GE

Technical Publication

LOGIQ e

Basic Service Manual

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Product Information

This Manual covers the software version of R8.x.x for LOGIQ e ultrasound system.

GE

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Revision history

Revision History

REV	DATE (YYYY/MM/DD)	REASON FOR CHANGE
Rev.1	2013/06/07	Initial Release
Rev.2	2013/10/10	Add service information
Rev.3	2014/03/07	Update spare part list
Rev.4	2014/05/12	Add E-Isolation Cart spare parts
Rev.5	2014/09/26	1. Add barcode scanner setting up information 2. Add system date and time check information 3. Add external monitor connection methods from Docking Cart 4. Update spare part list
Rev.6	2015/02/11	Add Advanced Isolation Cart spare part information

List of Effected Pages (LOEP)

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Important precautions

Translation policy

WARNING (EN)

THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.

- IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.
- DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.
- FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.

AVERTISSEMENT (FR)

CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.

- SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.
- NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.
- LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.

WARNUNG (DE)

DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.

- FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.
- VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.
- WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.

AVISO (ES)

ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.

- **SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEHC SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.**
- **NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.**
- **LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.**

ATENÇÃO (PT-Br)

ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.

- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEHC, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A‘ CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

AVISO (PT-pt)

ESTE MANUAL DE ASSISTÊNCIA ESTÁ DISPONÍVEL APENAS EM INGLÊS.

- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEHC, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE EFECTUAR REPARAÇÕES NO EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO PREVIAMENTE ESTE MANUAL.**
- **A INOBSERVÂNCIA DESTE AVISO PODE RESULTAR EM FERIMENTOS NO TÉCNICO DE ASSISTÊNCIA, OPERADOR OU PACIENTE EM CONSEQUÊNCIA DE CHOQUE ELÉCTRICO, PERIGOS DE ORIGEM MECÂNICA, BEM COMO DE OUTROS TIPOS.**

AVVERTENZA (IT)

IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.

- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEHC RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL’APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL’ADDETTO ALLA MANUTENZIONE, ALL’UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

HOIATUS (ET)

KÄESOLEV TEENINDUSJUHEND ON SAADAVAL AINULT INGLISE KEELES.

- KUI KLIENDITEENINDUSE OSUTAJA NÕUAB JUHENDIT INGLISE KEELEST ERINEVAS KEELES, VASTUTAB KLIENT TÕLKETEENUSE OSUTAMISE EEST.
- ÄRGE ÜRITAGE SEADMEID TEENINDADA ENNE EELNEVALT KÄESOLEVA TEENINDUSJUHENDIGA TUTVUMIST JA SELLEST ARU SAAMIST.
- KÄESOLEVA HOIATUSE EIRAMINE VÕIB PÕHJUSTADA TEENUSEOSUTAJA, OPERAATORI VÕI PATSIENDI VIGASTAMIST ELEKTRILÖÖGI, MEHAANILISE VÕI MUU OHU TAGAJÄRJEL.

VAROITUS (FI)

TÄMÄ HUOLTO-OHJE ON SAATAVILLA VAIN ENGLANNIKSI.

- JOS ASIAKKAAN PALVELUNTARJOAJA VAATII MUUTA KUIN ENGLANNINKIELISTÄ MATERIAALIA, TARVITTAVAN KÄÄNNÖKSEN HANKKIMINEN ON ASIAKKAAN VASTUULLA.
- ÄLÄ YRITÄ KORJATA LAITTEISTOA ENNEN KUIN OLET VARMASTI LUKENUT JA YMMÄRTÄNYT TÄMÄN HUOLTO-OHJEEN.
- MIKÄLI TÄTÄ VAROITUSTA EI NOUDATETA, SEURAUKSENA VOI OLLA PALVELUNTARJOAJAN, LAITTEISTON KÄYTTÄJÄN TAI POTILAAN VAHINGOITTUMINEN SÄHKÖISKUN, MEKAANISEN VIAN TAI MUUN VAARATILANTEEN VUOKSI.

ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)

ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ ΔΙΑΤΙΘΕΤΑΙ ΣΤΑ ΑΓΓΛΙΚΑ ΜΟΝΟ.

- ΕΑΝ ΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ ΕΝΟΣ ΠΕΛΑΤΗ ΑΠΑΙΤΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕ ΓΛΩΣΣΑ ΕΚΤΟΣ ΤΩΝ ΑΓΓΛΙΚΩΝ, ΑΠΟΤΕΛΕΙ ΕΥΘΥΝΗ ΤΟΥ ΠΕΛΑΤΗ ΝΑ ΠΑΡΕΧΕΙ ΥΠΗΡΕΣΙΕΣ ΜΕΤΑΦΡΑΣΗΣ.
- ΜΗΝ ΕΠΙΧΕΙΡΗΣΕΤΕ ΤΗΝ ΕΚΤΕΛΕΣΗ ΕΡΓΑΣΙΩΝ ΣΕΡΒΙΣ ΣΤΟΝ ΕΞΟΠΛΙΣΜΟ ΕΚΤΟΣ ΕΑΝ ΕΧΕΤΕ ΣΥΜΒΟΥΛΕΥΤΕΙ ΚΑΙ ΕΧΕΤΕ ΚΑΤΑΝΟΗΣΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ.
- ΕΑΝ ΔΕ ΛΑΒΕΤΕ ΥΠΟΨΗ ΤΗΝ ΠΡΟΕΙΔΟΠΟΙΗΣΗ ΑΥΤΗ, ΕΝΔΕΧΕΤΑΙ ΝΑ ΠΡΟΚΛΗΘΕΙ ΤΡΑΥΜΑΤΙΣΜΟΣ ΣΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ, ΣΤΟ ΧΕΙΡΙΣΤΗ Ή ΣΤΟΝ ΑΣΘΕΝΗ ΑΠΟ ΗΛΕΚΤΡΟΠΛΗΞΙΑ, ΜΗΧΑΝΙΚΟΥΣ Ή ΑΛΛΟΥΣ ΚΙΝΔΥΝΟΥΣ.

FIGYELMEZTETÉS (HU)

EZEN KARBANTARTÁSI KÉZIKÖNYV KIZÁRÓLAG ANGOL NYELVEN ÉRHETŐ EL.

- HA A VEVŐ SZOLGÁLTATÓJA ANGOLTÓL ELTÉRŐ NYELVRE TART IGÉNYT, AKKOR A VEVŐ FELELŐSSÉGE A FORDÍTÁS ELKÉSZÍTTETÉSE.
- NE PRÓBÁLJA ELKEZDENI HASZNÁLNI A BERENDEZÉST, AMÍG A KARBANTARTÁSI KÉZIKÖNYVBEN LEÍRTAKAT NEM ÉRTELMEZTÉK.
- EZEN FIGYELMEZTETÉS FIGYELMEN KÍVÜL HAGYÁSA A SZOLGÁLTATÓ, MŰKÖDTETŐ VAGY A BETEG ÁRAMÜTÉS, MECHANIKAI VAGY EGYÉB VESZÉLYHELYZET MIATTI SÉRÜLÉSÉT EREDMÉNYEZHETI.

VIÐVÖRUN (IS)

ÞESSI ÞJÓNUSTUHANDBÓK ER EINGÖNGU FÁANLEG Á ENSKU.

- EF ÞJÓNUSTUAÐILI VIÐSKIPTAMANNS ÞARFNAST ANNARS TUNGUMÁLS EN ENSKU, ER ÞAÐ Á ÁBYRGÐ VIÐSKIPTAMANNS AÐ ÚTVEGA ÞÝÐINGU.
- REYNIÐ EKKI AÐ ÞJÓNUSTA TÆKIÐ NEMA EFTIR AÐ HAFA SKOÐAÐ OG SKILIÐ ÞESSA ÞJÓNUSTUHANDBÓK.
- EF EKKI ER FARIÐ AÐ ÞESSARI VIÐVÖRUN GETUR ÞAÐ VALDIÐ MEIÐSLUM ÞJÓNUSTUVEITANDA, STJÓRNANDA EÐA SJÚKLINGS VEGNA RAFLOSTS, VÉLRÆNNAR EÐA ANNARRAR HÆTTU.

VÝSTRAHA (CS)

TENTO SERVISNÍ NÁVOD EXISTUJE POUZE V ANGLICKÉM JAZYCE.

- V PŘÍPADĚ, ŽE POSKYTOVATEL SLUŽEB ZÁKAZNÍKŮM POTŘEBUJE NÁVOD V JINÉM JAZYCE, JE ZAJIŠTĚNÍ PŘEKLADU DO ODPOVÍDAJÍCÍHO JAZYKA ÚKOLEM ZÁKAZNÍKA.
- NEPROVÁDĚJTE ÚDRŽBU TOHOTO ZAŘÍZENÍ, ANIŽ BYSTE SI PŘEČETLI TENTO SERVISNÍ NÁVOD A POCHOPILI JEHO OBSAH.
- V PŘÍPADĚ NEDODRŽOVÁNÍ TÉTO VÝSTRAHY MŮŽE DOJÍT ÚRAZU ELEKTRICKÁM PROUDEM PRACOVNÍKA POSKYTOVATELE SLUŽEB, OBSLUŽNÉHO PERSONÁLU NEBO PACIENTŮ VLIVEM ELEKTRICKÉHOP PROUDU, RESPEKTIVE VLIVEM K RIZIKU MECHANICKÉHO POŠKOZENÍ NEBO JINÉMU RIZIKU.

ADVARSEL (DA)

DENNE SERVICEMANUAL FINDES KUN PÅ ENGELSK.

- HVIS EN KUNDES TEKNIKER HAR BRUG FOR ET ANDET SPROG END ENGELSK, ER DET KUNDENS ANSVAR AT SØRGE FOR OVERSÆTTELSE.
- FORSØG IKKE AT SERVICERE UDSTYRET MEDMINDRE DENNE SERVICEMANUAL ER BLEVET LÆST OG FORSTÅET.
- MANGLENDE OVERHOLDELSE AF DENNE ADVARSEL KAN MEDFØRE SKADE PÅ GRUND AF ELEKTRISK, MEKANISK ELLER ANDEN FARE FOR TEKNIKEREN, OPERATØREN ELLER PATIENTEN.

WAARSCHUWING (NL)

DEZE ONDERHOUDSHANDLEIDING IS ENKEL IN HET ENGELS VERKRIJGBAAR.

- ALS HET ONDERHOUDSPERSONEEL EEN ANDERE TAAL VEREIST, DAN IS DE KLANT VERANTWOORDELIJK VOOR DE VERTALING ERVAN.
- PROBEER DE APPARATUUR NIET TE ONDERHOUDEN VOORDAT DEZE ONDERHOUDSHANDLEIDING WERD GERAADPLEEGD EN BEGREPEN IS.
- INDIEN DEZE WAARSCHUWING NIET WORDT OPGEVOLGD, ZOU HET ONDERHOUDSPERSONEEL, DE OPERATOR OF EEN PATIËNT GEWOND KUNNEN RAKEN ALS GEVOLG VAN EEN ELEKTRISCHE SCHOK, MECHANISCHE OF ANDERE GEVAREN.

BRĪDINĀJUMS (LV)

ŠĪ APKALPES ROKASGRĀMATA IR PIEEJAMA TIKAI ANGĻU VALODĀ.

- **JA KLIENTA APKALPES SNIEDZĒJAM NEPIECIEŠAMA INFORMĀCIJA CITĀ VALODĀ, NEVIS ANGĻU, KLIENTA PIENĀKUMS IR NODROŠINĀT TULKOŠANU.**
- **NEVEICIET APRĪKOJUMA APKALPI BEZ APKALPES ROKASGRĀMATAS IZLASĪŠANAS UN SAPRAŠANAS.**
- **ŠĪ BRĪDINĀJUMA NEIEVĒROŠANA VAR RADĪT ELEKTRISKĀS STRĀVAS TRIECIENA, MEHĀNISKU VAI CITU RISKU IZRAISĪTU TRAUMU APKALPES SNIEDZĒJAM, OPERATORAM VAI PACIENTAM.**

ĮSPĖJIMAS (LT)

ŠIS EKSPLOATAVIMO VADOVAS YRA IŠLEISTAS TIK ANGLŲ KALBA.

- **JEI KLIENTO PASLAUGŲ TEIKĖJUI REIKIA VADOVO KITA KALBA – NE ANGLŲ, VERTIMU PASIRŪPINTI TURI KLIENTAS.**
- **NEMĖGINKITE ATLIKTI ĮRANGOS TECHNINĖS PRIEŽIŪROS DARBŲ, NEBENT VADOVAUTUMĖTĖS ŠIUO EKSPLOATAVIMO VADOVU IR JĮ SUPRASTUMĖTE**
- **NEPAISANT ŠIO PERSPĖJIMO, PASLAUGŲ TEIKĖJAS, OPERATORIUS AR PACIENTAS GALI BŪTI SUŽEISTAS DĖL ELEKTROS SMŪGIO, MECHANINIŲ AR KITŲ PAVOJŲ.**

ADVARSEL (NO)

DENNE SERVICEHÅNDBOKEN FINNES BARE PÅ ENGELSK.

- **HVIS KUNDENS SERVICELEVERANDØR TRENGER ET ANNET SPRÅK, ER DET KUNDENS ANSVAR Å SØRGE FOR OVERSETTELSE.**
- **IKKE FORSØK Å REPARERE UTSTYRET UTEN AT DENNE SERVICEHÅNDBOKEN ER LEST OG FORSTÅTT.**
- **MANGLENDE HENSYN TIL DENNE ADVARSELEN KAN FØRE TIL AT SERVICELEVERANDØREN, OPERATØREN ELLER PASIENTEN SKADES PÅ GRUNN AV ELEKTRISK STØT, MEKANISKE ELLER ANDRE FARER.**

OSTRZEŻENIE (PL)

NINIEJSZY PODRĘCZNIK SERWISOWY DOSTĘPNY JEST JEDYNIE W JĘZYKU ANGIELSKIM.

- **JEŚLI FIRMA ŚWIADCZĄCA KLIENTOWI USŁUGI SERWISOWE WYMAGA UDOSTĘPNIENIA PODRĘCZNIKA W JĘZYKU INNYM NIŻ ANGIELSKI, OBOWIĄZEK ZAPEWNIENIA STOSOWNEGO TŁUMACZENIA SPOCZYWA NA KLIENCIE.**
- **NIE PRÓBOWAĆ SERWISOWAĆ NINIEJSZEGO SPRZĘTU BEZ UPRZEDNIEGO ZAPOZNANIA SIĘ Z PODRĘCZNIKIEM SERWISOWYM.**
- **NIEZASTOSOWANIE SIĘ DO TEGO OSTRZEŻENIA MOŻE GROZIĆ OBRAŻENIAMI CIAŁA SERWISANTA, OPERATORA LUB PACJENTA W WYNIKU PORAŻENIA PRĄDEM, URAZU MECHANICZNEGO LUB INNEGO RODZAJU ZAGROŻEŃ.**

ATENȚIE (RO)

ACEST MANUAL DE SERVICE ESTE DISPONIBIL NUMAI ÎN LIMBA ENGLEZĂ.

- DACĂ UN FURNIZOR DE SERVICII PENTRU CLIENȚI NECESITĂ O ALTĂ LIMBĂ DECÂT CEA ENGLEZĂ, ESTE DE DATORIA CLIENTULUI SĂ FURNIZEZE O TRADUCERE.
- NU ÎNCERCAȚI SĂ REPARAȚI ECHIPAMENTUL DECÂT ULTERIOR CONSULTĂRII ŞI ÎNȚELEGERII ACESTUI MANUAL DE SERVICE.
- IGNORAREA ACESTUI AVERTISMENT AR PUTEA DUCE LA RĂNIREA DEPANATORULUI, OPERATORULUI SAU PACIENTULUI ÎN URMA PERICOLELOR DE ELECTROCUTARE, MECANICE SAU DE ALTĂ NATURĂ.

ОСТОРОЖНО! (RU)

ДАННОЕ РУКОВОДСТВО ПО ОБСЛУЖИВАНИЮ ПРЕДОСТАВЛЯЕТСЯ ТОЛЬКО НА АНГЛИЙСКОМ ЯЗЫКЕ.

- ЕСЛИ СЕРВИСНОМУ ПЕРСОНАЛУ КЛИЕНТА НЕОБХОДИМО РУКОВОДСТВО НЕ НА АНГЛИЙСКОМ ЯЗЫКЕ, КЛИЕНТУ СЛЕДУЕТ САМОСТОЯТЕЛЬНО ОБЕСПЕЧИТЬ ПЕРЕВОД.
- ПЕРЕД ОБСЛУЖИВАНИЕМ ОБОРУДОВАНИЯ ОБЯЗАТЕЛЬНО ОБРАТИТЕСЬ К ДАННОМУ РУКОВОДСТВУ И ПОЙМИТЕ ИЗЛОЖЕННЫЕ В НЕМ СВЕДЕНИЯ.
- НЕСОБЛЮДЕНИЕ УКАЗАННЫХ ТРЕБОВАНИЙ МОЖЕТ ПРИВЕСТИ К ТОМУ, ЧТО СПЕЦИАЛИСТ ПО ТЕХОБСЛУЖИВАНИЮ, ОПЕРАТОР ИЛИ ПАЦИЕНТ ПОЛУЧАТ УДАР ЗЛЕКТРИЧЕСКИМ ТОКОМ, МЕХАНИЧЕСКУЮ ТРАВМУ ИЛИ ДРУГОЕ ПОВРЕЖДЕНИЕ.

ПРЕДУПРЕЖДЕНИЕ (BG)

ТОВА СЕРВИЗНО РЪКОВОДСТВО Е НАЛИЧНО САМО НА АНГЛИЙСКИ ЕЗИК.

- АКО ДОСТАВЧИКЪТ НА СЕРВИЗНИ УСЛУГИ НА КЛИЕНТ СЕ НУЖДАЕ ОТ ЕЗИК, РАЗЛИЧЕН ОТ АНГЛИЙСКИ, ЗАДЪЛЖЕНИЕ НА КЛИЕНТА Е ДА ПРЕДОСТАВИ ПРЕВОДАЧЕСКА УСЛУГА.
- НЕ СЕ ОПИТВАЙТЕ ДА ИЗВЪРШВАТЕ СЕРВИЗНО ОБСЛУЖВАНЕ НА ТОВА ОБОРУДВАНЕ, ОСВЕН ВСЛУЧАЙ, ЧЕ СЕРВИЗНОТО РЪКОВОДСТВО Е ПРОЧЕТЕНО И СЕ РАЗБИРА.
- НЕСПАЗВАНЕТО НА ТОВА ПРЕДУПРЕЖДЕНИЕ МОЖЕ ДА ДОВЕДЕ ДО НАРАНЯВАНЕ НА ДОСТАВЧИКА НА СЕРВИЗНИ УСЛУГИ, НА ОПЕРАТОРА ИЛИ ПАЦИЕНТА ВСЛЕДСТВИЕНА ТОКОВ УДАР, МЕХАНИЧНИ ИЛИ ДРУГИ РИСКОВЕ.

UPOZORENJE (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 POKUŠAVATI DA SERVISIRATE OPREMU AKO NISTE PROČITALI I RAZUMELI PRIRUČNIK ZA SERVISIRANJE.
- AKO NE POŠTUJETE OVO UPOZORENJE, MOŽE DOĆI DO POVREĐIVANJA SERVISERA, OPERATERA ILI PACIJENTA UZROKOVANOG ELEKTRIČNIM UDAROM, MEHANIČKIM I DRUGIM OPASNOSTIMA.

OPOZORILO (SL)

TA SERVISNI PRIROČNIK JE NA VOLJO SAMO V ANGLEŠČINI.

- **ČE PONUDNIK SERVISNIH STORITEV ZA STRANKO POTREBUJE NAVODILA V DRUGEM JEZIKU, JE ZA PREVOD ODGOVORNA STRANKA SAMA.**
- **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.**

UPOZORENJE (HR)

OVAJ SERVISNI PRIRUČNIK DOSTUPAN JE SAMO NA ENGLESKOM JEZIKU.

- **AKO KLIJENTOV SERVISER ZAHTIJEVA JEZIK KOJI NIJE ENGLESKI, ODGOVORNOST KLIJENTA JE PRUŽITI USLUGE PREVOĐENJA.**
- **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.**

UPOZORNENIE (SK)

TÁTO SERVISNÁ PRÍRUČKA JE K DISPOZÍCII LEN V ANGLIČTINE.

- **AK ZÁKAZNÍKOV POSKYTOVATEĽ SLUŽIEB VYŽADUJE INÝ JAZYK AKO ANGLIČTINU, POSKYTNUTIE PREKLADATEĽSKÝCH SLUŽIEB JE ZODPOVEDNOSŤOU ZÁKAZNÍKA.**
- **NEPOKÚŠAJTE SA VYKONÁVAŤ SERVIS ZARIADENIA SKÔR, AKO SI NEPREČÍTATE SERVISNÚ PRÍRUČKU A NEPOROZUMIETE JEJ.**
- **ZANEDBANIE TOHTO UPOZORNENIA MÔŽE VYÚSTIŤ DO ZRANENIA POSKYTOVATEĽA SLUŽIEB, OBSLUHUJÚCEJ OSOBY ALEBO PACIENTA ELEKTRICKÝM PRÚDOM, PRÍPADNE DO MECHANICKÉHO ALEBO INÉHO NEBEZPEČENSTVA.**

VARNING (SV)

DEN HÄR SERVICEHANDBOKEN FINNS BARA TILLGÄNGLIG PÅ ENGELSKA.

- **OM EN KUNDS SERVICETEKNIKER HAR BEHOV AV ETT ANNAT SPRÅK ÄN ENGELSKA ANSVARAR KUNDEN FÖR ATT TILLHANDAHÅLLA ÖVERSÄTTNINGSTJÄNSTER.**
- **FÖRSÖK INTE UTFÖRA SERVICE PÅ UTRUSTNINGEN OM DU INTE HAR LÄST OCH FÖRSTÅR DEN HÄR SERVICEHANDBOKEN.**
- **OM DU INTE TAR HÄNSYN TILL DEN HÄR VARNINGEN KAN DET RESULTERA I SKADOR PÅ SERVICETEKNIKERN, OPERATÖREN ELLER PATIENTEN TILL FÖLJD AV ELEKTRISKA STÖTAR, MEKANISKA FAROR ELLER ANDRA FAROR.**

DİKKAT
(TR)

BU SERVİS KILAVUZU YALNIZCA İNGİLİZCE OLARAK SAĞLANMIŞTIR.

- **EĞER MÜŞTERİ TEKNİSYENİ KILAVUZUN İNGİLİZCE DIŞINDAKİ BİR DİLDE OLMASINI İSTERSE, KILAVUZU TERCÜME ETTİRMEK MÜŞTERİNİN SORUMLULUĞUNDADIR.**
- **SERVİS KILAVUZUNU OKUYUP ANLAMADAN EKİPMANLARA MÜDAHALE ETMEYİNİZ.**
- **BU UYARININ GÖZ ARDI EDİLMESİ, ELEKTRİK ÇARPMASI YA DA MEKANİK VEYA DİĞER TÜRDEN KAZALAR SONUCUNDA TEKNİSYENİN, OPERATÖRÜN YA DA HASTANIN YARALANMASINA YOL AÇABİLİR.**

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Service Safety Considerations

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

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

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

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Table of Contents

Chapter 1

Introduction

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

Overview

Contents in this chapter

Manual Overview

This manual provides installation and service information for the LOGIQ e Ultrasound system and docking cart. It is divided in twelve chapters as shown below.

Contents in This Section

Contents in this service manual

The manual is divided into twelve chapters.

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

Table 1-1: Contents in this manual

Chapter number	Chapter title	Description
1.	'Introduction'	Contains a content summary and warnings.
2.	'Site Preparations'	Contains pre-setup requirements for the LOGIQ e and Docking Cart.
3.	'System Setup'	Contains setup procedure with procedure checklist for the system.
4.	'General Procedures and Functional Checks'	Contains functional checks for the system that must be performed as part of the installation, or as required during servicing and periodic maintenance.

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

Chapter number	Chapter title	Description
5.	'Components and Functions (Theory)'	Contains block diagrams and functional explanations of the electronics for the system.
6.	'Service Adjustments'	Contains instructions on how to make any available adjustments to the LOGIQ e system.
7.	'Diagnostics/ Troubleshooting'	Provides procedures for running diagnostic or related routines for the LOGIQ e system.
8.	'Replacement Procedures'	Provides disassembly procedures and reassembly procedures for all changeable FRU on the system.
9.	'Renewal Parts'	Contains a complete list of replacement parts for LOGIQ e system.
10.	'Care and Maintenance'	Provides periodic maintenance procedures for LOGIQ e system.
11.	'Docking Cart Setup'	Provides setup information for Docking Cart, including use, test and trouble shooting of Docking Cart.
12.	'Docking Cart Servicing'	Provides service information for Docking Cart, including replacement, spare parts and Maintenance.
N/A	Index	A quick way to the topic you're looking for.

Typical users of the Basic Service Manual

- Service personnel (installation, maintenance, etc.)
- Hospital's service personnel
- Contractors (some parts of Chapter 2 - Pre-Installation)

LOGIQ e models covered by this manual

Table 1-2: LOGIQ e Model Designations

Model Number	Description
5483518	LOGIQ e Console for USA
5483522	LOGIQ e Console
5498957	LOGIQ e Console for CKD
5499582	LOGIQ e Console for Canada
5483520	LOGIQ e Console for Korea
5483521	LOGIQ e Console for China

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

Purpose of the operator manual(s)

The operator manuals should be fully read and understood before operating the LOGIQ e and also kept near the unit for quick reference.

The online versions of the operator manuals are available via the Help function on LOGIQ e's operator panel.

General Caution

CAUTION

Standard maintenance must be performed by authorized service personnel for the lifetime of the product (7 years).

CAUTION

Proceed cautiously when crossing door or elevator thresholds with the Docking Cart or Isolation Cart. Use the handle to push/pull the system, e.g., do not use the Docking Cart external LCD. Failure to do so may cause serious injury or system damage.

CAUTION

Capacity load of the Docking Cart: The maximum capacity load of the Storage rack (1) is 2kg, DVD-RW Shelf (2) is 2kg, B/W Printer Shelf (3) is 4kg, Color Printer Shelf (4) is 7kg, refer to the following figure.

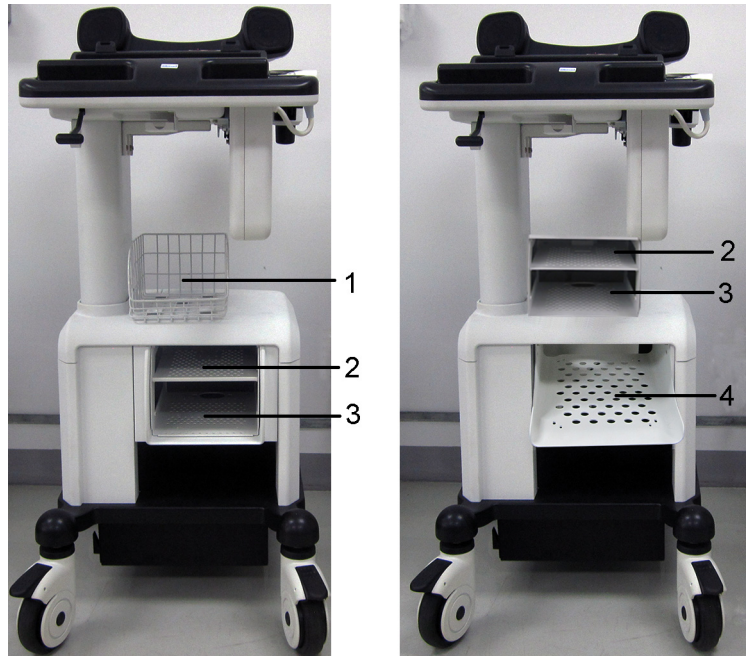


Figure 1-1. Capacity load of the Docking Cart

Important conventions

Conventions used in book

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

Model designations

This manual covers the LOGIQ e Ultrasound systems listed in:

'LOGIQ e models covered by this manual' on *page 1-5*.

Icons

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

Safety precaution messages

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

- DANGER
- WARNING
- CAUTION

d  DANGER

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

w  WARNING

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

c  CAUTION

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

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

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

Standard hazard icons

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

Table 1-3: Standard hazard icons

	ELECTRICAL
	MECHANICAL
	RADIATION
	LASER
	HEAT
	PINCH

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

Standard Icons that indicate that a special procedure is to be used

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

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

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

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

Product icons

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

Label Icon Description

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

Table 1-5: Product Icons

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)	Rating plate
	**Date of manufacture:** The date could be a year, year and month, or year, month and day, as appropriate. See ISO 8601 for date formats.	Bottom
	**Catalog or model number**	Bottom
	**Serial number**	Bottom
	**Direct Current:** For products to be powered from a DC supply	Bottom

Table 1-5: Product Icons (Continued)

Label/Icon	Purpose/Meaning	Location
INPUT	Input	Bottom
For use with adapter GE Part Number 5460229-X	For use with adapter GE part number 5460229-x	Bottom
DESC.	Description	Bottom
MODEL	Model	Rear of Docking Cart
Only for use with LOGIQ e series (Software version R 8.X.X)	Only for use with LOGIQ e series (Software version R8.x.x)	Rear of Docking Cart
Made in China	Made in China	Rear of Docking Cart
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX8) IPX8: MKF 2-MED GP26	Indicates the degree of protection provided by the enclosure per IEC60 529. IPX8 can be used in an operating room environment.	Bottom of Footswitch
EC REP	Authorized European Representative address.	Bottom panel
Rx ONLY U.S.	United States only Prescription Requirement label.	Bottom panel
	Type BF Applied Part (man in the box) symbol is in accordance with IEC 878-02-03.	Beside the probe connector

Table 1-5: Product Icons (Continued)

Label/Icon	Purpose/Meaning	Location
	General Warning.	Various
	“CAUTION” - Dangerous voltage” (the lightning flash with arrowhead) is used to indicate electric shock hazards.	Various
	“ON” indicates the power on 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 of AC adapter
	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.	Bottom
	Type CF Defib-Proof Applied Part (heart in the box with paddle) symbol is in accordance with IEC 60878-02-06.	ECG Module
	“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
	Do not push the system.	Rear of Docking Cart/ Isolation Cart

Table 1-5: Product Icons (Continued)

Label/Icon	Purpose/Meaning	Location
	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
	The separate collection symbol is affixed to a battery, or its packaging, to advise you that the battery must be recycled or disposed of in accordance with local or country laws. The letters below the separate collection symbol indicate whether certain elements (Pb=Lead,Cd=Cadmium, Hg=Mercury) are contained in the battery. To minimize potential effects on the environment and human health, it is important that all marked batteries that you remove from the product are properly recycled or disposed. For information on how the battery may be safely removed from the device, please consult the service manual or equipment instructions. Information on the potential effects on the environment and human health of the substances used in batteries is available at this url: http://www.gehealthcare.com/euen/weee-recycling/index.html	Battery Pack if contains Pb/Cd/Hg

Table 1-5: Product Icons (Continued)

Label/Icon	Purpose/Meaning	Location
	No hazardous substance, above the maximum concentration value, is present. 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).	
	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). "10" 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

Table 1-5: Product Icons (Continued)

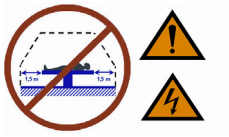
Label/Icon	Purpose/Meaning	Location
	Indicates the presence of hazardous substance(s) above the maximum concentration value. Maximum concentration values for electronic information products, as set by the People's Republic of China Electronic Industry Standard SJ/ T11364-2006, include the hazardous substances 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.	Rating Plate
	When closing the LCD cover, use caution to avoid injuring hands or fingers as there is a closing mechanism which allows the LCD cover to automatically close.	Bottom
	Do not connect the DVD-RW to the system while scanning. The DVD-RW can be used when connecting to the Docking Cart.	DVD-RW
	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.
	This product consists of devices that may contain mercury, which must be recycled or disposed of in accordance with local, state, or country laws. (Within this system, the backlight lamps in the monitor display, contain mercury.)	Bottom

Table 1-5: Product Icons (Continued)

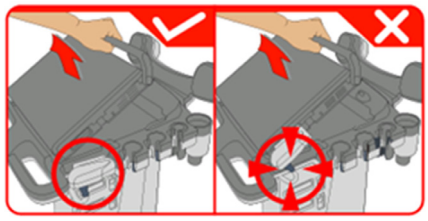
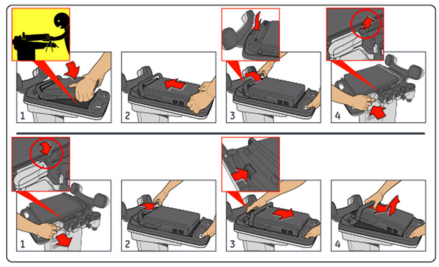
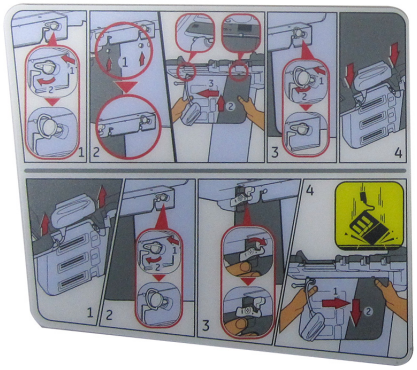
Label/Icon	Purpose/Meaning	Location
	INMETRO Certification: TUV Rheinland Brazil	Rating plate Note: Only after Brazilian regulatory registration is complete, this label will be located on the console rating plate.
	Disconnect the probe connector of Three-Probe Port before remove the system from Docking Cart Platform, otherwise the probe cable will be damaged.	Docking Cart Top Cover
	Guidance on how to connect the system to the docking cart and how to release it. When put the system on docking cart top cover, avoid injuring the fingers and hands. Make sure the system's handle is locked well after mounting the system to docking cart top cover. When connecting the probe connector to the system, press the probe connector locking lever up. When releasing the system from the docking cart, disconnect the probe connector of Three-Probe Port from the system before lifting up the system.	Docking Cart Top Cover
	Do not disconnect the probe connector of Three-probe Port from the system when the system is in use.	Probe Connector of Three-Probe Port

Table 1-5: Product Icons (Continued)

Label/Icon	Purpose/Meaning	Location
	Do not let the 3-Probe Port drop down when mounting it to the docking cart. The 3-Probe Port will be damaged if it drops on hard surface.	3-Probe Port
	When pushing the Extended Life Battery in to the power box, use caution to avoid injuring fingers and hands.	Power Box

Safety considerations

Introduction

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

Contents in this Section

Human Safety

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

Only personnel who have participated in a LOGIQ e Training Seminar are authorized to service the equipment.

d DANGER

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

w WARNING

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

Human Safety (continued)

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.

DO NOT substitute parts or modify equipment

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

Ensure that the Ultrasound system is turned off and unplugged

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

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

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

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

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

Human Safety (continued)

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

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

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

Mechanical safety

WARNING

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

WARNING

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

WARNING

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

CAUTION

LOGIQ e system weighs 5.2 kg or more, depending on installed peripherals, when ready for use. Care must be used when moving it or replacing its parts.

ALWAYS:

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

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

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

Mechanical safety (continued)

CAUTION

The Docking Cart weighs 53 kg (117 lb.) or more, depending on installed peripherals, when ready for use. Care must be used when moving it or replacing its parts.

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

ALWAYS:

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

WARNING

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

CAUTION

Make sure the console be fixed well to avoid the console falling down when moving Docking Cart.

CAUTION

Do not move Docking Cart with big incline angle.

CAUTION

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

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

CAUTION

Put peripherals in correct position to avoid Docking Cart overload.

Mechanical safety (continued)

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

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

Electrical safety

Safe practices

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

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

Connecting a LOGIQ e to the wrong voltage level will most likely destroy it.

Probes

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

- Inspect the probe prior to each use for damage or degradation to the:
  - housing
  - cable strain relief
  - lens
  - seal
  - connector pins
  - locking mechanism
- Do not use a damaged or defective probe.
- Never immerse the probe connector or adapter into any liquid.

Peripherals

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

Battery Safety

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

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

Battery Safety (continued)

CAUTION

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

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

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

Dangerous procedure warnings

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

d DANGER

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

w WARNING

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

w 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.

w WARNING

DO NOT substitute parts or modify equipment

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

w WARNING

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

Lockout/Tagout (LOTO) requirements

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

To apply Lockout/Tagout (LOTO):

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

All potentially hazardous stored or residual energy is relieved.

WARNING

Energy Control and Power Lockout for LOGIQ e.

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

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

Ultrasound System components may be energized.

Returning probes and repair parts

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

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

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

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

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

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

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

EMC, EMI and ESD

Contents in this Section

What is EMC?

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

CE Compliance

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

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

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

Electrostatic discharge (ESD) prevention

WARNING

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

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

Follow general guidelines for handling of electrostatic sensitive equipment.

WARNING

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

Customer assistance

Contact information

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

Before you call, identify the following information, and acquire image (Alt+D) to send to the Customer Care team:

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

NOTE: Restart the application before resuming clinical scanning.

Phone numbers for Customer Assistance

Table 1-6: Phone numbers for Customer Assistance

LOCATION	PHONE NUMBER	
USA GE Healthcare - GE Medical Systems Ultrasound & Primary Care Diagnostics, LLC 9900 Innovation Drive Wauwatosa, WI 53226	Service: On-site	1-800-437-1171
	Service Parts	1-800-558-2040
	Application Support	1-800-682-5327 or 1-262-524-5698
Canada		1-800-668-0732
Latin America	Service Application Support	1-262-524-5300 1-262-524-5698
Europe GE Ultraschall Deutschland Gmbh & Co. KG Beethovenstrasse 239 Postfach 11 05 60, D-42655 Solingen Germany	Phone:	+33 (0) 130-831-300 (General Imaging and Cardiac) +49 (0) 212-2802-652
	Fax:	+49 (0) 2122-8024-31
Asia (Singapore) GE Ultrasound Asia Service Department - Ultrasound 298 Tiong Bahru Road #15-01/06 Central Placa Singapore 168730	Tel:	+65 6291-8528
	Fax:	+65-6291-7006
Japan Support Center	Phone: Fax:	81-426-48-2940 81-426-48-2905

System manufacturer

Table 1-7: System manufacturer

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

Factory Site

Table 1-8: System manufacturer

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

Chapter 2

Site Preparations

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

Overview

Contents in this chapter

General requirements

Contents in this Section

Ultrasound system environmental requirements

If the Ultrasound system is very cold or hot

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

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

Table 2-1: System Acclimation Time Chart

Degree C	50	45	40	35	30	25	20	15	10	5	0	-5
Degree F	122	113	104	95	86	77	68	59	50	41	32	23
hours	4	2	0	0	0	0	0	0	0	2	4	6

Environmental specifications

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

Table 2-2: System Environmental Requirements

	Operational (with probe)	Storage LOGIQ e	Transport LOGIQ e
Temperature	10 - 40°C 50 - 104°F	-5 - 50°C 23 - 122°F	-5 - 50°C 23 - 122°F
Humidity	30 - 75% non-condensing	10 - 90% non-condensing	10 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

Table 2-3: Environmental Requirements for Docking Cart

	Operation	Storage	Transport
Temperature	10 - 40°C 50 - 104°F	-5 - 50°C 23 - 122°F	-5 - 50°C 23 - 122°F
Humidity	30 - 75% non-condensing	10 - 90% non-condensing	10 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

Environmental specifications (continued)

Table 2-4: Environmental Requirements for an Ultrasound Room for Docking Cart

Item	Values
Power Source	Refer to Table 2-6 *on page 2-8*.
Power Rating	500VA (100V-120V); 500VA (220-240V)
Radiation Shielding	NONE REQUIRED for ULTRASOUND ENERGY
Floor Landing	Approximately 680 - 800 kg/m^2 without Accessories
Floor Condition	Gradient: WITHIN 5 degrees
Weight	53 kg without Accessories

*NOTE: Temperature in degrees Celsius (ºC) conversion to degrees F (ºF): (ºF) = (ºC * 9/5) + 32*

CAUTION

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

CAUTION

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

Lighting

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

Electrical requirements

General requirements

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

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

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

Sites with a mains power system without a defined Neutral:

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

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

Electrical requirements for Adapter

Table 2-5: Electrical Specifications for Adapter

Adapter Model	AHM150PS19-XA1048
Input Voltage	100-240VAC
Input Current	1.5A at 115VAC 0.75A at 230VAC
Output Power	150W
Output Voltage	19.0VDC
Output Current	7.89A
Frequency	50/60Hz

Site circuit breaker

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

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

POWER OUTAGE MAY OCCURE.

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

Site power outlets

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

Unit power plug

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

Power stability requirements

Voltage drop-out:

Max 10 ms.

Power transients:

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.

Electrical requirements for Docking Cart

Table 2-6: Electrical requirements for Docking Cart

PARAMETER	AREA	LIMITS
Voltage Range	100-240V~	350VA
Power	All applications	More than or equal to 750 VA
Line Frequency	All applications	50/60Hz (±2Hz)
Power Transients	All applications	Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.
Decaying Oscillation	All applications	Less than 15% of peak voltage for less than 1 millisecond.

EMI limitations

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

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

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

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

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

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

EMI prevention/abatement

Table 2-7: EMI prevention/abatement

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

Probes environmental requirements

Operation and storage temperatures for probes

Table 2-8: Operation and storage temperatures for probes

Conditions	Temperature
Operation:	10 to 40 ºC (50 to 104 ºF)
Storage:	-5 to 50 ºC (23 to 122 ºF)
Temperature in degrees Celsius (ºC) conversion to degrees F (ºF): (ºF) = (ºC * 9/5) + 32	

NOTE: SYSTEMS AND ELECTRONIC PROBES ARE DESIGNED FOR STORAGE TEMPERATURES OF -5 TO + 50 degrees C. WHEN EXPOSED TO LARGE TEMPERATURE VARIATIONS, THE PRODUCT SHOULD BE KEPT IN ROOM TEMPERATURE FOR 10 HOURS BEFORE USE.

Facility needs

Purchaser responsibilities

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

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

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

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

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

Required facility needs

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

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

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

Sites with a mains power system without a defined Neutral:

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

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

- Dedicated single branch power outlet of adequate amperage meeting all local and national codes which is located less than 2.5 m (8 ft.) from the unit’s proposed location
- Door opening is at least 76 cm (30 in) wide
- Proposed location for unit is at least 0.2m (0.67 ft.) from the wall for cooling
- Power outlet and place for any external peripheral are within 2 m (6.5 ft.) of each other with peripheral within 1 m of the unit to connect cables.
- Power outlets for other medical equipment and gel warmer
- Power outlets for test equipment and modem within 1 m (3.2 ft.) of unit
- Clean and protected space to store transducers (in their cases or on a rack)
- Material to safely clean probes (done with a plastic container, never metal)

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

Desirable features

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

Suggested and Alternate Ultrasound Room Layout

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

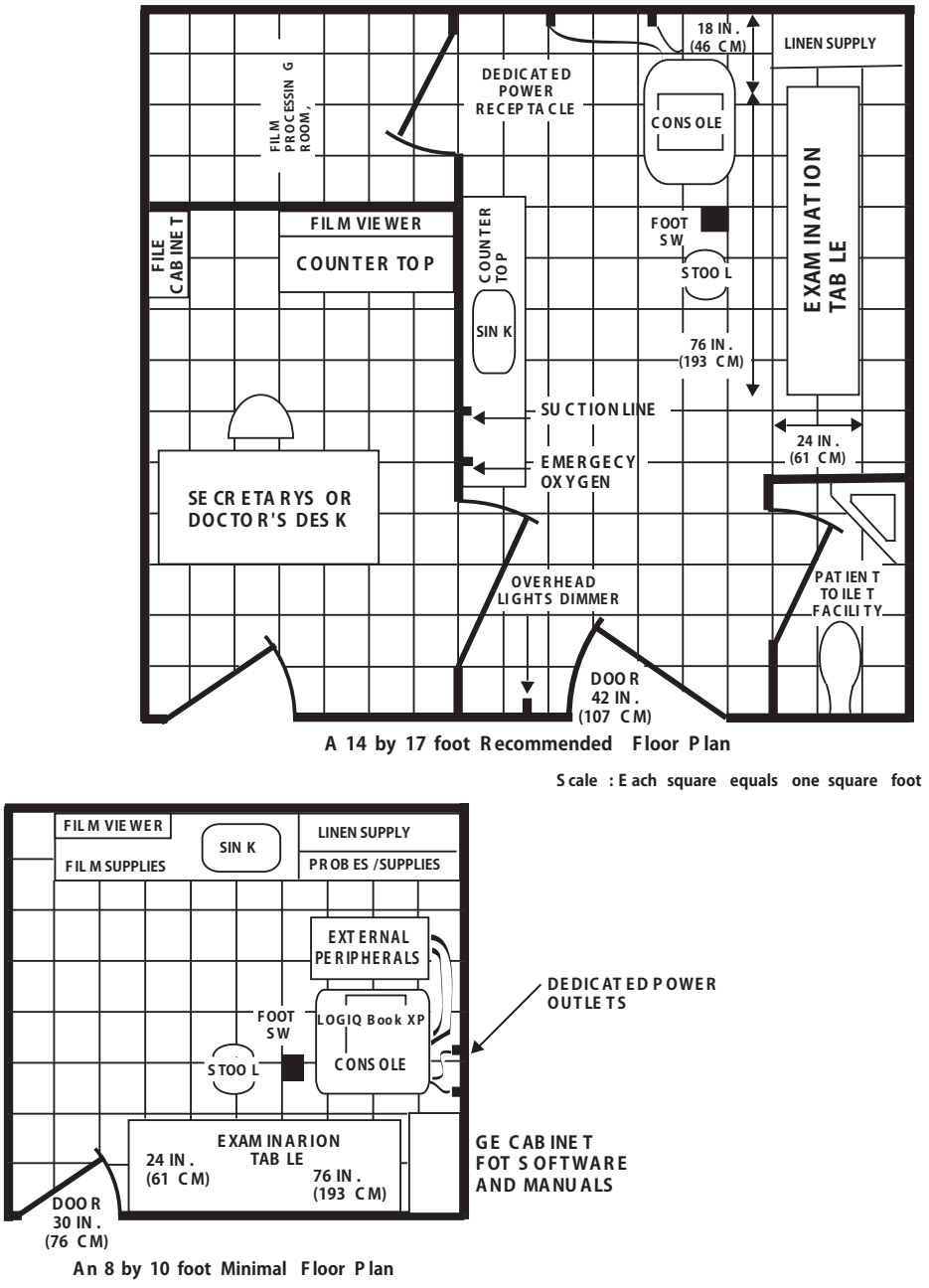


Figure 2-1. Suggested Ultrasound Room Layout

Networking setup requirements

Stand alone Ultrasound system (without network connection)

None.

Scanner connected to hospital's network

Supported networks:

Wireless LAN

Purpose of the DICOM network function

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

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

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

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

DICOM option setup requirements

To configure the Ultrasound system to work with other network connections, the site's network administrator must provide information to complete the form "Worksheet for DICOM Network Information in "Figure 2-2 *on page 2-18*. Ensure that there are no spaces in any field of the form.

Entries must include:

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

DICOM option setup requirements (continued)

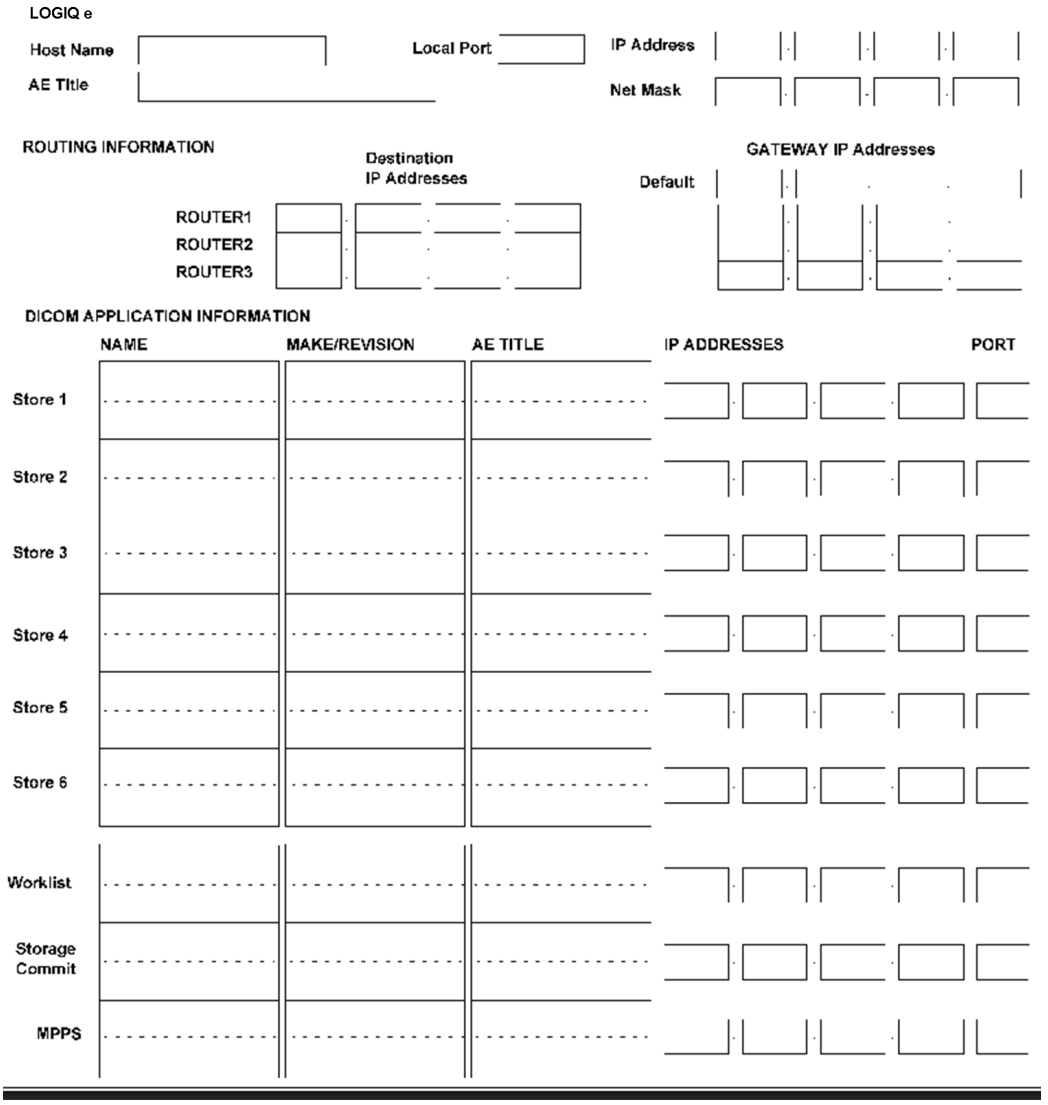


Figure 2-2. Worksheet for DICOM Network Information

Environmental Dangers

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

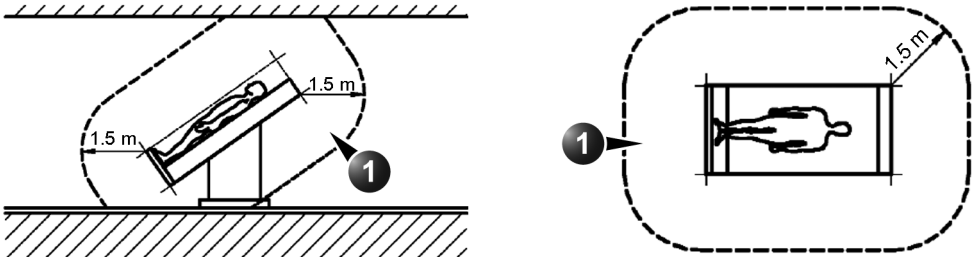
Patient Environment IEC60601-1and ANSI AAMI ES60601-1

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

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

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

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



1. Patient environment

Figure 2-3. Patient environment

Chapter 3

System Setup

This chapter contains information needed to install LOGIQ e system.

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

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

Overview

Contents in this chapter

Setup reminders

Contents in this Section

Average setup time

- Unpacking the LOGIQ e: 20 minutes
- Set up LOGIQ e wo/options: 30 minutes
- DICOM Network Configuration: 30 minutes

The LOGIQ e installation and functional checkout will take approximately one hour. LOGIQ e consoles with optional equipment may take slightly longer.

Setup warnings

DANGER

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

CAUTION

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

Setup warnings (continued)

c CAUTION

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

c CAUTION

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

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

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

2. After being transported, the unit may be very cold or hot. If this is the case, allow the unit to acclimate before you turn it on. It requires one hour for each 2.5×C increment it's temperature is below 10×C or above 40×C.

d DANGER

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

c CAUTION

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

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

-5	0	5	10	15	20	25	30	35	40	45	50
23	32	41	50	59	68	77	86	95	104	113	122
6	4	2	0	0	0	0	0	0	0	2	4

Setup warnings (continued)

d 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!

d DANGER

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.

d DANGER

Do not operate this unit unless all board covers are securely in place.

c CAUTION

Operator Manual(s)

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

c CAUTION

Acoustic Output Hazard

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

Receiving and unpacking the equipment

Contents in this Section

Receiving the LOGIQ e

Overview

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

Examine all packages

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

Unpacking the LOGIQ e

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

1. Cut the four PLASTIC BANDs
2. Cut the adhesive tape and open top covers of paper carton.

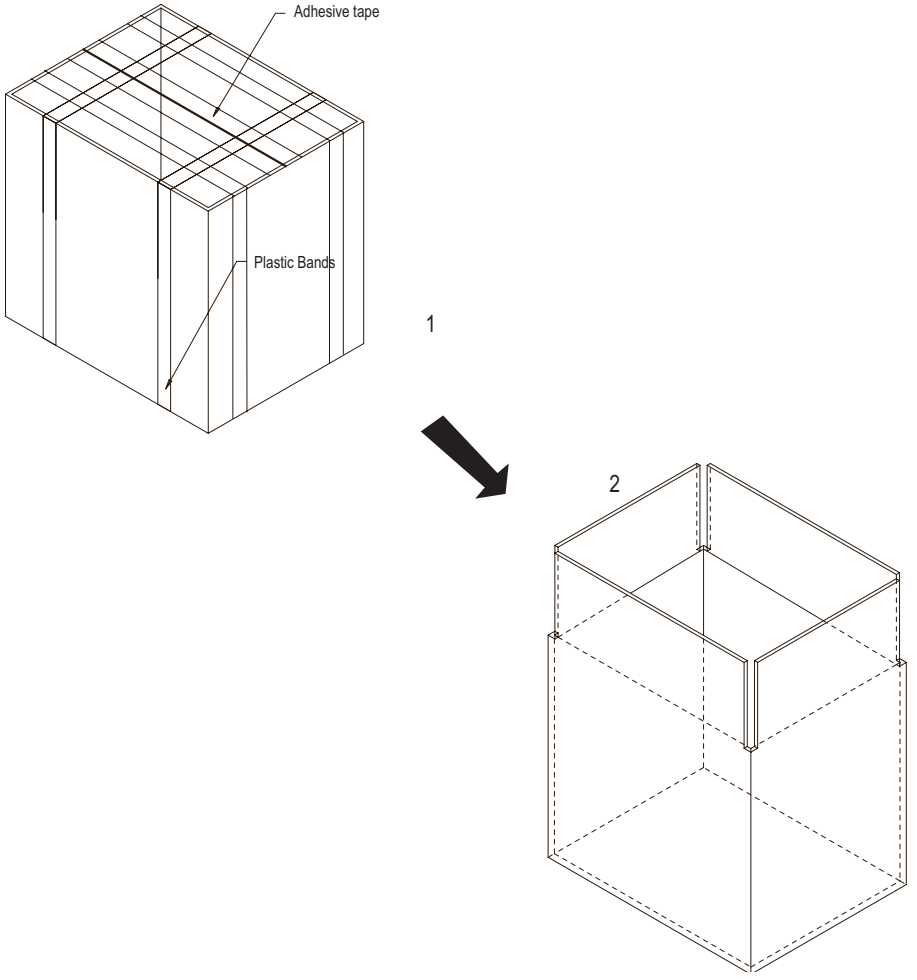


Figure 3-1. Open Top Covers of Paper Carton

Unpacking the LOGIQ e (continued)

3. Take out the Paper pad.
4. Take out console together with 2 interleavers from console package.
5. Take out the interleavers beside Accessories Package
6. Take out Accessories Package.

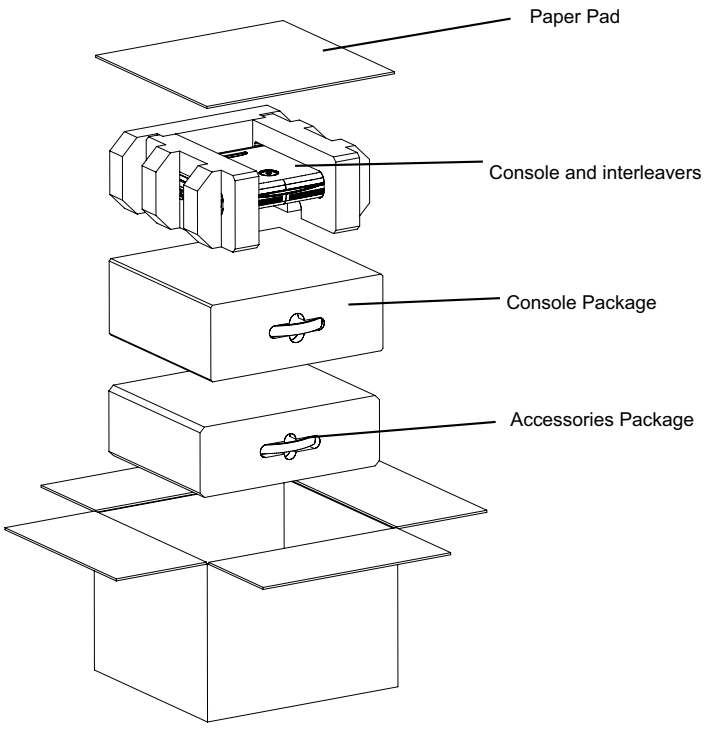


Figure 3-2. Unpacking the equipment

CAUTION

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

Unpacking the LOGIQ e (continued)

7. Remove 2 interleavers.
8. Remove plastic bag.

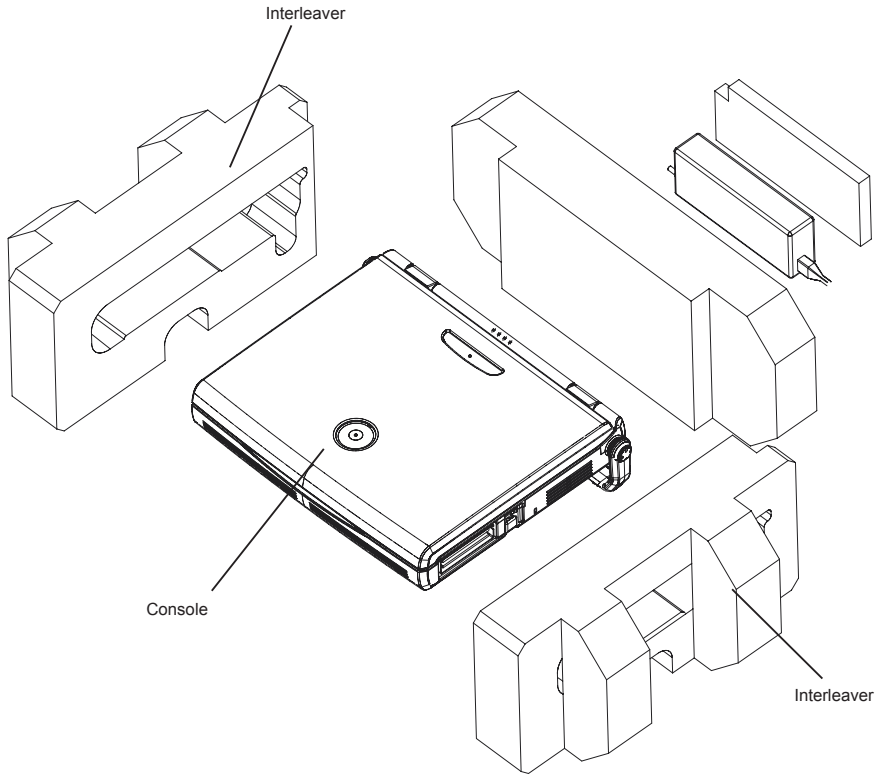


Figure 3-3. Removing interleavers and plastic bag

Unpacking the LOGIQ e (continued)

NOTE: Check the shipping container for special instructions. Verify that the container is intact. In some cases a secondary container may be used. If so, ask the carrier for unpacking instructions.

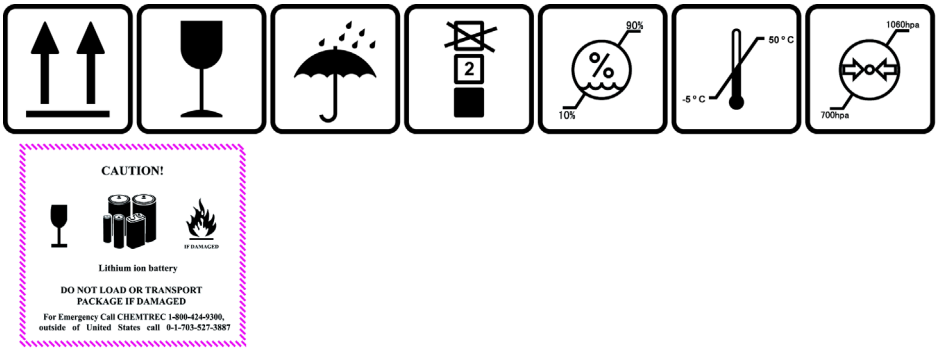


Figure 3-4. Labels on Package

CAUTION

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

Moving into Position

CAUTION

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

CAUTION

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

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

Packing the Equipment

Please pack LOGIQ e in the reverse order of unpacking.

Preparing for setup

Verify customer order

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

Physical inspection

System Voltage Settings

Verify that the system arrived intact (visual inspection).

If the system has been damaged, please refer to 'Damage in transportation' on *page i-11* in the beginning of this manual.

- Verify that the scanner is set to the correct voltage. The Voltage settings for the LOGIQ e Scanner is found on a label located on the AC adapter.
- 220-240VAC(China); 100-120VAC(USA/Japan); 220-240VAC(Europe, Latin America).

Connecting a LOGIQ e *system to the wrong voltage level will most likely destroy the scanner.*

EMI protection

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

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

Completing the setup

Contents in this Section

System specifications

System requirements verification

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

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

Physical dimensions

The physical dimensions vary from product to product. You may copy and use the table below in your local manuals or local core content.

- Height: 70 mm (2.75 in) console only; 100 mm (3.94 in) with handle
- Length: 346 mm (13.62 in) console only; 375 mm (14.76 in) with handle
- Width: 295 mm (11.61 in) console only; 343 mm (13.50 in) with handle

Console Weight

- Weight (with battery): approx. 5.2 kg (11.5 lbs)

Electrical specifications

WARNING

Connecting a LOGIQ e to the wrong voltage level will most likely destroy it.

Verification of the system's voltage setting

Verify that the mains voltage specified for the LOGIQ e is available on-site.

Electrical specifications for LOGIQ e

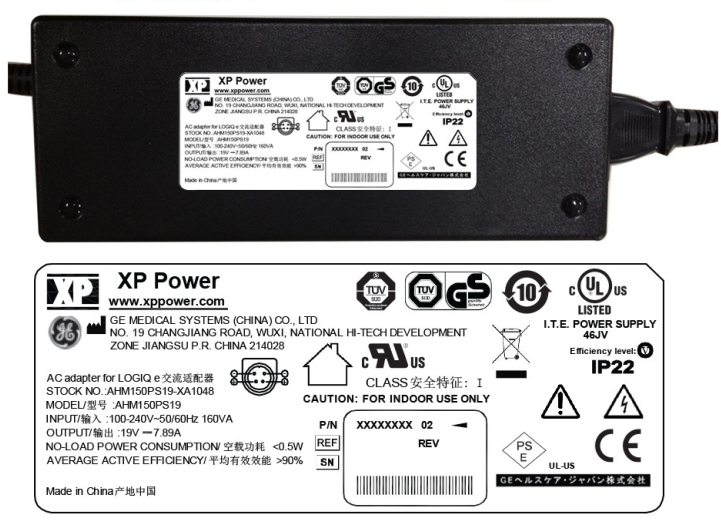


Figure 3-5. AC Adapter label

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.

System Power On

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

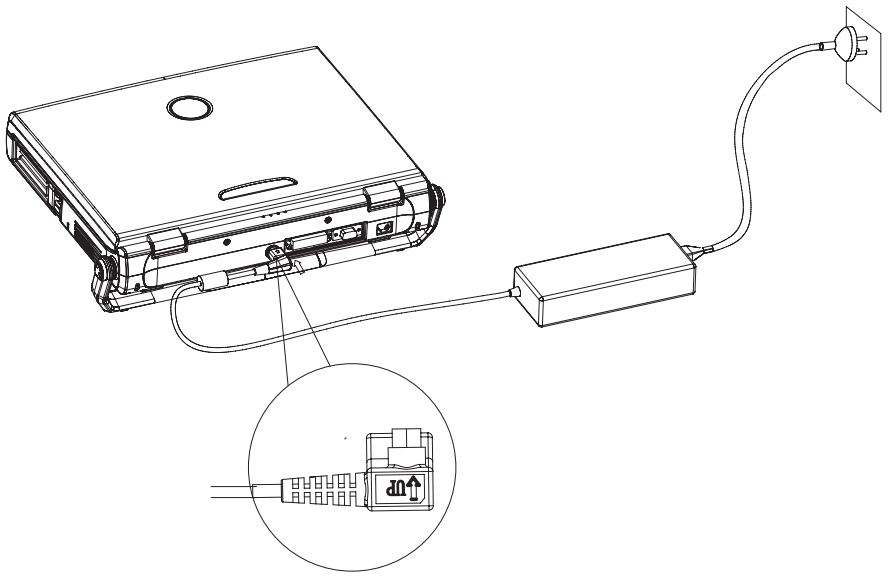


Figure 3-6. Connect AC adapter

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

CAUTION

The system should rest on the handle to allow an air gap to prevent overheating.

Power on the system

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

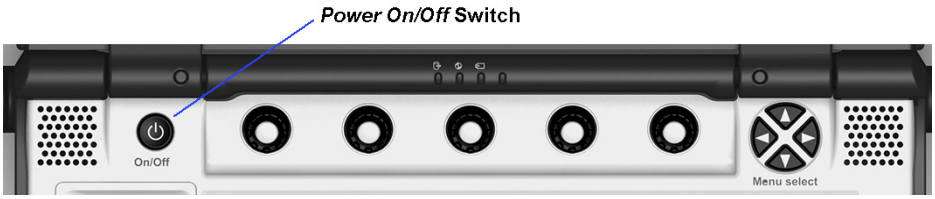


Figure 3-7. Power On/Off Switch

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.

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.

Back-end Processor Power off

To power off the system:

1. Press the ***Power On/Off*** switch at the front of the system once.
2. The system-Exit window is displayed.

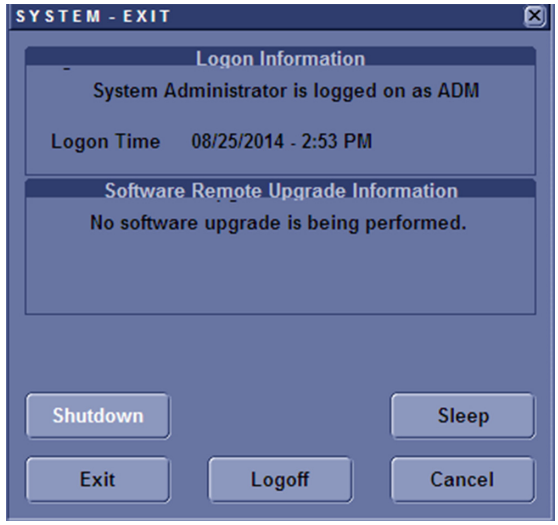


Figure 3-8. System Exit Window

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

System Shutdown

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

Connecting probes

Connect a probe

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

Do not allow the probe head to hang freely. Excessive impact to the probe will result in irreparable damage.

To prevent probe connector pins damage, or PCB board damage, do not use excessive force when connecting the probes.

Keep the probe cables away from the wheels.

Do not bend the probe cables.

Do not cross cables between probes.

Follow these steps to connect a probe:

Probes can be connected at any time, whether the unit is **On** or **Off**.

Carefully open the system LCD display, plug the probe connector into the probe port, then lock the probe latch upward.

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

1. Before connecting the probe:
   a. Do a visual check of the probe pins and system sockets.
   b. Remove any dust or foam rests from the probe pins.
   c. Verify the probe and the probe cable for any visual damage.

Connect a probe (continued)

2. Position the probe cable so that it is not resting on the floor.

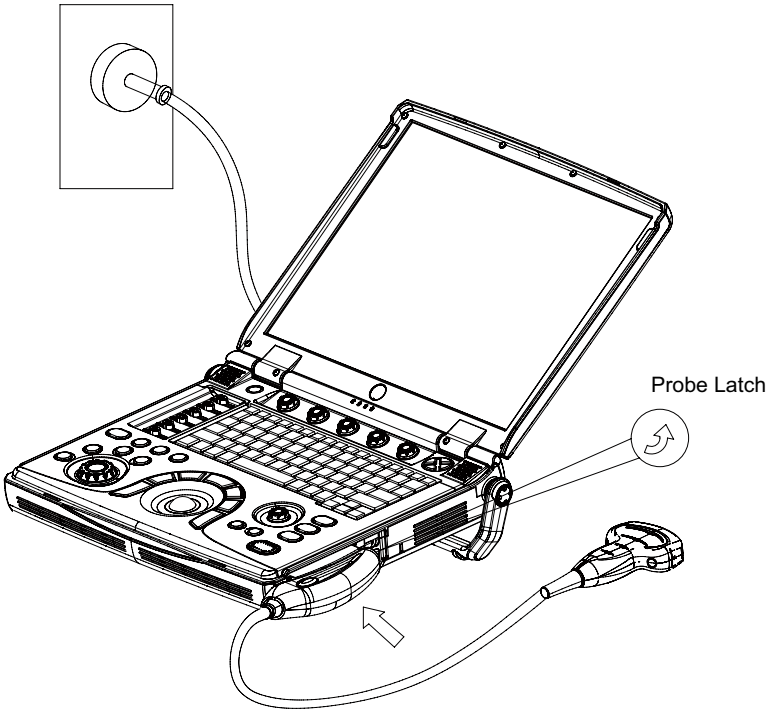


Figure 3-9. Probe connectors

Disconnect a probe

Follow these steps to disconnect a probe:

1. Remove the connector from the port.
2. Ensure that the probe head is clean before placing the probe in its storage case.

System Configuration

Contents in this Section

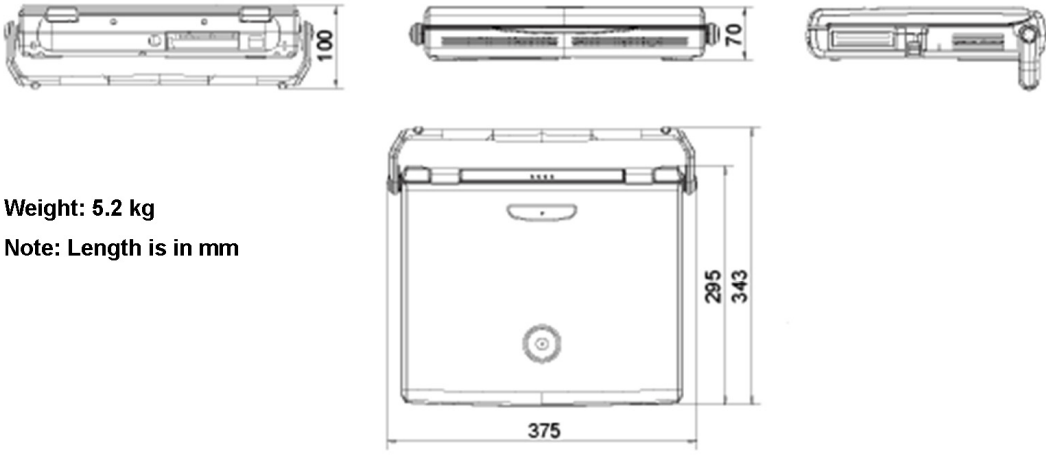
LOGIQ e configuration

System Specification

The physical dimensions of the LOGIQ e console with old LCD are summarized as below:

Table 3-1: Physical Dimensions of LOGIQ e

Height		Width		Depth		Unit
Console Only	Console with Handle	Console Only	Console with Handle	Console Only	Console with Handle	Unit
70	100	295	343	346	375	mm
2.75	3.94	11.61	13.50	13.62	14.76	inches



Weight: 5.2 kg

Note: Length is in mm

Figure 3-10. Overall Dimensions and Weight

Electrical requirements for Adapter

Table 3-2: Electrical Specifications for Adapter

Adapter Model	AHM150PS19-XA1048
Input Voltage	100-240VAC
Input Current	1.5A at 115VAC 0.75A at 230VAC
Output Power	150W
Output Voltage	19.0VDC
Output Current	7.89A
Frequency	50/60Hz

Approved peripherals

Table 3-3: Approved peripherals

Device	Manufacturer	Model	Interface	Remark
B/W Printer	SONY	UP-D897 B/W Printer	USB1.1 Port	
	SONY	UP-D898MD B/W Printer	USB1.1 Port	
Color Printer	SONY	UP-D25MD Color Printer	USB1.1 Port	
DVD RW	LITEON	LITEON eUAU108	USB Port	
	LITEON	LITEON eBAU108	USB Port	
3-pedal footswitch	Steute	MKF 2-MED GP26	USB Port	
USB Wireless Card	NetGear	NetGear WNA1000M Wireless USB Micro Adapter	USB Port	
ECG-USB	NORAV	ECGUSB1D-EX	USB Port	
Barcode Scanner	Honeywell	XENON 1900	USB Port	

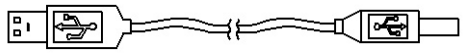
NOTE: For detailed installation information and connection procedures, please refer to Peripheral Installation manual.

Connecting Cables

WARNING

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

Table 3-4: List of Connecting Cables

Name	Part No.	Figure	NOTE
USB Cable			For USB Printer & USB DVD-RW

Peripheral/Accessories Connector Panel

LOGIQ e peripherals and accessories can be properly connected using the side connector panel.

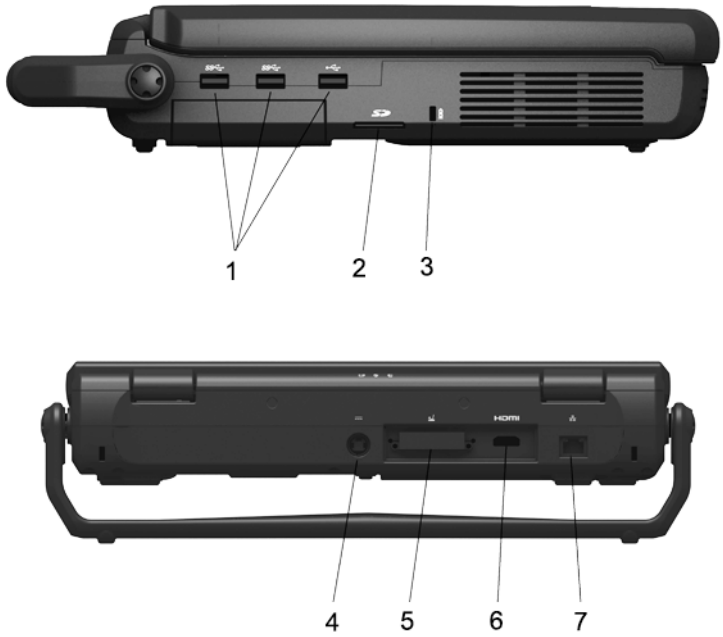


Figure 3-11. Left Side and Rear Connector Panel

1. 3 USB Ports for Printers (B/W, Color and USB), Memory Stick, Footswitch, DVD-RW, Wireless LAN Adapter, USB Hub, USB HDD, ECG
2. SD card port
3. Security lock
4. Port for DC In (AC Adapter)
5. Docking Port
6. HDMI Port
7. Network Port

NOTE: Each outer (case) ground line of peripheral/accessory connectors are protectively grounded. Signal ground lines are not isolated.

Pin Assignment

Pin Assignment of DC in put

Connector: 4 Pin, Female

Table 3-5: Pin Assignment of DC input

Pin No.	Signal	Pin No.	Signal
1	+20V	3	GND
2	+20V	4	GND

Pin Assignment of USB1

Table 3-6: Pin Assignment of USB1

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

Pin Assignment of USB2

Table 3-7: Pin Assignment of USB2

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

Pin Assignment of USB3

Table 3-8: Pin Assignment of USB3

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

Pin Assignment of External HDMI

Table 3-9: Pin Assignment of HDMI

Pin No.	Signal	Pin No.	Signal
1	TMDS Data2+	11	TMDS Clock Shield
2	TMDS Data2 Shield	12	TMDS Clock-
3	TMDS Data2-	13	CEC
4	TMDS Data1+	14	Reserved (N.C. on device)
5	TMDS Data1 Shield	15	SCL
6	TMDS Data1-	16	SDA
7	TMDS Data0+	17	DDC/CEC Ground
8	TMDS Data0 Shield	18	+5V Power
9	TMDS Data0-	19	Hot Plug Detect
10	TMDS Clock+		

Peripheral Connection

NOTE: Please refer to the operation manual of each peripheral for information needed by the user to operate the system safely.

To install the peripherals, See 'Peripherals Installation' on *page 3-34 for more information.*

Table 3-10: Peripheral Connection

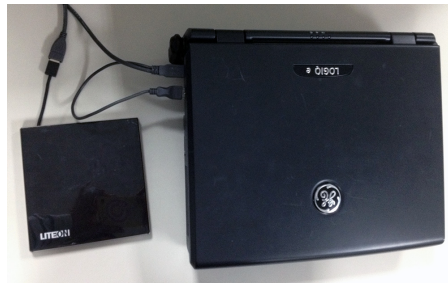
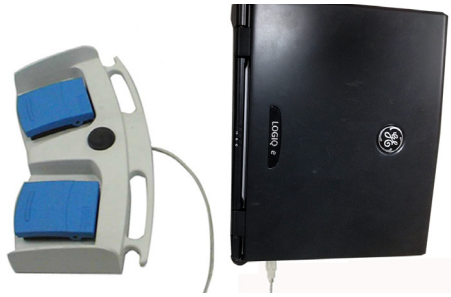
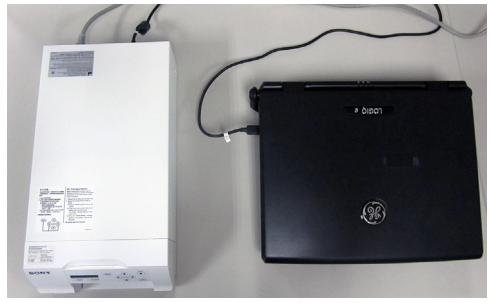
No.	Steps	Corresponding Graphic
1.	Connect DVD-RW. Connect the DVD-RW to the system. The DVD-RW can be properly connected using either of the 3 USB ports. *NOTE: Do not connect the DVD-RW to the system while scanning.*	
2.	Connect Footswitch. Connect the footswitch to the system. The footswitch can be properly connected using either of the 3 USB ports.	
3.	Connect SD Card. Connect SD Card to the system. Insert the SD Card into the SD Card port.	
4.	Connect Wireless LAN Adapter. Connect the Wireless LAN Adapter to the system. The wireless LAN adapter can be properly connected using either of the 3 USB ports.	

Table 3-10: Peripheral Connection

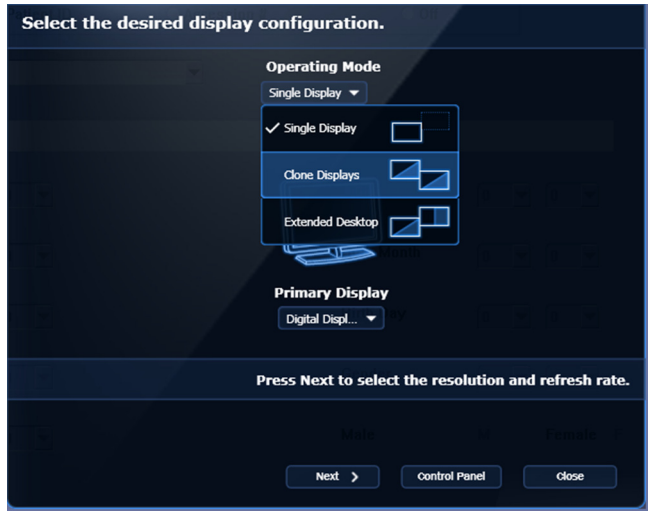
No.	Steps	Corresponding Graphic
5.	Connect Color Printer. Connect the Color Printer to the system. The Color Printer can be properly connected using either of the 3 USB ports.	
6.	Connect ECG. Connect the ECG to the system. The ECG can be properly connected using either of the 3 USB ports.	
7.	Connect Barcode Reader. Connect the Barcode Reader to the system. The Barcode Reader can be properly connected using either of the 3 USB ports.	
8.	Connect HDMI. Connect the external monitor to the system. The monitor can be properly connected using the HDMI port.	

External Display Configuration

Connect the external monitor to the system. The monitor can be properly connected using the HDMI port.

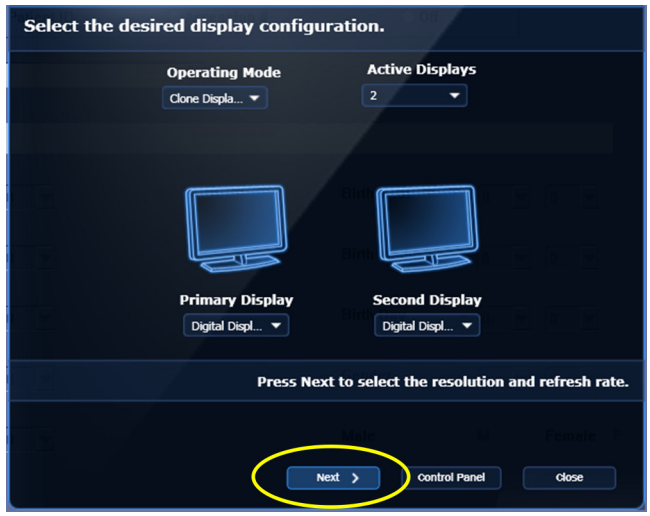
1. Connect HDMI cable to the system and the external monitor.
2. Press Ctrl+Alt+V on the keyboard of the system, a dialog box appears on the screen.

3. Select **Clone Displays** in the menu list of Operating Mode.

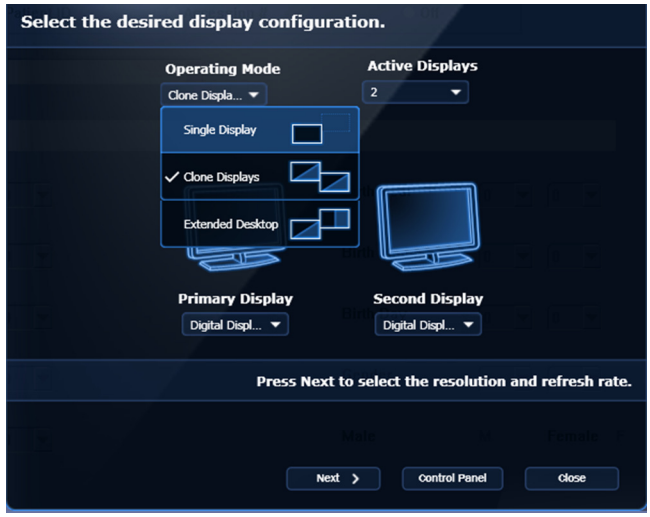


External Display Configuration (continued)

4. Select **Next**, the screen displays on the external monitor. Then select **Close** to close the dialog box.



5. To exit external monitor, Press Ctrl+Alt+V. Select **Single Display** in the menu list of Operating Mode, then select **Next** and **Close**.



Available probes

See in specification in the LOGIQ e User Reference Manual for Probes and intended use.

The LOGIQ e system supports C1-5-RS, 8C-RS, 9L-RS, 12L-RS, L4-12t-RS, L8-18i-RS, L10-22-RS, E8C-RS, 3Sc-RS and 6S-RS probes.

Table 3-11: List of Probes for LOGIQ e

Probe Name	Material of Headshell	TYPE	Catalog Number	Part Number
C1-5-RS	NORYL	CONVEX	H40462LA	5384875
E8C-RS	VALOX	MICRO-CONVEX	H40402LN	5434195
8C-RS	VALOX	MICRO-CONVEX	H40402LS	5434194
12L-RS	NORYL	LINEAR	H40402LY	5409291
3SC-RS	VALOX	Phased Array	H45041DL	47237516
9L-RS	VALOX	LINEAR	H40442LL	5213143
6S-RS	VALOX	SECTOR	H45021RP	5394465
L4-12t-RS	VALOX	LINEAR	H48062AB	5435010
L8-18i-RS	VALOX	LINEAR	H40462LF	5397810
L10-22-RS	VALOX	LINEAR	H48312AH	5441887

NOTE: Please refer to User Manual for the applications of the probes.

Software Options configuration

Software Option installation introduction

Refer to the LOGIQ e 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 e Basic User Manual, Chapter 16, Customizing Your System.

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

Connectivity setup

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

- Before you can set up the scanner, you need to collect some information.
- The Worksheet can be used for gathering this information.
- Typical source for this information is the network administrator.

Connectivity setup (continued)

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						

Figure 3-12. Connectivity Installation Worksheet

Paperwork after setup

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

User's Manual(s)

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

Product Locator Installation Card

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

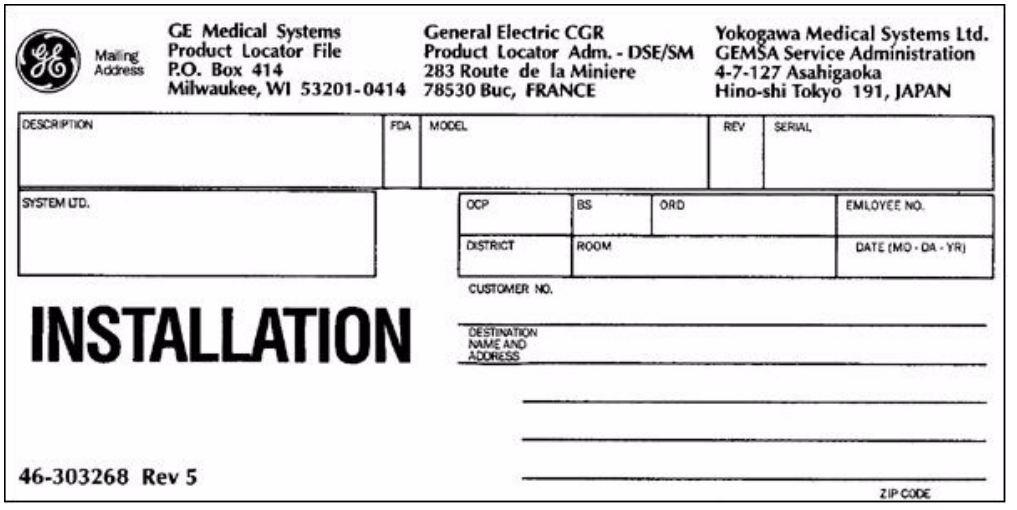


Figure 3-13. Product Locator Installation Card (Example)

Peripherals Installation

Contents in this Section

Overview

This section describes how to install and configure the peripherals validated for the LOGIQ e.

About the operation check-out of peripherals, See 'Peripheral Checks' on *page 4-52 for more information.*

Table 3-12: LOGIQ e Peripherals

Description	Power	Control	Model
B/W USB Printer	100-120VAC/ 240VAC 50/60Hz 1.5a/0.8A	USB port	UP-D897
	100-120VAC/ 240VAC 50/60Hz 1.3A/0.6A	USB port	UP-D898MD
Color USB Printer	100-240VAC 50/60hZ 1.7/1.0A	USB port	UP-D25MD
DVD-RW	100-240VAC 1.5A	USB port	eUAU108
	100-240VAC 1.5A	USB port	eBAU108
3-Pedal Footswitch	5V	USB port	MKF 2-MED GP26
USB Wireless Adapter		USB port	NetGear WNA1000M Wireless USB Micro Adapter
Barcode Scanner		USB port	XENON1900
ECG	USB 5V 80mA	USB port	ECGUSB1D-EX

Furnished materials

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

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

- UP-D898MD B/W Printer

Table 3-13: Materials furnished with B/W Printer

Item	Description	Quantity	Note
1	UP-D898MD B/W Printer	1	
2	Paper Roll	1	
3	USB cable	1	
4	AC Power Cord	1	

- Color USB Printer

Table 3-14: Materials furnished with Color USB Printer

Item	Description	Quantity	Note
1	UP-D25MD Color USB Printer	1	
2	Paper Roll	1	
3	AC Power Cord	1	
4	USB cable	1	

- DVD-RW (LITEON DVD-RW)

Table 3-15: Materials furnished with DVD-RW

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

Furnished materials (continued)

- USB Wireless Adapter

Table 3-16: Materials furnished with the Wireless LAN

Item	Description	Quantity	Note
1	Wireless Adapter	1	

- 3 Pedal Footswitch

Table 3-17: Materials furnished with the Footswitch

Item	Description	Quantity	Note
1	Footswitch	1	

- Barcode Scanner

Peripherals Installation Instructions

Color USB Printer Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the Color USB Printer.

Installation Procedure

1. Place the device in a suitable place.
2. Connect power cord and USB Cable on the Printer.

Figure 3-14. Color Printer USB cable and Power Cord connect

3. Connect the power cord to the outlet on the wall, then turn on the printer.

Color USB Printer Installation (continued)

4. Connect USB cable to LOGIQ e USB port.

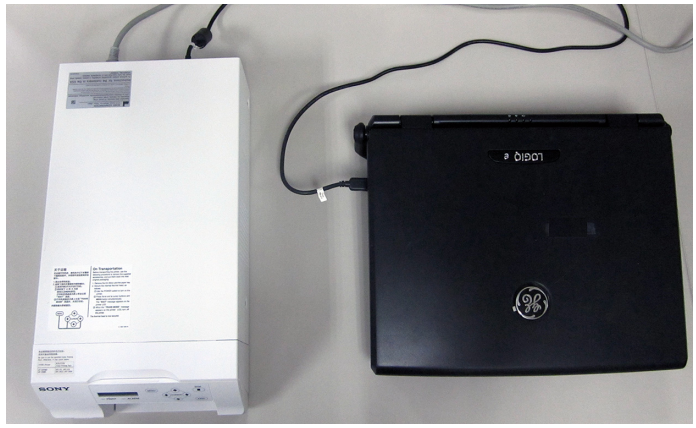


Figure 3-15. Color Printer connection

Setting up Color printer for Printing Report

1. Connect the color printer to the USB port of the system.
2. Power on the printer and the system.
3. After the system completes booting up, enter Utility -> System -> Peripherals, select UP-D25MD for Standard Printer.

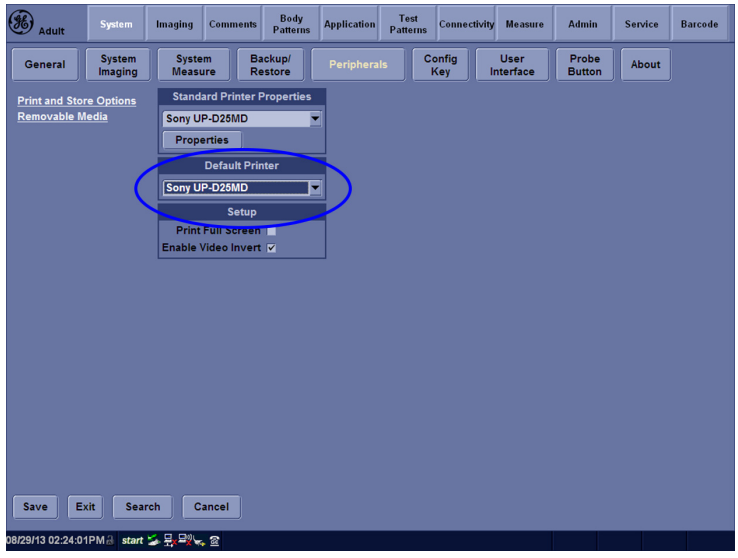


Figure 3-16. Peripheral Page

4. Select **Save**.

Assigning Printer Key to the Printer

Example below assign **P2** on the control panel to Color Printer UP-D25MD.

1. Select Connectivity -> Service, select **Standard Print** in the **Service** list.

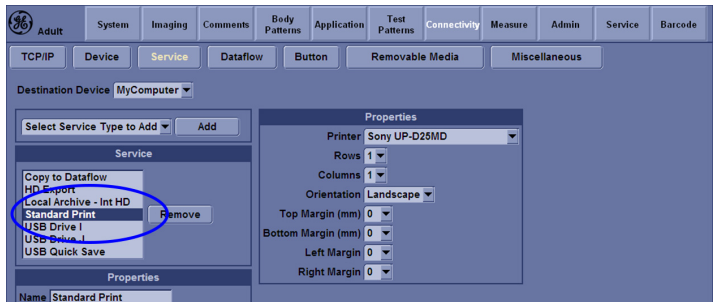


Figure 3-17. Service Page

2. Select Connectivity -> Button, select Print2 in Print Button list, then select the original setting in Printflow View field and select “<<“.

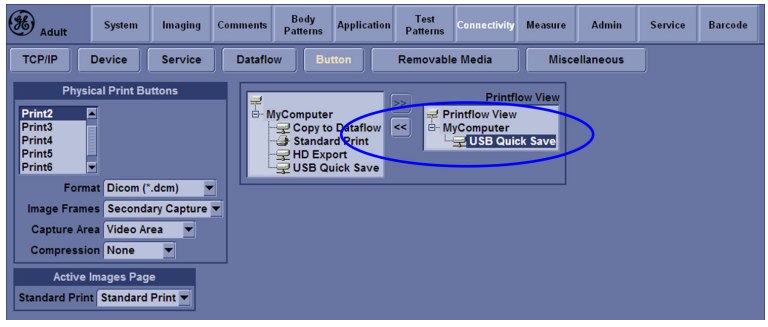


Figure 3-18. Button Page

3. Select Standard Print, then press “>>“ to add the standard printer to the Printflow View.

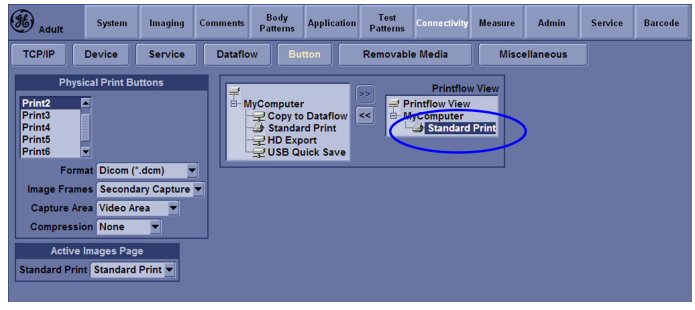


Figure 3-19. Standard Print setting

DVD-RW Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

1. Unpack the DVD-RW.
2. Ensure no physical damage.

Installation Procedure

1. Place the device in a suitable place.
2. Connect the USB Cable on the DVD-RW.

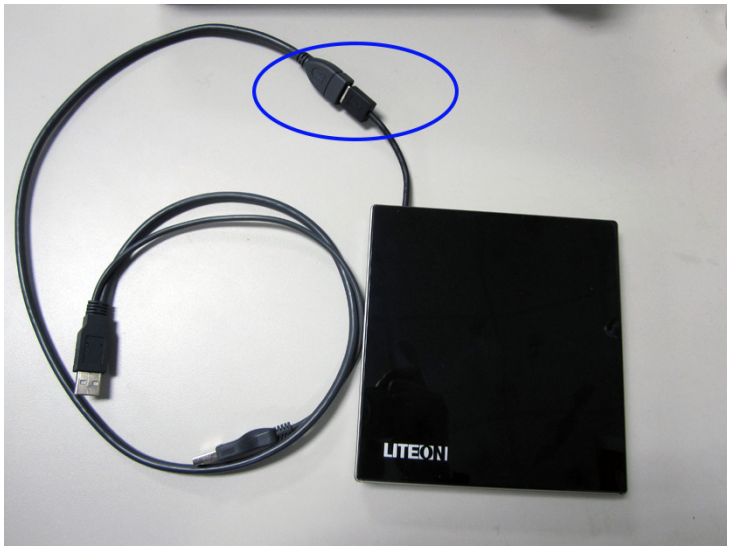


Figure 3-20. Connect USB cable on DVD-RW

DVD-RW Installation (continued)

3. Connect USB cable to LOGIQ e USB port.

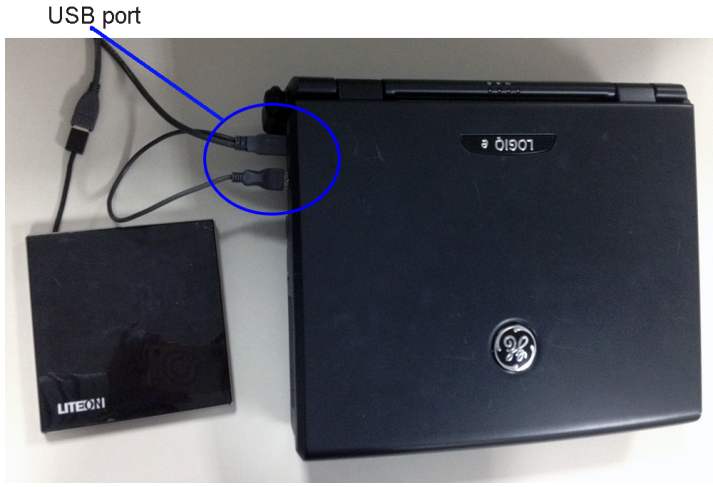


Figure 3-21. DVD-RW connection

WARNING Do Not connect DVD-RW with the system while scanning.

Wireless Lan Adapter Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

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

Installation Procedure

1. Connect the Wireless LAN Adapter to the USB port on the LOGIQ e system.

Figure 3-22. Connect Wireless LAN Adapter to the system

Wireless Lan Adapter Installation (continued)

2. Enter **Utility -> Connectivity -> TCP/IP** and select **Configuration** to configure wireless network.

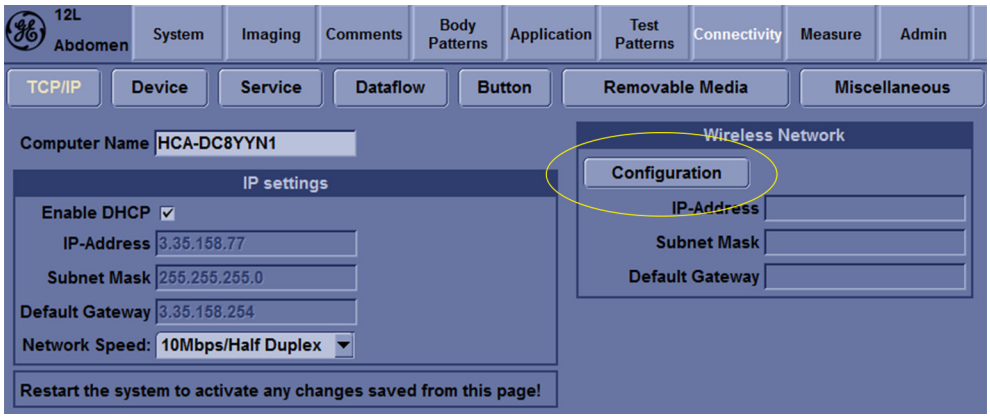


Figure 3-23. Wireless configuration

3. Config the wireless Lan setting with local IT person.

Footswitch Installation

Tools

No special tools needed.

Manpower

One person 5 min.

Preparations

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

Installation Procedure

1. Connect the Footswitch to the USB port on the LOGIQ e system.

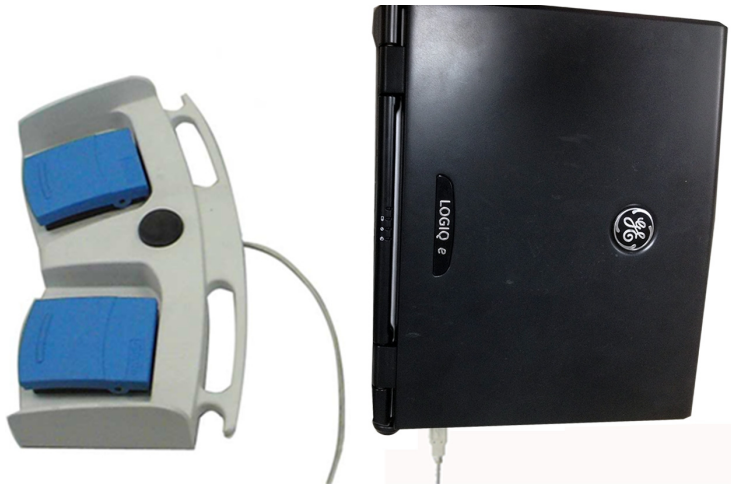


Figure 3-24. Connect Footswitch to the system

Footswitch Installation (continued)

Configuring Footswitch

Footswitch supports these configurations: No Function, Rec/ Pause, Freeze, Next Heartcycle, Prev Heartcycle, Print 1, Print 2, Print 3, Print 4, Update, Next Step (Scan Assistant), Previous Step (Scan Assistant), Scan Assistant Pause/Resume or Mark Cine. The default setting is No Function.

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

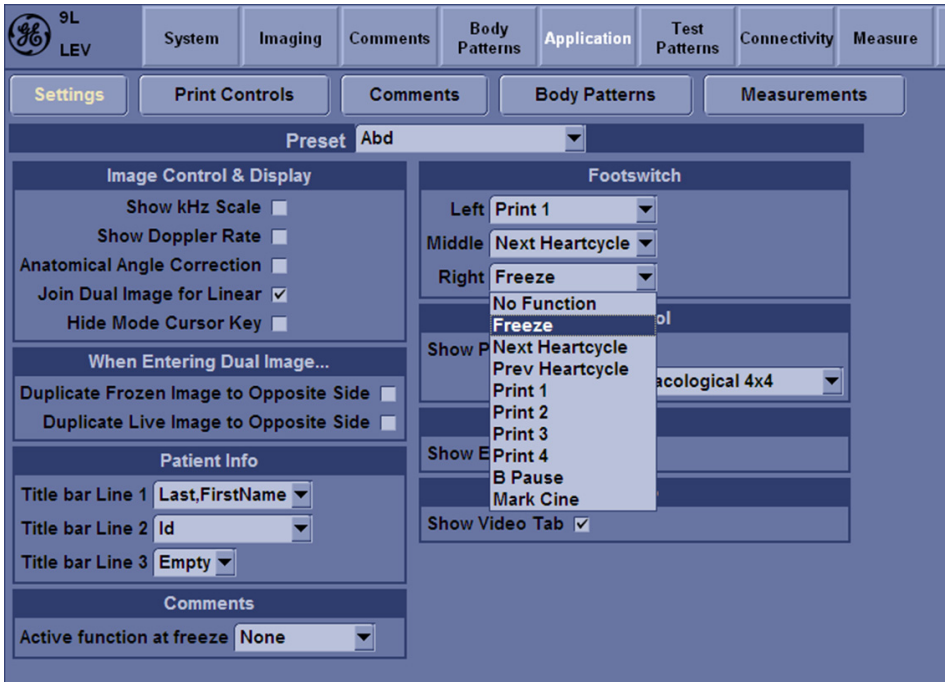


Figure 3-25. Configuring Footswitch Functions

Barcode Scanner Installation

Tools

No special tools needed.

Manpower

One person 1 min.

Preparations

1. Unpack the Barcode Scanner.
2. Ensure no physical damage.

Installation Procedure

1. Connect the Barcode Scanner to the USB port on the LOGIQ e system.

Figure 3-26. Connect Barcode Scanner to the system

Barcode Scanner Installation (continued)

NOTE: After the Barcode Scanner is connected to the Docking Cart, the cable of the Barcode Scanner can be hung in the cable hook.

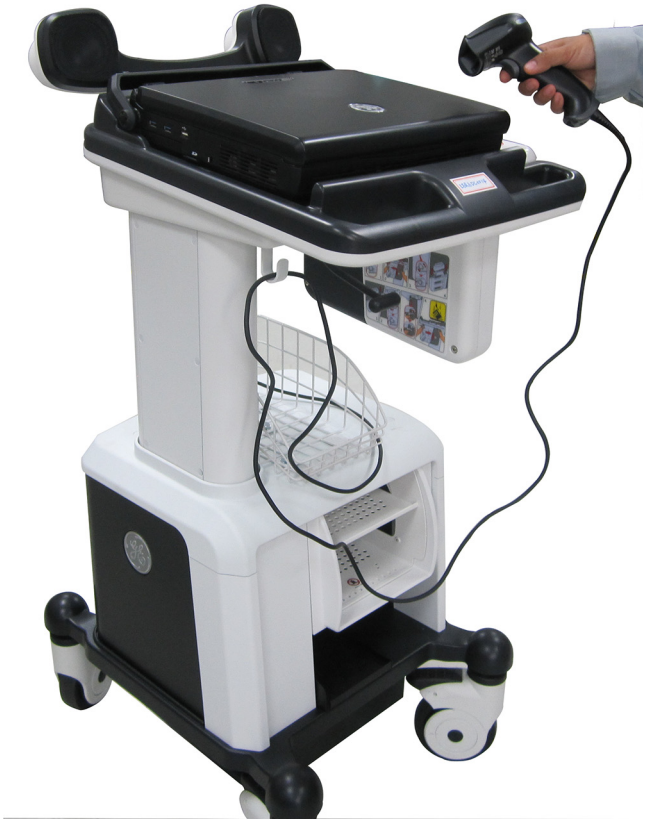


Figure 3-27. Barcode Scanner cable

Barcode Scanner Installation (continued)

Set Up Barcode Scanner

The barcode scanner needs to be set up before the first use.

To set up the barcode scanner, follow the steps below:

1. Power on the system. Connect barcode scanner to the system.
2. Scan the three barcodes.

   First scan the Remove Custom Defaults barcode (1), then scan the Activate Defaults barcode (2). This is to reset the scanner to the factory default settings. Finally, scan the USB Serial barcode (3). The Barcode scanner is ready for use.

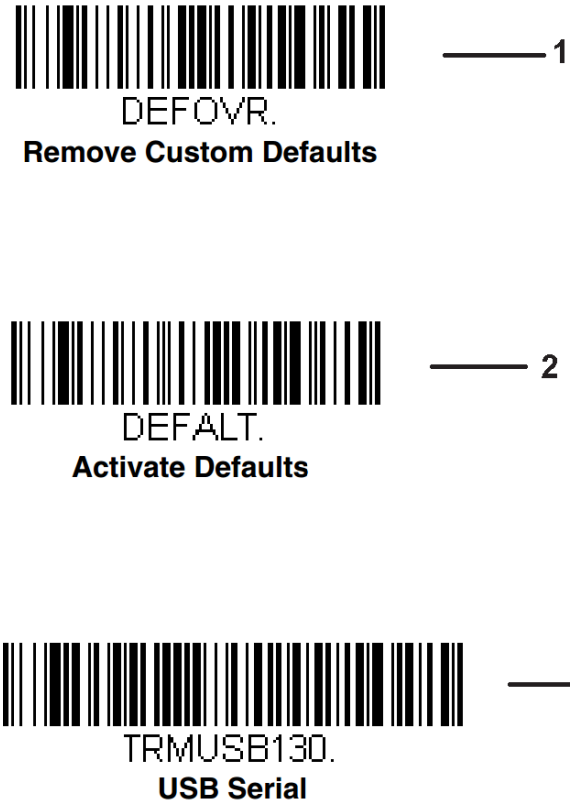


Figure 3-28. Barcode

NOTE: Only the printed barcodes on the paper can be scanned. If you do not have the printed version, be sure to print them to the paper first and scan them on the paper.

ECG Installation

Tools

- No special tools needed.

Manpower

- 1 person 1 minute.

Preparation

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

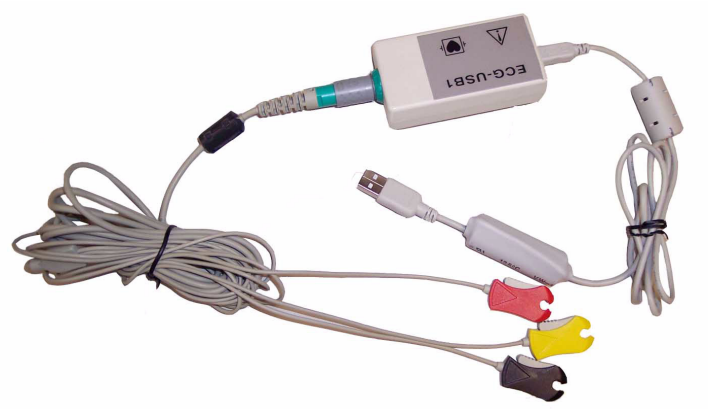


Figure 3-29. ECG

Installation Procedure

1. Connect the ECG to the USB port on the system.

Figure 3-30. ECG Installation

Installation Procedure (continued)

2. Wait 5 seconds for ECG function start automatically.

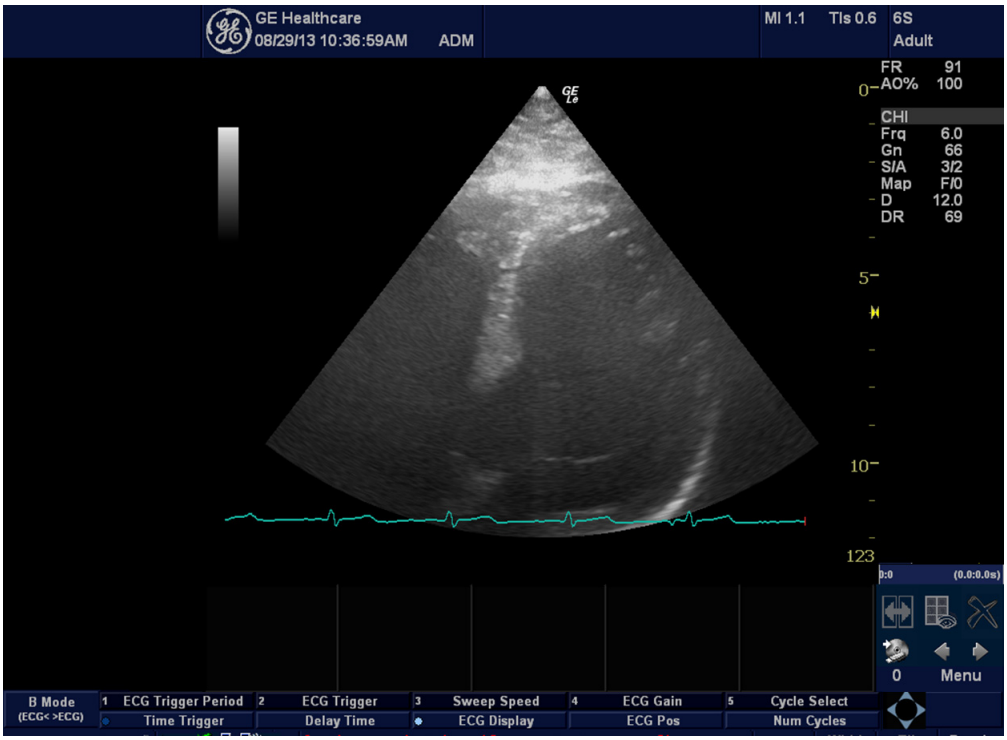


Figure 3-31. ECG Mode

ECG Intended Use

ECG is intended to disclose either normal condition or patterns of arrhythmia, or features of prognostic value in the following cases:

- Patients with suspected cardiac abnormalities
- Populations of patients at an age or period in which a routine baseline evaluation of ECG characteristics is desired.

Patient Preparation

The ECG traces quality depends very much on the stability and conductivity of the electrodes during the test, especially during high stages when the patient movements can cause artifacts. Here are some basic rules to ensure good electrical contact:

- Shave hair at the electrode contact points.
- Use a special shirt that attached the electrodes and lead wires to the body.
- Use high quality liquid gel electrodes.
- Make sure that the lead wires do not swing.

Detachable 3 leads each 100cm with clip connectors on the patient end designed for use with disposable ECG electrodes. Furthermore, equip 3 repeatable limbs electrode clamps which can connect with clip connector. Limbs electrodes are white, red and green (AHA\IEC).

Table 3-18: ECG Lead Placement

Lead	Patient Cable Marking		Position on Patient
	AHA	IEC	
I	RA (White)	R (Red)	Right Arm
II	LA (Black)	L (Yellow)	Left Arm
III	RL (Green)	N (Black)	Right Leg

Technical Specification of ECG

Table 3-19: ECG Technical Specifications

Feature	Specification
ECG	
Patient Cable	3 leads conform to AAMI
Defibrillator Protection:	Protected against 360 J discharge
Patient leakage current	< 10 uA
Ground Isolation	4 kV rms
Input Impedance	>100 Mohm
CMMR	> 100 dB
DC max.input	+/- 300mv
Frequency range (-3db)	0.05 - 150 Hz

Table 3-19: ECG Technical Specifications (Continued)

Feature	Specification
Signal dynamic range	10mV
Power	USB 5vdc, 80mA
Ext. ECG	
Input Level	+/- 1v, Amplification 1000
A2D	
A2D resolution	12 bit,2'complement
Full scale range	+/- 5 mV
LSB weight	2.44 uV
Full scale +	+5 mV (Digital value = 7FF hex)
Midscale	0mV (Digital value =000 hex)
Midscale - LSB	-2.44 uV (Digital value = FFF hex)
Full scale -	-5 mV (Digital value = 800 hex)
Sample Rate	1000
Communication	
USB 2.0 compliant, Full Speed Device	Control, Isochronous Transfer Types
Environmental	
Operating Temperature Range	0°C to 50°C
Storage Temperature Range:	-40°C to 70°C
Relative Humidity	0-85% non-condensing
Regulatory	
Safety Standards	IEC601-1 , IEC601-1-25

Chapter 4

General Procedures and Functional Checks

This chapter provides procedures for quickly checking major functions of the LOGIQ e and diagnostics instructions using the built-in service software and power supply adjustments.

Overview

Contents in this chapter

Special Equipment required

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).

General procedures

Contents in this Section

Caution and Warning

CAUTION

Ultrasound system requires all covers.

Operate this Ultrasound system only when all board covers and frame panels are securely in place. The covers are required for safe operation, good Ultrasound system performance and cooling purposes.

WARNING

Energy Control and Power Lockout for LOGIQ e.

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

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

Ultrasound System components may be energized.

Power ON/Boot Up

Warnings

d  DANGER

ALWAYS CONNECT THE ULTRASOUND SYSTEM TO A FIXED POWER SOCKET WHICH HAS THE PROTECTIVE GROUNDING CONNECTOR.

d  DANGER

NEVER USE A THREE-TO-TWO PRONG ADAPTER; THIS DEFEATS THE SAFETY GROUND.

d  DANGER

ENSURE THAT THE POWER CORD AND PLUG ARE INTACT AND THAT THE POWER PLUG IS THE PROPER HOSPITAL-GRADE TYPE (WHERE REQUIRED).

c  CAUTION

Ultrasound system requires all covers.

Operate this Ultrasound system only when all board covers and frame panels are securely in place. The covers are required for safe operation, good Ultrasound system performance and cooling purposes.

c  CAUTION

Use only power supply cords, cables and plugs provided by or designated by GE.

Connect AC/DC to the LOGIQ e

Connecting AC/DC to the LOGIQ e ultrasound unit, involves preliminary checks of the power cord, voltage level and compliance with electrical safety requirements.

1. Ensure that the wall outlet is of appropriate type.
2. Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3. Verify that the power cable is without any visible scratches or any sign of damage.
4. Verify that the on-site mains voltage is within the limits indicated on the rating label near the Circuit Breaker on the rear of the unit.
5. Connect the Power Cable to the Power Inlet at the rear of the unit.
6. Connect the Power Cable's other end (male plug) to a hospital grade mains power outlet with the proper rated voltage, and the unit is ready for Power ON/Boot Up.

Connect AC/DC to the LOGIQ e (continued)

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

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

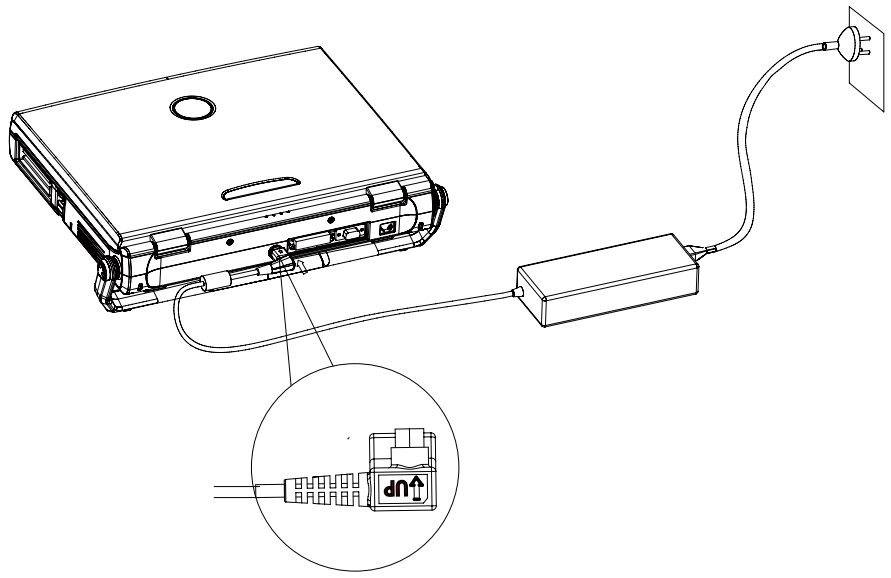


Figure 4-1. Connect AC Adapter

Switch ON the AC Power to LOGIQ e

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

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

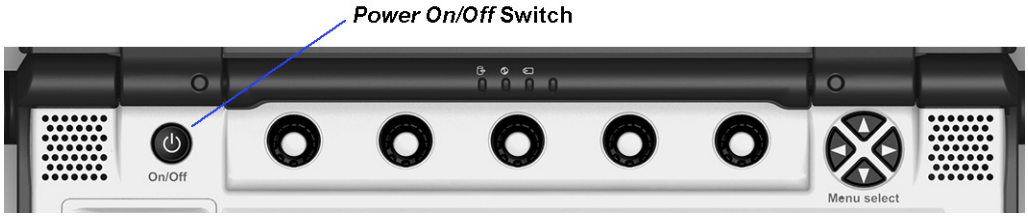


Figure 4-2. Power On/Off button

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.

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 up. This warning message appears for the possible reasons:

- The system is not boot up for more than 14 days.
- The system time has been changed by 24 hours earlier than the current system time of last boot-up.

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

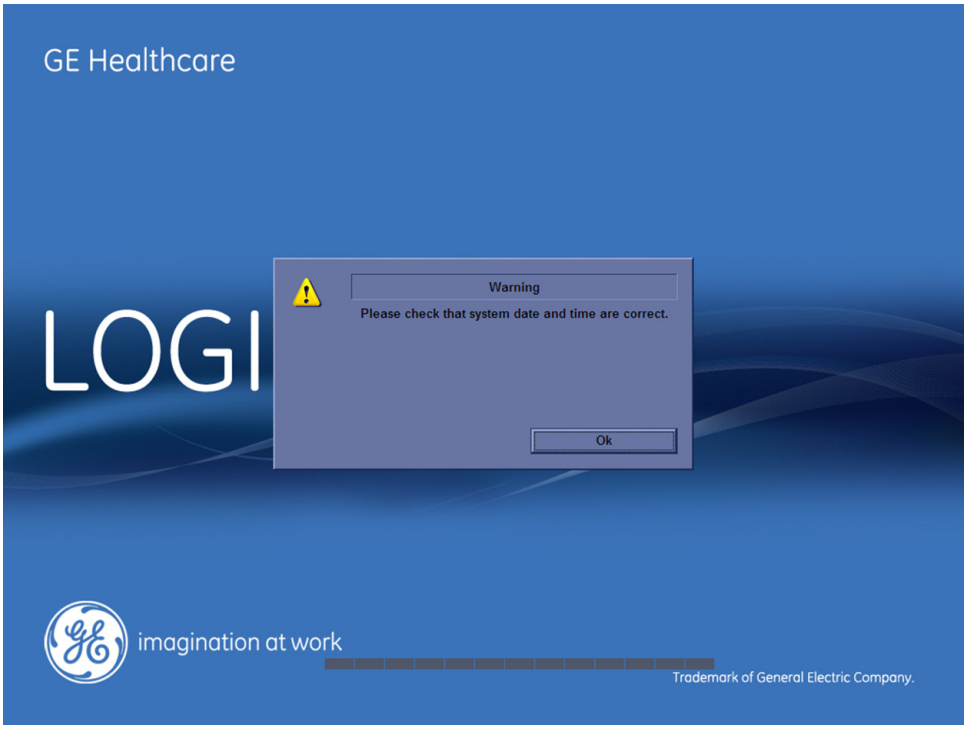


Figure 4-3. Check system date and time message

Check System Date and Time (continued)

Move the cursor to **OK** and press the **Cursor Key** to select **OK**. The system enters scanning mode.

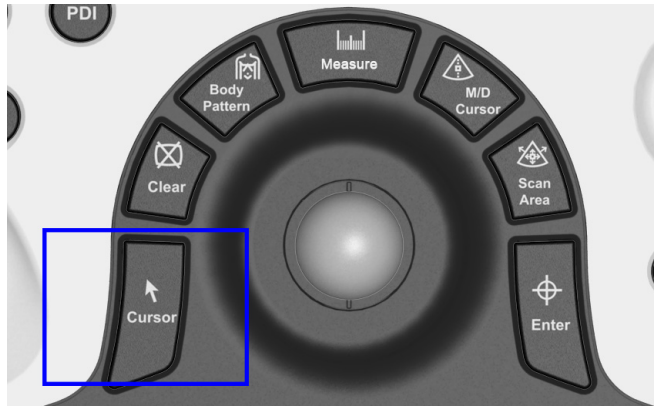


Figure 4-4. Cursor key

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 select **OK**.
4. Select **Save**.

Power shut down

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

1. Press the ***Power On/Off*** switch at the front of the system once.
2. The System-Exit window is displayed.

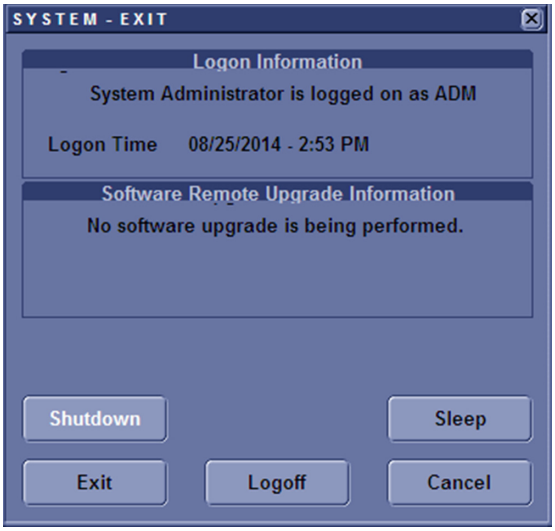


Figure 4-5. System Exit menu

3. Using the Trackball or Select key, select Shutdown.
4. The shutdown process takes 15 seconds and the power off sequence is complete when the power status LED is turned off.
5. Disconnect the probes. Clean or disinfect all probes as necessary. Store them in their shipping cases to avoid damage.
6. Close LCD cover.

Power shut down (continued)

The SYSTEM - EXIT menu, used when switching off the unit, gives you these choices:

- **Logoff**

  Use this button to log off the current user.

  The system remains ON and ready for a new user to log on.

  If the Logoff button is dimmed, it indicates that no user is logged on to the unit at the moment.
- **Shutdown**

  Use this button to shut down the system. The entire system will shut down. It is recommended to perform a full shutdown at least once a week.
- **Sleep Mode**

  Use this button when you do a portable exam in order to reduce the time to start up the system.
- **Cancel**

  Use this button to exit from the System-Exit menu and return to the previous operation.
- **Exit**

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

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

NOTE: *If you need to restart LOGIQ e when logged on to the Windows Desktop, ensure that you do a complete power down (Shut Down). This is required to power up the Front End Processor.*

System shutdown

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

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.

Removable media

Refer to the latest revision of the User Manual to perform the following tasks:

- Using Removable Media
- Labeling Removable Media
- Formatting Removable Media
- Verifying Removable Media

Archiving and loading presets

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

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

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

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

1. Insert an empty (blank) DVD-R disk into the DVD-RW.
2. Access to the Utility/Config Menu, and select System. The Backup sheet will be shown on the LCD display.

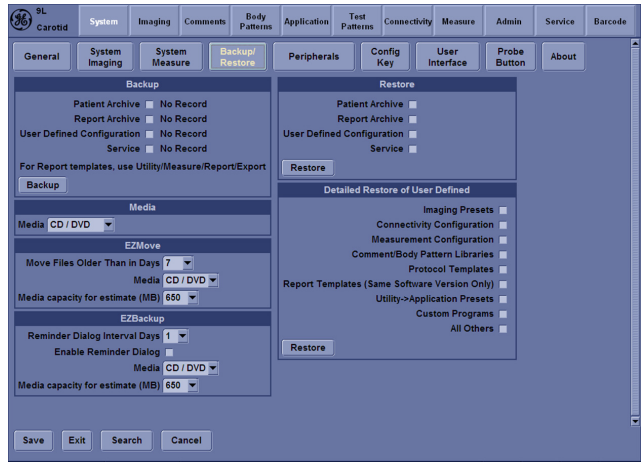


Figure 4-6. Backup Sheet

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

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

Loading Presets from an DVD-R disk (or USB memory device, SD Card)

1. Insert the DVD-R disk with the archived Presets into the DVD-RW.
2. Access to Utility->System->Backup/Restore. The Restore sheet will be shown on the LCD display. See Figure 4-6 *on page 4-13*.
3. Select the items needed to be restored.
4. Select Restore. The system performs the restore and restarts.

Where are the User Manuals and the Service Manual?

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

Both the User Manuals and the Service Manual are delivered as PDF files on a CD-ROM. Paper copies may be ordered from GE.

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

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

Do not try to use the LOGIQ e to read these files, it will not work!

2. Follow the instructions on the screen to display the manual of choice.
3. Before printing the complete manual, or pages from the manual, select **File > Page Setup**.
4. Select the **paper size** and choose **Portrait**.
5. Select **File > Print** to start printing. In the pop up window, you may choose which pages to print and the number of copies you want to print (usually 1 copy).

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. Remove battery.
6. Control all stored and residual energy.
7. Verify isolation.

   All potentially hazardous stored or residual energy is relieved.

WARNING

Energy Control and Power Lockout for LOGIQ e

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 operator panel On/Off button will turn off.
5. Remove the system battery.

All potentially hazardous stored or residual energy is relieved.

Functional checks

Contents in this Section

Overview

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

Operator Panel

Figure 4-7. Control Panel Tour

1. Time Gain Compensation (TGC)
2. New Patient
3. Mode/Gain/Auto keys: M-Mode, Doppler (PW) Modes, Color Flow (CF) Mode and B-Mode
4. Follow Up
5. Steer
6. Coded Harmonic Imaging (CHI)
7. Report
8. Additional Feature Keys: Exam, Needle, PDI
9. Imaging/Measurement Keys: Cursor, Clear, Body Pattern, Measure, M/D Cursor, Scan Area, Enter
10. Depth/Zoom/Ellipse
11. Start/Stop (L/R)
12. Freeze
13. Programmable Image Store Keys
14. Utility
15. Keyboard

Soft Menu Key Tour

In general, there are two types of softMenu keys: Paddle Switch and adjustable knobs.

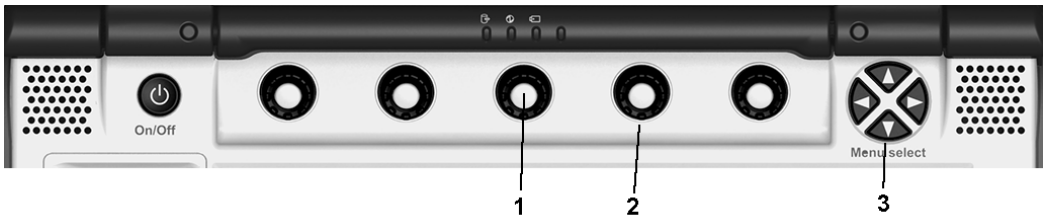


Figure 4-8. SoftMenu Key Tour

1. Press the adjustable knobs to toggle option menu between line one and line two.
2. Rotate the adjustable knobs to adjust the corresponding parameters.
3. The Paddle Switch is used to access and adjust the Sub SoftMenu.

Monitor Display

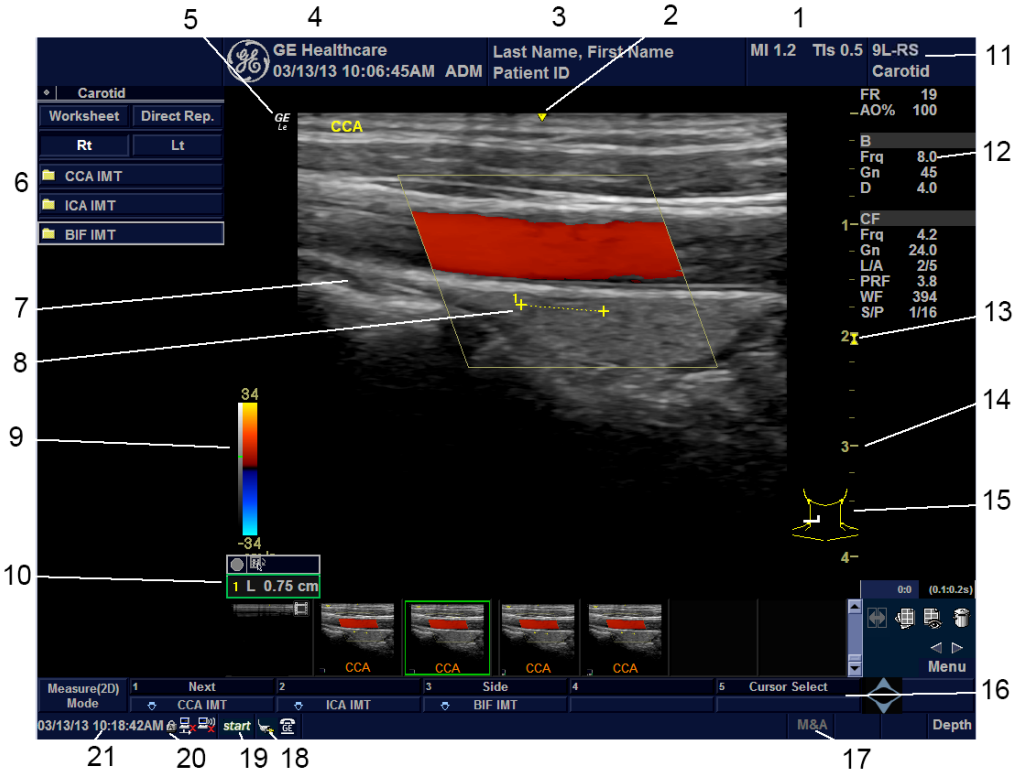


Figure 4-9. Monitor Display Tour

1. Power Output Readout
2. Center Mark for all linear and convex probes (used for short axis needle guidance)
3. Patient Name, Patient Identification
4. Institution/Hospital Name, Date, Time, Operator Identification, system status (real-time of frozen)
5. GE Symbol: Probe Orientation Marker
6. Measurement Window.
7. Image.
8. Measurement Calipers.
9. Gray/Color Bar.
10. Measurement Results Window
11. Probe Identifier. Exam Preset
12. Imaging Parameters by Mode.
13. Focal Zone Indicator
14. Depth Scale
15. Body Pattern.
16. Touch Panel.
17. Trackball Functionality Status: Scroll, M&A (Measurement and Analysis), Position, Size, Scan Area Width and Tilt
18. Plug icon
19. Start Menu Icon
20. Caps Lock On
21. Time

Performance Tests

B mode Checks

Introduction

The B Mode is the system's default mode.

B Mode Screen Example

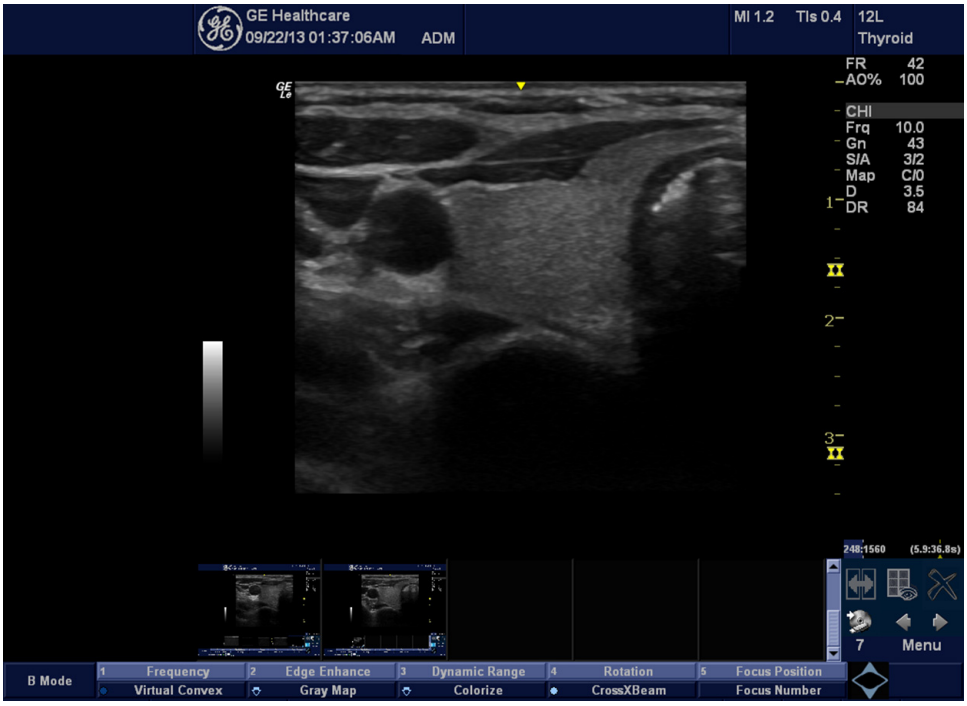


Figure 4-10. B Mode Screen Image Example

Preparations

1. Connect one of the probes.

   For available probes, See 'Available probes' on *page 3-30 for more information.*.

   See 'Connect a probe' on *page 3-17 for more information.* for info about connecting the probes.
2. Turn ON the scanner (if it isn't turned on already).

   The B Mode window is displayed (default mode).

B mode Checks (continued)

Adjust the B mode controls

Figure 4-11. Controls available in B Mode

1. Press B on the Operator Panel to access B mode.
2. These Image Controls are used to optimize the B picture. Verify that all the listed controls are working as intended:

Table 4-1: B Mode Operator Panel Controls

Step	Task	Expected Result(s)	Comments
1	Press B Mode key	B Mode Starts	
2	Adjust Depth	Adjust the field of view. Increasing the depth may view larger/deeper structures rates, and decreasing the depth may view near the skin line.Press Up/Down Button to increase/ decrease. Depth displays on the monitor in cm.	
3	Adjust Gain	Controls the amount of echo information displayed in an image. Turn B Mode dial to the left/right to increase/decrease Gain. Gain displays on the monitor in Gn (dB).	
4	Adjust Focus	Increases the number of focal zones or moves the focal zone(s) to tighten up the beam for specific area. Press the control to toggle between Focus Position and Focus Number. Press Up/Down Button to move or adjust the focal numbers.	

Table 4-1: B Mode Operator Panel Controls

Step	Task	Expected Result(s)	Comments
5	Activate Auto Optimize	Optimize the image based upon a specified region of interest or anatomy. Press the Center Button in the Gain Dial to toggle the ATO/ACE On and Off.	
7	Adjust Time Gain Compensation (TGC)	Amplifies the returning signals to correct for the attenuation caused by tissues at increasing depth. TGC slide pots spaced proportional to the depth. Move the slide pots to the left/right to decrease/increase TGC. A TGC curve appears on the display.	
8	Adjust Scan Area	Widen or narrow the size of the sector angle to maximize the image's region of interest (ROI). Press Scan Area and move the Trackball to narrow/widen the angle.	
9	Adjust Zoom	Changes the location of the focal point(s). A triangular focus marker indicates the depth of the focal point.	
10	Reverse	Toggles the left/right orientation of the scan image.	

B Mode Softmenu Key

Table 4-2: B Mode Softmenu Key

Step	Task	Expected Result(s)	Comments
1	Adjust Rejection	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).	
2	Activate Colorize	Enables gray scale image colorization. To deactivate, reselect a Gray Map.	
3	Adjust Edge Enhance	Edge Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. Adjustments to M Mode's edge enhancement affects the M Mode only.	
4	Activate Gray Map	Determines how the echo intensity levels received are presented as shades of gray.	
5	Adjust Frequency	Multi Frequency mode lets you downshift to the probe's next lower frequency or shift up to a higher frequency.	

Table 4-2: B Mode Softmenu Key

Step	Task	Expected Result(s)	Comments
6	Adjust Frame Average	Temporal filter that averages frames together. This has the effect of presenting a smoother, softer image.	
7	Adjust Rotation	Rotates the image by selecting the value from the pop-up menu.	
8	Adjust Line Density	Optimizes B Mode frame rate or spatial resolution for the best possible image.	
	Adjust Frame Rate	Optimizes B Mode frame rate or spatial resolution for the best possible image.	
9	Power output	Optimizes image quality and allows user to reduce beam intensity. 2% increments between 0-100%. Values greater than 0.1 are displayed.	
10	Dynamic Range	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.	
11	Focus Number and Position	Increases the number of transmit focal zones or moves the focal zone(s) 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.	
12	Virtual Convex	Virtual Convex for linear probe	
13	Virtual Apex	Virtual Convex for Sector probe	

M Mode Checks

Introduction

M Mode provides a display format that represents tissue motion occurring over time along a single vector.

M-Mode Screen Example

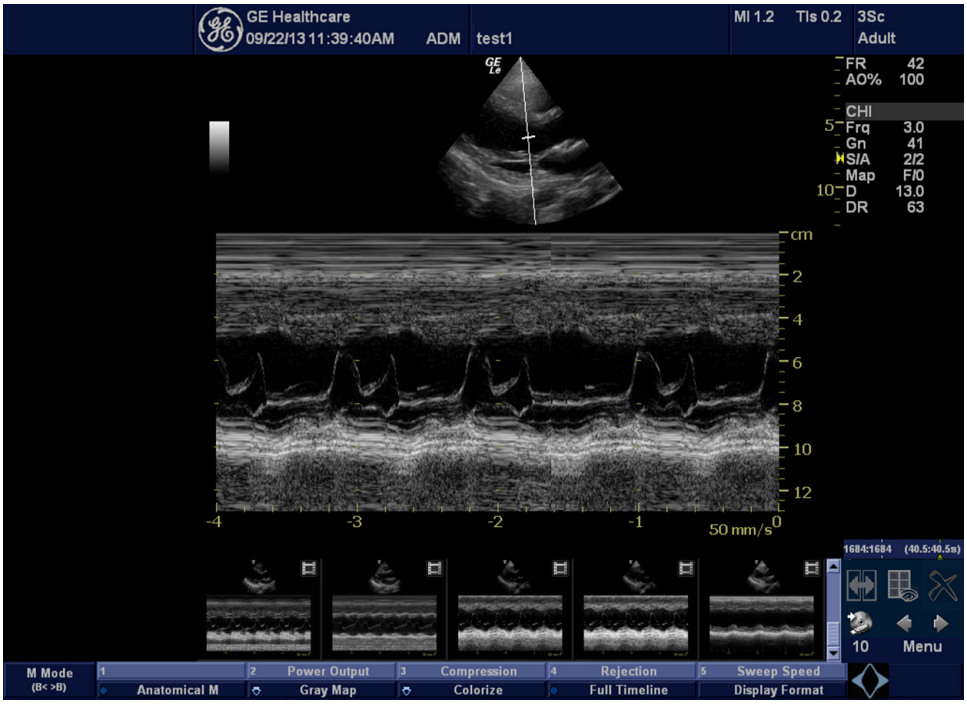


Figure 4-12. M Mode Screen Image Example

Preparations

1. Connect one of the probes.

   For available probes, See ‘Available probes’ on *page 3-30 for more information.*.

   See ‘Connect a probe’ on *page 3-17 for more information.* for info about connecting the probes.
2. Turn ON the scanner (if it isn’t turned on already).

M Mode Checks (continued)

Adjust the M Mode controls

Figure 4-13. Controls available in M Mode

1. Press M on the Operator Panel to access M mode.
2. These Image Controls are used to optimize the M picture. Verify that all the listed controls are working as intended:

Table 4-3: M Mode Operator Panel Controls

Step	Task	Expected Result(s)	Comments
1	Press M Mode key	M Mode Starts	
2	Adjust Gain	Controls the amount of echo information displayed in an image. Turn B Mode dial to the left/right to increase/decrease Gain. Gain displays on the monitor in Gn (dB).	
3	Display M-Mode Cursor	Displays the M-Mode cursor on the B-Mode image. Press Cursor and Trackball to position M-Mode Cursor.	

M Mode Checks (continued)

M Mode Softmenu Key

Table 4-4: M Mode Softmenu key

Step	Task	Expected Result(s)	Comments
1	Adjust Rejection	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).	
2	Adjust Sweep Speed	Changes the speed at which the time line is swept. The following speed values are available, 1, 2, 3, 4, 6, 8, 12, 16.	
3	Adjust Edge Enhance	Edge Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. Adjustments to M Mode's edge enhancement affects the M Mode only.	
4	Activate Gray Map	Determines how the echo intensity levels received are presented as shades of gray.	
6	Activate Colorize	Enables gray scale image colorization. To deactivate, reselect a Gray Map.	
7	Activate Full Timeline	Displays only timeline screen. Press the Full Timescreen to activate.	
8	Select Display Format	Select the format to display B image and M image on the LCD. Press Display Format, and select from the pop up menu.	
9	Adjust Dynamic Range (Compression)	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.	
10	Power output	Optimizes image quality and allows user to reduce beam intensity. 2% increments between 0-100%. Values greater than 0.1 are displayed.	

Color Flow Mode Checks

Introduction

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

Color Flow Mode Screen Example

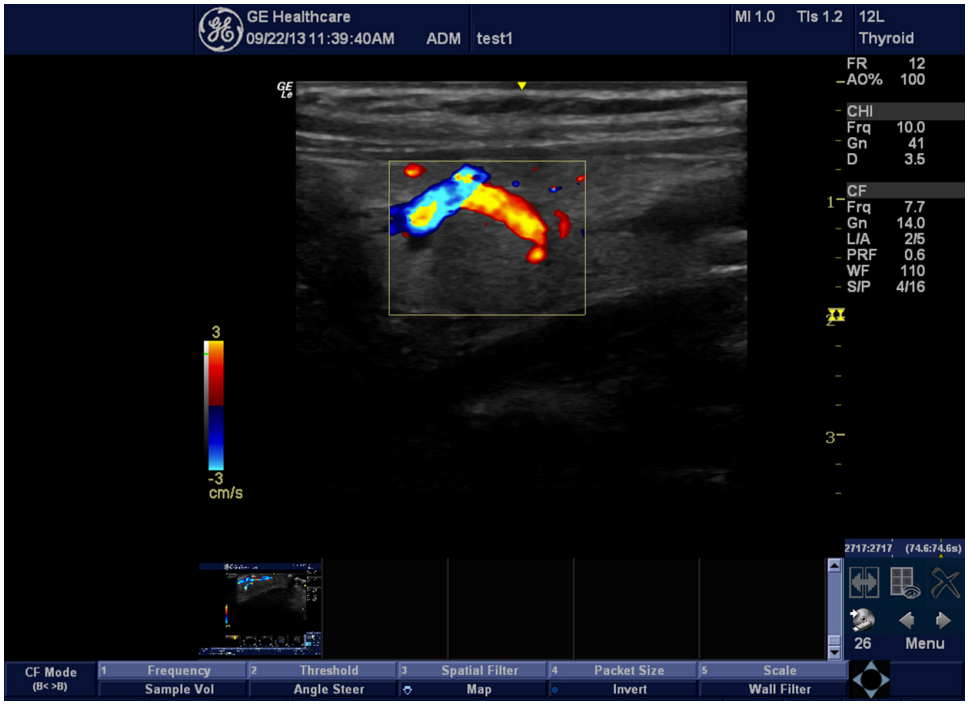


Figure 4-14. CFM Mode Screen Image Example

Preparations

1. Connect one of the probes.

   For available probes, See ‘Available probes’ on *page 3-30 for more information.*.

   See ‘Connect a probe’ on *page 3-17 for more information.* for info about connecting the probes.
2. Turn ON the scanner (if it isn’t turned on already).

Color Flow Mode Checks (continued)

Adjust the Color Mode controls

Figure 4-15. Controls available in Color Flow Mode

1. Press Color on the Operator Panel to access Color mode.
2. These Image Controls are used to optimize the Color picture. Verify that all the listed controls are working as intended:

Table 4-5: Color Flow Mode Operator Panel Controls

Step	Task	Expected Result(s)	Comments
1	Press Color Mode key	Color Flow Mode Starts	
2	Adjust Gain	Amplifies the overall strength of the echoes processed in the Color Flow window. Turn the Gain dial (CFM Mode key) to the left/right to increase/decrease Gain.	

Color Flow Mode Softmenu Key

Table 4-6: Color Flow Mode Softmenu Key

Step	Task	Expected Result(s)	Comments
1	Threshold	Threshold assigns the gray scale level at which color information stops.	
2	Packet Size	Controls the number of samples gathered for a single color flow vector.	
3	Select maps	Allows a specific color map to be selected. After a selection has been made, the color bar displays the resultant map.	
4	Adjust Frequency	Enables the adjustment of the probe's operating frequency. Press Frequency and select desired value. The selected frequency is displayed in the status window.	
5	Set Frame Average	Averages color frames. Press Frame Average up/down to smooth temporal averaging.	
6	Invert	Views blood flow from a different perspective. Press Invert to reverse the color map.	
7	Adjust LIne Density	Trades frame rate for sensitivity and spatial resolution. If the frame rate is too slow, reduce the size of the region of interest, select a different line density setting, or reduce the packet size.	
	Adjust Frame Rate	Adjust Frame rate to a higher setting to improve motion detection, or to a lower setting to improve resolution.	
8	Activate Spatial Filter	Adjust Spatial Filter to smooth out the color, makes it look less pixely.	
9	Adjust Dynamic Range	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.	
10	TIC Analysis/ QAnalysis	Time Intensity Curve (TIC) Analysis/ QAanalysis watch the agent flow through the anatomy of interest and calculates the mean pixel intensity within that ROI for all frames in the user designated loop and plots the resulting data as a function of time. Select a desired cine loop from the stored images.	
11	Adjust Angle Steer	Slants the Color Flow region of interest or the Doppler line to obtain a better Doppler angle.	
12	Move Baseline	Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing.	

Table 4-6: Color Flow Mode Softmenu Key

Step	Task	Expected Result(s)	Comments
13	Change scale (PRF)	Velocity scale determines pulse repetition frequency. If the sample volume gate range exceeds single gate PRF capability, the system automatically switches to high PRF mode. Multiple gates appear, and HPRF is indicated on the display.	
14	Transparency Map	Allows to select specific transparency map	
15	Focus Position	Increases the number of transmit focal zones or moves the focal zone(s) 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.	
16	Power output	Optimizes image quality and allows user to reduce beam intensity. 10% increments between 0-100%. Values greater than 0.1 are displayed.	
17	Wall Filter	Wall Filter insulates the Doppler signal from excessive noise caused from vessel movement.	
18	Map Compress	When you increase the value, high velocity elements in the map are compressed so that the map darkens. When you decrease the value, low velocity elements in the map are compressed so that the map lightens.	
19	Accumulation	Accumulation enhances the flow in an image. Off-Infinite: Infinite provides the same result as applying CINE Capture to a B-Flow CINE clip.	
20	Sample Vol	Adjust the control to adjust the sample volume gate on the Color Flow image.	
21	Flash Suppression	Activates/deactivates Flash Suppression, a motion artifact elimination process.	

Doppler Mode Checks

Introduction

PW Doppler are used to measure velocity (most often in blood).

Doppler mode can be done with a special pencil probe or with an ordinary probe. By using an ordinary probe, you can first bring up a B Mode picture for navigation purpose and then add PW Doppler.

Doppler Mode Screen Example

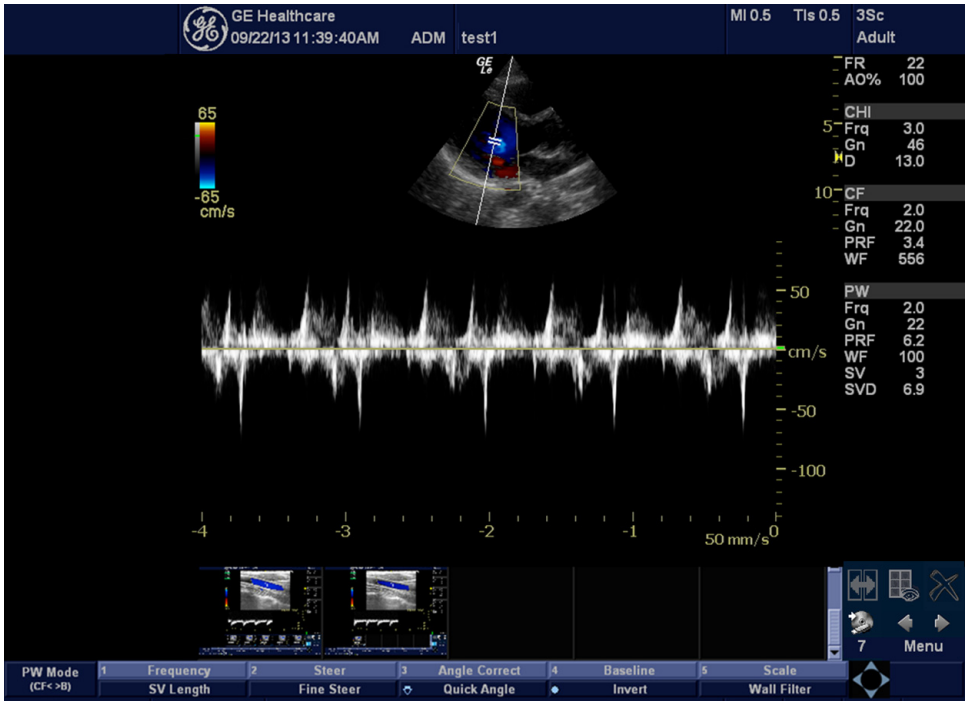


Figure 4-16. Doppler Mode Screen Image Example

Preparations

1. Connect one of the probes.

   For available probes, See ‘Available probes’ on *page 3-30 for more information.*.

   See ‘Connect a probe’ on *page 3-17 for more information.* for info about connecting the probes.
2. Turn ON the scanner (if it isn’t turned on already).

Doppler Mode Checks (continued)

Adjust the PW Doppler Mode controls

Figure 4-17. Controls available in Doppler Mode

Adjust the PW Doppler Mode controls (continued)

1. Press Color on the Operator Panel to access Color mode.
2. Press **PW** to start Pulsed Wave Doppler (PW).

   Use the trackball to select the Area of Interest (Sample Volume) in PW or direction of interest in CW.
3. These Image Controls are used to optimize the Color picture. Verify that all the listed controls are working as intended:

Table 4-7: PW Doppler Mode Operator Panel Controls

Step	Task	Expected Result(s)	Comments
1	Press PW Mode key	PW Mode Starts	
2	Adjust Gain	Amplifies the overall strength of the echoes processed in the Color Flow window. Turn the Gain dial (PW Mode key) to the left/right to increase/decrease Gain.	
3	Display M/D-Mode Cursor	Displays the M/D-Mode cursor on the B-Mode image. Press Cursor and Trackball to position sample volume graphic. Click SV gate to adjust sample volume gate size.	
4	B-Pause/Enter	Toggle between simultaneous and update presentation while viewing Spectral Doppler. Press B Pause to toggle between simultaneous and update.	

Doppler Mode Soft Menu Key

Table 4-8: PW Doppler Mode Soft Menu Key

Step	Task	Expected Result(s)	Comments
1	Adjust Rejection	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).	
2	Adjust Sweep Speed	Changes the speed at which timeline is swept. Press Sweep Speed up/down to increase/ decrease the value.	
3	Activate Full Timeline	Displays only timeline screen. Press the Full Timescreen to activate.	
4	Select Display Format	Display layout can be preset to have B-Mode and Time-motion side-by-side or over-under.	
5	Adjust Frequency	Enables the adjustment of the probe's operating frequency. Press Frequency and select desired value. The selected frequency is displayed in the status window.	

Table 4-8: PW Doppler Mode Soft Menu Key

Step	Task	Expected Result(s)	Comments
6	Trace Direction	Allows to select different trace direction.	
7	Invert	Vertically inverts the spectral trace without affecting the baseline position. Press invert to invert the spectral trace. The Plus and Minus signs on the velocity scale reverse when the spectrum is inverted.	
8	Auto Calcs	Enables or disables auto calculation.	
9	Modify Auto Calcs	Activates the window to modify the auto calculation items.	
10	Trace Method	Allows to select different trace method.	
11	Activate Colorize	Colorize the gray scale image to enhance the eyes' discrimination capability. Press the Cololize, Trackball to cycle through available maps and press Set to select.	
12	Activate Gray Map	Displays a map window adjacent to the image. Move the trackball to select the map. The image reflects the map as scrolled through the selections. Press Set to select.	
13	Compression (Dynamic Range)	Controls how echo intensities are converted to shades of gray. Click Dynamic Range to increase/decrease the value.	
14	Adjust Angle Correct	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.	
15	Adjust Steer/Fine Steer	Slant the Color Flow linear image left or right to get more information without moving probes. Click Angle Steer to the left to slant the linear image.	
16	Move Baseline	Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing.	
17	Change PRF (Pulse Repetition Frequencies) - (Wall Filter)	Velocity scale determines pulse repetition frequency. If the sample volume gate range exceeds single gate PRF capability, the system automatically switches to high PRF mode. Multiple gates appear, and HPRF is indicated on the display.	
	Change Scale - (Low Vel Reject)	Velocity scale determines pulse repetition frequency. If the sample volume gate range exceeds single gate PRF capability, the system automatically switches to high PRF mode. Multiple gates appear, and HPRF is indicated on the display.	

Table 4-8: PW Doppler Mode Soft Menu Key

Step	Task	Expected Result(s)	Comments
18	Trace Sensitivity	Adjusts the sensitivity to get more accurate envelope trace.	
19	PW/CF Ratio	Adjust PW/CF Ratio to show Maximum Ratio and Minimum Ratio of Color (Power) Doppler Pixels in each ROI.	
20	Spectral Avg	Optimizes the smoothness of the spectrum. Different levels can be selected.	
21	Power output	Optimizes image quality and allows user to reduce beam intensity. 10% increments between 0-100%.	
22	SV Length	Sizes the sample volume gate.	
23	Wall Filter	Wall Filter insulates the Doppler signal from excessive noise caused from vessel movement.	
24	Cycles to Average	Set the average value over a number of cycles (from 1-5).	
25	Quick Angle	Quickly adjusts the angle by 60 degrees. Press Quick Angle to toggle between Off, Right and Left.	

Tissue Velocity Imaging (TVI) Checks

Introduction

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

Preparation

1. Connect one of the probes.

   For available probes, See ‘Available probes’ on *page 3-30 for more information.*.

   See ‘Connect a probe’ on *page 3-17 for more information.* about connecting the probes.
2. Turn ON the scanner (if it isn’t turned on already).

TVI Mode Screen Example

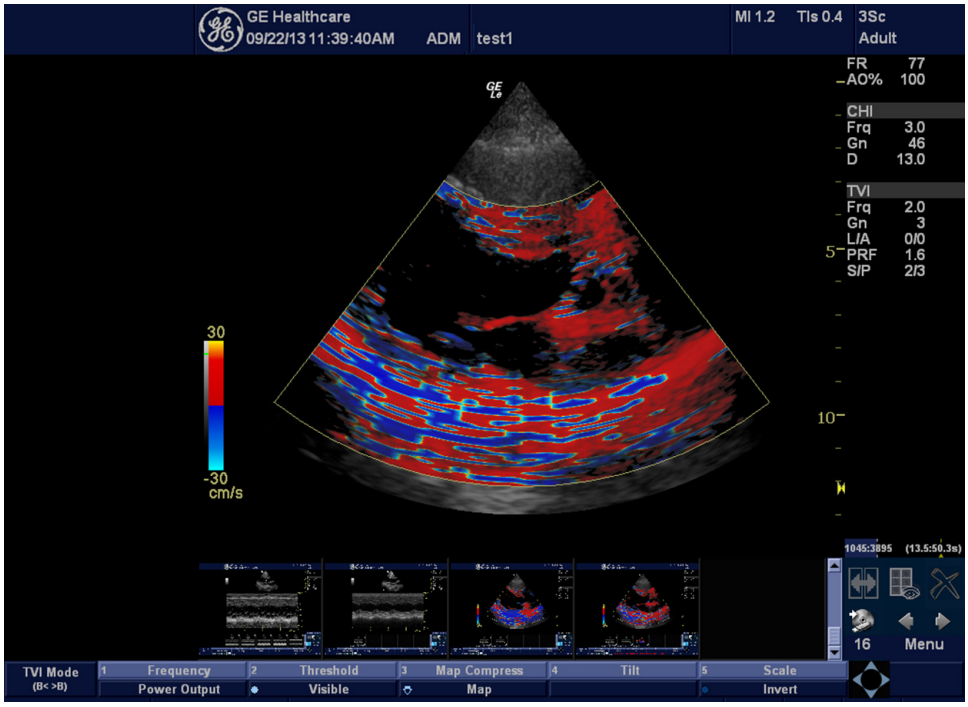


Figure 4-18. TVI Mode Screen Image Example

Tissue Velocity Imaging (TVI) Checks (continued)

Adjust the TVI Controls

1. Set PDI button for TVI mode in Utility -> Imaging -> General.
2. Press the PDI key to activate TVI Mode.

Adjust TVI Mode Softmenu Key

Table 4-9: TVI Mode Softmenu Key

Step	Task	Expected Result(s)	Comments
1	Adjust Visible	Select Visible to display TVI Color with TVI.	
2	Adjust LIne Density	Trades frame rate for sensitivity and spatial resolution. If the frame rate is too slow, reduce the size of the region of interest, select a different line density setting, or reduce the packet size.	
3	Select Color Map	Allows a specific color map to be selected. After a selection has been made, the color bar displays the resultant map.	
4	Threshold	Threshold assigns the gray scale level at which color information stops.	
5	Activate Spatial Filter	Adjust Spatial Filter to smooth out the color, makes it look less pixely.	
6	TVI Gain	Control color transparency. High values display more color; low values display more tissue.	
7	Width	Adjust the sizes of ROI.	

CWD Functional Check

Introduction

CW Doppler are used to measure velocity (most often in blood).

Doppler mode can be done with a special pencil probe or with an ordinary probe. By using an ordinary probe, you can first bring up a B Mode picture for navigation purpose and then add CW Doppler.

CWD Mode Screen Example

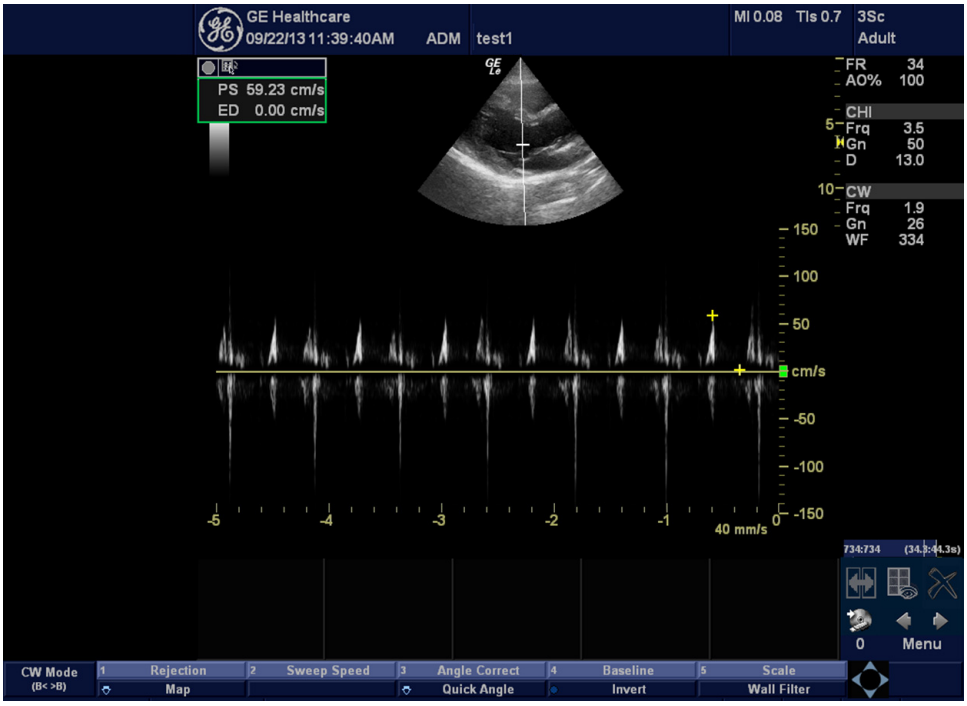


Figure 4-19. CWD Mode Image Example

Preparation

1. Connect 3Sc-RS/6S-RS Probe to the system.
   See ‘Connect a probe’ on *page 3-17 for more information.*
   for info about connecting the probes.
2. Turn ON the scanner (if it isn’t turned on already).

CWD Functional Check (continued)

Activating CW Doppler

To activate CW Doppler Mode:

1. Ensure that the appropriate CW probe is connected.
2. Set the hot key (From programmable key F5-F12) for CWD.
3. Press the hot key which is assigned for CWD mode. The Doppler Spectrum appears, along with the CW Touch Panel Menu.

The following CW parameters are displayed: Frequency, Gain, Acoustic Output, Scale, Wall Filter and Dynamic Range.

Exiting CW Doppler

To exit CW Doppler Mode:

Press the hot key which is assigned for CWD Mode.

Basic Measurements

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

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 **Enter**. 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 **Enter**. The system displays the distance or tissue depth value in the measurement results window.

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 **Enter**. The system fixes the first caliper and displays a second active caliper.
4. To position the second caliper, move the Trackball.
5. Adjust the **Ellipse**; an ellipse with an initial circle shape appears
6. To position the ellipse and to size the measured axes (move the calipers), move the Trackball.
7. To increase the size, rotate the **Ellipse** button clockwise. To decrease the size, contrarotate the **Ellipse** button
8. To complete the measurement, press **Enter**. The system displays the circumference and area in the measurement results window.

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.

Probe/Connectors Check

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

Connecting a Probe

1. Place the probe's carrying case on a stable surface and open the case.
2. Carefully remove the probe and unwrap the probe cable.
3. DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.
4. Align the connector with the probe port and carefully push into place.
5. Lock the probe latch upward.
6. Carefully position the probe cord so it is free to move and is not resting on the floor.

Activating the probe

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

Deactivating the probe

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

Probe/Connectors Check (continued)

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 latch downward.
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.

Take the following precautions with the probe cables: Do not bend. If you have purchased the cart option, be sure to keep probe cables free from the wheels.

Be careful not to trip on the probe cables if using the device without the optional cart.

Cineloop Check

Introduction

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

Activating CINE

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

Adjust the Cineloop controls

Quickly Move to Start/End Frame

Press ***First*** to move to the first CINE frame; press ***Last*** to move to the last CINE frame.

Start Frame/End Frame

Press the ***Start Frame*** Two-Button Softkey to move to the beginning of the CINE Loop. Adjust the ***Start Frame*** up/down Two-Button Softkey upward to move forward through the CINE Loop. Adjust the Softkey downward to move backward through the CINE Loop.

Press the ***End Frame*** Two-Button Softkey to move to the end of the CINE Loop. Adjust the ***End Frame*** up/down Two-Button Softkey upward to move forward through the CINE Loop. Adjust the Softkey downward to move backward through the CINE Loop.

Adjusting the CINE Loop Playback Speed

Adjust the ***Loop Speed*** up/down Two-Button Softkey to increase/decrease the CINE Loop playback speed.

Moving through a CINE Loop Frame By Frame

Adjust the ***Frame by Frame*** up/down Two-Button Softkey to move through CINE memory one frame at a time.

Image Management

For Image Management functionality refer to the LOGIQ e User Manual. It talks about several topics:

- Clipboard
- Printing Images
- Browsing and Managing an Exam's Stored Image
- Connectivity, and Dataflow Concept and Creation
- Starting an Exam
- Configuring Connectivity
- TCP/IP
- Services (Destinations)
- Buttons
- Views
- Verifying and Pinging a Device

Backup and Restore Database, Preset Configurations and Images

Formatting Media

To Format the backup media, DVD:

1. Go to Utility -> Connectivity -> Removable Media.
2. Select the media type from the drop down menu.
3. Enter the label for the media. It is best to use all capital letters with no spaces or punctuation marks. Press **Format.**

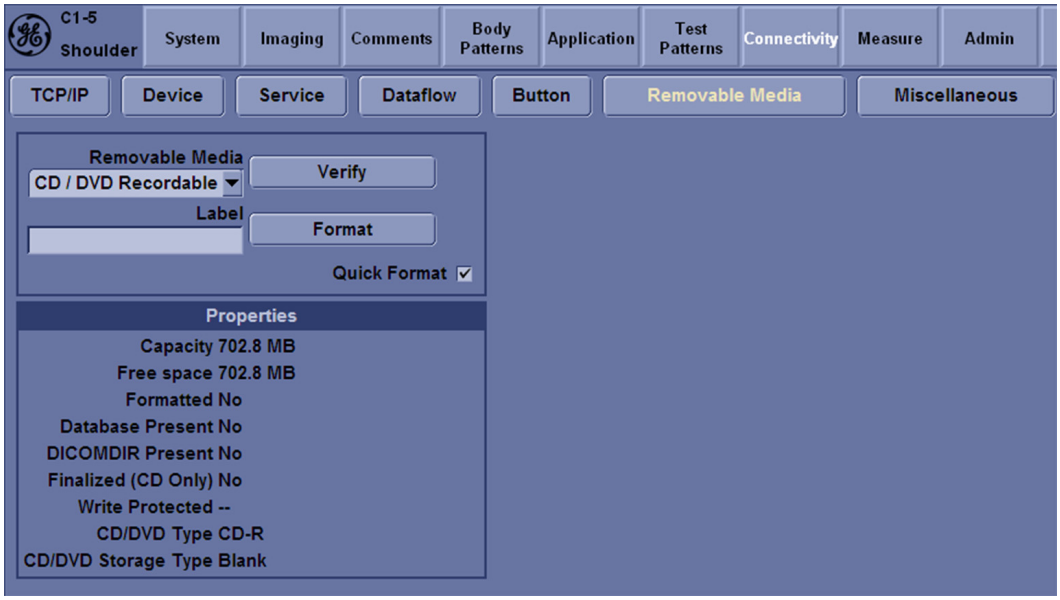


Figure 4-20. Format and verify media

4. A pop-up message displays to inform operation completed. Press **OK**.
5. If desired, verify that the format was successful by selecting **Verify** in Utility -> Connectivity -> Removable Media. see Figure 4-20 *on page 4-46*.

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 DVD-R disk into the drive.
2. Go to 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 and User Defined Configuration and Service.
4. In the Media field, select DVD(or USB memory device, SD Card).
5. Select **Backup**.

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

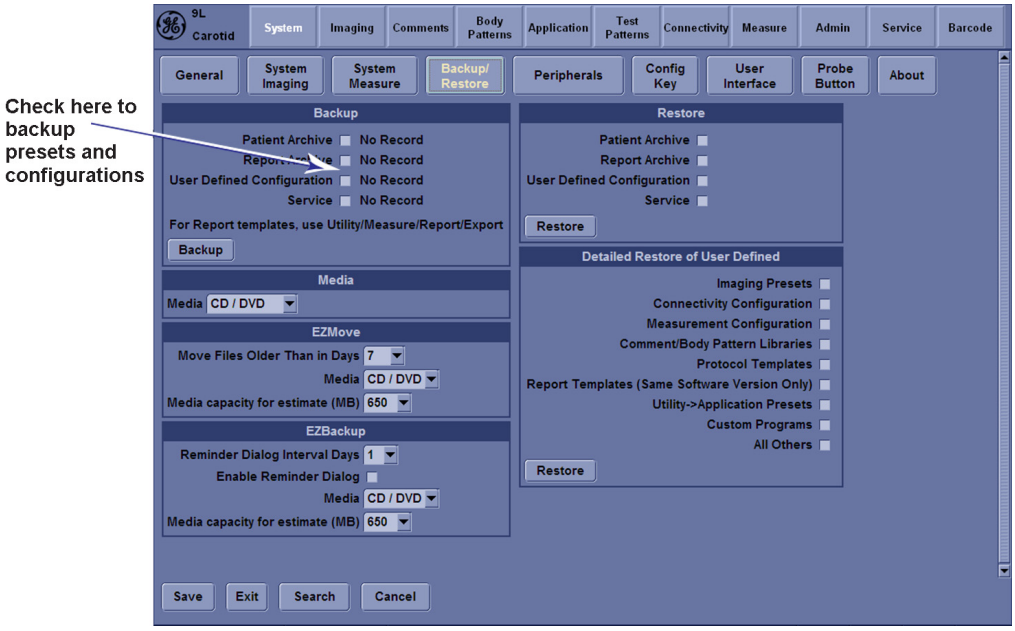


Figure 4-21. Backup/Restore Menu

Restore System Presets and Configurations

CAUTION

The restore procedure **overwrites** the existing database on the local hard disk drive. Make sure to insert the correct DVD (or USB memory device, SD Card).

1. Insert the Backup/Restore DVD-R disk (or USB memory device, SD Card) into the drive.
2. Go to 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 DVD-RW (or USB memory device, SD Card).
5. Select **Restore**.

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

After the Restore completes, the system need to reboot.

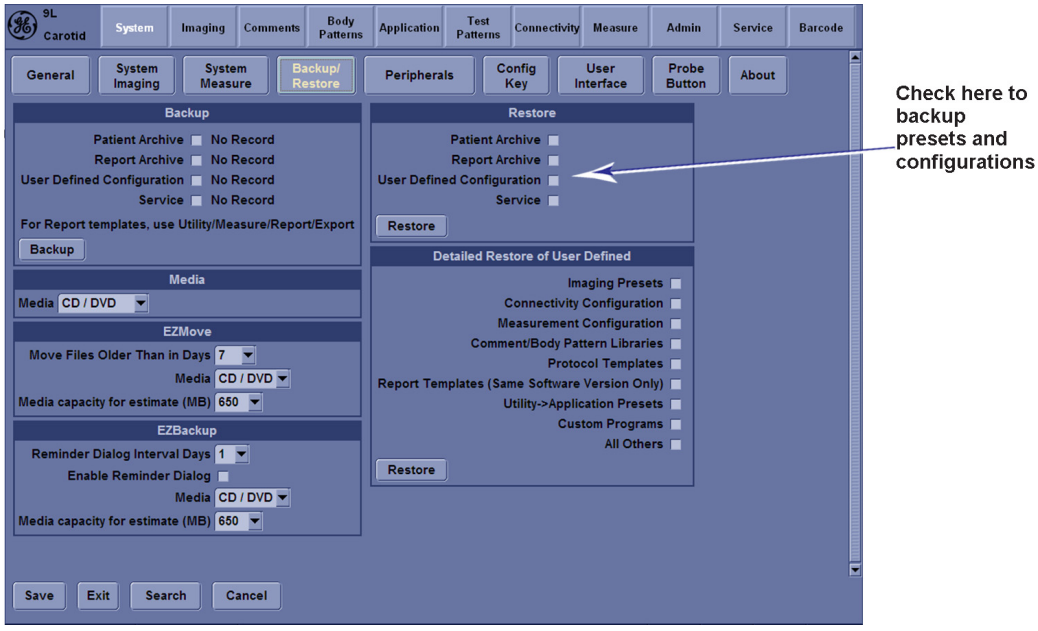


Figure 4-22. Backup/Restore Menu

Archiving Images

1. Insert the archive media. To format the archive media, DVD-R disk, select the Utility button on the Keyboard.
2. Go to Utility -> Connectivity -> Removable.
3. Format the DVD-R disk. Verify the format if desired.
4. Images will be moved from the hard disk drive by date. Therefore, the best way is to label media by date.

NOTE: *Images will be moved from the hard disk 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 disk drive. However, the patient database (backed up earlier) maintains pointers to the location of the images on the archive media.*

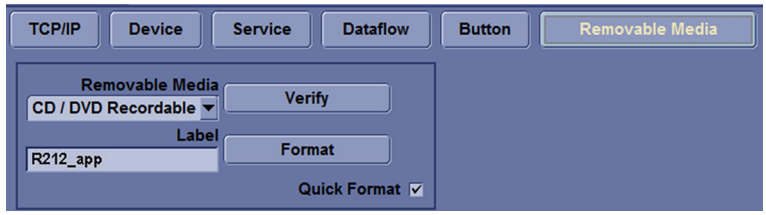


Figure 4-23. Format DVD-RW Screen

Archiving Images (continued)

5. Select Utility -> System -> Backup/Restore. Set EZMove and EZBackup requirements.

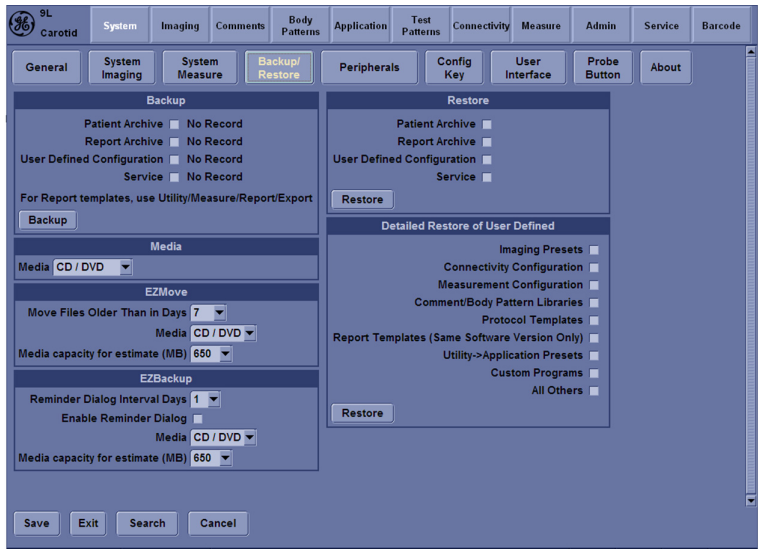


Figure 4-24. EZBackup/Move

6. Press Patient on the control pane to enter Patient Screen.
7. Set the Dataflow to Store images directly to DVD-R disk.
8. Press EZBackup/EZMove. The EZBackup Wizard window displays. Then Press **Next**

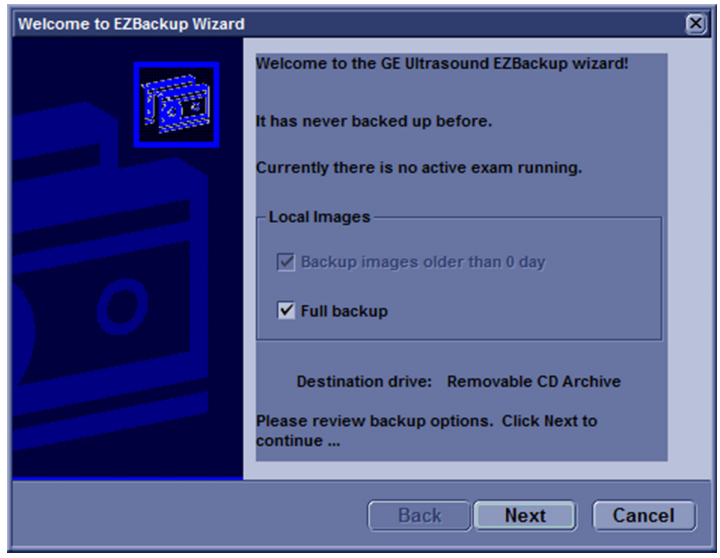


Figure 4-25. Image Archive window

Archiving Images (continued)

9. A Storage Size Information window appears. Press **Next** to continue.
10. An EZBackup in Progress... window displays. When the EZBackup is complete, press **Next** to continue.
11. Press **Finish**.

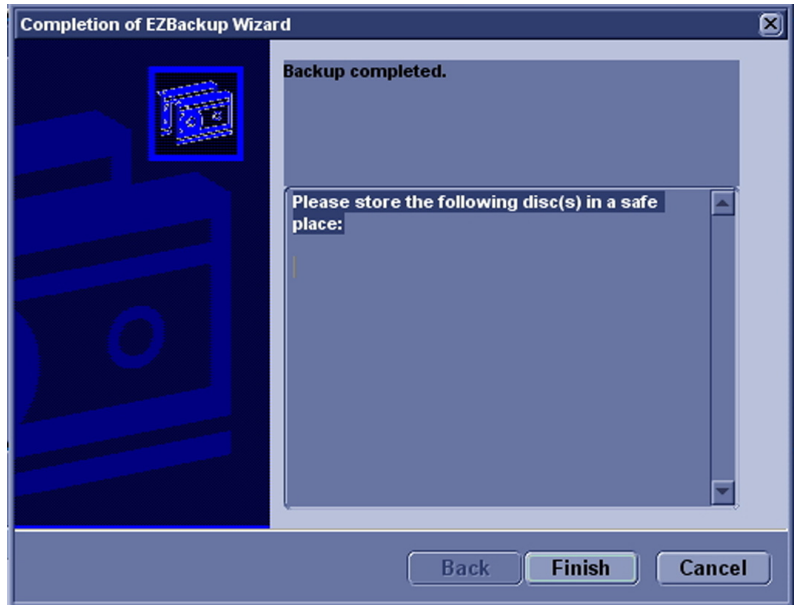


Figure 4-26. EZBackup/Move complete

Software Configuration Checks

Table 4-10: 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	For LOGIQ e, the default function for Print1-3 Keys is P1 (store image); P2 (print); P3 (USB Quick Save). Print1-3 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

Peripheral Checks

This section describes the final setup for the Peripherals and the Operational Check-out. For Peripherals installation information, See 'Peripherals Installation' on *page 3-34 for more information.*

Check that peripherals work as described below:

Color Printers

The Printers are controlled from the P2 on the system's control panel. The factory setting is P2 for the standard print.

Take Sony UP-D25MD Color Printer for an example to show the control assignment procedure.

Control assignment procedure

The Control Assignment for the printers is done in the Utility Menu.

1. Turn on the Peripherals and power on the system.
2. Select Utility -> Peripherals.
3. Select Sony UP-D25MD for **Standard Printer Properties** and **Default Printer**. Select **Save**.

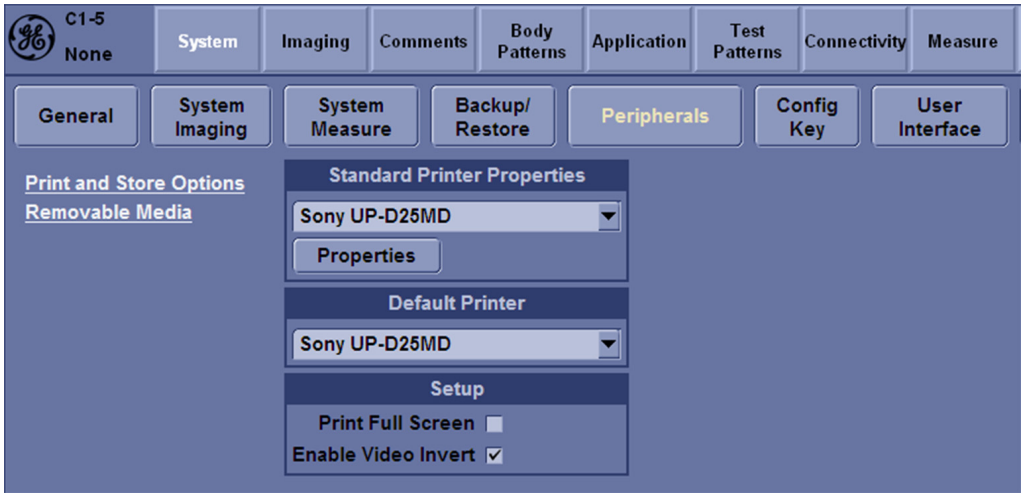


Figure 4-27. Select Printer

NOTE: For control assignment on the network printer HP Universal Printing PCL6,the control can only work when the network of the system is connected.

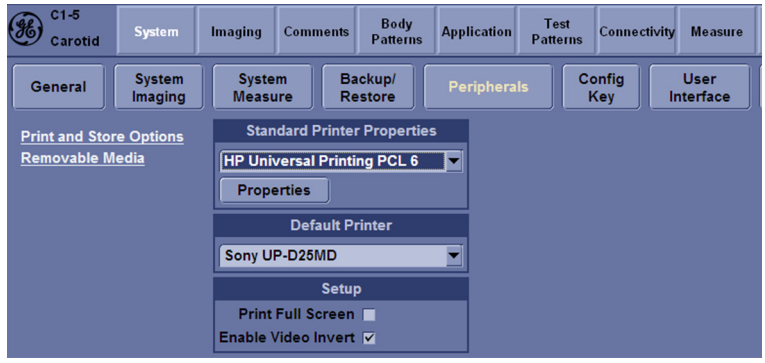


Figure 4-28. Network Printer

Select Properties to view the document information and configure properties for standard printer.

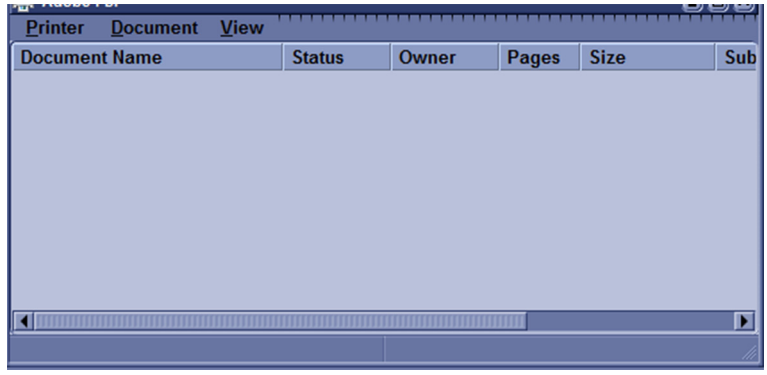


Figure 4-29. Standard Printer Properties

- Printer: A printer to be used as Standard Print.
- Rows: Specify rows on print.
- Columns: Specify columns on print.
- Orientation: Specify orientation to print.
- Top Margin: Specify top margin on print.
- Bottom Margin: Specify bottom margin on print.
- Left Margin: Specify left margin on print.
- Right Margin: Specify right margin on print.

Color Printers (continued)

4. Select Utility -> Connectivity -> Service.
5. Select the **Standard Print**. In the **Printer** field, select Sony UP-D25MD. Select **Save** to save the setting.

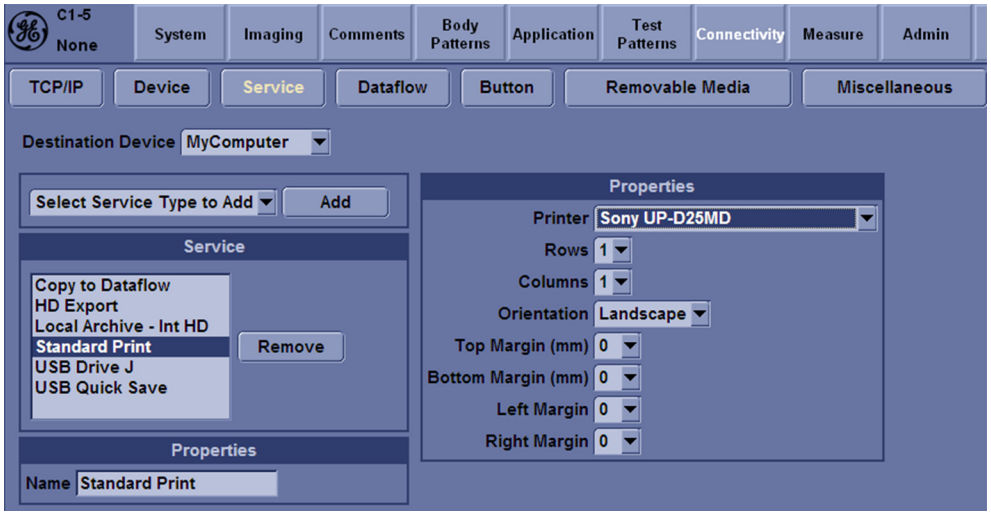


Figure 4-30. Standard Print

6. Select Utility -> Connectivity -> Button. In the field of **Physical Print Buttons**, select Print2.
7. Select **Standard Print**, press “>>” to add to the Printflow View.

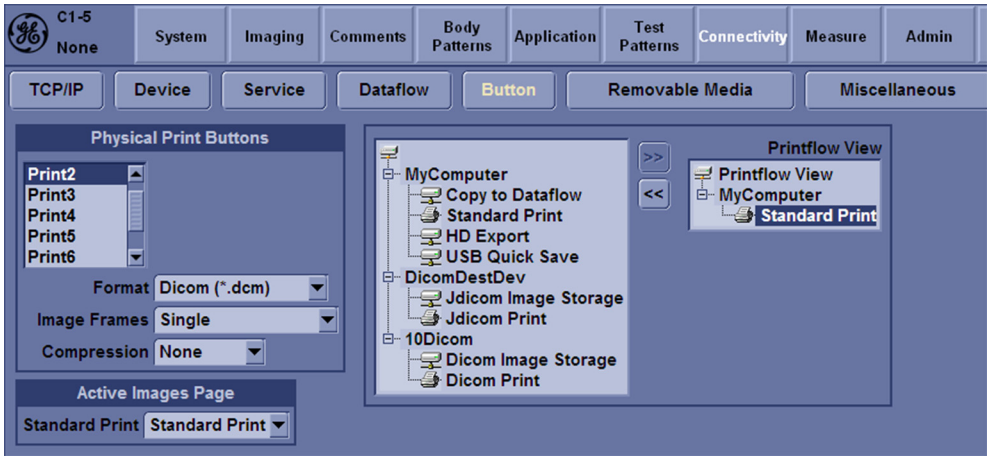


Figure 4-31. Add Standard Print

Color Printers (continued)

8. If another device has been selected, use “<<“to clear window.

Color Printers Checks

Make sure Printer Function is assigned to P2 key.

Table 4-11: Printer checks

Step	Task	Expected Result(s)
1	When scanning in B Mode, press **Freeze** to stop image acquisition	Image scanning stops with the last image on the screen.
2	Press P2 key on the control panel.	The image displayed on the screen is printed on Color printer, depending on the key assignment configuration.
3	Check if the print quality is of expected quality.	

NOTE: For checking the printer function on HP Universal Printing PCL6 Network Printer, when pressing P2, a pop-up window displays to require you to input the Printer Address. Contact your network administrator for local network information.

DVD-RW Settings and Check-out

1. Connect DVD-RW to the system.
2. Insert the DVD/CD into the DVD-RW.
3. Select Utility -> Connectivity -> Removable Media.

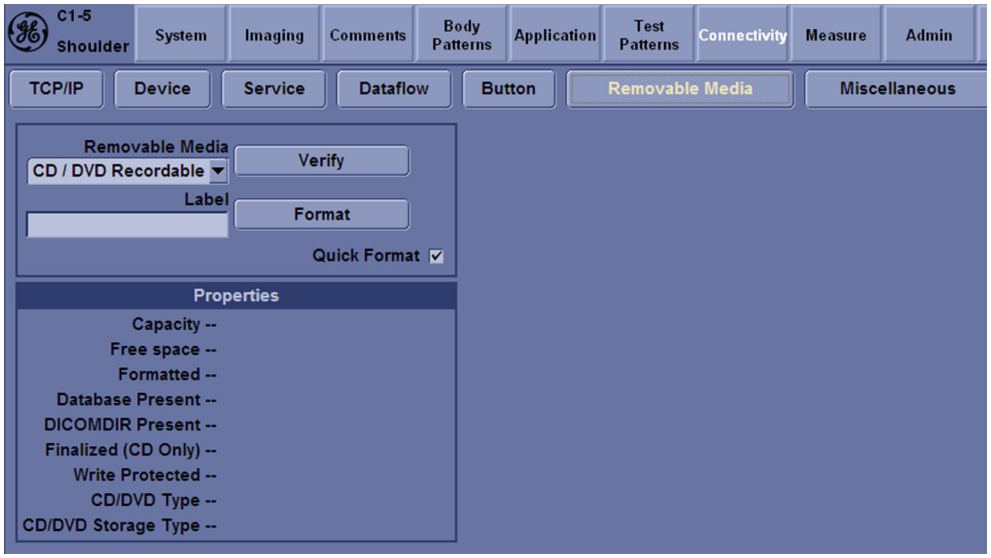


Figure 4-32. Removable Media

4. Click Verify to check the media's status.

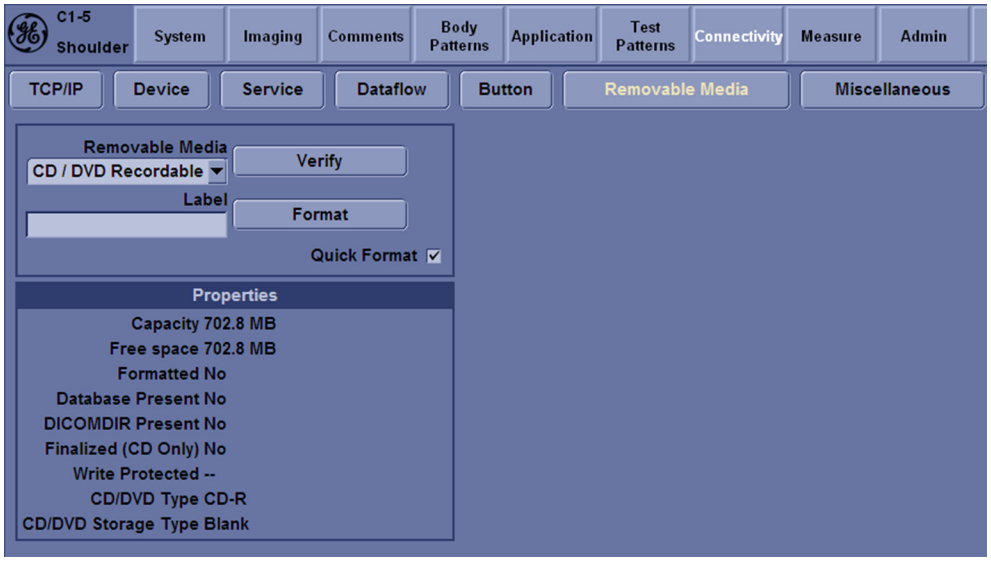


Figure 4-33. Verify Media

Wireless LAN Adapter Checks

1. Connect Wireless LAN Adapter to the USB port on the system. The Wireless Network configuration displays.

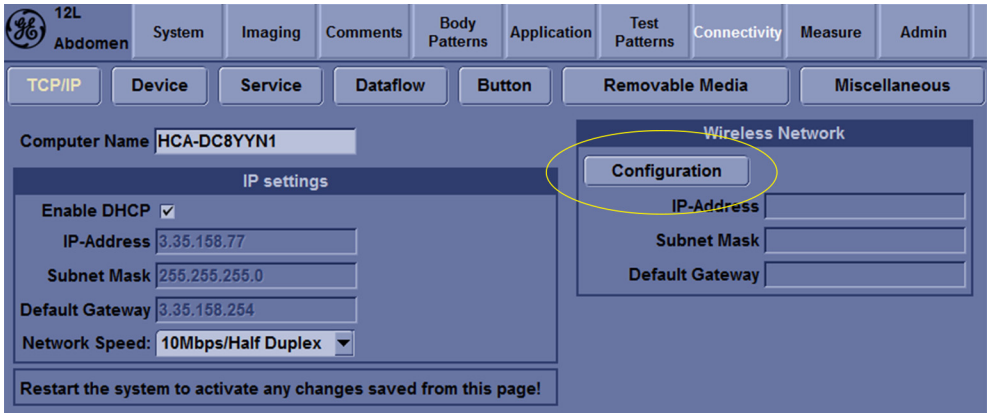


Figure 4-34. Wireless configuration

2. Select **Configuration**. A message pops up to indicate running Wireless Network Configuration. Wait until Wireless Network Configuration window appears.

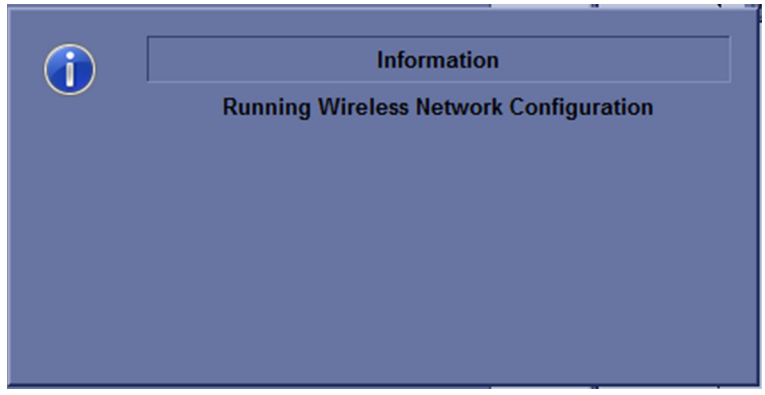


Figure 4-35. Message

Wireless LAN Adapter Checks (continued)

3. Select the Wireless Networks and select **Connect**.

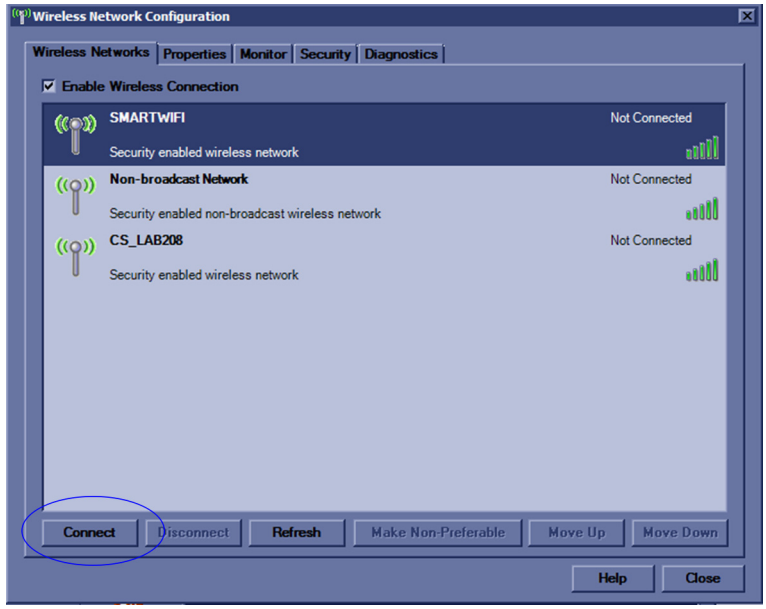


Figure 4-36. Wireless Network Configuration

4. The wireless network icon at the left bottom of the screen shows the wireless network is connected.

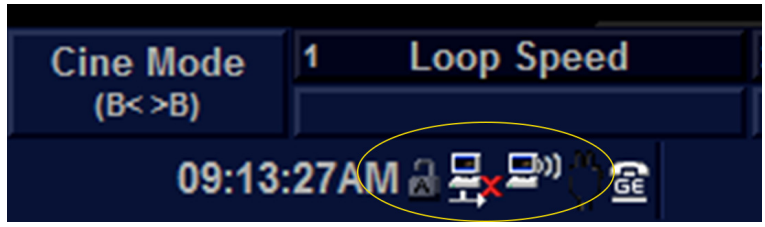


Figure 4-37. Wireless Network connected

Footswitch Checks

Table 4-12: Footswitch Checks

Step	Task	Expected result(s)
1	Set **Freeze** for right Pedal. Connect Footswitch to one USB port on the system. When scanning in B mode, click right button of Footswitch once.	Image scanning stops with the latest image on the screen.
2	Click the right pedal of Footswitch once again.	Image scanning starts.

USB memory stick checks

Table 4-13: USB memory stick checks

Step	Task	Expected result(s)
1	Power on the system.	
2	Connect USB memory stick with USB port on the system.	“New hardware device detector” icon display on the status bar.
3	Click the “New hardware device detector” icon	Check whether the device driver installed successfully.

Barcode Scanner Checks

Table 4-14: Barcode scanner check

Step	Task	Expected result(s)
1	Power on the system.	
2	Connect Barcode Scanner via the USB port on the system.	A beep should be heard.

Chapter 5

Components and Functions (Theory)

This chapter explains LOGIQ e's system concepts, component arrangement, and subsystem functions.

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

Overview

Contents in this chapter

Block Diagram and Theory

Contents in this Section

Block Diagram

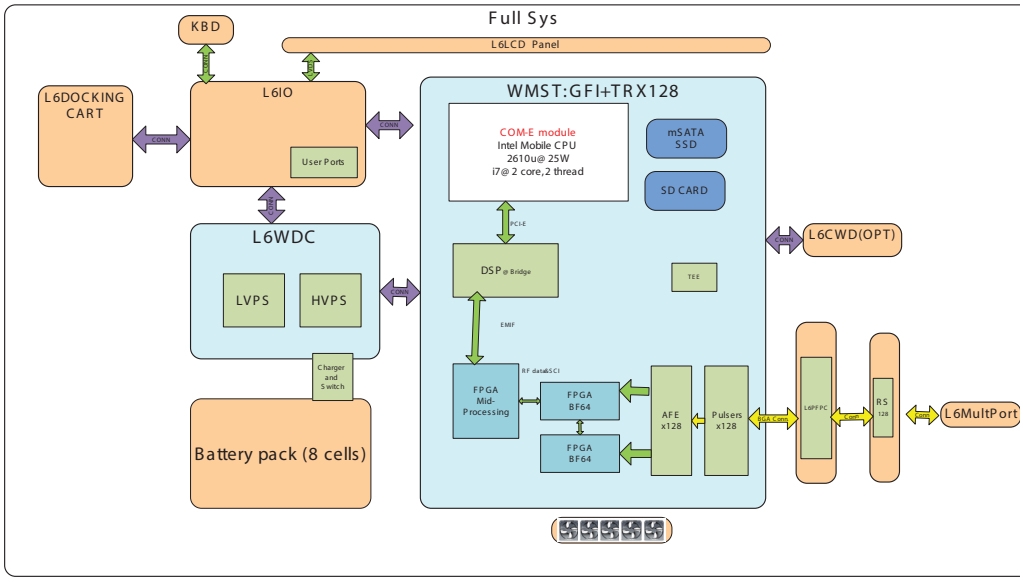


Figure 5-1. LOGIQ e System Block Diagram

General Information

LOGIQ e is an ultrasound imaging scanner.

The system can be used for:

- 2D Black and White imaging
- 2D Color Flow
- M-Mode Black and White imaging
- Doppler
- A number of combinations of the above

LOGIQ e is a digital beam forming system that can handle up to 128 elements linear probes.

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

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

Top Console

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

Power Diagram

Contents in this Section

Overview

The AC Power assy's main tasks are to isolate and output to the DC/DC unit which is inside the system console. The input of AC power pack will be the AC outlet and it's universal, the range is AC 90V-264V, 47-63Hz. And no main power switch located on this power pack.

AC Power

The mains cord has plugs in one side end. A male plug connects to the mains outlet on site.

The mains voltage is routed to the AC power pack through a Circuit Breaker located on the site.

The Circuit Breaker is of the auto fuse type, if for some reason the current grows to high, the switch will automatically break the power.

From the Main Circuit Breaker, the AC power is routed via an Inrush Current Limiter to a internal outlet connector for the Mains Transformer.

Battery Charging

The charging circuit is lithium-Ion battery charge and discharge controller. This block can switch the power between the battery and the output of AC Pack. If the output of AC Pack is available, the power input of Charge Board Unit should be from the AC Pack and the battery will be charged if it's not full. This block will be also in charge of the battery charging monitor to avoid the battery over heat and over charging, charging will be shut off automatically if battery is charged fully. The battery will discharge to provide the power to the system when out of AC power pack output or AC line.

Air Flow Distribution

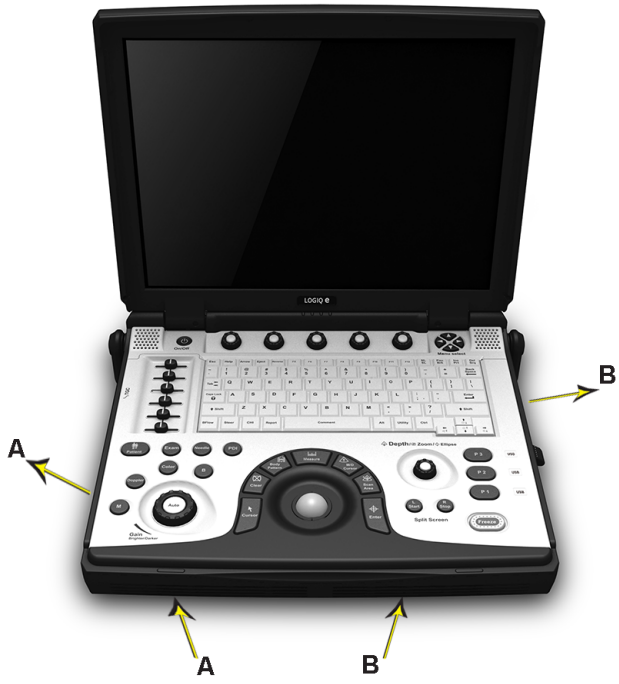


Figure 5-2. Air Flow Inside the System

The two air flow passes allow the scanner to be cooled down as shown in the figure above.

- Path A (Bottom front > CPU Assy > Bottom left) for TMST & CPU Assy cooling.
- Path B (Bottom front > PWA Assy > Bottom right) for PWA cooling.

Common Service Platform

Contents in this Chapter

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.

The usage for security cable

The ultrasound system equipped with Kensington security slot which is compatible with a Kensington security cable.

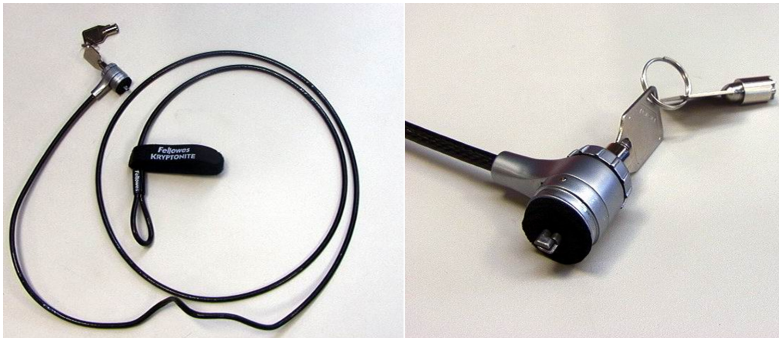


Figure 5-3. Security slot

How to prevent unauthorized removal of the ultrasound system?

1. Wrap the cable around the immovable object
2. Make sure and rotate the key to the right (unlocked position)
3. Insert the lock into the Kensington security slot in the system side cover
4. Rotate the key to the left (locked position).
5. For more information, visit www.kensington.com

Figure 5-4. Security slot and system

Global Service User Interface (GSUI)

Service Login

Select Utility -> Service. This button links the user or the Field Engineer (FE) to the service login screen.

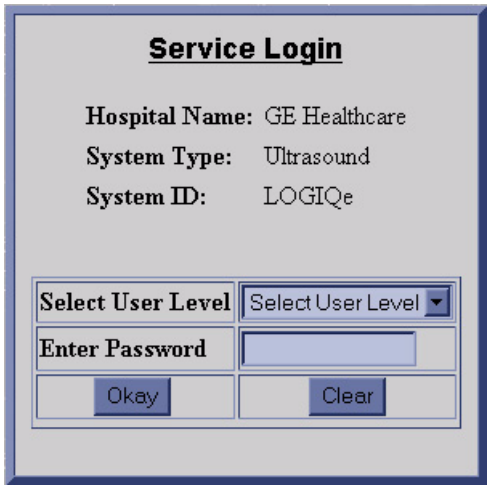


Figure 5-5. Service Login Screen

Access/Security

The service interface has different access and security user levels. Each user is only granted access to the tools that are authorized for their use

NOTE: A Service Dongle is necessary for use by GE Service when performing proprietary level diagnostics. Online Center access to the scanner requires the password and they must have "Disruptive" permission and customer input to run diagnostics.

Table 5-1: Service Login User Levels

User Level	Access Authorization	Password
Operator	Authorized access to specified diagnostics, error logs and utilities. Same acquisition diagnostic tests as GE Service.	uls
Administrator		uls
External Service		gogems
GE Service	Knowledge of a service level password. A physical Service Key (Dongle) required	Rotating security password

NOTE: For GE Field Engineer, the password changes at specific intervals. Access with the password is tied to the service key.

Every access request, whether successful or not, will be logged into a service access log that is viewable to authorized users.

Access/Security (continued)

NOTE: If the following window displays unauthorized access prohibited after input of correct password to try to login, do the followings:

Figure 5-6. Authentication Failure

1. Close the Login window.
2. Enter **Utility -> System -> General**.
3. Select **Date/Time**.

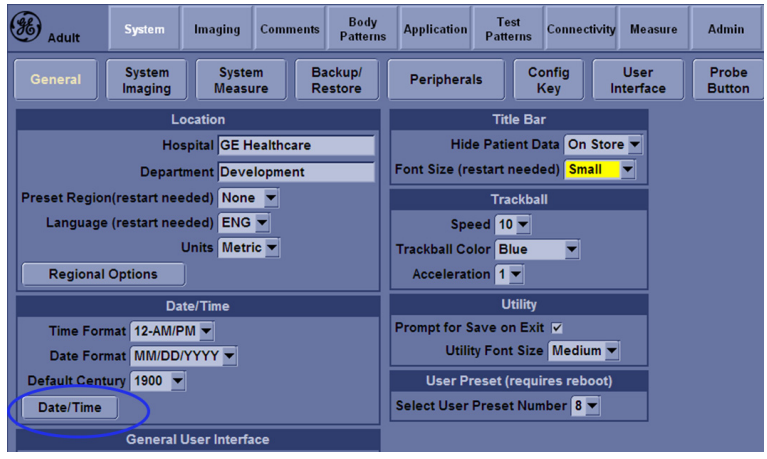


Figure 5-7. Date/Time

Access/Security (continued)

4. Change the Date/Time to the current date. Select **OK** and select **Save** to save the current date.

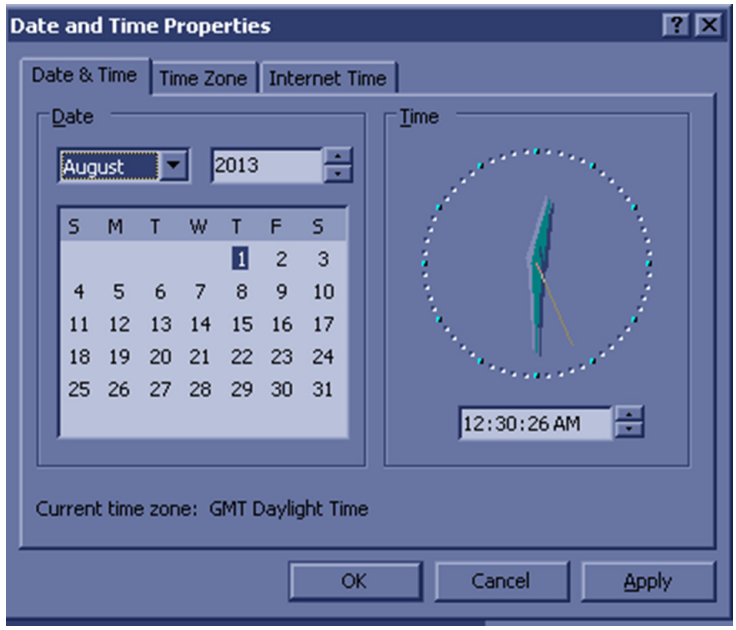


Figure 5-8. Date/Time

5. Select Utility -> Service and try to login again.

Customer Service Home Page

Enter customer service home page with customer level and password.

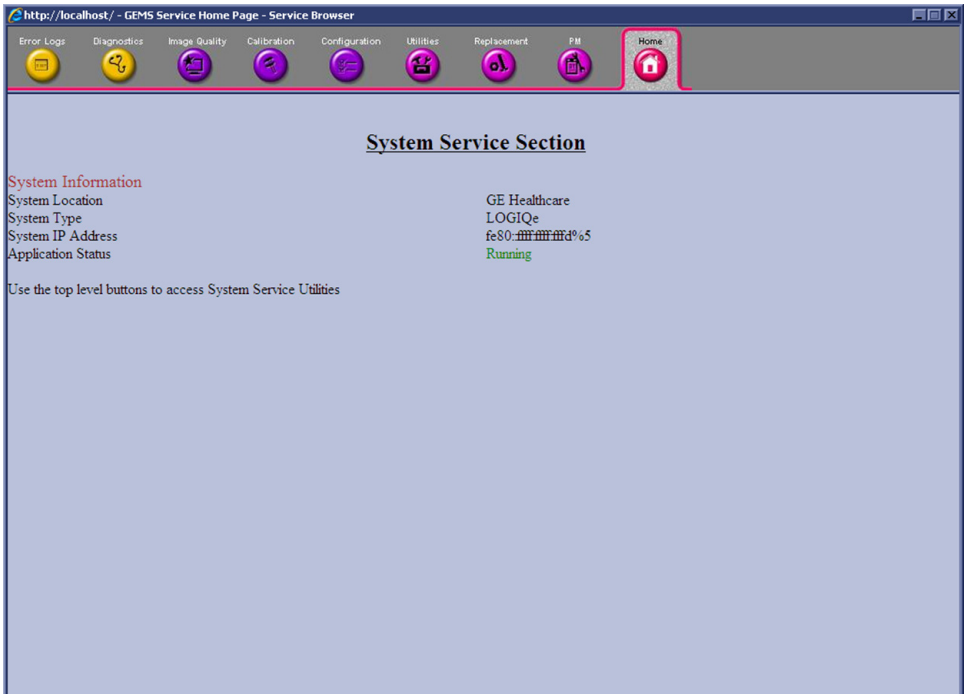


Figure 5-9. Customer Service Home Page

Chapter 6

Service Adjustments

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

LCD Monitor adjustments

Purpose of this section

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

Monitor Adjustments

1. To adjust the brightness and volume:
1. On the alphanumeric keyboard,
   - adjust brightness with the ***Ctrl*** + ***Up/Down*** keys;
   - adjust volume with the ***Ctrl*** + ***Left/Right*** keys

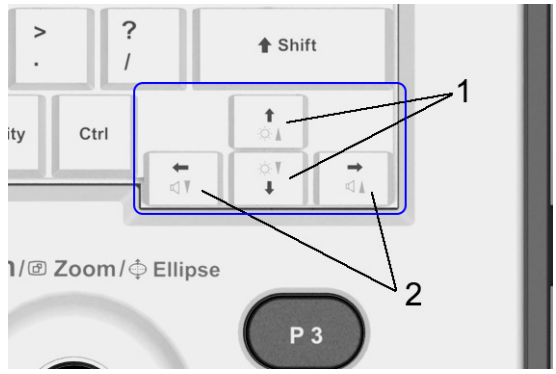


Figure 6-1.

1. Brightness
2. Volume

Chapter 7

Diagnostics/Troubleshooting

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

Overview

Contents in this chapter

Gathering Trouble Data

Overview

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

Contents in this Section

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 e

From the *Utility>System>About* screen:

Applications Software

- Software Version
- Software Part Number

System Image Software

- Image Revision
- Image Part Number

Collect Vital System Information (continued)

System Hardware

Click and open **Additional About Information** for hardware information: Module Name, Revision and Part Number.

- **Module Name**

  This column indicates the hardware modules which are supported on the system.

- **Revision**

  This column displays the information of the hardware. The "--" mark in the cell of this column indicates that the hardware in the same row is not installed on the system.

- **Part Number**

  This column indicates the part number of the hardware. The "--" mark indicates that there is no part number display for the hardware in the same row.

Module Name	Revision	Part Number
I/O Board	7	5442725
MST	1	5450474-5
CPS	7	5443576
3PP	--	--
CWD	Installed	--
CPU	Advantech	--

Figure 7-1. Hardware Information

Collect a Trouble Image with Logs

If the system should malfunction, press the Alt+D keys simultaneously. This will collect a screen capture of the image monitor, system presets and 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 e.

This Alt+D function is available at all times.

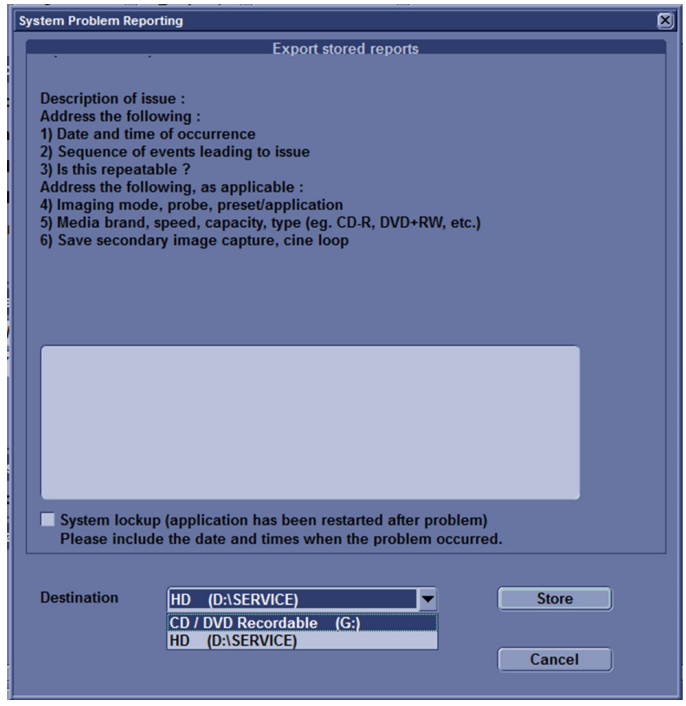


Figure 7-2. Alt+D Dialog Box

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 DVD-R, RD (Removable Disk) or to the Export directory D:\SERVICE.

Collect a Trouble Image with Logs (continued)

Use a log to if the user wants to send information to GE. There are two methods to follow:

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

- To save log files and an image snapshot, press Alt+D, select the save logs function, and fill in the form. Use a USB flash drive or CD-R to store the log(s). When you fill out the form, fill in the system behavior you saw, plus any other comments. Fill in the check box if the system crashed.
- To save log files and an image snapshot, press Alt+D. Describe the issues, then select to store logs to D:\SERVICE. Select ContactGE in Service Menu, then complete the form of Contact Information, Problem Type and Problem Description and select Send.

USB Quick Save

Overview

There may be times when the customer or field engineer will want to directly save images into USB memory. This is accomplished by saving individual Cine clips (moving images-avi format) or still images (jpg format) directly to a USB memory disk by pressing a Print Key.

The P3 key is the factory default print key to accomplish the USB Quick Save. However, the default is for the Image Area only or the customer may have customized the default Key function.

Check and Record the P3 Key Function

Check the function of the default Key in the event that the customer may have made some customized settings.

1. Click **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** section, select Print3 key.
   The Connectivity/Buttons Screen will be displayed.

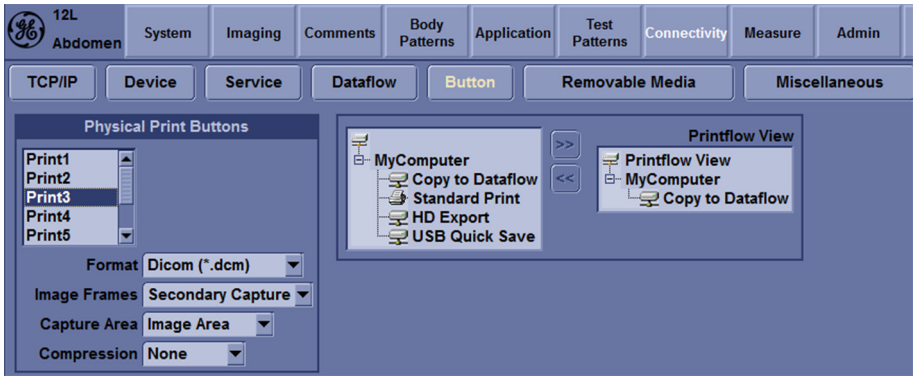


Figure 7-3. Buttons Set Up Screen

Check and Record the P3 Key Function (continued)

P3 is the factory default USB Quick Save key. If it is not set to Image Area, 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.

Setting the P3 Key to USB Quick Save

If the P3 Key is not set to USB Quick Save:

1. While on the Connectivity screen, with the Buttons tab displayed, go to the *Destinations* list.
2. From the list select *USB Quick Save*. Press [>>] to add the selection to the **Printflow View** section.

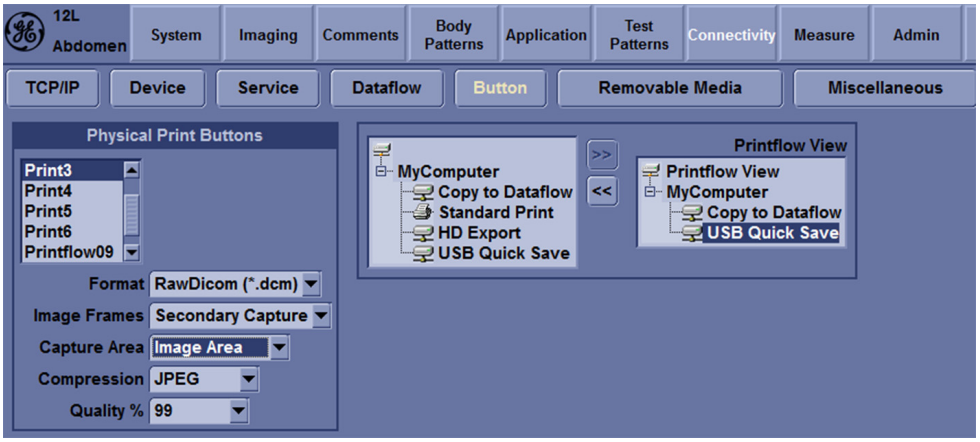


Figure 7-4. Set P3 Key to USB Quick Save

3. Ensure that the **Physical Print Buttons** section for capture Area is set to Image Area and No Image Compression.
4. The P3 Key should now be set up for USB Quick Save, sending the images directly to the USB memory

Screen Capture

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

There's no factory default print key to accomplish a secondary screen capture. However, customer may have customize any of Print Key function. Print1, Print2 and Print3 are the same. Therefore, screen capture should involve the following steps:

1. Check and record any custom settings for the Print1 button
2. Set the Print1 button to Whole Screen, Secondary Capture.
3. Capture the required screens to the Hard Disk Drive or DVD-R.
4. Restore the Print1 button to it's original settings.

Contents in this Section

Check and Record the P1 Key Function

Check the function of the Print1 Key in the event that the customer may have made some custom settings.

1. Press **Utility** on the control panel.
2. Select **Connectivity** from the Utilities Menu.
3. Select the **Button** tab on the Connectivity screen.
4. In the **Physical Print Buttons** field, select Print1.

   The Connectivity/Buttons Screen will be displayed.

   If P1 is not set to Whole Screen, proceed to step 5 to record the customer's customized settings.

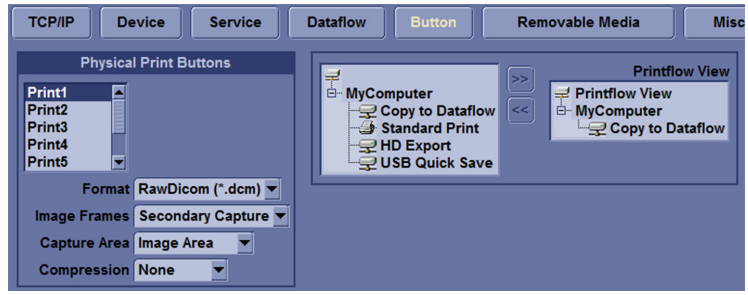


Figure 7-5. Connectivity/Button screen

5. In the Destinations section, record the service that is displayed.
6. In the **Physical Print Buttons** section, record the parameters related to the service.

Setting the P1 Key to Screen Capture

If the P1 Key is not set to screen capture:

1. While on the Connectivity screen, with the Buttons tab displayed, go to the *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 P1 Key should now be set up for whole screen capture, sending the screens to the image buffer (clipboard).

Capturing a Screen

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

1. Navigate to and display the image/screen to be captured.
2. Press **P1**. This will place a snapshot of the screen on the “clipboard” displayed at the bottom of the scan image display.

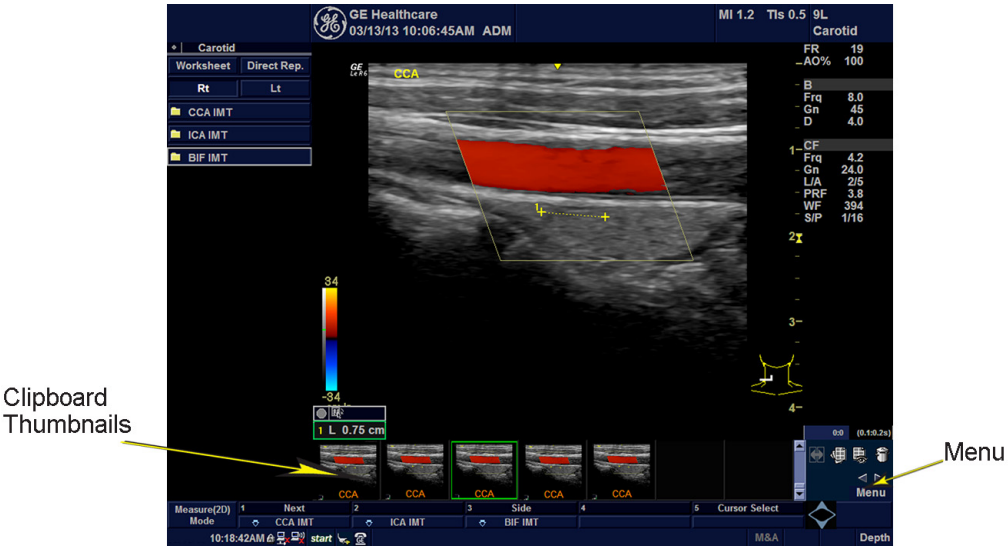


Figure 7-6. Select Image to Capture

3. Click **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 Menu on the right side of the image screen, then highlight and select **Save As**.

Figure 7-7. Menu > Save As

Capturing a Screen (continued)

6. A Save dialog box will be opened. Select ***Save*** first, and Select ***Transfer to CD/DVD*** to save the image on the CD/DVD

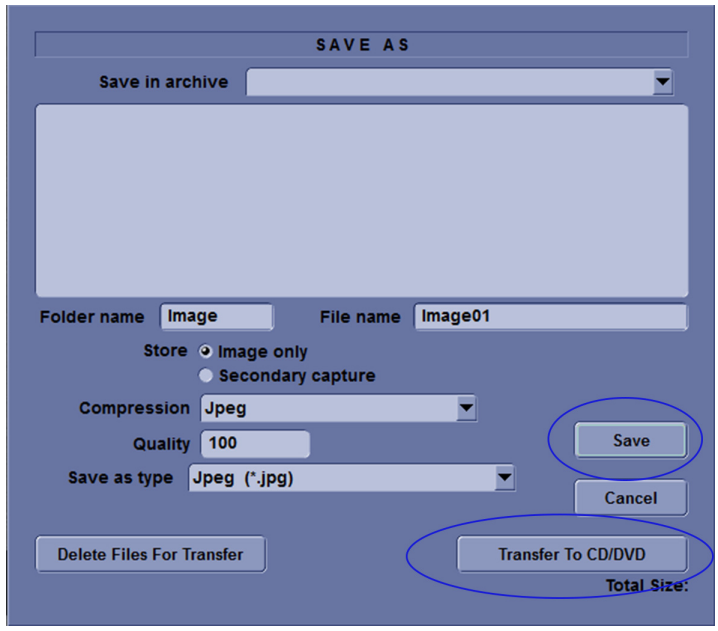


Figure 7-8. Save Dialog Box

Reset the P1 Key to Customer's Functionality

If the customer had programmed the P3 Key to a function other than screen capture, restore that functionality recorded in section 'Check and Record the P1 Key Function' on *page 7-10*. Refer to Figure 7-5 *on page 7-10*.

1. Select **Utility** on the control panel.
2. Select Connectivity -> Button.
3. In the ***Physical Print Buttons*** field, select Print1.
4. In the *Destinations* list, select the service(s) recorded in step 5, Section 'Check and Record the P1 Key Function' on *page 7-10*.
5. In the *Physical Print Buttons* section, select the parameters related to the service recorded in step 6, section 'Check and Record the P1 Key Function' on *page 7-10*.

Global Service User Interface (GSUI)

Contents in This Section

Common Diagnostics

Utilities

Provides two selections:

- **Disruptive Mode**

  Allows you to enable or disable disruptive mode troubleshooting.
- **System Shutdown**

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

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

PC

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

PC Interactive

- **AVI playback** tests playing back an AVI file.
  - Click “Play” to run the test. If the test is successful, you will see a brief video clipo with audio. For more information about the test, click “More Information”.
  - Click “Pass” if the test successfully reproduces the video clip.
  - Click “Fail” if the test is unable to successfully reproduce the video clip.
  - Click “Cancel” button to quit the test without recording a test result.
- **Keyboard**
  - Press each key on the keyboard and it will be added to the History. Hold down a key to test the repeat of that key. To cancel, click Cancel or press Alt+X.
  - Special purpose keys like volume control or Internet access keys may not be detected. To test the Fn key of a notebook computer, hold down the Fn key while pressing another key.
  - Note: This diagnostic is intended to verify keyboard keys are in good working order. It is not intended to verify that keyboards produce desired characters.

PC Interactive (continued)

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

PC Interactive (continued)

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

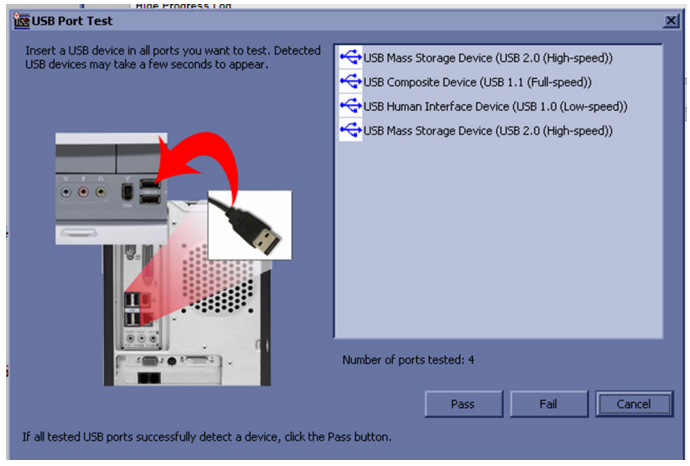


Figure 7-9. USB Ports Test

Restart the system after diagnostics

Always shutdown the system and reboot after a diagnostics session.

Network Configuration

Contents in This Section

Network Configuration

Wire-LAN Network

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

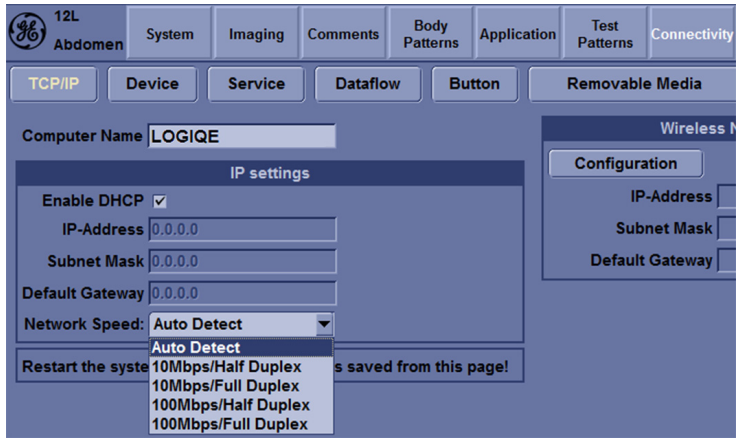


Figure 7-10. Enable DHCP

Network Configuration (continued)

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.

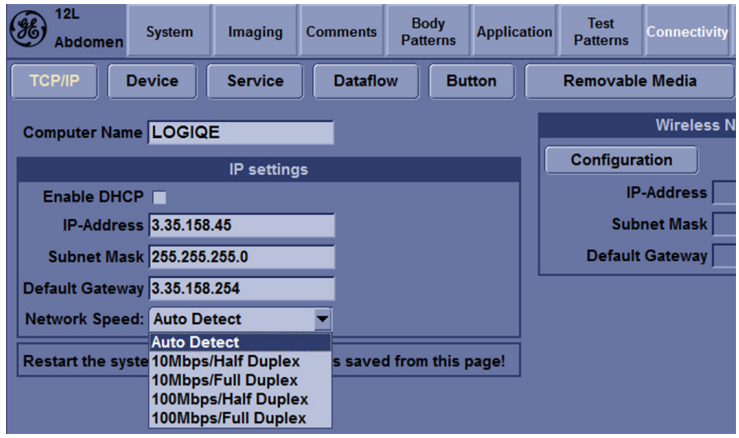


Figure 7-11. Input static address

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

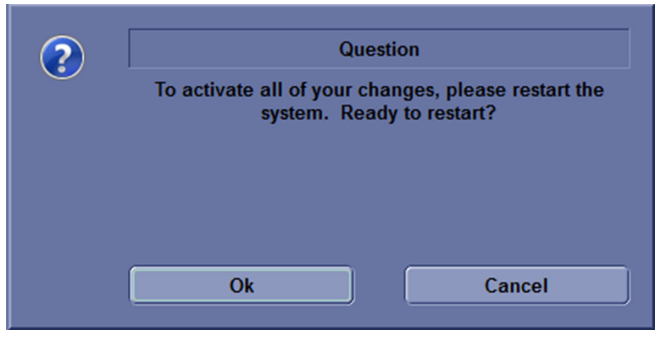


Figure 7-12. System Restart inquiry dialog

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

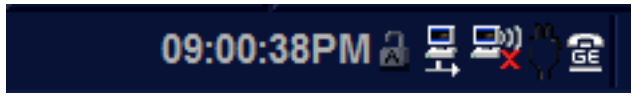


Figure 7-13. Network icon

Wireless LAN Network

1. Connect wireless LAN card with system.
2. Enter Utility -> Connectivity.
3. In the Section of **Wireless Network**, select **Configuration**.

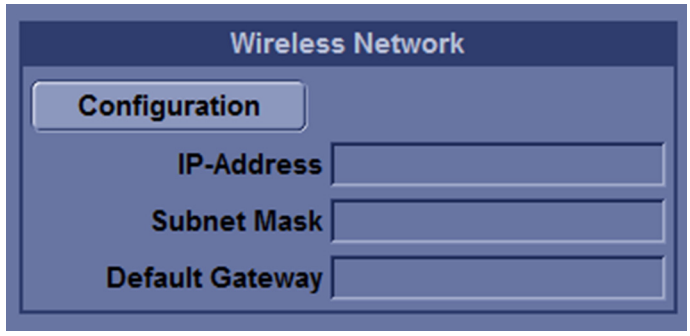


Figure 7-14. Wireless Network configuration

Software Download

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

Figure 7-15. Notification

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

2. Press the **Power On/Off** switch, the System-exit window is displayed.

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

   Download: To start the software download.

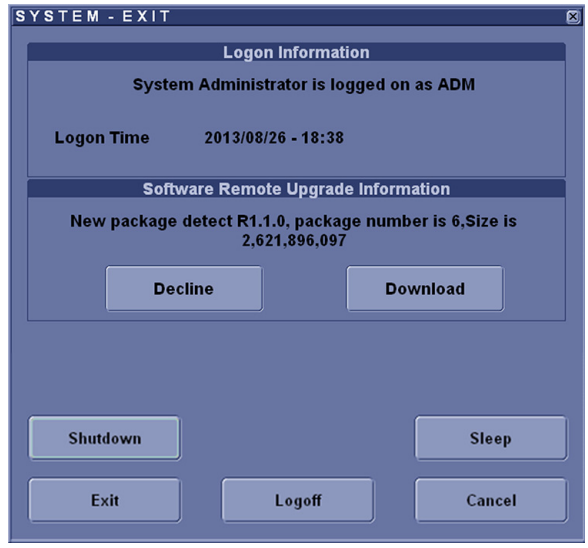


Figure 7-16. Remote Software Download

Software Download (continued)

3. Select Download. The download process starts. The progression of the download process is displayed.

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

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

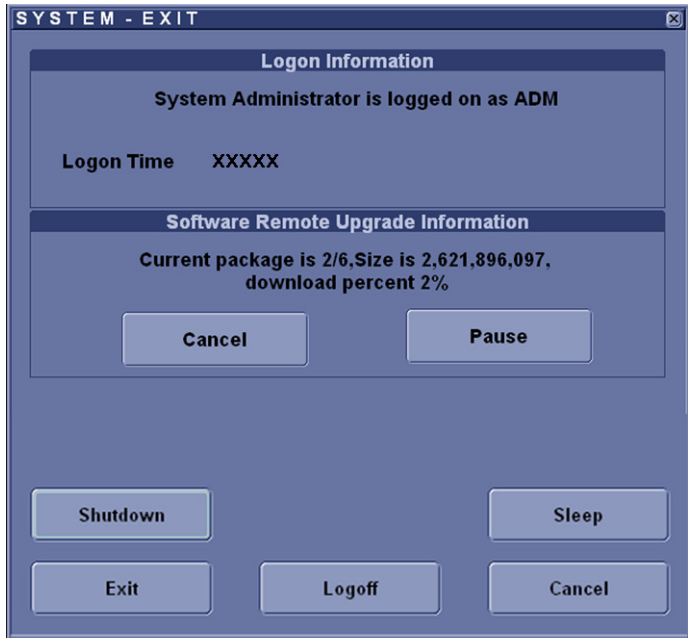


Figure 7-17. Pause the Download

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

Resume: Select Resume to continue the software download.

Software Download (continued)

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

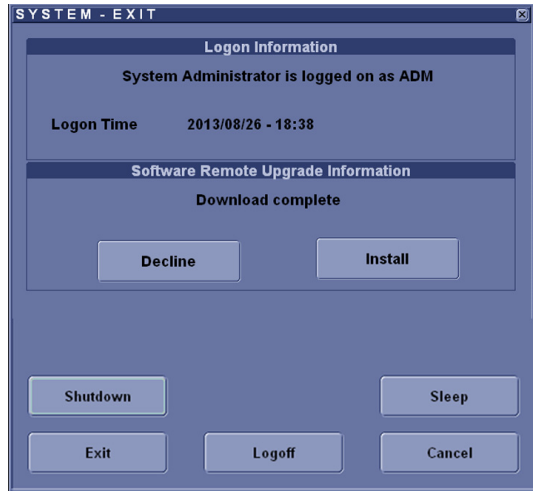


Figure 7-18. Install the software

NOTE: You can also select to decline the software installation process.

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

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

Software Download (continued)

5. Select Shutdown and then press Power On/Off button to reboot the system.

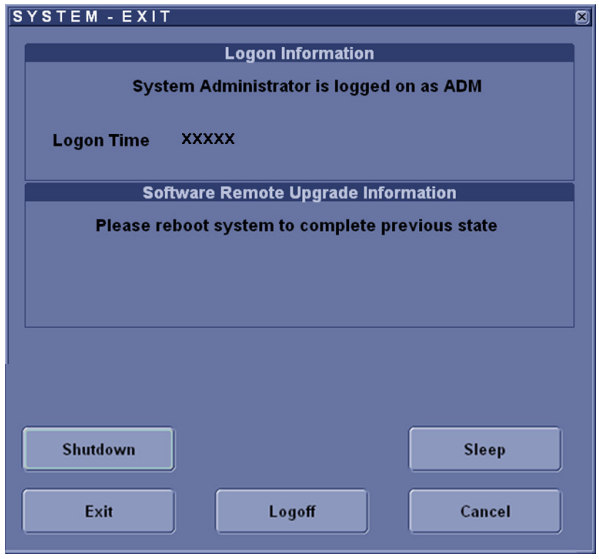


Figure 7-19. Reboot the System

NOTE: A typical installation may take up to 5 minutes.

Software Download (continued)

6. When the system starts up after the software installation is complete, press **Power On/Off** button and then select **Verify**.

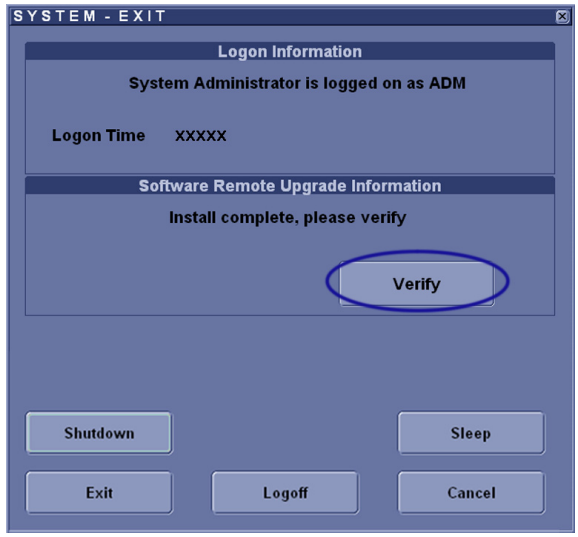


Figure 7-20. Verify the Software

NOTE: Select the question mark to get information on how to check each feature

Software Download (continued)

7. The New Software Verification Checklist is displayed. This dialog is critical. You MUST perform software verification after downloading and installing the new software.

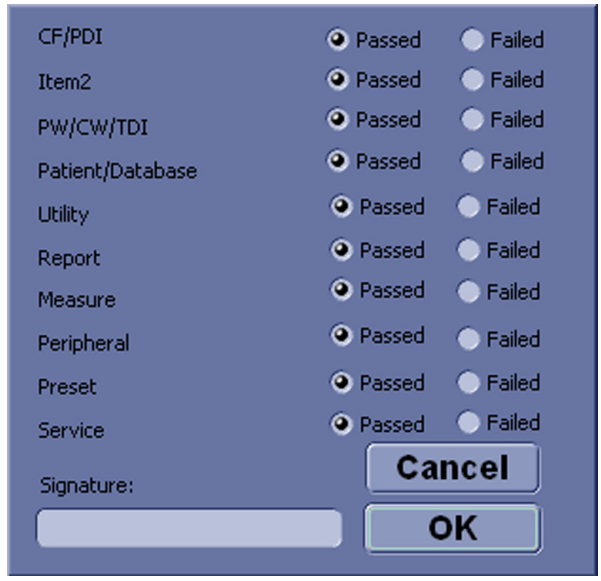


Figure 7-21. Verification Checklist

CAUTION

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

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

Software Download (continued)

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

NOTE: If any of the features in the list is not supported in the system, fill in Passed and do not need to verify it.

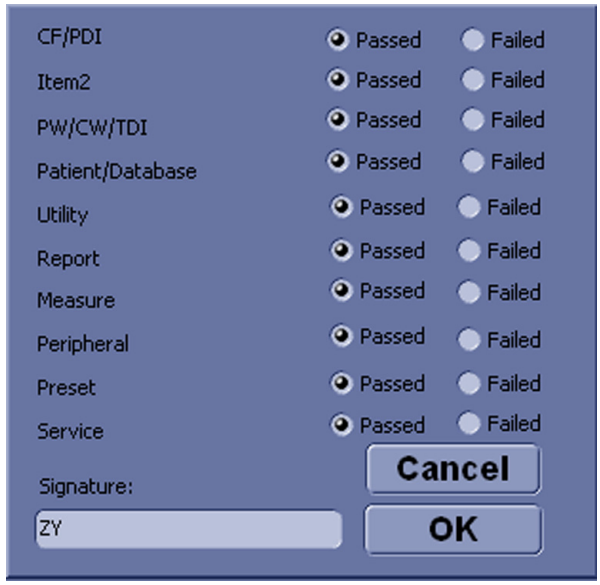


Figure 7-22. Item Passed

WARNING

However, if any of the features DID NOT function as expected, you need to select Failed for this feature. Type your signature and select OK, then the **System-Exit Window** is displayed and indicates that the system will return to the previous software version. Select **Exit** and then reboot the system to complete the previous state.

Chapter 8

Replacement Procedures

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

Overview

Contents in this chapter

Warnings and important information

Warnings

WARNING

Energy Control and Power Lockout for LOGIQ e.

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

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

Ultrasound System components may be energized.

WARNING

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

WARNING

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

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

Follow general guidelines for handling of electrostatic sensitive equipment.

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

Warnings (continued)

The waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately.

Please contact the manufacturer or other authorized disposal company to decommission your equipment.

Returning/shipping probes and repair parts

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

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

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

Disassembly/Re-assembly

Warning and Caution

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

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

Handle Assy (Part No. 5483188)

Purpose: This is a description on how to remove and replace the Handle Assy.

Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

Needed Manpower

- 1 person, 5 minutes + travel

Preparation

- Shut down the system, disconnect the AC/DC power cord and remove the battery.

Removal Procedure

Table 8-1: Removal Procedure for Handle Assy

No.	Steps	Corresponding Graphic
1.	Unscrew 2 handles caps on both sides of the system by rotating the cap counterclockwise.	
2.	Pull out the handle.	

Mounting Procedure

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

Advanced Isolation Cart Components Replacement

Basket of Advanced Isolation Cart (Part No. 5571410)

Purpose: This is a description on how to remove and replace the Basket of Advanced Isolation Cart.

Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

Needed Manpower

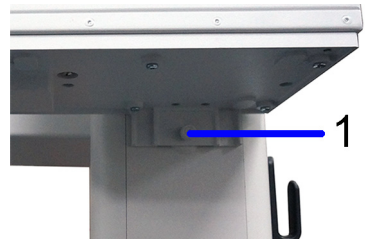
- 1 person, 2 minute + travel

Preparation

- Power off the Advanced Isolation Cart and disconnect the AC/DC power cord.

Removal Procedure

Table 8-2: Removal Procedure for Basket

No.	Steps	Corresponding Graphic
1.	Unscrew the 1 screw under the basket.	
2.	Hold the basket with both hands and push it up.	
3.	Remove the basket from the Upper Column.	

Mounting Procedure

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

Drawer of Advanced Isolation Cart (Part No. 5571411)

Purpose: This is a description on how to remove and replace the Drawer of Advanced Isolation Cart.

Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

Needed Manpower

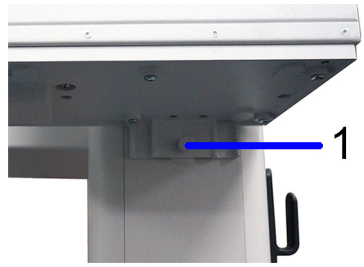
- 1 person, 2 minute + travel

Preparation

- Power off the Advanced Isolation Cart and disconnect the AC/DC power cord.

Removal Procedure

Table 8-3: Removal Procedure for Drawer

No.	Steps	Corresponding Graphic
1.	Unscrew the 1 screw under the drawer.	
2.	Hold the drawer with both hands and push it up.	
3.	Remove the drawer from the Upper Column.	

Mounting Procedure

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

3-Probe Port of Advanced Isolation Cart (Part No. 5571412)

Purpose: This is a description on how to remove and replace the 3-Probe Port of Advanced Isolation Cart.

Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

Needed Manpower

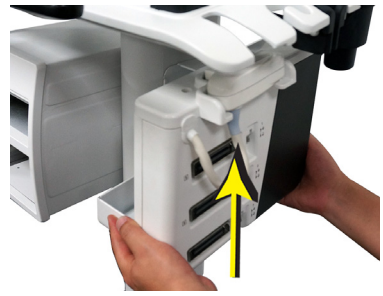
- 1 person, 2 minute + travel

Preparation

- Power off the Advanced Isolation Cart and disconnect the AC/DC power cord.

Removal Procedure

Table 8-4: Removal Procedure for 3-Probe Port

No.	Steps	Corresponding Graphic
1.	Unscrew the 1 screw under the 3-Probe Port.	
2.	Hold the 3-Probe Port with both hands and push it up.	
3.	Remove the 3-Probe Port from the Upper Column.	

Mounting Procedure

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

Loading the software

Contents in This Section

Purpose of this section

This section describes how to reinstall software on LOGIQ e.

Customer provided prerequisite

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

Data Management - moving all images

An error, or a power loss may occur.

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

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

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

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

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

Backing up the Patient Archive and System Configurations

An error, or a power loss may occur.

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

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

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

- Backup the Patient Archive and System Configurations.

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

Recording important settings and parameters

Overview

An error, or a power loss may occur.

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

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

This subsection includes descriptions for recording data from the following screens:

Loading the System Software

While the software install procedure is designed to preserved data, you should save any patient data, images, system setups and customer presets to CD, DVD, USB Flash Drive, or USB Hard Disk before doing a software upgrade.

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

There are two methods to load the system software:

- Load the system software with USB memory stick.

Loading the System Software with USB memory stick

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

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

NOTE: Please ensure AC adapter is connected during system upgrade!

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

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

3. Power on the system. The system will detect the USB memory stick automatically.

Loading the System Software with USB memory stick (continued)

4. Press any key to continue when below message displays.

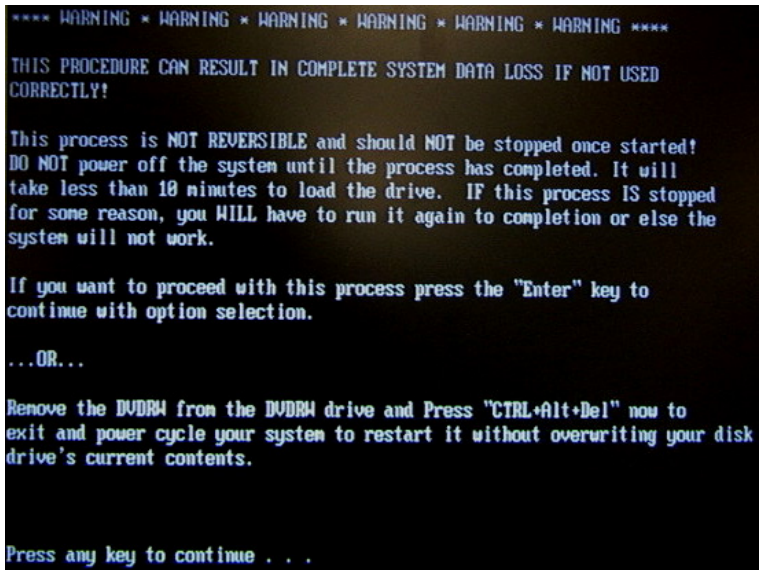


Figure 8-1. Upgrade message

5. Select one of the options for loading the system. Select choice [a] to load the complete disk.

CAUTION

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

- To select [a], the complete disk will be loaded. This option is recommended for application software upgrade.

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

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

Loading the System Software with USB memory stick (continued)

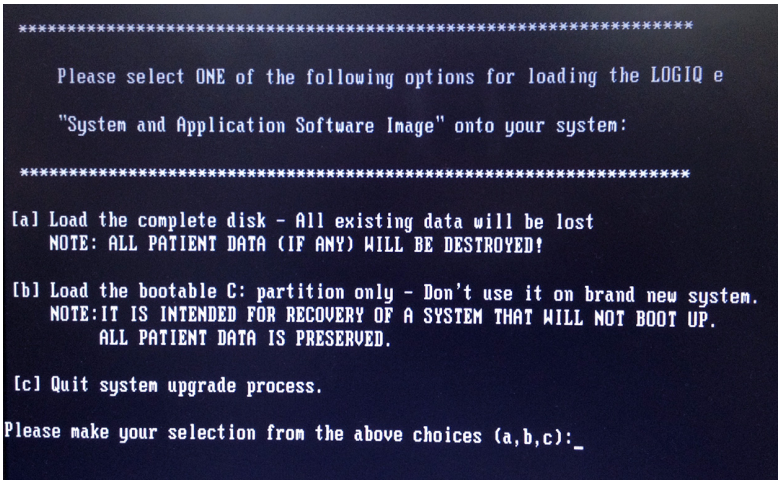


Figure 8-2. System Software load instruction

WARNING

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

6. Input “Yes” or “No” and press Enter key to continue.

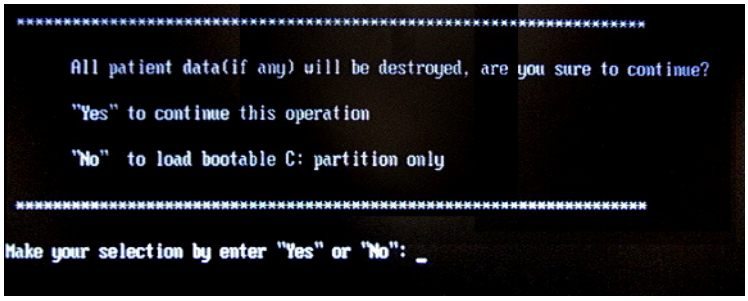


Figure 8-3. Confirmation on loading the system

Loading the System Software with USB memory stick (continued)

7. System USB memory stick will be loading. Wait for the software installation to complete. (Typical installation time: 5-10 minutes). Status bar on the screen indicates progress.

WARNING

Do not interrupt the software loading at any time.

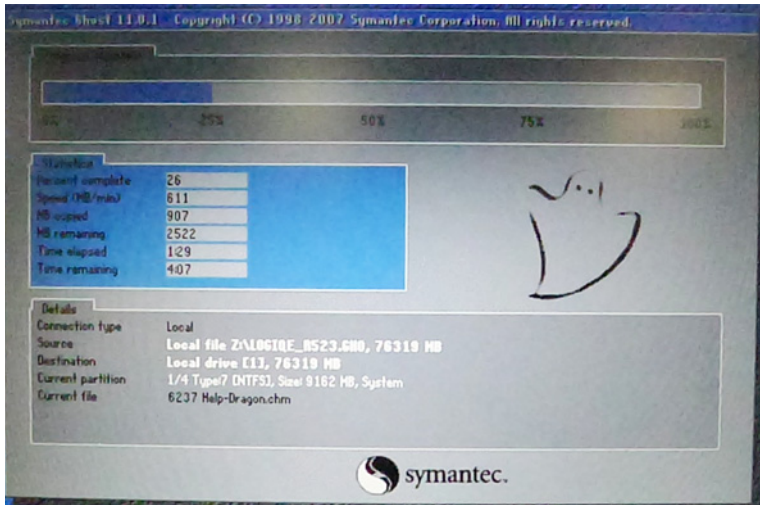


Figure 8-4. Loading status

8. After finish updating system, remove the USB memory stick and press any key to shut down the system.

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

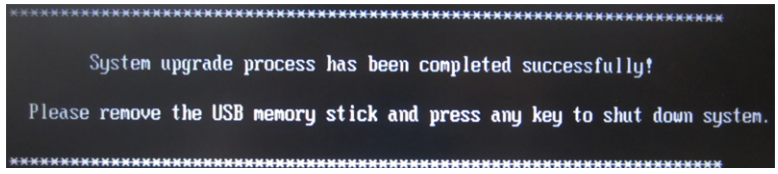


Figure 8-5. System upgrade complete

Loading the System Software with USB memory stick (continued)

9. Restart the system.

   If you select [a] to load the complete disk, the following steps are required.

   a. Enter the system's Serial Number and select OK. The system's Serial Number is at the bottom of the system.

      Press On/Off switch to restart the system.

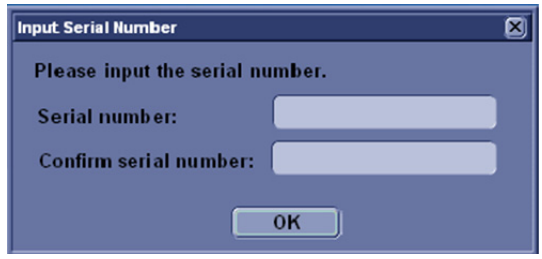


Figure 8-6. System Serial Number

   b. After the system restarts, enter the software license and select OK. The system will enter into scan mode.

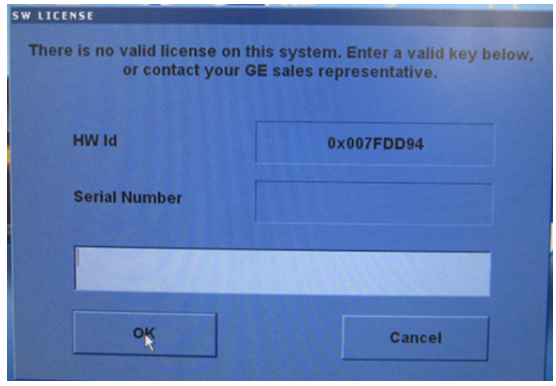


Figure 8-7. Software license

Software Version check out

Functional Check-out

1. Power on LOGIQ e system and wait until system booting to main screen.
2. Press **Utility** on the control panel.
3. Select the **About** button on the right.

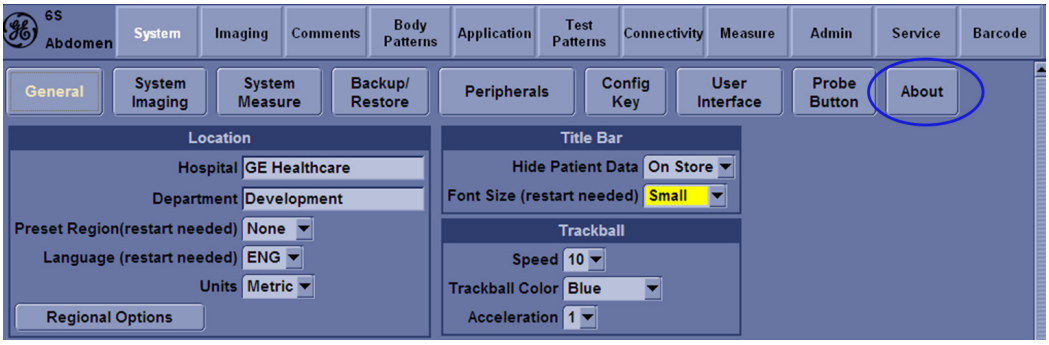


Figure 8-8. About

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

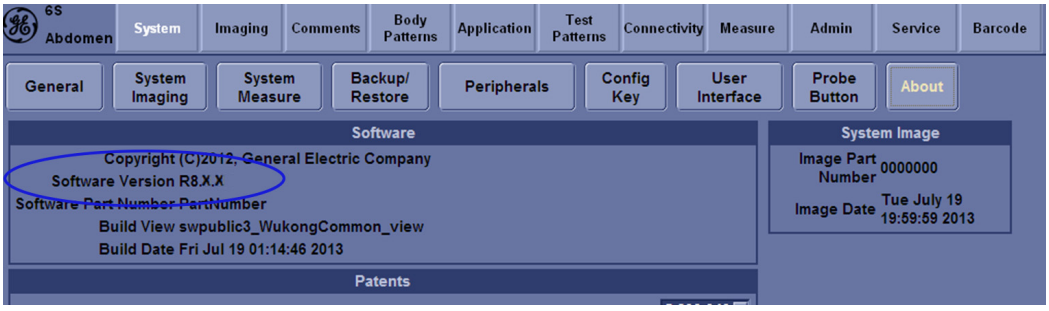


Figure 8-9. Software version

Reload the Correct Preset Region

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

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

Figure 8-10. Preset Region

4. Reboot the system.

Option Strings Check

NOTE: After the system software loading completion, please check the option strings to ensure that the options are activated and working.

1. Reboot the system.
2. Select Utility -> Admin -> System Admin.
3. Enter the option keys into the **Enter New Option Key** field and press **Add**.
4. Ensure that all the install option keys are displayed and the status of Options are valid.
   - The status “Valid” means the option keys are activated and working.
   - The status “disabled” means the option keys are not activated and not working. Check if the option is installed and if the serial number and option key are correct.

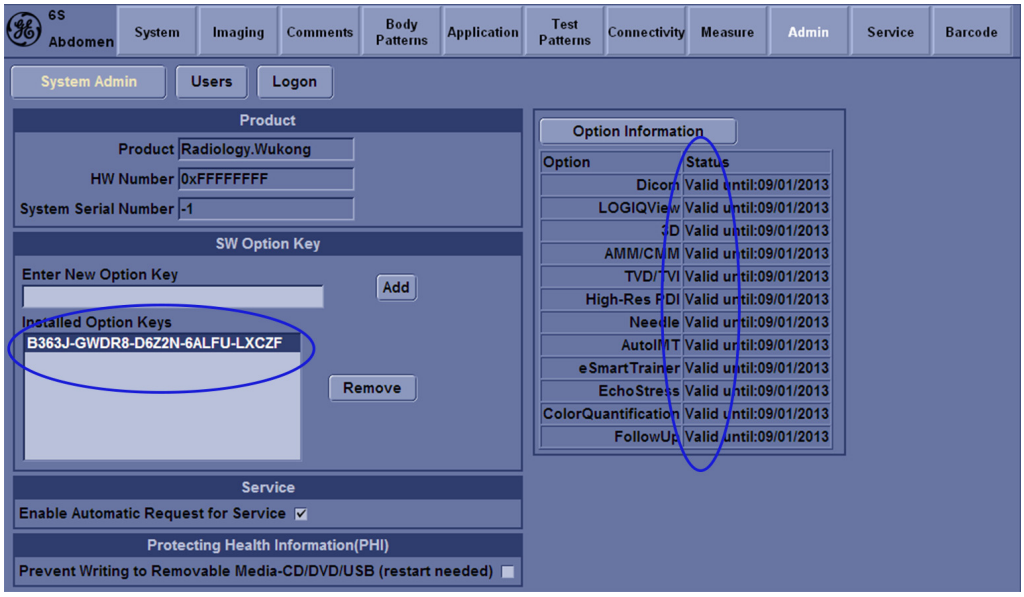


Figure 8-11. Option strings

Probe Recognition Check

NOTE: After the system software loading completion, please check to ensure that the system can recognize the probes.

Plug in the probe. In scanning mode, the probe information is displayed on the **right top** location of the screen. About the probe specification for intended use on LOGIQ e.

Plug in at least one of each type of the probes and check if each of the probes is recognized and the probe information is displayed correctly.

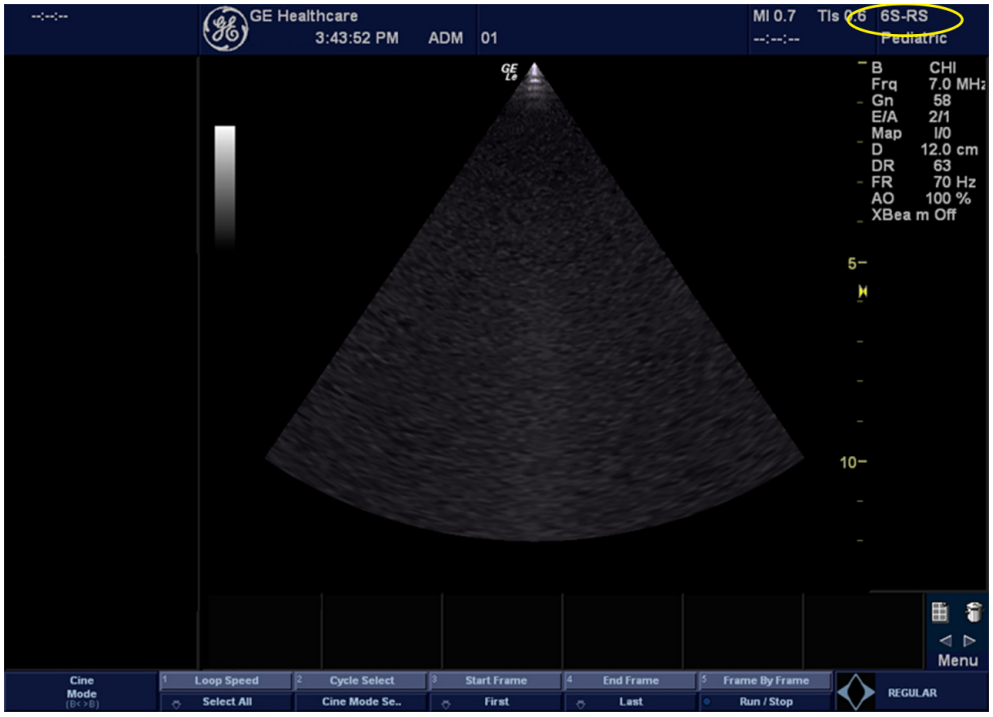


Figure 8-12. Probe identification

Peripheral Device Check

Check to ensure that all the peripheral devices work properly.

For instruction of peripheral device check, See ‘Peripheral Checks’ on *page 4-52 for more information.*

Reinstall DICOM Devices

Reinstall any DICOM devices used by the customers and check to ensure these DICOM devices work properly.

The instruction about installing DICOM devices is not incorporated in this manual. To access the instruction about installing DICOM devices please refer to another manual **Basic User Manual**. Please use the latest revision of this document.

Chapter 9

Renewal Parts

This chapter lists the renewal parts available for the LOGIQ e.

Overview

Contents in this chapter

List of Abbreviations

Table 9-1: List of Abbreviations

ABBREVIATION	DESCRIPTION
3D	THREE DIMENSIONAL
Assy	ASSEMBLY
KBD	Keyboard
LCD	Liquid Crystal Display
BnV	Brightness and Volume
WMST	Master Board

Renewal Parts Lists

Contents in This Section

NOTE: The part replacement is shown by the "Replaced By" column in the table. If the part is replaced by a new version, the new version is shown in the "Replaced By" column in the table. The item number for the new version will have a letter in the alphabetical order after the Arabic numerals. For example, the new version in item 300A will replace the parts or only some parts in the item 300. The parts in item 300 which are replaced by item 300A will have the part number of new version in the "Replaced By" column. The parts in item 300 which are not replaced do not have a new version in the "Replaced By" column

Power Cable

Table 9-2: Power Cable List for LOGIQ e R8.x.x and E-Isolation Cart

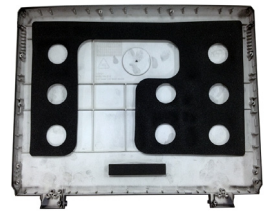
Item	Part Number	Description	Replaced By	Qty
1	5460229X	ACDC Adapter with Clamp Filter		1
2	5177126-2	ACDC Power Cable for Japan		1
3	5177195-2	ACDC Power Cable for Argentina		1
4	5177154-2	ACDC Power Cable for Switzerland		1
5	5177187-3	ACDC Power Cable for Australia		1
6	5177123-2	ACDC Power Cable for Europe		1
7	5176907-2	ACDC Power Cable for United Kingdom		1
8	5176773-2	ACDC Power Cable for India		1
9	5176753-2	ACDC Power Cable for Israel		1
10	5176304-2	ACDC Power Cable for China		1
11	5177146-2	ACDC Power Cable for USA		1
12	5177153-2	ACDC Power Cable for Denmark		1
13	5400868-2	ACDC Power Cable for Brazil		1

Operator Console Assy

Figure 9-1. Operator Console Assy

LCD Assy

Table 9-3: LCD Assy

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
100	5460119	LOGIQ e LCD Assy			1
102	5483138	LOGIQ e LCD Panel Kits			1
103	5419292	LOGIQ e LCD Back Cover Assy			1
104	5418452	LOGIQ e LCD Front Cover			1

Keyboard Assy

Table 9-4: Keyboard Assy

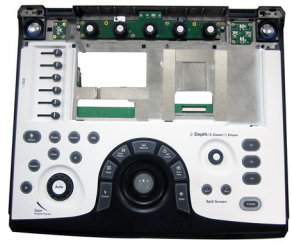
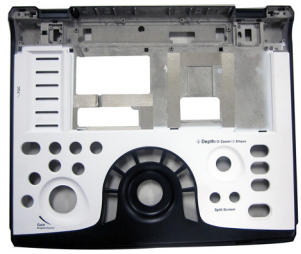
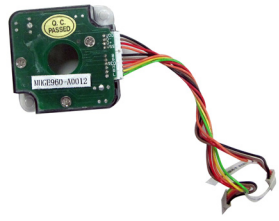
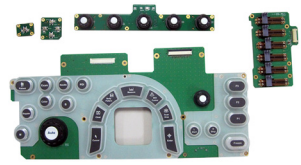
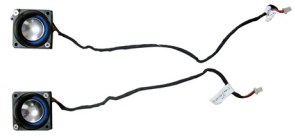
Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
200	5453774	LOGIQ e Keyboard Assy			1
201	5446052	LOGIQ e KBD Cover Assy			1
203	5456388	LOGIQ e AN Keyboard			1
204	5451287	LOGIQ e Trackball Assy			1

Table 9-4: Keyboard Assy

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
205	5483141	LOGIQ e Keyboard PWA Kits			1
206	5483143	LOGIQ e TGC Keytop Kits			1
207	5483185	LOGIQ e Depth Keytop Kits			1
208	5483189	LOGIQ e Speaker Kits			1

Bottom Assy

Table 9-5: Bottom Assy

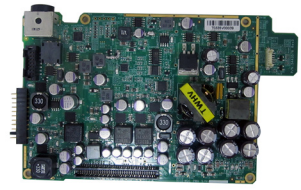
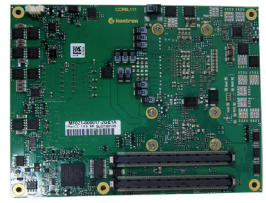
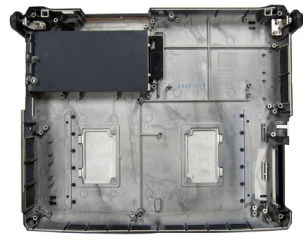
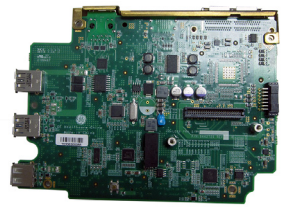
Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
300	5482282	Advantech 128G SSD Model:SQF-SMSM4-128G-S8C			1
301	5443576	LOGIQ e WDC PWA			1
302	5449310	LOGIQ e CPU Module			1
303	5452099	LOGIQ e Bottom Cover Assy			1
304	5462354	LOGIQ e Utility PWA Assy			1

Table 9-5: Bottom Assy

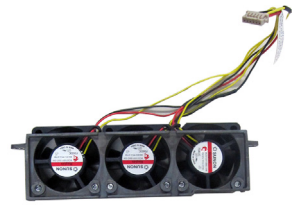
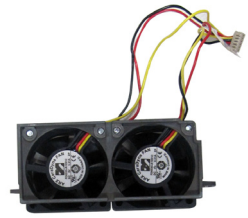
Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
305	5454601	LOGIQ e Probe Connector Assy			1
306	5460069	LOGIQ e Left Fan Assy			1
307	5458580	LOGIQ e Right Fan Assy			1
308	5483140	LOGIQ e LCD Hinge and Handle Hinge Kits			1
309	5483142	LOGIQ e Main PWA and Heatpipe Kits			1

Table 9-5: Bottom Assy

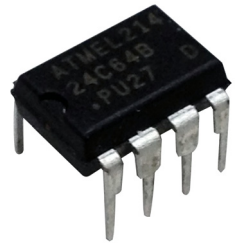
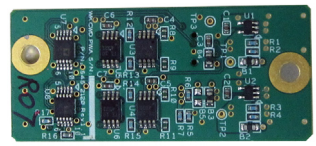
Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
310	5451284	LOGIQ e Battery Pack			1
311	5483358	LOGIQ e Probe Connect Lock Kits			1
312	5419298	LOGIQ e Menu Panel Assy			1
313	5462567	LOGIQ e Rubber Kits			1
314	5422180	LOGIQ e Battery Lock			1
315	5145407	LOGIQ e CMOS Battery			1
316	5484857	Memory Module			1
317	5490318	OPTKey IC			1

Table 9-5: Bottom Assy

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
318	5452120-S	LOGIQ e CWD Board			1
319	5483188	LOGIQ e Handle Kits			1
320	5490737	LOGIQ e Heatpipe Module Kits			
321	5483186	LOGIQ e Screw Kits			1
322	5582183	LOGIQ e Main PWA and Heatpipe Kits (For Software R8.0.5 and above)			1

E-Isolation Cart and Advanced Isolation Cart

Table 9-6: E-Isolation Cart and Advanced Isolation Cart

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
1400	5507953	Isolation Cart Power Box 220V			1
1401	5507952	Isolation Cart Power Box 110V			1
1402	5420768-2	Printer Box Assy for E-Isolation Cart			1
1403	5420771-2	E-Isolation Cart Assy			1

Table 9-6: E-Isolation Cart and Advanced Isolation Cart

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
1404	5561128-S	Advanced Isolation Cart Assy			1
1405	5439000	Front Castor MYSD-120R for Advanced Isolation Cart			
1406	5571410	Basket Kits for Advanced Isolation Cart			
1407	5571411	Drawer Kits for Advanced Isolation Cart			

Table 9-6: E-Isolation Cart and Advanced Isolation Cart

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
1408	5571412	3-Probe Port Kits for Advanced Isolation Cart			
1409	5426642	Cable Hook Kit for Advanced Isolation Cart			
1410	5426645	Locate Block and Screw Cap for Advanced Isolation Cart			
1411	5426644	Probe and Gel Holder Kit for Advanced Isolation Cart			

Table 9-6: E-Isolation Cart and Advanced Isolation Cart

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
1412	5461076	Rear Handle Kit for Advanced Isolation Cart			

Accessories and Kits

Table 9-7: Accessories and Kits

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
400	5483317-3	Software R8.0.3 USB	5483317-5		1
400A	5483317-5	Software R8.0.5 USB	5483317-7		1
400B	5483317-7	Software R8.0.7 USB			1
401	5483187	LOGIQ e LOGO Kits			1
402	5491253	SONY UPD25 Color Printer Brazil kit			1
403	5495509	SONY UP-D897 BW Printer Brazil Kit	5495509-2		1
403A	5495509-2	SONY UP-D898MD BW Printer Brazil Kit			1
404	5499686	LOGIQ e eSmart Trainer Japanese USB Flash Drive			1
405	5133106-2	SONY UPD25 Color Printer CHN kit			1
406	5133107-2	SONY UPD25 Color Printer USA kit			1
407	5133108-2	SONY UPD25 Color Printer EUP kit			1
408	5133109-2	SONY UPD25 Color Printer JPN kit			1
409	5151259	SONY UPD897 BW Printer USA Kit	5151259-2		1
409A	5151259-2	SONY UP-D898MD BW Printer USA Kit			1
410	5151261	SONY UPD897 BW Printer Europe Kit	5151261-2		1
410A	5151261-2	SONY UP-D898MD BW Printer Europe Kit			1

Table 9-7: Accessories and Kits

Item	Part Number	Part Name	Replaced By	Corresponding graphic	Qty
411	5151262	SONY UPD897 BW Printer China Kit	5151262-2		1
411A	5151262-2	SONY UP-D898MD BW Printer China Kit			1
412	5151263	SONY UPD897 BW Printer Japan Kit	5151263-2		1
412A	5151263-2	SONY UPD898MD BW Printer Japan Kit			1
413	5421913	LOGIQ e eSmartTrainer USB Flash Drive			1
414	5449275-2	TWIN LITEON eUAU108 DVDRW Kit			1
415	5473920	NetGear WNA1000M Wireless USB Micro Adapter Kit			1
416	5151236	USB Foot Switch for LOGIQ e			1
417	5446188	USB barcode reader Honeywell 1900GHD-2			1
418	5129487	ECG module from Norav Isral			1
419	5146056	ECG Detachable cable AHA Type USA			1
420	5146055	USB Cable for ECG			1
421	5146739	ECG detachable cable IEC type EURO and ASIA			1
422	5195563	ECG module with SKD label			1
423	5177378	SKD ECG Package English Label			1
424	5446638	Keeber8G USB Stick			1

Probe

Table 9-8: Probes for LOGIQ e

Item	Part Name	Part Number	Description	Replaced By	Illustration	Qty
500	L4-12t-RS	5435010	Linear Probe (Frequency Range: 6~13)			1
501	L10-22-RS	5441887	Linear Probe (Frequency Range: 9~22)			1
502	12L-RS	5409291	Linear Probe (Frequency Range: 6~13)			1
503	3Sc-RS	47237516	Sector Probe (Frequency Range: 2~4)			1
504	8C-RS	5434194	Convex Probe (Frequency Range: 6~10)			1
505	C1-5-RS	5384875	Convex Probe (Frequency Range: 2~5)	5499608		1
505A	C1-5-RS	5499608	Convex Probe (Frequency Range: 2~5)			1

Table 9-8: Probes for LOGIQ e

Item	Part Name	Part Number	Description	Replaced By	Illustration	Qty
506	L8-18i-RS	5397810	Linear Probe (Frequency Range: 8~18)	5499609		1
506A	L8-18i-RS	5499609	Linear Probe (Frequency Range: 8~18)			1
507	9L-RS	5213143	Linear Probe (Frequency Range: 4~9)	5499511		1
507A	9L-RS	5499511	Linear Probe (Frequency Range: 4~9)			1
508	6S-RS	5394465	Sector Probe (Frequency Range: 4~7)			1
509	E8C-RS	5434195	Convex Probe (Frequency Range: 6~10)	5499516		1
509A	E8C-RS	5499516	Convex Probe (Frequency Range: 6~10)			1

Manuals

Table 9-9: Manuals for LOGIQ e

Item	Part Number	Description	Qty
600	5461614-100	LOGIQ e Service Manual	1
System User Manual			
601	5454606-100	LOGIQ e Basic User Manual, English	1
602	5454606-101	LOGIQ e Basic User Manual, French	1
603	5454606-106	LOGIQ e Basic User Manual, Spanish	1
604	5454606-108	LOGIQ e Basic User Manual, German	1
605	5454606-111	LOGIQ e Basic User Manual, Italian	1
606	5454606-127	LOGIQ e Basic User Manual, Brazilian Portuguese	1
607	5454606-140	LOGIQ e Basic User Manual, English	1
608	5437241-141	LOGIQ e User Guide, Chinese Simplified	1
609	5437241-121	LOGIQ e User Guide, Dutch	1
610	5437241-129	LOGIQ e User Guide, Estonian	1
611	5437241-142	LOGIQ e User Guide, Swedish	1
612	5437241-143	LOGIQ e User Guide, Traditional Chinese	1
613	5437241-144	LOGIQ e User Guide, Korean	1
614	5437241-145	LOGIQ e User Guide, Russian	1
615	5437241-150	LOGIQ e User Guide, Polish	1
616	5437241-151	LOGIQ e User Guide, Greek	1
617	5437241-153	LOGIQ e User Guide, Hungarian	1
618	5437241-154	LOGIQ e User Guide, Slovakian	1
619	5437241-155	LOGIQ e User Guide, Czech	1
620	5437241-159	LOGIQ e User Guide, Turkish	1
621	5437241-160	LOGIQ e User Guide, Danish	1
622	5437241-161	LOGIQ e User Guide, Norwegian	1
623	5437241-162	LOGIQ e User Guide, Finnish	1
624	5437241-165	LOGIQ e User Guide, Bulgarian	1
625	5437241-167	LOGIQ e User Guide, Romanian	1
626	5437241-168	LOGIQ e User Guide, Croatian	1
627	5437241-174	LOGIQ e User Guide, Lithuanian	1

Table 9-9: Manuals for LOGIQ e

Item	Part Number	Description	Qty
628	5437241-175	LOGIQ e User Guide, Latvian	1
629	5437241-176	LOGIQ e User Guide, Serbian	1
630	5437241-177	LOGIQ e User Guide, European Portuguese	1
631	5437241-170	LOGIQ e User Guide, Ukrainian	1
632	5437241-181	LOGIQ e User Guide, Indonesian	1

Chapter 10

Care and Maintenance

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

Overview

Contents in this chapter

Protecting Health Information

Hide Patient Data

You can preset to display or remove patient information from the scanning screen title bar when scanning or storing images.

Select Utility -> System -> General, preset in the field of Hide Patient Data in the portion of Title Bar. Select **Save**.

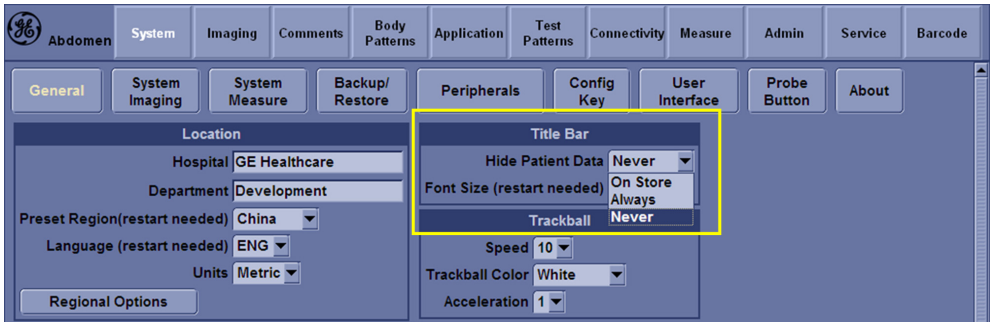


Figure 10-1. Hide Patient Information

- **Never**. When set to this, the patient information is not removed from title bar when scanning and when storing images.
- **On Store**. When set to this, the patient information is removed from title bar only when storing the images.
- Always. When set to this, the patient information is always removed from the scanning screen title bar when scanning and when storing images.

*NOTE: Upon recall of images with measurements, Dual image, the DICOM image is recalled. In this case, there is no patient data burned into the DICOM image. If you DO NOT want this to occur, set this to **Never**.*

Protecting Health Information

Prevent from copying data including Patient Information to external storage device.

Select Utility -> Admin -> System Admin and check the box in the portion of **Protecting Health Information (PHI)**. Select **Save** and reboot the system.

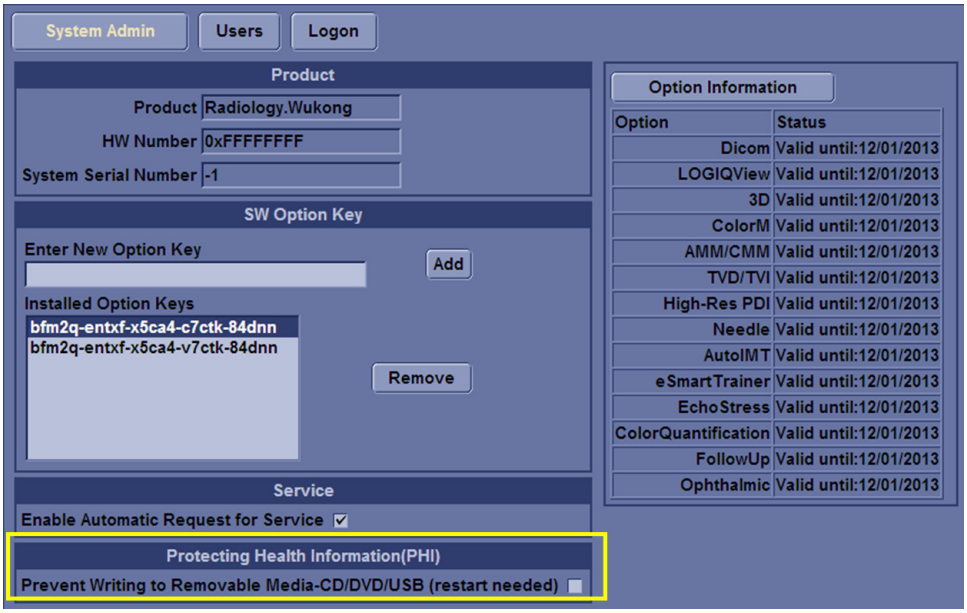


Figure 10-2. Protecting Health Information

Prevent writing patient information to external storage:

Media: USB Memory / SD Card / USB HDD / CD-R / DVD-R

Function: Export / MPEGVue / EZBackup / EZMove / Save As / Save As Images / Report Save As / Backup Patient Archive and Report Archive from Utility.

Users

The Users screen allows you to define user IDs. It also allows you to specify operators registration, operator's rights setting, and registration of staff related to an examination (for example, referring and interpreting physicians).

Select Utility -> Admin -> Users.

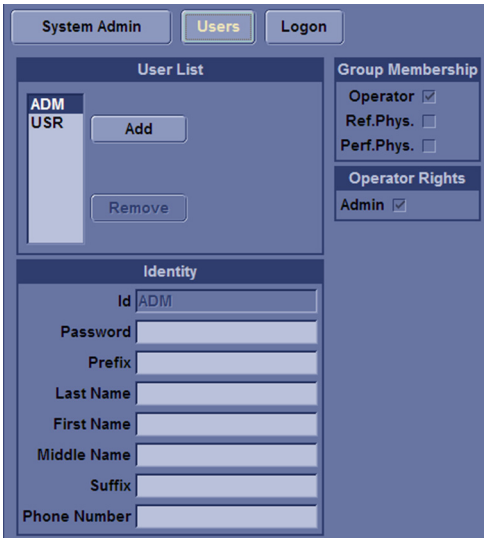


Figure 10-3. Users Preset Menu

Table 10-1: User List

Preset Parameter	Description
User List	Lists the user ID for all system users.
Identity	Type the operator's user ID, Password, Prefix, Last Name, First Name, Middle Name, Suffix, Phone Number.
Group Membership	Select the user's group: Operator (sonographers, doctors, or any person using the ultrasound system); Ref.Phys. (referring physician can be associated to the patient examination in the extended Patient information window); Perf.Phys. – physician performing the exam can be associated to the patient examination in the extended Patient information window.
Operator Rights	Admin – If selected, the operator has extended rights with access to the administrative setup functionality. The operator can also perform advanced operations

Creating a user

1. Press ***Add*** and select **New**.
2. Type the user ID. ENSURE that you DO NOT include the following characters in a user's ID: slash (/), dash (-), asterisk (*), question mark (?), an underscore (_), ampersand (&), or blank spaces. Also, DO NOT set up a user with the same initials/signifier.
3. Type the user's information in the Identity section.
4. Select the user's group(s).
5. If the user needs full configuration and advanced operations access, select ***Admin***.
6. Press ***Save***.

NOTE: DO NOT add users with the same initials/signifier. The system allows you to do this; however, the first user is erased and only the second remains.

NOTE: When adding a new user, press Add first. Then edit the ID from the default of "NewUser" and edit the other fields. DO NOT press Add again unless you actually want to create another user. Press Save after adding one or more users. The user listed as NewUser on the list will be updated with the edited ID when you re-enter this screen.

Changing a user configuration

1. Move the **Trackball** to a user ID in the User List.
2. Make the desired changes.

Deleting a user

1. Move the **Trackball** to a user ID in the User List.
2. Select ***Remove***.

   The user is removed from the User List

Logon

The Logon section defines log on procedures.

Select Utility -> Admin -> Logon.

Figure 10-4. Administrative Logon Preset Menu

Table 10-2: Logon

Preset Parameter	Description
Auto Logon	Specifies logon procedures: • When blank, the user must select a user ID and enter a password when logging on. • When selected, the system is started automatically, using the last user logon.
Common Network Login	Specifies the user ID and password used to access the network. User – User ID for network access; Password – Password for network access

Warnings

DANGER

BE SURE TO DISCONNECT THE ULTRASOUND SYSTEM POWER PLUG AND OPEN THE MAIN CIRCUIT BREAKER BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.

CAUTION

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

CAUTION

Do not pull out or insert circuit boards while power is on.

CAUTION

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

Why do maintenance

Periodic maintenance inspections

It has been determined by engineering that your LOGIQ e does not have any high wear components that fail with use, therefore no Periodic Maintenance inspections are mandatory.

However, some customers' Quality Assurance Programs may require additional tasks and or inspections at a different frequency than listed in this manual.

Keeping records

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

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

Quality assurance

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

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

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

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

Maintenance task schedule

How often should maintenance tasks be performed?

The Care and Maintenance task schedule (provided in Table 10-3 *on page 10-11*) specifies how often your LOGIQ e should be serviced and outlines items requiring special attention.

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

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

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

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

Table 10-3: Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Clean Probes	•*				* or before each use
Inspect AC Mains Cable			•		Mobile Ultrasound system: Check Weekly
Inspect Cables and Connectors			•		
Clean Console			•		
Clean LCD			•		

Table 10-3: Customer Care Schedule (Continued)

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Console Leakage Current Checks				See Notes	Twice Annually
Peripheral Leakage Current Checks				See Notes	Twice Annually
Surface Probe Leakage Current Checks				See Notes	Twice Annually
Endocavity Probe Leakage Current Checks				See Notes	Quarterly Annually
Surgical Probe Leakage Current Checks				See Notes	Quarterly Annually
Measurement Accuracy Checks				See Notes	Twice Annually
Functional Checks				See Notes	also after corrective maintenance

NOTE: The maintenance may require specialized equipment to complete.

NOTE: The periodic maintenances are not mandatory. The table above is for reference only.

Tools required

NOTE: For a list of required tools for servicing the LOGIQ e, refer to chapter 8.

Standard GE tool kit

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

Table 10-4: Overview of GE-1 tool kit contents

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

Table 10-4: Overview of GE-1 tool kit contents (Continued)

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

Table 10-4: Overview of GE-1 tool kit contents (Continued)

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

GE-2 tool kit

Table 10-5: Overview of GE-2 tool kit contents

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

Special tools, supplies and equipment used for maintenance

Table 10-6: Overview of tool requirements for periodic maintenance

Tool / kit	Part Number	Comments
Digital Volt Meter (DVM)		
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes anti–static mat, wrist strap and cables for 200 to 240V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
Safety Analyzer		The safety Analyzer tool should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.
QIQ Phantom	E8370RB	RMI Grayscale Target Model 403GS ***NOTE! The use of a Phantom is not required during Preventive Maintenance. Customer may use it as part of their Quality Assurance Program tests***.
B/W Printer Cleaning Sheet		See printer user manual for requirements
Color Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		

System maintenance

Contents in This Section

Preliminary checks

The preliminary checks take about 15 minutes to perform. Refer to the Ultrasound system user documentation whenever necessary.

Table 10-7: System preliminary checks

Step	Item	Description
1.	Ask and Listen	Ask the customer if they have any problems or questions about the equipment.
2.	Paperwork	Fill in the top of Ultrasound Inspection Certificate (see Figure 10-10 *on page 10-40*). Record all probes and Ultrasound system options.
3.	Power up	• Turn the Ultrasound system power on and verify that all fans and peripherals turn on. • Watch the displays during power up to verify that no warning or error messages are displayed. • Where applicable, confirm that the battery is charged. If no AC Input present, use the internal battery.
4.	Probes	Verify that the Ultrasound system properly recognizes all probes.

Table 10-7: System preliminary checks

Step	Item	Description
5.	Displays	Verify proper display on the monitor.
6.	InSite	Where applicable, for Warranty and Contract Customers only: • Verify that InSite is functioning properly. • Ensure two-way remote communications.
7.	Review Error Logs	Where applicable, Error Logs can be reviewed via system diagnostics.
8.	Diagnostics	Optional.
9.	Presets	Backup all Customer Presets to an appropriate media.
10.	Image Archive	Back up the Image Archive onto appropriate media.

Functional checks

NOTE: See also Chapter 4

The functional checks take about 60 minutes to perform. Refer to the Ultrasound system user documentation whenever necessary.

System checks

Table 10-8: System functional checks

Step	Item	Description
1.	B-Mode	Verify basic B-Mode (2D) operation. Check the basic Ultrasound system controls that affect this mode of operation.
2.	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic Ultrasound system controls that affect this mode of operation.
3.	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic Ultrasound system controls that affect this mode of operation.
4.	M-Mode	Verify basic M-Mode operation. Check the basic Ultrasound system controls that affect this mode of operation.
5.	Probe Elements	Perform an Element Test on each probe to verify that all the probe elements and system channels are functional.
6.	Applicable Software Options	Verify the basic operation of all optional modes such as Contrast. Check the basic Ultrasound system controls that affect each options operation.
7.	Xmit/Recv Elements	Use the Visual Channel Utility on the loop connect to verify that all system xmit/recv channels are functional.
8.	Operator Panel test	Perform the Operator Panel Test Procedure.
9.	Keyboard	Do the interactive keyboard test.
10.	LCD	Verify basic LCD display functions. Refer to Chapter 3 of the User Manual.
11.	Software Menu check	Verify Software Menu display functions. Refer to Chapter 3 of the User Manual.
12.	Peripherals	See: 'Peripheral Checks' on *page 4-52*.
13.	Measurements	In measurement mode, make distance measurement, get result in result window. Verify the distance by graduate rule. Distance Accuracy should be within ±5%. (Name result from result window Result A, result from graduate rule Result B; Distance Accuracy = (Result B-Result A)/Result A)

Peripheral/option checks

If any peripherals or options are not part of the system configuration, the check can be omitted.

Refer to the User Manual for a list of approved peripherals/ options.

Table 10-9: GE approved peripheral/hardware option functional checks

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

Mains cable inspection

Table 10-10: Mains Cable Inspection, As Appropriate

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

Cleaning

Table 10-11: General Cleaning

Step	Item	Description
1.	Console	Remove the battery. Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire system. Be careful not to get the cloth too wet so that moisture does not enter the console.
2.	Probe Holder	Clean probe holders. (they may need to be soaked to remove excess gel).
3.	LCD	Use a soft, non-abrasive folder cloth. Gently wipe the LCD face. DO NOT use a glass cleaner that has a hydrocarbon base (such as Benzene, Methy Alcohol or Methy Ethyl Ketone) on LCD with the filter (anti-glare shield).

Physical inspection

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

Table 10-12: Physical checks

Step	Item	Description
1.	Labeling	Verify that all Ultrasound system labeling is present and in readable condition.
2.	Scratches & Dents	Inspect the exterior for dents, scratches or cracks.
3.	Input Power	Refer to: 'Mains cable inspection' on *page 10-20*.
4.	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs.
5.	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
6.	Control Panel	Inspect keyboard and control panel. Note any damaged or missing items.
7.	Control Panel Lighting	Check for proper operation of all operator panel and Freeze Key light.
8.	LCD	Inspect the LCD Display for scratches and bad pixels. Verify proper operation of Contrast and Brightness controls. Where applicable, confirm that the LCD arm allows: • swivelling the screen to the left and to the right • folding the screen to the locked position • release and adjustment backwards and forwards • can be adjusted in the up/down positions. Note: LCD Arm movement may vary and is not applicable to all Ultrasound systems.
9.	External I/O	Check all connectors for damage.

Table 10-12: Physical checks (Continued)

Step	Item	Description
10.	Power and System Status Indicators	Check for proper operation of all Power and System Status Indicators.
11.	Battery	Where applicable, check that the battery is not damaged, does not leak, does not emit an odor, and is not deformed or discolored. Observe all warnings and cautions for battery handling, recharging, storing, and/or disposal,

Optional Diagnostic Checks

Optionally you can access the diagnostic software as described in Chapter 5 or 7. View the error logs and run desired diagnostics.

View the Log

1. Review the system error log for any problems.
2. Check the temperature log to see if there are any trends that could cause problems in the future.
3. Check the Configuration Log; update if needed.

Probe maintenance

Probe related checks

Table 10-13: System preliminary checks

Step	Item	Description
1.	Probe Holder	Clean probe holders. (they may need to be soaked to remove excess gel).
2.	Probes	Thoroughly check the Ultrasound system probe connectors and remove dust from inside the connector sockets if necessary. Visually check for bent, damaged or missing pins.
3.	Probes	Verify that the Ultrasound system properly recognizes all probes.

Basic probe care

The Ultrasound system user manuals and various probe handling cards provide a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

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

Any evidence of wear indicates the probe cannot be used.

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

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

Basic probe cleaning

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

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

Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty.

DO NOT soak or wipe the lens with any product not listed in the User Manual. Doing so could result in irreparable damage to the probe.

Follow care instructions that came with the probe.

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

Battery Performance Maintenance

Battery replacement every three years is recommended.

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

Please follow the flow chart below to carry out battery performance maintenance.

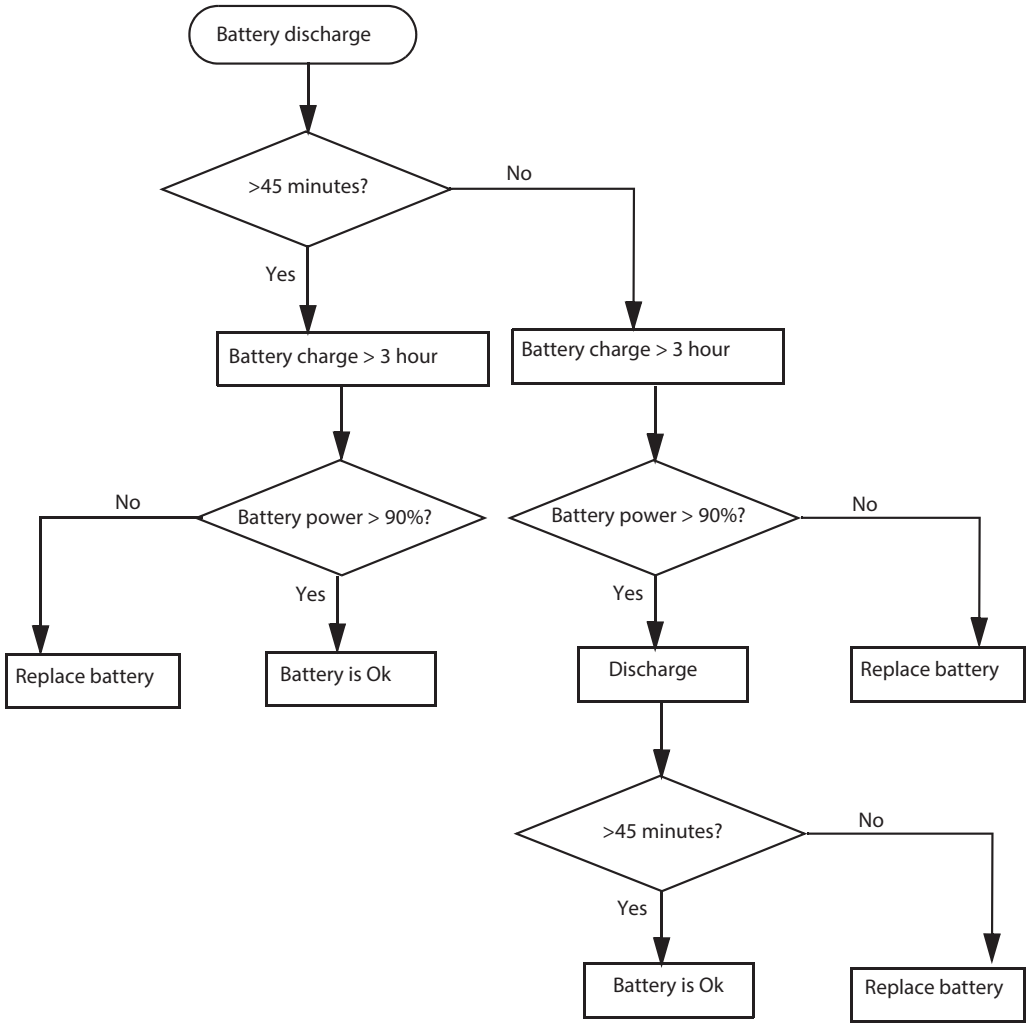


Figure 10-5. Flow chart of Battery Performance Maintenance

NOTE: Disconnect all probes when discharge battery.

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

Electrical safety tests

Contents in This Section

Safety test overview

The electrical safety tests in this section are based on and conform to IEC 60601-1 Medical Equipment Safety Standards. They are intended for the electrical safety evaluation of cord-connected, electrically operated, patient care equipment. If additional information is needed, refer to the IEC 60601-1 documents

WARNING

THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 6 MONTHS ACCORDING TO THE REQUIREMENTS OF THE PATIENT SAFETY STANDARD IEC-EN 60601-1. ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE SAFETY INSPECTIONS MENTIONED ABOVE.

DANGER

TO MINIMIZE RISK OF ELECTRICAL SHOCK, ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE ELECTRICAL SAFETY INSPECTIONS AND TESTS.

DANGER

TO AVOID ELECTRICAL SHOCK, THE ULTRASOUND SYSTEM UNDER TEST **MUST NOT** BE CONNECTED TO OTHER ELECTRICAL EQUIPMENT. REMOVE ALL INTERCONNECTING CABLES AND WIRES. THE ULTRASOUND SYSTEM UNDER TEST MUST NOT BE CONTACTED BY USERS OR PATIENTS WHILE PERFORMING THESE TESTS.

CAUTION

Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.

Safety test overview (continued)

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

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

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

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

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

Leakage current limits

WARNING

Energy Control and Power Lockout for LOGIQ e.

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

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

Ultrasound System components may be energized.

CAUTION

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

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

Table 10-14: Chassis Leakage Current Limits - Accessible Metal Surface

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
All (Except USA & Canada)	0.1 mA	0.5 mA	0.5 mA	0.5 mA
USA & Canada	0.1 mA	0.3 mA	0.3 mA	0.3 mA

Table 10-15: Type BF Applied Part Leakage Current Limits - Probes Surface

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
All	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

Leakage current limits (continued)

Table 10-16: Type CF Applied Part Leakage Current Limits - ECG Connections

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
All	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

NOTE: **Mains Applied refers to the sink leakage test where mains (supply) voltage is applied to the part to determine the amount of current that will pass (or sink) to ground if a patient contacted mains voltage.*

The following tests are performed at the factory and should be performed at the site. These tests are: chassis leakage current, and probe leakage current. All measurements are made with an electrical safety analyzer which should be calibrated and compliant with AAMI/ESI 1993 or IEC 60601 or AS/NZS 3551.

Table 10-17: Equipment Type and Test Definitions

Applied Parts (AP)	Parts or accessories that contact the patient to perform their function. For ultrasound equipment, this includes transducers and ECG leads.	
Type BF	Body Floating or non-conductive ultrasound probes which are marked with the 'man in box' BF symbol. this includes all transducers.	
Type CF	Cardiac Floating or non-conductive intraoperative probes for direct cardiac contact and isolated ECG connections so marked with the 'heart in box' CF symbol.	
Sink Leakage	The current resulting from the application of mains voltage to the applied part. This test is required test for Type CF applied parts.	

Outlet test - wiring arrangement

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

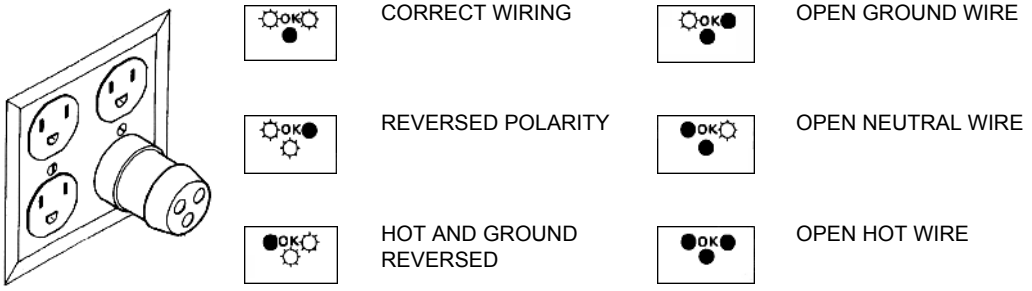


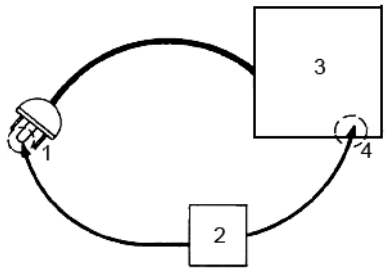
Figure 10-6. Typical alternate outlet tester

NOTE: No outlet tester can detect the condition where the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

Grounding continuity

DANGER ELECTRIC SHOCK HAZARD. THE PATIENT MUST NOT BE CONTACTED TO THE EQUIPMENT DURING THIS TEST.

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2** ohms. Reference the procedure in the IEC60601-1.



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

Figure 10-7. Ground continuity test

Chassis leakage current test

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

CAUTION

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

Generic procedure

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

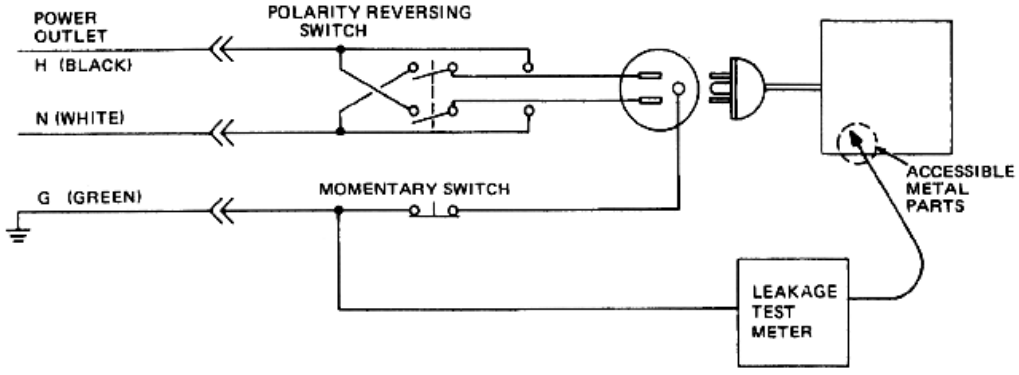


Figure 10-8. Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuos Leakage Currents and Patient, Auxiliary Currents

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 10-14 *on page 10-29*.

Data Sheet for enclosure Source Leakage Current

The test passes when all readings measure less than the value shown in Table 10-14 *on page 10-29*. Record all data on the PM Inspection Certificate.

Table 10-18: Typical Data Sheet for enclosure Source Leakage Current

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Speaker Cover	Test 2 Real Panel Metal Parts	Optional Test 3	Optional Test 4
Enter Name of tested peripheral here:						
ON	NORM	OPEN				
ON	NORM	CLOSED				
ON	REV	OPEN				
ON	REV	CLOSED				
OFF	NORM	OPEN				
OFF	NORM	CLOSED				
OFF	REV	OPEN				
OFF	REV	CLOSED				

Probe leakage current test

d DANGER

DO NOT USE THE PROBE IF THE INSULATING MATERIAL HAS BEEN PUNCTURED OR OTHERWISE COMPROMISED.

INTEGRITY OF THE INSULATION MATERIAL AND PATIENT SAFETY CAN BE VERIFIED BY SAFETY TESTING ACCORDING TO IEC60601-1.

c CAUTION

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

Definition

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

NOTE: Some leakage current is expected on each probe, depending on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. It is abnormal if no leakage current is measured. If no leakage current is detected, check the configuration of the test equipment.

Tools

For needed tools, see: 'Tools required' on *page 10-13*.

Generic procedure on probe leakage current

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

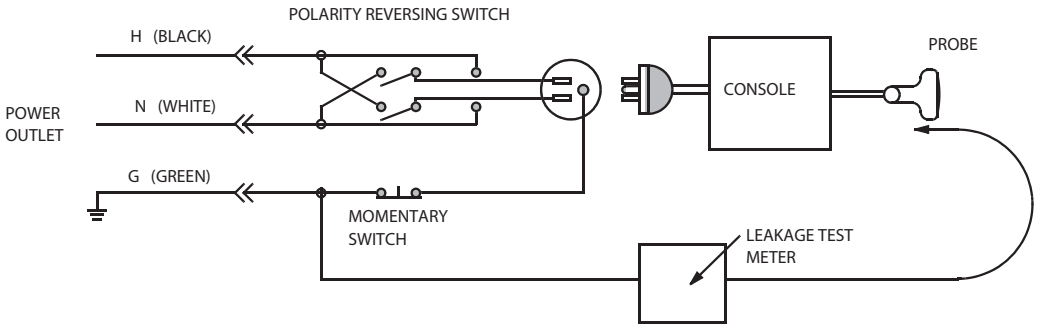


Figure 10-9. Set up for probe leakage current

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

DANGER TO AVOID PROBE DAMAGE AND POSSIBLE ELECTRIC SHOCK, DO NOT IMMERSE PROBES INTO ANY LIQUID BEYOND THE LEVEL INDICATED IN THE PROBE USERS MANUAL. **DO NOT TOUCH THE PROBE, CONDUCTIVE LIQUID OR ANY PART OF THE UNIT UNDER TEST WHILE DOING THE TEST**.

Meter Procedure Using Probe Adapter

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

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

No Meter Procedure Using Probe Adapter

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

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

Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values shown in Table 10-15 *on page 10-29*. Record all data on the PM Inspection Certificate.

Table 10-19: Typical Data Sheet For Transducer Source Leakage Current

Transducer Tested:			
Unit Power	**Tester Power Polarity Switch**	**Tester GROUND or NUETRAL Switch**	**Measurement**
ON	NORM	OPEN	
ON	NORM	CLOSED	
ON	REV	OPEN	
ON	REV	CLOSED	
OFF	NORM	OPEN	
OFF	NORM	CLOSED	
OFF	REV	OPEN	
OFF	REV	CLOSED	

When there's too much leakage current …

AC/DC Fails

Where applicable, check the AC/DC adapter and its cable. Replace a new one if any portion is defective.

Chassis Fails

Check the ground on the power cord and plug for continuity. Ensure the ground is not broken, frayed, or intermittent. Replace any defective part.

Where applicable, tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

Probe Fails

Test the probe in another connector to isolate if the fault lies with the probe or the Ultrasound system. Or Change another probe to confirm if the fail is caused by console.

NOTE: Each probe will have some amount of leakage, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable leakage current for body surface contact probe differs from inter-cavity probe. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive leakage current is slot dependent, inspect the system connector for bent pins, poor connections, and ground continuity.

If the problem remains with the probe, replace the probe.

Peripheral Fails

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Still Fails

If all else fails, begin isolation by removing the probes, external peripherals, then the on board ones, one at a time while monitoring the leakage current measurement.

New Unit

If the leakage current measurement tests fail on a new Ultrasound system and if situation can not be corrected, submit a Safety Failure Report to document the Ultrasound system problem. Remove Ultrasound system from operation.

ECG Fails

Inspect cables for damage or poor connections.

Inspection Paperwork

Ultrasound Inspection Forms

ULTRASOUND INSPECTION CERTIFICATE

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

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

Figure 10-10. Ultrasound Inspection Certificate

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

Ultrasound Inspection Forms (continued)

FUNCTIONAL CHECKS

Functional Check (if applicable)	OK? or N/A
B-Mode Function	
Doppler Modes Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Opti ons	
Applicable Hardware Options	
Control Panel	
LCD	
Measurement Accuracy	
GE Approved Peripherals	

PHYSICAL INSPECTION AND CLEANING

Physical Inspection and Cleaning (if applicable)	Inspect	Clean
Console		
LCD		
External I/O		
Cables and Connectors		
GE Approved Peripherals (DVD-RW, Printer)		
Labeling (see User Manual for Labeling)		

COMMENTS:

_____ _____ _____
_____ _____ _____
_____ _____ _____
_____ _____ _____

Figure 10-11. Functional Checks

ELECTRICAL SAFETY

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

PROBES

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

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

Accepted by: _____

Figure 10-12. Electrical Safety

Electrical Safety Tests Log

Table 10-20: Electrical safety tests log

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

Table 10-20: Electrical safety tests log (Continued)

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

Table 10-21: Electrical safety tests (probes) log

Probe	Max value allowed	Max value measured	OK?	Comments

Chapter 11

Docking Cart Setup

This chapter describe the docking cart and give information on how to set up and use it, the concepts, functional test, troubleshooting of the docking cart.

Overview

Contents in this chapter

Introduction

This chapter contains this information:

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

Safety Consideration

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

CAUTION

The Docking Cart weighs 59 kg (130.1 lb.) or more, depending on installed peripherals, when ready for use. Care must be used when moving it or replacing its parts.

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

ALWAYS:

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

WARNING

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

CAUTION

Do not move Docking Cart with big incline angle.

CAUTION

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

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

CAUTION

Put peripherals in correct position to avoid Docking Cart overload.

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

Set Up Docking Cart

Contents in This Section

Setup Reminders

Average Setup Time

Table 11-1: Average Installation Time

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

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

Setup Warnings

- Since the Docking Cart weighs approximately 53 kg.(116 lb) without options, preferably two people should unpack it. Two people are also preferable for setting up any additional bulky items.
- There are no operator serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing and troubleshooting.

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

Setup Warnings (continued)

- 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.

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

Table 11-2: Acclimation Time

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

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

Safety Reminders

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

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

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

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

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

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

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

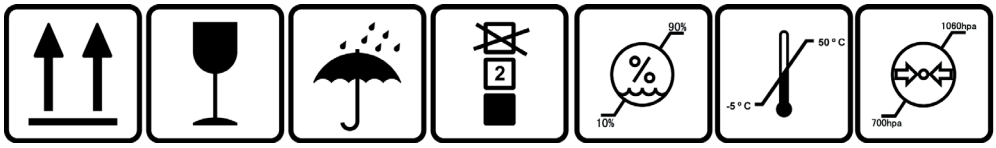


Figure 11-1. Environmental Labels

Receiving and Unpacking the Equipment

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

CAUTION

The crate with the Docking Cart weighs approximately 59 kg. Be prepared for a sudden shift of weight as the unit is removed from its base (pallet).

Unpacking Docking Cart

Table 11-3: Procedure to take out Docking Cart

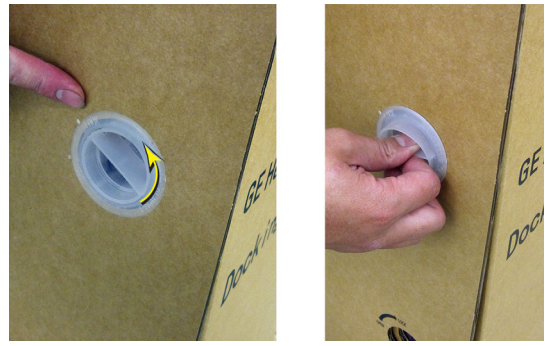
No.	Steps	Corresponding Graphic
1.	Cut off the two packing strap (1-2) and remove them. Then remove the two reinforce cardboards and remove the top cover.	
2.	Rotate the knob counterclockwise until it is loose and remove it.	

Table 11-3: Procedure to take out Docking Cart

No.	Steps	Corresponding Graphic
3.	Remove the ring from the carton.	 
4.	Open the carton and remove it. Remove the PE bag from the top.	 
5.	Remove the top foam. Remove the plastic film and the bottom foam from the Docking Cart.	 
6.	Cut off the reinforce strap and remove the pads on the four castors. Two people lift up the docking cart and move it off the platform.	 

Unpacking Docking Cart (continued)

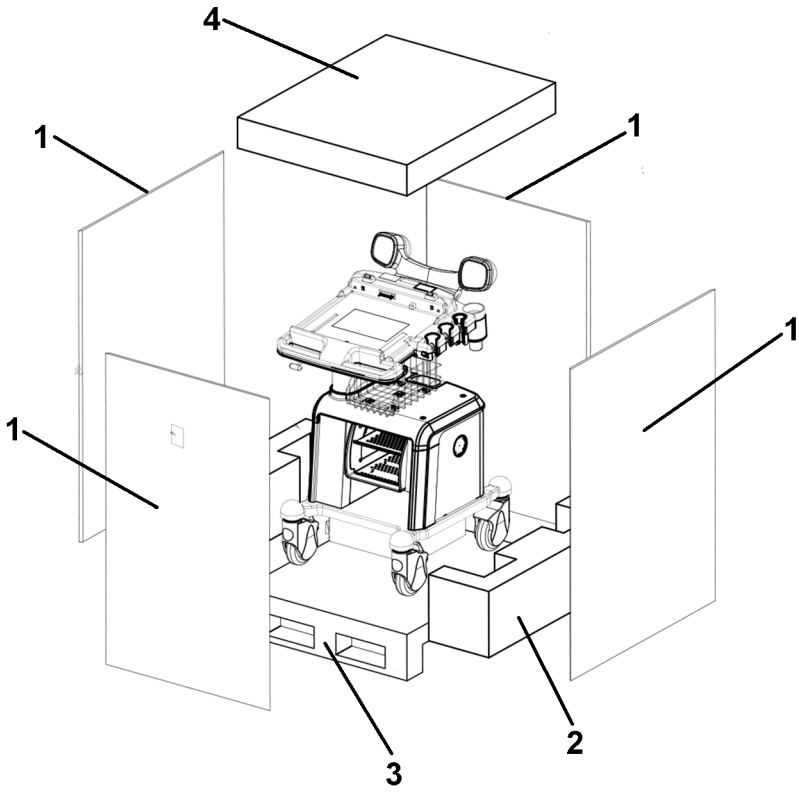


Figure 11-2. Remove Foam

1. Lateral
2. Bottom Foam
3. Platform
4. Top cover

Moving into Position

CAUTION

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

In general, a single adult can move the LOGIQ e 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.

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

Product Locator Installation Card

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

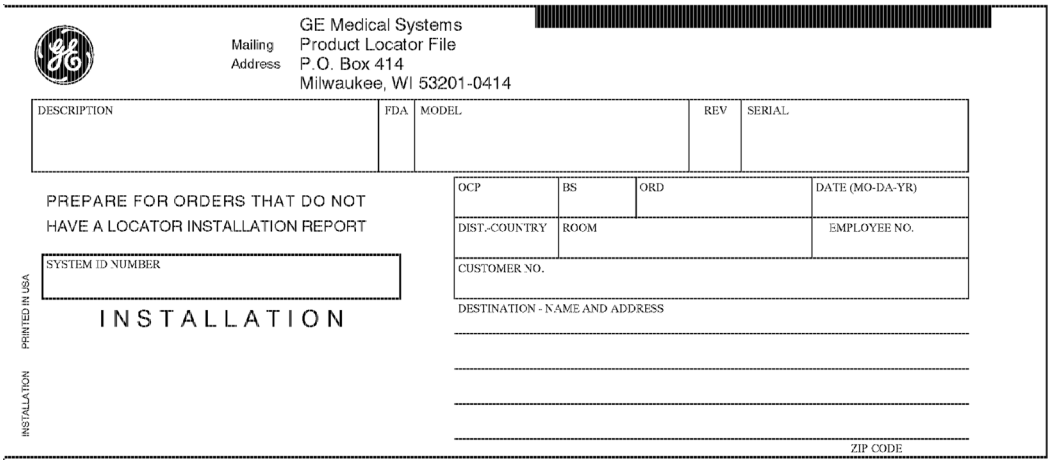

GE Medical Systems
Mailing Address
Product Locator File
P.O. Box 414
Milwaukee, WI 53201-0414
DESCRIPTION
FDA
MODEL
REV
SERIAL
PREPARE FOR ORDERS THAT DO NOT HAVE A LOCATOR INSTALLATION REPORT
OCP
BS
ORD
DATE (MO-DA-YR)
DIST.-COUNTRY
ROOM
EMPLOYEE NO.
CUSTOMER NO.
SYSTEM ID NUMBER
INSTALLATION
DESTINATION - NAME AND ADDRESS
ZIP CODE
PRINTED IN USA
INSTALLATION

Figure 11-3. Product Locator Installation Card

Preparing for Installation

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.

Electrical Specifications

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

Connecting a Docking Cart to the wrong voltage level will most likely destroy it.

Table 11-4: Electrical requirements for Docking Cart

PARAMETER	AREA	LIMITS
Voltage Range	100-240V~	350VA
Power	All applications	More than or equal to 750 VA
Line Frequency	All applications	50/60Hz (±2Hz)
Power Transients	All applications	Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.
Decaying Oscillation	All applications	Less than 15% of peak voltage for less than 1 millisecond.

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.

Physical Dimension and Weight

The physical dimension of the Docking Cart is summarized in Table 11-5 *on page 11-13* including the size of Docking Cart, 3 probe ports and speakers.

Table 11-5: Physical Dimensions of Docking Cart

	Height	Width	Depth	Unit
Tall	950	470	617	mm
Tall	31.2	15.4	240.2	inch
Short	810	470	617	mm
Short	37	15.4	240.2	inch

The weight of Docking Cart is 59 kg (130.1 lbs) with 3 probe ports.

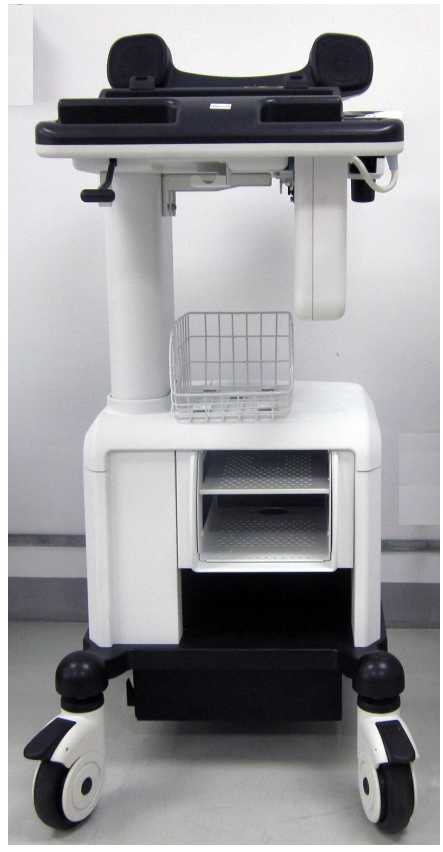


Figure 11-4. Overall Dimensions

Peripheral Installation

On-Board Optional Peripherals

Table 11-6: Peripherals Validate for Docking Cart

Device	Manufacturer	Model	Interface	Video Signal
B/W Printer	SONY	UP-D897	USB Interface	N/A (* USB Interface)
	SONY	UP-D898MD	USB Interface	N/A (* USB Interface)
Color Printer	SONY	UP-D25MD	USB Interface	N/A (* USB Interface)
DVD-RW	LITEON	LITEON eUAU108	USB Interface	N/A (* USB Interface)
	LITEON	LITEON eBAU108	USB Interface	N/A (* USB Interface)
ECG	NORAV GE	ECGUSB1D-EX	USB Interface	N/A (* USB Interface)

See each option setup instructions for installation and connection procedures.

Connect USB Printer to Docking Cart

Tools

- Common Allen Screwdriver
- common Phillips screwdriver

Needed Manpower

- 1 person, 8 minutes+travel

Preparations

- Shut down the system and switch off the main breaker

Connect USB Printer to Docking Cart (continued)

Mounting Procedure

Table 11-7: Mounting Procedure of B/W USB Printer

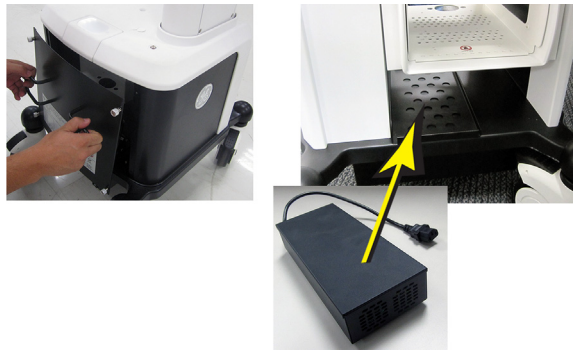
No.	Step	Corresponding Graphic
1.	Remove the rear panel from Docking Cart. Place the DC/AC adapter in the cabinet of Docking Cart. Let the cable of DC/AC adapter come out from the back of Docking Cart. Note: *The printer DC/AC adapter is optional. It is ordered separately.*	
2.	Connect the power cable from the Docking Cart to the DC/AC adapter. *Note: When connecting the power cable to DC/AC adapter, align the embossing on the power cable connector with the groove on the DC/AC adapter connector port edge. Then push the cable connector into the port.*	

Table 11-7: Mounting Procedure of B/W USB Printer

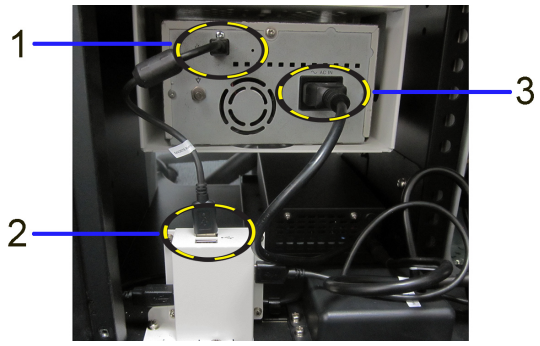
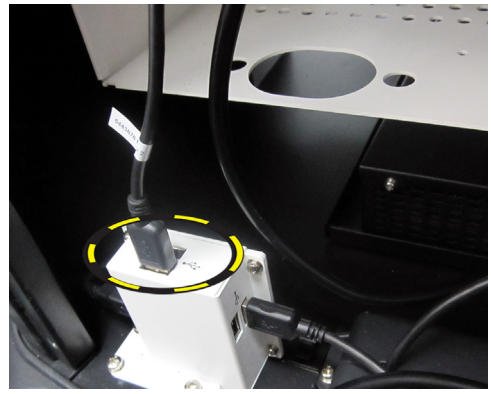
No.	Step	Corresponding Graphic
3.	Connect the DC/AC cable to the printer (3). Connect USB cable to the printer (1) and to the USB HUB (2). Then install the rear panel of Docking Cart.	

Table 11-8: Mounting Procedure of B/W USB Printer on Top Support DVD/Print Shelf

No.	Step	Corresponding Graphic
1.	Be sure Top DVD/Print Shelf has been installed. See 'Top Support DVD/Print Shelf Assy' on *page 11-35 for more information.*	
2.	Place the DC/AC adapter in the cabinet of Docking Cart. Let the cable of DC/AC adapter come out from the back of Docking Cart. Refer to Table 11-7 *on page 11-15* for this information.	
	Connect the power cable from the Docking Cart to the DC/AC adapter. Refer to Table 11-7 *on page 11-15* for the information	
3.	Connect USB Cable and Power Cable of DC/AC adapter to the printer and let the cables go down through Monitor Support Space.	

Table 11-8: Mounting Procedure of B/W USB Printer on Top Support DVD/Print Shelf

No.	Step	Corresponding Graphic
4.	Connect the USB Cable to the USB HUB.	
5.	Connect the power cable from the Docking Cart to the DC/AC adapter. See Table 11-7 *on page 11-15* for more information.	

Removal Procedure

Remove the new parts in the reverse order of installation.

NOTE: When disconnecting the power cable from the DC/AC adapter, grab the handle of the cable with fingers and pull the cable.

Figure 11-5. Disconnect Power Cable

Connect DVD-RW to Docking Cart

Tools

- NA

Needed Manpower

- 1 person, 3 minutes+travel

Preparations

- Shut down the system and switch off the main breaker.

Connect DVD-RW to Docking Cart (continued)

Mounting Procedure

NOTE: The mounting procedure in this section is only an example for illustrational purpose. For mounting procedure of different models of DVD-RW, please refer to the User Instruction which is supplied with the DVD-RW.

Table 11-9: Mounting Procedure of DVD-RW

No.	Step	Corresponding Graphic
1.	Connect the USB Y Cable to the DVD-RW.	
2.	Unscrew the 4 screws to remove the real panel.	

Table 11-9: Mounting Procedure of DVD-RW

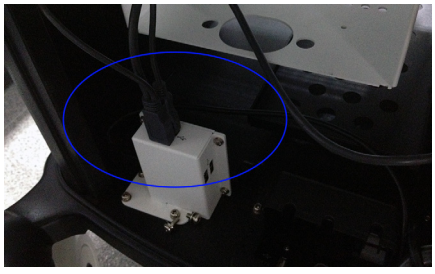
No.	Step	Corresponding Graphic
3.	Place the DVD-RW on the DVD-RW shelf and let the USB Y cable come out from the back of the docking cart.	 View from the front of the docking cart  View from the back of the docking cart
4.	Connect the two USB Connectors on the USB Y cable to the USB ports on the docking cart. *Note: Be sure the two connectors on the USB Y cable are connected to the USB ports on the Docking Cart at the same time.*	
5.	Mount the rear panel to the docking cart and tighten the 4 screws.	

Table 11-10: Mounting Procedure of DVD-RW to Top support DVD/print shelf

No.	Step	Corresponding Graphic
1.	Be sure Top DVD/Print Shelf has been installed. See 'Top Support DVD/Print Shelf Assy' on *page 11-35 for more information.*	
2.	Place the DVD-RW on the TOP DVD Shelf and connect the USB cable to the USB HUB. Refer to Table 11-9 *on page 11-20* for the information.	

Removal Procedure

Remove the new parts in the reverse order of installation.

Connect ECG to Docking Cart

Tools

- No special tools needed

Needed Manpower

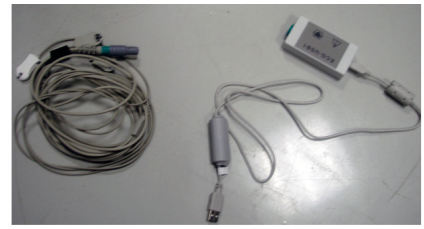
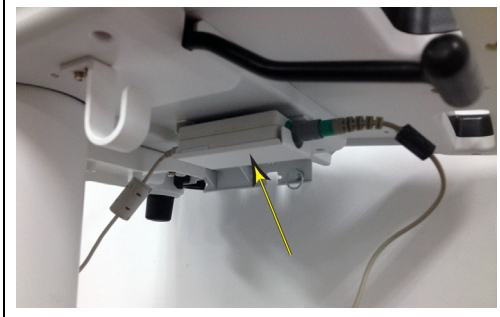
- 1 person, 3 minutes+travel

Preparations

- Shut down the system and switch off the main breaker.

Mounting Procedure

Table 11-11: Mounting Procedure of ECG

No.	Step	Corresponding Graphic
1.	Install ECG..	 
2.	Put ECG in the ECG bracket.	
3.	Connect the ECG to the USB port on the Docking Cart.	

Connect ECG to Docking Cart (continued)

NOTE: If the ECG is not in use, hang the cable in the ECG cable hook.

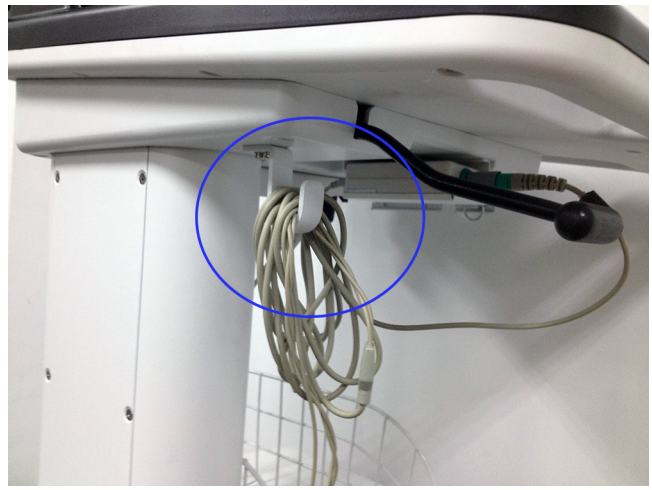


Figure 11-6. Hang the cable

Removal Procedure

Remove the new parts in the reverse order of installation.

Options Installation

Install Extended Life Battery to Docking Cart

NOTE: Before installing the Extended Life Battery, switch off the circuit breaker on the power box to power off the Docking Cart

Mounting Procedure

CAUTION

Use caution to avoid injuring hands when installing the Extended Life Battery.

Table 11-12: Mounting Procedure of Extended Life Battery

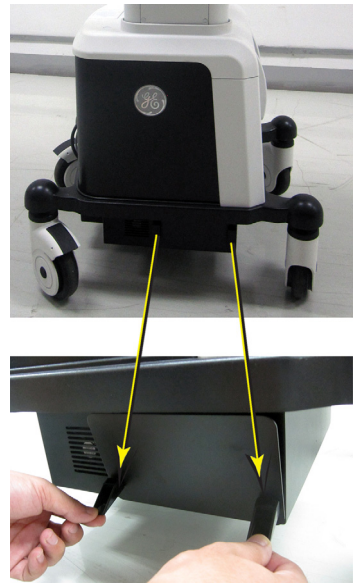
No.	Step	Corresponding Graphic
1.	Flip down the 2 cover latches on the battery cover.	

Table 11-12: Mounting Procedure of Extended Life Battery

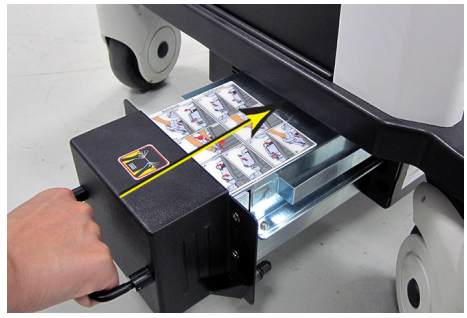
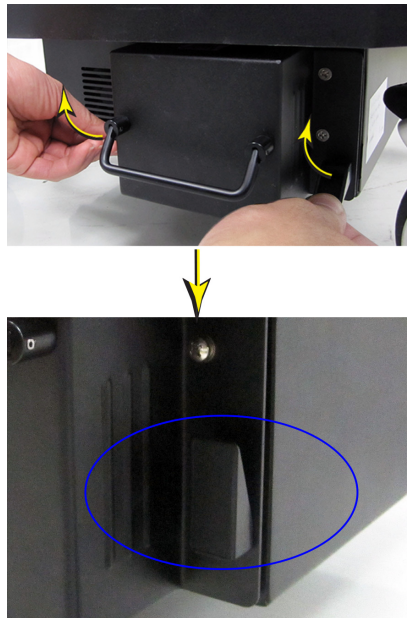
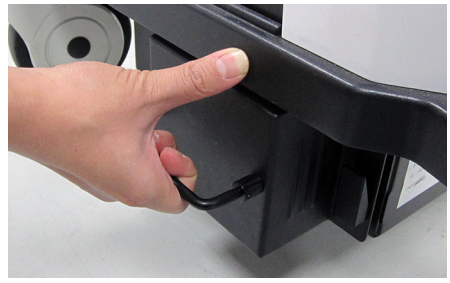
No.	Step	Corresponding Graphic
2.	Remove the battery cover.	
3.	Insert the Battery into the power box.	
4.	Push the battery into the power box.	

Table 11-12: Mounting Procedure of Extended Life Battery

No.	Step	Corresponding Graphic
5.	Flip up the 2 latches on the battery.	
6.	Try pulling the battery to check if the battery is fixed in the power box. • If the battery can not be pulled out, it means the battery is well installed. • If the battery can be pulled out, it means the battery is not well installed. Reinstall the battery until it can not be pulled out from power box.	

Removal Procedure

Remove the new parts in the reverse order of installation. See ‘Extended Life Battery (Part No. 5486499)’ on *page 12-9 for more information.*

Extended Life Battery Diagram

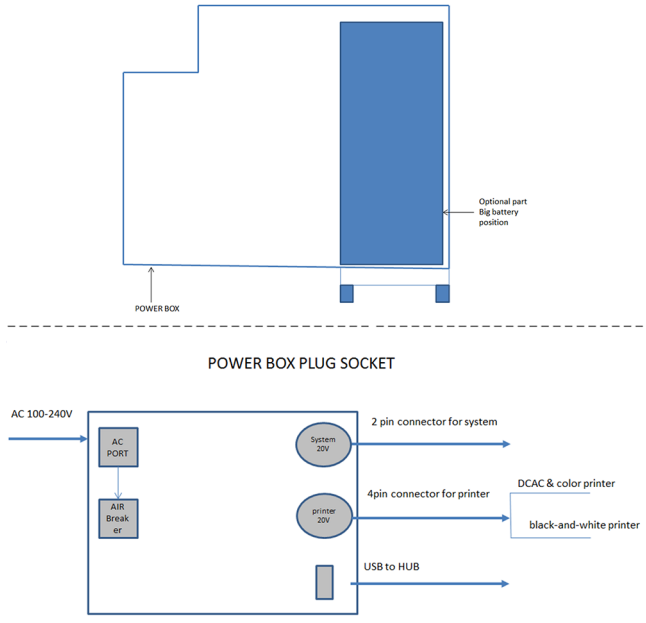


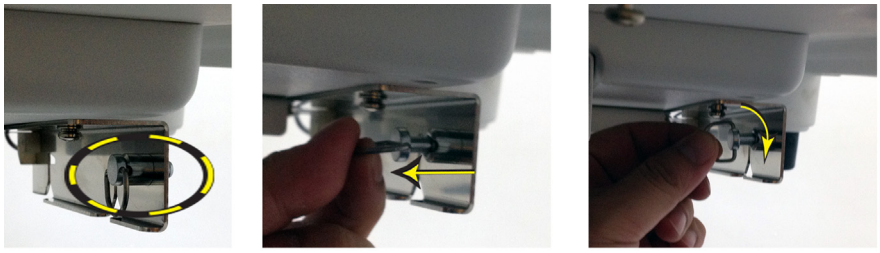
Figure 11-7. Diagram

Extended Life Battery Usage

Review the *Extended Life Battery User Instruction* (5494921) that is packed with the Extended Life Battery. Please be sure to use the latest revision of the document.

Install 3-Probe Port to Docking Cart

1. Pull out the lock on the 3-Probe Port bracket and rotate the lock 90° clockwise. Refer to picture 1.

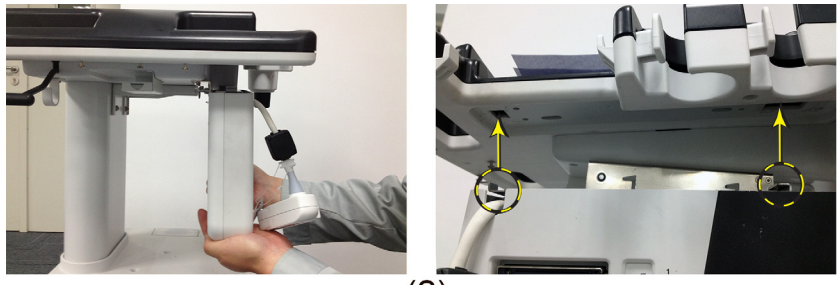


(1)

Figure 11-8.

2. Do not slant the 3-Probe Port and hold it with both hands. Aligning the two hooks on the 3-Probe Port with the two holes at the Docking Cart bottom, mount the 3-Probe Port to the Docking Cart. Refer to picture 2.

NOTE: *Be sure that the 3-Probe Port is not slanted when mounting it to the Docking Cart.*

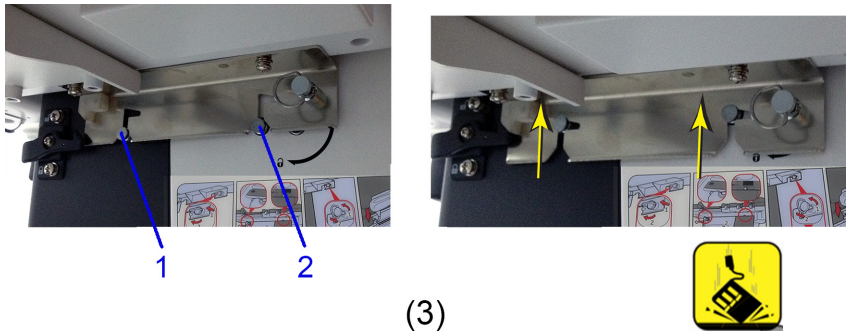


(2)

Figure 11-9.

Install 3-Probe Port to Docking Cart (continued)

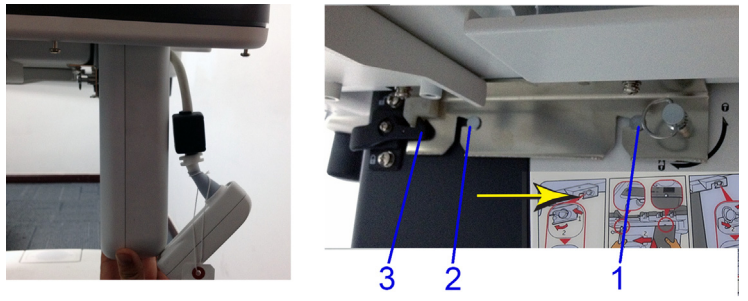
3. While holding the 3-Probe Port with both hands, install it by aligning the two attachment pins (1-2) with the two slots on the bracket, then push up the 3-Probe Port. The two attachment pins on 3-Probe Ports move up along the two slots on the bracket. Refer to picture 3.



(3)

Figure 11-10.

4. Make sure the 3-Probe Port is not slanted, then push it to the right. The two attachment pins (1-2) on the 3-Probe Port are clamped on the bracket. The hook (3) on the 3-Probe Port and the hook on the bracket are interlocked. Refer to picture 4.



(4)

Figure 11-11.

Install 3-Probe Port to Docking Cart (continued)

5. Rotate the lock 90° counterclockwise and release your hand, the lock automatically springs in the lock position. Refer to picture 5.

(5)

Figure 11-12.

6. Mount the probe connector to the Docking Cart. Refer to picture 6.

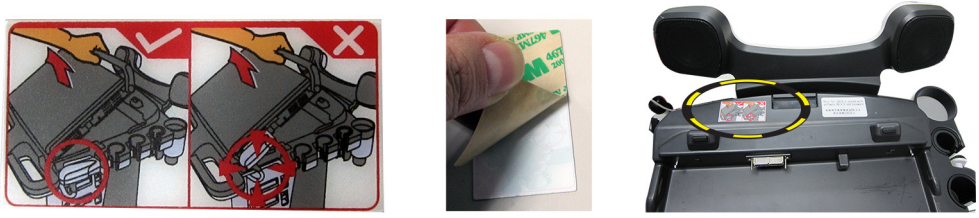
(6)

Figure 11-13.

Install 3-Probe Port to Docking Cart (continued)

7. Stick 3-Probe Port label on Docking Cart.

   Take out the label which is provided with 3-Probe Port in the Kit. Remove the backing tape on the label. Stick it at this location on the top cover of Docking Cart. See picture 7.



(7)

Figure 11-14.

Removal Procedure

Remove the new parts in the reverse order of installation. See '3-Probe Port Assy (Part No. 5423182-2)' on *page 12-5 for more information.*

3-Probe Port Usage

Review the *3-Probe Port User Instruction* (5494922) that is packed with the 3-Probe Port. Please be sure to use the latest revision of the document.

Install Color Printer Shelf to Docking Cart

Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

Preparation

- Shut down the system and switch off the main breaker.

Table 11-13: Mounting Procedure for Color Printer Shelf Assy

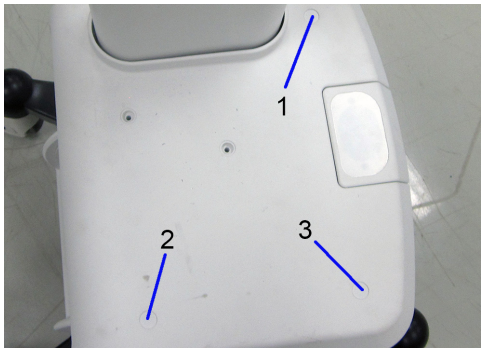
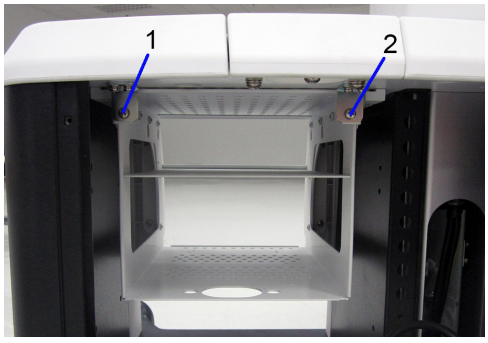
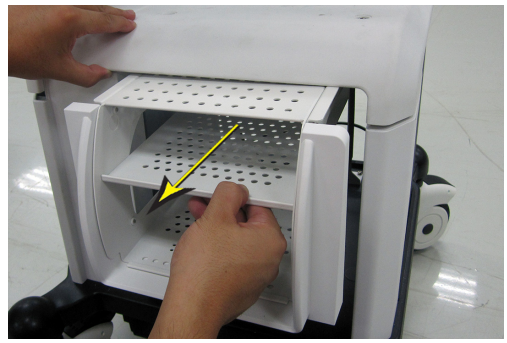
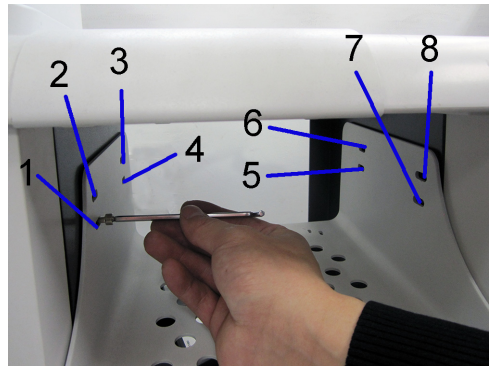
No.	Steps	Corresponding Graphic
1.	Remove the rear panel. See 'Rear Panel Assy (Part No. 5422978)' on *page 12-8 for more information.*	
2.	Remove the storage rack. See 'Storage Rack (Part No. 5219976-2)' on *page 12-7 for more information.*	
3.	Remove the 3 screw pads and unscrew the 3 screws on the cabinet top cover.	
4.	Unscrew the 2 screws at the back of the cabinet.	

Table 11-13: Mounting Procedure for Color Printer Shelf Assy

No.	Steps	Corresponding Graphic
5.	Slightly lift up the cabinet top cover with one hand and pull out the DVD and B/W printer shelf with another hand from the front of the Docking Cart.	
6.	Place the color printer shelf in to the cabinet from the front of Docking Cart.	
7.	Install the 8 screws to fix the shelf on Docking Cart.	
8.	Fix the cabinet top cover and Install the Rear Panel.	

Top Support DVD/Print Shelf Assy

Tools

- Common Hex driver
- common Phillips screwdriver

Needed Manpower

- 1 person, 2 minutes+travel

Preparations

- Turn off all the power supply.

Mounting Procedure

Table 11-14: Mounting Procedure of Top Support DVD/Printer Shelf Assy

No.	Step	Corresponding Graphic
1.	Remove the rear panel. See 'Rear Panel Assy (Part No. 5422978)' on *page 12-8 for more information.*	
2.	Remove Storage Rack. See 'Storage Rack (Part No. 5219976-2)' on *page 12-7 for more information.*	
3.	Remove the cover of the Monitor Support Space Cap.	
4.	Turn over the Top DVD/Print Shelf. Turn over B/W Printer and push it into the Top DVD/ Print Shelf.	
5.	Put the Support DVD/Print Shelf above the Top DVD/Print Shelf with the roll upwards.	

Table 11-14: Mounting Procedure of Top Support DVD/Printer Shelf Assy

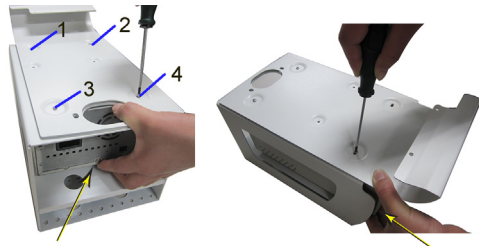
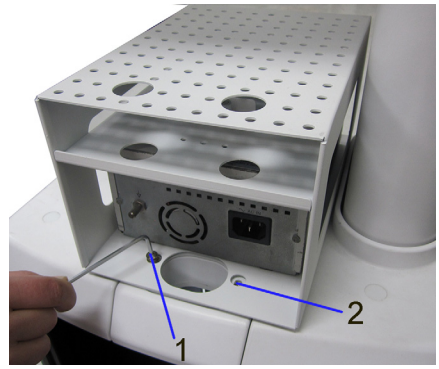
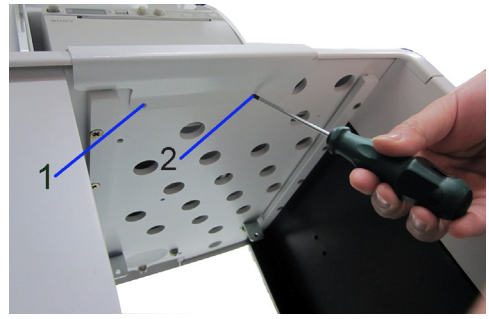
No.	Step	Corresponding Graphic
6.	Align the four screws holes to make sure the screw holes in B/W Printer and two shelves should superpose. Screw 4 screws. When screwing, slightly lift up the printer with hands to make the printer close to Top DVD/Print Shelf.	
7.	Place the Top DVD/Printer shelf on the top of the cabinet and install it with the Support Shelf snapped to the top of the cabinet.	
8.	Screw the 2 screws.	
9.	Screw the 2 screws.	

Table 11-14: Mounting Procedure of Top Support DVD/Printer Shelf Assy

No.	Step	Corresponding Graphic
10.	Install the rear panel.	

Removal Procedure

Remove the new parts in the reverse order of installation.

Paperwork

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

Product Locator Installation

User Manual

Check that the correct User Manual(s) for the Docking Cart is included with the installation. Specific language versions of the User Manual may also be available. Check with your GE Sales Representative for availability.

Cart Using

Contents in This Section

Introduction

Docking Cart supports the ultrasound system as below:

- LOGIQ e (Software version R8.x.x)

The docking cart can supply power for the system and peripherals which are mounted to the docking cart.

Height Adjustment

To adjust the height of the mounting-platform, raise the Release lever and pull the platform up or push it down with both hands, the traveling distance is 140mm.

When the lever is released the platform remains at the adjusted height.

Locking the Wheels

Depress the front of the Brake Lever with your foot. With the Brake Lever down the rolling and swivel function are locked.

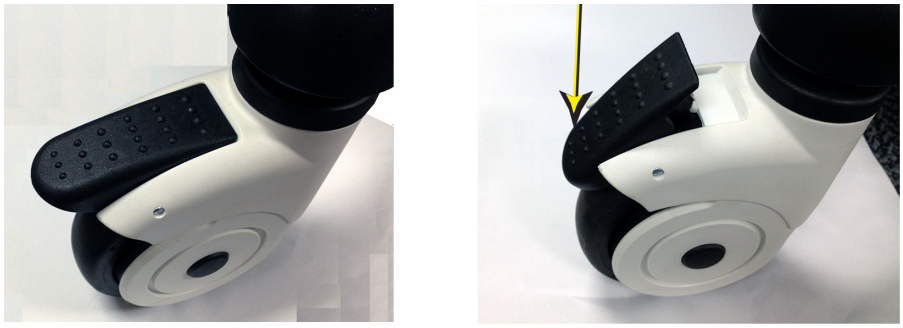


Figure 11-15. Released and Locked position

Mounting the System to Cart

The system can be mounted to Docking Cart either while the display screen is closed with the system fully shut-down or in standby mode, or while the display screen is open with the system powered On or Off.

NOTE: A battery or an empty battery-shell should always be attached to the system before mounting system to the cart.

CAUTION

Use caution when mounting system while it is turned-on to avoid shocks or vibrations which may be harmful to the hard-drive.

To mount the system to the cart:

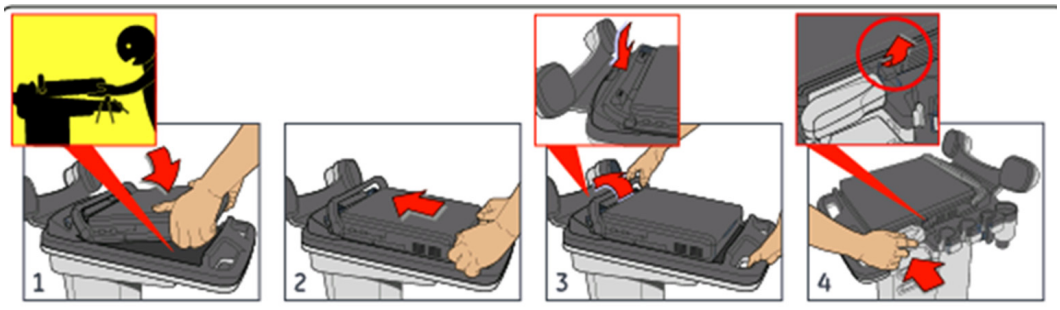


Figure 11-16. Mounting System to Cart

Mounting the System to Cart (continued)

1. Hold the system slightly tilted towards you and place the front bottom part over the front sliding guides.

NOTE: *When put the system on docking cart top cover ,aviod injuring the fingures and hands.*

2. Lower the rear part of the system to sit over the rear sliding guides. Push the system towards the rear until you feel that it stops and you hear a click (While pushing the system to the rear, prop the vertical plane behind the handles with fingers so that the cart does not move)
3. Rotate the system handle to the rear of LCD stoppers to lock the system. At this stage the system should be locked well on all four comers.Gently pull the system up to verify that it is locked well and can not be easily released.
4. Connect the probe connector of Three-probe Port to the system, press the probe connector locking lever up.

Release the System from Docking Cart

The system can be mounted to Docking Cart either while the display screen is closed with the system fully shut-down or in standby mode, or while the display screen is open with the system powered On or Off.

CAUTION

Before dismounting the system while it is powered ON, be sure to check availability and charge of battery, as system will switch-over to battery operation as it is released.

To release the system from mounting platform:

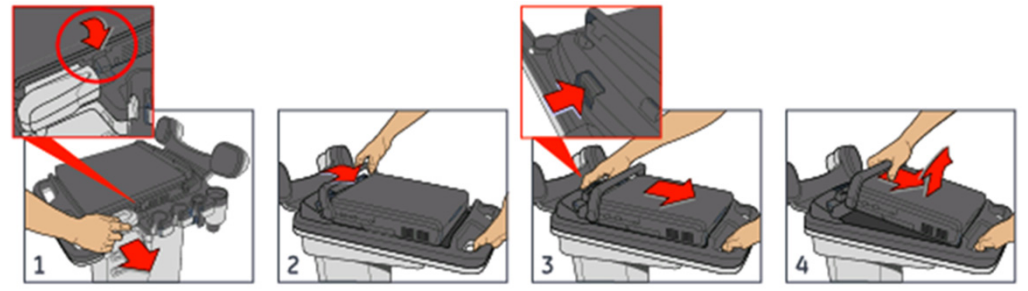


Figure 11-17. Release the System from Cart

Release the System from Docking Cart (continued)

1. Disconnect the probe connector of Three-Probe Port from the system.
2. Rotate the handle to unlock system
3. Place palm of one hand on the handle and push the system release button toward you with the other hand until it stops, then release the button back to it's normal position.
4. Lift up the system from the platform.

Switch the Three Probes

The system can switch the probe between the three probe which are connected in the Docking Cart Three Probes Box.

From the keyboard, press the Exam key. The Probe screen appears. Select the probe which you want.

Figure 11-18. Probe Screen

NOTE: If the docking cart loses power, the factory default probe is the probe which is connected to the port.

System Operation

LOGIQ e is supported on Docking Cart.

NOTE: To upgrade the system, release the system from the Docking Cart and connect the USB Memory Stick or SD Card to the system directly.

NOTE: To power off Docking Cart, open the circuit breaker and then pull out the AC Power Cord from the wall AC outlet.

NOTE: Do not plug the AC Power into the wall in the state of closing the circuit breaker.

Docking Cart Functions (Theory)

Overview

The section explains Docking Cart's system concepts, component arrangement, and subsystem function.

Block Diagram

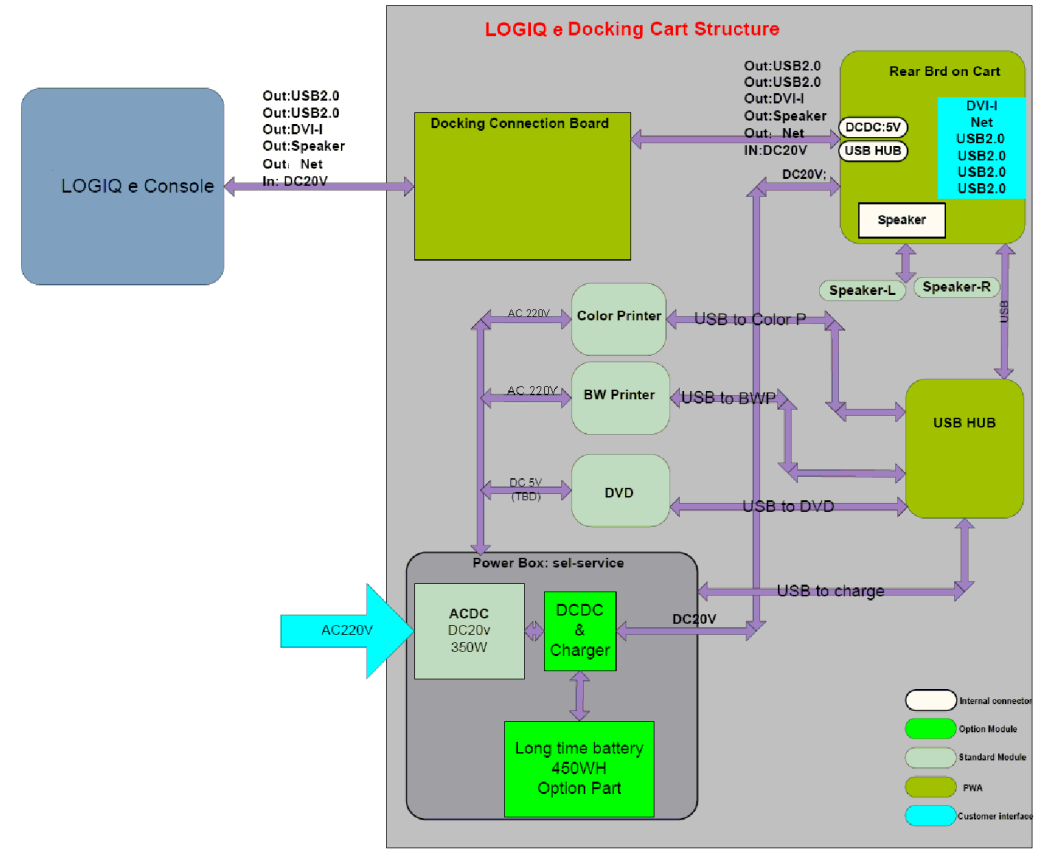


Figure 11-19. Docking Cart Function Diagram

Information

- Docking Connection Board

  DockBoard is a PWA, it has a Docking Port, which is responsible for docking and connecting to the LOGIQ e.
- Power Box

  The DC20V Power is transferred via this PWA Board and is extended from this board to USB HUB and peripherals.
- Rear Board

  It is a PWA, which take most charge of the Docking Cart electric system: Network, USB connection, DVI.

Supported External Interface/Port

Table 11-15: Supported external interface/port

Item	Interface/Port	Description
1	DVI	Support to 1024x768,60Hz
2	Network	10M/100M auto-adaptive
3	USB 2.0	4 USB 2.0 ports

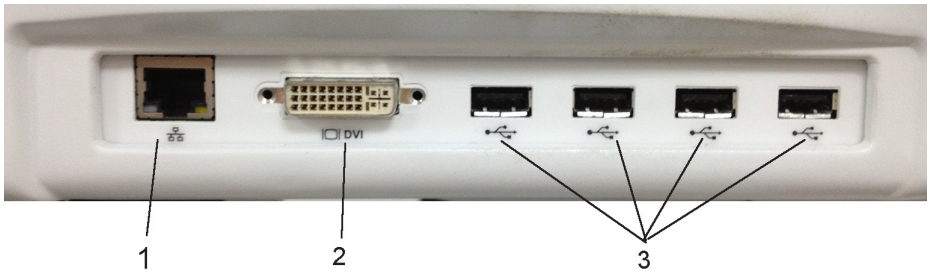


Figure 11-20. Supported external Interface/Port

1. Network 2. DVI 3. USB port

Configuration on External Display Through DVI Connection

You can use DVI cable or VGA cable to connect the external monitor through DVI port on Docking Cart.

Install the system on Docking Cart and power on the system.

Connect with DVI cable

1. Connect the DVI cable to the DVI port on Docking Cart and the external monitor.

Figure 11-21. Connect DVI cable

2. Press Ctrl+Alt+V on the keyboard of the system, a dialog box appears on the screen. In the menu list of Operating Mode, select **Clone Displays**. Then Select **Next**.

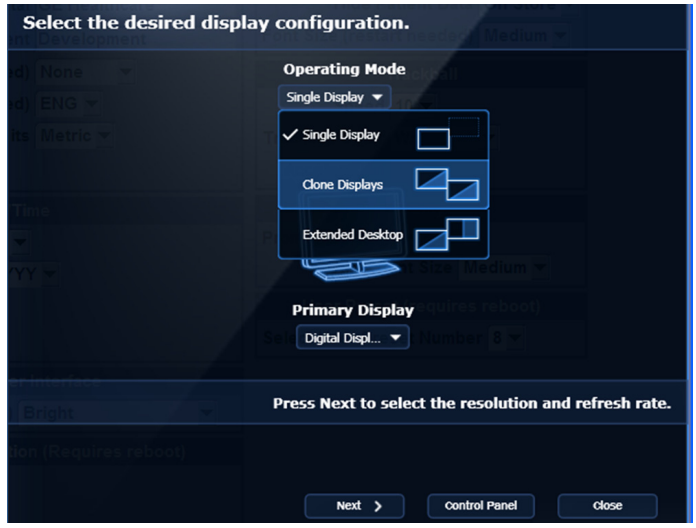


Figure 11-22. Select Clone Displays

Connect with DVI cable (continued)

3. Select **Digital Display EXTEND PANEL** in the menu list of Second Display. Then select **Next**.

Figure 11-23. Select Digital Display EXTEND PANEL

4. Select **Next**. The screen displays on the external monitor.Then select **Close** to close the dialog box.

Figure 11-24. External monitor display

Connect with DVI cable (continued)

5. To exit external monitor, press Ctrl+Alt+V. Select **Single Display** in the menu list of Operating Mode, then select **Next** and **Close**.

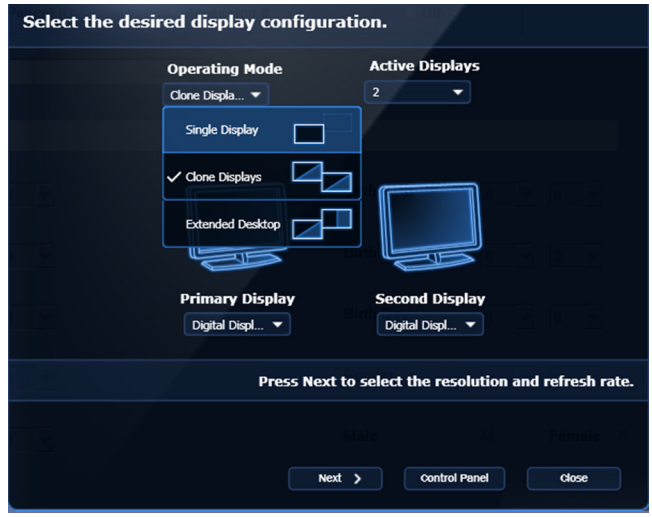


Figure 11-25. Exit External monitor display

Connect with VGA cable

1. Connect the DVI adapter to the DVI port on Docking Cart first. Then connect the VGA cable to the DVI adapter with one VGA connector and to the external monitor with another VGA connector.

Figure 11-26. Connect VGA cable

2. Press Ctrl+Alt+V on the keyboard of the system, a dialog box appears on the screen. In the menu list of Operating Mode, select **Clone Displays**, then Select **Next**.

Figure 11-27. Select Clone Displays

Connect with VGA cable (continued)

3. Select **Monitor** in the menu list of Second Display. Then select **Next**.

Figure 11-28. Select monitor

4. Select the resolution **1024x768** in the menu list of Resolution.

Figure 11-29. Select Resolution

Connect with VGA cable (continued)

5. Select **Next**. The screen displays on the external monitor.Then select **Close** to close the dialog box.

Figure 11-30. External monitor display

6. To exit external monitor, press Ctrl+Alt+V. Select **Single Display** in the menu list of Operating Mode, then select **Next** and **Close**.

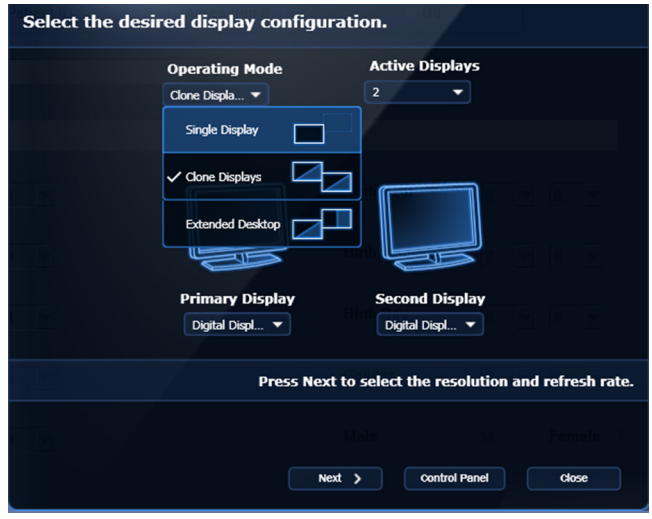


Figure 11-31. Exit External monitor display

Diagnostics/Troubleshooting

Overview

This section describes how to setup and run the tools that help Docking Cart operation. Cart and board level diagnostics are run whenever power is applied. Some Service Tools may be run at the application level.

Troubleshooting

There is a troubleshooting tool available that the customer can use as a first step to investigate failure issues. It gives the current status of failure and provides some relative ways to figure out.

Gathering Trouble Data

There may be a time when it would be advantageous to capture trouble information for acquisition through remote diagnostics or to be sent back to the manufacturer for analysis. There are different options to acquire this data that would give different results.

- Product Name: Docking Cart
- Docking Cart S/N Number:

Troubleshooting Trees

System Does Not Boot

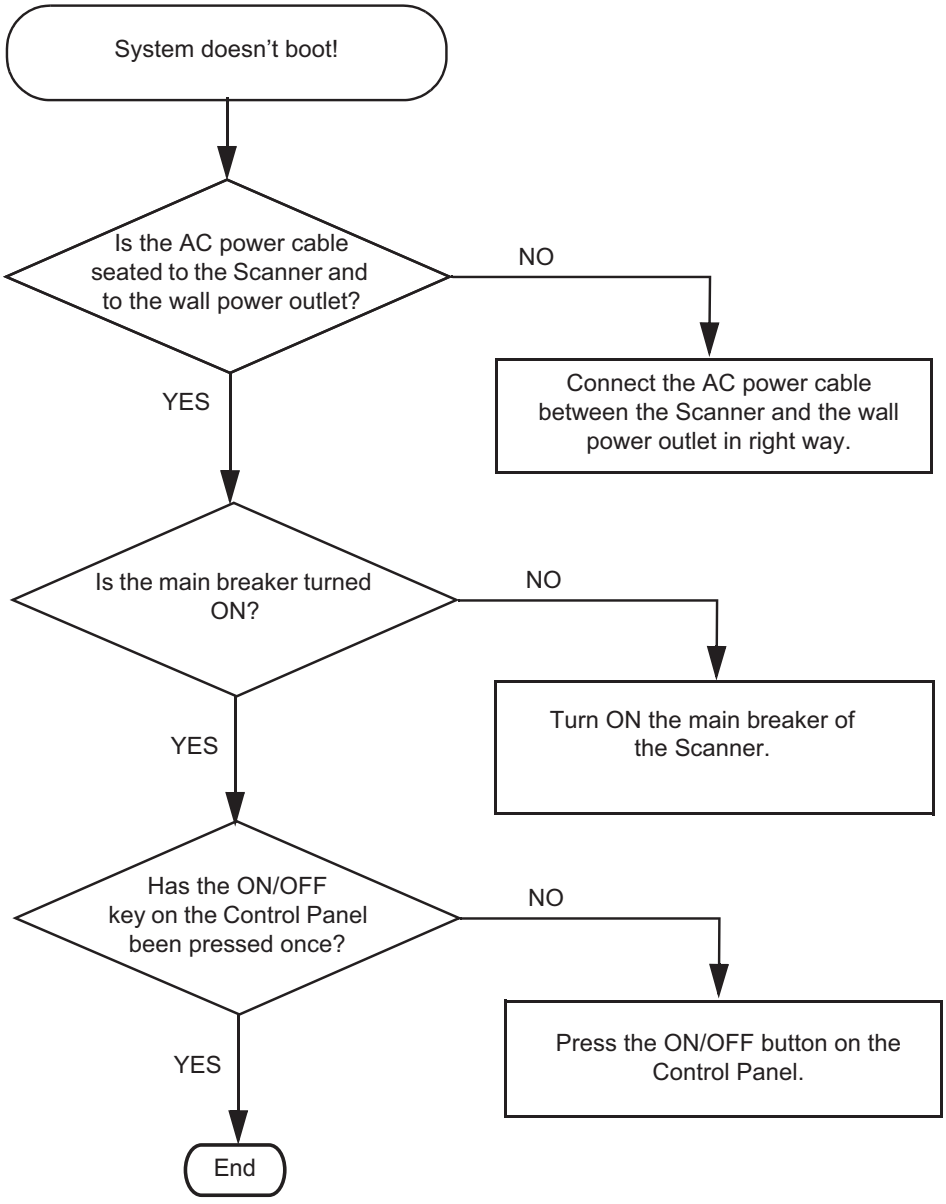


Figure 11-32. System Does Not Boot

Can Not Charge the Extended Life Battery

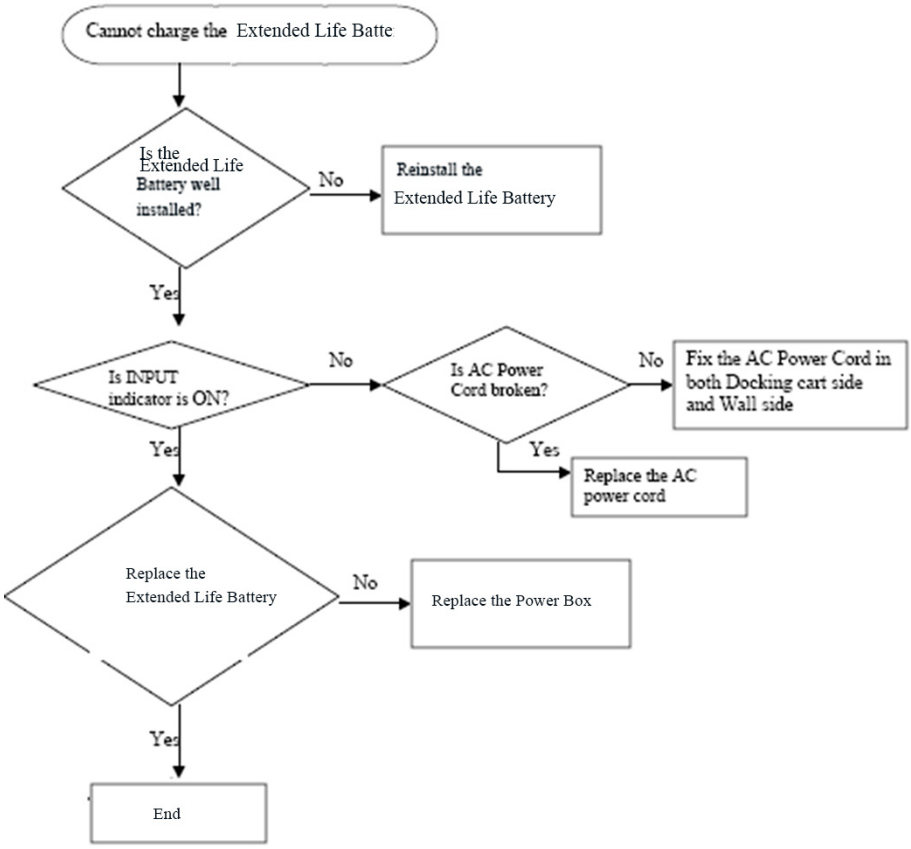


Figure 11-33. Can not Charge the Extended Life Battery

Extended Life Battery Has No OUTPUT

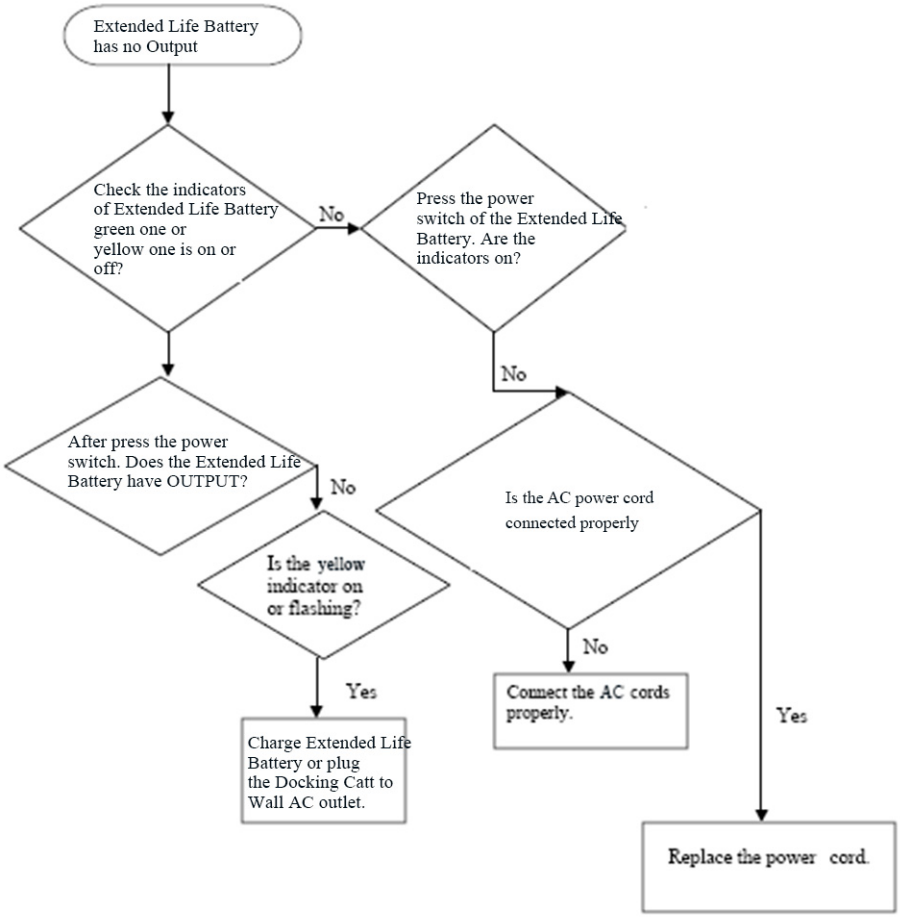


Figure 11-34. Extended Life Battery Has No OUTPUT

Chapter 12

Docking Cart Servicing

This Chapter describes replacement procedure and lists the renewal parts available for Docking Cart. The Care and Maintenance on Docking Cart is also provided.

Overview

Contents in this chapter

Introduction

This chapter contains this information:

- Describes replacement procedures for the modules and subsystems of Docking Cart.
- Provides an overview of Renewal Parts for Docking Cart.
- Describes Care & Maintenance on Docking Cart and peripherals. These procedures intended to maintain the quality of Docking Cart systems performance.

Safety consideration

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

List of Abbreviations

- Assy - Assembly
- Ctrl - Control
- Int - Internal
- I/O - Input/Output
- LCD - Liquid Crystal Display
- PAT - Patient
- PC - Personal Computer (Back End Processor)

Replacement Procedure

Introduction

This section describes how to remove and install, or replace, modules and subsystems in the Docking Cart.

Contents in this Section

Disassembly/Re-assembly

Warning and Caution

DO NOT service or disassemble parts under FRU unit level at any circumstances.

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.

Only Qualified service personnel should remove any covers or panels. Electrical hazards exists at several points inside. Before thoroughly familiar with all hazardous voltages and high current levels to avoid accidental contact.

Disassembly/Re-assembly (continued)

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

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

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

Follow general guidelines for handling of electrostatic sensitive equipment.

The waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately.

Please contact the manufacturer or other authorized disposal company to decommission your equipment.

3-Probe Port Assy (Part No. 5423182-2)

Purpose: This is a description on how to remove and replace the Docking Cart 3-Probe Port Assy.

Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

Needed Manpower

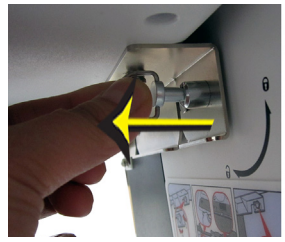
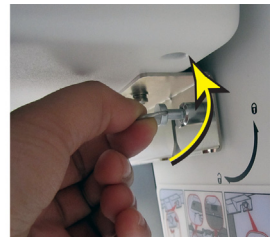
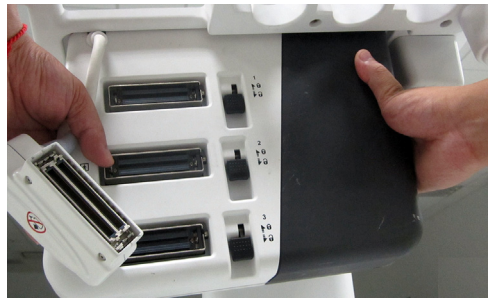
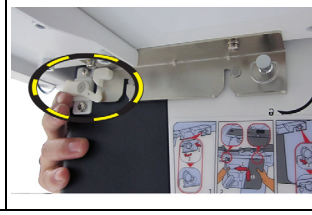
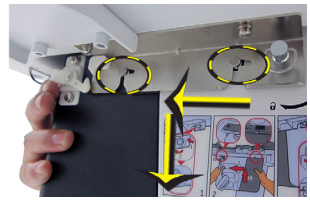
- 1 person, 1minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Removal Procedure

Table 12-1: Removal Procedure for 3-Probe Port Assy

No.	Steps	Corresponding Graphic
1.	Disconnect the probe connector	
2.	Pull out the lock and rotate the lock 90° clockwise.	 
3.	Hold the 3-Probe Port with both hands, meanwhile use one finger of the right hand to push up the lock on 3-Probe Port and move the 3-Probe Port to the right, then remove the 3-Probe Port. The two screws on the 3-Probe Port are released from the bracket. Take down the 3-Probe Port.	  

Mounting Procedure

Install the new parts in the reverse order of removal.

See ‘Install 3-Probe Port to Docking Cart’ on *page 11-29 for more information.*

Storage Rack (Part No. 5219976-2)

Purpose: This is a description on how to remove and replace the Storage Rack.

Tools

- Common Phillips screwdrivers
- Allen/Unbraco/Torx wrench

Needed Manpower

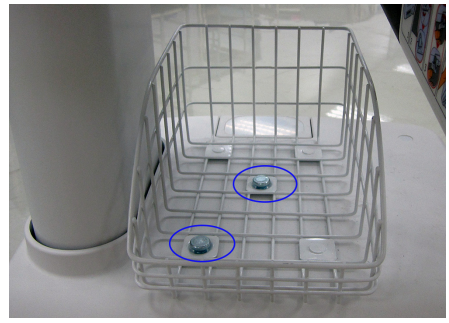
- 1 person, 1 minutes + travel

Preparation

- NA

Removal Procedure

Table 12-2: Removal Procedure for Storage Rack

No.	Steps	Corresponding Graphic
1.	Unscrew the 2 screws.	
2.	Remove the storage rack from the top cabinet.	

Mounting Procedure

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

Rear Panel Assy (Part No. 5422978)

Purpose: This is a description on how to remove and replace the Rear Panel Assy.

Tools

- No special tools

Needed Manpower

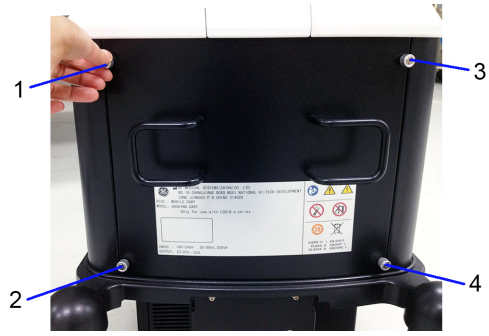
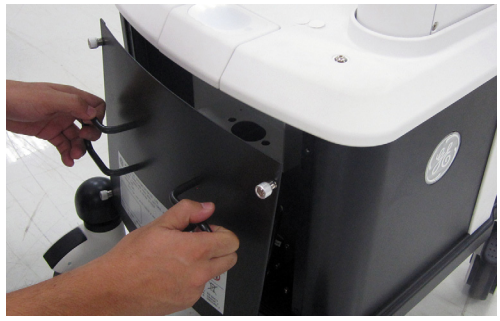
- 1 person, 1 minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Removal Procedure

Table 12-3: Removal Procedure for Rear Panel Assy

No.	Steps	Corresponding Graphic
1.	Loose the 4 screws.	
2.	Remove the rear panel Assy.	

Mounting Procedure

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

Extended Life Battery (Part No. 5486499)

Purpose: This is a description on how to remove and replace the Extended Life Battery.

Tools

- No special tools.

Needed Manpower

- 1 person, 1 minutes + travel

Preparation

- Shut down the system and switch off the main breaker.

Extended Life Battery (Part No. 5486499) (continued)

Removal Procedure

Table 12-4: Removal Procedure Extended Life Battery

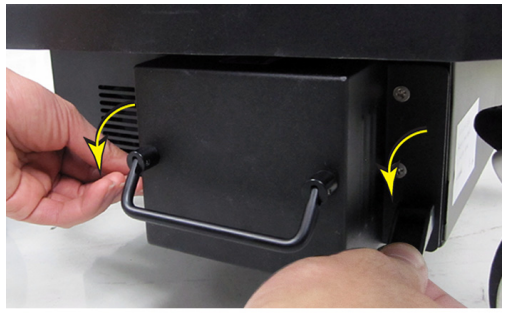
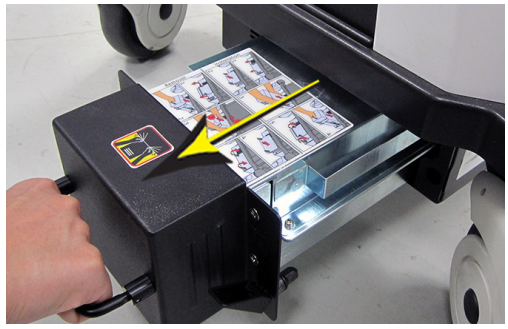
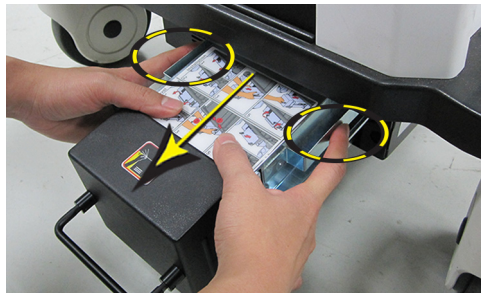
No.	Steps	Corresponding Graphic
1.	Flip down the two handle locks on the Extended Life Battery.	
2.	Pull out the Extended Life Battery.	
3.	While pressing the two spring lockings on both side of the battery with fingers, then move out the battery.	

Table 12-4: Removal Procedure Extended Life Battery

No.	Steps	Corresponding Graphic
4.	Take out the battery with both hands.	

Mounting Procedure

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

   See ‘Install Extended Life Battery to Docking Cart’ on *page 11-25 for more information.*

After the battery is installed, try pulling the battery to check if the battery is fixed in the power box.

- If the battery can not be pulled out, it means the battery is well installed.
- If the battery can be pulled out, it means the battery is not well installed. Reinstall the battery until it can not be pulled out from power box.

CAUTION

Use caution to avoid injuring hands when installing the Extended Life Battery.

Renewal Parts

Contents in This Section

Introduction

This chapter lists the renewal parts available for Docking Cart.

Power Cable

Table 12-5: Docking Cart Power Cable List

Item	Part Number	Description	Quantity
1	5177126-2	Power Cable for Japan	1
2	5177195-2	Power Cable for Argentina	1
3	5177154-2	Power Cable for Switzerland	1
4	5177187-3	Power Cable for Australia	1
5	5177123-2	Power Cable for Europe	1
6	5176907-2	Power Cable for United Kingdom	1
7	5176773-2	Power Cable for India	1
8	5176753-2	Power Cable for Israel	1
9	5176304-2	Power Cable for China	1
10	5177146-2	Power Cable for USA	1
11	5177153-2	Power Cable for Denmark	1
12	5400868-2	Power Cable for Brazil	1

Operator Console Assy

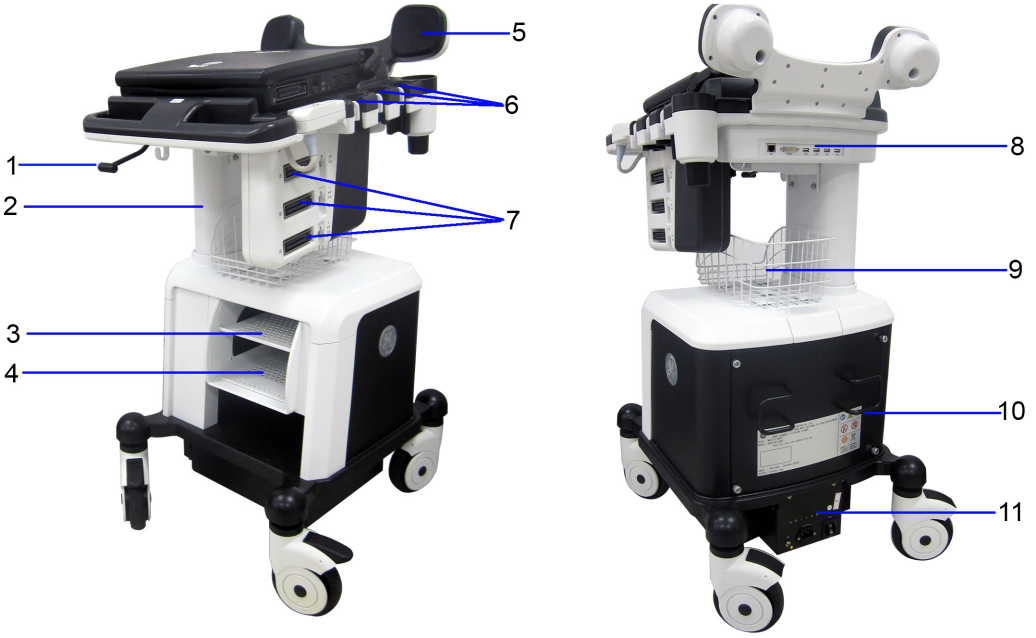


Figure 12-1. Operator Console Assy

1. Lever 2. Up/Down 3. DVD-RW shelf 4. B/W Printer shelf 5. Speaker 6. Probe holder	7. Three-probe connector 8. Ethernet port, DVI, USB ports 9. Storage rack 10. Cable hook 11. Power box

Docking Station

Table 12-6: Docking Station

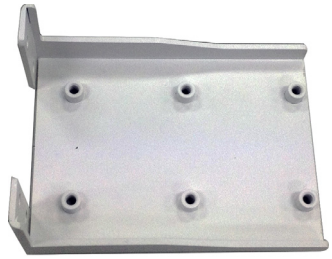
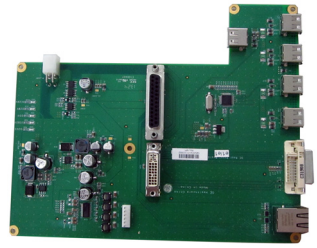
Item	Part Number	Part Name	Corresponding graphic	Qty
700	5422689-2	LOGIQ e Top Support		1
701	5423180-2	LOGIQ e DS Top Cover Assy		1
702	5423191-2	LOGIQ e DS Main PWA		1
703	5444585	LOGIQ e Multiport board cable		1

Table 12-6: Docking Station

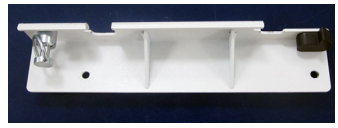
Item	Part Number	Part Name	Corresponding graphic	Qty
704	5421742	Docking Cart Monitor Support Space Cap		1
705	5422460	Docking Cart DS Bottom Cover		1

Probe Holder

Table 12-7: Docking Probe Holder

Item	Part Number	Part Name	Corresponding graphic	Qty
800	5423182-2	LOGIQ e 3-probe Box Assy		1
801	5422462-2	LOGIQ e Docking Cart 3-probe box left cover		1
802	5422461	LOGIQ e Docking Cart 3-probe box right cover		1
803	5240778-2	Probe Holder Service Kit		1

Table 12-7: Docking Probe Holder

Item	Part Number	Part Name	Corresponding graphic	Qty
804	5483613	3-probe Box Supporter Bracket Assy		1

Shelf Service

Table 12-8: Shelf Service

Item	Part Number	Part Name	Corresponding graphic	Qty
900	5255346-2	Support shelf with package		1
901	5219976-2	Storage Rack		1
902	5255345-2	Peripheral shelf with package		1
903	5423171-2	Top DVD Shelf Assy		1

Bottom and Wheels

Table 12-9: Bottom and Wheels

Item	Part Number	Part Name	Corresponding graphic	Qty
1000	5441308	USB HUB Assy		1
1001	5443853	Black white Rear Castor N125 from Secure		1
1002	5454032	Black white Front Castor N125 from Secure		1
1003	5458670	DCAC adapter for printer		1

Panel and Cabinet

Table 12-10: Panel and Cabinet

Item	Part Number	Part Name	Corresponding graphic	Qty
1100	5422978	Cart Rear Panel Assy		1

Gas Spring and Gas Spring Lever

Table 12-11: Gas Spring and Gas Spring Lever

Item	Part Number	Part Name	Corresponding graphic	Qty
1200	5423168	Gas Spring Lever Assy		1
1201	5245175	Gas Spring Service Kit		1

Power Box and Extended Life Battery

Table 12-12: Power Box and Extended Life Battery

Item	Part Number	Part Name	Corresponding graphic	Qty
1300	5439693	LOGIQ e Power Box for Docking Cart		1

Table 12-12: Power Box and Extended Life Battery

Item	Part Number	Part Name	Corresponding graphic	Qty
1301	5440512	Extended Life Battery for Docking Cart Power Box		1

Care & Maintenance

Contents in This Section

Overview

Purpose

This section describes **Care & Maintenance** on Docking Cart. These procedures are intended to **maintain the quality** of Docking Cart. Read this chapter completely and familiarize yourself with the procedures before performing a task.

Periodic Maintenance Inspections

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

c  CAUTION

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

d  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.

c  CAUTION

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

c  CAUTION

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

Why do Maintenance

Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Ultrasound Inspection Certificate (provided on 'Inspection Paper Work' on *page 12-35*) 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.

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.

Maintenance Task Schedule

How often should care & maintenance tasks be performed?

The Care & Maintenance Task Schedule (provided on Table 12-13 *on page 12-26*) specifies how often your Docking Cart should be serviced and outlines items requiring special attention.

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

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

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

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

Table 12-13: Customer Care Schedule

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

Table 12-13: Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Peripheral Leakage Current Checks				X	also after corrective maintenance
Surface Probe Leakage Current Checks				X	also after corrective maintenance
Endocavity Probe Leakage Current Checks				X	also after corrective maintenance
Transesphongeal Probe Leakage Current Checks				X	also after corrective maintenance
Surgical Probe Leakage Current Checks				X	also after corrective maintenance
Functional Checks				X	also after corrective maintenance

Tools Required

Standard GE Tool Kit

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

Please refer to ‘Standard GE tool kit’ on *page 10-13* for the information.

Special Tools, Supplies and Equipment

Table 12-14: Overview of Requirement for Care & Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		
Leakage Current Ultrasound Kit	2113015	For 120V and 220V Units
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes anti–static mat, wrist strap and cables for 200 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
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.
CD-RW Media		For LOGIQ e
B/W Printer Cleaning Sheet		See printer user manual for requirements
Color Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		

Cleaning Dusk Screen

The dusk screen requires weekly cleaning in order to retain its performance. Power off the Power Box when the dusk screen is removed for cleaning.

1. Pull out the Dusk Screen from the power box.

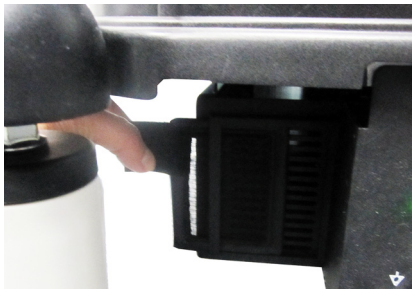


Figure 12-2. Pull out the Dusk Screen

2. Dust the Dusk Screen with a vacuum cleaner and/or wash it with a mild soapy solution. If washed, rinse and dry the Dusk Screen before re-installation.

Figure 12-3. Clean the Dusk Screen

3. Re-install the Dusk Screen on the power box.

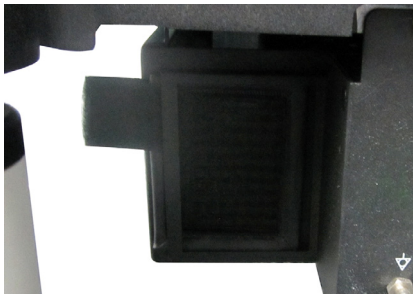


Figure 12-4. Re-install the Dusk Screen

Safety Test

Input Power

Table 12-15: Main Cable Inspection

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

Cleaning

Table 12-16: General Cleaning

Step	Item	Description
1	Console	Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire console. Be careful not to get the cloth too wet so that moisture does not enter the console.
2	Probe Holder	Clean probe holders (they may need to be soaked to remove excess gel).

Safety Test (continued)

Physical Inspection

Table 12-17: Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition. refer to the LOGIQ e 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.

Outlet Test - Wiring Arrangement - USA & Canada

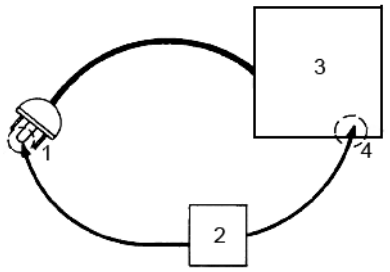
Please refer to ‘Outlet test - wiring arrangement’ on *page 10-31* for the information.

Safety Test (continued)

Grounding continuity

DANGER — ELECTRIC SHOCK HAZARD. THE PATIENT MUST NOT BE CONTACTED TO THE EQUIPMENT DURING THIS TEST.

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2** ohms. Reference the procedure in the IEC60601-1.



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

Figure 12-5. Ground continuity test

Meter Procedure

Follow these steps to test the ground wire resistance.

- Turn the LOGIQ e unit OFF.
- Plug the unit into the meter, and the meter into the tested AC wall outlet.
- Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ e unit.
- Set the meter's “FUNCTION” switch to the RESISTANCE position.
- Set the meter's “POLARITY” switch to the OFF (center) position.
- Measure and record the ground wire resistance.

Safety Test (continued)

Chassis Leakage Current Test

Please refer to 'Chassis leakage current test' on *page 10-33* for the information.

Isolated Patient Lead (Source) Leakage - Lead to Lead

Refer to the procedure in the IEC 60601-1.

Isolated Patient Lead (Sink) Leakage-Isolation Test

Refer to the procedure in the IEC 60601-1.

CAUTION

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

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

Data Sheet for ECG Leakage Current:

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

Table 12-18: 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 12-19: Maximum Allowance Limit for ECG Leakage Current

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

Isolated Patient Lead (Sink) Leakage-Isolation Test (continued)

Table 12-20:

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					

Probe Leakage Current Test

Please refer to ‘Probe leakage current test’ on *page 10-35* for the information.

When There’s Too Much Leakage Current...

Please refer to ‘When there's too much leakage current …’ on *page 10-38* for the information.

Inspection Paper Work

ULTRASOUND INSPECTION CERTIFICATE

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

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

Inspection Paper Work (continued)

FUNCTIONAL CHECKS **PHYSICAL INSPECTION AND CLEANING**

Functional Check (if applicable)	OK? or N/A		Physical Inspection and Cleaning (if applicable)	Inspect	Clean
B-Mode Function			Console		
Doppler Modes Function			Monitor		
CF-Mode Function			Touch Panel		
M-Mode Function			Air Filter		
Applicable Software Options			Probe Holders		
Applicable Hardware Options			External I/O		
Control Panel			Wheels, Brakes & Swivel Locks		
Measurement Accuracy			Cables and Connectors		
GE Approved Peripherals			GE Approved Peripherals (CD-RW, MOD, Printers)		

COMMENTS:

Inspection Paper Work (continued)

ELECTRICAL SAFETY

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

Probe 7:				
Probe 8:				
Probe 9:				

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

Accepted by:_____

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