



2036 Fillmore Street
Davenport, Ia. 52804
563-324-1046
www.racedigitaldelay.com

Multi Switch with Replay Tach

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Multi Switch with Replay Tach

The *Multi Switch* is designed to work with all 4, 6, or 8 cylinder ignitions. This unique *Multi Switch* has all the features of other RPM switches. Plus, extra features including, a digital tach, two range settings, and the ability to use time to activate devices including shift lights and automatic shifters. The *Multi Switch* will shift up to 5 different RPM or Time shifts.

The *Multi Switch* has two separate modes of operation. Mode one starts the shift sequence after the release of the transbrake input. The Replay starts recording at the release of the transbrake input for 15 seconds. Mode two works after the rpm goes above 2500, this will start the shift sequence. The Replay starts recording at the release of the line lock input for 15 seconds. Mode two is designed for the footbrake racer or super stock racer that is not allowed to wire the transbrake input to the box.

The *Multi Switch* also includes a built-in Replay tach. The Replay tach can be viewed directly or downloaded for printing by a DIGITAL VIEWER any time the engine is off.

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Features and Specifications

Features:

- Microprocessor controlled with large display
- Crystal controlled oscillator for extreme accuracy
- Large 5 button keypad for easy use with or without gloves
- Shift on MULTI up to 5 times
- Easy MULTI selection
- Easy RPM settings from 800 to 12700 RPMs
- Easy Time settings from 0.01 to 12.99 seconds
- Manual shift override button
- Very high current output
- Normally Closed output (power out until RPM or Time is reached)
- Normally Open output (no power out until RPM or Time is reached)
- Transbrake input to prevent shift from tire spin or converter flash
- Line lock input to prevent shift during a burn-out
- Controls shift lights and shift solenoids
- Digital tach
- Works with 4, 6, and 8 cylinder engines
- Built-in replay tach
- Down loading capabilities for printing hard copies of pass
- Mounting tabs for easy installation

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Specifications:

- Input Voltage Range: 10 to 18 Volts DC
- N.C. and N.O. Output Current: 20 Amps. continuous
- Line Lock Current Draw: 0.1 Amps. at 12 Volts DC
- Transbrake Current Draw: 0.1 Amps. at 12 Volts DC
- RPM Selection Increments: 100 RPM
- RPM Selection, High Range: 800 to 12,700 RPMs
- RPM Selection, Low Range: 800 to 9,900 RPMs
- Tach Operating Range: 800 to 12700 RPMs (100 RPM Increments)
- Replay record length: 15 Seconds
- Replay Tach Range: 800 to 12750 (50 RPM Increments)
- Timing Range: 0.01 to 9.99 seconds
- Time Selection Increments: 0.01 seconds
- Operating Temperature Range: -45 to 150 degrees F.

Quick Reference Diagram

The Terminal Strip

+12 Volts: Connect the +12 Volts terminal to a switched 12 Volt source with enough amperage capable of driving any device connected to the Multi Switch.

N.O. (Normally Open): The N.O. terminal will go from zero Volts to 12 Volts, when the Time or RPM Switch has either timed out in time mode, or if the engine RPM is greater than the RPM setting in RPM mode.

N.C. (Normally Closed): The N.C. terminal will go from 12 Volts to zero Volts, when the Time or RPM Switch has either timed out in time mode, or if the engine RPM is greater than the RPM setting in RPM mode.

Ground: Connect the Ground terminal to the Neg. terminal on the battery or to a good steel ground, not aluminum.

Trans. (Transbrake): Connect the Trans. terminal to the transbrake line. This terminal starts the replay tach and the timer for shifting on time, if in time mode, when the Transbrake releases.

L.L. (Line Locks): Connect the L.L. terminal to the Line Locks control wire, if the Line Locks are used only for the burnout. When the Line Locks are engaged for the burnout, the replay will automatically be armed. If the Line Locks are used at the starting line or if the vehicle does not have Line Locks, a push button must be connected to the L.L. terminal to arm the replay tach. To arm the replay tach with a push button, press the button connected to the L.L. terminal any time after the engine is started and before the Transbrake is engaged.

Tach: Connect the Tach terminal to the tach terminal on the ignition. If running without an ignition box connect the Tach terminal to the points side of the coil (minus side).

The Keypad

The keypad is made up of a row of five keys. Each of the five keys has three functions with the exception of the High Gear button which has four functions. The main function of each key is shown inside the box, which is around each of the keys. With the exception of the (Tach/Settings/2nd) all of the keys can perform their main function with the engine on or off. The main function of the (Tach/Settings/2nd) key changes depending on whether the engine is on or off. Below is a list of all the keys and their functions.

Tach/Settings/2nd

When the engine is on, the (Tach/Settings/2nd) key only functions as a selection key to switch between the tach and the settings. When the engine is off, the (Tach/Settings/2nd) key's main function is to allow the 2nd function of the other four keys to be selected. This is done by first pressing and holding down the (Tach/Settings/2nd) key. While holding down this key press one of the other keys. This will select their second function. The last function of the (Tach/Settings/2nd) key is to turn off the replay mode. This is explained in greater detail in Understanding The Replay Tach.

Right Arrow

The main function of the (Right Arrow) key is, to either change the hundredths place when in Time mode, or to select RPM mode. The second function of the (Right Arrow) key is to turn the replay on. To turn the replay on, hold down the (Tach/Settings/2nd) key and then press the (Right Arrow) key. The last function of the (Right Arrow) key is, when in replay mode, to switch between RPM and Time. This is explained in greater detail in Understanding The Replay Tach. This key will not function in Mode 2.

Center Arrow

The main function of the (Center Arrow) key is to either change the tenths place when in Time mode, or to change the hundreds place when in RPM mode. The second function of the (Center Arrow) key is to select either High or Low RPM and Time range. To select the High or Low range, hold down the (Tach/Settings/2nd) key and then repeatedly press the (Center Arrow) key until the desired setting is shown on the display. When in High range the Selectable RPM range goes from 800 to 12700 and the Selectable time range goes from 0.01 to 12.99 seconds. When in Low range the Selectable RPM range goes from 800 to 9900 and the Selectable time range goes from 0.01 to 9.99 seconds. The last function of the (Center Arrow) key is, when in replay mode, to start and stop the scrolling of the replay. This is explained in greater detail in Understanding The Replay Tach.

Left Arrow

The main function of the (Left Arrow) key is to either change the seconds place when in Time mode, or to change the thousands place when in RPM mode. The second function of the (Left Arrow) key is to match the number of cylinders the engine has to the setting of the box. To change the cylinder setting, hold down the (Tach/Settings/2nd) key and then repeatedly press the (Left Arrow) key until the number shown on the display matches the number of cylinders of the engine. The last function of the (Left Arrow) key is, when in replay mode, to jump to the shift points. This is explained in greater detail in Understanding The Replay Tach.

Shift Test

The main function of the (Shift Test) key is to enable the driver to override the box and activate the shifter manually by just pressing the (Shift Test) key. This is only allowable when the box is not running a shift cycle. The second function of the (Shift Test) key is to select which shift you want to review or change the setting of. To use this function, first press and hold the (Tach/Settings/2nd) key then press repeatedly the Shift Test key until the number on the display matches the shift you desire to view or change. Changing the setting is done with the three arrow keys. The last function of the (Shift Test) key is, when in replay mode, to change the speed of the replay. This is explained in greater detail in Understanding The Replay Tach.

RPM Mode

To set the *Multi Switch* in RPM mode, press the right most arrow until a dash is shown on the display in the right most digit. The dash signifies the unit is in RPM mode and locks the tens place of the RPM setting to a value of zero. When in RPM mode only the hundreds and thousands place can be set. This means that the smallest change from one setting to another is one hundred RPM. The RPM setting can be set to any value from 800 RPM to 9900 in Low range and from 800 to 12700 in Hi range. To adjust the setting, first make sure the settings screen is being displayed. Then set the desired RPM, using the two left most arrow keys. This is done by pressing the center arrow to set hundreds value and the left most arrow to set the thousands value. In the example below the *Multi Switch* is set to 6800 RPM.

insert photo here.

Example only

Time Mode

To set the *Multi Switch* in Time mode, press the right most arrow until any number is shown on the display in the right most digit. A number on the far right side of the display signifies the unit is in Time mode. When in Time mode all three arrow keys can be used to set the desired time. The smallest change from one setting to another is one hundredth of a second. The time setting can be set to any value from 0.01 to 9.99 in Low range and from 0.01 to 12.99 in Hi range. The value of zero can not be set into the unit because when the far right digit is set to zero the unit is put in RPM mode. To adjust the setting, first make sure the settings screen is being displayed. Then set the desired time, using the arrow keys. This is done by pressing the right arrow to set the hundredths, the center arrow to set tenths, and the left arrow to set the seconds value. In the example below the *Multi Switch* is set to 1.73 seconds.

insert photo here.

Example only

Understanding The Replay Tach

The Replay can be used as a helpful diagnostic tool. Some examples are, using the Replay to see how stable the engine is when on a throttle stop and how different stop settings affect the engine. Also the Replay can be used to see how different tracks and weather affect the engine's performance. Another use of the Replay is to check the amount of time from when the box initiates a shift and when the shift actually occurs.

The Replay information can only be viewed when the engine is turned off. Once the engine is off the Replay information can be viewed by pressing and holding down the 2nd function key, which is the far right key, and then pressing the Replay Mode key, which is just to the left of the 2nd function key. Once both keys have been pressed the display will show the letters PE, meaning the Replay is enabled. Any time after the Replay has been enabled, the release of both keys will enter the unit into Replay mode. Upon entering Replay mode the starting line time is shown on the display and the operation of the keys change to the function that is listed directly above each key. While in Replay mode if the engine is started the unit will automatically turn off the Replay feature and exit from Replay mode.

The replay function of each key is listed below.

Replay Off Key.....	When this key is pressed, Replay mode is turned off.
RPM / Time Key.....	This key is used to switch the display between time and RPM.
Start / Stop Key.....	This key is used to start and stop the Replay.
Shift Point Key.....	This key is used to jump to the next shift point.
Replay Speed Key..	This key is used to change the rate at which the replay plays.

Once the starting line time is being shown on the display, to start the Replay press the Start / Stop key. The Replay will now start replaying the last pass saved in memory. The time on the display will start counting up in high replay speed. As the time is counting up the speed of the Replay can be changed by pressing Replay Speed key. Each time the Replay Speed key is pressed the speed of the Replay will change. The order that the speeds change is from high to medium to slow to extra slow and then back to high. Press the Start / Stop again to stop the counting at the desired time. Then press the RPM / Time key to show the saved engine RPM that corresponds to the time that was shown on the display when the Start / Stop key was pressed.

The Start / Stop key can also be pressed while the RPM information is being displayed. This will cause the unit to Replay the RPM in the order in which it was saved. Press the Start / Stop key again to stop the Replay at the desired RPM. Then press the RPM / Time key to show the time that corresponds to the RPM that was on the display when Start / Stop key was pressed.

The Shift Point key can be pressed any time the Replay has been stopped. When the Shift Point key is pressed, if there was at least one shift, the unit will jump to the shift point. The display will show either the RPM or the time the shift occurred, depending upon whether the RPM or the time was being viewed before the Shift Point key was pressed. If a time was shown on the display when the Shift Point key was pressed, the unit will jump to the time when the first shift occurred. After jumping to a shift point, several things can be done. One of these is switching between the time and RPM of the shift by pressing the RPM / Time key. Or pressing the Shift Point key again to see if any other shifts occurred, a maximum of five can be saved each pass. Or pressing the Start / Stop key to start the Replay from the current shift point being displayed.

When done, press the Replay Off key. While the Replay Off key is held down the letters PO will be shown on the display indicating the Replay is off. When the Replay key is released the unit will exit the Replay mode and return to the same point the unit was at when the Replay was turned on.

Understanding and Setting Mode 1 and Mode 2

In mode 1 the unit starts the shift & Replay sequences after the transbrake input on the terminal strip has been released. This is described in pages 6,7 and 8. This Mode is mainly used in bracket racing.

In mode 2 the unit starts the shift sequence every time the unit receives a tach input climbing above 2500 rpm and restarts when tach input goes below 2500 rpm and then goes above 2500 rpm. This Mode is used for Super Stock racer that can not have a pushbutton wired to the transbrake terminal on the unit and for all footbrake racers.

In mode 2 the Replay starts when the linelock terminal on the terminal strip receives a input signal and a release of the signal. The Replay records for 15 seconds after the release of the signal. To receive the maximum of the 15 seconds is best to press and release the pushbutton wired to the linelock terminal after the prestage light is on. The linelock terminal can be wired to the linelocks for use on the burnouts and then repressed at the starting. The unit starts the replay over every time the linelock terminal is engaged and released. This also allows the driver to keep in memory the last pass until the linelock terminal is pressed and released again for viewing or down loading to a *Digital Viewer* in the pits.

Setting Mode 1 or Mode 2

To change from one mode setting to the other. First the unit has to have the power turned off, while pressing the Shift test Key turn the power on and SLE will be displayed on screen. Then release the Shift Test Key, a number 1 or 2 will be displayed to represent which Mode the unit is in. Pressing the right hand arrow will alternate between modes. Waiting 10 seconds after mode is set the unit will display a complete screen viewing for a second then will go to the first shift setting. After changing the mode all shift settings will go to zero. You then must install new numbers for your shift settings, this is described on page 6.

One way to quickly tell what mode the unit is in is by pressing the far right arrow, this key is disabled in Mode 2.

Understanding the Driver's Reaction Tester

This new feature allows a driver using the linelock pushbutton mounted in the vehicle to test their reaction time. This can also be used to test different kinds of buttons and locations that buttons are mounted in the vehicle for the quickest release possible.

To select the Driver's Reaction Tester, with the engine off press the right most key, everything on the screen will turn on, this can also be used to check for proper screen operation. Once in Reaction Test Mode, if the push button connected to the linelock terminal is pressed and held down, the screen will go blank. After 2 seconds all eights will be shown on the screen, at which time the driver releases the push

button being held. The display will now show the amount of time from when the eights were displayed, to when the push button was released, this is the driver's reaction time. If the driver lets go of the button too soon, before the display turns on, dashes will be shown on the screen to indicate a red light. If the driver does not let go of the button within .75 seconds after the eights are displayed, the display will show reaction time of all nines to indicate a missed light. To exit the Driver's Reaction Test Mode press the right most key on the keypad. If the push-button is not pressed, the unit will automatically exit the Driver's Reaction Test Mode after 30 seconds. Each time the push-button is pressed the 30 second time period resets.