

Win X-13 Version 3.3: A Windows Interface for X-13ARIMA-SEATS

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- [1. Introduction](#)
- [2. Requirements](#)
- [3. Setup](#)
- [4. Win X-13 Main Screen](#)
- [5. Program Output](#)
- [6. Creating New Spec Files](#)
- [7. Creating New Metafiles](#)
- [8. Creating Diagnostics and Graphs from Previously Run Series](#)
- [9. Deleting X-13 Files](#)
- [10. Acknowledgements](#)
- [11. References](#)

1. Introduction

Win X-13 is a Windows interface for X-13ARIMA-SEATS (U.S. Census Bureau 2024).

This interface will:

- Create the input files necessary for seasonally adjusting a series with X-13ARIMA-SEATS.
- Run X-13ARIMA-SEATS and display the output files.
- Create a data table with model information and diagnostics from series run in X-13ARIMA-SEATS.
- Create graphs from X-13ARIMA-SEATS output.

This release updates some columns in the Diagnostics window, including showing the highest peak for each Spectrum listed in the Nonsignificant Peaks columns.

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Return to [index](#).

2. Requirements

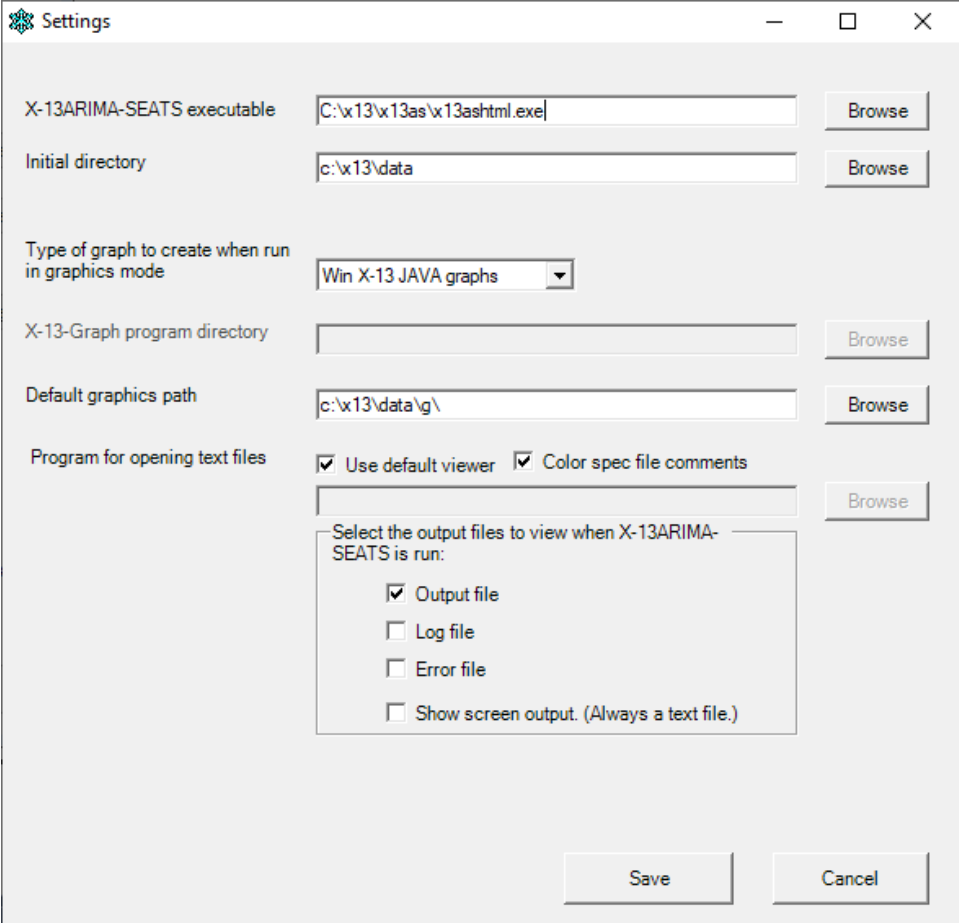
Win X-13 has been tested on Windows 10 and 11; it may be compatible with previous versions of Windows. The program requires that the .NET Framework 4.8 be installed on the computer. It can be downloaded [here](#).

Win X-13 was designed to run X-13ARIMA-SEATS and X-12-ARIMA Version 0.3. Not all features will work if using previous versions of X-12-ARIMA. Win X-13 does not support the HTML converter used to convert output files to HTML in the X-12-ARIMA program.

The interface can produce graphs in Java and in SAS. To produce the Java graphs, Java 1.8 must be installed on your computer. Download the latest version of Java at java.com. To create graphs in SAS you must have SAS Version 8 or higher and the program X-13-Graph Batch Version 2.0, which is available at <https://www.census.gov/data/software/x13as.X-13-Graph.html> (U.S. Census Bureau 2024).

Return to [index](#).

3. Setup



The screenshot shows the 'Settings' dialog box for Win X-13. The dialog has a title bar with a gear icon and the text 'Settings'. It contains several configuration options:

- X-13ARIMA-SEATS executable:** A text field containing 'C:\x13\x13as\x13ashtml.exe' and a 'Browse' button.
- Initial directory:** A text field containing 'c:\x13\data' and a 'Browse' button.
- Type of graph to create when run in graphics mode:** A dropdown menu currently set to 'Win X-13 JAVA graphs'.
- X-13-Graph program directory:** An empty text field and a 'Browse' button.
- Default graphics path:** A text field containing 'c:\x13\data\g\' and a 'Browse' button.
- Program for opening text files:** Two checked checkboxes, 'Use default viewer' and 'Color spec file comments', followed by an empty text field and a 'Browse' button.
- Select the output files to view when X-13ARIMA-SEATS is run:** A group box containing four checkboxes: 'Output file' (checked), 'Log file' (unchecked), 'Error file' (unchecked), and 'Show screen output. (Always a text file.)' (unchecked).

At the bottom right, there are 'Save' and 'Cancel' buttons.

Double click on WinX13.exe to start the Windows interface. The first time this program is run (along with any time a previously specified X-13ARIMA-SEATS executable cannot be found when starting Win X-13), a Settings window will appear. If a valid X-13ARIMA-SEATS executable has been provided, Win X-13 will open on the main screen; from here the Settings screen can be accessed from the File menu should you wish to make any changes.

The *X-13ARIMA-SEATS Executable* must be set before the interface is run; all other settings are optional.

Win X-13 Settings

X-13ARIMA-SEATS executable: Enter the full path and filename, including the .exe extension, of the X-13ARIMA-SEATS executable. This is usually called x13as.exe or x13ashtml.exe; the first produces text output files and the latter produces HTML output. If you've downloaded a version of Win X-13 which comes bundled with X-13ARIMA-SEATS, both programs will be found in the program's \x13as subdirectory; pressing the *Browse* button immediately following this text box will open a dialog window pointing to this \x13as directory.

Initial directory: Enter the directory containing your X-13ARIMA-SEATS input files. When Win X-13 is started, the folder browser on the main screen will point to this directory. By default, this control points to what is called the Desktop. Note, however, that any spec files that appear on the Desktop will not be found if the folder browser points to this top-rooted location; instead, the Desktop must be located and selected from the folder browser contents.

Type of graph to create when run in graphics mode: When running a spec file with X-13ARIMA-SEATS in graphics mode, Win X-13 can create graphs from the series. If "Win X-13 Java graphs" is selected, it will create these graphs using Java. This requires Java 1.6 or higher. Select "X-13-Graph SAS graphs" to create these graphs using the X-13-Graph SAS program. This requires that both SAS Version 8 or higher and the X-13-Graph Batch program, Version 2.0, are installed on your computer. Enter the path of the latter program in the *X-13-Graph program directory* text box. If "None" is selected, no graphs will be created when a spec file is run in graphics mode. However, the graphics files will still be saved, so you can create graphs later.

Default graphics path: Enter the directory to which graphics files should be saved when X-13ARIMA-SEATS runs in graphics mode.

Program for opening text files: Check the *Use default viewer* box to open input and text output files within Win X-13. Note that when using the default viewer all open files will be closed when Win X-13 is closed. To open and edit text files in an alternate text editor, deselect the *Use default viewer* box and enter the full path and filename of the program's executable in the text box. (For example, the program Notepad can generally be found at C:\Windows\notepad.exe.)

Color spec comments: When this box is checked, comments in X-13ARIMA-SEATS spec files (text which follows a "#" sign and is ignored by the X-13ARIMA-SEATS program) are blue, while the rest of the text is black. This option applies only when the default file viewer is used.

Select the output files to view when X-13ARIMA-SEATS is run: If you use the default viewer and the text output version of X-13ARIMA-SEATS, all four output files will open. If you use an alternate text editor or the HTML version of X-13ARIMA-SEATS, then check the boxes of the output files you want to open automatically. Output file types are described in [Section 4](#) and [Section 5](#) of this document. Note that this controls only whether the files will be opened; the output file, log, and error file will always be written and saved to your output directory, and the Screen Output (which generally contains similar information as in the error file) is saved in the program's \log subdirectory and overwritten every time a spec file runs.

Press *Save* to save the settings and return to the main screen. To access this window again, go to *File -> Settings*.

Return to [index](#).

4. Win X-13 Main Screen

The screenshot shows the 'Win X-13' settings window. At the top, there's a title bar with a snowflake icon and the text 'Win X-13'. Below it is a menu bar with 'File', 'Create', and 'View'. The main area is divided into several sections. The first section is 'X-13 Input Directory' with a text box containing 'h:\x13\data\retail\' and a 'Browse' button. Below this is a 'Select input files' section with a dropdown menu set to 'X-13 Input' and a list of files: 'X13 Hobby, toy, and game stores.spc', 'X13 Home furnishings stores.spc', 'X13 Household appliance stores.spc', and 'X13 Jewelry stores.spc'. To the right of this is a 'View output files' section with a dropdown menu set to 'HTML Output Files' and a list of files: 'Health and personal care stores.html', 'Hobby, toy, and game stores.html', 'Home furnishings stores.html', 'Household appliance stores.html', 'Jewelry stores.html', 'Limited service eating places.html', and 'Men's clothing stores.html'. Below these is an 'Options' section with several checkboxes: 'Run in graphics mode' (checked), 'New name for spec output' (unchecked), 'Output directory' (unchecked), 'Save original, trend, seasonal adjustment, and seasonal factors as HTML' (unchecked), 'Create summary file with diagnostics information' (checked), and 'Verify spec' (unchecked). There is also a 'Graphics directory' text box containing 'h:\x13\data\g\'. At the bottom right, there is a 'View upon completion' section with checkboxes for 'Output files' (checked), 'Diagnostics' (checked), and 'Graphs' (checked). Finally, there are two buttons at the bottom: 'Advanced options' and 'Run'.

Use the Win X-13 main screen to:

- Open and run X-13ARIMA-SEATS input files
- Open output files
- Set the options for running X-13ARIMA-SEATS
- Select the output to view when a spec file runs.

Further options in the menu include creating spec files, metafiles, and data metafiles, and creating graphs and diagnostics from previously run spec files.

Input Files: Running X-13ARIMA-SEATS

The three types of X-13ARIMA-SEATS input files are spec files, metafiles, and data metafiles. A spec file contains the instructions for adjusting a series. These files, which have a .spc extension, are described in [Section 6](#). You can adjust more than one series during one X-13ARIMA-SEATS run using a metafile (a list of spec files) or a data metafile (a list of data files to be run using one spec file). These files have extensions .mta and .dta respectively, and are described in [Section 7](#). Win X-13 can create all three types of input files; instructions are given in Sections 6 and 7.

Typically, the folder you selected as the initial directory from the Settings window will contain the spec file or the metafile of the series to adjust. Use the text box at the top of the screen to navigate to the directory containing your X-13A-S input files. The input list box will display all the X-13ARIMA-SEATS input files in this directory, along with all subdirectories of the current directory if the *Show folders* checkbox is checked. Use the drop-down box to filter the input files.

To run a spec file or metafile, select the file and double-click it, press the *Run* button, or type Ctrl+R.

To run a data metafile, first select the file and double-click it, press the *Run* button, or type Ctrl+R. A new screen will appear prompting you to choose the spec file corresponding to the data files listed in the metafile. Select the appropriate spec file and press *OK*. Note that a spec file used to adjust a list of data files in a data metafile cannot have a file or data statement in the `series{ } spec`.

To open the file *FileName.ext* for viewing or editing before running it, select the file and press Ctrl+O, or select View -> View *FileName.ext* from the menu. Metafiles and data metafiles can only be run from the main screen. However, if you're using Win X-13's file viewer, a spec file can be run directly from the file viewer. More information on this feature can be found at [the end of this section](#).

X-13ARIMA-SEATS Output Files

There are two versions of X-13ARIMA-SEATS; one produces text output and the other accessible HTML output. When X-13ARIMA-SEATS runs, it can create a number of output

files. These generally have the same name (or base name) as the spec file or metafile, unless an alternate output name is specified, but have extensions (in the text output X-13ARIMA-SEATS) or suffixes (in the HTML output X-13ARIMA-SEATS) based on the file type. Use the *View Output Files* drop-down box to filter the output files by type. All files in the directory of that type will appear in the list box; double click on the file you would like to open, or select it and use the View menu to open it.

The output file types are:

- Output file. The main output file created when X-13ARIMA-SEATS runs. Control the information saved to the *OutputName.out* or *OutputName.html* file using *print* arguments in the spec file; see the X-13ARIMA-SEATS documentation (U.S. Census Bureau 2024) for a complete description.
- Log file. A supplementary output file created when X-13ARIMA-SEATS runs, the log file displays the diagnostics requested in the spec file using *savelog* arguments. See the X-13ARIMA-SEATS documentation (U.S. Census Bureau 2024) for a complete list of *savelog* arguments available. Log files are named either *OutputName.log* or *OutputName_log.html*. If you run a metafile, only one log file will be created.
- Error file. X-13ARIMA-SEATS creates an error file for every series run. When it encounters an error, it saves a description of the error to an *OutputName.err* or *OutputName_err.html* file.
- Diagnostics file. If X-13ARIMA-SEATS is run in summary mode (by checking *Create summary file with diagnostics information*) or graphics mode, it creates an *OutputName.udg* file. This is a text file in both versions of X-13ARIMA-SEATS. See [Section 8](#) for more details.
- Save files. These are text files in x13save format of specific tables from the X-13ARIMA-SEATS run. Each save file must be requested in the spec file using the *save = ()* argument; their extension is the two or three letter code corresponding to that table. For example, *save = (d16)* in the *x11{}* spec will save the combined seasonal factors to *OutputName.d16*.

Runtime Options

Graphics mode: When the *Run in graphics mode* box is checked, X-13ARIMA-SEATS saves graphics files to the path given in the *Graphics directory* box. If "Win X-13 Java graphs" or "X-13-Graph SAS graphs" is selected as the *Type of graph to create when run in graphics mode* in the Settings window and the *Graphs* box is checked in the *View upon completion* group box, then the interface will produce these graphs when a spec file is run. See [Sections 5D](#) and [5E](#) for more information on the graphs. The graphics files that are saved can also be used to create graphs later; X-13-Graph Batch (U.S. Census Bureau 2022b) and X-13-Graph Java (U.S. Census Bureau 2022a) have a large number of graphs and graphing options available for this purpose.

Alternate output name: Check the *New name for spec output* box to specify an alternate name for all program output. (This includes the log file, the output file, and all graphics files and saved tables.) Changing the output name prevents overwriting previous results from a spec file.

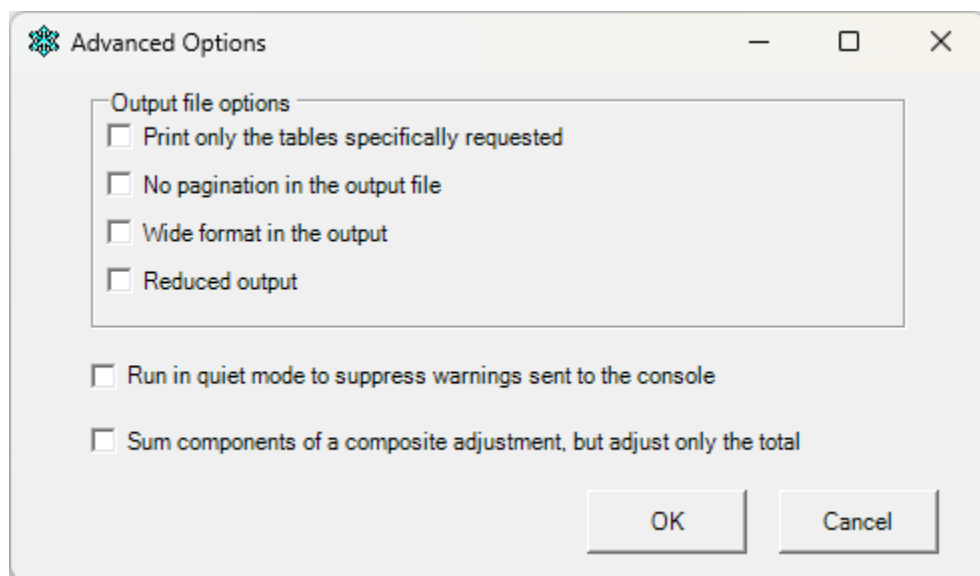
To save the output files to a directory other than the one in which the spec file is located, check the *Output directory* box and type the new directory in the text box next to it. You can also copy a directory location and paste it into the box, for example, from the Windows explorer.

These two options are available only when running spec files. To give alternate output names or directories to series run using a metafile, see the section on [Win X-13 metafile limitations](#).

Save original, trend, seasonal adjustment, and seasonal factors as HTML: Check this box to create up to four HTML files when a spec or metafile runs, saving the original series, trend (D12/S12 table), seasonally adjusted series (D11/S11 table), and the combined seasonal factors and calendar effects (D16/S16 table) to the output directory. See [Section 5F](#) for more details.

Summary mode: Check *Create summary file with diagnostics information* or run X-13ARIMA-SEATS in graphics mode to create the diagnostics file (*.udg file) when a spec file or metafile runs. The diagnostics file is saved to the graphics directory if *Run in graphics mode* is checked and to the output directory if only the summary box is checked. If neither box is checked, Win X-13 cannot create the [diagnostics table](#) when the spec file runs. The *Diagnostics* box must also be checked in the *View upon completion* group box for the series information to be added to the diagnostics table.

Verify spec: When this box is checked, the spec file is checked for errors when you submit it. Any errors found are written to the error file, which is displayed regardless of your output file. No further processing of the spec is performed.



Advanced Options: Further X-13ARIMA-SEATS options are available by pressing the *Advanced options* button. In the window that appears, you can:

- Suppress all output except for tables specifically requested in the spec file
- Turn off pagination in the output file
- Request a wide format in the output
- Ask for reduced output
- Run X-13ARIMA-SEATS in quiet mode, suppressing warnings sent to the console and printed to the "Screen Output" tab
- Sum each of the components of a composite adjustment, but only perform modeling or seasonal adjustment on the total

Win X-13 maintains the status of the check boxes--that is, the boxes that had been checked in the previous run of the program will be checked the next time the interface is started--with the exception of the alternate output name option.

Displaying X-13ARIMA-SEATS Output

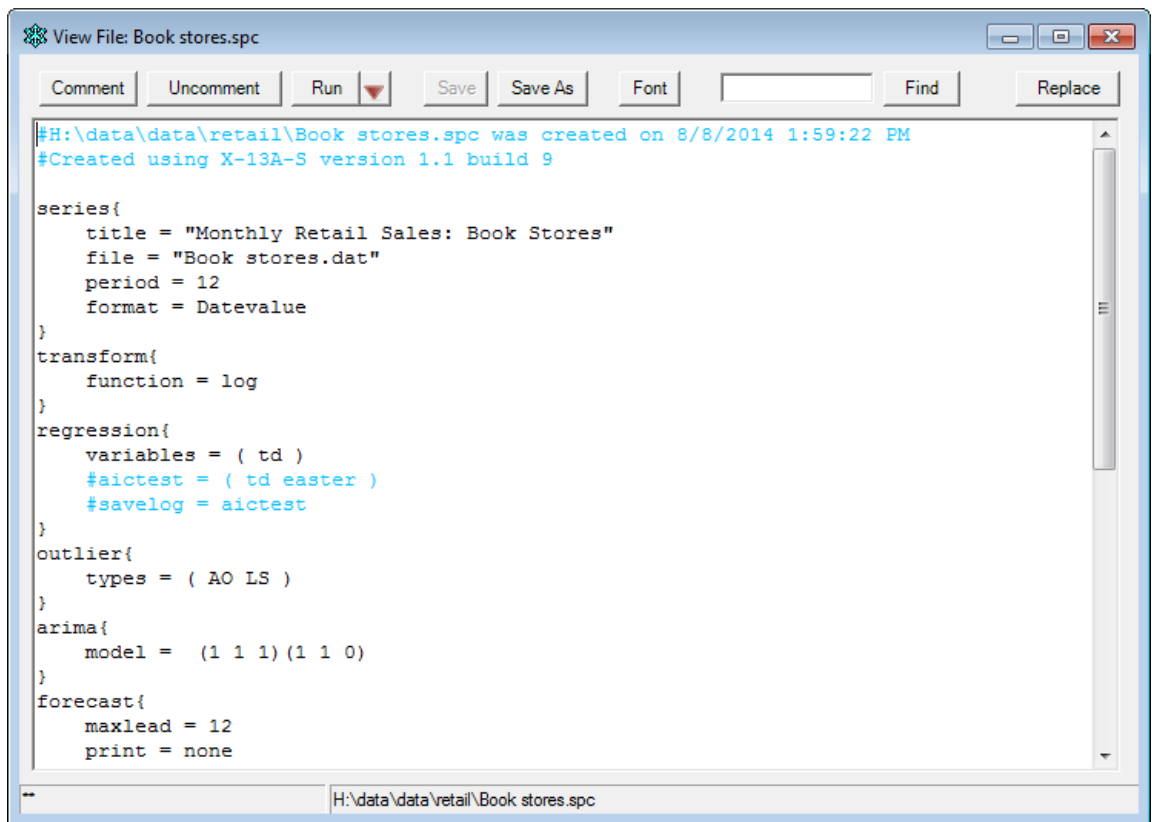
Check the *Output files* box to display the log, output, and/or error files when a spec file or metafile runs. The files shown will depend on what you have selected in the Settings window. See [Sections 5A](#) and [5B](#) for details.

Check the *Diagnostics* box to display summary information from the spec file(s) processed in a data table. See [Section 5C](#) for details.

Check the *Graphs* box to create Java or SAS graphs; this is available only when either Java or SAS graphs are selected in the Settings screen and the spec file or metafile runs in graphics mode.

Win X-13 File Viewer

Win X-13 has a built-in file viewer that opens spec files, metafiles, and other text files when the *Use default viewer* box is checked in the Settings window. Use the viewer to edit text files; to save them (with the *Save* button or Alt+S); and to save them as a new file (with the *Save As* button or Alt+A). Among other editing functions, the viewer allows you to search for text (using the *Find* text box and button, Alt+F, or Ctrl+F) and to replace text (with the *Replace* button, Alt+P, or Ctrl+H).



When the file viewer displays a spec file, some extra features are available:

- The *Comment* button (or Alt+C) will put a pound ("#") sign at the beginning of all lines of selected text. If no text is selected, the line containing the cursor will be commented out. All text between a "#" sign and the end of the line will be ignored when the spec file runs in X-13ARIMA-SEATS.
- The *Uncomment* button (or Alt+U) will remove a "#" sign from all lines of selected text, or from the line containing the cursor if no text is selected. Pound signs will be removed only if they are the first characters, barring white space, on a line.
- If the *Color spec comments* box is checked in the Settings screen, commented text will appear in blue to distinguish it from text which X-13ARIMA-SEATS will process. Note that although "#" signs in quotation marks (as in titles) are not regarded as comments by X-13ARIMA-SEATS, the file viewer will not differentiate them from comments and will turn the text following them blue.
- Run spec files directly from the file viewer by pressing the *Run* button or Alt+R. The spec file will run using the options selected in the Win X-13 main screen when the file was opened in the viewer. Some of these options can be changed by pressing the downward arrow button immediately to the right of the *Run* button. The following panel will appear:

The image shows a 'Runtime options' dialog box from the X-13ARIMA-SEATS software. At the top, there are buttons for 'Run' (with a dropdown arrow), 'Save', 'Save As', and 'Font', followed by an empty text field. Below these, there are three checked checkboxes: 'Run in graphics mode' (with a text field containing 'h:\x13\graphics\'), 'Alternate output directory' (with an empty text field), and 'Output name' (with an empty text field). Under the heading 'View after running:', there are three checked checkboxes: 'Output files', 'Diagnostics', and 'Graphs'. At the bottom, there is a button labeled 'Runtime options'.

From here you can choose whether to run in graphics mode, provide a graphics directory, provide an alternate output directory or file name, and choose whether to View output files, diagnostics, or graphs after running the spec file.

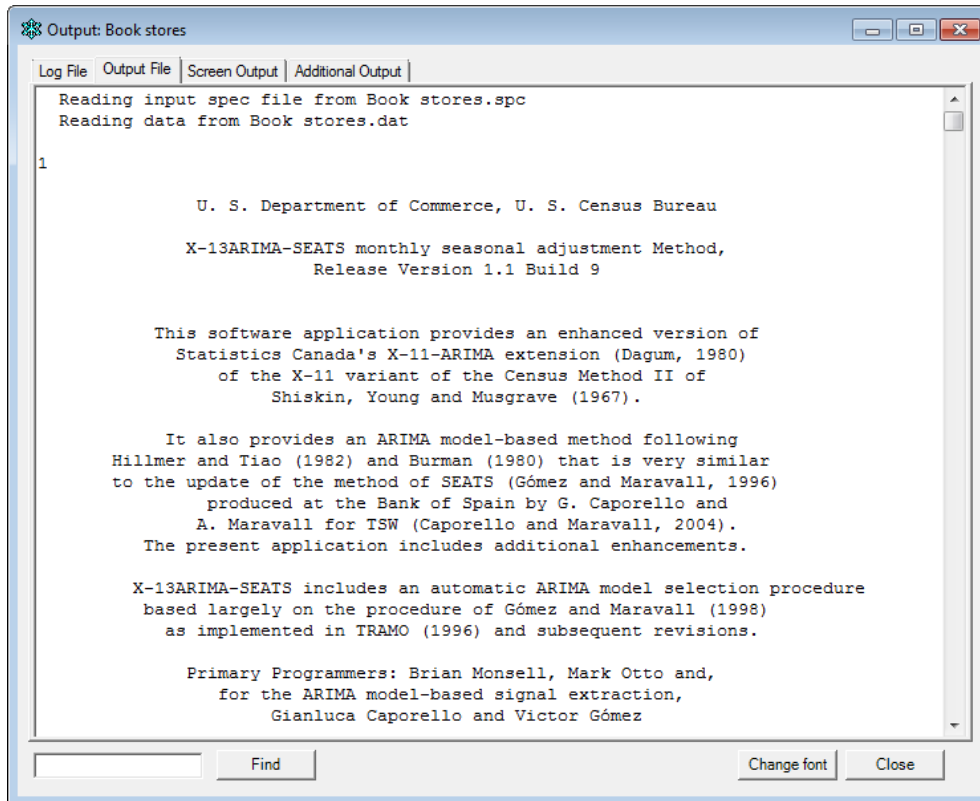
Spec files will be run with the X-13ARIMA-SEATS executable specified in the Settings window at the time it is run, even if this differs from the executable which was specified when the View window was opened. This is a change from Win X-13 Version 2.4, which always used the executable specified when the View window opened.

However, no other runtime option will change as a result of changes made on the program's main screen. For example, if you chose to save the original, trend, seasonal adjustment, and seasonal factors as HTML on the main page, they will always be saved when running using the file viewer. To see what settings are in effect for an open spec file, press the *Runtime Options* button.

Return to [index](#).

5. Program Output

A. Text Output



When a spec file or metafile runs, the text output is, by default, shown in a window with four tabs. The first tab shows the log file, containing the information requested in the spec file with *savelog* arguments. The second tab shows the output file, and the third tab the screen output, which shows warning and error messages. The fourth tab lists all other text output files with the same output name that were created at the same time as the output; among these is the error file, which will list any errors X-13ARIMA-SEATS encountered when running the spec file, and all files requested with *save* arguments in the spec file.

If a metafile ran, there will be only one log file, but each spec file will have its own output file. Access these output files on the *Output* tab using the drop-down box.

If an alternate *Program for opening text files* was provided in the Settings window, the log file, error file, and screen output will be opened in that editor. If a spec file runs, the output file will also be opened; the output files will not be opened if a metafile is run. To limit which of these four files opens when a spec file runs, use the appropriate check boxes in the Settings window.

B. HTML Output

When a spec file with output name *OutputName* runs with the accessible HTML version of X-13ARIMA-SEATS, the following HTML files are created:

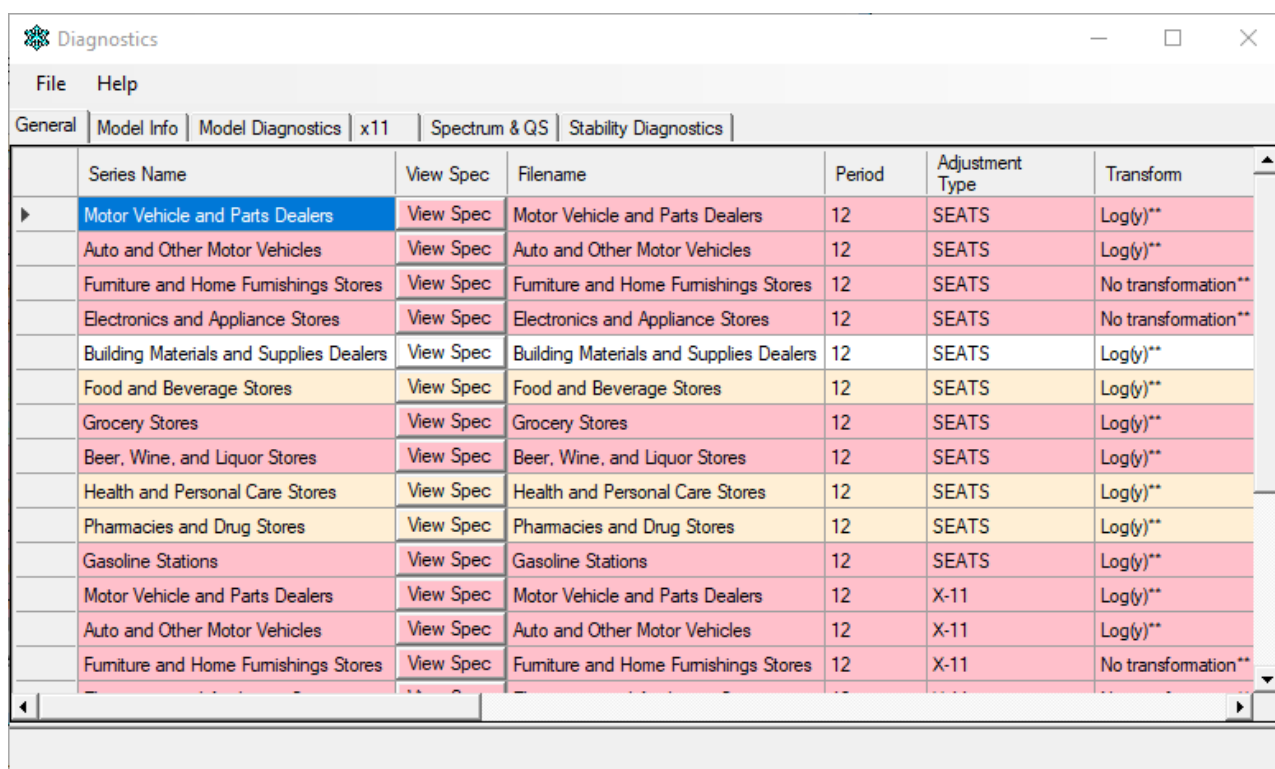
- *OutputName.html*: The output file
- *OutputName_log.html*: The log file
- *OutputName_err.html*: The error file

If a metafile (.mta) or data metafile (.dta) runs, one additional file will be produced:

- *MetafileName_mta.html* or *DataMetafileName_dta.html*: An index linking to all output, log, and error files from the series in the run

The specific files displayed when X-13ARIMA-SEATS runs depend on the selections in the *Settings* screen. The screen output can also be shown; however, this will always be a text file and will open in either Win X-13's default viewer or the alternate text viewer selected in the *Settings* window.

C. Diagnostics Tables



Series Name	View Spec	Filename	Period	Adjustment Type	Transform
Motor Vehicle and Parts Dealers	View Spec	Motor Vehicle and Parts Dealers	12	SEATS	Log(y)**
Auto and Other Motor Vehicles	View Spec	Auto and Other Motor Vehicles	12	SEATS	Log(y)**
Furniture and Home Furnishings Stores	View Spec	Furniture and Home Furnishings Stores	12	SEATS	No transformation**
Electronics and Appliance Stores	View Spec	Electronics and Appliance Stores	12	SEATS	No transformation**
Building Materials and Supplies Dealers	View Spec	Building Materials and Supplies Dealers	12	SEATS	Log(y)**
Food and Beverage Stores	View Spec	Food and Beverage Stores	12	SEATS	Log(y)**
Grocery Stores	View Spec	Grocery Stores	12	SEATS	Log(y)**
Beer, Wine, and Liquor Stores	View Spec	Beer, Wine, and Liquor Stores	12	SEATS	Log(y)**
Health and Personal Care Stores	View Spec	Health and Personal Care Stores	12	SEATS	Log(y)**
Pharmacies and Drug Stores	View Spec	Pharmacies and Drug Stores	12	SEATS	Log(y)**
Gasoline Stations	View Spec	Gasoline Stations	12	SEATS	Log(y)**
Motor Vehicle and Parts Dealers	View Spec	Motor Vehicle and Parts Dealers	12	X-11	Log(y)**
Auto and Other Motor Vehicles	View Spec	Auto and Other Motor Vehicles	12	X-11	Log(y)**
Furniture and Home Furnishings Stores	View Spec	Furniture and Home Furnishings Stores	12	X-11	No transformation**

When the *Diagnostics* box on the main screen is checked, Win X-13 produces a Diagnostics screen containing model information and diagnostics. These tables can also be created from

previously run spec files, as described in [Section 8](#). The following tables describe the information contained in the six tabs of the Diagnostics screen. These tables are also available from within the Diagnostics screen by clicking on *Diagnostics List* from the Help menu.

"General" Data Table

Column Heading	Column Description
Series Name	Name of series. This is the <i>name</i> argument in the series spec, if given, or the name of the output files otherwise.
View Spec File	Press the button to show the spec file that was used to adjust the series. Only works if the row was added automatically when the series was run.
Filename	Name of the output files
Period	Number of observations per year.
Adjustment Type	Indicates whether the adjustment is X-11, SEATS, or none.
Transform	Transformation. Includes "***" if the transformation was automatically selected.
Mode	Seasonal adjustment mode. Includes "***" if the mode was automatically selected.
Span	Span of data adjusted.
Outlier Span	Span of data checked for outliers.
AO/LS/TC Crit Val	Critical $ t $ values for additive outliers, level shifts, and temporary changes, separated by a slash. "*" indicates it was chosen by X-13ARIMA-SEATS; "--" indicates this type of outlier was not searched for.
# Outliers	Number of hard-coded and automatically selected outliers.
# Auto	Number of outliers automatically selected.
# Iter	Number of iterations to reach convergence. If the maximum number of iterations was changed from the default (1500), the cell will also show an "m". If the convergence tolerance was changed from the default (0.00001), the cell will also contain a "t".
# Forecasts	Number of forecasted values.
Forecast mode	Indicates whether forecasts are within sample or out of sample.
X-13 Version	The version and build number of the X-13A-S executable used for the run.
Date/Time Run	Gives the date and time when the spec file was run.

"Model Info" Data Table

Column Heading	Column Description
Series Name	Name of series.
Model Span	Span of data used to estimate regARIMA model coefficients.

"Model Info" Data Table

Column Heading	Column Description
ARIMA Model	ARIMA model; "***" indicates the model was selected automatically by the program.
Regressors	The regressors included in the model.
Trading Day	Trading day regressors included, with t-values if only one regressor and p-values of the chi-squared test of groups of regressors if multiple regressors; "***" indicates trading day was included based on results of AIC test.
Holiday	Easter, Thanksgiving, or Labor Day regressors (with their t-values) included; "***" indicates Easter was included based on results of AIC test.
Seasonal	Seasonal or trigonometric seasonal regressors included, with the p-value of the chi-squared test.
Constant	Gives the t-value of the constant, if it is included.
User	Gives t-values of user defined regressors included, and p-value of the chi-squared test of the group of regressors, if there is more than one; "***" indicates user regressors are included based on results of AIC test.
Coded Outliers	The outliers hard-coded in the spec file, with their t-values.
Auto Outliers	The outliers automatically found, with their t-values.
Variance	Innovation variance of the ARIMA model.
Phi1	Estimate of nonseasonal AR parameter at lag 1.
Sum NS AR	Sum of all nonseasonal AR parameter estimates.
Theta1	Estimate of nonseasonal MA parameter at lag 1.
Sum NS MA	Sum of all nonseasonal MA parameter estimates.
Sum Seas AR	Sum of all seasonal AR parameter estimates.
Sum Seas MA	Sum of all seasonal MA parameter estimates.
Successful SEATS Adj?	If a SEATS adjustment was requested and the decomposition was not successful (that is, there is no seasonal adjustment), this column will be 'no'. If it was successful, it will say 'yes'. If no SEATS decomposition was attempted, it will read 'n/a'.
SEATS Model	If the SEATS procedure changed the ARIMA model specified by the arima{ } spec or selected by the automatic model procedure, then this column will give the SEATS model.

"Model Diagnostics" Data Table

Column Heading	Column Description
Series Name	Name of series.
AICC	F-adjusted Akaike's Information Criterion (corrected for sample size).

"Model Diagnostics" Data Table

Column Heading	Column Description
BIC	Bayesian Information Criterion
aa FcE (3-yr)	Average absolute percentage error of forecasts in the last three years. An average of the 1-step ahead to 12-step ahead (4-step ahead for quarterly series) forecasts of the data with one, two and three years removed. By default, this is calculated using within-sample forecasts, but it can be done with out-of-sample forecasts if requested.
Normal?	Indicates whether residuals pass normality tests.
# LBQ Fail	Number of the lags from 1 to 24 (8 for quarterly) with significant Ljung-Box Q statistic.
Sig LBQ	List of lags with significant LBQ.
Sig Seas LBQ	Seasonal lags with significant LBQ.
# BPQ Fail	Number of the lags from 1 to 24 (8 for quarterly) with significant Box-Pierce Q statistic.
Sig BPQ	List of lags with significant BPQ.
Sig Seas BPQ	Seasonal lags with significant BPQ.
Sig ACF	Lags with significant autocorrelation in the residuals.
Sig Seas ACF	Seasonal lags with significant autocorrelation in the residuals.
Sig PACF	Lags with significant partial autocorrelation in the residuals.
Sig Seas PACF	Seasonal lags with significant partial autocorrelation in the residuals.
Resid Peaks	Indicates the visually significant seasonal and trading day peaks in the spectrum of the model residuals.
QS Residuals	p-value for the QS statistic of the residuals.
QSS Residuals	p-value for the QS statistic of the residuals on the last 96 observations (8 years for a monthly series).
Avg Sq Fcst Err 1 Period	Average One-Step-Ahead Squared Forecast Error (from History analysis)
Avg Sq Fcst Err 1 Year	Average One-Year-Ahead Squared Forecast Error (from History analysis)

"x11" Data Table

Column Heading	Column Description
Series Name	Name of series.
Sigma Lim	Lower and upper sigma limits for downweighting extreme values.
Seasonal MA	Seasonal moving average filter; "***" indicates the filter was chosen by X-13ARIMA-SEATS.
Trend MA	Length of the final Henderson trend filter; "***" indicates the filter was chosen by X-13ARIMA-SEATS.

"x11" Data Table

Column Heading	Column Description
I/S Ratio	The final irregular/seasonal Ratio from Table D10; also called the global moving seasonality ratio.
I/C Ratio	The final irregular/trend ratio from Table D12.
D8F	F-statistic of test for seasonality assuming stability from D8 table.
D8F p-val	p-value of D8 F statistic.
D11F	p-value of D11 F statistic for residual seasonality.
D11F 3 yr	p-value of D11 F statistic for residual seasonality in the last three years.
M1	The relative contribution of the irregular over three months span.
M2	The relative contribution of the irregular component to the stationary portion of the variance.
M3	The amount of period-to-period change in the irregular component as compared to the amount of period-to- period change in the trend-cycle.
M4	The amount of autocorrelation in the irregular as described by the average duration of run.
M5	The number of months it takes the change in the trend-cycle to surpass the amount of change in the irregular.
M6	The amount of year-to-year change in the irregular as compared to the amount of year-to-year change in the seasonal.
M7	The amount of moving seasonality present relative to the amount of stable seasonality.
M8	The size of the fluctuations in the seasonal component throughout the whole series.
M9	The average linear movement in the seasonal component.
M10	As M8, calculated for recent years only.
M11	As M9, calculated for recent years only.
Q	A weighted average of M1-M11.
Q2	A weighted average of M1-M11 without M2.
MCD	Months for Cyclical Dominance

"Spectrum & QS" Data Table

Column Heading	Column Description
Series Name	Name of series.
Sig Ori Peaks	Indicates the visually significant seasonal and trading day peaks in the spectrum of the (possibly differenced, transformed, prior-adjusted) original series.
QS Ori	p-value for the QS statistic of the original series.

"Spectrum & QS" Data Table

Column Heading	Column Description
QSS Ori	p-value for the QS statistic of the original series calculated using the spectrum span.
QS Ori Adj Ext	p-value for the QS statistic of the original series adjusted for extreme values.
QSS Ori Adj Ext	p-value for the QS statistic of the original series adjusted for extreme values calculated using the spectrum span.
Tukey Ori Peaks	Lists the highly significant ($p > .99$) and significant ($p > .90$) seasonal frequencies of the Tukey spectrum of the original series.
Sig SAdj Peaks	Indicates the visually significant seasonal and trading day peaks in the spectrum of the seasonally adjusted series.
Sig Irr Peaks	Indicates the visually significant seasonal and trading day peaks in the spectrum of the modified irregular.
Nonsig Seasonal Peaks	Indicates whether there is a nonsignificant peak at any of S1, S2, S3, or S4 in the spectrum of the seasonally adjusted series ("sadj"), irregular ("irr"), or residuals ("rsd"). Also gives the height in stars of the tallest of these peaks for each spectrum.
Nonsig TD Peaks	Indicates whether there is a nonsignificant peak at T1 in the spectrum of the seasonally adjusted series ("sadj"), irregular ("irr"), or residuals ("rsd"). Also gives the height in stars of the tallest of these peaks for each spectrum.
QS Sadj	p-value for the QS statistic of the seasonally adjusted series.
QSS Sadj	p-value for the QS statistic of the seasonally adjusted series calculated using the spectrum span.
QS Sadj Adj Ext	p-value for the QS statistic of the seasonally adjusted series adjusted for extreme values.
QSS Sadj Adj Ext	p-value for the QS statistic of the seasonally adjusted series adjusted for extreme values calculated using the spectrum span.
QS Irr	p-value for the QS statistic of the irregular component.
QSS Irr	p-value for the QS statistic of the irregular component calculated using the spectrum span.
QS Irr Adj Ext	p-value for the QS statistic of the irregular component adjusted for extreme values.
QSS Irr Adj Ext	QS statistic of the irregular component adjusted for extreme values calculated using the spectrum span.
Tukey Sadj Peaks	Lists the highly significant ($p > .99$) and significant ($p > .90$) seasonal frequencies of the Tukey spectrum of the seasonally adjusted series.
Tukey Irr Peaks	Lists the highly significant ($p > .99$) and significant ($p > .90$) seasonal frequencies of the Tukey spectrum of the irregular component.

"Spectrum & QS" Data Table

Column Heading	Column Description
Tukey Rsd Peaks	Lists the highly significant ($p > .99$) and significant ($p > .90$) seasonal frequencies of the Tukey spectrum of the residuals.

"Stability Diagnostics" Data Table

Column Heading	Column Description
Series Name	Name of series.
Rev Span	Span of data of revision history analysis.
SA.AAR	Average absolute percent revisions of the seasonal adjustments.
MM.AAR	Average absolute revision of the month-to-month percent change of the adjustments.
#Spans	Number of spans for sliding spans analysis.
Span Length	Length of each span.
SF Cut	Threshold value for the seasonal factors.
SF75p	75th percentile of maximum percent differences across spans of seasonal factors.
SF%	Percent of months (quarters) with a maximum absolute percent change of the seasonal factors greater than the threshold.
SA Cut	Threshold value for the seasonal adjustment values.
SA75p	75th percentile of maximum percent differences across spans of the seasonally adjusted series.
SA%	Percent of months (quarters) with a maximum absolute percent change of the seasonal adjustment values greater than the threshold.
MM Cut	Threshold value for the period-to-period percent change in the seasonally adjusted series.
MM60p	60th percentile of maximum percent differences across spans of period-to-period changes in the seasonally adjusted series.
MM%	Percent of months (quarters) with a maximum absolute difference of period-to-period change in the seasonally adjusted series greater than the threshold.
TD Cut	Threshold value for trading day factors.
TD75p	75th percentile of maximum percent differences across spans of trading day factors.
TD%	Percent of months (quarters) with a maximum absolute percent change of the trading day factors greater than the threshold.
YY Cut	Threshold value for the year-to-year change in the seasonally adjusted series.
YY90p	90th percentile of maximum percent differences across spans of year-to-year changes in the seasonally adjusted series.

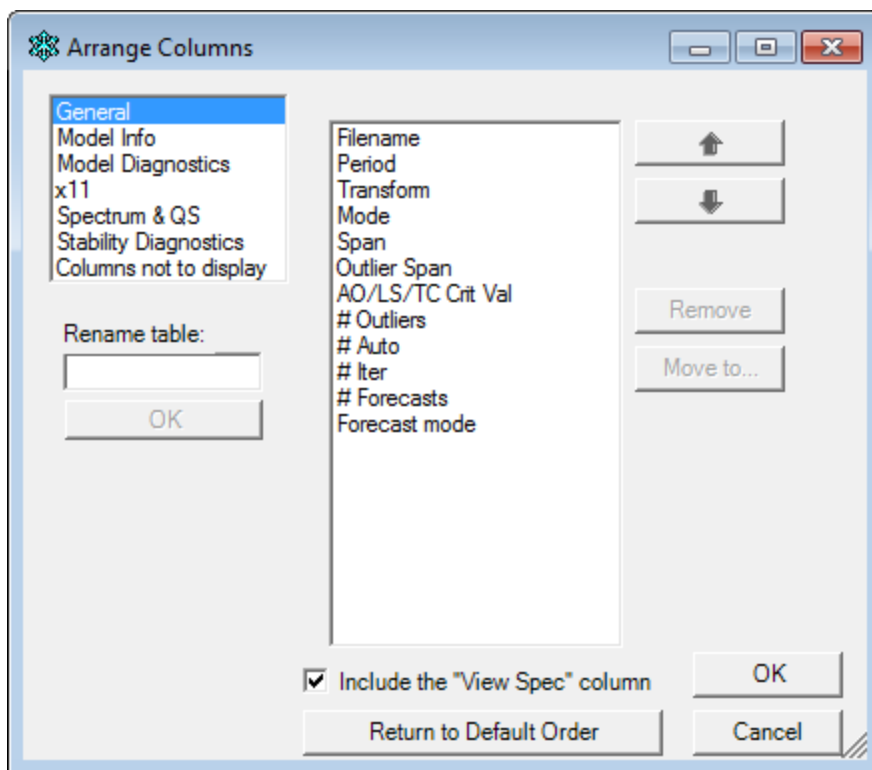
"Stability Diagnostics" Data Table

Column Heading

Column Description

YY%

Percent of months (quarters) with a maximum absolute difference of year-to-year change in the seasonally adjusted series greater than the threshold.



Change the columns displayed in the diagnostics table by selecting *Select Columns to View* from the File menu.

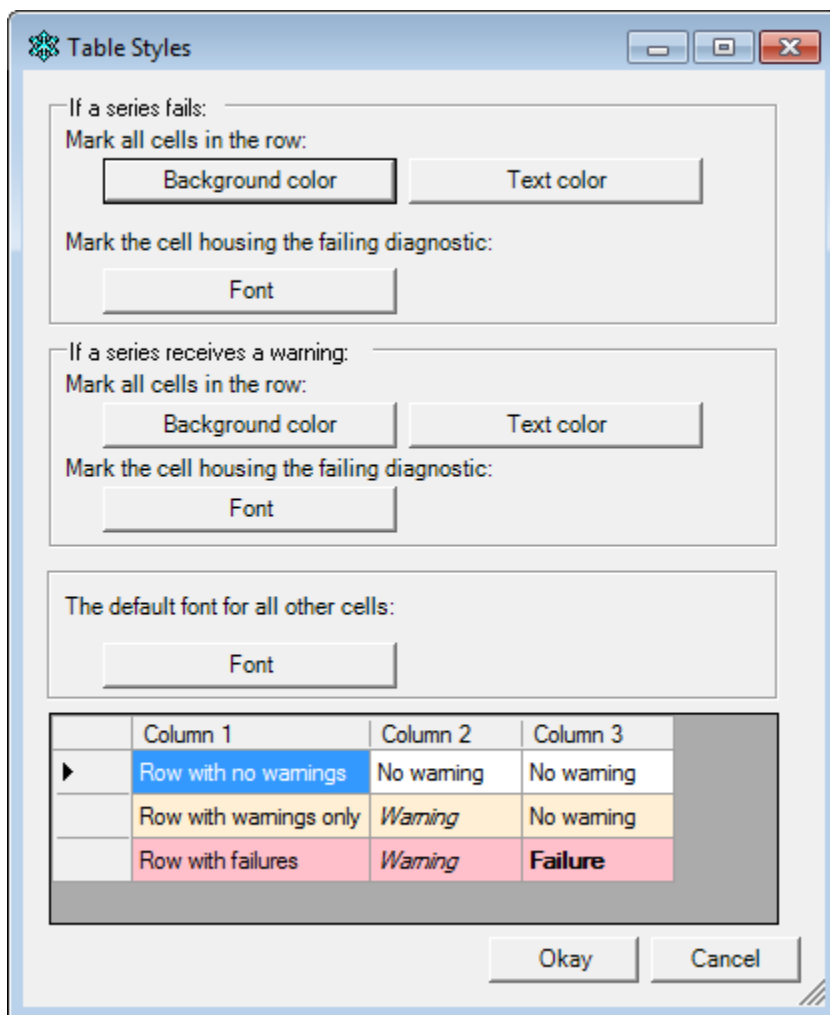
The table must have six tabs (though some can be empty). The names of these tabs are in the box to the top left. To rename a tab, select it from the list. Then type the new name in the *Rename table* box, and press the *OK* button directly below it.

The list box in the middle shows the columns currently in that tab. To move a column in that tab, select the column(s) and press the up and down arrow buttons at the top right. To remove column(s) so that they are not displayed at all, select them and press the *Remove* button. (Removed columns can be found under *Columns not to display* in the tab list, if you'd like to add them back into the table.) To move column(s), select them and press the *Move to...* button; a menu of the available tabs will appear, and you can select the tab to which the columns should be moved.

Alternately, you can move columns up or down, move columns to another tab, or remove columns by selecting the columns and pressing the right click button on your mouse; the available options for those columns will appear.

The first tab, named General by default, can display the View Spec column. This column is a list of buttons; pressing the button displays a copy of the spec file that was run to generate displayed diagnostics. This column cannot be moved; if it is in the diagnostics table, it must be the first column in the first tab. It can, however, be removed by deselecting the *Include the 'View Spec' column* check box.

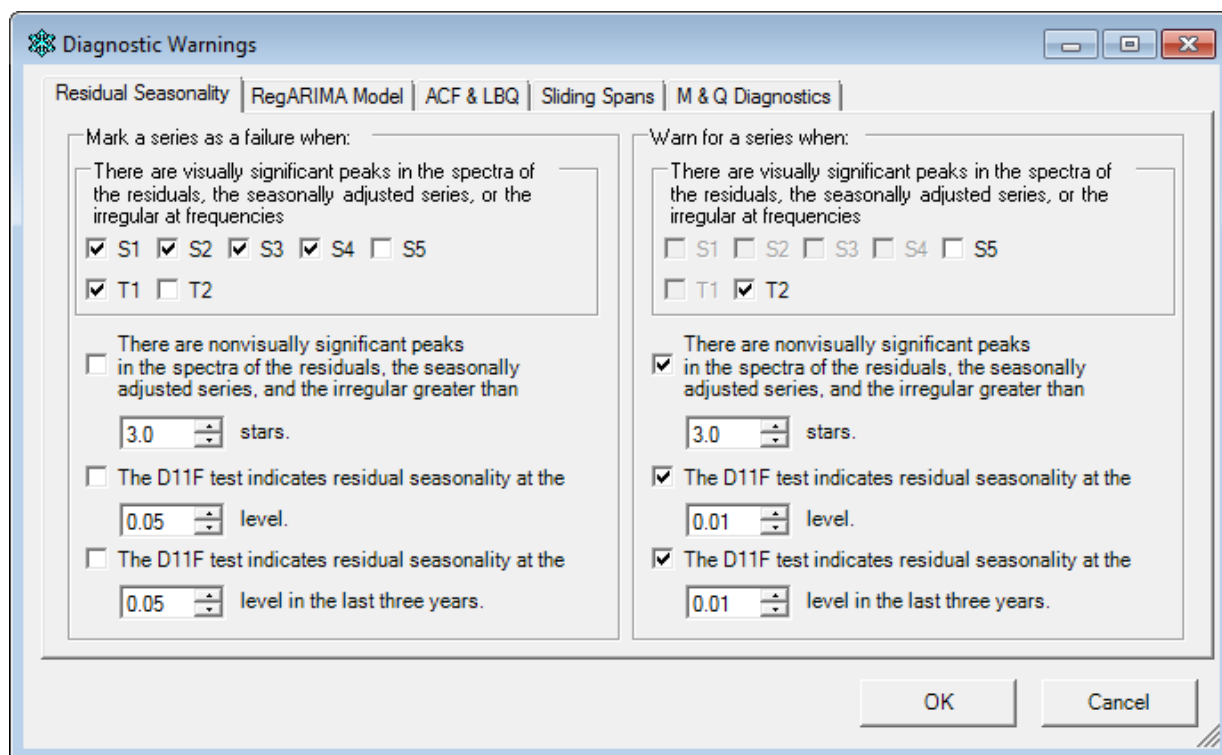
Once you've reordered the columns, Win X-13 will always remember the new order and display your diagnostics table using this order. To return to the original column order, press the *Return to Default Order* button.



Win X-13 can flag rows that fail certain diagnostics. To choose the appearance of these flagged series, select *Table Styles* from the File menu. From the window that appears, choose the background color and text color of the row containing a failed or warned diagnostic. Fonts can

be set separately for cells containing failed diagnostics, cells containing warnings, and all other cells.

When saving a table as HTML, the colors marking the failed and warned rows will be saved if you choose *Save Table With Formatting* from the File menu. Customized cell styles will not be saved; all failed cells will be bold and all warned cells will be italicized. To save the table without any flags, select *Save Table - Values Only* from the File menu.



Selecting *Failure/Warning Thresholds* from the File menu will open a window that allows you to choose the diagnostics warned against. Note that only the diagnostics currently displayed will determine whether a row fails or needs warning. For example, if a series has significant spectral peaks but the columns reporting spectrum information have been removed from the diagnostics table, the row will not be failed. For more information on X-13ARIMA-SEATS's diagnostics, see the X-13ARIMA-SEATS Reference Manual (U.S. Census Bureau 2024).

Win X-13 remembers the selections made for Table Styles and Diagnostic Thresholds. Once the selections are made, they will always be used when Win X-13 is run.

Select *Write to XML* from the File menu to save the diagnostics table as an XML file, which can later be read back into the diagnostics window by selecting *Read in XML*. The XML file will contain the full diagnostics table, including all nonvisible columns, but will not contain any formatting information. When the XML file is read back into the diagnostics window, the current column order, diagnostics thresholds, and formatting will be used.

D. Java Graphs

If "Win X-13 Java graphs" is selected in the Settings window as the *Type of graph to create when run in graphics mode*, the spec file runs in graphics mode, and the box to view graphs after running a spec file is checked, then a new graph window will appear whenever a spec file runs. This window will contain up to 11 graphs, depending on the options requested in the spec file. These graphs are:

- Original Series
- Logs of the Original Series
- Forecasts
- Overlay Graph of the Original Series, Seasonally Adjusted Series, and Trend
- Spectrum of the Original Series
- Spectrum of the RegARIMA Residuals
- Spectrum of the Seasonally Adjusted Series
- Spectrum of the Irregular
- Seasonal Factors by Period
- Seasonal Factors and SI Ratios by Period
- ACF and PACF of the Residuals

For a composite adjustment, the overlay graph shows instead the composite series with the direct and indirect seasonally adjusted series, and an additional spectrum graph of the indirect seasonally adjusted series is produced. The spectrum of the irregular component and the seasonal factor graphs display results from the direct adjustment.

If you right-click on any individual graph, a menu will appear allowing you to save the graph as a .png file, print the graph, or adjust certain graph properties, such as changing some of the graph colors or the title. For most graphs, the menu will also offer you zooming options. An alternative method to zoom in on a portion of the graph is to move the mouse to the upper left-hand point of the region you would like to view, press the left mouse button, and, while keeping the button pressed, move the mouse to the lower right-hand point of the region. When you release the mouse button, the graph should zoom in to that region. Zoom back out by repeating the procedure, but rather than moving the mouse down and to the right while the button is depressed, move it in any other direction.

If a metafile runs, a new window will appear containing a list of the series contained in the metafile. Select one or more series from the list and press *Graph* to create these graphs for the series. (Note that a new window will appear for each series.)

E. SAS Graphs

If (1) "X-13-Graph SAS graphs" is selected in the Settings window as the *Type of graph to create when run in graphics mode*, (2) you run the spec file in graphics mode, and (3) the box to view graphs after running a spec file is checked, then when a spec file is run, Win X-13 will attempt to start SAS and run the X-13-Graph program to create the 11 graphs listed above. If a metafile is run, a new window will appear containing a list of the series contained in the metafile. Select one or more series from the list and press *Graph* to create these graphs for the series.

If the interface encounters a problem starting SAS, it will instead open the SAS program, which is saved as x13graph.sas in the \appl subdirectory of the X-13-Graph program directory. Run this program manually to create the graphs.

F. HTML Tables of Original Series, Trend, Seasonally Adjusted Series, and Seasonal Factors

If the box is checked requesting the original series, trend, seasonally adjusted series, and seasonal factors be saved as HTML, then up to four HTML files will be created when a spec file or metafile runs. These files, called *OutputName_Original.html*, *OutputName_Trend.html*, *OutputName_SeasAdjSeries.html*, and *OutputName_SeasonalFactors.html*, where *OutputName* is the output name of the spec file or metafile, will be saved in the same directory as the output file. The original series file will always be created; the other three will be created if seasonal adjustment is successfully completed. The files correspond to output tables A1, D12, D11, and D16, respectively, of an X-11 seasonal adjustment or tables A1, S12, S11, and S16 of a SEATS adjustment.

Return to [index](#).

6. Creating New Spec Files

The screenshot shows the 'Create New Spec File' dialog box with the following fields and options:

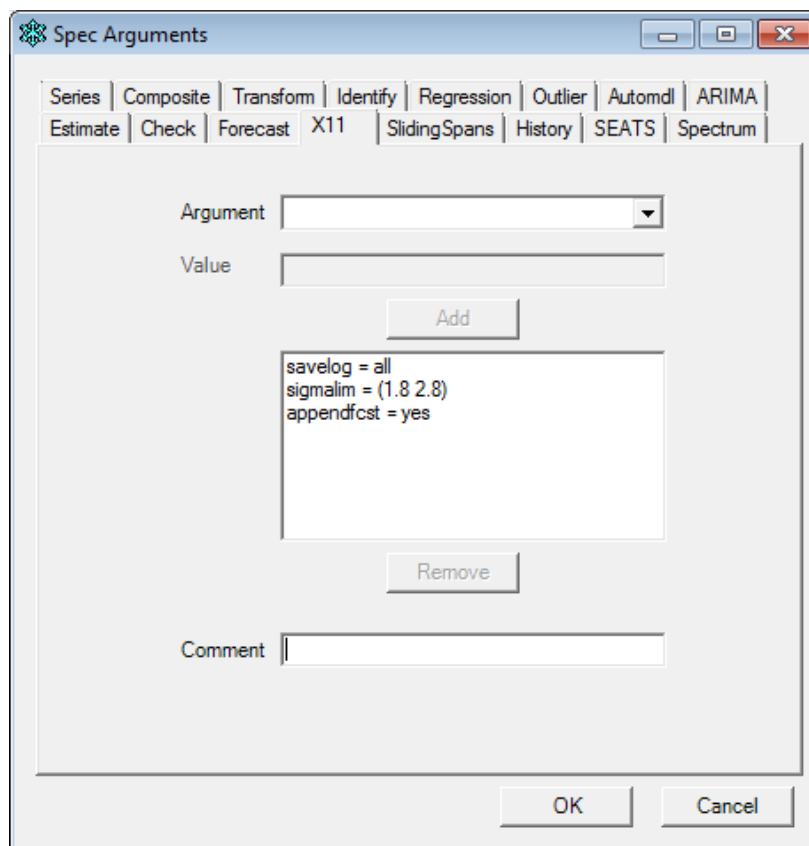
- File View** tabs: Data | Prior Adjustments | Prior Adj File | ARIMA model | User Regressors | Seasonal Adjustment | Metadata
- Create individual spec files for each series** (selected):
 - Data file or data metafile:
 - Name of new spec file:
 - ☐ Include the full path of the data file in the spec
 - ☐ Use alternate output name in metafile as the new spec name
- Create a single spec to adjust all series in a data metafile** (radio button)
- Create a parent spec for a composite adjustment** (radio button)
- Save new spec file as:**
- Spec file options:**
 - Title:
 - Data format: (dropdown)
 - Start date:
 - Period: (dropdown)
 - Span start:
 - Span end:
 - Model span start:
 - Model span end:
- Create spec** **Cancel**

To create a new spec file for your data file, select Create -> Spec file from the menu. In the window that appears, the only options that need to be specified are the data file, the data file format, and the period. Pressing *Create Spec* will then write a spec file customized to your series with:

- The span and model span encompassing the full series in the file
- The hard-coded result of a test for a log transformation
- The the hard-coded result of tests for flow trading day and Easter
- The hard-coded additive outliers and level shifts identified over the full series
- An ARIMA model selected automatically and hard-coded
- One year of forecasts
- An X-11 seasonal adjustment with the seasonal filter hard-coded based on the global moving seasonality ratio from the initial run
- Sliding spans and history diagnostics with default settings

Alternately, you can customize these options, specify a prior adjustment file or user regressor, and add metadata to your diagnostics file using the seven tabs in this window.

Customizing Spec Options



X-13ARIMA-SEATS spec files have many more options available than those displayed on the seven tabs of this interface. Some of these options (mostly pertaining to diagnostics to save to

the log file) were set to default options; others were not set at all. All X-13ARIMA-SEATS spec arguments can be set by going to *Customize spec arguments* in the File menu. The two rows of tabs along the top each represent one spec. The arguments available for each spec are listed in the Argument drop down box, and are all described in Chapter 7 of the documentation for X-13ARIMA-SEATS (U.S. Census Bureau 2024). Select an argument, type the value into the "Value" box, and press "Add." If the argument already has a value, you will be asked if you would like to replace it. Once you have set all the arguments you want, press "OK." Note that if an argument can be set using the controls in the seven tabs of the Create Spec window, the argument will not be listed in this Window.

Each tab also has a *Comment* box. Any text written into this box will be included in the corresponding spec as a comment.

The arguments you set will be used to create the spec file. If you want Win X-13 to remember these arguments save them as a template.

Templates are a way to set your own default selections in this Create Spec process. They're simple to use. First, edit the spec arguments as described above. Then select your preferred settings in the seven tabs of the Create Spec window. Select *Save Current Settings as New Template* from the File menu. In the window that appears, name the new template. If you check the box making these settings the default, then when you select *Create spec* from the Main screen, this window will appear with your custom settings. If you don't want your new template to be the default, uncheck the box. You can still create a new spec file using this template by choosing *Create spec from template* and then selecting the appropriate template.

To return to the program's default settings, simply clear your default template by selecting *Clear Saved Default Settings and Spec Arguments* from the File menu. To update a template with new arguments, make the required changes and select *Save Current Settings* from the File menu.

Additional Spec File Creation Options

Win X-13 can create a spec file for each series listed in a data metafile. To do this, specify the data metafile where the *Data File or Data Metafile* is requested in the Data tab. You can also specify a metafile; however, as metafiles do not supply the extension of the data file, Win X-13 looks first for a file with a .dat extension, and if one is not found, for a file with a .txt extension. If your data files have another extension, use a data metafile to create the spec files. If the data file cannot be found, a default spec file with no data file will be created.

Win X-13 can also create a parent spec file for a composite adjustment and a spec file to run with a data metafile.

Data File Formats

You must specify the format of your data file. X-13ARIMA-SEATS reads data from text files, generally with a .dat or .txt extension. The data can be in any of the following formats:

- Datevalue: The file contains three columns- the year, the month (as a number) or quarter, and the data value.
- Free: The file contains just the data separated by one or more spaces or tabs or a new line. To use this format, you must also provide the date of the first data point and the period.
- x13save: The format X-13ARIMA-SEATS uses to save data files. Use this format when using an X-13ARIMA-SEATS output file as the input file. (This format used to be called x12save.)
- tramo: The format the programs TRAMO and SEATS use to input data.
- 1L, 2L, 1R, 2R: Data formats originally used in X-11 and X-11-ARIMA. To use these formats, the name specified in the file must be provided; note these are case sensitive.
- Fortran: A valid Fortran format, to be specified in the *Fortran* text box with opening and closing parentheses.

X-13ARIMA-SEATS Dates

Dates in X-13ARIMA-SEATS spec files must be in *yyyy.mmm*, *yyyy.mm*, or *yyyy.q* format. The date March 2008 would thus be 2008.mar, 2008.03, or 2008.3; first quarter 2008 would be 2008.1.

Data Tab

Data	Prior Adjustments	Prior Adj File	ARIMA model	User Regressors	Seasonal Adjustment	Metadata
☒ Create individual spec files for each series						
Data file or data metafile: h:\x13\data\retail\Book Stores.dat Browse Name of new spec file: Book Stores.spc ☐ Include the full path of the data file in the spec ☐ Use alternate output name in metafile as the new spec name						
☐ Create a single spec to adjust all series in a data metafile						
☐ Create a parent spec for a composite adjustment						
Save new spec file as: Browse						
Spec file options						
Title: Monthly Sales: Book Stores						
Data format: Datevalue Start date:						
Period: 12						
Span start: Span end:						
Model span start: 2004.1 Model span end:						

Use the Data tab to choose the type of spec file to create, to specify the data file and the location to which to save the spec file, and to set some series options.

Create individual spec files for each series: Check this box if you have a data file or data metafile and want to create a spec file customized for each data file.

In the *Data file or data metafile* box, enter the full path and filename of the data file, metafile, or data metafile. Once a data file is entered in the box, you can open the file by choosing View -> Data from the menu, or pressing Ctrl+D.

Enter the *Name of new spec file* in the specified box if you are creating a single spec file. If you are creating spec files from a data metafile, the individual spec files will have the same filename as the data files, unless the *Use alternate output name in metafile as the new spec name* box is checked. Then the interface looks for an alternate name for the spec file, and possibly an alternate directory to which to save the spec file, in the data metafile. This name must follow the data file name and extension on the same line.

Unless an alternate directory is specified in the data metafile, the spec file(s) will be saved to the directory containing the data file. If you expect to later move the spec files a different own directory, check the box to *Include the full path of the data file in the spec* so X-13ARIMA-SEATS can find the data files.

Create a single spec to adjust all series in a data metafile: Check this box to create a spec file that can be used to run a data metafile. This spec file will not reference a data file, and will disregard all requests on subsequent tabs to hard-code results.

Enter the full path and file name of the spec file to be created in the *Save new spec file as:* box.

Create a parent spec for a composite adjustment: Check this box to create a spec file specifying the options for the direct adjustment of a composite run.

Enter the full path and file name of the spec file to be created in the *Save new spec file as:* box.

Title: Enter a title for the series. This is optional; if specified, it will be used on each page of the program output, and as the title for any graphs created.

If you are creating multiple spec files from a metafile, you can enter a title for each individual series by pressing the *Title Options* button. In the window which appears, you can select not to specify a title, to use the same title for all spec files, to create an individual title for each series by incorporating the series' name into a base title, or to specify a file containing the titles for the series in the metafile.

Format: The format of the data file. See [Data File Formats](#) for more details.

Period: Choose "12" for monthly data, "4" for quarterly data, and "1" for annual data.

Span start and *Span end:* By default, all data in the data file will be included. Use these two boxes to limit the data used. If only the span start is specified, all data from this date to the end will be used. Similarly, if only the span end is specified, all data from the beginning until this date will be used. Dates must be in [yyyy.mmm, yyyy.mm, or yyyy.q](#) format.

Model span start and *Model span end:* By default, all data in the span will be used for regARIMA modelint. Use these two boxes to limit the data used to estimate the regARIMA model. If only the span start is specified, all data from this date to the end will be used. Similarly, if only the span end is specified, all data from the beginning until this date will be used. Dates must be in [yyyy.mmm, yyyy.mm, or yyyy.q](#) format.

Prior Adjustments Tab

The screenshot shows the 'Prior Adjustments' tab of the X-13ARIMA-SEATS software. The tab is part of a multi-tabbed interface with other tabs like 'Data', 'Prior Adj File', 'ARIMA model', 'User Regressors', 'Seasonal Adjustment', and 'Metadata'. The 'Transformation' section has three radio buttons: 'Log' (selected), 'None', and 'Auto'. There is a checkbox for 'Hard-code transformation' which is checked. The 'Regression' section has a checkbox for 'This is a stock series' which is unchecked. Below it is a text box for 'AIC test' with a note. There are three checkboxes: 'TD' (checked), 'Easter' (checked), and 'Hard-code AIC results' (checked). The 'Regression variables' section has three checkboxes: 'Trading Day' (unchecked), 'Easter' (unchecked), and 'Constant' (unchecked). Below these is a text box for 'Other variables'. The 'Outliers' section has a text box for 'Types of Outlier to Test for' with 'AO' (checked), 'LS' (checked), and 'TC' (checked). There is a checkbox for 'Hard-code outliers' which is checked. Below this is a dropdown for 'LS run' set to '0'. At the bottom are two text boxes for 'Span start' and 'Span end'.

Use this tab to specify the transformation, regression variables, and outlier tests.

Transformation: Choose whether the data should be log transformed. Select *Auto* to let X-13ARIMA-SEATS decide using an AIC test. (See Section 7.16 of the X-13ARIMA-SEATS documentation for details of this test.) If the *Hard-code transformation* box is checked, X-

13ARIMA-SEATS will run to check for this transformation and write your spec file with the result.

Regression: Trading day and Easter have different regression variables for flow series than for stock series. If your series is a stock or inventory series, check the *This is a stock series* box to use the stock version of these variables. Otherwise, the flow series version will be used. (Note that X-13ARIMA-SEATS Version 0.3 does not have a stock Easter variable--later versions of the program do.)

X-13ARIMA-SEATS can perform *AIC Tests* for trading day effects and Easter. By default, checking the *TD* box will test for six-coefficient trading day if the series is a flow series. For stock series, the variable tested by default is end-of-month stock trading day. If the inventory is taken on another day, check the *Flow Trading Day* box below and specify the day in the drop down box that appears.

To test for another trading day regressor available in X-13ARIMA-SEATS, check the *TD* box and specify the variable in the *Other Variables* box.

By default, checking the *Easter AIC Test* box tests for Easter with a one-, eight-, and 15- day window. To test only one of these, also check the Regression Variables *Easter* box, and specify the window in the drop-down box.

Checking the *Hard-code AIC results* box will run X-13ARIMA-SEATS with the AIC tests selected, and then write your spec file with the results.

To include flow trading day, stock trading day, a constant, or an Easter effect, check the appropriate boxes. Any other regression variable available in X-13ARIMA-SEATS can be written into the *Other variables* box. See Section 7.13 of the X-13ARIMA-SEATS documentation for a complete list and description of these regressors.

Outliers: X-13ARIMA-SEATS can identify additive outliers, level shifts, and temporary changes. Check the *AO*, *LS*, or *TC* box to search for each type. If *Hard-code outliers* is checked, X-13ARIMA-SEATS will run, and any outliers found will be written into the regression spec of your spec file.

LS run: Choosing a value greater than one from the drop-down box will request that any successive run of up to that many level shifts be tested as to whether it is temporary. A table with these results will be printed to the output file. The maximum is five.

Span start and Span end: By default, the entire span of data specified in the model span will be searched for outliers. Use these boxes to shorten this span. Dates must be in [yyyy.mmm](#), [yyyy.mm](#), or [yyyy.q](#) format.

Prior Adj File Tab

The screenshot shows a software window with several tabs: Data, Prior Adjustments, Prior Adj File (selected), ARIMA model, User Regressors, Seasonal Adjustment, and Metadata. The 'Prior Adj File' tab is active and contains the following fields:

- Prior adjustment file:** A text box containing the path `h:\x13\data\prioradj.dat` and a **Browse** button to its right.
- Format:** A dropdown menu currently set to `Datevalue`.
- Name/Start:** An empty text box.
- Mode:** A dropdown menu currently set to `Factors are percents`.

Below the **Mode** dropdown, there is a note: "Ratio or percent factors can only be used with log-transformed data, and subtracted factors with no transformation. The program will set this transformation mode regardless of your choice on the Prior Adjustments tab."

Use this tab to specify a file of prior adjustments.

Prior adjustment file: Enter the full path and file name of the prior adjustment file. This file can then be viewed by choosing View -> Prior Adjustment File from the menu, or pressing Ctrl+A.

Format: Specify the format of the prior adjustment file. See [Data File Formats](#) for details.

Mode: Specify whether the factors are percents or ratios, to be divided out of the series, or values to be subtracted from the original series. Ratios or percent factors can be used only with log-transformed data, and subtracted factors with no transformation. The program will choose the transformation for the series based on the *Mode* selected here, ignoring your transformation choice on the Prior Adjustments tab.

ARIMA Model Tab

The screenshot shows the 'ARIMA model' tab in a software interface. It contains three main sections: 'ARIMA model', 'Identify model using ACF and PACF plots', and 'Forecasts'. In the 'ARIMA model' section, 'Select model automatically' is selected, 'Hard-code automodel selection' is checked, and the 'ARIMA model' text box contains '(0 1 1)(0 1 1)'. In the 'Identify model' section, 'Identify model' is checked, and both 'Difference' and 'Seasonal difference' list boxes have '1' selected. In the 'Forecasts' section, 'Number of years to forecast' is set to 5.

ARIMA model	
☒ Select model automatically ☐ Use ARIMA model specified	
☒ Hard-code automodel selection	
ARIMA model (0 1 1)(0 1 1)	

Identify model using ACF and PACF plots	
☒ Identify model	
Difference	Seasonal difference
0 <input checked="" type="text" value="1"/> 2	0 <input checked="" type="text" value="1"/> 2

Forecasts	
Number of years to forecast	5

Use the ARIMA Model tab to set the ARIMA model or ask X-13ARIMA-SEATS to automatically find the model, to request ACF and PACF plots of the original series for model identification purposes, and to set the number of forecasts.

Select model automatically: If the *Hard-code automodel selection* box is checked, X-13ARIMA-SEATS will run with the automatic modeling (automdl{ }) spec with default settings, and your spec file will be written with the model chosen. Otherwise, the spec file will be written with the automdl{ } spec. See Section 7.2 of the X-13ARIMA-SEATS documentation for details on this procedure.

Use ARIMA model specified: To specify an ARIMA model for your spec file, enter it into the *ARIMA model* box.

Identify model using ACF and PACF plots: Check the *Identify model* box and select one or more differences and seasonal differences from the list boxes to create ACF and PACF plots of each combination of difference and seasonal difference selected. Use these plots to identify an ARIMA model.

Forecasts: Choose how many years of forecasts to create. Choosing *Half filter length* will forecast for half the length of the X-11 seasonal filter, if either the filter or "Hard-code

Global MSR" is selected on the Seasonal Adjustment tab; otherwise, one year of forecasts will be produced.

User Regressors Tab

The screenshot shows the 'User Regressors' tab in a software application. The tab is part of a sequence: Data, Prior Adjustments, Prior Adj File, ARIMA model, User Regressors, Seasonal Adjustment, and Metadata. The 'User Regressors' tab is active. It contains the following fields and controls:

- Data file:** A text box containing 'h:\x13\data\My_Holiday.dat' and a 'Browse' button.
- Format:** A dropdown menu set to 'Datevalue'.
- Start date:** An empty text box.
- How many regressors are in the file?:** A dropdown menu set to '2'.
- Regressor names and types:** Two columns of dropdown menus. The first column has 'beforeHol' and 'duringHol'. The second column has 'holiday' and 'holiday' (the second one is highlighted in blue).
- Checkboxes:** Two checkboxes at the bottom: 'Perform AIC test for significance' (checked) and 'Hardcode AIC test results' (unchecked).

Use this tab to input a user-defined regressor from a data set.

Data file: Enter the data file containing the user regressors. Only one file can be specified, but it can contain up to 52 regressors. To view the file, choose View -> User Regressors from the menu, or press Ctrl+R.

Format: Specify the format of the user regressor file. See [Data File Formats](#) for details. If the file contains more than one user regressor, give the value for each regressor for a date before moving on to the next date. That is, in the "Datevalue" format, the file should contain a column for the year, a column for the month, and then a column for each user regressor for that date. In "free" format, a *Start date* must be provided.

How many regressors are in the file?: Choose the number of user regressors in the file.

Name and Type: Each user regressor can have a name and type specified. By default, the name is "user#", and the type "user". When you choose the number of regressors, that many rows

of Name text boxes and Type drop down boxes are added to the page. The first row corresponds to the first regressor in the file, and so on.

Significance tests: Check the *Perform AIC test for significance* box to test the user regressors, and include them in the regression only if the AICC is less than for the model without these effects. Check the *Hardcode AIC test results* to include the regressors in the spec file only if they have the smaller AICC.

Seasonal Adjustment Tab

The screenshot shows a software window with several tabs: Data, Prior Adjustments, Prior Adj File, ARIMA model, User Regressors, Seasonal Adjustment (selected), and Metadata. The Seasonal Adjustment tab contains the following controls:

- Type of adjustment:** A group box containing four radio buttons: ☒ x11, ☐ Trading day and holiday adjustment only, ☐ SEATS, and ☐ None.
- x11 filter options:** A dropdown menu currently showing "Hard-code Global MSR".
- How should the series be combined into the aggregate?:** A dropdown menu currently showing "Series is not part of an aggregate."
- Stability diagnostics:** A group box containing two checked checkboxes: ☒ Sliding spans and ☒ History. To the right of the History checkbox is a text field labeled "History start" with the value "2009.1".

Use this tab to choose the type of adjustment and the seasonal filter. You can also choose to include the history and sliding spans diagnostics, and tell the program how to include the series in an aggregate, if the spec file is for a series that will be combined with others to create a composite series.

Type of adjustment: Select *x11* to perform an X-11 seasonal adjustment, and *SEATS* to perform a SEATS adjustment. Select *Trading day and holiday adjustment only* to adjust the series only for calendar effects, not seasonality.

x11 filter options: Use the drop-down box to select the seasonal filter for the seasonal adjustment. Choose "3x3," "3x5," or "3x9" to use that filter for all X-11 iterations. Select "Global MSR" to let the program choose a 3x3, 3x5, or 3x9 filter for the final iteration depending on the global moving seasonality ratio. Selecting "Hard-code Global MSR" will

result in X-13ARIMA-SEATS running, using the Global MSR to choose the seasonal filter, and then writing your spec file with the chosen filter hard-coded. The "x11 default" filter is the default filter from older versions of X-12-ARIMA; it uses 3x3 filters for the initial seasonal factors and 3x5 filters for the final seasonal factors in each iteration.

How should the series be combined into the aggregate? If the spec file is being created for a series that will not be combined into an aggregate, select "Series is not part of an aggregate." Otherwise, choose to add, subtract, multiply, or divide the series into the aggregate or to ignore the series when creating the aggregate.

Stability diagnostics: Specify whether to calculate sliding spans and history diagnostics. An optional box is included to specify the start date for the revisions history analysis. Dates must be in [yyyy.mmm](#), [yyyy.mm](#), or [yyyy.q](#) format. Note that component series of aggregates must have the same number and length of sliding spans and the same history start date if you want to generate the stability diagnostics for the indirect adjustment.

Metadata Tab

	Key	Value
	AdjusterName	Demetra
	LastEditDate	Aug 2014

Save Clear Metadata

When X-13ARIMA-SEATS runs in summary mode or graphics mode, it creates a diagnostics file with model information and diagnostics. To include additional descriptive information in this file, enter a description in the "Key" column, and the value in the "Value" column. For example, if you type LastEditDate into the "Key" column, and "Aug 2014" into the "Value" column, then

metadata.LastEditDate: Aug 2014
will be included in the .udg file.

If you press the *Save* button after entering the keys and values, these columns will be saved and included every time a spec file is produced. Press the *Clear Metadata* button the next time you create a spec file to delete the stored metadata information.

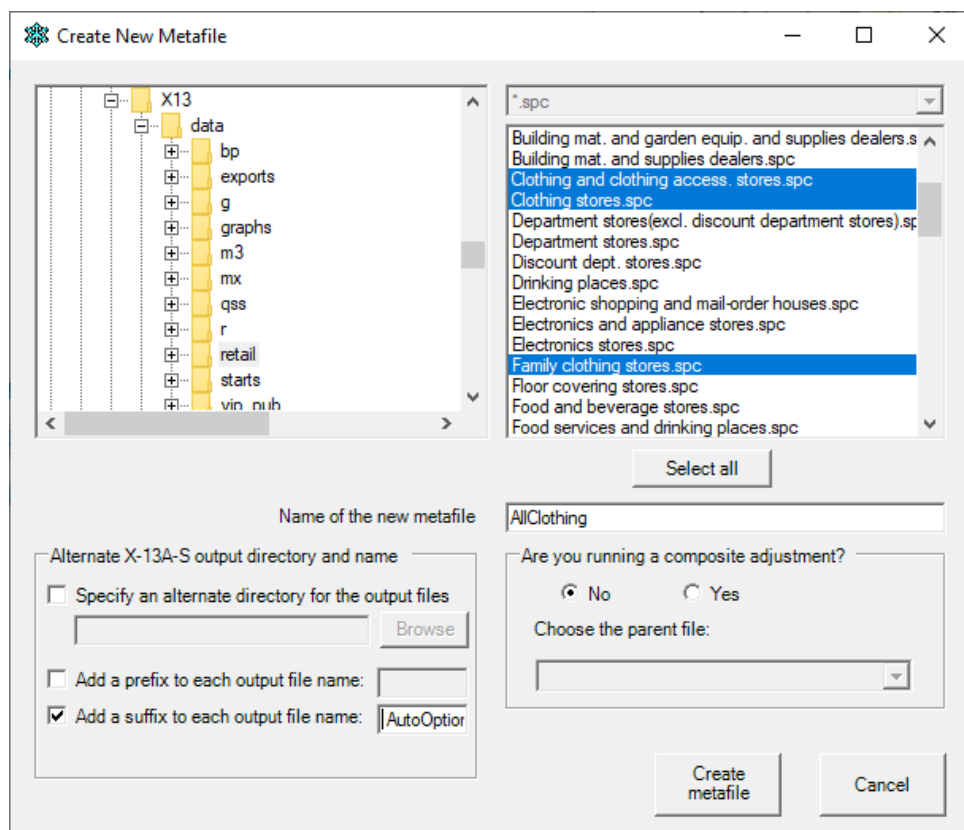
Return to [index](#).

7. Creating New Metafile/Data Metafile

Process multiple spec files in one run using metafiles or data metafiles. A metafile is a list of the spec files to run. A data metafile is a list of data files, which all run using the same spec file.

Metafiles are also used to adjust composite series. In this case, the spec files of the individual series should be listed first, and the parent spec file listed last.

Creating Metafiles With Win X-13



To create a new metafile using the interface, select *Create -> Metafile* from the menu on the main screen. In the window that appears, select the directory containing the spec files from the

folder browser. Select the spec files to include from the list box and enter a name for the new metafile in the text box.

If you are running a composite adjustment, choose the parent file (the spec file that contains the composite{ } spec) from the drop-down box. This will ensure that the parent file will be listed last in the metafile.

To route the program output to an alternate directory, enter this new directory in the text box provided. Use the *Add a prefix...* and *Add a suffix...* boxes to provide a prefix or a suffix to be appended to the spec file name as a new name for the program output.

Press *Create metafile*. The new metafile will be saved to the same directory as the spec files.

Creating Data Metafiles With Win X-13

To create a new data metafile using the interface, select Create -> Data metafile from the menu on the main screen. In the window that appears, select the directory containing the data files from the folder browser. Use the drop-down box to choose the extension of the data files. All files with that extension will be added to the list box; select the files to include in the metafile.

To route the program output to an alternate directory, enter this new directory in the text box provided. Use the *Add a prefix...* and *Add a suffix...* boxes to provide a prefix or a suffix to be appended to the data file name as a new name for the program output.

Press *Create metafile*. The new data metafile will be saved to the same directory as the spec files.

Win X-13 Limitations: Creating Metafiles by Hand

The interface can create a metafile when all the files to include are in the same directory, and program output name can only differ from the name of the spec file or data file by a prefix or suffix. If you need a metafile for spec files across different directories, or want to specify an alternate output name, you must create or edit the metafile by hand. Keep the following in mind when doing so:

- Metafiles have a .mta extension. Data metafiles have a .dta extension.
- Do not include the .spc extension for the spec files. The extension of the data files listed must be included in the data metafile.
- Only one spec file or data file can be on a line.
- If the spec file or data file is not in the same directory as the metafile, include the full path and filename of the file.
- To specify an alternate name for the output, include it on the same line as the spec file or data file. To specify an alternate path, include the path and the output name (even if you are not renaming the output) on the same line as the spec or data file.

- If the path or filename of the input has spaces, it must be enclosed in quotation marks. Similarly, if the path or filename of the output has spaces, it must be enclosed in quotation marks.
- If you are running a composite adjustment, the composite spec file must immediately follow its components.

For more information on creating metafiles, see Section 2.4 of the X-13ARIMA-SEATS documentation (U.S. Census Bureau 2024).

Return to [index](#).

8. Creating Diagnostics and Graphs From Previously Run Series

The diagnostics tables and graphs described in Sections [5C](#), [5D](#), and [5E](#) can be created using previously run spec files.

To create the diagnostics table, the spec file had to run in summary mode (with *Create summary file with diagnostics information* checked) or in graphics mode. If the spec file ran in graphics mode, the diagnostics file (.udg file) was saved to the graphics directory. Otherwise, if it ran in summary mode, the diagnostics file was saved to the same directory as the program output.

From the menu on the main screen, select Create -> Diagnostics. Enter the directory containing the diagnostics file in the *Summary file directory* box, select the .udg files to add to the diagnostics table, and press *OK*. Alternately, if you'd like to add all the series listed in a metafile to the diagnostics table, enter the directory of the metafile in the *Summary file directory* box. Choose "Metafiles" from the drop-down box, select the metafile from the list, and press *OK*. If the metafile contains an alternate output directory, the program will look in that directory for the .udg file. Otherwise, it will look in the directory containing the metafile. If you ran the metafile in graphics mode, the .udg files will be in the graphics directory, which in most cases is different from the metafile's directory; copy the metafile to the graphics directory before trying to create diagnostics.

If a series ran in graphics mode, create Java or SAS graphs by choosing Create -> Graph from the menu of the main screen.

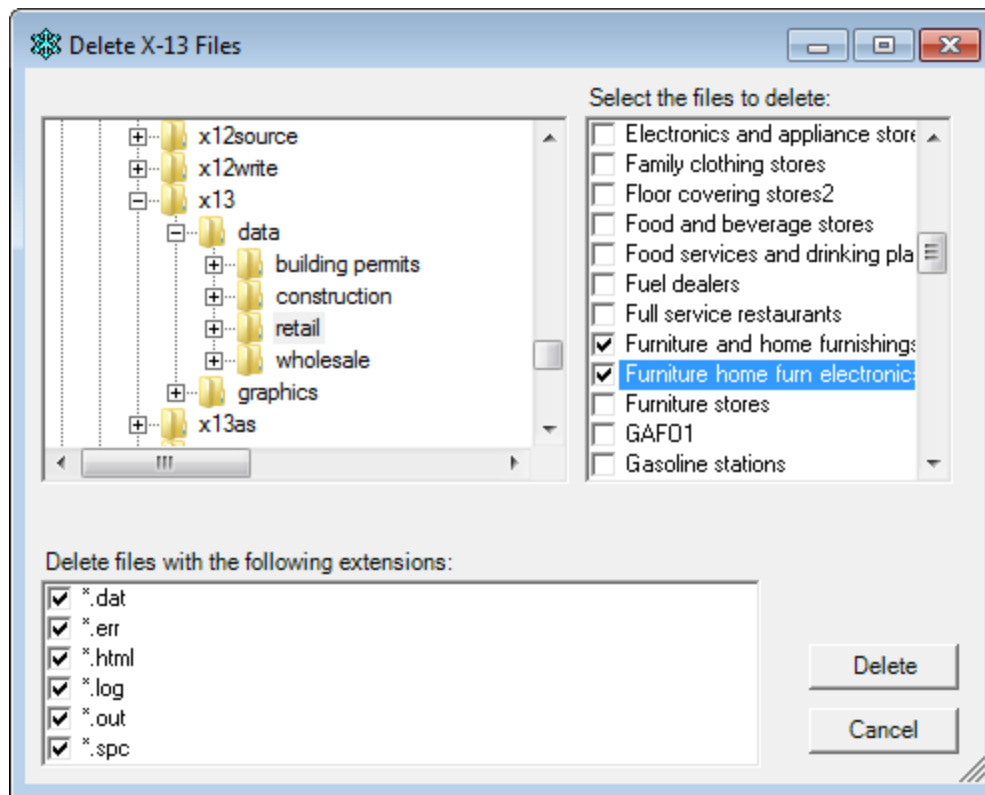
If Java graphs are selected from the [Settings window](#), a new window will appear. Enter the graphics directory in the box provided. Select the series to graph from the list box, and check the boxes for the graphs to create. A new graph window will appear for each series containing all the graphs checked, if applicable to the series.

If SAS graphs are selected from the Settings window, choose Create -> Graph from the menu to start the X-13-Graph interface. Creating graphs with this interface requires more effort, but there are more graphs and graph options available than with the Java graphs. See the X-13-Graph documentation (U.S. Census Bureau 2022b) for complete details of the program.

Return to [index](#).

9. Deleting X-13 Files

X-13ARIMA-SEATS can produce many output files when running a series. You can use the interface to delete them once you no longer need them.



To open this screen, go to File -> Delete X-13-Files in the menu. Use the folder browser to select the directory containing the files to be deleted. The interface will list the names of the X-13 files found, without the extension, in the list box on the right. It will list all the extensions from these files in the box on the bottom. In the file name list box, check the boxes next to the files to be deleted. In the extensions list box, deselect any file extensions to keep. For example, if your data is called MyData.dat, the spec file is MyData.spc, and the output files MyData.out, MyData.log, MyData.err, and MyData.udg are in the directory, checking "MyData" in the file name box and deselecting "*.dat" in the extension list box will delete all files except the data file.

Pressing *Delete* opens a screen listing all the files, with the extensions, that will be deleted. Press *Delete* to confirm the file deletion.

Return to [index](#).

10. Acknowledgements

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The program's Java graphs are produced using the JFreeChart and JCommon libraries, (C)opyright 2000- 2025 by Object Refinery Limited and Contributors. The libraries are covered by the Lesser General Public Licence. The interface also uses the Explorer Tree Control by Jim Parsells, covered by the Code Project Open License.

Return to [index](#).

11. References

U.S. Census Bureau (2022a). [X-13-Graph Java](#).

U.S. Census Bureau (2022b). [X-13-Graph: A SAS/GRAPH Program for X-13ARIMA-SEATS Output](#).

U.S. Census Bureau (2024). [X-13ARIMA-SEATS Reference Manual](#).

Return to [index](#).