GE

Technical Publication

LOGIQ V2/LOGIQ V1

Basic Service Manual
Direction Number: 5610739-100 English

Rev.10

Product Information

This Manual covers the software version of R1.x.x for LOGIQ V2, LOGIQ V1 ultrasound system.

GE

Revision history

Revision History

Revision	Date (YYYY/MM/DD)	Reason for change
Rev.1	2015/06/09	Initial Release
Rev.2	2015/11/13	New software version, general update
Rev.3	2015/11/23	Add software wipe information
Rev.4	2016/01/05	Update spare part list
Rev.5	2016/02/18	Update spare part list
Rev.6	2016/06/15	Update spare part list
Rev.7	2016/11/21	Change safety test frequency
Rev.8	2017/02/23	Update software loading procedure
Rev.9	2017/08/23	Update spare part list
Rev.10	2017/10/31	Add ECG Installation

List of Effected Pages (LOEP)

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Important precautions

Translation policy

WARNING

AVERTISSEMENT

ADVERTENCIA

WARNUNG

Deutsch

(DE)

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

AVVERTENZA

italiano

(IT)

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

WAARSCHUWING

Nederlands

(NL)

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

ADVERTÊNCIA

Português (PT-BR)

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

HOIATUS!

Eesti (ET)

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

OPOZORILO

Slovenščina (SL)

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

警告

日本語
(JA)

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

警告

简体中文
(ZH-CN)

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

VARNING

Svenska
(SV)

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

警告

繁體中文
(ZH-TW)

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

경고

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.

한국어 (KO)

ПРЕДУПРЕЖДЕНИЕ

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.

На русском языке (RU)

OSTRZEŻENIE

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.

Polski (PL)

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

ЕСКЕРТУ

BABALA

Damage in transportation

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

Certified electrical contractor statement - For USA Only

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

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

Omission and errors

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

Mail the information to: GE Medical Systems (China) Co., Ltd.
No. 19 Changiang Road
Wuxi National Hi-Tech Dev. Zone
Jiangsu
P.R.China 214028

GE employees should use TrackWise to report service documentation issues.

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

Service Safety Considerations

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

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

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

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Chapter 1

Introduction

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

Overview

Contents in this chapter

Manual Overview

This manual provides installation and service information for the LOGIQ V2/LOGIQ V1 Ultrasound system. It is divided in 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 LOGIQ V2/LOGIQ V1.
3.	System Setup	Contains setup procedure with procedure checklist for the system.
4.	General Procedures and Functional Checks	Contains functional checks that must be performed as part of the installation, or as required during servicing and periodic maintenance.
5.	Components and Functions (Theory)	Contains block diagrams and functional explanations of the electronics.
6.	Service Adjustments	Contains instructions on how to make any available adjustments to the LOGIQ V2/LOGIQ V1.

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

Chapter number	Chapter title	Description
7.	Diagnostics/ Troubleshooting	Provides procedures for running diagnostic or related routines for the LOGIQ V2/LOGIQ V1.
8.	Replacement procedures	Provides disassembly procedures and reassembly procedures for all changeable FRU.
9.	Renewal Parts	Contains a complete list of replacement parts for LOGIQ V2/LOGIQ V1.
10.	Care & Maintenance	Provides periodic maintenance procedures for LOGIQ V2/LOGIQ V1.
N/A	Index	A quick way to the topic you're looking for.

Typical users of the Proprietary Service Manual

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

LOGIQ V2/LOGIQ V1 models covered by this manual

Table 1-2:   LOGIQ V2/LOGIQ V1 Model Designations

Model Number	Description	System SW
5661244	LOGIQ V2 Generic version	R1.x.x
5661242	LOGIQ V1 Generic version	R1.x.x

NOTE: *When not otherwise specified, the contents of this manual applies to all LOGIQ V2/LOGIQ V1 models.*

Important conventions

Conventions used in book

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

Model designations

This manual covers the LOGIQ V2/LOGIQ V1 Ultrasound systems listed in:

'LOGIQ V2/LOGIQ V1 models covered by this manual' on *page 1-5*.

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 of specific types of hazards that could possibly cause harm. Even if a symbol isn't used in this manual, it may be included for your reference.

Table 1-3:   Standard hazard icons

	ELECTRICAL
	MECHANICAL
	RADIATION
LASER LIGHT	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.

LOGIQ V2/LOGIQ V1 labels are provided in English.

The labels are at the bottom of the system. The label content may be different for different regions and systems. Please refer to the labels on the system for the actual content
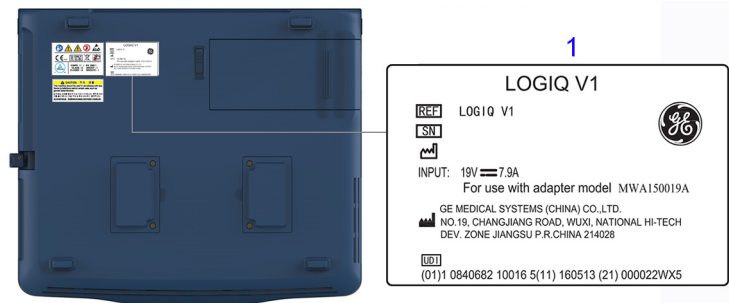
Figure 1-1.   LOGIQ V1 Label Location
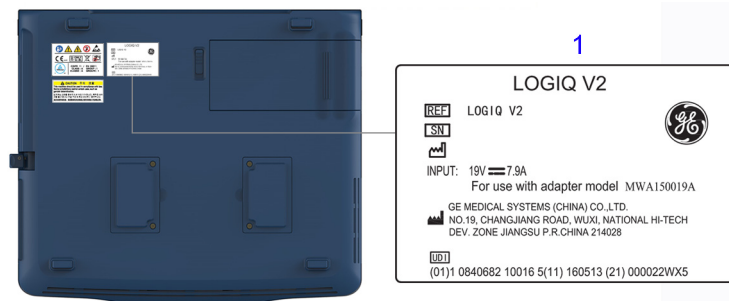
Figure 1-2.   LOGIQ V2 Label Location

1.   Rating Plate

Table 1-5: Label Icons

Label/Icon	Purpose/Meaning	Location
UDI (01)1 0840682 10016 5(11) 160513 (21) 000022WX5	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 LOGIQ V2/LOGIQ V1 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

Safety considerations

Contents in this section

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 a LOGIQ V2/LOGIQ V1 Training Seminar are authorized to service the equipment.

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

WARNING   If the covers are removed from an operating LOGIQ V2/LOGIQ V1, some metal surfaces may be warm enough to pose a potential heat hazard if touched, even while in shutdown mode.

Human Safety (continued)

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

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

⚠ WARNING	Ensure that the Ultrasound system is turned off and unplugged
	Wait for at least 20 seconds for capacitors to discharge as there are no test points to verify isolation. The amber light on the OP panel ON/OFF button will turn off.
	Ultrasound system components may be energized. Always refer to the Ultrasound system's Proprietary Service Manual for LOTO warnings and cautions

⚠ 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

Human Safety (continued)

⚠ 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.
⚠ CAUTION	The LOGIQ V2/LOGIQ V1 system weights 6 kg 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:

- Use the handle to move the Ultrasound system.
- Do not let the Ultrasound system strike walls or door frame.

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

- Before transporting, place the system in its special storage case.
- 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.

Mechanical safety (continued)

⚠ 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   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.

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 a LOGIQ V2/LOGIQ V1 to the wrong voltage level will most likely destroy it.

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.

Peripherals

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

Battery Safety

To avoid the risk of injury, follow the warning and cautions to make sure that the battery does not burst, ignite, or generate heat of fumes.

WARNING

- The battery has a safety device. Do not disassemble or alter the battery.
- Charge and discharge the batteries only when the ambient temperature is between 10° and 40° C (50° F and 104° F).
- Do not short-circuit the battery by directly connecting the negative terminals with metal objects.
- Do not heat the battery or discard it in a fire.
- Do not expose the battery to temperature over 50° C (122° F). Keep it away from fire and other heat sources.
- Do not charge the battery near a heat source, such as a fire or heater.
- Do not leave the battery in direct sunlight.
- Do not drop packs from height to prevent them from possible malfunction damage.
- Do not drop packs from height to prevent them from possible malfunction damage.
- Do not pierce the battery with a sharp object, hit it, or step on it.
- Do not use a damaged battery.
- Do not solder a battery.
- Do not connect the battery to an electrical power outlet.
- Do not contact PCM (Power Control and Monitor, it's a small board in the battery) directly to prevent packs from ESD damage.
- In case of longer non-use of the LOGIQ V2/LOGIQ V1, please make sure the battery is removed.

Battery Safety (continued)

CAUTION   To avoid the battery bursting, igniting, or fumes from the battery causing equipment damage, observe the following precautions:

- Do not immerse the battery in water or allow it to get wet.
- Do not put the battery into a microwave oven or pressurized container.
- If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, immediately remove it and stop using it. If you have any questions about the battery, consult GE or your local representative.
- Short term (less than one month) storage of battery pack:
  - Store the battery in a temperature range between-5° C (23° F) and 50° C (122°F).
- Use only GE recognized batteries.
- In case of the long term (3 months or more) storage:
  - Store the battery in a temperature range of -5° C (23° F) and 50° C (122°F).
  - When charging for the first time after long-term storage. Recover such packs to original performance through repeating several cycles of full charging and discharging.
  - When store packs for more than 6 months, charge at lease once charging require per 6 months to prevent leakage and deterioration in performance due to self-discharging.
- When the system isn't powered on continuously more than 6 months, in order to prevent leakage and deterioration in performance of CMOS battery, power on the system at least once per 6 months for more than 10 hours to have CMOS battery fully charged. Time and date need to be re-setup.

NOTE: *The battery shall be shipped in about 30% charged state. Those packs have to be fully charged and discharged up to 3 times to utilize Li-lon smart packs before use.*

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 LOGIQ V2/LOGIQ V1, some metal surfaces may be warm enough to pose a potential heat hazard if touched, even while in shutdown mode.

WARNING — Explosion Warning

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

WARNING — **DO NOT** substitute parts or modify equipment

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

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

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 LOGIQ V2/LOGIQ V1.

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.

Returning probes and repair parts

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

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

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

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

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

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

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

EMC, EMI and ESD

What is EMC?

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

CE Compliance

LOGIQ V2/LOGIQ V1 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 image (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 bottom 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
Europe (OLC-EMEA) GE Ultraschall Deutschland Gmbh & Co. KG Beethovenstraße 239 Postfach 11 05 60, D-42655 Solingen Germany	OLC - EMEA Phone:	+49 (0) 212 2802 - 652 +33 1 3083 1300
	Fax:	+49 (0) 2122-8024-31
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 Development Zone Jiangsu P.R.China 214028	+86 510 85225888	+86 510 85226688

Authorized Representative

Table 1-8:   Authorized Representative

AUTHORIZED REPRESENTATIVE	TELEPHONE / FAX NUMBER
The location of the CE marking is shown in the Safety chapter of the User manual. | EC	REP | Authorized EU Representative/European registered place of business: GE Medical Systems Information Technologies GmbH (GEMS IT GmbH) Munzinger Strasse 5, D-79111 Freiburg, GERMANY	+49 761 45 43 -0 / +49 761 45 43 -233

Chapter 2

Site Preparations

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

Overview

Contents in this chapter

General Ultrasound system requirements

Contents in this section

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.

Table 2-1:   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	32	23
hours	4	2	0	0	0	0	0	0	0	2	4	6

Environmental specifications for Ultrasound system

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

Table 2-2:   System Environmental Requirements

	Operational	**Storage**	**Transport** (<16hrs.)
Temperature	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

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

CAUTION   The LOGIQ V2/LOGIQ V1 system and probe connector is not waterproof. Do not expose the device to water or any kind of liquid.

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 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 LOGIQ V2/LOGIQ V1 system

Voltage	Tolerance	Power Consumption	Frequency
100-240 VAC	±10%	Max. 200VA	50/ 60HZ

Site circuit breaker

⚠ CAUTION — Power outage may occur. The LOGIQ V2/LOGIQ V1 requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you do not have any other equipment operating on the same circuit.

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

⚠ CAUTION — POWER OUTAGE MAY OCCURE.

The LOGIQ V2/LOGIQ V1 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 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

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

See: 'EMI prevention/abatement' on *page 2-10* 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

⚠️ **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 on page 2-3 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

Contents in this section

Purchaser responsibilities

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

• Procuring the materials required

• Completing the preparations before delivery of the Ultrasound system

• Paying the costs for any alterations and modifications not specifically provided in the sales contract

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

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

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

Required facility needs

  NOTE: *GE 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.

Required facility needs (continued)

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

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

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

Desirable features

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

Minimal floor plan suggestion

CSI 8x10
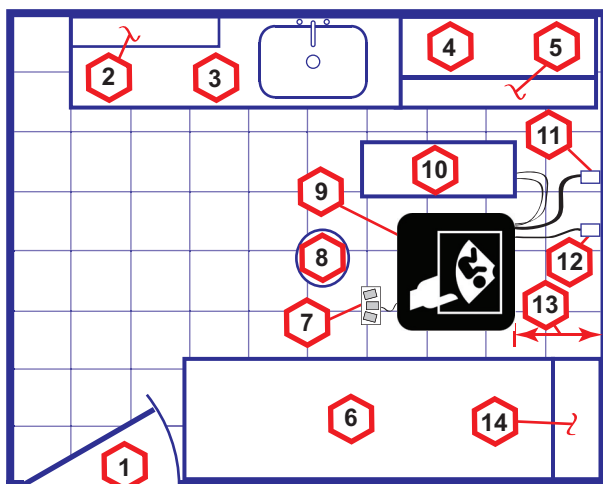
Scale:
Each square equals one square foot (app. 31 x 31 cm)

1. Door – at least 762 mm (30 inches)
2. Film Viewer
3. Counter Top, Sink with hot and cold water and Supplies Storage
4. Linen Supply
5. Probes/Supplies

6. Examination Table – 1930 x 610 mm (76 x 24 inches)
7. Footswitch
8. Stool
9. Ultrasound system
10. External Peripherals
11. Dedicated Power Outlet - Circuit Breaker protected and easily accessible

12. Network Interface
13. 457 mm (18 inches) distance of Ultrasound system from wall or objects
14. GE Cabinet for Software and Manuals

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

Recommended floor plan suggestion

CSI 14x17
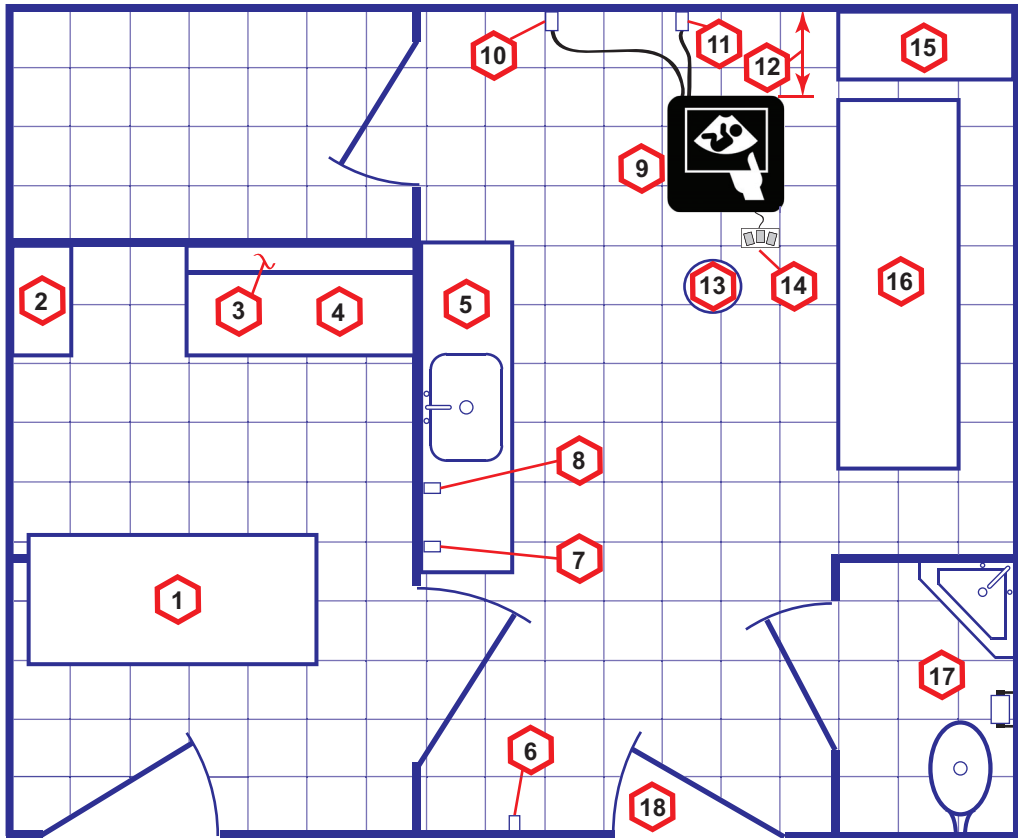
Scale: Each square equals one square foot (app. 31 x 31 cm)

1. Secretaries or Doctors Desk
2. File Cabinet
3. Film Viewer
4. Counter Top
5. Counter Top and Sink with hot and cold water
6. Overhead Lights Dimmer - Dual Level Lighting (bright and dim)
7. Emergency Oxygen

8. Suction Line
9. Ultrasound system
10. Dedicated Power Outlet - Circuit Breaker protected and easily accessible
11. Network Interface
12. 457 mm (18 inches) distance of Ultrasound system from wall or objects
13. Stool

14. Footswitch
15. Storage for Linens and Equipment
16. Examination Table – 1930 x 610 mm (76 x 24 inches)
17. Lavatory and Dressing Room
18. Door – at least 762 mm (30 inches)

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

Suggested floor plan, Ultrasound system, and EchoPAC PC in same room
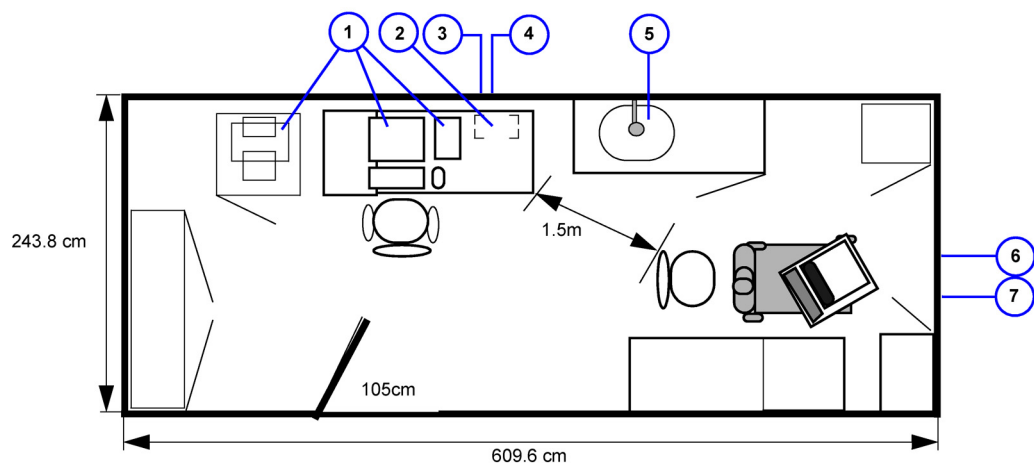
1. EchoPAC PC workstation parts
2. UPS
3. Ethernet network wall outlet
4. 3x mains power outlets
5. Hot and Cold water
6. Dedicated mains power outlet
7. Ethernet network wall outlet

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

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

Wireless LAN

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

DICOM option setup requirements (continued)

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 IEC60601-1 standards for electrical leakage.

Patient Environment IEC60601-1 and ANSI AAMI ES60601-1

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

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

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

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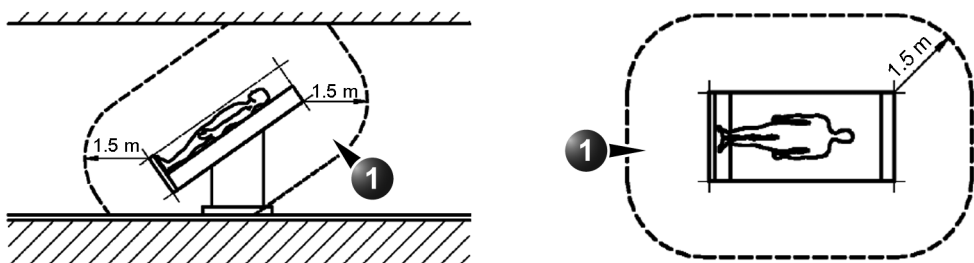
1. Patient environment

Figure 2-5.   Patient environment

Chapter 3

System Setup

This chapter contains information needed to install LOGIQ V2/LOGIQ V1 system.

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

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

Overview

Contents in this chapter

Setup reminders

Average setup time

- Unpacking the LOGIQ V2/LOGIQ V1: 20 minutes
- Set up LOGIQ V2/LOGIQ V1 options: 15 minutes
- DICOM Network Configuration: 30 minutes or more, depending on the configuration
- Install Insite: 0.5 hour

The LOGIQ V2/LOGIQ V1 installation and functional checkout will take approximately one hour. LOGIQ V2/LOGIQ V1 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 NOT** wear the ESD wrist strap when you work on live circuits and more than 30 V peak is present.

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

Setup warnings (continued)

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

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

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

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

c ⚠ 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

Setup warnings (continued)

CAUTION ⚠️ Operator Manual(s)

The User Manual(s) should be fully read and understood before operating the LOGIQ V2/LOGIQ V1 and kept near the Ultrasound system for quick reference.

CAUTION ⚠️ Acoustic Output Hazard

Although the ultrasound energy transmitted from the LOGIQ V2/LOGIQ V1 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 the LOGIQ V2/LOGIQ V1.

Contents in this section

Warnings for receiving and unpacking

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

Receiving the LOGIQ V2/LOGIQ V1

Overview

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

Examine all packages

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

Damage in transportation

Follow this procedure if damage is apparent:

1. Write "Damage In Shipment" on ALL copies of the freight or express bill **BEFORE** delivery is accepted or "signed for "by a GE representative or hospital receiving agent.

2. Report the damage to the carrier.

   • Whether noted or concealed, damage **MUST** be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier.

   • A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

Unpacking the LOGIQ V2/LOGIQ V1

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

⚠️ **CAUTION** Please carefully unpack the system, and do not dispose the package of LOGIQ V2/LOGIQ V1, so that it can be reused for service.

NOTE: *Please check the LOGIQ V2/LOGIQ V1 console is well assembly after unpacking the system.*

1. Cut the adhesive tape and open top covers of paper carton.
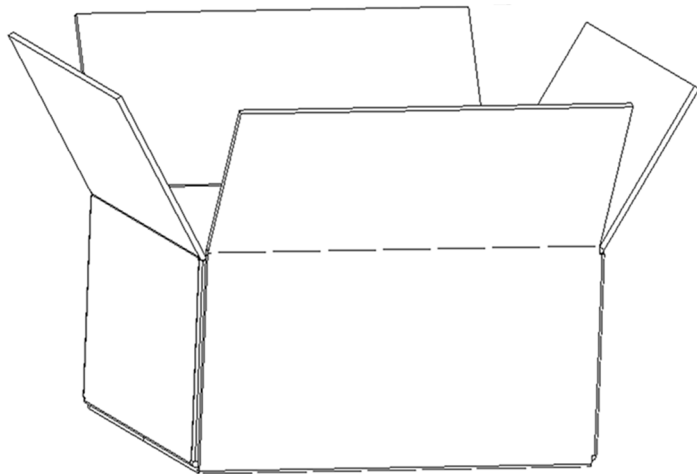
Figure 3-1.   Open Top Covers of Paper Carton

Unpacking the LOGIQ V2/LOGIQ V1 (continued)

2. Take out console together with 2 interleavers from console package.

3. Take out the interleavers beside Accessories Package

4. Take out Accessories Package.
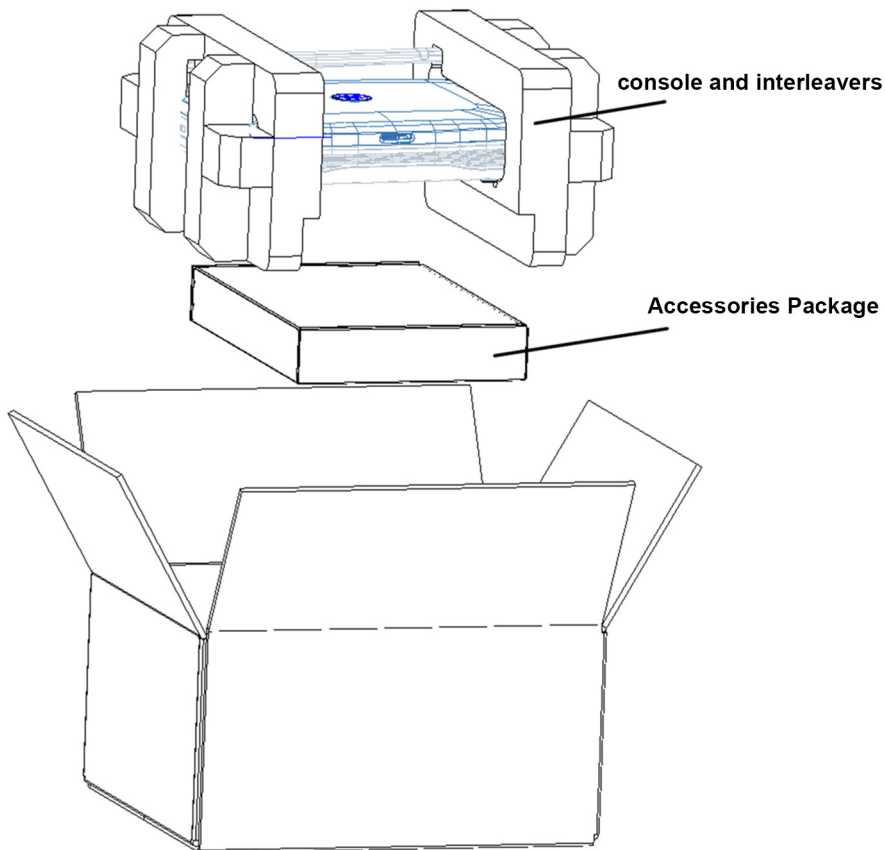
Figure 3-2.   Unpacking the equipment

| | CAUTION | Do not lift the unit by the rubber band. Equipment damage may result. |

Unpacking the `LOGIQ V2/LOGIQ V1` **(continued)**

5. Remove 2 interleavers.
6. Remove plastic bag.
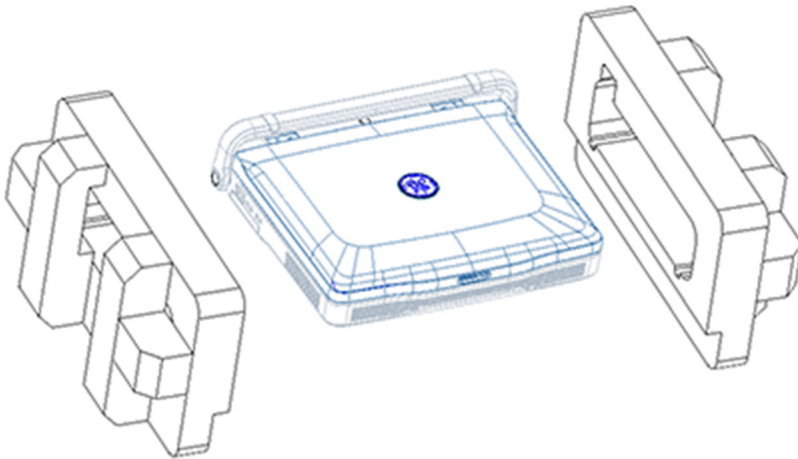
Figure 3-3.   Removing interleavers and plastic bag

Unpacking the `LOGIQ V2`/`LOGIQ V1` **(continued)**

> *NOTE:* *Check the shipping container for special instructions. Verify that the container is intact. In some cases a secondary container may be used. If so, ask the carrier for unpacking instructions.*
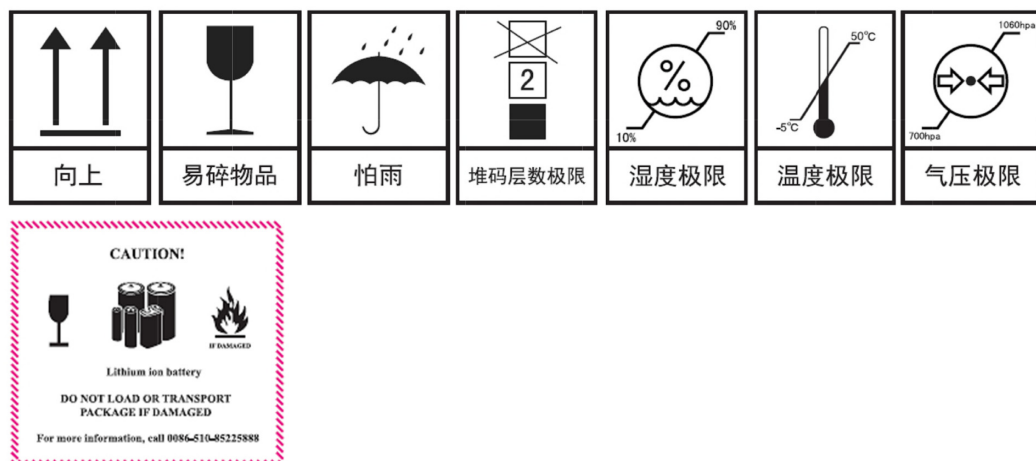
Figure 3-4.   Labels on Package

Moving into Position

⚠️ **CAUTION**   Do not lift the unit by the rubber band. Use handle to move system.

⚠️ **CAUTION**   Equipment Damage Possibility. Lifting the console by holding covers may damage the covers. Do not lift the console by holding any covers.

In general, a single adult can move the LOGIQ V2/LOGIQ V1. Before moving, store all loose parts in original accessory box or in back pack. Return probes to original box.

Packing the Equipment

Please pack LOGIQ V2/LOGIQ V1 in the reverse order of unpacking.

Packing materials - recycling information

The packing materials for LOGIQ V2/LOGIQ V1 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' on *page i-14* in the beginning of this manual.

EMI protection

The LOGIQ V2/LOGIQ V1 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 2-9* for more information about EMI protection.

Completing the setup

Purpose of this section

This section describes how to complete the installation of LOGIQ V2/LOGIQ V1.

Contents in this section

System specifications

System requirements verification

- • Verify that the site meets the requirements listed in Chapter 2.
  (See: 'Facility needs' on *page 2-12*.)
- • Verify that the specifications below don't conflict with any on-site conditions.

Physical dimensions

Table 3-2:   Physical dimensions of LOGIQ V2/LOGIQ V1

Height	Length	Width	Unit
120	396	368	mm
4.72	15.59	14.49	Inches

Console Weight

- • Weight: approx. 6 kg (13.23 lbs)

Electrical specifications

⚠ WARNING   Connecting a LOGIQ V2/LOGIQ V1 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 LOGIQ V2/LOGIQ V1 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 LOGIQ V2/LOGIQ V1

In the table below, the electrical specifications for LOGIQ V2/LOGIQ V1 includes monitor and on board peripherals.

Table 3-3:   Electrical specifications for LOGIQ V2/LOGIQ V1

Part Number	Description	Voltage	Tolerances	Power consumntion	Frequency
5661244	LOGIQ V2 Generic version	100-240V	±10%	Max.200VA	50/60 Hz
5661242	LOGIQ V1 Generic version				

Peripheral/Accessories Connector Panel

LOGIQ V2/LOGIQ V1 peripherals and accessories can be properly connected using the side connector panel.
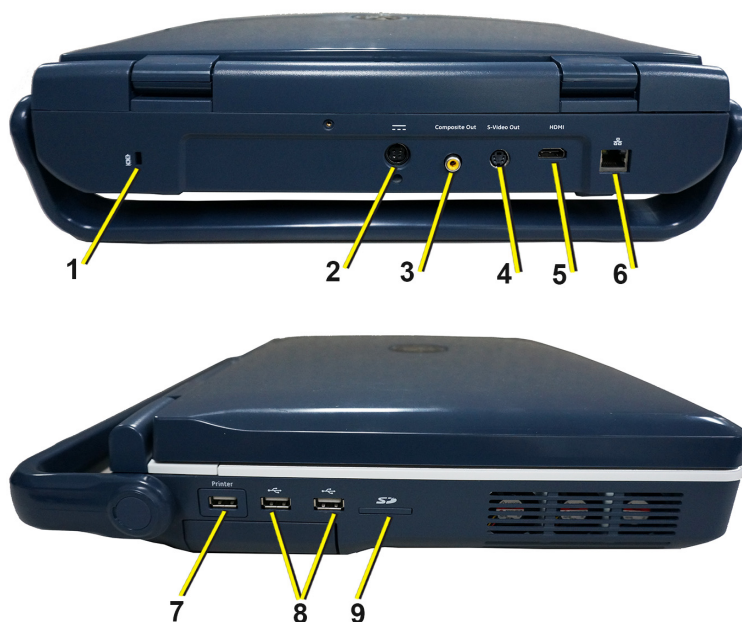
Figure 3-5.   Rear and left Side Connector Panel

1.   Security Lock
2.   Port for DC In (AC Adapter)
3.   Composite Out Port
4.   S-Video Out Port
5.   HDMI Port
6.   Ethernet Port
7.   Isolated USB Port for AC Printer ONLY

NOTE: *The AC printer can be connected to this isolated USB port only.*

8.   USB Ports for Footswitch, DVD-RW, Wireless LAN Adapter, USB Stick, USB HDD
9.   SD Port

Peripheral/Accessories Connector Panel (continued)

> *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 LOGIQ V2/LOGIQ V1, 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.*

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.

System Configuration

Purpose of this section

This section describes how to configure the LOGIQ V2/LOGIQ V1.

LOGIQ V2/LOGIQ V1 configuration

For complete instructions, refer to the latest revision of the LOGIQ V2/LOGIQ V1 Basic User Manual, Chapter 16.

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

Peripherals Installation

Overview

This section describes how to install and configure the peripherals validated for the LOGIQ V2/LOGIQ V1.

About the operation check-out of peripherals, See 'Peripheral checks' on *page 4-39 for more information.*

Table 3-4:   LOGIQ V2/LOGIQ V1 Peripherals

Description	Control	Model
B/W USB Printer	USB port	Sony UP-D897 Printer
B/W USB Printer	USB port	Sony UP-D898MD Printer
Color USB Printer	USB port	Sony UP-D25MD Printer
Officejet 100 Printer	USB port	HP Officejet 100 Printer
Officejet Pro 8100 Printer	USB port	HP Officejet Pro 8100 Printer
1-Pedal Footswitch	USB port	Footswitch FSU-1000
3-Pedal Footswitch	USB port	MKF 2-MED GP26
USB Stick	USB port	Keeber USB Flash Drive 8G
USB3.0 HDD	USB port	WD Elements 2.5 in USB3.0 HDD 1TB
USB3.0 HDD	USB port	Seagate Backup Plus 2.5 in USB3.0 HDD 1TB
USB3.0 HDD	USB port	Seagate Expansion 2.5 in USB3.0 HDD 1TB
Wireless Adapter	USB port	Netgear A6210 USB Adapter
Probe Adapter	Probe port	2 Probe Port Extension Adapter

Furnished materials

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

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

- B/W USB Printer

Table 3-5:   Materials furnished with B/W Printer

Item	Description	Quantity	Note
1	Sony UP-D897 Printer	1	
2	Sony UP-D898MD Printer	1	
3	Paper Roll	1	
4	USB cable	1	

- Color USB Printer

Table 3-6:   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	

- Digital Printer

Table 3-7:   Materials furnished with B/W Printer

Item	Description	Quantity	Note
1	HP Officejet 100 Printer	1	
2	HP Officejet Pro 8100 Printer	1	
3	Paper Roll	1	
4	USB cable	1	

Furnished materials (continued)

- USB Stick

Table 3-8:   Materials furnished with USB Stick

Item	Description	Quantity	Note
1	Keeber USB Flash Drive 8G	1	
2	Paper Roll	1	
3	USB cable	1	

- USB HDD

Table 3-9:   Materials furnished with the USB HDD

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

- Footswitch

Table 3-10:   Materials furnished with the Footswitch

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

Peripherals Installation Instructions

Sony UP-D25MD Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the Sony UP-D25MD Printer.

Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable and power cable on the Printer.
3. Connect the power cord in the wall outlet, then turn on the printer.
4. Connect USB cable to LOGIQ V2/LOGIQ V1 USB port.

Figure 3-6.   Color printer Connection

5. Press *Utility* on the Control Panel.

Sony UP-D25MD Printer Installation (continued)

6. Select **Connectivity**-> **Service**, add **Standard Print**.
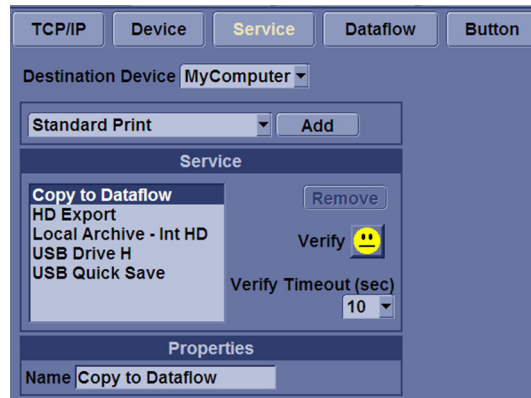
Figure 3-7. Connectivity->Service

7. Highlight **Standard Print** in the Service list. Select the printer from the Printer pull-down Properties menu. Type the printer name in the Name Filed. This name is used on the Button screen. After you select the printer from the Printer pull-down Properties menu again, it turns white. Press **Save**.

NOTE: *After selecting the printer, the field turns white.*
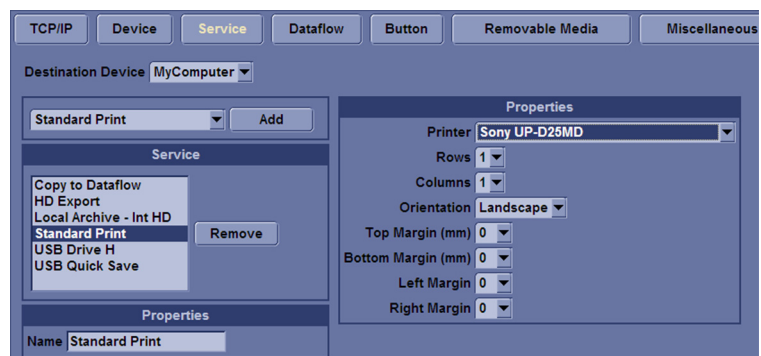
Figure 3-8. Select the Printer

Sony UP-D25MD Printer Installation (continued)

8. Select **Button**. Select the appropriate print key (Print, Store, Print3) from the **Physical Print Buttons** selection. Select the printer from **MyComputer** column and press >> to move it to the Printflow View column. Press**Save**.
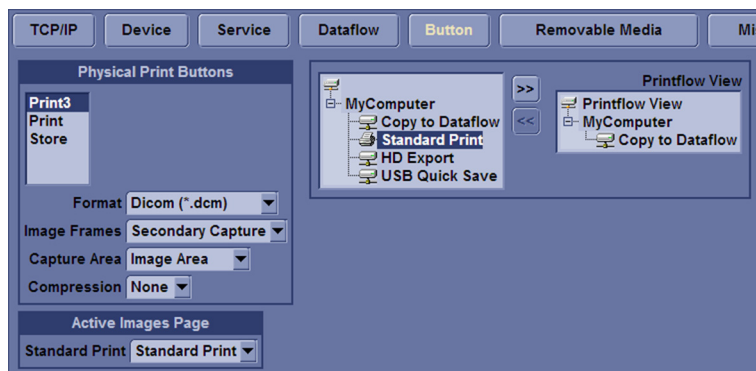
Figure 3-9.   Select Button

HP Officejet 100 Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the HP Officejet 100 Printer.

Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable on the Printer.
3. Connect the power cord with the AC output in the wall outlet, then turn on the printer.
4. Connect USB cable to LOGIQ V2/LOGIQ V1 USB port.

Figure 3-10.   HP Officejet 100 connection

5. Refer to the Connectivity configure steps of 'Sony UP-D25MD Printer Installation' on *page 3-22*.

HP Officejet Pro 8100 Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the HP Officejet Pro 8100 Printer.

Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable on the Printer.
3. Connect the power cord with the AC output in the wall outlet, then turn on the printer.
4. Connect USB cable to LOGIQ V2/LOGIQ V1 USB port.

Figure 3-11.   HP Officejet Pro 8100 connection

5. Refer to the Connectivity configure steps of 'Sony UP-D25MD Printer Installation' on *page 3-22*.

UP-D897 Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the UP-D897 Printer.

Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable on the Printer.
3. Connect the power cord with the AC output in the wall outlet, then turn on the printer.
4. Connect USB cable to LOGIQ V2/LOGIQ V1 USB port.

Figure 3-12.   UP-D897 connection

5. Refer to the Connectivity configure steps of 'Sony UP-D25MD Printer Installation' on *page 3-22*.

UP-D898MD Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the UP-D898MD Printer.

Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable on the Printer.
3. Connect the power cord with the AC output in the wall outlet, then turn on the printer.
4. Connect USB cable to LOGIQ V2/LOGIQ V1 USB port.

Figure 3-13. UP-D898 connection

5. Refer to the Connectivity configure steps of 'Sony UP-D25MD Printer Installation' on *page 3-22*.

Footswitch Installation

Tools

No special tools needed.

Manpower

One person 2 min.

Preparations

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

Installation Procedure

1. Connect the Footswitch to the USB port on the LOGIQ V2/ LOGIQ V1 system.
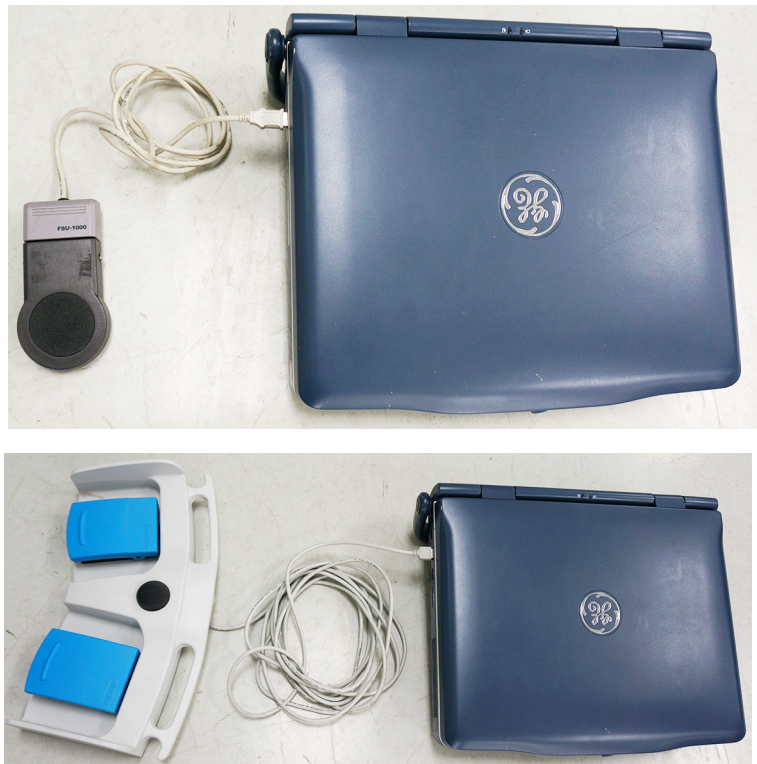
Figure 3-14.   Connect Footswitch to the system

Footswitch Installation (continued)

Configuring Footswitch

Footswitch supports these configurations: No Function, Freeze, Next Heartcycle, Prev Heartcycle, Print1, Print2, Update, Next Step (Scan Assistant), Previous Step (Scan Assistant), Scan Assistant pause/Resume.

Enter **Utility** -> **Application**-> **Settings** to configure the Footswitch functions.
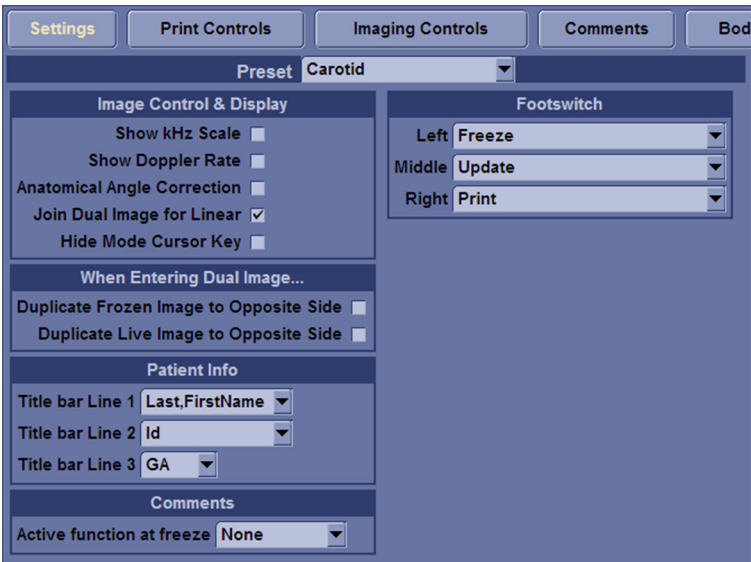
Figure 3-15.   Configuring Footswitch Functions

USB HDD Installation

Tools

No special tools needed.

Manpower

One person 1 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 LOGIQ V2/ LOGIQ V1 system.

Figure 3-16.   Connect HDD to the system

Wireless LAN Adapter Installation

Tools

No special tools needed.

Manpower

One person 1 min.

Preparations

1. Unpack the Wireless LAN Adapter.
2. Ensure no physical damage.

Installation Procedure

1. Connect the Wireless LAN Adapter to the USB port on the LOGIQ V2/LOGIQ V1 system.

Figure 3-17.   Connect Wireless LAN Adapter to the system

ECG Installation

Tools

No special tools needed.

Manpower

One person 1 min.

Preparations

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

Installation Procedure

1. Connect the ECG to the USB port on the LOGIQ V2/LOGIQ V1 system.

Figure 3-18.   Connect ECG to the system

Connectivity setup

TCP/IP Screen

1. Press *Utility* on the control panel and login as admin, refer to 'Logging on to LOGIQ V2/LOGIQ V1 as "ADM"' on *page 4-11* .

2. Select **Connectivity** on the screen.

3. Select **TCP/IP** tab, the screen gives an overview of the network settings for LOGIQ V2/LOGIQ V1.

Figure 3-19.   TCP/IP Screen

Changing the AE title and/or Port Number

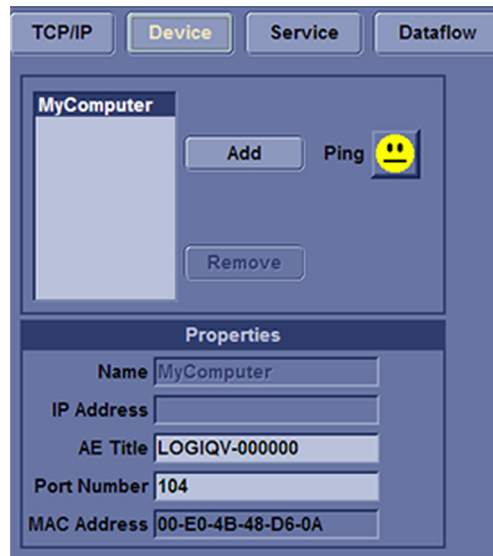To change **AE Title** and/or **Port Number**, edit the respective fields.

Figure 3-20.   AE Title/Port No

Network setup

For network connection setup, See 'Network Configuration' on *page 8-26 for more information.*
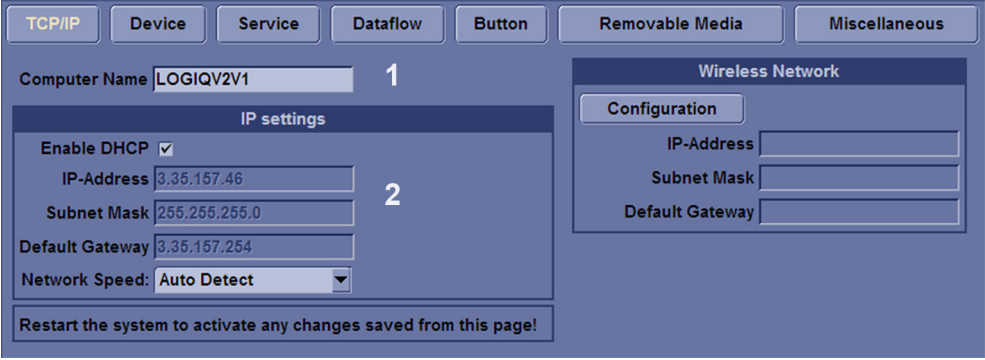
Setup the LOGIQ V2/LOGIQ V1 for DICOM Communications

LOGIQ V2/LOGIQ V1 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 3-11:   Utility ->Connectivity ->TCP/IP screen

TCP/IP	Device	Service	Dataflow	Button	Removable Media	Miscellaneous

Computer Name LOGIQV2V1   **1**

IP settings

Enable DHCP ☑
IP-Address 3.35.157.46
Subnet Mask 255.255.255.0   **2**
Default Gateway 3.35.157.254
Network Speed: Auto Detect ▼

Restart the system to activate any changes saved from this page!

Wireless Network

Configuration
IP-Address
Subnet Mask
Default Gateway

1	Enter the LOGIQ V2/LOGIQ V1 computer name. This may be the same as the station name.
2	Enter the LOGIQ V2/LOGIQ V1 IP address, subnet mask, default gateway and network speed. For automatic assignment of IP address, subnet mask and default gateway, select **DHCP**. *Note: If possible, set the LOGIQ V2/LOGIQ V1 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 LOGIQ V2/LOGIQ V1 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 LOGIQ V2/ LOGIQ V1 is most likely not hung.)*

Setup the LOGIQ V2/LOGIQ V1 for DICOM Communications (continued)

Table 3-12:   Utility ->Connectivity ->Device screen

1	Select **MyComputer**.
2	Assign an AE title to the LOGIQ V2/LOGIQ V1. (AE stands for Application Entity. DICOM services use this to identify the LOGIQ V2/LOGIQ V1.) 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 LOGIQ V2/LOGIQ V1 to recognize another Device on the Network
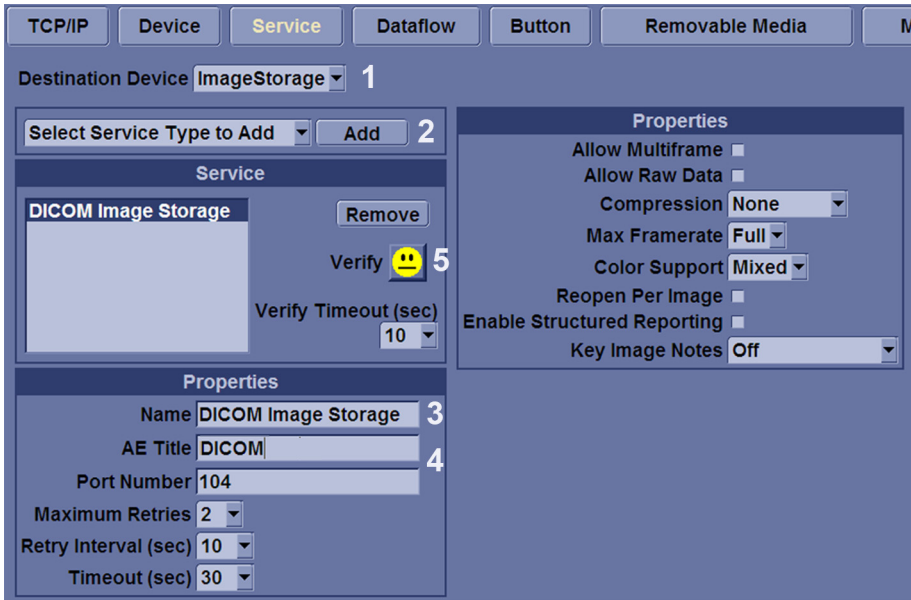
Table 3-13:   Utility ->Connectivity ->Device screen

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 LOGIQ V2/LOGIQ V1 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 Service

An Image Storage Service provides a place to store patient and exam data from LOGIQ V2/LOGIQ V1 and corresponding images. The Image Storage Service, or the device that hosts it, is often called a Patient Archiving and Communication System (PACS).

Table 3-14: 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 Setup and Use a DICOM Image Storage Service' on *page 3-39* .
2	From the *Select Service Type to add* drop-down menu, select **DICOM Image Storage** and press **Add**.
3	Change the name of the service to one of your choosing.
4	Enter the AE Title and port Number of the service. AE Title is case-sensitive.
4	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.

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**.

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

3. In **System Admin** tab, enter New Option Key, and then select **Add**.

Figure 3-21.   New Option Key

Software Option Installation Procedure (continued)

4. Select **OK** to restart the system.
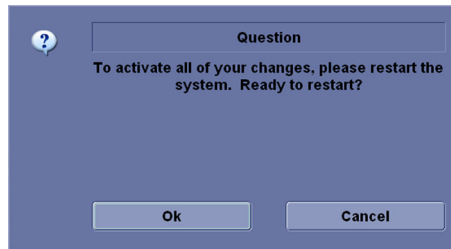
Figure 3-22.   Dialog Window

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

5. After the system is powered on, check the option status.
    The option status explanation:
    •   Valid: This option is enabled in the system.

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

Paperwork after setup

NOTE: *During and after setup, the documentation (i.e. CDs with documentation, User Manuals, Installation Manuals, etc.) for the LOGIQ V2/LOGIQ V1 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.*

Contents in this Section

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 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 3-23.   Product Locator Installation Card (Example)

Chapter 4

General Procedures and Functional Checks

This chapter provides procedures for quickly checking major functions of the LOGIQ V2/LOGIQ V1 and diagnostics instructions using the built-in service software.

Overview

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.

Contents in this chapter

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).

General procedures

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 LOGIQ V2/LOGIQ V1.

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.

Overview

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

Contents in this section

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.

Connect AC (mains) Power to LOGIQ V2/LOGIQ V1

Lower the handle. Plug the AC adapter output connector into the system DC input port (located on the system's rear panel) with the arrow side upward. Plug the AC adapter power cord into a grounded, protective earth outlet.

After AC/DC is connected correctly to the scanner, the power is applied to the scanner. When the ***Power On/Off*** key is pressed once, the System starts.

Figure 4-1.   Connect AC Adapter

Switch ON the AC Power to LOGIQ V2/LOGIQ V1

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.*

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.

This warning message is to remind the user to check the system date in case the system date and time is incorrect.
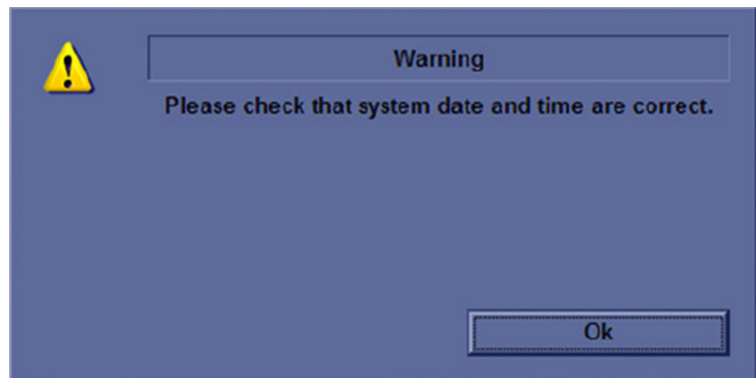
Figure 4-2. Check system date and time message

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

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

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

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 4-3.   System Exit Window

- • **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.

NOTE: *To enable the key-combination <Ctrl+Alt+Delete>, the dongle should be connected to the system.*

Power off (continued)

- **Exit**

  (Only available when logged in as GE Service with Service Dongle)

  Select this button when you want to exit to Windows Desktop.

- **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.

Logging on to LOGIQ V2/LOGIQ V1 as "ADM"

Select *Utility* -> **Admin** -> **System Admin**.

It will bring up the **Operator Login** dialog where you must log on.
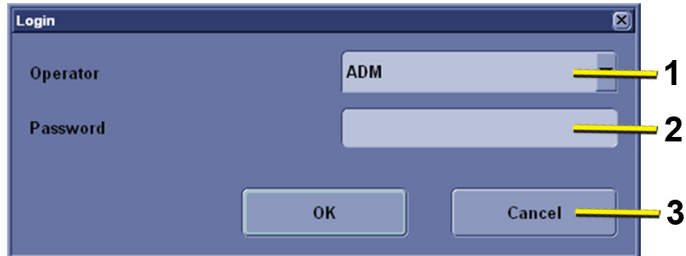
Figure 4-4.   Operator Login Window

1. **Operator**: Select the operator.
2. **Password**: Enter Operator's password (optional).
3. Select the type of Login or Cancel.

    • **OK**: Standard login.
    • **Cancel**: Cancel login.

As default, two users are defined, USR and ADM.

• 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.

• 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 and select **Login**.

It is possible for the administrator (*ADM*) to establish new users and set unique passwords for each user, including a new password for ADM. If the login as ADM fails, contact the responsible person in the hospital to get access.

Service Key (Dongle, HASP)

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

Exit to Windows Desktop from the LOGIQ V2/LOGIQ V1 application software

Follow these steps if you want to exit to the Windows Desktop when the application software is running. The Service Dongle must be plugged in.

1. On the alphanumeric keyboard, press **Ctrl**+**Alt**+**Delete** and then select **Task Manager**.

Figure 4-5.   Windows Security (For R1.0.x)
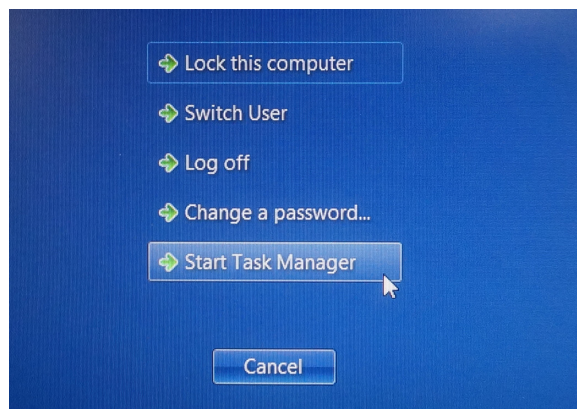
Figure 4-6.   Windows Security (For R1.1.x)

Exit to Windows Desktop from the LOGIQ V2/LOGIQ V1 application software (continued)

2. Select **EchoLoader.exe** in the Process list, then select **End Process**.
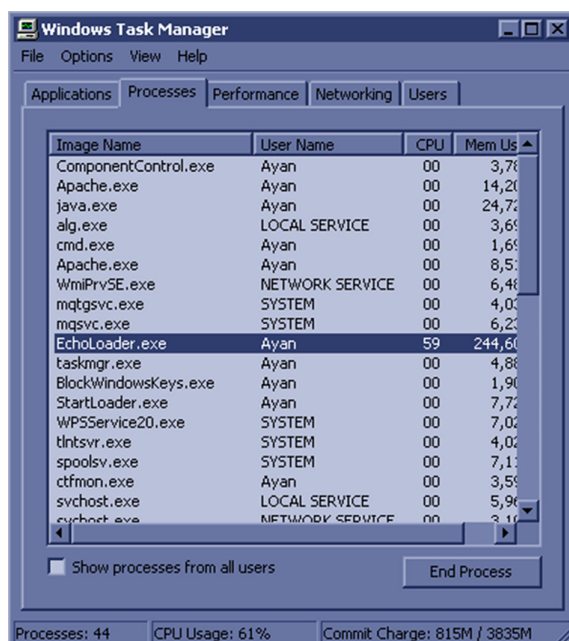
Figure 4-7.   Maintenance Access

3. Select **Yes** to continue.
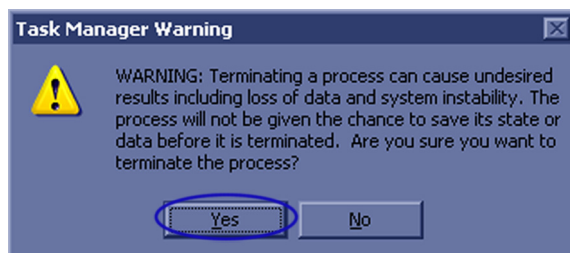
Figure 4-8.   Task Warning

4. Leave the **Username** field empty, type the current GE Service Password in the **Password** field.

Exit to Windows Desktop from the LOGIQ V2/LOGIQ V1 application software (continued)
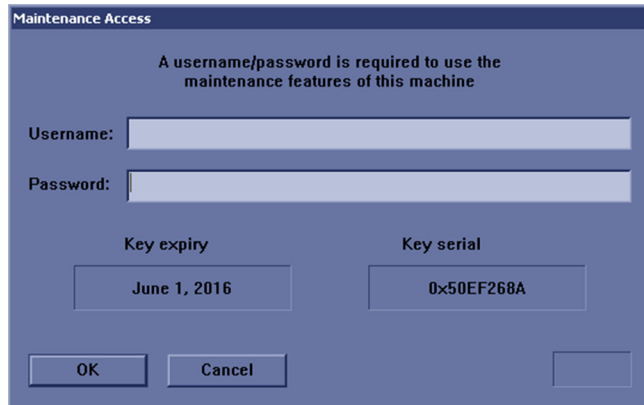
Figure 4-9.   Maintenance Access

NOTE:　　*READ THIS NOTE BEFORE YOU CONTINUE: After you have selected OK, the Start Application dialog will be displayed on screen. Be ready to select **MAINTENANCE...** before the Time Bar is "full", or the application software will be started. A description on how to recover, if you fail to select **MAINTENANCE... is included, but you will spend some extra time doing it.***

Exit to Windows Desktop from the LOGIQ V2/LOGIQ V1 application software (continued)

5. Select **MAINTENANCE...** to enter maintenance mode. This will bring up the Maintenance dialog.
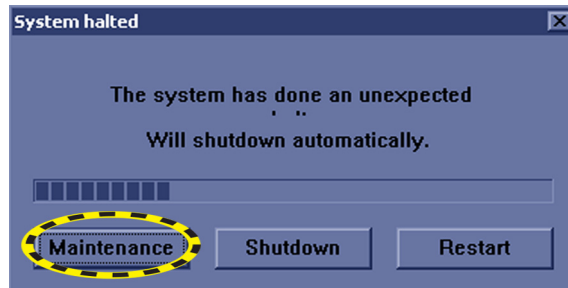
Figure 4-10.   System halted

6. In the **Maintenance** window, select **Exit to Windows**. This will display the Windows Desktop on the screen.
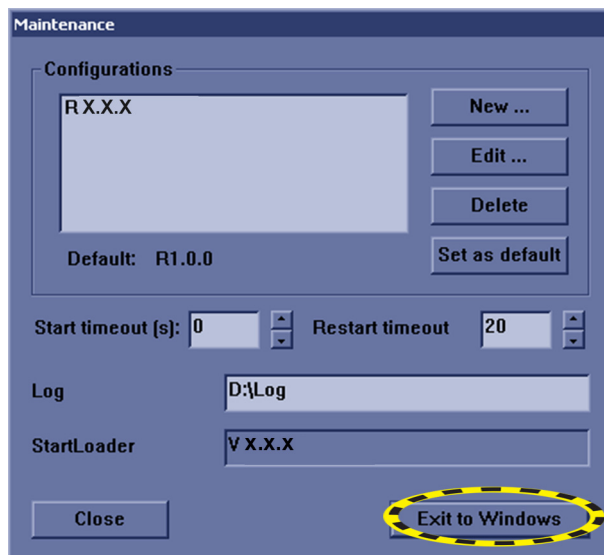
Figure 4-11.   Maintenance dialog

NOTE: If you need to restart, ensure that you do a complete power down (Shut Down). This is required to power up the Front End Processor.

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

Archiving and loading presets

NOTE: *Always save presets before any software reload. This ensures the presets loaded after the software reload are as up–to–date as possible.*

All user presets except changes to Summary, Anatomy, and Biometry pages, can be saved on an DVD-R disk (or USB memory device) for reloading on the system.

NOTE: *Presets should NOT be saved on the same USB memory device (or DVD-R disk) as images. The Archive Menu lists the images but does NOT list the presets stored on a USB memory device (or DVD-R disk, SD Card).*

Archiving Presets to a USB memory device (or DVD-R Disk, SD Card)

1. Connect the USB memory device to the system's USB port, or insert an empty (blank) DVD-R disk into the DVD-RW.
2. Enter **Utility** -> **System** -> **Backup/Restore**. The Backup/Restore sheet will be shown on the LCD display.

Figure 4-12.   Backup Sheet

Archiving Presets to a USB memory device (or DVD-R Disk, SD Card) (continued)

3. Select the item to Backup.
4. Enter backup destination or browse through the disk to locate the destination.
5. Select Backup. The backup status for each item is displayed on the Result column.

Loading Presets from a USB memory device (or DVD-R)

1. Connect the USB memory device or DVD-R with the archived Presets to the system.
2. Enter **Utility** -> **System** -> **Backup/Restore**. The Backup/ Restore sheet will be shown on the LCD display. See Figure 4-12 *on page 4-18*.
3. Select the items needed to be restored.
4. Select Restore. The system performs the restore and restarts.

Data Management

Refer to the latest revision of the LOGIQ V2/LOGIQ V1 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 the LOGIQ V2/LOGIQ V1 User Manual.

Restore the factory defaults

For instructions, please see "Data Backup and Restore" in the User Manual/User Guide.

Installation and Setup Procedure for Peripherals

Please refer to 'Peripherals Installation Instructions' on *page 3-22*.

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 on a CD-ROM. Paper copies may be ordered from GE.

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

1. Insert the CD-R disk (CD-ROM) into the CD-drive on a PC or Laptop with Adobe Acrobat Reader.

⚠ CAUTION   Do not try to use the LOGIQ V2/LOGIQ V1 to read these files, it will not work!

2. Follow the instructions on the screen to display the manual of choice.
3. Before printing the complete manual, or pages from the manual, select **File > Page Setup**.
4. Select the **paper size** and choose **Portrait**.
5. Select **File > 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

<table>
<tr>
<td>

^w ⚠️ WARNING

</td>
<td>

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.

</td>
</tr>
</table>

Manpower

One person, 5 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 down the system.
2. Disconnect the mains power cable from the wall outlet.

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.
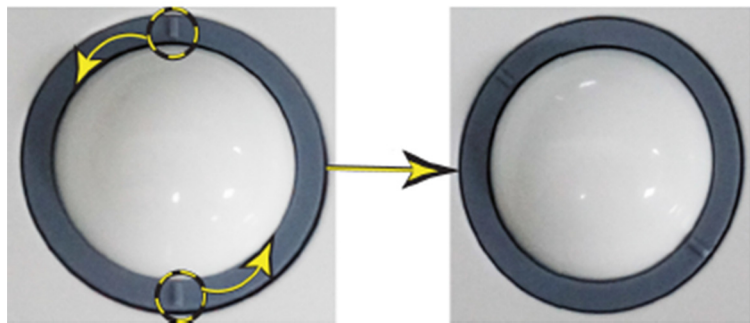
Figure 4-13.   Remove the retainer

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).

Test the Trackball

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

Functional checks

Overview

In this section, the functional checks for LOGIQ V2/LOGIQ V1 are described. Functional checks are used to verify that the product works as intended. Functional checks may also be used during troubleshooting.

Contents in this Section

Preparation

Turn on power to LOGIQ V2/LOGIQ V1. For detailed description, See 'Power ON/Boot Up' on *page 4-5 for more information.*

Basic Controls

Operator Panel

Figure 4-14.   Control Panel Map

1. Power On/Off Switch
2. Primary menu Key
3. Next Key
4. TGC
5. AN Keyboard
6. User Defined keys
7. Report key
8. Utility key
9. Patient key
10. Preset Key

11. Worksheet key
12. End Exam key
13. Archive key
14. Gain/AO keys
15. Scan Coach keys
16. Mode keys
17. Cursor key
18. Clear key
19. Comment key
20. Active key

21. Measure key
22. Body Pattern key
23. M/D Cursor key
24. Scan Area key
25. Set/B Pause key
26. Trackball
27. Depth/Zoom/Ellipse key
28. Left/Right key
29. Freeze key
30. Print key
31. Store key

Performance Tests

Test Phantoms

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

B mode Checks

Introduction

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** 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 **Frame rate** (move to lower frame rate) to increase resolution in image.
- Use **Frequency** (move to lower frequency) to increase penetration.
- Use the **Reject** control to reduce noise in the image.
- Use the DDP control to optimize imaging in the blood flow regions and make a cleaner, less noisy image.
- Use **UD Clarity** (Cardiac) or **UD Sp. Red.** (non-cardiac) to reduce image speckle. Extra care must be taken to select the optimal Speckle reduction level, as too much filtering of speckle can mask or obscure desired image detail.
- Use **Adaptive reject** (Cardiac) to reduce near field haze and blood pol artifact without diluting tissue appearance of moving structures.

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** 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.

  Use the **Frequency** (move to higher frequencies) or the **Frame rate** control (move to lower frame rate) to increase resolution in image.

  Use the **Frequency** (move to lower frequency) to increase penetration.

  Adjust **Focus** to move the focal point(s) around the region of interest in the M-Mode display.

  Adjust **Dynamic range** to optimize the useful range of incoming echoes to the available grey scale.

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

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

Color Mode Checks

Introduction

Color Flow screens are 2D or M Mode screens with colors representing blood or tissue movement.

Color Flow may be selected both from 2D mode or from M mode or a combination of these.

Preparations

*   Connect one of the probes to the scanner's left-most probe connector.
*   Turn ON the scanner.

    The B Mode window is displayed (default mode).

Select Color Mode

1. From an optimized B Mode image, press **CF.**
2. Use the trackball to position the ROI frame over the area to be examined.
3. Press **Scan Area**. 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 **Low Velocity Reject** to remove low velocity blood flow and tissue movement that reduces image quality.

  Adjust **Variance** to detect flow disturbances.

  Adjust **Sample volume** (SV) to a low setting for better flow resolution, or a higher setting to more easily locate disturbed flows.

  Adjust **Frequency** to optimize the color flow display. Higher settings improve resolution. Lower settings improve depth penetration and sensitivity. This does not affect the frequency used for 2D and M-Mode.

NOTE: *Frequency setting may affect FPS, SV and Low Velocity Reject.*

  Adjust **Power** to obtain an acceptable image using the lowest setting possible.

NOTE: *The Power setting affects all other operating modes.*

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

- Use **Invert** to reverse the color assignments in the color flow area of the display.

  Use **Tissue priority** to emphasize either the color flow overlay, or the underlying grey scale tissue detail.

  Use **Baseline** to emphasize flow either toward or away from the probe.

  Use **Radial** and **Lateral Averaging** to reduce noise in the color flow area. Radial and Lateral Averaging smooths the image by averaging collected data along the same horizontal line. An increase of the lateral averaging will reduce noise, but this will also reduce the lateral resolution.

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 **Select**. 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 **Low Velocity Reject** to remove low velocity blood flow and tissue movement that reduces image quality.

  Adjust **Variance** to detect flow disturbances.

  Adjust **Sample volume** (SV) to a low setting for better flow resolution, or a higher setting to more easily locate disturbed flows

  Adjust **Frequency** to optimize the color flow display. Higher settings improve resolution. Lower settings improve depth penetration and sensitivity. This does not affect the frequency used for 2D and M-Mode.

NOTE: *NOTE: Frequency setting may affect FPS, SV and Low Velocity Reject.*

  Adjust **Power** to obtain an acceptable image using the lowest setting possible.

NOTE: *The Power setting affects all other operating modes.*

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

- Use **Invert** to reverse the color assignments in the color flow area of the display.

  Use **Tissue priority** to emphasize either the color flow overlay, or the underlying grey scale tissue detail.

  Use **Baseline** to emphasize flow either toward or away from the probe.

  Use **Radial** and **Lateral Averaging** to reduce noise in the color flow area. Radial and Lateral Averaging smooths the image by averaging collected data along the same horizontal line. An increase of the lateral averaging will reduce noise, but this will also reduce the lateral resolution.

PW Doppler Mode Checks

Introduction

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.
- 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 **Low velocity reject** to reduce unwanted low velocity blood flow and tissue movement.

In PW mode, adjust **Sample volume** to low setting for better resolution, or higher setting to more easily locate the disturbed flows.

Adjust the **Compress** setting to balance the effect of stronger and weaker echoes and obtain the desired intensity display.

Adjust **Frequency** to optimize flow display. Higher setting will improve resolution and the lower setting will increase the depth penetration.

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.*

NOTE: *The Doppler Power setting affects only Doppler operating modes.*

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

Use the **Horizontal sweep** to optimize the sweep speed.

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

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

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

Tissue Velocity Imaging (TVI) Checks

Introduction

TVI calculates and color codes the velocities in tissue. The tissue velocity information is acquired by sampling of tissue Doppler velocity values at discrete points. The information is stored in a combined format with grey scale imaging during one or several cardiac cycles with high temporal resolution.

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).

- 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 **Select**. 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.

NOTE: *To toggle between active calipers, rotate **Cursor Select** button.*

Probe/Connectors Check

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

Connecting a Probe

1. Place the probe's carrying case on a stable surface and open the case.
2. Carefully remove the probe and unwrap the probe cable.
3. Put the porbe in the probe holder.

⚠ CAUTION   DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.

4. Align the connector with the probe port and carefully push into place.
5. Lock the probe latch upward.
6. Carefully position the probe cord so it is free to move, but not resting on the floor.

Table 4-1:   Probe and Connectors Checks

Step	Task	Expected Results
1	Select the appropriate connected probe from the probe indicators on the Touch Panel.	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 without changing the current probe, press **Model** on the Touch 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 10-20 for more information*.	It passes the test.
6	Repeat this procedure for all available probes.	

Cineloop Check

Introduction

A cineloop is a sequence of images recorded over a certain time frame. When using ECG the time frame can be adjusted to cover one or more heart cycles. When frozen, the System automatically displays the cineloop boundary markers on either side of the last detected heart cycle.

Preparation

- Connect one of the probes to the scanner.
- See 'Probe/Connectors Check' on *page 4-37* for info about connecting the probes

  For available probes, see 'Probe and Accessories' on *page 9-9*:
- 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 8-1*.

Operator Panel Test

•   The Operator Panel is tested when the LOGIQ V2/LOGIQ V1 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 8-1*.

Peripheral checks

Printer checks

The internal printer is controlled from the **Print** and **Store** keys on the LOGIQ V2/LOGIQ V1's Operator Panel.

The factory default is:

•   **Print** for the standard printer

    Store for the screen capture to clipboard

Turn OFF Power to LOGIQ V2/LOGIQ V1

See 'Power off' on *page 4-9 for more information.*

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.

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.

Application Turnover Check List

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

Software Configuration Checks

Table 4-2:   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 4-3:   Site Log

DATE	SRVICE PERSON	PROBLEM	COMMENTS

Chapter 5

Components and Functions (Theory)

This chapter explains LOGIQ V2/LOGIQ V1's system concepts, component arrangement, and subsystem functions.

It also describes the power distribution and the Common Service Desktop interface.

Overview

Contents in this chapter

Block Diagram and Theory

General Information

LOGIQ V2/LOGIQ V1 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 LCD 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
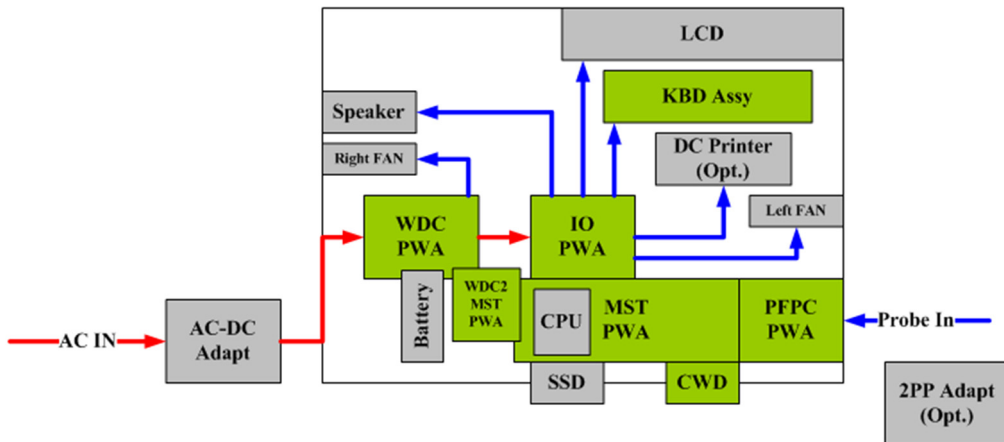
System Diagram

Figure 5-1.   LOGIQ V2/LOGIQ V1 System Block Diagram

Introduction

AC-DC adapter provides DC power input to WDC PWA.

WDC PWA is main power supply for the system, it provides multi powers to MST PWA and IO PWA.

MST provides the main control function, 64 channels transmitting/receiving and related signal processing, and connects to CWD board.

IO board receives MISC signals from MST board and make necessary processing, it provides multi-user interface (such as HDMI, LAN, USB, S-Video etc.).

PFPC board shall transfer 64 channels to 128 channels for RS type probe.

KBD Assy provides multi function keyboard.

2PP adapter shall expand the RS probe port quantity to two.

Power Diagram

Overview

The AC Power assy's main tasks are to isolate and output to the DC/DC unit which is inside the system console. The input of AC power pack will be the AC outlet and it's universal, the range is AC 100V-240V, 50-60Hz. And no main power switch located on this power pack.

AC Power

LOGIQ V2/LOGIQ V1 Power supply is an ACDC adapter which use 100V-240V (50-60Hz) as input and DC 19V (7.9A) as output.
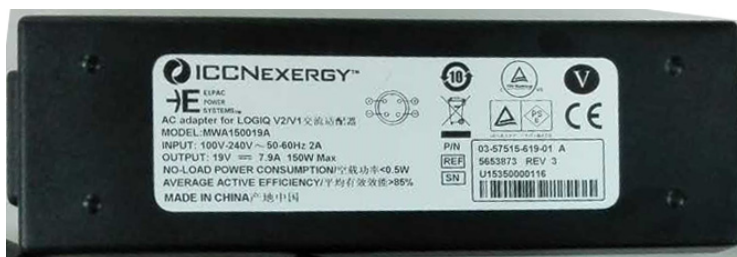

Figure 5-2.   ACDC Adapter

Common Service Platform

Introduction

The Service Platform contains a set of software modules that are common to all PC backend ultrasound and cardiology systems. The Common Service Platform will increase service productivity and reduce training and service costs.

Chapter 6

Service Adjustments

This chapter describes how to test and make adjustments to the LOGIQ V2/LOGIQ V1. You can use these to test the system for errors.

Overview

Contents in this chapter

LCD 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

To adjust the brightness and volume:

1. On the alphanumeric keyboard,

    *   adjust brightness with *Ctrl* +*Home/End* keys;
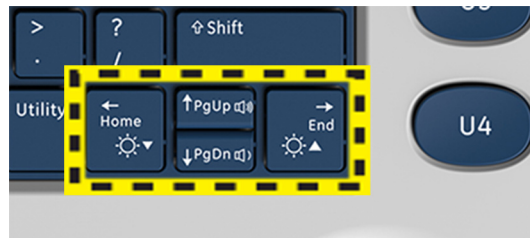   *   adjust volume with *Ctrl* +*PgUp/PgDn* keys.

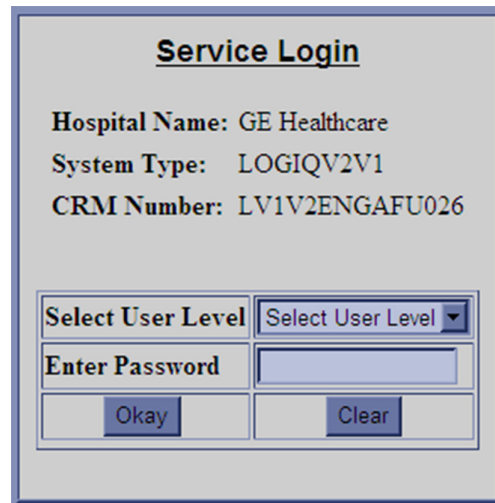Figure 6-1.   Monitor Adjustment

Software Reload

Confirm Backups for Patient Data and Presets

- The system can format C Disk (system data disk) and reinstall the system automatically. Although remote software does not delete any presets or settings on the system since it reloads the C:\partition only and application, it is recommended to follow these steps:

- Contact the customer to allow enough lead time to back up the system. Be sure no images are on the clipboard or in opened exams.

- Be sure that the DICOM spooler is empty.

- Review the troubleshooting section to collect information for future analysis (if you are troubleshooting loss of image or patient data.)

- Be sure all USB printers and the footswitch are connected and powered on. These USB devices will be automatically installed during the base image load process.

- Remove all USB Hard Disk Drives and Flash Drives. Failure to do so may result in a failure of the software reload process and damage to the data on the USB device.

- Be sure the Customer has saved all Presets, both User Defined and Service. This is precautionary in case the presets need to be restored manually.

- Note any window's type configurations, such as regional settings, keyboards, and localization settings.

System Reload procedure

If the system running, please follow the steps below:

1. Enter Utility -> Service.
2. Select GE Service in option of User Level of GEMS Service Home page and input correct password, press OK button.

Service Login

Hospital Name: GE Healthcare

System Type: LOGIQV2V1

CRM Number: LV1V2ENGAFU026

Select User Level	Select User Level ▼
Enter Password	
Okay	Clear

Figure 6-2.   Service Login Page

System Reload procedure (continued)

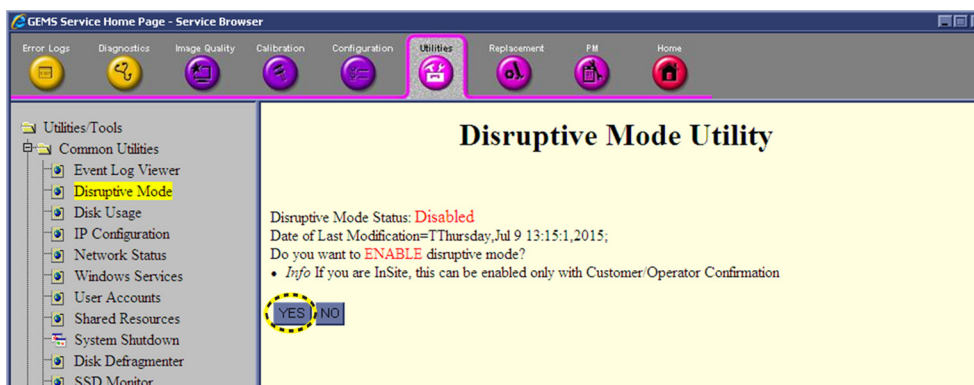3. Enter **Utility**-> **Common Utilities**-> **Disruptive Mode**, select **Yes**.

Figure 6-3. Enable Disruptive Mode

4. Choose **Utilities** in Global Service Interface, and then select **SW Reload** to invoke system reload.
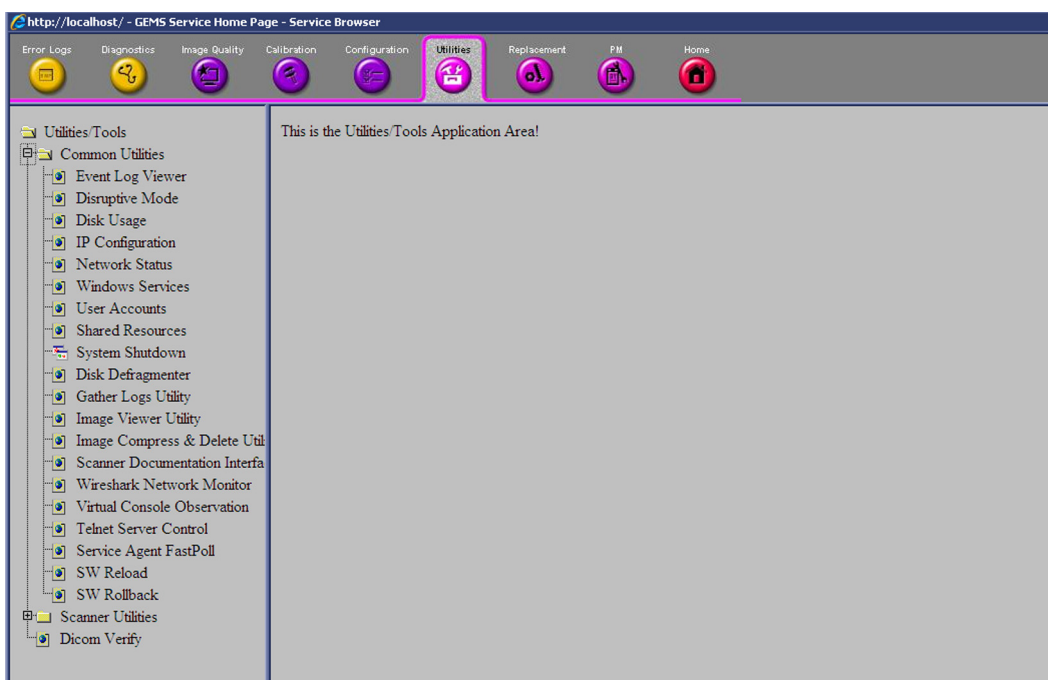

Figure 6-4. Utilities Window

System Reload procedure (continued)

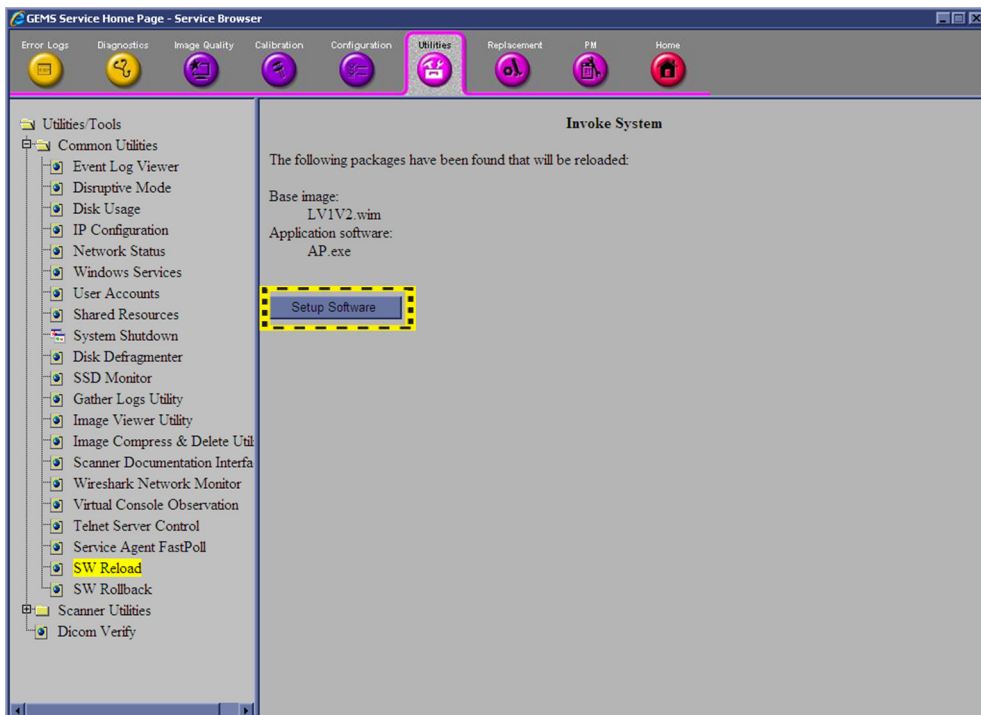5. Select **Setup Software**.

Figure 6-5.   Invoke System Reload

6. Reload system setup is successful, then reboot the system to begin software reload.

System Reload procedure (continued)

7. The software will be loading. Wait for the software installation to complete. Status on the screen indicates the progress.
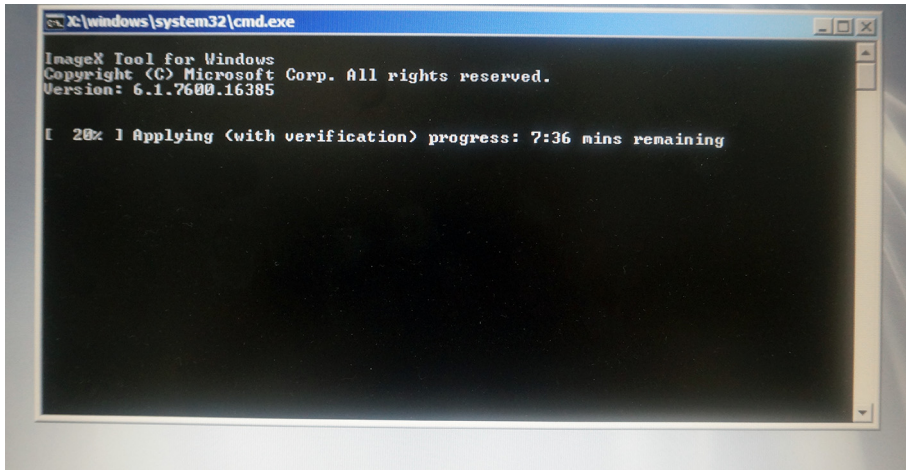

Figure 6-6.   **System Reload**

W ⚠ WARNING   Do not interrupt the software loading any time.

∞

8. When the software reload process completes, the system will reboot automatically.

Software Download

Software Download setting up

1. The user receives notification of available software updates via the envelop icon that appears in the status bar on the bottom of the monitor.

Figure 6-7.   **Envelop Icon**

NOTE: *To update the software, you must login with administrator privileges*

Software download and installation

Software Updates for the unit may be available for download and installation. When a Software Update is available, a message icon is displayed on the system exit window.

Only users with administrator rights are allowed to download Software Updates. You first download the software, then install the software. It is a two-step process.

Once the software installation has begun, the system is not usable until the software installation is done. The installation can take up to 45 minutes to complete. While installing, **DO NOT** turn off system power. For this reason, you may want to perform the software download one evening and then install the software the next evening.

After the software installation is complete, you will be asked to perform a few system functional checks to determine normal system operation.

NOTE: *A software download may take more than 1 hour (and may take several hours), depending on local network conditions. During this time, you cannot perform any other function. Please allow sufficient time to complete the software download and installation.*

NOTE: *Please ensure network connection when downloading software.*

NOTE: *After you press a software download button, it may take up to three (3) seconds for the system to respond.*

NOTE: *Software Updates through the GE service platform may not be available in all countries.*

You receive notification of available software updates via the envelope icon that appears in the status bar on the bottom of the monitor.

NOTE: *To update the software, you must login with administrator privileges.*

Software download and installation (continued)

1. Press the on/off button on the control panel. The Exit dialog window with software download displays.
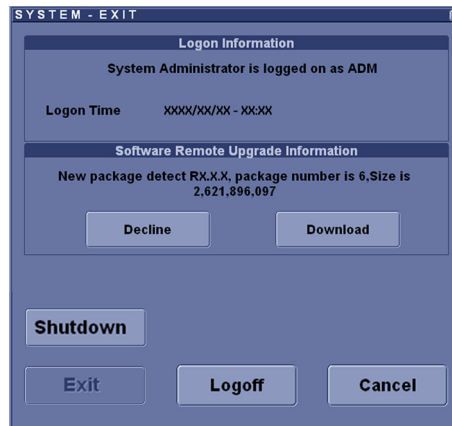

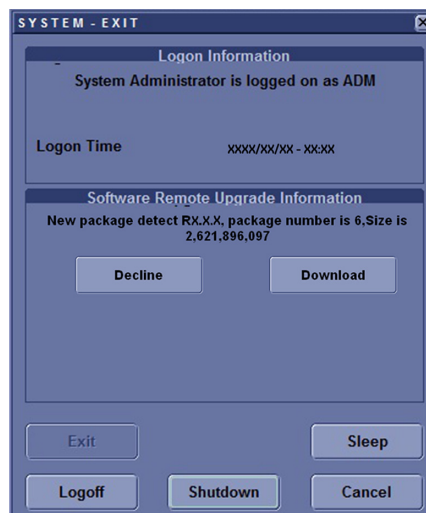Figure 6-8.   System - Exit Dialog Window (For R1.0.x)

Figure 6-9.   System - Exit Dialog Window (For R1.1.x)

- **Decline**: You decline the software download; the software is not downloaded, no update will be performed. The software download will not occur and you will not be informed about this package again.
- **Download**: Starts the software download.

Software download and installation (continued)
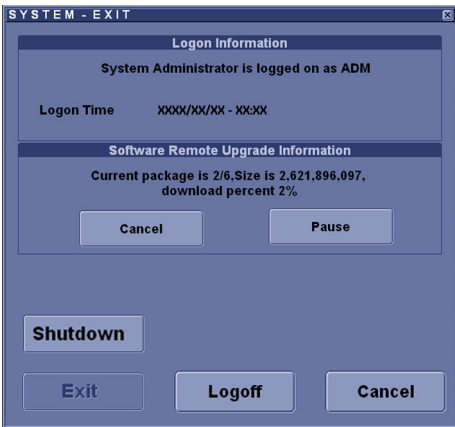
2. Select *Download*.

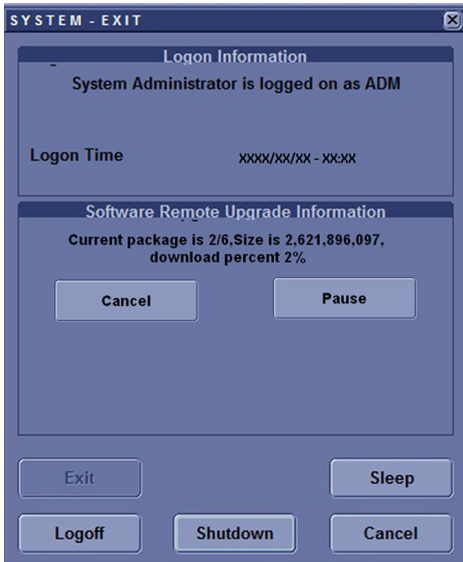Figure 6-10.   System - Exit Dialog Window (For R1.0.x)

Figure 6-11.   System - Exit Dialog Window (For R1.1.x)

Software download and installation (continued)

The download process starts. The progression of the download process is displayed.

NOTE: *The download step can be paused. While paused, you can return to normal operation. However, once the software installation has begun, the system is not usable until the software installation is done. While installing, **DO NOT** turn off system power.*

NOTE: *A typical software update of about 600 Mb may take up to 60 minutes to download, but times may vary depending on your location and network connection.*

- **Pause**: Pauses the software download process. If you select Pause, you can cancel out of this dialog and return to normal scanning or you can power off the scanner. A paused download can be resumed by logging in as Administrator, pressing the power switch, and selecting Resume.

- **Resume**: Press Resume to continue the software download.

Software download and installation (continued)

3. The following dialog is displayed when the software download is complete. Select **Install**.
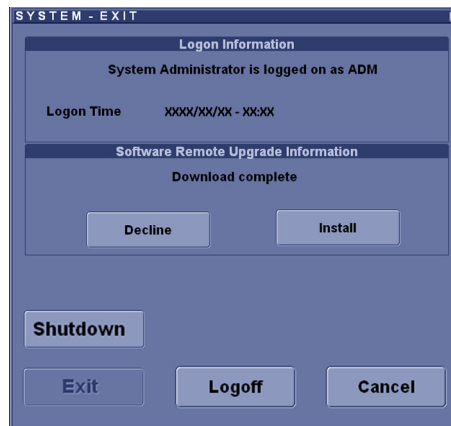

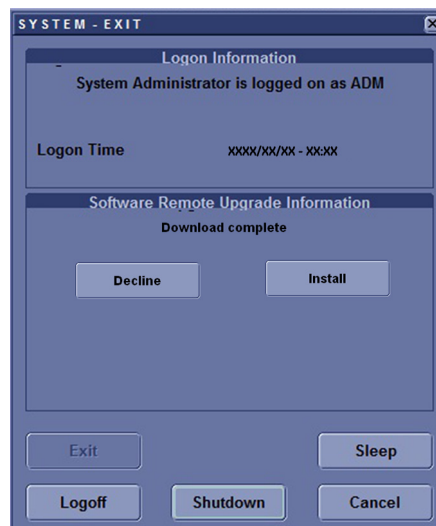Figure 6-12.   Software Ready To Be Installed (For R1.0.x)

Figure 6-13.   Software Ready To Be Installed (For R1.1.x)

• **Decline**: DO NOT install the downloaded software; no software upgrade will be performed. If you decline this installation, you **WILL NOT** be offered the chance to install this software package again. You can contact with GE Service Engineer to perform the install at a later time.

Software download and installation (continued)

Multiple screens appear during the software installation process. **DO NOT** interrupt this process **AND** follow instructions as they appear on the display.

NOTE: *A typical installation may take up to 15 minutes.*

4. After the installation complete, select **Shutdown** and then press **Power On/Off** button to reboot the system.

Figure 6-14.   Shutdown after Software Installation (For R1.0.x)
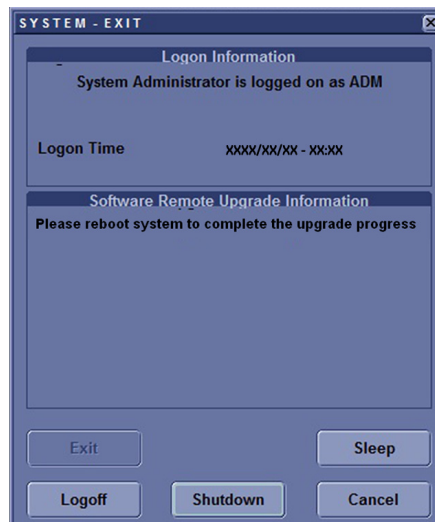
Figure 6-15.   Shutdown after Software Installation (For R1.1.x)

Software download and installation (continued)

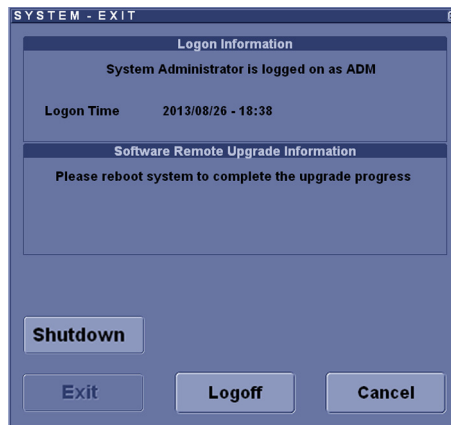5. When the system starts up after the software installation has finished, press **Power On/Off** button any then select **Verify**.
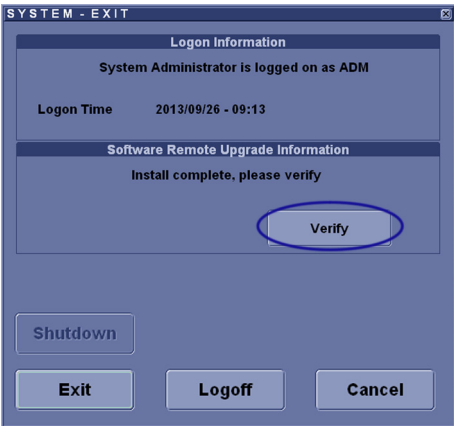
Figure 6-16. Shutdown after Software Installation (For R1.0.x)
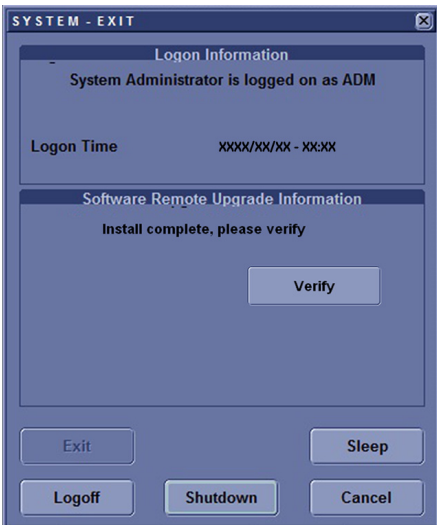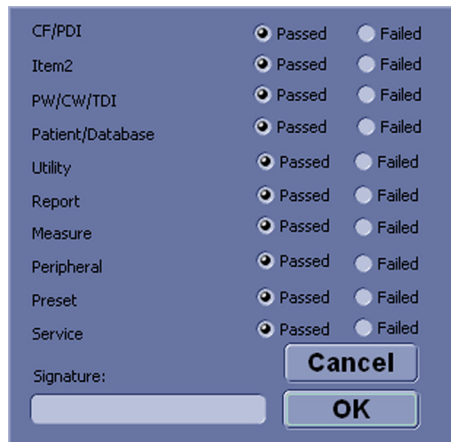
Figure 6-17. Shutdown after Software Installation (For R1.1.x)

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Software download and installation (continued)

6. The new software verification checklist is displayed, this dialog is **critical**. You **MUST** perform software verification after downloading and installing the new software.

Figure 6-18.   New Software Verification Checklist

CAUTION
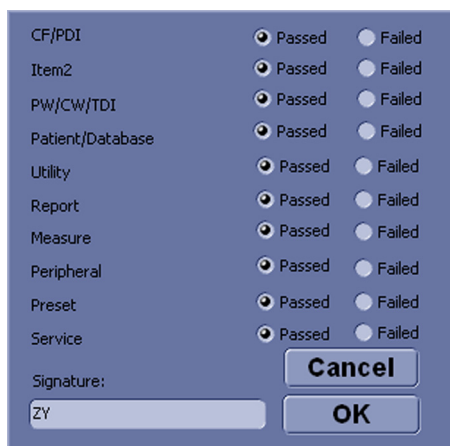
Perform a check for all the features listed. You **MUST** ensure that the entire system functions normally as expected.

These verification results are tracked for regulatory purposes, sent back to GE for tracking, and approved with your signature.

Software download and installation (continued)

7. As you verify that each feature works correctly, select "Passed." If all features work correctly and "Passed" is filled in for all features, type your signature and press **OK**. The system is now ready for use.

Figure 6-19.   Features check Passed

Software download and installation (continued)

WARNING **However**, if any of the features **DO NOT** function as expected, you need to select "Failed" for this feature. Type your signature and press *OK*. Then the System-Exit Window is displayed, select **Exit** and then reboot the system, the system will return to the previous software version.

For R1.0.x software:
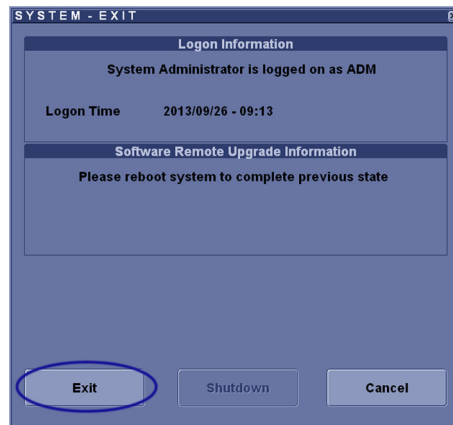
For R1.1.x software:
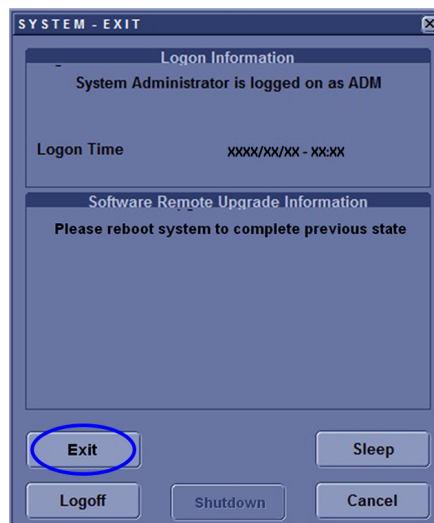
Chapter 7

Replacement Procedures

This chapter describes how to remove and install, or replace, modules and subsystems in the LOGIQ V2/ LOGIQ V1. It also includes instructions for installing and re-installing the software.

Overview

Contents in this chapter

Warnings and important information

Warnings

⚠ **WARNING**   Energy Control and Power Lockout for LOGIQ V2/LOGIQ V1.

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

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

Ultrasound System components may be energized.

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

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

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

Follow general guidelines for handling of electrostatic sensitive equipment.

NOTE: *Use an ESD compatible work space or the ESD-kit during parts replacement.*

Warnings (continued)

^w ⚠ 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 policy states that body fluids must be properly removed from any part or equipment prior to shipment. GE employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe). The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

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

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

Tools needed for servicing LOGIQ V2/LOGIQ V1

Table 7-1:   Standard tools list for LOGIQ V2/LOGIQ V1

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 SScrew #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
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 7-1

Trackball Roller Cleaning

1. Rotate the retainer counterclockwise until it can be removed from the keyboard.
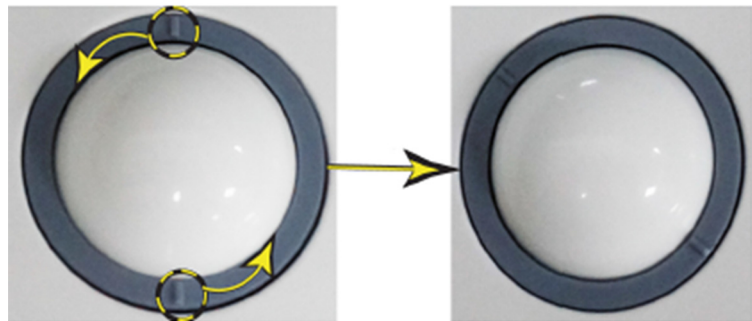
Figure 7-1.   Rotate the retainer

2. Seperate the trackball and the retainer. Wipe off any oil or dust from the trackball, retainer and the trackball housing using a cleaner or cotton swab.

3. Assemble the trackball and retainer, then put in into the housing and rotate it clockwise until its notches are set in position.

CAUTION   When cleaning, make sure not to spill or spray any liquid into the trackball housing (keyboard or system).

2-Probe Holder (5727508)

Purpose: This is a description on how to remove and replace the 2-Probe Holder.

Tools

- Common Phillips screwdrivers

Preparation
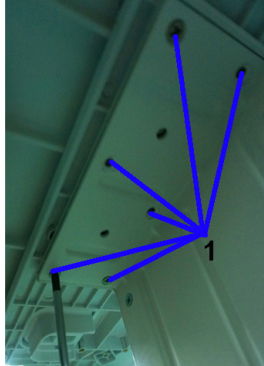
- Lock the castors in order to avoid cart moving.

Needed Manpower

- 1 person, 5 minutes + travel

2-Probe Holder (5727508) (continued)

Removal Procedure

Table 7-2:   Removal Procedure for 2-Probe Holder

No.	Steps	Corresponding Graphic
1.	Unscrew the 6 screws under the top table.	
2.	Remove the probe holder from the top of table.	
	2-Probe Holder (5727508)	

Mounting Procedure

1.   Install the new parts in the reverse order of removal.

Paper Tray Kit (5727505)

Purpose: This is a description on how to remove and replace the Paper Tray Kit of V Cart.

Tools

- None

Preparation
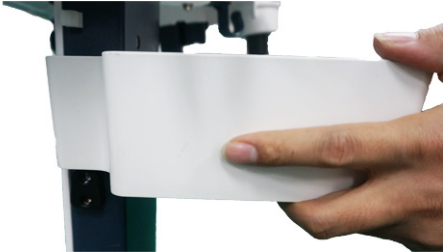
- Lock the castors in order to avoid cart moving.

Needed Manpower

- 1 person, 1 minutes + travel

Removal Procedure

Table 7-3:   Removal Procedure for Paper Tray Kit

No.	Steps	Corresponding Graphic
1.	Hold the paper tray with two hands and push it up.	
2.	Then remove it from the Upper Column.	

Mounting Procedure

1. Install the new parts in the reverse order of removal.

Printer Shelf (5727506)

Purpose: This is a description on how to remove and replace the Printer Shelf of V Cart.

Tools

- Common Phillips screwdrivers

Preparation

- Lock the castors in order to avoid cart moving.
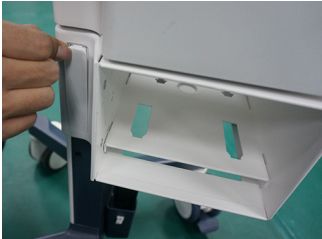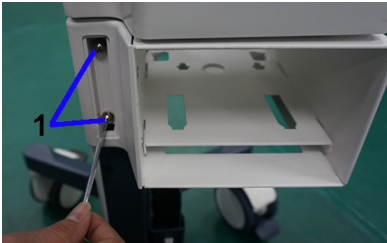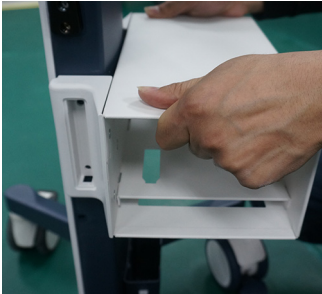
Needed Manpower

- 1 person, 5 minutes + travel

Printer Shelf (5727506) (continued)

Removal Procedure

Table 7-4:   Removal Procedure for Printer Shelf

No.	Steps	Corresponding Graphic
1.	Remove the screw pad.	
2.	Unscrew the 2 screws.	
3.	Hold the printer shelf with two hands and push it up. Then remove the printer shelf from the Upper Column.	

Mounting Procedure

1. Install the new parts in the reverse order of removal.

Loading the software

Purpose of this section

This section describes how to reinstall software on LOGIQ V2/LOGIQ V1.

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 hard disk replacement, or if all the content on the hard disk has been erased, the images must be moved away from LOGIQ V2/LOGIQ V1 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.

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

  For instructions, please see "Disk management" in the User Manual/User Guide.

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 LOGIQ V2/LOGIQ V1 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/User Guide.

Recording important settings and parameters

Overview

⚠️ CAUTION   An error, or a power loss may occur.

It is considered to be best practice to always keep a record on paper of the settings for the LOGIQ V2/LOGIQ V1. Verify if it is current before you start to load software!

Always keep a record of the settings for the LOGIQ V2/LOGIQ V1 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:

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.*

There are two methods to load the system software:

- Load the system software with USB memory stick.
- Load the system software with SD Card.

NOTE: *Before starting this procedure, remove all probes and peripherals and remove them from the Docking Cart.*

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!*

Loading the System Software with USB memory stick (For R1.0.x)

This section describes how to upgrade the software upgrade between R1.0.x.

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 one of the options and then press **Enter** key to continue. Select choice [1] to load the C disk only.
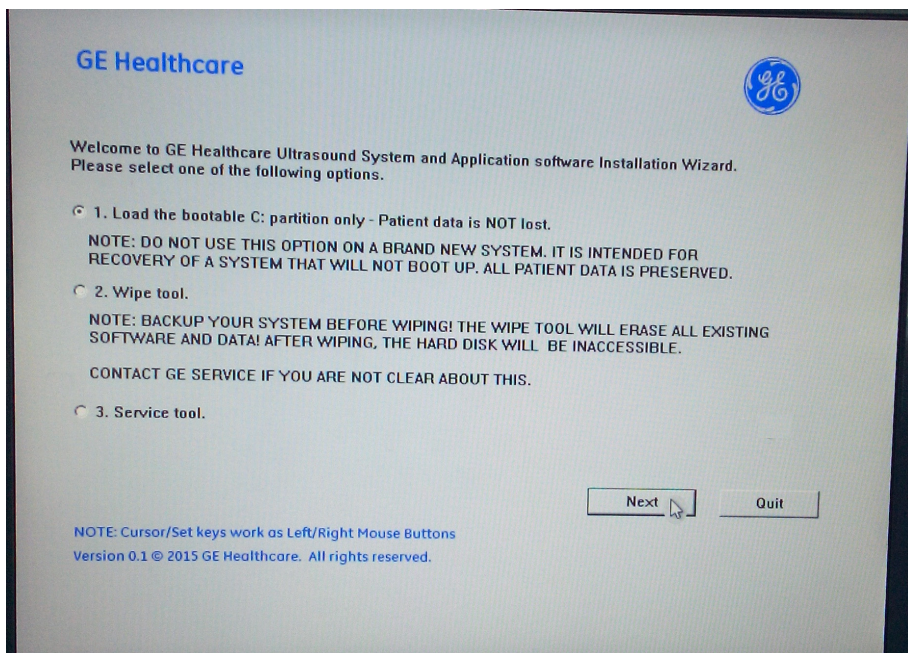
Figure 7-2.   System Software load instruction

Loading the System Software with USB memory stick (For R1.0.x)

(continued)

- To select [1], only the bootable C: partition is loaded. This option is intended for recovery of a system that will not boot up. It is not recommended for application software upgrade because during upgrade process, the data on the system would possibly be impacted.
- To select [2], wipe tool: This option is to wipe all the patient data.

NOTE: *All the patient data cannot be recovered after wipe process.*

- To select [3], Service tool. The complete disk will be loaded. This option is recommended for application software upgrade.

NOTE: *This option is used by service engineer only. It needs password to continue, the password is **GEWuXiChina** and it is case sensitive.*

NOTE: *When to select [3] to load complete disk, please ensure that any patient data on the disk has been backed up.*

_c ⚠ CAUTION   If you select [3], ALL existing software and data will be erased. If backup has not been performed, all data like Patient Database, System Configuration and User Configurations (Customer Presets) will be lost.

_w ⚠ WARNING   *While the software install procedure is designed to preserve data, you should select choice [1] to format disk C only.*

Loading the System Software with USB memory stick (For R1.0.x) (continued)

5. System USB memory stick will be loading. Wait for the software installation to complete.

^w ⚠ WARNING   *Do not interrupt the software loading at any time.*
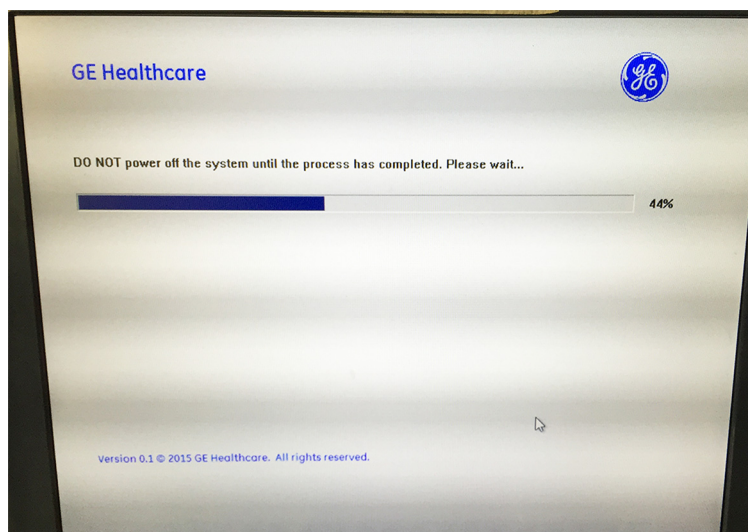
Figure 7-3.   Loading Process

Loading the System Software with USB memory stick (For R1.0.x)

(continued)

6. Select **Finish** when the upgrade process completes and the system will shutdown automatically.
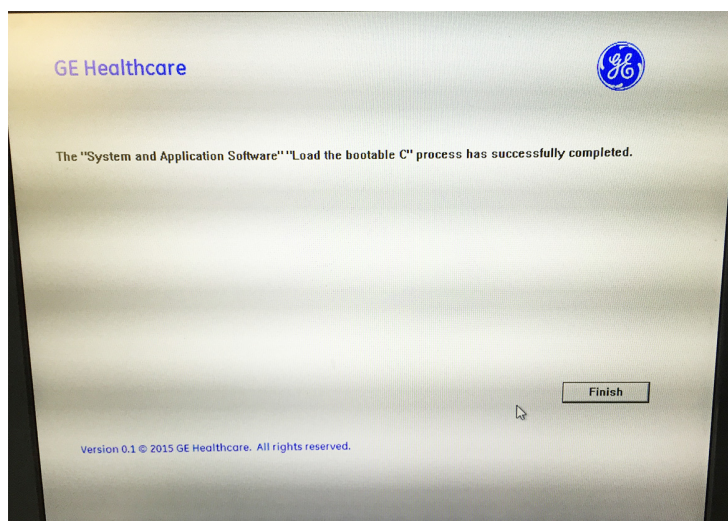
Figure 7-4.   System upgrade complete

7. Remove the USB memory stick and then press Power On/ Off switch to power on the system.

NOTE: *If you do not remove the USB memory stick, the software system loading process repeats when the system boots up.*

Loading the System Software with USB memory stick (For R1.0.x) (continued)

8. When the system is powered on, the following dialog displays to indicate to input password. The password is the same as that of service dongle.
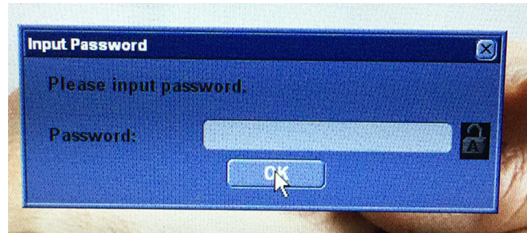
Figure 7-5.   Input password

For software R1.0.6 and above, the following dialog will display.

There are two options for you to continue.

•   If you will input a new serial number in step 9 on *page 7-21*, input the password and select **OK**.

•   If you will input the same serial number as the original in the step 9 on *page 7-21*, you can select **Ignore** without input of the password. Then the step 9 on *page 7-21* in the following procedure will be skipped.
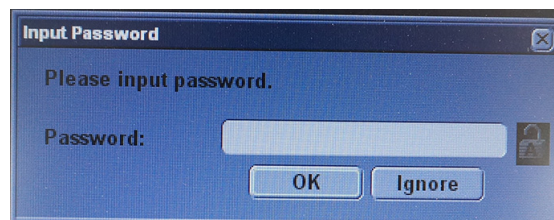
Figure 7-6.   Input Password

Loading the System Software with USB memory stick (For R1.0.x)

(continued)

9. Then input the correct Serial number, select OK.

NOTE: *The serial number is case sensitivity.*
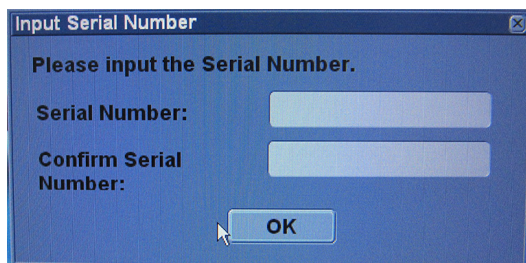
Figure 7-7. Input Serial Number

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

10. The serial number is reset, then the system is shut down automatically.
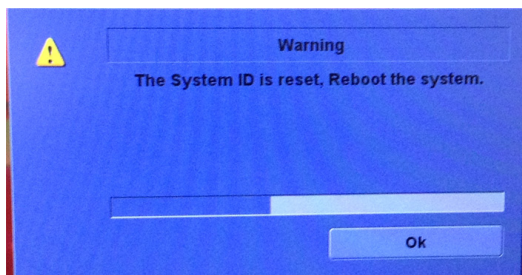
Figure 7-8. Reboot the system

NOTE: *Make sure the system is shut down after the serial number is reset.*

Loading the System Software with USB memory stick (For R1.0.x) (continued)

11. Power on the system, input the option keys if the dialog displays.
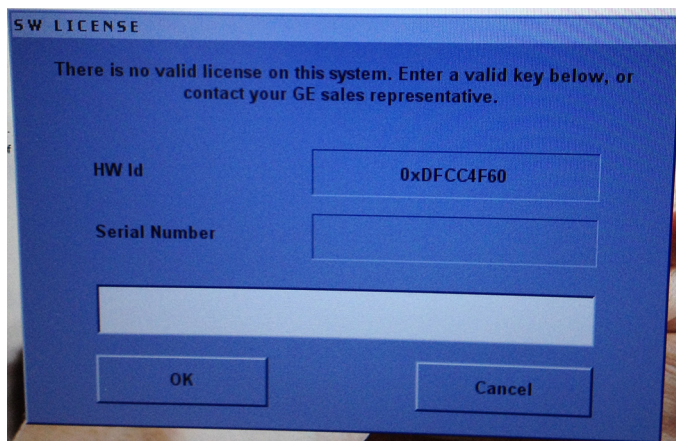
Figure 7-9.   Input Option Key

Loading the System Software with USB memory stick (For R1.1.x)

This section describes how to upgrade the software of LOGIQ V2/LOGIQ V1 from R1.0.x to R1.1.x and software upgrade between R1.1.x.

NOTE: *Load the disk completely to do this software upgrade from R1.0.x to R1.1.x. When loading the complete disk, ensure that any patient data on the disk has been backed up.*

NOTE: *Patient Archive, Report Archive, User Defined Configuration and Service of R1.0.x are not compatible with R1.1.x. Do not restore them between R1.0.x and R1.1.x.*

BIOS Setting

NOTE: *To upgrade the software from R1.0.x to R1.1.x, BIOS setting is required before software upgrade procedure.*

1. Power on the system. Press **DEL** or **F2** immediately when the BIOS information screen displays. Record the CPU GPN number.
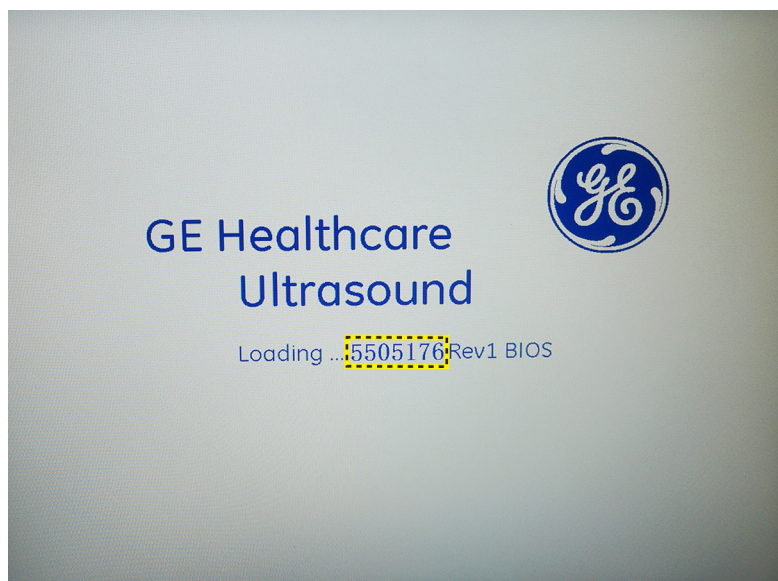
Figure 7-10.   BIOS Revision Information

NOTE: *The GPN number in the figure is for illustrational purpose only. Refer to your actual output screen on your system for the correct GPN number.*

Loading the System Software with USB memory stick (For R1.1.x) (continued)

2. Input the BIOS password **gerural** and login the BIOS.
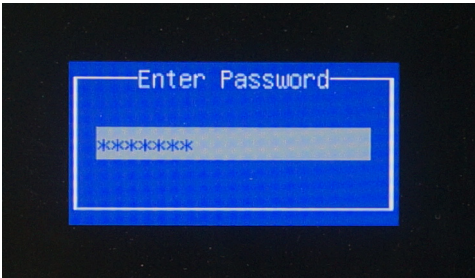
Figure 7-11.   BIOS Password

3. In the BIOS Main page, set the BIOS time to the current time.
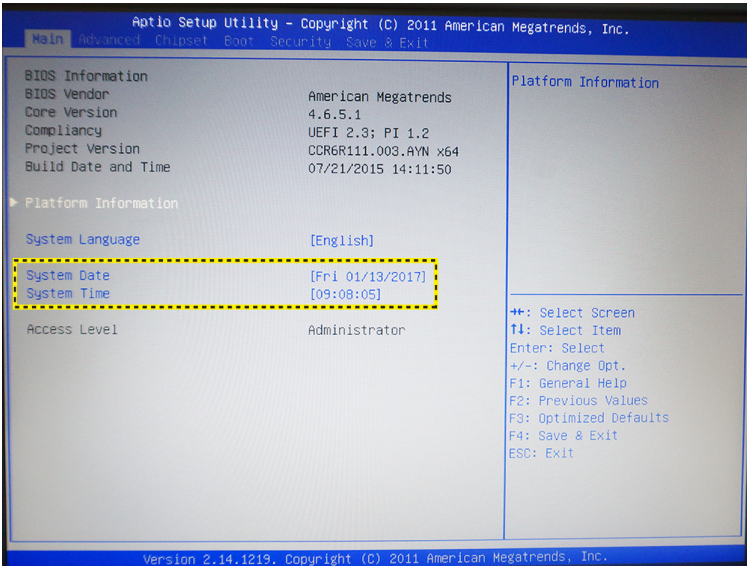
Figure 7-12.   BIOS Time Information

Loading the System Software with USB memory stick (For R1.1.x) (continued)

4. Check the CPU GPN number recorded on the and select **AHCI** for SATA Mode. There are two setting processes to continue:

- If the GPN number is 5548771, select the **AHCI** via **Advanced** -> **SATA** -> **SATA Mode Selection**. Press **F4** to save and exit BIOS.
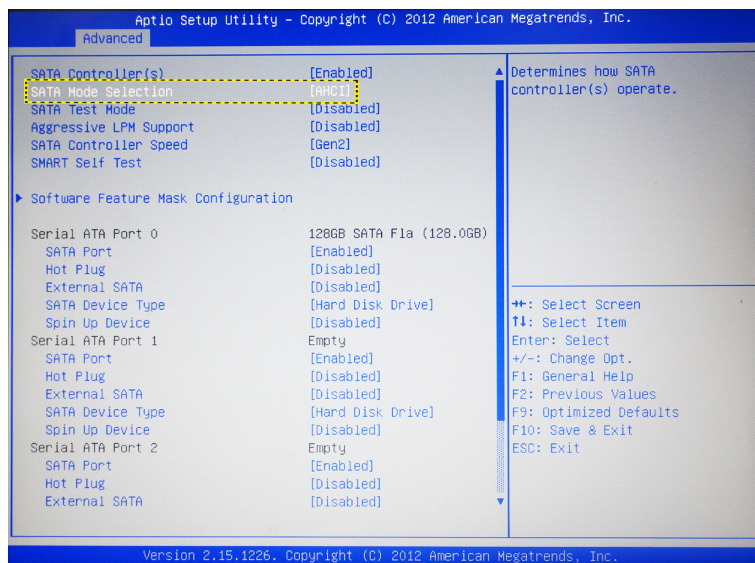
Figure 7-13.   SATA Mode Selection

Loading the System Software with USB memory stick (For R1.1.x) (continued)

- If the GPN number is 5505176, select **AHCI** via the
  Chipset -> **PCH-IO Configuration** -> **SATA
  Configuration** -> **SATA Mode Selection**. Press **F10** to
  save and exit BIOS.
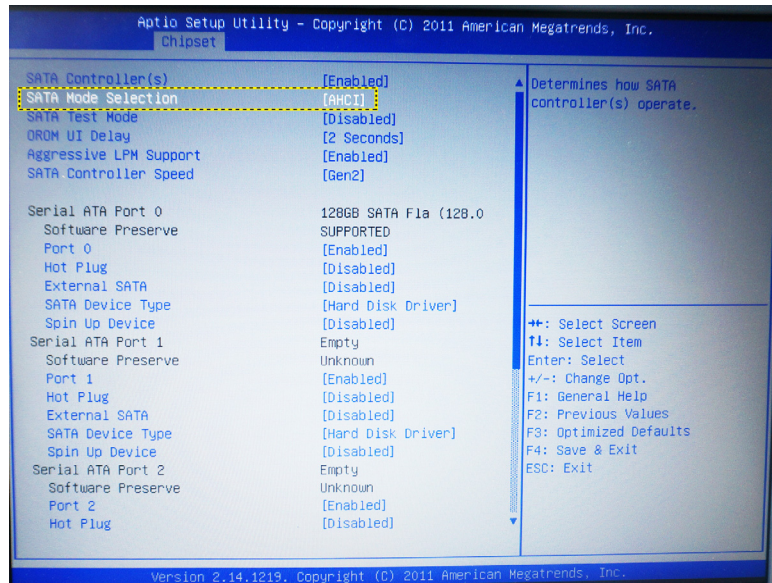
Figure 7-14.   SATA Mode Selection

5. The system enter scanning screen automatically. Then
    restart the system.

Software Upgrade Procedure (For R1.1.x)

This section is to describe software upgrade procedure about how to upgrade the software of LOGIQ V2/LOGIQ V1 from R1.0.x to R1.1.x and software upgrade between R1.1.x.

NOTE: *If you are going to upgrade software from R1.0.x to R1.1.x, be sure you have completed BIOS setting before you start software upgrade procedure.*

1. Insert the Upgrade USB memory stick labeled "System & Application Software" in 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** or **Load the bootable C: partition only** for software upgrade. Or select **Exit** to exit the upgrade process.
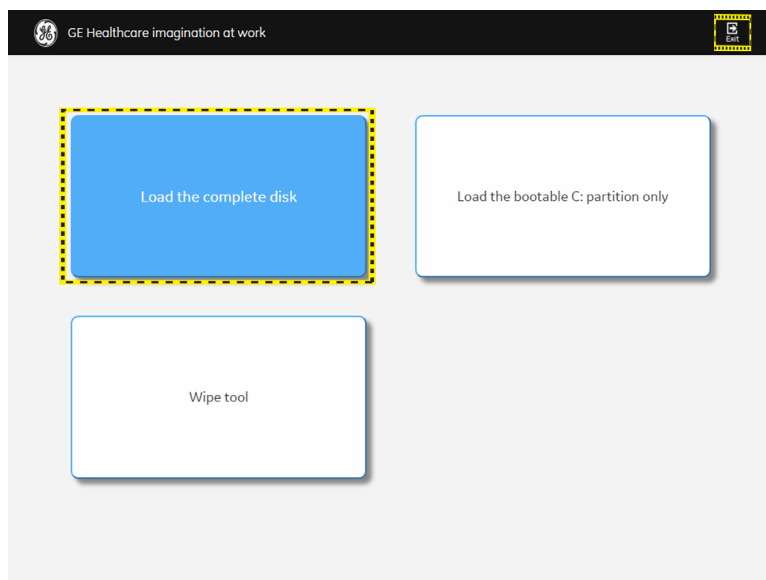
Figure 7-15.   Upgrade instruction

Software Upgrade Procedure (For R1.1.x) (continued)

- **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 make sure the patient data and the configuration have been backed up first, then upgrade the system.

NOTE: *This option is used by service engineer only. It needs password to continue. The password is **GEWuXiChina** and it is case sensitive.*

- **Wipe tool**: this option is to wipe all the patient data and the software from the system. It is not for software upgrade. All the patient data cannot be recovered after wipe process.

NOTE: *All the patient data cannot be recovered after wipe process.*

- **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. This option is not applicable for software upgrade from R1.0.x to R1.1.x.

NOTE: *While the software installation procedure is designed to preserve data, select choice Load the bootable C: partition only to format disk C only. Please do not use this option for software upgrade from R1.0.x to R1.1.x.*

NOTE: C disk upgrade is not allowed between the different version. To keep the data, the customer needs to use export/import.

Software Upgrade Procedure (For R1.1.x) (continued)

5. If the **Load the complete disk** is selected.

   • For R1.0.x, read the information in the Confirmation dialogue box carefully and check the boxes before Preset, Patient data and BIOS to confirm that the requirements have been executed. Then input the Installation Password: *GEWuXiChina*. Select **Execute** to continue.
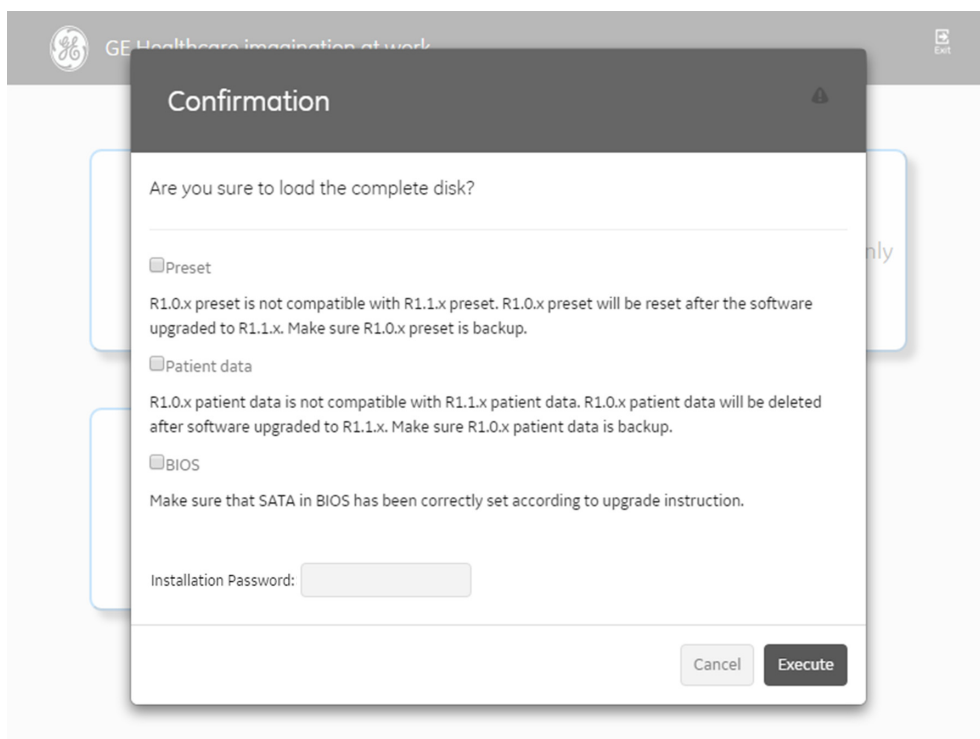
Figure 7-16.   Input Password between R1.0.x

Software Upgrade Procedure (For R1.1.x) (continued)

•   For R1.1.x, input the Installation Password:
    GEWuXiChina. Then select **Execute** to continue.
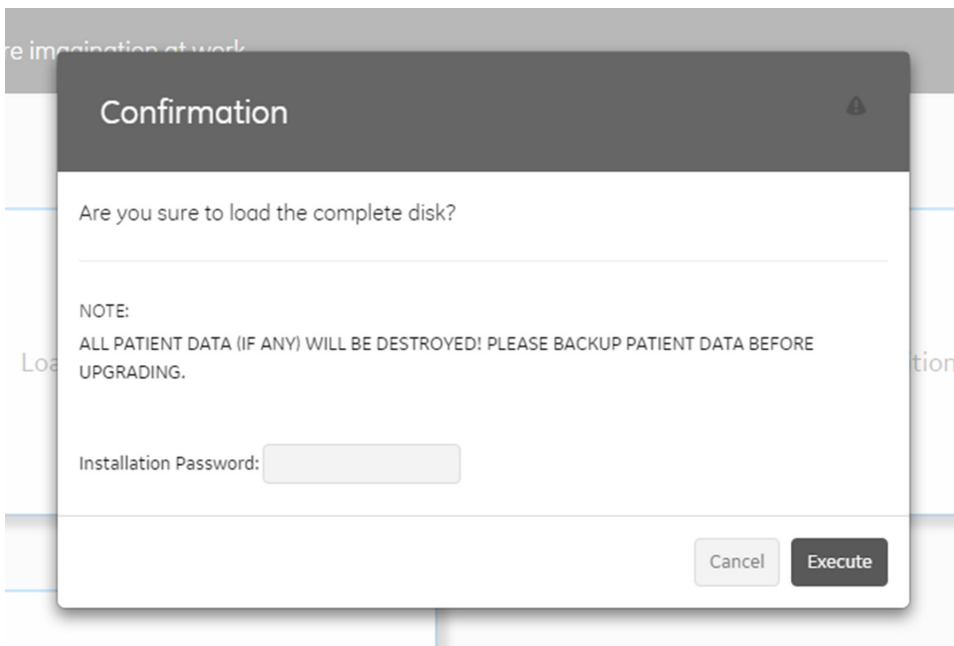
Figure 7-17.   Input Password between R1.1.x

If **Load the bootable C: partition only** is selected, the password is not required. Select **Execute** to continue. The step in the will be skipped

Software Upgrade Procedure (For R1.1.x) (continued)

6. The system detects whether the SSD Firmware needs update and pop up a message dialog. Click OK.

   • If needs, the system will automatically update the SSD Firmware and shut down afterwards. Restart the system by pressing Power On/Off key on the control panel and reselect **Load the complete disk.**

   • If no, the system will automatically continue running the software upgrade process.
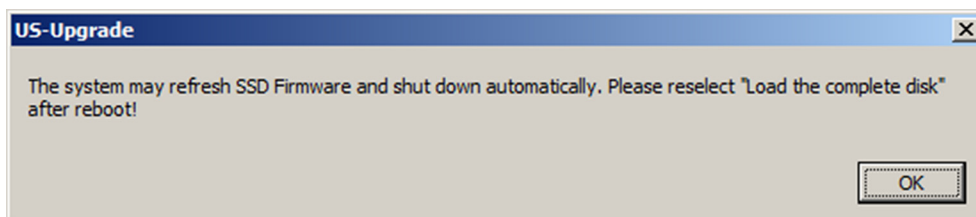
Figure 7-18.   Refresh SSD

7. System USB memory stick will be loading. Wait for the software installation to complete. Status bar on the screen indicates the progress.

⚠ **WARNING**   Do not interrupt the software loading any time.

Figure 7-19.   Loading Process

Software Upgrade Procedure (For R1.1.x) (continued)

8. 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.
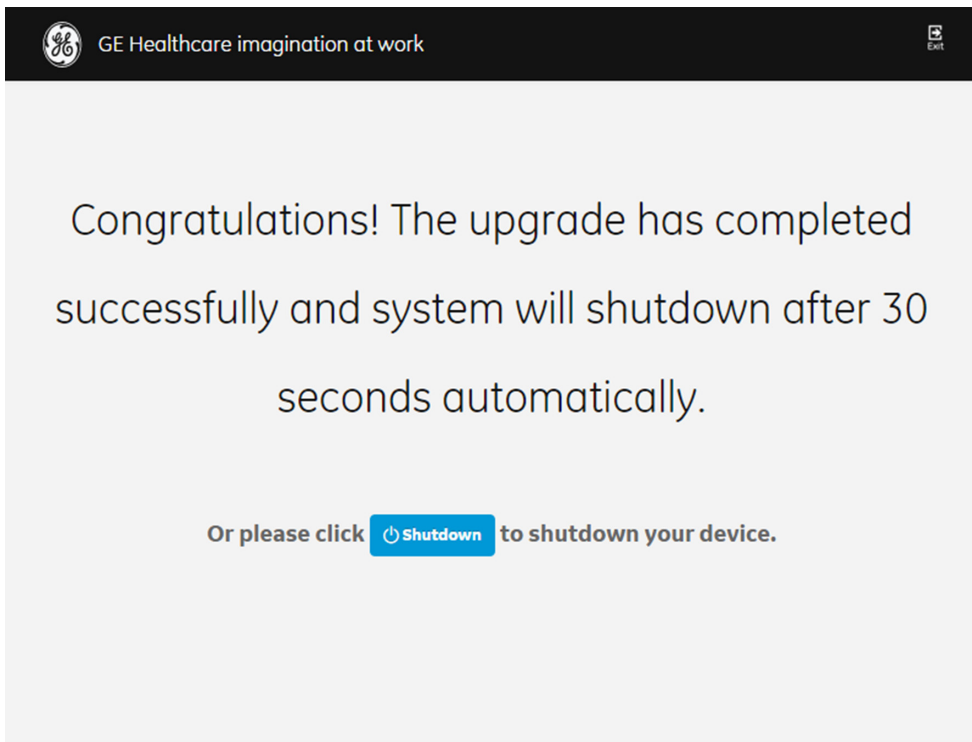
Figure 7-20.   System upgrade complete

Software Upgrade Procedure (For R1.1.x) (continued)

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 .
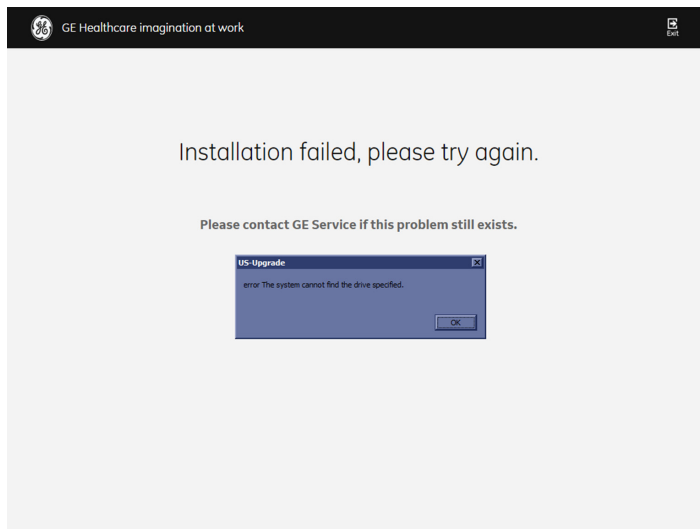
Figure 7-21.   System upgrade fail

9.   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* .

Rewrite the System ID

If selected to load the complete disk during the software loading process, when powering the system, the system will indicate to rewrite the system ID. About how to rewrite the system ID, please contact GE service for support.

Windows License Label

After upgrading from R1.0.x to R1.1.x, Windows License Label needs to be attached to the bottom of the system to replace the original one.

NOTE: *The Windows License Label to replace the original one is only required for upgrade from R1.0.x to R1.1.x.*

1. Take out the windows license label, pell off the yellow part of the paster.

Figure 7-22. Windows license label

2. Make sure the backcover is clean and dry. Then align the paster and attach it in the location illustrated by the figure.
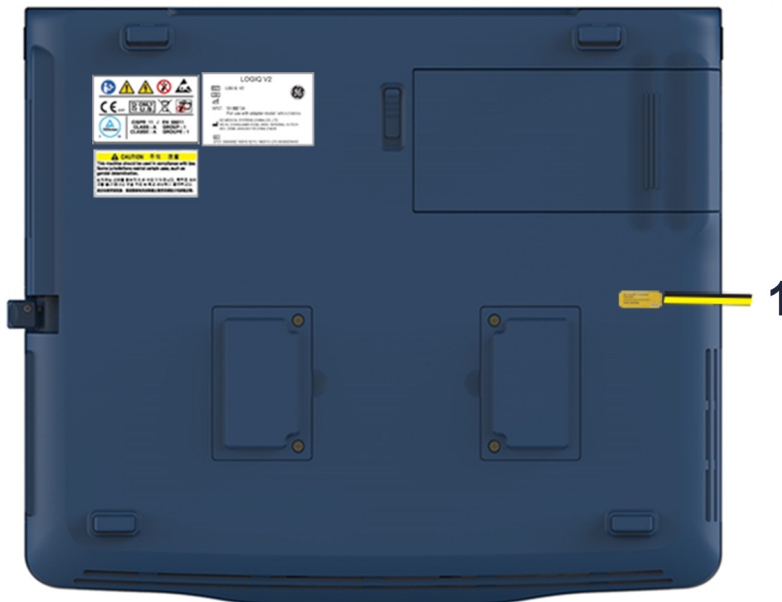
Figure 7-23. Windows license label location

• 1: Windows License Label

Wipe Tool

Wipe tool is intended to erase all the patient data with the software to wipe the partitions on the system before the system will be shipped for service.

NOTE: *Wipe tool will be performed with the software USB flash drive. Be sure your software USB flash drive is well kept.*

⚠ CAUTION   The system can not be boot up after wipe process.

⚠ WARNING   The wipe procedure will erase all the patient data and all existing software on the system. While the wipe 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 the wipe process.

NOTE: *Before starting the wipe tool, please ensure that the power can be continuously supplied and there is no risk of power cut off during loading procedure.*

1. Insert USB flash drive labeled "System & Application Software" to the system.
2. Properly turn off the system by momentarily pressing the Power/On/Off Switch. In System-Exit window, select **Shutdown** to shutdown the system.

NOTE: *If the system will not shut down normally, hold down the Power On/Off Switch until the light turns off.*

3. Power on the system. The system will detect the USB flash drive automatically.

Wipe Tool (continued)

4. For R1.0.x software, select **2. Wipe Tool** and then select **Next** to continue.

    For R1.1.x software, select Wipe tool.

NOTE: *All patient data cannot be recovered after this operation. Contact GE service for support.*

NOTE: *All patient data (if any) will be destroyed! Please backup patient data before executing erasing patient data!*
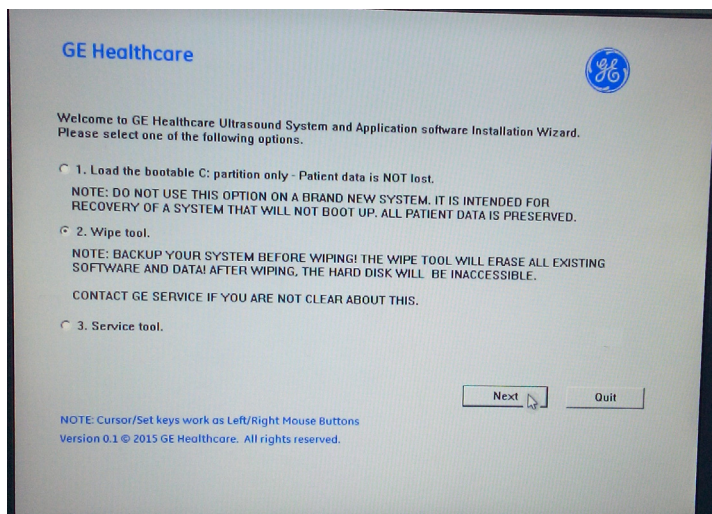
Figure 7-24.   Upgrade USB message (For R1.0.x)
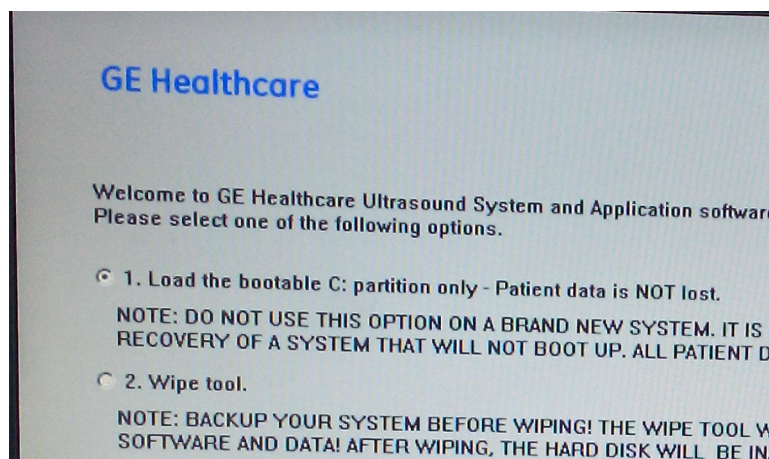
Figure 7-25.   Upgrade USB message (For R1.1.x)

Wipe Tool (continued)

5. The system indicates all data will be erased, select **Yes** to continue.
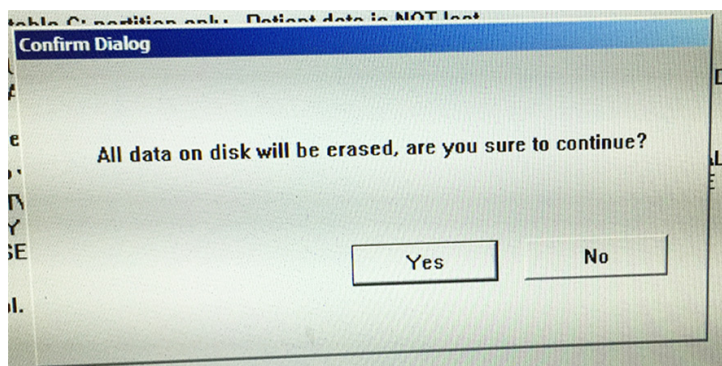
Figure 7-26.   Confirmation Dialog (For R1.0.x)
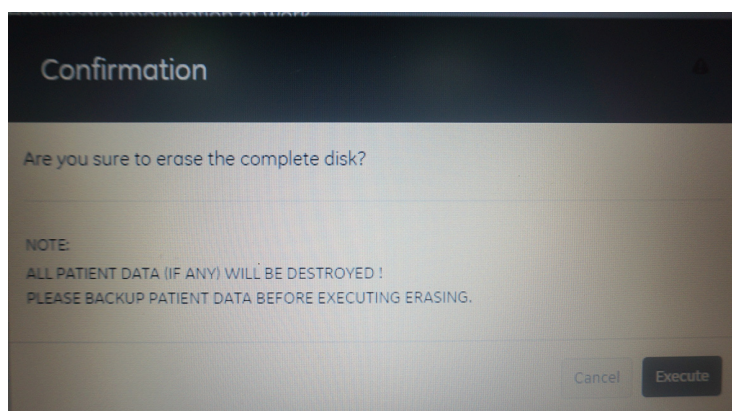
Figure 7-27.   Confirmation Dialog (For R1.1.x)

NOTE: *All the patient data cannot be recovered after wipe process. This wipe tool is not BAM approved as secure wipe tool.*

Wipe Tool (continued)

6. The process may take twenty minutes or more

NOTE: *Do not interrupt the wipe tool process at any time until all the partitions wiping is completed.*
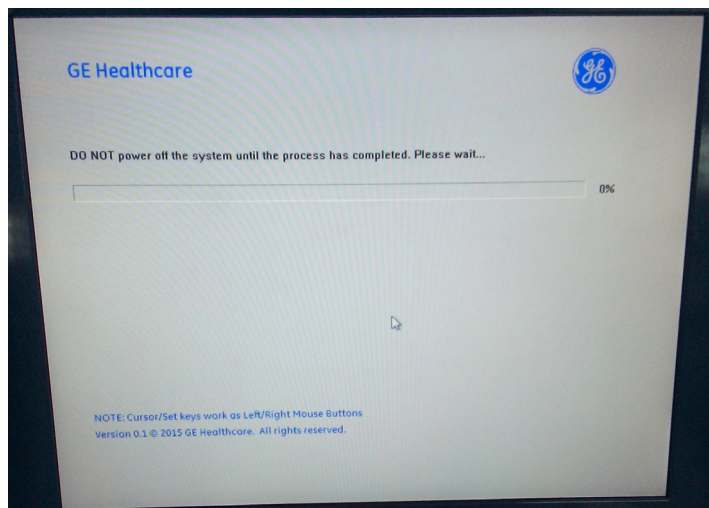
Figure 7-28.   Wiping progress (For R1.0.x)
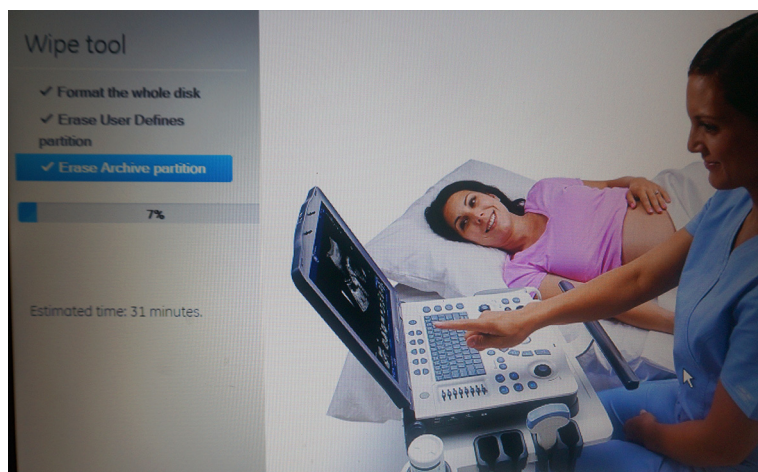
Figure 7-29.   Wiping Process (For R1.1.x)

Wipe Tool (continued)

7. For R1.0.x software, select **OK** when the process is complete, and the system will shutdown automatically.

   For R1.1.x, the system will shutdown automatically when the wiping progress completes.
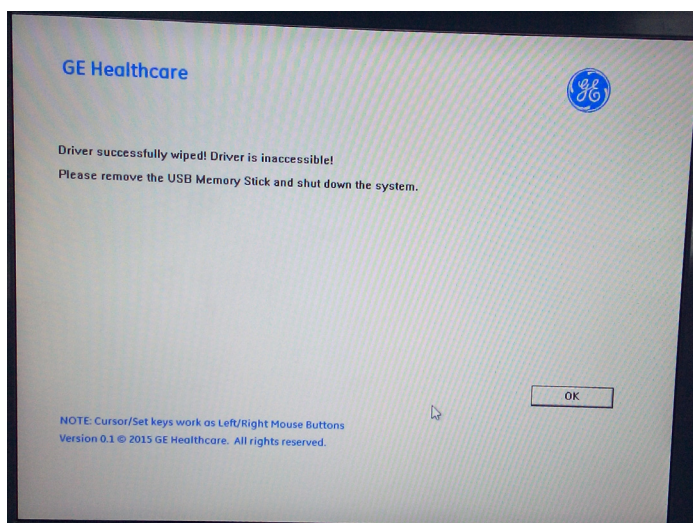
Figure 7-30.   Process Complete

NOTE: *As the SSD is empty after wipe process, the system cannot boot up. The software should be loaded first after the wipe process.*

8. The wipe tool procedure has erased all patient data and all existing software.

NOTE: *After the system is returned from service, restore the patient data, images, system setups and customer presets on your system. Contact GE service for support.*

Software Version check out

Functional Check-out

1. Power on LOGIQ V2/LOGIQ V1 system and wait until system booting to main screen.

2. Press **Utility** on the control panel.

3. Select the **About** button on the right.
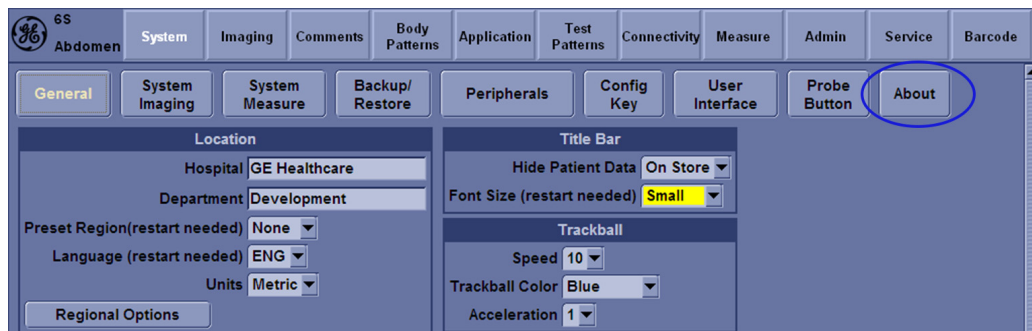
Figure 7-31.   About

4. Check whether "Software Version" is the right version for use.
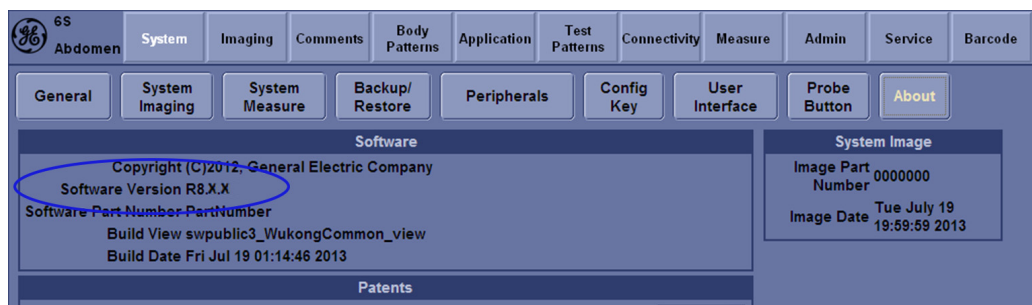
Figure 7-32.   Software version

Reload the Correct Preset Region

NOTE: *After the system software loading completion, please reload the correct preset region.*

1. Reboot the system.
2. Select Utility -> General.
3. In the **Location** portion, select the right region in the field of **Preset Region**.
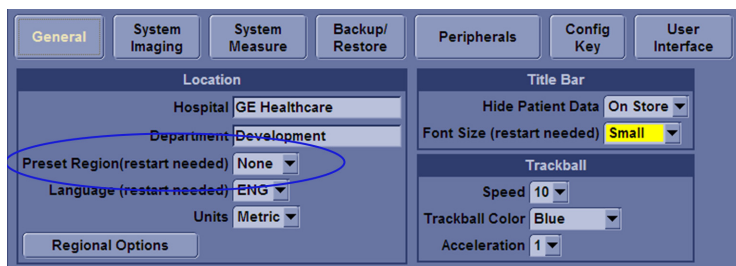
Figure 7-33.   Preset Region

4. Reboot the system.

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. Select Utility -> Admin -> System Admin.
3. Ensure that all the installed option keys are displayed and the status of Options are valid.

   • The status "Valid" means the option keys are activated and working.

   • The status "disabled" means the option keys are not activated and not working. Check if the option is installed and if the serial number and option key are correct.

Figure 7-34.   Option strings

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 LOGIQ V2/LOGIQ V1.
>
> 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.
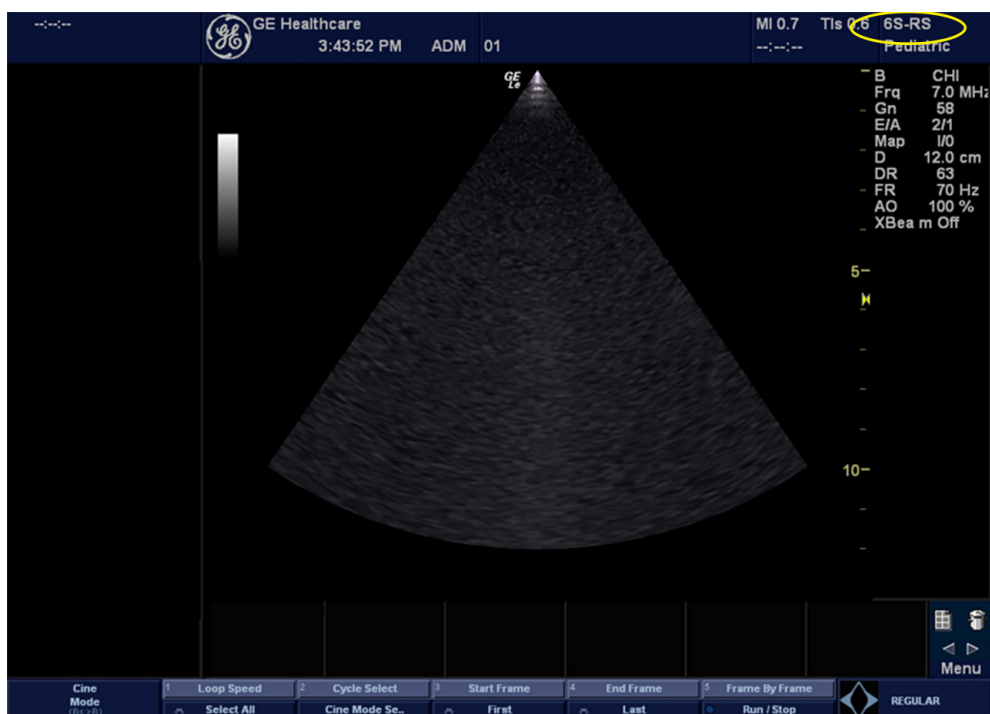
Figure 7-35.   Probe identification

Peripheral Device Check

> Check to ensure that all the peripheral devices work properly.
>
> For instruction of peripheral device check, See 'Peripheral checks' on *page 4-39 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 **Basic User Manual**. Please use the latest revision of this document.

Chapter 8

Diagnostics/Troubleshooting

This chapter describes LOGIQ V2/LOGIQ V1how to setup and run the tools and software that help maintain image quality and system operation. Very basic host, system and board levels are run whenever power is applied. Some Service Tools may be run at the application level.

Overview

Contents in this chapter

Gathering Trouble Data

Overview

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 = LOGIQ V2/LOGIQ V1

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

Applications Software

- Software Version
- Software Part Number

System Image Software

- Image Date
- Image Part Number

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:

*   a place to enter a description od the issue
*   a checkbox to indicate a System lockup
*   a choice to Export a pre-formatted CD-R/DVD-R or save to the Export directory D: drive (for remote viewing through InSite)

Figure 8-1.   Alt+D Dialog Box

Screen Capture

Button screen

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 Print Key.

Check the function of the Print Key in the event that the customer may have made some custom settings.

1. Press **Utility** on the Control Panel.
2. Select **Connectivity** from the Utilities Menu.
3. Select the **Button** tab on the Connectivity screen.
4. In the **Button** field, select **Print**, **Store**, or **Print3**.

   If Print key is not set to Whole Screen, proceed to step 5 to record the customer's customized settings.
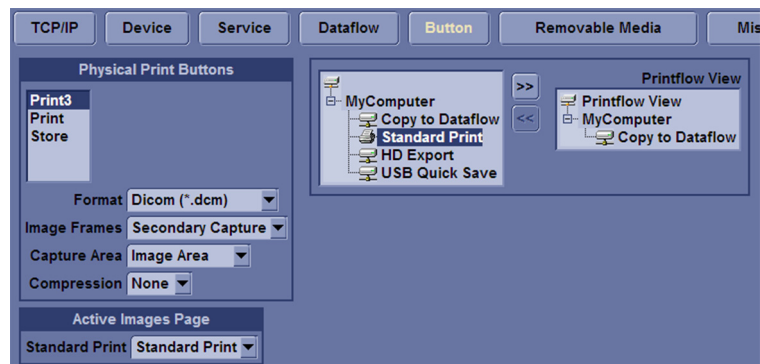
Figure 8-2.   Connectivity/Button screen (For R1.0.x)

Button screen (continued)
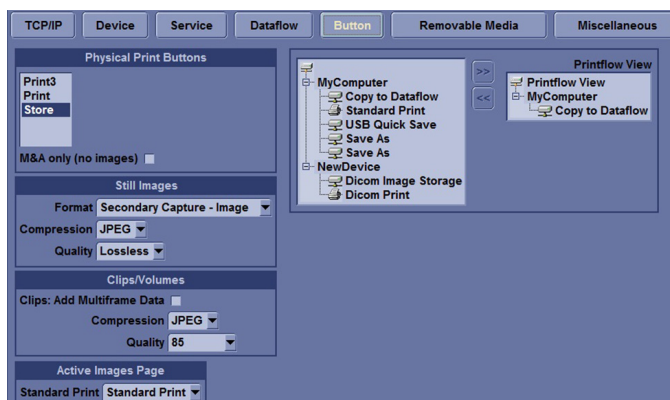
Figure 8-3.   Connectivity/Button screen (For R1.1.x)

5. In the Destinations section, record the service that is displayed.

6. In the **Physical Print Buttons** section, record the parameters related to the service.

Setting the Store Key to Screen Capture

If the Print Key is not set to screen capture:

1. While on the Connectivity screen, with the Button tab displayed, go to the *Destinations* list.

2. From the list select **Copy To Dataflow.** Press [>>] to add the selection to the **Printflow View** section.

3. Ensure that the **Physical Print Buttons** section for **Capture Area** is set to Whole Screen, secondary Capture and No Image Compression.

4. The Print Key should now be set up for whole screen capture, sending the screens to the image buffer (clipboard).

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 bottom of the scan image display.
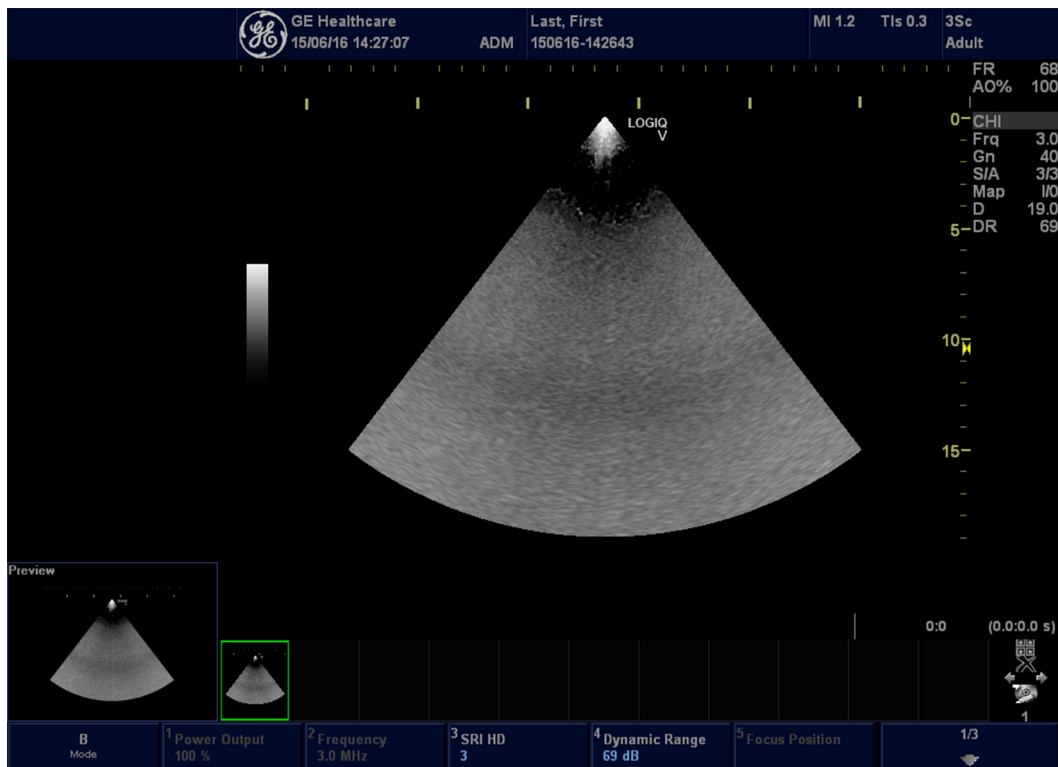
Figure 8-4.   Select Image to Capture

Capturing a Screen (continued)

3. Select and highlight the snapshot to be stored.

4. Select Save As Icon on the right side of the image screen.

Figure 8-5.   Save As Icon

5. A Save dialog box will be opened. Choose the archive location to save image on the USB Drive or CD/DVD.
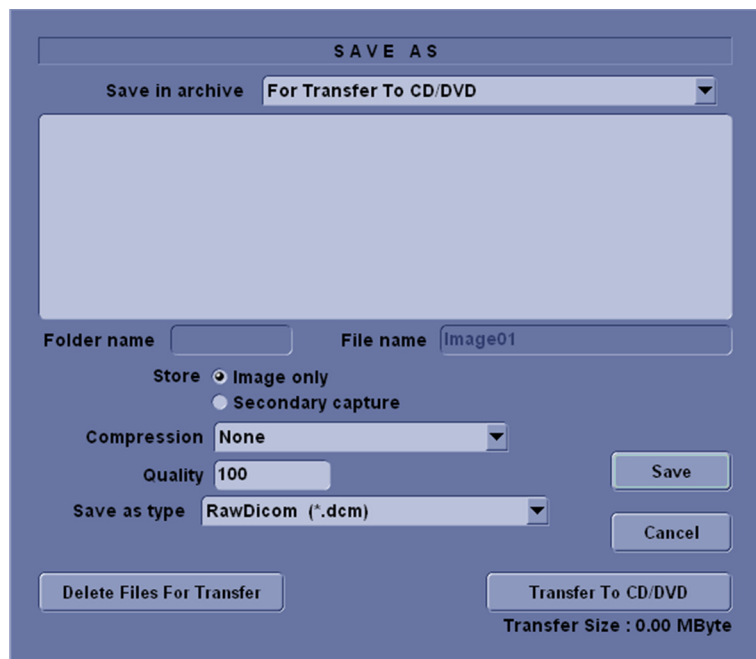
Figure 8-6.   Save Dialog Box

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

Reset the Store Key to Customer's Functionality

If the customer had programmed the Store Key to a function other than screen capture, restore that functionality recorded in section 'Setting the Store Key to Screen Capture' on *page 8-6*. Refer to Figure 8-2 *on page 8-5*.

1. Press **Utility** on the control panel.
2. Select **Connectivity** in the Utility menu.
3. In the ***Button*** field, select Store.
4. In the *Destinations* list, select the service(s) recorded in step 5, See 'Setting the Store Key to Screen Capture' on *page 8-6*.
5. In the *Physical Print Buttons* section, select the parameters related to the service recorded in step 6, see 'Setting the Store Key to Screen Capture' on *page 8-6*.

Common Diagnostics

Utilities

Provides two selections:

- **Disruptive Mode**

  Allows you to enable or disable disruptive mode troubleshooting.

- **System Shutdown**

  Allows for system shutdown from the diagnostic menu. Select to *Restart System* or *Shutdown System.* Also, select to retain Disruptive Mode or Not.

  After submitting to restart or shutdown a confirmation screen gives one last chance to confirm or cancel the request.

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, select the system which the OLE would remotely connect to, and select **Connect to device**.
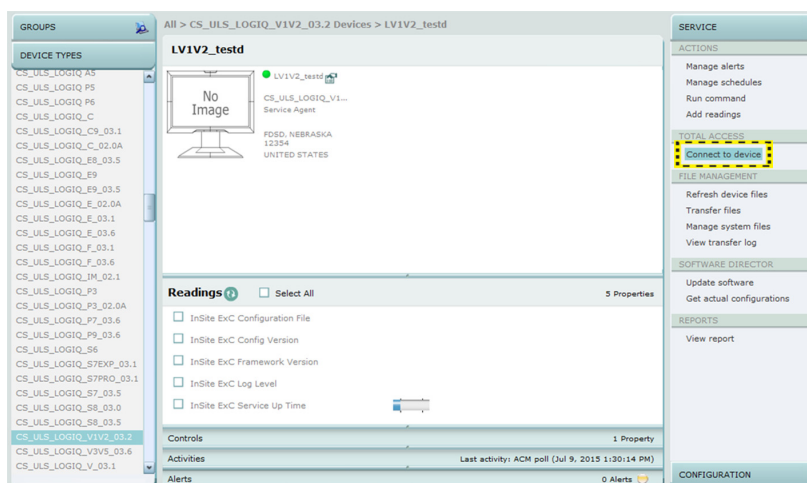
Figure 8-7. Connect to device

Utilities (continued)

2. Select the **CSD** to **Connect**. Then the OLE is remotely connected to the system.
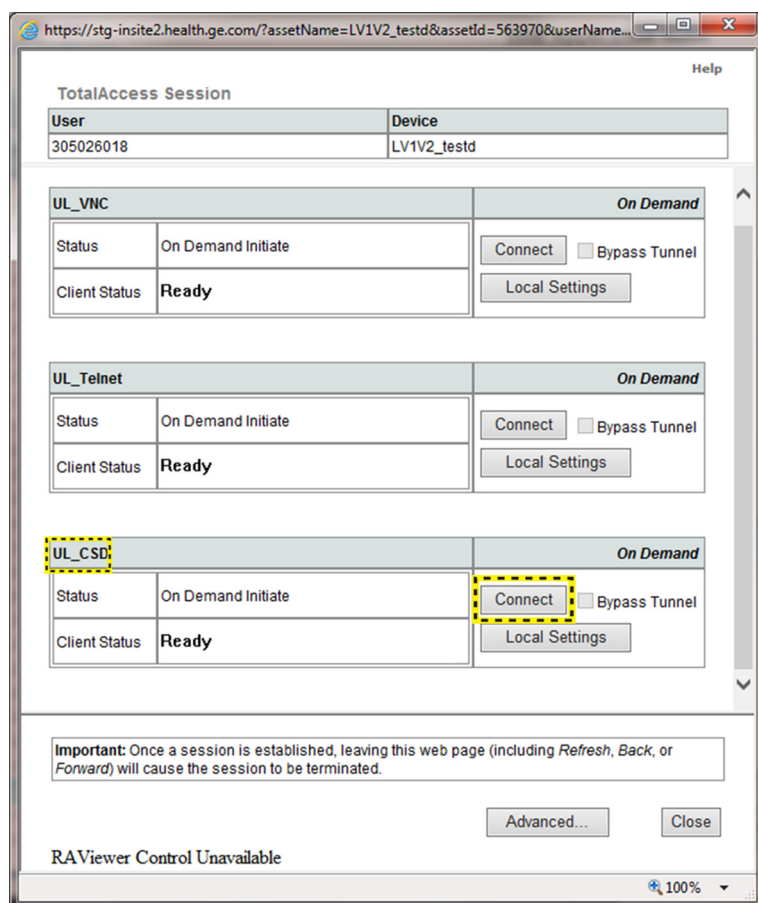
Figure 8-8.   Remotely Connect

Utilities (continued)

3. Enter **Utility**-> **Common Utilities**-> **Disruptive Mode**, select **Yes**.
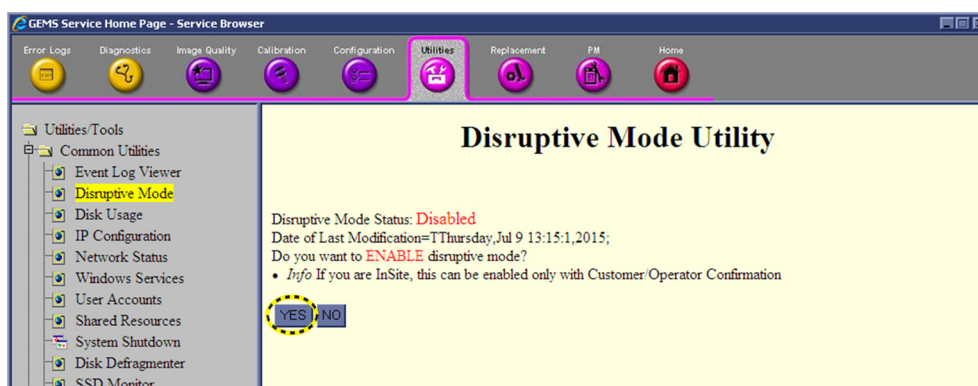
Figure 8-9.   Enable Disruptive Mode
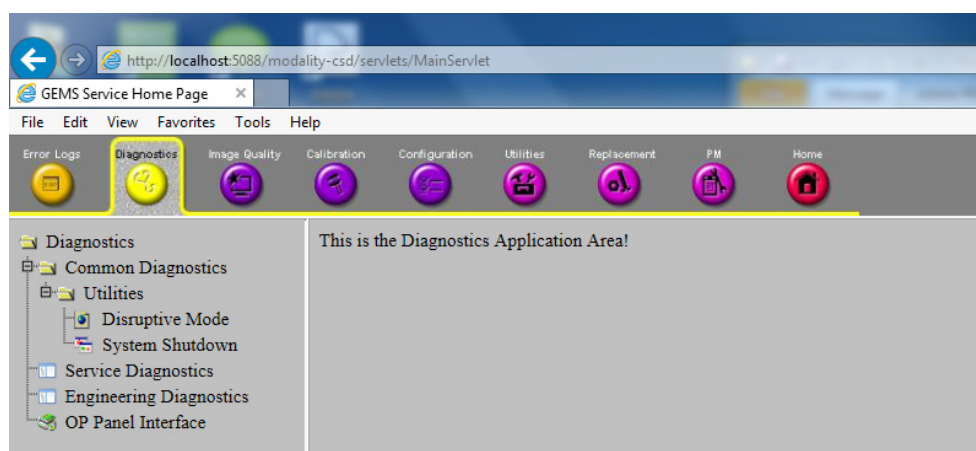
Figure 8-10.   Diagnostic Application Area

Utilities (continued)

4. 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. Then connect using VNC.

Figure 8-11.   Virtual Console Observation

Utilities (continued)

5. Select the **VNC** to **Connect**. Then the OLE is remotely connected to the system.
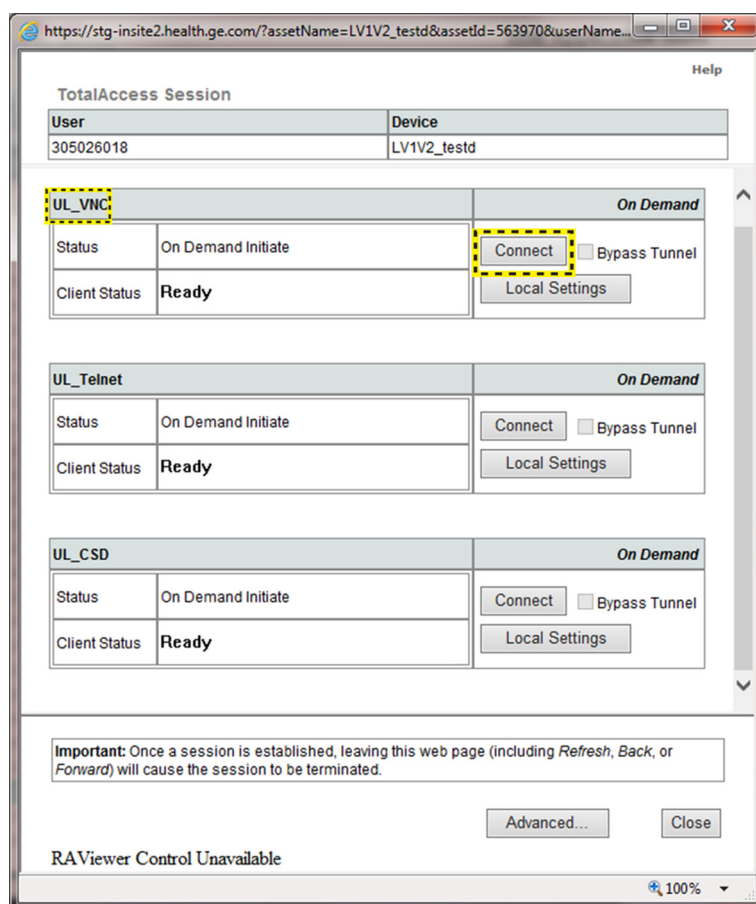
Figure 8-12.   Virtual Console Observation Connect

Service Diagnostics

MST

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

Service Diagnostics (continued)

System

- MST Temperature Test.
- CPS Temperature Test.
- CPU Temperature Test.
- MST Voltage Test.
- CPS Voltage Test.
- FPGA Version Test.
- HV_STOP Test: tests HV-STOP mechanism and checks each board is able to assert HV_STOP using its HV_STOP source.

Memory

- Callisto Memory Test.

NOTE: *The Callisto Memory test may fail if it is performed with other tests at the same time.*

AnalogReceive

- Noise Floor Test.
- BF Analog Rx Gain (High)
- BF Analog Rx Gain (Med)
- BF Analog Rx Gain (Low)

AnalogCW

- aCW IQ Symmetry Test
- aCW beamforming test
- aCW IQ Symmetry test

Digital Receive

- AFE IF Test
- Complex Mixer Test
- CE Decoder Test

Doppler Tests

- Doppler Audio Test runs the tests for Doppler.

Service Diagnostics (continued)

PC

- Essential Test tests: PCI, PCI Express, CPU, Memory, HD Disk and Video, CMOS, Network.
- Hard Drive Long: tests functionality of the hard drive.
- Hard Drive Short: tests functionality of the hard drive.
- Memory: tests the memory on the mother board.
- Network Adapter: Network cable must be connected.
- System board: tests the real time clock and CMOS.
- Video: tests functionality of video adapters.

PC Interactive

- **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 clip 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 verify that keyboards produce desired characters.

PC Interactive (continued)

- **Monitor**
    - 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 dialog 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 distorted 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 dialog by clicking the mouse button or pressing any key.

PC Interactive (continued)

- **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 indicate 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** generates sounds for testing the speakers.
- **USB Ports** lists USB Devices.

Assessment Utility

Probe Assessment

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.

_C ⚠ CAUTION   DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.

4. Align the connector with the probe port and carefully push into place.
5. Lock the probe latch upward.
6. Carefully position the probe cord so it is free to move and is not resting on the floor.
7. Enter global service user interface as GE service.

Assessment Utility (continued)

8. In the **Diagnostic-> Service Diagnostics-> Assessment Utility-> Probe Assessment** to check the probe.

    If there is no broken element and the probe is acceptable for diagnostic, the following result window displays.
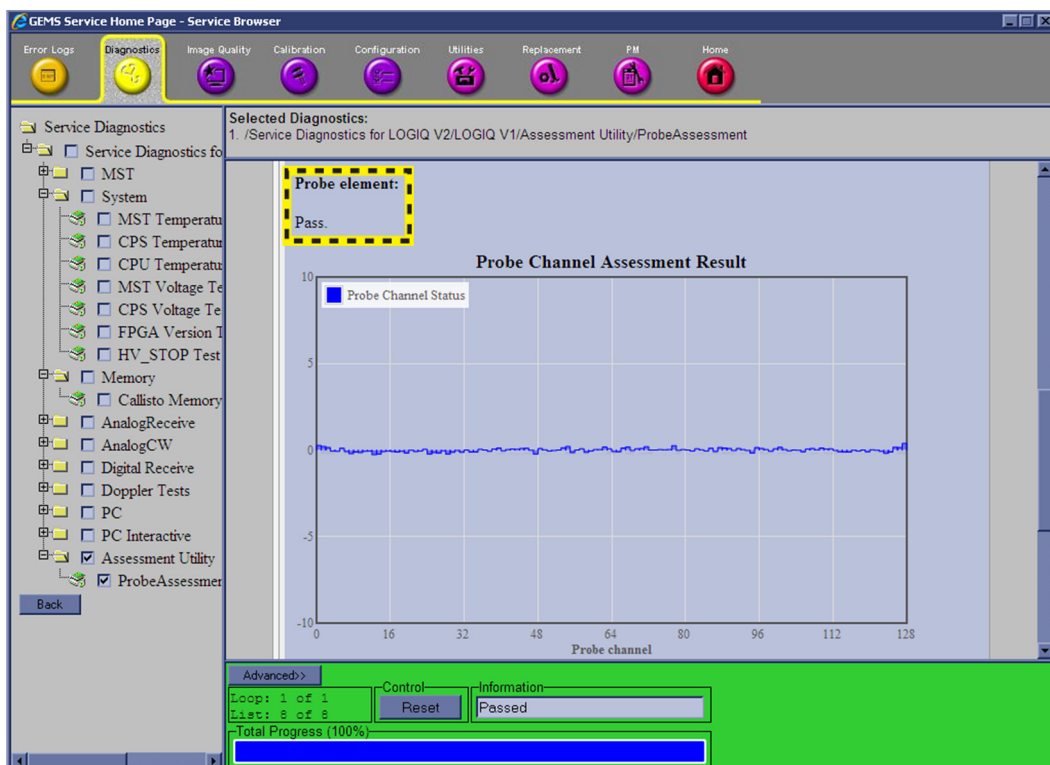
Figure 8-13.   **Probe Assessment Pass**

Assessment Utility (continued)

If there are broken elements and the probe is not acceptable for diagnostic. The assessment is fail and the failed elements are shown in the graphic.
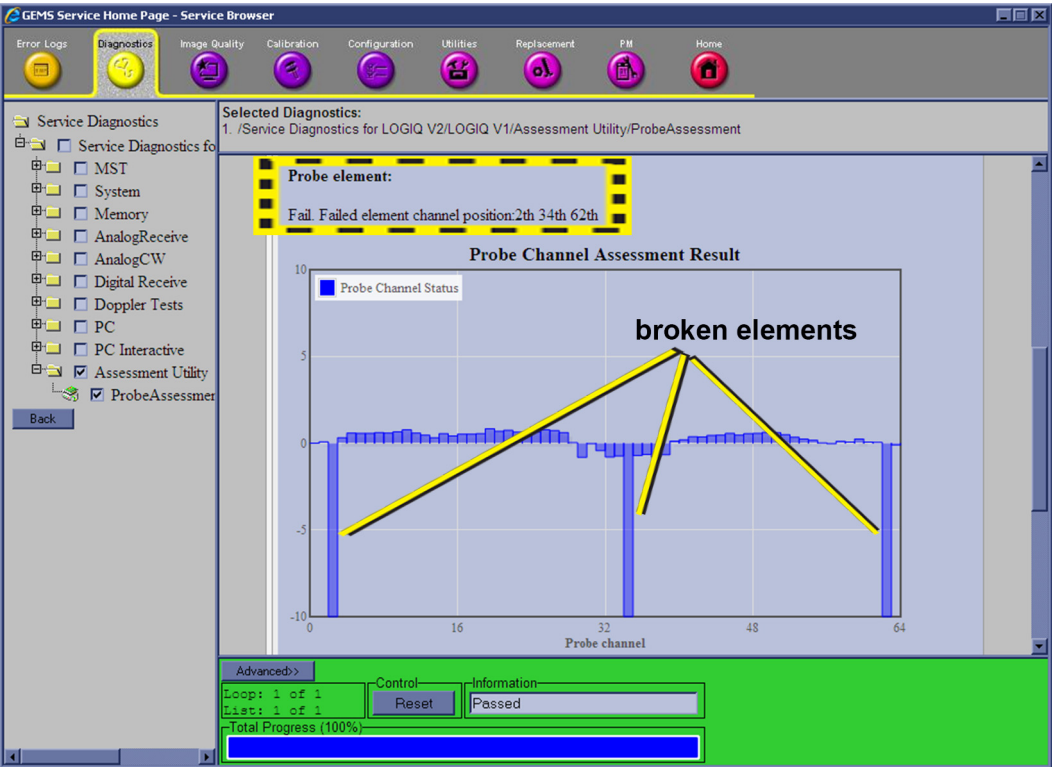
Figure 8-14.   **Probe Assessment Fail**

9.

⚠ CAUTION   Reboot the system after the probe assessment.

Probe Pass/Fail Criteria

Pass

• No dead element
• Dead elements on the edge (#0, #1 or #end-1, #end)

Fail

• Max 2 weak elements on the scan line:
  -3dB<elements<-2dB
• Any one of the elements in one scan line: element<-3dB

OP Panel Interface
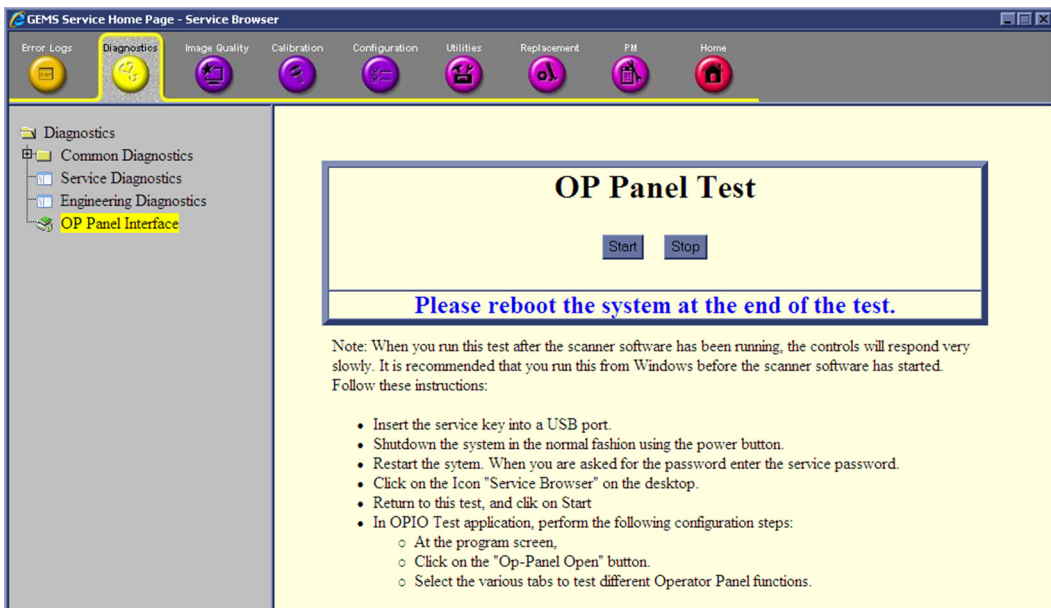
Figure 8-15.   OP Panel Test

Restart the system after diagnostics

Always shutdown the system and reboot after a diagnostics session.

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**.
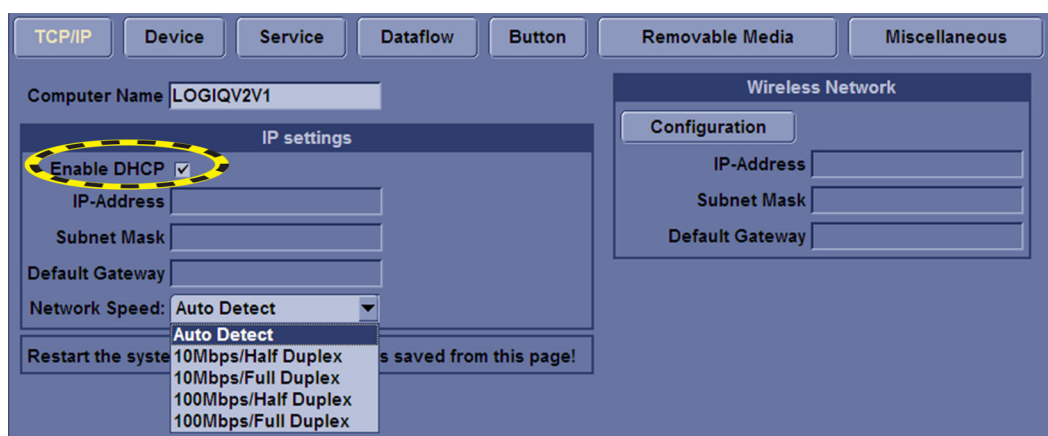
Figure 8-16.   Enable DHCP

Wire-LAN Network (continued)

> *NOTE:*   *If the user wants to set up static IP address, uncheck* **Enable DHCP** *option, input static address in* **IP-address**, **Subnet Mask** *and* **Default Gateway** *box. In* **Network Speed** *box, choose the proper speed available.*
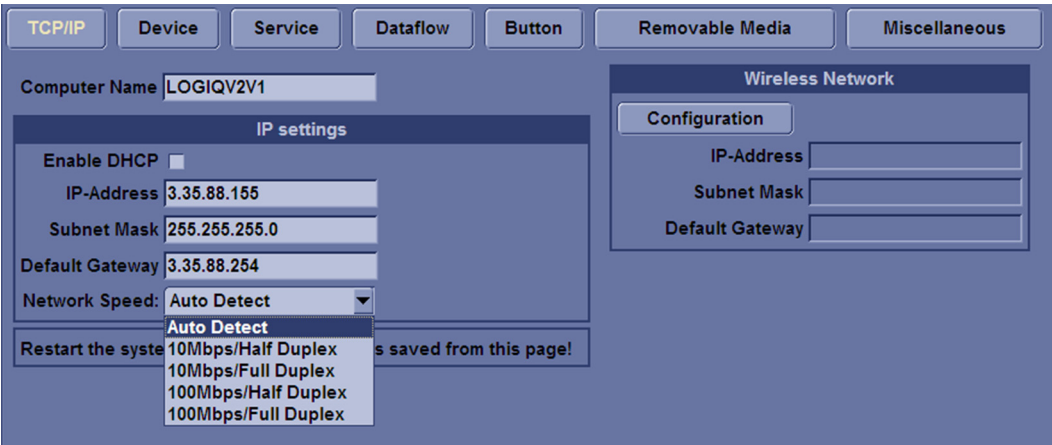
Figure 8-17.   Input Static IP

3. Select **Save**, and a popup window displays. Select **OK** to restart the system and activate the changes.
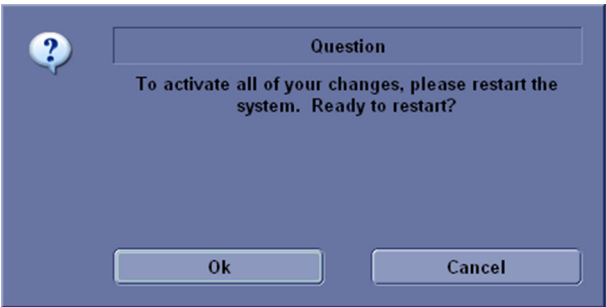
Figure 8-18.   System Restart inquiry dialog

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

Figure 8-19.   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**. In the section of **Wireless Network**, select **Configuration**.
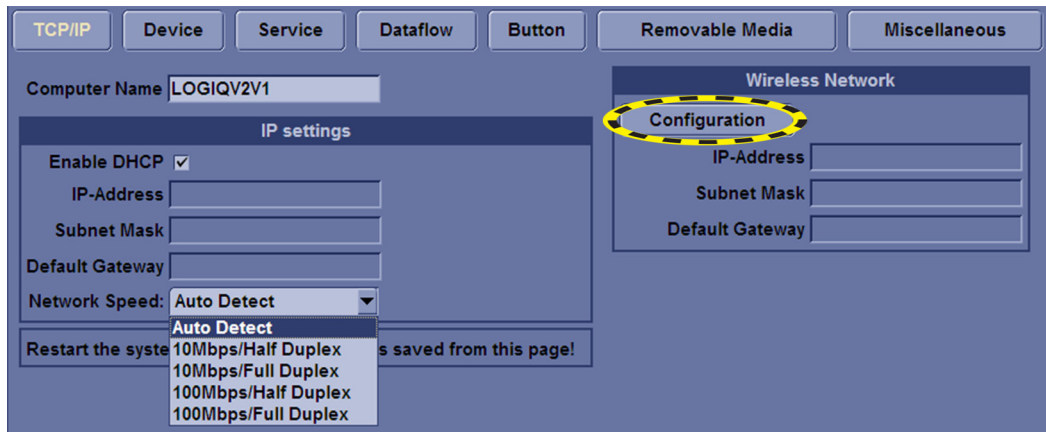
Figure 8-20.   Wireless Network Settings

Chapter 9

Renewal Parts

This chapter lists the renewal parts available for the LOGIQ V2/LOGIQ V1.

Overview

Contents in this chapter

List of Abbreviations

Table 9-1:   List of Abbreviations

ABBREVIATION	DESCRIPTION
3D	THREE DIMENSIONAL
Assy	ASSEMBLY
FRU 1	Replacement part available in part hub
FRU 2	Replacement part available from the manufacturer (lead time involved)
KBD	Keyboard
LCD	Liquid Crystal Display
BnV	Brightness and Volume
TMST	Master Board

Renewal Parts Lists

AC Power Cord

Table 9-2:   AC Power Cord

Item	Part Number	Part Name	Quantity	FRU
001	5177123-2	AC Power Cord Europe	1	1
002	5176304-2	AC Power Cord China	1	1
003	5176773-2	AC Power Cord India	1	1
004	5177195-2	AC Power Cord Argentina	1	1
005	5176907-2	AC Power Cord UK	1	1
006	5177153-2	AC Power Cord Denmark	1	1
007	5177154-2	AC Power Cord Switzerland	1	1
008	5177187-3	AC Power Cord Australia	1	1
009	5177146-2	AC Power Cord USA	1	1
010	5400868-2	AC Power Cord Brazil	1	1
011	5176753-2	AC Power Cord Israel	1	1
012	5177126-2	AC Power Cord Japan	1	1

Operator Console Assy

Figure 9-1.   Operator Console Assy

V Cart
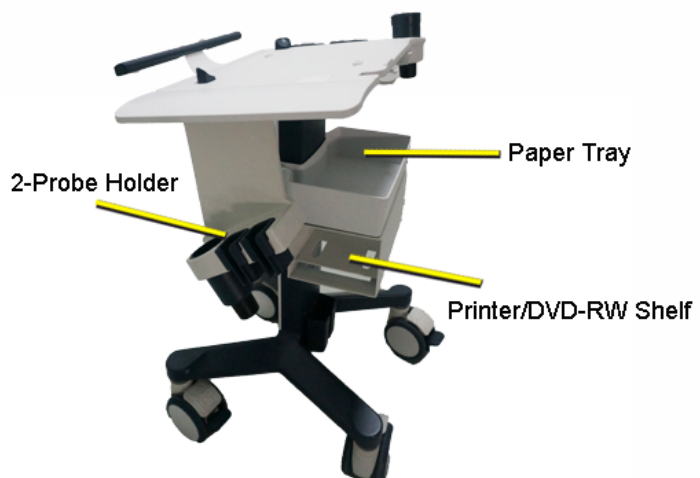
Figure 9-2.   V Cart

V Cart

Table 9-3:   V Cart

Item	Part Number	Part Name	Corresponding graphic	Qty	FRU
1400	5732311-S	V Cart SVC Parts		1	1
	5720204	V Cart Front Handle			
	5720225	V Cart Handle Clip			
	5720207	V Cart Cable Hook			
	5720221	V Cart Probe Holder Large			
	5641895	V Cart Small Probe Holder			

Table 9-3:   V Cart

Item	Part Number	Part Name	Corresponding graphic	Qty	FRU
1401	5727505	V Cart Paper Tray Kit		1	1
1402	5727506	V Cart Printer Shelf		1	1
1403	5727508	V Cart Probe Holder For 2PP and Cart		1	1
1404	5725649-S	V Cart Caster Kits		2	1
	5725649-2S	V Cart Castor Kits		2	1
1405	5730407-S	V Cart Bigger		2	1
1406	5729876-S	V Cart Wrench for service		1	1

Table 9-3:   V Cart

Item	Part Number	Part Name	Corresponding graphic	Qty	FRU
1407	5730407-2S	Bigger Castor kit including Wrench		1	1

Probe and Accessories

Table 9-4:   Probes for LOGIQ V2/LOGIQ V1

Item	Part Name	Part Number	Center Image Frequency (MHz)	Qty	FRU
700	4C-RS	5451471	3.10	1	1
701	L6-12-RS	5454332	7.75	1	1
702	3Sc-RS	5433833	2.75	1	1
703	8C-RS	5434203	6.50	1	1
704	E8C-RS	5499516	6.50	1	1
705	LK760-RS	5548914	7.15	1	1

Peripheral

Table 9-5: Peripherals for LOGIQ V2/LOGIQ V1

Item	Part Number	Description	Qty
		Footswitch	
808	5338419	Footswitch FSU-1000	1
808	5338419	Footswitch MKF 2-MED USB GP26	1
		USB Stick	
809	5168040-4	Sandisk USB Stick 4G	1
810	5434317-3	1TB USB mobile HDD	1
		Printer	
811	5133106-2	Sony UPD25 Color Printer Chinese kit	1
812	5133017-2	Sony UPD25 Color Printer USA kit	1
813	5133108-2	Sony UPD25 Color Printer European kit	1
814	5133109-2	Sony UPD25 Color Printer Japanese kit	1
815	5151262	UP-D897MD B/W Printer Chinese kit	1
816	5151259	UP-D897MD B/W Printer USA kit	1
817	5151261	UP-D897MD B/W Printer European kit	1
818	5151263	UP-D897MD B/W Printer Japanese kit	1
819	5426594	HP100 Printer Chinese kit	1
820	5426595	HP100 Printer European kit	1
821	5426596	HP100 Printer Japanese kit	1
822	5426597	HP100 Printer USA kit	1
823	5151259-2	UP-D898MD B/W Printer USA kit	1
824	5151261-2	UP-D898MD B/W Printer Europe kit	1
825	5151262-2	UP-D898MD B/W Printer China kit	1
826	5151263-2	UP-D898MD B/W Printer Japan kit	1
827	5495509-2	UP-D898MD B/W Printer Brazil kit	1
		System and Application USB	
828	5692048-5S	LOGIQ V2/LOGIQ V1 R1.0.4 System and Application Software USB	1
829	5692048-6S	LOGIQ V2/LOGIQ V1 R1.0.5 System and Application Software USB	1

Table 9-5: Peripherals for LOGIQ V2/LOGIQ V1

Item	Part Number	Description	Qty
830	5692048-7S	LOGIQ V2/LOGIQ V1 R1.0.6 System and Application Software USB	1
831	5692048-8S	LOGIQ V2/LOGIQ V1 R1.0.7 System and Application Software USB	1
832	5692048-9S	LOGIQ V2/LOGIQ V1 R1.0.8 System and Application Software USB	1
833	5765267-S	LOGIQ V2/LOGIQ V1 R1.1.0 System and Application Software USB	1
834	5765267-2S	LOGIQ V2/LOGIQ V1 R1.1.1 System and Application Software USB	1
		ECG	
835	H48952AB	ECG cable kits EU	1
836	H41852LL	ECG (IEC) Lead	1
837	H41852LK	ECG (AHA) Lead	1
838	5146056	ECG Detachable cable AHA Type USA	1
839	5146739	ECG detachable cable IEC type EURO and ASIA	1
840	5146055	USB Cable for ECG	1
841	5129487	ECG module from Norav Isral,not applies to Muslim coutry and China	1
842	5149641	ECG Module with Chinese label for Service part	1

Power Cord

Table 9-6:   Power Cord for LOGIQ V2/LOGIQ V1

Item	Part Number	Description	Qty	FRU
900	5177123-2	AC Power Cord Europe	1	1
901	5176304-2	AC Power Cord China	1	1
902	5176773-2	AC Power Cord India	1	1
903	5177195-2	AC Power Cord Argentina	1	1
904	5176907-2	AC Power Cord UK	1	1
905	5177153-2	AC Power Cord Denmark	1	1
906	5177154-2	AC Power Cord Switzerland	1	1
907	5177187-3	AC Power Cord Australia	1	1
908	5177146-2	AC Power Cord USA	1	1
909	5400868-2	AC Power Cord Brazil	1	1
910	5176753-2	AC Power Cord Israel	1	1
911	5177126-2	AC Power Cord Japan	1	1

V Cart With Package

Table 9-7:   V Cart With Package for LOGIQ V2/LOGIQ V1

Item	Part Number	Description	Qty	FRU
950	5720850	LOGIQ V2/LOGIQ V1 V Cart With Package	1	1

Manuals

Table 9-8:   Manuals for LOGIQ V2/LOGIQ V1

Item	Part Number	Description	Qty	FRU
1000	5610741-200	LOGIQ V2/LOGIQ V1 Manual CD	1	N
1001	5610738-100	LOGIQ V2/LOGIQ V1 Advanced Reference Manual	1	N
1002	5610739-100	LOGIQ V2/LOGIQ V1 Basic Service Manual	1	N
1003	5610735-100	LOGIQ V2/LOGIQ V1 Basic User Manual English version	1	N
1004	5610736-100	LOGIQ V2/LOGIQ V1 User Guide English version	1	N
1005	5610736-101	LOGIQ V2/LOGIQ V1 User Guide French version	1	N
1006	5610736-106	LOGIQ V2/LOGIQ V1 User Guide Spanish version	1	N
1007	5610736-108	LOGIQ V2/LOGIQ V1 User Guide German version	1	N
1008	5610736-111	LOGIQ V2/LOGIQ V1 User Guide Italian version	1	N
1009	5610736-121	LOGIQ V2/LOGIQ V1 User Guide Dutch version	1	N
1010	5610736-127	LOGIQ V2/LOGIQ V1 User Guide Brazilian Portuguese version	1	N
1011	5610736-129	LOGIQ V2/LOGIQ V1 User Guide Estonian version	1	N
1012	5610736-131	LOGIQ V2/LOGIQ V1 User Guide Slovenian version	1	N
1013	5610736-140	LOGIQ V2/LOGIQ V1 User Guide Japanese version	1	N
1014	5610736-141	LOGIQ V2/LOGIQ V1 User Guide Simplified Chinese version	1	N
1015	5610736-142	LOGIQ V2/LOGIQ V1 User Guide Swedish version	1	N
1016	5610736-144	LOGIQ V2/LOGIQ V1 User Guide Korean version	1	N
1017	5610736-145	LOGIQ V2/LOGIQ V1 User Guide Russian version	1	N
1018	5610736-150	LOGIQ V2/LOGIQ V1 User Guide Polish version	1	N
1019	5610736-151	LOGIQ V2/LOGIQ V1 User Guide Greek version	1	N
1020	5610736-153	LOGIQ V2/LOGIQ V1 User Guide Hungarian version	1	N
1021	5610736-154	LOGIQ V2/LOGIQ V1 User Guide Slovakian version	1	N
1022	5610736-155	LOGIQ V2/LOGIQ V1 User Guide Czech version	1	N
1023	5610736-159	LOGIQ V2/LOGIQ V1 User Guide Turkish version	1	N
1024	5610736-160	LOGIQ V2/LOGIQ V1 User Guide Danish version	1	N
1025	5610736-161	LOGIQ V2/LOGIQ V1 User Guide Norwegian version	1	N
1026	5610736-162	LOGIQ V2/LOGIQ V1 User Guide Finnish version	1	N

Table 9-8:   Manuals for LOGIQ V2/LOGIQ V1

Item	Part Number	Description	Qty	FRU
1027	5610736-165	LOGIQ V2/LOGIQ V1 User Guide Bulgarian version	1	N
1028	5610736-167	LOGIQ V2/LOGIQ V1 User Guide Romanian version	1	N
1029	5610736-168	LOGIQ V2/LOGIQ V1 User Guide Croatian version	1	N
1030	5610736-174	LOGIQ V2/LOGIQ V1 User Guide Lithuanian version	1	N
1031	5610736-175	LOGIQ V2/LOGIQ V1 User Guide Latvian version	1	N
1032	5610736-176	LOGIQ V2/LOGIQ V1 User Guide Serbian version	1	N
1033	5610736-177	LOGIQ V2/LOGIQ V1 User Guide European Portuguese version	1	N
1034	5610736-181	LOGIQ V2/LOGIQ V1 User Guide Indonesian version	1	N
1035	5610736-184	LOGIQ V2/LOGIQ V1 User Guide Kazakh version	1	N

Chapter 10

Care and Maintenance

*This chapter describes **Care and Maintenance** on the Ultrasound system and peripherals. These procedures are intended to **maintain the quality** of the Ultrasound **system's performance**. Read this chapter completely and familiarize yourself with the procedures before performing a task.*

Overview

Contents in this chapter

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

Periodic maintenance inspections

It has been determined by engineering that your LOGIQ V2/ LOGIQ V1 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.

Keeping records

It is good business practice that ultrasound facilities maintain records of periodic and corrective maintenance. The Ultrasound Periodic Maintenance Inspection Certificate provides the customer with documentation that the Ultrasound system is maintained on a periodic basis.

A copy of the *Ultrasound Periodic Maintenance Inspection Certificate* should be kept in the same room or near the Ultrasound system.

Quality assurance

In order to gain accreditation from organizations such as the American College of Radiology (USA), it is the customer's responsibility to have a quality assurance program in place for each Ultrasound system. The program must be directed by a medical physicists, the supervising radiologist/physician or appropriate designee.

Routine quality control testing must occur regularly. The same tests are performed during each period so that changes can be monitored over time and effective corrective action can be taken.

Testing results, corrective action and the effects of corrective action must be documented and maintained on the site.

Your GE service representative can help you with establishing, performing and maintaining records for a quality assurance program. Contact GE for coverage and/or price for service.

Maintenance task schedule

How often should maintenance tasks be performed?

The Care and Maintenance task schedule (provided in Table 10-1 *on page 10-6*) specifies how often your LOGIQ V2/ LOGIQ V1 should be serviced and outlines items requiring special attention.

NOTE: *It is the customer's responsibility to ensure the LOGIQ V2/ LOGIQ V1 care and maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.*

Your GE Service Representative has an in-depth knowledge of your LOGIQ V2/LOGIQ V1 and can best provide competent, efficient service. Contact GE for coverage information and/or price for service.

The service procedures and recommended intervals shown in the Care and Maintenance Task Schedule assumes that you use your LOGIQ V2/LOGIQ V1 for an average patient load (10-12 per day) and not use it as a primary mobile Ultrasound system which is transported between diagnostic facilities.

NOTE: *If conditions exist which exceed typical usage and patient load, then it is recommended to increase the periodic maintenance frequencies.*

Table 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			•		Mobile Ultrasound system: Check Weekly
Inspect Cables and Connectors			•		
Clean Console			•		

Table 10-1:   Customer Care Schedule (Continued)

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Clean LCD			•		
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 periodic maintenances are not mandatory. The table above is for reference only.

Tools required

NOTE: *For a list of required tools for servicing the LOGIQ V2/LOGIQ V1, refer to chapter 8.*

Standard GE tool kit

The following is a description of the "Standard" GE tool kit in the USA. Not all tools are required.

Table 10-2:   Overview of GE-1 tool kit contents

Tool ID	Description	Tool ID	Description
9-45358	Pliers Retaining Ring	9-XL9971MM	Xcelite-hex Blade 1.27mm
9-4078	Scribe	9-XL9972MM	Xcelite-hex Blade 1.5mm
9-44572	Wrench Open End 3/8 - 7/16	9-XL9973MM	Xcelite-hex Blade 2 mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9974MM	Xcelite-hex Blade 2.5mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9975MM	Xcelite-hex Blade 3mm
9-45385	Pliers, Arc Joint 7 inch	9-XL9976MM	Xcelite-hex Blade 4mm
9-45378	Pliers, Slip Joint	9-XL9977MM	Xcelite-hex Blade 5mm
9-4518	Pliers, Long Nose, Miniature	9-XL991CM	Handle
9-4518	Pliers, Long Nose, Miniature	C2356E	Screw starter - Kedman Quick Wedge
9-44776	Ignition Wrench Set, 10 pc.	BLBO	Box - 18 Compartment
9-44601	Wrench, Adj., 4 inch	DWL4283T	Box - 5 Compartment
9-4151	Screwdriver, Blade, Stubby	9-41322	Pickup Tool, Claw type
9-41421	Screwdriver, Blade, Pocket clip	9-6757	6 pc Needle File Set
9-41594	Screwdriver, Blade 1/8 in. × 4 in.	9-9487	Utility Knife
9-41581	Screwdriver, Blade 3/16 in. × 4 in.	9-45341	Pliers Vice Grip 10 inch
9-39451	20' Steel Tape, locking Spring load	9-3001	Xacto Pen Knife

Table 10-2: Overview of GE-1 tool kit contents (Continued)

Tool ID	Description	Tool ID	Description
9-GH807	Ratchet, Offset, Slotted	9-HT62002	Solder Aid, Fork and Hook
68-412	Ratchet, Offset, Phillips	9-4099	Mirror, Round, Telescoping
9-GH130	Tapered Reamer	9-GH3001	Steel Rule Decimal 6 inch
9-41584	Screwdriver, slotted 1/4 in. × 6 in.	9-GH300ME	Steel Rule Metric 6 inch
9-4118	Screwdriver, Phillips #2, Stubby	9-XL9920	Xcelite-hex Blade.050 inch
9-41293	Screwdriver, Phillips #0	9-XL9921	Xcelite-hex Blade 1/16 inch
9-41294	Screwdriver, Phillips #1	9-XL9922	Xcelite-hex Blade 5/16 inch
9-41295	Screwdriver, Phillips #2	9-XL9923	Xcelite-hex Blade 3/32 inch
9-46677	Hex Keys, 20 pc., Metric	9-XL9924	Xcelite-hex Blade 1/8 inch
9-34701	1/4 in. Standard Socket set (19 pc)	9-XL9925	Xcelite-hex Blade 5/32 inch
9-43499	1/2 inch Socket 1/4 inch drive	9-XL9926	Xcelite-hex Blade 3/16 inch
9-4355	Flex Spinner	9-XL99764	Xcelite-hex Blade 7/64
9-43523	Breaker	9-XL99964	Xcelite-hex Blade 9/64
9-43531	6 inch Ext.	9-XLM60	Mini-screwdriver kit
9-65283	Case 8.5 in. × 4.5 in. × 2 in. Deep	9-45072	Pliers 6 inch Diagonal
9-46696	Hex Keys	9-XL100X	Wire Stripper/Cutter 5 inch - 100X
9-39829	Torpedo Level, Magnetic	9-XL87CG	Pliers - very fine needle nose-87CG
9-38461	Hammer, Ball Peen, 4 oz.	9-WEWDT-07	Weller-Soldering-Replacement Tip(1)
9-4280	Universal Joint 1/4 inch	9-WS175-E	Wiss - Surgical Scissors
9-WEW60P3	Weller - Soldering Iron, 3 wire	KH174	Hemostat 5 inch Straight
9-WECT5B6	Weller - Soldering Iron Tip	KH175	Hemostat 5 inch curved
9-WEWDP12	Weller - Desoldering Pump	9-Z9480121	Alignment tool (red)
93383	Flashlight Mini-Mag Lite (AAA Bat.)		
9-GH408	Tweezers		
21576	Brush - Bristle		

Table 10-2: Overview of GE-1 tool kit contents (Continued)

Tool ID	Description	Tool ID	Description
9-4516	Pliers 4 1/4 inch Diagonal		

GE-2 tool kit

Table 10-3: Overview of GE-2 tool kit contents

GE-2 Sears Kit (#99034)			
Tool ID	**Description**	**Tool ID**	**Description**
9-45381	Pliers, Arc Joint 9 1/2 inch	9-44067	Socket 1 1/16 in. for 1/2 in. drive
9-45092	Pliers, Linesman 8 1/2 inch	9-42679	Socket 10MM Hex for 1/2 in. drive (2273333)
9-42882	Punch, Pin 3/32 inch	9-44262	Extension 10 inch for 1/2 in. drive (2273405)
9-42884	Punch, Pin 5/32 inch	9-4258	3/8 inch to 1/2 inch Adapter
9-42886	Punch, Pin 1/4 inch	9-34374	3/8 inch Metric Socket Set - 12 PT
9-42973	Cold Chisel 1/2 inch	9-44311	16mm Socket 12 pt.
9-GH77	Center Punch Automatic	9-33485	Metal Socket Tray
9-GH890	File Handle, Adj.	9-33484	Metal Socket Tray
9-31276	File, Round, Bastard 8 inch	9-33484	Metal Socket Tray
9-31277	File, Half Round, Bastard 8 inch	9-52068	Tap and Drill Set
9-31263	File, Flat Mill 8 inch	9-52722	#6 Tap
21045C	Close Quarter Saw	9-52723	#8 Tap
9-44604	Wrench, Adj. 10 inch		High Speed Drill Set
9-41587	Screwdriver 5/16 inch × 8 inch		#36 Drill
9-41586	Screwdriver, Stubby 5/16 inch		#29 Drill
9-GH19512	Countersink 1/2 inch	9-44046	3/8 inch Socket Set
9-44741	12 PC Combination Wrench Set		

Special tools, supplies and equipment used for maintenance

Table 10-4:   Overview of tool requirements for periodic maintenance

Tool / kit	Comments
Digital Volt Meter (DVM)	
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! The use of a Phantom is not required during Preventive 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 (see Figure 10-6 *on page 10-33*). Record all probes and Ultrasound system options.
3.	Power up	• Turn the Ultrasound system power on and verify that all fans and peripherals turn on. • Watch the displays during power up to verify that no warning or error messages are displayed. • Where applicable, confirm that the battery is charged. If no AC Input present, use the internal battery.
4.	Probes	Verify that the Ultrasound system properly recognizes all probes.
5.	Displays	Verify proper display on the monitor.
6.	InSite	Where applicable, for Warranty and Contract Customers only: • Verify that InSite is functioning properly. • Ensure two-way remote communications.
7.	Review Error Logs	Where applicable, Error Logs can be reviewed via system diagnostics.
8.	Diagnostics	Optional.
9.	Presets	Backup all Customer Presets to an appropriate media.
10.	Image Archive	Back up the Image Archive onto appropriate media.

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 operation. Check the basic Ultrasound system controls that affect this mode of operation.
2.	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic Ultrasound system controls that affect this mode of operation.
3.	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic Ultrasound system controls that affect this mode of operation.
4.	M-Mode	Verify basic M-Mode operation. Check the basic Ultrasound system controls that affect this mode of operation.
5.	Probe Elements	Perform an Element Test on each probe to verify that all the probe elements and system channels are functional.
6.	Applicable Software Options	Verify the basic operation of all optional modes such as Contrast. Check the basic Ultrasound system controls that affect each options operation.
7.	Xmit/Recv Elements	Use the Visual Channel Utility on the loop connect to verify that all system xmit/recv channels are functional.
8.	Operator Panel test	Perform the Operator Panel Test Procedure.
9.	Keyboard	Do the interactive keyboard test.
10.	LCD	Verify basic LCD display functions. Refer to Chapter 3 of the User Manual.
11.	Software Menu check	Verify Software Menu display functions. Refer to Chapter 3 of the User Manual.
12.	Peripherals	See: 'Peripheral checks' on *page 4-39*.
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: GE approved peripheral/hardware option functional checks

Step	Item	Description
1.	Media	Verify media drive(s) read/write property. Clean if necessary.
2.	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
3.	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
4.	DICOM	Verify that DICOM is functioning properly. Send an image to a DICOM device.
5.	ECG	Verify basic operation with customer
6.	Footswitch	Verify that the footswitch is functioning as programed. Clean as necessary.
7.	DVD	Verify that the DVD is functioning properly. Clean heads and covers if necessary.

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.

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.	LCD	Use a soft, non-abrasive folder cloth. Gently wipe the LCD face. DO NOT use a glass cleaner that has a hydrocarbon base (such as Benzene, Methy Alcohol or Methy Ethyl Ketone) on LCD with the filter (anti-glare shield).

Physical inspection

NOTE: *These features may not be present on all Ultrasound systems.*

Table 10-10:   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 10-14*.
4.	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs.
5.	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
6.	Control Panel	Inspect keyboard and control panel. Note any damaged or missing items.
7.	Control Panel Lighting	Check for proper operation of all operator panel and Freeze Key light.
8.	LCD	Inspect the LCD Display for scratches and bad pixels. Verify proper operation of Contrast and Brightness controls. Where applicable, confirm that the LCD arm allows: • swivelling the screen to the left and to the right • folding the screen to the locked position • release and adjustment backwards and forwards • can be adjusted in the up/down positions. Note: LCD Arm movement may vary and is not applicable to all Ultrasound systems.
9.	External I/O	Check all connectors for damage.

Table 10-10:   Physical checks (Continued)

Step	Item	Description
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 10-11:   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 GE probes.

Ultrasound probes can be easily damaged by improper handling. See the User Manual and probe care cards for more details. Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

Any evidence of wear indicates the probe cannot be used.

Do a visual check of the probe pins and Ultrasound system sockets before plugging in a probe.

The Interoperative probes often have special considerations and individual probe user manuals. For Interoperative probes also refer to their separate user manuals.

Basic probe cleaning

Refer to the User's Manual for details on probe cleaning.

⚠ WARNING	To help protect yourself from blood borne diseases, wear approved disposable gloves. These are made of nitrile derived from vegetable starch to prevent allergic latex reactions.

⚠ CAUTION	Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty.
	DO NOT soak or wipe the lens with any product not listed in the User Manual. Doing so could result in irreparable damage to the probe.
	Follow care instructions that came with the probe.

⚠ CAUTION	Disinfect a defective probe before you return it. Be sure to tag the probe as being disinfected.

Battery Performance Maintenance

Battery replacement every three years is recommended.

It is recommended to do battery performance maintenance one time per year.

Please follow the flow chart below to carry out battery performance maintenance.
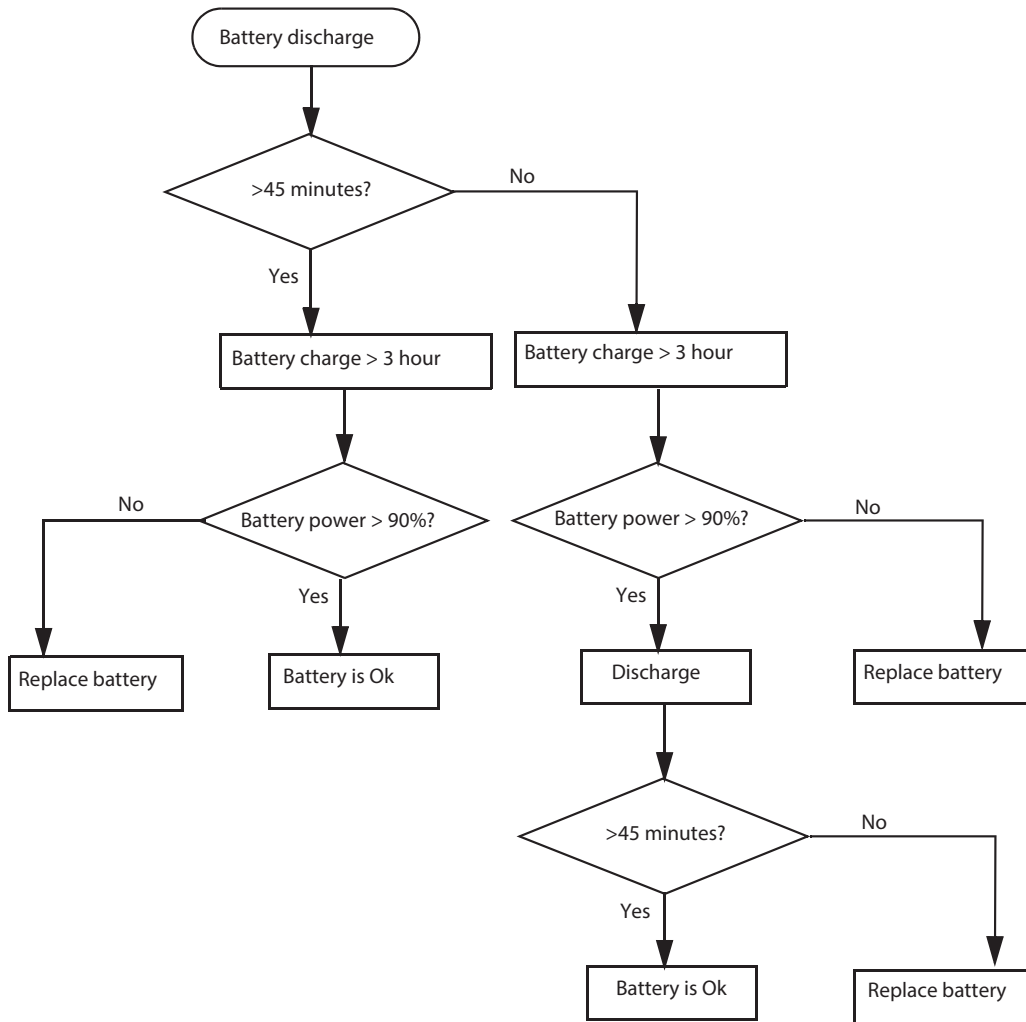
Figure 10-1.   Flow chart of Battery Performance Maintenance

NOTE: *Disconnect all probes when discharge battery.*

NOTE: *Discharge the battery to let the system automatically shut down.*

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 THE 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.

Safety test overview (continued)

Prior to initiating any electrical test, the Ultrasound system must be visually inspected. Perform the following visual checks:

- Check for missing or loose enclosure covers that could allow access to internal live parts.
- Examine the mains cord, mains plug and appliance inlet for damaged insulation and adequacy of strain relief and cable clamps.
- Locate and examine all associated transducers. Inspect the cables and strain relief at each end. Inspect the transducer enclosure and lens for cracks, holes and similar defects.

Test the system, peripherals and probes for leakage current. Excessive leakage current can cause injury or death in sensitive patients. High leakage current can also indicate degradation of insulation and a potential for electrical failure. Do not use probes or equipment having excessive leakage current.

To minimize the risk that a probe may shock someone the customer should:

- Not use a probe that is cracked or damaged in any way.
- Check probe leakage current:
    - Based on your facilities QA program for surface probes.
    - Based on your facilities QA program for endocavitary probes.
    - whenever probe damage is suspected.

Leakage current limits

WARNING
Energy Control and Power Lockout for LOGIQ V2/LOGIQ V1.

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

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

Ultrasound System components may be energized.

CAUTION
Compare all safety-test results with safety-test results of previously performed safety tests (e.g. last year etc). In case of unexplainable abrupt changes of safety-test results consult experienced authorized service personnel or GE for further analysis.

The following limits are summarized for IEC 60601-1 Medical Equipment Safety Standards. These limits are GEMS standards and in some cases are lower than the above standards listed.

Table 10-12:   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 10-13:   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

Leakage current limits (continued)

Table 10-14:   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 10-15:   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.

CORRECT WIRING

OPEN GROUND WIRE

REVERSED POLARITY

OPEN NEUTRAL WIRE

HOT AND GROUND REVERSED

OPEN HOT WIRE
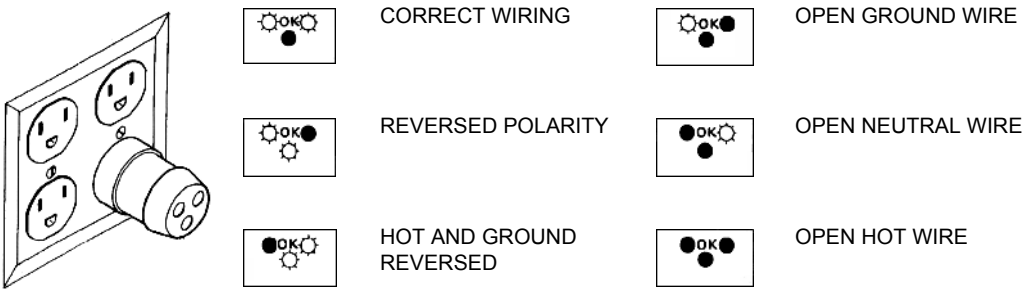
Figure 10-2.   Typical alternate outlet tester

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.
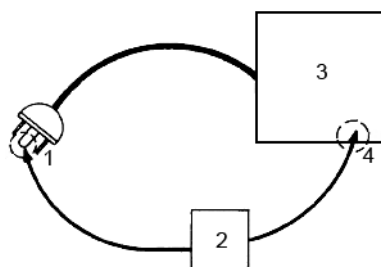
1. GROUND PIN
2. OHMMETER
3. LOGIQ V2/LOGIQ V1
4. ACCESSIBLE METAL PART:
   • MONITOR HOUSING
   • PEAR PANEL CONNECTOR
   • ANY CASTER/WHEEL SUPPORT

Figure 10-3. Ground continuity test

Chassis leakage current test

⚠️	DANGER	ELECTRIC SHOCK HAZARD. WHEN THE METER'S GROUND SWITCH IS OPEN, DON'T TOUCH THE ULTRASOUND SYSTEM!.

c ⚠️	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.
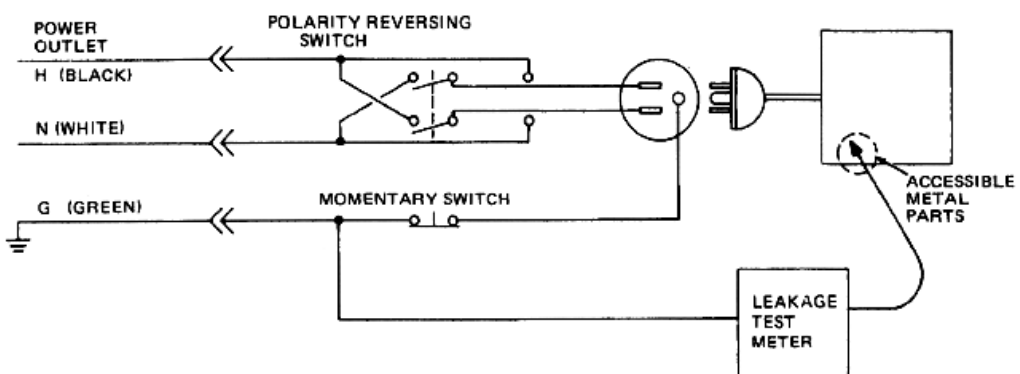
Figure 10-4.   Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuos Leakage Currents and Patient, Auxiliary Currents

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 10-12 *on page 10-22*.

Data Sheet for enclosure Source Leakage Current

The test passes when all readings measure less than the value shown in Table 10-12 *on page 10-22*. Record all data on the PM Inspection Certificate.

Table 10-16:   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

<table>
<tr>
<td>^d ⚠ DANGER</td>
<td>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.</td>
</tr>
<tr>
<td>^c ⚠ CAUTION</td>
<td>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.</td>
</tr>
</table>

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 10-8*.

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.
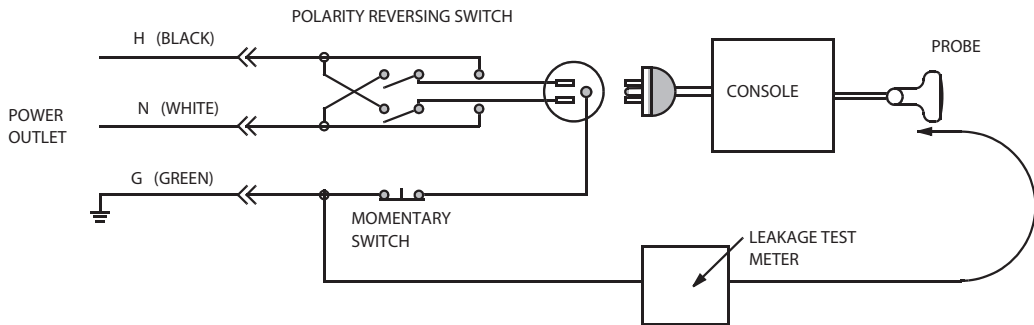
Figure 10-5.   Set up for probe leakage current

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 10-13 *on page 10-22*. Record all data on the PM Inspection Certificate.

Table 10-17:   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

ULTRASOUND INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/C ontract/HBS
System Type		Model Number:	S erial Number:	Manufacture Date:
P robe 1:	F requency:	S can Format*:	Model Number:	S erial Number:
P robe 2:	F requency:	S can Format*:	Model Number:	S erial Number:
P robe 3:	F requency:	S can Format*:	Model Number:	S erial Number:
P robe 4:	F requency:	S can Format*:	Model Number:	S erial Number:
P robe 5:	F requency:	S can Format*:	Model Number:	S erial Number:

   * Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

Figure 10-6. Ultrasound Inspection Certificate

  * Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

Ultrasound Inspection Forms (continued)

FUNCTIONAL CHECKS

Functional Check (if applicable)	OK? or N/A
B-Mode Function	
Doppler Modes Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Options	
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.   Functional Checks

ELECTRICAL SAFETY

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground &wiring config.)				
Type BF Applied Part Leakage Current Limits- Probe				
enclosure Source Leakage Current - Chassis Leakage Current Limits				
Peripheral 1 Leakage Current				
Peripheral 2 Leakage Current				

PROBES

Probe Number (from previous page)	Max Value Allowed	Max Value Measured	OK?	Comments
Probe 1:				
Probe 2:				
Probe 3:				

Final Check. All system covers are in place. System scans with all probes as expected.

Accepted by: _____

Figure 10-8.   Electrical Safety

Electrical Safety Tests Log

Table 10-18:   Electrical safety tests log

Electrical test performed	Max value allowed	Value measured	OK?	Comments
Outlet (correct ground and wiring config.)				
System ground continuity				
Chassis source leakage current - probe				
Chassis source leakage current - wheel				
Chassis source leakage current - monitor				
Patient lead source leakage (lead to ground)				
Patient lead source leakage (lead to lead)				
Patient lead source leakage (isolation)				
Peripheral 1 leakage current				
Peripheral 1 ground continuity				
Peripheral 2 leakage current				

Table 10-18:   Electrical safety tests log (Continued)

Electrical test performed	Max value allowed	Value measured	OK?	Comments
Peripheral 2 ground continuity				
Peripheral 3 leakage current				
Peripheral 3 ground continuity				

Table 10-19:   Electrical safety tests (probes) log

Probe	Max value allowed	Max value measured	OK?	Comments

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