



Brower Timing Systems
Test Center-System
2014

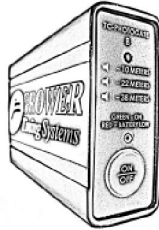
User's Manual

Power On/Off

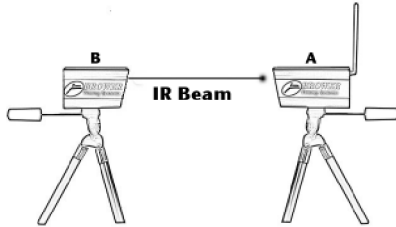
To power up the *TC-Timer*, press and hold the *On/Off* button for 2 seconds. The *Manual Start* button will simulate a remote start, and is helpful in learning how the timer works.


Power On PhotoGates A & B

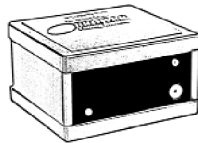
Press and hold the *On/Off* button until *TC-PhotoGate A* beeps, then buzzes continually. For *TC-PhotoGate B*, hold button until the desired distance is selected.


Line up PhotoGates A & B

Align *TC-PhotoGate B* to *A* until it stops beeping. Find eye center by rotating *B* to one side until *A* starts beeping then repeat to the other side. Set *B* in middle of these two positions.

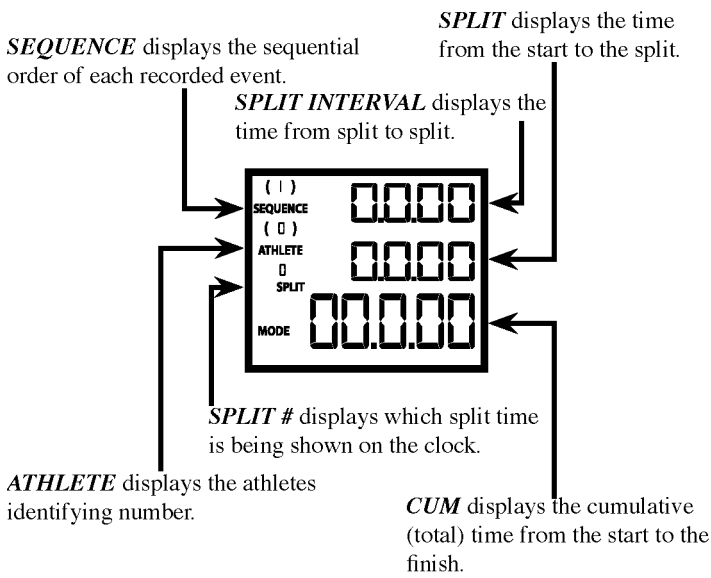

Power on TC-Motion Start

Press and hold the red *On/Off* button until one beep is heard. Place the *TC-Motion Start* 2-12 inches (5-30 cm) directly to the side of the athlete's hand or heel of the back foot.



Quick Start Guide	i
Operating Your TC-Timer	2
TC-PhotoGate Setup	5
Setting Up Your TC-Motion Start	7
TC-Timer Computer Communication	10
Test Identification Number (T id)	10
TC-Timer Modes	11
Chronograph Mode	11
Split Interval Diagram	13
1/1000th Mode	14
KPH/MPH Mode	14
Count Mode	15
Score Mode	15
Frequency Select Mode	16
RSSI Mode	16
TC-Display	17
TC-Results Center Software	18
Multiple System Setup	18
Troubleshooting	19
Battery Replacement	20
Caring For Your System	20
Specifications	20
Warranty	21
FCC Regulatory Compliance Information	21

Operating Your TC-Timer



Sequence

SEQUENCE (1) **SEQUENCE #** is a chronological counter. (1 to 199) It advances when the *New* button is pressed, this helps the user keep track of times when using *Memory Review*.

Power On/Off

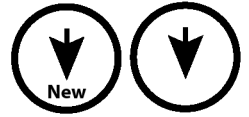
To power up the *TC-Timer*, press and hold the *Power On/Off* button for 2 seconds. The data from the last session is still in memory until memory is cleared. The clock is now ready to receive radio signals.



Power On/Off

Memory Clear

Press and hold both buttons at the same time for approximately four seconds. Memory will clear and the clock will be reset to *Sequence #1*. ****All past times will be lost.****



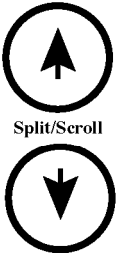
New Athlete

To start a new athlete, press the *New* button and a reset clock is shown. If in *Memory Review*, use the up arrow to get to the latest sequence which will show a reset clock. (This is the only time the *Athlete #* can be adjusted.)



Athlete # Adjust

Athletes can be assigned an identifying number. Use *Split/Scroll* arrows to assign an *Athlete #*. This may only be assigned before the clock starts for that athlete. (If in *Memory Review*, use *Up Arrow* to get to the latest sequence) After the desired number is reached, the start will lock the *Athlete #* to the time. If no adjustment is made for the next athlete, the same *Athlete #* will be assigned to the upcoming time. Press and hold the buttons to engage a high speed scroll.





Athlete Memory Review

To review times, press the *Memory Review* buttons. Holding down either button will engage the high speed scroll. The sequence will adjust accordingly. The *Athlete #* will be displayed also.



Memory Review



Split Review

Press *Split/Scroll* buttons to review an athlete's split times. (Up to 9 splits possible) The Split counter will adjust as each split is viewed.



Split/Scroll



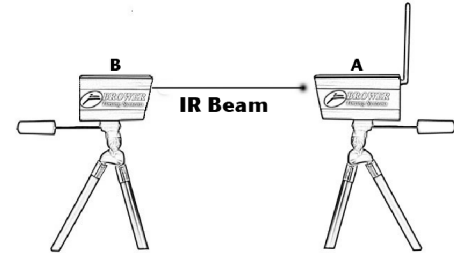
Manual Start

Press button to manually start, split or finish the timer. (Similar to a stopwatch) Using this function reduces the accuracy of an athletes time due to human error.



TC-PhotoGate Setup

- Set up the TC-PhotoGate units as displayed below at the *START*, *SPLIT* or *FINISH* location.
- Turn on *TC-PhotoGate A* by pressing and holding the power button for 2 seconds, it will beep then buzz continually, the green LED will also flash.
- Point *TC-PhotoGate B* in the direction of *TC-PhotoGate A*.

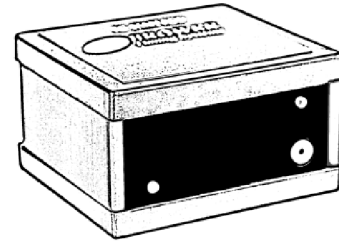


- Turn on *TC-PhotoGate B* by holding down the *On/Off* button until the desired power level is selected.* The blinking green light indicates the unit is on. *TC-PhotoGate B* emits an infrared (IR) light beam that is detected by A.
- Align *TC-PhotoGate B* by directing it toward the *TC-PhotoGate A* until it stops beeping. Center beam alignment by moving *B* in and out of alignment. The *A* unit will no longer sound when centered.
- To power down *PhotoGates A & B*, press and hold the *On/Off* button for two seconds. A low tone beep will indicate power off.

*The *TC-PhotoGate B* has three IR power settings indicating the maximum possible distance between *TC-PhotoGates A & B*.

Setting Up Your TC-Motion Start

Beeps	Power	Meters	Hours of Battery Life
1 Beep	Low	10	220
2 Beeps	Medium	22	140
3 Beeps	High	38	60



Application Tip

1. For the most accurate and repeatable results, set the IR light beam at the belt height of the athletes. This will be high enough so that the legs of the athletes do not break the IR light beam. This is also low enough that swinging arms and hands of the athlete will not prematurely break the IR beam.
2. To avoid unnatural hand reaching to break the beam, set *TC-PhotoGates A & B* 15-30 feet apart with the running lane in the middle. Set the finish beam so it is **not** on a visible finish line. This will make it difficult for athletes to know where to reach out and break the beam with a hand, which can result in a faster time.

TC-Motion Start Settings

To power up the unit, press and hold the red *On/Off* button until the desired setting is selected.

TC-Motion Start Settings	
1 Beep:	Start on Motion
2 Beeps:	Start on Detection
3 Beeps:	Ready Set Go

START ON MOTION

THREE OR FOUR POINT STANCE:

Place the *TC-Motion Start* on the starting line. Position the unit 2-12 inches (5-30 cm) directly to the side of the athlete's hand position. The black window should be facing the athlete's hand. The *TC-Motion Start* will beep twice when it detects that a hand is on the starting line; this means the unit is armed. When the hand lifts the unit will beep once and start the time.



STANDING START:

Place the *TC-Motion Start* 2-12 inches (5-30 cm) directly to the side of the athlete's rear foot position. The black window should be facing the athlete's foot. Make sure the unit is aligned with where first motion occurs. The unit will beep twice when it detects a foot; this means the unit is armed. When the back foot moves the unit will beep once and start the time.



START ON DETECTION

When turning the unit on, press and hold the red *On/Off* button until two beeps are heard. This sets the unit to Start on Detection. The *TC-Motion Start* will send a radio start signal and beep when a hand or foot is first detected. This mode is useful when timing tests that start or finish on stairs or bleachers.

Ready Set Go Setting

When turning the unit on, press and hold the red *On/Off* button until three beeps are heard. Place the *TC-Motion Start* 2-12 inches (5-30 cm) directly to the side of the athlete's hand or rear foot position. When a foot or hand is detected the unit will beep three times at random intervals: "Ready", "Set", and "Go". The *Motion Start* sends a start signal to the *TC-Timer* when the "Go" beep is heard. A second signal is sent when the athlete starts. The second signal captures the athlete's reaction time and will show as a split time on the *TC-Timer*. If the athlete false starts the unit will beep rapidly and no signal is sent.

Application Tip

1. Electronic start sprint times are always slower than hand times. This is due to the reaction time of the stopwatch operator. Studies have shown reaction times to be between 16-24 hundredths of a second. The general conversion for "start on movement hand timing" to "electronic start timing", is to subtract 20 hundredths of a second from the electronic total time.
2. The *TC-Motion Start* will result in a slightly faster overall sprint time in comparison to the Touch Pad start. This is because the *Motion Start* is slightly less sensitive and allows for a small amount of movement or shifting before it starts the time. The difference is between 0.04 and 0.06 seconds.

TC-Timer Computer Communication



The timer is available in two forms, *TC-Timer* and *TC-Timer USB*

If *TC-Timer USB* is purchased, it will have a computer USB port next to the antenna. This allows user to export data from the timer to a PC. To export data, Plug USB cable into the *TC-Timer* and connect to computer. Open *TC-Results Center*, and click *Get Memory* on the computer screen.

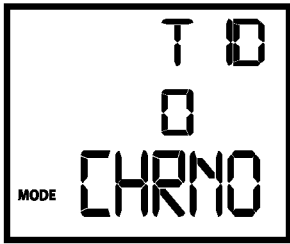


Test Identification Number (T id)

T id numbers allow the user to add a test identification number to a specific group of times. Once the identified data is downloaded to a computer, the test times can be organized and given a label, i.e. Test # 1 - 40 yard dash. For tests like the bench press or box jump, the weight or number of jumps can be entered into the *TC-Timer*. *T id* numbers (0-9) are input to the *TC-Timer* when selecting a mode.

With the *TC-Results Center* software the user will be able to customize timing data on a computer into:

- Grouped test results
- Individual athlete profiles
- Sort by rank for each test #



Use buttons to enter in the test ID #.



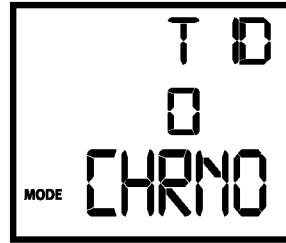
The difference between the *TC-Timer* and the *TC-Timer USB* is the ability to export data to a computer.

TC-Timer Modes

For both *TC-Timer* and *TC-Timer USB*

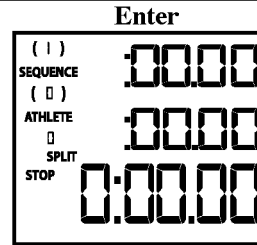
Use the *Mode* button to scroll through the mode options. When on the desired mode, use the *Split/Scroll* arrows to enter the *T id #*. Press *Enter*. The *TC-Timer* is now setup to time the event and input results in to the *Count* and *Score* modes.

Chronograph Mode



Chrno mode is the principal mode used for the majority of timing applications. When powered on, the *TC-Timer* automatically enters this mode.

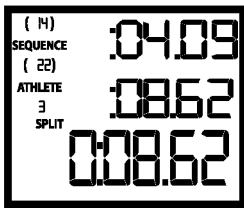
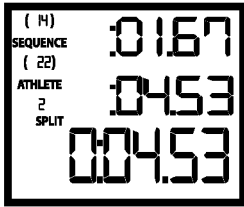
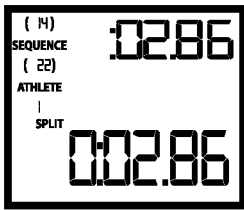
If doing two different timed tests in this mode, be sure to give each test a different *T id#*.



Description continued on pages 12, 13.

LIVE VIEW

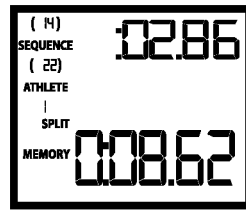
The following examples show what the user will see during a live timing.



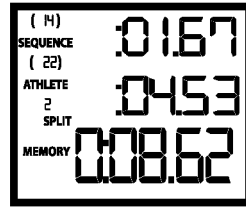
MEMORY REVIEW VIEW

The following examples show what the user will see in *Memory Review*.

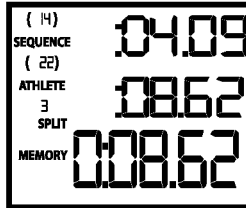
Split #1



Split #2



Finish

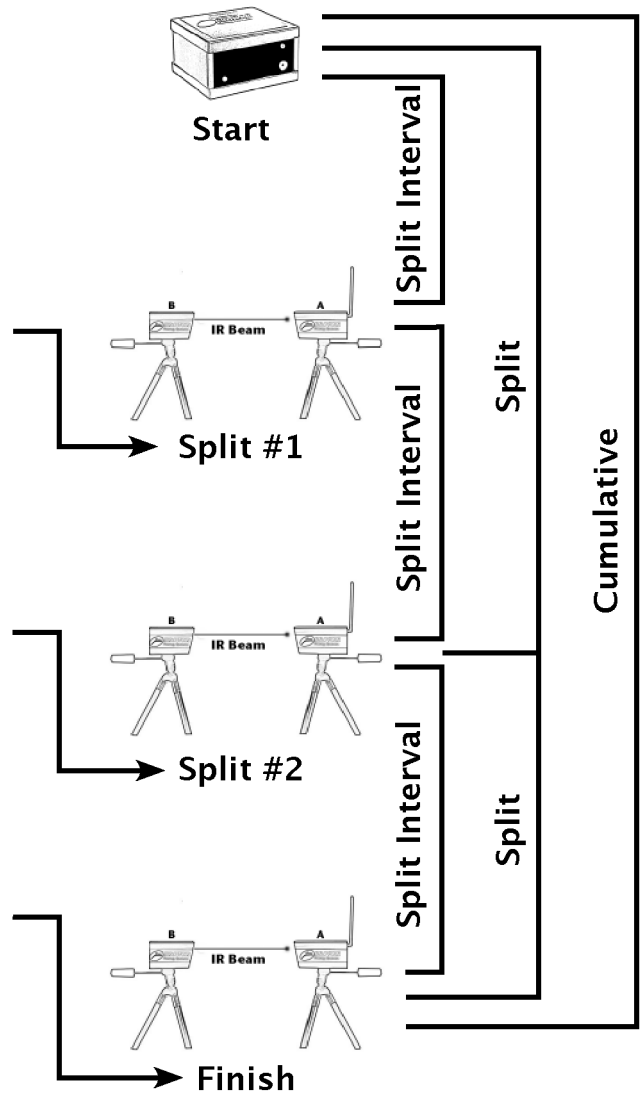


The first time the *NEW* button is pressed it will advance the *SEQUENCE* and will clear the clock.

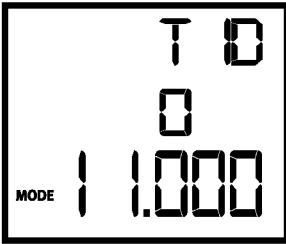
The second time the *NEW* button is pressed it will enter *Memory Review*. The user is then able to navigate the Timers' memory using the *Up* and *Down* arrows. To review split times use *Split/Scroll* arrows.

Split Interval Diagram

The following diagram defines *Split Interval*, *Split* and *Cumulative* times.

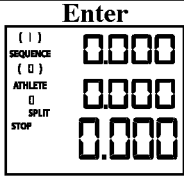


1/1000th Mode

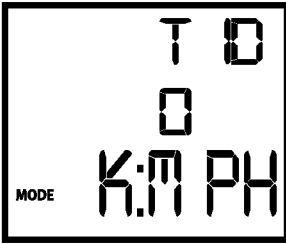


1/1000th mode is similar to the *Chrno* mode but displays 1/1000th of a second resolution. In this mode the display will only time to 9.999 seconds. This mode is useful in timing short spans between the start and finish where extra resolution is needed for differentiation. All of the functions work the same as the “Chrno” mode.

Rule: You must have at least 0.12 seconds of time between start PhotoGate and finish PhotoGate.



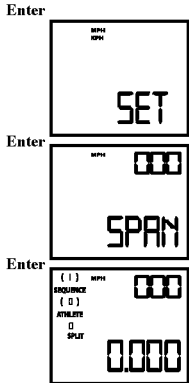
KPH/MPH Mode



KPH/MPH mode calculates kilometers per hour and miles per hour.

Rule: You must have at least 0.12 seconds of time.

At 20 mph the span needs to be 4 feet or more. At 100 mph it is 18 feet or more.



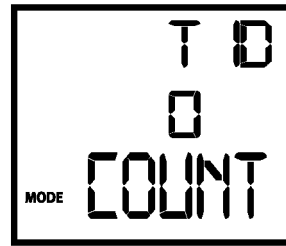
Use *Up Split/Scroll Arrow* to alternate between KPH and MPH.



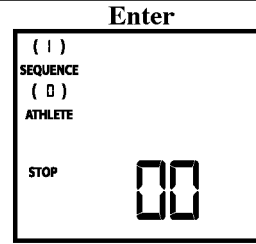
Scroll to set the number of **feet** or **meters** between the two *Photo-Gates*.

When passing through the start and finish gates, MPH will be seen on the top display and elapsed time on the bottom display. When adding a split, the *TC-Timer* will show MPH on the top display and advancing *CUM* times on the bottom display. Standard *Memory Review* functions will apply.

Count Mode



Count mode is used to count repetitions. Use the *Manual Start* button to count the number of reps.

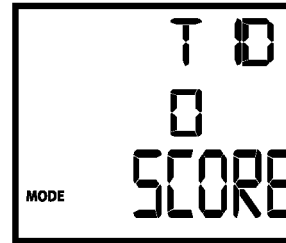


Rep Counter

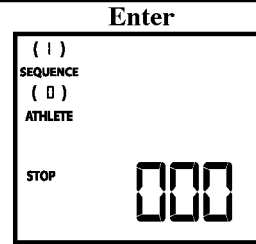


Score Mode

(*TC-Timer USB version only*)



Score mode is for numeric data input. Example: squat or bench press max. By manually inputting this data at the test sight, it will be automatically downloaded to the computers *TC-Results Center* software.



Use the Split/Scroll arrows to enter in the *Athlete #*. Press *Manual Start*, the *STOP* symbol on the LCD will disappear, then using the *Split/Scroll* arrows enter the desired score. Press *New* to advance to the next sequence.



Frequency Select Mode



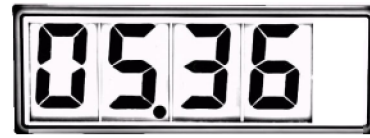
FREQ mode allows the user to change the radio frequency of the timing system. This allows two or more TC Systems to work in the same location. After setting the TC-Timer radio frequency (0-4), the frequency must also be changed to match in *TC-PhotoGate A* and *TC-Motion Start*. For the *PhotoGate A* this is done by removing the aluminum case, for the *TC-Motion Start* remove the bottom cap. Locate the blue switch panel and shift a lever to select a frequency. More than one switch cannot be down at the same time.

(All switches up is FREQ 0)



Note: A *TC-Timer* set to **FREQ 0** needs to have 10 feet of separation from a *TC-PhotoGate* set on **FREQ 1-4**. Otherwise it will receive an interfering signal.

TC-Display



MEM/MODE
Button

The *TC-Display* is a hands free timer that will display a time until a new time starts. The *TC-Display* has 10 different modes. To select a mode:

- Hold down **MEM/MODE** button until the mode number blinks
- Press the **MEM/MODE** button to scroll through each mode
- Hold down **MEM/MODE** button to select mode

For modes with a selectable distance:

- Scroll to the number of **feet** or **meters** between two *PhotoGates* by pressing the **MEM/MODE** button repeatedly
- Hold button for 3 seconds to select distance

Mode 0: Start and finish.

Mode 1: Start, split and finish.

Mode 2: Continual lap times.

Mode 3: Miles Per Hour (Select distance between 1 and 99 Feet)

Mode 4: Kilometers Per Hour (Select distance between 1 and 30 Meters)

Mode 5: Meters Per Second (Select distance between 1 and 30 Meters)

Mode 6: Displays two split intervals (Curling)

Mode 7: Times in 1/1000ths of a second

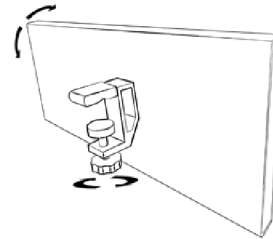
Mode 8: Times up to 9 Minutes. (Minutes, Seconds, 1/10ths of a Second)

Mode 9: Automatic Mode. Allows for unlimited split times. Time will reset to zero after 5, 10 or 15 seconds

The **MEM/MODE** button can be pressed to scroll through up to 10 previous times. A start will automatically bring the *TC-Display* back to the latest time.

The *TC-Display* will show b-Lo to signal a low battery after power up.

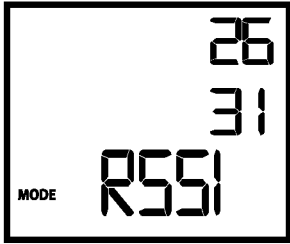
The *TC-Display* is capable of 5 different radio frequencies. Remove the end cap from the side of the *TC-Display* by removing two small screws. Locate the blue switch panel and switch the appropriate lever. More than one switch cannot be down at the same time. (All switches up is FREQ 0)



The included mounting clamp attaches to the back of the *TC-Display* and can be used as an adjustable tilt stand.



RSSI Mode



Relative Signal Strength Indicator

RSSI Test Mode allows you to self diagnose the distance capability of reception or problems with signal reception.

Problem I occasionally miss a start or stop signal.

Solution Check RSSI to see if there is radio interference at your location. Indoor

interference could come from equipment i.e. machines and computers, or Bluetooth. This may be the case if your RSSI reads 30/40 or higher without your *TC-PhotoGate A* transmitting.

Problem I need to time distances over 1000 feet, and I want to know if I will get reliable reception.

Solution Set up your *TC-PhotoGates* and have someone break the beam every three seconds. Go to the desired distance, the RSSI needs to read at least 29/35.

Problem I have noise or other users on my frequency. (38/50)

Solution Try frequency 1, 2, 3 or 4. (Must also be changed in *TC-PhotoGate A* and *TC-Motion Start*.)

TC-Results Center Software

For *TC-Timer USB* Only

- Insert CD (*Windows XP and Vista Only*)
- Drag Brower USB folder to desktop, or copy to desired location
- Setup is complete, open folder and double click the *TC-Results Center* file.
- Once the *TC-Results Center* software is open, click the *Instruction* button to read complete program instructions.

Multiple System Setup

Up to five TC systems can be used in the same area by using one of five different radio frequency channels. Systems must be spaced at least 10 feet (3 meters) apart.

The *TC-Timer*, *TC-Display*, *TC-Motion Start*, and all *TC-PhotoGates* must be set to the same frequency.

TC-Timer: Use the *Mode* button to scroll to the *FREQ* option. Select 0-4
TC-PhotoGates: Remove the aluminum case. Locate the blue switch panel and shift a lever.

TC-Motion Start: Remove the bottom cap. Locate the blue switch panel and shift a lever.

TC-Display: Remove two small screws from the side of the display. Pull the end cap out of the metal casing. Locate the blue switch panel and shift a lever. (All switches up is FREQ 0)

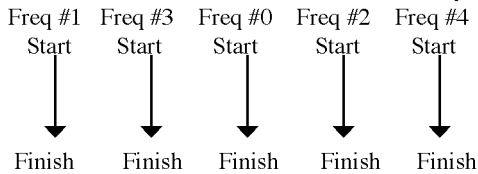
More than one switch cannot be down at the same time.



Note: To avoid confusion mark each component with it's frequency.

When setting up two Brower TC Systems in the same area use frequency 0 and frequency 1.

For the least amount of interference between TC Systems:



Troubleshooting

Problem One of my timing units does not power up.

Solution 1 All units require you to press and hold the power button for at least 2 seconds to initiate the power up sequence.

Solution 2 Check the battery. The units will warn of a low battery by a red flashing LED on the *TC-PhotoGate A* or *B* and *TC-Motion Start*. (The *TC-Timer* has a low battery symbol on the LCD). The units will work for up to 20 more hours and 5 for the *TC-Timer* with a low battery. If the unit will not turn on, check for dead battery.

Problem My timing system is setup correctly, but the *TC-Timer* won't receive a signal.

Solution Check to see if all the system components are on the same radio frequency. See FREQ on page 14.

Turn off all bluetooth devices near the *TC-Timer*

Problem I occasionally miss signals.

Solution See RSSI on page 14.

Problem My tripod is broken.

Solution If a single leg is broken, order a new tripod and save the two good legs for future replacement. The legs unscrew from the tripod. (60 day warranty, \$39 replacement)

Problem My touch-pad is correctly installed, but doesn't beep when I press it or beeps multiple times when I press it.

Solution Your touch-pad is worn out, order a new one. (60 day warranty, \$39 replacement)

If you are still not sure the system is functioning correctly, call us at 801-572-5540

"I have found a problem, what do I do now?"

If the system has a defect go to:

www.browertiming.com, click repair, and complete instructions to return defective unit.

Battery Replacement

TC-Timer: Remove the battery cover on the lower back of the unit. Install fresh AAA alkaline batteries. Replace the battery cover.
Battery life: 50 hours

TC-PhotoGates A & B: Remove the set screw from the base of the unit. Apply pressure to the front of the unit between the lens and buzzer to slide the unit out of its case. Replace batteries (AAA). Place the unit back into the case and replace the set screw.
Battery life: 220 hours

TC-Motion Start: Remove the set screw on the bottom of the unit. Pull the bottom cap off and replace three AAA batteries. Replace the bottom cap and set screw. Battery life: 50 hours

TC-Display: Remove two small screws from the side of the display. Pull the end cap out of the metal casing to expose a battery pack. Pull the battery pack out of the metal casing. Replace batteries (AA). Slide the battery pack back into the metal casing with the batteries facing the back side of the Display. Replace the end cap and two small screws.
Battery life: 100 hours

Caring For Your System

The TC system is water resistant but not waterproof. The general rule is if you can train in the weather conditions, the system can function. If it is raining too hard to train, take the system out of the rain. If components get wet, let them air dry before putting them back into the foam holder. If components get really wet, remove batteries until dry.

Using the Touch Pad with your feet will accelerate wear

Specifications

Radio: Radio transmission distances up to 1000 feet can be received in line of sight applications. Distances can be reduced if **TC-Timer** is in close proximity to electric motors and computers or **TC-Timer** is close against a body.

Frequency: 432.8

Timing Accuracy: 1/1000 of a second.

Radio Switch Accuracy: 0.0005 of a second.

Warranty

The BROWER TIMING SYSTEM is backed by a 1 year warranty covering manufacturing defects. Service, whether covered by the warranty or not can be performed and returned quickly. (Express incoming and return shipping charges are not covered by warranty.)

Touch-pads and tripods wear out with use are only covered for 60 days by the warranty.

When returning a BROWER component, go to www.browertiming.com and click "Repair"

FCC Regulatory Compliance Information

FCC ID: XVABTS

NOTE: This equipment 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

CAUTION: Any changes or modification not expressly approved by Brower Timing Systems could void the user authorization to operate this equipment.

TC-PhotoGate A compliance labeling

This device 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 may accept any interference received, including interference that may cause undesired operation.

Brower Timing Systems
12660 South Fort Street #102
Draper, Utah 84020 USA
Phone 801-572-5540 Fax 801-572-5941
techsupport@browertiming.com