GE Healthcare

BrightSpeed Elite, Edge, Excel

Installation Manual

Book 1 of 2: Mechanical Installation

OPERATING DOCUMENTATION

5141176-100
Rev 16

Book 1 of 2: Mechanical Installation

Pages 1 - 262

Effectivity

The information in this manual applies to the following CT Systems:

- BrightSpeed Elite
- BrightSpeed Edge
- BrightSpeed Excel

IMPORTANT PRECAUTIONS

LANGUAGE

ПРЕДУПРЕЖДЕНИЕ (BG)	Това упътване за работа е налично само на английски език. • Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод. • Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа. • Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациента в резултат на токов удар, механична или друга опасност.
警告 (ZH-CN)	本维修手册仅提供英文版本。 • 如果客户的维修服务人员需要非英文版本，则客户需自行提供翻译服务。 • 未详细阅读和完全理解本维修手册之前，不得进行维修。 • 忽略本警告可能对维修服务人员、操作人员或患者造成电击、机械伤害或其他形式的伤害。
警告 (ZH-HK)	本服務手冊僅提供英文版本。 • 倘若客戶的服務供應商需要英文以外之服務手冊，客戶有責任提供翻譯服務。 • 除非已參閱本服務手冊及明白其內容，否則切勿嘗試維修設備。 • 不遵從本警告或會令服務供應商、網絡供應商或病人受到觸電、機械性或其他的危險。
警告 (ZH-TW)	本維修手冊僅有英文版。 • 若客戶的維修廠商需要英文版以外的語言，應由客戶自行提供翻譯服務。 • 請勿試圖維修本設備，除非 您已查閱並瞭解本維修手冊。 • 若未留意本警告，可能導致維修廠商、操作員或病患因觸電、機械或其他危險而受傷。
UPOZORENJE (HR)	Ovaj servisni priručnik dostupan je na engleskom jeziku. • Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod. • Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik. • Zanemarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika.
VÝSTRAHA (CS)	Tento provozní návod existuje pouze v anglickém jazyce. • V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka. • Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah. • V případě nedodržování této výstrahy může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.

ADVARSEL (DA)	Denne servicemanual findes kun på engelsk. • Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse. • Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual. • Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten.
WAARSCHUWING (NL)	Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar. • Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan. • Probeer de apparatuur niet te onderhouden alvorens 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.
WARNING (EN)	This service manual is available in English only. • If a customer's service provider requires a language other than english, it is the customer's responsibility to provide translation services. • Do not attempt to service the equipment unless this service manual has been consulted and is understood. • Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards.
HOIATUS (ET)	See teenindusjuhend on saadaval ainult inglise keeles • Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest. • Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist. • Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.
VAROITUS (FI)	Tämä huolto-ohje on saatavilla vain englanniksi. • Jos asiakkaan huoltohenkilöstö 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 huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.
ATTENTION (FR)	Ce manuel d'installation et de maintenance est disponible uniquement en anglais. • Si le technicien d'un client a besoin de ce manuel dans une langue autre que l'anglais, il incombe au client de le faire traduire. • Ne pas tenter d'intervenir sur les équipements tant que ce manuel d'installation et 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 (DE)	Diese Serviceanleitung existiert nur in englischer Sprache. • Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen. • Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben. • Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.
ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)	Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά. • Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης. • Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις. • Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.
FIGYELMEZTETÉS (HU)	Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el. • Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészíttetése. • Ne próbálja elkezdeni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték. • Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.
AÐVÖRUN (IS)	Þessi þjónustuhandbók er aðeins fáanleg á ensku. • Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálaþjónustu. • Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin. • Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum.
AVVERTENZA (IT)	Il presente manuale di manutenzione è disponibile soltanto in lingua inglese. • Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione. • Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto. • Il mancato rispetto della presente avvertenza potrebbe causare lesioni all'addetto alla manutenzione, all'operatore o ai pazienti provocate da scosse elettriche, urti meccanici o altri rischi.
警告 (JA)	このサービスマニュアルには英語版しかありません。 ・ 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。 ・ 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ください。 ・ 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。

경고 (KO)	본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다 . • 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우 , 번역 서비스를 제공하는 것은 고객의 책임입니다 . • 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오 . • 본 경고 사항에 유의하지 않으면 전기 쇼크 , 기계적 위험 , 또는 기타 위험으로 인해 서비스 제공자 , 사용자 또는 환자에게 부상을 입힐 수 있습니다 .
BRDINJUMS (LV)	Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā. • Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu. • Neveiciet aprīkojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas. • Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam.
ĮSPĖJIMAS (LT)	Šis eksploatavimo vadovas yra tik anglų kalba. • Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas. • Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo. • Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų.
ADVARSEL (NO)	Denne servicehåndboken finnes bare på engelsk. • Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse. • Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått. • Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.
OSTRZEŻENIE (PL)	Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim. • Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta. • Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go. • Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego.
ATENÇÃO (PT-BR)	Este manual de assistência técnica encontra-se disponível unicamente em inglês. • Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros.

ATENÇÃO (PT-PT)	Este manual de assistência técnica só se encontra disponível em inglês. • Se qualquer outro serviço de assistência técnica solicitar este manual noutro idioma, é da responsabilidade do cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques eléctricos, mecânicos ou outros.
ATENŢIE (RO)	Acest manual de service este disponibil doar în limba engleză. • Dacă un furnizor de servicii pentru clienţi necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere. • Nu încercaţi să reparaţi echipamentul decât ulterior consultării şi înţelegerii acestui manual de service. • Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.
ОСТОРОЖНО! (RU)	Данное руководство по техническому обслуживанию представлено только на английском языке. • Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод. • Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения. • Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение.
UPOZORENJE (SR)	Ovo servisno uputstvo je dostupno samo na engleskom jeziku. • Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge. • Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo. • Zanemarivanje ovog upozorenja može dovesti do povređivanja servisera, rukovaoca ili pacijenta usled strujnog udara ili mehaničkih i drugih opasnosti.
UPOZORNENIE (SK)	Tento návod na obsluhu je k dispozícii len v angličtine. • Ak zákazníkov poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka. • Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obluhu a neporozumiete mu. • Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie.

ATENCION (ES)	Este manual de servicio sólo existe en inglés. • Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual. • No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio. • La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas o de otra naturaleza.
VARNING (SV)	Den här servicehandboken finns bara tillgänglig på engelska. . • Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster. • Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken. • Om du inte tar hänsyn till den här varningen kan det resultera i skador på serviceteknikern, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror.
OPOZORILO (SL)	Ta servisni priročnik je na voljo samo v angleškem jeziku. • Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod. • Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli. • Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.
DIKKAT (TR)	Bu servis kılavuzunun sadece ingilizcesi mevcuttur. • Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer. • Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz. • Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent, have notation "damage in shipment" written on all copies of the freight or express bill before delivery is accepted or "signed for" by a General Electric representative or a 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.

To file a report:

- Call 1-800-548-3366 and use option 8.
- Fill out a report on http://egems.med.ge.com/edq/home.jsp
- Contact your local service coordinator for more information on this process.

Rev. June 13, 2006

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT

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. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Medical personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. 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.

IMPORTANT...X-RAY PROTECTION

X-ray equipment if not properly used may cause injury. Accordingly, the instructions herein contained should be thoroughly read and understood by everyone who will use the equipment before you attempt to place this equipment in operation. The General Electric Company, Medical Systems Group, will be glad to assist and cooperate in placing this equipment in use.

Although this apparatus incorporates a high degree of protection against x-radiation other than the useful beam, no practical design of equipment can provide complete protection. Nor can any practical design compel the operator to take adequate precautions to prevent the possibility of any persons carelessly exposing themselves or others to radiation.

It is important that anyone having anything to do with x-radiation be properly trained and fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Avenue, Room 1016, Bethesda, Maryland 20814, and of the International Commission on Radiation Protection, and take adequate steps to protect against injury.

The equipment is sold with the understanding that the General Electric Company, Medical Systems Group, its agents, and representatives have no responsibility for injury or damage which may result from improper use of the equipment.

Various protective materials and devices are available. It is urged that such materials or devices be used.

IMPORTANT...RADIOACTIVE MATERIAL HANDLING

Only employees formally trained in radioactive materials handling and this equipment are authorized by the GE Healthcare Radiation Safety Officer to use radioactive materials to service this equipment.

GE Healthcare is required to notify the applicable U.S. state agency PRIOR to any source service event involving pin source handling. See NUC/PET radioactive material guides for specific instruction or contact your EHS Specialist.

A radiation survey must be performed when a pin source has been removed and replaced. See Radiation Survey Form Instructions or contact your EHS Specialist.

Rev 2 (July 21, 2005)

LITHIUM BATTERY CAUTIONARY STATEMENTS

CAUTION Risk of Explosion

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

ATTENTION Danger d'Explosion

Il y a danger d'explosion s'il y a replacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagées conformément aux instructions du fabricant.

OMISSIONS & ERRORS

Customers, please contact your GE Sales or Service representatives.

GE personnel, please use the GEMS CQA Process to report all omissions, errors, and defects in this publication.

Revision History

Revision	Date	Reason for change
16	05/11/17	**Chapter 1:** Section 13.0: Added Figure 1-102 for Seismic Open Console Mounting Hole Locations **Chapter 2:** Add new section 7.0 for open console connection **Chapter 5:** Section 2.10: Add Figure 5-24 Open Console Boot-up Flow Chart **Chapter 7:** Added section 7.0 for Declaring Remote Hosts on the CT system (SUSE OS System) Section 11.0: Add Figure 7-20 z840 host computer rear view
15	04/20/16	**Chapter 2:** Section 5.3: Add PMT-22 information on TIO Console Section 6.1: Add Figure 2-34 keyboard and Warning label installed information. Update Figure 2-37 and Table 2-11 GSCB Connection Section 6.2: Add PMT-22 information on NIO Console Section 6.4: Update Figure 2-42 NIO console interconnect and Figure 2-45 Host Computer Connection for PS2 mouse
14	03/30/15	Adjust the whole format for this installation manual **Chapter 8:** Delete this section according to global requirement

Revision	Date	Reason for change
13	08/22/13	**Important Precautions:** added an important precaution of RADIOACTIVE MATERIAL HANDLING. **Book 1: Chapter 1:** Added Section 1.5 Service Actions in Section 1.0 Added the template for GT1700 Table (5341997) in Section 2.0 and 4.0 Added the illustration of Hole locations for GT1700 Table in Section 4.0 Added the hole cutting procedure description for BSD Elite with GT1700 Table in Section 4.0. Updated the gap between gantry base and the floor surface to 17mm when it is evenly lowered with dollies in Section 4.0 Added a dolly moving caution notice in Section 4.0 Added a step to adjust the distance between floor and gantry base to 17.0mm in Section 4.3 Added the description and illustration of drawing reference line for GT1700 Table in Section 4.3 and 4.5 Moved the content from Section 4.6 to 4.12 under the section of Install and Level H-Power table Added Section 4.7 Install and Level GT1700 Table Update the procedure description in Section 5.0 Rear Entry Cable Box Added Section of Installing table foot switch assembly for GT1700 table Changed the type of Hex wrench to 10mm in Section 7.0 Updated Illustration of Flexible Conduit for PDU Power in Section 8.0 Added the sections of Installing TIO and NIO16 OC Added the Seismic mounting illustration for TIO and NIO16 console in Section 11.0 Added a note of Seismic mounting in Section 11.2 **Chapter 2:** Added the table of system interconnect cables for TIO and NIO16 OC in Section 1.0 Added the sections of TIO and NIO16 console connections. Added the description to refer to UPS manual in section of Install Options. Added MSUB/TGPG (J9) and MSUB/TGPG (J11) in the table of Gantry Cable Connections Added the illustration of Simplified Power Pan Connections Added the section of GT1700 Table connections Updated the illustration of CT System Ground Connections **Chapter 3:** Added the illustration of Simplified Power Pan in Section 1.0 **Appendix B:** Added the section of Assemble Worksurface (For FWS 5168666-2/-3) in Section 2.0 Added the Section of Install Seismic Kit (For FWS 5168666-2/-3) in Section 2.0.

Revision	Date	Reason for change
13	08/22/13	**Appendix E:** Updated Section 6.1 Minimum Room Size & Requirement Layouts and 6.2 Typical Room Size & Requirement Layouts **Book 2:** **Chapter 5:** Added the illustration of BrightSpeed Elite Gantry Emergency Stop Button Positions and GSCB Emergency Stop Button on NIO16 Console in Section 1.0 Updated the illustrations of System Settings Screen, Preferences Setup Screen, and corresponding procedures in Section 2.0. Added the diagrams of True-In-One Console Boot-up Flow Chart and NIO16 Console Boot-up Flow Chart in Section 2.0 Added the illustration of GSCB Volume Controls on NIO16 Console in Section 3.0. Updated SCIM to SCIM/GSCB. Added IEC3 caution label description and the Table of Caution Label Classification in Section 3.0 Updated the Table of System Warning Labels in Section 3.0 Added the tables of ***Table Elevation Tests, Position Tilt, Move Table to Interference Limit Tests, Position Table, Move Tilt to Interference Limit Tests, and Tilt Limits When Table Below Scan Plane Lower Limit Tests, for GT1700 table*** in Section 3.0 **Chapter 6:** Added MOD media in Section 2.3 Changed "IMAGE SERIES 48CM" to "ImgSer 48cm" in Section 6.4.1, 6.4.2 and 6.4.3. Updated Section 6.5.1 and 6.5.2 Changed the title "***2nd Image series*** **(Visible Lines) Failure Recovery**" to "**2nd *Recon* Series (Visible Lines) Failure Recovery**" in Section 6.5.3.2. Added the step of "Using Diagnostic Data Analysis, review the MSD Plots for each AIR scan" in Section 7.0. **Chapter 7:** Added MOD media in Section 3.0 and 8.2 Added the description of AW and HSP connector in Section 10 Added the illustration of TIO console and XW8600, and NIO16 console rear bulkhead in Section 10 Added Modem Setup procedures in IIP Configuration for TIO and NIO16 console in Section 11. **Chapter 8:** Added part numbers for *Dale 600 / 601 Meter (from Tool Pool)** and *Dale extended length leads** in Section 1.3.1 Added **Chapter 9 Installation Completion**.
12	10/11/10	**Chapter 1:** Added General Safety Guidelines on section 1.1 **Chapter 5**: Added section 2.12 Screen Saver Setup Utility
11	04/22/09	**Chapter 1**: Section 4.0 updated Table/Gantry Alignment Procedure. **Chapter 2**: Updated Section 4.6 Modem Option for AIO console **Chapter 5**: Updated reconfig OC user interface on Section 2.6 **Chapter 6**: Section 6.0 Updated section 6.4.2.2 IQ specification per CR13246738

Revision	Date	Reason for change
10	11/04/08	**Chapter 1**: Section 4.0 updated Table/Gantry Alignment Procedure. **Chapter 2**: Section 2.0 added system interconnected diagram with AC Outlet Box Section 4.4 added figure of power connection with AC Outlet Box updated Section 4.6 Modem Option for AIO console updated Section 4.8, added AIO Interconnect added Section 5.0 Install Options updated Section 5.3, 5.4, 5.5 for Install Options Section 9.0 updated figure of CT System Ground Connections **Appendix B**: added new FWS (part# 5168666) installation procedure. **Chapter 5**: updated Section 2.10, added AIO Console Boot-up Flow Chart Section 3.4 updated CT System X-Ray ON Indicators, Cautions & Warning Labels Section 3.11.3 Deleted Alignment Light Characterization, it is duplicated with 3.9.1. **Chapter 6**: Section 3.0 updated the procedure with Laser Alignment Tool. **Chapter 7**: Section 2.0 Deleted install Injector and UPS, they are duplicated with Chapter 2, Section 5. added Section 11 for Modem setup
9	04/21/ 08	**Chapter 5**: updated Section 3.9, 3.11 for Table/Gantry interference test specifications based on changes with software version 07MW11.10. **Customer Configuration Preference for Language requirements:** Updated Chapter 5, Section 2.6.2, Step 7c Procedure, and Section 3.5 Warning Labels. Also updated GE form e4879 to record information.

Revision	Date	Reason for change
8	12/03/07	**Important Precautions:** Updated content for damage in transportation **Chapter 1**: added Section 1.0 installer/FE notices updated Section 2.1 Training Process updated Section 2.5 common tools updated Section 4.3 procedure, added Cable enterance width added Section 4.4 Gantry bearing gap inspection procedures **Chapter 2**: updated Section 4.4 injector connection port updated Section 4.7 connection cable added Section 5.0 Install Options **Chapter 3**: updated Section 4.0 Mechanical Installation Completion Section **Appendix B**: added Section 2.4 install Seismic kit **Appendix E**: updated Regulatory Clearance Quick Reference Guide **Chapter 4**: updated Section 4.3 phantom added Section 6.0 FE Workflow added Section 7.0 Checklist for Completed Installation added Section 8.0 GE and Regulatory Forms **Chapter 5**: updated Section 2.3 system state DVD location updated Section 2.7Check/Set Date and Time added Section 2.10 GRE console boot-up flow chart updated Section 3.7 Verify Service Cabinet Installation **Chapter 7**: updated Section 2.5 UPS installation **Chapter 9**: removed this chapter ("Forms" chapter). Forms now reside on the Service CD.
7	8/29/07	Important Precautions: Added Bulgarian warnings Chapter 8 - Updated Patient Touch Leakage Test. Added the CT System Chassis Leakage Test. Chapter 9 - Added CT System Chassis Leakage Test Completion Form.
6	6/28/07	Important Precautions: updated multi-langurage warnings Chapter 5 - Added Section 3.10 for Short Footprint setting procedure.
5	12/12/06	Chapter 2 - Added note: use dry cleaning for electro components. Chapter 3 - Updated Mechanical Installation completion section. Chapter 5 - Added warning and notice about line transformer settings. Chapter 6 - Updated anchors tighten torque in section 3 table/gantry alignment procedure. Chapter 9 - Updated electrical calibration installation checklist. Updated GE Form 4879 installation data verification.
4	9/30/06	**Updated for Small Room:** **Chapter 1:** Section 3.2 Position Gantry **Appendix A**: Added Section 9.0 - Gantry Auxiliary (Mini) Dolly Installation w/Wood Block **Appendix E**: New appendix (Regulatory Clearance Quick Reference Guide)for Small Room

Revision	Date	Reason for change
3	8/28/06	Chapter 2 - Power, Ground & Interconnect Cables: Updated gantry cable routing: PQR 13078793.
2	6/22/06	Chapter 1 - Position Subsystems: Updated Section 14.0 - Seismic Mounting. Chapter 2 - Power, Ground & Interconnect Cables: Updated Figure 2-13 GOC4/LCGOC Interconnect. Chapter 3 - System Continuity & Ground Checks: Added Section 3.0 - Axial Head Holder Shim Installation. Appendix B - FWS Assembly and Adjustment: Update whole chapter. Chapter 5 - Electrical Integration and Safety Verifications: Updated Hardware Reconfig illustration. Chapter 8 - System-Level Safety Tests: Updated procedure.
1	2/20/06	Initial Release.

Table of Contents: Book 1

Chapter 2
Power, Ground & Interconnect Cables 111

Preface
Publication Conventions

Please become familiar with the conventions used within this publication before proceeding.

Section 1.0
Safety & Hazard Information

1.1 Text and Character Representation

Within this publication, different paragraph and character styles have been used to indicated potential hazards. Paragraph prefixes, such as hazard, caution, danger and warning, are used to identify important safety information. Text (Hazard) styles are applied to the paragraph contents that is applicable to each specific safety statement. Words describe the type of potential hazard that may be encountered and are placed immediately before the paragraph it modifies. Safety information will normally include:

- Type of potential hazard
- Nature of potential injury
- Causative condition
- How to avoid or correct the causative condition

EXAMPLES OF HAZARD STATEMENTS USED

A few examples are provided that have been adapted form GEMS' global document standard (2119696-100). They include paragraph prefixes and modified text styles.

⚠ **CAUTION**
Pinch Points
Loss of Data
Sharp Objects

Caution is used when a hazard exists that can or could cause minor injury to self or others if instructions are ignored. They include for example:

- **Loss of critical patient data**
- **Crush or pinch points**
- **Sharp objects**

⚠ **DANGER**
EXCESSIVE VOLTAGE
CRUSH POINT

DANGER IS USED WHEN A HAZARD EXISTS THAT WILL CAUSE SEVERE PERSONAL INJURY OR DEATH IF INSTRUCTIONS ARE IGNORED. THEY CAN INCLUDE:

- **ELECTROCUTION**
- **CRUSHING**
- **RADIATION**

⚠ **WARNING**
ROTATING EQUIPMENT
BARE WIRES

WARNING IS USED WHEN A HAZARD EXISTS WHICH COULD OR CAN CAUSE SERIOUS PERSONAL INJURY OR DEATH IF INSTRUCTIONS ARE IGNORED. THEY CAN INCLUDE:

- Potential for shock
- Exposed wires
- Failure to Tag and lockout system power could allow for un-command motion.

NOTICE
Equipment Damage Possible

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

- Disk drive will crash
- Internal mechanical damage, such as to the x-ray tube
- Coasting the rotor through resonance.

It's important that the reader not ignore hazard statements in this document.

1.2 Graphical Representation

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 possibly cause harm.

ELECTRICAL

MECHANICAL

RADIATION

LASER

HEAT

PINCH

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

AVOID STATIC ELECTRICITY

TAG AND LOCK OUT

WEAR EYE PROTECTION

Section 2.0
Publication Conventions

2.1 General Paragraph and Character Styles

Prefixes are used to highlight important non-safety related information. Paragraph prefixes (such as Purpose, Example, Comment and Note) are used to identify important but non-safety related information. Text styles are also applied to text within each paragraph modified by the specific prefix.

EXAMPLES OF PREFIXES USED FOR GENERAL INFORMATION

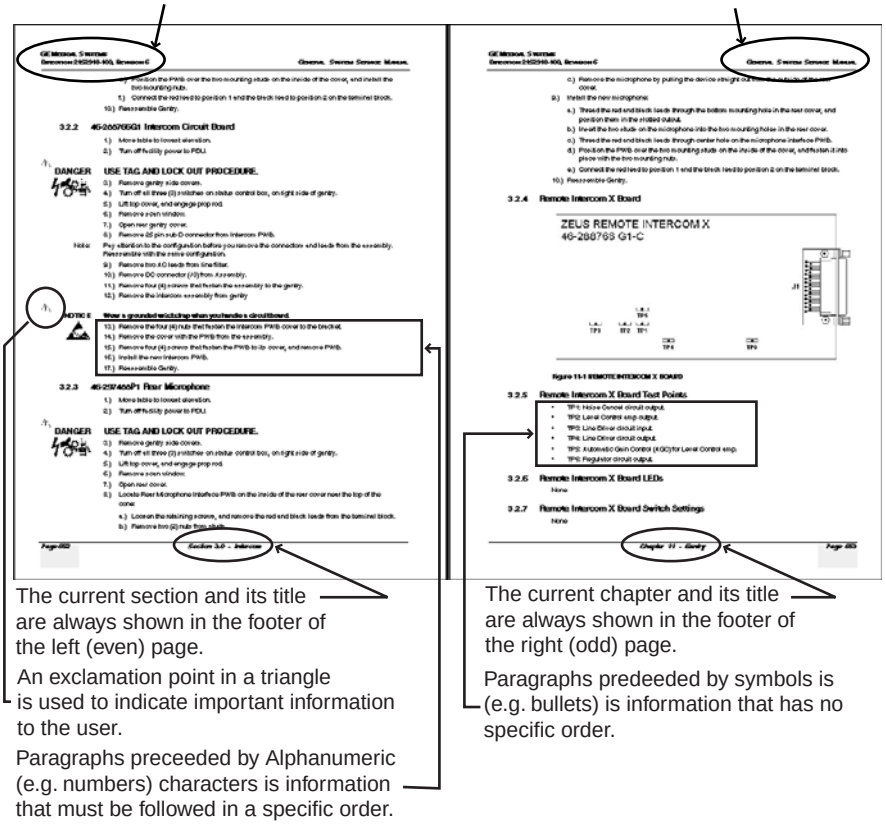
Purpose: Introduces and provides meaning as to the information contained within the chapter, section or subsection, such as used at the beginning this chapter for example.

Note: **Conveys information that should be considered important to the reader.**

Example: Used to make the reader aware that the paragraph(s) that follow are examples of information possibly stated previously.

Comment: Represents "additional" information that may or may not be relevant.

2.2 Page Layout



Headers and footers in this publication are designed to allow you to quickly identify your location. The document's part number and revision number appears in every header on every page. Odd

numbered page footers indicate the current chapter, its title, and current page number. Even page footers show the current section and its title, as well current page number.

2.3 Computer Screen Output/Input Character Styles

Within this publication different character styles are used to indicate computer input and output text. Character (input, output, and variable) styles are used and applied to the text within a paragraph so as to indicate directions. Computer screen output and input is also formatted using mono (fixed width) spaced fonts.

Example: Fixed Output

`This paragraph denotes computer screen fixed output. It's output is fixed from the sense that it does not vary from application to application.It's the most commonly used style used to indicate filenames, paths, and text.`

Example: Variable Output

`This paragraph denotes computer screen output that is variable. Its output varies from application to application. Variable output is sometimes found placed between greater than and lesser than operators. For example: <variable_ouput>`

Example: Fixed Input

`This paragraph denotes fixed input. It's typed input that will not vary from application to application. Fixed text the user is required to supply as input.`

Example: Variable Input

`This paragraph denotes computer input that can vary from application to application. Variable text the user is required to supply as input. Variable input sometimes is placed between greater than and lesser than operators. For example: <variable_input>. In these cases, the (<>) operators are dropped prior to input. Exceptions are noted in the text.`

2.4 Buttons, Switches and Keyboard Inputs (Hard & Soft Keys)

Different character styles are used to indicate actions requiring the reader to press either a hard or soft button, switch, or key. Physical hardware, such as buttons and switches, are called hard keys because they are hard wired or mechanical in nature. A keyboard or on/off switch would be a hard key. Software or computer generated buttons are called soft keys because they are software generated. Software driven menu buttons are an example of such keys. Soft and hard keys are represented differently in this publication.

Example: Hard Keys

A power switch **ON/OFF** or a keyboard key like **ENTER** is indicated by applying a character style that uses both over and under-lined bold text that is bold. This is a hard key.

Example: Soft Keys

Whereas the computer MENU button that you would click with your mouse or touch with your hand uses over and under-lined regular text. This is a soft key.

Chapter 1
Position Subsystems

NOTICE **Potential for Data Loss and/or Equipment Damage.**

To prevent potential data loss and equipment damage, please do the following:

- **When instructed, record data collected from the procedures in this chapter on GE Form e4879. For more information about this form, see Section 8.0 of Chapter 4.**
- **Only use the Installation manual that arrives with your system. Any other revisions of this manual may not exactly match your system.**

Section 1.0
Installer/FE Notices

1.1 General Safety Guidelines

1.) Follow all safety precautions, warnings and instructions in this manual.
2.) Read and obey the warnings and instructions on equipment labels or tags.
3.) Allow only qualified personnel to install, maintain and service this equipment.
4.) While the system is designed to meet all safety requirements applicable to medical equipment, qualified operators must understand the potential safety hazards, and take steps to minimize the risk at all times.
5.) **Never** modify the system in whole or in part without prior written approval by GE Healthcare.
6.) Do **not** change, add, or remove any system accessory without prior written approval of the vendor's local service manager.
7.) **Never** leave the system in an unsafe condition. Notify the customer that the system is not to be used until a problem is resolved.
8.) Read and follow the precautions described in this manual.

1.2 Shipping, Warehouse, and Transportation Warning

- This gantry is designed to be moved using the shipping dollies and should not be lifted or moved using a lift truck.
- Do not hoist gantry or table using dollies.

1.3 International Shipments

- Dollies must be used to remove the gantry from the shipping skid and to transport the gantry to the customer's site.
- If lifting is required, refer to the Pre-Installation Manual for instructions.

1.4 On Site Warning (Mechanical Installation Team)

This system requires a gantry bearing gap inspection before electrical calibration is started. See Draw Reference Line for GT1700 Table, on page 44.

1.5 Service Actions

Open a dispatch and record the bearing inspection results first, then close the dispatch and continue with the electrical calibration procedures.

Section 2.0
Install Table/Gantry Introduction

This chapter describes how to mount, position, and level the CT Scanner subsystems.

Note: Before you start the installation, make sure the site preparation complies with conditions and instructions found in the pre-installation manual. Failure to comply will result in excessive installation delay and potential increased, unrecoverable installation costs. This product is designed to meet specific mechanical installation standards, which should be reviewed prior to installing this system.

2.1 Floor and Room Preparation

2.1.1 Preparation

Consult your local GE Sales and service representative about your specific needs. It is the purchaser's (buyer) responsibility to provide an approved support structure and an approved method of mounting. General Electric is not responsible for any failure of the support structure or method of anchoring.

The BrightSpeed system has a total floor load of approximately 2950 kg (6500 lbs). About 2350 kg (5175 lbs), including patient (205 kg (450 lbs)), is concentrated in the table-gantry assembly. Refer to the *Pre-installation Manual* for more information.

2.1.2 Flooring

Do not place the scanner on any resilient flooring. Resilient tile or carpeting may slowly yield over a period of time and disturb the alignment of the table to the gantry. Refer to the floor template to determine locations where resilient flooring material should be removed.

Limitations include:

- No part of the floor surface within the table, gantry, or the two interface areas between table and gantry, should be higher than the support areas for the table and gantry.
- The floor structure must withstand the occupied weight of table and gantry, as well as the individual contact area loading of these components.
- The method and placement of anchors, or through bolts, must not reduce the structural strength of the floor.

If you have to remove the gantry covers in order to move the gantry into the room, refer to Appendix A, for the cover removal procedure. Please read the caution statement on page 197 before removing the gantry covers.

2.2 Overview

Procedures in this chapter provide detailed instructions to position, level, and anchor the gantry and table securely for operation. The BrightSpeed system uses adjustable leveling pads to support the gantry and table. The gantry has four (4) primary leveling pads located on the gantry base. The table has five (5) pads used for leveling it.

The process you will be following is:

1.) Use the room-layout template to determine the general position of the gantry and table.
2.) Move the gantry into position.
3.) Level gantry.
4.) Use the Laser Alignment Tool to position the table relative to the gantry.
5.) Level the table to the gantry, and anchor the system.

Use the template to position the system; however, use the gantry and table to locate and drill the anchor holes. Drill the anchor holes with the system in place.

2.3 Pre-Installation Template

Always use the room-layout template (in two pieces), during installation (see Table 1-1, for part number). The gantry and table will not be properly aligned if existing holes are used. The template shows the location of the gantry and table anchor holes.

This template is shipped with the system. It may also be ordered as FRU.

Table 1-1 Room Layout Templates

System	Part Number
BrightSpeed Elite, Edge, Excel with HPower Table	5160024
BrightSpeed Elite with GT1700 Table	5341997

2.4 Required Common Tools and Supplies

The following tools and supplies are required for installation of the scanner. Please refer to Appendix C, on page 243, for pictorial descriptions of the tools and supplies.

WRENCHES

- Standard and Metric combination wrench sets
- Standard and Metric Hex Key (Allen wrench) sets
- ½" and 3/8” drive torque wrench: 0-100 N-m (0-100 ft.-lb.) Must be calibrated yearly.

SOCKETS AND EXTENSIONS

- 3/8" and ½" drive ratchet wrenches
- ½" drive 3" & two 6" long extensions
- 3/8” drive 12" long extension
- Standard & Metric 3/8” drive socket sets
- ¾” deep well socket 3/8”
- 1", 1-1/8”, 1-¼" & 1-½" sockets for ½" drive
- 3/8” drive universal joint
- Metric hex bit set ¼" or 3/8” drive, including:
  - 14mm hex bit 3/8" or ½" drive (14mm ball hex helpful)
  - 10mm hex bit 3/8" drive

SCREW DRIVERS

- Phillips screwdriver set (small, medium, and large)
- Straight blade screwdriver set (small, medium, and large)

DRILL BITS

- Complete set of standard (U.S.) drill bits
- Metric tap set

- 12 mm concrete drill bit (2203081: HILTI, TE-CX 12/17 or equivalent)
- ½" masonry bit, min. 8" long USA – 18" optional (for rear table hole)
- 3" (76mm) hole saw with 1/4" (6mm) masonry bit (to remove flooring)

POWER TOOLS

- 3/8” or ½" drill, cordless or electric
- Reciprocating Saw (Sawzall or equivalent) and assorted blades.
- Hammer Drill & Blt (8" min, 12" max)
- Sears 17740 Shop vacuum or equivalent, with “**HEPA**” or dry wall dust filter (Sears part number 17918) or equivalent
- 25’ Extension power cords

HAND TOOLS

- Ball-Peen Hammer (1lb or 2lb)
- Tongue & Groove Pliers (large)
- Diagonal Cutting Pliers, Large (to cut 1/0 ground)
- Framing Square (e.g., Empire 16" x 24" aluminum square)
- Diagonal Cutting Pliers, Small
- Large pry bar
- 4', 2’ & 9" torpedo levels (see Table 1-2: Recommended Levels)
- Laser level (see Table 1-2: Recommended Levels)

Table 1-2 Recommended Levels

9"	Johnson Magnetic Level, model 7500M*
	Johnson Magnetic Level, model 4500
	Stanley Magnetic Level
2’	Johnson Professional Box Beam Level, model 9624*
	Empire Titan Professional Box Beam Level, model 900 series
4’ (nominal)	48" Johnson Professional Box Beam Level*
	42" Stanley Contractor Grade Level
	48" Empire Titan Professional Box Beam Level, model 900 series
	48" Stabila Aluminum Box Beam Level, Kit 24816

* Preferred levels

ELECTRICAL TOOLS

- DVM
- Continuity tester

PERSONAL SAFETY EQUIPMENT

- Safety shoes*
- Safety glasses*
- Gloves
- LOTO Kit (supplied)*
- Hearing Protection*
- 6' & 8 ' Step ladder

* These PPE items are absolutely required for every installation job, with NO exceptions.

SYSTEM CLEANERS

Purchase Locally:

- Glass Cleaner or equivalent
- Scrubbing Bubbles Bathroom Cleaner or equivalent
- Grease Cutting Cleaner or equivalent

GE TOOLS

- 5148193 (VCT alignment Kit)

or

- 5272090 (Complete Laser alignment tool for VCT, Brightspeed Select and RT16, which included 5148193 and 5180876)

Note: A box labeled Installation Support Kit is shipped with each system. It contains paint, masking tape, cleaners, towels, and other materials needed to install this CT scanner.

Section 3.0
Delivery and Inventory Procedure

3.1 Delivery Procedure

3.1.1 System Transportation - Temperature Extremes

When transporting the CT system, ensure that the system is not exposed to temperatures or humidity outside the following specifications.

Temperature: -40º to +158º F (-40º to +70º C)

Humidity: 10% to 100%, including condensing

NOTICE **Component Freezing occurs if CT system is exposed to temperatures below 0º F (-18º C) for a period longer than two days.**

Allow a minimum of 12 hours for the CT system to adjust to ambient room temperature, prior to installation.

3.1.2 Stored Systems

If your system have been stored for more than three months, you will need to complete a visual inspection, looking for damage due to improper storage. Check for the latest software revisions, options, and component changes. Contact the OLC or CT support central for additional information

3.1.3 Working with the Mover

Follow the instructions provided by your installation specialist regarding working with equipment movers. Help direct movers on where to place equipment and which items you need first.

Generally movers should move all equipment into the customer room. Door removal and other site changes to move equipment should be done only as directed by the install specialist.

For component sizes and weights, refer to the *BrightSpeed Elite, Edge, Excel Pre-Installation* manual.

3.1.4 Floor Protection

It is suggested that the movers use floor protection. Most equipment movers can provide floor protection during the equipment delivery. Installers should provide floor protection for the room.

3.1.5 Equipment Delivery Route

Prior to equipment delivery, review the delivery route with the movers. Refer to the installation specialist for any additional delivery instructions.

3.1.6 Removing Gantry Dollies and Covers

Refer to Appendix A, for the dolly and cover removal procedures. Please read the caution statement on page 197 before removing the gantry covers.

3.1.7 Check for Shipping Damage

Check for the following damage, which may have occurred during shipping:

- Equipment damage: paint scrapes and cover damage.
- Damage to hospital property: floors, door frames and walls.

If damage is found—or items are missing in shipment—notify the appropriate service personnel:

- For item(s) missing in shipment or short shipped, contact the install specialist to have the item(s) shipped.
- Report damaged items:

  http://egems.med.ge.com/edq/home.jsp.

3.1.8 A1 Breaker

Lock-out and tag-out the A1 breaker now.

Figure 1-1 Sample A1 Breaker

3.1.9 Installation Support Kits

An Installation Support Kit is shipped with every system. Locate this box now and open it. All included materials are to be used during the installation process. These items are to be left ON SITE, for future service needs.

3.1.10 Installation Conditions

1.) A Final Site Print is REQUIRED.

2.) The room size must match the print. Measure the room size. If it does not match the stated size, and is smaller, then check all regulatory clearances. If any regulatory clearance is less than the minimum, then DO NOT continue. Notify the PMI to set up a site escalation.

3.) Do Not start the installation process if the site is under construction:

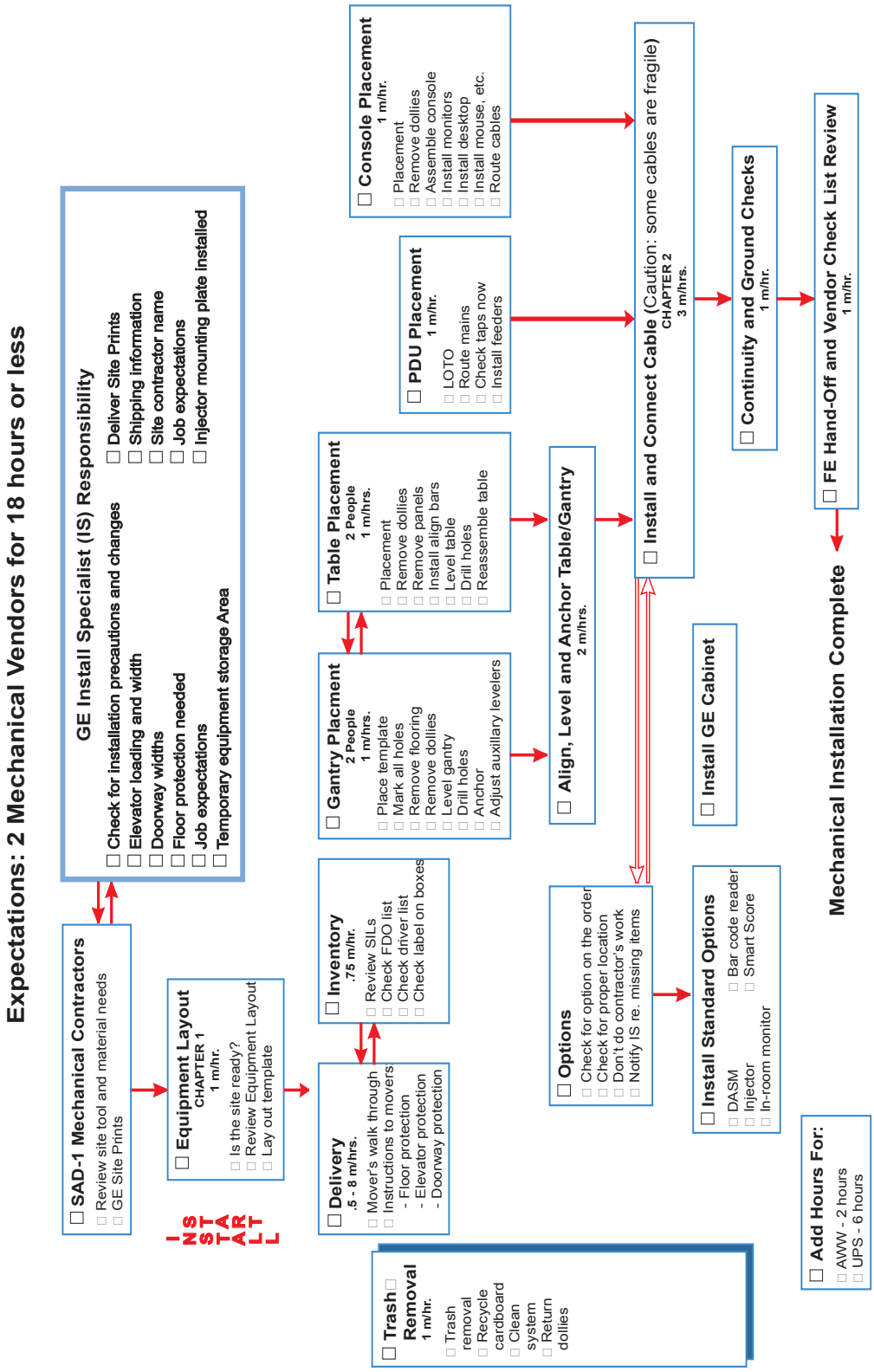
- In the Room
- In the Scan Area

Refer to the Pre-Installation Manual for additional details.

A customer Anchoring Plan is required, if there is anything other than a 102 mm (4") minimum concrete floor. GEHC employees shall only install the anchors supplied with this system

3.2 Mechanical Block Diagram

Figure 1-2 Mechanical Installation Block Diagram



Section 4.0
Install and Level Table/Gantry

4.1 Establish the Room Layout

NOTICE **The floor must meet the minimum floor specification in order to begin this procedure. Refer to the *Pre-Installation Manual* for details.**

Use the GE print (developed for your site) to establish the room layout. Make sure all the operating and service clearances shown on the print are observed. Using the supplied template, locate the anchor holes. Make sure they clear structural interferences in the floor.

Clean the area. Free the mounting surface of any material that may interfere with the positioning and leveling of the system.

1.) Lay out the two (2) pieces of the floor template (P/N 5160024/5341997).

2.) Start with the Gantry template—align per the GE print.

Note: If the floor has existing anchor penetration, the new anchors must be set at least 4" from the nearest penetration.

3.) Place the table template over the top of the Gantry template. Align the scan and table center-lines and secure the templates to the floor. Make sure there are no potential clearance issues.

4.) Refer to the ruler of the table template to confirm table travel distance and mark the limitation on the floor if table short footprint setting is needed.

5.) Now, check the level of the floor (See Figure 1-3) across the templates.

Figure 1-3 Hole Locations for Gantry and HPower Table

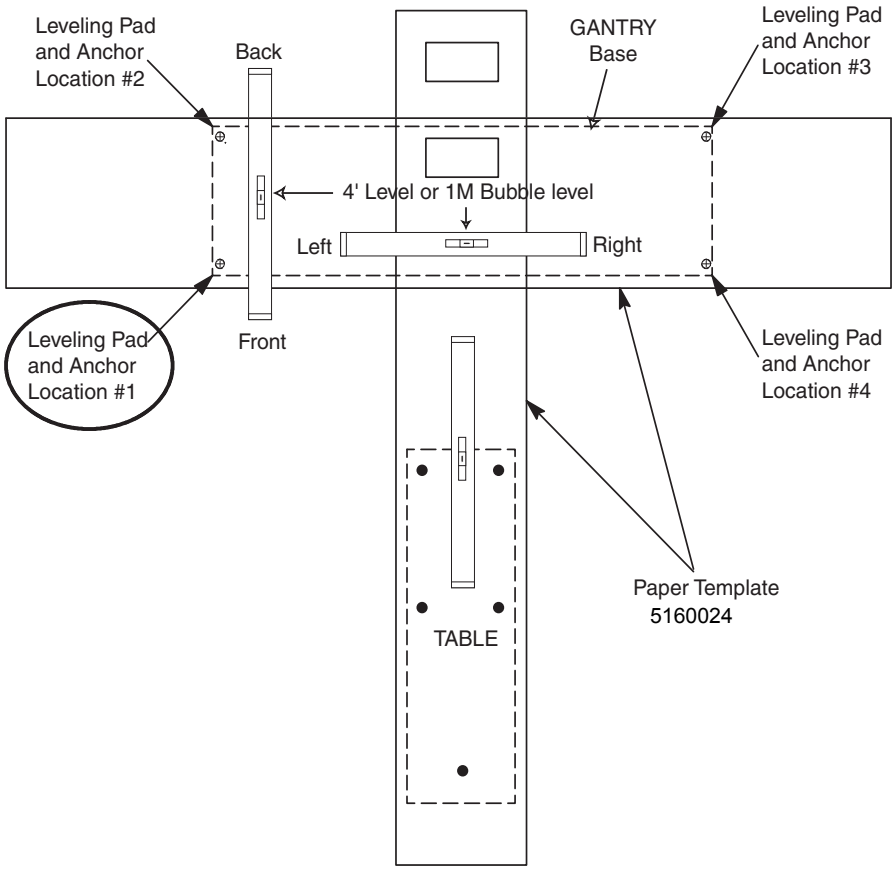
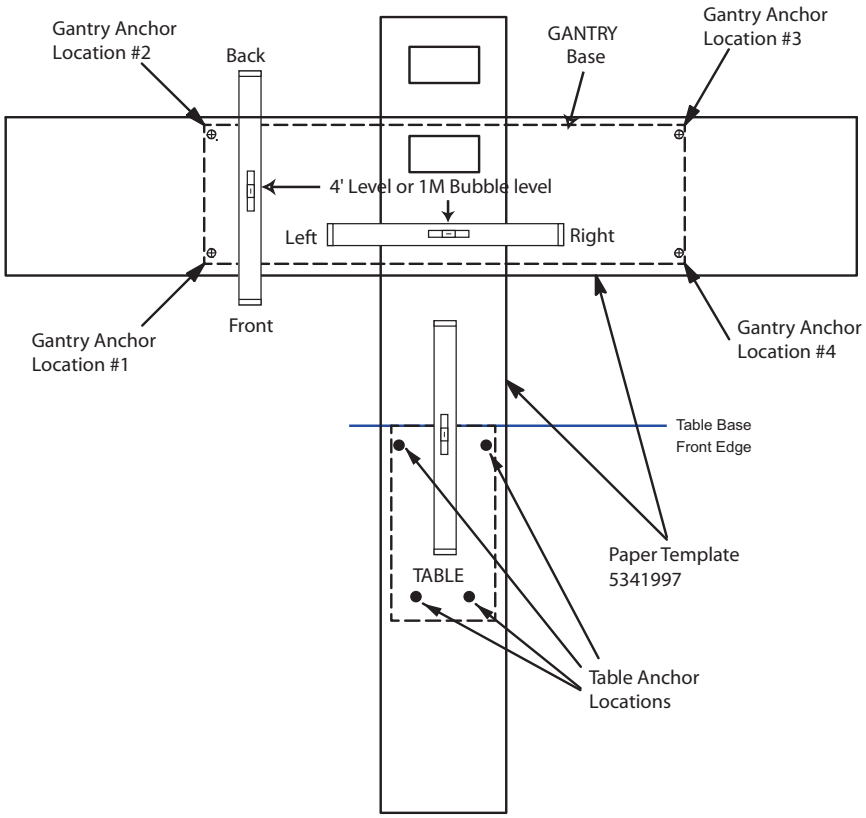


Figure 1-4 Hole Locations for Gantry and GT1700 Table



6.) Scribe a mark (e.g., use a center punch) at each of the gantry's mounting hole locations (there are four (4) of these).

7.) For BrightSpeed system with HPower table, using a center punch, mark the five (5) table mounting hole and two (2) leveler locations.

8.) For BrightSpeed system with GT1700 Table, using a center punch, mark the four (4) table mounting hole and two (2) leveler locations.

NOTICE

For BrightSpeed system with HPower table, positioning requires cutting 9 holes in the floor.
For BrightSpeed system with GT1700 Table, positioning requires cutting 8 holes in the floor.
Before you drill or cut any flooring, make sure the appropriate hospital personnel have approved the location of the table/gantry.

9.) Cut tiles (or other resilient flooring) around all holes punched in the template for the gantry and table. Use a utility knife with a heat gun, a 3" hole saw with a ¼" masonry bit or other adequate tools to cut the flooring.

10.) Some sites may require sealing of the floor penetrations after the flooring is removed.

Note:
- Use RTV or other sealant to seal the floor covering, as necessary.
- All documentation in this manual is based on mounting the table / gantry on a concrete floor only.

4.2 Position the Gantry

4.2.1 Gantry Prep - For Access Greater Than 28"

1.) Remove all the transportation packaging, except for dollies, from the gantry.

Note: Some sites require floor protection. Locate and install any required floor protection now.

4.2.2 Gantry Prep - For Access Less Than 28"

1.) Remove all the transportation packaging, except for dollies, from the gantry.

Note: Some sites require floor protection. Locate and install any required floor protection now.

2.) Remove the blue dolly from the left side of the gantry so that the gantry can be positioned closer to the left side wall:

Note: Use Floor Protection for this process.

a.) Lower the gantry to the floor so that the gantry is resting on the floor.

b.) Remove the three (3) M14 hex bolts that secure the gantry to the dolly.

c.) Replace the removed dolly with the shipped black gantry-positioning dolly, and reinstall the three (3) M14 hex bolts.

d.) Raise the gantry so that it is once again off of the floor.

4.2.3 Gantry Positioning - All Sites

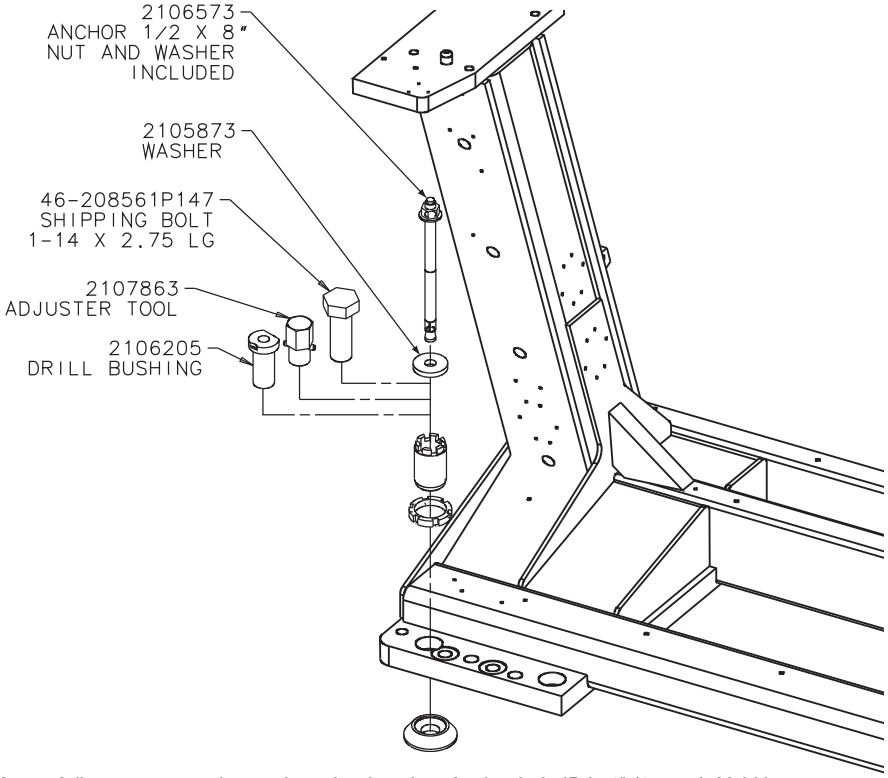
1.) Position the gantry over the template appropriately.

a.) Locate the four (4) leveling pads, and position each of them beneath its associated adjuster.

b.) Use the dollies to evenly lower the gantry, until it is just off of the floor (approximately 5/8" or 17.0 mm). Use a ½" ratchet to raise and lower the dollies.

c.) Carefully rotate the gantry into the correct position over the template.

Figure 1-5 Gantry Base Installation Hardware



Note: Adjusters are used at each anchor location. Anchor hole ID is 1" (2.5 cm). Void between adjuster and anchor must be filled according to local building codes for seismic application.

2.) Remove the paper templates from the floor and discard properly.

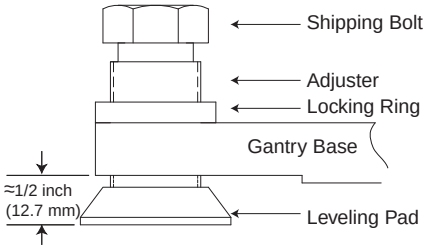
3.) Loosen the locking rings and shipping bolts so you can fine-tune the leveling pads to compensate for slight variations in the floor surface.

4.) Position the gantry so that the adjusters are centered over their respective holes scribed earlier into the floor.

IMPORTANT: Make certain to route the gantry power cord under the two rear gantry rails, before removing the gantry shipping dollies.

5.) Using a ½" ratchet, gently lower the gantry until it rests on the floor, over the marked areas.

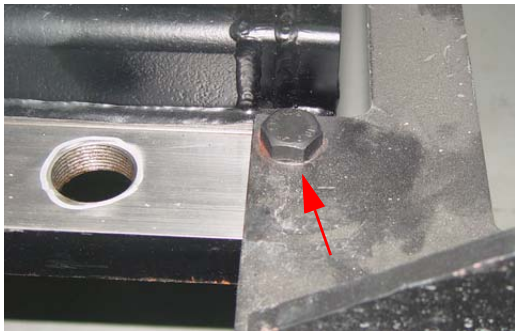
Figure 1-6 Gantry and Table Base Leveling Pads (Starting Positions)



NOTICE **Gantry dollies weigh approximately 250 lbs each. Exercise caution when removing dollies so as to not damage the floor covering.**

6.) Using a 14mm hex socket, remove the dollies from the gantry by removing the three dolly bolts found at both ends of the gantry (Figure 1-7).

Figure 1-7 Gantry Dolly Bolts

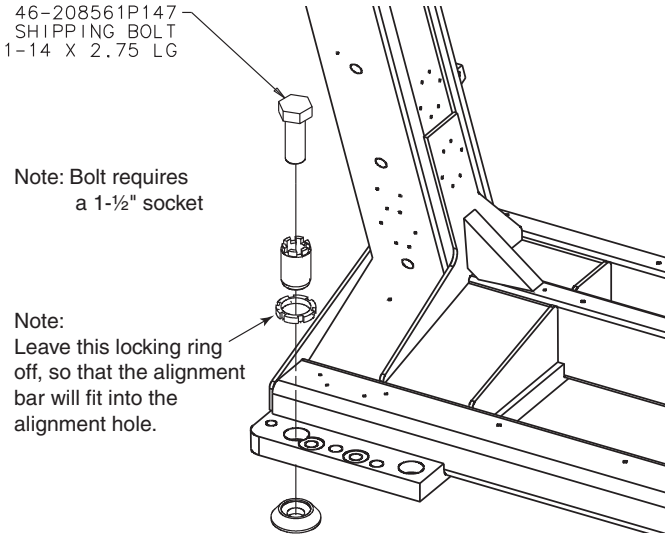


7.) Remove the dolly plates on both sides of the gantry. Retain the dolly plates in the service cabinet at the hospital.

Figure 1-8 Dolly Plate

8.) Remove the (4) gantry shipping bolts, using a 1½" socket.

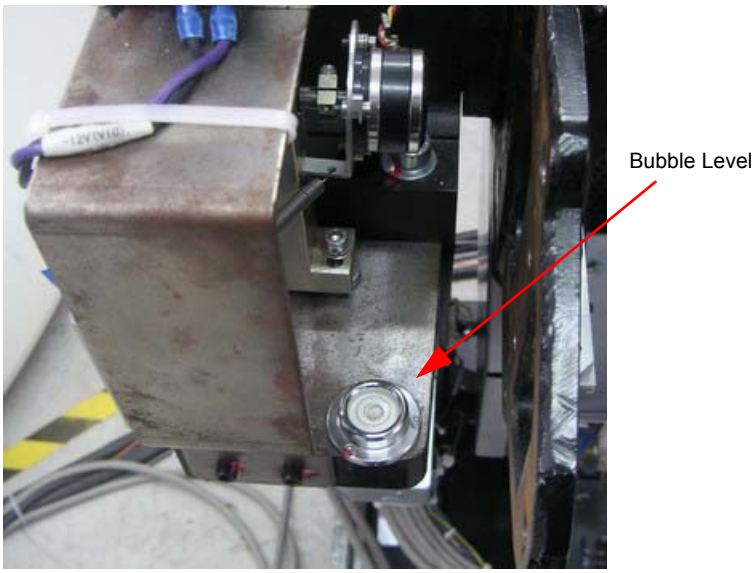
Figure 1-9 Gantry Shipping Bolts



4.3 Level the Gantry

The gantry uses 2 bubble levels that are permanently mounted to machined surfaces on the stationary base to tell when it is level.

Figure 1-10 Gantry Bubble Level



Bubble levels are located on both ends of the gantry stationary base. They're located on the stationary base near a point where the rotating structure pivots mount to the base structure. (See Figure 1-10.) The gantry is properly leveled when the bubble is centered. (See Figure 1-12, on page 42.)

1.) Loosen all adjuster lock rings (use a spanner wrench or large channel lock pliers).

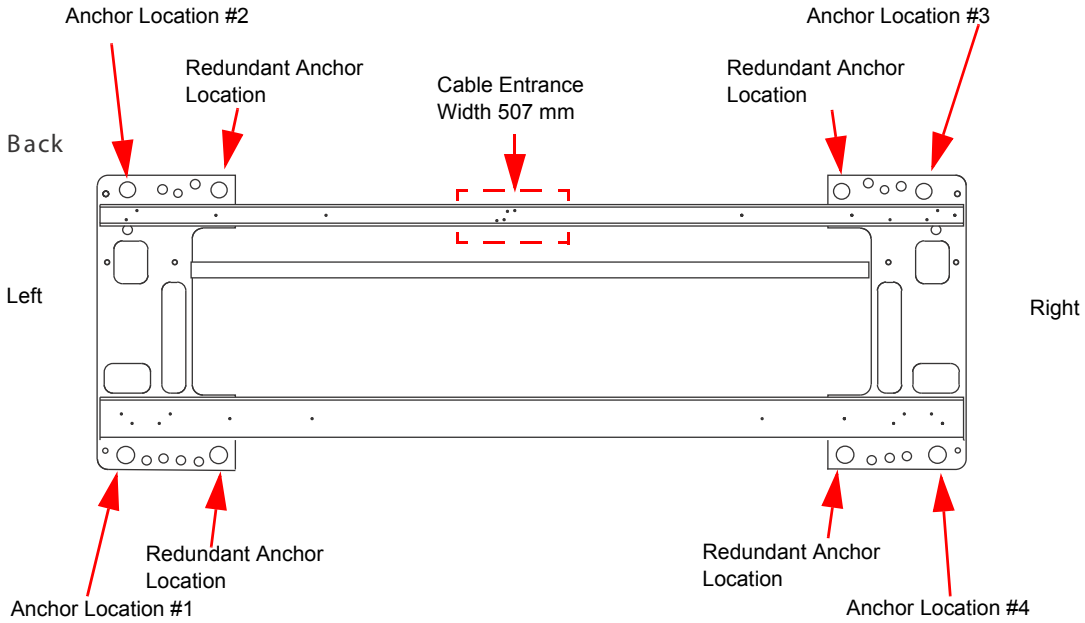
2.) Systematically turn each of the gantry's adjusters (locations 1, 2, 3 and 4 in Figure 1-11) until both bubble levels are centered left to right, and front to back.

- Begin by turning each adjuster no more than 1 turn at a time.
- Use the adjuster tool, $1^1/_8$" socket, and the ½" drive ratchet to turn each adjuster. (Refer to Figure 1-5, on page 39.)

Systematic Procedure for Leveling gantry follows:

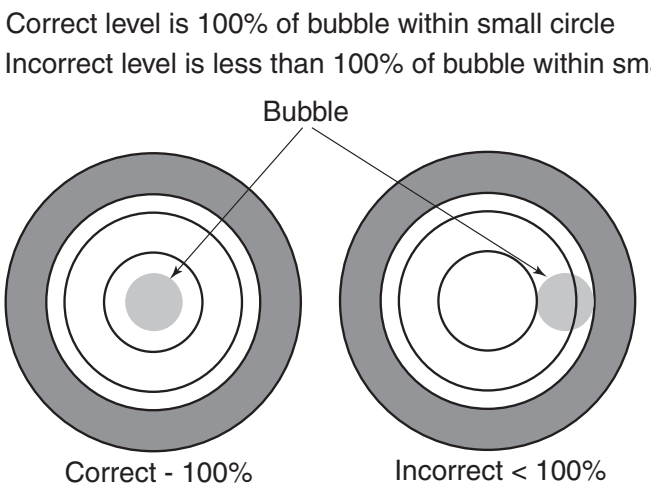
1.) Level the left side from front to back by turning adjusters #1 and #2.
2.) Level the right side from front to back by turning adjusters #3 and #4.
3.) Level the side (right or left) that is higher with respect to the other side. Turn both adjusters on a side equally until that side is level. The side should now also be level.

Figure 1-11 Gantry Base "Adjuster" Locations— Top View



3.) When the bubble levels are centered (Figure 1-12), each of the four (4) leveling pads should be carrying a portion of the gantry weight. Distribution of the gantry weight prevents the base frame from rocking during normal operation. **DO NOT leave any adjuster un-loaded or floating**.

Figure 1-12 Bubble Level Centering



4.) Adjust the distance between floor and gantry base at Anchor location #1 becomes approximately 17.0 mm by turning four (4) adjusters equally.
(Be careful no more than 1 turn at a time.)

5.) For HPower table, draw a reference line of 778 ± 5 mm position from Gantry Base on the floor as shown in the Figure 1-13. This line should be parallel to the gantry. In a later section, you will move the table against the 778 mm mark.

6.) For GT1700 Table, draw a reference line of 673 ± 6 mm (26.5" ± 0.25") position from Gantry Base on the floor as shown in the Figure 1-12. This line should be parallel to the gantry. In a later section, you will move the table against the 673 mm (26.5") mark.

Figure 1-13 Draw Reference Line for HPower Table

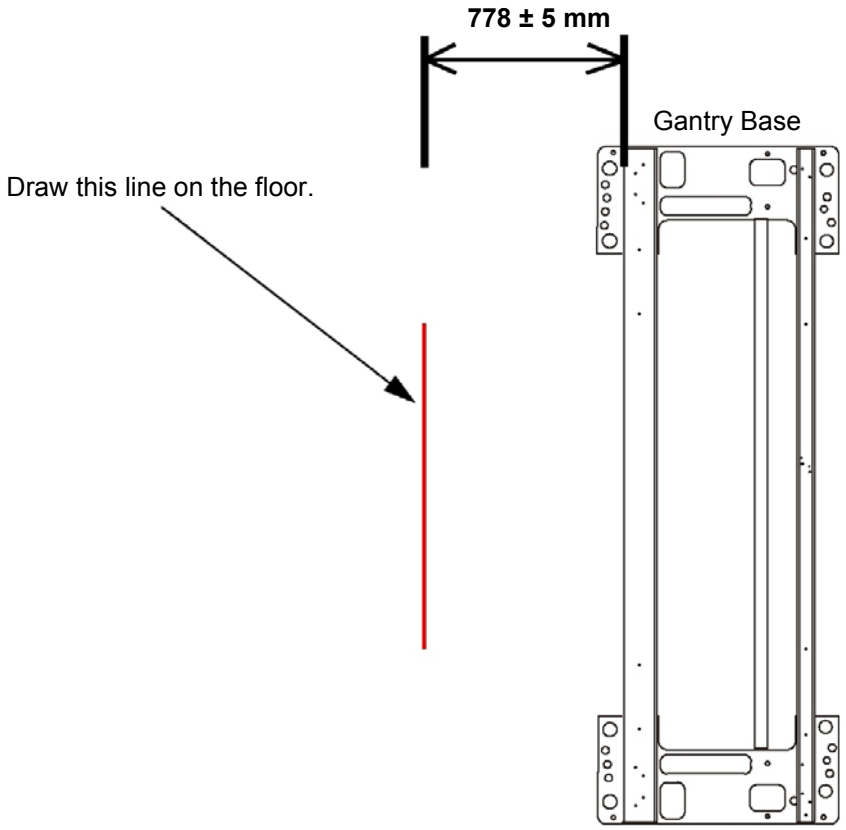
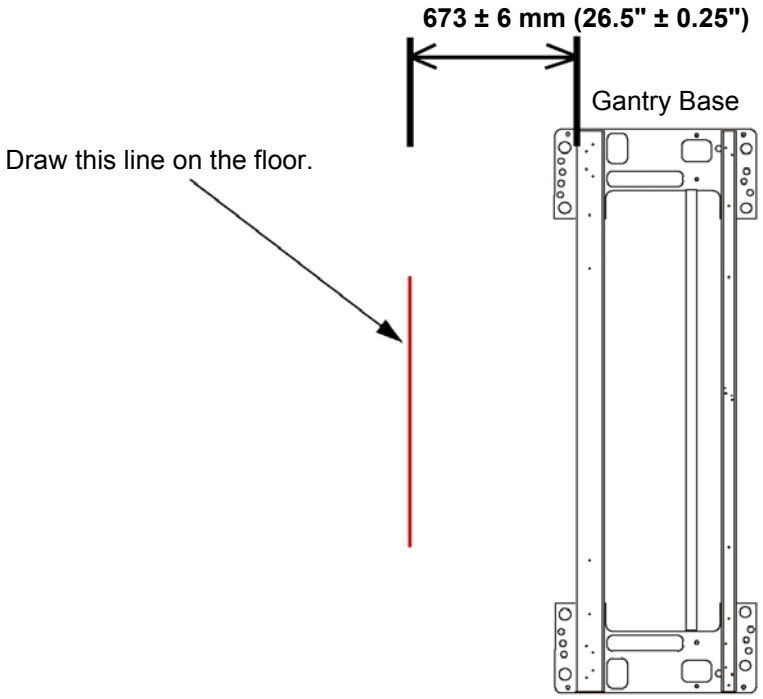


Figure 1-14 Draw Reference Line for GT1700 Table



4.4 Gantry Bearing Gap Inspection

All CT systems require a Gantry Bearing Gap inspection before starting electrical calibration. All international gantries are shipped in a wooden shipping crate that should not be removed until it arrives at the installation site. This shipping container is designed to reduce the risk of shipping damage.

4.4.1 Personnel Requirements

REQUIRED PERSONS	PRELIMINARY REQS	PROCEDURE	FINALIZATION
2 (mechanical suppliers or installation team)	15 min	15 min	15 min

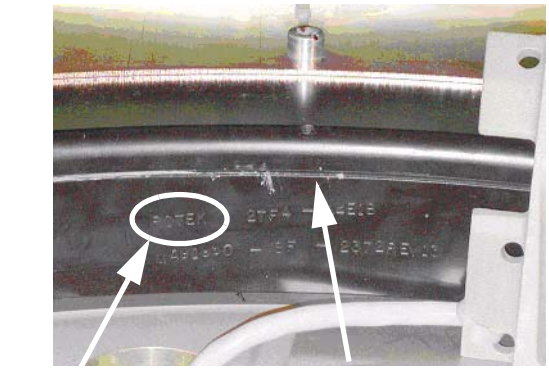
4.4.2 Tools and Test Equipment

- Standard tool kit
- Inspection document
- 2.5 mm Allen wrench
- Rear cover dollies (2)
- Flashlight

4.4.3 Damage Indicators

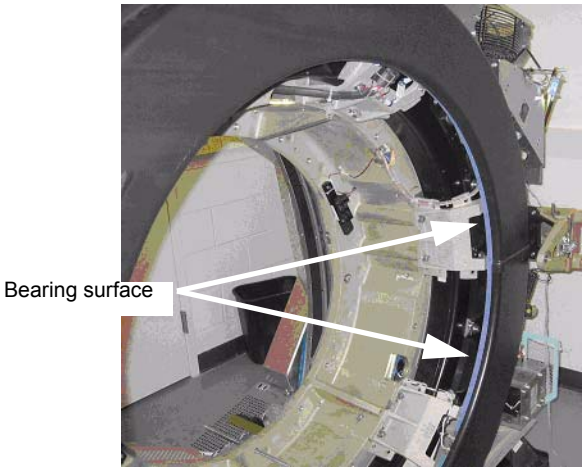
On the inside edge of the black-colored bearing assembly, a mark similar to that shown in Figure 1-15 will be seen, if this is a Rotek bearing.

Figure 1-15 Gantry Bearing - Rotek Label



The mark has a serial number in the same format as:
ROTEK 2TF4-44E1B-MA91960-8F-2372-REV13.
The gap to be inspected is shown in Figure 1-16 next to the serial number.

Figure 1-16 Gantry Bearing



On most systems, a change in the bearing gap does not cause the gantry to make unusual sounds, unless the gap is severe. If the gantry is badly damaged and the gap is severe, it can cause operation issues. Some systems are shipped with shock indicators that must be returned to Milwaukee.
A severe failure may be seen during installation as a problem rotating the gantry.

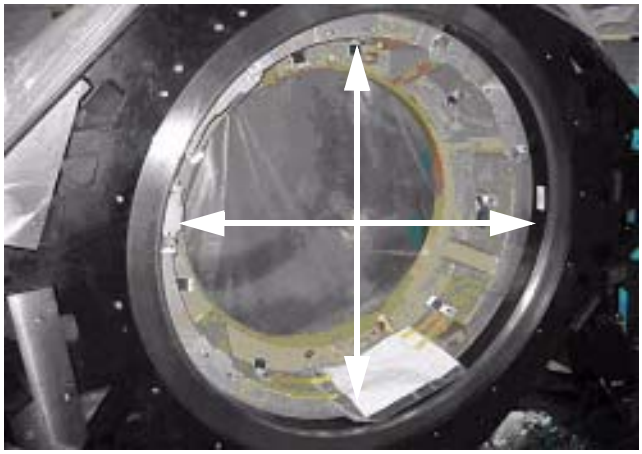
4.4.4 Procedure

1.) Remove the scan window following the procedure in appendix A, Section 6.0, on page 212

2.) Remove the top and rear gantry covers, following the procedures in Appendix A, Section 2.0, on page 198 and Section 4.0, on page 208

3.) Use a 2.5mm hex wrench as a tool to measure the gap at the positions shown in Figure 1-17. The location of gantry components does not matter. Simply measure four (4) locations 90 degrees apart from each other.

Figure 1-17 Inspection Locations

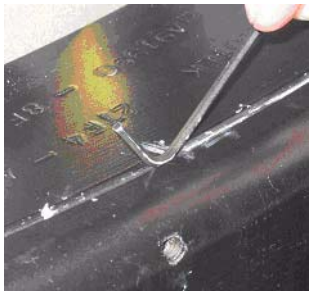


4.) If the 2.5mm hex wrench easily fits without effort in the gap, the gap is out of spec. Figure 1-18 shows a gap that is too large. Figure 1-19 shows a gap that is good. Notice that the hex wrench does not fit in the gap in Figure 1-19 but does in Figure 1-18.

Note: Do not use force when putting the wrench in the gap. Either it slips in or it doesn't.

Figure 1-18 Gap Too Large

Figure 1-19 Gap Is Good



5.) Replace the top and rear gantry covers, following the procedures in Appendix A, Section 2.0, on page 198 and Section 4.0, on page 208.

6.) Replace the scan window, following the procedures in Appendix A, Section 6.0, on page 212.

4.4.5 Finalization - Mechanical Installers

If the Bearing Gap Inspection passes, complete the signoff on the GE Form e4879, Installation Data verification form, that this inspection was completed.

If the Bearing Gap Inspection fails, contact your site FE.

4.4.6 FE Service Action Required

If the Bearing Gap Inspection fails, the mechanical installer notifies the site FE that the inspection failed.

The site FE should:

1.) Open a bearing inspection dispatch.

2.) Follow the inspection procedure described in this section.

3.) Record the bearing inspection results.

If no damage is found, close this dispatch and continue with the electrical calibration procedures.

If the system is damaged, go to the Equipment Delivery Quality web site and follow their instructions.

To enter a damaged in shipping claim, go to this web site:

http://egems.med.ge.com/edq/home.jsp

4.4.7 FE Inspection Completion

1.) After the Gantry Bearing Inspection passes, complete the opened service dispatch with the following information:

- Gantry Serial Number
- Gantry Type
- System ID
- Site Name
- Installation date
- Was the Gantry transported to the site in the shipping crate? (Yes/No)
- Was the Gantry lifted or hoisted, were riggers used, or was the Gantry delivered via flatbed wrecker? (Yes/No)
- Number of locations that fail the gap inspection if any: _____

2.) Close the service dispatch.

Should any follow-up be required after this inspection, the site engineer will be contacted directly by CT Engineering.

4.5 Install Gantry Alignment Laser and Bracket

4.5.1 Tools and Test Equipment

- Standard tool kit
- Laser Alignment Kit (P/N 5148193 or 5272090)
- Tape measure
- Masking tape

4.5.2 Procedure

NOTICE **Use caution while removing the gantry scan window.**

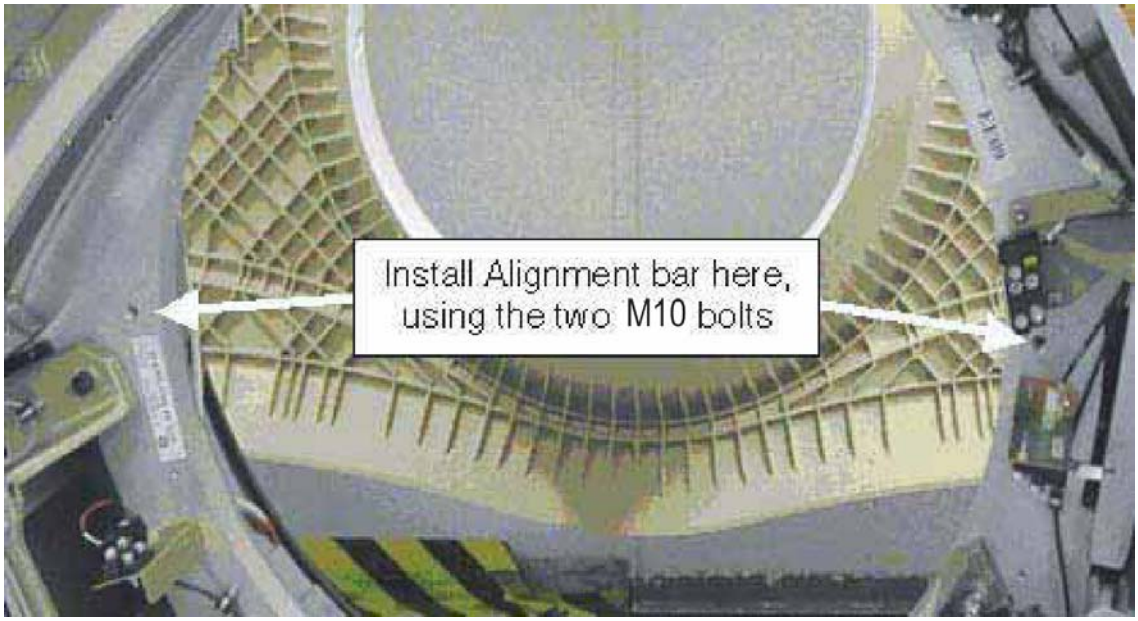
1.) Rotate the gantry by hand until the collimator face plate is at the 5 o'clock position.

Note: With power OFF, the gantry movement is tight.
DO NOT pin the gantry during this alignment process.

2.) With the top and back gantry covers removed, locate the two M10 bolt holes as shown in Figure 1-20. These bolt holes are used to attach the laser tool to the gantry.

- The bolts can be installed using an 8 mm Allen wrench. Be careful not to bump the alignment light; the mounting space is tight near the alignment light. Tighten bolts until both are snug.
- Do not drop bolts or the bar on the collimator faceplate. Attach the bar as shown in Figure 1-20.
- Using a minimum 223 mm (9 in.) level placed on the attached bar, level the bar by rotating the gantry.

Figure 1-20 Alignment Bar Installation Location



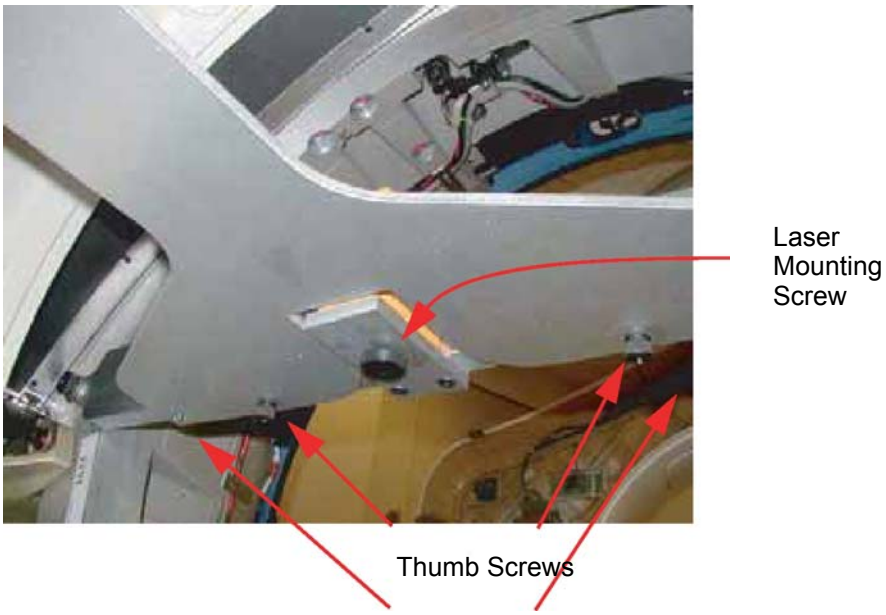
CAUTION **Potential for injury.**

DO NOT look into the laser.

Use appropriate safety procedures when working with lasers.

3.) Attach the laser centering plate onto the laser mounting bar as shown in Figure 1-21. The plate is attached from under the alignment bar using two fixed locators and two thumb screws.

Figure 1-21 Attach Laser Center Plate

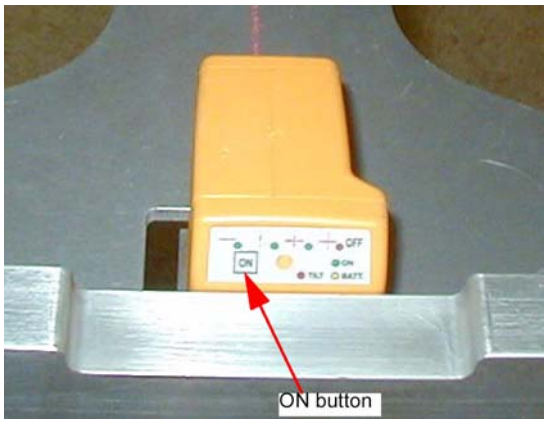


4.) When done, insert the laser and turn on the laser using the controls on the back. If the laser is loose when mounted, use a 2 in. piece of Velcro loop (fuzzy) section and attach it to the alignment plate over the attachment screw. Remount the laser and it should fit snugly without moving.

5.) When pressed, the **ON** button steps through four different beam profiles and "Self-Leveling Off". Press the **ON** button until the "|" beam shows. It will be used for this operation.

Times pressed	Function	Notes
1	—	Self-leveling on
2	|	
3	+	
4	Self-leveling off	Do not use

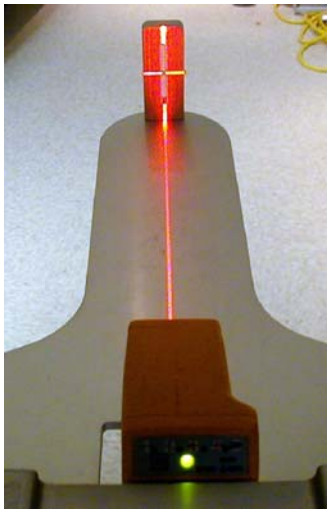
Figure 1-22 Laser ON Button



6.) Align the laser by carefully rotating the laser base assembly so that the "I" beam shines through the center of the alignment sight mounted on the end of the alignment plate. Note: The laser beam may be wider depending on the battery life.

7.) Use the locking screw on the bottom of the alignment bar to secure the laser to the bar, as shown in Figure 1-23. When done, the laser should fit snugly without moving on the mounting bracket.

Figure 1-23 Laser Centering



Note: When tightening, the laser may move. Use caution to prevent any movement, as this can result in drilling the table anchor holes in the wrong location.

8.) After the laser is centered, notice that the laser beam also appears on the back wall. Place a piece of masking on the wall and carefully mark a line on the tape where the laser appears. This line is later used in the table alignment. This line is also useful in determining if the laser unit moves during the alignment process.

9.) Remove the alignment centering plate and store it in the alignment case.

10.) Using a chalk line, mark a table center line on the floor along the laser light shining on the floor.

Figure 1-24 Draw Reference Line for HPower Table Center

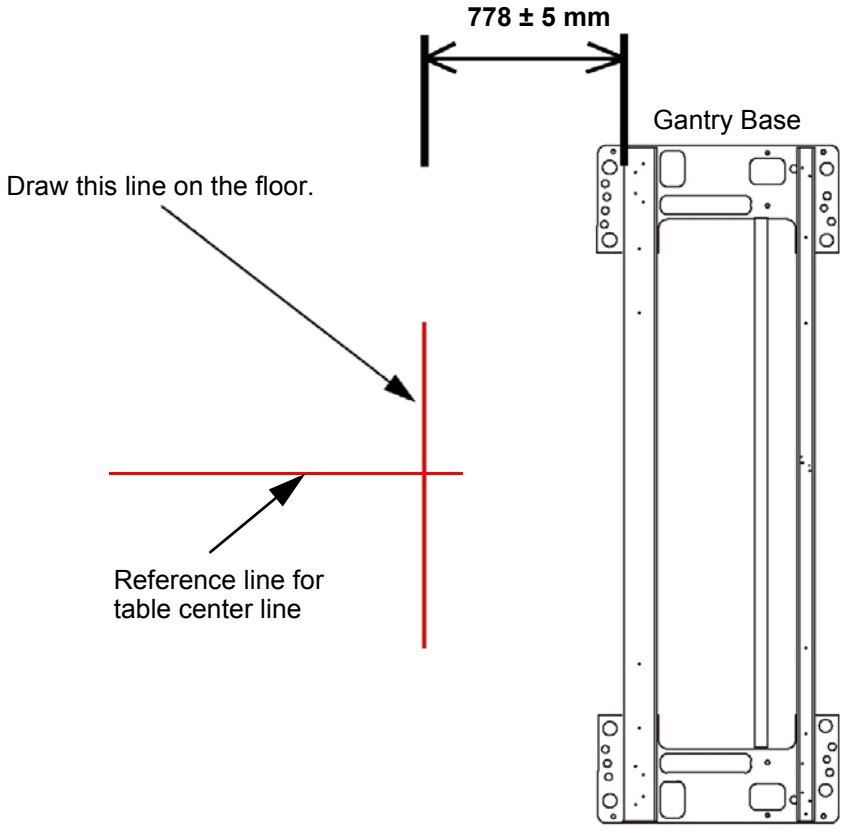
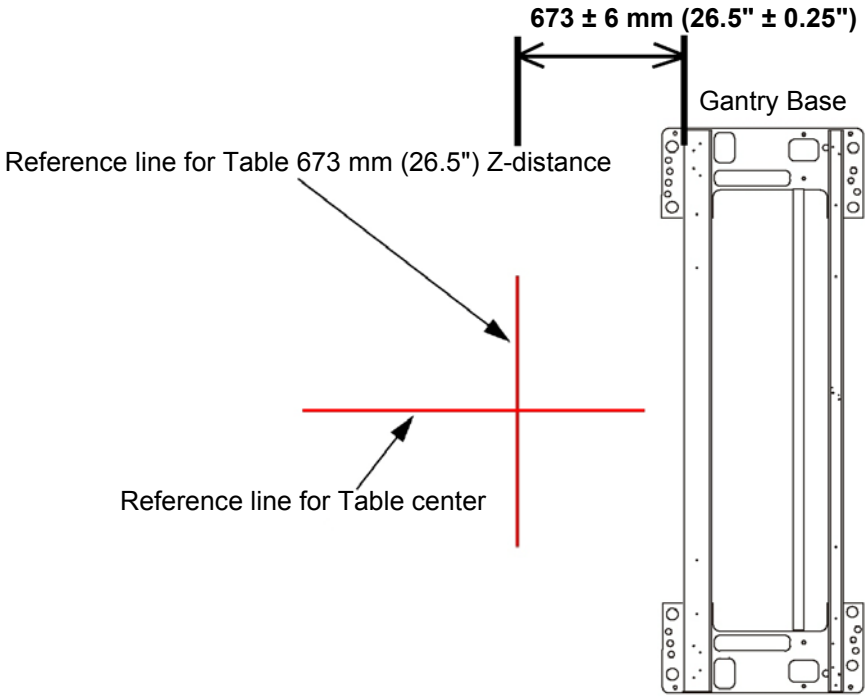


Figure 1-25 Draw Reference Line for GT1700 Table Center



11.) For BrightSpeed system with HPower table, recheck the table-to-gantry reference line for 778 ± 5 mm Z-distance. Refer to Figure 1-24.

12.) For BrightSpeed system with GT1700 Table, recheck the table-to-gantry reference line for 673 ± 6 mm (26.5" ± 0.25") Z-distance. Refer to Figure 1-25

13.) Turn off the laser but do not remove.

4.6 Install and level HPower Table

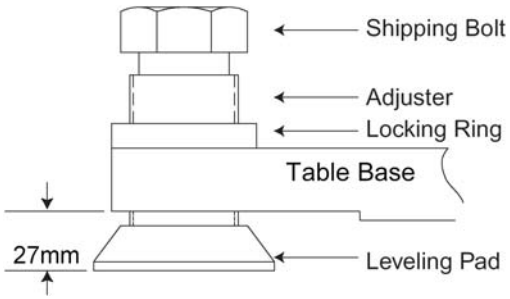
4.6.1 Position the Table

1.) Remove all the transportation packaging and boxes, except dollies, from the table.

2.) Wheel the table to its approximate position relative to the gantry, using the marks made earlier.

3.) Locate the table leveling pads and position them against the base of the table. Preset leveling pad heights to 27 mm. (see Figure 1-26).

Figure 1-26 Table Base Leveling Pads (Starting Positions)

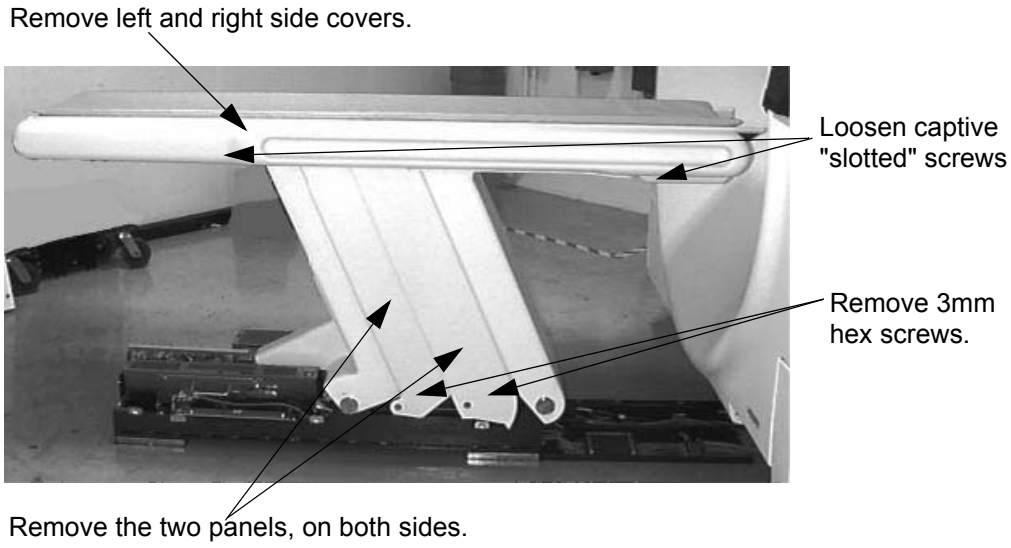


4.) Use the dollies to evenly lower the table until it rests on the leveling pads using an ½" ratchet.

5.) Remove the table left and right upper side covers (refer to Figure 1-27).

Note: The captive screws have a tendency to fall out occasionally.

Figure 1-27 Table Cover Removal

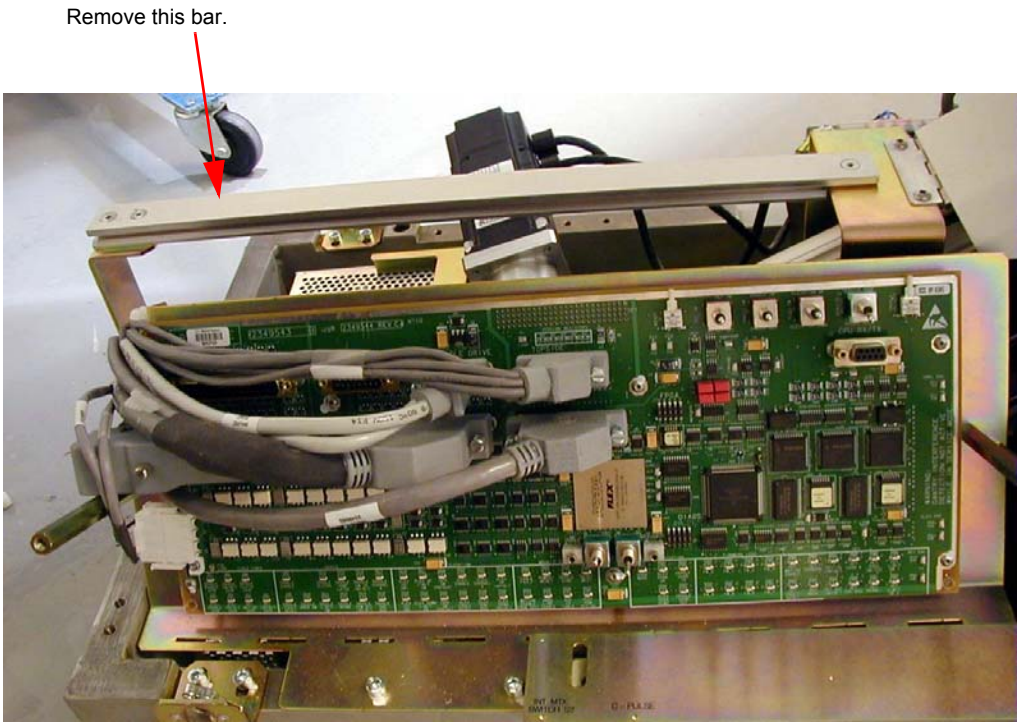


6.) Remove the four side panels, using a 5mm hex key. Without disconnecting the ground straps at the z-channel, carefully lay the side panels on top of the padded cradle.

NOTICE **Potential for Equipment Damage.**
Take extreme care to prevent damaging the MTCB printed wire assembly. Use some packing material to protect these components.

7.) Remove the table base cover center support bar. (See Figure 1-28.)

Figure 1-28 Center Support Bar

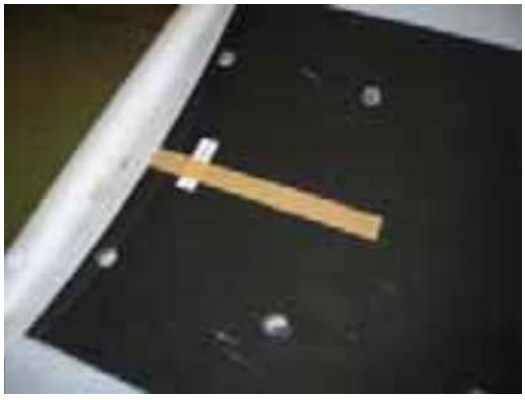


4.6.2 Center line on Cradle

1.) Using a metric tape measure or other suitable measuring device:

a.) Using masking tape, place a 150mm strip on the back of the cradle. See Figure 1-29.

Figure 1-29 Masking Tape



b.) Determine the cradle center-line by measuring the cradle width. Make two points on the masking tape and make a line. See Figure 1-30.

Figure 1-30 Making the Marker

c.) If Rear Table Laser Alignment is available in the laser alignment tool kit, install it to the back of the cradle.

A.) Loose adjustment knob to make the slot plate free.

B.) The slot of the tool should be over the cradle center-line. See Figure 1-31.

Figure 1-31 Rear Table Laser Alignment

4.6.3 Level and Center the Table to the Gantry

4.6.3.1 Required Tools

- Standard Install Tool Kit
- ¾”, 1-¼”, 1-½” and 1-5/8” sockets
- 8mm, 10mm, and 14mm hex socket bits
- 4 ft. level
- 2 ft. level

4.6.3.2 Alignment Conditions

- Before you start, turn on the laser and check that the beam is still on the mark placed on the wall. If not, reset the laser.
- If the mark is not present, use a measuring tape and place a 100 mm piece of masking tape on the cradle at the 1000 mm and on the laser line.
- The gantry must be at zero degrees.

4.6.3.3 Procedure

NOTICE **Avoid leaning on the cradle during this procedure.**
DO NOT pin the gantry during this alignment process.
This procedure is for systems mounted on 102 mm (4 in.) concrete floors only!

Note: If the floor covering was not properly removed with the glue removed, or the levelers were not centered over the floor cutouts, the leveler may become trapped against the edge of the floor covering, causing the table to become unlevel. If this happens, move the table and enlarge the 102 mm (4 in.) floor cutout for the table. Glue removal is important and aids in moving the table to its final location in accordance with the floor levelness specification.

1.) Have the table side panels removed and a ratchet, 1-1/8 in. socket, and a 2 ft. level ready to use.

2.) Turn on the laser's "I" beam (vertical beams) by pressing the **ON** button 2 times.

Note: Step 3 through Step 8 are for perpendicular positioning of the cradle to the gantry.

3.) The table on the dollies should be resting on the floor, and the laser beam visible on the cradle. The laser light should now shine down the cradle onto the rear vertical target. Moving the table on the dollies by raising and lowering makes it easier to center the table right-to-left.

Note: When using the table dolly to move the table, be sure that the shipping bolts are still attached to the adjuster leveler feet. This prevents the adjuster levelers from gripping on the floor adhesive, making it difficult to move.

4.) Center the cradle on the drive rollers assembly by pushing the cradle into the gantry to its maximum position (1400 mm) and back to just before the latch position six times. The cradle should be centered as shown in Figure 1-32.

5.) Move the table so that the base is roughly centered over the scan center line, the front edge of the table base is on the 778 ± 5 mm line, and the table is resting on the floor. Check that the leveling feet are centered in the cutout circles.

Figure 1-32 Centered Cradle

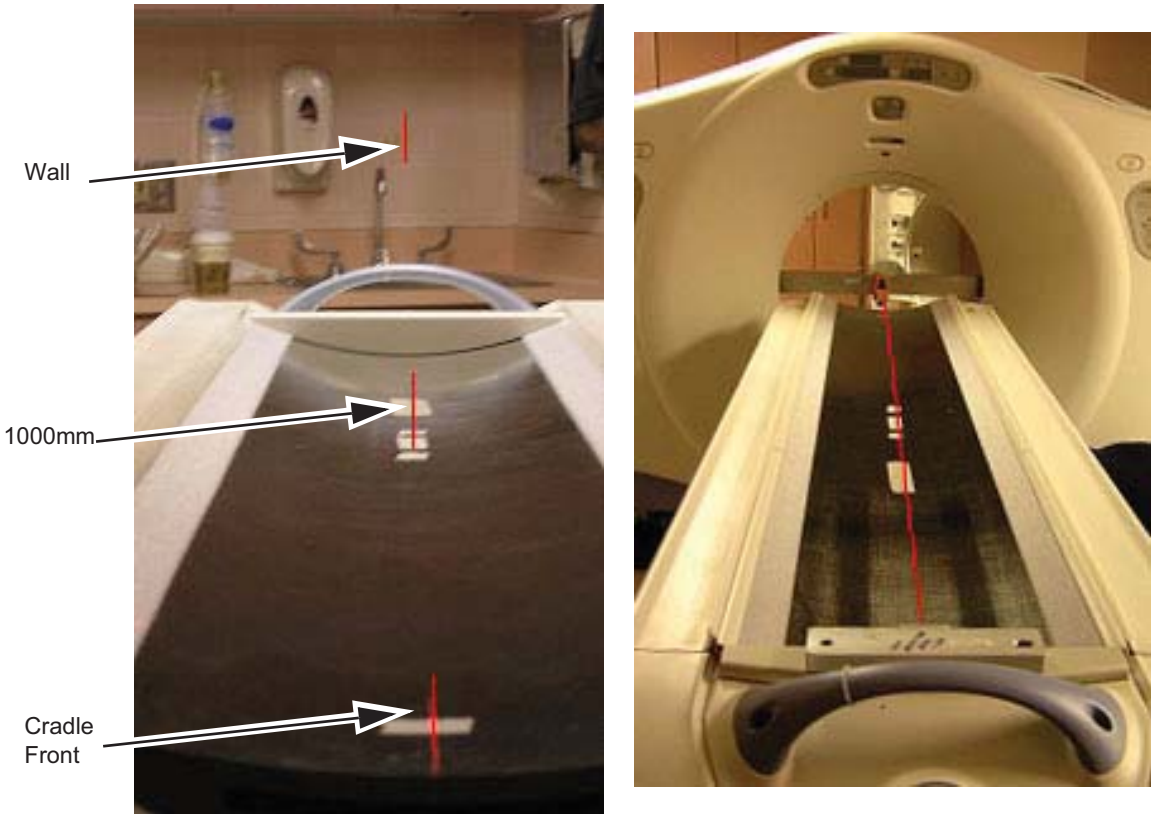
6.) Carefully move the table so that the cradle front center line and the back center line are aligned. You may need to raise the table to move it. When aligned, lower the table to the floor.

7.) Remove the table dolly.

8.) If not already done, measure 1000 mm from the front of the cradle, and place a piece of tape under the laser center line. Carefully mark a line along the laser line when the table is centered.

9.) The laser beam should now connect the cradle front centerlines, the 1000 mm cradle center line, onto the rear center line, and finally onto the alignment centering mark placed on the wall, when properly centered along the center line. Use the centering alignment line on the wall to be sure the laser is still centered. If the alignment line on the wall is NOT on the original mark, readjust the laser and repeat the above steps (see Figure 1-33).

Figure 1-33 Alignment Laser Marks - Table & Wall



Note: Step 9 through Step 11 are for front-to-back and side-to-side leveling of the cradle.

10.) The table should be completely on the floor and resting on all 5 levelers.

Figure 1-34 Table Level Alignment

11.) Raise or lower the table as needed using the front and rear levelers and level the cradle horizontally in the front and back locations (refer to Figure 1-34).

a.) First, horizontally across the cradle at the front of the cradle.

b.) Second, horizontally across the cradle at the 1000 mm mark on the cradle.

c.) When the cradle is roughly level in both locations, leave the level on the cradle horizontally.

12.) Level the cradle front to back using a 4 ft.level placed in the center of the cradle. These two leveling actions often conflict and a few iterations may be required. This process is complete when:

- The cradle is still centered on the front, mid, and rear marks.
- The cradle is leveled horizontally (across table) front and back (with the bubble centered between the lines.)
- The bubble is centered between the lines in the Y direction along the length of the cradle.
- The laser is still centered on the wall center line.
- The table is still on the 778mm line and the levelers are resting on the flooring.
- The laser is the same as in Step 8.

Note: The leveling process may take several iterations of Step 1 through Step 11. Patience and accuracy is required to properly complete this process.

13.) When completed, turn off the laser tool.

Note: Do not remove the table dollies.

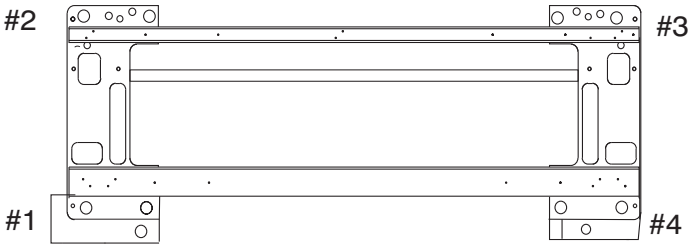
4.6.4 Tighten the Lock Rings

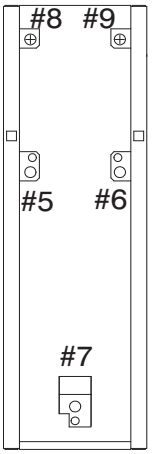
1.) Re-check gantry bubble levels.

2.) Re-check that bubbles levels on the table.

3.) Re-check that adjusters at Locations 1, 2, 3, 4, 7, 8 and 9 carry a portion of the load.

Figure 1-35 Table Base Gantry/Table Level Locations





4.) Re-check that gantry "inside" levelers carry a portion of the load.

CAUTION **Eye protection is required when using a hammer and chisel.**

5.) Tighten the lock rings at Locations #1 through #9 with the spanner where possible. Use a hammer and chisel to tighten the lock rings only where you can not use the spanner.

4.6.5 Drill the Anchor Holes

WARNING **POTENTIAL FOR PATIENT INJURY.**

IMPROPERLY SECURED TABLE MAY TIP, DISLODGING PATIENT.

PROPER ANCHORING IS KEY TO MAINTAINING PATIENT SAFETY DURING SYSTEM OPERATION.

4.6.5.1 Notes to Mechanical Installers

GE-provided floor anchors are designed for use ONLY on concrete floors that meet the 4-inch concrete floor requirement. Supplied floor anchors must be installed by a trained contractor, and shall be set to a minimum depth of 3 inches at each anchor point. ANY anchors having more than 1-inch of thread showing above the nut, when torque is set to 55 lb.-ft, shall have a second anchor installed in the closest adjacent hole. This is because the minimum anchor engagement length in the concrete was not met. The second anchor shall be installed to the standard depth and torque specification. **Do not cut anchor bolts that extend longer than the 1-inch limit.**

Note 1: Alternate Anchoring

If at least four anchors cannot be set for the gantry, and at least three anchors for the table, then the installer must inform GE that the minimum anchoring cannot be met. Additionally, a structural engineering contractor must be engaged to determine the anchoring method and to certify that their anchoring meets the stated GE minimum load requirement and torque specification.

Note 2: Non-Concrete Floors

All other anchoring methods — on floor types other than the concrete minimum — must be determined at the customer's expense, by a structural engineering contractor. The anchoring method must be certified to meet the stated GE minimum load requirement and torque specification.

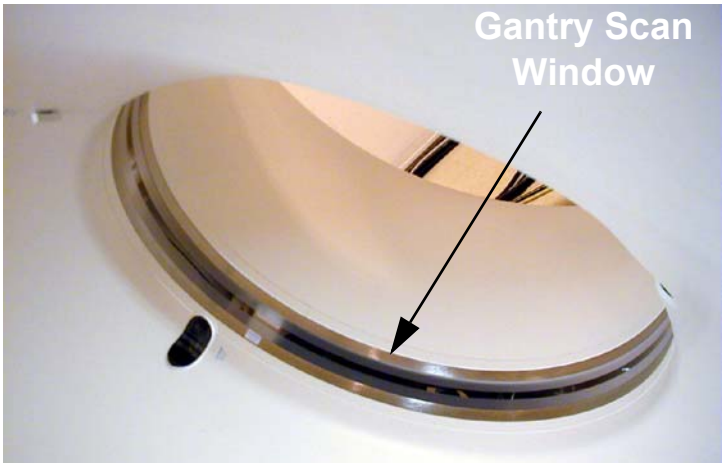
Note 3: GE Notification

It is not the role of the mechanical contractor or installer to determine acceptable methods to install or anchor equipment on non-4-inch concrete floors. The appropriate GE contact person shall be notified that the facility's floor type DOES NOT MEET the installation mounting requirement for the installation procedure (described in this Installation Manual), and therefore the table-gantry mounting process CANNOT continue.

4.6.5.2 Drilling Procedure

1.) Make certain that the gantry scan window is in place, to prevent dust from entering the gantry.

Figure 1-36 Gantry Scan Window



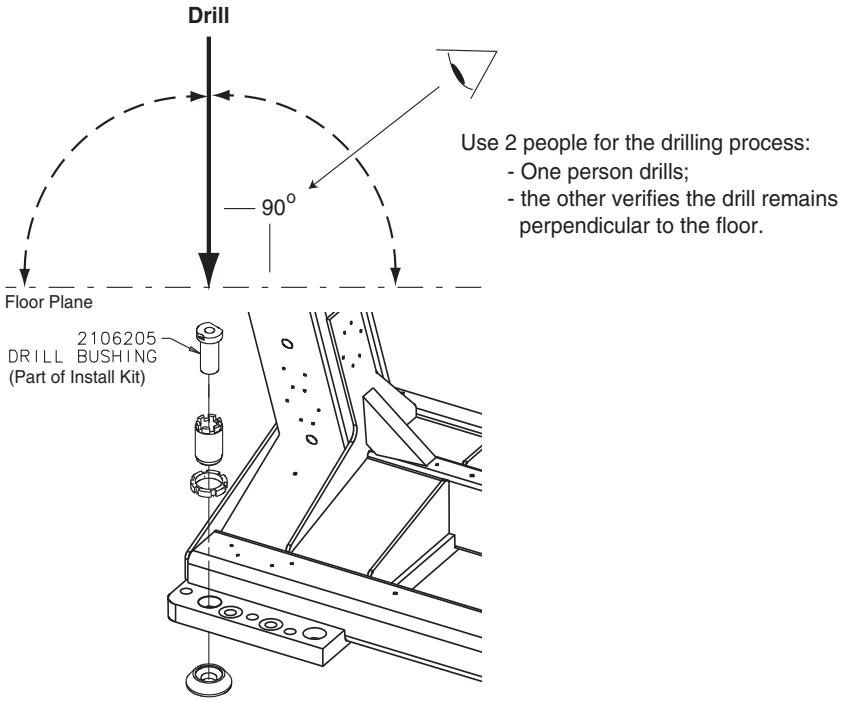
2.) Use a piece of tape to mark the drill bit depth of 190 mm ($7^{11}/_{16}$”) from the tip of the ½" masonry drill bit.

NOTICE
Potential for Equipment Damage from Dust

You must cover all electronic assemblies in the table base prior to drilling to prevent damage due to the dust created during drilling.

3.) Use the ½" bit to drill all seven (7) anchor holes (refer to Figure 1-39 for locations.)
- Review Figure 1-37, prior to drilling.

Figure 1-37 Drilling Position



- **Important -** Drill the holes perpendicular to the floor. While one person drills the holes, position a second person to watch the relationship between the drill bit and floor. Make sure the bit remains absolutely perpendicular to the floor throughout the drilling operation.

  Always use the mechanical guide supplied with the alignment kit.
- Stop drilling every 15 or 20 seconds and clear the hole of debris. This helps to prevent binding of the drill bit.

a.) Place appropriate protection to prevent damage and dust contamination to electronic assemblies. Refer to Figure 1-21, on page 49, for placement of dust protection materials.

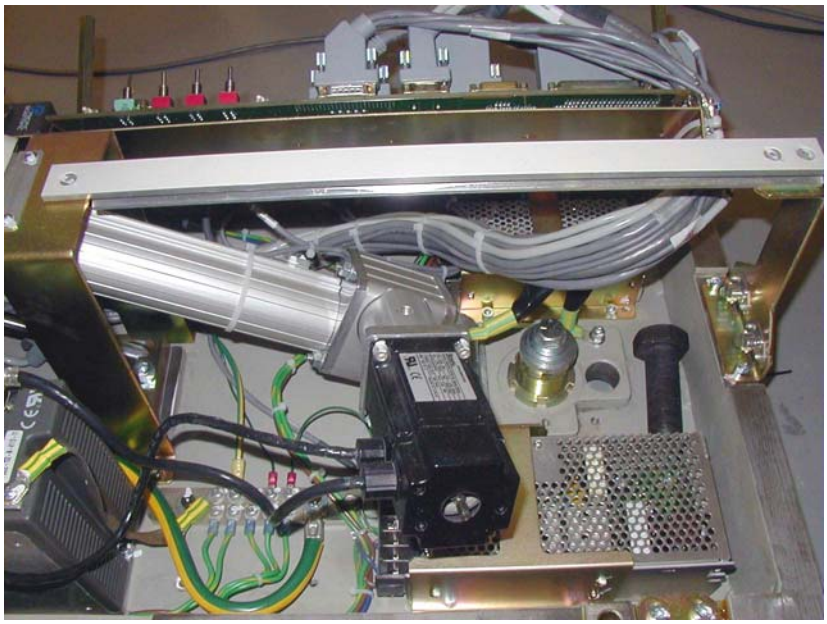
b.) Drill each hole until the mark on the drill bit is even with the top of the drill bushing. (195mm)

c.) Place the drill bushing inside each adjuster, to keep the hole vertical, and centered within the adjuster.

* Use the drill bushing to center the anchor holes in adjuster Location #5, #6, and #7, to provide maximum lateral alignment capacity when you center the cradle on isocenter during subsequent system testing.
* Take care not to injure yourself on the gantry cover brackets.
* Take care to avoid the actuator motor lead when you drill the Location #7 anchor hole. Remove the lead if necessary.

Note: An 18" bit will make drilling anchor location #7 easy, and will prevent component damage (see Figure 1-38).

Figure 1-38 Table Assembly Showing Actuator Motor and Anchor Location #7



d.) Stop the drill every 15 or 20 seconds and clear the hole of debris to prevent binding of the drill bit.

4.) Vacuum all debris from the inside of the hole:

Note: A drywall dust filter should be used on the vacuum.

a.) Place the funnel tip inside the hole; place the vacuum hose in the funnel.

b.) Continue to vacuum while you drill, if you can, to keep gantry and table as free of dust contamination as possible.

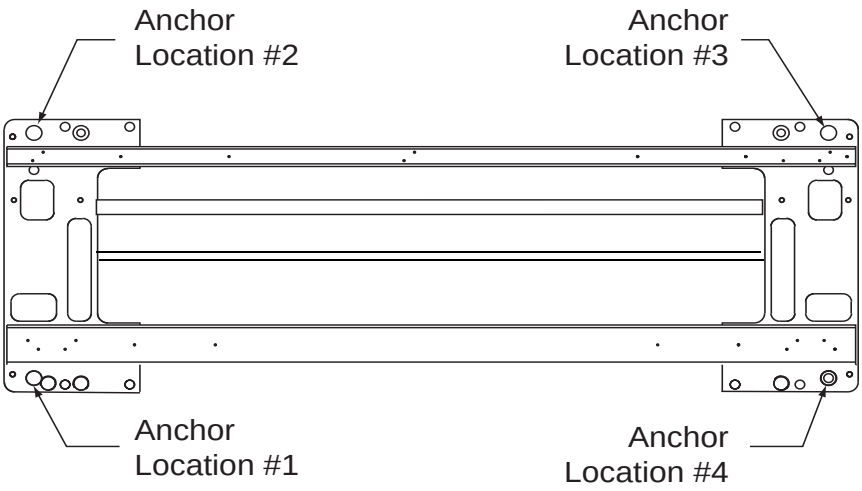
c.) When you finish clearing the anchor hole, vacuum the debris from the surrounding area.

d.) Stop drilling frequently to let the drill bit cool.

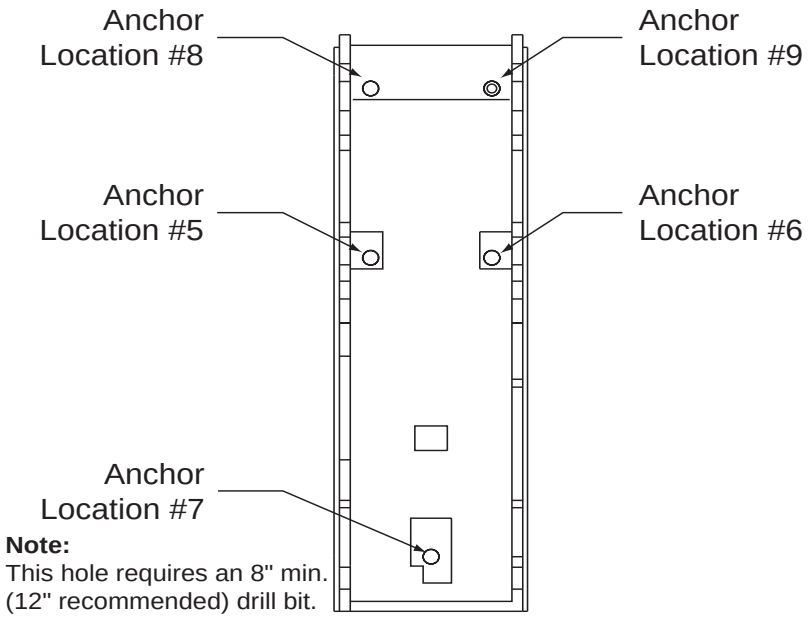
e.) All holes must be a minimum of 108 mm deep (see Figure 1-41, on page 64). Recheck all holes.

5.) Do not drill anchor holes at Location #8 and #9. These locations help support the weight, but do not anchor the table into place.

Figure 1-39 Anchor Locations, Standard



Note: Anchor holes in base are 7/8" (2.3 cm).



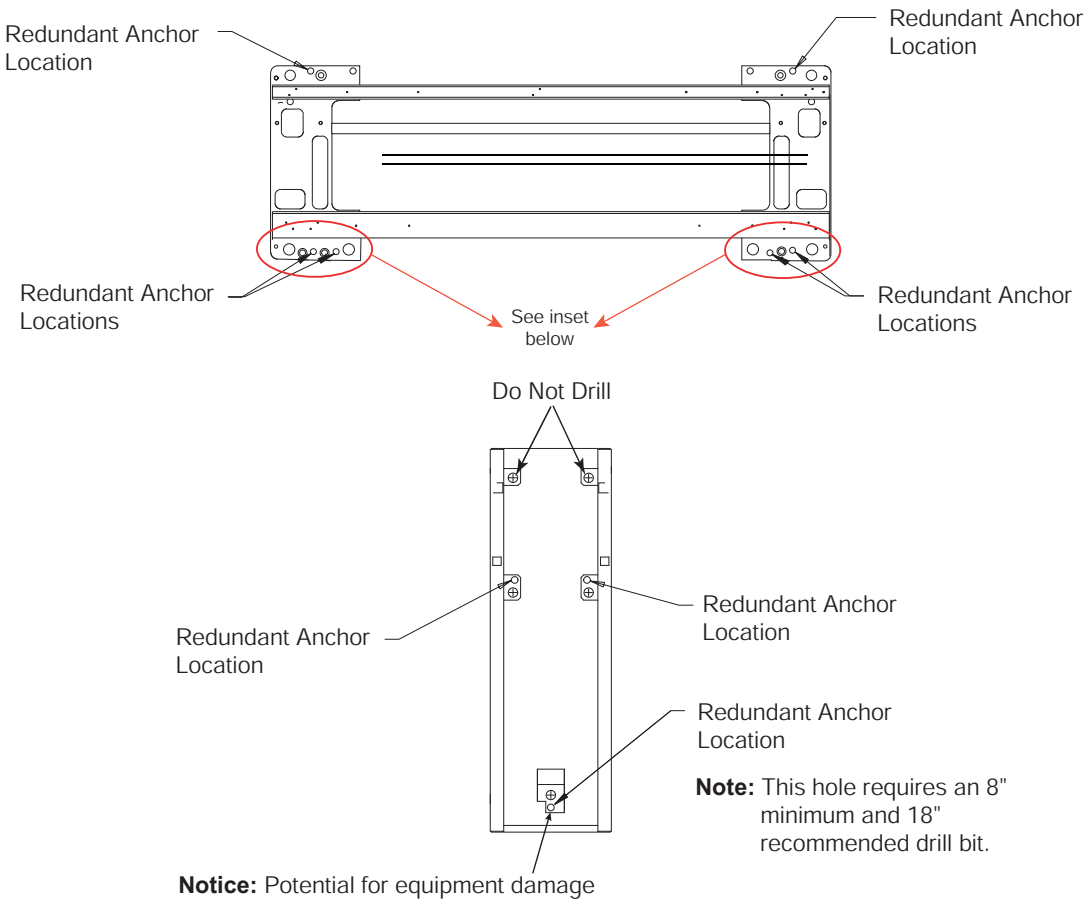
4.6.6 Gantry & Table Redundant Anchor Holes

If you cannot use one of the adjuster anchor holes due to structural interference, such as reinforcement bars in the concrete, you must use one of the redundant anchor locations, as shown in Figure 1-40.

- The gantry requires a minimum of four (4) anchors, one (1) in each corner.
- The table requires a minimum of three (3) anchors, one (1) at location #5, #6 and #7.

If you must use a redundant anchor hole in the gantry, you must remove the gantry covers. See Appendix A, for gantry cover removal.

Figure 1-40 Table Base Redundant Anchor Locations

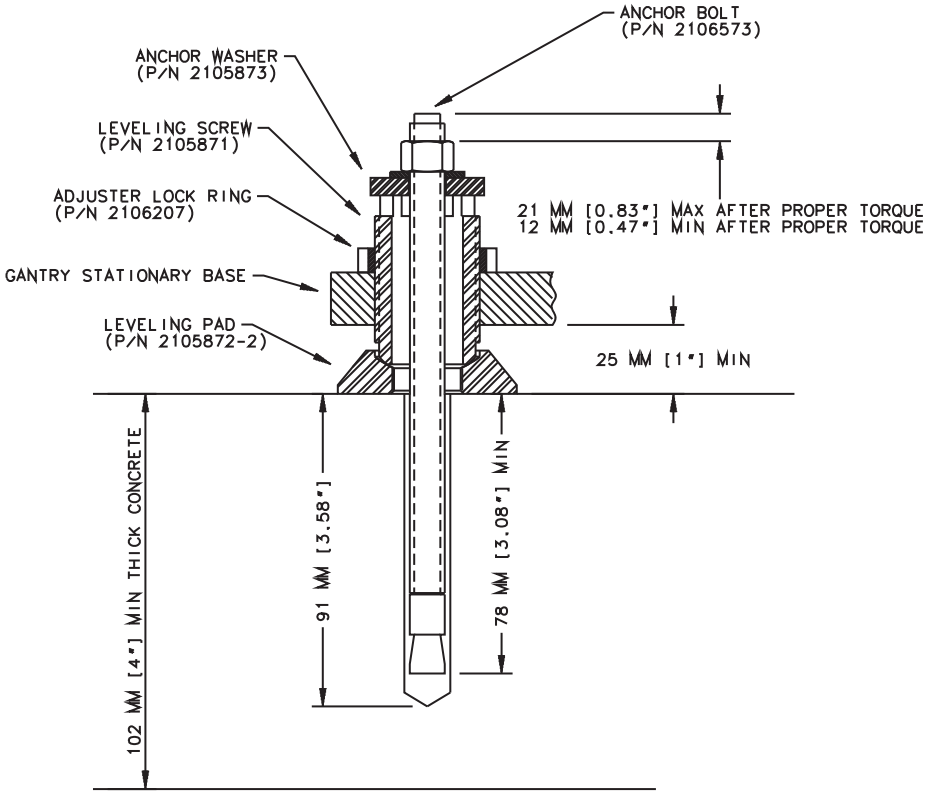


Mark the ½" drill bit with a piece of tape 170 mm ($6^{11}/_{16}$") from the tip of the bit, and follow the instructions in Section 4.6.5, on page 59.

4.6.7 Install the Anchors

Recommended - Use “Hilti Kwik-Bolt II” anchors P/N 2106573 (½" dia. by 8" long) as shipped with the BrightSpeed for this procedure.

Figure 1-41 Table Base Anchor Assembly



1.) Remove the three alignment bars and two attachment bars and repack the install kit.

2.) Assemble the anchors before you install them. Refer to Figure 1-41.

   a.) Remove the nut and washer from the anchor.

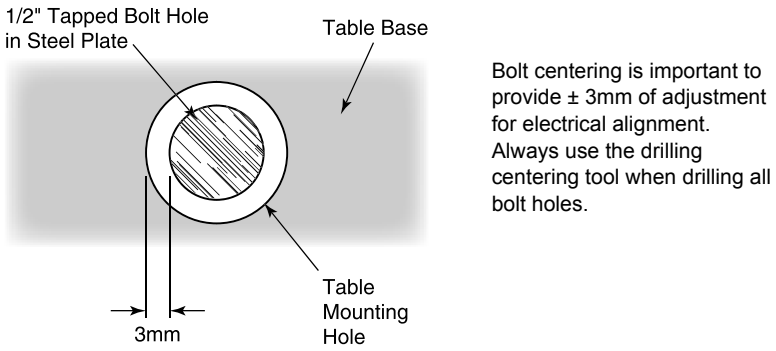
   b.) Add a ¼" thick washer (PN 2105873) under the regular anchor washer.

   c.) Reassemble the anchor washer and nut and position nut so top is flush with threads of anchor before hammering into hole.

Figure 1-42 Measure Table Base Anchor Thread

3.) Fixed site Installations must be centered under mounting holes in table base, with 3mm of space visible surrounding the tapped bolt hole. Figure 1-43.

Figure 1-43 Center tapped holes under mounting holes in table base



CAUTION **Eye protection is required when using a hammer.**

4.) Refer to Figure 1-41 for instruction on inserting the anchors in each hole. Using the anchor seating tool, hammer the anchor downward to *completely insert the anchor in the hole.*

5.) Once alignment has been verified, torque all mounting bolts.
Tighten the Location #1 through #7 anchors and torque to 75 ± 6 N-m (55 ± 5 ft.-lb.).

6.) Replace all the table parts you removed during installation, including covers, ground strap and the center support bar. Check the motor lead.

Note: If you cannot replace the lower table cover because the floor interferes, adjust all of the table and gantry levelers by ½ turn increments to raise the table/gantry until the lower table covers clear the floor. (Refer to Figure 1-70, on page 86, for table base cover clearances.) Return to Sections 4.3, on page 41, 4.6.6, on page 63 and 4.6.4, on page 58 to level the gantry, level the table, and tighten the locking rings, respectively.

4.7 Install and Level GT1700 Table

4.7.1 Table Prep and Set-up

Tools Required

- Standard Install Tool Kit
- 1-½”, 1-¼”, ¾” sockets
- 1-5/8” (40-41mm) socket
- 10mm and 14mm hex socket bits

Time and Personnel

- 1.5 hour labor on site
- 2 Engineers

SAFETY

CAUTION **Potential for Electric Shock.**

Equipment is Energized.

Follow appropriate safety procedures when working with an energized system.

CAUTION **Potential for Injury.**

Table will tip if not anchored on the dolly.

Make certain that Table is adequately secured to the dolly.

CAUTION **Potential for Injury.**

Table on dolly length is 118" (9'-10").

Exercise caution when moving the table on the dolly.

PROCEDURE

CAUTION **Potential for Injury.**

Table will tip if not anchored on the dolly.

Make certain that Table is adequately secured to the dolly.

1.) Remove all the transportation packaging and boxes, except dollies, from the table. (See Figure 1-44.) Leave a layer of packing material on the cradle to protect the cradle from damage. (It can be removed during laser alignment of the table.)

Figure 1-44 Remove Table Packing

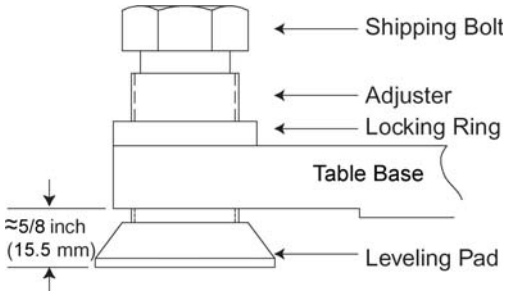
2.) Unpack the items and locate all of the items needed to install the table.

Note: The GT table on dollies is approximately 118" long and may require additional room to maneuver.

3.) Using the table centering and distance locator marks made earlier, wheel the table to its approximate position relative to the gantry.

4.) Locate the table leveling pads inside the table in the back and on the side in the front. Preset leveling pad heights to 15.5 mm (5/8"). (See Figure 1-22.)

Figure 1-45 Table Base Leveling Pads (Starting Positions)



5.) Use a 1-5/8" socket and ½" ratchet to loosen the shipping bolt. Loosen the locking rings if present.

6.) A 1-1/8" socket is used with the adjuster tool if needed to lower the adjuster.

7.) Use the dollies to evenly lower the table until it rests on the leveling pads using a ½"ratchet on each end.

Figure 1-46 Adjusters and Lock Rings

Back

Front

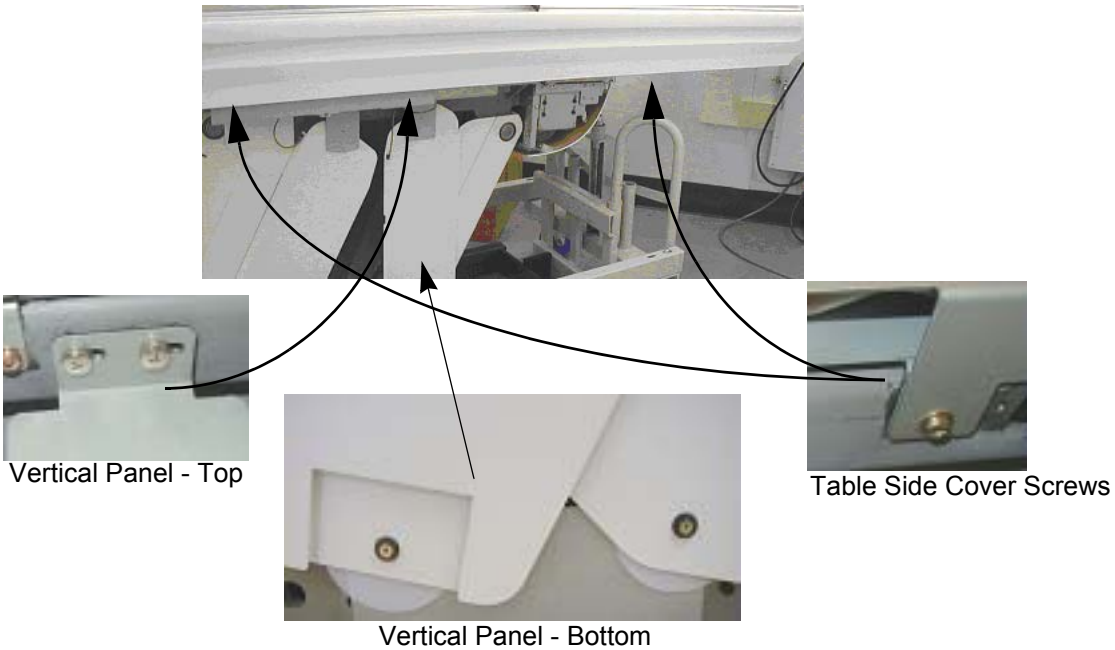
4.7.2 Table Cover Removal

1.) Remove the table right side cover, as shown in Figure 1-48.

a.) Removing the two screws on each end of the underside of the long side cover of the table.

b.) Slide each cover forward to unlatch, lift upward slightly to disengage the latches, and remove the side cover. Doing this procedure will require patience and practice to remove and replace this cover.

Figure 1-47 Table Covers



2.) The table is normally shipped with some of the side/vertical panels removed. If installed, remove the four side panels, using a Pozi drive #1 screwdriver.

3.) Carefully lay the side panels on protective padding out of the way.

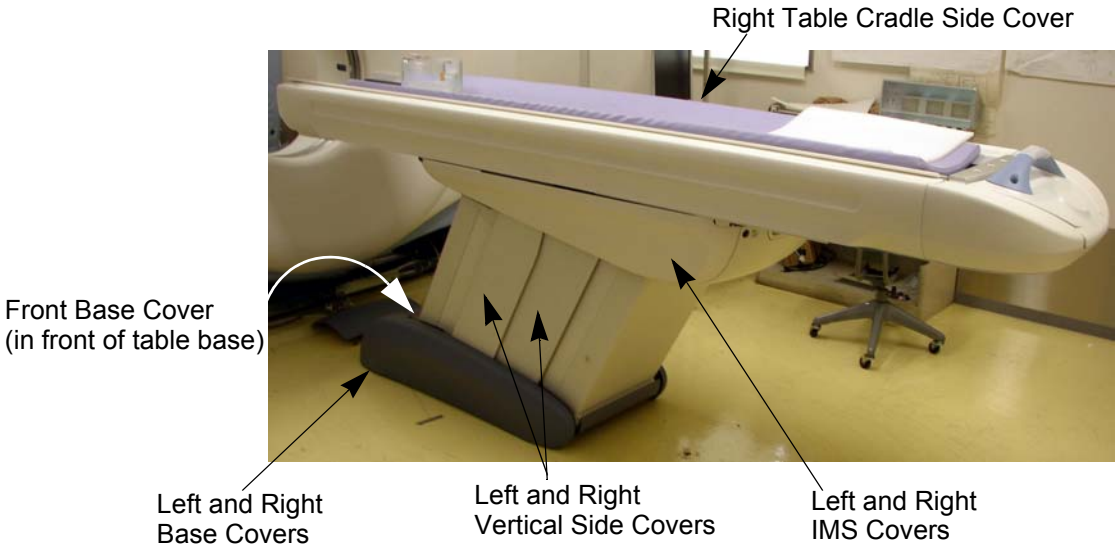
4.) Make sure that all four of the table levelers are on the floor. The table should set on the four levelers with the dollies still installed.

5.) Carefully center the four levelers over the 102 mm (4") floor cutouts.

6.) Check that the front table base center line is on the chalk table center line.

7.) If still present, remove all packing materials and the table cradle pad from the table cradle.

Figure 1-48 Table Covers



4.7.3 Removing the Accessory Rail Strip

1.) Remove the accessory mounting strip attached on each side of the cradle using a small flat blade screw driver. The nylon screws are inserted inside the accessory rail on the cradle.

2.) Place the accessory strips on the floor and reinstall the nylon screws into the accessory rail for safe keeping.

Figure 1-49 Accessory Rail Screw

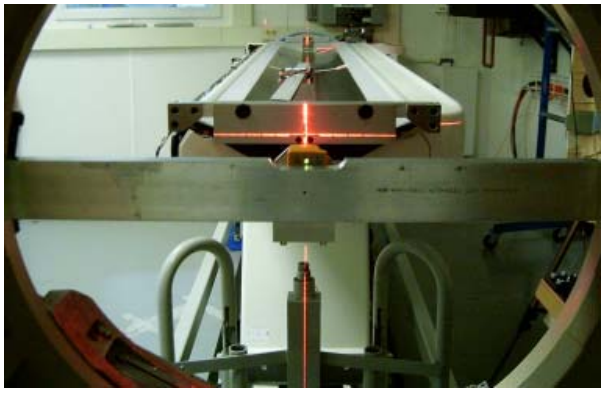
4.7.4 Install the Table Cradle Laser Alignment Plates

1.) Locate the aluminum accessory tray mounting plate with the three holes on the rear of the cradle. Fit the rear alignment target into the two mounting holes as shown in Figure 1-50. Use the adjustment screw to adjust the fit as needed. See Figure 1-50. The fit should be snug, without play, when you are finished.

Figure 1-50 Cradle Rear Laser Alignment Tool

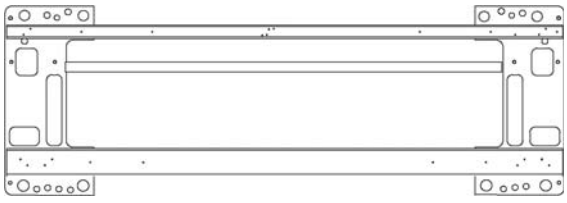
2.) Check that the table base is centered over the table center line, and the base is on the 673 ± 6 mm (26.5 in. ± 0.25 in.) made on the floor.

Figure 1-51 Rear Laser Alignment Tool - Installed



3.) Lower the table to the floor using the dollies, making sure to maintain the 673 ± 6 mm (26.5 in ± 0.25 in.) distance.

Figure 1-52 Two Reference Lines



Reference line for table Z-distance

Reference line for table perpendicularity

4.7.5 Level the Table

4.7.5.1 Basic Information

Tools Required

- Standard Install Tool Kit
- ¾”, 1-¼”, 1-½” and 1-5/8” sockets
- 8mm, 10mm, and 14mm hex socket bits
- Laser Alignment Kit
- Johnson Professional 6" level
- Johnson Professional 4’ level
- Johnson Professional 2’ level

Time and Personnel

- 0.5 hour labor on site
- 2 Engineers

Alignment Conditions

- Before you start, turn on the laser and check that the beam is still on the mark placed on the wall. If not, reset the laser.
- If mark is not present - Using a measuring tape measure and place a 5" piece of masking tape on the cradle at the 1000mm and on the laser line.
- Gantry must be at zero degrees within 0.14 degrees from gantry zero.

Alignment Specifications

- Mechanical base alignment must be perpendicular within 0.14 degrees from gantry zero (± 1.5mm) as measured in this procedure.
- Table cradle travel (X axis) must be perpendicular 0.14 degrees from gantry (Y axis) zero (± 1.5mm) as measured in this procedure.
- Table cradle must be level in all directions ± 0.0625 in. (centered within the lines on a Johnson Professional level).
- All table adjusters should be preset to a minimum of 15.5 mm (5/8 in.) down from the table base to make adjustment easier. Based on floor levelness and your experience, a different preset height may work better.

4.7.5.2 Level and Center the Table to the Gantry

NOTICE **Avoid leaning on the cradle during this procedure.**
DO NOT pin the gantry during this alignment process.
This procedure as described is for systems mounted on 102 mm (4 in.) concrete floors only!

Note: If the floor covering was not properly removed with the glue removed or the levelers were not centered over the floor cutouts, the leveler may become trapped against the edge of the floor covering, causing the table to become unleveled. If this happens, move the table and enlarge the 102 mm (4 in.) floor cutout for the table. Glue removal is important and aids in moving the table to its final location.

1.) Have the table side panels removed and have a ratchet, 1-1/8" socket, and a 2-foot level ready to use.

2.) Turn on the laser’s "I" beam (vertical beams) by pressing the **ON** button 2 times.

Note: Step 4 through Step 7 are for perpendicular positioning of the cradle to the gantry.

3.) The table on the dollies should be resting on the floor, and the laser beam visible on the cradle. The laser light should now shine down the cradle onto the rear vertical target. Moving the table on the dollies by raising and lowering makes it easier to center the table right to left.

Note: When using the table dolly to move the table, be sure that the shipping bolts are still attached to the adjuster leveler feet.) This prevents the adjuster levelers from gripping on the floor adhesive, making it difficult to move.

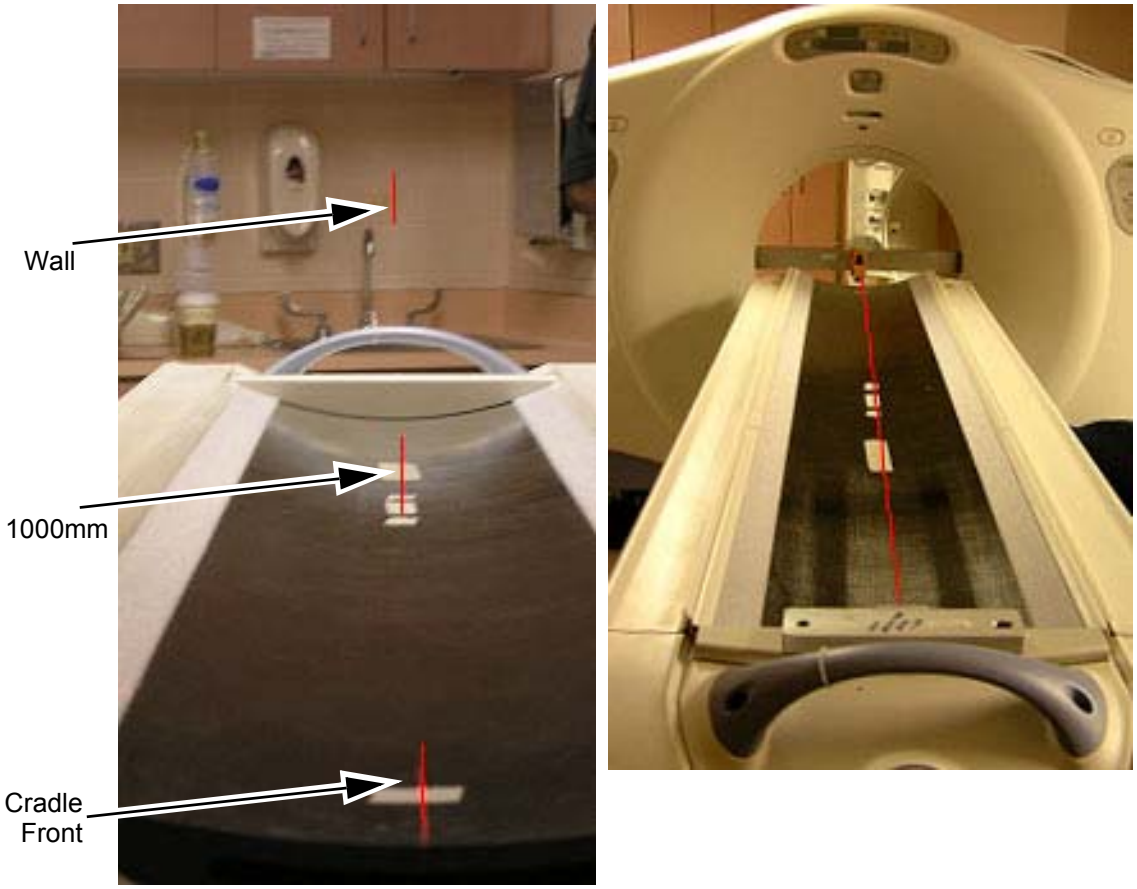
4.) Move the table so that the base is roughly centered over the scan center line, the front edge of the table base is on the 673 ± 6 mm (26.5 in.± 0.25 in.) line, and the table is resting on the floor. Check that the leveling feet are centered in the cutout circles.

5.) Carefully move the table so that the cradle front center line and the back target are aligned. You may need to raise the table to move the table. When aligned, lower the table to the floor.

6.) If not already done - Measure 1000mm from the front of the cradle, and place a piece of tape under the laser center line. Carefully mark a line along the laser line.

7.) The laser beam should now connect the cradle front centerlines, the 1000 mm cradle center line, onto the rear alignment tool vertical center and finally onto the alignment centering mark placed on the wall. The centering alignment line on the wall is used to be sure the laser is still centered. If the alignment line on the wall is NOT on the original mark, readjust the laser and repeat the above steps. See Figure 1-53.

Figure 1-53 Alignment Laser Marks - Table & Wall



Note: Step 8 through Step 9 are for front-to-back and side-to-side leveling of the cradle.

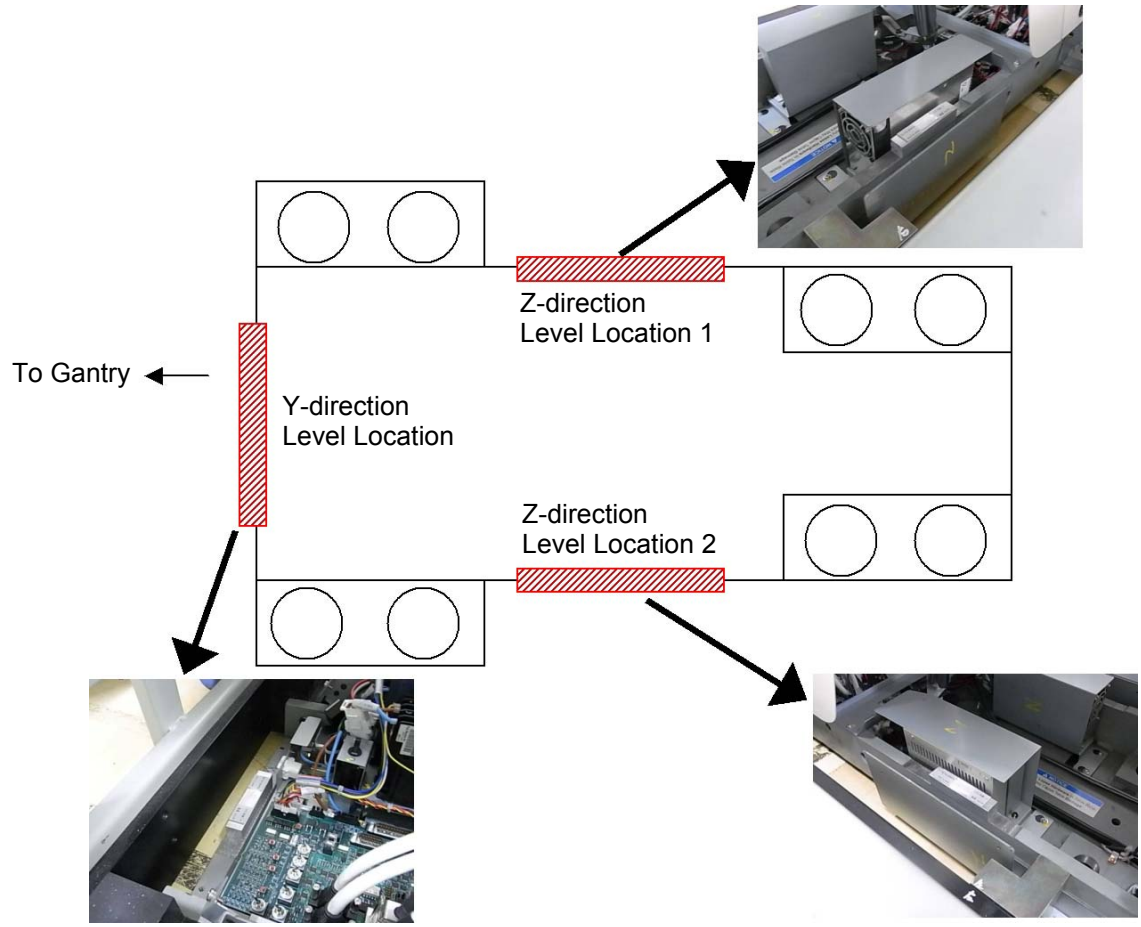
8.) The table should be completely on the floor and resting on all 4 levelers. Carefully remove one side of the table dolly, taking care not to bump or move the table. Ether side and/or end of the table dolly assembly can be removed.

CAUTION **Potential for Injury.**

In the ship position, the table tips easily!

DO NOT lean on the table! The shipping bracket should still be in place!

Figure 1-54 Level Location on the Table Base



9.) Raise or lower the table as needed using the front and rear levelers and level the table base in the Z-direction (2 positions) and the Y-direction (1 position). Refer to Figure 1-54.

This process is complete when:

- The cradle is still centered on the front, mid, and rear marks.
- The cradle is leveled in the Z-direction at 2 positions shown in Figure 1-54.
- The bubble is leveled in the Y direction.
- The laser is still centered on the wall center line.
- The table is still on the 673 mm (26.5") line and the levelers are not resting on the flooring.
- The laser is the same as in Step 7.

Note: The leveling process may take several iterations of Step 1 through Step 9. Patience and accuracy is required to properly complete this process.

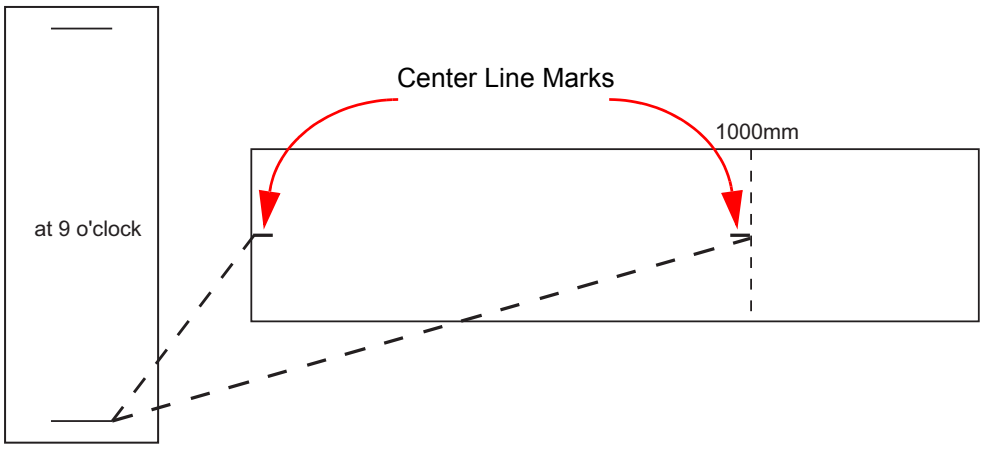
10.) When completed, turn off the laser tool.

Note: Do not remove the table dollies.

4.7.6 Cradle/Table Parallel Check

1.) With the cradle in the home position, rotate the collimator to the 9 o'clock position. Confirm with a level placed on the collimator face plate.

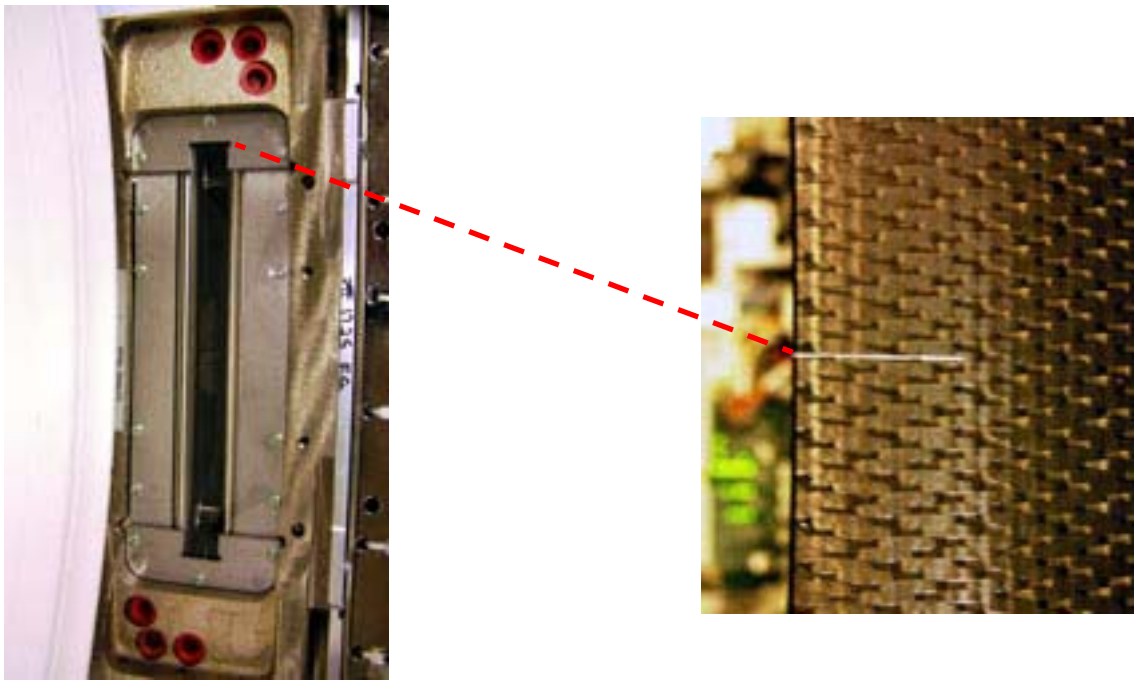
Figure 1-55 First Cradle/Table Parallel Check



2.) Measure the distance from the front top corner of the collimator face plate to the mark at the center front of the cradle. See Figure 1-55, Figure 1-56 and Figure 1-57. Note all measurements in Table 1-3.

Figure 1-56 Collimator Face Plate to Front of Table - Overview

Figure 1-57 Collimator Face Plate to Front of Table - Detail

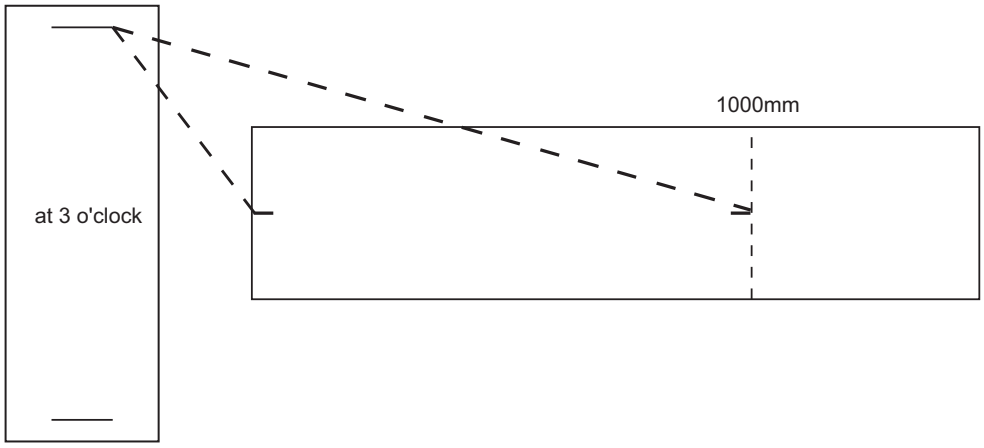


3.) Measure the distance from the same point of the collimator face plate to the center point on the cradle at the 1000mm mark. See Figure 1-55.

4.) Rotate the collimator to the 3 o'clock position. Confirm with a level.

5.) Repeat Step 2 and Step 3. See Figure 1-58.

Figure 1-58 Second Cradle/Table Parallel Check



6.) If needed, move the table using an appropriate tool and re-measure each side until measurements are equal side to side ± 1 mm.

Note: This final adjustment may be slightly different than the placement obtained using laser.

Table 1-3 Alignment Worksheet

MEASUREMENT	A: 3 O'CLOCK	B: 9 O'CLOCK	DIFFERENCE: | A-B |
Test #1			
To front of cradle			
To 1000mm mark			
Test #2			
To front of cradle			
To 1000mm mark			
Test #3			
To front of cradle			
To 1000mm mark			

7.) Recheck cradle level (front to back and across) and re-level as required.

4.7.7 Tighten the Lock Rings

1.) Re-check gantry bubble levels.

2.) Re-check that each of the eight adjuster is loaded by attempting to turn it.

CAUTION **Eye protection is required when using a hammer and chisel.**

3.) Tighten the lock rings at all locations with the spanner, where possible. Use a hammer and chisel to tighten the lock rings only where you can not use the spanner.

4.7.8 Drill the Table Anchor Holes

WARNING **POTENTIAL FOR PATIENT INJURY.**

IMPROPERLY SECURED TABLE MAY TIP, DISLODGING PATIENT.

PROPER ANCHORING IS KEY TO MAINTAINING PATIENT SAFETY DURING SYSTEM OPERATION.

4.7.8.1 Notes to Mechanical Installers

Note 1: Basic Anchoring Information

GE provided floor anchors are designed for use ONLY on concrete floors that meet the 4-inch concrete floor requirement. Supplied floor anchors must be installed by a trained contractor, and shall be set to a minimum depth of 3-inches at each anchor point. ANY anchors having more than 1-inch of thread showing above the nut, when torque is set to 55 lb.-ft, shall have a second anchor installed in the closest adjacent hole. This is because the minimum anchor engagement length in the concrete was not met. The second anchor shall be installed to the standard depth and torque specification. Do not cut anchor bolts that extend longer than the 1-inch limit.

Note 2: Alternate Anchoring

If at least four anchors cannot be set for the gantry, and at least four anchors for the table using the alternate anchor holes, then the installer must inform the PMI that the minimum anchoring cannot be met. Additionally, the customer's structural engineering contractor must be engaged to

determine the anchoring method, set the anchors, and certify that their anchoring meets the stated GE minimum load requirement and torque specification.

Note 3: Non-Concrete Floors

All other anchoring methods - on floor types other than the concrete minimum - must be determined at the customer's expense by a structural engineering contractor. The anchoring and method must be certified by the customer's contractor to meet the stated GE minimum load requirement and torque specification.

Note 4: GE Notification

It is not the role of mechanical contractors or installers (FEs) to determine acceptable methods to install or anchor equipment on non-4-inch concrete floors. The PMI or appropriate GE contact person shall be notified that the facility's floor type DOES NOT MEET the installation mounting requirement for the installation procedure (described in this Installation Manual), and therefore the table-gantry mounting process CANNOT continue.

4.7.8.2 Requirements

Tools Required

- Standard Install Tool Kit
- Hammer Drill
- ½" x 12" Drill Bit (Metric equivalent must not be used)
- ½" Drill Bushing (shipped in install support kit)
- Vacuum with HEPA or drywall dust filter
- Vacuum Hole Attachment - to clean debris from the holes
- PPE

Time and Personnel

- .5 hour labor on site
- 2 Engineers

4.7.8.3 Drilling Procedure

Note: The gantry rear cover should still be removed and the table should still be on the dolly.

1.) Make sure that all table and gantry levelers (four each) are firmly on the concrete floor.

NOTICE
Potential for Equipment Damage from Dust

To prevent damage due to the dust created during drilling, you must cover all electronic assemblies in the table base prior to drilling.

2.) Locate the hammer drill and ½" X 12" drill bit. The ½" bit will be used to drill all eight (8) table and gantry anchor holes. You must use the drilling bushing to drill all table and gantry holes. All primary holes can be drilled with the gantry covers installed.

NOTICE

There are two types of anchors used in this product depending on the manufacturing date.

Make sure which anchors is shipped with system before starting drilling procedure.

For Table anchoring, use the anchors which are shipped with the Table.

Note: Drilling bushing cannot be used for the table holes.

3.) Apply a piece of adhesive tape (see Figure 1-59) which will then provide a visual means of making sure the proper hole depth has been reached.

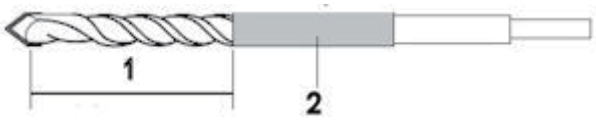


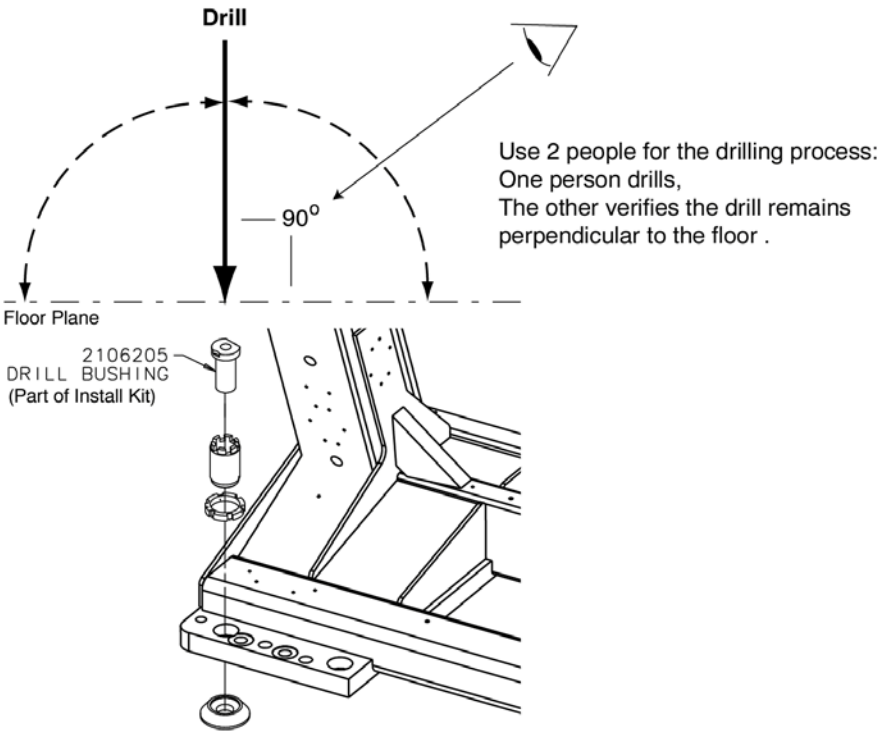
Figure 1-59 Drill Bit

Table 1-4 Drill Depth Gauge Mark Tape Location

	Anchor P/N: 2106573	Anchor P/N: 5487992-2
1	95mm (3-3/4 inches)	85 mm (3-3/8 inches)
2	Adhesive Tape	Adhesive Tape

4.) Use the ½" bit to drill all eight (8) anchor holes to a specified depth as measured from the top of the drill bushing. Review Figure 1-60 and Figure 1-61 prior to drilling.

Figure 1-60 Drilling Position



5.) Place appropriate protection to prevent damage and dust contamination to electronic assemblies.

6.) Place the drill bushing inside each adjuster, to keep the hole vertical and centered within the adjuster.

- Use the drill bushing to center the anchor holes in all adjuster locations, to provide maximum lateral alignment capacity when you center the cradle on isocenter during subsequent system testing.
- Take care not to injure yourself on the gantry cover brackets.

7.) Drill the holes perpendicular to the floor.

Important - Follow these guidelines when drilling anchor holes:

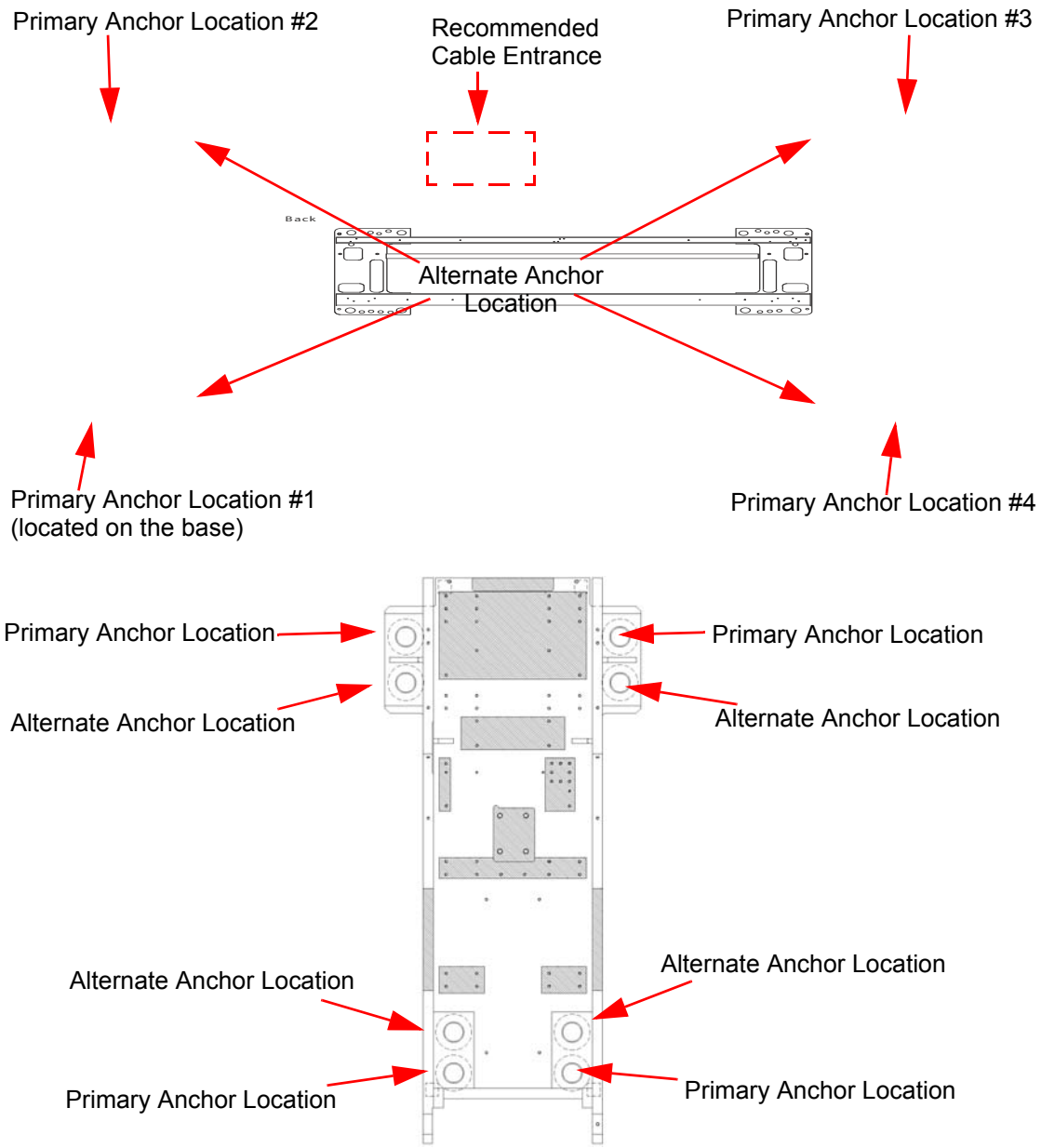
- While one person drills the holes, position a second person to watch the relationship between the drill bit and floor. Make sure the bit remains absolutely perpendicular to the floor throughout the drilling operation.
- Always use the mechanical guide when drilling.
- Stop drilling every 15 or 20 seconds and clear the hole of debris. This lets the drill bit cool and helps to prevent binding of the drill bit.
- Vacuum while drilling to keep gantry and table as free of dust contamination as possible. Place the funnel tip or long extension tip inside the hole.

  A drywall dust filter must be used on the vacuum.
- Drill each hole until the mark on the drill bit is even with the top of the drill bushing. All holes must be a minimum of 190 mm (7.5") deep, as measured from the top of the adjuster to the bottom of the hole. (See Figure 1-63, on page 82) Use an upside-down anchor to check the hole depth.

8.) Recheck the depth of all holes by inserting an anchor backward into the hole. A 13 mm (½") or less should be showing. Re-drill if needed.

9.) When finished drilling and clearing the anchor holes, vacuum the debris from the inside of each of the holes and from the surrounding (floor) area.

Figure 1-61 Anchor Locations



Note: If alternate location(s) are used to anchor the table or gantry, you must move the respective leveler(s) and pad(s) to the new alternate location(s) and re-drill.

4.7.9 Gantry & Table Alternate Anchor Holes

If you cannot use one of the adjuster anchor holes due to structural interference, such as reinforcement bars in the concrete, you must use one of the alternate anchor locations, as shown in Figure 1-61. You must also move the respective leveler(s) and pad(s) to the new alternate location(s) and re-drill.

Note: Do not remove the adjuster to move to the alternate anchor hole.

- The gantry requires a minimum of four (4) anchors, one (1) in each corner.
- The table requires a minimum of four (4) anchors, one (1) at location.

If you must use an alternate anchor hole in the gantry, you must remove the gantry covers to drill the holes. See Appendix A Removal & Installation of Covers, on page 197 for gantry cover removal.

WARNING **POTENTIAL FOR PATIENT INJURY.**

IMPROPERLY-SECURED TABLE MAY TIP, DISLODGING PATIENT.

PROPER ANCHORING IS KEY TO MAINTAINING PATIENT SAFETY DURING SYSTEM OPERATION.

It is the purchaser's responsibility to provide an approved support structure and mounting method for all floor types other than those listed. General Electric is not responsible for any failure of the support structure or method of anchoring, including seismic requirements and/or through-bolting.

Note: GE is not responsible for anchoring methods other than those listed in the pre-installation manual. Provided floor anchors are designed for use ONLY on concrete floors that meet the 4-inch concrete floor requirements.

MOUNTING REQUIREMENTS	ANCHOR P/N 2106573	ANCHOR P/N 5487992-2
Minimum Floor Thickness:	102 mm (4 in.)	102 mm (4 in.)
Recommended Drilling Depth:	95 mm (3-3/4 in.)	85 mm (3-3/8 in.)
Average Anchor Embedment:	89 mm (3-1/2 in.)	75 mm (3 in.)
Minimum Anchor Embedment:	76 mm (3 in.)	63 mm (2-1/2 in.)
Available Alternate Anchor Locations:	Yes	Yes
Shipped Anchor Size:	203 mm (8 in.)	178 mm (7 in.)
Alternate Anchoring Methods:	Yes (see notes, above)	Yes (see notes, above)
FLoor Levelness Requirement:	6 mm (1/4 in.) over 3 m (10 ft.)	6 mm (1/4 in.) over 3 m (10 ft.)

Table 1-5 Gantry and Table Mounting Requirements

4.7.10 Install the Anchors (For Gantry and Table)

NOTICE **Each anchor must be prepared by installing a nut 13.0 mm from the top of the anchor as measured from the top of the anchor to the top of the nut. before inserting and setting them in their respective anchor hole. failing to do this may result in anchor failure.**

NOTICE **The anchors will bend if they are hit too hard with a hammer. Strike the anchor with sufficient force to drive it down into the hole so the washer touches the leveling screw.**

1.) Prepare each anchor by installing the large flat washer and nut on to each anchor. Adjust the nut so there is 13.0 mm between the top of the anchor and top of the nut.

Figure 1-62 Anchor Preparation-set nut at 13.0 mm

2.) Place another nut on the anchor and thread it on far enough so it is flush with the top of the anchor. This nut will protect the threads.

3.) Insert an anchor into each anchor hole in the gantry and set the anchors with a hammer. The washer should touch the leveling screw if the anchor is installed and set properly.

Remove the nuts placed on the anchors to protect the end threads.

Figure 1-63 Gantry and Table Anchor Assembly with 8-inch Anchor (P/N 2106573)

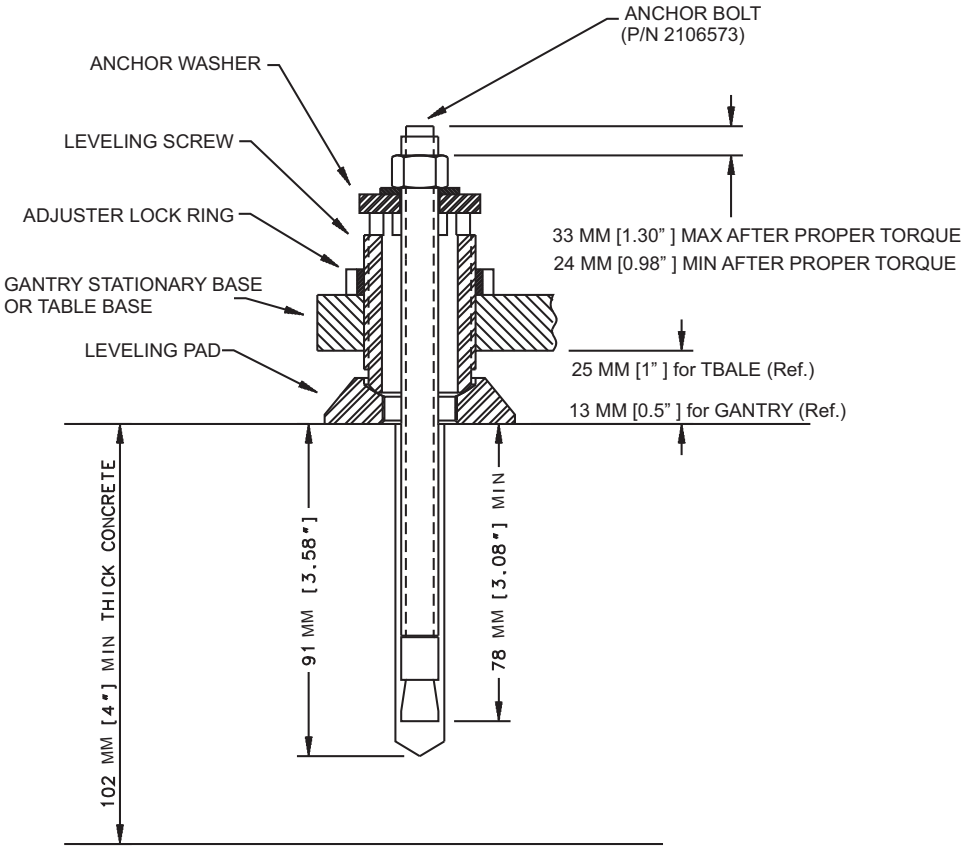


Figure 1-64 Gantry and Table Anchor Assembly with 7-inch Anchor (P/N 5487992-2)

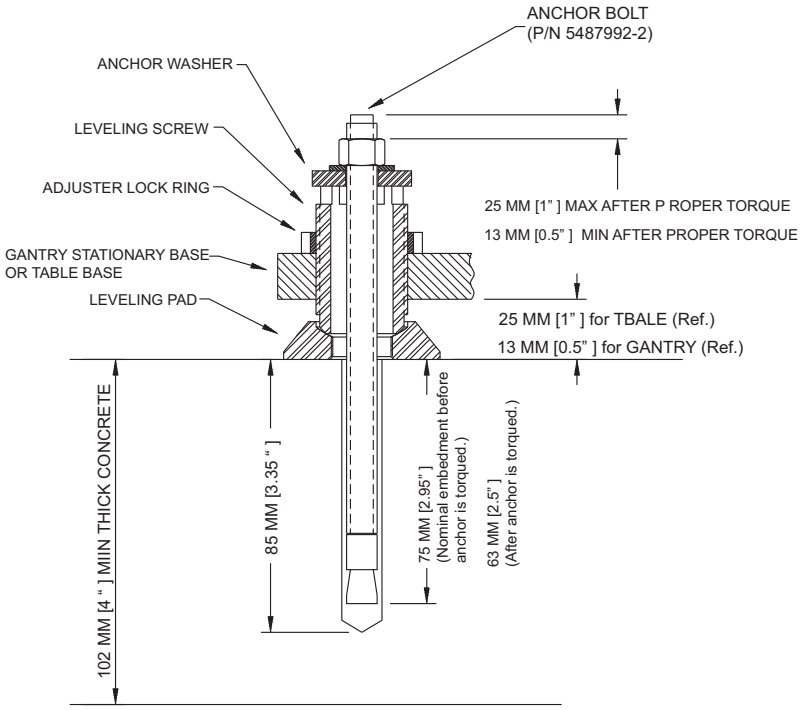
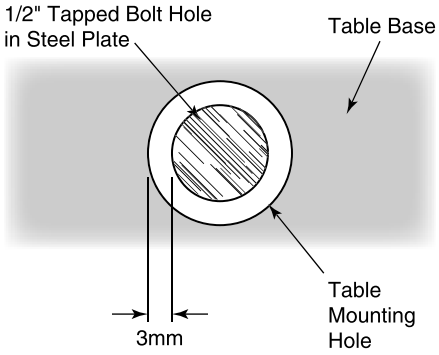


Figure 1-65 Center tapped holes under mounting holes in table base



Bolt centering is important to provide ± 3mm of adjustment for electrical alignment. Always use the drilling centering tool when drilling all bolt holes.

4.7.11 Alignment Recheck

Note: Alignment is critical. Recheck carefully.

1.) Turn on the alignment tool and recheck alignments. The table alignment must be the same as in Cradle/Table Parallel Check, on page 73. If re-leveling is required, repeat this procedure. Using the bubble levels, make adjustments as required to maintain required alignment.

2.) Once alignment has been verified, torque all mounting bolts.
Tighten the location #1 through #7 anchors and torque to:

- 75 N-m (55 ft.-lb.) for 8-inch Anchor (P/N 2106573)
- 54 N-m (40 ft.-lb.) for 7-inch Anchor (P/N 5487992-2)

3.) Remove the laser tools.

4.) Reinstall all the removed table panels and hardware.

5.) Reinstall the gantry rear cover.

Note: If you cannot replace the lower table cover because the floor interferes, adjust all of the table and gantry levelers by half-turn increments to raise the table/gantry until the lower table covers clear the floor. Then return to the alignment sections to level the gantry, level the table, and tighten the locking rings, respectively.

4.7.12 Removing Table Shipping Dollies

4.7.12.1 Requirements

Tools Required

- Standard Install Tool Kit
- 10mm Hex Socket Bit

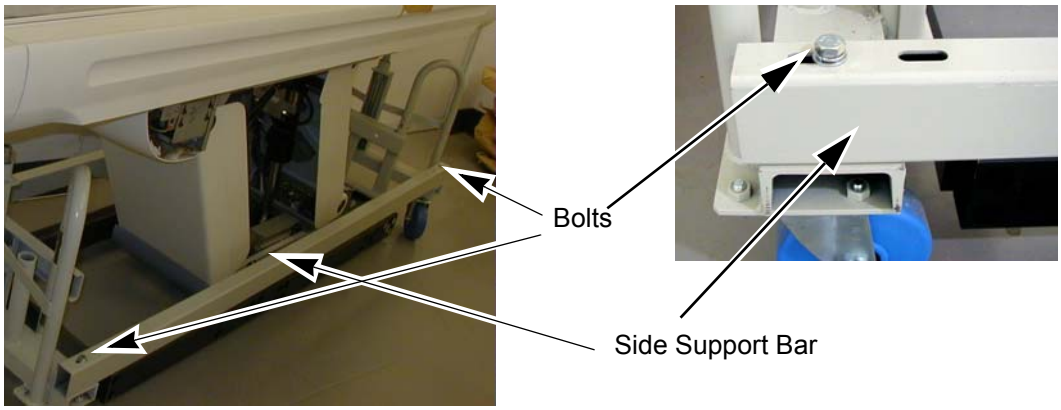
Time and Personnel

- .5 hour labor on site
- 1 Engineer

4.7.12.2 Procedure

1.) Remove the white table dolly support bars on the top of the dolly from each side. Refer to Figure 1-66.

Figure 1-66 Dolly Bolts



2.) Determine which direction is easiest for removing the dolly from the room. We will remove the dolly shipping rail so that the dolly can be rolled out of the room.

3.) There are two table shipping bolts on each end of the black shipping rails that hold the dolly together. Choose the rail on the opposite side of the direction that you plan to use to move the dolly out of the room.

4.) Using a 10mm hex socket, remove the two bolts on each end of the dolly frame. Refer to Figure 1-67.

Figure 1-67 Dolly Bolts


Wide View


Remove these 2 bolts

5.) --On the long black side rail, there are two 14mm bolts holding the table to the dolly on each side: one near the back of the table base and one in the front of the table base. Refer to Figure 1-68 and Figure 1-69.

Figure 1-68 Dolly Side Panels - Back Bolt

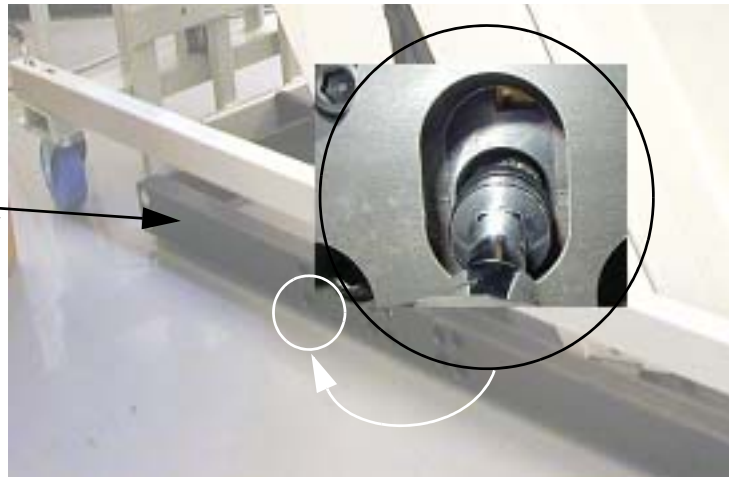


Figure 1-69 Dolly Side Panels - Front Bolt


Remove this bolt

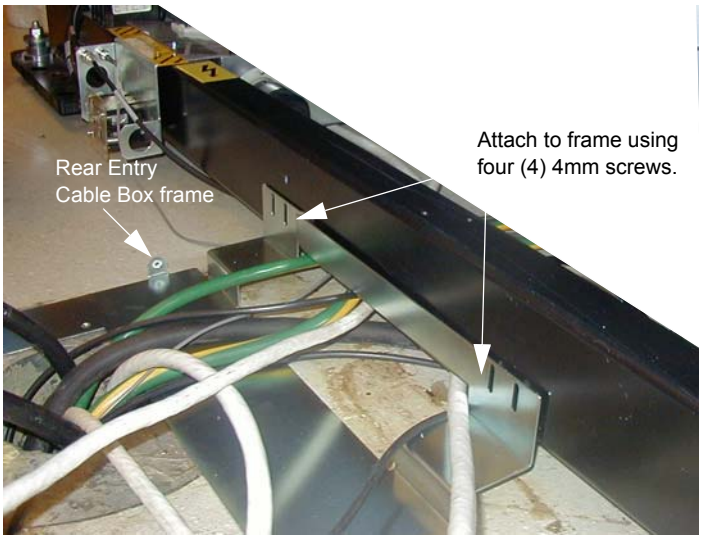
6.) Roll the dolly away from the table.
7.) Remove the remaining side rail of the dolly from the other side of the table following Step 5.
8.) Reassemble the dolly.

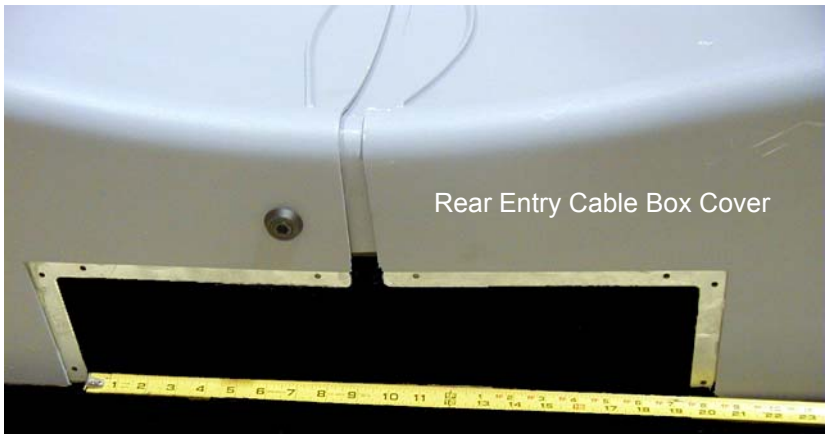
Section 5.0
Rear Entry Cable Box

A rear entry cable box (B7850RC) is used when the cables to the gantry cannot be brought-up inside the gantry base.The box is not supplied with the system and must be ordered separately.

1.) Attach the rear entry cable box frame to the gantry base using four (4) screws that are shipped with the kit. See Figure 1-70. The assembly can be made to fit floor entrance conduit or surface floor duct.

Figure 1-70 Rear Entry Cable Box





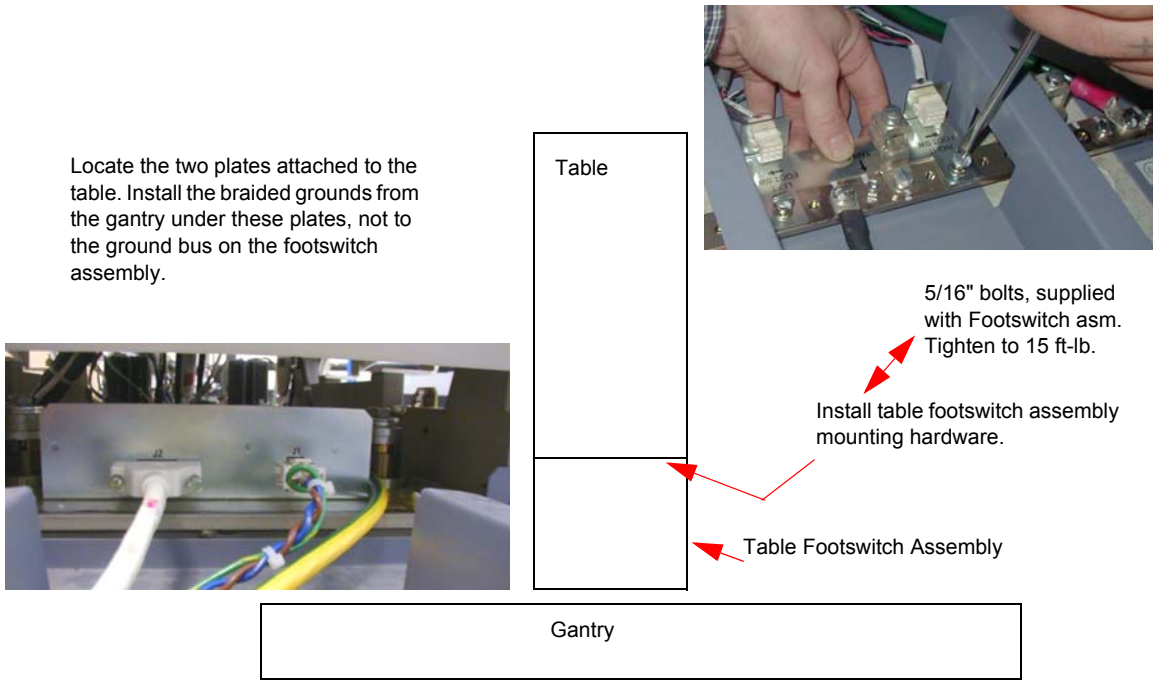
2.) There are three pairs of spacers shipped with this cover. Select the pair that is most appropriate for this site, based on the hardware.

- Solid metal
- Precut L-shaped metal
- Solid plastic - Can be cut

Section 6.0
Install HPower Table Footswitch Assembly

Install the table foot-switch assembly as shown in Figure 1-71, along with filler strip.

Figure 1-71 Install Table Foot-switch Assembly



1.) Remove foot switch assembly, and locate hardware.
2.) Loosen six (6) hex head screws and remove footswitch assembly.
3.) Place footswitch cover in a secure place.
4.) Locate the supplied 2' velcro in the install support kit, and apply two strips to the bottom of the footswitch assembly.
5.) Using the two 5/16" bolts and blue loctite (242), attach the footswitch assembly.
6.) Remove the 2" braided strip and gantry cable that are secured to gantry base, and place in the cable tray.
7.) Remove three (3) bolts that secure the footswitch bar.
8.) Take off the footswitch bar and discard.
9.) Locate the new footswitch bar from the install support kit.
10.) Install footswitch bar on cover, using the same three screws.

Section 7.0
Install GT1700 Table Footswitch Assembly

7.1 Requirements

7.1.1 Tools Required

- Standard Install Tool Kit

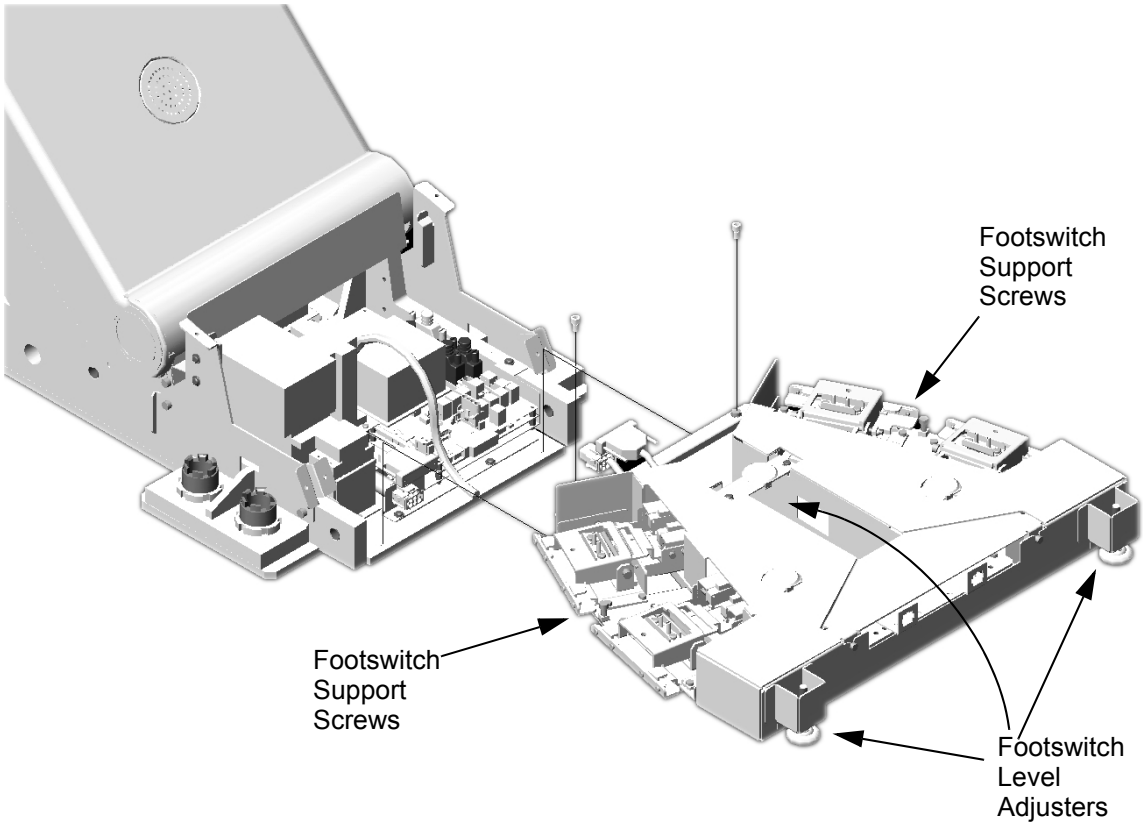
7.1.2 Time and Personnel

- 1 hour labor on site
- 1 Engineer

7.2 Procedure

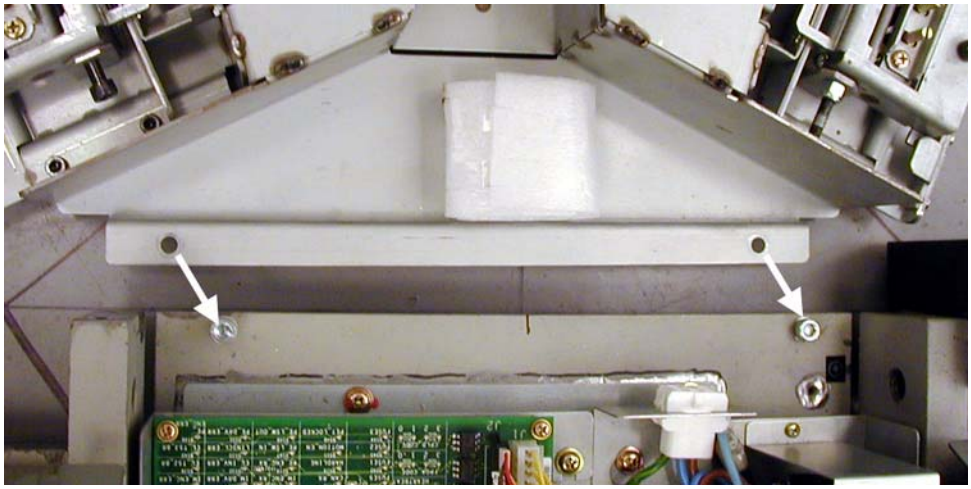
After Table positioning is completed and anchors installed, install the footswitch assembly as shown in Figure 1-71 following the steps below.

Figure 1-72 Install Table Foot-switch Assembly



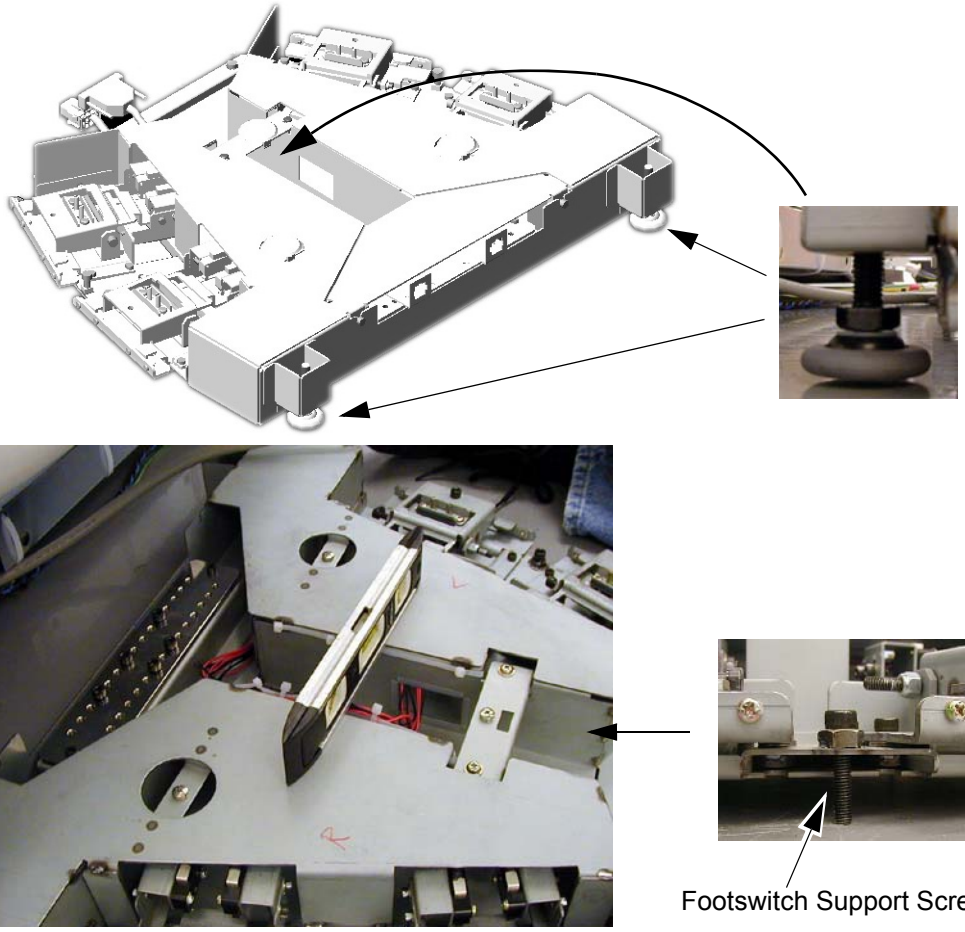
1.) Using two (2) M6 bolts, attach the footswitch assembly to the Table base.

Figure 1-73 Attach Footswitch



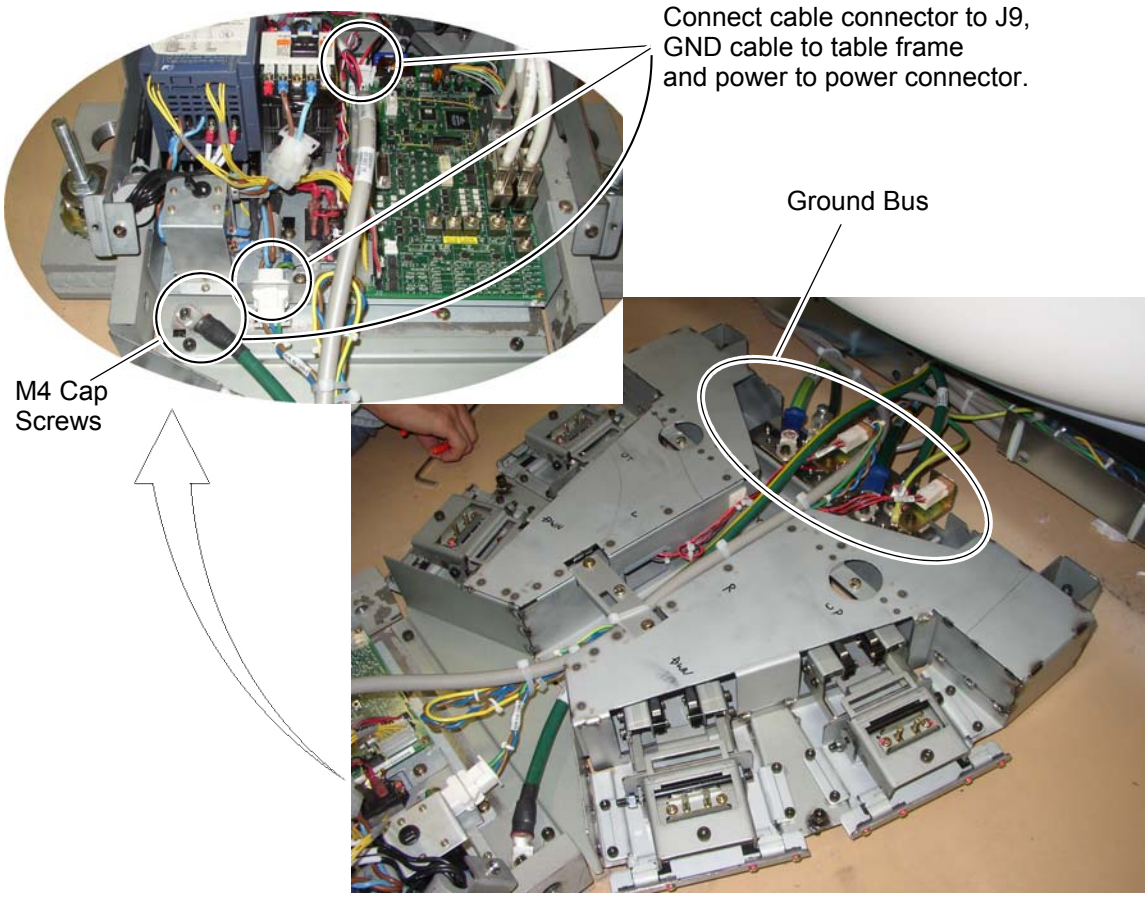
2.) Level the footswitch assembly using the three (3) level adjusters. Two are on the gantry side and one is in the middle. Use a 9" level to check the level in all directions.

Figure 1-74 Level Footswitch



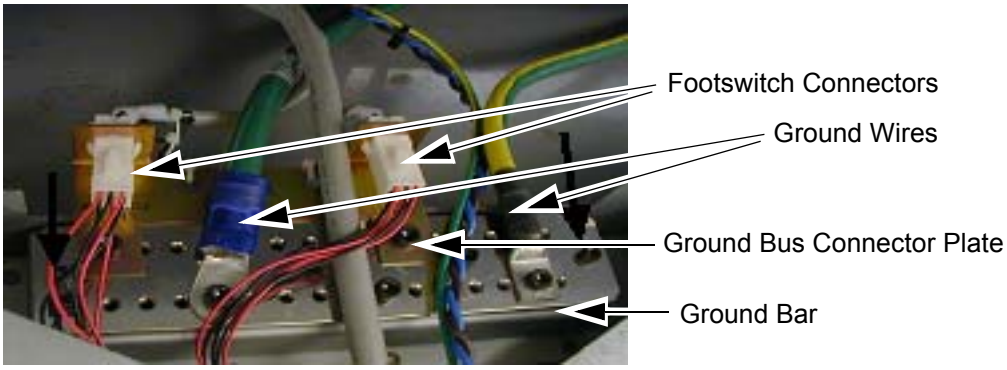
3.) Route the power cables from the gantry as shown in Figure 1-75.

Figure 1-75 Footswitch Assembly Cable Wiring



4.) Connect the ground bus connector plate.

Figure 1-76 Footswitch Ground/Bus Bar

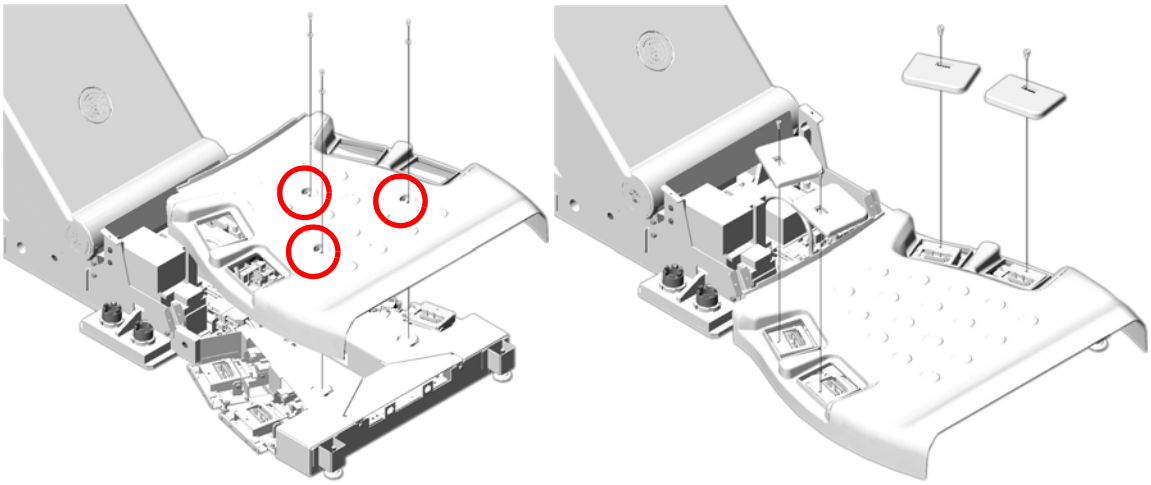


5.) Connect the ground wires (not all shown in Figure 1-76) to the installed ground bus:
- Table #2
- Gantry #1/0
- Console #2
- PDU #1/0
- Power Pan#10

6.) Install the footswitch pedal bracket onto the installed ground bus bar.

7.) Install the footswitch cover using three (3) screws (see Figure 1-77).

Figure 1-77 Footswitch Cover Installation



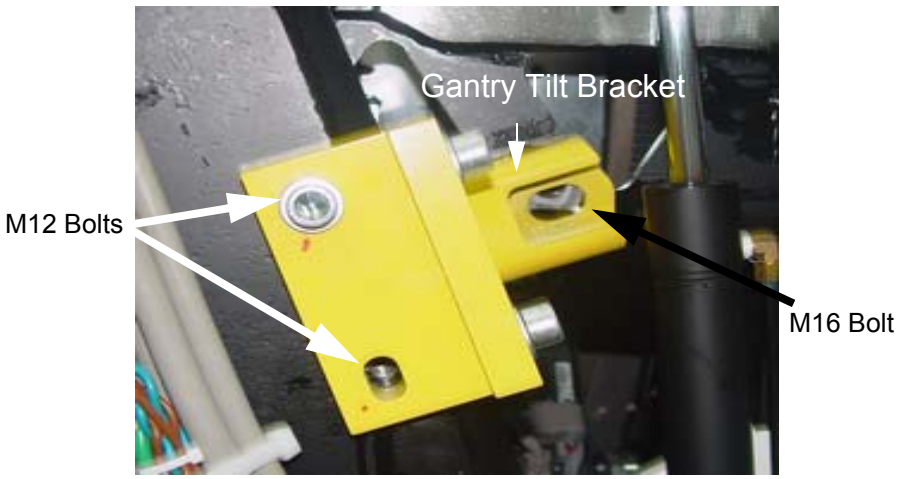
8.) Install cover caps on each pad.

Figure 1-78 Footswitch Pad Caps

9.) Install the four (4) foot pads onto the footswitch assembly.

Section 8.0
Remove Gantry Tilt Bracket

Figure 1-79 Gantry Tilt Bracket Removal



1.) Refer to Figure 1-79. Remove the M12 bolts using a 10 mm Hex wrench.

2.) Loosen the M16 bolt 1-2 turns and check the Gantry tilt bracket, it should be loose to the touch. If loose continue with step 4.

CAUTION **If tilt bracket is not loose, stop and put the M12 bolts back in and tighten tilt bracket back in place. If there is a load on the tilt bracket, removal may cause the gantry to suddenly tilt all the way back due to a possible lack of hydraulic pressure.**

3.) Check the hydraulic connections for leaks or lack of fluid. You will have to wait until the system can be energized to use the tilt controls to relieve the load on the tilt bracket prior to removal. Do not use force to remove the bracket.

4.) If the bracket feels loose, remove the M16 bolt using a 16 mm Hex wrench.

5.) Remove the bracket.

6.) Close the gantry covers and reinstall the scan window.

7.) Store brackets in the gantry base.

Section 9.0
Position the Power Distribution Unit

WARNING **LOCKOUT/TAGOUT IS REQUIRED BEFORE PERFORMING THIS TASK. USE THE SUPPLIED LOTO KIT.**

1.) Roll the PDU into position on its permanently mounted casters. Leave at least 15.5 cm (6") between the PDU and back wall to allow cooling air to circulate.

Note: **Connecting the primary incoming power (steps 2 through 5, below) is performed by the customer's electrical contractor.**

Table 1-6 Contractor Connections

Connection or Wall Box	AWG #	Connection From	Connection To PDU	Installed & Checked
TS1	#1	PDB-A	TS1-1	
	#1	PDB-B	TS1-2	
	#1	PDB-C	TS1-3	
	#1/0	GND	N/G **(Do NOT connect anything to neutral point.)**	

2.) Run the main input power conductors and ground though flexible metal conduit (attached between the PDU chassis and room duct-work) so you can move the PDU away from the wall during service.

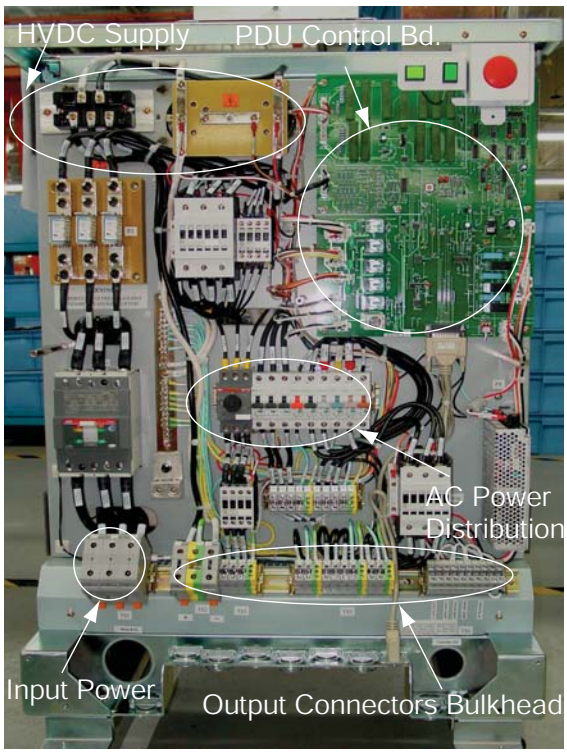
Figure 1-80 Flexible Conduit for PDU Power

3.) Locate the hole cover plate in Box 1 and attach the flexible metal conduit to the PDU.

4.) Cut the three phase and 1/0 ground wire to size.

5.) Attach cables as shown in Figure 1-80 and Figure 1-81.

Figure 1-81 PDU Area Locations



Section 10.0
Install Operator Console Without FWS Table

10.1 Unpack Console

Figure 1-82 Console boxed on skid

1.) Remove all items from the console.
2.) Remove all packing materials and discard.
3.) Place the step-board under the front edge of the skid and step on it to raise the front edge of the skid as in Figure 1-83.

Figure 1-83 Step-board used to raise front edge of skid

4.) Remove the two front cushions from the bottom of the skid. Refer to Figure 1-84

Figure 1-84 Cushion on bottom of skid

5.) Remove the Seismic Brackets from each side of the console. Refer to Figure 1-85. Save brackets for use later if you need to mount the console to the floor.

Figure 1-85 Removing the Seismic Brackets

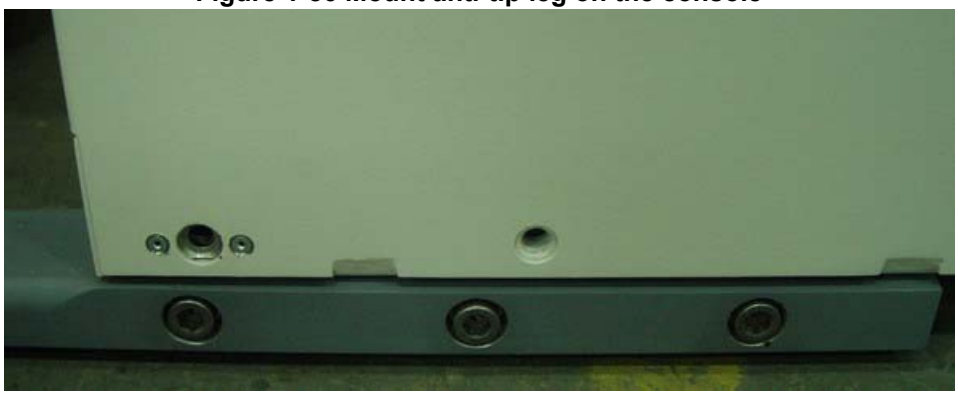
6.) Lift up on the strap on the front of the step-board (Figure 1-83) to lower the skid. Remove the step-board.

7.) Ensure the console stabilizers are in line with the notched portion at the front of the skid. This will allow enough clearance to smoothly roll the console down the ramps.

8.) Move console to installation location.

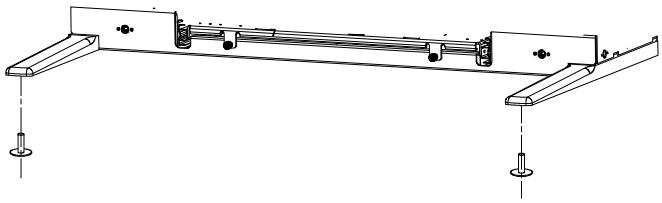
9.) Install the anti-tip legs of the console: Mount the two anti-tip legs on the console: 2318681-2 (left), 2318681-3 (right), secure three hex screws from console side.

Figure 1-86 Mount anti-tip leg on the console



10.) Attach the two pads to the console stabilizers. Refer to Figure 1-87.

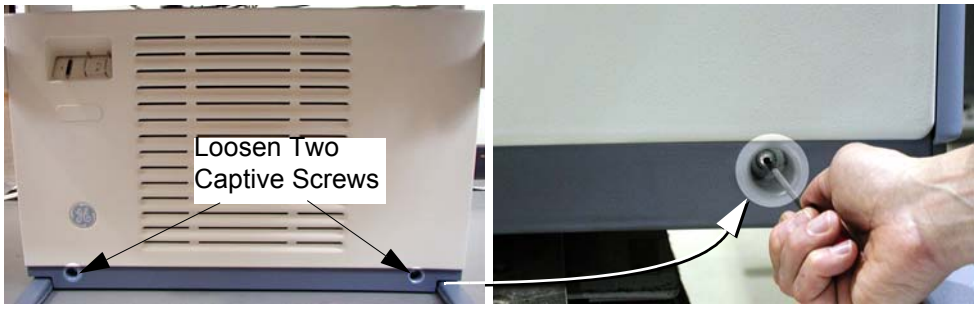
Figure 1-87 Console Stabilizer Pads



11.) Screw the pads all the way into the legs

10.2 Remove Console Covers

Figure 1-88 Front Cover Removal - Global Consoles



1.) Loosen two captive screws at bottom of console.
2.) Rotate bottom of cover outward and upward until it may be lifted free of the console at the top.

10.3 Adjust Table Top Height and Position Console

1.) Refer to Figure 1-89. The console normally arrives with the bottom hole on the monitor top aligned with the fourth bolt from the bottom.

Figure 1-89 Global Console tabletop adjustments

2.) For optimum operator comfort, align the bottom hole of the keyboard table top with the fifth hole from the bottom on the console.

Your site may have different requirements and you may have to adjust the monitor top and/or keyboard table top up or down from this position.

- Always select a table top height that permits the operator to see the patient on the table.
- Keep the one bolt-hole relationship between the monitor top and the keyboard table top. Fasten the keyboard table top one (1) hole lower than the console table top (Figure 1-89).

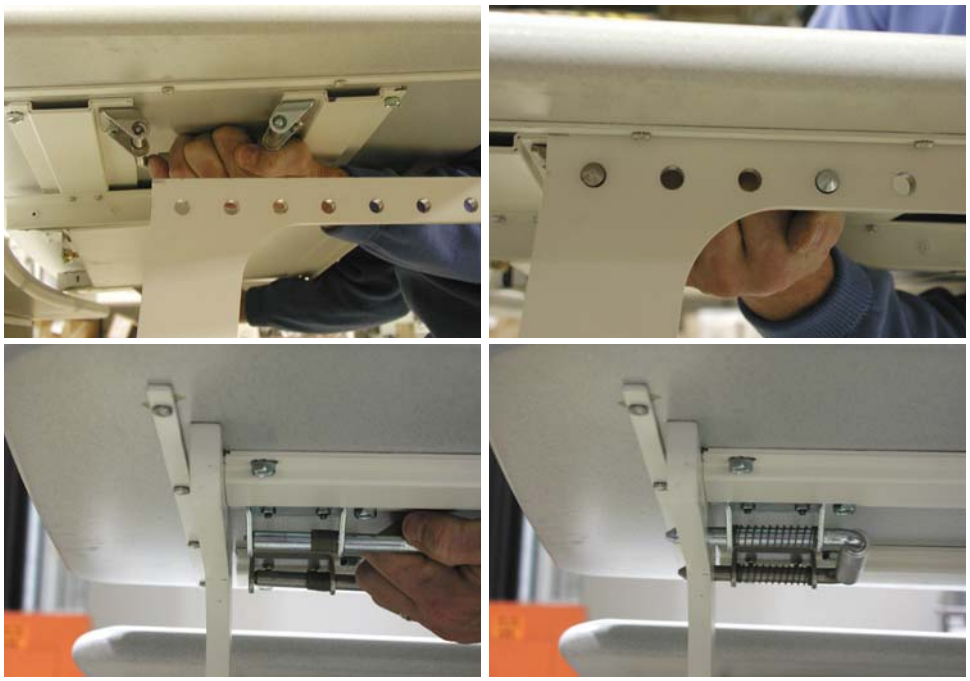
3.) Install the console side covers.

Side covers are left and right specific.

4.) Move the console into its final position, maintaining a 6" (15 cm) minimum distance between the console and the wall.

10.4 Attach Keyboard Table Top

Figure 1-90 Keyboard Table Top Placement

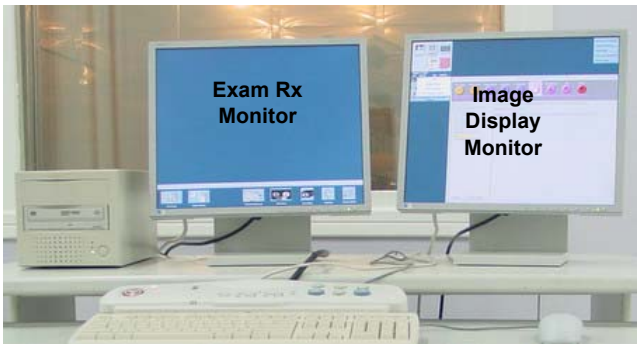


1.) Locate the spring loaded latches at either end of the underside of the keyboard table top.
2.) Pull latches inward (toward center of table top).
3.) Position table on brackets so that latches align with holes.
4.) Release latches, making certain that the pins fully engage the bracket holes (pins should protrude beyond outside edge of bracket).

10.5 Monitor and SCSI Tower Placement

1.) Locate and unpack the two monitors.
2.) Carefully place the monitors onto the monitor arms the console desktop.
3.) Locate and unpack the SCSI drive tower.
4.) Place the SCSI drive tower on the console desktop. A suggested placement is illustrated in Figure 1-91.

Figure 1-91 Global Console tabletop component placement



Section 11.0
Install Operator Console With FWS Table

11.1 Unpack Console

1.) Remove all items from the console.

2.) Remove all packing materials and discard.

3.) Place the step-board under the front edge of the skid and step on it to raise the front edge of the skid as in Figure 1-83.

Figure 1-92 Step-board used to raise front edge of skid

4.) Remove the two front cushions from the bottom of the skid. Refer to Figure 1-84

Figure 1-93 Cushion on bottom of skid

5.) Remove the Seismic Brackets from each side of the console. Refer to Figure 1-85. Save brackets for use later if you need to mount the console to the floor.

Figure 1-94 Removing the Seismic Brackets

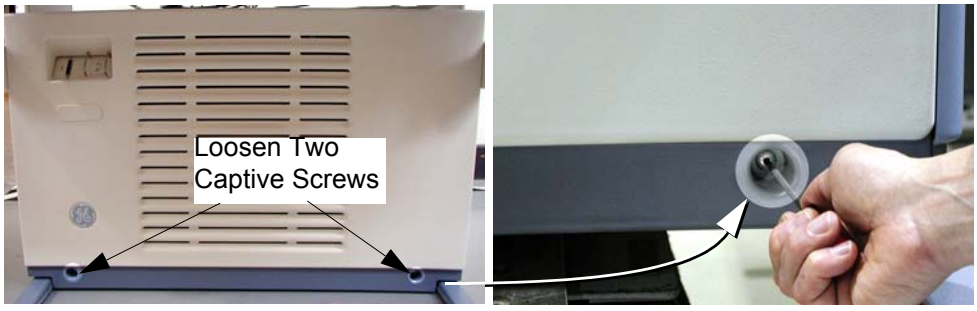
6.) Lift up on the strap on the front of the step-board (Figure 1-83) to lower the skid. Remove the step-board.

7.) Ensure the console stabilizers are in line with the notched portion at the front of the skid. This will allow enough clearance to smoothly roll the console down the ramps.

8.) Move console to installation location.

11.2 Remove Console Covers

Figure 1-95 Front Cover Removal - Global Consoles



1.) Loosen two captive screws at bottom of console.

2.) Rotate bottom of cover outward and upward until it may be lifted free of the console at the top.

11.3 Replace Console Table Top With Black Table Top

1.) Refer to Figure 1-96. The console normally arrives with the bottom hole on the console table top aligned with the fourth bolt from the bottom.

Figure 1-96 Console Table Top

2.) Replace the Monitor table top with the black table top:
   a.) Remove four (4) screws with 6mm hex tool at both right and left side of the console to remove monitor table top together with the support bracket.
   b.) Put the table top on the ground with the bracket upward. Remove six (6) screws with 6mm hex tool to remove the bracket from the table top.
   c.) Put the black table top on the ground with table surface downward. Install the bracket on black table top with original six (6) screws.
   d.) Install the black table top on the console with the revised order in step a).
3.) Install the console side covers. Side covers are left and right specific:
   2315656-6: Freedom workspace left side cover for console chassis
   2315656-5: Freedom workspace right side cover for console chassis
4.) Move the console into its final position, maintaining a 6" (15 cm) minimum distance between the console and the wall.

11.4 Install FWS table and Monitor Arms

1.) Assemble FWS table.
   Refer to Appendix B, on page 217 for details of FWS and monitor arms assembly.
2.) Install LCD Monitor and install monitor arms.
3.) Place the FWS table at one side of the console.

NOTICE FWS table should be place side by side with the console considering that the extended cable length used between FWS and Console is limited within 3 metre.

11.5 Peripherals Placement

1.) Place keyboard, SCIM
2.) Locate and unpack the SCSI drive tower.
3.) Place the SCSI drive tower **on the console desktop**.

Section 12.0
Install TIO/NIO16 Operator Console

12.1 Unpack Console

1.) Remove all items from the console.

2.) Remove all packing materials and discard.

3.) Place the step-board under the front edge of the skid and step on it to raise the front edge of the skid as in Figure 1-83.

Figure 1-97 Step-board used to raise front edge of skid

4.) Remove the two front cushions from the bottom of the skid. Refer to Figure 1-84

Figure 1-98 Cushion on bottom of skid

5.) Lift up on the strap on the front of the step-board (Figure 1-83) to lower the skid. Remove the step-board.

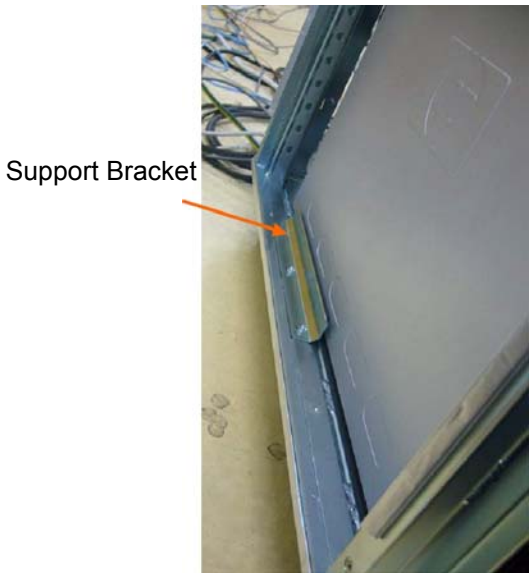
6.) Ensure the console stabilizers are in line with the notched portion at the front of the skid. This will allow enough clearance to smoothly roll the console down the ramps.

7.) Move console to installation location.

12.2 Remove the HostPC support Bracket

1.) Remove the Host PC Support Bracket from left side of TIO (refer to Figure 1-99).

Figure 1-99 Host PC Support Bracket



12.3 Install table

12.3.1 Install FWS table and Monitor Arms

1.) Assemble FWS table.
Refer to Appendix B for details of FWS and monitor arms assembly.
2.) Install LCD Monitor and install monitor arms.
3.) Place the FWS table at one side of the console.

Note: FWS table should be place side by side with the console considering that the extended cable length used between FWS and Console is limited within 3 metre.

12.3.2 Install Optima Desk

1.) If your system has the Optima Desk, place the desk in the control room.
2.) Attach the cable hooks and console stopper by the M4 screws.

12.4 Peripherals Placement

1.) Place keyboard, SCIM/GSCB
2.) Locate and unpack the Media tower.
3.) Place the Media tower on the FWS table.

12.5 Install GPU Card (If applicable)

Install the GPU Card in the Host Computer if the site has the option. Refer to Service Methods-->Installation--> Option-->*GPU Fluoro Prerequisite Installation Manual*

12.6 TIO Cover Installation

Install the TIO cover and adjust the Console power switch bracket as necessary.

1.) Install the TIO cover. Refer to Service Methods-->Replacement--> True-In-One Console--> *True-In-One Console Cover Removal and Installation procedure*.

2.) Power Switch Adjust

If the Console Power Switch cannot fit properly and could not function well, adjust the Console Power Switch bracket by adding or removing the adjustment plate of the power switch bracket as below illustration.

Two additional adjustment plate are stick inside TIO console between ICOM and AC Outlet box.

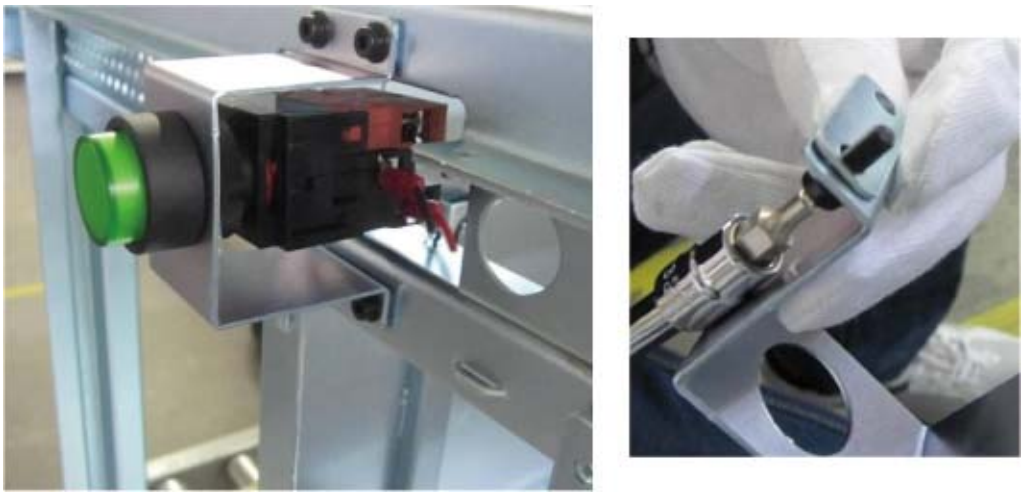


Figure 1-100 TIO Power Switch

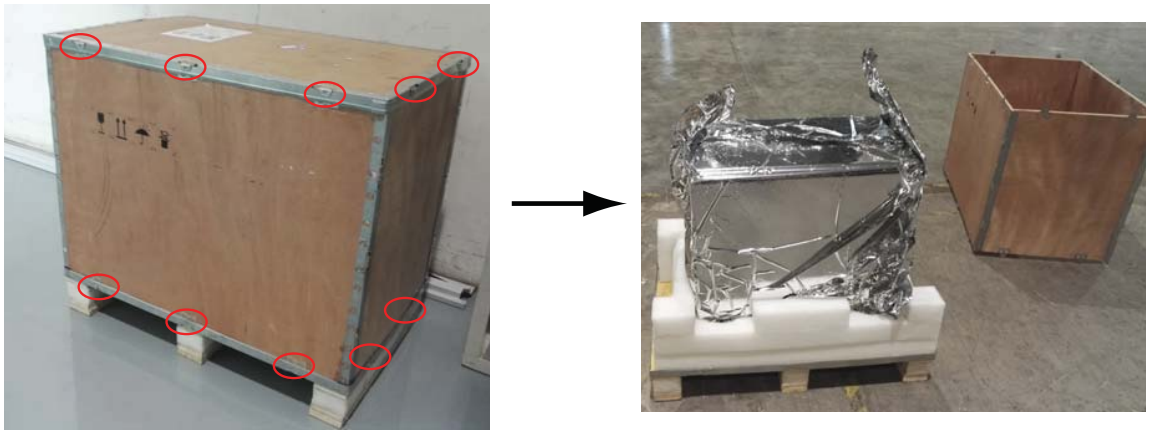
Section 13.0
Install OpenOC16 Console

13.1 Unpack Console

1.) Unpack console packaging.

a.) Prize up buckles by using screwdriver and remove the packaging covers.

Figure 1-101 Console Packaging Removal

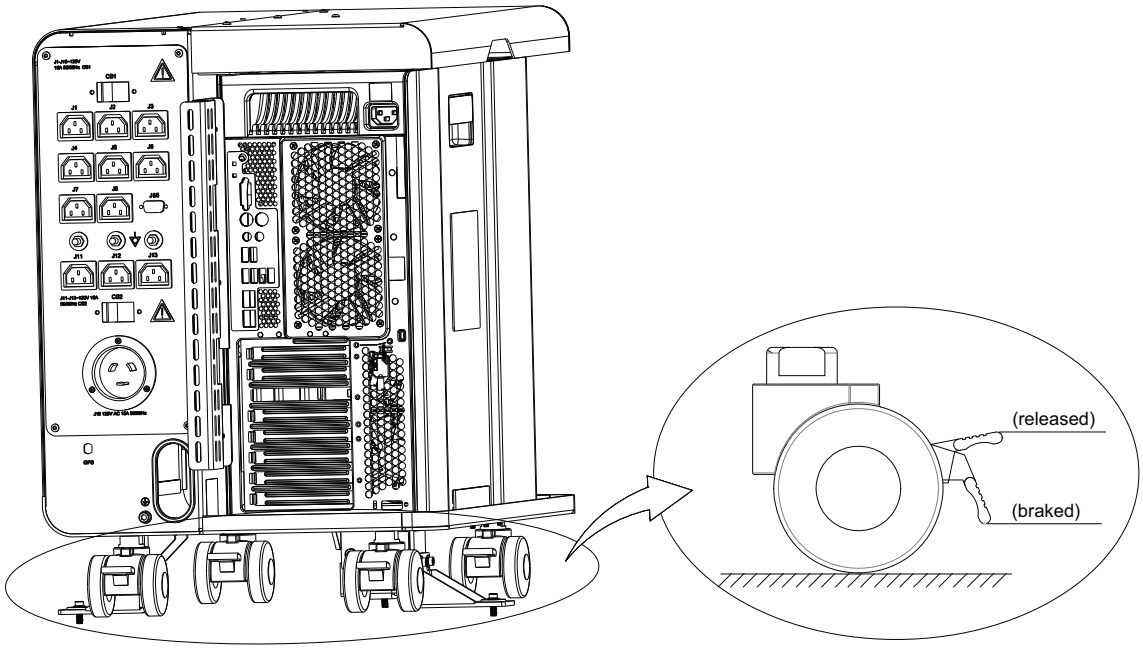


b.) Remove all packaging and discard per local requirement

2.) Move console to installation location.

3.) Adjust console position, and then pedal four brakes to prevent console from sliding.

Figure 1-102 Brake



13.2 Remove the Side Access Panel

Remove the side access panel by unscrewing its three screws from left side of Z840.

Figure 1-103 Side Access Panel

13.3 Install table

13.3.1 Install FWS table and Monitor Arms

1.) Assemble FWS table.
Refer to Appendix B for details of FWS and monitor arms assembly.
2.) Install LCD Monitor and install monitor arms.
3.) Place the FWS table at one side of the console.

Note: FWS table should be place side by side with the console considering that the extended cable length used between FWS and Console is limited within 3 metre.

13.3.2 Install Optima Desk

1.) If your system has the Optima Desk, place the desk in the control room.
2.) Attach the cable hooks and console stopper by the M4 screws.

13.4 Peripherals Placement

1.) Place keyboard, GSCB
2.) Locate and unpack the Media tower.
3.) Place the Media tower on the SWS table.

13.5 Install GPU Card (If applicable)

Install the GPU Card in the Host Computer if the site has the option. Refer to Service Methods-->Installation--> Option-->*GPU Fluoro Prerequisite Installation Manual*

13.6 Cover Installation

Install the OpenOC console cover. Refer to *Service Methods-->Replacement--> OpenOC16--> Console Cover Removal and Installation procedure*.

Section 14.0
Seismic Mounting

Seismic kits/brackets for console, Power Distribution Unit and Freedom WorkSpace (FWS) are available shipped with the subsystem or in Shipping Collector.

Note: See Appendix B for FWS seismic kit installation.

14.1 Console

If site specifications require seismic mounting, use ½" bolts to mount the brackets to the floor. Refer to Figure 1-104 for hole placement. The console seismic brackets are shipped with the console. They are used on the console shipping skid.

Figure 1-104 Seismic Mounting Hole Locations for GOC4/LCGOC/AIO Console

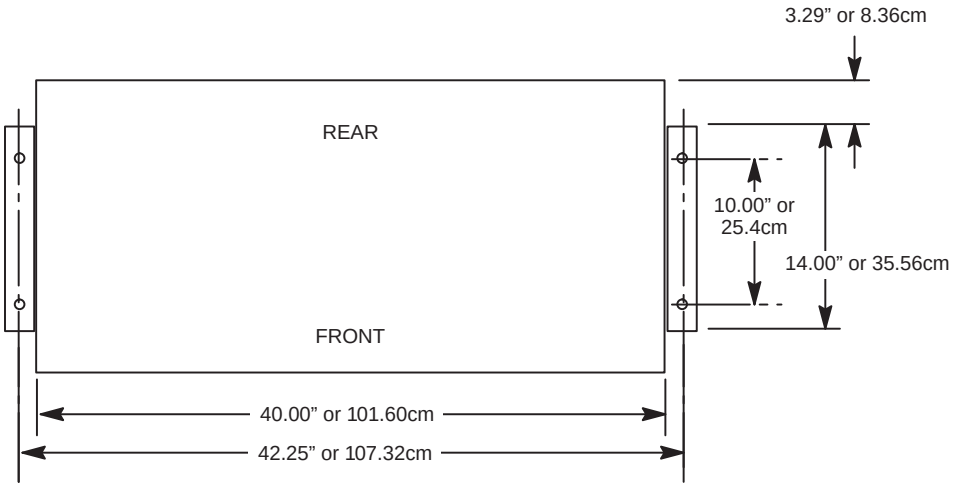


Figure 1-105 Seismic Console Mounting Hole Locations (True-In-One Console)

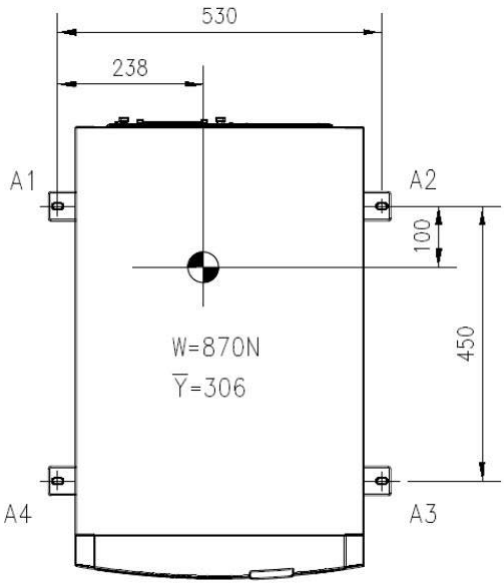


Figure 1-106 Seismic NIO16 Console Mounting Hole Locations

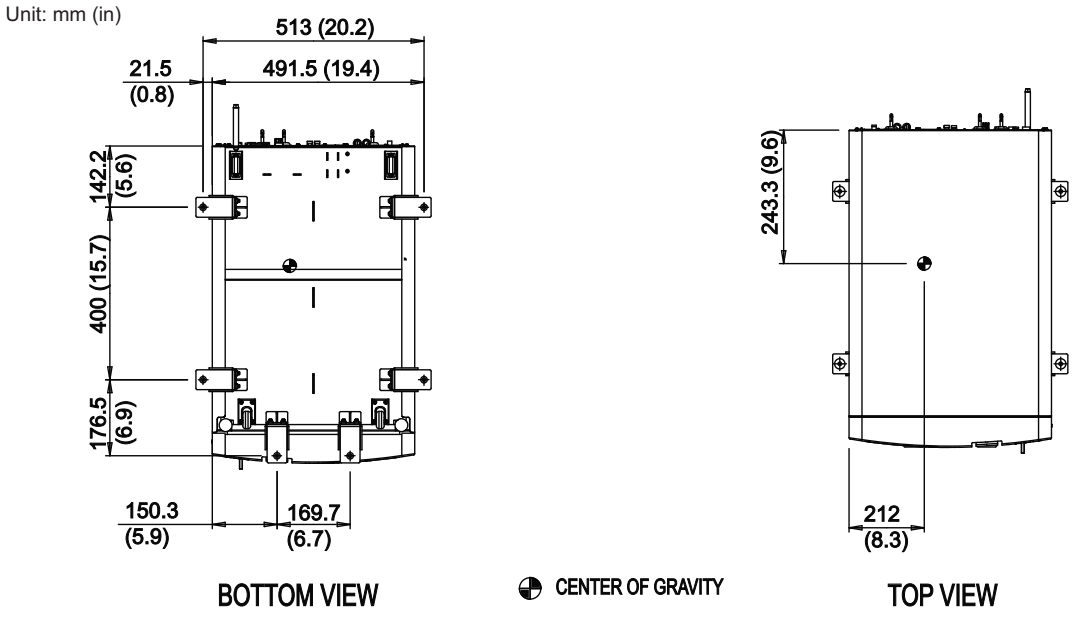
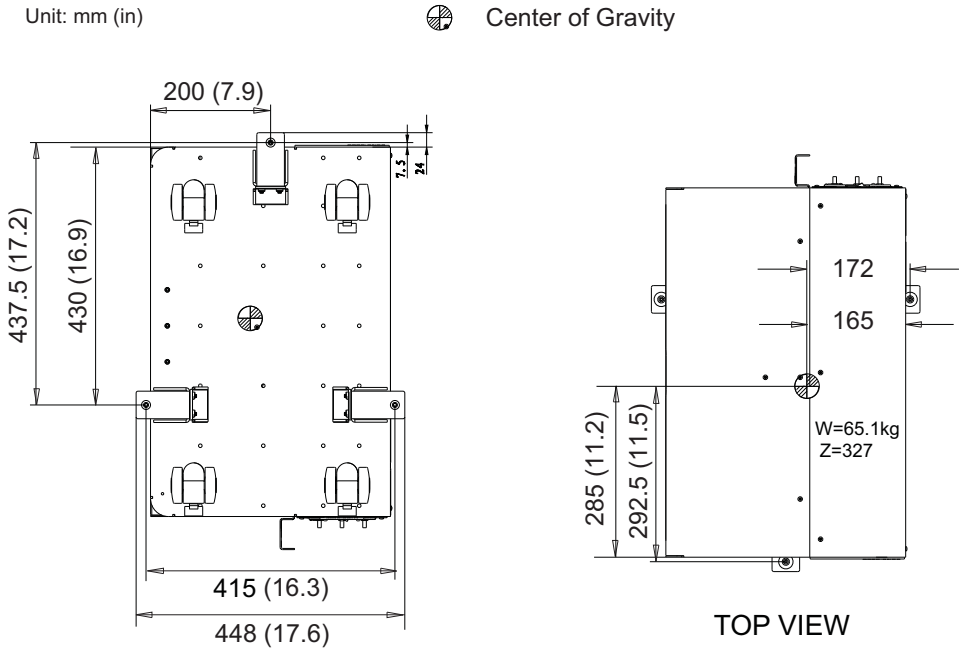


Figure 1-107 Seismic OpenOC Console Mounting Hole Locations

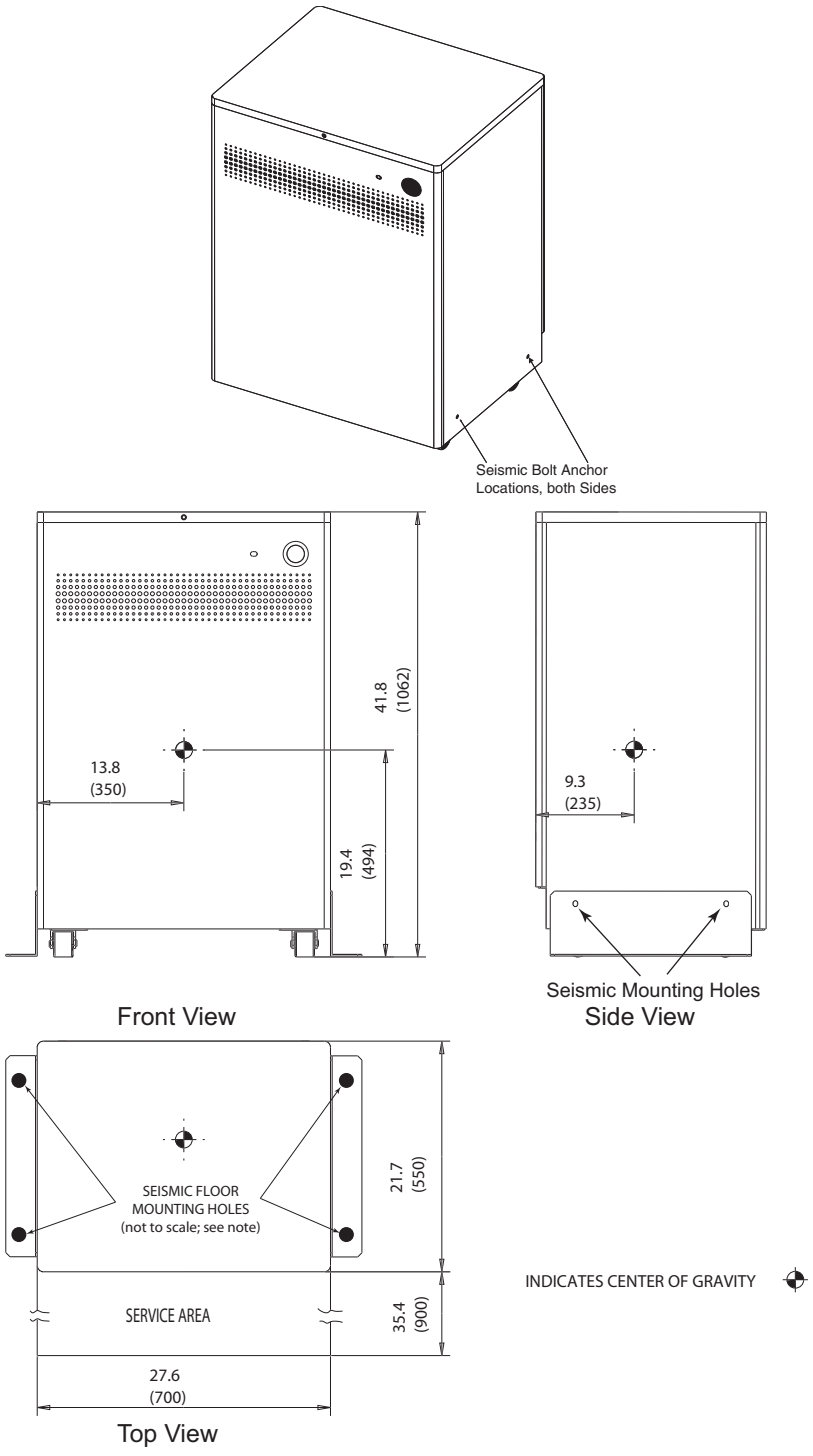


14.2 Power Distribution Unit

If site specifications require seismic mounting, use the PDU seismic brackets that were shipped with the seismic kit. Refer to Figure 1-108 for hole placement.

Note: Seismic floor anchor holes will need to be drilled.

Figure 1-108 Seismic PDU Mounting Hole Locations



Chapter 2
Power, Ground & Interconnect Cables

NOTICE **Potential for Data Loss and/or Equipment Damage**

To prevent potential data loss and equipment damage, please do the following:

- **When instructed, record data collected from the procedures in this chapter on GE Form e4879. For more information about this form, see Section 8.0 of Chapter 4.**
- **Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.**

Note: Use dry cleaning for electro components.

Section 1.0 Introduction

Site use of conduit, floor duct, wall duct, or a raised computer floor, as well as the individual component layout determines the system cable sequence. If your site has floor or wall ducts that will interfere with placement of the table/gantry, it may be important to have the movers unload the cable boxes (8 & 9) first and run those cables while others unload the subsystems.

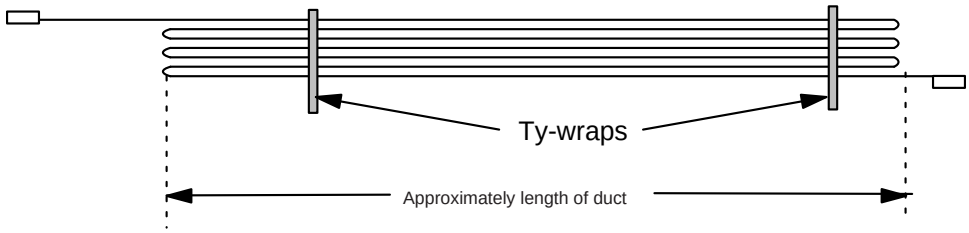
- Try to run the system cables after the contractor completes the contractor supplied wiring.
- All ground wires and other contractor wiring should be complete to the point of equipment placement.

NOTICE **Potential for Equipment Damage**

Do not store excess cable in the bottom of the PDU or Gantry.

When possible, store excess cable length in a serpentine configuration, approximately one meter long. **(Do NOT coil excess cable.)**

Figure 2-1 Excess Cable Storage Configuration



- Keep signal and control cables away from power cables and power wiring. When you lay cables in a raceway, locate the signal cables in a separate section of the raceway, or a separate conduit.
- Check all connections for tightness.
  - Use suitable tools and judgment.
  - Check all visible connections, especially ground connections.
- Check for reasonable cable routing.
  - Take into consideration necessary take-up distances for equipment maintenance, etc.
  - Try to complete as neat a job as possible.

1.1 System Component Identification

Identify all system cables by the system component designators listed in Table 2-1 on page 114. Each end of a system cable has a label, and may have a color near the connector, (refer to Table 2-2 on page 114) to indicate the component and the jack identifier of the component.

Table 2-1 System Component Identifiers

DESIGNATOR	SYSTEM COMPONENT
CT2	Gantry
CT1	Patient Table
PM	Power Distribution Unit
OC	Operator Console (Console Computer)
WL	X-Ray ON Warning Light

1.2 Cable Color Identifiers

The ends of the cables may be marked with a piece of blue, yellow, red, or orange colored tape to help with the cable installation. Table 2-2 lists the subcomponent, and corresponding color.

Table 2-2 Cable Color Identifiers

SUBCOMPONENT	COLOR
Gantry	Blue
Table	Yellow
PDU	Red
Console Computer	Orange

Table 2-3 BrightSpeed System (with GOC4/LCGOC/AIO Console) Interconnect Cables

RUN NO.	DESCRIPTION	PART NUMBER For GOC4/LCGOC/AIO Console	
		LONG CABLES (KIT 2281840-4)	SHORT CABLES (KIT 2281840-5)
1	Facility MDP to Room Disconnect (A1)	cust. supplied	cust. supplied
2	Room Disconnect (A1) to PDU	cust. supplied	cust. supplied
3	Room Disconnect (A1) to System E-Off	cust. supplied	cust. supplied
4	PDU to Room Warning Light(s)	cust. supplied	cust. supplied
5	PDU to Scan Room Door Switch	cust. supplied	cust. supplied
50	HVDC Power Cable - PDU to Gantry	2343529	2343529-2
51	HVAC Power Cable - PDU to Gantry	2343530	2343530-2
52	LVAC Power Cable - PDU to Gantry	2343528	2343528-2
53	LVAC Power Cable - PDU To Operator's Console	2343531	2343531-2
54	LVAC Power Cable - Gantry to Table	n/a	n/a
55	Ground, PDU to Raceway	2371450	2371450-2

Table 2-3 BrightSpeed System (with GOC4/LCGOC/AIO Console) Interconnect Cables

RUN NO.	DESCRIPTION	PART NUMBER For GOC4/LCGOC/AIO Console	
		LONG CABLES (KIT 2281840-4)	SHORT CABLES (KIT 2281840-5)
56	Ground, Raceway to Console	2371450-3	2371450-4
60	LVAC Power Cable - PDU to Optional UPS	-	-
61	LVAC Power Cable - UPS Disconnect Panel to PDU	-	-
90	LVAC Power Cable - PDU to PET	-	-
100	Signal Cable - Gantry to PDU	5120646	5120646-2
101	Signal Cable - Gantry to Console	5120645	5120645-2
102	Signal Cable (Ethernet) - Gantry to Console	2373436-2	2373436-3
103	Data Cable (Fiber Optic) - Gantry to Console	2117848-2	2117848-7
104	Signal Cable - Gantry to Table	n/a	n/a
110	Signal Cable - UPS Control to Room Disconnect (A1)	-	-
111	Signal Cable - UPS Control to UPS Disconnect Panel	-	-

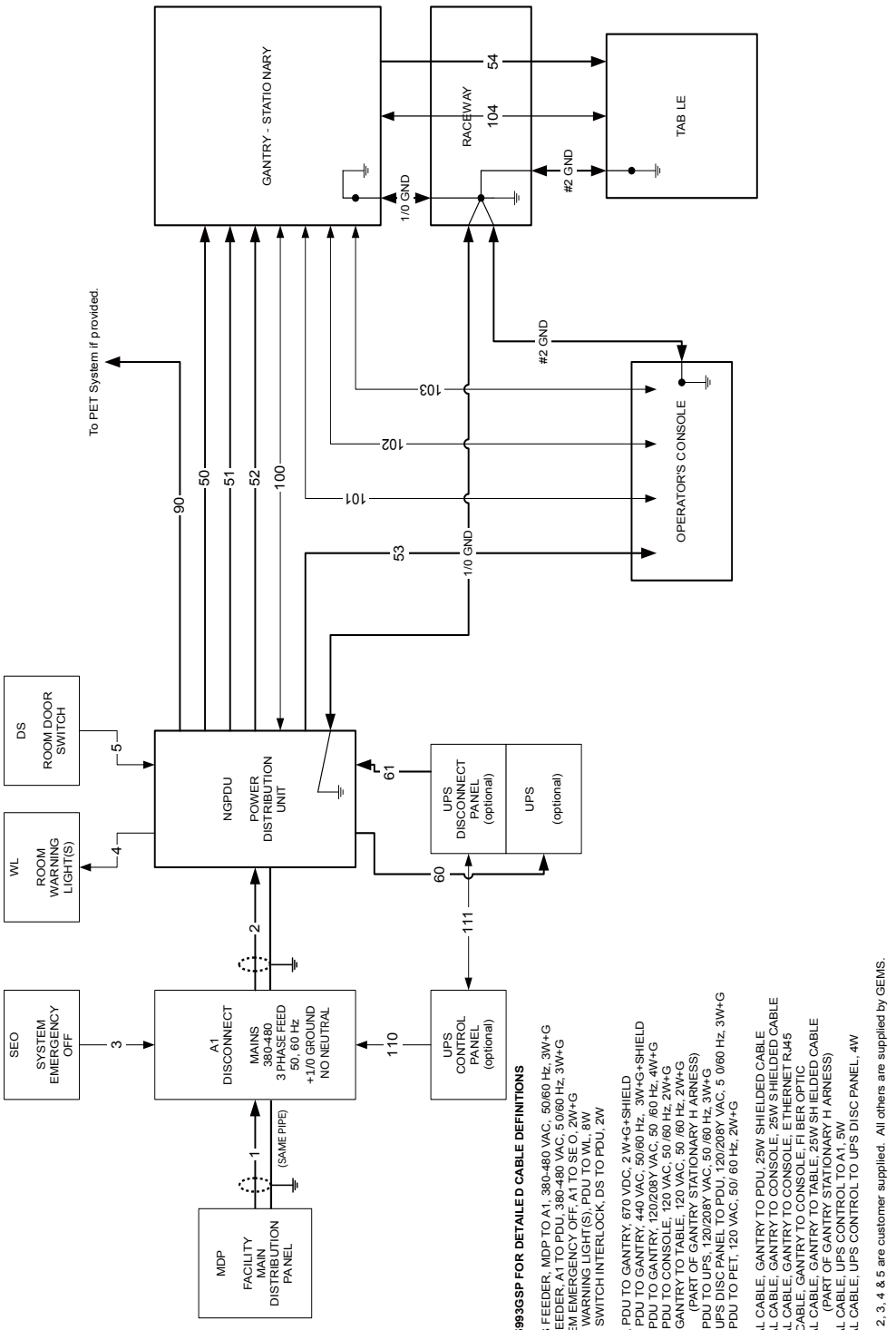
Table 2-4 BrightSpeed System (with TIO/NIO16 Console) Interconnect Cables

RUN NO.	DESCRIPTION	PART NUMBER			
		For GOC or TIO		For NIO16 Console	
		LONG CABLES (KIT 2281840-4)	SHORT CABLES (KIT 2281840-5)	LONG CABLES (KIT 2281840-13)	SHORT CABLES (KIT 2281840-14)
1	Facility MDP to Room Disconnect (A1)	cust. supplied	cust. supplied	cust. supplied	cust. supplied
2	Room Disconnect (A1) to PDU	cust. supplied	cust. supplied	cust. supplied	cust. supplied
3	Room Disconnect (A1) to System E-Off	cust. supplied	cust. supplied	cust. supplied	cust. supplied
4	PDU to Room Warning Light(s)	cust. supplied	cust. supplied	cust. supplied	cust. supplied
5	PDU to Scan Room Door Switch	cust. supplied	cust. supplied	cust. supplied	cust. supplied
50	HVDC Power Cable - PDU to Gantry	2343529	2343529-2	2343529	2343529-2
51	HVAC Power Cable - PDU to Gantry	2343530	2343530-2	2343530	2343530-2
52	LVAC Power Cable - PDU to Gantry	2343528	2343528-2	2343528	2343528-2
				2343528-3 for simplified power pan	2343528-4 for simplified power pan
53	LVAC Power Cable - PDU To Operator's Console	2343531	2343531-2	2343531	2343531-2
54	LVAC Power Cable - Gantry to Table	n/a	n/a	n/a	n/a
55	Ground, PDU to Raceway	2371450	2371450-2	2371450	2371450-2
56	Ground, Raceway to Console	2371450-3	2371450-4	2371450-3	2371450-4

RUN NO.	DESCRIPTION	PART NUMBER			
		For GOC or TIO		For NIO16 Console	
		LONG CABLES (KIT 2281840-4)	SHORT CABLES (KIT 2281840-5)	LONG CABLES (KIT 2281840-13)	SHORT CABLES (KIT 2281840-14)
60	LVAC Power Cable - PDU to Optional UPS	-	-	-	-
61	LVAC Power Cable - UPS Disconnect Panel to PDU	-	-	-	-
90	LVAC Power Cable - PDU to PET	-	-	-	-
100	Signal Cable - Gantry to PDU	5120646	5120646-2	5120646	5120646-2
101	Signal Cable - Gantry to Console	5120645	5120645-2	5419981	5419981-2
102	Signal Cable (Ethernet) - Gantry to Console	2373436-2	2373436-3	2373436-2	2373436-3
103	Data Cable (Fiber Optic) - Gantry to Console	2117848-2	2117848-7	5432019	5432019
104	Signal Cable - Gantry to Table	n/a	n/a	n/a	n/a
110	Signal Cable - UPS Control to Room Disconnect (A1)	-	-	-	-
111	Signal Cable - UPS Control to UPS Disconnect Panel	-	-	-	-

Section 2.0
System Interconnect Diagram

Figure 2-2 System Interconnect Diagram

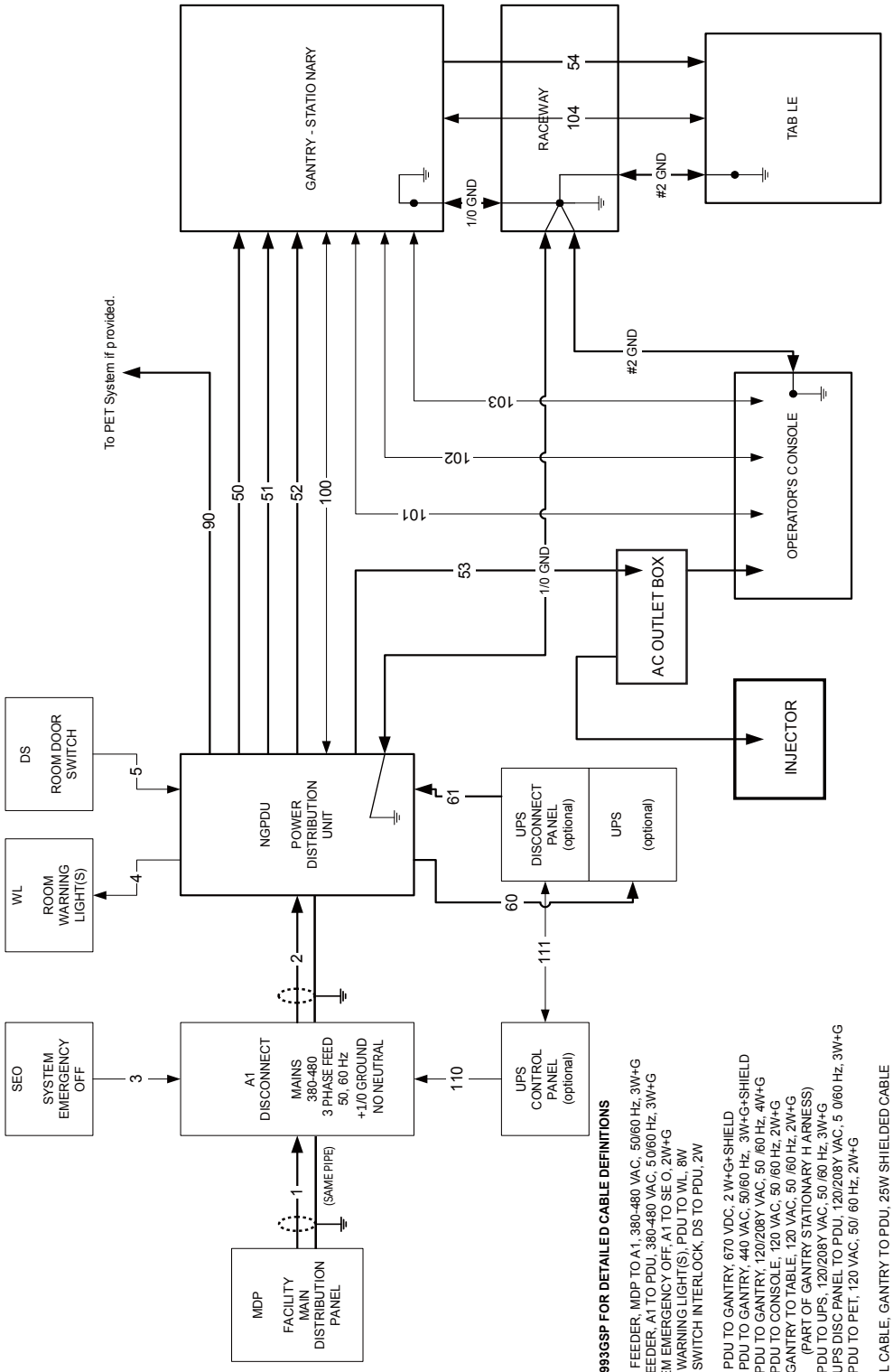


REFER TO 2305993GSP FOR DETAILED CABLE DEFINITIONS

1*	MAINS FEEDER, MDP TO A1, 380-480 VAC, 50/60 Hz, 3W+G
2*	SUB-FEEDER, A1 TO PDU, 380-480 VAC, 50/60 Hz, 3W+G
3*	SYSTEM EMERGENCY OFF, A1 TO SEO, 2W+G
4*	X-RAY WARNING LIGHT(S), PDU TO WL, 8W
5*	DOOR SWITCH INTERLOCK, DS TO PDU, 2W
50	HVDC, PDU TO GANTRY, 670 VDC, 2 W+G+SHIELD
51	HVAC, PDU TO GANTRY, 440 VAC, 50/60 Hz, 3W+G+SHIELD
52	LVAC, PDU TO GANTRY, 120/208Y VAC, 50 /60 Hz, 4W+G
53	LVAC, PDU TO CONSOLE, 120 VAC, 50 /60 Hz, 2W+G
54	LVAC, GANTRY TO TABLE, 120 VAC, 50 /60 Hz, 2W+G (PART OF GANTRY STATIONARY H ARNESS)
60	LVAC, PDU TO UPS, 120/208Y VAC, 50 /60 Hz, 3W+G
61	LVAC, UPS DISC PANEL TO PDU, 120/208Y VAC, 5 0/60 Hz, 3W+G
90	LVAC, PDU TO PET, 120 VAC, 50/ 60 Hz, 2W+G
100	SIGNAL CABLE, GANTRY TO PDU, 25W SHIELDED CABLE
101	SIGNAL CABLE, GANTRY TO CONSOLE, 25W SHIELDED CABLE
102	SIGNAL CABLE, GANTRY TO CONSOLE, ETHERNET RJ45
103	DATA CABLE, GANTRY TO CONSOLE, FIBER OPTIC
104	SIGNAL CABLE, GANTRY TO TABLE, 25W SHIELDED CABLE (PART OF GANTRY STATIONARY H ARNESS)
110	SIGNAL CABLE, UPS CONTROL TO A1, 5W
111	SIGNAL CABLE, UPS CONTROL TO UPS DISC PANEL, 4W

* NOTE: Runs 1, 2, 3, 4 & 5 are customer supplied. All others are supplied by GEMS.

Figure 2-3 System Interconnect Diagram (with AC Outlet Box)



REFER TO 2305993GSP FOR DETAILED CABLE DEFINITIONS

1* MAINS FEEDER, MDP TO A1, 380-480 VAC, 50/60 Hz, 3W+G
2* SUB-FEEDER, A1 TO PDU, 380-480 VAC, 50/60 Hz, 3W+G
3* SYSTEM EMERGENCY OFF, A1 TO SEO, 2W+G
4* X-RAY WARNING LIGHT(S), PDU TO WL, 8W
5* DOOR SWITCH INTERLOCK, DS TO PDU, 2W

50 HVDC, PDU TO GANTRY, 670 VDC, 2 W+G+SHIELD
51 HVAC, PDU TO GANTRY, 440 VAC, 50/60 Hz, 3W+G+SHIELD
52 LVAC, PDU TO GANTRY, 120/208Y VAC, 50 /60 Hz, 4W+G
53 LVAC, PDU TO CONSOLE, 120 VAC, 50 /60 Hz, 2W+G
54 LVAC, GANTRY TO TABLE, 120 VAC, 50 /60 Hz, 2W+G (PART OF GANTRY STATIONARY HARNESS)
60 LVAC, PDU TO UPS, 120/208Y VAC, 50 /60 Hz, 3W+G
61 LVAC, UPS DISC PANEL TO PDU, 120/208Y VAC, 5 0/60 Hz, 3W+G
90 LVAC, PDU TO PET, 120 VAC, 50/ 60 Hz, 2W+G

100 SIGNAL CABLE, GANTRY TO PDU, 25W SHIELDED CABLE
101 SIGNAL CABLE, GANTRY TO CONSOLE, 25W SHIELDED CABLE
102 SIGNAL CABLE, GANTRY TO CONSOLE, ETHERNET RJ45
103 DATA CABLE, GANTRY TO CONSOLE, FIBER OPTIC
104 SIGNAL CABLE, GANTRY TO TABLE, 25W SHIELDED CABLE (PART OF GANTRY STATIONARY HARNESS)
110 SIGNAL CABLE, UPS CONTROL TO A1, 5W
111 SIGNAL CABLE, UPS CONTROL TO UPS DISC PANEL, 4W

* NOTE: Runs 1, 2, 3, 4 & 5 are customer supplied. All others are supplied by GEMS.

Section 3.0
Contractor Connections

Table 2-5 Contractor PDU Connections

CONNECTION OR WALL BOX	AWG #	CONNECTION FROM	CONNECTION TO PDU	INSTALLED AND CHECKED
A1	#1	Load - T1	TS-1 L1	
	#1	Load - T2	TS-1 L2	
	#1	Load - T3	TS-1 L3	
	#1/0	GND	TS-1 GND **(Do NOT connect anything to neutral point.)**	
WL (Warning light) *See Figure 2-80, on page 182.*	#14	LV Source -1	TS6 1	
	#14	LV Source -2	TS6 2	
	#14	X-Ray ON Light -1	TS6 3	
	#14	X-Ray ON Light -2	TS6 4	
	#14	Sys-ON Light -1	TS6 5	
	#14	Sys-ON Light -2	TS6 6	
	#14	Ready Light -1	TS6 7	
	#14	Ready Light -2	TS6 8	
DS (Scan Room Door Switch)	#14	Door SW-1	TS6 9	
	#14	Door SW-2	TS6 10	

Note: Add #2 ground wire.

IMPORTANT: Add AWG #2 ground wire from Table frame to Table/Gantry raceway ground bar (as shown in Figure 2-2).

WARNING

WORK WITH THE ELECTRICAL CONTRACTOR TO BE SURE EXTERNAL POWER SOURCE IS TURNED OFF.

Section 4.0
LCGOC/GOC4/AIO Console Connections

4.1 SCIM, Keyboard, Trackball & Mouse Installation

NOTICE **Use OC Long Cable Kit (P/N: 5160577) for Freedom Workspace (FWS) table.**

1.) Route the keyboard cable under the SCIM, as shown in Figure 2-4.

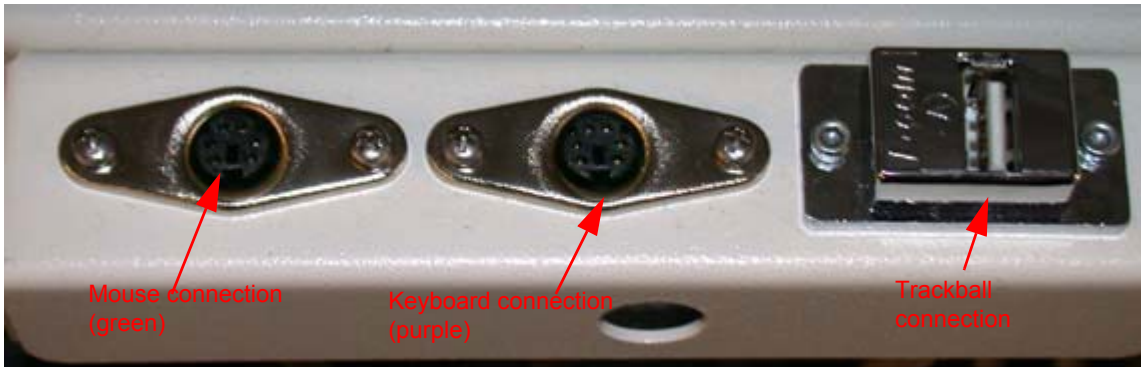
Figure 2-4 SCIM control with keyboard cable routed through SCIM

NOTICE **Potential for equipment damage**

Never connect a mouse or keyboard with the host computer powered "ON". Doing so can destroy components within the host computer.

2.) The keyboard and mouse connect to the ports on the top of the console front bulkhead. The keyboard connects to the port on the right, the mouse connects to the left port (Figure 2-5).

Figure 2-5 Global Console front bulkhead, showing keyboard and mouse connection



3.) Connect the SCIM cable to the SCIM as shown in Figure 2-6 (note the cable routing).

Note: Make sure the SCIM connector fits snug. Some molding may need to be removed to allow the cable to fit snug.

Figure 2-6 SCIM bottom, showing cables and keyboard mounting bracket

4.) Select and install the proper overlay with the appropriate language for your system: (1) with Tilt or (2) without tilt.

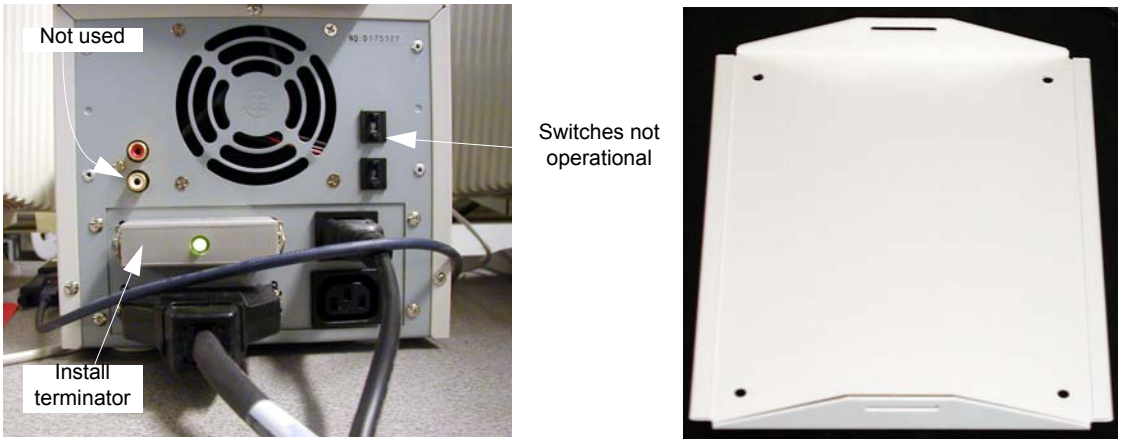
Verify that none of the buttons get caught and stuck under the overlay. Pay close attention to the prescribed tilt button on systems with the tilt feature.

5.) The keyboard should attach to the SCIM using the supplied Velcro strip and fit snugly against the SCIM when finished, as shown in Figure 2-7.

Figure 2-7 SCIM connected to the keyboard with the US English tilt overlay installed

4.2 Connecting the SCSI Tower

Figure 2-8 SCSI tower: Connections (left) and Optional Seismic Mounting Bracket (right)



1.) Connect the SCSI cable to the rear of the SCSI tower.

Note: The cable is included in the SCSI Cable Kit and is the same as the DASM cable.

2.) Connect the SCSI terminator to the rear of the SCSI tower.

3.) Connect the power cable to the rear of the SCSI tower.

4.3 Connecting the Monitor

NOTICE **Use OC Long Cable Kit (P/N: 5160577) for Freedom Workspace (FWS) table.**

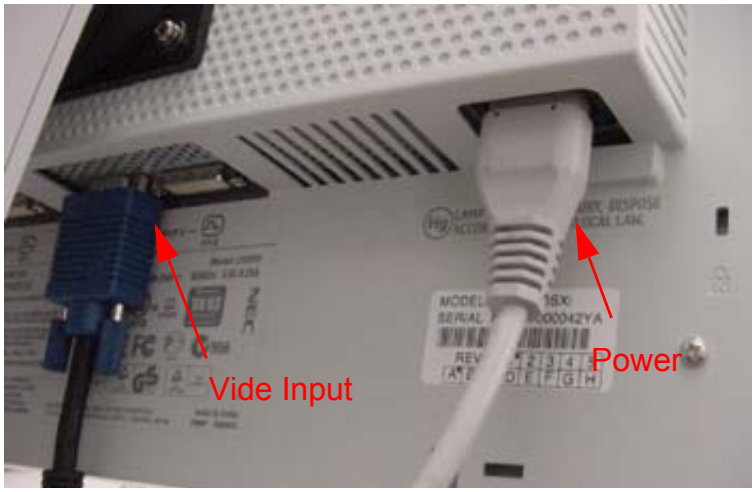
1.) With the monitor and computer switched off, connect the video signal cable to the monitor's video input (see Figure 2-9).

NOTICE **Equipment Damage Possible**

Do not touch the video signal cable connector pins as this might bend them. When connecting the video signal cable, check the alignment of the HD15 connector. Do not force the connector in the wrong way, or the pins might bend.

2.) Connect the power cord to the monitor, then connect it to console power panel outlet J10 or J12.

Figure 2-9 Monitor Connections (NEC Model 1980SXi)



4.4 Power Panel Connections

Note: Console power is single phase power. Outlet assigned is not critical.

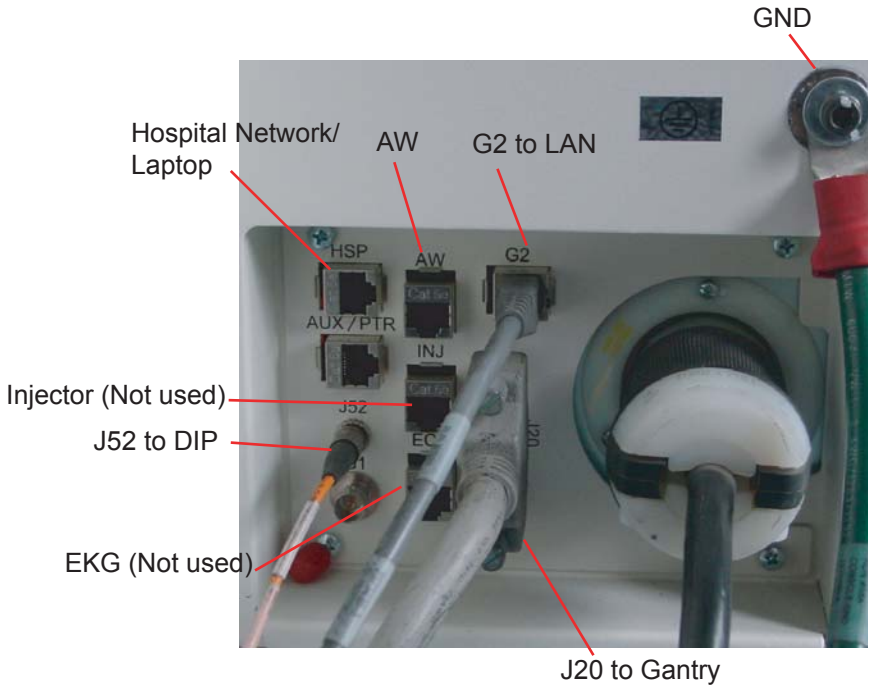
1.) Connect the console power cable to the console power panel.

2.) Connect console component power cords as listed in Table 2-6. (“J numbers” increment from top to bottom, left to right)

Table 2-6 Power Panel Outlet Assignments - GC-GRE

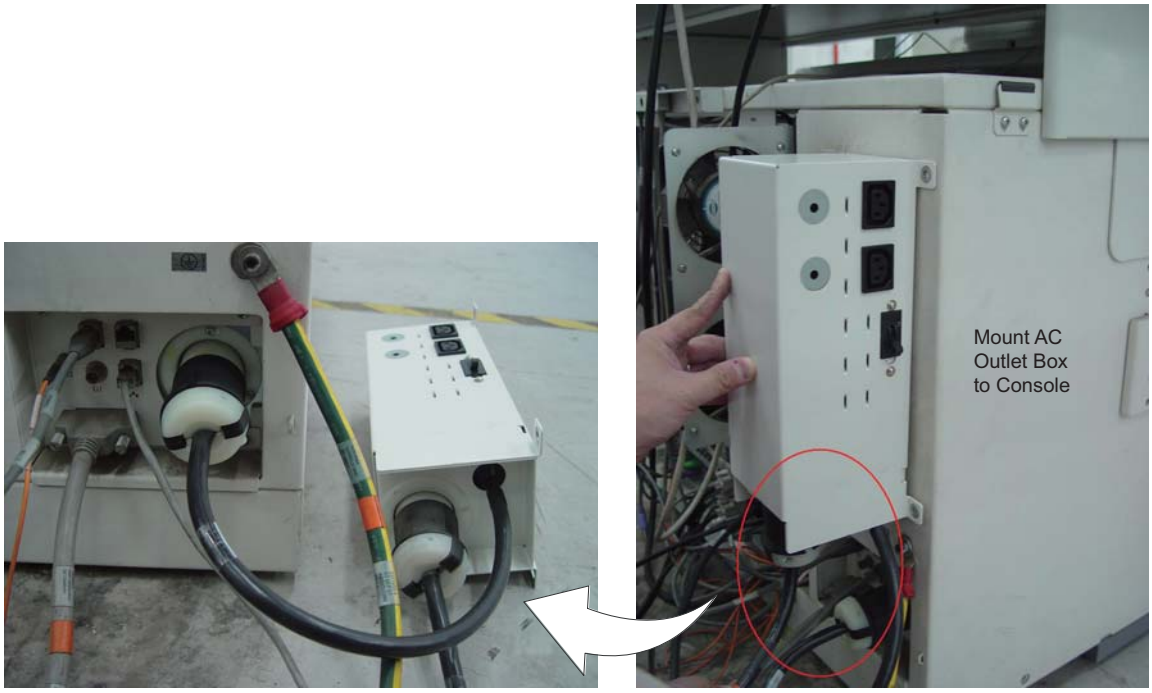
J#	DEVICE	J#	DEVICE
J1		J9	Host Computer
J2		J10	Power Monitor
J3	Modem	J11	DARC
J4	IG 3	J12	Power Monitor
J5	IG 1	J13	ICOM
J6	IG 2	J14	Power Media Conv
J7		J15	Fan
J8		J16	

Figure 2-10 Power Connections



Note: If Integrated Injector is installed, AC Outlet Box must be used for power connetion. Refer to Figure 2-11 for cable connection.

Figure 2-11 Power Connection (with AC Outlet Box)

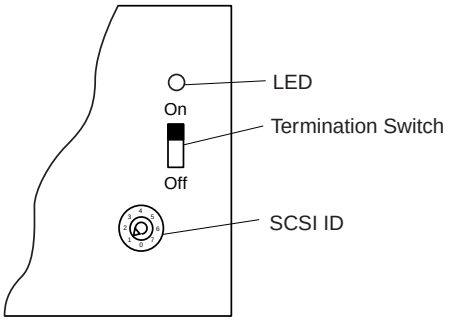


4.5 Installing a DASM (Hardware Option)

If you have a digital DASM to install, complete the following steps to connect it to the computer.

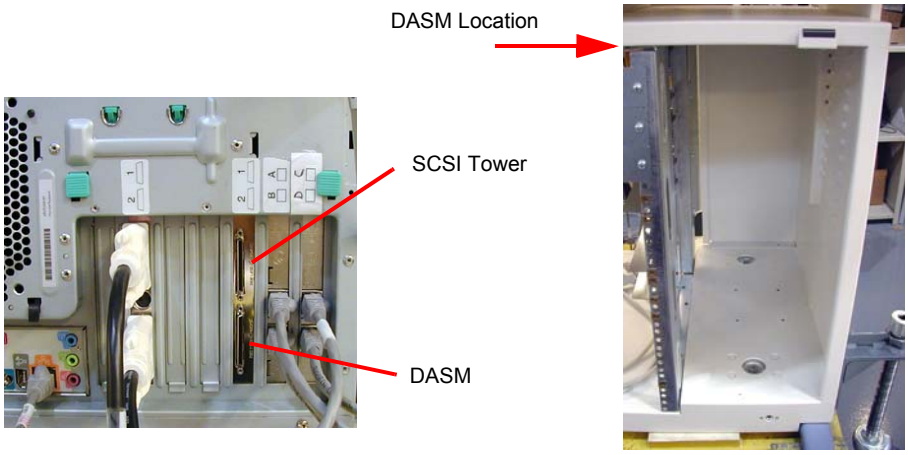
1.) Turn the DASM over so you are looking at the bottom.
2.) Set the DASM SCSI ID to 1.
3.) Set the DASM termination to ON.

Figure 2-12 DASM Bottom



4.) Set the RS232/RS422 switch to the RS232 position, for a digital DASM.
5.) Refer to Figure 2-13. Attach the SCSI cable supplied with DASM kit to the back of the DASM.

Figure 2-13 Rear view of HP xw8200, showing DASM SCSI cable connection



6.) Attach the free end of the SCSI cable to the rear of the Host Computer (see Figure 2-13).
7.) Plug DASM power cord into J10 (or any open slot).
8.) Attach remaining cable(s) from camera to DASM and install the DASM to the right of the slide-out tray.

Note: See your *Software Load Procedures* manual for instructions on configuring cameras.

4.6 Modem Option

If you have a modem to install, do it now. Place the modem on top of the console desktop. Hook up the power, phone, serial line (for GOC4/LCGOC) or USB line (for All-In-One Console) as shown in drawing which is located in the back cover of the console.

NOTICE If global Modem with Series port is used on All-In-One Console, connect the Series-USB converter cable to modem at first, then connect to USB port on the Host Computer inside of the All-In-One Console.

NOTICE If the USB Modem is used on All-In-One Console, there is no power cable for USB Modem. Only connect the USB cable to USB port on Host Computer inside of the All-In-One Console.

NOTICE For All-In-One Console, connect the USB cable to one of the USB port at rear of Host Computer. No specific USB port is designated.

4.7 LAN Connections

Plug LAN cable into HSP port of rear bulkhead on console.

Figure 2-14 LAN Connection

4.8 GOC4/LCGOC Interconnect

Figure 2-15 GOC4/LCGOC Interconnect

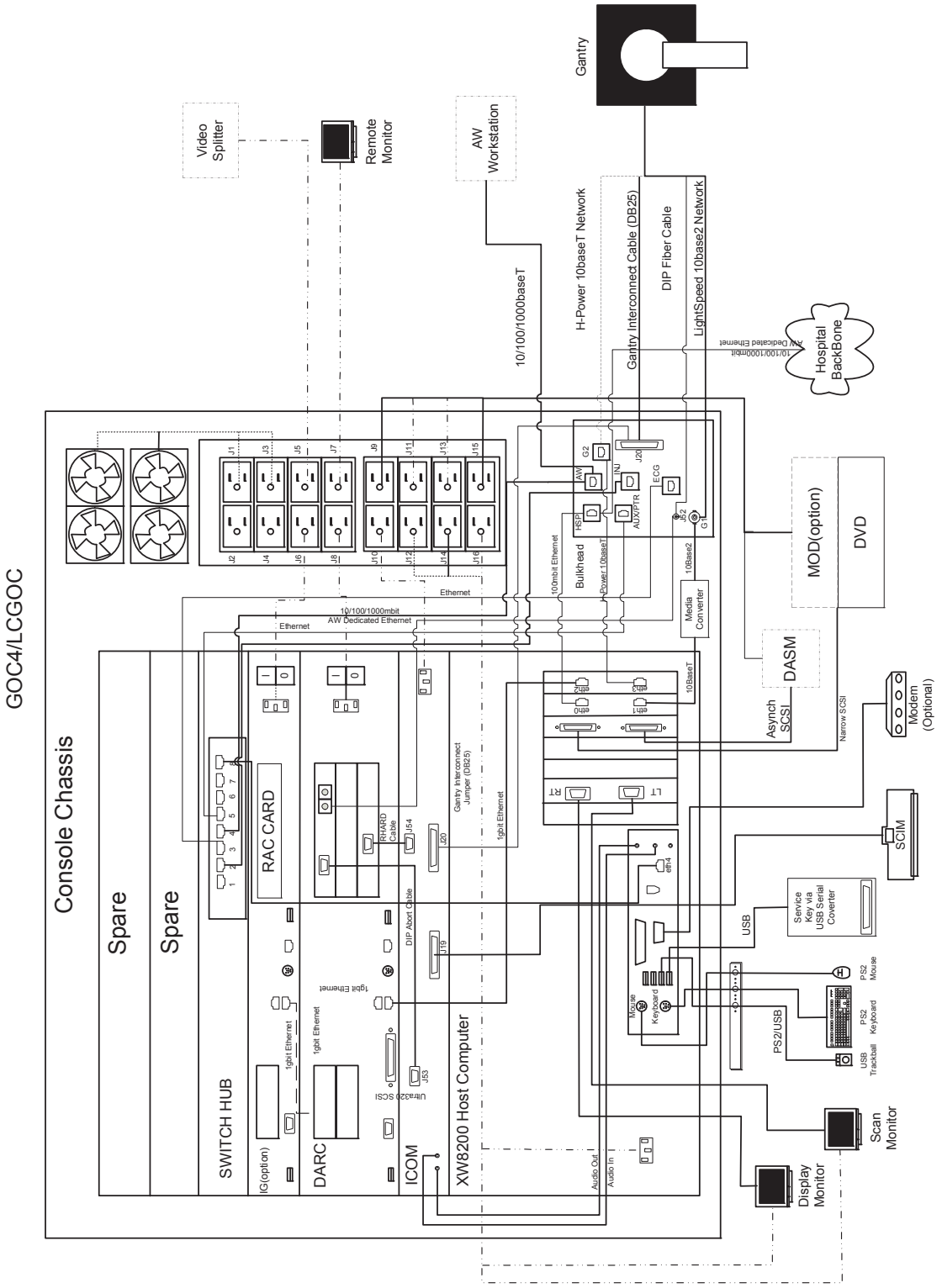
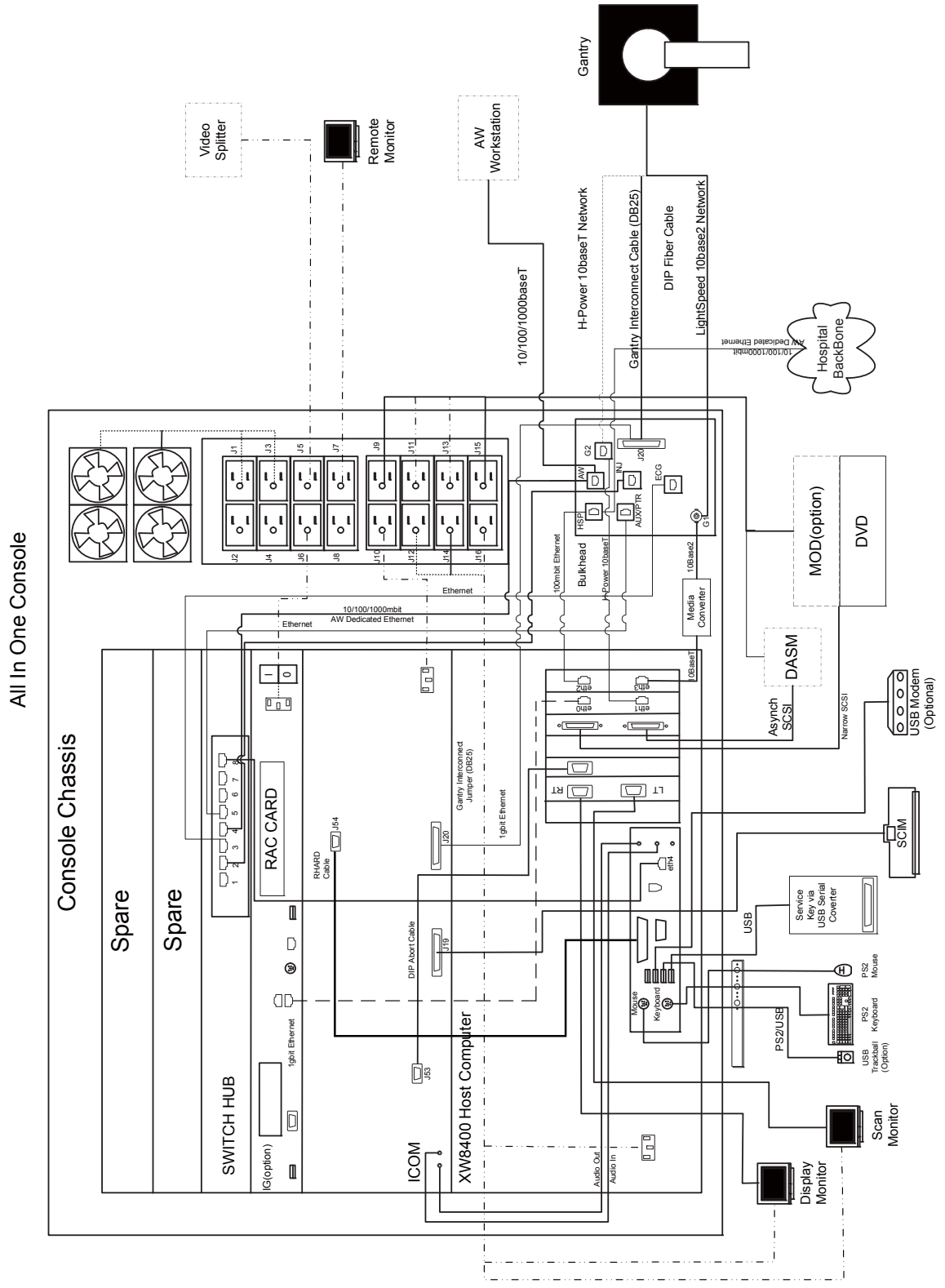


Figure 2-16 All-In-One Console Interconnect



Section 5.0
True-In-One Console Connections

5.1 SCIM, Keyboard, Trackball & Mouse Installation

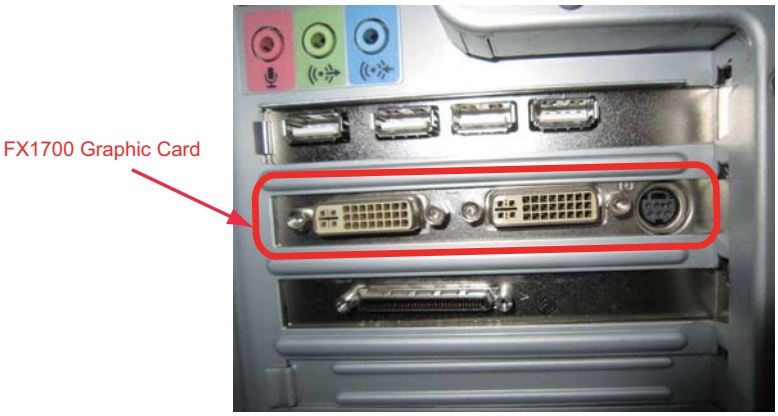
1.) Route the keyboard cable under the SCIM, as shown in Figure 2-4.

Figure 2-17 SCIM control with keyboard cable routed through SCIM

NOTICE **Potential for equipment damage Never connect a mouse or keyboard with the host computer powered "ON". Doing so can destroy components within the host computer.**

2.) Connect the keyboard and mouse to the ports on the USB connector of xw8600 (Figure 2-18).

Figure 2-18 TIO USB Connector Location with FX1700 graphic card



USB Connection on TIO Console with FX1700 Graphic Card:

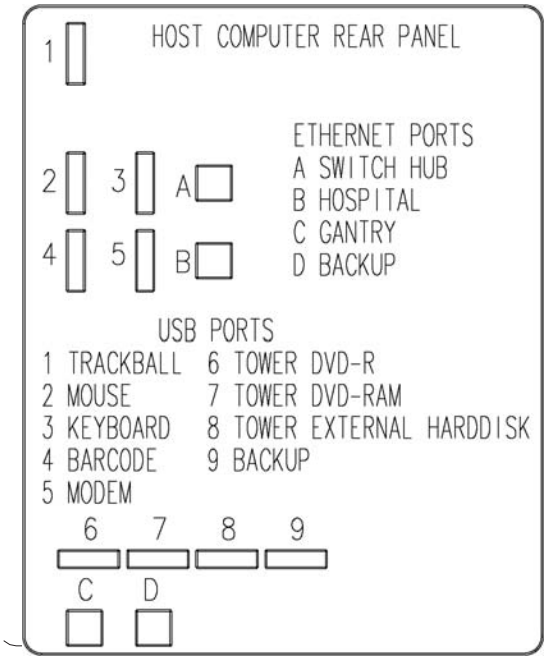
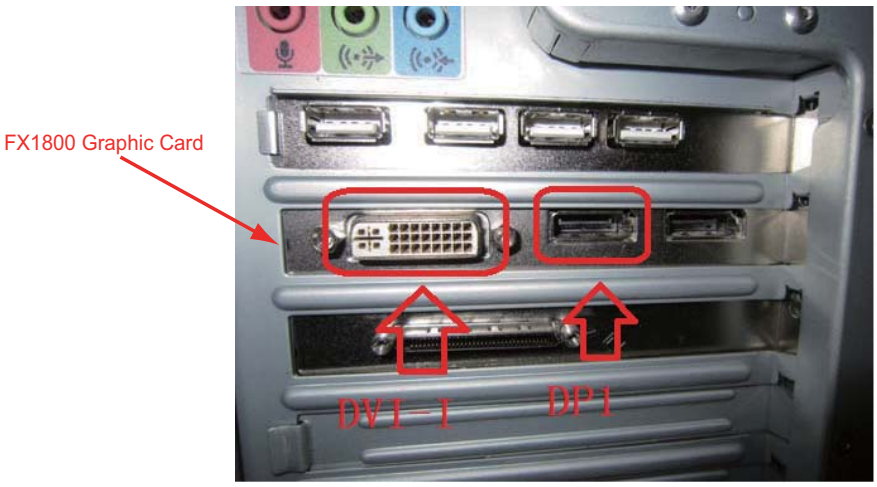
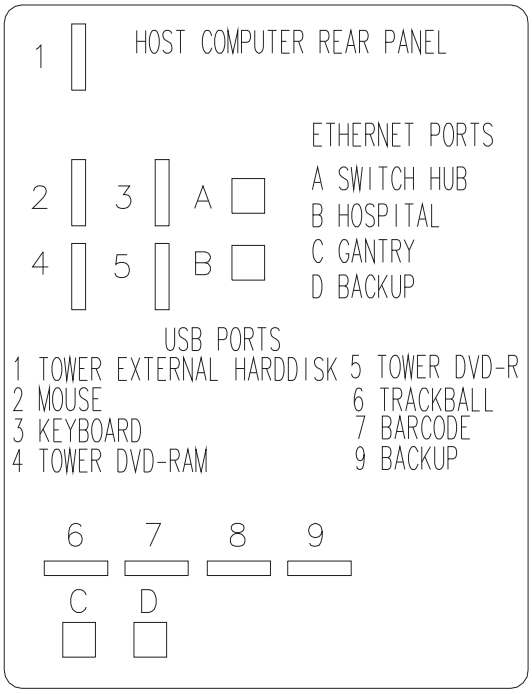


Figure 2-19 TIO USB Connector Location with FX1800 graphic card



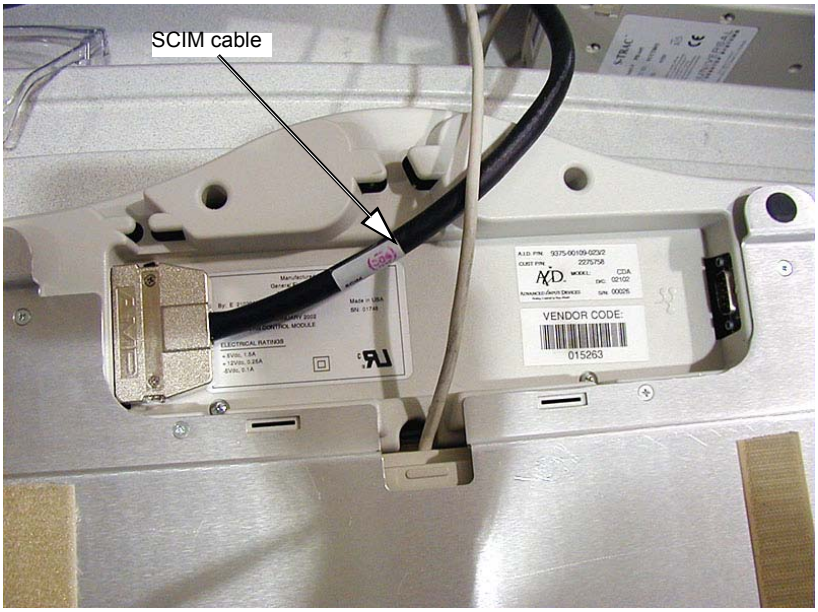
USB Connection on TIO Console with FX1800 Graphic Card:



3.) Connect the SCIM cable to the SCIM as shown in Figure 2-6. (Note the cable routing.)

Note: Make sure the SCIM connector fits snug. Some molding may need to be removed to allow the cable to fit snug.

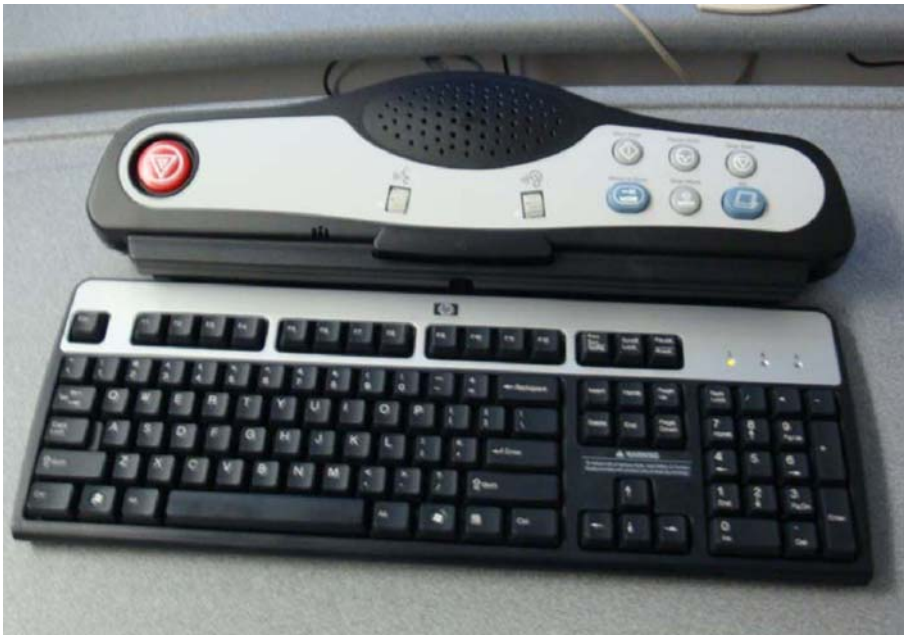
Figure 2-20 SCIM bottom, showing cables and keyboard mounting bracket



4.) Select and install the proper overlay with the appropriate language for your system: (1) with Tilt or (2) without tilt.
Verify that none of the buttons get caught and stuck under the overlay. Pay close attention to the prescribed tilt button on systems with the tilt feature.

5.) The keyboard should attach to the SCIM using the supplied Velcro strip and fit snugly against the SCIM when finished, as shown in Figure 2-21.

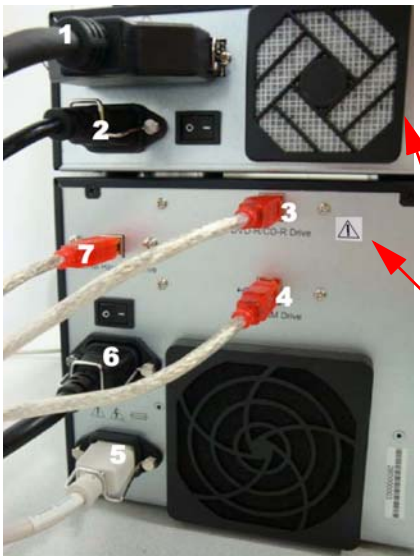
Figure 2-21 SCIM connected to the keyboard with the US English tilt overlay installed



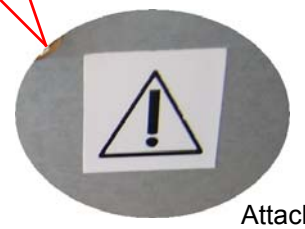
5.2 Connecting the Media Tower

5.2.1 Media Tower (5270510-3) Connection

Figure 2-22 Media Tower Connections shown with optional MOD Drive



1.) SCSI cable Mod Drive to console.
2.) Power into the MOD Drive
3.) DVD-R/CD-R Drive
4.) DVD-RAM Drive
5.) Power into the Media Tower
6.) Power out to the MOD Drive
7.) External Hard Disk Drive



Attach the warning label.

Check the box when each step is completed:

1.) ❒ Connect the three USB cables to the rear of the media tower. Each USB Cable is labeled, plug the labeled cable end into the correct connector.
2.) ❒ Connect the power cable to the rear of the media tower.
3.) ❒ Attach the warning label beside the DVD-R connector.

5.2.2 Media Tower (5270510-10, -11) Connection

Figure 2-23 Media Tower Front View

Figure 2-24 Media Tower Connections shown

1.) DVD-R/CD-R Drive
2.) Power into the Media Tower

5.3 Media Tower (5270510-20, -21, -22) Connection

Media Tower (5270510-20, -21, -22) Connection refer to section 6.2 - Connecting the Media Tower.

5.4 Option MOD Drive

1.) The power and SCSI cables that are supplied with the option.
2.) Mount MOD drive on top of the media tower.
3.) Connect the short power cable from the media tower to the MOD drive.
4.) Remove the rear cover to gain access to the HP.
5.) Connect the SCSI cable to channel 1 and route the cable so that is comes out of the top of the console.
6.) Reinstall the console rear cover and connect the SCSI to the rear of the mod drive.

5.5 Connecting the Monitor

5.5.1 Connecting the Monitor with FX1700 Graphic Card

NOTICE **Equipment Damage Possible**

Do not touch the video signal cable connector pins as this might bend them. When connecting the video signal cable, check the alignment of the HD15 connector. Do not force the connector in the wrong way, otherwise the pins might bend.

1.) Place the LCD monitors.

2.) Connect Scan Monitor and Image Monitor as followings:

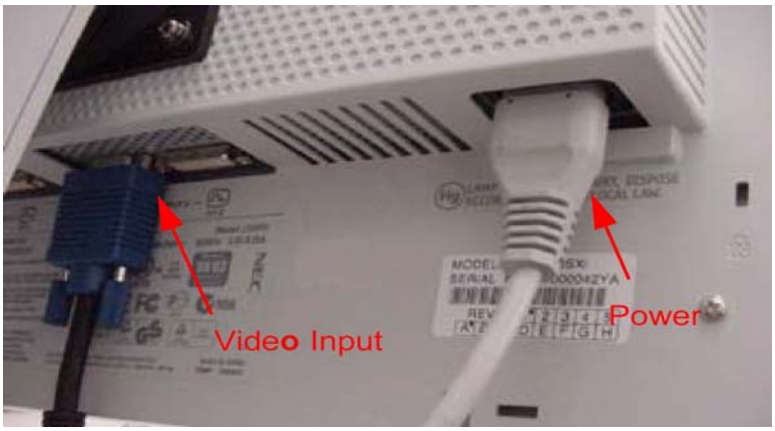
Scan Monitor

- Video cable from Console Host RGBHV (A) to Monitor D-SUB (HD15)
- Power cable from Console power panel outlet
- Route through the cable keeper

Image Monitor

- Video cable from Console Host RGBHV (B) to Monitor D-SUB (HD15)
- Power cable from Console power panel outlet
- Route through the cable keeper

Figure 2-25 Monitor Connections



3.) Connect the power cord to the monitor.

5.5.2 Connecting the Monitor with FX1800 Graphic Card

NOTICE **Equipment Damage Possible**

Do not touch the video signal cable connector pins as this might bend them. When connecting the video signal cable, check the alignment of the HD15 and DVI connector. Do not force the connector in the wrong way, otherwise the pins might bend.

Connect Scan Monitor and Image Monitor as following:

Scan Monitor

- Video cable from Console Host DP1 to Monitor DVI
- Power cable from Console power panel outlet
- Route through the cable keeper

Figure 2-26 Video Cable and Power Cable

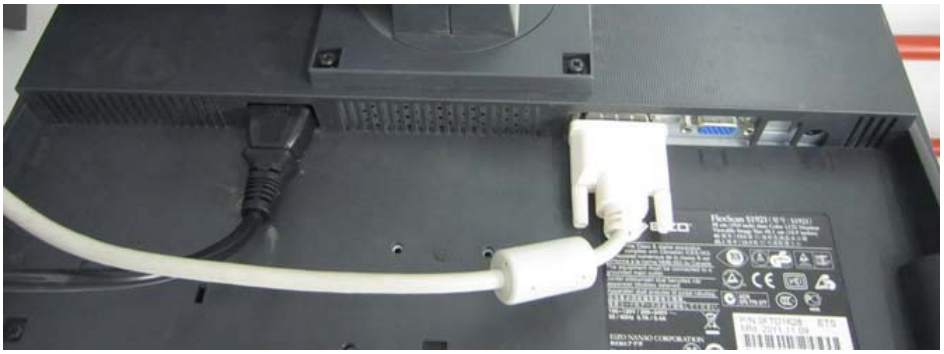


Image Monitor

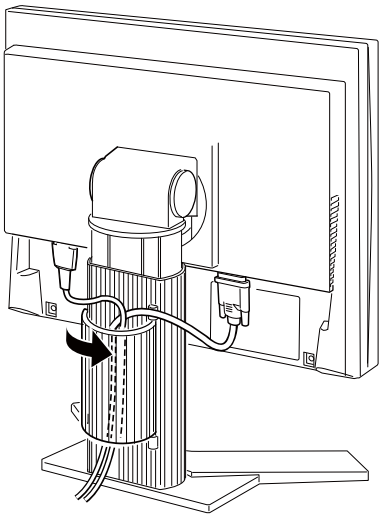
- Video cable from Console Host DVI-I to Monitor D-SUB
- Power cable from Console power panel outlet
- Route through the cable keeper

Figure 2-27 Video Cable and Power cable

DESCRIPTION	PART NUMBER	CABLE LENGTH	QTY
Scan Monitor Power Cable	5432953-4	3050 mm	1
Scan Monitor Video Cable	5408703	3000 mm	1
Display Monitor Power Cable	5432953-3	3050 mm	1
Display Monitor Video Cable	5332107-2	3000 mm	1

Table 2-7 Monitor Cables

Figure 2-28 Cable Routing and Keeper



NOTICE There is the exist issue that scan and image monitors display reverse on TIO (True-In-One) console + FX1800 graphics card (PN: 5700000-24) before 11BW46.3 SP2.2 installation.

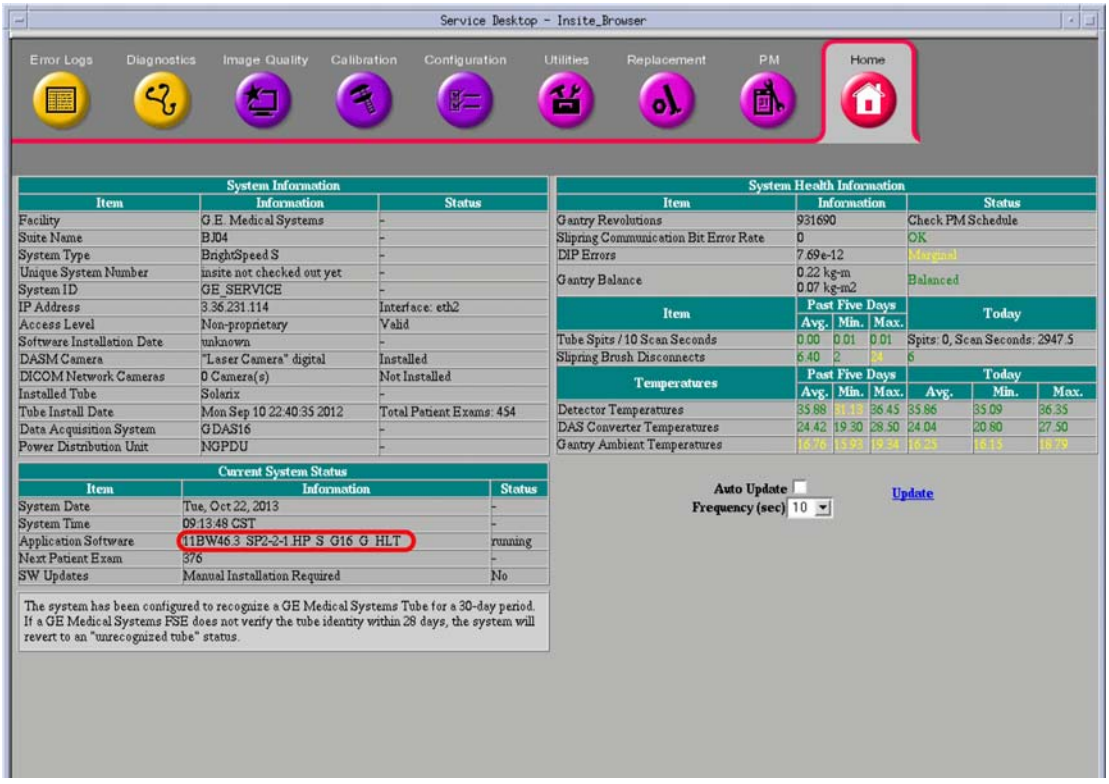
At first, check the software version string by following methods to confirm whether 11BW46.3 SP2.2 has been installed or not.

a.) Open a Unix Shell and type the following command, for example as below:

```
{ctuser@hostname} swhwinfo
11BW46.3_SP2-2-1.HP_S_G16_G_HLT
```

b.) Look at the Common Service Desktop Home Page.

Figure 2-29 Common Service Desktop



- **Prior to 11BW46.3 SP2.2 Installation**

There is a workaround for the scan and image monitors display reverse issue as followings:

a.) Open a shell, and then input the command below:

```
{ctuser@hostname} su -
Password: #bigguy
[root@hostname]#cd /etc/X11
[root@hostname X11]#cp xorg.conf.clean xorg.conf.clean.backup.date (date=Current date)
[root@hostname X11]#cp xorg.conf xorg.conf.backup.date (date=Current date)
[root@hostname]#BaseMonitorOpts Device0 TwinViewOrientation LeftOf
[root@hostname]#cp /etc/X11/xorg.conf /etc/X11/xorg.conf.clean
cp: overwrite `/etc/X11/xorg.conf.clean'? y
```

b.) Reboot the system.

- **After 11BW46.3 SP2.2 Installation**

Skip above command input and perform the section 5.5.3 - LCD Video Monitor Setup for LCD Monitor Setup.

5.5.3 LCD Video Monitor Setup

Detail LCD video monitor setup please refer to ***Service Methods→ Align,Setup,Calibration→ Console→LCD Video Monitor Setup.***

5.6 Power Panel Connections

Note: Console power is single phase power. Outlet assigned is not critical.

1.) Connect the console power cable to the console power panel.

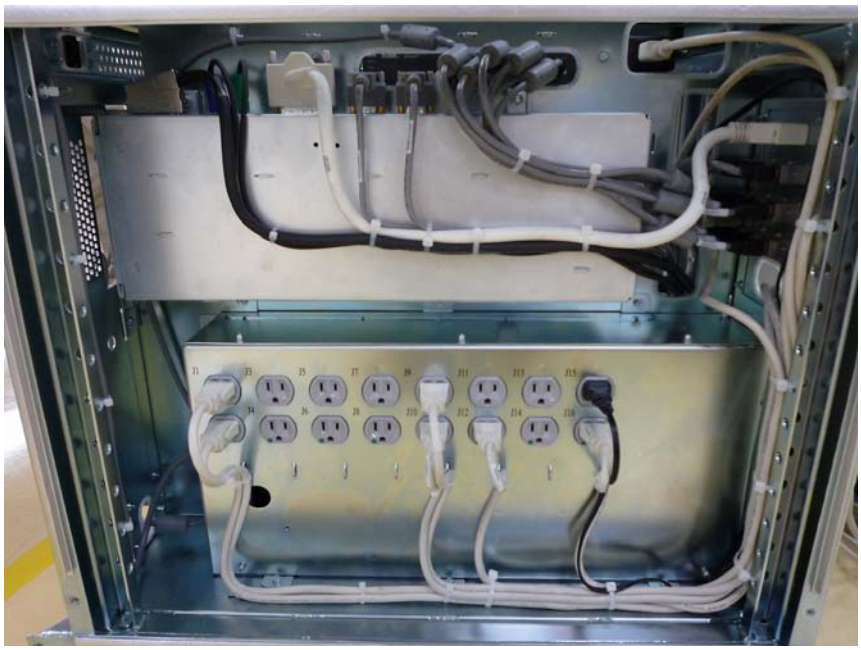
2.) Connect console component power cords as listed in Table 2-6. (“J numbers” increment from top to bottom, left to right)

Table 2-8 Power Panel Outlet Assignments

J#	DEVICE	J#	DEVICE
J1		J9	
J2		J10	
J3	Monitor	J11	Fan
J4	Monitor	J12	Host
J5	Media Tower	J13	
J6	MOD	J14	
J7	Hub	J15	
J8	ICOM	J16	

Figure 2-30 Power Connections

Figure 2-31 Power Panel Outlet



5.7 Modem Option

If you have a modem to install, do it now. Place the modem on top of the console desktop. Power supply of the Modem shall be located inside the console. Hook up the power, phone, or USB line as shown in drawing which is located in the back cover of the console.

NOTICE Only global Modem with Serial port can be used on True-In-One console, connect the serial USB converter cable to modem at first, then connect to USB port on the Host Computer inside of the True-In-One console.

Attach the warning label at the top of the modem.

5.8 LAN Connections

Plug LAN cable into HSP port of xw8600 (refer to Figure 2-18).

5.9 TIO OC Interconnect

Figure 2-32 TIO OC Interconnect with FX1700 Graphic Card

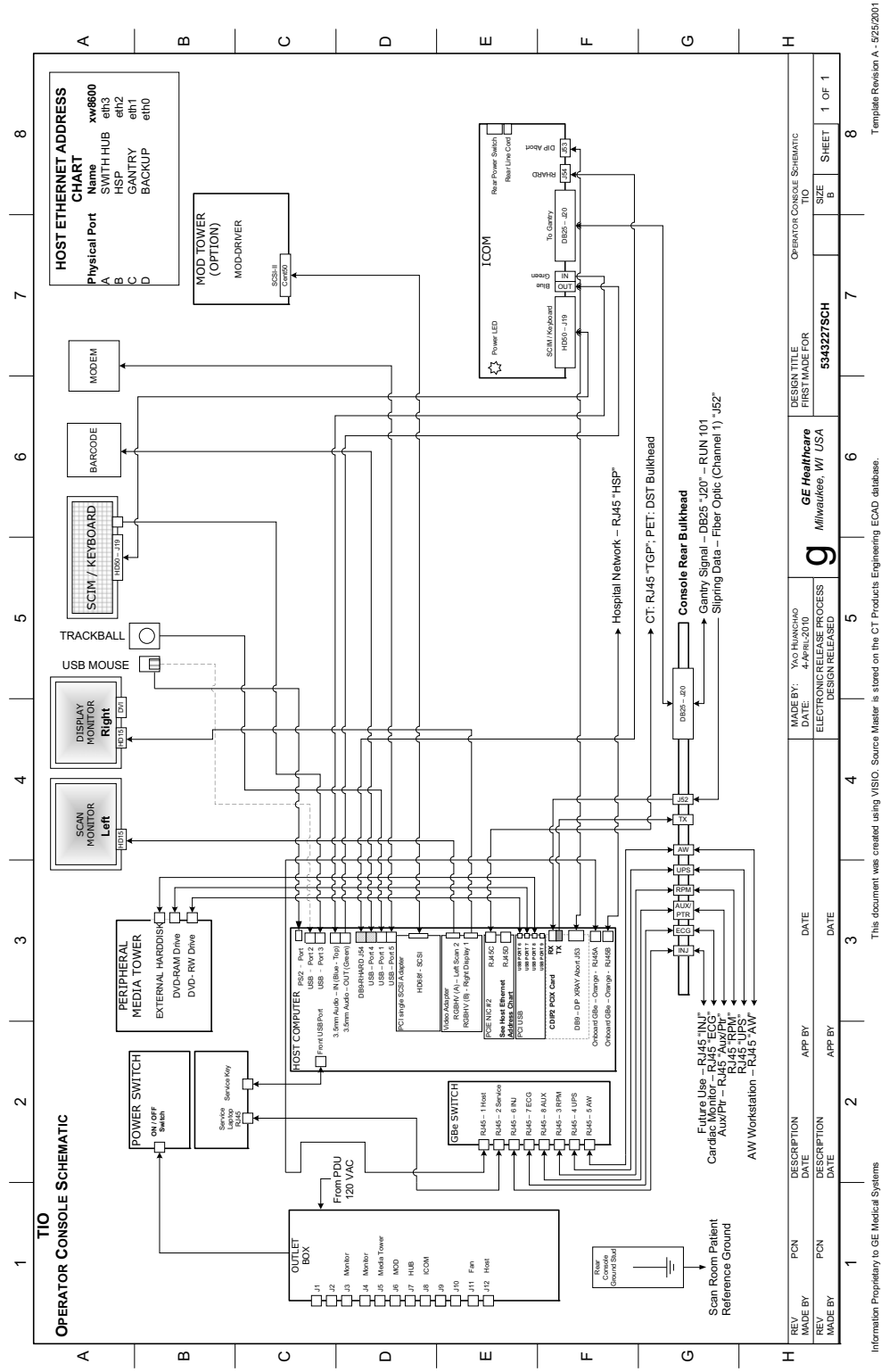
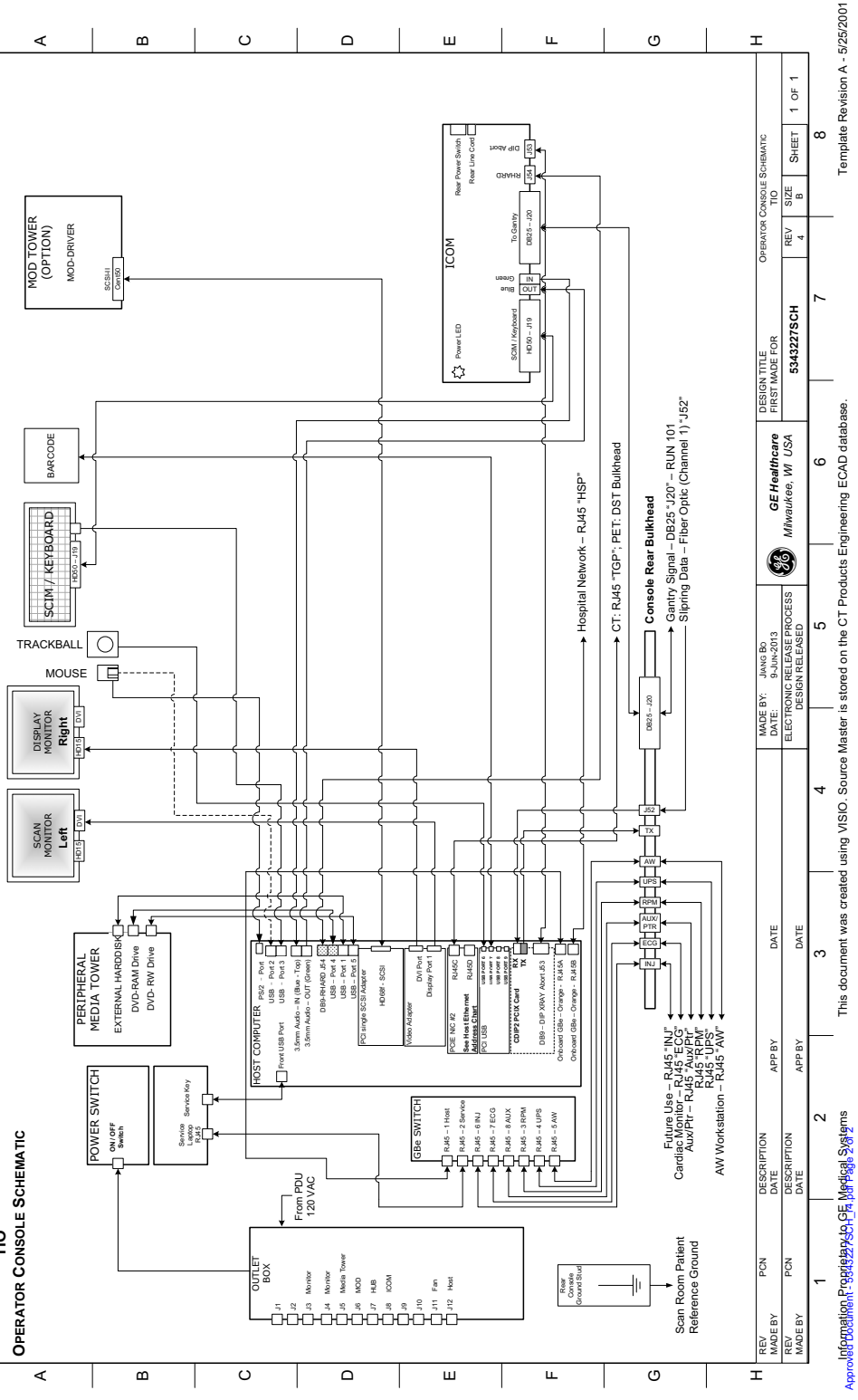


Figure 2-33 TIO OC Interconnect with FX1800 Graphic Card



Section 6.0
NIO16 Console Connection

6.1 GSCB, Keyboard, Trackball & Mouse Installation

PART #	DESCRIPTION	CONNECT TO	QUANTITY	LENGTH	
				MM	INCHES
5366514-2	Cable, USB_Extend	Keyboard	1	3560 ± 30	140.16 ± 1.18
5450275	PS2 extension cable	Mouse	1	3500 ± 50	137.80 ± 1.97
5332107-2	CABLE, DVI to D-SUB VIDEO CABLE	Monitor	1	3000 ± 20	118.11 ± 0.79
5315370	CABLE, USB TYPE A-B	PMT media Tower, DVD-RW/USB external HDD	2	2000	78.74
5408703	DP to DVI cable, 3 meter	Monitor	1	3000 ± 50	118.11 ± 1.97
5432953-2	Power Cable, Peripheral Tower to NIO AC Box	PMT media Tower	1	3050 ± 50	120 ± 1.97
5432953-3	Power Cable, Display monitor to NIO AC Box	Monitor	1	3050 ± 50	120 ± 1.97
5432953-4	Power Cable, Scan monitor to NIO AC Box	Monitor	1	3050 ± 50	120 ± 1.97

Table 2-9 GE Healthcare Supplied NIO16 Console Cables

1.) Route the keyboard cable under the GSCB, as shown in Figure 2-36.

NOTICE

Potential for equipment damage

Never connect a mouse or keyboard with the host computer powered "ON". Doing so can destroy components within the host computer.

2.) Route the keyboard and mouse cables to NIO16 console.
If the length of keyboard and mouse cables is not enough, add the following cable extensions (shipped with OC collector).

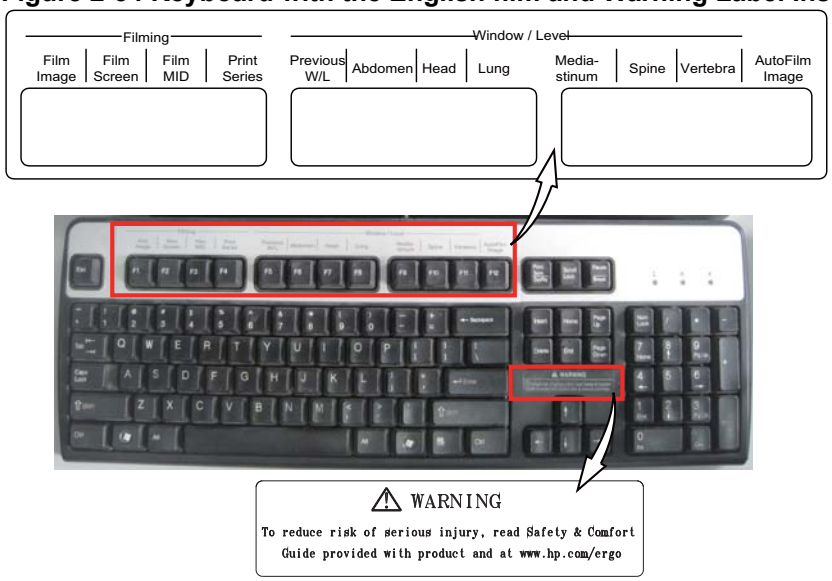
DESCRIPTION	PART NUMBER	CABLE LENGTH	QTY
PS2 extension Cable (Mouse)	5450275	3500 mm	1
USB Cable (Keyboard)	5366514-2	3560 mm	1

Table 2-10 Cable Extension

3.) Select the local language overlay film from the keyboard collector (5431062-1-XX) for your system.

- Select keyboard overlay from keyboard collector (5324605-XX) to attach. (See Figure 2-34)

Figure 2-34 Keyboard with the English film and Warning Label Installed



- Select the GSCB overlay (with Tilt and w/o **E-Reset**, P/N is 5409747-XXX) and install the proper overlay with the appropriate language for your system, as shown in Figure 2-35.

Verify that none of the buttons get caught and stuck under the overlay. Pay close attention to the prescribed tilt button on systems with the tilt feature.

Figure 2-35 GSCB without E-Reset overlay

4.) The keyboard should attach to the GSCB using the supplied Velcro strip and fit snugly against the GSCB when finished, as shown in Figure 2-36.

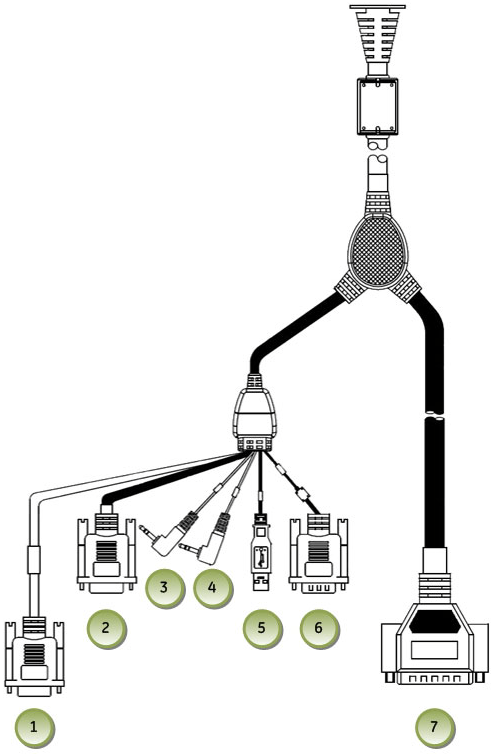
Figure 2-36 GSCB connected to the keyboard with the US English tilt overlay installed

Note: X-ray ON sound can be turned off / on using the switch on GSCB bottom if customer does not like it and if local regulation does not require X-ray ON sound. Detail information refer to ***Service Methods->Troubleshooting->NIO16 Console-> GSCB Troubleshooting***.

5.) Route the GSCB cable and connect connectors according to Figure 2-37 and Table 2-11.

Note: The USB cable of GSCB is reserved, please tie it with tie-wrap.

Figure 2-37 GSCB and Connections



	ITEM	DESCRIPTION
1	GSCB - Black DB-9 (Female) Connector	Host Computer DIP
2	GSCB - Gray DB-9 (Female) Connector	Host Computer RS232
3	GSCB - Green Audio Connector	Host Computer Audio Out (Green)
4	GSCB - Blue Audio Connector	Host Computer Audio In (Blue)
5	GSCB - USB Connector	Reserved
6	GSCB - Black DB-9 (Male) Connector	AC Box J56
7	GSCB - Black DB-25 (Male) Connector	TGP Gantry Cable

Table 2-11 GSCB Cables

6.2 Connecting the Media Tower

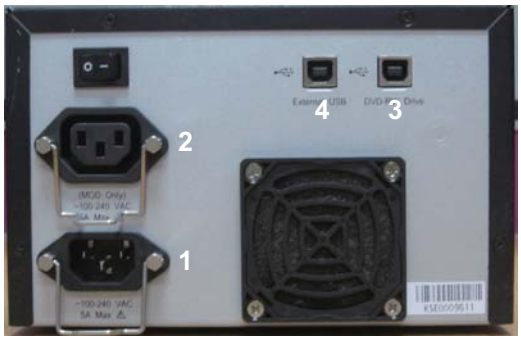
1.) Media Tower Connection (5270510-10, -11), refer to 5.2.2 Media Tower (5270510-10, -11) Connection.

2.) Media Tower Connection (5270510-20, -21, -22), refer to Figure 2-38.

Figure 2-38 Media Tower Connection shown

Front View

Rear View



1) Power for Media Tower
2) Power for MOD Drive
3) DVD-RW Drive
4) External USB
5) HDD External
SSA Key

Connect the power cable to the rear of the media tower. Use the following cables for connection.

DESCRIPTION	PART NUMBER	CABLE LENGTH	QTY
USB Cable (PMT)	5315370	2000 mm	2
PMT power cable	5432953-2	3050 mm	1

Table 2-12 Media Tower Cables

6.3 Connecting the EIZO LCD Monitor

NOTICE **Equipment Damage Possible**

Do not touch the video signal cable connector pins as this might bend them. When connecting the video signal cable, check the alignment of the HD15 connector. Do not force the connector in the wrong way, otherwise the pins might bend.

6.3.1 Connect Scan Monitor and Image Monitor as following:

Scan Monitor

- Video cable from Console Host DP0 to Monitor DVI
- Power cable from Console J10
- Route through the cable keeper

Figure 2-39 Video Cable and Power Cable

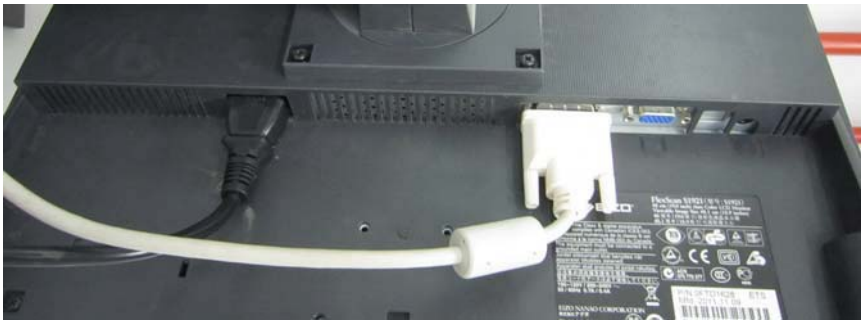


Image Monitor

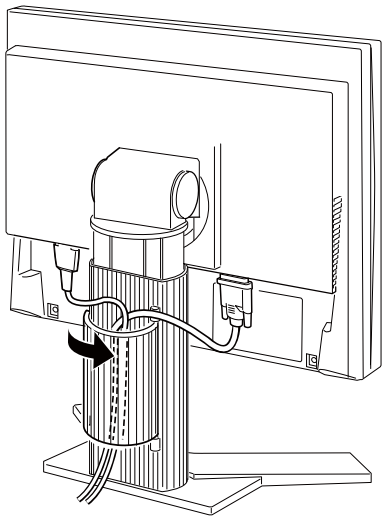
- Video cable from Console Host DVI-I to Monitor D-SUB
- Power cable from Console J9
- Route through the cable keeper

Figure 2-40 Video Cable and Power cable

DESCRIPTION	PART NUMBER	CABLE LENGTH	QTY
Scan Monitor Power Cable	5432953-4	3050 mm	1
Scan Monitor Video Cable	5408703	3000 mm	1
Image Monitor Power Cable	5432953-3	3050 mm	1
Image Monitor Video Cable	5332107-2	3000 mm	1

Table 2-13 Monitor Cables

Figure 2-41 Cable Routing and Keeper

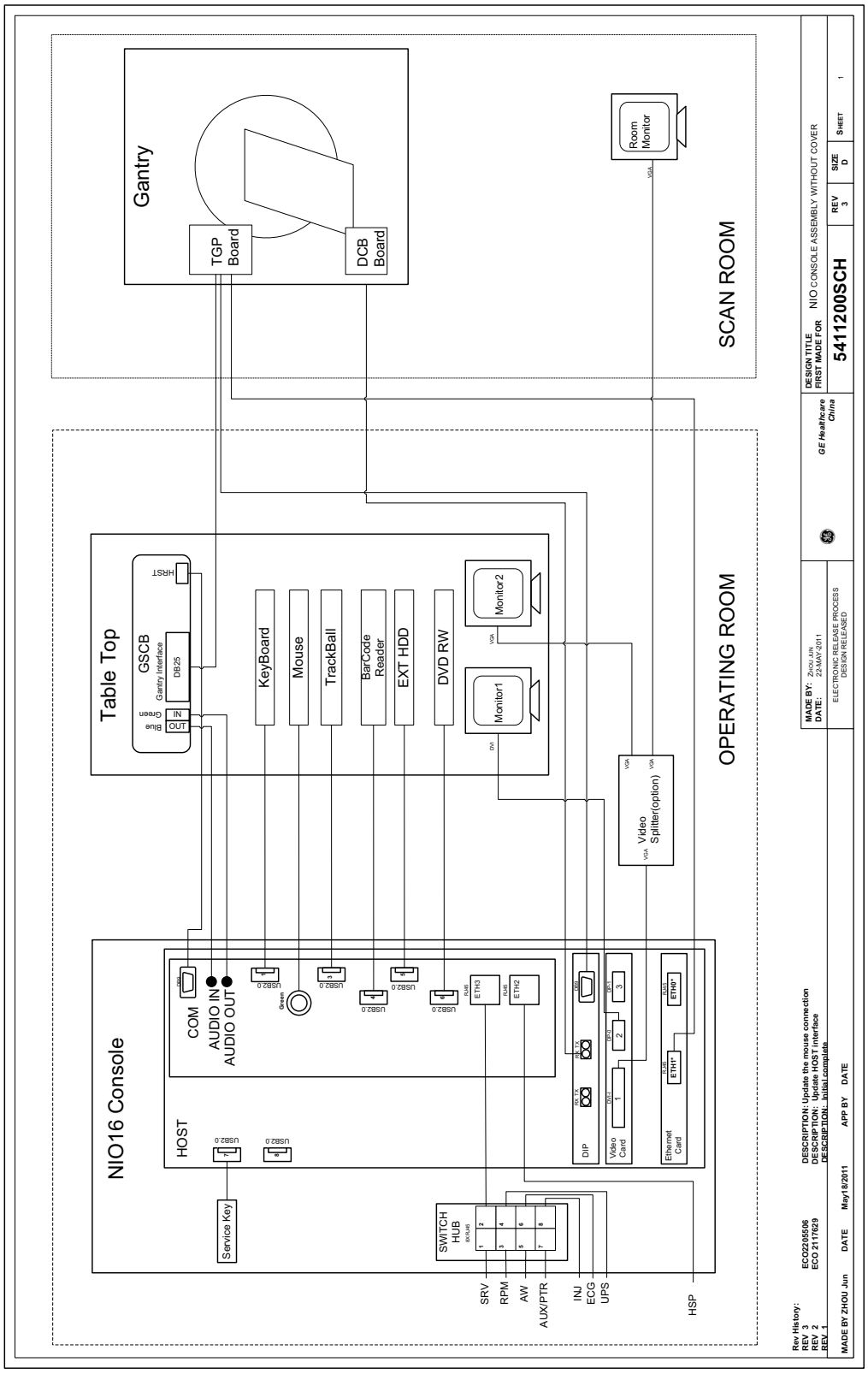


6.3.2 LCD Video Monitor Setup

Detail LCD Video Monitor Setup please refer to ***Service Methods→ Align,Setup,Cals→ Console→ LCD Video Monitor Setup.***

6.4 NIO Console Interconnections

Figure 2-42 NIO OC Interconnect



6.5 Host Computer Connections

NOTICE Potential for equipment damage Never connect a mouse or keyboard with the host computer powered "ON". Doing so can destroy components within the host computer.

1.) Open the right side of the console rear panel.

Figure 2-43 NIO Rear View with 5412524 AC BOX

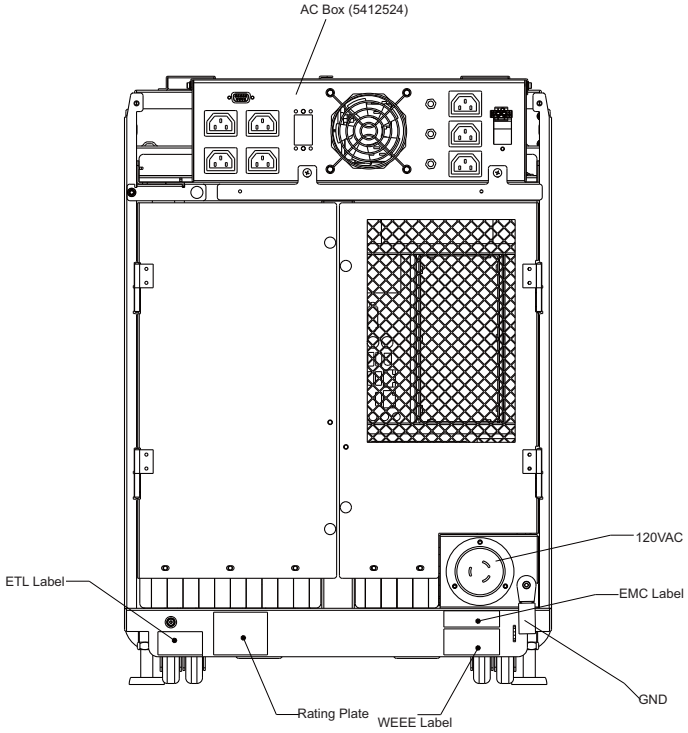
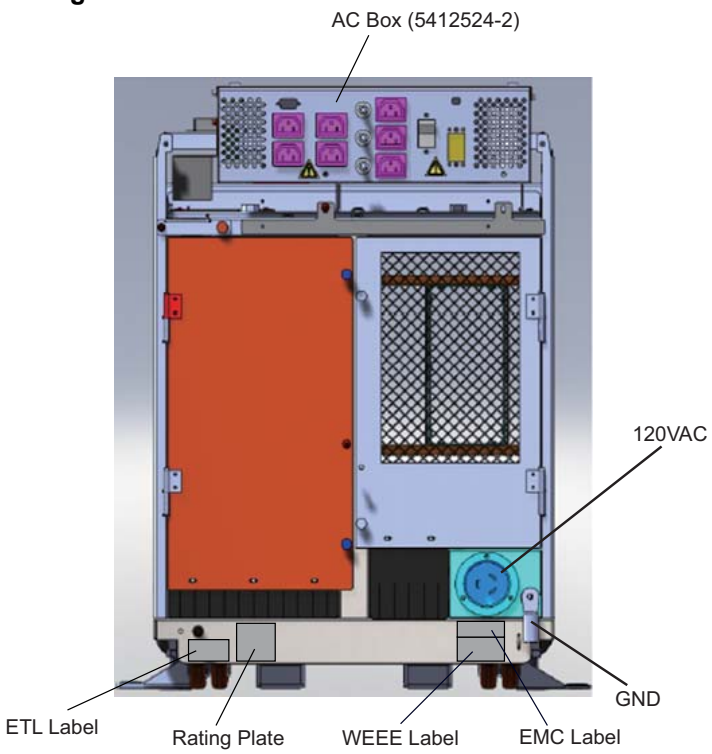


Figure 2-44 NIO Rear View with 5412524-2 AC BOX



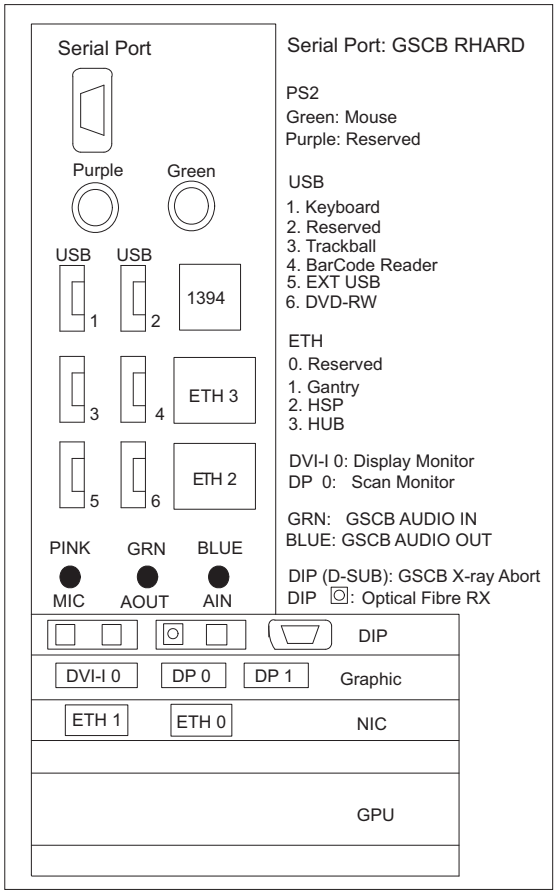
2.) Connect the power cable and ground cable to the console rear panel. (See Figure 2-43)

PART NUMBER		DESCRIPTION
SHORT	LONG	
2343531-2	2343531	120VAC Power Cable from PDU to OC
2371450-4	2371450-3	Ground, Raceway to OC

Table 2-14 Console Cable Connections

3.) Connect the all cables (see Table 2-9) to the rear of Host Computer referring to the drawing below (Figure 2-45).The drawing is also printed on the right rear door of the console.

Figure 2-45 Host Computer Connections

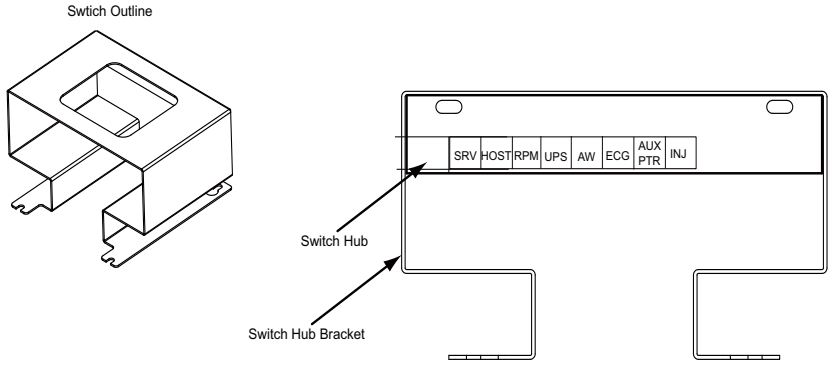


NOTE: EXT USB is for DVD Tower External HD Drive
DVD-RW is for DVD Tower DVD-R / CD-R Drive

6.6 Switch Hub Connections

Switch Hub located on the left bottom of the console. Plug cables into Switch Hub on console.

Figure 2-46 Switch Hub Connections



6.7 AC Box Connections

CAUTION **The outlets are not for General Use. Operator Console outlet has a rating for 2.5A at 120VAC. Accessories should not exceed above rating.**

Note: Console power is single phase power. Outlet assigned is not critical.

1.) Connect the console power cable and ground cable to the console power panel.

2.) Connect console component power cords as listed in Table 2-15. ("J numbers" increment from top to bottom, left to right)

Number	Description
J9	Display Monitor Power Connection
J10	Scan Monitor Power Connection
J11	Peripheral Media Tower Power Connection
J12	In-Room Monitor Connection
J13	Injector Power Connection
J14	RPM Power Connection
J56	GSCB Power Connection

Table 2-15 AC Box Outlet Assignments

Figure 2-47 AC Box (5412524) Connections

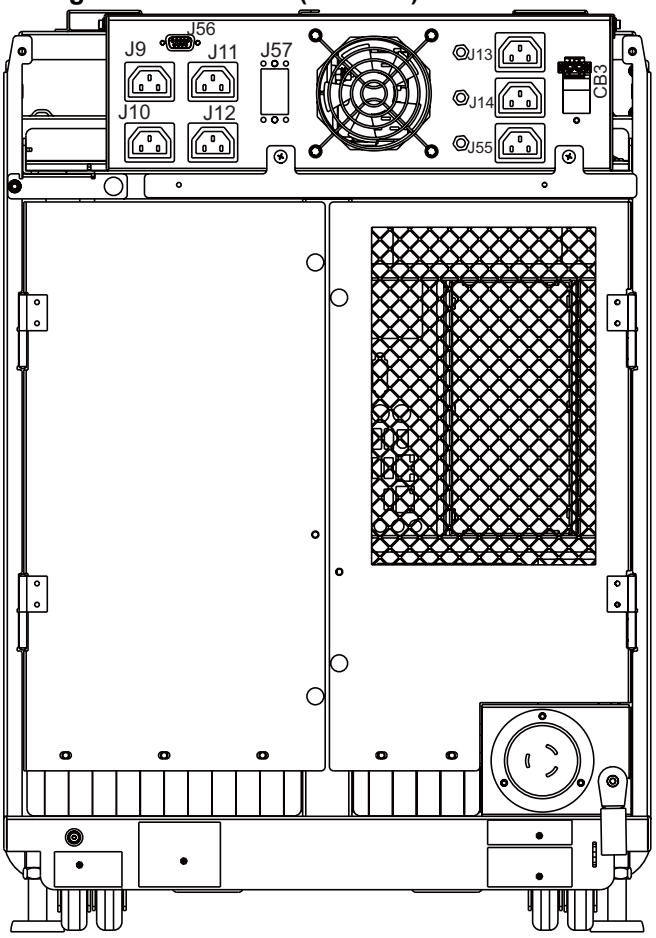
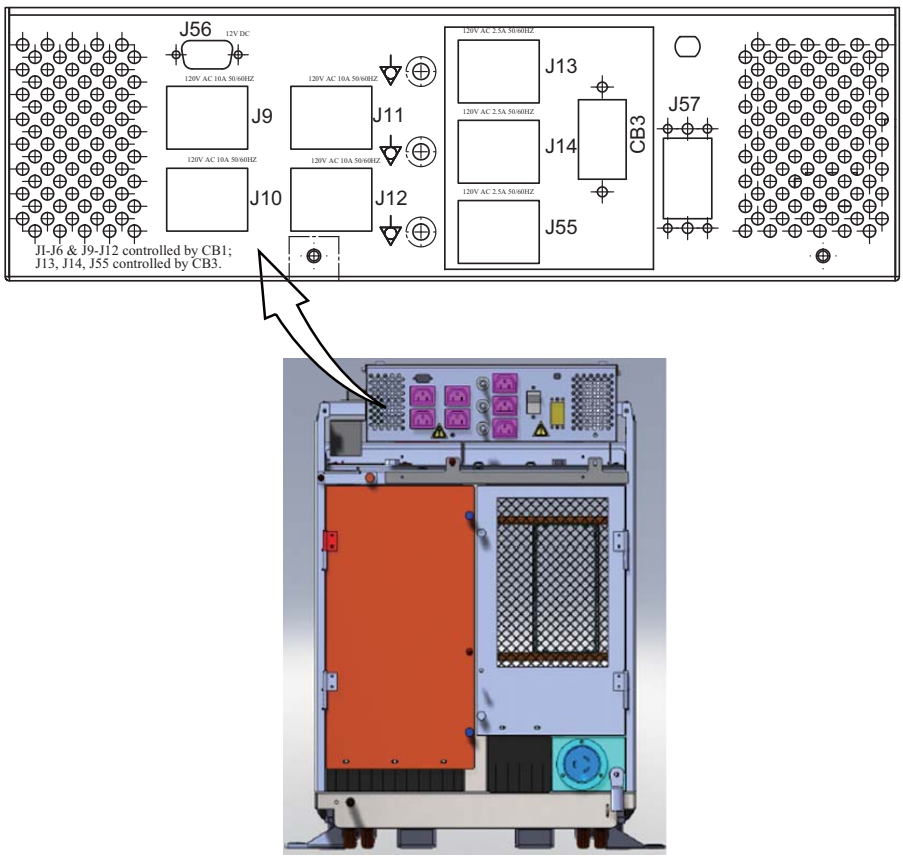


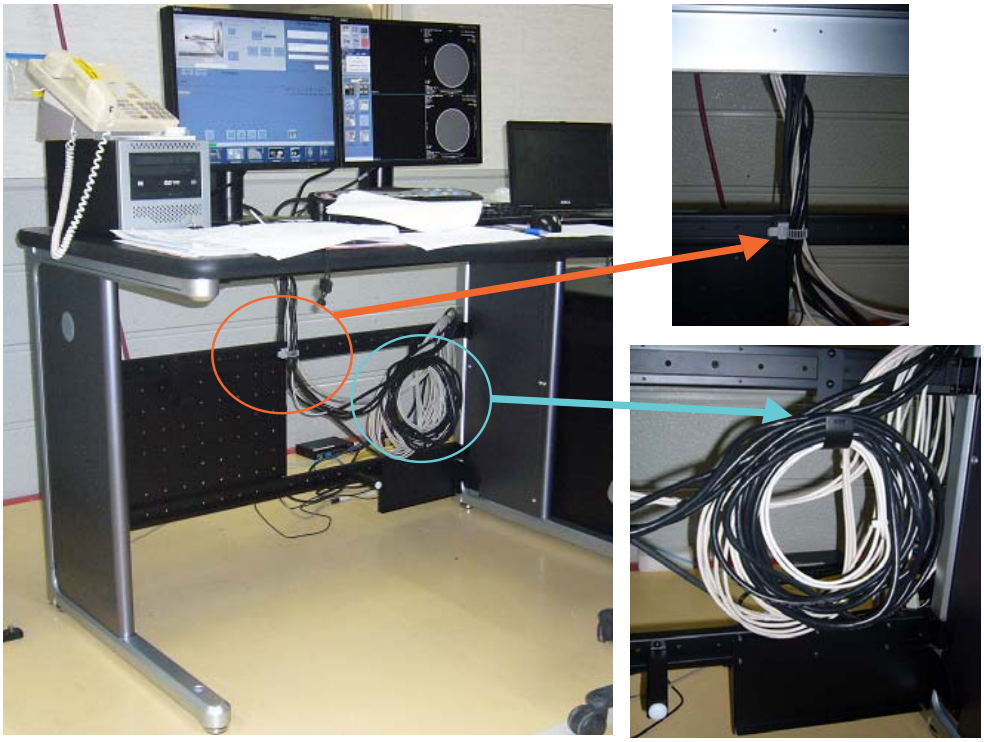
Figure 2-48 AC Box (5412524-2) Connections



6.8 Cable Arrangement

Arrange the cables appropriately by using the cable clamps equipped on the console tables.

Figure 2-49 Example: Cable Arrangement



Section 7.0
OpenOC Console Connection

7.1 GSCB, Keyboard, Trackball & Mouse Installation

PART #	DESCRIPTION	CONNECT TO	QUANTITY	LENGTH	
				MM	INCHES
5431909	Cable, USB_Extend	Keyboard	1	3500 ± 50	137.8 ± 1.97
5458346	USB EXTENSION CABLE	Mouse	1	3500 ± 50	137.8 ± 1.97
5315370	CABLE, USB TYPE A-B	PMT media Tower, DVD-RW/USB external HDD	2	2000	78.74
5408703-2	DP to DVI cable, 3 meter	Monitor	1	3000 ± 50	118.11 ± 1.97
5366259	DVI-I to VGA cable, 3 meter	Monitor	1	3000 ± 20	118.11 ± 0.79
5432953-6	Power Cable, Peripheral Tower to Open Console J5	PMT media Tower	1	3050 ± 50	120 ± 1.97
5478299-6	Power Cable, Display monitor to Open Console	Monitor	1	3050 ± 50	120 ± 1.97
5478299-5	Power Cable, Scan monitor to Open Console	Monitor	1	3050 ± 50	120 ± 1.97

Table 2-16 GE Healthcare Supplied Open Console (Z840 Host Computer) Cables

1.) Route the keyboard cable under the GSCB, as shown in Figure 2-36.

NOTICE **Potential for equipment damage**

Never connect a mouse or keyboard with the host computer powered "ON". Doing so can destroy components within the host computer.

2.) Route the keyboard and mouse cables to open console.

If the length of keyboard and mouse cables is not enough, add the following cable extensions (shipped with OC collector).

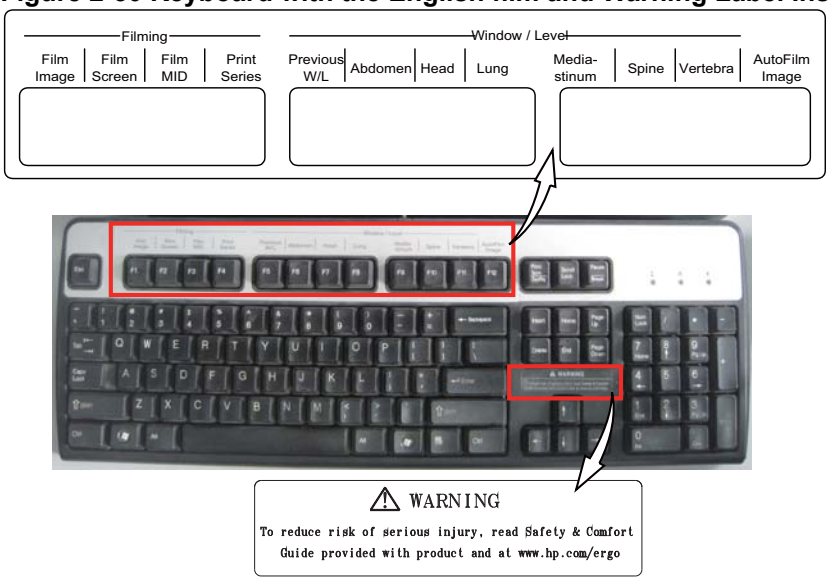
DESCRIPTION	PART NUMBER	CABLE LENGTH	QTY
USB extension Cable (Mouse)	5458346	3500 mm	1
USB Cable (Keyboard)	5431909	3500 mm	1

Table 2-17 Cable Extension

3.) Select the local language overlay film from the keyboard collector (5431062-1-XX) for your system.

- Select keyboard overlay from keyboard collector (5324605-XX) to attach. (See Figure 2-34)

Figure 2-50 Keyboard with the English film and Warning Label Installed



- Select the GSCB overlay (with Tilt and w/o **E-Reset**, P/N is 5409747-XXX) and install the proper overlay with the appropriate language for your system, as shown in Figure 2-35.

Verify that none of the buttons get caught and stuck under the overlay. Pay close attention to the prescribed tilt button on systems with the tilt feature.

Figure 2-51 GSCB without E-Reset overlay

4.) The keyboard should attach to the GSCB using the supplied Velcro strip and fit snugly against the GSCB when finished, as shown in Figure 2-36.

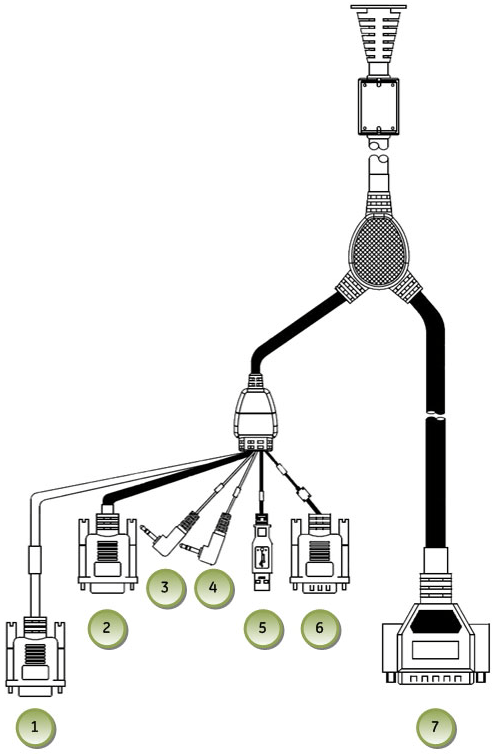
Figure 2-52 GSCB connected to the keyboard with the US English tilt overlay installed

Note: X-ray ON sound can be turned off / on using the switch on GSCB bottom if customer does not like it and if local regulation does not require X-ray ON sound. Detail information refer to ***Service Methods->Troubleshooting->NIO16 Console-> GSCB Troubleshooting***.

5.) Route the GSCB cable and connect connectors according to Figure 2-37 and Table 2-11.

Note: The USB cable of GSCB is reserved, please tie it with tie-wrap.

Figure 2-53 GSCB and Connections



	ITEM	DESCRIPTION
1	GSCB - Black DB-9 (Female) Connector	Host Computer DIP
2	GSCB - Gray DB-9 (Female) Connector	Host Computer RS232
3	GSCB - Green Audio Connector	Host Computer Audio Out (Green)
4	GSCB - Blue Audio Connector	Host Computer Audio In (Blue)
5	GSCB - USB Connector	Reserved
6	GSCB - Black DB-9 (Male) Connector	AC Box J14
7	GSCB - Black DB-25 (Male) Connector	TGP Gantry Cable

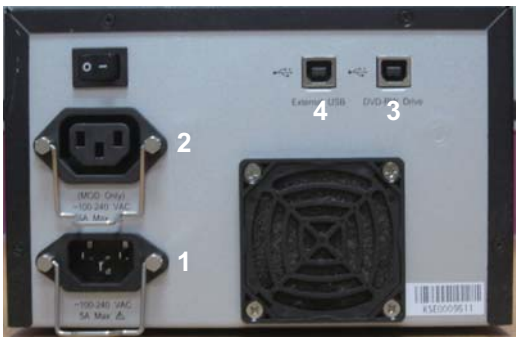
Table 2-18 GSCB Cables

7.2 Connecting the Media Tower (5270510-22)

Figure 2-54 Media Tower Connection shown

Front View

Rear View



1) Power for Media Tower
2) Power for MOD Drive
3) DVD-RW Drive
4) External USB
5) HDD External SSA Key

Connect the power cable to the rear of the media tower. Use the following cables for connection.

DESCRIPTION	PART NUMBER	CABLE LENGTH	QTY
USB Cable (PMT)	5315370	2000 mm	2
PMT power cable	5432953-6	3050 mm	1

Table 2-19 Media Tower Cables

7.3 Connecting the HP LCD Monitor

NOTICE **Equipment Damage Possible**

Do not touch the video signal cable connector pins as this might bend them. When connecting the video signal cable, check the alignment of the HD15 and DVI connector. Do not force the connector in the wrong way, otherwise the pins might bend.

7.3.1 Connect Scan Monitor and Image Monitor as following:

DESCRIPTION	PART NUMBER	CABLE LENGTH	QTY
Scan Monitor Power Cable	5478299-5	3050 mm	1
Image Monitor Power Cable	5478299-6	3050 mm	1
Scan Monitor Video Cable	5408703-2	3000 mm	1
Image Monitor Video Cable	5366259	3000 mm	1

Table 2-20 Monitor Cables for Z840

Figure 2-55 HP LCD Monitor

ITEM	DESCRIPTION
A	Power Cable Connection
B	DVI Video Connection – Prescription / Scan Monitor (left)
C	D-Sub (VGA) Video Connection – Display / Image Monitor (right)

Table 2-21 LCD Monitor Connections

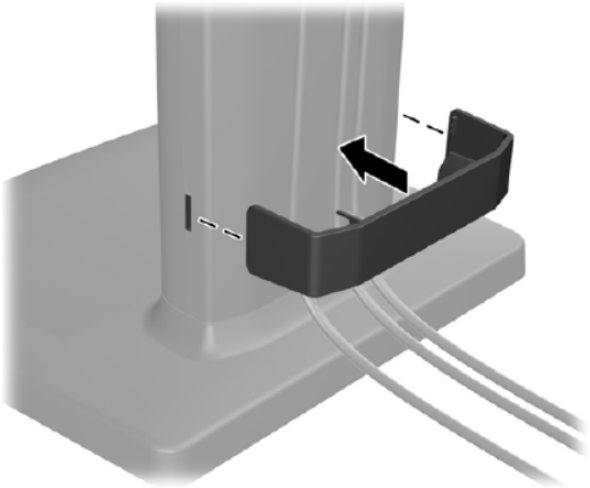
Scan Monitor

- Video cable: Z840 PC DP to Monitor DVI
- Power cable: AC Box J1 to Monitor power

Image Monitor

- Video cable:Z840 PC DVI to Monitor VGA
- Power cable: AC Box J2 to Monitor power

Figure 2-56 Cable Routing and Keeper

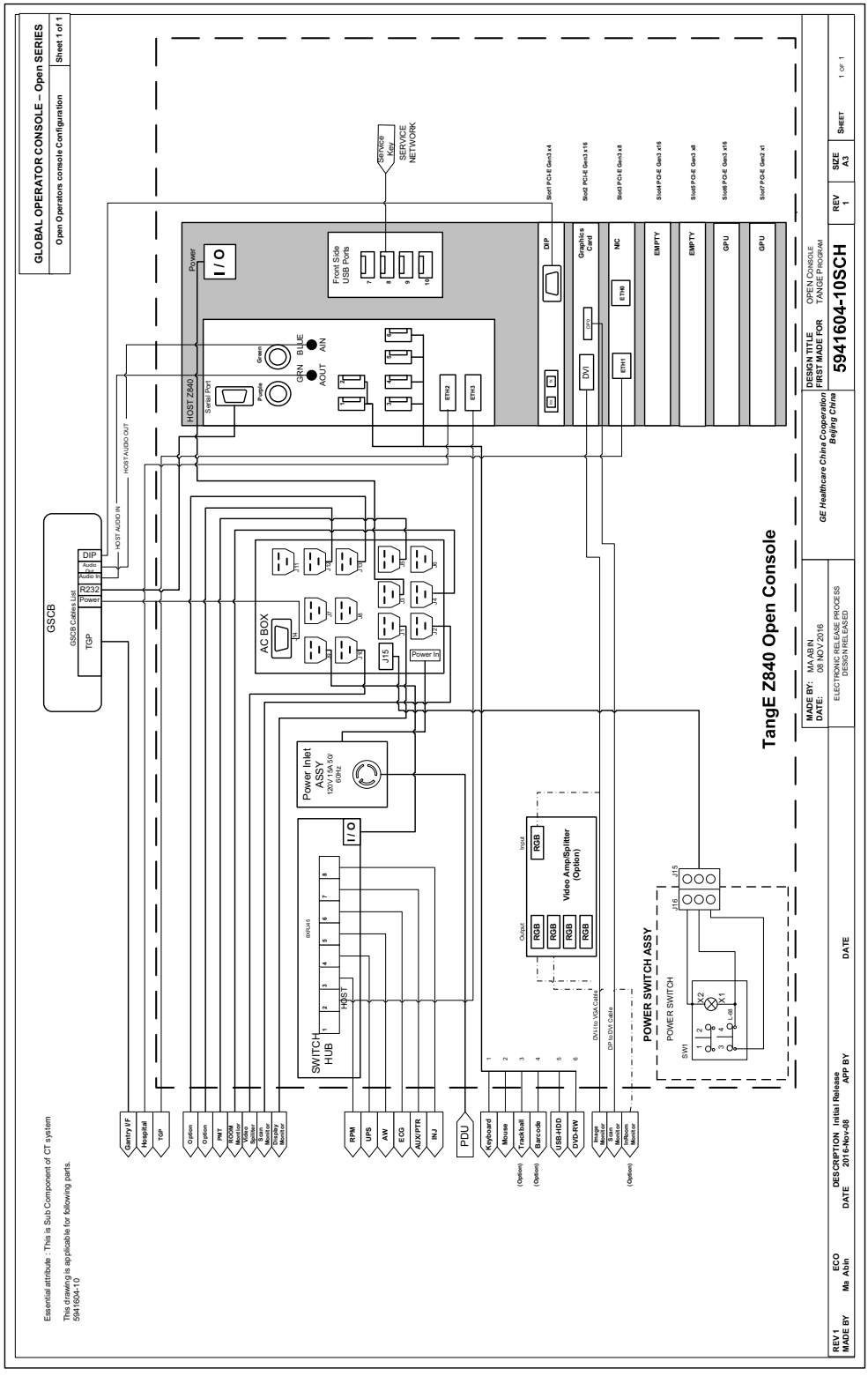


7.3.2 LCD Video Monitor Setup

Detail LCD Video Monitor Setup please refer to ***Service Methods→ Align,Setup,Cals→ Console→ LCD Video Monitor Setup.***

7.4 Open Console Interconnections

Figure 2-57 Open Console Interconnect_z840 Host Computer



7.5 Host Computer Connections

NOTICE Potential for equipment damage Never connect a mouse or keyboard with the host computer powered "ON". Doing so can destroy components within the host computer.

Figure 2-58 Open Console Rear View with AC BOX

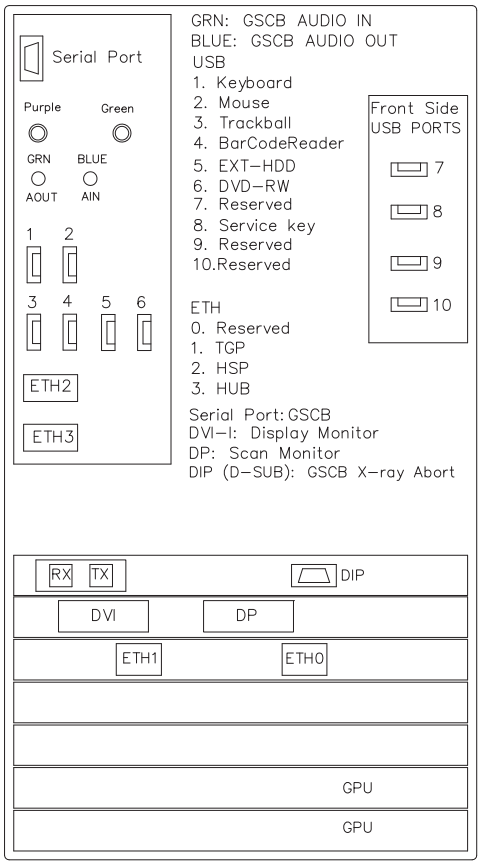
1.) Connect the power cable and ground cable to the console rear panel. (See Figure 2-58)

PART NUMBER		DESCRIPTION
SHORT	LONG	
2343531-2	2343531	120VAC Power Cable from PDU to OC
2371450-4	2371450-3	Ground, Raceway to OC

Table 2-22 Console Cable Connections

2.) Connect the all cables (see Table 2-9) to the rear of Host Computer referring to the drawing below (Figure 2-59).The drawing is also printed on the right rear door of the console.

Figure 2-59 Z840 Host Computer Connections

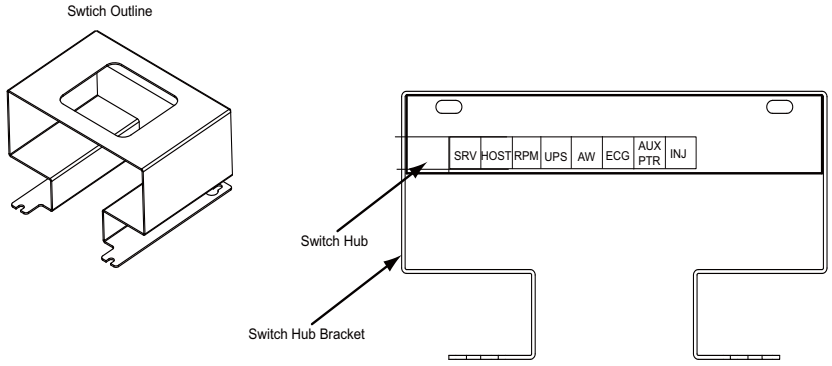


NOTE: EXT HDD is for DVD Tower External HD Drive
DVD-RW is for DVD Tower DVD-R / CD-R Drive

7.6 Switch Hub Connections

Switch Hub located on the left bottom of the console. Plug cables into Switch Hub on console.

Figure 2-60 Switch Hub Connections



7.7 AC Box Connections

CAUTION **The outlets are not for General Use. Operator Console outlet has a rating for 2.5A at 120VAC. Accessories should not exceed above rating.**

Note: Console power is single phase power. Outlet assigned is not critical.

1.) Connect the console power cable and ground cable to the console power panel.

2.) Connect console component power cords as listed in Table 2-23. ("J numbers" increment from top to bottom, left to right)

Number	Description
J1	Display Monitor Power Connection
J2	Scan Monitor Power Connection
J4	In-Room Monitor Connection
J5	Peripheral Media Tower Power Connection
J12	RPM Power Connection
J13	Injector Power Connection
J14	GSCB Power Connection

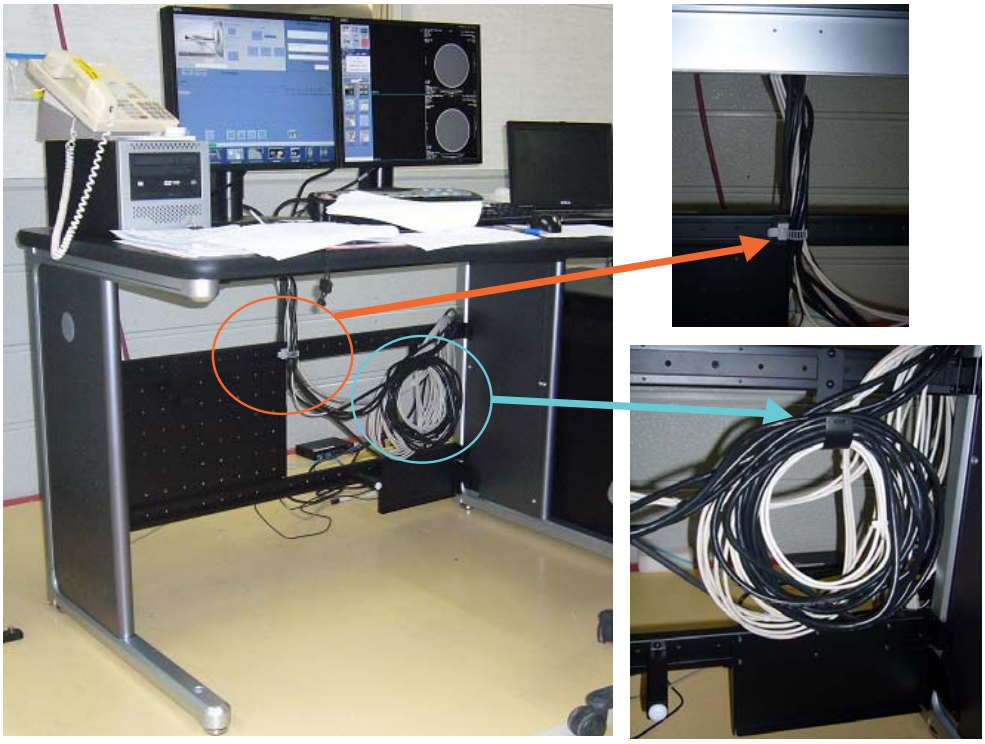
Table 2-23 AC Box Outlet Assignments

Figure 2-61 Open Console AC Box Connections

7.8 Cable Arrangement

Arrange the cables appropriately by using the cable clamps equipped on the console tables.

Figure 2-62 Example: Cable Arrangement



Section 8.0
Install Options

8.1 Install Optional Bar Code Reader

Follow the installation procedures in the Bar Code Reader box.

When finished neatly dress all cables.

8.2 Install Optional Remote Monitor

Follow the installation procedures in the Remote Monitor box.

8.3 Install Cardiac Gating IVY Monitor and Stand Option

Refer to the instruction shipped with the option. This option is attached to the Gantry Option Interface, and should only be mounted on the non-motor side of the gantry. Neatly dress all cables along the gantry base so that the base covers fit properly.

Note: For Gantry with GOB, Monitor power will plug into the wall. For Gantry with IPC board, Monitor power will plug into the Gantry or Console.

8.4 Install Respiratory Gating Option

Refer to the instruction shipped with the option. This option is attached to the Gantry Option Interface, and should only be mounted on the non-motor side of the gantry. Neatly dress all cables along the gantry base so that the base covers fit properly.

Note: For Gantry with GOB, Monitor power will plug into the wall. For Gantry with IPC board, Monitor power will plug into the Gantry or Console.

8.5 Install Injector Option

Follow the instructions shipped with the option. If this is a ceiling-mounted option, check that the plate is installed correctly with the holes in the correct location.

Note: For Gantry with GOB, Injector power will plug into the wall. For Gantry with IPC board, Injector power will plug into the Gantry

8.6 Customer Accessories (Head Holders and Extender)

Open the boxes and installed the appropriate language warning labels.

The head holders ship with shims installed to assure proper fit. Check that shims are included and a pair is installed. The holder should fit snugly. Follow the procedure in Section 4.0 of Chapter 3 to install Head Holders.

8.7 Install Service Cabinet

The service cabinet you receive may ship disassembled. Assembly takes about 1.5 hours.

1.) Assemble the cabinet following the instructions located in the cabinetís shipping box.

2.) When you complete assembly, place the cabinet in the location shown on the site print.

3.) Place all service materials shipped with the system in the service cabinet.

8.8 Install UPS

Follow the instructions shipped with the UPS option. The option ships with two sets of instructions, a GE set and a Powerware set.

The GE set instructs you to install the connections between the UPS and the PDU and between the UPS and the A1.

Please refer to *UPS Installation manual (Dir 5174051-100) on service methods->Installation->Option.*

Note: A GE A1 Disconnect with UPS controls is required for this option.

The Powerware set instructs you to internally connect the batteries and do a power-up check. Refer to both manuals for additional guidance.

WARNING LOCKOUT/TAGOUT IS REQUIRED WHEN WORKING IN THE A1 DISCONNECT.

Section 9.0
Gantry Cable Connections

Please refer to Figure 2-2 for complete system interconnect details.

Table 2-24 Gantry Cable Connections

TO	FROM	CABLE DESCRIPTION
Gantry Power Pan	PDU	HVDC
Gantry Power Pan	PDU	440VAC
Gantry Power Pan	PDU	120VAC
Gantry Power Pan	Console	Fiber - *Take extreme care when you install the fiber optic DAS data cable. Do not step on, kink, or sharply bend this fragile DAS cable*.
Gantry Power Pan	Console	LAN
TGPU (J9)	Console	Control
TGPU (J11)	PDU	Control
MSUB/TGPG (J9)	Console	Control (For Gantry with TGPG)
MSUB/TGPG (J11)	PDU	Control (For Gantry with TGPG)

1.) If using a rear cable entry box (B7850RC), install it now, before routing cables to gantry.

NOTICE

Potential for equipment damage.

Observe correct polarity when connecting the high voltage DC power. Reversing these leads will result in serious equipment damage. The HVDC positive conductors have red insulation and are labeled "ONE." The HVDC negative conductors have black insulation and are labeled "TWO." Lead "ONE" must be connected to lead "ONE," and lead "TWO" must be connected to lead "TWO."

Observe correct phase rotation when connecting the axial motor power. Phases one, two and three should be connected top to bottom.

2.) Install the cables to the gantry power pan. The power pan is located on the rear of the gantry at its base. See Figure 2-63, Figure 2-64 for connections.

Note: The gantry 120VAC cable may not fit under the gantry frame. Install this cable before gantry placement—or remove the power plug—to route it under the gantry.

Figure 2-63 Gantry Power Pan Connections

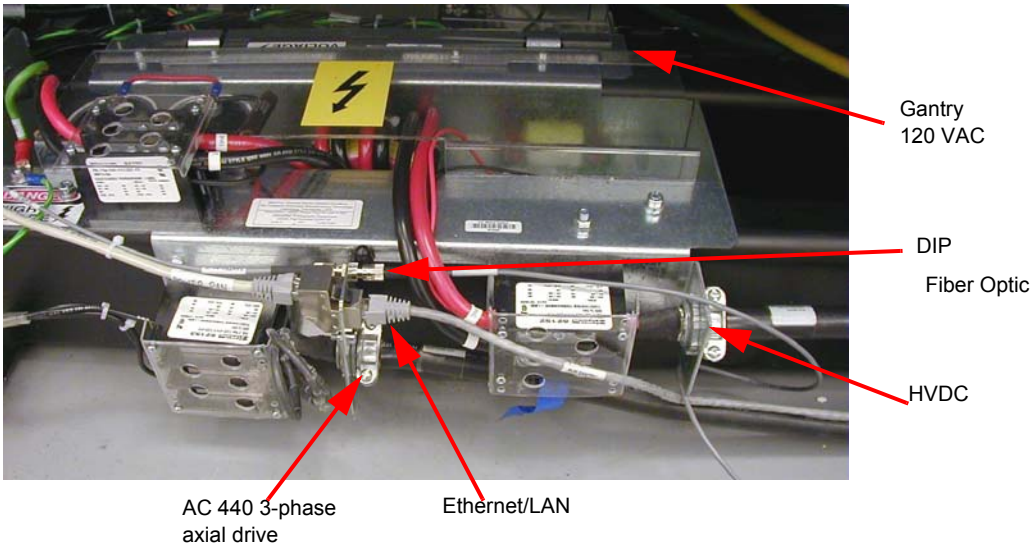


Figure 2-64 Gantry Power Pan

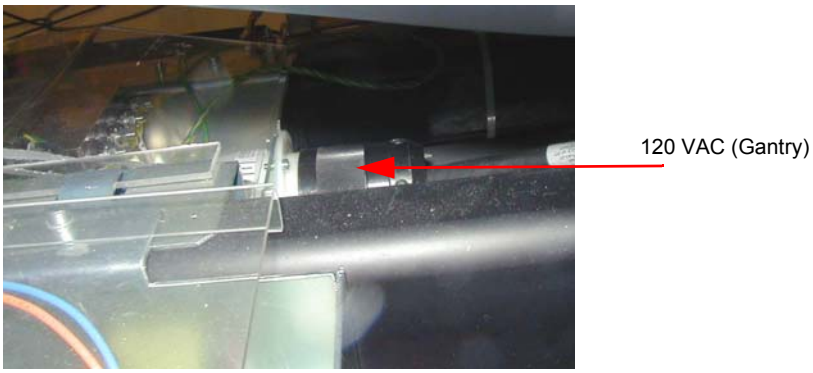
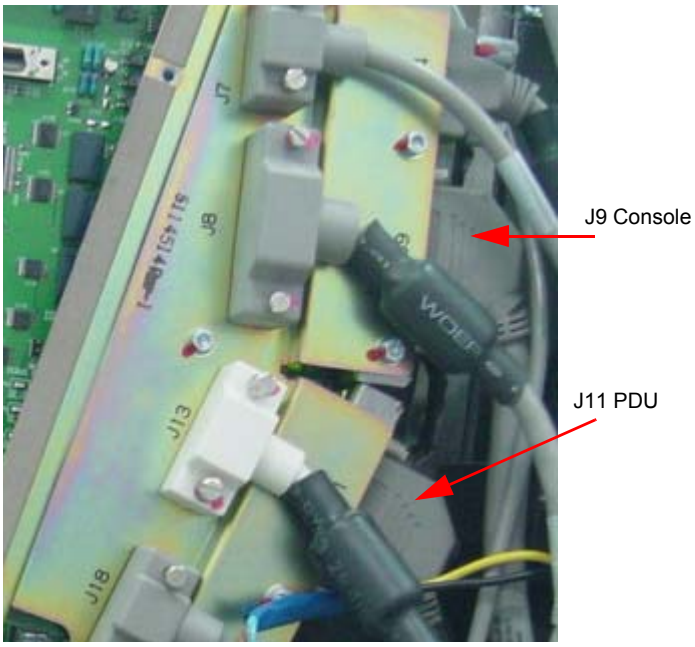


Figure 2-65 TGPU Connections

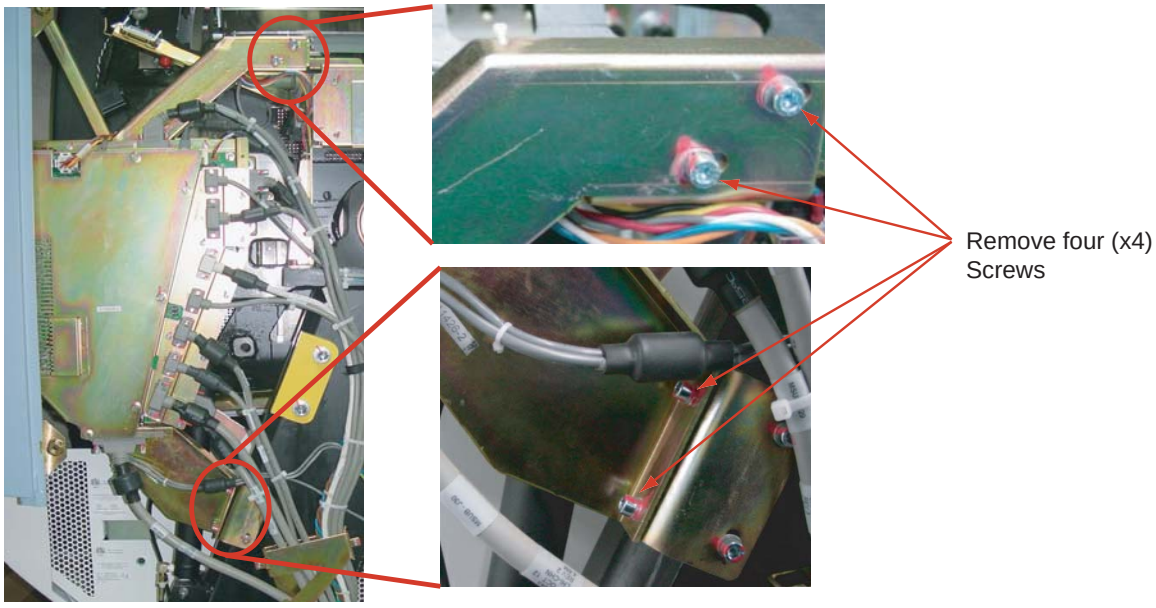


3.) Install cables to the gantry TGPU.

Note: If it's difficult to connect the cables to TGPU, follow below steps to take the TGPU outside the gantry frame (not remove the TGPU), so that it is easier to attach the cables to TGPU.

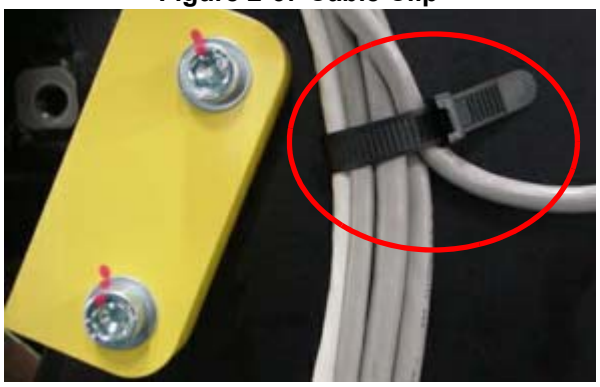
a.) Remove the four (4) screws which secure the TGPU assembly on the gantry frame. See Figure 2-66.

Figure 2-66 TGPU Assembly On The Gantry Frame



b.) Loose the cable clip. See figure below.

Figure 2-67 Cable Clip

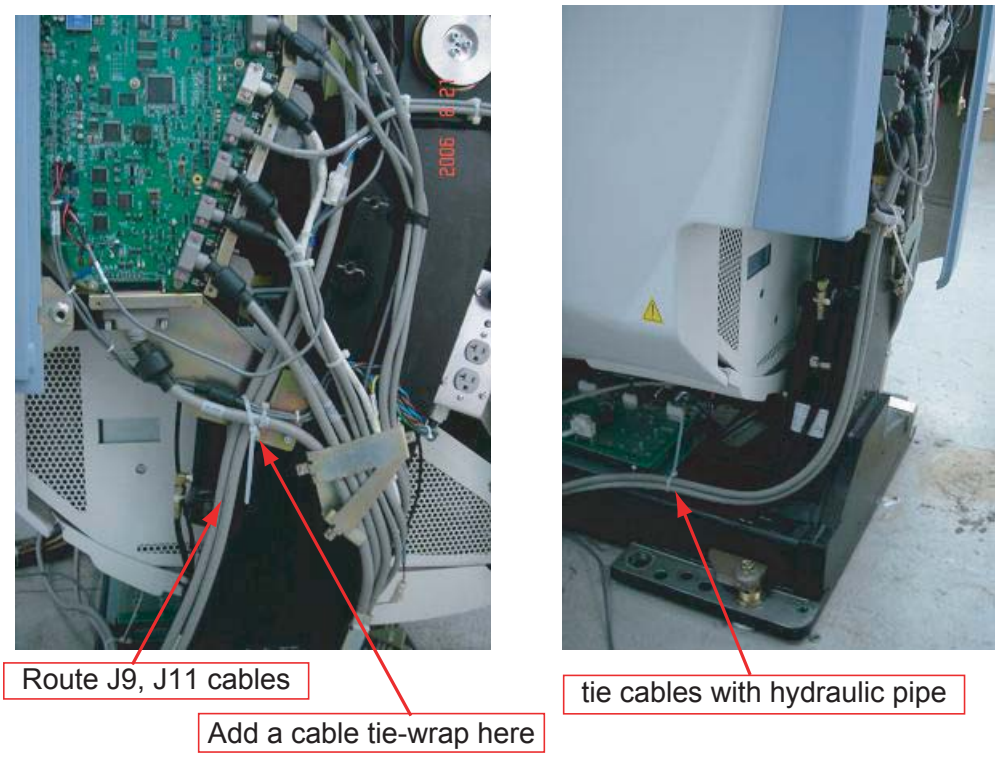


c.) Slightly rotate the TGPU outside, so that the cable receptacles on the TGPU is easier to access.

d.) Connect the cables on TGPU, then install the TGPU assembly with reversed order through step c) to a).

4.) Route J9 and J11 cables behind all cables at this area. See Figure 2-68.

Figure 2-68 Route Cables



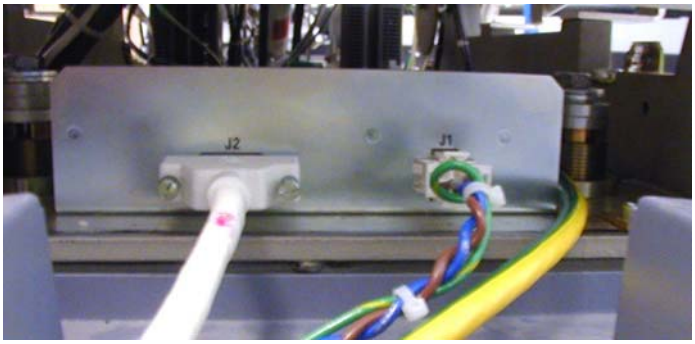
Section 10.0
H-Power Table Connections

Pull and connect the following cables:

Table 2-25 Cables Connected to Table

J#	CABLE DESCRIPTION
J1	120 VAC
J2	Signal Cable

Figure 2-69 Table Bulkhead Connections



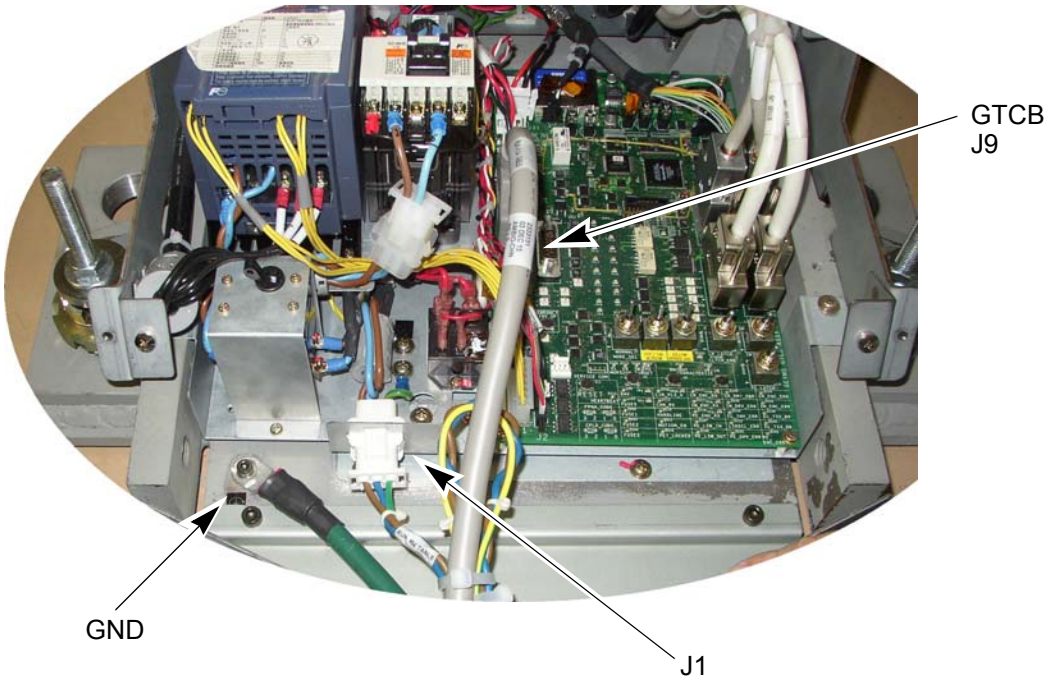
Section 11.0
GT1700 Table Connections

Pull and connect the following cables:

Table 2-26 Table Cable Connections

TABLE	FROM	CABLE DESCRIPTION
J1 table power	Gantry	120 VAC
J9 table control	Gantry	Signal Cable
Table ground	Gantry	Table ground

Figure 2-70 Table Connections



Note: You may need to add the table ground cable.

☐ Check box when complete

Section 12.0
PDU Cable Connections & Configuration

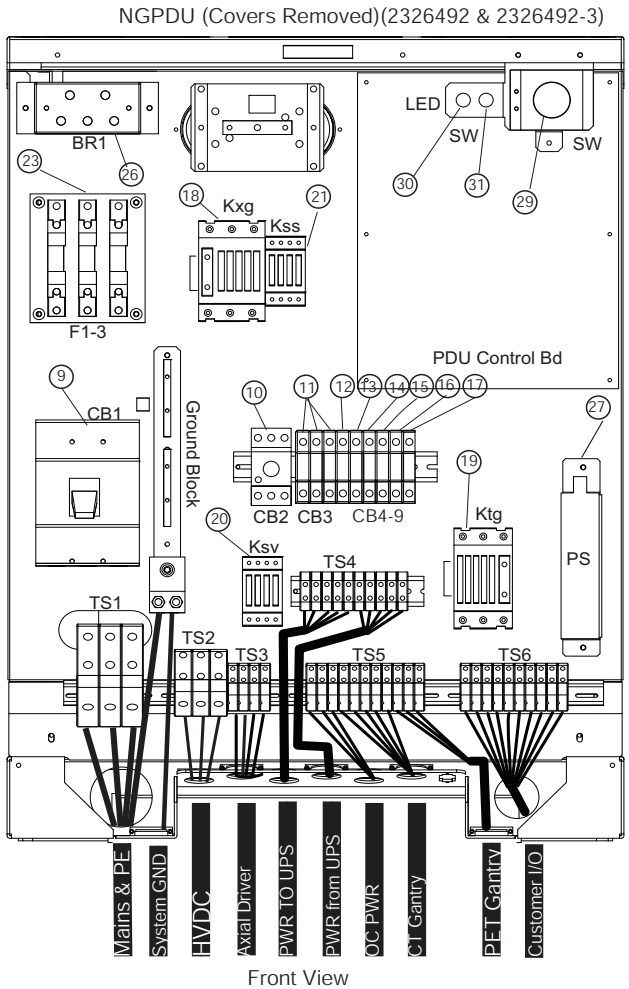
CAUTION **Do not work in an energized PDU. When working on the PDU, follow this simple rule: Always tag and lock out power to the PDU at the "main" disconnect. Failure to do so can result in electrocution or death.**

Do apply power to the PDU until all work has been completed and all PDU covers are in their proper place.

12.1 NGPDU

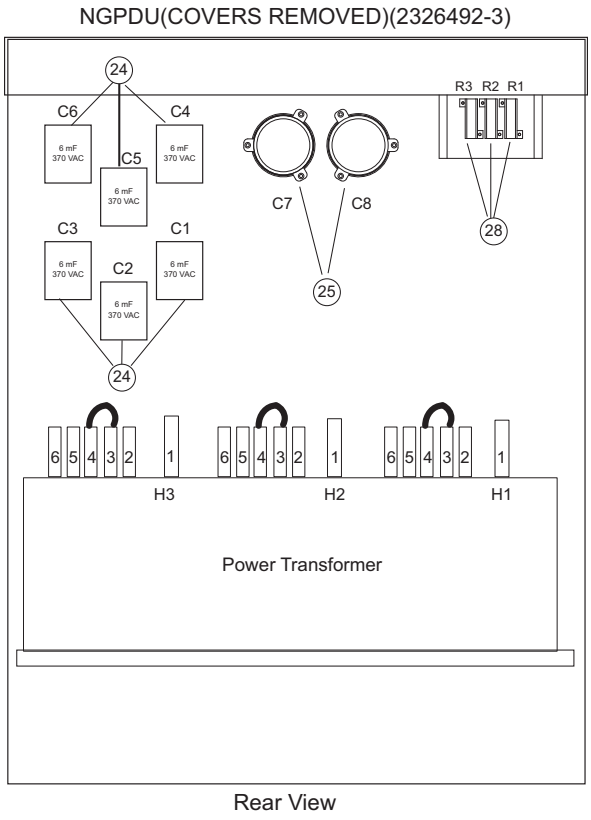
As seen in Figure 2-71, a number of cables must be installed throughout the PDU. Specific details on each connection can be found in the sub-sections that follow. Use Figure 2-71 for reference. The PDU has been designed to have cables routed into the PDU from its behind and/or from beneath it.

Figure 2-71 PDU Cable Connections - Front



HVDC	TS2-1	Red
	TS2-2	Green
	TS2-3	Black
Axial	TS3-1	Black
	TS3-2	Red
	TS3-3	Orange
OC Power	TS5-1	Brown
	TS5-2	Blue
	TS5-3	Grn/Yellow
CT Gantry	TS5-4	Black
	TS5-5	Red
	TS5-6	Orange
	TS5-7	Blue
	TS5-8	Grn/Yellow

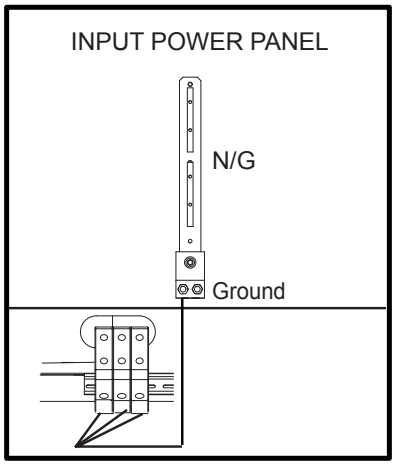
Figure 2-72 PDU Cable Connections - rear



12.1.1 Panel - 380 - 480VAC Mains "TS1" Input Power Connection

1.) Remove the TS1 panel front cover.
2.) Strip the wires to fit securely on the power block.
3.) Observe incoming phases (L1, L2 and L3) and insert bare leads into power block.
4.) Insert "vault" ground into PDU "vault" ground lug.
5.) Tighten all fasteners securely and replace the TS1 front panel.

Figure 2-73 Input Power Panel Connections

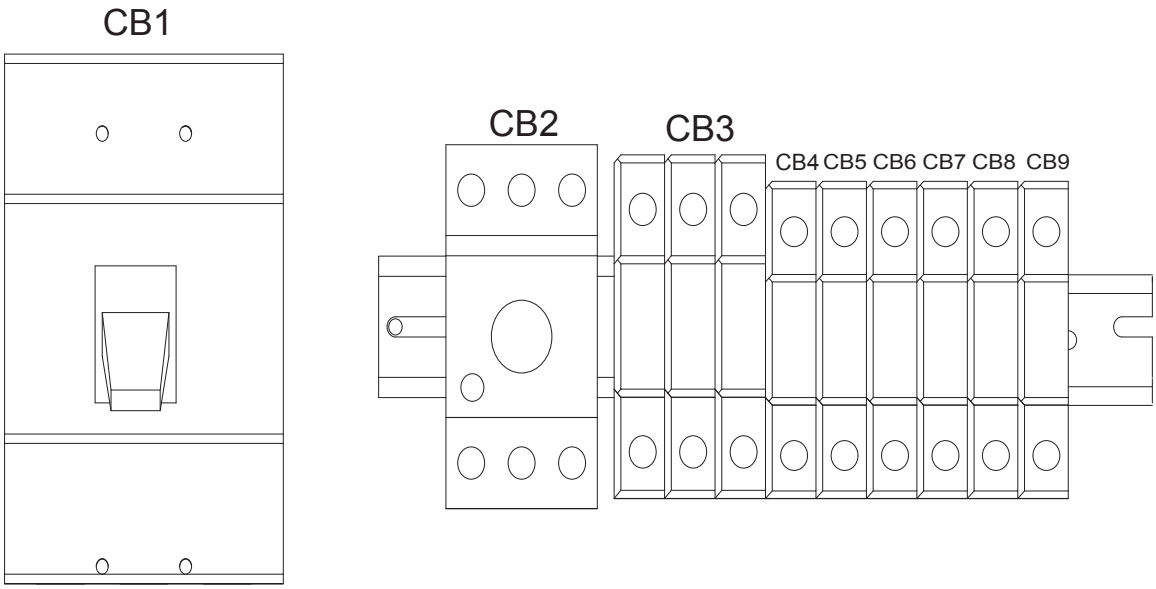


When Mains power is available to the PDU, the "TS1" power light will be illuminated. (See Figure 2-71.)

12.1.2 Panel - Circuit Breakers

Place the circuit breakers in the “off/down” position during installation, even with Mains incoming power tagged and locked out. After you have completed work on the PDU, you may return the circuit breakers to the “ON” positions.

Figure 2-74 Circuit Breaker Panel



By design, when CB3 is in the “OFF” position, circuit breakers 4, 5, 6, and 7 are switched “OFF”. CB3 is essentially in series with these breakers.

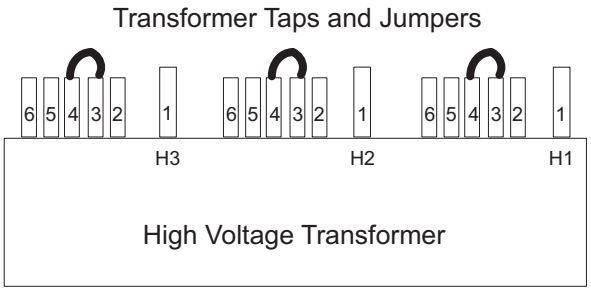
Table 2-27 Panel Circuit Breaker Descriptions

CIRCUIT BREAKER	DESCRIPTION
CB3	Fully Winding Protection (Master power of CB 4, 5, 6, and 7)
CB4	CT Gantry Service Outlets
CB5	CT Gantry rotating loads
CB6	Table & CT Gantry Station Loads
CB7	Operator Console
CB8	PET Gantry
CB9	NGPDU Control Power Supply

12.1.3 Transformer (480VAC) Taps

Verify that the transformer taps are set properly. The transformer taps are set to 480 VAC operation at the factory.The taps should be set as shown in Figure 2-75.

Figure 2-75 PDU Tap Positions for 480 volt operation

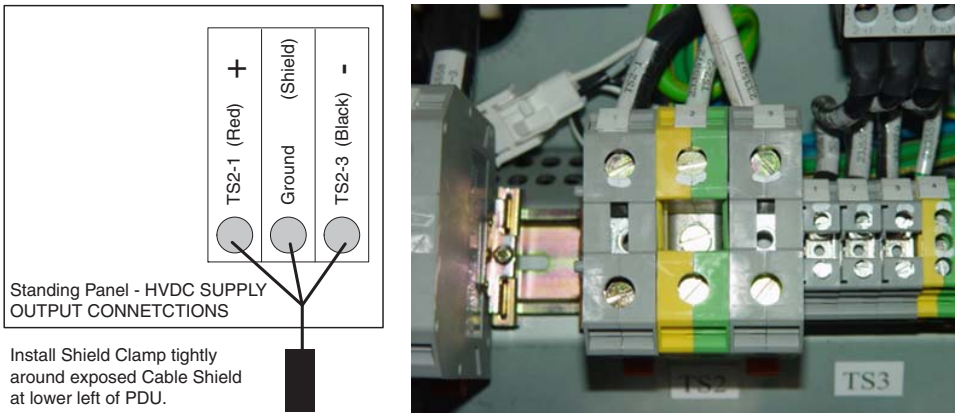


Note: Taps should be shipped as shown for 480 VAC only. For all others, you must move the taps to correct position according to Figure 2-75

12.1.4 HVDC Connection

Connect the internally shielded HVDC cable to TS2 on the standing panel. See Figure 2-71 for the location of the connector and Figure 2-76 for details. Observe polarities and grounds.

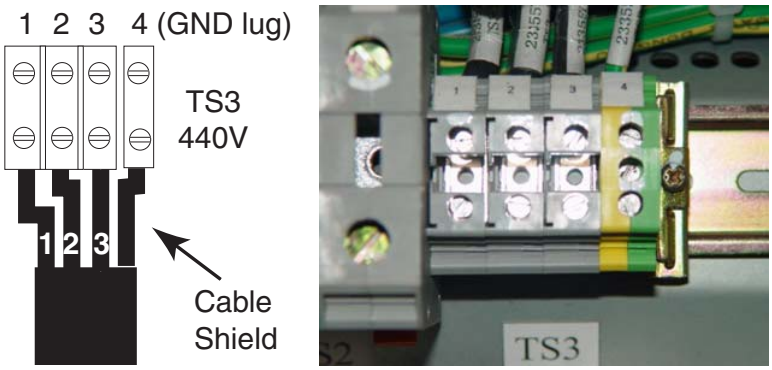
Figure 2-76 HVDC Connection



12.1.5 440V Connection

Connect the internally shielded 440V cable from the gantry to TS3 on the panel. See Figure 2-71 for the location of the connector and Figure 2-77 for details. Observe the labels on the cable leads for proper identification and orientation.

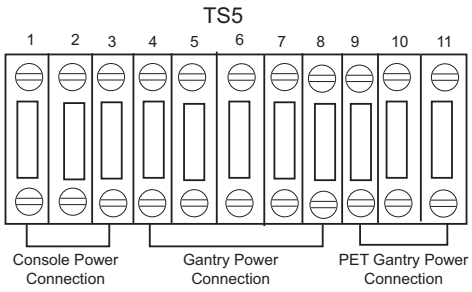
Figure 2-77 440VAC Connection



12.1.6 Gantry & Console Power Connections (120V)

Both Gantry and Console power cables come pre-terminated. Simply plug the Gantry power cable into “J4” and the Console power cable into “J5” as shown in Figure 2-78.

Figure 2-78 Gantry & Console Power Connections



12.1.7 Console Power Cable Re-termination

Power cable re-termination should be used as a last result. Short and long cables are available.

1.) Carefully remove the power plug and **record the color of the wires** in Table 2-28. The terminals are labelled X, W and G on the plug.

Table 2-28 Console Power Cable Termination

TERMINAL	X	W	G
Description	Hot	Neutral	Ground
Color			

2.) Cut the cable to desired length and dress ends.

3.) Re-install the power plug, according to the orientations recorded in Table 2-29.

4.) Verify that less than 1 ohm of resistance exists between the following connections:

Table 2-29 Resistance Verification Points

FROM PDU PLUG	TO CONSOLE PLUG END	
CB1 -11 (Black) (J5 Phase X (Brown))	Phase X (Brown)	☐ Check box when complete
A3 Neutral Buss Bar (Blue) (J5 -13 Phase W)	Phase W (Blue) Neutral	☐ Check box when complete
A3 Ground Buss Bar (J5 -22 Ground Green)	Ground (Green) Ground Green screw	☐ Check box when complete

12.1.8 PDU Control Cable

The PDU control cable comes pre-terminated and should not be re-terminated in the field. Excess cable length must be stored. Simply plug the cable into “J2” on the “A4” panel. Secure it by using the fasteners intergrated into cable’s connector shell.

12.1.9 System Ground Connection

Connect the ground wire (green with a yellow strip) from the Table/Gantry raceway ground bus to the system ground lug in the PDU. See Figure 2-71, on page 176, and Figure 2-79, below.

Figure 2-79 PDU System Ground Connection

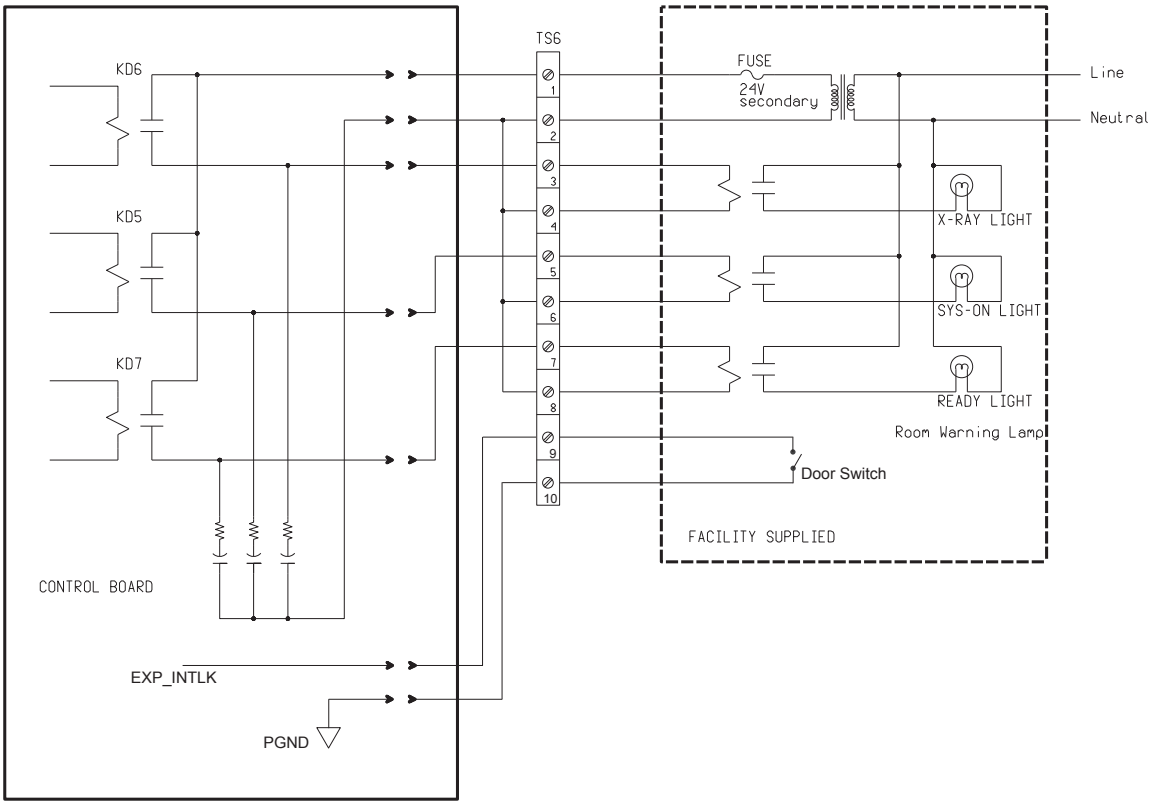
12.1.10 Warning Light & Door Interlock Connections

12.1.10.1 Warning Light Configuration & Connection

1.) Warning Light is controlled by signals from the system.

2.) This step is site specific. The PDU by default is configured for “no” external warning light connection. If you have external warning lights, see Figure 2-80 for proper connection.

Figure 2-80 Typical TS6 Warning Light & Door Interlock Connections



It is recommended that you use the four (4) wire method of adding a X-ray warning light to a room, as shown in Figure 2-80. When using this method, you:

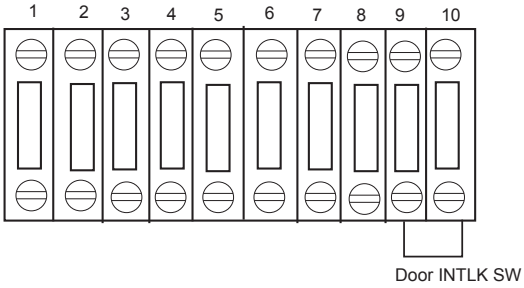
- Minimize EMC interference.
- Increase contact life of the relay used in the PDU.

12.1.10.2 Door Interlock Connections

Door interlocks are used to prevent X-Rays from being generated when the scan room door is open.

The Door Interlock circuitry in the PDU is shipped from the factory engaged. This means the system cannot generate X-ray until disengaged. A short must exist between pins 9 & 10 for X-ray to be generated. Using a small piece of wire, short pins 1 and 2 together. See Figure 2-81.

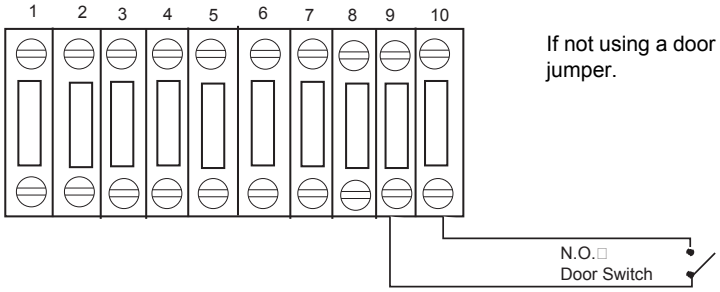
Figure 2-81 Without a Door Interlock



If jumper is not in place, exposures will not be made. Check this jumper if you get scan interlock errors.

To use the system with a a door interlock, wire a normally open switch between pins 1 & 2 that is attached to the interlock.

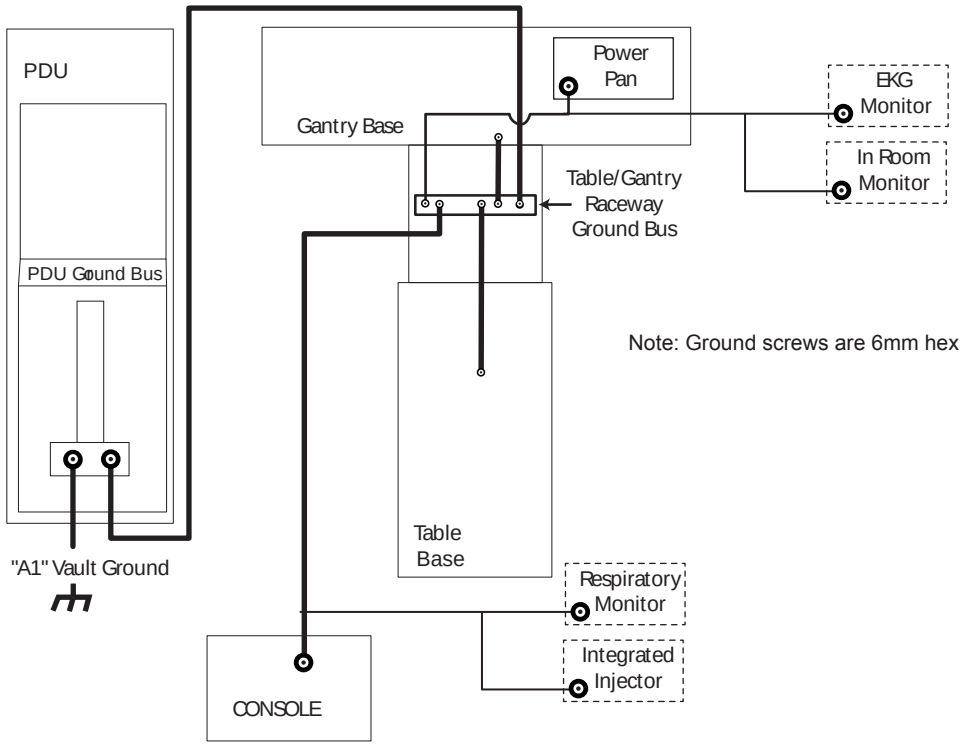
Figure 2-82 With a Door Interlock



Section 13.0
System Ground Connections

As seen in Figure 2-83, the Table/Gantry raceway ground bus is used to centralize all system grounding. The system ground is tied to vault ground at the PDU, through its chassis.

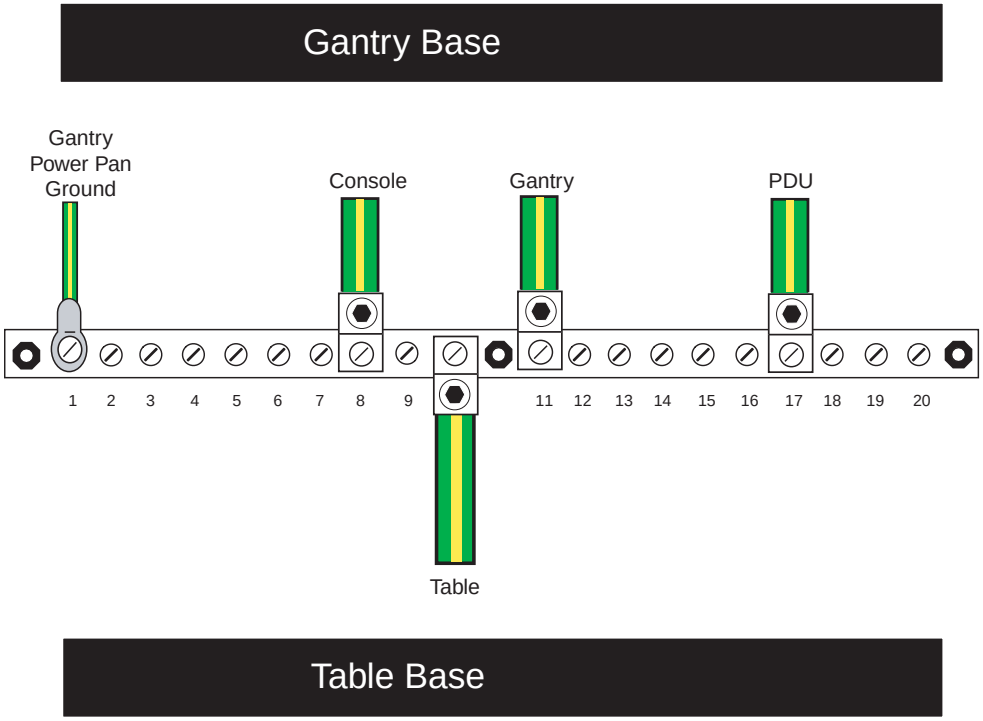
Figure 2-83 CT System Ground Connections



The gantry is tied to system ground at a number of points. It is important that all of these ground connections are securely made. See Figure 2-84.

Check that the terminals will not be loosened, by moving or swinging the cables rather strongly by hand.

Figure 2-84 Table/Gantry Raceway Bus - Grounds



Various types and sizes of wire are used to ground the system. Please use the type and sizes specified in Table 2-30, below.

Table 2-30 System Ground Connections

AWG #	CONNECTION TO	CONNECTION TO
#1/0	PDU	Power Main
#1/0	Gantry (Power Pan)	Raceway
#2	Console	Raceway
#1/0	Gantry	Raceway
#2	Table (frame)	Raceway
#1/0	PDU	Raceway

Chapter 3
System Continuity & Ground Checks

NOTICE **Potential for Data Loss and/or Equipment Damage**

To prevent potential data loss and equipment damage, please do the following:

- **When instructed, record data collected from the procedures in this chapter on GE Form e4879. For more information about this form, see Section 8.0 of Chapter 4.**
- **Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.**

Note: Use dry cleaning for electro components.

Section 1.0
System Continuity & Ground Checks (Mechanical Contractor)

Use this section to check cable and ground connections.

1.1 Tools Required

- Digital VOM
- 10m (30 ft) of #18 wire
- 600 VAC meter leads

1.2 Procedure

Reference Figure 3-1: Front View of NGPDU, with Covers Removed on page 189 and Figure 3-2: Gantry Power Pan on page 190.

WARNING **USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES; LOCK OUT WALL POWER.**

1.) Remove all System Power at the A1 Mains Disconnect Panel. Follow Lockout/Tagout procedures.
2.) Put the UPS in the Service Position.
3.) Remove the PDU A3 input power panel cover.
4.) Verify, with a voltmeter, that mains power is disconnected.
5.) Verify that less than 1 ohm of resistance exists between the following ground connections:

Table 3-1 Mains Connections to PDU

FROM	TO	
Wall ground connection	PDU Cabinet	☐ Check box when complete

6.) Verify that less than 1 ohm of resistance exists between the following connections:

Table 3-2 Resistance Verification Points

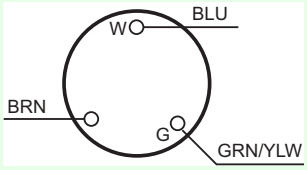
FROM	SIGNAL NAME (COLOR)	TO	
PDU TS2-1	+HVDC (Red)	Gantry HV Power Pan TS1-1	☐ Check box when complete
PDU TS2-2	HVDC Ground (Green/Yellow)	Gantry Power Pan Chassis	☐ Check box when complete
PDU TS2-3	-HVDC (Black)	Gantry HV Power Pan TS1-2	☐ Check box when complete
PDU Ground Bus	HVDC shield	Gantry HVDC cable shield	☐ Check box when complete
PDU TS3-1	Axial drive 440vac (Black)	Gantry HV Power Pan TS2-1	☐ Check box when complete
PDU TS3-2	Axial drive 440vac (Red)	Gantry HV Power Pan TS2-2	☐ Check box when complete
PDU TS3-3	Axial drive 440vac (Orange)	Gantry HV Power Pan TS2-3	☐ Check box when complete
PDU TS3-4	Axial drive ground (Green/Yellow)	Gantry Power Pan Chassis	☐ Check box when complete
PDU Ground Bus	Axial drive shield	Gantry 440 VAC cable shield	☐ Check box when complete
PDU TS5-1	120vac Phase A (Brown)	Console Power Plug:	☐ Check box when complete
PDU TS5-2	120vac Neutral (Light Blue)		☐ Check box when complete
PDU TS5-3	Ground (Green/Yellow)		☐ Check box when complete
PDU TS5-4	120vac Phase A (Black)	Gantry LV Power Pan A1J1 FIlter - L1	☐ Check box when complete
PDU TS5-5	120vac Phase B (Red)	Gantry LV Power Pan A1J1 FIlter - L2	☐ Check box when complete
PDU TS5-6	120vac Phase C (Orange)	Gantry LV Power Pan A1J1 FIlter - L3	☐ Check box when complete
PDU TS5-7	120vac Neutral (Light Blue)	Gantry LV Power Pan A1J1 FIlter - N	☐ Check box when complete
PDU TS5-8	Ground (Green/Yellow)	Gantry Power Pan Chassis A1J1 Filter Ground Stud	☐ Check box when complete

Figure 3-1 Front View of NGPDU, with Covers Removed

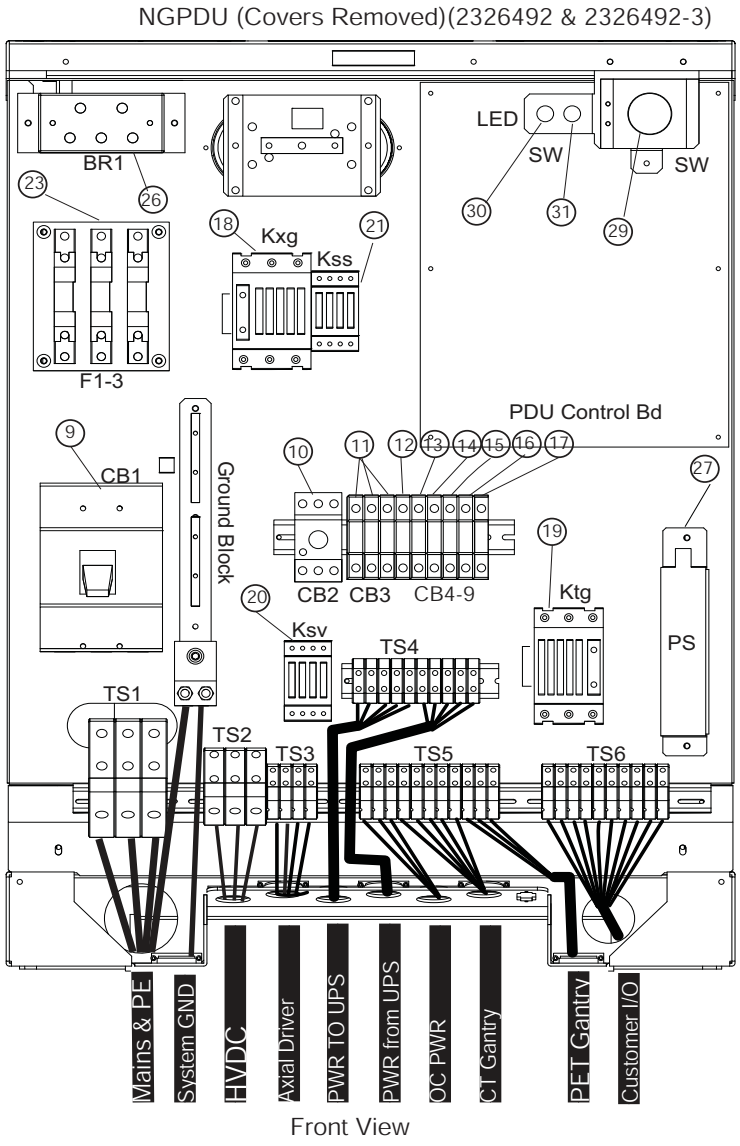
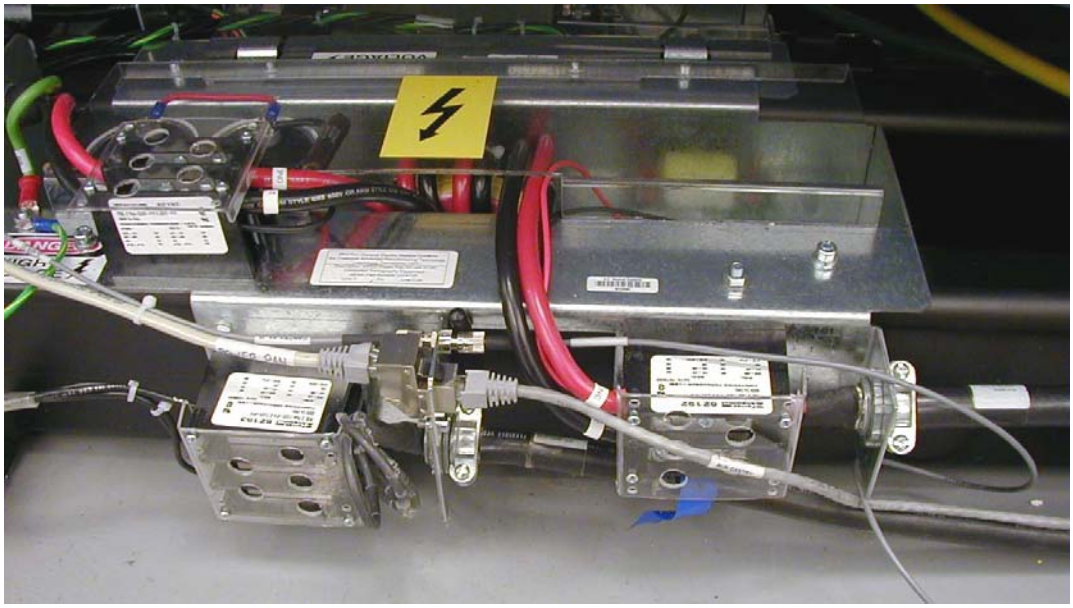


Figure 3-2 Gantry Power Pan



WARNING **TURN OFF ALL PDU CIRCUIT BREAKERS.**

7.) Set an ohmmeter to the lowest scale. Check between the following points for shorts to ground. Verify no continuity exists between the following points:

Table 3-3 No Continuity Verification Points

FROM PDU	TO A1 BREAKER BOX	
TS2-1 (+HVDC) (Red)	vault ground	☐ Check box when complete
TS2-3 (-HVDC) (Black)	vault ground	☐ Check box when complete
TS3-1 (440vac output) (Black)	vault ground	☐ Check box when complete
TS3-2 (440vac output) (Red)	vault ground	☐ Check box when complete
TS3-3 (440vac output) (Orange)	vault ground	☐ Check box when complete

8.) Leave the metal cover off the PDU A3 input power panel until you complete the checks in the next section.

Section 2.0
Site Ground Continuity Check

Use an ohmmeter to verify the presence of **less than 1.0 ohm of resistance** between each of the following points:

Table 3-4 Resistance Verification - Site Ground

FROM	TO	
PDU Ground Bus	Vault Ground	☐ Check box when complete
PDU Ground Bus	Table/Gantry raceway ground point	☐ Check box when complete
Table/Gantry raceway ground point	Gantry Chassis	☐ Check box when complete
Table/Gantry raceway ground point	Table Chassis	☐ Check box when complete
Table/Gantry raceway ground point	Operator Console Chassis	☐ Check box when complete
All Display or Computing Options (if any)	Operator Console Chassis	☐ Check box when complete

Section 3.0
Axial Head Holder Shim Installation

3.1 Overview

This procedure applies to following Table Types:

GT2000	All head holders
GT1700	All head holders
HP 1600	All head holders
PET Table	All head holders

3.2 Requirements

Table 3-5 Personnel Requirements

REQUIRED PERSONS	PRELIMINARY REQS	PROCEDURE	FINALIZATION
1	10 mins	15 mins	5 mins

Table 3-6 Tools and Test Equipment

ITEM	QTY	EFFECTIVITY	PART#	MANUFACTURER
Stand FE Tool Kit	1	-	-	-

Table 3-7 Replacement Parts

ITEM	QTY	EFFECTIVITY	PART#	MANUFACTURER
Shim Kit	1	-	-	-

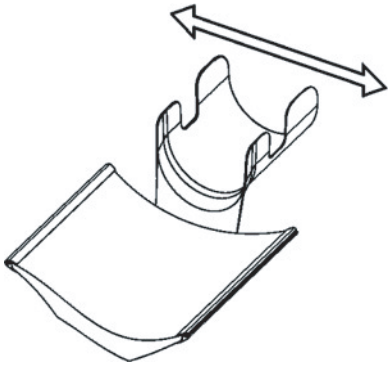
NOTICE

Understand and Follow All General Table Safety Procedures.

3.3 Required Conditions

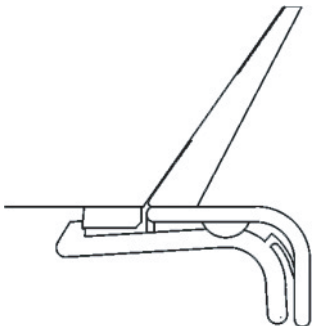
Check head holder for a tight fit. If the head holder fit is loose, follow this procedure.
Introduction:

- Some Axial Head Holders have a large free-play in the horizontal direction which could potentially lead to motion and therefore image artifacts.
- Installation of the 2327335 rubber shim kit can minimize this motion.

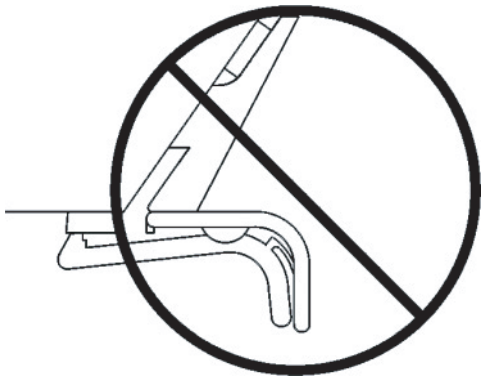


Notes before Selecting Shim Thickness:

- While selecting the best shim size, do not attach the rubber shim yet using the adhesive on the back. It is best to use a piece of tape to hold on the shim in order to see if the size is correct.
- Selecting a shim size that is too thick may result in:
  - Difficulty latching the head holder properly. The head holder must latch so that a patient is not injured.
  - Damage to the plastic latch or the plastic screws that secure it.



Correct - Head Holder is latched onto first step of plastic latch mechanism (The head holder does not need to be latched onto the second step)

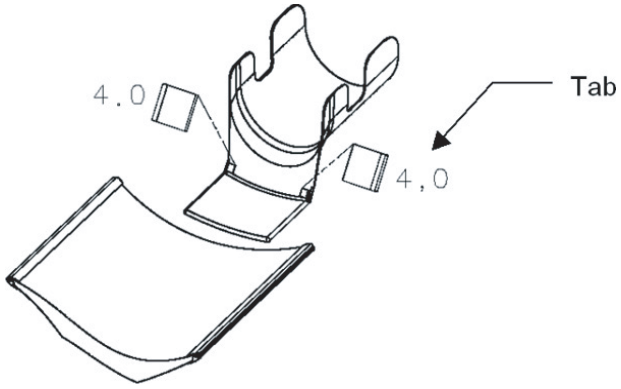


Wrong - Head Holder is NOT latched after installing shims

3.4 Procedure

1.) First place the two 4.0mm shims (thickest size) onto both edges of the head holder as shown (use a piece of tape to temporarily secure them)

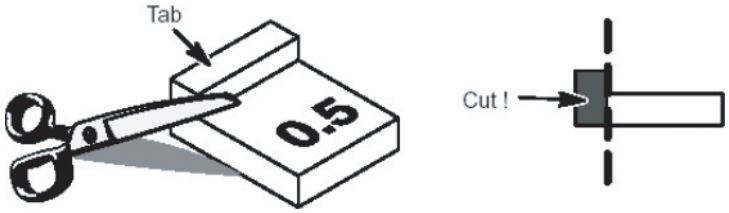
- The shim must be placed with the tab facing out
- The thickness is printed on the shim



2.) Insert the head holder into the cradle

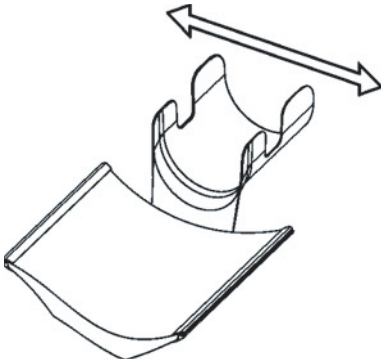
3.) Check if the head holder is latched onto the cradle at the first step of the plastic latch mechanism. (The head holder does not need to be latched onto the second step)

4.) Check if the head holder has a small free-play in the horizontal direction. If the rubber is too thick, repeat steps 1-4 using a thinner shim (3.5, 3.0...0.5mm) until the head holder is latched (without excessive force) and fits securely in the cradle.If the thinnest shim (0.5mm) is too tight, the tab can be cut off to reduce the thickness



5.) Clean off the surfaces where the shims will mount using alcohol.

6.) Peel off the paper from the back of the selected shims and attach with the tabs facing out. Hold each shim with your fingers for a few seconds to attach it to the head holder.



3.5 Finalization

Review latching of head holder with customer after installation.

Section 4.0
Mechanical Installation Completion Checklist

Complete the *Mechanical Installation* section of the GE e4879 and turn it over to your site FE. The electronic file for the checklist is found on the BrightSpeed Series Service Information CD-ROM 5193754-200. The electronic checklist is also located in the downloadable forms directory of the CD-ROM.

Appendix A
Removal & Installation of Covers

Section 1.0
Gantry Side Covers

1.1 Side Cover Removal

CAUTION

1.) Lower table to home (lowest) position.

Potential for injury if covers removed and power is left "ON".

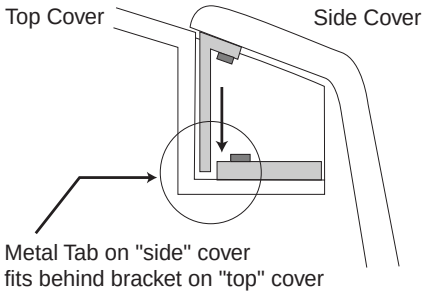
Always remove the right side cover first, and turn OFF power at the Service Switch Panel.

2.) Use an 8mm Hex wrench, turn the latch ¼ turn to latch and unlatch the side cover from the front and rear covers.

Figure A-1 Side Cover Latches

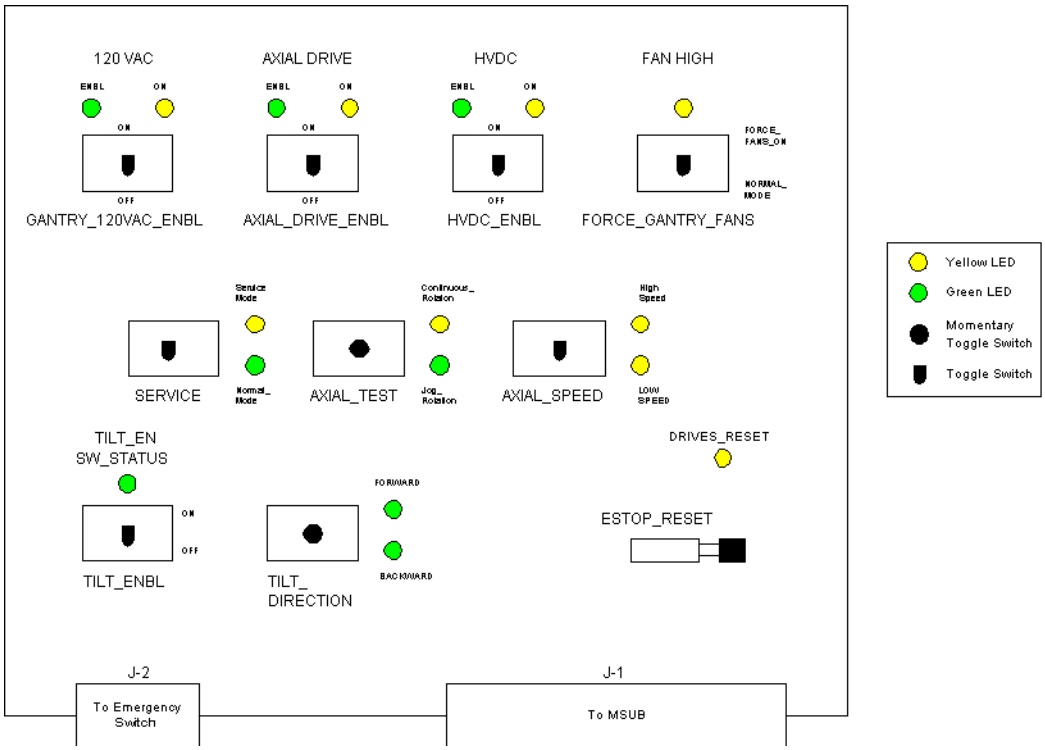
3.) Remove the right side cover by lifting it upward to release the two (2) latches, located on the top edge of the cover.

Figure A-2 Side and Top Cover Clasp



4.) Turn OFF the **HVDC**, **120 VAC**, and **AXIAL DRIVE** power switches on the gantry service switch panel (see Figure A-3).

Figure A-3 Gantry Service Switches



5.) Repeat steps 1-3 for the left side cover.

1.2 Side Cover Installation

1.) To install a side cover, place it over the top cover and let the two (2) side cover latches slide behind the metal tabs, located on the top cover. See Figure A-2.

2.) Use Hex wrench to secure the side cover to front cover by turning the bolts a quarter turn. See Figure A-1.

Section 2.0
Gantry Top Covers

2.1 Top Cover Removal

CAUTION **Potential for Shock.**
Voltage may be present. Potential for injury if covers removed and power is left ON.
Always remove the right side cover first, and turn OFF power at the service switches.

1.) Remove the gantry right side cover (see Gantry Side Covers Removal and Re-install).

NOTICE **Always turn OFF the HVDC before the 120 VAC. Turning OFF 120 VAC power before HVDC power can result in equipment damage.**

2.) Turn OFF the **HVDC**, **120 VAC**, and **AXIAL DRIVE** power switches on the gantry service switch panel (see Figure A-3).

3.) Disconnect the power cable that connects the fan on the top cover to the gantry.

Note: The cooling fans are now mounted on the top covers, one on each.

4.) Loosen the 2 Phillips screws which secure the top cover with the front and rear covers.

Figure A-4 Top Cover Mounting Screws

5.) Take the end of the top cover nearest to the side cover and tilt upwards.

6.) Slide the cover down to disengage the tab from the mounting bracket. See Figure A-5.

Figure A-5 Top Cover Tabs and Bracket

7.) Lift the cover clear and repeat the above steps for the other cover.

2.2 Top Cover Installation

The top cover consists of two (2) pieces. Install the front and rear gantry covers, if not already installed. See Section Section 3.0 on page 200, and Section 4.0 on page 208.

1.) Take one of the top covers and align the tabs on the cover with its associated bracket. Lift and slide the cover into place. Position the cover to fully engage the fan interlock switch. Secure the cover using 2 Phillips screws.

2.) Take the other top cover and align the tabs on the cover with its associated bracket. Lift and slide the cover into place, while being sure to engage the fan interlock switch. Secure the cover using 2 Phillips screws.

3.) Connect the cable from the fans to the gantry.

NOTICE **Always turn OFF the HVDC before the 120 VAC. Turning OFF 120 VAC power before HVDC power can result in equipment damage.**

4.) Turn on the three (3) power switches.

5.) Ensure fans work properly.

6.) Re-install the gantry side covers.

Section 3.0
Gantry Front Cover

NOTICE **Potential for cover damage.**

Front and rear cover removal and installation can be safely accomplished by one (1) person using the dollies provided with the system. Failure to use these dollies will significantly increase the likelihood of damage to the covers. Do not lean covers against walls.

3.1 Front Cover Dolly Setup

DANGER **DO NOT USE DOLLIES ON UNEVEN SURFACES SUCH AS STEPS OR ELEVATOR THRESHOLDS. THE DOLLIES ARE DESIGNED TO BE USED ON FLAT LEVEL FLOORS WITHIN THE SCANNING SUITE ONLY. MISUSE CAN RESULT IN PERSONAL INJURY OR DAMAGE TO COVERS OR OTHER FACILITY ITEMS.**

CAUTION **Rotating arms on the stand are supposed to be stiff. If they fall freely, tighten the tensioning nuts. Loose rotating arms will reduce the stability of the dollies when supporting the front cover. Do not lubricate.**

1.) Arrange Dolly sections for assembly. The base and post can be assembled only one way. Refer to Figure A-6 and Figure A-7.

- The base uses two (2) palm screws to clamp the four (4) legs in the open or usage mode.
- The base also uses the same palm screws to prevent the legs from falling in storage mode.
- The top post can be inserted in either base and is keyed for proper engagement.
- The top post locking pin prevents the sections from separating during usage.

Figure A-6 Front Cover Dolly in Storage Mode

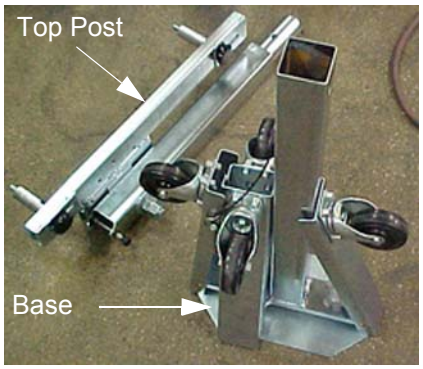
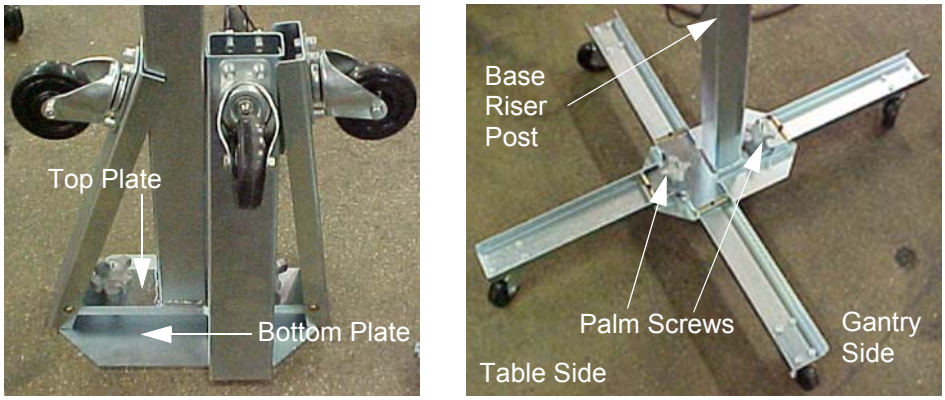


Figure A-7 Front Cover Dolly Base Assembly



2.) Unfold the base legs by loosening both palm screws to the top of their travel.

3.) Carefully unfold the legs so that the castors touch the floor.

4.) Tighten the palm screws to clamp the legs between the base top and bottom plates.

Note: Lifting the base by the riser post while leaving the castors on the floor will ease palm screw tightening. Reference Figure A-7.

WARNING **ENSURE BOTH PALM SCREWS ARE TIGHTENED SECURELY AND THE LEGS ARE CLAMPED TIGHTLY BETWEEN THE BASE TOP AND BOTTOM PLATES. FAILURE TO DO SO WILL RESULT IN INSTABILITY DURING FRONT COVER HANDLING.**

5.) Insert top post into the base riser post. Align the key for complete engagement.

6.) Insert top post locking pin to secure both top and bottom sections.

7.) Reverse above steps to disassemble.

Note: For base storage only one (1) palm screw needs to be tightened. This will engage the bottom base plate and the leg ends preventing the legs from unfolding during transport and storage.

3.2 Removal

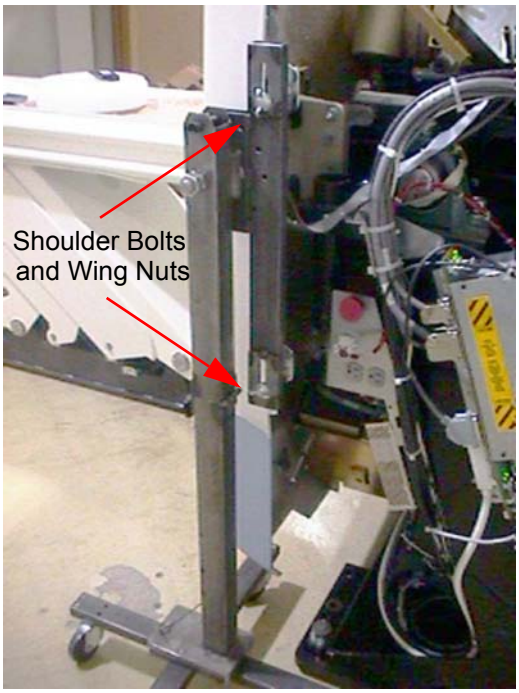
1.) Position the table at its lowest position.

2.) Remove gantry side and top covers, if you have not already done so. See Section 1.0 on page 197. Make sure that the three (3) power switches have been turned off. See Figure A-3.

3.) Assemble the front cover dolly.

a.) Tighten the two (2) shoulder bolts to the gantry securely. This will make cover installation easier. See Figure A-8.

Figure A-8 Front Side Dolly



b.) Attach side dolly to the shoulder bolts and secure assembly with two (2) wing nuts.

c.) Repeat steps a and b to assemble the other side dolly.

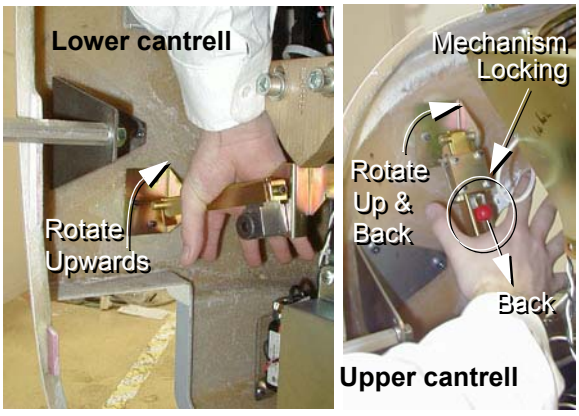
4.) Detach front cover J3 and J2 and front cover BKHD J1 cables.

5.) Remove front cover

a.) Disengage upper and lower cantrell brackets on both sides of the cover.

1.) Using steady but firm pressure, lift each of the lower cantrell brackets from their associated retainers. See Figure A-9.

Figure A-9 Releasing cover brackets

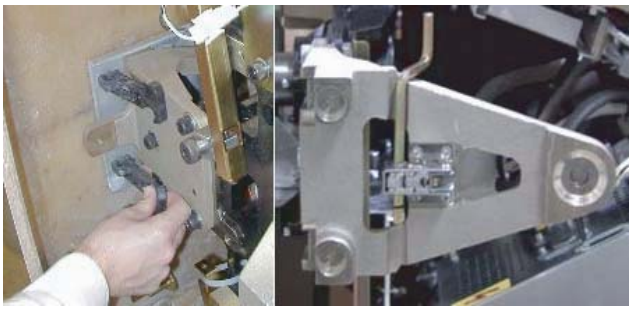


2.) Disengage the locking mechanism on the upper cantrell brackets by using your thumb to slide the trigger (red lever) back. This will release the locking mechanism and allow the cantrell to be rotated upwards with steady and firm pressure.

b.) Disengage the rubber retaining straps on both sides. You may find it helpful to lift "up" on the cover to align the stud while attaching the rubber retaining straps.

c.) Also lift and rotate cover locking arm to unlocked position.

Figure A-10 Rubber retaining straps and Cover Locking mechanism



NOTE: The rubber retaining straps at the right side of the gantry are different from the current HP60 system.

6.) Rotate front cover away from gantry.

a.) Move front cover away from gantry giving enough space (about 5 feet) between front cover and gantry.

b.) Pull the locking pin and rotate front cover away from gantry. Place locking pin in one of the side dolly perforations. See Figure A-11.

Figure A-11 releasing Front Cover Dolly Hinge

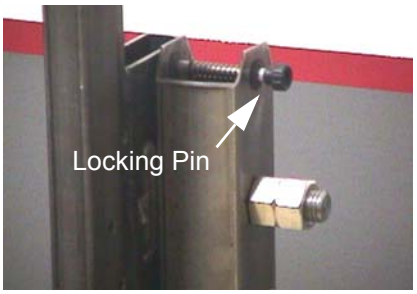


Figure A-12 Front Cover Removal Sequence

1. Upper Left>Rotate cover to make room for step 2.
2. Upper Right>Rotate cover to clear the table. Roll the cover to foot end of table
3. Lower Left> Rotate the cover upside down to provide clear work area.
   Note: Remove Gantry Display and Control Panel in position 2.

7.) Rotate the cover horizontally and move it back and over the table to a safe location. Once in a safe location, you may over-rotate the cover full vertically but upside down.

8.) Remove the gantry display and one (1) of the cover's control assemblies, and place them into the service positions.

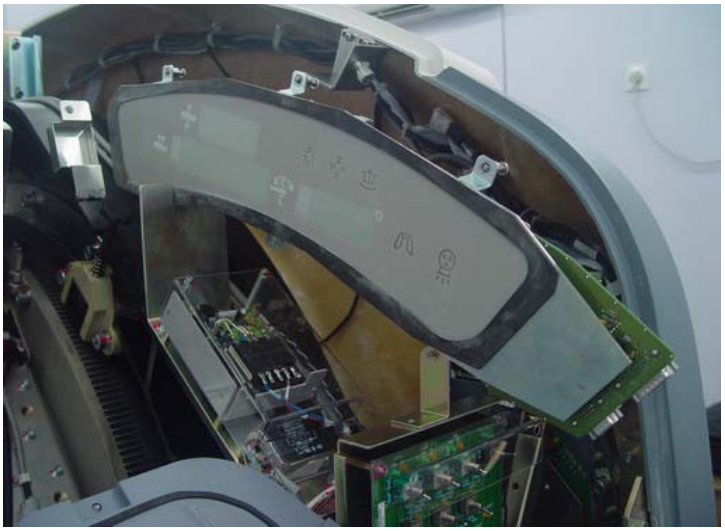
a.) Remove the gantry display and place it into its service position.

* The gantry display is held in place with (6) thumb screws. Use a flat-blade screwdriver to remove the Display. Reference Figure A-13.

Figure A-13 Gantry Display Removal

* Place the Display in the bracket on the right side of the gantry. See Figure A-14.

Figure A-14 Gantry Display Service Mounting Location

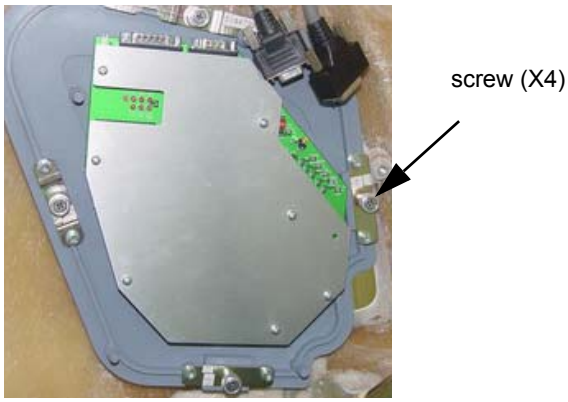


* Disconnect the cabling at the right rear gantry cover. Only (1) cable will connect to the Gantry Display. Connect the cable taken from the rear cover to the display.

b.) Remove a gantry control and place it into its service position.

1.) Loosen the screws that mounts the gantry control. Keep one hand on the control panel at all times to prevent it from dropping to the floor.

Figure A-15 Gantry control panel removal



2.) Align the ball studs with their associated receivers and snap into place.

Figure A-16 Control panel service position

3.) Connect cable to terminator located on the cantrell arm. Reference Figure A-17.

Note: There are 3 cables, each of which is unique. The ribbon cable is not used in the Service configuration. The other 2 cables will only fit in the terminator or the control panel, not both.

Figure A-17 Gantry Service Mode Cable Terminator

3.3 Installation

1.) Remove the gantry display and control assembly from their service positions and re-attach them to the gantry cover.
   a.) Disconnect cables from Display and Gantry Control Panels.
   b.) Install Gantry Display in front cover. Secure the 6 thumb screws. With a flat-blade screw driver gently tighten past finger tight.
   c.) Install the gantry control panel making sure the screws are secure within the receivers.
   d.) Re-attach cables.

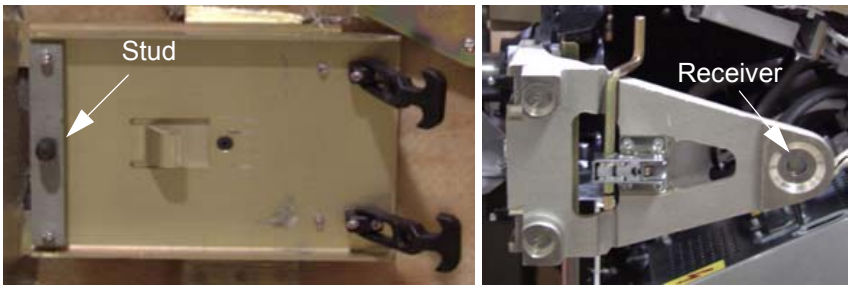
2.) Rotate gantry back to its vertical position.

NOTICE **Potential for front cover damage.**

When you put rotate the gantry back to its vertical position, make sure not to scratch the front cover with the edge of the table cradle.

3.) Attach the front cover.
   a.) Align the studs on both sides of the front cover with each associated receiver. Receiver is located on the gantry frame.

Figure A-18 Cover stud and Mounting bracket receiver



   b.) Insert the stud on one side into its associated receiver and attach the rubber retaining straps.Then insert the stud on the other side into its associated receiver and attach its rubber retaining straps.

   You may find it helpful to lift “up” on the cover to align the stud while attaching the rubber retaining straps.

4.) Re-attach upper and lower cantrell brackets on both sides.

a.) Remove upper Cantrell brackets from service position and rotate them into position over their associated retaining pins. See Figure A-19.

Figure A-19 Service position of upper and lower cantrell brackets

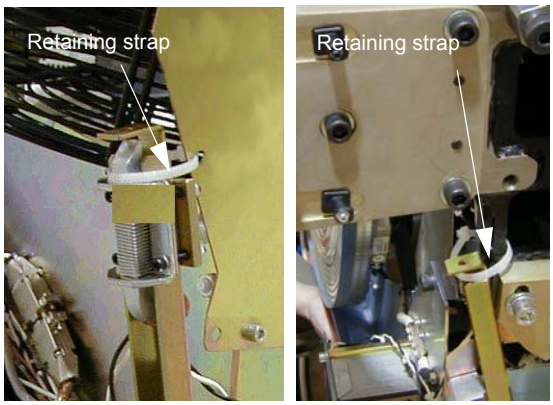
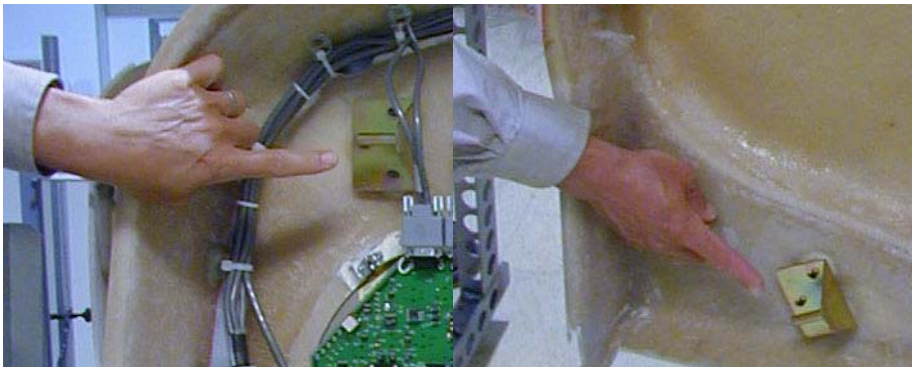


Figure A-20 Cover retaining pins (top and bottom)



Press down firmly on the bracket and snap it into place. The locking mechanism on each upper bracket should lock the bracket securely into place. Do this on both sides. See Figure A-21.

Figure A-21 Locking the cover brackets into place

b.) Remove lower cantrell brackets from service position (see Figure A-19), and rotate them into position over their associated retaining pins. Press down firmly on the bracket and

snap it into place. See Figure A-21.

Note: Mis-adjustment of the cantrell brackets can cause misalignment of the top and side covers. The upper and lower cantrell brackets do not require adjustment during normal use.

5.) Remove dolly, disassemble and store safely away for later use.

6.) Re-attach cables to cover.

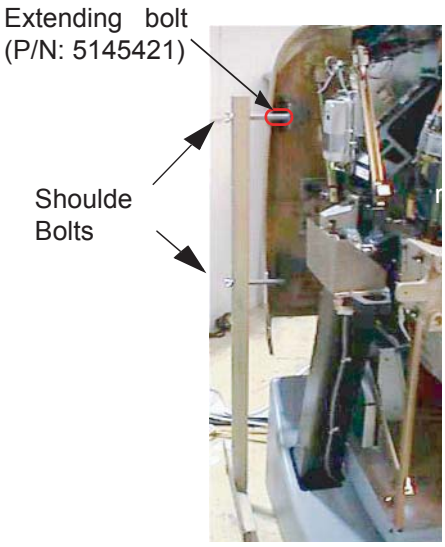
Section 4.0
Gantry Rear Cover

4.1 Removal

1.) Assemble the rear cover dolly.

a.) Tighten the two (2) shoulder bolts to the rear cover.

Figure A-22 One side of the Rear cover dolly



b.) Fit side dolly through the shoulder bolts and secure assembly with two (2) wing nuts. See Figure A-22.

c.) Repeat steps a and b for the other side dolly.

CAUTION **Potential for injury if covers removed and power is left "ON".**

2.) Disconnect cables on the right side of the rear cover.

3.) Remove rear cover.

a.) Disengage upper and lower cantrell brackets on both sides of the rear cover.

1.) Using steady but firm pressure, lift each of the lower cantrell brackets from their associated retainers. See Figure A-9.

2.) Disengage the locking mechanism on the upper cantrell brackets by using your thumb to slide the trigger (red lever) back. This will release the locking mechanism and allow the cantrell to be rotated upwards with steady and firm pressure.

b.) Disengage the rubber retaining straps on both sides.

4.2 Installation

1.) Position cover in back of gantry

2.) Attach the rear cover

a.) Align the studs on both sides of the rear cover with the receivers located on the gantry frame.

b.) Insert the stud on one side into its associated receiver and attach the rubber retaining straps.Then insert the stud on the other side into its associated receiver and attach its rubber retaining straps.

Note: You may find it helpful to lift “up” on the cover to align the stud while attaching the rubber retaining straps.

3.) Reattach upper and lower cantrell brackets on both sides.

a.) Remove upper cantrell brackets from service position and rotate them into position over their associated retaining pins. Press down firmly on the bracket and snap it into place. The locking mechanism on each upper bracket should lock the bracket securely into place. Do this on both sides.

b.) Remove lower cantrell brackets from service position and rotate them into position over their associated retaining pins. Press down firmly on the bracket and snap it into place.

Note: Adjustment of the cantrell brackets can cause misalignment of the top and side covers. The upper and lower cantrell brackets do not re-quire adjust during normal use.

4.) Remove dolly, disassemble and store safely away.

5.) Re-attach cables to cover.

6.) Re-install the mylar (scan) window. Carefully bend the scan window and place it into the channel (groove) provided in the covers.

Figure A-23 Installing the mylar window

Section 5.0
Gantry Cover Alignment Adjustment Guide

5.1 Overview

This section explains the adjustment capability available for the Gantry covers and guidelines for performing adjustments.

5.2 Tools Required

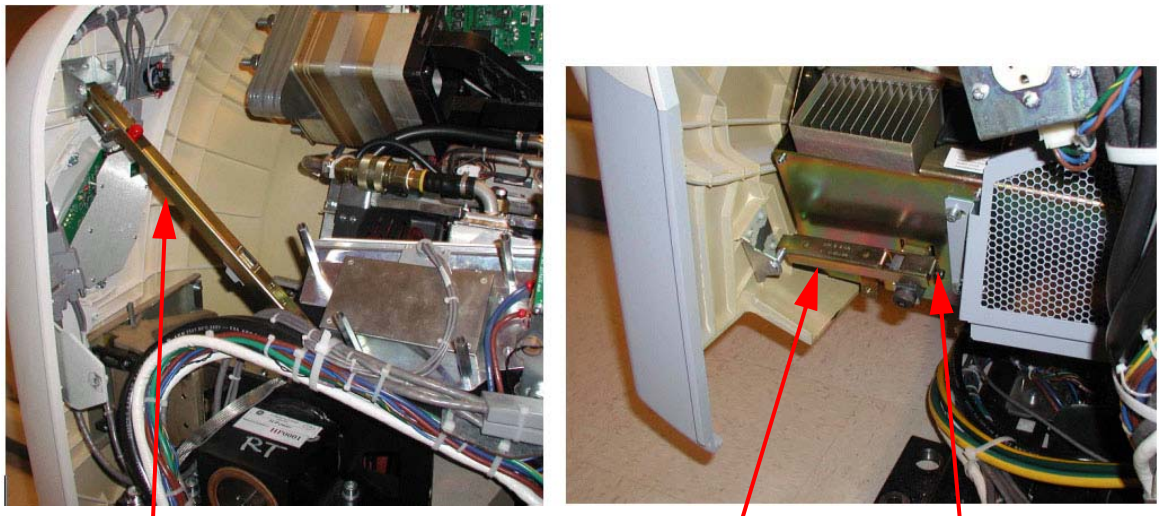
3mm, 5mm, 8mm, Hex wrenches

5.3 Adjustment Guide

5.3.1 Front/Rear Cover adjustment

The front and rear covers are held in a fixed vertical position by the cover locking mechanisms at the vertical middle of each cover on each side. The only adjustment capability is found on each of the cover cantrells (see Figure A-24, one near each corner of the front and rear covers. Adjustments are best done at zero tilt.

Figure A-24 Cantrells



1.) Remove the Gantry side covers using a 8mm hex wrench to release the bottom latches. Refer to Section 1.0 on page 197, for further details.

2.) Disable gantry rotation, 120VAC and HVDC via the service switch panel.

3.) Disconnect the fan power via the white molex connector (one for each top cover). Remove the top covers by lifting up and pulling to the side of the gantry.

4.) Remove the scan window to avoid creases or kinks during cover movements.

5.) Using a 5mm hex wrench, adjust the bolt on the gantry end of the cover cantrells (see Figure A-24) to lengthen or shorten the cantrell arm that will push or pull the cover corner. The distance

between the inside edges of the front and rear covers will be typically 27" + 1/8” (689mm). Distance should remain the same as measured along the inside edges from top to bottom with both covers hanging level as seen with a level on the inside vertical edge.

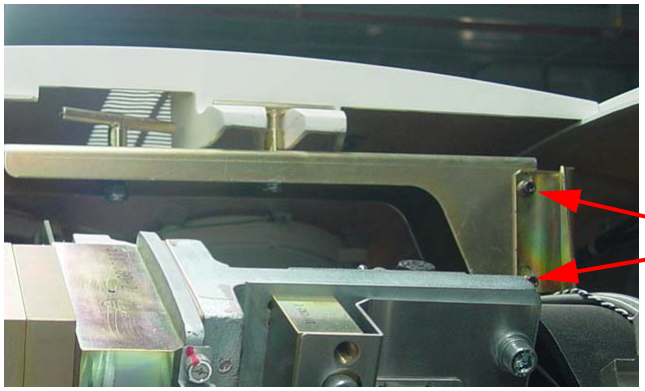
5.3.2 Scan Window

Position the scan window in the opening to verify that it seats all the way around with no gaps. The scan window should seat easily if the front and rear covers have been adjusted properly. If not, go back and readjust such that the scan window seats properly. There is no easy solution other than adjusting and looking for fit.

5.3.3 Top Cover Adjustment

The top covers rest in a top bracket that is mounted to the stationary gantry frame and subsequently just rest on top of the front/rear covers. There are also two alignment fingers on the outer edge of the top covers that need to sit in brackets on the front/rear covers.

Figure A-25 Top Cover Bracket



1.) Set the top covers back on the gantry and look for proper fit. The top covers should rest on the front/rear covers all along the edges. If they do then skip the rest of this section.

2.) If the top covers do not rest on the gantry at the top then lift them back off and use a 5mm hex wrench to loosen the bolts that hold the top cover bracket for adjusting vertical alignment to allow the top covers to rest on the front and rear covers.

3.) The brackets on the front/rear covers for the fingers on the outer edge of the top covers are adjustable using a 3mm hex wrench and sliding the bracket till it lines up with the top cover finger. (See Figure A-26)

Figure A-26 Top Cover Fingers

4.) Verify the top cover tapered edges fit over the lip along the top edge of the front/rear covers. If

not, go back to Section and readjust the cantrells as necessary.

5.) When done adjusting the top covers, reconnect the fan power molex connections.

5.3.4 Side Covers

The side covers just hang from the top covers by two fingers that are not adjustable. When set into the top covers, the side covers should hang straight down with the tapered edges fitting over top of the lip of the front/rear covers.

5.3.5 Finish

1.) Re-Enable gantry rotation via the Axial Enable switch on the service switch panel.

2.) Replace the side covers and latch using a 8mm hex wrench on the side cover bottom latches.

3.) Run an axial scan to ensure proper system operation prior to turning system back over to the customer.

Section 6.0
Gantry Scan Window

6.1 Remove Scan Window

1.) Grab the window at the top and pull firmly downward.

2.) Continue to pull until the top of the scan window makes contact with the bottom portion of the scan window.

3.) Hold the top and bottom portions of the scan window together, grasp both sides of the scan window, move them together and lightly pull upward, until you can free the window from between the front and rear covers.

Figure A-27 Scan Window Removal

6.2 Install Scan Window

1.) Install the front and rear covers.

2.) Deform the scan window, as shown in Figure A-28, and nest the scan window at the bottom of the opening between the front and rear covers, (Figure A-29) with the rivets in the 6 o'clock position installation position. Remember the rivets must be in the 12 o'clock position when the mylar window is fully installed.

3.) After you complete the initial seating of scan window, let the window slowly unfold, and work both sides of the window into position, starting at the bottom and finishing at the top.

4.) Make sure you position the window with the rivets at the 12 o'clock position, and the mylar window slit at either the 3 or 9 o'clock position.

Figure A-28 Install Scan Window

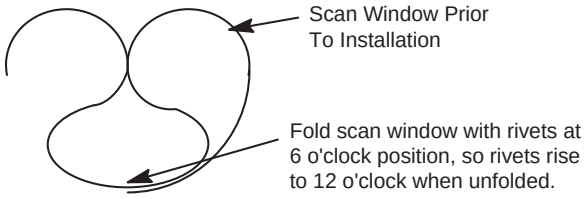
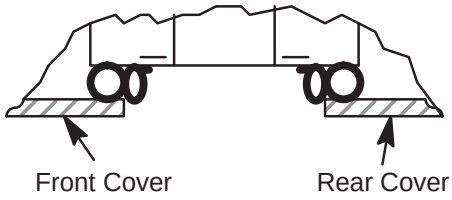


Figure A-29 Scan Window Nested Between Front and Rear Cover



Section 7.0
Gantry Base Covers

Refer to Figure A-30 for the following assembly sequence.

Note: Tighten means torque to 2.3 Nm

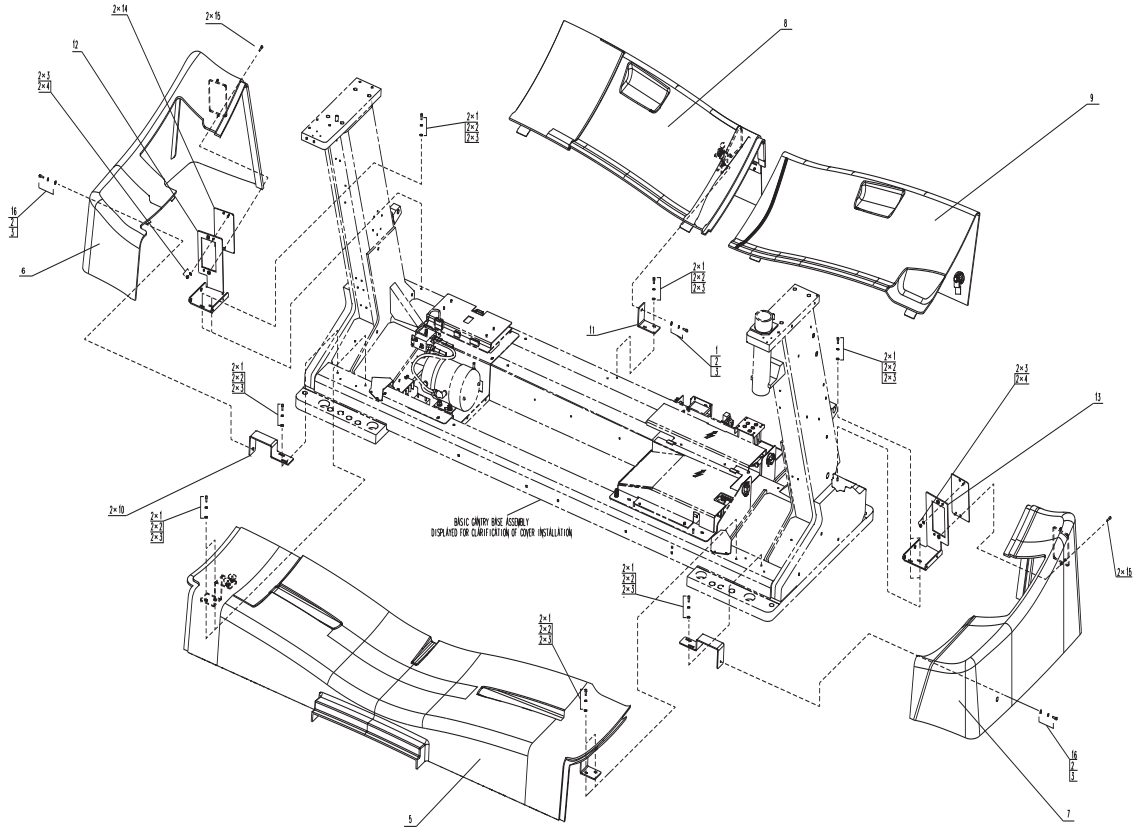
1.) Position cover (item 5) on gantry base with bracket slots aligned to gantry holes. Center cover left to right and attach with (4) hardware (items 1, 2, 3) as shown and tighten.

2.) Assemble two (2) bulkheads (item 14) to two (2) brackets (item 13) using (4) hardware items 3 and 4. Assembly two (2) brackets (item 10) and two (2) brackets (item 13) to gantry base using eight (8) hardware items 1, 2 and 3. Finger tighten hardware with bracket moved outward to end slots. Install side covers (item 6 and 7) on base pushing brackets (item 11 and 13) inward until properly aligned with front cover. Remove side covers, tighten fasteners and replace side covers using one (1) hardware (item 16, 2 and 3) and two (2) item 15 on each cover and tighten.

3.) Assembly last bracket (item 11) loosely to gantry base with two (2) hardware (item 1, 2 and 3). Install rear cover (item 8) to base properly aligned to side cover (item 6). Attach rear cover to bracket with hardware (items 1, 2 and 3) tightening all fasteners. Lock latch.

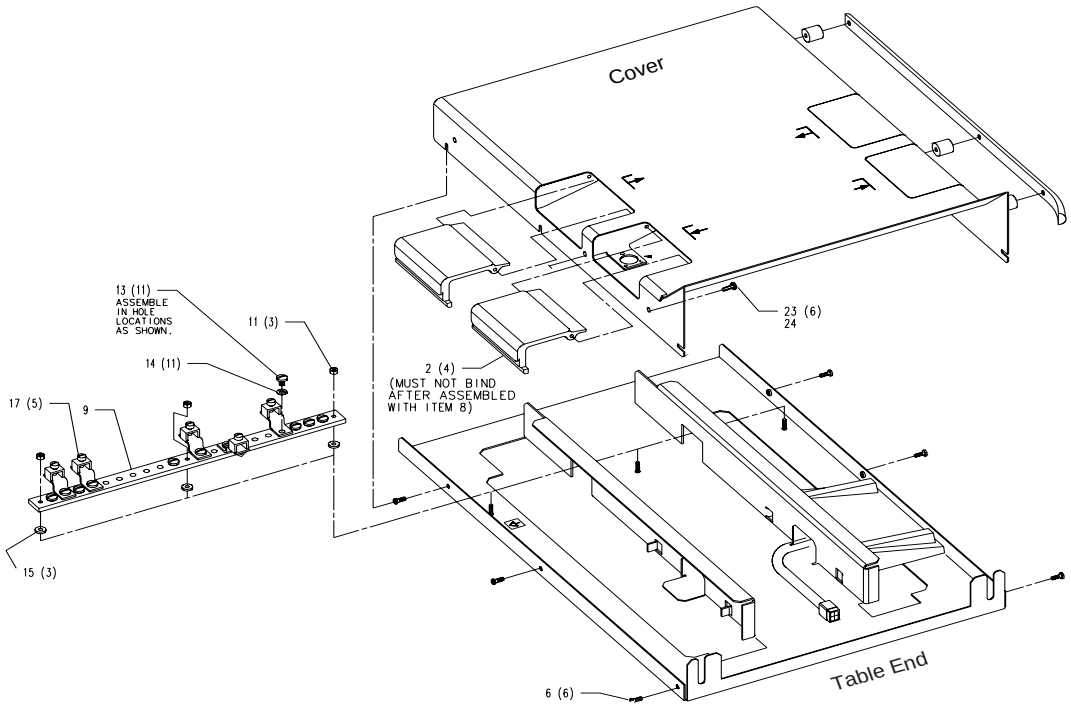
4.) Place cover (item 9) on gantry base, aligned to covers (item 7 and 8). Lock both latches.

Figure A-30 Gantry Base Covers

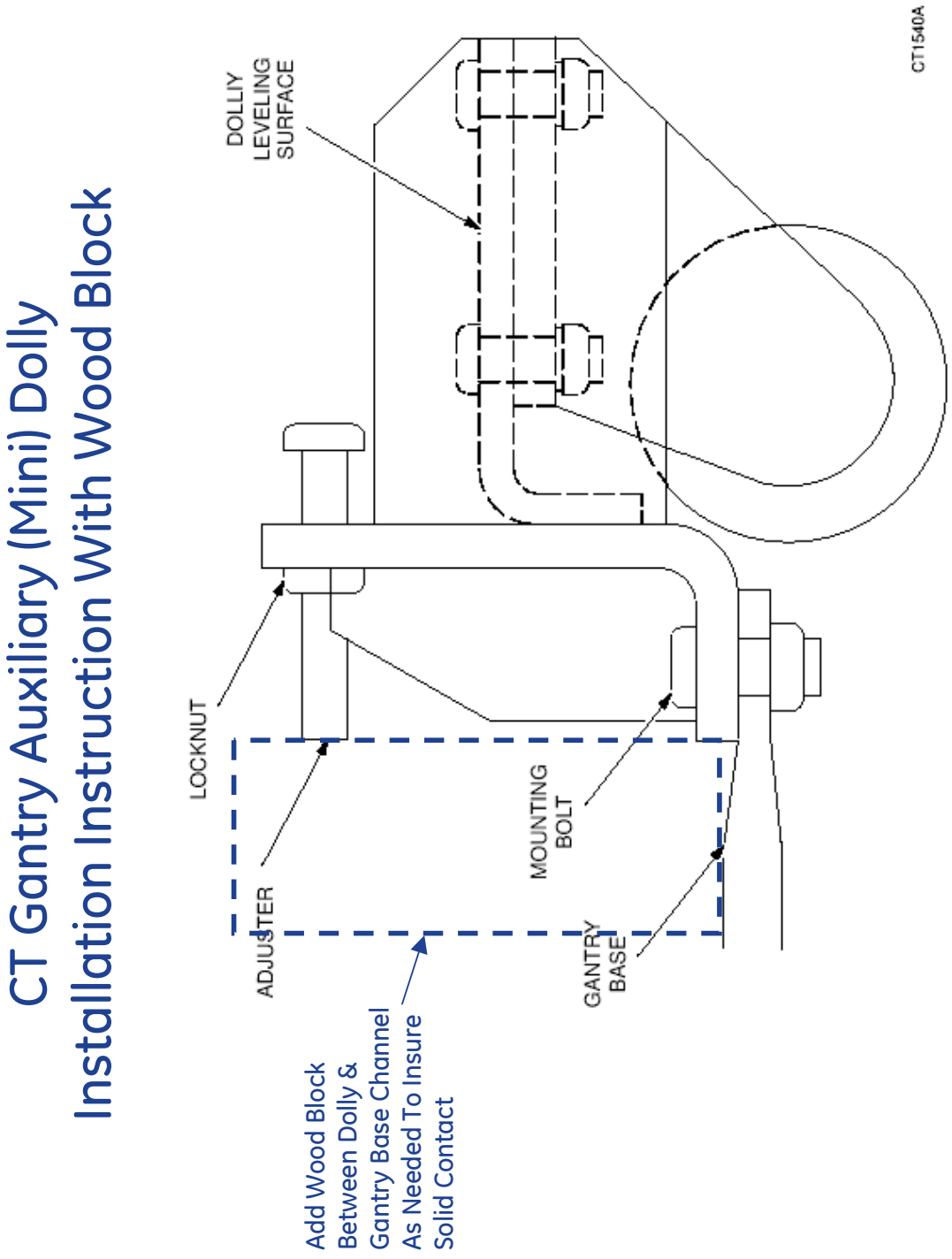


Section 8.0
Footswitch Covers

Figure A-31 Table Footswitch Assembly



Section 9.0
Gantry Auxiliary (Mini) Dolly Installation w/Wood Block



Appendix B
FWS Assembly and Adjustment

Section 1.0
Introduction

Freedom WorkSpace (FWS) is an optional console table with better ergonomic performance. The monitor arm is designed to adjust quickly and easily.

There are two FWS: part 5160735 and part 5168666. They are different in height adjustment. Refer to respective install procedure during installation.

Before assembly go through this section and checklist with the FWS to have an overview.

- Assemble worksurface
  - Assemble chain channel and chain with table base (only applicable for part 5160735)
  - Assemble table base and worksurface
  - Assemble drawer
- Install monitors
  - Mount pole onto table surface
  - Install monitor with monitor arms
  - Install monitor arms on the pole
  - Route cables
- Adjust the monitors for customer use
- Install Seismic Kit

Figure B-1 Overview of Assembled FWS w/o Peripherals

Section 2.0
Procedure

2.1 Assemble Worksurface (For Part 5160735)

1.) Carefully remove the base assembly from the packaging material. With the leg uprights supported, move the legs apart to attach the crossbrace.

2.) Secure the crossbrace to the leg uprights with four 1/4 - 20 x 5/16" screws (Figure 2).

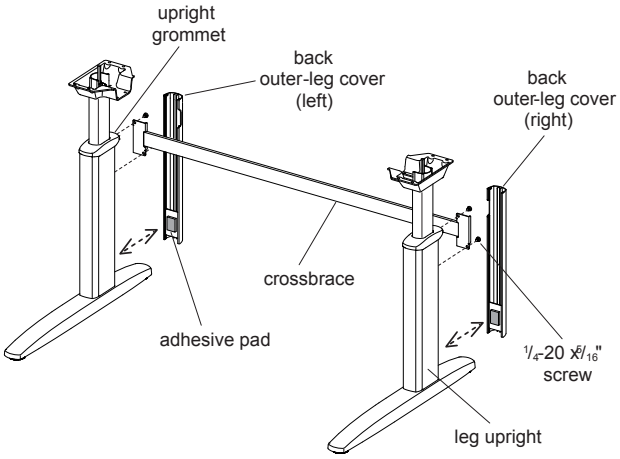
3.) Replace the back outer-leg covers to the leg uprights (Figure 2).

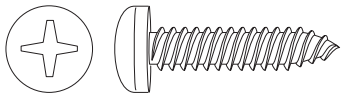
a.) Remove the adhesive pad paper on the legs.

b.) Position the top of each cover up into the upright grommet.

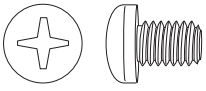
c.) Press the bottom down to secure with the adhesive pad.

Figure B-2 location





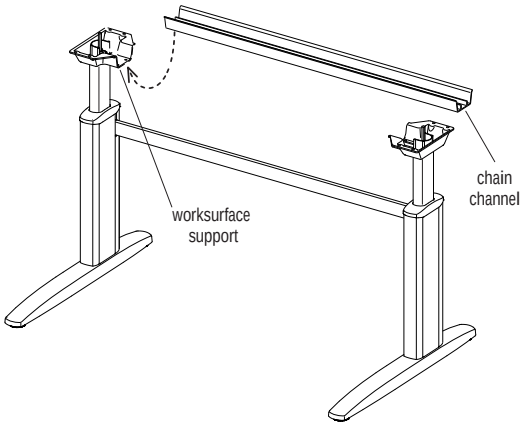
#12 x 1" Screw



1/4-20 x 5/16" Screw

4.) Slide the chain channel into the two openings in the worksurface supports (Figure 3).

Figure B-3



5.) Insert hand crank on one hex shaft, adjust the legs height and ensure the chain channel is horizontal.

6.) Install chain (Figure 4).

a.) Pull out the cotter pin.

b.) Slide the sprocket off over the hex shaft.

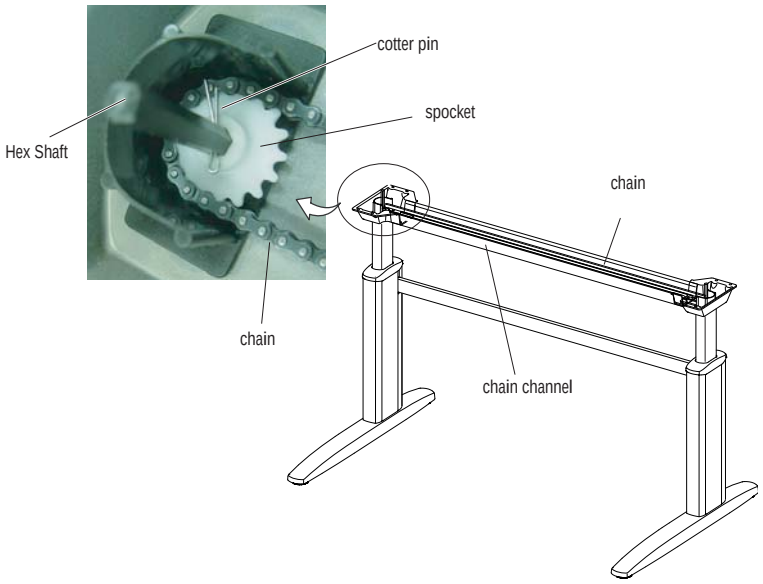
c.) Engage the sprocket into the chain and reinstall the sprocket.

d.) Insert the cotter pin and spread the ends to secure.

e.) Repeat the steps on the other side.

f.) Insert hand crank on one hex shaft and rotate to ensure the worksurface is adjustable.

Figure B-4



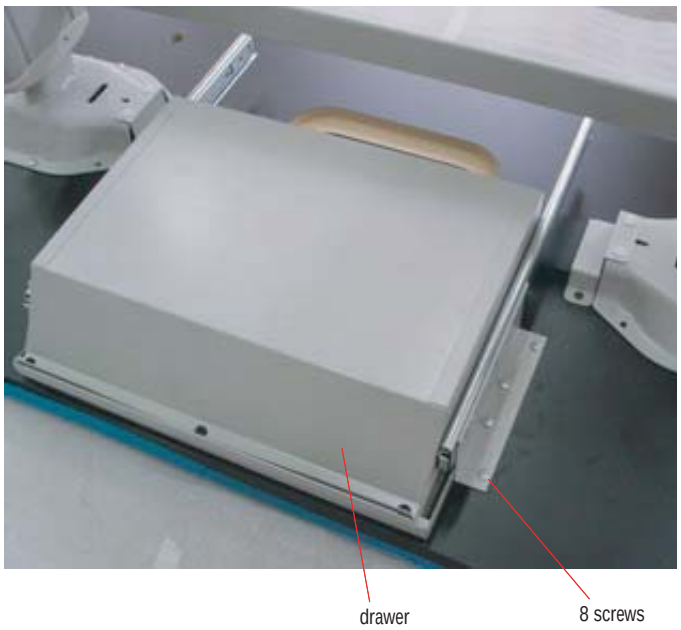
7.) Place the worksurface upside down on a clean, soft surface to prevent scratching. Invert the table base onto the worksurface, taking care to align the holes with the pre-drilled holes in the worksurface. Secure the table base to the worksurface with eight #12 x 1" screws (Figure 5).

Figure B-5

8.) Install two Chain Channel Brackets using four metal screws and two plastic push screws. (Figure 5)

9.) Find the 8 drawer screws inside the drawer. Install the drawer. (Figure 6)

Figure B-6



10.) Carefully turn the table assembly to the upright position. Insert crank grommets into holes in the worksurface as illustrated. Insert crank into one grommet and place a filler cap into the other side. Adjust worksurface to desired height with hand crank (Figure 7).

Figure B-7

11.) The four adjustable glides may be raised or lowered to accommodate varying floor surfaces. Lift the leg off the floor and turn the glide clockwise or counterclockwise to adjust (Figure B-7).

2.2 Assemble Worksurface (For Part 5168666)

1.) Carefully remove the base assembly from the packaging material.

2.) Attach the crossbrace with the two inner-leg cover and secure the crossbrace to the down leg with three M6 x 20 screws (Figure B-9).

Figure B-8

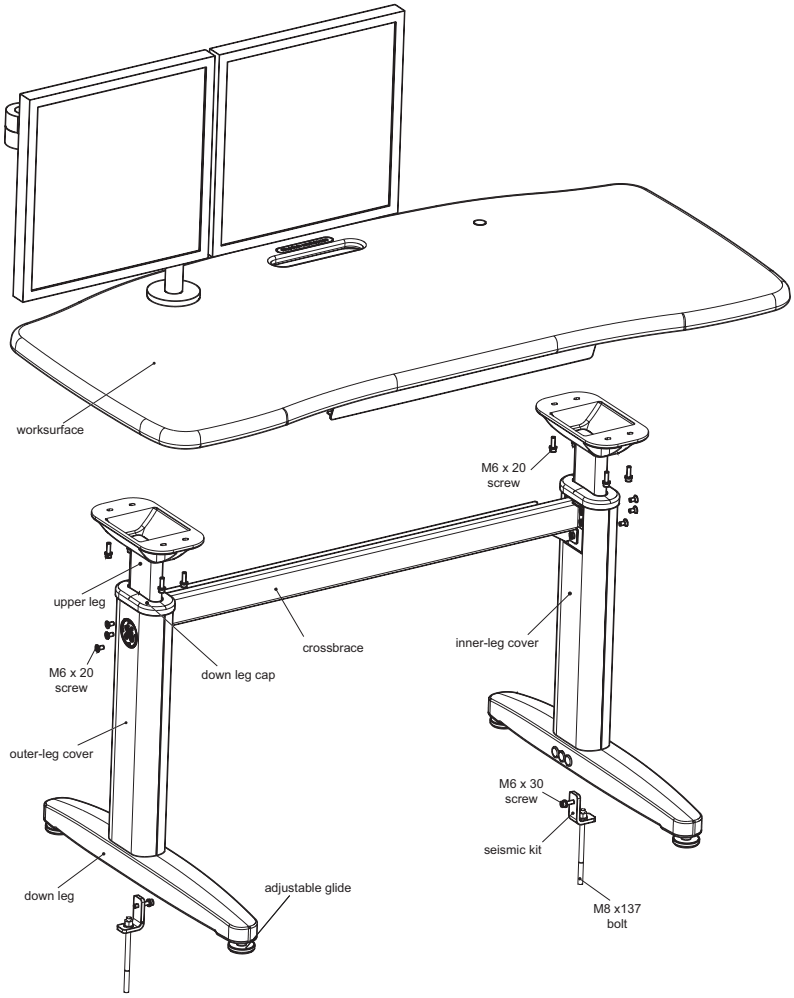
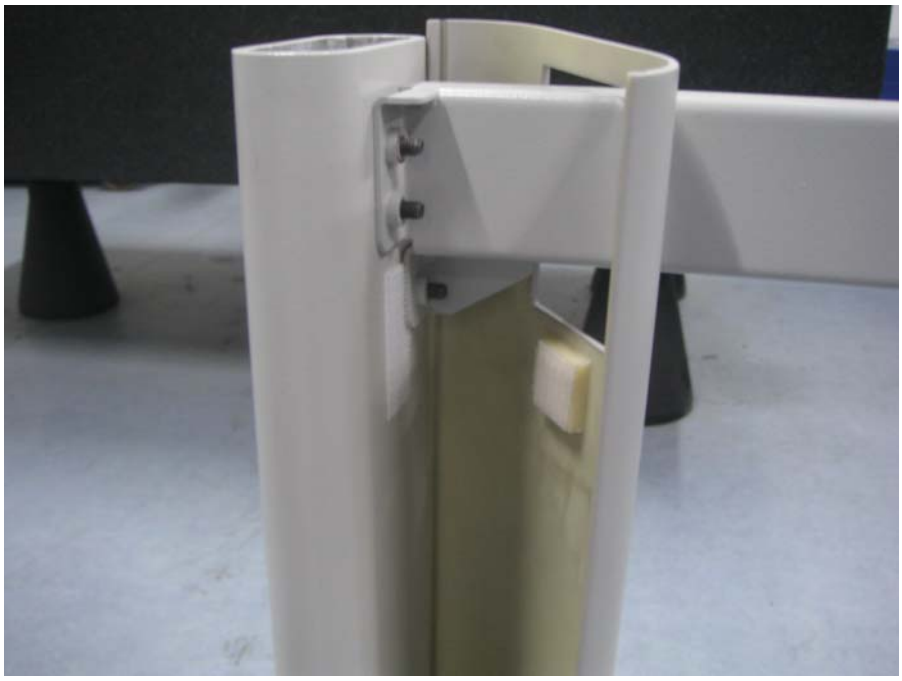


Figure B-9

3.) Press the inner-leg cover to secure with the adhesive pad (Figure B-10).

Figure B-10



4.) Install upper legs to down legs.

a.) Install down leg cap to the down legs (Figure B-11).

b.) Insert upper legs into down legs, adjust to desired height by attaching the upper legs' screws to appropriate down legs' holes. Figure B-12 shows an example of attaching upper legs at the fifth and seventh holes from the bottom upward. In this case, the height of worksurface would be 785mm.

c.) Secure the upper legs with four M6 x 20 screws each leg.

Figure B-11

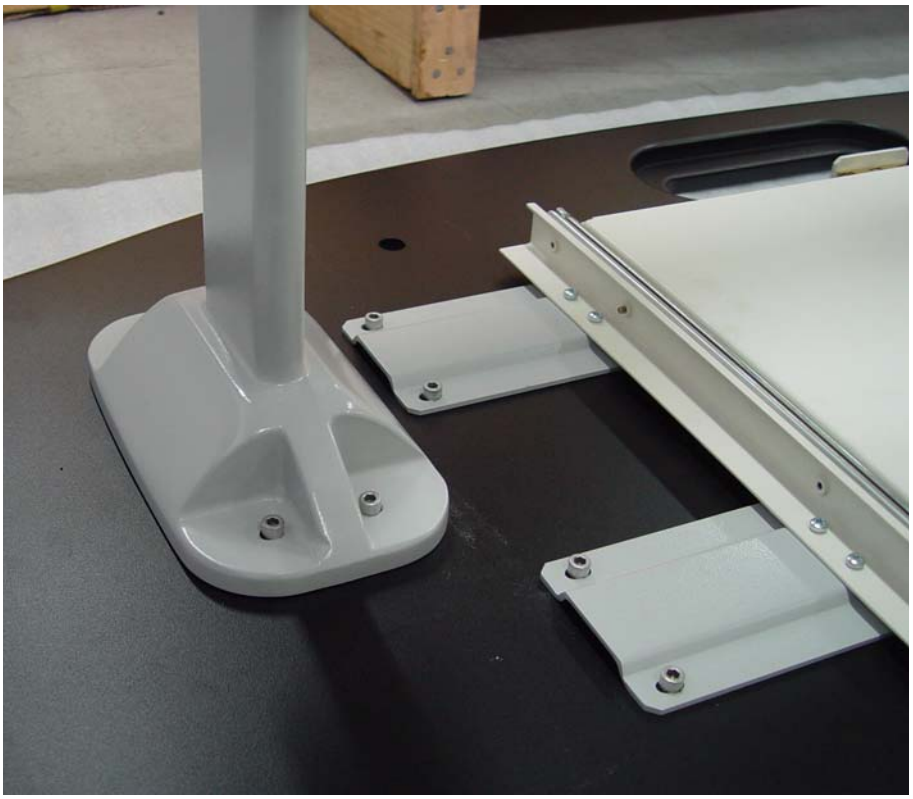
Figure B-12

5.) Insert outer-leg cover and inner-leg cover into down leg slot. Then push down the upper cover to fix them.(Figure 13).

Figure B-13

6.) Place the worksurface upside down on a clean, soft surface to prevent scratching. Invert the table base onto the worksurface, taking care to align the holes with the pre-drilled holes in the worksurface. Secure the table base to the worksurface with eight M6 x 20 screws (Figure 14).

Figure B-14



7.) Carefully turn the table assembly to the upright position. Insert hole cover into one of the two

holes in the worksurface, the other hole would be used for monitor installation.

8.) The four adjustable glides may be raised or lowered to accommodate varying floor surfaces. Lift the leg off the floor and turn the glide clockwise or counterclockwise to adjust.

2.3 Assemble Worksurface (For FWS 5168666-2/-3)

1.) Carefully remove the base assembly from the packaging material.

2.) Attach the crossbrace with the two inner-leg cover and secure the crossbrace to the down leg with six M6 x 20 screws (Figure 16).

Figure B-15 Worksurface Assembly

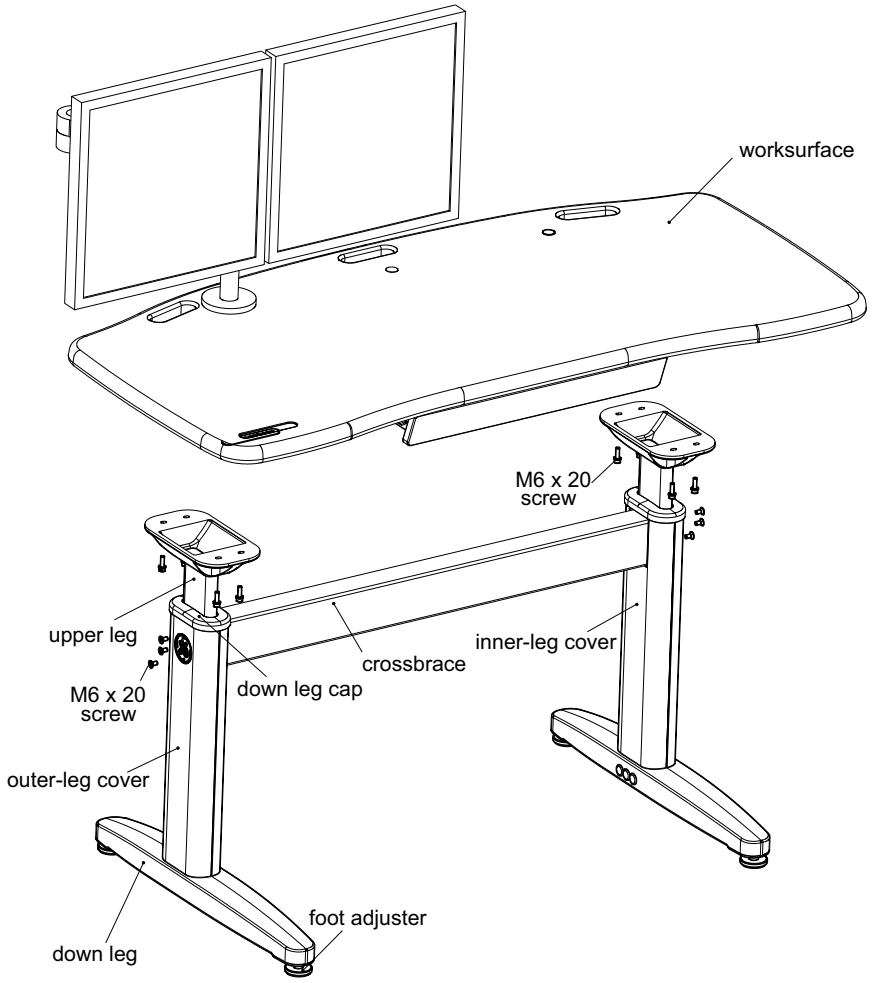


Figure B-16 Inner-Leg Cover

3.) Press the inner-leg cover to secure with the adhesive pad (Figure 17).

Figure B-17 Inner-Leg Cover and Adhesive Pad

4.) Install upper legs to down legs.

a.) Install down leg cap to the down legs (Figure 18).

b.) Insert upper legs into down legs, adjust to desired height by attaching the upper legs' screws to appropriate down legs' holes. Figure 19 shows an example of attaching upper legs at the fifth and seventh holes from the bottom upward. In this case, the height of worksurface would be 785mm.

c.) Secure the upper legs with four M6 x 20 screws each leg.

Figure B-18 Down Leg Cap

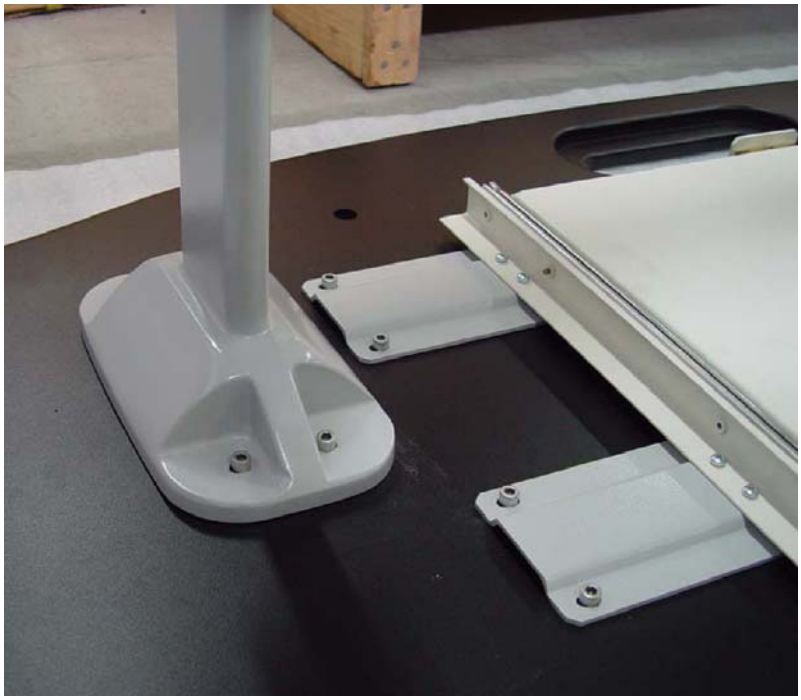
Figure B-19 Down Leg and Screws

5.) Insert outer-leg cover and inner-leg cover into down leg slot. Then push down the upper cover to fix them.(Figure 20).

Figure B-20Outer and Inner Leg Covers

6.) Place the worksurface upside down on a clean, soft surface to prevent scratching. Invert the table base onto the worksurface, taking care to align the holes with the pre-drilled holes in the worksurface. Secure the table base to the worksurface with eight M6 x 20 screws (Figure 21).

Figure B-21Table base and Worksurface



7.) Carefully turn the table assembly to the upright position. Insert hole cover into one of the two holes in the worksurface, the other hole would be used for monitor installation.

8.) The four adjustable glides may be raised or lowered to accommodate varying floor surfaces. Lift the leg off the floor and turn the glide clockwise or counterclockwise to adjust.

2.4 Install Monitors

Note: For more information, refer to the materials shipped with the FWS.

Figure B-22 (Part 5160735)

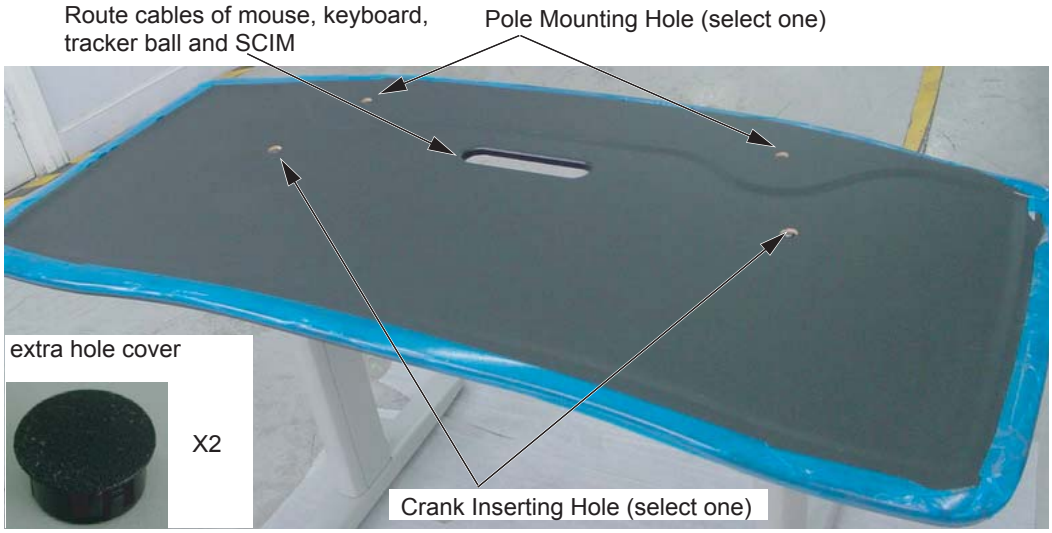
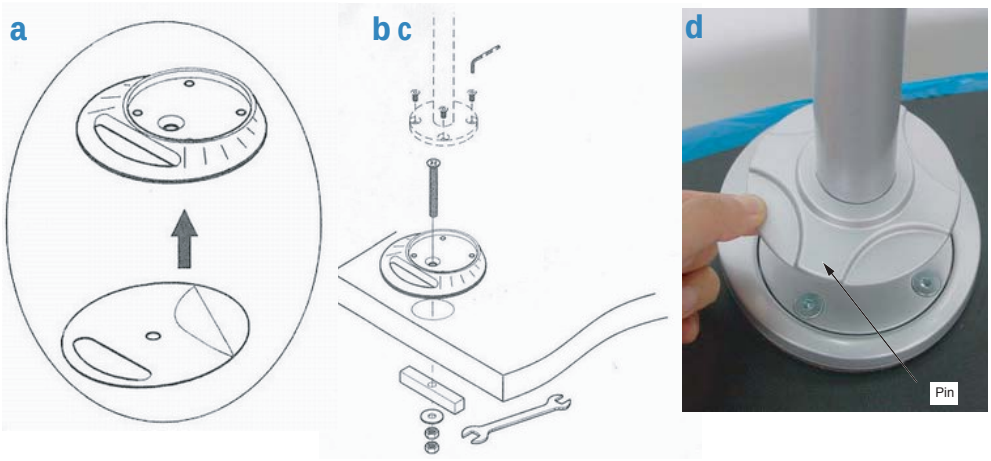


Figure B-23 (Part 5168666)

1.) Mount the pole on the worksurface. (See Figure 22, Figure 23 and Figure 24)
   a.) Adhesive the pad under the grommet mount.
   b.) Use large bolt to go through parts.
   c.) Fix the clamp on the desk with 4 screws.

d.) Put the screw plate cover through the pole. Check the pin position with the screw.

Figure B-24 Pole Mounting



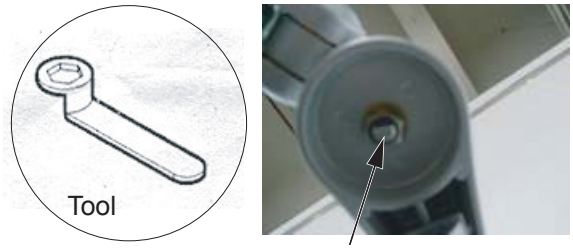
2.) Change configuration of the monitor arms for site.

a.) Three configurations for customer to select, see pictures below:

Figure B-25Three configurations

b.) If B or C is selected, disengage the not-to-used arm by unscrewing the junction bolts and reconfigure the arms.

Figure B-26Junction Bolt

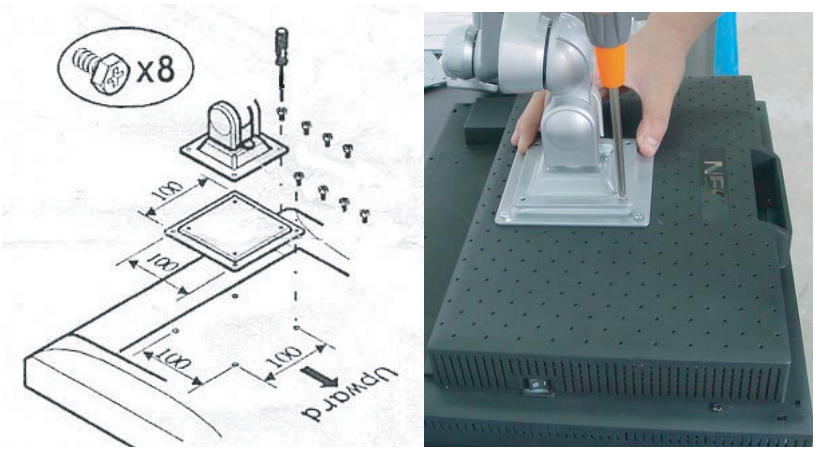


3.) Secure cable covers onto monitor arms. Cable covers should open backward the customer.

Figure B-27Monitor Arms

4.) Mount the monitors to the arm.

Figure B-28 Monitor Installation



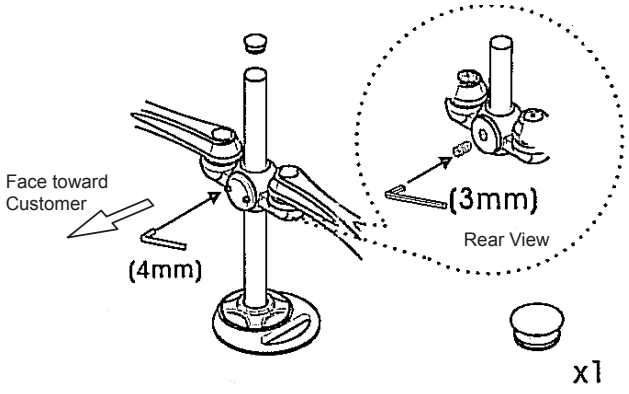
5.) Mount arms with pole. (Figure 29)

a.) Loosen two screws slightly. Put the arm into the pole and adjust it to the suitable position. Middle joint mount (two large allen screws) of the monitor arms should face toward the customer.

b.) Tighten up the pole with 4mm and 3mm allen keys.

c.) Put in the plug on top of the pole.

Figure B-29 Arm Installation



6.) Put extra hole covers onto the holes not used. (Figure 22)

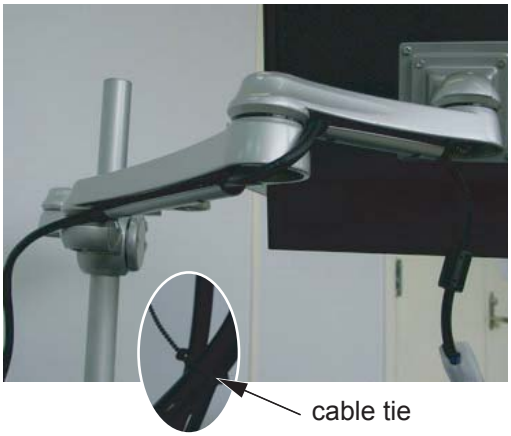
7.) Route cables.

a.) Extended Cables Kit (5160577) for FWS is used to connect monitors, keyboard, mouse, SCIM and trackball. Connection is same with short cables, see Section 4.0 on page 120, Console Connections.

b.) Thread monitor cables through cable covers.

c.) Use cable tie to wrap the cables together or wrap the cables with pole.

Figure B-30Cable Fixing



8.) Route cables (for FWS Part 5168666), thread cables through worksurface and use cable tie to wrap them together to the back slot of crossbrace (Figure B-31).

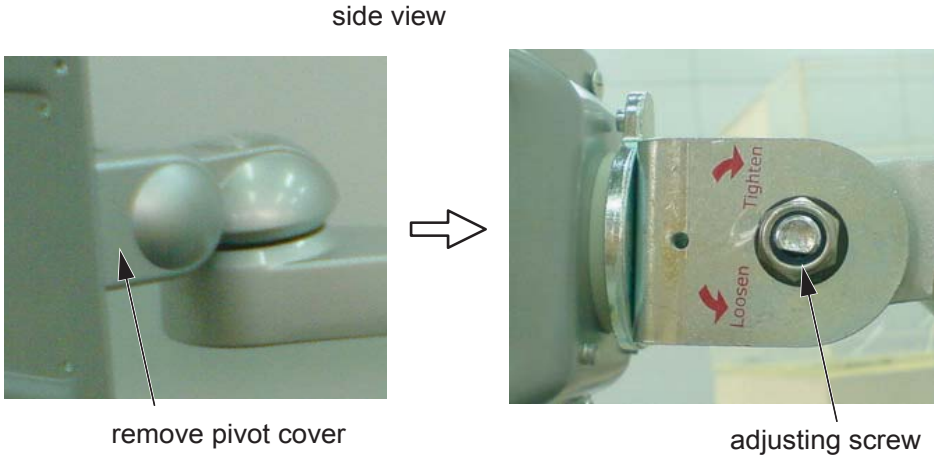
Figure B-31Cable Routing

2.5 Monitor Adjustment

1.) Position the arms for ergonomic viewing. For optimum ergonomic viewing set top of monitor screen 1" below eye height. With monitor and arm properly supported, loosen screw and adjust up or down to desired height. Retighten to secure arm to pole.

2.) Adjust monitor tilt: Tilt monitor back and forth through entire pivot range of motion. If it does not stay in place or movement in one direction is stiff, pivot needs adjustment - see below (pivot cover is removed). Adjust until monitor stays in place and tilting forces, up or down, are equal.
Increase tilt lifting force: Turn screw clockwise.
Decrease tilt lifting force: Turn screw counterclockwise.

Figure B-32Adjusting Screw



2.6 Install Seismic Kit (For Part 5160735)

If site specifications require seismic mounting, follow below steps:

1.) Insert the seismic bracket (x4) into the gap above the adjustable glide, at the bottom of leg.

2.) Use 1/4" bolts to mount the brackets to the floor. The seismic brackets are shipped with FWS table.

Figure B-33

2.7 Install Seismic Kit (For Part 5168666)

If site specifications require seismic mounting, follow below steps:

1.) Use M8 x 137 bolts to mount the brackets to the floor at a distance 916mm (Figure 34).

2.) Mount table base to brackets with two M6 x 30 screws (Figure 35).

Figure B-34

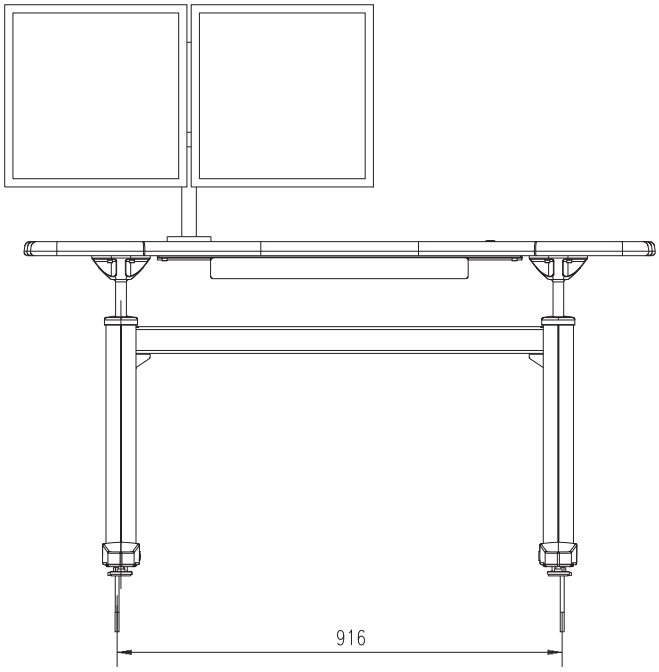
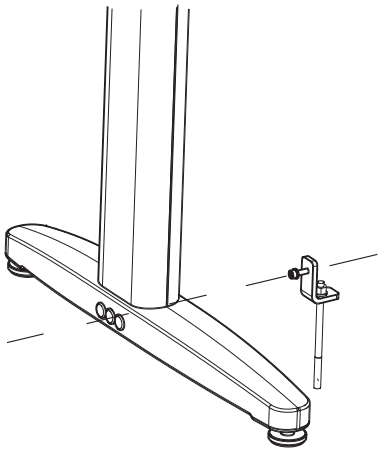
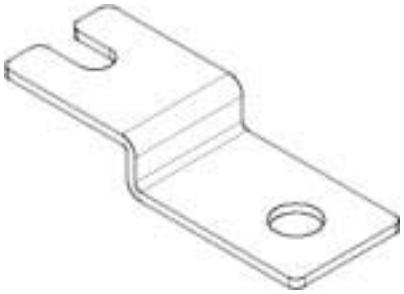


Figure B-35



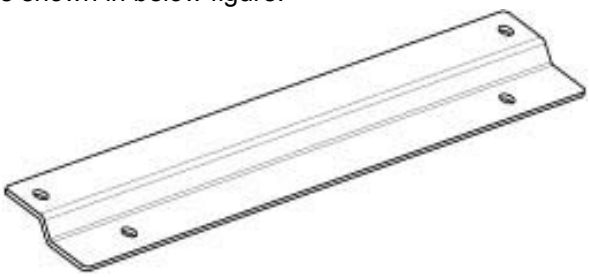
2.8 Install Seismic Kit (For FWS 5168666-2/-3)

There are two kinds of anti seismic brackets as shown in below figure.



FWS anti seismic bracket

(Part No.: 5380721)



FWS anti seismic bracket

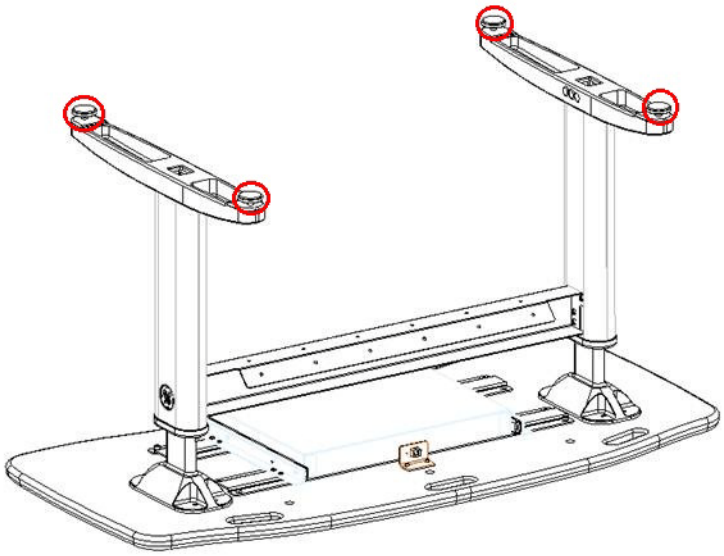
(Part No.: 5451608)

If site specifications require seismic mounting, follow below steps:

- **For anti seismic bracket 5380721**

1.) Turn over the Freedom WorkSpace (FWS), loosen the four foot adjusters as Figure 36 shown.

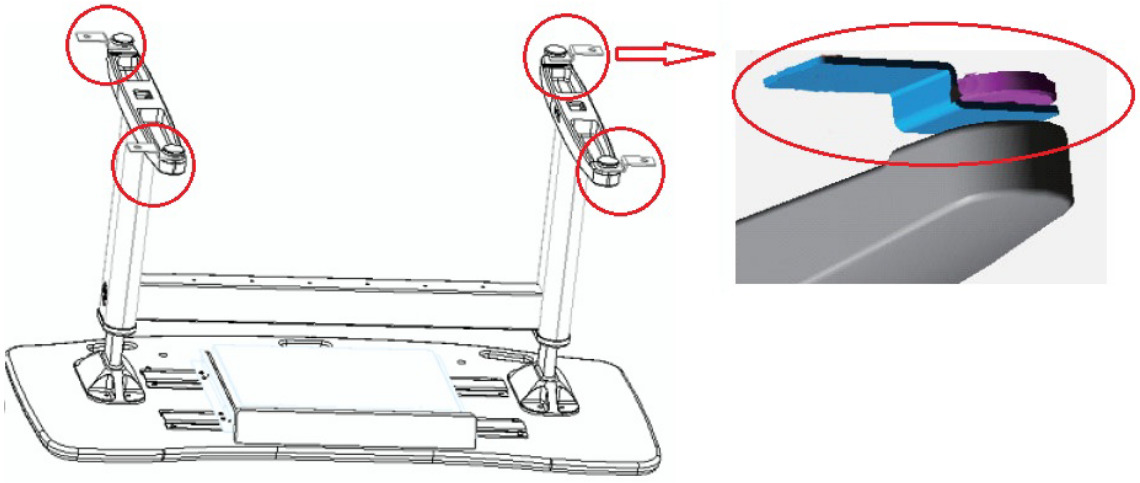
Figure B-36 Loosen four foot adjusters



2.) Insert the anti seismic brackets (5380721) between the adjusters and foots, then tighten the adjusters again, as Figure 37 shown.

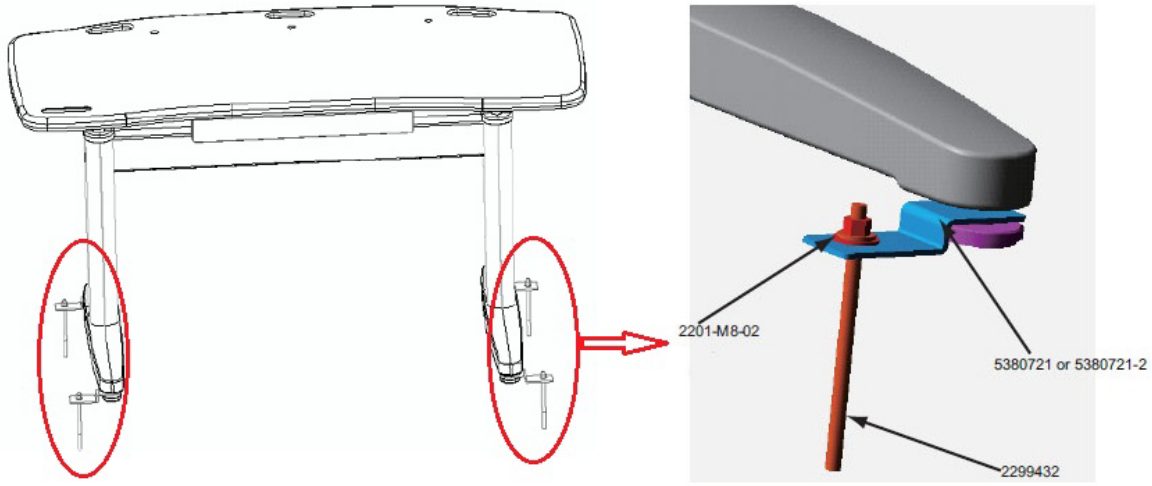
Note: Pay attention to the up down direction of the anti seismic brackets during installation, the side of bracket that used to mount to the floor shall be flush with the foot adjuster.

Figure B-37 Insert brackets between adjuster and foot



3.) Turn the Freedom WorkSpace (FWS) to the upright position, use anchors to mount the brackets to the floor, as shown in Figure 38.

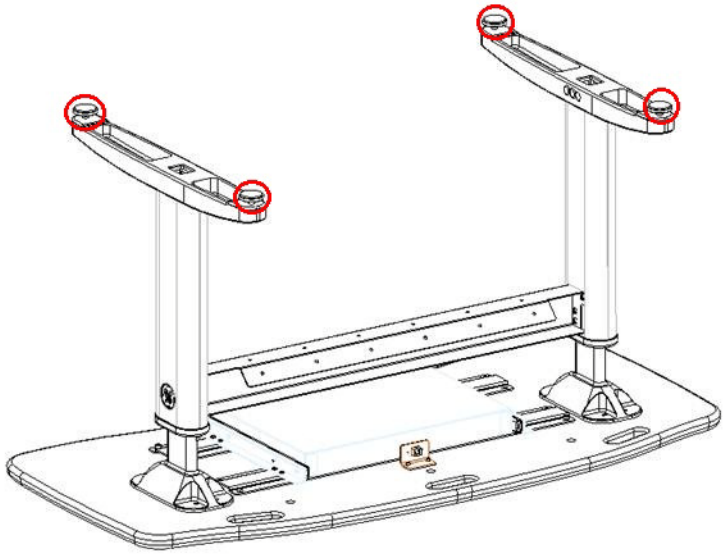
Figure B-38 Mount brackets to floor



- **For anti seismic bracket 5451608**

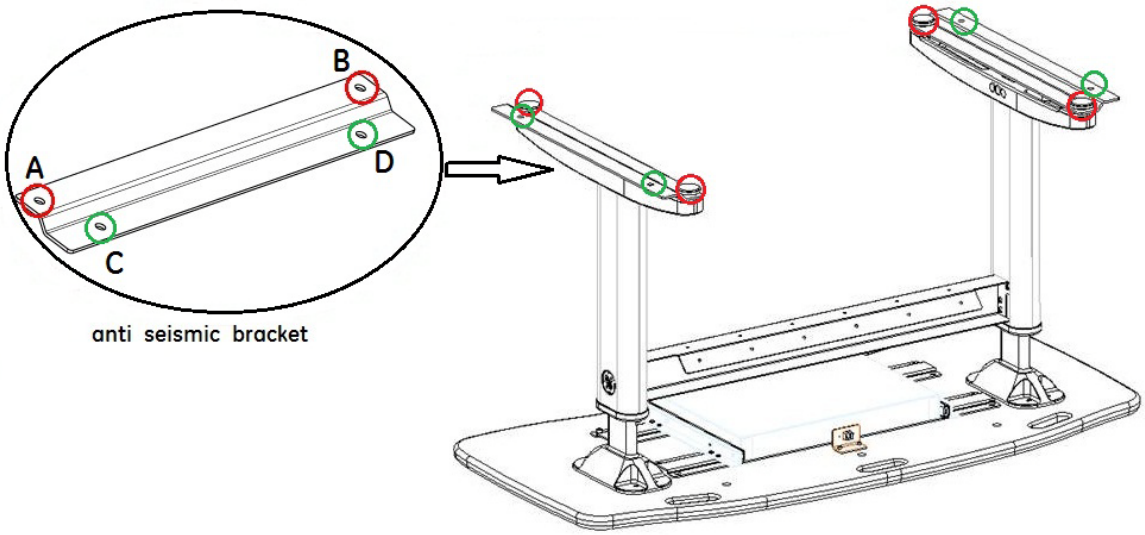
1.) Turn over the Freedom WorkSpace (FWS), loosen and remove the four foot adjusters as Figure 39 shown.

Figure B-39 Loosen and remove four foot adjusters



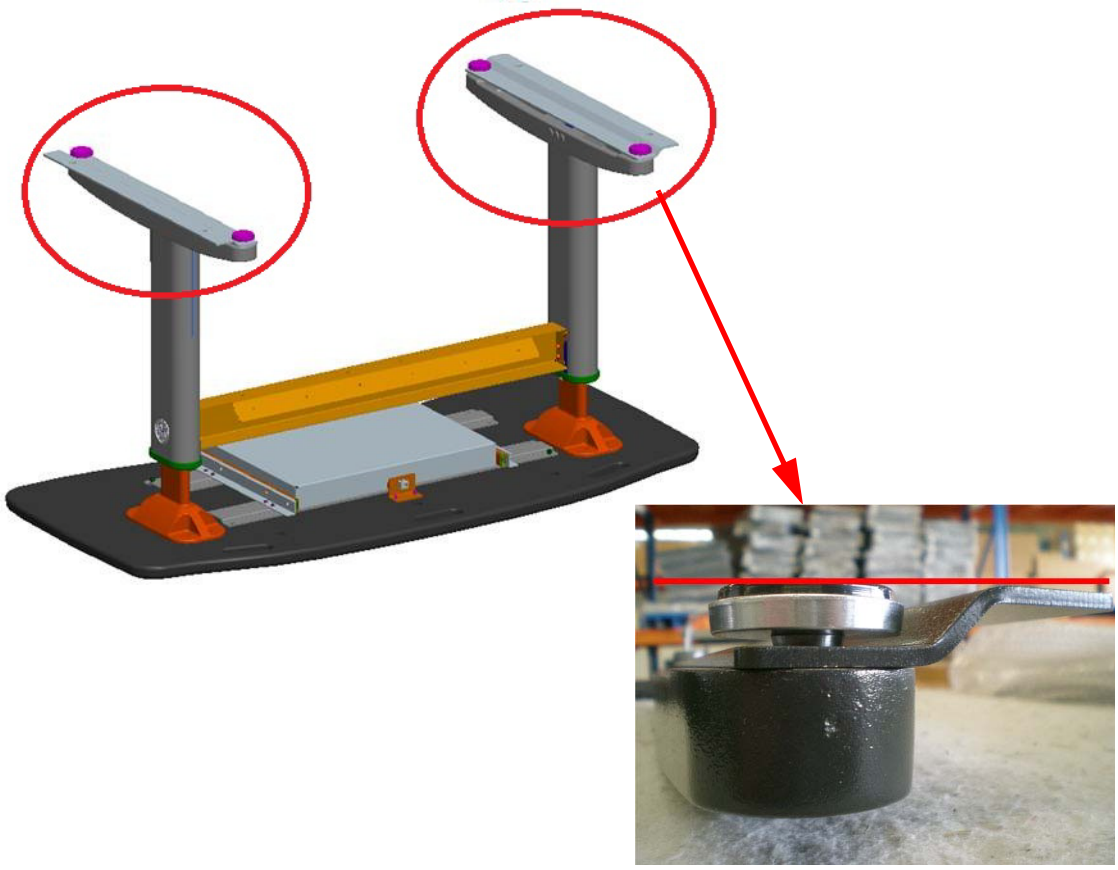
2.) Install two anti seismic brackets (5451608) to each down leg with the foot adjusters, hole A and B on bracket shall be used, and hole C and D are used for mounting the bracket to the floor, as shown in Figure 40.

Figure B-40 Install the anti seismic brackets



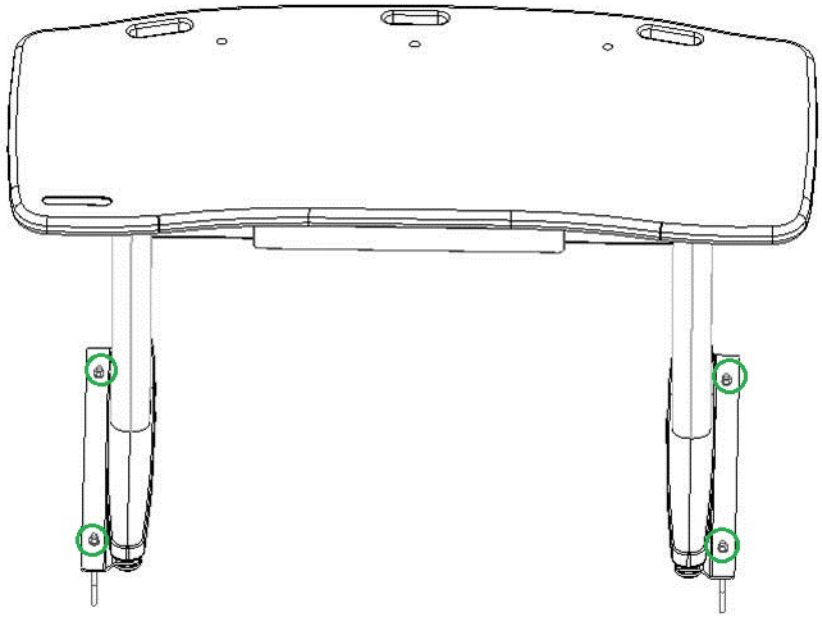
Note: Pay attention to the up down direction of the anti seismic brackets during installation, the side of bracket that used to mount to the floor shall be flush with the foot adjuster, and the holes reserved for mounting the brackets to floor shall be on the outside of each down leg, as shown in Figure 41.

Figure B-41 Installation direction of anti seismic brackets



3.) Turn the Freedom WorkSpace (FWS) to the upright position, use anchors provided by customer to mount the brackets to the floor, as shown in Figure 42.

Figure B-42 Mount brackets to floor



Appendix C
Pictorial Representation of Required Tools

Use the following guide as a reference, if you are unsure of a tool listed in Section 2.4, on page 31.

Table C-1 Required Tools

TOOL NAME	PICTURE	EXAMPLE PART NUMBER*
Adapter		Sears Industrial: $^{3}/_{8}$" to $^{1}/_{2}$" (9-4258)
Ball-Peen Hammer		Sears Industrial: 1lb/2lb (9-38465)
Canned Air		Miller Stephenson: Aero Duster (MS-222N)
Clamp on Amp Meter		Sears Industrial: 9-WTAD105
Combination Wrench Set		Sears Industrial: U.S. Standard & Metric (9-44048)
Cordless Screwdriver		Sears Industrial: 9-MU65401
Deep Well Socket		Sears Industrial: $^{3}/_{4}$" X $^{3}/_{8}$" (included with 9-34496)
Dental Pick		
Diagonal Cutting Pliers		Sears Industrial: Small (9-45077)

* Part Numbers given for reference only. GEMs does not endorse any tool brand name.

Table C-1 Required Tools (Continued)

TOOL NAME	PICTURE	EXAMPLE PART NUMBER*
Drill		Sears Industrial: $^{3}/_{8}$" or $^{1}/_{2}$" (9-27859)
Drill Adapter		Sears Industrial: 3" X $^{3}/_{8}$" (9-APSZ24)
Drill Bit Set		Sears Industrial: U.S. Standard (9-66084)
DVM		Sears Industrial: 9-82028 Sears Industrial: 9-FL873
Extension for Ratchet Wrench		Sears Industrial: 3" X ½" (9-44133)
Gloves		Sears Industrial: Large (9-40502)
Hammer Drill		Sears Industrial: ½" (9-27205)
Hex Bit Set		Sears Industrial: ¼" (9-SK45508)
Hex Key (Allen Wrench) Set		Sears Industrial: U.S. Standard (9-46284)

* Part Numbers given for reference only. GEMs does not endorse any tool brand name.

Table C-1 Required Tools (Continued)

TOOL NAME	PICTURE	EXAMPLE PART NUMBER*
Level		Sears Industrial: 4’ (9-39856)
Masonry Bit		
Open-End Wrench (Thin or Standard Tappet)		Snap-on: 10mm (SRSM10) & 21mm (LTAM2124)
Ratchet Wrench		Sears Industrial: $^{3}/_{8}$" (9-43175)
Reciprocating Saw with Blades		Sears Industrial: 9-MU650921
Safety Glasses		Sears Industrial: 9-18650
Safety Shoes		
Screwdriver Set		Sears Industrial: Phillips & Straight (9-41505)
Socket Set		Sears Industrial: Standard $^{3}/_{8}$" (9-34496)
Sockets		Sears Industrial: 1 $^{1}/_{8}$" X $^{1}/_{2}$" (9-47516)

* Part Numbers given for reference only. GEMs does not endorse any tool brand name.

Table C-1 Required Tools (Continued)

TOOL NAME	PICTURE	EXAMPLE PART NUMBER*
Step Ladder		Sears Industrial: 6’ (9-WN6006)
Tongue & Groove Pliers		Sears Industrial: Large (9-CL440)
Torpedo Level		Sears Industrial: 9" (9-39829)
Torque Wrench		Sears Industrial: $^{3}/_{8}$" (9-WR3470)
Universal Joint		Sears Industrial: $^{3}/_{8}$" (9-4435)
Vacuum Cleaner		Sears Industrial: 8 Gal (9-17780)

* Part Numbers given for reference only. GEMs does not endorse any tool brand name.

Appendix D
Option Cables

Run all option cables that connect to the Table, Gantry or Console.
For example the remote monitor (through the splitter) and SmartScore.
For more information, refer to “LightSpeed Linux CRT & LCD Monitor Option”

Figure D-1 Remote Monitor Splitter

Figure D-2 SmartScore

Appendix E
Regulatory and Service Clearances

Section 1.0
Regulatory Code Description

Egress: 29 CFR 1910 Subpart E (OSHA) and NFPA 101 (Life Safety Code) define the minimum requirements for means of egress. The requirement most applicable to equipment installation and room layout is minimum width of exit access. Under OSHA 1910.37(f)(6), the minimum width of exit access shall in no case be less than 28 in. from any potentially occupied point in the room. Under NFPA 101 (2006 edition) 7.3.4.1, the minimum width of any means of egress is 36 in. However, NFPA allows this to be reduced to 28 in. around furniture or equipment, provided that a 36 in. clearance would otherwise be available without moving permanent walls.

Electrical Clearance: 29 CFR 1910 Subpart S (OSHA) and NFPA 70E (Standard for Electrical Safety in the Workplace) define minimum clearance requirements for the workspace around electrical equipment. Under both OSHA 1910.303(g)(1) and NFPA 70E (2004 edition) 400.15, a minimum clear space of 36 in. depth (with minimum 30 in. width and 78 in. height) must be provided in front of electrical equipment with parts operating at 600 volts or below and likely to require examination, adjustment, servicing, or maintenance while energized.

This safety clearance requirement applies to all GEHC equipment. Although 36 in. is the minimum clearance for most installations, the standards require an increased minimum clearance distance where parts operate above 150 volts (but still below 600 volts) under the following circumstances:

- If the wall or surface directly facing the electrical equipment is grounded (e.g. brick, concrete, or tile) or includes grounded protrusions (such as medical gas ports, metal door or window frames, water sources and metallic sink structures, metallic cabinetry, electrical disconnects or emergency off panels, air conditioners or vents), then a 42 in. clearance depth is required.
- If the possibility exists of exposed and unguarded live parts on both sides of the workspace (for example if a power distribution unit were positioned on the wall directly facing the GEHC equipment), then a 48 in. clearance depth is required.

Section 2.0
Terms and Definitions

EGRESS

The path of exit from within any room. U.S. regulatory requires a minimum of 28 inches (711.2 mm) of continuous and unobstructed space including trip hazards along the path of exit.

WORK SPACE

This is the dimensional box required for safe inspection or service of energized equipment. It consists of depth, width, and height. The depth dimension is measured perpendicular to the direction of access. U.S regulation is minimum of 36 inches (914.4 mm). Additional conditions can increase the minimum requirement. CT defines this as the envelope of the component superstructure. For the NGPDU it is with the front panel removed. For the gantry and table, it is with the patient or external covers removed.

SERVICE ACCESS WIDTH

This is the width of the working space in front of the equipment, a minimum of 30 inches (762 mm), or the width of the equipment whichever is greater.

HEAD CLEARANCE

This is the height dimension of “Work Space”. The height of the workspace measured from floor at the front edge of equipment to ceiling or overhead obstruction(s), 78 inches (1981.2 mm) or height of equipment, which ever is greater.

GROUNDED WALL

Any wall that can be electrically conductive to earth ground. Masonry, concrete, or tile, are considered conductive. Additional commonly found aspects of a wall should also be considered as grounded. This is not an all-inclusive list:

- Medical Gas ports
- Metal door and window frames
- Water sources and metallic sink structures
- Metallic wall mounted cabinets
- A1 disconnect panel
- Equipment Emergency Off panels
- Industrial equipment such as air conditioners and vents
- Expansion joints

The following are not considered as grounded elements of a common wall:

- Standard wall outlet
- Light switches
- Telephones
- Communication wall jacks

Section 3.0
Regulatory and Service Clearances

3.1 Regulated Minimum Working Clearance by Major Subsystem

- Requirements apply to equipment operating at 600V or less, where examination, adjustment, servicing, or maintenance is likely to be performed while live parts are exposed.
- Direction of Service Access is defined as perpendicular to the surface of the equipment being serviced.
- Required regulatory clearance distances must be maintained and may not be used for storage. This includes normal system operation as well as service inspection or maintenance..

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access: front of console	914 mm (36 in.)	There are no exposed live part hazards with the cover in place. If the console is placed under a counter, the front edge of the console must be even with the vertical edge of the console workspace. Note: This component is typically serviced from the front with access to the rear.
Service access width: Front of console	762 mm (30 in.)	This is the width of the workspace in front of the equipment. A minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater, is required.
Head clearance	1981.2 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981.2 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table E-2 Console Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of NGPDU)	914.4 mm (36 in.)*	There are no exposed live part hazards with the cover in place. This component is typically serviced from the front with access to the rear. *If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) is required on both sides of the workspace with the operator between. *If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.

Table E-3 NGPDU Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	This is the width of the working space in front of the equipment. A minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater, is required.
Head Clearance	1981 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table E-3 NGPDU Subsystem

- For the gantry and table, distances are measured from the enclosure, not the finish covers.

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (All Sides)	914 mm (36 in.)	If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) on both sides of workspace with the operator between is required. If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	This is the width of the working space in front of the equipment. A minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater, is required.

Table E-4 Gantry Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Table Head or Foot)	914 mm (36 in.)	There are no exposed live parts hazards with the cover in place. This component is typically serviced form all four sides. this is the width of the workspace on each side of the equipment. A minimum of 914.4 mm (36 in.), or the width of the equipment, whichever is greater, is required.
Direction of Service Access (Table Sides)	914 mm (36 in.)*	*This distance can be reduced to 711 mm (28 in.) provided a written and signed approval is obtained by the local team from the local AHJ (Authority Having Jurisdiction). The signed document must be on file with GE.

Table E-5 Table Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Table Foot)	711 mm (28 in.)	For the front gantry cover removal, a minimum of 457 mm (18 in.) is allowed only if an unobstructed egress space of 711 mm (28 in.) is maintained around the equipment for room exit. This also means no trip hazards exist along the path of egress.
Service Access Width (Left-Right of workspace)	762 mm (30 in.)	This is the width of the working space in front of the equipment. A minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater, is required.

Table E-5 Table Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of UPS)	914.4 mm (36 in.)*	There are no exposed live part hazards with the cover in place. This component is typically serviced from the front with access to the rear. *If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) is required on both sides of the workspace with the operator between. *If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.
Service Access Width (Right side and length of UPS)	762 mm (30 in.)	This is the width of the working space in front of the equipment. A minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater, is required.
Head Clearance	1981 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table E-6 UPS Subsystem

Work Space Requirement	Minimum Clear Space	Additional Conditions
Direction of Service Access (Front of A1 Disconnect)	914.4 mm (36 in.)*	There are no exposed live part hazards with the cover in place. This component is typically serviced from the front with access to the rear. *If exposed live parts of 151 - 600 volts are present, 1219 mm (48 in.) is required on both sides of the workspace with the operator between. *If the opposite wall is grounded and exposed live parts of 151 - 600 volts are present, 1067 mm (42 in.) is required.
Service Access Width (Right side and length of A1 Disconnect)	762 mm (30 in.)	This is the width of the working space in front of the equipment. A minimum of 762 mm (30 in.) or the width of the equipment, whichever is greater, is required.
Head Clearance	1981 mm (78 in.)	This is the height of the workspace measured from the floor at the front edge of the equipment to the ceiling or overhead obstruction(s). A minimum of 1981 mm (78 in.) or the height of the equipment, whichever is greater, is required.

Table E-7 A1 Disconnect Subsystem

Section 4.0
Minimum Room Size (Limited Access)

The CT Gantry Left Side Limited Access Initiative provides the capability to reduce the minimum room size for CT Systems while still meeting all installation requirements and specifications. This adds left side flexibility, allowing the CT system to be sited in rooms with widths 22 in. smaller than the current minimum room width.In the minimum room configuration, left-side access and egress may be restricted for sites with less than 28 in. of left side clearance. Refer to your site's installation print for your room's detail.

4.1 Regulatory Caution

Site prints are required for all system installations including relocation and moves. CT room layout as shown on your site print shall meet all regulatory requirements as described in the installation manual. Additional room components such as cabinets reduce room size. Equipment not shown on the site print may void the caution statement, making the room non-compliant. Actual site measurements before installation will be taken to determine room size and compliance.For minimum room size sites, where the gantry distance between the wall and side cover is between 14 in. - 27 in. the left side cannot be considered or used for egress. In this configuration, egress around the left side of the gantry will be restricted. Unobstructed egress route shall be provided around the table foot end or behind the back of the gantry. If millwork is required or will be installed later, consider room placement locations that allows for regulatory compliance and clearances.

4.2 Operational Caution

In this minimum room layout (14 in. to 27 in.) the customer should consider workflow, customer access for patient care, and critical-care operations space requirements. Additionally, there may be limited equipment access on the gantry left side when loading patients or when positioning patient equipment in the room between the gantry and the wall. Detailed customer installation tasks are detailed in the product PIM. Chapters 1-4.

4.3 Recommended Room Size

This room configuration offers the most flexibility for future upgrades. It has sufficient workspace and space to add millwork, while meeting all regulatory requirements. This room would be compatible with most two-step future installations.

4.4 Typical Room Size

This room configuration allows for some future upgrades. It has sufficient workspace but limited space to add millwork and meet all regulatory requirements. This room may be compatible with some two-step future installations.

4.5 Minimum Room Size

This room configuration allows for no future upgrades. It has limited workspace and no in-room millwork, but meets all regulatory requirements. This room is not compatible with two-step future installations.

Section 5.0
System Specifications (BrightSpeed)

5.1 Recommended Room Size

3962 x 6299 mm (13' x 20'8")

Same Regulatory requirements apply

5.2 Typical Room Size

3912 x 5868 mm (12'10" x 19'3")

Same Regulatory requirements apply

5.3 Minimum Room Size

3353 x 6096 mm (11' x 20')

Same Regulatory requirements apply, with the addition of no energized left side service.

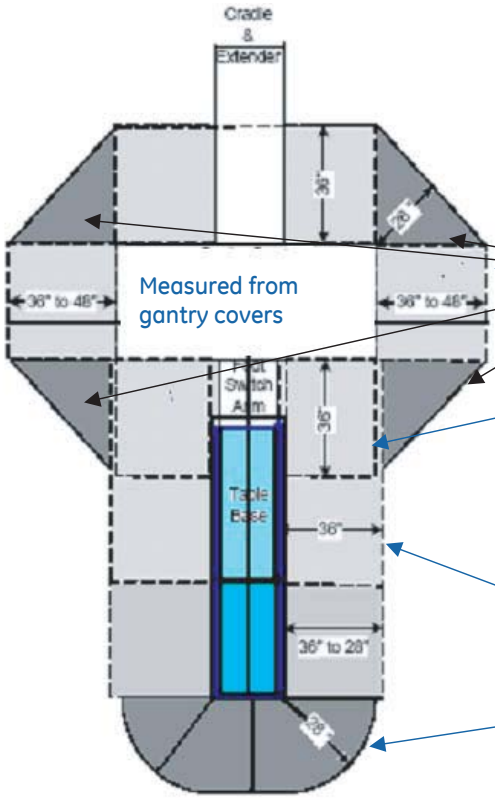
5.4 Rooms w/ Less Than 28 in. Egress Clearance around Table Foot End

Egress requires a clear unobstructed route out of the room, either around the back of the gantry or around the back of the table. If your egress route is not around the back of the table, maintain 18 in. of clearance between the back of the table, with a continuous width of 126 in. on each side to any obstruction so that the front cover can be removed. Refer to the Pre-Installation manual for more details on service clearances.

Exceptions

Rooms smaller than 11’ x 20' or 20'8" will require construction to meet the minimum

Section 6.0
How to Measure



How to measure
From the farthest outward component

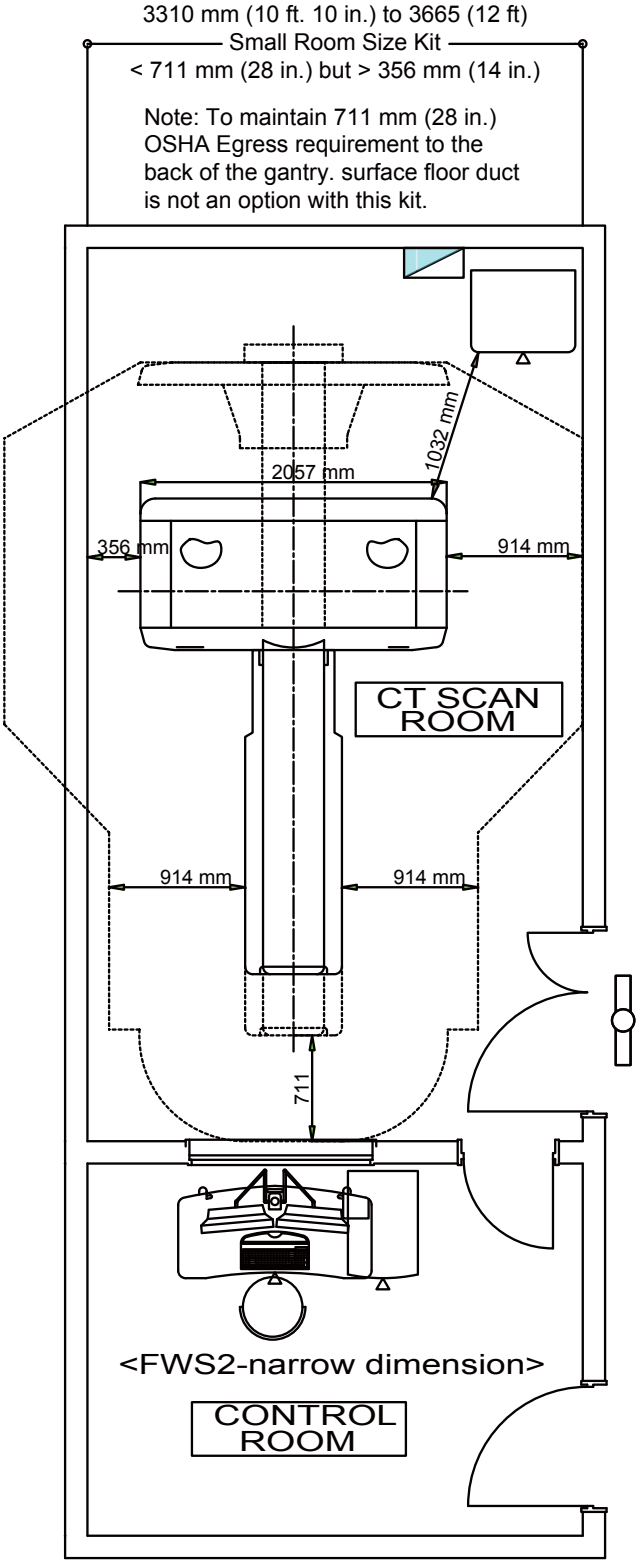
No obstruction areas

Gantry
Side vertical covers outward
Front or back vertical covers outward
Not from the base covers

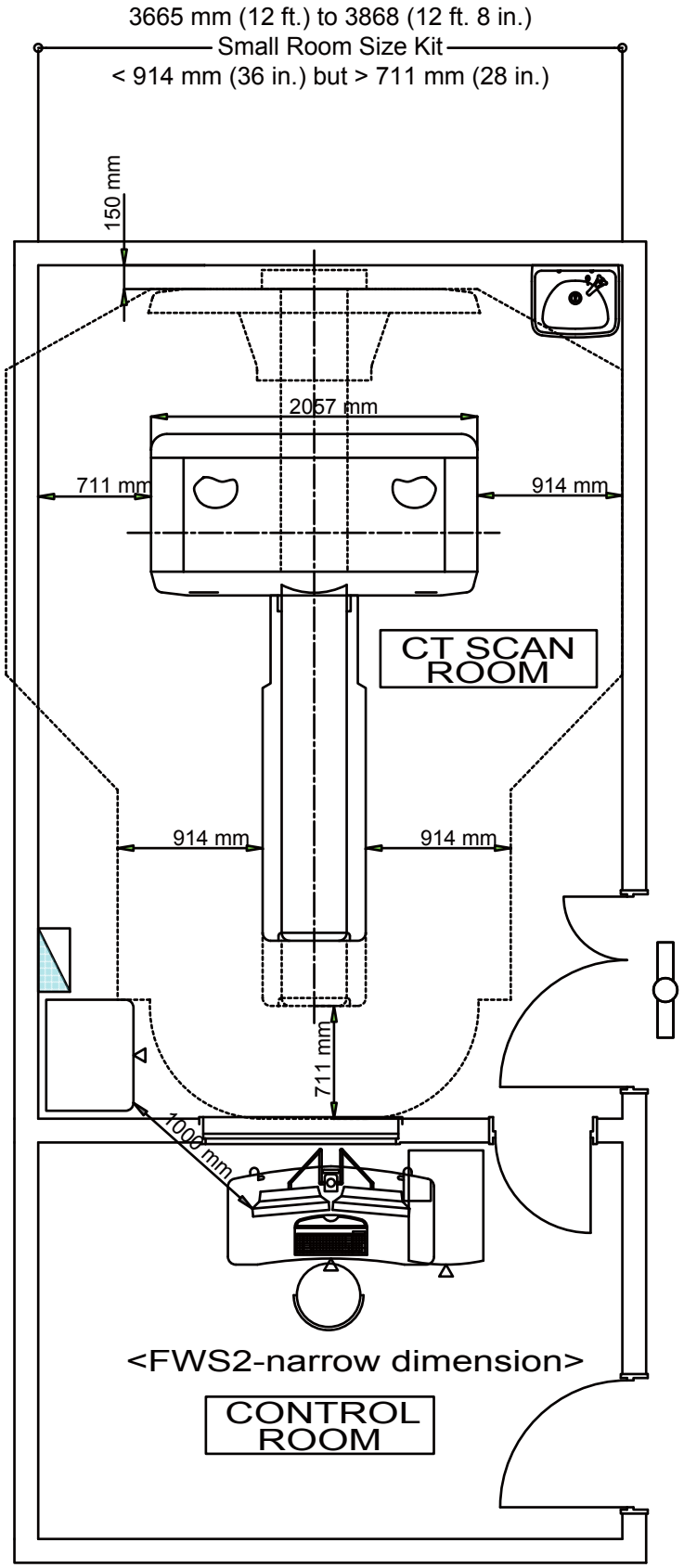
Table
Table cradle covers outward
Back of cradle outward

6.1 Minimum Room Size & Requirement Layouts

Room A - Less than 711 mm (28 in.) but greater than 256 mm (14 in.) measured from the covers to the left sidewall. In this configuration service, egress and workspace are compromised around the gantry.

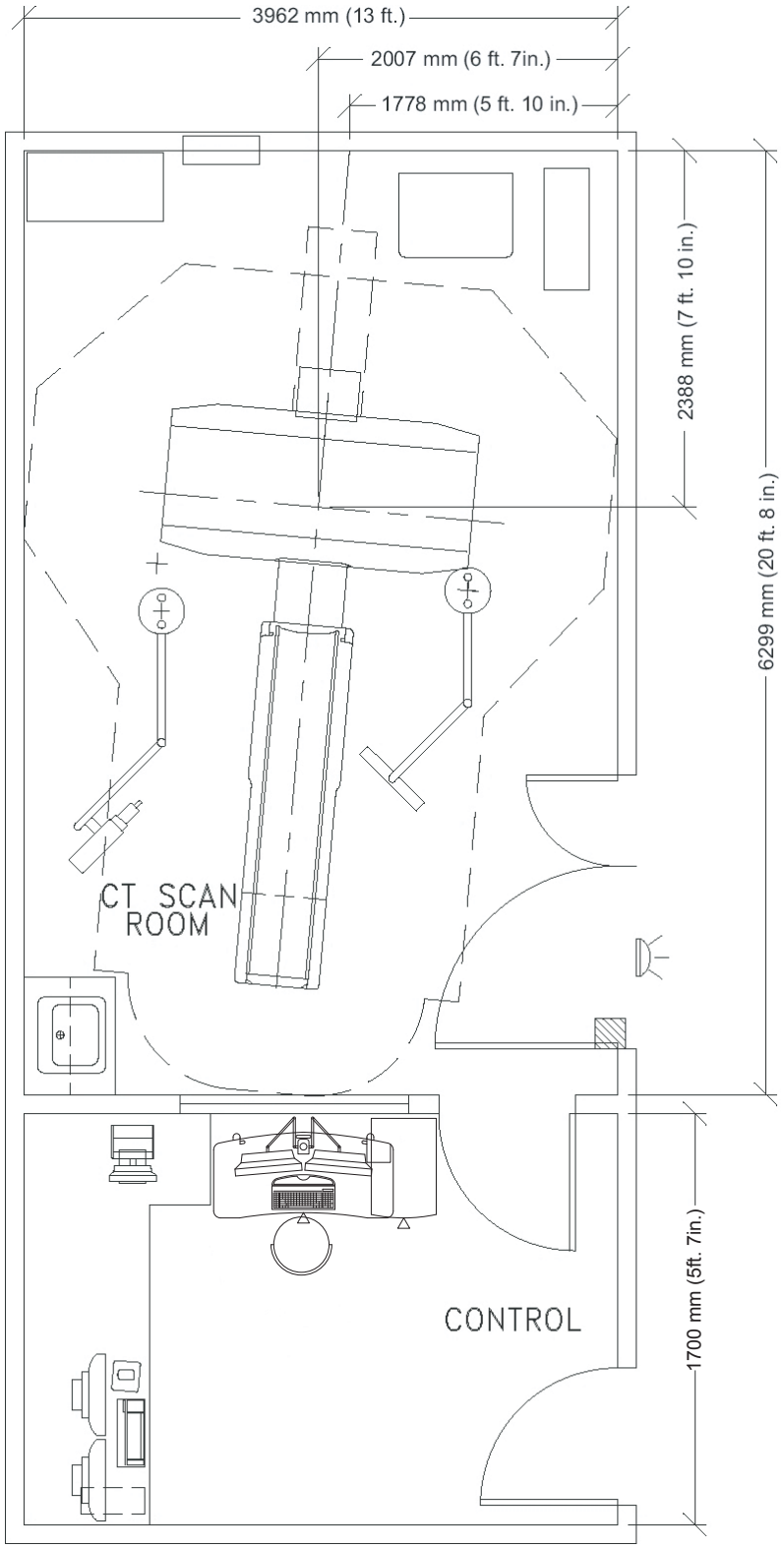


Room B - Less than 36 in. but greater than 28 in. measured from the covers to the left sidewall.In this configuration service, egress and workspace are acceptable around the gantry.



6.2 Recommended Room Size & Requirement Layouts

Note: Your room layout may meet the Typical or Recommended room requirements but look different than the room shown above. Contact your sales person to have a detail room layout completed for your site.



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BrightSpeed Elite, Edge, Excel
Installation Manual

Book 2 of 2: Electrical Calibration, Integration & Testing

OPERATING DOCUMENTATION

5141176-100
Rev 16

Book 2 of 2: Electrical Calibration, Integration & Testing

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Effectivity

The information in this manual applies to the following CT Systems:

- BrightSpeed Elite
- BrightSpeed Edge
- BrightSpeed Excel

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Chapter 5
Electrical Integration and Safety Verifications 281

Chapter 4
Electrical Introduction

CAUTION **Shock Hazard.**

Voltage Present.

No service on left side while energized.

NOTICE **To prevent potential data loss and equipment damage, please do the following:**

- **When instructed, record data collected from the procedures in this chapter on GE Form e4879. For more information about this form, see Section 8.0 of Chapter 4.**
- **Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.**

Section 1.0
Introduction

Use the continuity and ground checks to verify the system power connections have not shorted to ground and that the ground and neutral connections are intact.

Section 2.0
Review Mechanical Hand Off Material

Complete the Mechanical Hand Off checklist:

- ❒ All options were installed. If not, contact your install specialist.
- ❒ Check for short ships.
- ❒ Review cable connections with mechanical team.
- ❒ Complete mechanical vendor evaluation.

Section 3.0
Training

This product requires a trained FE to proceed with the calibrations in this section.

Section 4.0
Required FE Common Tools and Supplies

4.1 FE Calibration and Service Tool List

Note: Items with a "check" (√) are included in the Install Support Kit.

Special CT Tools used for mechanical alignments:

- √ 5mm hex bit for 3/8" drive 6" long (Snap-On FAML5E or equivalent)
- √ 10mm hex bit for ratchet wrench (ball end) (Snap-On FABM10E or equivalent)
- √ 2.5mm Allen hex bit for ¼"
- Standard FE Tool Kit
- Torque Wrench Kit
- √ 10mm open-end thin wrench (Snap-On SRSM10 or equivalent)
- √ 21mm open-end thin wrench (Snap-On LTAM2124 or equivalent)
- √ 14mm ball hex socket bit for 3/8" drive
- √ 14 mm hex socket bit for ½" drive

4.2 Electrical Tools

These tools must be calibrated yearly.

- Fluke 87 DVM or equivalent
- Clamp on amp meter

4.3 Image Quality Calibration Tools

- QA Phantom (2144715)
- IQ Cal poly phantom:
  - 35cm (2144721)
  - 48cm (2144721-2)
- Phantom Holder

4.4 Detector Service Tools

A DAS/Detector Service Kit (PN 2344539) is included in the Install Support Kit.

- Aero Duster
- AMAX Contact Cleaner

4.5 Optional Tools

Needed for warranty recalibration:

- GE HV Bleeder
- Scope with 10X probes
- Beckman CT231 clamp-on Amp probe: 46-194427P228 (Fits up to #2 size wire)
- Beckman CT232 clamp-on Amp probe: 46-194427P270 (Fits #1 size wire and larger)
- Scope Probe-to-bleeder Cable 46-219921G1 (Belden #8422 cable, 30 ft)
- Polaroid type 52 film and developer
- Radial dial indicator (mm or inches) and mounting bracket
- Caliper Dial indicators (mm or inches)
- Ground Rod Tester Clamp on Amp Probe

4.6 Safety Materials

Note: Items with "checks" (√) are included in the Install Support Kit

√ Lockout/Tagout kit, or equivalent

√ Nitrile Rubber Gloves

- Safety Glasses

4.7 Cleanliness

Any dirt on the surface increases leakage current on the filter or converter cards and causes the DAS to fail the drift spec. Wear Nitrile gloves (part number 2207303-6 [large] and 2207303-7 [extra large]) when you handle the DAS, because fingerprints on the board can cause problems during humid conditions. Use only clean, new Nitrile gloves. Do not use hospital grade gloves.

NOTICE **NEVER USE AN ERASER TO CLEAN ANY PART OF THE DAS.**

DUST COVERS REQUIRED for installations on construction sites.

Section 5.0
Requirements/Assumptions

- This procedure will be performed by an appropriately trained engineer.
- All stations in a suite must have the same SUITE ID.
- You need the name of all hosts in the suite and their corresponding Internet/Ethernet numbers.
- You need the Internet (IP) addresses the first time you execute a reconfig on the system.
  - When you connect the system to a network, contact the system administrator to obtain the IP addresses for all the computers in the suite.
  - You also need an IP address for each gateway (second) ethernet board in any OC or IC.
  - You can use the default internet number on stand-alone systems (stand-alone = not connected to any network).
- For more detailed information and instructions regarding Network Integration, see Chapter 7 on page 355.

Section 6.0
FE Workflow

1.) Review mechanical hand-off material.
2.) Obtain required FE common tools and supplies.
3.) Perform electrical power-on and ground checks.
4.) Gather all customer information needed for reconfiguration.
5.) Perform computer integration.
6.) Complete Table/Gantry integration.
7.) Complete the calibration process.
8.) Perform the Table/Gantry Alignment procedure.
9.) Perform tube warm-up and fast calibration.
10.) Complete tomographic plane indication.
11.) Run image series tests.
12.) Run system functional test.
13.) Create system state DVD.
14.) Perform the Patient Touch Leakage Test.
15.) Perform the CT System Chassis Leakage Test, as required by local code.
16.) Complete installation and verification of any customer options.
17.) Complete and return GE Form e4879 Installation Data Verification, for all installations.

Section 7.0
Checklists for Completed Installation

Complete the installation tasks listed below and check the appropriate boxes here and on the GE e-4879 form to verify the completion of these tasks. Section 8.1 contains an explanation of the GE e-4879 form, which the FE must complete and submit for ALL installations.

7.1 System-Level

7.1.1 General

- ❒ HVAC system is operational and environmental data reported on the GE e-4879 form.
- ❒ System realignments completed, if required.
- ❒ Broadband installed and operational.
- ❒ Power and ground audit completed.

7.1.2 Optional and Regional

- ❒ Seismic mounting kit installed, if required in your area.
- ❒ Generator recalibration completed, if necessary.
- ❒ Collimator recalibration completed, if necessary.

7.2 Site Clean Up

- ❒ All DVDs for customer options placed in the GE service cabinet.
- ❒ All system software and service tools placed in the GE service cabinet.
- ❒ System cleaned and nicks touched-up with paint.
- ❒ Installation site cleaned and all trash properly disposed.

7.3 Dolly Return

- ❒ Return of dollies arranged and dolly pick-up confirmed.

7.4 Options

Check the appropriate boxes here and on the GE e-4879 form to verify the installation and proper functionality of all customer-ordered options.

- ❒ Injector installed and operational.
- ❒ Advantage Windows Workstation installed and functional tests completed.
- ❒ Advantage 4D installed and functional tests completed.
- ❒ Filming/Camera/DASM installed and operational.
- ❒ Modem installed and functional tests completed.
- ❒ UPS installed and functional tests completed.

- ❒ Network items installed and functional tests completed.
- ❒ Customer software options installed and operational.
- ❒ Teleradiology connections completed. See Section 10.0 of Chapter 7.
- ❒ Remote monitor installed and operational.
- ❒ Bar code reader installed and operational.
- ❒ Cardiac monitor and stand installed and operational.

7.5 Paperwork (Final Activities)

- ❒ GE e-4879 form completed; see Section 8.1. (Required for installations in ALL countries.)
- ❒ FDA 2579 form completed; see Section 8.2. (Required ONLY for U.S. installations.)
- ❒ Any PQRs or PSRs that you encountered have been reported.
- ❒ All FMIs for system completed, if necessary.
- ❒ All dispatching activities (03-04-10 codes) completed.
- ❒ Customer acceptance checks completed.
- ❒ System transfer completed and appropriate GE Healthcare personnel notified.
- ❒ All outstanding customer installation issues have been addressed.

Section 8.0
GE and Regulatory Forms

Field Engineers must complete and submit the documents listed in Section 8.1 for ALL installations, regardless of the country. In addition, for installations performed within the United States, Field Engineers must ALSO complete and submit the documents listed in Section 8.2.

8.1 All Countries

8.1.1 GE e-4879 Form

The Field Engineer should:

1.) Locate the GE e-4879 form on the Service CD.
2.) Complete the form.
3.) E-mail the completed form to the following:
   a.) HHS Administrator

8.1.2 Product Locator Cards

The Field Engineer should:

1.) Enter the Product Locator Card information on the Product Locator Web site. Go to the following address to access the site: http://gib.gehealthcare.com/gib/gib_entry.jsp
2.) Leave ONE (1) Product Locator Card (or a copy) at the customer site for EACH piece of equipment installed there.

Note: CT Manufacturing completes GE HHS Data Sheets and provides them to the HHS Administrator.

8.2 U.S. Installations Only

8.2.1 FDA 2579 Form

The Field Engineer should:

1.) Download the FDA 2579 form from the HHS Support Central Web site: http://supportcentral.ge.com/products/sup_products.asp?prod_id=16442
2.) Complete the form.
3.) E-mail the completed form to the HHS Administrator.

Note: Do NOT print this form after completion. The HHS Administrator will e-mail a printable version to the FE for customer site records.

NOTICE **Some states require a State Registration Number to complete this form. For any questions concerning your state, contact the HHS Administrator or check the HHS Support Central Web site. Some states may also require additional information and test information. For instructions, contact the Project Manager of Installation.**

8.2.2 System Chassis Ground Leakage Test Form

The Field Engineer should:

1.) Locate the System Chassis Ground Leakage Test form on the Service CD.
2.) Complete the form, if required in your area.
3.) Forward the results as instructed on the form.

Chapter 5
Electrical Integration and Safety Verifications

CAUTION **Shock Hazard.**
Voltage Present.
No service on left side while energized.

NOTICE **To prevent potential data loss, please do the following:**

- **When instructed, record data collected from the procedures in this chapter on GE Form e4879. For more information about this form, see Section 8.0 of Chapter 4.**
- **Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.**

Section 1.0
Electrical Power ON & Ground Checks

WARNING **THIS PROCEDURE MEASURES POTENTIALLY HAZARDOUS VOLTAGES. USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.**

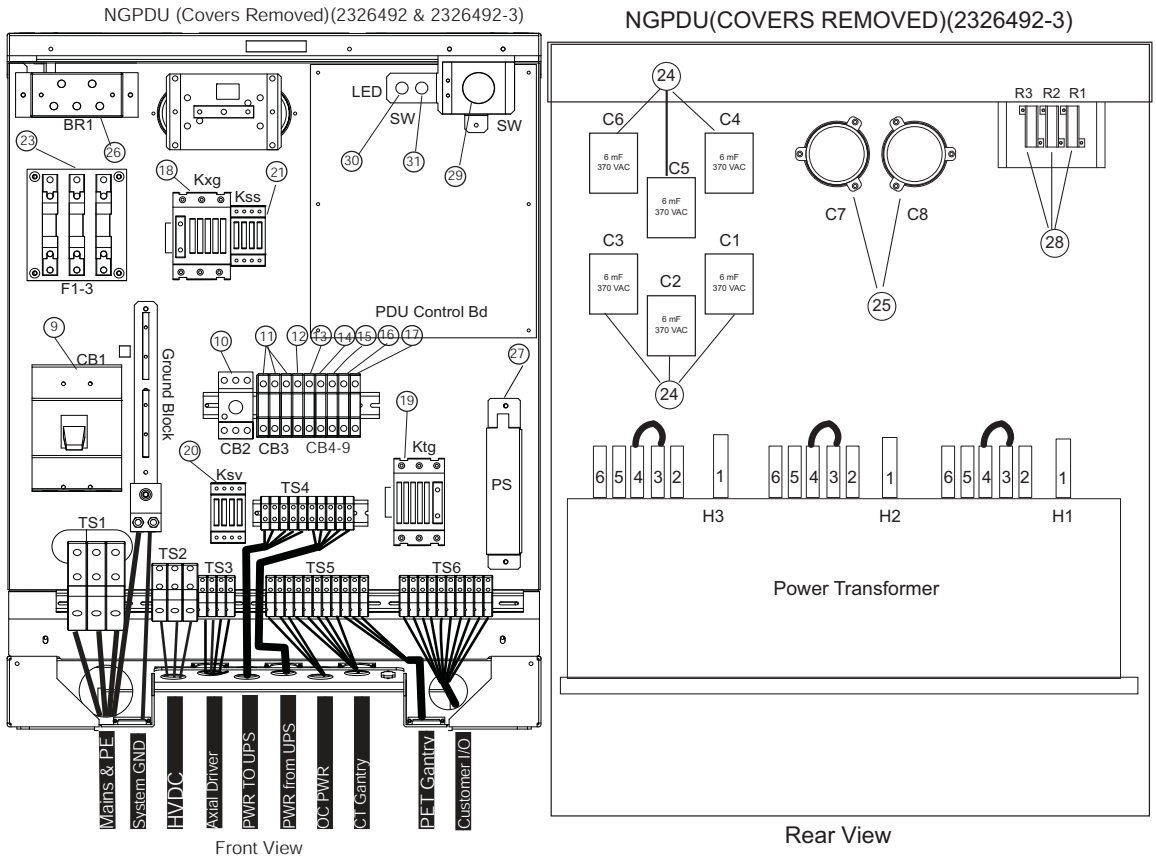


Figure 5-1 NGPDU

1.1 Required Tools

- Multimeter with a rating of at least 1000 volts
- Multimeter leads with a rating of at least 1000 volts

1.2 Initial PDU Configuration

WARNING **THIS PROCEDURE MEASURES POTENTIALLY HAZARDOUS VOLTAGES. USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.**

1.2.1 Circuit Breakers

Set all circuit breakers to OFF

1.2.2 Relay Board

1.) Set SW to the normal position.

2.) When system is already, three lamps are both lighting (refer to Figure 5-2).

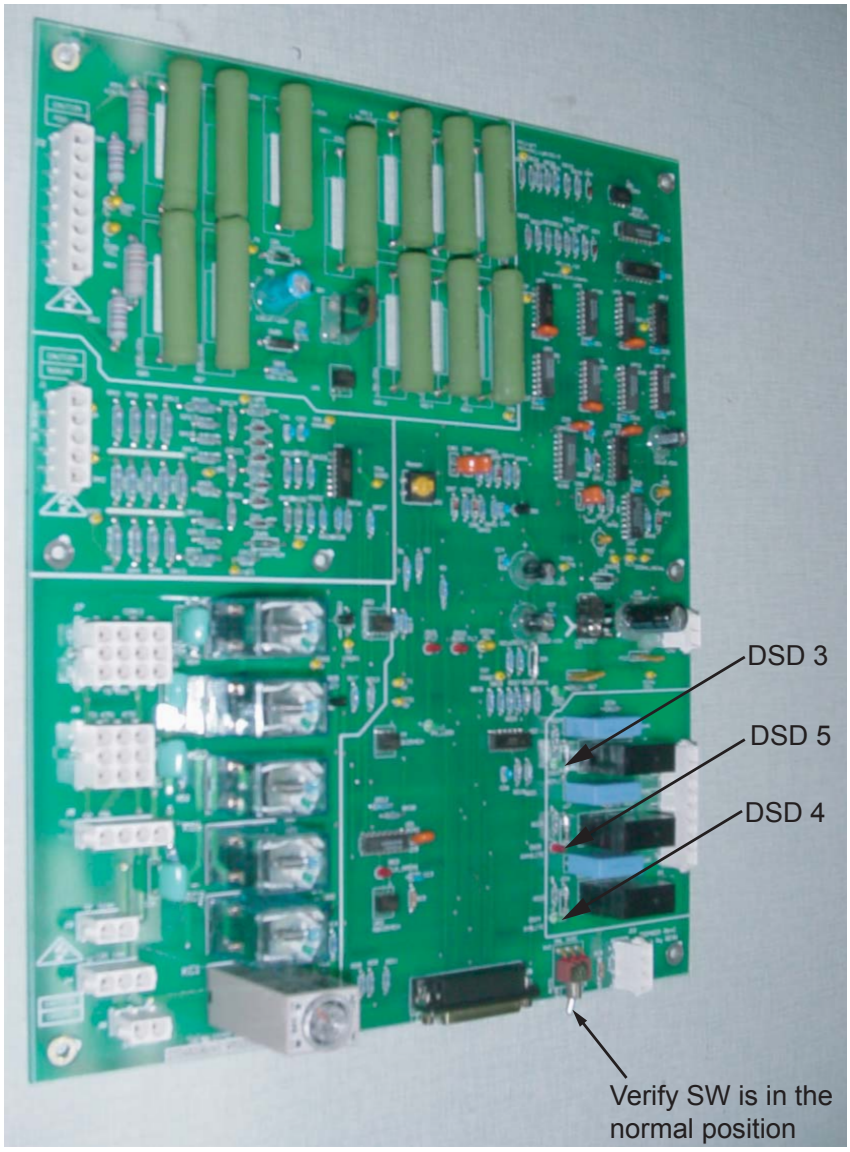


Figure 5-2 NGPDU Control Board

1.2.3 Power Switches

Turn OFF all power switches on all subsystems

- Gantry
- DAS
- Power Pan Breaker
- Table
- Console

1.2.4 Hardware and Connection Check

Use this step to check mechanical connections and tighten anything that may have shaken loose during shipment. Verify **all** hardware and connections in the PDU are securely fastened.

1.2.5 Covers

Install, or verify the presence of, all the lexan safety covers.

1.3 Suite Emergency Off Checks SEO

WARNING **VERIFY ALL PERSONNEL HAVE CLEARED THE SYSTEM BEFORE YOU TURN ON WALL POWER.**

1.) Turn wall power ON to the PDU.

2.) Press the suite emergency off button and verify it turns off wall power to the PDU.
[Typically, this red palm button is located on the wall close to the console, within the scan suite.]

3.) Verify that all “Emergency Off” button are working properly.

4.) Leave power “OFF”

1.4 Line Transformer Settings

WARNING **MAINS VOLTAGE MAY VARIABLE FOR DIFFERENT COUNTRY (REGION). MAKE SURE TO SET THE APPROPRIATE PDU TAPS CONNECTIONS.**

1.4.1 Requirements

1.) The PDU is shipped configured for 480VAC.

2.) Complete only if your site uses a voltage other than 480VAC.

3.) If PDU is configured for 480VAC, go to 1.5. Otherwise, proceed to Section 1.4.2.

WARNING **MAKE SURE YOU TURNED OFF, TAGGED AND LOCKED THE MAIN WALL POWER BEFORE YOU CHANGE TAPS. FAILURE TO DISCONNECT POWER AT MAIN INPUT MAY RESULT IN ELECTROCUTION. TURN OFF WALL POWER TO CONNECT OR MOVE METER LEADS, OR TO REMOVE OR INSTALL COVERS.**

NOTICE **TAPS SHOULD BE SHIPPED AS SHOWN FOR 480VAC ONLY. FOR ALL OTHERS, YOU MUST MOVE THE TAPS. THE TAP CHECK SHOULD BE COMPLETED BY THE MECHANICAL INSTALLER.**

1.4.2 Line Input Conditions

1.) Monitor the No Load Line to Line Voltage at L1, L2, L3, during the workday. Do not record this data during “brown out” conditions.

2.) After you determine the nearest nominal line, verify the tap connections match (refer to Table 5-1 and Figure 5-3 for tap locations).

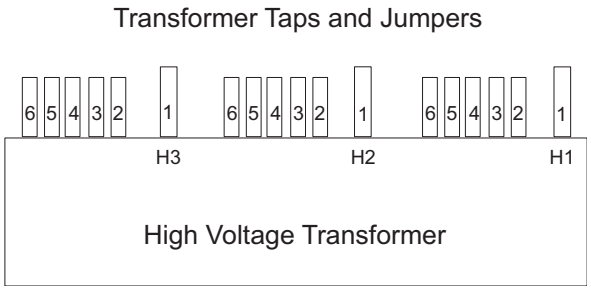


Figure 5-3PDU Tap Positions (Rear)

3.) Verify that the No Load Line to Line Voltage never falls outside the corresponding minimum and maximum values listed in Table 5-1.

4.) Use a 0-750 AC voltmeter of 3/4% accuracy to measure the line-to-line voltages at L1, L2, and L3.

- Verify the highest line-to-line voltage does not exceed 1.02 times the lowest voltage.
- **Example:** If the lowest voltage equals 474, the highest voltage should not exceed 474 x 1.02 = 483.5 volts.

WARNING **THIS PROCEDURE MEASURES POTENTIALLY HAZARDOUS VOLTAGES. USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.**

NO LOAD Line to Line Voltages		**TAP CONNECTIONS** (All 3 phases must have same the configuration)		
Nominal	Maximum Range (10%)	Phase A Connection	Phase B Connection	Phase C Connection
480V*	432 to 528*	3-4*	3-4*	3-4*
460V	414 to 506	3-5	3-5	3-5
440V	396 to 484	3-6	3-6	3-6
420V	378 to 462	2-4	2-4	2-4
400V	360 to 440	2-5	2-5	2-5
380V	342 to 418	2-6	2-6	2-6
240V**	216 to 264**	1-4**	1-4**	1-4**
220V**	198 to 242**	1-5**	1-5**	1-5**
200V**	180 to 220**	1-6**	1-6**	1-6**

* Factory Default

** 2326492-3 PDU only

Table 5-1 PDU Line Tap Connections

1.5 System Power Up

CAUTION **Verify all personnel have cleared the system before you turn on wall power.**

1.) Turn ON A1 breaker panel.
2.) Turn ON all system power switches and breakers (table, gantry, PDU, console).

SUB-SYSTEM POWER-UP

1.) Turn ON switch S3 in the table (120vac 24hr power).
2.) Turn ON the Gantry **120VAC**. (Light should turn on.)
3.) Turn **AXIAL DRIVE ENABLE** ON. (Light should turn on.)
4.) Turn **HV DC ENABLE** ON. (Light should turn on.)
5.) Push the Service Switch Panel reset button (see Figure 5-4).

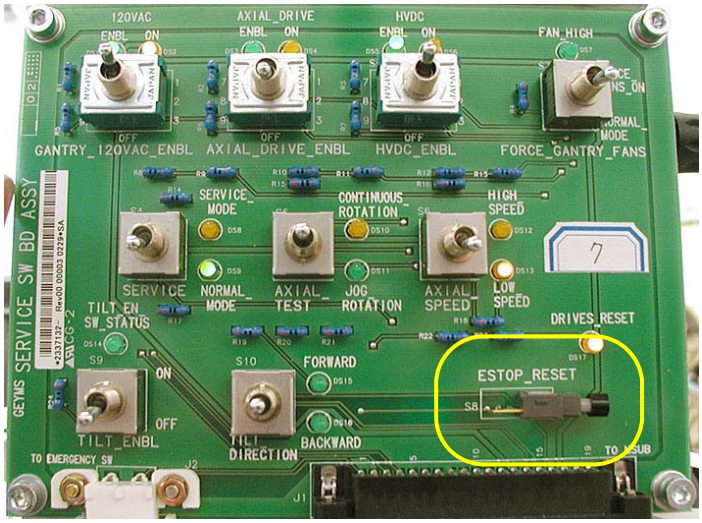


Figure 5-4Service Switch Panel

AXIAL ENABLE SWITCH TEST

1.) Turn OFF axial drive enable switch **AXIAL_DRIVE** on the Service Switch Panel.

Note: For the initial condition, do not leave the tube at the 2:30 position.

2.) Clear the gantry are for rotation.
3.) Press the alignment light push button.
4.) Verify that the gantry did not rotate.
5.) Turn ON axial drive enable switch **AXIAL_DRIVE** on the Service Switch Panel.

ROTATION SAFETY CHECKLIST

1.) Turn OFF axial drive enable switch **AXIAL_DRIVE**.
2.) Turn OFF **HVDC** enable switch.
3.) Press red **E-STOP** button.
4.) Manually rotate the gantry 360 degrees. (Keep one finger on the Gantry button.)
    - Listen for any interference between the rotating and stationary parts. (Correct any interference problems.)

- Listen for any loose parts.
  (Tighten parts as needed.)

5.) Turn ON axial drive enable switch **AXIAL_DRIVE**.

WARNING **MAKE SURE THERE ARE NO OBSTRUCTIONS AROUND THE GANTRY. PRESSING THE ALIGNMENT LIGHT PUSHBUTTON WILL CAUSE THE GANTRY TO ROTATE.**

6.) Press the alignment light push button.

7.) Verify that the gantry rotates.

8.) Perform a 4 second X-ray OFF scan.

NOTICE **During the scan, it may be necessary to enter the scan room, to obtain a better listening position. If so, keep a finger on one of the four E-STOP buttons (on the gantry), to quickly stop the gantry, if necessary.**

a.) From the console, click on the SERVICE DESKTOP icon. 

b.) Select DIAGNOSTICS.

c.) Select DIAGNOSTIC DATA COLLECTION

d.) Set the scan time to 4.00 seconds

e.) Leave the door open. (This makes it easier to hear any loose or interfering parts.)

* Listen for any interference between the rotating and stationary parts.
  (Correct any interference problems.)
* Listen for any loose parts.
  (Tighten parts as needed.)

9.) After completing the 4 second scan, repeat steps 9a through 9e, with the following scan times:

- 2.0 second scans
- 1.0 second scans
- 0.7 second scans
- 0.5 second scans

1.6 Emergency Stop Check

1.) Use the gantry push-buttons to advance the cradle about 0.5m (2ft) from the home position.

2.) Press one of the E-STOP buttons on the gantry.

3.) Make sure the TABLE POWER shuts off, and the green LED flashes.

4.) Depress one of the table elevation buttons, to verify the emergency stop disabled table elevation.

5.) Depress one of the cradle drive buttons, to verify the emergency stop disabled the cradle drive.

6.) Press one of the **RESET** buttons to turn on X-RAY DRIVES POWER. (120 VAC LED stops flashing.)

7.) Press the other E-STOP button on the gantry.

a.) Make sure the Table Power shuts off.

b.) Manually move the cradle to the home position to make sure the cradle clutch released.

c.) Make sure the cradle latches securely in the home position.

8.) Press one of the **RESET** buttons to turn on X-RAY DRIVES POWER.

9.) Press one of the four table tape switches to make sure the table down motion stops. Repeat with the three remaining table tape switches.

10.) Press the console emergency stop switch; make sure the Table Power shuts off.

11.) Press one of the **RESET** buttons to turn on X-RAY DRIVES POWER. (See Figure 5-4).

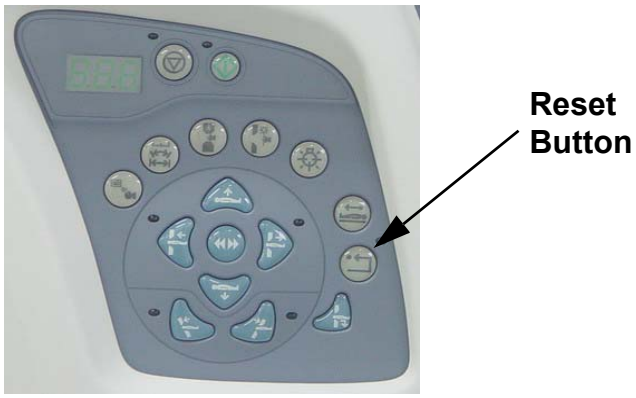


Figure 5-5 Reset buttons on Gantry and Service Switch bank.

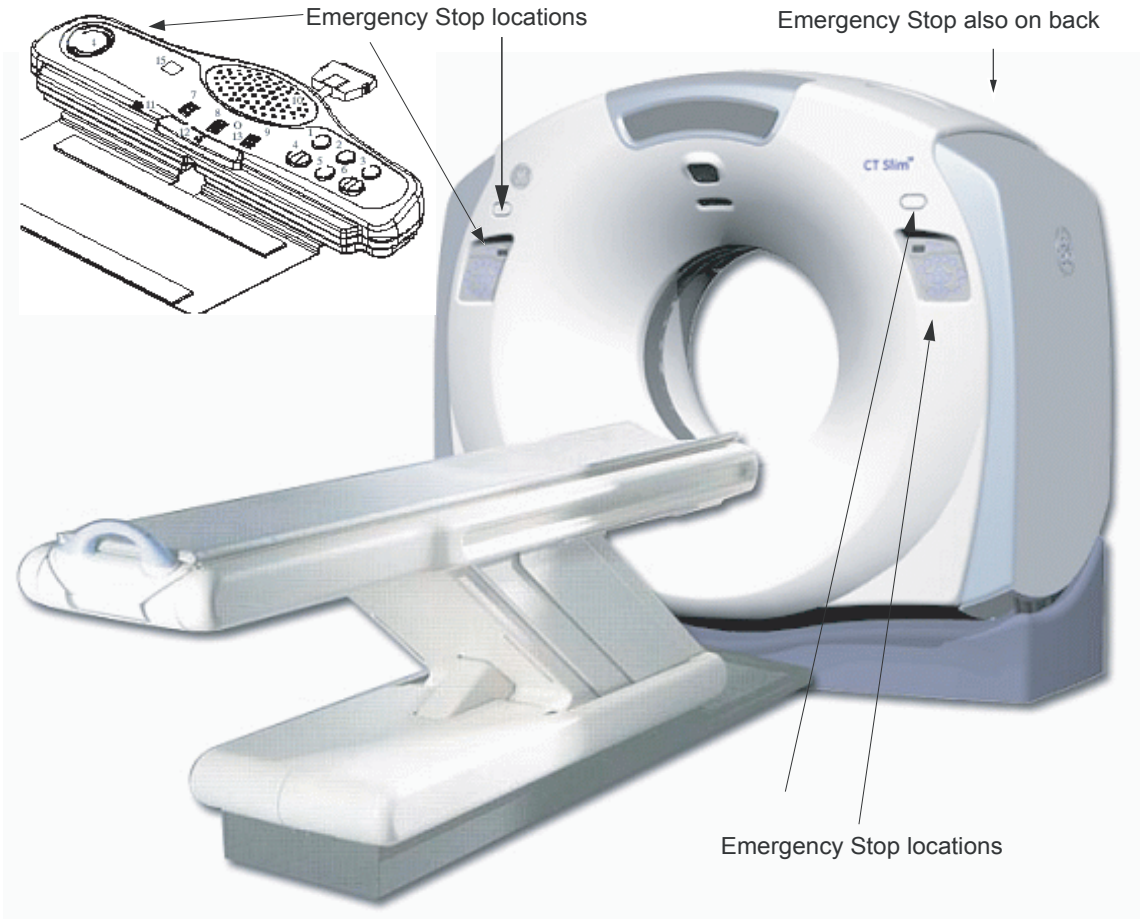


Figure 5-6 Emergency Stop button positions for BrightSpeed System with H-Power Table

Figure 5-7 Gantry Emergency Stop Button Positions for BrightSpeed Elite with GT1700 Table

Figure 5-8 GSCB Emergency Stop Button on NIO16 Console

Note: Emergency Stop buttons are located on the front and rear of the gantry (8 in all). They are also located on both sides of the table base (4 in all) as noted in Figure 5-6 and Figure 5-7. Additionally, an emergency stop button is provided on the Operator Console SCIM/GSCB (see Figure 5-6, Figure 5-7 and Figure 5-8).

Section 2.0
Computer Integration

2.1 Introduction

This Section describes the reconfiguration, system state restore, options, and monitor adjustment procedures.

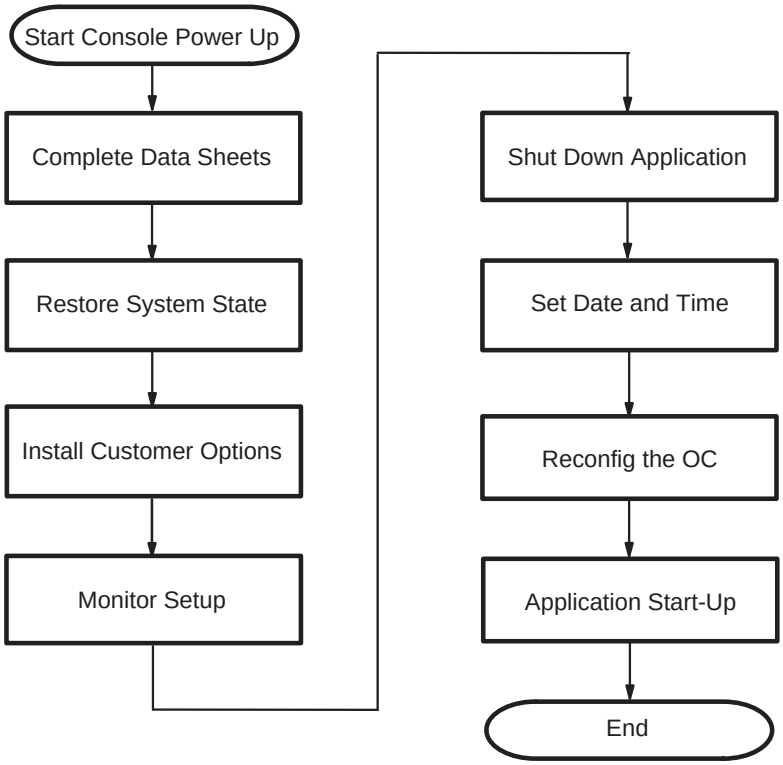


Figure 5-9 Computer Integration Process Overview

2.2 System Configuration Data Sheets

For convenient removal and use during installation, System Configuration Data Sheets appear in *Appendix G*. Please locate and complete to them at this point during installation.

2.3 Restore System State

Tools Required: None

Your system should have a system state DVD, located in the Gantry accessories' box.
The system state DVD contains:

- Collimator Characterization
- Phantom Calibrations
- Gen Cal
- Other Data

The installation process uses all the system state files. At this time, use the system state DVD to restore all files.

If you cannot locate an existing system state DVD, you must recalibrrate your system.

1.) If you are not on the Service Desktop, click on the SERVICE DESKTOP icon. 

2.) Click on the UTILITIES icon. 

3.) Select SYSTEM STATE.

4.) Insert the DVD into the DVD drive.

5.) Select CHARACT.

6.) Select CALS.

7.) Select RESTORE to restore the system characterization and phantom calibration files to the system.

Note: **Restore State can take as long as ten minutes, although typical times average about three minutes. When Restore State completes, dismiss the tool, and proceed to the next section.**

If any error should occur during the restore process, see the Software Load Procedure manual (Load From Cold) for information regarding possible error messages and their recovery.

8.) Click NO for `Reset Scan Hardware` popup message.

9.) Select DISMISS.

2.4 Install Customer Options

Tools Required: None

2.4.1 Software

Note: **Your system may have a DVD that contains customer purchased options. If your system has an options DVD, install it at this time--otherwise skip this section.**

Ensure that the options DVD is NOT write protected at this time. The initial install requires that the DVD be write enabled; subsequent installs can be done with the DVD write protected.

1.) If you are not on the Service Desktop, click on the SERVICE DESKTOP icon. 

2.) Click on the CONFIGURATION icon. 

3.) Select INSTALL OPTIONS.

4.) Select INSTALL OPTIONS.

An Options Window appears (Figure 5-10):

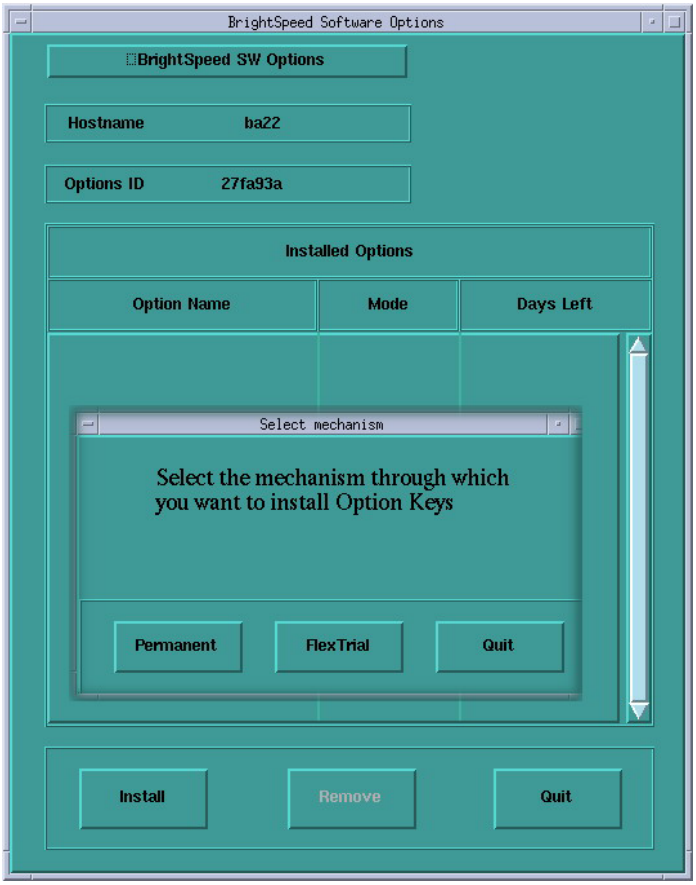


Figure 5-10 Options Window when First Selected

- Check the FDO to see what options were ordered.
- Compare FDO options to those on the Option DVD.
- If different contact your local sales representative.

5.) Insert the options DVD into the DVD drive and click on OK. (If you do not have an options DVD, click on OK anyway, wait for the abort pop up, then abort the process.)

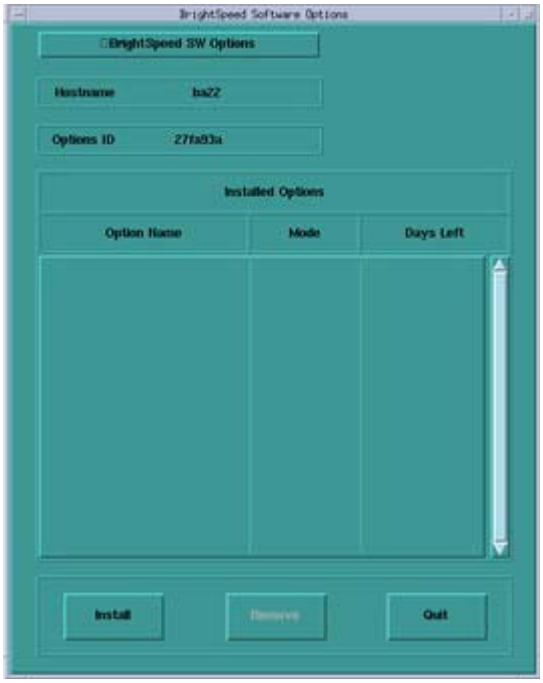


Figure 5-11 Example: Options Window

6.) Select all of the options in the left-hand column to install the corresponding software.

7.) Select INSTALL**.** A box may appear while the options are loading. When an option is displayed in the `Installed Options` list, then installation of that option is complete. Note that some options take a fraction of a second to install, while options like 3D may take a half minute (due to the fact that they are installing software).

8.) After the options are installed, select QUIT.

9.) Select OK.

10.) Remove the DVD and write protect the side with options.

11.) When the system prompts to Reboot, click YES, and reboot the system to complete the installation.

2.4.2 Camera

Tools Required:

- Small flat blade screw driver
- Data collected from data sheets (See Camera Application Configuration on page 405.)
- Software Load Procedures manual
- System Service manual.

Note: If a DASM is requires, the DASM hardware must be installed before proceeding.

For details on camera configuration, refer to the Software Load Procedures manual.

For details on troubleshooting the camera, refer to the System Service manual.

1.) Click on the SERVICE DESKTOP icon 

.

2.) Select CONFIGURATION icon. 
3.) Select INSTALL CAMERA.
4.) Select ADD.
5.) Select DASM or DICOM.
6.) Follow procedures on the screen.
7.) Return to Home Page.

2.5 Shut Down Application

Tools Required: None

Standard Level

If Applications is currently running, you must shutdown system applications.

1.) Click on the SERVICE DESKTOP icon. 

.

2.) On the desktop toolbar select UTILITIES icon.  .
3.) Select APPLICATIONS SHUTDOWN (to bring down applications only).

Super User Level

1.) Open a UNIX Shell window.
2.) Type: **`su`** - **ENTER** at the prompt.
3.) Type the root (super user) password: **`#bigguy`**

2.6 Reconfig the OC

Tools Required: None

Note: The document collector box that arrived with your system contains the *Software Installation Procedures* manual, which documents the reconfiguration procedure in more detail.

2.6.1 Overview

On the following screens, you should make the changes necessary, pressing the corresponding button at the top of the screen to move from screen to screen. When you are done, you can either press the ACCEPT button to start the reconfiguration process, or press the QUIT button to exit without changing the system configuration.

While the reconfiguration is going on, messages are displayed in a shell window that closes when reconfiguration is complete. Should you later want to review the reconfiguration output, it is logged to the following file:

`/var/adm/install.log.`*`YYYYMMDDWWWHHMMSS`*

Where

YYYYMMDDWWWHHMMSS is the Date/Time that the reconfiguration was started.

To view the file, type: **`more /var/adm/install.log.`*`YYYYMMDDWWWHHMMSS`***

It is possible to abort the reconfiguration while entering information on the reconfiguration screens. Simply press the QUIT button at the top of the screen. There is NO safe way to abort the reconfiguration after pressing the ACCEPT button. If the entries made in the screens were incorrect, DO NOT try to stop the reconfiguration, instead wait for it to complete, and rerun reconfig, entering the correct parameters.

2.6.2 Procedure

1.) Change directory to scripts:
Type: **`cd /usr/g/scripts`** **ENTER** at the prompt.

2.) Launch the Install utility:
Type: **`reconfig`** **ENTER** at the prompt.
The OC displays the Install Utility Window as shown in Figure 5-12.

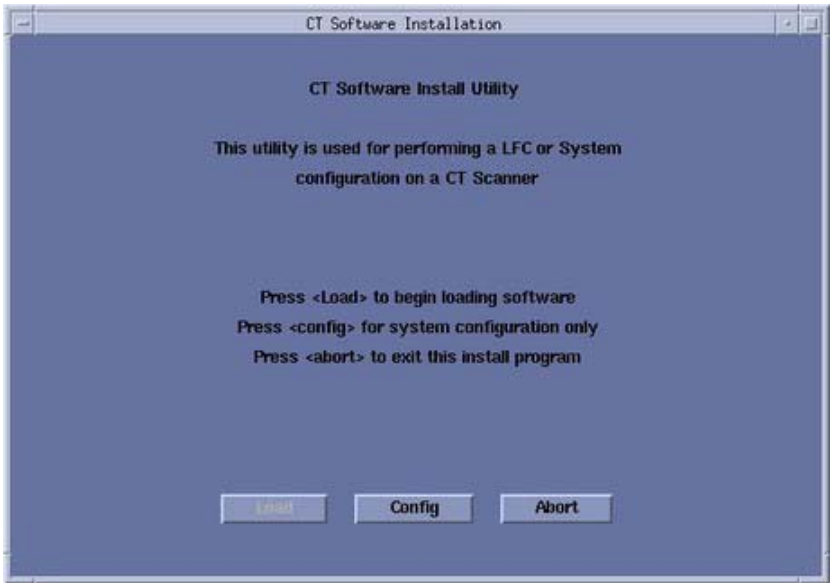


Figure 5-12Install Utility Window

3.) Click on the CONFIG button.
The OC displays the System Configuration - System Settings Screen as shown in Figure 5-13.

Comment: *The following pages show the screens that are used to change the configuration of the system. These screens are the same as those used for the Software Configuration during Load From Cold. The actual screens will vary depending on the current configuration of your system.*

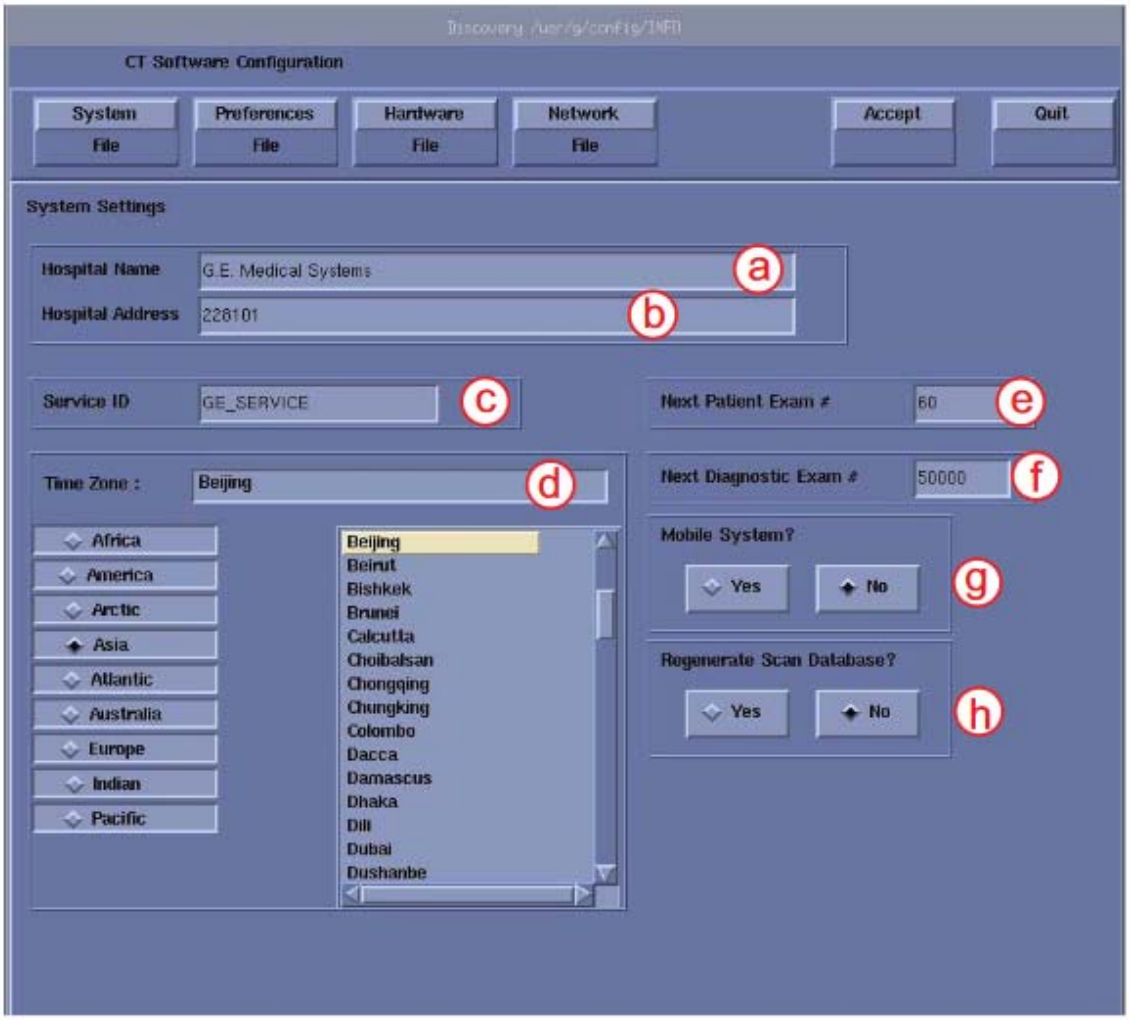


Figure 5-13 System Settings Screen

4.) Configure System Settings

a.) `Hospital Name` (Figure 5-13, item 1) configures the name that will show up on images produced by this scanner. *Example*: ST MARYS HOSPITAL

b.) `Hospital Address` configures the hospital address.

c.) `Service ID` (Figure 5-13, item 2) is issued by the Service organization. *Example*: 262785CT2 (no spaces)

d.) Select the `Time Zone` for the site.

Note: Use the scrollbar at the bottom of the time-zone selection list to view the entire description of the time-zone you are about to select, to ensure that you are selecting the correct time-zone for your location.

If the time-zone of your location is not in the list above, select one of the universal times in the selection menu. In this case, automatic changes for daylight savings time will not take effect. See Load from Cold manual, if you require more information regarding time-zone setting & selection.

e.) `Next Patient Exam #` configures the next Exam number the scan user interface will use. At initial system installation, type: **1**

f.) `Next Diagnostic Exam #` *Customer Selected.*

g.) `Mobile System` Select to tell the software if this CT is in a mobile environment or not.

h.) `Regenerate Scan Database` Select to tell the software if scan database will be regenerated or not.

5.) Select the PREFERENCES button to display the Preference Settings Screen as shown in Figure 5-14.

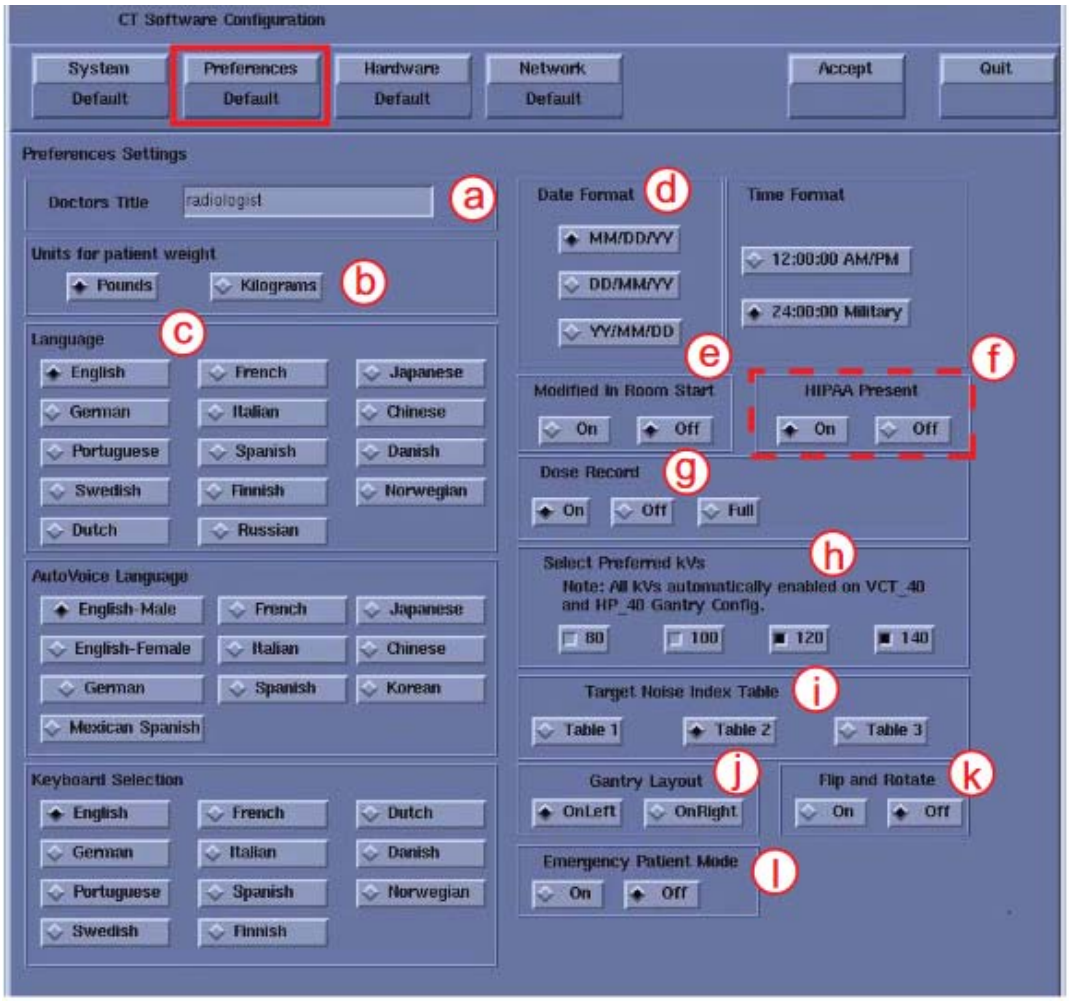


Figure 5-14 Preferences Setup Screen

6.) Configure Preferences Settings

a.) `Doctors Title` Enter the title for the Doctor. (eg. radiologist)

b.) `Units for Patient Weight` Tells the software whether pounds or kilograms are being used.

Note: Use Direction 5221102-1EN (found in the keyboard collector kit shipped with the system) to complete the language selection.

c.) `Language` configures the language to be displayed on the Application screens.

1.) Review the language matrix (in direction 5221102-1EN) and identify the appropriate language for your country.

2.) Ask the radiology manager, or equivalent, to agree to the user interface (UI) language and keyboard requirements listed for that country (per 5221102-1EN), OR choose another language for the UI and keyboard.

3.) Record the information on GE form e4879.

d.) `Date Format` configure the format in which the date will be displayed on the images. `Time Format` configure the format in which the time will be displayed on the images

e.) `Modified In Room Start:` **Select** ON **for Japan sites**, OFF for other sites.

f.) `HIPAA Present:` Configures the preference for Data Privacy (User Authorization) feature on the system.

Select [ON] if customer requests Data Privacy (User Authorization) feature enabled on the CT system.

From 17BW11.x, HIPAA is enabled as default and the selection button is not displayed. HIPAA ON/OFF can be selected by Configure HIPAA in Common Service Desktop.

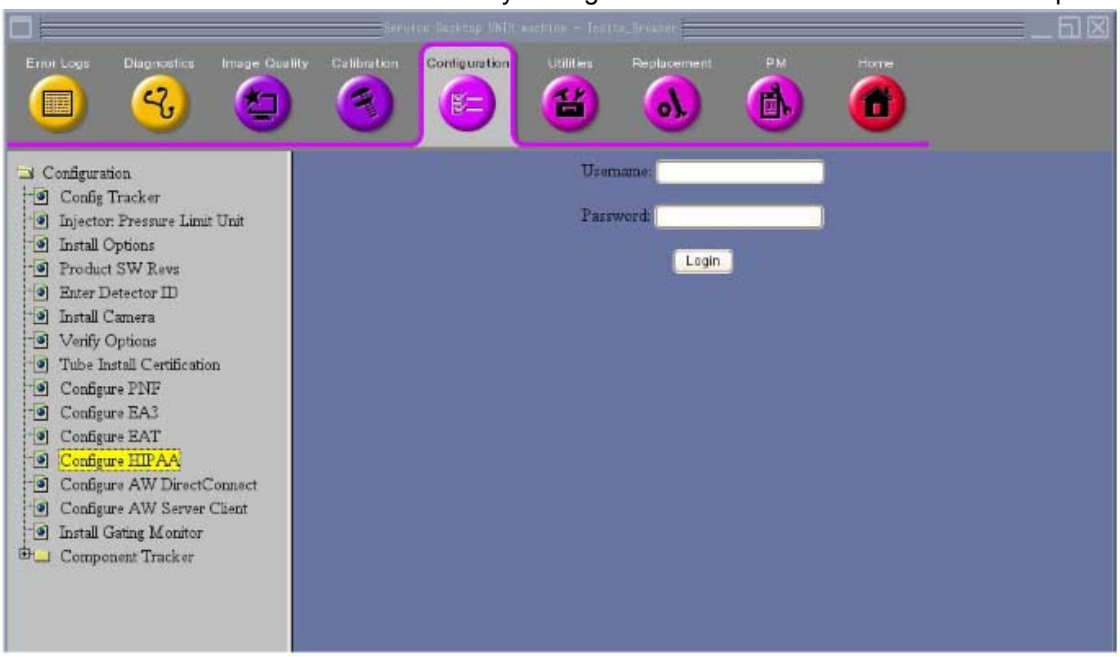


Figure 5-15 HIPAA Configuration

g.) Select the site-preferred `Dose Record` option for the site. Default is `ON`. The dose information is saved in a DICOM structured report. The DICOM standard defines a new DICOM X-RAY Radiation SR SOP class, which the other systems must support. The Dose SR feature saves an exam's dose information in this format.

* ON = Saves the dose information in a DICOM Enhanced SR SOP Class
* OFF = Turns off the option
* FULL = Saves the dose information in a DICOM X-Ray Radiation Dose SR SOP Class

h.) `Preferred Fast Cal KV` configures the preferred kV that the Fast Cal Routine will calibrate (80, 100, 120, 140 in the `Selected Preferred Fast Cal KV` field). The default selections are 120 and 140.

Comment: *These kVs should include all kVs that the site uses for patient scanning. Deselecting All Preferred FastCal KVs is the same as selecting ALL the Preferred FastCal KVs*

i.) Select Target Noise Index Table: default is [TABLE 2].

j.) Select `Gantry Layout` according to gantry/table layout in the hospital.

Note: Select ONLEFT if gantry is laid to the left of table (viewed from the control room), otherwise, select ONRIGH.

k.) `Flip and Rotate`: Configures the preference for allowing the `Flip and Rotate` feature to be turned on in the User interface on the (Left) SCAN Moniotr. Default is `OFF`. This preference allows the Customer to apply custom orientation changes based on Exam Type and reconstructions methods on the DICOM images that will be transferred to PACS and related systems.

Note: This preference shall not be enabled unless specifically requested by the Customer and `Evaluation of Image Flip and Rotate Compatibility` functional check procedure has been executed and all DICOM test images pass orientation check.

7.) Select the HARDWARE button to display the Hardware Settings Screen. See Figure 5-16, Figure 5-17 and Figure 5-18 (example only - actual screen may vary).

8.) Configure Hardware Settings.

a.) Review the information for `Gantry Type` for this system.

b.) Select the Tube Type and Das Type installed with this system.

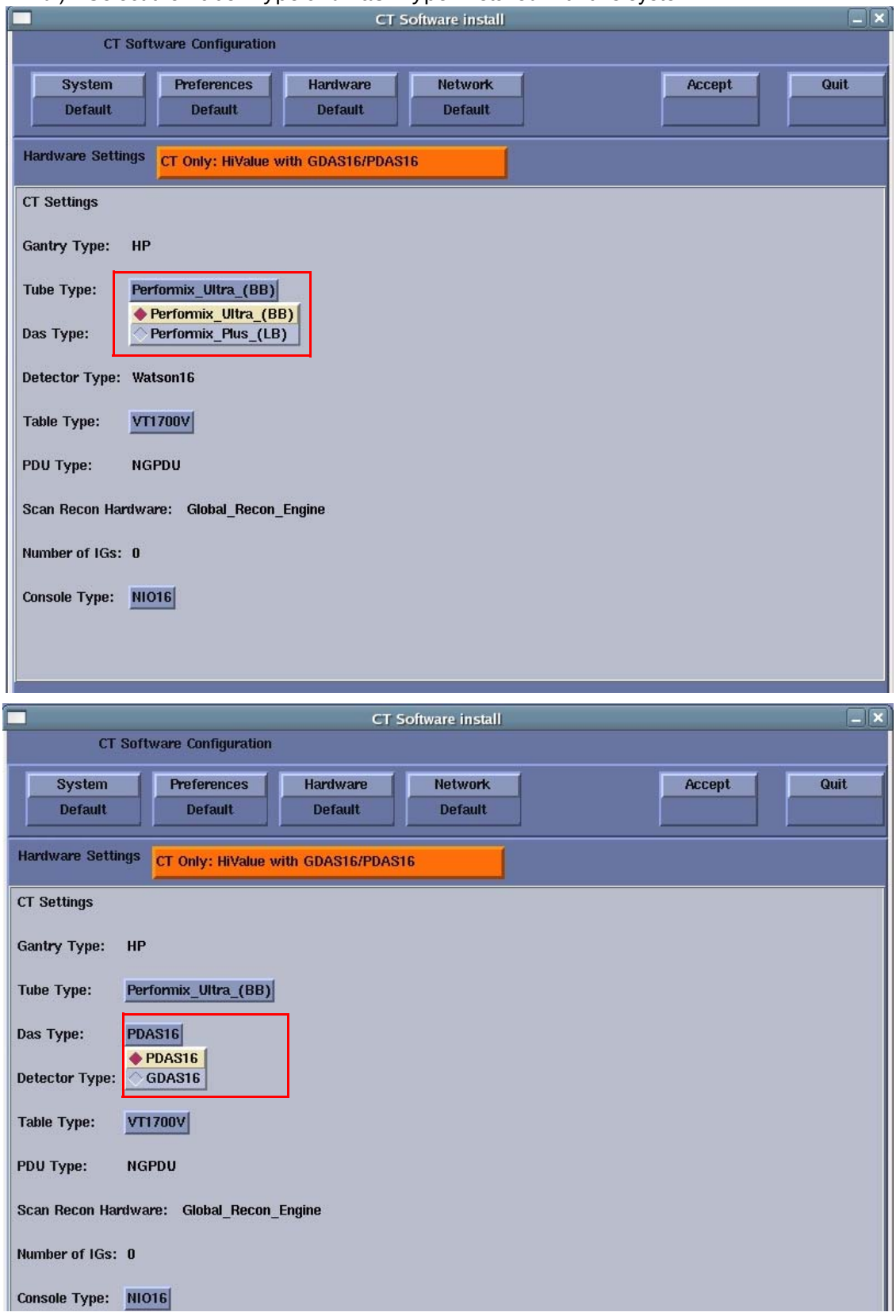


Figure 5-16Select Tube and Das Type in Hardware Settings Screen

c.) Review the information for Detector Type for this system.

d.) Select the `Table Type` installed with this system.

Determine the Table Type using the product locator card shipped with the order information.

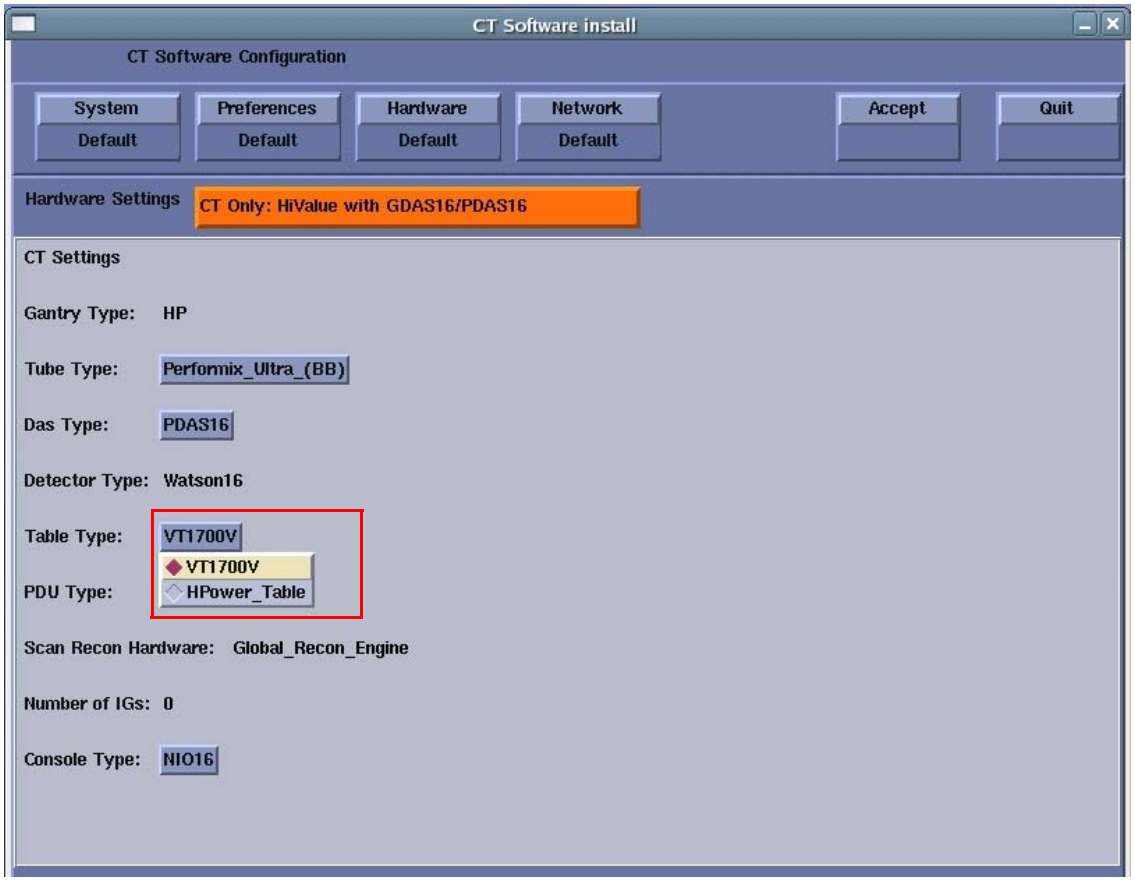


Figure 5-17Select Table Type in Hardware Settings Screen

e.) Review the `PDU Type` and `Scan Recon Hardware` for this system.

f.) Select the `Number of IGs` for this system if the console type is GOC3/GOC4/LCGOC. For AIO/TIO/NIO16 console, the number of IGs is 0.

9.) Select `Console Type` installed with this system.

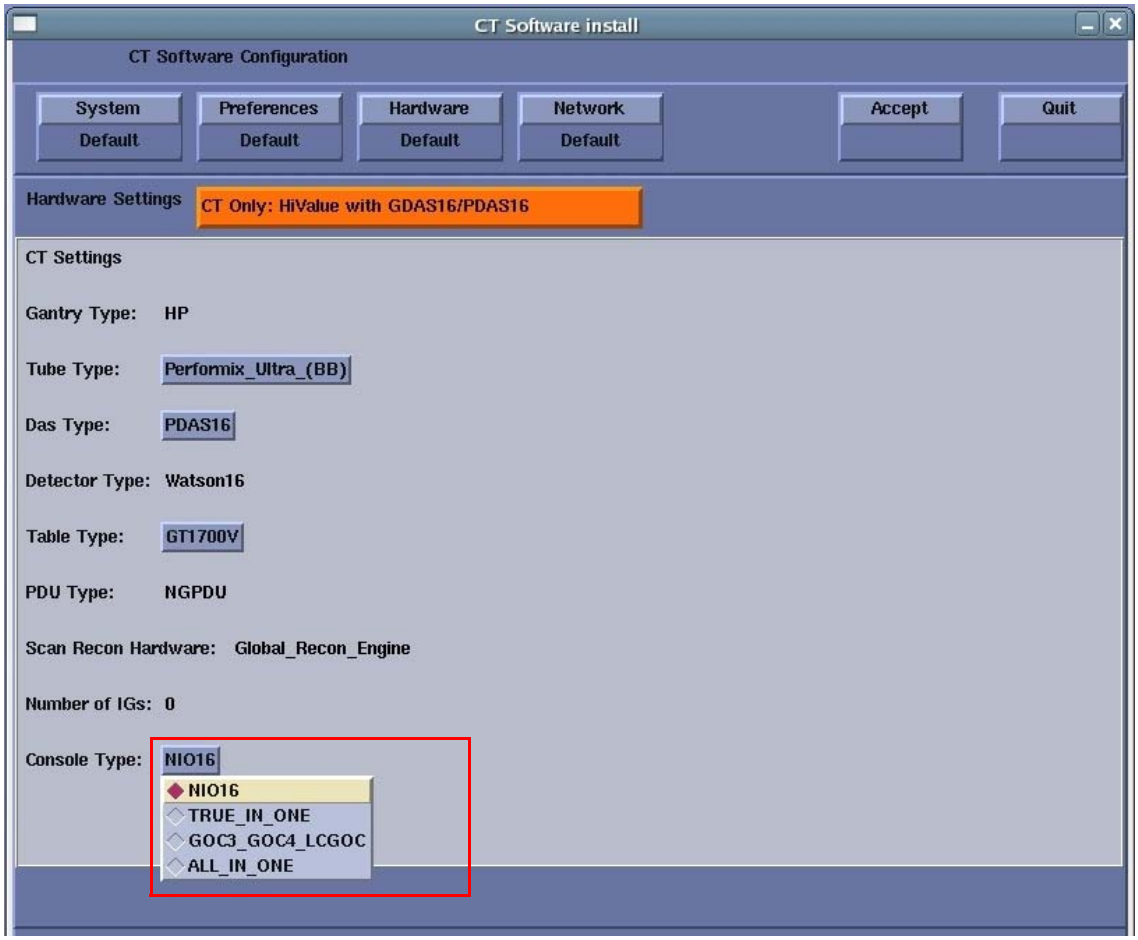


Figure 5-18Select Console Type in Hardware Settings Screen

10.) Select the NETWORK button to display the Network Settings Screen as shown in Figure 5-19.

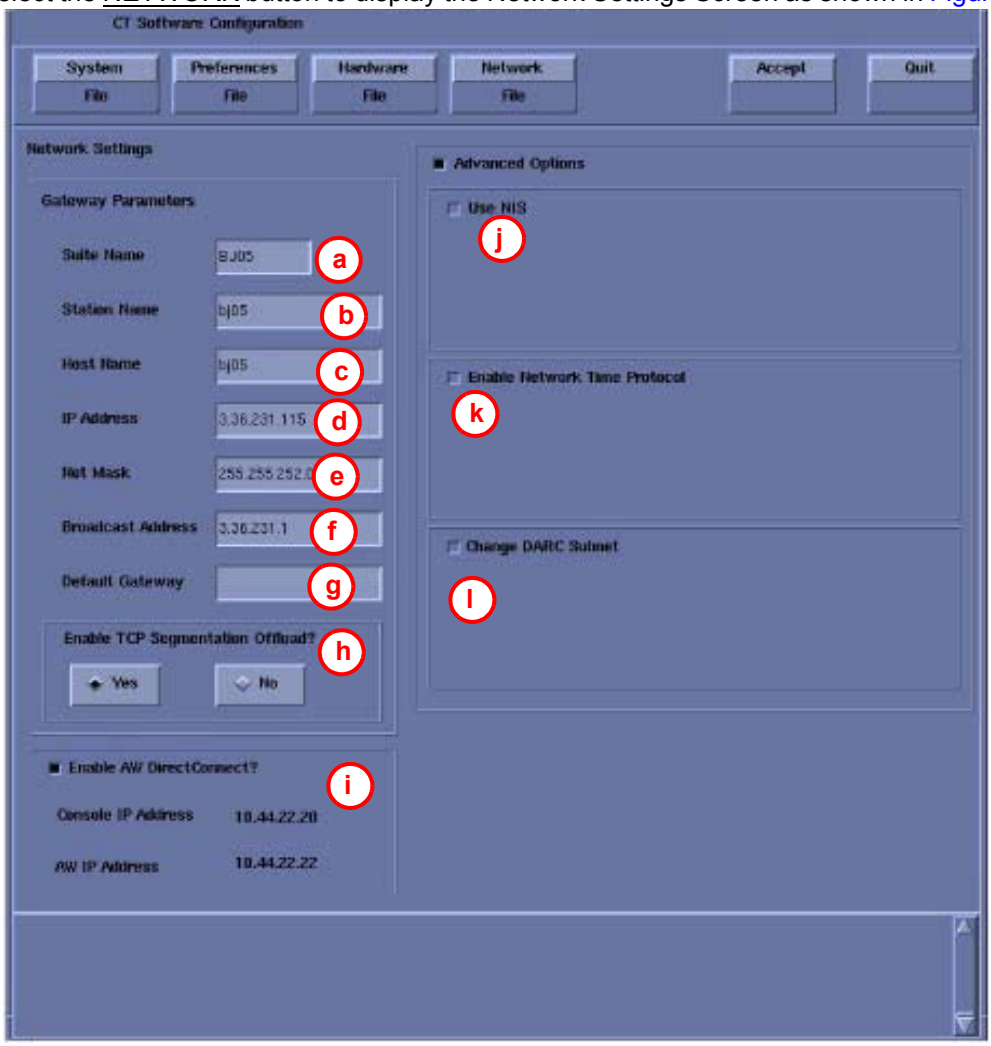


Figure 5-19Network Settings Screen

11.) Configure Network Settings

Comment: *This screen provides the ability to declare the CT system on a hospital network. Key information such as Host Name, IP Address, Net Mask (for CT systems on a subnet) must be obtained from the hospital network administrator.*

See Chapter 7 for more information and complete details of setting the Hospital/System Network Configuration.

a.) Enter the `Suite Name`.

The Suite Name must start with a letter, followed by three alphanumeric characters. Total must be four characters long. The name of the OC interface will be <*`Suite Name`*>, within the scanner's subnet.

Typically, you should use `su01 or ct01` ("su" and "ct" must be lowercase), unless the customer prefers a different suite name.

b.) Enter the `Station Name`.

* It cannot exceed 16 characters
* It can only contain **a** though **z**, and **0** through **9**.

`Example: stmary or ct01`

c.) Enter the hospital provided `Host Name`.

The Host Name identifies the network hostname and AE Title of the CT system to the hospital's network. The Host Name**:**

* **MUST NOT** exceed 16 Characters.
* **MUST** only contain the following characters: **`A`** through **`Z`**, **`a`** through **`z`**, `0` through **`9`**, **`-`** and `_`.

Comment: *The Host Name is typically* `stmary or ct01`.

d.) Enter the hospital provided `IP Address` for the system.

e.) Enter the hospital provided `Net Mask` (if the CT system is on a subnet).

f.) Enter the `Broadcast Address`.

Comment: *The Broadcast Address should be the same as the IP Address except for the bits of the host id portion (last digit group) set to 1's or 0's depending on the configuration of the network. The standard default is 1's, but older Sun OS machines used 0's.*

For example:

If the IP Address is 192.100.9.17, the Broadcast Address should be 192.100.9.255 if the network is configured to use 1's to specify the Broadcast Address.

If the network contains genesis based scanners or other Sun OS 3.5 or 4.1 computers, the Broadcast Address should be 192.100.9.0.

g.) Enter the hospital provided Default Gateway IP Address in the `Default Gateway` field (if applicable). If the site network does not use a default gateway, leave the field blank.

h.) "`Enable TCP Segmentation Offload?`" The default selection is `Yes`. In some situation, TCP Segmentation Offload can't work normally, please select `No` at this time.

i.) `Enable the AW DirectConnect`, if this option is provided with this system.

j.) Enter the hospital-provided NIS Domain Name for the system, if NIS is utilized on-site.

Enter the hospital-provided IP Address for NIS Service for the system, if NIS is utilized on-site.

k.) Check the `Enable Network Time Protocol` box, if instructed to do so by the hospital.

l.) Check the `Change DARC Subnet` box, if instructed to do so by the hospital.

12.) Select ACCEPT on the System Configuration Screen.

Comment: *The system loads the CT Application Software, OS patches, kernel changes and configures the system on the OC.*

*The loading process takes approximately 15 minutes. While the load is going on, the results are displayed in a shell window that closes when the loading process is complete. All the window output is logged to a file named:*_____

13.) When the loading process and configuration changes are complete, the system displays a prompt to reboot. Click on YES. (See Figure 5-20.)

Figure 5-20Reboot Screen

14.) The system will automatically login as `ctuser` after the reboot. Select OK on the Autostart Disabled popup message.

2.7 Check/Set Date and Time

Tools Required: None

If date and time need to be corrected:

1.) Open a Unix Shell window to check the current date.

Type ***{ctuser@hostname} date*** **ENTER** at the prompt.

2.) If the date is correct, proceed to the next section; if it is incorrect, continue this procedure.

Note: You must set the date and time on the Host computer with the Application software down.

3.) Open a Unix Shell window and login as root:

a.) Type ***{ctuser@hostname} su -*** **ENTER** at the prompt.

b.) Type the password: **#bigguy**

4.) Set the date and time.

a.) Type ***{root@hostname}# setdate*** **ENTER**

b.) Follow the instructions of the individual time-entry prompts, which will appear in the following sequence:

```
*  Note: Type "q" at any time to quit. Press ENTER to continue.
*  Note: TO BE ACCURATE, this tool will prompt you the enter the
   "Second." Watch your clock or PC carefully to enter the proper
   value, and hit [ENTER] at the right second to set the accurate
   time. Enter to proceed. Press ENTER to continue.
*  Enter the current Year (1980 - 2030) [2007]:
*  Enter the current Month (1-12) [04]:
*  Enter the current Day (1-30) [14]:
*  Enter the current Hour (Military Time) (0-23) [18]:
*  Enter the current Minute (0-59) [13]:
*  Enter the current Second (0-59) [00]:
*  Updating the time on the OC and DARC, Please Wait...
*  PING darc (172.16.0.2) 56(84) bytes of data.
```

2.8 Data Privacy Configuration

If "HIPAA Present" was enabled in reconfig, apply the following procedure to fully configure the Data Privacy (EA3 User Authorization) feature. Refer to *Data Privacy (EA3 User Authorization) Configuration* procedure in the Service Methods CD-ROM.

2.9 Initial Setup of EA3 Administrator Account

Service assistance is required for initial setup of User Accounts using EA3 Admin Brower. Complete the Section 4 of the *Dose Check Management and EA3 Configuration* procedure in the Service Methods CD-ROM.

2.10 Save System State

1.) Insert the DVD into the Peripheral Tower DVD drive.
2.) Select: SERVICE DESKTOP.
3.) If reloading software, select: UTILITIES. If upgrading from earlier version software, select: PM.
4.) Select: SYSTEM STATE.

Note: System State Save may be under Utilities or PM.

5.) Select ALL to save all data.
6.) Click SAVE.
7.) If applicable, click OK when the following message appears: System State Media Status: Please insert a DVD or MOD into the drive and press Save again.
8.) When completed select DISMISS.
9.) Label and date the disk including the suite name.
10.) Close the Service Desktop window at the upper left corner of the screen.

2.11 Applications Start-Up

Open the Console shell window, and type: **`st`** **ENTER**. The applications desktop appears on the monitor.

2.12 Console Boot-up Flow Chart

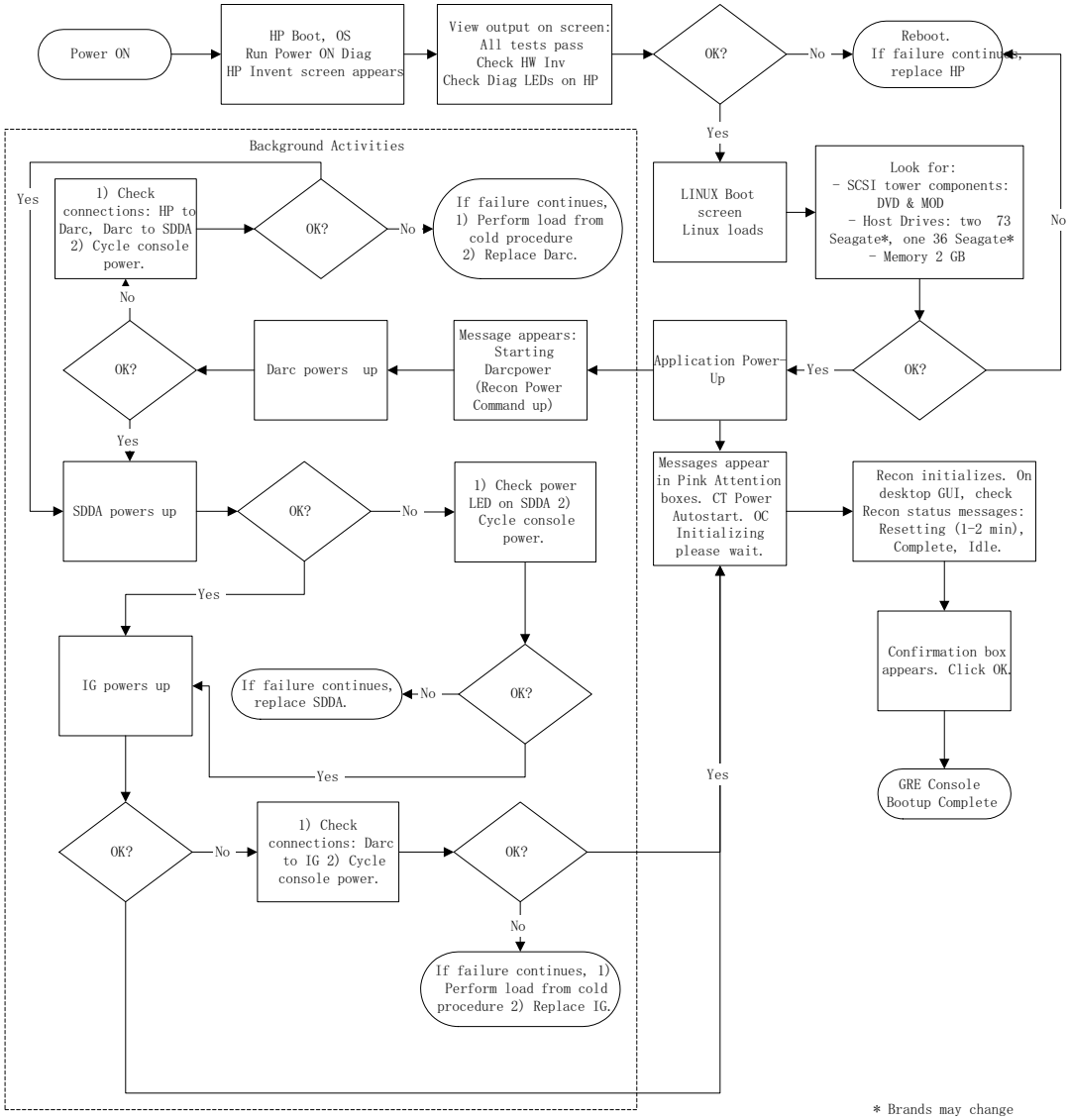


Figure 5-21 GOC4/LCGOC Boot-up Flow Chart

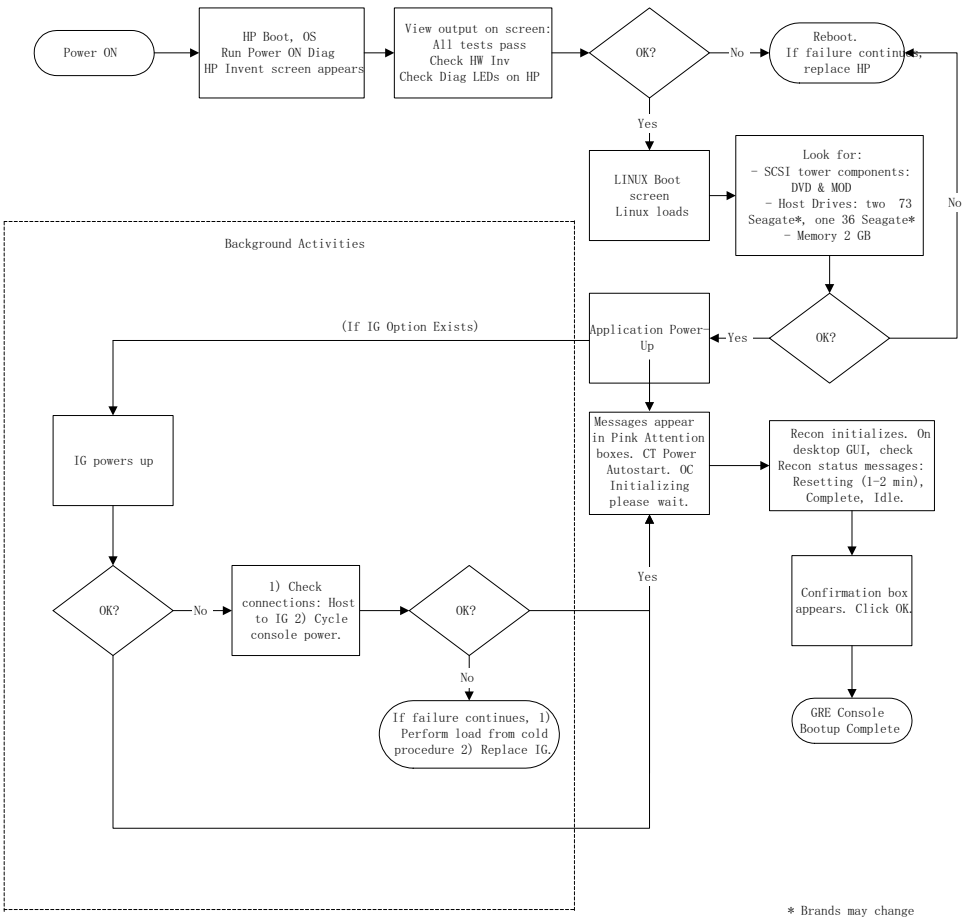


Figure 5-22 All-In-One Console Boot-up Flow Chart

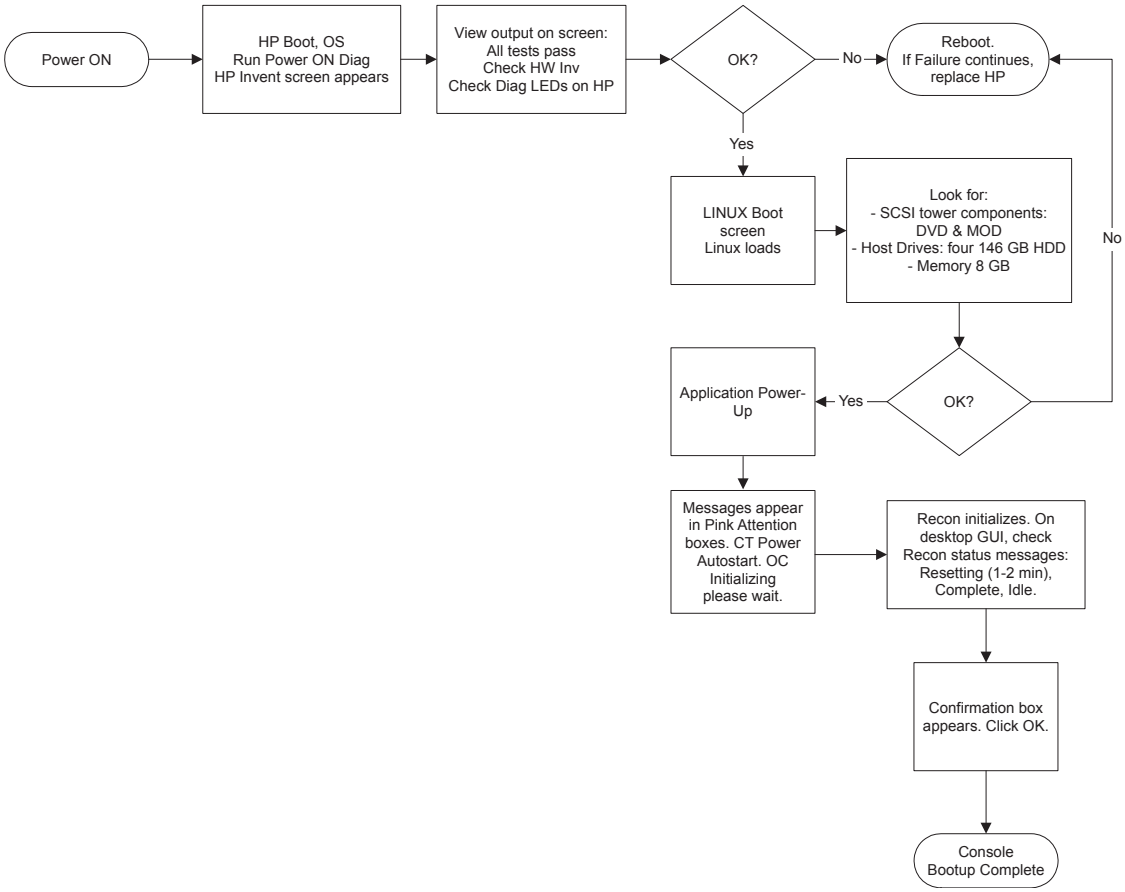


Figure 5-23 True-In-One Console Boot-up Flow Chart

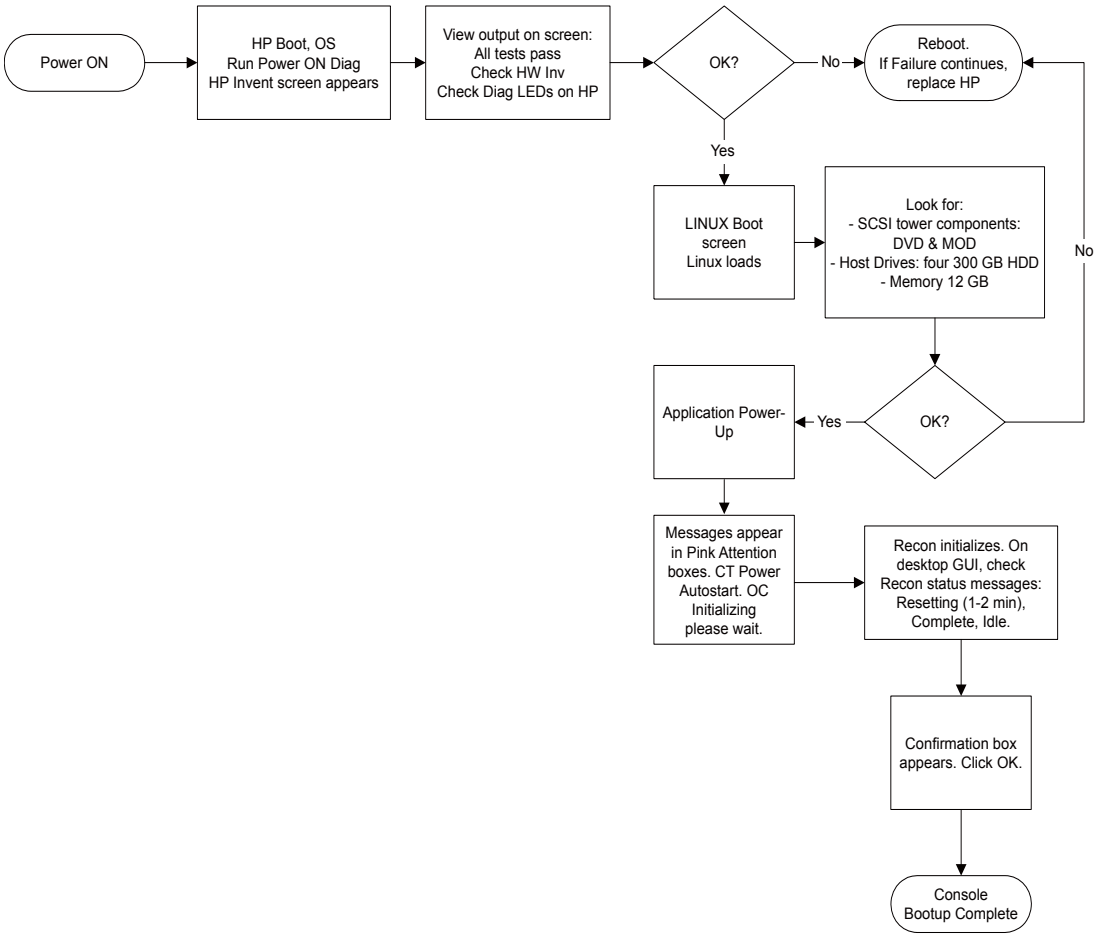


Figure 5-24 NIO16 Console Boot-up Flow Chart

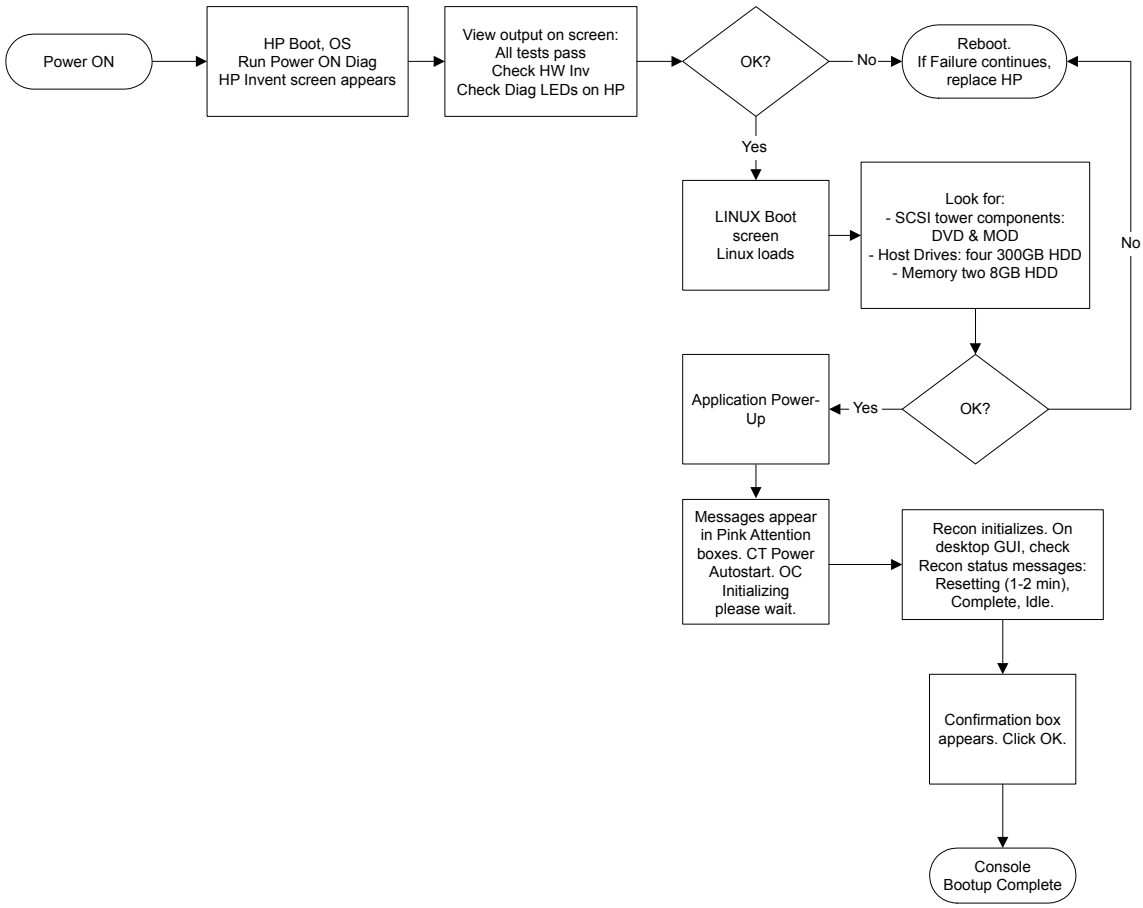


Figure 5-25 Open Console Boot-up Flow Chart

2.13 Adjust Monitor

1.) If you are not on the Service Desktop, click on the SERVICE DESKTOP icon. 

2.) Click on the IMAGE QUALITY icon. 

3.) Select INSTALL SMPTE IMAGE and wait approximately 3-4 minutes for SMPTE image to install. (When complete the following message will display: `SMPTE and QA images have been successfully copied`)

4.) Press **ENTER** to exit the Service Desktop.

5.) Click the IMAGEWORKS icon 

.

6.) Display the SMPTE pattern. Use the browser to select Exam 1000, which contains the SMPTE pattern, and enlarge the image to full screen display.

7.) Select Viewer.

8.) Select 1:1 format.

9.) Increase the monitor's contrast to maximum.

Note: Adjust monitor contrast until the operator sees the anatomical structure (window raster)

10.) Increase the Brightness to maximum.

11.) Decrease the Brightness, until the raster just fades into, and matches, the monitor screen background. At this point, the 5% and 95% patches should be just visible.

- If additional tweaking is required to attempt to match the monitor image to the filmed image, use only the brightness control.
- If the LCD image exhibits any tearing or smearing of the alphanumeric characters, then reduce the contrast setting slightly until the tearing/smearing is just eliminated. The optimum setting for contrast is the highest setting that does not cause tearing/smearing of the alphanumeric characters.

You should always finish up by displaying and filming images of anatomy (typical heads and bodies), and asking the technologist to compare the LCD image to the film image.

2.14 Screen Saver Setup Utility

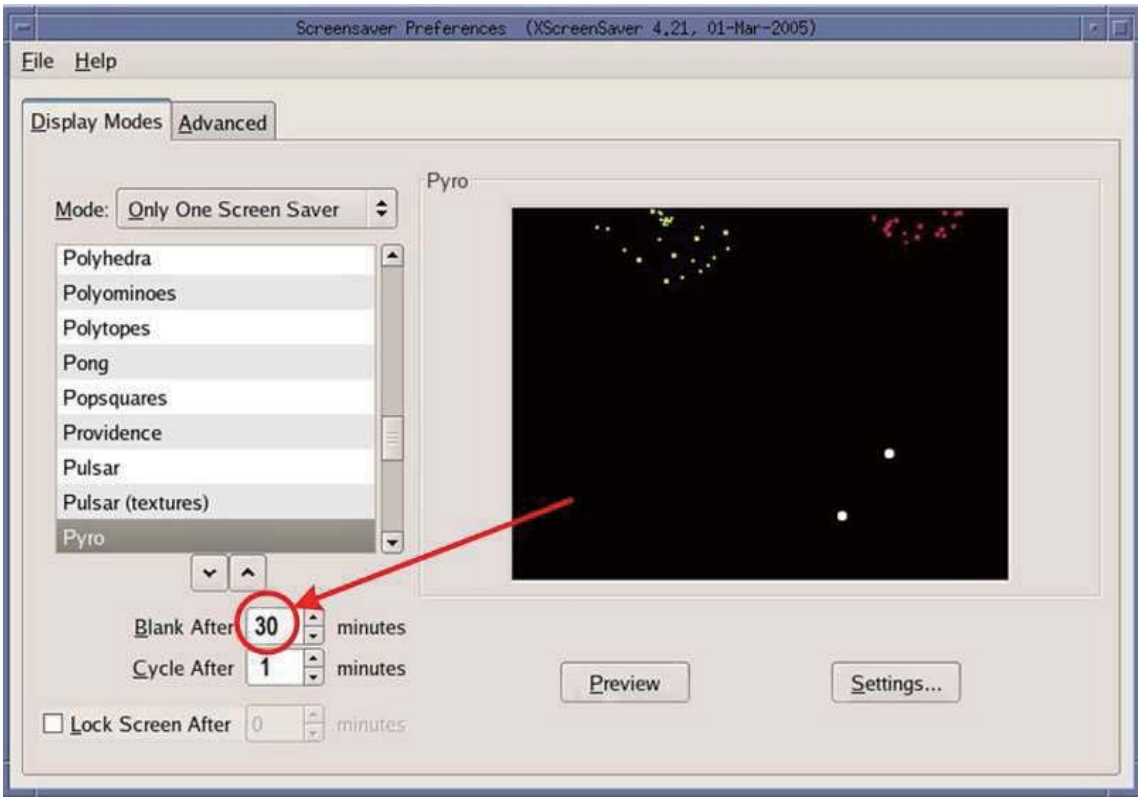
1.) Open a Terminal Window

Type: ***`{ctuser@hostname} xscreensaver-demo`*** **ENTER**

2.) The Screensaver Preferences UI will appear.

3.) Change the default ***"Blank After"*** time from 57 to 30 minutes on the ***"Display Modes"*** tab of the Screensaver Preferences.

Note: No other changes are recommended.



4.) Then click FILE on the menu bar and select RESTART DAEMON.

5.) Click FILE again on the menu bar and select QUIT.

Section 3.0
Table Gantry Integration

3.1 Introduction

Use these procedures to functionally check every part of the table/gantry subsystem.

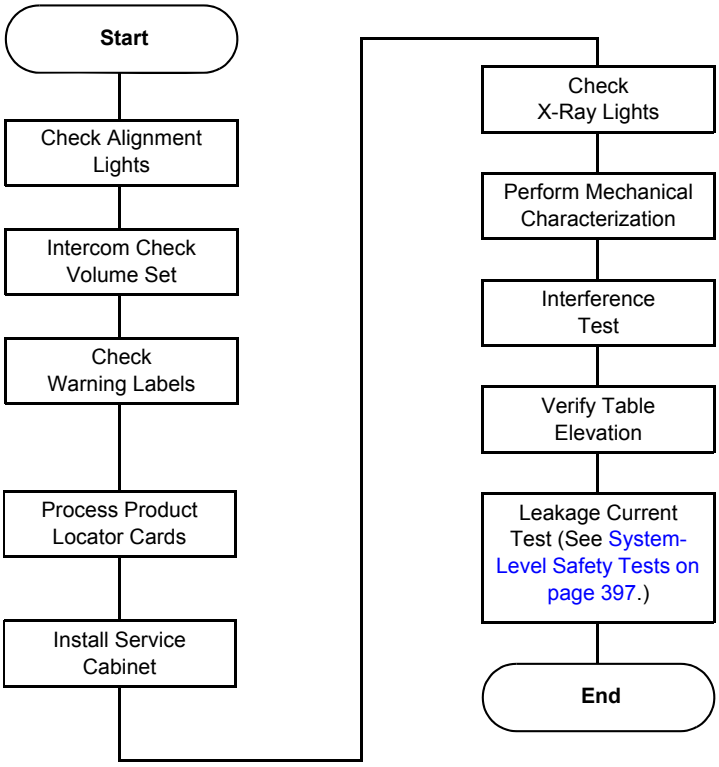


Figure 5-26Table Gantry Integration Process Overview

Required Tool

- Multimeter

3.2 Check Alignment Lights

3.2.1 Room Light Adjustment

Adjust the scan room lights to normal customer operating levels.

3.2.2 Turning the Alignment Lights ON

CAUTION **Verify all personnel have cleared the system. The Gantry rotates during this check.**

1.) Turn ON the **AXIAL DRIVE ENABLE** and **HVDC ENABLE** switches (located on the service switch board.

2.) Turn on the alignment light switch on the gantry control panel. The gantry will rotate and the alignment lights will turn ON.

CAUTION LASER EYE INJURY!

NEVER STARE DIRECTLY INTO THE LASER BEAMS WHEN YOU OPERATE THE ALIGNMENT LIGHTS. STARING INTO THE BEAMS CAN CAUSE PERMANENT EYE DAMAGE.

3.2.3 Internal Axial Lights

1.) Place a sheet of plain white paper over the output port of each light.

2.) Verify that the two laser lines coincide and appear as a single line.

Note: GE designed the internal axial lasers on the current CT system to shine *down* on the collimator. Do NOT adjust the internal alignment lights at this time. The tomographic plane tests use the QA phantom to check the internal axial lasers alignment to the collimator.

3.2.4 External Axial to Internal Axial Distance

Note: Ensure that cradle is level.

1.) Raise the table to its highest elevation.

2.) Extend the cradle until you see both the internal and external laser lights shining on the cradle.

3.) Place a metric rule on the right edge of the cradle, and measure the distance from the internal axial laser line to the external axial line. Verify this distance equals 240.0 mm +1.0 mm.

4.) Place the rule on the left edge of the cradle, and measure again.

5.) Leave the cradle in its current position, and lower the table to the minimum elevation.

6.) Measure the distance between the internal and external lights on both edges of the cradle, as above. Verify the distance remains equal to 240.0 mm +1.0 mm.

3.2.5 Coronal Lights

1.) Place a sheet of plain white paper at the left side of the patient opening, in front of the coronal laser light. Verify the two coronal lines coincide.

2.) Move the paper to the right side of the patient opening. Verify the two coronal lines coincide.

3.) Place the paper in the center of the gantry opening. Use a level to verify that the coronal lines are horizontal.

3.2.6 Turn Lights OFF

Press the alignment light button on the gantry control panel, again, to turn the lights OFF.

3.3 Autovoice/Intercom Check

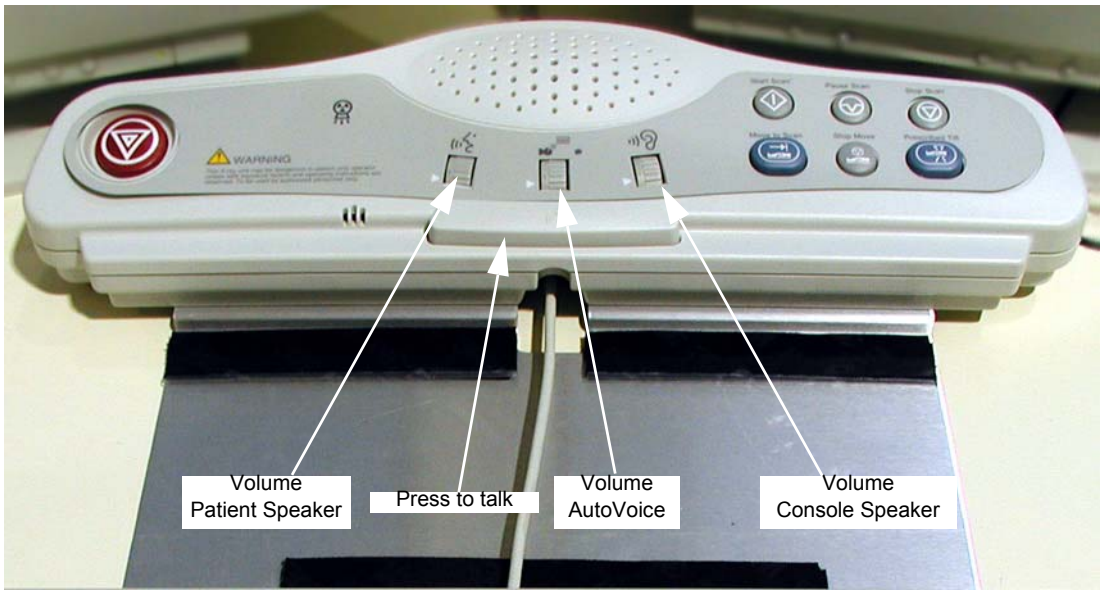


Figure 5-27SCIM Volume Controls

Figure 5-28GSCB Volume Controls on NIO16 Console

3.3.1 Requirements

Two people are required to complete this procedure.

3.3.2 Patient Speaker

1.) To adjust the volume of the patient speaker in the table, adjust the left-most volume thumb wheel on the SCIM/GSCB while speaking into the console microphone. (Press the bar on the SCIM/GSCB to talk; release the bar to listen.)

2.) The patient should be able to clearly hear the operator.

3.3.3 Operator Console Speaker

To adjust the console speaker volume:

1.) Have an assistant speak into the gantry microphone.

2.) Adjust the SCIM/GSCB console volume knob until you can clearly hear the patient.

3.3.4 Autovoice Volume

1.) On the Scan Desktop, select PROTOCOL MANAGEMENT.
2.) Select AUTO VOICE RECORD.
3.) Click the 3.4 button, to the right of “FF2. Inspiration”.
4.) Click the PLAY button, to play the Inspiration AutoVoice message.
5.) Adjust the center volume thumb wheel while Autovoice is playing, to set the volume for the gantry speaker.
6.) Repeat steps 4 and 5 as necessary to achieve satisfactory volume.
7.) Select DONE, then select QUIT.

Note: If a satisfactory volume can not be achieved, refer to the system service manual and review the intercom module setup procedure.

3.4 CT System X-Ray ON Indicators, Cautions & Warning Labels

3.4.1 Check And Install System Warning Labels

All labels are installed in English and present on PDU, Console, Table, Gantry and Accessories. Add the labels listed below (Table 5-3 and Section 3.5) for the appropriate language for the country in which this system is installed. Additionally, apply any other warning labels if present, on equipment where appropriate.

The system rating plate of the scanner marked with IPX0 should have below IEC rev3 unique labels. Detail IEC rev3 unique Caution labels information, please refer to ***Caution Label Installation Procedure (5442204-1EN)*** shipped with system.

	Read Docs Caution
	Pinch Point Caution
	PDU Movement Caution

Table 5-2 Caution label Classification

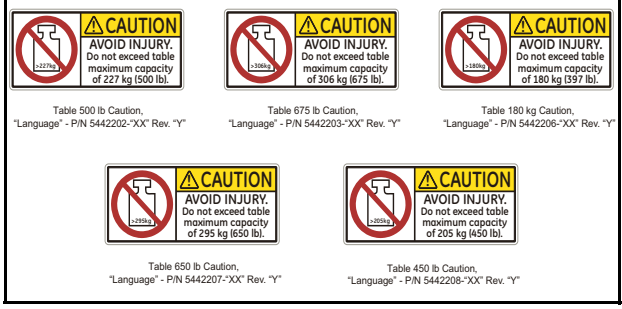
	Load Limit Caution Label (Only use a label that exactly matches the Table Load Limit Value)

Table 5-2 Caution label Classification

NOTICE **Do not cover English labels already on the system.**

Subsystem	Component	Label(s)
Console	SCIM/GSCB	SCIM/GSCB overlay warning label
	Keyboard	Function key overlay label
	Rear Panel	Read Documentation Caution Label
Gantry	Scan Window	Laser warning label
	Laser Window	Laser warning label
	Front Cover	Laser warning label Information labels
	Front Cover, Right Side	Read Documentation Caution Label Pinch Point Caution Label
	Front Cover, Left Side	Pinch Point Caution Label
	Rear Cover, Right Side	Pinch Point Caution Label
	Rear Cover, Left Side	Pinch Point Caution Label
	System GIB	System Global Installation Base (rating) label
Table	Front Side Cover	Pinch Hazard warning label - each side of cover
	Rear Side Cover	Pinch Hazard warning label - each side of cover
	Back Cradle Pan	Pinch Hazard warning label - each side of cover
	Front Leg	Read Documentation Caution Label
	Cradle Handle	Load Limit Caution Label

Table 5-3 System Warning Labels

Subsystem	Component	Label(s)
NGPDU	Front Cover	Emergency OFF label Gantry Enable label Power ON label
	Rear Panel	Read Documentation Caution Label
	Cabinet Side	PDU Movement Caution Label
Accessories	Table Foot Extender	Warning label
	Coronal Head Holder	Warning label
	Accessory Tray	Warning label
	IV Pole	Caution label

Table 5-3 System Warning Labels

3.4.2 Documentation - Verification

When finished update GE form e4879 (US Only) and the installation completion form that all appropriate language labels were installed and present.

3.5 Check Warning Labels

Note: The labels on the system and the system manuals must comply with the country law, as listed in Direction 5221102-1EN (found in the keyboard collector kit shipped with the system) regardless of the user interface (UI) language that is chosen. Compliance to the law must be completed prior to releasing the system to the customer.

Note: Do not cover English labels already on the system.

3.5.1 On SCIM/GSCB

1.) Make sure the SCIM/GSCB overlay warning label appears in the correct location on the SCIM/GSCB.

2.) Record this information on Form 4879. For more information about this form, see Section 8.0 of Chapter 4.

3.5.2 On Gantry

1.) Check that all laser warning labels are present on the gantry near the laser opening.

2.) There should also be warning labels on the lower right side of the gantry front cover.

3.) Record this information on Form 4879. For more information about this form, see Section 8.0 of Chapter 4.

3.5.3 On Laser

1.) Make sure all laser warning labels appear in the correct location on the outside of the gantry.

2.) Obtain and install replacements for any missing labels.

Figure 5-29Laser Warnings and Precautions

3.6 Process Product Locator Cards

1.) Collect the product locator cards shipped with the system. There should be approximately 28 product locator cards with the average system.
2.) Update the online product locator web site with the required hospital information.
3.) Confirm that the serial numbers on the cards shipped with the system match those found on the web site for that GON number.
4.) Update as required. Place the cards in a plastic bag, then place them in the service cabinet.

3.7 Verify Service Cabinet Installation (Optional)

Verify that the service cabinet is installed and that the shipped service materials are in the cabinet. If the cabinet was not installed, install it at this time by following the Service Cabinet Installation procedure in Section 8.7 of Chapter 2.

3.8 Check X-Ray Lights

Perform several scans following the steps below. Verify that the X-ray ON lights are ON during the scans. When done, check the boxes in Table 5-4.

1.) Make sure the axial drive enable and HVDC enable switches are ON.
2.) If you are not on the Service Desktop, click on the Service Desktop icon.
3.) Select DIAGNOSTICS.
4.) Select DIAGNOSTIC DATA COLLECTION.
5.) Set the scan time to 2.00.
6.) Set the kV to 80.
7.) Set the mA to 40.
8.) Press **ACCEPT RX**.
9.) Press **START SCAN** button when flashing.
10.) Record this information on Form 4879. For more information about this form, see Section 8.0 of Chapter 4.

Light On	Warning Light Locations
☐	SCIM
☐	Gantry Front
☐	Gantry Back (Use a mirror to view)

Table 5-4 X-ray Light Chart

Light On	Warning Light Locations
☐	Room Light (outside of the room)

Table 5-4 X-ray Light Chart

3.9 Mechanical Characterization

The relationship of table height to ISO center and internal-to-external landmarks must be characterized for proper interference matrix functionality.

Note: Do NOT perform tilt characterization.

3.9.1 Alignment Light Characterization

1.) Start the Mechanical Characterization tool from the Calibration tab on the Common Service Desktop.
2.) Select the CHARACTERIZE ALIGNMENT LIGHTS button from the interface.
3.) Follow the on-screen instructions.

3.9.2 Table Height Characterization

1.) Select the CHARACTERIZE TABLE HEIGHT button from the interface.
2.) Follow the on-screen instructions.

Note: If the table height is less than 21mm or greater than 25mm, relative to ISO, you must adjust the table height using the table leveling pad and adjusters. Raise or lower all four adjusters equally to achieve desired results. Note down the value of distance "V" which will be used in Section 3.11.

3.10 Short Footprint Setting

Normally, the table cradle can travel up to 1712 mm from scan central line. The Short Footprint function can limit this distance to a value shorter than 1712 mm (in 1 mm increments).

Note: If you moved the cradle into the set maximum distance while the table is not at the highest position, then the system will inhibit the table upward operation.

Note: During the table characterization procedure, or while operating the cradle with the service switches on the GTCB board, the cradle is enabled to move up to 1712 mm from scan central line, regardless of the short footprint set distance.

⚠ **CAUTION** **Potential for injury to a person.**

Small space present.

The IN-limit position of Cradle short foot print mode should be set in order not to pinch patient between the cradle edge and scanning room wall.

⚠ **NOTICE** **It is recommended that safety clearance from cradle IN-limit to wall should be no less than 100 mm.**

1.) Attach the cradle extender on the cradle.
2.) Launch the MECHANICAL CHARACTERIZATION tool from the Service Desktop, select CALIBRATION tab.
3.) Select SHORT FOOT PRINT.
4.) Follow the on screen instructions.

5.) After the setting, verify that you can not move the cradle inward further from the set position, with the following conditions:

a.) The table is at the highest position.

b.) The table is at a lowest position where scanning is possible.

3.11 Interference Test

PREREQUISITES

- Be sure that the System State was restored from **DVD** per Section 2.0.
- Reset the hardware to download the new characterization values before performing the table/ gantry interference tests in this section.

CONFIGURATION

1.) Table flashed with latest SW
2.) Table must have elevation and cradle characterized
3.) Table must be mechanically aligned to gantry
4.) Table must have had the table-gantry characterization completed
5.) Verify the Table extender is installed.

TEST OUTLINE

The following tests verify the proper tilt and table interference matrix on the H-Power gantry.

- Verify Table Elevation – Section 3.11.1
- Position Tilt, Move Table to Interference Limit – Section 3.11.2.1
- Position Table, Move Tilt to Interference Limit – Section 3.11.2.2
- Tilt Limits When Table Below Scan Plane Lower Limit – Section 3.11.2.3

REQUIREMENTS

The following requirements are tested in this series of tests.

1.) No motion shall cause the table to hit the gantry (or gantry to hit the table)
2.) Requirement #1 shall include the use of the table extender.
3.) No tilt motion shall cause the gantry tilting frame to touch the stationary base covers for any tilt angle.

LIMITATIONS

These requirements will only be met when the table is NOT in service mode.

INTERPRETING TEST RESULTS

If test results indicate that elevation and/or tilt display readings fail to meet specifications, DO NOT adjust the limit switches. Instead, re-characterize and/or adjust tilt speed. Refer to Appendix C. Perform elevation and cradle first, then repeat the test. If it still fails, perform tilt.

3.11.1 Verify Table Elevation

Note: "V" means distance from table height to ISO.

#	TEST	EXPECTED RESULTS
3.11.1-1	Move the cradle to home position. Push the table down gantry push-button to lower the table to the minimum height.	Elevation Display should read 475.0 + V ± 3 mm
3.11.1-2	Push the table up gantry push button to raise the table to the maximum height. If the mechanical alignment of the table/gantry is not correct, as is often the case during manufacturing staging, this value may be out of range. Most of the following tests will still be valid: Those that might have some variation are indicated in **bold type**.	Elevation Display should read V ± 3 mm. **If mechanical alignment of the table/gantry is not correct, this value can be as low as 0 mm and as high as 40 mm**.

Table 5-5 H-Power Table Elevation Tests

#	TEST	EXPECTED RESULTS
3.11.1-1	Move the cradle to home position. Push the table down gantry push-button to lower the table to the minimum height.	Elevation Display should read 560.0 + V ± 3 mm
3.11.1-2	Raise the table to the maximum height using the gantry controls. If the mechanical alignment of the table/gantry is not correct, as is often the case during manufacturing staging, this value may be out of range. Most of the following tests will still be valid: Those that might have some variation are indicated in **bold type**.	Elevation Display should read V ± 3 mm. **If mechanical alignment of the table/gantry is not correct, this value can be as low as 0 mm and as high as 40 mm.**

Table 5-6 GT1700 Table Elevation Tests

3.11.2 Tests

3.11.2.1 Position Tilt, Move Table to Interference Limit

The following tests verify the table interference limits at different tilt locations.

Note:
- “I” means top of gantry tilts toward the table base
- “S” means top of gantry tilts away from the table base.
- "V" means distance from table height to ISO

Important: **For all tests, make sure there is 2.5 cm of clearance between the gantry and table. Also make sure that the Gantry Tilting frame covers do not touch the stationary base covers, for all tilt angles used in this test.**

#	TEST	EXPECTED RESULTS
3.11.2.1-1	Move cradle to home position and set internal landmark.	Cradle position on display should read 0.0
3.11.2.1-2	Raise table height to maximum height, set the internal landmark, move cradle into gantry 1m.	Table elevation on display should read V ± 3mm. **(This value will be the same as in 3.11.1-2 above.)** Cradle position on display should read 1000.0 mm.

Table 5-7 Position Tilt, Move Table to Interference Limit Tests

#	TEST	EXPECTED RESULTS
3.11.2.1-3	Tilt the gantry to I30.0, then lower table until motion stops.	Table elevation on display should read 100 ± 3mm. Tilt display should read I30.
3.11.2.1-4	Tilt the gantry to I23.0, then lower table until motion stops.	Table elevation on display should read 155 ± 3mm. Tilt display should read I23.
3.11.2.1-5	Tilt the gantry to I20.0, then lower table until motion stops.	Table elevation on display should read 170 ± 3mm. Tilt display should read I20.
3.11.2.1-6	Raise the table elevation to maximum height.	Table elevation on display should read V ± 3mm. **(This value will be the same as in 3.11.1-2 above.)**
3.11.2.1-7	Tilt the gantry to S30.0, then lower table until motion stops.	Table elevation on display should read 156 ± 3mm. Tilt display should read S30.
3.11.2.1-8	Tilt the gantry to S23.0, then lower table until motion stops.	Table elevation on display should read 182 ± 3mm. Tilt display should read S23.
3.11.2.1-9	Tilt the gantry to S20.0, then lower table until motion stops.	Table elevation on display should read 192 ± 3mm. Tilt display should read S20.
3.11.2.1-10	Raise the table to 154 mm.	Table elevation on display should read 154mm.
3.11.2.1-11	Tilt gantry to S30 and verify the table height can be adjusted from 154 to 25 mm. **(This value will be the same as in 3.11.1-2 above.)**	Tilt display should read S30. Table lower limit should be 154 ± 3mm. Upper table limit should be V ± 3 mm. **(This value will be the same as in 3.11.1-2 above.)**
3.11.2.1-12	Set the table height to 98 mm.	Table elevation on display should read 98mm.
3.11.2.1-13	Tilt gantry to I30 and verify the table height can be adjusted from 98 to 25 mm. **(This value will be the same as in 3.11.1-2 above.)**	Tilt display should read I30. Table lower limit should be 98 ± 3mm. Upper table limit should be V ± 3 mm. **(This value will be the same as in 3.11.1-2 above)**

Table 5-7 Position Tilt, Move Table to Interference Limit Tests

#	TEST	EXPECTED RESULTS
3.11.2.1-1	Move cradle to home position and set internal landmark.	Cradle position on display should read 0.0.
3.11.2.1-2	Raise table height to maximum height. Set the internal landmark, move cradle into gantry 1m.	Table elevation on display should read V ± 3mm. **(This value will be the same as in 3.11.1-2 in above.)** Cradle position on display should read 1000.0 mm.
3.11.2.1-3	Tilt the gantry to I30.0, then lower table until motion stops.	Table elevation on display should read 90.0 ± 3mm. Tilt display should read I30.
3.11.2.1-4	Tilt the gantry to I23.0, then lower table until motion stops.	Table elevation on display should read 146.0 ± 3mm. Tilt display should read I23.
3.11.2.1-5	Tilt the gantry to I20.0, then lower table until motion stops.	Table elevation on display should read 163.0 ± 3mm. Tilt display should read I20.

Table 5-8 Position Tilt, Move Table to Interference Limit Tests for GT1700 Table

#	TEST	EXPECTED RESULTS
3.11.2.1-6	Raise the table elevation to maximum height.	Table elevation on display should read V ± 3mm. **(This value will be the same as in 3.11.1-2 in above.)**
3.11.2.1-7	Tilt the gantry to S30.0, then lower table until motion stops.	Table elevation on display should read 146.5 ± 3mm. Tilt display should read S30.
3.11.2.1-8	Tilt the gantry to S23.0, then lower table until motion stops.	Table elevation on display should read 174.5 ± 3mm. Tilt display should read S23.
3.11.2.1-9	Tilt the gantry to S20.0, then lower table until motion stops.	Table elevation on display should read 184.0 ± 3mm. Tilt display should read S20.
3.11.2.1-10	Raise the table to 146 mm.	Table elevation on display should read 146 mm.
3.11.2.1-11	Tilt gantry to S30 and verify the table height can be adjusted from 146 to 25 mm. **(This value will be the same as in 3.11.1-2 in above.)**	Tilt display should read S30. Table lower limit should be 146 ± 3mm. Upper table limit should be V ± 3 mm. **(This value will be the same as in 3.11.1-2 in above.)**
3.11.2.1-12	Set the table height to 90 mm.	Table elevation on display should read 90 mm.
3.11.2.1-13	Tilt gantry to I30 and verify the table height can be adjusted from 90 to 25 mm. **(This value will be the same as in 3.11.1-2 in above.)**	Tilt display should read I30. Table lower limit should be 90 ± 3mm. Upper table limit should be V ± 3 mm. **(This value will be the same as in 3.11.1-2 in above)**

Table 5-8 Position Tilt, Move Table to Interference Limit Tests for GT1700 Table

3.11.2.2 Position Table, Move Tilt to Interference Limit

The following tests verify the tilt interference limits at different table heights.

Note:
- “I” means top of gantry tilts toward the table base
- “S” means top of gantry tilts away from the table base.
- "V" means distance from table height to ISO

Important: **For all tests, make sure there is 2.5 cm of clearance between the gantry and table.**

#	TEST	EXPECTED RESULTS
3.11.2.2-1	Move cradle to home position and set internal landmark. Set gantry tilt to zero.	Cradle position on display should read 0.0. Gantry tilt on display should read 0.0.
3.11.2.2-2	Raise table height to maximum height, set the internal landmark, move cradle into gantry 1m.	Table elevation on display should read V ± 3mm. **(This value will be the same as in 3.11.1-2 above.)** Cradle position on display should read 1000.0 mm.
3.11.2.2-3	Lower table until height is 115mm. Tilt the gantry top away from the table (“S”) until it stops.	Table elevation on display should read 115 mm. Tilt display should read S30 ±0.5º.
3.11.2.2-4	Tilt the gantry top toward the table (“I”) until it stops.	Table elevation on display should read 115 mm. Tilt display should read I28 ±0.5º.
3.11.2.2-5	Tilt the gantry to 0. Lower table until height is 200mm. Tilt the gantry top away from the table (“S”) until it stops.	Table elevation on display should read 200 mm. Tilt display should read S17 ±0.5º.

Table 5-9 Position Table, Move Tilt to Interference Limit Tests

#	TEST	EXPECTED RESULTS
3.11.2.2-6	Tilt the gantry top toward the table (“I”) until it stops.	Table elevation on display should read 200 mm. Tilt display should read I14.5 ±0.5º.
3.11.2.2-7	Tilt the gantry to 0. Lower table until height is 210 mm. Tilt the gantry top away from the table (“S”) until it stops.	Table elevation on display should read 210 mm. Tilt display should read S13.5 ±0.5º.
3.11.2.2-8	Tilt the gantry top toward the table (“I”) until it stops.	Table elevation on display should read 210 mm. Tilt display should read I12 ±0.5º.

Table 5-9 Position Table, Move Tilt to Interference Limit Tests

#	TEST	EXPECTED RESULTS
3.11.2.2-1	Move cradle to home position and set internal landmark. Set gantry tilt to zero.	Cradle position on display should read 0.0. Gantry tilt on display should read 0.0.
3.11.2.2-2	Raise table height to maximum height, set the internal landmark, move cradle into gantry 1m.	Table elevation on display should read V ± 3mm. **(This value will be the same as 3.11.1-2 in above.)** Cradle position on display should read 1000.0 mm.
3.11.2.2-3	Lower table until height is 115mm. Tilt the gantry top away from the table (“S”) until it stops.	Table elevation on display should read 115 mm. Tilt display should read S30 ±0.5º.
3.11.2.2-4	Tilt the gantry top toward the table (“I”) until it stops.	Table elevation on display should read 115 mm. Tilt display should read I27 ±0.5º.
3.11.2.2-5	Tilt the gantry to 0. Lower table until height is 200mm. Tilt the gantry top away from the table (“S”) until it stops.	Table elevation on display should read 200 mm. Tilt display should read S14.5 ±0.5º.
3.11.2.2-6	Tilt the gantry top toward the table (“I”) until it stops.	Table elevation on display should read 200 mm. Tilt display should read I13 ±0.5º.
3.11.2.2-7	Tilt the gantry to 0. Lower table until height is 210 mm. Tilt the gantry top away from the table (“S”) until it stops.	Table elevation on display should read 210 mm. Tilt display should read S10.5 ±0.5º.
3.11.2.2-8	Tilt the gantry top toward the table (“I”) until it stops.	Table elevation on display should read 210 mm. Tilt display should read I9.5 ±0.5º.

Table 5-10 Position Table, Move Tilt to Interference Limit Tests for GT1700 Table

3.11.2.3 Tilt Limits When Table Below Scan Plane Lower Limit

The following tests verify the table and tilt interference limits when the table height is below the scan plane.

Note:
- “I” means top of gantry tilts toward the table base
- “S” means top of gantry tilts away from the table base.
- "V" means distance from table height to ISO

Important: **For all tests, make sure there is 2.5 cm of clearance between the gantry and table.**

#	TEST	EXPECTED RESULTS
3.11.2.3-1	Set gantry tilt to zero. Move cradle to home position, lower the table all the way, and set the internal landmark.	Cradle position on display should read 0.0 Gantry tilt on display should read 0.0. Table height should read 475.0 +V ± 3 mm. **(This value will be the offset from 500 mm by the same amount as the upper table limit varies from 25 mm in 3.11.1-2 above.)**
3.11.2.3-2	Tilt the gantry forward and backwards and verify the following tilt limits: S3.5 and I30.	Gantry tilt on display should read S3.5 ± 0.5º. Gantry tilt on display should read I30.0 ± 0.5º.
3.11.2.3-3	Set Gantry tilt to 0. Then, using the gantry push-buttons, move the cradle in towards the gantry until it is stopped.	Gantry tilt on display should read 0.0. Cradle should stop at 45.0 mm ± 6 mm from the home position. **(This value will not be valid if the table/gantry mechanical characterization is not correct as described in 3.11.1-2 above. Insure that the front of the table is at least 25 mm from the gantry.)**
3.11.2.3-4	Set gantry tilt to zero. Move cradle to home position.	Cradle position on display should read 0.0 Gantry tilt on display should read 0.0.
3.11.2.3-5	Raise the table to a height of 386 mm and verify the following tilt limits: S5.0 and I30.0.	Table height should read 386 mm. Gantry tilt on display should read S5.0 ± 0.5º. Gantry tilt on display should read I30.0 ± 0.5º.
3.11.2.3-6	Set Gantry tilt to 0. Set the internal landmark. Then, using the gantry push-buttons, move the cradle in towards the gantry until it is stopped.	Gantry tilt on display should read 0.0. Cradle should stop at 59.0 mm ± 6 mm from the home position.
3.11.2.3-7	Set gantry tilt to zero. Move cradle to home position.	Cradle position on display should read 0.0. Gantry tilt on display should read 0.0.
3.11.2.3-8	Raise the table to a height of 242 mm and verify the following tilt limits: S12.0 and I30.0.	Table height should read 242 mm. Gantry tilt on display should read S12.0 ± 0.5º. Gantry tilt on display should read I30.0 ± 0.5º.
3.11.2.3-9	Set Gantry tilt to 0. Raise the table to 210 mm. Then, using the gantry push-buttons, move the cradle in towards the gantry until it is stopped.	Gantry tilt on display should read 0.0. Cradle should go all the way through the gantry bore to the full-extended position.
3.11.2.3-10	Set gantry tilt to zero. Move cradle to home position, lower the table all the way and set the internal landmark.	Cradle position on display should read 0.0 Gantry tilt on display should read 0.0. Table height should read 475.0 +V ± 3 mm. **(This value will be the offset from 500 mm by the same amount as the upper table limit varies from 25 mm in 3.11.1-2 above.)**
3.11.2.3-11	Tilt the gantry top toward the table to a tilt of 30 degrees	Display should read I30.
3.11.2.3-12	With the table down all the way, move the cradle in until it stops.	Cradle position should be 359.0 ±3 mm.

Table 5-11 Tilt Limits When Table Below Scan Plane Lower Limit Tests

#	TEST	EXPECTED RESULTS
3.11.2.3-13	Move the table to the home position, raise the table to a height of 386 mm, set the internal landmark, and then move the cradle in until it stops.	Cradle position should be 330 ±50 mm.
3.11.2.3-14	Raise the table to a height of 98 mm, then move the cradle in.	Cradle should go all the way through the gantry bore to the full-extended position.

Table 5-11 Tilt Limits When Table Below Scan Plane Lower Limit Tests

#	TEST	EXPECTED RESULTS
3.11.2.3-1	Set gantry tilt to zero. Move cradle to home position, lower the table all the way, and set the internal landmark.	Cradle position on display should read 0.0 Gantry tilt on display should read 0.0. Table height should read 560.0 +V ± 3 mm.
3.11.2.3-2	Tilt the gantry forward and backwards and verify the following tilt limits:0.0 and I30.	Gantry tilt on display should read 0.0 ± 0.5º. Gantry tilt on display should read I30.0 ± 0.5º.
3.11.2.3-3	Set Gantry tilt to 0. Then, using the gantry push-buttons, move the cradle in towards the gantry until it is stopped.	Gantry tilt on display should read 0.0. Cradle should stop at 3.0 mm ± 6 mm from the home position.
3.11.2.3-4	Set gantry tilt to zero. Move cradle to home position.	Cradle position on display should read 0.0 Gantry tilt on display should read 0.0.
3.11.2.3-5	Raise the table to a height of 386 mm and verify the following tilt limits: S1.5 and I30.0.	Table height should read 386 mm. Gantry tilt on display should read S1.5 ± 0.5º. Gantry tilt on display should read I30.0 ± 0.5º.
3.11.2.3-6	Set Gantry tilt to 0. Set the internal landmark. Then, using the gantry push-buttons, move the cradle (and IMS) in towards the gantry until it is stopped.	Gantry tilt on display should read 0.0. Cradle should stop at 19.0 mm ± 6 mm from the home position.
3.11.2.3-7	Set gantry tilt to zero. Move cradle to home position.	Cradle position on display should read 0.0. Gantry tilt on display should read 0.0.
3.11.2.3-8	Raise the table to a height of 242 mm and verify the following tilt limits: S11.5 and I30.0.	Table height should read 242 mm. Gantry tilt on display should read S11.5 ± 0.5º. Gantry tilt on display should read I30.0 ± 0.5º.
3.11.2.3-9	Set Gantry tilt to 0. Raise the table to 210 mm. Then, using the gantry push-buttons, move the cradle in towards the gantry until it is stopped.	Gantry tilt on display should read 0.0. Cradle should go all the way through the gantry bore to the full-extended position.
3.11.2.3-10	Set gantry tilt to zero. Move cradle (and IMS) to home position, lower the table all the way and set the internal landmark.	Cradle position on display should read 0.0 Gantry tilt on display should read 0.0. Table height should read 560.0 ± 3 mm.
3.11.2.3-11	Tilt the gantry top toward the table to a tilt of 30 degrees	Display should read I30.
3.11.2.3-12	With the table down all the way, move the cradle in until it stops.	Cradle position should be 340.0 ±3 mm.

Table 5-12 Tilt Limits When Table Below Scan Plane Lower Limit Tests for GT1700 Table

#	TEST	EXPECTED RESULTS
3.11.2.3-13	Move the table to the home position, raise the table to a height of 386 mm, set the internal landmark, and then move the cradle in until it stops.	Cradle position should be 306 ±50 mm.
3.11.2.3-14	Raise the table to a height of 90 mm, then move the cradle in.	Cradle should go all the way through the gantry bore to the full-extended position.

Table 5-12 Tilt Limits When Table Below Scan Plane Lower Limit Tests for GT1700

Chapter 6
Image Quality

CAUTION **Shock Hazard.**
Voltage Present.
No service on left side while energized.

NOTICE **To prevent potential data loss, please do the following:**

- **When instructed, record data collected from the procedures in this chapter on GE Form e4879. For more information about this form, see Section 8.0 of Chapter 4.**
- **Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.**

Section 1.0
Introduction

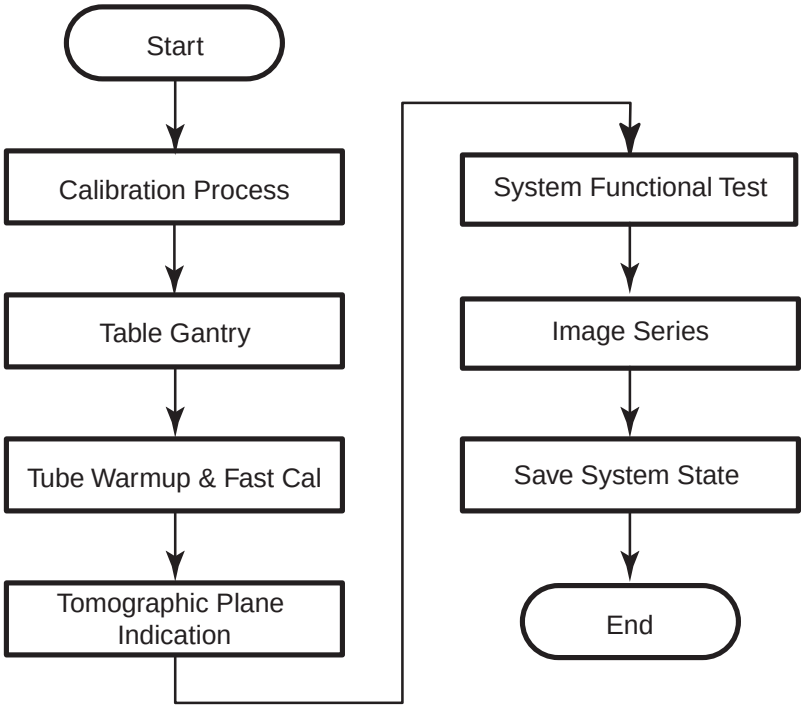


Figure 6- 1 System Test Overview

Section 2.0
Calibration Process

2.1 Reference Procedures

Do not perform these procedures (Scanning with Service Protocols or Center Phantom) until instructed to do so in other sections of this chapter.

2.1.1 Scanning with Service Protocols

Locate the Manufacturing and Installation protocols under Infant area 20.

Note: **Manufacturing and Service share this Protocol list. Different product option offerings also use this list. Carefully follow the scan section instructions, and verify you acquired the images with the correct technique before filling out the data sheet. Otherwise you may troubleshoot an image problem that only exists because you used the wrong technique.**

1.) Select the NEW PATIENT icon on the left monitor
2.) Enter a Patient ID (e.g., **`getest`**).
3.) Click on the box labeled PEDIATRIC.
4.) Select a service protocol from the list, to display the corresponding view edit screen.
Optional Method: Enter the protocol number into the `Protocol Number Field` on the Exam Rx Screen.

2.1.2 Center Phantom

1.) Select SCANNER UTILITIES icon on the left monitor
2.) Select CENTER PHANTOM.
3.) Follow the on-screen procedures.
4.) The phantom center spec is ±.5mm.
5.) Select QUIT, when the phantom is within specification.
6.) Level the phantom both front to back and side to side. (use a 6" level)

2.2 Prepare the QA Phantom

Note: **The QA phantom is shipped water filled.**

1.) Locate the multi-language sticker packet in the QA phantom shipping box.
2.) Attach the sticker with the customer's language to the face of the phantom hanger bracket.

2.3 Calibration Process Introduction

If your system has a factory supplied state DVD-RAM/MOD, you used it to load the system calibration files during the Restore System State (Section 2.3, on page 292 of this manual).

Section 3.0
Table/Gantry Alignment Procedure

3.1 Time & Personnel

Required Persons	Preliminary Reqs	Procedure	Finalization
2 (FE or mechanical supplier)		45 minutes labor on-site	

3.2 Tools and Test Equipment

- 1 mm wire

3.3 Preparation

- All table mechanical alignment procedures completed.
- The table perpendicular alignment test passed.
- Table anchors are in place and within specification.
- The table is level in all directions.

3.4 Procedure

TABLE GANTRY PREP

1.) Check that the table cradle is level in all directions. Correct, if necessary.
2.) Drive the table to its highest elevation ISO with the phantom holder removed.
3.) Check the scan window for proper installation.

VERIFY TABLE DRIVE CONSISTENCY

4.) Drive the table cradle in and out five times to seat the rollers.

CRADLE SETUP

5.) Turn on the alignment lights.
6.) Advance the end of the cradle to the black dot on cradle.
7.) Tape a 100 mm section of 1 mm wire on the cradle that aligns with the white cradle center line.
8.) Using the gantry keypad, set an internal landmark, and then advance the cradle 1000 mm.
9.) Tape second 100 mm section of 1 mm wire on the cradle that aligns with the alignment light.

SCANNING SETUP

10.) From the application screen Select *NEW PATIENT*.
    a.) Fill out patient ID: `GE Test`
    b.) Name: `Alignment`
11.) From the Protocol screen:
    a.) Select *SERVICE*,

b.) Select *IMAGE QUALITY*,

c.) Select *PERPENDICULAR ALIGNMENT*.

12.) The red boxes should disappear from the screen. If not, reset an internal landmark.

13.) Select *CONFIRM*, then press the START SCAN button when lighted.

IMAGE REVIEW

14.) On the Service screen, select *IMAGE WORKS*

a.) Locate the scanned examination in the Examinations column.

b.) Highlight the `Alignment` scans

c.) Select *VIEWER*.

d.) Select *FORMAT*, and select the two-in-one format horizontal display view.

15.) Click on image 1 and select the grid. With the grid and image displayed, visually compare image 1 to image 2.

- For close inspection, you may need to use the zoom function to see a difference.
- Visually compare image 1 and image 2 to verify the centering wire appears in the center of the grid. As shown on the screen, the wire is 1 mm. Use the measure tool to determine the alignment difference. Move the table until both are within ± 2 mm of center.

MOVING THE TABLE

16.) The adjustment is likely to require a very small movement. Use a suitable tool to move the table the required distance.

17.) Rescan to confirm each movement trial. This can take a few trials to move the table to a position that is within the specification.

18.) The plastic accessory edges of the cradle are installed to allow cradle accessories to be used. These edges, although visible, should not be used to determine cradle center. Edge-to-edge difference can be greater than the alignment specification.

19.) Repeat above steps until both images are visually aligned on the screen.

FINALIZATION

20.) Use a calibrated torque wrench to tighten the anchors to 75 ± 6 N-m (55 ± 5 ft.-lb.). Confirm that the torqued anchor still meets the anchor installation specifications:

a.) Maintain 1 full thread of adjustor showing above the lock ring or table base plate.

b.) Have not more than 1 in. of anchor showing above the nut. Do not cut off any access.

c.) Using a permanent marker, draw a line on the nut and base. Use this line to determine whether the anchor loosened over time.

21.) Reinstall all table components removed to access the anchors.

Section 4.0
Tube Warm Up and Fast Cal

1.) Select 

to warm up the tube.

2.) Select FAST CALIBRATION from the Daily Prep menu.

Note: **Use the default Fast Cal selections determined by the system configuration. (The system defaults to all four kV stations, but you can choose kV stations to calibrate during reconfig.)**

3.) Run the selected air calibrations.

4.) When the calibration process completes, click on QUIT.

Section 5.0
Tomographic Plane Indication

1.) Place the QA phantom on the phantom holder.

2.) Center the Phantom (refer to procedure Section 2.1.2, on page 334)

3.) Turn ON the internal alignment lights, and drive the phantom into the gantry opening, until the line on the phantom lines up with the internal laser lights.

4.) Verify that BOTH internal axial lasers line up along the line on the QA phantom. If not, check table/gantry, cradle, and/or laser alignment.

5.) Center the phantom in the scan plane with the calibration program. (See Section 2.1.2, on page 334 for details on the phantom centering procedure.)

6.) Select the service protocol TOMO PLANE INDICATION. (See Section 2.1.1, on page 334 for details on scanning with service protocols.)

or

Manually select the scan parameters in Table 6-1.

Scan Type	kV	mA	SFOV	Thickness	Scan Time	Start Loc.	End Loc.	Algorithm	Interval
Helical	120	200	Small	1.25HQ	1.0sec	I3.0	S3.0	Bone detail	0.2

Table 6-1 Tomographic Plane Indication Scan Parameters

7.) Display the image series, and locate the scan plane indicator, the longest bar in the bar pattern on the right side of the phantom. The right side of the phantom corresponds to the side of the image labeled **L** on the display screen.

8.) On the HHS Data Sheet, record the scan location (shown on the image annotation) of the image with the darkest scan plane indicator (darkest long bar).

9.) If your system meets all the installation and alignment specifications, the image at scan location zero (S0.0) should contain the scan plane indicator. If scan location S1.0 or scan location I1.0 has the darkest bar, the system still meets the specification. The scan plane deviation should equal S0.0 ±1.0mm. If necessary, adjust the internal alignment light position to meet the S0.0 ±1.0mm requirement.

10.) Repeat the Tomographic Plane Indication test with the external alignment lights.
   a.) Use the external alignment light, and press the external landmark.
   b.) Verify the external light lines up along the black line on BOTH the left and right sides of the QA phantom.
   c.) The scan plane indication must fall within the S0.0 ±1.0mm specification.
11.) Initial below.

Section 6.0
Image Series

IMPORTANT: **Run ALL Image Series Tests in Auto Mode. Manual procedures are provided in this section as REFERENCE ONLY.**

6.1 Scan Protocol

The person who acquires the image series has the responsibility to review the images and verify they meet the specifications listed on data sheets. Responsibilities also include means and standard deviation measurements and keeping a record of failures that occur during the image series.

Unless otherwise stated, use the following scan parameters during the image series acquisition:

- Scan FOV equal to display FOV (Field of View)
- 512x512 matrix size

Note: **Consider *any* image series scan that does not meet specifications as failing.**

For means and standard deviations, 90% of the slices must pass. Any failure on a particular technique requires at least ten additional slices to evaluate effectively.

Systems with metal-free cradles have a phantom holder with a perpendicular adjustment (Z-axis) knob on it. **Each time you change phantoms,** make sure you use a bubble level, and the Z-axis knob on the phantom holder, to level the phantom.

6.2 Data Recording: Means and Standard Deviation

Any failure on a particular technique requires at least a ten additional slices to evaluate effectively. For means and standard deviations, 90% of the slices must pass.

- Record means to two decimal places, and round to the nearest one-tenth, (one decimal place) when you compare the resulting values to the spec.
- Record standard deviations to two decimal places, then round off to one decimal place, to compare it to the spec.
- Average standard deviations: Use two decimal places to average the values, then round off to one place.

Before you record the means and standard deviations, check the image data sheets to determine whether to average the means and standard deviations, or record them slice by slice. Make sure you record all the required image data on the HHS data sheets.

6.3 Term Definitions and Screens

Xc - Mean CT number for the specified center coordinates of the phantom image.

AvXc - Average Mean CT number for the center of the phantom image: Average the mean CT value for all specified center coordinates of all slices in an exam.

Xo - Mean CT number for the outside of the phantom image: Average the mean CT value for all specified outside coordinates of one slice.

AvXo - Average outside mean CT number for the number of slices in an exam.

AvSDc - Average image noise about the center image coordinate (measured as the standard deviation) of all slices in an exam.

AvSDo - Average image noise (standard deviation) for the outside of a phantom: Average of all outside coordinates of all the slices in an exam.

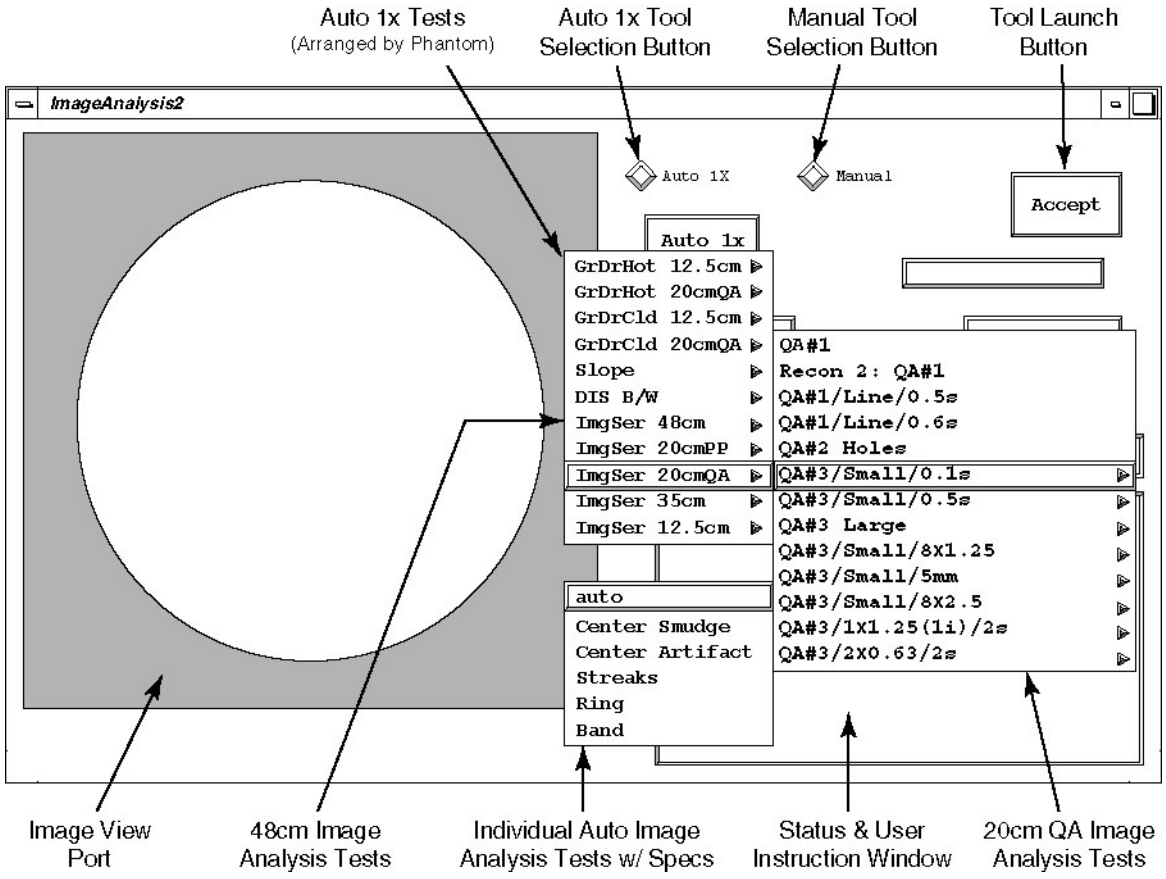


Figure 6- 2 Image Analysis Tool User Interface - Auto 1x Test Pull Down Menu

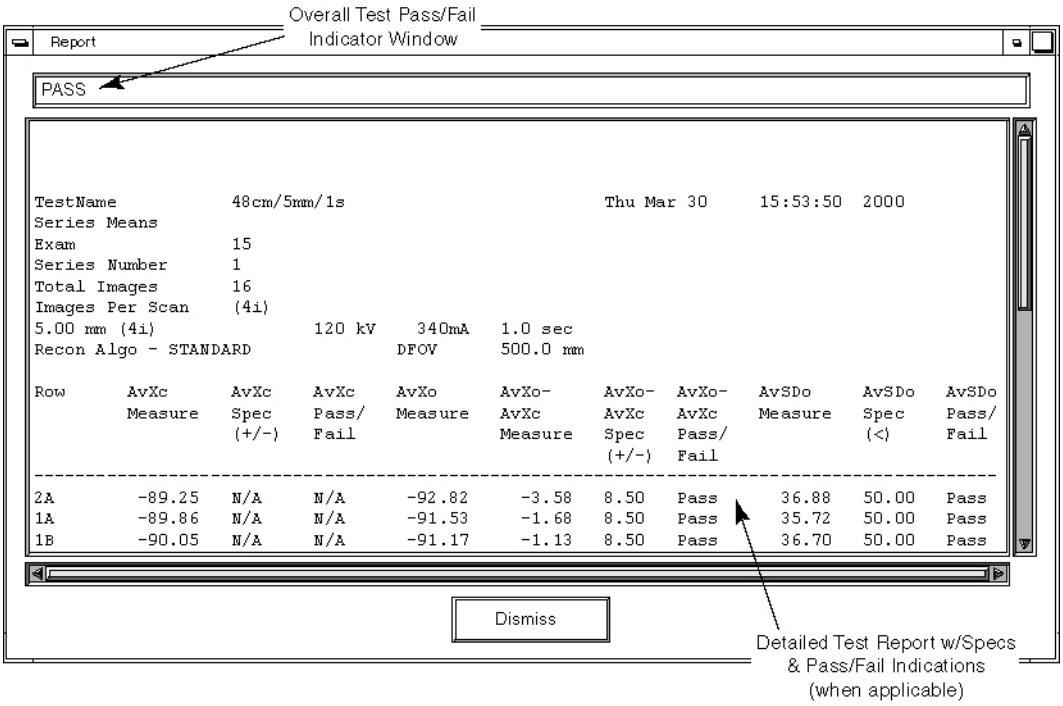


Figure 6- 3 Image Analysis Tool User Interface - Test Results Report Window

6.4 48cm Phantom Image Series Image Performance Verification

6.4.1 Acquiring the 48cm Phantom Image Series

1.) Mount the Phantom Holder on the head-end of the table.
2.) Mount the 48cm Phantom on the Phantom Holder.
3.) Align, level, & center the 48cm Phantom.
- Align phantom using the internal laser lights.
- Level phantom using bubble level and the Z Axis knob on the Phantom Holder.
- Center phantom using the CENTER PHANTOM procedure in the left head SCANNER UTILITIES selection and the X and Y Axis knobs on the Phantom Holder.

4.) Set up the system to scan a single, 64 image, 48cm Phantom series.

MANUAL SCAN PROTOCOL SETUP

Refer to Table 6-2 to manually set-up an Axial scan with the parameters shown.

Note: These parameters may differ from those found using the Auto Scan Protocol Setup below.

System	Series Description	Scan Type	Start Loc.	End Loc.	Total # of Images	Thick Speed	Interval (mm)	Gantry Tilt	SFOV	kV	mA	Total Exposure Time	DFOV (cm)	Recon Type
16 Slice	48 16x1.25/120kV /400mA/2s	Axial Full 2.0 sec	I9.375	S9.375	64	1.2516i	0.00	S0.0	Large	120	400	8.0 sec.	50.0	Std

Table 6-2 48cm Phantom Image Series Scan Parameters

System	Series Description	Scan Type	Start Loc.	End Loc.	Total # of Images	Thick Speed	Interval (mm)	Gantry Tilt	SFOV	kV	mA	Total Exposure Time	DFOV (cm)	Recon Type
4/8 Slice	48 Lg Series 1	Axial Full 1.0 sec.	I7.50	S7.50	16	5.0 4i	0.00	S0.0	Large	120	340	4.0 sec.	50.0	Std

Table 6-2 48cm Phantom Image Series Scan Parameters

AUTO SCAN PROTOCOL SETUP

a.) On the Exam Rx desktop, select NEW PATIENT.

b.) Type the following entries in the two listed `Patient Information` fields:

* `Patient ID:` **`Service`**
* `Name:` **`48cm Phantom Image Series`**

c.) From the Protocol Selection display, click on the Service Tab under Anatomical Selector.

d.) On the Service Protocol Selection window, click on MANUFACTURING.

e.) On the Service Category Protocol List, click on IMGSER 48CM.

f.) ***16 Slice***
On the ExamRx protocol parameter display, skip to the 3rd Series.
(`Series Description: 48 16x1.25/120kV/400mA/2s`)
***4/8 Slice*:**
On the ExamRx protocol parameter display, skip to the 2nd Series.

g.) Set internal Landmark.

5.) Acquire a single, 64 image, 4 scan, image series of the 48 cm Phantom.

6.4.2 Image Performance Verification

6.4.2.1 Series Means (AvXo-AvXc and AvSDo) & Center Smudge

1.) Launch the Image Analysis Tool.

a.) From the Global Control Palette, click on the Service Desktop.

b.) From the Service Desktop upper navigational bar, click on the IMAGE QUALITY icon.

c.) In the left navigational area directory, click on IMAGE ANALYSIS.

Note: During the Image Analysis process, you will need to switch between the Service Browser screen (to select the image series to analyze) and the Image Analysis screen (to run a particular Auto 1x analysis test). Use **ALT/F1** to bring a window to the front. Use **ALT/F3** to send a window to the back.

2.) Using the AUTO 1X Tool on the Image Analysis screen, generate a Series Means and Center Smudge report for the 1st series of the 48cm Phantom acquisition.

a.) From the Service Browser window, select the 48cm Phantom series acquired in Section 6.4.1.

b.) On the Image Analysis Tool window, click on the AUTO 1X diamond shaped button. (See Figure 6- 2, on page 339.)

c.) Click on the AUTO 1X rectangular button, select the IMGSER 48CM test from the pull-down menu, slide cursor to the right and select 16X1.25/120KV/400MA/2S (**16 Slice**) or 48CM/5MM/0.8S (**4/8 Slice**) from the test pull-down menu, and continue to slide cursor to the right to select AUTO.

d.) Click on the ACCEPT button.

3.) Review the Image Analysis Report data and record the Series Means (AvXo-AvXc, and AvSDc) data and the Center Smudge data for each row in Table 6-3 (**16 Slice**) or Table 6-4 (**4/8 Slice**).

a.) Verify the Overall Test Pass/Fail Indicator Window of the Report display indicates PASS. (See Table 6-2.)

b.) Verify the scan parameter values displayed in the report match those in Table 6-2.

c.) Record the Series Means (AvXo-AvXc, and AvSDo) data and the Center Smudge data for each row in Table 6-3 (**16 Slice**), or Table 6-4 (**4/8 Slice**).

6.4.2.2 Band and Streak Artifact

1.) Review the 48cm Phantom images acquired in Section 6.4.1 for Bands and Streaks using the Image Works Desktop.

a.) From the Global Control Palette, click on the IMAGE WORKS Desktop.

b.) From the Image Works Browser window, select the 48cm Phantom series acquired in Section 6.4.1.

c.) From the Image Works Browser window, click on the VIEWER button.

d.) While paging through the 64 images in the series, analyze images for any Band or Streak artifacts. Adjust Window/Level using the center mouse button, as required.

e.) Note any image that appears to have a Band or Streak artifact.

2.) Verify any images noted above (step 1e) meet 48cm Phantom Band or Streak Image Performance requirements.

a.) From the Global Control Palette, click on the Service Desktop.

b.) From the Service Browser window, select an image of the 48cm Phantom series acquired in Section 6.4.1 that appeared to have a Band or Streak while reviewing the series in Image Works.

c.) On the Image Analysis Tool window, click on the AUTO 1X rectangular button, select the IMGSER 48CM test from the pull-down menu, slide cursor to the right and select 16X1.25/120KV/400MA/2S (**16 Slice**) or 48CM/5MM/0.8S (**4/8 Slice**) from the test pull-down menu, and continue to slide cursor to the right to select BAND or STREAK.

d.) Click on the ACCEPT button.

Note: If required, adjust Window/Level using the center mouse button.

e.) Position and size the Band or Streak ROI using the left cursor button.

Note: To ensure specifications are properly applied, do not adjust the Reference ROI's for the Band and Streak artifact tests. The Reference ROI's are adjustable after the 1st Accept Modification click.

f.) Click on ACCEPT MODIFICATION twice, to generate a report.

g.) Verify the Overall Test Pass/Fail Indicator Window of the Report display indicates PASS.

h.) Repeat steps b through g, for each image noted in Step 1e.

Box Size =1600 mm2 to 2500 mm2
45 mm (+/- 5 mm) x 45 mm (+/- 5 mm)
45 (+/- 4 pixels) x 45 (+/- 4 pixels)

Box Positions:Box 1= 0 mm x 0 mm
Box 2 = 0 mm x -190 mm
Box 3 = 190 mm x 0 mm
Box 4 = 0 mm x 190 mm
Box 5 = -190 mm x 0 mm

Row	Images	Brightness Uniformity (AvXo - AvXc)	Noise (AvSDo)	Center Smudge Row Values	Comments
8A	1, 17, 33, 49				
7A	2, 18, 34, 50				
6A	3, 19, 35, 51				
5A	4, 20, 36, 52				
4A	5, 21, 37, 53				
3A	6, 22, 38, 54				
2A	7, 23, 39, 55				
1A	8, 24, 40, 56				
1B	9, 25, 41, 57				
2B	10, 26, 42, 58				
3B	11, 27, 43, 59				
4B	12, 28, 44, 60				
5B	13, 29, 45, 61				
6B	14, 30, 46, 62				
7B	15, 31, 47, 63				
8B	16, 32, 48, 64				
Specifications		< +/- 17	< 50	< +/- 14	

Table 6-3 48cm Phantom CT# Brightness Uniformity, Noise & Center Smudge Row Performance Data Sheet (16 Slice)

Row	Images	Brightness Uniformity (AvXo - AvXc)	Noise (AvSDo)	Center Smudge Row Values	Comments
2A	1, 5, 9, 13				
1A	2, 6, 10, 14				
1B	3, 7, 11, 15				
2B	4, 8, 12, 16				
Specifications		< +/- 17 for 8 slice < +/- 8.5 for 4 slice	< 70	< +/- 14	

Table 6-4 48cm Phantom CT# Brightness Uniformity, Noise & Center Smudge Row Performance Data Sheet (4/8 Slice)

6.4.3 Failure Recommended Actions

6.4.3.1 Series Means (AvXo - AvXc or AvSDo) Failure Recovery

Specifications

Each Row of the series must pass 48cm Series Means (for the first series scan parameters) specifications:

- AvXo - AvXc: < +/- 17 for 16/8 slice system; < +/- 8.5 for 4 slice system
- AvSDo: < 50.0 (16 Slice)
  < 70.0 (4/8 Slice)

Recommended Recovery

1.) Repeat Detailed Cal for the 48cm Phantom.
2.) Repeat Sections 6.4.1 & 6.4.2, to verify Image Performance.

6.4.3.2 Center Smudge Failure Recovery

Specifications

80% the Rows must pass Center Smudge specifications when re-scanning:
Center Smudge:Smudge Factor < +/- 14.0

Recommended Recovery

1.) If one image of one Row fails (Row fails once):
   - Re-scan the 48cm Phantom acquiring two series of 64 images using the same protocol settings as listed in Table 6-2.
   - Analyze the two 64 re-scanned image series using the Image Analysis IMGSER 48CM -> 16X1.25/120KV/400MA (**16 Slice**) or 48CM/5MM/0.8S (**4/8 Slice**) -> AUTO tool.
   - Verify that all the 128 re-scanned images do not fail Series Means (AvXo - AvXc and AvSDo) or Center Smudge.
2.) If more than one image of one Row fails (Row fails more than once) or multiple rows are failing:
   - Repeat Detailed Cal for the 48cm Phantom.
   - Re-scan the 48cm Phantom acquiring three series of 64 images using the same protocol settings as listed in Table 6-2.
   - Analyze the three re-scanned image series using the Image Analysis IMGSER 48CM -> 16X1.25/120KV/400MA (**16 Slice**) or 48CM/5MM/0.8S (**4/8 Slice**) -> AUTO tool.
   - Verify that all the 192 re-scanned images do not fail Series Means (AvXo - AvXc and AvSDo) or Center Smudge.

6.4.3.3 Band or Streak Artifact Failure Recovery

Specifications

- Band Artifact: Band Factor< +/- 8.0
- Streak Artifact: Streak Factor< +/- 4.0

Recommended Recovery

1.) Troubleshoot Band or Streak artifact failures, as described in the *System Service Manual*.
2.) Repeat Detailed Cal for the 48cm Phantom.
3.) Repeat Sections 6.4.1 & 6.4.2, to verify Image Performance.

6.5 20cm QA Phantom Image Series Image Performance Verification

6.5.1 Acquiring the 20cm QA Phantom Image Series

1.) Mount the Phantom Holder on the head-end of the table.
2.) Mount the 20cm QA Phantom on the Phantom Holder.
3.) Align, level, & center the 20cm QA Phantom.
   - Align black line on phantom using the internal laser lights.
   - Level phantom using bubble level and the Z Axis knob on the Phantom Holder.
   - Center phantom using the CENTER PHANTOM procedure in the left head SCANNER UTILITIES selection and the X and Y Axis knobs on the Phantom Holder.
4.) Set up the system to scan three 20cm QA Phantom image series with a Recon of the 1st series.
   a.) On the Exam Rx desktop, select NEW PATIENT.
   b.) Type the following entries in the listed `Patient Information` following fields:
      * `Patient ID`:**`Service`**
      * `Name`: **`20cm QA Phantom Image Series`**
   c.) From the Protocol Selection display, click on the Service Tab under Anatomical Selector.
   d.) On the Service Protocol Selection window, click on MANUFACTURING.
   e.) On the Service Category Protocol List, click on the appropriate Image Series selection as follows:

System	Protocol - First	Protocol - Second
BrightSpeed	ImgSer 20cmQA	(none)

   f.) On the ExamRx protocol parameter display, select the 1st Series.
   g.) Set internal Landmark.

5.) Acquire the 1st 20cm QA Phantom image series and ***2nd Recon series*** (MTF and Contrast, Visible Lines) by performing the 1st series protocol scan, the series name as "QA1 MTF 2x10/ 120kV/260mA/1s". The ***2nd Recon series*** is generated from QA1 MTF 2x10/120kV/260mA/1s automatically.

6.) Acquire the 3rd 20cm QA Phantom image series by performing the 4th series protocol scan, the series name as "QA2 Ho 2x10/120kV/260mA/1s".

7.) Acquire the 4th 20cm QA Phantom image series by performing the 5th series protocol scan, the series name as "QA3 Sm 2x10/120kV/260mA/1s".

20cm QA Phantom image series acquired are as following:

Acquired 20cm QA Phantom Image Series	1st 20cm QA Phantom image series	***2nd Recon series****	3rd 20cm QA Phantom image series	4th 20cm QA Phantom image series
Series Name	QA1 MTF 2x10/ 120kV/260mA/1s (1st series protocol scan)		QA2 Ho 2x10/ 120kV/260mA/1s (4th series protocol scan)	QA3 Sm 2x10/ 120kV/260mA/1s (5th series protocol scan)
* Note: ***2nd Recon series*** is generated from QA1 MTF 2x10/120kV/260mA/1s automatically				

6.5.2 20cm QA Phantom Image Series Image Performance Verification

1st QA Phantom Image Series (4 Image MTF Average and Contrast Scale) Image Performance Verification

1.) Launch the Image Analysis Tool.

a.) From the Global Control Palette, click on the Service Desktop.

b.) From the Service Desktop upper navigational bar, click on IMAGE QUALITY TESTS.

c.) In the left navigational area directory, click on IMAGE ANALYSIS.

Note: During the Image Analysis process, you will need to switch between the Service Browser screen (to select the image series to analyze) and the Image Analysis screen (to run a particular Auto 1x analysis test). Use **ALT/F1** to bring a window to the front. Use **ALT/F3** to send a window to the back.

2.) Using the Auto 1x Tool on the Image Analysis screen, generate a QA#1 MTF and QA#1 Contrast Scale report for the 1st series of the 20cm QA Phantom acquisition.

a.) From the Service Browser window, select the 1st series of the 20cm QA Phantom series acquired in section 6.5.1.

b.) On the Image Analysis Tool window, click on the AUTO 1X diamond shaped button. (See Figure 6- 2, on page 339.)

c.) Click on the AUTO 1X rectangular button, select the IMGSER 20CMQA test from the pull-down menu, slide cursor to the right to select QA1 MTF 2X10/120KV/260MA/1S from the test pull-down menu.

d.) Click on the ACCEPT button.

3.) Review the Image Analysis Report data and record the Per Image MTF, 4 Image MTF Average, and Per Image Contrast Scale data for each row in Table 10-7.

a.) Verify the Overall Test Pass/Fail Indicator Window of the Report display indicates PASS. (See Figure 6- 3, on page 340.)

b.) Verify the scan parameter values displayed in the report match those in Table 6-6.

c.) Record Per Image MTF and Per Image Contrast Scale data for each image in Table 6-6.

Image	MTF	MTF 4-slice average	Contrast Scale	Comments
1		N.A.		
2		N.A.		
3		N.A.		
4		N.A.		
Specifications	N.A.	0.65 to 1.0	110.0 to 130.0	N.A.

Table 6-5 20cm QA#1 Phantom High Contrast Spatial Resolution Image Performance (MTF and Contrast Scale)

***2nd Recon series* (4 Bone Retro Image Visible Lines) Image Perf. Verification**

1.) Using the Auto 1x Tool on the Image Analysis screen, generate a Per Image QA#1 Lines report for ***2nd Recon series*** acquisition.

a.) From the Service Browser window, select the 1st image of ***2nd Recon series*** acquired in section 6.5.1 (on page 345).

b.) Click on the AUTO 1X rectangular button, select the IMGSER 20CMQA test from the pull-down menu, and slide cursor to the right to select RECON 2.

c.) Click on the ACCEPT button. The tool displays a Visible Lines pop-up window.

d.) On the Visible Lines pop-up window, click on the VISIBLE LINE button.

Note: The Image Analysis Tool automatically sets the Window/Level for optimal viewing. If required, adjust Window/Level using the center mouse button.

e.) From the Visible Line pull-down menu, select the letter (A through F) that matches the smallest line pair pattern that you can discern in the Image View Port.

f.) On the Visible Lines pop-up window, click on the OK button.

2.) Review the Image Analysis Report data and record the Per Image QA#1 Visible Lines data for the 1st image in Table 6-6.

a.) Verify the Overall Test Pass/Fail Indicator Window of the Report display indicates PASS. (Refer to Figure 6- 3, on page 340.)

b.) Verify the scan parameter values displayed in the report match those in Table 6-7 (on page 348) for ***2nd Recon series***.

c.) Record the Per Image QA#1 Visible Lines data for the 1st image in Table 6-6.

3.) Repeat Steps 1 and 2, for each of the remaining three images in ***2nd Recon series***.

Image	Line Patterns Visible	Comments
1		
2		
3		
4		
Specifications	B, C, D, E, F	N.A.

Table 6-6 20cm QA#1 Phantom High Contrast Spatial Resolution Image Performance (Visible Lines)

3rd QA Phantom Image Series (4 Image Visible Holes) Image Performance Verification

1.) Using the Auto 1x Tool on the Image Analysis screen, generate a Per Image QA#2 Holes

report for the 3rd series of the 20cm QA Phantom acquisition.

a.) From the Service Browser window, select the 1st image of the 3rd series of the 20cm QA Phantom series acquired in section 6.5.1.

b.) Click on the AUTO 1X rectangular button, select IMGSER 20CMQA from the pull-down menu, and slide cursor to the right to select QA2 HO 2X10/120KV/260MA/1S.

c.) Click on the ACCEPT button. The tool displays a Visible Hole pop-up window.

d.) On the Visible Hole pop-up window, click on the VISIBLE HOLE button.

Note: The Image Analysis Tool automatically sets the Window/Level for optimal viewing. If required, adjust Window/Level using the center mouse button.

e.) From the Visible Hole pull-down menu, select the number (1 through 5) that matches the smallest hole that you can discern in the pattern centered in the image displayed in the Image View Port.

f.) On the Visible Hole pop-up window, click on the OK button.

2.) Review the Image Analysis Report data and record the Per Image QA#2 Visible Holes data for the 1st image in Table 6-7.

a.) Verify the Overall Test Pass/Fail Indicator Window of the Report display indicates PASS. (Refer to Figure 6- 3, on page 340.)

b.) Record the Per Image QA#2 Visible Holes data for the 1st image in Table 6-7.

3.) Repeat Steps 1 and 2 for the 3rd, 5th, and 7th images in the 3rd 20cm QA Image Series.

Image	Visible Holes Viewable at Window 20	Contrast Factor	Comments
1			
3			
5			
7			
Specifications	See Table 6-9	2.0 to 12.0	N.A.

Table 6-7 20cm QA#2 Phantom Low Contrast Detectability Image Performance (Visible Holes)

Contrast Factor Range (Box 1 Means - Box 2 Means)	Visible Number of Holes		Smallest Visible Hole Size
	Lower Limit *	Upper Limit *	
2.00 to 3.99	2	5	7.5 mm
4.00 to 7.99	3	5	5.0 mm
8.00 to 12.00	4	5	3.0 mm
* Required Number of Visible Holes depends on the Contrast Factor			

Table 6-8 20cm QA#2 Phantom Visible Hole Specifications

4th QA Phantom Image Series (QA#3 Small) Image Performance Verification

1.) Using the Auto 1x Tool on the Image Analysis screen, generate a QA#3 Small report for the 4th series of the 20cm QA Phantom acquisition.

a.) From the Service Browser window, select the 4th series of the 20cm QA Phantom series acquired in section 6.5.1 (on page 345).

b.) Click on the AUTO 1X rectangular button, select IMGSER 20CMQA from the pull-down menu, slide cursor to the right to select QA3 SM 2X10/120KV/260MA/1S from the test pull-down menu, and continue to slide cursor to the right to select AUTO. (Refer to Figure 6- 3, on page 340.)

c.) Click on the ACCEPT button.

2.) Review the Image Analysis Report data and record the QA3 Small data for the 4th 20cm QA Image Series in Table 6-9.

a.) Verify the Overall Test Pass/Fail Indicator Window of the Report display indicates PASS. (Refer to Figure 6- 3, on page 340.)

b.) Record the QA3 Small data (Row 2A1A and Row 2B1B Series Means AvXc and AvXo - AvXc), QA3 (AvSDc), and the Center Smudge Row data in Table 6-9.

Box Size = 196 mm2 to 256 mm2
15 mm (+/- 1 mm) x 15 mm (+/- 1 mm)
31 (+/- 2 pixels) x 31 (+/- 2 pixels)

Box Positions: Box 1 = 0 mm x 0 mm
Box 2 = 0 mm x -80 mm
Box 3 = 80 mm x 0 mm
Box 4 = 0 mm x 80 mm
Box 5 = -80 mm x 0 mm

Row	Images	AvXc	AvXo	AvXo - AvXc	AvSDo	AvSDc	Center Smudge Row Value	Comments
2A1A	1, 3, 5, 7				N.A.			
1B2B	2, 4, 6, 8				N.A.			
Specifications		+3.0 to -3.0	N.A.	+3.0 to -3.0	N.A.	+ 2.9 to +3.5	+2.2 to -2.2	

Table 6-9 20cm QA#3 Phantom CT#, Brightness Uniformity, Center Noise & Center Smudge Row Performance Data Sheet

3.) Review the 4th 20cm QA Phantom images acquired in Section 6.5.1 for Rings, Bands, and Streaks using the Image Works Desktop.

a.) From the Global Control Palette, click on the IMAGE WORKS DESKTOP.

b.) From the Image Works Browser window, select the 4th 20cm QA Phantom series acquired in section 6.5.1.

c.) From the Image Works Browser window, click on the VIEWER button.

d.) While paging through the eight images in the series, analyze images for any Ring, Band, or Streak artifacts. Adjust Window/Level using the center mouse button, as required.

e.) Note any image that appears to have a Ring, Band, or Streak artifact.

4.) Verify any images noted above (step 3e) meet 20cm QA Phantom Ring, Band, or Streak Image Performance requirements.

a.) From the Global Control Palette, click on the Service Desktop.

b.) From the Service Browser window, select an image of the 4th 20cm QA Phantom series acquired in section 6.5.1 that appeared to have a Ring, Band, or Streak while reviewing the series in Image Works.

c.) On the Image Analysis Tool window, click on the AUTO 1X rectangular button, select the IMGSER 20CMQA test from the pull-down menu, slide cursor to the right to select QA3 SM 2X10/120KV/260MA/1S from the test pull-down menu, and continue to slide cursor to the right to select RING, BAND, or STREAK.

d.) Click on the ACCEPT button.

Note: If required, adjust Window/Level using the center mouse button.

e.) Position and size the Ring, Band, or Streak ROI, using the left cursor button.

Note: To ensure specifications are properly applied, do not adjust the Reference ROIs for the Ring, Band, and Streak artifact tests. The Reference ROIs are adjustable after the 1st Accept Modification click.

f.) Click on ACCEPT MODIFICATION twice to generate a report.

g.) Verify the Overall Test Pass/Fail Indicator Window of the Report display indicates PASS.

h.) Repeat steps b through g for each image noted in Step 3e.

6.5.3 Failure Recommended Actions

6.5.3.1 1st Image Series (4 Image MTF Average) Failure Recovery

Specifications

The 4 Image MTF Average must pass specifications:

`4 Image MTF Average`:0.65 to 1.00

Recommended Recovery

1.) Repeat Detailed Cal for the 20cm QA Phantom.

2.) Repeat Auto CT# Adjust for the 20cm QA Phantom.

3.) Repeat Sections 6.5.1 & 6.5.2, to verify Image Performance.

6.5.3.2 2nd Recon Series (Visible Lines) Failure Recovery

Specifications

The Largest 5 line pair patterns (coded F, E, D, C, and B) must be visible for each of the four images in this series.

Recommended Recovery

Note: The most common failure for this test is that the phantom has air bubbles that are obscuring the line pair patterns.

1.) Carefully inspect the 20cm QA Phantom for air bubbles. If required, refill the phantom with water, to eliminate all air bubbles.

2.) Repeat Sections 6.5.1 & 6.5.2, to verify Image Performance.

6.5.3.3 3rd Image Series (Visible Holes) Failure Recovery

Specifications

The number of visible holes in this image series must pass specifications as follows:

- Contrast Factor = 2.0 to 3.99:
  Minimum of 2 holes must be visible (10mm & 7.5mm)
- Contrast Factor = 4.0 to 7.99:

Minimum of 3 holes must be visible (10mm, 7.5mm & 5mm)

- Contrast Factor = 8.0 to 12.0:
  Minimum of 4 holes must be visible (10mm, 7.5mm, 5mm, & 3mm)

Recommended Recovery

1.) Repeat Detailed Cal for the 20cm QA Phantom.
2.) Repeat Auto CT# Adjust for the 20cm QA Phantom.
3.) Repeat Sections 6.5.1 & 6.5.2, to verify Image Performance.

6.5.3.4 4th Image Series Failure Recovery

Series Means

SPECIFICATIONS

Both Rows (2A1A, 1B2B) of the series must pass QA#3 Series Means specifications:

- AvXc: < +/- 3.0
- AvXo - AvXc: < +/- 3.0

RECOMMENDED RECOVERY

1.) Repeat Detailed Cal for the 20cm QA Phantom.
2.) Repeat Auto CT# Adjust for the 20cm QA Phantom.
3.) Repeat Sections 6.5.1 & 6.5.2, to verify Image Performance.

QA#3 (AvSDc)

SPECIFICATIONS

Both Rows (2A1A, 1B2B) of the series must pass QA#3 AvSDc specifications:

- AvSDc (< 5K Scans):2.90 to 3.50
- AvSDc (> 5K Scans):2.80 to 3.60

RECOMMENDED RECOVERY

1.) Repeat Detailed Cal for the 20cm QA Phantom.
2.) Repeat Auto CT# Adjust for the 20cm QA Phantom.
3.) Repeat Sections 6.5.1 & 6.5.2, to verify Image Performance.

Center Artifact or Center Smudge

SPECIFICATIONS

All eight images of the series must pass 20cm QA#3 Center Artifact and Center Smudge specifications:

- Center Artifact Factor:+/- 3.5

- Center Smudge Factor:+/- 2.2

RECOMMENDED RECOVERY

1.) Repeat Detailed Cal for the 20cm QA Phantom.
2.) Repeat Auto CT# Adjust for the 20cm QA Phantom.
3.) Repeat Sections 6.5.1 & 6.5.2, to verify Image Performance.

Ring, Band, or Streak Artifact Failure Recovery

SPECIFICATIONS

- Ring Artifact: Ring Factor < +/- 4.8
- Band Artifact: Band Factor+/- 2.8 from 0cm to 8.5cm
  < +/- 2.8 > 8.5cm
- Streak Artifact: Streak Factor< +/- 4.0

RECOMMENDED RECOVERY

1.) Troubleshoot Ring, Band or Streak artifact failures as described in the Service Manual.
2.) Repeat Detailed Cal for the 20cm QA Phantom.
3.) Repeat Sections 6.5.1 & 6.5.2, to verify Image Performance.

Section 7.0
System Functional Test

Use the system tests in the following sections to exercise all aspects of the system and to ensure system integrity before releasing to the customer. Although the means, standard deviation, and resolution specifications do not apply during system functional tests, treat any artifact or image anomaly as a failure.

If you encounter a failure during the system tests:

- Record any evidence of artifacts, such as rings, streaks, shading, cupping, noise, or center artifacts.
- Correct artifacts, system test, or image series failures when they occur. Any delay in repairs could increase the number of retests.

1.) Place the QA phantom on the cradle.
   - Drive the table to an elevation of 100.
   - Align the line on the phantom with the internal laser lights.

   Never scan above 50mA without first placing a phantom in the field of view. Levels in excess of 50mA can cause temporary radiation damage to the detector that lasts several hours. If you acquire image series cals with a radiation damaged detector, the cals may cause artifacts in subsequent image series scans.
2.) Select the service protocol, SYSTEM SCAN/CUST QUAL RELI.
3.) Run each series.

Note: **Stop the service protocol after the second helical series. It is not necessary to proceed past that point in the protocol**.

4.) Using Diagnostic Data Analysis, review the MSD Plots for each AIR scan.
5.) Complete all scans.

6.) Review the message log for unacceptable errors and review the images for artifacts.

Section 8.0
Save System State

Use the following commands to create the System State DVD.

1.) Load a DVD into the mod drive on the front of the console.

2.) If you are not on the Service Desktop, click on the SERVICE DESKTOP icon, 

.

3.) Click on the UTILITIES icon. 

4.) Select SYSTEM STATE to open the System State Save/Restore menu.

5.) Select ALL

6.) Select SAVE

7.) When the save operation completes, select FILE and QUIT from the pull down menu.

8.) Remove the DVD from the drive

Chapter 7
Customer Options Installation & Verification

Note: **Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.**

Section 1.0
CT Options

- ❒ Injector functional tests completed.
- ❒ AWW functional tests completed.
- ❒ Filming/Camera/DASM functional tests completed.
- ❒ UPS functional tests completed.
- ❒ Network items installed and functional tests completed.
- ❒ Verify that all customer software options are installed and functional.

Section 2.0
Install Options

Refer to:

- GE Prints and schematics for mechanical (physical) location of option
- FDO shipment for identification of items
- Installation Specialist for installation instructions if they differ from print

2.1 5 inch MOD

Refer to documentation shipped with 5" MOD.

- 5" MOD Drive Option 5162230

2.2 Camera (Filming Device)

Refer to documentation shipped with camera

- Chapter 2 of this manual
- DICOM 2210573 GE Document
- DICOM Print 2152913

2.3 Advantage Windows Workstation (AWW)

Refer to the directions provided:

- Pre-install 2111833
- Service 2111831

Section 3.0
DICOM Network Introduction

BrightSpeed systems support two basic Networking Protocols:

- Advantage NET (IC, Signa 4.X, CT-HLA, CT/I …)
- DICOM (CT/I, CT Synergy, Advantage Workstations, …)

DICOM NETWORK INTRODUCTION

DICOM networks basically operate on the **tasks** or services that various devices on the network use or provide. These services are labeled as Application Entity Titles (AE Titles). The CT scanner system is a **user** of six DICOM Network Services and is a **provider** of two DICOM Services:

AS A DICOM SERVICE USER:

- Send or **Push** images to another network device.
- Send or **Push** images to a DICOM Printer.
- Review image database on another device and retrieve or **Pull** selected images from that device (Query/Retrieve User).
- Send or **Push** images to a an image storage device and obtain confirmation that the images have been archived (Storage Commitment).
- Obtain Patient Worklist Information from the Hospital HIS/RIS System.
- Store images on DVD-RAM media.

AS A DICOM SERVICE PROVIDER:

- Receive **Pushed** images from another network device
- Allow another network device to review the image database and to retrieve or **Pull** selected images (Query/Retrieve Provider)

For each DICOM Service that the CT system will be a **User** (except for storing images on DVD-RAM/MOD media), you must **declare** this device on the CT system using three menu selections. For some devices, you must declare not only the device, but each service (AE Title) that the device provides. For example, you may be required to declare a PACS System twice on the CT system: once as a destination to **push** images and, second, as destination that provides storage commitment capability after images have been **pushed**.

For each DICOM Service that the CT system will be a **Provider**, you must **declare** the CT system on the network device that will be using these services.

Information required to complete configuring a hospital DICOM network is provided by the hospital network administrator (hostnames, IP Addresses) and the DICOM Conformance Statement document (AE Titles, Port Numbers) provided with each DICOM compatible network device on the network.

Section 4.0
Before You Start

4.1 Network Physical Requirements

Before setting up the CT scanner system on the hospital network, verify the following physical items are complete:

- Scanner console, monitor, keyboard, and mouse are installed and connected.
- CT system power is ON
- Hospital Ethernet network RJ45 Class IV twisted pair cable is connected to the scanner console network receptacle.
- Hospital network connection is operational and is running 10baseT or 100baseT.

4.2 Network Identity Information

To declare the CT system on the network, ensure the following network identity information is available from the Hospital Network Administrator:

- Hostname (No more than 16 Characters)
- Internet Protocol (IP) Address
- Subnet Net Mask IP Address (if applicable)
- Broadcast Address (if applicable)

4.3 Scanner to DICOM Remote Hosts Network Information

To declare DICOM remote hosts (PACS systems, archival devices, review workstations) on the CT system, ensure the following information is available for each remote host:

From the Hospital Network Administrator:

- Hostname
- Internet Protocol (IP) Address
- Network Protocol (DICOM for CT Systems)

From the Remote Host Device DICOM Conformance Statement Document:

- DICOM Application Entity Title or AE Title (DICOM service that remote host provides or uses)
- DICOM Listening Port Number

4.4 Scanner to DICOM HIS/RIS Interface Network Information

To declare DICOM Hospital HIS/RIS Interface devices (Mitra and others) on the CT System, ensure the following information is available:

From the Hospital Network Administrator: *Internet Protocol (IP) Address*

From the HIS/RIS Interface Device DICOM Conformance Statement Document:

- DICOM Application Entity Title or AE Title (DICOM Service that the HIS/RIS interface provides)
- DICOM Listening Port Number

4.5 Scanner to DICOM Printers Network Information

To declare DICOM on the CT System, ensure the following information is available for each printer:

From the Hospital Network Administrator:

- Hostname
- Internet Protocol (IP) Address

From the Printer DICOM Conformance Statement Document:

- DICOM Application Entity Title or AE Title (DICOM service that remote host provides or uses)
- DICOM Listening Port Number

Section 5.0
Declaring the System on the Hospital Network

5.1 Enter Configuration Routine

1.) On the OC, open a Unix shell window.

2.) Enter root as a superuser:
Type: **su** - **ENTER** at the prompt.
Type: **#bigguy** **ENTER** at the password prompt.

3.) Change directory to scripts:
Type: **cd /user/g/scripts** **ENTER** at the root prompt.

4.) Launch the Install Utility:
Type: **reconfig** **ENTER** at the prompt.
The OC displays the Install Utility Window as shown in Figure 7-1.

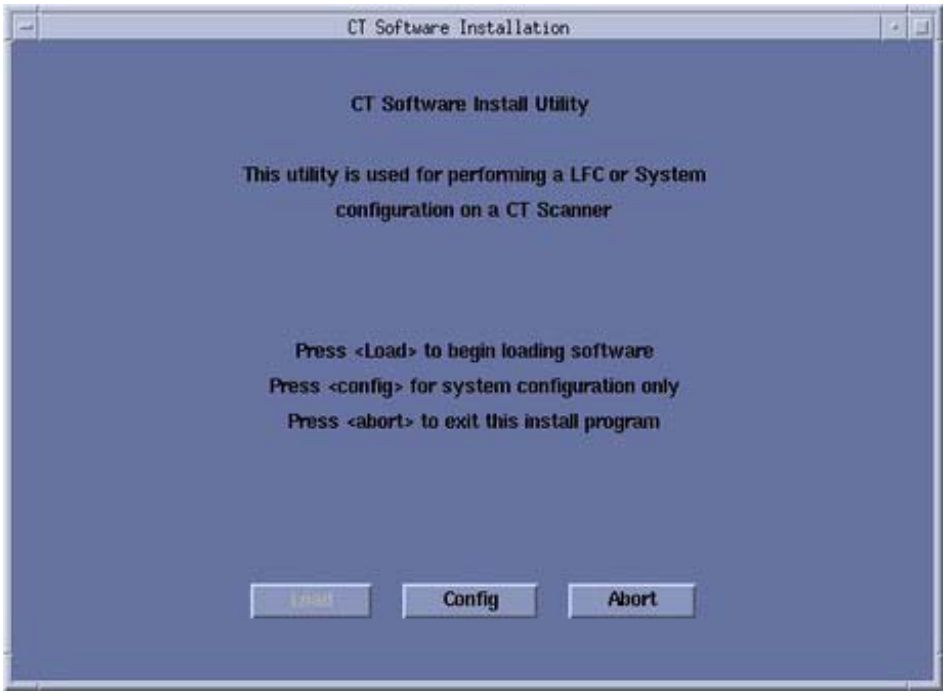


Figure 7-1 Install Utility Window

5.) Enter the Configuration Routine:

Using the mouse, click on the CONFIG button.

The OC displays the System Configuration - System Settings screen, as shown in Figure 7-2.

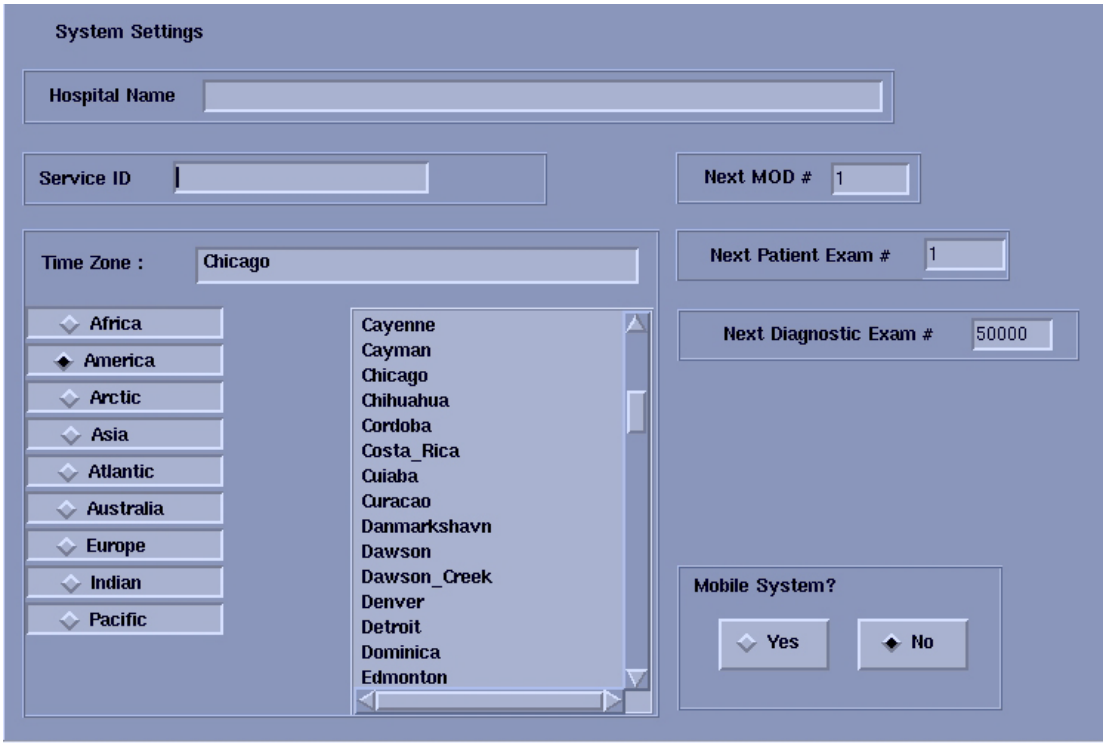


Figure 7-2System Settings Screen

5.2 Configure Network Settings

This screen provides the ability to declare the CT system on a hospital network. Key information such as Host Name, IP Address, Net Mask (for CT systems on a subnet) must be obtained from the hospital network administrator.

1.) Select the NETWORK button to display the Network Settings screen as shown in Figure 7-3.

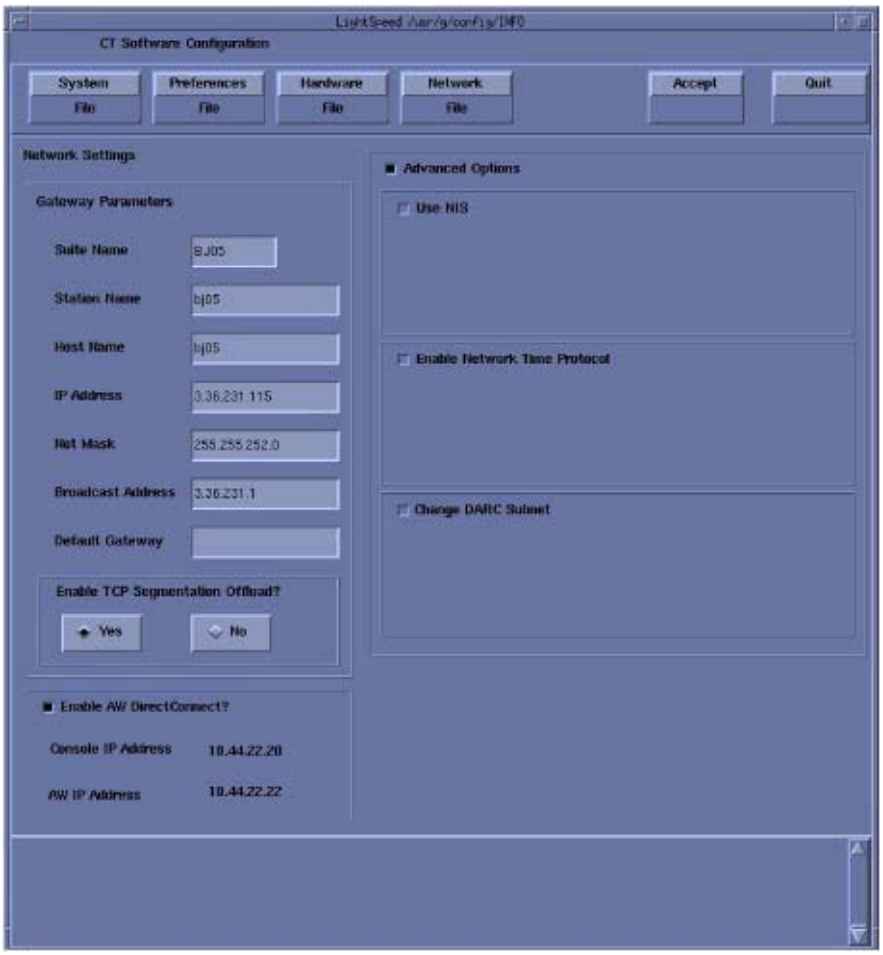


Figure 7-3 Network Setting Screen

2.) Enter the `Suite Name`.

The Suite Name is a means of identifying this particular CT system as a part of a group of CT Systems in a suite configuration. This Suite Name will appear on all image headers.

The Suite Name must start with a letter, followed by three alphanumeric characters (total MUST be four characters long). The name of the OC interface will be `<Suite Name>_oc` and the SBC interface will be `<Suite Name>_sbc`.

3.) Enter the `Station Name`.

- It cannot exceed 16 characters
- It can only contain **a** though **z**, and **0** through **9**.

  `Example: stmary or ct01`

4.) Enter the hospital provided `Host Name`.

The Host Name identifies the network hostname and AE Title of the CT system.

The Host Name:

- **MUST NOT** be `<Suite Name>_oc` or `<SUITE NAME>_OC`.
- **MUST NOT** exceed 16 Characters.
- **MUST** only contain the following characters: **A** through **Z**, **a** through **z**, **0** through **9**, **-** and **_**

5.) Enter the hospital provided `IP Address`.

6.) Enter the hospital provided `Net Mask` (if the CT system is on a subnet).

7.) Enter the `Broadcast Address`:

The Broadcast Address should be the same as the IP Address except for the bits of the host id portion (last digit group) set to 1s or 0s depending on the configuration of the network. The standard default is 1s but older SunOS machines used 0s.

Example: If the IP Address is 192.100.9.17, the Broadcast Address should be 192.100.9.255 if the network is configured to use 1's to specify the broadcast address.

If the network contains genesis based scanners or other SunOS 3.5 or 4.1 computers, the Broadcast Address should be 192.100.9.0.

8.) Enter the hospital provided `Default Gateway` IP Address in the `Default Gateway` field (if applicable). If the site network does not use a default gateway, leave the field blank.

9.) "`Enable TCP Segmentation Offload`?" The default selection is `Yes`. In some situation, TCP Segmentation Offload can't work normally, please select `No` at this time.

10.) Select NIS (Yellow Pages database) `Advanced Option` only if requested by the hospital network administrator as follows:

a.) Select ADVANCED OPTIONS button on the Network Settings screen.

b.) Select Use NIS? button.

c.) Enter the hospital provided Domain Name.

11.) Record all the Network parameters in the *Software Installation Procedures* Document, or on the worksheet in 2.2 on page 292.

5.3 Initiate System Reconfiguration

1.) Select ACCEPT on the System Configuration Screen.

The system loads the application software, OS patches, and kernal changes, and configures the system on both the OC and the SBC.

This loading process takes approximately 15 minutes. While the load is going on, the results are displayed in a shell window, which closes when the loading process is complete. All the window output is logged to a file named:

`/var/adm/install.log.YYYYMMDDWWWHHMMSS.`

(Where *YYYYMMDDWWWHHMMSS* is the Date/Time that the loading process was started.)

2.) When the loading process and configuration changes are complete, the system displays a prompt to reboot. Click on YES.

3.) The system will automatically login as ctuser after the reboot. Select OK on the Autostart Disabled popup message.

4.) To startup Applications, in the console shell window, type **`startup`** **ENTER**.

Section 6.0
Declaring Remote Hosts on the CT System (CTT OS System)

6.1 Enter Remote Host Configuration Screen

1.) On the OC, select the IMAGE WORKS icon. 

2.) Select NETWORK.

6.2 Declaring Advantage NET Remote Hosts on the Scanner

Use Advantage NET Protocol networks to communicate with older CT or MR Systems (MR Signa 4.x, CT-HLA, CT/I Systems, and Workstations that support the Advantage NET protocol). Advantage NET Protocol does not offer full compatibility with BrightSpeed DICOM formats.

Repeat the following procedure for each Advantage NET Remote Host device that the customer expects to have this CT system communicating with.

1.) Select REMOTE HOSTS from the pull down menu. The system displays the Remote Host Parameter Screen as shown in Figure 7-4.

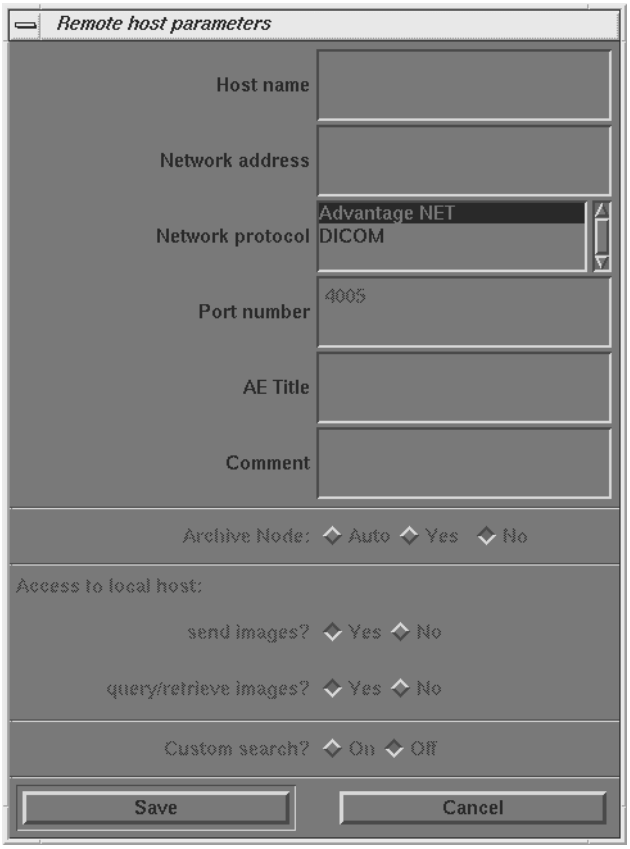


Figure 7-4 Advantage Net Network Protocol Parameter Settings

2.) Enter the hospital provided `Host name`.

3.) Enter the hospital provided `Network Address` (IP Address).

4.) Select ADVANTAGE NET as the `Network Protocol`.

The systems automatically de-highlights the remaining parameter fields on the Remote Host parameter selection screen. These are dedicated DICOM protocol parameters and do not apply to Advantage NET type devices.

5.) Select SAVE to store the parameter settings of the remote host.

6.3 Declaring DICOM Remote Hosts on the CT Scanner

Use DICOM protocol networks to communicate to DICOM devices such as CT/i, CT Synergy, DLX, MR Lx, and third party hosts.

Repeat the following procedure for each DICOM remote host device that the customer expects to have this CT system communicating with.

1.) Select REMOTE HOSTS from the pull down menu. The system displays the Remote Host Parameter screen as shown in Figure 7-5.

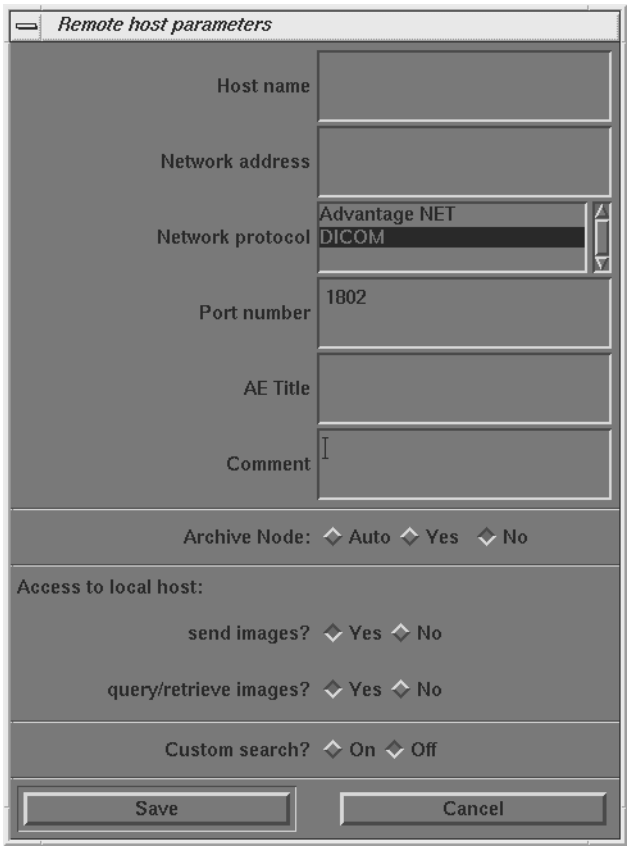


Figure 7-5 DICOM Network Setting Protocol Parameter Settings

2.) Enter the hospital provided `Host name`.

3.) Enter the hospital provided `Network Address` (IP Address).

4.) Select DICOM as the `Network Protocol`.

The system automatically highlights the remaining parameter fields on the Remote Host parameter selection screen. These are dedicated DICOM Protocol parameters.

5.) Enter the TCP/IP Listening `Port Number` from the DICOM Conformance Statement provided

with the device.

6.) Enter the `AE Title` from the DICOM Conformance Statement provided with the device.

Application Entity Titles (also known as ACR-Nema or Dicom Name) refer to the DICOM Network Services that a device provides to the CT System. For most devices, the AE Title is the same as the hostname (CT systems are equipped with this feature).

However, some devices such as PACS systems may have separate AE Titles and port numbers for each of the services that the PACS system provides. In these cases, you must enter a separate remote host (same hostname and IP Address) for each of the independent AE Title Services that the host provides (one host as an image **push-to** destination, another host as a **query/retrieve** provider, and another host as a **storage/commitment** provider).

Be sure to review the DICOM Conformance Statement for each device that will provide a remote host network service for the CT system (image **push-to** or store destination, Query/ Retrieve, and Storage Commitment) to ensure that each service is correctly configured.

7.) Select the correct `Archive Node` choice for the device. The Archive Node selection field defines the ability of the remote host to act as a DICOM Storage/Commitment provider and indicate to the operator that a study/series/image was archived. Select:

- AUTO to have the CT system automatically check to see if the designated remote host is a DICOM Storage/Commitment Provider.
- YES if the device is the hospital designated DICOM Storage/Commitment Provider. During an Application Study Archive process, the local browser screen will indicate `Archive Status = Y` to the operator.
- NO if the device is not a DICOM Storage/Commitment Provider.

8.) Select the correct `Access to local host`: settings. These two selections allow you to selectively block the remote host from using the BrightSpeed DICOM services as a provider (image **push-to** destination, and a **Query/Retrieve** provider).

- `Send Images`? Set to YES if the customer wants the CT system to be able to have images **pushed** to the system from the applicable remote host. Set to NO if the customer wants to block an image **push** from the applicable remote host.
- `Query/retrieve images`? Set to YES if the customer wants the remote host to be able to review the image database (query) and **pull** selected images from the database. Set to NO if the customer does not want the remote host to have this ability.

9.) Select the correct `Custom search`? setting. This selection allows the CT scanner to selectively search through the remote host's image database when the operator is using remote browser screen to **query** the remote host. The search parameters that the CT system allows the customer to use are: last name contains, patient ID, exam number, accession number, and exam date.

- Select ON if the device supports custom searches as part of the devices **Query/Retrieve** DICOM Provider service.
- Select OFF if the device does not support custom searches.

10.) Record all the remote host network parameters for each remote host in the *Software Installation Procedures* Document.

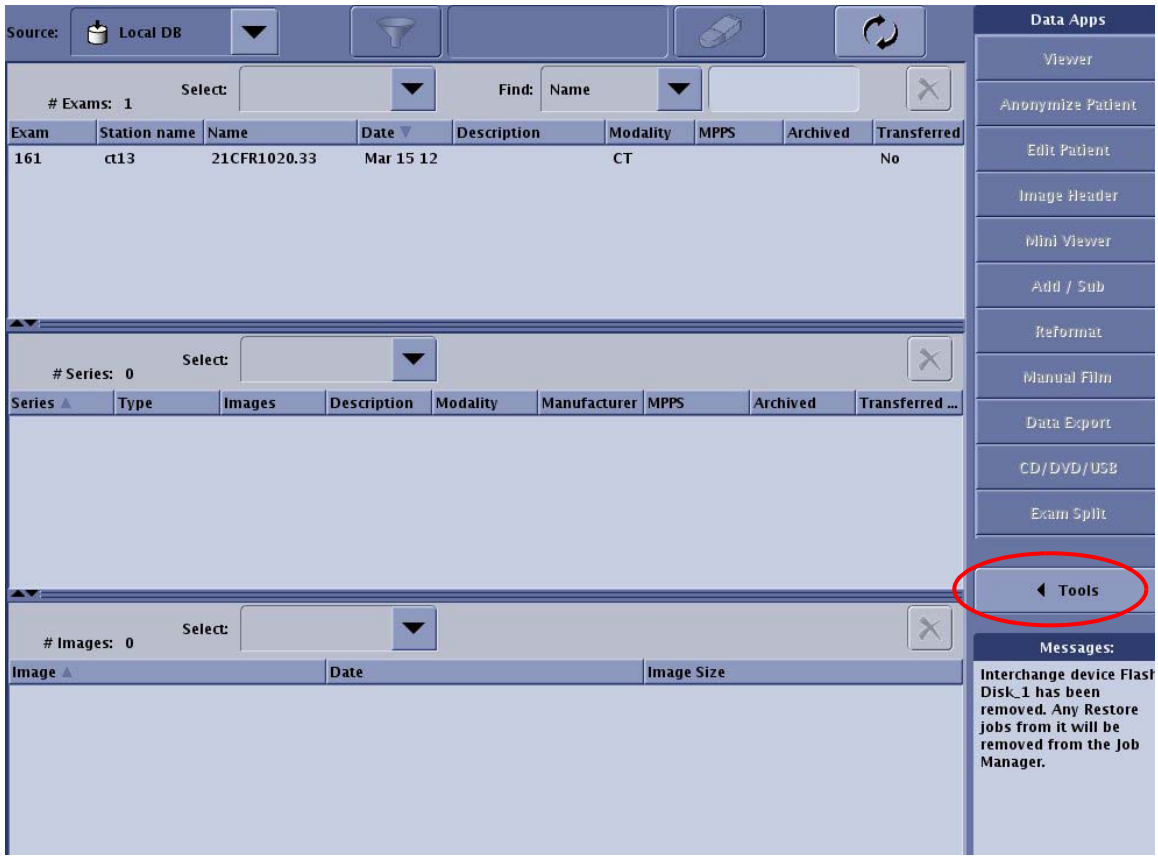
11.) Select SAVE to store the parameter settings of the remote host.

Section 7.0
Declaring Remote Hosts on the CT System (SUSE OS System)

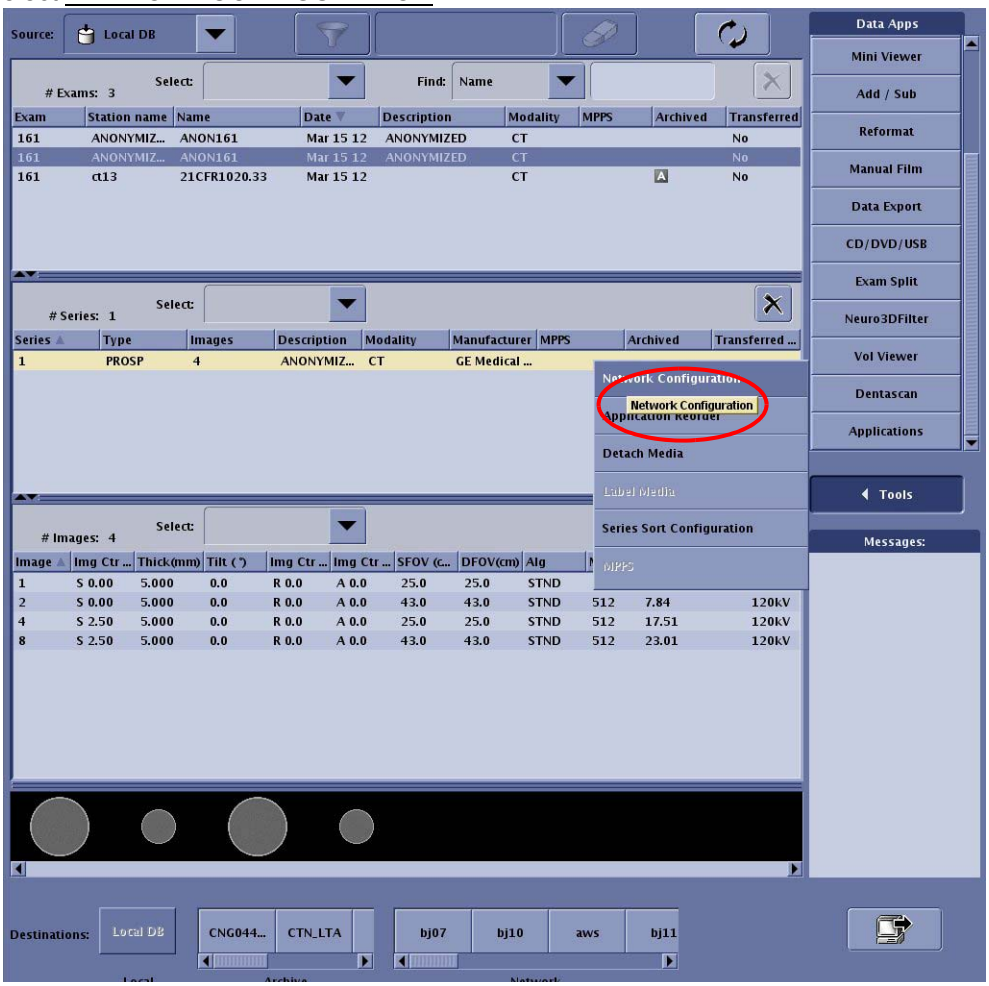
7.1 Enter Remote Host Configuration Screen

1.) On the OC, select the IMAGE WORKS icon. 

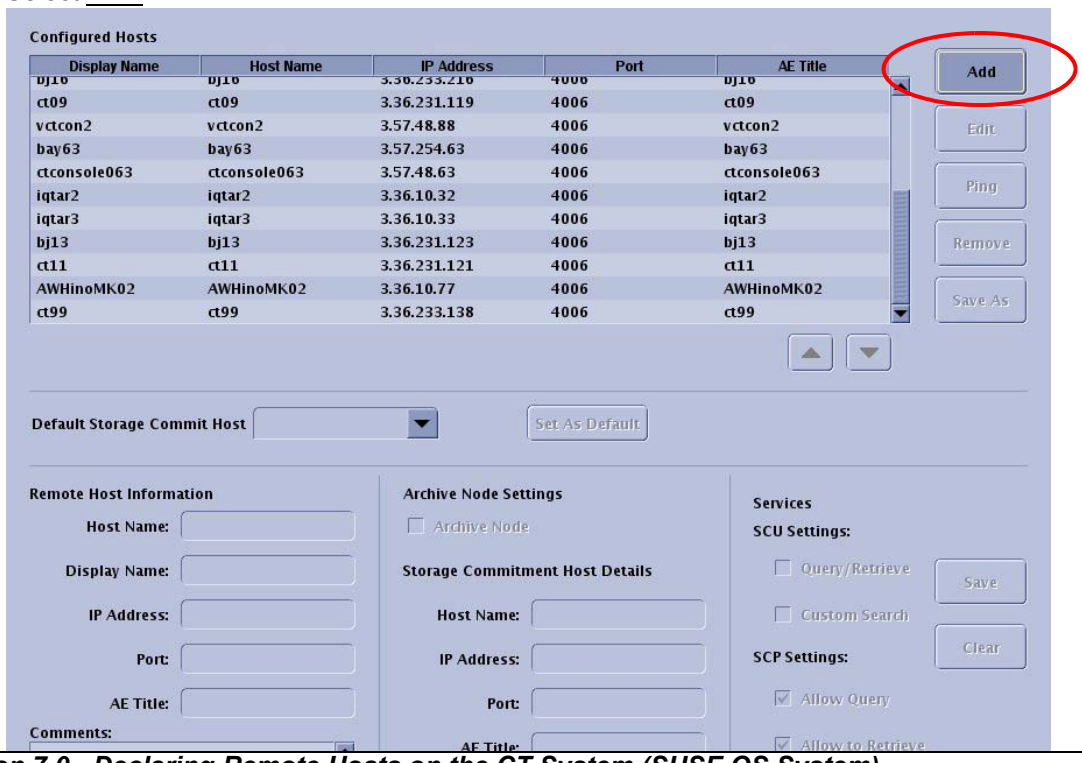
2.) Select TOOL.



3.) Select NETWORK CONFIGURATION.



4.) Select ADD.



7.2 Declaring DICOM Remote Hosts on the CT Scanner

Use DICOM protocol networks to communicate to DICOM devices such as CT/i, CT Synergy, DLX, MR Lx, and third party hosts.

Repeat the following procedure for each DICOM remote host device that the customer expects to have this CT system communicating with.

1.) Enter the hospital provided `Host name`.

2.) Enter the hospital provided `IP Address`.

3.) Enter the TCP/IP Listening `Port` from the DICOM Conformance Statement provided with the device.

4.) Enter the `AE Title` from the DICOM Conformance Statement provided with the device.

Application Entity Titles (also known as ACR-Nema or Dicom Name) refer to the DICOM Network Services that a device provides to the CT System. For most devices, the AE Title is the same as the hostname (CT systems are equipped with this feature).

However, some devices such as PACS systems may have separate AE Titles and port numbers for each of the services that the PACS system provides. In these cases, you must enter a separate remote host (same hostname and IP Address) for each of the independent AE Title Services that the host provides (one host as an image **push-to** destination, another host as a **query/retrieve** provider, and another host as a **storage/commitment** provider).

Be sure to review the DICOM Conformance Statement for each device that will provide a remote host network service for the CT system (image **push-to** or store destination, Query/ Retrieve, and Storage Commitment) to ensure that each service is correctly configured.

5.) Select the correct `Archive Node` choice for the device. The Archive Node selection defines the ability of the remote host to act as a DICOM Storage/Commitment provider and indicate to the operator that a study/series/image was archived.

- Select `Archive Node` if the device is the hospital designated DICOM Storage/ Commitment Provider. During an Application Study Archive process, the local browser screen will indicate `Archive Status = Y` to the operator.
- Don't select `Archive Node` if the device is not a DICOM Storage/Commitment Provider.

6.) `SCU Settings`: The following two selections allow you to selectively block the remote host from using the Brivo CT385 Series DICOM services as a provider (image **push-to** destination, and a **Query/Retrieve** provider).

- `Query/Retrieve:` select if the customer wants the remote host to be able to review the image database (query) and **pull** selected images from the database. Don't select if the customer does not want the remote host to have this ability.
- `Custom Search:` This selection allows the CT scanner to selectively search through the remote host's image database when the operator is using remote browser screen to **query** the remote host. The search parameters that the CT system allows the customer to use are: last name contains, patient ID, exam number, accession number, and exam date.
  * Select if the device supports custom searches as part of the devices **Query/Retrieve** DICOM Provider service.
  * Don't select if the device does not support custom searches.

7.) Select the correct `SCP Settings:` setting.

8.) Record all the remote host network parameters for each remote host in the *Software Installation Procedures* Document.

9.) Select SAVE to store the parameter settings of the remote host.

Section 8.0
Declaring the CT System on Remote Hosts

8.1 Declaring the Scanner on Advantage NET Protocol Devices/Systems

Refer to the appropriate service manual provided with the Advantage NET Protocol device or system to find instructions how to declare the CT System as an Advantage NET remote host.

8.2 Declaring the Scanner on DICOM Protocol Devices/Systems

Refer to the appropriate Service Manual provided with the DICOM protocol device or system to find instructions how to declare the CT System as a DICOM remote host.

The CT System provides two DICOM Services as a provider to remote hosts:

- A remote host can **push** images to the CT image database.
- A remote host can review the CT image database (query) and **pull** selected images (retrieve).

Use the following parameter information to configure the DICOM device/system to either **push** images to the CT scanner and/or perform a **Query/Retrieve** operation:

- `Hostname:` Provided by the Hospital Network Administrator. Exactly the same scanner assigned hostname entered in Network Configuration Screen.
- `Application Entity Title:` Exactly the same entry as the Hostname.
- `Network Address:` Provided by the Hospital Network Administrator. Exactly the same scanner assigned IP Address entered in Network Configuration Screen.
- `Network Protocol:` DICOM 3.0.
- `Port Number:` For all DICOM service that the CT System provides, use 4006.
- `Provider Type:` This field concerns the BrightSpeed DICOM **Query/Retrieve** provider capability. All CT systems are wtudy root systems, which allow queries at the exam, series, and image level.
- `Support Worklist:` This field concerns whether a DICOM **Query/Retrieve** provider capable device or system supports a filter search of the image database. All CT systems support a filtered search of the image database as part of the BrightSpeed DICOM **Query/ Retrieve** provider capability.

Section 9.0
DICOM HIS/RIS Setup

9.1 Prerequisites

Most hospital HIS/RIS systems are not DICOM compatible and require a DICOM HIS/RIS Worklist Interface to provide patient scheduling information to the CT system. Contact your local HNS support engineer to determine exactly what DICOM HIS/RIS Interface is appropriate for the customer.

In addition, the CT system must have the ConnectPRO software option installed to utilize the DICOM Protocol Worklist capability.

9.2 Loading ConnectPRO Software Option on the CT System

1.) If you are not on the Service Desktop, click on the SERVICE DESKTOP icon. 

2.) Click on the CONFIGURATION icon. 

3.) Click on INSTALL OPTIONS.

4.) Select INSTALL and click START. The console displays the Software Options window as

shown in Figure 7-6.

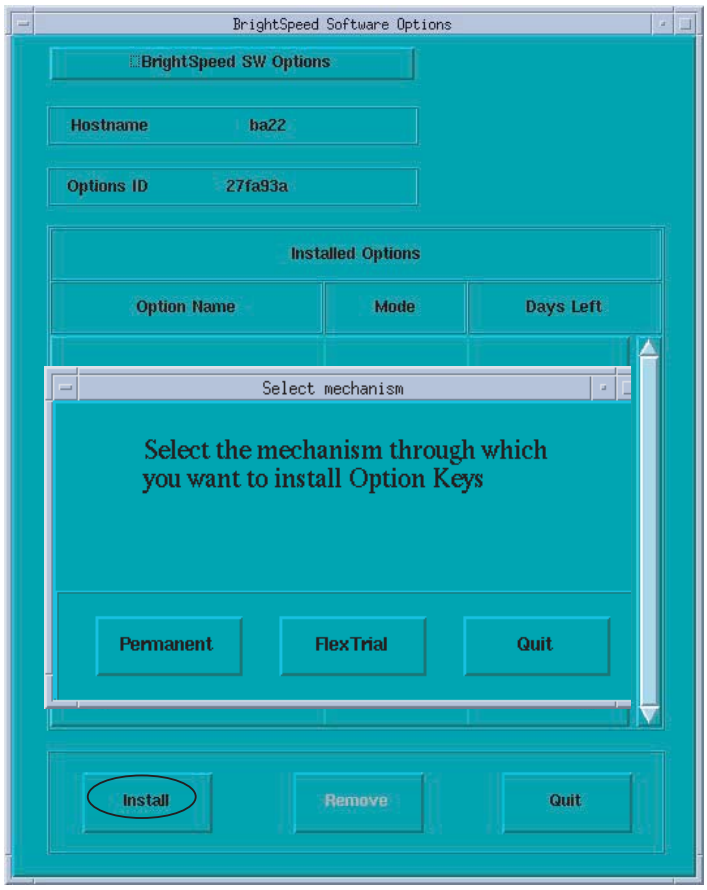


Figure 7-6 Options Window when First Selected

5.) Insert the ConnectPRO Options DVD/MOD into the DVD/MOD drive.

6.) Click on OK to continue.

7.) On the Software Option window, select the CONNECTPRO option in the Available Options window.

8.) Click on the INSTALL button.

The console may display a message box during the software loading operation. When the system has completed loading the software:

- the Installed Options window displays the ConnectPRO option, and

- the console displays the ConnectPro Setup window as shown in Figure 7-7.

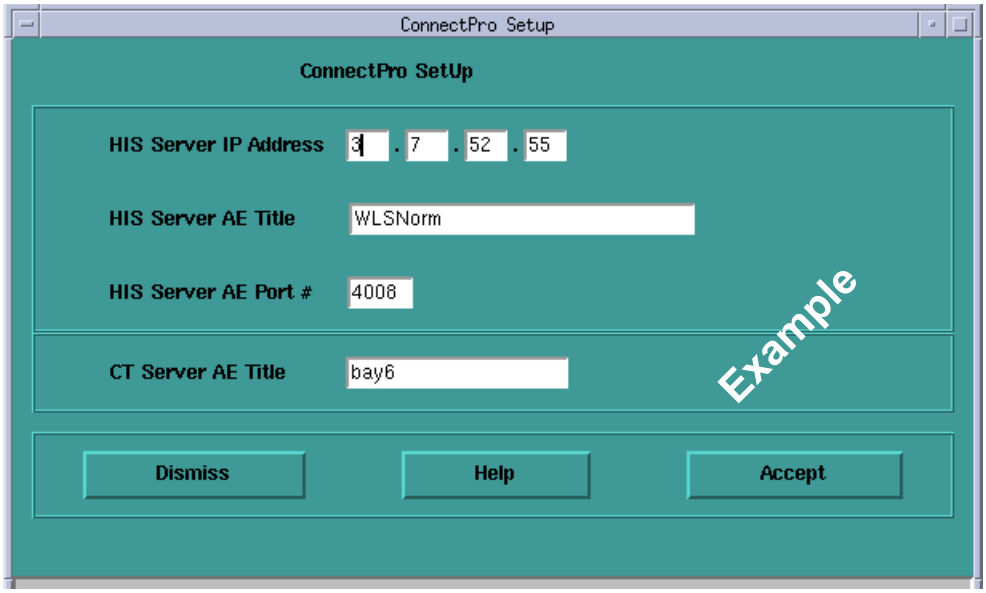


Figure 7-7 ConnectPro Setup Screen

9.) Enter the hospital provided `HIS Server IP Address`.

10.) Enter the `HIS Server AE Title` from the DICOM HIS/RIS Interface device DICOM Conformance Statement document.

11.) Enter the `HIS Server AE Port #` from the DICOM HIS/RIS Interface device DICOM Conformance Statement document.

12.) Record all the ConnectPRO HIS/RIS Network parameters.

The system will automatically load the BrightSpeed `CT Server AE Title` (Hostname of the system). `CT Server AE Title` will be used for PPS setup later.

13.) Click on the ACCEPT button.

14.) "Should PPS be enabled?" is popped up. Select Yes.

15.) The console displays the ConnectPro Setup window as shown in

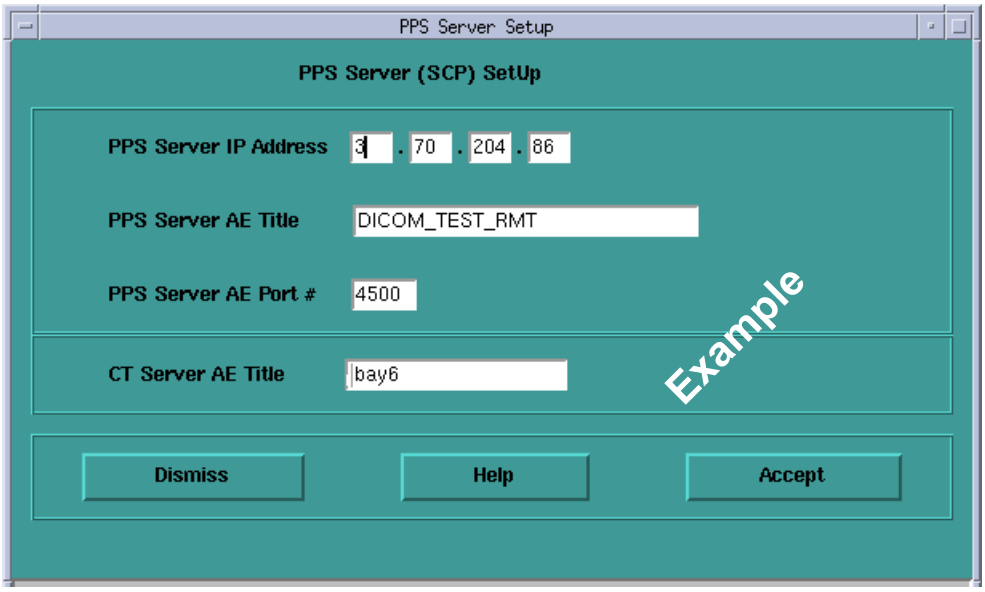


Figure 7-8 PPS Setup Screen

16.) Enter the hospital provided `PPS Server IP Address`.

17.) Enter the `PPS Server AE Title` from the DICOM HIS/RIS Interface device DICOM Conformance Statement document.

18.) Enter the `PPS Server AE Port #` from the DICOM HIS/RIS Interface device DICOM Conformance Statement document.

19.) Enter `CT Server AE Title` got from Step 12). Click [Accept].

20.) The system will check valid setup entries, execute a perl script that makes changes to the configuration files for HIS/RIS, and return to the Software Option window shown in Figure 7-6.

21.) Click on the QUIT button and the subsequent OK button in the message window.

22.) Remove the DVD from the DVD drive, and write protect the side containing the ConnectPRO option.

9.3 PPS Setup

If PPS is not enabled during ConnectPro Option installation, PPS can also be setup when needed later.

From the tool chest located in upper right corner of either monitor, select Unix Shell.

Type '**`hostname`**'. The output is the CT scanner AE title that will be sent to the worklist server.

Type '**`installhisris`**'.

Then the ConnectPro Setup window as shown in Figure 7-7. Follow the Step 9) to Step 19) in Section 9.2, on page 370.

Section 10.0
DICOM Filming Devices Setup

10.1 Prerequisites

Before configuring DICOM filming devices (cameras, printers) on the CT System, ensure the following are complete:

- Filming Device Service Representative to assist in camera/printer setup for best image quality film presentation.
- Hospital DICOM network is operational.
- Filming device is connected to the DICOM network with the correct filmer DICOM interface.
- Filming device is DICOM protocol compatible.
- Filming device DICOM Conformance Statement document is available.

Note: **Filmer DICOM Application Entity Titles may be site specific. Make sure that you check with the Filming Device Service Representative and the hospital network administrator to ensure you are using the correct AE Title for the destination filming device.**

10.2 Declaring DICOM Filming Devices on the CT System

⚠ **NOTICE**
Potential For Data Loss

Empty all filming queues before modifying camera parameters.

This section contains procedures for recording important Camera setup information. Use the table(s) at the end of this section to record information from the setup screens.

1.) Click on the SERVICE DESKTOP icon. 

.

2.) On the Desktop Toolbar select CONFIGRUATION **->** INSTALL CAMERA**.** The Install Camera window appears, along with a warning message pop-up box, to remind you that all filming queues must be empty before you begin to update or delete a camera.

3.) The Graphical User Interface displayed shows a list of cameras installed (See Figure 7-10). First, you must click OK in the warning message box. See Figure 7-9.

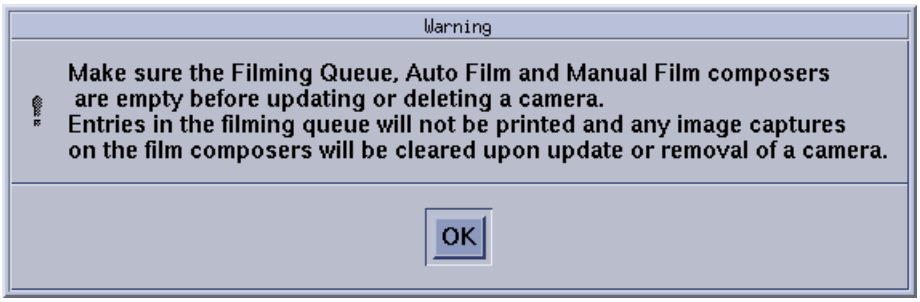


Figure 7-9 Warning Screen

4.) Now you are asked a series of questions.

a.) To add a new camera, click the ADD button (See Figure 7-10).

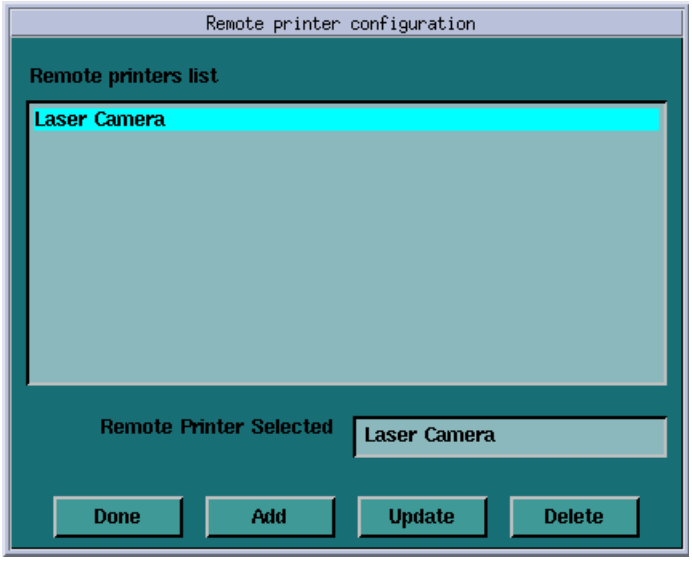


Figure 7-10 Printer Configuration GUI

b.) A dialog window for the camera type (DASM/DICOM) appears. If no DASM is detected during the OC boot, the DASM button will be disabled (Figure 7-11). If a DASM is present and has not been detected, reboot the OC and run the camera configuration tool again.

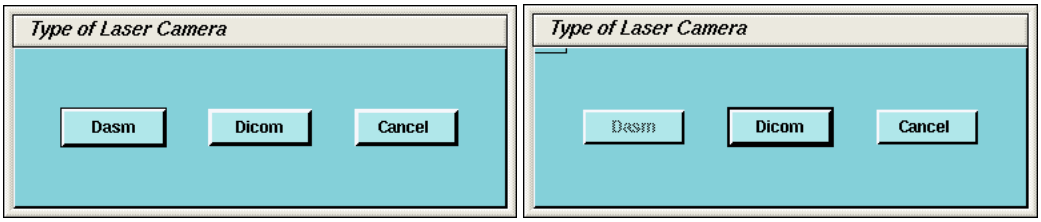


Figure 7-11 Dialog Box for camera Type

5.) To add a new laser camera, click DASM in the camera type dialog box. This brings up a list of available camera models. Select the appropriate model form the list and click SELECT (See Figure 7-12). Now you must configure it.

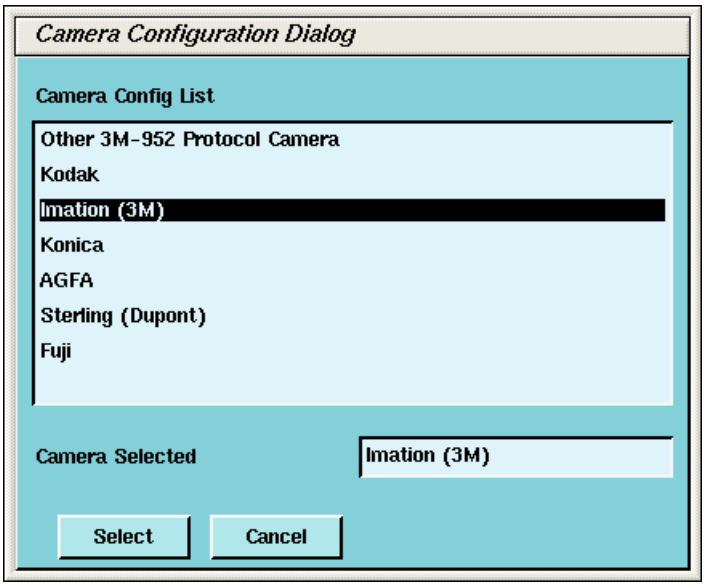


Figure 7-12 Camera Model Dialog (with DASM)

a.) `DASM Interface` is automatically detected as either `Analogue` or `Digital`

b.) Two `Laser Options` are available for laser cameras: SLIDES and ZOOM. Set this option only if the camera being installed supports slides and zoom. Setting the option allows it to be enabled or disabled at the application level.

c.) Camera manufactures provide two (2) `Magnification Type` options for cameras. The SMOOTH resolution blurs the image, while the SHARP resolution makes the image pixels more pronounced. The default is smooth.

Comment: To film good images, and have them look like images filmed by other GE CT products, the following camera settings are suggested:

Kodak:SMOOTH

Dupont/Sterling:SMOOTH

3M/Imation (Laser Camera):SHARP

3M/Imation (Dry View):SMOOTH

Agfa: SMOOTH

d.) Select the appropriate `File Format`. Select ON from the drop down list boxes on the menu. Valid film formats are determined by the camera manufacture. IMATION for example, doesn't support 4x4, 2x4 or 1x2 and AGFA does not support 2x4) The DICOM print convention designates film formats by column and row (e.g. 12 on 1 film is 3x4).

When finished setting parameters, click on DONE and proceed to step 8.

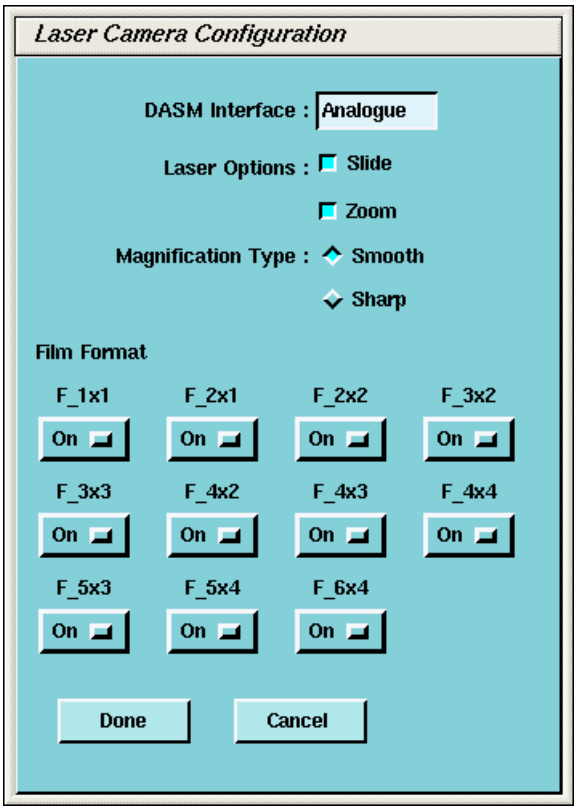


Figure 7-13 Laser Camera Configuration

6.) To add a new DICOM camera, click on ADD and then DICOM in the dialog box that appears.

a.) A list of camera models appears (See Figure 7-14). Select the appropriate model from the list and click SELECT. Clicking SELECT presets all the parameters to that models except

the Network parameters.

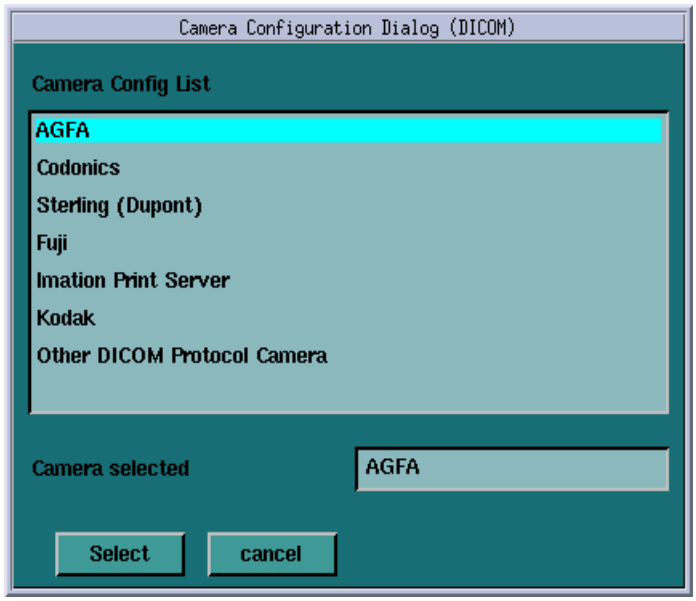


Figure 7-14 Camera Model Dialog (DICOM)

Comment: It's advised to recheck the preset information with the camera manufacturer's representative.

Selection of a different camera model clears the Image Quality parameters, because these are camera manufacture dependent.

b.) Enter the `Network Parameters` (See Figure 7-15)

>`Device Name` A unique name used to identify the camera.

>`Host Name` DICOM print server host name, as defined by the hospital.

>`IP Address` DICOM print server IP address, as defined by the hospital.

>`AE Title` DICOM print server application entity title, as defined by the print server. *You should consult the manufacturers DICOM Conformance Statement.*

Note: The Application Entity Title for the Camera may be site specific. Make sure that you check with the Camera Manufacturer's Representative and the hospital network administrator to ensure you are using the correct AE Title for the destination DICOM Print Camera.

>`TCP/IP Listen Port` DICOM print server TCP/IP listen port, as defined by the server. *You should consult the manufacturers DICOM Conformance Statement.*

>`Comments` Optional comments used by the DICOM print server.

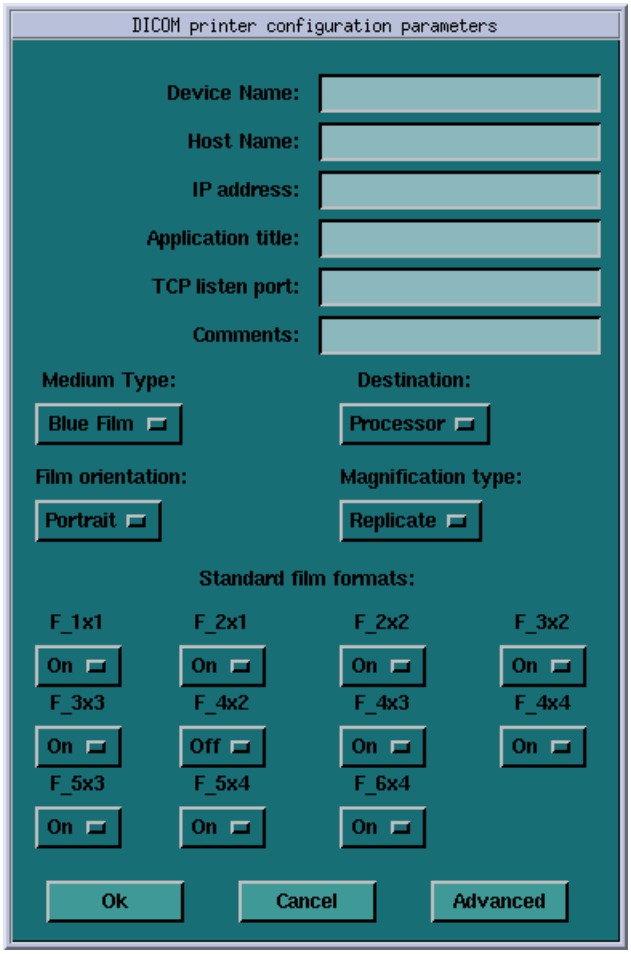


Figure 7-15 DICOM Camera Configuration

c.) `Medium Type specifies` the type of film being used. Currently, only BLUE FILM and CLEAR FILM are supported.

d.) Set `Destination` to the final location for film output: either MAGAZINE or PROCESSOR.

e.) `Orientation` selects film orientation. Ony PORTRAIT is currently supported.

f.) Set the `Magnification Type`. This parameter selects the algorithm used to interpolate pixels for proper film resolution. Set this parameter after consulting the camera manufacture to ensure optimal image quality. Choices are describe below:

>`None`No interpolation. This option is not supported by all cameras.

>`Replicate`Adjacent pixels are interpolated. This can result in "pixelized" images. *This algorithm is not normal preferred.*

>`Bilinear`A 1st order interpolation of pixels. Results in images usually described as blurred. *This algorithm is not normal preferred.*

Comment: For most Camera Manufacturers, the preferred selection is CUBIC.

>`Cubic`A 3rd order interpolation. Used with a large number of possible formulations. Camera manufactures define parameters called "smoothing type" to set coefficients used in this algorithm. The implementation of these "smoothing soefficients" is camera dependent.

g.) Select the `Standard Film Formats`. Select the film format by choosing ON in the pull-

down menu box located below each selection. See Figure 7-15. Valid film formats are set by the camera manufacture. IMATION for example, doesn't support 4x4, 2x4 or 1x2 and AGFA does not support 2x4) The DICOM print convention designates film formats by column and row (e.g. 12 on 1 film is 3x4).

h.) After the camera has been configured, click the ADVANCED button. This creates the camera device file for you automatically and pops up the Advanced Parameters screen. See Figure 7-16.

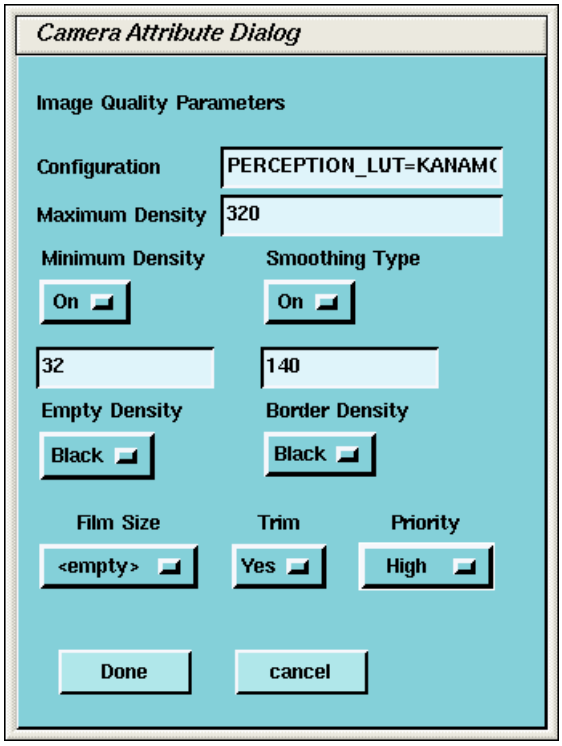


Figure 7-16 Advanced Parameters (Camera Attribute Dialog)

7.) Advanced camera parameters control the image quality of films.

Note: For more information on the proper settings for these parameters, please see the Camera's DICOM Print Device Conformance Statement or the Camera Manufacturer Representative.

You may need to refer to a copy of the Conformance Statement as you are working with the Camera Manufacturer's Representative, to correctly set up the DICOM Print Camera I/Q and Time-out Settings.

a.) `Configuration` - This parameter is camera manufacturer dependent as is typically used to specify the image contrast. The Configuration field may be up to 1024 characters long. The field will scroll automatically as text is entered. To review your entry, simply click and hold the middle mouse button, while the cursor is in the field, and drag the mouse towards the right (or left) as needed.

Note: Recommended Configuration Setting Values:

Agfa Drystar (MG3000)**PERCEPTION_LUT=KANAMORI (100)**
Imation Dryview (8700)**LUT=0,7**
Kodak Laser Printer 190**CS434\CN0\PD1.20**

b.) `Smoothing Type` - Set `Smoothing Type` to ON, and input the selected value. This parameter is used when the magnification type is CUBIC. It represents the coefficient for the image resolution alogrithm.This parameter is camera manufacturer dependent, and should be re-verified with your radiology department.

Note: **Recommended Smoothing Type Starting Values and Ranges:**

Agfa DryStar (MG3000)Start Value:**140**Range:**137-150**
Imation Dryview (8700)Start Value:**3**Range:**3-13**
Kodak Laser Printer 190Start Value:**Enhanced**Range:**Normal**

c.) `Minimum` and `Maximum Density` - Used to set brightness of the images on film. The range of values is 0-4095, although the valid range for a specific camera is manufacture dependent. For `Maximum Density`, input the correct value into the text box. For `Minimum Density`, set it to ON and input the correct value in the text box.

Note: **Recommended Minimum and Maximum Density Starting Values:**

Agfa Drystar (MG3000)Min.:**20** or **23**Max:**300**
Imation Dryview (8700)Min.:**(Blank)**Max:**300**
Kodak Laser Printer 190Min.:**20**Max:**300**

d.) `Empty Image Density` - This parameter sets the density for empty film viewports. Typically, BLACK is used but WHITE is an avialble option. The minimum and maximum density values are used as the representation.

e.) `Border Density` - This sets the density for the border used around the film viewports. Typically, BLACK is used but WHITE is an available option. The minimum and maximum density values are used as the representation.

f.) `Film Size` - Allows the system to specify a particular film size, if selected.

g.) `Trim` - YES produces a white (clear) box surrounding each image.

h.) `Priority` - This sets the print priority.

i.) If you have completed entry of advanced parameters, click DONE.

CAMERA DATA TABLES: TO LOCATE INSTALL CAMERA INFORMATION: CLICK ON THE SERVICE DESKTOP BUTTON. ON THE DESKTOP TOOLBAR SELECT UTILITIES -> INSTALL -> INSTALL CAMERA. THE INSTALL CAMERA WINDOW APPEARS. SELECT EACH OF THE CAMERAS THAT ARE INSTALLED FROM THE LIST OF INSTALLED CAMERAS, AND CLICK ON UPDATE TO VIEW THE CAMERA'S SETTINGS. RECORD THE VALUES USED TO SET UP EACH CAMERA IN THE TABLES THAT FOLLOW. EXTRA TABLES ARE PROVIDED FOR MULTIPLE CAMERAS

Note: You can determine this information by looking at the contents of the following files:

- For a DASM Camera: **`/usr/g/ctuser/app-defaults/devices/camera.dev`**
- For a DICOM Print Camera: **`/usr/g/ctuser/app-defaults/devices/`*`name.cfg`*** *where*, ***`name.cfg`*** is the camera device name from the printer configuration GUI.

Example: **`more <filename from above>`** **ENTER**

DASM CAMERA #1 SETUP

GUI SETTING	SELECTIONS	VALUE
Camera Type	Model Type of Camera	
DASM Type	Digital or Analog	o Digital o Analog
Options	Slides or Zoom	o Slides o Analog
Film	Smooth or Sharp	o Smooth o Sharp
Film Format Available	1x1, 2x1, 2x2, 3x2, etc.	

Table 7-1

GUI SETTING	SELECTIONS	VALUE
Film Format Default	1x1, 2x1, 2x2, 3x2, etc.	

Table 7-1

DICOM CAMERA #1

GUI SETTING	SELECTIONS	VALUES
DICOM Camera Type	Model Type of Camera	
Film Format Available	1x1, 2x1, 2x2, 3x2, etc.	
Network Parameters	Host Name	
	IP Address	
	AE Title	
	TCP Listen Port	
	Comments	
	Destination	o Magazineo Processor
Special Set Up	Orientation	o Portraito Landscape
	Medium Type	o Blue o Clear
	Magnification Type	o None o Replicate o Bilinearo Cubic
*Advanced Parameters - IQ	Smoothing Type	o ON o OFF Value:
	Configuration	
	Minimum Density	o ON o OFF Value:
	Maximum Density	
	Empty Density (Black/White)	o Black o White
	Border Density (Black/White)	o Black o White
	TRIM	o YES o NO
	Priority	o HI o MEDo LOW
	Film Size	

NOTES

*To view Advanced DICOM Camera Settings, you must click on ADVANCED.

Table 7-2 DICOM Camera #1

DICOM CAMERA #2

GUI SETTING	SELECTIONS	VALUES
DICOM Camera Type	Model Type of Camera	
Film Format Available	1x1, 2x1, 2x2, 3x2, etc.	
Network Parameters	Host Name	
	IP Address	
	AE Title	
	TCP Listen Port	
	Comments	
	Destination	o Magazineo Processor
Special Set Up	Orientation	o Portraito Landscape
	Medium Type	o Blue o Clear
	Magnification Type	o None o Replicate o Bilinearo Cubic
*Advanced Parameters - IQ	Smoothing Type	o ON o OFF Value:
	Configuration	
	Minimum Density	o ON o OFF Value:
	Maximum Density	
	Empty Density (Black/White)	o Black o White
	Border Density (Black/White)	o Black o White
	TRIM	o YES o NO
	Priority	o HI o MEDo LOW
	Film Size	

NOTES

*To view Advanced DICOM Camera Settings, you must click on ADVANCED.

Table 7-3 DICOM Camera #2

DICOM CAMERA #3

GUI SETTING	SELECTIONS	VALUES
DICOM Camera Type	Model Type of Camera	
Film Format Available	1x1, 2x1, 2x2, 3x2, etc.	
Network Parameters	Host Name	
	IP Address	
	AE Title	
	TCP Listen Port	
	Comments	
	Destination	o Magazineo Processor
Special Set Up	Orientation	o Portraito Landscape
	Medium Type	o Blue o Clear
	Magnification Type	o None o Replicate o Bilinearo Cubic
*Advanced Parameters - IQ	Smoothing Type	o ON o OFF Value:
	Configuration	
	Minimum Density	o ON o OFF Value:
	Maximum Density	
	Empty Density (Black/White)	o Black o White
	Border Density (Black/White)	o Black o White
	TRIM	o YES o NO
	Priority	o HI o MEDo LOW
	Film Size	

NOTES

*To view Advanced DICOM Camera Settings, you must click on ADVANCED.

Table 7-4 DICOM Camera #3

10.3 Troubleshooting Tips

The following is a summary of troubleshooting information for DICOM print that was gathered during software testing and validation of the DICOM print feature.

There is also a significant amount of additional troubleshooting procedures, and the theory of the DICOM print feature in the System Service Manual. Should you have problems installing a DICOM print camera, first read the information in System Service Manual.

ERROR BRINGING UP THE CAMERA INSTALLATION/FILMING APPLICATION

- **Symptom**: After creating/modifying the DICOM print camera the install camera interface does not come up and the filming application indicates it cannot bring up the film composer.

  Cause: The configuration field contains invalid information such as a backslash (\) as the final character in the field or brackets ({}).
- **Solution**: The camera.dev file in `~ctuser/app-defaults/devices` must be manually edited to remove the offending characters in the set configuration line. Invalid characters include `\{}`

CONFIGURATION INFORMATION FIELD

- **Symptom**: Cannot view the entire configuration field (> 25 characters)
- **Solution**: Hold down the middle mouse button and move the field contents

NEED TO SET DICOM PRINT ATTRIBUTES NOT SUPPORTED BY SOFTWARE

- **Symptom**: User wants the white border around each image box ON/OFF permanently for this system and it cannot be set as the default for the camera.
- **Solution**: Using your favorite editor, add the following line to the camera.dev file located in `~ctuser/app-defaults/devices` after the DICOM print device has been otherwise configured.

  For Trim Off - set `TRIM NO`

  For Trim On - set `TRIM YES`
- **Symptom**: DICOM print camera supports multiple film sizes and the user only wants to print if the film size is correct for BrightSpeed (14x17). [Otherwise the camera will queue the films or return an error causing the queue to pause (based upon the DICOM print camera specifications).]
- **Solution**: Using your favorite editor, add the following line to the camera.dev file located in `~ctuser/app-defaults/devices` after the DICOM print device has been otherwise configured.

  To force a 14x17 film size - set `filmSize 14INX17IN`

NEED TO PREVENT DICOM PRINT ATTRIBUTES FROM BEING SENT TO DICOM PRINT CAMERA

- **Symptom**: Some DICOM print attributes are optional, and may result in fatal errors. For example, the Fuji camera does not support the Empty Image Density parameter for the film box.
- **Solution**: Using your favorite editor, add the following line(s) to the camera.dev file located in `~ctuser/app-defaults/devices` after the DICOM print device has been otherwise configured.
  - To prevent sending the Smoothing Parameter set `FB_Smooth FALSE`

- To prevent sending the Border Density set `FB_Border FALSE`
- To prevent sending the Empty Image Density set `FB_EID FALSE`
- To prevent sending the Minimum Density set `FB_MinD FALSE`
- To prevent sending the Trim Parameter set `FB_Trim FALSE`

ERROR TRYING TO CONNECT TO THE DICOM PRINT CAMERA

- **Symptom**: DICOM print server can be reached (ping), but Application error indicates "`Unable to start filming interface`" and the help message talks about running the install.dasm (Association Error)
- **Solution**: The system is unable to complete the association. Check the `AE Title` and the `Port number` of the DICOM print server and correct them through the Install Camera procedure.

FILM COMPOSER ERROR NOT USABLE

- **Symptom**: Film composer error says "`unrecognized status - code 0`"
- **Solution**: Review the log file, the attention and status windows. These areas have the correct filming status (for example, **film jam** and **supply empty**).

DEBUGGING CONNECTION ISSUES DIFFICULT

- **Symptom**: The timeouts for the DICOM print are very long, which means one needs to wait a long time before you know the application is not working.
- **Solution**: The timeouts for the DICOM print were setup to ensure that the system would work regardless of whether the DICOM print camera was on a LAN or a WAN halfway around the world. The DICOM print timeouts for the association and DIMSE classes (for example, **N-GET**, **N-DELETE**) can be modified within the DICOM print camera installation. They can be reduced down to 90 seconds.

DICOM PRINT ERROR ON N-GET TIMEOUT CONFUSING

- **Symptom**: When the N-GET timeout goes off, the error message in the prslog file will be "`Could not get printer status, invalid command sequence for N-GET`".
- **Solution**: When the user sees the above error they may want to consider that the issue may be an inactivity timer on the N-GET DIMSE service.

DICOM PRINT CAMERA SLIDE SUPPORT

- **Symptom**: Current implementation of DICOM print does not allow selection of slide format.
- **Solution**: Feature not currently supported. Possibly in future releases.

CONFUSION ON FILM FORMAT NOTATION

- **Symptom**: GEMS Laser Camera and DICOM Print film format notations are opposite.
- **Solution**:
  - GEMS Laser Camera film format notation has always been row x col (for example, 12 on 1 = 4x3)
  - DICOM Print Standard film format notation is col x row (for example, 12 on 1 = 3x4)

Section 11.0
Network Connections

BROAD-BAND

Broad-band is considered the standard network connection for BrightSpeed. (A dial-up modem is optional.) Broad-band connections should use one of the following Category 5 patch cables:

CAT Num	GE Part Num	Length
K9000WB	2215028-10	20 m
K9000KP	2215028-5	10 m
K9000JR	2215028-4	5 m
K9000WA	2215028-9	3 m

The CT system is connected to the network through the Console.

- A patch cable (not to exceed 10 feet) should be provided by the customer, and it is used to connect the console to a wall box. (See Notes on Figure 7-17)
- Some customer-site units may require cable duct-work or conduit to route connecting network cables to the workstation, camera and console.
- The run from the hospital switch to the CT wall outlet must not exceed 290 ft. (88m). Bandwidth performance is degraded when the length reaches 300 ft. (91m) or greater.
- For the optional modem: **Two phone lines should be provided by the facility**. One line is for use with a modem and must be an analog line. The second line is a voice only line.

For LCGOC/GOC4/AIO Console Network Connection:

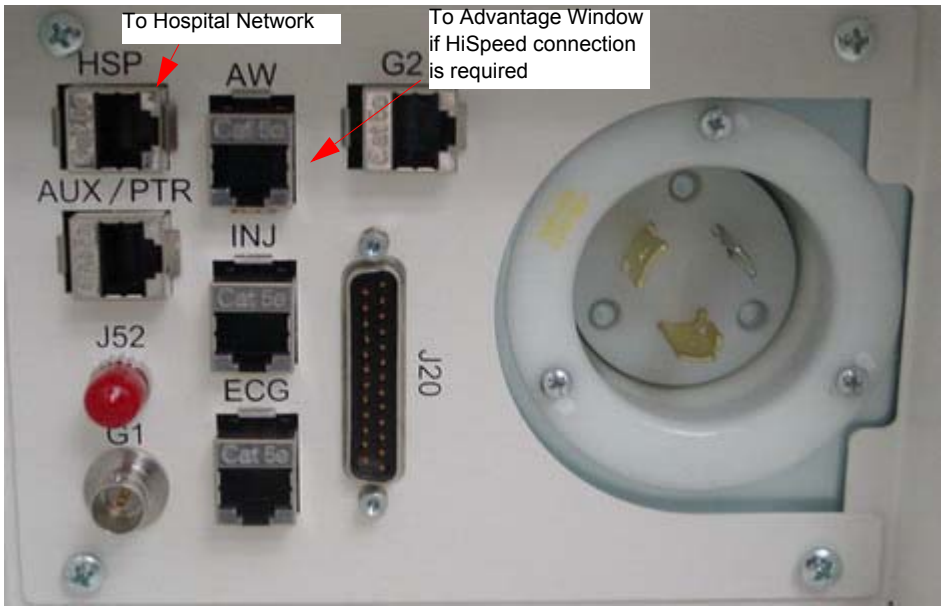
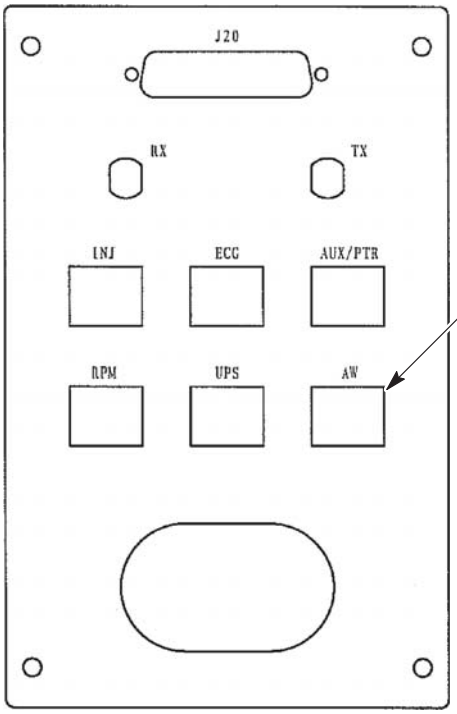


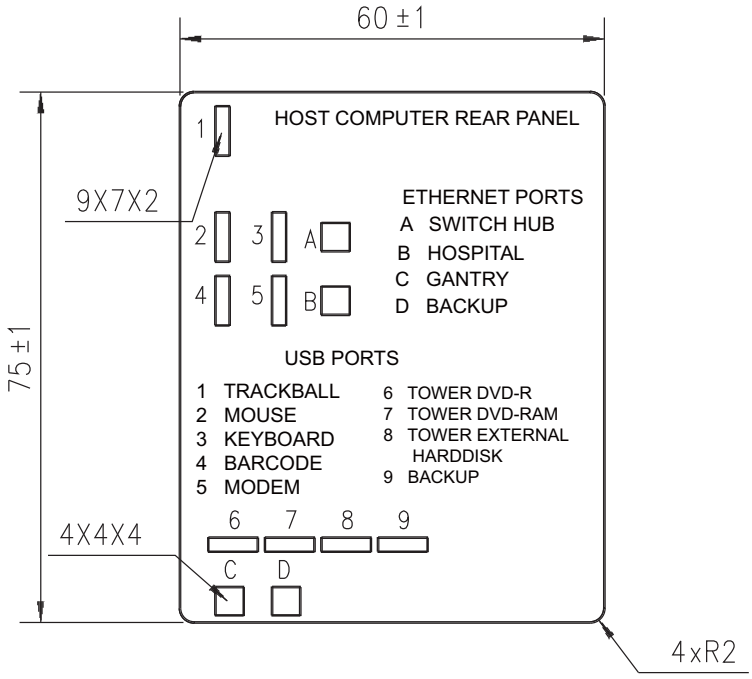
Figure 7-17 LCGOC/GOC4/AIO Console Rear Bulkhead

For TIO Console Network Connection:

- AW High Speed Connector will use the bulkhead connector named "AW". Hospital network connector uses network connector of XW8600.



TIO Console Rear Bulkhead

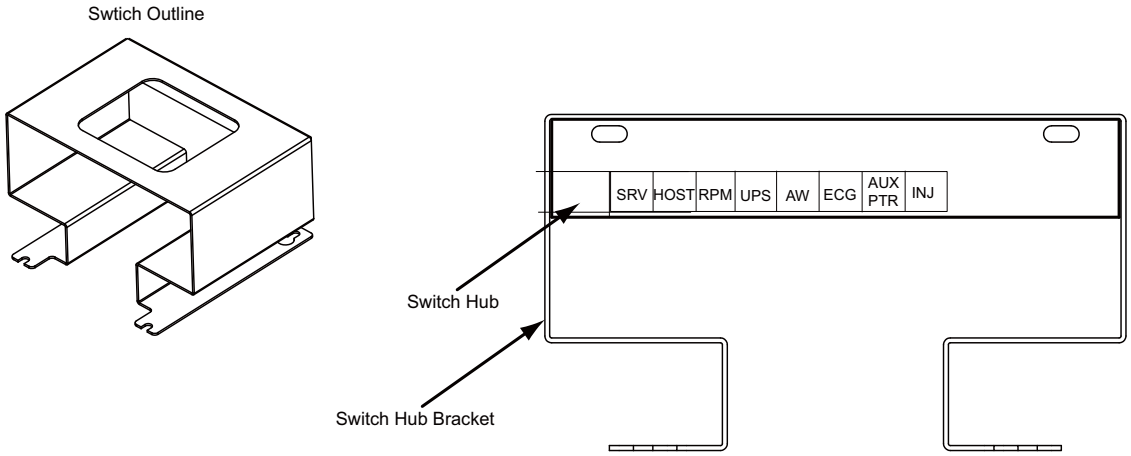


TIO Console Host Computer Rear

Figure 7-18 TIO Console and Host Computer (XW8600) Rear Bulkhead

For NIO16 Console Network Connection:

- All cables connection via Switch Hub, Switch Hub located on the left bottom of the console, Plug cables into Switch Hub on console.



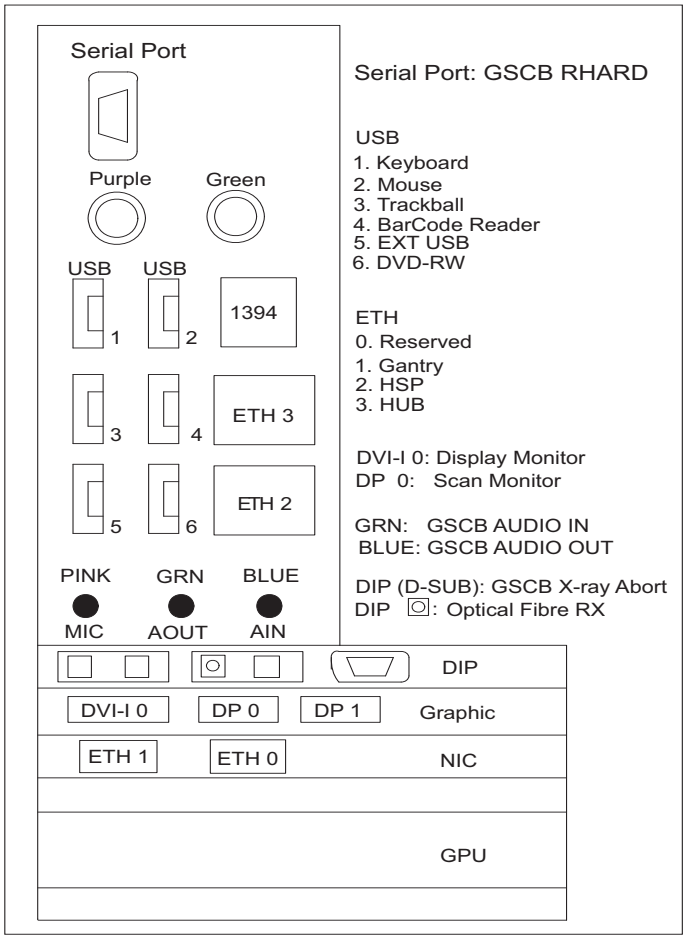
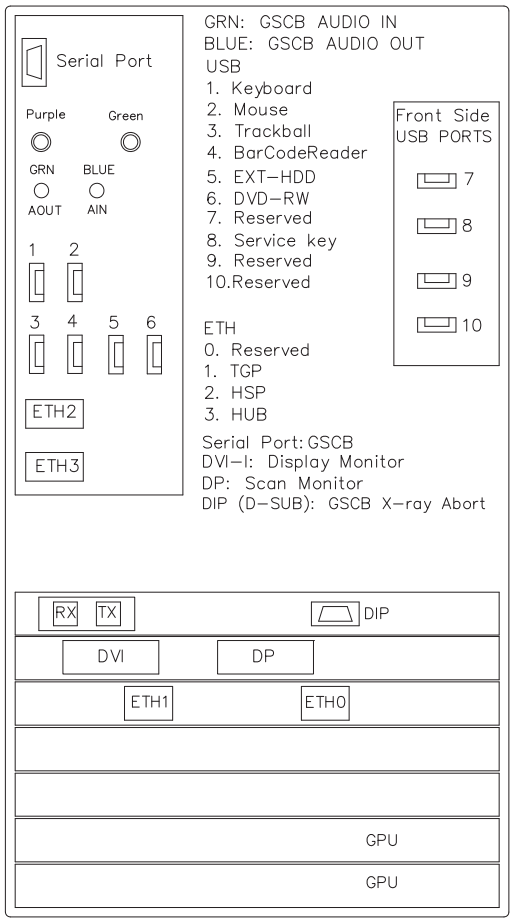


Figure 7-19 NIO16 Console Rear View



NOTE: EXT HDD is for DVD Tower External HD Drive
DVD-RW is for DVD Tower DVD-R / CD-R Drive

Figure 7-20 Z840 Host Computer Connections

US PROCESS OVERVIEW

The United States network connectivity requirement for this product is broad-band. The US process relies on the Install Specialist to select a Customer Champion and identify an IT contact for the site. Together, those individuals then complete a site assessment to gauge what tasks are needed to fulfill the connection.

Anyone can contact the GE Connectivity team at 800.321.7937, Option #3, with questions.

CUSTOMER BROADBAND RESPONSIBILITIES

Provide GE Healthcare Installation Specialist with an accurate site address, telephone number, contact name, and e-mail address for the:

- Customer Champion
  - Coordinate VPN activities between Radiology/Cardiology and the Information Technology (IT) departments
  - Act as a focal point in assuring site broadband infrastructure meets GE Healthcare requirements for connection as determined by a mutual assessment with the GE Healthcare Connectivity team.
- IT Contact
  - Complete an equipment assessment with GE Healthcare Connectivity team to determine site readiness for broadband
  - Work with the Customer Champion to complete any identified infrastructure changes
  - Provide IP addresses for new CT equipment
  - Provide a VPN compatible appliance that will support the IPSec tunneling protocol and 3DES data encryption
  - To utilize an Internet Service Provider that supports static routing

GE Medical Systems

Remote Service Broadband - Customer Site Assessment

Site Name: _____ **FE Name:** _____
City, State: _____ **FE Phone:** _____
Date: _____ **FE Email** _____

	Yes	No
1. Does your site currently have a persistent (24x7) Internet connection?	☐	☐
2. Is the GEMS Diagnostic Imaging equipment on the Local Area Network and will it be accessible to the Internet?	☐	☐
3. Does your site have a VPN device today?	☐	☐
4. Is the VPN device one of the models below? *If **Yes**, please select the model from the options below.*	☐	☐

- ☐ a) Cisco Pix Firewalls
- ☐ b) Cisco Routers
- ☐ c) Cisco 3000 Series (Altiga acquisition)
- ☐ d) Checkpoint Firewalls Software Version 4.1 and higher
- ☐ e) Nortel Contivity Software Version 3.2 or higher
- ☐ f) Redcreek
- ☐ g) Symantec (Raptor) firewalls
- ☐ h) Firebox
- ☐ i) Linux S/WAN
- ☐ j) Sidewinder
- ☐ k) Netscreen
- ☐ l) None
- ☐ m) Other _____

If **No, the GEMS Connectivity Support Team can help determine device compatibility.*

5. Does your VPN device support "triple DES" Encryption?	☐	☐
6. Has approval been given to install this VPN connection?	☐	☐

Site Approver's Name _____

7. Provide your VPN Installer information, this is the person who will be contacted to schedule the VPN install.

Customer Installer Name: _____
Installer Telephone Number: _____
Installer e-mail address: _____

Notes: _____

Field Engineer needs to provide compatible system informaiton:

System ID	IP Address	Gateway Address

Additional System and IP Address Spaces Available on Page 2

If you have questions or need assessment support contact your Zone Champ or:

Joe Gracz - HQ Support 1-262-524-5261
Joseph.Gracz@med.ge.com

Once you have completed both pages of this form, please send it to:
a) Judy Heyer judy.heyer@med.ge.com
b) Judy Heyer Fax# **414-918-4707**

Use the send button on page 2

GE Medical Systems

System ID List & Compatibility Matrix

MR	Software Version	CT	Software Version
Include all Signa(LX, Ovation, OpenSpeed and CV/I) MR's System Ids and IP Addresses in assessment.		HiSpeed CT/e	Minimum 6.0
		HiSpeed CT/e dual	Minimum 2.06
		HiSpeedNX/I	Minimum 5.5
Prior to completing an InSite checkout systems must be upraded to Version 9.0 or 9.1 unless shown in the compatible list below.		LightSpeed QX/I	Minimum 1.3
		LightSpeed Plus	Minimum 2.1
Signa TwinSpeed	Release 9.0	LightSpeed Ultra	Minimum 3
Signa	Release 9.1	HiSpeed X/I	
Signa	Release 10.x	CT/I	Minimum 6.2
Signa CV/I	CNV4	Lxi, Dxi, Fxi, Zxi	Minimum 6.01
Signa 3T			
Signa Profile	Minimum 7.66		
Signa Contour	Minimum 7.66		
Magnet Monitor	Minimum 2.3 software		

Network Products	Software Version	Nuclear/Pet	Software Version
AW 4.0	Version 4.0 or Above	Advance	Minimum 5.1
AW 4.0P		eNTEGRA	Minimum 2.03

X-Ray	Software Version
Cardiac	
INNOVA	All
Mammography	
Seno2000D	All
Digital Radiology	
Revolution XQ/I	Version 10.12.5 or above
Revolution XR/d	Version 18.0

Multi Vendor

MR	PSI	CT	PSI
Philips ACS 1.5T	MZP 400	Picker MX-TWIN	CZM 400
Philips NT 2000	MZP 401	Picker MX 8000	CZM 401
Philips NT 3000	MZP 402	Picker PQ	CZM 500
Philips NT ACS	MZP 403	Picker PQ 2000	CZM 501
Picker Outlook 0.23T	MZM 301	Picker PQ 5000	CZM 502
Picker Edge 1.5T	MZM 800	Picker PQ 6000	CZM 503
Picker Vista 1.0T	MZM 801	Picker PQS	CZM 504
Picker Eclipse 1.5T	MZM 900	Siemens AR STAR	CZS 100
Picker Polaris 1.0T	MZM 901	Siemens AR.C	CZS 101
Siemens Harmony 1.0T	MZS 100	Siemens AR.HP	CZS 102
Siemens Impact 1.0T	MZS 200	Siemens AR.SP	CZS 103
Siemens Impact Expert 1.0T	MZS 201	Siemens AR.T	CZS 104
Siemens SP 1.0T	MZS 400	Siemens PLUS-4 EXP	CZS 400
Siemens SP 1.5T	MZS 401	Siemens PLUS-4 POW	CZS 401
Siemens SP4000 1.5T	MZS 403	Siemens PLUS-4 VOL	CZS 402
Siemens Symhony 1.5T	MZS 500		
Siemens Vision 1.5T	MZS 600		

Field Engineer needs to provide compatible system informaiton:

System ID	IP Address	Gateway Address

Once you have completed this form, please send it to:

Judy Heyer	**email**	**judy.heyer@med.ge.com**
Judy Heyer	**Fax #**	**414-918-4707**

Send Now

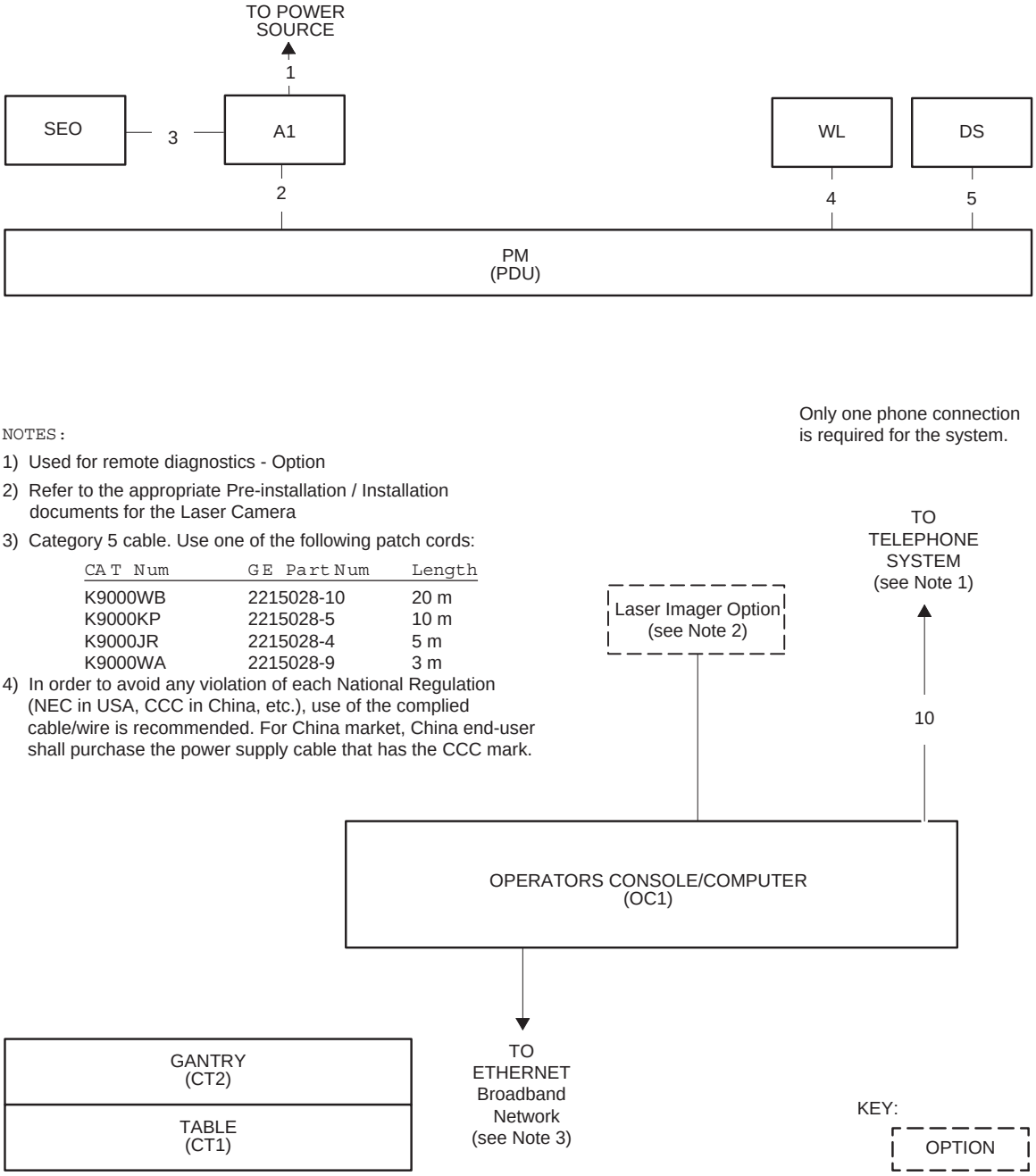


Figure 7-21 BrightSpeed System Interconnection Runs

Section 12.0
Modem Setup in IIP Configuration

If a phone Modem needs to be installed, follow below description to select correct modem type in "iipadmin config" GUI.

Figure 7-22IIP Config GUI

For GOC4/LCGOC, a Series Port Modem will be used. At "CPU Series Port Name", Select `/dev/ttys0`.

For All-In-One Console, see below:

If a USB Port Modem is used. at "CPU Series Port Name", Select `/dev/ttyACM0`.

If a Series Port Modem and USB Series converter cable is used. at "CPU Series Port Name", Select `/dev/ttyUSB1`.

For TIO/NIO16 Console, select **`/dev/ttyUSB0`** in CPU Serial Port Name.

Chapter 8
System-Level Safety Tests

You must complete these tests after all options are installed. They cover three safety and leakage current checks:

- Patient Touch Current Test (Completed after installation)
- System Ground Resistance Measurement (completed during installation)
- Ground Current Typical (completed after installation - optional)

Refer to the BrightSpeed Elite Service Methods CD to located the latest Enclosure Leakage (Patient Touch) and System Chassis Leakage Tests under the **Function Checks** chapter.

Chapter 9
Installation Completion

Section 1.0
Notice to the customer

Note: If equipment is connected to CT system via signal cable (for example, Ethernet hub), is powered by different source other than CT system (for example, wall outlet), and if there is a difference in electrical potential between those grounds, additional separate device for the equipment is required. Otherwise use un-shielded cables to have isolation.

The following shall be explained before delivery up the system to customer.

Do not change the power line connection of the following devices to the wall plug. It will cause of the increase of leakage current and the electric shock.

- OC LCD Monitors
- MOD Tower
- Peripheral Media Tower
- Modem
- Video Splitter

Do not connect any other electrical devices than accessories provided by GE. It will cause of the increase of leakage current and the electric shock.

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Appendix F
Additional Characterization Procedures

For information related to alignment, setup, and calibration procedures, please refer to the BrightSpeed System Service Methods, Direction 5193754-800.

Appendix G
System Configuration Data Sheets

REQUIREMENT

Record valuable system information in the data sheets that follow. Consult with your customer or network administrator to obtain the information. Understanding how the customer plans to use their CT scanner, and their network and filming expectation reduces the time required to reconfigure the system.

MANUAL FILM COMPOSER OPTIONS

MANUAL FILM COMPOSER OPTIONS	
Slide Format (if available):	
Greyscale:	
Auto Printing:	
Auto Clear Page:	
Icon Labels:	
Expose Order:	
No. of Copies:	

Table G-1 Manual Film Composer Options

SYSTEM NETWORK CONFIGURATION

SYSTEM NETWORK CONFIGURATION			
	FIELD NAME:	**SETENV NAME:**	**FIELD VALUE:**
System Settings:	Service ID	SERVICE_ID	
	Hospital Name	HOSPITAL_NAME	
	Exam Number *	* ask customer or checklog	
	DAS Type	DASTYPE	
	PDU Type	PDUTYPE	
Network Settings:	Gateway Host Name	GATEWAY_HOSTNAME	
	Gateway IP	GATEWAY_IP	

Table G-2 System Network Configuration

SYSTEM NETWORK CONFIGURATION			
	FIELD NAME:	**SETENV NAME:**	**FIELD VALUE:**
	Gateway Net Mask	GATEWAY_NETMASK	
	Gateway Broadcast Mask	GATEWAY_BROADCAST	
	Suite Name	SUITEID	
Option	Network Printer IP Address		
Option	HIS Server IP Address		
Option	HIS Server AE Title		
Option	HIS server AE Port		
Option	CT Server AE Title		
Option	Connect Pro IP Address		

Table G-2 System Network Configuration (Continued)

NETWORK APPLICATION (IMAGE TRANSFER) CONFIGURATION

Record the network application (image transfer) configuration.

NETWORKING APPLICATION (IMAGE TRANSFER) CONFIGURATION				
AE TITLE OR HOST NAME	**NETWORK ADDRESS**	**NETWORK PROTOCOL**	**PORT NUMBER**	**COMMENTS**

Table G-3 Networking Application (Image transfer) Configuration

HOST ETHERNET ADDRESS

_____:_____:_____:_____:_____:_____

CAMERA APPLICATION CONFIGURATION

Record the camera application configuration for the DASM or DICOM print camera.

DASM LASER CAMERA CONFIGURATION	
Camera Type:	
DASM Type:	
Film Smooth/Sharp Setting:	
Options:	
Valid Film Formats:	
Default Film Formats:	

Table G-4 DASM Laser Camera Configuration

DICOM PRINT CAMERA CONFIGURATION	
Camera Type:	
Host Name:	
IP Address:	
AE Title:	
TCP/IP Listen Port:	
Comments (Optional):	
Valid Film Formats:	
Default Film Formats:	
Destination:	
Orientation:	
Medium Type:	
Magnification Type:	

Table G-5 DICOM Print Camera Configuration

DICOM PRINT CAMERA ADVANCE CONFIGURATION	
Smoothing Type:	
Configuration:	
Minimum Density:	
Maximum Density:	
Empty Density:	
Border Density:	
Association Timeout:	
Session Timeout:	
N-Set Timeout:	
N-Action Timeout:	
N-Create Timeout:	
N-Delete Timeout:	
N-Get Timeout:	

Table G-6 DICOM Print Camera Advanced Configuration

CONFIGURATION

Note: Type the text shown in **boldface**, and press the **ENTER** key on the keyboard.

NEXT STEPS

Resume installation following instructions in Chapter 5: Restore System State (Section 2.3).

Appendix H Symbols

SYMBOL	PUBLICATION	DESCRIPTION
	417-5032	Alternating Current
	335-1	Three-phase Alternating Current
	335-1	Three-phase Alternating Current with neutral conductor
		Direct Current
	417-5019	Protective Earth (Ground)
	348	Attention, consult ACCOMPANYING DOCUMENTS
	417-5008	OFF (Power: disconnection from the mains)
	417-5007	ON (Power: connection to the mains)
		Warning, HIGH VOLTAGE
		Emergency Stop
		Type B

Table H-1 Symbols

SYMBOL	PUBLICATION	DESCRIPTION
	417-5339	X-ray Source Assembly Emitting
	417-5009	Standby
		Start
		Table Set
		Abort
		Intercom
		(on Operator Console) Power On: light on Standby: light off

Table H-1 Symbols

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