

JayGee Racing

Linear 200 Pro 40 Controller

Brake Chip Installation Instructions

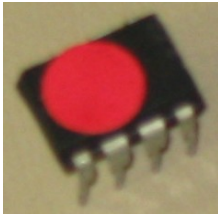
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Introduction

The Linear 200 features a brake profile chip that can be replaced by the user to modify the controller's braking characteristics. The chip is installed in a socket on the controller's transistor power module and can be replaced using common hand tools. No soldering is required.

There are currently two brake profile chips available for the Linear 200 Pro 40's power module. The PWM profile chip is shipped with a red sticker. The Brake & Release™ profile chip is shipped without any stickers.

Figure 1. PWM Brake Profile Chip with Red Sticker



Tools You will Need

- Small flat bladed screw driver
- Xacto knife
- #2 Phillips screwdriver

Before You Begin – A Few Words on Anti-Static Protection

The brake profile chip and other integrated circuits on the transistor power module can be damaged by static discharge. However, with a few simple precautions the risk of damage is greatly minimized. The single most effective precaution you can take is to ground yourself before handling the brake profile chip and removing the protective shrink-wrap insulation on the power module. Then, after grounding yourself to eliminate any static buildup, sit or stand at your workbench or table and complete the chip replacement before walking around, rubbing your feet on the carpet, etc.

You can ground yourself by touching a metal pipe or electrical conduit...or even the metal case of your plugged-in power supply (which is what I do).

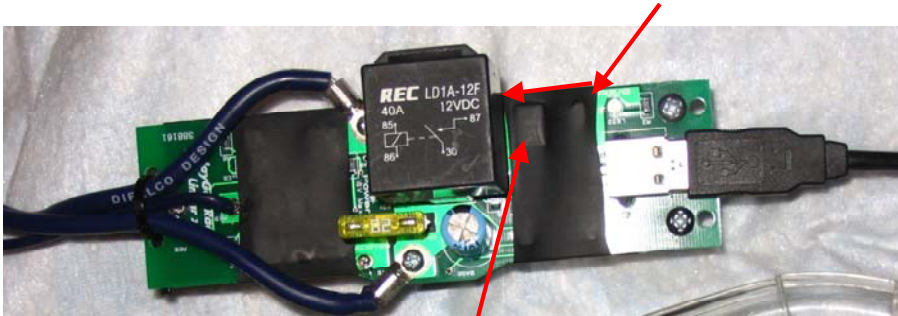
Ready?...now let's begin.

Step 1 – Removing The Protective Shrink-Wrap Insulation

The brake profile chip is located on the board near the USB cable connector. Using an Xacto knife (or similar) carefully slice the shrink-wrap all the way through along the edge as shown in Figure 2. Unfold it and pull it out from underneath the board...a new insulator is provided with the replacement brake chip.

Figure 2. Removing the Shrink-Wrap Insulation

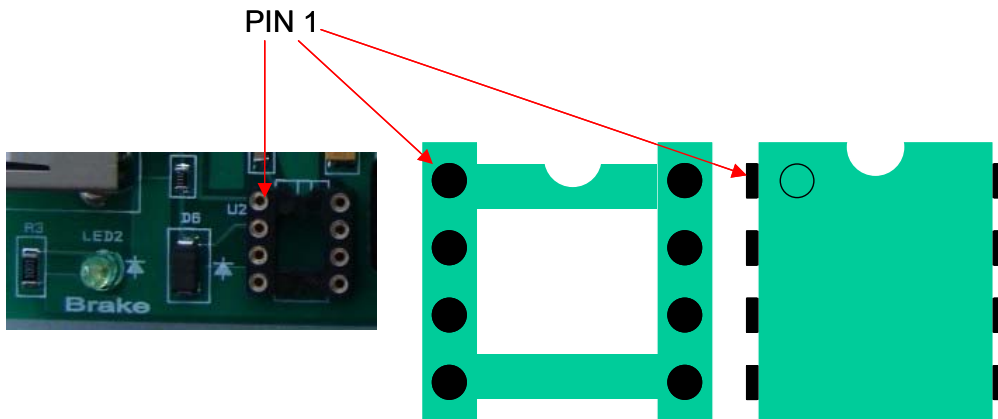
Slip blade between shrink-wrap and board, slicing away from board so as not to damage any traces



Brake Chip

When you remove the insulation, note the orientation of the brake chip in its socket. Both the socket and chip have a very small notch on one end to indicate the correct orientation. Additionally, the chip has a small dimple on it to identify PIN 1.

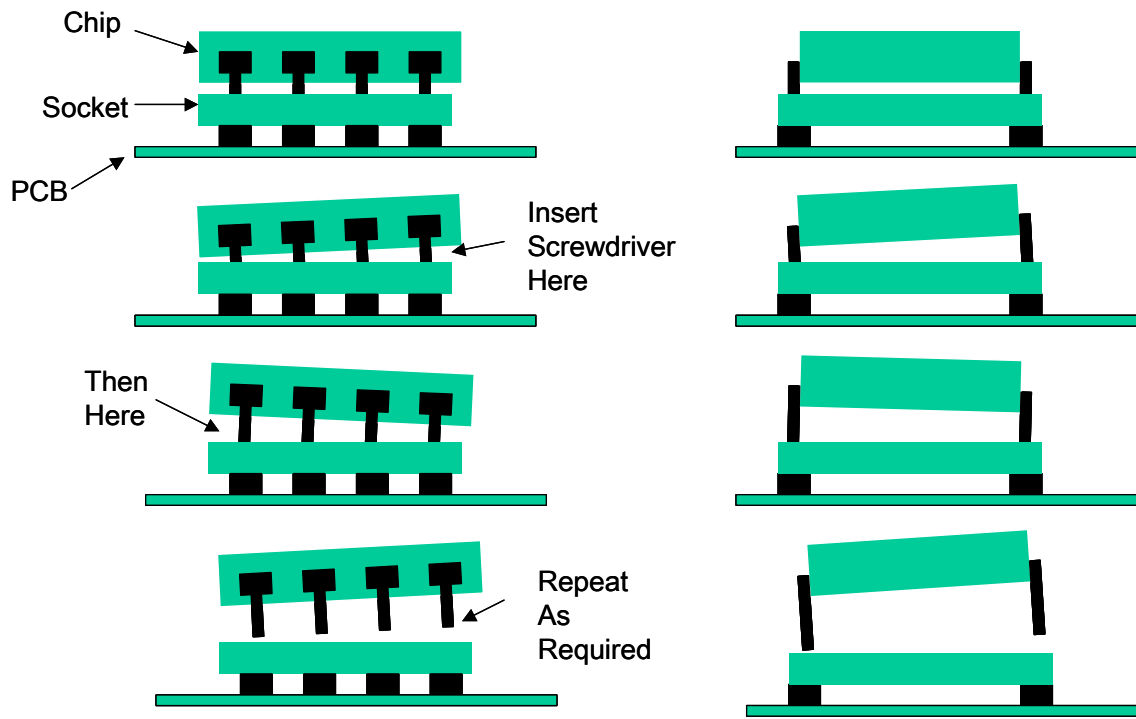
Figure 3. Brake Chip Orientation



Step 2 – Removing the Brake Chip

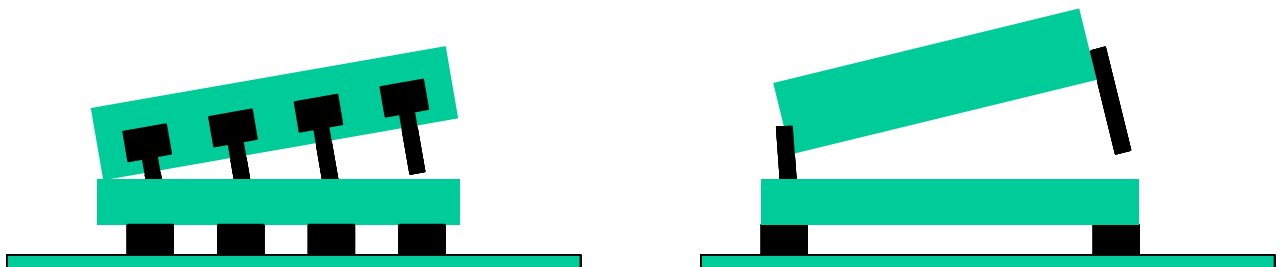
Slip the flat bladed screwdriver between the chip and socket at one end. Gently rotate the screwdriver slightly clockwise, then counter-clockwise to begin prying the chip from its socket. Alternate this action from each end so the chip rises out level as shown in Figure 4. Holding the chip with one hand while prying with the other will help keep it level. Be sure that it remains level both front to back and side-to-side.

Figure 4. Keeping the Chip Level During Removal



What you don't want to do is get the chip cocked in the socket as shown in Figure 5. If it starts to get cocked, push down gently on the chip and start over. If the pins come completely out on one end or side, don't panic. Grab the chip with one hand and slowly work the remaining pins out of the socket. The chip's pins are soft metal and you can often straighten them out without breaking them off.

Figure 5. Don't Do This!!!!



Step 3 – Installing the Brake Chip

When delivered from the factory, the chip's pins are bent outwards slightly as shown in Figure 6.

Figure 6. Splayed Pins Required by Integrated Circuit Insertion Tools



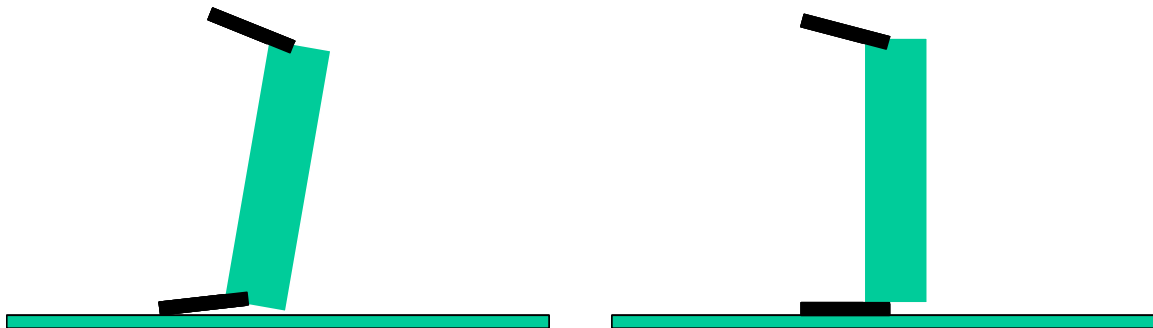
Automated pick and place machines and other integrated circuit insertion tools used during printed circuit board manufacturing rely on this bend to grab the IC properly. This bend must be eliminated when inserting the chip in the socket by hand.

Figure 7. Straightened Pins for Hand Insertion in Socket



Rather than use pliers for this, you can place the chip on a hard surface as shown in Figure 8 and gently "roll" it so that all the pins are straightened the same amount. Performing this action on both sides will make the pins parallel to each other. The chip can now be easily installed in the socket.

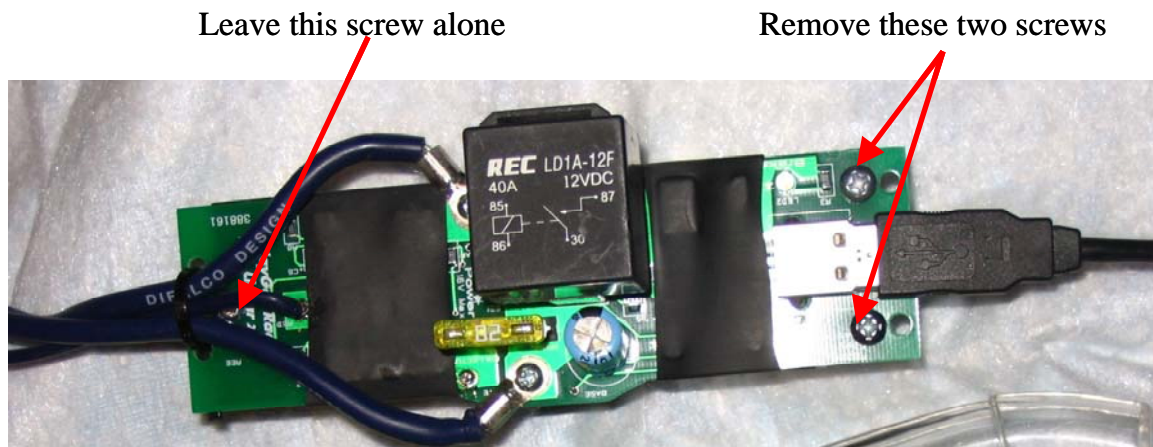
Figure 8. Straighten the Pins by Rolling The Chip



Step 4 – Installing the Shrink-Wrap Insulator

The shrink-wrap insulator is designed to protect the brake chip and its voltage regulator from static electricity. If you are going to frequently alternate between different brake profile chips, you may wish to leave the insulator off. If you do, just be very careful when handling the power module so that you never touch any of the chips on the board. It's easy enough to do so...grabbing the module by the heatsink when cold or the relay when hot. However, just like the man said, "Youse pays your money and youse takes your chances". The controller is not warranted against damage from static electricity.

To install the insulator, disconnect the USB cable and remove the Phillips screws holding the board to the heatsink on each side of the connector.



There is enough slack in the transistor wiring to allow you to lift up on the board slightly and slip the heat-shrink tubing over the board. You'll have to carefully work it over the USB connector and Brake LED. If necessary, you can stretch the tubing if it's too tight. (I pre-stretch it before shipping but I don't know if it shrinks back over time). Put the screws back after installing the tubing and before heating it up to shrink it.

After installing the tubing, it needs to be exposed to heat to shrink it. You can use a heat gun or possibly even a hair-dryer. Holding the module over a kitchen range gas burner will also work (I know, I've done so). If you use the kitchen range method, it's a good idea to remove the blast relay from its socket and be very careful...the PCB and USB connector will possibly get hot enough to burn you.