

STUDY SERIES
(Survey Methodology #2008-4)

**AN ACCESSIBILITY EVALUATION
OF THE WIN X-12 APPLICATION**

Lawrence Malakhoff

Statistical Research Division
U. S. Census Bureau
Washington, D.C. 20233

Report Issued: March 26, 2008

Disclaimer: This report is released to inform interested parties of research and to encourage discussion. Any views expressed on the methodological issues are those of the authors and not necessarily those of the U.S. Census Bureau.

Abstract

Users of the Win X-12 application will be X-12 ARIMA users who wish to create charts and graphs. Some of them may have visual disabilities. According to Federal regulations, computer users who have visual and/or other disabilities are entitled to have the same access as users who do not currently have any disabilities. To assess the compliance of the Win X-12 application with the Federal regulations, the present evaluation was performed in January 2008 using the Job Access With Speech (JAWS) screen-reader, software used by people with visual disabilities. Although the evaluation revealed general compliance with the federal regulations, it also found some instances of non-compliance. For example, indicators of position and status (selected, not selected) of list-box entries were not accessible, and list-boxes were not labeled. These omissions violate the Federal regulations. This report uses screen shots to illustrate how compliance with Federal regulations can be accomplished, and it includes recommendations to improve the accessibility of the Win X-12 user interface.

Key Words: accessibility, X-12 ARIMA, Win X-12, screen-reader, Federal regulations, user-interface evaluation.

INTRODUCTION

Since June 2001, Federal regulations require that U.S. government Web sites and other software developed by or for the U.S. Government provide comparable access to the information for all users¹. Computer users who have visual and/or other disabilities are entitled to have the same access as users who do not currently have any disabilities

Accessibility is a subset of usability. Accessibility guidelines have several checkpoints that address more general usability, such as developing a logical tab order, dividing large information blocks into more manageable groups, and using the clearest and simplest language appropriate. Even if the application complies with the law, it still may not be usable, as the Census Bureau's Usability Lab has found in other testing. Both usability and accessibility testing need to be done to identify problems that actual users may have.

BACKGROUND

This accessibility evaluation was performed on the Win X-12 application in January 2008. The Office for Statistical Methods Research Economics Programs (OSMREP) requested that the Statistical Research Division (SRD) use its expertise to verify and/or identify accessibility problems in the SRD accessibility lab. Users of the Win X-12 application will be X-12 ARIMA users who wish to create charts and graphs.

PURPOSE

The purpose of this evaluation is to report and rate the severity of accessibility problems for people with visual disabilities to the developer of the software so that the problems could be fixed. The priority for accessibility problems is rated high, medium, or low. An item flagged as high means that the user could not perform the task at all. An item flagged as medium means that the user could perform the task, but with difficulty. An item flagged as low priority means that the user is not presented the same information as the able-bodied user, but can still perform the task.

SCOPE AND METHOD

This evaluation is primarily focused on testing accessibility for computer users with visual disabilities. Accessibility testing is performed using Insight/InFocus 4.2.2, which tests web applications². This product lists potential accessibility problems, which are checked using the Job Access With Speech (JAWS) 9 screen reader software³. For the purpose of this report, an item is judged to be accessible (compliant with the regulations) if its screen text is read out loud, in a coherent order by the screen reader. Usability problems are detected by an analyst with usability experience listening to the content vocalized by the screen reader and visual inspection. These problems are included in this

¹ <http://www.section508.gov/index.cfm?FuseAction=Content&ID=3>

² <http://www.ssbtechnologies.com>

³ <http://www.freedomscientific.com>

report as issues to evaluate in formal usability testing if resources are available.

FINDINGS

Findings are detailed in Figures 1-16, below. This application is not accessible for the following reasons:

- Combo box controls which permit a user to enter data do not give instructions to use arrow keys to select other options (global).
- Group box text is not accessible (global).
- List boxes are not labeled.
- Indicators of position and status (selected, not selected) of list-box entries are not accessible.

Further detail on these findings is provided below.

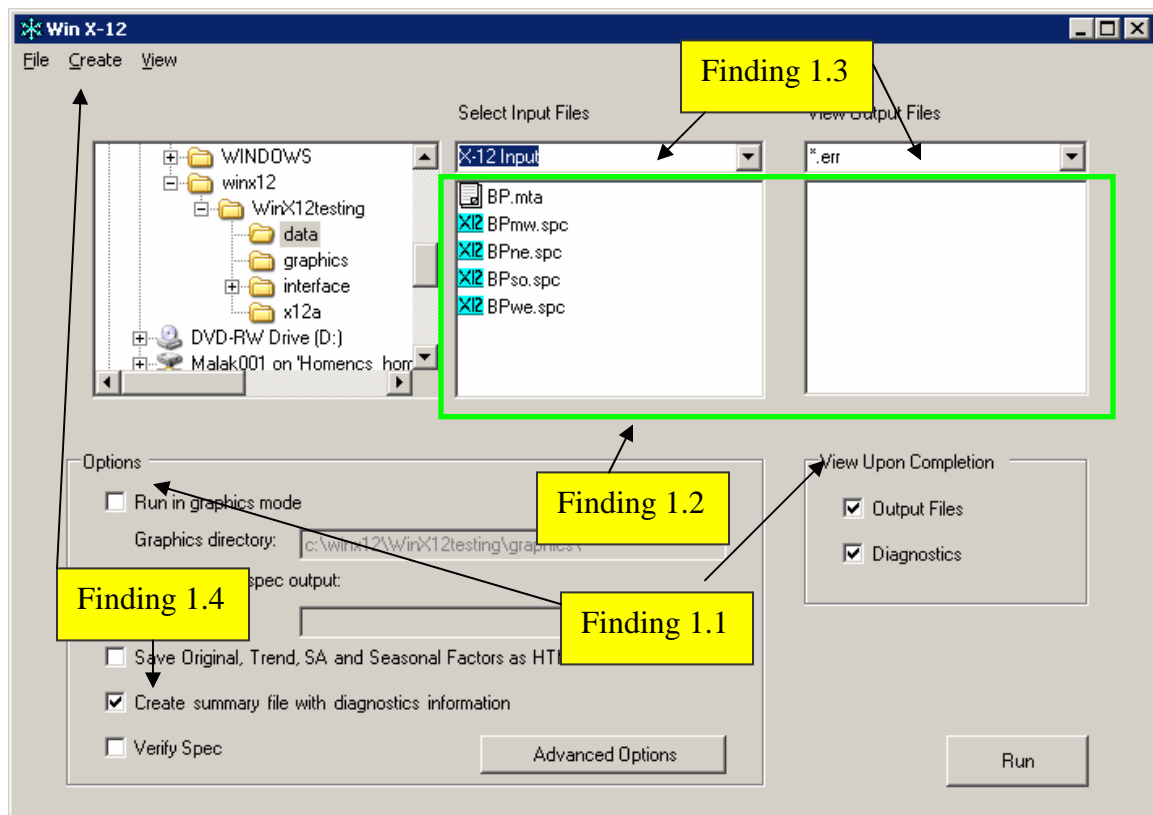


Figure 1. The main screen has two global accessibility issues: Instructions are not detected for the input/output list-boxes, and two controls use ALT-C as a shortcut.

Finding 1.1: The screen reader does not detect the text, “Options” or “View Upon Completion” in the group box lines on this screen.

Priority: High

Details: Although the screen reader detects the check box labels and button text inside the group box lines, the displayed text is not detected in the group box lines.

Recommendation: Group box text must be accessible so the screen-reader user can hear descriptions of the check box groups on the main screen, per 1194.21 paragraph A of the Section 508 regulation. Use the accessibility attribute for group boxes to make group box text accessible with the development software.

Finding 1.2: There are no instructions on how to select an item in the input and output file list-boxes.

Priority: High

Details: Hitting the space bar selects an item and highlights it in blue, but the screen reader does not detect or announce the status of the selected file. There is no instruction to use the space bar to select an item. This behavior violates 1194.22 paragraph N of the Section 508 regulation.

Recommendation: Instructions must be provided about selecting/deselecting files in the list. Item status must be announced when using the up/down arrows through the list.

Finding 1.3: Instructions for usage of the combo box are not vocalized by the screen reader.

Priority: High

Details: When the combo box is accessed, the screen reader does not give instructions on using arrows to make a selection or provide the number of items or position in the list. This behavior violates 1194.22 paragraph N of the Section 508 regulation

Recommendation: This control appears as a combo box, but does not perform like one. Instead, the screen-reader user only hears “edit combo,” with no instructions about using arrows to select other options. Users who can see would click on the combo box to view all options, but would also be aware they could type in text. We recommend replacing this non-standard edit/combo box with a combo box. We recommend saying “Use the up and down arrows to choose an option, 1 of N.” “N” is the number of options in the combo box. Also, typing a letter should change the focus to the first listed option beginning with that letter, and the screen reader should announce the position in the list, e.g. “3 of N.” Use the combo-box accessible text attribute within the development software to make this correction.

Finding 1.4: Two controls use the same hot key.

Priority: High

Details: The “Create” menu entry and the “Create summary file with diagnostics information” checkbox label both use ALT-C as the accelerator key shortcuts. This situation may cause the user confusion. This behavior violates 1194.21 paragraph A of the Section 508 regulation

Recommendation: Use unique accelerator key shortcuts for the menu entry and checkbox label.

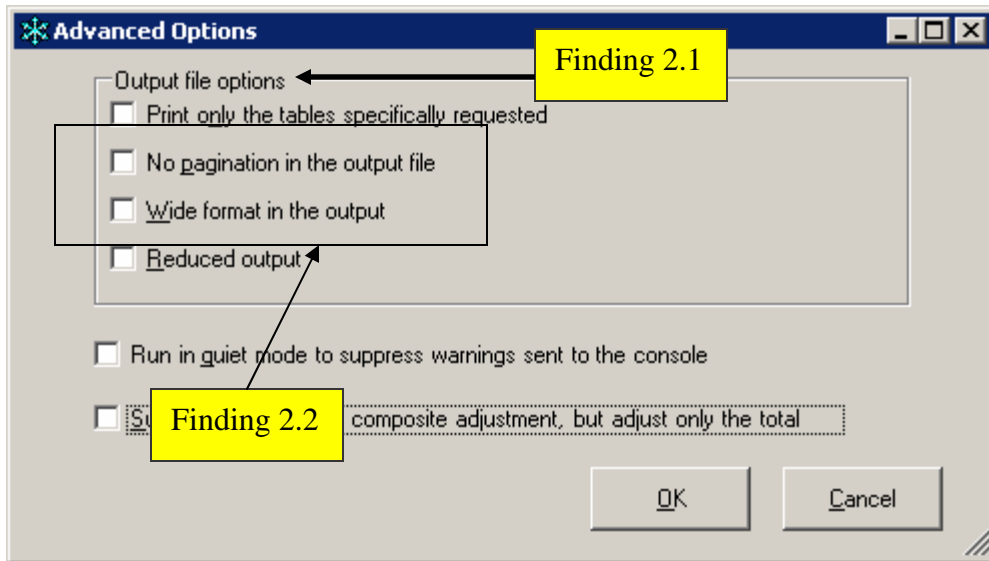


Figure 2. Output file options terminology does not take advantage of existing context.

Finding 2.1: Checkbox options are redundant or use negative logic.

Priority: Medium

Details: Usability of the checkbox options could be improved. The second option, “No pagination in the output file” uses negative logic and is redundant because it is already part of a group titled Output file options. The third option, “Wide format in the output”, uses redundant language.

Recommendation: The second option should read as “Pagination” and the third option should read as “Wide format.”

Finding 2.2: The screen reader does not detect the text, “Output file options” in the group box line on this screen.

Priority: High

Details: Although the screen reader detects the check box labels inside the group box line, the displayed text is not detected in the group box lines.

Recommendation: Group box text must be accessible so the screen-reader user can hear descriptions of the check box groups on the main screen, per 1194.21 paragraph A of the Section 508 regulation. Use the accessibility attribute for group boxes to make group box text accessible with the development software.

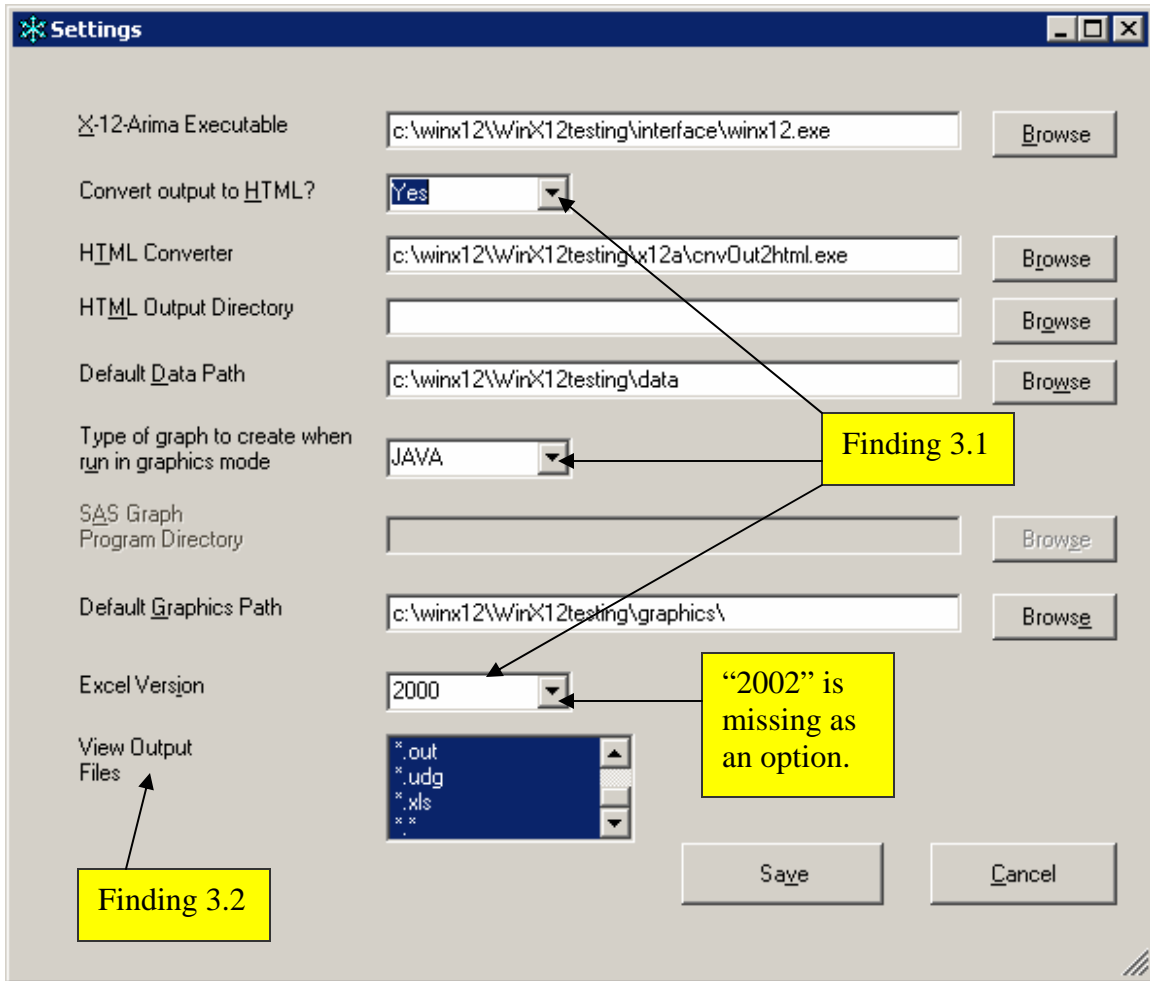


Figure 3. Instructions to use combo boxes and the label for the “View Output File” list box are inaccessible.

Finding 3.1: The screen reader does not vocalize instructions for using combo boxes.

Priority: High

Details: When the combo box is accessed, the screen reader does not give instructions on using arrows to make a selection or provide the number of items or position in the list.

This behavior violates 1194.22 paragraph N of the Section 508 regulation

Recommendation: This control appears as a combo box, but it does not perform like one. Instead, the screen-reader user only hears “edit combo,” with no instructions about using arrows to select other options. Users who can see would click on the combo box to view all options, but be aware they could type in text. We recommend replacing this non-standard edit/combo box with a combo box. We recommend “use the up and down arrows to choose an option, 1 of N.” “N” is the number of options in the combo box. Also, typing a letter should change the focus to the first listed option beginning with that letter, and the screen reader should announce the position in the list, e.g. “3 of N.” Use the combo box accessible text attribute within the development software to make this correction.

Finding 3.2: The label for the output file type list box is inaccessible.

Priority: High

Details: The screen reader did not detect the label for the output file type multi-selection list box. This behavior violates 1194.22 paragraph L of the Section 508 regulation

Recommendation: To know how to proceed, the screen-reader user must hear a label announced when focus is placed on the list box. Assign the label text shown on screen to the corresponding list box. This will ensure that the screen-reader user will hear what sighted users see when using this control. Use the development software to make this change.

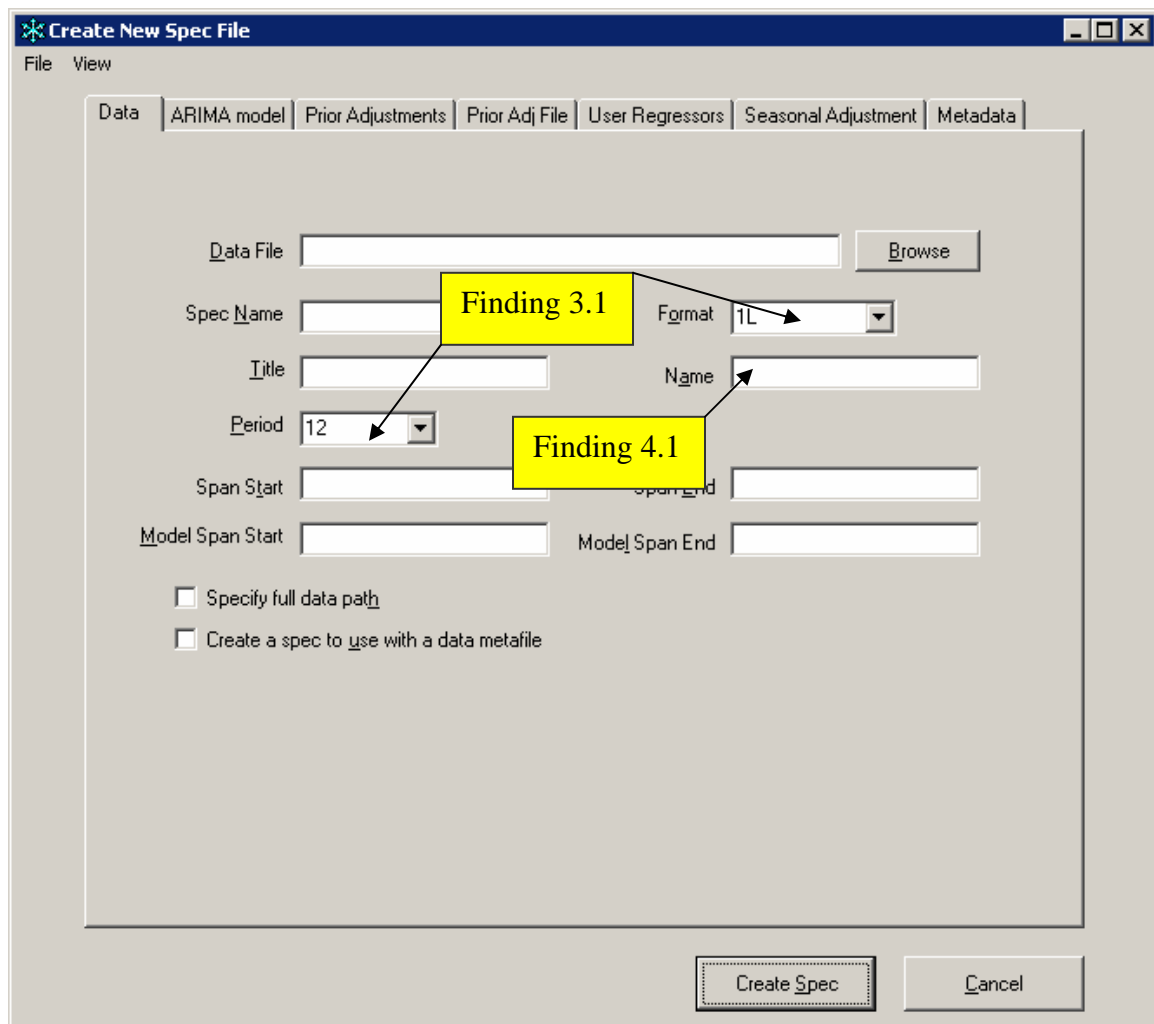


Figure 4. The “Name” data-entry field does not follow the “Title” data-entry field.

Finding 4.1: Tabbing order does not match the visual reading order on this screen.

Priority: High

Details: Screen-reader users are not presented data-entry fields in the same order as provided to sighted users. When format “1L” is selected, the Name data-entry field does not follow the Title data-entry field. Instead, the Name data-entry field follows the

“Create a spec to use with a data metafile” checkbox. This behavior violates 1194.22 paragraph N of the Section 508 regulation

Recommendation: Use the development software to ensure when the Name data-entry field is available it follows the Title data-entry field.

Note: Finding 3.1 applies to the “Format” and “Period” combo boxes.

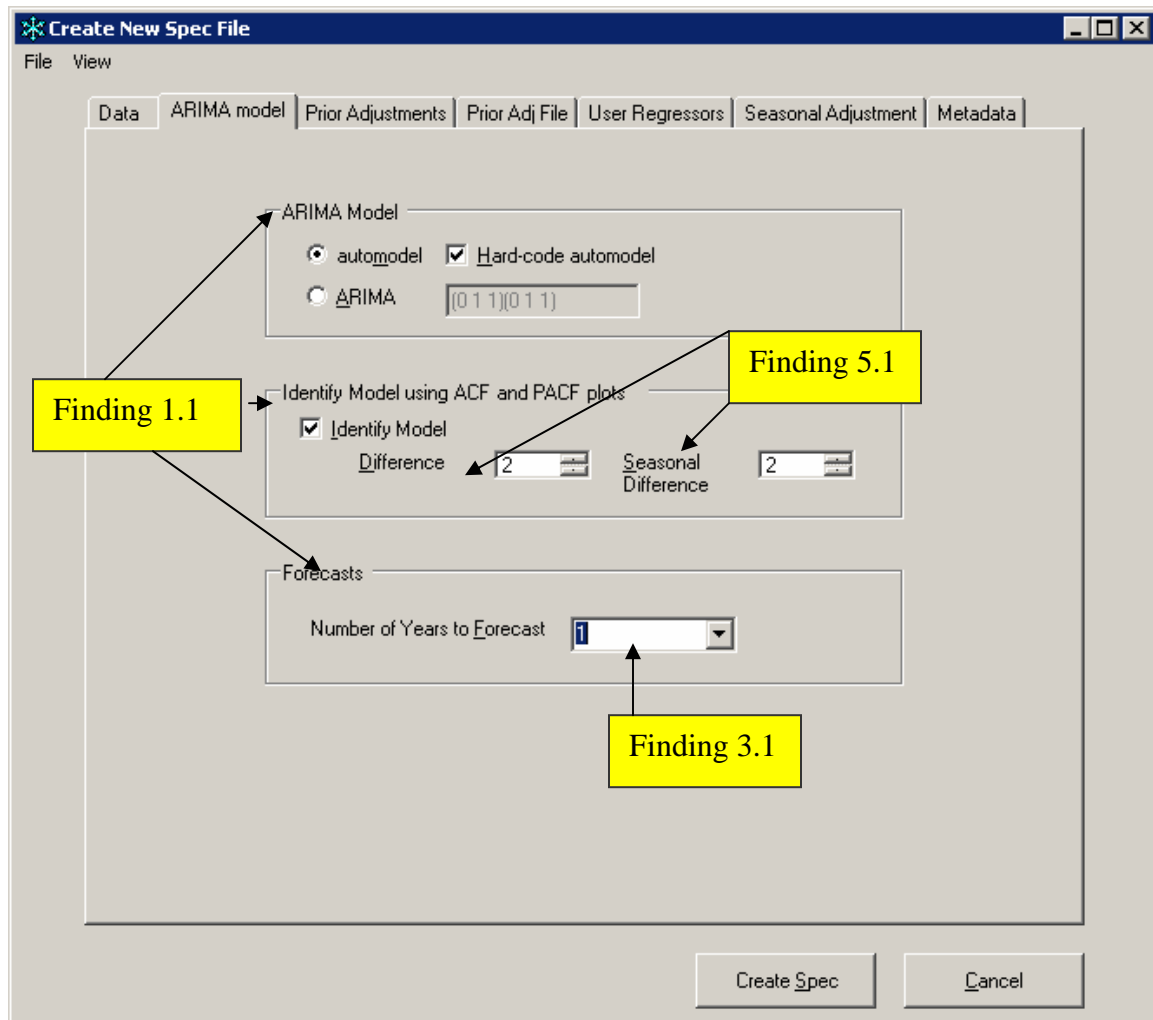


Figure 5. Labels for the “Difference” and “Seasonal Difference” spin boxes and text within the group box lines are inaccessible.

Finding 5.1: The labels for the “Difference” and “Seasonal Difference” spin boxes are inaccessible.

Priority: High

Details: The screen reader did not detect the label for the output file type multi-selection list box. This behavior violates 1194.22 paragraph L of the Section 508 regulation.

Recommendation: To know how to proceed, the screen-reader user must hear a label announced when focus is placed on the list box. Assign the label text shown on screen to the corresponding list box. This will ensure that the screen-reader user will hear what sighted users see when using this control. Use the development software to make this change.

Note: Finding 1.1 applies to the “ARIMA model,” “Identify Model using ACF and PACF plots,” and “Forecasts” group box text.

Note: Finding 3.1 applies to the combo box labeled “Number of Years to Forecast.”

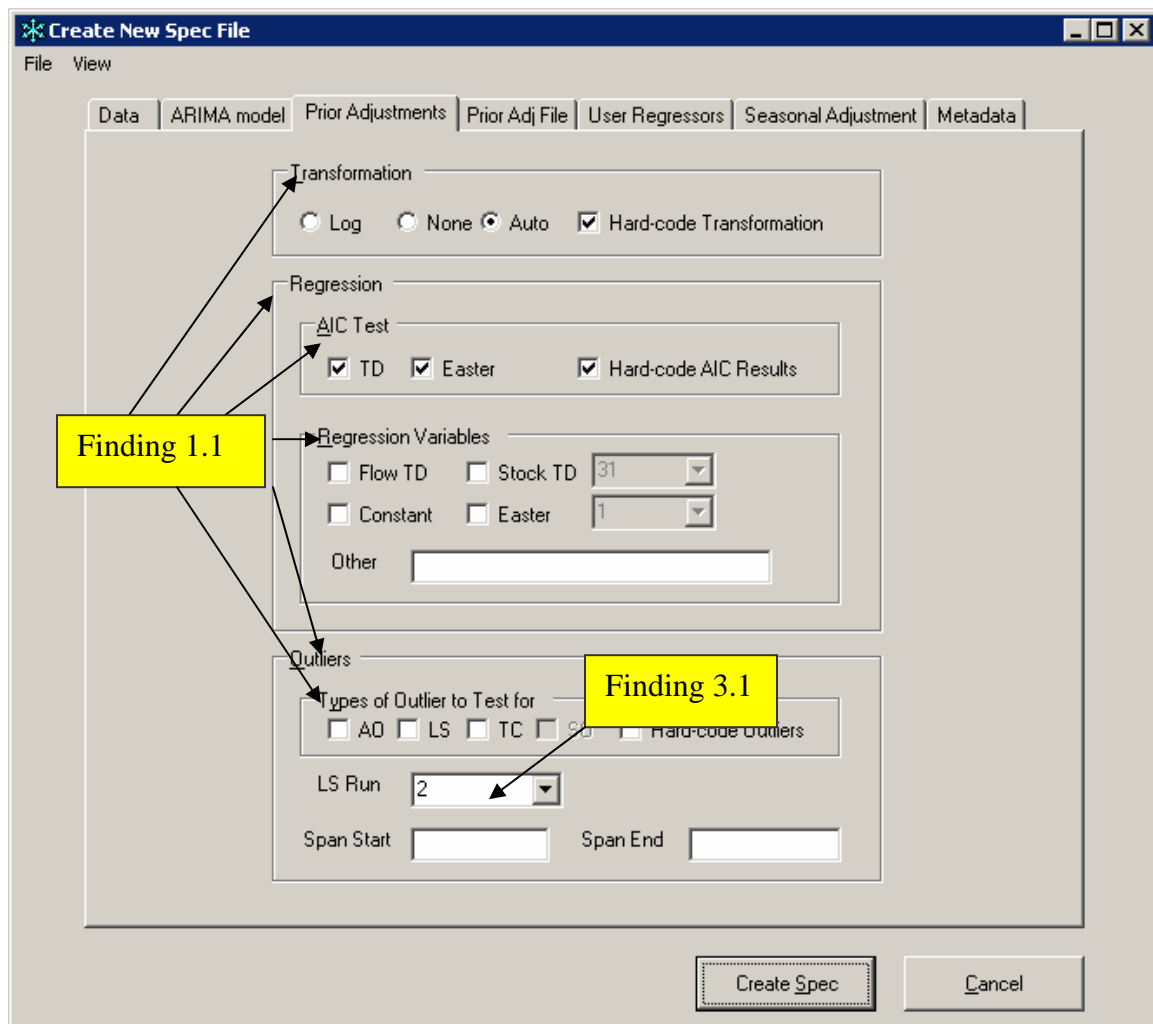


Figure 6. The “Prior Adjustments” screen has two global accessibility issues.

Note: Finding 1.1 applies to the “ARIMA model,” “Identify Model using ACF and PACF plots,” and “Forecasts” group box text.

Note: Finding 3.1 applies to the combo box labeled “LS Run”.

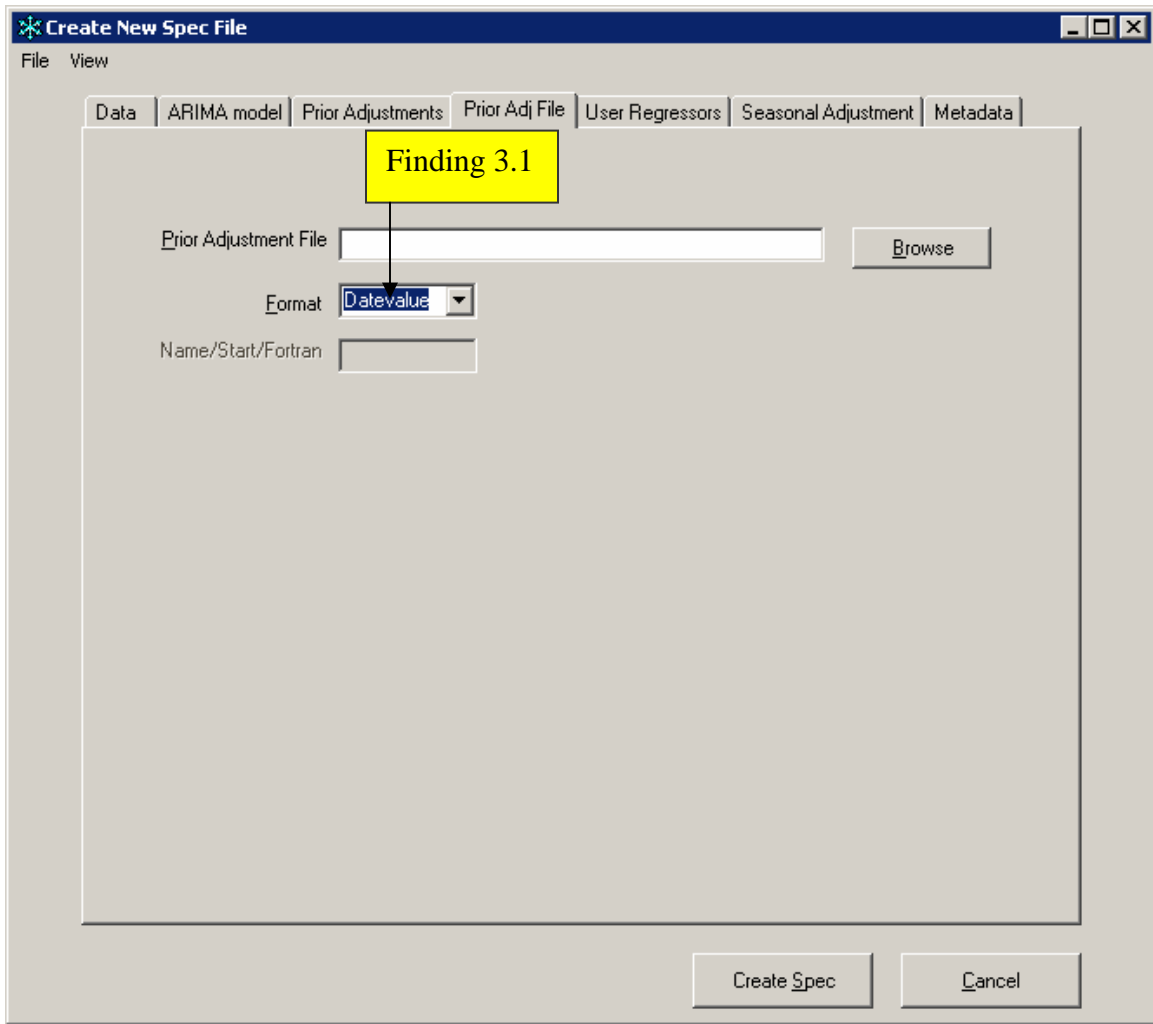


Figure 7. Instructions to use the combo box labeled “Format” are not accessible.

Note: Finding 3.1 applies to the combo box labeled “Format.”

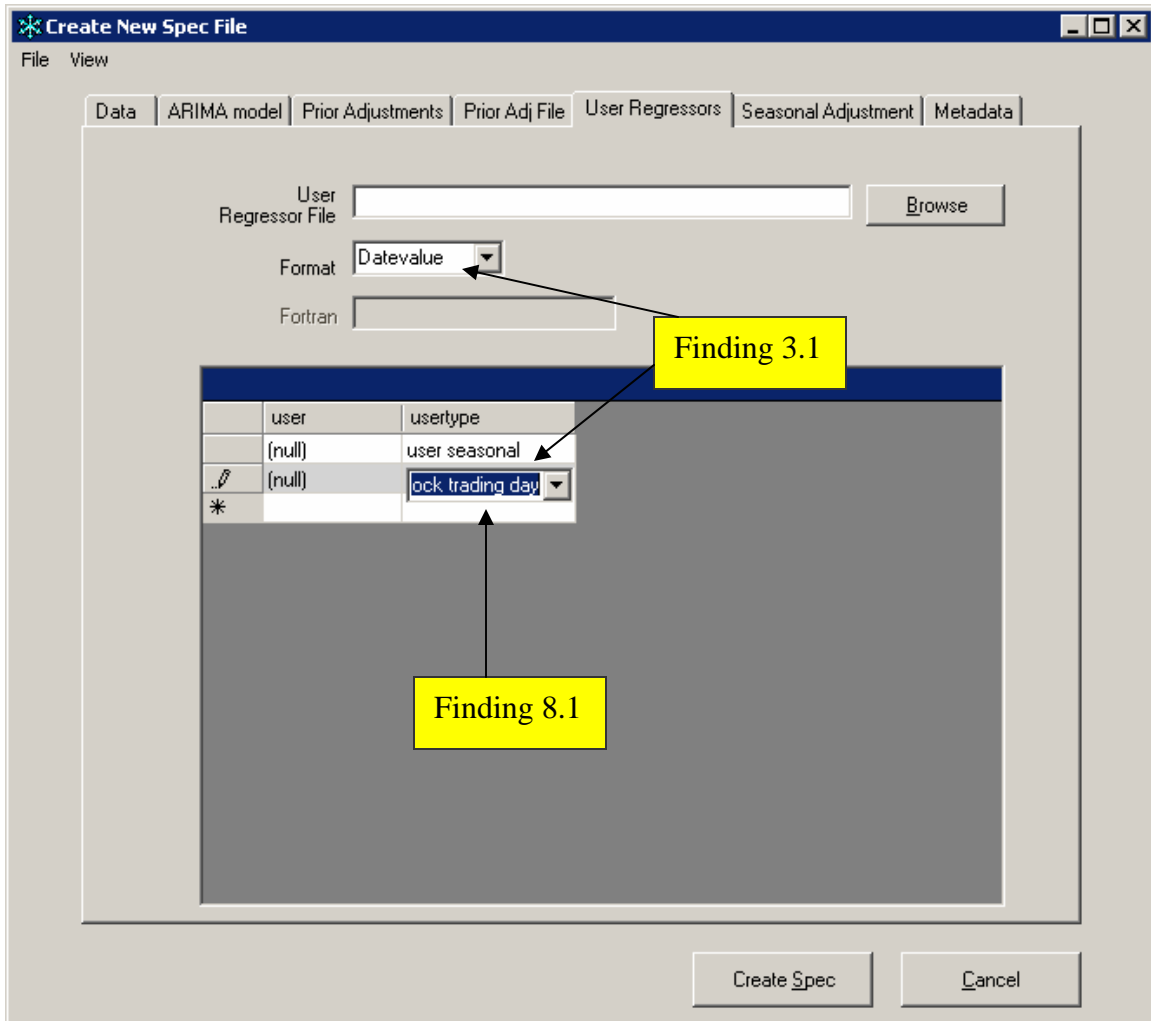


Figure 8. The User Regressors screen has a global accessibility issue and a formatting issue.

Finding 8.1: Text is covered in two instances in the combo box below the usertype column.

Priority: High

Details: The entry in Figure 8 should read “Stock trading day.” Similarly, the entry in Figure 9, below, should read “Length of Quarter.” This is a usability issue that affects all users. In both cases, there is plenty of room to expand the combo box window.

Recommendation: The screen name, “User Regressors,” may not be familiar to some users. We recommend usability testing to determine if this terminology will be understood. Use the development software to make the combo box window wider so all text is displayed properly without truncation.

Note: Finding 3.1 applies to the combo box labeled “Format.”

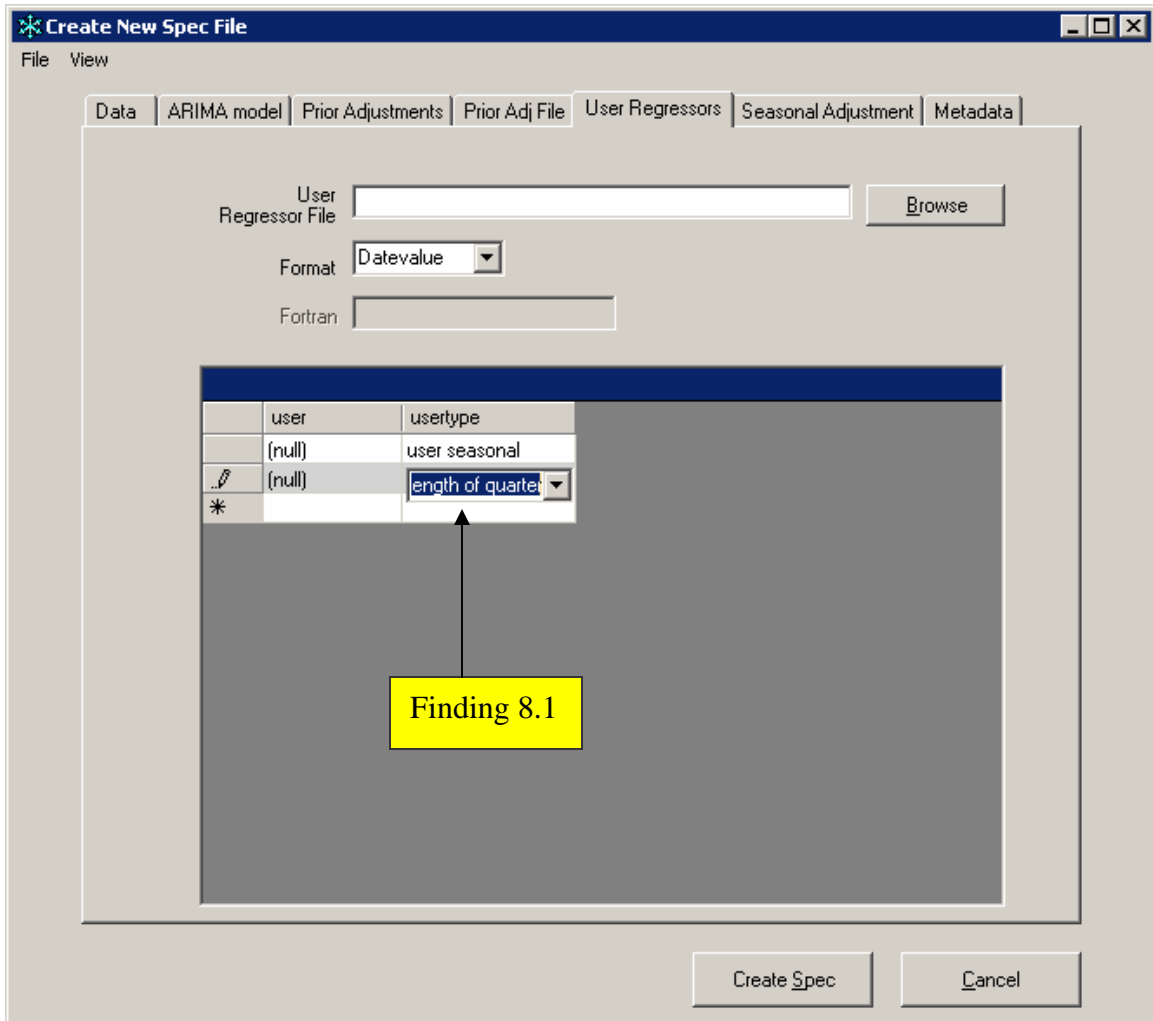


Figure 9. The Users Regressors screen has a truncated combo box entry.

Note: Finding 8.1 applies to the combo box underneath the usertype column.

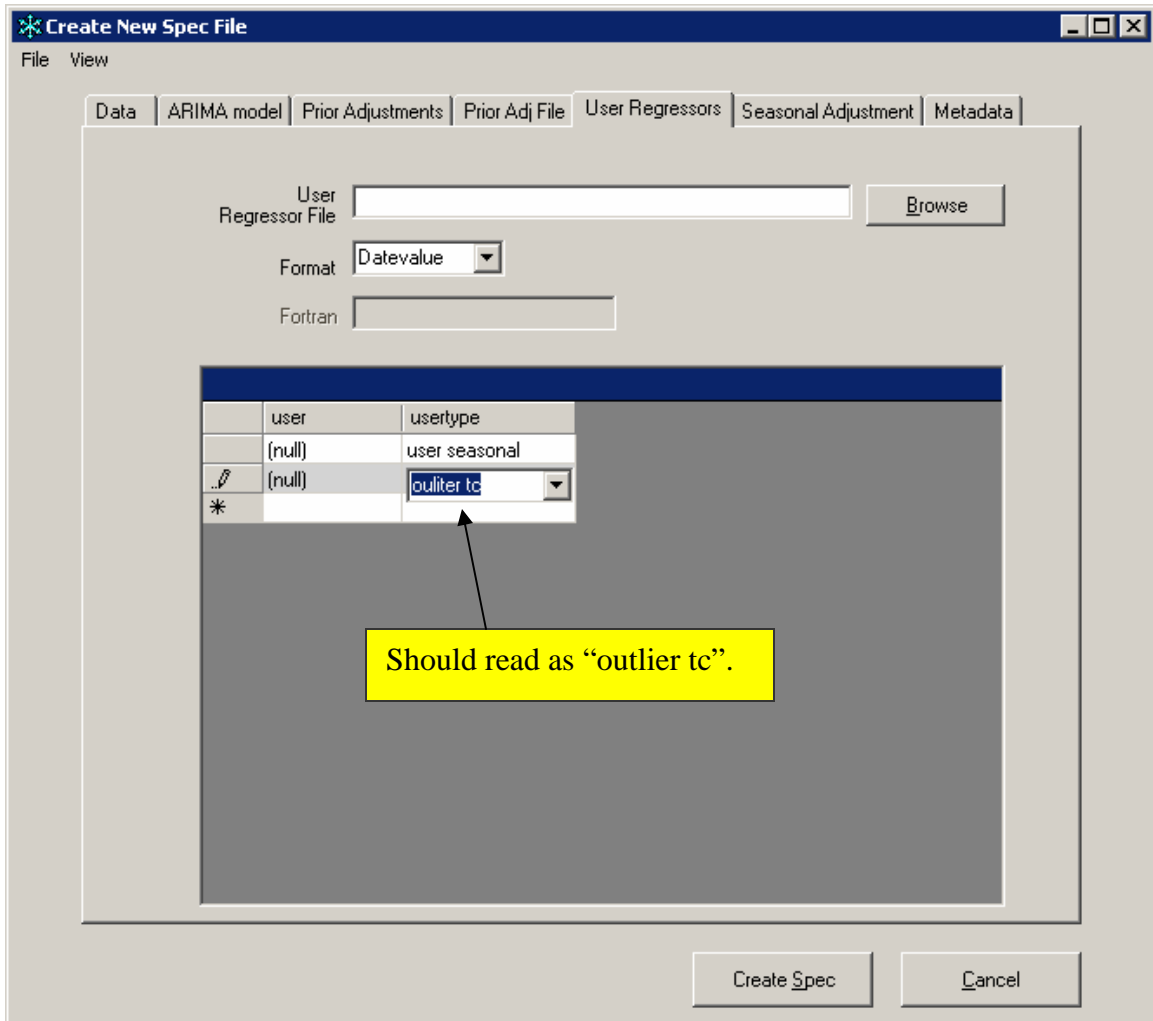


Figure 10. The combo box below the usertype column has an option with a spelling error. The correct spelling is “outlier tc.” The screen reader vocalizes spelling errors as written, causing confusion for users with visual impairments.

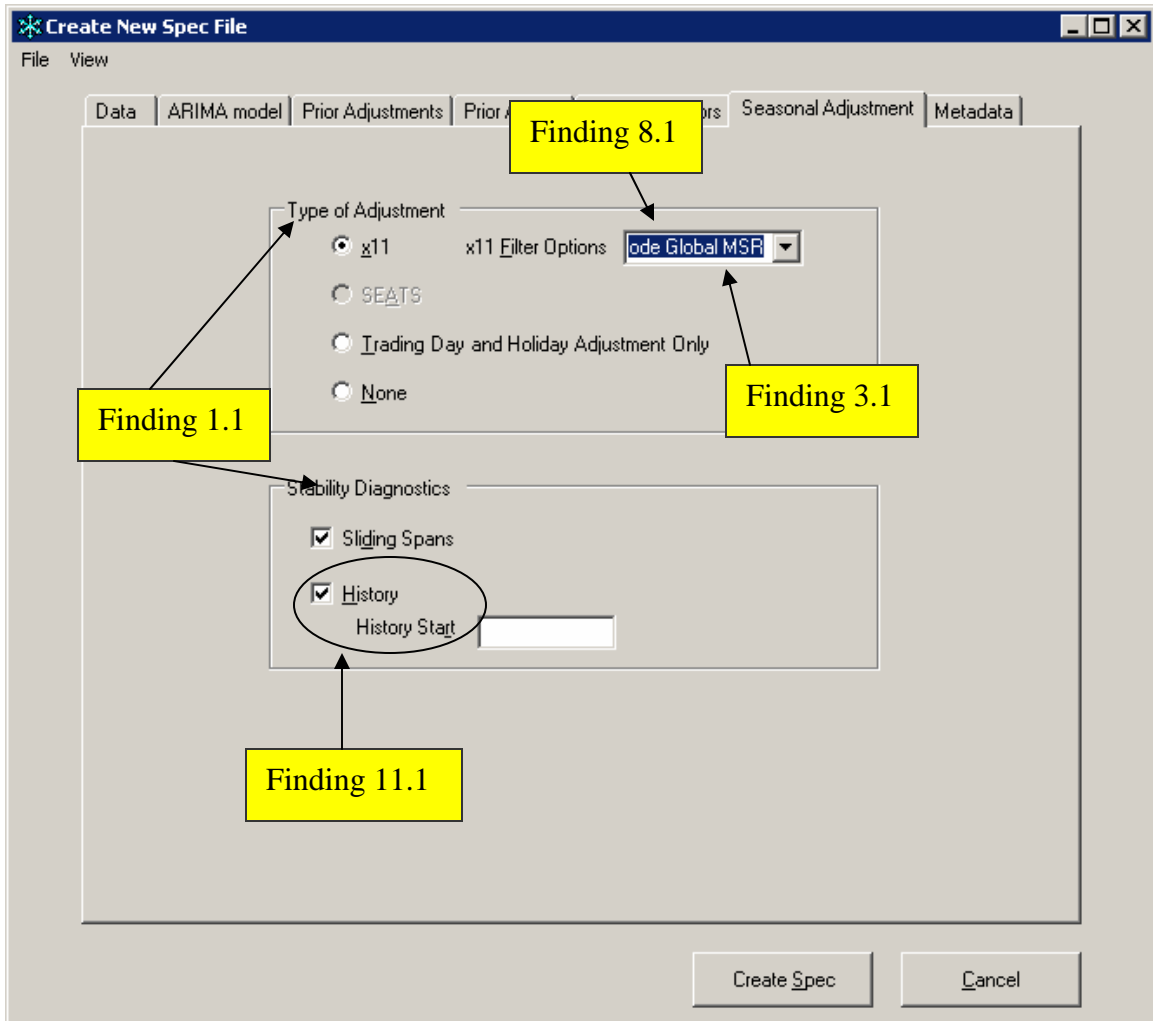


Figure 11. Text is cut off in the x11 Filter Options combo box, labels are too close to each other inside the Stability Diagnostics group box, and there are two global accessibility issues.

Finding 11.1: The “History” and “History Start” labels are too close to each other and may cause confusion.

Priority: Medium

Details: This is not an accessibility issue, but persons with normal vision may misread the checkbox label.

Recommendation: Use the development software to move the data-entry label and field further to the right of the “History” check box.

Note: Finding 1.1 applies to the “Type of Adjustment” and “Stability Diagnostics” group box text entries.

Note: Finding 3.1 applies to the combo box labeled “x11 Filter Options.”

Note: Finding 8.1 applies to the x11 Filter Options combo box. Text should read as “Hard Code Global MSR.”

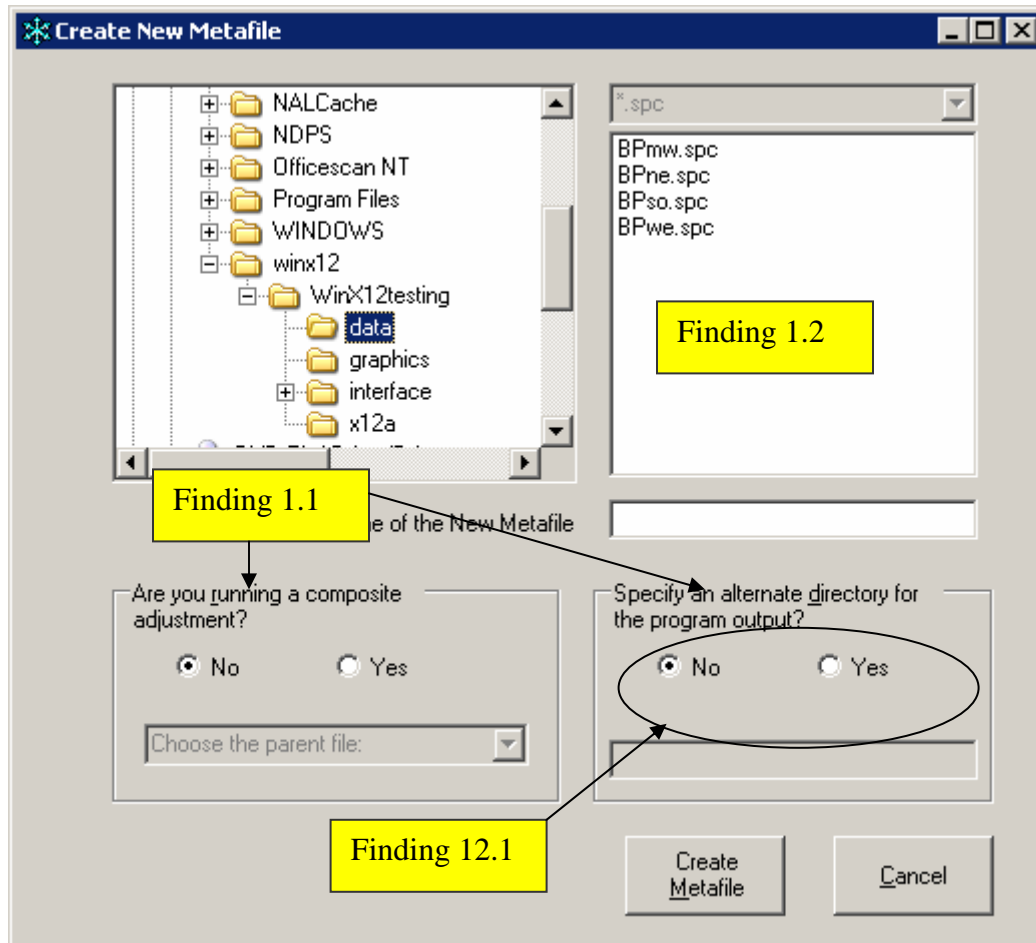


Figure 12. The Create New Metafile screen has buttons that do not follow the visual reading order and has two global accessibility issues.

Finding 12.1: Tabbing order does not match the visual reading order on this screen.

Priority: High

Details: The radio button options follow the “Create Metafile” and “Cancel” buttons instead of preceding them. This behavior violates 1194.22 paragraph N of the Section 508 regulation.

Recommendation: Use the development software to change the tab order so that the “Create Metafile” and “Cancel” buttons follow the radio buttons.

Note: Finding 1.1 applies to the “Are you running a composite adjustment?” and “Specify an alternate directory for the program output?” group box text entries.

Note: Finding 1.2 applies to the spc list box.

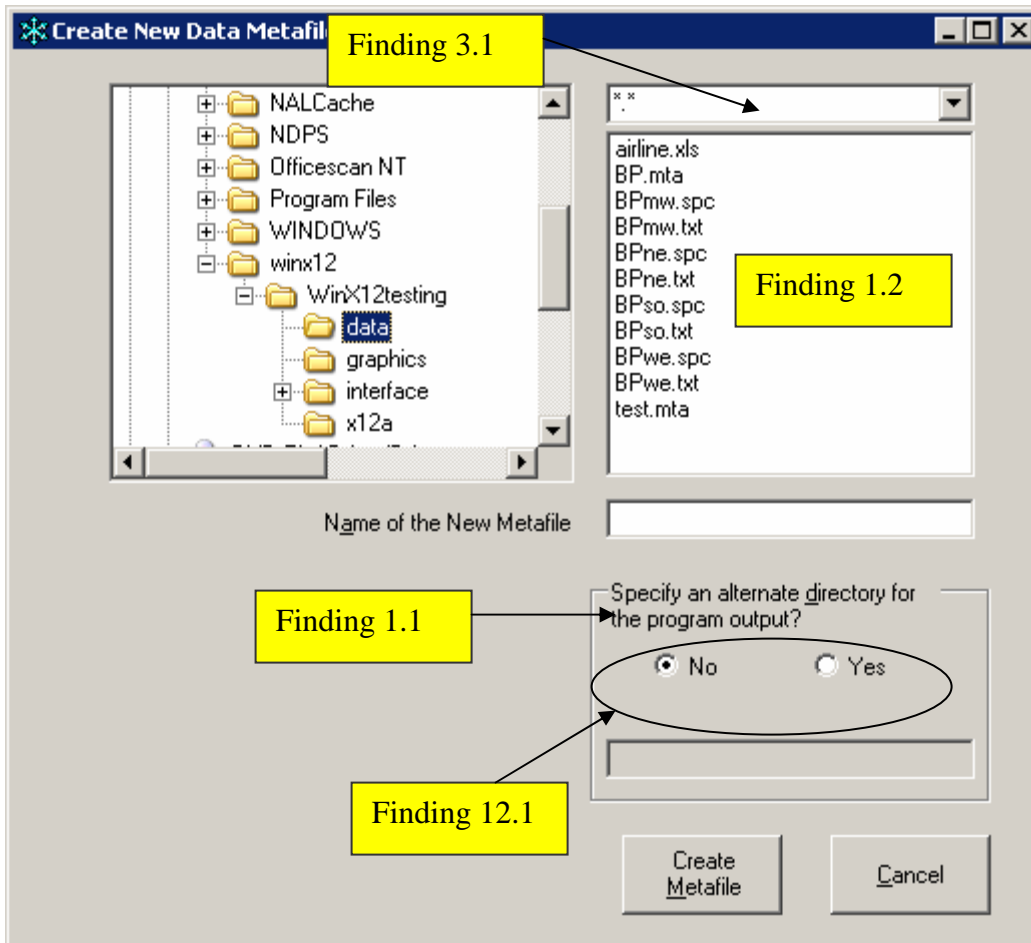


Figure 13. The Create New Data Metafile screen has three accessibility issues.

Note: Finding 1.1 applies to the “Specify an alternate directory for the program output?” group box text.

Note: Finding 1.2 applies to the “*.*” list box.

Note: Finding 3.1 applies to the file filter combo box.

Note: Finding 12.1 applies to the yes/no radio button options.

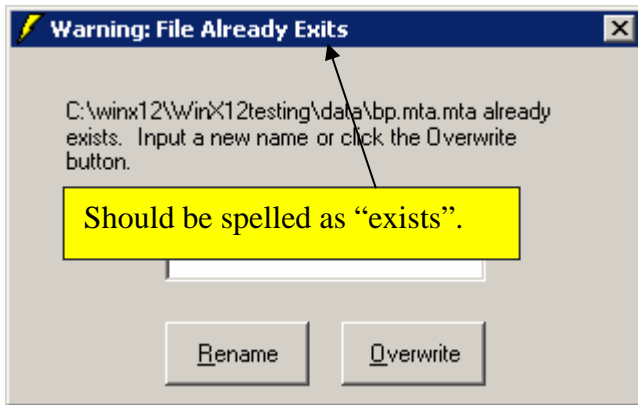


Figure 14. The Frame title has a typographical error.

The correct spelling is “exists”.

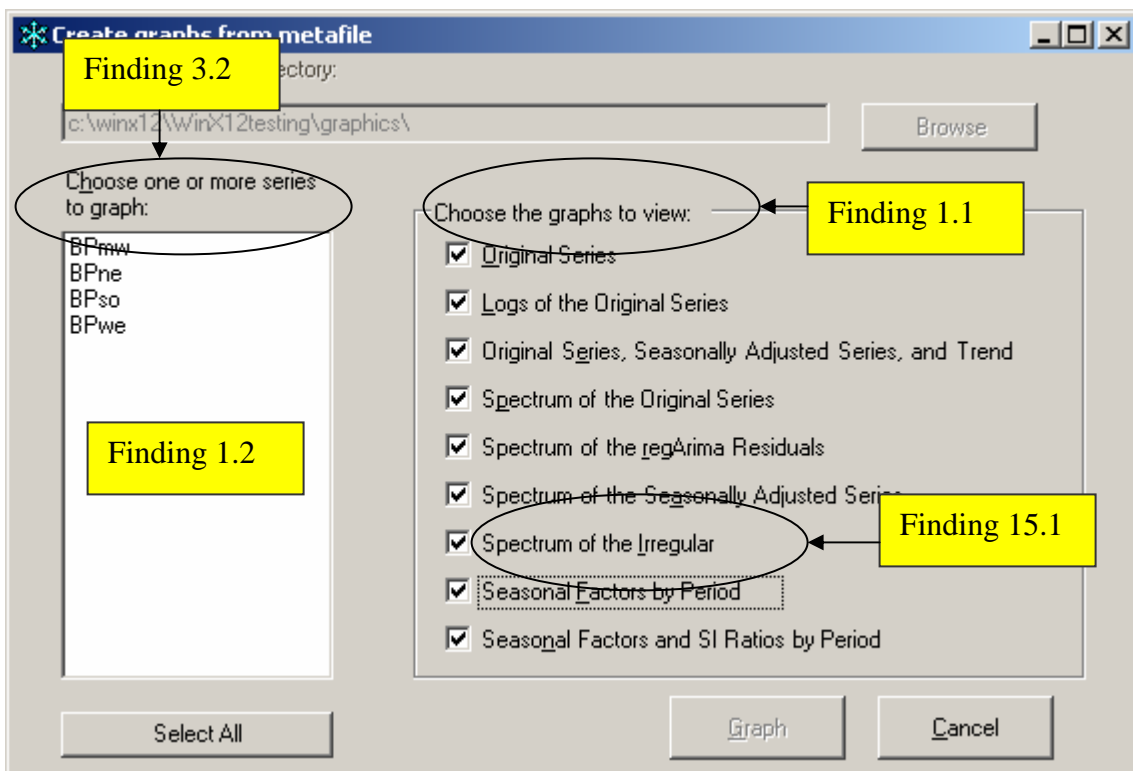


Figure 15. The Create graphs from metafile screen has four accessibility issues.

Finding 15.1: The screen-reader software does not vocalize the displayed text.

Priority: High

Details: “Spectrum of the Irregular” is voiced as “Spectrum of the Original” which does not match the displayed text. This behavior violates 1194.22 paragraph N of the Section 508 regulation.

Recommendation: Use the development software to replace “Original” with “Irregular.”

Note: Finding 1.1 applies to the “Choose the graphs to view:” group box text.

Note: Finding 1.2 applies to the list box labeled “Choose one or more series to graph:”

Note: Finding 3.2 applies to the label for the list box shown in Figure 15.

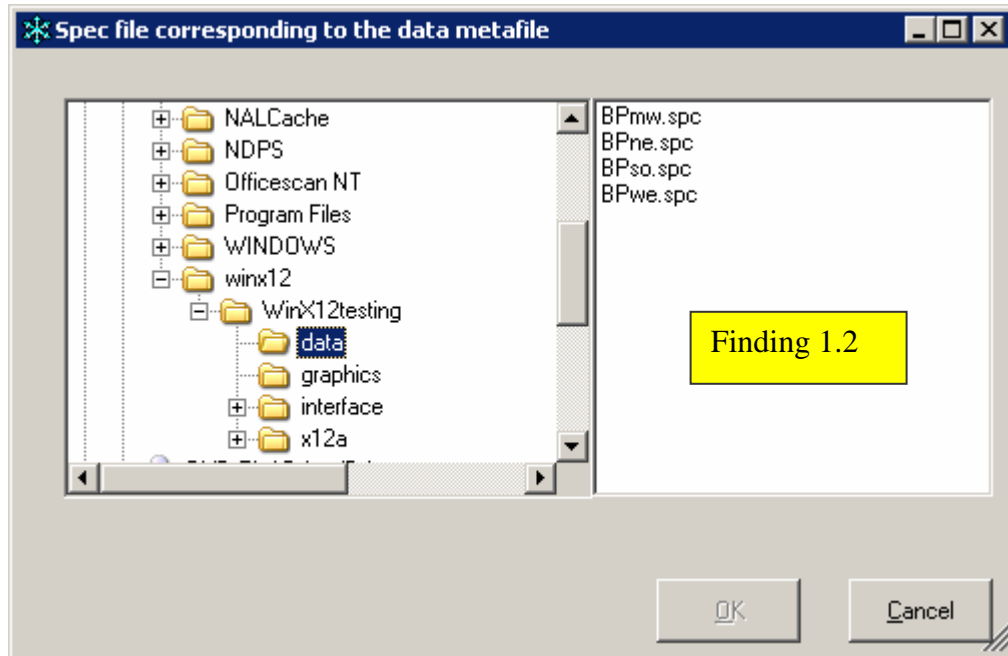


Figure 16. The list box does not provide status or position in the list.

Note: Finding 1.2 applies to the list box in Figure 16.

Summary

Accessibility

The Win X-12 application was found to have four global accessibility issues: 1) Combo box controls which permit a user to enter data do not give instructions to use arrow keys to select other options. 2) Group box text is not accessible. 3) List boxes are not labeled. 4) Position and status (selected, not selected) of list box entries are not accessible. There were three instances of incorrect tab order, and two spin boxes did not have accessible labels.

Usability

Few issues were discovered in the usability review. One combo box was too narrow to display combo box entries completely. Two labels were positioned too near each other, which may cause confusion.

If the recommendations from this accessibility evaluation are implemented, then this project can move forward to usability testing with X-12 users.

