CAMPDEN INSTRUMENTS LIMITED

INSTRUCTION MANUAL

FOR

BNC MKI Control System

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Mk1 Controller and 9 Hole box set-up Information

1. Setting-up the MK1 controller

1.1. Power supply

Connect the two power leads to power the two 110V mains supplies, one for the internal PC operating the embedded QNX software and the second for the internal 24V DC Power supply. (See picture 1)

1.2. Network connection

The system can be operated using direct connection to a PC using the Cross-over cable supplied or as part of a network, by patching the controller in to a network hub (See picture 1). The IP address has been set as labeled on the MK1 controller, this can be changed (See chapter 2 -*Modifying IIP and broadcast address).*

1.3. Advantech Cards

There are two Advantech cards in the controller which operate the digital inputs and outputs. The plug need to be attached as shown in picture 1, ensuring that Con 1 is the left connector and Con 2 is on the right, they also need to be inserted correctly and fully home.

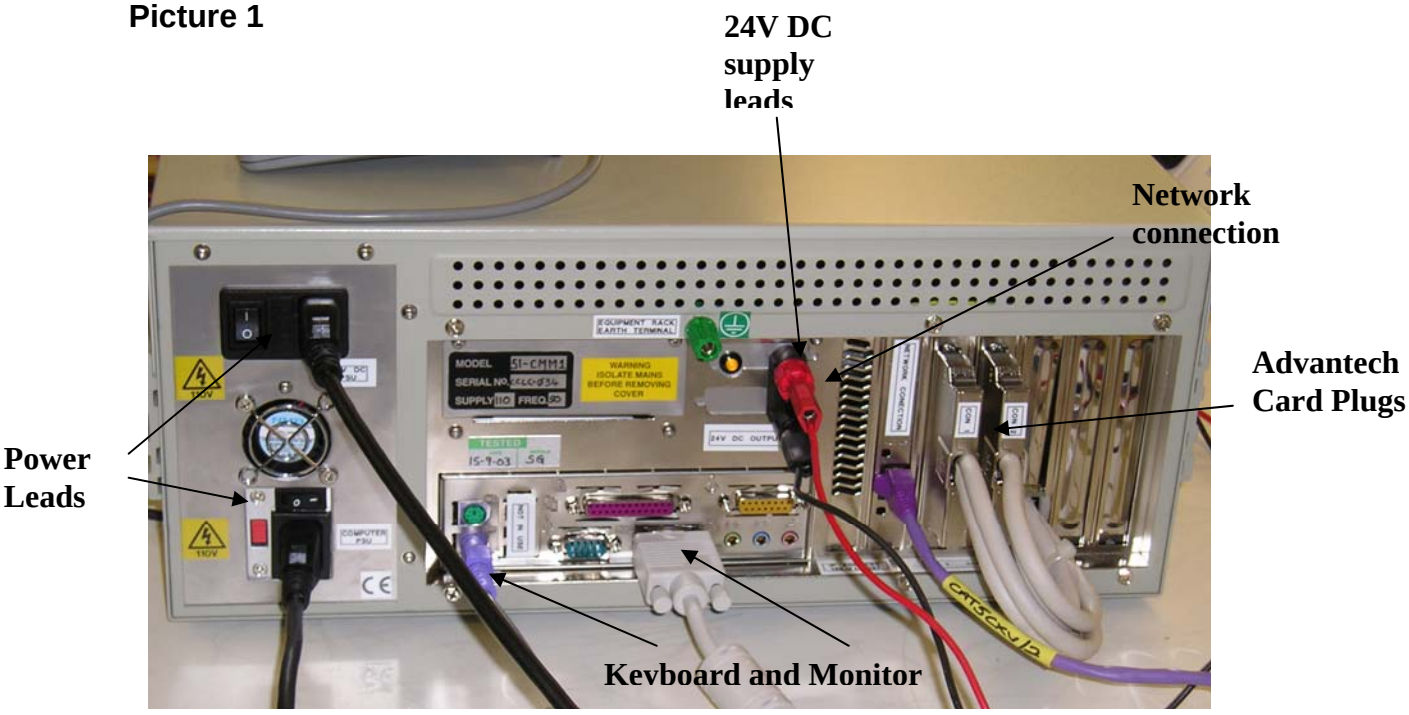
1.4. Keyboard and Monitor

The keyboard and monitor will not be required for the general operation of the system, but if required for fault diagnosis should be connected as shown in picture 1.

1.5. 24V DC supply

The Internal 24V DC power supply for the equipment has the output terminals at the rear of the controller. These are normally attached to a power-rack. The terminals are capable of taking low current 4mm plug or high current crimp terminals, theses are attached by unscrewing the red and black terminals to reveal the pillar and holes for pin connections. The terminals need to be screwed back down onto the connector to ensure good connection.

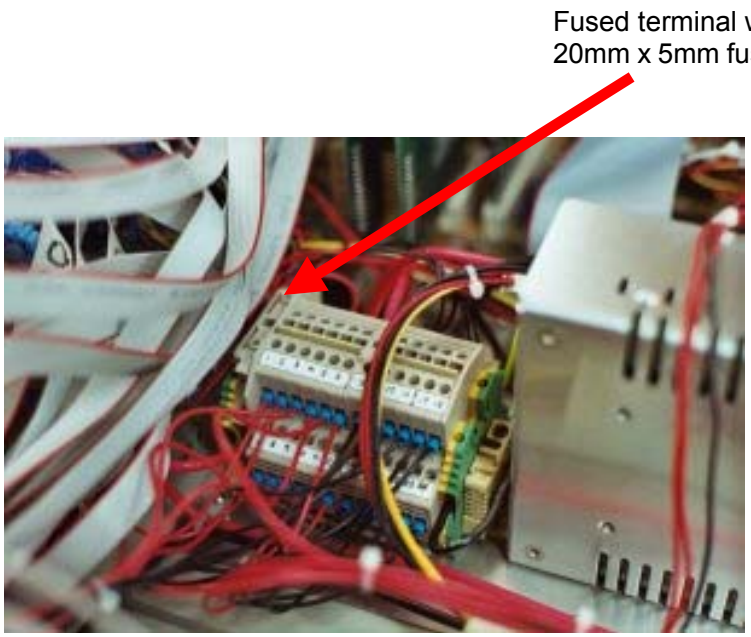
Picture 1



1.6. 24V DC Fuse position

In the event of a loss of the 24V DC supply, the Control system has an internal fuse supplying the 24V DC supply, the position of this is shown in Picture 2 shown below.

Picture 2



2. Modifying IP and Broadcast Address on QNX Embedded Software

You may need to change the IP address of the controller, to fit your own network. The following explains how to do this.

2.1. Conventions used in this section

Text to be typed at the terminal is indicated by use of the courier new font. Unless otherwise indicated, text should be typed exactly as seen, including spaces; each line should be followed by a carriage return (press the enter key). Where additional returns are required, they are indicated by the symbol
□̃

Items that can be seen on the screen are indicated by use of an *italic font*.

2.2. Step 1: Initial set up

Connect power to the controller, a keyboard and monitor will be required and connected. Power up the system and wait till the flashing cursor appears after the hash sign, the system is now ready.

2.3. Step 3: Familiarise yourself with QNX

(If you are already familiar with these applications, you can skip straight to Step 4).

2.3.1. To change to a directory enter:

cd <directory name>

e.g.

cd /home/james

2.3.2. To view the contents of a directory:

ls

Optionally, enter the following to get more details about the directory contents:

ls -l

2.3.3. To view the contents of a file:

cat <file name>

e.g.

cat /log

2.3.4. To edit the contents of a file:

vim <file name>

e.g.

vim /tnt/tnt.properties

2.3.5. How to edit files using vim:

Vim is a command line text editor and can be used on a Control Unit to edit certain configuration files. When using vim, there are two modes of operation: command mode and insert mode.

By default, vim starts in command mode. In this mode you can create new lines, navigate around the contents of a text file using the keys h, j, k and l delete characters, save and close files and so on.

Important commands in command mode:

h – move the cursor left

l – move the cursor right

k – move the cursor up

j – move the cursor down

i – enter insert mode

x – delete the character under the cursor

o – create a new line and enter edit mode on that line

dd – delete the selected line

:q! – exit without saving changes

:wq – exit and save changes

In insert mode you can type in plain text, but you can't navigate around the file. To exit insert mode and return to command mode, press escape.

2.4. Step 4: Changing the IP Address

With the system booted and ready, type the following commands

Remember if at anytime you are unsure of any changes made, use the :q! command to leave without saving

- vim /etc/ipaddr (this allows you to edit the information on the embedded software)
- dd (the IP address will be deleted)

- i (this puts you in insert mode)
- Now type in the new IP Address e.g. 192.168.0.226
- Esc (takes you out of insert mode)
- :wq
-

2.5. Step 5: Changing the Broadcast address

Remember if at anytime you are unsure of any changes made, use the :q! command to leave without saving

With the system booted and ready, type the following commands:

- vim /tnt/tnt.properties (this allows you to edit the information on the embedded software)
- j (allows you to navigate down the screen, press this key until you reach the text *TNT_ADDRESS_BROADCAST*=)
- o (ensure the cursor is on the above line before pressing this key, this action will insert a new line)
- At this new line type in the following in the exact format
- TNT_ADDRESS_BROADCAST=10.2.1.0
- Esc (takes you out of insert mode)
- Ensure cap lock is off
- k (type once to take you to the old line, the cursor should go up one line)
- dd (this deletes the old line, and should leave the new line created)
- :wq
-

2.6. Step 6: Checking changes

Once the above modifications have taken place and the system has been re-started, it is advisable to check the changes that have been made. To check the changes that have been made you need to view the contents of the file, this is achieved using the command explained in section 1.2.3 as follows:

cat <file name>

e.g.

cat /etc/ipaddr (This will display the current IP address)

or

cat /tnt/tnt.properties (This will display the current Broadcast address)

In addition to the IP address and Broadcast Address it is also possible to check the system settings for the network the is achieved using the following command:

- ifconfig -a (This will display the current network settings)

2.7. Step 7: Re-starting system

When all changes have been confirmed the system is now ready for use. Use the current start up procedures to reinstate the controller to operational conditions.

3. Connecting Campden 9-hole boxes (Mouse or Rat)

3.1. Connecting the Noise Generator

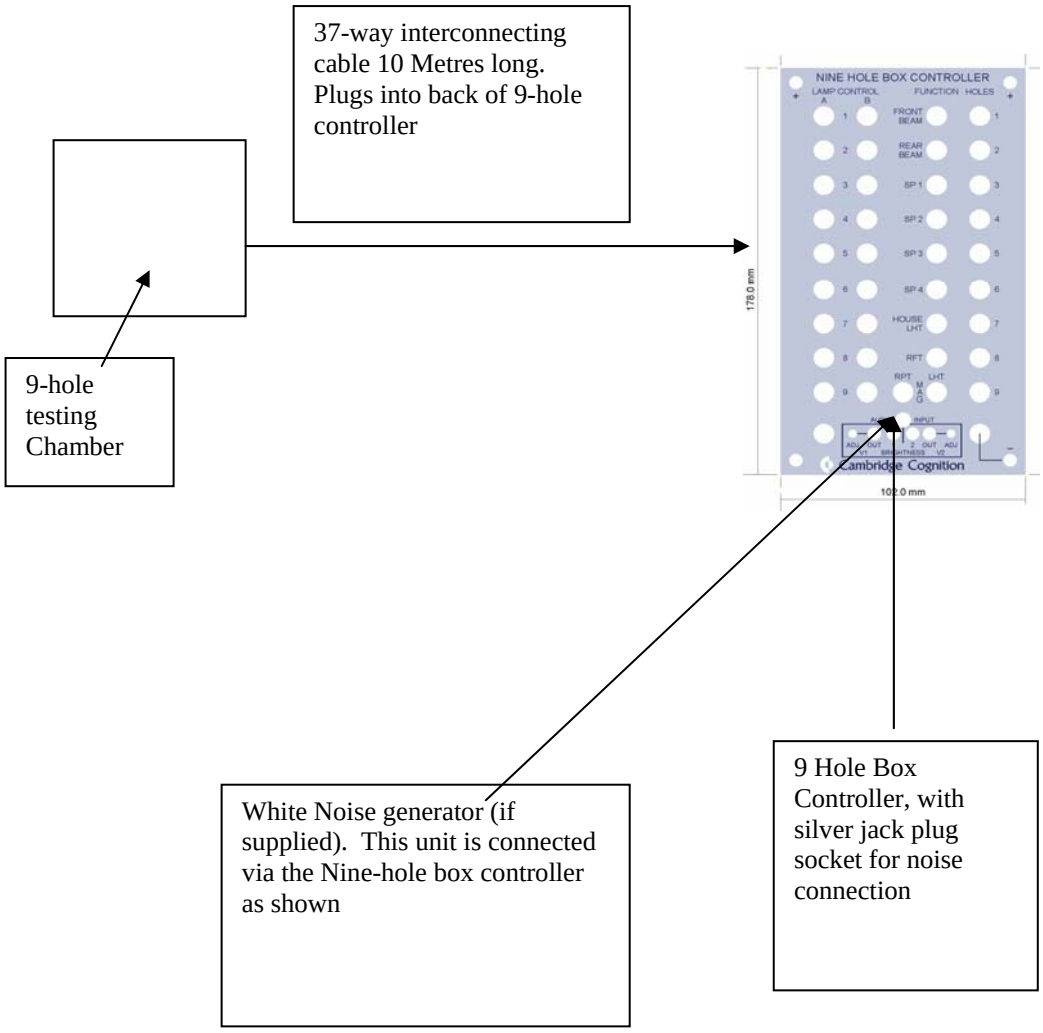


Fig 1 showing connection of Noise Generator into Nine Hole Box controller

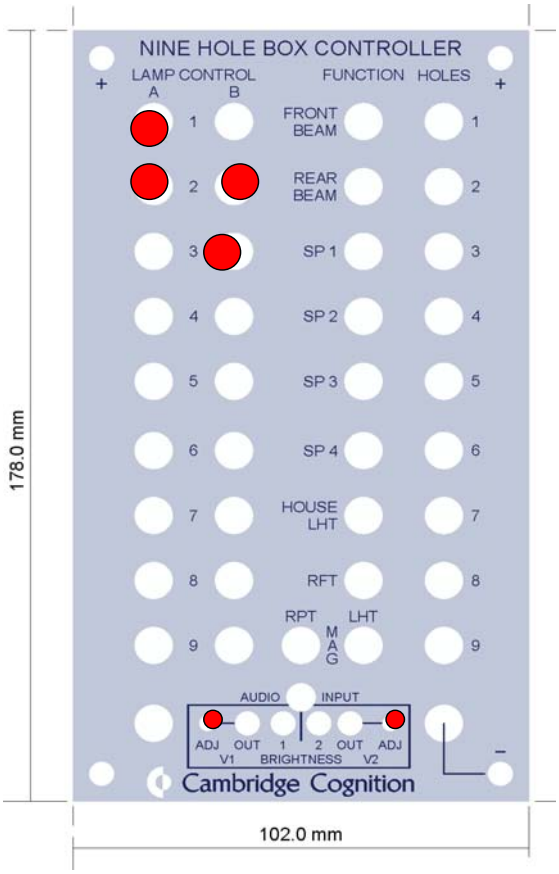
3.2. Analogue dimming of the stimulus lights

Analogue dimming of the stimulus lights is achieved by connecting both outputs A and B for each lamp. The different combinations available are shown in the table below.

Matrix for Lamp control

Out put connected to lamp control sockets	ADJ for V1	ADJ for V2
A	No Dimming	No Dimming
A + B	Dimming	Not used
B	Not used	Dimming

Fig 2 shows examples of connected outputs from the Control system to the Nine Hole Box controller



3.3. Connecting to the MK1 Controller

Connections from the 9 Hole box controller to the control system is achieved using the 4mm connecting leads, there are usually 2 lengths provided and both can be used where appropriate. Please see the Rat or Mouse 5 choice manual for detailed connection information, from the 9 Hole box controller to the Control system.

4. Becoming familiar with the BNC Control System

4.1. Using the Tutorials

The best way to become familiar with the BNC control system is to follow the tutorial supplied with the main manual. The tutorials allow you to become familiar with using the full capacity of the 'BNC Control System'.

If you have not already installed the control software on your PC, it is most simply done by inserting the CD, double-clicking on 'set-up' and clicking 'next' until the installation is complete. For training, writing programs and analysing results, this can be done on a PC that is not connected to the controller unit in the laboratory.

The tutorials are described in the manual. The manual can be found by clicking 'Start', 'Programs', 'Campden Instruments', 'Control 1.x', 'Control User Manual'. (where x is the latest version sent to you).

Tutorials for the following can be found:

- Writing programs - page 11 and 44
- Writing settings – page 83
- Running schedules on a MKI unit/ using the Network Manager – page 104
- Running schedules on a MKII unit/ using the Network Manager – page 120
- Results Analysis – page 176
- Versioning control / locking programs – page 232
- Using results to adapt program behaviour – page 215

You should use the following notes, along side the manual, while following the above tutorials.

4.1.1. Writing Settings

When simulating the program at the end of the tutorial, note that the program works by having the 'hold button' pressed down and not released until after the stimulus light is lit. To simulate this, left click the 'hold button' so that the lever icon points down. When the stimulus light is lit, left click the hold button again (lever icon points up) and then right click a stimulus switch (right clicking simulates pressing and then instantly release a switch).

4.1.2. Running schedules

If you are running this as a demo, or want to become familiar with this function away from the lab, a demo controller has been installed. To load this demo, open the Network Manager by clicking on ‘Start’ and the ‘Network Manager’. An error will appear to say that no controller unit can be contacted – click ‘OK’ and ignore. To load the demonstration controller click on the ‘Controller’ menu and select ‘Add a controller’. In the dialog box which comes up type either ‘++demo’ (for a MKI demo) or ‘++demo2’ (for a MKII demo). Both demo controllers can be added one after the other and each can be selected from the drop down list created top right of the window. The tutorials for the MKI and MKII systems only vary with regard to how the hardware is set-up and I/O lines allocated.

Note: The MKI demo automatically loads 9 boxes. To follow the tutorial, first remove these by selecting the box rows and then clicking on the ‘Controller’ menu and selecting ‘Remove boxes’.

You will not be able to run the tutorial for the MKII exactly as described, as the element input and output line set-up has been configured as ports A-O, B-I, C-O, D-I and the tutorial assumes A-O, B-O, C-I, D-O. These ports refer to the blocks of input and output lines on each digital I/O card and in reality are configured by a hardware switch on the actual card. However, you should be able to get the idea of how this works and play around with the I/O set-up given. I would suggest adding two boxes to each card with box 1 using ports A and B and box 2 using ports C and D.

4.1.3. Results Analysis - Creating a filter

When loading the RedGreenBlue V1 program to create a filter, note that if you have already created a version 2 during the settings tutorial, this is automatically selected and you will have to use the drop down arrow to select V1.

A new feature, since the manual was written, is to allow several filters to be created for one program. After selecting to ‘Design a results filter’, a box appears to allow you to select either an existing or a new filter. A default filter, as described in the tutorial, has already been included in the example program. To practise writing this filter, simply select [New] and give it a name of your choice.

Note: when giving a measure a new name, by over writing ‘New Measure’, note that no spaces are allowed in the name. This rule should be applied to all naming in the designer.

Note: clicking ‘(delete)’ beside a path will allow you to amend as well as delete that path.

4.1.4. Results Analysis – Using the Results manager

After clicking to filter the selected results, you will also have to select a filter name. Choose either ‘Default’ or the filter you created.

An error message will appear when you start to filter. This is because the program has been changed since the results were collected and the system is warning you that it may effect results. (If you compare carefully the diagrams of the program in the manual to the actual program design, you might spot these error corrections). The program, however, is still essentially the same and this error message can safely be ignored – tick ‘don’t show again this session’ and click OK.

A default report, like that described in the manual, has already been created for you. To follow the tutorial you will need to remove some of the rows so you can recreate them. Simply select all the rows below the one reading ‘Status’ (in the bottom window) and click the delete row icon.