

# Tutorial

This Tutorial is an easy way to learn the basics of using SPC Express.

Please expand this folder  for more information ...

## ***Introduction***

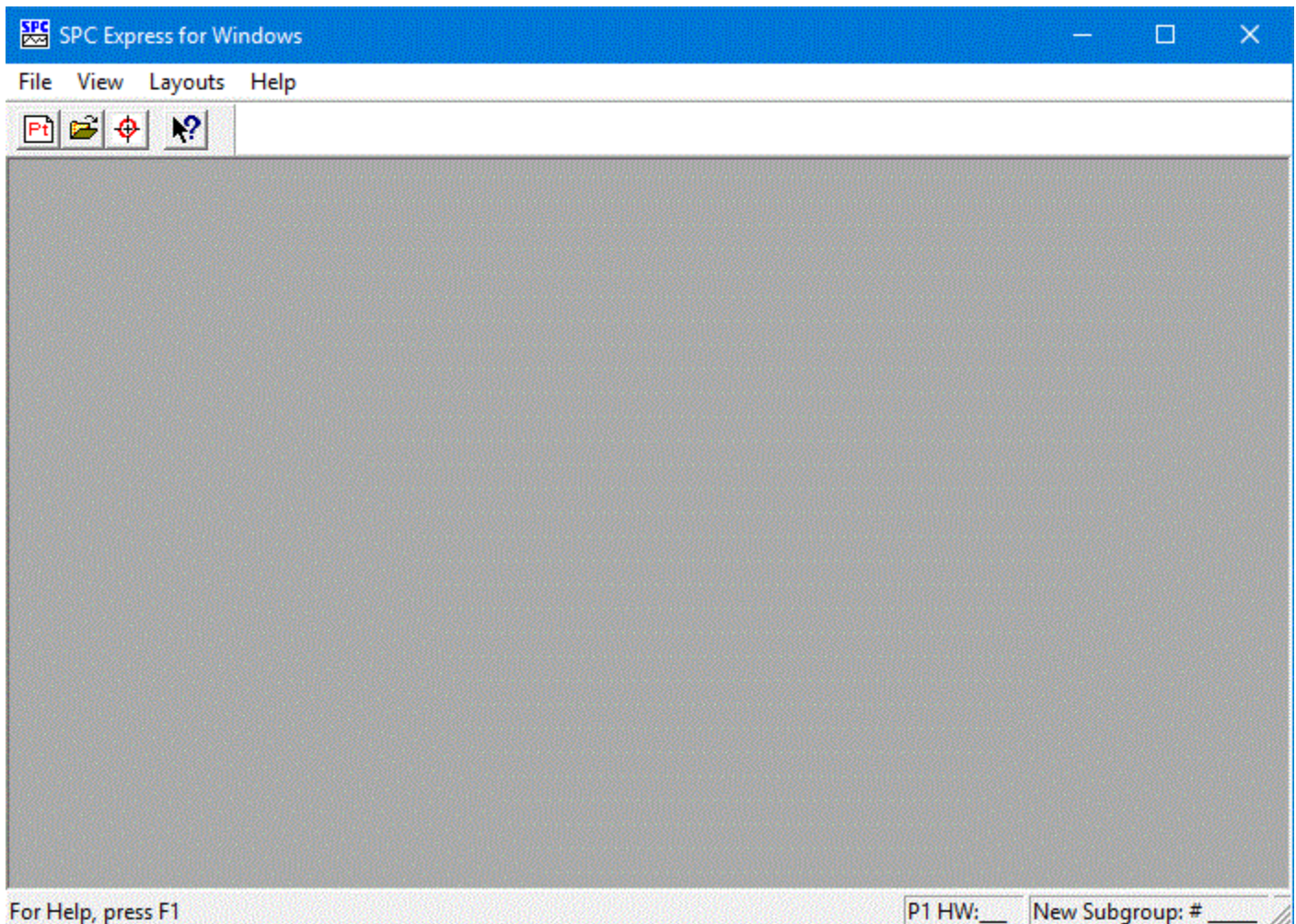
This **Tutorial** is designed to introduce you to SPC Express for Windows. It will take you through each step you would normally go through in creating a Part File, entering in-process data and histogram data, viewing charts and printing reports. It is not designed to explain every option or prompt, but rather to give you a sample of how the system works. If you get stuck or confused you have several choices:

- 1) Refer to the Main Reference Section of this manual which has a complete explanation of each option in the program.
- 2) Press the (F1) key to ask for HELP.
- 3) Pick up the phone and call for assistance.

**Tech Support:** 1-248-350-9177

**Fax Number:** 1-248-350-9274

Enough of the introductions already, let's get going! The first thing you must do is start up the program. Read the sections titled "Installation" and "Start-up" in the **Introduction** section of this manual. Follow the instructions on how to start up SPC Express. Be sure to also read the section called "Conventions" in the **Introduction** on how various notations are used within this manual. Read those sections now, and then we'll get going with this tutorial. You should now be looking at the initial screen as shown below:



Let's assume that you do not yet have any existing Part Files. So, let's create a new one now.

## **Create a New Part File**

To **create** a new Part File ...

- Choose: **\*File \*Create a New Part File** from the Menu Bar or click on the “New Part” shortcut button (Pt) on the Tool Bar. At this point, you must enter a File Name for the new Part File. This should be a legal DOS file name. You will see a dialog box asking you to enter the name of a new Disk File that will contain your new part information. Click your mouse inside the field called “File Name” and type in: **qtrdemo.mdb** and then click **[Create]** (or hit Enter).
- Now you will see a dialog box for you to fill out ...

**Create a New Part File** (compatibility: Access 2000)

Clone from existing Part Number... Part Number:

Part Description:

Optional fields:

Rev. Date / Comments:

Customer Code:  Customer Name:

(Choose the fields you want in your new file from the left column, and click the "Add" button)

| Fields to choose from: | Type | Sz. | Fields in your data file | Type | Sz. | Flags: P I R |
|------------------------|------|-----|--------------------------|------|-----|--------------|
| Shift                  | Text | 3   | Date (required)          | Date | 10  | x x x        |
| Inspector              | Text | 10  | Time (required)          | Date | 11  | x x x        |
| Machine                | Text | 10  | Material                 | Text | 10  | x x x        |
| Material               | Text | 10  | Operator                 | Text | 10  | x x x        |
| Lot Control No         | Text | 10  | Corrective Action        | Text | 10  | x x x        |
| Operator               | Text | 10  |                          |      |     |              |
| Corrective Action      | Text | 10  |                          |      |     |              |
| Assignable Cause       | Text | 20  |                          |      |     |              |
| Auditor                | Drop | 10  |                          |      |     |              |
| Notes                  | Text | 20  |                          |      |     |              |

Buttons: Add to -> / Move up, <- Del from <-

Flags:

☐ Propagate Traceability

☒ Subgroup Info Window

☒ Print on Reports

Save as default (for next time)

Hint: Double-click on Field name to edit the DropDownList.

Buttons: Create/Edit User Defined Fields..., Cancel, OK

- Enter the Part Number: **QTR-1000** and then hit the (Tab) key. Be sure to use the mouse or the Tab key to advance to the next field. Do not hit the Enter key until you are completely done. In Windows, Enter is usually treated as an **[OK]** button. You may optionally enter Revision Date, Customer Name and Customer Code if you want.
- Now enter the Part Description: **U.S. Quarter** and then hit the (Tab) key.
- Enter **02-09-2017** for the Revision Date and hit the (Tab) key.
- Enter **GM** for the Customer Code and hit the (Tab) key.
- Enter **General Motors Corp** for the Customer Name.
- Now you must specify (or design) the **traceability** fields that you want to have in your subgroups of data. You automatically get Date and Time. Let's say that we want to track the Material and Operator with every subgroup. First click on Material and it will become highlighted. Now click the **[Add to ->]** button and that field will be placed on the right side of the screen. Next, click on Operator and it will become highlighted. Click the **[Add to ->]** button and that field will be placed on the right side of the screen.
- Let's also specify a field for entering Corrective Action. Click on the field on the left called Corrective Action, then click the **[Add to ->]** button to add it to the right side.
- Notice how each of the five fields (Date, Time, Material, Operator, and Corrective Action) have x's next to them indicating the "PIR" flags. These flags indicate that each of these fields is to be used for Propagating Traceability, Subgroup Info Window, and Report Printouts. Let's say that you don't want to see the Operator field in the Subgroup Info Window (Don't worry, you'll learn what that window is all about in a few minutes.) Here's what you'll do: Click on the Operator row on the right side of the screen. It will become highlighted. Now the three checkboxes for the **PIR Flags** are active. Click your mouse on the middle checkbox (Subgroup Info Window) and that checkmark will go away indicating that you do NOT want the Operator field to appear on the Subgroup Info Window.
- Finally, click the **[OK]** button. This concludes the definition of your New Part.
- We should, however, define at least one characteristic. Every Part File should have at least one characteristic, but may contain many more (diameter, length, width, thickness, etc.) You will be presented with another dialog box allowing you to define your first characteristic. You will see five tab sheets labeled {**Required Info**}, {**Optional Info**}, {**Input Options**}, {**Formats**}, and {**Misc. Options**}. You really only need to fill in the first tab sheet (Required Info).

Create a new Characteristic for this part

Required Info | Optional Info | Input Options | Formats | Misc. Options

Clone from an existing Characteristic ...

Characteristic: Thickness

Dept / Process: Press Department

☒ Variable (i.e. 1.44, 1.56, 1.49) ☐ Attribute (i.e. bent, rusty)

Attribute Description File: C:\SPCXW\_Latest\_Test\example.att

Type of Tolerance:

☒ Bilateral (Upper and Lower Specs)  
☐ Unilateral w/Upper Spec (i.e. "At Most")  
☐ Unilateral w/Lower Spec (i.e. "At Least")

Type of Std. Dev.:

☒ R/d2 (Cpk)  
☐ RMS (Ppk)  
☐ use Global Pref.

Subgroup Size (samples per subgroup 1-99): 5

Specifications:

USL: 0.645  
Target: 0.640  
LSL: 0.635

Startup View Type:

☒ XBar R ☐ P ☐ NP  
☐ Rainbow ☐ U ☐ D  
☐ Histogram  
☐ Subgroup Entry ☐ and SG Entry

All Done (Save) Cancel

- Enter the word **Thickness** for the Characteristic and hit the (Tab) key.
- Enter **Press Department** for the Dept/Process field and hit the (Tab) key.
- Click on Variable data and Bilateral Specs.
- Choose how you want the standard deviation to be computed. Your choices are R/d2, RMS (root mean squared), or use the method as defined in the Global Preferences.
- Enter **5** for the subgroup size.
- Enter **.0645, .0640, .0635** for the Specifications.
- Finally, choose the Start-up View Type of X-bar R by clicking on it.
- If you want, you may now click on the {Optional Info} tab to enter more information about this characteristic. Here you may enter **Special Instructions**, **Inspection Information**, etc. Also, you may choose the {Input Options} tab to specify **electronic gage** input parameters, **formulas**, or pre-defined keyboard data. Choose {Formats} to specify how many **decimal** places you want to see for sample values and calculated results, such as mean, standard deviation, and control limits. The {Misc. Options} tab allows you to specify that calculated fields, such as min, max, and average, are to be displayed on the subgroup entry screen or yellow pop-up window. You may also ask that the **Inspection Information** be shown on the subgroup entry screen.
- Now click **[All Done (Save)]**. You will be asked if you want to open this file now? For now, answer "No."
- Congratulations! You just created your first SPC Express for Windows File!

## Open an Existing Part File

To **open** an existing Part File (such as the one we just created),

- choose **\*File \*Open an existing Part File** or click the "open folder" button on the Tool Bar.
- Double click on "qtrdemo" and it will open a window asking which characteristic(s) to open.
- Use your mouse to highlight "Thickness" and click **[OK]**. That characteristic will open and probably be initially represented on your screen as an X-Bar R Chart. (This may vary based on how you configured your system. Choices include X-Bar R Chart, Histogram, Subgroup View, or Part Info.)

## Entering Subgroups:

Before you can start entering subgroups, the Part File must first be opened. (See above.)

- If everything worked the way it's supposed to, you should now be looking at a blank X-bar R chart of the Thickness. (Remember when you selected X-bar R for the Start-up View Type?)
- In order to enter subgroups, we need something other than an X-bar R chart. We need a subgroup data window. At this point you have two choices. You can change the X-bar R Chart window into a Subgroup data window, or better yet, create a new window (in addition to the X-bar R chart window) for subgroup data entry. To do this, click on the blue Subgroup button on your toolbar. Note: the yellow buttons change the type of window and the blue buttons add a new type of window.
- You should now see a second window appear on your screen. By default, the subgroup window comes up in the view mode if there are any subgroups already in the Part File. If it is a new file with no subgroups in it yet, it will automatically be in the New mode. If it is not in the new mode, click the "New" button" now. You are now ready to enter a subgroup.
- Put your cursor on Sample 1 and enter the thickness of your quarter. For example, type **.0642** and hit the (Tab) key. Now enter a sample 2 through 5 in a similar manner.
- Next enter the traceability information, such as Material and Operator. Finally, click the **[Save]** button and the subgroup will be saved on your disk. If you click on the **[Save ->]** button, this subgroup will be saved and you will be allowed to enter another.

## View Style

Once you have opened a characteristic, you may view it a number of different ways. You may even view it in two or more ways at the same time! On your Tool Bar is a group of **yellow buttons** and **blue buttons**. The yellow buttons change the view of the currently highlighted window. The blue buttons add a new view of the currently highlighted window. For example, click the yellow Histogram and the X-Bar R Chart will change to a Histogram. Click the blue Subgroup and a new view (showing a subgroup data form) will be created in addition the graph you are currently viewing.

### Operations on Views

When you are looking at a view ...

#### All Charts:

- **\*View \*Chart Options** - allows you to specify which subgroups are to be included in the graph. You may choose the most recent subgroups and specify how many, or you may select from several historical choices, such as a given month or quarter. If you have a very specific criteria that you want to use, you may define your own query, based on the subgroups' traceability fields. You may also specify how many subgroups may be plotted along the horizontal axis.
- **\*Edit \*Run an update to change subgroups** - this is a global edit function that allows you to specify which subgroups need changing and what they should be changed to. For example, if the afternoon shift used the English gage instead of the metric gage, you could scan for all subgroups where the Shift was "Aft" and multiply all those samples by 25.4.
- **\*File \*Print Preview** (or click the Print Preview button) - allows you to see a printed report on the screen before actually printing it.
- Re-size - Views can be dragged and stretched. As the window changes size, the font size changes automatically so that the entire graph can be seen. As the window gets extremely small, the detail box below the graph disappears, since it is too small to be readable.

#### X-Bar R Charts View:

- Click on a specific subgroup to see details. When viewing the details, you may click on another subgroup or click on either the **[Close]** or **[View/Edit]** buttons.

#### Histograms View:

- Nothing special on this view.

#### Subgroup View:

- **Browse** through subgroups - use the Next and Previous buttons, or the Forward and Reverse Tool Bar buttons (similar to your VCR at home). If you have a process chart (X-Bar R, Rainbow, P, U, NP, or C) open at the time, you should see an **orange highlight** line showing you which subgroup you are viewing. Note that only one window at a time is allowed to have an orange highlight line.
- Edit an existing subgroup - just click on the Edit box, make your changes and hit **[Save]** or **[Save ->]**. Note: **[Save ->]** (save forward) save this subgroup and advances to the next one.

- Add a new subgroup - just click on the **[New]** button, enter your data for the new subgroups and hit **[Save]** or **[Save ->]**. Note: **[Save ->]** (save forward) save this subgroup and advances to the next one.
- **Autosize** - Right click at any time within the Subgroup View window and it will automatically re-size to the optimum size for the number of fields in your subgroup.

### **Part/Characteristic Info View:**

- View Part information including File Name, how many subgroups are in the file for this characteristic, specifications for this characteristic, what the other characteristics are, etc.
- You can open comm ports, send data and receive data for testing purposes. (future)

### **Viewing Graphs On-Screen:**

- Because we entered the subgroup in a window that was created with the blue Subgroup button, the X-bar R chart window should still be on the screen. Click the toolbar button called “Tile Vertically” and the two windows will be displayed side-by-side.
- The subgroup data window is probably a lot bigger than it needs to be. Try this: Right click anywhere within the subgroup window and it will automatically be resized to the smallest possible size and still show all fields.
- Notice that whenever you have a subgroup data window and an X-bar R chart window open at the same time, a subgroup on the X-bar R chart will be highlighted, showing you which subgroup is currently in the subgroup data window.
- To view a histogram, click on the blue Histogram button and a third window will appear. Again, you may re-tile the windows by clicking on one of the toolbar tile buttons, or resize them individually using your mouse.
- One of the things that you can do when viewing the X-bar R chart is to click on any subgroup to see more detail. When you do, a yellow pop-up window will appear which contains information about that subgroup. Only those fields that have the “I” flag set will be shown in the yellow pop-up window.
- At this point, go to the subgroup data window and enter about 10 more subgroups.
- Now highlight the Xbar R Chart window and click on **\*View \*Chart Options**. This will allow you to select which subgroups you want to have charted. For example: Let’s say we want to see all of the subgroups from “This Year to Date” (Everything from the beginning of this year, up to and including today.) To do this, click on the “radio button” called This Year (to Date). Also, enter the number 5 in the Chart Width field. Finally click the **[OK]** button. The graph should instantly change to reflect those subgroups. The chart will only be 5 subgroups wide, even though there are about 11 or 12 subgroups that need to be charted. This allows you to customize your chart to be more readable, especially when you may have hundreds of subgroups in the set of subgroups to be charted. Because of this, you will be presented with a horizontal scrollbar. You can now scroll through your subgroups by dragging the “thumb” on the scrollbar or by clicking on one of the arrows at the ends of the scrollbar.

### **Optional Gage Input:**

- If you want to take readings from an electronic gage, you must first tell SPC Express for Windows about the communications parameters for that gage. To do this, choose **\*Edit** from the Menu bar, then choose **\*Edit the current Characteristic** from the drop-down list. Choose the tab called **{Input Options}**. Here you may specify the comm port to be used, baud rate, etc. For a Sylvac Ultra-Cal II caliper, use 4800 baud, even parity, 7 data bits, 1 stop bit, and hardware flow control. If you simply have one gage connected, you don’t need to specify a Gage ID. Just put the number 1 in the Position of Sample field and 6 in the Number of Characters in Sample field. After you have entered this information, click the **[All Done]** button.
- To take a gage reading, open a subgroup data window and simply press the send button on the gage. You should see the reading appear in the sample field. As soon as the subgroup is full, it will be saved and charted automatically.

### **Print Preview / Printing:**

Any time you want to get a printed report, you can see it on the screen first by clicking on the Print Preview button on the toolbar. Note that on page 2, you will only see those traceability fields that have the “R” flag set, indicating that you want that field to appear on a printed report. If you need to define your printer type, or change from portrait to landscape mode, choose **\*File** from the menu bar, then choose **\*Print Setup** from the drop-down list. Finally, to print a report to the printer, choose Print Preview (either from the File menu or by clicking the Print Preview Toolbar button), then click the **[Print]** button. At this point you will have the opportunity to specify which pages you want printed. Click **[OK]** to start the printing.

# A Walk Through SPC Express

Take a brief "Walk-through " to get the overall flow of SPC Express.

Please expand this folder   for more information ...

## Walk-Through

This section will show you the basic steps you would take on a typical journey through SPC Express. You are by no means restricted to taking these steps in this exact order, but this will at least provide you with an idea of how all the options fit together and in what general order you do things.



### GETTING READY

Before taking your first step with SPC Express for Windows, you must first install it on your computer. See the **Introduction** for further information. You should then go through the **Tutorial** to learn how to use SPC Express with its various menus and toolbar buttons. After you've completed the **Tutorial**, you're ready to start tracking parts with SPC Express, so take...



#### Step 1 - CREATING A NEW PART FILE

Select the New Part File option from either the File Menu or use the toolbar button for New part. You can enter the Part Number, Description, Customer Name, Customer Code, and the Traceability fields for the part you wish to track with SPC Express. Once you have entered all the title information for the Part file, you will never need to enter it again (although you can edit it later if you wish). You will also need to define at least one Characteristic to this Part File, where you will define the name of the characteristic and its specifications. Now that the Part File is created, you can take ...



#### Step 2 - OPEN A PART FILE

Use the File Open Menu to select a specific Part File. It is what tells SPC Express which file in a drive or directory you wish to work on. Opening a Part File opens a window where you can enter and view subgroups for that file. You can open several Part Files at a time and position them on your screen wherever you want. Once a Part File is open, you can take ...



#### Step 3 - ENTER IN-PROCESS DATA

Open a subgroup data view of your Part File. (One way to do this is to click on the blue Subgroup toolbar button.) You may now enter subgroup data, both sample values and traceability information. As you complete each subgroup, it is automatically charted on any X-Bar R Chart and Histogram views that are open. If you have an electronic gage connected, simply press the button on your gage to send a reading and it will be placed into the subgroup for you. After you have entered your subgroups and want a printed report of your process, you are ready to take ...



#### Step 4 - PRINT AN X-BAR R CHART REPORT

Printing an X-Bar R Chart is very easy. Simply highlight the window containing your chart and click the Print Preview toolbar button. You will see your report on the screen just as if it were printed on paper. From here you can print one or all of the pages in the printed report. The first page shows the header information and the graph. The rest of the pages show the detail information in each of the subgroups. This complete report shows you your control limits, capability, and much, much more. It makes a good starting reference point to help you get a picture of your process. When you collect a few new subgroups for this file, you should go back to step 3 and enter more in-process data.

After entering those new subgroups, you might like to see an on-screen histogram of your samples so far, so you would take ...



#### Step 5 - VIEW A HISTOGRAM

When you are viewing an X-Bar R Chart on the screen, you can change that window into a histogram view by clicking on the yellow histogram toolbar button. Or, if you prefer to see both the X-Bar R Chart and the histogram at the same time, click on the blue histogram toolbar button and a new window will be created containing the histogram.

If you spot any errors in any of your subgroup data, you may wish to take ...



#### Step 6 - EDIT IN-PROCESS DATA

Editing subgroup information is very easy to do. You can correct any typographical errors and save the subgroup back on disk. If you wish you can even delete an entire subgroup with this option. First, be sure one of your windows is in the Subgroup Data Form. To see such a window if you don't already have one, simply click on one of the Subgroup Data Form toolbar buttons. Then browse forward and back through your subgroups using the browse buttons on the form. When you get to the subgroup you wish to edit, click on the Edit button and make your changes. Finally, click the Save button to save your changes.



#### Step 7 - PART FILE MANAGEMENT

You can add new Part Files or Characteristics to those Part Files any time you want. You can create new Part Files on any disk drive on your system and in any subdirectory you want. You may edit many of the definitions in your part files, such as engineering specifications, chart scaling factors, and electronic gage input formats.

Well, that's about it. You now have a general idea of one way that you can use SPC Express to keep track of your parts. As it says in the beginning of this section, you don't have to follow these steps in the exact order we have shown them -- just remember these simple steps:

- Create your Part File
- Open your Part File
- Enter Subgroups of Data
- Print an X-Bar R Chart
- View a Histogram
- Edit your Subgroup Data if Necessary
- Maintain your Part Files

Don't be afraid. Jump right in!

