



# BSD300 User Manual

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## **INTENDED USE STATEMENT FOR BSD300**

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The BSD300 is a six plate semi-autonomous dried sample punch instrument for use with industry-standard dried sample collection media. Dried samples are punched quickly, efficiently and accurately out of collection media using BSD's patented punching system into pre-determined cells for tracking sample identification within the plates for downstream analytical testing.



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# CHAPTER 1: INTRODUCTION

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For the purpose of these guidelines, the BSD300 will be referred to as the “Punch Instrument”.

One of the fundamental goals of the manufacturer is to supply highly reliable punching equipment to meet the needs of the modern analytical laboratory. The Punch Instrument integrates the latest developments in computer and electronic technologies and applies these technologies in a practical way to the task of punching dried samples from dried sample cards.

Microelectronic Systems Pty Ltd<sup>®</sup> developed user guidelines to provide users with simple and clear instructions on the use of the instrument. With a basic understanding of the operations of the Punch Instrument, users will quickly obtain maximum performance from the instrument. Retain this guide in close proximity to the instrument. While Microelectronic Systems Pty Ltd<sup>®</sup> will provide training to available staff on the use of the Punch Instrument at the time of installation, Microelectronic Systems Pty Ltd<sup>®</sup> highly recommends that all new users become familiar with appropriate sections of this manual before using the Punch Instrument.

The factory has thoroughly tested the Punch Instrument prior to delivery and has been designed to minimize any risk to the safety of the user. Even so, as with any equipment, it is important that simple and common sense instructions be provided to users prior to use of the instrument. These safety instructions are set out in section [\*Safety Instructions\*](#).

Safety precautions are important to take at the time of installation and commissioning since transportation of the Punch Instrument from factory to site, invariably exposes the unit to high levels of vibration, bumps, temperature extremes, and variations in humidity, among other things. For this reason, focus your attention on ensuring that the Punch Instrument is properly commissioned, to ensure best performance for the end-user.

# 1 KEY INFORMATION

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

## 1.1 EQUIPMENT MANUFACTURER AND SUPPLIER

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Brendale  
Queensland, 4500 Australia  
Phone: +61 (0)7 3881 1834  
E-mail: [support@microelectronics.com.au](mailto:support@microelectronics.com.au)

## 1.2 INSTALLATION CATEGORY - II

## 1.3 POLLUTION DEGREE - 2

## 1.4 DEFINITION OF SYMBOLS AND WARNINGS

	Caution – Consult accompanying documentation
	Earth (Ground)
	The caution label displays on the Punch Instrument

## 1.5 MOVING PARTS

Moving parts is a reference to the movement of the plate table which moves:

- during initialization on power-up
- when the unit is reset (via the Reset Button)
- after loading of Plates and the Continue button is selected in the software
- when either of the Inspect Plates buttons is selected in the software
- when one of the buttons that display after a punching error occurs, is selected in the software

**WARNING:** This is a Class A Product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## 1.6 BARCODE READER

Class II LED Product – Do not stare into the beam.

## 1.7 EQUIPMENT RATINGS

Input Voltage:	Automatically switchable in the range of 110 - 240V AC. Main supply voltage fluctuations are not to exceed 10% of the normal supply voltage.
Frequency Range:	50 / 60Hz
Power Rating:	200W
Fuse Ratings:	Main Fuse - F2A Anti-Surge L250V Power Supply Fuse - 250V 6.3A PCB Fuse – F1A 250V
Input Connections:	Main power via main power connector Foot Switch via canon connector Computer via D9 connector
Output Connectors:	5V Barcode Reader power supply
Air Pump Pressure:	250 mb (minimum)
Air Flow Rate:	200 L/h (minimum)

# 1.8 OPERATING REQUIREMENTS

None

# 1.9 ACCEPTABLE ENVIRONMENTAL CONDITIONS

Indoor Use Only

Operating Temperature:	15°C-35°C (59°F-95°F)
Altitude:	Up to 2000 m
Humidity:	Maximum relative humidity 80% up to 31°C, then decreasing linearly to 50% humidity at 40°C.

# 1.10 OPERATIONAL RESTRICTIONS

Indoor Use Only

Maximum continuous use before cooling period:	2.5 hours	
Length of cooling period:	15 minutes	
Maximum throughput between:	Chute cleaning:	1,500 strikes
	Preventive maintenance:	150,000 strikes or 6 months (whichever occurs first)

# 1.11 CONSUMABLES

The system does not contain consumer-replaceable components.

# 1.12 SPARE PARTS

Use only spare parts

- supplied by the manufacturer, or
- deemed by the manufacturer to be equivalent, or
- that meets the manufacturer's specifications as outlined in this manual.

**CAUTION:** Using spare parts that are not specifically outlined above will void the warranty of the instrument.





## 2 INITIAL FAMILIARIZATION

From an operator's viewpoint, the most important parts of the Punch Instrument are identified in the following images.

1. Power Switch



2. Reset Switch



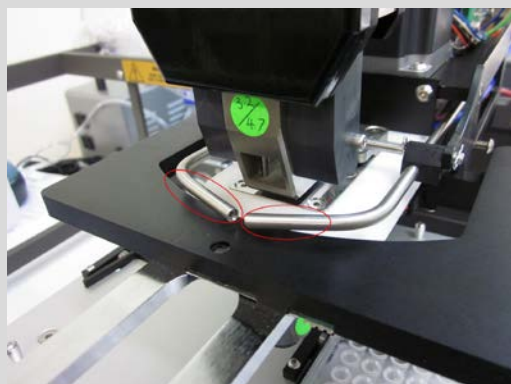
3. Barcode Reader



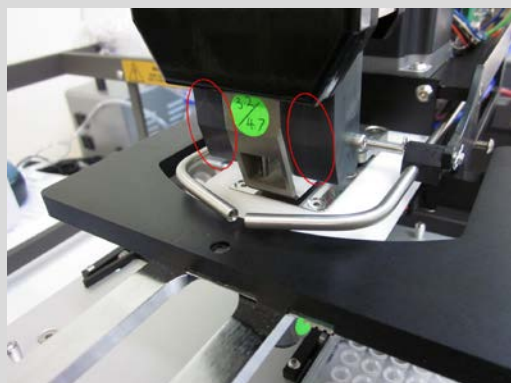
4. Rear Card Platform



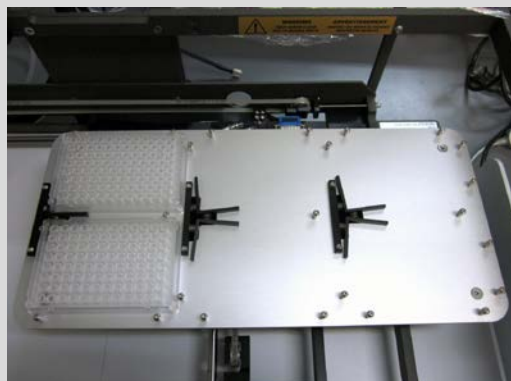
5. Card Clamp



6. Light Guides



7. Plate Table



8. Upper Console (Closed)



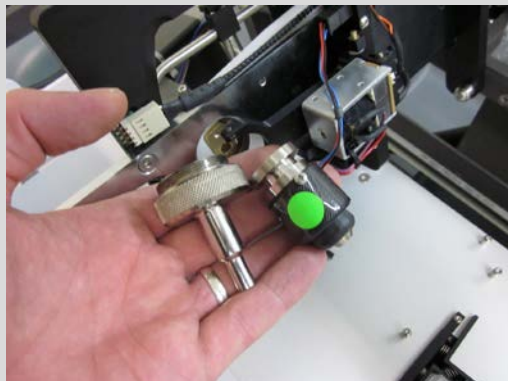
9. Upper Console (Open)



10. Chute



11. Chute Removed



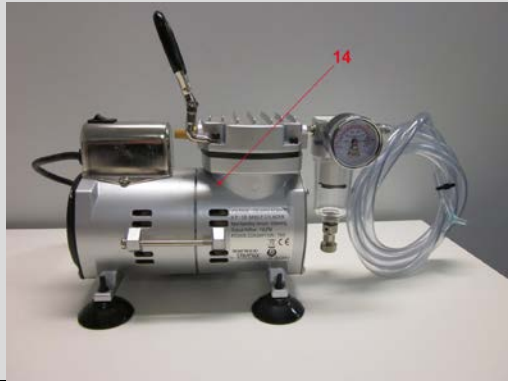
12. Foot Switch



13. Air Pump



14. Dust Extraction Pump



### 3 SAFETY INSTRUCTIONS

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Microelectronic Systems Pty Ltd<sup>®</sup> designed and manufactured the Punch Instrument in such a way as to minimize risk to the safety of the user or technician. However, as with any instrument, observe basic work-safe practices.



**NOTE:** The fundamental precautions outlined below need to be strictly observed. Technicians that install and service the Punch Instrument must follow the precautions and must bring the precautions to the attention of any new user prior to using the instrument.

- When connecting the equipment to the main supply, use only a detachable main power cord with a main connector that meets specification IEC320 and complies with the requirements of specification IEC799 or is certified or approved by a recognized national test house. The main power cord, including both connectors, shall be rated to at least 6 amps.
- The Punch Instrument is supplied with an air pump that conforms to the requirements associated with CSA or UL standards. If any other pump is used, it must also conform to the applicable standard.
- The Punch Instrument does not incorporate any user-changeable or user-serviceable parts or components.
- Follow the routine cleaning procedure as described in this manual. Users must not remove any covers from the Punch Instrument, especially those enclosing moving parts or electrical or electronic components. All matters that are not dealt with as part of this manual must be referred to authorized and qualified service personnel.
- To prevent fire or shock hazard, the instrument must only be operated within the appropriate indoor environmental conditions as defined in section .



**WARNING:** Under no circumstances should users look directly or indirectly into the laser beam of the barcode reader. To do so could result in serious and permanent eye damage. All efforts have been made to ensure that this scenario will not occur under normal operating conditions as prescribed within this manual.

- At different times, the punch head and plate table will move to allow the dried samples to be punched and samples distributed to the appropriate plates. Under normal operation, the punch head and plate table can move or shift once the instrument is turned ON, made to reset during punching or when one of the option buttons displays after a punching error is selected. Although every effort has been made by the manufacturer to isolate these parts and prevent any possibility of contact with them during operation, users must still use caution to ensure that no part of their body, hands or hair, come into contact with the punch head or plate table.
- Users must not undertake punching operations using the Punch Instrument until they have received adequate training in relation to the equipment and in particular, the need for caution in relation to moving parts.
- Under no circumstances should any attempt be made to use the instrument to punch any material other than dried sample cards unless otherwise stated by the manufacturer.



**CAUTION:** The punching of any different material can significantly damage the punching functions of the instrument, and will VOID THE WARRANTY OF THE INSTRUMENT.

- Microelectronic Systems Pty Ltd<sup>®</sup> recommends that at the end of each punching cycle, any accumulated paper dust be removed from the instrument, both around the punch head and within the dust extraction vacuum unit.



**CAUTION:** Ensure care is taken so users do not come into direct contact with the dust for health and safety reasons. Where exposure to potentially biohazardous material exists, follow the appropriate biosafety procedures and use personal protective equipment (PPE) such as gloves, gowns, laboratory coats, face shields, or mask and eye protection. Microelectronic Systems Pty Ltd<sup>®</sup> recommends that these protective items be worn at all times when handling dried samples.

- Users should consult with their laboratory supervisor concerning the laboratory's adopted procedures for washing hands or other parts of the body that come into contact with dried sample cards or dried sample dust.
- An appropriate grade of cleaning alcohol (100% alcohol is recommended) shall be used to clean those parts of the instrument that come into contact with the dried sample cards or paper dust.

## 4 USER GUIDELINES

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### 4.1 IMPORTANT FEATURES

#### 4.1.1 Computer Control

The end-user supplied PC controls the operation of the Punch Instrument. In terms of day-to-day punching requirements, the user's interaction with the computer has been designed to be as simple as possible.

The software establishes a separate section of the Punch Instrument program where the required plate layouts are recorded. Within the **Edit Test Sequences** part of the program, it is possible to:

- Position samples with total flexibility - any pattern, in any fill order, in any plate
- Deliver more than one disk into a single cell
- Take multiple strikes from the sample card and deposit into one or more cells
- Vary the number of disks punched per punching sequence

Various configuration settings associated with the Punch Instrument and the program are also included and can be accessed from the **Main Menu** by selecting the **Configuration System** button. Within the configuration system, it is possible to:

- Select the ports that the instrument and barcode readers will use to communicate to the computer system
- Modify the colors applied to samples, controls, and standards
- Select the output file type and the directory it will be saved to
- Select the option to use sample numbers as part of its punching process
- Turn barcoding facilities ON or OFF
- If desired, establish validation checks for barcodes read by the system
- Categorize or collect particular tests into test groups

More information on the software can be found in section: [BSD300 Software](#).

#### 4.1.2 Positive Identification

Through the use of the barcode reader, along with the barcoded sample cards and plates, it is possible for a laboratory to positively and uniquely identify the processing path and outcomes associated with each individual client, with certainty.

More detailed information on the barcoding arrangements are incorporated in section: [BSD300 Software](#).

#### 4.1.3 Air System

The Punch Instrument is supplied and fitted with an air system which incorporates the pressure air pump and the anti-static humidifier system. The air system enables the punched disk to be delivered promptly and reliably into the cell of the plate or tube. The anti-static humidifier system assists to reduce the effects of static electricity affecting the plate. The sponges in the humidifier bottles of the anti-static humidifier system must be moist before the Punch Instrument is in operation. To moisten the sponges in the humidifier bottle:

1. Unscrew the humidifier bottle cap.

2. Fill the humidifier bottle with distilled water.
3. Ensure that the sponge in the humidifier bottle has absorbed the distilled water and is sufficiently moist.
4. Tip the humidifier bottle to remove all excess distilled water not absorbed by the sponge.
5. Replace the humidifier bottle cap ensuring that the humidifier bottle cap is screwed tightly onto the humidifier bottle.

**NOTE:** Do not tip the humidifier bottle after the cap is screwed back on.

1. Repeat for the other humidifier bottle (if the Punch Instrument has a two humidifier bottle system).

Inspect the air system and corresponding equipment daily. Verify that the air-tubings are free from obstruction and are not kinked. Ensure the water within the humidifier bottles is changed once or twice a week and use only distilled water. When the instrument is not in use, allow the bottles to air out in order to prevent the build up of molds and bacteria within the bottles.

**NOTE:** Only add water to the humidifier system if there is evidence in the lab of static electricity affecting the punched disks.

To ensure reliability of the punching processes, the pressure air pump must be turned ON whenever the Punch Instrument is in operation. It is very important that the pressure air pump is turned OFF when the Punch Instrument is not in use.



**CAUTION:** Failure to turn OFF the pressure air pump when the Punch Instrument is not in use will void the warranty of the Punch Instrument.

To replace the air-tubing or sponges within the humidifier bottle, contact your local service agent to request the replacement service.

#### **4.1.4 Dust Extraction System**

The dust extraction system attaches onto the card clamps, and removes the filter paper dust created during the punching process. The system consists of a vacuum pump with a removable filter which is used to trap particulate matter and filter paper dust. Empty the filter daily, and dispose of the biomaterial in accordance with the laboratory's health and safety policy.

To replace the vacuum tubes, contact your local service agent to request the replacement service.

#### **4.1.5 Light Targeting System**

The Punch Instrument's light targeting system allows the user to identify the precise location on the card to be punched. The system involves a light template mounted on both sides of the punch mechanism. Factory programming provides the illumination of up to seven sample disks.

Once a card is placed under the light pattern and the foot switch is activated, the card is clamped in position, and the Punch Instrument will move across the card and punch out a disk from the position targeted by the user utilizing the light targeting system. By doing this, the user is able to obtain maximum punch output from the available sample on the card.

The instrument is now ready for the next sample.



#### 4.1.6 Disk Detector System

The Punch Instrument's disk detector system works to ensure the integrity of the punching process. The disk detector system incorporates a number of sensors (located in the lower section of the chute) designed to detect each disk as it passes, with a software element coupled to these sensors. If a punched disk is not detected, the Punch Instrument automatically recycles the punch in the same position, for up to a maximum of three cycles.

Typically, a disk that is "hung-up" or stuck to the bottom of the die after the first punch, is removed on the second or third punch stroke. If after three punch attempts, a disk is still not detected, then the Punch Instrument stops and a **Punching Error** message will display on the **Distribute Spots** program. User intervention is then required for the punch operation to proceed.

Find more detailed information on "Punch Error" arrangements in section [\*Operation of the Disk Detector\*](#).

Microelectronic Systems Pty Ltd<sup>®</sup> found that the Punch Instrument is highly reliable under actual laboratory conditions. Punch errors can occur at various circumstances (for example, abnormal incidents). These include:

- When the air system is turned OFF
- When a dried sample card is in poor condition (If the paper is weakened it may not be punched in a "clean" circle)
- When the punching mechanism has not been cleaned since the previous day's use
- When conditions or laboratory protocols promote the generation of static electricity affecting plates, sample disks, or the Punch Instrument

## 5 OPERATING THE PUNCH INSTRUMENT

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### 5.1 OVERVIEW OF OPERATIONS

The Punch Instrument punches disks from dried sample cards and the disks are deposited via a chute into plates positioned on a plate table below the punch unit. The plate table is computer controlled and moves so that the appropriate cell of the appropriate plate is below the chute.

### 5.2 STARTING UP

To start the unit, perform the following steps:

1. Switch the Punch Instrument and the air system to the ON position. The initialization of the system begins.

**NOTE:** The initialization of the instrument takes 10 seconds to complete.

2. Double-click the **BSD** icon to launch the BSD300 Software. The **Login** screen displays.
3. From the **Login** screen, enter the user name and password. The **Main Menu** screen displays.
4. From the Main Menu, select the **Distribute Spots Program** option. The BSD300 Software verifies the chute is operational.
5. Click Continue. The Select Test Group To Punch option displays.
6. From the list of pre-selected groupings, select the option that best suits the laboratory's needs.

Refer to section [BSD300 Software](#) regarding any issues or problems that can occur.

7. Click the **Continue** button.

**NOTE:** If some tests are not to be performed within the selected grouping, clear the check box beside that test. At this stage, the user also confirms whether the system is to punch samples, standards, and controls. Select the appropriate check box.

8. After selecting the tests to be performed, click the **Continue** button. The user is asked to load the plates and trays.

**NOTE:** If, as part of the configuration of the program, the system is to use **Sample Numbers**, the system will either display a starting sample number of **1**, or will alternatively prompt the user to enter a "Starting Sample Number". This is dependent of the **Starting Sample Mode** set in the Configuration of the system.

**NOTE:** If the barcode feature is enabled, the user will be prompted to scan the plate barcode before loading the plates and trays.

## 5.3 LOADING THE PLATES

Once the initial choices have been made, as described in the [Starting Up](#) section, perform the following steps:

1. Click the **Continue** button. The Punch Instrument moves into position and is ready to load empty plates. The computer screen displays the plates selected for punching and highlights one of the plates (with red cross-hatching) to be loaded first onto the plate table.
2. If the option to scan plate barcodes has been activated and barcodes have been attached to the plates, the computer program prompts the user to scan the barcode for a particular plate. To scan a barcode, the user places the full length of the barcode under the beam of the barcode reader. Once a barcode has been successfully scanned, the reader beeps and the scanned barcode displays on the computer screen as being the barcode associated with that particular plate.

**NOTE:** If a barcode cannot be read or an error has been made, for example, the incorrect plate was scanned for a particular test, the user can elect to re-scan the correct barcode or enter the barcode manually. These options are presented to the user on the computer screen.

3. If the correct barcode for the plate displays on the screen, the program prompts the user to click the **Continue** button.

## 5.4 PUNCHING PROCEDURE

Once all plates are loaded, perform the following steps:

1. Click the **Continue** button.

**NOTE:** If the barcode feature is enabled, the user will be prompted to enter a barcode for samples, standards or controls

If the selection was made to punch samples, standards or controls, the program prompts the user (depending on the configuration setting) to scan the barcode of either the first samples card or the first standards card (if the option to scan card barcodes has been activated). Regardless of whether the card being punched is a samples card, or a card containing standards or controls, the punching procedure is identical. The punch head moves to its targeting position. This involves three operations:

- The punch head moves slightly to one side.
- The light targeting system is activated and the red target pattern displays beside the punch head.
- The plate table moves so that the first cell in a disk is to be punched is positioned below the chute.

The screen indicates that the Punch Instrument is ready to commence punching.

2. Turn the auto-trigger ON by pushing the button on the right side of the auto-trigger. Turn OFF the auto-trigger at anytime, and the foot switch used to activate the punching process. Adjust the auto-trigger delay by rotating the knob. Reduce the delay by turning the knob counter clockwise. Increase the delay by turning the knob clockwise. The green indicator light on the front of the instrument illuminates when the auto-trigger is ON.

**NOTE:** Manual operation via the foot switch can be performed with or without the auto-trigger enabled.

- C. Place the first card beneath the beam of the barcode reader so that the beam crosses the full length of the barcode. As with the scanning of barcodes on the plates, once a barcode is successfully registered, the reader generates a beep and the barcode displays on the computer screen as being the barcode associated with that particular samples, standards or controls card.

- D. Slide the part of the card containing the dried sample material beneath the card clamps and into the card slot so that the light targeting pattern displays on the sample area on the card. The light targeting pattern indicates the precise positions from which the disks are punched.
1. The user can move the card to a position which ensures that:
    - All punched disks are fully covered with dried sample material
    - There is minimal waste of the available dried sample material
  2. In positioning the card, the user must ensure that **THE CARD REMAINS BELOW BOTH CARD CLAMPS.**

**NOTE:** The yellow indicator of the auto-trigger on the front of the instrument is illuminated when a card is detected within approximately 3.0 mm of the sensor located in the card clamp pad. The user then has a pre-set time to decide on a suitable position for the disks to be punched from the card. The time delay between sensing the sample and punching is set by turning the auto-trigger knob on the left-hand side of the instrument.

Turning the knob further in a clockwise direction increases the time delay. The light targeting system is briefly dimmed to indicate that the punch has commenced a punching sequence:

- The card clamps are activated and clamp down on the card, holding it in position.
- The punch head moves back to a punching position immediately above the card and punches out the first disk.
- The chute moves downwards onto the top of the first cell of a plate and a punched disk falls into the cell.
- The chute returns to its up position.

The punch head moves to the next punching location, ready to punch the second disk, while the plate table positions the second receiving cell under the chute.

This punching cycle continues automatically until all targeted disks have been punched, after which time the punch head returns to its targeting position, ready for the next card.

The auto-trigger can be turned OFF at anytime, and the foot switch used to activate the punching process.

During the punching cycle, progress is recorded on the computer screen with the cells of the plates, as represented on the screen, being coloured as they are filled with a punched disk. Different colours are used to display the various types of disks being punched. These colours can be changed through the **Configuration System**.

3. At the end of the punching process, the user is prompted to check the plates to ensure the disks have been punched into wells as programmed. Select **All spots present** to complete the run.
4. Remove trays from loading dock.

## 5.5 OPERATION OF THE DISK DETECTOR

If following the punching of a disk, the disk detector fails to detect that a disk has passed through the chute, the punching process is repeated where the punch head does not move to the next punching position, but rather the Punch Instrument automatically recycles the punch in the same position for a maximum of three cycles.

If after three attempts, a disk is not detected, the system pauses and waits for the user to intervene using the computer. The computer software prompts the operator with six (6) options. Each of these options writes a comment to the output file for later processing.

- (A) **Spot in the Cell** - If the disk has passed through the chute undetected and fallen into the correct cell, the user can select the **Spot in cell** option, which allows the system to continue onto the next disk.
- (B) **Spot Placed in Cell** - If the disk has passed through the chute undetected and has not fallen into the correct cell, the user has the option of manually placing the spot into the correct cell. If the disk cannot be seen, the user can, by following the procedures as described in section: [User Cleaning Procedures](#), try to locate the disk either inside the chute, the manifold, or in the surrounding area. If located, the user can manually place the disk into the correct cell. After the disk is placed into the correct cell, the user can select the **Spot Placed in cell** option which allows the system to continue onto the next disk.
- (C) **Spot Discarded** - If the disk has not fallen through into the cell and cannot be seen, the user, following the procedures as described in the [User Cleaning Procedures](#) section, can attempt to locate the disk either inside the chute, the manifold, or in the surrounding area. If located, the user can discard the spot by selecting the **Spot Discarded** option. The system requires the user to move the sample card into the card slot so that the light targeting system displays on a new sample spot.

**NOTE:** The light targeting system only projects the number of lights for disks still to be punched.

Once the user depresses the foot switch, the system continues by first re-punching the last disk.

- (D) **Spot Not Found (Re-punch & Continue)** - If the disk has not fallen through into the cell and cannot be seen, the user can, by following the procedures as described in section: [User Cleaning Procedures](#), try to locate the disk either inside the chute, the manifold, or in the surrounding area. If the disk cannot be located, the user can return the chute and the cover to the original operational position, power-up the Punch Instrument and, after the initialization process is complete, click the **Spot Not found (Re-punch & Continue)** option. The system requires the user to move the sample card into the card slot so that the targeting system displays on a new sample spot.

**NOTE:** The light targeting system only projects the number of lights for disks still to be punched.

Once the user depresses the foot switch, the system continues by first re-punching the last disk.

- (E) **Card not punched option** - The card can not be punched at all. There is no hole or extra holes in the card and therefore no disk in the cell. The user should be sure the card is in sight of the red targeting system. Once the user depresses the foot switch, the system will continue by first re-punching the last disk.
- (F) **Inspect Trays option** - This option moves the plates either left or right to allow easier viewing of the plates and their cells.

## 6 USER CLEANING PROCEDURES

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### 6.1 USER CLEANING PROCEDURES

Two types of cleaning are associated with the Punch Instrument.

- Cleaning of the chute and punch mechanism
- General cleaning

### 6.2 CLEANING OF THE CHUTE AND PUNCH MECHANISM

For optimum performance, clean the chute and punch mechanism daily or in any event, after no more than 1500 strikes.

To clean the chute and punch mechanism:

1. With the Punch Instrument turned OFF, lift the two perspex card platforms located behind the front panel.
2. Lift the front panel up and allow it to rotate down onto the front of the Punch Instrument.
3. Lift the upper console by the black handle inside the front of the main frame, and rotate the console fully to the left, exposing the underside of the console.
4. Remove the chutes by unscrewing the inner chute.

**NOTE:** Do not unplug the connecting wire to the outer chute.

Once fully unthreaded the inner chute is free to slide out.

5. Using 100% alcohol, clean only the inner and outer surfaces of the inner chute. Use a can of compressed air to blow through the chutes.



**WARNING:** Do NOT clean the outer chute with alcohol. Using the supplied cleaning brush, gently clean the inside of the outer chute.

6. Using a can of compressed air, blow through the hole in the underside of the manifold to remove any build-up of lint on and around the die and associated parts.
7. Re-assemble the chutes and reconnect them to the unit.
8. Return the upper console to the upright position.
9. Direct a strong flow of compressed air horizontally between the punch guide and die.
10. Lower the perspex card platforms and return the front panel to its operating position.

## 6.3 GENERAL CLEANING

General cleaning of the Punch Instrument is essential for long term performance.

Microelectronic Systems Pty Ltd® recommends to clean the area around the Punch Instrument daily in order to remove the paper dust that can accumulate as a result of the punching process. At the very least, this cleaning process must occur on a daily basis and care should be taken so that users do not come into direct contact with such dust.

**NOTE:** The dust extraction system will greatly minimize the amount of residual dust around the punching area.

Microelectronic Systems Pty Ltd® recommends to periodically clean the Punch Instrument on its top surfaces to remove normal atmospheric dust that may build up over time.

Dust the external surfaces of the Punch Instrument using a soft, damp cloth. Do not allow water to come into contact with any of the electrical connectors, power leads, or communication leads.

While cleaning of the Punch Instrument is required by operating staff, only authorized service personnel should perform any maintenance work on the Punch Instrument.

**NOTE:** Turn the instrument OFF before any cleaning is performed.

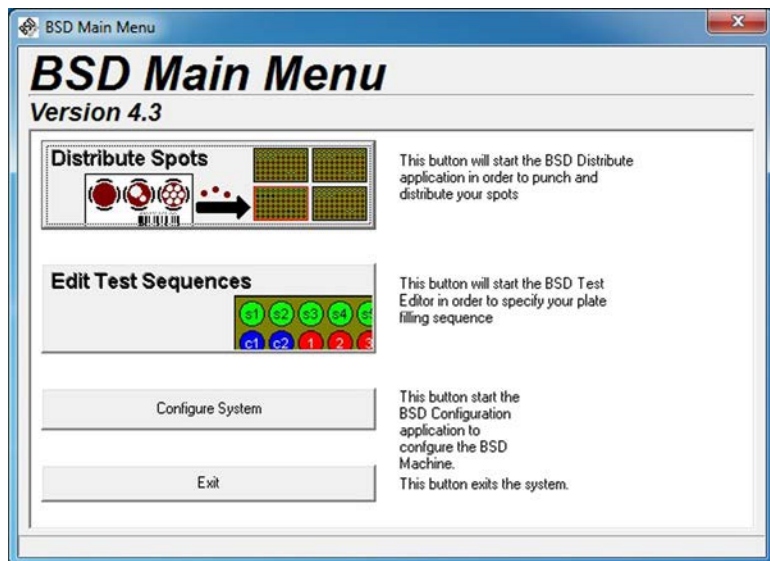
## 7 BSD300 SOFTWARE

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From the main menu, up to three different programs are accessible:

- Distribute Spots
- Edit Test Sequences
- Configure System

The actual number of programs displayed depends upon the security level of the user.



These programs are explained in detail in the BSD Test Editor, Distribute Spots, and Configure System sections.

### 7.1 TEST EDITOR PROGRAM

The Test Editor program is accessed by selecting the **Edit Test Sequences** option. It is used to specify:

- Which types of spots go into the cells of each plate (Samples, Standards or Controls)
- The sequence in which the plates are filled (horizontally, vertically and the starting cell number)
- The size of the spot to be punched (for dual punches)
- The position of each test on the plate table of the Punch Instrument

Once the **Edit Test Sequences** option is selected from the main menu, the entry dialog box of the **Test Editor** program is displayed:

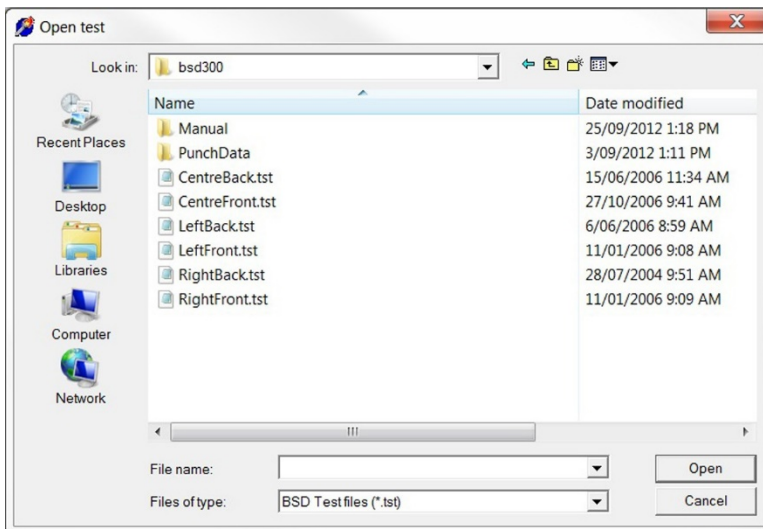




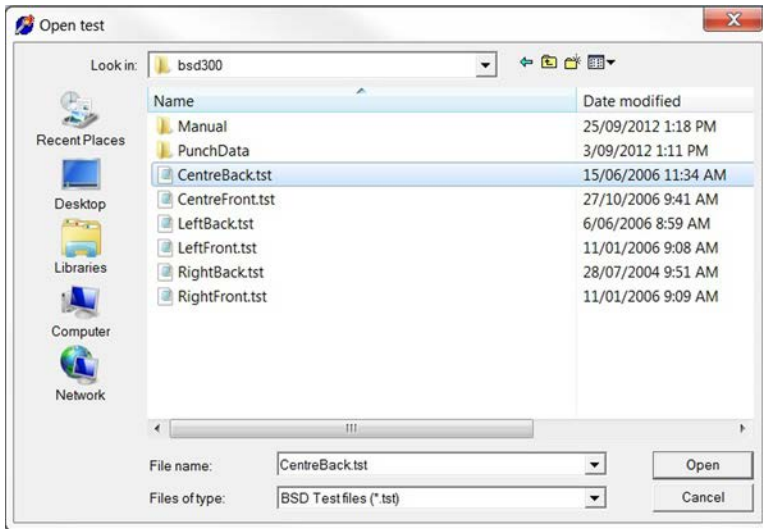
## 7.2 OPENING AN EXISTING TEST

To open an existing test:

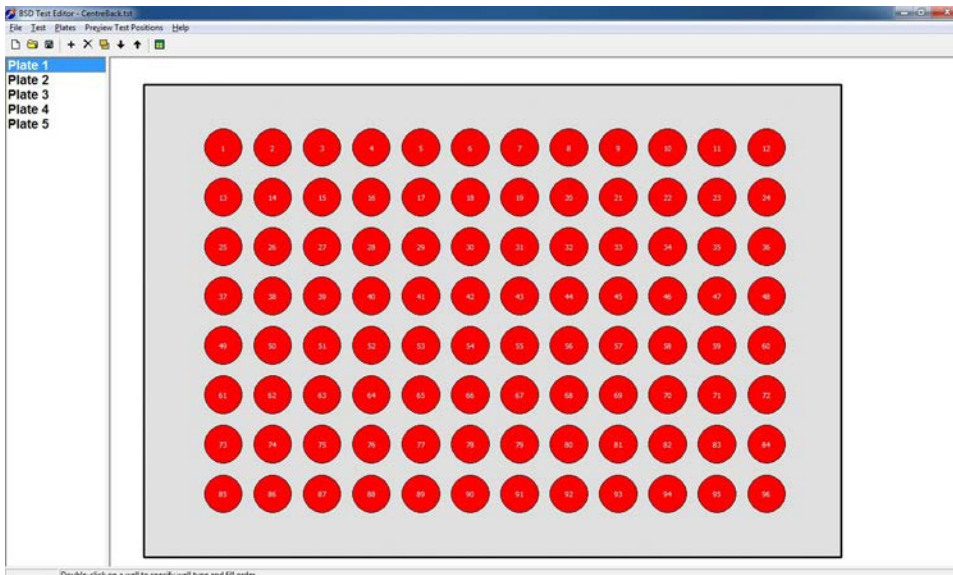
Click the Open an existing test button.



The **Open test** dialog box displays.



From the **Open test** dialog box, click to select the test to be opened. Click **Open**. A basic 96-cell definition is displayed.



The attributes of the test can now be viewed or modified. (The functionality found within the Test program is explained in the following sections).

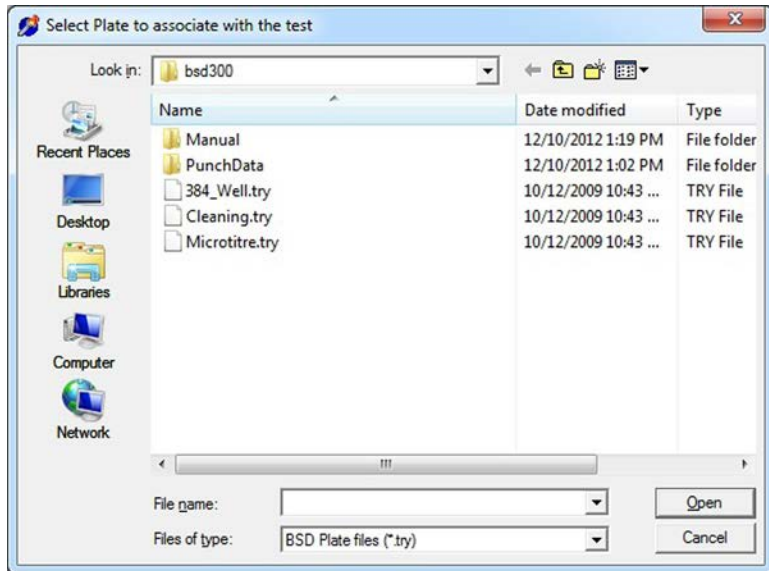
## 7.3 CREATING A NEW TEST

To create a new test, select the **Create a new test** button.



## 7.4 ASSOCIATING A PLATE TYPE WITH THE NEW TEST

After the Create a new test button is selected, the Select Plate to associate with the test dialog box is displayed:

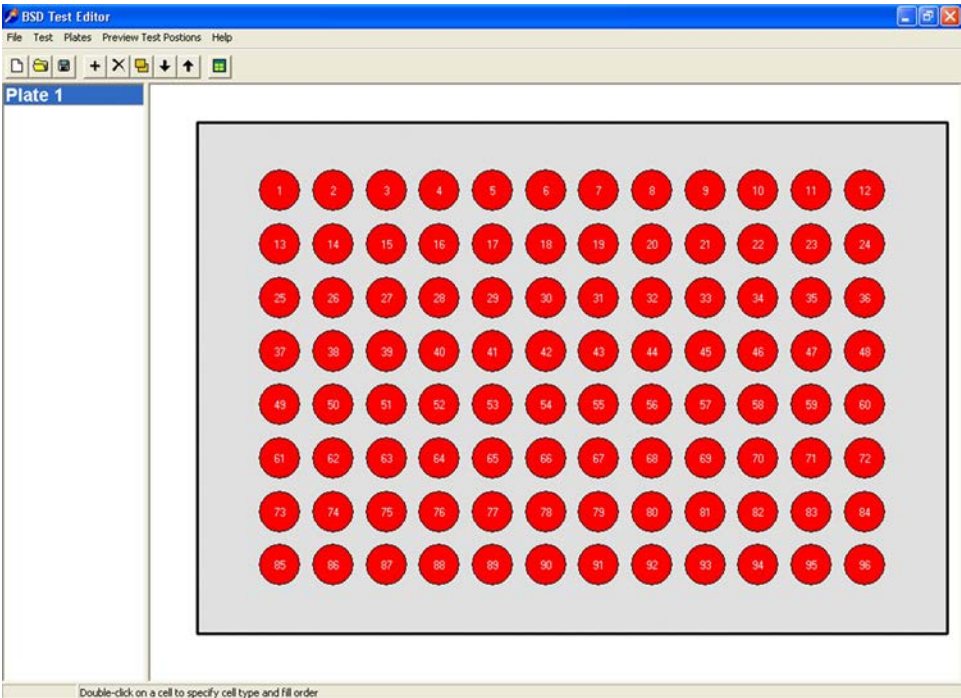


The following three tests are available for selection:

- 384-cell
- Cleaning
- Microtitre (96-cell plate)

Click to highlight the desired test, then click **Open** to continue.

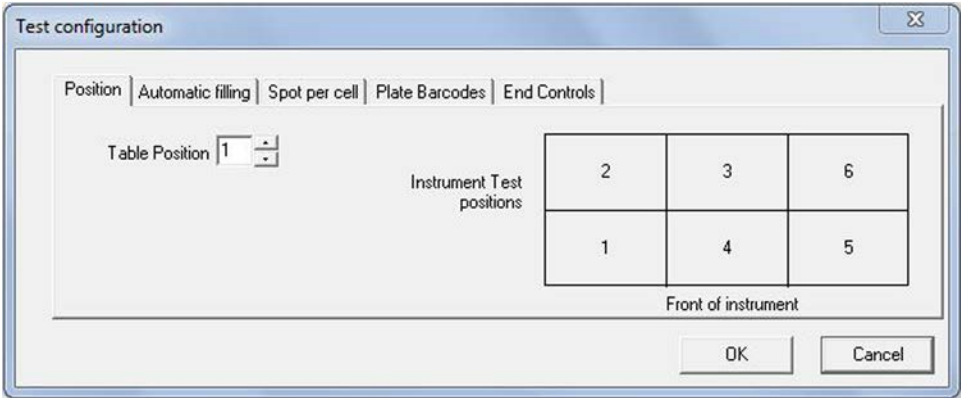
**NOTE:** If selecting the Microtitre test, a 96-cell definition test is displayed.



The numbers shown in the red circles indicate the sample numbers related to those cells.

**7.5 SPECIFYING THE POSITION OF THE TEST ON THE PLATE TABLE**

Now that a test has been nominated, specify its position on the plate table by selecting the **Test configuration** option from the **Test** menu. The **Test configuration** dialog box displays:



To select the test position, select the position tab and enter a table position between **1** or **6** and then select the **OK** button.

## 7.6 AUTOMATIC FILLING

Numbering and filling of cells can be done automatically by selecting the **Automatic filling** tab on the **Test configuration** option on the **Test** menu. When the **Test configuration** option is selected, the Test configuration dialog box displays.

The screenshot shows the 'Test configuration' dialog box with the 'Automatic filling' tab selected. The 'Enable automatic filling' checkbox is checked. Under 'Begin filling at corner', 'Top left' is selected. Under 'Fill direction', 'Horizontal' is selected. The 'Cells per sample' spinner is set to 1. The 'OK' and 'Cancel' buttons are at the bottom right.

Select the Enable automatic filling check box.

**NOTE:** If this box is not selected, the automatic numbering will not be performed and the filling sequence of each sample cell will need to be specified manually.

Filling can start in any corner of the plate and can proceed either horizontally (across rows first) or vertically (down columns first).

## 7.7 SPECIFYING THE NUMBER OF SPOTS TO DELIVER TO EACH CELL

Select the **Spot per cell** tab from the **Test configuration** dialog box and up to 10 different sample spots can be placed in each cell. Use the up / down arrow buttons to increase or decrease the number of spots for the relative size. The total number allocated and the maximum number available are both displayed.

The screenshot shows the 'Test configuration' dialog box with the 'Spot per cell' tab selected. It displays a table for specifying the number of spots for 'Small (1.2)' and 'Large (2.0)' relative sizes. The 'Samples' row shows 1 spot for Small and 0 for Large, with a total of 1 / 10. The 'Standards' row shows 1 spot for Small and 0 for Large, with a total of 1 / 10. The 'Controls' row shows 1 spot for Small and 0 for Large, with a total of 1 / 10. The 'OK' and 'Cancel' buttons are at the bottom right.

	Small (1.2)	Large (2.0)	
Samples	1	0	1 / 10
Standards	1	0	1 / 10
Controls	1	0	1 / 10

## 7.8 PLATE BARCODES

The barcode pattern for the plates can be defined here. It ensures that a barcode number will only be taken as valid if the specified pattern of special characters matches the barcode number exactly. For sample patterns, see section [Barcode Patterns](#).

The 'Test configuration' dialog box has five tabs: 'Position', 'Automatic filling', 'Spot per cell', 'Plate Barcodes' (selected), and 'End Controls'. The 'Barcode pattern for plates of this test:' label is above a text input field. Below this, a 'Special characters:' section lists: '?' for 'Any Character', '#' for 'Any numeric character', '@' for 'Any alpha-numeric character', '\*' for 'Zero or more characters', '{...}' for 'Set of characters (eg. {3AB})', and '\' for 'Match next character literally'. 'OK' and 'Cancel' buttons are at the bottom right.

## 7.9 END CONTROLS

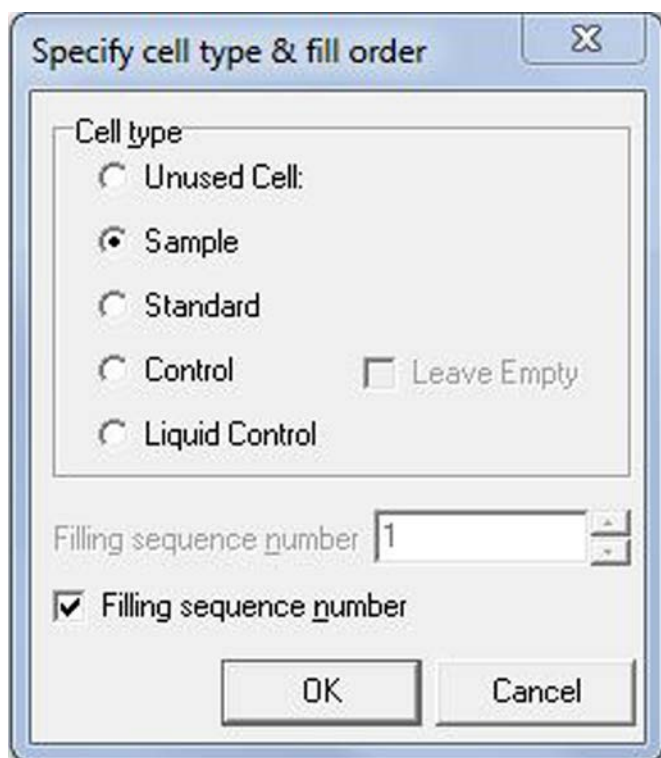
Up to 3 end controls can be specified for each test with up to 10 spots per cell. The size of the spots can be specified.

The 'Test configuration' dialog box has five tabs: 'Position', 'Automatic filling', 'Spot per cell', 'Plate Barcodes', and 'End Controls' (selected). The 'End Control' section shows two columns: 'Small (1.2)' and 'Large (2.0)'. Each column has a numeric input field (both showing '0') and a unit label '0 / 10'. Below these is a 'Number of End Controls' label with a numeric input field (showing '0'). 'OK' and 'Cancel' buttons are at the bottom right.

## 7.10 SPECIFYING THE TYPE OF CELL

The type of cell on a plate can be specified as unused, sample, standard, control, or liquid control. The number given to a cell can also be set at this stage.

Double click the left mouse button while positioned over a cell. The **Specify cell type & fill order** dialog box is displayed.



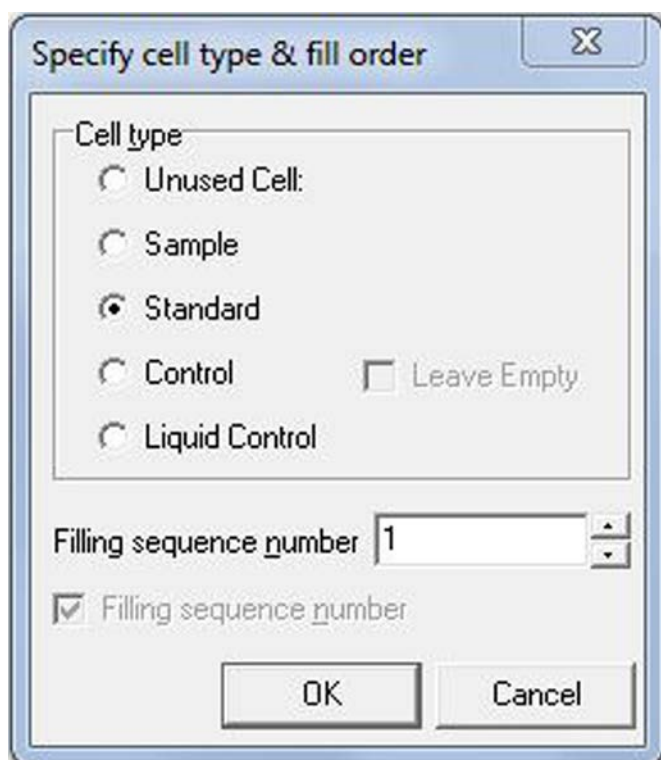
By default, all cells are automatically classified as a sample. For the multi-cell selection option:

1. Hold down the left mouse button to draw a rectangle around the cells to be changed, or hold down the shift key and click on the individual cell.
2. Click the right mouse button to display the Specify cell type & fill order dialog box.

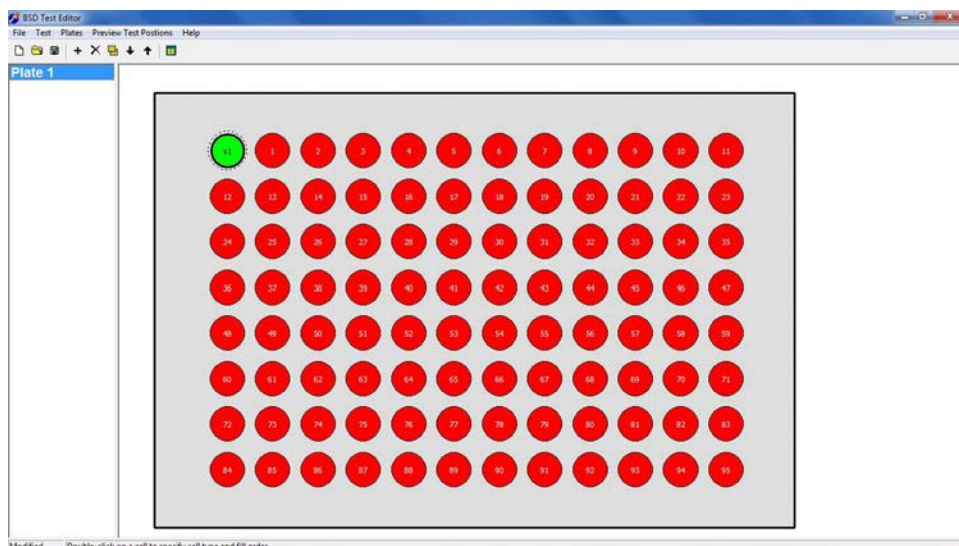
## 7.11 SPECIFYING THE POSITION OF STANDARDS

To specify a cell as a Standard cell, double-click on the appropriate sample number (for example, sample **1**) and then choose the **Standard** option.





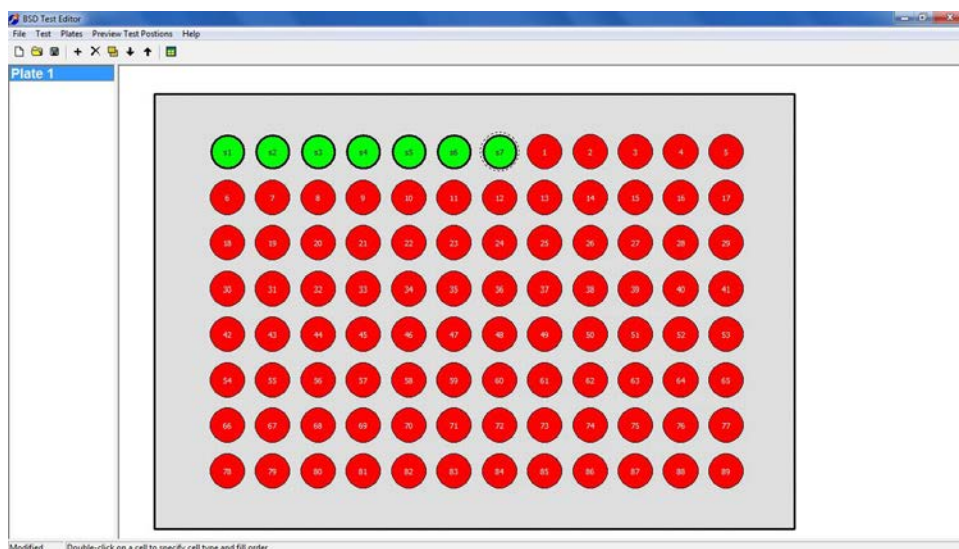
When you click the **OK** button, the top left cell will change from sample number "1" (coloured red) to standard "s1" (coloured green).



**NOTE:** The start of the automatic numbering has now moved from the original position (top left) to the next cell on the right.

The above procedure can be repeated for each relevant cell. For example, the first seven cells are set as Standard cells. In each case, the **Filling sequence number** was manually set by the user.



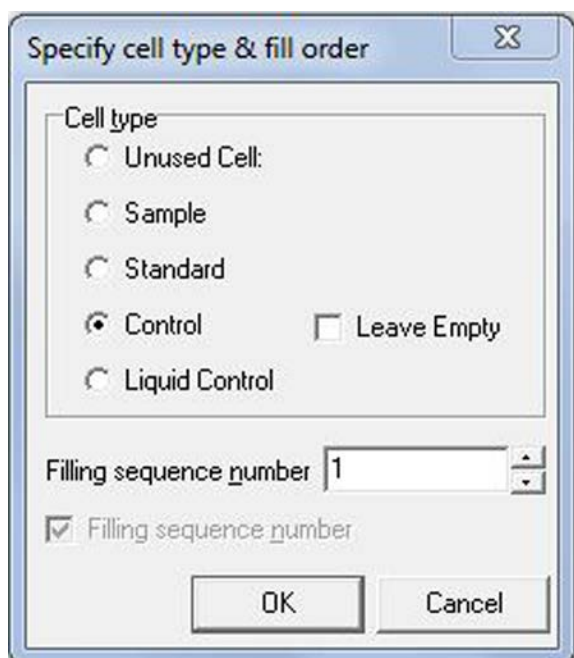


**NOTE:** The numbering does not need to be sequential (example: 1, 2, 5, 10, 20, 50, and 100).

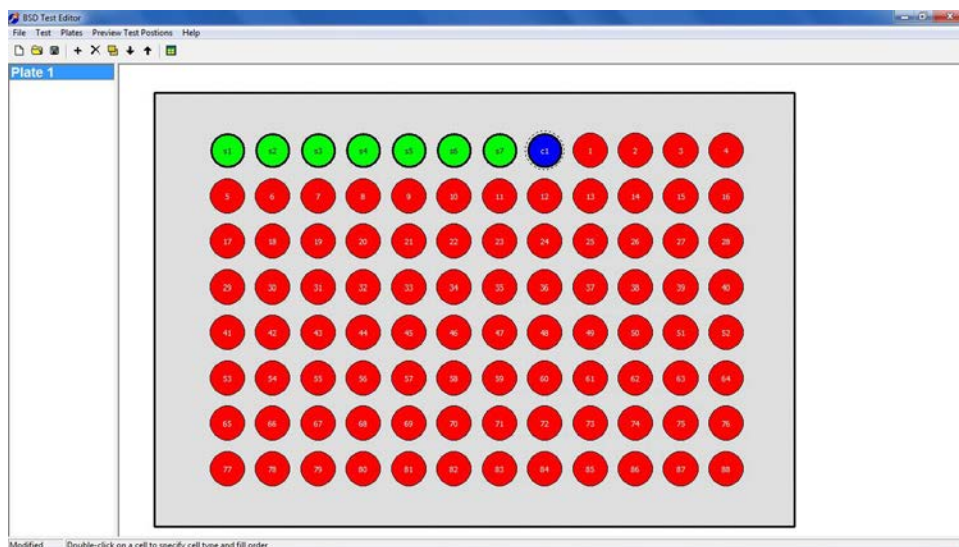
## 7.12 SPECIFYING THE POSITION OF CONTROLS

To specify a cell as a Control cell,

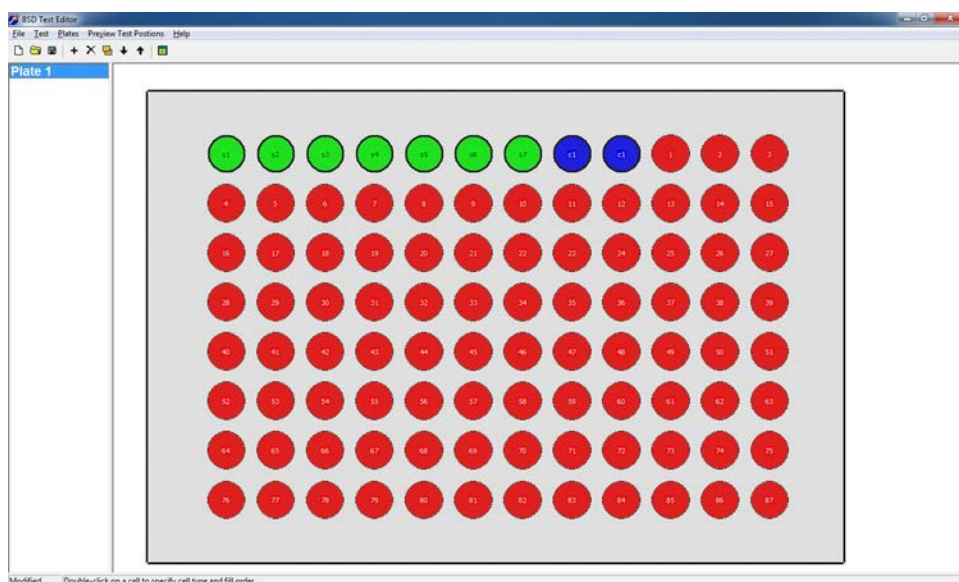
1. Double-click on the appropriate sample number (example: sample 1)
2. Choose the **Control** option as shown below.



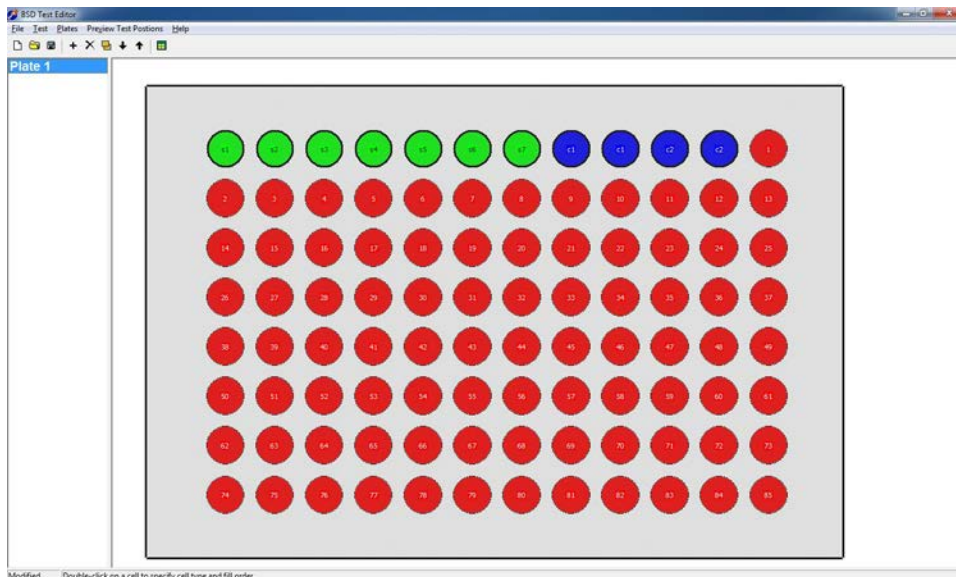
When you select the **OK** button, the **Control cell** is displayed as shown:



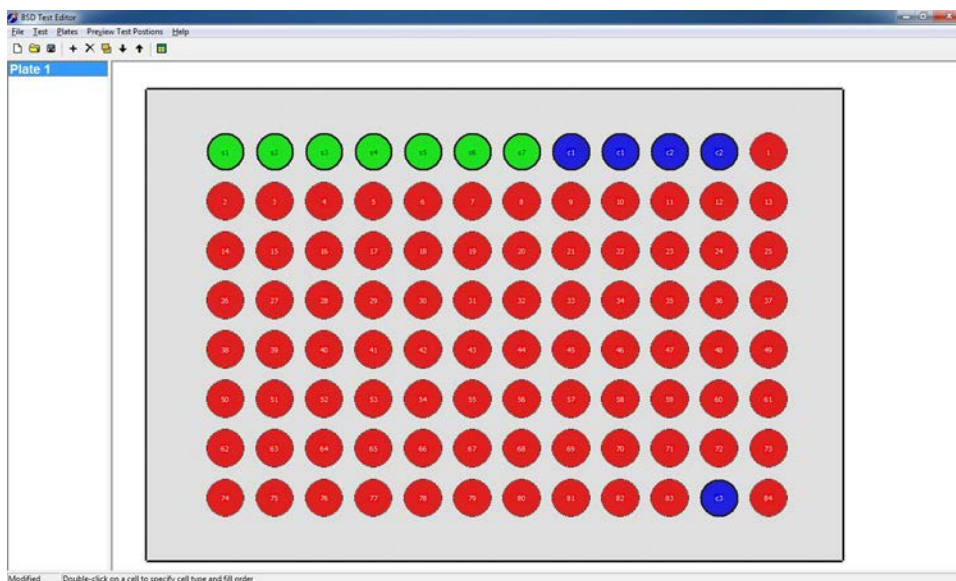
Similarly, the next cell to the right can be specified as a second **c1** (control 1). This results in the following display:



In the same way the next two cells can be set as Control cells, as shown.



Any cell can be set as a Control cell. For example, the cell numbered **84** can be set as a fifth control cell. This results in the following display:



The first plate for a 96-cell test, containing the filling order and position of samples, standards and controls has now been specified.

**NOTE:** More than one plate can be specified per test.

## 7.13 SPECIFYING THE POSITION OF LIQUID CONTROLS

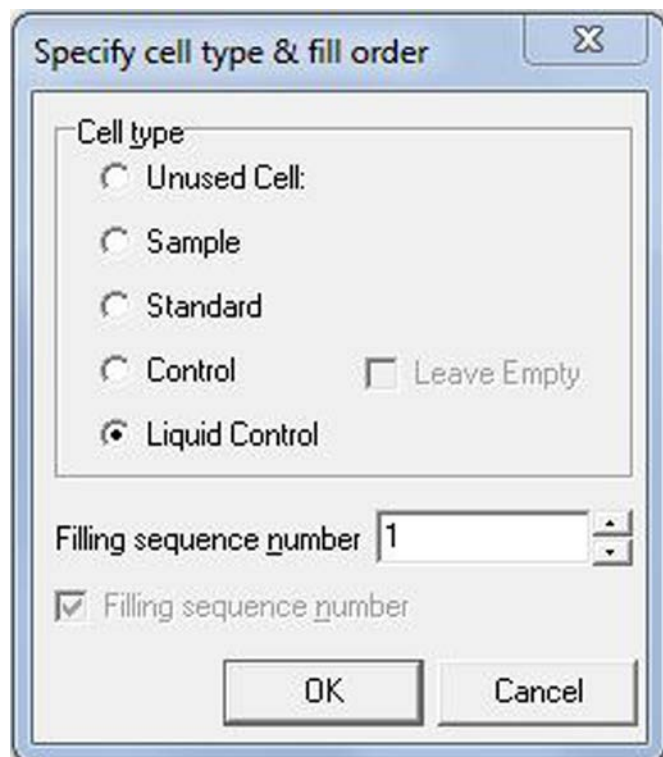
The liquid control cell type is used to denote a cell that will have material placed into the cell during a downstream process.

To specify a cell as a Liquid Control cell,

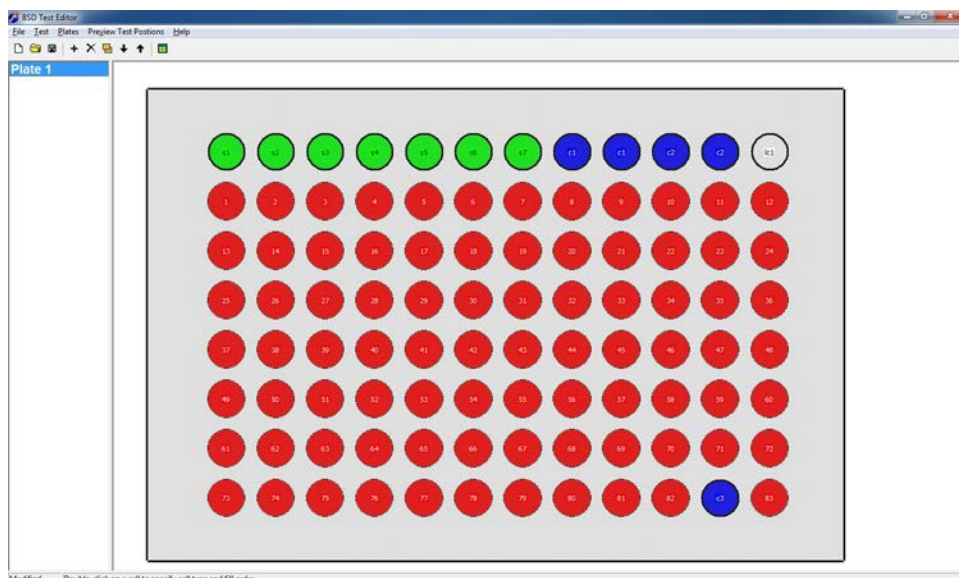
Double-click on the appropriate sample number (example: sample '1').

Choose the **Liquid Control** option.

Click the **OK** button.



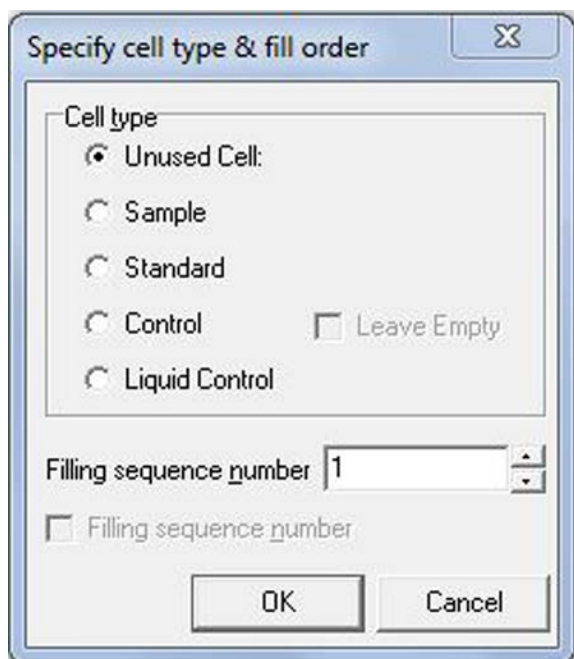
Liquid controls are denoted by the prefix "**lc**" as shown below.



## 7.14 SPECIFYING THE POSITION OF UNUSED CELLS

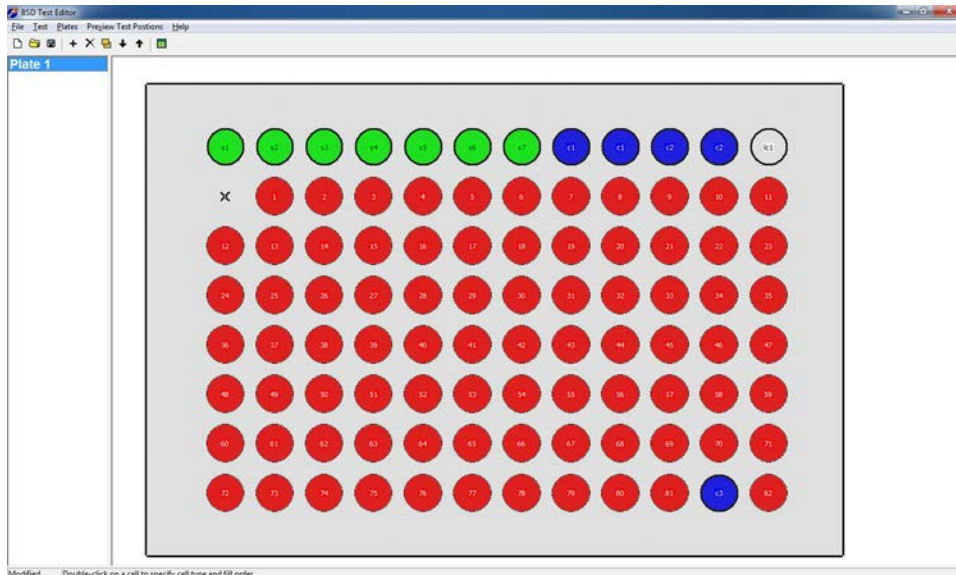
To specify a cell as an Unused cell:

1. Double-click on the appropriate sample number (Example: sample 1).
2. Choose the Unused Cell option.
3. Click the OK button.



An "x" is placed in the position of the unused cell, as displayed below:



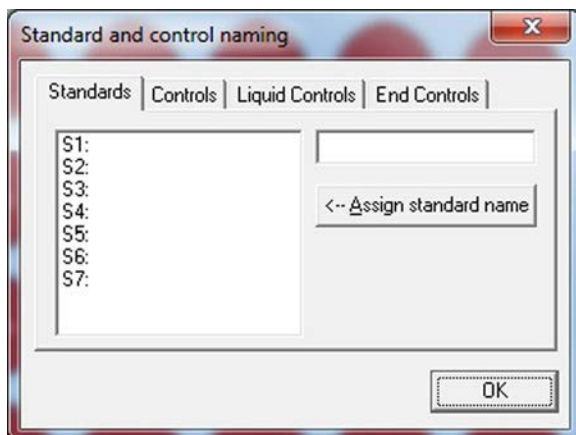


## 7.15 NAMING OF STANDARDS AND CONTROLS

The **Test Editor** uses numbers to refer to standards and controls. Words such as high, low, normal or abnormal are commonly used to describe controls. The **Test Editor** program provides a facility to create name aliases for the standards and controls.

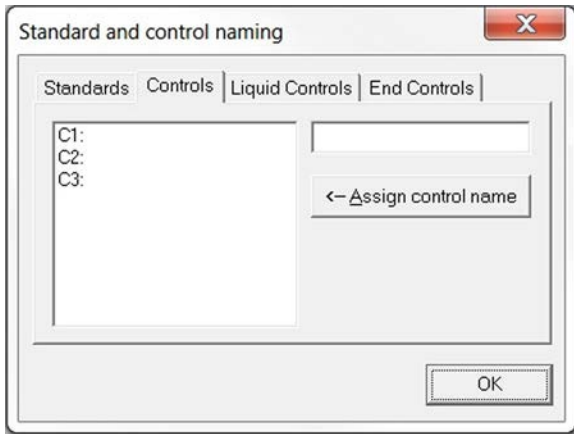
In the test specified in the previous section, three different types of controls (**C1:**, **C2:** and **C3:**) were specified. The following procedure explains how to assign the names **Low**, **High** and **Normal** to these controls.

1. Select the Standard and control naming option from the Test menu.

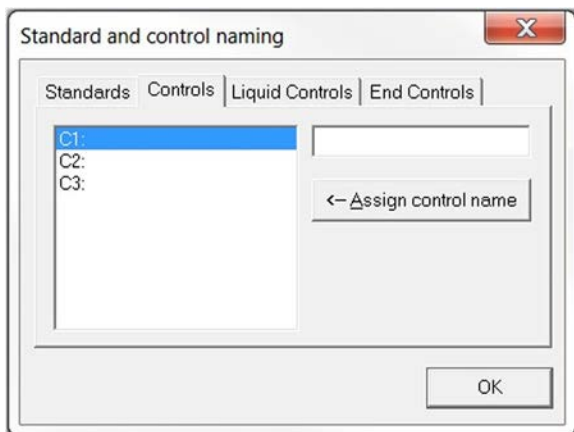


The **Standard and control naming** dialog box displays. Notice that all of the standards that have been specified are displayed in this list.

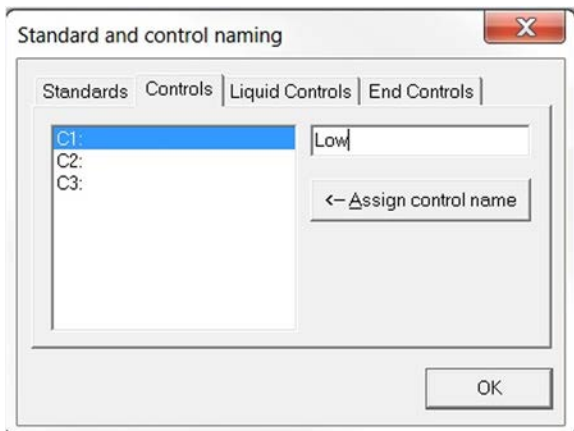
2. Since the names are to be assigned to Controls, click to select the **Controls** tab. The three specified controls are automatically displayed in the list box.



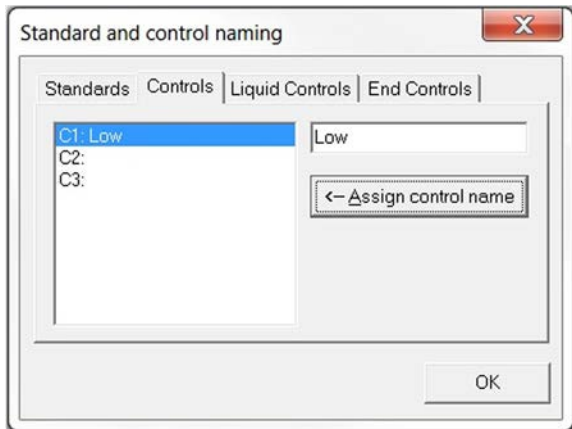
To assign a name to the control **C1:**, click to select **C1:**.



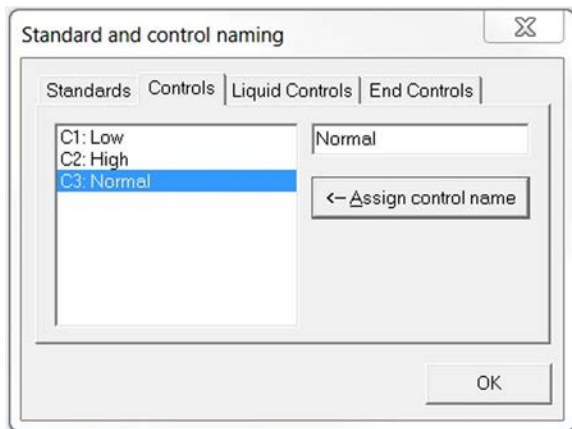
3. Type the name **Low** in the edit control to the right.



4. Click the **Assign control name** button to assign the name **Low** to control **C1:**.



5. To assign the name **High** to **C2:** and **Normal** to **C3:**, repeat Steps 3-5. Once complete, the assigned controls will display:



6. Click the **OK** button after the last name is assigned.

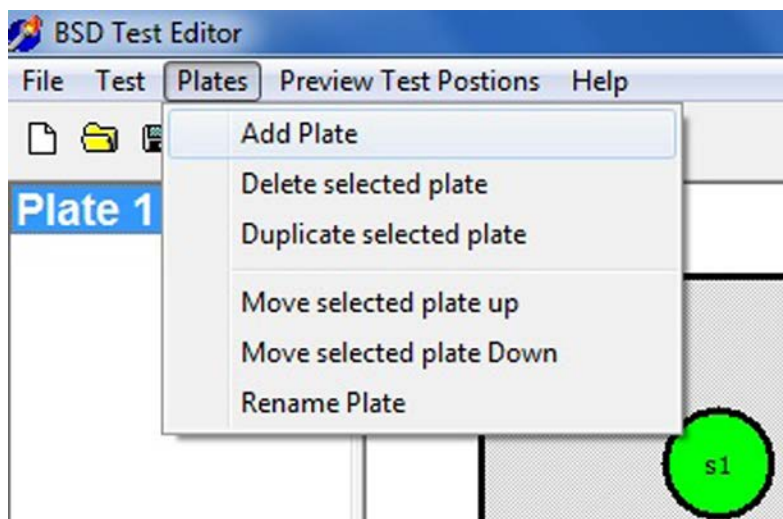
**Standards, Liquid Controls and End Controls** can also be named in the same manner, if required.

**NOTE:** The name associated with each **End Control** is used to group the end control with those in other tests.

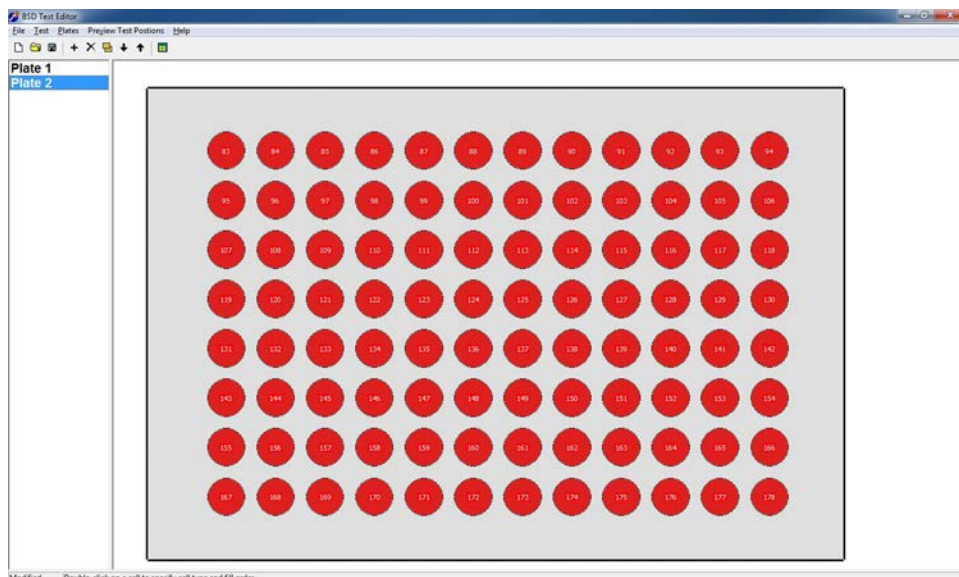


## 7.16 ADDING NEW PLATES

To add an additional plate, select **Plates** from the toolbar, then select the **Add Plate** option.

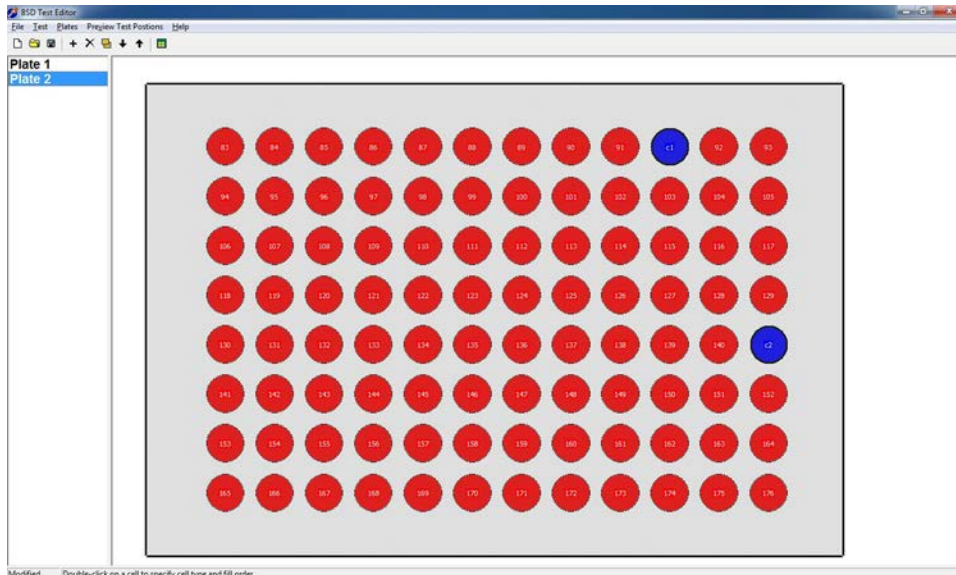


In the example below, a second plate is added and displayed.



The second plate is automatically numbered, starting at **83** to correctly follow the numbering from the first plate (which ended at 82).

Two controls are now added to the second plate by double-clicking on the cells numbered **92** and **141** and specifying as controls 1 and 2 (**c1** and **c2**).

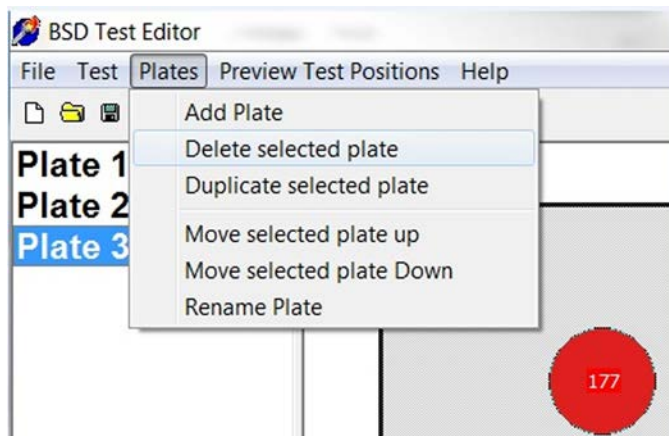


Add as many plates as required to complete the required tests.

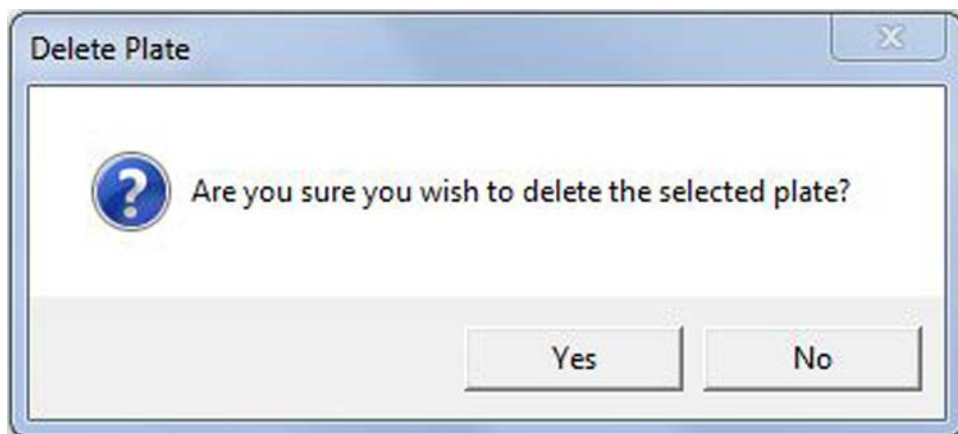
## 7.17 DELETING A PLATE

The selected plate can be deleted. To demonstrate this procedure, create a third plate using the **Add Plate** option.

To delete the third plate, select the **Delete selected Plate** option from the **Plates** menu.

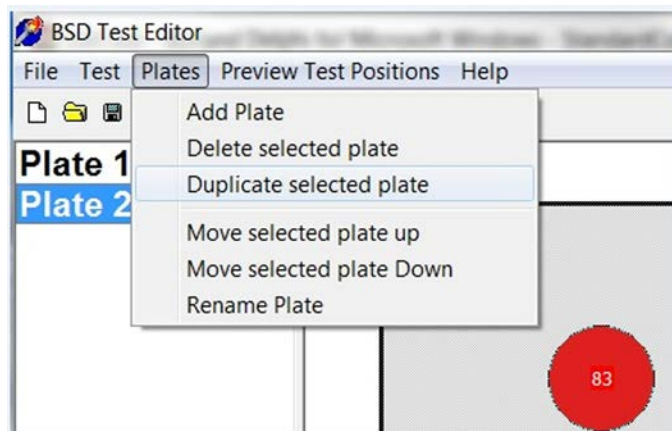


A confirmation dialog box displays. Click the **Yes** button to confirm the plate deletion.

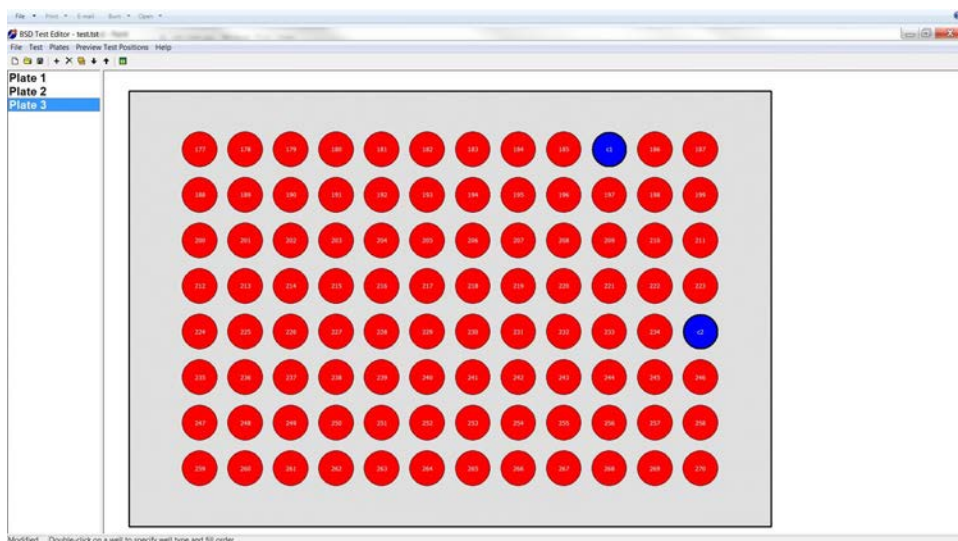


## 7.18 DUPLICATING PLATES

If a third plate is required that has identical positions of the standards and controls as the second plate, the second plate can be duplicated to create a third plate. This is accomplished by selecting the **Duplicate selected plate** option from the **Plates** menu.



The second plate is duplicated to create a third plate.



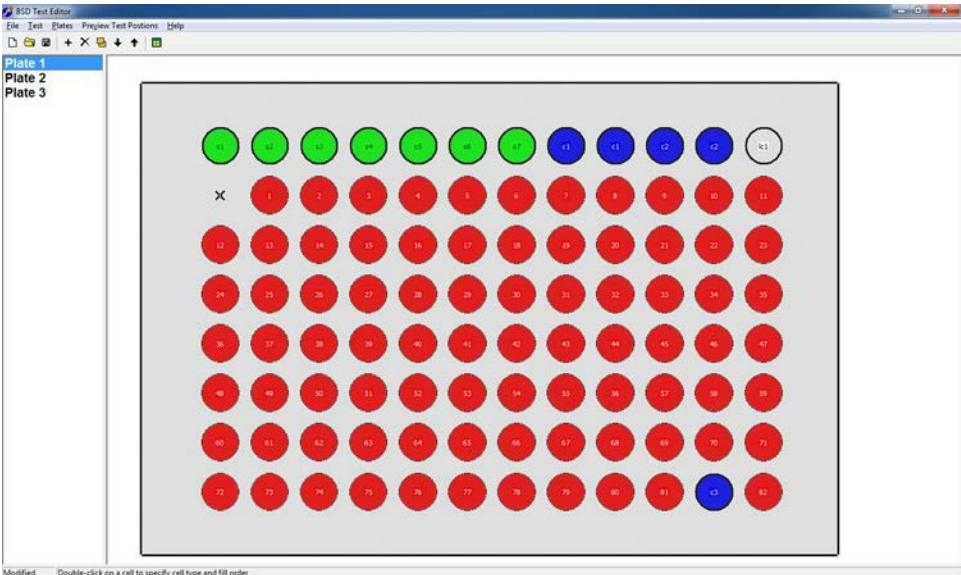
The third plate is numbered automatically, starting at **177** to follow the numbering sequence from the second plate which finished at 176 ( $96 - 14 + 96 - 2$ ).

### 7.19 MOVING A SELECTED PLATE DOWN

The order in which a plate displays can be moved up or down the list. The procedure is explained in the following example.

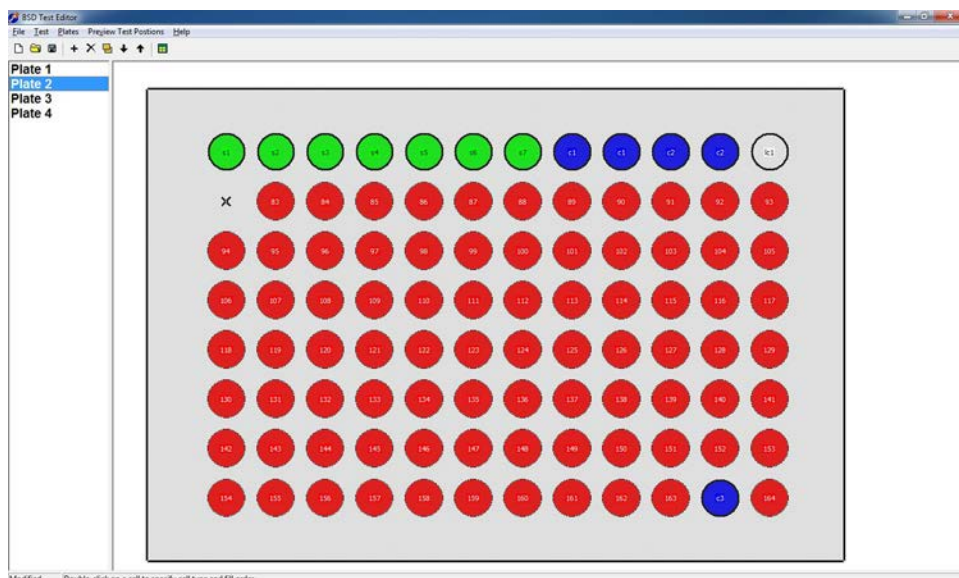
**Example:**

A fourth plate is required that has the same positions of standards and controls as the first plate and positioned as the fourth plate. To do this, select the first plate from the plate list.



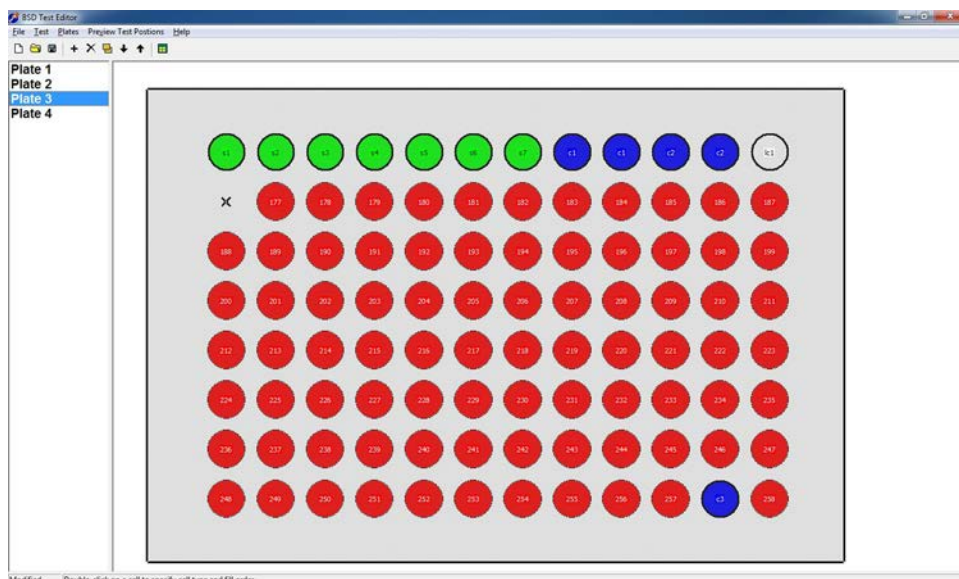
A duplicate of this plate is created by selecting the **Duplicate selected plate** option from the **Plate** menu. A fourth plate is created with identical standard and control positions as the first plate. The original second and third plates are automatically moved down into the third and fourth plate position respectively.



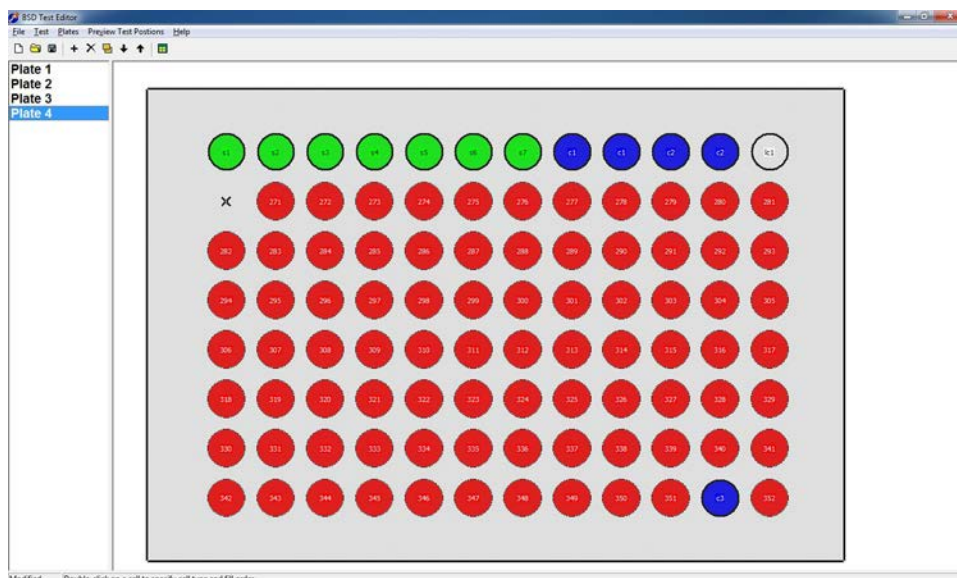


To move the duplicate plate down one position, select the **Move selected Plate Down** option from the **Plates** menu.

The plate is moved to the position of plate three.

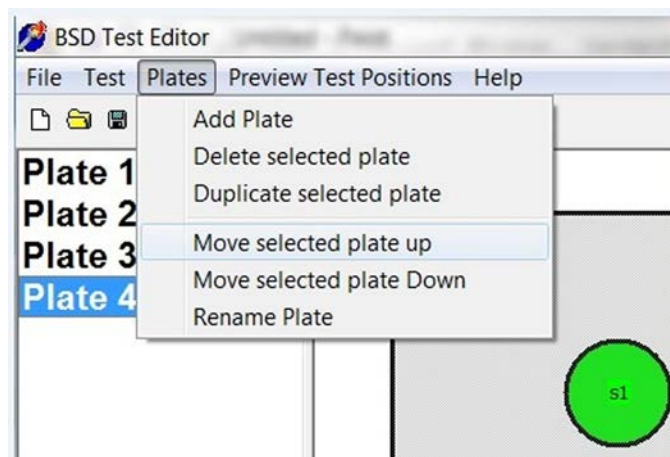


Select the **Move selected Plate Down** option from the **Plates** menu for a second time to move the plate into its final position.



## 7.20 MOVING A SELECTED PLATE UP

The plates can be moved up or down the list. To move a plate up the plate list, select the **Move selected plate up** option from the **Plates** menu.



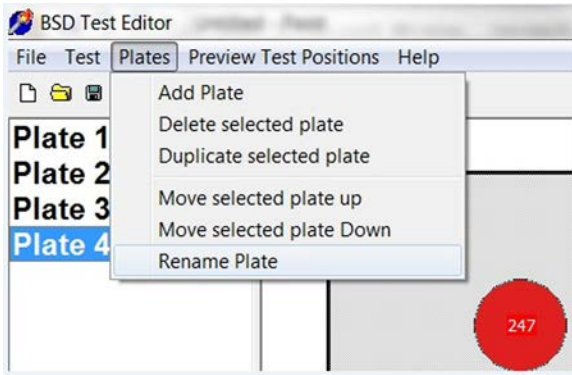
Notice that all sample cells are automatically re-numbered in sequence as the plate is moved up or down.

## 7.21 RENAMING THE PLATES

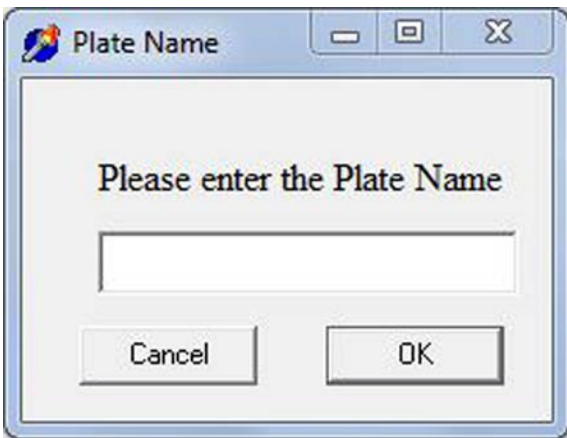
The Rename Plate option allows a plate to be given a specific name. When a plate is created, the plate number is used as the default name, such as Plate 2.

To rename the plate:

1. Highlight the existing plate name on the left-hand side of the screen.
2. Select the **Plates** option from the taskbar and select **Rename Plate**.



3. The **Plate Name** dialog box opens, enter the new plate name.

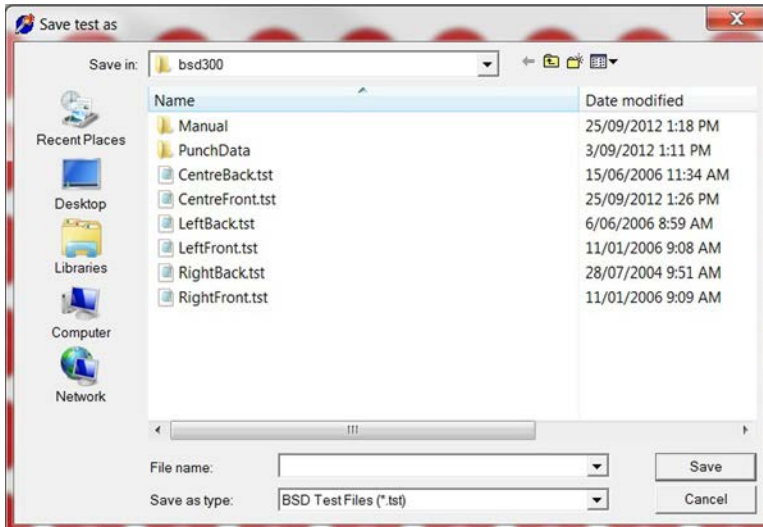


4. After renaming the plate, click **OK** to save the new plate name.

## 7.22 SAVING THE TEST

Now that a test has been specified, save the test.

1. Select the **Save as** option from the **File** menu. The **Save test as** dialog box displays.



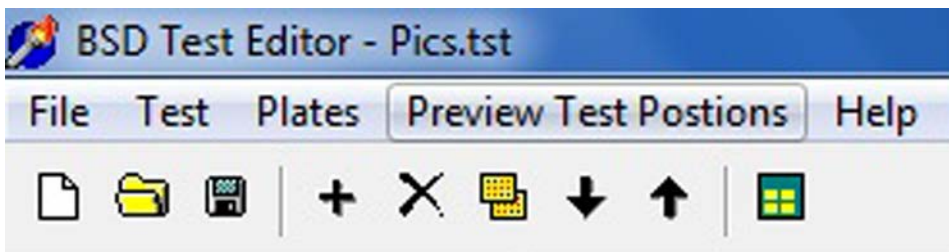
2. Enter the test a relevant name, for example **PKU** or **TSH** or **GAL**, by entering it into the
3. **Filename** edit box located at the bottom of the **Save test as** box.
4. Click **Save** button.

**NOTE:** Notice that the test files have the file extension “.tst”.

## 7.23 PREVIEWING THE TEST POSITIONS

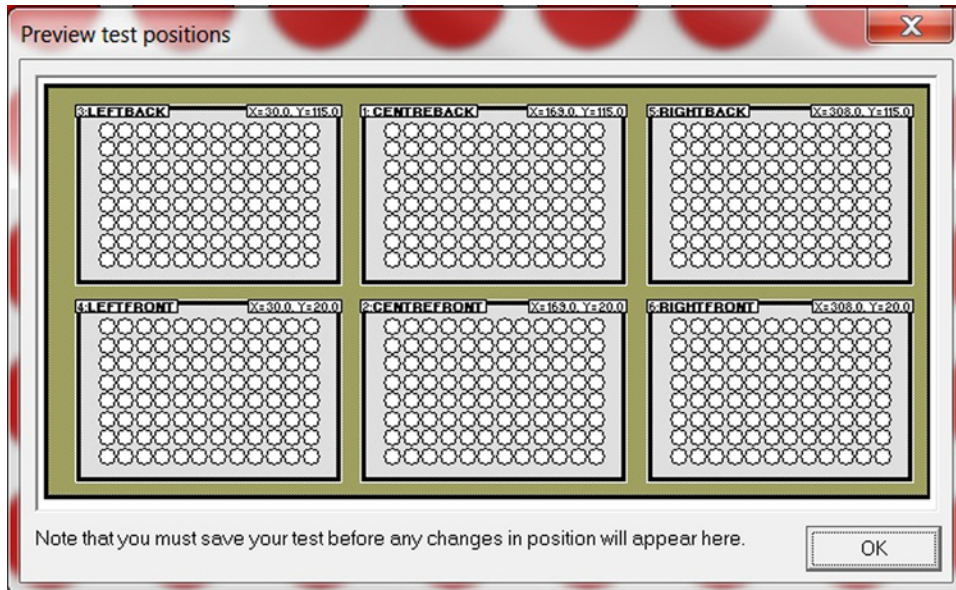
To preview the table layout showing all test positions:

1. Select the **Preview Test Positions** menu option.



The **Preview test positions** dialog box is displayed.





- All tests that have been specified are shown.
- Any changes to test positions that have not been saved are not shown.

**NOTE:** Ensure that the test has been saved before previewing its position.



Refer to section [Saving the Test](#).

2. Select the **OK** button to clear the preview screen.

**NOTE:** If only one plate is shown but a second plate has been defined, both plates can be located in the same position (one plate is on top of the other). To correct this, change the position of one plate (reference the section titled [Specifying the Position of the Test on the Plate Table](#)) if both positions on the plate table are to be used at the same time.

# 8 DISTRIBUTE SPOTS PROGRAM - FEATURES

This section describes the functions found in the Distribute Spots program.

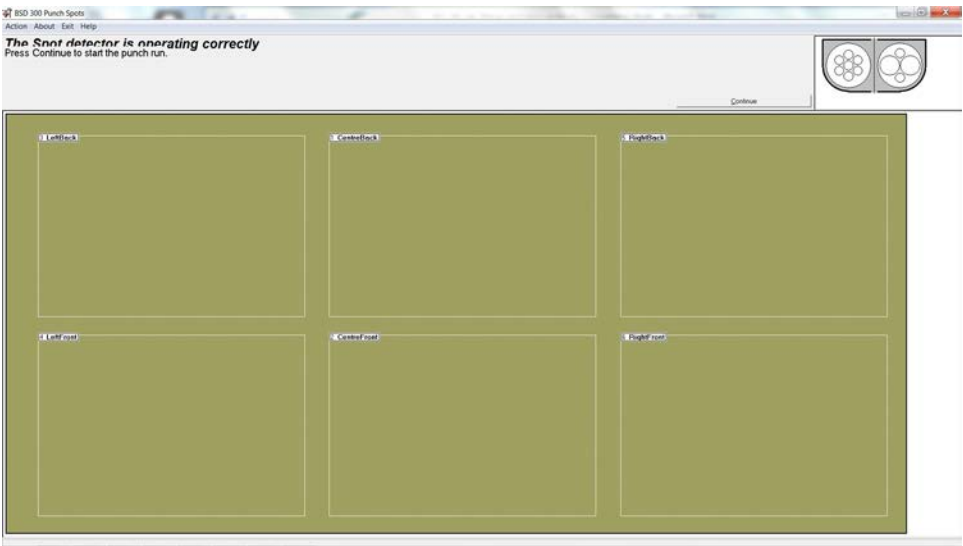
## 8.1 MAIN SCREEN - No COMMUNICATIONS



Key Information on the Main Screen:

1.	Version number	Lists the version number
2.	Test names	These tests are available for use
3.	Punch Pattern	This pattern will vary depending on how each Instrument is configured
4.	Simulation only button	Replaces the <b>Continue</b> button (see below), if the program is unable to communicate with the Punch Instrument

## 8.2 MAIN SCREEN - WITH COMMUNICATIONS

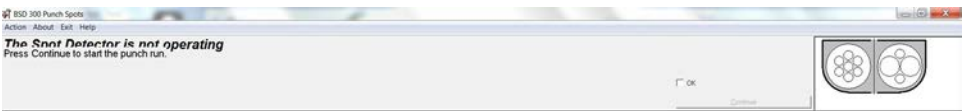


Press the **Continue** button.

## 8.3 SPOT DETECTOR CHECK

At startup, the BSD300 Software verifies the chute is operational. If the chute fails to respond, an error message displays with a **Continue** button and an **OK** check box.

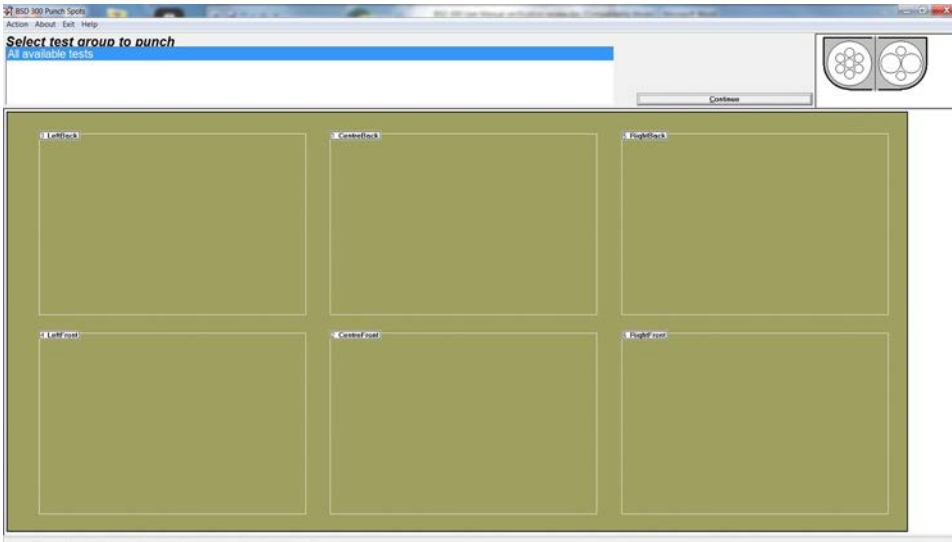
1. Select the check box to activate the **Continue** button, so the software will continue to operate. This procedure advises the user of the importance of the error message.
2. Select the **Ok** check box.



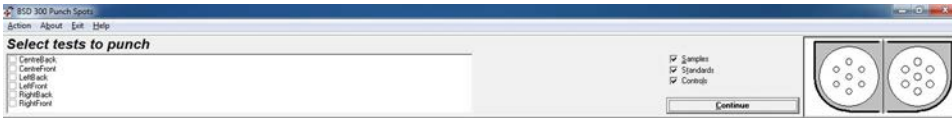
3. Click the **Continue** button.



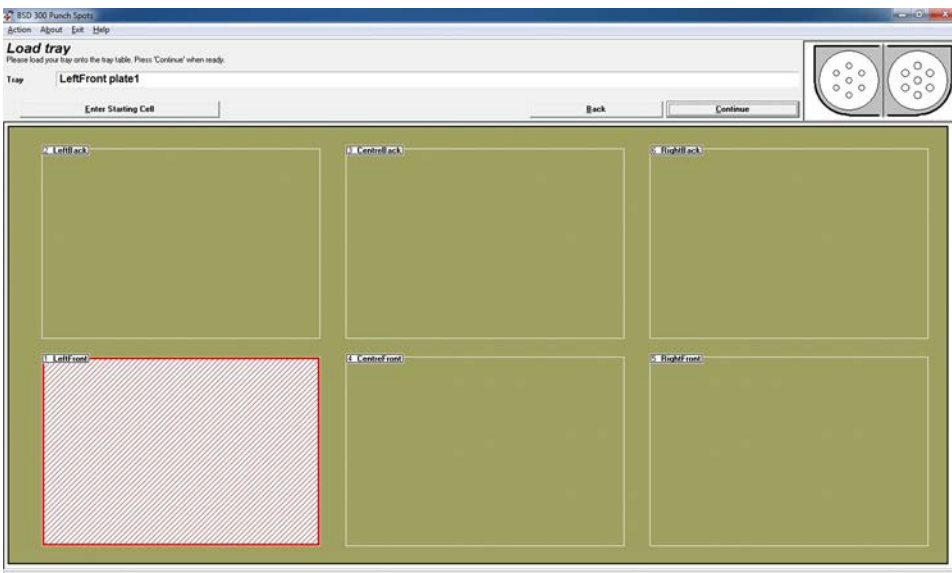
## 8.4 SELECTING TESTS



1. Select a test group and click the Continue button. The Select tests to punch screen displays. The tests that display in this window depend on the previous selection. For example, if Group 1 was selected instead of All available tests, then the tests listed would only be a subset of All Available tests. (Assuming Group 1 is configured to contain CAH and GAL, to Assign tests to a group, refer to section [Edit Test Groups.](#))



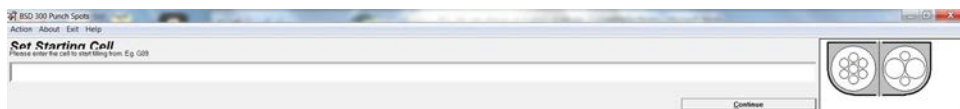
2. Select select tests to punch check boxes.
3. Select the cell types to be punched. Each cell or cell in a plate can be assigned a type (Sample, Standard, Control). These can be punched or not punched by selecting the check box beside each type.
4. Click the **Continue** button. The front plate displays hatched.



5. Click one of three options:

- a. Back – returns to the previous test selection screen.
- b. Enter Starting Cell – allows the starting cell to be specified, if other than A01.
- c. Continue

**NOTE:** The starting cell number must be entered in the correct format (Example: A02, B20, G33) and must contain a zero if less than 10. If the format is incorrect, the incorrect cell number is ignored and **will not** display an error message.



## 8.5 BATCH NUMBER - BSD5 FILE FORMAT

Selecting the BSD5 file format enables the use of batch numbers. A batch number can be assigned for a run and can be continued over multiple runs. The batch number can be continued using the **Resume punching** check box. Enter the batch number and click **Continue** to continue the program.

## 8.6 RE-PUNCH CELL

By double-clicking on a cell, the user can choose to re-punch that cell including the cleaning cell. The software will cancel the existing spot selection and proceed to re-punch the selected cell.

When a sample cell is re-punched, and barcoding is in use, the barcode scanned for the re-punched sample is checked against the barcode scanned for the original punched sample. If the barcode does not match, the user must scan the correct barcode before the sample can be re-punched.

## 8.7 CHANGE ASSAY

By selecting **Change Assay**, the user can suspend any test or resume punching into any of the tests currently loaded in the instrument. If a position is available, additional tests can be added. The software will check that at least one test is active and no tests overlap. This operation acts similar to the “Select Tests” procedure. All tests currently loaded onto the instrument table will remain displayed. The tests that have been suspended only have the outline and test name displayed.

## 8.8 INSPECT

**NOTE:** For the Change Assay operation to work correctly, all tests must use automatic numbering. The change assay operation clears the current strike for immediate selection of the new test arrangement.

The user can choose to suspend the punching operation and examine the plates loaded onto the instrument by clicking the Inspect button. The user then has the option of positioning the instrument table on either side of the instrument by clicking on the **Inspect Right** or **Inspect Left** buttons. The default position is the left-hand side.



To resume the punching cycle, make sure all covers are closed and then click on the **Continue** button.

## 8.9 X AND Y COORDINATES SETTING

By right-clicking on a test, it is possible to alter the position of the test relative to the punch head. This allows the user to adjust the test alignment during the punching run. The user then has the option of either saving the change to a file or keeping the change active until the end of the current punching run.

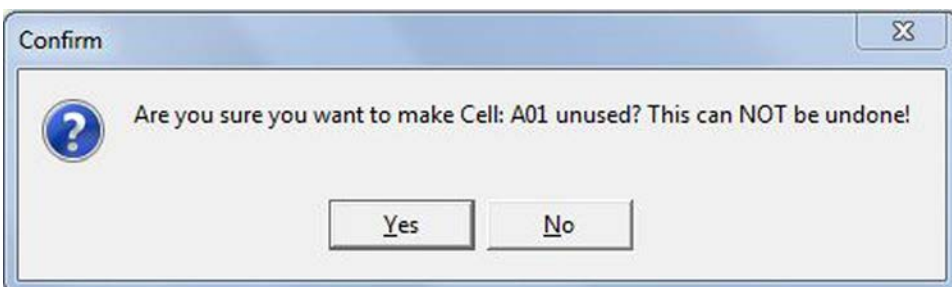
For the purposes of “X” and “Y” coordinates, the point X=0 Y=0 is at a hypothetical position near the front left-hand corner of the tray mount. If the chute needs to be moved slightly to the right to allow for precise alignment with the cell of the tray, then its “X” dimension needs to be increased. Similarly, if the chute needs to be moved slightly towards the back of the Punch Instrument so that it is precisely aligned with its cell, then the “Y” dimension needs to be increased.

While precise alignment of the chute and cell is encouraged, it is essential in circumstances where the laboratory wants to use the Punch Instrument to punch large disks.

Any misalignment of the centers of the chute and its appropriate cell, in either the “X” or “Y” direction, should not exceed 0.3 mm.

## 8.10 SKIP CELL

By double-clicking on an empty sample cell, it is possible to mark it as being unused so the instrument will not punch a spot into that cell. A prompt is first issued to confirm this action. Only if the action is confirmed, the current spot selection will be cancelled and the selected cell will change color to that of an unused cell. The program will then create a new selection of spots, which does not include the cell to be skipped. The change to the cell is not saved to the test file.



**NOTE:** The ability to skip a cell is not available using the **file input** mode.

Double clicking an empty cell in **File input** mode only notifies that this operation cannot be done.

## 8.11 PUNCHED CELL INFORMATION

Using your mouse, position the pointer, but do not click, on a cell to display information about the cell. The information displays at the bottom of the screen. The information includes Test Name, Tray Number, Barcode, Cell Reference, Spot type and Barcode or Fill Reference.

**NOTE:** This information can be useful in identifying a cell to be re-punched.

## 8.12 RE-SCAN BARCODE

Once a barcode has been scanned and prior to pressing the foot switch, the user has the option to re-scan the barcode if it is incorrect or has been scanned incorrectly.

## 8.13 SHRINK PATTERN

In the event that the substance on the sample card is not large enough to allow for the punching of the required number of disks, the user can select the **Shrink Pattern** option. The number of disks to be punched initially will be reduced by one and one targeting light will not illuminate. This step can be repeated as many times as required until the reduced pattern of disks are suitable for punching or only one spot remains.

The user should then proceed to punch using the normal punching procedure. After the reduced number of disks have been punched, the punch head will return to the targeting position, ready for a second strike on the same sample card. By default, the light targeting system will display the balance of the required disks (the number of disks by which the pattern has been “shrunk”).

The user can use this **Shrink Pattern** option as often as is required, without affecting the program or the recording of information in the output file.

## 8.14 UNSHRINK PATTERN

If the user selects the Shrink Pattern option, the **Unshrink Pattern** button is made available for use. By selecting this option, the spot pattern returns to the previous pattern by adding a spot. The option will only go back one step and then become inactive until the **Shrink Pattern** option is again selected.

## 8.15 BACK BUTTON

On selected pages during the initialization process, it is possible to return to the previous page to change the punch run configuration.

## 8.16 STARTING CELL

When the system requests the user to load a plate onto the table, the user has the option of specifying the cell to start punching from (the user can specify the starting cell to be G05). The cell reference is three characters long. All cells which have a lower fill order than the selected cell are marked as unused and only cells with a higher fill order will be used for the punching run.

**NOTE:** The cell reference must correspond to a sample cell and must be specified by its grid reference, not the fill order. This can be useful when using plates, which have previously been partially filled.

The selection of the start cell is for each individual plate loaded onto the table. This option can also be selected for each of the plates loaded to replace full plates.

**NOTE:** This feature is only available if the test uses auto numbering of the cells.

## 8.17 END CONTROLS

By selecting the Punch End Controls option from the menu, the user can punch the number of end controls as specified in each test and terminate the run.



## 8.18 END RUN

By selecting the **End Run** option from the menu, the user can select to end a punching run and return to the run setup page without exiting the program. This procedure will write all the data to the output file and close the file. It also removes all the currently loaded tests and re- initializes the instrument ready to start a new run. The plate is moved to the right and the test plate prompt is displayed for removal of plates.



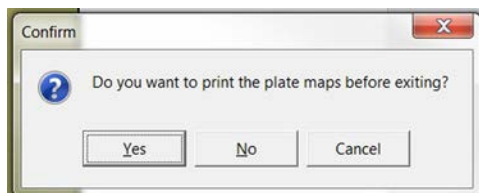
**All Spots Present** - Indicates all the spots are present in the specified plate.

**Re-punching Required** - Indicates that re-punching is required for the specified plate.

**Plate Not Checked** - Indicates that the user must check the spots in the specified plate to continue.

## 8.19 PRINT PLATE MAPS

A plate map is a printed representation of all the cells in a plate with either the type of spot, fill order or the scanned barcode printed inside the cell.



By selecting **Print Plate Maps** from the menu or from the dialog box when exiting the software, it is possible to print out the plate maps of all tests including the scanned barcodes. This must be done prior to using the "End Run" procedure.

All tests currently loaded on the instrument are printed even if the test has been suspended.

Once spooling to the printer has begun the print menu will be disabled until it has finished spooling to the printer.

## 8.20 ABOUT

The About menu option displays information on the software.

## 8.21 EXIT

The Exit menu option will stop the punching run, close the program and return to the BSD Menu screen.

## 8.22 INSTRUMENT START UP

The order of the activation of the Punch Instrument and BSD300 Software is not relevant. However, Microelectronic Systems Pty Ltd® advises that the instrument be switched ON first. If the machine is switched ON after the software, the software will wait for the machine to go through its reset and initialization procedure, then the software will continue.

## 8.23 STARTING SAMPLE NUMBER

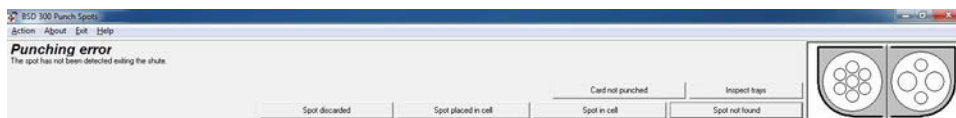
If the system is configured to use Sample Numbers, it will display a starting sample number of **1** and the Distribute Program will prompt the user to enter the Starting Sample Number.

## 8.24 PUNCH ERROR

If following the punching of any spot, the disk detector fails to detect that a disk has passed through the chute, it will cause the punching process to repeat where the punch head will not move to the next punching position, but rather will re-punch up to three times in the existing position.

If after three attempts a disk is still not detected, the system will pause and wait for the user to intervene using the computer, before proceeding.

The computer software will supply six options on the screen for the user at this stage. Each of these options will write a comment to the output file for later processing.



**Spot In Cell** - If the disk has passed through the chute undetected and fallen into the correct cell, the user should select **Spot in cell**, which will then allow the system to continue with the next disk.

**Spot Placed In Cell** - If the disk has passed through the chute undetected but not fallen into the correct cell, the user has the option of manually placing the spot into the correct cell. If this occurs the user should select the **Spot placed in cell** option, which will then allow the system to continue with the next disk.

**Spot discarded** - If the disk has not fallen through into the cell and cannot be seen, the user should, by following the procedures as described in section [User Cleaning Procedures](#), try to locate the disk either inside the chute, the manifold, or in the surrounding area. If located, the user can discard the spot. If this occurs the user should select **Spot discarded**. The system will require the user to move the sample card into the card slot, such that the red targeting system displays on a new sample spot. The light targeting system will only project the number of lights for disks still to be punched. Once the user depresses the foot switch, the system will continue by first re-punching the last disk.

**Spot not found** - If the disk has not fallen through into the cell and cannot be seen, the user should, by following the procedures as described in [User Cleaning Procedures](#), try to locate the disk either inside the chute, the manifold, or in the surrounding area. If the disk cannot be located, the user should return the chute and the covers

to their original operational position, and click **Spot not found**. The system will require the user to move the sample card into the card slot, such that the red targeting system displays on a new sample spot. This light targeting system will only project the number of lights for disks still to be punched. Once the user depresses the foot switch, the system will continue by first re-punching the last disk.

**Card not punched** - The card can not be punched at all. The card contains no hole or extra holes and therefore no disk in the cell. The user should be sure the card is in sight of the red targeting system. Once the user depresses the foot switch, the system will continue by first re-punching the last disk.

**Inspect Trays** - This will move the plate either left or right to allow easier view of the plate and their cells.

## 8.25 TEST OVERLAPPING

The software checks to see if any loaded tests overlap. If so, the software requests the user to delete a test.

## 8.26 SELECT GROUPS

The Select Groups section allows the user to either select a pre-defined group of tests or to select from all the available tests. The pre-defined groups have been defined in the configuration system.

## 8.27 SELECT TESTS

The Select Tests section allows the user to select which tests are to be punched during the run.

The user can select tests by selecting a check box next to the test name. If a test is already selected, clear the check box to not use the test.

When the software displays the tests for the user to select from, all the tests names and an outline are displayed, even if the test is in the same position as another test. This allows the user to see all available tests and which tests overlap.

Once the user has selected the tests to be used for the punching run, the software checks if any of the loaded tests overlap. If so, the user is requested to reselect the tests.

The software also checks that at least one test is loaded for punching. This does not include the optional cleaning test.

## 8.28 DUPLICATE BARCODE

When the barcode of a sample is scanned, the software checks all previous sample barcodes from the run for any duplication. If a duplicate is found the user has the option of re-scanning the barcode or accepting the duplicate barcode.

If the software is configured to use an input file, the user will also have the option of scanning a different barcode.

## 8.29 OUTPUT FILES

As each spot is punched, data about the spot is written to a temporary output file. At the end of the punching run the temporary output file is closed and then copied to the output file directory.

The user can configure the system to use different output file formats. See the [\(Output\) File Format](#) section for a description of the data in each file.

## 8.30 INPUT FILE

It is possible to link the software with an input file containing the barcodes to be punched. The barcodes are then checked with those scanned by the barcode reader. The user has the option to skip a card if the correct card is not available for punching. If a card is skipped the corresponding cell is also skipped and will not contain any spots. Processing will then continue from the next card in the input file. The barcodes are also checked for duplicates.

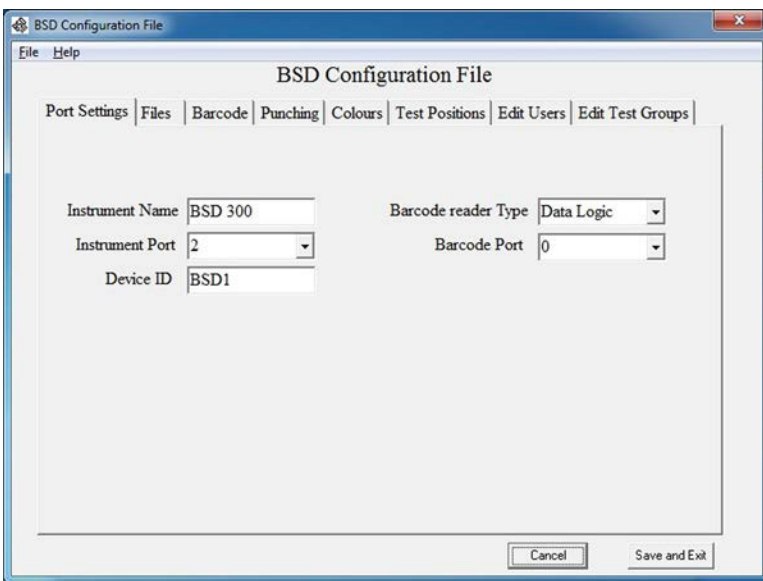
## 9 CONFIGURE SYSTEM

---

The BSD Configuration File option is used to set the various properties required for the Distribute program.

The window below contains eight sub-sections, and each section is accessed by the slide control.

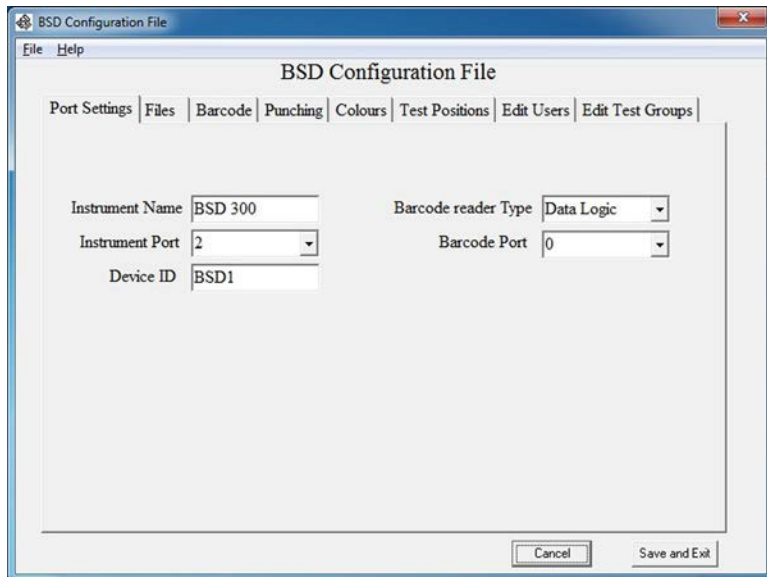
- *Port Settings Tab*
- *Files Tab*
- *Barcode Tab*
- *Punching Tab*
- *Colors Tab*
- *Test Positions Tab*
- *Edit Users Tab*
- *Edit Test Groups Tab*



### 9.1 PORT SETTINGS TAB

Select the **Port Settings** tab. Of the five settings, the **Instrument Name** and **Device ID** cannot be changed by the user. Select values from the drop down list for the following entries:

- Instrument Port (Number)
- Barcode reader Type
- Barcode Port



### 9.1.1 Instrument Name

The Instrument Name is a read only property indicating the type of instrument installed.

### 9.1.2 Instrument Port

The Instrument Port indicates the COM (serial) port in which the instrument is connected. A port number of 0 indicates that the device is not connected. Otherwise the port number is the COM port to which the device is connected. This is set during installation.

### 9.1.3 Device ID

The Device ID property holds an identification name for the instrument.

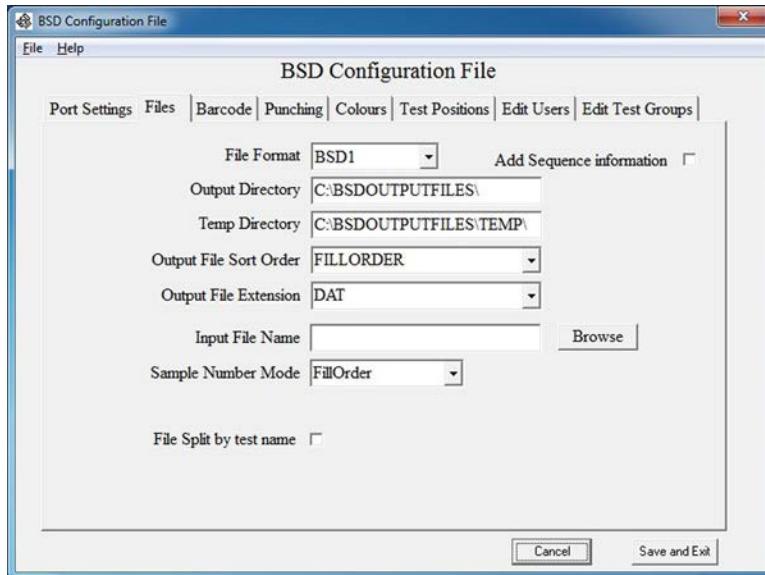
### 9.1.4 Barcode Reader Type

The Barcode reader Type specifies the type of Barcode Reader attached to the instrument. The instrument supports three types of scanners.

#### Barcode Port

The Barcode Port indicates to which COM (serial) port that the Barcode Reader is connected. A port number of 0 indicates that the Barcode Reader is connected via USB connection. This is set during installation.

## 9.2 FILES TAB



### 9.2.1 (Output) File Format

**(A) Function of the Output File** - The Output file, an ASCII file is created by the BSD300 program. The Output File stores the data from each test or run for later downstream processing by other equipment. The structure, or data stored, in an Output file depends on what File Format the user has selected in the Configure System program found on the BSD Main Menu. The default Output File Format is BSD1.

**(B) Viewing an Output File** - Two common methods to view an Output file:

- View the data using Microsoft® Notepad
- Import the data using Microsoft® Excel

After each punch, the new data is added to a temporary file. This file is saved in the directory **C:\BSDOutputFiles\Temp\**.

**NOTE:** The user can specify the name of the temporary directory where this file is saved.

After a test has been completed, the test data in the temporary file is sorted (according to the pre-selected File Format) and an Output file is created. This file is saved in the directory **C:\BSDOutputFiles\**.

**NOTE:** The user can specify the name of the directory where the Output file is saved.

An Output file has the file extension **\*.pnn**, where **nn** is a two digit number (in the range of 01 to 99) incremented each time an Output file is created on any one particular day. The actual filename is the date the file was created, in the format **yyyymmdd**. For the File Format BSD4, a second file is created with the file extension **\*.snn**. See the "Fields present in the various Output Files" table below for the differences between these files.

**NOTE:** For File Format BSD5 a file is created for each test with the name of the test followed by the extension **.Wxx**, where **xx** is the batch number.

**(C) Structure of the Output File** - The Output file is composed of the Header Information and the Run Data.

**Header Information** - The header information contains the following four (4) fields:

- **File Format Name** - the name of the selected format (BSD1 to BSD4)
- **User Name** - the user name entered at the login prompt
- **Date** - the date when the test was completed (Date format: yyyyymmdd)
- **Run Number** - a two digit number that is incremented for each run that occurs on the same date

**Run Data** - The Run Data contains several fields separated by commas. There are different formats that the run data can be saved in; BSD1, BSD2, BSD3, BSD4, BSD5, BSD6, BSD8, and BSD9.

They differ from each other by what fields are present and whether or not the data is sorted. Fields for BSD1 – BSD4 different file formats are listed in the table below.

**NOTE:** For any given file format, the field will always be present. If no data is available the field will be empty.

You can select an output file type from the File format drop-down list. The list includes formats BSD1 - BSD9.

**TABLE 1. Fields Present in the Various Output Files**

Number	Field	BSD1	BSD2	BSD3	BSD4	
					1st File	2nd File
1	Test Name	Y	Y	Y	Y	-
2	Plate Number	Y	Y	-	Y	Y
3	Plate Barcode <sup>1</sup>	Y	Y	Y	Y	-
4	Grid Reference	Y	Y	Y	Y	Y
5	Sample Barcode <sup>1</sup>	Y	Y	Y	Y	Y
6	Sample Type	Y	Y	-	Y	-
7	Fill Order	Y	Y	-	Y	-
8	Cell Alias <sup>1</sup>	Y	-	-	-	-
9	Other (Reserved)	Y	Y	Y	Y	-
10	Comment / (Multiple Samples <sup>2</sup> )	Y	Y	Y	Y	-

<sup>1</sup> If no data is present, the field will remain empty by displaying a comma followed by another comma.

<sup>2</sup> Applies only to BSD2 format. If more than one sample per cell is taken, then the number of samples are recorded in this field along with the Comment.

<sup>3</sup> This second file has the file extension \*.snn.

BSD2 only has one line for each cell in a plate even if multiple spots were punched. For multiple spots, the number of spots punched is recorded in the comment field.

The BSD5 output file does not contain the same data as the other formats. The BSD5 contains data showing how many punches were punched in the last run. Using 'file input' mode the BSD5 contains data containing the barcodes that were used.



#### (D) Function of the Fields -

- **Test Name** – the name of the test.
- **Plate Number** – the number of the plate of the current test (starts from 0).
- **Plate Barcode** – the barcode number that was scanned for this plate.
- **Grid Reference** – the standard grid reference depicted on a plate (e.g. A01).
- **Sample Barcode** – the barcode number that was scanned for this sample.
- **Sample Type** – Either, Unused, Control, Liquid Control or Sample.
- **Fill Order** – 1 of 4 values, 0= None, 1 = Fill Order, 2= Row, 3 = Column.
- **Cell Alias** – the name of a cell given by the user. If none the field is empty.
- **Other** – this field is reserved (currently set to zero).
- **Comment** – a text string added by the program, (Example: “cell empty”).

The BSD6 output file contains a simple listing of per plate data. This data consists of a plate barcode, sample barcode, and cell grid reference such as Pbarcode1234, Sbarcode3,A01, or Sbarcode4,A02.

The BSD8 output file was designed for use with certain types of LIMs. The file name is of format ddmmyy-runNumber-testname010306-01-B.txt refers to the first of March 2006 for Plate B for the first run. The file contains cell grid references and sample barcodes or control aliases that can also be left empty. A tab character separates these two fields.

A02[tab]FTASTANDARD	A08 200460510
A03 200460319	A09 200460511
A04 200460320	A10 200460512
A05 200460321	A11 200460513
A06 200460322	B01 LEAVEBLANK
A07 200460323	

A02[tab]FTASTANDARD	A08 200460510
A03 200460319	A09 200460511
A04 200460320	A10 200460512
A05 200460321	A11 200460513
A06 200460322	B01 LEAVEBLANK
A07 200460323	

The BSD9 output file contains a simple listing of per plate data identical to the BSD6 file format. The difference with the BSD6 file is that it is named according to the barcode of the first plate. If no barcodes are present, the output file will be named according to the current date.

**NOTE:** When a Cleaning test is enabled and subsequently punched, it is treated as if it was a normal sample, in the sense that another line of data (all fields) are filled with the appropriate data that represents that cleaning strike.

## 9.2.2 Output Directory

The Output Directory property specifies the directory in which the Output file is saved after a punch run is completed. The directory name must include the pathname and the filename.

## 9.2.3 Temp Output Directory

The Temp Output Directory property specifies the directory in which the temporary Output file is saved. The directory name must include the pathname and the filename.

## 9.2.4 Output File Sort Order

On completion of the punch run, the program copies the Output file from the temporary output directory to the output directory. At this time the file is sorted as specified by this property.

The data in the Output file can be sorted in one of three ways. This applies only to the file formats BSD1, BSD3, BSD4, BSD6, BSD8 and BSD9. See the "Sort Methods" table below.

**NOTE:** The file format BSD2 cannot be sorted.

**TABLE 2. Sort Methods**

Sort Method	Data Sorted By Fields
None (Default)	No sorting occurs (the data remains in the order in which the samples were taken).
Row	Test Name Plate Name Grid Reference (row letter, then column number)
Column	Test Name Plate Name Grid Reference (column number, then row letter)
Fill Order	Test Name Plate Name Fill Order - the order in which they were filled

The file is always sorted by test name then plate number. If the sort order is either Row or Column, the file is sorted by the cell reference as defined by the plate in the test file or by the fill order if the sort order is Fill Order.

## 9.2.5 Input File Name

The Input file is created by the user with a text editor such as MS Notepad and is primarily used to specify the barcode numbers in advance of a punch run. The Input file is an ASCII file and contains two components, the Header Information and the Run Data.

After the file is created containing the fields as described below, the user specifies the file location and name and sets the program so that the Input file will be used in the next punch run. The procedure for this is described in section D, below.

**(A) Header Information** - The header information contains the three (3) fields:

- **Date** – the date the file was created (any format)
- **User Name** – the name of the user that created the file
- **File name** – name of the Input file

**NOTE:** None of the above fields are processed by the program. The information is only shown for the user's reference.

**(B) Run Data** - The run data contains the following fields:

- **Barcode Number** – the barcode number of the cell
- **Test Name(s)** – the name of the test(s) to be used
- **Cell Number** – the grid reference that consists of a letter followed by two digits, for example, A01
- **Comment** – An optional comment can be entered by the user

**NOTE:** If no comment is necessary, insert a semicolon after the grid reference

- **End of File** – End of file marker that must be entered as "End of File"

The above fields are repeated for each barcode number. Note that the fields are separated by semicolons (;) but if more than one test name is entered, the test names are separated by commas (,). The tests corresponding to a particular barcode number must be on one line.

**NOTE:** No carriage returns should separate the specified tests or Comment fields.

**(C) Examples –**

**Example 1: Standard structure of an Input File:**

```
date;user name;input file name
barcode;test name;grid reference;comment1
barcode;test name;grid reference;comment2
barcode;test name;grid reference;comment3
... {repeated for each barcode number }
End of File
```

**Example 2: One Test:**

```
08/25/03;J.Smith;Test #2
100941;CAH;A01;
100942;CAH;A02;
100943;CAH;A03;last cell
End of File
```

### Example 3: Two Tests:

2003/08/25;J.Smith;Test #3  
101341;GAL,CAH;C11;first cell both tests  
101351;GAL,C12;second cell one test  
101361;GAL,CAH;C13;  
End of File

**(D) Program Setup to Use the Input File** - Before the Input file can be used, two settings in the program must be made.

- (I) The Input file path and name must be specified
- (II) The correct **Sample Number Mode** must be set

The procedure for this is as follows:

- Run the Program and from the main menu select the **Configure System** button.
- Scroll down and at the entry **Input File Name**, enter the full file path and file name or use the browse button.
- In the very next entry called **Sample Number Mode**, select **File Input** from the drop down list.
- Click on the **Save & Exit** button.

For the next punch run, the program will use the Input file.

In the Distribute Spots Program, the expected barcode number (drawn from the Input file) is displayed at the top of the screen.

**NOTE:** Verify that the number of barcode numbers contained in the Input file matches the number of cells to be punched (as determined by the specified Test).

## 9.2.6 Sample Number Mode

This property specifies the input mode for the distribute program. The sample numbering modes are:

**Fill Order** - In this mode, sample numbers can be in the range of 1 to 9999. This is the default mode.

**Sample Number** - In this mode, the user is initially prompted to enter the starting sample number. This number can be up to 18 digits long. This is taken to be the sample number of the first sample card to be punched. Subsequent sample numbers are generated automatically.

**File Input** - In this mode, the specified input file is used to determine the barcode of each of the samples to be punched. The format of the input file is described in the [Input File Name](#) section.

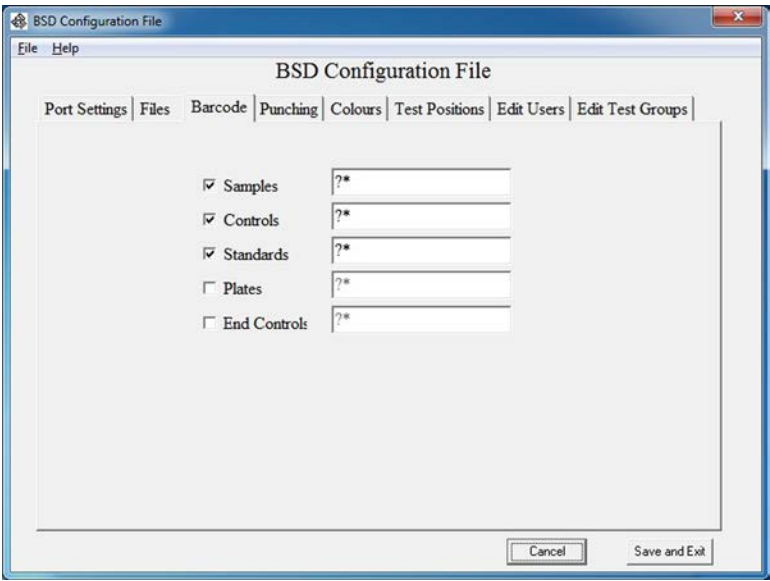
**Master List** - In this mode, the specified input file is used to determine the barcode of each of the samples to be punched. Barcodes are read at the start of the punching run and assigned a position on the plate maps. Plate maps are printed. The punching run then begins with the scanned barcodes required to match the list of barcodes.

## 9.2.7 Files Split by Text Name

By selecting the **Files split by Text name** check box, the output file will split into smaller files containing the punching information of only one test per file.

### 9.3 BARCODE TAB

The Barcode tab specifies which spot types require a barcode. To turn barcoding on for any of the spot types or plates, select the check box next to the required spot type or plate.



#### 9.3.1 Barcode Patterns

Barcode patterns are used for barcode validation. Any barcode scanned **MUST** match the pattern for that type of barcode. For example, if the control barcode pattern is:

Control Pattern = CONTROL001

Then the barcode of ALL controls scanned **MUST** be "CONTROL001" for the program to proceed.

A number of special or wildcard characters are allowed in the patterns. These are listed below:

?	Match any individual character (alpha or numeric)
#	Match any numeric character
@	Match any alphanumeric character (upper and lower case)
{...}	Match with any character from a set of characters (Example: {ABC123} )
*	Match with zero or more characters If the asterisk "*" is at the end of the pattern, it means match all characters to the end of the
\	Match the character immediately after the backslash "\" literally. So \? means match a "?" character and not any character.

The default pattern is ?\* which means that the barcode must contain at least one character.

**TABLE 3. Example Barcode Patterns Using the Wildcard Characters**

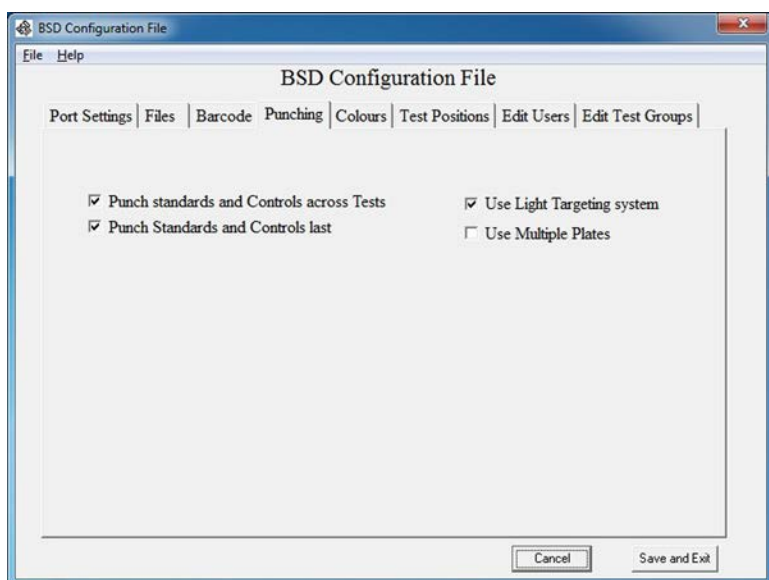
Example Pattern	Description
#####	Match any barcode that contains five digits.
C#####-###	Match any barcode starting with "C" followed by 6 digits, then a "-", followed by three digits. This would match with a barcode like "C000000-123".
222@###A10##	Match any barcode starting with "222" followed by an alphanumeric character followed by three digits followed by "A10" followed by two digits. This would match with a barcode like "222Z123A1002".
A{01}#####Z	Match any barcode starting with "A" followed by either "0" or "1" followed by 6 digits followed by "Z". This would match with a barcode like "A1000000Z".
A*Z	Match any barcode starting with "A" and ending in "Z". This would match with "AZ", "A000001Z", "A123Z", "AdummyZ"
A\#####\#Z	Match any barcode starting with "A#" followed by six digits followed by "#Z". This would match with a barcode like "A#123456#Z".

If a barcode validation pattern is defined in the **Test Editor** program, it will override the default values provided here.

The only exception is the samples pattern, which are not defined in the test editor and always take their validation pattern from the Sample Pattern section of this file. For Plate Barcodes, the Before Every Sample option instructs the software to read the barcode of the plates before every sample is punched.

## 9.4 PUNCHING TAB

The Punching tab determines when the spot types will be punched in the punching run.



### 9.4.1 Punch Standards and Controls Across Tests

Select the Punch standards and Controls across Tests check box to deliver standards and controls to all selected tests.

## 9.4.2 Punch Standards and Controls Last

Select the Punch Standards and Controls last check box to punch the samples into each plate before the standards and controls. When a plate is completed, the standards and controls for that plate are punched. If more than one plate is completed at the same time, the standards and controls for one of the plates are punched before moving to the next completed plate.

## 9.4.3 Use Light Targeting System

If the instrument is being used to punch only one spot from each sample, it is possible to disable the targeting system. This will shorten the punching cycle by allowing the sample to be placed directly under the punch and not having to go through the targeting part of the cycle.

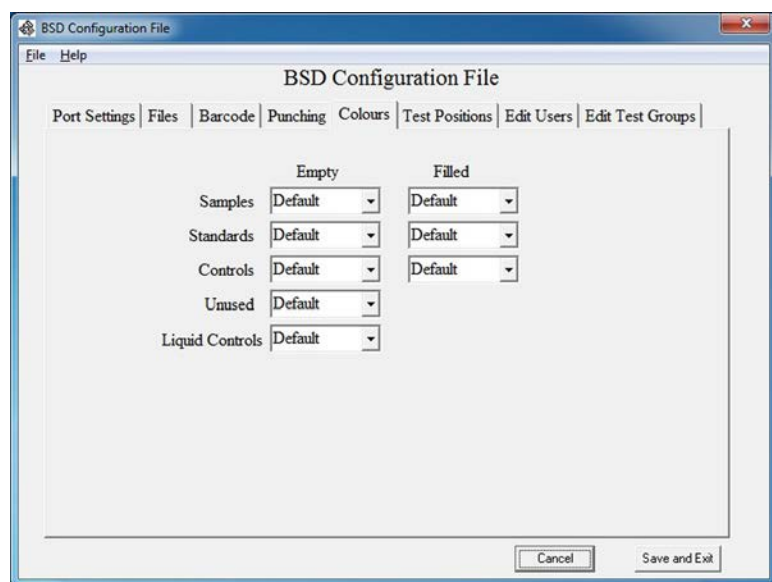
By checking the box next to “Use Light Targeting System”, the array of illuminated red dots on the sample is switched on.

## 9.4.4 Use Multiple Plates

The option to **Use Multiple Plates** allows the user to have more than one plate of a test on the instrument table at a time. The user may select either 1 test with 6 plates, 2 tests with 3 plates each or 3 tests with 2 plates each. If more than 3 tests are selected the software will cancel the multiple plate option.

To activate the **Use Multiple Plates** option, click to place a check in the box next to **Use Multiple Plates** listing.

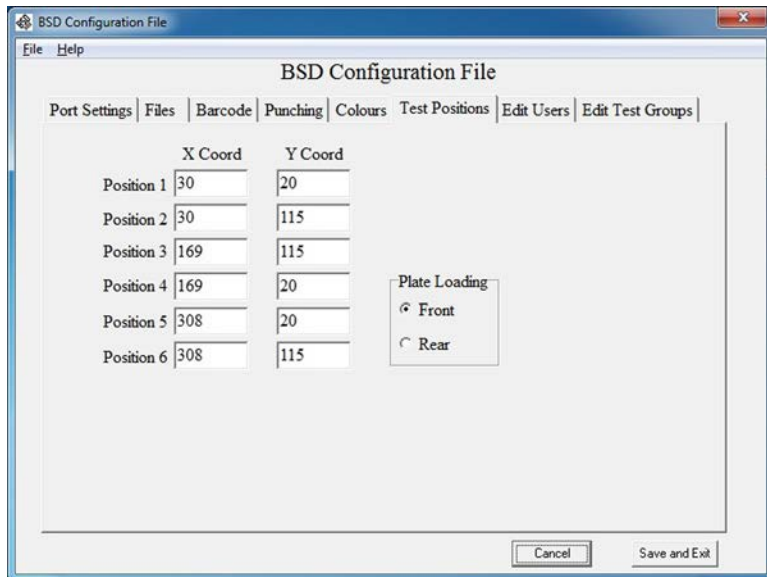
## 9.5 COLORS TAB



The Colors tab defines the color associated with each spot type for displaying on the screen. A different color can be assigned for an empty cell and for a cell after a spot has been delivered.

Allowable colors are: Aqua, Black, Blue, DkGray, Fuchsia, Gray, Green, Lime, LtGray Maroon, Navy, Olive, Purple, Red, Sliver, Teal, White and Yellow.

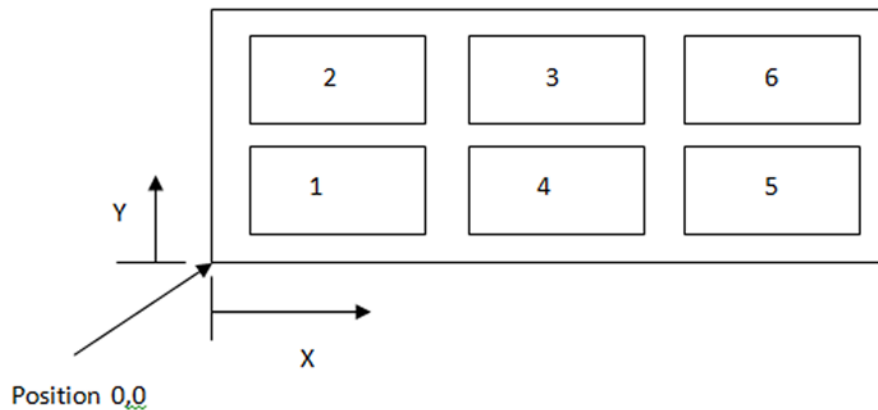
## 9.6 TEST POSITIONS TAB



The Test Positions tab specifies the X and Y coordinates of the first cell for each of the six plates on the Plate Table. For the purposes of X and Y coordinates, the point X=0, Y=0 is at a notional position near the front left-hand corner of the Plate Table.

The following diagram illustrates the meaning of the X and Y values in terms of the position of the plate on the BSD instrument's Plate Table.

**NOTE:** The first cell refers to the first cell encountered by the X and Y coordinate system



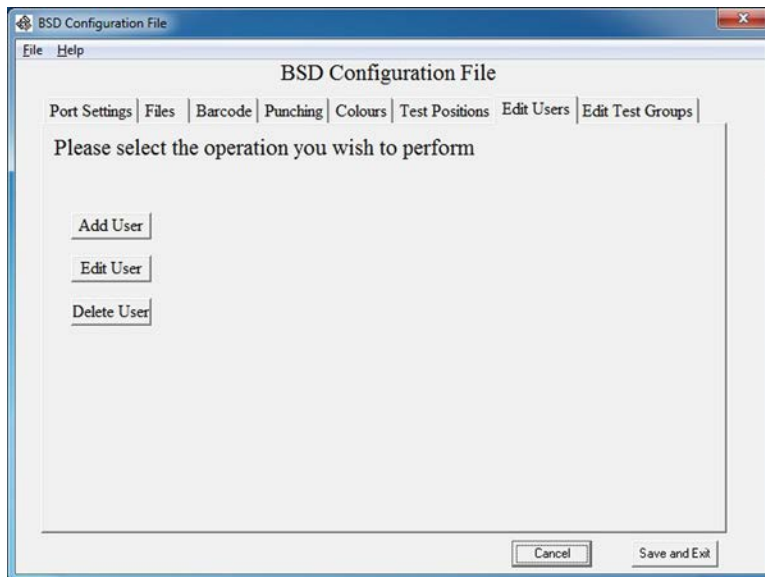
If the coordinates are altered, all of the tests associated with that plate will use the revised coordinates.

These X and Y coordinates would have been set during installation but may require periodic adjustment or reset if different plate types are used.

The plate loading option allows the user to always load from the front or the back position first.



## 9.7 EDIT USERS TAB



The Edit Users tab allows the system administrator to add a user, edit a user's profile, or delete a user. The user's details include username, password and security level. There are two security levels - 1 or 2.

**Security Level 1** - For "general users", this security level only allows access to the Distribution Spot program.

**Security Level 2** - For "supervisors" or system administrators, this security level allows access to the Distribution Spot program, Test Editor program and the Configuration system.

**(A) To Add a User -**

The screenshot shows a window titled "BSD Configuration File" with a menu bar containing "File" and "Help". Below the menu bar is a tabbed interface with tabs for "Port Settings", "Files", "Barcode", "Punching", "Colours", "Test Positions", "Edit Users", and "Edit Test Groups". The "Edit Users" tab is selected. The main area contains the text "Please enter your username and password". On the left, there are three buttons: "Add User", "Edit User", and "Delete User". The "Add User" button is highlighted. To the right of these buttons are three text input fields labeled "Username", "Password", and "Confirm Password". To the right of the "Confirm Password" field is a "Security Level" dropdown menu currently set to "1". At the bottom of the form area are "Cancel" and "Submit" buttons. At the bottom of the window are "Cancel" and "Save and Exit" buttons.

Click on the **Add User** button and enter the user name and the password and confirm the password.

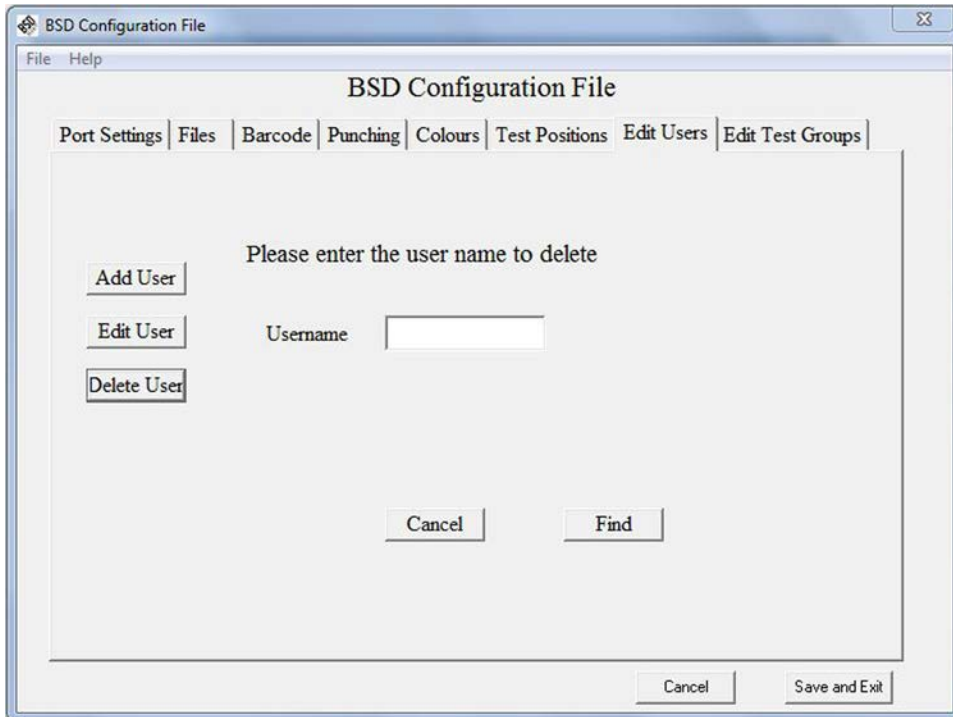
**NOTE:** The user name and password must have a minimum of 6 characters. From this window, the user's security level must be set. Then click the **Submit** button.

**(B) To Edit a User's Details -**

The screenshot shows the same "BSD Configuration File" window with the "Edit Users" tab selected. The main area contains the text "Please enter the user name to edit". On the left, there are three buttons: "Add User", "Edit User", and "Delete User". The "Edit User" button is highlighted. To the right of these buttons is a single text input field labeled "Username". At the bottom of the form area are "Cancel" and "Find" buttons. At the bottom of the window are "Cancel" and "Save and Exit" buttons.

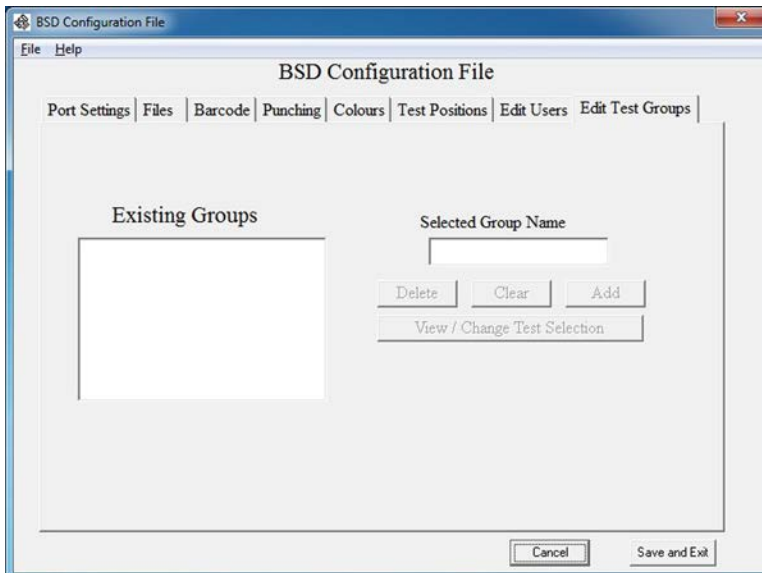
Click on the **Edit User** button and enter the username and select **Find**. If the user exists, modify the username or password. Then click the **Submit** button.

### (C) To Delete a User -



Click on the **Delete User** button and enter the username and select **Find**. If the user exists, the details will be displayed. If the user's details are displayed, then click the **Submit** button to permanently delete that user.

## 9.8 EDIT TEST GROUPS TAB



The Edit Test Groups tab allows the user to set up groups of test which will be frequently punched.

To edit a test group, double-click on the group in the left-hand side list box. This will place the details in the edit boxes on the right hand side for the user to edit. When the editing is complete, the user can select to replace the data, delete the test group or clear the changes by clicking on the required button.