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GE Healthcare

Technical Publication

Direction 5213326-100

Revision 3

**GE Healthcare
LOGIQ A3 Basic Service Manual**

Operating Documentation

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Important Precautions

WARNING

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

AVERTISSEMENT

- CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.
- SI LE PRESTATAIRE DE SERVICES DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, IL INCOMBE AU CLIENT DE LE FAIRE TRADUIRE.
- NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL DE MAINTENANCE 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

- 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.
- WARTEN SIE DIESES GERÄT NUR, WENN SIE DIE ENTSPRECHENDEN ANWEISUNGEN IM KUNDENDIENST-HANDBUCH GELESEN HABEN UND NACHVOLLZIEHEN KÖNNEN.
- 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

- ESTE MANUAL DE SERVICIO SÓLO ESTÁ DISPONIBLE EN INGLÉS.
- SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, LA TRADUCCIÓN ES RESPONSABILIDAD DEL CLIENTE.
- 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 USUARIO O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR DESCARGAS ELÉCTRICAS, PROBLEMAS MECÁNICOS O PELIGROS DE OTRA NATURALEZA.

ATENÇÃO

- ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.
- SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.
- NÃO TENHA TENTADO REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.
- O NÃO CUMPRIMENTO DESTES AVISOS PODE PÔR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.

AVVERTENZA

- IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.
- SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS 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

- KÄESOLEV TEENINDUSJUHEND ON SAADAVAL AINULT INGLISE KEELES.
- KUI KLIENDITEENINDUSE OSUTAJA NÕUAB JUHENDIT INGLISE KEELEST ERINEVAS KEELES, VASTUTAB KLIENT TÖLKETEENUSE 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

- 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

- 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 ΕΠΙΧΕΙΡΗΣΤΕ 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

- 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

- ÞESSI ÞJÓNUSTUHANDBÓK ER EINGÖNGU FÁANLEG Á ENSKU.
- EF ÞJÓNUSTUADILI 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

- 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 TĚTO VÝSTRAHY MŮŽE DOJÍT ÚRAZU ELEKTRICKÁM PROUDEM PRACOVNÍKA POSKYTOVATELE SLUŽEB, OBSLUŽNÉHO PERSONÁLU NEBO PACIENTŮ VLIVEM ELEKTRICKÉHO PROUDU, RESPEKTIVE VLIVEM K RIZIKU MECHANICKÉHO POŠKOZENÍ NEBO JINÉMU RIZIKU.

ADVARSEL

- 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

- 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

- ŠĪ APKALPES ROKASGRĀMATA IR PIEĒJAMA TĪKAI ANĢĻU VALODĀ.
- JA KLIENTA APKALPES SNIEDZĒJAM NEPIECIEŠAMA INFORMĀCIJA CITĀ VALODĀ, NEVIS ANĢĻU, 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.

ISPĖJIMAS

- 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

- 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

- NINIEJSZY PODRĘCZNIK SERWISOWY DOSTĘPNY JEST JEDYNIEM 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 UPZIEDNIEGO 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

- ACEST MANUAL DE SERVICE ESTE DISPONIBIL NUMAI ÎN LIMBA ENGLEZĂ.
- DACĂ UN FURNIZOR DE SERVICII PENTRU CLIEȚI NECESITĂ O ALTĂ LIMBĂ DECÂT CEA ENGLEZĂ, ESTE DE DATORIA CLIENTULUI SĂ FURNIZEZE O TRADUCERE.
- NU ÎNCERȚAȚI SĂ REPARAȚI ECHIPAMENTUL DECÂT ULTERIOR CONSULTĂRII ȘI 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.

- ДАННОЕ РУКОВОДСТВО ПО ОБСЛУЖИВАНИЮ ПРЕДОСТАВЛЯЕТСЯ ТОЛЬКО НА АНГЛИЙСКОМ ЯЗЫКЕ.
- ЕСЛИ СЕРВИСНОМУ ПЕРСОНАЛУ КЛИЕНТА НЕОБХОДИМО РУКОВОДСТВО НЕ НА АНГЛИЙСКОМ ЯЗЫКЕ, КЛИЕНТУ СЛЕДУЕТ САМОСТОЯТЕЛЬНО ОБЕСПЕЧИТЬ ПЕРЕВОД.

ОСТОРОЖНО!

- 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.

- TÁTO SERVISNÁ PRÍRUČKA JE K DISPOZÍCII LEN V ANGLIČTINE.
- AK ZÁKAZNÍKOV POSKYTOVATEĽ SLUŽIEB VYŽADUJE INÝ JAZYK AKO ANGLIČTINU, POSKYTNUTIE PREKLADATEĽSKÝCH SLUŽIEB JE ZODPOVEDNOSŤOU ZÁKAZNÍKA.

UPOZORNENIE

- 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.

- 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.

WARNING

- 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.

- BU SERVİS KILAVUZU YALNIZCA İNGİLİZCE OLARAK SAĞLANMIŞTIR.
- EĞER MÜŞTERİ TEKNİSYENİ KILAVUZUN İNGİLİZCE DIŞINDAKİ BİR DİLDE OLMASINI İSTERSE, KILAVUZU TERCÜME ETTİRMEK MÜŞTERİNİN SORUMLULUĞUNDADIR.

DIKKAT

- 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.

このサービスマニュアルには英語版しかありません。
GEMS以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。

警告

このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないで下さい。

この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

本维修手册仅存有英文本。

非 GEMS 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。

注意：

未详细阅读和完全了解本手册之前，不得进行维修。忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

경고

- 본 서식 지침은 영문 만 이동할 수 있습니다 .
- 고객 서식 제공자 영어 이외 언골 요율 경우, 번역 서식을 제공는 것은 고객 책임대 .
- 본 서식 지침을 참했고 이해지 않는 한은 해당 장뵤 수려현 시뵤지 마십시오 .
- 이 경뵤 유려지 않뵤 전기쇼크, 기뵤의 혹은 다른 위험부터 서식 제공 , 운영 혹은 한뵤게 위험 가할 수 있습니다 .

DAMAGE IN TRANSPORTATION

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

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT - FOR USA ONLY

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

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

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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, see the Chapter 1, Safety Considerations section of the LOGIQ™ A3 Basic Service Manual (5213326-100).

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Revision History

Revision	Date	Reason for change
1	05 Aug 2007	Initial Release
2	28 Jan 2008	Revised to add a section on Service Diagnostics
3	25 Aug 2008	Added sections on: Troubleshooting guide and Network Connectivity FRU replacement procedures updated with functional checkout procedure and debrief guidelines.

List of Effected Pages

Pages	Revision	Pages	Revision	Pages	Revision
Title Page	3	Chapter3-Installation (pages 3-1 to 3-24)	3	Chapter8-Replacement Proceduresn (pages 8-1 to 8-28)	3
Important Precautions (pages i to X)	3	Chapter4-Functional checks (pages 4-1 to 4-14)	3	Chapter9-Renewalparts (pages 9-1 to 9-8)	3
Table of Contents (pages TOC1 to TOC6)	3	Chapter5-Components And functions (pages 5-1 to 5-12)	3	Chapter10-Care & maintenance (pages 10-1 to 10-30)	3
Chapter 1 - Introduction (pages 1-1 to 1-18)	3	Chapter6-Scan Adjustments (pages 6-1 to 6-2)	3	index	3
Chapter2-Preinstallation (pages 2-1 to 2-8)	3	Chapter7-Trouble Shooting and Diagnostics (pages 7-1 to 7-2)	3	Rear Cover	3

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Chapter 1 Introduction

Section 1-1 Overview

1-1-1 Purpose

This chapter describes important issues related to safely servicing the LOGIQ A3 scanner. The service provider must read and understand all the information presented in this manual before installing or servicing a unit.

1-1-2 Table Of Contents

Table 1-1 Contents in Chapter 1

S.No	Description	Page Number
1	Overview	1-1
2	Safety	1-2
3	Important Conventions	1-3
4	Safety Considerations	1-7
5	EMC, EMI, and ESD	1-17
6	Customer Assistance	1-18

1-1-3 Purpose of Service Manual

This Service Manual provides installation and service information for the LOGIQ A3 Ultrasound scanning system and contains the following chapters:

- 1.) **Chapter 1 - Introduction:** Contains a content summary and warnings.
- 2.) **Chapter 2 - Pre-Installation:** Contains pre-installation requirements for the LOGIQ A3.
- 3.) **Chapter 3 - Installation:** Contains installation procedure with installation checklist.
- 4.) **Chapter 4 - Functional Checks:** Contains functional checks that must be performed as part of the installation, or as required during servicing and periodic maintenance.
- 5.) **Chapter 5 - Components and Functions:** Contains block diagrams and functional explanations of the electronics.
- 6.) **Chapter 6 - Service Adjustments:** Contains instructions on how to make available adjustments to the LOGIQ A3.
- 7.) **Chapter 7 - Diagnostics/Troubleshooting:** Provides procedures for running diagnostic or related routines for the LOGIQ A3.
- 8.) **Chapter 8 - Replacement Procedures:** Provides disassembly procedures and reassembly procedures for all changeable Field Replaceable Units (FRU).
- 9.) **Chapter 9 - Renewal Parts:** Contains a complete list of replacement parts for the LOGIQ A3.
- 10.) **Chapter 10 - Care & Maintenance:** Provides periodic maintenance procedures for the LOGIQ A3.

Section 1-1 Overview (cont'd)

1-1-4 Typical Users of the Basic Service Manual

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

1-1-5 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the LOGIQ A3 and also kept near the unit for quick reference.

Section 1-2 Safety

1-2-1 Warnings



WARNING CAREFULLY READ ALL OF THE WARNINGS BELOW

- 1.) The operator manual should be fully read and understood before operating the LOGIQ A3 and kept nearby for quick reference.
- 2.) Although the ultrasound energy transmitted from the LOGIQ A3 transducer is within AIUM/NEMA standards, unnecessary exposure should be avoided. Only trained personnel should operate the LOGIQ A3.
- 3.) To prevent electrical shock, the LOGIQ A3 should be connected to a properly grounded power receptacle. Do not use a three prong to two prong adapter. This defeats safety grounding.
- 4.) Probes are fragile, please handle with care.
- 5.) Concerning Outside Markings, refer to Figure 1-1 through 1-3.
- 6.) For the cleaning, disinfection, and sterilization, refer to Probe section in LOGIQ A3 User Manual and Caution Sheet supplied with each probe.



NOTICE This medical equipment is approved, in terms of the prevention of radio wave interference, to be used in hospitals, clinics and other institutions which are environmentally qualified. The use of this equipment in an inappropriate environment may cause some electronic interference to radios and televisions around the equipment. Proper handling of this equipment is required in order to avoid such trouble according to the operator and service manuals. This equipment can be used in residential areas only under the supervision of physicians or qualified technicians.



CAUTION Improper performance possibility. Do not use the following devices near this equipment. Cellular phone, radio transceiver, mobile radio transmitter, radio-controlled toy, etc. Use of these devices near this equipment could cause this equipment to perform outside the published specifications. Keep power to these devices turned off when near this equipment

Section 1-3 Important Conventions

1-3-1 Conventions Used in Book

Icons

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

Safety Precaution Messages

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



DANGER

DANGER IS USED TO INDICATE THE PRESENCE OF A HAZARD THAT WILL CAUSE SEVERE PERSONAL INJURY OR DEATH IF THE INSTRUCTIONS ARE IGNORED.



WARNING

WARNING IS USED TO INDICATE THE PRESENCE OF A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR PROPERTY DAMAGE IF INSTRUCTIONS ARE IGNORED.



CAUTION

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



NOTICE

Equipment Damage Possible:

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

Example: Disk Drive will crash.

NOTE:

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

1-3-2 Standard Hazard Icons

Important information will always be preceded by the exclamation point contained within a triangle , as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could cause harm.

Table 1-2 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION
		
LASER	HEAT	
 <p>LASER LIGHT</p>		

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

Table 1-3 Standard Icons Indicating a Special Procedure Be Used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION
		 <p>EYE PROTECTION</p>

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1-3-3 Product Icons

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

Table 1-4 Product Icons

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
Identification and Rating Plate	Manufacturer's name and address Date of manufacture Model and serial numbers Electrical ratings	Rear of console near power inlet On each probe
Device Listing/Certification Labels	Laboratory logo or labels denoting conformance with industry safety standards such as UL or IEC.	Rear of console
Type/Class Label	Used to indicate the degree of safety or protection	
IP Code (IP68)	Indicates the degree of protection provided by the enclosure per IEC 60529. IP68 indicates can be used in operating room environment.	Foot switch
	Equipment Type BF (man in the box symbol) IEC 60878 indicates B Type equipment having a floating applied part	Probe connectors and PCG Connectors
"CAUTION This unit weighs... Special care must be used to avoid..." 	This precaution is intended to prevent injury that may result if one person attempt to move the unit considerable distances or on an incline due to the weight of the unit.	On the console where easily seen during transport
	"CAUTION" The equilateral triangle is usually used in combination with other symbols to advise or warn the user.	Various
	ATTENTION - 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
	"CAUTION - Dangerous voltage" (the lightning flash with arrowhead in equilateral triangle) is used to indicate electric shock hazards.	Various
	"Mains OFF" Indicates the power off position of the mains power switch.	Rear of system adjacent to mains switch

Table 1-4 Product Icons (Continued)

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	<p>"OFF/Standby" Indicates the power off/standby position of the power switch. CAUTION This Power Switch DOES NOT ISOLATE Mains Supply</p>	<p>Adjacent to On-Off/Standby Switch</p>
	<p>"Mains ON" Indicates the power on position of the mains power switch. CAUTION This Power Switch DOES NOT ISOLATE Mains Supply</p>	<p>Rear of system adjacent to mains switch</p>
	<p>"Protective Earth" Indicates the protective earth (grounding) terminal.</p>	<p>Internal</p>
	<p>Alternating Current</p>	<p>Rear Panel, Circuit breaker label of Console and Front Panel</p>
	<p>"Non-ionizing Radiation" indicates that the system applies RF energy.</p>	<p>Rear of console</p>
	<p>Do not use the following devices near this equipment, Cellular phones, radio transceivers, mobile radio transmitters, radio controlled toy etc. Use of these devices could cause this equipment to perform outside the published specifications. Keep power to these devices turned off when near this equipment.</p>	<p>Rear of console</p>
	<p>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 authorised representative for manufacturer for information concerning the decomposing of your requirement.</p>	<p>Rear Panel</p>

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Section 1-4 Safety Considerations

1-4-1 Introduction

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

1-4-2 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 A3 Training Seminar are authorized to service the equipment.

1-4-3 Mechanical Safety

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



WARNING

ULTRASOUND PROBES ARE HIGHLY SENSITIVE MEDICAL INSTRUMENTS THAT CAN EASILY BE DAMAGED BY IMPROPER HANDLING. USE CARE WHEN HANDLING AND PROTECT FROM DAMAGE WHEN NOT IN USE. DO NOT USE A DAMAGED OR DEFECTIVE PROBE. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY AND EQUIPMENT DAMAGE.



WARNING

NEVER USE A PROBE THAT HAS FALLEN TO THE FLOOR. EVEN IF IT LOOKS OK, IT MAY BE DAMAGED.



WARNING

Always lock the Control Console in its parking (locked) position before moving the scanner around.



CAUTION

The LOGIQ A3 weights approx 70kg , 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.



CAUTION ALWAYS:

- Be sure the path way is clear.
- Use slow, careful motions.
- Use two people when moving on inclines or lifting more than 23 kg (50 lb).

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

- Secure the unit in an upright position.
- Lock the wheels (brake)
- DO NOT use the Control Panel as an anchor point.
- Place the probes in their carrying case.
- Eject any CD (R/W) disk from the CD(R/W) Drive
- Remove the Footswitch and place it in a secure place
- Disconnect any other Off board peripherals if used.

NOTE: Keep the Heat venting holes on the monitor unobstructed to avoid overheating of the monitor.

1-4-4 Electrical Safety

To minimize shock hazard, the equipment chassis must be connected to an electrical ground. The system is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety ground. If an extension cord is used with the system, make sure that the total current rating of the extension cord is greater than the system rating.

The power outlet used for this equipment should not be shared with other types of equipment.

Both the system power cable and the power connector meet international electrical standards.

 **CAUTION** If the Power Plug is Modified or replaced to Suit the local Conditions and regulations, Ground continuity check should be performed between Ground Pin on the Plug and a Metal Part on the LOGIQ A3.

1-4-5 Returning/Shipping Probes and Repair Parts

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

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe).

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

NOTE: *The 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.*

Section 1-5 Warning Label Locations

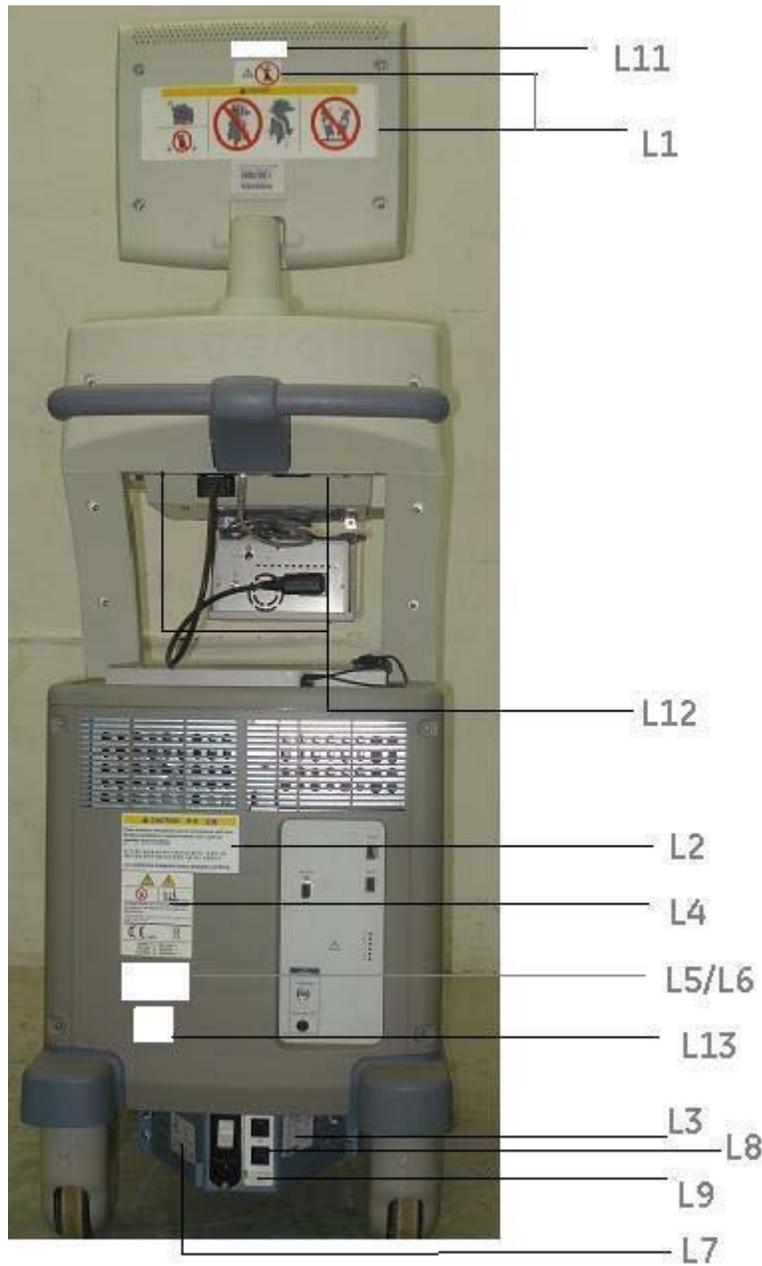


Figure 1-1 Label Location

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Warning Label Locations (continued)



Figure 1-2 Transport Label

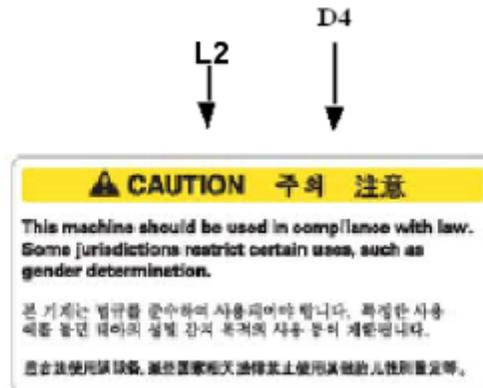


Figure 1-3 Gender Caution Label

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Warning Label Locations (continued)



Figure 1-4 Rating Plate Label

Warning Label Locations (continued)

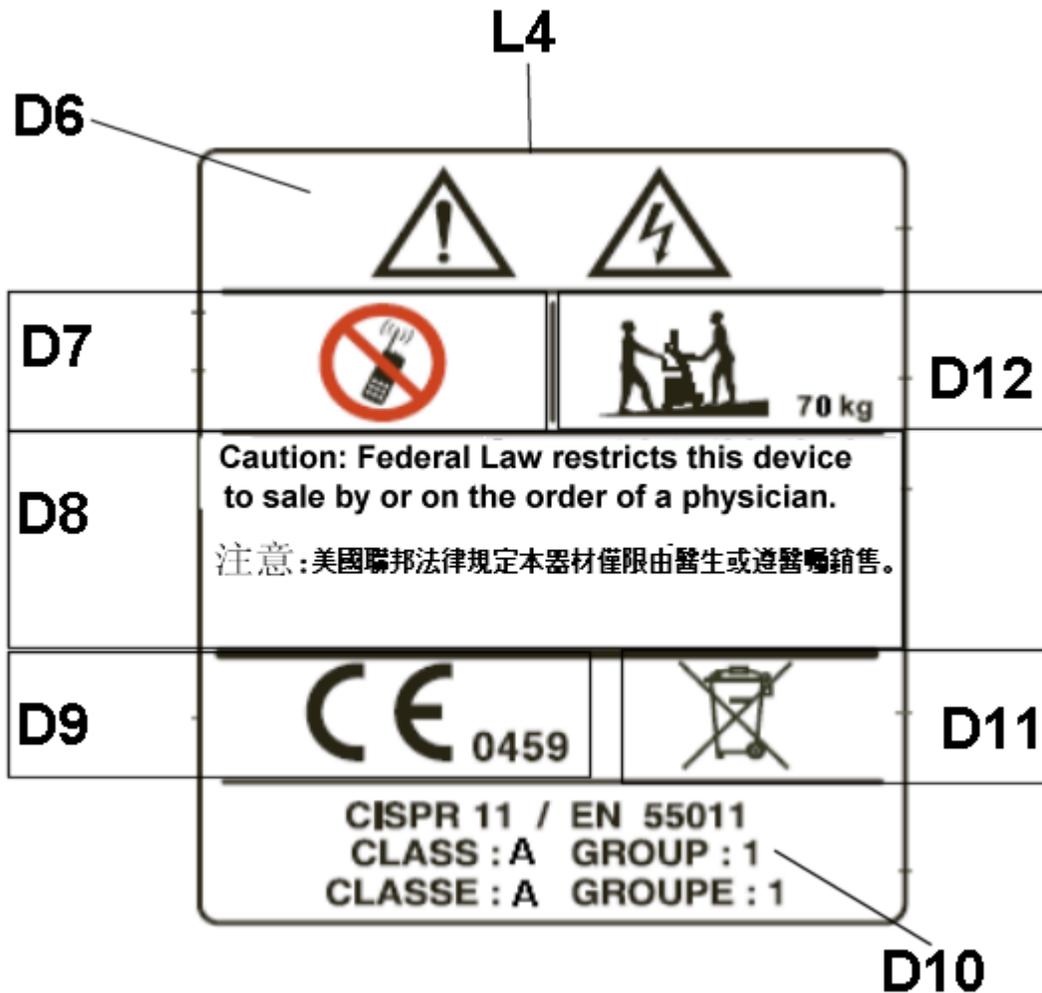


Figure 1-5 Caution Label

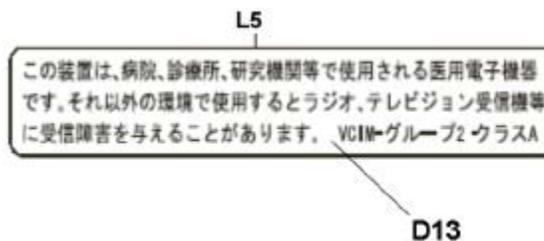


Figure 1-6 EIAJ Label (Japan Only)

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Warning Label Locations (continued)

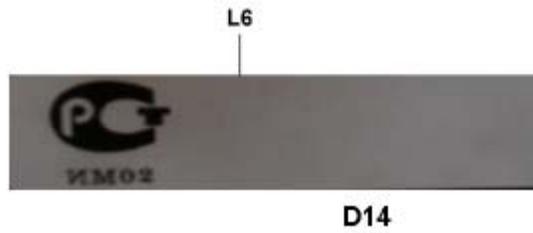


Figure 1-7 Gost Label

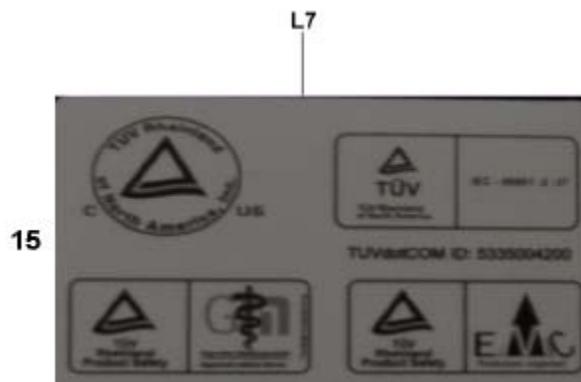


Figure 1-8 TUV Label

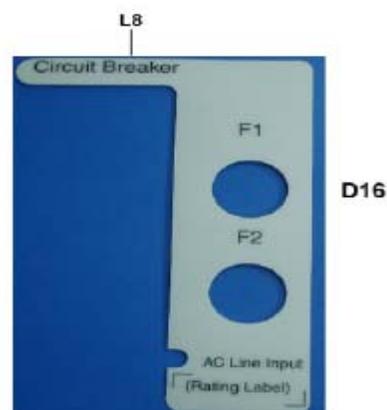


Figure 1-9 Circuit Breaker Label

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Warning Label Locations (continued)

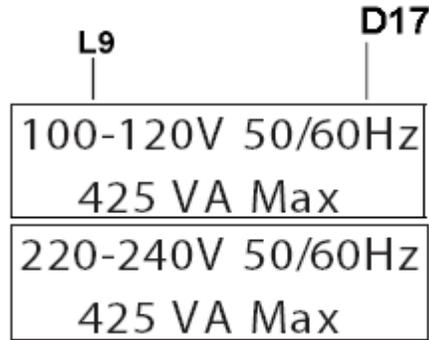


Figure 1-10 Circuit Breaker Panel Rating Label

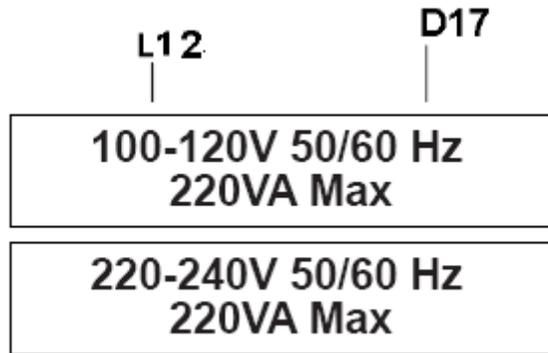


Figure 1-11 Front Panel Rating Label

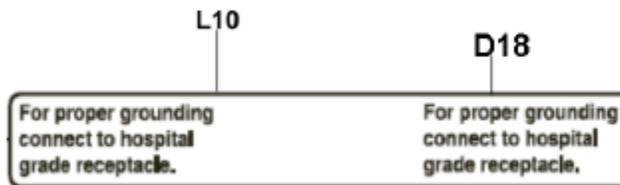


Figure 1-12 Grounding Label

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Warning Label Locations (continued)



Figure 1-13 Mercury Label



Figure 1-14 ROHS Label

Warning Label Locations (continued)

L1 (Figure 1-2)

D1: Standard LCD monitor may rotate while transporting. Bind the system securely to prevent damage in transportation.

D2: To avoid injury by tipping over, DO NOT PUSH THIS UNIT FROM THE SIDES.

D3: DO NOT place a finger, hand or any object on the joint of the monitor or monitor arm to avoid injury when moving the monitor and monitor arm. Placing objects on top of the monitor may cause the monitor to tilt with the falling objects resulting in injury to the operator. Do not place any objects on the monitor.

L2 (Figure 1-3)

D4: This machine should be used in compliance with law. Some jurisdictions restrict certain uses, such as gender determination.

L3 (Figure 1-4)

D5: Identification and Rating Plate.

L4 (Figure 1-5)

D6: Possible shock hazard. Do not remove covers or panels. No user serviceable parts are inside. Refer servicing to qualified service personnel.

D7: Do not use the following devices near this equipment: cellular phone, radio receiver, mobile radio transmitter, radio controlled toy, etc. Use of these devices near this equipment could cause this equipment to perform outside the published specifications. Keep power to these devices turned off when near this equipment.

D8: Prescription Device: United States law restricts this device to sale or use by or on the order of a physician U.S.A. Only

D9: The CE Mark of Conformity indicates this equipment conforms with the Council Directive 93/42/EEC

D10: CISPR CAUTION: The LOGIQ A3 conforms to the CISPR11, Group 1, Class A of the international standard for Electromagnetic disturbance characteristics.

D11: WEEE Label: This symbol indicates that the waste of electrical and electronic equipment must not be disposed 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.

D12: The equipment weighs approximately 70 kg (154 lbs). To avoid possible injury and equipment damage when transporting from one area of use to another:

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

L5 (Figure 1-6)

D13: EIAJ Label (Japan Only).

L6 (Figure 1-7)

D14: Gost Label (Russia Only).

L7 (Figure 1-8)

D15: TUV Label: TUV 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

L8 (Figure 1-9)

D16: Circuit breaker Label

L9 (Figure 1-10)

D17: Circuit breaker panel rating Label.

L12 (Figure 1-11)

D17: Front panel rating Label.

L10 (Figure 1-12)

D18: Signal ground point label CAUTION: This is only for "FUNCTIONAL GROUNDING", NOT "PROTECTIVE EARTH".

L11 (Figure 1-13)

Lamp contains Mercury Dispose According to State/Local Law.

L13 (Figure 1-14)

ROHS Label

NOTE: For an explanation of the symbols shown in the illustration, refer to latter pages in this chapter. The CAUTION label for the radio influence is required to be attached on the console from April, 1996. The GHOST label is required to be attached on the console from June, 1998. The Sex determination label is required to be attached on the console from September 2001, for Asia Only

1-5-1 Dangerous Procedure Warnings

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



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



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 INTERDICTING ADDITIONAL HAZARDS, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

Section 1-6 EMC, EMI, and ESD

1-6-1 Electromagnetic Compatibility

Electro Magnetic 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 interface 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 interface (RFI/EMI) and can be radiated through space or conducted over interconnecting power or signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

1-6-2 Electrostatic Discharge (ESD) Prevention

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



- 1.) **Always connect yourself, via an arm-wrist strap, to the advised ESD connection point located on the rear of the scanner (to the right of the power connector).**
- 2.) **Follow general guide lined for handling of electrostatic sensitive equipment.**

1-6-3 CE Compliance

The LOGIQ A3 unit conforms to all applicable conducted and radiated emission limits and immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements.

Applicable standards are: 47CFR Part18, IEC/EN 60601-1-2

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.*

Section 1-7 Customer Assistance

1-7-1 Contact Information

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

- Prepare the following information before you call:
- System ID serial number.
- Software version.

For GE Service:

Table 1-5 GE Service

Location	Phone Number
USA/CANADA: GE Medical systems Ultrasound Service Engineering, 4855 W. Electric Avenue Milwaukee, WI 53219	TEL: 1 800-437-1171, 1-800-682-5327 1-262-524-5698, FAX: +1- 414-647-4125
LATIN AMERICA: GE Medical systems Ultrasound Service Engineering 4855 W. Electric Avenue Milwaukee, WI 53219	TEL: (1) 262-524-5300 TEL: (1) 262-524-5698 FAX: +1- 414-647-4125
ASIA(Singapore/Japan): GE Ultrasound Asia (Singapore) Service Department - Ultrasound 298 Tiong Bahru Road #15-01/06 Central Plaza Singapore 169730	TEL: 65-291 8528 (81) 426-48-2950 FAX: 65-272-3997 FAX: (81) 426-482902 +(81) 426482944
ASIA(China/India/Korea/SEA): Ultrasound Tech Support - CHINA Ultrasound Tech Support - INDIA Ultrasound Tech Support - KOREA Ultrasound Tech Support - SEA	+(86) 8008108188 +(91) 1800114567 +(82) 262013585 +(65) 62773444
EUROPE: GE Ultraschall Deutschland GmbH & Co. KG BeethovenstraBe 239 Postfach 11 05 60, D-42665 Solingen Germany	TEL:+49 212 2802 208 +49 212 2802 207 FAX: (49) 212.28.02.431
Ultrasound Tech Support - ANZ	+(61) 1800647855

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1-7-2 System Manufacturer

Table 1-6 System Manufacturer

WIPRO GE HEALTHCARE PVT LIMITED- INDIA
WIPRO GE HEALTHCARE PVT LIMITED, NO: 4, KADUGODI INDUSTRIAL AREA, BANGALORE, KARNATAKA, INDIA-560067. TEL: (91) 80-4180-1000 FAX: (91) 80-2845-2924

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Chapter 2 Pre-Installation

Section 2-1 Overview

2-1-1 Purpose

This chapter provides the information required to plan and prepare for the installation of a LOGIQ A3. Included are descriptions of the facility and electrical needs to be met by the purchaser of the unit.

2-1-2 Table Of Contents

S.No	Description	Page Number
1	Overview	2-1
2	General Console Requirements	2-2
3	Facility Needs	2-6

Table 2-1 Contents in Pre-Installation

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Section 2-2 General Console Requirements

2-2-1 Console Environmental Requirements

Table 2-2 Environmental Requirements for LOGIQ A3 Scanners

	Operation	Storage	Transport
Temperature	10 - 40 degree C 50 - 104 degree F	-10 - 60 degree C 14 - 140 degree F	-40 - 60 degree C -40 - 140 degree F
Humidity	30 - 85% non-condensing	30 - 85% non-condensing	30 - 85% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

Table 2-3 Environmental Requirements for an Ultrasound Room

Item	Values
Power Source	Refer to Table 2-4 on page 2-3.
Radiation Shielding	NONE REQUIRED for ULTRASOUND ENERGY
Temperature	20-26 DEG. C (68-79 DEG F) for PATIENT COMFORT
Humidity	50% to 70% for PATIENT COMFORT
Heat Dissipation	1366 BTU/Hr.
Floor Landing	Approximately 680 - 800 kg/m ² without Accessories
Floor Condition	Gradient: WITHIN 5 degrees
Weight	70 kg without Accessories

2-2-1-1 Cooling

The cooling requirement for the LOGIQ A3 is 1366 BTU/hr. This figure does not include cooling needed for lights, people, or other equipment in the room. Each person in the room places an additional 300 BTU/hr. demand on the cooling system.

2-2-1-2 Lighting

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

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2-2-2 Electrical Requirements

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

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

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

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

2-2-3 Power Requirements

Electrical Specifications for LOGIQ A3.

PARAMETER	AREA	LIMITS
Voltage Range	230V	230 VAC ±10% (207-253 VAC)
Voltage Range	120V	120 VAC ±10% (103-127 VAC)
Power	All applications	MAX. 425VA
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.

Table 2-4 Electrical Specifications for LOGIQ A3

2-2-3-1 Inrush Current

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

2-2-3-2 Site Circuit Breaker

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



POWER OUTAGE MAY OCCUR.
DANGER The LOGIQ A3 requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you DO NOT have any other equipment operating on the same circuit.

2-2-3-3 Site Power Outlets

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

2-2-3 Power Requirements (cont'd)

2-2-3-4 Unit Power Plug

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

2-2-3-5 Power Stability Requirements

Voltage drop-out / Max 10 ms.

Power Transients

Refer [Table 2-4](#)

2-2-4 EMI Limitations

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. Ultrasound machines also generate EMI. The LOGIQ A3 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 unit is installed.

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

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

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

See [Table 2-5](#) for EMI Prevention tips.

EMI Rule	Details
Be aware of RF sources	Keep the unit at least 5 meters or 15 feet away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Ground the unit	Poor grounding is the most likely reason a unit will have noisy images. Check grounding of the power cord and power outlet.
Replace all screws, RF gaskets, covers, cores	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of card cage. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn on the unit until any loose metallic part is removed.

Table 2-5 EMI Prevention/Abatement

EMI Rule	Details
Do not place labels where RF gaskets touch metal	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. Or, if a label has been found in such a position, move the label.
Use GE specified harnesses and peripherals	The interconnect cables are grounded and require ferrite beads and other shielding. Also, cable length, material, and routing are all important; do not change from what is specified.
Take care with cellular phones	Cellular phones may transmit a 5 V/m signal; that could cause image artifacts.
Properly dress peripheral cables	Do not allow cables to lie across the top of the card cage or hang out of the peripheral bays. Loop the excess length for peripheral cables inside the peripheral bays. Attach the monitor cables to the frame.

Table 2-5 EMI Prevention/Abatement

2-2-5 Probes Environmental Requirements

	ELECTRONIC
Operation:	10 to 40 degree C(50 to 104 degree F)
Storage:	-20 to 50 degree C(-4 to 122 degree F)
Temperatures in degree C, conversion to degree F = degree C*(9/5) + 32)	

Table 2-6 Operation and storage Temperatures for Probes

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



NOTICE

SYSTEMS AND ELECTRONIC PROBES ARE DESIGNED FOR STORAGE TEMPERATURES OF -20 TO + 50(-4 to 122 degree F) degrees C. WHEN EXPOSED TO LARGE TEMPERATURE VARIATIONS, THE PRODUCT SHOULD BE KEPT IN ROOM TEMPERATURE FOR 10 HOURS BEFORE USE.

2-2-6 Time and Manpower Requirements

Site preparation takes time. Begin Pre-installation checks as soon as possible. If possible, allow six weeks before delivery, for enough time to make necessary changes.



CAUTION

Have two people available to deliver and unpack the LOGIQ A3. Attempts to move the unit considerable distances or on an incline by one person could result in injury or damage or both.



Section 2-3 Facility Needs

2-3-1 Purchaser Responsibilities

The work and materials needed to prepare the site is the responsibility of the purchaser. Delay, confusion, and waste of manpower can be avoided by completing pre installation work before delivery. Use the Pre installation checklist to verify that all needed steps have been taken. 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 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 machine. Carpets are not recommended because they collect dust and create static. Potential sources of EMI (electromagnetic interference) should also be investigated before delivery. Dirt, static, and EMI can negatively impact system reliability.

2-3-2 Required Features

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

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

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

Sites with a mains power system without a defined Neutral:

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

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 0.3 m (1 ft.) from the wall for proper cooling of the system
- Power outlet and place for any external peripheral are within 2 m (6.5 ft) of each other with peripheral within 1 m of the unit to connect cables.

2-3-2 Required Features (cont'd)

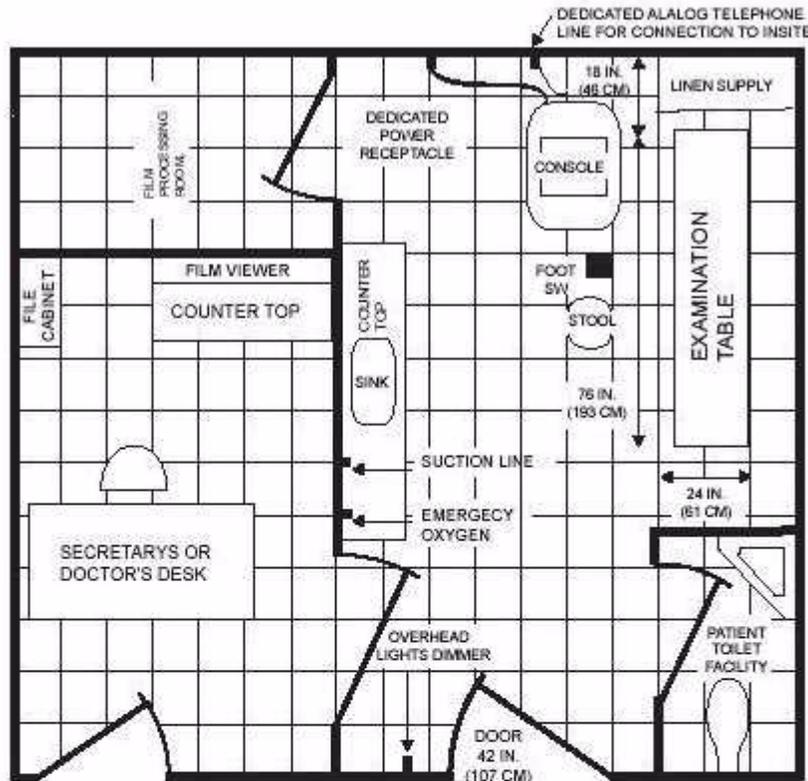
NOTE: *The LOGIQ A3 has three outlets in the unit. One is for the on board peripheral and two for off board peripherals.*

- Power outlets for other medical equipment
- 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)

2-3-2-1 Desirable Ultrasound Room Facilities

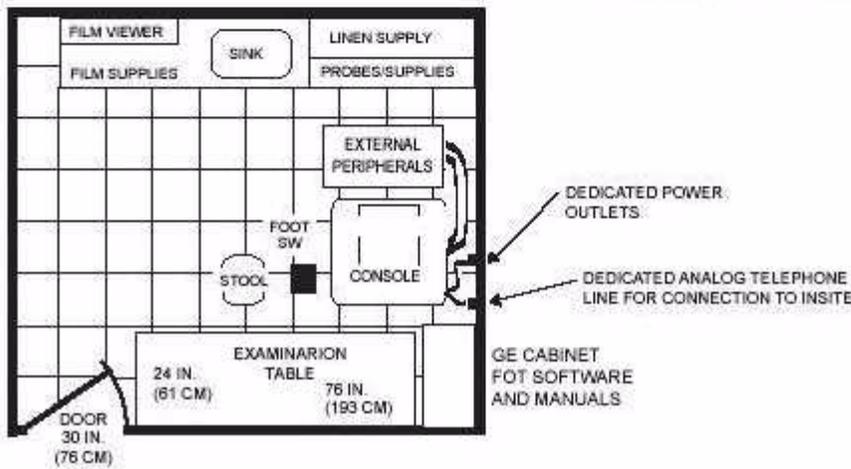
- Door is at least 92cm (3 ft.) wide
- Circuit breaker for dedicated power outlet is easily accessible
- Lab sink with hot and cold water
- Receptacle for bio-hazardous waste, like used probe sheaths
- Emergency oxygen supply
- Storage for linens and film
- Medical equipment storage
- Hospital grade equipment electrical outlet
- Nearby waiting room, lavatory, and dressing room
- Dual level lighting (bright and dim)
- Lockable cabinet for GE Software & proprietary manuals
- Trash bin.

2-3-2-2 Minimal Floor Plan Suggestion



A 14 by 17 foot Recommended Floor Plan

Scale : Each square equals one square foot



An 8 by 10 foot Minimal Floor Plan

Figure 2-1 Minimal Floor Plan

Chapter 3 Installation

Section 3-1 Overview

3-1-1 Purpose

This chapter contains information needed to install the unit. Included are references to a procedure that describes how to receive and unpack the equipment and how to file a damage or loss claim

3-1-2 Table Of Contents

Table 3-1 Contents in Chapter 3

S.No	Description	Page Number
1.	Overview	3-1
2.	Receiving and Unpacking LOGIQ A3	3-3
3.	Safety Reminders	3-9
4.	Moving into Position	3-10
5.	Adjusting System Clock	3-10
6.	Product Locator Installation Card	3-10
7.	Preparing for Installation	3-11
8.	Completing the Installation	3-12
9.	System Configuration	3-18
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12.	Connectivity Installation Worksheet	3-29
13.	Paper work	3-37

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3-1-3 Average Installation Time

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	Approximately 0.5 hour	
Scanner wo/options	Approximately 0.5 hour	Dependant on the required configuration

The LOGIQ A3 including options has been designed to be installed and checked out by an experienced service technician in approximately **Four** hours.

NOTE: For Installing Options average installation time is approximately between 0.5 - 2hrs depending on the required configuration

3-1-4 Installation Warnings

- 1.) Since the LOGIQ A3 weighs approximately 70 kg without options, preferably two people should unpack it. Two people are also preferable for installing any additional bulky items.
- 2.) There are no operator serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing and troubleshooting.

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

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

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

CAUTION

°C	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	140	131	122	113	104	96	86	77	68	59	50	41	32	23	14	5	-4	-13	-22	-31	-40
hrs	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8	10	12	14	16	18	20

Table 3-3 Time for Settlement

Section 3-2 Receiving and Unpacking LOGIQ A3

When a new system arrives, ensure that none of the components are damaged or in short supply. If shipping damage or shortage occurs, contact the address shown in chapter-introduction.

The Packaging/Unpacking Procedure.

Topics discussed in the Packaging/Unpacking Procedure:

- 1.) Check the Shipment,
- 2.) Unpack the Unit,
- 3.) Handling Incomplete or Damaged Shipment

Please read these procedures before packing/unpacking the LOGIQ A3.

We strongly advise you to store the LOGIQ A3 packing material in undamaged condition in case of future transportation.



Do not lift the unit by the Keyboard. This may cause equipment damage.

CAUTION



The crate with the LOGIQ A3 weighs approximately 70 kg. Be prepared for a sudden shift of weight as the unit is removed from its base (pallet).

CAUTION



Inspect the Shock watch and Tilt watch. Ensure that they are not fused. (Refer to the instructions attached on the packing Box on how to check the Shock watch and Tilt watch)

CAUTION

Section 3-2 Receiving and Unpacking LOGIQ A3 (cont'd)

- 1.) Remove all the Metal locks to dismantle the plywood packing.



Figure 3-1 The metal bands to be removed

Section 3-2 Receiving and Unpacking LOGIQ A3 (cont'd)

- 2.) Lift the TOP Cover up and off.



Figure 3-2 Removing the top cover

Section 3-2 Receiving and Unpacking LOGIQ A3 (cont'd)

- 3.) Remove the Front plywood...



Figure 3-3 Removing the front plywood

Section 3-2 Receiving and Unpacking LOGIQ A3 (cont'd)

- 4.) Move the slide plywoods to make space for placing the ramp.
- 5.) Remove the internal foams carefully.
- 6.) Place the top cover as shown in the figure 3-4 below to form the ramp to put the console down.



Figure 3-4 Position Top Cover

Section 3-2 Receiving and Unpacking LOGIQ A3 (cont'd)

- 7.) Unlock the brakes on the front castors, then carefully put the console off the Palette.
- 8.) Remove the Plastic Wrapping around the LOGIQ A3.



Figure 3-5 Moving the LOGIQ A3 from the crate

3-2-1 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!



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

CAUTION



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

CAUTION



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

CAUTION



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

CAUTION



OPERATOR MANUAL(S)

The User Manual(s) should be fully read and understood before operating the LOGIQ A3 and

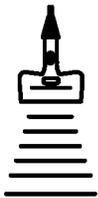
CAUTION kept near the unit for quick reference.



ACOUSTIC OUTPUT HAZARD

Although the ultrasound energy transmitted from the LOGIQ A3 probe is within AIUM/NEMA standards, avoid unnecessary exposure. Ultrasound energy can produce heat and mechanical damage.

CAUTION



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.

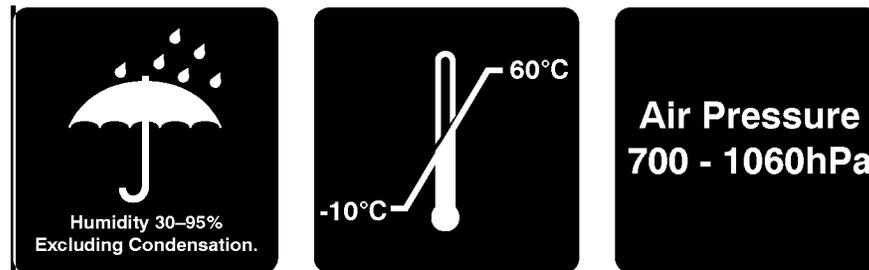


Figure 3-6 LABELS ON PACKAGE

3-2-2 Moving into Position



**Do not lift the unit by the Keyboard.
 Do not tilt the unit more than 5 degrees to avoid tipping it over.**

CAUTION



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

CAUTION

In general, a single adult can move the LOGIQ A3 along an even surface with no steep grades. At least two people should move the machine when large humps, grooves, or grades are encountered. (It is better to pull from the rear rather than push from the front of the unit). Before moving, store all loose parts in the unit. Wrap transducers in soft cloth or foam to prevent damage.

Although LOGIQ A3 is a compact and mobile machine, two people should move it over rough surfaces or up and down grades.

3-2-3 Adjusting System Clock

Set the system clock for the LOGIQ A3 to the local time. For procedure of adjusting the system clock, refer to Software Configuration Checks, in Chapter FUNCTIONAL CHECKS.

3-2-4 Product Locator Installation Card

Fill out proper customer Information on the Product Locator Installation Card. Mail this Installation Card "Product Locator" to the address corresponding to your pole.

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

	Mailing Address GE Medical Systems 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)
SYSTEM ID NUMBER <div style="border: 1px solid black; width: 100px; height: 15px; margin: 5px auto;"></div>			DIST.-COUNTRY	ROOM	EMPLOYEE NO.	
INSTALLATION						
CUSTOMER NO. _____ _____ _____ _____						
DESTINATION - NAME AND ADDRESS _____ _____ _____ _____						
ZIP CODE _____						

PRODUCT LOCATOR INSTALLATION CARD

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Section 3-3 Preparing for Installation

3-3-1 Verify Customer Order

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

3-3-2 Physical Inspection

3-3-2-1 Systems Voltage Settings

Verify that the received scanner is set to the correct voltage.

The Voltage ratings for the LOGIQ A3 Scanner is found on Rating label near the Circuit Breaker at the rear of the system



WARNING **CONNECTING A LOGIQ A3 SCANNER TO THE WRONG VOLTAGE LEVEL WILL MOST LIKELY DESTROY THE SCANNER.**

3-3-2-2 Video Formats

Check that the video format is set to the locally used video standard, NTSC or PAL. This can be done in the *setup* menu. (Refer to Chapter 13 of the Basic Users Manual for the procedure for change in the settings)

3-3-3 EMI Protection

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

3-3-4 Checking the Components

When a new system arrives, check that none of the components are damaged or in short supply. If shipping damage or shortage occurs, contact the address shown in Chapter-Introduction.



CAUTION **If the Power Plug is Modified or replaced to Suit the local Conditions and regulations, Ground continuity check should be performed between Ground Pin on the Plug and the Metal Part on the LOGIQ A3. Refer Section 10-6-4 for more details.**

Section 3-4 Completing the Installation

3-4-1 System Specifications

3-4-1-1 Physical Dimensions

The physical dimensions of the LOGIQ A3 unit are summarized in [Table 3-4 on page 12](#). The Size of LOGIQ A3, with monitor and peripherals is shown in [Figure 3-7 on page 12](#).

Table 3-4 Physical Dimension of LOGIQ A3

Height	Width	Depth	Unit
125	41.6	59	cm

Note: Tolerance of +/- 1.5 cm

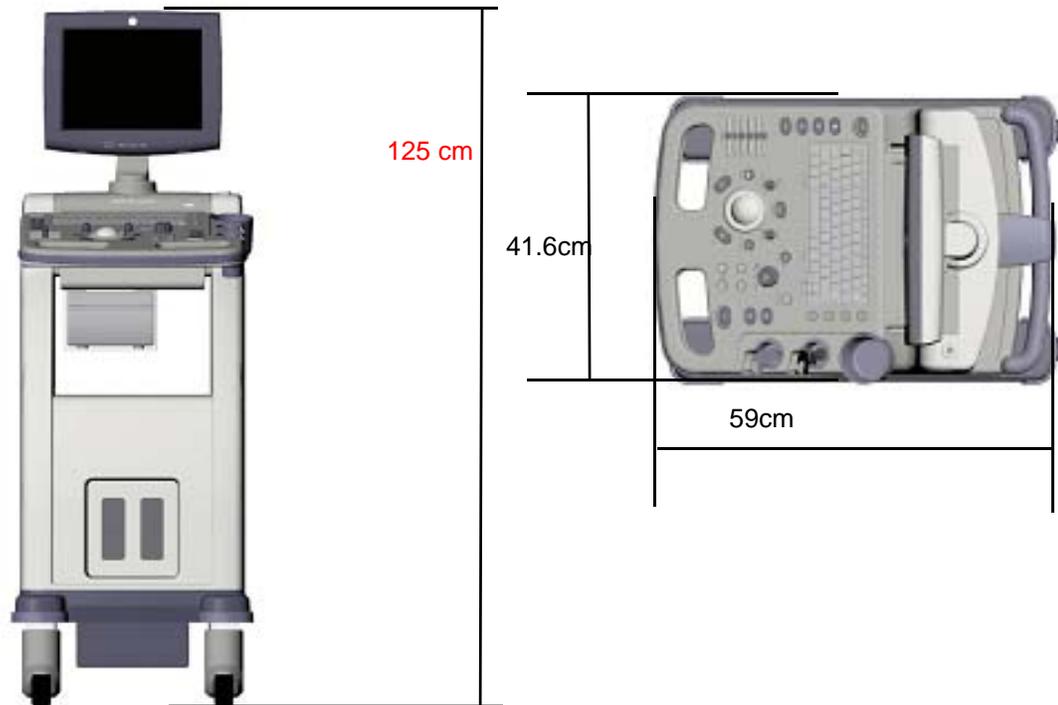


Figure 3-7 OVERALL DIMENSIONS

3-4-1-2 Weight with Monitor and without Peripherals

The Weight of LOGIQ A3 with monitor, without peripherals

Table 3-5 Weight of LOGIQ A3

Model	Weight [Kg]	Weight [lbs]
LOGIQ A3	70	154

3-4-1-3 Acoustic Noise Output:

Less than 70dB (A) according to DIN 45635 - 19 - 01 - KL2.

3-4-2 Electrical Specifications

Electrical conduit, junction boxes, outlets, circuit breakers, and switches should be in place before installing the LOGIQ A3 console

Table 3-6 Electrical Specification for LOGIQ A3

System	Voltage	Current	Frequency
1	120 ~ VAC	4.25A	50-60 Hz
2	230 ~ VAC	1.94A	50-60 HZ

3-4-3 Probe (Transducer) Connection

1.) Connect a transducer to the upper transducer receptacle as follows:

- A.) Ensure that the transducer twist lock lever points towards the 9 o'clock position.
- B.) Insert the transducer connector on the receptacle guide pin until it touches the receptacle mating surface.
- C.) Twist the transducer twist lock lever to the 2 o'clock position to lock it in place. Twist the lever to the 9 o'clock position to disconnect the transducer.

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

Connect the main power cable to a hospital grade power receptacle with the proper rated voltage checked during pre installation. Never use a three-to-two prong adapter; this defeats the safety ground.

3-4-4 Power On / Off Process

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

3-4-4-1 Scanner Power On

- 1.) Connect the Power Cable to the back of the system.
- 2.) Connect the Main Power Cable to a hospital grade power receptacle with the proper rated voltage. Never use an adapter that would defeat the safety ground.
- 3.) Switch ON the Circuit Breaker at the rear of the system.



Figure 3-8 Circuit Breaker and Power Cable on Back of Scanner

A- Circuit Breaker

B- Power cable

When power is applied to the scanner and the rear Circuit Breaker is turned ON, power is distributed to the Transformer Assembly

3-4-4-2 System Boot Up

Press the **Power On/Off** switch on the Control Panel once.



Figure 3-9 Power On/Off Switch for Back-end Processor Boot Up

1-Power ON/OFF Switch

When the **Power On/Off** switch on the Control Panel is pressed once, the Power is distributed to the Front-End, to the Peripheral outlets and to the Master Board at Back End. Master Board at Back End starts and the software is initiated to start the scanner.

No status messages are displayed during this process.

3-4-5 Power Off/ Shutdown

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

3-4-5-1 System Power Down

To power off the system:

- 1.) Lightly press the **Power On/Off** switch at the front of the system once. The Shutdown window is displayed.

NOTE: *DO NOT press and hold down the Power On/Off switch to shutdown the system. Instead, lightly press the Power On/Off switch and select Shutdown.*

- 2.) Using the Trackball, select Shutdown.
The shutdown process takes a few seconds and is completed when the control panel illumination shuts down.
- 3.) Disconnect the probes.
Clean or disinfect all probes as necessary. Store them in their shipping cases to avoid damage.
- 4.) If daily maintenance is to be performed, turn off the circuit breaker.

NOTE: *Do not pull the power cable without turning off the circuit breaker.*



CAUTION

DO NOT turn off the circuit breaker before the Power On/Off switch LED is amber.

Data may be lost or system software damaged if the circuit breaker is turned off before the Power On LED is amber.

(or)

- 1.) Press the **Power On/Off** switch on the Control Panel , and hold it till power goes off from the system.

3-4-5-2 Scanner Shutdown



Figure 3-10 Circuit Breaker and Power Cable on Back of Scanner

A- Circuit Breaker

B- Power cable

- 1.) Switch OFF the Circuit Breaker at the back of the system.
- 2.) Disconnect the Mains Power Cable if necessary. *For example:* Relocating the scanner.

Section 3-5 System Configuration

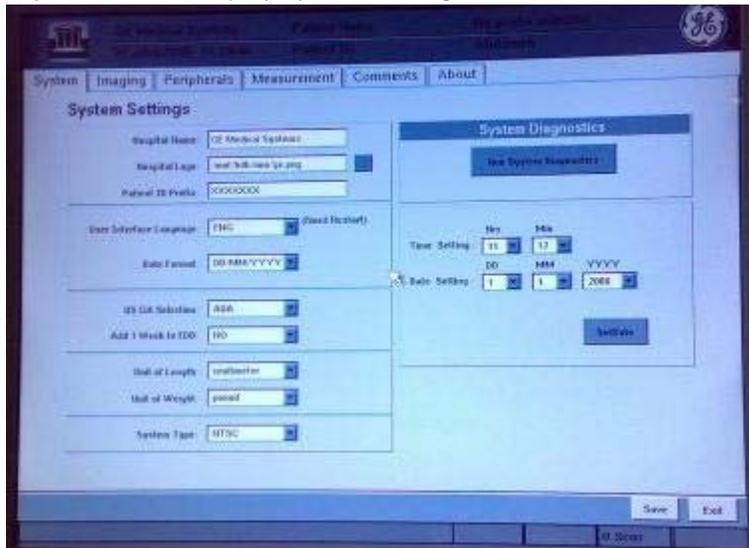
3-5-1 System Configuration

3-5-1-1 System Settings

Table 3-1 System Configuration

Configuration Category	Description
Settings	Enables the user or service personnel to set the date, time, unit, language, basic information about the organization such as the institution name and department.

- 1.) Power on the scanner.
- 2.) Press **Utilities** button
- 3.) Select "System" tab to display system settings menu.



- 4.) Set the **Hospital name, Department, Date format, Language, and Units.**
- 5.) Click on "Save" button.
- 6.) Click on Exit or Utilities to terminate the utility function.

NOTE: After making changes reboot the system when message appears on the screen.

Section 3-6 Network Connectivity

You use Connectivity functionality to set up the connection and communication protocols for the ultrasound system. This page gives an overview of each of the connectivity functions.

This configuration category enables users with rights to set the network connection for the system and connected remote PC to store images data. The windows XP remote PC with “Internet Information Services” enabled should be required.

NOTE: The remote PC with Windows XP Operating System should be required, and also make sure Internet Information Services Installed on PC.

Section 3-6 Network Connectivity (cont'd)

Check the availability of Internet Information Services by following below steps:

- 1.) Select "Start->Control Panel"



Figure 3-1. Control Panel

- 2.) Select "Administrative Tools" from control panel window.

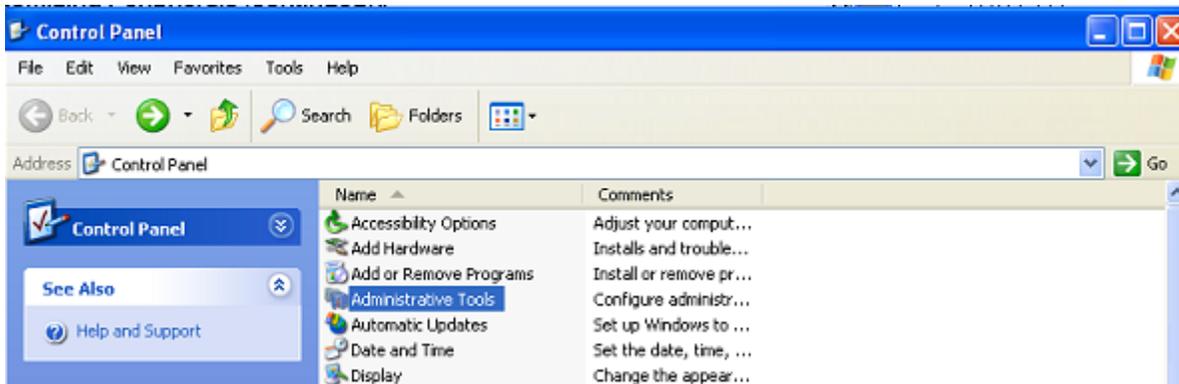


Figure 3-2. Administrative Tools

Section 3-6 Network Connectivity (cont'd)

- 3.) Select “Internet Information Services” from Administrative tools.

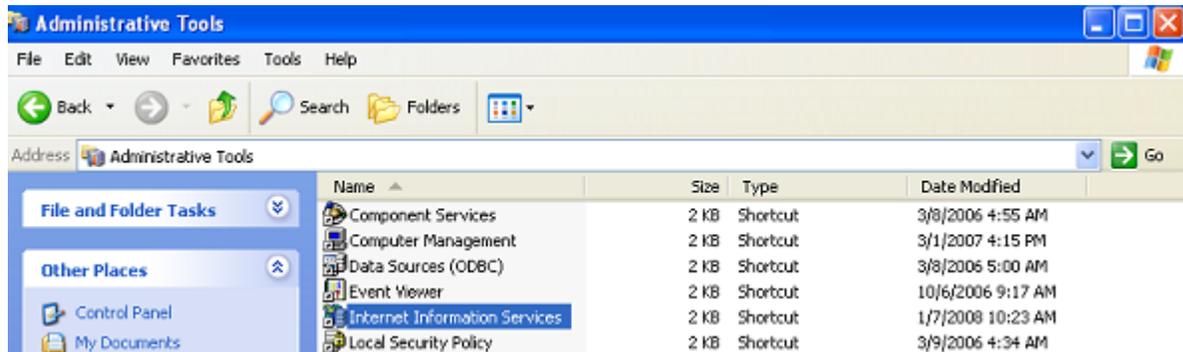


Figure 3-3. Internet Information Services

- 4.) Double click on Internet Information Services. Select “FTP sites” under “local computer” of “Internet Information Services” window.
Check for the “Default FTP site” state as “Running”.

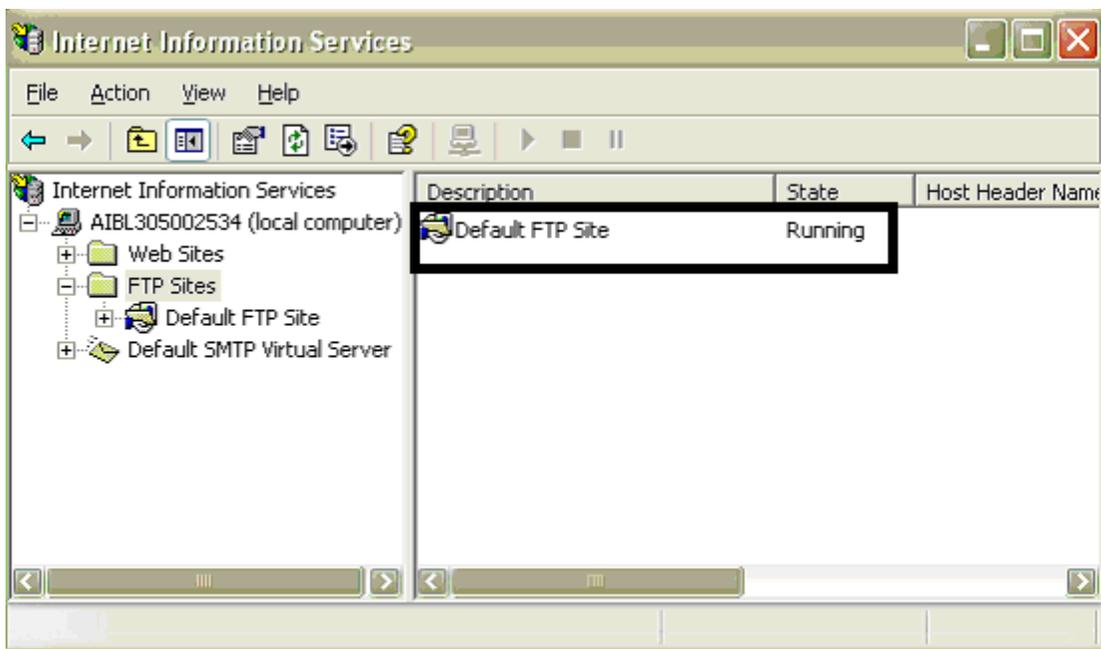


Figure 3-4. FTP site

NOTE: Default FTP site state as “Running” indicates that the system is ready for file transfer.

- 5.) Select the “Network Connection” from “Control Panel” to setup static IP Address. From “Network Connections”, select “Local Area Network”.

The “Local Area Connection properties” window displays on the screen. Select “Internet Protocol (TCP/IP)”->”Properties”. Select “Use the following IP Address” from Internet Protocol (TCP/IP) properties.

Section 3-6 Network Connectivity (cont'd)

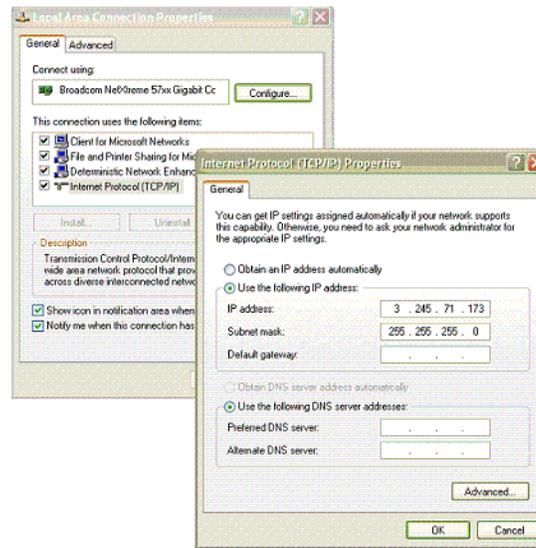


Figure 3-5. Static IP Address Setup

Enter IP address (for eg:3.245.71.173), and enter subnet mask as “255.255.255.0”.

- 6.) Now connect ethernet cable between the **LOGIQ A3** System and **remote PC**.
To enable the network connectivity, select “**Utility-> Measurement->Enable Network**” option.

It allows to enter the following Data:

- A.) Type the name of the Ultrasound system in the AE Title of **Devices** section.
- B.) type **port** number (Default:“**21**”) in port field of **Devices** section.
- C.) In the IP settings section, identify the ultrasound system to the rest of the network by one of the following:
 - * DO NOT enable DHCP.
 - * Type the IP-Address (acquire unique static IP address from hospital network administrator, for e.g.: 3.245.71.170), Subnet Mask as 255.255.255.0, and Default Gateway (if applicable).
 - * Enable DHCP, the system acquires dynamic IP Address from DHCP server.
- D.) In the External Host section, type the IP Address (acquire unique static IP address from hospital network administrator, for e.g.: 3.245.71.173).
- E.) On pressing “**Ping**” button tests the network connectivity.
Ping successful on the “ping status box” indicates the system is successfully connected to the network, ping failure message on the “ping status box” indicates the network connection failed.

Reboot the system once the network connection is established.

Section 3-7 Storage And Operation Requirements

The LOGIQ A3 is shipped in a single container excluding PROBES. Shipping weight is approximately 70 kg. The size of the container is B120 cm x W66 cm x H139 cm. (47 in. x 26 in. x 55 in). Table 3-2 provides a summary of temperature, atmospheric pressure, and humidity tolerances for shipping, installation, and operation.

Table 3-1 STORAGE AND OPERATION REQUIREMENTS

Parameter	Storage	Operation
Temperature (Deg C) (Deg F)	-10 to 60 14 to 140	10 to 40 50 to 104
Atmospheric Pressure (hPa)	700 to 1060	700 to 1060
Humidity (%) (non-condensing)	30 to 85	30 to 85

Section 3-8 Optional Peripherals

3-8-1 Optional Peripherals/Peripheral Connection

See the Internal and External I/O description in Chapter 5.

3-8-1-1 Approved peripherals

The below table shows the suggested optional peripherals for LOGIQ A3. CD Drive is the only On-board peripheral. All other peripherals are Off-board.

Table 3-2 List of Recording Devices

Device	Manufacturer	Model	Catalog Number	Video Signal
B/W Video Printer	SONY	UP-897MDW UP-D897MD	H47012LW	NTSC/PAL
Deskjet Printer	HP	HP-1160C	H47002LM	NTSC/PAL

Table 3-3 USB Devices

Device	Device Name	Manufacturer	Device Type	Memory Size
USB	JetFlashTS256 M	Transcend	Digital	512MB USB 2.0 Flash Memory
USB	Cruzer	SanDisk	Digital	512MB USB 2.0 Flash Memory
USB HDD	Silver Series Portable Hard Drive	iomega	Digital	<= 120GB Hard disk

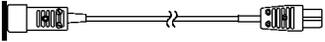
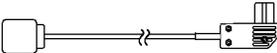
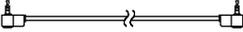
NOTE: See each option installation instructions for installation and connection procedures.

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3-8-1-2 Connecting Cables

 **Equipment damage possibility. Be sure to use the following recommended connecting cables to connect recording devices and a network with LOGIQ A3 console. Failure to do so would result CAUTION in unstable system behaviour and can possibly damage the Equipment**

Table 3-4 LIST OF CONNECTING CABLES

Name	Part No.	Figure	NOTE
Power Cable	P9509EE		Use only approved IEC Couplers for peripherals connection to System Rear panel
	P9509MH		Used only for installing Peripherals on front panel of the console
Mini-Plug Cable	P9509BE		For control signals (used only for B/W video printer)

3-8-1-3 Power Consumption of Optional Peripherals

Table 3-5 Power Consumption of Optional Recording Devices

Device	Manufacturer	Model	Power Consumption (VA)
B/W Video Printer	SONY	UP-897MDW	133
		UP-D897MD	133
Deskjet Printer	HP	HP-1160C	50

NOTE: At Any point of time, only one peripheral should be activated.

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3-8-2 Available Probes

See in specification in the LOGIQ A3 User Manual for Probes and intended use.
 See Chapter - Renewal Parts for Part Numbers to be used when ordering new or replacement probes.

Table 3-6 LIST OF TRANSDUCERS

Probe Name	Material of Headshell	Area of Using	TYPE	Catalog Number	Part Number
4C	PES	Abdomen, OB/GYN, Urology	Convex	H4904PC	5123455
3S	NORYL	Cardiac	Sector	H4550SZ	2323337
8L	NORYL	Small Parts	Linear	H40482L	5140738
E8C	NORYL/PBT	OB/GYN, Urology	Micro_Convex	H40412LE	2294641

NOTE: PES: Polyethersulfone NORYL: Modified Polyphenylene Oxide PU: Polyurethane PBT: Polybutylene Terephthalate ABS: Acrylonitrile Butadiene Styrene

3-8-3 Peripherals/Accessories Connector Panel

Connection to the Peripherals and Accessories can be established by connecting to the LOGIQ A3 Rear panel.

The Rear Panel of LOGIQ A3 Consists of following connectors to connect peripherals.

- 1) BNC Connectors
- 2) SVideo-Out
- 3) Ethernet
- 4) USB Ports

3-8-3 Peripherals/Accessories Connector Panel (cont'd)

5)VGA Connector



Figure 3-11 Rear Panel

Item	Connector Name	Table Number	Description
1	S-Video Out	Table 3-8	4 pin mini-DIN
2	VGA Out	Table 3-9	DSUB-HD22 15 Pin female
3	Composite Video Out	Table 3-10	BNC Connector, Color Output
4	USB	Table 3-12	
5	Ethernet		Network Connectivity

Table 3-7 External I/O Connector Descriptions

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3-8-3 Peripherals/Accessories Connector Panel (cont'd)

1.) S-Video Connector - 4Pin mini-DIN

Table 3-8 S-Video Connector, 4 Pin

Pin No	Output Signal	Description	Picture
1	SVIDEO OUT/IN YG	Y (Luma) GND	
2	SVIDEO OUT/IN CG	C (Chroma) GND	
3	SVIDEO OUT/IN Y	Y (Luma) SIGNAL	
4	SVIDEO OUT/IN C	C (Chroma) SIGNAL	

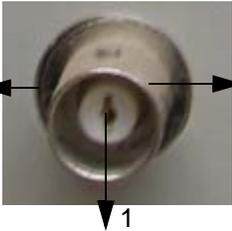
2.) VGA Out - DSUB-HD22 15 pin female

Table 3-9 VGA Connector, Shrunk Sub-D 15 Pin

Pin No	Output Signal	Description	Picture
1	VGA OUT1 R	Red	
2	VGA OUT1 G	Green	
3	VGA OUT1 B	Blue	
4, 9,11,12,15	N/C	N/C	
5, 6, 7, 8, 10	GND	GND	
13	VGA OUT1 HS	H Sync	
14	VGA OUT1 VS	V Sync	

3.) Composite Video Out - BNC Connector

Table 3-10 Composite Video Out

Pin No	Output Signal	Description	Picture
1	Composite Video	BNC Connector, Color Output	
2	GND	GND	
3	GND	GND	

3-8-3 Peripherals/Accessories Connector Panel (cont'd)

4.) Pin Assignment of USB1 & USB2 Connector: USB

Pin No.	Signal	Pin No.	Signal	Picture
1	+5 VDC	3	DATA +	<p>USB</p>
2	DATA -	4	GND	

Table 3-11 Pin Assignments of USB

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Section 3-9 Paper work

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

3-9-1 Product Locator Installation

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

		GE Medical Systems Mailing Address: Product Locator File P.O. Box 414 Milwaukee, WI 53201-0414			
		DESCRIPTION	FDA	MODEL	REV
PREPARE FOR ORDERS THAT DO NOT HAVE A LOCATOR INSTALLATION REPORT		OCF	BS	ORD	DATE (MO-DA-YR)
		DIST.-COUNTRY	ROOM	EMPLOYEE NO.	
SYSTEM ID NUMBER		CUSTOMER NO.			
PRINTED IN USA INSTALLATION INSTALLATION		DESTINATION - NAME AND ADDRESS			

		ZIP CODE			

Figure 3-1 Product Locator Installation Card

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3-9-2 GE Cares Sticker

Stick GE CARES sticker after Installation. Refer Figure 3-12 for details.

NOTE: InSite is not supported in Logiq A3, hence is not applicable.

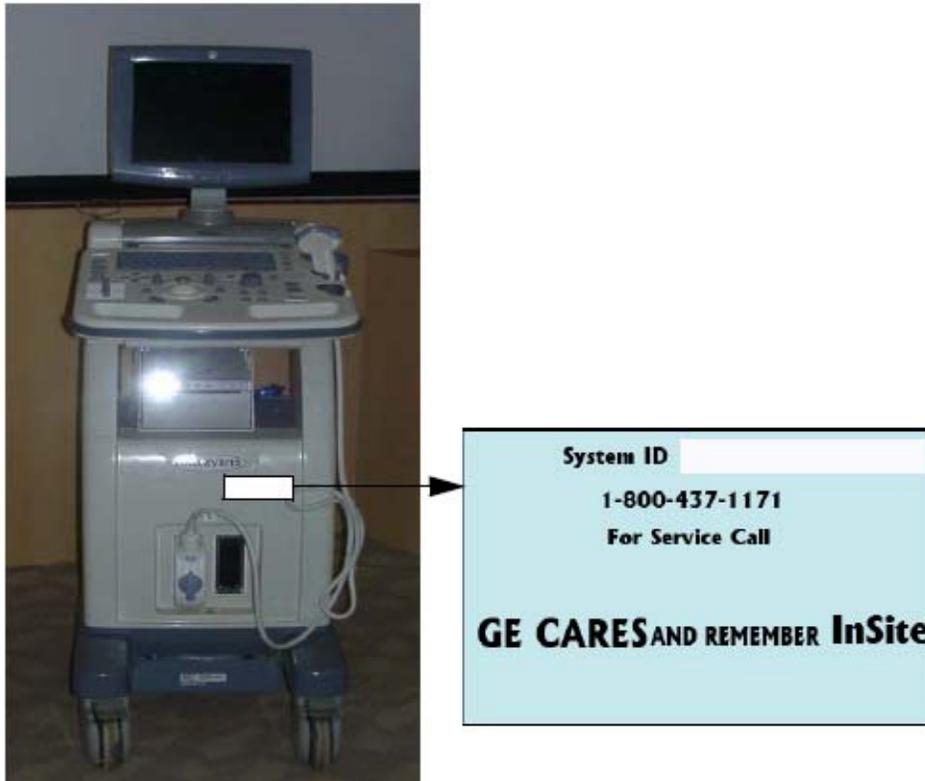


Figure 3-12 GE CARES Sticker Location

3-9-3 User Manual(s)

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

Chapter 4 Functional Checks

Section 4-1 Overview

4-1-1 Purpose

This chapter provides procedures for quickly checking major functions of the LOGIQ™ A3 scanner diagnostics by using the built-in service software, and power supply adjustments.

4-1-2 Table Of Contents

Table 4-1 Contents in Chapter 4

S.No	Description	Page Number
1	Overview	4-1
2	Required Equipment	4-1
3	General Procedure	4-2
4	Functional Checks	4-3
5	Software Configuration Checks	4-11
6	Peripheral Checks	4-11
7	Safety Issues	4-13
8	Site Log	4-14



NOTICE Most of the information pertaining to this *Functional Checks* chapter is found in the LOGIQ™ A3 *Basic User Manual* (Direction number 5191391-100).

Look for the letters (BUM) after a section in the Table of Contents to determine if the information is in this chapter or in the *Basic User Manual*.

Section 4-2 Required Equipment

- An empty (blank) CD R/W disk
- At least one transducer. (normally all the transducers used on the system should be checked).

Section 4-3 General Procedure



CAUTION SYSTEM REQUIRES ALL COVERS

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



NOTICE Lockout/Tagout Requirements (For USA only)

Follow OSHA Lockout/Tagout requirements by ensuring you are in total control of the Power Cable on the system.



4-3-1 Power On/Boot Up

For Power On/Off process , Refer Power On / Off Process on page 3 - 14

4-3-2 Adjusting the Display Monitor

4-3-2-1 Brightness and Contrast

To adjust the brightness:

- 1.) Press the menu button of the display.
- 2.) Press the “+” button to increase brightness.
Press the “-” to decrease brightness.
The amount of brightness is shown on a slider on the screen.

To adjust the contrast:

- 1.) Press the menu button of the display. Select the contrast from the popup menu.
- 2.) Press the “+” button to increase contrast.
Press the “-” to decrease contrast.
The amount of the contrast is shown on a slider on the screen.

4-3-3 Lockout/Tagout Requirements (For USA/Europe Only)

Follow OSHA Lockout/Tagout requirements by ensuring you are in total control of the plug.



NOTICE Lockout/Tagout Requirements (For USA / Europe only)

Follow OSHA Lockout/Tagout requirements by ensuring you are in total control of the Power Cable on the system.



Section 4-4 Functional Checks

4-4-1 Basic Controls

4-4-1-1 Alpha Numeric Keyboard

Table 4-2 Keyboard

Task	Expected Result
Esc	Exit current display screen.

4-4-1-2 Keyboard Controls

Table 4-3 Keyboard Controls

Task	Expected Result
Patient	Enter Patient Demographic data screen.
B-Mode (Scan)	Returns machine to scanning state and select scan mode.
Report	Activates default report and touch screen of report choices.
Utility	Activates the machine's configuration.
Probe	Activates probe selection menu.

4-4-2 B Mode Checks

4-4-2-1 Preparations

- 1.) Connect one of the probes listed in Available Probes of Chapter - Installation to the system probe connector.
- 2.) Turn ON the scanner (if it isn't turned on already)
- 3.) Perform the "Screw driver Test" on the system, to ensure that that B-mode image is fine.

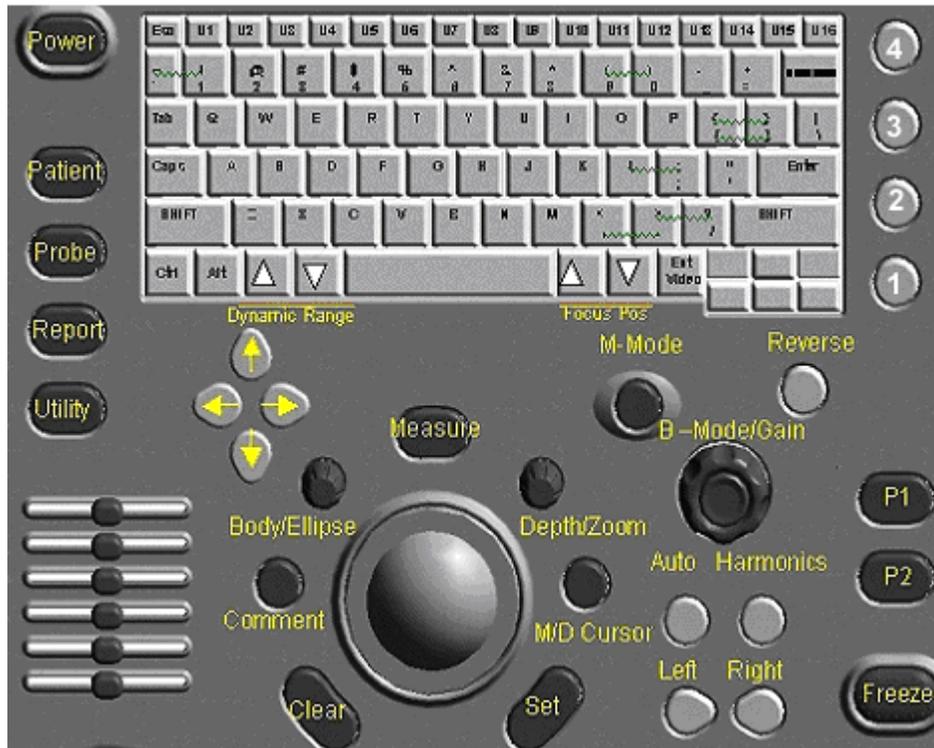


Figure 4-1 LOGIQ™ A3 B Mode Controls

4-4-2-2 B Mode OP Panel Controls

Table 4-4 B Mode Control Panel Controls

S.No	Task	Expected Result(s)
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. Turn Depth right/left 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 G (dB).
4	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.
5	Activate Auto Optimize	Optimize the image based upon a specified region of interest or anatomy. Press the right Auto control to activate.
6	Adjust Zoom	invokes the ROI on the display, according to ROI movement by using trackball the zoomed image with respect to ROI will be displayed on the image area of the screen.
7	Adjust Focus	Changes the location of the focal point(s). A triangular focus marker indicates the depth of the focal point.
8	Reverse	Toggles the left/right orientation of the scan image.
9	Harmonics (Activate Tissue Harmonics)	Diminishes low frequency high amplitude noise and improves imaging. Enhances near field resolution for improved small parts imaging as well as far field penetration. Press Harmonics Key to activate.
10	Dynamic Range	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast. This Control is available on the Top Menu

Table 4-5 B Mode Top and Sub menu Controls

Step	Task	Expected Result(s)
1	Image Invert	Flips the image top/bottom by 180 degrees.
2	Edge Enhance	Enhance the gray scale differences corresponding to the edges of structures. Press and turn Edge Enhance left/right to cycle through the settings.
3	Frequency	Enables the adjustment of the probe's operating frequency. Rotate Frequency and select desired value. The selected frequency is displayed in the status window.
4	Biopsy Guideline	Biopsy guidelines appears.
5	Grey Map	Image brightness will be adjusted as per grey map selection.
6	Frame Average	Smooths the image by averaging frames.

4-4-3 M Mode Controls

4-4-3-1 Preparations

- 1.) Connect one of the probes listed in Available Probe of Chapter-Installation to the system probe connector.
- 2.) Turn ON the scanner (if it isn't turned on already)

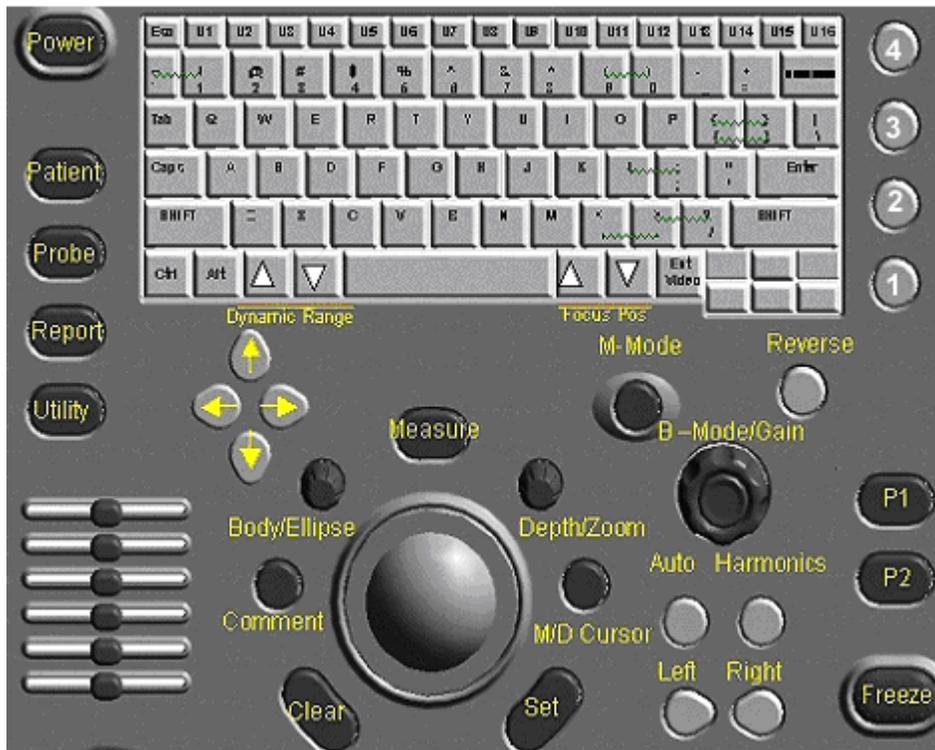


Figure 4-2 Controls available in M Mode

4-4-3-2 M Mode OP Panel Controls

Table 4-6 M Mode OP Panel Controls

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

4-4-3-3 M Mode Top and Sub menu Controls

Table 4-7 M Mode Top and Sub Menu Controls

Step	Task	Expected Result(s)
1	Sweep Speed	Changes the speed at which timeline is swept. Rotate Sweep Speed left/right to increase/decrease the value.
2	Rejection	Affects border sharpness.
3	MGrey Map	Image brightness will be adjusted as per grey map selection.

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4-4-4 Measurement and Multi Image Checks

4-4-4-1 Performing B Mode Measurements Checks

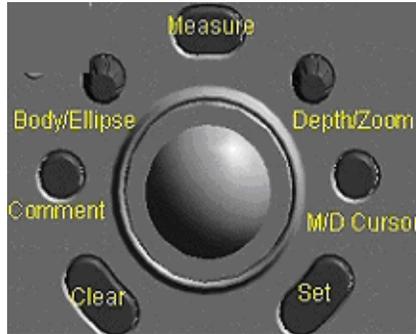


Figure 4-3 Measurement Keys

Table 4-8 Measurement Checks

Step	Task	Expected Result(s)
1.	Generate the B image.	B image is active on the screen
2.	Press Freeze	Freeze the image to measure.
3.	Press MEASURE on the Control Panel to enter the Assign and Measure modality.	The measurement soft menu for the current exam category is displayed on the Monitor. Select the appropriate exam category and measurement kind.
4.	Trackball the cursor	Move the cursor to the start point of the measurement
5.	Press Set .	Anchor the start point of the measurement.
6.	Trackball the cursor	Move the cursor to the measurement end point. The current distance value is displayed in the <i>Measurement result table</i> and is instantaneously updated when moving the cursor

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4-4-5 Basic Measurements

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

4-4-5-1 Distance and Tissue Depth Measurements

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

Before you complete a measurement:

To toggle between active calipers, press **MEASURE**.

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

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

4-4-5-2 Circumference/Area (Ellipse) Measurement

- 1.) Press **MEASURE** once; an active caliper displays.
- 2.) To position the active caliper, move the **TRACKBALL**.
- 3.) To fix the start point, press **SET**. The system fixes the first caliper and displays a second active caliper.
- 4.) To position the second caliper, move the **TRACKBALL**.
- 5.) Turn the **ELLIPSE** control; an ellipse with an initial circle shape appears.

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

- 6.) To position the ellipse and to size the measured axes (move the calipers), move the **TRACKBALL**.
- 7.) To increase the size, turn the **ELLIPSE** control in a clockwise direction. To decrease the size, turn the **ELLIPSE** control in a counterclockwise direction.
- 8.) To toggle between active calipers, press **MEASURE**.
- 9.) To complete the measurement, press **SET**. The system displays the circumference and area in the measurement results window.

Before you complete a measurement:

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

4-4-5-3 Report Pages

Measurements/Calculations can also be displayed on Report Pages.

4-4-6 Probe/Connectors Usage

4-4-6-1 Connecting a probe

- 1.) Place the probe's carrying case on a stable surface and open the case.
- 2.) Carefully remove the probe and unwrap the probe cable.
- 3.) DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.
- 4.) Turn the connector locking handle counterclockwise.
- 5.) Align the connector with the probe port and carefully push into place.
- 6.) Turn the connector locking handle clockwise to secure the probe connector.
- 7.) Carefully position the probe cable in the probe cord holder spot so it is free to move, but not resting on the floor.

4-4-6-2 Activating the probe

Press "**Probe**" Key available on the control panel. The next available probe will be activated and presets will be loaded automatically.

When deactivating the probe, the probe is automatically placed in standby mode.

- 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.

4-4-6-3 Disconnecting the probe

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

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

4-4-7 Using Cine

4-4-7-1 Activating CINE

Press **FREEZE**, Then cine guage appears on the bottom of submenu. Use "Trackball" to move frame by frame or Gain key. Press "Numeric Key 2" to start cine loop.

4-4-8 Image Management (QG)

For Image Management functionality refer to the LOGIQ™ A3 Quick Guide. It talks about several topics:

- Clipboard
- Internal Memory
- Starting an Exam

4-4-9 CF Checks

If all the previous tests have been passed successfully, the CF is most likely OK. If the system seems to be operating erratically, Please refer to Chapter7, Diagnostic/Troubleshooting.

4-4-10 Software Configuration Checks

Table 4-9 Software Configuration Checks

Step	Task to do	Expected Result(s)	
1.	Check Date and Time setting	Date and Time are correct	Adjust the Date and Time setting
2.	Check that Location (Hospital Name and Department) is correct	Location Name is correct	Re-enter the correct Location Name
3.	Check Language setting	Language is proper	Set the proper Language
4.	Check Units setting	Units are proper	Set the local units
5	Check assignment of Printer Keys	Print1-2 Keys are assigned as desired by the customer	
6	Check that all of the customer's options are set up correct	All authorized functions are enabled	

Section 4-5Peripheral Checks

Check that peripherals work as described below:

Table 4-10 Peripheral checks

Step	Task to do	Expected Result(s)
1.	Press FREEZE	Stop image acquisition.
2.	Press PRINT 1 or PRINT2 on the Control panel	The image displayed on the screen is printed on B&W, depending on the key assignment configuration.
3.	Press B MODE on the Control Panel	to return to the scanning mode

Section 4-6 Presets Backup/Restore Checks

Check that preset Backup/Restore feature work as described below:

- 1.) **Presets Backup:** It allows to save presets on memory stick.
- 2.) **Presets Restore:** It allows to copy the presets from memory stick to the system.

4-6-1 Presets Backup

- 1.) Create a folder "**imgsettingsbackup**" on Memory stick
- 2.) Create a file "**unopresetbackup**" on Memory stick
- 3.) Switch **Off** the system and insert memory stick on top panel memory port
- 4.) Switch **ON** the system and allow it to boot.

The system copies the Imaging Presets onto the Memory stick.

Rename the file on Memory stick "**unopresetbackup**" as "**unopresetbackup_**" to have a backup before restoring in to the system.

4-6-2 Presets Restore

- 1.) Create a file "**unopresetbackup**" as "**unopresetrestore**" onto memory stick
- 2.) Switch **Off** the system and insert memory stick on top panel memory port
- 3.) Switch **ON** the system and allow it to boot.

The presets from memory stick get restored on the System at bootup.

Section 4-7 Safety Issues

4-7-1 Probe/Connectors Check

Take the probes and check them as described below:

Table 4-11 Probe and connectors check

Step	Task to do	Expected Result(s)
1.	Test Each delivered Probe	it will display pictorial data on the screen
2.	Test each probe in each connector slot	It will display pictorial data each time
3.	Hold the probe connector vertically with the cable pointing upward. Turn the connector locking handle to the horizontal position. Align the connector with the probe port and carefully push into place. Rotate the locking handle to the full vertical position to lock in place. Position the probe cable so that it is not resting on the floor CAUTION: Do not allow the probe head to hang freely. Impact to the probe head may result in irreparable damage.	Able to connect a probe
4.	Press the "Probe" key available on the control panel to activate second probe connected.	Second probe details loaded on the screen automatically.
5.	Rotate the lock handle counter-clockwise to the horizontal position to unlock the connector. Remove the connector from the port Ensure that the probe head is clean before placing the probe in its storage case.	To disconnect probes: The probes that are not connected to the unit should be stored in their storage case.



WARNING *Probes can be connected at any time, whether the unit is on or off*

Do NOT touch the patient and any of the connectors on the ultrasound unit simultaneously, including ultrasound probe connectors.



WARNING *Take the following precautions with the probe cables: Keep free from the wheels. Do not bend. Do not cross cables between probes.*

4-7-2 Power Supply Adjustment

There are no adjustments on the power supplies. The DC Power is self-regulated. If a voltage is outside the specified range, it means that something is wrong, either with the power supply itself or with a component connected to that specific power outlet.

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Chapter 5 Components and Functions

Section 5-1 Overview

5-1-1 Purpose of Overview

This chapter explains LOGIQ™ A3's system concepts, component arrangement, and subsystem function. It also describes the Power Distribution System (PDS) and probes.

Table 5-1 Table Of Contents for this chapter

S.No	Description	Page Number
1	Overview	5-1
2	Block Diagrams and Theory	5-3
3	Front End	5-4
4	Back End Module	5-6
5	Power Supply(LV/HVPS)	5-8
6	Rear Panel Assembly	5-9
7	Keyboard Assembly	5-10
8	LCD	5-11
9	Circuit Boards Descriptions	5-12

5-1-2 General Information

- LOGIQ™ A3 is a phased and linear array ultrasound imaging scanner. The system can be used for:
 - 2D Black-and-White imaging
 - M-Mode Black-and-White imaging
 - Different combinations of the above modes
- Signal flow travels from the Probe Connector Panel to the Front End, to the Mid Processors and Back-End Processor, and finally to the monitor and peripherals.

5-1-3 System Features

The key design goals of this system are:

- High Image Quality
- Increased User Productivity
- Multiple Clinical Applications
- High Mobility

5-1-4 Types of Applications

The LOGIQ™ A3 is a general imaging system which supports many clinical uses. Scan and display parameters may be user selected to default to desired values for each application. The system presets many parameters to clinically determined, optimal values.

- Radiology/Abdomen
- Cardiology
- Obstetrics
- Gynecology
- Urology
- Small Parts

The LOGIQ™ A3 system can be divided into an analog signal processing section, a digital signal processing section, and the microprocessor driven system control section, which controls the system based on operator commands and system status information.

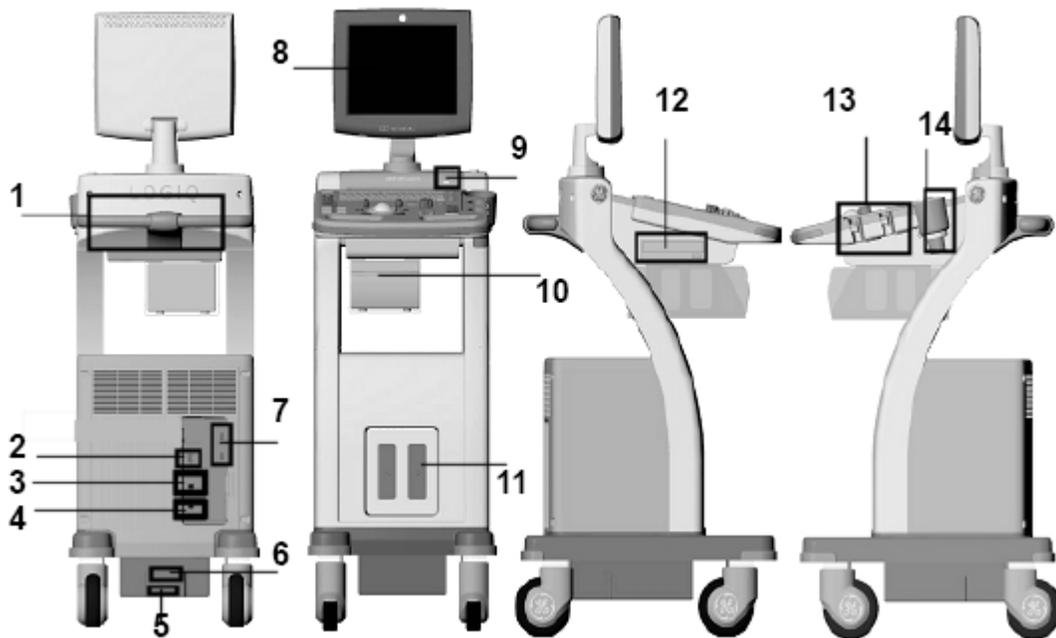


Figure 5-1 LOGIQ™ A3 Major Components

- | | | |
|---------------------|---------------------------|--------------------|
| 1. Handler | 6. Circuit Breaker | 11. Two Probe Port |
| 2. VGA Connector | 7. USB Ports | 12. CD Drive |
| 3. BNC Connectors | 8. Monitor | 13. Probe Holder |
| 4. Video Connectors | 9. USB Port | 14. Gel Holder |
| 5. Power Connector | 10. B/W Printer(Optional) | |

Section 5-2 Block Diagrams and Theory

5-2-1 Block Diagram

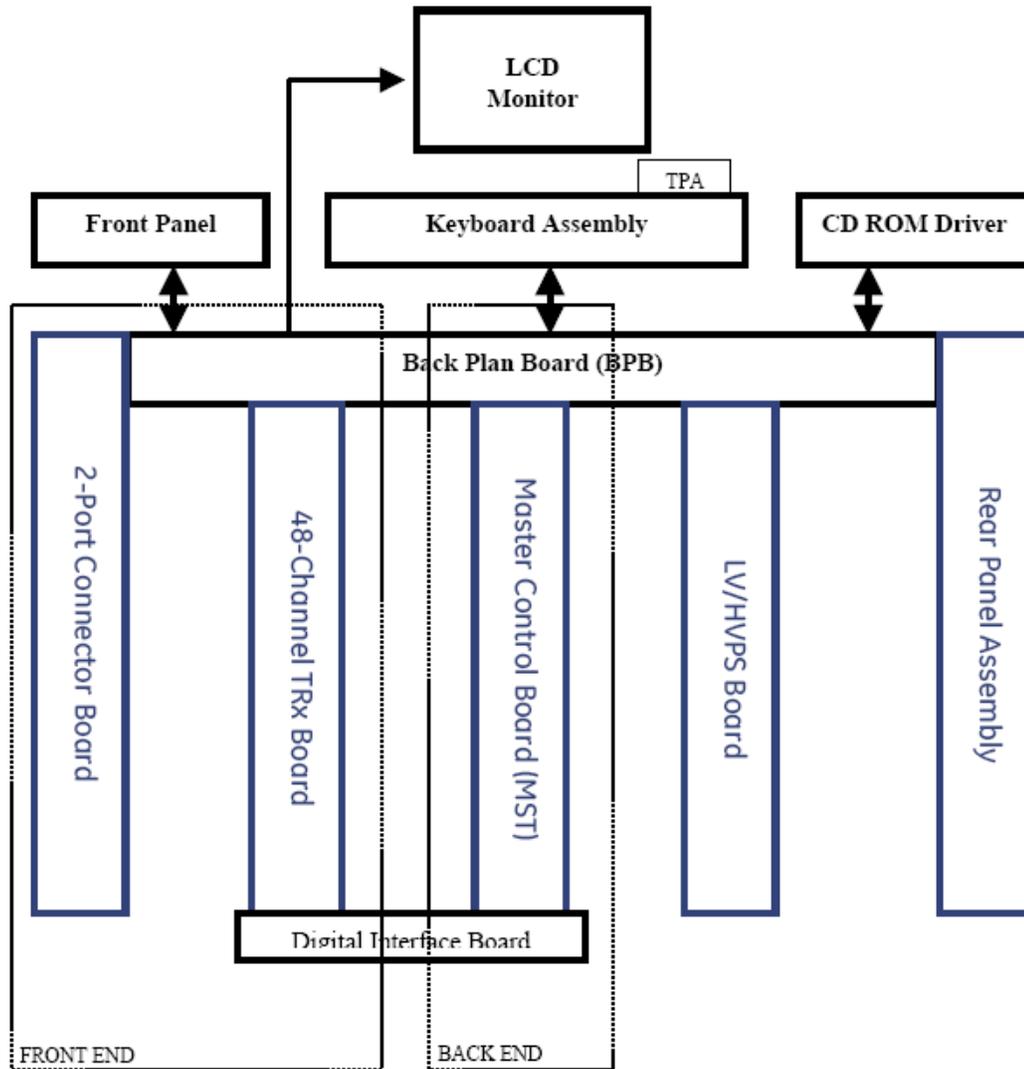


Figure 5-2 LOGIQ™ A3 Block Diagram

5-2-2 Front End

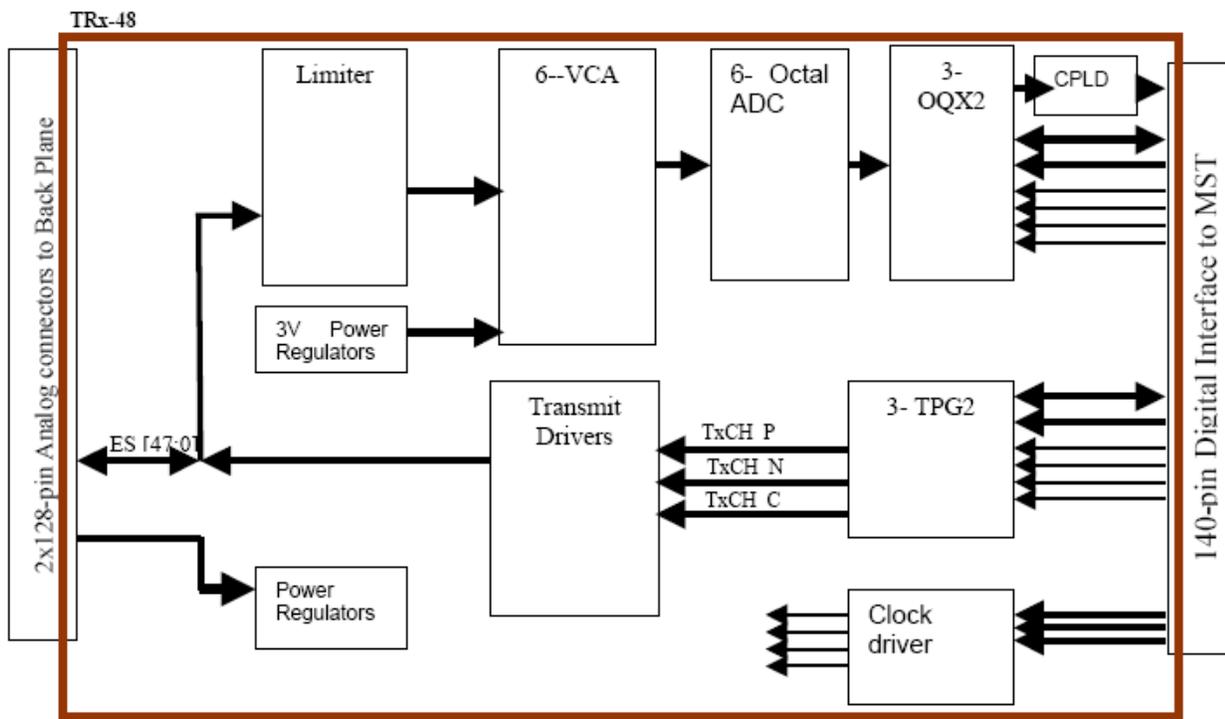
This module is mainly responsible for interface and control of ultrasonic transducer and also does the data delay summing on the received raw data. The processed data is send to Back end module for further DSP processing, display and storage. The Front End Module consists following two PCB's:

- 1) TxRx Board
- 2) Connector Board

5-2-2-1 Transmit/Receive PCB (TxRx)

TxRx includes 48-channel transmit and receive circuits in a single board. This board is mainly divided in to five sections:

- 1.) Three 16-channel transmit pulse generators
- 2.) 48- High voltage transmit drivers
- 3.) Six octal voltage control attenuator/gain amplifier
- 4.) Six Octal high speed analog to digital converter
- 5.) Three 16-channel receive delay summer



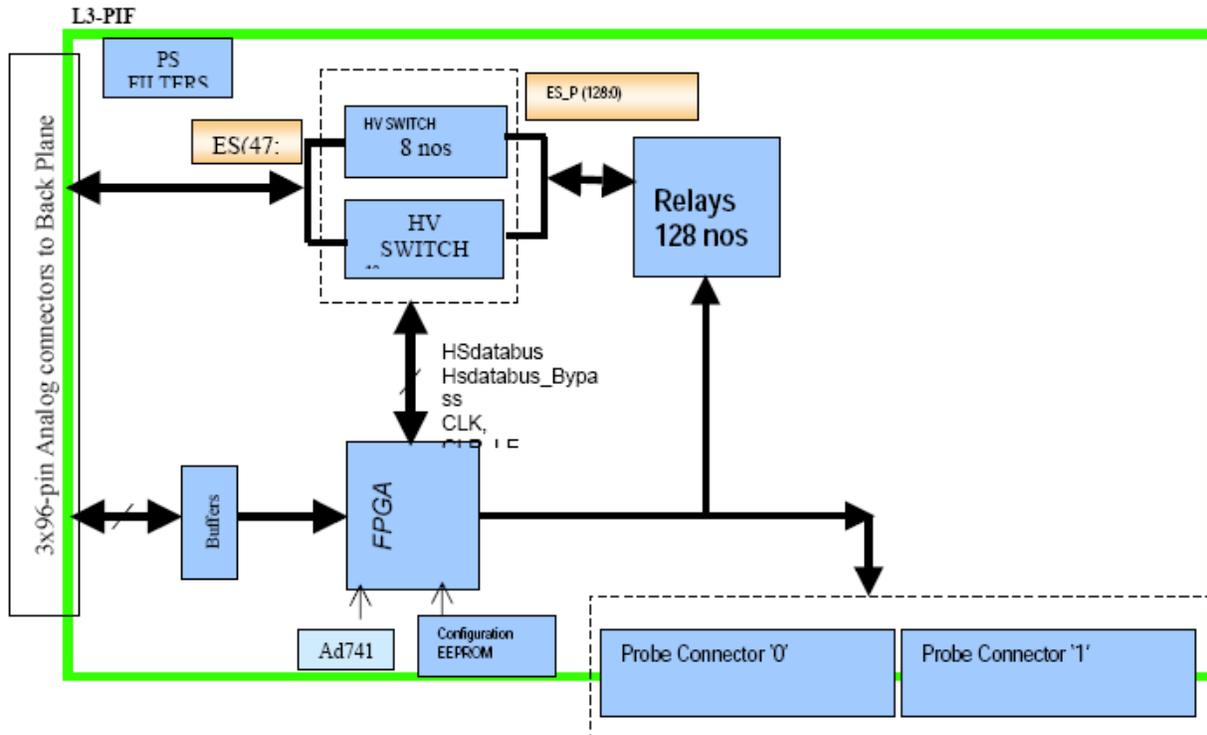
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5-2-2-2 Probe Interface PCB(Connector Board)

Logiq Uno Connector board is designed to support 64, 96 and 128-element probes. Depending on the scan line number, 48-specific elements out of 64/96/128 elements are connected to the respective TxRx sections.

CONN board includes 128-HV-switches which acts as Multiplexer/De-Multiplexer to steer 48 transceiver signal lines from TxRx board to the selected 48 - transducer elements of the probe. HV Switches can handle a maximum of 200V PP transmit pulses.

Logiq-Uno CONN board supports two probe ports with only one probe is active at a time. To switch between the two probes a bank of 128 electromagnetic relays are used.



CONN board includes a FPGA to generate the HV switch programming data that will steer the TxRx signals to the correct probe elements. FPGA has following read/write registers to interface with the master controller board (MST):

Read registers from connector board....

- 1.) creg0 at address X03H is temp(7:0)
- 2.) creg1 at address x04H is temp(15:8)
- 3.) creg2 at address x05 is connector board revision number
- 4.) creg3 at address x06 is probe port status.....Its 11111& Probe2 status & Probe1 status & Probe0 status
- 5.) creg4 at address 0x07 is probe code for port0
- 6.) creg5 at address 0x08 is probe code for port1

Write registers to connector board....

- 1.) reg1 at address 0x01 is PRMCHG & MUXPRB & X & CONNUM(1:0) & RegFreeze(2:0)
- 2.) reg2 at address 0x02 is start element

5-2-3 Back End Module

The Back End Module consists following two PCB's:

- 1.) System On Module
- 2.) Master Control Board

5-2-3-1 System On Module(SOM)

This module consists of a System On Module (SOM), which is mainly responsible for backend processing and storing of patient data.

5-2-3-2 Master Control Board(MST)

MST board is the central processing unit of the Logiq-Uno system. It includes a TMS320C6415T digital signal processor for front-end data processing (mainly scan conversion) of receive signals and scan setup and control.

The OQX2 beam former output of TxRx board is connected to Chafcom ip. CHACOM- CHAF + COMSO CHAF is Coded decoder and filter for Tissue Harmonics. The COMSO includes filters, demodulator, detector, rate conversion, edge enhance and its controls. Data FPGA controls the chafcom interface and initializes all the chafcom registers with default data on poweron. DSP based on command from SOM updates the DPRAM region in data fpga whenever user changes DRC, Edge enhancement, Gain, Frequency and TGC. DataFpga based on command updates these data to chafcom during Trig high period.

The output of Chafcom scan line wise is stored in DPRAM implemented in Data Fpga. DSP reads this image data in polar coordinates from Data Fpga Dpram and stores in internal memory. DSP performs scan conversion, bilinear interpolation on the data in polar format to XY format. The final data is transferred to SOM SDRAM using PCI bus DMA protocol.

DSP6415 firmware controls the scan setup and sequence. DSP sets up the scan based on Trig interrupt from FPGA. The trig low time depends on the ultrasound depth set by the user. Scan setup happens during trig high time. DSP writes the TPG2, Oqx2 register values required for the current scan line to Control FPGA DPRAM. Control FPGA reads the DPRAM values and updates the ASIC with the new set of data. Control FPGA generates the necessary signals required to meet the timing specs for the Asic. MST Control FPGA interfaces with Connector Board FPGA with predefined protocol. DSP updates on probe change request, and HV mux start element values are written from control fpga to connector board fpga every trig. Connector board FPGA in turn returns the probe code value and other status to MST FPGA.

DSP code resides in the flash memory. DSP copies the data from flash memory to internal memory and executes the code. CPLD controls the DSP flash interface. DSP SDRAM stores probe related IQ resource data.

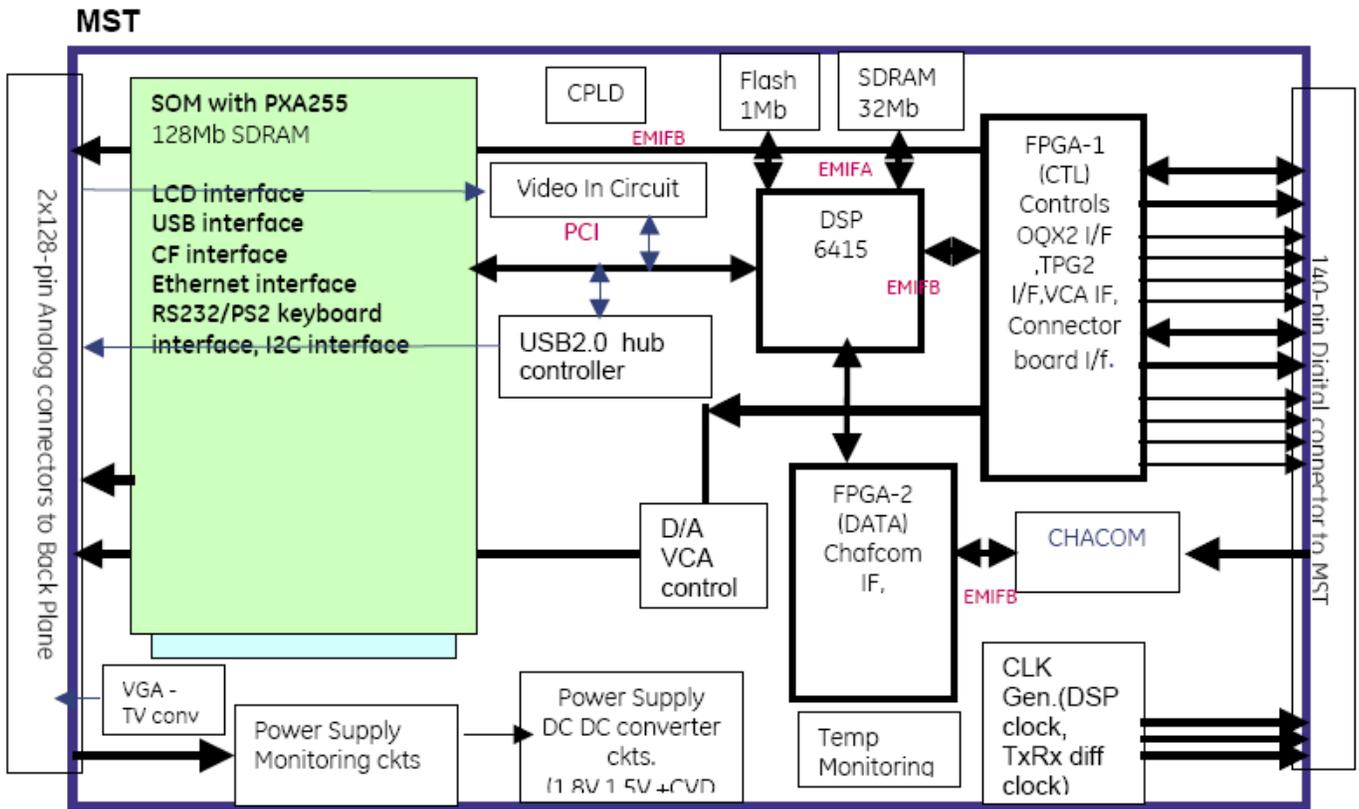
MST has DC-DC regulators, which generate the voltages required by on board devices. MST has voltage monitoring circuit which monitors all the voltages in the system and the information is passed on to control FPGA. DSP reads this information and sends these data to system software for user alerts. MST has clock generation circuitry which generates all the clock signals these signals are used to generate all the clocks used by DSP, Fpgas, chafom, oqx2,tpg2 and connector board.

VCA_control signal is generated by DAC circuit based data from control fpga.

MST also has an interface to the SOMA255F, which is mainly responsible for backend processing, user interface and storing of patient data. SOMA255F has PCI 2.2 support and supports 2 USB ports of USB1.1. These 2 ports are connected to rear panel of the system. MST has a USB 2.0 controller device connected on PCI bus. This controller provides 4 more USB downstream ports which are connected to front panel and top panel and for CD drive. System has a video play back device connected on pci bus. MST also has VGA, Digital RGB to composite video, S video output conversion circuit which is connected to rear panel.

5-2-3-2 Master Control Board(MST) (cont'd)

MST has 2 euro connector for power supply and control inputs and outputs. Trx to MST connection is through 140 pin connectors.



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5-2-4 Power Supply(LV/HVPS)

An integrated power supply (Low voltage & High voltage) is required to supply all required voltages to Backend and Front End hardware of LOGIQ Uno. Following are the voltage requirements for the Uno hardware:

Table 6:

PCB Name	Voltage Source	Max. Current	Tolerance/ Range	Connector/ Routing
CONN Board	+5V	1.25Amp	±5%	Directly from integrated power supply through BPB
	-5V	10mAmp	±5%	--
	12VA	20mAmp	±5%	--
	+SHV	TBD	+80V	--
	-SHV	TBD	-80V	--
TxRx Board	+5V	1.3Amp	±5%	Directly from integrated power supply through BPB
	+3.3V	2Amp	±5%	--
	12VA	250mAmp	±5%	--
	+THV	TBD	+2.5V to +60V	--
	-THV	TBD	-2.5V to -60V	--
MST Board	+3.3V	2Amp	±5%	Directly from integrated power supply through BPB
	+5V	450mAmp	±5%	--
	-5V	140mAmp	±5%	--
	12VA	90mAmp	±5%	--
FAN	12VA	400mAmp	±5%	Directly from integrated power supply through BPB
USB-HDD	+5V	1Amp	±5%	--
LCD	12VA	TBD	±5%	--

5-2-5 Rear Panel Assembly

This board/boards shall be an interface module, which can be plugged into the system back plane via 96-pin EURO connector.

There are two boards in this assembly **rear panel board 1** and **rear panel board 2**. There is a 34-pin connector on each of the boards for interface between the two boards.

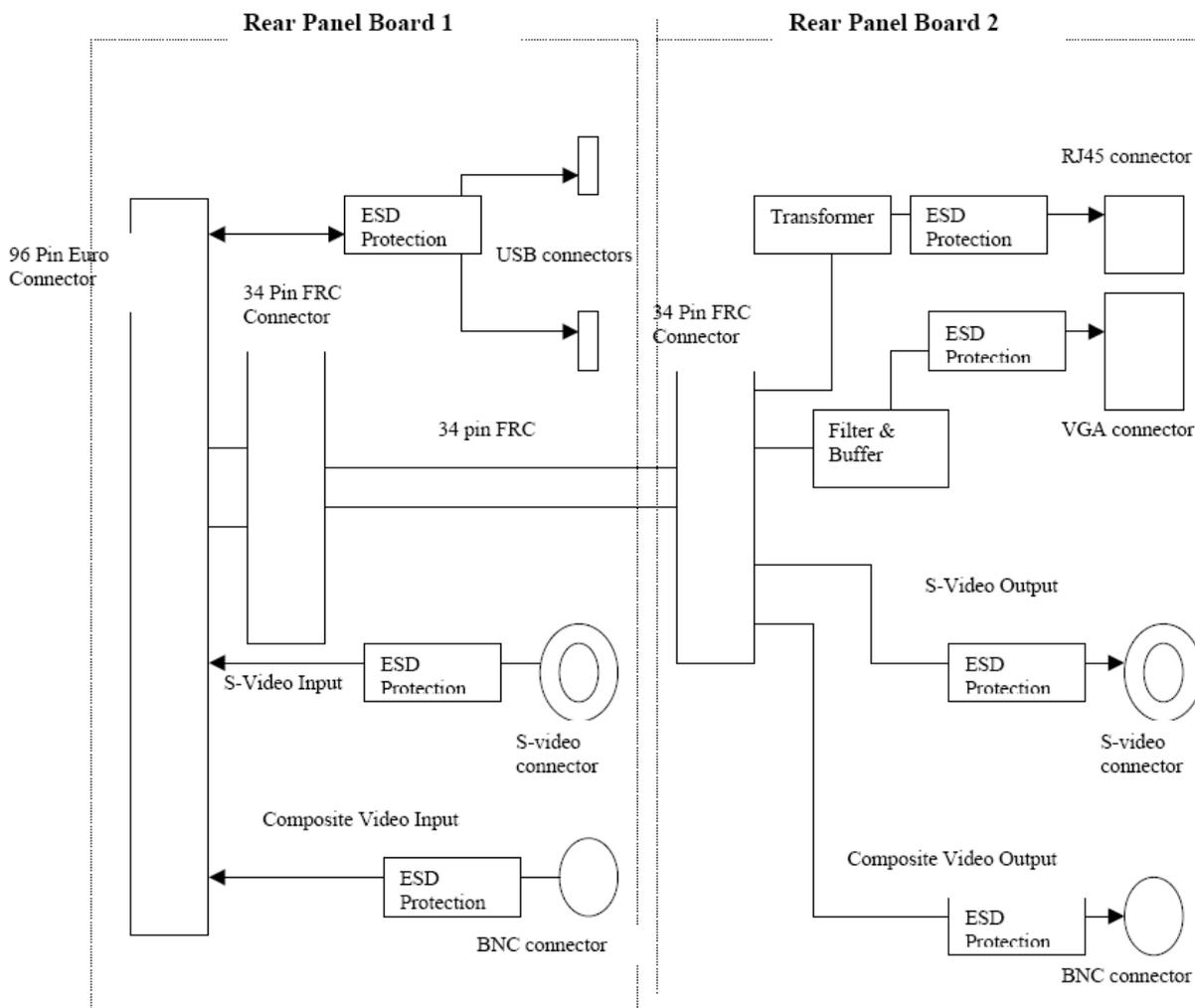
The USB Hub is on the Back plane, 2 downstream ports from the back plane outed onto rear panel to the respective USB connectors with suitable ESD protection.

VGA signals routed onto the rear panel as inputs from MST board and terminated to a VGA connector with suitable ESD protection.

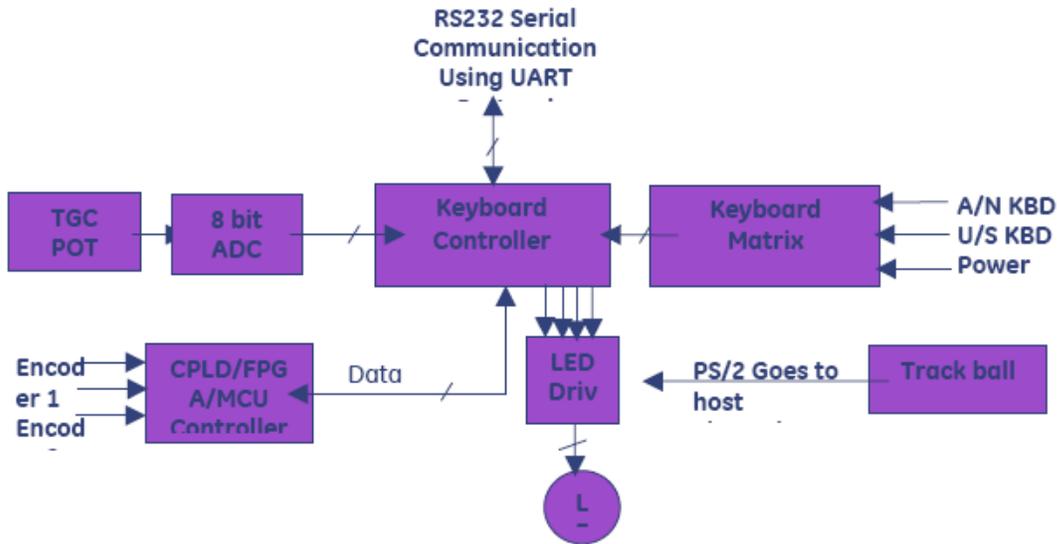
The composite video signals (input and output video signals) routed to this board from MST board and terminated to the respective connectors with suitable ESD protection.

The S-video signals (input and output video signals) routed from the MST board and terminated to the respective connectors with suitable ESD protection.

There are 6 LEDs for diagnostic purpose of the various other boards that are present in the Logiq Uno system. These LEDs mounted on the **rear panel board -1**.



5-2-6 Keyboard Assembly



5-2-6-1 Main PCB

This board will be mounted on to the rear of keyboard. This will be a 4 LAYER FAB. (Complete Electronics) This houses the controller, CPLD/FPGA & other logic circuits. The key code data & TGC ADC value is sent to MST using asynchronous serial interface. Track ball movement and trackball switch data to be sent via PS/2 interface.

The following will be major functional requirements of the keyboard PCB.

- 1.) This keyboard shall provide interface to scan 16 x 8 key matrix type alphanumeric keyboard. This PCB must have connectors, which interfaces to 24-pin FPC cable and LED's from alphanumeric keyboard.
- 2.) The keyboard shall have scan matrix for Ultrasound keys.
- 3.) Backlighting arrangement – Individual Ultrasound keys will have some sets of LED's (4 nos) & Individual LED with in the set cannot be controllable. The LED's brightness will be controlled by the PWA (Pulse Width Adjustment) or similar means. The LED ON & OFF period will be controlled based on the "Hex" value set from the Host side. LED should be of High Luminescence type and shall consume less power.
- 4.) Encoder interface – The phase quadrature output of encoder will be connected to CPLD or micro controller interrupt pin. The de bouncing of the signal needs to be done & 4or 8-bit counter will be updated depending on the direction of rotation. The encoder switches are connected to the ultrasound scan matrix.
- 5.) TGC PCB Interface – TGC analog input is connected to a connector on keyboard PCB. These signals will be connected to micro controller port with ADC built in. Each TGC pot has different ID & equivalent digital value is sent back toHOST using asynchronous serial interface. Power On/Off switch - This key will be part of ultrasound key switch matrix. Bicolor LED shall be provided and will be driven from the host for indicating the status of Power.

5-2-6-2 TGC_PCB

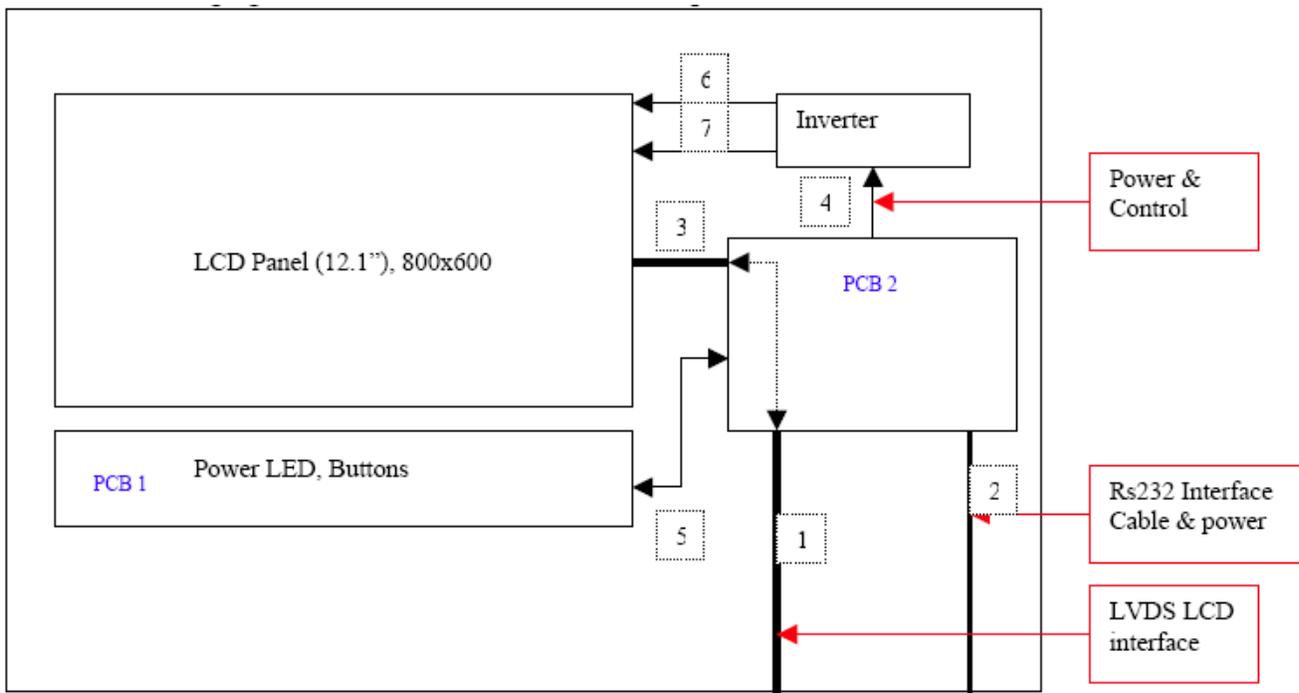
This PCB houses 6 Potentiometer encoders. This gets connected to keyboard PCB through cable assembly.

5-2-7 LCD

Monitor of LCD type and the LCD Panel shall meet the following requirements.

- 1.) Size: 12.1 inch (Standard size)
- 2.) Resolution: 800x600
- 3.) Color: 256K color (RGB, 6 Bits each) LCD has a mounting arrangement to fix on top of the Uno console and should have provision to adjust the position both vertically and Horizontally. Specifications for tilt are as detailed below.
- 4.) Swivel (Horizontal): +/- 90 Deg (part of the system)
- 5.) Tilt (Vertical): 90 deg (down), 40 Deg (UP) (0 deg being when the LCD Panel surface is Normal to the Ground)
- 6.) Force of Operation for the LCD panel: 39.24 +/- 4.9 N

Monitor assembly house an inverter for supplying power to the LCD backlight. In addition there is a panel to hold LED for power /signal indication and 3 switches for menu driven control of video/LCD parameters. It is required to house all these in a metallic structure for strength and EMI protection. Following figure shows the functional block diagram of the LCD monitor



There are two additional PCB's inside the LCD housing PCB 1 and PCB2

PCB 1: This board shall incorporate 1 LED and 3 tactile push button keys. The LED shall have a LED Lens for light transmission, which shall flush with the front cover of the panel. The Push Button Keys shall be operated through the Knob integrated into the Front Cover. It shall house a connector of appropriate size (determined during the design) to establish connectivity with PCB 2.

5-2-7LCD (cont'd)

There is an indication of the status of the LCD monitor using LED.

Table 7:

Condition	LED status
1. Power Off	LED off
2. Power on without LVDS signal	Glow Orange color
3. Power on with LVDS signal	Glow green color
4.EEPROM error /I2C fail	Flash Red color every 200ms

PCB 2: This board shall be the main interface board having all the interface connectors. There shall be 5 interface connectors on this board

- 1.) Interface connector for LVDS LCD data input from the system processor (Molex- 47151-1101)
- 2.) Interface connector for the embedded LCD controller board (similar to the one present on the LCD controller board)
- 3.) Interface connector for PCB 1 (design dependant)
- 4.) Interface connector for Inverter (similar to the one present on the inverter board)
- 5.) Interface connector for RS232 and Power (CUI INC. - MD-80SF or equivalent)

5-2-7-1 Brightness adjustment:

There shall be provision to set the brightness level of the LCD panel. There is a 16 steps (0-15) to vary this brightness level linearly from 0 to 100%.

Section 5-3Circuit Boards Descriptions

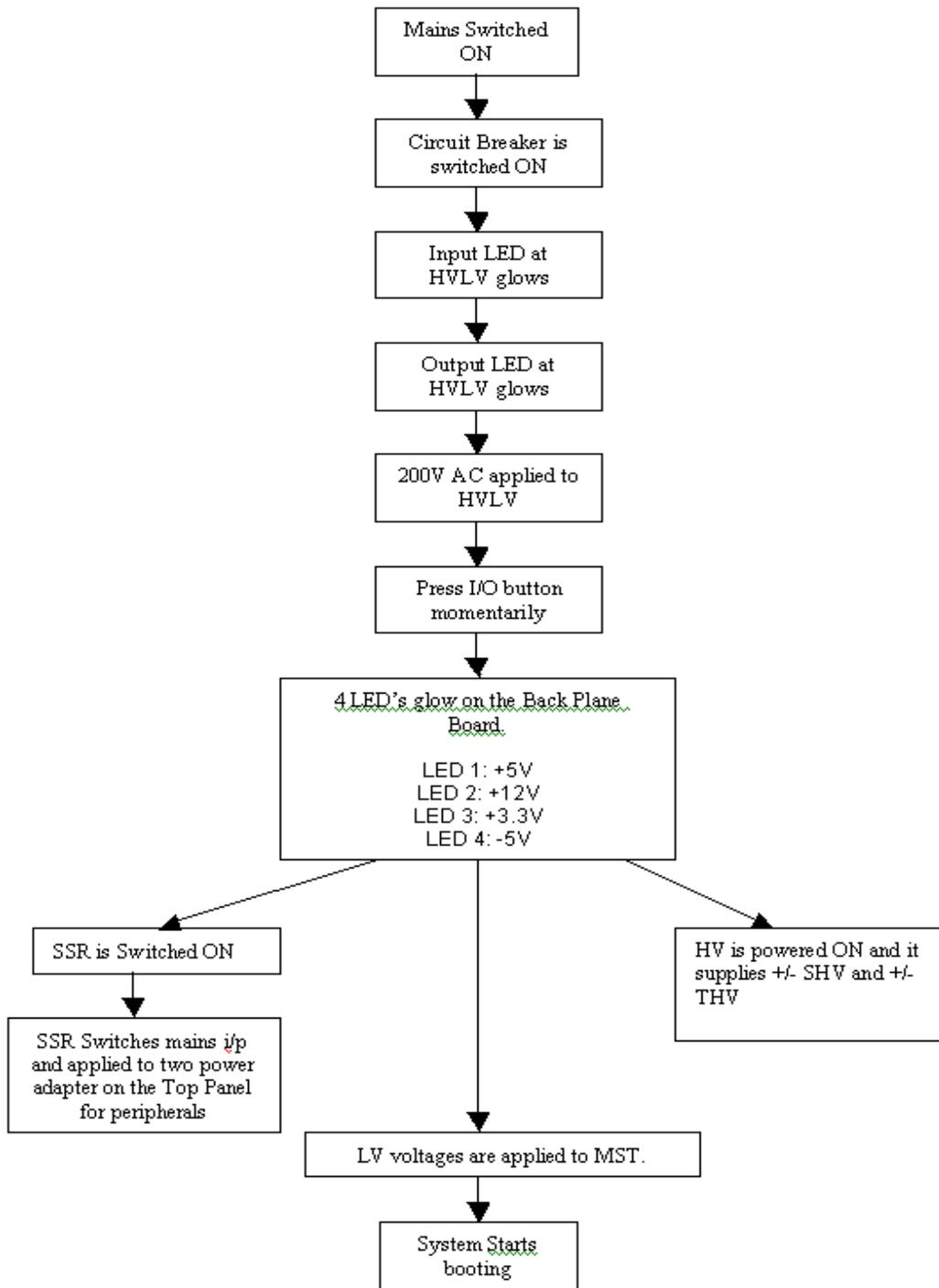
The following table lists circuit boards and their respective card cage slot assignments on the mother board of the LOGIQ™ A3 system.

Table 5-1 CIRCUIT BOARD DESCRIPTION

Card Cage Slot	Board Name	Description	Note
1	TxRx	Transmit/Recieve Board	
2	MST	Main Control Board	
3	LV/HVPS	Power Supply	

Section 5-4ON/OFF Signal Flow

Below is the flow chart that explains the signal flow during the system ON/OFF.



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Chapter 6 Service Adjustments

Section 6-1 Overview

6-1-1 Purpose

This chapter describes how to test and adjust the mechanical capabilities of a scanner that may be out of specification. Although some tests may be optional they should only be performed by qualified personnel.

6-1-2 Table Of Contents

S.No	Description	Page Number
1	Overview	6-1
2	Regulatory	6-1
3	Monitor Adjustment	6-2

Table 6-1 Chapter 6 Contents

Section 6-2 Regulatory

Verify, where applicable, that any regulatory information or tests required by national law are present and accounted for, and any regulatory tests required by national law are performed *and* documented.

Section 6-3 Monitor Adjustment

This helps to adjust the settings of the Contrast and the Brightness on the LCD Monitor suitably.

The Monitor Adjustment button is displayed as shown.



Figure 6-1 Monitor Adjustment

- 1.) Press The Toggle Button for contrast & brightness. Confirm that the Contrast (or brightness) indicator is displayed on the monitor. If the brightness is displayed, press the toggle button again.
- 2.) Press the adjustment button (+/2/>) to increase contrast (or brightness)
- 3.) Press the Adjustment button (-/2/<) to decrease contrast (or brightness).
 The amount of contrast (or brightness) is shown on a slide bar on the screen. Refer the following table for the setting.

Table 6-2 Contrast and Brightness Recommended Setting

Room Condition	Monitor Adjustment	
	Contrast	Brightness
Dark room	5	4
Dim room	6	3
Bright room	7	3
room for Cardiology	8	2

Record the final brightness and contrast settings and leave this information with the system. Generally speaking, do not change the controls once they have been set, the display becomes the reference for the hard copy device(s).

After readjusting the monitor's Contrast and Brightness, readjust all preset and peripheral settings.

Chapter 7Diagnostics/Troubleshooting

Section 7-1Overview

7-1-1 Purpose

This chapter describes how to test and adjust the electrical and voltage capabilities of a scanner that may be out of specification. Although some tests may be optional they should only be performed by qualified personnel.

7-1-2 Table Of Contents

Table 7-1 Chapter 7 Contents

S.No	Description	Page Number
1	Overview	7-1
2	LED Descriptions	7-2
3	Voltage Testing	7-7
4	Troubleshooting Tips	7-8

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Section 7-2 LED Descriptions

7-2-1 TxRx Board

The TX Board is located at the No. 1 slot in the Card Cage Assembly.

LED	DESCRIPTION	STATE
DS1	Indicates Trig	ON
DS2	indicates on board generated voltage +1.8V	ON-OK
DS3	Not Used	OFF

Table 7-2 TxRx LED Descriptions

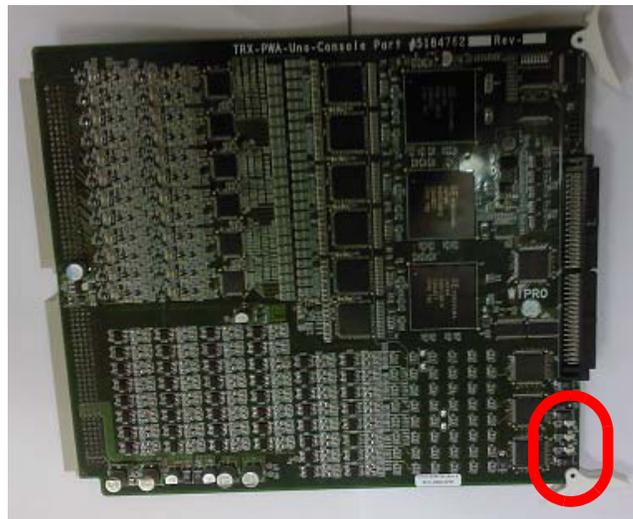
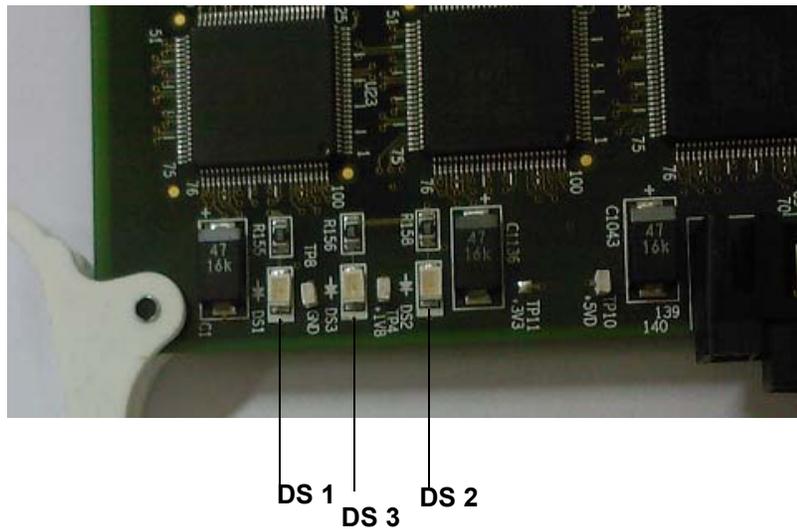


Figure 7-1 TxRx Board



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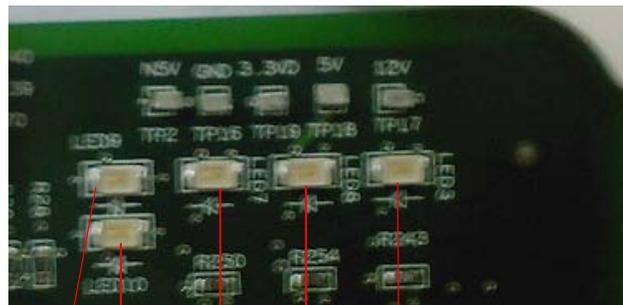
7-2-2 MST Board

The TX Board is located at the No.2 slot in the Card Cage Assembly.

LED	DESCRIPTION	STATE
LED3	indicates on board generated voltage +1.5V	ON-OK
LED7	indicates on board generated voltage +1.8V	ON-OK
LED8	indicates on board generated voltage +1.2V volts	ON-OK
LED9	Not Used	OFF
LED10	Not Used	OFF



MST Board



LED 9
 LED 10
 LED 7
 LED 8
 LED 3

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7-2-3 BackPlane Board

LED	DESCRIPTION	STATE
LED1	indicates on board generated voltage +5V	ON-OK
LED2	indicates on board generated voltage +12VA	ON-OK
LED3	indicates on board generated voltage +3.3VD	ON-OK
LED4	indicates on board generated voltage -5V	ON-OK

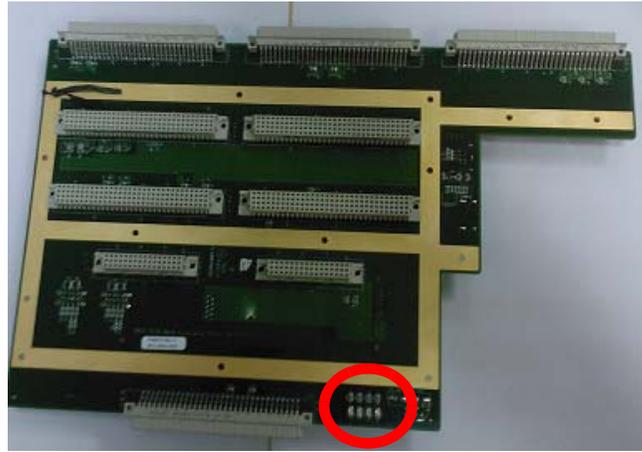
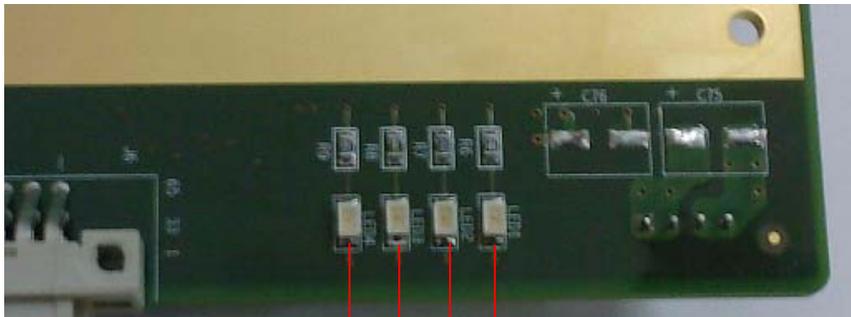


Figure 7-2 Back Plane Board



LED 3 LED 1
 LED 4 LED 2

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7-2-4 Connector Board

LED	DESCRIPTION	STATE
DS0	R_BANK_SELECT 0	ON
DS1	R_BANK_SELECT 1	ON
DS2	Will be "ON" while Configuring FPGA, and Turned "OFF" during Functionality	OFF ON-FPGA Not Configured
DS3	Trig LED	ON

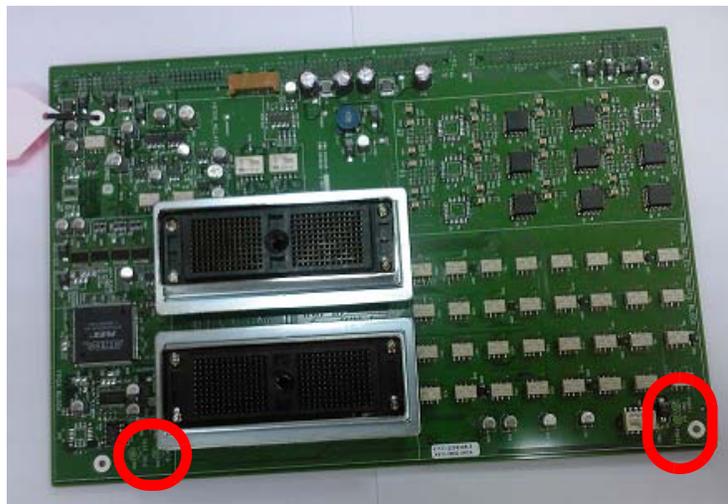
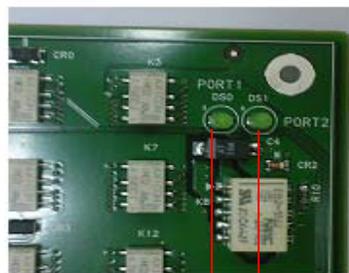


Figure 7-3 Connector Board



DS 2

DS 3



DS 0

DS 1

7-2-5 Rear Panel Board Service Diagnostics

LED	DESCRIPTION	STATE
D1	Interlock	ON-OK
D2	PIF	ON-OK
D3	MST	ONOK
D4	KBD	ON-OK
D5	TxRx	ON-OK
D6	DIF	ON-OK



Figure 7-4 Rear Panel

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Section 7-3 Voltage Testing

7-3-1 MST Board

The following Low Voltage Testing points available on MST Board:

- 1.) +12 Volts
- 2.) +5 Volts
- 3.) -5 Volts
- 4.) +3.3 Volts

7-3-2 BPB Board

The following Low Voltage Testing points available on BPB Board:

- 1.) - THV
- 2.) + THV
- 3.) - SHV
- 4.) + SHV
- 5.) +12 Volts
- 6.) -5 Volts
- 7.) +5 Volts
- 8.) Ground
- 9.) +3.3 Volts

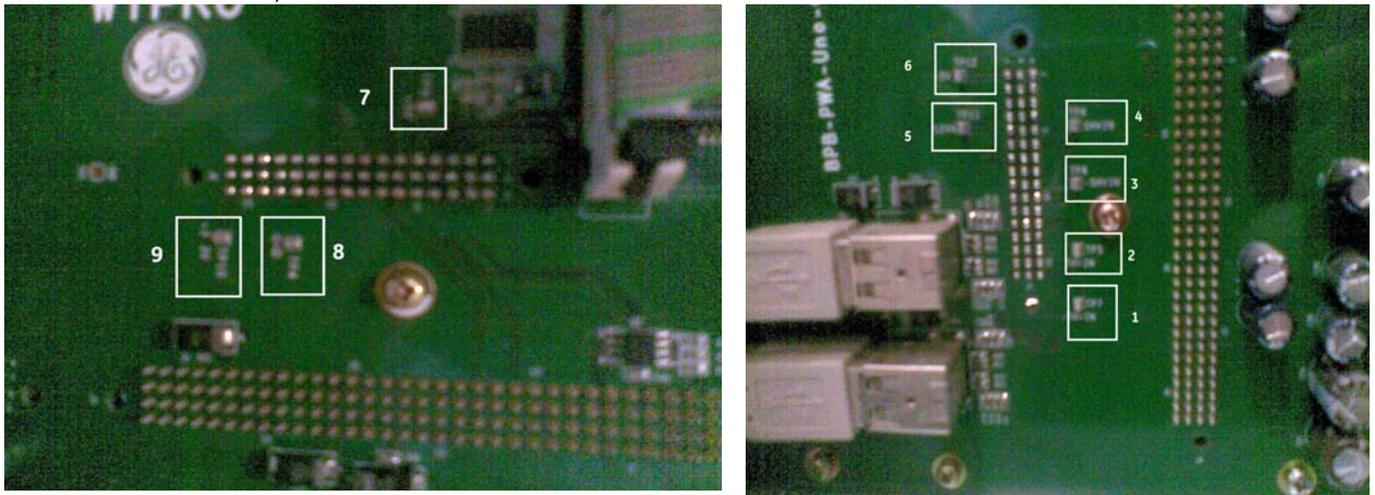


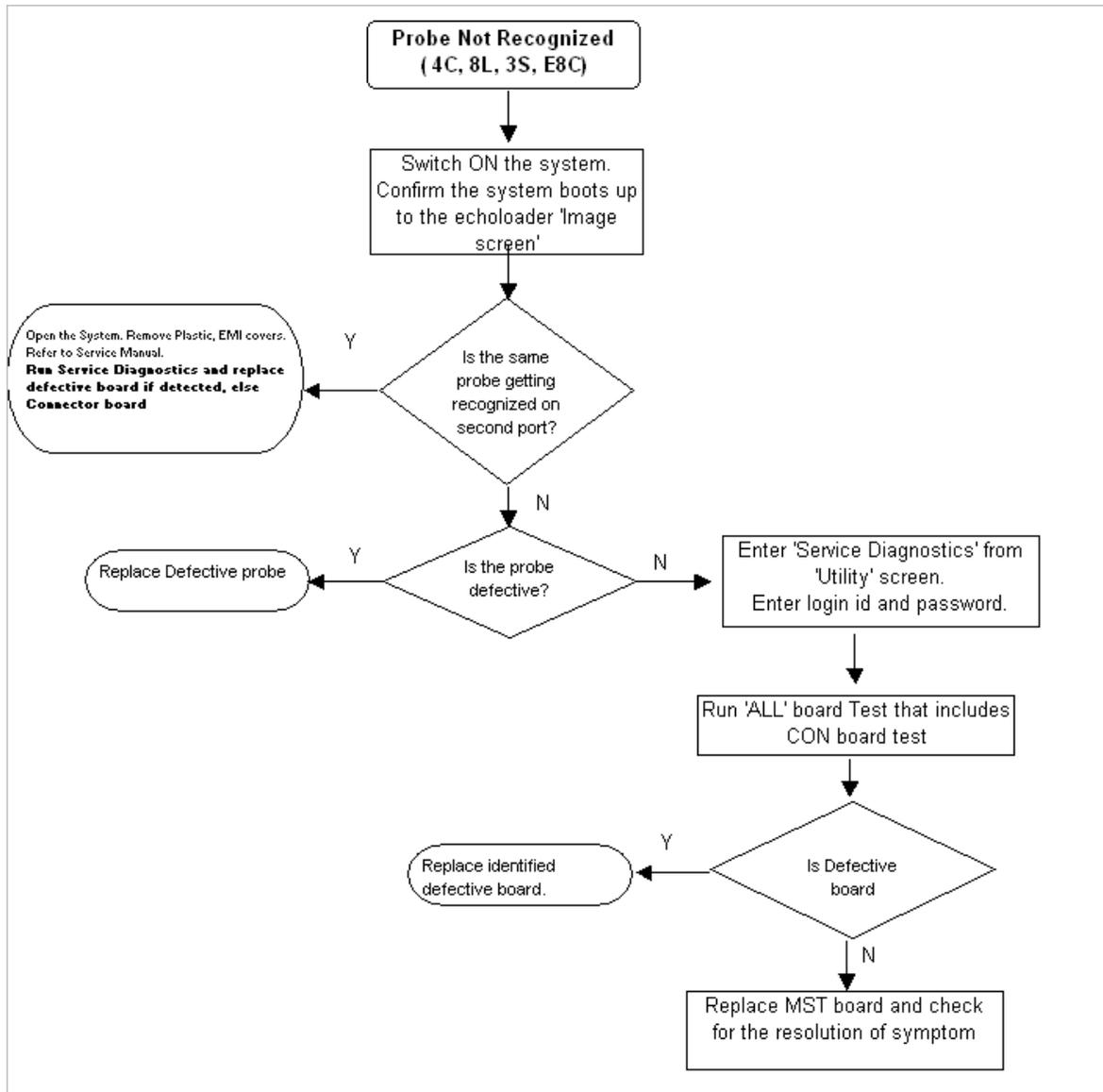
Figure 7-5 BPB Testing Points

Section 7-4 Troubleshooting Tips

S.NO	Issue	Possible Cause	Resolution
1	System doesn't Bootup	Circuit Breaker Trip	Switch On Circuit Breaker
		Transformer Failure	Replace Transformer
		HvLv Failure	Replace HvLv
		MST Failure	Replace MST
2	No Display	Circuit Breaker Trip	Switch On Circuit Breaker
		Transformer Failure	Replace Transformer
		HvLv Failure	Replace HvLv
		LCD Failure	Replace LCD
		Loose connection at Back Plane Board	Restore Loose Connections
		MST Failure	Replace MST
3	No Keyboard Response	Keyboard Failure	Replace Keyboard
		Loose connection at Back Plane Board	Restore Loose Connections
		MST Failure	Replace MST
4	No Image on External Monitor	MST Failure	Replace MST
5	Probe Not Recognised	Probe Loose Connection	Restore Loose Connections
		CNB Failure	Replace CNB
		MST Failure	Replace MST
6	No Image	CNB Failure	Replace CNB
		TxRx Failure	Replace TxRx
		DIF Failure	Replace DIF
		MST Failure	Replace MST
7	Peripherals Power Supply from System Absent	Fuse Failure/Transformer Failure	Replace Transformer
8	Unable to Print	MST Failure	Replace MST
9	Unable to archive/backup	MST Failure	Replace MST
10	Unable to Freeze	KBD Failure	Replace KBD
		MST Failure	Replace MST
11	TGC Doesn't Work	TGC Failure	Replace TGC
		MST Failure	Replace MST
12	Gain Doesn't change	KBD Failure	Replace KBD
		MST Failure	Replace MST
13	Trackball doesn't Work	KBD Failure	Replace KBD
		MST Failure	Replace MST

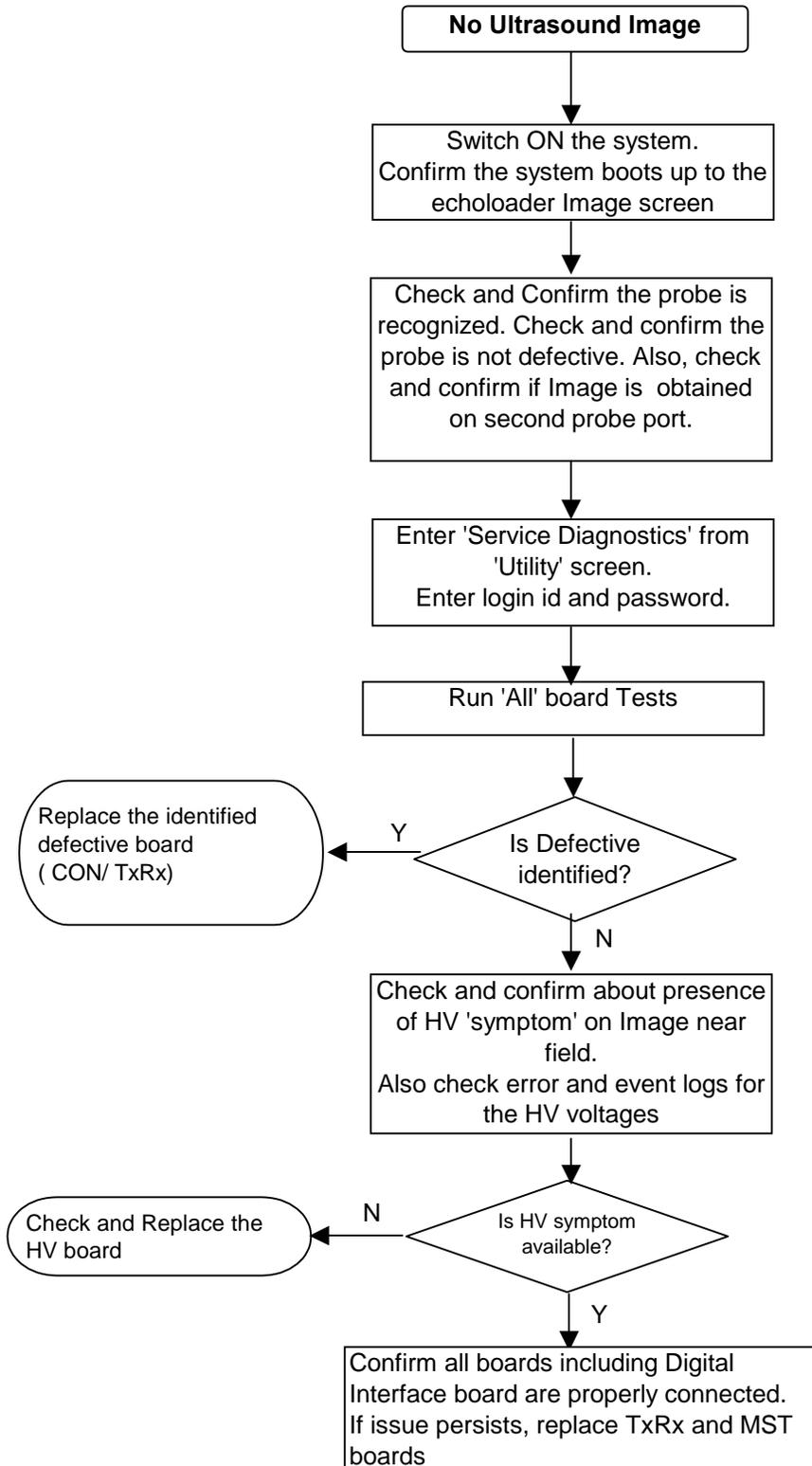
Section 7-5 Troubleshooting Guide

7-5-1 Probe not getting recognized



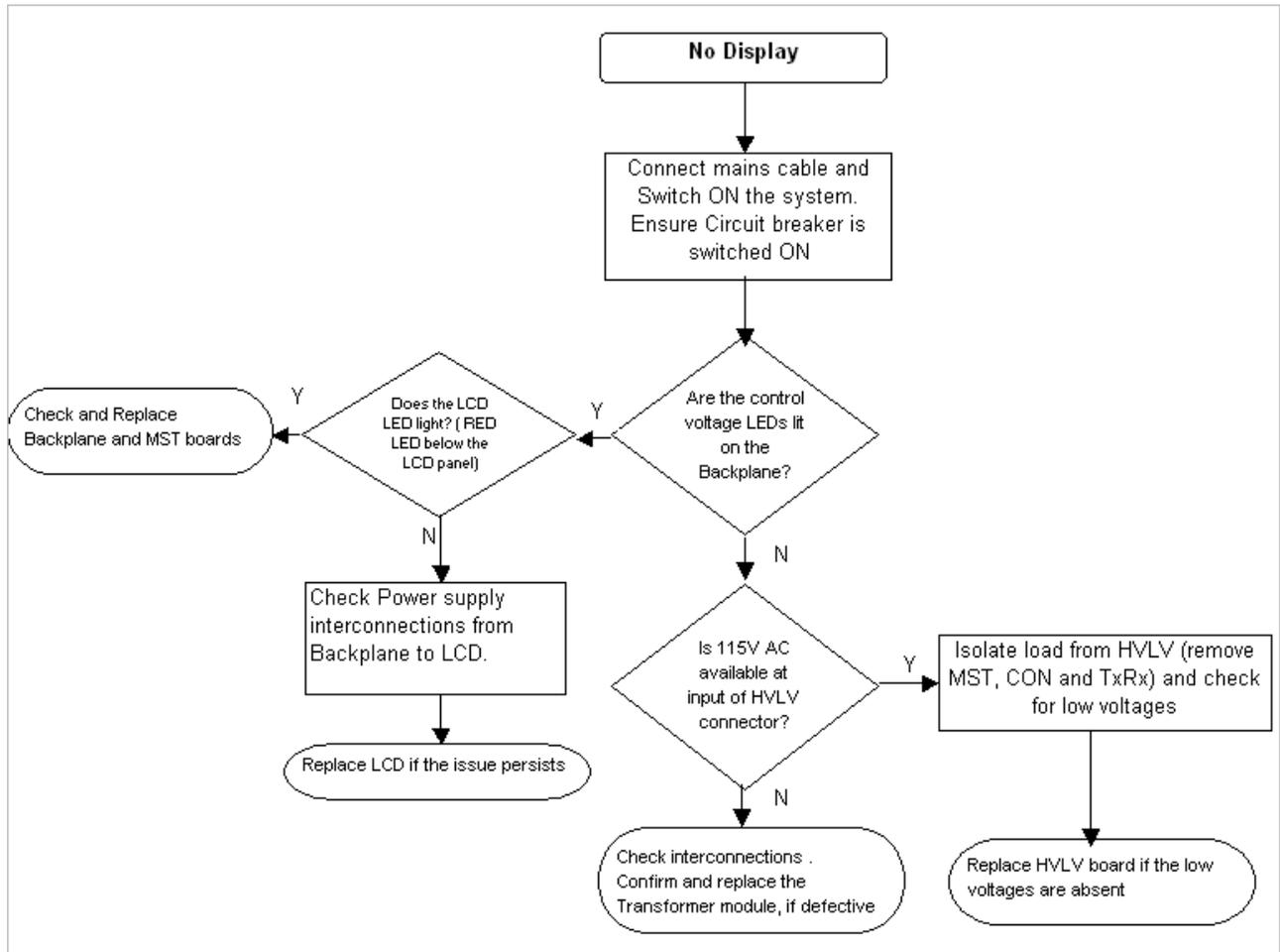
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7-5-2 No Ultrasound Image



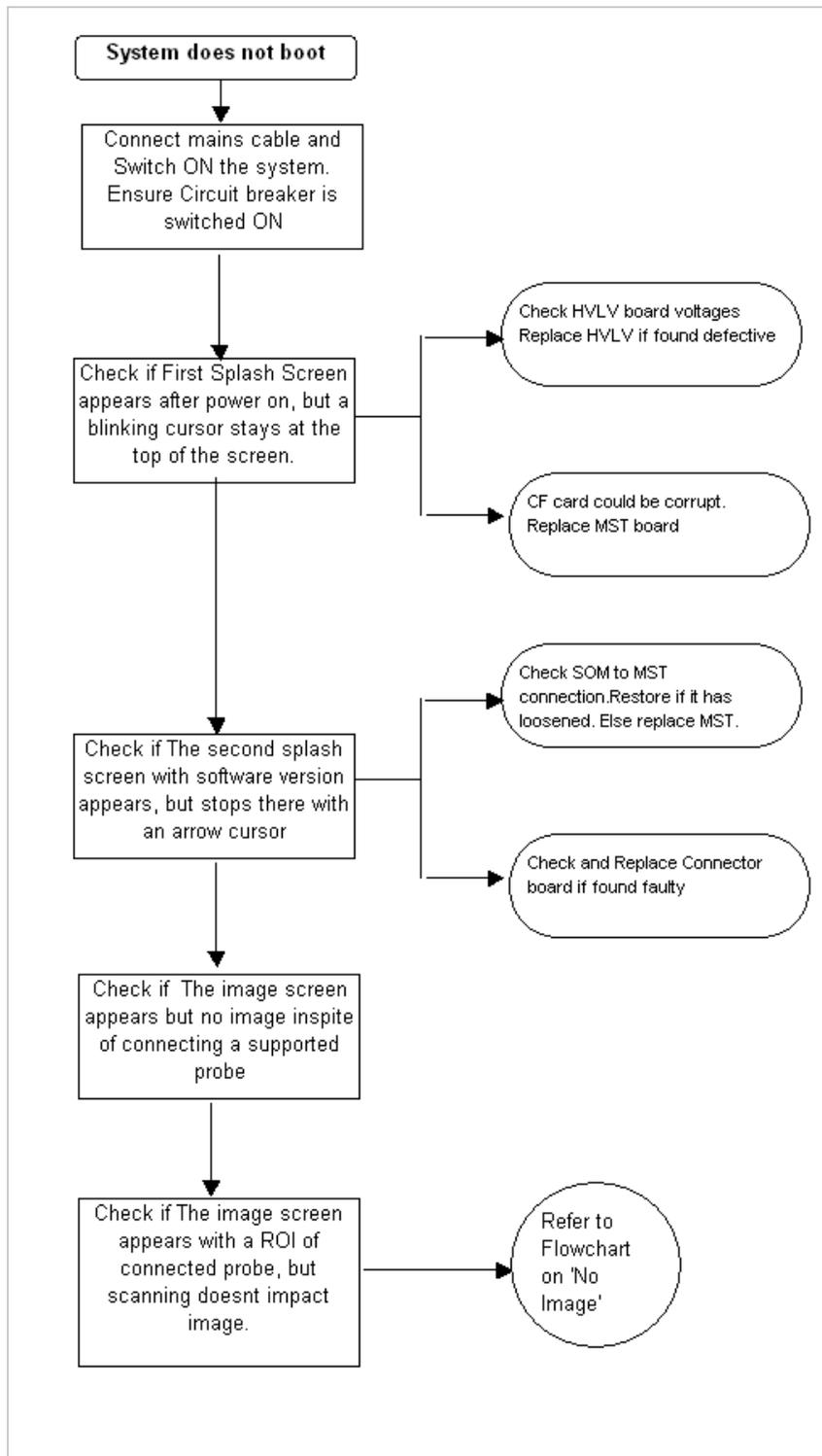
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7-5-3 No Display



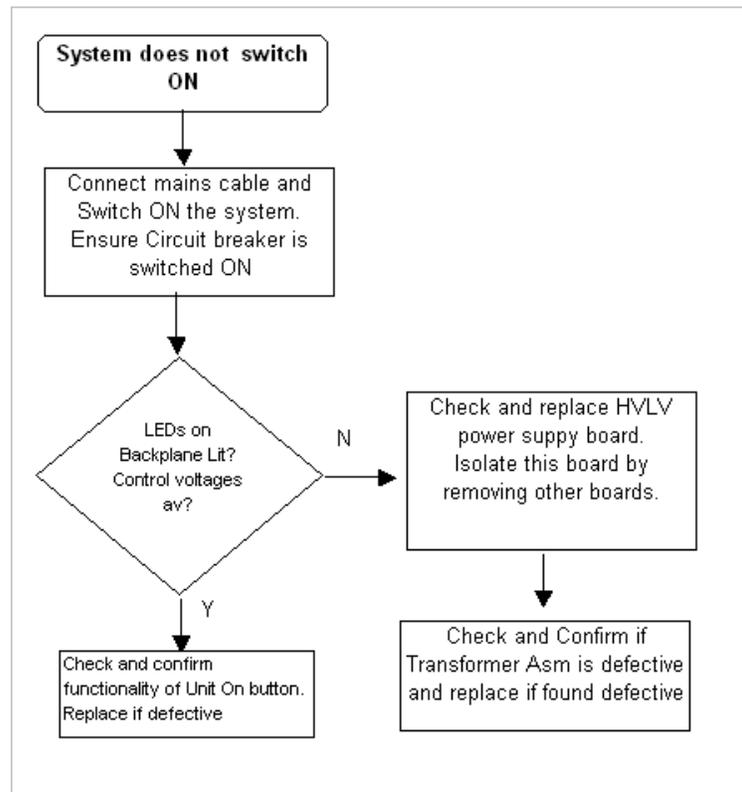
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7-5-4 System does not Boot



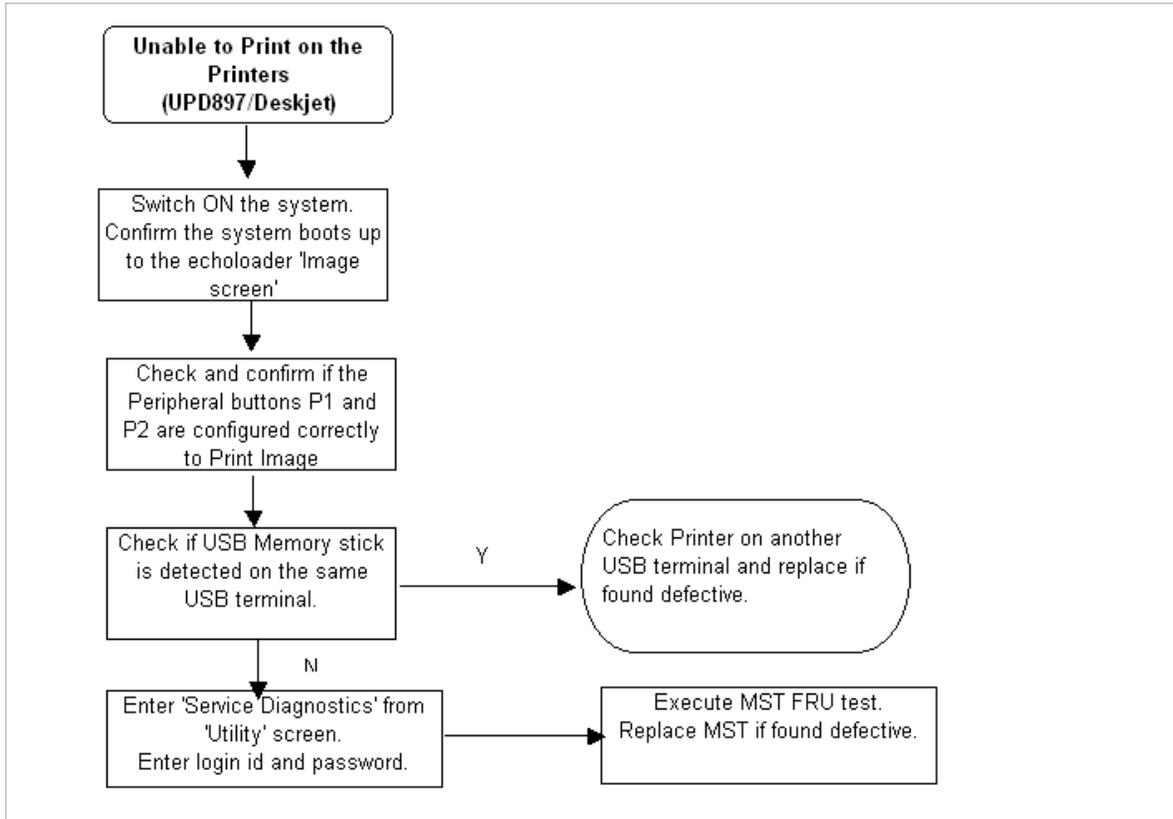
State: RELEASE - Document is released and under formal Change Control. Changes are subject to the ECR/ECO Process. See the GEHC Workshop System to determine the status of this document.

7-5-5 System does not switch ON



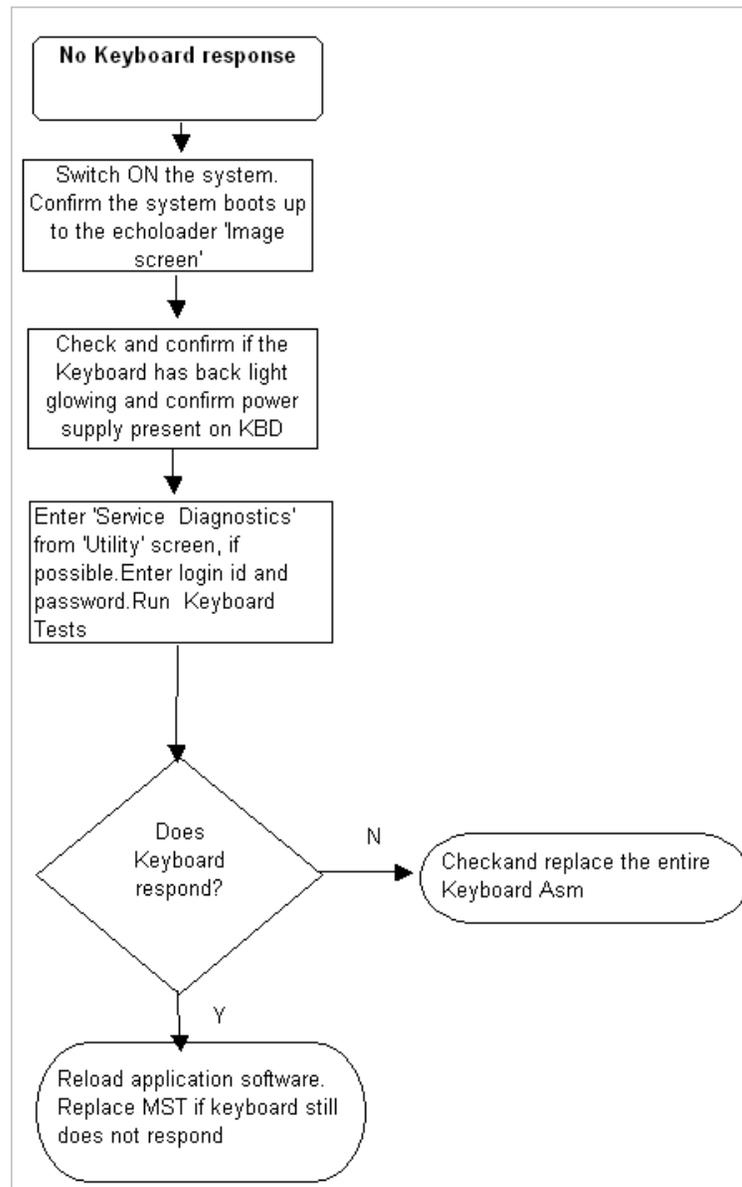
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7-5-6 Unable to Print on the Printers (UPD897/Deskjet)



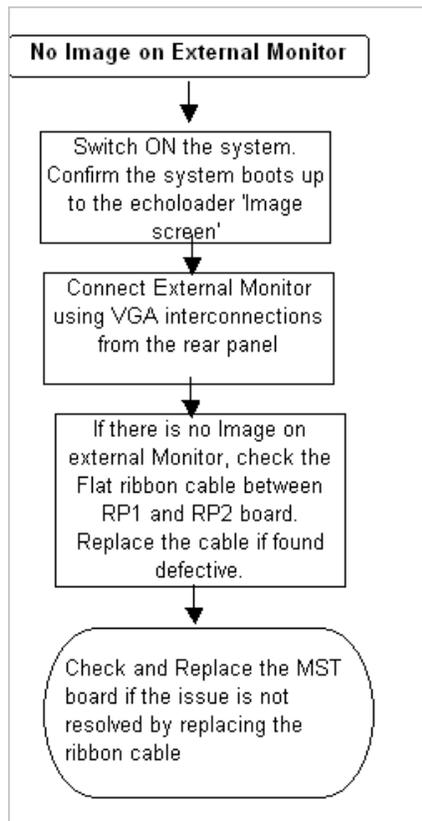
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7-5-7 No Keyboard response



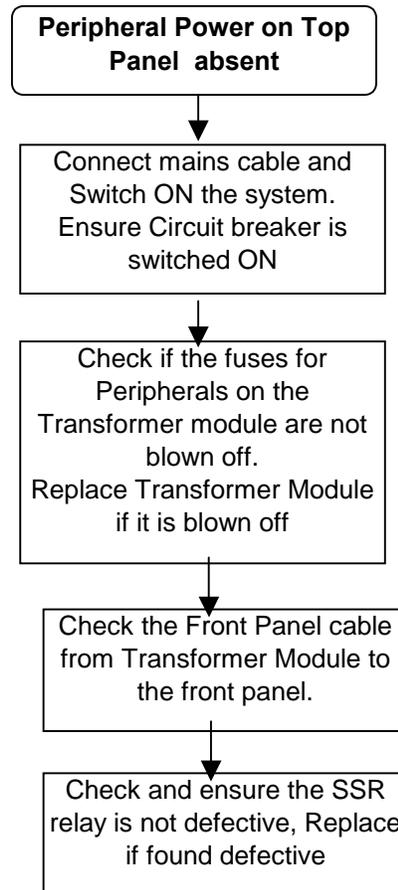
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7-5-8 No Image on External Monitor



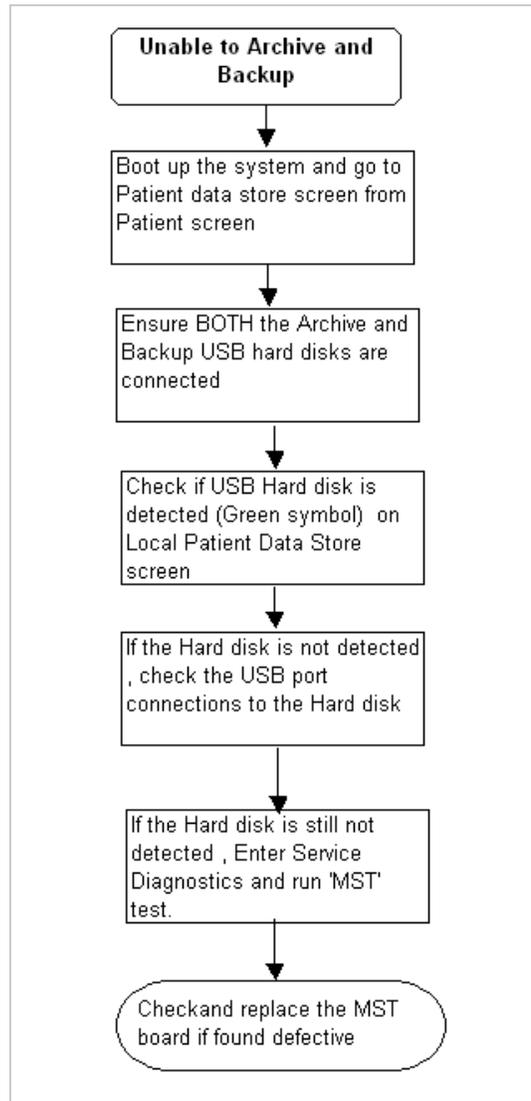
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7-5-9 Peripheral Power on Top Panel absent



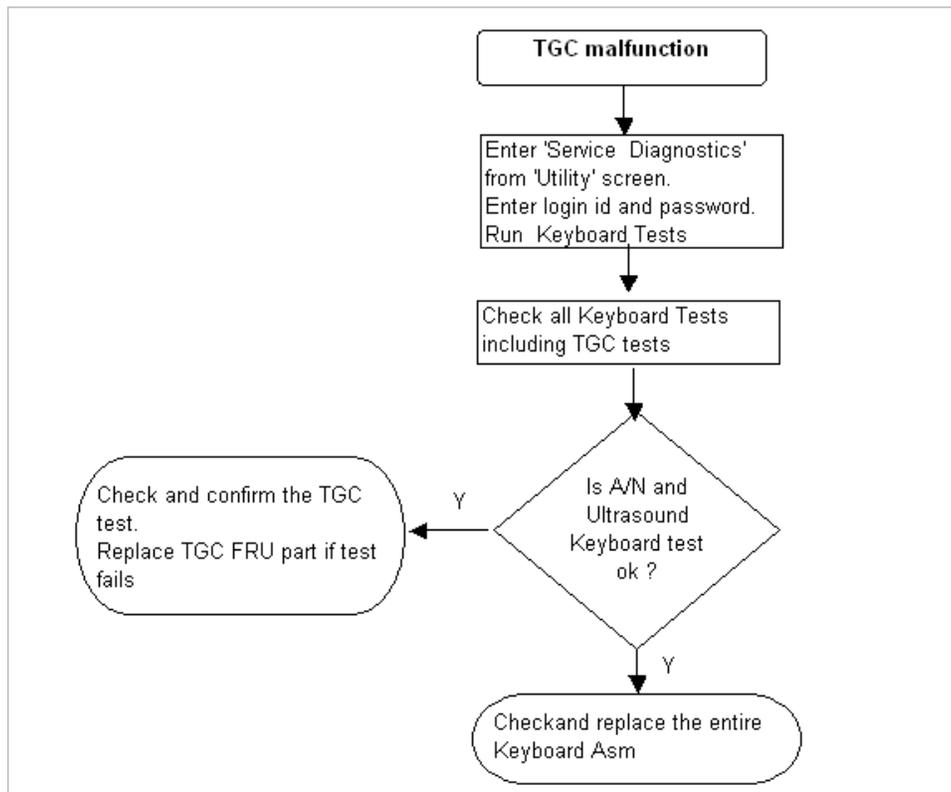
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7-5-10 Unable to Archive and Backup



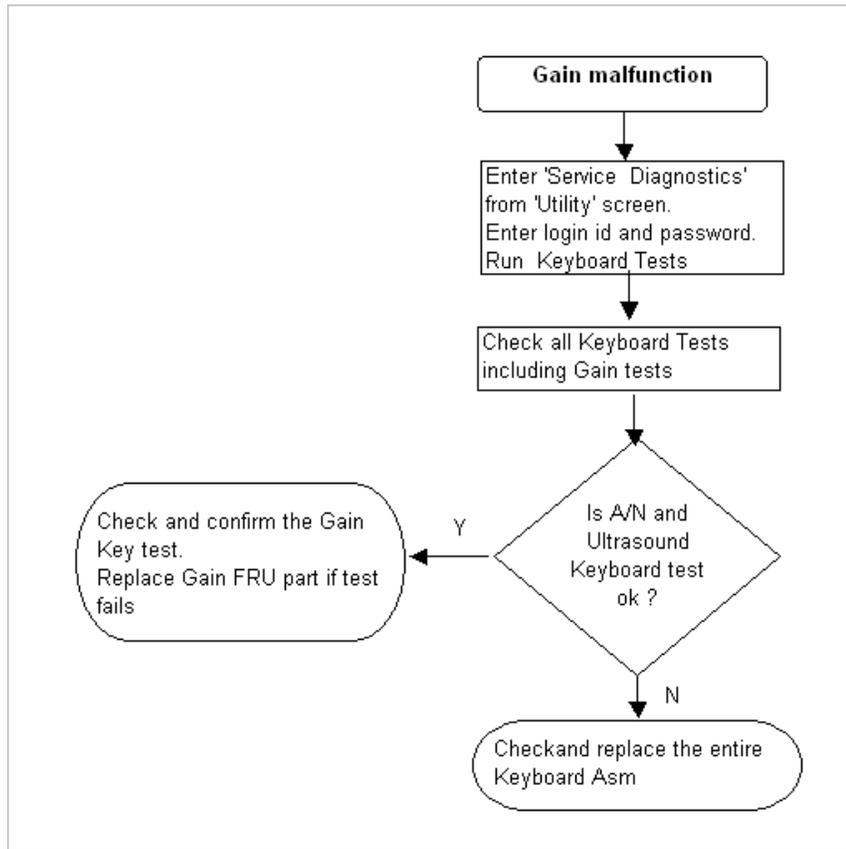
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7-5-11 TGC malfunction

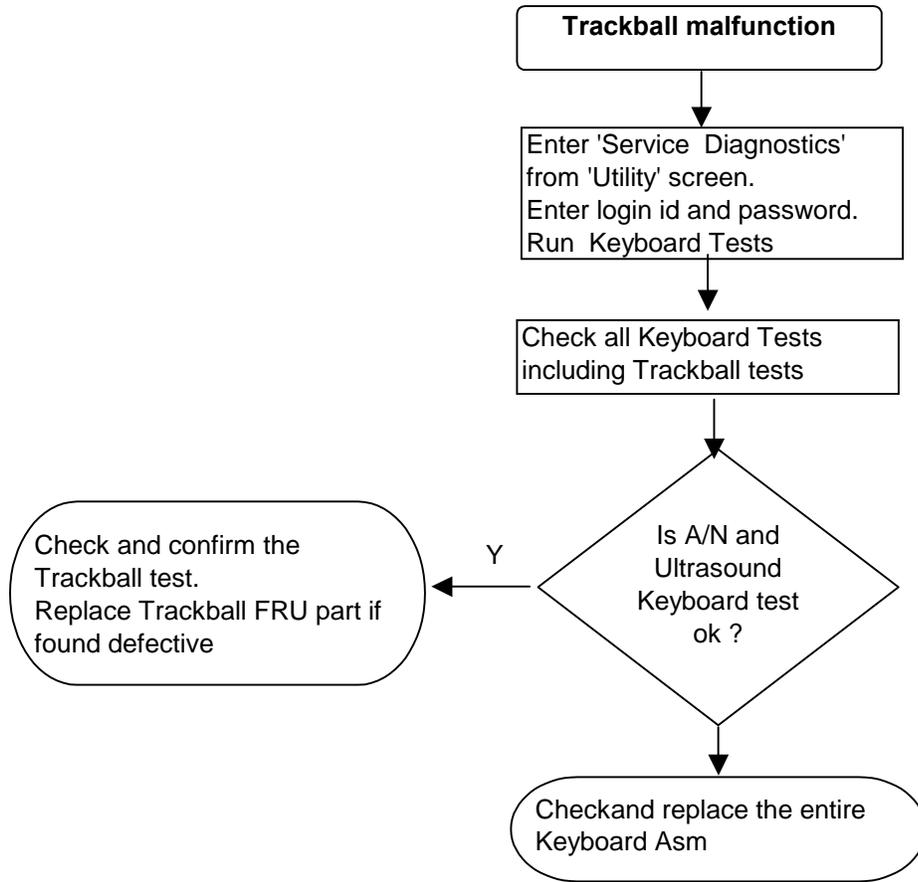


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7-5-12 Gain malfunction



7-5-13 Trackball malfunction



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Section 7-6 Service Diagnostics

Services Diagnostics can be accessed from the utility screen.

1. Press the Utility button on the Keyboard Panel.



Figure 7-6 Utility button on keyboard

2. Following Screen will appear. Refer Figure 7-2 below.

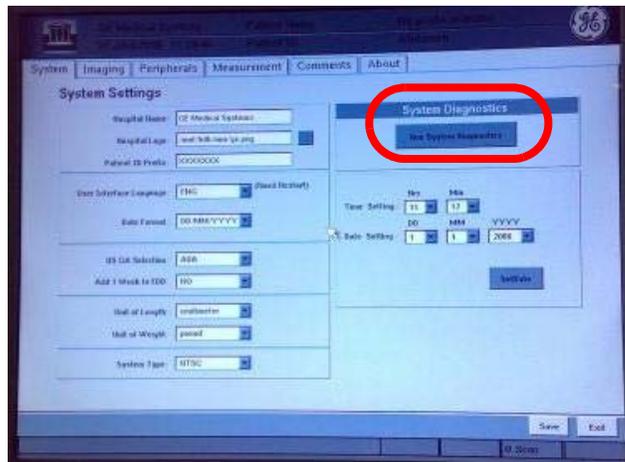


Figure 7-7 System Settings

Click on **Run System Diagnostics**. The login screen will appear. Refer Figure 7-3 below.

Section 7-6 Service Diagnostics (cont'd)

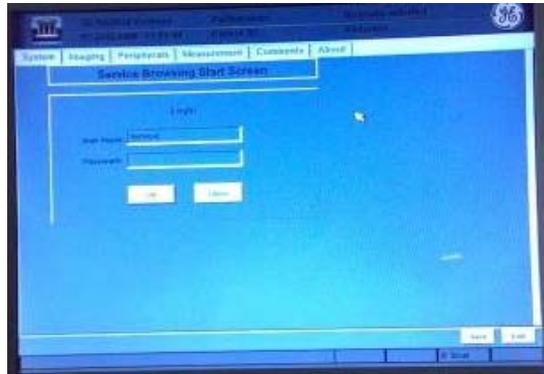


Figure 7-8 Service diagnostics Login Screen

4. Enter User Name: **Service** Password: **Sample** (Confidential) and press OK.

5. Once you type the User name and password, service diagnostics main screen (Refer Figure 7-4) will appear.

Main Screen Consists of the following buttons:

- 1.) **Full Tests:** To do the tests on MST, TRX, and CON boards.
- 2.) **KeyBoard Test:** To perform the Keyboard Test
- 3.) **LCD Test:** To perform the Display Tests
- 4.) **Error Logs:** To view the Errors occurred in the system
- 5.) **Event Logs:** To view the Event Logs .
- 6.) **Copy to USB:** To copy the Log files to USB
- 7.) **Copy to CD:** To copy the Log files to CD
- 8.) **Return:** Return to the main Utility screen.

NOTE:

For all kind of Tests

If Indicator is Red -----Test is failed and you may see Error Logs .

If indicator is Green ----- Test is passed and all the components are Ok.

Section 7-6 Service Diagnostics (cont'd)



Figure 7-9 Service Diagnostics Main Screen

a - Indicators

- 1.) **FULL Tests:** To perform the MST, TRX, and CON board, Click FULL Test button (Refer figure 7-5) on Service Diagnostics main screen. The test will be performed and result will be displayed on corresponding Indicators.



Figure 7-10 Start Test

- a - Click Here to start the Con, Trx, and Mst tests.

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Section 7-6 Service Diagnostics (cont'd)

- 2.) **Keyboard Test:** From the service diagnostics main screen click on Keyboard Test (Refer Figure 7-6) and the screen (Refer Figure 7-7) will appear.



Figure 7-11 Keyboard Test

a - Click Here to start the Keyboard Tests

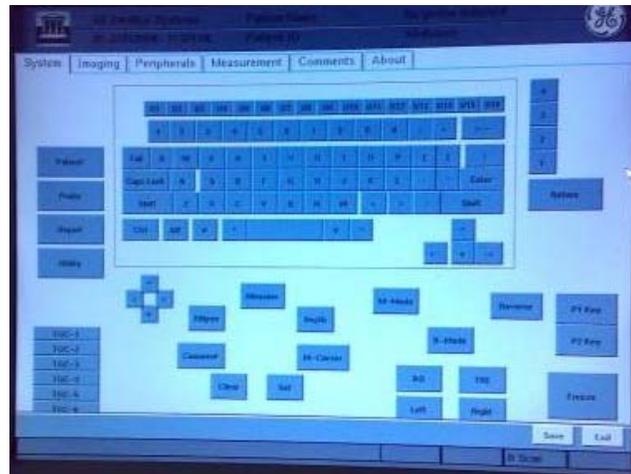


Figure 7-12 Keyboard test screen

Press each of the key on the Keyboard. As you press each key, corresponding keys will disappear from the screen.

Press Return key to return to Service Diagnostics main Screen. Keyboard test result would be displayed on the indicator above the Keyboard Test Button.

Section 7-6 Service Diagnostics (cont'd)

- 3.) **LCD Test:** From the service diagnostics main screen click on LCD Test (Refer Figure 7-8) and the screen (Refer Figure 7-9) will appear.



Figure 7-13 LCD Test

a - Click here to start LCD Test

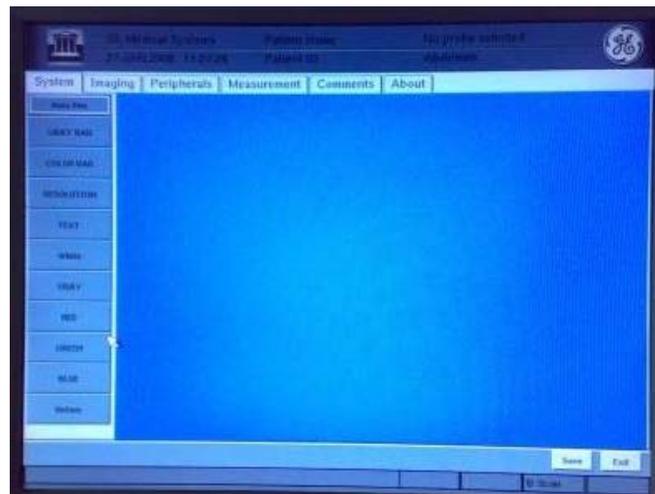


Figure 7-14 Patterns test screen

Click on each of the button on the left Panel to test the different pattern/ colors.

Click Return to return to the Service Diagnostics main Screen.

Result will be displayed as indicator above the Display Test button on the service diagnostics main screen.

Section 7-6 Service Diagnostics (cont'd)

- 4.) **Event Logs:** Click Event Logs Button from the Service Diagnostics main Screen (Refer Figure 7-10).



Figure 7-15 Event Logs

a - click here to invoke Event Logs screen

Following screen will appear (Refer Figure 7-11). Screen will consists of Event No., Event Description, Event Date, Time, and Parameter.

The screenshot shows the 'Event Logs' screen with a table of event data. The table has columns for Event Name, Event Description, Event Date, Time, and Parameter. The data is as follows:

Event No.	Event Name	Event Description	Event Date	Time	Parameter
1		Session Start			
2			Sat Sep 6		
3			Sat Sep 6	12:12:28	
4			Sat Sep 6	12:13:32	
5			Sat Sep 6	12:14:32	
6			Sat Sep 6	12:15:32	
7			Sat Sep 6	12:15:32	
8			Sat Sep 6	12:15:32	
9			Sat Sep 6	12:15:32	
10		4 Gain changed	Sat Sep 6	12:15:32	0
11		4 Gain changed	Sat Sep 6	12:16:31	16
12		temperature: 30.25			
13		19 Probe changed	Sat Sep 6	12:16:31	0
14		18 Ellipse encoder ch	Sat Sep 6	12:16:31	0
15		4 Gain changed	Sat Sep 6	12:16:31	0
16		4 Gain changed	Sat Sep 6	12:16:31	0

Figure 7-16 Event logs screen

Click return key to return to Service Diagnostics main Screen.

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Section 7-6 Service Diagnostics (cont'd)

- 5.) **Error Log:** Press "Error Log" Button from the Service Diagnostics main Screen (Refer figure 7-12).



Figure 7-17 Error Log

a - Click here to invoke Error Logs

Error Log Screen Consists of Error Name, Error Description Error Date and Time columns. Refer figure 7-13.

Error Name	Error Description	Date	Time
	--- Session Start		
	HW Not ready - Sy	Sal Sep 6	
	HW Initialization F	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26
voltage_monitor	TRX_OOX test on c	Sal Sep 6	12:12:26

Figure 7-18 Error Log screen

Click return Button to return to Service Diagnostics main Screen.

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Section 7-6 Service Diagnostics (cont'd)

- 6.) **Copy To CD:** Put CD onto CD driver. Click the Copy to CD button (Refer Figure 7-14) from Service Diagnostics main Screen. Log files will be copied to CD.



Figure 7-19 Copy to CD

- 7.) **Copy To USB:** Put USB onto USB driver. Click the Copy to USB button (Refer figure 7-15) from Service Diagnostics main Screen. Log files will be copied to USB.



Figure 7-20 Copy to USB

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Chapter 8 Replacement Procedures

Section 8-1 Overview

8-1-1 Purpose

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

8-1-2 Returning/Shipping Probes and Repair Parts

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

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe).

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

NOTE: *The 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.*



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



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

Section 8-2 LCD

8-2-1 LCD ASSEMBLY(FRU P/N # 5271538)

This is a description on how to remove and replace the LCD Assembly.

8-2-1-1 Tools

- Common phillips screwdrivers

8-2-1-2 Needed Manpower

- 1 person, 15 minutes + travel

8-2-1-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-2-1-4 Removal procedure

- 1.) Flip down the LCD Monitor.
- 2.) Unscrew the two screws (5, 6) and remove LCD arm cover, Refer [Figure 8-1 on page 8-2](#) .

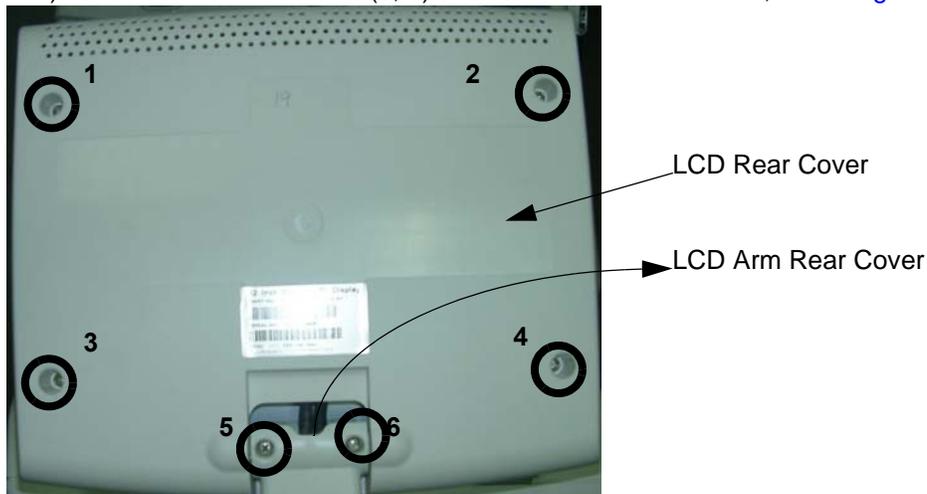


Figure 8-1 LCD Rear Cover

- 3.) Unscrew the four screws (1,2,3,4) to remove LCD Rear Cover, Refer [Figure 8-1 on page 8-2](#)
- 4.) Unfasten the cable clamp for Power and Signal cables and disconnect the cable connection to the LCD

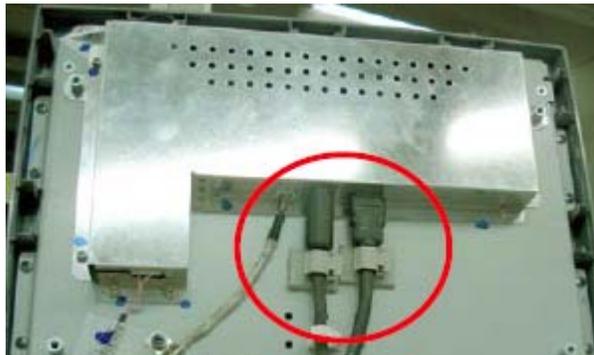


Figure 8-2 Remove Cables

8-2-1 LCD ASSEMBLY(FRU P/N # 5271538) (cont'd)

- 5.) Unscrew the two screws (A, B) in [Figure 8-3 on page 8-3](#)
- 6.) Lift the LCD Assembly upward to remove it from the system.

NOTE: Please angle the LCD while lifting LCD Assembly upward to remove it from the system. If LCD Assembly remove with out angling it may damage or break the LCD Cover.



Figure 8-3 Remove LCD Assembly

8-2-1-5 Mounting Procedure

- 1.) Install new LCD Assembly and fix two screws (A, B). Refer [Figure 8-3 on page 8-3](#)
- 2.) Re connect Power and Signal Cables. Refer [Figure 8-2 on page 8-2](#)
- 3.) Put back LCD arm cover and fix the two screws (5, 6). Refer [Figure 8-1 on page 8-2](#)
- 4.) Replace LCD rear cover by fixing the four screws (1, 2, 3, and 4). Refer [Figure 8-1 on page 8-2](#)

8-2-1-6 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-2-1. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
Section 7-6	Service Diagnostics	

8-2-2 LCD Arm Cover Set (FRU P/N # 5270335)

8-2-2-1 Tools

- Common phillips screwdrivers

8-2-2-2 Needed Manpower

- 1 person, 15 minutes + travel

8-2-2-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-2-2-4 Removal procedure

1. Remove Keyboard Assembly.
2. Remove Keyboard rearcover by unfastening the 2 screws holding it.
3. Remove-LCD-Arm-Rear-Cover assy.
4. Remove Monitor Neck Cover by removing the 4 screws holding it and disconnect the USB cable from inside



Figure 8-4 LCD Arm Rear Cover and Monitor Neck Cover



Figure 8-5 Keyboard Rear Cover

8-2-2-5 Functional Checkout Procedure

<p>See Section</p> <p>4-3-1</p> <p>4-4-1</p> <p>4-4-2</p> <p>4-4-3</p> <p>4-4-4</p> <p>Section 4-5</p> <p>Section 7-6</p>	<p>Functional and/or Leakage Current Test</p> <p>Power On/Boot Up</p> <p>Basic Controls</p> <p>B- Mode Checks</p> <p>M-Mode Checks</p> <p>Measurement Check</p> <p>Peripheral Checks</p> <p>Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p style="text-align: center;">Service Manual Direction 5213326-100, Rev 3, Section 8-2-2. Equipment passes all required tests and is ready for use.</p>
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8-2-3 Handle A3 Console (FRU P/N # 5168365)

8-2-3-1 Tools

- Common phillips screwdrivers; Allen Key Set.

8-2-3-2 Needed Manpower

- 1 person, 15 minutes + travel

8-2-3-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-2-3-4 Removal procedure

1. Remove Keyboard rear cover by removing hte 2 screws holding it.
2. Using the allen key set remove Handle A3 Console by unfastening the 4 socket head fasteners (marked A,B,C,D).



Figure 8-6 Handle A3 Console

8-2-3-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-2-3. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	

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8-2-4 Monitor Holder Assembly(FRU P/N # 5308054)

8-2-4-1 Tools

- Common phillips screwdrivers; Allen Key Set; Standard Screwdriver.

8-2-4-2 Needed Manpower

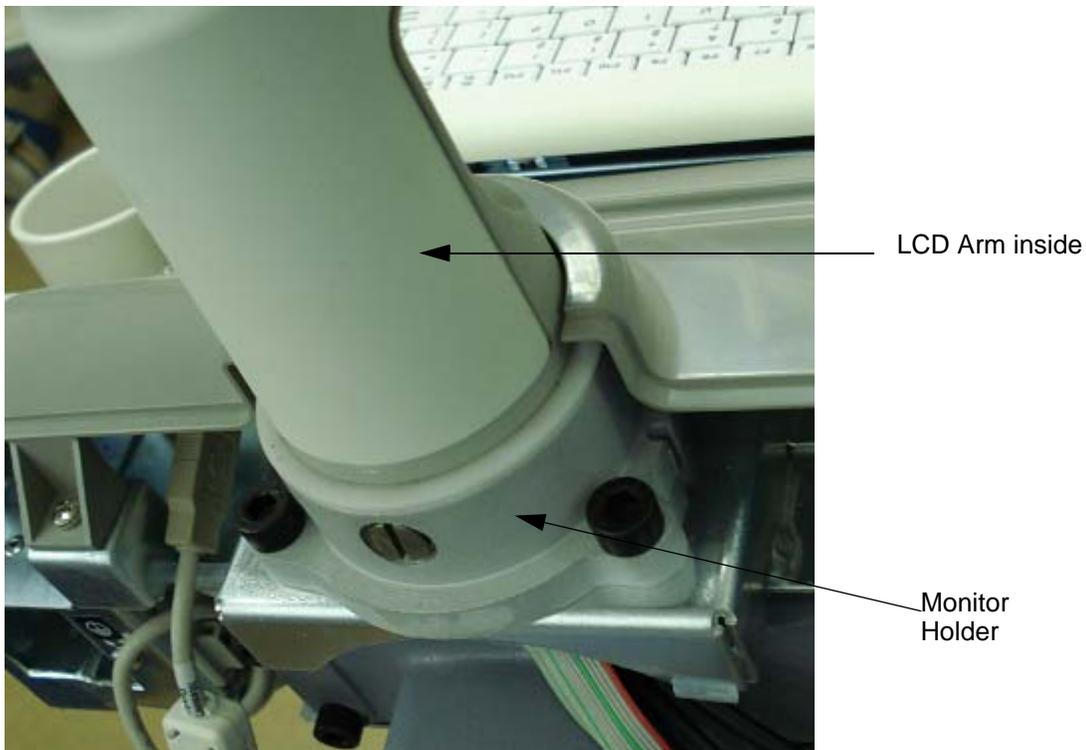
- 1 person, 30 minutes + travel

8-2-4-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-2-4-4 Removal procedure

1. Remove Monitor Neck cover.
2. Remove LCD assembly.
3. Unfasten the Locking screw using a standard flat(-) screwdriver
4. Remove LCD Arm
5. Remove spacer sheet
6. Using the allen key set, unfasten the 3 sockethead screws to remove the Monitor Holder.



8-2-4-5 Functional Checkout Procedure

<p>See Section 4-3-1 4-4-1 4-4-2 4-4-3 4-4-4</p>	<p>Functional and/or Leakage Current Test Power On/Boot Up Basic Controls B- Mode Checks M-Mode Checks Measurement Check</p>	<p style="text-align: center;">Debrief Script</p> <p style="text-align: center;">Service Manual Direction 5213326-100, Rev 3, Section 8-2-4. Equipment passes all required tests and is ready for use.</p>
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Section 8-3 Keyboard

8-3-1 Keyboard Assembly (FRU P/N # 5168531)

8-3-1-1 Tools

- Common phillips screwdrivers

8-3-1-2 Needed Manpower

- 1person, 10 minutes + travel

Note: The Freeze key is part of Keyboard.

8-3-1-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-1-4 Removal Procedure

- 1.) Remove the Gel Holder and Probe Holders.



Figure 8-7 Key Board Top View

- 2.) Unscrew the four screws (a, b, c, and d).



Figure 8-8 Key Board Bottom View

- 3.) Lift the Keyboard Assembly Up and Remove the Keyboard cable

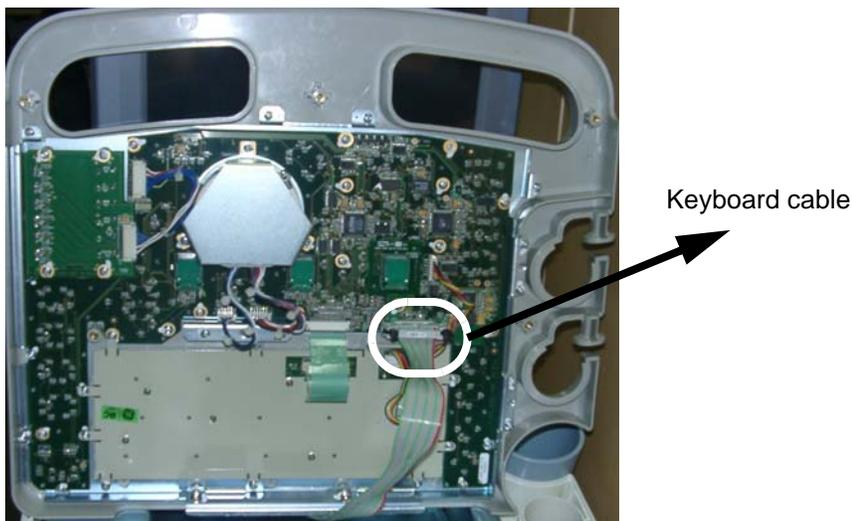


Figure 8-9 Keyboard cable location

- 4.) Remove Keyboard Assembly.

8-3-1-5 Replace Keyboard Assembly

- 1.) Connect keyboard cable to the new Keyboard Assembly.
- 2.) Locate the Keyboard top hinge appropriately.
- 3.) Replace keyboard Assembly by fixing four screws (a,b,c, and d).
- 4.) Refix Gel holder and Probe holders.

8-3-1-6 Functional Checkout Procedure

<p>See Section 4-3-1 4-4-1 4-4-2 4-4-3 4-4-4 Section 4-5 Section 7-6</p>	<p>Functional and/or Leakage Current Test Power On/Boot Up Basic Controls B- Mode Checks M-Mode Checks Measurement Check Peripheral Checks Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-3-1. Equipment passes all required tests and is ready for use.</p>
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8-3-2 TGC PWA FRU Assy (FRU P/N # 5266629)

8-3-2-1 Tools

- Common phillips screwdrivers

8-3-2-2 Needed Manpower

- 1 person, 10 minutes + travel

8-3-2-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-2-4 Removal procedure

1. Remove keyboard Assembly.
2. Remove TGC Caps. (6 Nos.)
3. Remove TGC assembly by removing the 4 screws (as marked in figure 4-10) PWA with TGC interface cable.

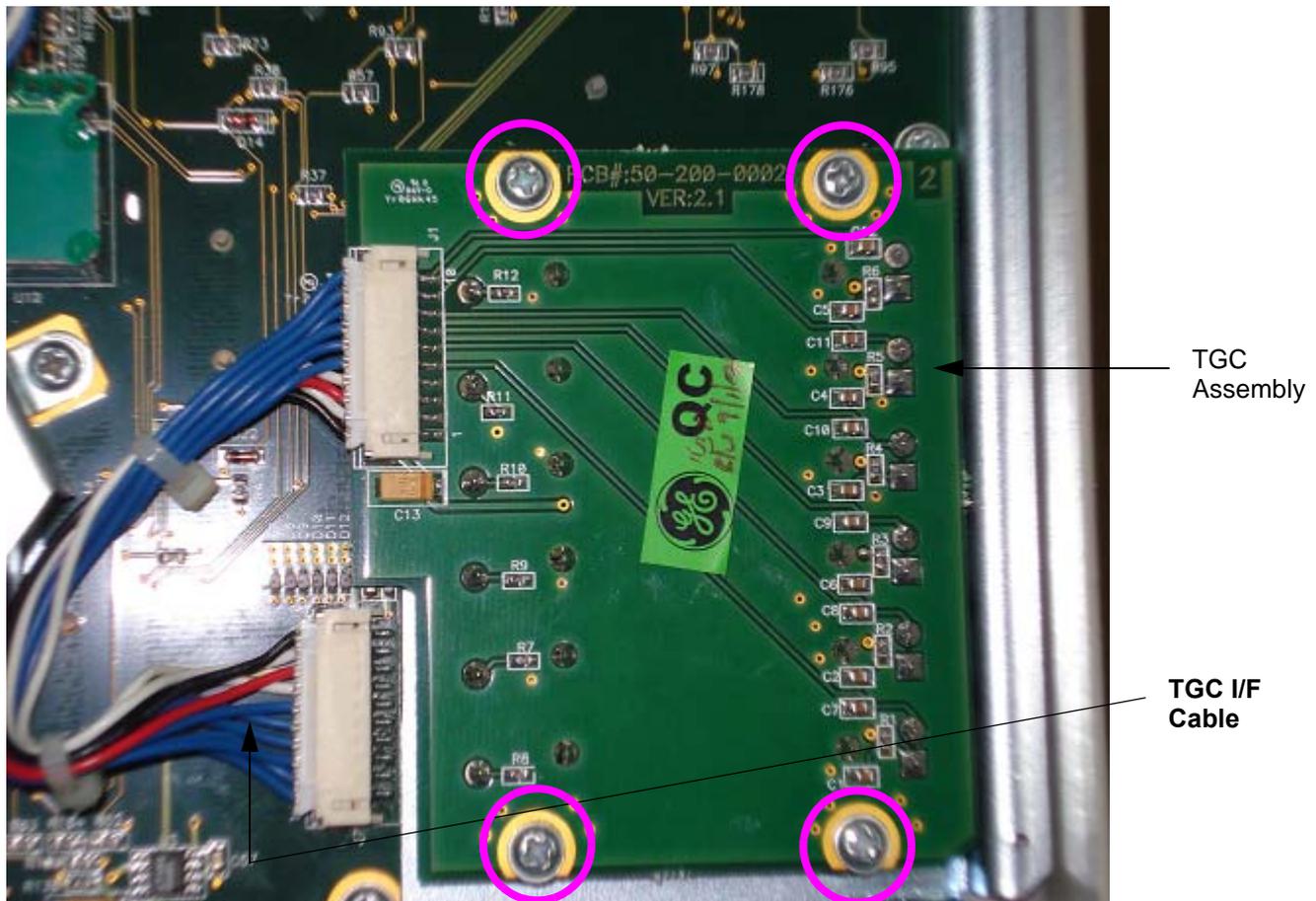


Figure 8-10 TGC Assembly

8-3-2-5 Functional Checkout Procedure

<p>See Section 4-3-1 4-4-1 4-4-2 4-4-3 4-4-4 Section 4-5 Section 7-6</p>	<p>Functional and/or Leakage Current Test Power On/Boot Up Basic Controls B- Mode Checks M-Mode Checks Measurement Check Peripheral Checks Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-3-2. Equipment passes all required tests and is ready for use.</p>
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8-3-3 Alpha Numeric Keyboard with cables (FRU P/N # 5181790)

8-3-3-1 Tools

- Common phillips screwdrivers

8-3-3-2 Needed Manpower

- 1 person, 30 minutes + travel

8-3-3-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-3-4 Removal procedure

1. Remove Keyboard Assembly.
2. Remove A/N Keyboard cable
3. Remove the keyboard top hinge by unfastening the 2 screws marked A & B in Figure 8-11
3. Remove the Alphanumeric Keyboard by unfastening the 10 screws (marked in cyan color in Figure 4-11) holding it

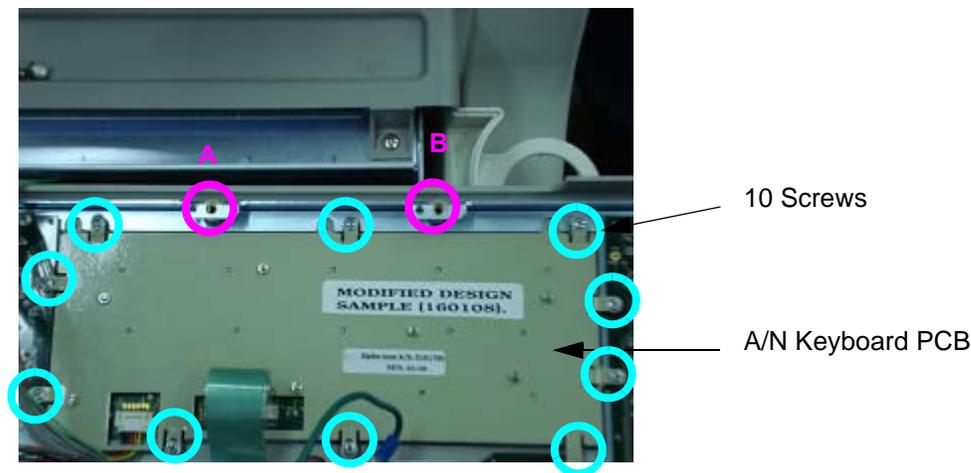


Figure 8-11 A/N Keyboard PCB

8-3-3-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-3-3. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
Section 4-5	Peripheral Checks	
Section 7-6	Service Diagnostics	

8-3-4 Optical Trackball Assy (FRU P/N # 5262338)

8-3-4-1 Tools

- Common phillips screwdrivers

8-3-4-2 Needed Manpower

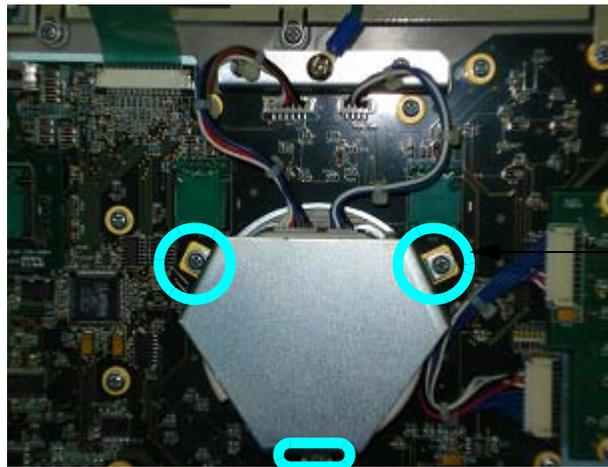
- 1 person, 10 minutes + travel

8-3-4-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-4-4 Removal procedure

1. Remove Keyboard Assembly.
2. Unfasten the 3 screws holding the trackball bracket (circled in cyan color in Figure 8-12)
3. Remove Trackball assembly with Trackball Interface cable.



3 screws to be removed

Figure 8-12 Optical Trackball Assembly

8-3-4-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-3-4. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
Section 4-5	Peripheral Checks	
Section 7-6	Service Diagnostics	

8-3-5 Encoder Set (FRU P/N # 5262796)

8-3-5-1 Tools

- Common phillips screwdrivers; Plier

8-3-5-2 Needed Manpower

- 1 person, 30 minutes + travel

8-3-5-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-5-4 Removal procedure

1. Remove Keyboard assembly.
2. Remove all knobs on the keyboard
3. Remove the Alphanumeric keyboard, TGC PCB and Trackball.
4. Using a plier remove the nut, holding the encoder PCBs, on the rear side.

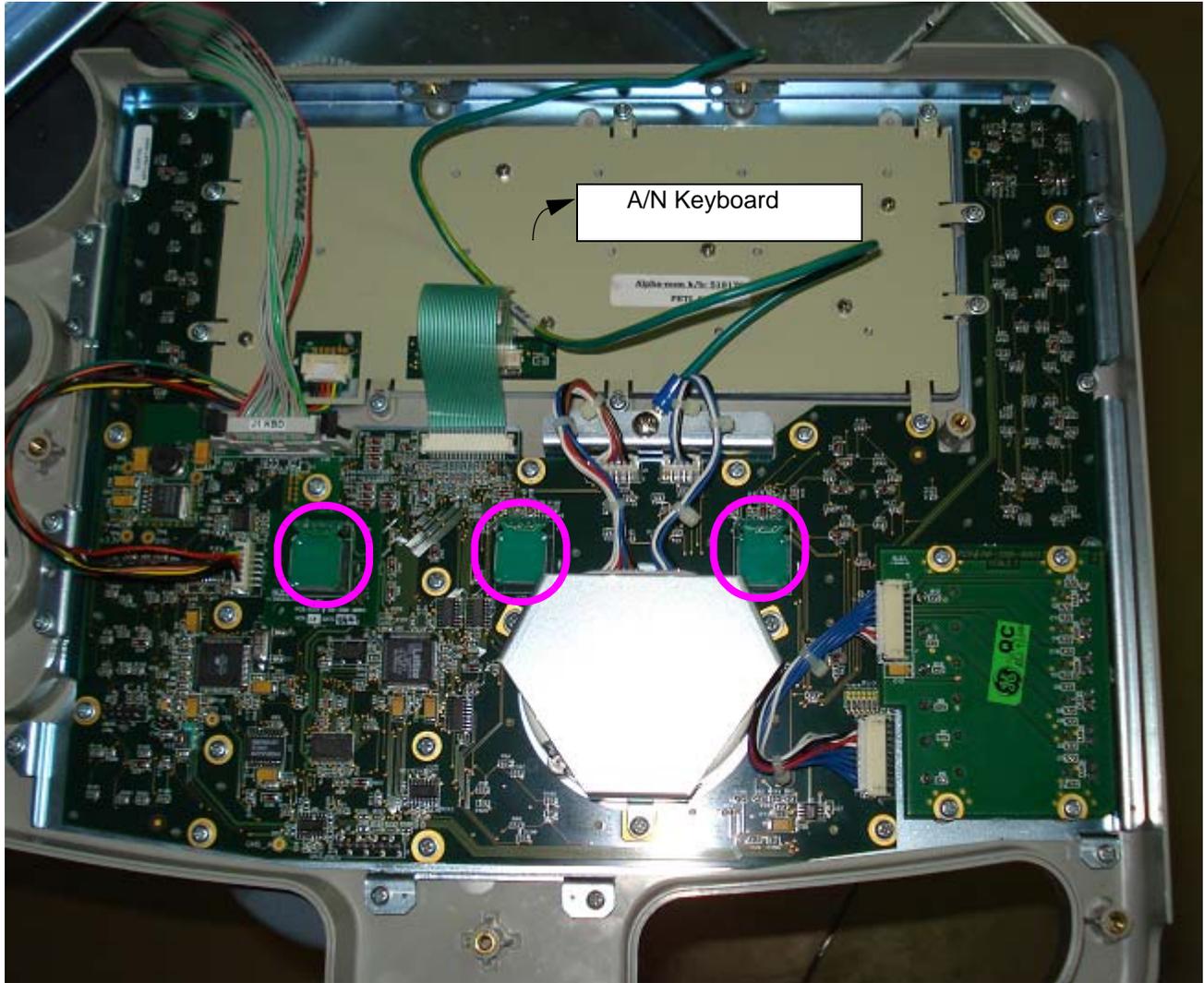


Figure 8-13 Encoder Set

8-3-5-5 Functional Checkout Procedure

<p>See Section</p> <p>4-3-1</p> <p>4-4-1</p> <p>4-4-2</p> <p>4-4-3</p> <p>4-4-4</p> <p>Section 4-5</p> <p>Section 7-6</p>	<p>Functional and/or Leakage Current Test</p> <p>Power On/Boot Up</p> <p>Basic Controls</p> <p>B- Mode Checks</p> <p>M-Mode Checks</p> <p>Measurement Check</p> <p>Peripheral Checks</p> <p>Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-2-5. Equipment passes all required tests and is ready for use.</p>
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8-3-6 CA3-Keyboard Interface Cable (FRU P/N # 5192650)

8-3-6-1 Tools

- Common phillips screwdrivers

8-3-6-2 Needed Manpower

- 1 person, 30 minutes + travel

8-3-6-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-6-4 Removal procedure

1. Remove LH Cover and RH Cover
2. Remove Left EMI Cover
3. Disconnect the Keyboard cable from BPB.
4. Remove Left & right arm rear covers
5. Remove Top Cover plastic by unfastening the 2 screws holding it
6. Cut the tie wraps in the arm cover
7. Remove keyboard back cover assembly
8. Remove Keyboard Assembly
9. Pull the Keyboard interface cable from the back side

Keyboard Interface
Cable

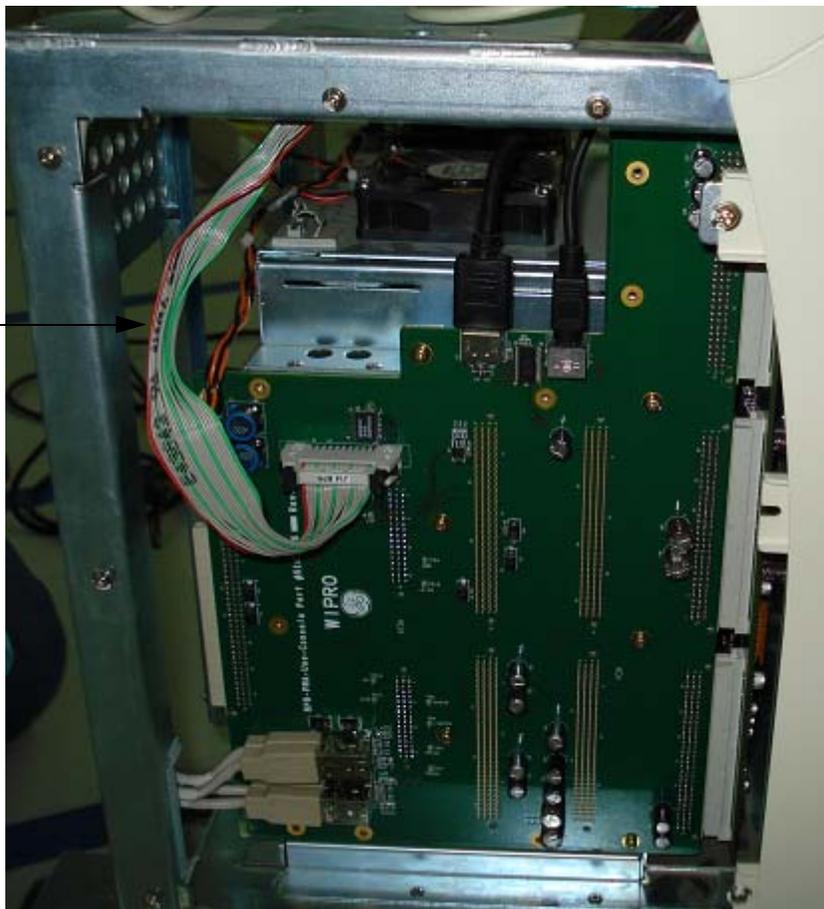


Figure 8-14 Keyboard Interface cable



Figure 8-15 Cable routing

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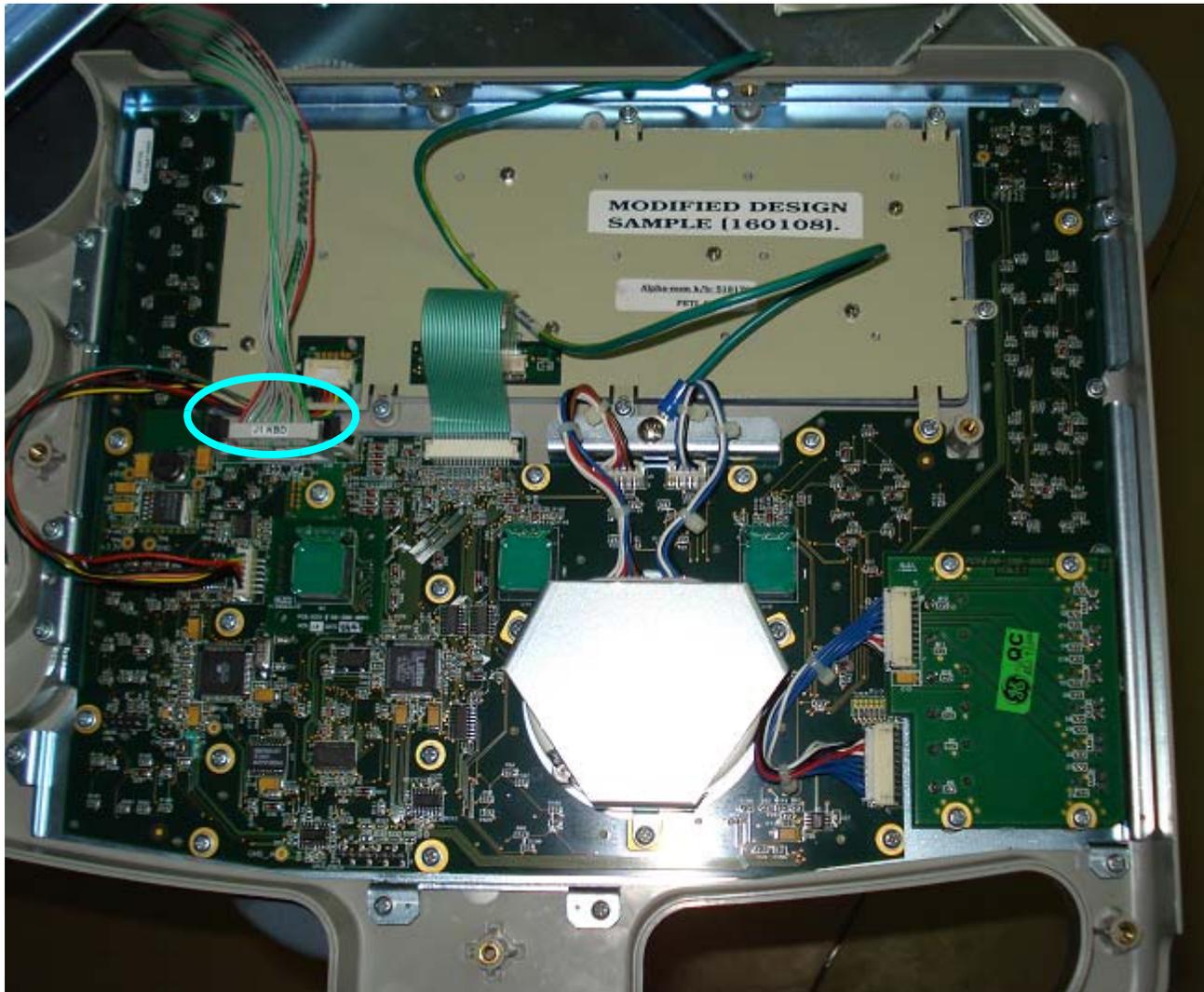


Figure 8-16 Cable connected to keyboard

8-3-6-5 Functional Checkout Procedure

<p>See Section</p> <p>4-3-1</p> <p>4-4-1</p> <p>4-4-2</p> <p>4-4-3</p> <p>4-4-4</p> <p>Section 4-5</p> <p>Section 7-6</p>	<p>Functional and/or Leakage Current Test</p> <p>Power On/Boot Up</p> <p>Basic Controls</p> <p>B- Mode Checks</p> <p>M-Mode Checks</p> <p>Measurement Check</p> <p>Peripheral Checks</p> <p>Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-3-6. Equipment passes all required tests and is ready for use.</p>
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8-3-7 Keyboard Cover Set (FRU P/N # 5262766)

8-3-7-1 Tools

- Common phillips screwdrivers

8-3-7-2 Needed Manpower

- 1 person, 15 minutes + travel

8-3-7-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-7-4 Removal procedure

1. Remove Keyboard rear cover.
2. Remove CD tray assembly.
3. Remove Keyboard assembly.
4. Remove Keyboard rubber bumper.
5. Remove keyboard bottom cover.



Rubber
Bumper

Figure 8-17 Keyboard



Figure 8-18 Keyboard Rear Cover

8-3-7-5 Functional Checkout Procedure

<p>See Section</p> <p>4-3-1</p> <p>4-4-1</p> <p>4-4-2</p> <p>4-4-3</p> <p>4-4-4</p> <p>Section 4-5</p> <p>Section 7-6</p>	<p>Functional and/or Leakage Current Test</p> <p>Power On/Boot Up</p> <p>Basic Controls</p> <p>B- Mode Checks</p> <p>M-Mode Checks</p> <p>Measurement Check</p> <p>Peripheral Checks</p> <p>Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-3-7. Equipment passes all required tests and is ready for use.</p>
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8-3-8 Keyboard Knob Set (FRU P/N # 5263937)

8-3-8-1 Tools

- Common phillips screwdrivers

8-3-8-2 Needed Manpower

- 1 person, 15 minutes + travel

8-3-8-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-3-8-4 Removal procedure

1. Pull the knobs out with hands by slightly pushing it up from the bottom edge.



Figure 8-19 Keyboard Knob Set

8-3-8-5 Functional Checkout Procedure

<p>See Section 4-3-1 4-4-1 4-4-2 4-4-3 4-4-4 Section 4-5 Section 7-6</p>	<p>Functional and/or Leakage Current Test Power On/Boot Up Basic Controls B- Mode Checks M-Mode Checks Measurement Check Peripheral Checks Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-3-8. Equipment passes all required tests and is ready for use.</p>
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Section 8-4 Mechanicals

8-4-1 RH Side Cover (FRU No. 5265162)

This is a description on how to remove and replace the Right Cover.

8-4-1-1 Tools

- Common Phillips screwdrivers

8-4-1-2 Needed Manpower

- 1 person, 15 minutes + travel

8-4-1-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-1-4 Removal Procedure

- 1.) Unscrew the two screws (1-2).
- 2.) Remove the Right cover in the direction as shown in the figure below.

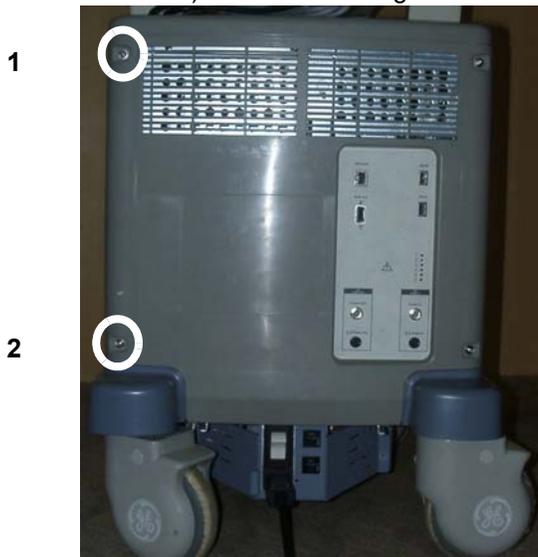


Figure 8-20 Right Cover

8-4-1-5 Functional Checkout Procedure

<p>See Section</p> <p>4-3-1</p> <p>4-4-1</p> <p>4-4-2</p> <p>4-4-3</p>	<p>Functional and/or Leakage Current Test</p> <p>Power On/Boot Up</p> <p>Basic Controls</p> <p>B- Mode Checks</p> <p>M-Mode Checks</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-4-1. Equipment passes all required tests and is ready for use.</p>
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8-4-2 LH Side Cover (FRU No. 5267220)

This is a description on how to remove and replace the Left Cover.

8-4-2-1 Tools

- Common Phillips screwdrivers

8-4-2-2 Needed Manpower

- 1 person, 15 minutes + travel

8-4-2-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-2-4 Removal Procedure

- 1.) Unscrew 2 screws (a, b).
- 2.) Remove the Left cover in the direction as shown in the figure below.



Figure 8-21 Left Cover

8-4-2-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-4-2. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	

8-4-3 Rear Cover (FRU No. 5269718)

Purpose: This is a description on how to remove and replace the Rear Cover.

8-4-3-1 Tools

- Common Phillips screwdrivers

8-4-3-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-4-3-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-3-4 Removal Procedure

- 1.) Remove Right cover. Refer [8-4-1 on page 8-26](#) for details on how to remove Right cover.
- 2.) Remove Left cover. Refer [8-4-2 on page 8-27](#) for details on how to remove Left cover.
- 3.) Remove the Rear Cover.



Figure 8-22 Rear Cover

8-4-3-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-4-3. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	

8-4-4 Front Cover (FRU No. 5271834)

This is a description on how to remove and replace the Front Cover.

8-4-4-1 Tools

- Common Phillips screwdrivers

8-4-4-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-4-4-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-4-4 Removal Procedure

- 1.) Remove Right cover. Refer [8-4-1 on page 8-26](#) for details on how to remove Right cover.
- 2.) Remove Left cover. Refer [8-4-2 on page 8-27](#) for details on how to remove Left cover.
- 3.) Loosen the four screws (a, b, c, d)
- 4.) Remove the front cover..

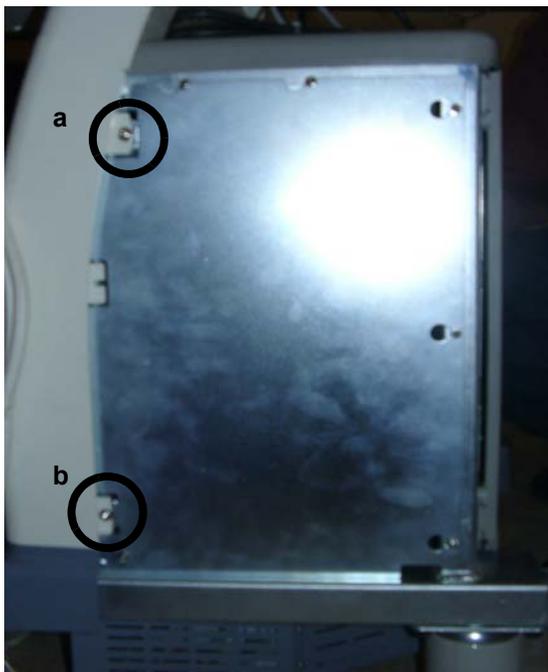


Figure 8-23 Front Cover

8-4-4-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-4-4. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	

8-4-5 Top Cover (FRU P/N # 5168637)

8-4-5-1 Tools

- Common phillips screwdrivers

8-4-5-2 Needed Manpower

- 1 person, 15 minutes + travel

8-4-5-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-5-4 Removal Procedure

1. Remove the front cover
2. Remove the Rear Arm cover set
3. Remove the Top cover by unfastening the 2 screws (marked in Figure 8-24) holding it



Figure 8-24 Top Cover

8-4-5-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-4-5. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	

8-4-6 Rear Arm Cover Set (FRU P/N # 5263051)

8-4-6-1 Tools

- Common phillips screwdrivers

8-4-6-2 Needed Manpower

- 1person, 15 minutes + travel

8-4-6-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-6-4 Removal Procedure

1. Remove Keyboard rear cover.
2. Remove Rear Arm cover set. Retain the fasteners for the rear arm covers.



Figure 8-25 Arm Covers

8-4-6-5 Functional Checkout Procedure

See Section 4-3-1 4-4-1 4-4-2 4-4-3	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-4-6. Equipment passes all required tests and is ready for use.
	Power On/Boot Up	
	Basic Controls	
	B- Mode Checks	
	M-Mode Checks	

8-4-7 LH Arm Cover Front with GE Logo (FRU P/N # 5263193) / RH Arm cover Front with Labels (FRU # 5263420)

8-4-7-1 Tools

- Common phillips screwdrivers

8-4-7-2 Needed Manpower

- 1person, 15 minutes each + travel

8-4-7-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-7-4 Removal Procedure

1. Remove front cover.
2. Remove printer tray and CD tray assembly.
3. Remove Monitor Neck Cover.
4. Remove Keyboard bottom cover.
5. Remove Probe cable hanger if available
6. Remove Left/Right arm cover

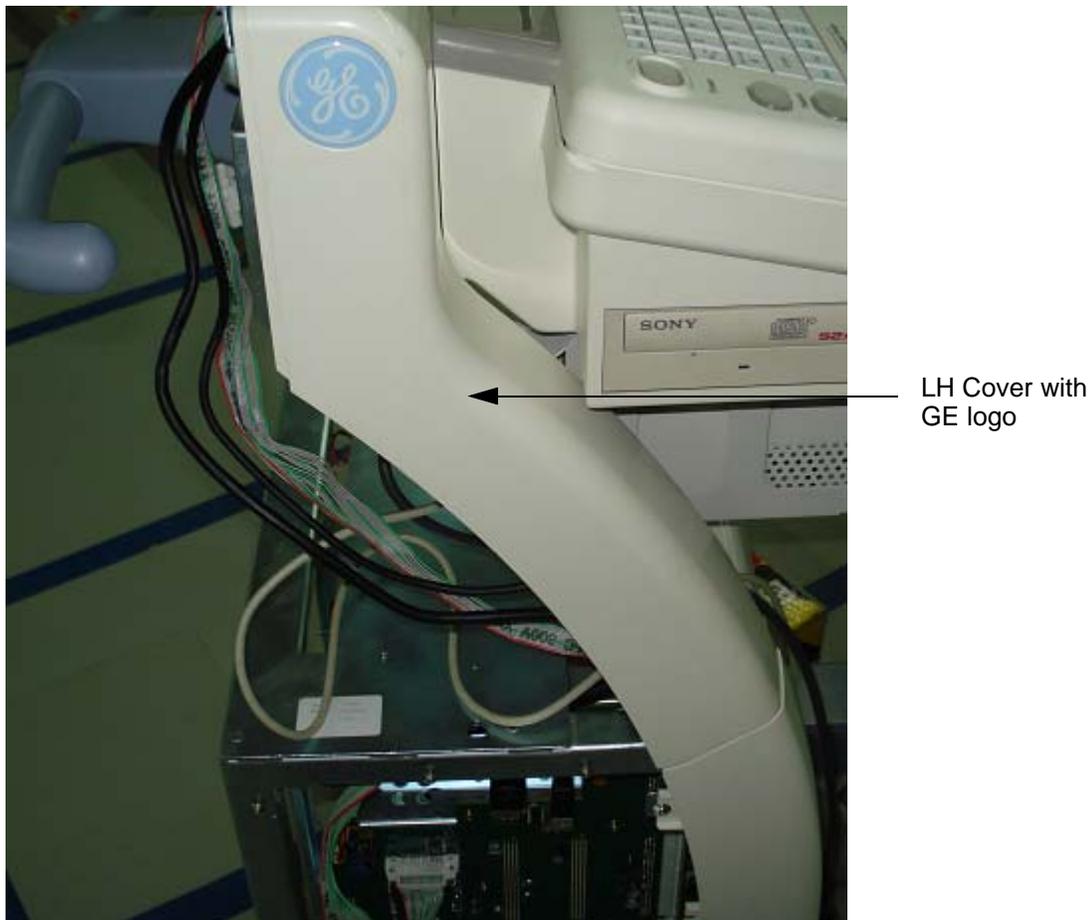


Figure 8-26 LH Cover with GE Logo

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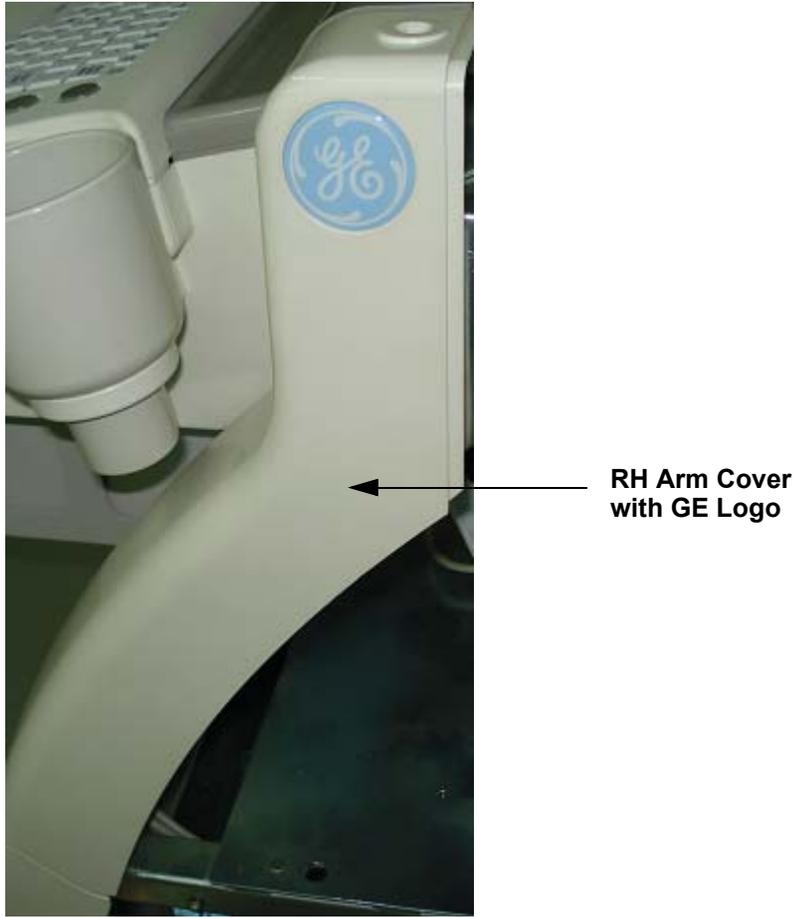


Figure 8-27 RH Arm Cover

8-4-7-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-4-7. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	

8-4-8 Front Bumper (FRU No. 5168362)

This is a description on how to remove and replace the Front Bumper.

8-4-8-1 Tools

- Common Phillips screwdrivers

8-4-8-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-4-8-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-8-4 Removal Procedure

1. Remove Front Cover. Refer [8-4-4 on page 8-29](#) for details on how to remove Front Cover
2. Remove the two screws (marked 1, 2 in Figure 8-28)
3. Remove Front Bumper

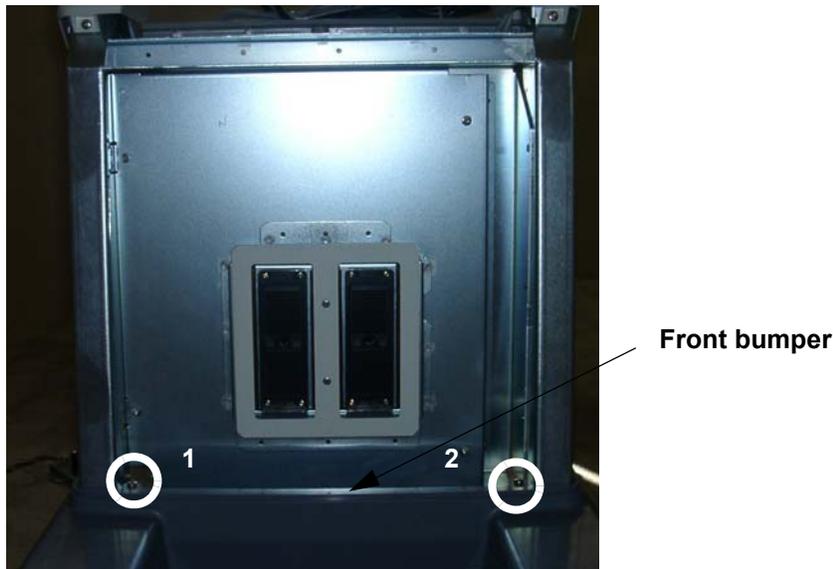


Figure 8-28 Removing Front Bumper

8-4-8-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-4-8. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	

8-4-9 Castor Wheel Front (FRU P/N # 5265433) / Castor Wheel Rear (FRU P/N # 5264222)

8-4-9-1 Tools

- Common phillips screwdrivers; Allen Key Set.

8-4-9-2 Needed Manpower

- 1person, 15 minutes + travel each

8-4-9-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-9-4 Removal Procedure

1. Remove Front Bumper
2. Remove the Transformer assy
3. Lift the system slightly up on the side of the castor wheel that needs replacement
4. Place a small block of the size of castor wheel to balance the system
5. Using the allen key set, unfasten the 4 Hex screws holding the Castor wheel and remove it



Figure 8-29 Castor wheel

8-4-9-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-4-9. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	

8-4-10 Right EMI Cover (Part of EMI Cover Assy FRU P/N # 5264421)

This is a description on how to remove and replace the Right EMI Cover (P/N # 5196549).

8-4-10-1 Tools

- Common phillips screwdrivers

8-4-10-2 Needed Manpower

- 1 person, 15 minutes + travel

8-4-10-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-10-4 Removal Procedure

- 1.) Remove Right Cover. Refer [8-4-1](#) on page 8-26 for details on how to remove Right cover.
- 2.) Loose the six screws (A-F).
- 3.) Remove the Right EMI Cover..

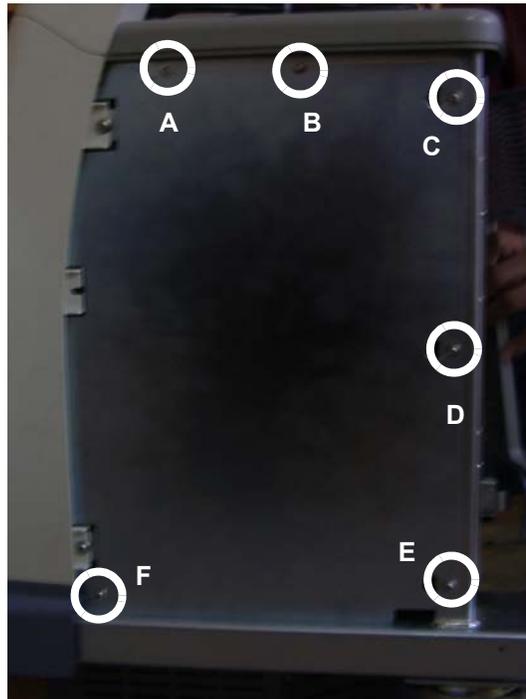


Figure 8-30 Removing Right EMI Cover

8-4-11 Left EMI Cover(Part of EMI Cover Assy FRU P/N # 5264421)

This is a description on how to remove and replace the Left EMI Cover.(P/N # 5196545)

8-4-11-1 Tools

- Common Phillips screwdrivers

8-4-11-2 Needed Manpower

- 1person, 15 minutes + travel

8-4-11-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-11-4 Removal Procedure

- 1.) Remove Left Cover. Refer [8-4-2 on page 8-27](#) for details on how to remove left cover.
- 2.) Loose six screws (1-6).
- 3.) Remove the Left EMI Cover .

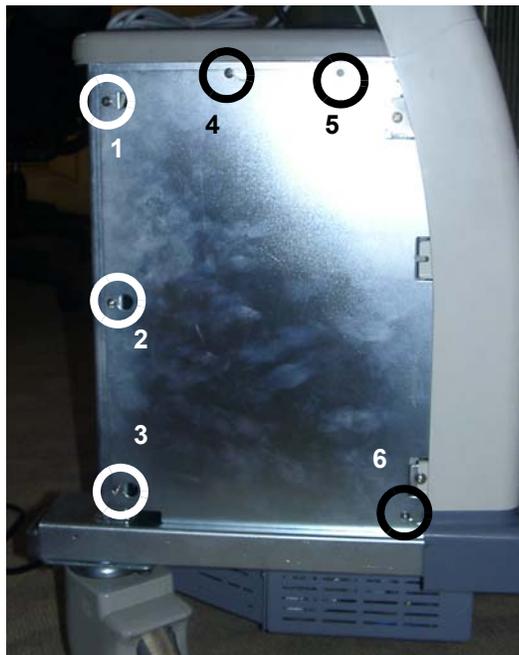


Figure 8-31 Removing Left EMI Cover

8-4-12 Card Cage EMI Cover (Part of EMI Cover Assy FRU P/N # 5264421)

This is a description on how to remove and replace the Card Cage EMI Cover (P/N # 5233532)

8-4-12-1 Tools

- Common Phillips screwdrivers

8-4-12-2 Needed Manpower

- 1 person, 15 minutes + travel

8-4-12-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-12-4 Removal Procedure

1. Remove Right EMI Cover. Refer [8-4-10 on page 8-38](#) for details on how to remove Right EMI cover.
2. Unscrew six screws (1-6) holding the Card cage EMI Cover

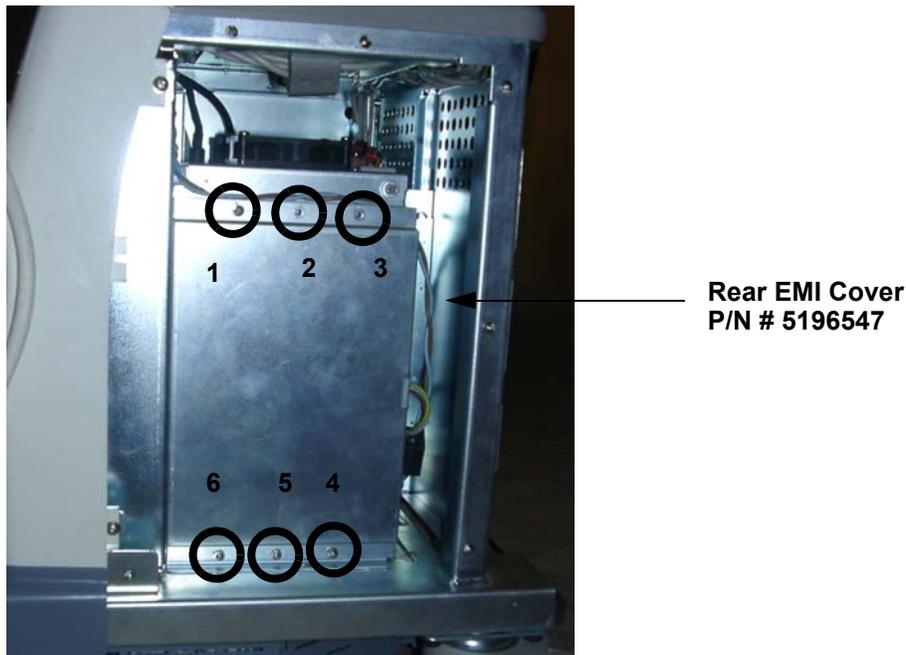


Figure 8-32 Nest EMI Cover

Figure 8-33 Card Cage Left EMI Cover

- 4.) Remove the Card Cage EMI Cover.

8-4-13 Conn-EMI-Cover-Assy (Part of EMI Cover Assy FRU P/N # 5264421)

This is a description on how to remove and replace the Front EMI Cover (P/N # 5196548)

8-4-13-1 Tools

- Common Phillips screwdrivers

8-4-13-2 Needed Manpower

- 1person, 15 minutes + travel

8-4-13-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-13-4 Removal Procedure

- 1.) Remove Right Cover. Refer 8-4-1 on page 8-26 for details on how to remove Right Cover.
- 2.) Remove Left Cover. Refer 8-4-2 on page 8-27 for details on how to remove Left cover.
- 3.) Remove Front Cover. Refer 8-4-4 on page 8-29 for details on how to remove front cover.
- 4.) Remove Front Bumper. Refer 8-4-8 on page 8-35 for details on how to remove front bumper
- 5.) Unscrew the four screws (1-4).
- 6.) Remove Front EMI Cover

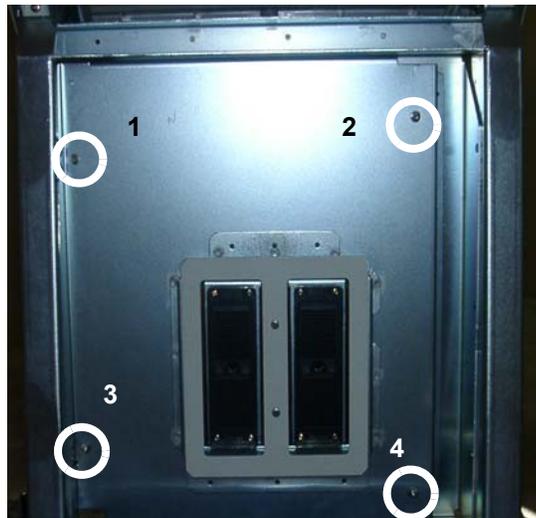


Figure 8-34 Removing Conn- EMI-Cover-Assy

8-4-13-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-4-13. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	

8-4-14 Fan Assy (FRU No. 5215345)

This is a description on how to remove and replace the Card Cage Fan Assy.

8-4-14-1 Tools

- Common Phillips screwdrivers

8-4-14-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-4-14-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-4-14-4 Removal Procedure

- 1.) Remove the Right Cover. Refer to section [8-4-1](#) on page 8-26
- 2.) Remove the Right EMI Cover. Refer to section [8-4-10](#) on page 8-38
- 3.) Disconnect the Fan Assembly cable from the backplane.

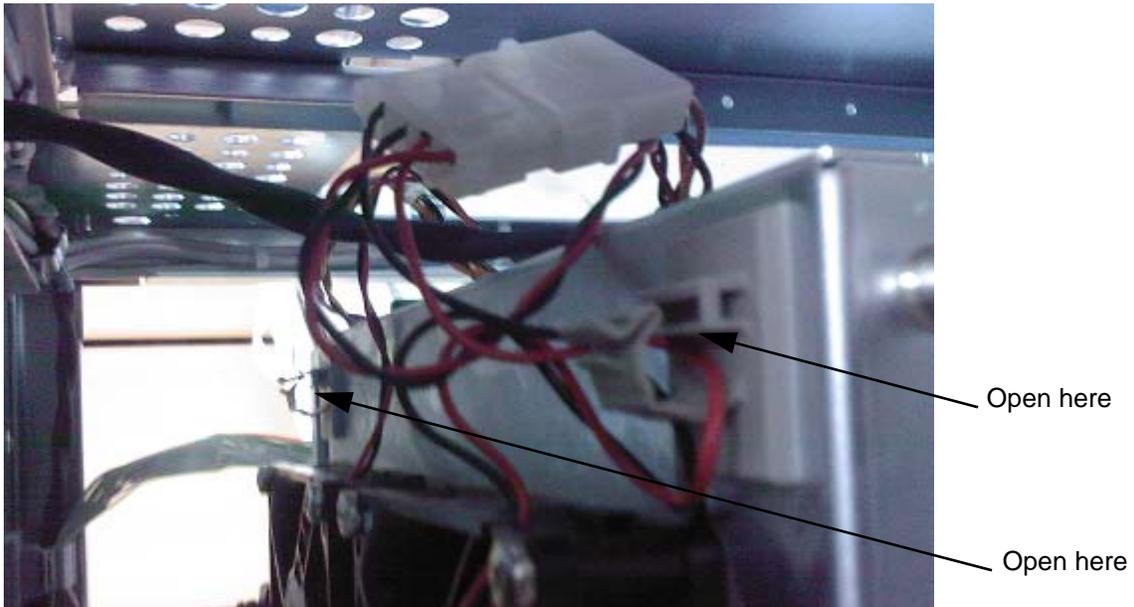


Figure 8-35 Removing Fan cable

- 4.) Remove SSR cables on FAN Assembly.

5.) Loose the two screws (a,b)

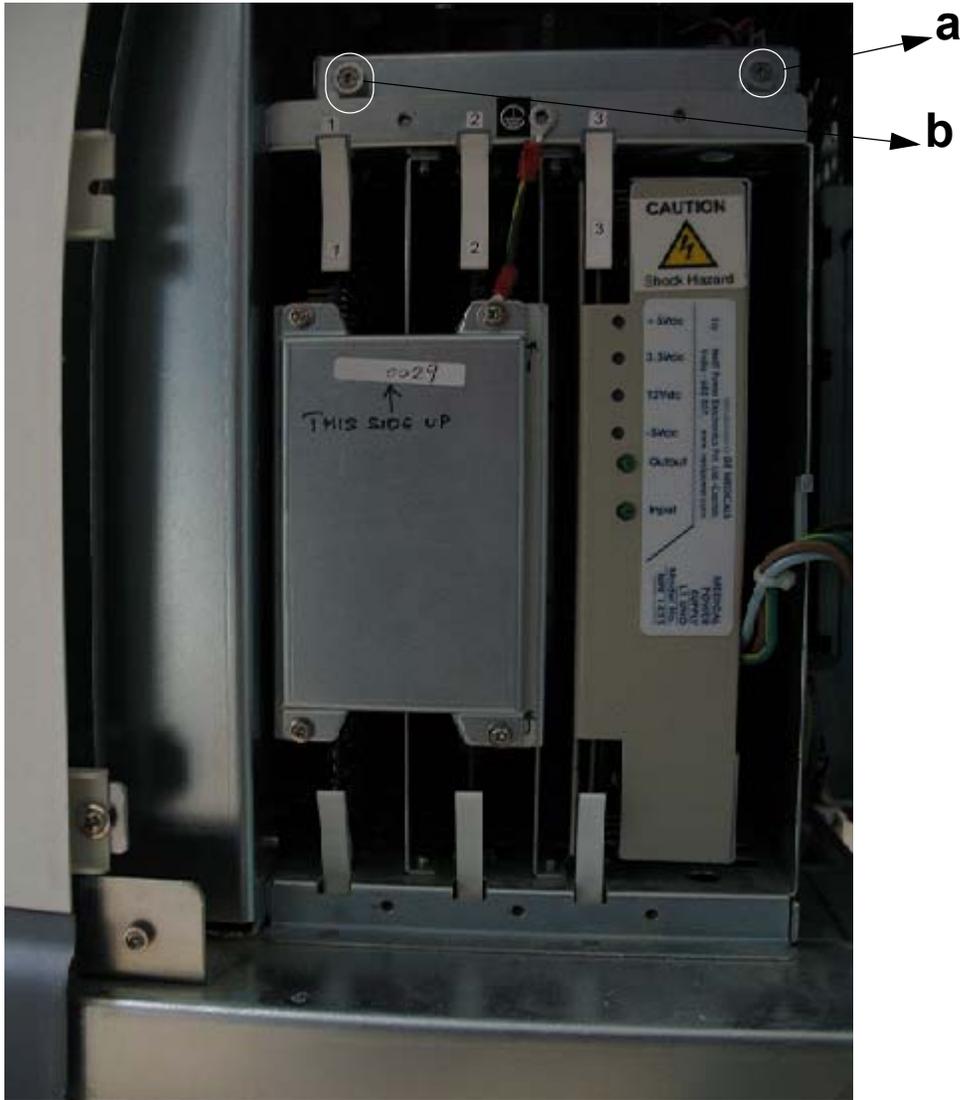


Figure 8-36 Removing Fan Assembly

6.) Pull out the Fan Assy

8-4-14-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-4-14. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
Section 4-5	Peripheral Checks	
Section 7-6	Service Diagnostics	

Section 8-5 I/O Interfaces

8-5-1 Rear Panel Assy (FRU No. 5196446)

This is a description on how to remove and replace the Rear Panel Assy.

8-5-1-1 Tools

- Common Phillips screwdrivers

8-5-1-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-5-1-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-5-1-4 Removal Procedure

- 1.) Remove the Rear Cover . Refer to section [8-4-3 on page 8-28](#) .
- 2.) Unscrew the four screws (a, b, c,d)
- 3.) Pull out the Rear panel assy by holding in the slot.

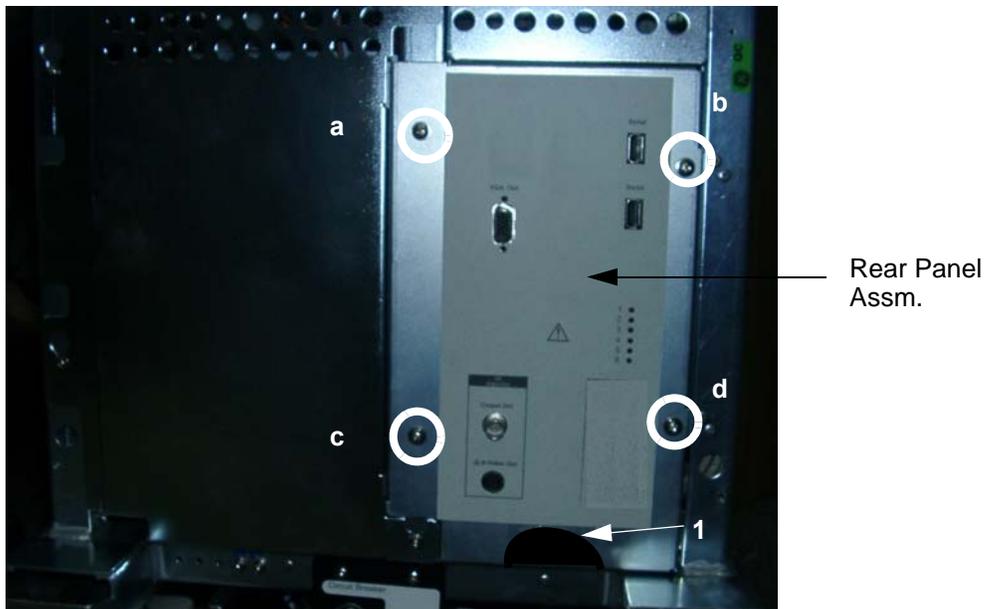


Figure 8-37 Removing Rear Panel Assembly

8-5-1-5 Functional Checkout Procedure

<p>See Section 4-3-1 4-4-1 4-4-2 4-4-3 4-4-4 Section 4-5 Section 7-6</p>	<p>Functional and/or Leakage Current Test Power On/Boot Up Basic Controls B- Mode Checks M-Mode Checks Measurement Check Peripheral Checks Service Diagnostics</p>	<p style="text-align: center;">Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-4-14. Equipment passes all required tests and is ready for use.</p>
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8-5-1-6 Front Panel (FRU P/N # 5192657 for 100-110V / P/N # 5196449 for 220-240V)

This is a description on how to remove and replace the Front Panel.

8-5-1-7 Tools

- Common Phillips screwdrivers

8-5-1-8 Needed Manpower

- 1 persons, 15 minutes + travel

8-5-1-9 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-5-1-10 Removal Procedure

- 1.) Unscrew two screws (a,b) marked in Figure 8-38 and pull down the Front panel assy



Figure 8-38 Removing Front Panel Assembly

2.) Disconnect USB's and Power connector

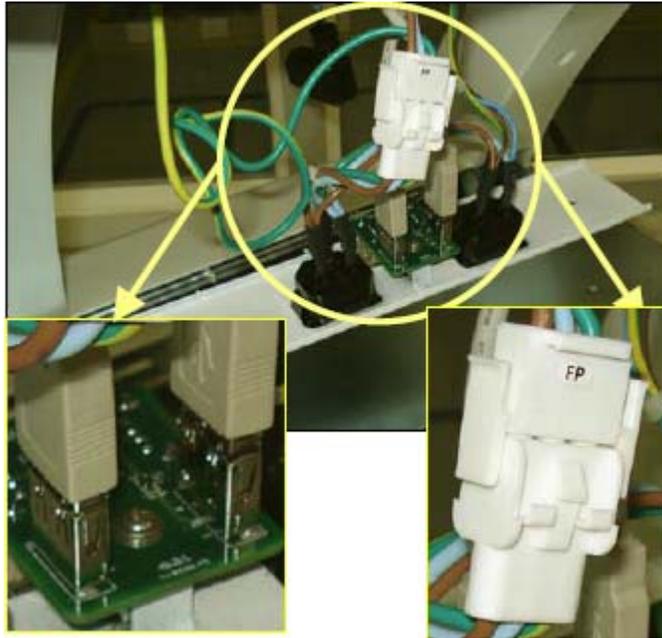


Figure 8-39 Removing Front Panel USB Power cord

3.) Remove the Front Panel

8-5-1-11 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	<p>Debrief Script</p> <p>Service Manual Direction 5213326-100, Rev 3, Section 8-5-2. Equipment passes all required tests and is ready for use.</p>
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-4-6	Probe/Connector Check	
Section 7-6	Service Diagnostics	

8-5-2 CA9-Transformer to Front Panel and power supply cable assy (FRU P/N # 5192656)

8-5-2-1 Tools

- Common phillips screwdrivers

8-5-2-2 Needed Manpower

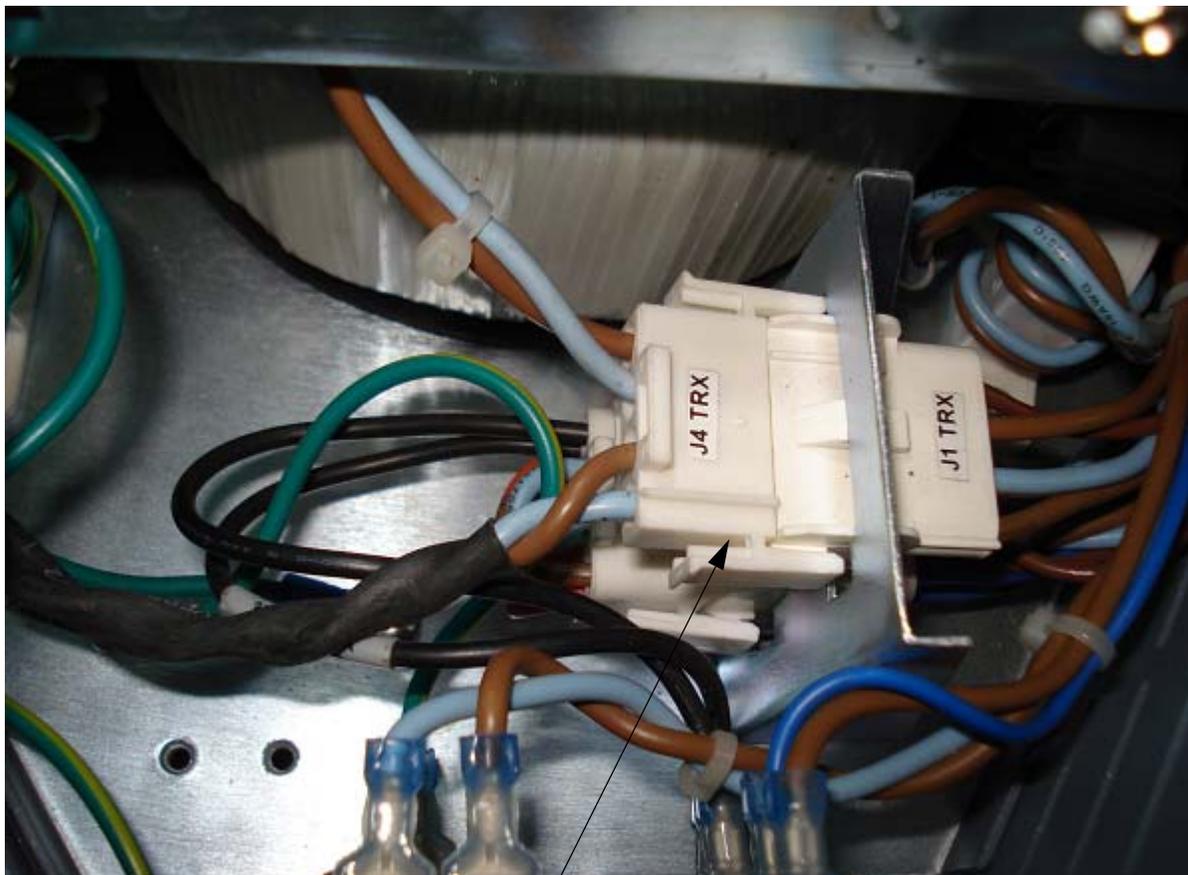
- 1person, 30 minutes + travel

8-5-2-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-5-2-4 Removal Procedure

1. Remove LH and RH plastic covers.
2. Remove two screws of transformer.
3. Disconnect J4 from TRX.
4. Remove LH and RH EMI Covers.
5. Remove Card Cage EMI Cover.
6. Slide out the HVLV and disconnect the power input cable for HVLV.
7. Remove SSR by removing 2 fasteners and disconnect cable from fan assy.
8. Remove the cable from all the cable clamps
9. Remove the Top Cover
10. Cut the required cable ties
11. Remove Keyboard Rear Cover
12. Remove front panel
13. Remove the grounding cables.



Remove this connector from Transformer assm.

Figure 8-40 J4 TRX

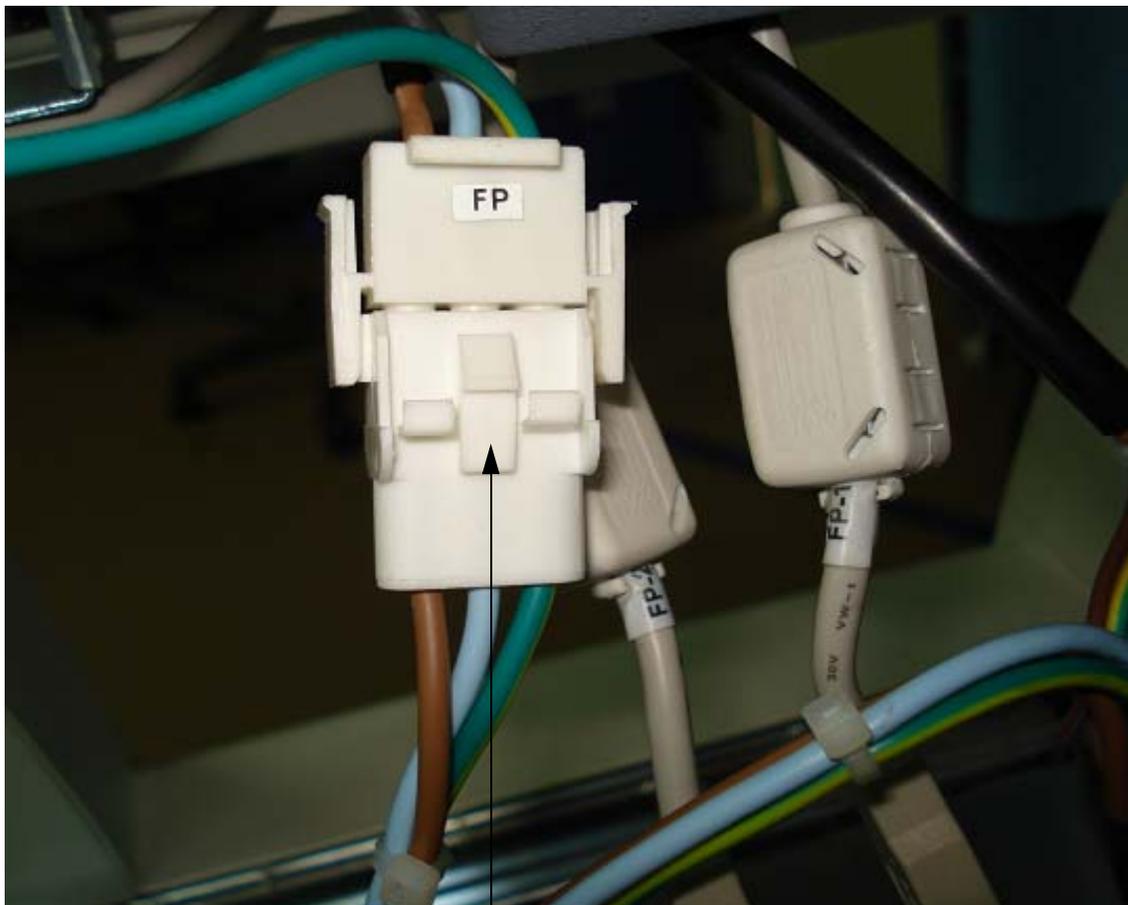


Remove Cables
from these clamps

Figure 8-41 Cable routing



Figure 8-42 SSR



Remove this connector

Figure 8-43 Connector



Remove these USB terminals

Figure 8-44 USB terminals



Figure 8-45 Grounding Cables

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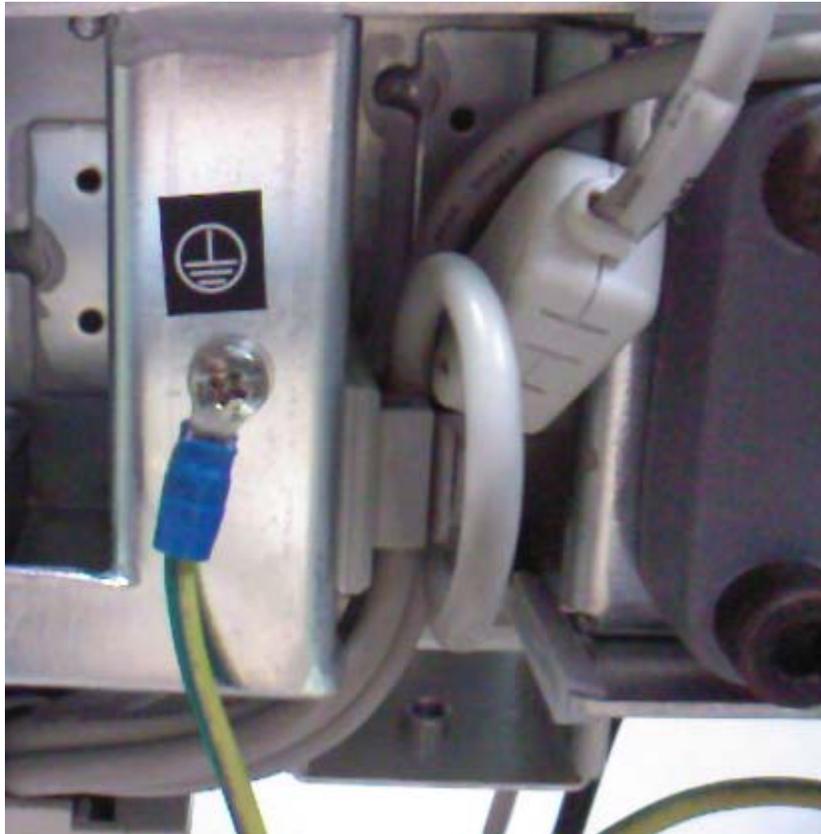


Figure 8-46 Grounding Cable

8-5-2-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script Service Manual Direction 5213326-100, Rev 3, Section 8-5-3. Equipment passes all required tests and is ready for use.
4-3-1	Power On/Boot Up	
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-7-1	Probe/Connector Check	
Section 7-6	Service Diagnostics	

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8-5-3 CA4-USB Cable Assy (FRU P/N # 5192651)

8-5-3-1 Tools

- Common phillips screwdrivers

8-5-3-2 Needed Manpower

- 1person, 30 minutes + travel

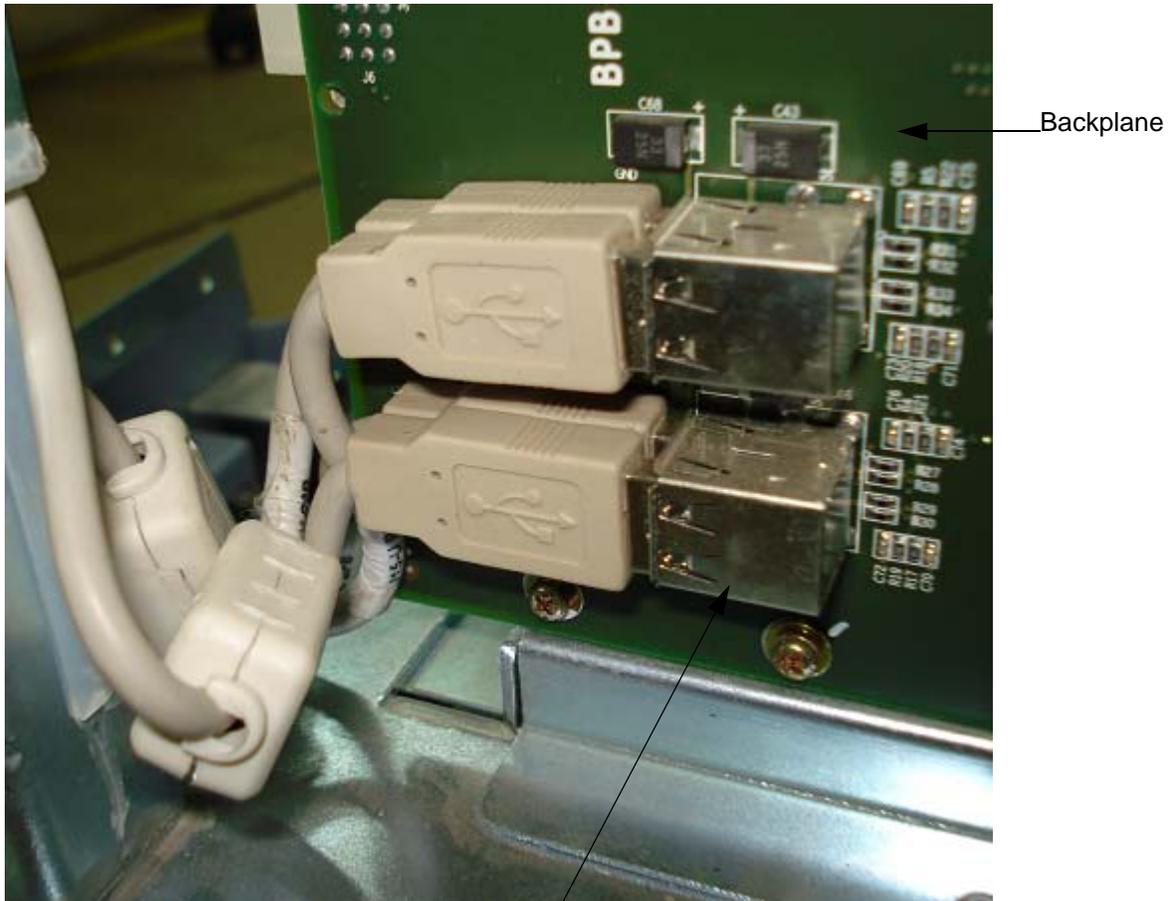
8-5-3-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-5-3-4 Removal Procedure

1. Remove Top Cover plastic
2. Remove front panel and disconnect two USB cable
3. Disconnect the top panel USB cable
4. Remove CD tray and disconnect the USB cable.
(Only if CD-ROM Option is integrated)
5. Disconnect the USB cables from the BackPlane Board

6. Remove the cables from cable ties in the Right Arm and remove the USB cable assy



Remove the Fan USB cables at these connections on the BPB

Figure 8-47 Fan USB cables at BPB



Cable Routing

Figure 8-48 Cable Routing

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8-5-3-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-5-4. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-7-1	Probe/Connector Check	
Section 7-6	Service Diagnostics	

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Section 8-6 PCB

8-6-1 PCB Boards

This is a description on how to remove and replace the PCB Boards.

8-6-1-1 Tools

- Common Phillips screwdrivers

8-6-1-2 Needed Manpower

- 1 persons, 10 minutes + travel

8-6-1-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-6-1-4 Removal Procedure

 **CAUTION** An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity. Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

- 1.) Remove the Right Cover. Refer to [8-4-1 on page 8-26](#) .
- 2.) Remove the Right EMI Cover. Refer to [8-4-10 on page 8-38](#) .
- 3.) Remove the Card Cage EMI Cover. Refer to [8-4-12 on page 8-40](#)
- 4.) Remove DIF Board
- 5.) Move the upper and lower board ejector in the direction indicated by the arrow (1) in Figure B.
- 6.) For HVLV power supply, disconnect the power cable connected to it

7.) Pull out the board in the direction indicated by the arrow (2) in Figure B, do not bend itr.



TxRx DIF MST HVLV

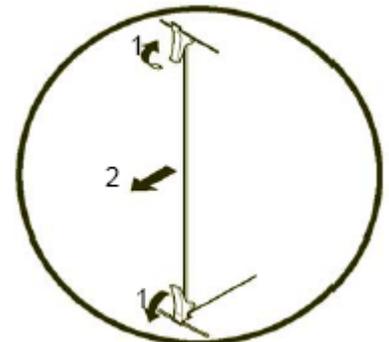


Figure B

SLOT	BOARD	FRU NO.
1	TxRx	5184762
2	MST	5268149
	DIF	5264760
3	HVLV	5165083

Figure 8-49 Removing PCB Boards

8-6-1-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-6-1. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-7-1	Probe/Connector Check	
Section 7-6	Service Diagnostics	

8-6-2 Connector Board Assy (FRU No. 5193606)

This is a description on how to remove and replace the Conn. Board Assy.

8-6-2-1 Tools

- Common Phillips screwdrivers

8-6-2-2 Needed Manpower

- 1 person, 15 minutes + travel

8-6-2-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-6-2-4 Removal Procedure

CAUTION An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity.

Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

- 1.) Remove Right Cover. Refer [8-4-1 on page 8-26](#) for details on how to remove Right Cover.
- 2.) Remove Left Cover. Refer [8-4-2 on page 8-27](#) for details on how to remove Left cover.
- 3.) Remove Front Cover. Refer [8-4-4 on page 8-29](#) for details on how to remove front cover.
- 4.) Remove Front EMI Cover. Refer [8-4-13 on page 8-41](#) for details on how to remove front EMI cover.
- 5.) Unscrew the four screws (1-4) from the connector board

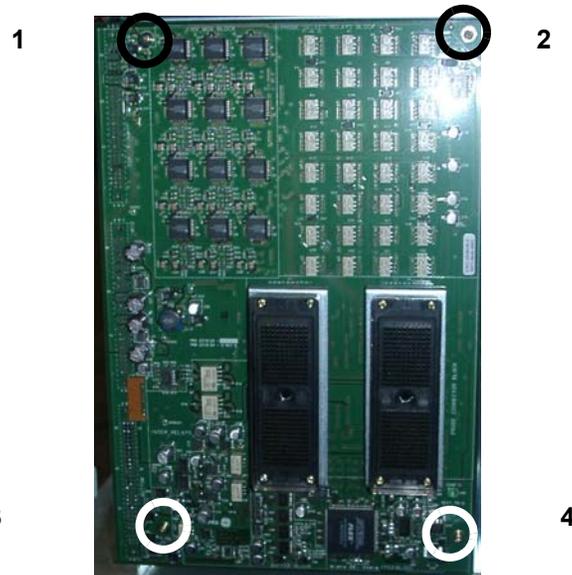


Figure 8-50 Removing Connector Board Assembly

- 6.) Disconnect the connector board assembly.

8-6-2-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-6-2. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-7-1	Probe/Connector Check	
Section 7-6	Service Diagnostics	

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8-6-3 Back Plane Board (FRU No. 5183676)

This is a description on how to remove and replace the Back Plane Board.

8-6-3-1 Tools

- Common Phillips screwdrivers

8-6-3-2 Needed Manpower

- 1 person, 30 minutes + travel

8-6-3-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-6-3-4 Removal Procedure

CAUTION An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity.

Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

- 1.) Remove Right Cover.
- 2.) Remove Right EMI Cover.
- 3.) Remove connector board
- 4.) Eject all Card Cage boards
- 5.) Disconnect all the cables connected to back plane board

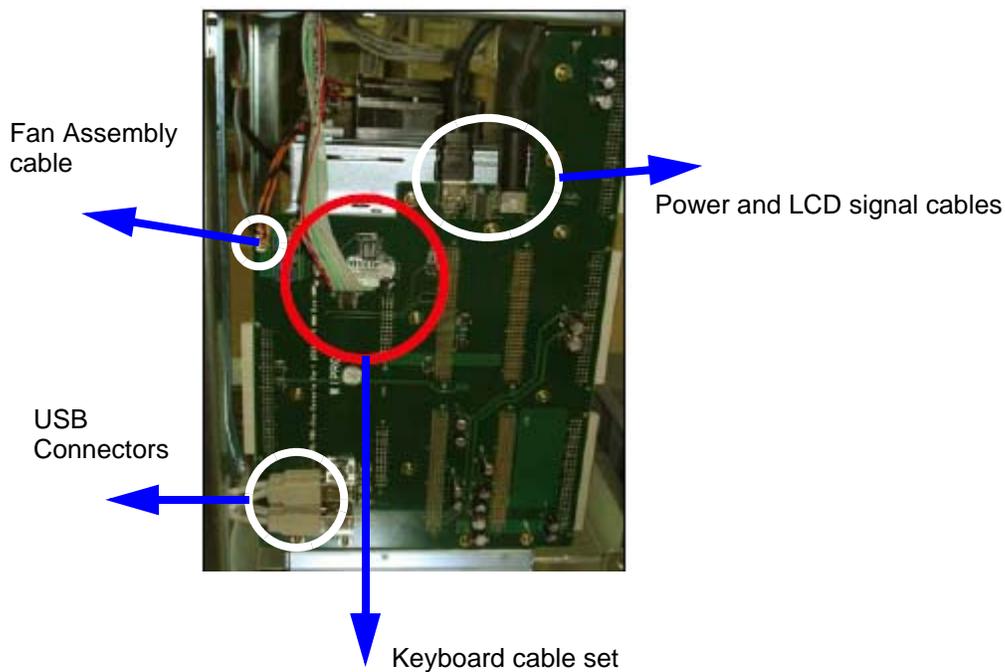


Figure 8-51 Disconnecting BPB Cables

6.) Unscrew the fourteen screws (1-14) as marked in Figure 4-50

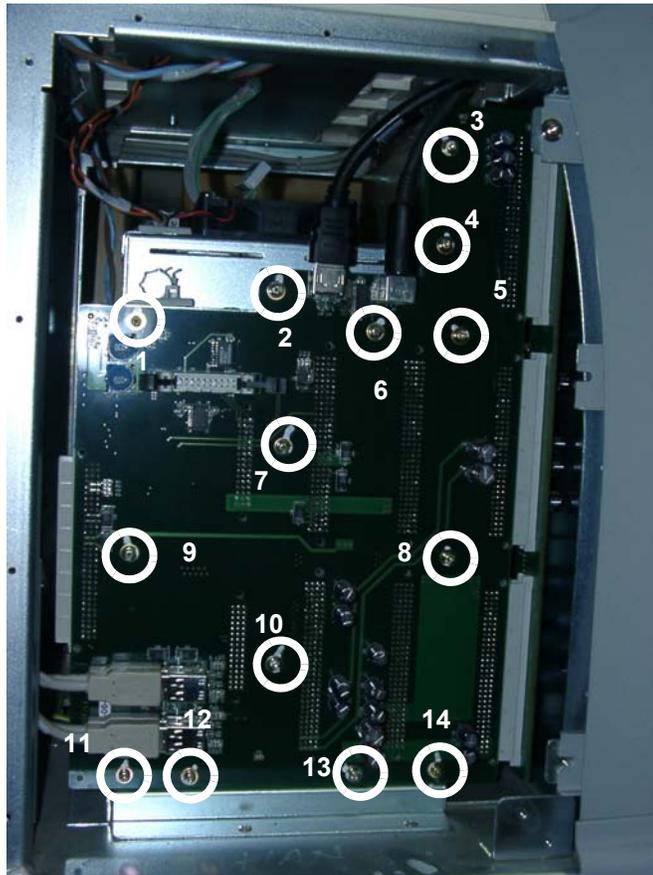


Figure 8-52 Removing BPB Assembly

7.) Remove the Backplane

8-6-3-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-6-3. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-7-1	Probe/Connector Check	
Section 7-6	Service Diagnostics	

Section 8-7 Power Block

8-7-1 Transformer Assembly (FRU No. 5196448)

This is a description on how to remove and replace the Transformer Assy.

8-7-1-1 Tools

- Common Phillips screwdrivers

8-7-1-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-7-1-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-7-1-4 Removal Procedure

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

- 1.) Remove Rear cover
- 2.) Unscrew two screws (a,b).
- 3.) Remove GND cable (which ever connected near to “a”)

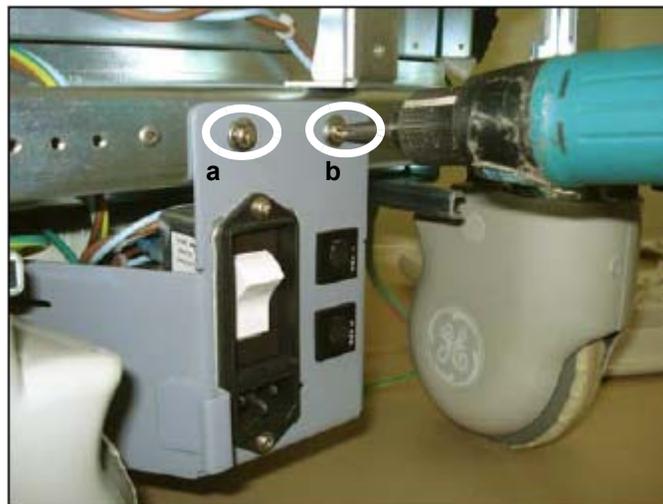


Figure 8-53 Removing Transformer Assembly

- 4.) Pull out the transformer tray so the connector marked J4 is accessible and disconnect Cable (J4TRx)



5.) Remove the Transformer Assembly from the guide

8-7-1-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-7-1. Leakage Current measured at _____ [record value] and meets allowable limits. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-7-1	Probe/Connector Check	
Section 7-6	Service Diagnostics	
10-6-5	Chassis Leakage Current	

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8-7-2 Power Entry Module

8-7-2-1 Tools

- Common phillips screwdrivers

8-7-2-2 Needed Manpower

- 1person, 15 minutes + travel

8-7-2-3 Preparations

- Shutdown the system and switch off the main Circuit Breaker at the bottom rear side of the system.

8-7-2-4 Removal Procedure

1. Remove all side plastics.
2. Remove the transformer assembly.
3. Disconnect the J4 TRX and disconnect the transformer grounding to the chassis.
4. Disconnect two power out cables from power entry module.
5. Remove power entry module.



Figure 8-54 Power Entry Module

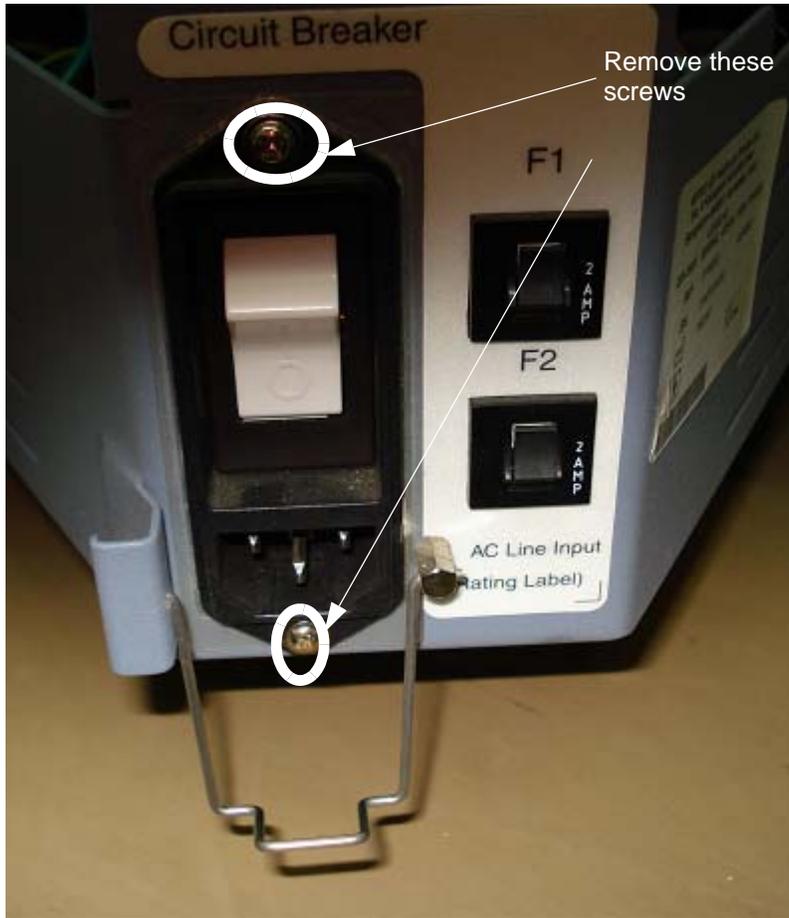


Figure 8-55 Circuit Breaker

8-7-2-5 Functional Checkout Procedure

See Section	Functional and/or Leakage Current Test	Debrief Script
4-3-1	Power On/Boot Up	Service Manual Direction 5213326-100, Rev 3, Section 8-7-2. Leakage Current measured at _____ [record value] and meets allowable limits. Equipment passes all required tests and is ready for use.
4-4-1	Basic Controls	
4-4-2	B- Mode Checks	
4-4-3	M-Mode Checks	
4-4-4	Measurement Check	
4-4-10	S/W Config Checks	
Section 4-5	Peripheral Checks	
4-7-1	Probe/Connector Check	
Section 7-6	Service Diagnostics	
10-6-5	Chassis Leakage Current	

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Chapter 9 Renewal Parts

Section 9-1 Overview

9-1-1 Purpose

This chapter gives you an overview of Spare Parts available for the LOGIQ A3

9-1-2 Table Of Contents

Table 9-1 Contents in Chapter 9

S.No	Description	Page Number
1	Overview	9-1
2	List of Abbreviations	9-1
3	Operator Console Assy	9-2
4	Logiq Uno Console FRU List	9-1

Section 9-2 List of Abbreviations

- Assy - Assembly
- Ctrl - Control
- FRU 1 - Replacement part available in parts hub
- FRU 2 - Replacement part available from the manufacturer (lead time involved)
- Int -Internal
- I/O - Input/Output
- PWA - Printed Wire Assembly
- Recv - Receive
- XFRMR - Transformer

Section 9-3 Operator Console Assy

Logiq A3 System Overview

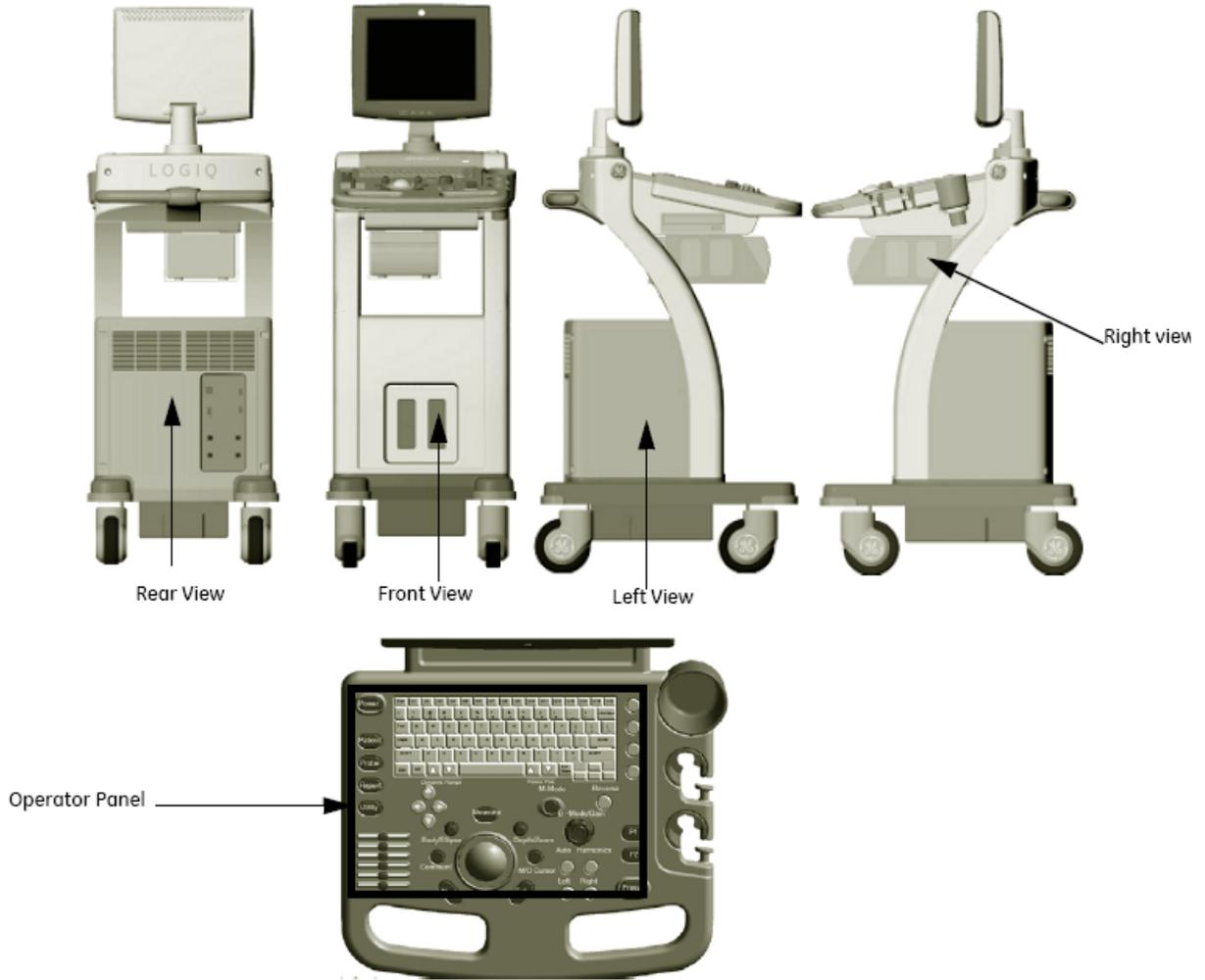


Figure 9-1 Operator Console Assembly

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9-3-1 LOGIQ A3 Configuration

Part Number	Part Description	Qty
5165083	LVHV Integrated Power supply for Logiq UNO Console	1
5183676	BPB-PWA-Uno-Console	1
5184762	TRX-PWA-UNO-Console	1
5193606	2 Port Connector Board Logiq Uno	1
5268149	MST PWA Assembly for Logiq A3	1
5264760	Digital Interface Board Asm for Logiq A3	1
5196446	Rear_Panel_Assembly_Complete_UNO	1
5196447	Top_Panel_Assembly-Complete_UNO	1
5196448	Transformer_Assembly-Complete_UNO	1
5231741	Power_Entry_Module_Assy	1
2326158	AIR FILTER _LOGIQ3	1
5215345	Fan_Assy_Uno_Console	1
5271538	LCD Monitor Asm for Logiq A3	1
5168531	Keyboard-Assy-Uno-Console	1
5266269	TGC PWA Asm for Logiq A3	1
5181790	Alpha numeric keyboard for Logiq Uno with cables	1
5262338	Optical Trackball Asm	1
5270046	Logiq A3 Software Pen Drive FRU	1
5269718	Rear cover Asm with Labels	1
5262796	Encoder set for Logiq A3 KBD	1
5265162	RH side cover asm with retainable fastener	1
5267220	LH side cover asm with retainable fastener	1
5168362	Front-Bumper-Uno-Console	1
5168636	Gel-Bottle-Holder-Uno-Console	1
5168637	Top-Cover-Uno-Console	1
5271834	Front cover Asm with labels	1

Part Number	Part Description	Qty
5168500	Probe-Holder-Uno-Console	1
5263051	Rear Arm cover set with retainable fasteners	1
5263193	LH Arm cover _Front with GE logo	1
5263420	RH Arm cover front with Labels	1
5270335	LCD Arm Cover Set	1
5264421	EMI Cover Asm for Logiq A3	1
5168365	Handle-Uno-Console	1
5308054	Logiq A3 LCD Holder Asm	1
5265433	Castor wheel Front _ Logiq A3	2
5264222	Castor wheel Rear _ Logiq A3	2
5262766	Keyboard Cover set for Logiq A3	1
5266030	CD Tray asm	1
5265630	Label Set for Logiq A3	1
5262507	Fastener set for Logiq A3	1
5192656	CA9- Transformer to Front panel and Power supply cable assembly for LOGIQ UNO	1
5192651	CA4- USB Cable Assembly For LOGIQ UNO	1
5192650	CA3- Keyboard Interface Cable For LOGIQ UNO.	1
5192657	CA10_Front_Panel_Assembly_Complete_Uno_Console_100-110V	1
5263937	Keyboard knob set Logiq A3	1
2294641	E8C Probe	1
2323337	3S Probe	1
5123455	4C Probe	1
5140738	Probe 8L	1
5308729	Desk Jet printer	1
5308726	B/W digital printer kit	1
5271352	USB Internal CD Drive Logiq A3	1
5263174	USB Archive pack Logiq A3	1

Part Number	Part Description	Qty
5269387	USB Foot Switch Logiq A3	1
2365879	POWER CABLE JAPAN (LOGIQ 3)	1
2365880	POWER CABLE US (LOGIQ 3)	1
2365881	POWER CABLE EUROPE (LOGIQ 3)	1
2365882	POWER CABLE INDIA (LOGIQ 3)	1
5248395	POWER CABLE CHINA (LOGIQ 3)	1

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Chapter 10 Care & Maintenance

Section 10-1 Overview

10-1-1 Periodic Maintenance Inspection

It has been determined by engineering that your LOGIQ™ A3 system does not have any high wear components that fail with use, therefore no Periodic Maintenance Inspections are mandatory. Some Customers Quality Assurance Programs may require additional tasks and or inspections at a different frequency than listed in this manual.

10-1-2 Purpose

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

10-1-3 Table Of Contents

Table 10-1 Contents in Chapter 10

S.No	Description	Page Number
1	Overview	10-1
2	Why do Maintenance	10-2
3	Periodic Maintenance Schedule	10-2
4	Tools Required	10-4
5	System Maintenance	10-7
6	Electrical Safety Tests	10-12
7	When There's Too Much Leakage Current...	10-24
8	PM Inspection Certificate	10-24

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

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

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

Section 10-2 Why do Maintenance

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Ultrasound Inspection Certificate (Provided on Page 10-29) provides the customer with documentation that the ultrasound scanner is maintained on a periodic basis.

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

10-2-2 Quality Assurance

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

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

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

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

Section 10-3 Periodic Maintenance Schedule

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

The Care & Maintenance Task Schedule (provided on page 10-3) specifies how often your LOGIQ™ A3 should be serviced and outlines items requiring special attention.

NOTE: *It is the customer's responsibility to ensure the LOGIQ™ A3 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™ A3 ultrasound scanning system and can best provide competent, efficient service. Please contact us for coverage information and/or price for service.

The service procedures and recommended intervals shown in the Care and Maintenance Task schedule assumes that you use your LOGIQ™ A3 for an average patient load (10-12 per day) and not used as a primary "mobile unit" which is transported between diagnostic facilities.

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

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

Table 10-2 Customer Care Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Annually	Notes
Clean Probes	•*				* or before each use
Clean Probe Holders	•				
Clean Air Filter		•			more frequently depending on your environment
Inspect AC Mains Cable			•		Mobile Unit Check Weekly
Inspect Cables and Connectors			•		
Clean Console			•		
Clean Monitor			•		
Inspect Wheels, Casters, brakes and Swivel Locks			•		Mobile Unit Check Daily
Console Leakage Current Checks				•	also after corrective maintenance
Peripheral Leakage Current Checks				•	also after corrective maintenance
Surface Probe Leakage Current Checks				•	also after corrective maintenance
Endocavity Probe Leakage Current Checks					Twice Annually
Surgical Probe Leakage Current Checks					As Prescribed in probe manual
Measurement Accuracy Checks				•	also after corrective maintenance

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Section 10-4 Tools Required

10-4-1 Standard GE Tool Kit

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

Table 10-3 Overview of GE-1 Tool Kit Contents

Tool ID	Description	Tool ID	Description
9-45358	Pliers Retaining Ring	9-XL9971MM	Xcelite-hex Blade 1.27mm
9-4078	Scribe	9-XL9972MM	Xcelite-hex Blade 1.5mm
9-44572	Wrench Open End 3/8 - 7/16	9-XL9973MM	Xcelite-hex Blade 2 mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9974MM	Xcelite-hex Blade 2.5mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9975MM	Xcelite-hex Blade 3mm
9-45385	Pliers, Arc Joint 7 inch	9-XL9976MM	Xcelite-hex Blade 4mm
9-45378	Pliers, Slip Joint	9-XL9977MM	Xcelite-hex Blade 5mm
9-4518	Pliers, Long Nose, Miniature	9-XL991CM	Handle
9-4518	Pliers, Long Nose, Miniature	C2356E	Screw starter - Kedman Quick Wedge
9-44776	Ignition Wrench Set, 10 pc.	BLBO	Box - 18 Compartment
9-44601	Wrench, Adj., 4 inch	DWL4283T	Box - 5 Compartment
9-4151	Screwdriver, Blade, Stubby	9-41322	Pickup Tool, Claw type
9-41421	Screwdriver, Blade, Pocket clip	9-6757	6 pc Needle File Set
9-41594	Screwdriver, Blade 1/8 in. x 4 in.	9-9487	Utility Knife
9-41581	Screwdriver, Blade 3/16 in. x 4 in.	9-45341	Pliers Vice Grip 10 inch
9-39451	20' Steel Tape, locking Spring load	9-3001	Xacto Pen Knife
9-GH807	Ratchet, Offset, Slotted	9-HT62002	Solder Aid, Fork and Hook
68-412	Ratchet, Offset, Phillips	9-4099	Mirror, Round, Telescoping
9-GH130	Tapered Reamer	9-GH3001	Steel Rule Decimal 6 inch
9-41584	Screwdriver, slotted 1/4 in.X 6 in.	9-GH300ME	Steel Rule Metric 6 inch
9-4118	Screwdriver, Phillips #2, Stubby	9-XL9920	Xcelite-hex Blade.050 inch
9-41293	Screwdriver, Phillips #0	9-XL9921	Xcelite-hex Blade 1/16 inch
9-41294	Screwdriver, Phillips #1	9-XL9922	Xcelite-hex Blade 5/16 inch
9-41295	Screwdriver, Phillips #2	9-XL9923	Xcelite-hex Blade 3/32 inch
9-46677	Hex Keys, 20 pc., Metric	9-XL9924	Xcelite-hex Blade 1/8 inch
9-34701	1/4 in. Standard.Socket set (19 pc)	9-XL9925	Xcelite-hex Blade 5/32 inch
9-43499	1/2 inch Socket 1/4 inch drive	9-XL9926	Xcelite-hex Blade 3/16 inch
9-4355	Flex Spinner	9-XL99764	Xcelite-hex Blade 7/64
9-43523	Breaker	9-XL99964	Xcelite-hex Blade 9/64
9-43531	6 inch Ext.	9-XLM60	Mini-screwdriver kit
9-65283	Case 8.5 in. x 4.5 in. x 2 in. Deep	9-45072	Pliers 6 inch Diagonal

Table 10-3 Overview of GE-1 Tool Kit Contents (Continued)

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

Table 10-4 Overview of GE-2 Tool Kit Contents

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

10-4-2 Special Tools, Supplies and Equipment

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

Table 10-5 Overview of Requirements for Periodic 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	See Chapter 9	air intake
Safety Analyzer	46-285652G1	DALE 600 KIT (or equivalent) for electrical tests
QIQ Phantom	E8370RB	RMI Grayscale Target Model 403GS
CD-RW Media		For LOGIQ™ A3
B/W Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		

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Section 10-5 System Maintenance

10-5-1 Preliminary Checks

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

Table 10-6 System Checks

Step	Item	Description
1	Ask & Listen	Ask the customer if they have any problems or questions about the equipment.
2	Paperwork	Fill in the top of the Ultrasound Inspection Certificate(see page 10-29). Note all probes and system options.
3	Power up	Turn the 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.
4	Probes	Verify that the system properly recognizes all probes.
5	Displays	Verify proper display on the monitor

10-5-2 Functional Checks (See Also Chapter 4)

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

10-5-2-1 System Checks

Table 10-7 System Functional Checks

÷	Step	Description
	B-Mode	Verify basic B-Mode (2D) operation. Check the basic system controls that affect this mode of operation.
	M-Mode	Verify basic M-Mode operation. Check the basic system controls that affect this mode of operation.
	Probe Elements	Perform an Element Test, on each probe to verify that all probe elements (and system channels) are functional.
	Control Panel Test	Perform the Control Panel Test Procedure, to verify that all keyboard controls are OK. This is performed by the internal PC (backend processor) which does a normal keyboard run through.
	Monitor	Verify basic Monitor display functions.

NOTE: * Some software may be considered standard depending upon system model configuration.

10-5-2-2 Peripheral/Option Checks

If any peripherals or options are not part of the system configuration, the check can be omitted. Refer to the User Manual for a list of approved peripherals/options.

Table 10-8 GE Approved Peripheral/Hardware Option Functional Checks

Step	Item	Description
2	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
4	Footswitch	Verify that the footswitch is functioning as programmed. Clean as necessary.

10-5-3 Input Power

10-5-3-1 Mains Cable Inspection

Table 10-9 Mains Cable Inspection

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

10-5-4 Cleaning

10-5-4-1 General Cleaning

Table 10-10 General Cleaning

Step	Item	Description
1	Console	Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire system. Be careful not to get the cloth too wet so that moisture does not enter the console.
2	Probe Holder	Clean probe holders (they may need to be soaked to remove excess gel).
3	Monitor	LCD monitor, use a non-ammonia (just isopropyl and water) lens cleaner. These are available at most computer outlet stores. DO NOT use Windex, Screen-Clean, etc., because these contain ammonia, which will remove the anti-glare coating on the monitor.
4	Keyboard (Rubber Keypad)	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.

10-5-4-2 Air Filter Cleaning

Table 10-11 Air Filter Cleaning - frequency varies with your environment

Step	Item	Description
1	Remove Filter Cover	Refer to Chapter 8 for air filter location and removal instructions.
2	Clean Filter	The filters can be cleaned in sprinkling water, or they can be dusted with a vacuum cleaner. If the filter is metal wash and/or vacuum. If the filter is fiber or plastic vacuum or replace.
3	Install Filter	Install the clean filter.

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

10-5-4-3 Physical Inspection

Table 10-12 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition.
2	Scratches & Dents	Inspect the console for dents, scratches or cracks.
3	Control Panel	Inspect keyboard and control panel. Note any damaged or missing items.
4	Control Panel Movement	Verify ease of control panel (Operator I/O Panel) movement in all acceptable directions. Ensure that it latches in position as required.
5	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 wheel locks and wheel swivel locks for proper operation.
6	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.
7	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.
8	External I/O	Check all connectors for damage and verify that the labeling is good.

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10-5-5 Diagnostic Checks

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

NOTE: Diagnostic Software information will be available UNO post design completion

10-5-5-1 View the Logs

- 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.

10-5-6 Probe Maintenance

10-5-6-1 Probe Related Checks

Table 10-13 Probe Related 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 system probe connectors and remove dust from inside the connector sockets if necessary. Visually check for bent, damaged or missing pins

10-5-6-2 Basic Probe Care

The 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 system sockets before plugging in a probe.

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

10-5-6-3 Basic Probe Cleaning

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

NOTE: 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.

NOTE: 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.

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

Section 10-6 Electrical Safety Tests

10-6-1 Safety Test Overview

The electrical safety tests in this section are based on and conform to NFPA 99 (For USA) and IEC/EN 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 NFPA 99 (For USA) and IEC/EN 60601-1 documents.

 **WARNING** *THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 12 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.*

 **CAUTION** To avoid electrical shock, the unit under test must not be connected to other electrical equipment. Remove all interconnecting cables and wires. The unit 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.

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:
 - * once a year on surface probes
 - * twice a year on endocavitary probes
 - * whenever probe damage is suspected

10-6-2 GEMS Leakage Current Limits

The following limits are summarized for NFPA 99 (For USA) and 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 Surfaces

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
USA	N/A	0.3 mA	0.3 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA

Table 10-15 Type BF Applied Part Leakage Current Limits - Non-Conductive (Floating) Surface and Cavity Probes

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.05 mA	0.05 mA	0.05 mA	0.05 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

Table 10-16 Type CF Applied Part Leakage Current Limits - Surgical Probes

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.01 mA	0.05mA	0.05 mA	N/A	0.025 mA
Other	0.01 mA	0.05 mA	0.05 mA	0.05 mA	0.05 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: grounding continuity, chassis leakage current, and probe leakage current. All measurements are made with an electrical safety analyzer Model 600/600E built by Dale Technology Corporation or equivalent device.

10-6-3 Outlet Test - Wiring Arrangement - USA & Canada

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

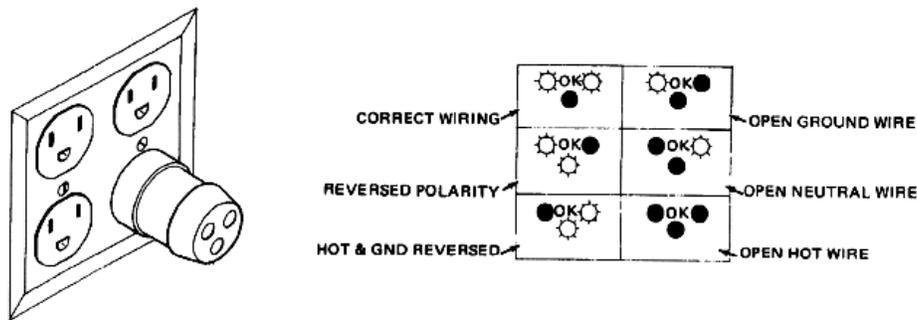


Figure 10-1 Typical Alternate Outlet Tester

The Dale 600 has self-contained lamps designed for testing the outlet wiring arrangement. Plug the Dale 600 into each outlet to be tested comparing the lamp status.

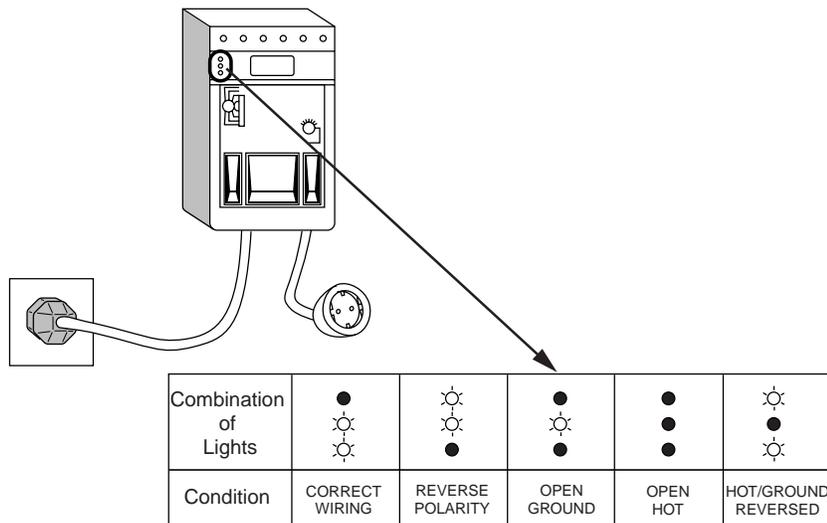


Figure 10-2 Dale 600 Outlet Test

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.

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10-6-4 Grounding Continuity



CAUTION Electric Shock Hazard. The patient must not be contacted to the equipment during this test

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2 ohms**. Reference the procedure in the IEC 601-1.1.

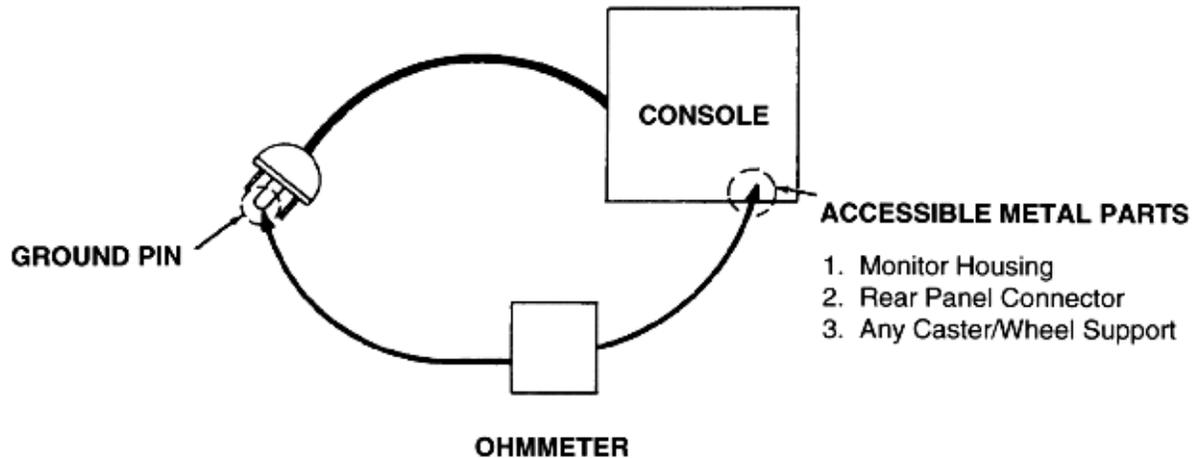


Figure 10-3 Ground Continuity Test

10-6-4-1 Meter Procedure

Follow these steps to test the ground wire resistance.

- 1.) Turn the LOGIQ™ A3 unit OFF.
- 2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
- 3.) Plug the black chassis cable into the meter's "CHASSIS" connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ™ A3 unit.
- 4.) Set the meter's "FUNCTION" switch to the RESISTANCE position.
- 5.) Set the meter's "POLARITY" switch to the OFF (center) position.
- 6.) Measure and record the ground wire resistance.

10-6-4-2 Dale 600 - Ground Continuity

The Dale 600 measures line cord resistance from the third pin of the attachment plug to the meter's Chassis Cable clamp. Test the grounding continuity of the system to all exposed metal parts in accordance with the IEC 601-1.1 procedure as above. Refer to the Dale 600 Instruction Manual for meter self tests and operation. Record measured resistance of the grounding continuity. The ground wire resistance should be less than 0.2 (Use any safety analyzer.)

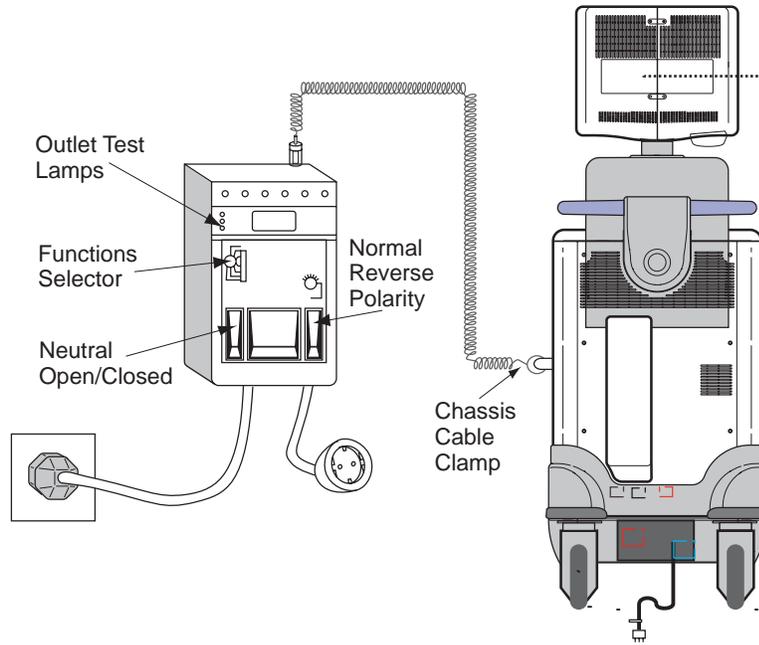


Figure 10-4 Dale 600 Ground Continuity Test

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10-6-5 Chassis Leakage Current Test

10-6-5-1 Definition

This test measures the current that would flow in a grounded person who touched accessible metal parts of the bedside station if the ground wire should break. The test verifies the isolation of the power line from the chassis. The meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit On and Off, with the power line polarity Normal and Reversed. Record the highest reading.



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



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

10-6-5-2 Generic Procedure

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

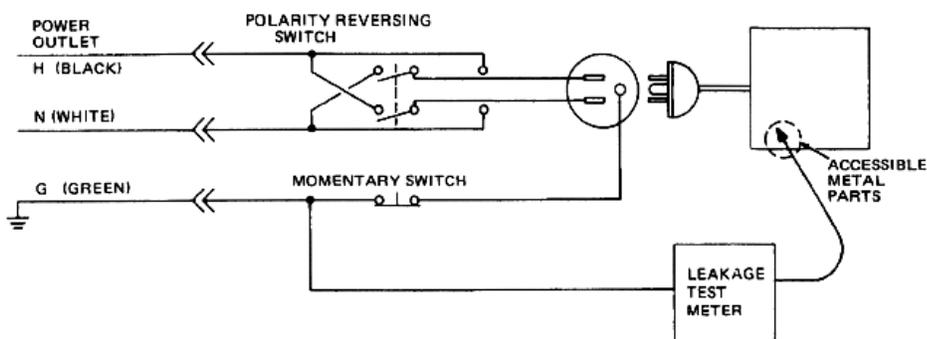


Figure 10-5 Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuous Leakage Currents and Patient, Auxiliary Currents

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](#).

10-6-5-3 Dale 600 Meter Procedure

When measuring system chassis currents with the Dale 600, always use the CHASSIS selection of the external/chassis function switch. This requires the ground clip lead and changing the meters switches in accordance with the IEC 601-1.1. Refer to the Dale 600 Instruction Manual for meter self-test and operation. Record the highest leakage current measured.

Follow these steps to test the unit for leakage current.

- 1.) Turn the LOGIQ™ A3 unit OFF.
- 2.) Plug the unit into the meter, and the meter into the tested AC wall outlet
- 3.) Plug the black chassis cable into the meter's "CHASSIS" connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ™ A3.
- 4.) Set the tester's "FUNCTION" switch to CHASSIS position.

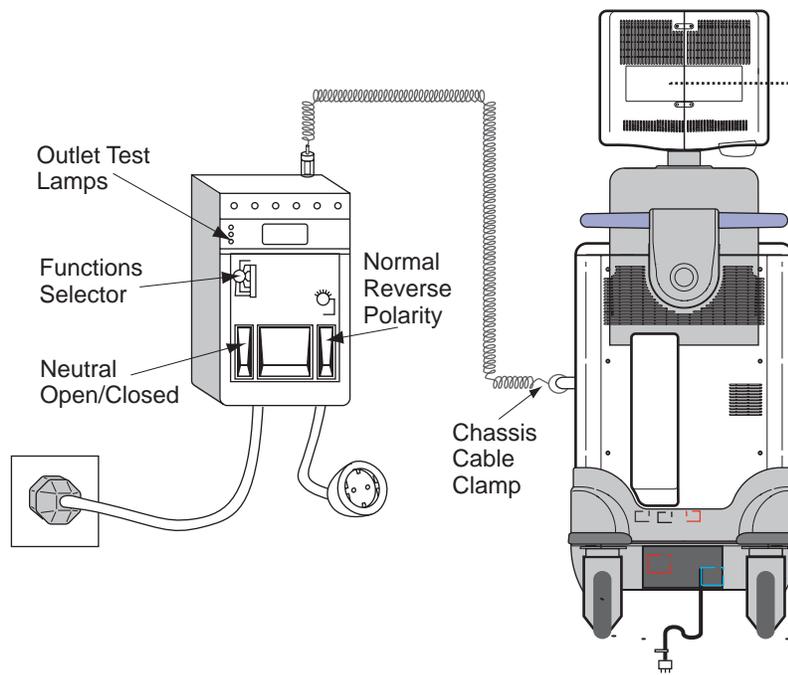


Figure 10-6 Ground and Chassis Leakage Current Test

- 5.) Follow the test conditions described for respective test points shown in [Table 10-17](#).

Table 10-17 Chassis Leakage Current Test Condition

TEST	CONDITION
1	Mounting screw for probe receptacle
2	Wheel support
4	Mounting screw for peripheral plugged into unit
5	Mounting screw for other peripheral powered by unit

- 6.) Keep a record of the results with other hard copies of PM data kept on site.

10-6-5-4 Data Sheet for Chassis Source Leakage Current

The test passes when all readings measure less than the value shown in [Table 10-14](#). Record all data on the PM Inspection Certificate.

Table 10-18 Typical Data Sheet for Chassis Source Leakage Current

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Probe Connector Screw	Test 2 Metal on Wheel	Test 3 Screws on CRT Housing	Optional Test 4 Rear Panel Connectors	Optional Test 5
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					

10-6-6 Probe Leakage Current Test

10-6-6-1 Definition

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

10-6-6-2 Generic Procedure

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

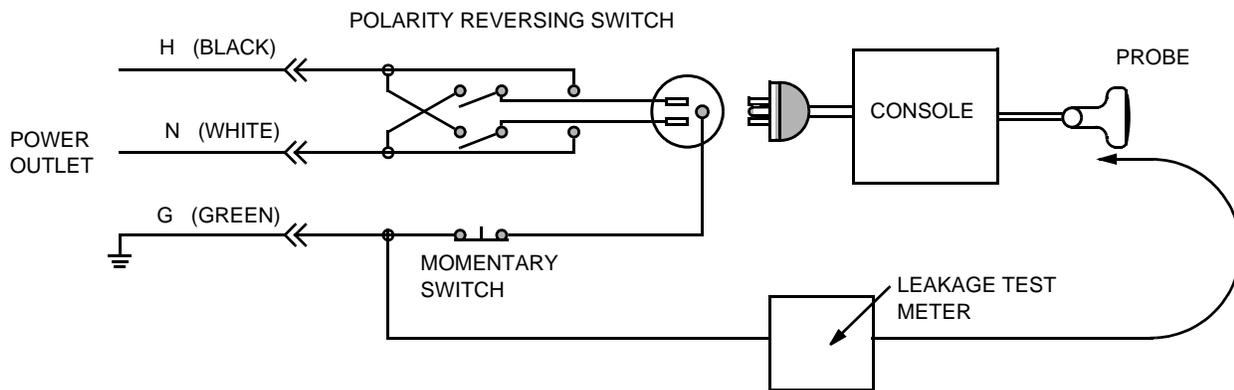


Figure 10-7 Set Up for Probe Leakage Current

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

10-6-6-3 Meter Procedure Using Probe Adapter

The Dale 600/600E provides a method for testing probes independently from the system. The meter utilizes a probe adapter to apply a test potential commonly to all connector pins.

The probe's imaging area is immersed in a saline solution along with a grounding probe from the meter to complete the current path. Saline solution is a mixture of water and salt. The salt adds a free ion to the water, making it conductive. Normal saline solution is 0.9% salt or 1/2 gram salt per 1 liter of water. If saline is not available, a mixture of 1 quart water with one or more grams of table salt, mixed thoroughly, will substitute.

CAUTION 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 the ISO TEST switch is depressed.**

Follow these steps to test each transducer for leakage current.

- 1.) Turn the LOGIQ™ A3 unit OFF.
- 2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
- 3.) Connect the probe for test with the meter's appropriate adapter.
- 4.) Plug the saline probe into the meter's "CHASSIS" connector.
- 5.) Plug the probe adapter into the meter's connector marked "EXTERNAL".

10-6-6-3 Meter Procedure Using Probe Adapter (cont'd)

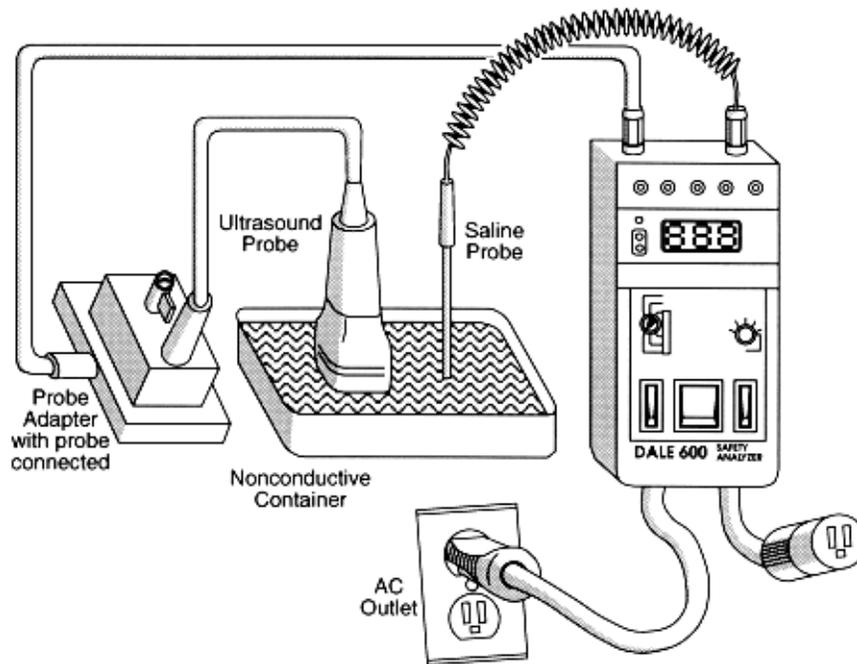


Figure 10-8 Transducer Source Leakage Current Test

- 6.) Set the meter's "FUNCTION" switch to EXTERNAL position.
- 7.) Add the saline probe and the imaging area of the probe into the saline bath.
- 8.) Have unit power ON for the first part; turn it OFF for the second half.
- 9.) Depress the ISO TEST rocker switch and record the highest current reading.
- 10.) Follow the test conditions described in [Table 10-19](#) for every transducer.
- 11.) Keep a record of the results with other hand copies of PM data.

10-6-6-4 No Meter Probe Adapter Procedure

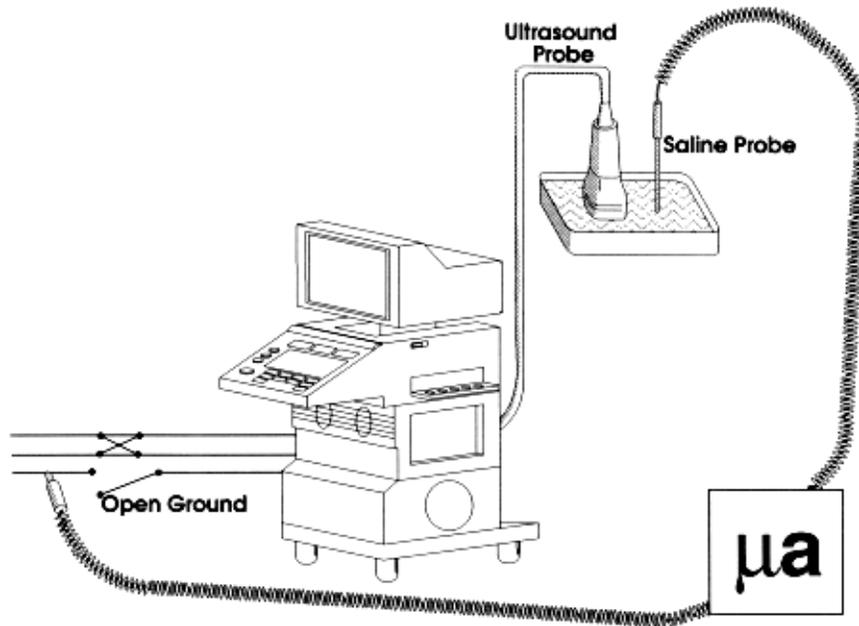


Figure 10-9

Follow these steps to test each transducer for leakage current.

- 1.) Turn the LOGIQ™ A3 unit OFF.
- 2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
- 3.) Plug the external probe into the meter's (Dale 600) "EXTERNAL" connector.
- 4.) Set the meter's "FUNCTION" switch to EXTERNAL position.
- 5.) Connect the probe for test with the connector of the console.
- 6.) Add the saline probe and the imaging area of the probe into the saline bath.
- 7.) Have unit power ON for the first part; turn it OFF for the second half.
- 8.) Depress the ISO TEST rocker switch and record the highest current reading.
- 9.) Follow the test conditions described in [Table 10-19](#) for every transducer.
- 10.) Keep a record of the results with other hand copies of PM data.

10-6-6-5 Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values shown in [Table 10-15](#) and [Table 10-16](#). Record all data on the PM Inspection Certificate.



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

Table 10-19 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	

Section 10-7 When There's Too Much Leakage Current...

CHASSIS FAILS

Check the ground on the power cord and plug for continuity. Ensure the ground is not broken, frayed, or intermittent. Replace any defective part.

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

PROBE FAILS

Test the probe in another connector to isolate if the fault lies with the probe or the scanner.

NOTE: Each probe will have some amount of leakage, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable leakage current for body surface contact probe differs from inter-cavity probe. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive leakage current is slot dependent, inspect the system connector for bent pins, poor connections, and ground continuity.

If the problem remains with the probe, replace the probe.

PERIPHERAL FAILS

Tighten all grounds. Ensure star washers are under all ground studs.

STILL FAILS

If all else fails, begin isolation by removing the probes, external peripherals, then the on board ones, one at a time while monitoring the leakage current measurement.

NEW UNIT

If the leakage current measurement tests fail on a new unit and if situation can not be corrected, submit a Safety Failure Report to document the system problem. Remove unit from operation.

ULTRASOUND INSPECTION CERTIFICATE

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

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

FUNCTIONAL CHECKS

PHYSICAL INSPECTION AND CLEANING

Functional Check (if applicable)	OK? or N/A
B-Mode Function	
M-Mode Function	
Control Panel	
Monitor	
Measurement Accuracy	
GE Approved Peripherals	

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

COMMENTS:

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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 - Wheel				
Chassis Source Leakage Current - CRT				
Peripheral 1 Leakage Current				
Peripheral 1 Ground Continuity				
Peripheral 2 Leakage Current				
Peripheral 2 Ground Continuity				
Peripheral 3 Leakage Current				
Peripheral 3 Ground Continuity				

PROBES

Probe Number (from previous page)	Max Value Allowed	Max Value Measured	OK?	Comments
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				

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

Accepted by: _____

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GE Healthcare

*GE Healthcare: Telex 3797371
P.O. Box 414; Milwaukee, Wisconsin 53201, U.S.A.
(Asia, Pacific, Latin America, North America)*

*GE Ultraschall: Tel: +49 (0) 212 28 02 208
Deutschland GmbH & Co KG
Beethovenstrabe 239, Postfach 11 05 60
D-42655 Solingen, Germany*