



# RF Install Guide

e-BOS™ Version 2.x

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## Overview

Radio Frequency (RF) technology allows Lil'Champ handsets to play bingo as though they were connected to a PowerPlay desk – ball calls, game jumping, and other events are transmitted through radio directly into the handset. The handset can automatically update its screen, but the player must still announce a bingo in the traditional manner.

In order to use RF, a hall must have an RF Base Station, one or more RF transmitters, and Lil'Champ handsets equipped with radios.

The Base Station connects to PowerServer either by Ethernet connection via a hub (using TCP/IP) or by Serial cable. The type of connection used is chosen during the PowerServer installation routine. This manual assumes that TCP/IP will be used.

To achieve satisfactory signal coverage, halls may need to use from 1 to 8 radio transmitters, as each transmitter has a coverage area with a radius of 300 feet. In other words, handsets must be located within 300 feet of a transmitter in order to function properly. Transmitters can be positioned throughout a hall, from where they connect back to the Base Station which in turn is connected to the PowerServer machine. The Base Station distributes bingo events from PowerServer to the transmitters, which in turn send events to the handsets.

## Usage

There are varying degrees of automation that the Lil'Champ handsets can use when playing RF bingo. For example, one jurisdiction may require that a player manually daub each ball call, while another may allow the handset to be fully automated. In addition, a player can reduce the level of automation or disable RF altogether.

If the jurisdiction allows full auto-daub, the handset will automatically advance games, daub all calls, and make the winning sound when bingo is won. The player can decide to “turn down” some of this automation by selecting semi-auto-daub, game advance, or no RF mode.

If the jurisdiction requires semi-auto-daub, the handset will require the player to daub each ball call by pressing enter when they see the call come up on their screen.

If the jurisdiction requires game-advance mode, the player must enter each called ball number manually.

Finally, the player can decide to turn off all RF features entirely by selecting No-RF mode.

## Components



**RF Base Station**



**RF Remote Transmitter**

## Physical Connections

### *RF Base Station: Data Connection*

Connects to standard hubs/switches using straight-through CAT5 cabling, standard network connection length limitation applies (300 feet).

### *RF Base Station: Power Connection*

Connects to standard 110/120 volt outlet, use of UPS is highly recommended.

### *RF Remote Transmitters*

Connects to the RF Base Station using straight-through CAT5 cabling, maximum length of cable is 150 feet. This cable provides both data and power.

## Software Installation

The option to install RFServer is provided during a PowerServer install.

Ensure that an RF Mode is allowed by the hardlock.

An RF Mode must also be selected in PowerEdit.

*To enable RF in PowerEdit:*

- At the Hall level, press the *Settings* button. The Settings dialog will be displayed.
- Press the *Lil'Champ* tab.
- Select the *RF Mode* field.
- Select an option other than *1. Disabled*.

The RFServer service, *pbkRFServer.exe*, will start automatically when the PowerServer machine is started. It can take up to 30 seconds for RFServer to begin sending out game events when a session starts. If RFServer has to restart during a session for any reason, there could be a longer delay before transmitting as it processes previous game information. The Base Station uses a serial channel (the RS-232 connector on the rear panel) for logging. A Hyper Terminal (115200/8N1) program can be used to check Base Station firmware version as well as do basic troubleshooting.

## Hardware Installation

### ***Position Base Station***

The key consideration when positioning the Base Station in the hall is to ensure that transmitters can be located relative to it in such a way as to provide good coverage to the entire hall.

Keep in mind the location of the hub; the Base Station can be connected to it by up to 300 feet of cable.

### ***Connect Base Station to Hub***

The Base Station supports a 10/100 Ethernet connection; connect it to the network hub using up to 300 feet of cable so that it may communicate with PowerServer.

The Base Station has the following IP Address: 192.168.8.251

This address cannot be changed.

### ***Position Transmitters***

A transmitter can be connected to the Base Station by up to 150 feet of cable. Because the RF transmitters have a range of 300 feet, a handset must be within 300 feet of one in order to function properly. Ensure that the entire playing area of the hall is contained within the effective range of the transmitters.

When positioning a transmitter, there are a few considerations to keep in mind:

- In a hall with a sloping roof, you may need to position the transmitter at the lowest part of the roof to get the best coverage.
- Do not position the transmitter against a large steel beam.
- The transmitter must be oriented with its antenna pointing up or down; do not tilt the transmitter onto its side.

### ***Connect Transmitters to Base Station***

Connect each transmitter to a port (1-8) on the Base Station using up to 150 feet of cable.

## Hardware Operation

Each port on the Base Station has two colored lights – one green and one yellow.  
Each transmitter also has two colored lights – one green and one yellow.

As described below, information can be gathered about the state of the system by interpreting the color of a light and whether it is off, flashing, or solid.

### **Base Station Lights**

Each port on the Base Station has one green and one yellow light. The status of the transmitter attached to a particular port can be determined as follows:

Green Light OFF: Power is not being received by the transmitter.

Green Light ON: Power is being received by the transmitter.

Yellow Light OFF: No transmitter has been detected.

Yellow Light ON: The transmitter has been detected.

Yellow Light TOGGLES during game: When the Base Station receives a game event, such as a ball call or game advance, it passes this event on to the transmitter. Whenever the transmitter receives an event, the Yellow light toggles (if it was OFF, it will turn ON; if it was ON, it will turn OFF.)

### **Transmitter Lights**

Green Light OFF: Transmitter is not transmitting.

Green Light FLASHING: Transmitter is transmitting.

Yellow Light OFF: Transmitter does not have power.

Yellow Light ON: Transmitter has power.

### **Common events and corresponding light patterns**

#### *The Base Station is Reset:*

All Base Station lights will turn ON for a second.

When the Base Station has completed internal initialization, all Base Station lights will turn OFF.

When the Base Station is providing power to a transmitter, the corresponding Base Station green light turns ON.

When transmitters are receiving power, their yellow lights will turn ON.

When the Base Station has detected a transmitter, the corresponding yellow light on the Base Station will turn ON.

#### *RFServer is started:*

When a transmitter has been configured by RFServer, its green light will FLASH.

#### *Bingo is played:*

When a bingo event occurs, the yellow lights on the Base Station will TOGGLE.

## Troubleshooting

When playing a game of bingo, if handsets are not receiving game events (such as ball calls):

1. *If no handset gets ball calls*, check to see if the transmitters have power and are transmitting.
2. *If no transmitter has power*, ensure that the base station has power.
3. *If all transmitters have power but no transmitter is transmitting game events*, ensure that pbkRFServer service is running. Ensure that RF Mode is enabled in both PowerEdit and at the Hardlock level on the PowerServer machine.
4. *If the base station does not have power*, ensure that its 9V power supply is plugged in to a standard 110/120 volt outlet (preferably to a UPS.)
5. *If the base station has power, but one remote is not detected*, ensure that the cable is securely plugged in at both the base station and the transmitter, and that there is no damage to the cable.
6. *If the base station has power, but no remotes are detected*, reset the Base Station.
7. *If the base station has power and remotes are detected, but game events are not being sent to remotes*, ensure that the Base Station is connected to the hub, the hub is connected to the PowerServer machine, and that all cables are plugged in securely.
8. *If the base station has power, remotes are detected, and there is a good connection from the Base Station to PowerServer*, but game events are not being sent to remotes, ensure that pbkRFServer service is running.
9. *If the pbkRFServer service will not stay running for more than 10 seconds*, check the log file to see if any TCP activity has occurred. See the section entitled *Checking the PowerServer Log for RF Activity* for more information.
10. *If no TCP activity occurs in the log file*, check to see if there is any UDP activity.
11. *If there is no TCP and no UDP activity in the log file*, then make sure there are proper network connections between the Base Station, hub, and PowerServer machines. Make sure that the Base Station is powered. Check connectivity with the Base Station by using the DOS command PING from the PowerServer machine to ping the Base Station at IP Address 192.168.8.251. If the ping is successful, contact the help desk. If the ping is not successful, there is a hardware problem somewhere in the system.
12. *If there is UDP activity but no TCP activity*, restart the pbkRFServer service.

## Checking the PowerServer Log for RF Activity

RFServer creates log messages to document its activity. The following is a series of events and the associated log messages.

**Note:** *Each log message is prefaced with the following timestamp and identifiers, but these have been removed for readability:*

13:04:01 \_I [RFSERVER] P,T< 764,1104>

When RFServer starts, it attempts to establish a connection with a Base Station using the UDP protocol:

(UDP) Waiting for UDP packet from BaseStation

If RFServer detects a Base Station, it switches to TCP protocol:

(UDP) 192.168.8.251:2023 Base station Address Packet Received 0x12345678 (0x9ABCDEF0)

(TCP) Received UDP trying to connect 00000000

(TCP) Connected to BaseStation 192.168.8.251:2023

The Base Station will then report the status of any connected transmitters:

Radio Info Records for 9 devices follow:

BASESTATION Hardware Rev 1.1 Firmware Rev 1.2 ProtI Rev 1.1

REMOTE 1 Hardware Rev 1.0 Firmware Rev 0.1 ProtI Rev 2.0

REMOTE 2 \*\* Is not Connected \*\*

REMOTE 3 \*\* Is not Connected \*\*

REMOTE 4 \*\* Is not Connected \*\*

REMOTE 5 \*\* Is not Connected \*\*

REMOTE 6 \*\* Is not Connected \*\*

REMOTE 7 \*\* Is not Connected \*\*

REMOTE 8 \*\* Is not Connected \*\*

RFServer logs the communication of game events to the Base Station. The numbers in parentheses will change depending on the message sent, but the presence of these three messages indicates successful communication:

(TCP) Data Sent (6)

(TCP) Waiting for 400 bytes of data

(TCP) Data Processing (2) bytes

Looking for these messages in the PowerServer log can help to establish whether there are communications between RFServer and the Base Station/transmitters.

## RF Configuration Checklist

### *Hardware Configuration Checklist*

	<b>Hardware Configuration Checklist</b>
	Confirm that the PowerServer Hardlock supports RF mode.
	On the PowerServer machine, ensure that the NIC has IP Address 192.168.8.10. Ensure that this NIC is enabled and connected to the bingo network.
	If the PowerServer machine is also connected to a corporate network, ensure that the 2 <sup>nd</sup> NIC has a static corporate IP address assigned to it. Ensure that this NIC is enabled and connected to the corporate network.
	On the PowerPlay machine, ensure that the NIC has IP Address 192.168.8.1. Ensure that this NIC is enabled and connected to the bingo network.
	If this is a dual desk environment, ensure that the bonanza desk has a NIC set to IP Address 192.168.8.2. Ensure that this NIC is enabled and connected to the bingo network.
	Set the workgroup on all machines to the bingo workgroup (i.e. BINGO).
	From the PowerServer machine, ping the PowerPlay machine (or ping both PowerPlay machines, if this is a dual desk environment.)
	Plug the Base Station into the supplied UPS. Plug the UPS into a standard 110/120 volt outlet
	Connect the Base Station to the bingo network using straight-through CAT5 cabling.
	From the PowerServer machine, ping the Base Station (IP Address 192.168.8.251) to ensure connectivity.
	Connect all remote transmitters to the Base Station using straight-through CAT5 cabling.

**Software Configuration Checklist**

	<b>Software Configuration Checklist</b>
	On the PowerServer machine, install PowerServer (select a TCP/IP-based RF install.)
	If the PowerServer machine is connected to a corporate network, then in <i>PowerConfig</i> under the <i>PowerServer</i> tab, change the <i>Network Address</i> from the default of DISCOVER to 192.168.8.0.
	On the PowerServer machine, under Services, ensure that the <i>pbkRFServer</i> service is started.
	On the PowerPlay machine, perform a network install of PowerPlay. <i>If there is an existing PowerPlay installation with a different e-BOS version from that which is installed on the PowerServer, perform an upgrade install.</i>
	Under Services, if the <i>pbkFileControlServer</i> service exists, set its <i>Startup Type</i> to Disabled.
	In <i>PowerConfig</i> under the <i>PowerPlay</i> tab, set <i>Desk-Server Mode</i> to STRICT, and set the <i>Server IP Address</i> to 192.168.8.10.
	Reset the Base Station. After 30 seconds, check all remote transmitters for green lights (these lights indicate that RFServer has located the transmitters.)
	On the PowerServer machine, in PowerEdit, ensure that a jurisdictionally-supported RF Mode is selected for each session.
	Share C: on the server (this will allow the help desk to dial-in through the PowerPlay desk.)