

Davis Racing Products Inc.

# Ultra-Box

Multi-Function  
Crossover Delay Timer



Instruction Manual

## COPYRIGHT

The Ultra-Box design is a combination of a powerful micro-processor and a computer program. This computer program is protected by Copyright Law and is the sole property of Davis Racing Products Inc. The message "Copyright (C) 1994, Davis Racing Products Inc. All Rights Reserved." which is displayed when the box is first turned on, is required by Copyright Law.

## About This Manual

The Ultra-Box provides the racer with a list of features. Although the box is very user friendly, it is suggested that you read this manual.

## INSTALLATION

### Wiring Connections - READ THIS FIRST!

Before making any connections, all power **MUST BE OFF!** Never make any connections with the power on, or damage to the box may result.

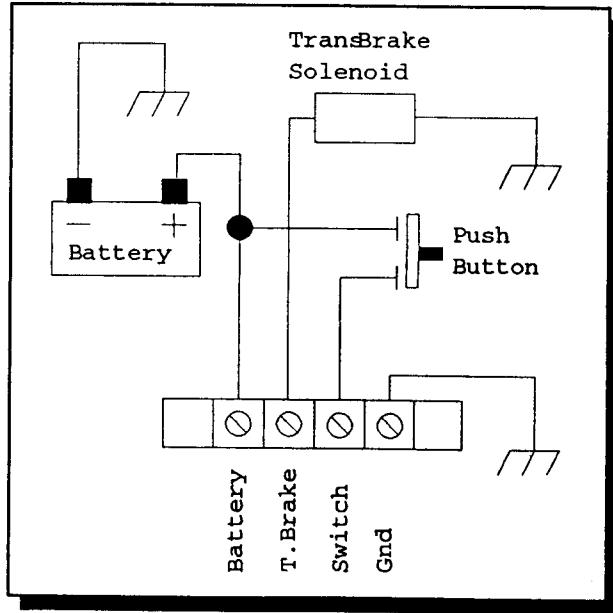
**THE GROUND WIRE MUST BE CONNECTED FIRST!** The ground must be connected to the **Negative battery terminal or the chassis.** Do not use aluminum parts for a ground.

**ALWAYS** use a fuse between this device and the battery. Not using a fuse presents a severe fire hazard. The fuse rating depends on the amount of current required to activate the transbrake solenoid (30 amps should be sufficient). The box has no ON/OFF switch, and it is not necessary to place one in the power line. The box draws only 0.1 Amps when the transbrake is not applied.

Follow the wiring diagram carefully and

**NOTE: THE TRANSBRAKE BUTTON IS CONNECTED TO THE POSITIVE BATTERY TERMINAL.**

The Ground, +Battery, and Transbrake wires should be a minimum of 14 gauge, with 12 gauge being a better choice. Larger wire applies more voltage to the solenoid, and is less likely to overheat. The transbrake button wire can be any size, but fine, delicate wire should be avoided - one day it will break, usually at the worst possible time. An installation kit is available from Biondo Racing Products and is described at the back of this manual.



**Output Short Circuit Protection:** The box has a built in short circuit protection feature. If an electrical short develops in the transbrake solenoid, or in the wiring from the box to the solenoid, the message

'Output Shorted!' will appear when the transbrake button is pressed. If you see this message displayed, turn off the power to the box. Disconnect the transbrake wire at the Ultra-Box terminal strip. Turn the power back on and press the transbrake button. If the 'Output Shorted!' message no longer appears, there is a problem in the wiring or the solenoid.

**MOUNTING:**

The box must be mounted using the supplied rubber grommets in the mounting holes. These grommets help to isolate the box from the extreme vibrations present in most race cars. Using the grommets will extend the life of the unit.

The box should be mounted at least 12 inches from the ignition system components. This includes items such as an MSD box, the distributor, etc.

**THE FRONT PANEL**



**Liquid Crystal Display:** This is a 16 character by 1 line display which has a soft green back light for easy night time viewing. All information about Delay, Dial-ins, and features is displayed here.

**Toggle Switches:** There are two 3 position toggle switches which are used to make all adjustments to Delays, Dial-ins and features. They are the **Adjust/Hold** switch and the (+/-) switch.

**Transbrake LED:** This LED indicates when power is applied to the transbrake solenoid. If the LED does not light up when the transbrake button is pressed, look for a problem with the button, or a problem in the wiring between the button and the box.

**Contrast Adjust:** Behind this opening is an adjustment screw (use a small jewelers screwdriver - Phillips or Standard). This is a **Very Important Adjustment**, but it only has to be done once. Turning this screw allows you to adjust the contrast of the display for optimum viewing. If you mount the box at eye level or above, such as along the roof line of a door slammer, you will need less contrast for a clear display. If you mount the box below eye level, as would be typical in a dragster, you will need more contrast for a clear display. Once the box is mounted, adjust for optimum contrast while in the drivers seat.

### **BASIC OPERATION OF THE ULTRA-BOX**

The **Ultra-Box** can be used in many different ways. There are four main operating modes. Depending on your racing style and personal preference, you can set the box to work in any of these modes (for more on this read the section - **Delay Modes**).

The two switches on the face of the box are used to make all adjustments. Simply tap the **Adjust/Hold** switch UP until you see the item you want to adjust on the

screen. Then use the (+/-) switch to adjust that item.

When adjusting the numbers (Delays or Dial-ins), each time you tap the (+/-) switch the last digit of that number will change. If you hold the (+/-) switch, the box will begin scrolling - First the last digit changes, then the second last digit changes. This makes large or small adjustments quick and easy. The scrolling speed can be set according to personal preference - **FAST, MEDIUM or SLOW** (see Scrolling Speed).

Once all number adjustments have been made prior to a run, it is recommended that the **Adjust/Hold** switch is moved DOWN to the **Hold** position. But don't worry if you forget to do this. The delay function will still work when the box is in the adjust position. **NOTE: When using two delays, Delay 1 is displayed in the HOLD position, Delay 2 can be viewed in the ADJUST position.**

### **DELAY RESET,**

The (+/-) switch also acts as a **RESET SWITCH**. A delay cycle can be reset instantly. If the transbrake button has been released, and a delay cycle is in progress, simply tap the (+/-) switch to cancel the delay cycle.

For example, you have a long delay cycle set in the box (you are crossing over against a much slower opponent). Your opponent is staged, you move into the stage beam and press the transbrake button. Then your car rocks backward slightly and your stage light goes out. With other delay boxes, you would have to wait for the delay cycle to count out before you can move forward, and by then the starter probably RED lights you. With the Ultra-Box, just reset the delay, move back into the stage

beam, and you are ready to go. Delay Reset is also handy if you have to engage your transbrake to use reverse.

#### FEATURES SETUP:

This is used to select a Delay Mode, view the interfacer numbers, and to choose your list of Features. To access Features Setup, **FIRST** press the **Adjust/Hold** switch to the **UP** position. Now while still holding the **Adjust/Hold** switch **UP**, press the **(+/-)** to the **UP** position. Release the switches and you are now in Features Setup. To step through the list of features, tap the **Adjust/Hold** switch to the **UP** position. Use the **(+/-)** switch to adjust numbers and to turn a Feature **ON** or **OFF**.

To exit the Features Setup, press the **Adjust/Hold** switch to the **DOWN** position.

#### CAUTION!

When the box is in the Feature Setup mode, the **TRANSBRAKE WILL NOT WORK!** Never leave the box in the Features Setup mode.

**After Run Display** numbers such as the interfacer numbers are displayed in Features Setup. These numbers are updated each time you press the transbrake and activate a delay cycle. If you want to use the numbers, make sure to read them after the run and **BEFORE** the next delay cycle. For example, if you return to the pits and press the transbrake button to engage reverse, you will lose your numbers from the last run.

#### The Memory:

You only have to set the Delay Mode and your preferred Features **ONCE**. When you turn the power **OFF**, the box has a 'Memory' which holds your choices. Of course you can change these settings as often as you like. **NOTE:** The memory also holds Delay, Dial-ins and After Run Display numbers.

#### DELAY MODES

The **Ultra-Box** has four modes of operation.

#### 1.) Standard Single Delay Mode:

This mode functions like a regular crossover delay box. There is only one delay, and no additional delay is added if the Opp. Dial is faster or equal to Your Dial. The box resets immediately if you press the transbrake button during a delay cycle.

To use this mode, first select **FEATURES SETUP -**

<u>Display</u>		<u>What to do</u>
<b>Two Delays</b>	<b>OFF</b>	Set this display to <b>OFF</b>
<b>Subtract</b>	<b>OFF</b>	Set this display to <b>OFF</b>

**NOTE:** When Pro-Tree racing, use this delay mode.

#### 2.) Single Delay with Subtract:

This mode is similar to the 'Standard Single Delay Mode' but with the Subtract feature added. Every racer knows the feeling of being 'quick tree'd' or maybe you were just not ready. When you know you released late, **Subtract** allows you to reduce the Delay 1 value. After releasing the transbrake button, you simply tap the transbrake button to reduce the delay by the preset **Sub Amount**. The button can be tapped once, or several times, reducing the Delay 1 amount by the **Sub Amount** for each tap of the button. Subtract does not permanently alter the value for Delay 1.

**Ultra-Box.** Using the Two Delay mode provides you with two independent delay timers. **Delay 1** is the primary delay and includes crossover numbers to set the total delay. **Delay 2** is the secondary delay. The first release of the transbrake button starts the timer for Delay 1. Releasing the transbrake button a second time starts the timer for Delay 2.

**Operating Tips -**

There are many ways to use this feature. If you are the faster car, the most common method would be to release on your opponents top yellow and then release on your own top yellow. Another option would be to release on your opponents top yellow and your own bottom yellow. If you are the slower car, you can release on your top and your bottom. The interfacer releases the transbrake on the quicker of the two reactions.

If you 'flinch' (release before the yellow) in this mode, there is no way to recover. The first delay timer to count out launches the car. But if you are not prone to 'flinching' this mode has an important advantage. If you are top and bottom bulb racing and have a great first release on the top bulb, but you are **Very Late** on the bottom bulb, the car will launch on the first release, even though you may still have the transbrake button pressed.

To use this mode, first select **FEATURES SETUP -**

<u>Display</u>	<u>What it means</u>
<b>Two Delays ON</b>	Set this display to ON
<b>Flinch Mode OFF</b>	Set this display to OFF

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**Example -** The **Sub Amount** is 0.050 (5 hundreds). The release is late, and would have resulted in a .570 reaction time. You feel late, so before the launch, you tap the transbrake button once. The Ultra-Box instantly subtracts 0.050 from the Delay 1 value, and the end result is a .520 reaction time!

To use this mode, first select **FEATURES SETUP -**

<u>Display</u>	<u>What to do</u>
<b>Two Delays OFF</b>	Set this display to OFF
<b>Subtract ON</b>	Set this display to ON
<b>Sub Amount 0.050</b>	Use the (+/-) switch to adjust for the desired Sub Amount. The ideal value to use here depends on your ability to sense when you are 'Late' and by how much

Subtract mode has an After Run Display -

<u>Display</u>	<u>What it means</u>
<b>Number of Subs 2</b>	This display indicates you tapped the transbrake button twice <b>BEFORE</b> the launch

**3.) Two Delays, Flinch Mode OFF:**

This is the **Most Powerful Mode** of the

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There are 3 possible After Run Displays from the interfacer. This display shows which delay you launched on, and by how much. This information, combined with your time slip allows you to fine tune the delay setting for the slower of the two releases. Examples:

<u>Display</u>	<u>What it means</u>
Delay 1 by 0.005	Launched on Delay 1 by 0.005
Delay 2 by 0.010	Launched on Delay 2 by 0.010
Delay 1 by No 2	Launched on delay 1, Delay 2 was not activated

#### 4.) Two Delays, Flinch Mode ON:

This mode is recommended if you 'flinch a lot' (release before the yellow). This mode operates the same way as Two Delays, Flinch Mode OFF. The only difference between the two modes is the ability to recover from a 'flinch'. Normally a 'flinch' is a guaranteed RED light when using two delays. With this mode, if you are pressing the transbrake button when the Delay 1 timer counts out, the box ignores the first release, and waits to launch off of the second release. To block the first release **YOU MUST BE PRESSING THE TRANSBRAKE BUTTON** when Delay 1 counts out. The best way to assure this is to set Delay 2 to leave off your bottom bulb.

#### Operating Tips -

Assume you have flinched, and you have set Delay 2 for 0.050 to leave off your bottom bulb. Your first release is

blocked (preventing a RED light), but the second release will still include the 0.050 delay. This is unique to the **Ultra-Box**, and makes Flinch Mode a truly useful feature.

When using Flinch Mode, if you are top/bottom bulb racing, and have a great first release, but are **Very Late** on the second release, the box will ignore your first release because the transbrake button is still pressed.

**NOTE:** When using Two Delays, it is not required that you activate Delay 2. You may choose to do this only when you feel you 'missed the tree' on your first release.

To use this mode, first select **FEATURES SETUP -**

<u>Display</u>	<u>What to do</u>
<b>Two Delays ON</b>	Set this display to ON
<b>Flinch Mode ON</b>	Set this display to ON

There are four possible After Run Displays from the interfacer. The first three are identical to those described in Two Delays, Flinch Mode OFF. The Fourth display is -

<u>Display</u>	<u>What it means</u>
<b>Delay 2 by HOLD</b>	Launched by Delay 2, Delay 1 was ignored because you were pressing the transbrake button when the Delay 1 timer counted out

### ADDITIONAL FEATURES:

#### Transbrake LOCKOUT:

When this safety feature is turned on, if you accidentally press the transbrake button after the launch, the transbrake will not engage. The display will read **Brake Lockout On**. The time period can be set from 0 to 90 seconds. When Brake Lockout is ON, you can instantly reset the box by tapping the (+/-) switch. This is handy if you are engaging the transbrake in the staging lanes or are engaging the transbrake to use reverse.

To use this feature, first select **FEATURES SETUP** -

<u>Display</u>	<u>What to do</u>
<b>Brk Lockout 10 s</b>	Use the (+ / -) switch to set the lockout interval for the desired amount

#### SCROLLING SPEED:

To use this feature, first select **FEATURES SETUP** -

<u>Display</u>	<u>What to do</u>
<b>Scrolling Slow</b>	Use the (+ / -) switch to change the scrolling speed to <b>Fast</b> , <b>Med</b> , or <b>Slow</b>

### SPECIFICATIONS

<b>Input Voltage</b>	9.0 to 18.0 Volts D.C.
<b>Transbrake Output Current</b>	30 Amps Continuous, 40 Amps for 30 seconds
<b>Current Draw (Transbrake OFF)</b>	0.1 Amps
<b>Delay Timer Accuracy</b>	+ / - 8 uSec (0.000008 seconds)
<b>Dial In Range</b>	0 - 99.99 Seconds
<b>Delay Range</b>	0 - 1.999 Seconds
<b>Output Delay when set to Zero</b>	0.000 Seconds

#### Delay Box Installation Kit

Available from Biondo Racing Products

The kit includes:

- ▶ Ultra quick micro switch
- ▶ 16 gauge stretch cord
- ▶ 10 feet of 14 gauge wire
- ▶ In line fuse assembly
- ▶ Wiring connectors
- ▶ Terminals, mounting screws and 25 nylon ties
  
- ▶ Price: \$49.95