GE

LOGIQ V5/LOGIQ V3

Basic Service Manual

Part Number: 5496012-100
Revision: 6

Important Precautions

English
(EN)

WARNING

This Service Manual is available in English only.

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

Français
(FR)

AVERTISSEMENT

Ce manuel de maintenance est disponible en anglais uniquement.

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

Español
(ES)

ADVERTENCIA

Este Manual de servicio está disponible en idioma inglés únicamente.

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

WARNUNG

Deutsch (DE)

Dieses Wartungshandbuch ist nur auf Englisch verfügbar.

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

AVVERTENZA

italiano (IT)

Il presente Manuale di assistenza è disponibile solo in inglese.

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

WAARSCHUWING

Nederlands (NL)

Deze servicehandleiding is alleen beschikbaar in het Engels.

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

ADVERTÊNCIA

Português (PT-BR)

Este Manual de Manutenção está disponível apenas em Inglês.

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

HOIATUS!

Eesti (ET)

Service Manual (Hooldusjuhend) on saadaval ainult ingliskeelsena.

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

OPOZORILO

Slovenščina (SL)

Ta servisni priročnik je na voljo samo v angleščini.

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

警告

日本語 (JA)

このサービスマニュアルは英語版のみ提供されています。

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

警告

简体中文 (ZH-CN)

本维修手册仅提供英文版。

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

VARNING

Svenska (SV)

Den här servicehandboken finns endast på engelska.

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

警告

繁體中文 (ZH-TW)

此服務手冊僅推出英文版。

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

경고

한국어 (KO)

이 서비스 설명서는 영어로만 제공됩니다.

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

ПРЕДУПРЕЖДЕНИЕ

На русском языке (RU)

Данное руководство по обслуживанию доступно только на английском языке.

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

OSTRZEŻENIE

Polski (PL)

Niniejszy podręcznik serwisowy jest dostępny wyłącznie w języku angielskim.

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

ΠΡΟΕΙΔΟΠΟΙΗΣΗ

Ελληνικά (EL)

Το παρόν Εγχειρίδιο σέρβις διατίθεται μόνο στα Αγγλικά.

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

FIGYELMEZTETÉS

Magyar (HU)

A szervizkézikönyv kizárólag angol nyelven érhető el.

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

VAROVANIE

Slovenčina (SK)

Táto servisná príručka je dostupná iba v anglickom jazyku.

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

VÝSTRAHA

česky (CZ)

Tato servisní příručka je k dispozici pouze v angličtině.

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

UYARI

Türkçe (TK)

Servis Kılavuzu yalnızca İngilizce olarak mevcuttur.

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

ADVARSEL

Dansk (DA)

Denne servicemanual fås kun på engelsk.

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

ADVARSEL

Norsk (NO)

Denne servicehåndboken er bare tilgjengelig på engelsk.

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

VAKAVA VAROITUS

Suomi (FI)

Tämä huolto-opas on saatavana vain englanniksi.

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

ПРЕДУПРЕЖДЕНИЕ

Български (BG)

Настоящото Сервизно ръководство се предлага само на английски език.

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

AVERTISMENT

Română (RO)

Acest manual de service este disponibil doar în engleză.

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

UPOZORENJE

Hrvatski (HR)

Ovaj servisni priručnik dostupan je samo na engleskom jeziku.

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

ĮSPĖJIMAS

Lietuvių k. (LT)

Šis priežiūros vadovas galimas tik anglų kalba.

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

BRĪDINĀJUMS

Latviski (LV)

Šī apkalpes rokasgrāmata ir pieejama tikai angļu valodā.

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

UPOZORENJE

Srpski (SR)

Ovaj priručnik za servisiranje dostupan je samo na engleskom jeziku.

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

AVISO

Português (Portugal) (PT-PT)

Este manual de assistência está disponível apenas em inglês.

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

Українська (UK)

ПОПЕРЕДЖЕННЯ

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.

Bahasa Indonesia (ID)

PERINGATAN

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.

ไทย (TH)

คำเตือน

คู่มือซ่อมบำรุงนี้มีเฉพาะภาษาอังกฤษเท่านั้น

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

Tiếng Việt (VI)

CẢNH BÁO

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

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

Қазақ тілінде (KK)

ЕСКЕРТУ

Осы қызмет көрсету нұсқаулығы тек ағылшын тілінде қолжетімді.

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

Tagalog (TL)

BABALA

Available lamang sa Ingles ang Manwal ng Serbisyong ito.

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

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.

OMISSIONS & ERRORS

If there are any omissions, errors or suggestions for improving this documentation, please 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:

Service Documentation,
GE Medical Systems (China) Co., Ltd.
No.19 Changjiang Road
WuXi National Hi-Tech Development Zone
Jiangsu, P.R China 214028
TEL: +86 510 85225888; FAX: +86 510 85226688

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, see the Chapter 1, Safety Considerations section in the Service Manual.

LEGAL NOTES

PROPRIETARY TO GE

TRADEMARKS

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Revision History

Revision	Date	Reason for change
1	2014/03/20	Initial Release
2	2014/07/10	Update the CRU list
3	2014/12/23	Update the CRU list
4	2016/12/19	Add attaching keyboard film process
5	2017/09/25	Update the unpacking procedure of the equipment for sea transportation
6	2018/03/29	Update the unpacking procedure

List of Effected Pages (LOEP)

Pages	Revision	Pages	Revision	Pages	Revision
Title Page	5	Chapter 3 - Installation pages 3-1 to 3-28	5	Chapter 8 - Replacement Procedures pages 8-1 to 8-8	5
Important Precautions pages i to x	5	Chapter 4 - Functional Checks pages 4-1 to 4-32	5	Chapter 9 - Replacement Parts pages 9-1 to 9-10	5
Table of Contents pages i to xii	5	Chapter 5 - Theory pages 5-1 to 5-4	5	Chapter 10 - Periodic Maintenance pages 10-1 to 10-18	5
Chapter 1 - Introduction pages 1-1 to 1-17	5	Chapter 6 - Service Adjustments pages 6-1 to 6-2	5	Index pages I to II	5
Chapter 2 - Pre-Installation pages 2-1 to 2-12	5	Chapter 7 - Diagnostics/ Troubleshooting pages 7-1 to 7-10	5	Back Cover	5

Table of Contents

CHAPTER 1
Introduction

CHAPTER 2
Site Preparations

CHAPTER 3
System Setup

CHAPTER 4
Functional Checks

CHAPTER 5
Components and Functions (Theory)

CHAPTER 6
Service Adjustments

CHAPTER 7
Diagnostics/Troubleshooting

CHAPTER 8
Replacement Procedures

CHAPTER 9
Renewal Parts

CHAPTER 10
Care & Maintenance

Chapter 1
Introduction

Section 1-1
Overview

1-1-1 Purpose of Chapter 1

This chapter describes important issues related to safely servicing the LOGIQ V5/LOGIQ V3. The service provider must read and understand all the information presented in this manual before installing or servicing a unit.

Table 1-1 Contents in Chapter 1

1-1-2 Purpose of Service Manual

This Service Manual provides installation and service information for the LOGIQ V5/LOGIQ V3 and contains the following chapters:

1.) **Chapter 1 - Introduction:** Contains a content summary and warnings.
2.) **Chapter 2 - Site Preparations:** Contains pre-installation requirements for the LOGIQ V5/LOGIQ V3.
3.) **Chapter 3 - System Setup:** Contains installation procedures.
4.) **Chapter 4 - Functional Checks:** Contains functional checks that are recommended as part of the installation, or as required during servicing and periodic maintenance.
5.) **Chapter 5 - Components and Functions (Theory):** Contains block diagrams and functional explanations of the electronics.
6.) **Chapter 6 - Service Adjustments:** Contains instructions on how to make available adjustments to the LOGIQ V5/LOGIQ V3.
7.) **Chapter 7 - Diagnostics/Troubleshooting:** Provides procedures for running diagnostic or related routines for the LOGIQ V5/LOGIQ V3.
8.) **Chapter 8 - Replacement Procedures:** Provides disassembly procedures and reassembly procedures for all changeable Customer Replaceable Units (CRU).
9.) **Chapter 9 - Renewal Parts:** Contains a complete list of field replaceable parts for the LOGIQ V5/LOGIQ V3.
10.) **Chapter 10 - Care & Maintenance:** Provides periodic maintenance procedures for the LOGIQ V5/LOGIQ V3.

1-1-3 Typical Users of the Basic Service Manual

- Service Personnel (installation, maintenance, etc.).
- Hospital's Service Personnel
- Contractors (Some parts of Chapter 2 - Pre-Installation)

1-1-4 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the LOGIQ V5/LOGIQ V3 and also kept near the unit for quick reference.

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

1-1-5 LOGIQ V5/LOGIQ V3 Models Covered by this Manual

Table 1-2 LOGIQ V Model Designations

Part Number	Description
5488781	LOGIQ V Color Console (2 Probe Ports)
5478038	LOGIQ V BW Console

1-1-6 Peripheral List

Table 1-3 LOGIQ V Model Designations

Item	Part Name	Part Number	Qty	FRU
Printers				
1000	Sony UP-D897 Chinese kit	5151262	1	N
1000A	Sony UP-D897 USA kit	5151259	1	N
1000B	Sony UP-D897 European kit	5151261	1	N
1000C	Sony UP-D897 Japanese kit	5151263	1	N
1001	Sony UP-D25MD USA kit	5398062	1	N
1001A	Sony UP-D25MD European kit	5398063	1	N
1001B	Sony UP-D25MD Japanese kit	5398064	1	N
1001C	Sony UP-D25MD Chinese kit	5398061	1	N
1002	Sony UP-D711MD with Paper kit	5494719	1	N
1002A	Sony UP-D711MD Paper 1 roll	5494718	1	N
1002B	Sony UP-D711MD Printer Paper 10 rolls	5543548	1	N
1003	HP Officejet 100 Chinese kit	5426594	1	N
1003A	HP Officejet 100 European kit	5426595	1	N
1003A	HP Officejet 100 Japanese kit	5426596	1	N
1003B	HP Officejet 100 USA kit	5426597	1	N
1004	Sony UP-D898MD USA kit	5151259-2	1	N
1004A	Sony UP-D898MD European kit	5151261-2	1	N
1004B	Sony UP-D898MD China kit	5151262-2	1	N
1004C	Sony UP-D898MD Japan kit	5151263-2	1	N
1004D	Sony UP-D898MD Brazil kit	5495509-2	1	N
1005	HP Officejet Pro 8100	NA	1	N
1006	Sony UP-D898MD Printer shelf option kit	5599283	1	N
1007	Sony UP-D711MD Printer shelf option kit	5484791	1	N
Video Converter				
1008	Video Converter Module	5534825	1	N
DVD-RW				
1009	LITEON eUAU108	5454614-2	1	N
Footswitch				
1010	MKF 2-MED GP26 (IPx8)	5151236	1	N
1011	FSU-1000 (IPx8)	5338419	1	N
USB Stick				
1012	SanDisk CRUZER 4G	5395754	1	N

Table 1-3 LOGIQ V Model Designations

Item	Part Name	Part Number	Qty	FRU
1013	1TB mobile USB HDD	5434317-3	1	N
Biopsy Kit				
1014	E8C-RS biopsy kit	E8385NA	1	N
1015	E8C-RS reusable biopsy kit	2398164	1	N
1016	4C-RS biopsy kit	5160703	1	N
1017	L6-12-RS biopsy kit	5176499	1	N
1018	3Sc-RS biopsy kit	5329137	1	N
System and Application Software USB				
1019	LOGIQ V Series R1.0.0 System and Application Software USB	5501727	1	Y
1020	LOGIQ V Series R1.0.1 System and Application Software USB	5501727-2S	1	Y
1021	LOGIQ V Series R1.0.2 System and Application Software USB	5501727-3S	1	Y
1022	LOGIQ V Series R1.0.3 System and Application Software USB	5501727-4S	1	Y
1023	LOGIQ V Series R1.0.4 System and Application Software USB	5501727-5S	1	Y
Keyboard Film				
1024	Keyboard Film	5727997-S	1	Y

Section 1-2
Important Conventions

1-2-1 Conventions Used in Book

Icons

Pictures, or icons, are used wherever they 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 are labeled in one of following ways:

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.**

NOTICE **Equipment Damage Possible**

Notice is used when a hazard is present that can cause property damage but has absolutely no personal injury risk.

Example: Disk drive will crash.

NOTE: Notes provide important information about an item or a procedure. Information contained in a NOTE can often save you time or effort.

1-2-2 Standard Hazard Icons

Important information will always be preceded by the exclamation point contained within a triangle, 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 cause harm.

Table 1-4 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION
		
LASER	**HEAT**	**PINCH**
		

Other hazard icons make you aware of specific procedures that should be followed.

Table 1-5 Standard Icons Indicating a Special Procedure Be Used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION
		

1-2-3 Product Icons

The following table describes the purpose and location of safety labels and other important information provided on the equipment.

Table 1-6 Product Icons

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
Label/Icon	**Purpose/Meaning**	**Location**
Identification and Rating Plate 	• Manufacture's name and address • Date of manufacture • Model and serial numbers • Electrical ratings (Volts, Amps, phase, and frequency)	Refer to User manual for detailed information.
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX8) IPX8: FSU-1000, MKF 2-MED GP26	Indicates the degree of protection provided by the enclosure per IEC60 529.	Bottom of footswitch
	Type BF Applied Part (man in the box) symbol is in accordance with IEC 60878-02-03.	Beside the probe connector
	General Warning	Various
	"CAUTION" - Dangerous voltage" (the lightning flash with arrowhead) is used to indicate electric shock hazards.	Various
	Indicates the power on and power off position of the power switch. **CAUTION:** This Power Switch **DOES NOT ISOLATE** Mains Supply.	See the Console Overview section for location information.
	"Protective Earth" indicates the protective earth (grounding) terminal.	Inside Console
	This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	Bottom

Table 1-6 Product Icons

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	Indicates the presence of hazardous substance(s) above the maximum concentration value. Maximum concentration values for electronic information products, as set by the People's Republic of China Electronic Industry Standard SJ/T11364-2006, include the hazardous substances of lead, mercury, hexavalent chromium, cadmium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE). "20" indicates the number of years during which the hazardous substance(s) will not leak or mutate so that the use of this product will not result in any severe environmental pollution, bodily injury, or damage to any assets.	Probe and Rear Panel, China Rating Plate
	Do not place any objects on the monitor.	Back of LCD
	Do not force the LCD monitor with your hands.	Back of LCD
	There is a pinch point on the LCD monitor. Take care to avoid injuring hands or fingers when flipping down the LCD monitor.	Back of LCD
	Use the rear handle for horizontal movement only.	Back of LCD
	Do not push the system.	Back of LCD
	"Consult accompanying documents" is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.	Various
	GOST symbol: Russia Regulatory Country Clearance.	Bottom Note: Only after Russian regulatory registration is complete, this label will be located on the console rating plate.

Table 1-6 Product Icons

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	Do not put your whole body weight on the foot-rest holder.	Footrest
	INMETRO Certification: TUV Rheinland Brazil	Rating plate Note: Only after Brazilian regulatory registration is complete, this label will be located on the console rating plate.
	NRTL Listing and Certification Mark is used to designate conformance to nationally recognized product safety standards. The Mark bears the name and/or logo of the testing laboratory, product category, safety standard to which conformity is assessed and a control number.	Rear Panel
	United States only Presciption Requirement label	Rating Plate

Section 1-3
Safety Considerations

1-3-1 Introduction

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

1-3-2 Human Safety

Servicing should be performed by authorized personnel only.
Only personnel who have participated in a LOGIQ V5/LOGIQ V3 Training are authorized to service the equipment.

1-3-3 Mechanical Safety

WARNING ***WHEN THE UNIT IS RAISED FOR A REPAIR OR MOVED ALONG ANY INCLINE, USE EXTREME CAUTION SINCE IT MAY BECOME UNSTABLE AND TIP OVER.***

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 V5/LOGIQ V3 weighs 45 kg or more, depending on installed peripherals, when ready for use. Care must be used when moving it or replacing its parts. Failure to follow the precautions listed could result in injury, uncontrolled motion and costly damage.**

ALWAYS:

Be sure the pathway is clear.

Use slow, careful motions.

Use two people when moving on inclines or lifting more than 65 kg (143.3 lbs).

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

1-3-3 Mechanical Safety (cont'd)

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

- *Secure the unit in an upright position.*
- *Lock the wheels (brake)*

1-3-4 Electrical Safety

To minimize shock hazard, the equipment chassis must be connected to an electrical ground. The 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 meet international electrical standards.

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

1-3-5 Label Locations

Refer to User Guide for label location information.

1-3-6 Dangerous Procedure Warnings

Warnings, such as the examples 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** ***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, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

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

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

1-3-7 Returning/Shipping Probes and Repair Parts

Equipment being returned must be clean and free of blood and other infectious substances.

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS 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 USER/SERVICE staff should dispose all the waste properly as per federal, state, and local waste disposal regulation.

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 all the waste properly as per federal, state, and local waste disposal regulation.

Section 1-4
Lockout/Tagout (LOTO) requirements

Follow OSHA Lockout/Tagout requirements (USA) or local 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:

1.) Plan and prepare for shutdown.
2.) Shutdown the equipment.
3.) Isolate the equipment.
4.) Apply Lockout/Tagout Devices.
5.) Control all stored and residual energy.
6.) Verify isolation.
All potentially hazardous stored or residual energy is relieved.

NOTICE Energy Control and Power Lockout for LOGIQ V5/LOGIQ V3

WHEN SERVICING PARTS OF THE SYSTEM WHERE THERE IS EXPOSURE TO VOLTAGE GREATER THAN 30 VOLTS:
1. TURN OFF THE SCANNER.
2. UNPLUG THE SYSTEM.
3. MAINTAIN CONTROL OF THE SYSTEM POWER PLUG.
4. 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.

Section 1-5
EMC, EMI, and ESD

1-5-1 Electromagnetic Compatibility (EMC)

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

1-5-2 CE Compliance

The LOGIQ V5/LOGIQ V3 unit 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 in the User Guide.

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

1-5-3 Electrostatic Discharge (ESD) Prevention

⚠ **WARNING** ***DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:***

1.FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

Section 1-6
Customer Assistance

1-6-1 Contact Information

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

Prepare the following information before you call:

- System ID serial number.
- Software version.

Table 1-7 Phone Numbers for Customer Assistance

LOCATION	PHONE NUMBER	
USA GE Medical Systems Ultrasound Service Engineering 9900 Innovation Drive Wauwatosa, WI 53226	Service: On-site Service Parts Application Support	1-800-437-1171 1-800-558-2040 1-800-682-5327 or 1-262-524-5698
Canada		1-800-668-0732
Latin America	Service Application Support	1-800-321-7937 1-262-524-5698
Europe (OLC- EMEA) GE Ultraschall Deutschland GmbH 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) 212 2802 - 431	
Online Services Ultrasound Asia Australia China India Japan Korea Singapore	 Phone: +(61) 1-800-647-855 +(86) 800-810-8188 +(91) 1-800-11-4567 +(81) 42-648-2924 +(82) 2620 13585 +(95) 6277-3444	

1-6-2 System Manufacturer

Table 1-8 System Manufacturer

Manufacturer	FAX Number
GE Medical Systems (China) Co., Ltd. No.19, Changjiang Road, Wuxi National Hi-Tech Development Zone, Jiangsu, P.R. China 214028	TEL: +86 510-85225888 FAX: +86 510-85226688

1-6-3 Factory Site

Table 1-9 Factory Site

Factory Site	FAX Number
GE Medical Systems (China) Co., Ltd. No.19, Changjiang Road, Wuxi National Hi-Tech Development Zone, Jiangsu, P.R. China 214028	TEL: +86 510-85225888 FAX: +86 510-85226688

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Chapter 2
Site Preparations

Section 2-1
Overview

2-1-1 Purpose of chapter 2

This chapter provides the information required to plan and prepare for the installation of LOGIQ V5/ LOGIQ V3. Included are descriptions of the facility and electrical needs to be met by the purchaser of the unit.

Table 2-1 Contents in Chapter 2

Section 2-2
General Console Requirements

2-2-1 Console Environmental Requirements

Table 2-2 Environmental Requirements for LOGIQ V Series Scanners

	Operational	Storage	Transport
Temperature	10 - 40^{o}C 50- 104 ^{o}F	-5 - 50 ^{o}C 23 - 122^{o}F	-5 - 50 ^{o}C 23 - 122^{o}F
Humidity	30 - 80% non-condensing	10 - 90% non-condensing	10 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

*NOTE: Temperature in degrees C. Conversion to Degrees F = (Degrees C * 9/5) + 32.*

2-2-1-1 Lighting

Bright light is needed for 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 diameters can be a source of EMI which could degrade image quality. These controls should be selected to minimize possible interface.

2-2-2 Electrical Requirements

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

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

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

Sites with a mains power system without a defined Neutral:

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

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

2-2-2Electrical Requirements (cont'd)

2-2-2-1 LOGIQ V5/LOGIQ V3 Power Requirements

The following power line parameters should be monitored for one week before installation. We recommend that you use an analyzer Dranetz Model 606-3 or Dranetz Model 626:

Table 2-3 Electrical Specifications for LOGIQ V5/LOGIQ V3

PARAMETER	AREA	LIMITS
Voltage Range	100-240V~	300VA
Power	All applications	MAX. 300 VA
Line Frequency	All applications	50/60Hz
Power Transients	All applications	Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.
Decaying Oscillation	All applications	Less than 15% of peak voltage for less than 1 millisecond.

2-2-2-2 Inrush Current

Inrush Current is not a factor to consider due to the inrush current limiting properties of the power supplies.

2-2-2-3 Site Circuit Breaker

It is recommended that the branch circuit breaker for the machine be ready accessible.

CAUTION **POWER OUTAGE MAY OCCURE.**

The LOGIQ V5/LOGIQ V3 requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you DO NOT have any other equipment operating on the same circuit.

2-2-2-4 Site Power Outlets

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

2-2-2-5 Unit Power Plug

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

2-2-2-6 Power Stability Requirements

Voltage drop-out
Max 10 ms.

Power Transients
(All applications)
Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.

2-2-3 EMI Limitations

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transient in the air wiring. They also generate EMI. The LOGIQ V5/LOGIQ V3 complies with limits as stated on the EMC label. However there is no guarantee that interface will not occur in a particular installation.

Possible EMI sources should be identified before the unit is installed.

Electrical and electronic equipment may produce EMI unintentionally as the result of defect.

These sources include:

- medical lasers,
- scanners,
- cauterizing guns,
- computers,
- monitors,
- fans,
- gel warmers,
- microwave ovens,
- light dimmers,
- portable phones.

The presence of broadcast station or broadcast van may also cause interference. See for EMI Prevention tips.

See Table 2-4 for EMI Prevention tips.

Table 2-4 EMI Prevention/abatement

EMI Rule	Details
Be aware of RF sources	Keep the unit at least 5 meters or 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 unit	Poor grounding is the most likely reason a unit will have noisy images. Check grounding of the power cord and power outlet.
Replace all screws, RF gaskets, covers, cores	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of card cage. Loose or missing covers or RF gaskets allow radio frequencies to interface with the ultrasound signals.
Replace broken RF gaskets	If more than 20% or a pair of fingers on the RF gaskets are broken, replace the gaskets. Do not turn on the unit until any loose metallic part is removed.
Do not place labels where RF gaskets touch metal	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF 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 dress peripheral cables	Do not allow cables to lie across the top of the card cage or hang out of the peripheral bays. Loop the excess length for peripheral cables inside the peripheral bays. Attach the monitor cables to the frame.

2-2-4 Scan Probe Environmental Requirements

Operation: 10° to 40° C

Storage: -5° to 50° C

*NOTE: Temperature in degrees C. Conversion to Degrees F = (Degrees C * (9/5) + 32).*

NOTICE SYSTEMS AND ELECTRONIC PROBES ARE DESIGNED FOR STORAGE TEMPERATURES OF -10 TO + 60 degrees C. WHEN EXPOSED TO LARGE TEMPERATURE VARIATIONS, THE PRODUCT SHOULD BE KEPT IN ROOM TEMPERATURE FOR 10 HOURS BEFORE USE.

Section 2-3
Facility Needs

2-3-1 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. User the Pre Installation checklist to verify that all needed steps have been taken,
Purchaser reasonability includes:

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

NOTE: All electrical installation 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, products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these product 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 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 (preferable prior to purchase).
The ultrasound suite must be clean proof to delivery of the machine. 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 system.

2-3-2 Required Features

NOTE: GE Medical Systems 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 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:

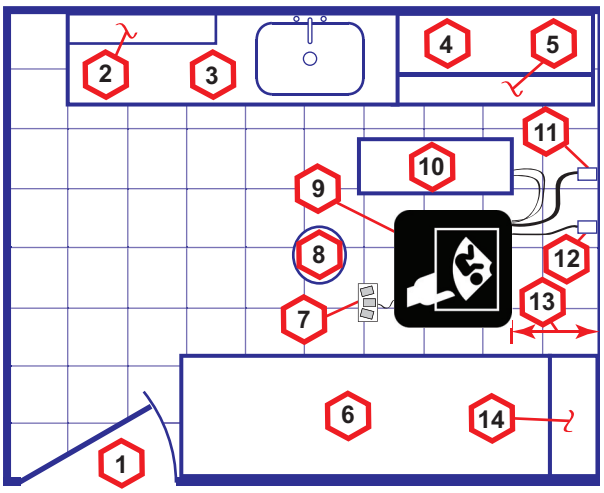
The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

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 0.3 m (1 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.

2-3-3 Minimal floor plan suggestion

CSI 8x10



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

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

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

2-3-4 Recommended floor plan suggestion

Recommended standard floor plan and a minimal floor plan for ultrasound equipment:

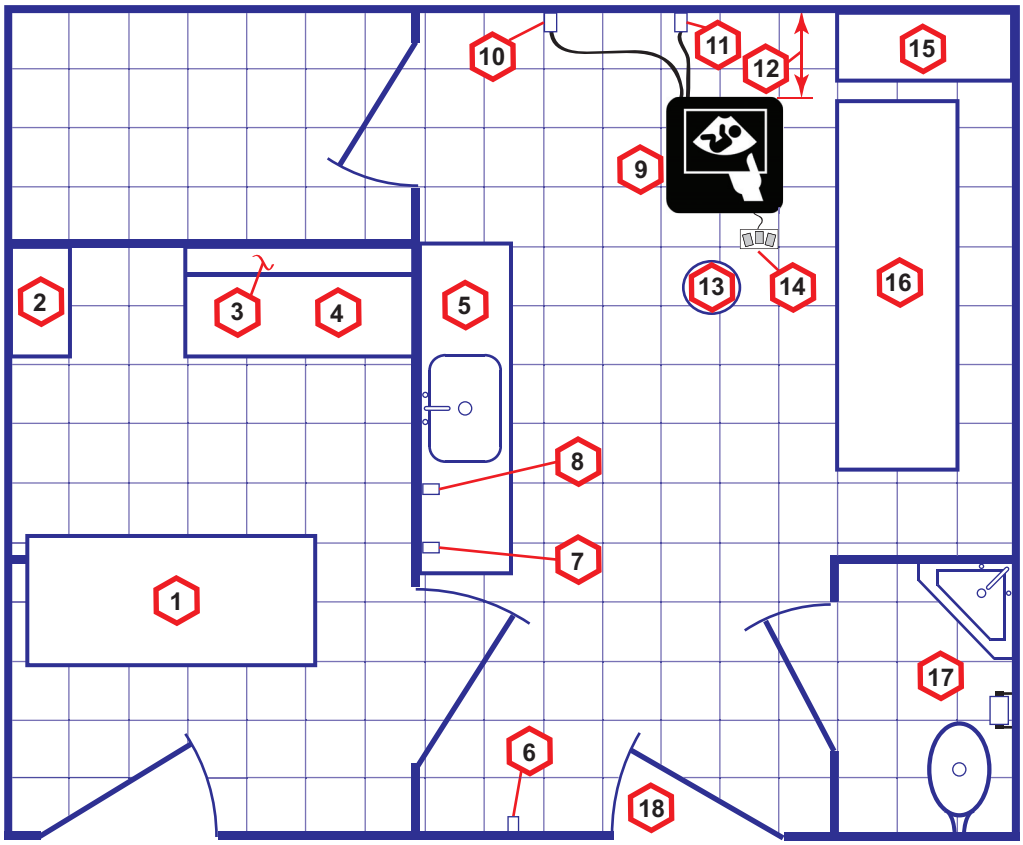
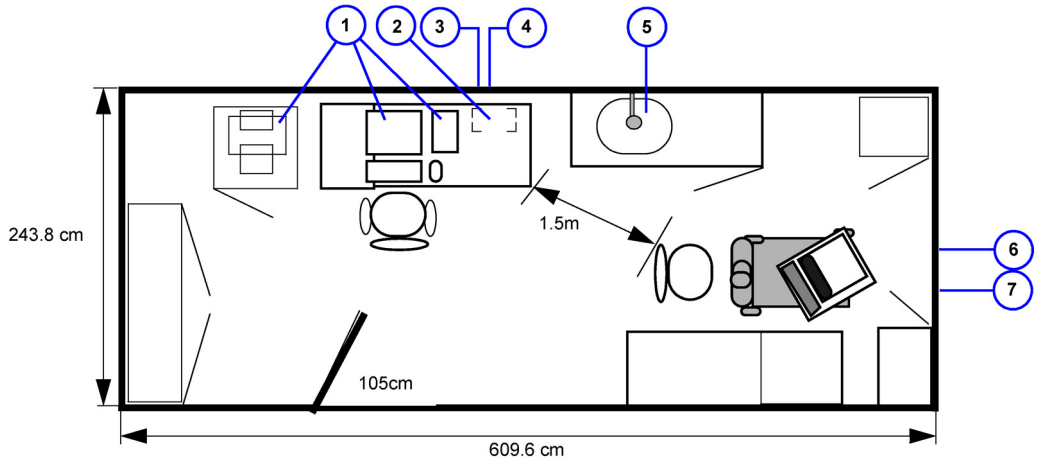


Figure 2-1 RECOMMENDED ULTRASOUND ROOM LAYOUT

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)

2-3-5 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 2-2. Suggested Room with EchoPAC PC workstation and Ultrasound Scanner

2-3-6 Networking Pre-installation Requirements

2-3-6-1 Stand Alone Scanner (without Network Connection)

None.

2-3-6-2 Scanner Connected to Hospital's Network

Supported networks:

Wire LAN

2-3-6-3 Purpose of DICOM Network Function

DICOM services provide the operator with clinically useful features for moving images and patient information over a hospital network. Examples of DICOM services include the transfer of images to workstations for viewing or transferring images to remote printers. As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues. With DICOM, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

2-3-6-4 DICOM Option Pre-installation Requirements

To configure the LOGIQ V5/LOGIQ V3 to work with other network connections, the site's network administrator must provide some necessary information.

Information must include:

- A host name, local port number, AE Title, IP address and Net Mask for the LOGIQ V5/LOGIQ V3.
- 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 LOGIQ V5/LOGIQ V3 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 solving errors.

2-3-6-4 DICOM Option Pre-installation Requirements (cont'd)

LOGIQ V5/
Host Name _____ **Local Port** _____ **IP Address** ___.___.___.___

AE Title _____ **Net Mask** ___.___.___.___

ROUTING INFORMATION

	Destination IP Addresses	GATEWAY IP Addresses
		Default ___.___.___.___
ROUTER1	___.___.___.___	___.___.___.___
ROUTER2	___.___.___.___	___.___.___.___
ROUTER3	___.___.___.___	___.___.___.___

DICOM APPLICATION INFORMATION

	NAME	MAKE/REVISION	AE TITLE	IP ADDRESSES	PORT
Store 1				___.___.___.___	
Store 2				___.___.___.___	
Store 3				___.___.___.___	
Store 4				___.___.___.___	
Store 5				___.___.___.___	
Store 6				___.___.___.___	
Worklist				___.___.___.___	
Storage Commit				___.___.___.___	
MPPS				___.___.___.___	

Figure 2-2 Worksheet for DICOM Network Information

Chapter 3
System Setup

Section 3-1
Overview

3-1-1 Purpose of Chapter 3

This chapter contains information needed to install the unit. Included are references to a procedure that describes how to receive and unpack the equipment and how to file a damage or loss claim.
How to prepare the facility and unit of the actual installation, and how to check and test the unit and external peripherals for electrical safety are included in this procedure. Also included LOGIQ V5/LOGIQ V3 in this section are guidelines for transporting the unit to a new site.

Table 3-1 Contents in Chapter 3

Section 3-2Setup Reminders

3-2-1 Average Installation Time

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	0.5 hour	
Scanner wo/options	0.5 hour	Dependant on the configuration that is required
DICOM Option	0.5 hour	Dependant on the amount of configuration

The LOGIQ V5/LOGIQ V3 has been designed to be installed and checked out by an experienced service technician in approximately 1 hour. LOGIQ V5/LOGIQ V3 consoles with optional equipment may take slightly longer.

3-2-2 Installation Warnings

1.) Since the LOGIQ V5/LOGIQ V3 weighs approximately 50 kg without options, preferably two people should unpack it. Two people are also preferable for installing any additional bulky items.

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

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

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

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

Table 3-3 Acclimation Time

°C	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	140	131	122	113	104	95	86	77	68	59	50	41	32	23	14	5	-4	-13	-22	-31	-40
hrs	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8	10	12	14	16	18	20

3-2-3 Safety Reminders

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

CAUTION **Two people should unpack the unit because of its weight. Two people are required whenever a part weighing 19kg (35 lb.) or more must be lifted.**

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

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

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

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

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

CAUTION **OPERATOR MANUAL(S)**
The User Manual(s) should be fully read and understood before operating the LOGIQ V5/ LOGIQ V3 and kept near the unit for quick reference.

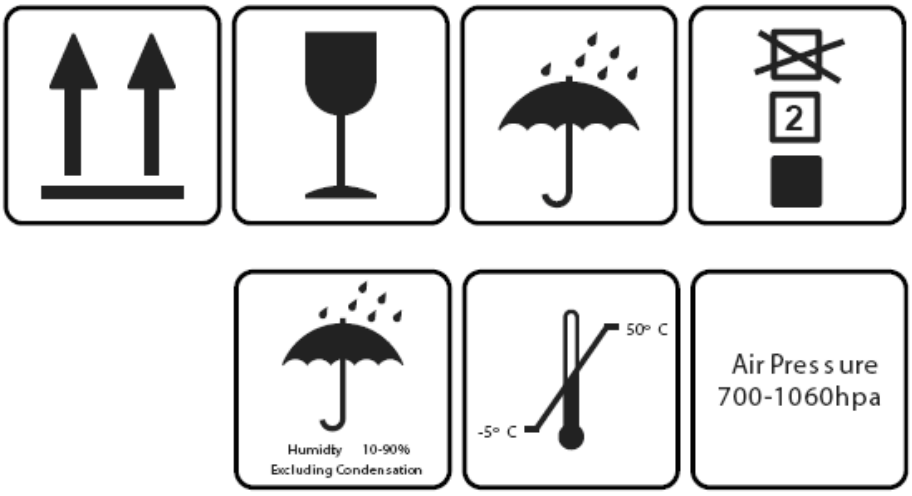


Figure 3-1 Environmental Labels

Section 3-3
Receiving and Unpacking the Equipment

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

CAUTION **The crate with the LOGIQ V5/LOGIQ V3 weighs approximately 50kg. Be prepared for a sudden shift of weight as the unit is removed from its base (pallet)**

Table 3-4: Unpacking the equipment

Step	Description	Corresponding Graphic
1	Tear off the "stop open" mark.	
2	Cut off the two packing straps around the crate. *Note: To avoid injury, hold the strap clasp with one hand when cutting the strap.*	
3	Remove the top cover.	

Table 3-4: Unpacking the equipment

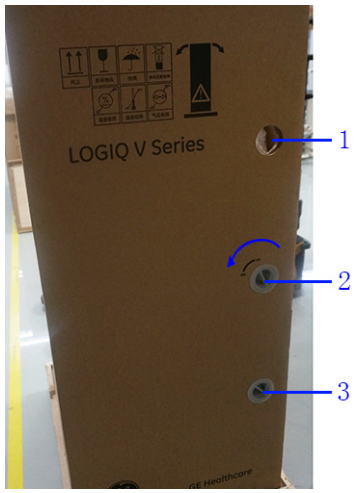
Step	Description	Corresponding Graphic
4	Remove the three plastic locks. *Note: Rotate the inside plastic lock counterclockwise to remove it and then remove the outside lock.*	 
5	Remove the outside shipping box.	
6	Remove the dust bag from the unit. Note: There is no dust bag if the system is transported by sea. Ignore this step if there is no dust bag.	

Table 3-4: Unpacking the equipment

Step	Description	Corresponding Graphic
6	Cut the clear plastic (wrapped around the LOGIQ V5/LOGIQ V3) by scissors and remove the 4 foams beside the wheels	
7	Cut off the packing straps around the four wheels.	
8	Remove the barrier bag from the unit. *Note: Remove the PE bag if the system is transported by air.*	

Table 3-4: Unpacking the equipment

Step	Description	Corresponding Graphic
9	Remove the foams beside the LCD monitor and the control panel.	
10	With one hand holding the control panel and the other holding the rear handle, move the whole system down to the ground.	

3-3-1 Moving into Position

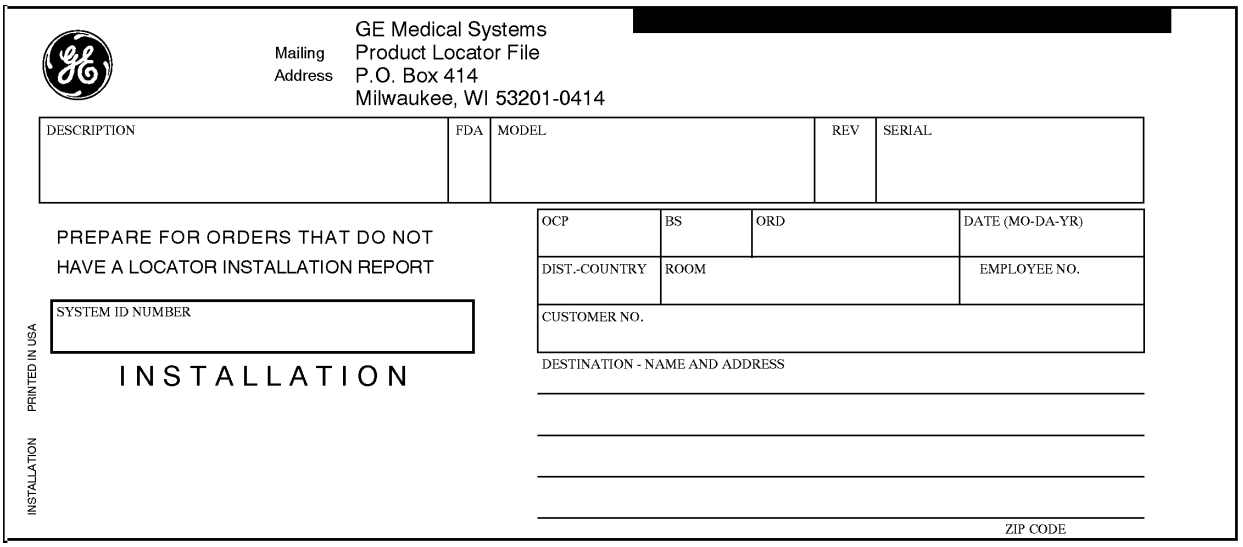
CAUTION **Do not tilt the unit more than 5 degrees to avoid tipping it over.**
To avoid injury by tipping over. Set the monitor to the lowest position before moving.

In general, a single adult can move the LOGIQ V5/LOGIQ V3 along an even surface with no steep grades. At least two people should move the machine when large humps, grooves, or grades will be encountered. (It is better to pull from the rear rather than push from the front of the unit). Before moving, store all loose parts in the unit. Wrap transducers in soft cloth or foam to prevent damage.

Although LOGIQ V5/LOGIQ V3 is a mobile machine, two people should move it over rough surfaces or up and down grades.

3-3-2 Product Locator Installation Card

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


GE Medical Systems
Mailing Address
Product Locator File
P.O. Box 414
Milwaukee, WI 53201-0414

DESCRIPTION	FDA	MODEL	REV	SERIAL

PREPARE FOR ORDERS THAT DO NOT HAVE A LOCATOR INSTALLATION REPORT

OCP	BS	ORD	DATE (MO-DA-YR)
DIST.-COUNTRY	ROOM		EMPLOYEE NO.
CUSTOMER NO.			

SYSTEM ID NUMBER

INSTALLATION

DESTINATION - NAME AND ADDRESS

ZIP CODE

PRINTED IN USA

INSTALLATION

Figure 3-2 Product Locator Installation Card

Section 3-4
Preparing for Installation

3-4-1 Verify Customer Order

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

3-4-2 Physical Inspection

3-4-2-1 System Voltage Settings

Verify that Docking Cart is set to the correct voltage.
The Voltage settings for the LOGIQ V5/LOGIQ V3 is found on a label to the right of the Power switch and External I/O, on the rear of the system.

⚠ **WARNING** ***Connecting a LOGIQ V5/LOGIQ V3 to the wrong voltage level will most likely destroy it.***

3-4-2-2 Video Formats

Check that the video format is set to the locally used video standard, NTSC or PAL.

3-4-3 EMI Protection

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

Section 3-5
Completing the Installation

3-5-1 Power On / Boot Up

NOTE: After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.

3-5-1-1 Scanner Power On

When power is applied to the scanner, power is distributed to the Cooling Unit, Control Panel, LCD, Peripherals and the Back-end Processor.

3-5-1-2 Turn on the system

Press the ***Power On/Off*** switch at the front of the system once.

Figure 3-3 Power On/Off Switch

When the ***Power On/Off*** switch on the Control Panel is pressed once, the Back-end Processor starts and the software code is distributed to initiate the scanner.

No status messages are displayed during this process.

3-5-2 Power Off/ Shutdown

NOTE: After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.

3-5-2-1 Back-end Processor Power Down

To power down the system:

1.) Press the ***Power On/Off*** switch once.
2.) The System-Exit window is displayed.

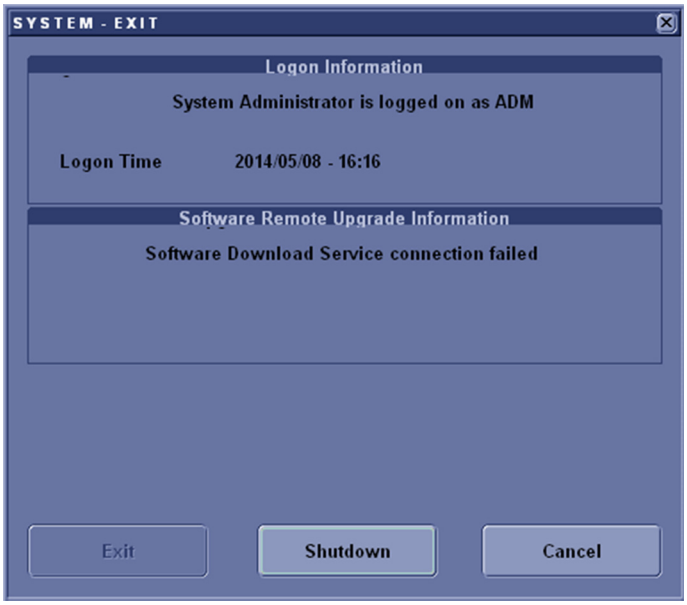


Figure 3-4 System-Exit Window

3.) Using the Set key, select Shutdown.
4.) The shutdown process takes a few seconds and is complete when the power status LED is turned blue.
5.) Disconnect the probes. Clean or disinfect all probes as necessary. Store them in their shipping cases to avoid damage.

3-5-2-2 Scanner Shutdown

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

3-5-3 Transducer Connection

1.) Plug the probe connector into the probe port, then lock the probe.

NOTE: Please ensure that the probe latch is in an unlocked position before you connect the probe to the system.

NOTE: It is not necessary to turn OFF power to connect or disconnect a probe.

Section 3-6
System Configuration

3-6-1 System Specifications

3-6-1-1 Physical Dimensions

The physical dimensions of the LOGIQ V5/LOGIQ V3 unit are summarized in Table 3-5 on page 3-12. The Size of LOGIQ V5/LOGIQ V3.

Table 3-5 Physical Dimensions of LOGIQ V5/LOGIQ V3

Height	Width	Depth	Unit
1320±60	420±30 (Wheel to Wheel)	635±30	mm
52±2.3	16.5±1.1	25±1.1	inches

3-6-1-2 Weight

Table 3-6 Weight of LOGIQ V5/LOGIQ V3 With Monitor and Without Other Peripherals

Model	Weight [kg]	Weight [lb]
LOGIQ V5/LOGIQ V3	Approximately 45	Approximately 99.2

3-6-2 Electrical Specifications

Table 3-7 Electrical Specifications for LOGIQ V5/LOGIQ V3

Voltage	Current	Frequency
100 –240 V AC	300VA	50/60Hz

3-6-3 On-Board Optional Peripherals

Table 3-8 List of Optional Peripherals

Device	Manufacturer	Model	Video Signal
B/W Printer	SONY	UP-D897MD	USB
B/W Printer	SONY	UP-D898MD	USB
B/W Printer	SONY	UP-D711MD	USB
HP Printer	HP	HP Officejet 100	USB
HP Printer	HP	HP Officejet Pro 8100	USB
USB Memory	SanDisk	SanDisk 4G	USB
1-Pedal Footswitch	Whanam	FSU1000	USB
3-Pedal Footswitch	Whanam	MKF 2-MED GP26	USB
USB Hard Disk	Seagate	USB HDD 500G	USB
Color Printer	SONY	UP-D25MD	USB

3-6-4 Connecting Cables

WARNING Equipment damage possibility. Be sure to use the following recommended connecting cables to connect recording devices and a network with LOGIQ V5/LOGIQ V3 console.

Table 3-9 List of Connecting Cables

Name	Part No.	Figure	NOTE
USB Cable			For USB Printer

3-6-5 Peripherals/Accessories Connector Panel

LOGIQ V5/LOGIQ V3 peripherals and accessories can be properly connected using the side connector panel.

3-6-5-1 Rear Panel Connector

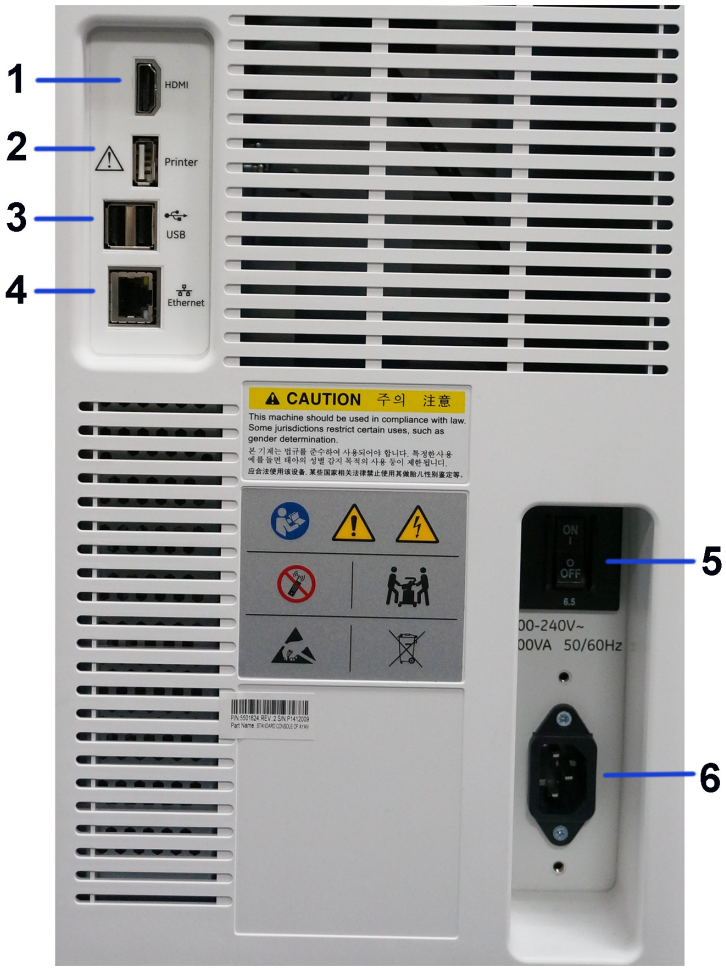


Figure 3-5 Rear Connector Panel

NOTE: The AC printer can be connected to the isolated Printer USB port on the rear panel only.

3-6-5Peripherals/Accessories Connector Panel (cont'd)

Table 3-10 Peripheral/Accessory Connector Panel

1	HDMI port	HDMI out
2	Isolated Printer USB port	For AC Printer ONLY
3	USB Ports	USB Ports
4	Ethernet	LAN for InSite Connection (RJ45)
5	Circuit breaker	6.5A
6	AC Inlet	100-240V

3-6-5-2 Pin assignment for each connector

Table 3-11 Pin Assignments of External VGA

Pin No.	Signal	Pin No.	Signal
1	RED	9	NC
2	GREEN	10	NC
3	BLUE	11	NC
4	NC	12	NC
5	NC	13	HSY
6	GND	14	VSY
7	GND	15	NC
8	GND		

Table 3-12 Pin Assignments of USB

Pin No.	Signal	Pin No.	Signal
1	+5 VDC	5	+5 VDC
2	DATA	6	DATA
3	DATA	7	DATA
4	GND	8	GND

Table 3-13 Pin Assignments of Audio

Pin No.	Signal	Pin No.	Signal
1	GND	4	NC
2	L+	5	R+
3	Speaker L	6	Speaker R

Table 3-14 Pin Assignment of S-Video

Pin No.	Output Signal	Pin No.	Output Signal
1	GND	3	Y
2	GND	4	C

Table 3-15 Pin Assignment of Composite Video Out

Pin No.	Output Signal	Pin No.	Output Signal
1	Composite Out	2	GND

3-6-5-3 Connect Peripherals

A.) Connect B/W printer to the system.

Sony UP-D711MD Printer can be properly connected using the STD and DC cables.

Figure 3-6 Connect B/W printer to the system

Sony UP-D711MD is connected to the LOGIQ V5/LOGIQ V3 system via the STD and DC cables under the control panel.

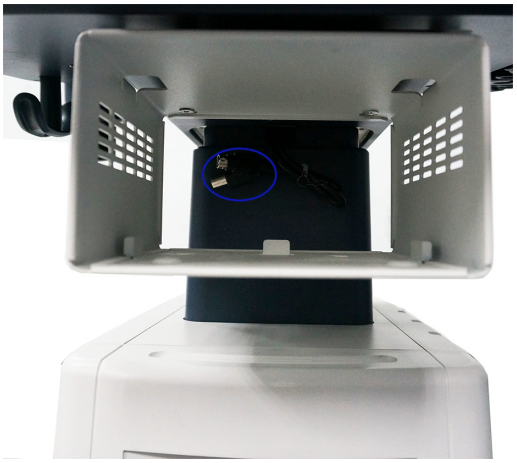


Figure 3-7 STD cable location

3-6-5-3Connect Peripherals (cont'd)

B.) Connect Sony UP-D25MD color printer to the system. Sony UP-D25MD Color Printer can be properly connected using the isolated Printer USB Port. And connect the power cable of Sony UP-D25MD to the wall outlet.

Figure 3-8 Connect color printer to the system

3-6-5-3 Connect Peripherals (cont'd)

C.) Connect the B/W printer (Sony UP-897/Sony UP-D898MD) to the system

The B/W printer can be properly connected using the isolated Printer USB Port. And connect the power cable of Sony UP-D897/Sony UP-D898MD to the wall outlet.

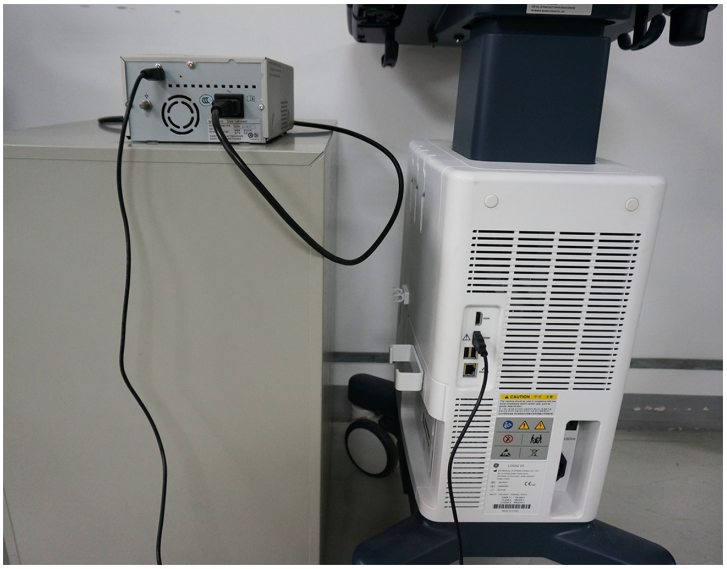


Figure 3-9 Connect B/W Printer (Sony UP-897) to the system

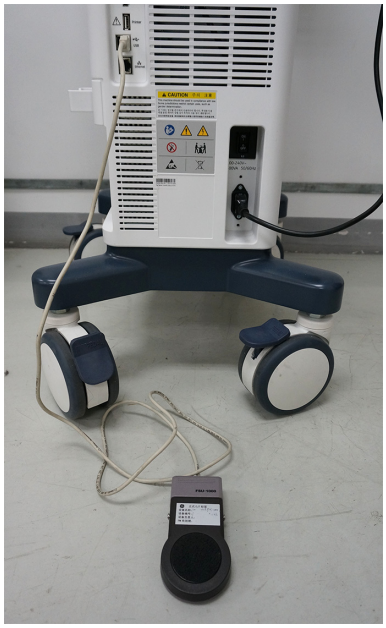
D.) Connect HP Officejet 100 printer to the system. HP Officejet 100 Printer can be properly connected using the isolated Printer USB Port. And connect the power cable of HP Officejet 100 to the wall outlet.

Figure 3-10 HP Officejet 100 printer to the system

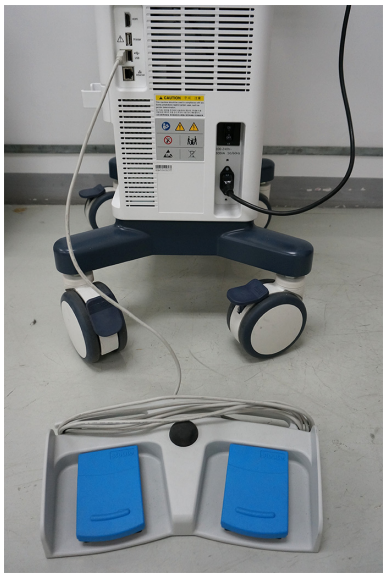
3-6-5-3Connect Peripherals (cont'd)

E.) Connect Foot Switch to the system.

Foot Switch can be properly connected using USB Ports.



1-Pedal Footswitch



3-Pedal Footswitch

Figure 3-11 Connect Foot Switch to the system

3-6-5-3Connect Peripherals (cont'd)

F.) Connect the USB Memory to the system. The USB Memory can be properly connected using the USB ports.

Figure 3-12 USB Memory Connection

G.) Connect the USB HDD to the system. The USB Harddisk can be properly connected using USB ports.

Figure 3-13 USB Hard Disk Connection

3-6-5-4 Digital Printer Setup

There are two steps to do when setting up a digital printer: 1. follow the procedure below for each printer, then 2. set up specific properties for each printer if you need.

Follow this procedure for each printer:

1.) Select Utility--> Connectivity--> Service. Add the Standard Print.

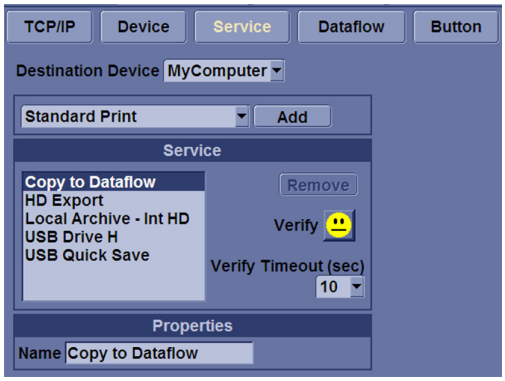


Figure 3-14 Add the Printer

2.) Highlight Standard Print in the Service list. Select the printer from the Printer pull-down Properties menu. For the UP-D897 printer, select “Portrait” as orientation. Type the printer name in the Name field. 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***.

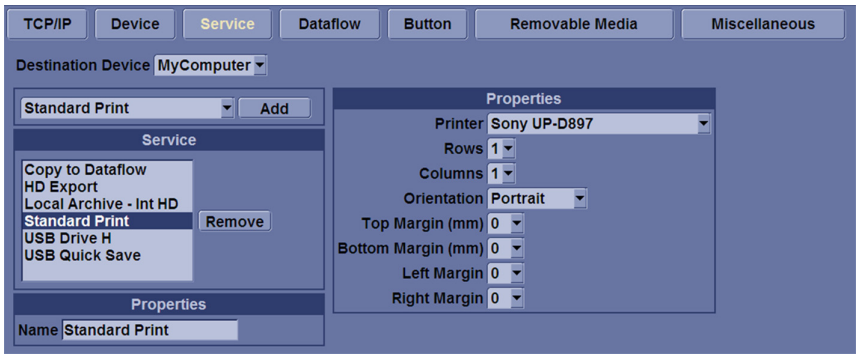


Figure 3-15 Select the Printer

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

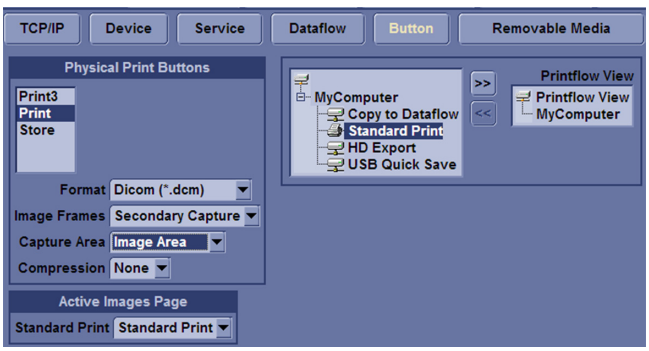


Figure 3-16 Select Button

3-6-5-5 Digital Printer Instructions

Follow these steps to set up the paper size of the printer, take Sony UP-D897 as an example.

1.) Press Utility-->System-->Peripherals. Select the UP-D897 from the pull-down menu under Standard Printer Properties. Click ***Properties***.

Figure 3-17 Properties

2.) Select **Properties** from Printer pull-down menu.

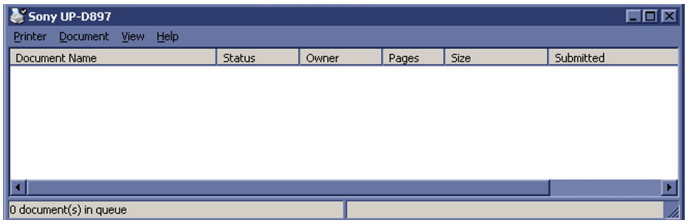


Figure 3-18 Properties

3.) Click Printing Preferences at the bottom of Properties Window.

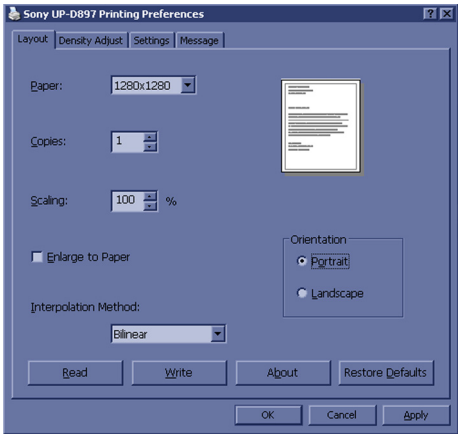


Figure 3-19 Printing Preferences

4.) Select Paper Size. Press ***Apply***. Press ***OK***.

5.) Press ***Save***, then ***Exit***.

3-6-6 Available Probes

See in specification in the LOGIQ V5/LOGIQ V3 User Reference Manual for Probes and intended use.

Table 3-16 List of Probes on LOGIQ V5/LOGIQ V3

Probe Name	Material of Headshell	Area of Using	TYPE	Catalog Number	Part Number
4C-RS	NORYL	GENERAL PURPOSE	CONVEX	H4000SR	5451471
E8C-RS	VALOX	TRANSVAGINAL TRANSRECTAL	MICRO-CONVEX	H40402LN	5409293
3Sc-RS	VALOX	CARDIAC	SECTOR	H45041DL	47237516
L6-12-RS	VALOX	SMALL PARTS PERIPHERAL VASCULAR	LINEAR	H48062AC	5454332

Section 3-7
Software/Option Configuration

Refer to the LOGIQ V5/LOGIQ V3 Basic User Manual, Chapter 16, Customizing Your System for information on configuring items like Hospital, Department, Language, Units (of measure), Date, Time and Date Format.

For information on configuring Software Options, Refer to the LOGIQ V5/LOGIQ V3 Basic User Manual, Chapter 16, Customizing Your System.

For information on configuring DICOM Connectivity, Refer to the LOGIQ V5/LOGIQ V3 Basic User Manual, Chapter 16, Customizing Your System.

Section 3-8
Connectivity Installation Worksheet

Site System Information

Site:

Dept:

LOGIQ SN:

Type:

Floor:

Room:

REV:

Comments:

CONTACT INFORMATION

Name	Title	Phone	E-Mail Address

TCP/IP Settings

Name - AE Title:

IP Settings

IP Address:

Subnet Mask:

Default Gateway:

Remote Archive Setup

Remote Archive IP:

Remote Archive Name:

Services (Destination Devices)

	Device Type	Manufacturer	Name	IP Address	Port	AE Title
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Section 3-9
Loading Base Image Software

Refer to

Section 8-3 "Loading Base Image Software" on page 8-6.

Section 3-10Software Version check out

3-10-1 Functional Check-out

1.) Power on LOGIQ V5/LOGIQ V3 scanner and wait until system booting to main screen.

2.) Press **Utility** key on control panel.

3.) Choose the **About** button on the right.

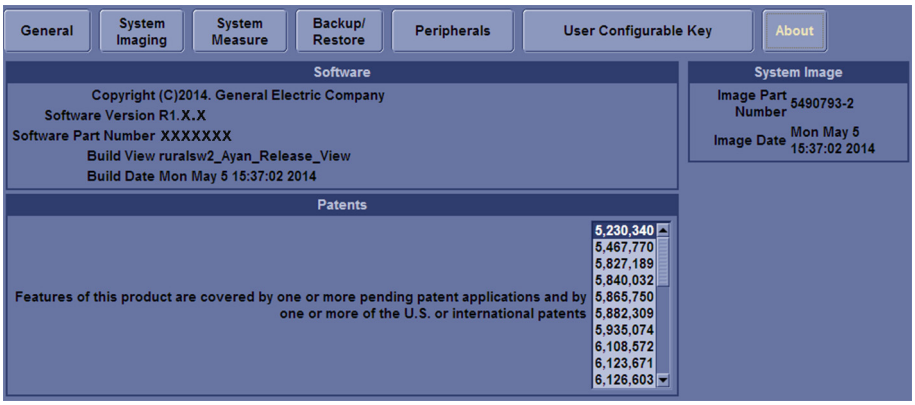


Figure 3-20 About and Software version

4.) Check whether “Software version” is the right version for use.

Section 3-11
Paperwork

NOTE: During and after installation, the documentation (i.e. User Manuals, Installation Manuals...) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

3-11-1 Product Locator Installation

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

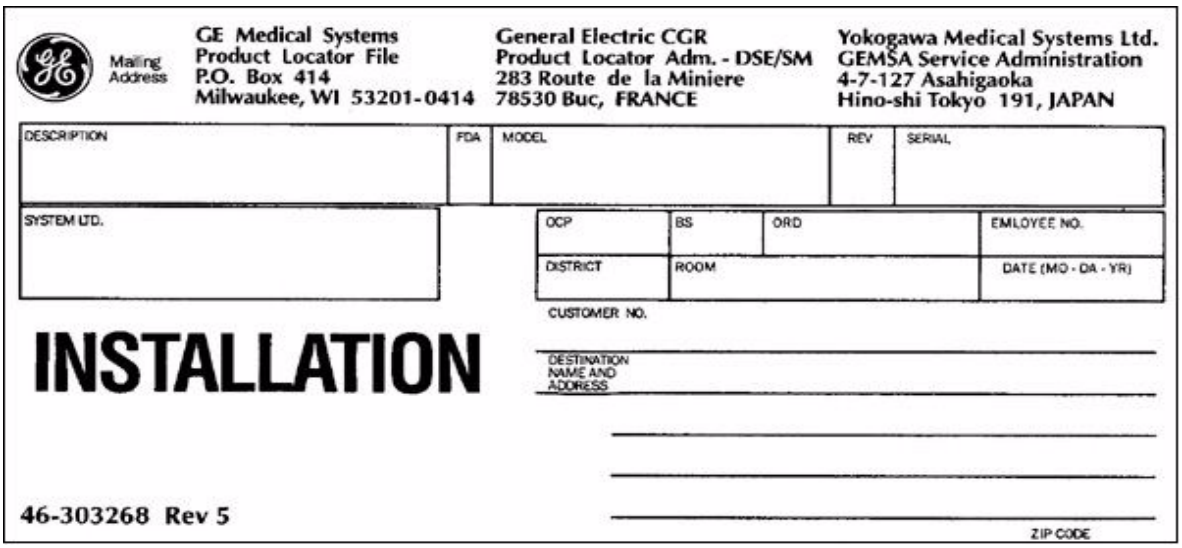


Figure 3-21 Product Locator Installation Card

3-11-2 User 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.

Chapter 4
Functional Checks

Section 4-1
Overview

4-1-1 Purpose for Chapter 4

This chapter provides procedures for quickly checking major functions of the LOGIQ V5/LOGIQ V3 console, diagnostics by using the built-in service software, and power supply.

Table 4-1 Contents in Chapter 4

Section 4-2
Required Equipment

To perform these tests, you'll need any of the sector, linear, or convex transducers.

(normally you should check all the transducers used on the system)

Section 4-3
General Procedure

CAUTION **SYSTEM REQUIRES ALL COVERS**
Operate this unit only when all board covers and frame panels are securely in place. The covers are required for safe operation, good system performance and cooling purposes.

4-3-1 Power On/Boot Up

After connect the system to the electrical supply, the power is applied to the scanner. When the Control panel ***Power On/Off*** key is pressed once, the System starts.

4-3-1-1 Scanner Power On

When power is applied to the scanner, power is distributed to the Cooling Unit, Control Panel, LCD, Peripherals and the Back-end Processor.

4-3-1-2 Turn on the system

Press the ***Power On/Off*** switch at the front of the system once.

Figure 4-1 Power On/Off Switch

When the ***Power On/Off*** switch on the Control Panel is pressed once, the Back-end Processor starts and the software code is distributed to initiate the scanner.

No status messages are displayed during this process.

4-3-2 Power Off/ Shutdown

NOTE: After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.

4-3-2-1 Back-end Processor Power Down

To power down the system:

1.) Press the ***Power On/Off*** switch at the front of the system once.

2.) The System-Exit window is displayed.

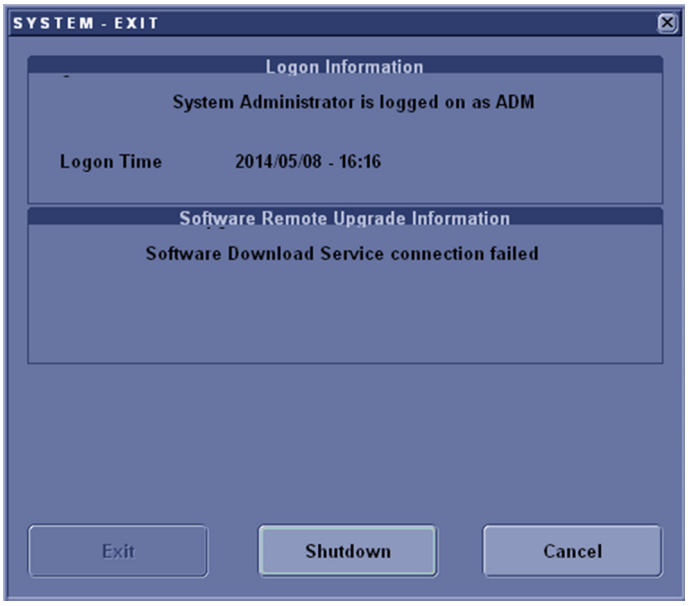


Figure 4-2 System-Exit Window

3.) Using the Set key, select Shutdown.

4.) The shutdown process takes a few seconds and the power off sequence is complete when the power status LED is turned blue.

5.) Disconnect the probes. Clean or disinfect all probes as necessary. Store them in their shipping cases to avoid damage.

4-3-2-2 Scanner 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.**

4-3-2-3 Check System Date and Time

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

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

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

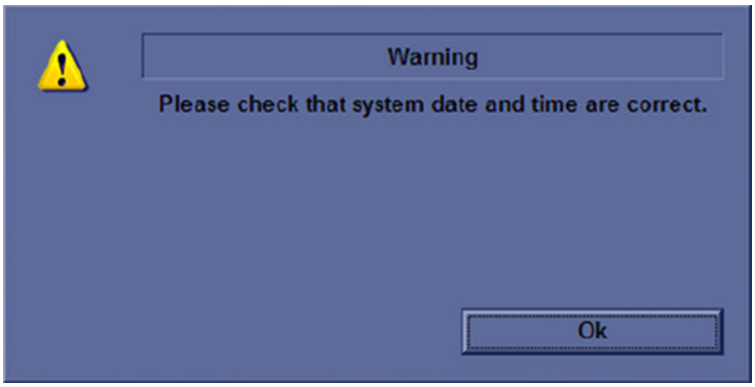


Figure 4-3 Check system date and time message

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**.

4-3-3 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 CD-R disk (or USB memory device) for reloading on the system.

⚠ **NOTICE** Presets should NOT be saved on the same CD-R disk (or USB memory device) as images. The Archive Menu lists the images but does NOT list the presets stored on a CD-R disk (or USB memory device).

4-3-3-1 Archiving Presets to an CD-R Disk (or USB memory device)

1.) Insert an empty (blank) CD-R disk into the DVD-RW.

2.) Access to the **Utility** Menu, and select **System**. The Backup sheet will be shown on the LCD display.

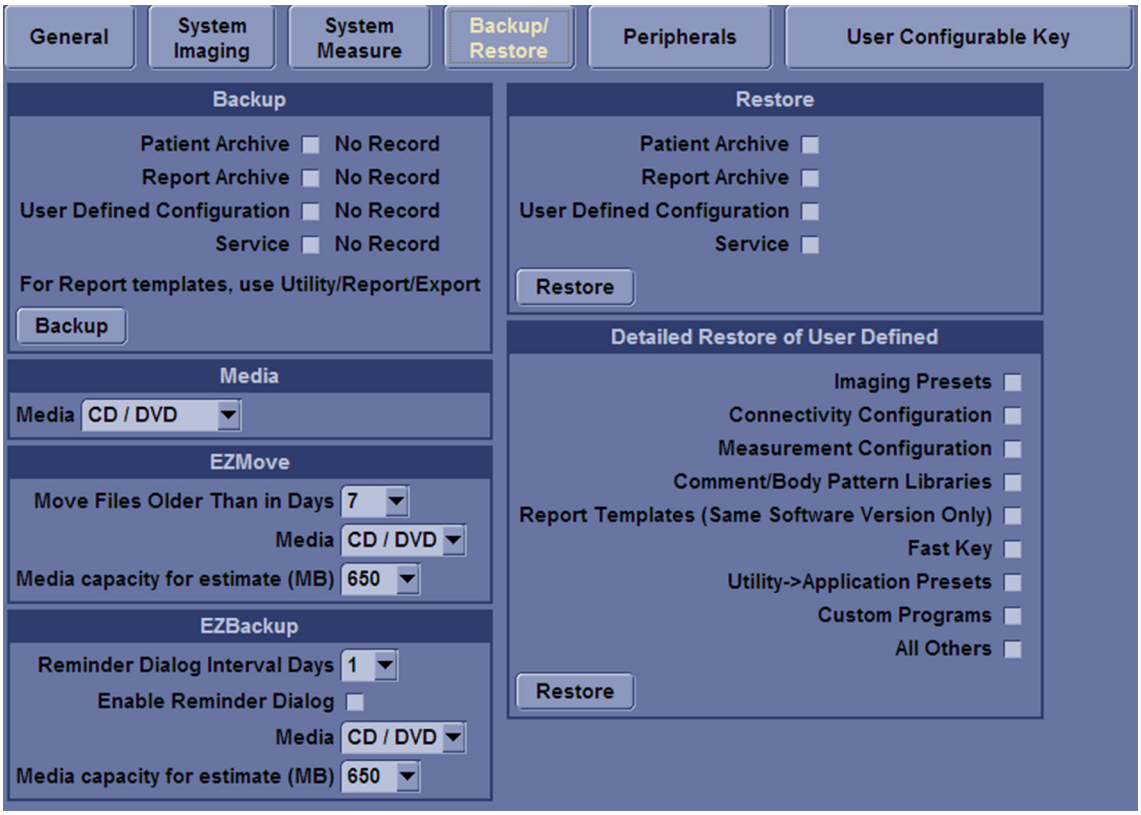


Figure 4-4 Backup Sheet

3.) Select the item to back up either from Resource Files.

4.) Enter backup destination or browse through the disk to locate the destination.

5.) Select Backup now. The backup status for each item is displayed on the Result column.

4-3-3-2 Loading Presets from an CD-R disk (or USB memory device)

1.) Insert the CD-R disk with the archived Presets into the DVD-RW.
2.) Access to the Utility Menu, and select System. The Restore sheet will be shown on the LCD display.
3.) Select the item to restore either from Resource Files.
4.) Enter restore destination or browse through the disk to locate the destination.
5.) Select Restore. The restore status for each item is displayed on the Result column.

4-3-4 Adjusting the Display Monitor

Please refer to Section 6-2 "Monitor Adjustments" on page 6-2

4-3-5 System Features

4-3-5-1 Control Panel

Figure 4-5 Control Panel Tour

1. Power On/Off 2. Rotary Button 3. Page Up/Down keys 4. TGC 5. AN Keyboard 6. User Defined Keys 7. Patient/Preset key 8. Probe key 9. User Preset key 10. Worksheet key	11. End Exam key 12. Archive key 13. Scan Coach 14. Mode/Gain 15. Cursor key 16. Clear key 17. Comment key 18. Body Pattern 19. Measure key 20. Ellipse/ Zoom key	21. M/D Cursor key 22. Scan Area key 23. Set /B Pause key 24. B Steer/ Depth key 25. AO and CHI key 26. Left/Right key 27. Freeze key 28. Print key 29. Store key

4-3-5-2 LOGIQ V5/LOGIQ V3 SoftMenu Key Tour

1.) Rotary key: Rotate to adjust the menu.

2.) Page Up/Down key: To turn the menu page up and down.

Figure 4-6 SoftMenu Key Tour

4-3-5-3 Monitor Display

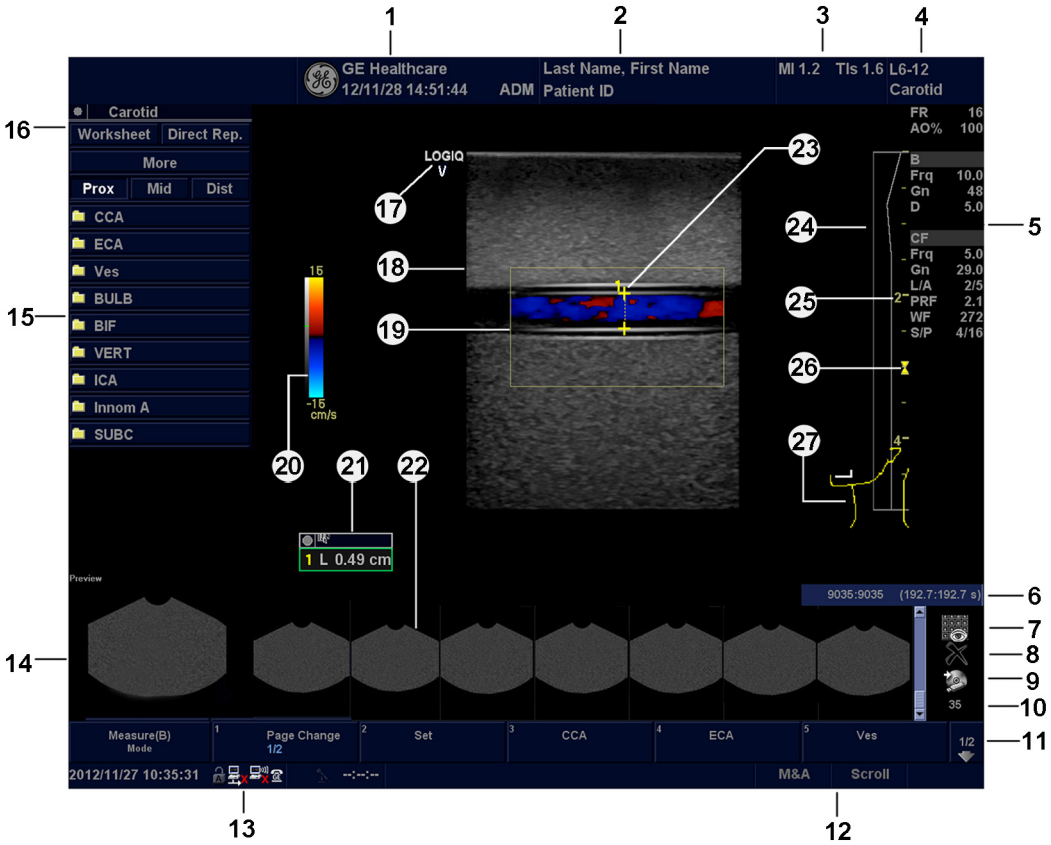


Figure 4-7 Monitor Display Tour

1. Institution/Hospital Name, Date, Time, Operator Identification.
2. Patient Name, Patient Identification.
3. Power Output Readout.
4. Probe Identifier. Exam Preset.
5. Imaging Parameters by Mode.
6. Cine Gauge.
7. Active Images screen.
8. Delete Image.
9. Save As Menu.
10. Number of Images in Exam.
11. Page Indication.
12. Touchpad Functionality Status.
13. Current date and time, Caps Lock: (lit when on), network connection indicator (PC=connected, PC with X=not connected), system messages display, InSite status, InSite controls. Image Preview
14. Image Preview.
15. Measurement Summary Window.
16. Worksheet/Direct Report.
17. Probe Orientation Marker.
18. Image.
19. Region of interest.
20. Gray/Color Bar.
21. Measurement Results Window.
22. Image Clipboard.
23. Measurement Calipers.
24. TGC.
25. Depth Scale.
26. Focal Zone Indicator.
27. Body Pattern.

4-3-6 B Mode Checks

4-3-6-1 Preparations

1.) Connect one of the probes listed in 3-6-6 "Available Probes" on page 3-23, in Chapter 3 Installation to the System probe connector.

2.) Turn ON the scanner (if it isn't turned on already).

Figure 4-8 Controls available in B Mode

Figure 4-9 B Mode Screen Picture Example

4-3-6-2 B Mode Controls

Table 4-2 B Mode Controls

Control	Possible Bioeffect	Description/Benefit
Depth	Yes	Depth controls the distance over which the B-Mode images anatomy. To visualize deeper structures, increase the depth. If there is a large part of the display which is unused at the bottom, decrease the depth.
Gain	No	B-Mode Gain increases or decreases the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated.
Focus	Yes	Increases the number of focal zones, moves the focal zone(s) and change the zone width so that you can tighten up the beam for a specific area. A graphic caret corresponding to the focal zone position(s) appears on the right edge of the image.
Auto Optimize	No	Auto Optimize (Auto) lets you optimize the image based upon a the actual B Mode image data (Auto Tissue Optimize, ATO). The preset levels (Low, Medium, and High) allow you to pick a preference for the contrast enhancement in the resulting image. Low does the least amount of contrast enhancement, high does the most. Auto is available in single or multi image, on live, frozen or CINE images (in B-Mode only), and while in zoom and in Spectral Doppler. Auto in PW Doppler Mode(ASO) optimizes the spectral data. Auto adjusts the Velocity Scale/PRF (live imaging only), baseline shift, dynamic range, and invert (if preset). Upon deactivation, the spectrum is still optimized.
Mode Cursor	No	Displays the M/D-Mode cursor on the B-Mode image.
CrossXBeam	Yes	CrossXBeam is the process of combining three or more frames from different steering angles into a single frame. CrossXBeam is available on Convex and Linear probes. CrossXBeam combines multiple co-planar images from different view angles into a single image at real-time frame rates, using bi-cubic interpolation.
Coded Harmonic Imaging (CHI)	Yes	Enhances image resolution and improved small parts imaging.
Frequency	Yes	Multi Frequency mode lets you downshift to the probe's next lower frequency or shift up to a higher frequency.
Steer	Yes	You can slant the B-Mode or Color Flow linear image left or right to get more information without moving the probe. The angle steer function only applies to linear probes.
Virtual Convex	Yes	On Linear and Sector probes, Virtual Convex provides a larger field of view in the far field.
TGC	No	TGC amplifies returning signals to correct for the attenuation caused by tissues at increasing depths. TGC slide pots are spaced proportionately to the depth. The area each pot amplifies varies as well. A TGC curve may appear on the display (if preset), matching the controls that you have set (except during zoom). You can choose to deactivate the TGC curve on the image.
Width	Yes	You can widen or narrow the size of the sector angle to maximize the image's region of interest (ROI).

Table 4-2 B Mode Controls

Control	Possible Bioeffect	Description/Benefit
Tilt	Yes	You can steer the sector angle to get more information without moving the probe while in B-Mode, M-Mode, Doppler Mode, and Color Flow Mode.
Reverse	No	Flips the image 180 degrees left/right.
Dynamic Range	No	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.
Line Density	Yes	Optimizes B-Mode frame rate or spatial resolution for the best possible image.
Map	No	The system supplies B, M, and Doppler Mode system maps.
Frame Average	No	Temporal filter that averages frames together, thereby using more pixels to make up one image. This has the effect of presenting a smoother, softer image.
Colorize	No	Colorize is the colorization of a conventional B-Mode image or Doppler Spectrum to enhance the user's ability to discern B, M, and Doppler Mode intensity valuations. Colorize is NOT a Doppler Mode. NOTE: You can colorize realtime or CINE images or Timeline CINE. Colorizes the gray scale image to enhance the eye's discrimination capability. Spectrum Colorize colorizes the spectrum as a function of power using the inverse of the Colorize map for the signal intensity in each Doppler line. Colorize enhances the visibility of the spectrum's characteristics and enhances your ability to identify spectral broadening and the edge contours of the spectrum used to define the peak frequency/velocity. The colorize bar displays while Colorize is activated.
Edge Enhance	No	Edge Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures.
Rotation	No	You can flip the image up/down. **CAUTION:** When reading an rotated image, be careful to observe the probe orientation to avoid possible confusion over scan direction or left/right image reversal.
Rejection	No	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).
Suppression	No	Suppresses the noise in the image.

Table 4-2 B Mode Controls

Control	Possible Bioeffect	Description/Benefit
SRI-HD	No	SRI-HD (Speckle Reduction Imaging High Definition) is an adaptive algorithm to reduce the unwanted effects of speckle in the ultrasound image. Image speckle usually appears as a grainy texture in otherwise uniform areas of tissue. Its appearance is related to image system characteristics, rather than tissue characteristics, so that changes in system settings, such as probe type, frequency, depth, and others, can change the appearance of the speckle. Too much speckle can impair image quality and make it difficult to see the desired detail in the image. Likewise, too much filtering of speckle can mask or obscure desired image detail. Extra care must be taken to select the optimal SRI-HD level. SRI-HD is available in 2D imaging and may be used with any transducer or clinical application when image speckle appears to interfere with the desired image detail.
LOGIQ View (Option)	No	LOGIQ View provides the ability to construct and view a static 2D image which is wider than the field of view of a given transducer. This feature allows viewing and measurements of anatomy that is larger than what would fit in a single image. Examples include scanning of vascular structures and connective tissues in the arms and legs. LOGIQ View constructs the extended image from individual image frames as the operator slides the transducer along the surface of the skin in the direction of the scan plane. The quality of the resulting image is somewhat user-dependent and requires some additional skill and practice to develop proper technique and become fully proficient. LOGIQ View is not available for the following: Multi Image, Timeline Modes, Color Flow Mode or PDI Mode.

4-3-7 M Mode Controls

4-3-7-1 Preparations

1.) Connect one of the probes listed in 3-6-6 "Available Probes" on page 3-23, in Chapter 3 Installation to the System probe connector.

2.) Turn ON the scanner (if it isn't turned on already).

Figure 4-10 Controls available in M Mode

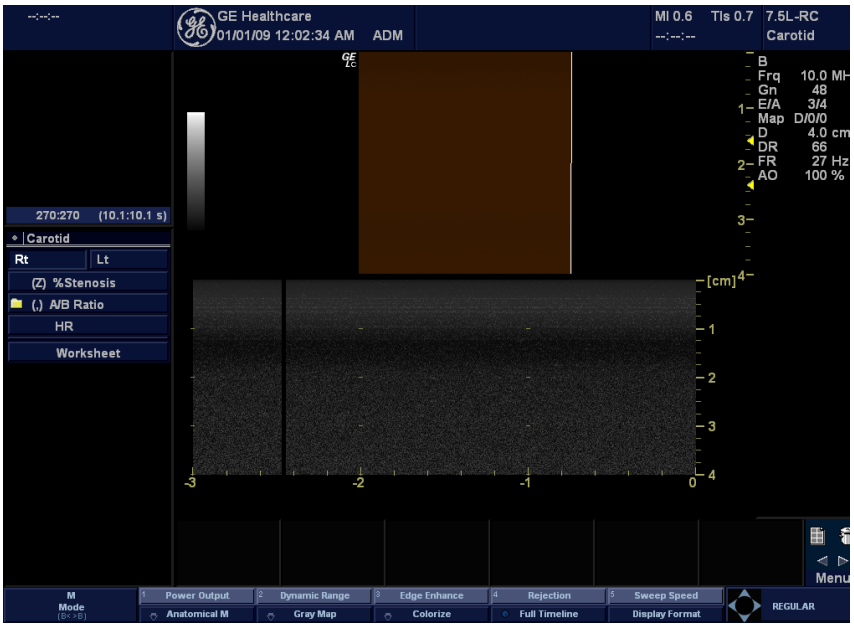


Figure 4-11 M Mode Screen Picture Example

4-3-7-2 M Mode Controls

Table 4-3 M Mode Controls

Control	Possible Bioeffect	Description/Benefit
Sweep Speed	No	Changes the speed at which the timeline is swept. Available in M-Mode, Doppler Mode and M Color Flow Mode.
Anatomical M-Mode (option)	Yes	Anatomical M-Mode gives you the ability to manipulate the cursor at different angles and positions. The M-Mode display changes according to a motion of the M cursor.

4-3-8 Doppler Mode Checks

4-3-8-1 Preparations

1.) Connect one of the probes listed in 3-6-6 "Available Probes" on page 3-23, in Chapter 3 Installation to the System probe connector.

2.) Turn ON the scanner (if it isn't turned on already).

Figure 4-12 Controls available in Doppler Mode

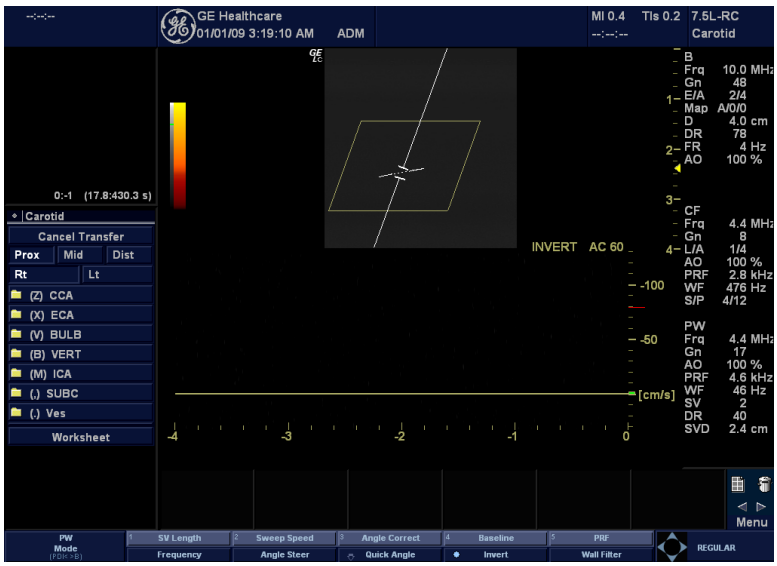


Figure 4-13 Doppler Mode Screen Picture Example

4-3-8-2 Doppler Mode Controls

Table 4-4 Doppler Mode Controls

Control	Possible Bioeffect	Description/Benefit
Auto Spectral Optimize [ASO] (Auto)	Yes	Auto in Doppler Mode optimizes the spectral data. Auto adjusts the Velocity Scale/PRF (on live images only), baseline shift, Dynamic Range and invert (if preset). The benefit of Auto can be found in reduced optimization time and a more consistent and accurate optimization process.
Update	Yes	Toggles between simultaneous and update presentation while viewing the timeline.
Doppler sample volume gate position	Yes	Moves the sample volume gate on the B-Mode's Doppler Mode cursor. The gate is positioned over a specific position within the vessel.
Doppler sample volume length	Yes	Sizes the sample volume gate.
Scale (Velocity Scale)	Yes	Adjusts the velocity scale to accommodate faster/ slower blood flow velocities. Velocity scale determines pulse repetition frequency. If the sample volume gate range exceeds single gate Scale capability, the system automatically switches to high PRF mode. Multiple gates appear, and HPRF is indicated on the display.
Angle Correct	No	Estimates the flow velocity in a direction at an angle to the Doppler vector by computing the angle between the Doppler vector and the flow to be measured. *NOTE: When the Doppler Mode Cursor and angle correct indicator are aligned (the angle is O), you cannot see the angle correct indicator.*
Quick Angle	No	Quickly adjusts the angle by 60 degrees.
Wall Filter	No	Insulates the Doppler signal from excessive noise caused from vessel movement.
Baseline	No	Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing.
Mode Cursor	No	Displays the Doppler Mode cursor on the B-Mode image.
Steer and Fine Steer	Yes	You can slant the ROI of the Color Flow linear image left or right to get more information without moving the probe. The angle steer function only applies to linear probes.
Volume	No	Controls audio output.
Invert	No	Vertically inverts the spectral trace without affecting the baseline position.
Compression	No	Dynamic range controls how echo intensities are converted to shades of gray, thereby increasing the range of contrast you can adjust.
Trace Method	No	Traces the average mean and peak velocities in realtime or frozen images.
Cycles to Average	No	The average value over a number of cycles (from 1-5).
Trace Sensitivity	No	Adjust the trace to follow the waveform for signal strength.
Trace Direction	No	Specifies trace direction.

Table 4-4 Doppler Mode Controls

Control	Possible Bioeffect	Description/Benefit
Display Format	No	Changes the horizontal/vertical layout between B-Mode and M-Mode, or timeline only.
Modify Auto Calcs	No	Activates the menu to select which calculations are automatically calculated.
Auto Calcs	No	Activates the calculation automatically which you select in the Modify Auto Calculation when the system is in a state of freeze or live.
Simultaneous (Duplex/Triplex)	Yes	When you select Duplex or Triplex, everything is live. For example, both B-Mode and PW/CW Doppler Modes are active if Duplex is selected. When Triplex is selected, B-Mode, PW/CW Doppler Mode, and CF Doppler Modes are active. If Duplex/Triplex is not selected, use M/D Cursor or Update to toggle between modes.

4-3-9 Color Flow Mode Checks

NOTE: Color Flow Mode only support by LOGIQ V5.

4-3-9-1 Preparations

1.) Connect one of the probes listed in 3-6-6 "Available Probes" on page 3-23, in Chapter 3 Installation to the System probe connector.

2.) Turn ON the scanner (if it isn't turned on already).

Figure 4-14 Controls available in Color Flow Mode

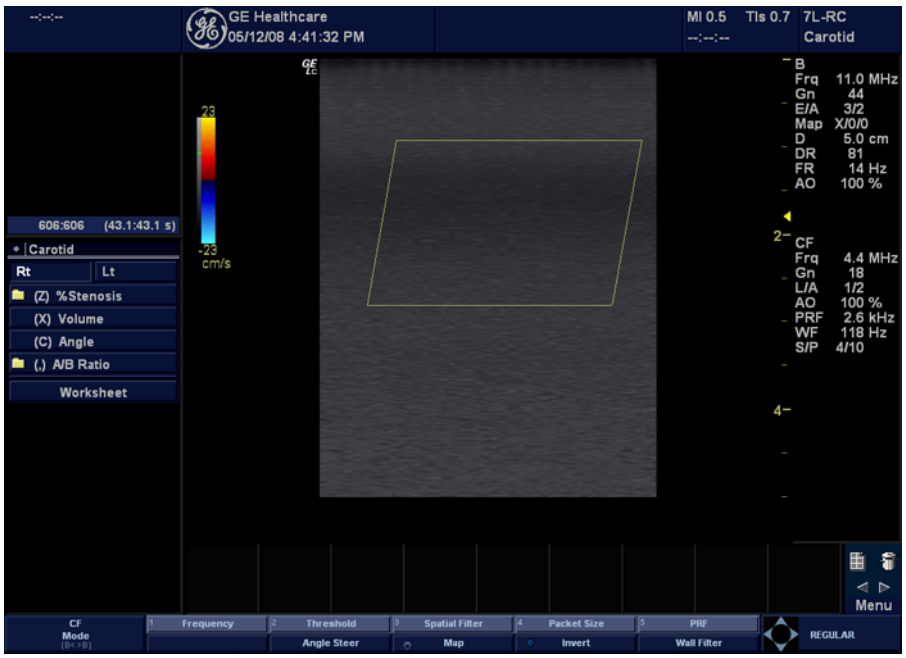


Figure 4-15 CFM Mode Screen Picture Example

4-3-9-2 Color Flow Mode Controls

Table 4-5 Color Flow Mode Controls

Control	Possible Bioeffect	Description/Benefit
Flow Selection	No	In the Lower Extremity Vein (LEV) and Abdominal applications, you can quickly select the flow state via a shortcut on the Color Flow Mode menu.
Gain	No	Gain amplifies the overall strength of echoes processed in the Color Flow window or spectral Doppler timeline.
Scale (Velocity Scale)	Yes	Increases/decreases the Scale on the color bar.
Wall Filter	No	Filters out low flow velocity signals. It helps get rid of motion artifacts caused from breathing and other patient motion.
Size/Position	Yes	Adjust size and position of the color window.
Invert (Color Invert)	No	Lets you view blood flow from a different perspective, e.g., red away (negative velocities) and blue toward (positive velocities). You can invert a real-time or frozen image. *NOTE: Invert reverses the color map, NOT the color PRF.*
Baseline	No	Changes the Color Flow or Doppler spectrum baseline to accommodate higher velocity blood flow. Minimizes aliasing by displaying a greater range of forward flow with respect to reverse flow, or vice versa. Baseline adjusts the alias point. The default baseline is at the midpoint of the color display and at the midpoint of the color bar reference display.
Angle Steer	Yes	You can slant the ROI of the Color Flow linear image left or right to get more information without moving the probe. The Angle Steer function only applies to linear probes.
Accumulation	No	Accumulation enhances the flow in an image. Available in Color Flow, PDI, and B Flow.
Color Flow Line Density	Yes	Optimizes the Color Flow frame rate or spatial resolution for the best possible color image.
Map	No	Allows you to select a specific color map. After you have made your selection, the color bar displays the resultant map.
Map Compress	No	Change the gradation of color map.
Threshold	No	Threshold assigns the gray scale level at which color information stops.
Frame Average	No	Averages color frames.
Transparency Map	No	Brings out the tissue behind the color map.
Spatial Filter	No	Smooths out the color, makes it look less pixely.
Flash Suppression	No	Activates/deactivates Flash Suppression, a motion artifact elimination process.
Packet Size	Yes	Controls the number of samples gathered for a single color flow vector.
Sample Volume	Yes	Adjusts the size of the color flow doppler transmit wave (or pulse) and size (or length). Lower setting gives better flow resolution and a higher setting increases sensitivity.

Table 4-5 Color Flow Mode Controls

Control	Possible Bioeffect	Description/Benefit
CF/PDI Auto Sample Volume	Yes	Set the default value at Utility -> Imaging -> CF Mode.
CF/PDI Focus Depth	Yes	
CF/PDI Frequency	Yes	
CF/PDI Auto Frequency	Yes	
CF/PDI Center Depth	Yes	
PDI	Yes	Power Doppler Imaging (PDI) is a color flow mapping technique used to map the strength of the Doppler signal coming from the tissue rather than the frequency shift of the signal. Using this technique, the ultrasound system plots color flow based on the number of reflectors that are moving, regardless of their velocity. PDI does not map velocity, therefore it is not subject to aliasing.
TVI (Option)	Yes	Tissue Velocity Imaging (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 gray scale imaging during one or several cardiac cycles with high temporal resolution.
TVD	Yes	TVD: Tissue Velocity Doppler: basing on TVI mode, activate a sample volume of PW ventricular wall to get the spectral information of the sample section.

4-3-10 Basic Measurements

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

4-3-10-1 Distance and Tissue Depth Measurements

1.) Press **Measure** once, an active caliper displays.
2.) To position the active caliper at the start point (distance) or the most anterior point (tissue depth), move the **Trackball**.
3.) To fix the start point, press ***Set/ B Pause***. The system fixes the first caliper and displays a second active caliper.
4.) To position the second active caliper at the end point (distance) or the most posterior point (tissue depth), move the **Trackball**.
5.) To complete the measurement, press **Set**. The system displays the distance or tissue depth value in the measurement results window.

Before you complete a measurement:

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

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

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

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

4-3-10-2 Circumference/Area (Ellipse) Measurement

1.) Press **Measure** once; an active caliper displays.
2.) To position the active caliper, move the **Trackball**.
3.) To fix the start point, press ***Set/ B Pause***. The system fixes the first caliper and displays a second active caliper.
4.) To position the second caliper, move the **Trackball**.
5.) Rotate the **Ellipse** button; an ellipse with an initial circle shape appears.

NOTE: Be careful not to press the Ellipse control as this activates the Zoom.

6.) To position the ellipse and to size the measured axes (move the calipers), move the **Trackball**.
7.) To increase/ decrease the size, Rotate the **Ellipse** button.
8.) To toggle between active calipers, *rotate **Cursor Select** button*.
9.) To complete the measurement, press ***Set/ B Pause***. The system displays the circumference and area in the measurement results window.

Before you complete a measurement:

- To erase the ellipse and the current data measured, press ***Clear*** once. The original caliper is displayed to restart the measurement.
- To exit the measurement function without completing the measurement, press ***Clear*** a second time.

4-3-10-3 Worksheets

Measurement/Calculation worksheets are available to display and edit measurements and calculations. There are generic worksheets as well as Application specific worksheets. The worksheets are selected from the Measurement Touch Panel.

4-3-10-4 Report Pages

Measurements/Calculations that are included on the worksheet can also be displayed on Report Pages. Report Pages can be customized to meet the appropriate needs of the user.

4-3-11 Probe/Connectors Usage

4-3-11-1 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.) 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.
6.) Carefully position the probe cord so it is free to move and is not resting on the floor.

4-3-11-2 Activating the probe

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

4-3-11-3 Deactivating the probe

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

4-3-11-4 Disconnecting the probe

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

1.) Unlock the probe.
2.) Pull the probe and connector straight out of the probe port.
3.) Carefully slide the probe and connector away from the probe port and around the right side of the keyboard.
4.) Ensure the cable is free.
5.) Be sure that the probe head is clean before placing the probe in its storage box.

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

4-3-12 Using Cine

4-3-12-1 Activating CINE

Press **Freeze**, then roll the **Trackball** to activate CINE. To start CINE Loop playback, rotate **Run/Stop** button. To stop CINE Loop playback, rotate **Run/Stop** button.

4-3-12-2 Quickly Move to Start/End Frame

Rotate ***First*** button to move to the first CINE frame; rotate ***Last*** *button* to move to the last CINE frame.

4-3-12-3 Start Frame/End Frame

Rotate the ***Start Frame*** button to move to the beginning of the CINE Loop. Rotate the ***Start Frame*** clockwise to move forward through the CINE Loop. Rotate the ***Start Frame*** anticlockwise to move backward through the CINE Loop.

Rotate the ***End Frame*** button to move to the end of the CINE Loop. Rotate the ***End Frame*** button clockwise to move forward through the CINE Loop. Rotate the ***End Frame*** anticlockwise to move backward through the CINE Loop.

4-3-12-4 Adjusting the CINE Loop Playback Speed

Rotate the ***Loop Speed*** button to increase/decrease the CINE Loop playback speed.

4-3-12-5 Moving through a CINE Loop Frame By Frame

Rotate the ***Frame by Frame*** button to move through CINE memory one frame at a time.

4-3-13 Backup and Restore Database, Preset Configurations and Images

4-3-13-1 Formatting Media

1.) To format the backup media, enter **Utility-> Connectivity->Removable Media**.

2.) Select the media type from the drop down menu.

3.) Enter the label for the media as shown in Figure 4-16 on page 4-25. It is best to use all capital letters with no spaces or punctuation marks. Select **Format**.

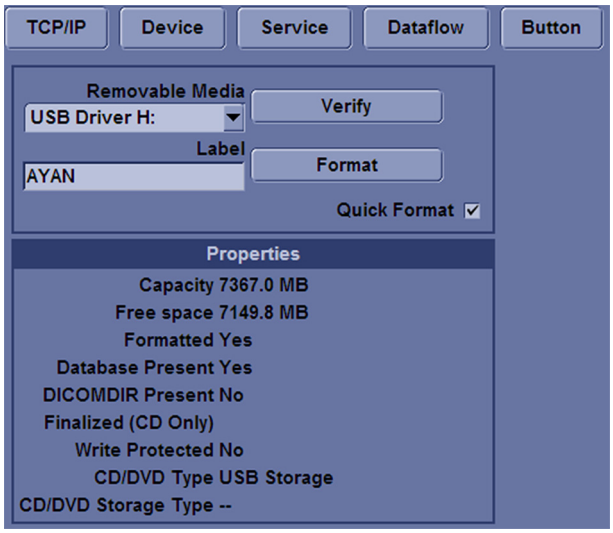


Figure 4-16 Format and Verify Media

4.) The system displays a pop-up menu, as shown in Figure 4-18 on page 4-26, select **OK** to continue.

Figure 4-17 Format Warning Pop-up Window

5.) If desired, verify that the format was successful by returning to **Utility-> Connectivity->Removable Media** and selecting **Verify** as shown in Figure 4-16 on page 4-25.

4-3-13-2 Backup System Presets and Configurations

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

1.) Insert a formatted media into the drive.

2.) Enter enter **Utility-> System-> Backup/Restore**.

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

3.) In the Backup list, select **Patient Archive**, **Report Archive**, **User Defined Configuration** and **Service**.

4.) In the Media field, select CD/DVD (or USB memory device).

5.) Select **Backup**, as shown in Figure 4-18 on page 4-26.

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

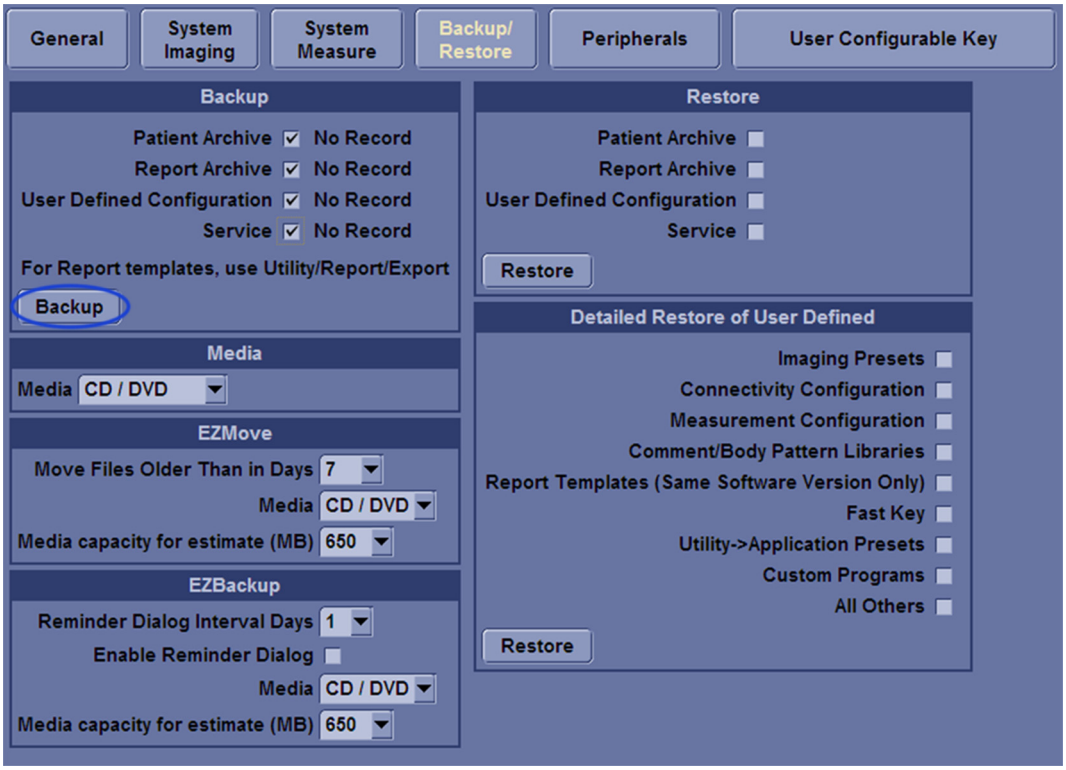


Figure 4-18 Backup/Restore Menu

4-3-13-3 Restore System Presets and Configurations

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

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

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

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

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

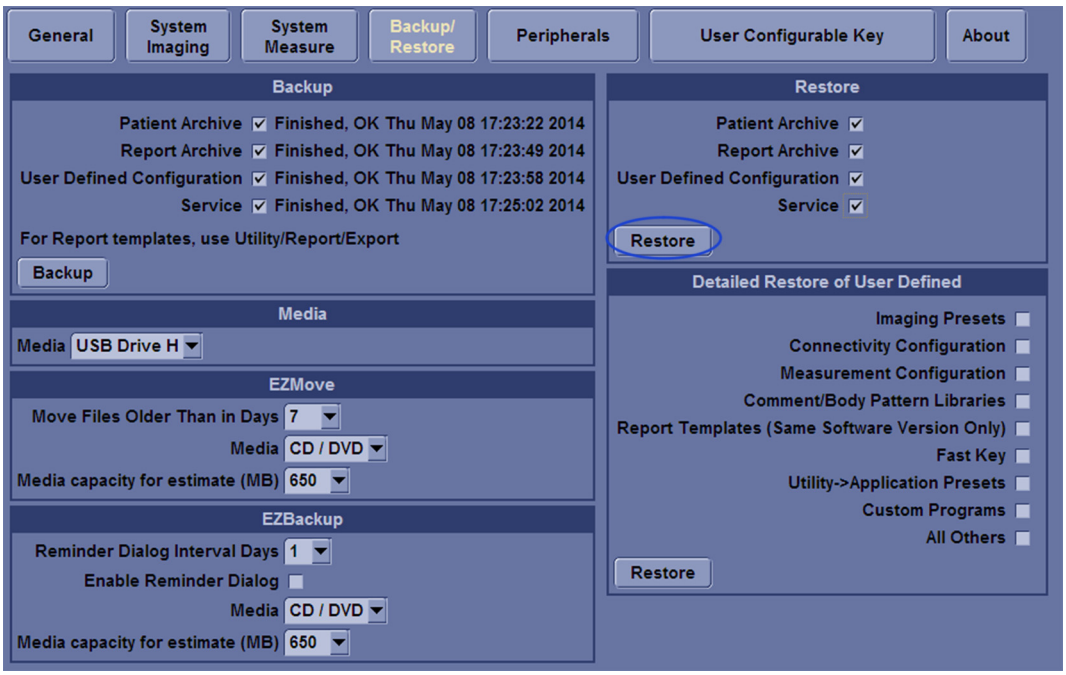


Figure 4-19 Backup/Restore Menu

4-3-13-4 Archiving Images

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

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

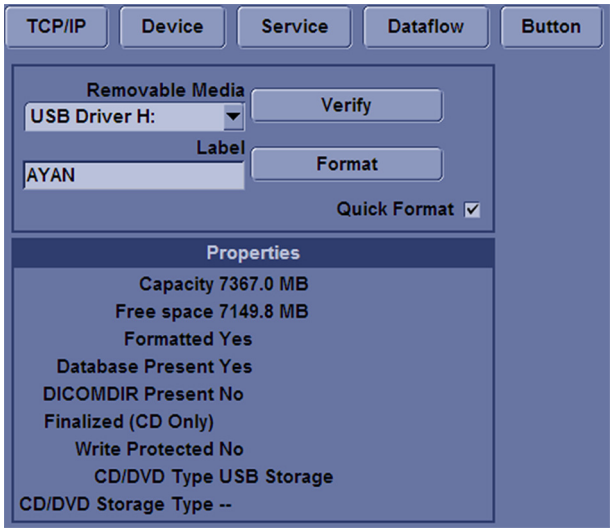


Figure 4-20 Format Media Screen

5.) Enter **Utility**-> **System**-> **Backup/Restore**,
6.) Select “Move File Older Than in Days”.

Figure 4-21 EZBackup/Move

4-3-13-4 Archiving Images (cont'd)

7.) Go to **Archive** menu and select **EZBackup/EZMove**, the EZBackup/EZMove wizard starts.

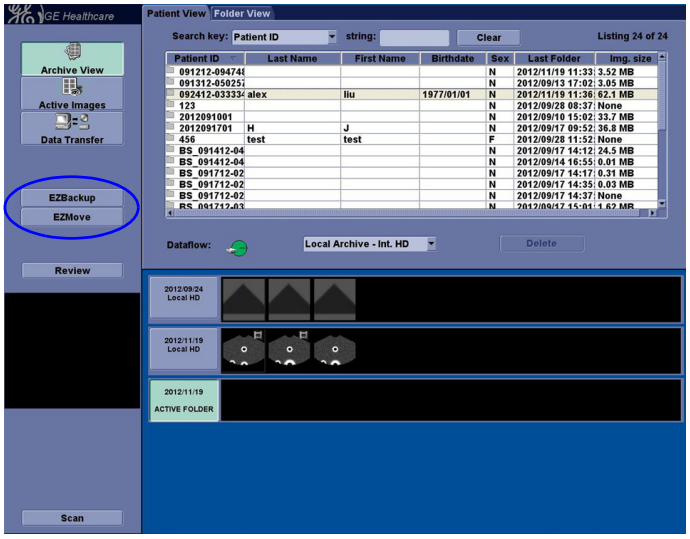


Figure 4-22 Archive Screen

8.) Verify the information on the first page of EZBack/EZMove wizard, then select **Next**.

If you want to backup all of the exams in the range (even if the exam was previously backed up), check this option. If you uncheck this option, the system only backs up exams which have not yet been backed up.

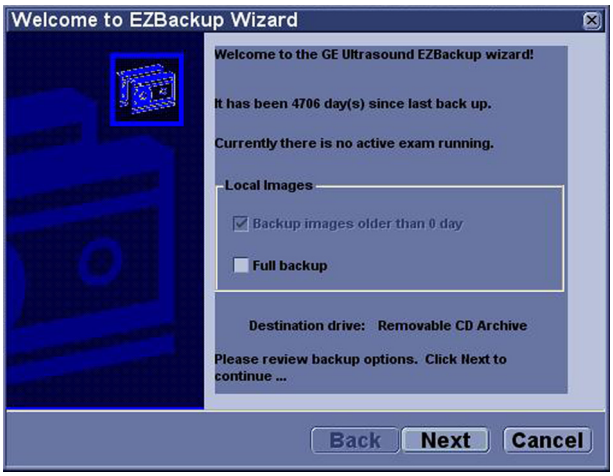


Figure 4-23 EZBackup Wizard 1

4-3-13-4 Archiving Images (cont'd)

9.) It indicates the size of the data and the storage. Select **Next** to continue.

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

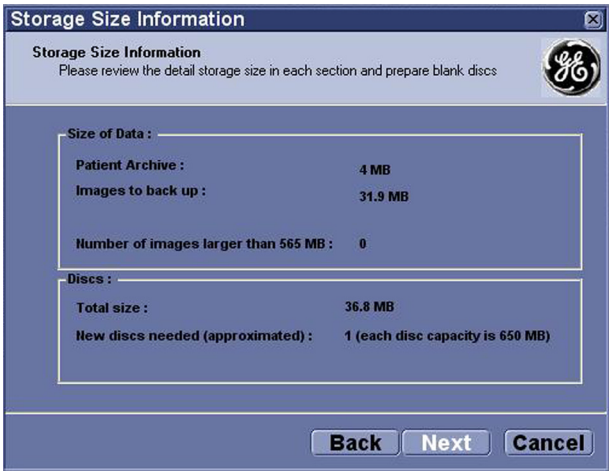


Figure 4-24 EZBackup Wizard 2

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

Figure 4-25 Insert Media Message

4-3-13-4 Archiving Images (cont'd)

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

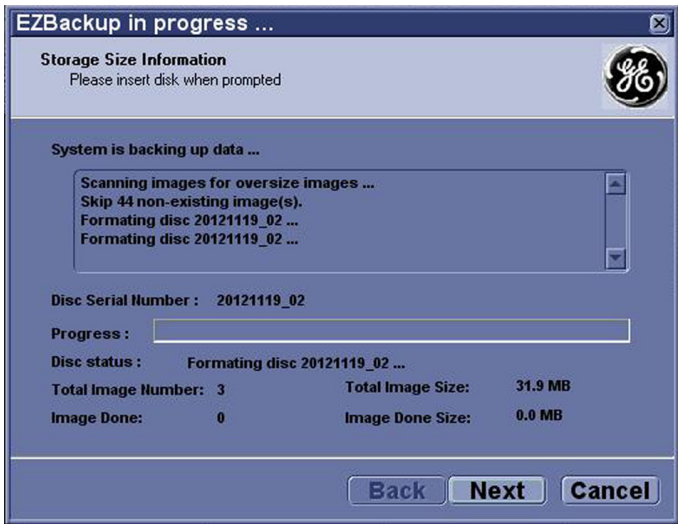


Figure 4-26 EZBackup Wizard 3

NOTE: If you need to insert the next media, a message appears providing you with the media label. Label the media, then insert the next media and press OK.

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

Figure 4-27 EZBackup Completion Window

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

Section 4-4
Software Configuration Checks

Table 4-6 Software Configuration Checks

Step	Task to do	Expected Result(s)
1.	Check Date and Time setting	Date and Time are correct
2.	Check that Location (Hospital Name) is correct	Location Name is correct
3.	Check Language settings	Desired Language is displayed
4.	Check assignment of Printer Keys	The default function for Store and Print Keys are Store (store image), Print (print). Store and Print Keys can also be assigned as desired by the customer
5.	Check that all of the customer's options are set up correct	All authorized functions are enabled

Section 4-5
Peripheral Checks

Check that peripherals work as described below:

Table 4-7 Peripheral Checks

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

Chapter 5
Components and Functions (Theory)

Section 5-1
Overview

5-1-1 Purpose of Chapter 5

This chapter explains LOGIQ V5/LOGIQ V3 system concepts, component arrangement, and subsystem function.

Table 5-1 Contents in Chapter 5

Section 5-2
Block Diagram

5-2-1 System Diagram

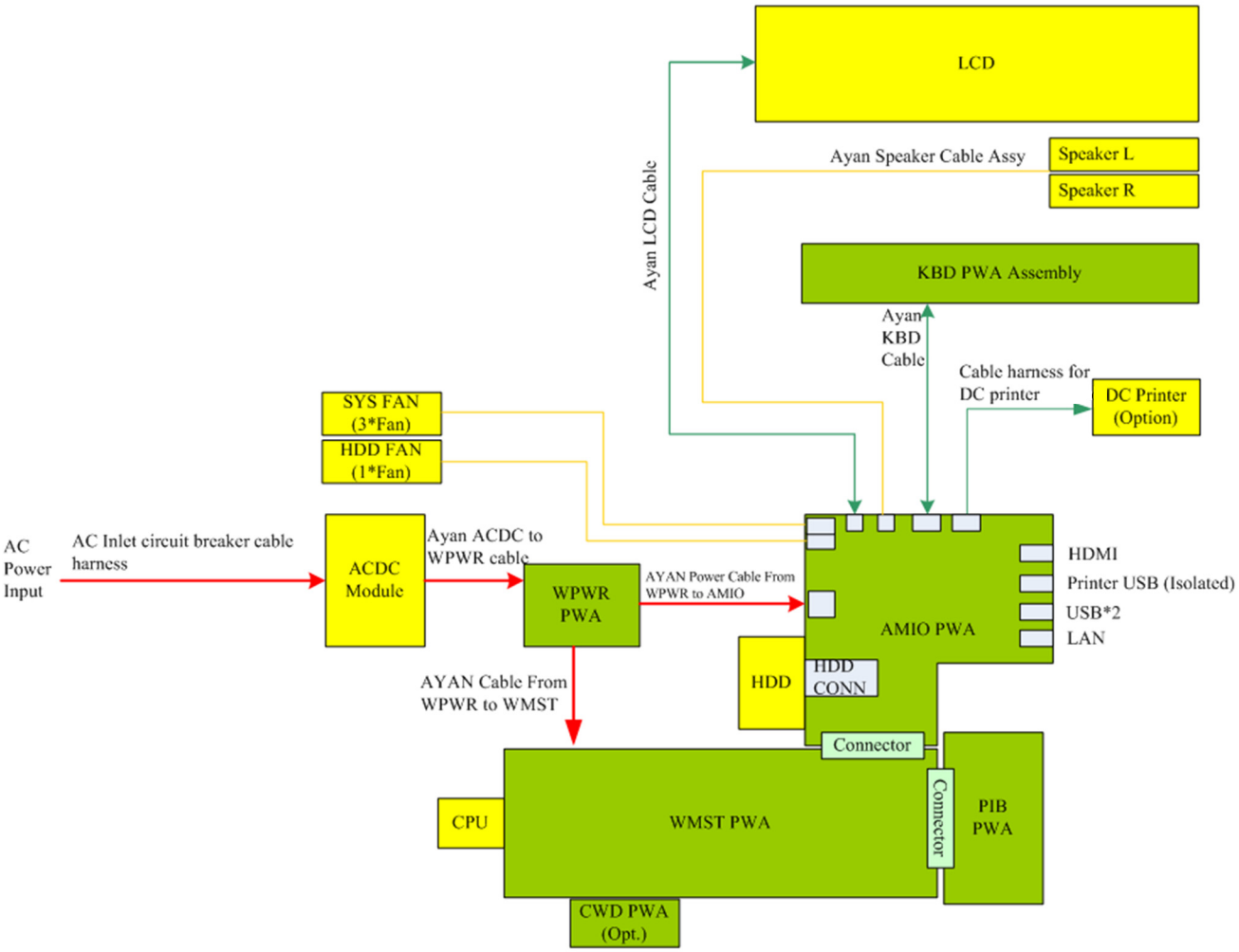


Figure 5-1 LOGIQ V5/LOGIQ V3 System Diagram

Section 5-3
Common Service Platform

5-3-1 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.

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Chapter 6
Service Adjustments

Section 6-1
Overview

6-1-1 Purpose of this chapter 6

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

Table 6-2 Contents in chapter 6

Section 6-2
Monitor Adjustments

6-2-1 Adjustments Procedures

To adjust the brightness: Press **Home** and **End** button on the keyboard.

Figure 6-2 Light Adjustment

Chapter 7
Diagnostics/Troubleshooting

Section 7-1
Overview

7-1-1 Purpose of Chapter 7

This section describes how to setup and run the tools and software that help maintain image quality and system operation. Very basic host, system and board level diagnostics are run whenever power is applied. Some Service Tools may be run at the application level. However most software tests are required.

Table 7-3 Contents in Chapter 7

Section 7-2
Gathering Trouble Data

7-2-1 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.

7-2-2 Collect Vital System Information

The following information is necessary in order to properly analyze data or images being reported as a malfunction or being returned to the manufacturer:

- Product Name = LOGIQ V5/LOGIQ V3

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

Applications Software

- Software Version
- Software Part Number

System Image Software

- Image Revision
- Image Part Number

7-2-3 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 the following logs:

- Keyboard Shadow Log
- Error Logs
- Crash Log
- Power Supply
- Temperature

NOTE: Power Supply and Temperature logs are not currently being updated by the LOGIQ V5/LOGIQ V3.

This Alt-D function is available at all times.

Figure 7-1ALT-D Dialog Box

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

- A place to enter a description of the problem
- A choice to store to a pre-formatted CD-R, RD (Removable Disk) or to the *Export* directory D: drive.

The subsequent file is compressed and time stamped. The screen capture is a bitmap which eliminates the possibility of artifacts from compression.

Section 7-3
Screen Captures

There may be times when the operator 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.

7-3-1 Check and Record the Store Key Function

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

1.) Press ***Utility*** on the keyboard.
2.) Select ***Connectivity*** from the **Utilities** Menu.
3.) Select the ***Button*** tab on the **Connectivity** screen.
4.) In the *Physical Print Buttons* field, select Store.

The Connectivity/Buttons Screen will be displayed as shown in Figure 7-2 on page 7-4.

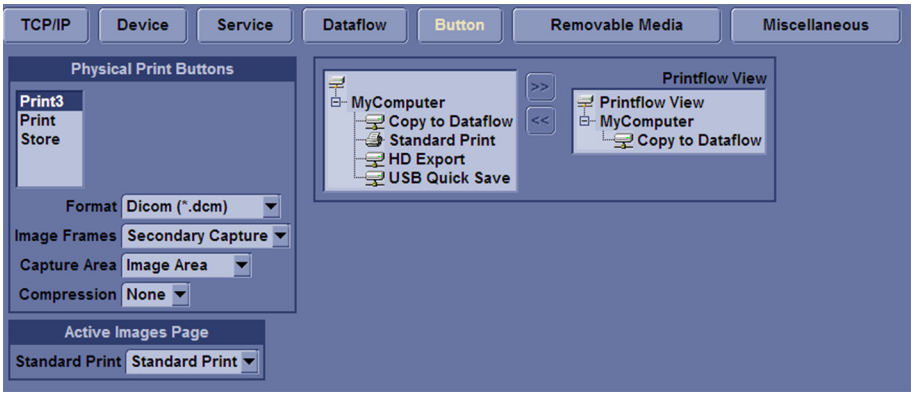

Figure 7-2 Define Store Key Operation

If Store key is not set to Whole Screen, as shown in Figure 7-2 on page 7-4, proceed to step 5 to record the customer's customized settings.

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.

7-3-2 Setting the Store Key to Screen Capture

If the Store Key is not set to screen capture:

1.) While on the Connect screen, with the Buttons 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 Store Key should now be set up for whole screen capture, sending the screens to the image buffer (clipboard).

7-3-3 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.

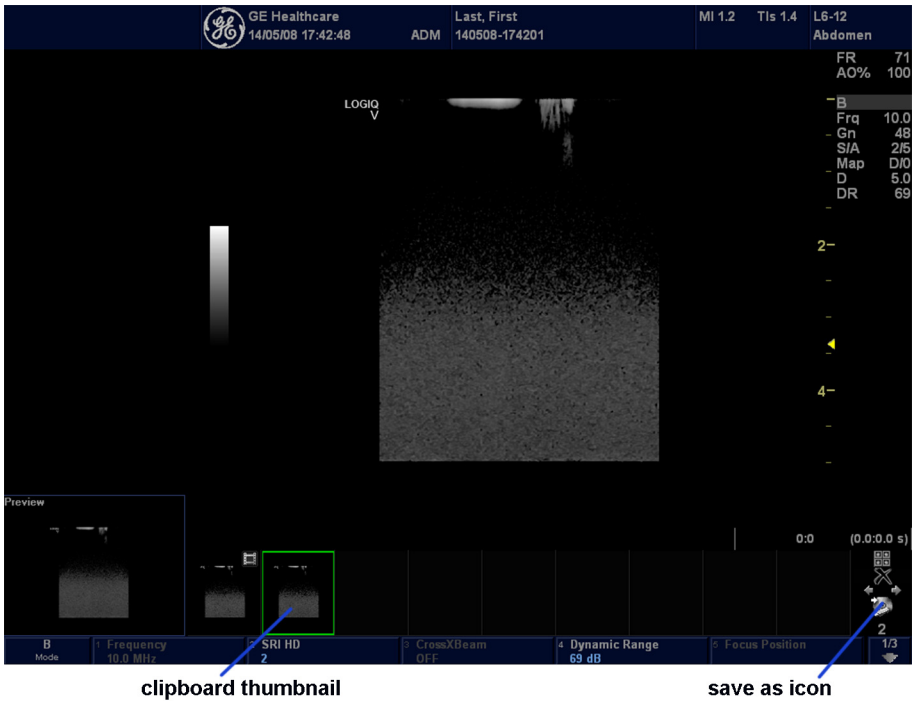

Figure 7-3 Select Image to Capture

3.) Press **Freeze** to unfreeze the image to view the image screen and the snapshots displayed on the bottom.

4.) Highlight the snapshot to be stored.

5.) Select the save as icon on the right side of the image screen.

7-3-3Capturing a Screen (cont'd)

6.) A Save dialog box will be opened. Choose *d:\export folder* as the archive location to save the image on the hard disk or CD.

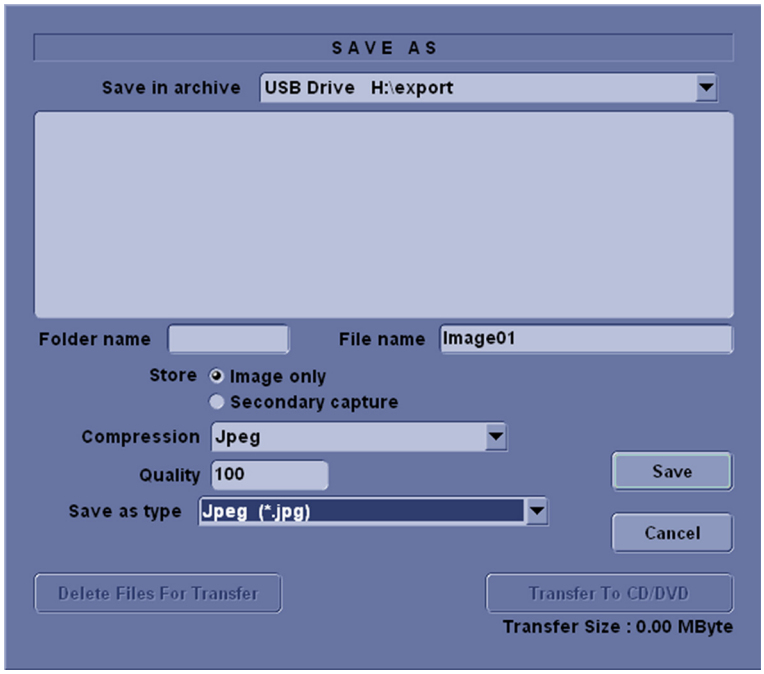

Figure 7-4 Save Dialog Box

⚠ **NOTICE** **After capture the snapshot of the screen to the "clipboard" and save it to the hard disk or other media, it is not full screen image on the hard disk or media.**

7-3-4 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 7-3-2 "Setting the Store Key to Screen Capture" on page 7-4.
Refer to Figure 7-2.

1.) Click *Utility* on the keyboard.
2.) Select *Connectivity* from the Utilities Menu.
3.) Select the *Buttons* tab on the Connectivity screen.
4.) In the *Physical Print Button* field, select Store.
5.) In the *Destinations* list, select the service(s) recorded in step 5, Section 7-3-1.
6.) In the *Physical Print Buttons* section, select the parameters related to the service recorded in step 6, Section 7-3-1.

Section 7-4
Common Diagnostics

7-4-1 Utilities

Provides two selections:

7-4-1-1 Disruptive Mode

Allows you to enable or disable disruptive mode troubleshooting.

7-4-1-2 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.

Section 7-5
Network Configuration

7-5-1 Network Configuration

1.) Connect system with network.

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

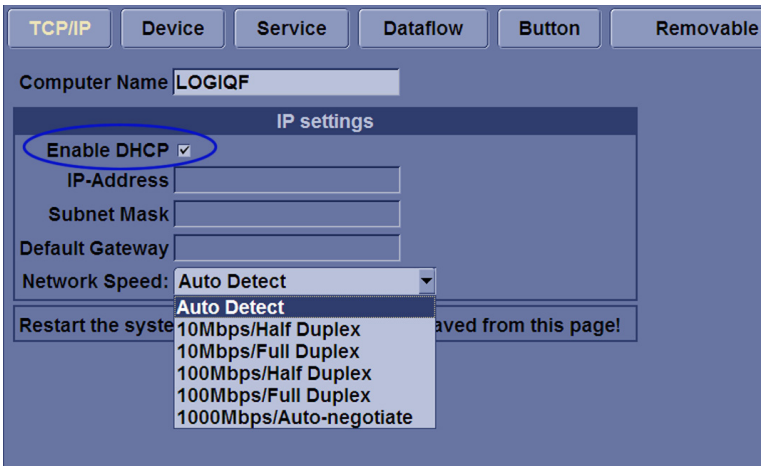

Figure 7-5 Enable DHCP

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

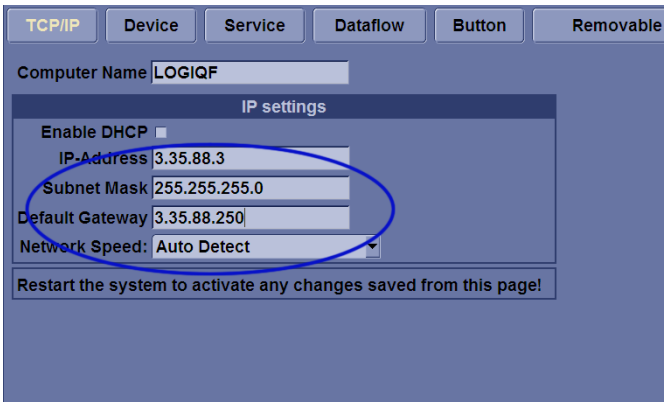

Figure 7-6 Input static address

7-5-1 Network Configuration (cont'd)

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

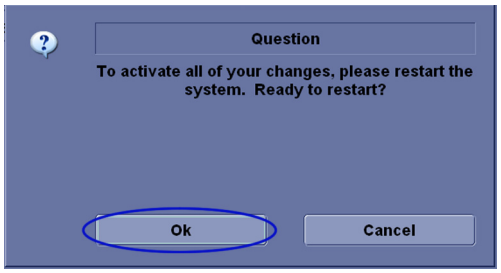

Figure 7-7 System Restart inquiry dialog

4.) After the system restarts, the network icon at the left bottom of screen turns green.

Figure 7-8 Network icon

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Chapter 8
Replacement Procedures

Section 8-1
Overview

8-1-1 Purpose of Chapter 8

This chapter describes replacement procedures for the following modules and subsystems.

Table 8-1 Contents in Chapter 8

Section 8-2 DISASSEMBLY/RE-ASSEMBLY

8-2-1 Warning and Caution

⚠ **WARNING** ***ONLY QUALIFIED SERVICE PERSONNEL SHOULD REMOVE ANY COVERS OR PANELS. ELECTRICAL HAZARDS EXISTS AT SEVERAL POINTS INSIDE. BECOME THOROUGHLY FAMILIAR WITH ALL HAZARDOUS VOLTAGES AND HIGH CURRENT LEVELS TO AVOID ACCIDENTAL CONTACT***

⚠ **CAUTION** **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

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

8-2-2 Returning/Shipping for repairs

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.

If the LOGIQ V5/LOGIQ V3 needs to be sent for repair, ensure that any patient information is erased from the Harddisk/Storage Device. In case that any patient information is still residing on the LOGIQ V5/ LOGIQ V3, GE will contact the customer and request for urgent collection of that patient information. GE will keep this patient information in a secure environment for a maximum period of 1 month. All patient information will be permanently deleted at that point.

If PHI (Patient Healthcare Information) data needs to be sent to GE employees for service purposes, GE will ascertain agreement from the customer. The paitent 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.

8-2-3 Footrest

8-2-3-1 Tools

- Common phillips screwdrivers

8-2-3-2 Preparations

- Shut Down the System and disconnect the power cord.

8-2-3-3 Removal procedure

1.) Unscrew 4 screws at the bottom side, and remove the footrest, refer to Figure 8-9 on page 8-3.

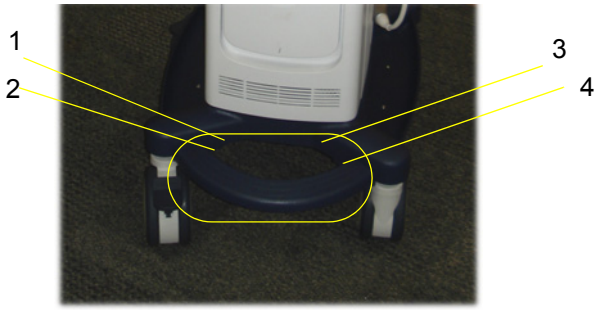

Figure 8-9 Footrest Cover Disassembly

8-2-3-4 Mounting procedure

Install the new parts in the reverse order of removal.

8-2-4 Attaching Keyboard Film

8-2-4-1 Tools

- NA

8-2-4-2 Preparations

- NA

8-2-4-3 Installation procedure

Attach the keyboard film to the keyboard.

1.) Use a cotton swab to clean around the keys.

NOTE: Be careful and keep the keyboard film clean when you take it out.

2.) Align the keyboard film to the keyboard and remove the release paper upper side. Refer to Figure 8-10 on page 8-4.

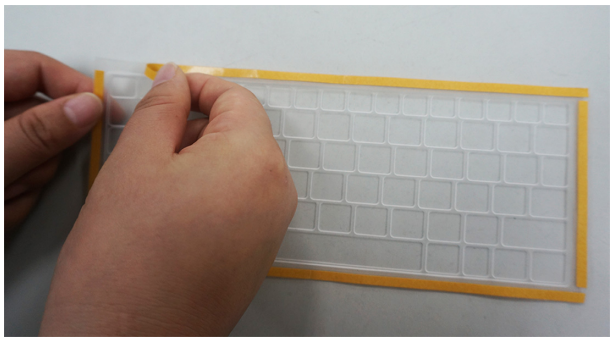

Figure 8-10 Remove Release Paper

Align the keyboard film to the keyboard. Refer to Figure 8-11 on page 8-4.

Figure 8-11 Fit the keyboard film

8-2-4 Attaching Keyboard Film (cont'd)

Fit the film on the keyboard well and then remove the remaining release paper. Refer to Figure 8-12 on page 8-5.

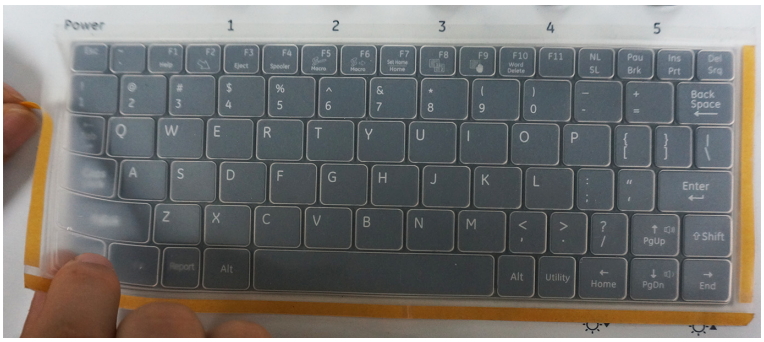

Figure 8-12 Fit the keyboard film

3.) The keyboard film is attached successfully. Refer to Figure 8-13 on page 8-5.

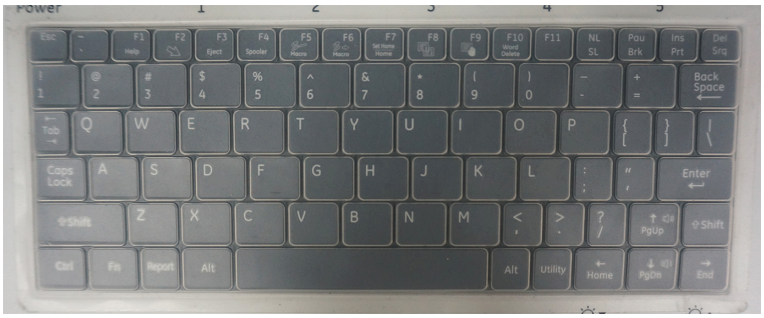

Figure 8-13 Attached Successfully

.

Section 8-3 Loading Base Image Software

NOTE: While it is believed to be unnecessary, It would not hurt to disconnect the system from the network and remove all transducers.

NOTE: Please ensure power cable is connected during system upgrade!

1.) Insert the USB disk labeled “System & Application Software” in the USB port of the system.
2.) Properly turn off the scanner by momentarily pressing the *Power On/Off* Switch. Select “Shut Down” from the System Exit menu.
3.) If the system will not shutdown normally, hold down the *Power On/Off* Switch until the light turns from green to amber.
4.) Turn on the system. System will detect the USB automatically.
5.) Press any key to continue when below message display as shown below.

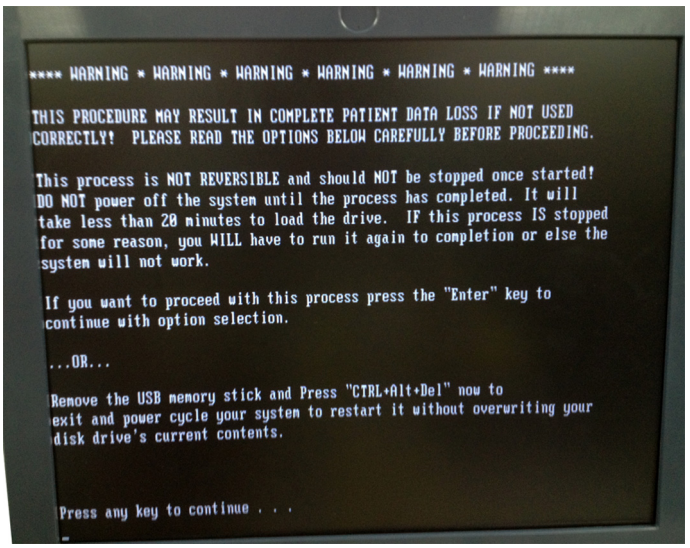

Figure 8-14 Upgrade message

Section 8-3 Loading Base Image Software (cont'd)

6.) Select one of the options for loading the system. Select choice 1] to load the complete disk.

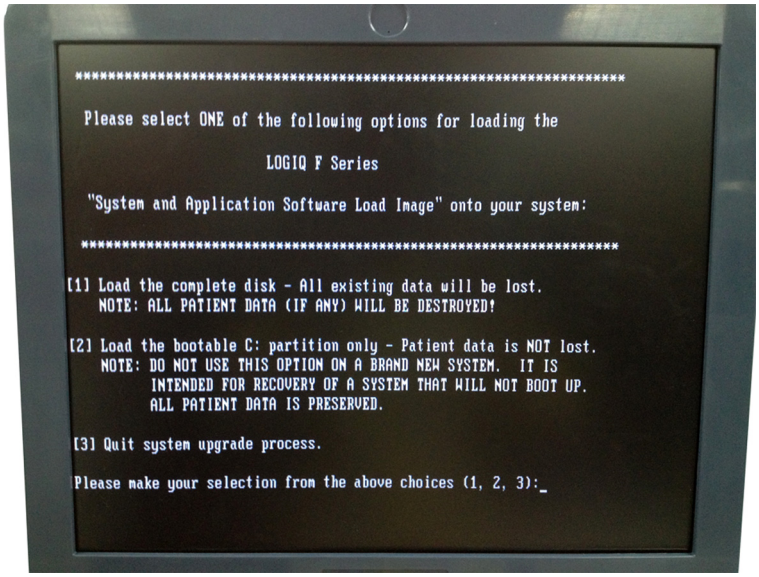

Figure 8-15 Selection for loading the system

⚠ **WARNING** ***While the software install procedure is designed to preserve data, you should select choice [2] to format disk C only.***

7.) Press any key to continue when below message display as shown below.

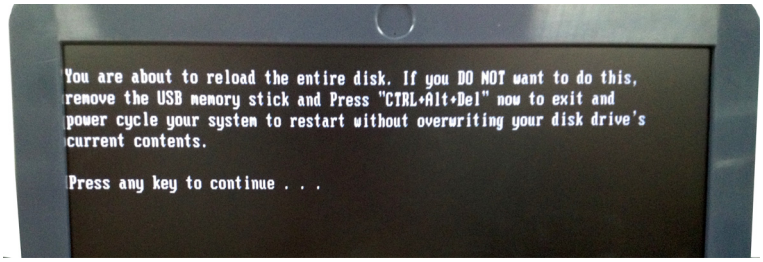

Figure 8-16 Upgrade continue message

Section 8-3 Loading Base Image Software (cont'd)

8.) System will be loaded as shown in the screen below.

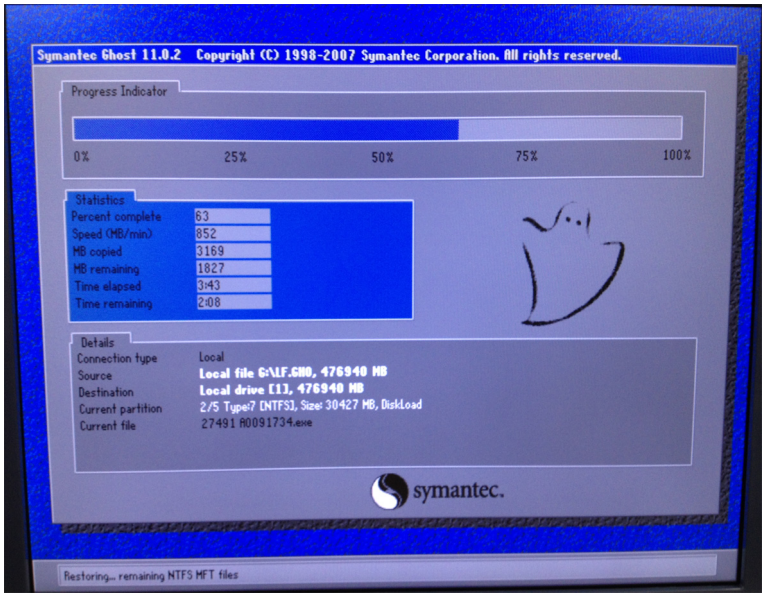

Figure 8-17 System Load

9.) System updating finished, refer to Figure 8-18 on page 8-8.

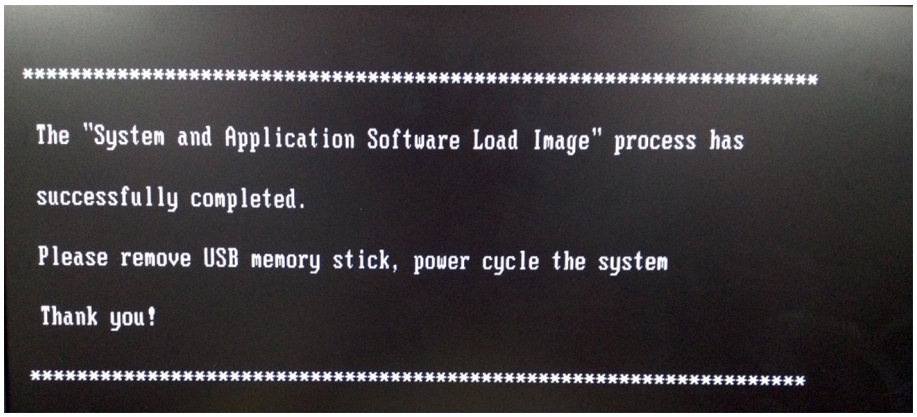

Figure 8-18 System upgrade complete

10.)Remove the USB stick, then press power key to restart system.

Chapter 9
Renewal Parts

Section 9-1
Overview

9-1-1 Purpose of Chapter 9

This chapter gives you an overview of Renewal Parts for LOGIQ V5/LOGIQ V3.

Table 9-1 Contents in Chapter 9

Section 9-2
List of Abbreviations

- Assy - Assembly
- Ctrl - Control
- FRU 1 - Replacement part available in part hub
- FRU 2 - Replacement part available from the manufacturer (lead time involved)
- Int - Internal
- I/O - Input/Output
- LCD - Liquid Crystal Display
- MON - Monitor
- PAT. - Patient
- PC - Personal Computer (Back End Processor)

Section 9-3
Renewal Parts Lists

9-3-1 Equipment Models Covered in this Chapter

Table 9-2 ACDC Power Pack & ACDC Power Cable list

Part Name	Part Number	Description	Quantity	FRU
AC Power Cord	5177123-2	Power cord Europe Class	1	1
AC Power Cord	5176304-2	Power cord China Class	1	1
AC Power Cord	5176773-2	Power cord India Class	1	1
AC Power Cord	5177195-2	Power cord Argentina Class	1	1
AC Power Cord	5176907-2	Power cord UK Class	1	1
AC Power Cord	5177153-2	Power cord Denmark Class	1	1
AC Power Cord	5177154-2	Power cord Switzerland Class	1	1
AC Power Cord	5177187-3	Power cord Australia Class	1	1
AC Power Cord	5177146-2	Power cord USA Class	1	1
AC Power Cord	5176753-2	Power cord Israel Class	1	1
AC Power Cord	5177126-2	Power cord Japan Class	1	1
AC Power Cord	5400868-2	Power cord Brazil Class	1	1

Section 9-4 Operator Console Assy

Figure 9-1Operator Console Assy

Section 9-5 CRU Parts List

A CRU is a FRU part that can be replaced by the Customer and Customer comfirms functional check at site.

Table 9-3 CRU Parts List

Part Name	Part Number	Description	Quantity	FRU
4C-RS Probe	5451471	4C-RS Convex Probe	1	1
E8C-RS probe	5409293	E8C-RS convex probe	1	1
3Sc-RS probe	47237516	3Sc-RS sector probe	1	1
L6-12-RS probe	5454332	L6-12-RS Linear probe	1	1
Power cord Europe Class	5177123-2	Power cord Europe Class	1	1
Power cord China Class	5176304-2	Power cord China Class	1	1
Power cord India Class	5176773-2	Power cord India Class	1	1
Power cord Argentina Class	5177195-2	Power cord Argentina Class	1	1
Power cord UK Class	5176907-2	Power cord UK Class	1	1
Power cord Denmark Class	5177153-2	Power cord Denmark Class	1	1
Power cord Switzerland Class	5177154-2	Power cord Switzerland Class	1	1
Power cord Australia Class	5177187-3	Power cord Australia Class	1	1
Power cord USA Class	5177146-2	Power cord USA Class	1	1
Power cord Israel Class	5176753-2	Power cord Israel Class	1	1
Power cord Japan Class	5177126-2	Power cord Japan Class	1	1
Power cord Brazil Class	5400868-2	Power cord Brazil Class	1	1

Section 9-6 Manuals

Table 9-4 LOGIQ V Series Manuals

Item	Part Number	Description	Qty	FRU
7000	5496012-100	LOGIQ V5/LOGIQ V3 Basic Service Manual	1	N
System User Manuals				
7001	5475853-100	LOGIQ V5/LOGIQ V3 Basic User Manual, English	1	N
7002	5475843-100	LOGIQ V5/LOGIQ V3 User Guide, English	1	N
7003	5475843-101	LOGIQ V5/LOGIQ V3 User Guide, French	1	N
7004	5475843-106	LOGIQ V5/LOGIQ V3 User Guide, Spanish	1	N
7005	5475843-108	LOGIQ V5/LOGIQ V3 User Guide, German	1	N
7006	5475843-111	LOGIQ V5/LOGIQ V3 User Guide, Italian	1	N
7007	5475843-121	LOGIQ V5/LOGIQ V3 User Guide, Dutch	1	N
7008	5475843-127	LOGIQ V5/LOGIQ V3 User Guide, Brazilian Portuguese	1	N
7009	5475843-129	LOGIQ V5/LOGIQ V3 User Guide, Estonian	1	N
7010	5475843-131	LOGIQ V5/LOGIQ V3 User Guide, Slovenian	1	N
7011	5475843-140	LOGIQ V5/LOGIQ V3 User Guide, Japanese	1	N
7012	5475843-142	LOGIQ V5/LOGIQ V3 User Guide, Swedish	1	N
7013	5475843-144	LOGIQ V5/LOGIQ V3 User Guide, Korean	1	N
7014	5475843-145	LOGIQ V5/LOGIQ V3 User Guide, Russian	1	N
7015	5475843-150	LOGIQ V5/LOGIQ V3 User Guide, Polish	1	N
7016	5475843-151	LOGIQ V5/LOGIQ V3 User Guide, Greek	1	N
7017	5475843-153	LOGIQ V5/LOGIQ V3 User Guide, Hungarian	1	N
7018	5475843-154	LOGIQ V5/LOGIQ V3 User Guide, Slovakian	1	N
7019	5475843-155	LOGIQ V5/LOGIQ V3 User Guide, Czech	1	N
7020	5475843-159	LOGIQ V5/LOGIQ V3 User Guide, Turkish	1	N
7021	5475843-160	LOGIQ V5/LOGIQ V3 User Guide, Danish	1	N
7022	5475843-161	LOGIQ V5/LOGIQ V3 User Guide, Norwegian	1	N
7023	5475843-162	LOGIQ V5/LOGIQ V3 User Guide, Finnish	1	N
7024	5475843-165	LOGIQ V5/LOGIQ V3 User Guide, Bulgarian	1	N
7025	5475843-167	LOGIQ V5/LOGIQ V3 User Guide, Romanian	1	N
7026	5475843-168	LOGIQ V5/LOGIQ V3 User Guide, Croatian	1	N
7027	5475843-174	LOGIQ V5/LOGIQ V3 User Guide, Lithuanian	1	N
7028	5475843-175	LOGIQ V5/LOGIQ V3 User Guide, Latvian	1	N
7029	5475843-176	LOGIQ V5/LOGIQ V3 User Guide, Serbian	1	N
7030	5475843-177	LOGIQ V5/LOGIQ V3 User Guide, European Protuguese	1	N
7031	5475843-181	LOGIQ V5/LOGIQ V3 User Guide, Indonesian	1	N

Table 9-4 LOGIQ V Series Manuals

Item	Part Number	Description	Qty	FRU
7032	5498971-141	LOGIQ V3 User Guide, Chinese	1	N
7033	5498972-141	LOGIQ V5 User Guide, Chinese	1	N

Section 9-7 Peripheral

Table 9-5 LOGIQ V Model Designations

Item	Part Name	Part Number	Qty	FRU
Printers				
8000	Sony UP-D897 Chinese kit	5151262	1	N
8000A	Sony UP-D897 USA kit	5151259	1	N
8000B	Sony UP-D897 European kit	5151261	1	N
8000C	Sony UP-D897 Japanese kit	5151263	1	N
8001	Sony UP-D25MD USA kit	5398062	1	N
8001A	Sony UP-D25MD European kit	5398063	1	N
8001B	Sony UP-D25MD Japanese kit	5398064	1	N
8001C	Sony UP-D25MD Chinese kit	5398061	1	N
8002	Sony UP-D711MD with Paper kit	5494719	1	N
8002A	Sony UP-D711MD Paper 1 roll	5494718	1	N
8002B	Sony UP-D711MD Printer Paper 10 rolls	5543548	1	N
8003	HP Officejet 100 Chinese kit	5426594	1	N
8003A	HP Officejet 100 European kit	5426595	1	N
8003A	HP Officejet 100 Japanese kit	5426596	1	N
8003B	HP Officejet 100 USA kit	5426597	1	N
8004	Sony UP-D898MD USA kit	5151259-2	1	N
8004A	Sony UP-D898MD European kit	5151261-2	1	N
8004B	Sony UP-D898MD China kit	5151262-2	1	N
8004C	Sony UP-D898MD Japan kit	5151263-2	1	N
8004D	Sony UP-D898MD Brazil kit	5495509-2	1	N
8005	HP Officejet Pro 8100	NA	1	N
8006	Sony UP-D898MD Printer shelf option kit	5599283	1	N
8007	Sony UP-D711MD Printer shelf option kit	5484791	1	N
Video Converter				
8008	Video Converter Module	5534825	1	N
DVD-RW				
8009	LITEON eUAU108	5454614-2	1	N
Footswitch				
8010	MKF 2-MED GP26 (IPx8)	5151236	1	N
8011	FSU-1000 (IPx8)	5338419	1	N
USB Stick				
8012	SanDisk CRUZER 4G	5395754	1	N

Table 9-5 LOGIQ V Model Designations

Item	Part Name	Part Number	Qty	FRU
8013	1TB mobile USB HDD	5434317-3	1	N
Biopsy Kit				
8014	E8C-RS biopsy kit	E8385NA	1	N
8015	E8C-RS reusable biopsy kit	2398164	1	N
8016	4C-RS biopsy kit	5160703	1	N
8017	L6-12-RS biopsy kit	5176499	1	N
8018	3Sc-RS biopsy kit	5329137	1	N
System and Application Software USB				
8019	LOGIQ V Series R1.0.0 System and Application Software USB	5501727	1	Y
8020	LOGIQ V Series R1.0.1 System and Application Software USB	5501727-2S	1	Y
8021	LOGIQ V Series R1.0.2 System and Application Software USB	5501727-3S	1	Y
8022	LOGIQ V Series R1.0.3 System and Application Software USB	5501727-4S	1	Y
8023	LOGIQ V Series R1.0.4 System and Application Software USB	5501727-5S	1	Y
Keyboard Film				
8024	Keyboard Film	5727997-S	1	Y

Section 9-8Probes

Table 9-6 Probes on LOGIQ V5/LOGIQV3

Item	Part Name	Part Number	Description	Quantity	FRU
9000	4C-RS	5451471	Probe (Center Frequency: 3.10MHz)	1	1
9001	3Sc-RS	47237516	Probe (Center Frequency: 2.75MHz)	1	1
9002	L6-12-RS	5454332	Probe (Center Frequency: 7.75MHz)	1	1
9003	E8C-RS	5409293	Probe (Center Frequency: 6.5MHz)	1	1

NOTICE All the spare parts should be disposed according to local laws.

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Chapter 10
Care & Maintenance

Section 10-1
Overview

10-1-1 Periodic Maintenance Inspections

It has been determined by engineering that your system does not have any high wear components that fail with use, therefore no Periodic Maintenance Inspections are mandatory. Some Customers Quality Assurance Programs may require additional tasks and or inspections at a different frequency than listed in this manual.

10-1-2 Purpose of Chapter 10

This chapter describes **Care & Maintenance** on the scanner and peripherals. These procedures are intended to **maintain the quality** of the ultrasound **systems performance**. Read this chapter completely and familiarize yourself with the procedures before performing a task.

Table 10-1 Contents in Chapter 10

CAUTION **Practice good ESD prevention. Wear an anti–static strap when handling electronic parts and even when disconnecting/connecting cables.**

DANGER **THERE ARE SEVERAL PLACES ON THE BACKPLANE, THE AC DISTRIBUTION, AND DC DISTRIBUTION THAT ARE DANGEROUS. BE SURE TO DISCONNECT THE SYSTEM POWER PLUG AND OPEN THE MAIN CIRCUIT BREAKER BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.**

CAUTION **Do not pull out or insert circuit boards while power is ON.**

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

Section 10-2
Why do Maintenance

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Ultrasound Inspection Certificate (provided on page 10-16) provides the customer with documentation that the ultrasound scanner is maintained on a periodic basis.

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

10-2-2 Quality Assurance

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

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

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

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

Section 10-3
Maintenance Task Schedule

10-3-1 How often should care & maintenance tasks be performed?

The Care & Maintenance Task Schedule (provided on page 10-3) specifies how often your LOGIQ V5/ LOGIQ V3 should be serviced and outlines items requiring special attention.

NOTE: It is the customer's responsibility to ensure the LOGIQ V5/LOGIQ V3 care & maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.

Your GE Service Representative has an in-depth knowledge of your LOGIQ V5/LOGIQ V3 ultrasound scanning system and can best provide competent, efficient service. Please contact us for coverage information and/or price for service.

The service procedures and recommended intervals shown in the Care & Maintenance Task Schedule assumes that you use your LOGIQ V5/LOGIQ V3 for an average patient load (10-12 per day) and not use it as a primary mobile unit which is transported between diagnostic facilities.

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

Section 10-3 Maintenance Task Schedule (cont'd)

Table 10-2 Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Clean Probe Holders	•				
Clean Air Filter		•			more frequently depending on your environment
Inspect AC Mains Cable			•		Mobile Unit Check Weekly
Inspect Cables and Connectors			•		
Clean Console			•		
Inspect Wheels, Casters, brakes and Swivel Locks			•		Mobile Unit Check Daily
Check Control Panel Movement			•		Mobile Unit Check Daily
Console Leakage Current Checks				•	also after corrective maintenance
Peripheral Leakage Current Checks				•	also after corrective maintenance
Surface Probe Leakage Current Checks				•	also after corrective maintenance
Endocavity Probe Leakage Current Checks				•	also after corrective maintenance
Transesphongeal Probe Leakage Current Checks				•	also after corrective maintenance
Surgical Probe Leakage Current Checks				•	also after corrective maintenance
Measurement Accuracy Checks				•	also after corrective maintenance
Functional Checks				•	also after corrective maintenance

NOTE: PMs are not mandatory, the table above is for reference only.

NOTE: May require specialized equipment to complete.

Section 10-4
Tools Required

10-4-1 Standard GE Tool Kit

The following is a description of the “Standard” GE tool kit in the USA. Not all tools are required for PMs.

Table 10-3 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. x 4 in.	9-9487	Utility Knife
9-41581	Screwdriver, Blade 3/16 in. x 4 in.	9-45341	Pliers Vice Grip 10 inch
9-39451	20' Steel Tape, locking Spring load	9-3001	Xacto Pen Knife
9-GH807	Ratchet, Offset, Slotted	9-HT62002	Solder Aid, Fork and Hook
68-412	Ratchet, Offset, Phillips	9-4099	Mirror, Round, Telescoping
9-GH130	Tapered Reamer	9-GH3001	Steel Rule Decimal 6 inch
9-41584	Screwdriver, slotted 1/4 in.X 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

Table 10-3 Overview of GE-1 Tool Kit Contents (cont'd)

Tool ID	Description	Tool ID	Description
9-65283	Case 8.5 in. x 4.5 in. x 2 in. Deep	9-45072	Pliers 6 inch Diagonal
9-46696	Hex Keys	9-XL100X	Wire Stripper/Cutter 5 inch - 100X
9-39829	Torpedo Level, Magnetic	9-XL87CG	Pliers - very fine needle nose-87CG
9-38461	Hammer, Ball Peen, 4 oz	9-WEWDT-07	Weller-Soldering-Replacement Tip(1)
9-4280	Universal Joint 1/4 inch	9-WS175-E	Wiss - Surgical Scissors
9-WEW60P3	Weller - Soldering Iron, 3 wire	KH174	Hemostat 5 inch Straight
9-WECT5B6	Weller - Soldering Iron Tip	KH175	Hemostat 5 inch curved
9-WEWDP12	Weller - Desoldering Pump	9-Z9480121	Alignment tool (red)
93383	Flashlight Mini-Mag Lite (AAA Bat.)		
9-GH408	Tweezers		
21576	Brush - Bristle		
9-4516	Pliers 4 1/4 inch Diagonal		

Table 10-4 Overview of GE-2 Tool Kit Contents(cont'd)

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 x 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		

10-4-2 Special Tools, Supplies and Equipment

10-4-2-1 Specific Requirements for Care & Maintenance

Table 10-5 Overview of Requirements for Care & Maintenance

Tool	Comments
Digital Volt Meter (DVM)	
Leakage Current Ultrasound Kit	For 120V and 220V Units
Anti Static Kit	Kit includes anti–static mat, wrist strap and cables for 200 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	120V 230V
Air Filter	air intake
Safety Analyzer	The Safety Analyzer tool should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551
SVHS VCR Cassette	60 minute 120 minute
SVHS VCR Head Cleaner	See VCR user manual for requirements
3.5” MOD MEDIA	blank 128 M disk blank 230 M disk
5.25” MOD Media	
3.5” MOD Media Cleaner	cleans the diskettes
5.25” MOD Media Cleaner	cleans the diskettes
3.5” MOD Head Cleaner Kit	cleans the drive heads
5.25” MOD Head Cleaner Kit	cleans the drive heads
QIQ Phantom	RMI Grayscale Target Model 403GS
B/W Printer Cleaning Sheet	See printer user manual for requirements
Color Printer Cleaning Sheet	See printer user manual for requirements
Disposable Gloves	

10-4-3 Input Power

10-4-3-1 Mains Cable Inspection

Table 10-6 Mains Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the mains cable from the wall and system.
2	Inspect	Inspect it and its connectors for damage of any kind.
3	Verify	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Verify	Inlet connector retainer is functional.

10-4-4 Cleaning

10-4-4-1 General Cleaning

Table 10-7 General Cleaning

Step	Item	Description
1	Console	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).

NOTE: For your convenience or of the air filter is too dirty, replacement filters are available. refer to Chapter 9 for the air filter replacement part number.

10-4-5 Physical Inspection

Table 10-8 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition. refer to the LOGIQ V5/LOGIQ V3 User Manual for details.
2	Scratches & Dents	Inspect the console for dents, scratches or cracks.
3	Wheels & Brakes	Check all wheels and casters for wear and verify operation of foot brake, to stop the unit from moving, and release mechanism. Check all caster locks and caster swivel locks for proper operation.
4	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs.
5	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
6	External I/O	Check all connectors for damage and verify that the labeling is good.
7	Op Panel Lights	Check for proper operation of all operator panel and TGC lights.
8	Monitor Light	Check for proper operation of any monitor lights if available.
9	External Microphone	Check for proper operation of any external microphones by recording an audio test.

10-4-6 Outlet Test -Wiring Arrangement - USA & Canada

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

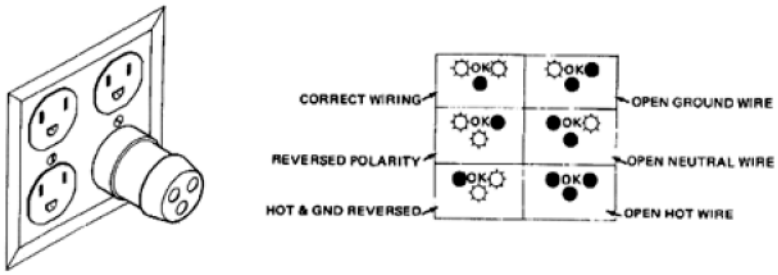

Figure 10-1 Typical Outlet Tester

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.

10-4-7 Grounding Continuity

CAUTION **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 IEC 601-1.1.

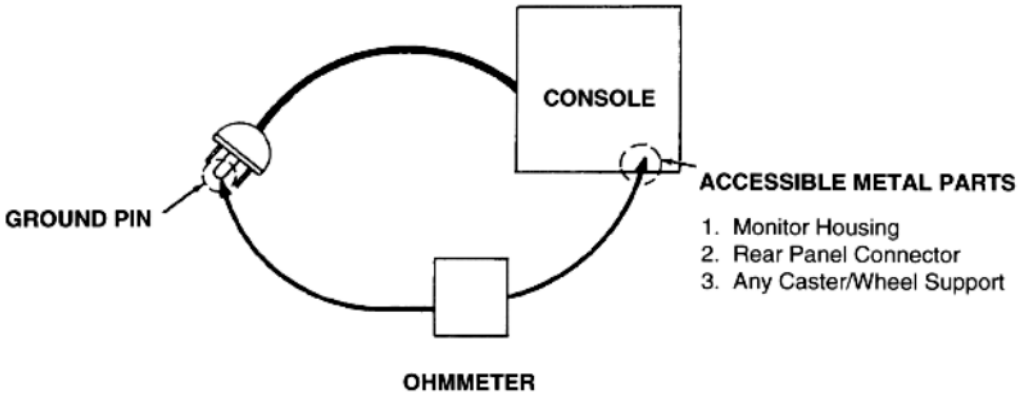

Figure 10-2 Ground Continuity Test

10-4-7-1 Meter Procedure

Follow these steps to test the ground wire resistance.

1.) Turn the LOGIQ V5/LOGIQ V3 unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's "CHASSIS" connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ V5/LOGIQ V3 unit.
4.) Set the meter's "FUNCTION" switch to the RESISTANCE position.
5.) Set the meter's "POLARITY" switch to the OFF (center) position.
6.) Measure and record the ground wire resistance.

10-4-8 Chassis Leakage Current Test

10-4-8-1 Definition

This test measures the current that would flow in a grounded person who touched accessible metal parts of the bedside station if the ground wire should break. The test verifies the isolation of the power line from the chassis. The 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.

.

CAUTION **Electric Shock Hazard. When the meter's ground switch is OPEN, don't touch the unit!**

CAUTION **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged.**

10-4-8-2 Generic Procedure

The test verifies the isolation of the power line from the chassis. The testing meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading of current.

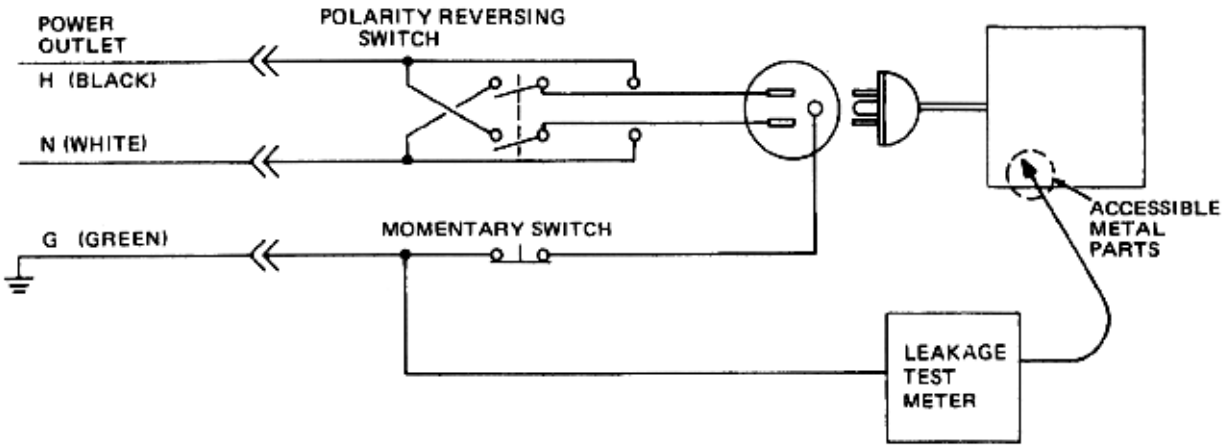

Figure 10-3 Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuos Leakage Currents and Patient, Auxiliary Currents

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test is plugged into the receptacle on the panel of the meter. This places the meter in the grounding conductor and the current flowing from the case to ground will be indicated in any of the current ranges. The maximum allowable limit for chassis source leakage is shown in Table 10-12.

10-4-9 Isolated Patient Lead (Source) Leakage–Lead to Lead

Reference the procedure in the IEC 60601-1. Select and test each of the five ECG lead positions (except ALL) on the LEAD selector, testing each to the power condition combinations found in the table. Record the highest leakage current measured.

10-4-10 Isolated Patient Lead (Sink) Leakage-Isolation Test

reference the procedure in the IEC 60601-1. Select the ALL position on the lead selector. Depress the rocker switch to ISO TEST to test lead isolation.

CAUTION **Line voltage is applied to the ECG leads during this test. To avoid possible electric shock hazard, the system being tested must not be touched by patients, users or anyone while the ISO TEST switch is depressed.**

NOTE: It is not necessary to test each lead individually or power condition combinations as required in previous tests.

10-4-10-1 Data Sheet for ECG Leakage Current

The test passes when all readings measure less than the value shown in the table below. Record all data on the PM Inspection Certificate.

Table 10-9 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit	
		GROUND OPEN	GROUND CLOSED
Patient Lead to Ground Leakage Current Test and Patient Lead to Lead Leakage Current Test	115V	10uA	10uA
	220/240V	500uA	10uA

Table 10-10 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit
Patient Lead Isolation Current Test	115V	20uA
	220/240V	5mA

Table 10-11 Typical Data Sheet for ECG Leakage Current

ECG Power	Tester Polarity Switch	Tester Ground Switch	Tester Lead Selector				
			RL	RA	LA	LL	C
ON	NORM	CLOSED					
ON	REVERSE	CLOSED					
ON	NORM	OPEN					
ON	REVERSE	OPEN					
OFF	NORM	CLOSED					
OFF	REVERSE	CLOSED					
OFF	NORM	OPEN					
OFF	REVERSE	OPEN					

10-4-11 Probe Leakage Current Test

10-4-11-1 Definition

This test measures the current that would flow to ground from any of the probes through a patient who is being scanned and becomes grounded by touching some other grounded surface.

10-4-11-2 Generic Procedure

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the probe must be active to find the worst case condition.

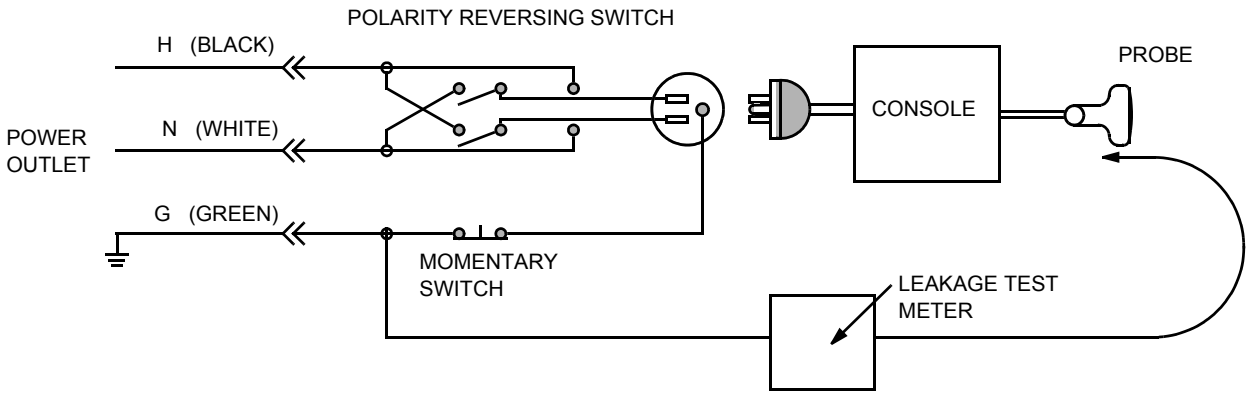

Figure 10-4 Set Up for Probe Leakage Current

NOTE: Each probe will have some amount of leakage current, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.

10-4-11-3 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 AMMI/ESI 1993 or IEC 60601 or AS/NZS 3551.

10-4-11-4 No Meter Probe Adapter Procedure

Follow the Safety Analyzer tool instruction to test each transducer for leakage current.

The electrical Safety Analyzer tool should be calibrated and compliant with AMMI/ESI 1993 or IEC 60601 or AS/NZS 3551.

10-4-11-5 Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values. Record all data on the PM Inspection Certificate.

CAUTION **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged**

.

Table 10-12 Typical Data Sheet For Transducer Source Leakage Current

Transducer Tested:			
Unit Power	**Tester Power Polarity Switch**	**Tester GROUND or NEUTRAL 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	

Section 10-5
When There's Too Much Leakage Current...

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.

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 scanner.

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 unit and if situation can not be corrected, submit a Safety Failure Report to document the system problem. Remove unit from operation.

ECG FAILS

Inspect cables for damage or poor connections.

ULTRASOUND INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 6:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 7:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 8:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 9:	Frequency:	Scan Format*:	Model Number:	Serial Number:

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

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	
Monitor	
Touch Panel	
Measurement Accuracy	
GE Approved Peripherals	

PHYSICAL INSPECTION AND CLEANING

Physical Inspection and Cleaning (if applicable)	Inspect	Clean
Console		
Monitor		
Touch Panel		
Air Filter		
Probe Holders		
External I/O		
Wheels, Brakes & Swivel Locks		
Cables and Connectors		
GE Approved Peripherals (VCR, CD-RW, MOD, Printers)		

COMMENTS:

ELECTRICAL SAFETY

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground &wiring config.)				
System Ground Continuity				
Chassis Source Leakage Current - Probe				
Chassis Source Leakage Current - Caster				
Chassis Source Leakage Current - CRT				
Patient Lead Source Leakage (Lead to Ground)				
Patient Lead Source Leakage (Lead to Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Leakage Current				
Peripheral 1Ground Continuity				
Peripheral 2 Leakage Current				
Peripheral 2Ground Continuity				
Peripheral 3 Leakage Current				
Peripheral 3Ground Continuity				
PROBES				
Probe Number (from previous page)	**Max Value Allowed**	**Max Value Measured**	**OK?**	**Comments**
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				
Probe 7:				
Probe 8:				
Probe 9:				

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

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INDEX

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GE-GEMedical Systems Ultrasound.
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