Agilent
QC Chart Tool v1.3

User Guide

Agilent Technologies

Notices

Manual Part Number

G4460-90022

Edition

Fourth Edition, October 2009

Printed in USA

Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA

Software Revision

This guide is valid for 1.3 revision or higher of the Agilent QC Chart Tool software, until superseded.

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In This Guide...

This guide contains information to use the QC Chart Tool.

1 Basic Tasks

This chapter contains instructions for using QC Chart Tool.

2 Backup and Restore

This chapter describes the steps that you need to take to back up and restore the QC Chart Tool Database.

3 Extraction and Queries Pane and Extraction Results Pane

This chapter describes the Extraction Queries and QC Charts Pane and the Extraction Results Panes.

4 Reference

This chapter contains reference and concepts information about QC Chart Tool.

Contents

1 Basic Tasks

This chapter contains instructions to use QC Chart Tool.

Loading Data

The QC Chart tool needs extractions imported in its database to create meaningful metrics and thresholds. Loading the tool with extractions consists of extracting the Stats and FEParameter data from the output text files of Feature Extraction.

To import Feature Extraction output text files individually

1 Click **File > Import Files > FE Files** or click **Ctrl-F**.

2 In the Browse FE Files dialog box, select the Feature Extraction text files that you want to load.

3 Click **Open** to import the extraction data from the selected files.

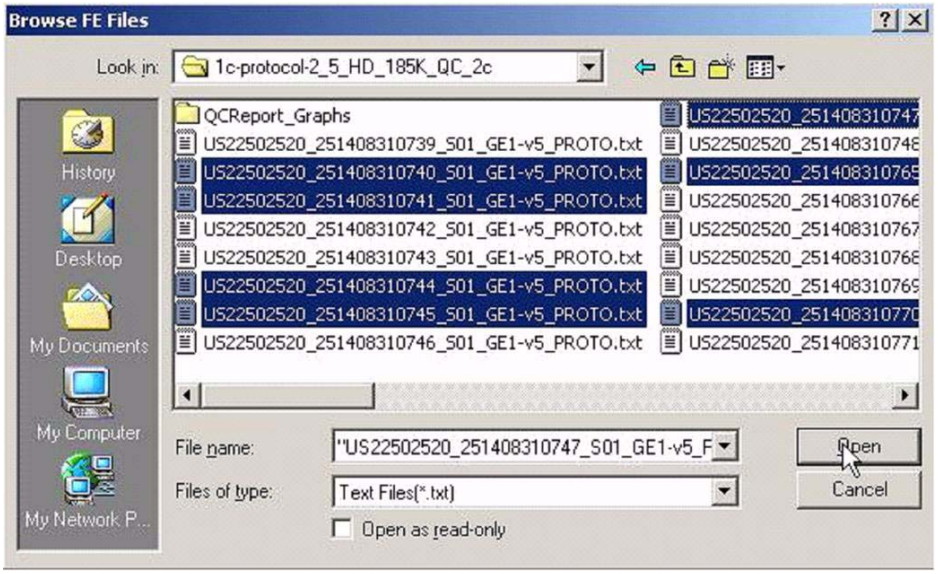


Figure 1 Browse FE Files dialog box

To import files recursively

When you import files recursively, all FE.txt files in the selected folder and all subfolders below the selected folder are imported.

1 Click **File > Import Files Recursively** or press **Ctrl-R**.

2 In the Browse for Folder dialog box, select the folder that contains the data files to import. See Figure 2.

3 Click **OK** to start the import.

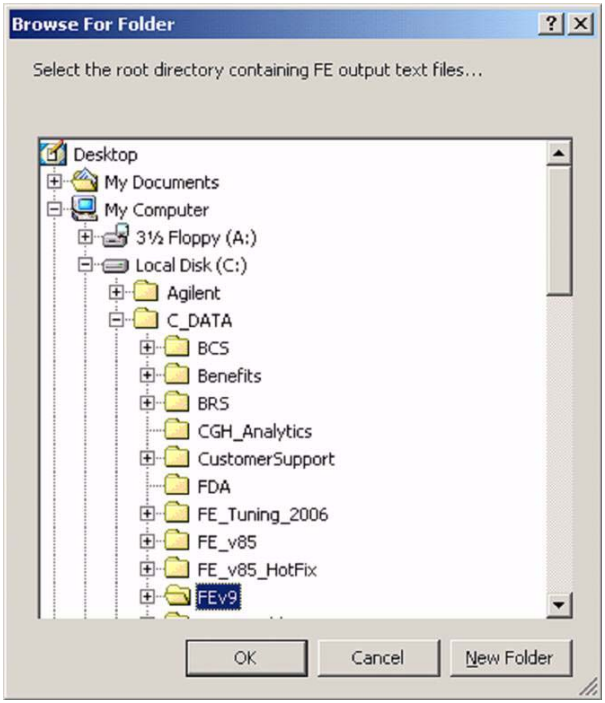


Figure 2 Browse For Folder dialog box

A folder containing 2000 Feature Extraction files will take approximately 15 to 20 minutes to import.

4 Click **OK** to start the import.

5 If the Invalid File List message box appears, click **OK** to continue.

This message box appears if any of the files from the selected folders are not Feature Extraction output text files.

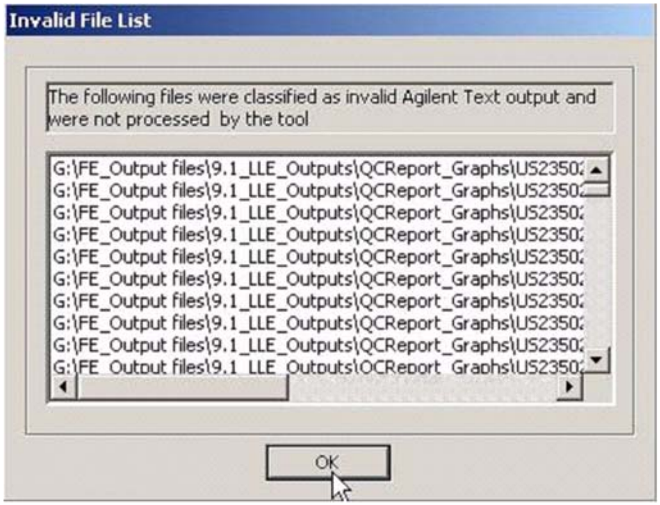


Figure 3 Invalid File List message box

The import process creates a “row” or “record” for each unique extraction. If a bar code has been extracted with various Feature Extraction protocols, these will result in unique records, as the extraction name is created from both the barcode and the name of the protocol.

Two types of data are imported:

- All Stats fields from the extraction
- Selected FEParameters fields are also imported to help you define queries of the extractions (see “Feature Extraction FEParameter fields used in QC Chart Tool” on page 61).

Associate Annotations

You can create annotations for the extractions that exist in the QC Chart Tool database and import the annotations with the tool.

Annotations associated with an extraction can be used to filter for that extraction in queries. The annotation can also be used to organize data in QC charts produced by the QC Chart Tool, for example, to sort extractions, or to indicate different subsets of extractions by color-coding or by shape-coding.

You can add annotations by one of three different methods:

- Export all database records, editing and re-importing.
- Export a subset of the database records, editing and re-importing.
- Generate a new tab-delimited text file containing the annotations.

To export all database records for annotations

Once extractions are loaded into the QC Chart Tool database, all barcodes (and their associated FEParams and Stats) can be exported in the QC Chart Tool. This method will result in the export of every extraction in the database.

1 Click **File > Export Database** or press **Ctrl-A**.

  The default Export Repository file name is displayed. You can change the file name and path before you click **Save**.

2 Open the text file using a spreadsheet program such as Microsoft Excel.

3 Delete all columns (Stats and FEParameters) other than BarCode and user-added annotations.

CAUTION The annotation file must contain only the BarCode and any user-added annotation. If it contains any of the Stats or FEParams columns, or if it fails to contain the BarCode, you will encounter an error.

4 Delete records (rows in Excel) of any barcodes that you do not want to annotate.

5 Add additional custom columns (with descriptive column header names in the first row) and array annotations within those columns as desired.

Column header names must not contain any spaces. The **BarCode** column must be left exactly as exported, or the annotations will not be imported correctly. See Table 1.

6 Confirm that Excel has not changed the formatting of the BarCode column.

7 If the BarCode formatting has changed, change it back to decimal format:

a Select the **BarCode** column. See Figure 4.

b Click **Format > Cells > Number**.

c In the **Category** drop-down list, select **Number**. See Figure 5.

d In the **Decimal places** list, select **0**.

The BarCodes column will be in the correct format for re-import into the QC Chart tool. See Figure 6.

Table 1 Example

BarCode	Project	Experiment	RedSample	GreenSample	Polarity	Comments	Stringency
251209751852	STG_1	GE1_Human_June06	h1	h2	1		v4
251209751871	STG_1	GE1_Human_June06	h1	h2	1		v4
251209751873	STG_1	GE1_Human_June06	h1	h2	1	re-scanned	v4
251209751882	STG_1	GE1_Human_June06	h2	h1	-1		v4
251209751884	STG_1	GE1_Human_June06	h2	h1	-1		v4
251209751886	STG_1	GE1_Human_June06	h2	h1	-1		v4
251269421651	STG_1	GE2_Mouse_May06	m1	m2	1	trainee	Legacy
251269421653	STG_1	GE2_Mouse_May06	m1	m2	1	trainee	Legacy
251269421655	STG_1	GE2_Mouse_May06	m2	m1	-1		Legacy
251269421658	STG_1	GE2_Mouse_May06	m2	m1	-1		Legacy
251209751887	CGH_prep	Compare 2 preps	k1	k2	1		v3
251209751890	CGH_prep	Compare 2 preps	k1	k2	1		v3

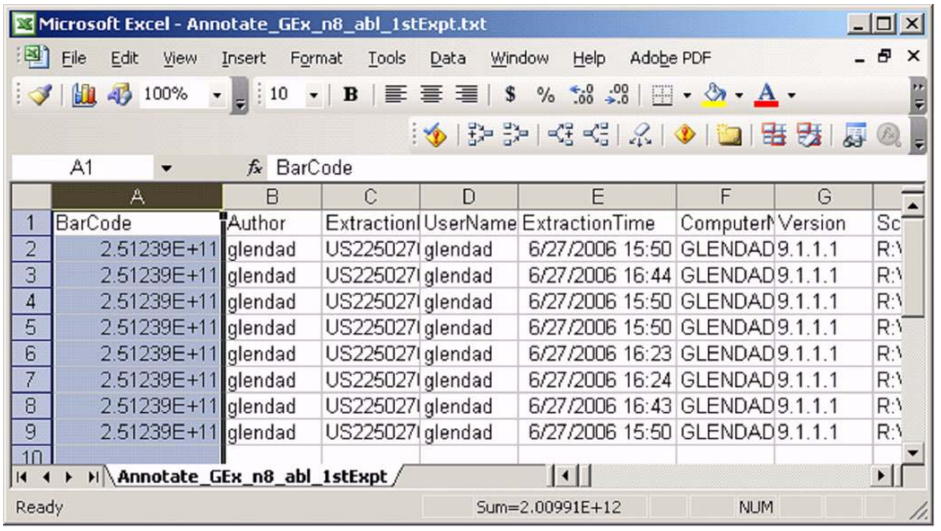


Figure 4 Annotation spreadsheet with incorrectly formatted BarCode numbers

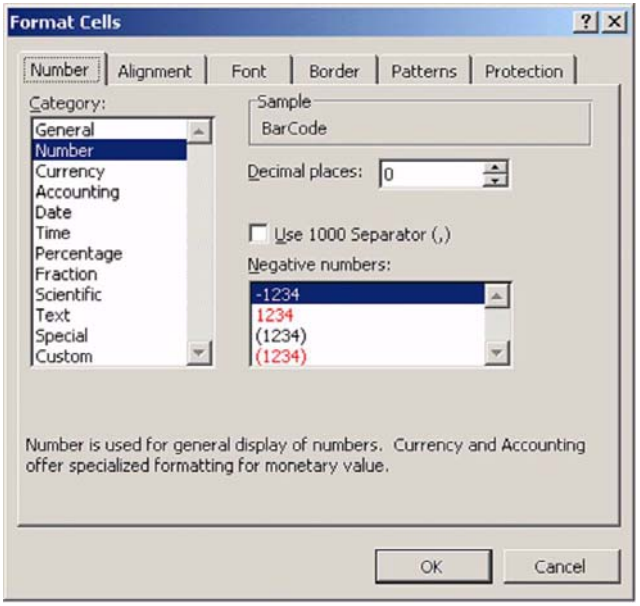
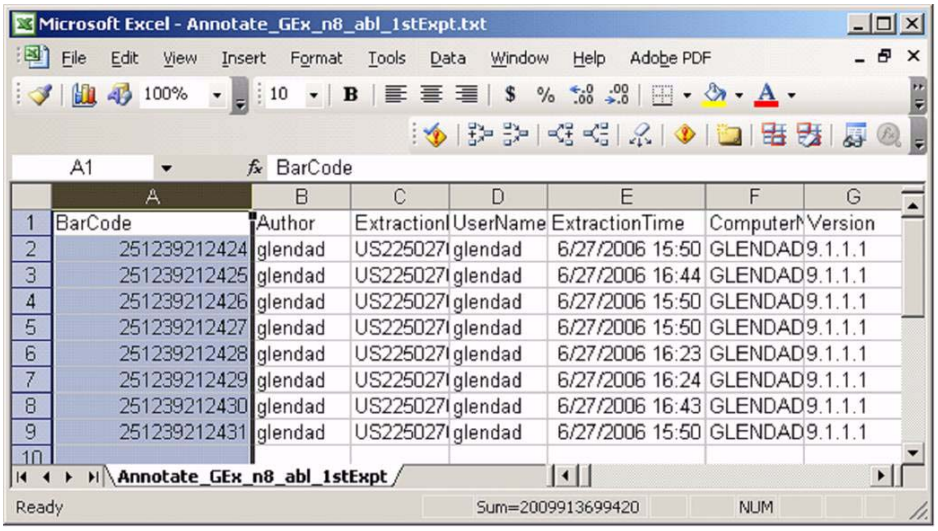


Figure 5 Select **Number** and **0** as **Decimal places** in the Format Cells dialog box.



	A	B	C	D	E	F	G
1	BarCode	Author	ExtractionI	UserName	ExtractionTime	ComputerN	Version
2	251239212424	glendad	US225027I	glendad	6/27/2006 15:50	GLENDAD	9.1.1.1
3	251239212425	glendad	US225027I	glendad	6/27/2006 16:44	GLENDAD	9.1.1.1
4	251239212426	glendad	US225027I	glendad	6/27/2006 15:50	GLENDAD	9.1.1.1
5	251239212427	glendad	US225027I	glendad	6/27/2006 15:50	GLENDAD	9.1.1.1
6	251239212428	glendad	US225027I	glendad	6/27/2006 16:23	GLENDAD	9.1.1.1
7	251239212429	glendad	US225027I	glendad	6/27/2006 16:24	GLENDAD	9.1.1.1
8	251239212430	glendad	US225027I	glendad	6/27/2006 16:43	GLENDAD	9.1.1.1
9	251239212431	glendad	US225027I	glendad	6/27/2006 15:50	GLENDAD	9.1.1.1
10							

Figure 6 Excel spreadsheet with BarCode column correctly formatted

8 Save the annotation file in tab-delimited-text (TDT) format.

9 If you are warned that the file contains features that are not compatible with Text (Tab delimited) format, click **Yes** to keep the format.

10 In the QC Chart tool, click **File > Import> Files > Annotated Extractions** or press **Ctrl-E**.

11 Browse to the previously saved TDT file and click **Open**.

To export a subset of records for annotation

A QC database may consist of extractions that have already been annotated, as described above. If new extractions are added, you can just export, edit and import a subset of those records.

1 Create a query to identify the subset of barcodes which have no annotation.

  See "To find blank annotations" on page 21.

2 Export the subset to Excel.

3 Continue in "To export all database records for annotations" on page 11 at step 2.

CAUTION The annotation file must contain only the BarCode and any user-added annotation. If it contains any of the Stats or FEParams columns, or if it fails to contain the BarCode, you will encounter an error.

If you have previously added annotation, use the exact same column names as you used before. For example, if "GreenSample" is used as a column name as shown in Table 1, then you need to type that same column name into your new annotation spreadsheet. The column names are case-sensitive. If you call the column "greensample" or "Green_Sample", the database will see this as a new column and your annotations will be spread over two different columns in the database, which makes queries difficult.

To minimize the chance of errors, open a previously saved TDT annotation file and copy the column names into your new annotation file.

To generate a new data set of barcodes to be annotated

Do this method of annotation if you only have a few barcodes to annotate.

1 Open a blank Excel worksheet.

2 Type in the BarCode numbers exactly as they appear in the QC database.

3 Continue at "To export all database records for annotations" on page 11 at step 5.

To add annotations to barcodes with multiple entries

When you rescan or re-extract an image with different protocols, you may have multiple extractions with the same barcode. If you enter these into the database, you will have multiple records with the same barcode. If you make an annotation file as described in "Associate Annotations" on page 11, the database will use the BarCode column as its primary key to connect annotations to database records. For this case, all records with the same barcode will have the same annotation. If you want to annotate what was different about those extractions, then follow these steps.

1 Create a query to identify the subset of barcodes which have no annotation.

   See "To find blank annotations" on page 21.

2 Click **File > Export Database** or press **Ctrl-A**.

   The default Export Repository file name is displayed. You can change the file name and path before you click **Save**.

3 Open the exported database in a spreadsheet program, such as Excel.

4 Delete all columns except ExtractionName.

5 Add your annotations.

6 Save the annotation file in tab-delimited-text (TDT) format.

7 If you are warned that the file contains features that are not compatible with Text (Tab delimited) format, click **Yes** to keep the format.

8 In the QC Chart tool, click **File > Import> Files > Annotated Extractions** or press **Ctrl-E**.

9 Browse to the saved TDT file and click **Open**.

The database now keys off of the extraction name instead of the barcode, so each multiple instance of extraction of that same barcode can have a different annotation.

Note that this process works only if the extraction names are unique. The names will be unique if different FEParam protocols are used. But if you have two records because of a rescan, you will need to change the extraction name. You do this in two ways:

- Before the extraction, change the name of image in the FE project window, *or*
- After the extraction, and before you import into the QC Chart database, change the extraction file name in Windows Explorer.

Queries

The QC Chart tool supports a Query Builder that allows you to select a subset of the extractions among the ones available in the QC Chart tool database.

A query is used to define a subset of extractions that define a representative data set for use in metric and threshold development. One example is a query that contains data only from similar biological samples processed under identical conditions. Another example is to query across different types of samples or across different processing methods. With the latter example, you could then use those different processing annotations to color-code a QC Chart. See "Color by" on page 37.

A subset of extractions may be defined in a query by specific FEParameter fields, or by user-added annotation fields.

To start the query builder

- Click **View > Extraction Query Builder** or press **Ctrl-Q**.

  You can also right-click in the Extractions pane and select **Add New**.

To do a basic query

1. In the **Column Name** drop-down list, select the parameter to set. (In Figure 7, the selected Column Name is ColorMode.)
2. In the **Operator** drop-down list, select the appropriate operator.
3. In the right-most text box, select the value with which to compare the value of the **Column Name** parameter.
4. Click **Add**.
5. Click **Verify** to check that the query is valid.

   If the query is valid the Show Results and Save button is enabled.
6. Click **Show Results** to display the results for the current query. You can save the query with any user-defined name.

   See Figure 7.

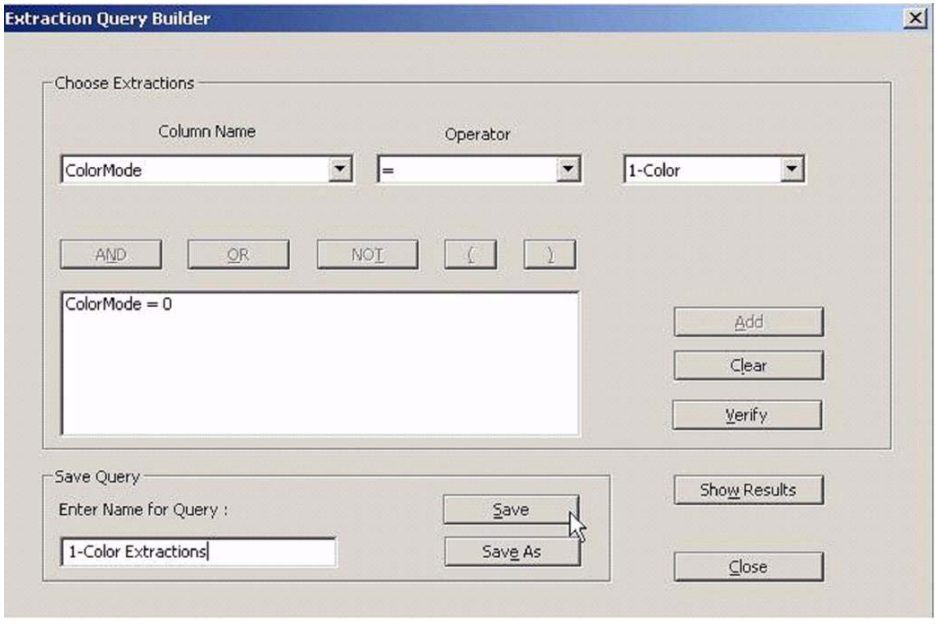


Figure 7 Extraction Query Builder with showing basic query

To do a composite query

1 Create a basic query. See "To do a basic query" on page 18.

2 Click **AND** or **OR**.

Use AND to find extractions that meet all criteria. Use OR to find extractions that meet at least one criterion.

3 Create the next basic query.

4 To group composite queries, click a query, then click **"("** or **")"**. Repeat for the query at the other end of the group.

5 Click **Verify** to check that the query is valid.

If the query is valid the Show Results and Save button is enabled.

6 Click **Show Results** to display the results for the current query. You can save the query with any user-defined name.

Figure 8 shows an example of a query that will find all 2-color gene expression extractions.

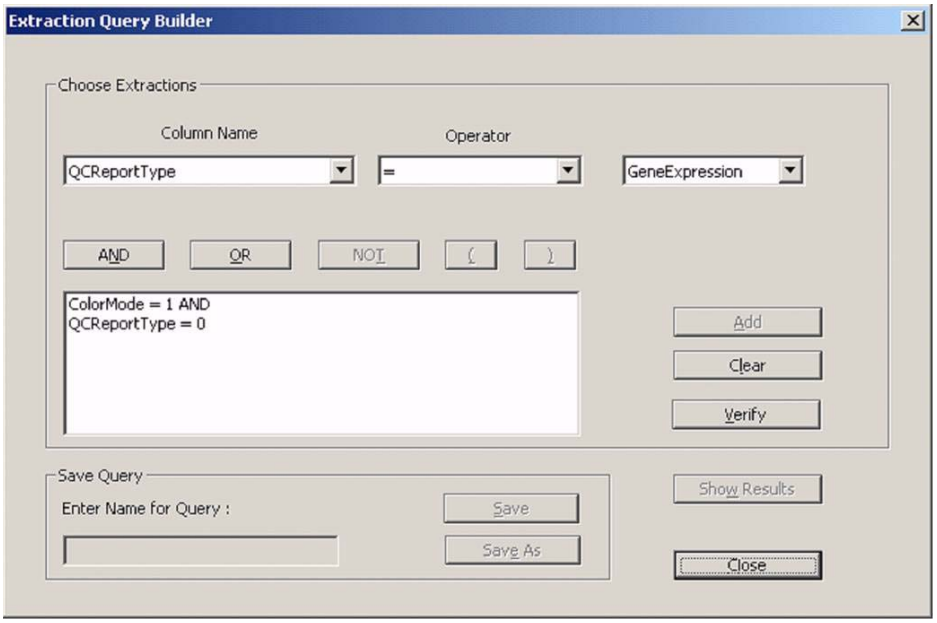


Figure 8 Extraction Query Builder showing a composite query

To save a query

1 After you create the query, click **Show Results** to see the resulting extractions.

2 In the **Enter Name for Query** text box, type the name that you want to use to save the query.

3 Click **Save**.

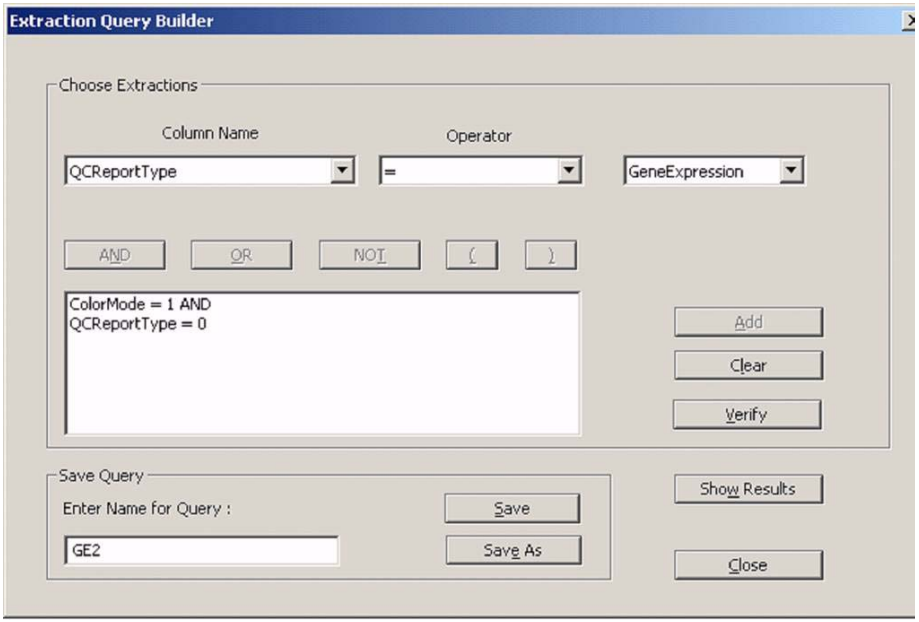


Figure 9 Extraction Query Builder showing a query name

To find blank annotations

This step is useful to identify extractions that need annotation.

1 In the **Column Name** list, select a column to search. This column should be a user-added annotation field.

2 In the **Operator** list, select **IS NULL**.

3 Click **Verify**.

4 Click **Show Results**.

The results of the query shown in Figure 10 is displayed in Figure 11 on page 22. All records with no Project annotations are displayed.

Once the results are displayed, these results can be exported by right-clicking the name of the query and choosing **Export results to file**. The exported file can then be opened and annotated as described in "To export a subset of records for annotation" on page 15.

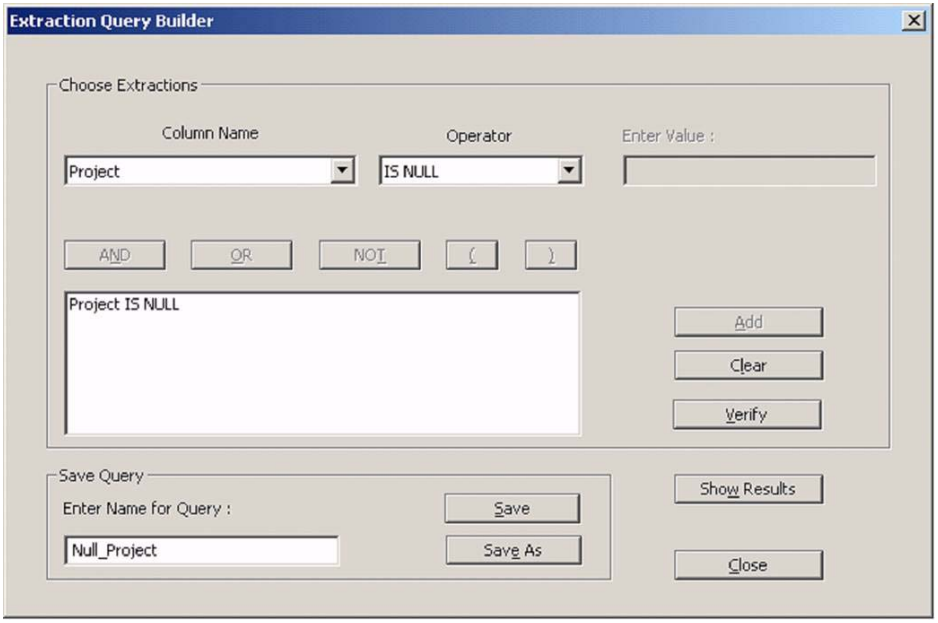


Figure 10 Extraction Query Builder to search for blank annotations

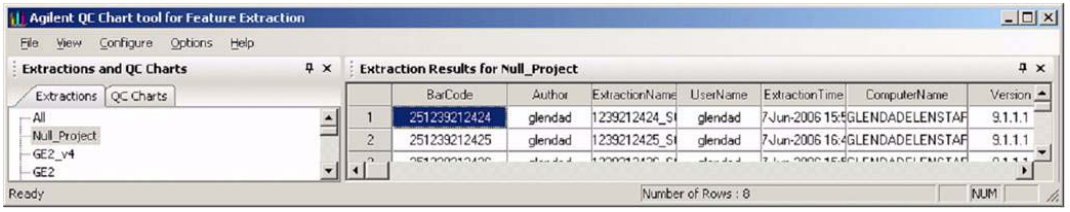


Figure 11 Results of query in which Project has no annotation.

Defining Metric Sets and Thresholds

Metrics are defined in order for you to track desired statistical values across a set of extractions. These metrics can be associated in a metric set. In addition, you can use this tool to specify thresholds for each of the metrics.

This Configure Metrics and Thresholds dialog box is used to define metrics, metric sets and thresholds.

To open the Configure Metrics and Thresholds dialog box

- Click **Configure > Metrics**, or press **Ctrl-M**.

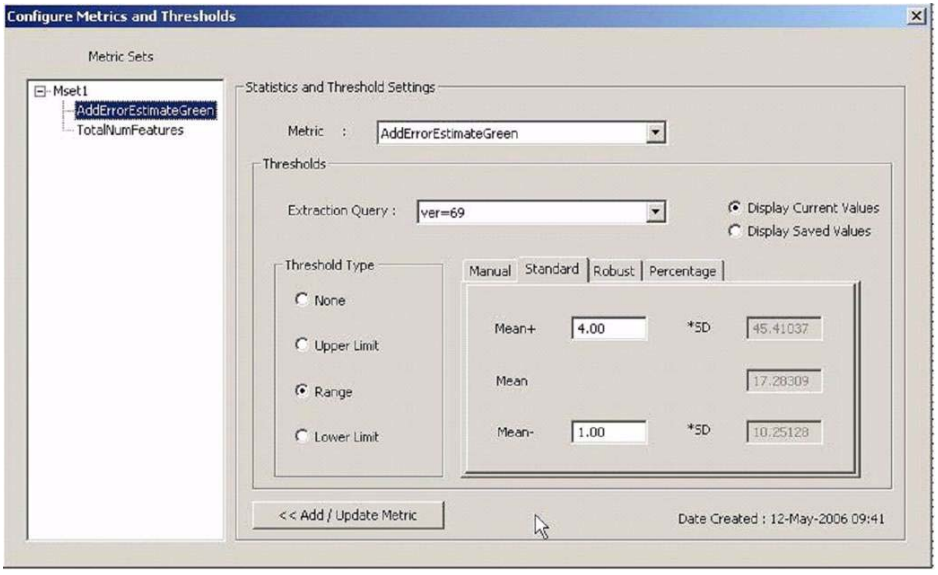


Figure 12 Configure Metrics and Thresholds dialog box

To define metric sets

A metric set is a collection of one or more metrics and an associated query common to all the metrics.

1 Right-click on the white space below the **Metrics Set** label.

2 Choose **Add Set**.

A new pop-up appears asking the metric-set name.

3 Select any suitable alphanumeric name.

4 Click **OK**.

To define metrics

1 In the Configure Metrics and Thresholds dialog box, from the **Metric** drop-down list, select **Add New**.

The Add Metric dialog box is displayed. The Choose Metric Column drop down list shows all available metrics from the FE Stats table.

2 Select a metric from the **Choose Metric Column** list, or define a new metric as an expression.

Use the operator buttons and type numbers in the **Numerical Constant** text field to create a formula.

3 Click **Validate**.

4 In the **Metric Name** text box, type a name to save the new metric.

5 Click **Save**.

The new metric now appears in the **Metric** list of the Configure Metrics and Thresholds dialog box.

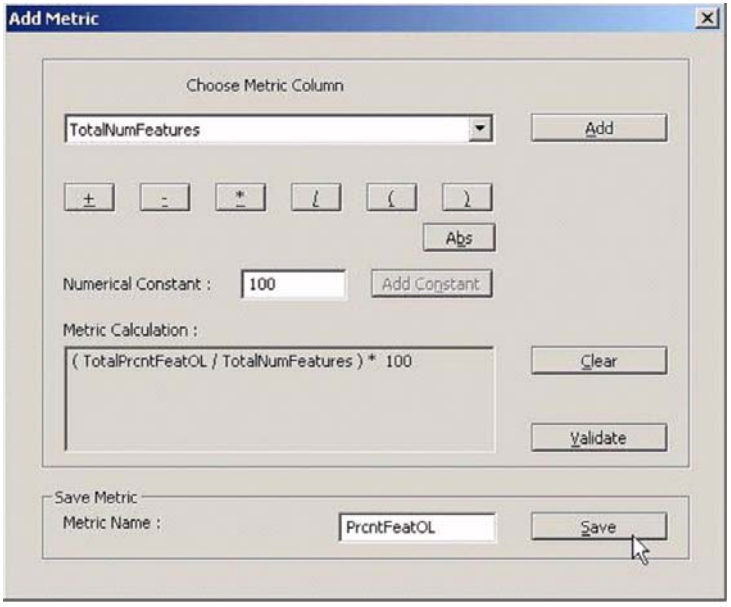


Figure 13 Add Metric dialog box

Example

Feature Extraction calculates a slope for the eQC spike-ins (observed versus expected Log Ratio). Depending upon the hybridization, this spike-in mixture may be present as "+1" or "-1" polarity. If it is "-1", then any threshold that is set (e.g. Slope > 0.85), will not pass. Thus you need to make a derivative metric by taking the absolute of the slope.

To do this:

1 Click **Abs**. The term `Abs(` appears in the Metric Calculation box.

2 From the Choose Metric Column list, select the statistic **QCObsVsExpLRSlope**, click **Add**, then select **")"** to finish the expression

3 Validate and save the metric as `Abs_eQCSlope`.

The new metric now appears in the **Metric** list of the Configure Metrics and Thresholds dialog box, as shown in Figure 14.

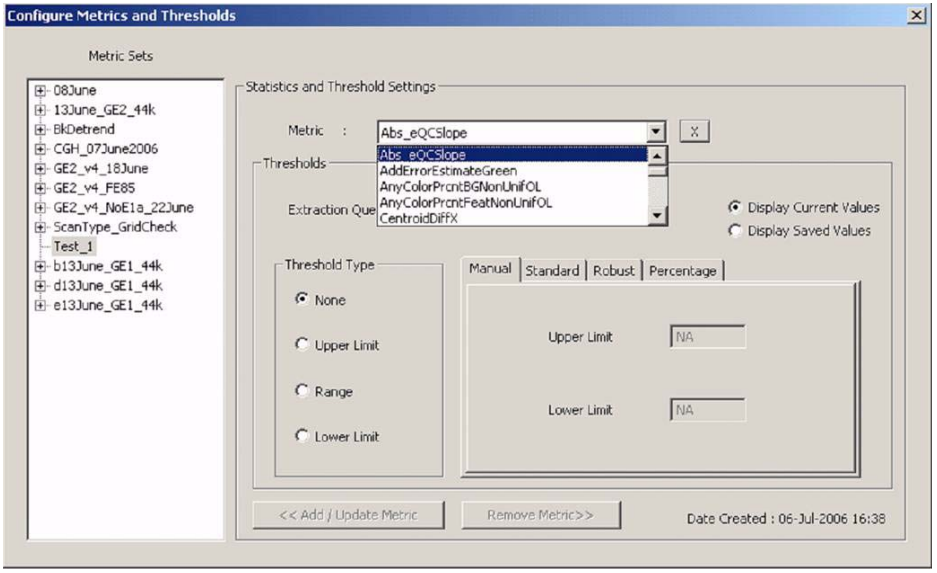


Figure 14 Configure Metrics and Thresholds dialog box, with new Metrics listed

To associate a metric with a metric set

1 Select a metric set from the **Metric Sets** navigation pane.

2 Select the metric from the **Metric** pull-down list to be associated with the selected metric set. In Figure 15, **Test_1** is selected as the metric set.

3 Assign an Extraction Query to the metric set.

This query will filter for the appropriate extractions from your database, so that just the data from the queried extractions will be used in calculation of various statistical summary values that may be used in setting thresholds, described in "To set thresholds" on page 29. Figure 15 shows GE2 selected as the Extraction Query. The metric set will be used with two-color Gene Expression extractions.

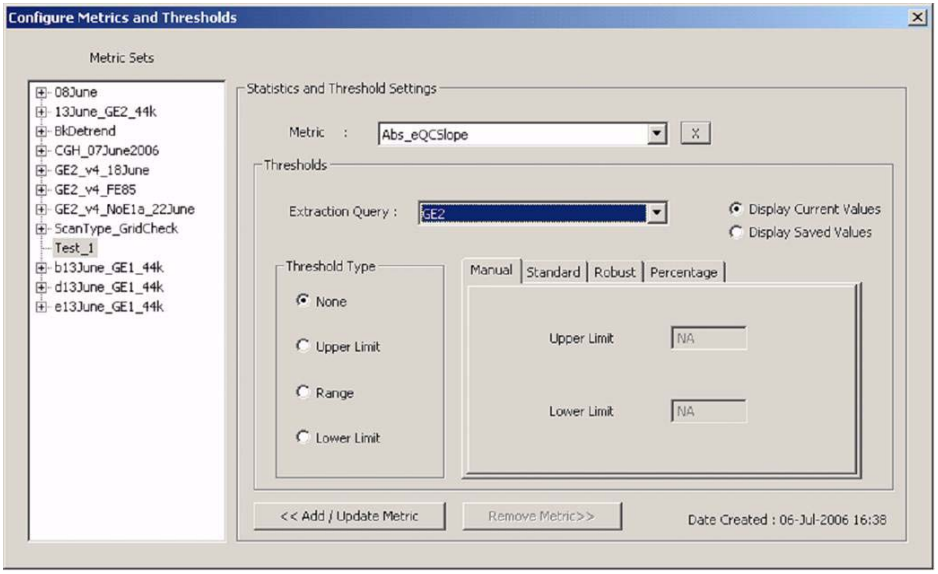


Figure 15 2-color gene extraction selected to be used with the metric set

4 Click **<< Add/Update Metric**.

Figure 16 shows the metric Abs_eQCSlope displayed when Test_1 is expanded in the Metric Sets pane.

To assign additional metrics to the metric set, select a different metric from the **Metric** pull-down list, then click **<<Add/Update Metric**.

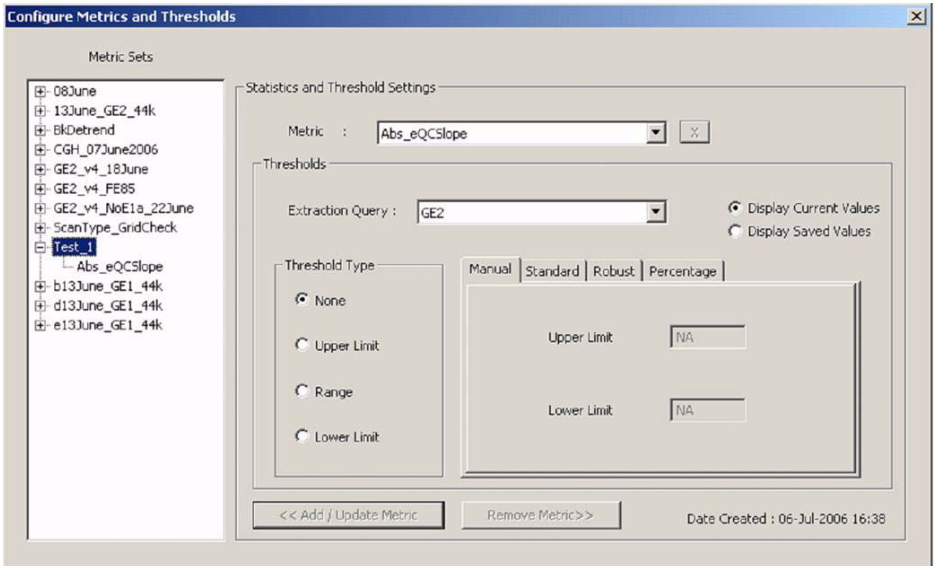


Figure 16 Expanded metric set that shows added metric

To set thresholds

If you want to associate a threshold with a given metric, you can do this at the same time that the metric is associated with a metric set, or you can be it after the association.

1 In the Metric Sets pane, select the metric associated with a metric set.

2 Select the threshold to be associated with the metric:

- None
- Upper Limit
- Range
- Lower Limit

3 Click the tab for the calculation type that you want to use to set the threshold:

- Manual Limits
- Standard Limits
- Robust Limits
- Percentile Limits.

The relevant calculations and their limits are displayed.

4 Edit the limits as appropriate. The text boxes accept floating point constants.

5 In the Configure Metrics and Thresholds dialog box, click << **Add/Update Metric** to add the chosen metric along with its limits to the selected metric-set.

If the metric is already present then it will be updated with the new limits.

Examples

In Figure 17, the metric Abs_eQCSlope is already associated with the metric set Test_1. The threshold type for the slope is set to Lower Limit, and the value for that limit is set to 0.85 using the “Manual” calculation type. The threshold value will not be calculated from the extractions defined in the extraction query, because it was set manually, not dynamically, from the data. Extractions that have an absolute slope lower than 0.85 will be flagged.

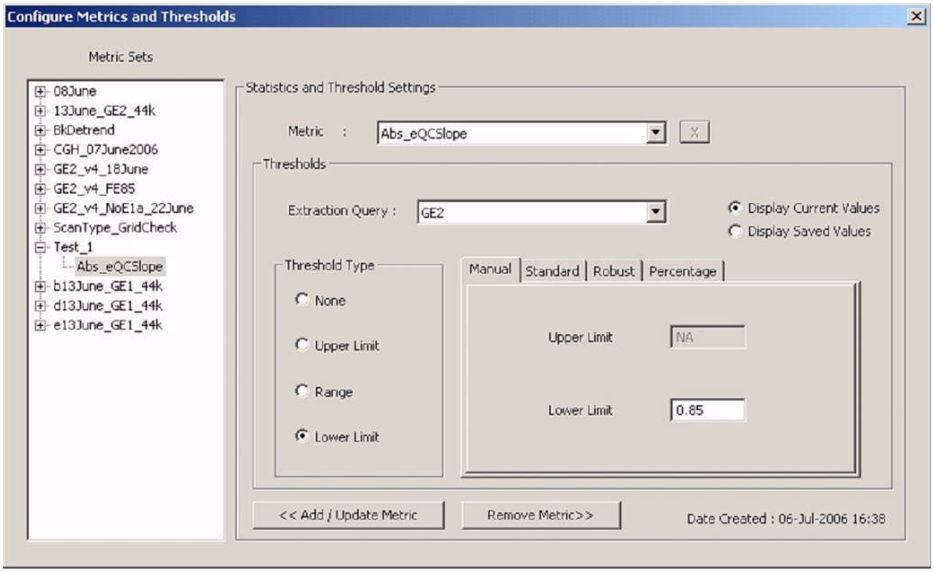


Figure 17 Threshold set manually for lower limit of 0.85

To flag extractions with a high SD of Negative Control BkSubtractedSignals, select the metric NegCtrlSDevBGSubSig, select Threshold Type to Upper Limit, select Standard type of calculation with a constant of 3 (multiplier of SD). The statistics of the gNegCtrlSDevBGSubSig values of all extractions that are in the GE2 extraction query set are calculated. For this example, calculations include the mean and the standard deviation. An upper limit is then set as mean + 3*SD, which is shown to be 18.79 in Figure 18. Because this value is dynamically calculated with Standard type of statistics, not manually set, the value is grayed out and cannot be edited.

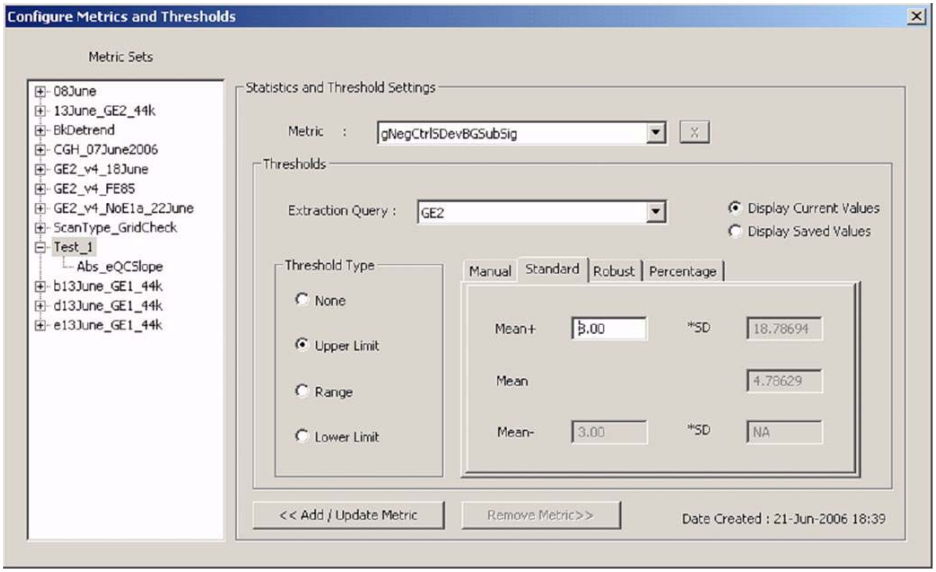


Figure 18 Threshold set for upper limit

If you select the **Robust** type of calculation, then the median and IQR (inter-quartile range) is calculated. Using the IQR, the robust equivalent of SD is also calculated.

If you select **Percentage** type of calculation, then the percentiles that you choose are calculated for an upper limit (e.g. 99%), lower limit (e.g. 1%), or range (e.g. 99%, 1%).

To set the values to be displayed

If you have imported more extractions after the metric has been created, you can determine how values are displayed.

- In the Configure Metrics and Thresholds dialog box:
  - Click **Display Current Values** to display the limits that were saved with the latest data, which may differ from the previously saved limits.
  - Click **Display Saved Values** to display the old threshold limits.

To export metric sets

The created metric sets can be exported to an XML file and re-imported in the QC Chart tool as well as Feature Extraction.

1. Right-click a metric set in the **Metric Sets** pane.
2. Select **Export Metric Sets...**.

To import metric sets

You can import metric sets that have been exported as an XML file, or that have been downloaded to your computer from the Agilent Web site at http://www.agilent.com/chem/feqcmetrics.

1. Right-click anywhere in the **Metric Sets** pane.
2. Select **Import Metric Set...**.
3. Browse to the appropriate metric set and click **Save**.
4. If you are warned that you may be overwriting Threshold settings for the matching metrics, click **Yes**.

You can copy and modify metric sets. You can associate a copied metric set with a different extraction query than the parent metric set. See "To copy a metric set" on page 34.

You can also modify metric sets, for example, add or remove thresholds, or modify thresholds.

To set the mandatory and in-range evaluation status for metrics

1 Right-click a metric set in the **Metric Sets** pane in the Configure Metrics and Thresholds dialog.

2 Select **View Thresholds...** The Metric Set dialog box is displayed.

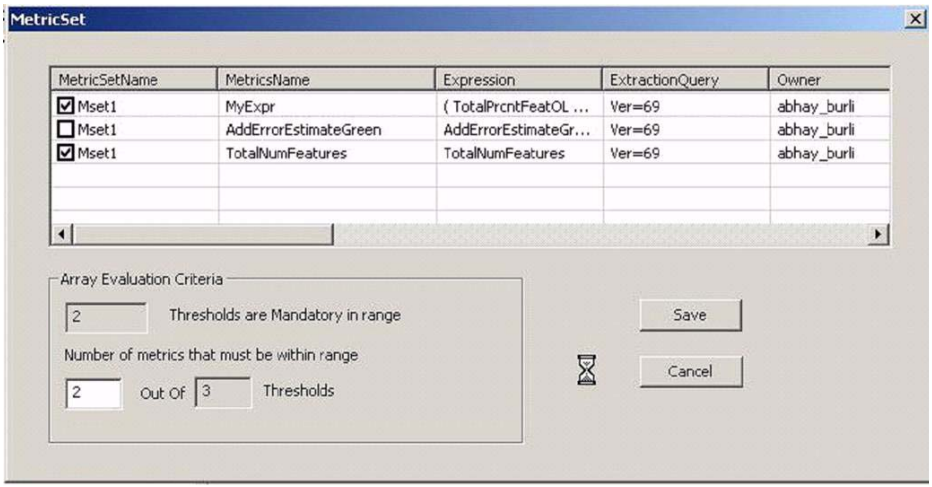


Figure 19 MetricSet dialog box showing two mandatory metrics

3 To define an extraction evaluation, mark the check boxes for the metrics that are mandatory. For an extraction to “pass” a metric set with any “mandatory” type of metrics, each of the mandatory metrics must be in the threshold range.

4 Type the total for the **Number of metrics that must be within range**.

5 Click **Save** to save the settings.

Figure 19 indicates that two metrics are mandatory to be in-range. The third metric is not required to be in range. You can also specify how many metrics must be in range, and which metrics, if any, are mandatory.

To remove a metric set

1 In the **Metric Sets** pane of the Configure Metrics and Thresholds dialog box, right-click the metric set that you want to remove.

2 Select **Remove Set**.

If the metric set is associated with any chart then it will still remain in the system.

To copy a metric set

1 In the Metric Sets pane of the Configure Metrics and Thresholds dialog box, right-click the metric set that you want to copy.

2 Select **Duplicate Set**.

Metric sets require that a query that is common to all the metrics within the set to be assigned with the metrics. But if you need to create metrics without associating a query, you can copy the metric set using (none) as the query. You can then associate a query later. See Figure 20.

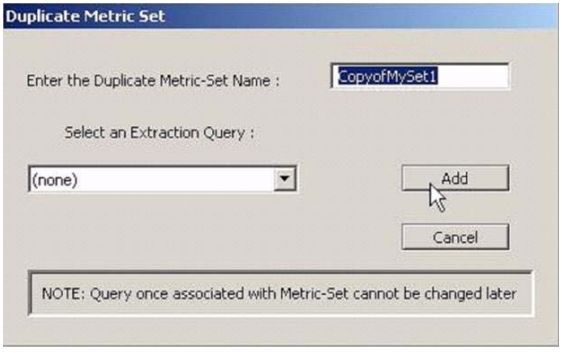


Figure 20 Creating a copy of a metric set with no query associated

To remove a metric from a metric set

1 In the Configure Metrics and Thresholds dialog box, in the **Metric Sets** pane, select a metric from within a metric set.

2 Click **Remove Metric >>**.

To remove a metric globally

1 From the Configure Metrics and Thresholds dialog box, select the metric from the **Metrics** pull-down list.

2 Click the **X** button next to the name of the metric. The metric will be removed from the database.

3 If you are prompted to confirm that you want to delete the metric, click **Yes**.

If the X button is gray, the metric is associated with one or more metric sets. You need to remove the metric from all metric sets with which it is associated before you can remove the metric globally.

Defining a QC Chart

A chart can be drawn on a metric set for a chosen query. The QC chart can be defined in the QC Chart dialog box.

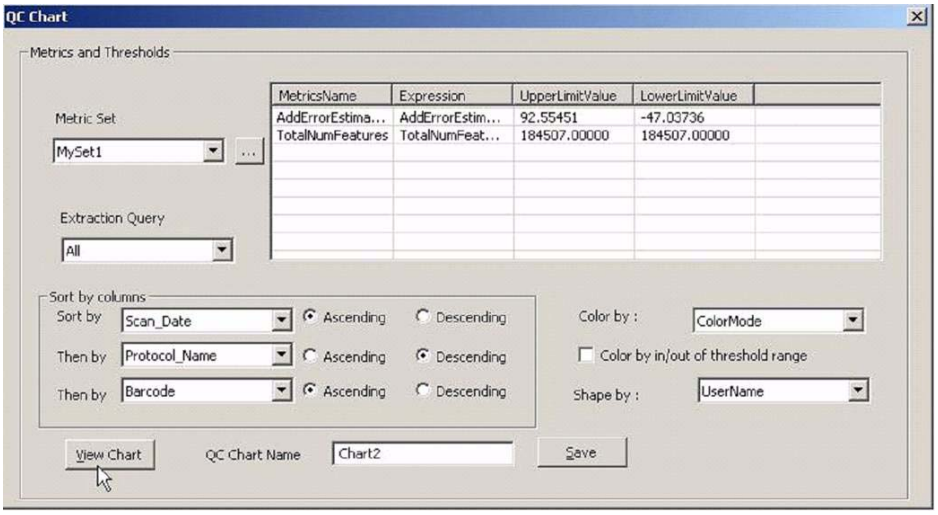


Figure 21 QC Chart dialog box

To create a new QC Chart

1 Click **Configure > QC Chart...** to open the QC Chart dialog box.

You can also press **Ctrl-W**, or right-click on a chart name in the QC Chart tab and select **Add New** from the shortcut menu.

2 Configure the dialog box according to your needs.

The dialog box components are described below.

Metric Set Select the metric set to be used with the QC chart.

Extraction Query Select the extraction query that is to be evaluated to produce a chart.

Sort by Columns Select how you want to order the extractions in the chart.

Color by Indicates how the points on the chart are to be color-coded. For example, selecting ColorMode creates a chart where all the points that are 1-color are one color and points that are 2-color are another color. This list is disabled if the **Color by in/out of threshold range** check box is marked.

Color by In/Out of Range of threshold range Indicates whether to color-code extraction data points depending on whether they fall inside or outside the threshold level. Points that are outside the limits will be color-coded in red and the ones within the limits will be color-coded in blue. All the points are connected by a *light-gray* line. The ShapeBy and ColorBy columns are disabled if this check box is marked.

ShapeBy Indicates what groups are used to differentiate the data points by shape. For example, selecting Username causes all the extractions that are from a particular user to have the same shape.

To view the QC chart

1 In the QC Chart tab, right-click a chart name that you want to view, then select **Show Chart Configuration**.

The QC Chart dialog box appears.

2 Select **View Chart**. The QC Chart View for MetricSet ("QC Chart") appears

You can also double-click the name of the QC Chart that you want to view.

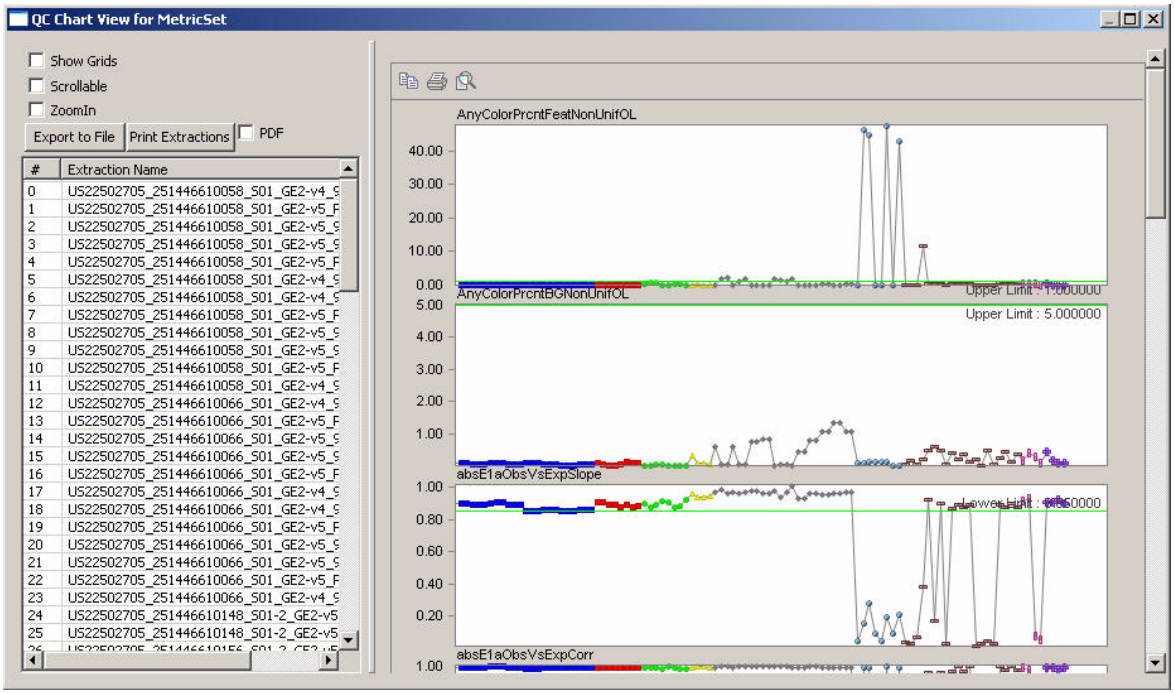


Figure 22 QC Chart View for MetricSet

The controls on this dialog box are described below.

Check boxes and buttons over the left Extraction Name Pane

Show Grids Places a grid over the plot.

Scrollable Makes the X-axis scrollable if the number of data points do not fit within the screen area.

ZoomIn Activates the zoom function. When the zoom function is active, the Zoom button above the QC chart appears active (not gray). You can then drag and release the mouse to define the area to zoom. Double-click anywhere in the chart to return to normal view.

Use this check box if the Zoom button above the QC chart has scrolled past the visible area of the pane. If Zoom icon is inactive, mark the check box to activate it. If the Zoom icon is active, clear the check box to inactivate the zoom function. If the Zoom icon is inactive, and the check box is already marked, clear the check box first and then mark the check box again to active the zoom function.

Export to File Copies the following columns to a TDT file:

- Ordinal
- Number
- ExtractionName
- InRange
- MetricName
- Ismandatory
- Limits

The columns MetricName, Ismandatory and Limits are repeated as many times as the number of metrics in the metric-sets. A sample output is show in the Figure 23.

	A	B	C	D	E	F	G	H	I	J	K
1	Ordinal No	EName	InRange	AddErrorEstimateGreen	IsMandatory	Upper	Lower	TotalNumFl	IsMandatory	Upper	Lower
2	0	Human_22K_expression-2_GE2-v	1	71.0087	0	92.55451	-47.0374	22153	0	184507	184507
3	1	Human_22K_expression_GE2-v4	1	71.0087	0	92.55451	-47.0374	22153	0	184507	184507
4	2	US22502705_251406810133_S01	1	6.41339	0	92.55451	-47.0374	184507	0	184507	184507
5	3	US22502705_251406810134_S01	1	13.6281	0	92.55451	-47.0374	184507	0	184507	184507
6	4	US22502705_251406810132_S01	1	8.70752	0	92.55451	-47.0374	184507	0	184507	184507
7	5	US22502705_251406812276_S01	1	9.92479	0	92.55451	-47.0374	184507	0	184507	184507
8	6	US22502705_251406812275_S01	1	8.56611	0	92.55451	-47.0374	184507	0	184507	184507
9	7	US22502705_251406812276_S02	1	11.6894	0	92.55451	-47.0374	184507	0	184507	184507
10	8	US22502705_251406812275_S02	1	9.66922	0	92.55451	-47.0374	184507	0	184507	184507
11	9	US22502705_251406810580_S01	1	20.2103	0	92.55451	-47.0374	184507	0	184507	184507
12	10	US22502705_251406810582_S01	1	16.3309	0	92.55451	-47.0374	184507	0	184507	184507
13	11	US22502705_251406810579_S01	1	70.1822	0	92.55451	-47.0374	184507	0	184507	184507
14	12	US22502705_251406810581_S01	1	22.7981	0	92.55451	-47.0374	184507	0	184507	184507
15	13	US22502705_251406810579_S02	1	12.3675	0	92.55451	-47.0374	184507	0	184507	184507
16	14	US22502705_251406810581_S02	1	9.10904	0	92.55451	-47.0374	184507	0	184507	184507
17	15	US22502705_251406810580_S02	1	12.5281	0	92.55451	-47.0374	184507	0	184507	184507
18	16	US22502705_251406810582_S02	1	12.5547	0	92.55451	-47.0374	184507	0	184507	184507

Figure 23 TDT output

Print Extractions Prints the table that is displayed in the left pane, including the X-axis numbers and the extraction names. If the PDF check box is marked, the entire QC Chart is saved as a PDF file. To print the plots, click the Printer button above the QC chart.

PDF When marked, saves both the plots and the extraction table to a PDF file when Print Extraction is clicked.

Icons over the chart

Copy as Bitmap Copies the chart to the clipboard as a bitmap which can be pasted in MS Word and MS Paint, or in any other appropriate software.

Printer Prints all plots to the printer.

Zoom Indicates whether the zoom function is active. When active (not gray), you can zoom in on a chart by using the mouse to drag and release on the area to zoom. When the button is gray, click the button to activate the zoom function. Click the active button to disable the function. Double-click the chart to return to normal view.

Managing Databases

To export data

You may want to export some or all of the data in your database so that you can use the TDT file in Excel, or to use for 3rd party graphing or statistical packages, or to send to customer support.

- If you want to export just a subset:
  - **a** Create a query to identify the data that you want to export.
  - **b** Right-click on that extraction query in the Extractions tab and select **Export Results to File...**.
- If you want to export your entire database, then click **File > Export Database** or press **Ctrl-A**.

To reset the database

- Click **Options > Reset Database**, or press **Ctrl-T**.

Running this command clears all the data in the QC Chart tool database.

To remove a database

- Click **Options > Remove Database**.
- This command deletes the QC Chart database totally. If you want to re-use the tool, you have to configure the database as described in "Step 4. Configure the QC Chart Tool Database" in the *QC Chart Tools v1.3 Installation and Configuration Guide*.

2 Backup and Restore

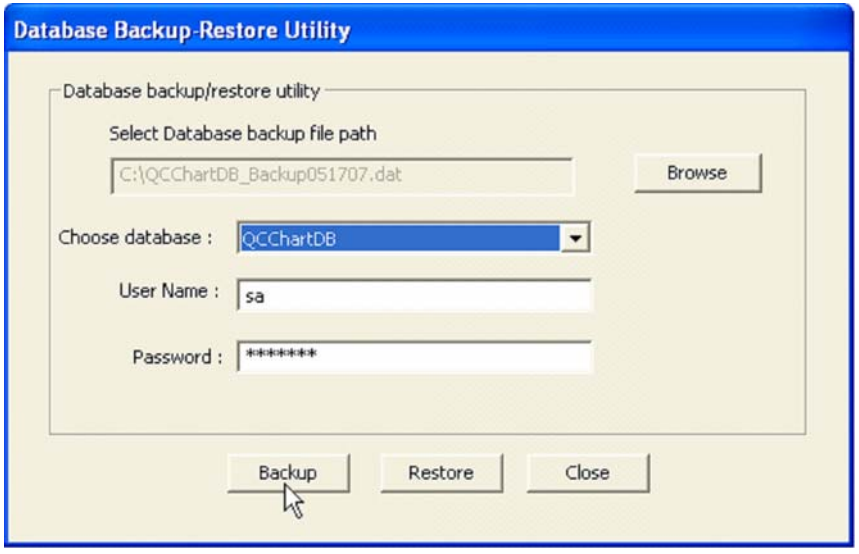
This chapter describes the steps that are needed to backup and restore the QC Chart Tool Database.

To back up QC Chart Tool Database

Back up your database frequently in case you need to restore lost data.

If you previously installed QC Chart Tool v1.3 and Feature Extraction v9.5.3, you must back up the QC Chart Tool Database (QCChartDB) before you upgrade to Feature Extraction v10.5 or v10.7. Feature Extraction v10.5 and v10.7 have a different database schema than FE v9.5.3. If you do not back up the QCChartDB before you install Feature Extraction v10.5 or v10.7, all data will be lost.

1. Close all windows of QC Chart Tool.
2. Click **Start > All Programs > Agilent > Feature Extraction > Tools > Backup Restore Utility**.
3. In the Data Backup-Restore Utility window, click **Browse** to choose a local directory and type a name for the backup file. For example, you can use a file name such as `QCChartDB_Backup`*MMDDYY*.
4. Click the **Choose database** pull down menu and select **QCChartDB**.
5. Click **Backup** to save the backup file.



To restore the QC Chart Tool Database

Do this step if you backed up your database before you upgraded Feature Extraction v10.5 or v10.7.

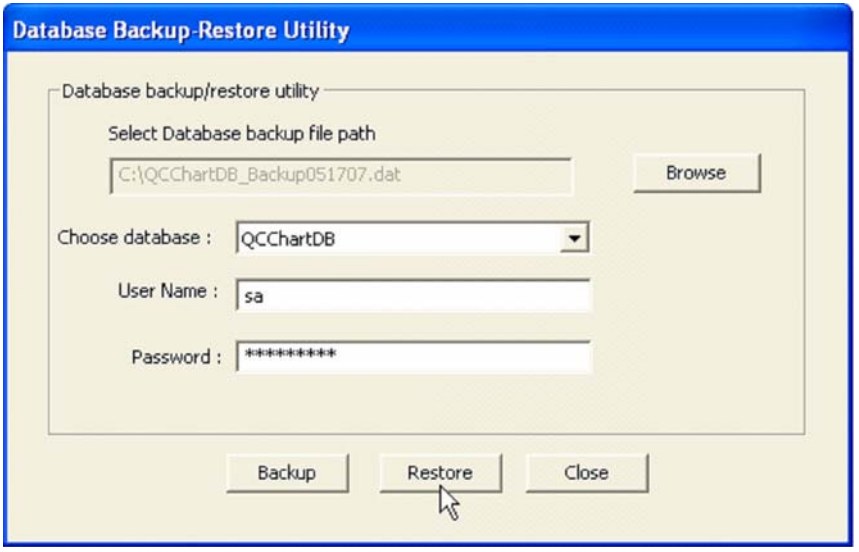
1 Close all windows of QC Chart Tool.

2 Click **Start > All Programs > Agilent > Feature Extraction > Tools > Backup Restore Utility**.

3 In the Data Backup-Restore Utility window, click **Browse** to select the backup file that you saved prior to installing Feature Extraction 9.5.3 or later.

4 Click the **Choose database** pull down menu and select **QCChartDB**.

5 Click **Restore** to restore the data saved from previous database.



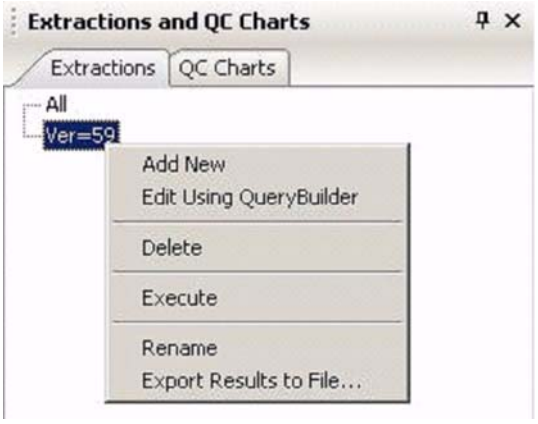
3 Extraction and Queries Pane and Extraction Results Pane

This chapter describes the two tabs found in the Extraction and QC Charts Pane as well as the Extraction Results Pane.

Extraction and QC Charts Pane - Extractions Tab

This pane supports the operations as shown by the figure below.

To open the shortcut menu, right click the name of an extraction in the Extractions tab.



Add New Opens the query builder, similar to clicking **View > Extraction Query Builder** or pressing **Ctrl + Q**.

Edit Using QueryBuilder Allows you to modify an already created query. The query builder is opened with the previously saved query pre-populated.

Delete Deletes the highlighted query from the QC Chart database.

Execute Executes the query and displays the results in the grid-view on the right. You can also double-click the query to execute the query.

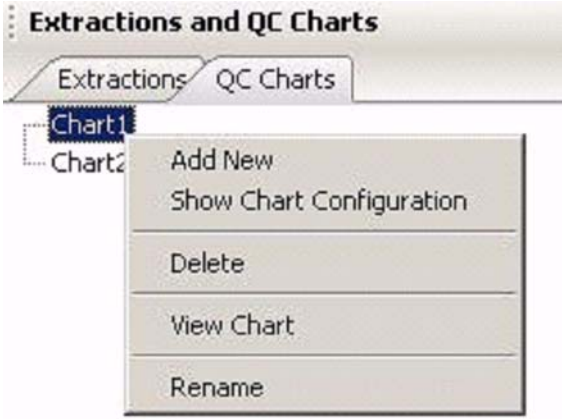
Rename Allows you to rename the query.

Export Results to File... Exports the query results to a TDT file.

Extraction and QC Charts Pane - QC Charts Tab

This pane supports the operations as shown in the figure below.

To open the shortcut menu, right click the name of a chart in the QC Charts tab.



Add New Opens the QC Chart dialog box, which is same a clicking **Configuring > QC Charts** or pressing **Ctrl-W**.

Show Chart Configuration Opens the same dialog as of above but will have the saved configurations reflected in the dialog. This option is useful if you want to make minor changes to the existing configurations and save it with a different name.

Delete Removes the saved chart along with its configuration. The metric sets and queries associated however remain in the QC Chart database.

View Chart Opens the **QC Chart View for MetricSet** dialog box.

Rename Renames the chart.

Extraction Results Pane

The extractions loaded into the QC Chart tool database are displayed in the form of a grid-view. See the figure below:

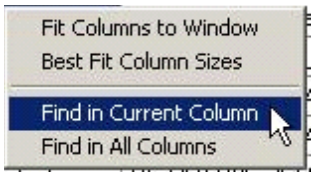
Extraction Results for Version59Query

	BarCode	Author	ExtractionName	UserName	ExtractionTime
1	251209710036	abhay_burli	Human_22K_expression-2_GE2-v4_91	abhay_burli	09-Jun-2006 11:43
2	251209710036	abhay_burli	Human_22K_expression_GE2-v4_91	abhay_burli	09-Jun-2006 11:43
7	251406810579	abhay_burli	US22502705_251406810579_S02_CGH-v4_91	manoj_choudhari	10-Jun-2006 07:44
8	251406810580	abhay_burli	US22502705_251406810580_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 07:51
9	251406810580	abhay_burli	US22502705_251406810580_S02_CGH-v4_91	manoj_choudhari	10-Jun-2006 07:59
10	251406810581	abhay_burli	US22502705_251406810581_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:06
11	251406810581	abhay_burli	US22502705_251406810581_S02_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:13
12	251406810582	abhay_burli	US22502705_251406810582_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:20
13	251406810582	abhay_burli	US22502705_251406810582_S02_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:27
14	251406812275	abhay_burli	US22502705_251406812275_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:34
15	251406812275	abhay_burli	US22502705_251406812275_S02_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:42
16	251406812276	abhay_burli	US22502705_251406812276_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:49
17	251406812276	abhay_burli	US22502705_251406812276_S02_CGH-v4_91	manoj_choudhari	10-Jun-2006 08:56
3	251406810132	abhay_burli	US22502705_251406810132_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 11:27
4	251406810133	abhay_burli	US22502705_251406810133_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 11:34
5	251406810134	abhay_burli	US22502705_251406810134_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 11:42
6	251406810579	abhay_burli	US22502705_251406810579_S01_CGH-v4_91	manoj_choudhari	10-Jun-2006 11:49

The column-headers appear in this order:

- Barcode
- User Added Annotations
- FE text Params
- FE text Stats

Right-click in the grid to see this menu:



Fit Column to Window Makes the current column the size of the window. But it doesn't scroll the column so that it is the only one visible in the screen. This option is used to resize the column to the size of the results pane.

Best Fit Column Sizes Does a best-fit for all the columns given the pane size.

Find in Current Column Finds the text in the current column and highlights the found item. To consecutively find the next matching item this operation has to be repeated.

Find in All Columns Finds the text in the all the columns and highlights the found item. To consecutively find the next matching item this operation has to be repeated.

4 Reference

This chapter contains reference information for using QC Chart Tool.

Overview

The QC Chart tool is a desktop application that accumulates, aggregates and analyzes summary statistics from Feature Extraction output files and optional annotation files for the purpose of monitoring microarray processing performance. The data is housed in a relational database from which queries can be generated and saved to subset the data into user-defined logical groupings such as by experiment, by batch, or by date of processing. Using the data, metrics can be generated that monitor aspects of the microarray processing workflow. Metric sets can be formed that combine metrics that monitor different aspects of microarray processing. With metric sets, you can plot graphically the results from historical data and generate thresholds for the metrics that are appropriate for your experimental conditions and processing environment. The metric sets and thresholds can be used in the QC Chart tool on a regular basis to monitor processing performance. They can also be imported to Feature Extraction software to monitor each array and batch as it is processed.

The QC Chart Tool is meant to be used in a production environment where:

- Microarray processing protocols are standardized
- Monitoring run-to-run consistency is an important goal

The QC Chart Tool is provided as an optional accessory to Feature Extraction (FE). The software must be installed on a computer with a compatible version of FE already functionally installed. QC Chart Tool uses the FE license and does not require a separate license to operate. Agilent provides the software “AS IS” and any express or implied warranties, including, but not limited to any implied warranties of merchantability, satisfactory quality, reasonable care and skill, and fitness for a particular purpose are expressly disclaimed.

For the most recent information on the QC Chart Tool, please go to the Web site: http://www.agilent.com/chem/feqcmetrics

This web site will contain updates to the software and this manual as well as example metric sets as they become available.

Objective

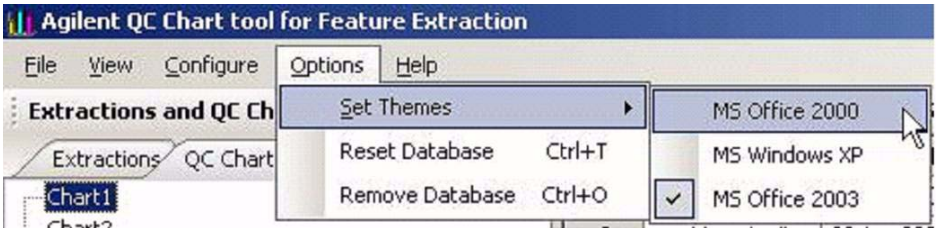
Feature Extraction software can run a batch of arrays to generate a batch summary and a quality control report (QC Report) for each microarray. To ensure the quality of the array, you should check the QC report of each array. QC Chart Tool is used to get a summary of quality of multiple extractions. This tool lets you define quality metrics, apply those metric criteria to extraction data, and verify quality metrics through QC Charts.

This tool has the following features:

- Ability to have all extractions in a central database.
- Ability to share central database.
- Ability to annotate extractions with custom annotation.
- Ability to filter extractions by defining queries.
- Defines metrics to monitor quality.
- Defines thresholds for metrics to check performance/quality of extraction.
- Defines metric sets as a set of metrics (with or without thresholds).
- Defines a Quality chart (“QC Chart”) by defining query filters, metric set, and chart formatting on extraction set.
- Exports QC Chart data for further use.
- Exports metric set for use in Feature Extraction.

Application Themes

The QC Chart tool can sport three desktop application themes as shown in the figure below. You can check the desired theme for look and feel.

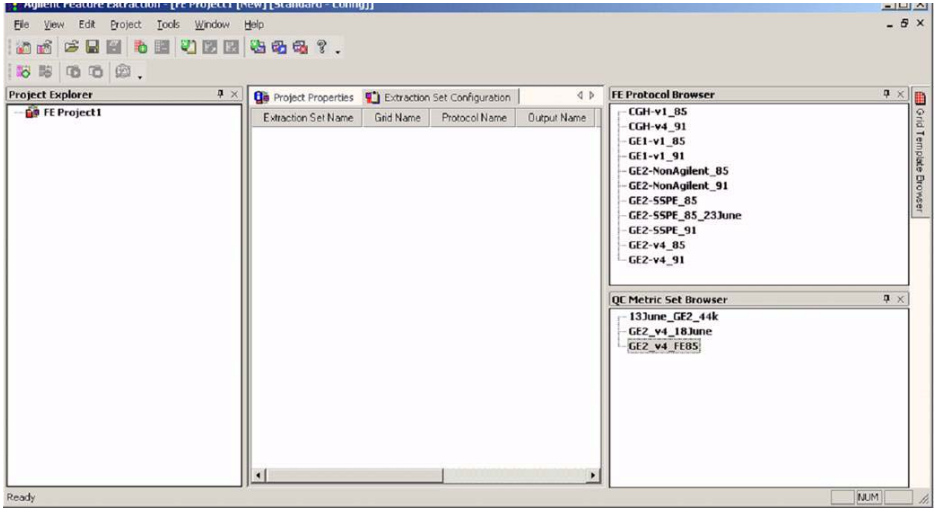


Use of Metric sets in Feature Extraction

Metric sets can be associated with Feature Extraction projects to give information to you for each extraction:

- QC Chart showing value of each metric for each extraction
- whether metrics are within range (if thresholds are set)
- whether extraction is within range (if evaluation metric has been set)

You can export a metric set so that it can used by Feature Extraction. In the Feature Extraction UI, locate the QC Metric Set Browser pane. If it is not visible, click **View > QC Metric Set Browser**. Right- click in the pane and select **Import** and browse to the desired metric set. After import, double- click on the metric set to see the metrics, any thresholds and any mandatory metrics that are defined by this metric set.



Once a metric set has been imported into Feature Extraction, it is available to be associated with any Feature Extraction project. To associate a metric set with a project, choose the desired metric set from the drop down box **QC Metric Set** in the **Other** section of the Feature Extraction Project Properties tab.

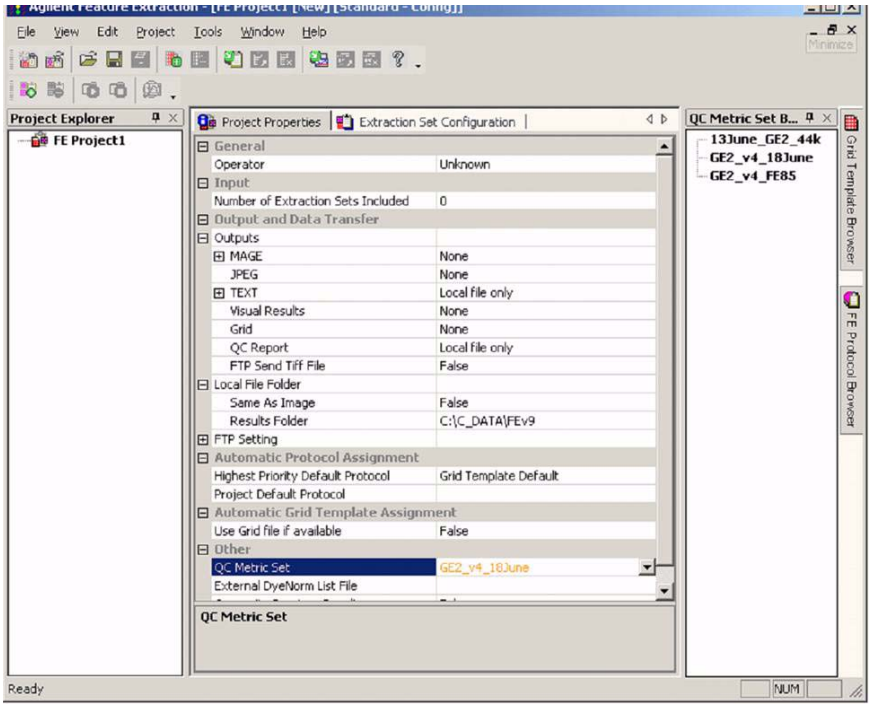


Figure 24

When this project is run, the metric set will be used to yield the following output:

1 QC Chart: a run-chart type view showing values for metrics for each extraction.

   a Chart visible on screen showing all extractions on X-axis with value of metric on Y-axis. If there are multiple metrics in the metric set, the plots will be stacked.

   b The QC Chart can be printed or saved as text file. It is also saved by Feature Extraction as a PDF file.

   c The key showing where barcodes are plotted along the X-axis can also be printed.

2 Project Run Summary: new information.

   a If thresholds are associated with the metric set, will show how many metrics were in range for each extraction

   b If an evaluation metric was associated with the metric set, will show if the extraction is in range, or needs evaluation by you

3 QC Report: new information

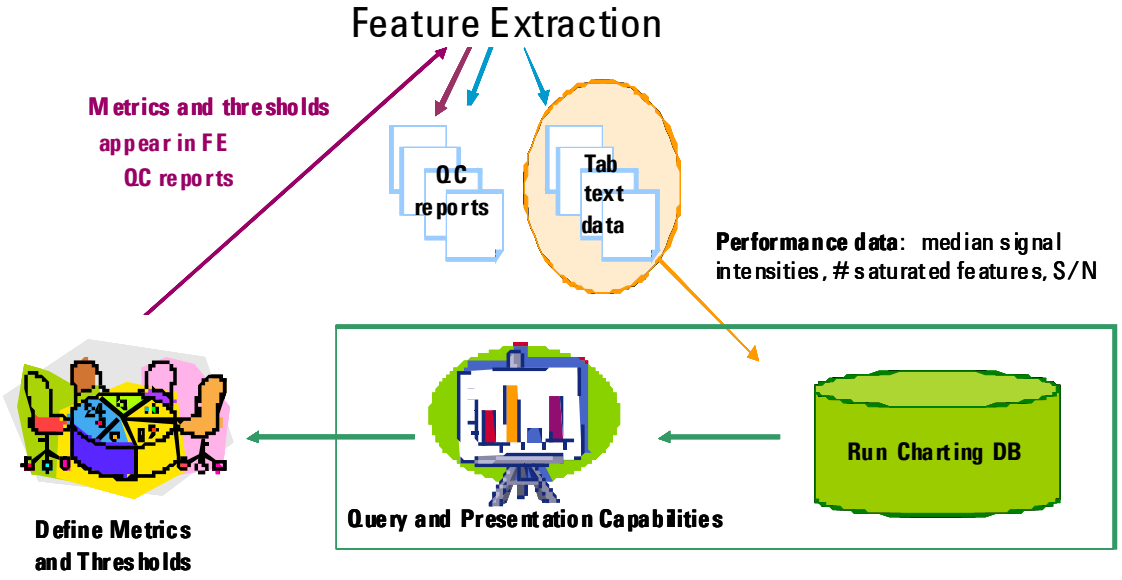
   a Header: If thresholds are associated with the metric set, will show how many metrics were in range for each extraction

   b At the bottom of the QC Report, will show a table listing each metric and the value calculated for that extraction

   c If thresholds are associated with the metric set, will show:

   - Value of threshold
   - Color-code which metrics were in range
   - Whether or not the metric was set as mandatory if an evaluation criteria was set.

Overview of Feature Extraction & QC Chart Tool Connection



Feature Extraction FEParameter fields used in QC Chart Tool

- BarCode
- ExtractionName
- UserName
- ExtractionTime
- ComputerName
- Version
- ScanFileName
- PatternName
- DesignFileName
- Protocol_Name
- Protocol_Date
- Scan_ScannerName
- Scan_Date
- QCReportType
- ColorMode
- Scan_NumChannels
- Scan_MicronsPerPixelX
- Scan_MicronsPerPixelY
- Grid_Name
- Grid_Date
- Grid_NumRows
- Grid_NumCols
- Grid_NomSpotWidth
- Grid_NomSpotHeight

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In This Book

This book contains information to set up and use QC Chart Tool with Feature Extraction software.

Fourth Edition, October 2009

G4460-90022

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