Introduction to DCC
Part 2
Installing DCC Decoders
by Paul A Wussow

ADDING DECODERS TO OUR LOCOMOTIVES

Locomotives may be:

DCC

DCC Ready

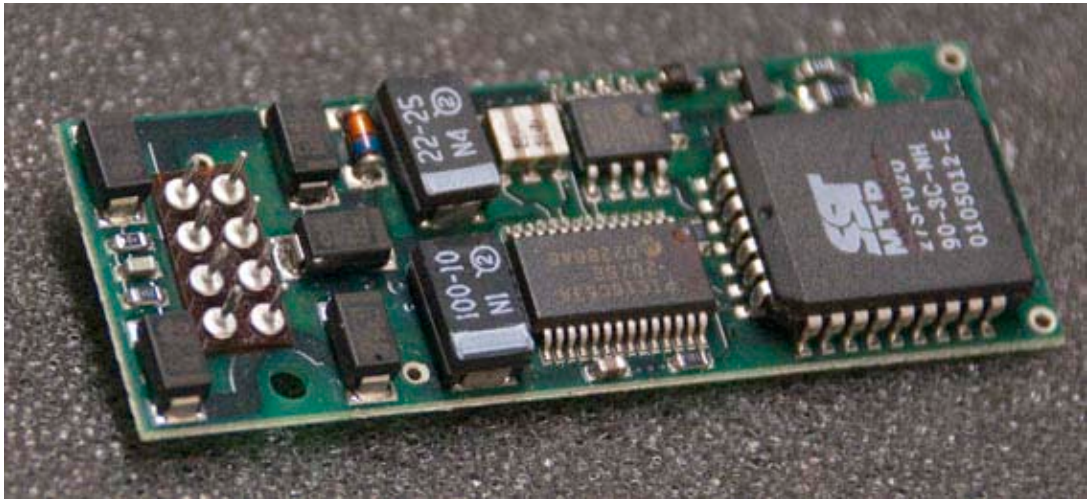
DC

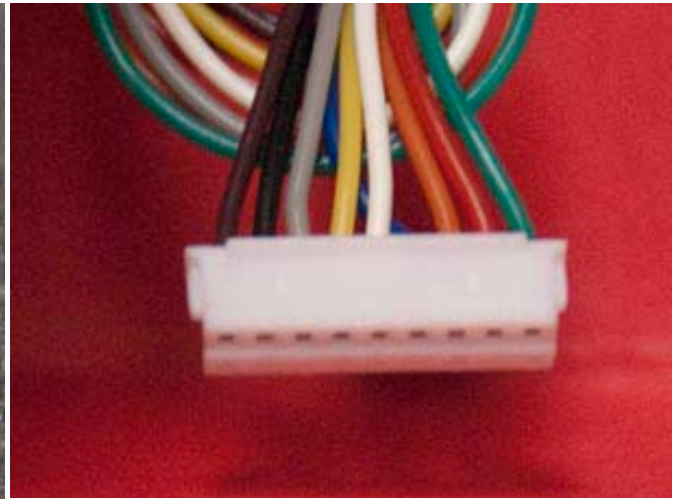
DCS(MTH)

DCC Ready Locomotive

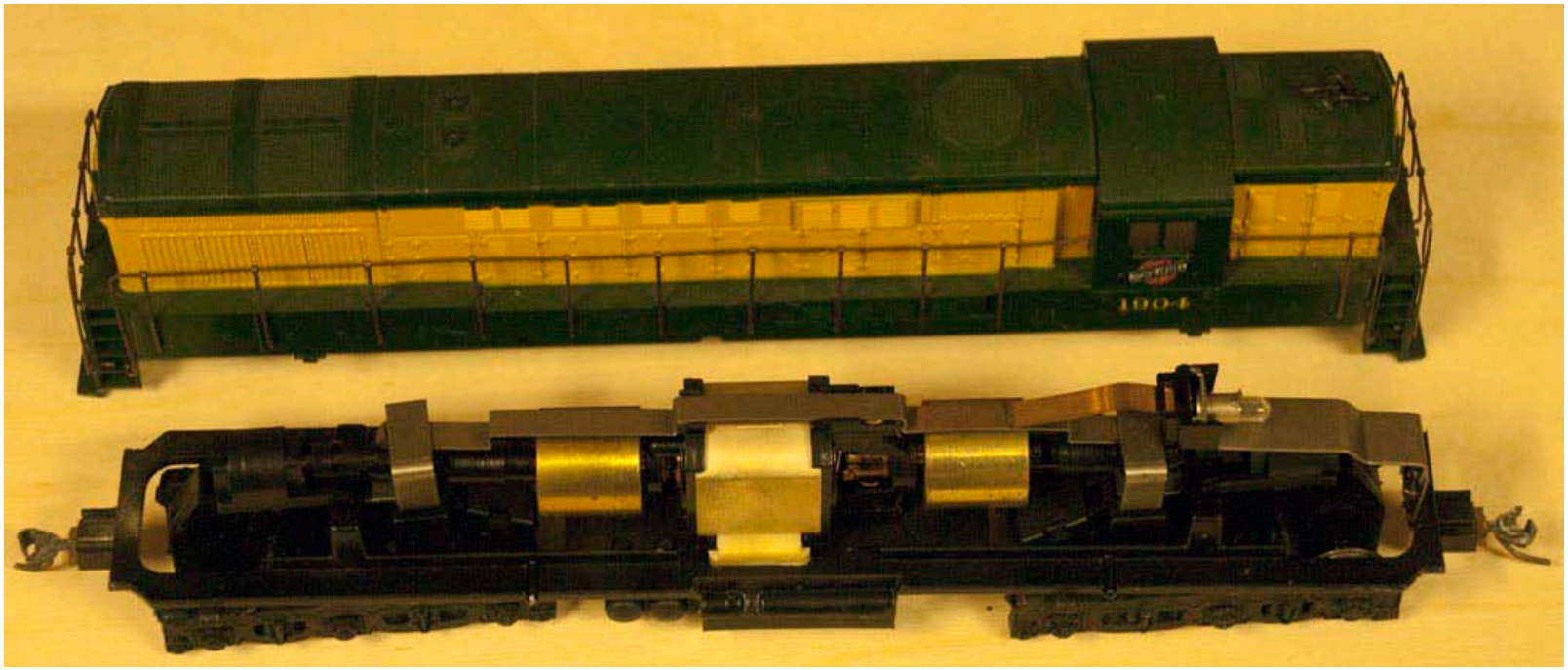
DCC socket may be an 8 or 9 pin

May contain a molded plug or metal punched jumpers to allow DC operations



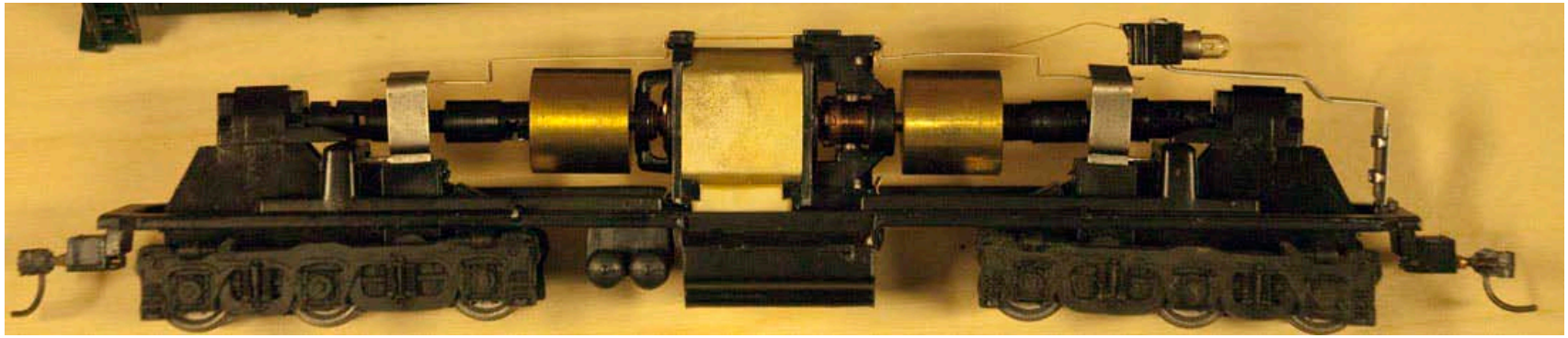


DC Locomotive
Positive voltage applied to the right hand rail shall produce forward motion (NMRA Std.)



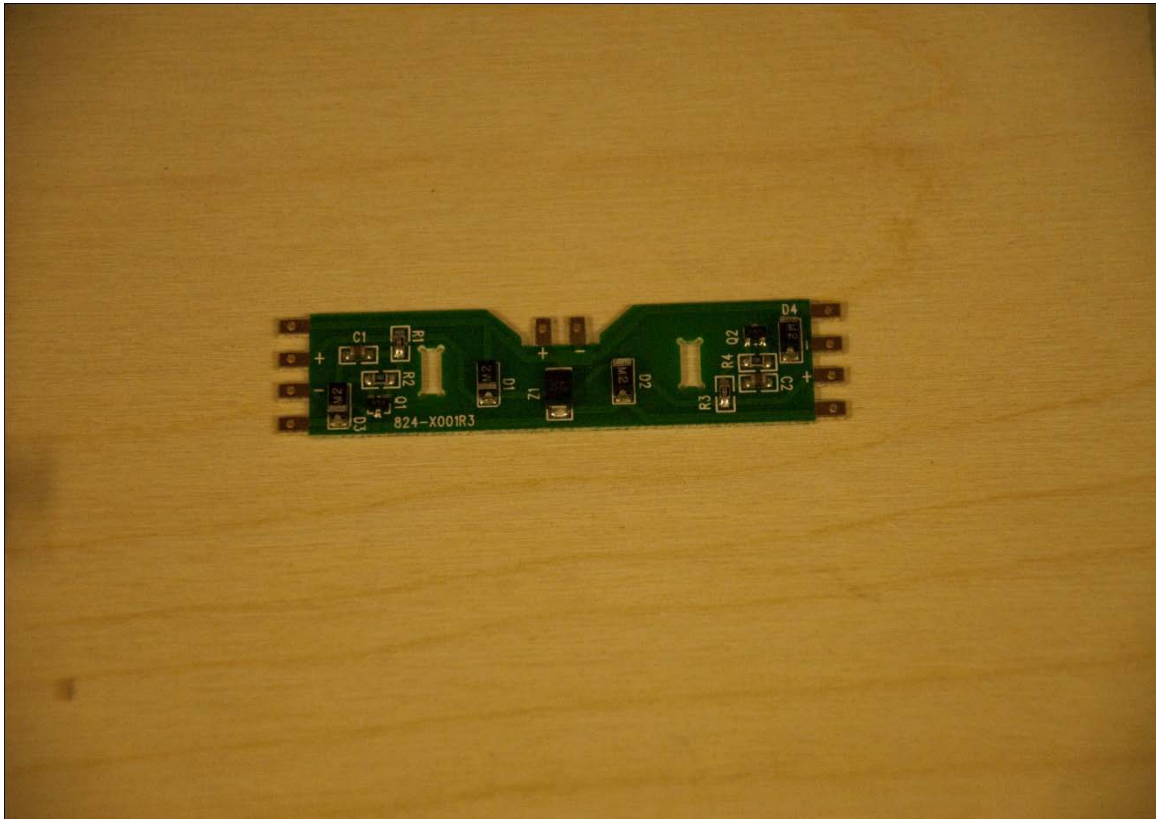
A Little Back Ground

In a simple DC locomotive the electric current picked up from the rails is passed directly to the motor and the electric head light



Sophisticated DC locomotives

Directional low voltage lighting installed



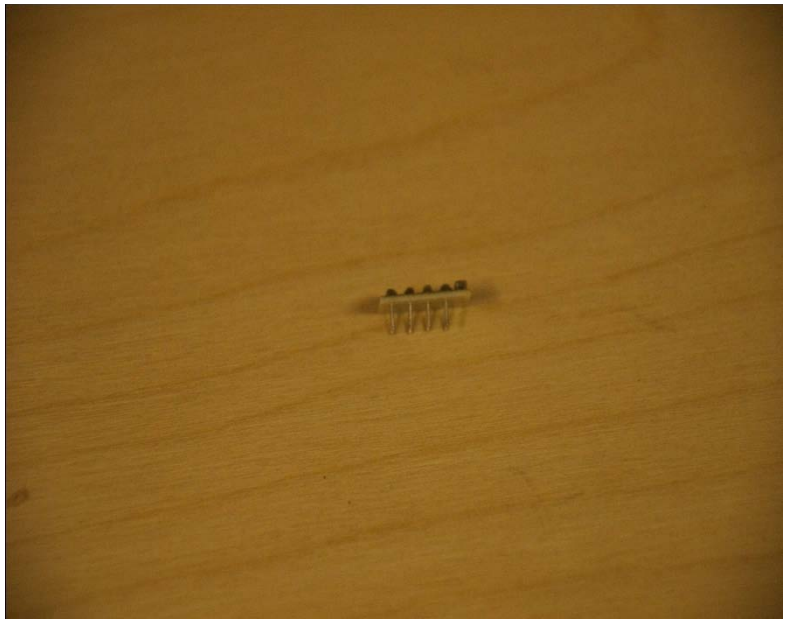
DCC Ready Locomotive

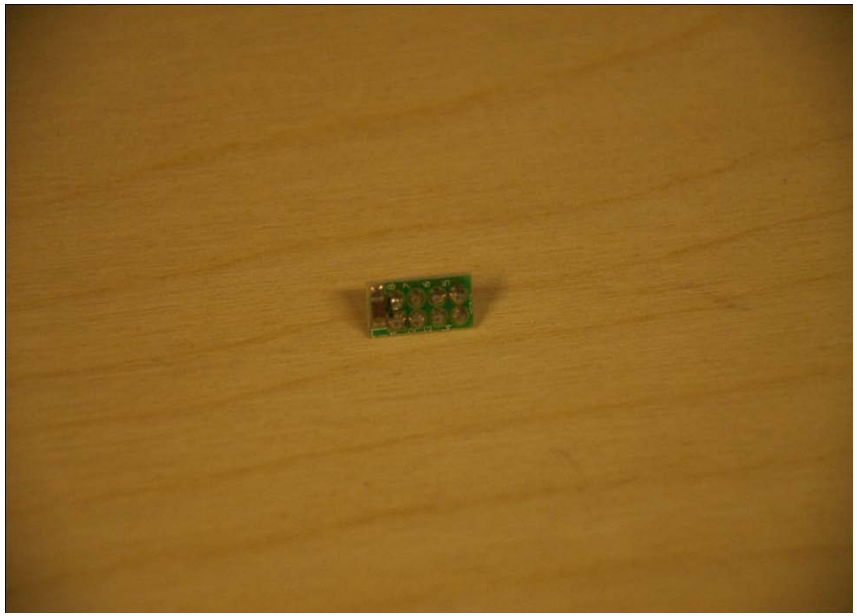
8 Pin Medium Interface

No.	Color	Use
1	Orange	Motor Right Orange
2	Yellow	Rear Headlight
3	NC	
4	Black	Left Rail
5	Gray	Motor Left
6	White	Front Headlight
7	Blue	Common (V+)
8	Red	Right Rail

NMRA NOTE: **There must be no electrical connection on the locomotive side of the interface between either of the motor leads and either of the track leads. In addition, a direct connection must not be made between pins 3 and 7 on the locomotive side of the interface for the medium plug. Either type of connection can lead to decoder damage.**

8 Pin Medium Interface

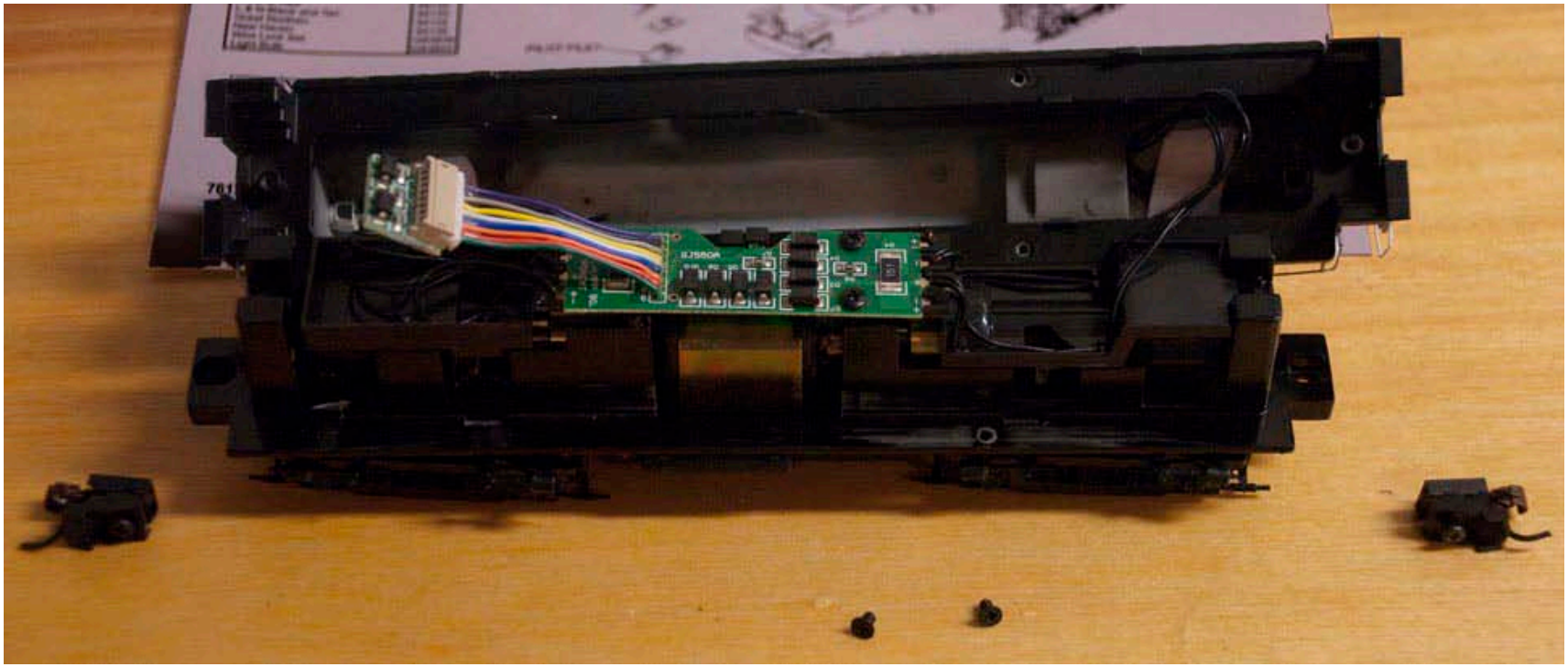




DCC Ready Locomotive

9 Pin Color	Electromechanical controller socket Use	Pin Number
Violet or Brown	Output 4	1
Black	Track – Left Rail	2
Gray	Motor (-)	3
Yellow	Output 2 (Rear Headlight)	4
White	Output 1 (Front Headlight)	5
Blue	+V	6
Orange	Motor (+)	7
Red	Track – Right Rail	8
Green	Output 3	9

9 Pin Electromechanical controller socket

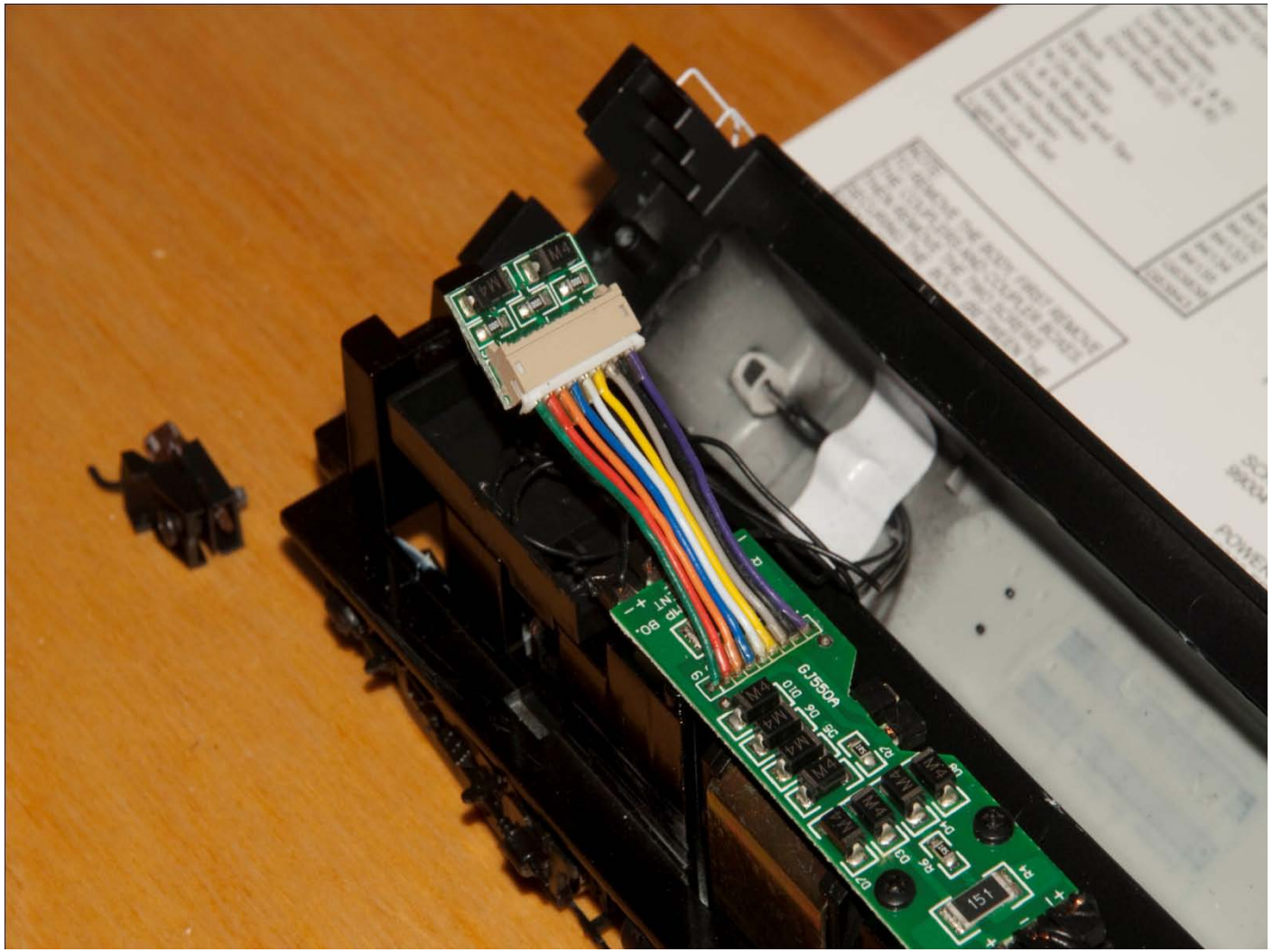



M4

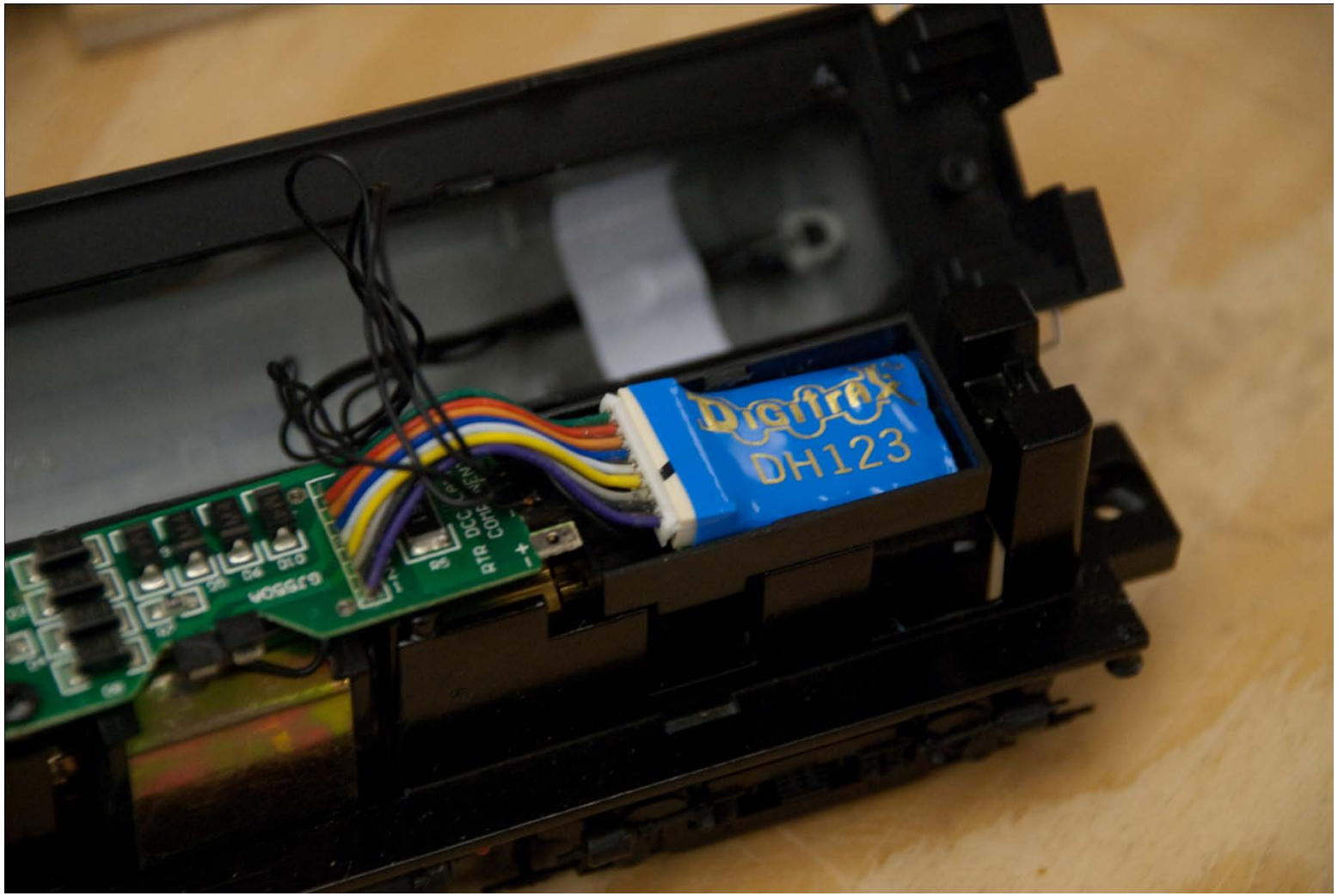
NMRA DCC Standard Connection and Color Code

RED from right-hand rail
ORANGE to motor brush (+) connected to right-hand rail*
BLACK from left-hand rail
GRAY to motor brush (-) connected to left-hand rail **
WHITE front headlight(s) power sink
YELLOW rear headlight(s) power sink
BLUE common (+) headlight(s)/function(s) power source

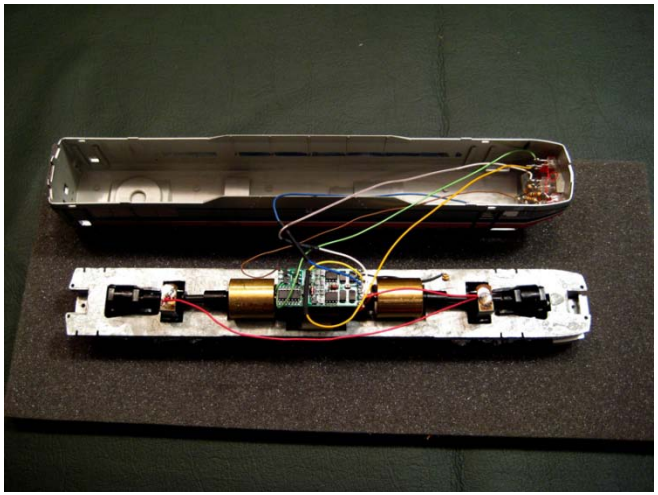
Installing a decoder in a DCC Ready Locomotive

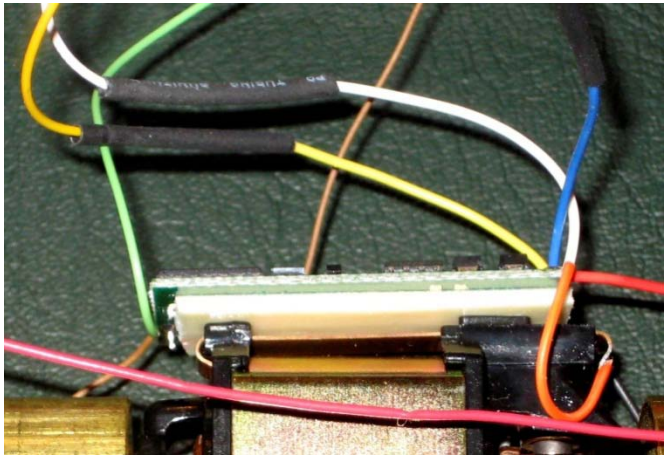


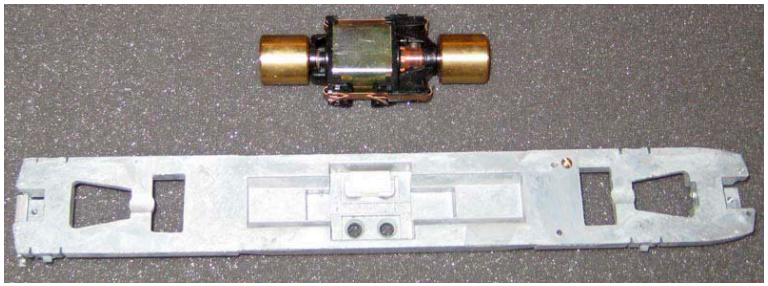
Installed decoder in a DCC Ready Locomotive

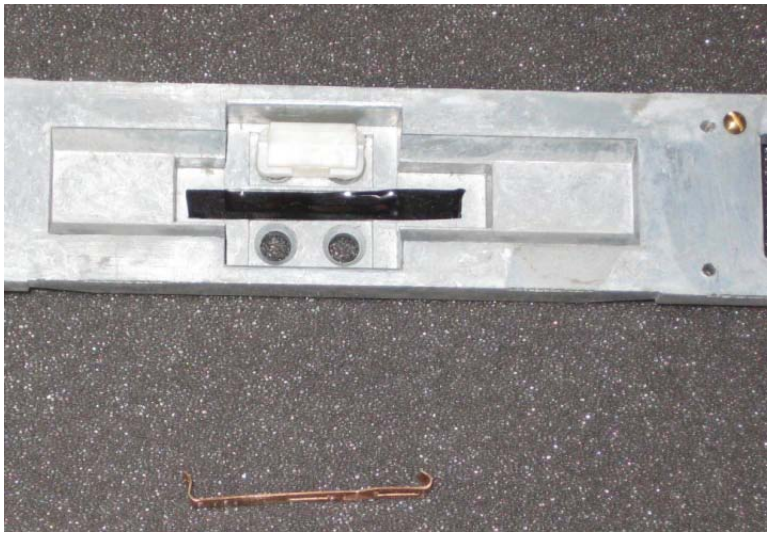


Installing a decoder in a DC Locomotive (Athearn Blue Box)

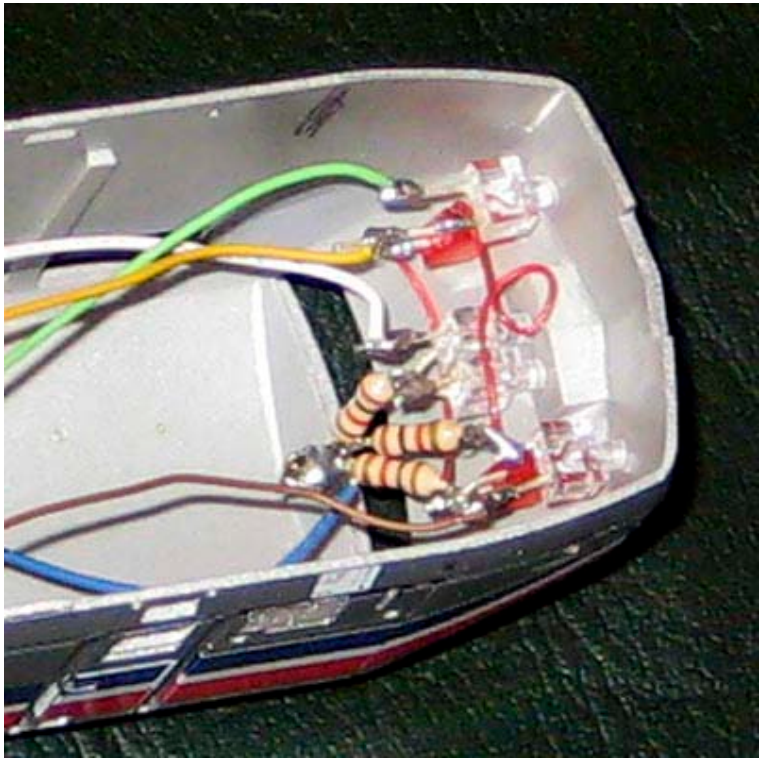









Amtrak




Amtrak


Amtrak

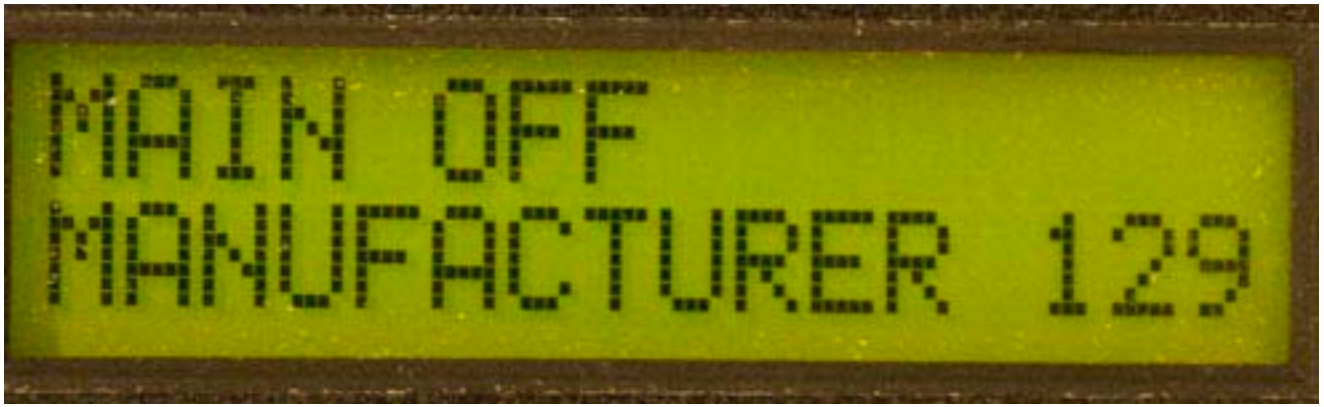

Amtrak

Testing and Programming


SEL MODE 85:46
USE PROGRAM TRK


PROG TRK
1=STD 2=CV 3=REG

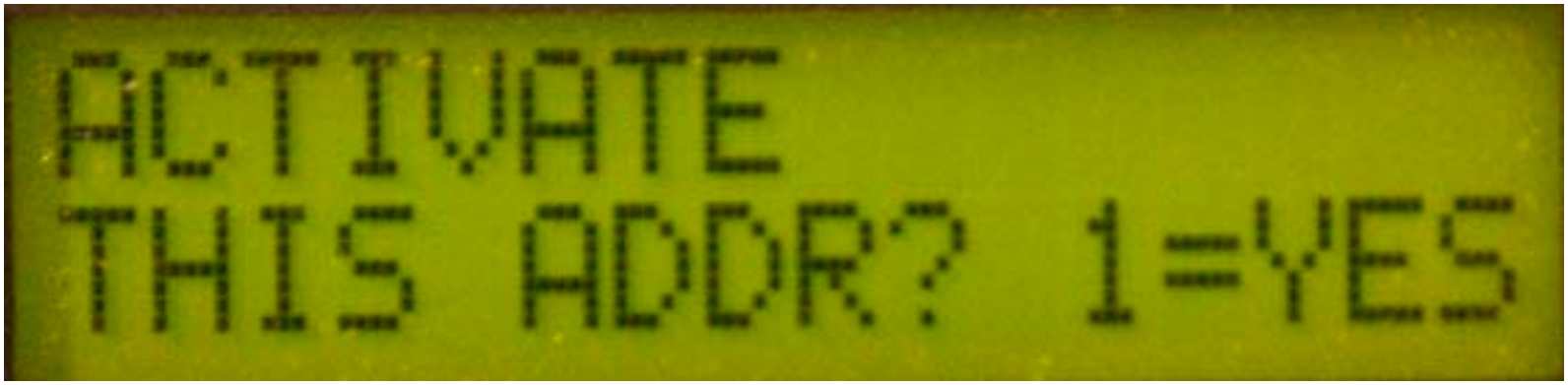

MAIN OFF
WAIT


MAIN OFF
MANUFACTURER 129

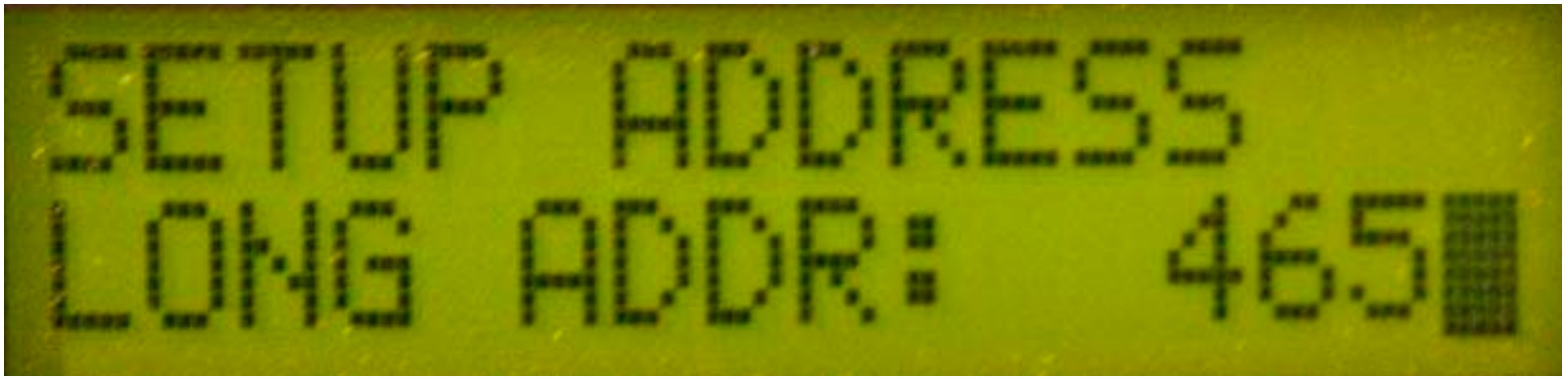

DIR MODE
DECODER VER: 036

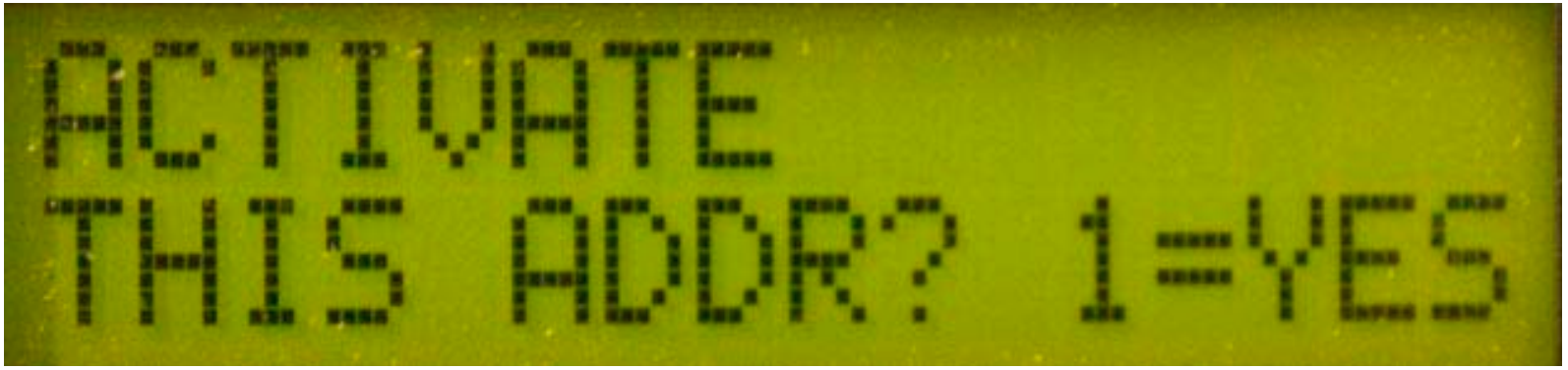

ACTIVE ADR:SHORT
SETUP ADDR 1=YES

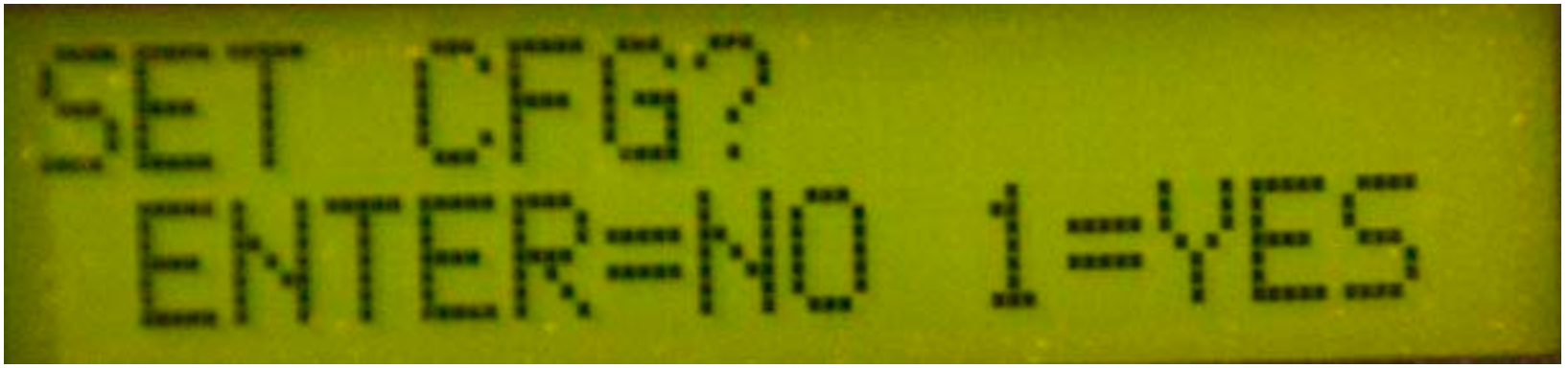

ACTIVE ADR:SHORT
SHORT ADDR: 03


ACTIVATE
THIS ADDR? 1=YES


SETUP ADDRESS
LONG ADDR: 0000

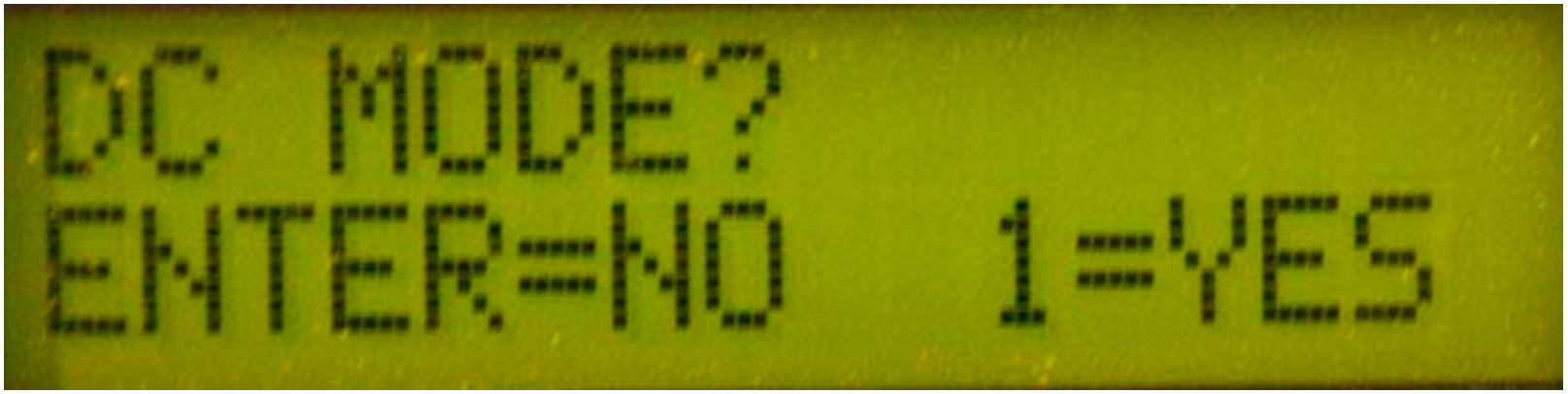

SETUP ADDRESS
LONG ADDR: 465

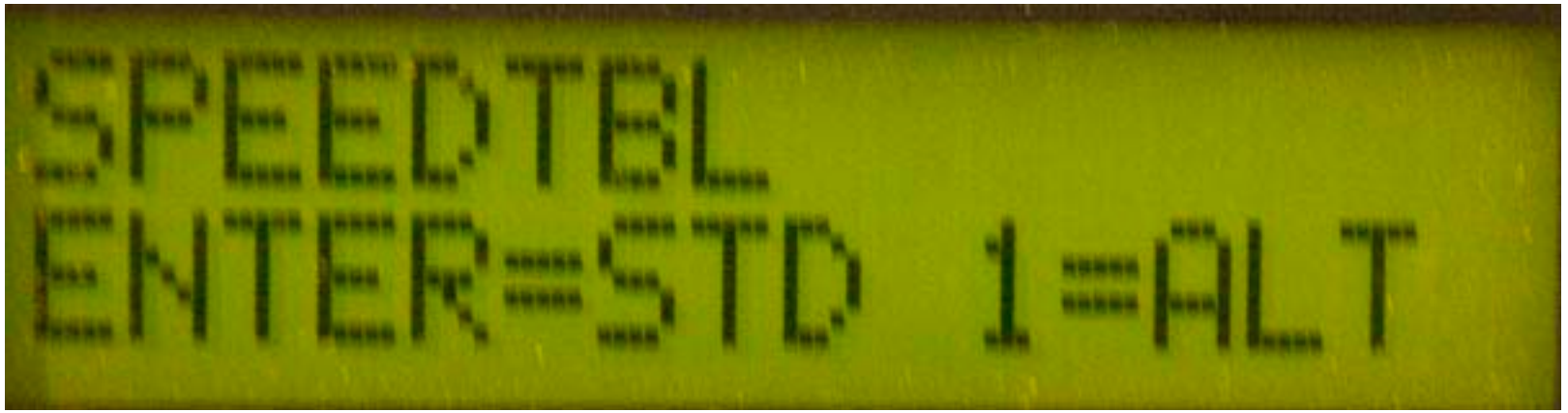

ACTIVATE
THIS ADDR? 1=YES

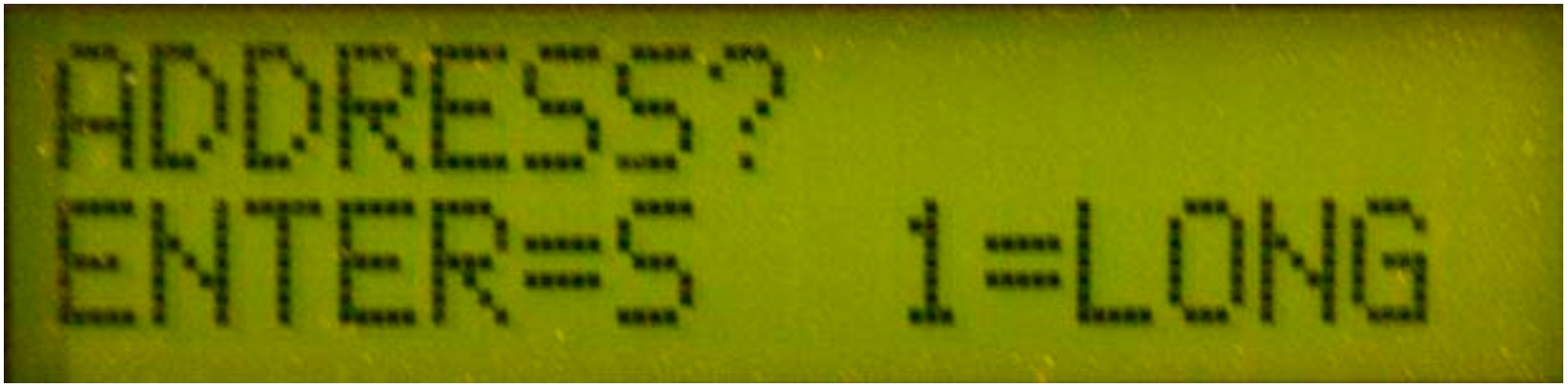

SET CFG?
ENTER=NO 1=YES

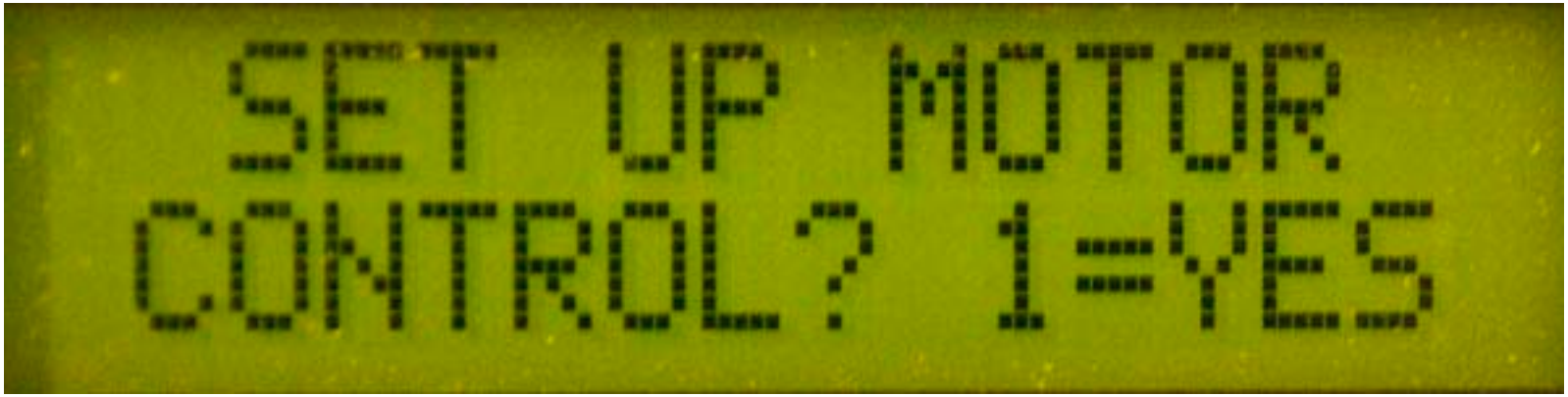

DIR BIT?
ENTER=NORM 1=REV

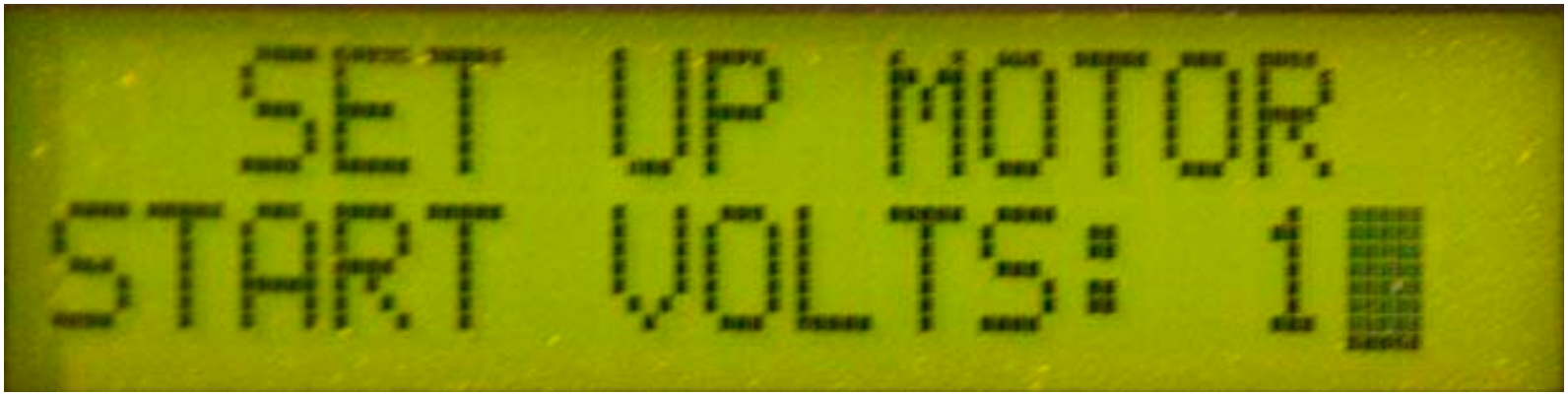

SPD STEP
ENTER=28 1=14

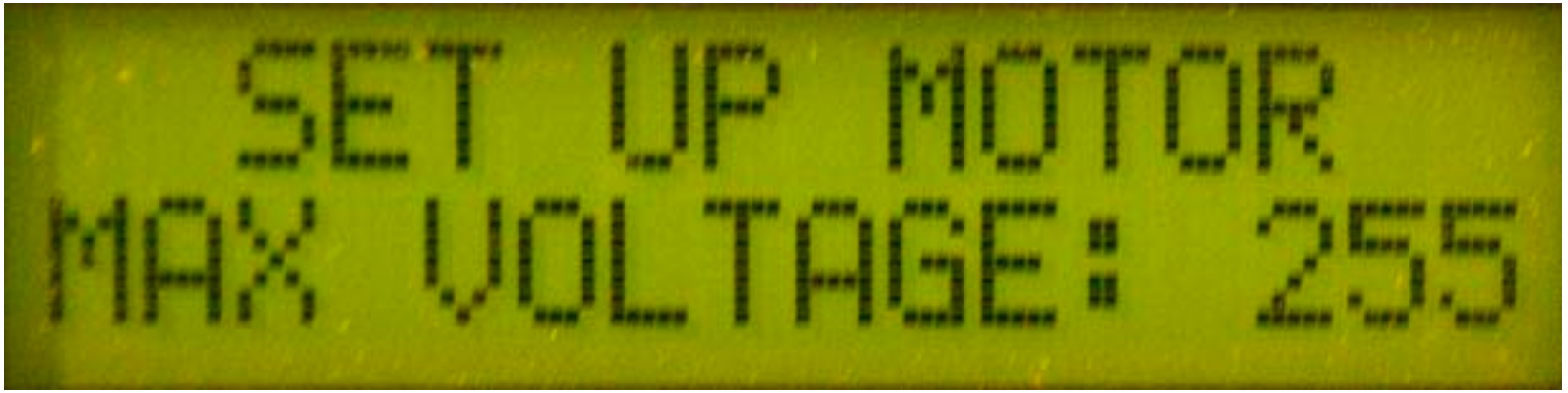

DC MODE?
ENTER=NO 1=YES


SPEEDTBL
ENTER=STD 1=ALT


ADDRESS?
ENTER=S 1=LONG

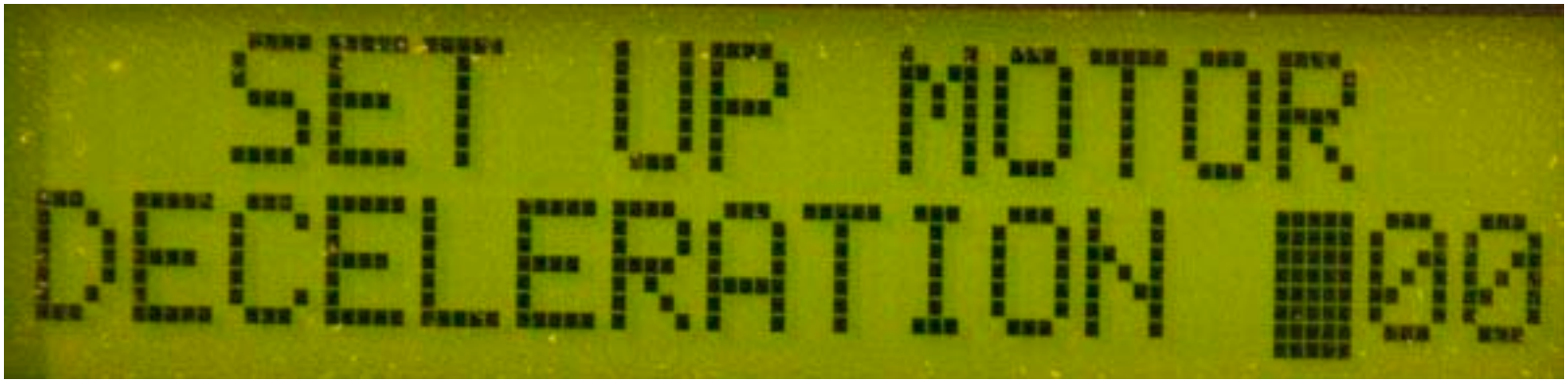

SET UP MOTOR
CONTROL? 1=YES

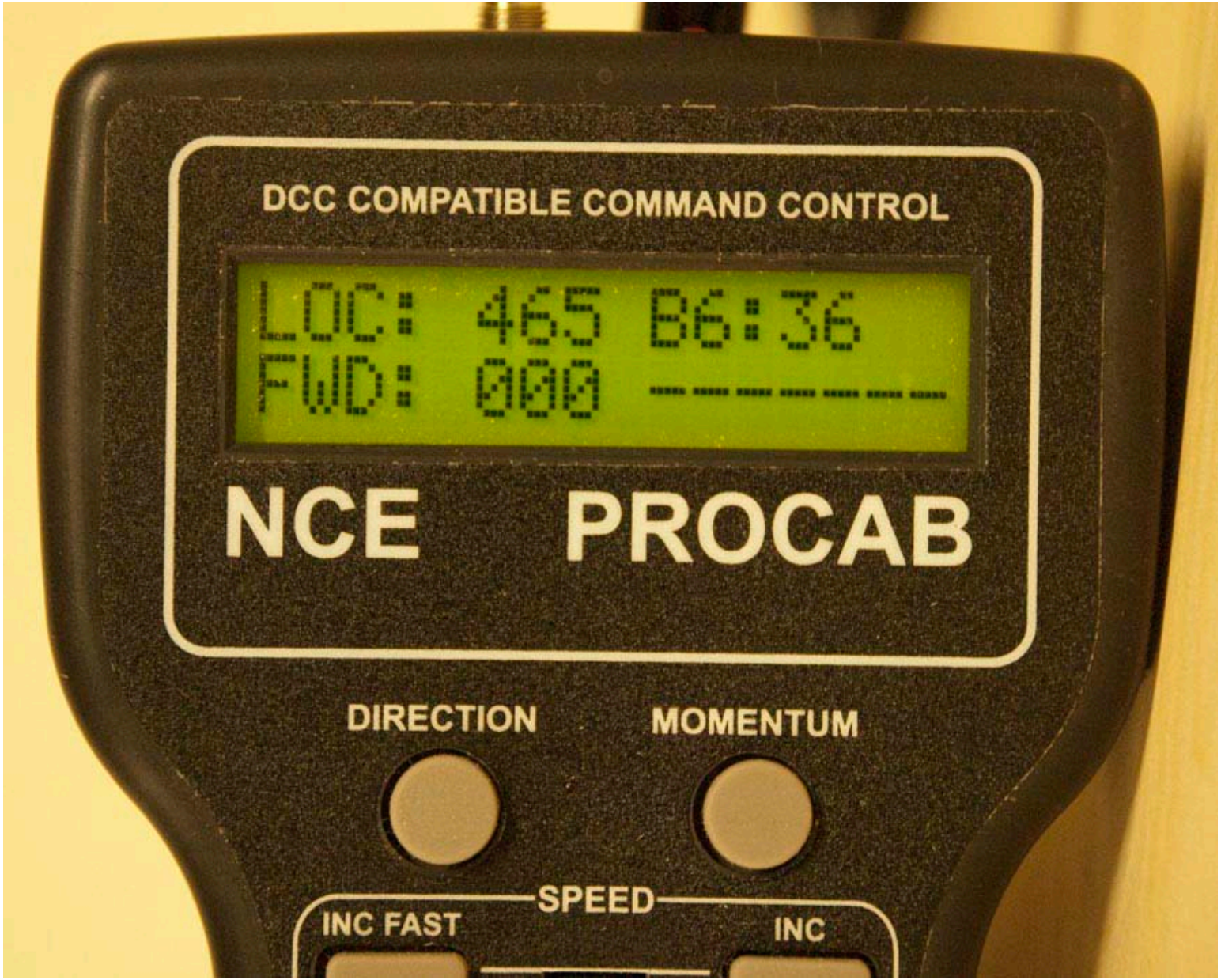

SET UP MOTOR
START VOLTS: 1

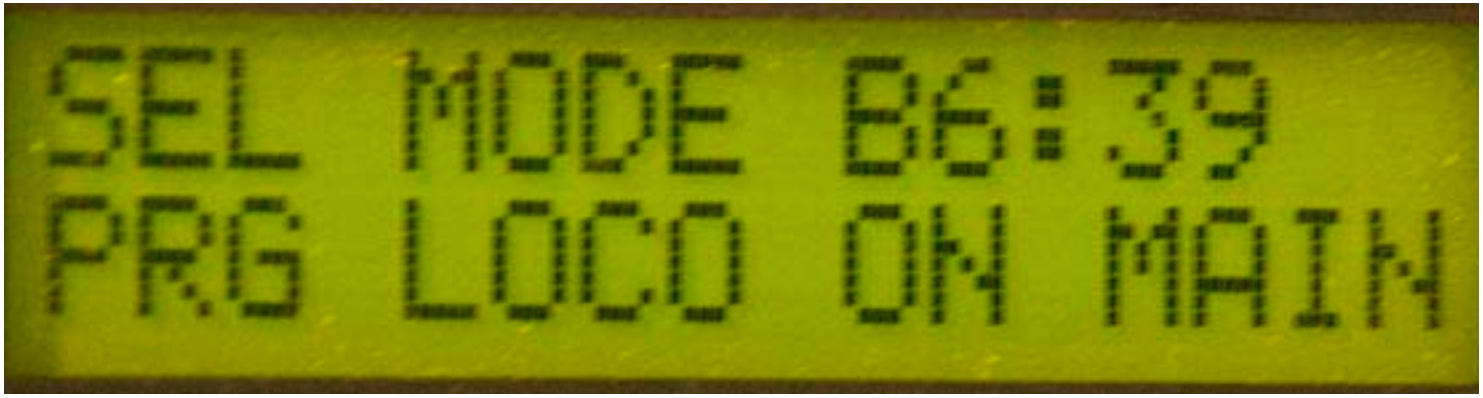

SET UP MOTOR
MAX VOLTAGE: 255


SET UP MOTOR
MID VOLTAGE: 000


SET UP MOTOR
ACCELERATION 000

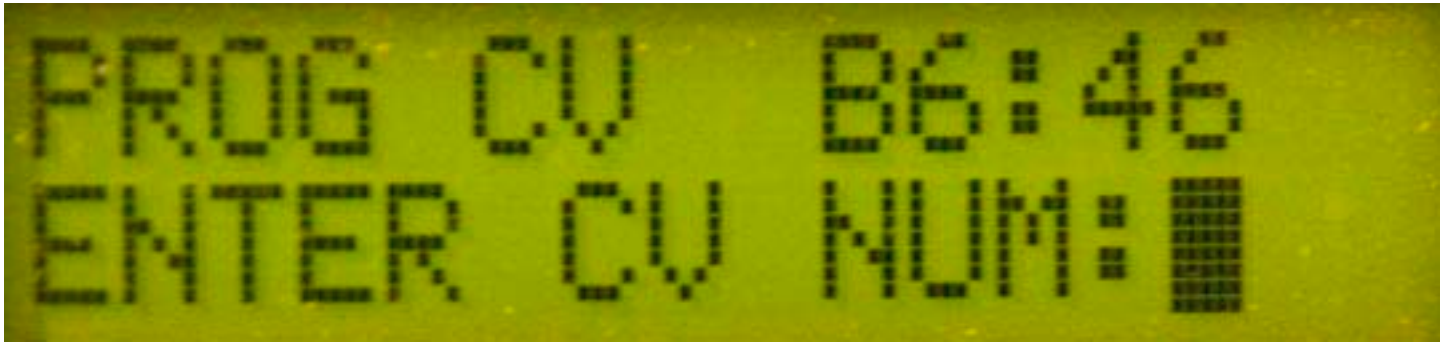

SET UP MOTOR
DECELERATION 000

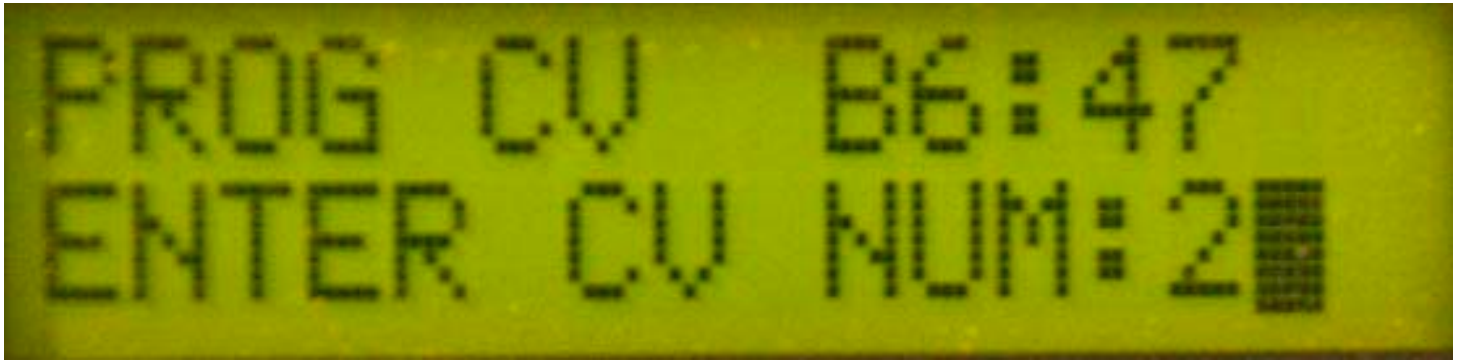

DCC COMPATIBLE COMMAND CONTROL
LOC: 465 B6:36
FWD: 000
NCE PROCAB
DIRECTION
MOMENTUM
SPEED
INC FAST
INC


SEL MODE 86:39
PRG LOCO ON MAIN


OPS PROG 86:43
PROG LOCO: 465


LOC: 465 86:45
1=ADR 2=CV 3=CFG


PROG CV B6:46
ENTER CV NUM:


PROG CV B6:47
ENTER CV NUM:2


PROG CV B7:19
ENTER VALUE: 50

PROG CV B7:27
ENTER VALUE: 055