

GE Healthcare

MobileLink™ Wireless Communication  
Installation Manual  
For GEH-BR-4600 Wireless Bridge  
2053535-080 C



MobileLink  
English  
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## Publications Information

### NOTE:

The information in this manual applies only to the following MobileLink product configurations:

#### MAC 2000 Resting ECG Analysis System:

Software version 1.1 or higher

#### MAC 800 Resting ECG Analysis System:

Software version 1.0.X and 2.0.X

#### Servers:

Silex Wi-Fi Bridge GEH-BR-4600

#### MUSE Systems Software Versions:

7.1.1 or higher

8.0.1 or higher

9.0 or higher

The information is provided for reference to support legacy systems with this MobileLink configuration.

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The document part number and revision are on each page of the document. The revision identifies the document's update level. The revision history of this document is summarized in the following table.

Revision	Date	Comment
A	8 August 2017	Initial release of GEH-BR-4600 Server only manual
B	6 November 2017	Updated to phase in Silex wireless module.
C	24 May 2018	Update according to the service comments.

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### NOTE:

All illustrations in this document are provided as examples only. Depending on system configuration, screens in the document may differ from the screens on your system.

All patient names and data are fictitious. Any similarity to actual persons is coincidental.

If you require additional assistance, contact your GE Healthcare representative, or GE Healthcare support at one of the following numbers:

- North America: 1-800-558-7044
- Europe: +49 761 45 43 -0
- Asia: +86 21 3877 7888

## Service Manual Language Information

WARNING (EN)	<p>This service manual is available in English only.</p> <ul style="list-style-type: none"> <li>• If a customer's service provider requires a language other than English, it is the customer's responsibility to provide translation services.</li> <li>• Do not attempt to service the equipment unless this service manual has been consulted and is understood.</li> <li>• Failure to heed this warning may result in injury to the service provider, operator, or patient, from electric shock, mechanical or other hazards.</li> </ul>
ПРЕДУПРЕЖДЕНИЕ (BG)	<p>Това упътване за работа е налично само на английски език.</p> <ul style="list-style-type: none"> <li>• Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод.</li> <li>• Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа.</li> <li>• Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациент в резултат на токов удар или механична или друга опасност.</li> </ul>
警告 (ZH-CN)	<p>本维修手册仅提供英文版本。</p> <ul style="list-style-type: none"> <li>• 如果维修服务提供商需要非英文版本，客户需自行提供翻译服务。</li> <li>• 未详细阅读和完全理解本维修手册之前，不得进行维修。</li> <li>• 忽略本警告可能对维修人员，操作员或患者造成触电、机械伤害或其他形式的伤害。</li> </ul>
警告 (ZH-TW)	<p>本維修手冊只提供英文版。</p> <ul style="list-style-type: none"> <li>• 如果客戶的維修人員有英語以外的其他語言版本需求，則由該客戶負責提供翻譯服務。</li> <li>• 除非您已詳閱本維修手冊並了解其內容，否則切勿嘗試對本設備進行維修。</li> <li>• 不重視本警告可能導致維修人員、操作人員或病患因電擊、機械因素或其他因素而受到傷害。</li> </ul>
UPOZORENJE (HR)	<p>Ove upute za servisiranje dostupne su samo na engleskom jeziku.</p> <ul style="list-style-type: none"> <li>• Ukoliko korisnički servis zahtijeva neki drugi jezik, korisnikova je odgovornost osigurati odgovarajući prijevod.</li> <li>• Nemojte pokušavati servisirati opremu ukoliko niste konzultirali i razumjeli ove upute.</li> <li>• Nepoštivanje ovog upozorenja može rezultirati ozljedama servisnog osoblja, korisnika ili pacijenta prouzročenim električnim udarom te mehaničkim ili nekim drugim opasnostima.</li> </ul>
VAROVÁNÍ (CS)	<p>Tento provozní návod existuje pouze v anglickém jazyce.</p> <ul style="list-style-type: none"> <li>• V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka.</li> <li>• Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah.</li> <li>• V případě nedodržování této varování může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik.</li> </ul>

## Service Manual Language Information (cont'd.)

ADVARSEL (DA)	<p>Denne servicemanual findes kun på engelsk.</p> <ul style="list-style-type: none"> <li>• Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse.</li> <li>• Forsøg ikke at servicere udstyret medmindre denne servicemanual har været konsulteret og er forstået.</li> <li>• Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk, mekanisk eller anden fare for teknikeren, operatøren eller patienten.</li> </ul>
WAARSCHUWING (NL)	<p>Deze service manual is alleen in het Engels verkrijgbaar.</p> <ul style="list-style-type: none"> <li>• Indien het onderhoudspersoneel een andere taal nodig heeft, dan is de klant verantwoordelijk voor de vertaling ervan.</li> <li>• Probeer de apparatuur niet te onderhouden voordat deze service manual geraadpleegd en begrepen is.</li> <li>• Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de gebruiker of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren.</li> </ul>
HOIATUS (ET)	<p>Käesolev teenindusjuhend on saadaval ainult inglise keeles.</p> <ul style="list-style-type: none"> <li>• Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest.</li> <li>• Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist.</li> <li>• Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel.</li> </ul>
VAROITUS (FI)	<p>Tämä huolto-ohje on saatavilla vain englanniksi.</p> <ul style="list-style-type: none"> <li>• Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla.</li> <li>• Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen.</li> <li>• Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi.</li> </ul>
ATTENTION (FR)	<p>Ce manuel technique n'est disponible qu'en anglais.</p> <ul style="list-style-type: none"> <li>• Si un service technique client souhaite obtenir ce manuel dans une autre langue que l'anglais, il devra prendre en charge la traduction et la responsabilité du contenu.</li> <li>• Ne pas tenter d'intervenir sur les équipements tant que le manuel technique n'a pas été consulté et compris.</li> <li>• 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.</li> </ul>

## Service Manual Language Information (cont'd.)

<p>WARNUNG (DE)</p>	<p>Diese Serviceanleitung ist nur in englischer Sprache verfügbar.</p> <ul style="list-style-type: none"> <li>Falls der Kundendienst eine andere Sprache benötigt, muss er für eine entsprechende Übersetzung sorgen.</li> <li>Keine Wartung durchführen, ohne diese Serviceanleitung gelesen und verstanden zu haben.</li> <li>Bei Zuwiderhandlung kann es zu Verletzungen des Kundendiensttechnikers, des Anwenders oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen.</li> </ul>
<p>ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)</p>	<p>Το παρόν εγχειρίδιο σέρβις διατίθεται στα αγγλικά μόνο.</p> <ul style="list-style-type: none"> <li>Εάν το άτομο παροχής σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει υπηρεσίες μετάφρασης.</li> <li>Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό εκτός εάν έχετε συμβουλευτεί και έχετε κατανοήσει το παρόν εγχειρίδιο σέρβις.</li> <li>Εάν δεν λάβετε υπόψη την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στο άτομο παροχής σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους.</li> </ul>
<p>FIGYELMEZTETÉS (HU)</p>	<p>Ez a szerviz kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> <li>Ha a vevő szerviz ellátója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészítése.</li> <li>Ne próbálja elkezdni használni a berendezést, amíg a szerviz kézikönyvben leírtakat nem értelmezték és értették meg.</li> <li>Ezen figyelmeztetés figyelmen kívül hagyása a szerviz ellátó, a működtető vagy a páciens áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti.</li> </ul>
<p>AÐVÖRUN (IS)</p>	<p>Þessi þjónustuhandbók er eingöngu fáanleg á ensku.</p> <ul style="list-style-type: none"> <li>Ef að þjónustuveitandi viðskiptamanns þarfnast annars tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálþjónustu.</li> <li>Reynið ekki að afgreiða tækið nema þessi þjónustuhandbók hefur verið skoðuð og skilin.</li> <li>Brot á að sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklingi frá raflosti, vélrænum eða öðrum áhættum.</li> </ul>
<p>PERINGATAN (ID)</p>	<p>Manual servis ini hanya tersedia dalam bahasa Inggris.</p> <ul style="list-style-type: none"> <li>Jika penyedia jasa servis pelanggan memerlukan bahasa lain selain dari Bahasa Inggris, merupakan tanggung jawab dari penyedia jasa servis tersebut untuk menyediakan terjemahannya.</li> <li>Jangan mencoba melakukan servis terhadap perlengkapan kecuali telah membaca dan memahami manual servis ini.</li> <li>Mengabaikan peringatan ini bisa mengakibatkan cedera pada penyedia servis, operator, atau pasien, karena terkena kejut listrik, bahaya mekanis atau bahaya lainnya.</li> </ul>

## Service Manual Language Information (cont'd.)

AVVERTENZA (IT)	<p>Il presente manuale di manutenzione è disponibile soltanto in Inglese.</p> <ul style="list-style-type: none"> <li>Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione.</li> <li>Si proceda alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto.</li> <li>Il non rispetto della presente avvertenza potrebbe far compiere operazioni da cui derivino lesioni all'addetto, alla manutenzione, all'utilizzatore ed al paziente per folgorazione elettrica, per urti meccanici od altri rischi.</li> </ul>
警告 (JA)	<p>このサービスマニュアルは英語版しかありません。</p> <ul style="list-style-type: none"> <li>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。</li> <li>このサービスマニュアルを熟読し、十分に理解をした上で装置のサービスを行ってください。</li> <li>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。</li> </ul>
CẢNH BÁO (VI)	<p>Tài Liệu Hướng Dẫn Sửa Chữa chỉ có bản tiếng Anh.</p> <ul style="list-style-type: none"> <li>Nếu các đơn vị cung cấp dịch vụ cho khách hàng yêu cầu một ngôn ngữ nào khác tiếng Anh, thì khách hàng sẽ có trách nhiệm cung cấp các dịch vụ dịch thuật.</li> <li>Không được sửa chữa thiết bị trừ khi đã tham khảo và hiểu Tài liệu Hướng dẫn Sửa chữa.</li> <li>Không tuân thủ những cảnh báo này có thể dẫn đến các tổn thương cho người thực hiện sửa chữa, người vận hành hay bệnh nhân, do sốc điện, các rủi ro về cơ khí hay các rủi ro khác.</li> </ul>
ЕСКЕРТУ (KK)	<p>Бұл қызмет көрсету бойынша нұсқаулығы тек ағылшын тілінде қолжетімді.</p> <ul style="list-style-type: none"> <li>Тұтынушының қызмет провайдері ағылшын тілінен басқа тілдегі нұсқаны талап етсе, аудару бойынша қызметтерімен қамтамасыз ету тұтынушы жауапкершілігінде болуы тиіс.</li> <li>Бұл қызмет көрсету бойынша нұсқаулығын назарға алып, түсінбегенше, жабдыққа қызмет көрсетуден бас тартыңыз.</li> <li>Бұл ескертуді елемей қызмет провайдері, оператор немесе емделушінің электр шоғынан, механикалық немесе басқа қауіптер нәтижесінде жарақат алуына әкелуі мүмкін.</li> </ul>
BRĪDINĀJUMS (LV)	<p>Šī apkalpotāju rokasgrāmata ir pieejama tikai anglu valodā.</p> <ul style="list-style-type: none"> <li>Ja apkalpošanas sniedzējam nepieciešama informācija citā, nevis anglu, valodā, klienta pienākums ir nodrošināt tās tulkošanu.</li> <li>Neveiciet aprīkojuma apkopi, neizlasot un nesaprotot apkalpotāju rokasgrāmatu.</li> <li>Šī brīdinājuma neievērošana var radīt elektriskās strāvas trieciena, mehānisku vai citu risku izraisītu traumu apkopes sniedzējam, operatoram vai pacientam.</li> </ul>
ISPĖJIMAS (LT)	<p>Šis eksploataavimo vadovas yra prieinamas tik anglų kalba.</p> <ul style="list-style-type: none"> <li>Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba - ne anglų, numatyti vertimo paslaugas yra kliento atsakomybė.</li> <li>Nemėginkite atlikti įrangos techninės priežiūros, nebent atsižvelgėte į šį eksploataavimo vadovą ir jį supratote.</li> <li>Jei neatkreipsite dėmesio į šį perspėjimą, galimi sužalojimai dėl elektros šoko, mechaninių ar kitų paslaugų tiekėjui, operatoriui ar pacientui.</li> </ul>

## Service Manual Language Information (cont'd.)

ADVARSEL (NO)	<p>Denne servicehåndboken finnes bare på engelsk.</p> <ul style="list-style-type: none"> <li>• Hvis kundens serviceleverandør trenger et annet språk, er det kundens ansvar å sørge for oversettelse.</li> <li>• Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått.</li> <li>• Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer.</li> </ul>
OSTRZEŻENIE (PL)	<p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.</p> <ul style="list-style-type: none"> <li>• Jeśli dostawca usług klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta.</li> <li>• Nie należy serwisować wyposażenia bez zapoznania się i zrozumienia niniejszego podręcznika serwisowego.</li> <li>• Niezastosowanie się do tego ostrzeżenia może spowodować urazy dostawcy usług, operatora lub pacjenta w wyniku porażenia elektrycznego, zagrożenia mechanicznego bądź innego.</li> </ul>
AVISO (PT-BR)	<p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> <li>• Se o serviço de assistência técnica do cliente não for GE, e precisar de outro idioma, será da responsabilidade do cliente fornecer os serviços de tradução.</li> <li>• Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica.</li> <li>• O não cumprimento deste aviso pode por em perigo a segurança do técnico, operador ou paciente devido a choques elétricos, mecânicos ou outros.</li> </ul>
AVISO (PT-PT)	<p>Este manual técnico só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> <li>• Se a assistência técnica do cliente solicitar estes manuais noutro idioma, é da responsabilidade do cliente fornecer os serviços de tradução.</li> <li>• Não tente reparar o equipamento sem ter consultado e compreendido este manual técnico.</li> <li>• O não cumprimento deste aviso pode provocar lesões ao técnico, ao utilizador ou ao paciente devido a choques eléctricos, mecânicos ou outros.</li> </ul>
AVERTISMENT (RO)	<p>Acest manual de service este disponibil numai în limba engleză.</p> <ul style="list-style-type: none"> <li>• Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere.</li> <li>• Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service.</li> <li>• Ignorarea acestui avertisment ar putea duce la rănirea depanatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură.</li> </ul>
ПРЕДУПРЕЖДЕНИЕ (RU)	<p>Настоящее руководство по обслуживанию предлагается только на английском языке.</p> <ul style="list-style-type: none"> <li>• Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует обеспечить перевод самостоятельно.</li> <li>• Прежде чем приступать к обслуживанию оборудования, обязательно обратитесь к настоящему руководству и внимательно изучите изложенные в нем сведения.</li> <li>• Несоблюдение требований данного предупреждения может привести к тому, что специалисты по обслуживанию, операторы или пациенты получат удар электрическим током, механическую травму или другое повреждение.</li> </ul>

## Service Manual Language Information (cont'd.)

UPOZORENJE (SR)	<p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"> <li>Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge.</li> <li>Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo.</li> <li>Zanemarivanje ovog upozorenja može dovesti do povređivanja serviser, rukovaoca ili pacijenta usled strujnog udara, ili mehaničkih i drugih opasnosti.</li> </ul>
VAROVANIE (SK)	<p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"> <li>Ak zákazníkov poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka.</li> <li>Nepokúšajte sa o obsluhu zariadenia skôr, ako si neprečítate návod na obsluhu a neporozumiete mu.</li> <li>Zanedbanie tohto varovania môže vyústiť do zranenia poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanickým alebo iným nebezpečenstvom.</li> </ul>
OPOZORILO (SL)	<p>Ta servisni priročnik je na voljo samo v angleškem jeziku.</p> <ul style="list-style-type: none"> <li>Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod.</li> <li>Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli.</li> <li>Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik.</li> </ul>
ADVERTENCIA (ES)	<p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"> <li>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.</li> <li>No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio.</li> <li>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.</li> </ul>
VARNING (SV)	<p>Den här servicehandboken finns bara tillgänglig på engelska.</p> <ul style="list-style-type: none"> <li>Om en kunds servicetekniker har behov av ett annat språk än engelska ansvarar kunden för att tillhandahålla översättningstjänster.</li> <li>Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken.</li> <li>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.</li> </ul>
UYARI (TR)	<p>Bu servis kılavuzunun sadece İngilizcesi mevcuttur.</p> <ul style="list-style-type: none"> <li>Eğer müşteri teknisyeni bu kılavuzu İngilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer.</li> <li>Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz.</li> <li>Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir.</li> </ul>



## Service Manual Language Information (cont'd.)

<p>ЗАСТЕРЕЖЕННЯ (UK)</p>	<p>Дане керівництво з сервісного обслуговування постачається виключно англійською мовою.</p> <ul style="list-style-type: none"> <li>• Якщо сервісний інженер потребує керівництво іншою мовою, користувач зобов'язаний забезпечити послуги перекладача.</li> <li>• Не намагайтеся здійснювати технічне обслуговування даного обладнання, якщо ви не читали, або не зрозуміли інформацію, надану в керівництві з сервісного обслуговування.</li> <li>• Недотримання цього застереження може призвести до травмування сервісного інженера, користувача даного обладнання або пацієнта внаслідок електричного шоку, механічного ушкодження або з інших причин невірної обслуговування обладнання.</li> </ul>
<p>CẢNH BÁO (VI)</p>	<p>Tài Liệu Hướng Dẫn Sửa Chữa chỉ có bản tiếng Anh.</p> <ul style="list-style-type: none"> <li>• Nếu các đơn vị cung cấp dịch vụ cho khách hàng yêu cầu một ngôn ngữ nào khác tiếng Anh, thì khách hàng sẽ có trách nhiệm cung cấp các dịch vụ dịch thuật.</li> <li>• Không được sửa chữa thiết bị trừ khi đã tham khảo và hiểu Tài liệu Hướng dẫn Sửa chữa.</li> <li>• Không tuân thủ những cảnh báo này có thể dẫn đến các tổn thương cho người thực hiện sửa chữa, người vận hành hay bệnh nhân, do sốc điện, các rủi ro về cơ khí hay các rủi ro khác.</li> </ul>



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# 1

## Introduction

MobileLink is a wireless, integrated ECG communication solution that helps you capture, transmit, and analyze your patient's ECG information quickly and efficiently. MobileLink combines all available security protocols into one superset to guard your facility from the risk of transmission interception.

This chapter provides general information required for the proper use of the system and this manual. Familiarize yourself with this information before using the system.

## Manual Information

This section provides information for the correct use of this manual.

Keep this manual with the equipment at all times and periodically review it. You should request training assistance from GE Healthcare, if needed.

## Manual Purpose

The purpose of this manual is to provide instruction on how to install MobileLink Wireless Communication to a MAC 2000/MAC 800 using a Silex Wireless Bridge.

## Additional Assistance

GE Healthcare maintains a trained staff of application and technical experts to answer questions and respond to issues and problems that may arise during the installation, maintenance, and use of this system.

Contact your local GE Healthcare representative to request additional assistance.

## Customer Responsibility

GE Healthcare Service is responsible for the initial installation and configuration of the MobileLink wireless communication for ECG. Any changes made to configuration, security, and so on by the customer after the initial installation are the responsibility of the customer.

## On-Line Center Support

Contact the GE Healthcare On-Line Center if you have any questions or problems while performing this installation.

## Before You Begin

Before installing the MobileLink option, confirm that your site meets the following system requirements:

- Confirm that your site meets the system requirements for MobileLink. See [“System Requirements” on page 14](#).
- Review the different procedures to install MobileLink and determine which is appropriate for your site. See [“Determining Appropriate Installation Procedures” on page 16](#).

## Silex GEH-BR-4600 Introduction

The GEH-BR-4600 bridge is the wireless bridge which allows the MAC 800/MAC 2000 LAN port to be used as a wireless device. A high-performance wireless network adapter which enables the Ethernet LAN port to become an 802.11a/b/g/n dual band wireless network device.

GE Healthcare Part Number	Manufacturing Part Number	Description
2095170-001	GEH-BR-4600WAN2-03-US	SILEX WI-FI BRIDGE KIT MAC2000 US
2098761-001	GEH-BR-4600WAN2-03-WW	MAC 2000 SILEX WIRELESS BRIDGE KIT- GLOBAL VERSION

### Key Features:

- Communicate in the 2.4 GHz and 5 GHz frequencies
- Wired LAN port configured for 10base-T-Full
- Uses the MAC 800/2000 MAC address for wireless communications (MAC address transparency feature)
- Configuring the bridge for Single Client Mode disables the wireless bridge functionality when the GEH-BR-4600 bridge is connected to the wired LAN port of another MAC 800/MAC 2000 or another PC (security feature)

## System Requirements

Review and confirm that your site meets the following system requirements.

1. The MAC system software requirements:
  - MAC 2000 system must be at v1.1 or higher
  - MAC 800 system must be at 1.0.X or 2.0.X
2. The MAC system must have the appropriate option activated.
  - a. From the **Main Menu**, press **System Configuration** > **More** > **More** > **Option Setup**.
  - b. Verify that the **LANM** or **LANC** option is activated.

3. A dynamic IP, static IP, or host name must be provided for each MAC system to be configured with the LAN option.
4. MUSE system software requirements:
  - v7 : 7.1.1
  - v8: 8.0.1
  - v9: 9.0.0 (only available for MAC 2000)
  - CardioSoft-CS v6.71 or higher and the connectivity server option

## Print the Configuration Capture File

Confirm all the information about this system has been accurately entered into the *Configuration Capture File (2002783-067)*. Prior to this installation, you may have received a copy of this file from Project Management or ND&I with information gathered during pre-installation. If so, use that copy of the *Configuration Capture File*. If you have not received a copy of the *Configuration Capture File*, use the blank version of the file on the MobileLink CD.

Print a copy as a reference to use during the installation. During installation, you will add information to the file and then store the completed file on the MUSE file server.

### MobileLink Configuration

The IP Address, Subnet Mask, and Gateway Address  
If this information cannot be acquired ahead of t  
After completion, this file should be saved on th

Site Name:  
IS Contact Name:  
IS Contact Phone:  
Notes:

### Configuration Information

IP Address:  
Subnet Mask:  
Gateway Address:  
SSID:  
Station Name: MAC5K001  
Port Number: 3001  
MAC Address:  
Client Bridge Serial Number:  
Encryption Information:

*Configuration Capture File*  
*Provides data entry for up to 30 MAC systems.*

### NOTE:

The *Station Name* is a general field that is used to identify a cart. This name can be different from or the same as the System Name, if hostname addressing is used.

### NOTE:

Station name and Port Number have been pre-populated in this file with the following suggested convention. The Station Name and Port Numbering system is a suggested convention.

Station Name	Port Number
MAC2K001	3001
MAC2K002	3002

Station Name	Port Number
MAC2K003	3003
etc.	etc.

## Determining Appropriate Installation Procedures

These instructions are written for several types of installations, including one type of serial server and two kinds of trolleys. When installing and configuring the MobileLink option, use the section of this manual which is appropriate to the hardware you are installing.

1. Use [Chapter 3 “Configuring the Silex Wireless Bridge GEH-BR-4600 for the MAC 2000 and MAC 800”](#) on page 25.
2. [Chapter 2 “Mounting the GEH-BR-4600 Wireless Bridge”](#) on page 19.  
[See “Mounting the GEH-BR-4600 Wireless Bridge on the MAC 2000 Device”](#) on page 20.  
[See “Mounting the GEH-BR-4600 Wireless Bridge on the MAC 800 Device”](#) on page 22.
3. Configure the System as described in [Chapter 3 “Configuring the Silex Wireless Bridge GEH-BR-4600 for the MAC 2000 and MAC 800”](#) on page 25.

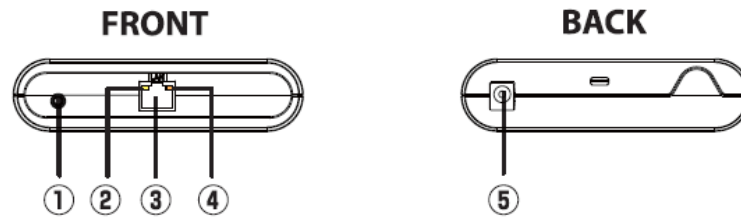
## Connectors and Indicators

### Silex Wireless Bridge GEH-BR-4600WAN2-03-XX

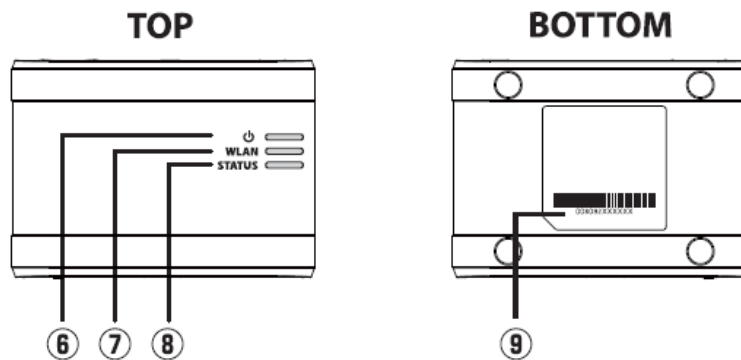


*Silex Wireless Bridge GEH-BR-4600*





Item	Name	Description
1	Push switch	<b>Starts this product in Configuration Mode:</b> Press and hold the push switch, release the push switch when the WLAN LED and STATUS LED start to blink together. It may take up to 5 seconds for the 2 LEDs to start blinking together.  <b>Resets this product to factory default settings:</b> Press and hold the push switch while turning on this product. Release the switch when the LAN Link LED turns to the Orange and then Green.
2	LAN Status LED (Yellow)	BLINK: Waiting for connection when Link LED is OFF. Transferring data when Link LED is ON.
3	LAN port	Connects to the network cable.
4	LAN Link LED (Green/Orange)	ON (Green): Connected to 10BASE-T/100BASE-TX network ON (Orange): Connected to 1000BASE-T network
5	Power connector	Connect USB power cable



Item	Name	Description
6	POWER LED (Orange)	Turns ON when this product is powered on.
7	WLAN LED (Green)	<b>ON:</b> Running in Infrastructure mode. <b>OFF:</b> Running in Ad hoc mode. * Blink together with STATUS LED when running in <b>Configuration Mode</b> .

Item	Name	Description
8	STATUS LED (Green)	<b>ON:</b> A network connection is established. <b>BLINK:</b> Transferring data. * Blink together with WLAN LED when running in <b>Configuration Mode</b> .
9	Ethernet address	The Ethernet (MAC) Address of this product is found on the bottom. The last 6 digits are the product's serial number. Example: If the Ethernet Address is 00:80:92:00:11:22 (noted as 008092001122) then the product's serial number is 001122. <b>NOTE:</b> DHCP Reservation by MAC address - Use the MAC 800/MAC 2000 MAC address, not the GEH-BR-4600 MAC address.

# 2

## Mounting the GEH-BR-4600 Wireless Bridge

Use the following instructions for mounting a GEH-BR-4600 wireless bridge.

## Mounting the GEH-BR-4600 Wireless Bridge on the MAC 2000 Device

1. Stick a pair of dual locks on the GEH-BR-4600 wireless bridge as shown in the following graphic.



2. Put another pair of dual locks on the dual locks stuck on the Silex wireless bridge and press firmly.



3. Connect the Silex cable to the Silex wireless bridge using the circular connector.



4. Connect the Silex cable to the MAC 2000 device using the USB connector.

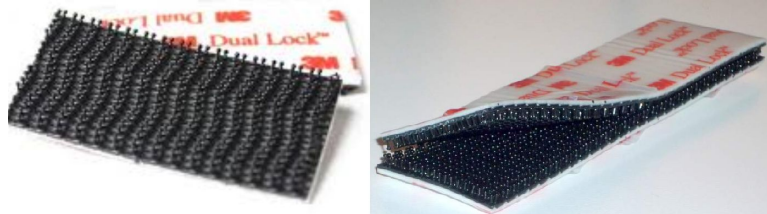


5. Insert the internet cable to the network connectors of both the Silex wireless bridge and MAC 2000 device.
6. Remove the stick cover on the dual locks and place the Silex wireless bridge on the MAC 2000 device as shown in the following graphic.



## Mounting the GEH-BR-4600 Wireless Bridge on the MAC 800 Device

1. Select the **Dual Locks** from the **Silex Wireless Bridge Kit** and engage the hook and loop surface of the **Dual Locks** against each other to form a pair.



2. Remove the adhesive liner from one side of the dual lock and adhere each pair to the flat surface of Silex wireless bridge module.



3. Remove the adhesive liner and carefully position the Silex Module on the MAC 800 unit by placing it to the rear of the printer side. The LAN port and power switch should be visible from the rear of the MAC 800 device.



4. Route and connect the Ethernet and USB power cables from the Silex wireless module to the MAC 800 unit.







# 3

## Configuring the Silex Wireless Bridge GEH-BR-4600 for the MAC 2000 and MAC 800

### Important

Before you begin this procedure, check for any updates to the procedure that may have been released in a Technical Bulletin.

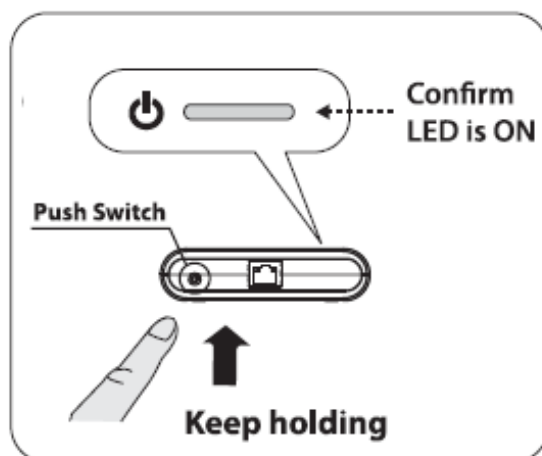
**NOTE:**

Before configuring the wireless bridge, be sure you have performed the steps in ["Before You Begin" on page 14](#).

## Configuring Silex Wireless Bridge GEH-BR-4600 for Wireless LAN

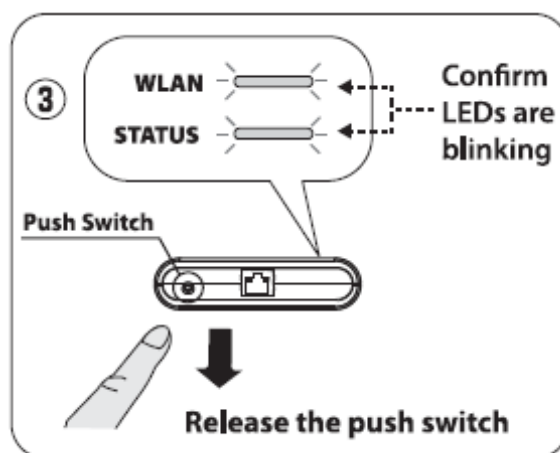
1. Configure PC LAN port for DHCP.
2. Connect the Silex wireless bridge to a PC using the standard CAT 5 network cable that came with the product.
3. Take the USB power cable and connect the DC connector side to Silex wireless bridge and USB connector side to the same PC.

4. When the Power LED at the top turns **ON**, press and hold the **Push** switch at the front.



5. Release the **Push** switch when **WLAN** LED and **STATUS** LED starts to blink together.

It may take 20 seconds for the 2 LEDs to blink together.



The Silex wireless bridge is now set to **Configuration Mode**.

6. Use the same PC to connect to the bridge for configuring the product. Disable any wireless LAN (if enabled) on the PC.

7. Start a Web Browser on the PC you are using for the setup.

The web page of this product is [silex.com](http://silex.com). If the webpage is not displayed, enter `silex.com` in the address bar of the browser and press the **Enter** key.

The screenshot shows the 'Wireless LAN Configuration' web interface. The left sidebar contains a navigation menu with sections: 'System Configuration' (Wireless LAN, Advanced, Certificate, Password), 'Maintenance' (Reboot, Factory Default, Firmware Update), and 'Information' (License Information). The main content area is titled 'Wireless LAN Configuration' and has three tabs: 'Easy Configuration', 'Detailed Configuration', and 'Smart Wireless Setup'. The 'Easy Configuration' tab is active. It displays instructions for configuring the wireless LAN settings. Step 1, 'Select a wireless network', includes a 'Wireless Network List' table with columns: Select, SSID, RSSI, CH, Wireless Standard, and Wireless Mode. The table lists three networks: 'dd-wrt' (selected), 'BLUESO', and 'Internet'. Step 2, 'Enter the Network Key', has a text input field for the 'Network Key'. Step 3, 'Save the configuration and reboot this product', has a 'Submit' button.

Select	SSID	RSSI	CH	Wireless Standard	Wireless Mode
<input checked="" type="radio"/>	dd-wrt	000000	6	11g	Infrastructure
<input type="radio"/>	BLUESO	000000	1	11n	Infrastructure
<input type="radio"/>	Internet	000000	1	11n	Infrastructure

**NOTE:**

If the hospital wireless network is not listed on this page, select the **Detailed Configuration** tab.

8. The **Detailed Configuration** window opens.

The screenshot shows the 'Wireless LAN Configuration' web interface with the 'Detailed Configuration' tab selected. It displays various configuration options: 'Operating Mode' (set to 'Intra'), 'Wireless Standard' (set to 'AUTO'), 'SSID' (text input 'test'), 'SSID Filter' (set to 'OFF'), 'Network Authentication' (set to 'WPA2'), and 'IEEE802.1X Authentication' (set to 'OFF'). Below these is the 'WPA/WPA2 Configuration' section with a table for 'Name' and 'Value'. The table has two rows: 'Encryption Mode' (set to 'AES') and 'Pre-Shared Key' (text input with masked characters). 'Submit' and 'Reset' buttons are at the bottom right.

Name	Value
Encryption Mode	AES
Pre-Shared Key	••••••••

- Select **Wireless Standard** and choose 2.4GHZ or 5GHZ if a specific radio frequency is required.
- Enter the **SSID**
- Go to the "Silex wireless Bridge GEH-BR-4600 Encryption/Authentication Modes" on page 30 for the encryption and authentication settings.
- Select Submit after the authentication and encryption settings have been configured.

**NOTE:**

After **Submit** is selected and the changes activated, the Silex Bridge leaves the configuration mode.

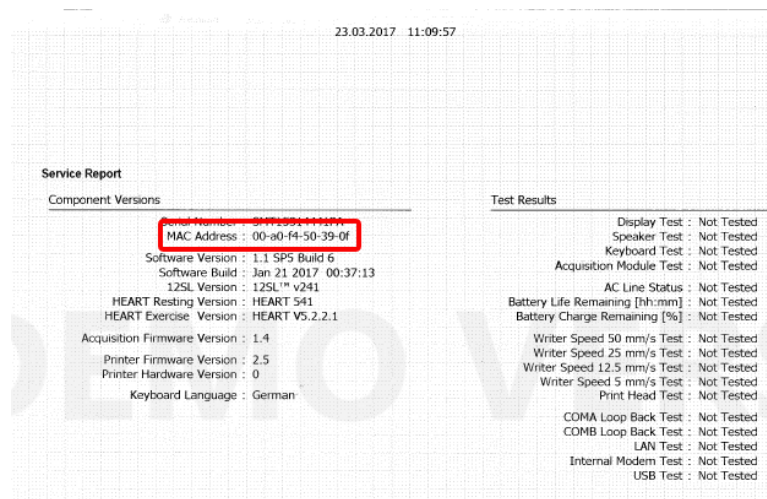
The **WLAN** and **STATUS** LEDs do not blink any more.

# Configuring Silex Wireless Bridge GEH-BR-4600 to Single Client Mode

## CAUTION:

To prevent unauthorized access to the wireless bridge, configure the bridge for single client mode using the MAC 800/MAC 2000 MAC address. Configuring the bridge for Single Client Mode disables the wireless bridge functionality when the GEH-BR-4600 bridge is connected to the wired LAN port of another MAC 800/2000 or another PC (security feature).

1. Record the MAC address of the device.
  - a. On the device, go to **Main Menu > System Configuration > Service Setup**. The password is 7763.
  - b. Select **System Diagnostic** and press **Enter**.
  - c. Select **Service Report** and press **Enter**.
  - d. The service report lists the MAC address.



2. In the Silex configuration page, click **Advanced Configuration**.
3. Select **10BASE-T-FULL** for **LAN Interface** field.

**silex technology**

Select Language  
English

▼ System Configuration  
- Wireless LAN Configuration  
- Advanced Configuration  
- Certificate Configuration  
- Password Configuration

▼ Maintenance  
- Reboot  
- Factory Default Configuration  
- Firmware Update

▼ Information  
- License Information

### Advanced Configuration

Configure the parameters for "Advanced Configuration". Enter the values and click "Submit".

Name	Value
LAN Interface	10BASE-T-Full
Network Device Address	
Client Mode	Single Client Mode

Name	Value
DHCP	DISABLE
IP Address	0.0.0.0
Subnet Mask	0.0.0.0
Default Gateway	0.0.0.0

4. Type the MAC 800/MAC 2000 MAC address in the **Network Device address** field.

**NOTE:**

The MAC Address needs to be entered without the hyphen.

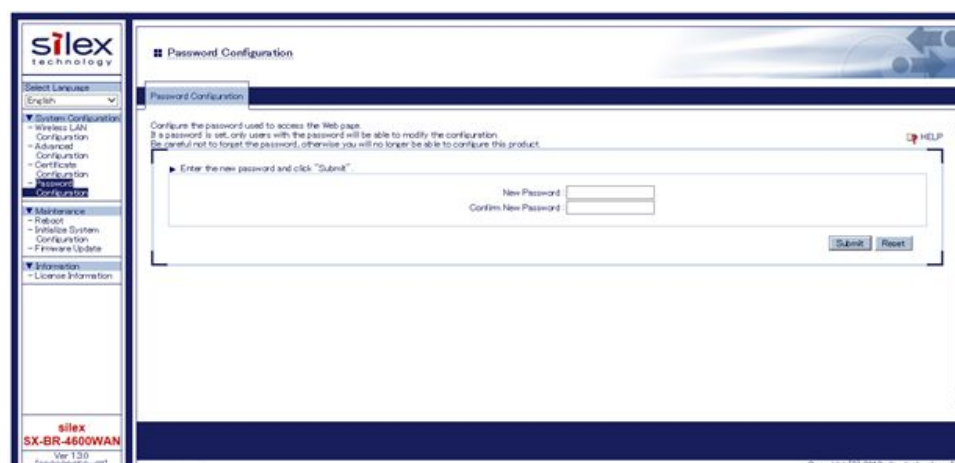
5. Keep all other fields as default values.
6. Click **Submit** to submit the configuration changes.

## Configuring Silex Web Page with Password

**CAUTION:**

To prevent unauthorized change of patient data, enable password while accessing configuration page.

1. In Silex Configuration mode, click **Password configuration**.



2. Type a password in the **New Password** field.

**NOTE:**

The default password is `access`. It is recommended that the default password is used.

3. Type the same password in the **Confirm New Password** field.
4. Click **Submit**.

The password is set to access the Silex web page. If a password is set, only users with the password will be able to modify the product configuration. Be careful not to forget the password or you will not be able to configure the product.

## Silex wireless Bridge GEH-BR-4600 Encryption/Authentication Modes

GEH-BR-4600WAN2-03-XX supports the following security functions:

- WEP (64 Bit/128 Bit)
- WPA/WPA2 Mix Mode (TKIP/AES)
- WPA2-PSK (AES)
- IEEE 802.1X PEAP, EAP-TLS, EAP-TTLS, EAP-FAST, LEAP

### Silex Encryption/Authentication Matrix

Authentication	Encryption		
	WEP	WPA/WPA2 Mix Mode	WPA2
Open	supported See "Configuring WEP/Open Authentication" on page 31.	not supported	not supported

## Silex Encryption/Authentication Matrix (cont'd.)

PSK	supported See "Configuring WEP/Pre-shared Key" on page 32.	supported See "Configuring WPA/WPA2 Mix Mode Encryption and PSK Authentication" on page 33.	supported See "Configuring WPA2 Encryption and PSK Authentication" on page 33.
LEAP	not supported	supported See "Configuring EAP with LEAP Authentication" on page 35.	supported See "Configuring EAP with LEAP Authentication" on page 35.
PEAP	not supported	supported See "Configuring EAP with PEAP Authentication" on page 34.	supported See "Configuring EAP with PEAP Authentication" on page 34.
EAP-TLS	not supported	supported See "Configuring EAP with TLS Authentication" on page 36.	supported See "Configuring EAP with TLS Authentication" on page 36.
EAP-TTLS	not supported	supported See "Configuring EAP with TTLS Authentication" on page 37.	supported See "Configuring EAP with TTLS Authentication" on page 37.
EAP-FAST	not supported	supported See "Configuring EAP-FAST Authentication" on page 38.	supported See "Configuring EAP-FAST Authentication" on page 38.

## Configuring WEP/Open Authentication

1. Type or select the information in the **Detailed Configuration** tab using the information in the following table:

## WEP/Open Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>Open</b> for WEP. <ul style="list-style-type: none"> <li>• <b>Open</b> (Open System) Allow all accesses without using any authentication. This mode uses WEP (64bit/128bit) to encrypt the communication. You can disable this encryption when it is not necessary.</li> </ul>
<b>WEP</b>	Select <b>ON</b> or <b>OFF</b> .

### WEP/Open Authentication Selections (cont'd.)

Item	Selection
<b>Key Index</b>	Select <b>1, 2, 3,</b> or <b>4.</b>
<b>WEP Key</b>	Enter the WEP key of this product. If the key format is hexadecimal, enter 10 or 26 hexadecimal digits. If the key format is alphanumeric character, enter 5 or 13 character.

**NOTE:**

Do not change the other settings in this window.

- Click **Submit**.

## Configuring WEP/Pre-shared Key

- Type or select the information in the **Detailed Configuration** tab using the information in the following table:

### WEP/Pre-shared Key Selections

Item	Selection
<b>Network Authentication</b>	Select <b>Shared</b> for WEP. <ul style="list-style-type: none"> <li><b>Shared</b> (Pre-Shared Key) Allow access only to network devices with the same WEP Key by using it as an authentication key. This mode uses WEP (64bit/128bit) to encrypt the communication. You can disable this encryption when it is not necessary.</li> </ul>
<b>WEP:</b>	Select <b>ON</b> .
<b>Key Index:</b>	Select <b>1, 2, 3,</b> or <b>4.</b>
<b>WEP Key:</b>	Enter the WEP key of this product. If the key format is hexadecimal, enter 10 or 26 hexadecimal digits. If the key format is alphanumeric character, enter 5 or 13 character.

**NOTE:**

Do not change the other settings in this window.

- Click **Submit**.



## Configuring WPA2 Encryption and PSK Authentication

1. Type or select the information in the **Detailed Configuration** tab using the information in the following table:

### WPA2 Encryption and PSK Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>WPA2</b> .
<b>IEEE802.1x Authentication</b>	Select <b>OFF</b> .
<b>Encryption Mode:</b>	Select <b>AES</b> .
<b>Pre-shared Key</b>	Type the pre-shared key or passphrase.  <b>NOTE:</b> The key value or passphrase entered here is used to initialize the session with the access point. If a key value is entered, it must be exactly 64 hex characters. A passphrase must be 8 to 63 displayable characters.

**NOTE:**

Do not change the other settings in this window.

2. Click **Submit**.

## Configuring WPA/WPA2 Mix Mode Encryption and PSK Authentication

1. Type or select the information in the **Detailed Configuration** tab using the information in the following table:

### WPA/WPA2 Mix Mode Encryption and PSK Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>WPA/WPA2 Mix Mode</b> .
<b>IEEE802.1x Authentication</b>	Select <b>OFF</b> .
<b>Encryption Mode:</b>	Select <b>AES</b> or <b>Auto</b> .
<b>Pre-shared Key</b>	Type the pre-shared key or passphrase.  <b>NOTE:</b> The key value or passphrase entered here is used to initialize the session with the access point. If a key value is entered, it must be exactly 64 hex characters. A passphrase must be 8 to 63 displayable characters.

**NOTE:**

Do not change the other settings in this window.

2. Click **Submit**.

## Configuring EAP with PEAP Authentication

**NOTE:**

This configuration requires Silex firmware version 1.1.1 or higher.

1. Type or select information in the **Detailed Configuration** tab using the information in the following table:

### EAP with PEAP Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>WPA2</b> or <b>WPA/WPA2 Mixed Mode</b> for PEAP. <ul style="list-style-type: none"> <li>• <b>WPA2</b></li> <li>• <b>WPA/WPA2 Mixed Mode</b> This mode uses network authentication by PSK and encrypts the communication using TKIP/AES. Please note that WPA/WPA2 can be used only when this product is running in <b>Infra</b> mode.</li> </ul>
<b>IEEE802.1x Authentication</b>	Select <b>ON</b> .
<b>IEEE802.1x Authentication Type</b>	Select <b>PEAP</b> .
<b>Encryption Mode:</b>	This parameter is determined by the option selected in the detailed <b>Configuration</b> page. If <b>WPA2</b> is selected the only option is <b>AES</b> , if <b>WPA/WPA2 Mixed mode</b> is selected <b>AES</b> and <b>Auto</b> is selected. The default is <b>AES</b> .
<b>Inner Authentication Method:</b>	This defines the authentication method used for the inner authentication of the bridge. Select <b>MSCHAPv2</b> .
<b>Server Certificate Verification</b>	Select <b>ON</b> or <b>OFF</b> . This provides an option not to use CA Certificates during the authentication process. Disabling certificate verification weakens the authentication process and is not recommended.
<b>IEEE802.1x User Name</b>	This is the user name defined on the RADIUS server account being used by the target network. This is an ASCII string.
<b>Password</b>	This is the password assigned to the user name defined on the RADIUS server account being used by the target network.
<b>Network Device Address</b>	Type the MAC address of the device. If using IEEE802.1X authentication, register the Ethernet address of the network device that will be connected to a wired LAN.

**NOTE:**

Do not change the other settings in this window.

**NOTE:**

If server certificate verification is ON, a CA Certificate is required for PEAP and must be loaded and registered for PEAP to work. See [“Configuring Authentication CA Certificate” on page 40](#) for loading and registering certificates.

2. Click **Submit**.

## Configuring EAP with LEAP Authentication

**NOTE:**

This configuration requires Silex firmware version 1.1.1 or higher.

1. Type or select information in the **Detailed Configuration** tab using the information in the following table:

### EAP with LEAP Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>WPA2</b> or <b>WPA/WPA2 Mixed Mode</b> for LEAP. <ul style="list-style-type: none"> <li>• <b>WPA2</b></li> <li>• <b>WPA/WPA2 Mixed Mode</b> This mode uses network authentication by PSK and encrypts the communication using TKIP/AES. Please note that WPA/WPA2 can be used only when this product is running in <b>Infra</b> mode.</li> </ul>
<b>IEEE802.1x Authentication</b>	Select <b>ON</b> .
<b>IEEE802.1x Authentication Type</b>	Select <b>LEAP</b> .
<b>Encryption Mode:</b>	This parameter is determined by the option selected in the detailed <b>Configuration</b> page. If <b>WPA2</b> is selected, the only option is <b>AES</b> , if <b>WPA/WPA2 Mixed mode</b> is selected, <b>AES</b> and <b>Auto</b> are selected. The default is <b>AES</b> .
<b>IEEE802.1x User Name</b>	This is the user name defined on the RADIUS server account being used by the target network. This is an ASCII string.
<b>Password</b>	This is the password assigned to the user name defined on the RADIUS server account being used by the target network.
<b>Network Device Address</b>	Type the MAC address of the device. If using IEEE802.1X authentication, register the Ethernet address of the network device that will be connected to a wired LAN. One device for Single Client Mode and up to 16 devices for Multi-Client Mode can be registered.

**NOTE:**

Do not change the other settings in this window.

**NOTE:**

No certificate is required for LEAP.

LEAP is a deprecated authentication protocol, use is discouraged due to security vulnerabilities.

2. Click **Submit**.

## Configuring EAP with TLS Authentication

**NOTE:**

This configuration requires Silex firmware version 1.1.1 or higher.

1. Type or select information in the **Detailed Configuration** tab using the information in the following table:

### EAP with TLS Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>WPA2</b> or <b>WPA/WPA2 Mixed Mode</b> for TLS. <ul style="list-style-type: none"> <li>• <b>WPA2</b></li> <li>• <b>WPA/WPA2 Mixed Mode</b> This mode uses network authentication by PSK and encrypts the communication using TKIP/AES. Please note that WPA/WPA2 can be used only when this product is running in <b>Infra</b> mode.</li> </ul>
<b>IEEE802.1x Authentication</b>	Select <b>ON</b> .
<b>IEEE802.1x Authentication Type</b>	Select <b>EAP-TLS</b> .
<b>Encryption Mode:</b>	This parameter is determined by the option selected in the detailed <b>Configuration</b> page. If <b>WPA2</b> is selected, the only option is <b>AES</b> , if <b>WPA/WPA2 Mixed mode</b> is selected, <b>AES</b> and <b>Auto</b> are selected. The default is <b>AES</b> .
<b>User name in IEEE802.1x</b>	This is the user name defined on the RADIUS server account being used by the target network. This is an ASCII string.
<b>Network Device Address</b>	Type the MAC address of the device. If using IEEE802.1X authentication, register the Ethernet address of the network device that will be connected to a wired LAN. One device for Single Client Mode and up to 16 devices for Multi-Client Mode can be registered.

**NOTE:**

Do not change the other settings in this window.

**NOTE:**

A CA Certificate and Client Certificate are required for TLS and must be loaded and registered for EAP-TLS to work. See [“Configuring Authentication CA Certificate” on page 40](#) and [“Configuring Authentication Client Certificate” on page 40](#) for loading and registering certificates.

2. Click **Submit**.

## Configuring EAP with TTLS Authentication

**NOTE:**

This configuration requires Silex firmware version 1.1.1 or higher.

1. Type or select information in the **Detailed Configuration** tab using the information in the following table:

### EAP with TTLS Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>WPA2</b> or <b>WPA/WPA2 Mixed Mode</b> for TTLS. <ul style="list-style-type: none"> <li><b>WPA2</b></li> <li><b>WPA/WPA2 Mixed Mode</b> This mode uses network authentication by PSK and encrypts the communication using TKIP/AES. Please note that WPA/WPA2 can be used only when this product is running in <b>Infra</b> mode.</li> </ul>
<b>IEEE802.1x Authentication</b>	Select <b>ON</b> .
<b>IEEE802.1x Authentication Type</b>	Select <b>EAP-TTLS</b> .
<b>Encryption Mode:</b>	This parameter is determined by the option selected in the detailed <b>Configuration</b> page. If <b>WPA2</b> is selected the only option is <b>AES</b> , if <b>WPA/WPA2 Mixed mode</b> is selected <b>AES</b> and <b>Auto</b> is selected. The default is <b>AES</b> .
<b>Inner Authentication Method</b>	This defines the authentication method used for the inner authentication of the bridge. The options include <b>PAP</b> , <b>CHAP</b> , <b>MSCHAP</b> and <b>MSCHAPv2</b> .
<b>Server Certificate Verification</b>	Select <b>ON</b> or <b>OFF</b> . This provides an option not to use CA Certificates during the authentication process. Disabling certificate verification weakens the authentication process and is not recommended.
<b>IEEE802.1x User Name</b>	This is the user name defined on the RADIUS server account being used by the target network. This is an ASCII string.

## EAP with TTLS Authentication Selections (cont'd.)

Item	Selection
<b>Password</b>	This is the password assigned to the user name defined on the RADIUS server account being used by the target network.
<b>Network Device Address</b>	Type the MAC address of the device. If using IEEE802.1X authentication, register the Ethernet address of the network device that will be connected to a wired LAN. One device for Single Client Mode and up to 16 devices for Multi-Client Mode can be registered.

**NOTE:**

Do not change the other settings in this window.

**NOTE:**

If server certificate verification is ON, a CA Certificate is required for TTLS and must be loaded and registered for EAP-TTLS to work. See [“Configuring Authentication CA Certificate” on page 40](#) for loading and registering certificates.

- Click **Submit**.

## Configuring EAP-FAST Authentication

- Type or select information in the **Detailed Configuration** tab using the information in the following table:

## EAP-FAST Authentication Selections

Item	Selection
<b>Network Authentication</b>	Select <b>WPA2</b> or <b>WPA/WPA2 Mixed Mode</b> for EAP-FAST. <ul style="list-style-type: none"> <li><b>WPA2</b></li> <li><b>WPA/WPA2 Mixed Mode</b> This mode uses network authentication by PSK and encrypts the communication using TKIP/AES. Please note that WPA/WPA2 can be used only when this product is running in <b>Infra</b> mode.</li> </ul>
<b>IEEE802.1x Authentication</b>	Select <b>ON</b> .
<b>IEEE802.1x Authentication Type</b>	Select <b>EAP-FAST</b> .
<b>Encryption Mode:</b>	This parameter is determined by the option selected in the detailed <b>Configuration</b> page. If <b>WPA2</b> is selected, the only option is <b>AES</b> , if <b>WPA/WPA2 Mixed mode</b> is selected, <b>AES</b> and <b>Auto</b> are selected. The default is <b>AES</b> .

## EAP-FAST Authentication Selections (cont'd.)

Item	Selection
<b>IEEE802.1x User Name</b>	This is the user name defined on the RADIUS server account being used by the target network. This is an ASCII string.
<b>Password</b>	This is the password assigned to the user name defined on the RADIUS server account being used by the target network.
<b>PAC Auto-distribution</b>	EAP-FAST uses a file called a PAC file to distribute the necessary credentials for the network. EAP-FAST has an option for automatic credential distribution. It is mandatory to enable this option, so that the PAC file can be obtained from the network when initial configuration is done.
<b>Network Device Address</b>	Type the MAC address of the device. If using IEEE802.1X authentication, register the Ethernet address of the network device that will be connected to a wired LAN. One device for Single Client Mode and up to 16 devices for Multi-Client Mode can be registered.

**NOTE:**

Do not change the other settings in this window.

- Click **Submit**.

## System Configuration – Certificate Configuration

Enterprise security types (EAP types) often require the use of certificates as part of the authentication process. These certificates must be stored on the bridge for them to be used during the outer and inner authentication stages.

The PAC file is a Cisco format file that encapsulates all the necessary client side credentials for the bridge to authentication to an EAP-FAST configured network.

The following settings allow use of EAP-TLS:

Setting	Description
<b>Client Certificate</b>	This section allows you to choose the client certificate required for the authentication of the bridge to the network. This certificate will be unique to the client. You must locate and select the certificate on the connected laptop/desktop, and then enter the password used to encrypt the certificate.
<b>CA Certificate</b>	This section allows you to choose the server side (Certificate Authority) certificate required for the authentication of the bridge to the network. This certificate will be unique to the authentication server being used by the network. You must locate and select the certificate on the connected laptop/desktop.
<b>Certificate Registration</b>	This section shows the currently loaded and registered certificates on the bridge.

**NOTE:**

The files will not be saved to the bridge until the **Submit** button has been pressed.

## Configuring Authentication CA Certificate

**NOTE:**

This is required for PEAP, TLS or TTLS authentication.

### Steps for the Hospital IT Department

1. Identify the authorized Server Certificate Authority recognized by the radius server.
2. Generate CA certification from radius server with **.PEM** format.
3. Provide the **.PEM** file generated in the previous step to the GE Healthcare field engineer.

### Steps for the GE Healthcare Field Engineer

1. From the **Silex Network Security** window, click on **Configure authentication server certificate**.
2. Click **Browse** and locate the exported **.PEM** file exported.
3. Click **Submit** and click the link to reset the device.
4. Verify that the **root key** was loaded on the **Certificate Root Key** field.

## Configuring Authentication Client Certificate

**NOTE:**

This is required for TLS authentication.

### Steps for the Hospital IT Department

1. Identify the User/Client Certificate being recognized by the RADIUS server.
2. Generate client certification with **.P12** format in radius server.  
Make sure to select the option to export the private key. This requires a passphrase to be entered. Record the passphrase.
3. Provide the **.P12** file saved in the previous step to the GE Healthcare field engineer.

### Steps for the GE Healthcare Field Engineer

1. From the **Silex Network Security** window, click on **Configure Private Key**.
2. Type the passphrase entered during the export process and browse for either the private key or client certificate **.PEM** files and click **Submit**.
3. Reset the device and repeat the procedure for the private key **.P12** file.



# 4

## Troubleshooting

### Silex Wireless Bridge GEH-BR-4600

Symptom	Possible Cause	Remedy
The MAC device is connected to wireless bridge but unable to communicate	The wireless bridge is running in <b>Configuration mode</b> instead of <b>Infrastructure Mode</b>	Check the status of WLAN LED and STATUS LED. LEDs should blink together, if the wireless bridge is running in <b>Configuration mode</b> . In such case, restart the wireless bridge and check that the LEDs do not blink anymore.
	Problem with the IP address attained by MAC device OR duplicate IP Address is assigned to device as it would cause a conflict if another device on the network has the same address.	Verify if the RJ45 cable is functioning properly OR connected properly to Ethernet port of MAC device. Go to <b>System Configuration &gt; Communication Setup</b> . Check the Wired LAN settings page. Verify if the MAC device has obtained a valid IP.
	The wireless LAN settings on the wireless bridge are not configured properly.	Obtain proper information of wireless settings and ensure that configured settings are correct. If settings are incorrect, disconnect the wireless bridge from MAC device. Connect it to PC and access the configuration web page. Configure the wireless bridge with valid settings again.

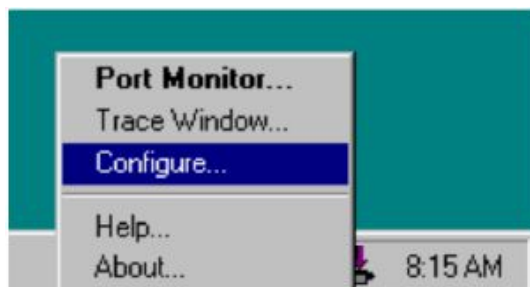
Symptom	Possible Cause	Remedy
	The Settings on the MAC device are not configured properly.	Disconnect the wireless bridge from MAC device. Connect MAC device to wired LAN and check if communication works. If the MAC device is still unable to communicate, check that the communication settings for the MAC device are configured properly.
* Call tech support for assistance if problem persists		

## Using the Serial/IP Tools to Troubleshoot

### NOTE:

This section only applies to MUSE v5.x and MUSE v7.x systems as well CardioSoft V 6.6x and higher that use Tactical software. For MUSE v8.x and v9.x, troubleshooting, see ["Testing Connections Using netstat" on page 43](#).

The Serial/IP Utility can be launched from the MUSE file server by right-clicking the icon in the systray and selecting either **Port Monitor...**, **Trace Window...**, or **Configure...**



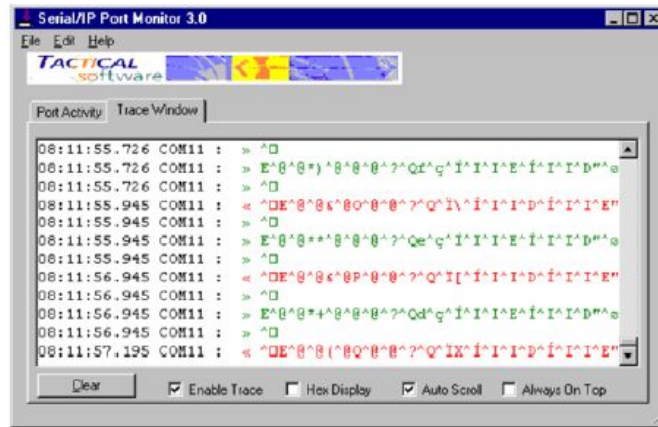
## Port Activity

The Port Monitor window shows one COM port configured in Serial/IP. The lights show TR and DR when there is a connection. TD and RD flashes to show the transmission and reception of data.

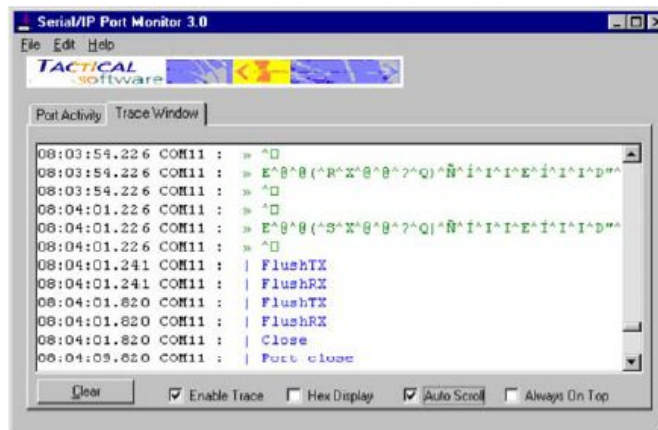


## Trace Window

The **Trace Window** shows the activity of an ECG being sent into the MUSE system. Green text is outgoing data and red text is incoming data. Select the **Enable Trace** check box to display information in this window. By checking the **Auto Scroll** check box, the last entry is displayed automatically at the bottom of the list.



The following **Trace Window** shows how the MUSE system sends data every 7 seconds to keep the CSI connection active. The blue text is informational and, in this case, shows the connection closing after powering down the cart.



## Testing Connections Using netstat

With the removal of the Tactical Software in MUSE v8.x and v9.x, you no longer have the ability to open this program and view the connection status of each network connection. To view connection status in MUSE v8 and v9, open a command prompt window on the system where the MUSE Modem service is running. This is typically the MUSE server.

To view the connection status, type the command **netstat -n**.

A listing is displayed showing all open socket connections on the system. If there is a connection established between the MUSE Modem service and the cart, you see an entry that has the "local address" with the IP address of the server, the "foreign

address” with the IP address of the cart with the port number following the cart’s IP address, and the state of the connection.

#### Local Address Foreign Address State

Local Address	Foreign Address	State
TCP 3.62.192.148:52379	TCP 3.62.192.159:3001	ESTABLISHED

In the above example, the server is at **3.62.192.148** and the cart is at **3.62.192.159**. The port number configured for this cart is **3001**. The connection state should be established.

If the cart is not connected, you do not see an entry in this list. The MUSE Modem service opens a connection once per the number of seconds equal to the retry interval. If it fails to connect, it closes this connection until the next interval time.

This command only shows established connections. If there is no connection, nothing is listed even though a CSI Network modem may be defined in the MUSE application.



# Technical Specifications

## Silex Wireless Bridge GEH-BR-4600

Manufacturer/Model	GEH-BR-4600WAN2-03-XX
Physical Requirements	Dimension: 110.5 × 79,0 × 27.6 (mm) Weight: 130 (g)
Interface Requirements	Ethernet Port: 10M/100 Mbps BASE-T, support Auto MDIX Power Connector: 5.5 (outer)/2.1 (Inner) mm Diameter Indication: LED indication for Power , wireless connection, Data communication
Power Requirements	Nominal Input Power: 5V Input Current: 750 mA
Wireless Requirements	Wireless LAN Protocol: IEEE 802.11a/b/g/n Wireless LAN Channel: IEEE 802.11b/g: Ch1~CH13 Encryption: WEP (64/128), WPA-PSK (TKIP/AES), WPA2-PSK (AES) IEEE802.1X enterprise authentication: EAP-PEAP, EAP-TLS, EAP-TTLS, EAP-FAST, EAP-LEAP
Frequency Band	2.4 GHz 5 GHz
Operating frequency range Maximum operating transmit power	Frequency Range: 2400-2483.5 MHz Output Power (including antenna gain): 100 mW (20 dBm)
Operating frequency range Maximum operating transmit power	Frequency Range: 5150-5350 MHz; 5470-5725 MHz Output Power (including antenna gain): 126 mW (21 dBm)

## Technical Specifications

Environmental Requirements	<p>Operating Temperature: 0 ~ 40 °C</p> <p>Operating Relative humidity: 20 ~ 80%</p> <p>Operating barometric pressures: 700 ~ 1060 hPa (Altitude range: 3010.9 to -381.9 meters)</p> <p>Non-Operating Temperature: -10 ~ +50 °C</p> <p>Non-Operating Relative humidity: 20% ~ 90%</p> <p>Non-Operating barometric pressures: 500 ~ 1060 hPa (Altitude range: 5570 to -380 meters)</p>
Accessories	<p>LAN Cable: Length 250 mm, RJ45 *2 connector</p> <p>USB Power Cable: Length 260 mm, Type A Plug, Right angle USB connector, Right angle DC connector, Wire size 24 AWG</p>
Standards Compliance	<ul style="list-style-type: none"> <li>• CE certification</li> <li>• FCC/IC certification</li> <li>• This product complies with the following Regulatory requirements for Australia, New Zealand and Singapore.</li> <li>• EMC Directive: EN55032 Class B, EN55024, EN301489-1/-17 v1.8.1</li> <li>• RE Directive: EN 300-328 v2.1.1, EN 301-893 v1.8.5 (EN 301-893 v1.8.1 (Adaptivity), EN 301-893 v2.1.0 (Receiver Blocking)), EN 60950-1, EN 62311, EN301-489-1 v2.1.1, EN301-489-17 v3.1.1</li> <li>• This product is compliant with the EU's RoHS directive (2011/65/EU or newer)</li> <li>• This product is compliant with the EU's WEEE directive (2002/96/EC)</li> </ul>





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