
# Brower Timing Systems
## BIB ID RL System
## 2015

## User's Manual

# INTRODUCTION

## Congratulations!

You have just purchased the RL System. The RL System is a wireless timing system that synchronizes all of the units to a common Time-of-Day (TOD) reference, and synchronizes all of the radios to a precise common frequency. This provides the RL System with unprecedented accuracy and reliability.

## Benefits of RL

- New “Race Link” radio link with signal redundancy provides high reliability for training and race day.
- Signal analysis test allows for total confidence in the reliability of the radio link.
- No cable is required for synchronization, sync start and finish at the same time with the press of a button.
- All options are set from the ***Timer***. The syncing process then programs the ***Wand*** and ***Photocell A***.
- Superior battery life.
- Simple reliable use.
- Exact crystal synchronization.
- With precise crystal matching, (+/-) 1/1000 second accuracy can be maintained from unit to unit for over 4 hours, over the full range of temperatures experienced in skiing.

## Getting Started

The best way to learn how to operate the RL System is the hands-on method.

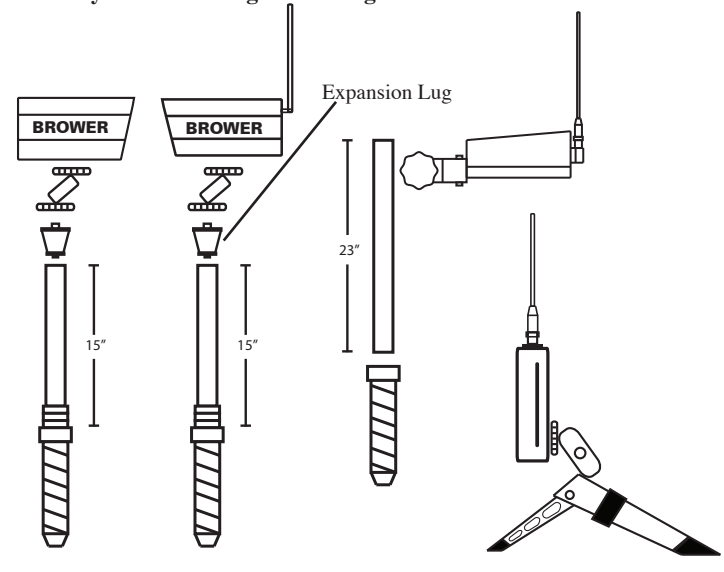
Set the system up in your home or office. Start pushing buttons as you read the manual. Read the manual front to back and work through each page. Try the “what if’s?” (What if a skier falls or false starts?) to see how the ***Timer*** responds. On the back of the ***Timer*** are notes summarizing how to use the system.



# BUILDING SNOW SCREWS

The RL System comes with mounting fixtures for on-the-hill installation, however, the snowscrew bases and shafts are not included. The user can use bases that are compatible with their existing drills and wrenches.

**Mount system according to drawing below:**




**Instructions for building stands for the RL System**

- Use slalom bases (new or used) that are compatible with your team’s drills and wrenches
- From one length of 1.25" diameter slalom pole, cut shaft to make 3 pieces as diagramed
- Use hinges for Beam stands for added safety
- For the ***Wand*** stand, use the 23" shaft; it is best to remove the hinge.
- Insert ***expansion lugs*** into the end of the slalom pole and tighten setscrew with allen wrench counter clockwise

The ***Timer*** stand can be set on a table or be strapped to slalom pole or tree.

## Training Tips

Assign a training number to all of your skiers for the entire year. Choose a numbering system that will help you remember what number belongs to each skier. For example, U18 racers could use numbers 0-9 and U16 racers could use 10-19 and so on. If you know the skier's number, the ***Timer*** will tell you in advance who is on the course.

*Timing is most beneficial if the skier can see his or her time at the bottom of the course*.

## Note

The display counts by 10ths of a seconds while a skier is on the course. This time is not official until the TOD, which is transmitted by the finish, is subtracted from the start to give 1/100 second time on the ***Timer*** display and 1/1000 second resolution when downloaded with the optional ***Smartphone Interface***.

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# COMPONENT SETUP

Attach the antennas to the ***Timer***, and ***Wand***, and mount units according to diagram on page ii.

## Power On

The ***Timer***, ***Wand***, ***Photocell A***, and ***Photocell B*** are all powered on by pressing and holding the power button for 3 seconds. All components will respond with a beep. The ***Wand*** and ***Photocell A*** are now waiting to be synced and will not operate until they are synced (page 5).

## Timer Setup

When the ***Timer*** is powered on, a time-of-day (TOD) reference is set. This reference is then synced to the ***Wand*** and ***Photocell A***. If the ***Timer*** is powered off, the TOD reference is lost. If the ***Wand*** and ***Photocell A*** are powered off the reference is also lost. Therefore, leave your system on all day. If the ***Timer*** is powered off the whole system needs to be re-synced. The ***Timer*** can re-sync a ***Wand*** or ***Photocell A*** at any point, even in the middle of an event.
The ***Timer***'s memory must be manually cleared by pressing the "CLEAR" button for six seconds. The ***Timer*** will store 499 skiers times and splits. After the memory is full, times will continue to show, but not be saved.

## Wand Setup

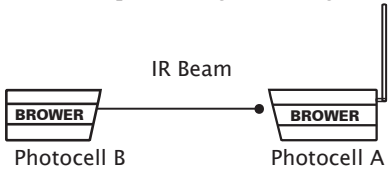
After the ***Wand*** has been synced it will display the program number. (page 7) Screw the ***Wand Stick*** into ***Wand*** and firmly press and twist the fiberglass extension into the ***Wand Stick***.

## Signal Analysis Test Button

The RL system has a signal analysis test feature. This feature can test the radio reliability of any timing location. Once the RL system is setup on the timing location, trigger the start ***Wand*** and ***Photocell*** to send signals to the RL ***Timer***. Hold the **TEST** button for 2 seconds to see the signal strength of the Wand. Continue holding the test button to see the Split and Finish signal strength. The number on the top line is the signal strength. Any number over 10 will insure a good radio link. The dashes ( / ) on the bottom line represent the each successfully received signal. Only 1 dash is needed to receive a signal. Up to 12 signals can be sent for each start and finish. Multiple dashes and a signal strength over 10 will ensure high reliability

## Photocell Setup and Alignment

After the ***Photocell A*** has been synced it will beep every four seconds to indicate that it is ready to be lined up with the ***Photocell B***. Line the ***Photocell A*** and ***Photocell B*** up according to the diagram.




When units are properly aligned, the ***Photocell A*** will only buzz when the beam is broken. *Fine tune the alignment with the* ***Photocell B***.

## Photocell B Setup

The ***Photocell B*** has three power settings. These settings allow for different finish line widths. To set the power level, press and hold the power button for the desired number of beeps. The blinking green light next to the power button indicates that the unit is on.

## Photocell B Power Levels

1 Beep - 10 Meters
2 Beeps- 20 Meters
3 Beeps- 30 Meters

Use a higher power setting in heavy snow.

## Low Battery Warning

All of the RL units will indicate when the batteries are getting low.*

***Timer***- When powering unit on,The display will show ***BATT GOOD*** or ***BATT BAD***.

***Wand***- When powering unit on, the display will show ***BATT GOOD*** or ***BATT BAD***.

***Photocell A***- A green LED, next to the power button, will flash if the battery is good. A red LED will flash if the battery is low.

***Photocell B***- A green LED, next to the power button, will flash if the battery is good. A red LED will flash if the battery is low.

** All components will work for 20 hours after first low battery warning.*



## System Setup and Sync

All of the system setup is done through the ***Timer***. This information is transferred to the ***Wand*** and ***Photocell A*** when synced.

## Choosing Settings

Press the **Mode** button to cycle through the Options. Use the ← → buttons to view option settings. Press the **Enter** button to choose settings.

## Option Menu

**CH - Channel 1-31.** ← →
This sets the system to one of 32 isolated frequency channels. Systems set on different channels will not interfere with one another.

**Pr - Power level of transmission.** ← →
The option's settings are:

Power Level

| | WAND | SPLIT | FINISH |
|---|---|---|---|
| SL* | low | low | low |
| DH | high | high | low |
| ALL | high | high | high |

*Use the SL option when testing the system indoors* and for slalom length courses. If longer transmission lengths are required use the DH setting. If timing from the top of a long GS or DH, choose the ALL setting. Using the proper setting conserves battery life.

*The SL option will work for most training hills that are under 35 seconds.

**rd - RF Redundancy.** ← →
This sets the number of times the ***Wand*** and ***Photocell A*** send start and finish data to the ***Timer.*** The options are 1,4,8,12. Use higher numbers for long range, use lower numbers to increase battery life. See TEST Button (page 6) to determine what number is needed.

**P# - Program** ↓↑

The options settings are:

P1- FIFO – First In First Out.
P2- PACE – Pace setting for hands free use.
P3- AUTO – Single skier timing, hands free.
P4- DUAL – Fist In First Out Dual.*
P5- DUAL DIFF – Finish Differential.*

*Additional Dual components required.

**SYnC- Sync**

Press "**Enter**"

## Syncing the System

*Choose settings before syncing, Channel (***CH)**, Power of Transmission (**Pr)**, Redundancy(**rd**), and Program (**P#)**.

- Power on all units
- Select **ALL** from the syncing options on the ***Timer***
- Press "**Enter**" and wait 5 seconds. The ***Wand*** and ***Photocell A*** will both beep 2 times.

## Syncing Splits

- After the ***Wand*** and ***Finish Photocell A*** are synced, turn on all ***Split Photocell A*** units
- Press "**MODE**" twice to select **SYnC ALL**
- Press ⇄ to select SPLIT
- Press "**Enter**" and wait 5 seconds. The ***Photocell A*** units will beep 2 times.

*Do not turn on Split Photocells until the* ***Wand*** *and* ***Finish Photocell A*** *are finished syncing. Doing so will cause the* ***Split Photocells*** *to act as* ***Finish Photocells****.*

*A* ***Photocell*** *synced as a finish must be used as a finish.* ***Photocells*** *synced as splits must be used as splits.*

*After the system is synced, the* ***CH, PR,*** *and* ***rd*** *options will no longer appear in the settings menu.*



# Program Introduction

The RL system has five program options. While each program has its own instructions the following are functions that are common to all of the programs.

## Enter Bib Number

The first step in all of the programs is for the racer to key in their bib number (1-499) into the ***Wand*** then press **Enter**. The ***Wand*** will then triple beep when the racer can start. The ***Timer*** will only display up to bib # 99 but will store and transmit up to bib # 499.
For example: Enter #385 on the ***Wand***, the ***Timer*** will show 85

## Memory Review of Timer

All of the times are stored in the ***Timer***. These times may be reviewed at any point by pressing the ↓↑ buttons. The ***Timer*** will continue to receive times even when the stored times are being reviewed.
To review split times use the ⇄ buttons adjacent to the times.
Advancing the memory (when split times are stored), with the ↓↑ buttons, will always display the finish times.

## Radio Signal Blocking

To block an unwanted finish signal from triggering the ***Timer***, press and hold the **Block** button throughout the unwanted finish signal and for 3 seconds after. This allows the operator to block any signals that are triggered by accident, such as a stray skier.

## Manual Finish

A skier may be manually finished by pressing the **DNF** button on the ***Timer***. Use this function to finish a skier if the finish line has been disabled. The display will show DNF but the time will store like a split and is viewable by pressing the ⇄ on the ***Timer*** or through the ***Smartphone Interface***.

## Program 1
## (FIFO) First In First Out

This program is used for racing events and training and has the capacity for 9 skiers on the course at one time. Skiers must finish in the order that they started.

Mount the ***Timer*** where the coach may view finishes and operate the ***Timer***.

If a skier falls or goes off course the skier must be DNF'd. To DNF a skier press the "DNF" button on the ***Timer***. Pressing the DNF button will only DNF the time on the top line of the ***Timer***.

In the case of a false start, the phantom skier must be DNF'ed. If the ***Timer*** is not manned, press the DNF button on the ***Wand*** along with the next skiers Bib #. This will send a signal to the ***Timer*** to DNF all running times.

### Caution!

If a fallen skier or false start is not DNF'd, the next skier will finish the fallen skier's time. If this occurs, push the "DNF" button to make up for the error.

### Split

Up to 3 splits can be used in Program 1. Make sure not to mix up the split and finish ***Photocell***s after they are synced.

### Split Rule

The first skier must pass all of the intermediate split ***Photocell***s before the next skier can start. Once all of the splits are passed, the next skier can start even before the first skier passes the finish.



## Program 2
## (PACE)

This program is great for ski teams that use the system regularly. **PACE** is a hands free program, no operator is needed to operate the ***Timer***. Hands free operation is possible by the automated DNF function. Mode 2 handles DNF skiers automatically by establishing an "Arrival Window" which is a space of time in which the skier must finish. Program 2 is capable of timing up to 9 skiers at a time.

### Arrival Window & Extent

The Arrival Window is the time period in which a skier must finish. A skier finishing a course will stop the timer only if he is within his Arrival Window. The Window Extent is the width of the Arrival Window. There are 3 Window Extents to choose from: 10, 14, and 18 seconds. Choose the desired extent from the **P2** program mode. Use  buttons to select option, then press **Enter**.

### Pacer(s)

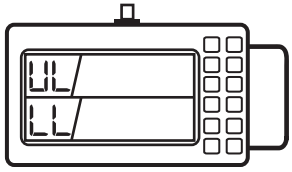
A Pacer is the skier that will establish the average finish time. This average finish time will automatically establish the Arrival Window for the skiers to follow. The Pacer is the first skier out of the start and must press the **Pace** button and his Bib #. A flashing "**P**" will show on the ***Wand***'s display. If the Pacer falls, the next skier must designate himself as a Pacer. Only the Pacer can be on the course when the Arrival Window is being established. In other words, the Pacer must start and finish before the next skier can start. A**"P"** will show on the ***Timer's*** display while the Pacer is on coarse.

### Example

If the pacer's finish time is 40.00 seconds, the extent is 10 seconds, then the subsequent skiers would be required to finish before (40.00-5sec)=35.00 seconds and no later than (40.00+5sec)=45.00 seconds.

## Adjusting the Arrival Window

- The ***Timer*** operator may manually lengthen or shorten the time of the Arrival Window.
- Adjustments can be made to the Finish Window ***after*** the course is Paced.
- To adjust the Arrival Window press **Mode**, **Window**.
- The display will show.




Use the ↓↑ button to adjust the arrival window, then press **Enter**.

## DNF

- If a skier's time runs past the Upper Limit set by the pacer, the skier's time will be replaced with DNF.
- If a skier finishes before his time has reached the Lower Limit, the skier's time will continue to run until it is either manually DNFed or it runs past the Upper Limit. At this time the display will be replaced with DNF.

## Split

Up to 3 splits can be used in Program 2. *When using splits make sure that the **Photocell** at the finish is programmed as a finish and not a split.*

## Split Rule

The first skier must pass all of the intermediate splits before the next skier can start. Once all of the splits are passed, the next skier can start even before the first skier passes the finish.



## Program 3
## (AUTO)

This program is for recreational races and small training groups.

ONE SKIER ON THE COURSE AT A TIME.

No ***Timer*** operator is required. False starts and DNF'S are handled automatically by sending the next skier. For false starts, just re-enter the same bib number.

Running times are DNFed when a new skier starts.

Mount ***Timer*** where the skiers can view times.

## Caution!

If a new skier starts before the previous skier has finished, the previous skier's time will be canceled and a DNF will appear on the display.

## Splits

Same as in Program 1&2.

# Program 4
# (Dual)

Dual Lane Program 4 is a dual version of Program 3 and operates in the same manner.

## Entering Bib Numbers

- When the RL System is set to Mode 4 the display on the ***Wand*** will flash.“**b L U**”
- Enter the bib # of the skier in the Blue lane. The display will now flash “**r E d**”
- Enter the bib # of the skier in the Red lane. The display will now show ¯–_.
- The skiers are now ready to start.

One set of skiers can be on the course at one time.

If a skier is racing as a single, do not enter a bib # for the empty start gate, just press ENTER.

## Notes

Program 4 is similar to Program 3. Running times are automatically DNFed when a new set of skiers starts

Blue and Red lanes are stored and reviewed as sets.



# Program 5
# (Dual DIFF)

This program is for events where the desired result is the time difference between a Dual finish.

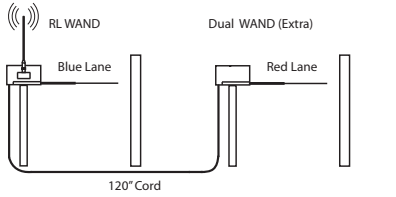
No start ***Wand*** is used. Set up the finish like a Dual Finish.

As 2 racers are finishing, the fastest racer’s Display (Red or Blue) will show 00:00, the slower racer’s display will show the differential time.

If a racer does not finish, press the “DNF” button on the ***Timer***.
The ***Timer*** will also automatically DNF a racer that has not finished after 15 seconds. The ***Timer*** will then display all zeros and is then ready for the next two racers. A tie will show 00.00 in both the red and blue lanes.

## Dual Lane Components

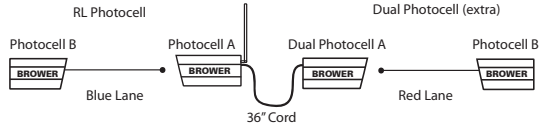
**Set Up:**




The ***Dual Wand*** is set up like the ***BIB Entry Wand*** (page 2). To power on, hold ***Wand*** arm open for 5 seconds. The unit will automatically power down after 2 hours of non use. The ***Dual Wand*** will beep 6 seconds after the arm is opened. Battery life on the ***Dual Wand*** is 1 year. Change at the beginning of each year.

## Dual Beam Set

**Set Up:**




The ***Dual Beam*** is set up the same as the ***Photocell***, connect the two eye’s with the 36" cord.

# Replacing Batteries & Maintenance

USE ONLY ALKALINE BATTERIES

## Expected Battery Life

***Timer***: 200 hours
***Wand***: 300 hours
***Photocell A***: 200 hours
***Photocell B***: 250 Hours - Low setting – 10 Meters.
220 Hours - Medium – 22 Meters.
100 Hours - High – 38 Meters.

## Changing Batteries

DO NOT INSTALL BATTERIES BACKWARDS!!!

***Timer***: Remove the 4 screws holding the backplate. Attach tripod to the backplate. Remove backplate to reveal the batteries. Replace with: 3 AA Energizer Alkaline batteries.

***Wand***: Remove the 4 screws holding the bottom plate and open the ***Wand*** like a book. When removing the battery brace make sure to loosen the set screw at the base of the back with an allen wrench. Replace the batteries and re-assemble in reverse order. Replace with: 3 AA Energizer Alkaline batteries.

***Photocell A and Photocell B***: With a screwdriver, remove the setscrew on the bottom of the unit. Press on the face of the unit below the lens to slide the guts of the unit out of the housing. Replace with: 3 AAA Energizer Alkaline batteries.

## Maintenance

The ***Photocell A*** and ***Photocell B*** are susceptible to water infiltration in heavy rain or wet snow. If water does get inside, remove the housing and remove the batteries. Let stand until dry. Replace batteries.

## Crystal Calibration (once a year)

The RL System uses ultra high precision clock crystals to insure accurate timing. Over 1-2 years the crystals can age and loose small amounts of accuracy. It is suggested that the ***Wand*** and ***Photocell A*** units be calibrated at the beginning of every season. (New systems do not require calibration) Open the ***Timer***, ***Wand***, and ***Photocell A*** units and locate each unit's USB jack. Use the male to male USB cable to connect the ***Timer*** and ***Wand***. The calibration starts automatically and takes 30 seconds. Repeat the process for each ***Photocell A.***




# Electrical Specifications

| | |
|---|---|
| Radio frequency | 433.425MHz 25kHz spacing. |
| Modulation method | FM.FSK. 32 Channels |
| Temperature rating | - 20 degrees C. |
| Receiver sensitivity | .18 uV |
| Transmitter power | Low 10 mW, High 135 mW |
| Transmission distance | 5 miles line-of-sight |
| Memory capacity | all components store 499 skiers times |

# Warranty

All products have a 1 year warranty. Brower Timing will repair or replace any failed product at no charge for 1 year from time of purchase. Damage caused by user is not covered by the warranty.

Customer will pay the cost to ship to Brower, Brower will pay for return shipping.

## Diagnose Malfunction and Return Procedure

***Go to www.browertiming.com to complete the return checklist.***

**1-** Determine which component is failing and call or email Brower Timing to confirm that it must be returned.

**2-** To reduce shipping cost, send only the failed component packaged in the smallest box available.

**3-** Include all your contact information and Visa or Mastercard number with expiration date and last 3 digits on the back of the card. Also it is very important to write a description of the problem

**4-** If shipping from outside of the USA send by Post office and label the package "Return for repair, Charge no duties". Expected turnaround time is 16 days, and shipping cost will be minimal.

**5-** If a faster turn around time is required (8 days) 2 way shipping costs can reach $300.00 to some countries.

**6-** Send all repairs directly to Brower Timing Systems.

CE 0408 

Austria
Germany
France
Switzerland
Great Britain
Norway
Sweden
Finland
Portugal
Slovenia
Spain

Brower Timing Systems declares that the equipment contained in this system conforms to the RTT directives.

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