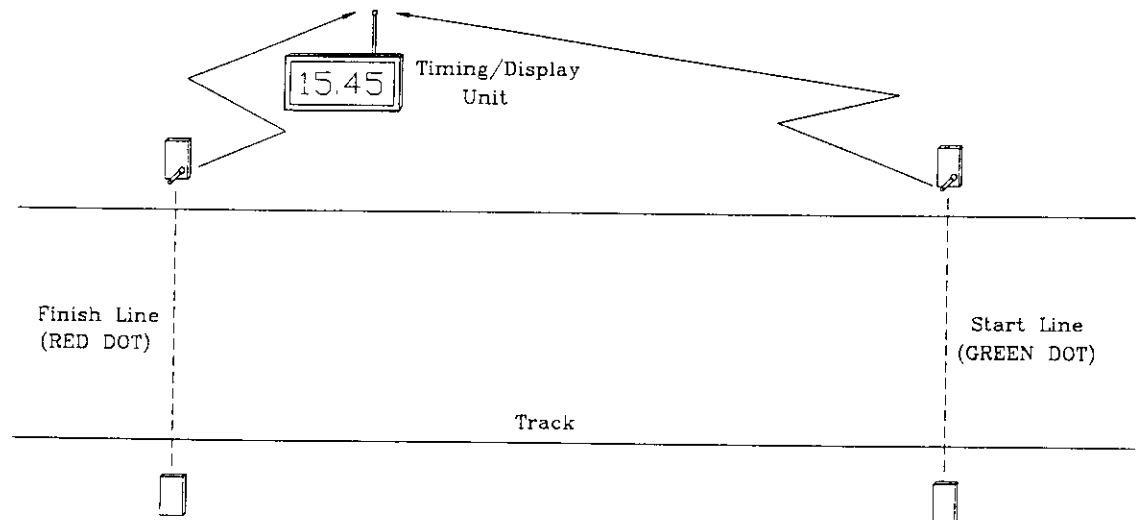


Preparation For Use

- 1) Place the electric eyes across from each other as shown in the illustration to form the start line and the finish line. The two electric eyes with the **green** dot form the start line. The two electric eyes with the **red** dot form the finish line.
- 2) Turn on each electric eye by pressing the **On/Off** button. The red **Power** light illuminates when the unit is on.
- 3) Align each pair of electric eyes so they face each other as squarely as possible. Adjust the height of the stands so the runners' hips and/or torso break the beam.

Quick Reference Guide (1)

- 4) Place the time display where it is easily seen by the record-keeper and the runners as they finish the course. Turn on the time display by pressing the **On/Off** button. A time of "**0.00**" is displayed when the unit is first turned on.
- 5) If desired, connect the hand switch to the time display by plugging the 25 foot cable into the **Hand Switch** jack on the right side of the time display. The hand switch is required to manually start and stop the timer if the electric eyes are not used. The hand switch can also be used to clear the timer when required.



Timer Operation

Operation of the timer is hands-free. Crossing the start line automatically starts timing for a runner. Crossing the finish line stops timing for the runner and displays the runner's time. Up to 16 runners can be on the course at the same time. *Multiple runners on course must be spaced far enough apart so they do not pass each other and so they finish at least one second apart.*

If the timer gets out of sequence for any reason (a runner is passed, an extra beam break, etc), the times of all runners on course become invalid. Have all runners exit the course and then clear the timer. The timer can be cleared in two different ways:

- a) Press *and hold down* the hand switch button until the display clears to **0.00**, *or...*
- b) Turn the time display unit off and back on.

Time Display

The timer displays either the running time of the lead runner on the course, or the final time of the most recent runner. A runner's final time is displayed immediately when the finish line is crossed. After five seconds without finish line activity, the running time of the lead runner is again displayed. If no runners are on course, then the most recent finish time remains displayed.

Quick Reference Guide (2)

Times are displayed to the finest resolution possible on the four digit display:

Elapsed Time	Resolution	Display
Less than 1 min.	.01 sec.	00.00 to 59.99
1 to 10 minutes	.1 sec.	1.00.0 to 9.59.9
10 to 60 minutes	1 sec.	10.00 to 59.59
1 to 10 hours	10 sec.	1.00.0 to 9.59.5

Hand Switch Operation

Stopwatch Operation

The timer can be used as a stopwatch without using the electric eyes. Connect the hand switch to the time display by plugging the 25 foot cable into the **Hand Switch** jack on the right side of the time display. Press the hand switch to start the timer, press it again to stop the timer.

Hand Switch with Electric Eyes

If required, the timer can be operated with one pair of electric eyes instead of two pairs. Place the electric eyes across the start line as normal. Stand at the finish

line and uses the hand switch to stop the timer as each runner crosses. Stopping the timer with the hand switch performs the same function as stopping the timer with the electric eyes.

Clearing the Timer

If the timer gets out of sequence for any reason (a runner is passed, an extra beam break, etc), the times of all runners on course become invalid. Have all runners exit the course and then clear the timer by pressing *and holding down* the hand switch button until the display clears to **0.00** (about 1 second).

Batteries

Battery Type / Life

All units operate from standard 9 volt alkaline batteries. New batteries provide about 80 hours of operation. The timing unit operates from *two* 9 volt batteries. (Never mix new and old batteries in the timing unit – replace both batteries with fresh batteries at the same time.)

Low Battery Indication

The red light on the front of the electric eye flashes when the battery is low. The right-most decimal point on the timing unit flashes when its battery is low. All units operate about 8 hours after the first indication of low battery. However, it is best to replace the batteries as soon as possible after low battery indication.

FCC Information

This equipment has been tested and found to comply 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 undesirable operation.

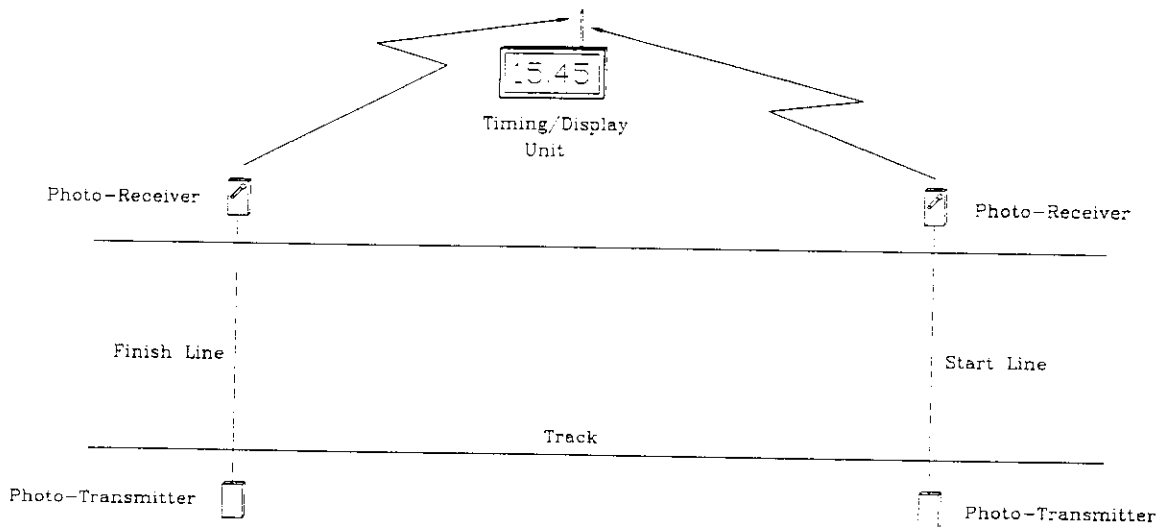
If this equipment causes interference to radio or television reception, which can be determined by turning

the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna of the affected equipment.
- Increase the separation between the equipment and the affected equipment.
- Consult the dealer for help.

Introduction

The Match Play Timer is used to time track and field events which start at point "A" and finish at point "B" (such as a 100 yard dash). A photosensor pair is used at the starting point to automatically start timing when a runner crosses the starting line. A second photosensor pair is used at the finish line to automatically stop timing when the runner crosses the finish line. Timing is performed by a unit separate from the photosensors. To make setup and operation simple, all units operate from internal, disposable batteries and a one-way wireless link is used from the photo-sensor to the timing unit to signal the timer to start or stop.



Wireless Radio Link

The wireless radio link used in the Match Play Timer is a one-way link from each photo-receiver to the timing/display unit. The wireless link operates under FCC regulations Part 15, Section 231, paragraphs A - D:

- Operating frequency is 418 Mhz.
- Both the radio transmitter and receiver are SAW (Surface Acoustic Wave) stabilized to eliminate the need for periodic adjustment or tuning.
- To improve interference rejection in noisy radio environments, FSK (Frequency Shift Keying) modulation is used instead of AM or OOK (On/Off Keying).
- Full $\frac{1}{4}$ wave whips are used on both the transmitter and receiver.

When the light beam is broken, the data transmitted by the photo-receiver includes a 16-bit code that uniquely identifies the photo-receiver. This code is used by the timing unit to distinguish between the start and finish line photosensors. The transmitted message is of fixed length and transmission time (85.2 ms) so that accurate calculation of when the beam was broken can easily be determined.

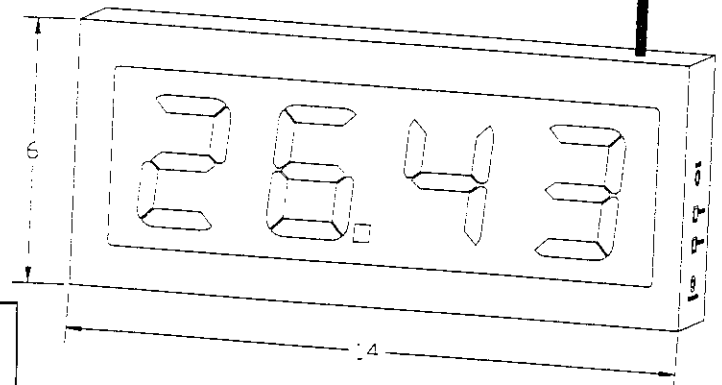
Photo-Receiver (contains RF Transmitter)

The photo-receiver detects the infrared beam of light that is emitted by the opposing photo-transmitter. When the photo-receiver detects a broken beam, it transmits a message to the main timing unit via a one-way radio link. The following table outlines specifications particular to the photo-receiver:

Packaging	Plastic case approximately 2.5 x 3.8 x 1.0 inches with an easily accessible battery compartment.
Power	A 9 volt alkaline battery provides a minimum of 80 hours of operation.
Radio Link	418 Mhz, SAW stabilized, FSK transmitter. A six inch, flexible antenna exits through the top of the case. The transmitter activates whenever the unit detects the infrared beam has been broken. A sixteen-bit code is transmitted to uniquely identify the transmitter.

Timing / Display Unit (contains RF Receiver)

The main timing unit functions as both the timing and display mechanism. Time is displayed on a four digit, liquid crystal display (LCD), with 3 inch tall digits. The timing unit is automatically started and stopped by the start and finish line photosensors via a one-way radio link to the timing unit.



Packaging	Metal case approximately 14 x 6 x 2 inches with an easily accessible battery compartment.
Power	The unit is powered by two 9 volt alkaline batteries. The batteries provide a minimum of 80 hours of operation.
Radio Link	418 Mhz, SAW stabilized, FSK receiver. A six inch, flexible antenna exits through the top of the case.

Match Play Electronic Timer

User's Manual

FarmTek

FarmTek, Inc.
5113 Heritage Ave. (972) 495-6529
Sachse, TX 75048 (800) 755-6529

Introduction

The Match Play electronic timer makes timing of track events quick and easy! The timer is best suited for sprint events which start at point "A" and finish at point "B." A photosensor pair ("electric eyes") is used at the starting point to automatically start timing when a runner crosses the starting line. A second photosensor pair is used at the finish line to automatically stop timing when the runner crosses the finish line. Timing is performed by a unit separate from the photosensors. The timing unit displays the time on a four digit display which is large enough to be easily read from 20 to 30 feet in indoor and outdoor lighting conditions. To make setup and operation simple, all units operate from internal batteries, and a wireless link is used from the photosensor to the timing unit to signal the timer to start or stop.

In order to facilitate timing of a variety of running events and deal with the possibility of photosensor malfunction, the timer incorporates several other basic features:

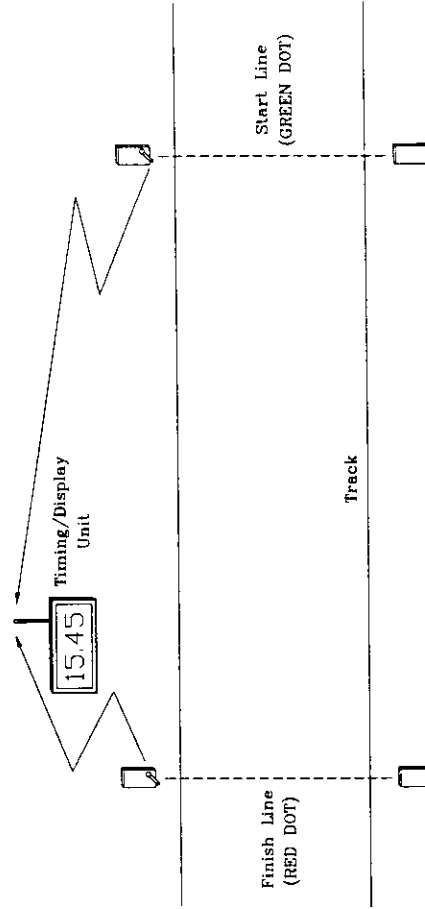
- The timer can be manually started and stopped via a wired, hand-held push-button.
- To allow display of a wide range of times on a four digit display, the timer automatically reduces the resolution of the displayed time as the elapsed time increases.
- The timer can time multiple runners on course at the same time. This feature assumes the runners never change their relative positions while on course (i.e., runners do not pass each other).

The complete Match Play electronic timer consists of the following major components:

Quantity	Description
2	Photo-transmitter (light source)
2	Photo-receiver (light detector)
4	Adjustable stands (to mount photo-transmitters and receivers)
1	Timing unit (four digit timing/display unit)
1	Hand-held start/stop push-button with 25 foot cord to connect to the timing unit.

Preparation For Use

- 1) Attach each of the four electric eyes to the yellow stands by gently screwing the electric eye onto the top of the stand. Loosening the knob at the top of the stand just $\frac{1}{4}$ turn allows the electric eye to be positioned at any angle as required for alignment.
- 2) Place the electric eyes across from each other as shown in the illustration to form the start line and the finish line. The electric eyes with the green dot form the start line. The electric eyes with the red dot form the finish line.
- 3) Turn on each electric eye by pressing the **On/Off** button. The red Power light illuminates when the unit is on.
- 4) Align each pair of electric eyes so they face each other as squarely as possible. Adjust the stand height so the runners' hips and/or torso break the beam.
- 5) Place the time display where it is easily seen by the record-keeper and the runners as they finish the course. Turn on the time display by pressing the **On/Off** button. A time of "0.00" is displayed when the unit is first turned on.
- 6) If needed, connect the hand switch to the time display by plugging the 25 foot cable into the **Hand Switch** jack on the side of the time display. The hand switch is required to manually start and stop the timer if the electric eyes are not used. The hand switch can also be used to clear the timer when required.



Timer Operation

Operation of the timer is hands-free. Crossing the start line automatically starts timing for a runner. Crossing the finish line stops timing for the runner and displays the runner's time. Up to 16 runners can be on the course at the same time. *Multiple runners on course must be spaced far enough apart so they do not pass each other and so they finish at least one second apart.*

If the timer gets out of sequence for any reason (a runner is passed, an extra beam break, etc), the times of all runners on course become invalid. Have all runners exit the course and then clear the timer. The simplest way to clear the timer is to:

- Press and hold down the hand switch button until the display clears to **0.00**, or...
- Turn the time display unit off and back on.

Time Display

The timer displays either the running time of the lead runner on the course, or the final time of the most recent runner. A runner's final time is displayed immediately when the finish line is crossed. After five seconds without finish line activity, the running time of the lead runner is again displayed. If no runners are on course, then the most recent finish time remains displayed.

Times are displayed to the finest resolution possible on the four digit display:

Elapsed Time	Resolution	Display
Less than 1 min.	.01 sec.	00.00 to 59.99
1 to 10 minutes	.1 sec.	1.00.0 to 9.59.9
10 to 60 minutes	1 sec.	10.00 to 59.59
1 to 10 hours	10 sec.	1.00.0 to 9.59.5

Hand Switch Operation

Stopwatch Operation

The timer can be used as a stopwatch without using the electric eyes. Connect the hand switch to the time display by plugging the 25 foot cable into the **Hand Switch** jack on the right side of the time display. Press the hand switch to start timing from zero (no reset required), then press it again to stop the timer.

Hand Switch with Electric Eyes

If required, the timer can be operated with one pair of electric eyes instead of two pairs. Place the electric eyes across the start line as normal. Stand at the finish line and uses the hand switch to stop the timer as each runner crosses. Stopping the timer with the hand switch performs the same function as stopping the timer with the electric eyes.

Clearing the Timer

If the timer gets out of sequence for any reason (a runner is passed, an extra beam break, etc), the times of all runners on course become invalid. Have all runners exit the course and then clear the timer by pressing and holding down the hand switch button until the display clears to **0.00** (about 1 second).

Batteries

Battery Type / Life

All units operate from standard 9 volt alkaline batteries. New batteries provide about 80 hours of operation. The timing unit operates from two 9 volt batteries. (Never mix new and old batteries in the timing unit - replace both batteries with fresh batteries at the same time.)

Low Battery Indication

The red light on the front of the electric eye flashes when the battery is low. The right-most decimal point on the timing unit flashes when its battery is low. All units operate about 8 hours after the first indication of low battery. However, it is best to replace the batteries as soon as possible after low battery indication.

Trouble Shooting

Indoor Use

When used indoors, the infrared light beam emitted by the electric eye can "bounce" off nearby walls and clothing causing the unit to occasionally miss a runner. To avoid this problem, orient the photo-receiver (the electric eye with the antenna) so it faces away from any nearby wall (have it face into the room).

Radio Link Problems

The radio link between the electric eye and the time display has a typical operating range of about 500 feet. However, actual range can vary significantly based on environmental conditions including line-of-sight obstructions, nearby radio interference, temperature, etc.

If the electric eyes don't reliably start and stop the timer, it is possible the radio signal is not reaching from the electric eye to the time display. Since the start line electric eye is usually the furthest away from the time display, problems are typically experienced with the start line.

To improve reception, move the time display so that there are no obstructions between the electric eye and the time display. Also, moving the time display away from nearby large objects, walls, crowds, etc., may also improve reception distance. If problems are still experienced, position the time display closer to the start line (i.e., move the unit further from the finish line and closer to the start line).

If a particular electric eye *never* trips the timer, try re-setting the ID code for the electric eye in the time display (see below).

Advanced Features

Two small push buttons on the side of the time display allow you to view and set several timer parameters. Each time the **MENU** button is pressed, the timer displays a different option from which you can choose. The **ENTER** button is used to perform the option that is displayed. Following are some of the parameters you may wish to change.

Setting ID Codes for the Electric Eyes

The electric eyes transmit an ID code to the time display whenever the beam is broken. The timer has to "know" the ID code for the start line and the ID code for the finish line. If you receive a new or replacement electric eye, you must "teach" the time display the ID code for the new electric eye. You may also want to reset the ID codes if you are experiencing problems with the start or finish line electric eyes. To teach the time display a new electric eye ID code:

- 1) Set up and align the electric eyes as outlined in the *Preparation For Use* section.
- 2) Press the **MENU** button until "ID S" (for the Start line) or "ID F" (for the Finish line) is displayed, then press **ENTER**. The display shows dashes "----" to indicate it is waiting for a transmission from an electric eye.
- 3) Walk through the beam of the electric eye pair for which you are setting the ID code. As soon as the beam is broken, the timer unit displays and memorizes the four digit ID code. After a few seconds, the ID code is removed from the display and normal time display is restored.

NOTE: If an ID code is not received from the electric eye, the dashes remain on the display – try walking through the beam again.

Changing the Hold Time

The *hold time* parameter determines how long a runner's finish time remains on the display before the running time of the next runner on course is displayed. The default hold time is five seconds.

To change the hold time, press the **MENU** button until "Hold" is displayed, then press **ENTER**. The current hold time setting is displayed. Press the **MENU** button again to cycle through the different hold times available. When the desired hold time is displayed, press **ENTER** to activate the new hold time.

Other Control Button Functions

Pressing **ENTER** when the "Clr" (clear) option is displayed clears the timer in the same manner as holding down the hand held switch.

The "CAL" (calibrate) option is for factory use only.

FCC Information

This equipment has been tested and found to comply 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 undesirable operation.

CAUTION: Changes made or modifications not expressly approved by the party responsible for FCC compliance of this equipment could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Consult the dealer or an experienced radio TV technician for help.