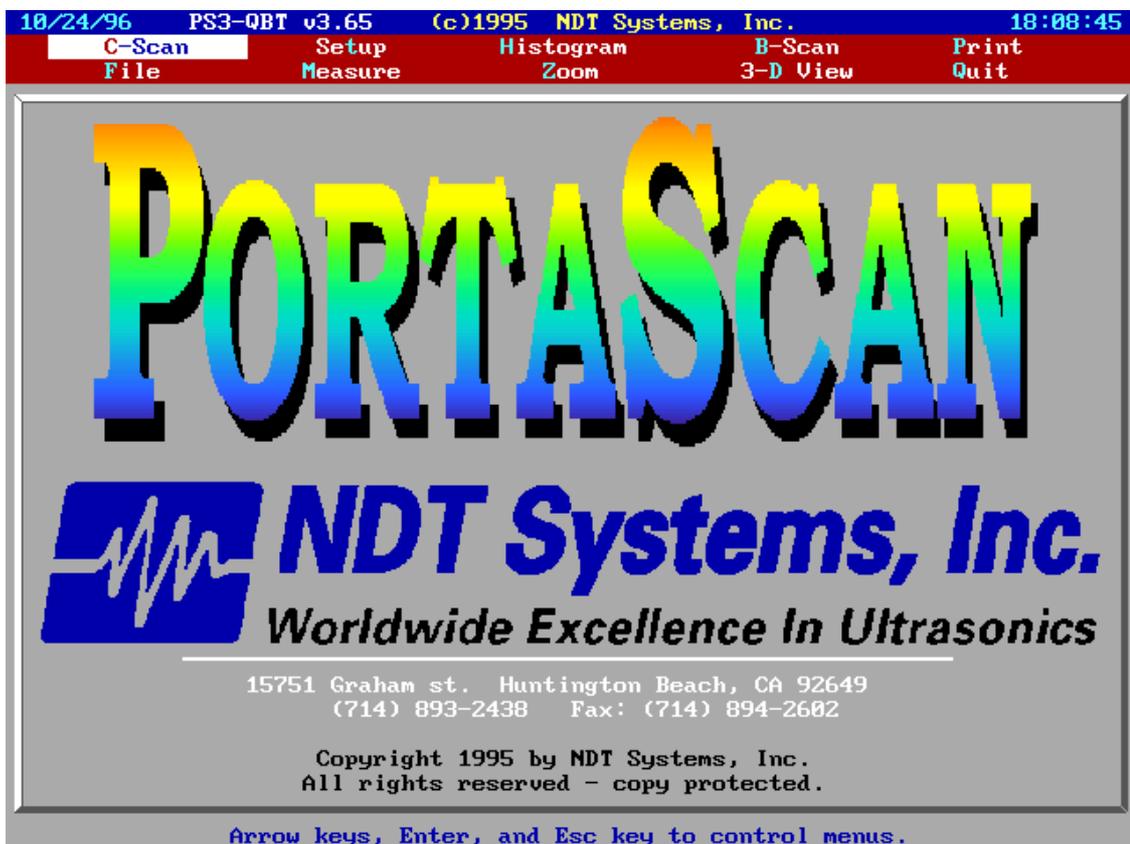


# OPERATING MANUAL

PS3-QBT

VERSION 3.XX

PORTASCAN SOFTWARE



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## Table of Contents

|            |   |    |
|------------|---|----|
| <b>1.0</b> | <b><u>INTRODUCTION</u></b> .....                              | 1  |
| <b>2.0</b> | <b><u>INITIALIZATION</u></b> .....                            | 4  |
| 2.1        | C-Scan.....   | 6  |
| 2.1.1      | New Scan.....   | 6  |
| 2.1.1.1    | Calibration.....  | 6  |
| 2.1.1.2    | Scan Area Definition.....                                     | 6  |
| 2.1.2      | Start Scan.....   | 7  |
| 2.1.3      | Move Motors.....  | 8  |
| 2.1.4      | Home Motors.....  | 8  |
| 2.1.5      | Motor Speed.....  | 9  |
| 2.1.6      | Scanner.....  | 9  |
| 2.1.7      | Clear Scan.....   | 9  |
| 2.2        | File.....   | 10 |
| 2.2.1      | Load Scan.....  | 10 |
| 2.2.2      | Save Scan.....  | 11 |
| 2.2.3      | Store Setup.....  | 11 |
| 2.2.4      | Load Setup.....   | 12 |
| 2.2.5      | Save Proplot.....   | 12 |
| 2.2.6      | Export Data.....  | 13 |
| 2.3        | Palette.....  | 14 |
| 2.4        | Report.....   | 15 |
| 2.5        | Histogram.....  | 15 |
| 2.6        | Zoom.....   | 16 |
| 2.7        | B-Scan.....   | 17 |
| 2.8        | 3-D View.....   | 17 |
| 2.9        | Print.....  | 18 |
| 2.10       | Quit.....   | 18 |
| <b>3.0</b> | <b><u>QUICK START</u></b> .....                               | 20 |
| <b>4.0</b> | <b><u>SOFTWARE INSTALLATION AND COPY PROTECTION</u></b> ..... | 26 |
| 4.1        | Installation - Full 007 or QBT-WS<br>(workstation).....       | 26 |
| 4.2        | Copy Protection.....  | 27 |
|            | <b><u>WARRANTY</u></b> .....                                  | 29 |

## 1. INTRODUCTION

PS3-QBT is a simple-to-use program which generates scaled color C-Scan and 3-D (Three Dimensional) images based on the Quantum's digital input of material thickness or flaw depth at respective X/Y scan locations input by the MiniScanner. In addition, the PS3-QBT also allows the user to perform a scan using the amplitude of the received signal rather than the thickness.

A scaled color C-Scan image is initially generated whose size and shape are operator-defined (Within the specifications of the MiniScanner model used).

Beneath the C-Scan is an adjustable, graduated Thickness/Depth scale with a moving pointer. Underneath this scale is an adjustable color spectrum bar (Palette). High-precision software, together with the Quantum, allow these functions to operate with  $\pm 0.010$ " resolution, depending upon the mode and setup.

A data inset window digitally displays Thickness/Depth, X/Y coordinates for transducer position and selected scan size (X/Y).

A major feature is the high-speed ability of this program to store the "Raw" numerical data for every acquired point in the C-Scan image. This feature (A "Giant" data-logger) permits any C-Scan image to be re-processed at any time (From RAM or disk storage) for the purpose of image enhancement. Equally important, the Thickness/Depth digital readout can be retrieved for any desired location (Via the data window) on a C-Scan image by simply moving a pair of crosshairs to that location. Also, two other pairs of adjustable crosshairs can be used for "Sizing" of suspect regions.

Once a C-Scan is generated, associated, scaled color B-Scans or 3-D (Three dimensional) images can be quickly displayed. Adjustable vertical or horizontal crosshairs allow corresponding vertical or horizontal B-Scan sectional slices to be presented. The 3-D imaging mode features a "Topographical" view of the scanned material volume enhanced

by perspective visual compensation (Geometric) and hidden line format. Also, to optimize the viewing angle for various image features, the 3-D image can be rotated about its 3 Axes (Pitch, Roll And Yaw). Furthermore, each axis can be compressed or stretched from original scale to accentuate image features.

In addition to processing images with their associated "Raw" test data, ultra-fast "Screen Captures" of an image without its test data can be selectively displayed or stored at any time.

The Quantum's ability permits this PS3-QBT software to be used with contact, delay line or "Immersion" (Bubbler/Squirter) transducers to inspect products ranging in thickness from approximately 0.025" To 9.999" (Material Dependent).

A convenient menu for Storing/Retrieving images along with their associated

"Description/Comment Text Screen" is included. For hard copy, an optional color Paint Jet printer is offered. Many other software features include:

- 256 Color Capability for higher resolution scan images.
  - includes full color pallet, 256 shades of gray, red, blue & green.
  - True data point acquisition, not pixel based as in earlier versions. User definable length and resolution, separate for X & Y Axis. Data array size limited by the amount of RAM within the computer or 30,000 data points in either the X or Y axis, whichever is smaller.
- Ability to set scan index from .010" to 2".
- Pan and Zoom.
- Zoom to actual numbers in Acquired Data.
- Spreadsheet display of thickness or amplitude value.
- Show 3D or B-Scan based on the Zoom Window.
  - Scanner acts as a mouse pointer in B-scan window for location of indications.
  - Export data to an ASCII text or binary file on almost any grid size for input into other DOS based

- applications such as Excel, Lotus or Statistical packages, including Pro-Plot. Software will also export the minimum, maximum, center, or average value found within a user definable "grid" pattern in ascii format.
- Display of X & Y B-Scan on a single screen.
    - Fully downward compatible with earlier versions of PortaScan software.
    - 2 Axis Motor Control Hardware. Includes Indexer, Driver and Power Supplies. Allows use of manual scanners also.
    - System has the ability to define and use new scanners in the future without software modifications.
    - Software will hold and display the lowest, center or the highest value acquired.
    - Model DAC-2 Data Acquisition Card, used for determining X & Y coordinates as well as information from the NDT Equipment.
  - 38 lbs.
  - Size 16" X 20" X 10"
  - 110 / 220 Volt AC automatic switching.

## **2.0 SOFTWARE INITIALIZATION**

When you initialize the PS3-QBT version 3.5 software, you will notice that the software does a system test and setup during its boot sequence. First, the software version is identified, then it looks to see if the optional two axis motion control system is installed.

Next, the amount of RAM (memory) available for scan data is shown. All PortaScan version 3 series software requires expanded memory. A minimum of two megabytes is required, but eight or more is recommended. The maximum number of data points available for a scan can be calculated by taking the amount of RAM over one megabyte and dividing that number by two. For example: If you have two megabytes of expanded RAM you have a maximum of 500,000 data points available for a given scan. You may have a maximum of 30,000 data points

per axis for a total not to exceed 900,000,000 data points per scan (30,000 X 30,000). As you can see, there is ample room for very large high resolution scans.

Next, the video chipset is verified. The video runs in the VESA 101 mode. This mode is required for the 256 color mode to operate. If this mode is not detected, the 16 color mode is activated. The software also looks for direct serial connection between the Quantum and the computer. If this is detected, then scan setup and calibration are done automatically. This is a good time to note that this system will only operate as well as the NDT instrument connected to it is setup. Be sure that you are using the proper equipment, and that it is set up and calibrated properly. Once these tests have been made, the last setup used is initialized as the software completes its boot procedure.

The first screen to appear shows the color spectrum (In the logo) and the main menu bar. You may activate the menu selections two ways. First, by using the arrow keys to move the highlight bar to the menu desired and pressing <ENTER>. Second, by selecting the direct access key that corresponds to the blue letter on the menu selection desired. Direct access keys only appear on the main menu. Use the arrow keys and <ENTER> for all sub menus. The <ESCAPE> key will allow you to back up to the previous screen.

## **2.1 C-Scan**

When the PS3-QBT version 3.0 software boots, the highlight bar is on the C-Scan menu. To perform a scan press enter. The C-scan pop-up window will appear.

### **2.1.1 New Scan**

Select New Scan from the menu and press <ENTER>. This menu selection will clear any scan information in RAM memory and reset the screen so new scan data can be acquired. If this is the first scan to be set up, then the operator needs to clarify the scanner selection (2.1.6) and motor speed (2.1.5) before initializing this step.

#### **2.1.1.1 Calibration**

The next screen to appear is for Calibration. Use the up and down arrows to select a calibration mode, then use the left and right arrows or numbers to enter values. The scale at the bottom of the screen corresponds to the scale start and range in the Calibration menu. When all selections have been made press <ENTER> to proceed or <ESC> to back up to the previous screen (this applies throughout the program). If the Quantum is on, and on the main menu screen and information is available, this screen will receive its information from the Quantum and will allow you to override the input or continue to the next step.

#### **2.1.1.2 Scan Area Definition**

Now the Scan Area Definition screen will appear. Use the up and down arrows to select, then use the left and right arrows or numbers to enter values. "Index" refers to the distance between data points in each axis. "Length" refers to the positive dimension to be scanned in each axis. "Points" shows how many data points will be collected in each axis. Note that the first data point is taken at zero, and the last data point taken at the length entered. Example: A 1." index and a 12." length will yield thirteen data points.

The "Data Stored Each Point" selection allows you to choose between three methods of holding data information acquired during a scan. "Lowest" means that the lowest reading in a data point will be held. "Highest" means that the highest reading in a data point will be held. "Center" means that the reading closest to the dimensional center in a data point will be held. When all selections have been made press <ENTER> to proceed or <ESC> to back up to the previous screen (this applies throughout the program).

Place the transducer at the zero reference corner by using the corresponding motor jog arrow keys to position the scanner in the proper location. Press <ENTER> to initialize the scan area, <ESC> to abort to the previous screen.

When the scan area is initialized, a grey box will appear on the screen and the scale will be repositioned at the bottom or left side of the screen depending on the size and shape of the scan area.

### **2.1.2 Start Scan**

The C-Scan pop-up window will appear with the highlight bar on Start Scan. Make sure that there is nothing that will obstruct the movement of the scanner (like cables) during the scan, and make sure that there is plenty of couplant for the transducer. If you are ready to scan press <ENTER>, and the motorized scan will begin. If you are in the manual mode, you can begin scanning now. You can stop a scan at any time by pressing <ESC>. If you need to stop a scan, you may want to restart it using the Start Scan command.

### **2.1.3 Move Motors**

Pressing <ENTER> at the Move Motors selection will allow you to jog the motors to position the scanner at a particular location.

### **2.1.4 Home Motors**

Pressing <ENTER> at the Home Motors selection will return the scanner to its original zero position where the scan was started from. If you stop a scan in the middle of a scan, you do not have to home the motors before proceeding. Even

if you have jogged the motors around a bit, you can restart a scan by going back the Start Scan selection and pressing <ENTER>. If the scanner is momentarily stalled, and then continues, only the data at the end of that stroke will be lost. The system will put itself back location and continue the scan without losing proper position.

### **2.1.5 Motor Speed**

If you have a rough surface, or a smooth one, you will want to adjust the scan speed to optimize the performance of the scanner. Highlight the Motor Speed selection and press <ENTER>. From this pop-up menu you can adjust the Start, Ramp, Jog, and Maximum speed of the motor in each axis. You can also set the number of strokes the scanner will make before indexing, and set the motors in a locked on idle condition. If you select a speed which is beyond the capabilities of the motor it will either suffer from frequent torque stall or will not run. On the other hand, if you select a speed which is too slow it will take longer than necessary to perform a scan. Usually, only the Jog and Maximum speeds need to be adjusted. For optimum performance, move back and forth between adjusting the Jog speed and the Move Motors selection. Adjust one axis at a time. When satisfactory results are achieved, then adjust the Maximum speed to match the jog speed and you are ready to go.

#### **2.1.5.1 Strokes**

Using the left and right arrow keys, select the number of strokes the scanner will make before indexing. A minimum of one and a maximum of ten strokes are allowed. This feature is helpful when rough material, or other conditions make accuracy difficult. By stroking an additional time, the operator can have a greater confidence in the data collected in undesirable conditions.

#### **2.1.5.2 Locked**

When scanning in situations where a free moving scanner might cause injury or other damage, use the lock motor

feature to lock the motors in place between scans. Use the left and right arrow keys to lock or unlock the motors. When the motors are locked, the motors will stay energized in a locked condition whenever the scanner is not in scan mode. While scanning the motors stay locked to provide for positioning concerns, but when a scan is complete the operator will want to have the motors locked so that the scanner will not move while another scan is being set up.

#### **2.1.5.3 X Start**

This setting determines the start rate of the motor. It limits the amount of current the motor receives on its initial pulse. A rate too high will cause the motor to stall before starting. Every situation is different, but the factory settings should be sufficient for most applications. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

#### **2.1.5.4 X Ramp**

This setting determines how fast the motor accelerates to scan speed. A rate too high will cause the motor to stall while accelerating. Every situation is different, but the factory settings should be sufficient for most applications. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

#### **2.1.5.5 X Jog**

This setting determines the speed the scanner will move while in the move motors or scan setup modes. Because surface conditions vary, this setting should be set to allow for maximum scan speed without having the motors stall or stop. Once this speed is set, the maximum speed should be set to the same rate. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

#### **2.1.5.6 X Max**

This setting determines the actual scan speed. This setting is the speed the scanner will travel while scanning. It is a good practice to set this to the same rate as the jog

speed, but they do not have to be the same. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

#### **2.1.5.7 Y Start**

This setting determines the start rate of the motor. It limits the amount of current the motor receives on its initial pulse. A rate too high will cause the motor to stall before starting. Every situation is different, but the factory settings should be sufficient for most applications. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

#### **2.1.5.8 Y Ramp**

This setting determines how fast the motor accelerates to scan speed. A rate too high will cause the motor to stall while accelerating. Every situation is different, but the factory settings should be sufficient for most applications. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

#### **2.1.5.9 Y Jog**

This setting determines the speed the scanner will move while in the move motors or scan setup modes. Because surface conditions vary, this setting should be set to allow for maximum scan speed without having the motors stall or stop. Once this speed is set, the maximum speed should be set to the same rate. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

#### **2.1.5.10 Y Max**

This setting determines the actual scan speed. This setting is the speed the scanner will travel while scanning. It is a good practice to set this to the same rate as the jog speed, but they do not have to be the same. Use the left and right arrow keys to adjust the setting. Increments are in inches per second.

### 2.1.6 Scanner

Use the arrow keys to move the highlight bar to the Scanner... menu choice, and press <ENTER>. Move the highlight bar to the appropriate scanner selection and press <ENTER>. This tells the software which resolution, motor configuration, and coordinate system to use while scanning. This selection does not have to be made again unless you change the type of scanner being used. Note that there is a selection for an inverted pipe scanner. This setting is for using the P2-12 pipe scanner with the directions reversed. This is important when using the cantilever arm attachment (optional accessory for this scanner) to get close to an object on the opposite end of the scanner.

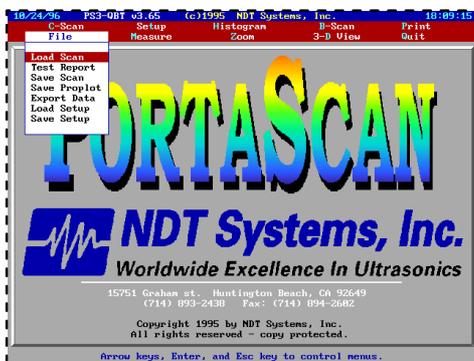
### 2.1.7 Clear Scan

If you want to re-scan an area you do not have to enter a new scan. You can move the highlight bar to the Clear Scan selection and press <ENTER>. If you have not saved the data already scanned it will be lost! To scan an area over again: Home Motors, Clear Scan, then Start Motors.

## 2.2 File

Once a scan is completed, you will want to save it. Press <ESC> to exit the C-Scan menu, and press <ENTER> with the File menu highlighted. A File sub menu will appear on the screen.

### 2.2.1 Load Scan



If you have previous saved scans that you want to view press <ENTER> on Load Scan. A menu of saved scans will appear. The software looks for scans with a ".P10" or ".P30" file extension. The ".P10" extension is a scan from any software version before 3.0. These files were saved in a

sixteen color format, but you will be able to view them in the 256 color format when you load them. You may save these files in the new format by saving the scan again. Under the menu title Load Scan From Disk is the directory in which the software is looking for files with the appropriate extension. Note that the extension is automatically added to a file name when the scan is saved. Using the arrow keys and <ENTER> to move the highlight bar, you can look for files on any drive, and in any directory. Using the hot keys shown at the bottom of the screen, you can make a directory, delete a scan file, or rename a scan file. To load a saved scan, move the highlight bar to its name and press <ENTER>.

### **2.2.2 Test Report**

The Report menu selection contains the Test Report information. Highlight Report and press <ENTER>. Here you will enter scan and setup information along with instrument and transducer information. You can also enter a few lines of comments. The Test Report information is saved along with the scan. It is important to fill in this information because it is also used in the saved setup and export files. The test report can also be printed by pressing the <F1> key.

### **2.2.3 Save Scan**

To save a scan press <ENTER> on the Save Scan selection in the File menu. A window will appear on the screen. Under the Save Scan To Disk title is the current directory where the scan will be saved to. If this is not the directory you want to save the file in, you may change the directory by pressing <F1>. Here you will be asked to select, make, or rename the directory you want to use. Once a directory is chosen, assign a name for the scan file. This name cannot exceed eight characters and may not have any spaces. Press <ENTER> to accept the name, or <ESC> to return to the C-Scan screen.

### **2.2.4 Store Setup**

If you repeat the same scan, or perform similar scans, you will want to use the Store Setup and Load Setup menu selections. A saved setup will include calibration settings, scan settings, and test report information. The file will have a ".ST3" extension. Saving a setup is just like saving a scan file. To save a setup press <ENTER> on the Save Setup selection in the File menu. A window will appear on the screen. Under the Store Setup To Disk title is the current directory where the setup will be saved to. If this is not the directory you want to save the file in, you may change the directory by pressing <F1>. Here you will be asked to select, make, or rename the directory you want to use. Once a directory is chosen, assign a name for the setup file. This name cannot exceed eight characters and may not have any spaces. Press <ENTER> to accept the name, or <ESC> to return to the C-Scan screen.

### **2.2.5 Load Setup**

Load a setup just as you would load a scan. If you have previous saved setups that you want to view press <ENTER> on Load Setup. A menu of saved setups will appear. The software looks for setups with a ".ST3" file extension. Under the menu title Recall Setup From Disk is the directory in which the software is looking for files with the appropriate extension. Note that the extension is automatically added to a file name when the setup is saved. Using the arrow keys and <ENTER> to move the highlight bar, you can look for files on any drive, and in any directory. Using the hot keys shown at the bottom of the screen, you can copy, delete, or rename a setup file. To load a saved setup, move the highlight bar to its name and press <ENTER>.

### **2.2.6 Save Proplot**

The Save Proplot menu selection will allow you to save a scan file in a binary file format that can be used in the programs such as ProPlot analysis software (Not provided by NDT Systems). Saving a scan in the Proplot format is done the same way you would save a scan. Press <ENTER> on the

Save Proplot selection in the File menu. A window will appear on the screen. Under the Convert to Proplot title is the current directory where the scan will be saved to. If this is not the directory you want to save the file in, you may change the directory by pressing <F1>. Here you will be asked to select, make, or rename the directory you want to use. Once a directory is chosen, assign a name for the scan file. This name cannot exceed eight characters and may not have any spaces. Press <ENTER> to accept the name, or <ESC> to return to the C-Scan screen. The converted file is saved with a ".MRG" extension.

### **2.2.7 Export Data**

The Export Data menu selection will allow you to save a scan in ASCII format to be used in spreadsheet and graphing programs such as Microsoft Excel (Available from NDT Systems). To make an export file, move the highlight bar to the Export Data menu selection and press <ENTER>. You will now be shown a menu to enter a name and other parameters for the export file.

#### **2.2.7.1 File Name**

The name can be up to eight characters, but it may not contain any spaces. This is a "DOS" compatible file name. It may be the same name as the scan file name, but the extension must be different. The file name entered in the scan setup is automatically entered here, but may be changed.

#### **2.2.7.2 Extension**

An extension that is acceptable to the program you are exporting to, such as ".TXT" can be entered here. This extension is used by programs to determine what type of file it is. The default entry is ".ASC" which represents that it is an ASCII text file. The extension can be any three letters except ".P30", this extension is used for the scan files.

#### **2.2.7.3 Directory**

The default directory is C:\Scan\, but the export files may be saved to any directory or drive available. If the operator chooses a path that does not exist, an error message will appear on screen saying "Error opening file. Press any key".

#### **2.2.7.4 Overrange Value**

This selection allows the operator to enter a value that will be recognized as not part of the actual scan data, such as un-scanned areas, or areas with missing data points do to lost couplant or other variables. The default setting leaves the output empty. A negative number like "-999", or other easily identifiable number or character may be entered here to simplify analysis in the spreadsheet.

#### **2.2.7.5 Export All/Grid**

This selection is used to determine if all of the scan data will be exported, or data will be exported in a larger grid. If you have completed a scan with a .05" index, and it is 12 inches by 10 feet in size, that would be 576,000 data points. This is impractical (If not impossible) to put into a spreadsheet. You may select a more reasonable index rate to use for the index file that will give an adequate representation of the scan area to meet your needs. If you were to save the above scan with a .5" grid the export file would only use 5760 data points. This is still too many, but you get the idea, cut it down to a manageable size. Always remember that less data can be exported than was acquired, but more!

#### **2.2.7.6 Grid Output**

The operator may select what values to be exported. The highest reading (including or excluding the empty or overrange value), the lowest reading (including or excluding the empty or overrange value), the average value in the cell, or the value at the grid corners, for a given data segment or cell can be chosen for export.

#### **2.2.7.7 X-Axis Offset**

This information can be entered here, or when the scan is initialized. This feature allows the operator to identify the scan with an offset so that it may be linked with other scans in a spreadsheet much easier, or so the operator will not lose track of the current scan location relative to others in a large area grid.

#### **2.2.7.8 Y-Axis Offset**

This information can be entered here, or when the scan is initialized. This feature allows the operator to identify the scan with an offset so that it may be linked with other scans in a spreadsheet much easier, or so the operator will not lose track of the current scan location relative to others in a large area grid. If the export file is of a zoom view of a larger scan, the offset data relative to the larger scan area will be automatically entered here.

#### **2.2.7.9 X-Axis Length**

When exporting on a grid, the length is defined just as it is defined when an initial scan is taken. The length is limited to the length of the defined scan area. This information is automatically entered when a zoom view is used.

#### **2.2.7.10 Y-Axis Length**

When exporting on a grid, the length is defined just as it is defined when an initial scan is taken. The length is limited to the length of the defined scan area. This information is automatically entered when a zoom view is used.

#### **2.2.7.11 X-Axis Index**

This parameter defines how many data readings will be taken or used within the defined length of the scan. This value must be divisible by the length in whole numbers, or the software will automatically round off and adjust as necessary. The operator can select any value between .010"

and 2." as long as the resolution is not finer than the data taken in the original scan. This information is automatically entered when a zoom view is used.

#### **2.2.7.12 Y-Axis Index**

This parameter defines how many data readings will be taken or used within the defined length of the scan. This value must be divisible by the length in whole numbers, or the software will automatically round off and adjust as necessary. The operator can select any value between .010" and 2." as long as the resolution is not finer than the data taken in the original scan. This information is automatically entered when a zoom view is used.

#### **2.2.7.13 X-Axis Cells**

This number displays the number of data points that will be exported in the selected axis. This number is automatically calculated as length and index values are identified.

#### **2.2.7.14 Y-Axis Cells**

This number displays the number of data points that will be exported in the selected axis. This number is automatically calculated as length and index values are identified.

#### **2.2.7.15 Exporting the data**

When you have entered the desired parameters press <ENTER> and the export file will be saved. This same information can be used to export information in a zoomed area of a scan. When you view an exported file, you will notice that in addition to the data points, there is a header of information also. This header includes the file name, part name, part number, serial number, company, operator, scan date and time, display mode, index, and length and orientation for each axis. This information is gathered from the Test Report.

### **2.3 Setup**

Under this menu, the operator can manipulate the scale of the scan by adjusting range and offset, change the color bar, and view the Quantum setup.

### **2.3.1 Scale**

use this selection to adjust the dimensional range and offset shown of the ultrasonic data within the scan. This is used to maximize the color bar spectrum across the data within the scan.

#### **2.3.1.1 Range**

The range setting determines how broad of a area will be shown on the scan. Use the left and right arrows to adjust the scale. The scale will stretch and shrink like a rubberband. Shrink the amount of area shown to maximize the spread of the color bar. This adjustment does not affect the actual ultrasonic data, only the data displayed.

#### **2.3.1.2 Offset**

The offset determines the dimensional start point of the scale. This can begin at zero, and be adjusted upward. The offset is used in conjunction with the range setting to stretch the color scale across a broader range of actual data. This allows the operator better visual perspective of the image scanned. This adjustment does not affect the actual ultrasonic data, only the data displayed.

### **2.3.2 Color Bar**

The Color Bar menu will allow you to adjust the color of the scan. The Spectrum selection is a 256 color pallet. The other colors listed, Gray, Red, Green, and Blue, allow you to display the scan in the shades of this individual color range. Flip will invert the color bar. You can cycle the color bar by pressing <F1> to cycle left to right or top to bottom. Press <F2> to cycle the other direction. Press any key to stop cycling. The display will flash during this movement, but no harm is being done to the system. This is helpful to align the color bar with a particular reading,

like aligning red with the thinnest or highest amplitude value.  
Report.

## **2.4 Measure**

Analysis features in this software package include the ability to measure scan areas with either a line, rectangle/ellipse, or an operator defined polygon.

### **2.4.1 Line**

This feature allows the operator to draw a line between any two points in the C-Scan area and view statistical information from it. The active point of the line, identified by a cross symbol, can be moved by using the arrow keys. Holding down the <Control> key while pressing the arrow keys will make the point move faster. To switch which point you want to move, press the <ENTER> key. This will anchor the point where the cross was to make that end of the line stationary, and put the cross at the other end of the line to allow for that end to be moved.

On the right side of the display screen are line data windows. The top window indicates dimensional information regarding the first point. When the first point is active, as indicated by the cross, this window will have a red background; otherwise, it will be blue. After the first point has been selected, a window will appear with dimensional data for the second point. This window will have a red background when it is active and a blue background when it is not. A third window in the lower right corner of the display screen shows the length of the line, the incremental axial differential in both the X and Y axis relative to the first point, and the angle of the line.

### **2.4.2 Rect./Ellipse**

The rectangle/ellipse feature gives the operator some sizing capabilities. The arrow keys (or <CONTROL> arrow for faster movement), or the <Home>, <END>, <PAGE UP>, or <PAGE DOWN> keys for angles, will move the cross to a start point of the rectangle/ellipse. This point is in the center of one side.

When a start point is chosen, press <ENTER>(First Point). The rectangle/ ellipse is drawn on the screen and the cross is now located in the center of the other side of the measurement area. Use the arrow keys (or <CONTROL> arrow for faster movement) to position the cross in the desired location. Notice that when you move the cross the size and shape of the measurement area changes. Press <ENTER> when the second desired location is set (Second Point). Now the cross is in the center of the measurement area. When you move the cross now, the size and shape of the measurement area will change in relation to the direction and distance the cross is moved (Rectangle Size). Press <ENTER> again and when you move the cross now, the position of the entire measurement area will move in relation to the movement of the cross (Center Position). Press <ENTER> again, and the measurement area will rotate around the cross in the direction the arrows are pressed to adjust the offset angle (Offset Angle in Degrees). The next time the <ENTER> key is pressed, the cross moves back to the first point selected. It can now be moved to a new location.

The windows on the right of the display area show the statistical information of the measurement area, including the area of both the rectangle and the ellipse, the width and height, and the X and Y position of the area relative to the position of the cross. A red background appears on the window being adjusted. All other backgrounds are blue, except the area calculation window background is black.

### **2.4.3 Polygon option**

Since most indications or flaws are not perfect in shape, the polygon measurement is the most accurate and most versatile. Simply move the cross to a point you would like to start from (use <CONTROL> arrows for faster movement) and press <ENTER> to select the next point. Notice that a line now starts from the point selected and extends to a new position where the cross is. Again, move the cross to a point you would like (use <CONTROL> arrows for faster movement) and press <ENTER> to select the next point.

Continue this process until you have defined the area you wish to measure.

Notice that the window in the lower right corner of the display screen shows the area within the polygon. The X and Y position of the cross, and the number of points selected appears in the window in the upper right corner of the display screen.

At any time while in the polygon measure mode, you can press <F> for fill, and the area within the polygon will fill in red. This will allow you to see exactly what area of the screen is being measured. Pressing any arrow key or the <ENTER> key will return the screen to normal. Be sure to return the screen to normal before escaping out of this screen.

## **2.5 Histogram**

The Histogram shows what percentage of the scan falls into a particular range and scale. To the right of the profile is a scale showing the percentage of scan area a color represents. The <PAGE UP> and <PAGE DOWN> keys allow you to adjust the percentage scale to see how much area a color represents. The arrow keys allow you to adjust the range and offset of the scale and color bar. Pressing <F1> will automatically scale the Histogram for you. This will set the minimum thickness reading found at the lower end of the scale, and the maximum reading at the upper end, thus maximizing the spread of the color scale across the range of data collected.

## **2.6 Zoom**

To access the Zoom features, move the highlight bar to the Zoom menu selection and press <ENTER>. The C-Scan will reappear in a smaller box in the upper right hand corner of the display area. Below the C-Scan is a box containing the parameters of the Zoom view which is now in the center of the display. On the right side of the display screen is a Zoom View box. In it are the parameters of the zoom view area. Below it is the Scan Area box which displays the

parameters of the actual C-Scan. On the bottom of the display is the color bar and scale. Note that the Zoom box in the center of the display corresponds to the contents of the highlighted box within the C-Scan presentation in the upper right hand corner of the display.

Use the arrow keys to move the Zoom box around anywhere within the C-Scan area. Since this is a live Zoom presentation, the screen will be automatically redrawn when you stop pressing the keys. The <Page Up> and <Page Down> keys are used to adjust the size of the Zoom box from a minimum of one data point to a maximum of the perimeter of the C-Scan area. The <Home> and <End> keys are used to adjust the vertical and horizontal size ratio of the Zoom box. By pressing the <F1> key you can see a Zoom area displayed with the spreadsheet data values included. This box can be moved around with the arrow keys, but may not be re-sized. Pressing any key will return you to the previous Zoom configuration.

Pressing the <F4> key will swap the Scan area window with a Zoom stats window which will show information concerning the zoom area such as area, minimum and maximum data readings, average, and standard deviation. Pressing the <F4> key again will return the window to the Scan area information mode. Pressing the <F2> key will give you full zoom equal to the total C-Scan area (the stat display will display information for the whole scan in this mode).

You can press <ESC> to leave Zoom and return to the normal C-Scan image, or once you have focused on a particular area with the Zoom box you can press <ENTER> to keep the Zoom area as the scan area and redraw the Zoomed area as if it were the full C-scan. The rest of the scan data is retained in memory, though you are able to use all of the menu features to examine the Zoomed scan area. To get back to the full image, re-enter the Zoom menu area and press <F2>, and then <ENTER>. This will return the scan to its original configuration and redraw the C-Scan.

Another use of the zoom area is to define areas to re-scan. If there is an unscanned area, or an area that needs to be re-scanned for any reason, this can be accomplished without re-scanning the entire scan. This function will only work with a live scan, not one that is a saved file. Note that the operator may save the original scan in a file, and continue to work with the live scan on the display. To utilize this feature, complete the live scan, and zoom in an area to be re-scanned. Press the <ENTER> key to keep the zoomed area, and display the area as the C-scan. Under the C-Scan menu, select "Clear Scan". This will clear the data inside the zoom window being used, but will not effect the data in the rest of the scan.

Select "Home Motors" to position the scanner at the zero reference corner of the zoom window. This creates an incremental positioned zero reference point that the system will now use for the scan. The zoom window creates the scan plan. Select "Start Scan" and the unit will now scan the zoomed area as if it were the complete scan. When it is finished it will stop. Return to the Zoom menu and select <F2> to return to the original complete scan with the re-scanned area now an integral part of the scan. Be sure to save the scan.

## **2.7 B-Scan**

For a B-Scan profile highlight the B-Scan menu selection and press <ENTER>. The C-Scan image will be displayed slightly smaller, with X and Y axis B profiles next to the C-Scan image. The color bar and scale appear to the left or under the scan image. A set of crosshairs on the C-Scan image shows the location of the B-Scan slice. You can move the crosshairs with the arrow keys. Pressing the <F1> key will center the crosshairs on the first lowest reading in the scan. Pressing the <F2> key will center the crosshairs on the first highest reading in the scan. When using the B-Scan display with a live scan, the <F3> key can be used to move the scanner to where the crosshairs are. This allows the operator to compare the A-Trace on the Quantum with the

reading taken during the scan. The <F4> key will move the scanner to the location of the crosshairs, but will also re-acquire the data at that location. When you escape out of the B-Scan mode the C-Scan image will be redrawn.

## **2.8 3-D View**

For 3-D images, highlight the 3-D View menu selection and press <ENTER>. A menu will appear allowing you to set the parameters of the image to be generated, including size, orientation, quality (resolution), and fill style. Three fill styles are available. They are grid, lines, and dots. Try all three to see which will be best suited for your application. Once your selections have been made press <ENTER> to draw the 3-D image. If all parameters are set the way you want when you enter the 3-D menu, then press <ENTER> with the Fill 3-D highlighted and the image will be drawn. If you are not sure what you want you can select the Set Default and the default settings will be reestablished. Then highlight the Fill 3-D and press <ENTER> to draw the image. When you escape out of the 3-D mode, the C-Scan image will be redrawn.

## **2.9 Print**

Any image in the program can be printed by highlighting the Print menu selection and pressing <ENTER>, or by pressing the <Print Screen> key. Images are printed using the Pizazz Plus screen capture and printing utility. The settings will print a full screen rotated color image on an HP Paintjet printer. For other settings or printers, see the Pizazz Plus manual for instructions.

## **2.10 Quit**

This menu selection will quit the program and return you to DOS or a menu program if that is how the program is being run. PortaScan software is not written for Microsoft Windows; however, you can access the program from Windows and return if you wish to do so. Consult your Windows manual for setting up other programs and icons. If you run

from windows the amount of RAM available for scan area is greatly reduced. You have been provided with a PortaScan Main menu program that is activated with a Boot.bat batch file. This program will list any program with an ".EXE" extension that resides in the C:\Scan directory. If you have other PortaScan software, those programs will be listed as well.

### 3.0 QUICK START

3.1 Place the PortaScan 007 on a stable surface.

```
*****  
*           C A U T I O N           *  
*****
```

EXCESSIVE IMPACT TO THE COMPUTER WILL DAMAGE  
THE INTERNAL HARD DISK DRIVE.

3.2 Set the Scanner on the Pipe Under Test (If something other than pipe is being scanned, or another scanner is being used (ie. the NDT Systems MiniScanner) set up the scanner appropriately (Within cable length of the PortaScan 007 case). The software expects the scanner to be placed with the carriage or base running left to right in front of the user, with the connectors to the back.

3.3 Plug the barrel connector (From 007CCB-25) into the connector on the back of the scanner. (If the 007 has a 9 pin connector for the scanner, use the appropriate cable. Some older systems were equipped this way.)

3.4 (If the 007 has a 15 pin connector for the scanner, use the appropriate cable. Some older systems were equipped this way.)

3.5 Plug the Microdot connector(s) (From 007CCB-25) into the transducer mounted in the scanner.

3.6 Connect the couplant tube (From 007CCB-25) into the probe holder on the scanner.

3.7 Plug the 6 pin Lemo connector (From 007CCB-25) into the ENCODER receptacle in the PortaScan 007 box.

- 3.8 Plug the barrel connector on the other end of the cable bundle into the receptical on the side of the 007 unit. (Plug the 15 pin plug connector (From 007CCB-25) into the MOTORS receptacle in the PortaScan 007 box, if so equipped)
- 3.9 Plug the BNC connector(s) (From 007CCB-25) into the TRANSMIT (and RECEIVE) connectors in the PortaScan 007 box.
- 3.10 Connect the couplant tube to the MPCV-1 Couplant Vessel. Fill with the appropriate level with couplant (Water is recommended). Pressurize the vessel and open the flow valve to allow the air in the line to escape and to let a light bead of fluid to begin to flow.
- 3.11 If an external monitor is used, connect its 15 pin plug connector into the MONITOR socket on the PortaScan 007 box. Be careful not to connect the monitor to the connector for the Motors.
- 3.12 Connect the power cables for the PortaScan 007 and external monitor if used.
- 3.13 Remove any floppy disks from the floppy drive in the PortaScan 007.
- 3.14 Locate the main power switch in the back of the PortaScan 007 box, and external monitor if used, and turn them on.
- 3.15 Turn on the Red power switch on the front left side of the PortaScan 007 top panel. The computer will boot up on the internal hard drive, and run the portascan program. Do not press any keys until the menu appears. If a user menu program is installed, select 'QFTV30'.
- 3.16 Turn on the Quantum (The switch is in the from lower left corner of the PortaScan 007 top panel).

Set the controls on the Quantum as shown in its manual. Note that the operation of the imaging system is dependent on the position of the Flaw Gate on the Quantum. The thickness measurement system does not work in RF display mode.

- 3.17 Calibrate the Quantum. Refer to the Quantum manual for help. The probe holder may be removed from the cradle for calibration, then put back into place before continuing.
- 3.18 Make sure that the Quantum main menu is showing on the display along with the signal from the transducer.
- 3.19 Select the first menu selection on the PS3-QBT PortaScan program, called 'C-scan'.
- 3.20 Select 'New Scan'. A calibration screen will now appear. If the Quantum was on, and on the main menu screen when the software was initialized, then the setup information from the Quantum will be entered here automatically. If the Quantum was not detected, then you will manually enter the information desired. Enter whether you wish to perform the scan using thickness or amplitude, inch or metric, and the range desired.
- 3.21 After calibration is performed, the user is asked to define the scan information. Here you will select index resolution and scan length for each axis. A scan must be larger than 1/2 inch square.
- 3.22 Now you will move the scanner to the zero reference corner. This is usually the lower left of the scan area. When you have moved the scanner there, press <ENTER>. The scan area is initialized and the area is displayed on the screen. The Start Scan menu selection is highlighted on the menu bar. If everything is ready, press <ENTER> to begin scanning. As you scan, the thickness or amplitude information received from the Quantum is converted to a color

on the color bar under the scale on the screen and plotted to the screen in the corresponding location as a circular dot.

- 3.23 Make sure there is enough couplant on the part, and that the correct pressure is being applied on the transducer holder to keep constant coupling under the transducer. This may take some practice.
- 3.24 When the scan is sufficiently filled in, it may be desirable to save the scan data to disk for later recall and analysis. If so, you may also wish to enter information about the scan to be saved along with the data. This can be done by selecting 'Test Report' from either the main menu.
- 3.25 The scan can then be saved to disk by moving to the File menu and selecting Save Scan. You will be asked for an eight character name by which to save the file. This must be a valid DOS file name: no spaces, periods, commas, slashes, asterisks, etc. You can also change what directory or disk you save the file to.
- 3.26 Once the scan is saved to disk, if you choose to do so, you may use any of the other software features to examine the scan, export the scan, print the scan, or clear the scan and start a new one. If the scan you have completed is one with parameters that will be repeated often, you will want to save the setup under the Save Setup selection in the File menu.

## 4.0 SOFTWARE INSTALLATION AND COPY PROTECTION

### 4.1 Installation

In most cases, the PortaScan software has already been installed on the system computer and a backup disc is provided; however, if it has not been installed, or you want to move the software to a different computer, the following instructions will apply.

For software installation, insert program disc in drive and type: **INSTALLA or INSTALLB** (according to the appropriate drive designation) then press <ENTER>. From the DOS prompt you may type: **TYPE READ.ME** then press <ENTER> to display the install/recall instructions that follow.

The Quantum PortaScan program is called QBTV3x.EXE, where x is the current version number, and is set up to reside in the C:\SCAN subdirectory of the hard disk. To install, type **INSTALLA or INSTALLB** depending on which drive is used, and press <ENTER>. The program will start automatically.

The Main Menu program is called MAINMENU.EXE, and is called from the 'boot.bat' batch file.

**NOTE: To run this program upon power on, you will need to alter the AUTOEXEC.BAT with one that will start the PortaScan program upon power on. Factory ordered systems come this way.**

### 4.2 Copy Protection

The PortaScan system uses **DAC-LOCK** copy protection. This method of copy protection modifies the files to be protected, making them unusable unless the software corresponds to the **DAC** card installed in the computer. The **DAC** card is serialized and the number can be verified using the **SER-NO.EXE** program in the utility directory.

When the software is purchased, the modified PortaScan system files are placed on a floppy disk, along with the

utility programs. The software can be copied, but the **PortaScan** software can only be operated on the **DAC** card with the corresponding serial number.

A workstation copy of the software is available.

If using the workstation copy of the PortaScan software a different scheme of copy protection is used as there is no DAC Card installed. This scheme incorporates a method whereby the files are "moved" to the users hard drive along with the necessary encoding files. You can not simply copy the files to your hard drive. This will render the installation disk useless.

To install the workstation copy, type INSTALLA from the A:\ prompt in DOS or a DOS window in Windows. This will copy the files to that machine. You are permitted 2 installs. If a third is attempted you will likely see a "security" error.

To "move" the software to another machine, there is another utility on the floppy called recall, which, when used, will copy the files back to the floppy along with it's security rights. To perform this action type RECALLA at the A:\ prompt in DOS or a DOS window in Windows.



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