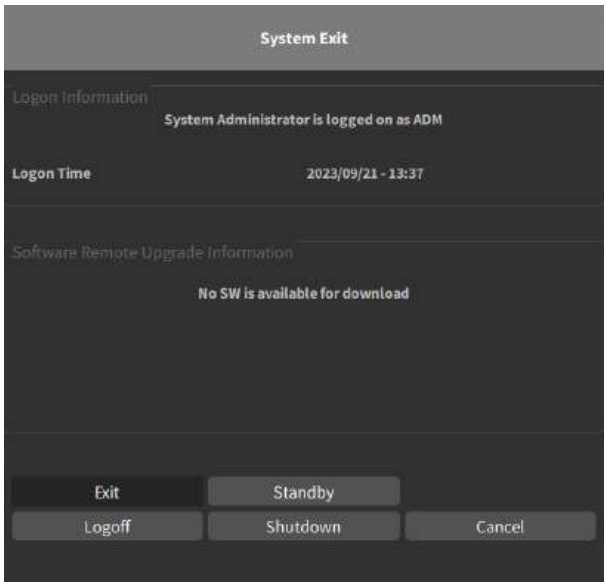
   NOTE
   Set up Drive D password and System password, refer to ***EZ Configuration Wizard***.

Power off

When you switch off the unit, the system performs an automatic shutdown sequence.

The **System Exit** menu, used when switching off the unit, gives you these choices:

Figure 4-1 System Exit Window



- ***Standby***
  Use this button to turn off the backlight of LCD, freeze image, disable all keys (Function Keys, A/N keys, Trackball) except On/Off switch and turn off all backlight and active light of keys except On/Off switch.

  Press the On/Off Switch to fast boot up.

  NOTE
  Image is still on freeze mode (Frozen Image).

- ***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.
- ***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 by pressing the power icon at the right bottom of the LCD monitor.
- ***Cancel***
  Use this button to exit from the System-Exit menu and return to the previous operation.

System shutdown

Disconnect the Mains Power Cable is necessary. For example: Relocating the scanner.

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.

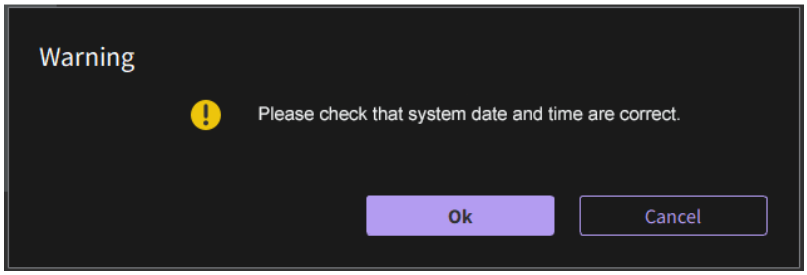
Check System Date and Time

A warning message "Please check the system date and time are correct" appears on the screen when the system is powered on. This warning message appears for the possible reasons:

- The system is not boot up for over 14 days.
- The system time has been changed by 24 hours earlier than the current system time of last boot-up.
- The BIOS time is changed by 24 hours earlier than the current system by resetting BIOS time,replacing BIOS module or changing BIOS time.

This warning message is to remind the user to check the system date in case the system date and time is incorrect.

Figure 4-2 Check system date and time message



Move the cursor to OK and press Cursor key on the control panel to select OK. The system enters.

Check the system date and time. If it is incorrect, follow below steps to reset the system date and time.

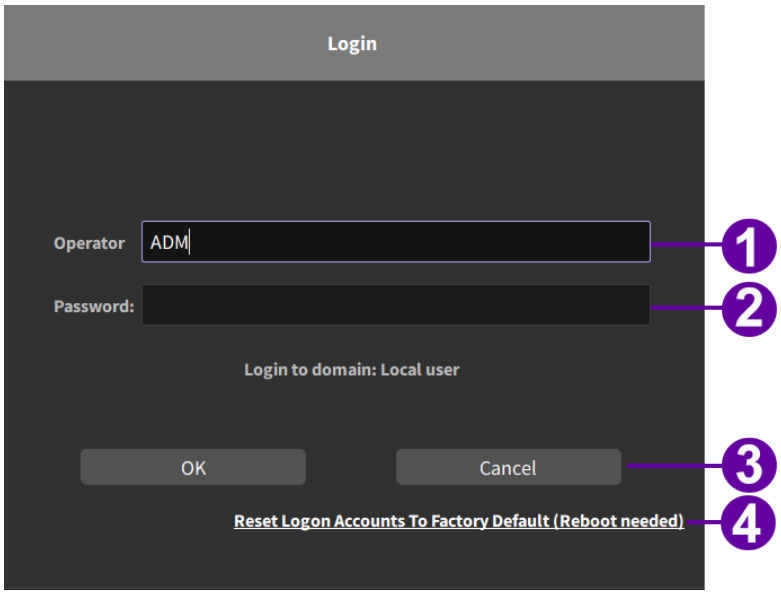
- Enter ***Utility*** > ***System*** > ***General*** > ***Date/Time***.
- Reset the system date and time.
- Select ***Apply*** and then select ***OK***.
- Select ***Save***.

Logging on to the Ultrasound System as “ADM”

Select ***Utility*** on the touch panel, then select Admin.

It will bring up the Operator Login dialog where you must log on.

Figure 4-3 Operator Login Window



1. ***Operator***: Select the operator.
   - ***ADM***
     If you log on as ***ADM***, you will have access to do general set-up, service adjustments, adjust network and connectivity settings.

     Select the name ***ADM***, the password as default and select ***Login***.

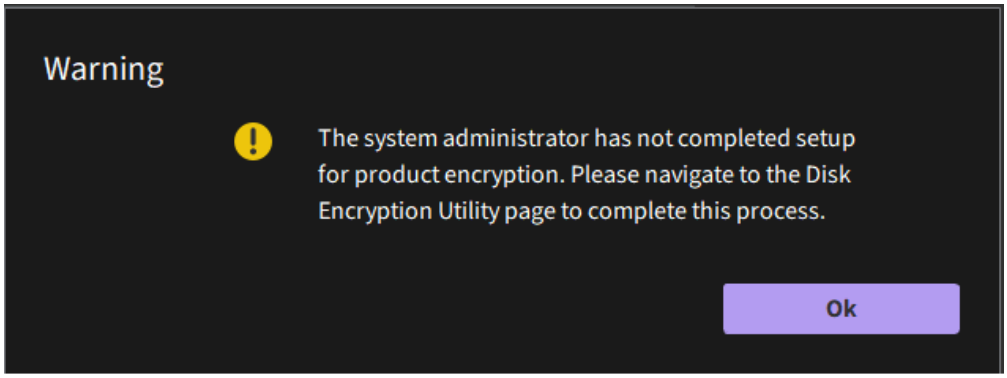
     It is possible for the administrator (ADM) to establish new users (USR) and set unique passwords for each user, including a new password for ADM. If the login as ADM fails, contact the responsible person in the hospital to get access.
   - ***USR***
     If you log on as USR, you will have access to do set-up tasks that a user may need to do during daily use.

   NOTE
   This ultrasound system ***Local Disk*** is encrypted by default. The user will be notified to complete encryption process by changing password and saving the recovery keys. If user did not complete this process, a warning message will appear each time the user logs in as an administrator (***ADM***).
2. ***Password***: Enter Operator's password (optional).
3. Select ***OK*** or ***Cancel***.
   - ***OK***: Standard logon
   - ***Cancel***: Cancel logon
4. Reset Logon Accounts To Factory Default (Reboot needed): Plug in SSA Dongle to reset Logon accounts.

Change Password and Save Recovery Keys

This ultrasound system ***Local Disk*** is encrypted by default. The user will be notified to complete encryption process by changing password and saving the recovery keys. If user did not complete this process, a warning message will appear each time the user logs in as an administrator (***ADM***).

Figure 4-4 Warning message for product encryption

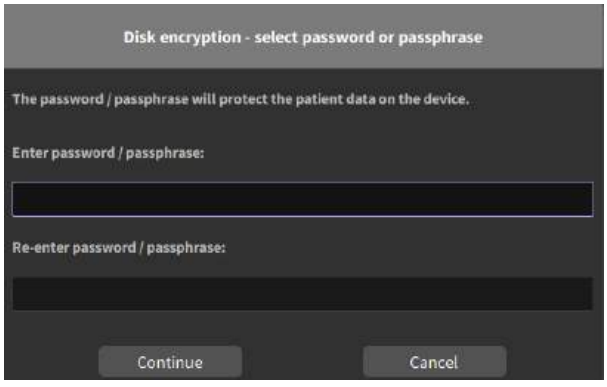


Please navigate to ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption*** to complete this process.

Change Password

1. Press ***Change Password***.
2. Enter new password/passphrase, and re-enter it to confirm.

Figure 4-5 Change Password



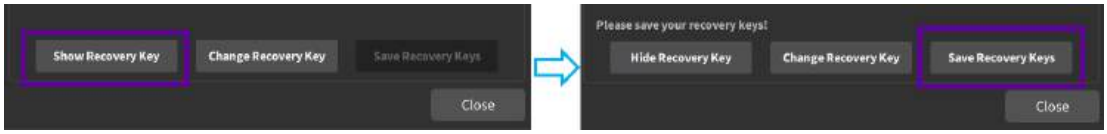
3. Press ***Continue*** to complete changing password. Maintain the Encryption Password safely.

Save Recovery Keys

1. Insert a USB and select ***Show Recovery Key*** > ***Save Recovery Keys*** to save the recovery keys to USB device.

NOTE
Please save the recovery keys safely.

Figure 4-6 Save Recovery Keys



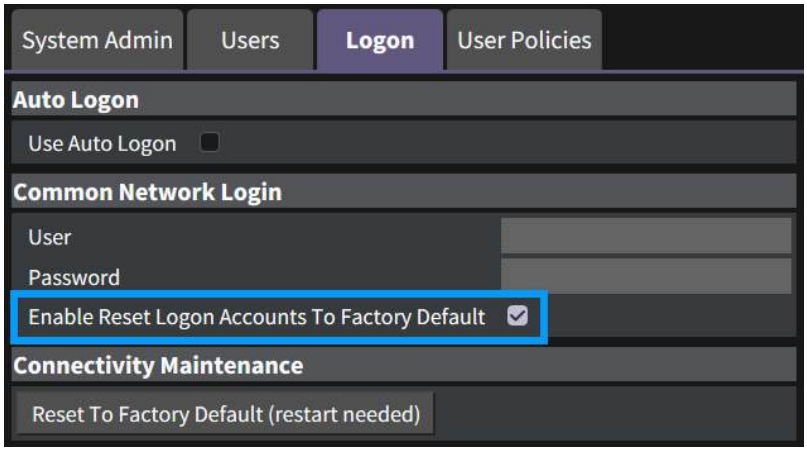
2. You can press ***Hide Recovery Key*** to hide the recovery key. Press ***Close*** to exit.

Reset Logon Accounts to Factory Default (Reboot needed)

To reset logon account to factory default:

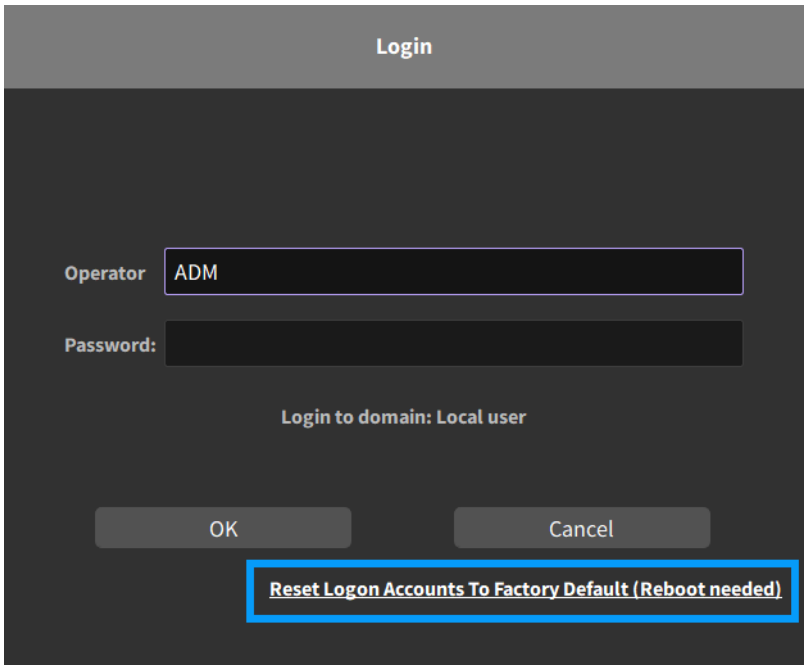
1. Check on ***Enable Reset Logon Accounts To Factory Default*** in ***Utility*** > ***Admin*** > ***Logon*** and save the setting before reseting logon accounts to factory default.

Figure 4-7 Enable Reset Logon Accounts To Factory Default



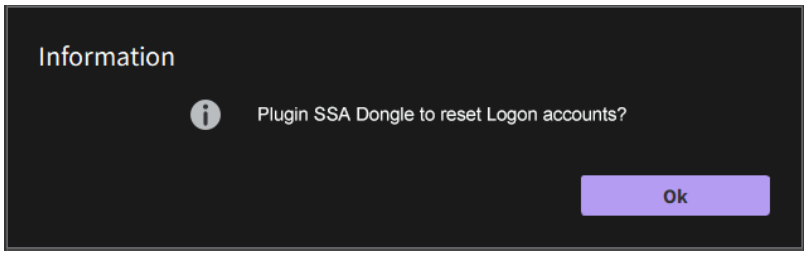
2. Select ***Reset Logon Accounts to Factory Default (Reboot needed)***.

Figure 4-8 Reset Logon Accounts to Factory Default



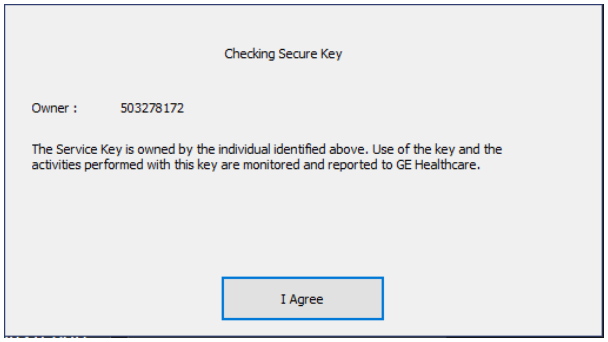
3. A pop-up window appears. Press ***Ok*** and plug in the SSA Dongle.

Figure 4-9 Plugin SSA Dongle



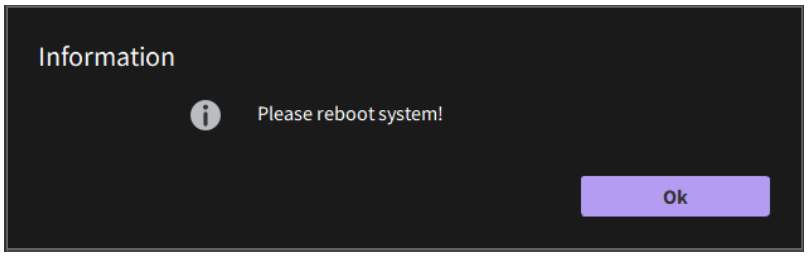
4. The Checking Secure Key window pops up, click ***I Agree***.

Figure 4-10 Checking Secure Key



5. Press ***Reset Logon Accounts to Factory Default*** again. A pop-up window appears and press ***Ok*** to continue.

Figure 4-11 Reboot system information



6. Reboot the system, and you will be prompted to first logged into the ultrasound system. Refer to *Logging on to the Ultrasound System as "ADM"* on page 142.

Service Key (SSA)

A Service Key and a proprietary GE HealthCare Service password are necessary for use by GE HealthCare Service when performing proprietary level diagnostics like accessing the desktop on the BEP. The password used with the GE HealthCare service key changes at specific intervals.

The SSA key provides secure access for GE HealthCare service personnel to advanced tools to service the system.

SSA is a class M key with the following characteristics:

NOTE
The SSA dongle may not be recognized by USB 3.0 port intermittently. Use the USB 2.0 port at the rear side of the system as alternative solution.

- Access to all service features.
- Access to Windows Desktop (Press **Ctrl** + **Alt** + **Del**).
- 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.

Exit to Windows Desktop from the application software

If you want to exit to the Windows Desktop when the application software is running, please refer to Proprietary Service Manual.

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

Backup and Restore Database, Preset Configurations and Images

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).

EZ Settings Restore

EZ Settings Restore helps to fast backup network, userdefines and Insite agent setting in local disk.

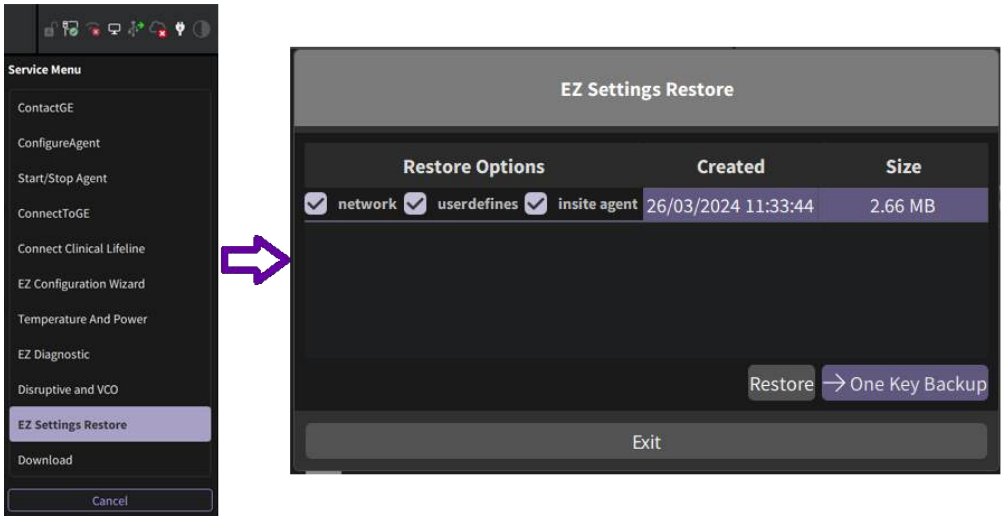
- ***Network***: IP settings of wired/wireless network, system proxy settings, wireless network settings, public DICOM certifications.
- ***Userdefines***: general utility settings including Scanner software user settings of annotation, measure, report template, imaging presets, date/time format, time zone, keyboard setting, printer settings, network printer IP address, Scan Coach and Voice Comment, Whizz Note.
- ***Insite agent***: Remote Service Platform settings include: SerialNumber, CRM No, Enterprise Host and port, Software Download URL, Proxy Configuration.

To perform EZ Settings Restore,

1. Click Insite ExC icon at the upper right of the display screen.
2. Select ***EZ Settings Restore***.

3. Select any options under ***Restore Options*** and then click Restore, those settings will be restored.

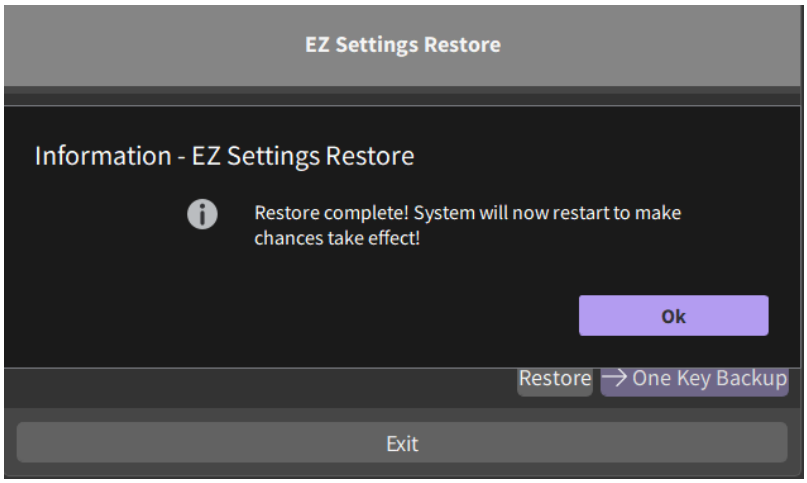
Figure 4-12 EZ Settings Restore



If user never perform backup since software installed, there will be no restore options listed in EZ Settings Restore window. Press ***One Key Backup*** to backup first.

4. After restore completed, an information window pops out. Press ***OK*** to restart the system to make changes take effect.

Figure 4-13 Restore complete

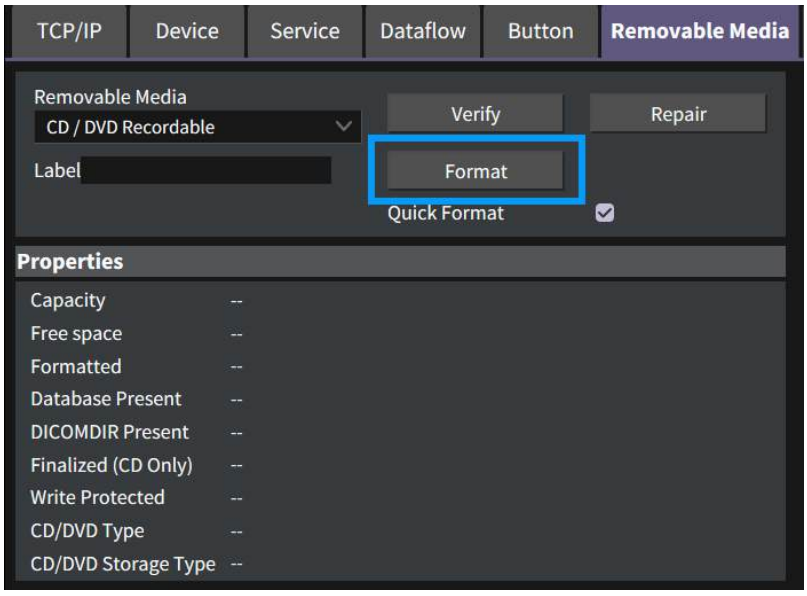


Formatting Media

1. Select ***Utility*** > ***Connectivity*** > ***Removable Media***.
2. Select the media type from the drop down menu.

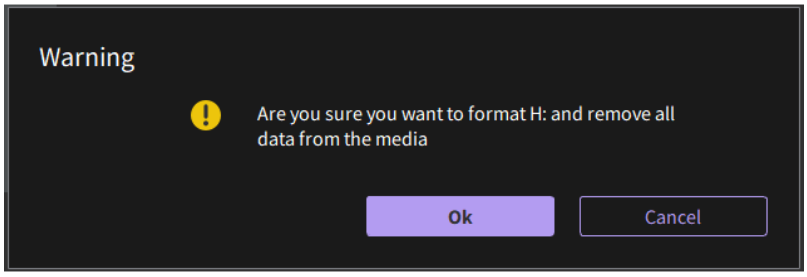
3. Enter the label for the media. It is best to use all capital letters with no spaces or punctuation marks. Select ***Format***.

Figure 4-14 Format and Verify Media



4. The system displays a pop-up menu, as shown in *General Procedures and Functional Checks* on page 137, select ***OK*** to continue.

Figure 4-15 Format Warning Pop-up Window



5. If desired, verify that the format was successful by returning to ***Utility*** > ***Connectivity*** > ***Removable Media*** and selecting ***Verify***.

Backup System Presets and Configurations

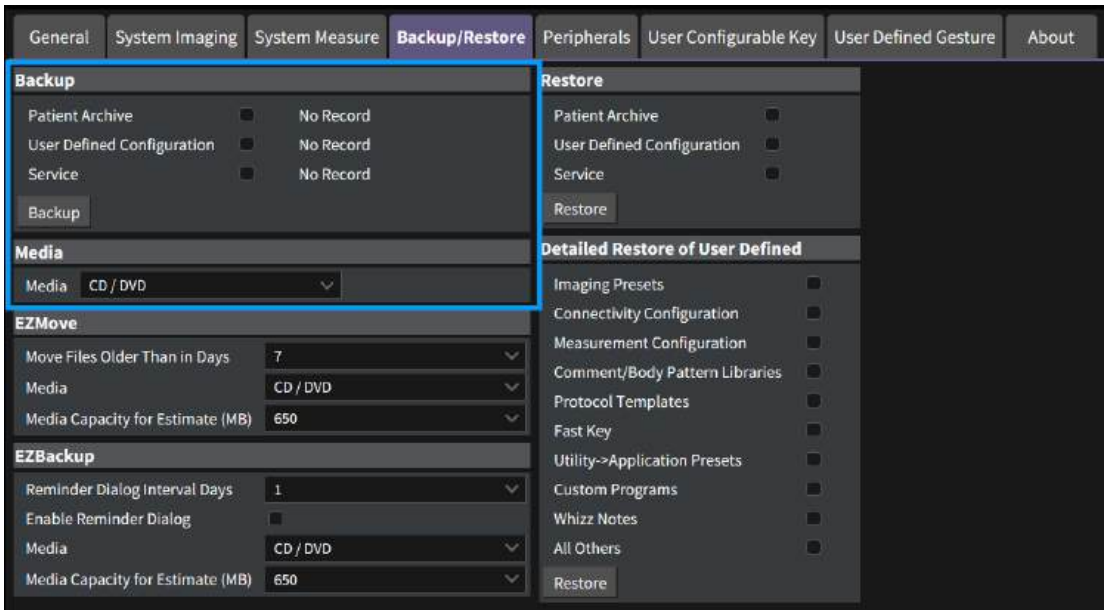
NOTE
Always backup any preset configurations before a software reload. This ensures that if the presets need to be reloaded, after the software update, they will be the same ones the customer was using prior service.

1. Insert a formatted media into the drive.
2. Enter ***Utility*** > ***System*** > ***Backup/Restore***.

NOTE
If you are not logged in as GE HealthCare Service or with administrator privileges, the Operator Login window is displayed. Log on with administrator privileges.

3. In the Backup list, select ***Patient Archive***, ***User Defined Configuration*** and ***Service***.
4. In the Media field, select ***CD/DVD*** (or ***USB memory device***).
5. Select ***Backup***.

Figure 4-16 Backup/Restore Menu



The system performs the backup. As it proceeds, status information is displayed on the Backup/Restore screen.

Restore System Presets and Configurations

CAUTION
The restore procedure overwrites the existing database on the local hard drive. Make sure to insert the correct CD (or USB memory device).

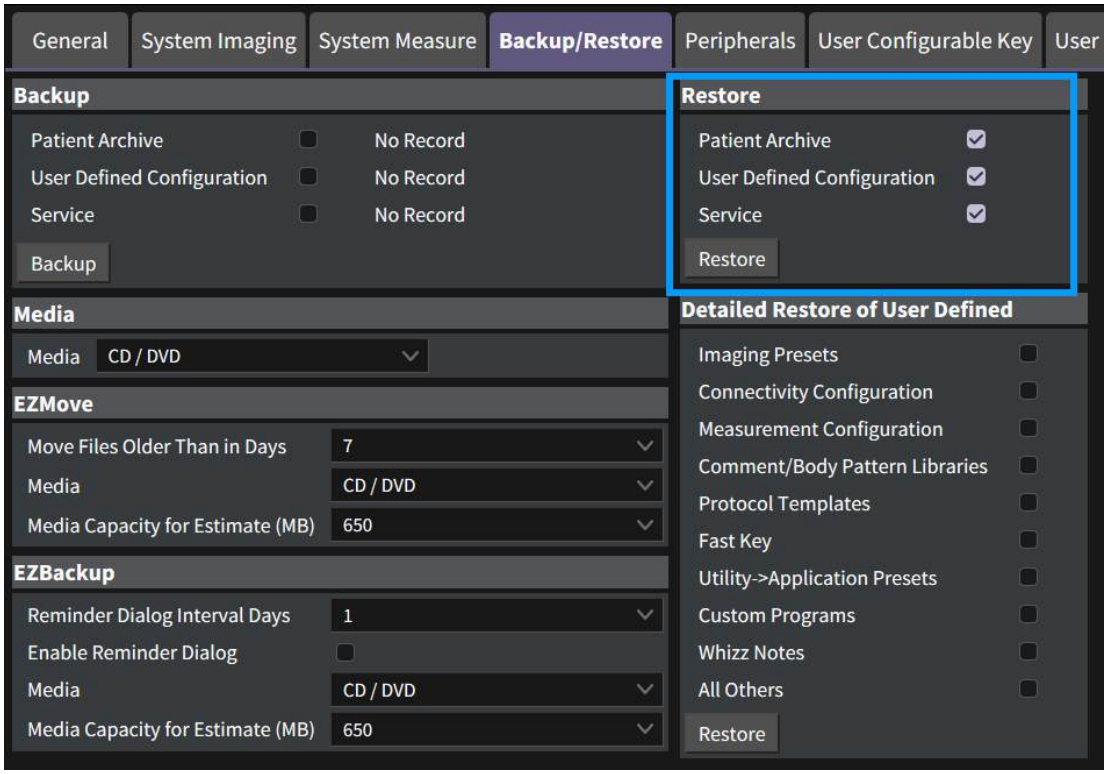
1. Insert the Backup/Restore CD/DVD (or USB memory device) into the drive.
2. Enter ***Utility*** > ***System*** > ***Backup/Restore***.

NOTE
If you are not logged in with administrator privileges, the Operator Login window is displayed.Log on with administrator privileges.

3. In the Restore list, select ***Patient Archive***, ***User Defined Configuration*** and ***Service***.
4. In the Media field, select the Backup/Restore ***CD/DVD*** (or ***USB memory device***).

5. Select ***Restore***.

Figure 4-17 Restore Menu



The system performs the restore. As it proceeds, status information is displayed on the Backup/Restore screen.

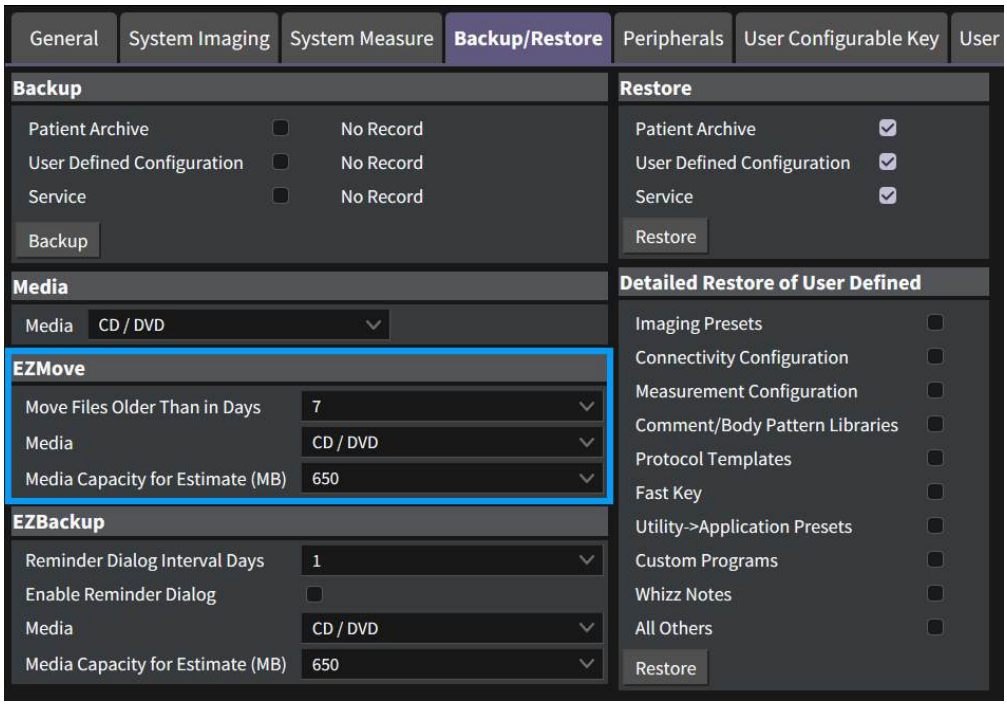
Archiving Images

1. Insert the archive media.
2. To format the archive media, enter ***Utility*** > ***Connectivity*** > ***Removable Media***.
3. Format the CD. Verify the format if desired.
4. Images will be moved from the hard drive by date. Therefore, the best way is to label media by date.

NOTE
Images will be moved from the hard drive by date. Therefore, the best way to label media is by date. When images are moved to the archive media, they will be deleted from the system hard drive. However, the patient database (backed up earlier) maintains pointers to the location of the images on the archive media.

5. Specify the EZBackup/EZMove setup on ***Utility*** > ***System*** > ***Backup/Restore*** page. Select ***Move File Older Than in Days*** if desired.

Figure 4-18 EZBackup/Move



6. To start the EZBackup/EZMove procedure, go to the ***Patient***menu and select ***EZBackup/EZMove***. The EZBackup/EZMove Wizard starts.

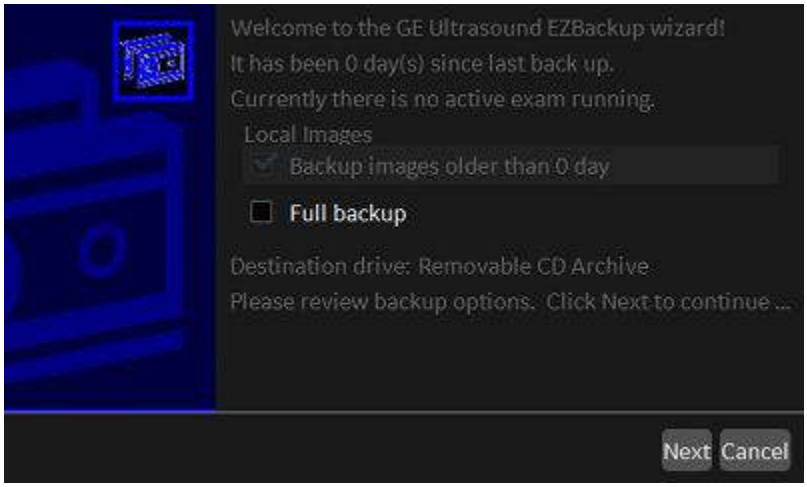
   NOTE
   If you use the USB HDD, some wizards and the pop-up messages DO NOT appear.

7. Verify the information on the first page of EZBack/EZMove wizard, then select ***Next***. Full backup options display on the first page of the EZBackup wizard. If you want to backup all of the exams in the range (even if the exam was previously backed up, check this option). If you uncheck this option, the system only backs up exams which have not yet been backed up.

   EZBackup does not back up the exams which were previously backed up once by EZBackup or Export.

NOTE
If you update an exam which is already backed up, the exam is also backed up.

Figure 4-19 EZBackup/EZMove Wizard 1



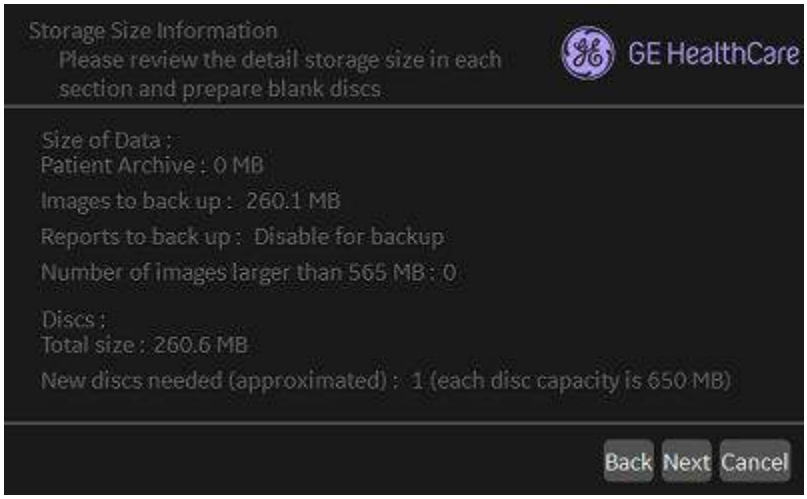
8. Verify the information on the EZBackup/EZMove Wizard. The backup may span multiple media. This page tells you how many media you need to do this backup. After you have gathered the media (allow for one extra media, just in case), you are ready to begin the backup. Press Next.

   Free Space/Total Size: tells you the size of the data you have selected to store/and the total size of the USB Hard Drive storage media. If the storage capacity of the USB HD is insufficient, you will see the message, "Selected Location does not have enough free space."

   NOTE
   The calculation for the number of backup CD is only an estimate. Allow for one additional CD when performing an EZBack/EZMove.

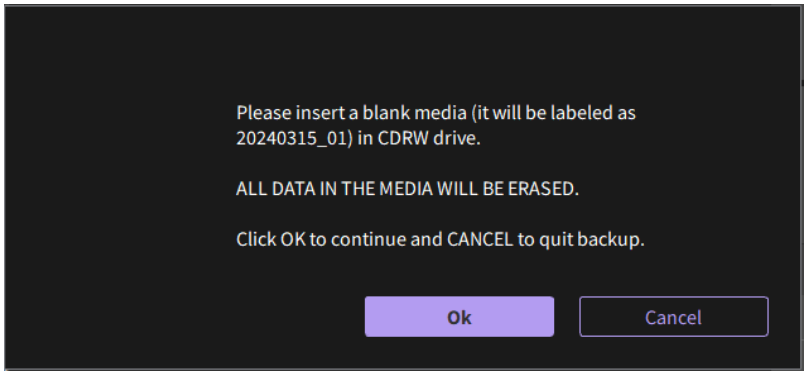
NOTE
This message “Please insert a blank media...” appears if you press Next without inserting the backup media. Insert the media and continue.

Figure 4-20 EZBackup/EZMove Wizard 2



9. A pop-up message appears that provides you with the media label. Label the media, then insert the media. Press OK.

Figure 4-21 Insert Media Message



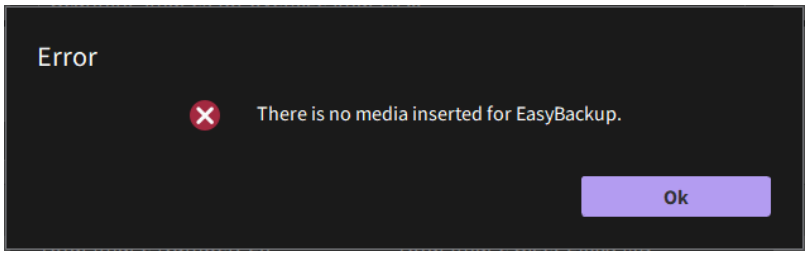
a. Ensure that you label the media with not only the volume name indicated on the Insert Media Message, but with the name of the Versana Premier system where this backup/move procedure was done.
b. Update the EZBackup/EZMove log with this information the volume information and the location of the media.
c. After the backup/move has been completed, file the media.

Table 4-1 Typical EZBackup/EZMove Log

Date	Scanner ID Name	Backup Images Y/N	Older than _ Days	Move Images Y/N	Media Label (and Scanner ID)

10. The system will check whether the media is inside the drive.
    - If the media is in the drive, the window automatically disappears when the checking is completed. The EZBackup progress then begins.
    - If the media is not in the drive, a pop-up message appears notifying that there is no media in the drive. Press ***OK***.

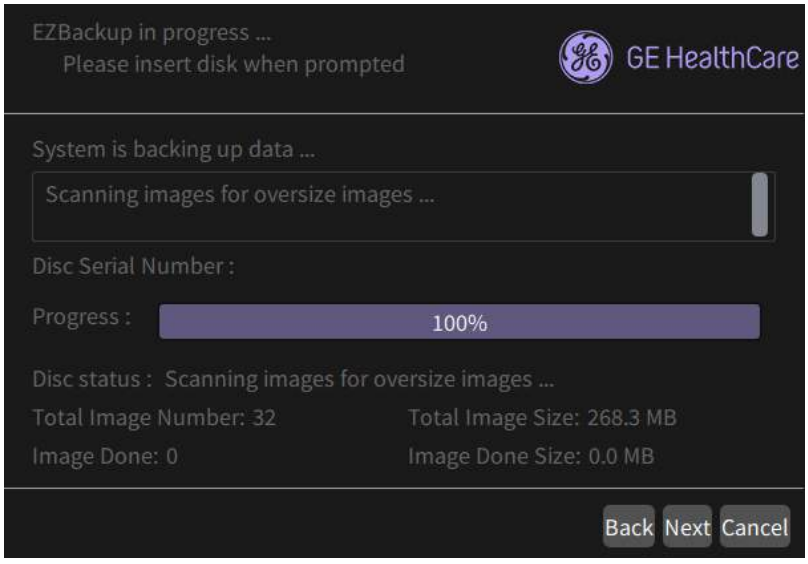
Figure 4-22 Insert Disc Error



A pop-up message appears that provides you with the media label. Label the media, then insert the media. Press ***OK***.

11. The status menu appears. When the backup/move has been complete, press ***Next***.

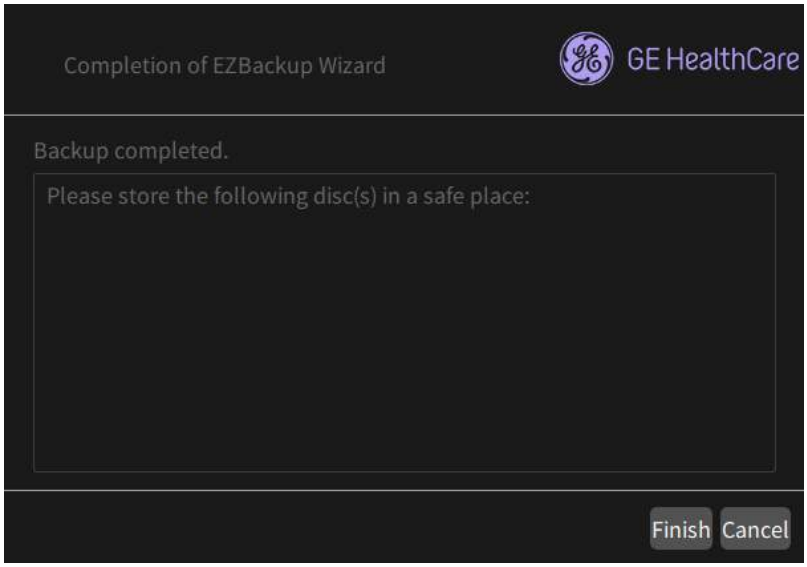
Figure 4-23 EZBackup Wizard 3



NOTE
When/if you need to insert the next media, a message appears providing you with the media label. Label the media, then insert the next media and press ***OK***.

12. When the backup is complete, the completion wizard page appears. Press ***Finish***.

Figure 4-24 EZBackup Completion Window



All databases, presets and images should now be saved to removable media.

Data Management

Refer to the latest revision of this ultrsound system's User Manual to perform the following tasks:

- Configuring the Disk Management Function
- Setting the Disk Management Schedule
- Configuring Data Management Settings
- Configuringestination Device Setting
- Running the Disk Management Function
- Starting Disk Management Manually

Backup

For more information, refer to the latest revision of this ultrsound system's User Manual.

Restore the factory defaults

For instructions, please see “Data Backup and Restore” in the User Manual.

WARNING
To avoid not being able to connect to Local Archive, connecivity.res and IPSave in “D:\Scanner\target\resources\userdefs” should not be deleted. If they are deleted, refer to Proprietary Service Manual to rewrite the serial number.

Installation and Setup Procedure for Peripherals

Please refer to *Peripherals Installation* on page 95.

Where are the User Manuals and the Service Manual?

Online versions of the User Manuals are available via the help function.

Both the User Manuals and the Service Manual are delivered as PDF files in an USB Disk. Paper copies may be ordered from GE HealthCare.

How to display or print the PDF files from the Manual CD?

1. Insert the USB disk into the USB port on a PC or Laptop with Adobe Acrobat Reader.

CAUTION
Do not try to use the ultrasound system to read these files, it will not work!

1. Go to the USB Disk and open ***ultradoc folder*** to select User Manual or Service Manual with your preferred language.
2. Before printing the complete manual, or pages from the manual, select ***File*** > ***Print***.
3. Select the ***paper size*** and choose ***Portrait***.
4. Select ***Print*** to start printing. In the pop up window, you may choose which pages to print and the number of copies you want to print (usually 1 copy).

Cleaning the Trackball

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.

Manpower

One person, 10 minutes,

Tools

- Antistatic brush and/or antistatic vacuum cleaner

Preparations

To get access to the trackball for cleaning, you must perform the following steps:

1. Power off the system.
2. Disconnect the mains power cable from the wall outlet.

Follow *Power off* on page 140 if you need more information for power off the system.

Clean the Trackball

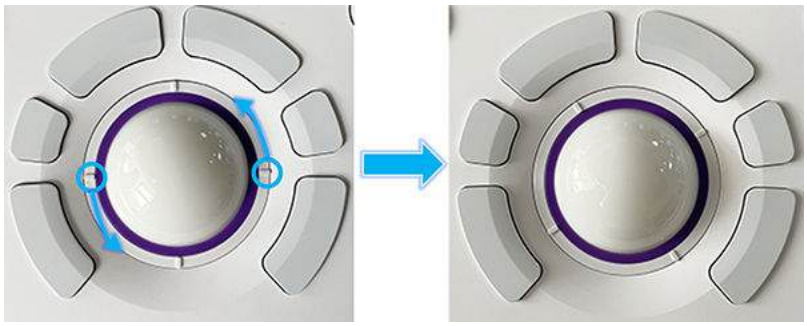
Dust is often building up behind the ball, so it interferes with the ball rotation and for optical trackballs the light used for sensing. To get access for cleaning, you need to remove the ball.

The ball is held in position by the Dust Gasket.

1. Power off the system.

2. Rotate the dust gasket counterclockwise until it can be removed from the keyboard.

Figure 4-25 Rotate the retainer



3. Separate the trackball and the gasket. Wipe off any oil or dust from the trackball, gasket and the trackball housing using a cleaner or cotton swab.
4. Assemble the trackball and gasket, then put it into the housing and rotate it clockwise until its notches are set in the position.

CAUTION
When cleaning, make sure not to spill or spray any liquid into the trackball housing (keyboard or system). DO NOT use cleaning agents containing ammonia, such as Windex, Screen-Clean, which will remove the anti-glare coating on the Trackball.

Test the Trackball

Power up the system and test that the trackball now works as intended.

Cleaning the air filters

Clean the system's air filters to ensure that a clogged filter does not cause the system to overheat and reduce system performance and reliability. It is recommended the filters be cleaned every two weeks, but the requirements will vary due to your system use.

CAUTION

Be sure to lock the wheels before cleaning the air filters to avoid injury by any unexpected movement of the system.

DO NOT operate the unit without the air filters in place.

Allow the air filters to dry thoroughly before re-installing them on the unit.

Cleaning

1. Pull the air filter from the back cover of the system.

Figure 4-26 Remove the air filter

2. Dust the filters with a vacuum cleaner and/or wash it with a mild soapy solution.

   NOTE
   If washed, RINSE and DRY the filters before re-installation.

3. Put back the air filters.

Cleaning the gel warmer

The reservoir of the gel warmer(option) is designed to hold the redundant gel temporarily. User needs to clean the reservoir in time to avoid reservoir being full and leaking inside of the system.

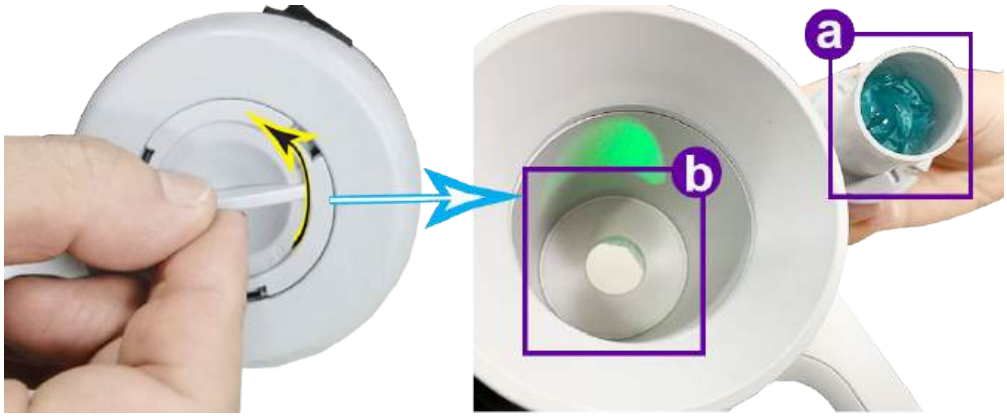
Follow below steps to remove and clean the reservoir:

1. Spin the reservoir counterclockwise to remove it from the gel warmer.

   a. Clean the reservoir.

b. If there is already gel leaked to the inside of gel warmer, please clean it before re-install the reservoir.

Figure 4-27 Remove the reservoir from gel warmer



2. Re-install the reservoir to the gel warmer.

CAUTION
If the gel leaked in the gel warmer always cannot be cleaned on time, it may cause a short circuit in the internal board.

Monitor

To clean the monitor face:

Use a soft, folded cloth. Gently wipe the monitor face.

DO NOT use a glass cleaner that has a hydrocarbon base (such as Benzene, Methyl Alcohol or Methyl Ethyl Kentone) on monitors with the filter (anti-glare shield). Hard rubbing will also damage the filer.

NOTE
When cleaning the screen, make sure not to scratch the monitor.

Operator Control Panel

To clean the operator control panel:

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.
2. Wipe down operator control panel.
3. Use a cotton swab to clean around keys or controls. Use a toothpick to remove solids from between keys and controls.

NOTE
When cleaning the operator control panel, make sure not to spill or spray any liquid on the controls, into the system cabinet, or in the probe connection receptacle.

NOTE
In case of SARS, use bleach, or Cidex in a normal diluted form for cleaning/disinfecting the operator panel.

NOTE
DO NOT use T-spray or Sani Wipes on the control panel.

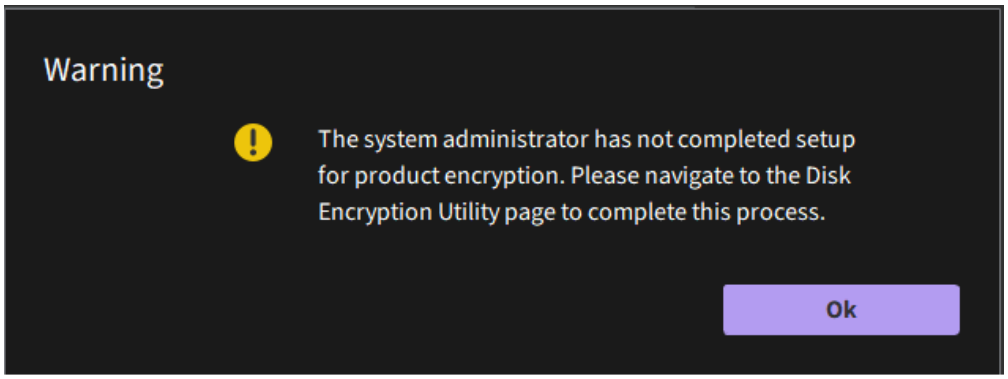
CAUTION
Before cleaning the control panel, make sure the key cap is firmly in place.

Disk Encryption/Decryption

Disk Encryption is a function to protect the patient information on the device and prevent unauthorized access to PI/PHI, especially when the device is stolen. The encryption AES is 256 bit.

The ***Local Disk*** of this ultrasound system is encypted by default. The user will be notified to complete encryption process by changing password and saving the recovery keys. If user did not complete this process, a warning message will appear each time the user logs in as an administrator (***ADM***).

Figure 4-28 Warning message for product encryption



Please navigate to ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption*** to complete this process.

NOTE
Disk Encryption can also protect the user data stored on removable device. The steps for ***Removable Media*** Encryption and ***Local Disk*** Encryption are the same.

CAUTION
The user must make backups and take care of the encryption keys. It is the customer's responsibility for storing the keys. GE HealthCare will have no back door or any responsibility or possibility of recovering the data.

WARNING

Without the Encryption Password or Recovery Key, it is not possible to access patient information, images, or local archive.

GE HealthCare has no access to this information or the ability to undo encryption in the event that the Encryption Password and Recovery Key are lost. Maintaining the Encryption Password and Recovery Key are solely the user's responsibility.

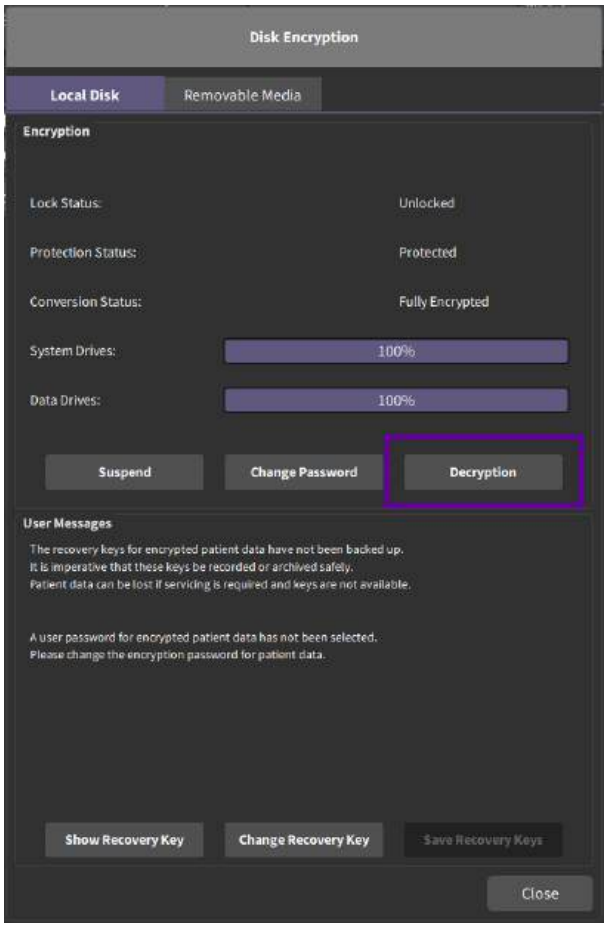
WARNING
This step is mandatory for US customers, and is highly recommended for all customers.

NOTE
Security for patient data on the system will be reduced when decryption is turned on. The system should not be used while decryption process is ongoing. Scanner functionality will be unavailable while decryption.

Disk Decryption

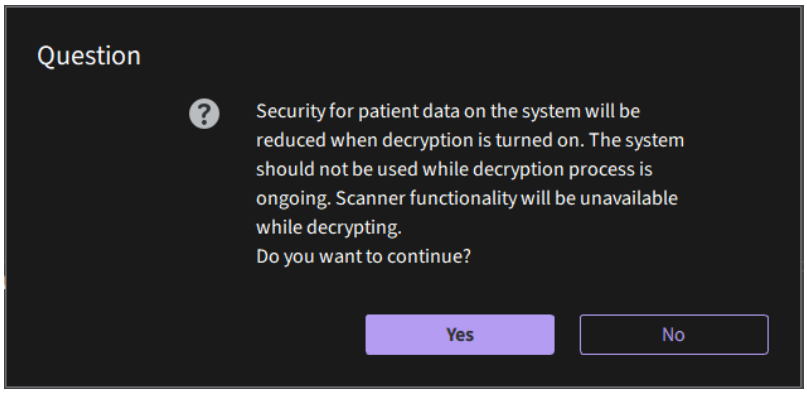
1. If you want to perform disk decryption, you can press ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption***. Select ***Decryption***.

Figure 4-29 Decryption



2. A question window displays on the screen for confirmation. Read the question and select ***Yes*** to decrypt the disk, or select ***No*** to cancel.

Figure 4-30 Disk Decryption confirmation window



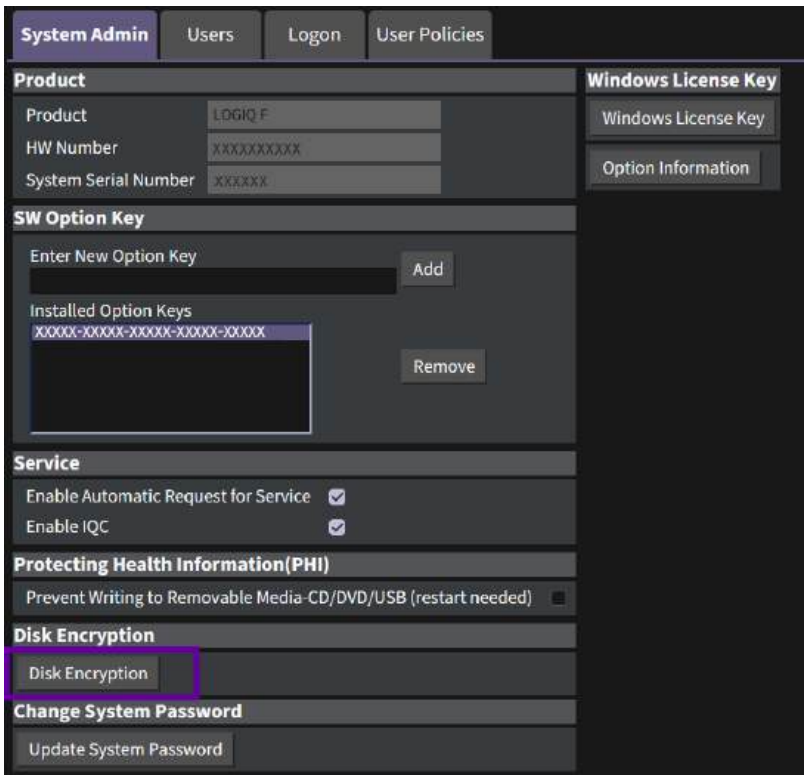
3. Enter a password or a passphrase and re-enter to confirm. Press ***Continue***.

Figure 4-31 Enter Password

Disk Encryption

1. Login as administrator. Press ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption***.

Figure 4-32 Disk Encryption navigation



2. Select ***Disk Encryption***.
3. Enter a password or a passphrase and re-enter to confirm. Press ***Continue***.

NOTE
A valid password must be at least 8 characters long and has a maximum length of 256 characters.

Figure 4-33 Enter Password window

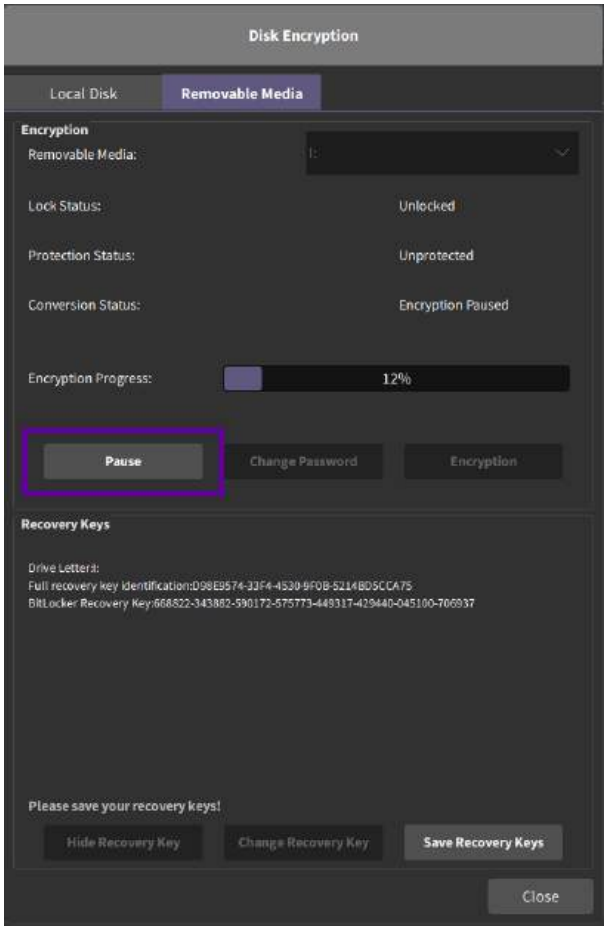
4. Insert a USB and select ***Save Recovery Keys*** to save the recovery keys to USB device. You can press ***Hide recovery key*** to hide the recovery key. Press ***Close*** to exit.

CAUTION
Make sure to keep the password/passphrase, recovery key and any back up of these in secure place, not accessible for unintented audience.

Pause Encryption

During encryption process for Removable Media, you can press ***Pause*** to stop the encryption process.

Figure 4-34 Encryption Pause

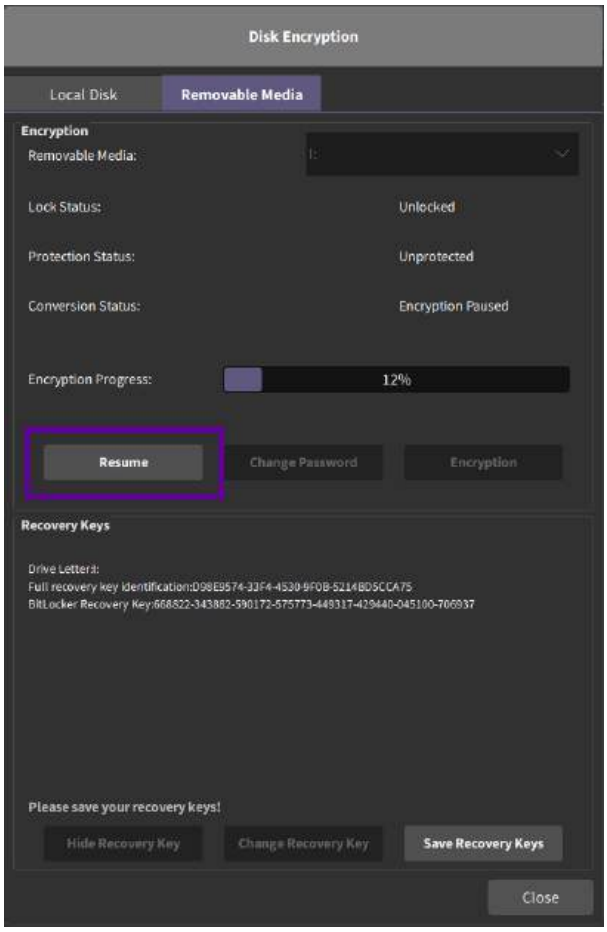


Resume Encryption

During Disk encryption/decryption process for Removable Media, press pause to stop. Follow below steps to resume the conversation:

Press ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption***. Press ***Resume*** to resume disk encryption/decryption.

Figure 4-35 Encryption Resume

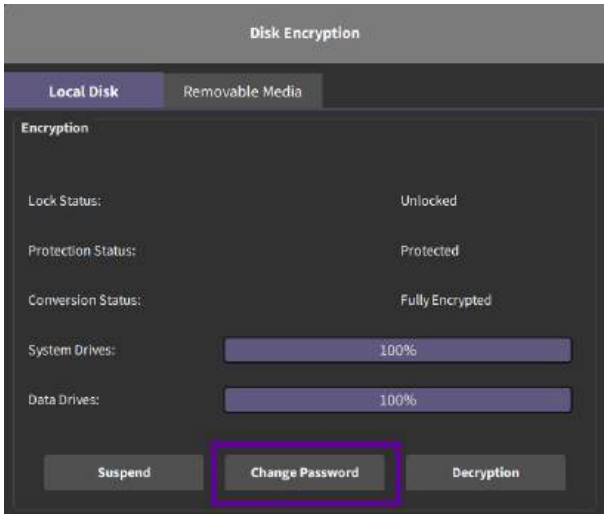


Change Password

User can change the password through ***Disk Encryption*** page.

1. Press ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption***. Press ***Change Password***.

Figure 4-36 Change Password



2. Enter new password/passphrase, and re-enter it to confirm.

Figure 4-37 Enter new password/passphrase

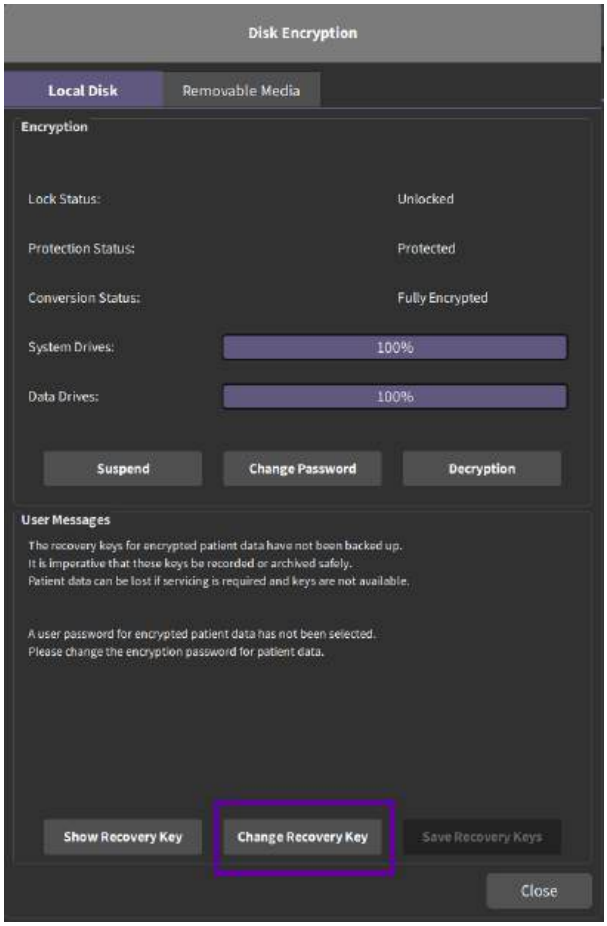
3. Press ***Continue*** to complete changing password.

Change Recovery Key

After the encryption process is completed, you can change the recovery key as you prefer.

1. Press ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption***. Press ***Change Recovery Key***.

Figure 4-38 Change Recovery Key



2. Insert a USB to store the new recovery key.

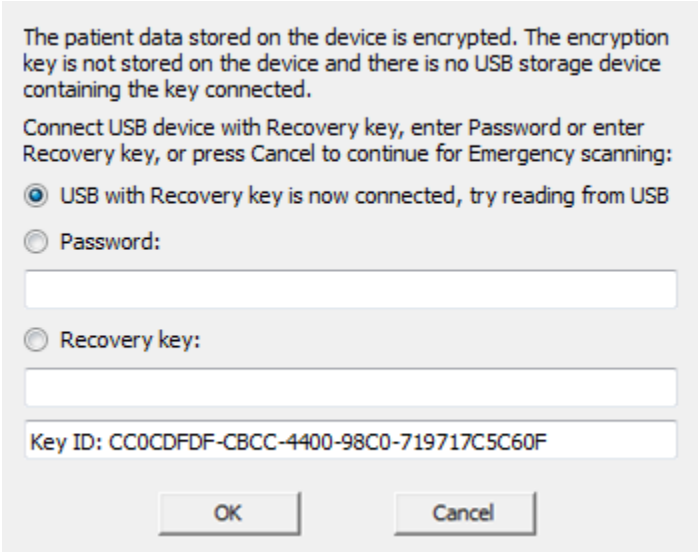
Unlock with user entered key & recovery key

When the patient data is in locked status, you can unlock it with user entered key and recovery key.

You can insert the USB with recovery key, or you can input the password or recovery key manually to unlock the system.

NOTE
If you press ***Cancel***, the system will stay in locked status and some of the functions will be not available.

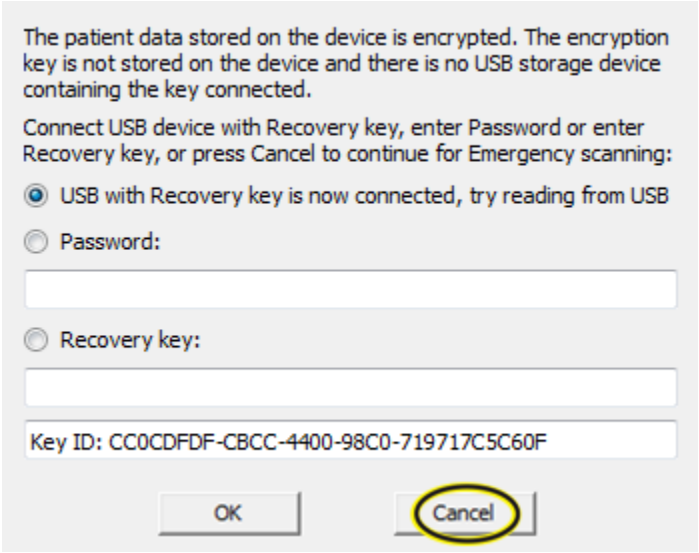
Figure 4-39 Unlock Dialog



Emergency Scanning

1. Boot scanner.
2. Press ***Cancel*** on unlock dialog.

Figure 4-40 Cancel Unlock Process



3. Continue as before (Press Emergency in login dialog).

Functional Checks

In this section, the functional checks for the ultrasound system are described. Functional checks are used to verify that the product works as intended. Functional checks may also be used during troubleshooting.

Preparation

Turn on power to the ultrasound system. For detailed description, *Power ON/Boot Up* on page 139.

Basic Controls

Control Panel

Figure 4-41 Control panel map - example

1. Probe and Gel Holders
2. Touch Panel
3. Power On/Off
4. Menu knobs
5. User Configurable keys
6. Quad, Single, Dual keys
7. Assistant key
8. M Mode/X
9. CW key
10. PW Mode/Y
11. PDI
12. CF Mode/Z
13. 3D/4D
14. B Mode key
15. Depth
16. Ellipse/Zoom key
17. Whizz key
18. Cursor
19. Clear key
20. Measure key
21. Body Pattern key
22. Comment key
23. Print key
24. Freeze key
25. Trackball, Trackball Keys

Top/Sub Menu

The Top/Sub Menu contains exam function and mode/function specific controls.

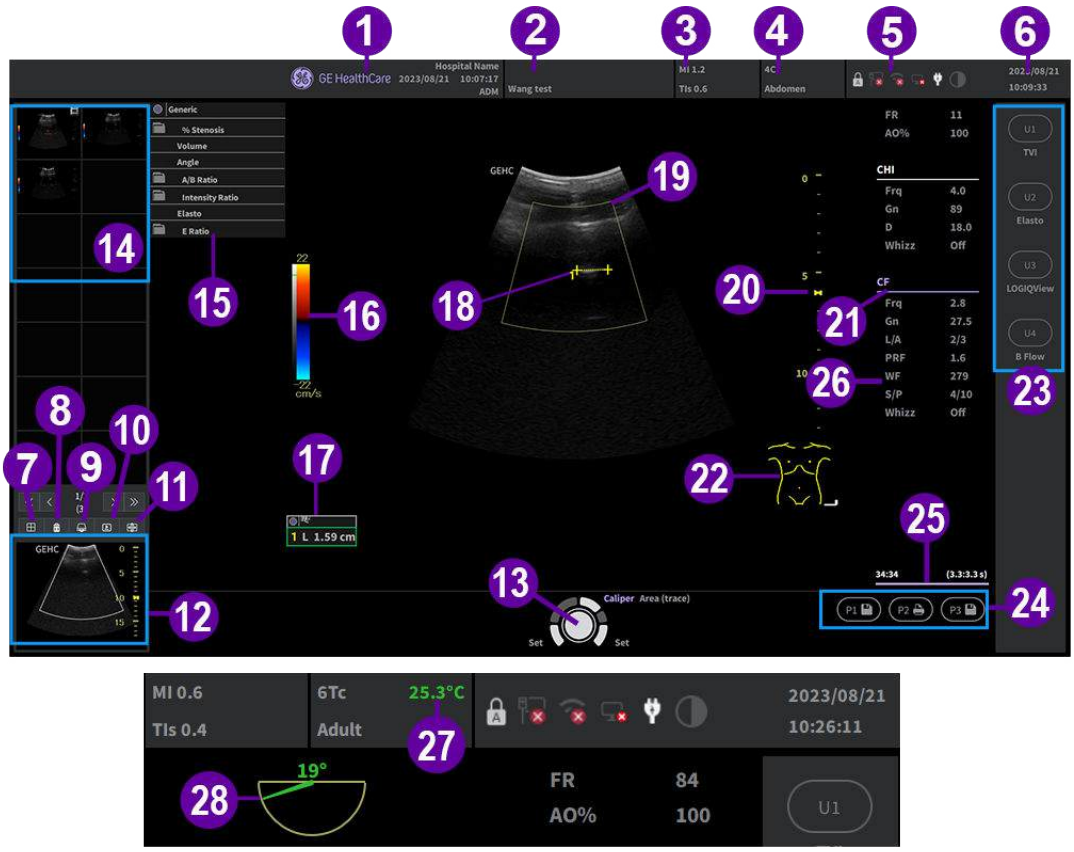
Figure 4-42 Top/Sub Menu controls

The Top/Sub Menu contains adjustable knobs associated with it. The adjustable knobs are used to adjust the selected function. For example, to increase or decrease frequency, turn the knob clockwise or anticlockwise; the paddle switches are used to access and adjust the menu. The functionality of these controls change depending upon the currently displayed menu.

1. Rotary key: Rotate to adjust the menu.
2. Page Up/Down key: To turn the menu page up and down.

Monitor Display Tour

Figure 4-43 Monitor Display Tour



1. Institution/Hospital Name, Date, Time, Operator Identification
2. Patient Name, Patient Identification
3. Power Output Readout
4. Probe Identifier. Exam Preset
5. Caps Lock: (lit when on), network connection indicator, system messages display, InSite status, InSite controls
6. Current date and time
7. Active Images screen
8. Delete Image
9. Save As Menu
10. Slide Show
11. Follow Up
12. Image Preview
13. Trackball Controls and Status
14. Image Clipboard
15. Measurement Window
16. Gray/Color Bar
17. Measurement Results Window
18. Measurement Calipers
19. Region of interest
20. Focal Zone Indicator
21. Imaging Parameters by Mode
22. Body Pattern
23. User Configurable Keys
24. P1, P2, P3 keys
25. Cine Gauge
26. Depth Scale
27. 6Tc-RS Probe temperature display
28. 6Tc-RS Probe angle display

Performance Tests

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.

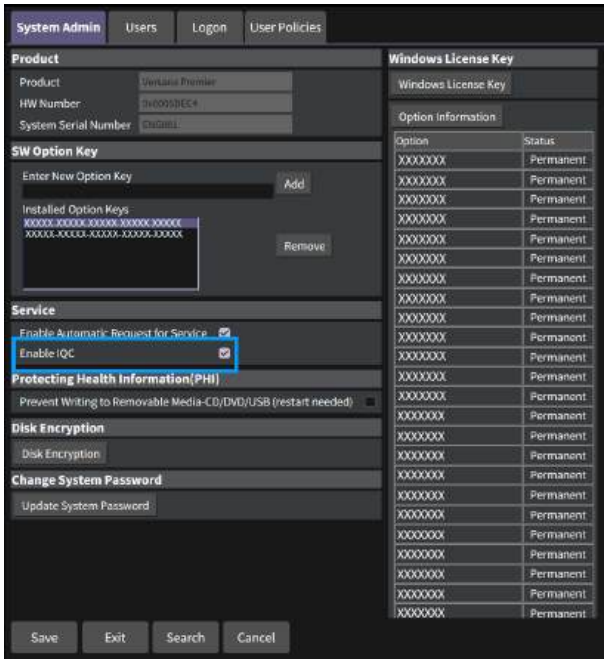
This preset only includes fundamental settings for 2D mode. Processing modes like SRI, Harmonics, etc., are turned off.

To do IQC, follow the steps below:

NOTE
The IQCforService is only visible when service dongle is connected to the system.

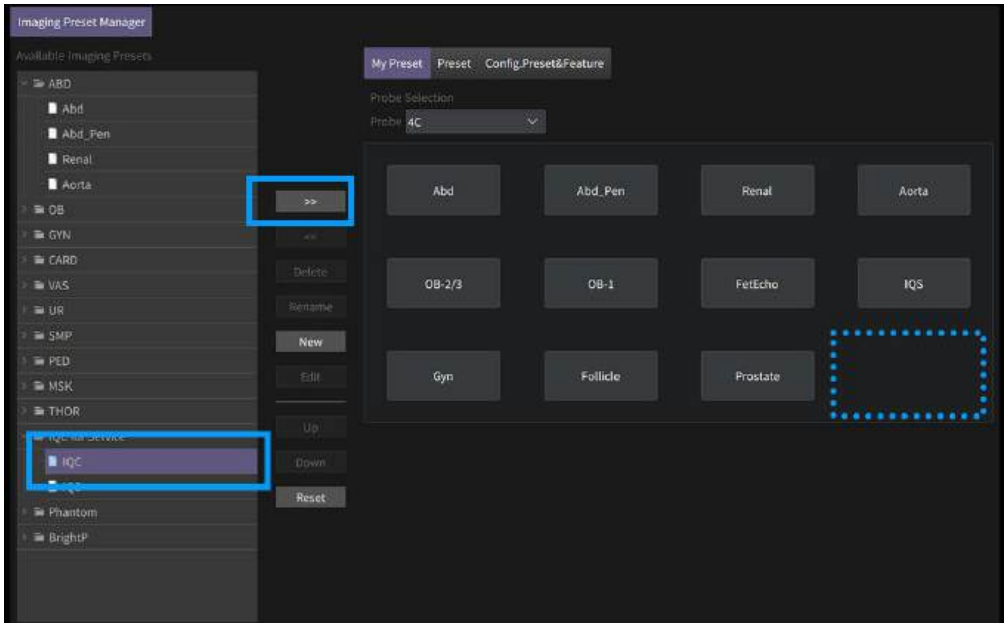
1. Activate IQC via ***Utility*** > ***Admin*** > ***System Admin***. Check the ***Enable IQC*** box. Select ***Save***, then select ***Exit***.

Figure 4-44 Check "Enable IQC"



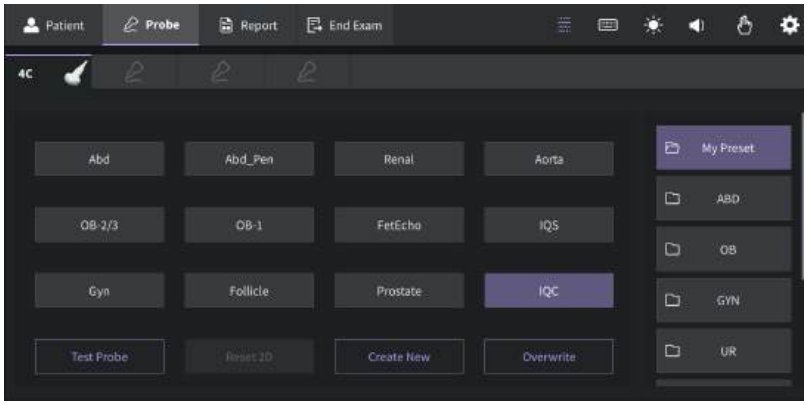
2. Press ***Utility*** > ***Imaging Preset Manager***. Select IQC from the left column, and selece >> to move it to the ***Imaging Preset Selections***. Then Select ***Exit***.

Figure 4-45 Image Quality Check Preset



3. Press ***Probe/Preset*** on the touch panel. Then select ***IQC***.

Figure 4-46 Image Quality Check



Test Phantoms

The use of test phantoms is only recommended if required by your facility's (customer's) QA program.

B Mode Checks

The B Mode is the system's default mode.

B Mode Screen Example

Preparations

- Connect one of the probes.
- Turn ON the scanner.

  The B Mode is displayed (default mode).

Adjust the B mode controls

Press B Mode on the Operator Panel to access B mode.

These Image Controls are used to optimize the B Mode picture. Verify that all the listed controls are working as intended:

- Use ***Gain*** and TGC controls to optimize the overall image together with the Power control.
- Use ***Depth*** to adjust the range to be imaged.
- Use ***Focus*** to center the focal point(s) around the region of interest.
- Use ***Frequency*** (move to higher frequencies) or ***Line Density*** (move to higher line density) to increase resolution in image.
- Use ***Frequency*** (move to lower frequency) to increase penetration.
- Use the Rejection control to reduce noise in the image.

M Mode Checks

M-Mode Screen Example

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 M Mode on the Operator panel to bring up an M-Mode picture on the screen.

  Use the trackball to position the cursor over the required area of the image.

Adjust the M Mode controls

These Image Controls are used to optimize the M mode picture. Verify that all the listed controls are working as intended:

- Adjust ***Horizontal sweep*** to optimize the display resolution.

Adjust ***Gain*** and TGC controls to adjust the range to be imaged.

Adjust ***Compression*** and ***Edge Enhance*** to further optimize the display.

Adjust ***Rejection*** to reduce noise while taking care not to eliminate significant low-level diagnostic information.

Color Mode Checks

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.

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).

Select Color 2D Mode

1. From an optimized 2D image, press ***CF***.
2. Use the trackball to position the ROI frame over the area to be examined.
3. Press ***Set***. The instruction ***Size*** should be highlighted in the trackball status bar. Use the trackball to adjust the dimension of the ROI.

Adjust the Color 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 ***Wall Filter*** to remove low velocity blood flow and tissue movement that reduces image quality.

  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 ***PowerOutput*** 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 ***Threshold*** 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 ***Spatial Filter*** to reduce noise in the color flow area. Spatial Filter smooths the image by averaging collected data along the same horizontal line. An increase of the spatial filter will reduce noise, but this will also reduce the lateral resolution.

Select Color M Mode

1. Select M Mode.
2. Use the trackball to position the ROI frame over the area to be examined.
3. Press ***Set***. The instruction ***Size*** should be highlighted in the trackball status bar. Use the trackball to adjust the dimension of the ROI.

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 ***Wall Filter*** to remove low velocity blood flow and tissue movement that reduces image quality.

  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 ***PowerOutput*** 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 ***Threshold*** 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.

PW Doppler Mode Checks

PW 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 Doppler.

Preparations

- Connect one of the probes to the scanner.
- See *Probe/Connectors Check* on page 185 for info about connecting the probes. For available probes, see *Probes* on page 23:
- Turn ON the scanner

  The 2D Mode window is displayed (default mode).
- If needed, adjust the Display's Brightness and Contrast setting.

  Press ***PW*** to start Pulsed Wave Doppler (PW).

  Use the trackball to select the Area of Interest (Sample Volume) in PW.

Adjust the PW Doppler Mode controls

Adjust the **Active mode gain** to set the gain in the spectral Doppler area.

- Adjust ***Wall Filter*** 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.

  Adjust the ***Compression*** 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.

  Adjust ***Frame rate*** to a higher setting to improve motion detection, or to a lower setting to improve resolution.

  NOTE
  Frequency and Frame rate settings may affect the Low Velocity Reject.

  Adjust ***Power Output*** 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.

  Adjust the following settings to further optimize the display of the image.

  Use the ***Sweep Speed*** to optimize the sweep speed.

  To view signal detail, adjust ***Scale*** to enlarge the vertical spectral Doppler trace.

  Use ***Invert*** to reverse the vertical component of the spectral Doppler area of the display.

  Use ***Angle Correct*** to steer the ultrasound beam to the blood flow to be measured.

Tissue Velocity Imaging (TVI) Checks

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.

Preparations

- Connect one of the probes, to the scanner's left-most probe connector.
- See *Probe/Connectors Check* on page 185 for info about connecting the probes. For available probes, see *Probes* on page 23:
- 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 trackball (assigned function: Pos) to position the ROI frame over the area to be examined.

  Press ***Set***. The instruction Size should be highlighted in the trackball status bar.

  NOTE
  If the trackball control pointer is selected, press ***trackball*** to be able to select between Position and Size controls.
  Use the trackball to adjust the dimension of the ROI.

Adjust the TVI Controls

- 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 to the muscle for all the parts of the ventricle.

  NOTE
  PW will be optimized for Tissue Velocities when activated from inside TVI.

Basic Measurements

NOTE
The following instructions assume that you first scan the patient and then press ***Freeze***.

Check Distance and Tissue Depth Measurement

1. Press ***Measure*** once to display an active caliper.

2. Move the trackball 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 trackball 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.

Before you complete a measurement:

To toggle between active calipers, rotate Cursor Select button.

To erase the second caliper and the current data measured and start the measurement again, press Clear.

NOTE
To rotate through and activate previously fixed calipers, rotate Cursor Select button.

NOTE
After you complete the measurement, to erase all data that has been measured to this point, but not data entered onto worksheets, press Clear.

Probe/Connectors Check

NOTE
Probes can be connected at any time, whether the unit is ON or OFF.

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 probe 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.

CAUTION
TAKE THE FOLLOWING PRECAUTIONS WITH THE PROBE CABELS:

-KEEP AWAY FROM THE WHEELS

-DO NOT BEND

-DO NOT CROSS CABLES BETWEEN PROBES

Table 4-2 Probe and Connectors Checks

Step	Task	Expected Results
1	Select the appropriate connected probe from the probe indicators.	The probe activates in the currently-selected operating mode. The probe's default settings for the mode and selected exam are used automatically.
2	Launch the application. To change application, press Probe key on the Control Panel.	The selected application starts.
3	Verify there's no EMI/RFI or artifacts specific to the probe.	No EMI/RFI or artifacts.
4	Test the probe in each active connector slot.	It will display pictorial data each time.
5	Do a leakage test on the probe, see *Electrical safety tests* on page 333.	It passes the test.
6	Repeat this procedure for all available probes.	

Activating the probe

The probe activates in the currently-selected operating mode. The probe's default settings for the mode and selected exam are used automatically.

Deactivating the probe

1. Press the Freeze key.
2. Gently wipe the excess gel from the face of the probe. (Refer to the User Manual for complete probe cleaning instructions.)
3. Carefully slide the probe around the right side of the keyboard, toward the probe holder. Ensure that the probe is placed gently in the probe holder.

Disconnecting the probe

Probes can be disconnected at any time. However, the probe should not be selected as the active

1. Unlock the probe.
2. Pull the probe and connector straight out of the probe port.
3. Carefully slide the probe and connector away from the probe port and around the right side of the keyboard.
4. Ensure the cable is free.

5. Be sure that the probe head is clean before placing the probe in its storage box.

WARNING
Take the following precautions with the probe cables: Do not bend, be sure to keep probe cables free from the wheels.

ECG Check

The ECG capability on this unit, is intended as use as a trigger for measurements, but can also be viewed on the screen.

Parts needed

- ECG Module

Preparations

None

ECG Check

Table 4-3 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.

Cineloop Check

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.

Preparation

- Connect one of the probes to the scanner.
- See *Probe/Connectors Check* on page 185 for info about connecting the probes
  For available probes, see *Probes* on page 23:
- Turn ON the scanner. The 2D Mode is displayed (default mode).

Adjust the Cineloop controls

- Press ***Freeze***.
  The left and right markers are displayed on either side of the last detected heart cycle on the ECG trace.
- Press ***Freeze***.
  The selected heart beat is played back.
- Press ***Freeze*** to freeze the cineloop.
  Use the trackball to scroll through the acquisition and find the sequence of interest.
- Adjust ***Cycle*** select to move from heart beat to heart beat and select the heart cycle of interest.
  Adjust ***Num cycles*** to increase or decrease the number of heart beats to be played back.

  Adjust ***Left marker*** and ***Right marker*** to trim or expand the cineloop boundaries.

Back End Processor checks

- If all the previous tests have been passed successfully, the Back End Processor is most likely OK.

  If the system seems to be operating erratically, please refer to *Diagnostics/ Troubleshooting* on page 205.

Operator Panel Test

- The Operator Panel is tested when the ultrasound system 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 205.

Peripheral checks

Check that peripherals work as described below:

Table 4-4 Peripheral Checks

Step	Task to do	Expected Result(s)
1.	Press FREEZE	Stop image acquisition.
2.	Press PRINT on the Control Panel	The image displayed on the screen is printed on B&W printer.
3.	Connect with Foot Switch on USB port and press once.	To start image acquisition (the same function as FREEZE key).

Printer checks

The internal printer is controlled from the ***Print*** and ***Store*** keys on the ultrasound system's Operator Panel.

The factory default is:

- ***Print*** for the standard printer
  Store for the screen capture to clipboard

Mechanical Functions Checks

Turn OFF Power to the Ultrsound System

See *Power off* on page 140 for the detail information.

Operator Panel Movement

Please refer to *Monitor Adjustments* on page 204.

Casters (Wheels) and Brakes Checks

Examine the wheels frequently for defects to avoid breaking or jamming.

Table 4-5 Wheel Characteristics

Wheel	Characteristics
Front and Rear	Swivel and Brake

Power Supply test & adjustments

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.

If you appear to have a problem that may be related to the Power Supplies, refer to *System Doesn't Boot (Hang-up)* on page 251,

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.

If you appear to have a problem that may be related to the Power Supplies, refer to *System Doesn't Boot (Hang-up)* on page 251.

Application Turnover Check List

Complete these checks before returning the scanner to customer for use:

Software Configuration Checks

Table 4-6 Software Configuration Checks

Step	Task to do	Notes
1	Verify Date and Time is correct.	
2	Verify that Location (Hospital Name) is correct.	
3	Verify Language settings are correct.	
4	Verify assignment of Print Keys.	
5	Verify all of the customer’s options are set up correctly.	Demo Option strings turn on

Site Log

Table 4-7 Site Log

DATE	SRVICE PERSON	PROBLEM	COMMENTS

My Trainer

My Trainer provides a quick guide to operate the system.

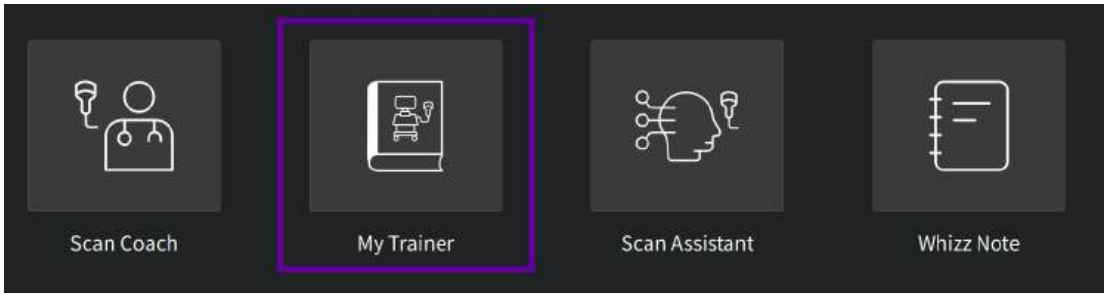
Follow below steps to access My Trainer:

- Press **Alt** + **H** to enter ***My Trainer***.

OR

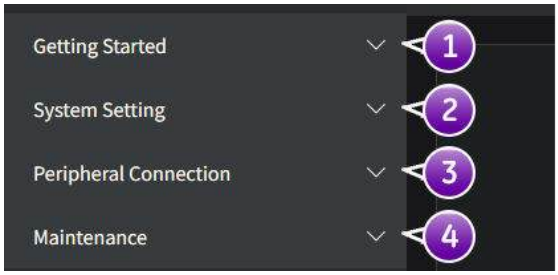
- Press ***Assistant*** key on the control panel, then select ***My Trainer***.

Figure 4-47 Enter My Trainer by Assistant key



There are five sections in My Trainer. The five sections are displayed on the left side of the My Trainer interface.

Figure 4-48 Sections Display



1. Getting Started: Supply Mains Switch, Probe Connection.
2. System Setting: Facility name set up, Date time set up, Enable options check, Language setting, User configuration, User preset.
3. Peripheral Connection: Back panel ports, Wire Connectivity, Wireless Connectivity, Connect to a printer, DICOM worklist setting, DICOM Image storage, Back-up/restore the animal information, software version.
4. Maintenance: Trackball, Contact GE HealthCare service, Connect to Insite, Log export, Air Filter Replacement.
5. New Feature: Latest new features.

My Trainer User Interface

The interface of the My Trainer includes below information:

Figure 4-49 Interface Illustration

1. The product name of the system.
2. Sections. Select the button to expand the section to show the list of subsections.
3. Subsections.
4. The highlighted subsection shows this subsection is currently opened and displayed on the right side.
5. Exit. Press this button to exit this interface
6. The left number shows the current page of the subsection. The right number shows the total pages of the subsection.
7. Illustration with graphic.
8. Text instruction about how to operate.
9. Step Description.

Chapter 5
Components and Functions (Theory)

In this section

Block Diagram and Theory

General Information

The ultrasound system is an ultrasound imaging scanner.

The system can be used for:

- 2D Gray Scale
- 2D Color Flow imaging
- M-Mode Gray Scale imaging
- Color M-Mode
- Doppler
- Different combinations of the above

Signal flow from the Probe Connector Panel to the Front End, to the Mid Processors and Back End Processor and finally to the monitor and peripherals.

System configuration is stored on a hard disk drive and all necessary software is loaded from the hard disk drive on power up.

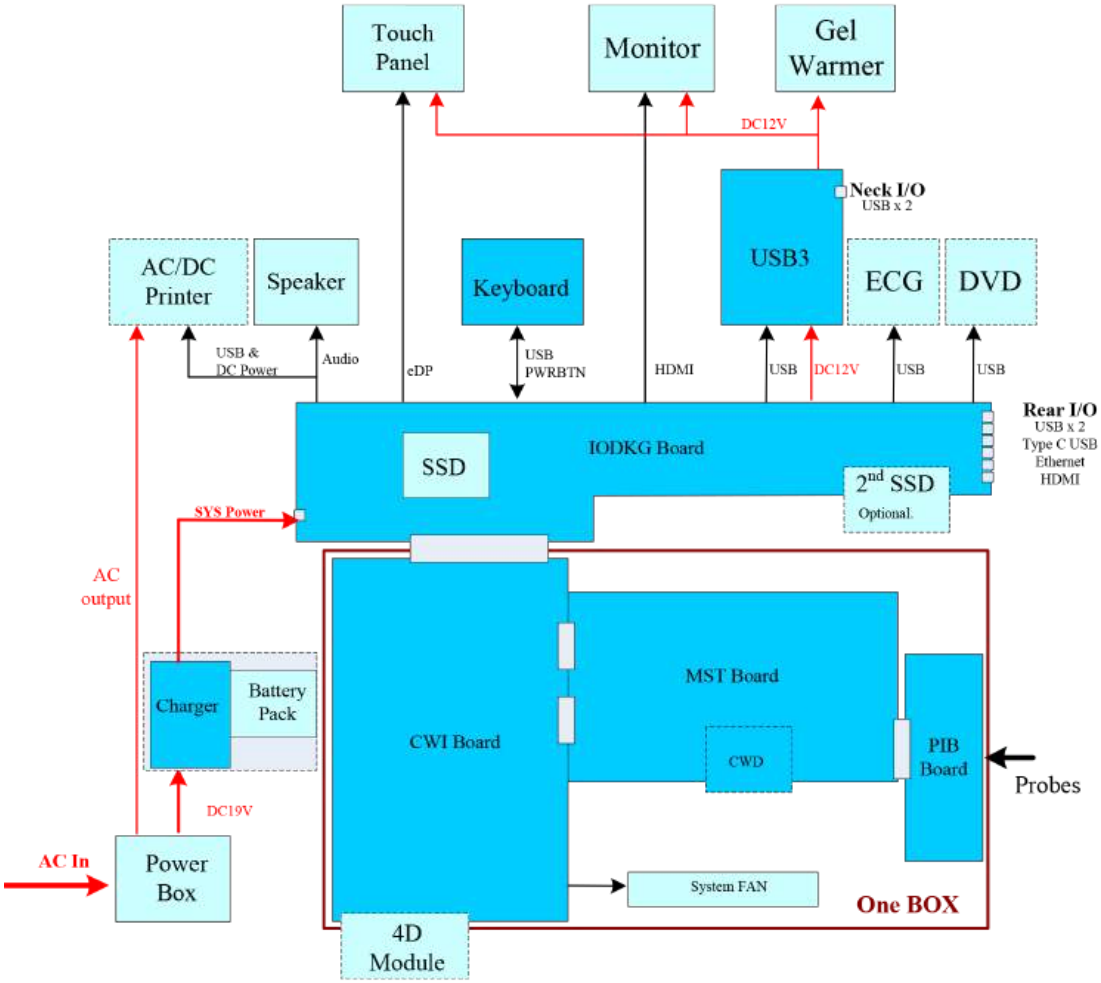
Top Console

The Top Console includes a Standby/On switch, a keyboard, different controls for manipulating the picture quality, controls for use in Measure & Analyze (M&A), and loudspeakers for stereo sound output (used during Doppler scanning).

Block Diagram

System Diagram

Figure 5-1 System Block Diagram



NOTE
The dotted square illustration shows the option parts.

System Diagram Introduction

- The system is composed with top modules, one box and power box which is located at the bottom side of the machine.
- The top modules include Keyboard, Speaker, Gel warmer , Touch Panel, Monitor and optional peripherals (AC/DC printer, ECG, DVD).
- The one box has 4 PWAs: CWI, MST, PIB and CWD(optional). System FANs are assembled in the Box.

- IODKG board is fixed on the mechanical frame, this is the power and I/O signals connection of one box.
- 4D module is mounted on one box.
- The power box includes power switch and ACDC module which provides DC19V power to system.

NOTE
When AC power in, the power is DC19V generated by ACDC of Power Box; When no AC power, and if the machine has battery, the power is from battery.

Common Service Desktop

The Service Desktop is an interface that provides access to system information, status and diagnostics.

The Service Desktop has different content or views depending on the access level. The access level is determined by the user profile as well as the service options enabled on the ultrasound system.

- Basic view is the standard view, restricted only by the user through the user profile settings. Administrator default user has access to the Service Desktop. Any user with "local Service access" in their user profile can have access to this view.
- Class C view is the view enabled by the service options purchased.
  - Service Advanced
  - Service Expert (requires Service Advanced)
  - Service Pro (requires Service Advanced)

User Level of the Service Desktop

Below table shows Service Desktop widgets available for local service user without an SSA Key and without service options.

Table 5-1 User Level of the Service Desktop

Main Menus	Main Sub-menus	Basic View	Class C View Levels		
		Simple	Service Advanced	Service Expert	Service Pro
Home		X	X	X	X
Diags			X	X	
	Run Diags		X	X	
	Diag History		X	X	
Utilities		X	X	X	X
	Change Password	X	X	X	X
	Disk Defragment		X	X	
	Gather Logs	X	X	X	X
	Delete Files	X	X	X	X
	Virtual Console Observation			X	
	Software Reload			X	
	Reset Patient Database			X	
	Clean Userdefs			X	

Main Menus	Main Sub-menus	Basic View	Class C View Levels		
		Simple	Service Advanced	Service Expert	Service Pro
	Network Capture	X	X	X	X
	Third Party License	X	X	X	X
	Checkpoints		X	X	
	Disruptive Mode Utility			X	
	SSH			X	
	Data Transfer	X	X	X	X
	SSA license	X	X	X	X
	System Shutdown		X		
Options		X	X	X	X
Agent Configuration		X	X	X	X

Chapter 6
Service Adjustments

In this section

Preset Region

Only factory default presets are supported. User is allowed to selection region presets according to where the system is used with service support.

Table 6-1 Preset Region

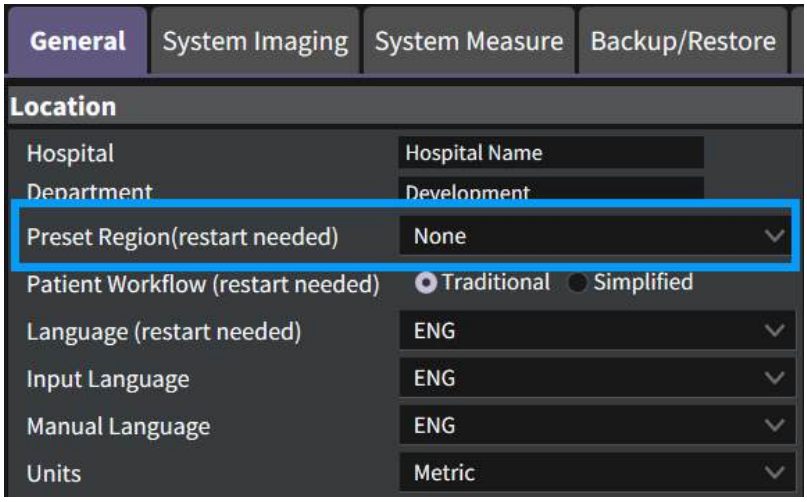
Region	Preset Region
USA, Canada and Latin America	USA_LA Preset
Europe	EU Preset
China	China Preset
APAC	Asia Preset
South Asia	India Preset
Middle East, Africa and other countries	EAGM Preset
Brazil	Brazil Preset

Region presetting procedure

The Region Presetting procedure:

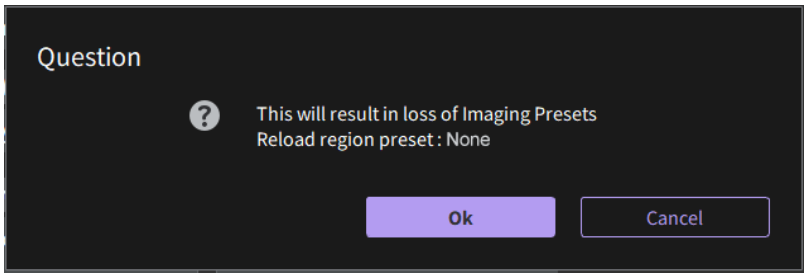
- In ***Utility*** > ***System*** > ***General***, select the correct region from ***Preset Region (restart needed)***.

Figure 6-1 Region Preset



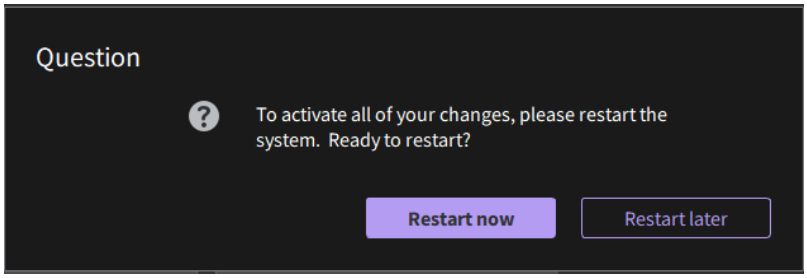
- The window below will display after the region being selected. Select ***Ok***.

Figure 6-2 Quesiton



- After "Ok" is selected, the window below will display. Select ***Ok*** and then restart the system.

Figure 6-3 Restart the system



Monitor Adjustments

Purpose of this section

This section describes how to test and adjust the scanner. These tests are optional. You may use them to check the system for errors.

Monitor Adjustments

Please refer to User Manual for how to adjust the Monitor Position, Brightness and Contrast.

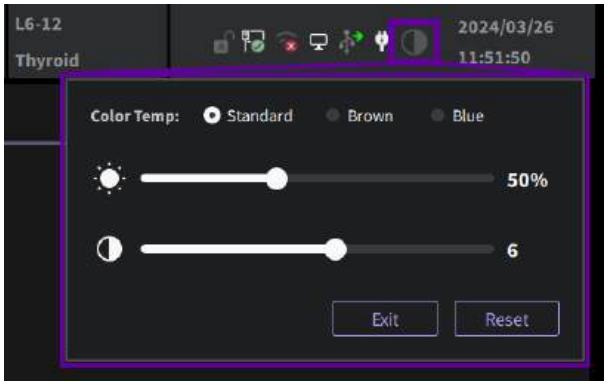
To adjust the brightness and volume:

1. Press the light bar on the Touch Panel to adjust ***Display***, ***Touch Panel***, ***Control Panel*** brightness.
2. Press volume bar on the Touch Panel to adjust volume.

Brightness and Contrast

1. Press ***Cursor*** key on the control panel. Move the trackball to position the cursor over the adjustment icon, then press ***Set*** to display the setting menu.

Figure 6-4 Adjust Monitor Brightness and Contrast



2. Adjust the Color Temperature, Contrast and Brightness by moving the trackball and using ***Set*** key.
3. Press ***Reset*** to return to the default setting; Press ***Exit*** to exit the setting menu.

NOTE
Press ***Reset*** button and the three color temperature settings will return to the default settings.

Chapter 7
Diagnostics/Troubleshooting

In this section

Gathering Trouble Data

There may be a time when it would be advantageous to capture trouble images and system data (logs) for acquisition to be sent back to the manufacturer for analysis. There are different options to acquire this data that would give different results.

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:

Product Name =

From the ***Utility*** > ***System*** > ***About*** screen:

Applications Software

- Software Version
- Software Part Number

System Image Software

- Image Date
- Image Part Number

Additional Information

Collect a Trouble Image with Logs

If the system should malfunction, press the **Alt**+**D** keys simultaneously. This will collect a screen capture of the image monitor, system presets and several log files in a date and time stamped ".zip" file.

NOTE
This function may also be used to make a Print Screen.

This **Alt**+**D** function is available at all times.

When **Alt**+**D** is pressed, a menu box appears that allows for:

1. a place to enter a description of the issue
2. a checkbox to indicate a System lockup
3. a checkbox to include protected information, requires related privilege.

   Only the operator who has be authorized to include protected information in exported logfile from ***Utility*** > ***Admin*** > ***Users*** > ***Operator Rights*** can enable this checkbox.
4. a choice to export a pre-formated CD-R/DVD-R or save to the export directory D: drive (for remote viewing through FFA)
5. Service Log

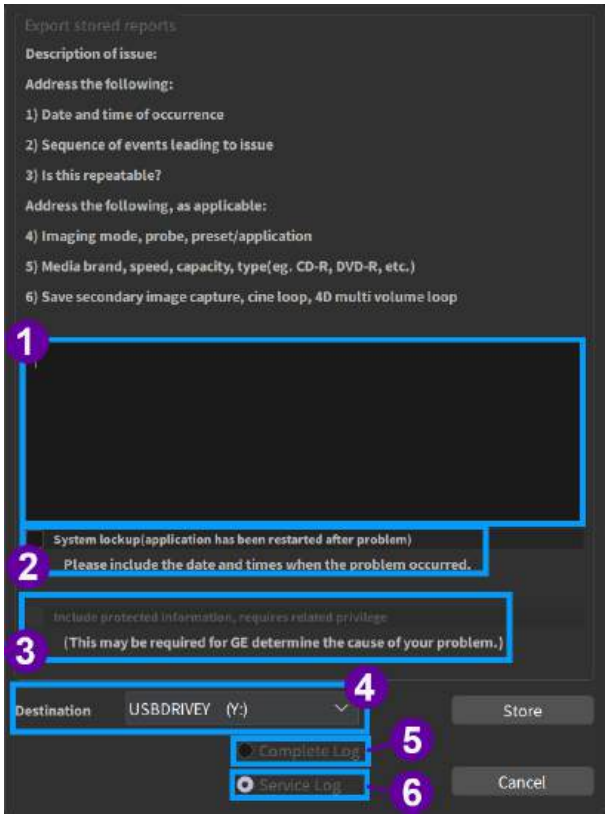
Service related logs, including Power ON/OFF record, system memory monitor record, USB connection record, Network Adapter connection status, etc.

6. Complete Log

   Complete Log includes all software logs except for service related logs listed in Service Log.

   NOTE
   For trouble shooting, please export Complete Log, which contains user operating information, user defined configuration, and internal board temperature/voltage, etc.

Figure 7-1 Alt+D Dialog Box



Screen Capture

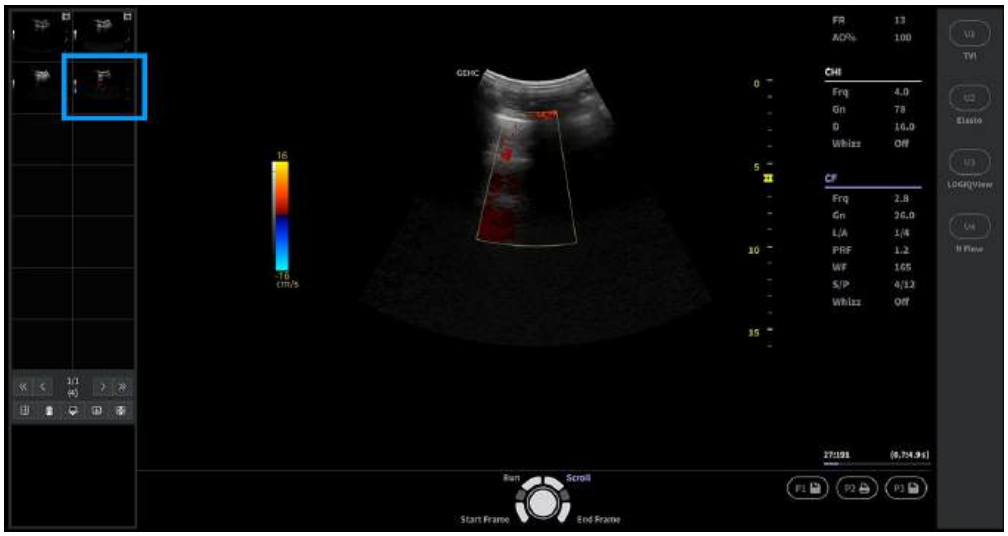
There may be times when the customer or field engineer will want to capture a presentation on the screen. This is accomplished by first saving the image(s) to the clipboard using a Store Key.

Capturing a Screen

The following is a generic process to capture any screen from the scanner:

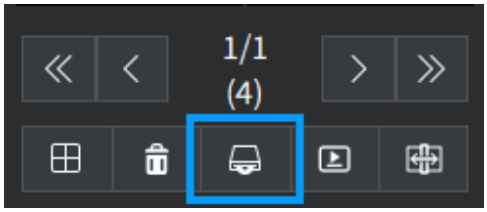
1. Navigate to and display the image/screen to be captured.
2. Press ***Store***. This will place a snapshot of the screen on the “clipboard” displayed at the left side of the scan image display.

Figure 7-2 Select Image to Capture



3. Select and highlight the snapshot to be stored.
4. Select ***Save As*** Icon on the lower left of the image screen.

Figure 7-3 Save As Menu



5. A **Send to**(Simplified Workflow)/**Save**(Traditional Workflow) dialog box will be opened. Choose the archive location to save image on the USB Drive or CD/DVD.

Figure 7-4 Simplified Workflow Send to dialog

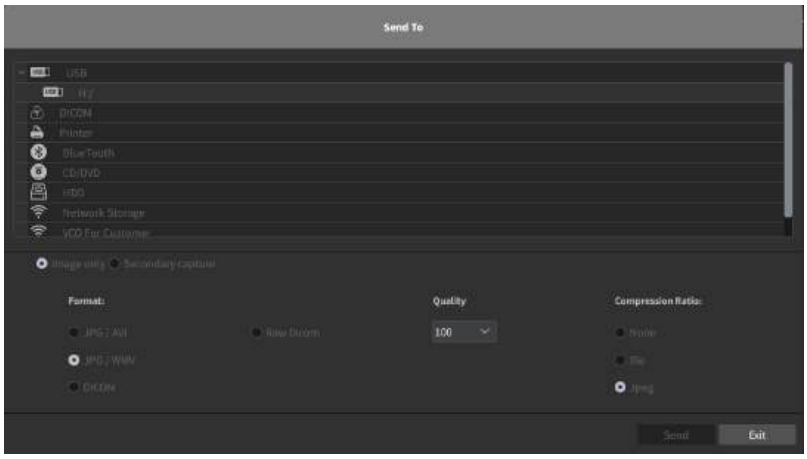
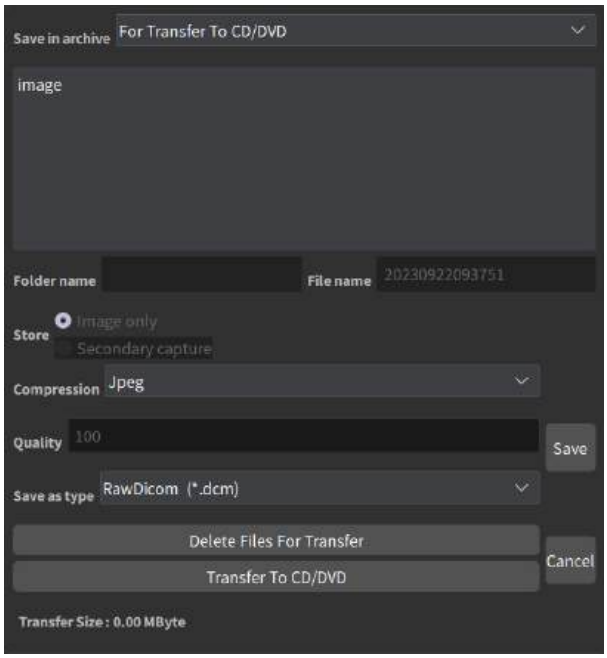


Figure 7-5 Traditional Workflow Save dialog



NOTE
Click ***Save*** > ***Transfer To CD/DVD***, if the archive location is DVD/CD; Click ***Save***, if the archive location is USB.

NOTE
It is better to save the image in Jpeg format. Image of this format can be easily reviewed in the computer.

Capturing a Screen with Service Key

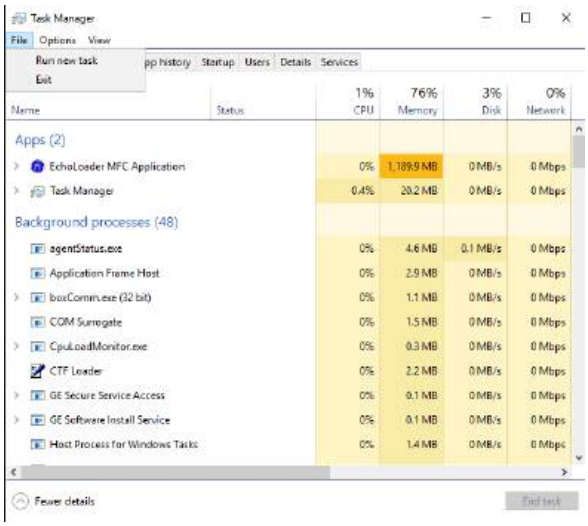
The following is a generic process to capture the whole screen (including the Touch Panel screen) from the scanner:

1. Insert the Service Key in the system's USB port.
2. Press ***Prtsc*** key on the control panel, the whole screen is captured.
3. Press ***Ctrl+Alt+Delete***, the ***Start Task Manager*** dialog is displayed.

   NOTE
   It is also available to Exit to Windows and save the image on the system or removal media.

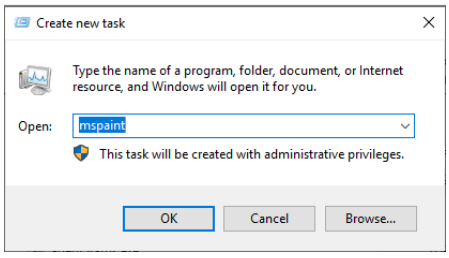
4. In ***Task Manager*** window, select ***File*** > ***Run new task***.

Figure 7-6 Windows Task Manager



5. Type in the program name: ***mspaint***.

Figure 7-7 Create New Task



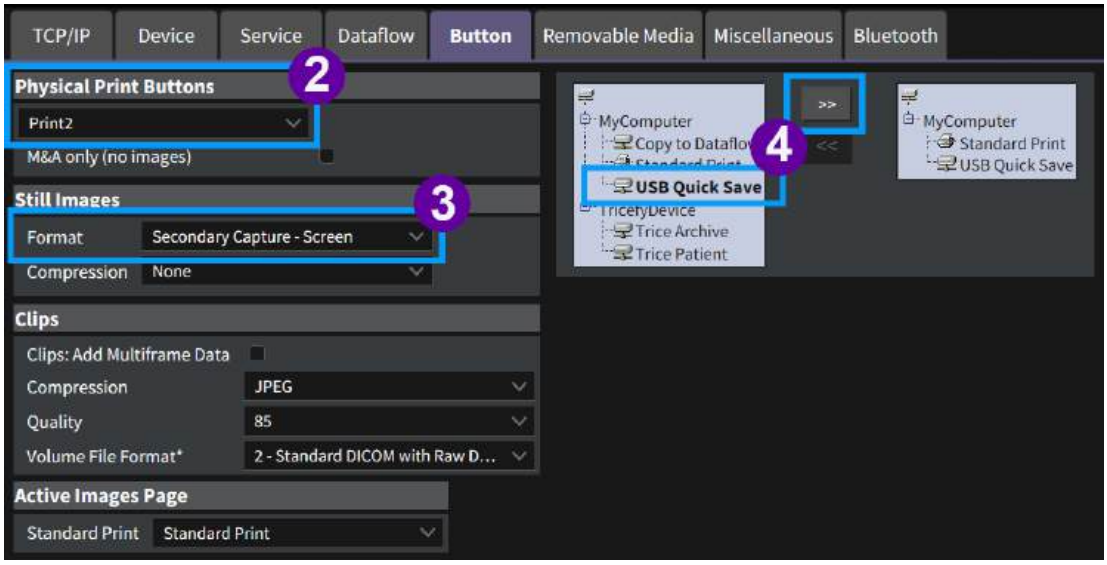
6. The paint screen is displayed, press ***Ctrl+V*** to paste the captured screen. And then save the image in the appropriate destination.

Capturing a Screen by physical print buttons

The following is a generic process to capture the whole screen (not including the Touch Panel screen) from the scanner:

1. Press ***Utility*** > ***Connectivity*** > ***Button*** to configure Physical Print Buttons for the button to capture screens.
2. Select any key from ***Print1***, ***Print2***, ***Print3*** from ***Physical Print Buttons***.
3. Select ***Secondary Capture - Screen*** from ***Format***.
4. Select ***USB Quick Save***, press **>>** to move to right column. Press ***Save*** and ***Exit***.

Figure 7-8 Windows Task Manager

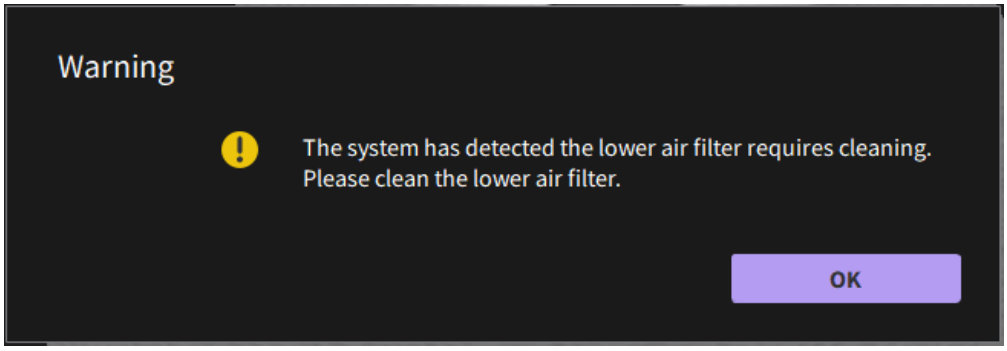


5. After Print key configuration complete, press the configured ***Print*** key, the captured screen will be saved to the USB directly.

System Warning/Error and Logs

Temperature warning

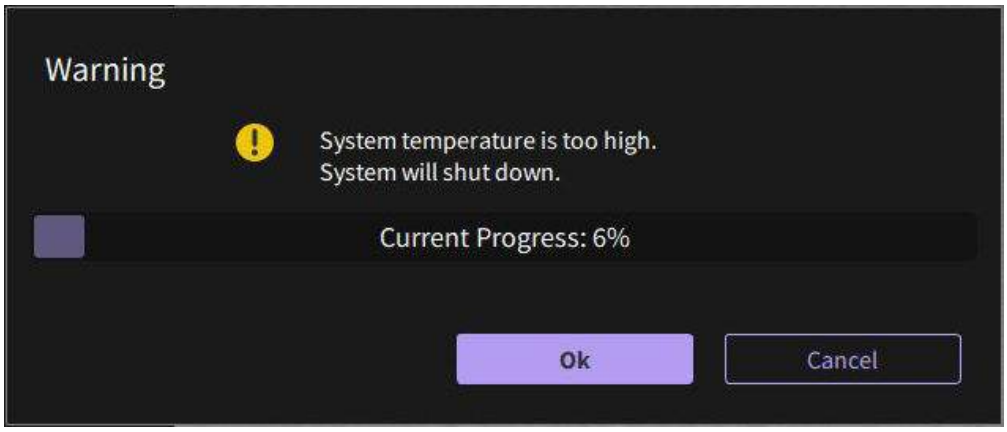
Figure 7-9 Temperature Warning



- Cause: CPU temperature exceeds threshold (95 degrees)
- What to do: shut down the system and clean the filter.

Temperature exceeds threshold

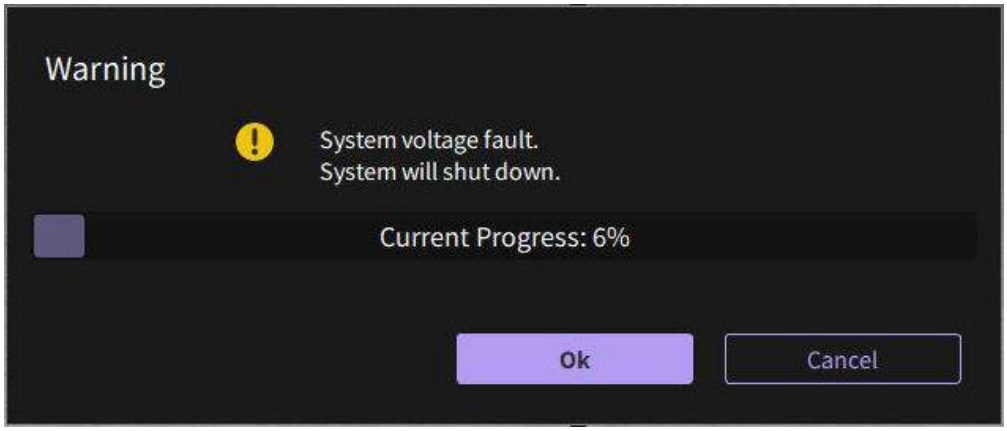
Figure 7-10 Temperature exceeds threshold



- Cause: CPU temperature exceeds threshold (100 degrees) and therefore, system must be shutdown immediately.
- What to do: shut down the system and clean the filter.

System voltage failure

Figure 7-11 System voltage failure

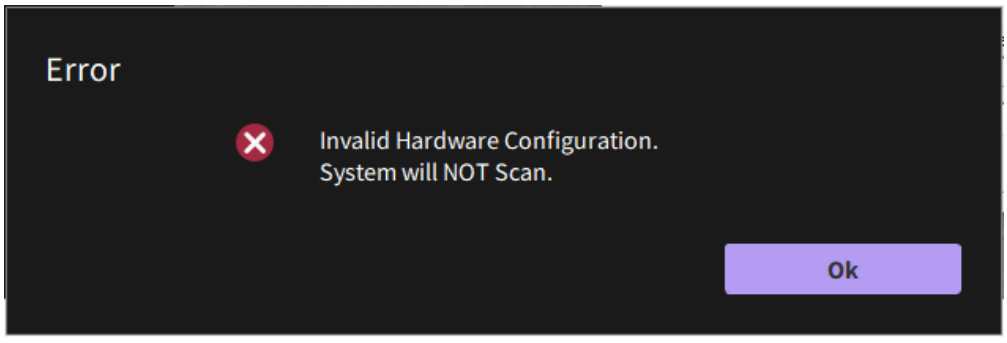


- Cause: Hardware and/or voltage error detected.
- What to do

1. Press OK and reboot the system.
2. if the problem persists, shut down the system, turn OFF the circuit breaker and then reboot the system.

Hardware configuration error

Figure 7-12 Hardware configuration error

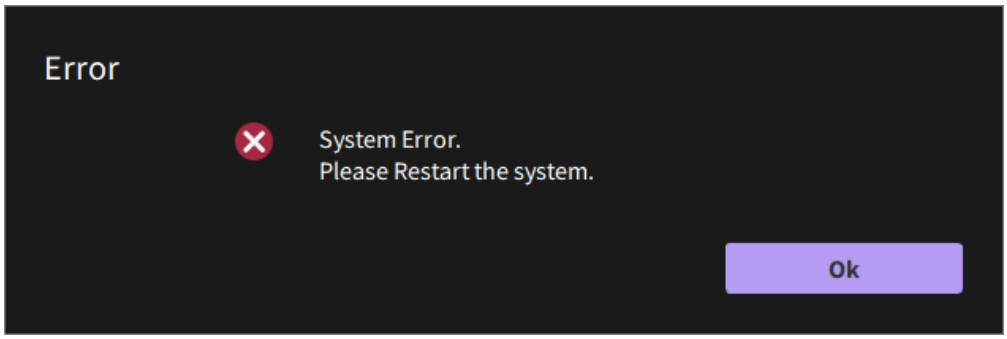


- Cause: Hardware(s) is not detected as valid system. System is able to boot up but not able to scan.
- What to do

1. Press OK and reboot the system.
2. If the problem persists, shut down the system, turn OFF the circuit breaker and then reboot the system.
3. if the problem persists, shut down the system and analyze the log files in Technical Support Mode.

System error

Figure 7-13 System error



- Cause: Hardware(s) is not detected as valid system. System is able to boot up but not able to scan.
- What to do

1. Press OK, turn off the system and then reboot it.
2. If the problem persists, shut down the system and analyze the log files.

Common Service Desktop

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 ultrasound system. 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.

Disruptive mode

Disruptive mode is a way to control interruptions to operation of the ultrasound system. 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 ultrasound system needs to be restarted once the service activity is complete. The message remains until the ultrasound system is restarted. This prevents patient scanning while the ultrasound system is not operating at an optimal status. For example, running a diagnostic may leave the ultrasound system 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 ultrasound system may be limited.
- When Disruptive mode is Off, some service functionality on the Service desktop is not available and user operation of the ultrasound system 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 ultrasound system 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 ultrasound system will not be able to automatically switch Disruptive mode to On. The logged in user (user actually logged on to the ultrasound system) 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:*Disruptive mode* on page 215

Color statuses

Throughout the Service desktop, colors indicate the following:

- Green - Status is normal
- Orange - Status is a warning
- Red - Status is an error

Licenses

With Service Basic Access (Class A), these are the available options:

- HOME
- Utilities
  - Change Password
  - Data Transfer
  - 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
    - Run Diags
    - Diag History
- Utilities
    - Change Password
    - Checkpoints
    - Delete Files
    - Disk Defragment
    - Data Transfer
    - Gather Logs
    - Network Capture
    - SSA License
    - System Shutdown
    - Thirty Party Licenses
- 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 GEHC Service access (Class M) and an SSA key, these are the available options:

- HOME
- Diags
    - Run Diags
    - Diag History
- Utilities
    - Change Password (not available through a remote connection)
    - Checkpoints
    - Clean Userdefs
    - Data Transfer
    - Delete Files
    - Disk Defragment (not available through a remote connection)
    - Disruptive Mode Utility
    - Gather Logs

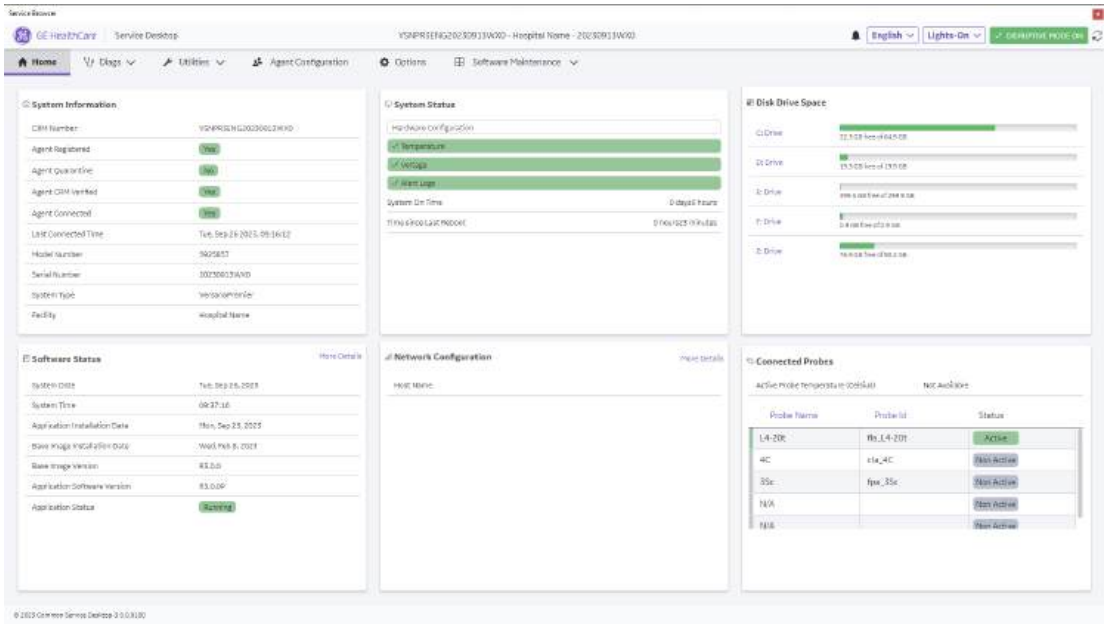
- Network Capture
- Reset Patient Database
- Software Reload
- SSA License
- SSH
- Thirty Party Licenses
- Virtual Console Observation

- Options
- Agent Configuration

Home

Home configurations vary depending upon the purchased service level.

Figure 7-14 Home with Class C and Class M Access



For more information, see:

- *System Information* on page 219
- *Software Status* on page 220
- *System Status* on page 221
- *Disk Drive Space* on page 227
- *Network Configuration* on page 229
- *Connected Probes* on page 230

System Information

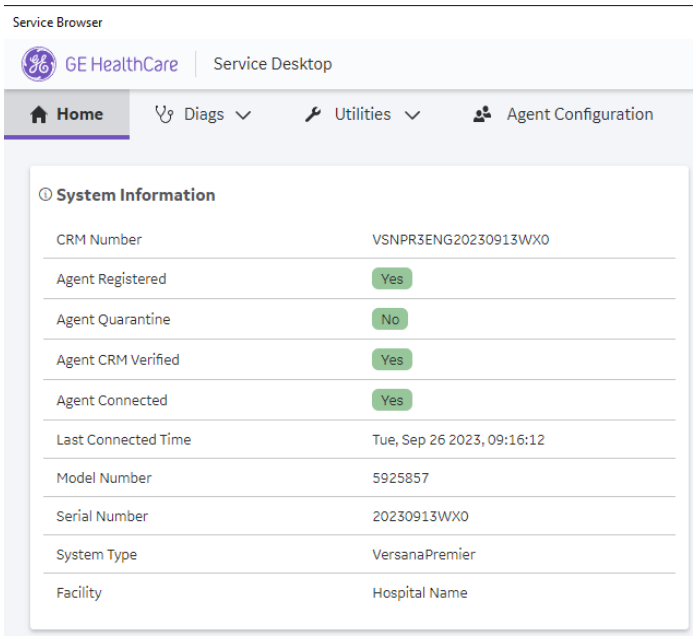
System Information displays general information about the ultrasound system. When the ultrasound system has been successfully configured with the back office, these elements will have the corresponding values:

- Agent Registered will be **Yes**
- Agent Quarantine will be **No**
- Agent CRM Verified will be **Yes**
- Agent Connected will be **Yes**

The information on ***System Information*** is available to all service class licenses.

To access ***System Information***, navigate to ***Utility*** > ***Service*** > ***Home***.

Figure 7-15 System Information



This table shows all the elements available on System Information with descriptions.

Table 7-1 System Information

Element	DESCRIPTION
CRM Number	Customer Relationship Management (CRM) number. System identifier assigned to the customer unit by the region service team.
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.

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.
Agent Connected	Connected status of the agent. Valid values are: • Yes - The agent is connected in the back office. • No - The agent is not connected in the back office. • Not Available - The agent is not running or has not been configured.
Model Number	GE part number for the ultrasound system. The same number as listed on the rating plate.
Serial Number	Serial number of the ultrasound system. The same number as listed on the rating plate.
System Type	Product name of the ultrasound system.
Facility	Name of the hospital or facility where the ultrasound system is installed

For more information, see:*Home* on page 218

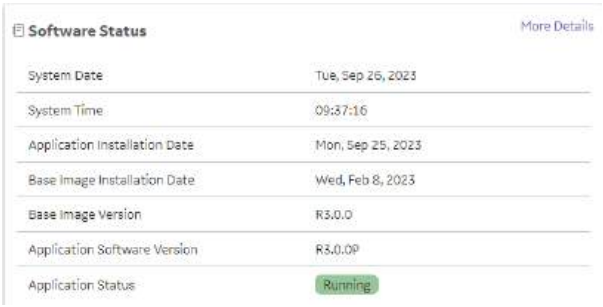
Software Status

Use ***Software Status*** to view general information about the software installed on the ultrasound system.

The information on ***Software Status*** is available to all service class licenses.

To access Software Status, navigate to ***Utility*** > ***Service*** > ***Home***.

Figure 7-16 Software Status



This table shows all the elements available on ***Software Status*** with descriptions.

Table 7-2 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 ultrasound system 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

For more information, see:

- *Home* on page 218

System Status

Use ***System Status*** to view status information on the ultrasound system. Specifically, do the following:

- View the hardware configuration file
- View temperatures for FRUs, fans, and a graphical representation of the monitored temperatures
- View voltages for FRUs and AC
- View the amount of time the ultrasound system has been running
- View the amount of time since the ultrasound system has last been rebooted

The information on ***System Status*** is available to Class C and Class M licenses.

To access ***System Status***, navigate to ***Utility*** > ***Service*** > ***Home***.

Figure 7-17 System Status

This table shows all the elements available on ***System Status*** with descriptions.

Table 7-3 System Status

Element	DESCRIPTION
Hardware Configuration	Displays the contents of the hardware configuration file.
Temperature	Displays the temperature monitoring of the ultrasound system as normal, warning, or error using the standard colors and icons. Includes temperature out-of-spec events including an overall count of event warnings and errors for the last 30 days or the last status checkpoint whichever is sooner. Temperature displays temperature a graph for the configured monitoring points.
Voltage	Displays the voltage monitoring of the ultrasound system as normal, warning or error using the standard colors and icons. Includes voltage out-of-spec events including an overall count of the event warnings and errors for the last 30 days or last status checkpoint whichever is sooner.
System On Time	Displays the time the ultrasond system was turned on.
Time Since Last Reboot	Displays the time the ultrasound system was last rebooted.

Hardware Configuration

Hardware Configuration displays the contents of the hardware configuration file which includes all the vital product data (VPD).

To access ***Hardware Configuration***, navigate to ***Utility*** > ***Service*** > ***Home***, and then under ***System Status***, select ***Hardware Configuration***.

Figure 7-18 Hardware Configuration

This table shows all the elements available on Hardware Configuration with descriptions.

Table 7-4 Hardware Configuration

Element	DESCRIPTION
Component	Hardware component.

Item	Parameter with the vital product data (VPD).
Value	Actual value of the Item.

For more information, see:

- *System Status* on page 221
- *Home* on page 218

Temperature

Use Temperature to troubleshoot problems with monitored FRUs and the fans. Specifically, use these pages:

- FRU Status
- Graphs

To access Temperature, navigate to ***Utility*** > ***Service*** > ***Home*** > ***System Status*** > ***Temperature***.

For more information, see:

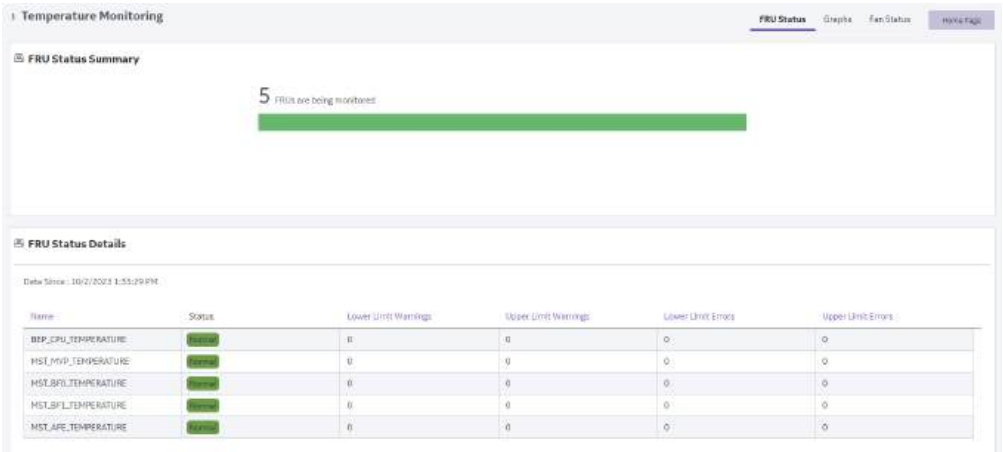
- *FRU Status* on page 223
- *Graphs* on page 224
- *System Status* on page 221
- *Home* on page 218

FRU Status

FRU Status displays a summary of the FRUs being monitored and the details for each FRU.

To access this page, under ***System Status***, select ***Temperature*** and then select ***FRU Status***.

Figure 7-19 FRU Status



This table shows all the elements available on ***FRU Status*** with descriptions.

Table 7-5 FRU Status

Element	DESCRIPTION
FRU Status Summary	Number of the FRUs being monitored.
FRU Status Details	
Name	Name of the FRU.
Status	Status of the FRU. Valid values are: • Normal - Indicates that the FRU is operating within the allowable range. • Warning - Indicates that the FRU is operating close to the limit of the allowable range. • Error - Indicates that the FRU is operating outside the allowable range.
Low Level Warning	Number of low temperature warnings.
High Level Warning	Number of high temperature warnings.
Low Level Errors	Number of low temperature errors.
High Level Errors	Number of high temperature errors.

For more information, see:

- *Temperature* on page 223
- *Home* on page 218

Graphs

Graphs displays trend graphs for selected elements which have been selected as key indicators of overall temperature status inside the card rack.

To access this page, under ***System Status***, select ***Temperature*** and then select ***Graphs***.

Figure 7-20 Graphs

For more information, see:

- *Temperature* on page 223
- *Home* on page 218

Voltage

Use ***Voltage*** to troubleshoot problems with monitored FRUs and the AC voltage of the ultrasound system.

Specifically, use these pages:

- FRU Status
- AC Voltage

To access Voltage, navigate to ***Utility*** > ***Service*** > ***Home***, and then under ***System Status***, select ***Voltage***.

For more information, see:

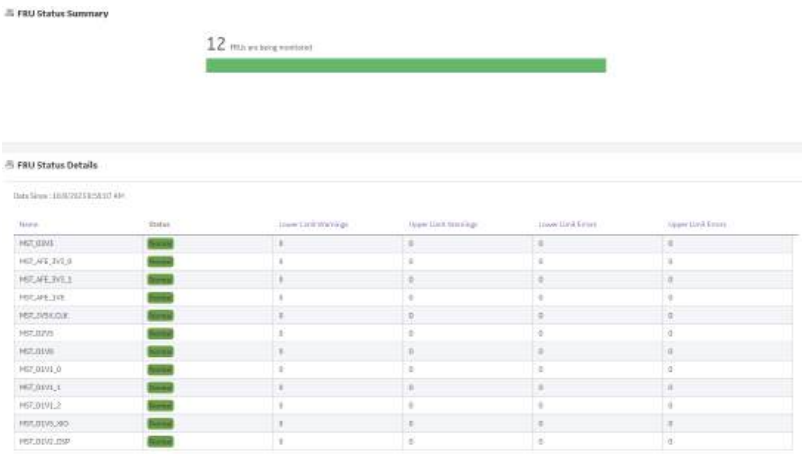
- *FRU Status* on page 223
- *Voltage Graph* on page 227
- *System Status* on page 221
- *Home* on page 218

FRU Status

FRU Status displays a summary of the voltages for the FRUs being monitored and the details for each FRU.

To access this page, under ***System Status***, select ***Voltage*** and then select ***FRU Status***.

Figure 7-21 FRU Status



This table shows all the elements available on ***FRU Status*** with descriptions.

Table 7-6 FRU Status

Element	DESCRIPTION
Name	Name of the FRU.
Status	Status of the voltage for the FRU. Valid values are: • Normal - Indicates that the fan is within the allowable range. • Warning - Indicates that the voltage is close to the limit of the allowable range. • Error - Indicates that the voltage is outside the allowable range.
Lower Limit Warnings	Number of low limit voltage warnings.
Upper Limit Warnings	Number of high limit voltage warnings
Lower Limit Errors	Number of low limit voltage errors
Upper Limit Errors	Number of high limit voltage errors

For more information, see:

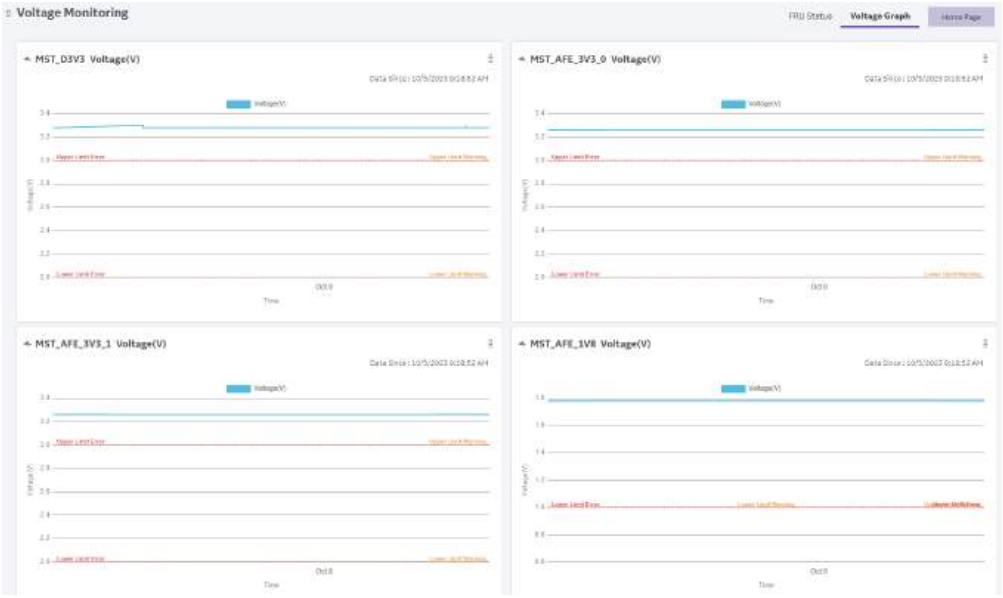
- *Voltage* on page 225
- *Home* on page 218

Voltage Graph

AC Voltage graphically displays the voltage input over a period of time to help identify instabilities,or fault conditions, over time.

To access this page, under ***System Status***, select ***Voltage*** and then select ***Voltage Graph***.

Figure 7-22 Voltage Graph



For more information, see:

- *Voltage* on page 225
- *Home* on page 218

Disk Drive Space

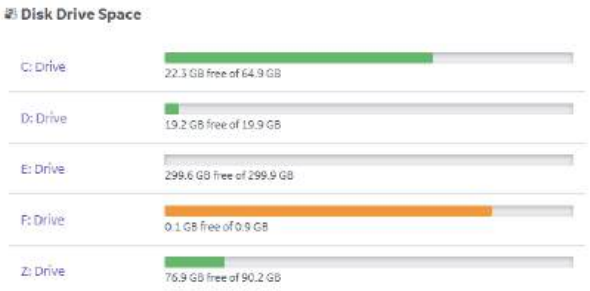
Use ***Disk Drive Space*** to view the hard drive partitions including total size and available free space in GB. Includes the overall health of the drive in one of these colors:

- Red - Available free space is less than 10% of the total size.
- Orange - Available free space is more than 10% and less than 20% of the total size.
- Green - Available free space is more than 20% of the total size.

The information on ***Disk Drive Space*** is available to Class C and Class M licenses.

To access Disk Drive Space, navigate to ***Utility*** > ***Service*** > ***Home***.

Figure 7-23 Disk Drive Space



This table shows all the elements available on ***Disk Drive Space*** with descriptions.

Table 7-7 Disk Drive Space

Element	DESCRIPTION
C: Drive	C: partition shows the graphical representation of the following: • Used space in GB • Available free space in GB
D: Drive	D: partition shows the graphical representation of the following: • Service • Logs. • Temp • Export • Service configuration • Misc • Available free space in GB
E: Drive	E: partition shows the graphical representation of the following: • Patient images • Archive • Printer spooler • Clipboard • Dicom spooler • Misc • Available free space in GB
F: Drive	F: partition shows the graphical representation of the following: • Serial Number • Available free space in MB
Z: Drive	Z: partition shows the graphical representation of the following: • Package repository • Misc • Available free space in GB

For more information, see:

- *Home* on page 218

Network Configuration

Use ***Network Configuration*** to view network (wired and wireless) information (the full ipconfig details) for the network configured with the ultrasound system.

The information on ***Network Configuration*** is available to Class C and Class M licenses.

To access ***Network Configuration***, navigate to ***Utility*** > ***Service*** > ***Home***.

Figure 7-24 Network Configuration with More Details

This table shows all the elements available on ***Network Configuration*** with descriptions.

Table 7-8 Network Configuration

Element	DESCRIPTION
Host Name	Name of the local host for the ultrasound system.
More Details	Displays the ipconfig details
Wired Connection	
IpV4 Address	Local IP address for the wired network connection.
IpV6 Address	Local IP address for the wired network connection.

Subnet Mask	Local subnet mask for the wired network.
Default Gateway	Default gateway for the wired network.
MAC Address	Address for the MAC for the wired network.
Speed (Mbps)	Speed of the wireless connection.
Wireless Connection	
IP Address	IP address for the wireless network connection.
Subnet Mask	Subnet mask for the wireless connection.
Default Gateway	Default gateway for the wireless connection.
MAC Address	Address for the MAC for the wireless connection.
Speed (Mbps)	Speed of the wireless connection
Status	Current status of the wireless connection.

For more information, see:

- *Home* on page 218

Connected Probes

Connected Probes shows probes connected to the ultrasound system. The order on the user interface is top down matching the left-to-right order on the ultrasound system.

The information on ***Connected Probes*** is available to all service class licenses.

To access ***Connected Probes***, navigate to ***Utility*** > ***Service*** > ***Home***.

Figure 7-25 Connected Probes

This table shows all the elements available on Connected Probes with descriptions.

Table 7-9 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 ultrasound system.

Probe ID	Identifier of the probe connected to the ultrasound system.
Status	Statuses of the probe connected to the ultrasound system. Valid values are: • Active • Non Active

For more information, see:*Home* on page 218

Utilities

Utilities configurations vary depending upon the service class.

For more information, see:

- *Change Password for Auto File Transfer* on page 234
- *Delete Files* on page 232
- *Gather Logs* on page 231
- *Network Capture* on page 233
- *SSA License* on page 236

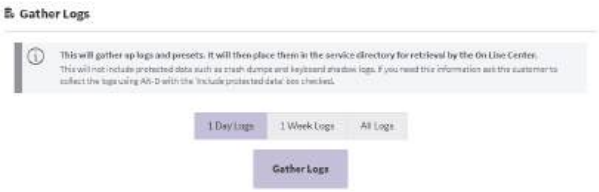
Gather Logs

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 ***Utility*** > ***Service*** > ***Utilities*** > ***Gather Logs***.

Figure 7-26 Gather Logs



This table shows all the elements available on ***Gather Logs*** with descriptions.

Table 7-10 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.

Complete Logs	When selected, gathers all available log files.
Service Logs	When selected, gathers service log files.

To gather log files:

- Navigate to select ***Utility*** > ***Service*** > ***Utilities*** > ***Gather Logs***.

1. Select one of the following:
   - 1 Day Logs
   - 1 Week Logs
   - Complete Logs
   - Service Logs
2. 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.

Figure 7-27 Gather Logs1

For more information, see:

- *Utilities* on page 231

Delete 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 ***Utility*** > ***Service*** > ***Utilities*** > ***Delete Files***.

Figure 7-28 Delete Files

This table shows all the elements available on Delete Files with descriptions

Table 7-11 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 ***Utility*** > ***Service*** > ***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:

- *Utilities* on page 231

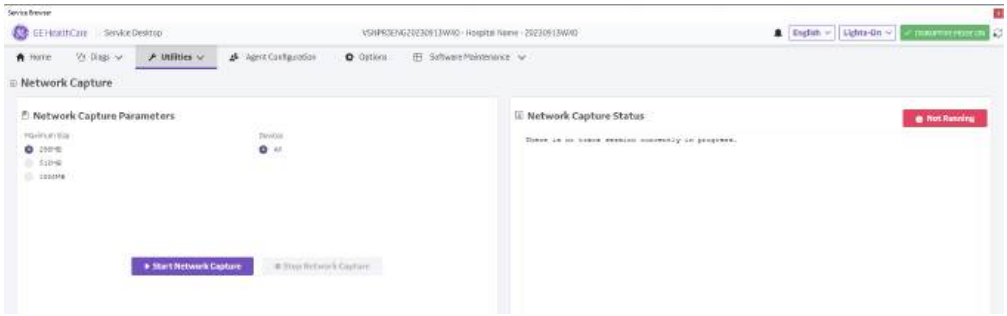
Network Capture

Network Capture displays network traffic between the ultrasound system 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 ***Utility*** > ***Service*** > ***Utilities*** > ***Network Capture***.

Figure 7-29 Network Capture



This table shows all the elements available on ***Network Capture*** with descriptions.

Table 7-12 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	
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 the ultrasound system application software.	
Displays the current status of the network capture. Valid values are: • Not Running • Running	

To perform a network capture:

1. Navigate to ***Utility*** > ***Service*** > ***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:
   - Stops the data collection and immediately closes the .etl file.
   - 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:

- *Utilities* on page 231

Change Password for Auto File Transfer

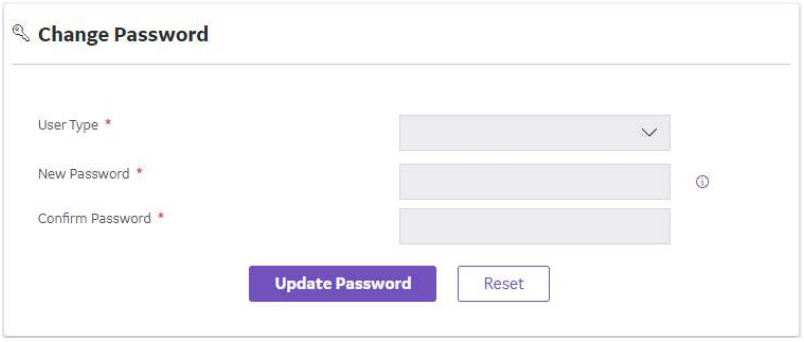
Change Password for Auto File Transfer allows you to change the password for a specified user type.

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 for Auto File Transfer is available to all service class licenses. Change Password for Auto File Transfer is not available through a remote connection.

To access Change Password for Auto File Transfer, select ***Utility*** > ***Service*** > ***Utilities*** > ***Change Password***.

Figure 7-30 Change Password for Auto File Transfer



This table shows all the elements available on ***Change Password*** for ***Auto File Transfer*** with descriptions.

Table 7-13 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 ***Utility*** > ***Service*** > ***Utilities*** > ***Change Password***.
2. Under User Type, select the user.

   NOTE
   Before changing the GEService password (the default is SvcForward123$), make sure the ultrasound system 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 ultrasound system to reflect the password change.

SSA License

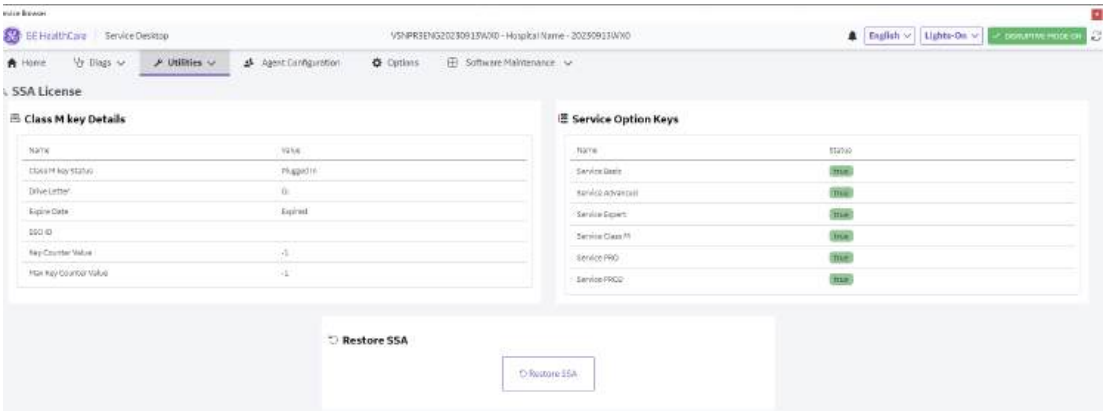
SSA License provides a way to do the following:

- 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 ***Utility*** > ***Service*** > ***Utilities*** > ***SSA License***.

Figure 7-31 SSA License



This table shows all the elements available on SSA License with descriptions.

Table 7-14 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 ultrasound system
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.

Element	DESCRIPTION
Max Key Counter Value	Number of remaining times the SSA key can be used.
Service Option Keys	
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 ***Utility*** > ***Service*** > ***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 ultrasound system.
2. If open, close the Service desktop.
3. Restart the ultrasound system.
4. Once the ultrasound system has restarted, plug in the SSA key.
5. Navigate to ***Utility*** > ***Service*** > ***Utilities*** > ***SSA License***.
6. Click Restore SSA.
7. Check to see if the SSA key validates.

For more information, see:

- *Utilities* on page 231.

Options

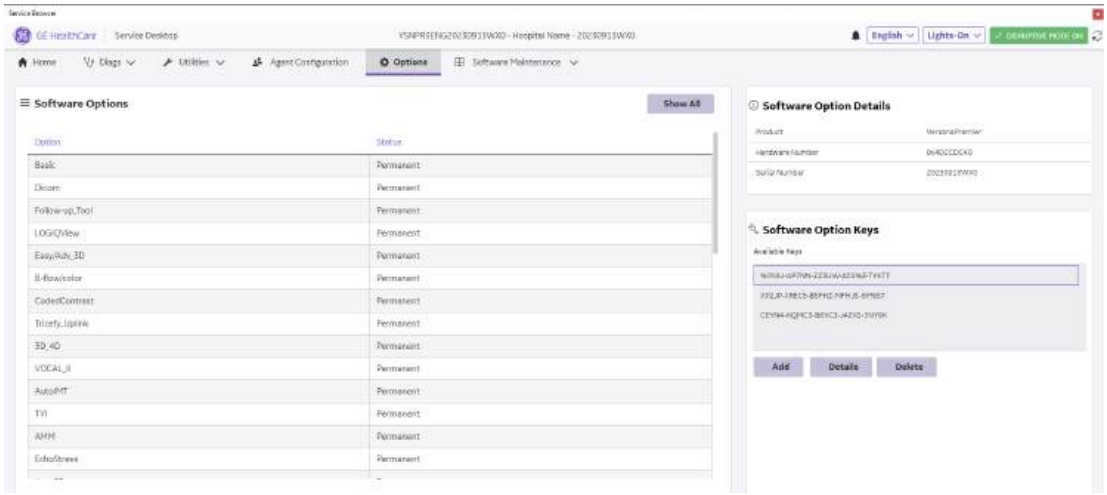
Use Options to:

- 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 ***Utility*** > ***Service*** > ***Options***.

Figure 7-32 Options



This table shows all the elements available on Options with descriptions.

Table 7-15 Options

Element	DESCRIPTION
Software Options	
Option	Software options on the ultrasound system.
Status	Status of the options on the ultrasound system.
Software Option Details	
Product	Name of the product.
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 ultrasound system.
Software Option Keys	
Available Keys	List of the option keys installed on the ultrasound system.

Agent Configuration

Use Agent Configuration to:

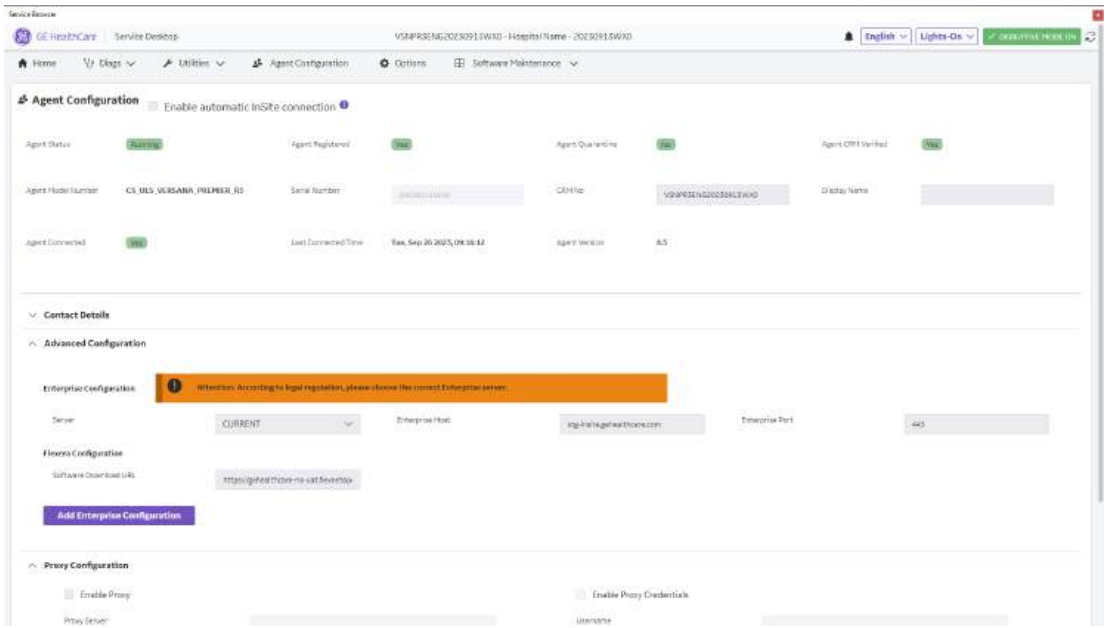
- To enable or disable Auto Connect
- Edit and configure the following:
  - Enterprise host name in the agent
  - Enterprise port number in the agent

  - 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 ***Utility*** > ***Service*** > ***Agent Configuration***.

Figure 7-33 Agent Configuration



NOTE
Make sure production server is selected.

This table shows all the elements available on Agent Configuration with descriptions.

Table 7-16 Agent Configuration

Element	DESCRIPTION
Agent Configuration	
Enable automatic Insite connection	Auto Connect is a feature to enable scanners connect and register to back office automatically instead of manually.
Contact Details	Phone number for the person at the customer site a GEHC 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.

Element	DESCRIPTION
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 ultrasound system. 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 ultrasound system. The serial number of the agent is tied to the serial number of the ultrasound system.
CRM No	Customer Relationship Management (CRM) number. System identifier assigned to the customer unit by the service region. CRM is pre-populated by adding ultrasound system to the CRM number. The CRM number of the ultrasound system is editable.
Display Name	Displayed name of the agent.
Advanced Configuration	
Server	Name of the enterprise server (Staging & Production). **NOTE** Make sure production server is selected.
Enterprise Host	Number of the enterprise host. If user want to use US production server, system will display (insite.gehealthcare.com:443) as default, no actioin required. If user want to use EU production server, user need to type insite-eu.gehealthcare.com:443 manually.

Element	DESCRIPTION
Enterprise Port	Number of the enterprise port.
Proxy 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.

InSite

Use Insite to establish a connection between the Ultrasound system and the GE backoffice (InSite).

NOTE
This device is configured to automatically enable InSite connection to GE HealthCare. For any installations where remote connections are not approved, please disable InSite connection per instructions below.

Insite includes Autoconnect which is enabled by default. When enabled and when the customer allows outbound connections over port 443, the Ultrasound system will automatically connect to Insite so there are no additional steps to perform. Manual configuration is needed in the following scenarios:

- The customer does not allow outbound connections over port 443.
- When password authentication is required.
- When a proxy server is used.
- When a VPN connection is used.

Perform this procedure to manually set up Insite (with Autoconnect disabled).

To Manually configure InSite (without Autoconnect):

1. Navigate to ***Utility*** > ***Service*** > ***Agent Configuration***.
2. Uncheck ***Enable automatic InSite connection***.
3. Configure the fields on the page.
4. Click ***Submit Changes***.

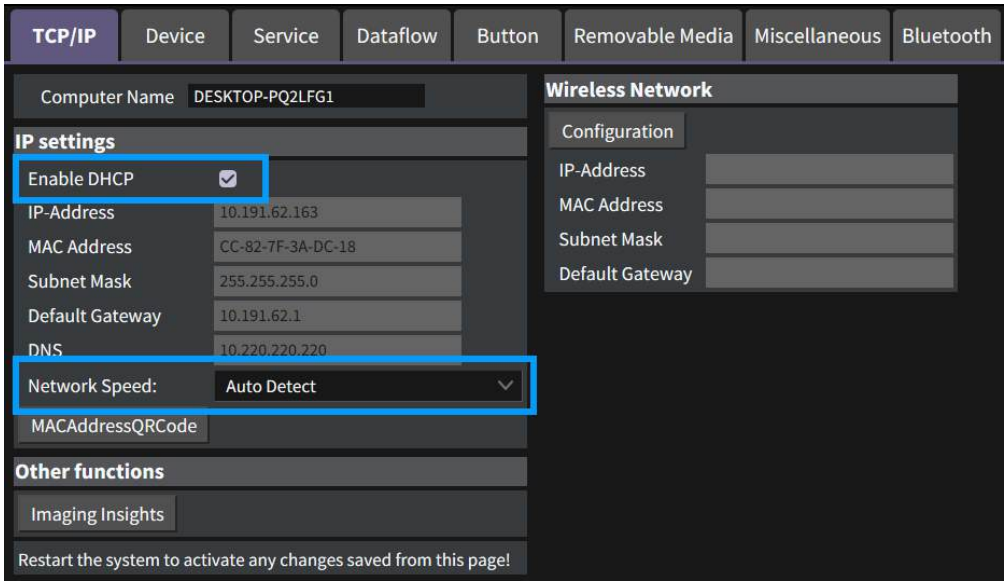
Network and Common Diagnostics

Network Configuration

Wire-LAN Network

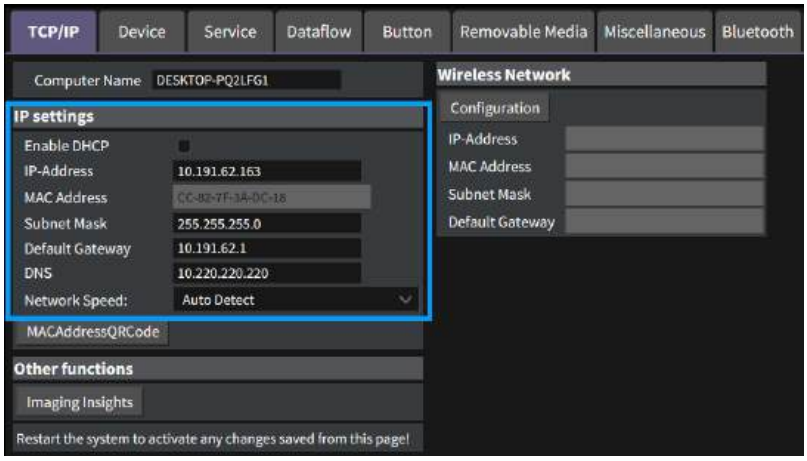
1. Connect system with network.
2. Enter ***Utility*** > ***Connectivity*** > ***TCP/IP***, in IP settings window, check ***Enable DHCP***, and select the proper network speed in ***Network Speed***.

Figure 7-34 Enable DHCP



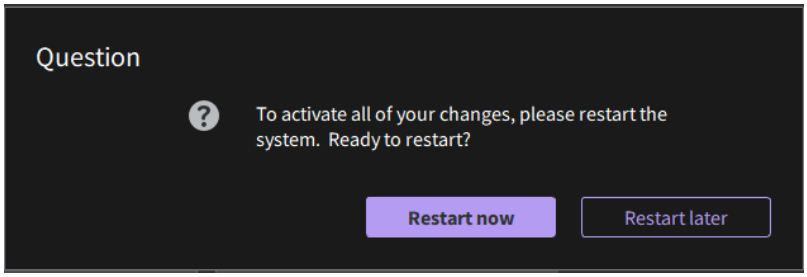
NOTE
If user wants to setup static IP address, uncheck ***Enable DHCP*** option, input static address in ***IP-Address*** box, ***Subnet Mask***, ***Default Gateway*** and ***DNS*** box. In ***Network Speed***, choose the proper speed available.

Figure 7-35 Network Settings



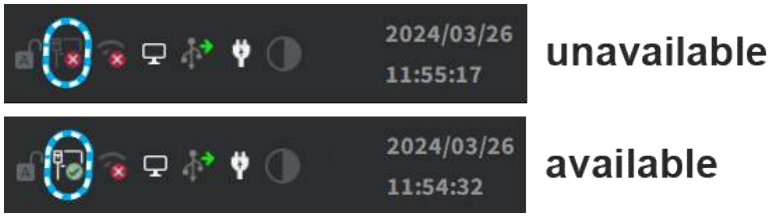
3. Select ***Save***, and a popup window displays. Select ***Restart now*** to restart the system and activate the changes.

Figure 7-36 System Restart inquiry dialog



4. After the system restarts, the network icon on the right top of the screen shows that the network is available.

Figure 7-37 Network icon

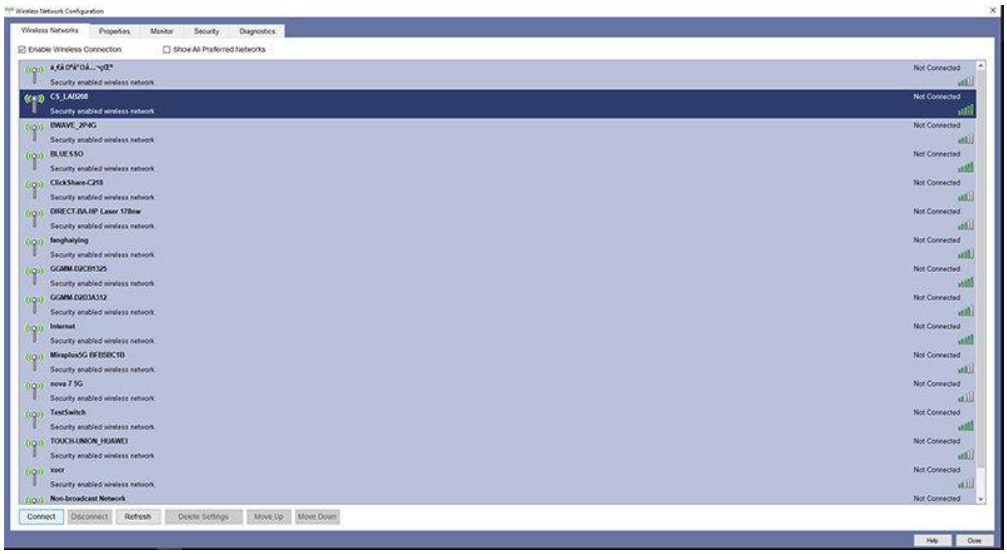


Wireless-LAN Network

NOTE
To configure the Wireless-LAN network, the operator must login as administrator.

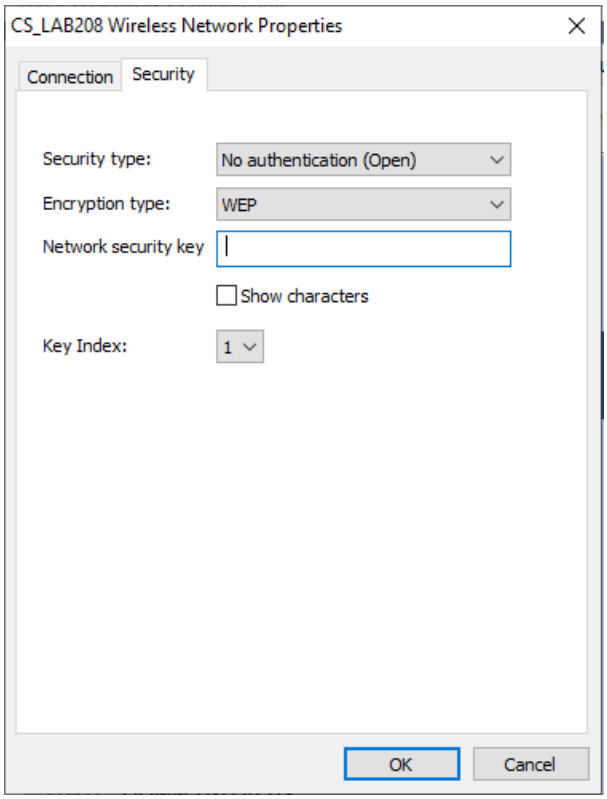
1. Connect the wireless adapter in the USB port.
2. Enter ***Utility*** > ***Connectivity*** > ***TCP/IP***, press ***Configuration***.
3. Double click ***Wireless network*** you chosen, or click the ***Connect*** at the left bottom of screen.

Figure 7-38 Wireless Network Connection



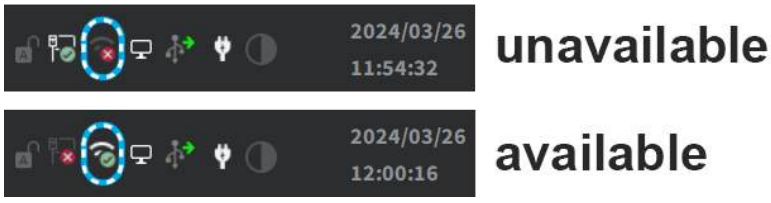
4. ***Wireless Network Properties*** window pops out. Select ***Security*** tab and fill in the information required, then click ***OK***.

Figure 7-39 Connection Status



5. The network icon at the left bottom of screen shows that the wireless network is available.

Figure 7-40 Wireless-LAN Connection



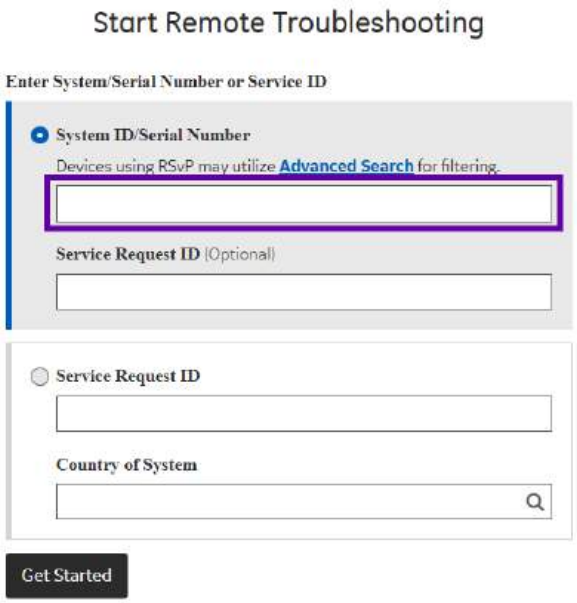
Remote Access

Remote Access is a feature designed to enable OLE's access to customer's desktop remotely, service engineers don't have to be on site to connect the physical dongle to exit to desktop, it's doable remotely by using this feature.

1. In the server side, type the CRM No. of the system which the OLE would remotely connect to, and select ***Get Started***.

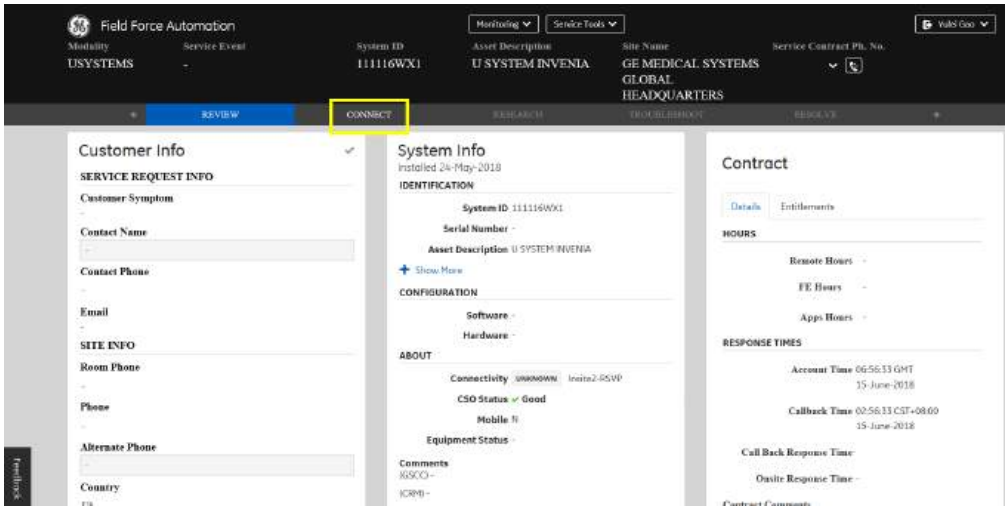
   NOTE
   Remote FFA link: *https://ffa.health.ge.com/#/di/home*.

Figure 7-41 Input System ID



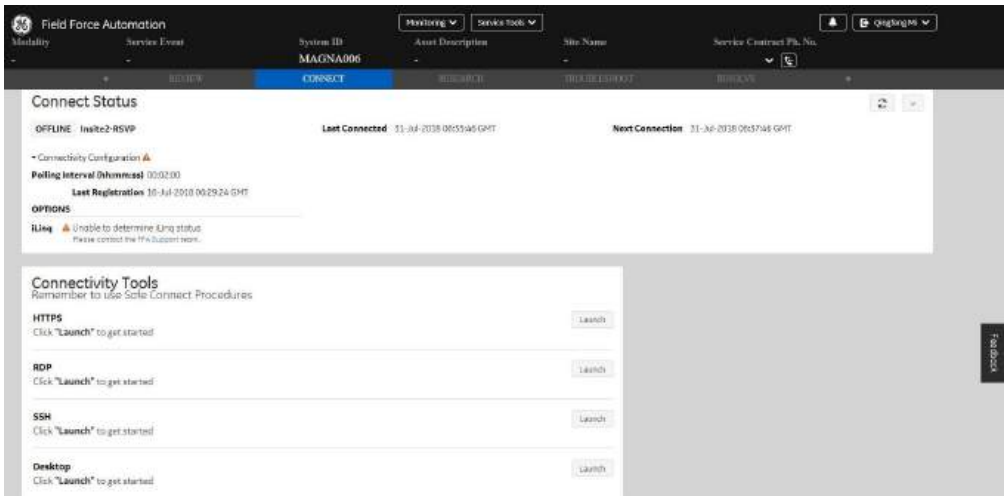
2. Select ***Connect***. Then the Connect page is displayed.

Figure 7-42 Connect Page



3. Select HTTPS to Connect. Then the OLE is remotely connected to the system.

Figure 7-43 Select HTTPS to Connect



NOTE
RDP is not available in ultrasound system.

4. Enter ***Otpions*** to add service option key.

NOTE
Please delete the added service option key when your service work is done.

5. Enter ***Utility*** > ***Disruptive Mode Utility***, select ***Enable.***
6. If we want to see the Scan screen or have control of the unit, we have to go to Virtual Console Observation and start it. Enter ***Utility*** > ***Virtual Console Observation***, select ***Start.***
7. Select Desktop to Connect. Then the OLE is remotely connected to the system.

NOTE
You need to reboot the system before clinical scanning is resumed.

Service Diagnostics

MST board

- MST Swept Demodulator Test performs a signal path test of the swept demodulator FPGA on the MST.
- MST Front End Interface Test tests that the MST can access Front-End boards.
- MST Analog Test.
- MST Memory Access Test tests that MST can access to the internal, external, external cache memory spaces.
- Front End Interface FPGA Test reads the version of the GFE FPGA.

- MST Fixed Demodulator Test: MST Fixed Demodulator signal path test.
- DSP Master Clock Check checks DSP Master Clock.
- MST Swept Demodulator Long Test.
- MST Temperature Test.
- MST Voltage.
- FPGA Internal Memory Test.

  NOTE
  The FPGA Internal Memory test may fail if it is performed with other tests at the same time.

- FPGA Version.

CWI board

- HV STOP Test tests HV-STOP mechanism and checks each board is able to assert HV_STOP using its HV_STOP source.
- CWI Voltage.
- Other Voltage test point.
- Memory tests the memory on the mother board.
- Network Interface.
- Network Interface Reliability Test.
- CPU Temperature Test.

Front End Path

- AFE IF Test checks digital path between AFE chips and FPGA.
- Complex Mixer Test checks the Mixer process chain of FPGA.
- CE Decoder Test checks the Code Excitation Decoder process chain of FPGA.
- Analog CW checks I-Q symmetry of pedof CW beamformer receiving signal.

When AFE IF Test/Complex Mixer Test/CE Decoder Test fail, please try to replace MST. If it doesn't work, please try other PWA. When aCW IQ Symmetry Test fail, please try to replace MST. If it doesn't work, please try CWD or other PWA.

PC Test

- Hard Drive Test Long tests functionality of the hard drive.
- Hard Drive Test Short tests functionality of the hard drive.
- RTC clock:

AVI playback tests playing back an AVI file.

- Click "Play" to run the test. If the test is successful, you will see a brief video clipo with audio. For more information about the test, click "More Information".
- Click "Pass" if the test successfully reproduces the video clip.
- Click "Fail" if the test is unable to successfully reproduce the video clip.
- Click "Cancel" button to quit the test without recording a test result.

Keyboard

- Press each key on the keyboard and it will be added to the History. Hold down a key to test the repeat of that key. To cancel, click Cancel or press Alt-X.
- Special purpose keys like volume control or Internet access keys may not be detected. To test the Fn key of a notebook computer, hold down the Fn key while pressing another key.
- Note: This diagnostic is intended to verify keyboard keys are in good working order. It is not intended to veriy that keyboards produce desired characters.

Monitor Test Patterns

NOTE
Please perform testing for the Touch Panel first and select pass/fail to continue testing for the main display. Then select pass/fail for the main display to complete the diag.

- This test is composed of various elements that verify a monitor functions correctly. To test a monitor feature, click the appropriate button. You can return to this dalog by clicking the mouse button or pressing any key.
- The Combination Test helps you verify your monitor is properly aligned, and set at the correct color depth and resolution. Use the crosshair pattern in each corner of the screen to visually determine if the monitor aligns correctly. If the crosshairs appear distored or out of focus, a problem may exist with the monitor alignment. Use the color spectrum array for visually verifying the monitor color depth capacity. If the colors in the color spectrum do no blend smoothly together, a problem may exist with the monitor color depth. Use the graduated horizontal and vertical alignment bars to determine the monitor resolution capabilities. The better you can discern individual lines as they move closer together, the higher the resolution capabilities of the monitor.
- The Solid Color Test helps point out malfunctioning or dysfunctional pixels using five basic colors: red, green, blue, black, and white. Fill the screen with an appropriate color by clicking the associated button. If a pixedl is malfunctioning, the pixel color will contrast with the color of all other pixels.
- The VESA Test Patterns allow you to test the monitor for proper luminance, geometry and focus. Click the appropriate button to fill the screen with the associated test pattern. You can return to this dalog by clicking the mouse button or pressing any key.

Trackball

- The Mouse Status Test verifies the cursor position and mouse button state. When a mouse button is pressed, the corresponding button on the picture will change color. If the mouse is a wheel or scroll mouse, an arrow will indcate the direction the wheel is being rotated. Clicking the wheel will flash the picture of the mouse in the Mouse Status Test area.
- The Drag and Drop Test verifies a mouse can successfully perform drag and drop operations. Left click the picture of the CD and drag is onto the picture of the drive. If successful, the picture will change.
- The Double Click Test verifies a mouse can successfully perform double-click operations. Double-click on the picture of the monitor. If successful, the picture will change.

Sound Test

Sound Test generates sounds for testing the speakers.

USB Ports Test

USB Ports Test lists USB Devices.

Assessment Utility

Probe Assessment

NOTE
The probe assessment is only available for the probe connected in the first probe port.

1. Place the probe's carrying case on a stable surface and open the case.
2. Carefully remove the probe and unwrap the probe cord.
3. Put the probe 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. Prior to inserting the probe, ensure that the connector locking handle is positioned to the left.
5. Align the connector with the probe port and carefully push into the left-most probe port.
6. Turn the connector locking handle to the right to secure the probe connector.
7. Carefully position the probe cord so it is free to move and is not resting on the floor.
8. Press ***Probe*** button on the control panel and select the first probe from the probe indicators.
9. Enter global service user interface as GE HealthCare service.
10. In the ***Diags*** > ***Run Diags*** > ***ProbeAssessment*** to check the probe.
11. In the ***Diags*** > ***Run Diags*** > ***Diags History*** to check the probe diagnostic results.

CAUTION
Reboot the system after the probe assessment.

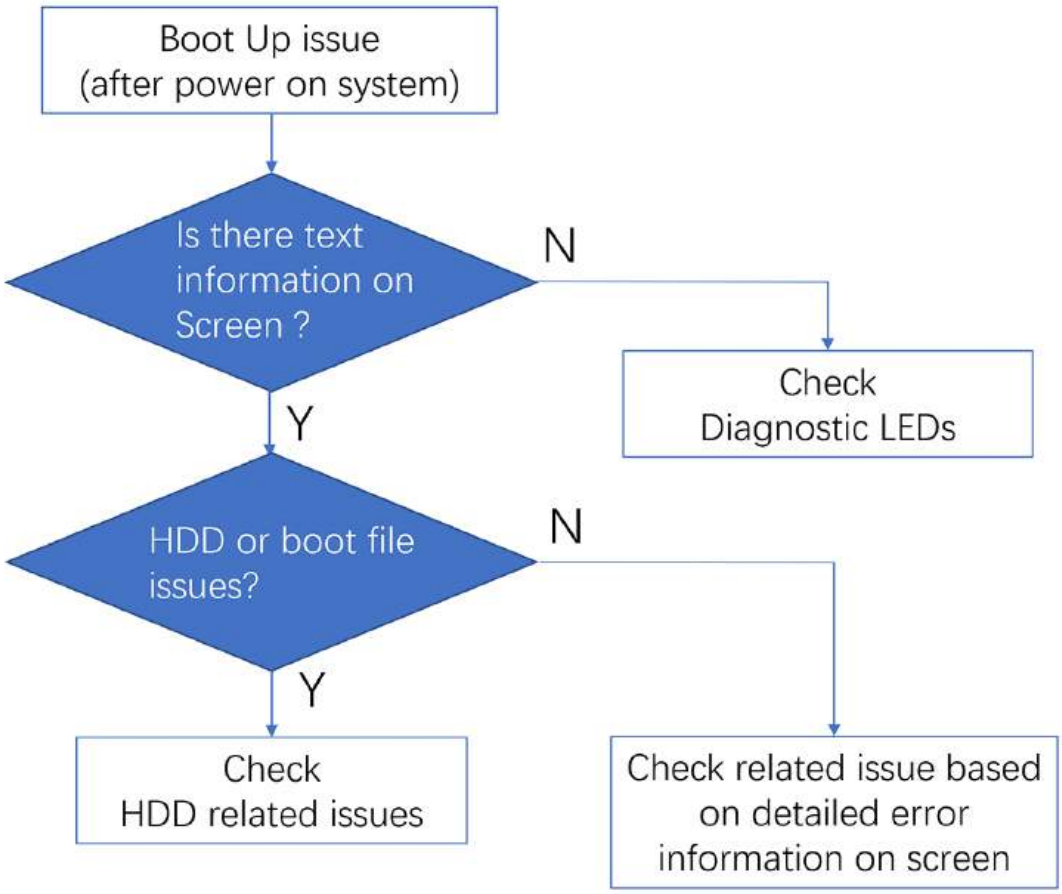
NOTE
The above diagnostic result is just for reference and not used to decide probe defect or not.

Troubleshooting

Console Troubleshooting

System Doesn’t Boot (Hang-up)

Figure 7-44 Boot Up Issue Diagnostic



Diagnostic LEDs

Figure 7-45 Diagnostic LEDs on Real panel

Table 7-17 Diagnostic LEDs

	ON/OFF button(KBD)	LED1	LED2	LED3	Possibly Failure module
Power connected. Power on button not pressed.	No Light	Not Blink	NA	NA	1. ACDC failure or its related cable fail. 2. Charger module failure or its related cable fail. 3. CWI PWA failure. 4. Docking PWA failure.
	White On	Not Blink	NA	NA	CWI PWA failure
	No light	Blink	NA	NA	1. KBDCable Connection failure 2. KBD PWA failure
	White On	Blink	OFF	OFF	This is normal status

	ON/OFF button(KBD)	LED1	LED2	LED3	Possibly Failure module
Power on button pressed	Keep White	Blink	NA	NA	1. KBD Cable Connection failure. 2. KBD PWA failure. 3. CWI PWA failure.
	Green ON	Blink	ON	OFF	CWI PWA failure.
	Green ON	Blink	OFF	ON	1. Docking PWA failure. 2. LCD / TP / Gel Warmer / USB3 failure (caused Docking D12V short)
	Green ON	Blink	ON	OFF	Normal status (after system boot up successfully).

HDD related issues

Table 7-18 HDD related issues

Text information on screen	Possibly Failure module
No hard disk found	HDD not detected, could be HDD, Docking or CWI failure.
No boot file found, please install the system and application software	OS files lost, need re-install SW

Chapter 8
Replacement Procedures

In this section

Warnings and important information

Warnings

WARNING
Energy Control and Power Lockout for the ultrasound system.

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, GEHC 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.

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.

Returning/shipping probes and repair parts

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. GEHC 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.

NOTE
Please remove the battery before system shipment to avoid any potential danger.

Disassembly/Re-assembly

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.

CAUTION
Do wear the ESD wrist strap when you work on circuits.

CAUTION
Be sure to protect the system appearance during replacement procedure, such as using clothes, foam, sponges or cushions, etc.

Tools needed for servicing the ultrasound system

Table 8-1 Standard tools list for the ultrasound system

No	Part Name	Part No.	QTY	Screw Description	Screwdriver Description
1	screw	2159632	2	Screw BH M4x6	Common Phillips Screwdriver
2	screw	2159634	4	Screw BH M4x10 WHT	Common Phillips Screwdriver
3	screw	2327793	135	D2 Screw SJ2836-87 M3x8	Common Phillips Screwdriver
4	screw	2373562	3	Screw M4x10	Common Phillips Screwdriver
5	screw	5138465	10	Screw FH M2.5x5(NL)	Common Phillips Screwdriver
6	screw	5176890	6	Screw DIN965A M4x8	Small Phillips Screwdriver
7	screw	5244775	2	Screw GB T820-2000 M3x8	Common Phillips Screwdriver
8	screw	5342274	4	Inch Screw #6-32UNC	Common Phillips Screwdriver
9	screw	5439265	246	Screw-M4x10	Common Phillips Screwdriver
10	screw	5445720	12	GB 818-2000 M4x30	Common Phillips Screwdriver
11	screw	2337572	2	Screw FH M3x6	Common Phillips Screwdriver
12	screw	5476381	20	Bolt M8x18 with Washer	6# Inner Hexangular Set
13	screw	5476387	34	Bolt M6x15 with Washer	5# Inner Hexangular Set
14	screw	5476394	5	Bolt M8x30	6# Inner Hexangular Set
15	screw	5476438	14	Bolt M8x36 With Washer	6# Inner Hexangular Set

No	Part Name	Part No.	QTY	Screw Description	Screwdriver Description
16	screw	5476440	17	Bolt M6x24 With Washer	5# Inner Hexangular Set
17	screw	5477579	2	Screw_DIN912 M6_20	5# Inner Hexangular Set
18	screw	5490719	4	Screw PM SW4x8	Common Phillips Screwdriver
19	screw	5491747	1	Screw Pan Head M4x4	Common Phillips Screwdriver
20	screw	5491847	2	Hand Screw M2p5x5	by hand

NOTE
Please use the correct Screwdrivers listed in *Table 8-1 Standard tools list for the ultrasound system* on page 258.

Overview of the Ultrasound System

NOTE
The graphics of the ultrasound system in this manual are for illustration purpose only, real system may vary with different configuration.

Figure 8-1 Ultrasound system overview - example

1 LCD Monitor
2 Touch Panel
3 Gel Bottle Holder/Gel Warmer
4 Control Panel
5 Probe Holder
6 Flexible Cable Hook/Cable Hook
7 Printer & DVD Box
8 Body Left and Right Cover
9 Probe Connector
10 Speaker
11 Rear Handle
12 Rear Panel
13 Wheel
14 Flexible Arm / Fixed Arm
15 Back side Accessory Tray (Option)
16 Back side Accessory Box (Option)

NOTE
The console graphics in this manual are only for illustrational purposes. Refer to the system for actual appearance.

Loading the software

Purpose of this section

This section describes how to reinstall software on the ultrasound system.

Customer provided prerequisite

- Formatted and labelled media for Images storage.
- Formatted and labelled media for Patient Archive and Presets (User Defined Settings).
- Password for the user ADM.

Data Management - moving all images

CAUTION
An error, or a power loss may occur.

Always backup the Patient Archive and the Presets (System Configurations) before loading the software!

In order to complete a successful restore of the Patient Database, as needed after a SSD replacement, or if all the content on the hard disk has been erased, the images must be moved away from the ultrasound system before doing backup of the Patient Database.

Depending on the location set-up, either move the images to a remote server or to removable media like CD, DVD, removable HDD or USB media.

- Move the images to a remote server or to removable media.

  For instructions, please see “Disk management” in the User Manual.

Backing up the Patient Archive and System Configurations

CAUTION
An error, or a power loss may occur.

Always backup the Patient Archive and the Presets (System Configurations) before loading the software!

In order to complete a successful restore of the Patient Database, as needed after a hard disk replacement, or if all the content on the hard disk has been erased, the images must be moved away from the ultrasound system before doing backup of the Patient Database.

Depending on the location set-up, either move the images to a remote server or to removable media like DVD or CD discs.

- Backup the Patient Archive and System Configurations.

For instructions, please see “Data Backup and Restore” in the User Manual.

Restoring up the Patient Archive and System Configurations

NOTE
It is not suggested to manually delete the files in D:\Scanner\target\resources\userdefs.

WARNING
To avoid not being able to connect to Local Archive, connecivity.res and IPSave in “D:\Scanner\target\resources\userdefs” should not be deleted. If they are deleted, refer to Proprietary Service Manual to rewirte the serial number.

Recording important settings and parameters

CAUTION
It is considered to be best practice to always keep a record on paper of the settings for the ultrasound system. Verify if it is current before you start to load software!

Always keep a record of the settings for the ultrasound system on paper. Verify if it is current before starting a software loading! If needed, record the settings.

This subsection includes descriptions for recording data from the following screens:

Data Backup

NOTE
The screen graphics in this manual are only for illustrational purposes. Actual screen output may differ with different users' systems.

CAUTION
An error, or a power loss may occur.

Always backup the Patient Archive and the Presets (System Configurations) before loading the software!

NOTE
For the upgrade option Load the complete disk or Load the bootable C: partition only, the information for Computer name will be lost. Before upgrade, backup these information.

1. Record the information for Computer name and Network Speed in ***Utility*** > ***Connectivity*** > ***TCP/IP***. Refer to *Table 8-2 Record Table* on page 262.

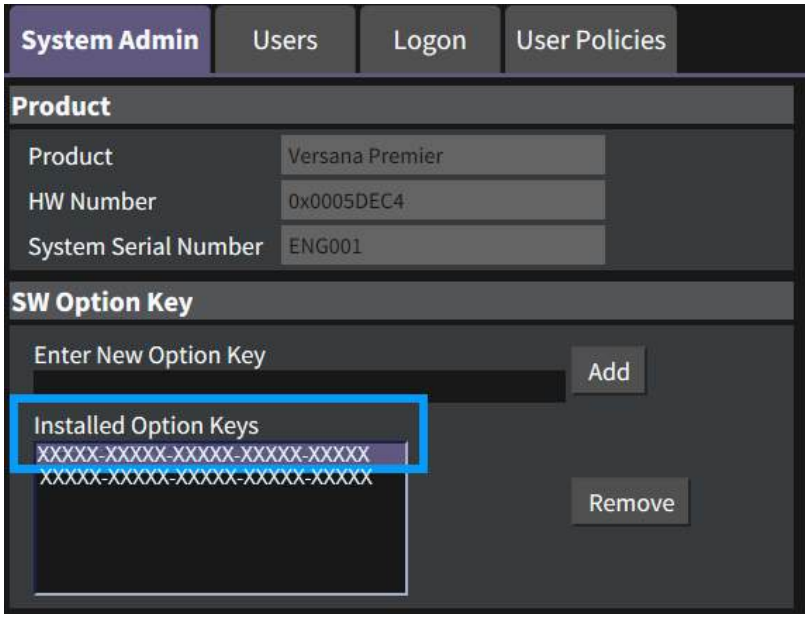
Table 8-2 Record Table

Item Name	Setting
Computer Name	

Item Name	Setting
Network Speed	

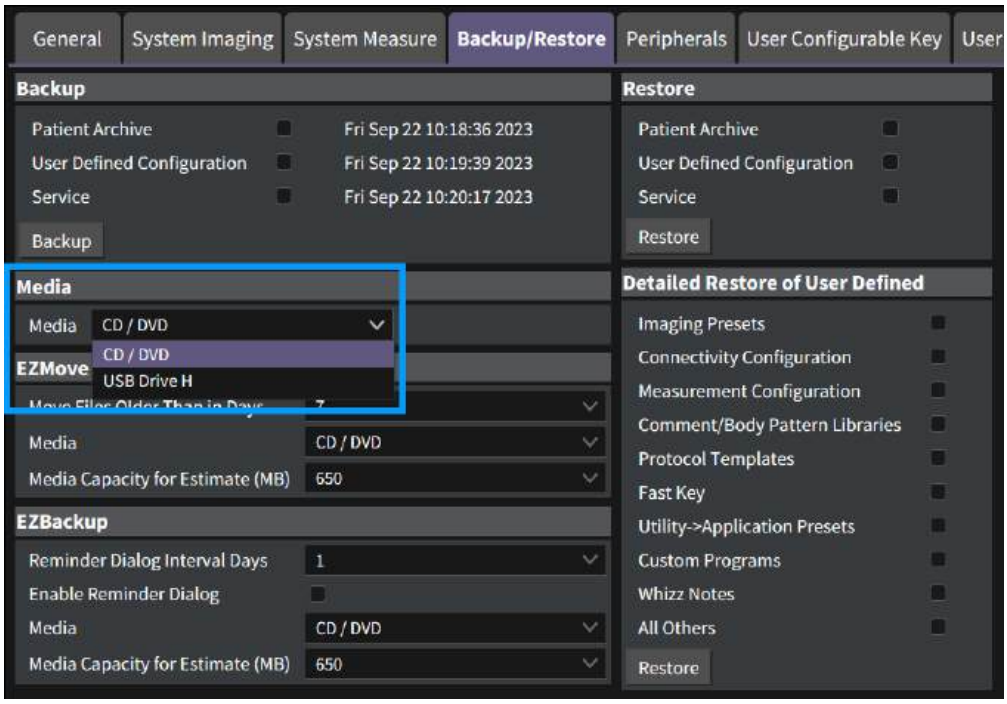
2. Record the installed option keys in ***Utility*** > ***Admin*** > ***System Admin***.

Figure 8-2 Option Key



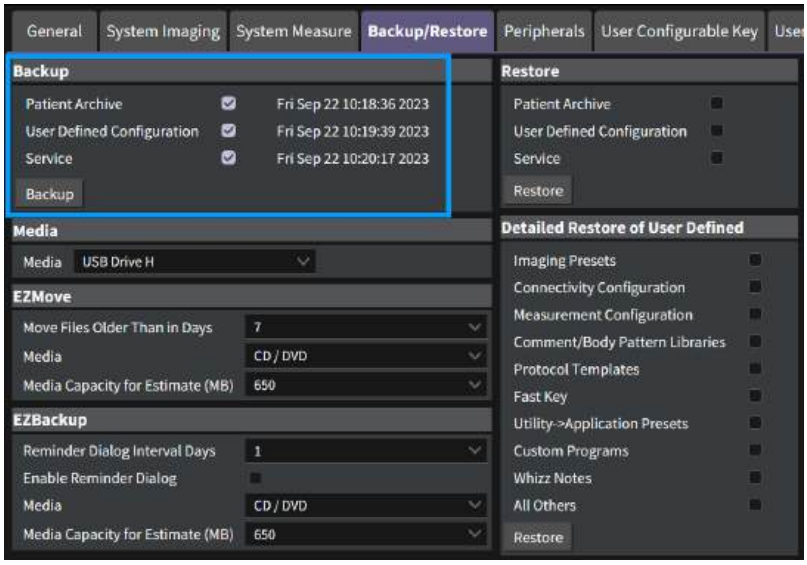
3. Insert the backup media. Go to ***Utility*** > ***System*** > ***Backup/Restore*** > ***Media*** to select the media.

Figure 8-3 Media Menu



4. Go to ***Utility*** > ***System*** > ***Backup/Restore***, select ***Patient Archive***, ***User Defined Configuration*** and ***Service*** under Backup by placing a check mark in front of them. Then select ***Backup*** to backup the information.

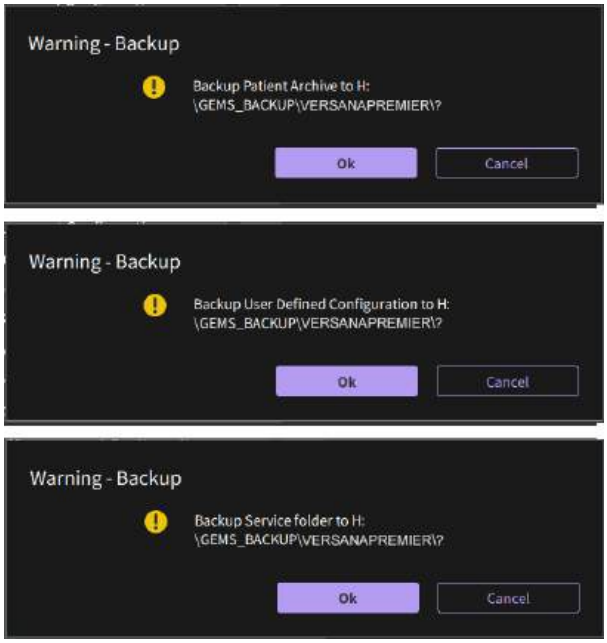
Figure 8-4 Backup Menu



5. Select ***OK*** to backup the system information when the following pop-up warning windows display.

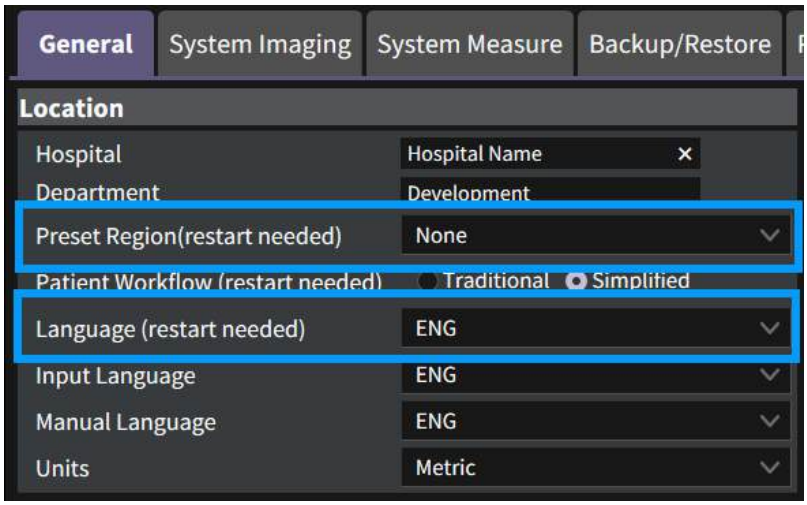
NOTE
After Patient Archive, User Defined Configuration and Service backup, remove all the external USB devices.

Figure 8-5 Backup Confirmation message



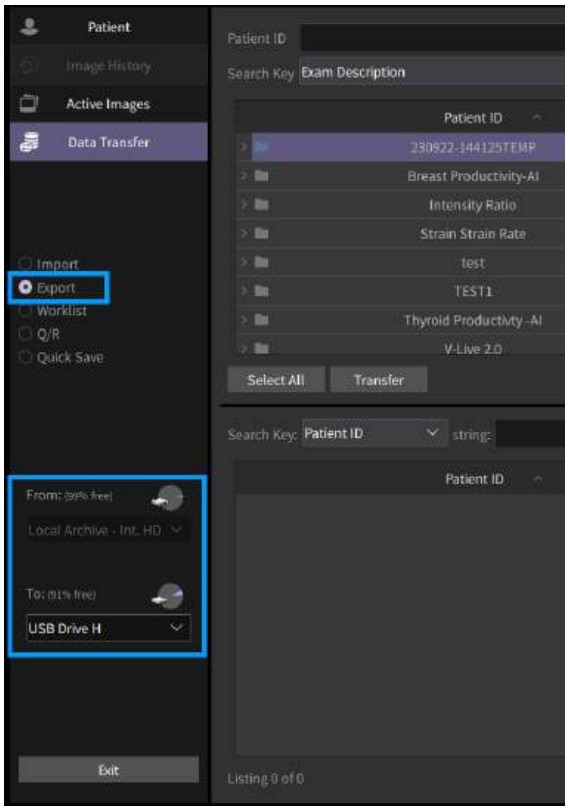
6. Go to ***Utility*** > ***System*** > ***General***, record the ***Preset Region*** and the ***Language***.

Figure 8-6 Preset region



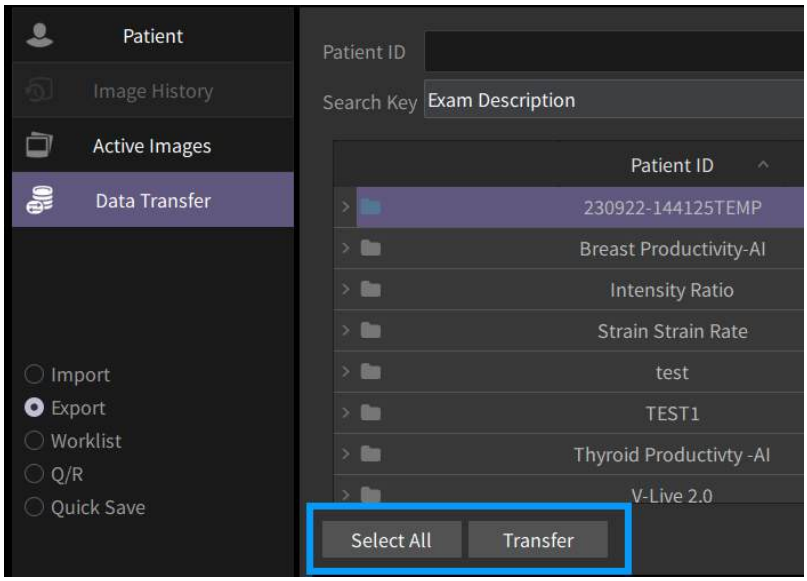
7. Press ***Patient*** key on the control panel, and then select ***Data Transfer***. Select the task as Export and specify the destination to backup the patient information and images.

Figure 8-7 Data Transfer



8. Select ***Select All***, and then select Transfer to backup all the patient information and images.

Figure 8-8 Export Patient Information



Loading the System Software

WARNING
While the software install procedure is designed to preserved data, you should save any patient data, images, system setups and customer presets to CD, DVD, USB Flash Drive, or USB Hard Disk before doing a software upgrade.

NOTE
Before loading the system software, please ensure that the power can be continuously supplied and there is no risk of power cut off during loading procedure.

NOTE
Before loading/reload the system software, please change system language to English. Otherwise, there will be garbage on the system after software reload/loading.

There is one method to load the system software:

- Load the system software with USB memory stick.

NOTE
Find the system software USB memory stick by removing the body right cover.

Figure 8-9 System software USB memory stick location

Loading the System Software with USB memory stick

This section describes how to upgrade the software.

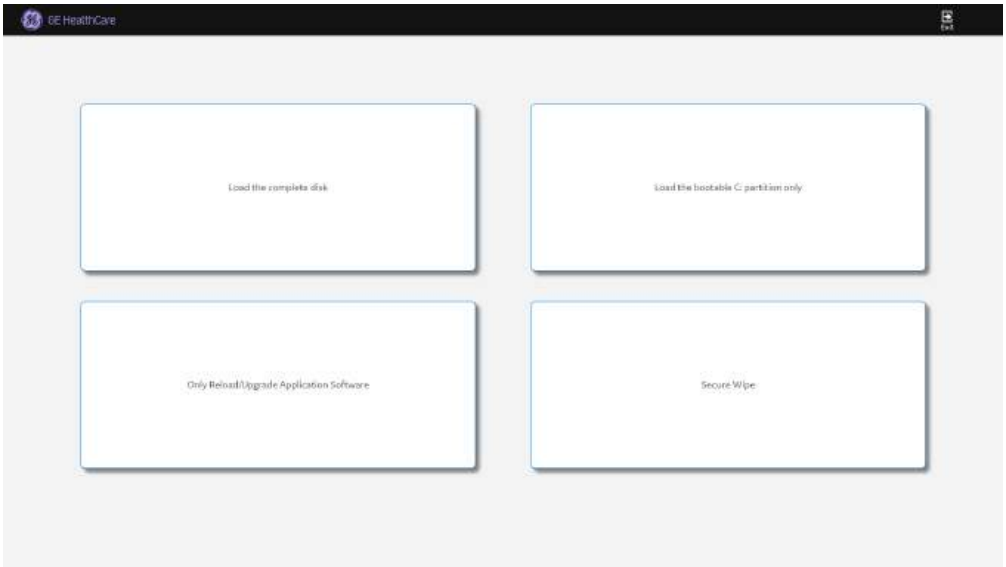
1. Insert the Upgrade USB memory stick labeled “System & Application Software” to the USB port of the system.
2. Properly turn off the system by momentarily pressing the Power On/Off Switch. Then select ***Shutdown*** in the System Exit Window.

   NOTE
   If the system does not shutdown normally, hold down the Power On/Off Switch until the light turns off.

3. Power on the system and it will detect the USB memory stick automatically.

4. Select the option ***Load the complete disk***, ***Load the bootable C: partition only*** or ***Only Reload/Upgrade Application Software*** on Touch Panel or use Cursor key to select on LCD screen. You can also select ***Exit*** to exit the upgrade process.

Figure 8-10 Upgrade instruction



- ***Load the complete disk***: the complete disk will be loaded. This option is recommended for application software upgrade.

WARNING
If selecting Load the complete disk, all existing software and data will be erased. If backup has not been performed, all data like Patient Data, System Configuration and User Configurations (Customer Presets) will be lost. Please ensure that any patient data on the disk has been backed up before upgrading the system.

NOTE
This option is used by service engineer only.

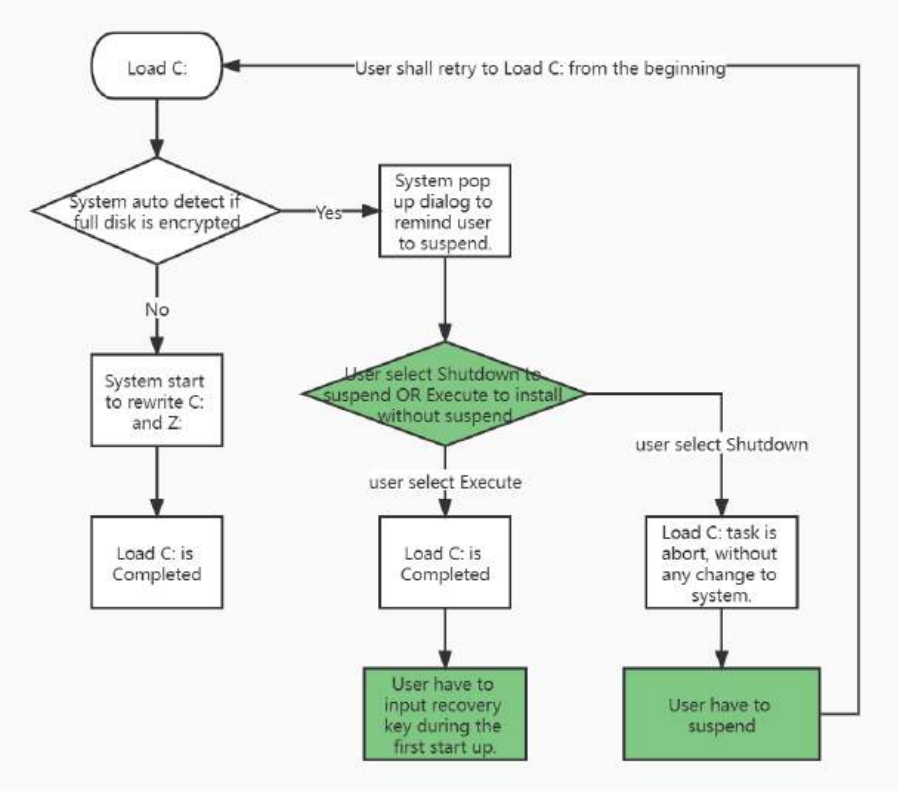
- ***Load the bootable C: partition only:*** this option is intended for recovery of a system that will not boot up. All patient data is preserved.

NOTE
While the software installation procedure is designed to preserve data, select choice Load the bootable C: partition only to format disk C.

NOTE
Before ***Load the bootable C: partition only*** and ***Only Reload/Upgrade Application Software***, please go to ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption*** page and press ***Suspend*** button. If no access to ***Suspend***, please make sure to backup the password/recovery key for all the disks before upgrading. Recovery key or password are necessary for the first boot up after installation to unlock the system.

NOTE
Pleaser refer to below diagram to understand the software reload process in different encryption situation. The green blocks stand for steps that requires operator's action.

Figure 8-11 Diagram for loading the bootable C:partition only

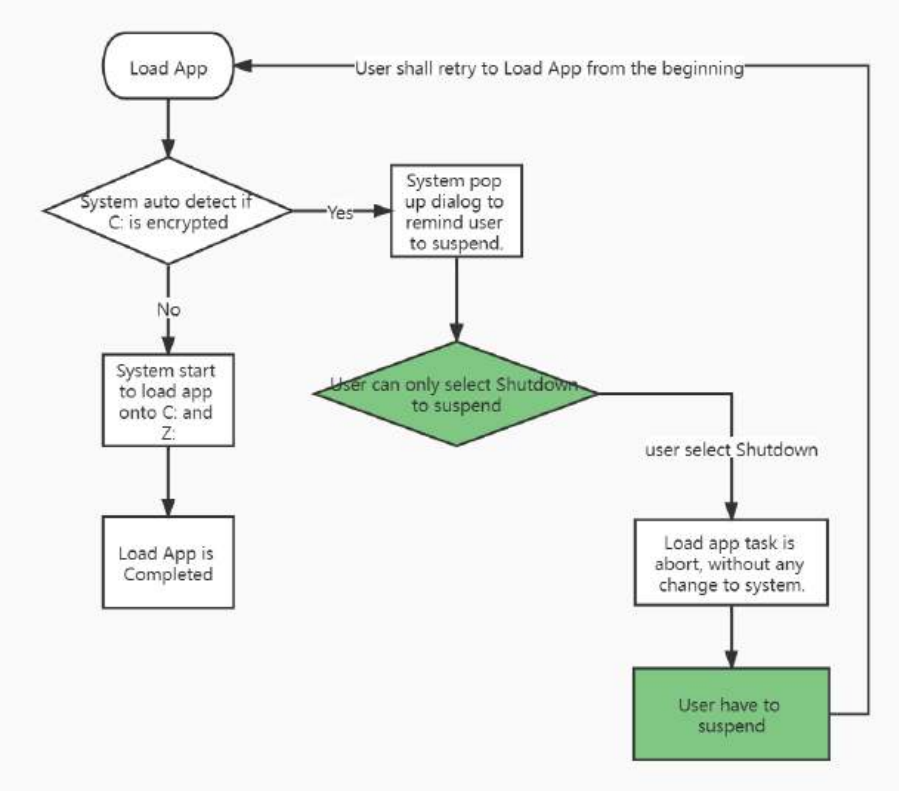


- ***Only Reload/Upgrade Application Software***: the application software will be loaded/upgraded only. This option is recommended for application software upgrade or reload. The software upgrade kit will automatically detect if the system compatible with this function and complete upgrading.

  NOTE
  If the current system base image does not support the application version of the upgrade USB disk, a message will be displayed on the screen and cancelled upgrading automatically.

NOTE
Pleaser refer to below diagram to understand the software reload process in different encryption situation. The green blocks stand for steps that requires operator's action.

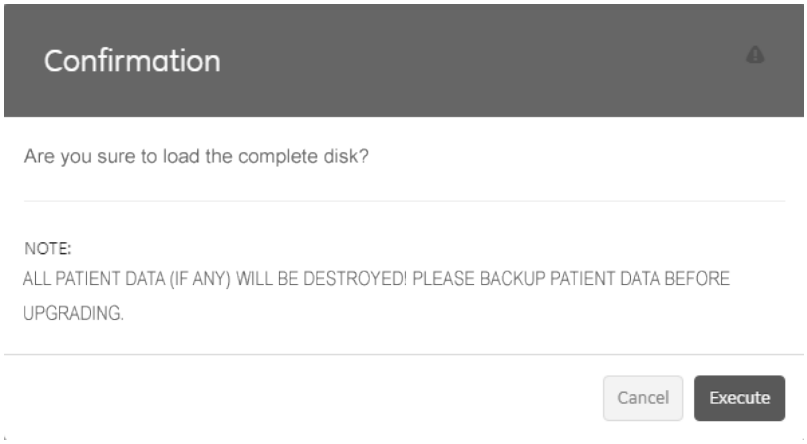
Figure 8-12 Diagram for only reload/upgrade application software



5. If ***Load the complete disk*** is selected, a confirmation window will pop out, then select ***Execute*** by using Touch Panel or Cursor key to continue.

NOTE
Before loading the complete disk, please ensure that any patient data on the disk has been backed up.

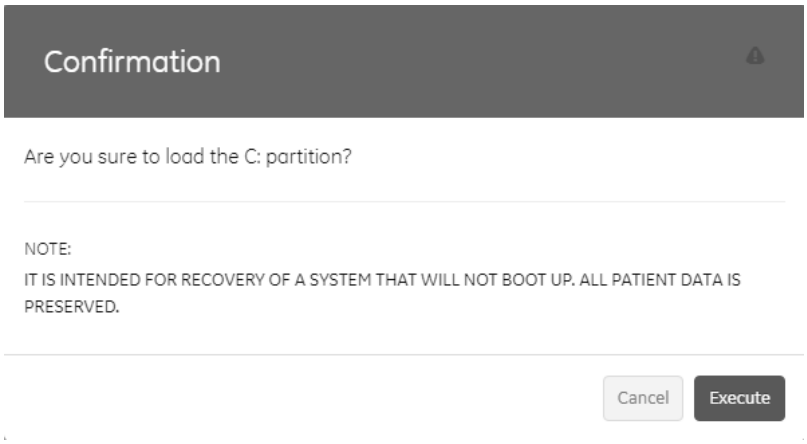
Figure 8-13 Confirmation Window



If Load the bootable C: partition only or ***Only Reload/Upgrade Application Software*** is selected, system will check if current disk is in Suspend status.

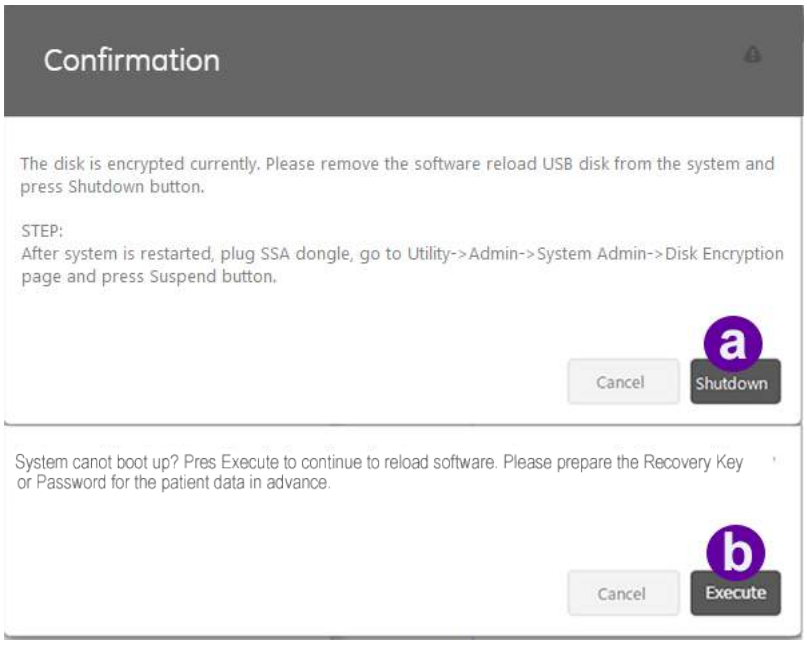
- If yes, a confirmation window for continuing will pop out, press ***Execute*** by using Touch Panel or Cursor key to continue.

Figure 8-14 Confirmation Window



- If the disk is not in Suspend status, a confirmation window will pop out.

Figure 8-15 Confirmation Window



1. If you select Shutdown, system will shutdown to let you suspend by ***Utility*** > ***Admin*** > ***System Admin*** > ***Disk Encryption*** page.
2. If the system cannot boot up, you can select ***Execute*** to continue. But user needs to provide recovery key or password to patient later.

NOTE
If user lost password or recovery key, please do the complete disk installation.

Installation results will differ based on your system situation, please find the matrix below:

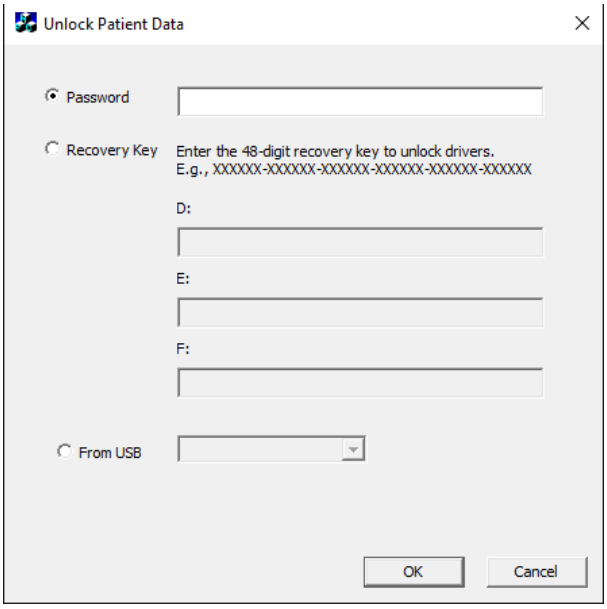
Figure 8-16 Installation result

System Situation		Installation Result	
Patient data is Encrypted? (D:\, E:\, F:\)	System can boot up and **Suspend** is clicked?	After installation, when first boot up, **need input Recovery key or Password?**	Previous recovery image file in Z:\ still exists?
No	Yes	**No need.**	**Yes**
Yes	Yes	**No need.**	**Yes**
No	No	**No need.**	No
Yes	No	Yes	No

NOTE
If Suspend is not clicked due to system cannot boot up, previous recovery image file in Z:\ will be lost.

If patient data is encrypted and suspend is not clicked due to system cannot boot up, recovery key or password are necessary for the first boot up after installation.

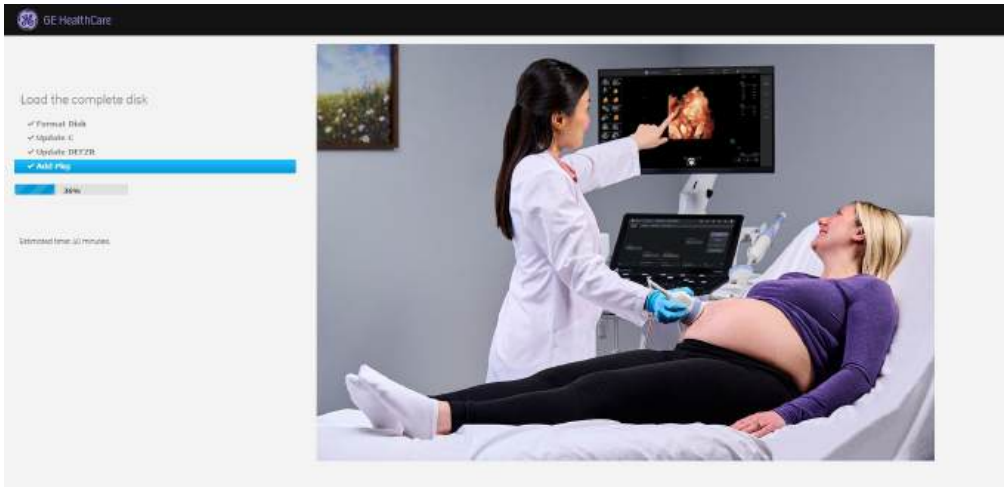
Figure 8-17 Unlock Patient Data



6. System USB memory stick will be loading. Wait for the software installation to complete. Status bar on the screen indicates the progress (about 30 minutes).

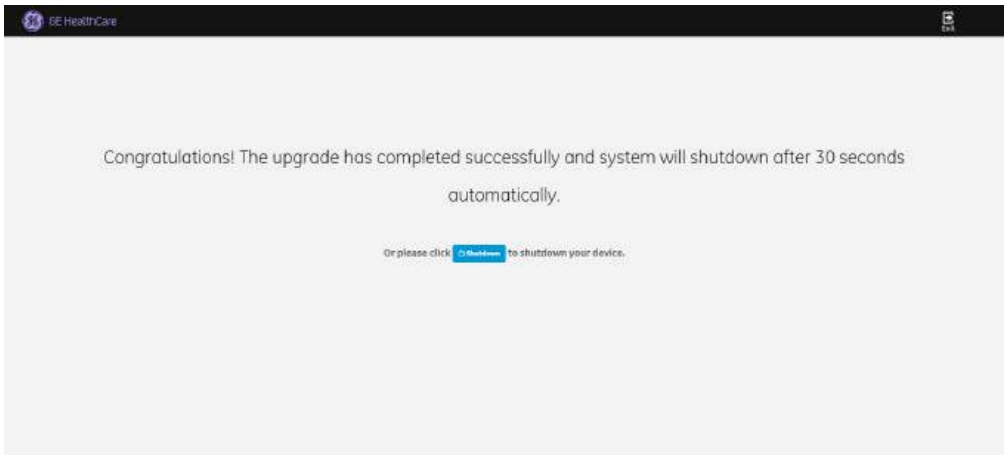
WARNING
Do not interrupt the software loading at any time.

Figure 8-18 Loading Process



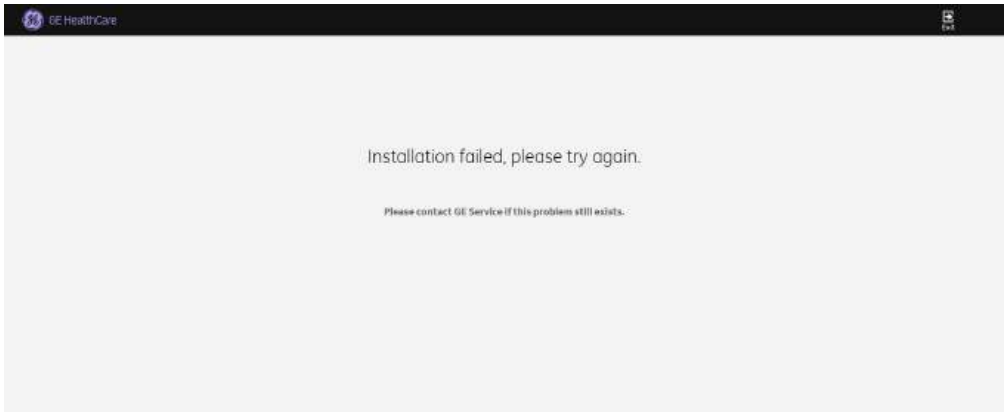
7. The system will display upgrading result and shutdown automatically within 30 seconds. Or click the ***Shutdown*** in the screen to shut down the system immediately.

Figure 8-19 System upgrade complete



If the upgrade fails, select ***Exit*** to exit the upgrade process, then remove the USB memory stick. Insert the USB memory stick again and repeat the upgrade process from the *Step 2*.

Figure 8-20 System upgrade fail



8. Remove USB memory stick. Then press Power On/Off switch to power on the system.

NOTE
Remove the USB memory stick before the system restarts. If you do not remove the USB memory stick, the software system upgrading process repeats when the system boots up.

NOTE
Ensure the USB memory stick is properly and securely connected. Once the USB memory stick is accidentally disconnected from the system during the upgrading process, the error message will pop up: “The volume for a file has been externally altered so that the opened file is no longer vaild.” Insert the USB memory stick again and restart the system to run the upgrading process from the *Step 3*.

Rewrite the Serial Number

If selected to load the complete disk during the software loading process, when powering the system, the system will indicate to rewrite the serial number, refer to Proprietary Service Manual.

Password Reset Policy

After the serial number is reset, the system will shutdown automatically. Power on the system and complete the password setting for use.

NOTE
Disk Encryption password and system password setting is required when turning on the system for the first time or after the software installation.

NOTE
Software upgrade will cause password reset, see *Table 8-3 Password Reset Policy* on page 277 for more information.

Table 8-3 Password Reset Policy

System Upgrade	Disk Encryption password	System password	ADM User password	Database password
Whole disks	Yes	Yes	Yes	Yes
Only C disk	No	Yes	No	No
Reload Apps	No	No	No	No

NOTE
Please save the system password properly. User is required to provide the system password to back office for remote connection.

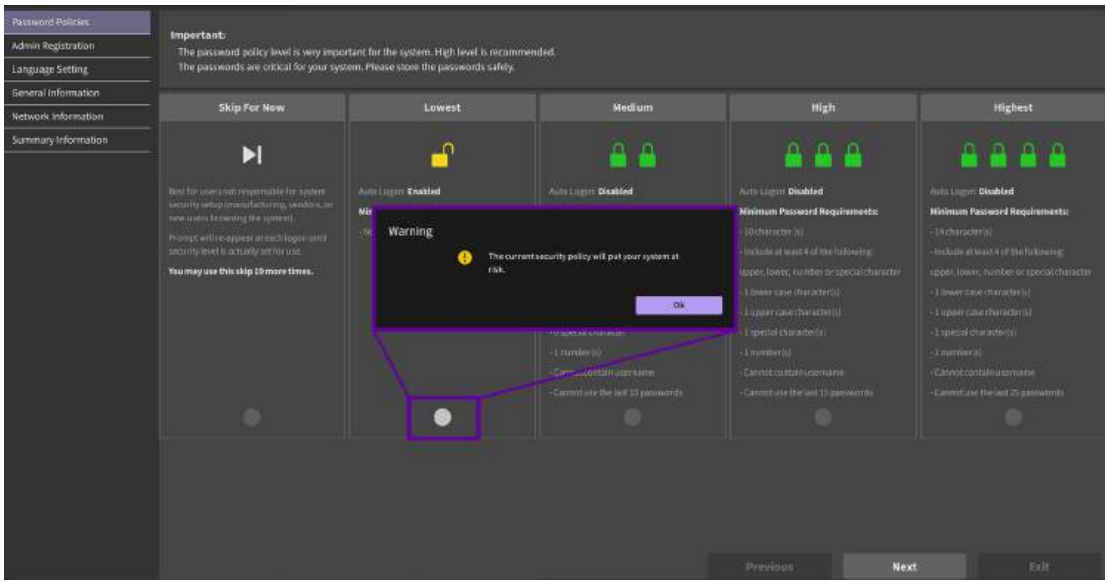
Set Password

1. Select ***password level*** in Password Policies, and click ***Next*** to continue. User can change the policy level later by ***Utility*** > ***Admin*** > ***User policies***.

   NOTE
   Password policy level setting is only required when turning on the system for the first time or after the software installation.

   NOTE
   When user select lowest, a warning will display to inform that the current security policy will put your system at risk.

Figure 8-21 Select password policy level



Users can select the option ***Lowest***, ***Medium***, ***High*** or ***Highest*** for policy level. The complexity of the password will be differed by the policy level you selected:

NOTE
If user select select lowest level in password policies, ADM password can be empty during Admin Registration setup.

NOTE
Exit button is not activated in password policies setting, users are not able to exit the EZ Configuration Wizard in this step.

2. Set ADM password in Admin Registration.

   If users didn't set ADM password during system setup. User can also set operator password later by ***Utility*** > ***Admin*** > ***Users***. Refer to User Manual for details.

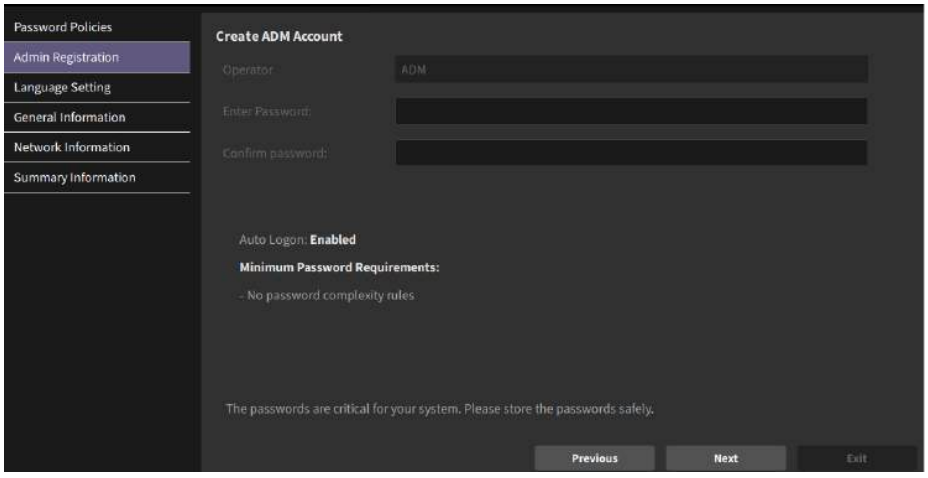
   NOTE
   Admin Registration is only required when turning on the system for the first time or after the software installation.

   NOTE
   Exit button is not activated in Admin Registration setting, users are not able to exit the EZ Configuration Wizard in this step.

   NOTE
   ADM password can be empty if password policy level is selected as LOWEST.

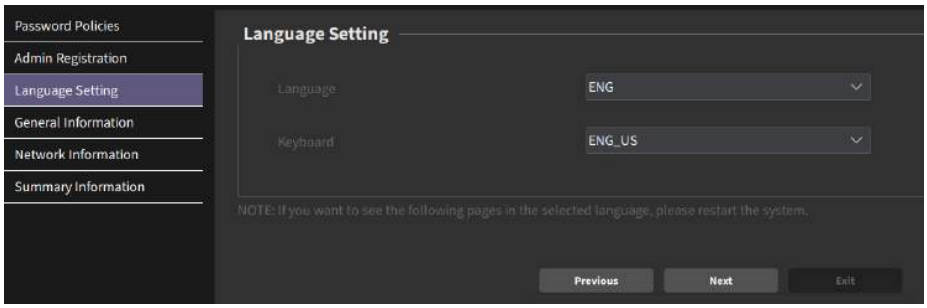
   NOTE
   A valid password must be at least 8 characters long and has a maximum length of 256 characters.

Figure 8-22 ADM password setting



3. Select the appropriate language for system language and keyboard language from the drop-down list.

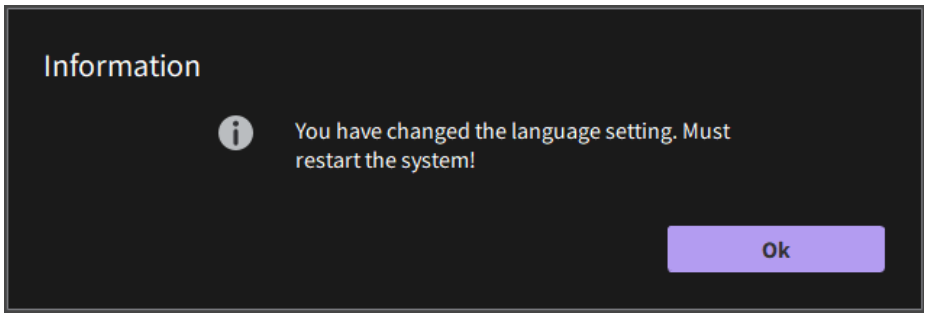
Figure 8-23 System Language settings 1



- If you do not change the language, press ***Next*** to continue.
- If you change the language setting, a language setup window will display.

  Set language and keyboard language, then press ***OK*** to restart the system.

Figure 8-24 Language setup confirmation



4. To continue the ***General Information***, ***Network Information*** and ***Summary Information***, refer to ***EZ Configuration Wizard***.

   - If you change the language setting, press ***OK*** to restart the system.

   NOTE
   If you press ***Previous***, you will go to the previous page.

Secure Wipe

Secure wipe is intended to erase all the patient data with the software on the system before the system will be shipped for service.

NOTE
This tool is not BAM approved.

NOTE
Before starting this procedure, remove all probes and peripherals and remove them from the system.

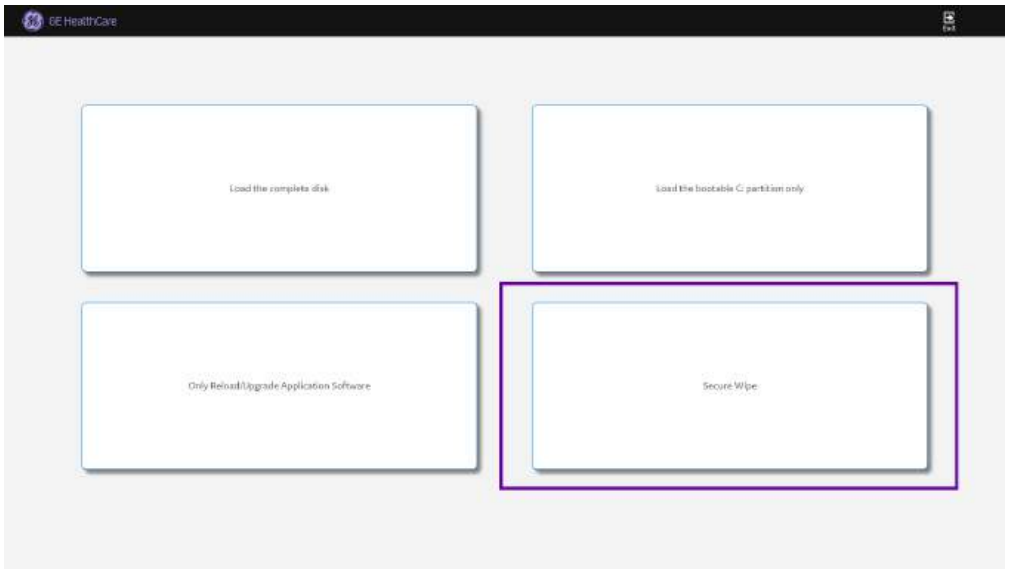
NOTE
While it is believed to be unnecessary, it would not hurt to disconnect the system from the network and remove all transducer.

NOTE
Please ensure AC adapter is connected during system upgrade!

1. Insert the USB memory stick labeled “System & Application Software” to the system.
2. Properly turn off the scanner by momentarily pressing the Power On/Off Switch. In System-Exit window, select ***Shutdown*** to shutdown the system.

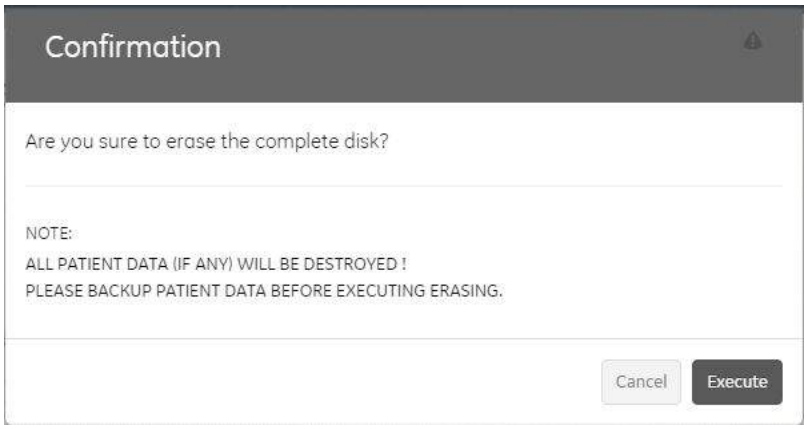
   NOTE
   If the system will not shutdown normally, hold down the Power On/Off Switch until the light turns off.
3. Power on the system. The system will detect the USB memory stick automatically.
4. Select ***Secure Wipe***. Or select ***Exit*** to exit the process.

Figure 8-25 Upgrade screen



5. The system indicates all data will be erased, select ***Execute*** to continue.

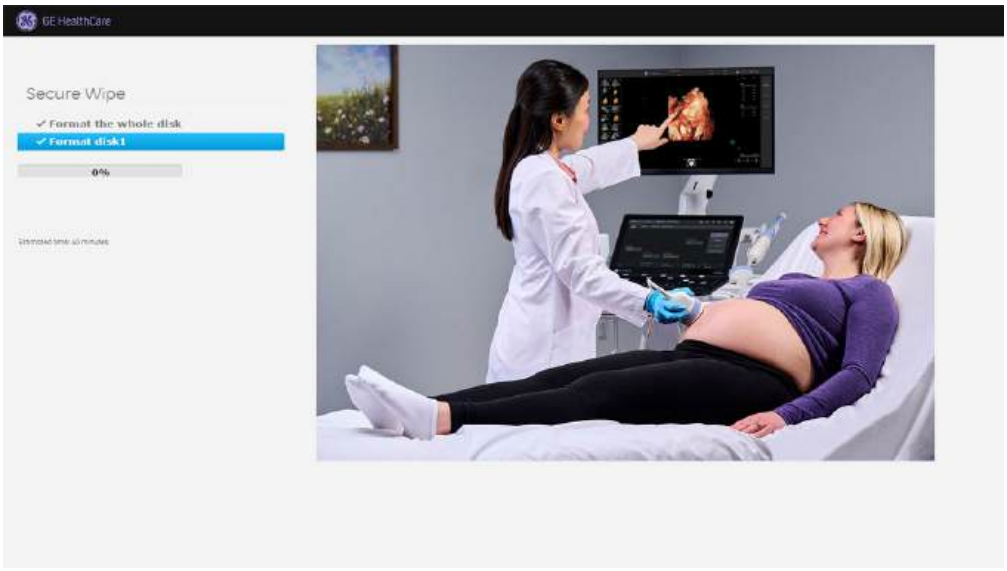
Figure 8-26 Confirmation Dialog



NOTE
All the patient data cannot be recovered after wipe process.

6. The process may take twenty minutes or more.

Figure 8-27 Wiping Process



7. The system will shutdown automatically when the wiping progress completes.

NOTE
As the SSD is empty after secure wipe, the system cannot boot up. The software should be loaded first after the wipe process.

Software Version check out

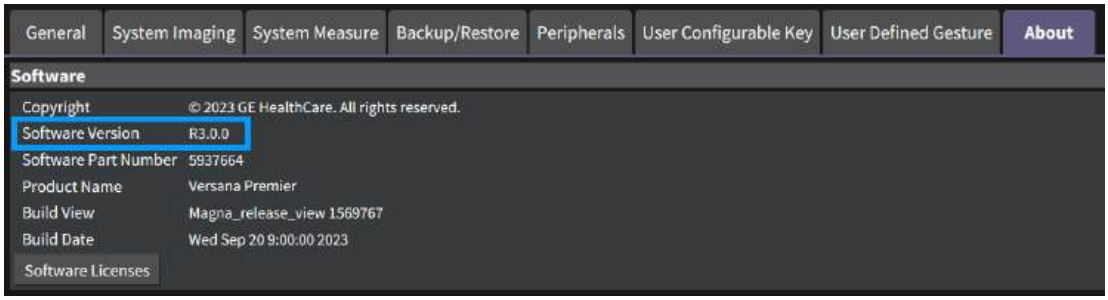
Functional Check-out

1. Power on the ultrasound system and wait until system booting to scanning screen.

   NOTE
   If selected to load C Disk only when loading the system software, the system will display a screen to restore Computer name before entering the scanning screen.

2. Press ***Utility*** on the touch panel.
3. Select the ***System*** > ***About*** and check whether the software version is right.

Figure 8-28 Software version



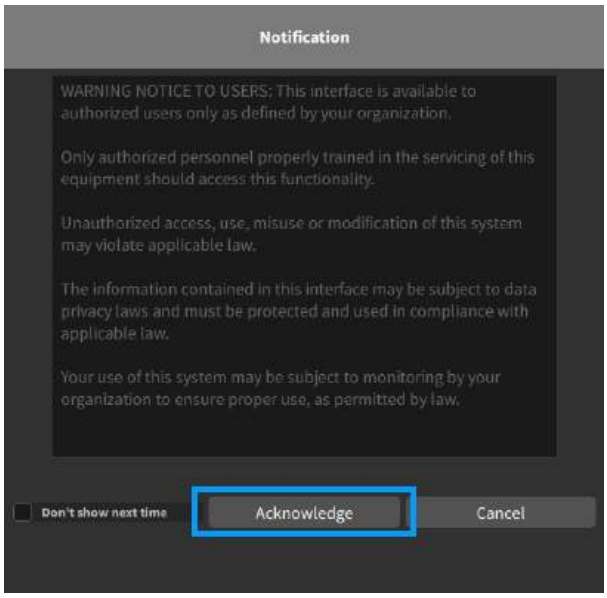
Option Strings Check

NOTE
After the system software loading completion, please check the option strings to ensure that the options are activated and working.

1. Reboot the system.

2. Press ***Utility*** > ***Admin***, the following dialog is displayed. Select ***Acknowledge*** to continue.

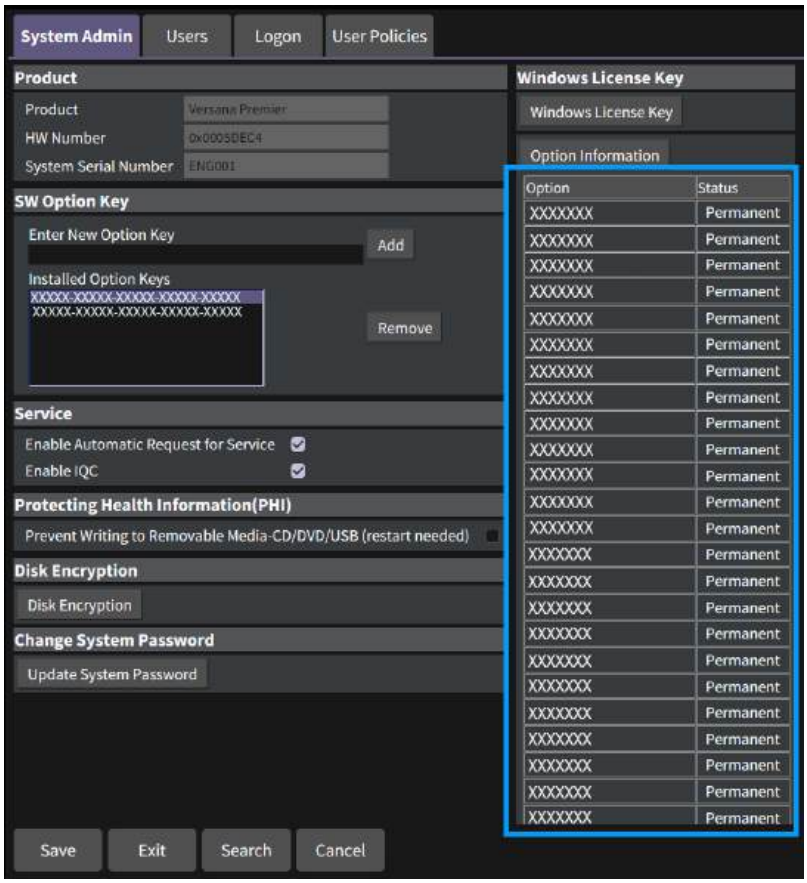
Figure 8-29 Notification Window



3. Login to the ultrasound system for the first time. Refer to *Logging on to the Ultrasound System as "ADM"* on page 142.

4. Ensure that all the installed option keys are displayed and the status of Options are valid.

Figure 8-30 Software Option



- The status “Permanent” means the option keys are activated and working.

Reload the Correct Preset Region

NOTE
After the software upgrade process, the preset region will be set as the default. Change the settings if needed.

NOTE
Refer to steps on *Region presetting procedure* on page 202 for the system Region Preset settings.

1. When the system is powered on, go to ***Utility*** > ***System*** > ***General***, select desired region under ***Preset Region (restart needed)*** and select ***Save***.
2. Press ***OK***.
3. Select ***Restart now*** to restart the system.
4. When the system boots up, the system appears in the selected language.

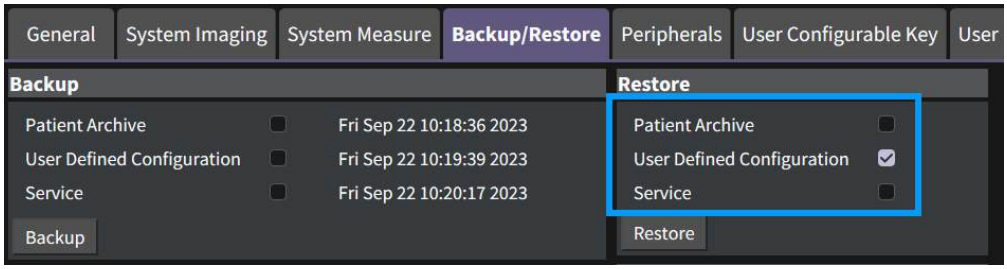
Configuration Restore

1. When the system is powered on, go to ***Utility*** > ***Connectivity*** > ***TCP/IP*** to check if the ***Computer Name*** and ***Network Speed*** display as desired and change them if needed.
2. Select ***Save***, then the following pop-up window will display. Select ***Restart later***.
3. If ***Load the complete disk*** is selected for software upgrade, the user is required to restore the ***Patient Archive*** and ***System Configurations***.
   Insert the media which is used to back-up.
4. Select ***System***, then select ***Backup/Restore***.
5. In the Media field, select the media.
6. Restore user defined configuration. There are 2 options.

   - If the user would restore all user defined configuration, in the Restore field, select ***User Defined Configuration***.Then select ***Restore*** button in the Restore field.

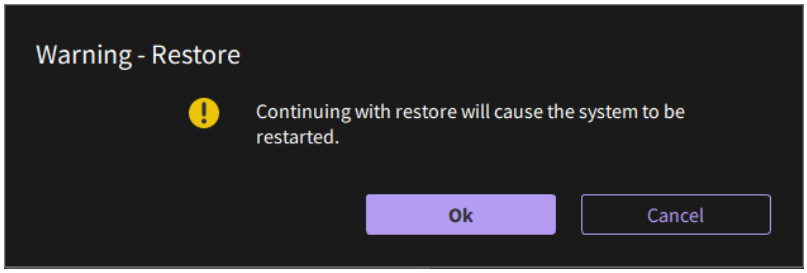
     NOTE
     If the user requires to restore all the User Defined Configuration, there is no need to select all the items of the Detailed Restore of User Defined to restore.

Figure 8-31 Restore all user defined configuration



Then the following pop-up Warning message will display, then select ***OK*** to continue.

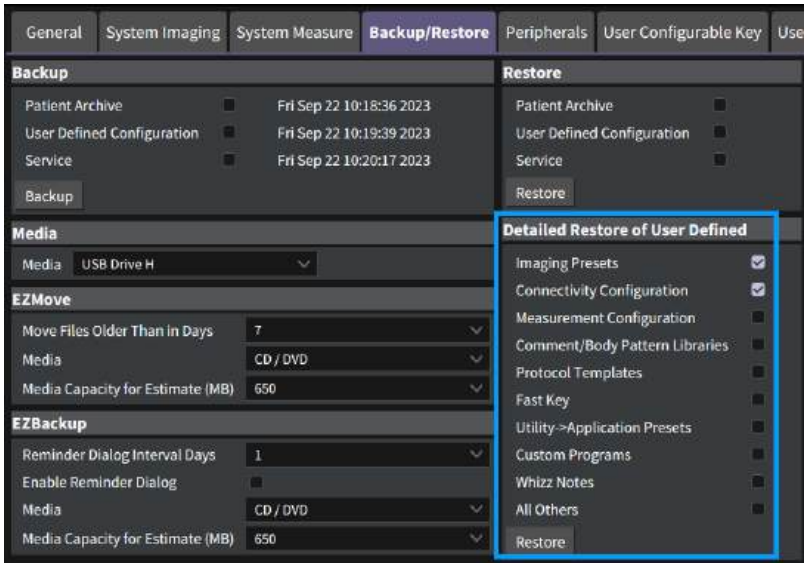
Figure 8-32 Question Message



- If the user would not restore all user defined configuration, in the Detailed Restore of User Defined field , select the items the user would like to restore.Then select ***Restore*** button in the Detailed Restore of User Defined field.

NOTE
According to the requirements from the User, restore the items in Detailed Restore of User Defined.

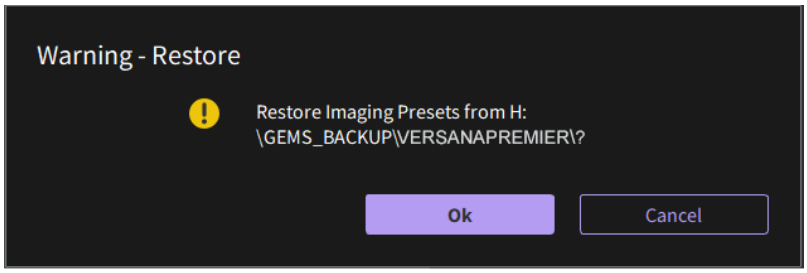
Figure 8-33 Detailed Restore of User Defined

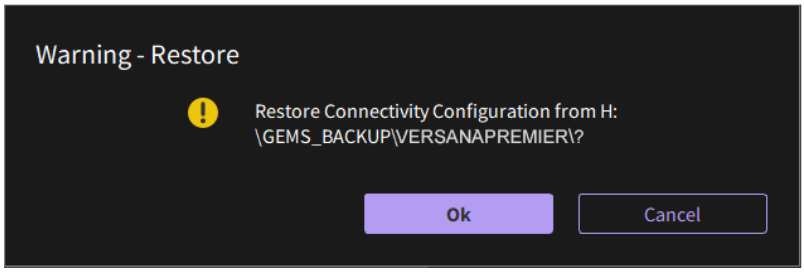


During the restore process, the following pop-up message will display. Press ***OK*** to continue.

How many warning message windows show up depends on how many items of Detailed Restore of User Defined are selected to restore.

Figure 8-34 Restore Warning Message



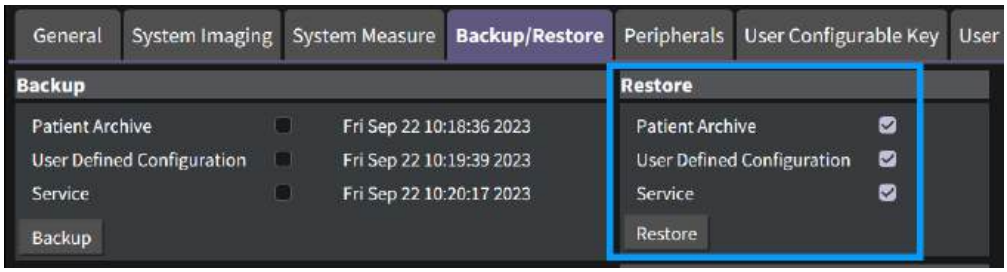


7. After restoring the User Defined Configuration, the System will restart.
8. After the system is powered on, go to ***Utility*** > ***System*** > ***Backup/Restore***. Select ***Patient Archive***, ***User Defined Configuration*** and ***Service*** under Restore field.

NOTE
If the user selects Patient Archive, the patient data will be restored but the exam images might be damaged thus unable to read.

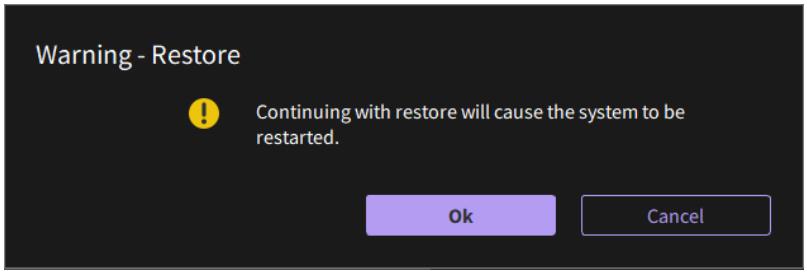
NOTE
If the user already restores the detailed User Defined Configuration in step 6, DO NOT select User Defined Configuration in this step.

Figure 8-35 Restore Menu



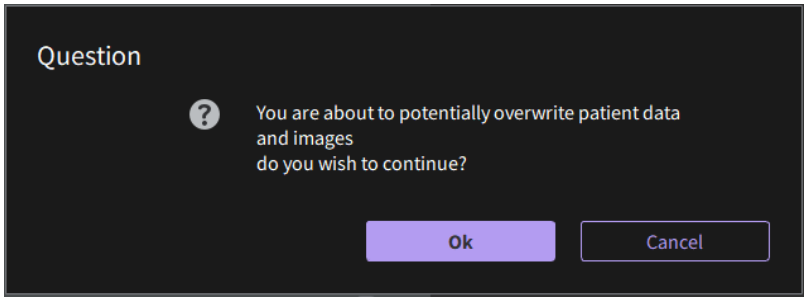
9. Select ***Restore***. Then the following pop-up Warning message will display, then select ***OK*** to continue.

Figure 8-36 Warning Message



10. Then the following pop-up Warning message will display, then select ***OK*** to continue.

Figure 8-37 Question Message

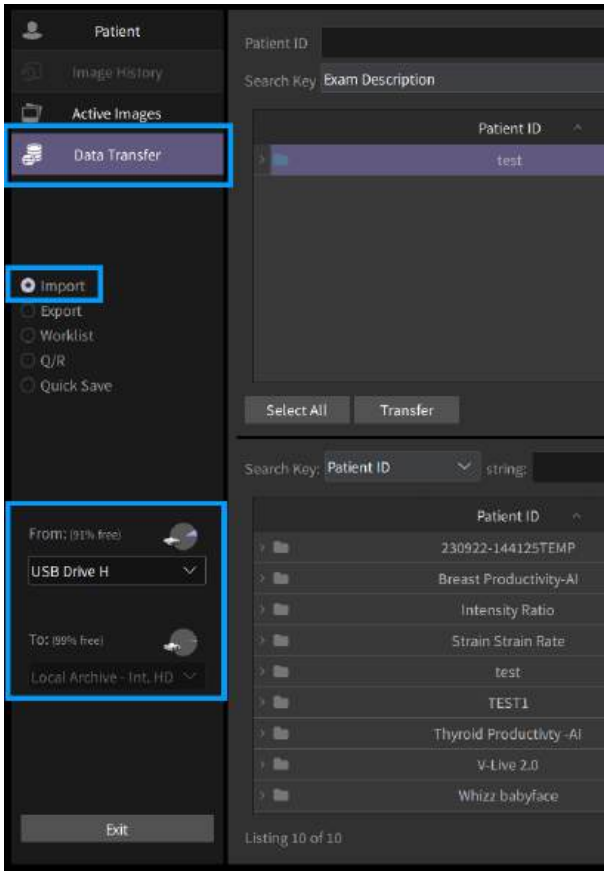


11. During the restoring process, a series of pop-up message will display. Press ***Ok*** to continue.

NOTE
The warning message will display according to User Defined Configuration selected to restore in step 8.

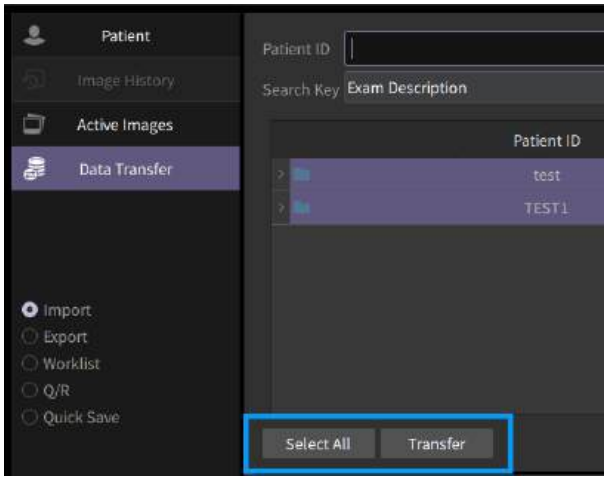
12. Press ***Patient*** key on the control panel, and then select ***Data Transfer***. Select the task as ***Import*** and select the source as where the patient information is exported to.

Figure 8-38 Data Import



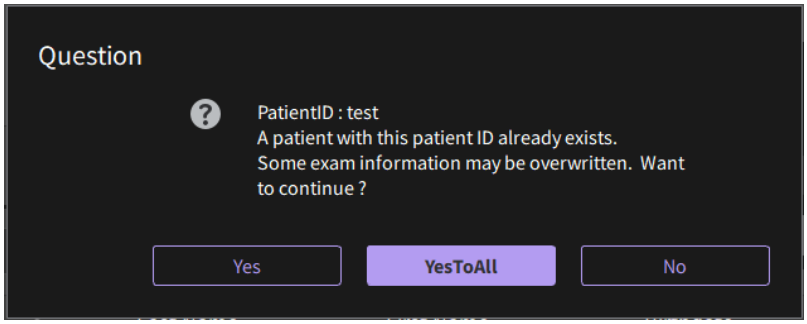
13. Select ***Select All***, and then select ***Transfer*** to restore all the patient information and images.

Figure 8-39 Data Transfer



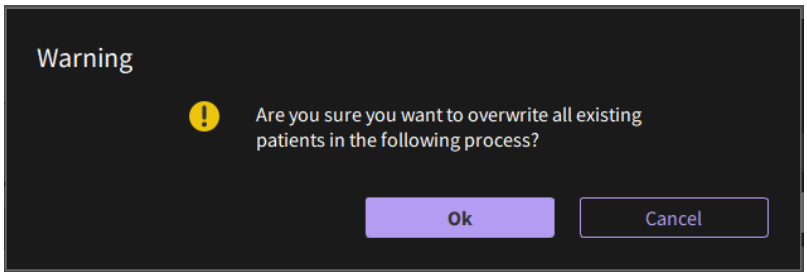
14. Then the following pop-up question message will display, select ***YesToAll*** to continue.

Figure 8-40 Overwrite Question Message



15. The following pop-up warning will display, select ***Ok*** to continue.

Figure 8-41 Overwrite Warning



16. The overwrite process is completed.

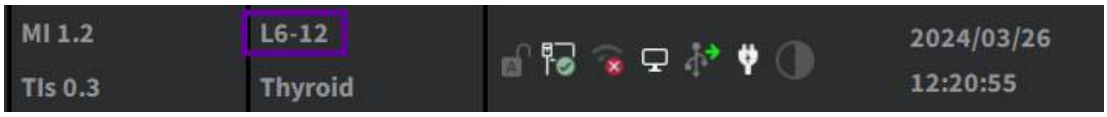
Probe Recognition Check

NOTE
After the system software loading completion, please check to ensure that the system can recognize the probes.

Plug in the probe. In scanning mode, the probe information is displayed on the right top location of the screen. About the probe specification for intended use on the ultrasound system.

Plug in at least one of each type of the probes and check if each of the probes is recognized and the probe information is displayed correctly.

Figure 8-42 Probe identification



Peripheral Device Check

Check to ensure that all the peripheral devices work properly.

For instruction of peripheral device check, *See 4-4-33 'Peripheral checks' on page 4-47 for more information.*

Reinstall DICOM Devices

Reinstall any DICOM devices used by the customers and check to ensure these DICOM devices work properly.

The instruction about installing DICOM devices is not incorporated in this manual. To access the instruction about installing DICOM devices please refer to another manual User Manual. Please use the latest revision of this document.

eDelivery - Software update

External software environment of the ultrasound system should be updated regularly for better use experience. If necessary, the external software environment of the ultrasound system can also be updated urgently.

User can update to the latest software in two ways.

As part of the product lifecycle management, GEHC regularly analyzes and integrates software updates from our third party vendors into our products. These are typically released as part of regular updates or software releases.

The two available downloading options for eDelivery are:

- Through the GEHC service platform on the ultrasound system. This requires Insite RSvP connectivity.
- Through an end-user portal to a local storage location (i.e. a readable / writeable flash drive with enough storage space) and install it on the ultrasound system.

WARNING
The operator or service engineer should confirm the system status after software update with eDelivery function.

Software update via Insite Remote Service Platform (RSvP)

Software update for the system may become available for download and installation through the GEHC Service platform.

Users must have administrator rights to perform the software download and installation. A user who is not logged in as ADM (administrator) will see the notification of an available update, but not be allowed to initiate the download.

CAUTION
Please backup presets and patient data when updates system software. Remote software download should not change user presets or affect customer database; however, it is always best practice to ensure patient data and preset are backed up before proceeding with any software installation.

NOTE
Be sure to end any open exams before software update.

NOTE
Please allow approximately half an hour for complete software download (the download time may vary due to network connection speed).

NOTE
Please allow approximately 30 minutes for complete installation.

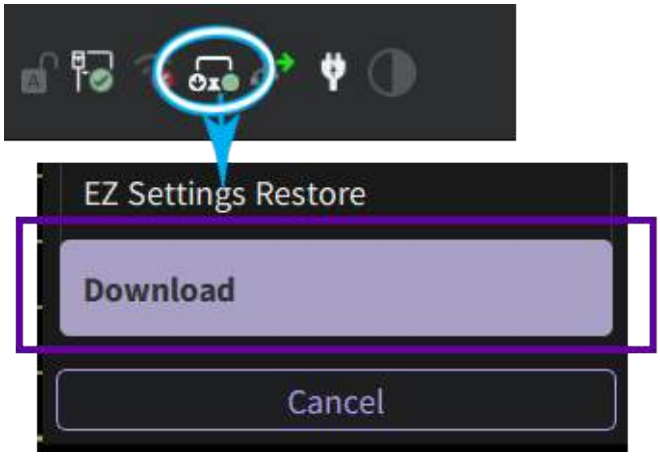
NOTE
Software upgrade through the GEHC service platform may not be available in all markets.

Software download and installation

CAUTION
Please end current exam before downloading the package provided by eDelivery.

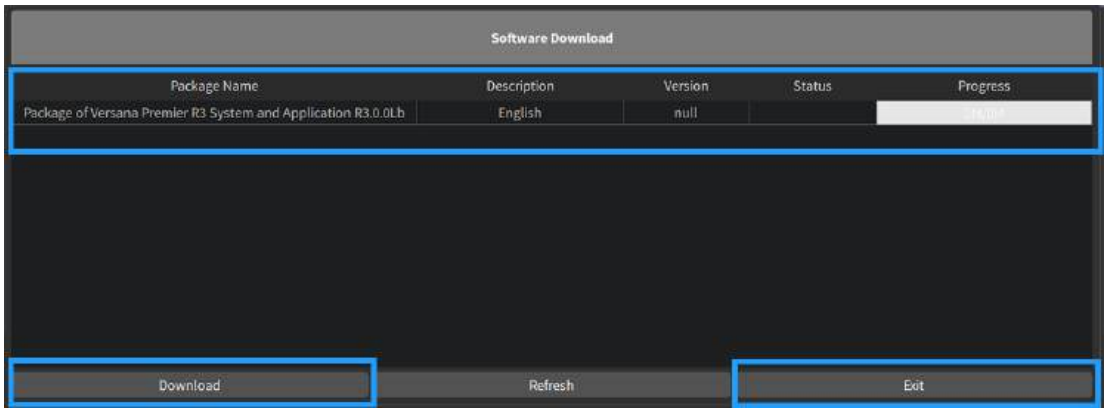
1. Press the notification icon to display the service menu, click ***Download*** to check the update.

Figure 8-43 Service Notification



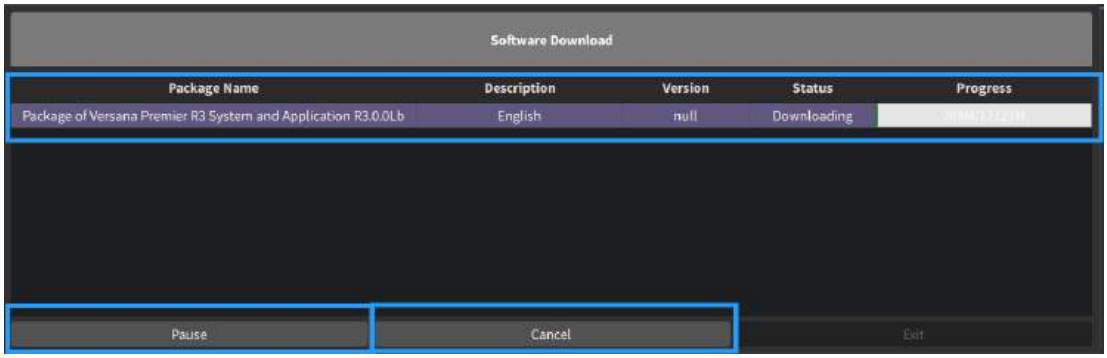
2. Available software updates are displayed in the list. If you want to refresh the query for available updates, press ***Refresh***.
3. Select the desired software version and press ***Download*** to download the software package, or press ***Exit*** to exit the window.

Figure 8-44 Download or Exit



4. During the software download process, the status will be displayed as "***Downloading***". You can press ***Pause*** to suspend the download or press ***Cancel*** to abort the download.

Figure 8-45 Downloading

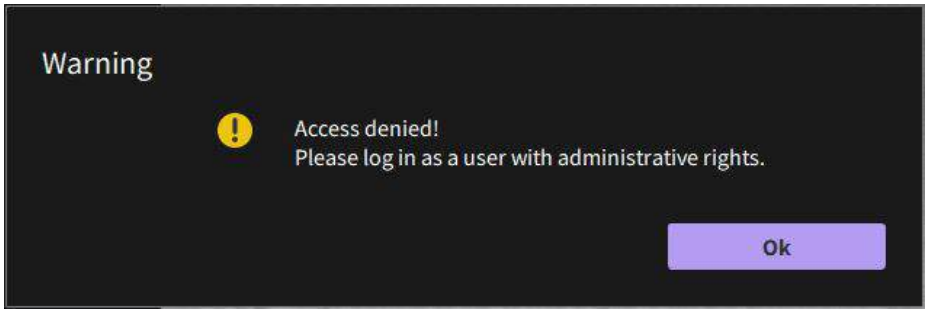


NOTE
While the software is downloading, the ***Exit*** button is disabled. If you want to go back to scanning page, please press ***Pause*** to suspend the download process first and then press the ***Exit*** button.

- When the download is in progress, press the ***Pause*** button to suspend the download process.
- When the download process is suspended, press the ***Resume*** button to recover the download process from the point where it is stopped.
- If there is an error during the downloading process, press the ***Retry*** button to recover the download process from the beginning.

NOTE
Before installation, user should login with the ADM account, otherwise there will be pop-up message to remind. Only after logging in with the ADM account, the user will have access to install software.

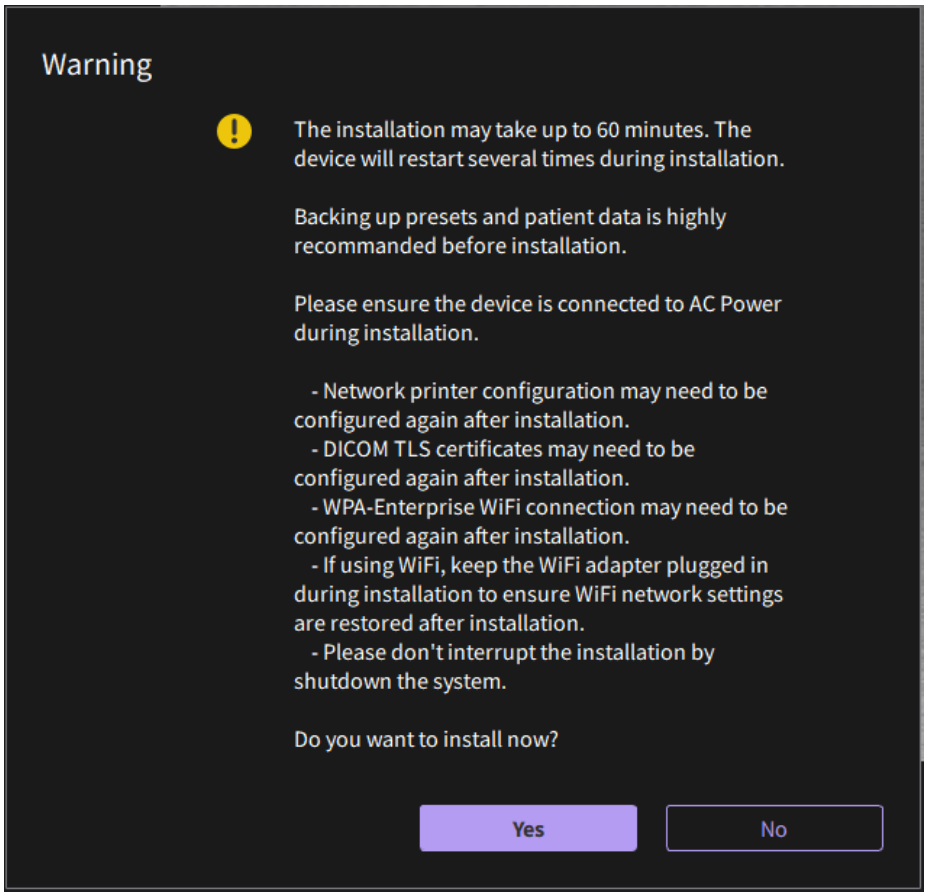
Figure 8-46 Access Denied



5. When the download process finishes, the software is ready to be installed in the ultrasound system. Log in with the ADM account, then click ***Yes*** to start the installation.

Figure 8-47 Install to the system

Figure 8-48 Start Installation



NOTE
Please allow enough time for ultrasound device to reboot automatically to complete the installation process.

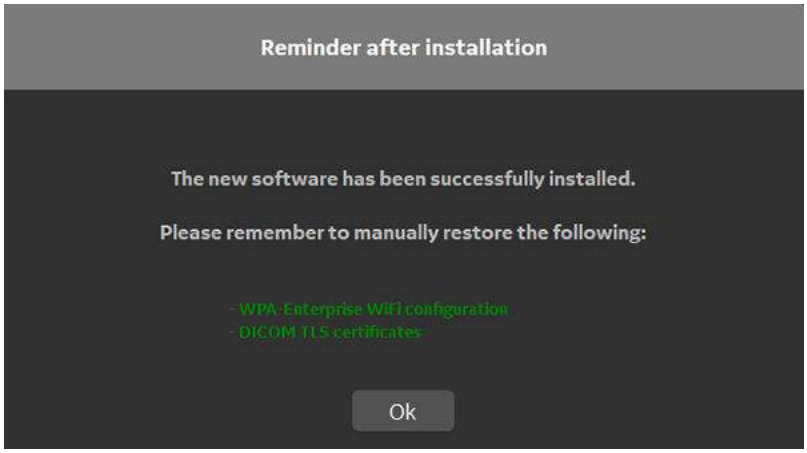
6. The system will reboot several times to complete the installation.

NOTE
DO NOT power off the system during the software installation.

NOTE
A typical full installation may take up to 30 minutes.

7. After software installation is complete and the system is rebooted, a ***Reminder after Installation*** window will appear. This is to remind the user to manually restore configurations if the system has related settings backed up before the software update.

Figure 8-49 Reminder after Installation



8. Click ***OK*** to confirm the installation is completed.

NOTE
Ensure that the entire system functions normally after service procedures.

Software update via End-User Portal

Customers who have purchased the end-user eDelivery option will receive a customer account to download software within the End-User Portal.

Users are created for the account based on e-mail addresses provided by the customer at the point of sale. These e-mail addresses are the log-in credential for the End-User Portal along with a temporary password provided to the user through e-mail. When logging in to the End-User Portal the first time, the user is prompted to change the password and enter a secret question and answer for password retrieval.

Follow the below instructions to download software from the portal:

1. Log on to the portal website which is provided to end user via a welcome email:
   https://gehealthcare.flexnetoperations.com/flexnet/operationsportal

2. Log in using the user name (e-mail) and password.

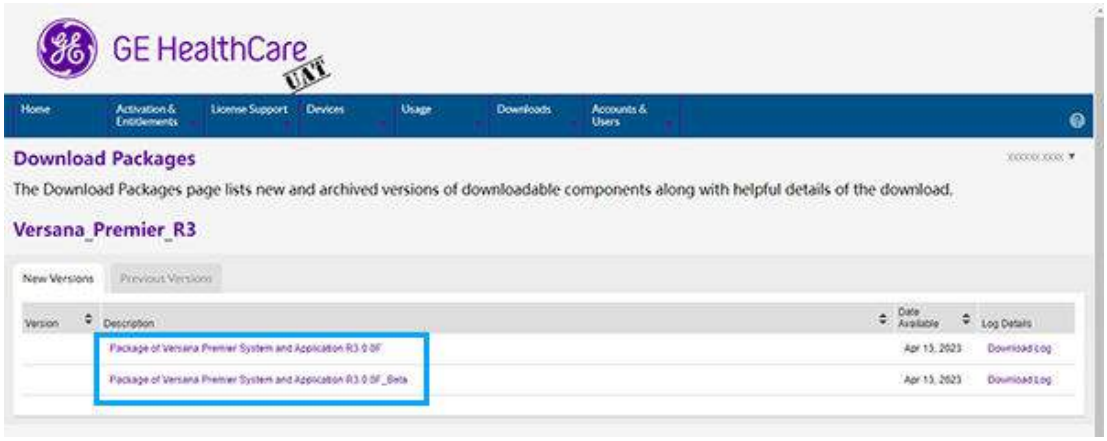
Figure 8-50 Login Window

3. The ***License & Delivery Portal*** dashboard is displayed. All downloadable packages will be listed in a link under ***Your Downloads***.

Figure 8-51 Your Downloads

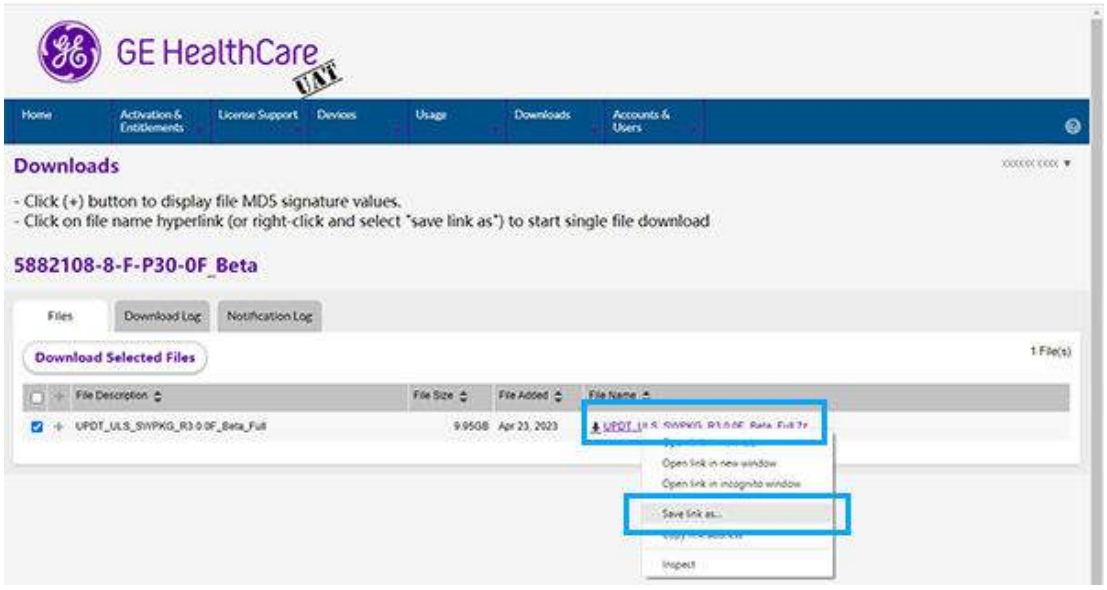
4. Click the link to enter the ***Download Packages*** page. Downloadable packages with links will be listed. Click on the desired link to enter the ***Downloads*** page.

Figure 8-52 Select link



5. Right click on the link under ***File Name***, select ***Save link as...*** to download the file to your storage device (a readable and writeable USB flash drive with enough capacity).

Figure 8-53 Save Link as...



NOTE
Multiple files may be downloaded on one device.

6. Load the downloaded software on the ultrasound system from the selected storage location.

Loading the Software

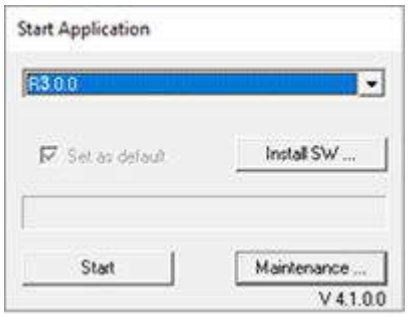
To load a software onto the ultrasound system,

1. Power off the ultrasound system.
2. Insert the USB Flash Drive into a USB port.

   NOTE
   Ensure that the system is USB Device Enabled.

3. Power on the ultrasound system. The software program files will be recognized automatically, select ***Install SW...*** on the ***Start Application*** screen.

Figure 8-54 Select Install SW...



NOTE
If by accident you try to load a software that is not compatible with the software on the Versana Premier, an error message will indicate "The package present in media is not compatible. Please contact GE Service" and "Software installation is not started".

4. Click ***OK*** on ***StartLoader*** screen. Then select the package you want to install, and click ***INSTALL*** to start installation.
5. When the installation is complete, the system will reboot automatically.
6. Remove the USB stick from the ultrasound device.
7. The whole installation is completed once system reboots.

NOTE
Installation time depends on the type of update. No action is needed until the installation is completed.

Chapter 9
Renewal Parts

In this section

List of Abbreviations

Table 9-1 List of Abbreviations

ABBREVIATION	DESCRIPTION
3D	THREE DIMENSIONAL
Assy	ASSEMBLY
FRU	Field Replacement Unit
CRU	Customer Replacement Unit
KBD	Keyboard Assy
BnV	Brightness and Volume
MST	Master Board
CWI	CPU / WDC / IO Board. WDC is DC Power Board for Wukong Platform.
PIB	Probe Interface Board, also name as Relay PIB
4PP	4 Probe Port
5PP	5 Probe Port
SSA	Secure Service Access

Renewal Parts Lists

Operator Console Assy

The following figure illustrates what is the body right cover (1), body left cover(2), body front cover (3), body back cover (4) of the system.

Figure 9-1 Operator Console Assy

The following figure illustrates what is the Monitor Assy (1), Keyboard Assy(2), Body Assy (3), Base Assy (4) of the system.

Figure 9-2 Console Assy

Probe

Table 9-2 Probes for the ultrasound system

Item	Part Name	Part Number	Commercial Part Number	Center Image Frequency (MHz)
601	4C-RS	5488477	H4000SR	3.10 ± 10%
602	8C-RS	5499508	H40402LS	6.5 ± 20%
603	E8C-RS	5499516	H40402LN	6.5 ± 20%
604	E8Cs-RS	5670375	H48062AF	2.75 ± 20%
605	C1-5-RS	5499608	H40462LA	3.1 ± 10%
606	BE9CS-RS	5589323	H40482LN	7.5 ± 20%
607	E7C8L-RS	5817485	H48062AL	6.9MHz ± 8% (For -L: Linear Transducer) 7.0MHz ± 8% (For -C: Convex Transducer)

Item	Part Name	Part Number	Commercial Part Number	Center Image Frequency (MHz)
608	3Sc-RS	5433833	H45041DL	2.75 ± 20%
609	6S-RS	5499316	H45021RP	4.5 ± 20%
610	12S-RS	5499321	H44901AB	7.75 ± 20%
611	L3-12-RS	5785912	H44901AP	6.575 ± 15%
612	L6-12-RS	5454332	H48062AC	7.75 ± 20%
613	9L-RS	5499511	H40442LL	5.25 ± 20%
614	12L-RS	5499501	H40402LY	7.5 ± 20%
615	LK760-RS	5548914	H44901AF	7.15 ± 20%
616	L8-18i-RS	5499609	H40462LF	9.5 ± 20%
617	RAB2-6-RS	KTZ303982	H48681WR	3.3 ± 10%
618	RIC5-9A-RS	KTZ304128	H48701EJ	6.5 ± 10%
619	IC9-RS	5722023	H48691PJ	6.25 MHz ± 0.35
620	6Tc-RS	5729431	H45551ZE	4.8 MHz ± 0.4
621	L4-20t-RS	5843289	H48062AJ	9.1 MHz ± 20%

Peripheral

Table 9-3 Peripherals for the ultrasound system

Item	Part Number	Commercial Part Number	Description
Footswitch			
701	5151236	H41642LS	Footswitch MKF 2-MED USB GP26
702	5338419	H41882LD	1-Peadl type Footswitch “Whanam FSU-1000”
USB Stick			
703	5863937	H48962LC	USB Stick
Printer			
704	5133107-2	H48542LZ	SONY UPD25 Color Printer USA Kit
705	5133108-2	H48552LA	SONY UPD25 Color Printer EUP Kit
706	5133106-2	H48542LY	SONY UPD25 Color Printer CHN Kit
707	5133109-2	H48552LB	SONY UPD25 Color Printer JPN Kit
708	5491253	H48312AN	SONY UPD25 Color Printer Brazil kit
709	5151259-2	H48492AZ	BW PRINTER (UP-D898MD)
710	5778615	H48052BG	UP-D898DC Printer Kits

Item	Part Number	Commercial Part Number	Description
711	5939764-S	H48122DH	Printer shelf for VSN P R3, LF R3
712	5151261-2	NA	SONY UP-D898MD BW Printer Europe Kit
713	5151262-2	NA	SONY UP-D898MD BW Printer China Kit
714	5151263-2	NA	SONY UP-D898MD BW Printer Japan Kit
715	5495509-2	NA	SONY UP-D898MD BW Printer Brazil Kit
Others			
716	NA	H48122BT	Bluetooth Adaptor
717	5434317-4	H48492AB	1TB mobile USB HDD
718	5939765-S	H48122DJ	ECG shelf for VSN P R3, LF R3-CRU
719	5863491	H48732AK	TS8XDVDS-K DVDRW kit
720	5880558-S	H48392BN	Norav ECG ASSY with AHA CABLE
721	5880561-S	H48392BP	Norav ECG ASSY with IEC CABLE
722	5880563-S	H48392BR	Norav ECG ASSY with IEC CABLE -- MFG Germany
723	5880564-S	H48392BS	Norav ECG ASSY with IEC CABLE -- Chinese Label
724	5933000-S	H48962CG	Wireless Adaptor
725	5869055-S	H48362BC	1 TB SSD
726	5840613-S	H48722BE	Video Output Adapter
727	5860470	H48542AE	USB barcode reader
728	NA	E8390AG	Lamicall Goose Neck Mount
729	KZ200687	H45511EE	ADULT TEE CLIP-ON BITE GUARD
730	KZ200693	H45521CB	ADULT TEE CLIP-ON BITE GUARD OPR
731	KZ307808	H45521CK	ADULT TEE SCANHEAD PROTECTION COVER
732	086A0016	H45521JH	ADULT TEE CONVENTIONAL BITE GUARD
733	KZ200800	H45531HS	BITE HOLE INDICATOR
734	KX200272	H45551NM	TEE STORAGE RACK
735	NA	H48092DS	HDMI Extension Cable with Ferrite Core
736	NA	E8390AA	Digital Expert Hardware Kit (includes Microsoft Surface Tablet)
737	NA	E8390AC	Digital Expert Cables and Video Grabber
738	NA	HG11VCL	Digital Expert Connect – License Term

System and Application Software Upgrade USB

NOTE
The list for system and application software upgrade USB is not up to date, please contact your local Service Representative for the latest software version information.

Table 9-4 System and Application Software Upgrade USB for the ultrasound system

Item	Part Number	Commercial Part Number	Description
801	5937892-6S	NA	Magna R3.0.5 System and Application Update USB
802	5937892-7S	H48552DB	Versana Premier R3.0.6 System and Application Update USB
803	5937892-8S	H48552DC	System and Application R3.0.7 Update USB for Versana Premier R3 and LOGIQ F R3
804	5937892-9S	H48552DB	System and Application R3.0.8 Update USB for Versana Premier R3 and LOGIQ F R3

Power Cord

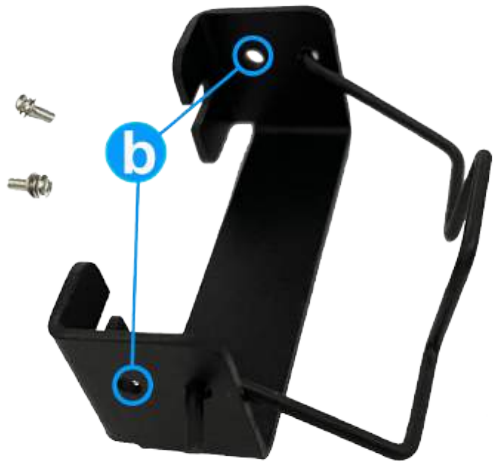
Table 9-5 Power Cords List 1

Item	Part Number	Commercial Part Number	Description	Qty
901	6736103-2	H48502AT	PWR SPLY CRD BRAZIL 10A 250V STRAIGHT 2.5M	1
902	6736105-2	H48502AW	PWR SPLY CRD EUROPE KOREA 10A 250V STRAIGHT 2.5M	1
903	6736109-2	H48502AZ	PWR SPLY CRD ISRAEL 10A 250V STRAIGHT 2.5M	1
904	6736111-2	H48512AA	PWR SPLY CRD JAPAN 12A 125V STRAIGHT 2.5M	1
905	6736101-2	H48512AC	PWR SPLY CRD ARGENTINA 10A 250V STRAIGHT 2.5M	1
906	6736102-2	H48512AD	PWR SPLY CRD ANZ 10A 250V STRAIGHT 2.5M	1
907	6736104-2	H48512AE	PWR SPLY CRD CHINA 10A 250V STRAIGHT 2.5M	1
908	6736107-2	H48512AF	PWR SPLY CRD UK IRELAND 10A 250V STRAIGHT 2.5M	1
909	6736108-2	H48512AG	PWR SPLY CRD INDIA 10A 250V STRAIGHT 2.5M	1

Item	Part Number	Commercial Part Number	Description	Qty
910	6736113-2	H48512AJ	PWR SPLY CRD SWITZERLAND 10A 250V STRAIGHT 2.5M	1
911	6736114-2	H48512AK	PWR SPLY CRD UNITED STATES - CANADA 10A 125V STRAIGHT 2.5M	1
912	6736115-2	H48532AY	PWR SPLY CRD DENMARK 10A 250V STRAIGHT 2.5M	1

NOTE
Cable clip for power cord in *Table 9-5 Power Cords List 1* on page 305 should be installed in the hole **b**, refer to *Figure 9-3 Hole b of the cable clip* on page 306.

Figure 9-3 Hole b of the cable clip



Manuals

Table 9-6 Manuals for the ultrasound system

Item	Commercial Part Number	Part Number	Description	Qty
1	H48032DW	5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
2	H48032DZ	5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1

Item	Commercial Part Number	Part Number	Description	Qty
3	H48042DA	5928218-1EN	Versana Premier/Versana Premier Lotus R3 English User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1EN	Versana Premier/Versana Premier Lotus R3 English Release Notes	1
4	H48042DC	5928218-1FR	Versana Premier/Versana Premier Lotus R3 French User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1FR	Versana Premier/Versana Premier Lotus R3 French Advanced Reference Manual	1
		5928219-1FR	Versana Premier/Versana Premier Lotus R3 French Release Notes	1
5	H48042DD	5928218-1ES	Versana Premier/Versana Premier Lotus R3 Spanish User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1ES	Versana Premier/Versana Premier Lotus R3 Spanish Release Notes	1
6	H48042DE	5928218-1DE	Versana Premier/Versana Premier Lotus R3 German User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1DE	Versana Premier/Versana Premier Lotus R3 German Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
7	H48042DF	5928218-1IT	Versana Premier/Versana Premier Lotus R3 Italian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1IT	Versana Premier/Versana Premier Lotus R3 Italian Release Notes	1
8	H48042DG	5928218-1NL	Versana Premier/Versana Premier Lotus R3 Dutch User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1NL	Versana Premier/Versana Premier Lotus R3 Dutch Release Notes	1
9	H48042DH	5928218-1PT-BR	Versana Premier/Versana Premier Lotus R3 Brazilian Portuguese User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1PT-BR	Versana Premier/Versana Premier Lotus R3 Brazilian Portuguese Release Notes	1
10	H48042DJ	5928218-1ET	Versana Premier/Versana Premier Lotus R3 Estonian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1ET	Versana Premier/Versana Premier Lotus R3 Estonian Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
11	H48042DK	5928218-1JA	Versana Premier/Versana Premier Lotus R3 Japanese User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1JA	Versana Premier/Versana Premier Lotus R3 Japanese Release Notes	1
12	H48042DL	5928218-1SV	Versana Premier/Versana Premier Lotus R3 Swedish User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1SV	Versana Premier/Versana Premier Lotus R3 Swedish Release	1
13	H48042DM	5928218-1KO	Versana Premier/Versana Premier Lotus R3 Korean User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1KO	Versana Premier/Versana Premier Lotus R3 Korean Release Notes	1
14	H48042DN	5928218-1RU	Versana Premier/Versana Premier Lotus R3 Russian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1RU	Versana Premier/Versana Premier Lotus R3 Russian Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
15	H48042DP	5928218-1PL	Versana Premier/Versana Premier Lotus R3 Polish User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1PL	Versana Premier/Versana Premier Lotus R3 Polish Release Notes	1
16	H48042DQ	5928218-1EL	Versana Premier/Versana Premier Lotus R3 Greek User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1EL	Versana Premier/Versana Premier Lotus R3 Greek Release Notes	1
17	H48042DR	5928218-1SK	Versana Premier/Versana Premier Lotus R3 Slovakian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1SK	Versana Premier/Versana Premier Lotus R3 Slovakian Release Notes	1
18	H48082DS	5928218-1CS	Versana Premier/Versana Premier Lotus R3 Czech User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1CS	Versana Premier/Versana Premier Lotus R3 Czech Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
19	H48082DT	5928218-1TR	Versana Premier/Versana Premier Lotus R3 Turkish User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1TR	Versana Premier/Versana Premier Lotus R3 Turkish Release Note	1
20	H48082DW	5928218-1DA	Versana Premier/Versana Premier Lotus R3 Danish User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1DA	Versana Premier/Versana Premier Lotus R3 Danish Release Notes	1
21	H48082DY	5928218-1FI	Versana Premier/Versana Premier Lotus R3 Finnish User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1FI	Versana Premier/Versana Premier Lotus R3 Finnish Release Notes	1
22	H48082DZ	5928218-1BG	Versana Premier/Versana Premier Lotus R3 Bulgarian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1BG	Versana Premier/Versana Premier Lotus R3 Bulgarian Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
23	H48092DA	5928218-1RO	Versana Premier/Versana Premier Lotus R3 Romanian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1RO	Versana Premier/Versana Premier Lotus R3 Romanian Release Notes	1
24	H48092DB	5928218-1LT	Versana Premier/Versana Premier Lotus R3 Lithuanian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1LT	Versana Premier/Versana Premier Lotus R3 Lithuanian Release Notes	1
25	H48092DC	5928218-1LV	Versana Premier/Versana Premier Lotus R3 Latvian User Manual	
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1LV	Versana Premier/Versana Premier Lotus R3 Latvian Release NotesM R3 UG+RN Latvian	1
26	H48092DD	5928218-1SR	Versana Premier/Versana Premier Lotus R3 Serbian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1SR	Versana Premier/Versana Premier Lotus R3 Serbian Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
27	H48092DE	5928218-1PT-PT	Versana Premier/Versana Premier Lotus R3 European Portuguese User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1PT-PT	Versana Premier/Versana Premier Lotus R3 European Portuguese Release Notes	1
28	H48092DF	5928218-1ID	Versana Premier/Versana Premier Lotus R3 Indonesian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1ID	Versana Premier/Versana Premier Lotus R3 Indonesian Release Notes	1
29	H48092DG	5928218-1SL	Versana Premier/Versana Premier Lotus R3 Slovenian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1SL	Versana Premier/Versana Premier Lotus R3 Slovenian Release Notes	1
30	H48092DH	5928218-1KK	Versana Premier/Versana Premier Lotus R3 Kazakh User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1KK	Versana Premier/Versana Premier Lotus R3 Kazakh Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
31	H48092DJ	5928218-1HU	Versana Premier/Versana Premier Lotus R3 Hungarian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1HU	Versana Premier/Versana Premier Lotus R3 Hungarian Release Notes	1
32	H48092DK	5928218-1NO	Versana Premier/Versana Premier Lotus R3 Norwegian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1NO	Versana Premier/Versana Premier Lotus R3 Norwegian Release Notes	1
33	H48092DL	5928218-1HR	Versana Premier/Versana Premier Lotus R3 Croatian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1HR	Versana Premier/Versana Premier Lotus R3 Croatian Release Notes	1
34	H48092DM	5928218-1UK	Versana Premier/Versana Premier Lotus R3 Ukrainian User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1UK	Versana Premier/Versana Premier Lotus R3 Ukrainian Release Notes	1

Item	Commercial Part Number	Part Number	Description	Qty
35	H48092DN	5928218-1VI	Versana Premier/Versana Premier Lotus R3 Vietnamese User Manual	1
		5928214-1EN	Versana Premier/Versana Premier Lotus R3 Basic Service Manual	1
		5928216-1EN	Versana Premier/Versana Premier Lotus R3 English Advanced Reference Manual	1
		5928219-1VI	Versana Premier/Versana Premier Lotus R3 Vietnamese Release Notes	1
36	H48092DP	5946505	Versana Premier/Versana Premier Lotus R3 e-manual USB kit	1
		5928320	Versana Premier/Versana Premier Lotus R3 eIFU Leaflet	1
		5928319	Versana Premier/Versana Premier Lotus R3 e-manual USB Flash Disk	1

Chapter 10
Care and Maintenance

In this section

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.

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.

Why do maintenance

Preventive maintenance inspections

It has been determined by engineering that your ultrasound system does not have any high wear components that fail with use, therefore no Preventive 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.

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 HealthCare service representative can help you with establishing, performing and maintaining records for a quality assurance program. Contact GE HealthCare for coverage and/or price for service.

Maintenance task schedule

How often should maintenance tasks be performed?

It has been determined by engineering that your Ultrasound System 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.

The Care and Maintenance task schedule (provided in *Table 10-1 Customer Care Schedule* on page 321) specifies how often your ultrasound system should be serviced and outlines items requiring special attention.

NOTE
It is the customer's responsibility to ensure the ultrasound system care and maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.

Your GE HealthCare Service Representative has an in-depth knowledge of your ultrasound system and can best provide competent, efficient service. Contact GE HealthCare 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 ultrasound system for an average patient load (15 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 care and maintenance frequencies.

Table 10-1 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			•		
Inspect Cables and Connectors			•		
Clean Console			•		
Clean Monitor			•		
Clean Filters			•		
Console Leakage Current Checks				See Notes	Twice Annually
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 care and maintenances are not mandatory. The table above is for reference only.

Tools required

NOTE
For a list of required tools for servicing the ultrasound system, refer to chapter 8.

Standard GE HealthCare tool kit

The following is a description of the “Standard” GEHC tool kit in the USA. Not all tools are required.

Table 10-2 Overview of GEHC-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
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

Tool ID	Description	Tool ID	Description
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		
9-4516	Pliers 4 1/4 inch Diagonal		

GE HealthCare-2 tool kit

Table 10-3 Overview of GEHC-2 tool kit contents

GEHC-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		

Special tools, supplies and equipment used for maintenance

Table 10-4 Overview of tool requirements for care and maintenance

Tool / kit	Comments
Digital Volt Meter (DVM)	

Tool / kit	Comments
Anti Static Kit	Kit includes anti–static mat, wrist strap and cables for 200 to 240V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	120V 230V
Safety Analyzer	The safety Analyzer tool should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.
QIQ Phantom	RMI Grayscale Target Model 403GS **NOTE** NOTE! The use of a Phantom is not required during Care and Maintenance. Customer may use it as part of their Quality Assurance Program tests.
B/W Printer Cleaning Sheet	See printer user manual for requirements
Color Printer Cleaning Sheet	See printer user manual for requirements
Disposable Gloves	

System maintenance

Preliminary checks

The preliminary checks take about 15 minutes to perform. Refer to the Ultrasound system user documentation whenever necessary.

Table 10-5 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. 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.	FFA (server)	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.

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.

System checks

Table 10-6 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.	Monitor	Verify basic monitor 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: *Peripheral checks* on page 188.
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)

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 10-7 GEHC approved peripheral/hardware option functional checks

Step	Item	Description
1.	Media	Verify media drive(s) read/write properlty. Clean if necessary.

Step	Item	Description
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.

Mains cable inspection

Table 10-8 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.
4.	Verify	Inlet connector retainer is functional.

Cleaning

Table 10-9 General Cleaning

Step	Item	Description
1.	Console	Remove the battery. Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire system. 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).
3.	Monitor	Use a soft, non-abrasive folder cloth. Gently wipe the monitor face. DO NOT use a glass cleaner that has a hydrocarbon base (such as Benzene, Methy Alcohol or Methy Ethyl Ketone) on monitor with the filter (anti-glare shield).

For general cleaning of the system, we recommended to use non-abrasive soap and water solution.

Table 10-10 Compatible Chemicals for Cleaning

	System Cabinet	Operator Control Panel	Main display	Touch screen	Probe Holder
PDI Easy Screen Cleaning Wipe	X	X	X	X	X
70% isopropyl alcohol	X	X	X	X	X
CaviWipes	X	X	X	X	X
Wet Wipe	X	X	X	X	X
Protex	X	X	X	X	X
Sono Ultrasound Wipes	X	X	X	X	X
PDI Sani-Cloth Plus	X	X	X	X	X
Clorox wipes	X	X	X	X	X
Tristel Wipes	X	X	X	X	X
PDI Super Sani-Cloth	X	X	X	X	X
Effective Disinfection is always a balance between safe inactivation of infectious agents and undesirable side effects. Due to the generally uneven and irregular surface of Ultrasound consoles, a comprehensive surface disinfection process cannot be recommended by the manufacturer.					

Physical inspection

NOTE
These features may not be present on all Ultrasound systems.
Table 10-11 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: *Mains cable inspection* on page 328.
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.
8.	Monitor	Inspect the monitor Display for scratches and bad pixels. Verify proper operation of Contrast and Brightness controls. Where applicable, confirm that the monitor 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: Monitor 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,

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.

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.

Probe maintenance

Probe related checks

Table 10-12 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.

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 GEHC 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.

Basic probe cleaning

To clean the probe:

1. Disconnect the probe from the ultrasound console and remove all coupling gel from the probe by wiping with a soft cloth and rinsing with flowing water.
2. Wash the probe with mild soap in lukewarm water. Scrub the probe as needed using a soft sponge, gauze, or cloth to remove all visible residue from the probe surface. Prolonged soaking or scrubbing with a soft bristle brush (such as a toothbrush) may be necessary if material has dried onto the probe surface.

CAUTION
Do not submerge the probe above the probe as the strain relief is not sealed. Do not allow fluid into or onto the connector of the probe.

CAUTION
Take extra care when handling the lens face of the Ultrasound transducer. The lens face is especially sensitive and can easily be damaged by rough handling. NEVER use excessive force when cleaning the lens face.

3. Rinse the probe with enough clean potable water to remove all visible soap residue.
4. Air dry or dry with a soft cloth.

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.

Disinfecting probes

Ultrasound probes can be disinfected using liquid chemical germicides. The level of disinfection is directly related to the duration of contact with the germicide. Increased contact time produces a higher level of disinfection.

Refer to User Manual for detail on disinfecting probes.

CAUTION
Review the probe care card that is packed with each probe. The following website contains the most current and up-to-date recommendations:

http://www.gehealthcare.com/usen/ultrasound/products/probe_care.html

Electrical safety tests

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.

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.

Leakage current limits

WARNING
Energy Control and Power Lockout for the ultrasound system.

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 HealthCare 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 10-13 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 10-14 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

Table 10-15 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 10-16 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.	

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.

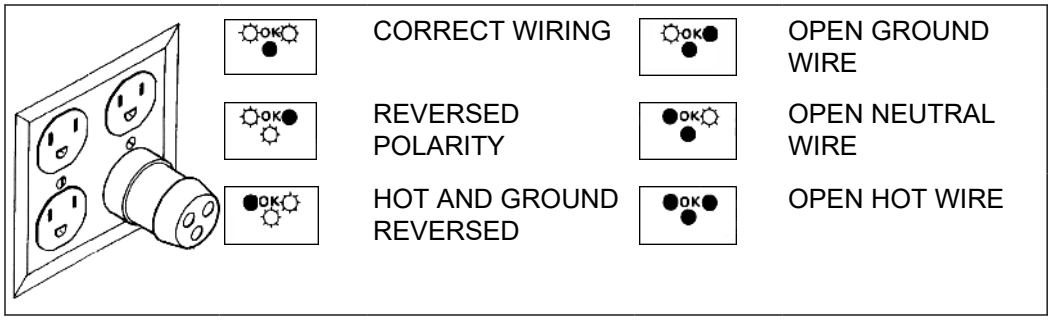


Figure 10-1 Typical alternate outlet tester

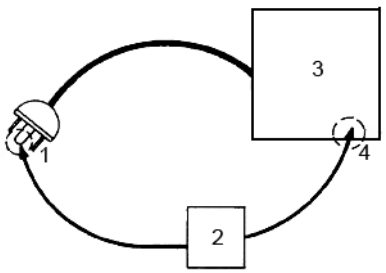
NOTE
No outlet tester can detect the condition where the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

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.

Figure 10-2 Ground continuity test



1. GROUND PIN
2. OHMMETER
3. Versana Premier/Versana Premier Lotus
4. ACCESSIBLE METAL PART:

   MONITOR HOUSING

   PEAR PANEL CONNECTOR

   ANY CASTER/WHEEL SUPPORT

Chassis leakage current test

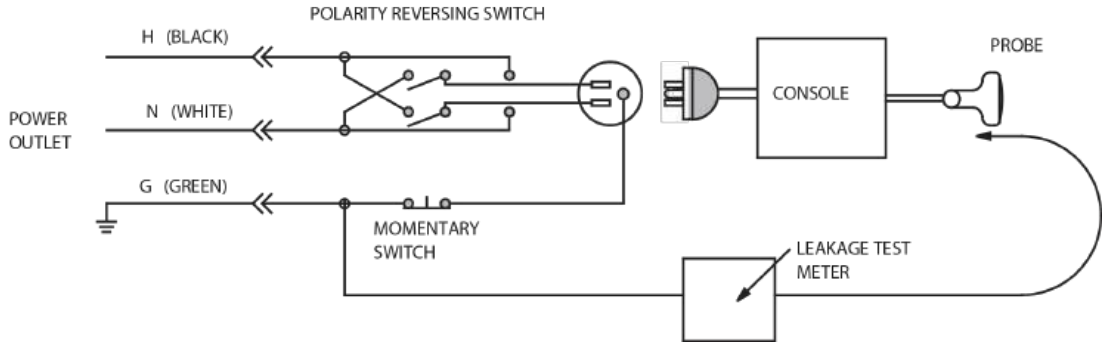
DANGER
ELECTRIC SHOCK HAZARD. WHEN THE METER'S GROUND SWITCH IS OPEN, DON'T TOUCH THE ULTRASOUND SYSTEM!

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.

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 10-3 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 10-13 Chassis Leakage Current Limits - Accessible Metal Surface* on page 334.

Data Sheet for enclosure Source Leakage Current

The test passes when all readings measure less than the value shown in *Table 10-13 Chassis Leakage Current Limits - Accessible Metal Surface* on page 334. Record all data on the PM Inspection Certificate.

Table 10-17 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				

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.

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.

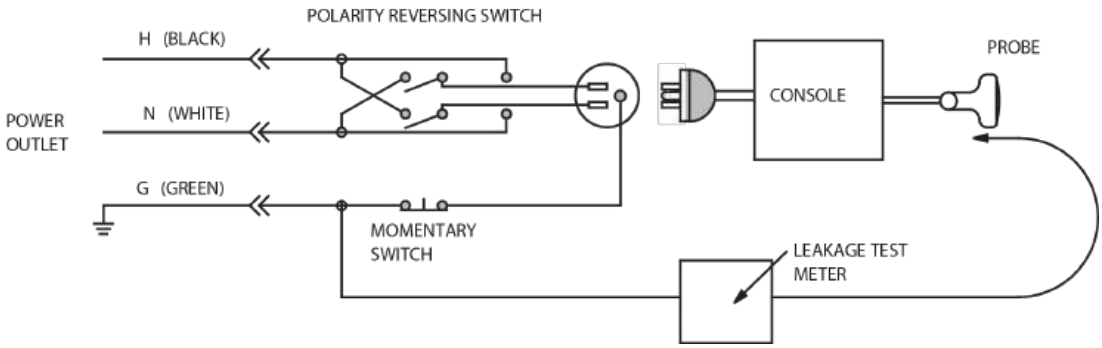
Tools

For needed tools, see: *Tools required* on page 322.

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 10-4 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.

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.

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.

Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values shown in *Table 10-14 Type BF Applied Part Leakage Current Limits - Probes Surface* on page 334. Record all data on the PM Inspection Certificate.

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.

Table 10-18 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	

When there's too much leakage current …

AC/DC Fails

Where applicable, check the AC/DC adapter and its cable. Replace a new one if any portion is defective.

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.

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.

Peripheral Fails

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

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.

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.

ECG Fails

Inspect cables for damage or poor connections.

Inspection Paperwork

Ultrasound Inspection Forms

Figure 10-5 Ultrasound Inspection Certificate

ULTRASOUND INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/C ontract/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

* Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

Figure 10-6 Functional Checks

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 10-7 Electrical Safety

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: _____

Electrical Safety Tests Log

Table 10-19 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				
Peripheral 2 ground continuity				
Peripheral 3 leakage current				
Peripheral 3 ground continuity				

Table 10-20 Electrical safety tests (probes) log

Probe	Max value allowed	Max value measured	OK?	Comments

Privacy and Security

Potential Hazardous Situations Resulting from Failures of the IT Network

The following general hazardous situations have been identified as potentially hazardous as a result of the IT network failing to provide the required characteristics specified above.

- Delayed or impaired access to images or other exam information or patient data.
- Permanent loss of images or other exam information or patient data.
- Corruption of images or other exam information or patient data.
- LAN connection loss during operation may cause loss of data, and damage data integrity.

Warning

In addition to the hazardous situations identified above, connection of the Ultrasound System Software to a network that includes other equipment could result in other unidentified risks to patients, operators or third parties. The responsible organization should identify, analyze, evaluate and control these risks on an ongoing basis including after changes to the network such as those listed below, which could introduce new risks and require additional analysis.

- Changes in network configuration.
- Connection of additional items to the network.
- Disconnecting items from the network.
- Update of equipment connected to the network.
- Upgrade of equipment connected to the network.

MDS²

The "Manufacturer Disclosure Statement for Medical Device Security" (MDS²) is provided as a statement of the security and privacy capabilities using a well-known standard disclosure format.

Please see MDS² for the ultrasound system as below:

Table 10-21 Manufacturer Disclosure Statement for Medical Device Security - MDS²

Question ID	Question	Answer
DOC-1	Manufacturer Name	GE Healthcare
DOC-2	Device Description	15976 Scanning
DOC-3	Device Model	Versana Premier R3 Versana Premier Lotus R3 LOGIQ F R3

Question ID	Question	Answer
DOC-4	Document ID	DOC2724255
DOC-5	Manufacturer Contact Information	GE Healthcare Service 1-800-437-1171
DOC-6	Intended use of device in network-connected environment:	This is an ultrasound diagnostic imaging system, which is used to create a patient image, present the image for diagnostic purposes, and/or transmit the image to a storage device, remote reading workstation or filming device.
DOC-7	Document Release Date	08-24-2023
DOC-8	Coordinated Vulnerability Disclosure: Does the manufacturer have a vulnerability disclosure program for this device?	Yes
DOC-9	ISAO: Is the manufacturer part of an Information Sharing and Analysis Organization?	Yes
DOC-10	Diagram: Is a network or data flow diagram available that indicates connections to other system components or expected external resources?	Yes
DOC-11	SaMD: Is the device Software as a Medical Device (i.e. software-only, no hardware)?	No
DOC-11.1	Does the SaMD contain an operating system?	N/A
DOC-11.2	Does the SaMD rely on an owner/operator provided operating system?	N/A
DOC-11.3	Is the SaMD hosted by the manufacturer?	N/A
DOC-11.4	Is the SaMD hosted by the customer?	N/A

MANAGEMENT OF PERSONALLY IDENTIFIABLE INFORMATION

Table 10-22 MANAGEMENT OF PERSONALLY IDENTIFIABLE INFORMATION

Question ID	Question	Answer	NIST SP 800-53 Rev. 4	ISO 27002:2013
MPII-1	Can this device display, transmit, store, or modify personally identifiable information (e.g. electronic Protected Health Information (ePHI))?	Yes	AR-2	A.15.1.4

Question ID	Question	Answer	NIST SP 800-53 Rev. 4	ISO 27002:2013
MPII-2	Does the device maintain personally identifiable information?	Yes	AR-2	A.15.1.4
MPII-2.1	Does the device maintain personally identifiable information temporarily in volatile memory (i.e., until cleared by power-off or reset)?	No	AR-2	A.15.1.4
MPII-2.2	Does the device store personally identifiable information persistently on internal media?	Yes		
MPII-2.3	Is personally identifiable information preserved in the device's non-volatile memory until explicitly erased?	Yes		
MPII-2.4	Does the device store personally identifiable information in a database?	Yes		
MPII-2.5	Does the device allow configuration to automatically delete local personally identifiable information after it is stored to a long term solution?	No	AR-2	A.15.1.4
MPII-2.6	Does the device import/export personally identifiable information with other systems (e.g., a wearable monitoring device might export personally identifiable information to a server)?	Yes	AR-2	A.15.1.4
MPII-2.7	Does the device maintain personally identifiable information when powered off, or during power service interruptions?	Yes	AR-2	A.15.1.4
MPII-2.8	Does the device allow the internal media to be removed by a service technician (e.g., for separate destruction or customer retention)?	Yes		
MPII-2.9	Does the device allow personally identifiable information records be stored in a separate location from the device's operating system (i.e. secondary internal drive, alternate drive partition, or remote storage location)?	Yes	AR-2	A.15.1.4

Question ID	Question	Answer	NIST SP 800-53 Rev. 4	ISO 27002:2013
MPII-3	Does the device have mechanisms used for the transmitting, importing/ exporting of personally identifiable information?	Yes	AR-2	A.15.1.4
MPII-3.1	Does the device display personally identifiable information (e.g., video display, etc.)?	Yes	AR-2	A.15.1.4
MPII-3.2	Does the device generate hardcopy reports or images containing personally identifiable information?	Yes	AR-2	A.15.1.4
MPII-3.3	Does the device retrieve personally identifiable information from or record personally identifiable information to removable media (e.g., removable-HDD, USB memory, DVD-R/RW,CD-R/RW, tape, CF/SD card, memory stick, etc.)?	Yes	AR-2	A.15.1.4
MPII-3.4	Does the device transmit/receive or import/export personally identifiable information via dedicated cable connection (e.g., RS-232, RS-423, USB, FireWire, etc.)?	Yes	AR-2	A.15.1.4
MPII-3.5	Does the device transmit/receive personally identifiable information via a wired network connection (e.g., RJ45, fiber optic, etc.)?	Yes	AR-2	A.15.1.4
MPII-3.6	Does the device transmit/receive personally identifiable information via a wireless network connection (e.g., WiFi, Bluetooth, NFC, infrared, cellular, etc.)?	Yes	AR-2	A.15.1.4
MPII-3.7	Does the device transmit/receive personally identifiable information over an external network (e.g., Internet)?	Yes	AR-2	A.15.1.4
MPII-3.8	Does the device import personally identifiable information via scanning a document?	No		
MPII-3.9	Does the device transmit/receive personally identifiable information via a proprietary protocol?	Yes		

Question ID	Question	Answer	NIST SP 800-53 Rev. 4	ISO 27002:2013
MPII-3.10	Does the device use any other mechanism to transmit, import or export personally identifiable information?	No	AR-2	A.15.1.4

AUTOMATIC LOGOFF (ALOF)

The device's ability to prevent access and misuse by unauthorized users if device is left idle for a period of time.

Table 10-23 AUTOMATIC LOGOFF (ALOF)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
ALOF-1	Can the device be configured to force reauthorization of logged-in user(s) after a predetermined length of inactivity (e.g., auto-logoff, session lock, password protected screen saver)?	No	Section 5.1, ALOF	AR-2	
ALOF-2	Is the length of inactivity time before auto-logoff/screen lock user or administrator configurable?	No	Section 5.1, ALOF	AC-11	A.11.2.8, A.11.2.9

AUDIT CONTROLS (AUDT)

The ability to reliably audit activity on the device.

Table 10-24 AUDIT CONTROLS (AUDT)

Question ID	Question	Answer	IEC TR 80001-2-2:2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
AUDT-1	Can the medical device create additional audit logs or reports beyond standard operating system logs?	Yes	Section 5.2, AUDT	AU-1	A.12.1.1, A.18.1.1, A.18.2.2, A.5.1.1, A.5.1.2, A.6.1.1
AUDT-1.1	Does the audit log record a USER ID?	Yes			
AUDT-1.2	Does other personally identifiable information exist in the audit trail?	Yes	Section 5.2, AUDT	AU-2	

Question ID	Question	Answer	IEC TR 80001-2-2:2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
AUDT-2	Are events recorded in an audit log? If yes, indicate which of the following events are recorded in the audit log:	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.1	Successful login/logout attempts?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.2	Unsuccessful login/ logout attempts?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.3	Modification of user privileges?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.4	Creation/modification/ deletion of users?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.5	Presentation of clinical or PII data (e.g. display, print)?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.6	Creation/modification/ deletion of data?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.7	Import/export of data from removable media (e.g. USB drive, external hard drive, DVD)?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.8	Receipt/transmission of data or commands over a network or point-to-point connection?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.8 .1	Remote or on-site support?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.8 .2	Application Programming Interface (API) and similar activity?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.9	Emergency access? **NOTE 1**	N/A	Section 5.2, AUDT	AU-2	
AUDT-2.1 0	Other events (e.g., software updates)?	Yes	Section 5.2, AUDT	AU-2	
AUDT-2.1 1	Is the audit capability documented in more detail?	Yes	Section 5.2, AUDT	AU-2	

Question ID	Question	Answer	IEC TR 80001-2-2:2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
AUDT-3	Can the owner/ operator define or select which events are recorded in the audit log?	No	Section 5.2, AUDT	AU-2	
AUDT-4	Is a list of data attributes that are captured in the audit log for an event available?	Yes	Section 5.2, AUDT	AU-2	
AUDT-4.1	Does the audit log record date/time?	Yes	Section 5.2, AUDT	AU-2	
AUDT-4.1 .1	Can date and time be synchronized by Network Time Protocol (NTP) or equivalent time source?	No	Section 5.2, AUDT	AU-2	
AUDT-5	Can audit log content be exported?	Yes	Section 5.2, AUDT	AU-2	
AUDT-5.1	Via physical media?	Yes			
AUDT-5.2	Via IHE Audit Trail and Node Authentication (ATNA) profile to SIEM?	No			
AUDT-5.3	Via Other communications (e.g., external service device, mobile applications)?	Yes			
AUDT-5.4	Are audit logs encrypted in transit or on storage media?	No			
AUDT-6	Can audit logs be monitored/reviewed by owner/operator?	No			
AUDT-7	Are audit logs protected from modification?	Yes	Section 5.2, AUDT	AU-2	
AUDT-7.1	Are audit logs protected from access?	Yes			

Question ID	Question	Answer	IEC TR 80001-2-2:2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
AUDT-8	Can audit logs be analyzed by the device?	No	Section 5.2, AUDT	AU-2	
NOTE 1: This device does not have emergency access. But supports users to scan without login, and the scan information cannot be saved.					

AUTHORIZATION (AUTH)

The ability of the device to determine the authorization of users.

Table 10-25 AUTHORIZATION (AUTH)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
AUTH-1	Does the device prevent access to unauthorized users through user login requirements or other mechanism?	Yes	Section 5.3, AUTH	IA-2	A.9.2.1
AUTH-1.1	Can the device be configured to use federated credentials management of users for authorization (e.g., LDAP, OAuth)?	Yes	Section 5.3, AUTH	IA-2	A.9.2.1
AUTH-1.2	Can the customer push group policies to the device (e.g., Active Directory)?	No	Section 5.3, AUTH	IA-2	A.9.2.1
AUTH-1.3	Are any special groups, organizational units, or group policies required?	No	Section 5.3, AUTH	IA-2	A.9.2.1
AUTH-2	Can users be assigned different privilege levels based on 'role' (e.g., user, administrator, and/or service, etc.)?	No	Section 5.3, AUTH	IA-2	A.9.2.1
AUTH-3	Can the device owner/operator grant themselves unrestricted administrative privileges (e.g., access operating system or application via local root or administrator account)?	No	Section 5.3, AUTH	IA-2	A.9.2.1
AUTH-4	Does the device authorize or control all API access requests?	No	Section 5.3, AUTH	IA-2	A.9.2.1

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
AUTH-5	Does the device run in a restricted access mode, or ‘kiosk mode’, by default?	Yes			

CYBER SECURITY PRODUCT UPGRADES (CSUP)

The ability of on-site service staff, remote service staff, or authorized customer staff to install/ upgrade device's security patches.

Table 10-26 CYBER SECURITY PRODUCT UPGRADES (CSUP)

Question ID	Question	Answer
CSUP-1	Does the device contain any software or firmware which may require security updates during its operational life, either from the device manufacturer or from a third-party manufacturer of the software/firmware? If no, answer “N/A” to questions in this section.	Yes
CSUP-2	Does the device contain an Operating System? If yes, complete 2.1-2.4.	Yes
CSUP-2.1	Does the device documentation provide instructions for owner/ operator installation of patches or software updates?	Yes
CSUP-2.2	Does the device require vendor or vendor-authorized service to install patches or software updates?	Yes
CSUP-2.3	Does the device have the capability to receive remote installation of patches or software updates?	Yes
CSUP-2.4	Does the medical device manufacturer allow security updates from any third-party manufacturers (e.g., Microsoft) to be installed without approval from the manufacturer?	No
CSUP-3	Does the device contain Drivers and Firmware? If yes, complete 3.1-3.4.	Yes
CSUP-3.1	Does the device documentation provide instructions for owner/ operator installation of patches or software updates?	Yes
CSUP-3.2	Does the device require vendor or vendor-authorized service to install patches or software updates?	Yes
CSUP-3.3	Does the device have the capability to receive remote installation of patches or software updates?	Yes
CSUP-3.4	Does the medical device manufacturer allow security updates from any third-party manufacturers (e.g., Microsoft) to be installed without approval from the manufacturer?	No
CSUP-4	Does the device contain Anti-Malware Software? If yes, complete 4.1-4.4.**NOTE 1**	No

Question ID	Question	Answer
CSUP-4.1	Does the device documentation provide instructions for owner/ operator installation of patches or software updates?	N/A
CSUP-4.2	Does the device require vendor or vendor-authorized service to install patches or software updates?	N/A
CSUP-4.3	Does the device have the capability to receive remote installation of patches or software updates?	N/A
CSUP-4.4	Does the medical device manufacturer allow security updates from any third-party manufacturers (e.g., Microsoft) to be installed without approval from the manufacturer?	N/A
CSUP-5	Does the device contain Non-Operating System commercial off-the-shelf components? If yes, complete 5.1-5.4.	Yes
CSUP-5.1	Does the device documentation provide instructions for owner/ operator installation of patches or software updates?	Yes
CSUP-5.2	Does the device require vendor or vendor-authorized service to install patches or software updates?	No
CSUP-5.3	Does the device have the capability to receive remote installation of patches or software updates?	No
CSUP-5.4	Does the medical device manufacturer allow security updates from any third-party manufacturers (e.g., Microsoft) to be installed without approval from the manufacturer?	No
CSUP-6	Does the device contain other software components (e.g., asset management software, license management)? If yes, please provide details or refernce in notes and complete 6.1-6.4.	No
CSUP-6.1	Does the device documentation provide instructions for owner/ operator installation of patches or software updates?	N/A
CSUP-6.2	Does the device require vendor or vendor-authorized service to install patches or software updates?	N/A
CSUP-6.3	Does the device have the capability to receive remote installation of patches or software updates?	N/A
CSUP-6.4	Does the medical device manufacturer allow security updates from any third-party manufacturers (e.g., Microsoft) to be installed without approval from the manufacturer?	N/A
CSUP-7	Does the manufacturer notify the customer when updates are approved for installation?	Yes
CSUP-8	Does the device perform automatic installation of software updates?	Yes
CSUP-9	Does the manufacturer have an approved list of third-party software that can be installed on the device?	No
CSUP-10	Can the owner/operator install manufacturer-approved third-party software on the device themselves?	No

Question ID	Question	Answer
CSUP-10.1	Does the system have mechanism in place to prevent installation of unapproved software?	N/A
CSUP-11	Does the manufacturer have a process in place to assess device vulnerabilities and updates?	Yes
CSUP-11.1	Does the manufacturer provide customers with review and approval status of updates?	Yes
CSUP-11.2	Is there an update review cycle for the device?	Yes
NOTE 1: The device uses whitelist (Device Guard) of Windows 10 for anti-malware		

HEALTH DATA DE-IDENTIFICATION (DIDT)

The ability of the device to directly remove information that allows identification of a person.

Table 10-27 HEALTH DATA DE-IDENTIFICATION (DIDT)

Question ID	Question	Answer	IEC TR 80001-2-2:2012	ISO 27002:2013
DIDT-1	Does the device provide an integral capability to de-identify personally identifiable information?	Yes	Section 5.6, DIDT	ISO 27038
DIDT-1.1	Does the device support de-identification profiles that comply with the DICOM standard for de-identification?	No	Section 5.6, DIDT	ISO 27038

DATA BACKUP AND DISASTER RECOVERY (DTBK)

The ability to recover after damage or destruction of device data, hardware, software, or site configuration information.

Table 10-28 DATA BACKUP AND DISASTER RECOVERY (DTBK)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
DTBK-1	Does the device maintain long term primary storage of personally identifiable information / patient information (e.g. PACS)?	Yes			
DTBK-2	Does the device have a “factory reset” function to restore the original device settings as provided by the manufacturer?	Yes	Section 5.7, DTBK	CP-9	A.12.3.1

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
DTBK-3	Does the device have an integral data backup capability to removable media?	Yes	Section 5.7, DTBK	CP-9	A.12.3.1
DTBK-4	Does the device have an integral data backup capability to remote storage?	Yes			
DTBK-5	Does the device have a backup capability for system configuration information, patch restoration, and software restoration? **NOTE 1**	Yes			
DTBK-6	Does the device provide the capability to check the integrity and authenticity of a backup?	No	Section 5.7, DTBK	CP-9	A.12.3.1
NOTE 1: Patch restoration can not be restored.					

EMERGENCY ACCESS (EMRG)

The ability of the device user to access personally identifiable information in case of a medical emergency situation that requires immediate access to stored personally identifiable information.

Table 10-29 EMERGENCY ACCESS (EMRG)

Question ID	Question	Answer	IEC TR 80001-2-2:201 2	NIST SP 800-53 Rev. 4
EMRG-1	Does the device incorporate an emergency access (i.e. “break-glass”) feature?	No	Section 5.8, EMRG	SI-17

HEALTH DATA INTEGRITY AND AUTHENTICITY (IGAU)

How the device ensures that the stored data on the device has not been altered or destroyed in a non-authorized manner and is from the originator.

Table 10-30 HEALTH DATA INTEGRITY AND AUTHENTICITY (IGAU)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
IGAU-1	Does the device provide data integrity checking mechanisms of stored health data (e.g., hash or digital signature)?	No	Section 5.9, IGAU	SC-28	A.18.1.3

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
IGAU-2	Does the device provide error/ failure protection and recovery mechanisms for stored health data (e.g., RAID-5)?	No	Section 5.9, IGAU	SC-28	A.18.1.3

MALWARE DETECTION/PROTECTION (MLDP)

The ability of the device to effectively prevent, detect and remove malicious software (malware).

Table 10-31 MALWARE DETECTION/PROTECTION (MLDP)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
MLDP-1	Is the device capable of hosting executable software?	No	Section 5.10, MLDP		
MLDP-2	Does the device support the use of anti-malware software (or other anti-malware mechanism)? Provide details or reference in notes. **NOTE 1**	Yes	Section 5.10, MLDP	SI-3	A.12.2.1
MLDP-2.1	Does the device include anti-malware software by default? **NOTE 1**	Yes	Section 5.10, MLDP	CM-5	A.12.1.2, A.12.1.4, A.12.5.1, A.9.2.3, A.9.4.5
MLDP-2.2	Does the device have anti-malware software available as an option?	No	Section 5.10, MLDP		A.12.4.1, A.16.1.2, A.16.1.4
MLDP-2.3	Does the device documentation allow the owner/operator to install or update anti-malware software? **NOTE 2**	N/A	Section 5.10, MLDP	AU-6	A.17.1.2
MLDP-2.4	Can the device owner/operator independently (re-)configure anti-malware settings?	No	Section 5.10, MLDP	CP-10	
MLDP-2.5	Does notification of malware detection occur in the device user interface?	No		AU-2	

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
MLDP-2.6	Can only manufacturer-authorized persons repair systems when malware has been detected?	Yes			
MLDP-2.7	Are malware notifications written to a log?	No			
MLDP-2.8	Are there any restrictions on anti-malware (e.g., purchase, installation, configuration, scheduling)?	No			
MLDP-3	If the answer to MLDP-2 is NO, and anti-malware cannot be installed on the device, are other compensating controls in place or available?	Yes	Section 5.10, MLDP	SI-2	A.12.6.1, A.14.2.2, A.14.2.3, A.16.1.3
MLDP-4	Does the device employ application whitelisting that restricts the software and services that are permitted to be run on the device?	Yes	Section 5.10, MLDP	SI-3	A.12.2.1
MLDP-5	Does the device employ a host-based intrusion detection/ prevention system?	No	Section 5.10, MLDP	SI-4	
MLDP-5.1	Can the host-based intrusion detection/prevention system be configured by the customer?	N/A	Section 5.10, MLDP	CM-7	A.12.5.1
MLDP-5.2	Can a host-based intrusion detection/prevention system be installed by the customer?	N/A	Section 5.10, MLDP		
NOTE 1: The device uses whitelist (Device Guard) of Windows 10 for anti-malware. NOTE 2: The whitelist rules are static and only modified when the software is updated.					

NODE AUTHENTICATION (NAUT)

The ability of the device to authenticate communication partners/nodes.

Table 10-32 NODE AUTHENTICATION (NAUT)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
NAUT-1	Does the device provide/ support any means of node authentication that assures both the sender and the recipient of data are known to each other and are authorized to receive transferred information (e.g. Web APIs, SMTP, SNMP)?	Yes	Section 5.11, NAUT	SC-23	
NAUT-2	Are network access control mechanisms supported (E.g., does the device have an internal firewall, or use a network connection white list)?	Yes	Section 5.11, NAUT	SC-7	A.13.1.1, A.13.1.3, A.13.2.1, A.14.1.3
NAUT-2.1	Is the firewall ruleset documented and available for review?	Yes			
NAUT-3	Does the device use certificate-based network connection authentication?	No			

CONNECTIVITY CAPABILITIES (CONN)

All network and removable media connections must be considered in determining appropriate security controls. This section lists connectivity capabilities that may be present on the device.

Table 10-33 CONNECTIVITY CAPABILITIES (CONN)

Question ID	Question	Answer
CONN-1	Does the device have hardware connectivity capabilities?	Yes
CONN-1.1	Does the device support wireless connections?	Yes
CONN-1.1.1	Does the device support Wi-Fi?	Yes
CONN-1.1.2	Does the device support Bluetooth?	Yes
CONN-1.1.3	Does the device support other wireless network connectivity (e.g. LTE, Zigbee, proprietary)?	No
CONN-1.1.4	Does the device support other wireless connections (e.g., custom RF controls, wireless detectors)?	No
CONN-1.2	Does the device support physical connections?	Yes
CONN-1.2.1	Does the device have available RJ45 Ethernet ports?	Yes

Question ID	Question	Answer
CONN-1.2.2	Does the device have available USB ports?	Yes
CONN-1.2.3	Does the device require, use, or support removable memory devices?	Yes
CONN-1.2.4	Does the device support other physical connectivity?	Yes
CONN-2	Does the manufacturer provide a list of network ports and protocols that are used or may be used on the device?	Yes
CONN-3	Can the device communicate with other systems within the customer environment?	Yes
CONN-4	Can the device communicate with other systems external to the customer environment (e.g., a service host)?	Yes
CONN-5	Does the device make or receive API calls?**NOTE 1**	Yes
CONN-6	Does the device require an internet connection for its intended use?	Yes
CONN-7	Does the device support Transport Layer Security (TLS)?	Yes
CONN-7.1	Is TLS configurable?	Yes
CONN-8	Does the device provide operator control functionality from a separate device (e.g., telemedicine)?**NOTE 2**	Yes
NOTE 1: Tricefy NOTE 2: This device just support Remote Service.		

PERSON AUTHENTICATION (PAUT)

The ability to configure the device to authenticate users.

Table 10-34 PERSON AUTHENTICATION (PAUT)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
PAUT-1	Does the device support and enforce unique IDs and passwords for all users and roles (including service accounts)?	Yes	Section 5.12, PAUT	IA-2	A.9.2.1
PAUT-1.1	Does the device enforce authentication of unique IDs and passwords for all users and roles (including service accounts)?	Yes	Section 5.12, PAUT	IA-2	A.9.2.1

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
PAUT-2	Is the device configurable to authenticate users through an external authentication service (e.g., MS Active Directory, NDS, LDAP, OAuth, etc.)?	Yes	Section 5.12, PAUT	IA-5	A.9.2.1
PAUT-3	Is the device configurable to lock out a user after a certain number of unsuccessful logon attempts?	No	Section 5.12, PAUT	IA-2	A.9.2.1
PAUT-4	Are all default accounts (e.g., technician service accounts, administrator accounts) listed in the documentation?	No	Section 5.12, PAUT	SA-4(5)	A.14.1.1, A.14.2.7, A.14.2.9, A.15.1.2
PAUT-5	Can all passwords be changed?	Yes	Section 5.12, PAUT		
PAUT-6	Is the device configurable to enforce creation of user account passwords that meet established (organization specific) complexity rules?	Yes	Section 5.12, PAUT	IA-2	A.9.2.1
PAUT-7	Does the device support account passwords that expire periodically?	Yes			
PAUT-8	Does the device support multi-factor authentication?	No			
PAUT-9	Does the device support single sign-on (SSO)?	No	Section 5.12, PAUT	IA-2	A.9.2.1
PAUT-10	Can user accounts be disabled/locked on the device?	Yes	Section 5.12, PAUT	IA-2	A.9.2.1
PAUT-11	Does the device support biometric controls?	No	Section 5.12, PAUT	IA-2	A.9.2.1
PAUT-12	Does the device support physical tokens (e.g. badge access)?	Yes			
PAUT-13	Does the device support group authentication (e.g. hospital teams)?**NOTE 1**	No			
PAUT-14	Does the application or device store or manage authentication credentials?	Yes			
PAUT-14.1	Are credentials stored using a secure method?	Yes			

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
NOTE 1: Field Engineers can use Secure Socket Access on this device.					

PHYSICAL LOCKS (PLOK)

Physical locks can prevent unauthorized users with physical access to the device from compromising the integrity and confidentiality of personally identifiable information stored on the device or on removable media

Table 10-35 PHYSICAL LOCKS (PLOK)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
PLOK-1	Is the device software only? If yes, answer “N/A” to remaining questions in this section.	No	Section 5.13, PLOK	PE-3(4)	A.11.1.1, A.11.1.2, A.11.1.3
PLOK-2	Are all device components maintaining personally identifiable information (other than removable media) physically secure (i.e., cannot remove without tools)?	No	Section 5.13, PLOK	PE-3(4)	A.11.1.1, A.11.1.2, A.11.1.3
PLOK-3	Are all device components maintaining personally identifiable information (other than removable media) physically secured behind an individually keyed locking device?	No	Section 5.13, PLOK	PE-3(4)	A.11.1.1, A.11.1.2, A.11.1.3
PLOK-4	Does the device have an option for the customer to attach a physical lock to restrict access to removable media?	No	Section 5.13, PLOK	PE-3(4)	A.11.1.1, A.11.1.2, A.11.1.3

ROADMAP FOR THIRD PARTY COMPONENTS IN DEVICE LIFE CYCLE (RDMP)

Manufacturer's plans for security support of third-party components within the life cycle of the device.

Table 10-36 ROADMAP FOR THIRD PARTY COMPONENTS IN DEVICE LIFE CYCLE (RDMP)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
RDMP-1	Was a secure software development process, such as ISO/IEC 27034 or IEC 62304, followed during product development?	Yes	Section 5.14, RDMP	CM-2	
RDMP-2	Does the manufacturer evaluate third-party applications and software components included in the device for secure development practices?	Yes	Section 5.14, RDMP	CM-8	A.8.1.1, A.8.1.2
RDMP-3	Does the manufacturer maintain a web page or other source of information on software support dates and updates?	Yes	Section 5.14, RDMP	CM-8	A.8.1.1, A.8.1.2
RDMP-4	Does the manufacturer have a plan for managing third-party component end-of-life?	Yes	Section 5.14, RDMP	CM-8	A.8.1.1, A.8.1.2

SOFTWARE BILL OF MATERIALS (SBOM)

A Software Bill of Material (SBoM) lists all the software components that are incorporated into the device being described for the purpose of operational security planning by the healthcare delivery organization. This section supports controls in the RDMP section.

Table 10-37 SOFTWARE BILL OF MATERIALS (SBOM)

Question ID	Question	Answer
SBOM-1	Is the SBoM for this product available?	Yes
SBOM-2	Does the SBoM follow a standard or common method in describing software components?	Yes
SBOM-2.1	Are the software components identified?	Yes
SBOM-2.2	Are the developers/manufacturers of the software components identified?	Yes
SBOM-2.3	Are the major version numbers of the software components identified?	Yes
SBOM-2.4	Are any additional descriptive elements identified?	Yes
SBOM-3	Does the device include a command or process method available to generate a list of software components installed on the device?	Yes

Question ID	Question	Answer
SBOM-4	Is there an update process for the SBoM?	Yes

SYSTEM AND APPLICATION HARDENING (SAHD)

The device's inherent resistance to cyber attacks and malware.

Table 10-38 SYSTEM AND APPLICATION HARDENING (SAHD)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
SAHD-1	Is the device hardened in accordance with any industry standards?	Yes	Section 5.15, SAHD	AC-17(2), IA-3	A.13.1.1, A.13.2.1, A.14.1.2, A.6.2.1, A.6.2.2, None
SAHD-2	Has the device received any cybersecurity certifications?	No	Section 5.15, SAHD	SA-12(10)	A.14.2.7, A.15.1.1, A.15.1.2, A.15.1.3
SAHD-3	Does the device employ any mechanisms for software integrity checking?	Yes			
SAHD-3.1	Does the device employ any mechanism (e.g., release-specific hash key, checksums, digital signature, etc.) to ensure the installed software is manufacturer-authorized?	Yes			
SAHD-3.2	Does the device employ any mechanism (e.g., release-specific hash key, checksums, digital signature, etc.) to ensure the software updates are the manufacturer-authorized updates?	Yes	Section 5.15, SAHD	CM-8	A.8.1.1, A.8.1.2
SAHD-4	Can the owner/operator perform software integrity checks (i.e., verify that the system has not been modified or tampered with)?	No	Section 5.15, SAHD	AC-3	A.13.1.1, A.14.1.2, A.14.1.3, A.18.1.3, A.6.2.2, A.9.1.2, A.9.4.1, A.9.4.4, A.9.4.5

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
SAHD-5	Is the system configurable to allow the implementation of file-level, patient level, or other types of access controls?	No	Section 5.15, SAHD	CM-7	A.12.5.1*
SAHD-5.1	Does the device provide role-based access controls?	N/A	Section 5.15, SAHD	CM-7	A.12.5.1*
SAHD-6	Are any system or user accounts restricted or disabled by the manufacturer at system delivery?	Yes	Section 5.15, SAHD	CM-8	A.8.1.1, A.8.1.2
SAHD-6.1	Are any system or user accounts configurable by the end user after initial configuration?	Yes	Section 5.15, SAHD	CM-7	A.12.5.1*
SAHD-6.2	Does this include restricting certain system or user accounts, such as service technicians, to least privileged access?	Yes	Section 5.15, SAHD	CM-7	A.12.5.1*
SAHD-7	Are all shared resources (e.g., file shares) which are not required for the intended use of the device disabled?	Yes	Section 5.15, SAHD	CM-7	A.12.5.1*
SAHD-8	Are all communication ports and protocols that are not required for the intended use of the device disabled?	Yes	Section 5.15, SAHD	SA-18	
SAHD-9	Are all services (e.g., telnet, file transfer protocol [FTP], internet information server [IIS], etc.), which are not required for the intended use of the device deleted/disabled?	Yes	Section 5.15, SAHD	CM-6	
SAHD-10	Are all applications (COTS applications as well as OS-included applications, e.g., MS Internet Explorer, etc.) which are not required for the intended use of the device deleted/disabled?	Yes	Section 5.15, SAHD	SI-2	A.12.6.1, A.14.2.2, A.14.2.3, A.16.1.3

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
SAHD-11	Can the device prohibit boot from uncontrolled or removable media (i.e., a source other than an internal drive or memory component)?	Yes			
SAHD-12	Can unauthorized software or hardware be installed on the device without the use of physical tools?	Yes			
SAHD-13	Does the product documentation include information on operational network security scanning by users?	No			
SAHD-14	Can the device be hardened beyond the default provided state?	Yes			
SAHD-14.1	Are instructions available from vendor for increased hardening?	Yes			
SHAD-15	Can the system prevent access to BIOS or other bootloaders during boot?	Yes			
SAHD-16	Have additional hardening methods not included in 2.3.19 been used to harden the device?**NOTE 1**	Yes			
NOTE 1: TPM and BitLocker					

SECURITY GUIDANCE (SGUD)

Availability of security guidance for operator and administrator of the device and manufacturer sales and service.

Table 10-39 SECURITY GUIDANCE (SGUD)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
SGUD-1	Does the device include security documentation for the owner/operator?	Yes	Section 5.16, SGUD	AT-2, PL-2	A.12.2.1, A.14.1.1, A.7.2.2

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
SGUD-2	Does the device have the capability, and provide instructions, for the permanent deletion of data from the device or media?	Yes	Section 5.16, SGUD	MP-6	A.11.2.7, A.8.2.3, A.8.3.1, A.8.3.2
SGUD-3	Are all access accounts documented?	No	Section 5.16, SGUD	AC-6, IA-2	A.9.1.2, A.9.2.1, A.9.2.3, A.9.4.4, A.9.4.5
SGUD-3.1	Can the owner/operator manage password control for all accounts?	Yes			
SGUD-4	Does the product include documentation on recommended compensating controls for the device?	Yes			

HEALTH DATA STORAGE CONFIDENTIALITY (STCF)

The ability of the device to ensure unauthorized access does not compromise the integrity and confidentiality of personally identifiable information stored on the device or removable media.

Table 10-40 HEALTH DATA STORAGE CONFIDENTIALITY (STCF)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
STCF-1	Can the device encrypt data at rest?	Yes	Section 5.17, STCF	SC-28	A.8.2.3
STCF-1.1	Is all data encrypted or otherwise protected?	Yes			
STCF-1.2	Is the data encryption capability configured by default?	Yes			
STCF-1.3	Are instructions available to the customer to configure encryption?	Yes			
STCF-2	Can the encryption keys be changed or configured?	Yes	Section 5.17, STCF	SC-28	A.8.2.3
STCF-3	Is the data stored in a database located on the device?	Yes			

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
STCF-4	Is the data stored in a database external to the device?	No			

TRANSMISSION CONFIDENTIALITY (TXCF)

The ability of the device to ensure the confidentiality of transmitted personally identifiable information.

Table 10-41 TRANSMISSION CONFIDENTIALITY (TXCF)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:2013
TXCF-1	Can personally identifiable information be transmitted only via a point-to-point dedicated cable?	No	Section 5.18, TXCF	CM-7	A.12.5.1
TXCF-2	Is personally identifiable information encrypted prior to transmission via a network or removable media?	Yes	Section 5.18, TXCF	CM-7	A.12.5.1
TXCF-2.1	If data is not encrypted by default, can the customer configure encryption options?	N/A			
TXCF-3	Is personally identifiable information transmission restricted to a fixed list of network destinations?	Yes	Section 5.18, TXCF	CM-7	A.12.5.1
TXCF-4	Are connections limited to authenticated systems?	Yes	Section 5.18, TXCF	CM-7	A.12.5.1
TXCF-5	Are secure transmission methods supported/implemented (DICOM, HL7, IEEE 11073)?	Yes			

TRANSMISSION INTEGRITY (TXIG)

The ability of the device to ensure the integrity of transmitted data.

Table 10-42 TRANSMISSION INTEGRITY (TXIG)

Question ID	Question	Answer	IEC TR 80001-2-2: 2012	NIST SP 800-53 Rev. 4	ISO 27002:201 3
TXIG-1	Does the device support any mechanism (e.g., digital signatures) intended to ensure data is not modified during transmission?	No	Section 5.19, TXIG	SC-8	A.13.1.1, A.13.2.1, A.13.2.3, A.14.1.2, A.14.1.3, A.8.2.3
TXIG-2	Does the device include multiple sub-components connected by external cables?	No			

REMOTE SERVICE (RMOT)

Remote service refers to all kinds of device maintenance activities performed by a service person via network or other remote connection.

Table 10-43 REMOTE SERVICE (RMOT)

Question ID	Question	Answer	NIST SP 800-53 Rev. 4	ISO 27002:2013
RMOT-1	Does the device permit remote service connections for device analysis or repair?	Yes	AC-17	A.13.1.1, A.13.2.1, A.14.1.2, A.6.2.1, A.6.2.2
RMOT-1.1	Does the device allow the owner/ operator to initiative remote service sessions for device analysis or repair?	Yes		
RMOT-1.2	Is there an indicator for an enabled and active remote session?	Yes		
RMOT-1.3	Can patient data be accessed or viewed from the device during the remote session?	Yes	AC-17	A.13.1.1, A.13.2.1, A.14.1.2, A.6.2.1, A.6.2.2
RMOT-2	Does the device permit or use remote service connections for predictive maintenance data?	No		
RMOT-3	Does the device have any other remotely accessible functionality (e.g. software updates, remote training)?	Yes		

OTHER SECURITY CONSIDERATIONS (OTHR)

Table 10-44 OTHER SECURITY CONSIDERATIONS (OTHR)

<table>
<tr><th>Question ID</th><th>Question</th><th>Answer</th></tr>
<tr><td>OTHR-1</td><td>List the PI/PII/PHI Elements collected by the Product (if applicable)</td><td>Patient ID, Patient Name, Other Person IDs , Patient's Postal Address, Patient's Phone Number, Age, Date/Time of Birth, Gender, Height and/or Size, Weight,
Coded Indices (Cal score, BMI, BW Pain Assessment, etc.), Medical Procedure and Clinical Information (e.g., Series Description, Exam Type, Protocols, Procedure Description), Medical Diagnosis Comments, Patient's Medical Condition and History, Exam Date/Exam Start Time/Exam End Time, Images, Image Identifiers, Free Form Text Fields etc.</td></tr>
<tr><td>OTHR-2</td><td>Audit trails Log size and duration rules (if applicable)</td><td>100MB</td></tr>
<tr><td>OTHR-3</td><td>Details on Firewall Solution(s) supported by the product (if applicable)</td><td>Inbound :
<table>
<tr><th>Local port</th><th>Network service</th></tr>
<tr><td>104</td><td>DICOM server</td></tr>
</table>
Outbound:
<table>
<tr><th>Remote port</th><th>Network service</th></tr>
<tr><td>445</td><td>File and Printer Sharing</td></tr>
<tr><td>80</td><td>http</td></tr>
<tr><td>515, 9100</td><td>Network Printer</td></tr>
</table></td></tr>
</table>

Index

F

G

H

I

L

M

N

O

P

R

S

T

U

V

W


GE HealthCare