

***FarmTek***

Sport Timing Specialists



# ***Polaris***

Autocross Timing System

Operating  
Instructions

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## **FCC and Industry Canada Information**

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 when the equipment is operated in a residential installation. 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. 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, the user is encouraged to try to correct the interference by one or more of the following measures: (1) Reorient or relocate the receiving antenna. (2) Increase the separation between the equipment and the receiver. (3) Consult the dealer or radio/TV technician for help.

**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.

### ***Industry Canada***

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communications.

This radio transmitter (IC: 3845A-MI043) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

¼ wave whip, max gain 2 dBi, 50 ohm

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

### ***d'Industrie Canada***

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio (IC: 3845A-MI043) de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

¼ whip d'onde, le gain max 2 dBi, 50 ohm

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

# POLARIS TIMER CONSOLE

## Overview

### **Batteries**

The *Polaris* timer console is powered by four AA alkaline batteries. The timer runs 50 to 60 hours on a new set of batteries. Always turn the timer off before changing the batteries and always replace all four batteries at the same time – do not mix old and new batteries.

To check the battery level, follow these steps:

- 1) Press SETUP to access setup functions.
- 2) Press NEXT CHOICE until Check Battery is displayed (just one or two presses).
- 3) Press ENTER to show remaining battery life.
- 4) Press SETUP to return to normal operation.

Keep in mind that when the console is first turned on after being off for a while (e.g., overnight), the reported battery level is artificially high for the first half-hour or so of use.

When storing the timer for an extended period of time, always remove the batteries.

### **Low Battery Warning**

A low battery icon is flashed in the upper right corner of the **Status Display** when about 2 hours of console battery life are left. Note that the battery icon is also displayed whenever an electric eye has a low battery. Check the console's battery level as described to see whether the console or the electric eyes are the reason the icon is flashing.

### **Power On/Off**

Turn the *Polaris* timer on and off using the slide switch located at the upper right corner of the timer console.

### **Connections**

The **Input** jack is for connection of input devices such as an optional bar code reader or numeric keypad. *Do not plug an AC adapter from an older model timer into the Input jack on this timer – it can cause serious damage!*

The **Output** jack is for connection of output devices such as an optional scoreboard, printer or computer interface cable.

The **Horn** jack provides audio output of the horn sound to a PA system and control of the optional external horn.

# WIRELESS ELECTRIC EYES

## Overview

### Batteries

The electric eyes operate over 70 hours from a 9 volt alkaline battery (*use only alkaline batteries*). The **Power** lamp on the unit glows steadily while the battery is good and flashes when the battery is low.

To help detect an eye with a low battery, the timer in the announcer's booth flashes a low battery icon in the upper right corner of its **Status Display** when any electric eye in use has a low battery.

The electric eyes operate at least two hours after the *first* indication of low battery. **Note:** The two hour period is from the *first time* the low battery light begins flashing. If a unit with a low battery is turned off and then later turned back on, the lamp may glow steadily for some time before it starts flashing again. This does not mean there are two more hours of operation remaining at this point.

Once the **Power** lamp begins flashing, it is simplest to just replace the battery during the next break in your event – don't worry about trying to use the last few hours of the battery.

When storing the electric eyes for an extended period of time, always remove the batteries.

### Care

The electric eyes are not waterproof. If you plan to run in the rain, slip a thin sandwich bag over each electric eye. Snap a rubber band over the bag to hold the bag in place and to keep it taut over the face of the eye where the beam shoots through.

When you arrive home, remove wet equipment from the carrying case, remove batteries and leave the battery compartment cover off each unit. Allow the equipment to dry out thoroughly in a heated or air conditioned environment for several days.

Do not remove the antennas. Even though the antenna can be removed, doing so can cause problems.

## Electric Eye ID Codes

Each electric eye is permanently programmed with a unique electronic identification code. The ID code is transmitted whenever the electric eye beam is broken. For a set of wireless electric eyes to work with a particular timer console, the timer console must "know" the ID code of the electric eyes being used.

**Most likely, you will never need to perform this procedure**, but if your timer ever loses its settings, or you use a different set of electric eyes or a different timer console than usual, you must have the timer console "learn" the ID code of the electric eyes:

### Learning a New ID Code

1) Set up the electric eyes with about ten feet between each other and at least ten feet from the timer console. *Make sure no other electric eyes*

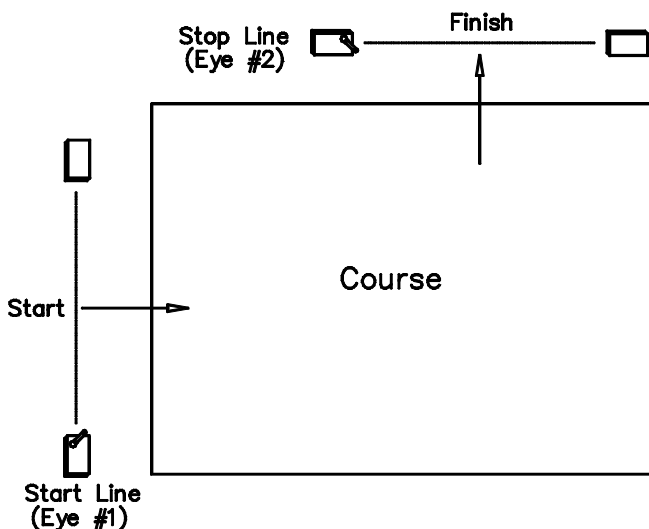
*are on or could accidentally transmit while programming in the intended electric eye.*

- 2) On the timer console, press the SETUP button to access the timer Setup options.
- 3) Press NEXT CHOICE until you see the appropriate "Set ID" message for the eye you are programming (e.g., Set Eye #1 ID, Set Eye #2 ID, etc.).
- 4) When you are ready to break the electric eye beam, press ENTER. The timer will tell you to "break the beam now".
- 5) Walk through the selected electric eye beam. As soon as the beam is broken, the timer momentarily displays the ID code for the eye.

That's it! Repeat the procedure for other eyes if needed.

## Preparation for Use

- 1) Attach each electric eye to a tripod. Place Transmitter/Receiver pairs facing each other to form start/stop lines between the eyes. The lowest tripod height is generally best for timing vehicles.
- 2) Turn the electric eyes ON. The power indicator lamp on each unit should glow steadily. If the indicator is blinking, the battery is low and should be replaced.
- 3) Align the electric eyes. The opposing electric eye should be directly in-line when sighting down either line on top of the electric eye (left to right alignment), and when sighting down the crack on the side of the eye (up and down alignment).
- 4) Turn on the timer console at the timekeeper's table. The power switch is located at the upper right corner of the timer.
- 5) The current event type is shown on the **Status Display**. If AUTOCROSS is not displayed, select the Autocross event as follows:
  - a) Press SETUP to access Setup functions.
  - b) Press ENTER to select a new event.
  - c) Press NEXT CHOICE several times until AUTOCROSS is displayed.
  - d) Press ENTER to select Autocross.
- 6) Walk through each electric eye beam to force the eyes to send a message to the timer console. This makes the timer console update its electric eye alignment indicators (see below).



## Checking Eye Alignment

The bottom right corner of the **Status Display** shows the alignment status of the electric eyes. When the eyes are aligned, its number is displayed (1 or 2). If not aligned, or if the beam is broken, "x" is shown.

Alignment	Display Shows
Eyes aligned	Eye #1 $\geq$
Eye #2 not aligned (or beam broken)	Eye #1 x

**Important!** When setting up the electric eyes, take time to align the eyes as outlined above – *even if the timer indicates the eyes are aligned*. This ensures a strong alignment instead of a possibly marginal alignment.

## Timer Operation

Timer operation is virtually hands free. When the start beam is broken, the timer sounds a single beep and begins timing the vehicle. When the finish beam is broken, the timer sounds a *double* beep and shows the driver's final time. Up to seven vehicles can be on course at the same time.

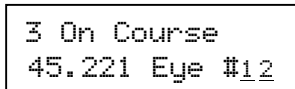
Information about the cars on course is shown on the timer's two displays: The large numeric **Time Display**, and the two-line **Status Display**.

The **Time Display** shows either the running time of the next car in line to finish, or the most recent finish time. Finish times are held on the display for about five seconds, after which, the display returns to showing the running time of the next vehicle in line to finish. The five second hold time can be adjusted, see "Scoreboard Hold Time" later in this manual.

The first line on the **Status Display** shows the number of cars currently on course. When no cars remain on course, the "Autocross" event name is displayed instead.

The second line on the **Status Display** shows the most recent finish time. This time is not removed until another car crosses the finish line.

Number of vehicles on course



3 On Course  
45.221 Eye #12

Most recent finish time

## Important Features

### **Accidental START Beam Break**

If the start beam is accidentally broken, pressing the CLEAR TIME button removes ("clears") the most recently started time. This is equivalent to the "Reset Start" feature on other timers.

### **Accidental FINISH Beam Break**

If the finish beam is accidentally broken, pressing the RESTART button resumes ("restarts") timing as if the timer had never been stopped. This is equivalent to the "Reset Finish" feature on other timers.

### **Manual Stop (Vehicle does not Finish)**

If a vehicle is not able to finish its run, care must be taken to ensure times are not lost for the other vehicles on course. When the vehicle would have been the next to finish, press the black START/STOP button to manually stop timing for that vehicle. (If preferred, the NO TIME button performs the exact same function.)

### **Manual Start**

Pressing the black START/STOP button starts the timer *only if no other cars are on course*. Once cars are on course, the START/STOP button functions only as a manual stop. If an "extra" car is on course because the start beam failed to trigger, subsequent cars can still be accurately timed by pressing the RESTART button after the "extra" car crosses the finish beam.

### **Locking Out The Electric Eyes**

If you need to prevent a car from tripping the start or finish beams, you can temporarily disable the electric eyes by pressing the EYES OFF button. "OFF" is flashed over the electric eye alignment display while the eyes are off. To re-enable the electric eyes, press the EYES ON button.

### **Previous Time Recall**

Use the PREV and NEXT keys to scan back and forth through previous times. The previous time display is removed after about ten seconds, or by pressing any other key.

## Helpful Hints – Electric Eyes

### **Optical Interference / Crosstalk**

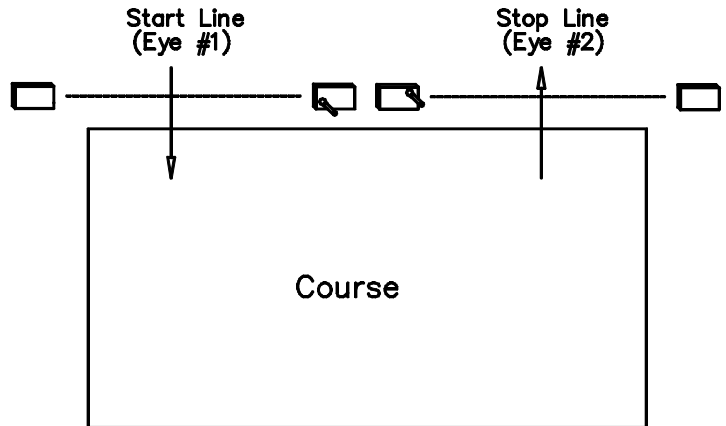
If the start and finish lines are along the same side of the course (or even close to being along the same line), **be sure to face the eyes in opposite directions** as shown to the right. This prevents the start electric eye from seeing the finish electric eye, and vice-versa.

### **Protecting the Electric Eyes on Course**

The optical range of the electric eyes is over 150 feet. This means you can place the electric eyes well off the course to reduce the likelihood of being hit. If any sort of enclosure is built over the electric eyes, do not use metal as this greatly reduces radio range.

### **Optical Interference from the Sun**

When the electric eyes are setup with a very long distance between them, a late afternoon sun shining directly into the Photo-Receiver (the electric eye with the antenna) can cause problems. A simple remedy is to swap the electric eyes with each other so that the sun shines into the face of the Photo-



Transmitter instead (the electric eye without the antenna).

### **Electric Eye Ignore Period**

To prevent accidental starts and stops, the electric eyes are each ignored for about two seconds after a vehicle passes through them. This allows time for dust and debris to settle. If you have a special application which needs a shorter or longer ignore period, this can be adjusted with us over the phone.

## Helpful Hints – Maximizing Radio Performance

The maximum radio range is 250 to 300 feet. This is the distance from the electric eye with the antenna to the timer console at the timer's table (not the distance from the start line to the finish line).

As with any radio system, the shorter the radio distance, the better the system reliability. Consider this when designing course layouts. If needed, external antennas are available to substantially increase radio range. Contact us for details.

Many factors affect radio performance. Here are some common items to consider:

- Ensure the line-of-sight between the electric eyes and the timer console is not obstructed by any large metal objects or chain link fence. Verify line-of-sight from down at the antenna's level – not just from your standing eye level.

- If the timer's table is inside a trailer, motor-home, etc., be sure the timer console has clear sight of the electric eyes and the radio signal does not have to shoot through metal walls to reach the timer.
- Position the timer console at least 2-3 feet from major electronic equipment such as computers, monitors, and the PA system.
- Raise the tripod with the electric eye as high as practically possible. Radio range decreases substantially as the eye is positioned closer and closer to the ground.
- External antennas are available to increase radio range or to simply move the receiving antenna outside of a window or obstruction. Contact us for additional information.

## Advanced Features

In addition to starting the timer with Eye #1 and stopping the timer with Eye #2, the timer provides other electric eye combinations. To select a different electric eye combination:

- 1) Press SETUP to access Setup options.
- 2) Press NEXT CHOICE until Set Eye Usage is displayed, then press ENTER.
- 3) Press NEXT CHOICE to scan through the available eye combinations and press ENTER when the desired combination is displayed.

Note: An asterisk (\*) is displayed next to the currently active eye combination.

Timer Display	Timer Action
Start #1, Stop #2	Start with Eye #1, Stop with Eye #2.
Start #2, Stop #1	Start with Eye #2, Stop with Eye #1.
Start #1, Stop #1	Start and Stop with Eye #1 (a common start/finish line allows just one vehicle on course at a time).

### Split Times

Up to two additional sets of electric eyes can be added to measure split times. In Autocross mode with multiple cars on course, split time information is *not* displayed on the timer console or scoreboard. Instead, split time data is only transmitted over the computer interface. The software package can use the data to compute and display the split times.

If you are only running a single car at a time, split times can be displayed on the timer console and scoreboard. To do this, use the “Sprint/General” event instead of the Autocross event as follows:

- 1) Press SETUP to access Setup functions.
- 2) Press ENTER to select a new event.
- 3) Press NEXT CHOICE several times until Sprint/General is displayed.
- 4) Press ENTER to select the Sprint/General event.

By default, the Sprint/General event is set to start with eye #1 and stop with eye #2 just like the Autocross event. However, only one car can be on course at a time. Feel free to contact us with any questions.

## Scoreboard Operation

The optional scoreboard adds excitement for participants and spectators. The scoreboard shows the driver’s running time as the car approaches the finish, and then the final time once the finish line is crossed. The driver’s time is shown for about five seconds, after which, the scoreboard returns to showing the running time of the next car.

### Adjusting the Scoreboard Hold Time

The amount of time that a finish time remains on the scoreboard is adjustable. Follow these steps to change the scoreboard hold time:

- 1) Press SETUP to access Setup functions.
- 2) Press PREV CHOICE twice so Scoreboard Options is displayed, then press ENTER.
- 3) Press NEXT CHOICE several times until Set Hold Time is displayed, then press ENTER.
- 4) Press NEXT CHOICE until the desired hold time is shown, then press ENTER.

**Note:** The scoreboard hold time also sets the amount of time the numeric display on the timer console shows each finish time.

### Show Finish Times Only

To show only finish times without ever showing a running time, choose Run Time Off in the Scoreboard Options menu (step 2 above). This setting only affects the scoreboard – the timer console still shows the running time after expiration of the scoreboard hold time.

### Connection to other Scoreboard Brands

The timer console can drive some other brands of scoreboards. Not all features may be supported such as running times or the wireless scoreboard interface. Contact us for additional information.

# Computer Interface

The optional computer interface cable provides a connection between the timer console and a serial port or USB port on a computer. We offer a simple interface program that places times into the active cell on a spreadsheet or similar program each time the finish line is crossed.

To work with third-party software, the timer can emulate the output of a variety of popular timers on the market. This makes integration of the timer especially easy. Output options include models from TAG Heuer (CP520, CP504, CP705), models from RaceAmerica (AC4, T-Link), and models from JA-Circuits (normal mode and chrono mode).

To choose an output option, follow these steps:

- 1) Press SETUP to access Setup options.
- 2) Press NEXT CHOICE until Interface Type is displayed, then press ENTER.
- 3) Press NEXT CHOICE until the desired output format (see details below) is displayed, then press ENTER.

## **Standard Output**

Choose this option to use the timer's standard output format. This format is required to use the timer interface software we offer for placing times into a spreadsheet or other Windows application. In this mode, the timer transmits data only at the completion of each run.

## **TAG Heuer**

Choose this option to emulate the output of common TAG Heuer models like the CP520, CP504, and CP705. The timer transmits both start and finish beam breaks to the computer to support advanced features in your software. When the Clear Time ("Reset Start") and Restart ("Reset Finish") buttons are pressed on the timer console, the equivalent commands are sent over the interface to automatically keep the timer and software in sync.

The start beam break is always sent as eye "1" and the finish beam break is always sent as eye "2" even if you have used the Eye Usage menu to swap the start and finish eyes. This allows your software to work properly without changes. Time data from split eyes is sent as eye "3" and eye "4."

## **JAC Normal**

Choose this option to emulate the "normal" (not chrono-mode) output of the JA-Circuits timer and the RaceAmerica AC4 timer. Note: The timer emulates newer versions of the AC4 that do *not* include a start trigger. In AxWare, for example, uncheck the "AC-4 with Start Trigger" option.

The timer transmits data only at the completion of each run. When the Restart ("Reset Finish") button is pressed on the timer console, the equivalent command is sent over the interface (a time of all zeros).

## **JAC Chrono**

Choose this option to emulate the output of the JA-Circuits timer operating in "chrono-mode." The timer emulates the "reverse" chrono-mode of the newer JA-Circuits timers. In AxWare, for example, check the "Chrono" and "Reversed" options to properly support this interface.

The timer transmits both start and finish beam breaks to the computer to support advanced features in your software. When the Clear Time ("Reset Start") and Restart ("Reset Finish") buttons are pressed on the timer console, the equivalent commands are sent over the interface to automatically keep the timer and software in sync.

The start beam break is always sent as eye "A" and the finish beam break is always sent as eye "B" even if you have used the Eye Usage menu to swap the start and finish eyes. This allows your software to work properly without changes. Time data from split eyes is sent as eye "C" and eye "D."

## **RA T-Link**

Choose this option to emulate the output of the RaceAmerica T-Link system. The timer console emulates the T-Link "Z" unit. The timer transmits both start and finish beam breaks to the computer to support advanced features in your software. Note that commands equivalent to the Clear Time ("Reset Start") and Restart ("Reset Finish") buttons are *not* provided by the T-Link system or the emulation.

(Continued on next page)

## **Computer Interface (cont'd)**

### **RA T-Link (cont'd)**

The start beam break is always sent as ID "A" and the finish beam break is always sent as ID "B" even if you have used the Eye Usage menu to swap the start and finish eyes. This allows your software to work properly without changes. Time data from split eyes is sent as ID "C" and ID "D." AxWare, for example supports computation of split times from the T-Link system as "Sector Timing."

In addition to time data, the T-Link system also sends battery and radio status to the computer. This data is emulated by the timer console as follows:

**Battery Strength:** The timer console's battery level is provided under ID "Z." The battery level of each electric eye is reported as 50% unless the low battery light is flashing on the electric eye, then the battery level reported is 10%.

**Radio Strength:** Radio signal strength data is not collected by the timer console during normal operation. Therefore the timer reports simply reports 50% signal strength at all times.

### **Pass-Through Mode**

For ultimate flexibility, the timer console can be placed into a pass-through mode in which the timer does not display any timing information. Instead, the timer console is a "black box" that simply passes beam break information to the computer. To enter pass-through mode, follow these steps:

- 1) Press SETUP to access Setup options.
- 2) Press NEXT CHOICE once until *Pass thru Mode* is displayed, then press ENTER.

The timer will restart in a new event called Time-Stamp. This event directly passes all beam break information to the computer in the interface format chosen. Any of the interface types shown on the previous page will work in pass-through mode except for "JAC Normal." The timer's standard output switches to a timestamp format when in the pass-through mode. Contact us for additional information about this format if needed.