



PRODUCTS, INC.

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SUPER CROSS-OVER REACTION TIME DELAY

Model SCO-1 • INSTALLATION & OPERATION MANUAL

IMPORTANT!

PLEASE READ THESE INSTRUCTIONS COMPLETELY TO FULLY UNDERSTAND THE WIRING, PROGRAMMING, OPERATION, AND FUNCTIONS OF THIS DELAY BOX.

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PURPOSE OF A DELAY BOX

The theory behind a delay box is that if a car launches so hard that it will red-light if the driver leaves off the amber light, then some form of delay must be used to create a time lag before the car launches. The driver isn't able to do this because while his reflexes are consistent, the human mind doesn't have the ability to create a precise time lag. This led to the development of the delay box. The driver uses his reflexes (which are consistent) to release his transbrake switch. The delay box creates a precise time delay, and then the car launches perfectly on the green.

A more sophisticated form of delay box is the cross-over box, which in addition to your delay, also allows programming of your E.T. (dial-in) and your opponent's E.T. If you are the faster car, you can leave off your opponent's top bulb. The box will calculate the difference between the E.T.'s (the handicap) and wait that amount of time plus your delay time before releasing the trans brake. This gets rid of the distraction of watching your opponent going downtrack while trying to concentrate on your tree.

The Super-Crossover goes a step further; in addition to giving you a delay or cross-over box as described above, you have the ability to take two or even three shots at the tree. Since a "bad" light is almost always a late light (your reflexes don't just "speed up"), the Super Cross-Over allows you to leave off both your opponent's tree and your tree or both your top bulb and bottom bulb, and the box picks the quickest light to release the trans brake.

Read the rest of this manual to learn how to install and operate your Super Cross-Over delay box.

PARTS INCLUDED:

- 1) Super Cross-Over Delay Box Model SCO-1
- 1) "Bypass" Toggle switch Part # TSWRTD
- 2) Decals - Blue & White
- 1) Instruction Booklet

Orig. 10/98, Rev. 01/00

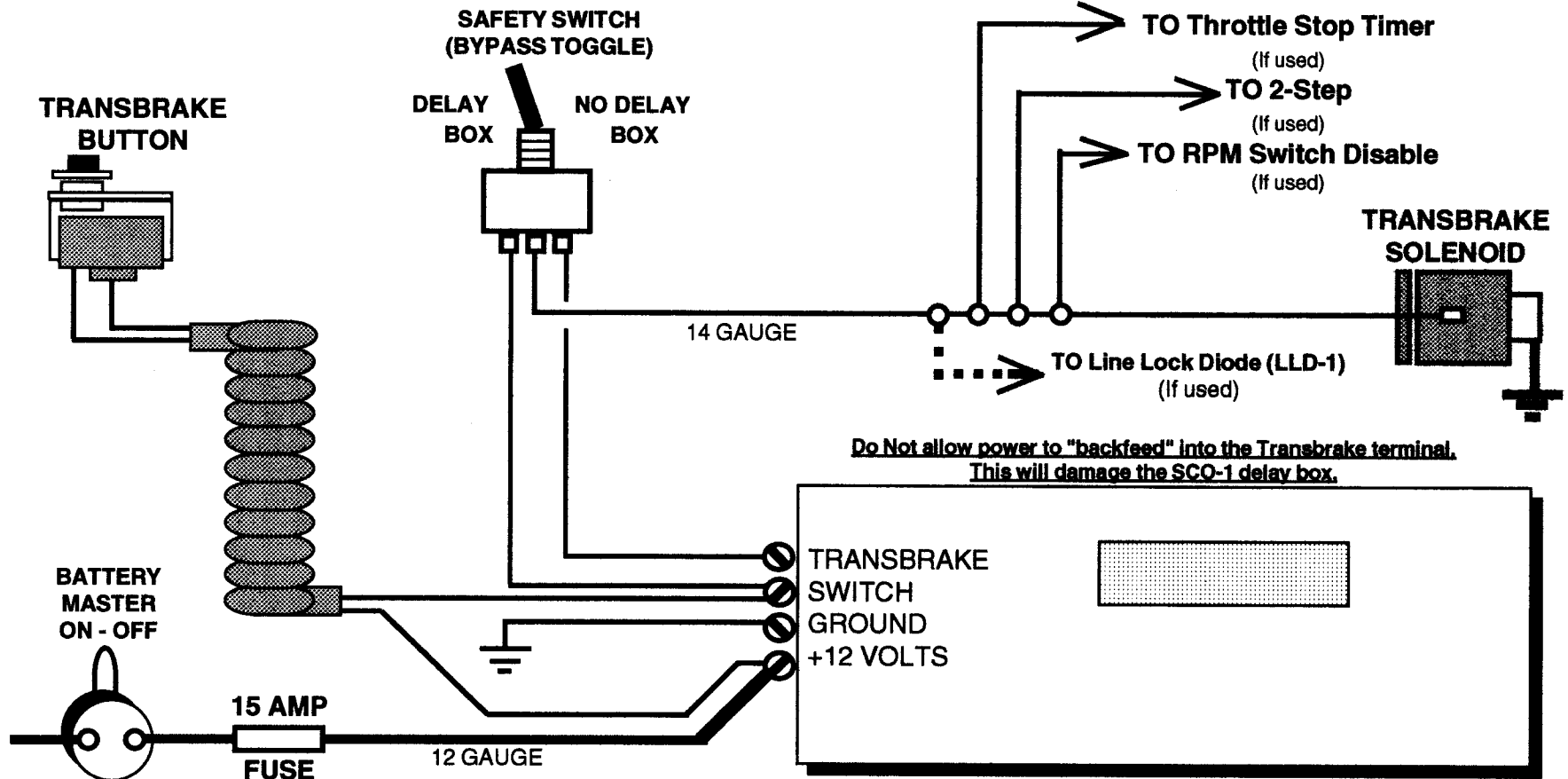
1. Mount Super Cross-over Delay box using 4) sheet metal screws or 4) machine screws in a location the driver can reach when strapped in. The box can even be mounted upside-down for overhead installations. Be sure to use the rubber grommets that are installed on the mounting pads to absorb vibration. Check to insure the driver can read the display. You may have to tilt it forward or backwards slightly for best visibility.
2. Choose the appropriate wiring diagram for your application and wire exactly as shown. Use at least 14-gauge wire or larger. Power wire **must be 12-gauge and run all the way to the Master On / Off switch at the back of the car, not the firewall.** Install an "in-line" 15-amp fuse or circuit breaker to protect the box from expensive damage should the Transbrake or Line-Lock solenoids, or solenoid wires short out or fail.
3. For added safety and convenience, install the "Safety Switch" or "Bypass Switch" as shown. This allows the racer to completely "Bypass" the Super Cross-Over box and activate the transbrake or line-lock solenoid directly off the button, without delay! This is also used to back up the car in reverse gear when using a "Pro" brake valvebody. DO NOT use a second button to activate the brake if you have a pro-brake valve body. Reverse power into the transbrake terminal will damage the SCO-1 delay box.

(Note: If you wish to use the line-lock with the transbrake to hold the car on the starting line, call for line-lock diode information)

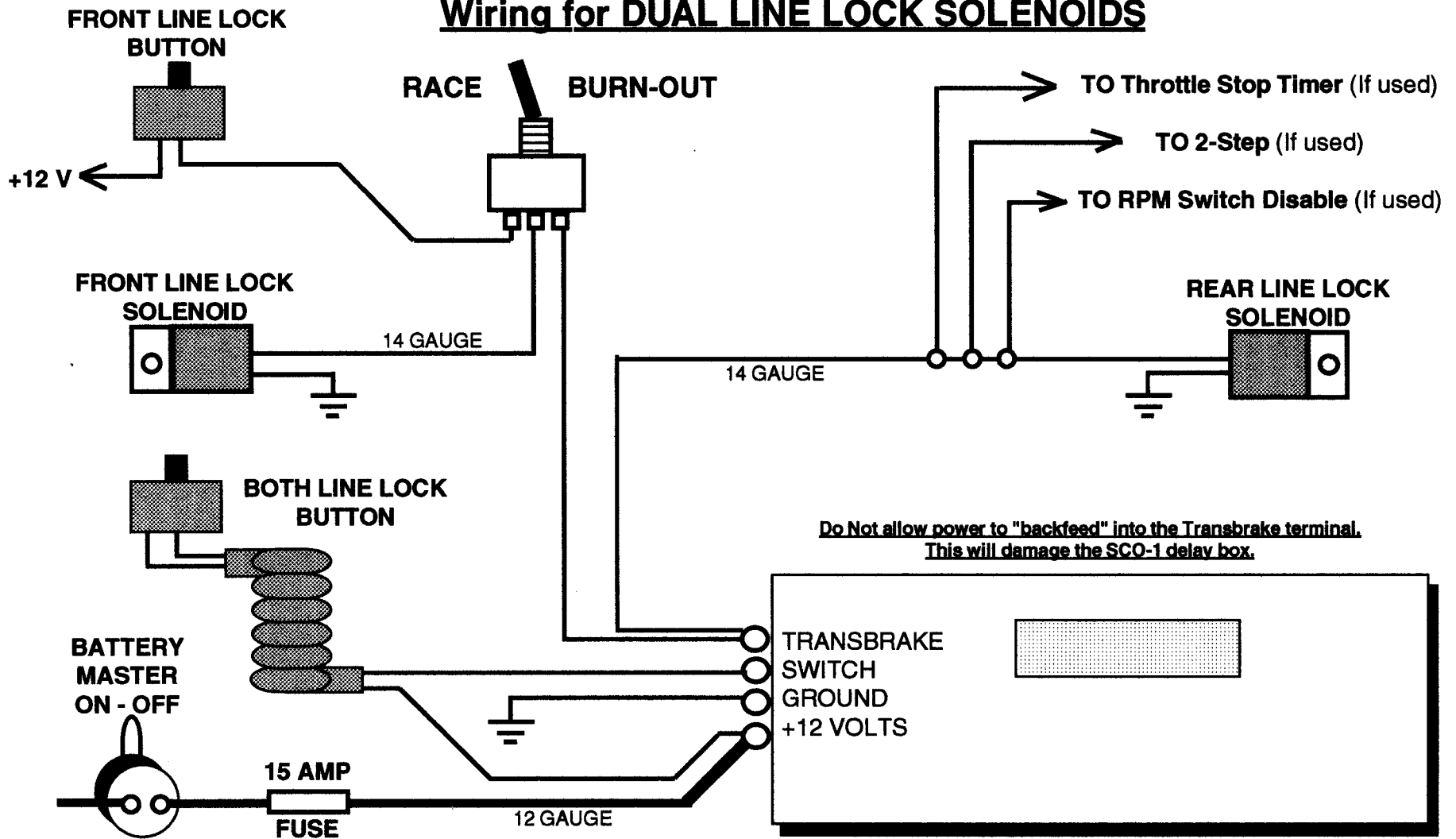


CAUTION: DO NOT USE A SECOND TRANSBRAKE BUTTON TO BACK UP THE CAR IF YOU USE A PRO-BRAKE VALVE BODY TRANSMISSION. REVERSE POWER INTO THE DELAY BOX WILL DAMAGE THE SCO-1!

Wiring for TRANSBRAKE



Wiring for DUAL LINE LOCK SOLENOIDS



Wiring Tips and Tricks

- Turn off / Disconnect battery before doing any wiring.
- **DISCONNECT ALL WIRES BEFORE WELDING!!**
(Better yet, remove the electronics from the car!)
- Use sufficient gauge, quality, multi strand, tinned copper wire.
- Use a good quality "ratchet" style crimper for terminals.
- Use heat-shrink tubing on terminals and soldered connections.
- Always use fuses or breakers to protect the electronic accessories.
- Grounds should be to clean bare metal & serrated washers used.
(Grounding to interior aluminum sheet metal is not reliable)
- Never use "wire taps" or "Scotch locks" for permanent connections.
- Main +12v wires for "Timers" should be independent & run to Master On - Off switch, **not** to switch panels, ign. switch or starter solenoids.
- Color code or label all wires in your car! Draw a Master diagram of your car's harness and keep it handy for quick track-side reference.
- Use plenty of wire ties (they're cheap!) to secure the wire bundles.
- Use wire harness clamps every foot to secure the bundles to the car.
- Use rubber grommets where wires/harnesses pass through sheetmetal.
- Terminal blocks are more secure than plastic "quick disconnects".

YOUR E.T.
DISPLAYS THE SETTING OF YOUR OWN DIAL-IN

UP
BUTTON MOVES THE SETTINGS UP 1 NUMBER AND SCROLLS IF HELD

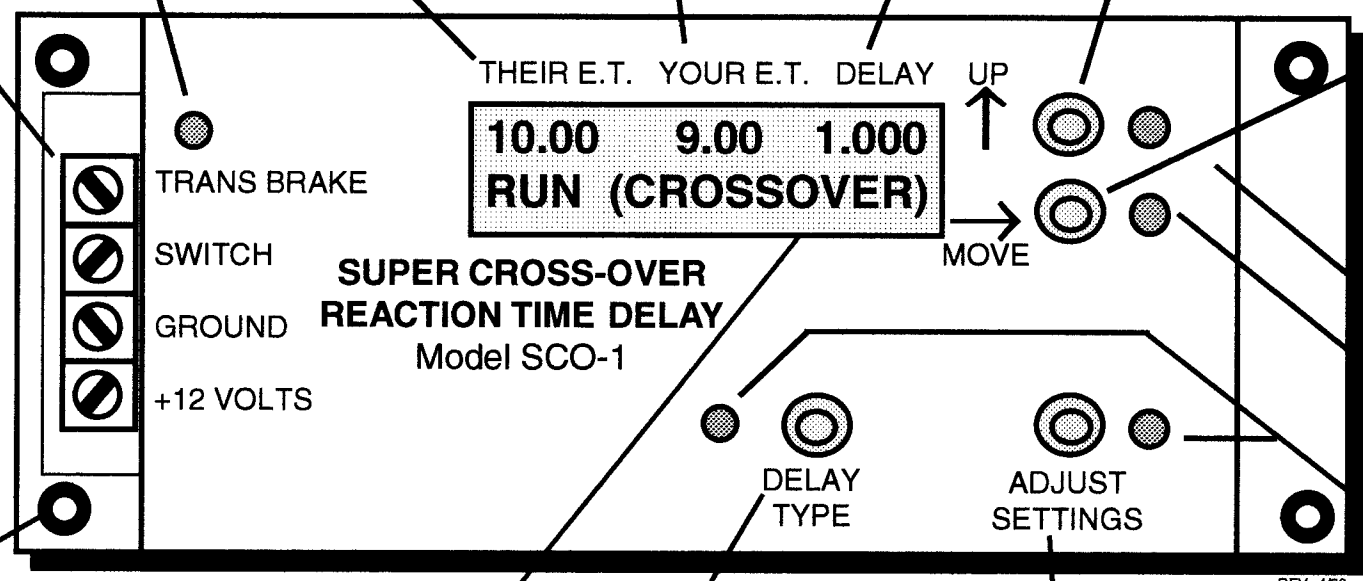
TRANS BRAKE INDICATOR LED

THEIR E.T.
DISPLAYS THE SETTING OF YOUR OPPONENT'S DIAL-IN

DELAY
DISPLAYS THE SETTING OF YOUR DELAY (Your Top Bulb)

MOVE
BUTTON MOVES THE CURSOR TO THE NEXT DIGIT TO THE RIGHT

TERMINAL STRIP



THEIR E.T. YOUR E.T. DELAY UP
10.00 9.00 1.000
RUN (CROSSOVER)
MOVE

**SUPER CROSS-OVER
REACTION TIME DELAY**
Model SCO-1

DELAY TYPE

ADJUST SETTINGS

REV. 4/88

RUBBER MOUNTING GROMMETS

DISPLAY SHOWS TIME SETTINGS ON THE TOP LINE, AND WHAT TYPE OF DELAY BOX & RUN CONDITION (Ready to run, etc.) ON BOTTOM LINE.

BACK-LIT FOR NIGHTTIME USE.

DELAY TYPE
BUTTON CHANGES WHAT KIND OF DELAY BOX YOU WANT TO USE... Std. Delay, CrossOver, Interfacer, etc...

L.E.D.'S ILLUMINATE BUTTON LOCATIONS FOR NIGHT TIME USE

ADJUST SETTINGS
BUTTON CHANGES THE DISPLAY TO THE ADJUSTMENT MODE SO YOU CAN CHANGE SETTINGS

BASIC DESCRIPTION OF SUPER CROSS-OVER FUNCTIONS

By pressing and momentarily holding the "DELAY TYPE" button, you can change the type of delay box you wish to use. Below are the 4 different delay boxes that are built into the Super Cross-Over Delay Box. The display will show you that it is in "RUN" mode and show you what your delay settings are. This way the driver knows before the run that the box is ready.

DELAY TYPE

STANDARD DELAY BOX

THEIR E.T. YOUR E.T. DELAY

1.000
RUN (DELAY)

In this mode, the Super Cross-Over delay box functions as a straight 4 digit delay box (0.000 to 1.999 secs.). This is for **Pro-Tree** (.400) racing, bottom bulb racing, and top bulb racing on a **Bracket-Tree** (.500). Only Delay setting, T B Lockout, and Delay On settings are accessible in this mode.

INTERFACE DELAY BOX

THEIR E.T. YOUR E.T. DELAY

10.00 9.00 1.000
RUN (INTERFACE)

In this mode, the Super Cross-Over delay box functions as a Cross-Over box, a straight Delay box, plus an Interfacer. This allows you to "leave" off your opponent's top bulb and your top bulb, and the Interfacer will launch off the **quicker** of the two reactions. You can also use the "**Last Chance**" feature and leave off your bottom bulb if you feel you missed one or both top bulbs. Only Delay, Their E.T., Your E.T., Bottom Delay, Crossover Compensation, TB Lockout, and Delay On settings are accessible in this mode.

TWICE YOUR TREE

THEIR E.T. YOUR E.T. DELAY

RUN .100 1.000
TWICE YOUR TREE

In this mode, the Super Cross-Over delay box functions as two delay boxes designed to "leave" off your own top bulb **and** bottom bulb. The Super Cross-Over will launch the car on the faster of the two "hits". This is for **Bracket tree** racing where you can't cross-over on your opponent's top bulb because of "blindners" or "shields" on the tree, or if you are the slower car. Only Delay, Bottom Delay, T B Lockout, and Delay On settings are accessible in this mode.

CROSS OVER DELAY BOX

THEIR E.T. YOUR E.T. DELAY

10.00 9.00 1.000
RUN (CROSSOVER)

In this mode, the Super Cross-Over delay box functions as a straight "Cross-Over" box. This allows you to "leave" off your opponent's top bulb. Only Delay, Their E.T., Your E.T., Crossover Compensation, T B Lockout, and Delay On are accessible in this mode.

DESCRIPTION OF FEATURES AND DISPLAYS

By pressing and momentarily holding (for .300 seconds) the "DELAY TYPE" button, you can change the mode or type of delay box you wish to use. Each of the different delay boxes will access only the special features and racer settings (E.T.'s, etc.) that will work for that "box". Below is the description of each feature. By pressing the "ADJUST SETTINGS" button to get to SET UP MODE, you can view & adjust the settings.

NOTE: The Super Cross-Over box will only stay in SET UP MODE for 8 seconds from the last time you pressed a button. Then it will automatically return back to RUN (ready to race!) mode. Also, you can get back to RUN mode by pressing your transbrake button. This insures that the unit will always automatically be ready to run.

REACTION TIME DELAY
(Top bulb & Pro Tree)
ALL 4 DELAY BOX TYPES

THEIR E.T. YOUR E.T. DELAY
SETUP MODE
DELAY 1.050

This is the basic 4-digit delay box. All 4 modes (boxes) let you adjust the amount of **DELAY** (0.000 - 1.999) you need to react to the TOP BULB (.500) Full-Tree. This is also used for Pro-Tree (.400) racing. To adjust the setting, press the → button until the cursor (_) is under the digit you wish to change, then press the ↑ button to change the number. If you hold the ↑ button down, the numbers will scroll rapidly.

THEIR E.T.
(Opponent's Dial In)
CROSSOVER AND
INTERFACE ONLY

THEIR E.T. YOUR E.T. DELAY
SETUP MODE
THEIR ET 10.00

In Cross-Over or Interface mode, you can adjust your opponent's "dial in" or E.T. (from 00.00 to 19.99 Sec.) by pressing the "ADJUST SETTINGS" button until **THEIR E.T.** is displayed. Adjust this setting by using the → and ↑ buttons.

YOUR E.T.
(Your own Dial In)
CROSSOVER AND
INTERFACE ONLY

THEIR E.T. YOUR E.T. DELAY
SETUP MODE
YOUR ET 09.00

You can change your own car's "dial in" or E.T. (from 00.00 to 19.99 Sec.) by pressing the "ADJUST SETTINGS" button until **YOUR E.T.** is displayed. Adjust this setting by using the → and ↑ buttons.

CROSS COMP
(Cross Over Compensation *)
CROSSOVER AND
INTERFACE ONLY

THEIR E.T. YOUR E.T. DELAY
SETUP MODE
CROSS COMP .020

This feature* allows the CrossOver to **COMPENSATE** for the delay that occurs because you are viewing your opponent's bulb from an angle. (0.000 to 0.099 Sec.) Since it is pointing away from your car, you would normally remove delay time from your delay setting (usually .010 to .030). Now you can preset the box to automatically subtract the amount anytime you leave off your opponent's top bulb! Adjust this setting by using the → and ↑ buttons.

BOT DELAY
(Bottom Bulb Delay)
INTERFACE AND
TWICE YOUR TREE

THEIR E.T. YOUR E.T. DELAY
SETUP MODE
BOT DELAY .020

This feature allows you to set the needed amount of delay to leave off your **BOTTOM BULB** for Full-Tree (.500 sec.) in **TWICE YOUR TREE** mode (about .010 - .120).
In **INTERFACE** mode, this is your **LAST CHANCE** delay setting (about .010 - .120). If you feel that you missed either bulb, or both, you can press your transbrake button a **third** time which will cancel both reactions and then you have a "Last Chance" to leave off your bottom bulb. Adjust this setting by using the → and ↑ buttons (0.000 to 0.299 Sec.).

DELAY ON
(Trip Protection *)
ALL 4 DELAY BOX TYPES

THEIR E.T. YOUR E.T. DELAY
SETUP MODE
DELAY ON 0.200

All modes allow you to adjust your safety **DELAY ON*** setting. **This is the amount of delay time your trans-brake button will take to TURN ON the transbrake solenoid.** Set this to about 0.200 seconds for starters. This is enough to protect you should you accidentally tap your button on the return road or in the pits, your transbrake wont apply. Adjust this setting by using the → and ↑ buttons. (0.020 minimum to 1.999 Sec.) **DO NOT SET THIS TOO HIGH OR YOUR TRANSBRAKE WILL SEEM TO TAKE FOREVER TO APPLY.**

T B LOCKOUT
(Transbrake Lockout)
ALL DELAY BOX MODES

THEIR E.T. YOUR E.T. DELAY
SETUP MODE
T B LOCKOUT 15

This feature allows you to adjust the Tranbrake Lockout time (00 - 19 seconds). This timer starts when the transbrake solenoid is released by the Super CrossOver. This locks out your transbrake button preventing the driver from re-applying the transbrake accidentally once the transbrake has released. Set this to just longer than you are in first gear or to a few seconds longer than your E.T. (default is 15 sec). It can be set to zero when practicing on a "Practice Christmas Tree". Adjust this setting by using the → and ↑ buttons.

SPECIAL FEATURES & DISPLAYS

"HOW LATE"
INTERFACE AND
TWICE YOUR TREE

THEIR E.T. YOUR E.T. DELAY



Racers can find out **HOW LATE** two different ways. In **INTERFACE** and **TWICE YOUR TREE** modes, when you're releasing the transbrake button off both your opponent's top bulb and your own top bulb, or both your own top bulb and your own bottom bulb, the display will show for up to 15 seconds (depending on your T B Lockout delay) which bulb took the light and by how much quicker.

After the display disappears, you can **recall** the **HOW LATE** by pressing both the → button ↑ button at the same time.

"BRAKE LOCKOUT"
ALL 4 DELAY BOX MODES

THEIR E.T. YOUR E.T. DELAY



BRAKE LOCKED OUT is a safety time out that is automatic in all 4 different delay box modes. This feature locks out the box's transbrake solenoid output for up to 15 seconds **after** the Super Cross-Over releases the transbrake. After the timed lockout, the box will return back to race mode. **You can RESET this by simply tapping the "ADJUST SETTINGS" button once.** This will cancel the lockout and put the box back into race mode. Set for at least your E.T. for racing or to zero for Practice tree practicing.

TYPICAL SETTINGS FOR DELAYS & SPECIAL FEATURES

Typical Delay Settings used by racers:

(.400 SEC) PRO TREE.....ABOUT 0.010 - 0.030
 (.500 SEC) FULL TREE - Top Bulb.....ABOUT 0.950 - 1.100
 (.500 SEC) FULL TREE - Bottom Bulb....ABOUT 0.010 - 0.120
 DELAY ON setting.....ABOUT 0.050 - 0.500

CROSS COMPENSATION TIME.....ABOUT 0.010 - 0.030
 BOTTOM DELAY
 (in Twice Your Tree).....ABOUT 0.080 - 0.120
 (for Last Chance in Interface Mode).....ABOUT 0.010 - 0.120

* DEDENBEAR DELAY BOXES ARE PROTECTED UNDER
 US PATENT NUMBERS #4,467,219 and Re 32,474 and #5,652,488

TIPS:

AUTOMATIC RELEASE PROTECTION (A.R.P.) - Should you anticipate the lights and accidentally let go too quickly, you can easily recover. In DELAY or CROSS-OVER mode, simply press the transbrake switch again and the Super Cross-Over will instantly reset itself. In TWICE YOUR TREE and INTERFACE mode, because the Super Cross-Over expects you to press the switch again, you use the "Last Chance" feature for Automatic Release Protection.

LAST CHANCE - This feature is available in TWICE YOUR TREE and INTERFACE mode. If you think either or both your releases were too quick, press the switch again and the releases are canceled. The transbrake then stays on until you release the switch again and your BOTTOM DELAY times out. (Bottom delay and Last Chance delay are the same thing). In TWICE YOUR TREE, it is recommended that you not use this feature if your bottom delay is less than .080 because it is hard to release your switch and get back on it in less than .080 seconds.

SETTINGS - You only have to make a setting one time and it is automatically transferred to each delay type. For example, if you set DELAY at 1.000 second, it will automatically be set into all four Delay Types (Delay, Cross-over, Twice your tree, Interface). This is convenient, because, for example, if you are changing back and forth between "Cross-over" and "Delay" modes each round, you merely press the DELAY TYPE button to change.

ADJUSTING SETTINGS - The set up menus prompt you and request that you adjust only the settings that you need for the delay type selected. This saves time and confusion.

TEMPERATURE - If the display ever gets dark and unreadable when it is in direct sunlight, it is too hot. Cover the unit with a towel to let it cool off and the display will return to normal. This should rarely happen as it will occur only when the Super Cross-Over metal cover is so hot it would burn your hand when touching it! The Super Cross-Over will not generate heat itself.

SERVICE:

Dedenbear Products, Inc. prides itself with its knowledgeable technical service staff and the industry's best customer service. If you feel you have a problem, have a question or two, need help wiring, or if you have special wiring needs, custom wiring, or a "crazy idea", just call us. We are here to help you use your Dedenbear equipment to its full potential.

If you feel the box needs to be serviced, call us first before removing it from the car (we might be able to troubleshoot it while it's still in the car). If it is required that the box be returned to our facility, **call first**; then package it carefully in a box, and enclose a note describing the problem. Give your name, address, work & home phone numbers so we can contact you regarding return shipment or other questions. Turn-around is usually same day to 24 hours!

CALL DEDENBEAR • Mon. - Fri. 8am - 5pm Pac. Time

(925)935-3025 • Fax (925)935-2287

Ship To: DEDENBEAR PRODUCTS • Repair Dept. • 1917 Oak Park Blvd. • Pleasant Hill, CA 94523

LIMITED 1 YEAR WARRANTY

Dedenbear Products components are warranted **directly by Dedenbear Products** against defective material or workmanship under normal use and service for a period of **one (1) year after purchase**. Dedenbear Products will repair or replace the defective unit, at Dedenbear Products option, free of charge. This warranty does not cover any damage to the component caused by abuse, mishandling, alteration, accident, electrical current fluctuations, failure to follow installation/operating instructions, maintenance, storage and environmental conditions, or repair attempts made by anyone other than Dedenbear Products Authorized Service facility.

DEDENBEAR PRODUCTS SHALL NOT BE LIABLE FOR INJURY, CONSEQUENTIAL, OR OTHER TYPE DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS, OTHER THAN THE LIABILITY STATED ABOVE. This warranty is in lieu of all other warranties of merchantability or fitness of use. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.