



# ADC In-Building 850 and 1900MHz Wireless Repeater User Manual

ADCP-75-237 • Issue 1 • 8/2007







**ADC In-Building**  
**850 and 1900MHz Wireless Repeater**  
User Manual

**ADCP-75-237 • Issue 1 • 8/2007**

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## REVISION HISTORY

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1	08/2007	Original

## LIST OF CHANGES

The technical changes incorporated into this issue are listed below.

PAGE	IDENTIFIER	DESCRIPTION OF CHANGE
All		New publication

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## ABOUT THIS MANUAL

This manual describes the installation and operation of the ADC In-Building Wireless Repeater. The repeater is normally mounting inside and distributes the RF over coax to an indoor antenna located in the desired coverage area.

## ADMONISHMENTS

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times.

These warnings are flagged by use of the triangular alert icon (seen below), and are listed in descending order of severity of injury or damage and likelihood of occurrence.



**Danger:** *Danger is used to indicate the presence of a hazard that **will** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*



**Warning:** *Warning is used to indicate the presence of a hazard that **can** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*



**Caution:** *Caution is used to indicate the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.*

## GENERAL SAFETY PRECAUTIONS

List here all general admonishments which apply throughout procedures within the manual.



**Warning:** *Wet conditions increase the potential for receiving an electrical shock when installing or using electrically-powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.*



**Danger:** *This equipment uses a Class 1 Laser according to FDA/CDRH rules. Laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not look directly into the optical transceiver of any digital unit or exposure to laser radiation may result. An optical power meter should be used to verify active fibers. A protective cap or hood **MUST** be immediately placed over any radiating transceiver or optical fiber connector to avoid the potential of dangerous amounts of radiation exposure. This practice also prevents dirt particles from entering the adapter or connector.*



**Caution:** *This system is a RF Transmitter and continuously emits RF energy. Maintain 3 foot (91.4 cm) minimum clearance from the antenna while the system is operating. Wherever possible, shut down the RAN before servicing the antenna.*



**Caution:** *Always allow sufficient fiber length to permit routing of patch cords and pigtails without severe bends. Fiber optic patch cords or pigtails may be permanently damaged if bent or curved to a radius of less than 2 inches (5.1 cm).*



**Caution:** *Exterior surfaces of the RAN may be hot. Use caution during servicing.*

## FCC Compliance Statement

The writer may pick from Class A or Class B (below) if either is applicable, or may omit this statement entirely if not needed. The heading for Class A or Class B may also be deleted. Fill the product name in to replace the X at the beginning of the text.

### Class A

X has been certified to comply with the requirements for class A computing devices per part 15 of the FCC regulations.



**Warning:** *This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with limits for a Class A digital device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference to TV and radio reception in which case the user, at their own expense, will be required to take whatever measures may be required to correct the interference.*

*This equipment does not exceed Class A limits for radio emission for digital apparatus, set out in the radio interference regulation of the authorization methods of Industry Canada. Operation in a residential area may cause unacceptable interference to TV and radio reception requiring the owner or operator to take whatever steps are necessary to correct the interference.*

***This product conforms to all applicable standards of 21 CFR 1040.***

### Class B

X complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions; (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.





**Warning:** *This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with limits for a Class B digital device pursuant to Subpart A of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential environment. If interference to TV and radio reception does occur relocate or reorient the antenna of the affected radio or TV.*

*This equipment does not exceed Class B limits for radio emission for digital apparatus, set out in the radio interference regulation of the authorization methods of Industry Canada.*

***This product conforms to all applicable standards of 21 CFR 1040.***

### **Certification: UL/ETL/CSA/CE/NEBS Listed (delete inapplicable items, here and in TOC)**

State condition of UL, ETL and/or CSA status. An example: X has been tested and found to comply with the requirements of UL/CSA 60950.

XXX modules and chassis have been tested and found to comply with all applicable CE Directives.

XXXX complies with the requirements of GR-63-CORE, Issue 1, October 1995 and GR-1089-CORE, Issue 2, December 1997 with Revision 1, February 1999 as specified in SR-3580, Issue 1, 1995.

### **Standards**

The following listing is a bibliography of applicable ANSI and Bellcore documents:

ANSI T1.403-1989	Carrier-to-Customer Installation — DS1 Metallic Interface, February 22, 1989.
ANSI T1E1.4/91-002R2	Study of the Feasibility and Advisability of Digital Subscriber Lines Operating at Rates Substantially in Excess of the Basic Rate.
etc.	
etc.	

### **STANDARDS CERTIFICATION**

Below is an alternative format for standards certification.

**FCC:** The Digivance NXD complies with the applicable sections of Title 47 CFR Part 15, 22, 24 and 90.

The Digivance NXD Hub has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to

radio communications.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commissions rules.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.

**ETL:** This equipment complies with ANSI/UL 60950-1 Information Technology Equipment. This equipment provides the degree of protection specified by IP24 as defined in IEC Publication 529. Ethernet signals are not for outside plant use.

**FDA/CDRH:** This equipment uses a Class 1 LASER according to FDA/CDRH Rules. This product conforms to all applicable standards of 21 CFR Part 1040.

**IC:** This equipment complies with the applicable sections of RSS-131. The term “IC:” before the radio certification number only signifies that Industry Canada Technical Specifications were met.

**Wind Loading:** The NXD RAN is able to withstand wind loads up to 150 mph.

## LIST OF ACRONYMS AND ABBREVIATIONS

Below is an example of a list of this type.

The acronyms and abbreviations used in this manual are detailed in the following list:

<b>AC</b>	Alternating Current
<b>ANT</b>	Multiband Antenna
<b>BIM</b>	Base Station Interface Module
<b>BTS</b>	Base Transceiver Station
<b>C</b>	Centigrade
<b>CDRH</b>	Center for Devices and Radiological Health
<b>C/MCPLR</b>	Cellular SMR Multicoupler
<b>CM</b>	Centimeter
<b>cPCI</b>	CompactPCI
<b>CPU</b>	Central Processing Unit
<b>CXD</b>	Compact RAN
<b>DAS</b>	Distributed Antenna System
<b>dB(FS)</b>	decibals (Full Scale – digital reading)
<b>DC</b>	Direct Current
<b>Div</b>	Diversity
<b>EMS</b>	Element Management System
<b>ESD</b>	Electrostatic Discharge
<b>F</b>	Fahrenheit

<b>FDA</b>	U.S. Food and Drug Administration
<b>FCC</b>	U.S. Federal Communications Commission
<b>GPS</b>	Global Positioning System
<b>IC</b>	Industry Canada
<b>IN</b>	Inch
<b>IP</b>	Internet Protocol
<b>KG</b>	Kilogram
<b>LED</b>	Light Emitting Diode
<b>LSE</b>	Location Services Equipment
<b>LVD</b>	Low Voltage Disconnect
<b>MHz</b>	Mega Hertz
<b>MTBF</b>	Mean Time Between Failure
<b>MUX</b>	Multiplexer
<b>Node</b>	Any CPU in the Digivance NXD system
<b>NXD</b>	Digivance Neutral Host Product Line
<b>OSP</b>	Outside Plant
<b>PA</b>	Power Amplifier
<b>PAA</b>	Power Amplifier Assembly
<b>PC</b>	Personal Computer
<b>PCI</b>	Peripheral Component Interconnect bus
<b>PIC</b>	PA Interface Controller
<b>P/MCPLR</b>	PCS Multicoupler
<b>RAN</b>	Radio Access Node
<b>RDC</b>	RAN Down Converter
<b>RDC2</b>	RAN Down Converter Version 2
<b>RF</b>	Radio Frequency
<b>RUC</b>	RAN Up Converter
<b>RUC2.X</b>	RAN Up Converter Version 2.X
<b>RUC3</b>	RAN Up Converter Version 3
<b>SFP</b>	Small Form-Factor Pluggable Optical Transceiver
<b>SIF</b>	Sonet Interface Module
<b>SNMP</b>	Simple Network Management Protocol
<b>SONET</b>	Synchronous Optical Network
<b>STF2</b>	System Interface Module
<b>UL</b>	Underwriters Laboratories
<b>VAC</b>	Volts Alternating Current
<b>VDC</b>	Volts Direct Current
<b>VSWR</b>	Voltage Standing Wave Ratio
<b>WDM</b>	Wave Division Multiplex
<b>WSP</b>	Wireless Service Provider



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### 1 DESCRIPTION

The repeater transmits RF in both directions to provide indoor wireless coverage. The device is connected via coax to a donor antenna that is typically located on a rooftop or external wall of a building, directed at the donor cell-site. The repeater is mounted inside the building and distributes the RF over coax to an indoor antenna located in the desired coverage area.

#### 1.1 RF SIGNAL FLOW (850MHz)

##### 1.1.1 Forward (Down) Link

The base station signal ranging from 869 ~ 894MHz is received by the Donor antenna. Then going through the duplexer removing the unwanted signals received by the LNA. The forward link signal received by the LNA goes through a BPF (Band Pass Filter) then is amplified by the drive amplifier. The signal then goes through the LAN, and a Down Mixer where IF signal conversion is done. This IF signal then goes through an IF SAW Filter adding two bands of 11+1.5MHz and 10+2.5MHz, totaling 25MHz, after filtering the signal. This signal now moves to an up mixer to be converted to RF frequency and sent to a final stage amplifier. The final stage amplifier's output power goes through duplexer. The signal then goes through the service antenna transmitting the forward link signal to the handsets.

### **1.1.2 Reverse(Up) Link**

The reverse link and the forward link have a same structure. Frequency ranging from 824 ~ 849MHz received by the service antenna go into the duplexer. The duplexer removes all unwanted signals and sends the specific signal to the LNA. The reverse link signal received by the LAN is amplified by the drive amplifier and Down Mixer where IF signal conversion is done.

The IF signal then goes through IF SAW Filter adding two bands of 11+1.5MHz and 10+2.5MHz, totaling 25MHz, after filtering the signal. This signal now moves to up mixer to be converted to the RF frequency and sent to a final stage amplifier. The signal in final stage amplifier undergoes through duplexer. Then the signal goes through the donor antenna, transmitting reverse link signal to base stations.

## **1.2 RF SIGNAL FLOW (1900MHz)**

### **1.2.1 Forward(Down) Link**

The base station signal ranging from 1930 ~ 1990MHz is received by the Donor antenna. It passes through the duplexer removing the unwanted reverse path signals received by the LNA. The forward link signal received by the LNA goes through a BPF (Band Pass Filter) then is amplified by the drive amplifier. The signal then goes through the LNA and a Down Mixer where IF signal conversion is done. This IF signal then goes through an IF SAW Filter adding two bands of 15MHz and 5MHz, totaling 20MHz, after filtering the signal. This signal now moves to an up mixer to be converted to the RF frequency and sent to a final stage amplifier. The final stage amplifier's output power goes through the duplexer. The signal then goes through the service antenna transmitting the forward link signal to the handsets.

### **1.2.2 Reverse(Up) Link**

The reverse link and the forward link have the same structure. Frequencies ranging from 1850 ~ 1910MHz received by the service antenna go into the duplexer. The duplexer removes all unwanted signals and sends the specific signal to the LNA. The reverse link signal received by the LAN is amplified by the drive amplifier and Down Mixer where IF signal conversion is done.

The IF signal then goes through IF SAW Filter adding two bands of 15MHz and 5MHz, totaling 20MHz, after filtering the signal. This signal now moves to up mixer to be converted to the RF frequency and sent to a final stage amplifier. The signal in final stage amplifier undergoes through duplexer. Then the signal goes through the donor antenna, transmitting reverse link signal to base stations.

## 2 FEATURES

### 2.1 LED Status

Five LEDs on the front display repeaters status. LED indicators are defined in [Table 1-1](#).

**Table 1-1.LED Indicators**

COLOR	STATUS
Red	Tx Shut Down
Red	Rx Shut Down
Yellow	Sleep Mode
Red	Isolation Check
Green	DC Power

### 2.2 Automatic Level Control (ALC)

If the forward or reverse RF output power exceeds 13dBm, the system automatically controls the output power to maintain power and protect the repeater.

### 2.3 Sleep Mode

Sleep Mode is activated when the reverse output RF power drops below  $-65\text{dBm}$  for more than three minutes. The repeater returns to normal operation when the signal goes over  $-65\text{dBm}$ .

### 2.4 Isolation Check

Isolation check LED for the forward path and reverse path comes on after the Donor antenna is set up and the power is turned on. Automatic Gain set up is available within the repeater for the Path - Isolation.

### 2.5 Over Power Shut Down

If the RF output power exceeds the maximum for more than five seconds, the repeater automatically shuts down. After five minutes, the repeater checks and monitors the RF Power, if the RF output power is above the maximum, repeater remains shut down. If RF output power is back to normal, the repeater comes back on.

### 2.6 Graphical User Interface (GUI)

The GUI control interface is used to change to Sleep Mode, select different bands A, B, C, D, E, and F of the US PCS service. Other features of the BDU such as the On/Off controls of the system can be accessed through the USB port provided. All control is set “Automatic” when shipped, you can change the setting using the GUI control interface provided.

### 2.6.1 850MHZ Repeater Band Selection

Band Selection is available within the US CELLULAR 25MHz bandwidth. User can select either A band set (A''+A +A') or B band set (B + B') for 12.5MHz Bandwidth each, totaling 25MHz, or request the manufacturer to set the bandwidth before shipping the product from the factory. Band selection is shown in [Table 1-2](#).

**Table 1-2. Band Selection Table (850MHz)**

BAND	DOWNLINK		UPLINK	
	A''+A	869	880	824
B	880	890	835	845
A'	890	891.5	845	846.5
B'	891.5	894	846.5	849

### 2.6.2 1900MHZ Repeater Band Selection

Band selection is available within the US PCS 60MHz bandwidth. You can select any A, B, or C band(15MHz each, group1) and any D, E, or F band (5MHz each, group1) for a total 20MHz Bandwidth each, or request the manufacturer to set bandwidth before shipping product from the factory. Example; select A + E, or C + D, or A + F or any combination, but not two bands within the same group. You can also choose to use only one band among the six bands available. Band selection is shown in [Table 1-3](#).

**Table 1-3. Band Selection Table (1900MHz)**

BAND	DOWNLINK		UPLINK	
	A	1930	1945	1850
D	1940	1950	1865	1870
B	1950	1965	1870	1885
E	1965	1970	1885	1890
F	1970	1975	1890	1895
C	1975	1990	1895	1910



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### 1 REPEATER INSTALLATION

The repeater should be mounted in accordance with local code using appropriate hardware (customer provided). Repeater must be installed within six feet of an AC power source (100–240 VAC 50 or 60 Hz). The repeater mounting bracket has four mounting holes, as shown in [Figure 2-1](#). Below are guidelines for standard wall mount and masonry wall mount of the repeater.

**Figure 2-1. Wall Mount Bracket**

#### 1.1 Mechanical Attachment of Repeater



**Warning:** *Never install the repeater in a wet location or during a lightning storm. When installing or modifying communication lines, disconnect lines at the interface before working with uninsulated lines or terminals to prevent electrical shock.*

##### 1.1.1 Standard Wall Mount

When mounting the repeater on a wooden or metal surface, it is recommended that it be installed on pressure-treated plywood (customer provided) with a minimum thickness of 0.75–inch (19.0 cm). The plywood should be firmly secured to the wall studs.

##### 1.1.2 Masonry Wall Mount

When mounting the repeater on a masonry surface, it is important that the bolts (especially the upper bolts) be located as close as possible to the center of bricks or blocks.

**Figure 2. Example of PDU Standard Wall Mount**

## **1.2 Installation of Repeater Cables**

There are four connection points on the repeater; two antenna connectors, one power connector, and one USB port.

A USB cable is required when configuring the repeater using the GUI. Plug one end of the USB cable into the port on the bottom of the repeater and plug the other end into a USB port connected to the PC.

Power Connection

Donor Antenna

Indoor Antenna

1. Connect the ground cable under the grounding screw on the PDU front panel. Connect the other end of the cable to the site grounding pole.

2. Connect the alarm cable leads to the base station or site alarm system. Use either “Normally Open” or “Normally Closed” contacts. shows the PDU alarm logic
3. Connect the other end of the alarm cable to the PDU “ALARM” connector.
4. Connect the power cable to the site DC power connector. (The power cable has three leads. Red is positive, Black is negative, and Yellow/Green is for ground.)
5. Connect the power cable to the “INPUT” connector on the PDU front panel.
6. When connecting a Remote Electrical Tilt (RET) system, connect an RS-485 cable from the RET controller to the RS-485 connector on the PDU. PDU RS-485 connector information is shown in . The recommended plug is a Molex® Mini-Fit® 71694-1103 or equivalent.



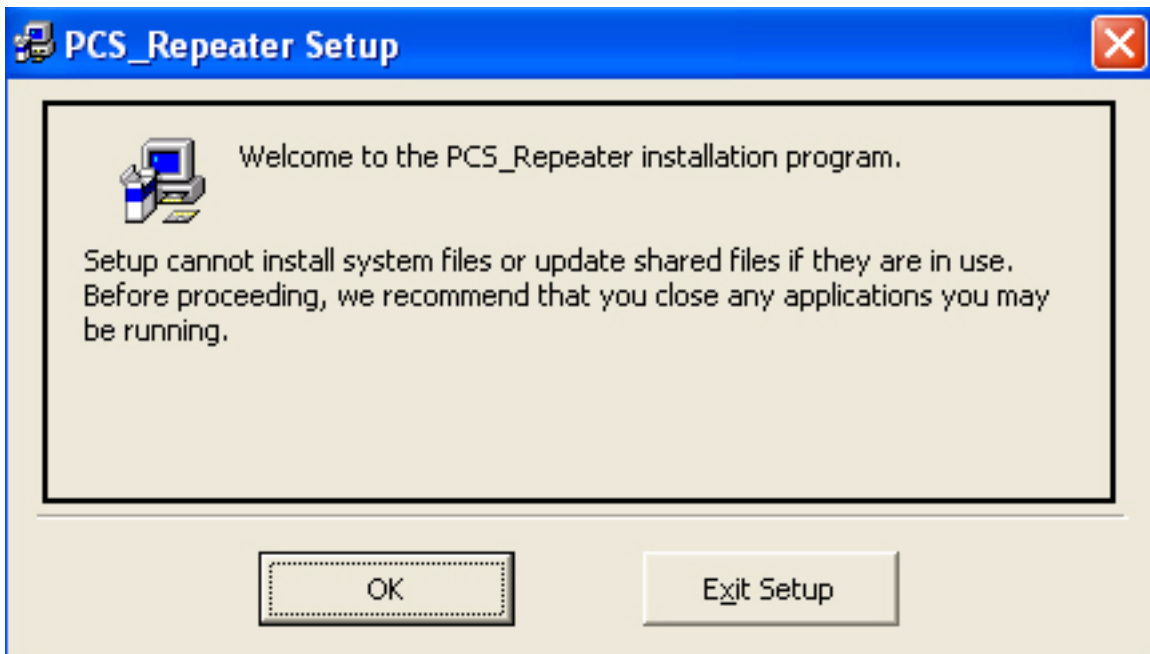
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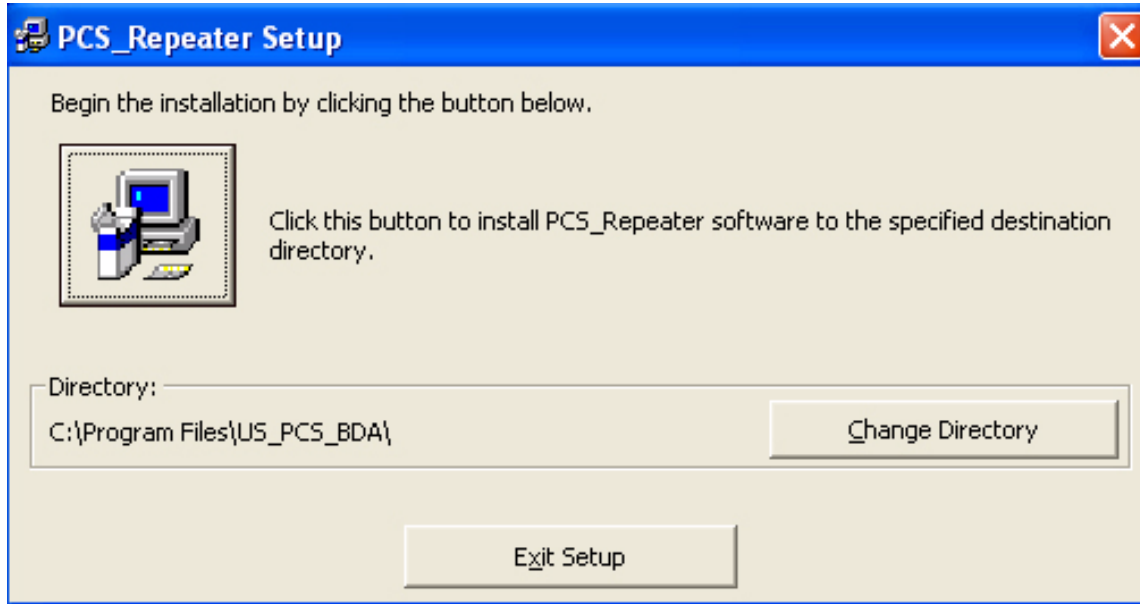
### 1 INSTALL SOFTWARE

Software comes in a zip file and must be un-zipped before it can be installed on the PC. Un-zip “pcs\_setup.zip” file to a temporary directory. Double click “setup.exe” file to start installation.

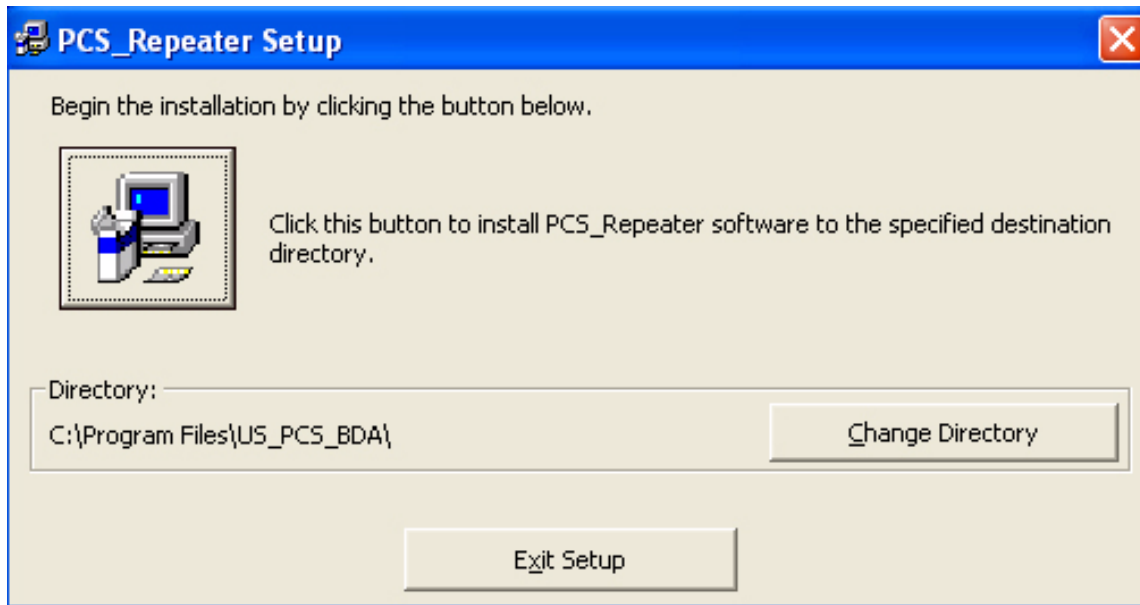
When PCS\_Repeater Setup screen appears, click “OK”



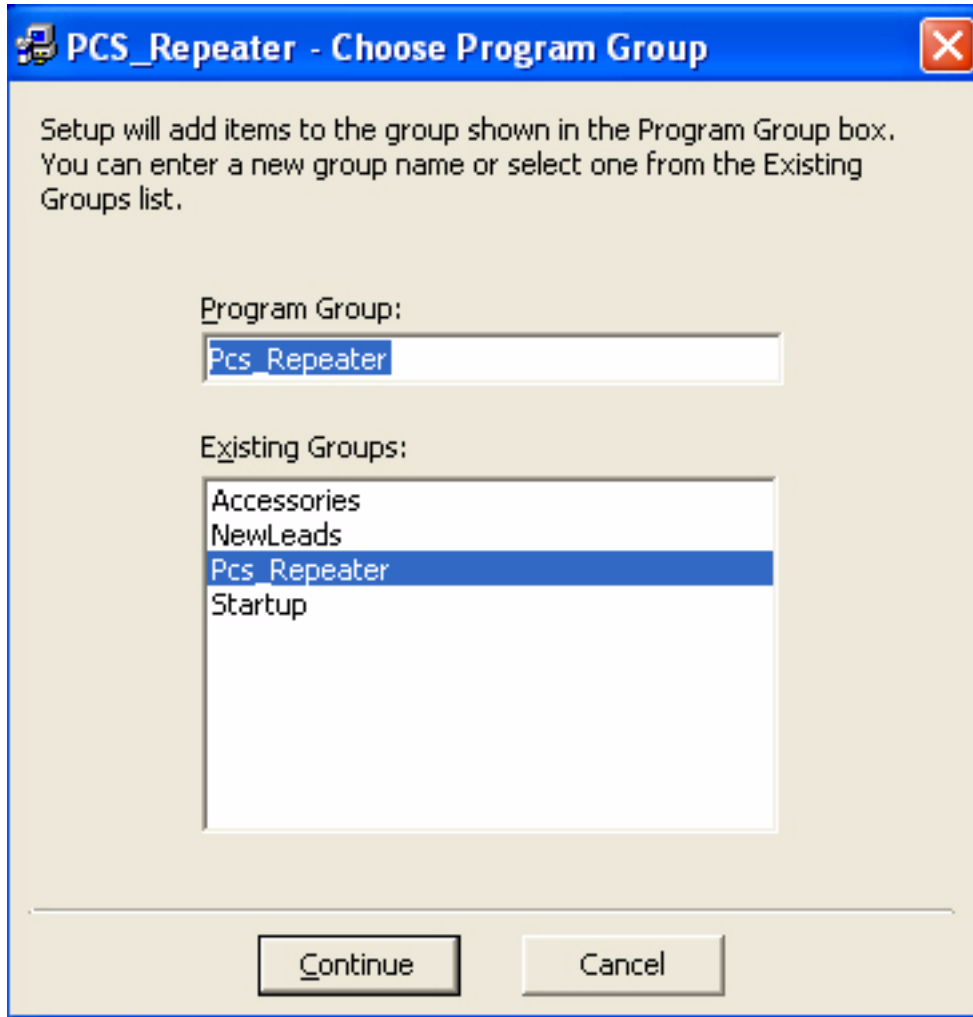
Program automatically creates a default directory to install the program in. If you wish to change the installation directory, select “Change Directory” button to manually create a directory.



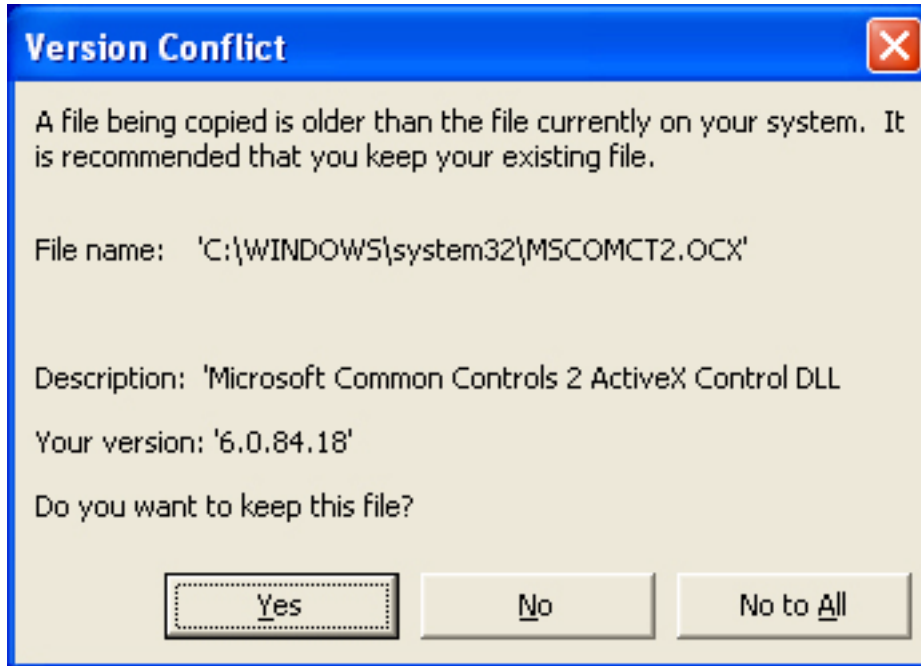
Click icon on screen to begin installation.



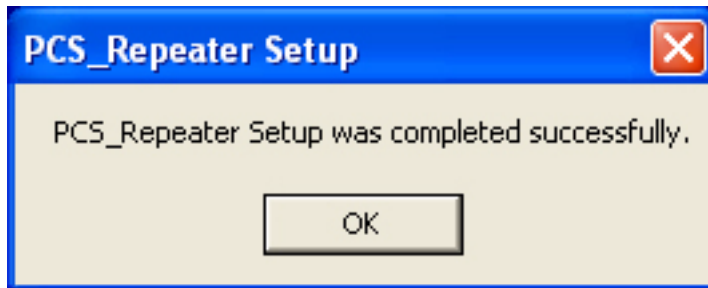
Choose a Program Group where program is to be installed. By default, the program creates a new program group named “Pcs\_Repeater”. Click “Continue” button.



If this software program is using an older window database there is a version conflict. Keep the original file by clicking “Yes”



Successful installation completed. Click “OK” button.

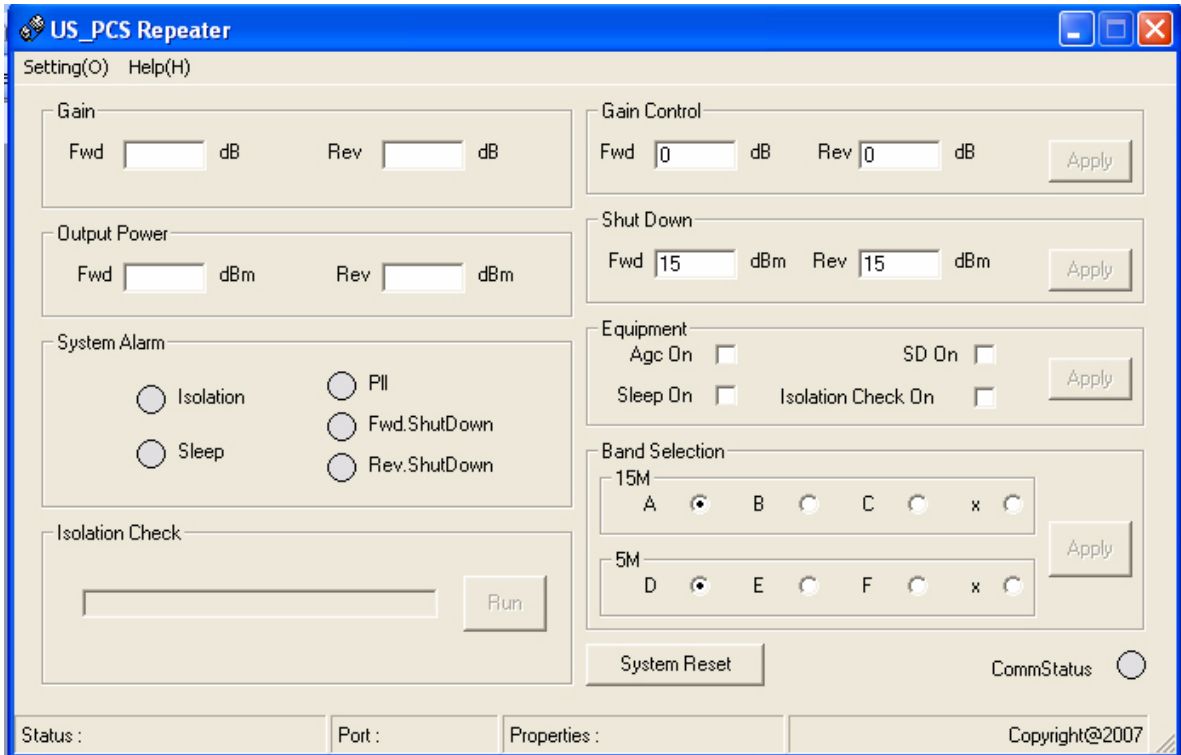


The window will automatically close. You do not need to re-start the computer to begin using the program.



## 2 OPERATING THE SOFTWARE

After installing the program, run program by going to Windows “Start” menu -> “Program” -> Pcs\_Repeater program group. Click “Pcs\_Repeater” to start program. The following screen displays the start window of the program.

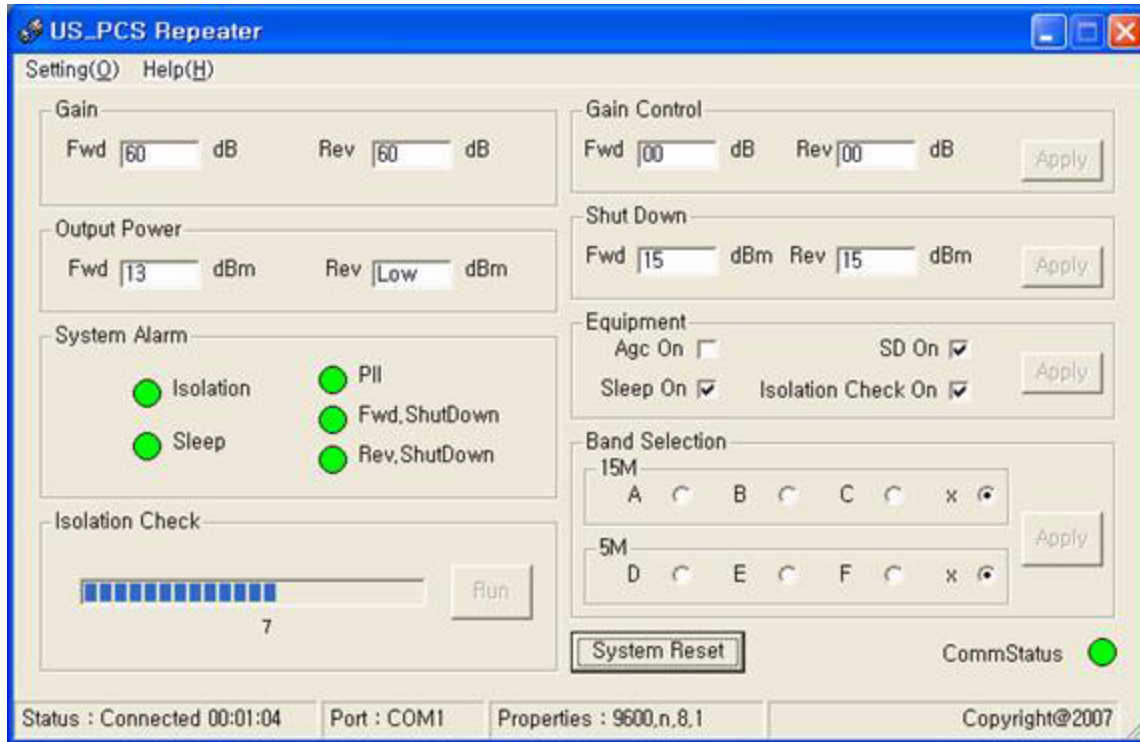


### 2.1 Menu Information

- Setting:

- Connection: options for connecting the PC and the Repeater system by RS232 port
- Disconnection: Disconnect the RS232 port
- Exit: Exit from the software

- Help: Show PC information/program information



## 2.2 Control Panel Information

- **Gain:** Show current gain of the repeater system
- **Output Power:** Show current output power
- **System Alarm:** Show current alarm status
  - Isolation: When there is an error, Fwd.ShutDown, Rev.ShutDown, and Isolation signal buttons turn red.
  - PLL: When there is an error on PLL, the signal button turns red.
  - Fwd.ShutDown: When output power is equal to or higher than the registered value, the signal button turns red.
  - Rev.ShutDown: When output power is equal to or higher than the registered value, the signal button turns red.
- **Isolation Check:** “RUN” button is active. Pressing the “RUN” button starts the isolation check. When the “Isolation Check On” check box from “Equipment Box” section is checked, the Repeater system starts the isolation check three seconds after the BDA is connected. If you do not press the button for three seconds the isolation check is automatically started. If the results produce an error, System Alarm LEDs indicate the error.
- **Gain Control:** Input attenuation value, to control gain of the repeater system. Press “Send” button to apply the value to the system.
- **Shut Down:** Input shut down level of the repeater system. Press “Send” button to apply the value to the system.

**- Equipment:**

- AGC ON/OFF: Select to apply this option to the system and press “Send” to apply the selection.
- Sleep ON/OFF: Select to apply this option to the system and press “Send” to apply the selection.
- SD (shut down) ON/OFF: Select to apply this option to the system and press “Send” to apply the selection.

**850MHz Band Selection:**

- A”+A/A/x: 12.5MHz path band A”+A, A, or no selection (x)
- B/B’/x: 12.5MHz path band B, B’, or no selection (x)
- Select to apply these options to the system and press “Apply” to apply the selections. See below for factory set frequencies per band.

BAND	TX			RX		
	start Freq.	Lo Freq.	stop Freq.	start Freq.	Lo Freq.	stop Freq.
A”+A	869	951.5	880	824	951.5	835
B	880		890	835		845
A’	890		891.5	845		846.5
B’	891.5		894	846.5		849

**1900MHz Band Selection:**

- A/B/C/x: 15MHz path band A,B,C, or no selection (x)
- D/E/F/x: 5MHz path band D,E,F, or no selection (x)
- Select to apply these options to the system and press “Apply” to apply the selections. See below for factory set frequencies per band.

BAND	TX			RX		
	start Freq.		stop Freq.	start Freq.		stop Freq.
A	1930.625	1937.5	1944.375	1850.625	1857.5	1864.375
D	1945.625	1947.5	1949.375	1865.625	1867.5	1869.375
B	1950.625	1957.5	1964.375	1870.625	1877.5	1884.375
E	1965.625	1967.5	1969.375	1885.625	1887.5	1889.375
F	1970.625	1972.5	1974.375	1890.625	1892.5	1894.375
C	1975.625	1982.5	1989.375	1895.625	1902.5	1909.375

**- System Reset:** Press this to re-set the system.

**- CommStatus:** Blinking -> communicating  
 Gray -> Shut communication

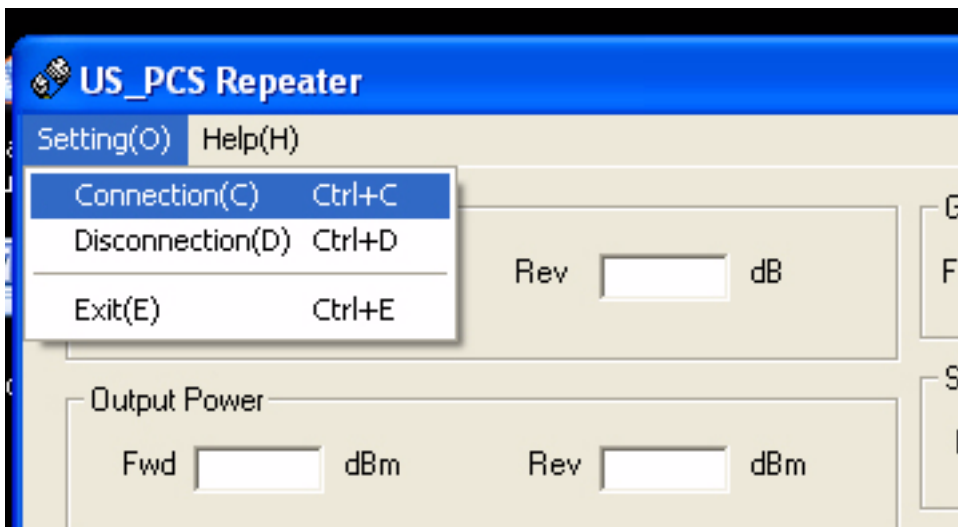
### 2.3 Status Bar

- **Status:** Window bottom line Status shows connected/disconnected status and time being connected. Upper right side check box will also denote Communication status of connected activity.
  - **Port:** Window bottom line Port shows the connected port number
  - **Properties:** Window bottom line Properties shows the property information.
- **Note:** You must install a USB driver to use the USB port. After installing the driver, the software recognizes the USB driver as a normal com port.

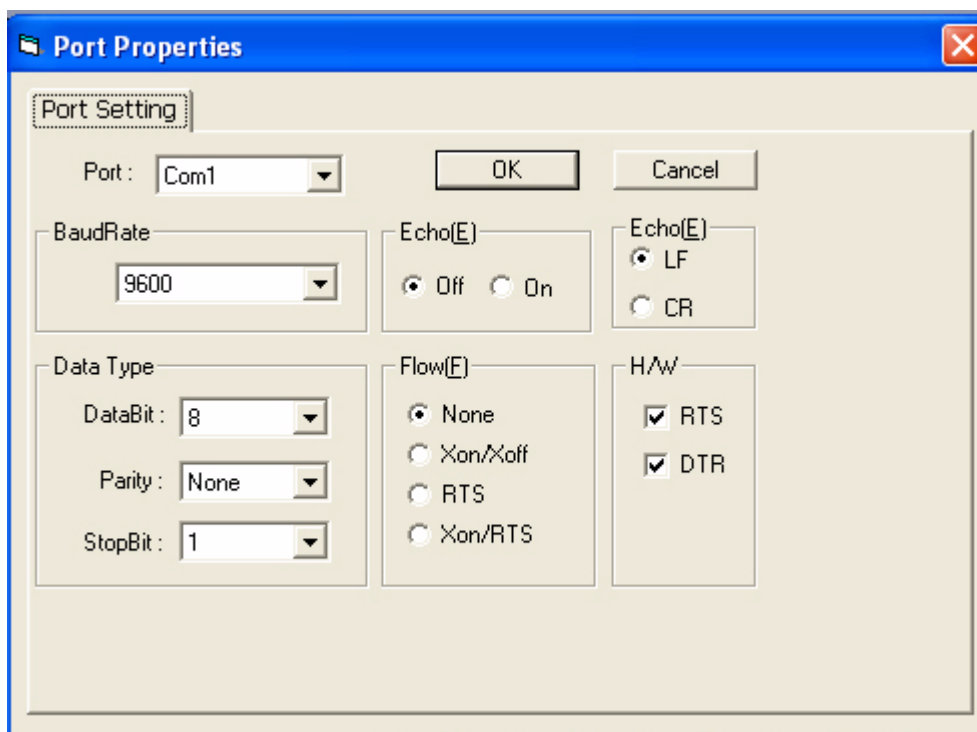
### 3 SET COMMUNICATION PORT PROPERTIES

Communication parameters must be set before the computer can communicate with the repeater. All GUI controls can be used after connecting the repeater system using the following “Connection” procedure.

1. Open “Setting” -> “Connection”



2. Port Properties window opens.



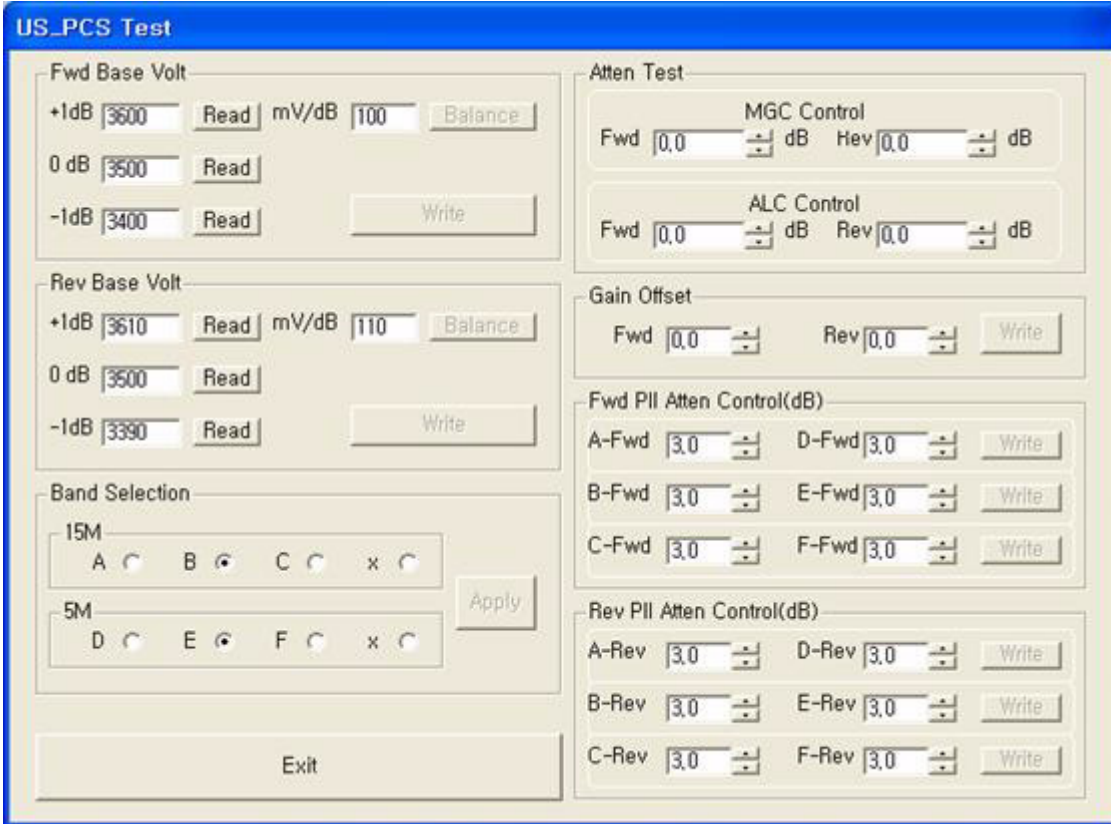
- **Port:** Select serial port number from 1 to 16
- **BaudRate:** Select Baud rate “9600”bps
- **Data Type:** DataBit: Select “8”bit, Parity: Select “None”, StopBit: Select “1”
- **Echo:** Select “Off”, “LF”
- **Flow:** Select “None”
- **H/W:** Select both.

All options may use default settings except for “Port”. You must select correct port # that the computer is connected to the equipment with.

After finishing the selection, press “OK” to save and return to the main setting window. If you press “Cancel”, the selections are not be saved and you are returned to the Port Properties window. If the selected port is not correct, the program displays “It's not available” on the screen and requests that you select another port.

## 4 US\_PCS TEST SCREEN

The Testing screen is opened by pressing the “F5” Function key. This window is used to test each attenuation, and test band selection or set PLL.



### 4.1 Fwd Base Volt

Input 0dB signal to the repeater system, and click 0dB “Read” button. This will read the forward path voltage and show in the text box.

Input +1dB signal to the repeater system, and click +1dB-”Read” button. This will read the forward path voltage and show in the text box.

Input -1dB signal to the repeater system, and click -1dB-”Read” button. This will read the forward path voltage and show in the text box.

After all three values are read, “Balance” button will become active. By pressing the “Balance” button, the program automatically calculates the voltage difference of 0dB, +1dB, and -1dB situation, and print in the text box beside the “Balance” button.

After the balance voltage value has been printed in the text box, “Write” button will become active. Pressing the “Write” button will save the voltage values to the repeater system memory.

## 4.2 Rev Base Volt

Repeat the FWD Base Volt set-up for the Rev Base Volt (Reverse Base Voltage).

## 4.3 Band Selection

**850MHz**

**1900MHz**

A/B/C/x: 15MHz path band A, B, C, or no selection (x)

D/E/F/x: 5MHz path band D, E, F, or no selection (x)

Select to apply these options to the system and press “Apply” to apply the selections.

## 4.4 Attenuation Test: MGC / ALC Control

Press up/down arrow key to adjust the Manual Gain Control in 0.5dB increments.

Press up/down arrow key to adjust the Automatic Level Control in 0.5dB increments.

## 4.5 Gain Offset Box

FWD/REV gain offset can be changed in 0.5dB steps by using Up/Down Key.

## 4.6 Fwd PLL Attenuation Control

Each band can be selected to have 0.0~9.5dB attenuation. This function can test gain flatness. Press “Write” to apply setting.

## 4.7 Rev PII Attenuation Control

Same as FWD PLL Attenuation Control

If you have finished each function testing, press “Exit” to exit the testing mode and reset the system.

*Blank*



## SECTION 4: GENERAL INFORMATION

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### 1 WARRANTY/SOFTWARE

(This is a boilerplate section that appears in many manuals. Delete this paragraph.)

The Product and Software warranty policy and warranty period for all ADC Products is published in ADC's Warranty/Software Handbook. Contact the Technical Assistance Center at 1-800-366-3891, extension 73476 (in U.S.A. or Canada) or 952-917-3476 (outside U.S.A. and Canada) for warranty or software information or for a copy of the Warranty/Software Handbook.

### 2 SOFTWARE SERVICE AGREEMENT

ADC software service agreements for some ADC Products are available at a nominal fee. Contact the Technical Assistance Center at 1-800-366-3891, extension 73476 (in U.S.A. or Canada) or 952-917-3476 (outside U.S.A. and Canada) for software service agreement information.

### 3 REPAIR/EXCHANGE POLICY

All repairs of ADC Products must be done by ADC or an authorized representative. Any attempt to repair or modify ADC Products without written authorization from ADC voids the warranty.

If a malfunction cannot be resolved by the normal troubleshooting procedures, call the Technical Assistance Center at 1-800-366-3891, extension 73476 (in U.S.A. or Canada) or 952-917-3476 (outside U.S.A. and Canada). A telephone consultation can sometimes resolve a problem without the need to repair or replace the ADC Product.

If, during a telephone consultation, ADC determines the ADC Product needs repair, ADC will authorize the return of the affected Product for repair and provide a Return Material Authorization number and complete return shipping instructions. If time is critical, ADC can arrange to ship the replacement Product immediately. In all cases, the defective Product must be carefully packaged and returned to ADC.

## **4 REPAIR CHARGES**

If the defect and the necessary repairs are covered by the warranty, and the applicable warranty period has not expired, the Buyer's only payment obligation is to pay the shipping cost to return the defective Product. ADC will repair or replace the Product at no charge and pay the return shipping charges.

Otherwise, ADC will charge a percentage of the current Customer Product price for the repair or NTF (No Trouble Found). If an advance replacement is requested, the full price of a new unit will be charged initially. Upon receipt of the defective Product, ADC will credit Buyer with 20 percent of full price charged for any Product to be Out-of-Warranty. Products must be returned within thirty (30) days to be eligible for any advance replacement credit. If repairs necessitate a visit by an ADC representative, ADC will charge the current price of a field visit plus round trip transportation charges from Minneapolis to the Buyer's site.

## **5 REPLACEMENT/SPARE PRODUCTS**

Replacement parts, including, but not limited to, button caps and lenses, lamps, fuses, and patch cords, are available from ADC on a special order basis. Contact the Technical Assistance Center at 1-800-366-3891, extension 73476 (in U.S.A. or Canada) or 952-917-3476 (outside U.S.A. and Canada) for additional information.

Spare Products and accessories can be purchased from ADC. Contact Sales Administration at 1-800-366-3891, extension 73000 (in U.S.A. or Canada) or 1-952-938-8080 (outside U.S.A. and Canada) for a price quote and to place your order.

## **6 RETURNED MATERIAL**

Contact the ADC Product Return Department at 1-800-366-3891, extension 73748 (in U.S.A. or Canada) or 952-917-3748 (outside U.S.A. and Canada) to obtain a Return Material Authorization number prior to returning an ADC Product.

All returned Products must have a Return Material Authorization (RMA) number clearly marked on the outside of the package. The Return Material Authorization number is valid for 90 days from authorization.





**PHONE:**

**U.S.A. or CANADA**

Sales: 1-800-366-3691  
Extension 73000  
Technical Assistance: 1-800-366-3891  
Connectivity Extension: 73475  
Wireless Extension: 73476

**EUROPE**

Sales Administration: +32-2-712-65 00  
Technical Assistance: +32-2-712-65 42

**EUROPEAN TOLL FREE NUMBERS**

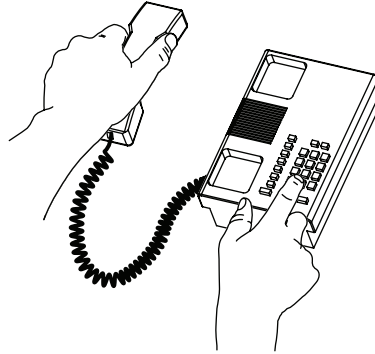
Germany: 0180 2232923  
UK: 0800 960236  
Spain: 900 983291  
France: 0800 914032  
Italy: 0800 782374

**ASIA/PACIFIC**

Sales Administration: +65-6294-9948  
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Technical Assistance: +1-952-917-3475

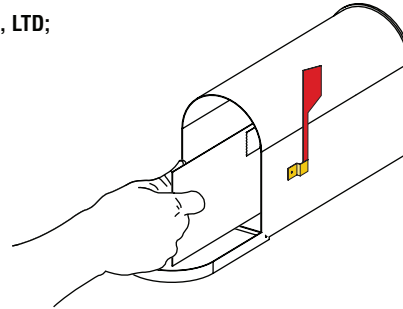


**WRITE:**

**ADC Telecommunications (S'PORE) PTE, LTD;**  
100 Beach Road, #18-01, Shaw Towers.  
Singapore 189702.

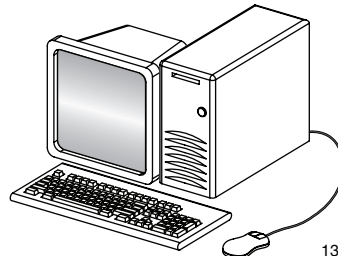
**ADC Telecommunications, INC**  
PO Box 1101,  
Minneapolis, MN 55440-1101, USA

**ADC European Customer Service, INC**  
Belgicastraat 2,  
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**PRODUCT INFORMATION AND TECHNICAL ASSISTANCE:**

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