familiarize yourself with the following terminology:

Program - Change address and other data in the decoder.

Address - A number assigned a decoder to identify the decoder. All decoders are programmed with address #3 at the factory.

Start Voltage - A voltage to overcome a locomotive's weight and friction to make it just start to move. You can program your locomotive with start voltage so that it will begin to move as soon as you move the throttle control. Otherwise you may have to move the throttle some distance to get it to move.

Acceleration Rate - The time the locomotive will take to speed up to follow the greater throttle setting. The higher the programmed setting the longer it will take to speed up when running. The maximum setting from start to full speed is 30 seconds.

Deceleration Rate - The time the locomotive will take to slow down to follow the throttle setting. The higher the setting in program the longer it will take to slow down. The maximum setting is 30 seconds.

How to program decoder with address 2:

Step 1 Put the decoder equipped locomotive on the track. Push Reset button (9). Then push Program button (4) **three times to select program mode. All LEDs will turn on to indicate you are in program mode. Make sure there are no other locos on the track (except standard loco). Otherwise they will be programmed with the same setting !!!**

Step 2 Push Group Select button (5) to select group A. Make sure the group A indicator is on. Put set1/set2 switch on set1

Step 3 Adjust the starting voltage by throttle #1, acceleration rate by throttle #2, and deceleration rate by throttle #3.
As a beginner, we suggest that you put all settings at the minimum position

Last step Push direction button 2. Then wait five seconds for both group indicator LEDs to turn on to show programming is finished.

Now push Reset button (9) and then Run button (5) to select run mode to run all three locos in group A set 1. You can adjust speed of the loco #2 by throttle #2 and change its direction by pushing direction button 2. You can turn on/off the light of the loco #2 by pushing light button (8) first and then pushing direction button 2.

If you feel comfortable with the Command 2000, please try to program the decoder with different starting voltage, acceleration rate, and deceleration rate. See Section 5, paragraph 1.

Note: You can program a decoder equipped loco to run on throttle #1 if you like.

You can not program a standard loco. But during running, you can adjust its starting voltage by throttle #1, acceleration rate by throttle #2, and deceleration rate by throttle #3, and then push Standard Loco Momentum Adjustment button (7). Loco #2 and #3's speed settings will be effected while you make this adjustment.
Note: Once you have pushed Reset all these settings will be erased.

Section 2   HOW TO RUN 6 LOCOS

In this section we want explain how to use the Command 2000 to control up to six locos. Always keep the Walkaround Control Switch on set1.

There are three throttles on the Command 2000. So you can control three locomotives simultaneously in run mode. In order to control up to six locomotives, we divide six locos into two groups. By assigning the throttles to one group at a time you can easily control six locos. If the current group is A, the three throttles #1, #2, and #3 will control standard loco/loco #1, loco #2, and loco #3. If the current group is B the same throttles will control loco #4, #5, and #6. See Table 1. It is easy to change groups. Just push group select button (5). It is also easy to know what current group you are in by the group indicator LEDs.

Note:
1. This table is good for both run and program modes.
2. The address being programmed is determined by which group you selected and which direction button you pushed.

Group	Throttle #1/Direction #1	Throttle #2/Direction #2	Throttle #3/Direction #3
A	Standard/Loco #1	Loco #2	Loco #3
B	Loco #4	Loco #5	Loco #6

Table 1. Throttles and address relationship

Make a program track:
It is a good practice to make a program track. With the program track you do not have to remove all locos from the layout in order to program one loco. You can put a loco on the program track and switch off your layout while you program

the loco. When you finish programming switch on the layout and put the loco on the layout.

To build a program track you will need a piece of track, a single pole single throw switch, and a protector resistor (47 ohm, 2 w) which is included. Figure 2 illustrates how to wire your program track.

Note:
1. The resistor is to protect your decoder in case the decoder is not installed properly.
2. You can not run the loco on the program track for full speed test. But you can test the loco's light to be sure that it is programmed.
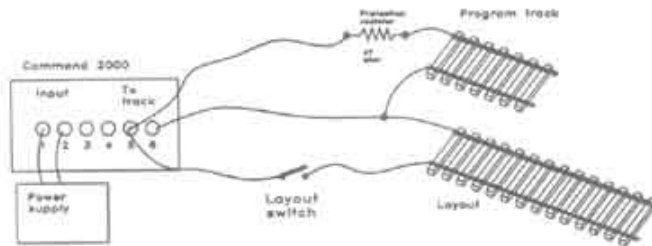

Figure 2. Connection of the DCC system with program track.

Normal mode/Advanced mode:

Command 2000 can program and run two modes, **Normal mode** and **Advanced mode**. In normal mode you only have 14 speed steps to control a loco's speed. In advanced mode you will have 28 steps. The advanced mode gives you better speed control. If the advanced indicator is on it indicates that you are in advanced mode. If the light is off, it indicates normal mode. All locomotives should be programmed and run in the same speed step mode, otherwise you cannot control lights properly. We recommend using advanced mode.

How to program up to six locos:

Now you can follow the Program Procedure and Table 1 to program your decoders to address 4, address 5, and address 6.

Program procedure:

Step 1 Put a decoder equipped locomotive on the track. Push Reset button (9). Then push Program button (4) **three times** to select program mode. All LEDs will turn on to indicate that you are in program mode. **Make sure there are no other locos on the track. Otherwise they will be programmed with the same setting!!!**

Step 2 Select which group to program by Group Select button (5).

Step 3 Select Advanced Mode or Normal Mode by pushing the Advanced/Normal button (10).

Step 4 Adjust the starting voltage by throttle #1, acceleration rate by throttle #2, and deceleration rate by throttle #3. (For further information read Section 5.)

Step 5 This step is optional. You will learn why and how to use this step later on. If you want to change polarity of loco, push button (6). Also if you only want to change address, push button (8).

Last step Select which address (i.e. throttle) to program by pushing one of the three Direction buttons. If you are going to program throttle #1 push direction button 1 (If throttle #2 push Direction button #2). See Table 1. Then wait five seconds for both group indicator LEDs to turn on to show programming is finished. The loco may jerk during programming.

Here is an example of how to program a decoder to address 4 with advanced mode (28 steps):

Step 1 Put a decoder equipped locomotive on the track. Push Reset button (9). Then push Program button (4) **three times** to select program mode. All LEDs will turn on to indicate you are in program mode.

Step 2 Push Group Select button (5) twice to select group B.

Step 3 Push Advanced/Normal button (10) to select advanced mode.

Step 4 Adjust the starting voltage by throttle #1, acceleration rate by throttle #2, and deceleration rate by throttle #3.

Last step Push direction button #1. Then wait five seconds for both group indicator LEDs to turn on to show programming is finished.

Remember if you choose advanced mode when programming loco #4 you should reprogram loco #2 and loco #3 if they were programmed in normal mode.

How to run six locos:

After you program all the locos put them on your layout. Set the Mode switch to match your locomotive's scale and

turn on the power switch. Push Reset button (9) then Run button (5) to select run mode.

Now you are in Run mode, set1, group A. You can adjust the speed of the standard loco by throttle #1 and change its direction by pushing direction button 1. You can adjust speed of the loco #2 by throttle #2 and change its direction by pushing direction button 2. You can turn on/off the light of the loco #2 by pushing light button (8) first and then pushing direction button 2. You can control loco #3 just like you control loco #2.

To control loco #4, #5, and #6 just switch to group B by pushing Group Select button (5). When you switch to group B, the locos in group B will not respond to the throttle settings until you change speed setting. The three locos in group A will follow the speed setting that you set before switching to group B.

Section 3   HOW TO RUN 10 LOCOS

In Section 2 you learned how to program and run six locos by using two groups in set1. The Command 2000 has another two groups in set 2 so you can control up to ten locos. Table 2 shows you all four groups.

Note:
1. This table is good for both run and program modes.
2. The address being programmed is determined by which group (A or B), which set (1 or 2), and which direction button you push.

Group	Set	Throttle #1/Direction #1	Throttle #2/Direction #2	Throttle #3/Direction #3
A	1	Standard/Loco #1	Loco #2	Loco #3
B	1	Loco #4	Loco #5	Loco #6
A	2	Standard/Loco #1	Loco #7	Loco #8
B	2	Loco #4	Loco #9	Loco #10

Table 2. Throttles and address relationship with ten locos

To program locos #7-10 follow the program procedure in Section 2. Move set1/set2 switch to set 2, and follow the program procedures as outlined in Section 2.

Running ten locos is just like running six. The only difference is that now you have four groups, set1 group A, set 1 group B, set 2 group A, and set 2 group B. You need to push Run button (5) and change the set 1/set 2 switch to switch among these four groups. You should familiarize yourself with Table 2 above before operating ten locos.

Section 4   WALKAROUND CONTROLLER 2000

The advantages of having a Walkaround Controller 2000 are tremendous. It offers two more throttles and remote operation. Now you can independently control five locos simultaneously. It also makes it possible for two or more people to operate the layout together. With inexpensive four wire telephone cable you can install several sockets around your layout. You can unplug the walkaround controller from one socket, walk to another socket and plug it in and control again. During the time you are unplugged the locomotives will remember the last command and will keep going.

When you put the walkaround switch to ON position (same as you select set1), the Walkaround Controller can control loco #7 and loco #8 in walkaround group A, and loco #9 and loco #10 in walkaround group B. The walkaround groups are independent from main control groups. i.e. When the main control current group is A, the walkaround group could be B. When the switch is OFF, the Walkaround Controller looses control and the Command 2000 will control loco #7, #8, #9, and #10. See Table 2 above.

Section 5   MORE ABOUT PROGRAMMING

How to program starting voltage:
All decoders are programmed with zero start voltage, zero acceleration and deceleration rate at the factory. If you find that you have to move up the throttle a lot to make the loco just start moving, you should reprogram the decoders starting voltage to make the throttle control more efficient. It may take you several attempts of programming to get the right starting voltage. Try a quarter position first. If it is not enough add more starting voltage and try again.

Lashing:
Before DCC it was very difficult to lash (couple) two locomotives together. Because they may not start at the same time or even run in different directions. With DCC technology you may program two locos with the same address and different starting voltage to make them start moving at the same time. If they go in different directions you can change one of the locos's polarity. To do so just follow the program procedure (Section 2) and push button (6) in **step 5**.

Change address only programming:
If you do not want to change other variables and only want to change a locos address you can do so simply by pushing button (8) in **step 5**.