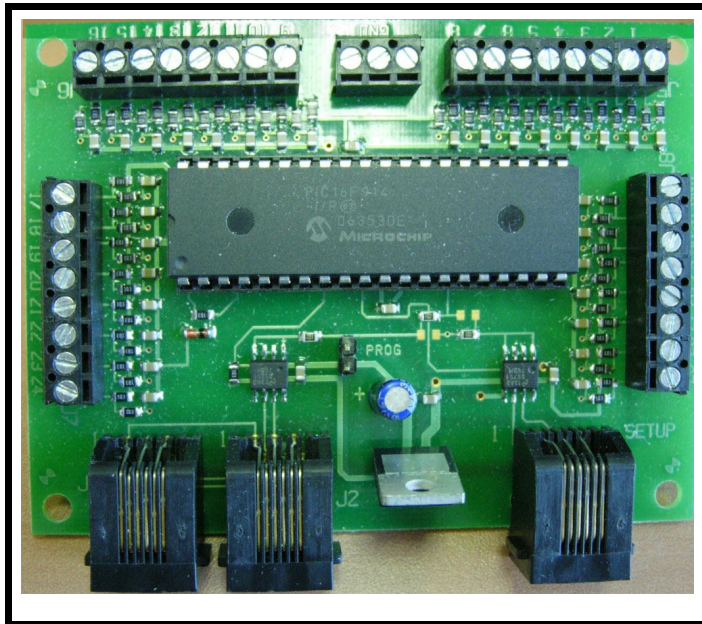# NCE
The Power of DCC

Mini Panel

Accy and Macro Controller

Dimensions: 3.20" x 2.70"   (81 x 69 mm)

Revision 1.00

$49.95

Build the kind of control panels you've always wanted without complicated wiring!

- Use one button to control multiple switches or macros on your NCE DCC
- Up to 30 pushbuttons, toggle switches, block detectors, etc. can be connected for control of turnouts, signals and other devices
- Easy programming, just plug in a ProCab
- Simple hook up, one Cab Bus connection and 2 wires for each pushbutton or other input device
- Can be used to perform simple automatic train control and other layout automation tasks

05240230
05240230

Last revised: 9 December 2008

Description of Mini-Panel

The mini-panel is primarily intended to make it easy to build control panels for yards, towns, interlockings and other layout applications. This manual concerns itself with these aspects of the Mini Panel.

A secondary use of the Mini Panel is to provide rudimentary automation of trains or control of signals. For more information on this aspect of the Mini-Panel the **Mini-Panel Technical Reference** is available for download from our web site: www.ncecorporation.com/pdf

For even more complex automation or signal operation the _Macro_-Panel has more comprehensive implementation of these secondary features and more memory for command storage.

The mini panel has 30 inputs that can be connected to pushbuttons, toggle switches, block detectors, etc. for the purpose of issuing accessory, macro or locomotive control commands. A thirty-first input is provided to act as a panel reset.

Activation (grounding) of an input will initiate sending a string of one or more DCC commands through the track to control turnouts, locomotives, signals or other DCC controlled devices. Inputs are activated by connecting them to the mini panel "GROUND". This makes the mini panel compatible with pushbutton/toggle switches and most block detectors. Virtually any device that provides a "contact closure" to

> Warning: _Do not connect devices that are powered from an external power supply to the Mini Panel_ Any electrical noise from an external supply will be introduced the Cab Bus possibly causing erratic operation of your system.

panel ground can be used.
The mini-panel communicates with the command station via the cab bus and uses one cab bus address. The factory default address is 3.
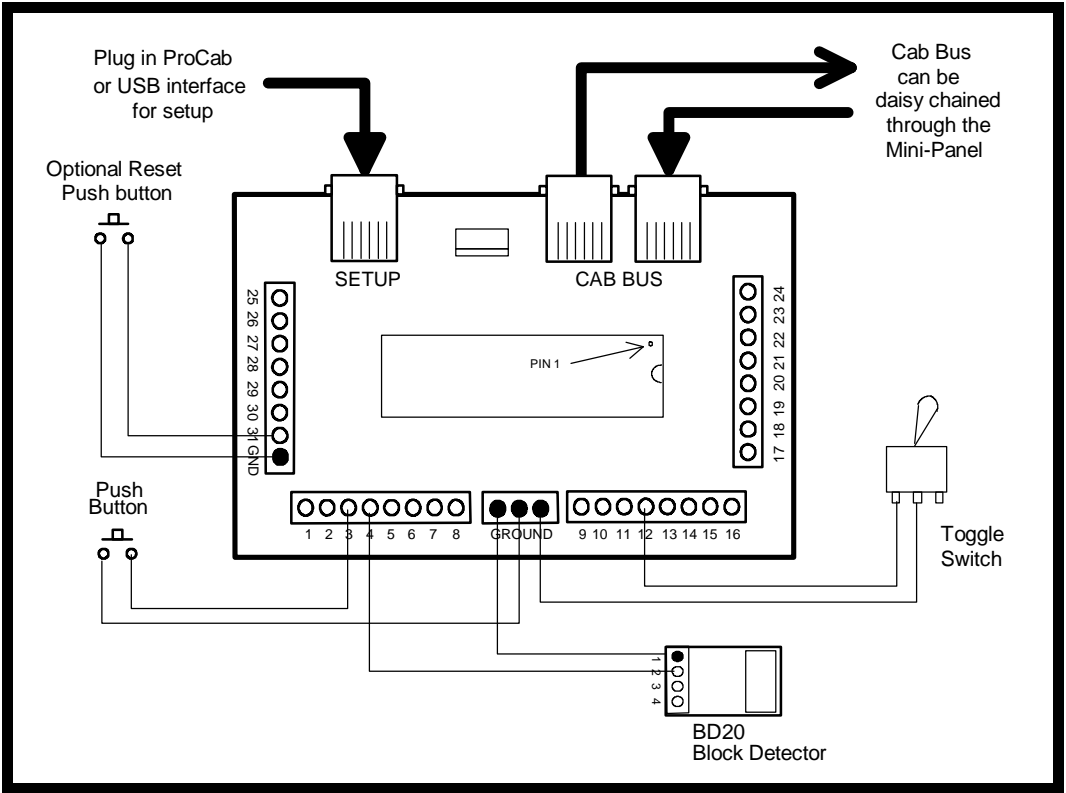
Setup (programming) of the mini-panel is accomplished by plugging a ProCab or NCE USB adapter into the "setup" jack. If USB is used the mini-panel memory is accessed via CV read and write commands (page or direct mode). USB jumpers should be set for PowerCab v1.28. CV7 and CV8 return the manufacturer number and version of the Mini Panel as with a decoder when used with the USB interface. See the Mini Panel Technical Reference for additional USB information.

Installation Notes:

The mini panel runs off Cab Bus power (nominal 12V DC) and draws about 90mA of current, slightly less than a ProCab. NOTE: When used with a PowerCab use the mini panel must be used with the address of 3.
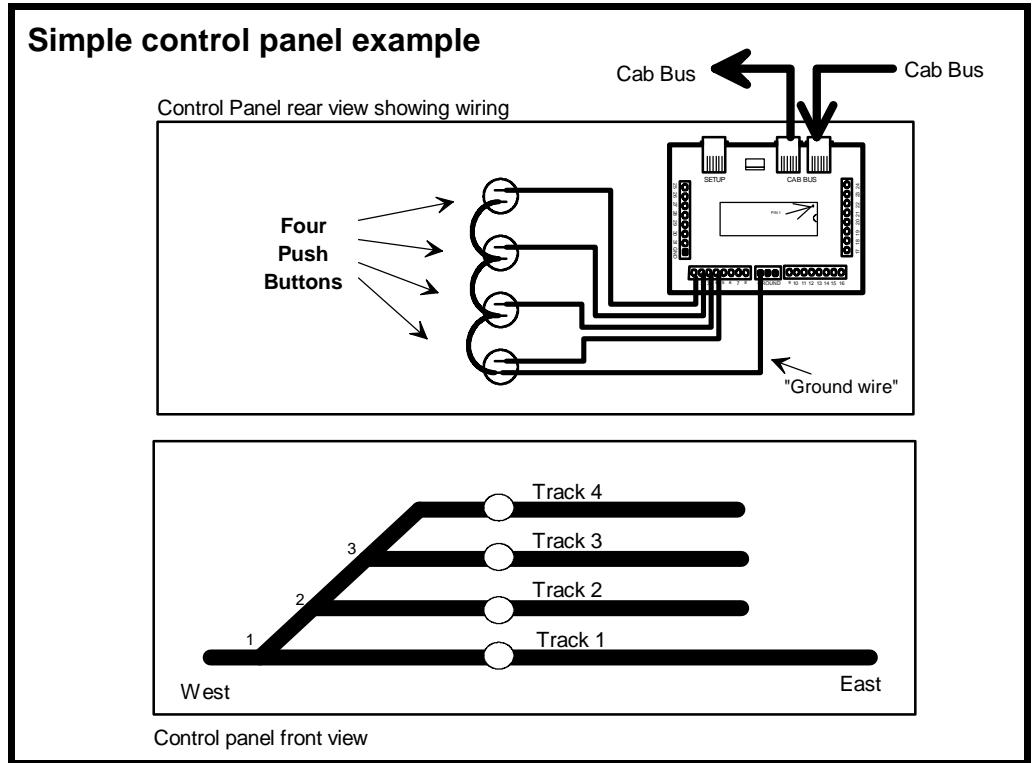
Wiring:
See the diagram below for sample wiring ideas.

Plug in ProCab or USB interface for setup

Cab Bus can be daisy chained through the Mini-Panel

Optional Reset Push button

SETUP

CAB BUS

PIN 1

25 26 27 28 29 30 31 GND

17 18 19 20 21 22 23 24

Push Button

1 2 3 4 5 6 7 8   GROUND   9 10 11 12 13 14 15 16

Toggle Switch

1 2 3 4

BD20
Block Detector

Simple control panel example:
Below is an example of a control panel for a simple yard with 3 tracks off the mainline.
We will need 4 pushbuttons to select the various tracks in the yard or main. We
designated the yard as tracks 2, 3 and 4 with track 1 the main line.

Simple control panel example

Cab Bus   Cab Bus

Control Panel rear view showing wiring

SETUP   CAB BUS

PIN 1

Four
Push
Buttons

"Ground wire"

Track 4

3   Track 3

Track 2

2

1   Track 1

West   East

Control panel front view

Wiring of the mini panel for this example is straight forward. Each pushbutton has two terminals. We connect one terminal from each button together and then tie it to one of the "GND" terminals of the Mini Panel. Then we tie the remaining terminal from each button to a separate input terminal of the Mini Panel. The last connection(s) to be made is the Cab Bus connection. There are two Cab Bus connectors making it easy to 'daisy chain' the Cab Bus through the mini panel. Once the wiring is complete it is time to setup the Mini Panel to send the commands for correct alignment of the yard switches when each button is pushed.

Control panel setup example
In the example there are three DCC controlled turnouts with accessory addresses of 1, 2 and 3 as noted in small text on the panel drawing above.

What we want to accomplish:
Press button 1 to align the turnouts for track 1, press 2 to align for track 2, 3 for track 3 and so on.

Pressing button 1 will need to send the following command
 Accessory 1 (turnout 1) to the Normal (straight position)
Button 2 will need to send
 Accessory 1 to Reverse (diverging) position
 Accessory 2 to Reverse (diverging)
Button 3 will need to send
 Accessory 1 to Reverse (diverging)
 Accessory 2 to Normal (straight)
 Accessory 3 to Reverse (diverging)
Button 4 will need to send
 Accessory 1 to Reverse (diverging)
 Accessory 2 to Normal (straight)
 Accessory 3 to Normal (straight)

To set up the Mini Panel:
  1. Turn off system power or unplug the Mini Panel from the Cab Bus
  2. Plug a ProCab into the "SETUP" jack of the Mini Panel
  3. Turn on the system power or plug in the Cab Bus.

NOTE: a ProCab will only be recognized if it is plugged in to the SETUP jack _before_ Cab Bus power is applied to the Mini Panel.

NOTE: in this example we will be using the Mini Panel at its default cab bus address of 3 so make sure that any other cab bus device with the address of 3 is disconnected.

After several seconds the mini panel will detect the presence of the ProCab and you should see an opening LCD display of:

```
NCE MINI-PANEL
 VERSION 1.OO
```

Press ENTER on the ProCab to get the main display for panel setup

```
1=SETUP 2=MACRO
3=TEST OPERATION
```

We want to setup the panel so press "1" to enter setup mode, this will present the display screen as below

```
SETUP MINI PANEL
1=INPUT 2=CONFIG
```

Press "1" to setup an INPUT.

```
SETUP INPUT MENU
INPUT NUMBER: 01
```

We will start programming the inputs with input number 1. Type "1" followed by "ENTER" to program input number 1

```
SETUP INPUT MENU
 STEP NUMBER:  1
```

Normally when setting up an input we start with step number 1. We want to start programming at step 1 so just press ENTER to accept that step. Commands will be sent from the Mini Panel in order of their step number until an 'empty' step is encountered or four steps are completed.

```
INP: 01   STEP: 1
1=ACCY 2=MACRO
```

At this point we're ready to tell the mini panel exactly which command to send when button 1 is pushed. Press "1" to send an accessory command.

```
INP: 01   STEP: 1
ACCY NUMBER:
```

Type the accessory number "1" followed by "ENTER". Allowable NMRA accessory addresses are 1-2044. Accessory number 2044 is the broadcast address for accessories. There is no accessory address 0.

```
INP: 01   STEP: 1
1=NORM 2=REV
```

Press "1" to send the accessory command for Normal when button 1 is pressed.

```
INP: 01   STEP: 2
1=ACCY 2=MACRO
```

Note that the step number has increased to 2 indicating the last command has been accepted and the Mini Panel is ready for the next command for this input. We don't need any more commands for this input so press "PROG/ESC" to return to the main menu.

```
1=SETUP 2=REVIEW
3=TEST OPERATION
```

Let's review the command that has just been programmed. Press "2" to review.

```
1=SETUP 2=REVIEW
REVIEW INPUT:
```

Type "1" and press "ENTER" to review the command sent by input number 1

```
INP: 01   STEP: 1
ACCY: 001 NORM
```

The LCD now displays the accessory number (1) that we entered and the turnout position (Normal).   Press "ENTER" to see the next step for this input

```
INP: 01   STEP:  2
        --END--
```

The display now indicates that there are no more entries programmed into this string. At this point you may continue pressing "ENTER" to cycle up through all the command steps if you wish. The Input and step numbers will be displayed as well as a description of the command for that step.   Press "PROG/ESC" to return to the main menu.

```
1=SETUP 2=REVEIW
3=TEST OPERATION
```

At this point we have programmed and reviewed the command(s) that will be sent when input number 1 is grounded.   The command can be tested by pressing "3".

```
TESTING
INPUT NUMBER:  01
```

Press "1" followed by "ENTER" to test input 1.   The command string associated with input number 1 will be sent.

```
1=SETUP 2=REVIEW
3=TEST OPERATION
```

Putting the Mini Panel into test mode will also allow testing of any input by grounding that input number. Pressing any button on the ProCab will return the Mini Panel to setup mode.

Finishing programing:
At this point we have programmed, reviewed and tested the command(s) that will be sent when input number 1 is grounded.   In a similar manner we can program the commands for inputs 2,3 and 4 using the proper accessory or macro commands.

Other Useful Commands:

Link:
If you need more than 4 steps for an input you can "link" to the steps associated with another command. It is unusual that a control panel will need to use all thirty inputs. You can use the command steps for one or more of those inputs by linking to that input number.

Example: Assume that you need 6 steps for input number 1. Program the first 3 steps with the first three commands you want performed when input 1 is grounded. When you get to step 4 do not enter the fourth command, instead select the LINK command as follows.   Press "ENTER" at the following prompt to see more command options:

```
INP: 01   STEP:  4
1=ACCY 2=MACRO
```

You will see more commands.

```
INP: 01   STEP:  2
3=LOCO 4=SIGNAL
```

Press "ENTER" again to see the "OTHER CMDS" Prompt.

```
INP:  O1   STEP:  2
5=OTHER  CMDS
```

Press "5" to be presented with "OTHER" commands that are available

```
SELECT  CMD  GROUP
1=DELAYS  2=WAIT
```

Press "ENTER" to see even more options

```
SELECT  CMD  GROUP
3=LINK  4=CV  PROG
```

Press "3" to select the LINK command.

```
SELECT  CMD  GROUP
LINK  TO  INPUT:
```

In our simple example any input from 5 through 30 is available. Enter the input
number for the link (30 would be a good number) followed by "ENTER".

```
SELECT  CMD  GROUP
CMD  BUFFER  FULL
```

CMD BUFFER FULL indicates that all four command steps have now been used for
input number 1.   Press "ENTER" to get back to the main menu as follows:

```
1=SETUP  2=REVIEW
3=TEST  OPERATION
```

Press "1" to setup an INPUT.

```
SETUP  INPUT  MENU
INPUT  NUMBER:  3O
```

We want to continue with the remainder of the command steps from input 1 at input
30.
We will start programming the inputs with input number 1. Type "3" "0" followed by
"ENTER" to program input number 30

```
SETUP  INPUT  MENU
 STEP  NUMBER:  1
```

Press "ENTER"

```
INP:  3O   STEP:  1
1=ACCY  2=MACRO
```

At this point continue entering the commands in the normal manner

Delay Command:
You can use the delay command to insert a pause between command steps. This is
useful for spreading out commands to accessory decoders that do not respond to
multiple commands to the same decoder (MRC, CVP and Lenz have this problem).
There are two delay commands. One inserts a delay in increments of four seconds
and the other delays in increments of ¼ second.

Example: Assume that you need a 1 second delay between two accessory commands
for input 3. Program the first step with the desired accessory command then when

you get to step 2 do not enter the second accessory command, instead select the DELAY command.

To access delay commands:
Press "ENTER" at the following prompt to see more command options:

```
INP: O3   STEP:  2
1=ACCY  2=MACRO
```

You will see more commands.

```
INP: O1   STEP:  2
3=LOCO  4=SIGNAL
```

Press "ENTER" again to see the "OTHER CMDS" Prompt.

```
INP: O1   STEP:  2
5=OTHER  CMDS
```

Press "5" to be presented with "OTHER" commands that are available

```
SELECT  CMD  GROUP
1=DELAYS  2=WAIT
```

Press "1" to use the DELAY command.

```
SELECT  INTERVAL
1=4SEC  2=1/4SEC
```

We want a 1 second delay. The 4 second interval will be too long so press "2" to select the ¼ second interval delay command.
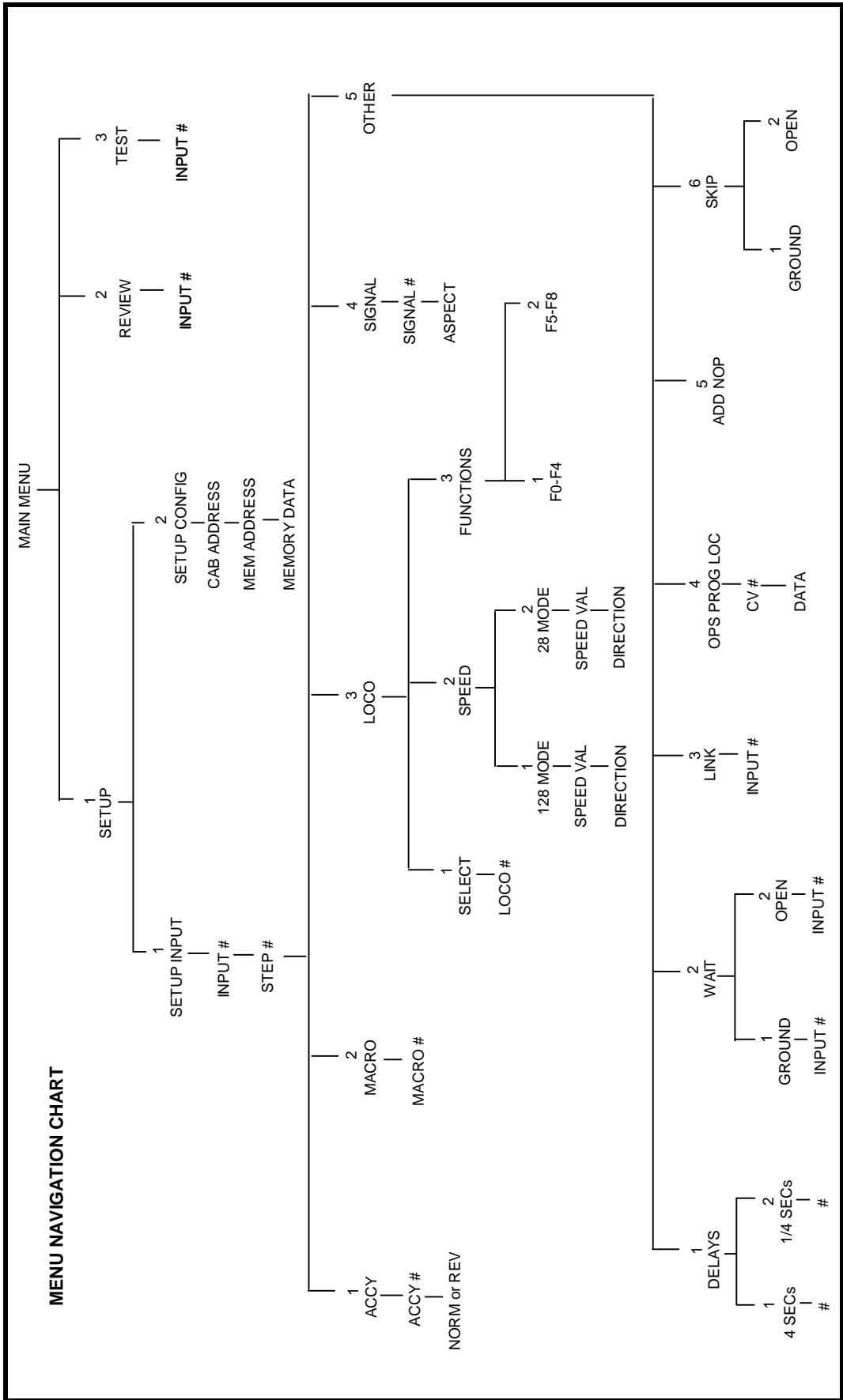
```
SELECT  CMD  GROUP
NUM  1/4  SEC:  OO
```

Press "4" followed by "ENTER" to introduce a 1 second delay (4 x ¼ = 1).

```
INP: O3   STEP:  3
1=ACCY  2=MACRO
```

Note that the step number is now 3. The delay command uses up one command step. Proceed to program the second accessory command as normal.   When input 3 is grounded the first accessory command will be sent immediately. After a 1 second delay the second accessory command will be sent.

NOTE: The Mini Panel will do nothing while it is performing a delay. If you use a very long delay activity on other inputs may be missed. With the short delays

MENU NAVIGATION CHART

MAIN MENU

1 SETUP
- 1 SETUP INPUT — INPUT # — STEP #
- 2 SETUP CONFIG — CAB ADDRESS — MEM ADDRESS — MEMORY DATA

2 REVIEW — INPUT #

3 TEST — INPUT #

ACCY
- 1 ACCY — ACCY # — NORM or REV
- 2 MACRO — MACRO #
- 3 LOCO
  - 1 SELECT — LOCO #
  - 2 SPEED
    - 1 128 MODE — SPEED VAL — DIRECTION
    - 2 28 MODE — SPEED VAL — DIRECTION
  - 3 FUNCTIONS
    - 1 F0-F4
    - 2 F5-F8

5 OTHER
- 1 DELAYS
  - 1 4 SECs — #
  - 2 1/4 SECs — #
- 2 WAIT
  - 1 GROUND — INPUT #
  - 2 OPEN — INPUT #
- 3 LINK — INPUT #
- 4 OPS PROG LOC — CV # — DATA
- 5 ADD NOP
- 6 SKIP
  - 1 GROUND
  - 2 OPEN

4 SIGNAL — SIGNAL # — ASPECT

Command Descriptions:

The following commands can be setup through the ProCab user interface and sent by the Mini Panel:

Accessory/Macro commands covered in this manual

- Accessory Command - all NMRA standard accessory addresses (1-2044) can be sent via the accessory command
- Macro command - all NCE macro numbers (0-255) can be sent via the Macro command
- Link Command
- Delay Command

For a complete description of the other commands shown in the MENU NAVIGATION CHART on page 9 see the Mini Panel Technical Reference.

Locomotive commands - Speed and functions may be controlled
- Select loco .
- Speed commands
- Function commands

Signal commands
- Signal Command

Other commands

There are 6 groups of 'other' commands executed by the Mini Panel. These commands do not result in a DCC command being sent but control the flow of the commands from the Mini Panel.
- Delays
- Wait
- Link
- OPs Prog CV
- Skip
- Nop
- Terminate

Disabling inputs

The sending of commands when certain inputs are grounded can be disabled

Continuous Memory

Command strings are normally limited to 4 commands per input (unless you LINK to another command). This limitation can be removed for the writing of layout automation "programs".   Memory can be made continuous above a certain input number so that up to a total of 124 commands can be strung together.

Warning: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Warranty

This product is fully factory tested and warranted against manufacturing defects for a period of 1 year. As the circumstances under which this product is installed can not be controlled, failure due to installation problems can not be warranted.   This includes misuse, miswiring, operation under loads or voltages beyond the design range of the product.

For warranty or non-warranty repair/replacement send the product (an any payment, if required) to:

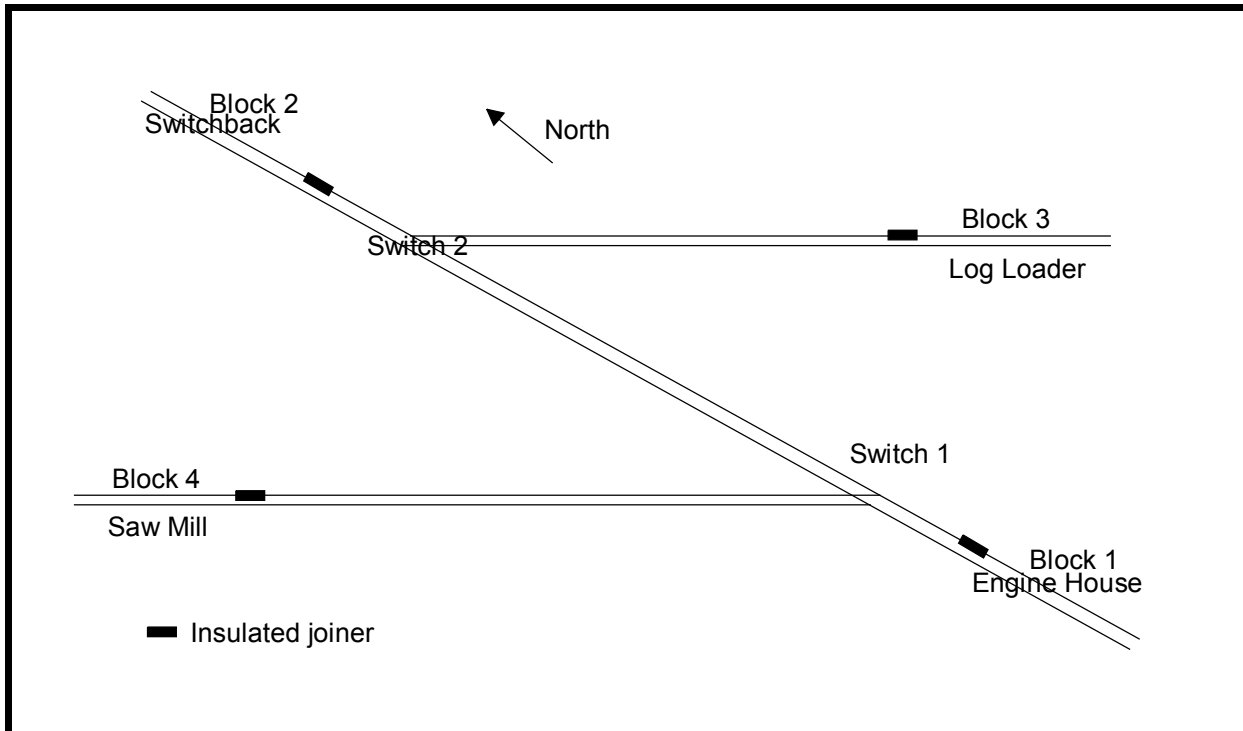**NCE Warranty Center   82 East Main St.   Webster, New York 14580**

05240230
05240230

Circuitron display layout

Our test layout:

Turnouts aligned for "straight" are in Normal position
Loco forward is heading North

System wiring
Block 1 = input 11
Block 2 = input 12
Block 3 = input 13
Block 4 = input 14
Start button = input 15 (optional)

System configuration
Power up command = 31
Set memory location 3 = 15 (continuous memory starts with input 15)
Set memory location 4 = 10 (grounding of inputs starting at input 10 will not cause command string for that input to be executed)

Command Programming for each input

Input 31 (this command string is executed at each power up of the mini panel)
Step 1 Select loco 3 we will always use loco 3
Step 2 Prog CV 4
Step 3 Data 35
Step 4 Link to 30

Input 30
Step 1 Prog CV 3
Step 2 Data 25
Step 3 Link to input 15

Circuitron display layout

Input 15 (start button):
Step 1 Select Loco 3   Select which loco we want to run
Step 2 Accy: 1=Norm   align for main
Step 3 Accy: 2=Norm   align for main
Step 4 Wait input 11 ground start if loco in block 1

Input 16
Step 1 Speed Fwd:10   start loco moving north (all speed commands in 28 speed mode)
Step 2 Wait input 12 ground wait until we get to block 2
Step 3 Speed Fwd: 0   coast to stop
Step 4 Delay 4 sec: 2   kill time (8 seconds) while loco comes to a stop

Input 17
Step 1 Speed Rev: 0   not *really* needed here but we want headlight to change direction
Step 2 Accy: 2=Rev   throw switch for log siding
Step 3 Speed Rev: 10   accelerate toward
Step 4 Wait input 13 ground wait for loco to get to block 3

Input 18
Step 1 Speed Rev: 0   coast to stop
Step 2 Delay 4 sec: 2   kill time (8 seconds) while loco comes to a stop (and clears switch)
Step 3 Delay 4 Sec: 3   allow 12 more seconds to load logs
Step 4 Speed Fwd: 10   head back toward mainline

Input 19
Step 1 Wait input 12 ground wait until we get to block 2
Step 2 Speed Fwd: 0   coast to stop
Step 3 Delay 4 sec: 2   kill time (8 seconds) while loco comes to a stop (and clears switch)
Step 4 Accy 2=Norm   throw switch for mainline

Input 20
Step 1 Speed Rev: 10   accelerate toward block 1
Step 2 Wait input 11 ground wait until we get to block 1
Step 3 Speed Rev: 0   coast to stop
Step 4 Delay 4 sec: 2   kill time (8 seconds) while loco comes to a stop (and clears switch)

Input 21
Step 1 Accy 1=Rev   Throw switch for sawmill siding
Step 2 Speed Fwd: 10   head back toward mainline
Step 3 Wait input 14 ground wait until we get to block 4
Step 4 Speed Fwd: 0   coast to stop

Input 22
Step 1 Delay 4 sec: 2   kill time (8 seconds) while loco comes to a stop (and clears switch)
Step 2 Delay 4 Sec: 3   allow 12 more seconds to unload logs
Step 3 Speed Rev: 10   head back toward mainline
Step 4 Wait input 11 ground wait until we get to block 1

Input 23
Step 1 Speed Rev: 0   coast to stop
Step 2 Delay 4 sec: 2   kill time (8 seconds) while loco comes to a stop (and clears switch)
Step 3 Accy 1=Norm   throw switch for mainline
Step 4 Terminate   end of program

Hookup of BD20 to signal when train in block and when train leaves block
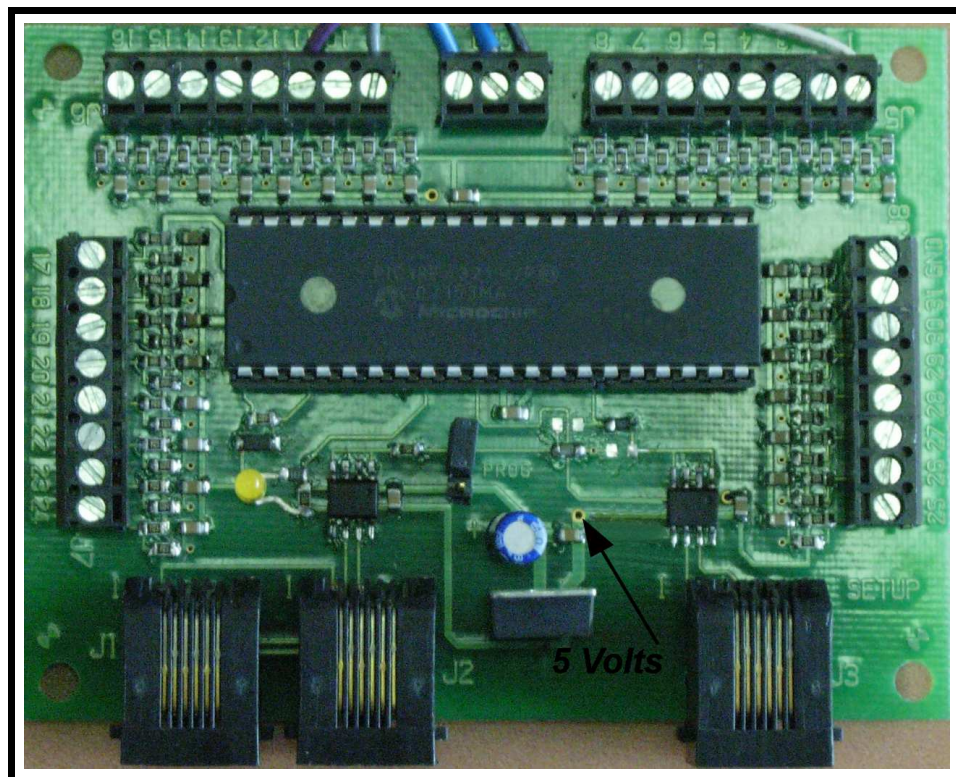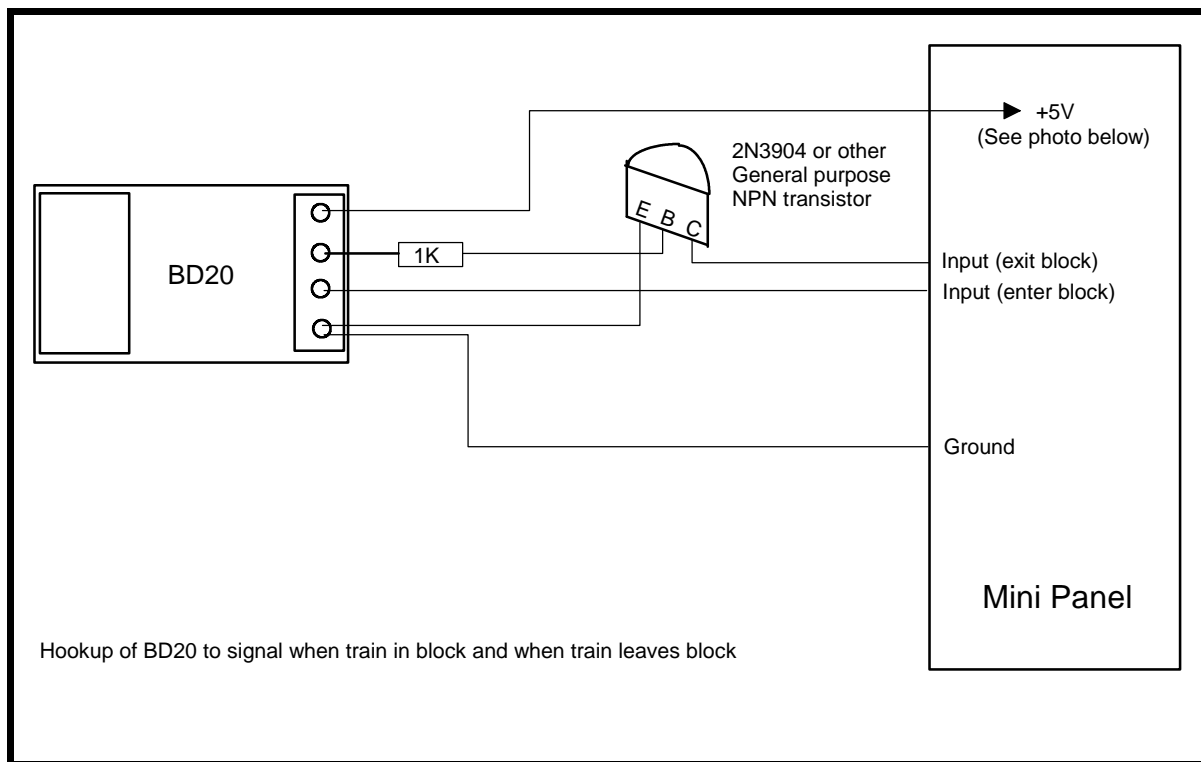
5 Volts

Five volts is available on the mini panel by soldering a wire to the indicated hole (above). To avoid potential damage to the mini panel or BD20 use only the 5 volts from the mini panel. There are no specific voltage or current requirements for the transistor as long as it is an NPN transistor. The 1 K resistor can be any wattage, 1/4 Watt is the most common.

Plug in ProCab
or USB Interface
for setup

Cab Bus
can be
daisy chained
through the
Mini-Panel

SETUP

CAB BUS

Pin 1

Optional Reset
Push Button

25 26 27 28 29 30 31 GND

17 18 19 20 21 22 23 24

1 2 3 4 5 6 7 8   GROUND   9 10 11 12 13 14 15 16

BD20

BD20

BD20 Signal

BD20 Signal

BD20 Ground

BD20 Ground

It is only necessary to gap one rail

It is only necessary to gap one rail

Track

Track

Track

LOC:1234 12:00AM
FWD: 000 L1=3----

NCE *Power*CAB

Hook Up
Power Cab using the Mini Panel
to automate a loco going forward/reverse