

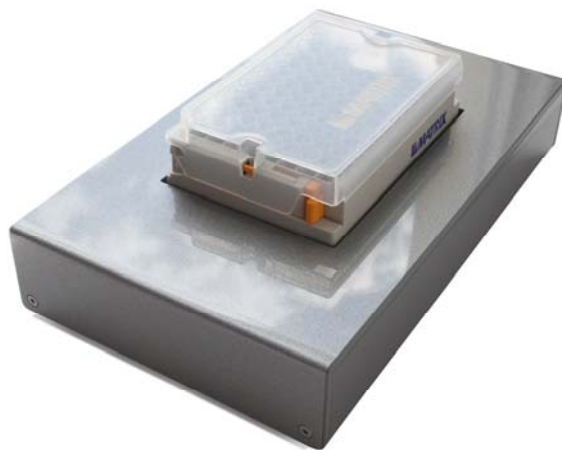


XTR-96

96 Tube Rack Scanner

Manual

Version 2.205





August 2006

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Welcome

The XTR-96 Reader is the latest member of a family of sophisticated 2D Data Matrix code readers capable of reading standard 96 way racks of pre coded tubes from a variety of manufacturers provided that they adhere to the ISO 16022 Data Matrix Two Dimensional Bar Code format. The software has been designed to run with the minimum of user input and set-up.

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Introduction

The *XTR-96* is a high performance reader of SBS format racks containing industry standard coded tubes. It is based upon a specially modified flat bed scanner with a USB2 interface delivering high speed operation. As the system uses a unique method of operation and algorithms that do not rely on custom chips, the decode speed and overall performance is directly related to the power of the PC that is running the software.

XTR-96 Features

Flexible software integration -The system has a standard Windows™ interface with an automation override facility. Several methods are available for the controlling application to collect the processed results.

The Windows based software is based upon Medusa™ decode algorithms for high speed and reliability.

Full Industry standard ODBC compatibility with common database systems.

Images of the tubes are displayed after every read cycle together with the standard SBS grid references 1 – 12 and A - H.

An integrated database allows easy verification of tube data.

Installation

Before you start please ensure that you have the

- XTR-96 Reader
- Power Supply and Lead
- USB Cable
- USB Dongle
- XTR-96 Software CD-ROM

Unlock the Scanner by placing a small screw driver into the slot at the read and moving the slider switch to the right (towards the USB and Power connectors) see below.

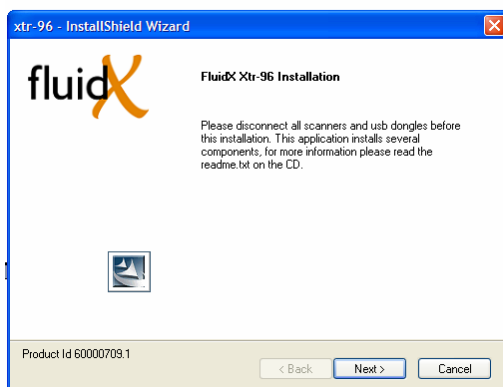


Illustration showing rear of unit.

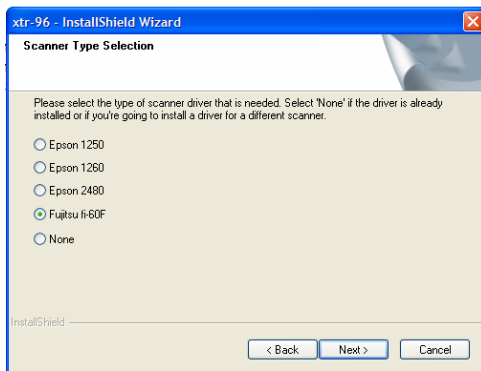
Do not connect USB Cable or USB Dongle at this stage.

Insert CD-ROM and follow on screen instructions.

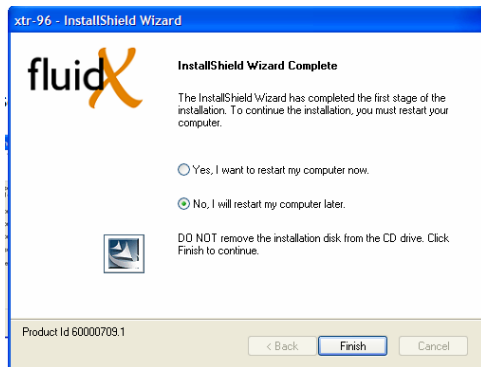
1. Install should start automatically, if not start the install manually by double clicking on the setup.exe icon.
2. Click Next



3. Select Fujitsu fi-60F as the scanner type.



4. Restart the computer to complete the installation process.



5. Connect the USB dongle and USB Scanner Cable.

Getting started

This section assumes that the software has been loaded, your scanner is turned on and that you have a rack of coded tubes placed on the scanner.

You can execute the XTR-96 software from either the **start button** or from the **shortcut** that was created on you desktop.

To execute from the start menu, **single click the left mouse button** on the **start button** and select **Programs** then move to the entry that says **XTR-96** finally move to the entry that says **XTR-96** and **single click the left mouse button**.

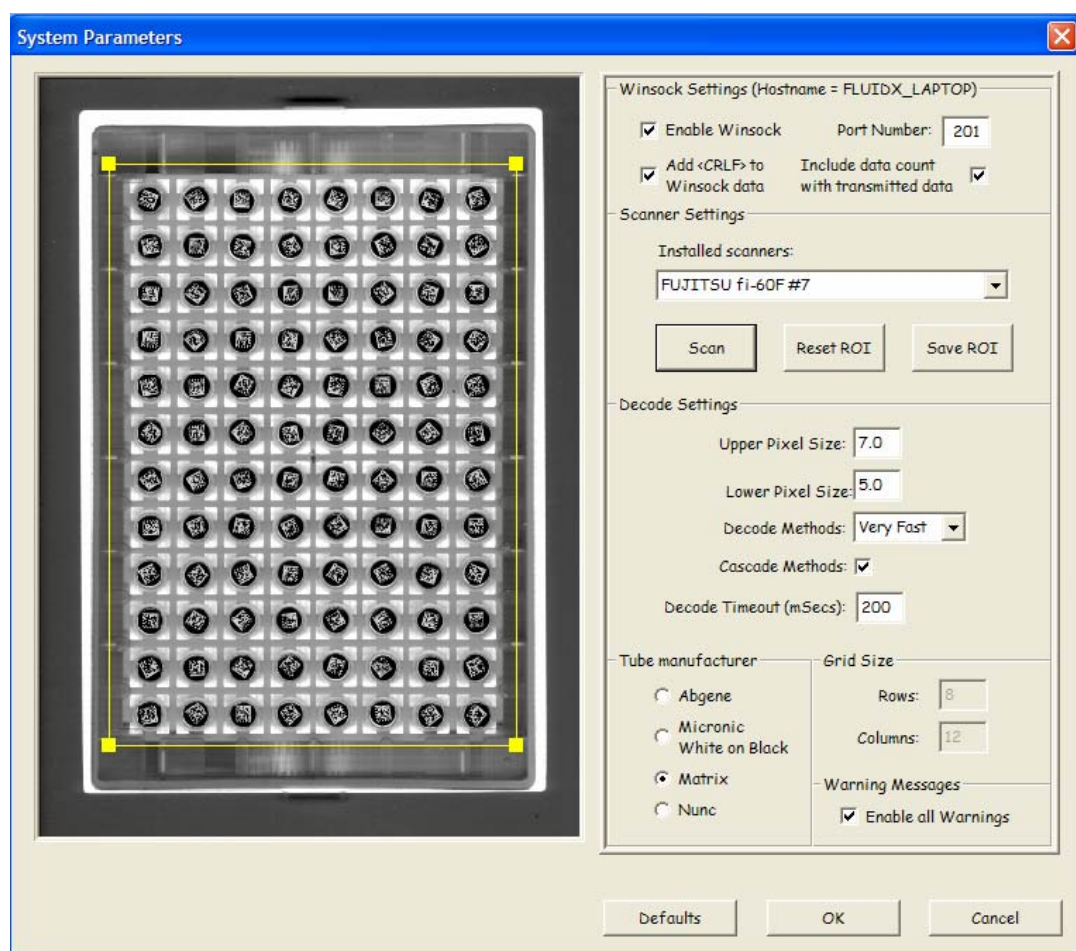
To execute from the desktop **shortcut** simply locate the **shortcut** on your desktop that says **XTR-96** and **double click the left mouse button**.

Once you have done this you will see the following screen.



The software is now starting.

After a few second this screen will be displayed.



This screen is displayed on the first execution of the software, the software will automatically scan and a progress bar will be shown as in the screenshot above (ensure that FUJITSU fi-60F is the scanner selected).

In the screen shot above you will see an image of what the scanner has captured. You will notice a yellow box with a square at each of its four corners. This box should be aligned with each of the corners of the rack containing the tubes.

If it is not aligned use the **mouse** to point to one of the yellow boxes that is not on the corner of the rack, **left click the mouse and drag** the yellow box until it is over the corner of the rack that it was nearest to. Repeat this operation until all four yellow boxes are on the corresponding corners of the rack.

Before we leave this screen please make sure the correct tube manufacturer has been selected. You can change tube manufacturer by simply **left mouse button clicking** the **radio button** that is to the left of the tube manufacturer's name. This section is located to the right of centre and towards the bottom of the **dialog box** the section is titled "Tube manufacturer".

We will explain about the other settings on this screen later in this manual. Please **left mouse click** the **OK button** located at the bottom of the **dialog box** to save and exit.

The system will now scan again, this time it will only scan the area that was within the yellow box that you have just configured.

Once the scan has completed the screen display should look like this:

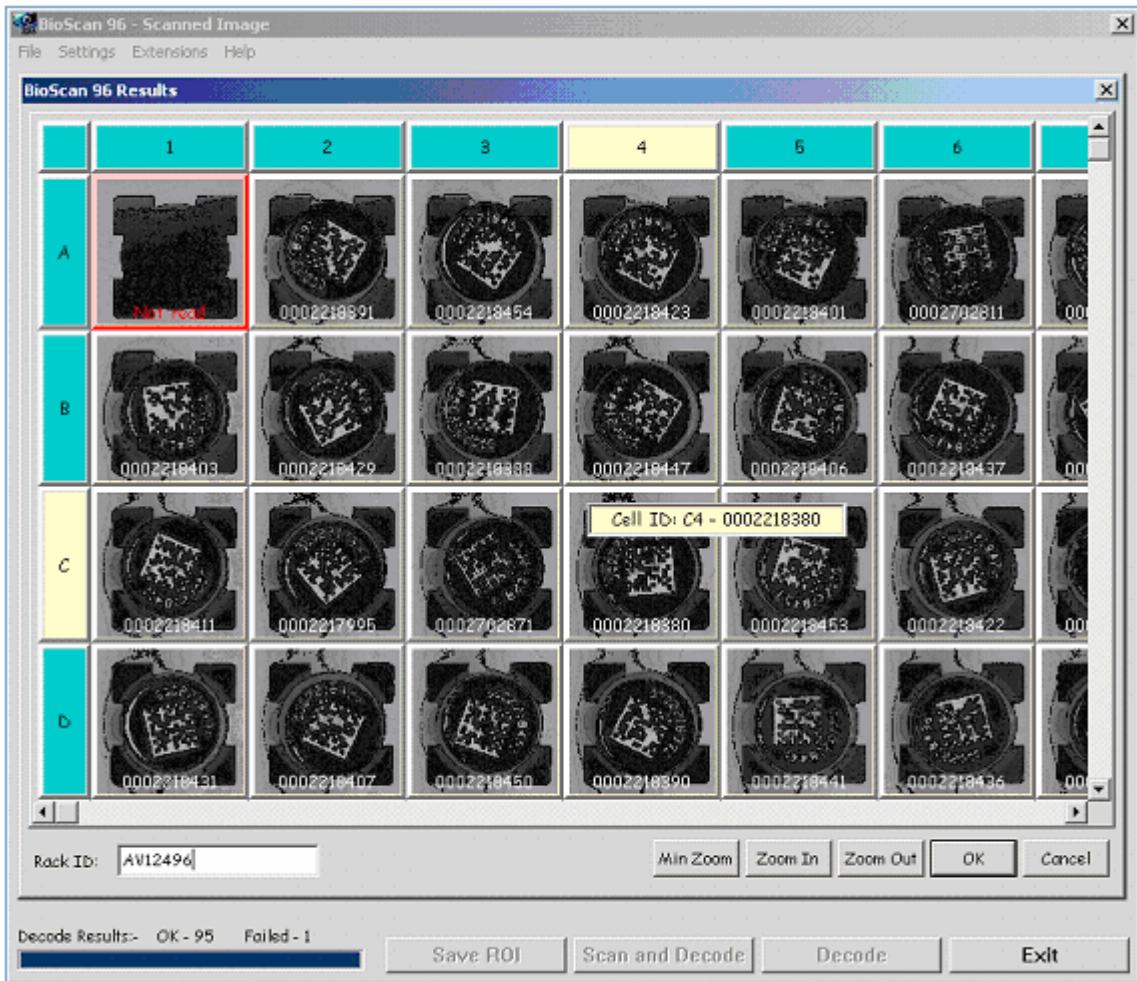


The green boxed grid of 12 columns and 8 rows should surround each of the 96 coded tubes. If the grid is not correctly aligned then in the same way that we moved the yellow box, move the green grid by **left mouse clicking and dragging** it by its corners. Once each tube is located centrally in its own box you can then **left mouse click** the **Save ROI** button.

ROI is an acronym for Region of Interest.

Once the ROI has been saved we can select one of the other functions from this dialog. If we **left mouse click** the **Decode button** the software will decode the 96 coded tubes from the image that is currently displayed.

Alternatively we can **left mouse click** the **Scan and Decode** button, this will start a new scan and when the scan had finished it will have decoded the 96 coded tubes.

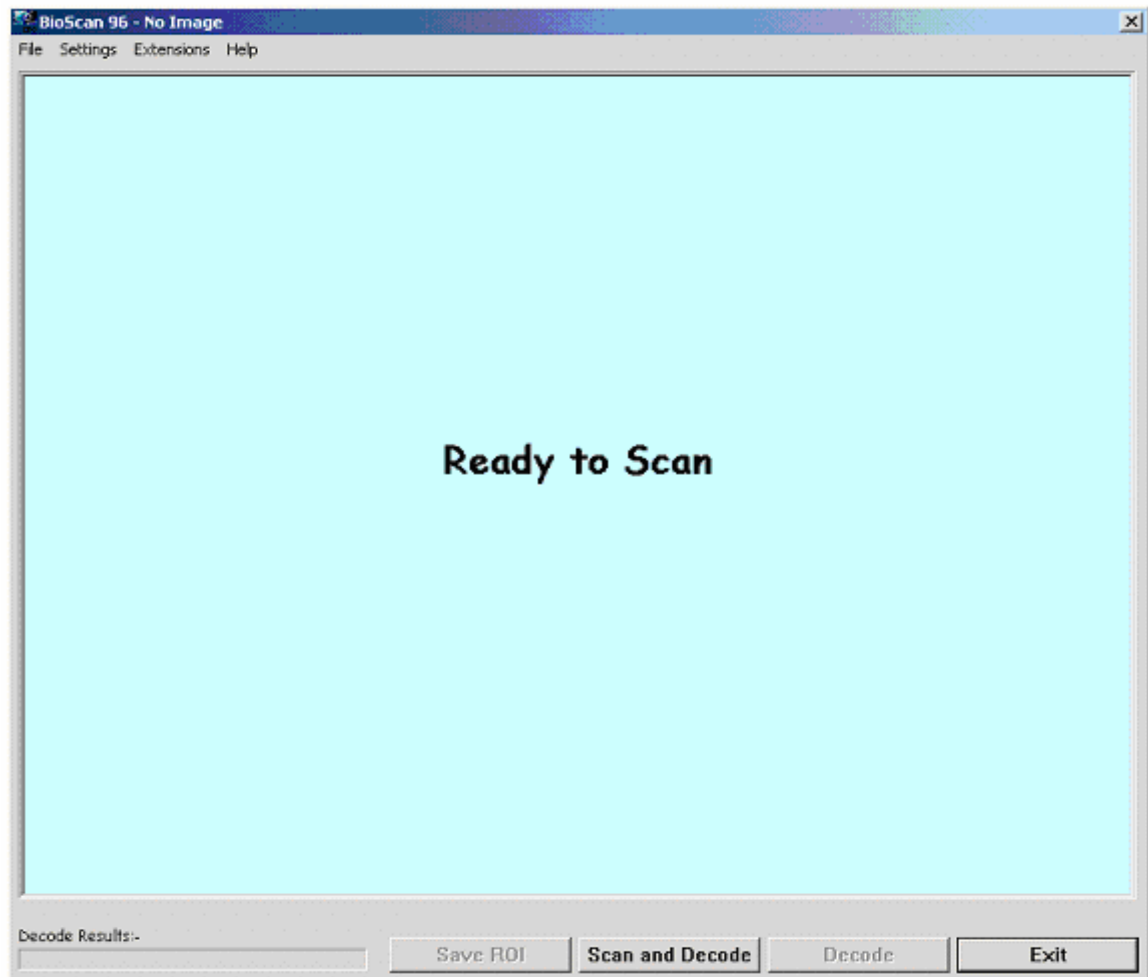


You should now have a screen that looks very similar to the one that is shown above. The one above has tube A1 missing and the progress bar and decode results in the bottom left hand corner of the screen shows that we have 95 tubes OK and one that has failed. There are lots of other buttons on this screen which will come back to later. Now move the mouse to **white text entry box** called **Rack ID:** *left mouse click* inside the white box area and **type** in the Rack ID that is on the rack barcode, if it does not have one just type test. Now *left mouse click* the **OK button** to the right hand side of this dialog.

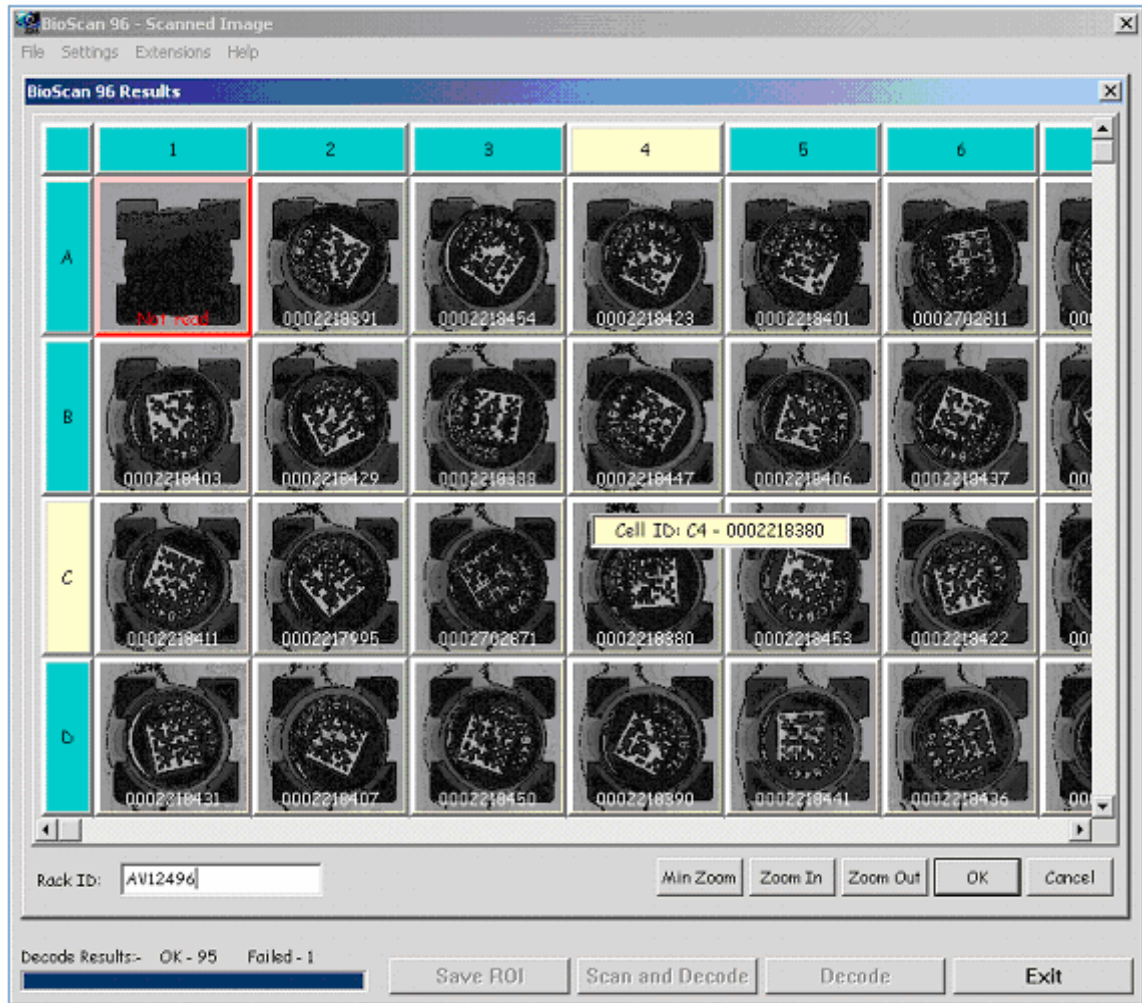
This concludes the first execution of the XTR-96 Software this sets up the system ready for use. Now *left mouse click* the **Exit button** on the bottom right hand corner of the main screen.

Running XTR-96

Once you have started the XTR-96 software as described in the getting started section of this manual you will see the following screen.

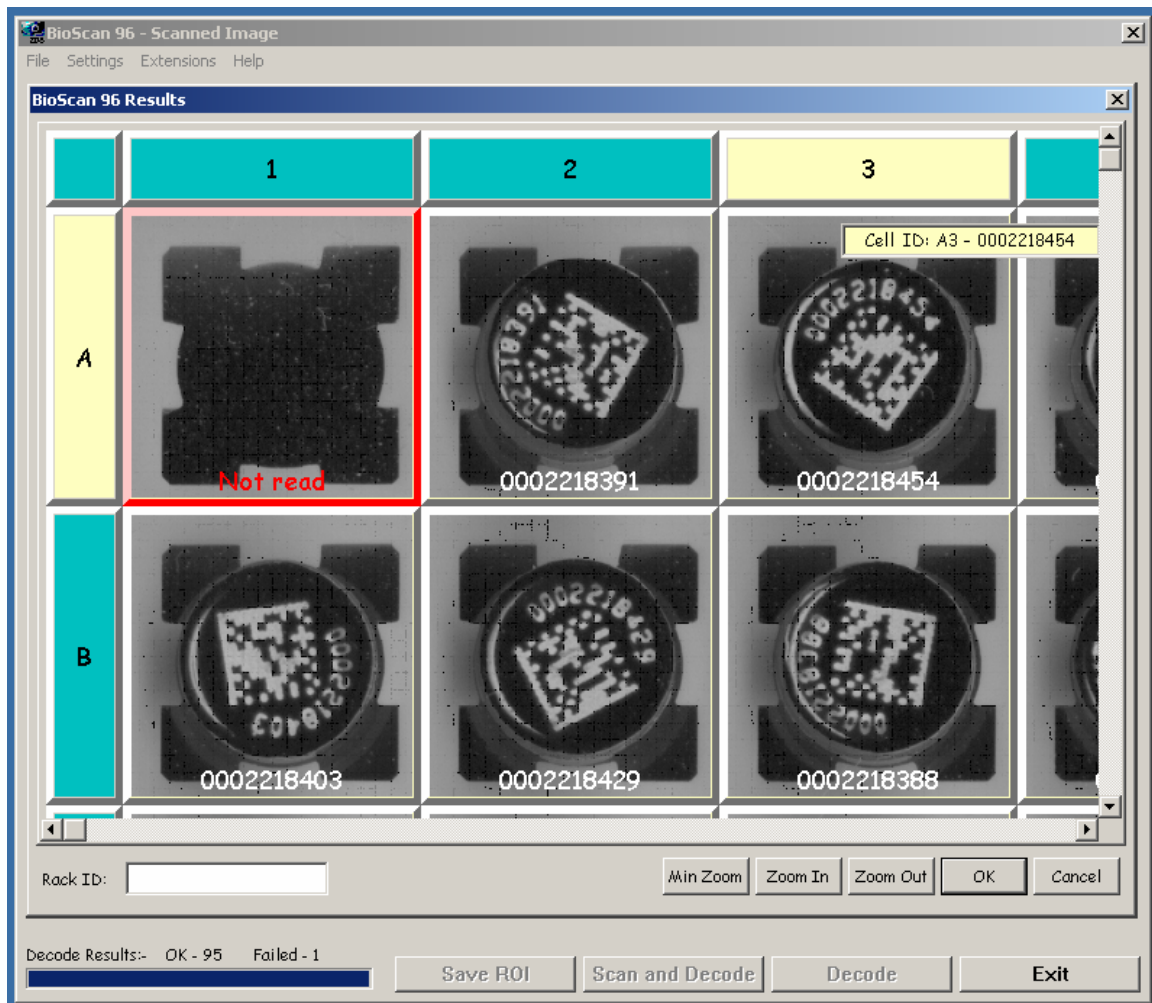


To scan a rack of tubes place the rack in the scanner housing and ***left click the mouse*** on the **Scan and Decode button**, the software will now perform a scan of the rack and then decode image of coded tubes.



The software will now display a screenshot similar to the one above. As you move the mouse pointer over the tubes a small text box indicates the cell ID and the tube number, you will also see that the row and column numbers highlighted.

If you **left mouse click** the **Zoom In** button the screen will magnify and you will see the image in more detail.



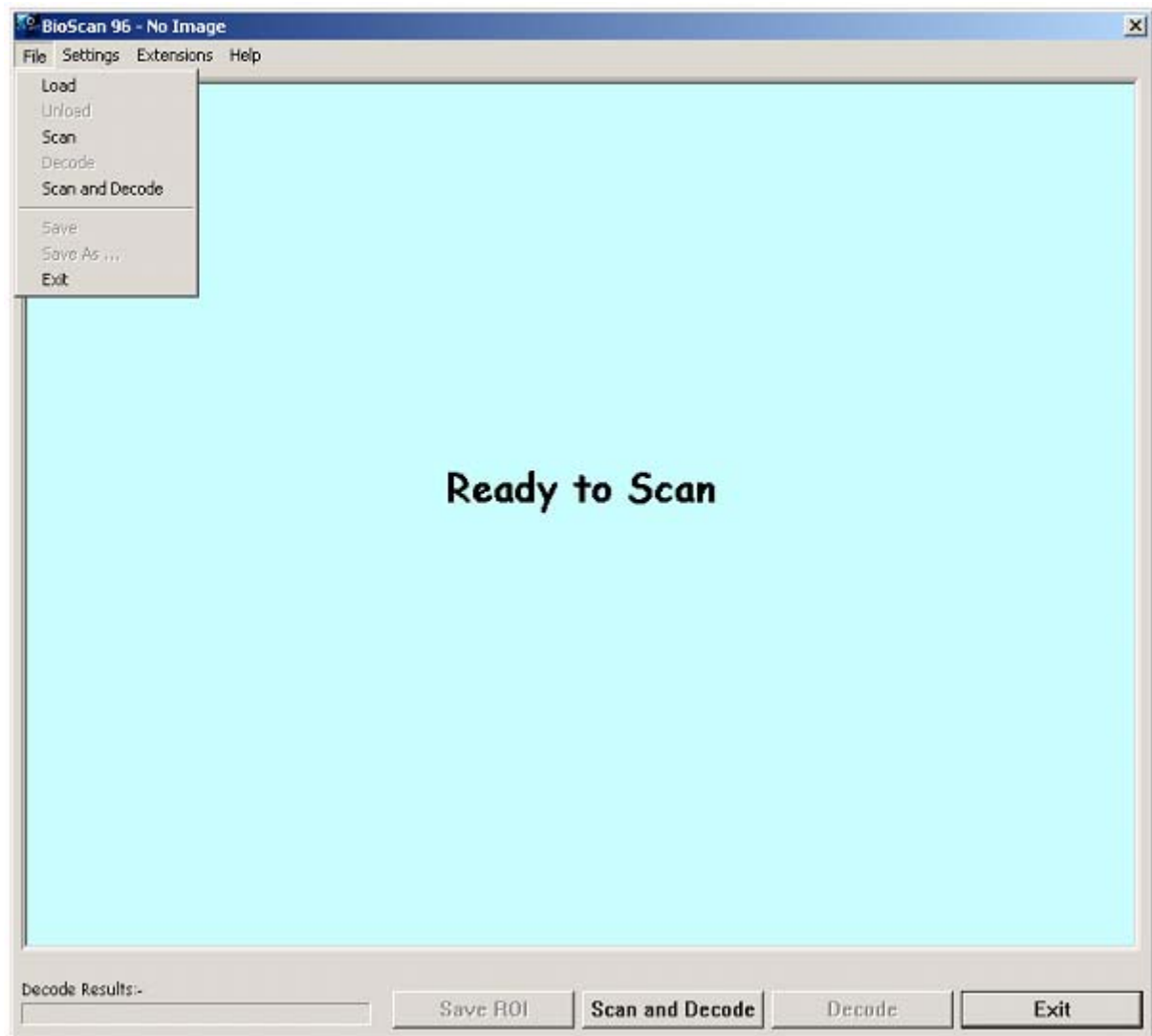
This is a screen shot of a zoomed image.

The **Min Zoom / Max Zoom button** zoom has two effects, in Min Zoom mode it shows the whole rack of tubes in the Max Zoom mode it shows two tubes.

The **Zoom In** and **Zoom Out** buttons progressively reduce, or enlarge, the image between minimum and maximum zoom positions.

Now move the mouse to **white text entry box** called **Rack ID:** *left mouse click* inside the white box area and **type** in the Rack ID that is on the rack barcode. Now *left mouse click* the **OK button** to the right hand side of this dialog to save the decoded data to the results files (see Results Configuration, later).

We are now going to take a look at some of the other features of the software.



Move the mouse pointer to the file menu and left click the mouse, you will see a list of commands some of which are grey in colour and some that are black.

Results configuration

The screenshot shows the 'Results Configuration' dialog box for BioScan 96. The dialog is organized into several sections:

- File Naming:** Standard File Name: aaannnn SID SLOC RACKID yyyyymmdd hhmmss.zzz. Endings: Prefix (aaa): BioScan 96, Suffix (zzz) eg. txt: txt. Sequence Number (nnnn): No. of digits (1-9): 9, Start at: 17. At startup: Restart numberings, Continue from last number.
- Identifiers:** Scanner ID (SID), Scanner Location (SLOC), Rack Identifier (RACKID).
- Dates:** Date (yyyyymmdd), Time (hhmmss).
- Results Capture:** Require RackID with tube readings.
- Results Destination:** Storage Path for data: C:\BioScan 96 Data. OLE Link File: BioScan 96.csv. ODBC Dataset Name: BioScan 96, Activate.
- Tube Labels:** Prefix, Suffix.
- Header Information:** Date and Time, Location of the Scanner, File name, Rack ID, Free Text 1, Free Text 2.
- Results Format:** Values Reported: Tube IDs only, Tube IDs and TubeRack Coordinates. Spacing of Results: Leading spaces on each result line: 0, Commas only, Comma and Space. Separation of Records: Same line, New line per record. Grouping of Records: by Column, by Row.

Buttons at the bottom include 'Default Settings', 'Reload Current Settings', 'Cancel', and 'OK'. A 'Decode Results:-' field and buttons for 'Save ROI', 'Scan and Decode', 'Decode', and 'Exit' are located at the very bottom of the window.

From the main screen select Settings / Results to display the screen above.

This screen is used to define the names and storage location of the results files, the structure of the data in the results files and provides connectivity to an external database using the industry ODBC standard.

By default XTR-96 saves two copies of decoded data: once in a file with an unchanging name, known as the "OLE Link File" and once in a file with a configurable name composed of nine independent elements.

The **File Naming** panel allows the various elements to be activated, or suppressed at will. The elements are:

each time a rack is read.

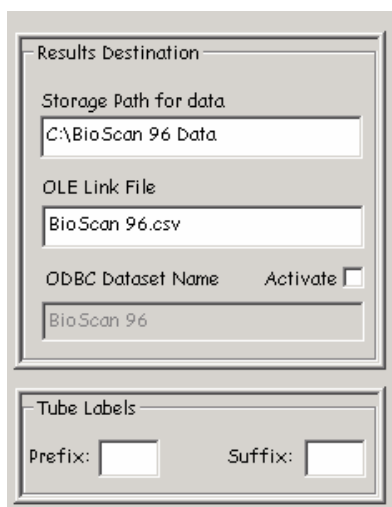
- A user defined **Scanner ID**.
- A user defined **Scanner location**
- A **rack identifier**, which could be a barcoded serial number on the rack read.
- The **date** and / or **time** the rack was read.

The “Example Filename” field shows what the filename will look like with the options currently defined.

It is possible to select only unvarying elements to make up the name, in which case the second time a rack is read a duplicate file name will be generated and a warning will be issued.

- A constant **prefix**, comprising characters of the user’s choice
- A **suffix**, which normally be .txt to indicate a text file, or .csv to indicate a comma separated variable file. Windows associates suffices with applications; thus, if Excel is installed on the PC when a .csv file is double clicked in Windows Explorer Excel is automatically started and a spreadsheet is created and populated with data from the .csv file. This provides a convenient way of viewing the data, or carrying out further processing. Double clicking a .txt file would normally open the file in Notepad, which does not present the data in such a convenient way.
- A **sequence number** of a specified length which starts with a defined value when XTR-96 is started, or will continue from the last number used irrespective of restarts. The sequence number is incremented

The **Results Destination** panel allows the setting of:



The image shows two panels from a software interface. The top panel is titled "Results Destination" and contains the following fields: "Storage Path for data" with the text "C:\BioScan 96 Data", "OLE Link File" with the text "BioScan 96.csv", "ODBC Dataset Name" with the text "BioScan 96", and an "Activate" checkbox which is currently unchecked. The bottom panel is titled "Tube Labels" and contains two text input fields labeled "Prefix:" and "Suffix:", both of which are currently empty.

- The **storage path for data** - this is the name of the folder where all generated data is saved.
- **OLE Link File** - a fixed name file where the last set of results are saved. Any old data will be overwritten. The file name may be changed from the default, but is always saved in a folder called "OLE Link" below the storage path already defined.
- **ODBC Dataset Name** - Activation of this check box will cause data will to be sent to the database at the end of each reading cycle. The connection to the database is made by specifying an ODBC Dataset Name (DSN), which will be given to you by your system administrator.

The database can reside on the reader PC, or on a remote, networked machine. XTR-96 comes with a preconfigured demonstration local Access database. It is normally recommended that data should be saved on a professional data system, eg SQL Plus or Oracle, mounted on a remote machine. (It has been found that using a data base on the local machine leads to poor performance as data volumes increase, especially if an Access database is used, which is not optimised for handling large volumes of data.

Tube Labels are fixed strings of characters added to the front and / or end of the each tube code. These may be specified as Prefix and Suffix, respectively.

Header Information - a number of lines of control information may be specified at the top of each results file:

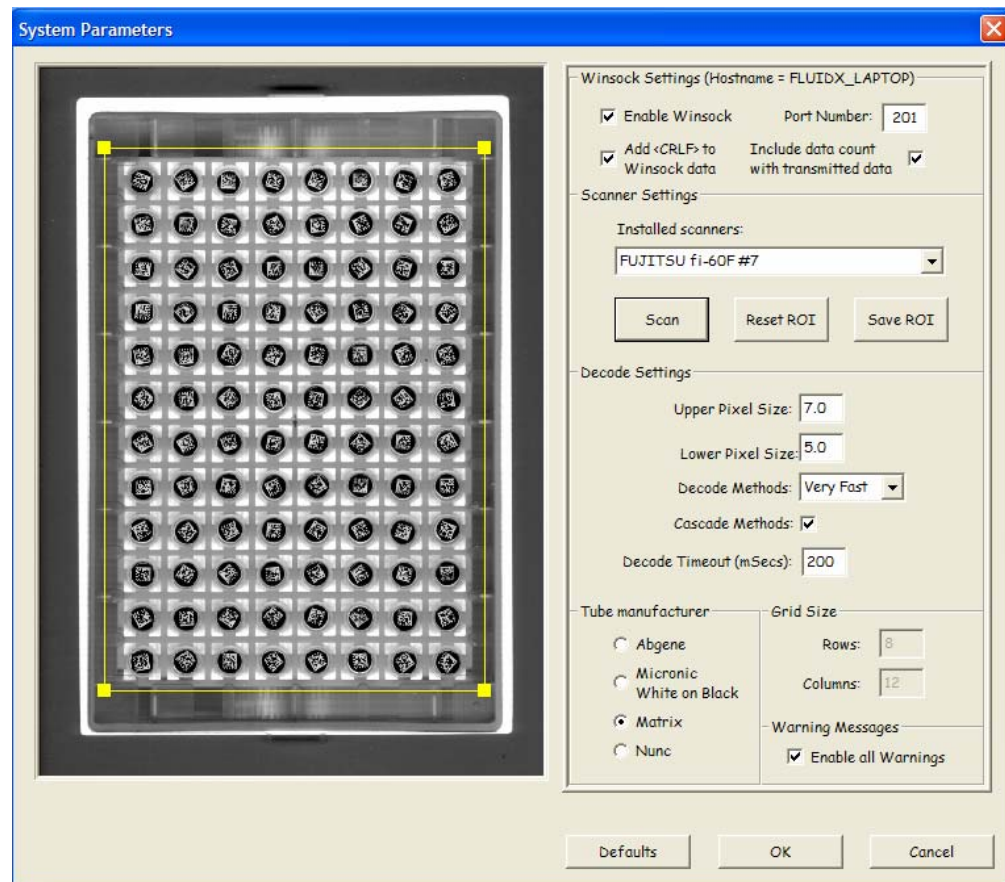
- **Date and Time** - when checked this will cause the date and time of the read cycle to be inserted at the top of the results file.
- **Location of the scanner** - the scanner location entered in the File Naming Section will be used. If you do not want the scanner location used in the filename: you should check the filename scanner location, type in required scanner location and then uncheck the scanner location.
- **File name** - The name of the file will be added to the lines of header information.
- **Rack ID** - Use the RackID which was input at reading time

- **Free Text** - Two lines of information of the user's choice.

Results Format - allows the presentation of the results to be modified:

- **Values Reported** - tube IDs (the code printed on the tube) may be associated with their x/y positions in the rack (eg B5), or the IDs may be used on their own.
- **Spacing of Results** - an optional number of spaces may be prefixed to each result line and results may be delimited by commas, or by a comma and a space.
- **Separation of Records** - all results may be printed on the same line, or a new line can be used for each result.
- **Grouping of records** - allows the results to be printed row by row, or column by column.

System settings



From the main screen select Settings / System to display the dialog shown above.

This will enable the following groups of activity to be configured:

Winsock settings:

- The **hostname** of the PC is displayed in the title bar of this section and is needed when configuring a client Winsock session to interface with XTR-96.
- Check **Enable** to activate the Winsock interface.
- The default **Port Number** (201) may be changed if, for example, you have another system that uses Port Number 201. It is not usually necessary to change this value, which is needed when configuring a client Winsock session to interface with XTR-96.
- **Add CRLF to Winsock data** - this is essentially cosmetic. When viewing a HyperTerminal session (see later) data tends to be shown in a continuous stream of values across the screen and is not easy to interpret (this causes no problem to an application which knows how much data to expect). By checking this field each item of data is left justified on the next line of the screen and creates a clear display of the Winsock transactions.
- **Include data count with transmitted data** - some of the transactions generate more data than can be transmitted in a single Winsock block of data. Sometimes it can be useful in a client application to know, at the start of transmission, how much data is going to be transmitted. When this feature is enabled the first block of data is preceded with a 16 character block comprising the number of characters to follow right padded with spaces.

Scanner settings:

- The **name** of the currently selected scanner is displayed in the first field.
- **Select Scanner** - will display a list of all the usb imaging drivers installed on your PC. Put a rack of tubes on the scanner you want to use and select it from the list. A new scan will be done and the left hand side of the display will be updated. **Please note** that scanning racks of tubes is a specialist activity and not all scanners are suitable (there may be focusing, brightness, contrast or resolution problems). Adjust the size of the ROI, in the left hand, to match the position of the rack.
- **Save ROI** - will save the current position of the ROI (amazing). It will also be saved when the dialog is closed using the "OK" button.
- **Scan** - if you think the ROI needs to be adjusted its position should be refreshed by pressing "Scan".
- **Reset ROI** - Sets the position of the ROI to the manufacturer's default values.

Decode settings:

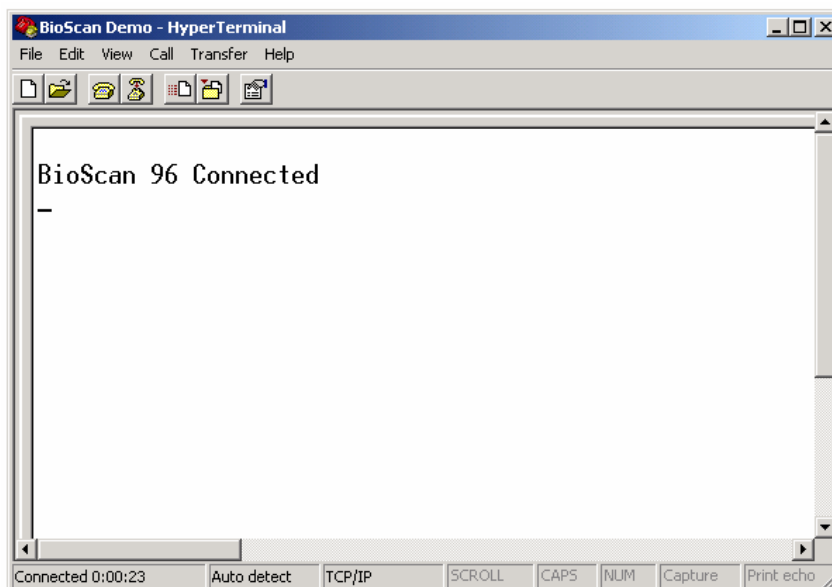
- **Upper Pixel Size** - this value should not normally be changed.
- **Lower Pixel Size** - this value should not normally be changed.
- **Decode Methods** - you should not necessarily believe that the fastest algorithm will produce the fastest overall decode cycle as some codes are better suited to different decode algorithms. Using the wrong algorithm may fail first time necessitating a second or third retry.
- **Cascade Methods** - when checked, will cause decoding of each tube to start using the "Decode Method " selected above and then to retry with successively slower methods until a successful decode has been achieved.
- **Decode Timeout** - if an attempt to decode a tube has not been successful within the time specified, the attempt will be aborted and a "No read" result will be returned. This setting can be used to stop part full racks taking too long to decode. If you find that some tubes are not decoding, this is the first parameter to change. So long as there are tubes to be read it doesn't matter if this value is much too large, but it could slow the system down if you regularly use part full racks.

Tube manufacturer - changing this setting will set the parameters needed to decode matrix codes of the different sizes used by different manufacturers.

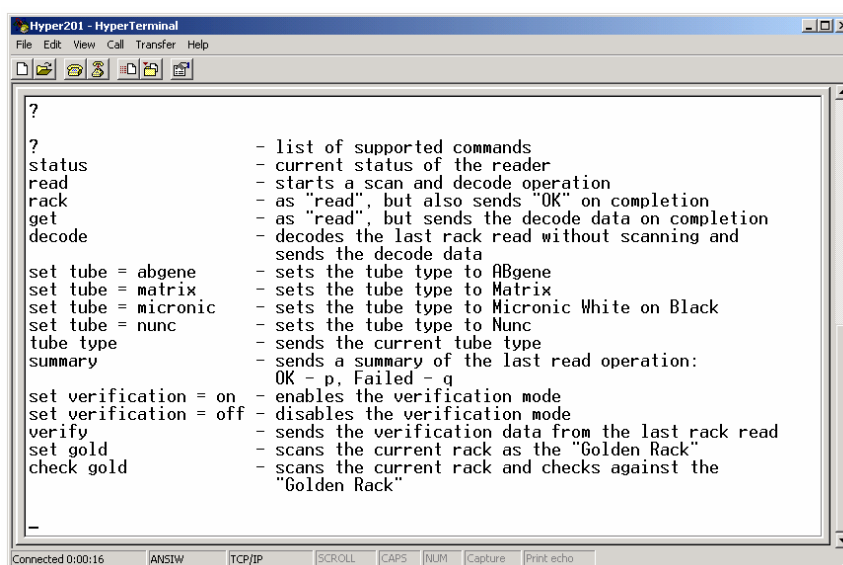
Grid Size - this is not a configurable option.

Using the Winsock interface

Essentially this provides a network interface for client programs to communicate with XTR-96. To gain familiarity with the interface a HyperTerminal session can be set up and used to send commands to XTR-96. The next section describes how to set up a HyperTerminal session.



- Enable Winsock from the System Dialog and make a note of the Hostname and Port Number
- Connect the HyperTerminal Session and the message shown in the above display will automatically be displayed. This also provides confidence that a connection has been established.
- Type ? into the HyperTerminal session and the following display of all commands available will be displayed.



- Type **status** into the HyperTerminal session and XTR-96 will reply **Ready, Finished or Busy** according to what it is currently doing.

- Type **read** into the HyperTerminal session and XTR-96 will reply **Reading...** It will also start a scan and decode cycle, You can find out the state of the cycle by sending the status command until it replies Finished. Or you might look for a database write event, or look for the results file to be created.
- Type **rack** (read and acknowledge) into the HyperTerminal session and XTR-96 will reply **Reading...** and when the scan and decode cycle has completed it will also send **OK**.
- Type **get** into the HyperTerminal session and XTR-96 will reply **Reading...** and when the scan and decode cycle has completed it will also send a comma separated list of all the data read. The adjacent screen shows the last screen of data.
- Type **decode** into the HyperTerminal session and XTR-96 will decode the last rack scanned and send a comma separated list of all the data read.
- Type **set tube = abgene** into the HyperTerminal session and XTR-96 will reply OK and treat all future tubes as ABgene. This is not a persistent setting so next time XTR-96 is started this instruction would have to be sent again.
- Similarly matrix, micronic (White on Black) and nun can be specified.
- Type **tube type** into the HyperTerminal session and XTR-96 will reply with one of the supported tube types.
- Type **summary** into the HyperTerminal session and XTR-96 will reply with a message of the form "OK - p, Failed q", where p and q were the number of tubes passed and failed last time XTR-96 read.
- Type **set verification = on** (or **off**) into the HyperTerminal session and XTR-96 will reply **OK** and enable (or disable) the verification module, using the predefined verification prefix on the results file names.
- Type **set gold** into the HyperTerminal session and XTR-96 will reply **Reading...** followed by **OK** as it scans and decodes the current rack and configures the data as the "Golden Rack"
- Type **check gold** into the HyperTerminal session and XTR-96 will reply **Reading...** followed by **OK**, or a comma separated list of tube locations as it scans and decodes the current rack and compares the results with the "Golden Rack"

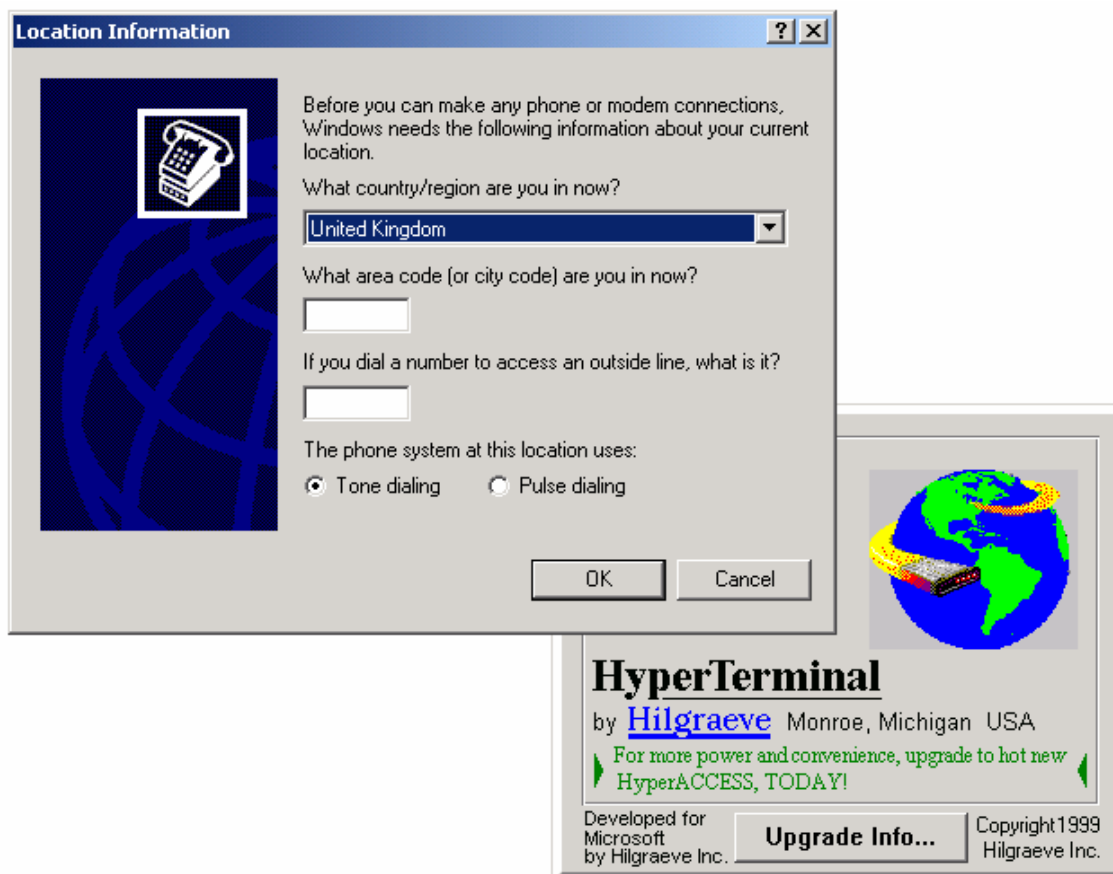
```

Hyper201 - HyperTerminal
File Edit View Call Transfer Help
C10, NAAA151356
D10, NAAA151231
E10, NAAA151116
F10, NAAA150995
G10, NAAA150870
H10, NAAA150755
A11, NAAA151587
B11, NAAA151462
C11, NAAA151347
D11, NAAA151222
E11, NAAA151107
F11, NAAA150986
G11, NAAA150861
H11, NAAA150746
A12, NAAA151578
B12, NAAA151453
C12, NAAA151338
D12, NAAA151213
E12, NAAA151091
F12, NAAA150977
G12, NAAA150852
H12, NAAA150737
Connected 0:06:31 ANSIW TCP/IP SCROLL CF

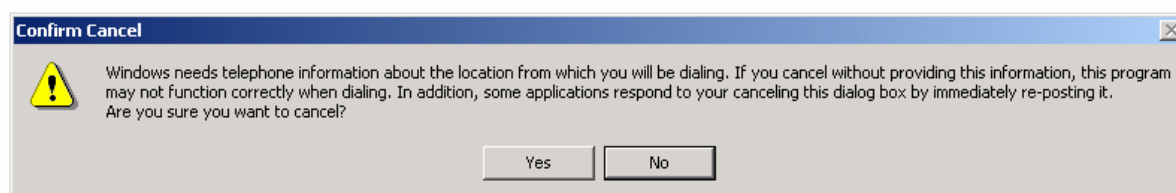
```

Setting up a 'HyperTerminal' session

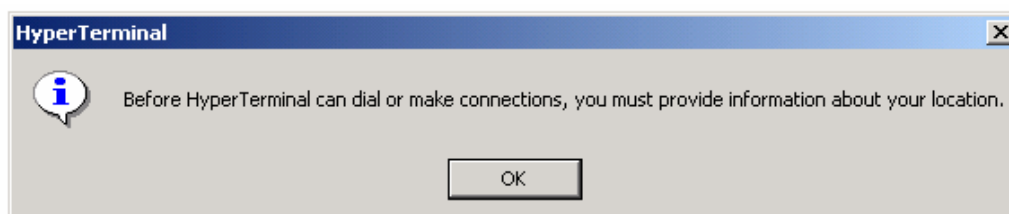
- Select **Start Menu / Programs / Accessories / Communications / HyperTerminal** and Bill Gates will bombard you with questions you don't want to answer.



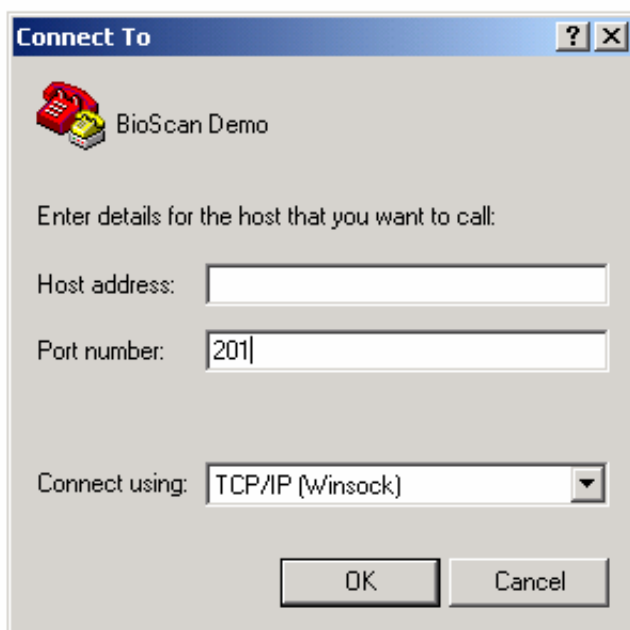
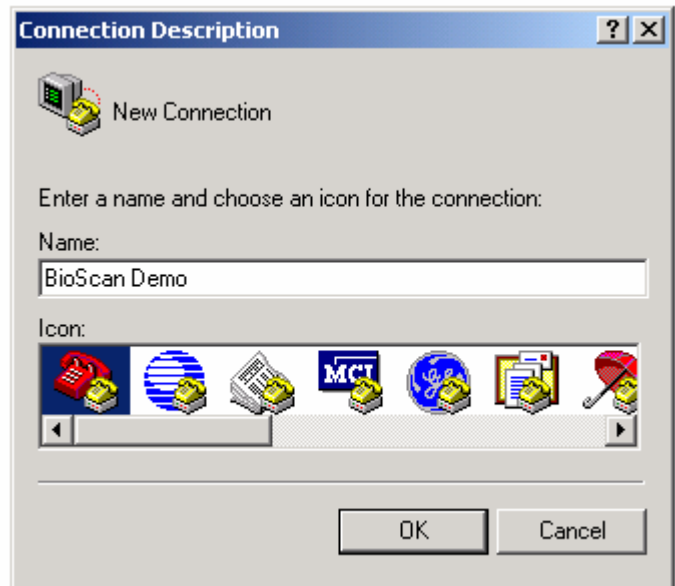
- Press **Cancel** at the "Location Information" screen. Bill will shout at you as follows:



- Press **Yes** and Bill will shout at you again: Press **OK**



- HyperTerminal responds with the **Connection Description** dialog
- Enter a name for your connection and select an icon
- HyperTerminal responds with the **Connect To** dialog



- In the Connect using combo box select TCP/IP (Winsock)
- Enter the Host address that was displayed in XTR-96's System dialog and change the Port number to 201
- Ensure that XTR-96 is running with Winsock enabled. Press **OK** and the message "XTR-96 Connected" message will be displayed.

Trouble shooting

- Is the scanner operating correctly?
 - Note: When a new USB device is added to a PC it should not, generally, be plugged in until the drivers have been installed. Windows XP is more forgiving than earlier versions of Windows, but it is safest to only plug in the device after its drivers have been installed.
 - To cleanup the PC's USB configuration
 - Unplug all USB devices
 - In Control panel / System / Hardware / Device Manager delete all entries under "Universal Serial Bus controllers" by highlighting each item in turn and pressing the Delete key and acknowledge the warning of dire consequences. This looks severe, but just removes Windows' list of installed devices; it does not delete the device drivers themselves.
 - Right click any item in the Device Manager and select "Scan for Hardware changes"
 - Wait for Windows to rebuild it's list of installed USB devices.
 - Plug in the unplugged USB devices one at a time, waiting for the installation of each one to complete.
 - To install new USB devices
 - Ensure the USB Device is not plugged in.
 - Insert the manufacturer's installation CD and follow the instructions to install the driver, then reboot the PC and plug in the USB device.
 - Is the correct scanner installed?
 - XTR-96 is supplied with an FUJITSU fi-60F scanner and the drivers for this scanner are installed by the setup process on the product CD.
 - The installation has gone wrong and you want to revert to a "new" installation.
 - This procedure will delete all of XTR-96 settings to provide a nice clean start to XTR-96.
 - At the Start / Run menu type in regedit and press OK.
 - If you want to be reset the scanner control information only, you can delete the Scanner and System keys only.
 - Align the yellow "Region of Interest" indicator around the outline of the rack and press OK.
 - The scanner will carry out a high resolution scan of the Region of Interest and display a green grid.
 - Align the green grid so that one tube is inside each cell of the grid.
- Save the Region of Interest and you are ready to go.