

Polycom® KIRK Repeater

Placement, Programming and Installation with Service Tool Software

72167600, ed. B



Welcome

Congratulations on your purchase of a KIRK Repeater to extend the coverage area of your KIRK Wireless Server 500 (KWS500). This manual provides a set of easy-to follow steps covering the placement, programming and installation of KIRK Repeaters. The KIRK Service Tool software is used to program KIRK Repeaters prior to installation, and may also be used to program KIRK Handsets.

The KWS500 is an integrated call server/base station composed of a call server¹ that is wired to your host PBX² integrated with a radio base station³ for KIRK Handsets⁴. Up to six KIRK Repeaters may be synchronized to one KWS500.

The KIRK Repeater is a two-way radio unit placed within the range of a KWS500 that can pick up and retransmit a signal from the base station or KIRK Handset.

The KIRK Repeater typically extends the coverage area of the KWS500 by roughly 50% in a given direction, based on building materials and direct line-of-sight conditions.

KIRK Repeaters:

- Do not require cabling to the KWS500.
- Do extend the overall coverage area of the KWS500 system.
- Repeat a maximum of four simultaneous voice channels per KIRK Repeater.
- Do not add more voice channels to the system. Your KWS500 provides up to six voice channels.
- Are synchronized to the KWS500 wirelessly.
- Can only be synchronized to the KWS500 when placed within the coverage area of the KWS500, or another synchronized KIRK Repeater.
- Require local 120V AC power.

How to use the guide

This guide is divided into several sections. Please read and understand the steps described in these sections before attempting to perform the actions. It is important to complete each of these sections in sequence:

- Getting Started
- Capacities and Specifications
- Repeater Configurations
- Site Survey
- Service Tool

¹ Type of server that processes call requests and connects them to their destinations. A server is a computer that performs a service for another device or computer. The KWS500 has a call server. The analog signals between the handsets and the PBX are processed by the call server and are transmitted and received by the Base Station's two-way radio.

² Private Branch eXchange, a telephone switching system located at a business office. A PBX can use a microprocessor and a telephone line distribution frame to provide internal station-to-station communications, as well as access to outside telephone lines and special features such as conference calling and voice mail.

³ Low-power two-way radio that connects a wireless telephone to the wired telephone system, such as a PBX, through a call server. Base stations commonly transmit at a power level of 250 milliwatts and have a maximum range of several hundred feet.

⁴ Two-way radio that is similar to a cell phone and communicates with a radio base station connected to a wired telephone network.

- Repeater Programming
- Repeater Hardware Installation

Icons and Conventions

This manual uses the following icons and conventions.



Caution! Follow these instructions carefully to avoid danger.



Note these instructions carefully.

NORM

This typeface indicates a key, label, or button on the KIRK Repeater or a computer screen.

Product Information

CE Mark R& TTE Directive



This KIRK 500 Server has been marked with the CE mark. This mark indicates compliance with EEC Directives 89/336/EEC, 73/23/EEC 1999/5/EC. A full copy of the Declaration of Conformity can be obtained from Polycom Ltd, 270 Bath Road, Slough, Berkshire, SL1 4DX, UK.

Česky
[Czech]:

Polycom (UK) Ltd tímto prohlašuje, že tento KIRK 500 Server je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.

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[Danish]:

Undertegnede Polycom (UK) Ltd erklærer herved, at følgende udstyr KIRK 500 Server overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

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[German]:

Hiermit erklärt Polycom (UK) Ltd, dass sich das Gerät KIRK 500 Server in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.

Eesti
[Estonian]:

Käesolevaga kinnitab Polycom (UK) Ltd seadme KIRK 500 Server vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

English:

Hereby, Polycom (UK) Ltd. declares that this KIRK 500 Server is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Español
[Spanish]:

Por medio de la presente Polycom (UK) Ltd declara que el KIRK 500 Server cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

Ελληνική
[Greek]:

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Polycom (UK) Ltd ΔΗΛΩΝΕΙ ΟΤΙ KIRK 500 Server ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/EK.

Français
[French]:

Par la présente Polycom (UK) Ltd déclare que l'appareil Kirk 500 Server est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

Italiano [Italian]:	Con la presente Polycom (UK) Ltd dichiara che questo KIRK 500 Server è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
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Malti [Maltese]:	Hawnhekk, Polycom (UK) Ltd, jiddikjara li dan <i>[il-mudel tal-prodott]</i> jikkonforma mal-htigijiet essenzjali u ma provvedimenti oħrajn rilevanti li hemm fid-Dirrettiva 1999/5/EC.
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Explosive Device Proximity Warning



Warning Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

Waarschuwing	Gebruik dit draadloos netwerkapparaat alleen in de buurt van onbeschermd ontstekers of in een omgeving met explosieven indien het apparaat speciaal is aangepast om aan de eisen voor een dergelijk gebruik te voldoen.
Varoitus	Älä käyttää johdotonta verkkolaitetta suojaamattomien räjäytysnallien läheisyydessä tai räjäytysalueella, jos laitetta ei ole erityisesti muunnettu sopivaksi sellaiseen käyttöön.
Attention	Ne jamais utiliser un équipement de réseau sans fil à proximité d'un détonateur non blindé ou dans un lieu présentant des risques d'explosion, sauf si l'équipement a été modifié à cet effet.
Warnung	Benutzen Sie Ihr drahtloses Netzwerkgerät nicht in der Nähe ungeschützter Sprengkapseln oder anderer explosiver Stoffe, es sei denn, Ihr Gerät wurde eigens für diesen Gebrauch modifiziert und bestimmt.
Avvertenza	Non utilizzare la periferica di rete senza fili in prossimità di un detonatore non protetto o di esplosivi a meno che la periferica non sia stata modificata a tale proposito.
Advarsel	Ikke bruk den trådløse nettverksenheten nært inntil uisolerte fenghetter eller i et eksplosivt miljø med mindre enheten er modifisert slik at den tåler slik bruk.
Aviso	Não opere o dispositivo de rede sem fios perto de cápsulas explosivas não protegidas ou num ambiente explosivo, a não ser que o dispositivo tenha sido modificado para se qualificar especialmente para essa utilização.
¡Advertencia!	No utilizar un aparato de la red sin cable cerca de un detonador que no esté protegido ni tampoco en un entorno explosivo a menos que el aparato haya sido modificado con ese fin.
Varning!	Använd inte den trådlösa nätverksenheten i närheten av oskyddade tändhatten eller i en explosiv miljö om inte enheten modifierats för att kunna användas i sådana sammanhang.



The WEEE Marking on this equipment indicates that the product must not be disposed of with unsorted waste, but must be collected separately.

Safety Instructions



Before using your telephone equipment, you should always follow basic safety instruction to reduce the risk of fire, electrical shock, and injury to persons, and damage to property.

- Read and understand all instructions.
- Follow all warnings and instructions including those marked on the product.
- Unplug this product before cleaning; do not use liquid cleaners or aerosol cleaners. Use only a lightly damp cloth for cleaning.
- Do not install the telephone equipment in the bathroom or near a washbowl, kitchen sink, or laundry tub, in a wet basement, or near swimming pools.
- Slots or openings in the chassis are provided for ventilation to protect it from over-heating. These openings must not be blocked or covered.
- This product should be operated only from the type of power supply indicated on the instructions. If you are not sure of the type of power supply, consult your dealer.
- Do not overload wall outlets and extension cords, as this can result in fire or electrical shock.
- Never push objects of any kind into this product through chassis slots as they may touch dangerous voltage points or short out parts that could result in fire, electric shock, or injury. Never spill liquid of any kind into this product.
- Refer servicing to qualified service personnel under the following circumstances:
 - If liquid has been spilled into the product.
 - If the product has been exposed to rain or water.
 - If the product does not operate normally when following the operating instructions in the manual. Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage and will often require extensive repair by qualified service personnel to restore correct operation.
 - If the product has been dropped or chassis has been damaged.
 - If the product exhibits a distinct change in performance.
- Avoid using handsets during electrical storms. There may be a risk of electrical shock from lightning.
- Do not use the handset to report a gas leak in the vicinity of the leak.
- Do not place the unit near microwave ovens, radio equipment, or non-ground connected televisions. These appliances may cause electrical interference.
- Installation must be performed in accordance with all relevant national wiring rules
- Plug acts as Disconnect Device - The socket outlet to which this apparatus is connected must be installed near the equipment and must always be readily accessible
- The system will not operate in the event of a power blackout. Please keep a backup telephone for these emergencies.



Do not install this unit in conditions where there is a danger of electrically ignited explosions.

Exposure to sunlight, heat, and moisture

- Do not expose the unit to direct sunlight for long periods. Keep away from excessive heat and moisture.

Repair

- Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Spare parts and accessories

- Use only approved spare parts and accessories. Operation of non-approved parts cannot be guaranteed and may even cause damage.



Before installing this equipment, users should ensure that it is permissible to connect it to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions might not prevent degradation of service in some situations.



Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together.

Users should not attempt to make such connections themselves, but should contact the appropriate electrical authority as appropriate.

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Table of Contents

1.	Getting Started	9
1.1	Hardware Summary	9
1.2	Tools	9
1.3	Deployment Requirements	10
1.4	Installation Overview	11
2.	Capacities and Specifications	14
3.	Repeater Configurations	15
3.1	Multi-Cell Environment	15
3.2	Linear Configuration	15
4.	Site Survey	16
4.1	Radio Coverage Areas	16
4.2	KWS500 and Repeater Radio Signal Coverage	17
4.3	Measuring Radio Coverage	17
4.4	Using the Handset as a Signal Meter	18
4.5	Signal Meter Display	20
4.6	Site Survey Technique	20
4.7	Completing the Site Survey	21
5.	Service Tool	22
5.1	Programming Requirements	22
5.2	Programming Overview	22
5.3	Welcome	23
5.4	Help Menu	23
5.5	Communications	25
5.6	Repeater	27
5.7	Handset Screens	28
6.	Repeater Programming	30
6.1	Connecting to a Repeater	30
6.2	Repeater Programming Screen Basics	32
6.3	Using the Repeater Programming Screen	33
6.4	Configuring Repeaters for a Multi-Cell Environment	34
6.5	Configuring Repeaters in a Linear Configuration	37
7.	Repeater Hardware Installation	41
7.1	Repeater Wall-Mounting Bracket	42
7.2	Applying Power	43
7.3	Mounting the KIRK Repeater	44
7.4	Completion	44
8.	Glossary	45

1. Getting Started

This guide describes how to:

- Prepare for a successful installation.
- Find suitable locations for your KIRK Repeaters by conducting a site survey.
- Program the KIRK Repeaters with the KIRK Service Tool software.
- Install the KIRK Repeater.

You can find more detailed information on the placement, programming and installation of KIRK Repeaters in the following documents:

- KIRK Wireless Server 500 User Guide
 - Service Tool Help file (SERVICETOOL.HLP)
- Available at <http://www.kirktelecom.com/Installer>



Installation of telecommunications equipment such as KIRK Repeaters requires knowledge of basic hardware functions and terminology. These are defined as they appear and in the glossary in back. Please consult the glossary or a standard dictionary when you encounter terms you are not familiar with. The better your understanding of hardware functions and terminology, the more easily installation will proceed.

First, unpack the shipping container and familiarize yourself with the parts that were shipped to you.

1.1 Hardware Summary

Please remove all containers from the master cartons and verify that all parts are included in the shipment before continuing in this guide.

Inside the master container, you will find several boxes containing: (part number)

- KIRK Repeater(s) (0233 8200)
- KIRK Repeater mounting hardware (2 Phillips screws, 2 drywall anchors)
- Power Supply for KIRK Repeater (8464 2432)
- KIRK Repeater Programming Kit (0231 9508)

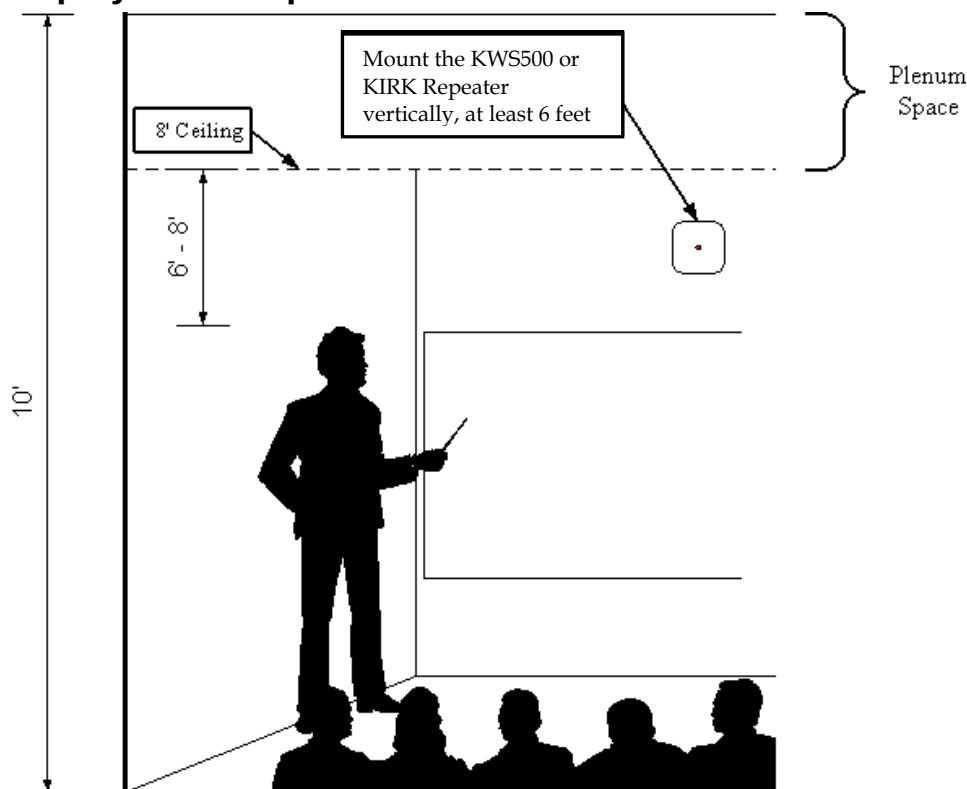
Please do not discard the packaging until all of your items have been checked against your packing slip and you have verified that your order is complete. If any items are damaged or missing, please contact your KIRK vendor.

1.2 Tools

The tools listed below are commonly required for installation of a KIRK Repeater. Additional tools may be necessary, depending on the location or mounting surface.

- Level
- Drill
- #1 and #2 Phillips screwdrivers

1.3 Deployment Requirements



KWS500 or KIRK Repeater placement

Please read this section before programming and installing KIRK Repeaters.

Optimum locations for KIRK Repeaters are best determined by an accurate site survey. This requires the KWS500 to be installed in a central location, connected to a phone system, and powered on. At least one KIRK wireless handset must also be registered to the system in order to monitor signal strength and voice quality while conducting the site survey.

Connection requirements

The KIRK Repeater has specific connection requirements and rules for installation. Following these guidelines is paramount to accomplishing a proper installation.

- Do not apply the power to KIRK Repeaters until you have read and understand the programming procedures and are ready to begin the programming process.
- Programming KIRK Repeaters requires a laptop PC with the KIRK Service Tool software installed. The KIRK Repeater Programming Kit is required to connect the KIRK Repeater to a laptop PC.
- KIRK Repeaters require connection to a standard 120V AC power source.
- KIRK Repeaters connect to the KWS500 wirelessly, so do not require cabling to the KWS500.

KWS500 and KIRK Repeater installation do's and don'ts

The KWS500 integrated call server/base station and KIRK Repeater emit a 1.9 GHz radio signal⁵ to support KIRK wireless handsets. Radio frequency signals are transmitted in all directions from the antennas. While surveying for suitable mounting locations, in order to receive the best performance from the KWS500 and KIRK Repeaters, observe the following rules:

- The KWS500 should be placed in a central position relative to the expected usage of the handsets.
- The KWS500 and KIRK Repeater are typically wall mounted.
 - The KWS500 requires a 9" x 9" mounting area.
 - The KIRK Repeater requires a 6" x 6" mounting area.
- The KWS500 and KIRK Repeater each require local power (standard 120V AC). A dedicated, conditioned power source⁶ is recommended.
- The KWS500 and KIRK Repeater MUST be placed vertically and right-side up. Any other placement can reduce radio signal penetration by up to 50%. Vertical orientation may be observed by the printed stickers located on the rear of the unit. In addition, the power connector is at the bottom of the KWS500 and on the back of the KIRK Repeater.
- Placing the KWS500 or KIRK Repeater above ceilings or ceiling tiles is not recommended.
- Placing the KWS500 or KIRK Repeater behind furniture or other objects that may reduce radio signal penetration is not recommended.
- Painting of the KWS500 or KIRK Repeater or, if mounted externally, their housing or containers, is not recommended. Paints contain metallic and/or carbon materials that will reduce radio signal penetration.
- Place the KWS500 or KIRK Repeater at least six feet above floor level.
- Do not place the KWS500 or KIRK Repeater inside a metallic case. Use plastic enclosures for external mounting.
- Never mount the KWS500 or KIRK Repeater to a metallic surface. Metallic surfaces can cause radio signal reflections.

1.4 Installation Overview

Although each facility is unique, most KWS500 and KIRK Repeater installations follow this basic sequence. Steps 1 through 10 must be completed before conducting a site survey, programming, and installing KIRK Repeaters.

Although each facility is unique, most installations follow this basic sequence:

- Have your PBX vendor prepare your PBX system for the installation. If you know where the KWS500 will be installed and want your PBX vendor to install

⁵ The KWS500, KIRK Repeater and KIRK Handsets are two-way radios that transmit at a frequency of 1.9 gigahertz, or 1.9 billion cycles per second, at a power level of up to 250 milliwatts, giving a coverage area of approximately 25,000 square feet (more with KIRK Repeaters) in a typical office building installation.

⁶ AC current from the power company fluctuates and contains electronic "noise". This can disrupt the operation of sensitive electronic devices and can affect audio signal quality. A power conditioner smoothes out the power fluctuations and noise.

the cabling from the PBX distribution frame to the installation site, have them do so.

- After unpacking the KWS500 and verifying that all parts are present, remove the handsets and chargers from their packaging.
- Charge the handsets. This takes about 3 1/2 hours. See your KIRK Handset's User Guide for charging instructions. Charged handsets are required for the handset subscription and programming steps.
- While the handsets are charging, first read this manual thoroughly and then perform steps 5 through 9 below.
- Select a suitable central mounting location for the KWS500 installation.
- Verify the chosen location has 120V AC power available, or provide power to the location. A dedicated, conditioned power source within six feet of the location is recommended.
- If not done on step 1, provide Cat. 3⁷ cabling from the host PBX distribution frame (most likely located in your facility's "phone closet") to the installation site. This cabling can be obtained from an electrical supply house. (You may use temporary cabling if the final location is not yet certain.)
- (Conditional) Cat. 3 cabling contains eight wires for a total of four phone lines. If you plan to subscribe⁸ five or more handsets (maximum eight), you will need to run two Cat. 3 cables from the host PBX distribution frame to the KWS500.
- Install the KWS500.
- Subscribe the master handset.⁹
- Add the remaining handsets.
- Check each handset for dial tone and the ability to send and receive calls.
- Perform a walk-through of the facility to verify radio coverage¹⁰. If needed, adjust the position of the KWS500 or arrange to add KIRK Repeaters for wider coverage.
- (optional) Program the KIRK Handsets with special features.
- If the walk-through determined that KIRK Repeaters were needed, conduct a thorough site survey to determine the best placement of KIRK Repeaters.
- Verify that the locations chosen for KIRK Repeaters have 120V AC power available, or provide power to the locations.

⁷ Standard eight-wire color-coded twisted-pair wire cabling commonly used for telephone systems. Cat. 3 cabling is used to connect the analog station ports on the PBX distribution frame to the KWS500 telephone wire termination block. One Cat. 3 cable can support four telephone lines.

⁸ Program the KWS500 to send and receive signals from a KIRK Handset.

⁹ The first KIRK Handset registered to the KWS500 becomes the "master" handset, which can be used to register additional KIRK Handsets to the system and to remove handsets if needed.

¹⁰ Effective transmission zone of a radio signal, expressed as an area (square feet), or as a distance (linear feet). Radio coverage can vary greatly from facility to facility, depending upon radio signal barriers such as walls, metal doors and cabinets, and interference from other radio signal sources.

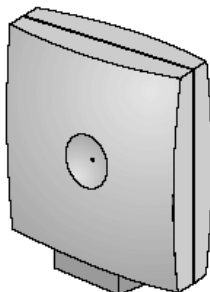
- Program the KIRK Repeaters using the KIRK Service Tool software. Repeaters may be programmed for a linear configuration or multi-cell environment. See Section 3 *Repeater Configuration*.
- Install the KIRK Repeaters.
- Conduct a site survey to verify coverage.
- If needed, obtain additional KIRK Repeaters and do steps 11 through 13. The KWS500 supports up to six Repeaters.
- Conduct a final site survey to verify coverage and adjust Repeater placement as needed.

Additional KIRK Handsets may be added, and more in-depth programming may be performed on the system, using the Administration Program¹¹ and/or the KIRK Service Tool software, at any time after step 10 above.

¹¹ KIRK software program used to configure KIRK wireless servers and KIRK Handsets.

2. Capacities and Specifications

KIRK Repeater, 1.9 GHz four-channel



The KIRK Repeater is a building block to be used to extend the coverage area of a KWS500 integrated call server/base station.

KIRK Repeaters do not increase the number of active voice channels available in the coverage area. Repeaters are used to extend the coverage area of a KWS500 to areas isolated from the main coverage area. Repeaters can be used to create a new coverage cell in a remote location such as a rear storeroom or building or to allow coverage in an external breezeway.

Repeater capacities and requirements

- A maximum of six KIRK Repeaters may be synchronized to a single KWS500.
- The KIRK Repeater has two internal antennas; one antenna is used for maintaining a link to the KWS500, and the second for increasing the coverage range.
- The KIRK Repeater requires no wired connections to the KWS500. Therefore, Repeaters do require a standard 120V AC power outlet within six feet of placement.
- When a KIRK Handset is using a KIRK Repeater, one Repeater channel and one KWS500 channel are in use.
- The KIRK Repeater handles up to four simultaneous voice channels provided by the KWS500.
- The KIRK Repeater must be placed well within the coverage area of the KWS500 or another KIRK Repeater to be able to repeat a signal.
- The KIRK Repeater requires specific minimum levels of radio signal strength and signal quality from the KWS500 or another Repeater:
 - Radio Signal Strength Indicator (RSSI) value of 80 or above
 - Q-value stably at 60 or above. (See *Site Survey* section for full explanation.)

Repeater specifications

Frequency:	1.9 GHz
Transmit range:	Dependent on building materials
Protocol:	DECT ¹² GAP ¹³
Power requirements:	9V DC - 300mA 2,7VA
Dimensions:	4 x 4 x 1.5" (100 x 100 x 36 mm)
Weight:	5.5 oz (156 g)
Active speech channels:	2 to 4, software-controlled

¹² Digital Enhanced Cordless Telecommunications. DECT is a radio technology standard originally developed for European wireless telephone systems and is now in use worldwide.

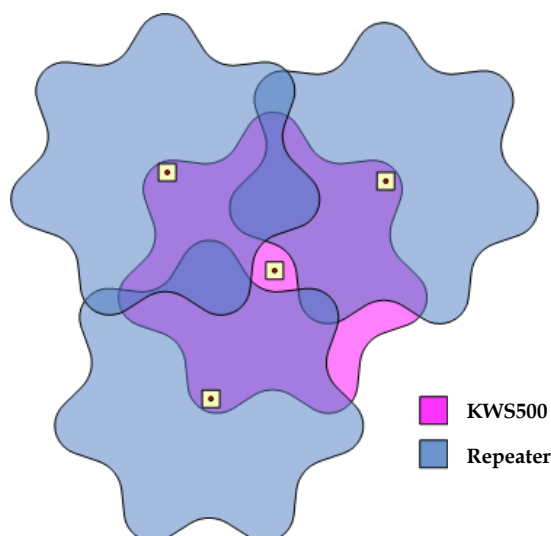
¹³ Generic access profile, an interoperability profile for DECT telephone systems. Handsets and base stations of different makes that support GAP can communicate with each other at a basic level.

3. Repeater Configurations

KIRK Repeaters may be configured for a multi-cell environment¹⁴, or in a linear configuration. You may use both configurations, with a limit of six KIRK Repeaters synchronized to one KWS500.

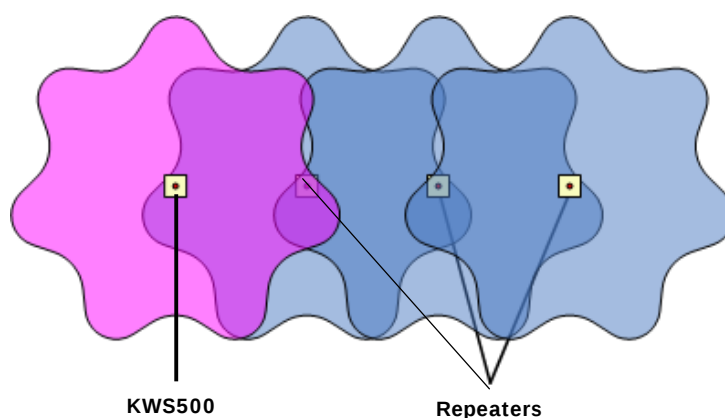
3.1 Multi-Cell Environment

In a multi-cell environment, up to six KIRK Repeaters may be synchronized to the KWS500 to extend the radio coverage area. Each KIRK Repeater adds another “cell” to the KWS500 coverage area.



3.2 Linear Configuration

KIRK Repeaters may also be configured in a linear configuration of two or three Repeaters. In this configuration, the Repeater closest to the KWS500 is the only Repeater in the chain that is synchronized to the KWS500. Subsequent Repeaters are synchronized to the previous Repeater in the chain.



¹⁴ “Cell” is a term for the radio coverage area of a base station or repeater. “Multi-cell” means more than one cell, often with overlapping coverage. “Multi-cell environment” refers to one or more repeater cells added to a base station cell to expand the coverage area.

4. Site Survey

The purpose of a site survey is to determine the optimum locations and configurations for the KWS500 and KIRK Repeaters. This is accomplished by positioning the KWS500 according to the guidelines given in Section 1.3 *Deployment Requirements* and, using a KIRK Handset as a signal meter, walking through the desired coverage area and noting any spots where the KWS500 signal is too low to support quality voice transmission. These locations require KIRK Repeaters to boost the KWS500 radio signal.

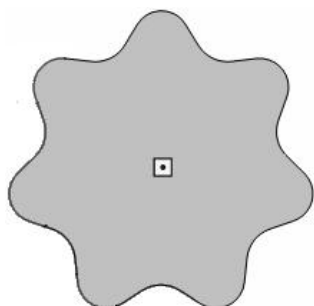
If the KWS500 has been placed in an area that is not centrally located or that inhibits radio signal transmission, it may need to be moved to a more optimum location. The do's and don'ts of KWS500 and KIRK Repeater placement are covered in Section 1.3 *Deployment Requirements* and in *Radio Coverage Areas* below.

4.1 Radio Coverage Areas

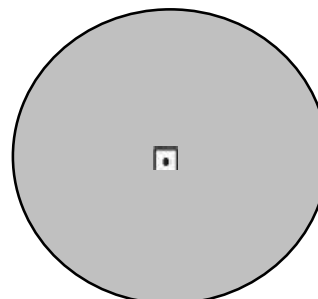
It is extremely important to keep in mind that radio signal coverage is dependent on construction materials, method of construction and environment; therefore care must be taken when choosing the proper mounting location.

The following points should be taken into consideration when planning the installation.

- The KWS500 Base Station provides a radio coverage of around 25,000 square feet in a typical office building. However, the exact coverage range depends on the building architecture and materials. Radio signal measurements should be taken after installation to verify the actual coverage provided.



Radio coverage in a typical office building



Outdoor radio coverage in direct line-of-sight conditions

- Outdoors, the KWS500 Base Station may extend to 900 feet in direct line-of-sight conditions.
- The KWS500 supports a maximum of eight handsets.¹⁵
- The KWS500 supports a maximum of six Repeaters.
- The KWS500 provides six simultaneous voice channels with seamless handover between the KWS500 and KIRK Repeaters, and between the repeaters.
- KWS500 and KIRK Repeater antennas are omni-directional (360 degrees).

¹⁵ Two-way radio that is similar to a cell phone and communicates with a radio base station connected to a wired telephone network.

- KIRK Repeaters should always be mounted vertically, utilizing the supplied mounting bracket. The coverage area can be adversely affected if the KWS500 or KIRK Repeater is mounted improperly.
- The KWS500 should be placed in a central area of the structure to be covered, between six and eight feet in height. If the KWS500 or KIRK Repeater are placed any lower, persons walking around could interfere with the radio signal.
- Avoid placing the KWS500 or KIRK Repeater near other electronic equipment, large machinery, etc., as the range can be severely affected.

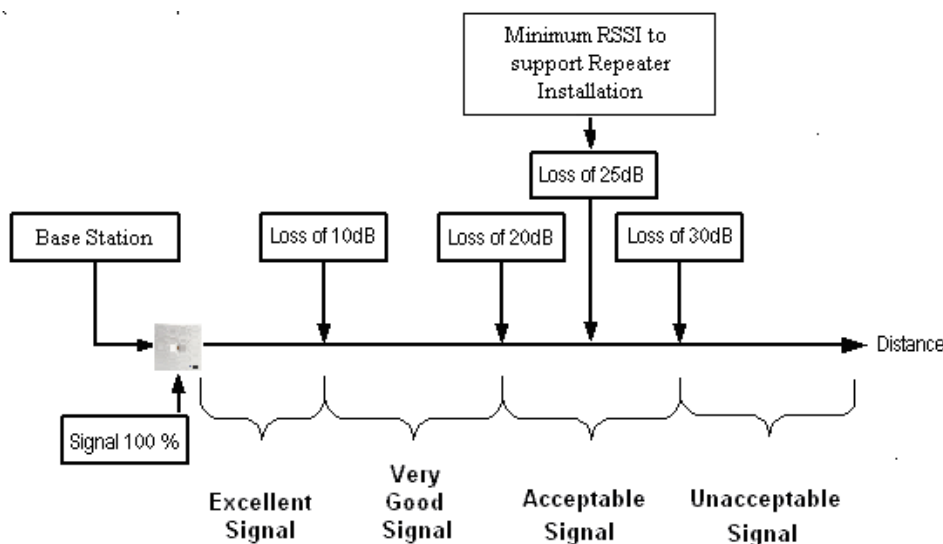
4.2 KWS500 and Repeater Radio Signal Coverage

The KWS500 is a single-cell DECT system, meaning that there is a single source of the radio signal. The KWS500 is designed for generally simple structures requiring up to eight KIRK handset users. Up to six KIRK Repeaters may be added to the system to extend the radio coverage provided by the KWS500.

Once the KWS500 is installed and a master handset subscribed, use the handset as a signal meter to check the entire coverage area for quality of radio signal. Use KIRK Repeaters to boost coverage to low traffic and low signal areas.

KIRK Repeaters must be mounted within the coverage area of the KWS500 to synchronize and provide proper operation. The Radio Signal Strength Indicator (RSSI) value is normally not accepted as lower than a loss of 25dB relative to the signal which is 100% measured near to the KWS500 Base Station. Repeaters typically provide a 50% increased coverage of the Base Station.

RSSI value as it relates to voice quality



4.3 Measuring Radio Coverage

The radio coverage provided by the KWS500 and associated KIRK Repeaters is measured through two separate but equally important radio signal values. These two values are referred to as the Q-value, and Radio Signal Strength Indicator (RSSI). A KIRK Handset can be used as a signal meter for measuring these values.

Q-value

The Q-value is an expression for the bit failure rate in the communication between the Base Stations and the handset. The highest possible Q-value is 64. At this value there is no bit failures measured and should provide excellent speech quality.



As the wireless handset roams the coverage area, the Q-value will change. When the wireless handset registers a Q-value of 52 (12 bit failures measured), the wireless handset will request a handover to an alternative Base Station or Repeater or eventually to another channel, frequency or timeslot.

Be aware that the information in the display is only updated once per second meaning that the number of bit failure can be lower or higher than indicated in the display. Therefore it is important to accept that as soon as significant fluctuation of the Q-value occurs the end of the radio coverage has been reached.

RSSI value

The Radio Signal Strength Indicator value is a relative expression for the field strength of signal from the Base Station. The RSSI-value is used for the choice of the alternative Base Station(s).

The wireless handsets will choose the Base Station from which the strongest RSSI signal is received as the first alternative Base Station. Alternative Base Stations are listed according to RSSI values. If the “Best alternative Base Station” disappears the next Base Station with the highest RSSI value will become the “Best alternative Base Station”.

RSSI value display

In some cases, the RSSI value may be a three-digit value (i.e. greater than 99). In this case, the handset uses a punctuation symbol to indicate this. (Only the KIRK 5020 handset indicates a three-digit value). The punctuation symbol should be read as 100 + the number shown.

For instance, to relate a RSSI value of 99, the digits **99** will be shown in the display. To relate a RSSI value of 106, the value may appear as: **6** or **; 6**. The punctuation symbol shown may change; however, the meaning remains the same.



To provide for quality speech, the RSSI value is normally not accepted as lower than a loss of 25dB relative to the signal which is 100% measured near to the KWS500 Base Station. **If the signal loss rises to more than 25dB within the desired coverage area, plan to install a KIRK Repeater to improve coverage.**

When measuring for placement of Repeaters, the signal loss of the KWS500 (or KIRK Repeater in a linear configuration) should not be higher than 25dB at the location chosen for mounting the Repeater.

4.4 Using the Handset as a Signal Meter

During a site survey, any KIRK Handset subscribed to the system can be used as a signal meter to measure the radio signal strength and voice quality of the KWS500 and KIRK Repeaters and determine their optimal locations.

Radio coverage is measured by a combination of the Q-value and RSSI value, shown in the handset's display as described below. If values are not adequate in a sector of the coverage area (Signal loss of more than 25dB and Q-value less than 60), the KWS500 may need to be moved to a better location, and/or KIRK Repeaters may need to be installed.



All signal measurements must be taken with the subscribed handset off-hook and in a call to monitor voice quality.



It is recommended to use a headset to assist with measuring radio signal strength. This allows you to listen to the quality of the voice while simultaneously viewing the signal values on the handset's display screen.

Activating the signal meter (3040, 4020, 4040)

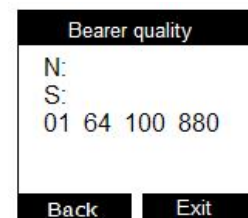
- Turn the handset on (press the  key for one second).
- Dial        (make sure that the "key lock" is not active).
- Press the  MUTE key; the Signal Meter will appear.
-



3040, 4020, 4040
Signal Meter

Activating the signal meter (5020)

- Turn the handset on (press the left softkey for one second).
- Dial        (make sure that the "key lock" is not active).
- Press the R key, and wait for signal data to be received; the Signal Meter will appear.



5020 Signal Meter

Performing measurements (3040, 4020, 4040)

- Take the handset off-hook by pressing the  key.
- Place a call to a destination.
- Place your hand over the top of the handset to simulate actual usage.
- Monitor the values displayed.

Performing measurements (5020)

- Take the handset off-hook by pressing the  key.
- Place a call to a destination.
- Place your hand over the top of the handset to simulate actual usage.
- Monitor the values displayed.

Turning off the Signal Meter (3040, 4020, 4040)

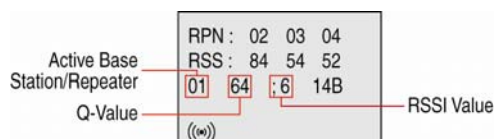
To exit the Signal Meter mode, press and hold the  REDIAL key for two seconds. The handset will return to the idle condition.

Turning off the Signal Meter (5020)

To exit the Signal Meter mode, press **Exit**.

4.5 Signal Meter Display

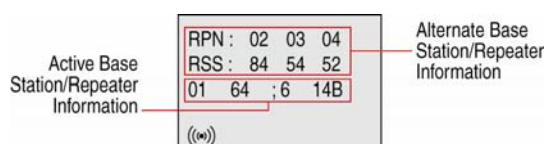
The Signal Meter displays the Q-value and RSSI value for the active Base Station/Repeater, and the RSSI values for up to three KIRK Repeaters, when located within the range of the handset. The KWS500 (Base Station) is always number **01**. Repeaters are numbered **02** to **07**, according to the numbers assigned to them when they are programmed with the KIRK Service Tool software. Be aware that the indication of values of the display differs from one handset type to another (RPN = N = base station no./repeater no., and RSS = S = RSSI value (signal strength)).



When beginning the site survey, the values for the KWS500 are reported along the bottom row of the display. From left to right, the bottom row shows the KWS500's number, the Q-value, and the RSSI value.

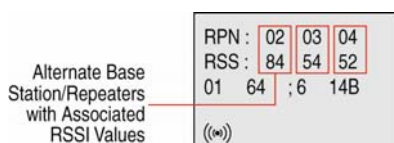
The remaining numbers in the row are not part of the measurement process. This is called the active Base Station/Repeater.

When KIRK Repeaters are installed, information is provided for the signal strength of the three closest Repeaters. These Repeaters are listed to the right of RPN (Radio fixed Part number).



(Alternatives 03 & 04 = signal value too low. Anything below 60 will not be shown)

Number). The RSSI value for each Repeater is listed below its RPN. These alternate Repeaters are prioritized by RSSI value.



In this example, the handset is actively synchronized to the KWS500 (Base Station **01**) with a Q-value of **64** and an RSSI value of **106**. The handset is also within range of KIRK Repeater **02** with an RSSI value of **84**. When the Q-value of Base Station **01**

drops to around **52**, the handset will request a handover to the KIRK Repeater with the highest RSSI value, if available. In this case, the handover would be given to KIRK Repeater **02** with an RSSI value of **84**.

4.6 Site Survey Technique

Starting near the KWS500, use your KIRK Handset to place an active call to another telephone to monitor voice quality. Walk away from the KWS500 while monitoring signal values to find the limits of the coverage. Roam to each room or area of the facility where coverage is desired.

Monitor the Q-value while moving away from the KWS500. If the Q-value drops to 52 or becomes unstable (fluctuating) the limit of the radio coverage has been reached. Walk back to an area where the Q-value stably measures at least 60, and the signal loss is not higher than 25dB, and mark the location to install a KIRK Repeater.

During measurement of radio coverage, it is important to simulate the influence of the human body and normal usage of the handset. This can be done either by shielding the antenna by the hand, or by turning the handset and the body in a way to achieve a "worst case" situation for reception of the radio signal from the Base Station.

4.7 Completing the Site Survey

By the end of the site survey, you will have established the optimum locations for the KIRK Repeaters. Mark these locations clearly, and plan out how you will configure the KIRK Repeaters (multi-cell and/or linear) and provide electrical power for them.

The next step is to program the KIRK Repeaters.

5. Service Tool

The KIRK Service Tool is a software program developed by KIRK telecom to program KIRK Repeaters and KIRK Handsets. It is downloaded from the KIRK telecom website and installed on a PC, which is then connected to a KIRK Repeater or handset via the KIRK Programming Kit.

5.1 Programming Requirements

- PC with a 9-pin male serial port¹⁶ running Windows 98 or above.
- KIRK Service Tool software downloaded from the KIRK telecom website.
- KIRK Programming Kit - contains a Y-splitter cable¹⁷ and a Programming Cable (specially wired serial cable). The cables in the programming kit can be used to connect a PC to a KIRK Repeater or to a KIRK Single Charger.

5.2 Programming Overview

Once the optimum KIRK Repeater configuration and the mounting locations have been determined by site survey, the Repeaters can be synchronized to the KWS500 and programmed for multi-cell or linear configuration. Each KIRK Repeater synchronized to the KWS500 must have a unique radio part number (RPN) assigned, starting with 2 and going as high as 7. No two KIRK Repeaters can share the same RPN within an installation.

Program the KIRK Repeaters prior to mounting them on the wall.

KIRK Repeater configuration options include:

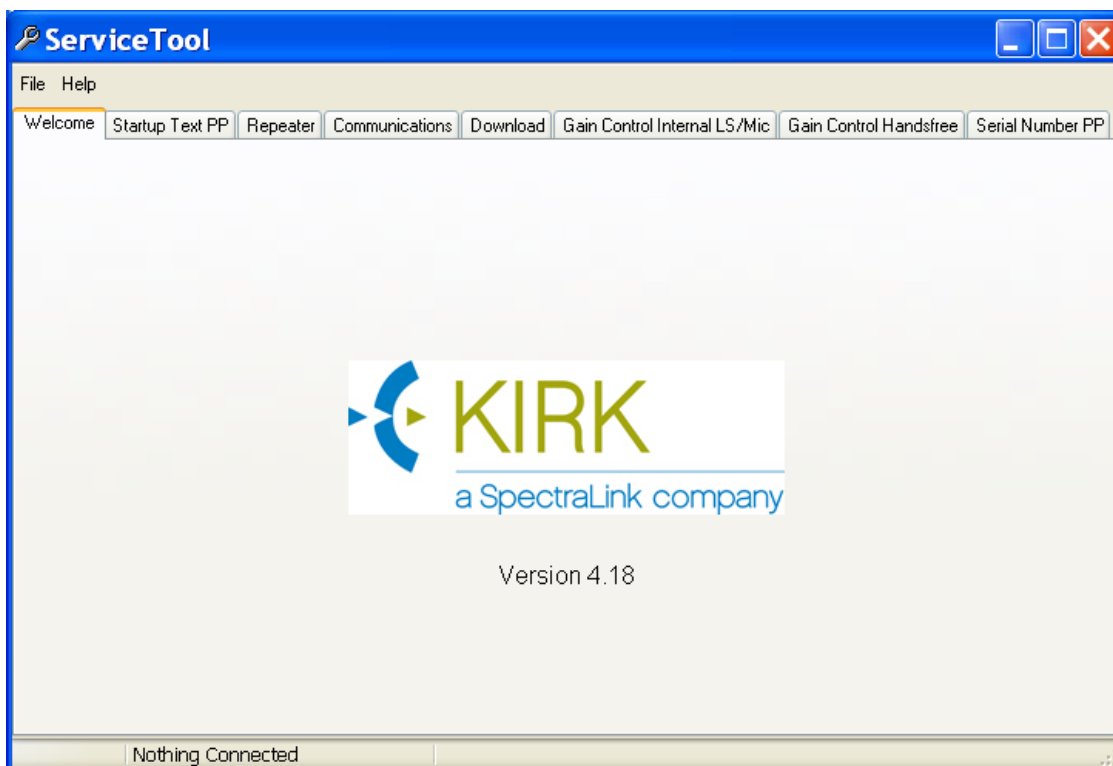
- Set the type of connection to the KIRK Repeater.
- Synchronize with the KWS500.
- Synchronize with another KIRK Repeater.

¹⁶ Type of port (wiring connection point) on a computer, used for data transmission. It is called a “serial” port because the bits of data are transmitted in sequence over a single wire.

¹⁷ Electrical cable that has a single connector on one end and two connectors on the other end. The KIRK Repeater Programming Kit’s Y-splitter cable has a male connector on one end and two female connectors on the other end.

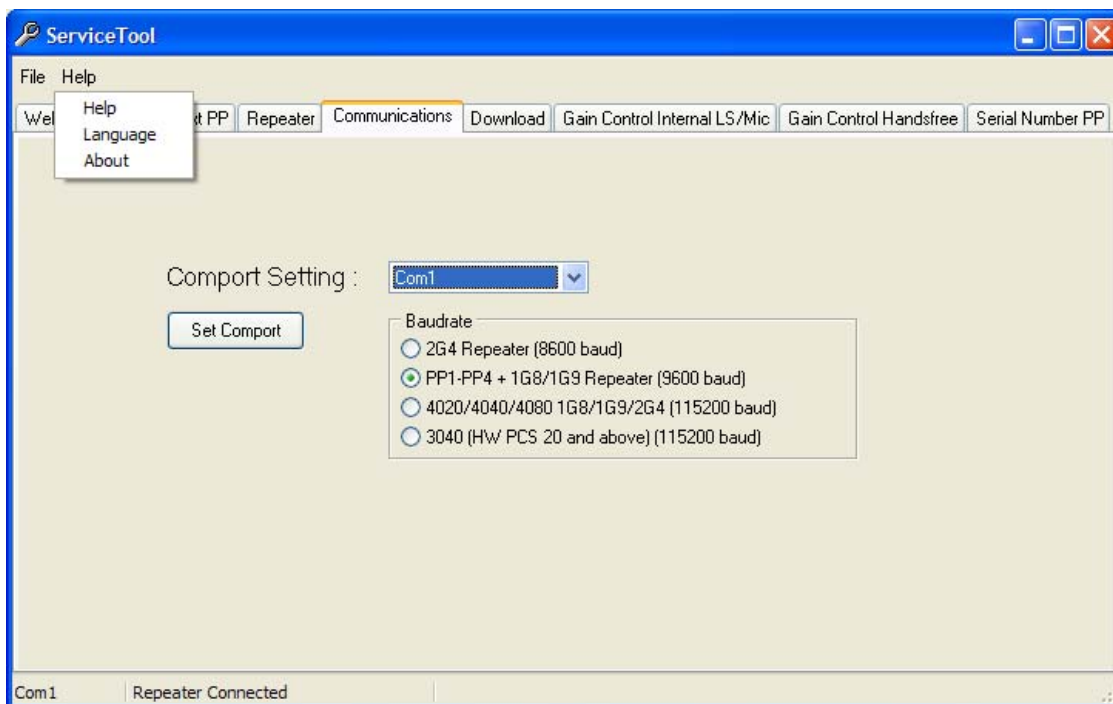
5.3 Welcome

The **Welcome** tab screen is the default main screen of the KIRK Service Tool.



5.4 Help Menu

Click the **Help** button to access the **Help** menu or to choose a different language.





5.5 Communications

The **Communications** tab screen is used to select the type of connection between a KIRK Repeater or handset and a PC.

Setting the COM port and baud rate

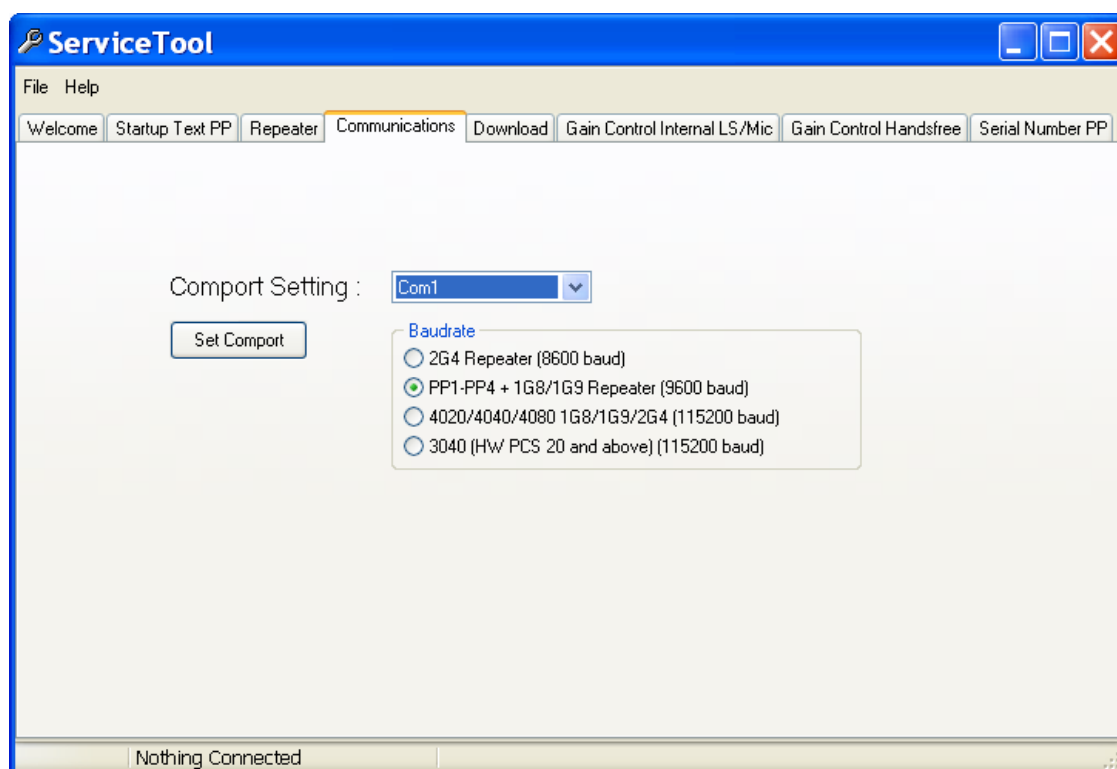
- From the **Comport Setting** drop-down list, select the proper **COM** port.¹⁸ This is normally **COM1**.
- Select the type of connection to be made by clicking the appropriate **Baudrate**¹⁹ option.

Repeater/ Handset	Baud Rate
KIRK Repeater (1.9 GHz)	PP1-PP4 + 1G8/1G9 Repeater (9600 baud)
KIRK 3040 Handset	PP1-PP4 + 1G8/1G9 Repeater (9600 baud)
KIRK 4020/4040 Handset	4020/4040/4080 1G8/1G9/2G4 (115200 baud)

- Click the **Set Comport** button. The status bar should acknowledge that it has found the KIRK Repeater or handset by displaying **Repeater Connected** or **Handset Connected**.
- Click the tab relating to the programming action you wish to perform. For KIRK Repeater programming, click the **Repeater** tab.

¹⁸ Serial port on a PC.

¹⁹ Data transmission rate used in telecommunications systems, measured in symbols per second.



5.6 Repeater

The **Repeater** tab screen contains all of the fields and commands necessary for programming a KIRK Repeater for a multi-cell environment or in a linear configuration.

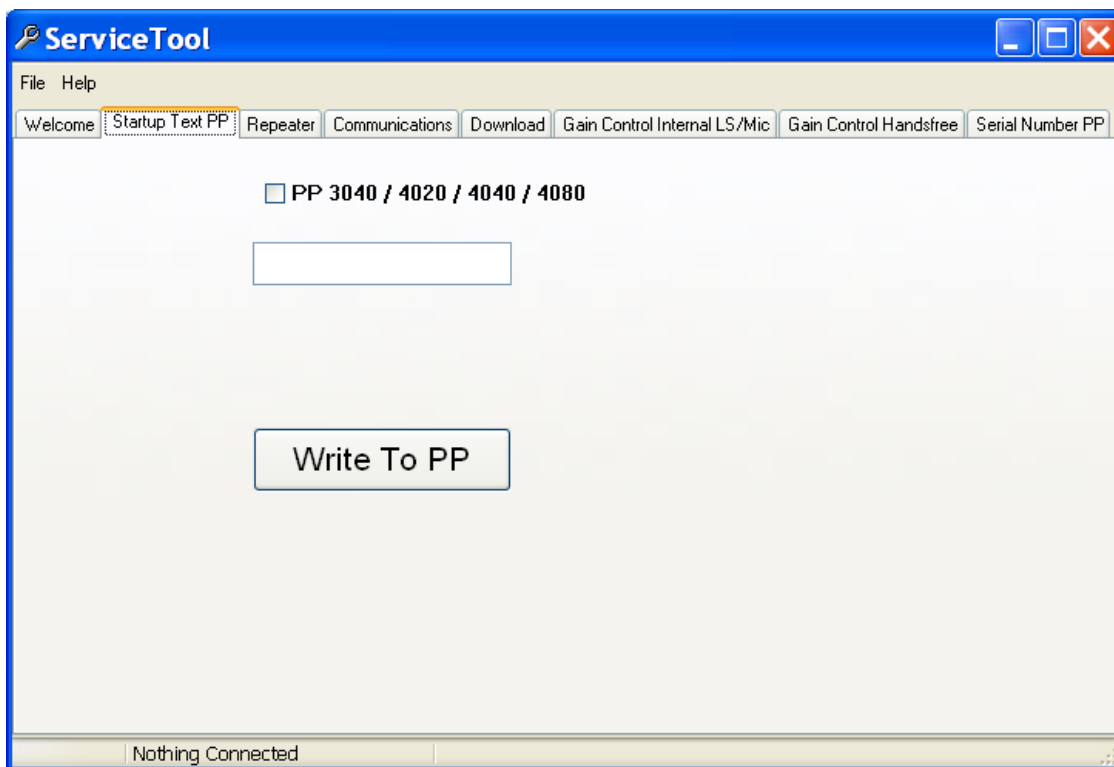
The screenshot shows the ServiceTool application window with the 'Repeater' tab selected. The interface includes a menu bar (File, Help) and a tabbed control area with tabs for Welcome, Startup Text PP, Repeater, Communications, Download, Gain Control Internal LS/Mic, Gain Control Handsfree, and Serial Number PP. The main area contains the following fields and controls:

- Multi Cell System :** A text box containing 'OCTAL'.
- Base to synchronize on :** A text box containing 'Dec(0-255)'.
- Repeater number :** A text box containing 'Dec(0-255)'.
- Number of channels to transfer (Busy Bit) :** A text box containing '2' and a label 'Dec(1,2,3)'.
- Debug Bip:** An unchecked checkbox.
- Buttons:** Read from Repeater, Write to Repeater, New, and Single Cell Base.
- Warning Message:** A red text box stating: "If Handsets of the type PP1 is registrated on the system the range of numbers for repeaters must be limited into 0-31 Otherwise the handsets is not able to registrate the repeater."
- Status Bar:** Displays 'Nothing Connected'.

5.7 Handset Screens

Startup Text PP

This screen allows the programmer to send new startup text to a handset. The startup text is shown when the handset is first powered on, and when it is in standby mode (not receiving a signal from the KWS500).



Download

The **Download** tab screen is used to load upgrade files to a connected KIRK Handset. This is not part of configuring the KIRK Repeater. KIRK Handset programming instructions using the KIRK Service Tool can be found in (insert document name and how to obtain document).

Gain Control Internal LS/Mic

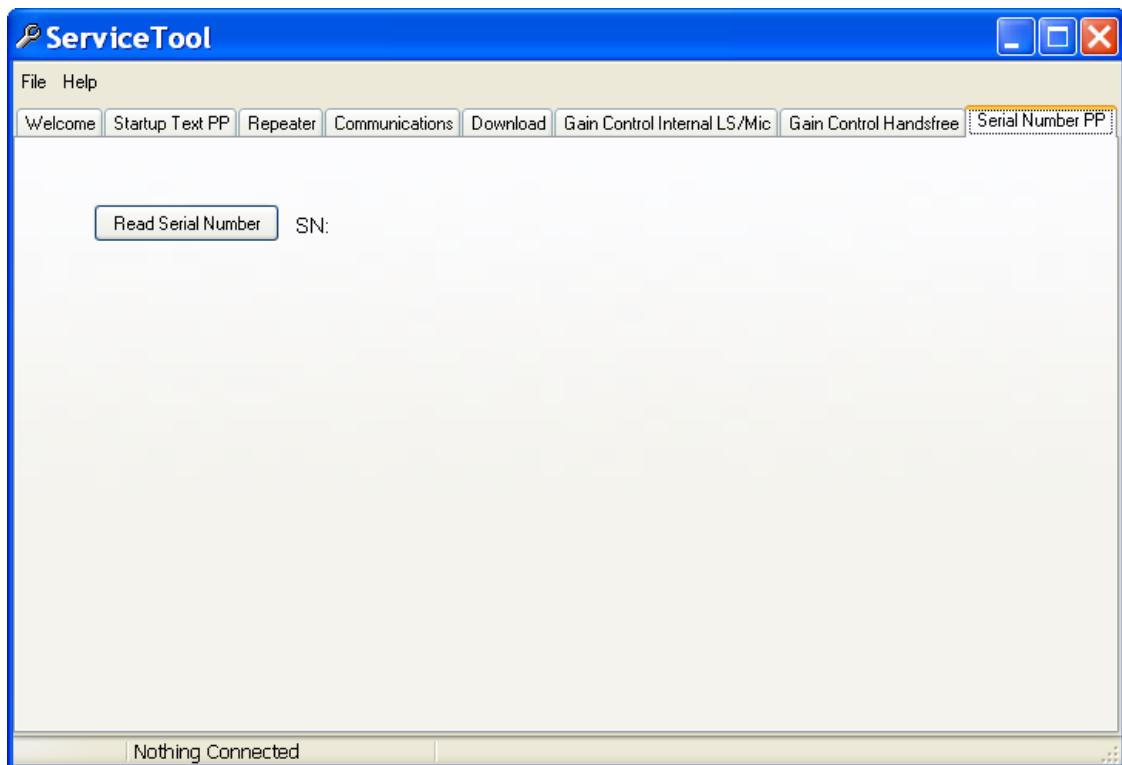
To be used by qualified KIRK telecom personnel only.

Gain Control Handsfree

To be used by qualified KIRK telecom personnel only.

Serial Number PP (Handset)

The **Serial Number PP** tab screen can be used to check the serial number of a connected handset. Click the **Read Serial Number** button and the handset's serial number will display.



6. Repeater Programming

6.1 Connecting to a Repeater

To connect a KIRK Repeater to a PC, a KIRK Repeater Programming Kit is required. The kit contains a Y-splitter cable and a Programming Cable with a serial connector²⁰ on one end and a modular plug²¹ on the other end. See the diagram on the following page.

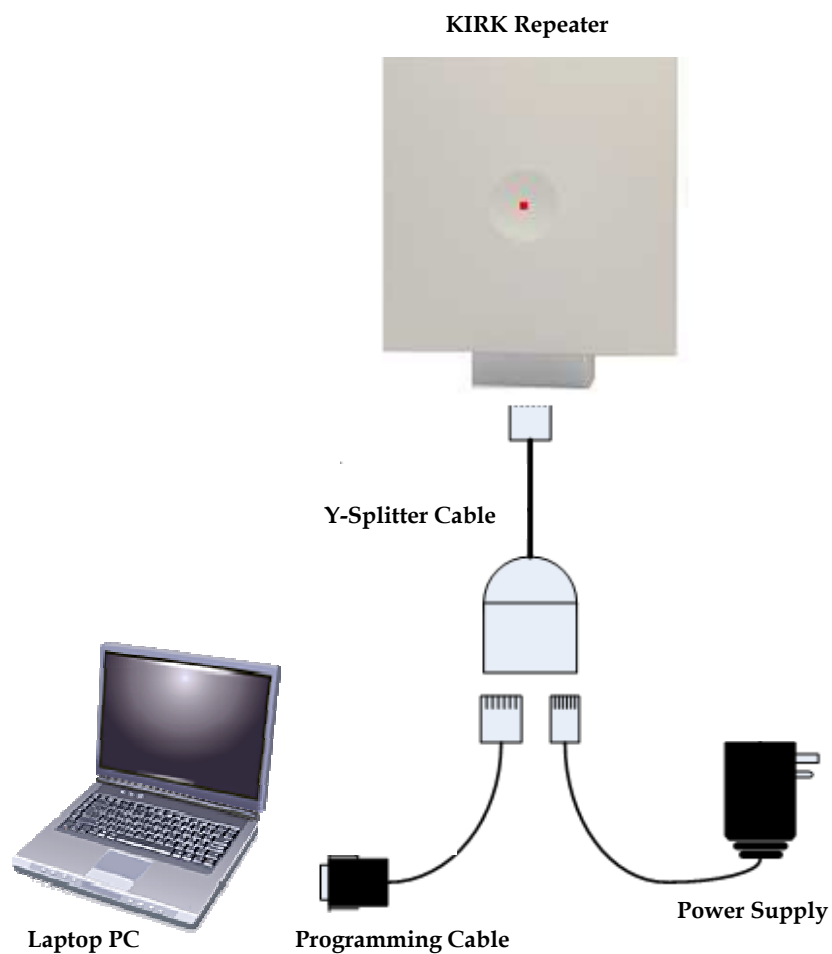
Follow this sequence exactly:

- Insert the Y-splitter cable's modular plug into the connector on the back of the KIRK Repeater.
- Insert the power cable's modular plug into the narrower female connector in the Y-splitter.
- Plug the power supply into a 120V AC power source. The LED²² on the front of the KIRK Repeater will light red (flashing).
- Insert the Programming Cable's modular plug into the wider female connector in the Y-splitter.
- Connect the cable's serial connector to the PC's serial port.
- Click the **Service Tool** icon to start the KIRK Service Tool on the PC.
- Click the **Communications** tab.
- From the **Comport setting** drop-down list, select the **COM** port to which the Repeater Programming Kit is connected. This is normally **COM1**.
- Click the **Baudrate** option **PP1-PP4 + 1G8/1G9 Repeater (9600 baud)**.
- Confirm your selection by clicking the **Set Comport** button. The status bar should acknowledge that it has found the KIRK Repeater by displaying **Repeater Connected**.
- If the status bar does not show that the KIRK Repeater is connected, ensure that the LED on the KIRK Repeater is lit (flashing), and that each cable connection is firm. If necessary, disconnect all cables and perform the above steps again in the exact sequence given. If the KIRK Service Tool still does not register a connection, contact your KIRK vendor.
- Once connected, click the **Repeater** tab. The **Repeater** tab screen contains all the fields and commands necessary for configuring a KIRK Repeater.

²⁰ A cable connector for a serial port (COM port) on a PC.

²¹ One of several sizes of male connectors such as those that plug into a telephone jack, Ethernet jack, or similar connector.

²² Light emitting diode. Usually red or green, it is an electrical component that lights up when electricity is passed through it. The KIRK Repeater has an LED in the center of its cover.

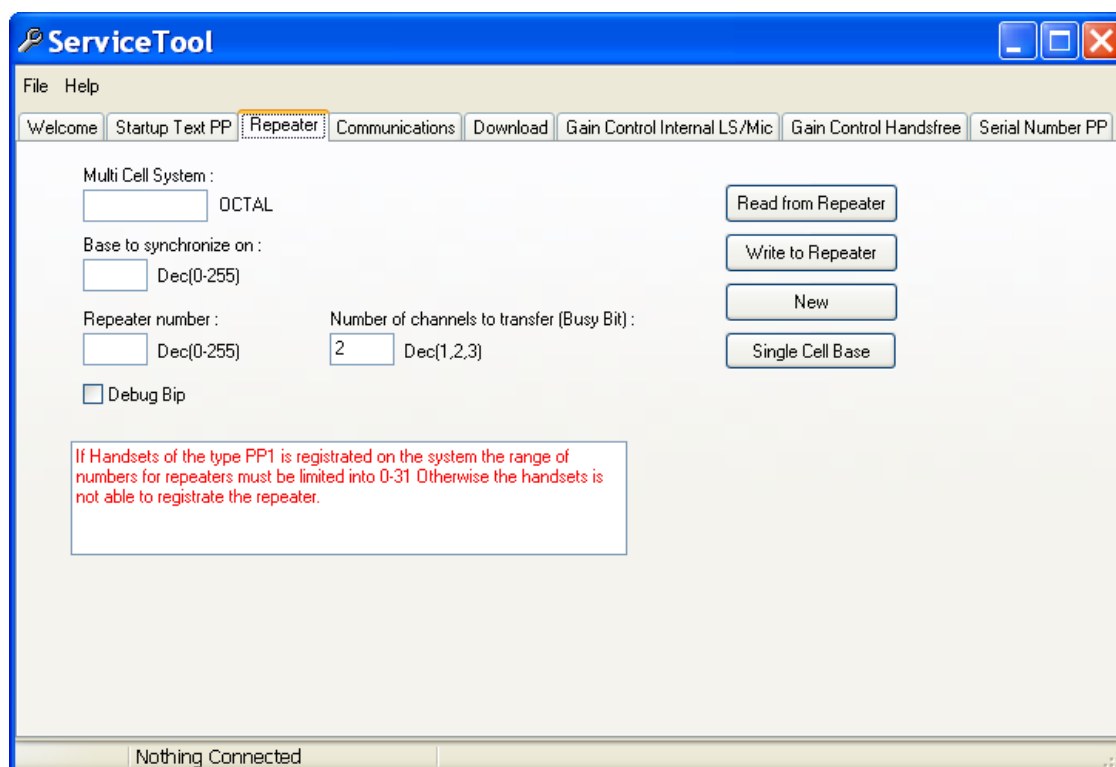


KIRK Repeater with Repeater Programming Kit

6.2 Repeater Programming Screen Basics

Click the Repeater tab to display the default screen. As you can see, this screen is for a **Multi Cell System**. This refers to a Kirk Wireless Server system, such as the KWS1500, with a larger wireless server²³ connected to multiple KIRK Base Stations, also called cells.

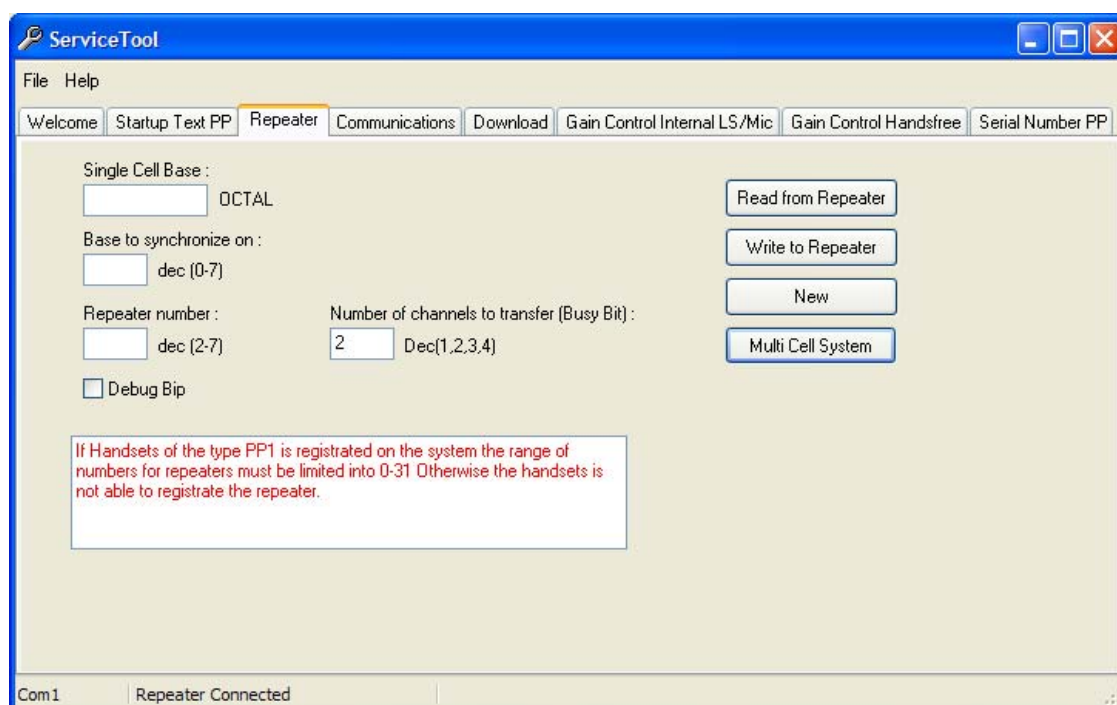
The KWS500 is a single cell (one base station) system that supports up to six KIRK Repeaters in multi-cell and linear Repeater configurations. To bring up the screen for synchronizing KIRK Repeaters with a KWS500, click the **Single Cell Base** button.



Single Cell Base

Click this button when programming a KIRK Repeater with a KIRK Wireless Server 500 system. You will see the following screen.

²³ Computer that provides a range of telecom input/output functions for a wireless communications network.



6.3 Using the Repeater Programming Screen

Single Cell Base: OCTAL²⁴

You will enter your KWS500's 12-digit Access Rights Identity (ARI) number in this field. This number is used to identify the KWS500 to the KIRK Repeater. The ARI number is located on the back panel of the KWS500.

Example: S/N: 000012345678.

Base to synchronize on

Enter the number **1** to tell the KIRK Repeater to synchronize with the KWS500. The KWS500 base number is always **1**.

Repeater number

Enter a number to identify the KIRK Repeater being programmed. The KWS500 supports up to six KIRK Repeaters. The **Repeater number** may be any number from **2** to **7**. No two KIRK Repeaters associated with your KWS500 may be assigned the same number.

Debug Bip

When you select the **Debug Bip** check box, it causes the associated KIRK Repeater to emit a short chirp about every two seconds when a KIRK Handset is in use in the vicinity of the Repeater. Leave this check box clear.

Number of channels to transfer (Busy Bit)

This value controls the number of handsets the KIRK Repeater will support before returning a busy signal. By default the **Busy Bit** is set to **2**. Since the KIRK Repeater will support up to four handsets, you may set the **Busy Bit** to **4**.

1 Busy bit transmitted when one handset is off-hook.

²⁴ Refers to octal numbering system. This system is convenient for computers, and is based on the number 8 instead of the usual 10. The ARI number entered in this field is an octal number.

- 2 Busy bit transmitted when two handsets are off-hook.
- 3 Busy bit transmitted when three handsets are off-hook.
- 4 No busy bit transmitted. Busy bit transmitted when four handsets are off-hook.

Write to Repeater

Click this button to write the programming information you entered in the above fields to the connected KIRK Repeater.

Read from Repeater

Click this button to read the current values programmed on the connected KIRK Repeater.

New

Click this button to clear all data and prepare the screen for programming another KIRK Repeater.

Multi Cell System

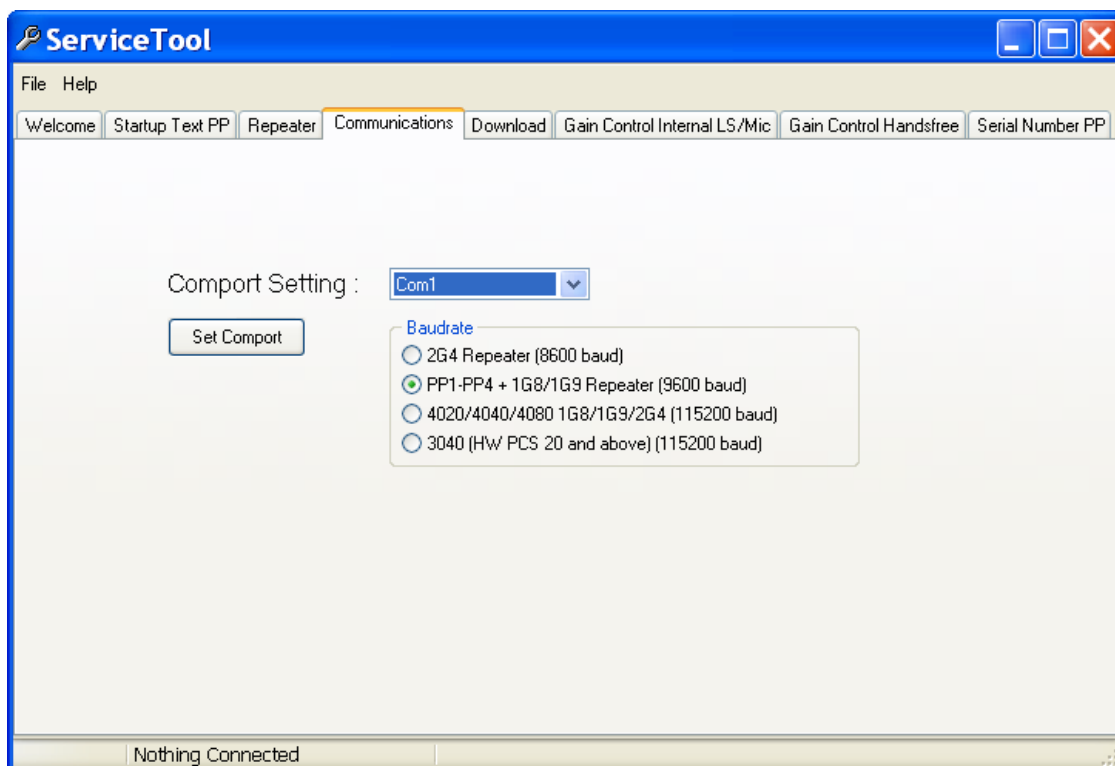
Click this button to return to the default **Repeater** tab screen.

6.4 Configuring Repeaters for a Multi-Cell Environment

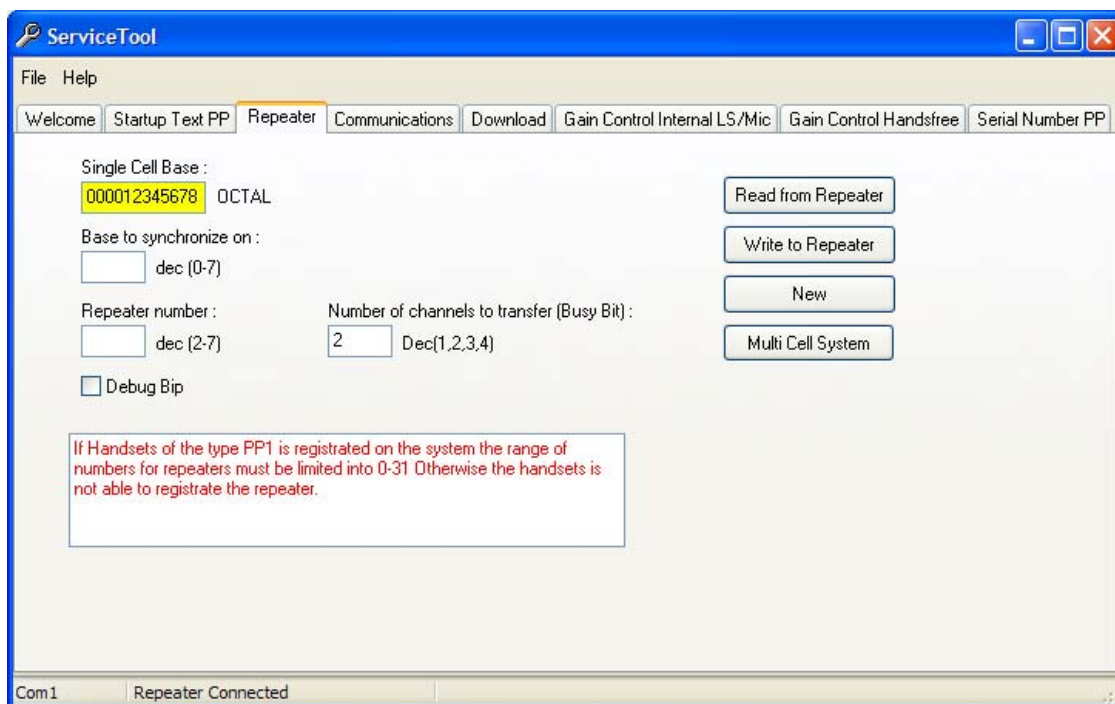
This is the most common configuration. Use the KIRK Repeater Programming Kit and a laptop PC with the KIRK Service Tool software installed to program your KIRK Repeaters.

To connect a KIRK Repeater to a laptop PC and configure it for a multi-cell environment:

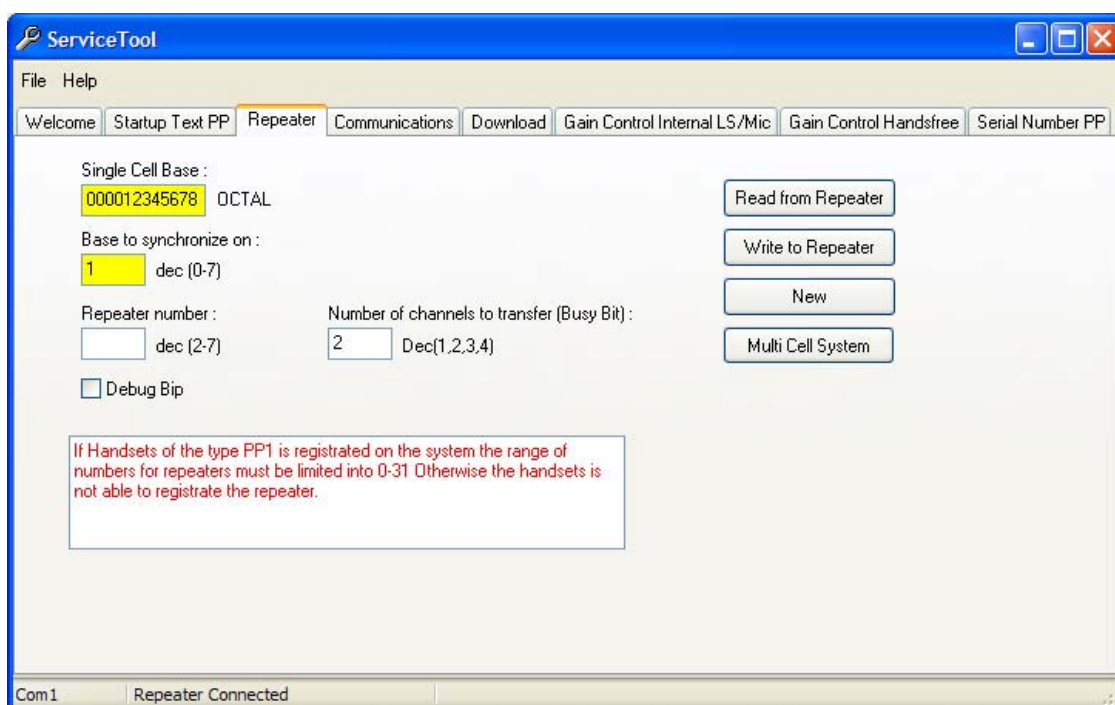
- Make a note of the ARI number located on the back of the KWS500.
- Select the first KIRK Repeater you wish to program.
- Insert the Y-splitter cable's modular plug into the connector on the back of the KIRK Repeater.
- Insert the power cable's modular plug into the narrower female connector in the Y-splitter.
- Plug the power supply into a 120V AC power source. The LED on the front of the KIRK Repeater will light red.
- Insert the Programming Cable's modular plug into the wider female connector in the Y-splitter.
- Connect the cable's serial connector to the laptop PC's serial port.
- Click the **Service Tool** icon to start the KIRK Service Tool on the PC.
- **Click the Communications tab.**
- From the **Comport setting** drop-down list, select the **COM** port to which the Repeater Programming Kit is connected. This is normally **COM1**.
- **Click the Baudrate option for PP1-PP4 + 1G8/1G9 Repeater (9600 baud).**
- Confirm your selection by clicking the **Set Comport** button. The status bar should acknowledge that it has found the KIRK Repeater by displaying **Repeater Connected**.



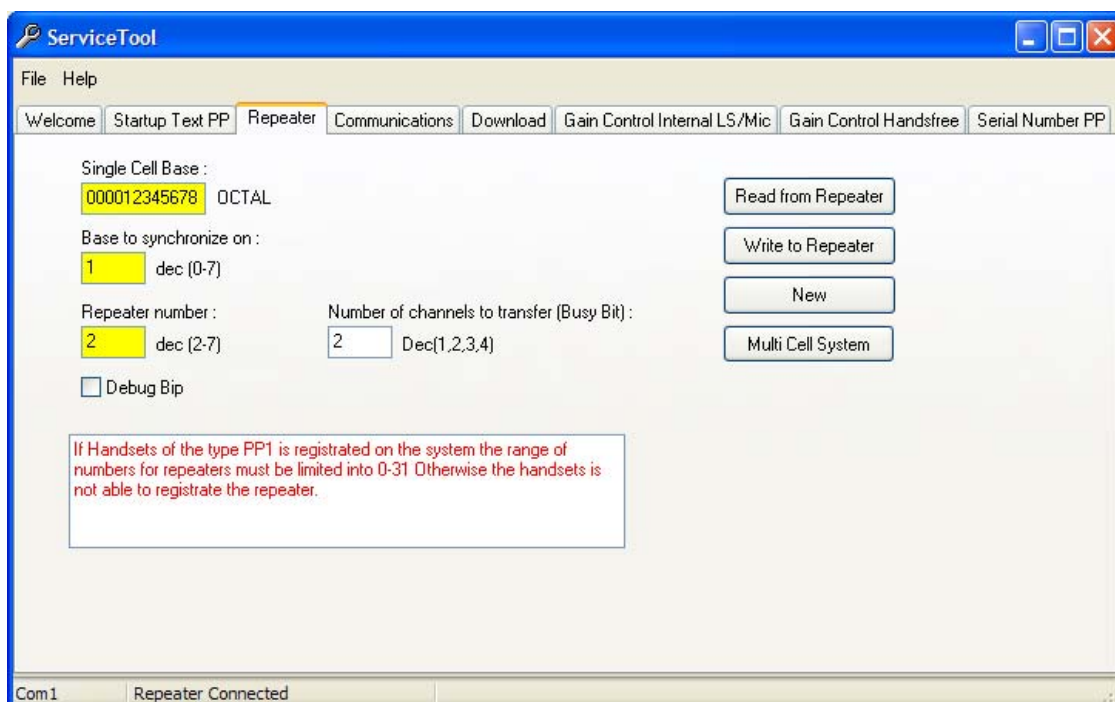
- Once connected, click the **Repeater** tab. The **Repeater** tab screen contains all the fields and commands necessary for configuring a KIRK Repeater.
- Click the **Single Cell Base** button.
- Enter the KWS500's ARI number in the **Single Cell Base: OCTAL** field.



- In the **Base to synchronize on** field, enter **1**. The KWS500 is always Base **1**.



- In the **Repeater number** field, enter the KIRK Repeater number. The first KIRK Repeater to be programmed is numbered **2**, the second is **3**, etc.
- Write this number on the bottom of the KIRK Repeater.
- Verify that the **Busy Bit** is set, and that the **Debug Bip** check box is not selected.
- Click the **Write to Repeater** button.



- Repeat the procedure for each KIRK Repeater to be installed in a multi-cell environment.

6.5 Configuring Repeaters in a Linear Configuration

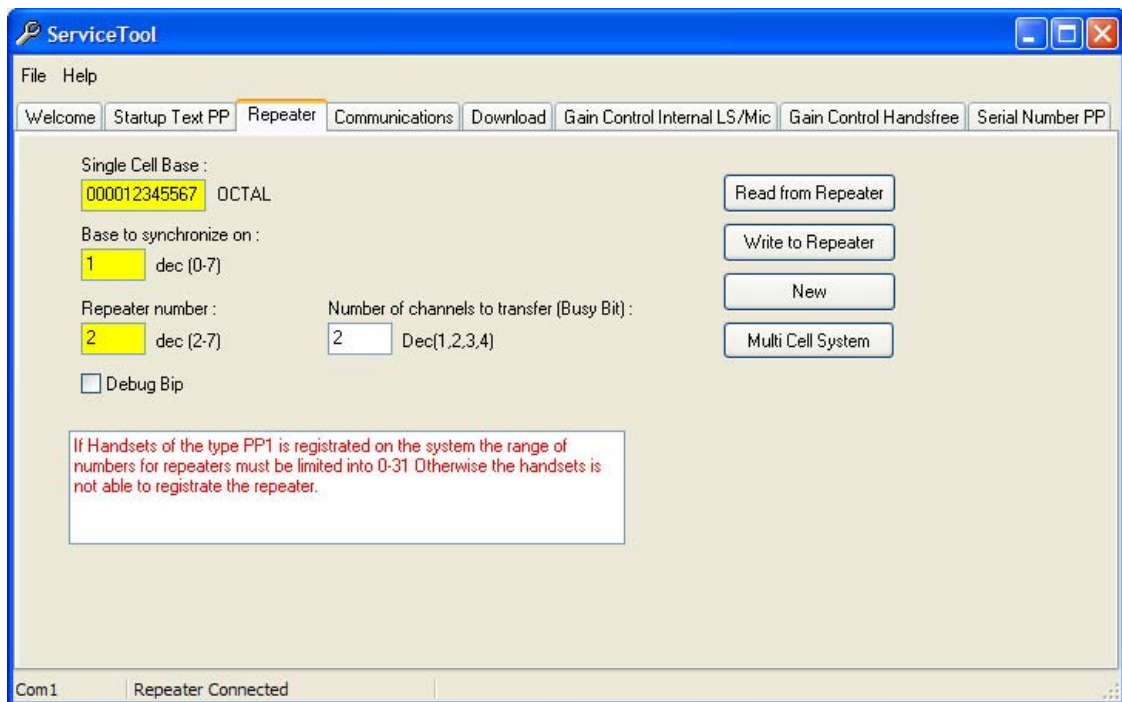
To connect a KIRK Repeater to a laptop PC and configure it in a linear configuration:

- Make a note of the ARI number located on the back of the KWS500.
- Select the KIRK Repeater you wish to program.
- Insert the Y-splitter cable's modular plug into the connector on the back of the KIRK Repeater.
- Insert the power cable's modular plug into the narrower female connector in the Y-splitter.
- Plug the power supply into a 120V AC power source. The LED on the front of the KIRK Repeater will light red.
- Insert the Programming Cable's modular plug into the wider female connector in the Y-splitter.
- Connect the cable's serial connector to the laptop PC's serial port.
- Click the **Service Tool** icon to start the KIRK Service Tool on the PC.
- Click the **Communications** tab.
- From the **Comport setting** drop-down list, select the **COM** port to which the Repeater Programming Kit is connected.
- Click the **Baudrate** option **PP1-PP4 + 1G8/1G9 Repeater (9600 baud)**.
- Confirm your selection by clicking the **Set Comport** button. The status bar should acknowledge that it has found the KIRK Repeater by displaying **Repeater Connected**.
- Once connected, click the **Repeater** tab. This screen contains all the fields and commands necessary for configuring a KIRK Repeater.
- Click the **Single Cell Base** button.
- Enter the system ARI number in the **Single Cell Base: OCTAL** field.
- In the **Base to synchronize on** field, enter **1** for the KWS500.
- In the **Repeater number** field, enter the KIRK Repeater number. The first KIRK Repeater is numbered **2**, the second is **3**, etc.
- Write this number on the bottom of the KIRK Repeater.

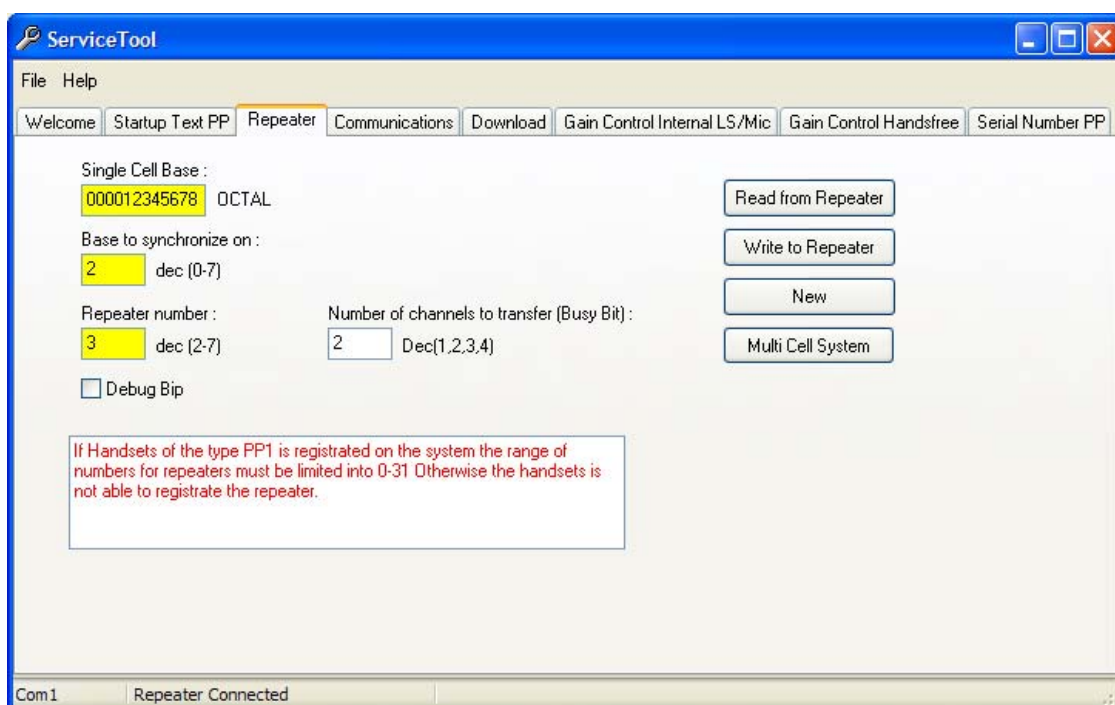


If you have already programmed one or more KIRK Repeaters for a multi-cell environment, the Repeater numbers you need to enter will differ from those in this example. Simply number each KIRK Repeater as it is programmed in sequence from 2 to 7.

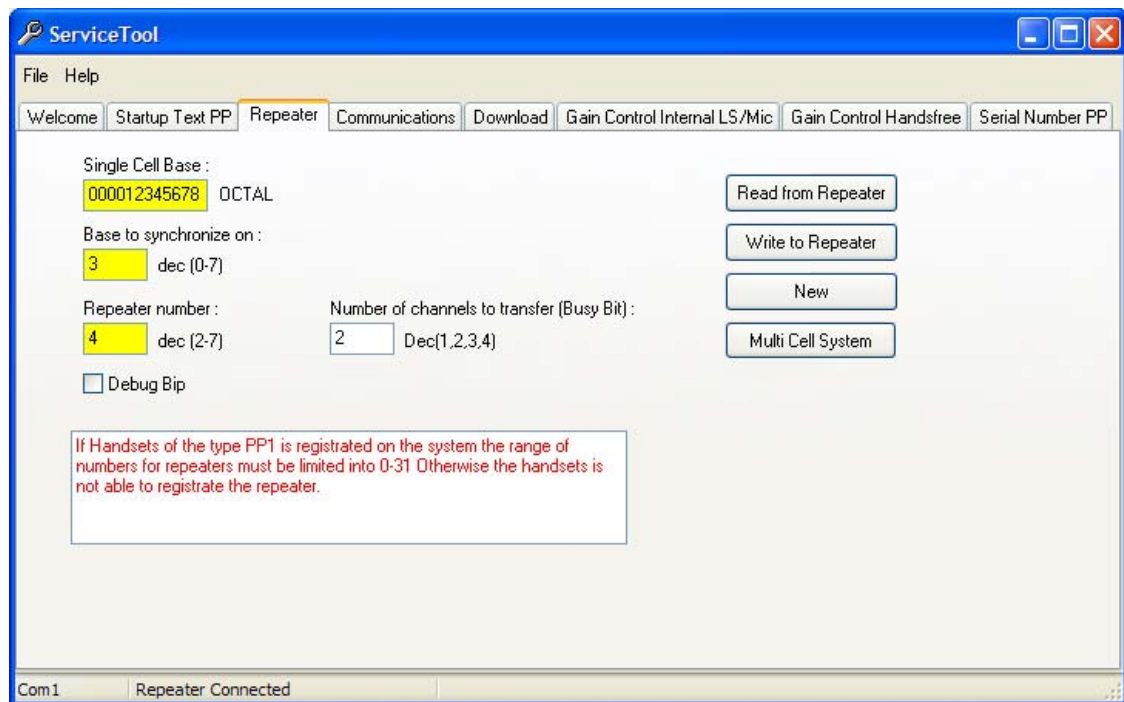
- Verify that the **Busy Bit** is set, and that the **Debug Blp** check box is not selected.
- Click the **Write to Repeater** button.



- Unplug the KIRK Repeater Programming Kit from the back of the first KIRK Repeater and connect it to the second Repeater.
- Click the **New** button.
- Enter the KWS500's ARI number in the **Single Cell Base: OCTAL** field.
- In the **Base to synchronize on** field, enter the number of the Repeater you just programmed (**2**). The second Repeater in the linear configuration will pick up a radio signal from the first Repeater.
- In the **Repeater number** field, enter the number of the second Repeater (**3**).
- Write this number on the bottom of the KIRK Repeater.
- Verify that the **Busy Bit** is set, and the **Debug Bip** check box is not selected.
- Click the **Write to Repeater** button.



- Unplug the KIRK Repeater Programming Kit from the second Repeater and connect it to the third Repeater.
- Click the **New** button.
- Enter the KWS500's ARI number in the **Single Cell Base: OCTAL** field.
- In the **Base to synchronize on** field, enter the number of the second Repeater (**3**). The third Repeater will obtain a radio signal from this Repeater.
- In the **Repeater number** field, enter the number of the third Repeater (**4**).
- Write this number on the bottom of the KIRK Repeater.
- Verify that the **Busy Bit** is set, and the **Debug Bip** check box is not selected.
- Click the **Write to Repeater** button.



- Unplug the KIRK Repeater Programming Kit from the third Repeater. There is a limit of three KIRK Repeaters in a linear configuration.

7. Repeater Hardware Installation

Installing the KIRK Repeater hardware is a simple procedure. Verify that there is a wall outlet or other power source within six feet of the mounting location prior to installation. The KIRK Repeater must be programmed and connected to a 120V AC power source in order to be operational.

Repeater hardware installation step-by-step

- Use the wall-mounting bracket to mark the screw insertion points on the mounting surface (fig. 1).
- If using the included Phillips screws to fasten the KIRK Repeater to drywall, drill a pilot hole and tap the included drywall anchors into the mounting surface. Other mounting surfaces may require different preparation.
- Feed the power cable's modular plug of the through the middle of the wall-mounting bracket (fig. 2).
- Fasten the wall-mounting bracket to the mounting surface with the provided screws.
- Insert the modular plug into the female connector on the back of the KIRK Repeater (see Section 8.2 *Applying Power*).
- Mount the KIRK Repeater on the wall-mounting bracket, sliding the plastic hooks on the back of the Repeater onto the bracket and pressing down until the hooks engage (fig. 3).
- Connect the power supply to a 120V AC power source. The programmed KIRK Repeater is now operational.

7.1 Repeater Wall-Mounting Bracket

Included with the KIRK Repeater is a plastic wall-mounting bracket with mounting hardware. To mount the KIRK Repeater, you will need to drill two holes, two inches apart vertically and secure the bracket with screws.

- If using the included drywall anchors and Phillips screws to fasten the KIRK Repeater to drywall, drill two holes and tap the drywall anchors into the mounting surface.
- If mounting to a wooden surface, drill two screw pilot holes.
- If mounting to a brick wall, use a 6 mm diameter masonry drill bit and insert wall plugs.
- Loosely secure the wall-mounting bracket with two suitable screws.

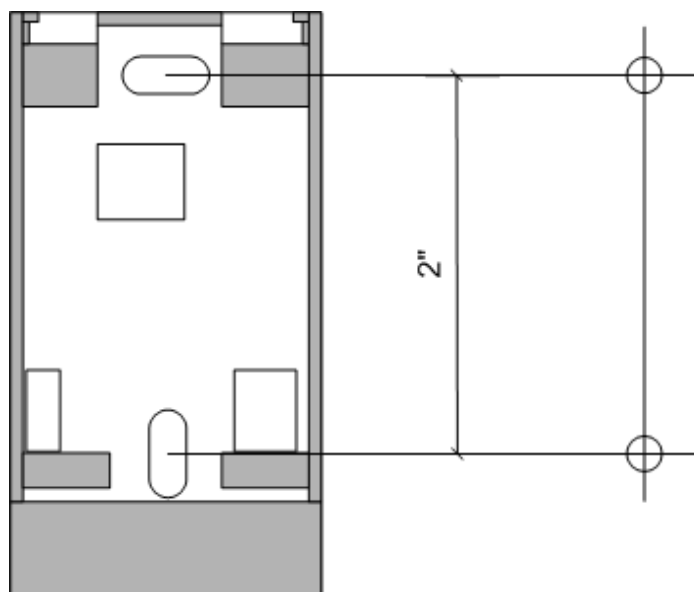


Fig. 1 Wall-mounting bracket

7.2 Applying Power

Feed the power cable's modular plug through the hole in the back of the wall-mounting bracket. Complete the installation of the wall-mounting bracket by tightening down the screws. Connect the power cable to the back of the KIRK Repeater.

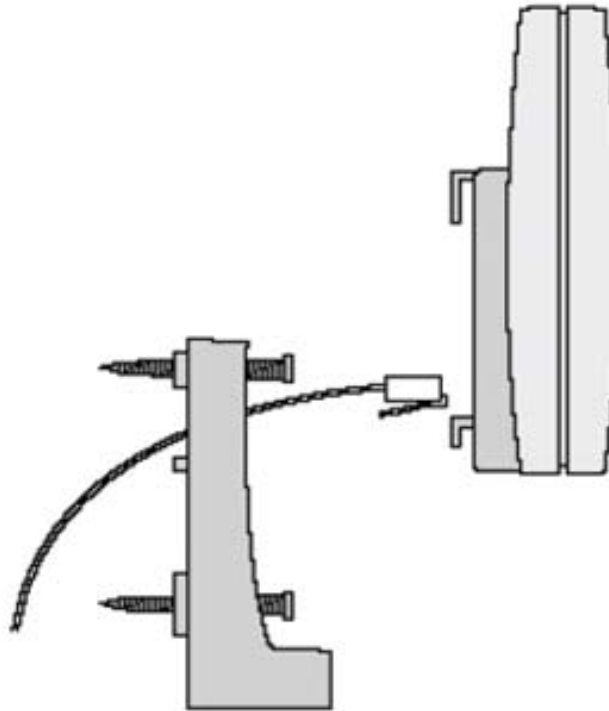


Fig. 2 Connecting power to the KIRK Repeater

7.3 Mounting the KIRK Repeater

Slide the plastic hooks of the KIRK Repeater onto the wall-mounting bracket. It is important to mount the Repeater with the antennas facing out and right-side up. Connect the power supply to the wall outlet or other power source.

If the KIRK Repeater is already programmed, the LED on the front may flash several times and then light solid. The programmed KIRK Repeater is now operational.

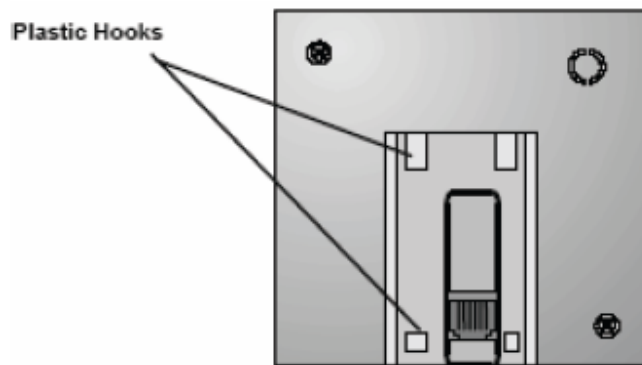


Fig. 3 KIRK Repeater rear panel mounting surface

7.4 Completion

After programming and installing the KIRK Repeaters, conduct a final site survey to verify coverage.

8. Glossary

Specialized and technical terms used in this manual are defined below. If you do not find the term you are looking for in the glossary, please consult a dictionary.

1.9 GHz radio	The KWS500, KIRK Repeater and KIRK Handsets are two-way radios that transmit at a frequency of 1.9 gigahertz, or 1.9 billion cycles per second, at a power level of up to 250 milliwatts, giving a coverage area of approximately 25,000 square feet (more with KIRK Repeaters) in a typical office building installation.
Administration Program	KIRK software program used to configure KIRK wireless servers and KIRK Handsets.
Analog signal	Continuous electrical signal, in this case transmitted over a telephone line, that varies in amplitude and frequency according to changes in loudness (amplitude) and pitch (frequency) of the voice speaking into the telephone.
Analog station port	Pair of connectors in a termination block that are dedicated to a particular analog station (telephone extension) on the PBX system. It is used to transmit analog signals, as opposed to digital signals.
ARI number	Access Rights Identity number, a 12 digit number that specifically identifies the DECT ²⁵ system. Each KWS500 produces a unique ARI number that identifies it from any other KWS500. The ARI number is located on the back panel of the unit. Example: s/n 000123456789
Base station	Low-power two-way radio that connects a wireless telephone to the wired telephone system (such as a PBX) through a call server that is connected to the telephone system with cabling . Base stations commonly transmit at a power level of 250 milliwatts and have a maximum range of several hundred feet.
Baud rate	Data transmission rate used in telecommunications systems, measured in symbols per second.
Call server	Type of server that processes call requests and connects them to their destinations. A server is a computer that performs a service for another device or computer. The KWS500 has a call server. The analog signals between the handsets and the PBX are processed by the call server and are transmitted and received by the Base Station's two-way radio.
Cat. 3 cabling	Standard eight-wire color-coded twisted-pair wire cabling commonly used for telephone systems. Cat. 3 cabling is used to connect the analog station ports on the PBX distribution frame to the KWS500 telephone wire termination block. One Cat. 3 cable can support four telephone lines.

²⁵ Digital Enhanced Cordless Telecommunications. DECT is a radio technology standard originally developed for European wireless telephone systems and is now in use worldwide.

Conditioned power source	AC current from the power company fluctuates and contains electronic “noise”. This can disrupt the operation of sensitive electronic devices and can affect audio signal quality. A power conditioner smoothes out the power fluctuations and noise.
COM port	Name for a serial port on a PC. The COM port that the Programming Cable connects to looks like this: 
DECT	Digital Enhanced Cordless Telecommunications. DECT is a radio technology standard originally developed for European wireless telephone systems and is now in use worldwide.
GAP	Generic access profile, an interoperability profile for DECT telephone systems. Handsets and base stations of different makes that support GAP can communicate with each other at a basic level.
GHz	Abbreviation for gigahertz. Giga- is a prefix meaning one billion. Hertz is a frequency of one cycle per second. A frequency of one gigahertz is one billion cycles per second.
KIRK	Brand name for several models of wireless servers, repeaters and handsets that conform to the DECT standard.
LED	Light emitting diode. Usually red or green, it is an electrical component that lights up when electricity is passed through it. The KIRK Repeater has an LED in the center of its cover.
Master handset	The first KIRK Handset registered to the KWS500 becomes the “master” handset, which can be used to register additional KIRK Handsets to the system and to remove handsets if needed.
Multi-cell	Cell is a term for the radio coverage area of a base station or repeater. Multi-cell means more than one cell, often with overlapping coverage. “Multi-cell <u>environment</u> ” refers to one or more repeater cells added to a base station cell to expand the coverage area. “Multi-cell <u>system</u> ” refers to a wireless communications system consisting of multiple base stations.
PBX	Private Branch eXchange, a telephone switching system located at a business office. A PBX can use a call server and a telephone line distribution frame to provide internal station-to-station communications, as well as access to outside telephone lines and special features such as conference calling and voice mail.
Port	Connection point for wiring between two electrical devices, such as a serial port or a USB port.
Power conditioner	Electronic device that smoothes out fluctuations in mains power so as to protect sensitive electronic equipment and provide a steady, smooth power supply.
Programming cable	Specially wired serial cable used to connect a laptop PC (running the KIRK Service Tool software) with a KIRK Repeater or KIRK Handset or for programming.

Radio coverage	Effective transmission zone of a radio signal, expressed as an area (square feet), or as a distance (linear feet). Radio coverage can vary greatly from facility to facility, depending upon radio signal barriers such as walls, metal doors and cabinets, and interference from other radio signal sources.
Register a handset	Cause the KWS500 to recognize a KIRK Handset and assign a radio channel to that handset.
Repeater	Two-way radio unit placed within the range of a base station that can pick up and retransmit a base station's or KIRK Handset's signal. KIRK Repeaters can be used to expand the system's coverage area.
Serial connector	Cable connector for a serial port on a PC. 
Serial port	Type of port on a computer used for data transmission. It is called a "serial" port because the bits of data are transmitted in sequence over a single wire. The serial port that the Programming Cable connects to looks like this: 
Service Tool	KIRK software used to program KIRK Repeaters and KIRK Handsets. A PC running the KIRK Service Tool software connects to the KIRK Repeater or handset charger with the KIRK Programming Cable.
Termination block	Block of wiring connectors that connects the wires from one system or device to another system or device. For instance, the public telephone lines connect to one side of your PBX system's punchdown termination block. Wires connected to the other side of the termination block travel to PBX extensions and to the KWS500's spring-loaded termination block.
Wireless server	Computer that provides a range of telecom input/output functions for a wireless communications network. The wireless server also acts as base station as it transmits and receives radio signals.
Wireless telephone	Two-way radio that is similar to a cell phone and communicates with a radio base station connected to a wired telephone network.
Y-splitter cable	Electrical cable that has a single connector on one end and two connectors on the other end. The KIRK Repeater Programming Kit's Y-splitter cable has a male connector on one end and two female connectors on the other end.