TRADING TECHNOLOGIES

ALGOS IN X_TRADER®
SETUP GUIDE

LEGAL

Introduction

X_TRADER Pro and the TT Algo Strategy Engine (Algo SE server) provide an interactive way of creating custom trading algos and automated strategies. Using the drag-and-drop building blocks of ADL, you can quickly design, test, and deploy automated futures and options trading programs without writing a single line of code.

When an ADL strategy is deployed to the Algo SE server, the strategy is compiled and run as if it were a traditional computer program. Multiple instances of the algo can be launched from X_TRADER order entry windows, and the orders and fills generated from the algo can be managed similar to other orders.

The primary focus of this document is to describe how to use X_TRADER to deploy, launch, and manage custom trading programs created in ADL. In this document, we will…

- Examine how to deploy algos

- Illustrate how to launch algos

- Describe how to manage and modify running algos

- Describe algo order management

- Explain how TT risk checks algo orders

See the *ADL User Guide* to learn more about how to create custom trading programs using ADL.

Algo functionality was first released with X_TRADER Pro 7.11.2, Algo Strategy Engine (Algo SE) server 7.2.2, and TT User Setup 7.4.0. Please see the current release notes for specific software requirements.

Every X_TRADER user who shares an order book and works algo orders must use the same X_TRADER Pro version.

Testing Algos with TT SIM™

TT SIM with X_TRADER 7.11.2 (or higher) allows users to test their custom trading programs against a live production price feed via a simulated matching engine running locally on the X_TRADER workstation. The user may then seamlessly deploy and run these algos in their production trading environment.

It is strongly recommended that users test their algos with TT SIM before deploying algos to a LIVE production environment.

In X_TRADER 7.11.2 with Guardian™ 7.9, the **TT Login** dialog box displays two radio buttons allowing the user to log into either the production or simulation trading environment. Each option authenticates the Username against the user's login credentials in TT User Setup after the **Login** button is clicked.

> Use the TT Login dialog box to log into the desired trading environment

> Select **LIVE** to log into the production environment

> Select **TT SIM** to log into the simulation environment

The **TT SIM** radio button is grayed out and unavailable if TT SIM is not installed on the workstation.

X_TRADER can only operate in one mode at a time (i.e., LIVE or SIMULATION). To change modes, the user must exit and log back into X_TRADER. A gold *SIMULATION* band similar to the example shown below displays when operating in **TT SIM** mode.

X_TRADER Control Panel

> Gold *SIMULATION* band indicates user is logged into TT SIM

Deploying Algos

Once you have created algos in **ADL**, you may deploy them using the **Algo Dashboard**. The **Algo Dashboard** is accessible from the **X_TRADER Control Panel** by selecting ⚙ (the Algo Dashboard icon).

The ability to deploy algos is controlled by your login attributes to the Algo SE server as defined in TT User Setup.

The **Algo Explorer** pane allows you to deploy, view, and manage algos in an easy to use tree structure. Click the plus (**+**) sign to expand the tree and the minus (**-**) sign to collapse the nodes on the tree.

> **My Algos** contains algos deployed with your Username
>
> Select the desired Algo SE server to which you would like to deploy your algo
>
> **Public Algos** contains algos deployed and shared by others
>
> View the status of Algo SE servers: Green = active; Red = inactive
>
> Deploy an algo to the selected Algo SE server

Algo Explorer Pane

The top level of the tree is split into two branches: **My Algos** and **Public Algos**.

| Section	Description
My Algos	Displays algos deployed and owned by you or anyone else who is mapped to the same MemberGroupTrader ID on the Algo SE; these algos are private unless you enable the algo's **Share** parameter
Public Algos	Displays shared algos deployed by others with whom you share an order book on the Algo SE (i.e., mapped to the same Member and Group ID in TT Users Setup); the algo owner has enabled the algo's Share parameter on these algos

Once an algo owner has started a private algo, users sharing an order book with the algo initiator on the Algo SE and all TT Gateways used by the algo can manage (Pause/Run) that private algo, even though the **Share** parameter is not enabled.

Deploying Algos (continued)

Using the tree structure, you may deploy either private or public (shared) algos.

To deploy a private algo to an Algo SE server…

1. Select the **Algo SE** server in the **My Algos** section to which you would like to deploy your algo.

2. Click the **Deploy** button. This displays the **Algos** dialog box with a list of your algo source files. **Note:** You may also right-click the desired Algo SE server and select **Deploy…** from the context menu.

3. Navigate to your algo file and click [>] (the transfer button). This moves the algo file to the **Algos** field.

4. Select the desired Algo SE server in the **Algo Server** drop-down list.

5. Click the **Persist** check box if you would like the algo to remain on the server upon server restarts. (*Optional*)

6. Notice the **Share** parameter. The parameter is unavailable since you are deploying a private algo. If necessary, you may enable the **Share** parameter at a later time.

7. Click the **Password** check box if you would like to password protect your algo. This displays a text box where you can type up to 12 ASCII characters. (*Optional*)

8. Click the **Deploy** button to deploy the algo to the Algo SE server. The private algo displays in the **My Algos** section under the Algo SE server to which the algo was deployed.

Algos Dialog Box
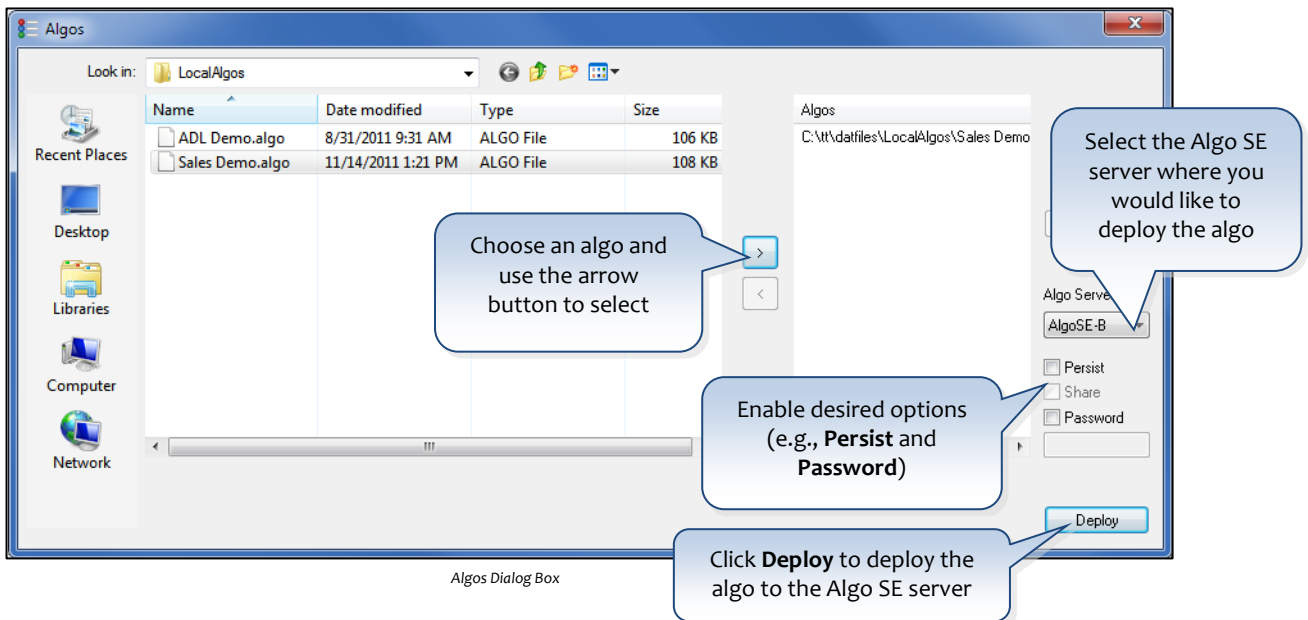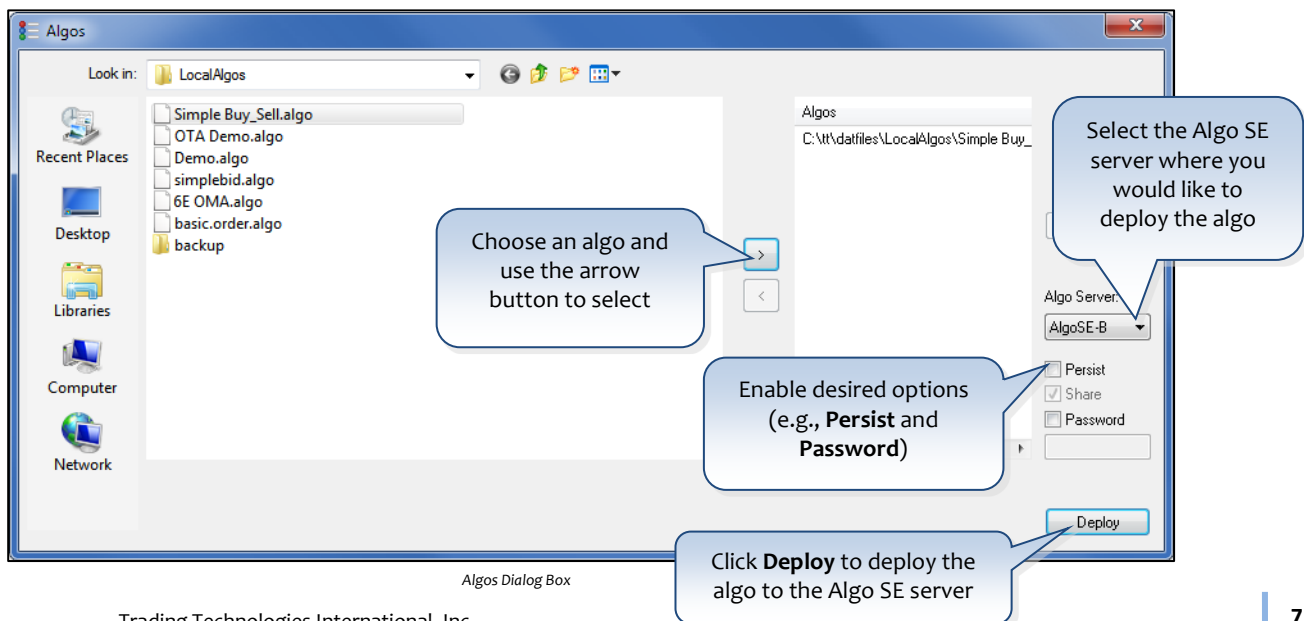
Deploying Algos (continued)

To deploy a shared algo to an Algo SE server...

1. Select the **Algo SE** server in the **Public Algos** section to which you would like to deploy your algo.

   Note: Administrators can only deploy public algos by selecting an Algo SE server listed in the **Public Algos** section. Users that roll up to the administrator can view, start and manage the algo.

2. Click the **Deploy** button. This displays the **Algos** dialog box with a list of your algo source files. **Note:** You may also right-click the desired Algo SE server and select **Deploy...** from the context menu.

3. Navigate to your algo file and click ☐ › ☐ (the transfer button). This moves the algo file to the **Algos** field.

4. Select the desired Algo SE server in the **Algo Server** drop-down list.

5. Click the **Persist** check box if you would like the algo to remain on the server upon server restarts. (*Optional*)

6. Notice the **Share** field is disabled. The **Share** parameter is automatically enabled when you are deploying to a server listed in the **Public Algos** section. If necessary, you may disable the **Share** parameter at a later time.

7. Click the **Password** check box if you would like to password protect your algo. This displays a text box where you can type up to 12 ASCII characters. (*Optional*)

8. Click the **Deploy** button to deploy the algo to the Algo SE server. The shared algo displays under the Algo SE server to which the algo was deployed in your **My Algos** section and in the **Public Algos** section for those with whom you share an order book.
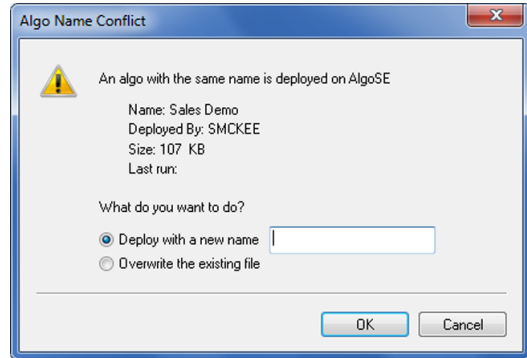
Algos Dialog Box

Deploying Algos (continued)

Algo names must be unique.

Each deployed non-shared algo on the Algo SE server must have a unique name per Member Group Trader ID. The **Algo Name Conflict** dialog box displays when deploying an algo using the name of an existing non-shared algo on the server. When a naming conflict occurs, you may either deploy the algo with a new name or overwrite the existing algo residing on the server.

Algo Name Conflict Dialog Box

You may choose to deploy and persist an algo to the Algo SE server using the name of an existing shared algo already residing on the server. This duplicate instance is private (non-sharable) and cannot be seen by others sharing an order book in their **Public Algos** list. However, users can manage (Pause/Run) these private algos once the owner has started them.

Persisted Algos

When an algo is deployed, the algo's source code is sent to the selected Algo SE server. The Algo SE server compiles the source code and loads the compiled code into memory. Enabling the **Persist** option saves the algo source code to disk in an encrypted format. When the Algo SE server is restarted, persisted algos are reloaded into memory allowing you to run your algos without re-deployment.

Algo Templates

X_TRADER provides the ability to create and manage algo templates. These allow you to save frequently used variable settings for future use. For example, you've created an algo designed to run on different instruments, but do not want to change the instrument each time that you start the algo. Instead, you can change the instrument variable and save the algo as a new template.

Templates are server-specific, meaning if you create a template on Algo SE-A for an algo that is on both AlgoSE-A and AlgoSE-B, the template will only be available on AlgoSE-A. If you wish to use the template on AlgoSE-B, you will need to create a separate template on AlgoSE-B.

When an algo is redeployed on an Algo SE server (e.g., updated with a new version) all templates associated with the algo are removed. This prevents an old template from referencing variables that may have new meaning or might not even be present in the newly updated version of the algo.

All algo templates are private and cannot been seen by or used by others. Algo templates display in the **Algo Explorer** tree structure below the associated algo. Although templates are private, Algo users sharing an order book can manage (Pause/Run) and manipulate algo variables once the owner has started the private template even when the **Share** parameter is not enabled.

To create an algo template from the Algo Dashboard…

1. Select the desired algo in the **Algo Explorer** pane. This displays the algo variables in the **Algo Variable** pane.

2. Edit the variables as needed.

3. Click the **Templates** drop-down at the top of the **Algo Variable** pane and select **Save Template**. This displays a dialog box with a suggested template name of "New Template". If "New Template" already exists for the algo on the Algo SE server, then the proposed name will include an integer enclosed in parentheses (e.g., New Template (1)).

   Note: You may also select the **Save Template As…** option.

4. Type a template name and click **OK**. This creates the new template and displays the template name under the associated algo in the **Algo Explorer** pane.

*Select **Save Template***

Algo Variable Pane

Displays template under the selected algo
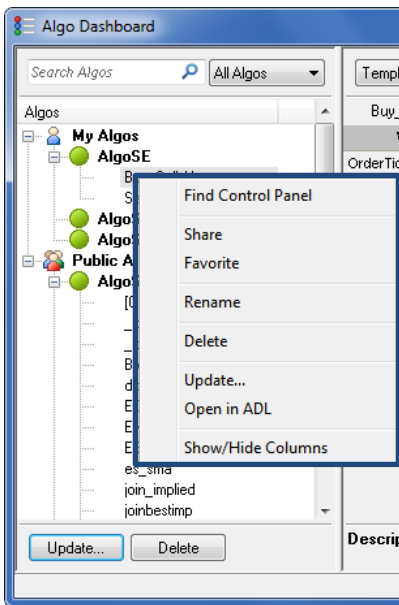
Algo Explorer Pane
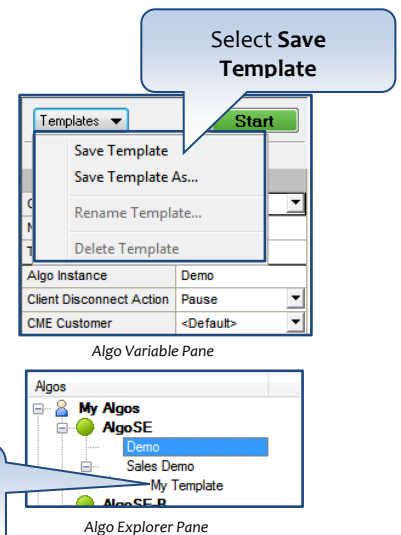
Once you have created an algo template, you may save your current template parameters with a new template name, rename the template, or delete the template from either the **Template** drop-down or the right-click template context menu.

Managing Deployed Algos

Algo Dashboard

You can use **Algo Explorer** to manage your algo files and templates. For example, you can right-click a deployed algo to display the **Algo Explorer** context menu. From the right-click context menu, you can...

Algo Explorer Pane

Option	Description
Find Control Panel	Displays the X_TRADER Control Panel
Share	Shares the deployed algo with other users
Favorite	Sets the algo as your favorite **Note:** This option does not apply to templates or servers.
Rename	Renames the algo or algo template
Delete	Deletes the algo on the Algo SE server
Update	Launches the **Algos** dialog box allowing you to load updated source code to the server
Open in ADL	Opens the algo in **ADL**
Show/Hide Columns	Sets the columns that you would like to display in **Algo Explorer**

Only the owner who deployed the algo can **Share, Rename, Delete** and **Update** algo parameters.

Selecting **Show/Hide Columns** from the right-click context menu allows you to choose the columns that you would like to display in **Algo Explorer**. The table shown below describes optional columns provided to help you manage algos.

Column	Description
Deployed By	Displays the **Username** of the person who deployed the algo on the Algo SE server (i.e., the algo owner)
Shared	Indicates whether other users sharing an order book can launch the algo
Persisted	Indicates whether the encrypted algo source code is saved on the Algo SE server
Type	Displays the algo type: OTA (Order Ticket Algo) or OMA (Order Management Algo)

Managing Deployed Algos (continued)

Sharing Algos

After deploying a private algo to an Algo SE server, you may share the algo with other users. All users mapped to the Algo SE server can then see and launch the algo. Users who need to share working instances of algos on a server must be configured with credentials that allow order book sharing on the Algo SE server and all TT Gateways corresponding to the instruments that will be used by the algo.

Proper TT User Setup credentials (i.e., Algo Deployment Allowed and Algo Sharing Allowed) are required to share algos with other users.

To share your deployed algo with other users...

1. Right-click the desired algo in the **My Algos** section. This displays the **Algo Explorer** context menu.

2. Select **Share**. This enables the **Share** parameter on the Algo SE server. Users with whom you share an order book can see the algo listed in their **Public Algos** section under the applicable server and can launch the algo.
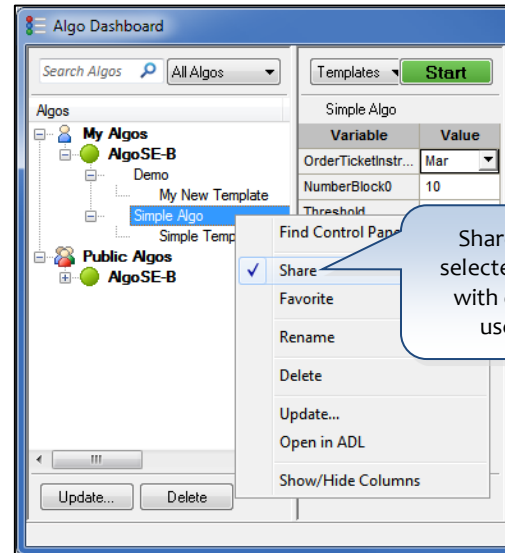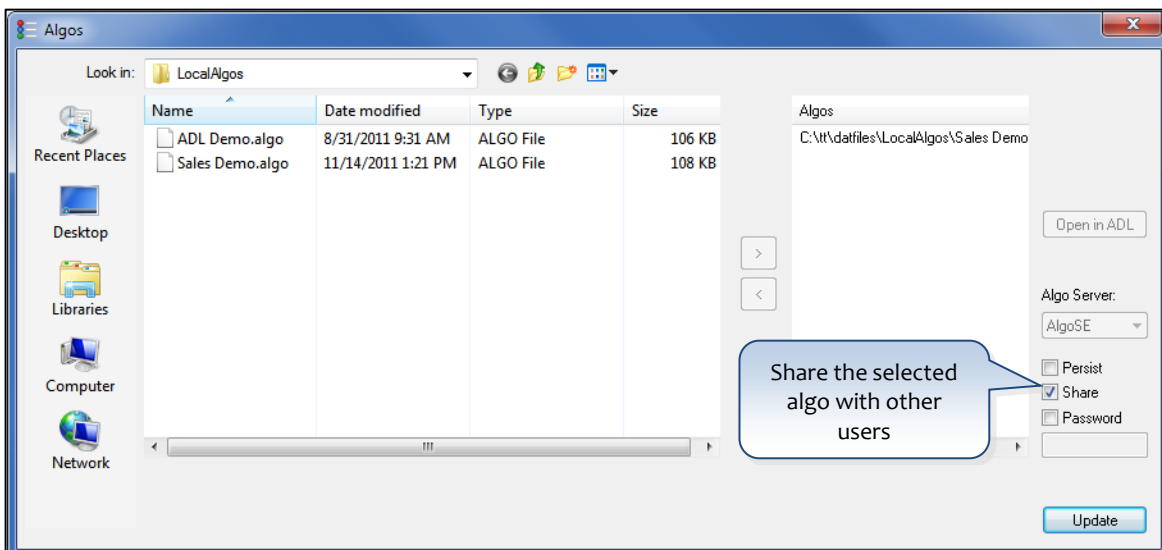

Algo Explorer Right-Click Context Menu

Shared algos must have unique names.

The algo owner can also enable (or disable) the **Share** parameter when updating an algo. Do this with caution since **Update** re-deploys the algo, and erases all templates related to the updated algo, including private algo templates created by users with whom you share an order book.

Algos Dialog Box

Managing Deployed Algos (continued)

Updating Algos

Update functionality, available from the the **Algo Explorer** right-click context menu or the **Update** button, allows you to…

- Load a changed algo to the server
- Enable/Disable the **Persist** option
- Share your algo with other users in your trading environment
- Enable/Disable a **Password**

Update re-deploys the algo and erases all templates related to the updated algo. This includes private algo templates created by users with whom you share an order book.

To update an algo on the Algo SE server…

1. Select the desired algo in the **My Algos** section of the **Algo Explorer** pane.
2. Click the **Update** button at the bottom of the **Algo Explorer** pane.

   Note: You may also right-click the algo and select **Update…** from the context menu.

3. If the correct location does not display in the **Algos** field, navigate to your updated algo file and click ⟩ (the transfer button) to move the algo file to the **Algos** field.

4. Update **Persist, Share**, and **Password** options. (*Optional*)

   Note: If you previously assigned a password to the algo, you will need to type the password before the **Update** button is enabled.

5. Click the **Update** button to update the algo on the Algo SE server.
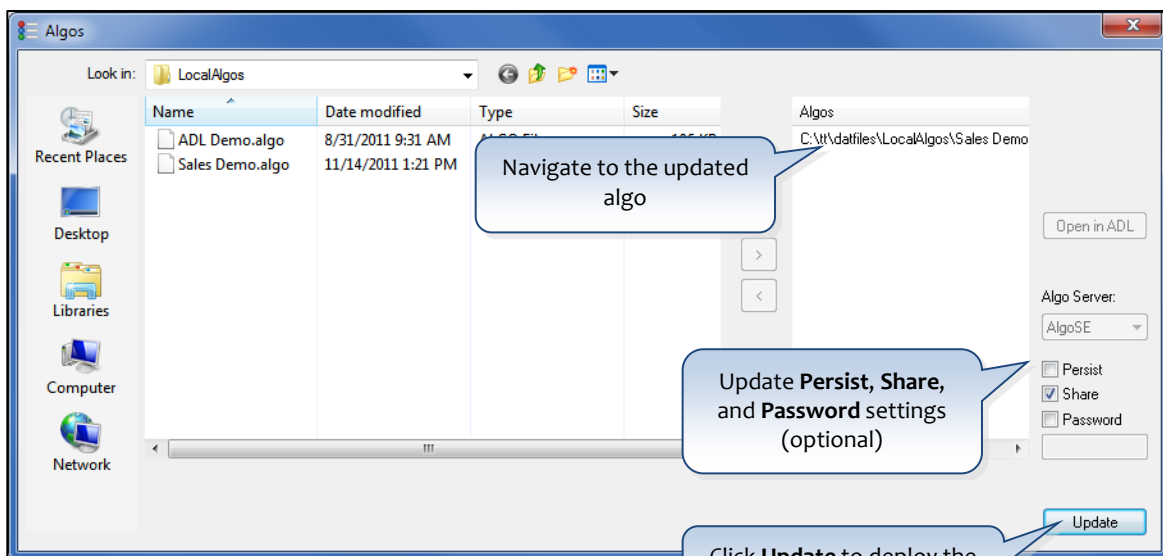
Algos Dialog Box

Managing Deployed Algos (continued)

Opening the algo in ADL

The **Open in ADL** option available in the **Algo Explorer** right-click context menu allows you to open and modify algos that you have deployed. Additionally, users who can see a shared and persisted algo in **Algo Explorer** can request the algo from the server using the **Open in ADL** option. You may want to set an optional password if you want to prevent others from opening the algo in **ADL**.
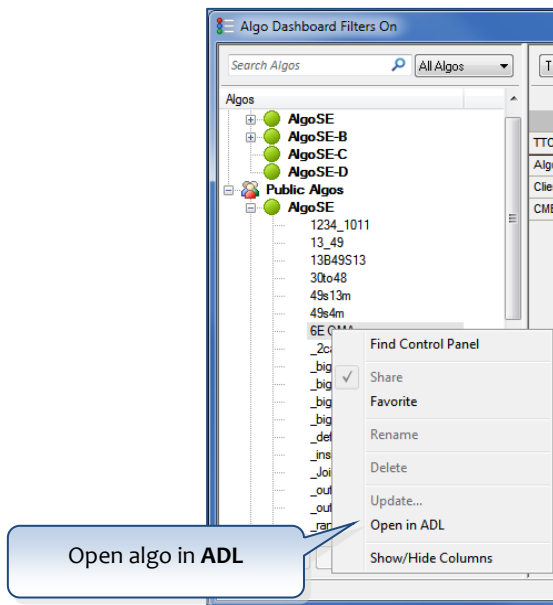
Algo Explorer Right-Click Context Menu

The dialog box shown below displays if the algo file residing on your local workstation is different from the algo file residing on the server. You may either open the local copy or download a copy of the algo from the Algo SE server.
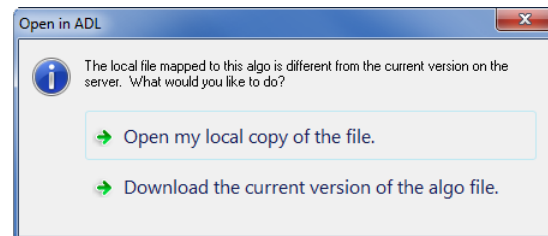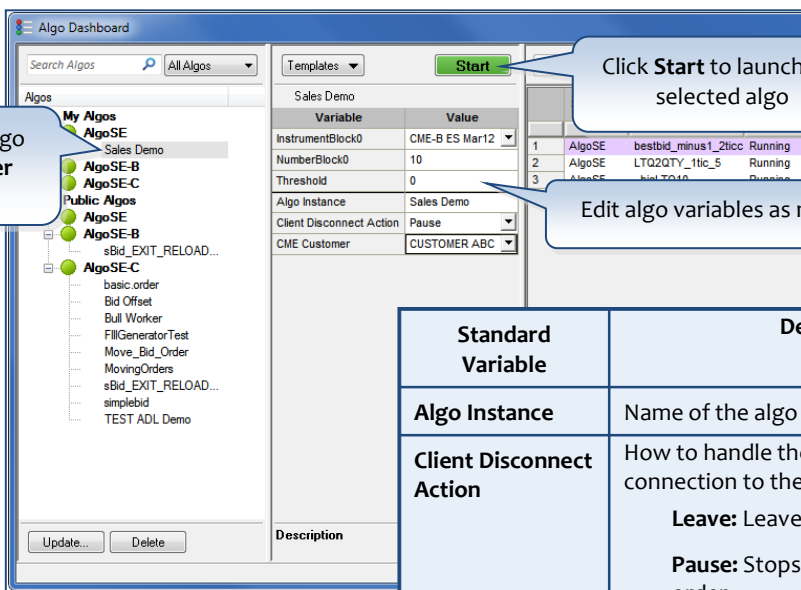
Launching Algos

X_TRADER provides several ways to start your algos. In this section, we will explore how to start algos from the **Algo Dashboard, Market Window**, the **Order Pane**, and **MD Trader**.

Algo Dashboard

The **Algo Variable** pane allows you to modify algo variables, create templates, and launch deployed algos that you have selected in the **Algo Explorer** pane. The **Algo Variables** pane displays two types of algo variables: algo specific and standard variables.

Algo Variable Type	Description
Algo Specific	Added within **ADL** at design time and can include such things as order quantity or instrument
Standard	Allows you to change the algo instance name Defines how to handle the working algo if connection to the Algo SE server is lost Defines the default customer for the specified market

Algo Dashboard

Standard Variable	Description
Algo Instance	Name of the algo defined in **ADL**
Client Disconnect Action	How to handle the working algo when connection to the Algo SE server is lost: **Leave:** Leaves algo order working **Pause:** Stops further actions to algo order **Delete:** Deletes algo order
Market Customer	Customer default for the specified market **Note:** The market drop-down list displays if the algo trades on multiple markets.

To start algos from the Algo Variable pane…

1. Select the desired algo (or algo template) in the **Algo Explorer** pane. This displays algo variables in the **Algo Variable** pane.

2. Edit the variables as needed.
   Note: Rather than typing a static variable, you may paste link a variable from Excel.

3. Click **Start** to launch the algo. Upon successful submission to the Algo SE server, the **Algos Orders** pane displays the algo order in the **Running** state.

Launching Algos (continued)

Users with whom you share an order book may not have the same product permissions. Attempts to launch an algo containing an instrument for which they are not permissioned will be rejected and display a reject message in the **Audit Trail**.

Once the algo instance is started, the **Algo Dashboard** displays the algo in the **Algo Orders** pane. Users sharing an order book will see each other's working algos even when the algo is not shared.

Algo Orders Pane

The table shown below describes the default columns displayed in the **Algo Orders** pane.

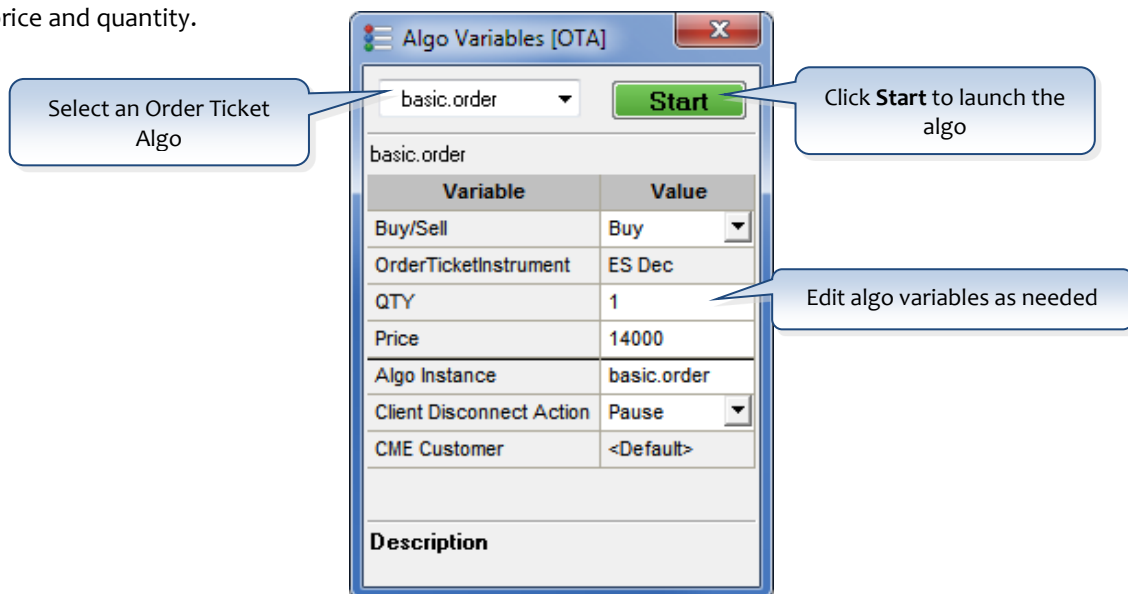| Column	Description
SE Server	Displays the name of the server hosting the algo
Algo Instance	Displays the name of the running algo instance **Note:** The instance name may be different from the name of the algo.
TTStatus	Displays the state of the algo (e.g., Running, Paused)
Net Pos	Displays the current net position of the algo instance; this is blank if the algo is trading multiple instruments
# Orders	Displays the number of orders the algo is working **Note:** If an Order Management Algo (or OMA) is applied to the child of an algo, the child of the OMA is not counted towards the algo number of orders.
P/L	Displays the P/L of the algo instance
▦	Launches **MD** Trader(s) seeded with each instrument that is part of the algo
Username	Displays the **Username** logged into the Algo SE server who last touched the algo
Time	Displays the time of the last algo action formatted as HH:MM:SS.mmm

Launching Algos (continued)

Like other trading windows in X_TRADER, you may display additional columns in the **Algo Orders** pane by selecting **Show/Hide Columns** from the right-click context menu. The table shown below describes these optional columns.

Column	Description
Account Number	Displays the **Account Number** of the **Username** logged into the Algo SE server; this is the account number associated with the parent order
Algo Instance ID	Displays the ID associated with all orders and fills generated by the algo **Note:** This key is the algo parent order's **TT Order Key**, a unique key that does not change during the life of the algo parent order.
Algo Name	Displays the name of the algo on the Algo SE server
Date	Displays the date of the last action on the algo formatted as DDMMMYY
Description	Displays user-defined text created at algo design time in **ADL**
Net Spread Pos	Displays the net position for an exchange-defined spread contract and does not include positions in the underlying leg contracts
Price	Displays the price of the current working order; this is blank if the algo is trading multiple instruments or multiple orders
User Tag	Displays user-defined text
A, B, C, D, and E	Display ADL export values in real-time

Algo Variable [OTA] Dialog Box

You can also launch Order Ticket Algos (OTA) directly from the **Market Window,** the **Order Pane,** and **MD Trader** allowing you to quickly execute strategies with a single-click style of execution. **Order Ticket Algos (or OTAs)** are algos that contain an **Order Instrument Variable** block and specify the instrument, price and quantity.

Select an Order Ticket Algo

Click **Start** to launch the algo
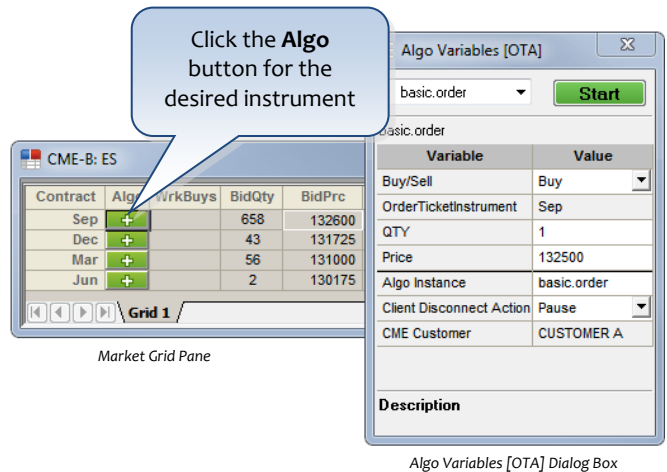
Edit algo variables as needed

Algo Variables [OTA] Dialog Box

Launching Algos (continued)

Market Window

To start an Order Ticket Algo or Algo Template from the Market Window...

1. Display the **Algo** column in the **Market Grid**.

   a. Right-click the **Market Grid** and select **Show/Hide Columns...** from the context menu.

   b. Select **Algo** and click **OK**. This displays the **Algo** column in the **Market Grid**.

2. Start the Algo.

   a. Left-click the **Algo** button adjacent to the desired instrument. This displays the **Algo Variable [OTA]** dialog box.

*Click the **Algo** button for the desired instrument*

Market Grid Pane

Algo Variables [OTA] Dialog Box

   b. Select the desired Order Ticket Algo (or algo template) in the **Algo** drop-down list.

   c. Edit algo variables as needed.

   d. Click **Start** to launch the Order Ticket Algo.

Order Pane

You can also start Order Ticket Algos and algo templates directly from the **Order Pane**. This applies to **Order Panes** attached to the **Market Window** or in floating order entry mode. When an algo (or algo template) is selected in the **Order Template** drop-down list, all sections to the right of the **Order Template** section are hidden and the **Algo Variables Form** displays. Like the **Algo Variable [OTA]** dialog box, the **Algo Variable Form** displays algo-specific and standard variables.

*Select an Order Ticket Algo or algo template in the **Order Template** drop-down list*

Floating Order Pane

*Click **Start** to launch the algo for the selected instrument*

Edit algo variables as needed
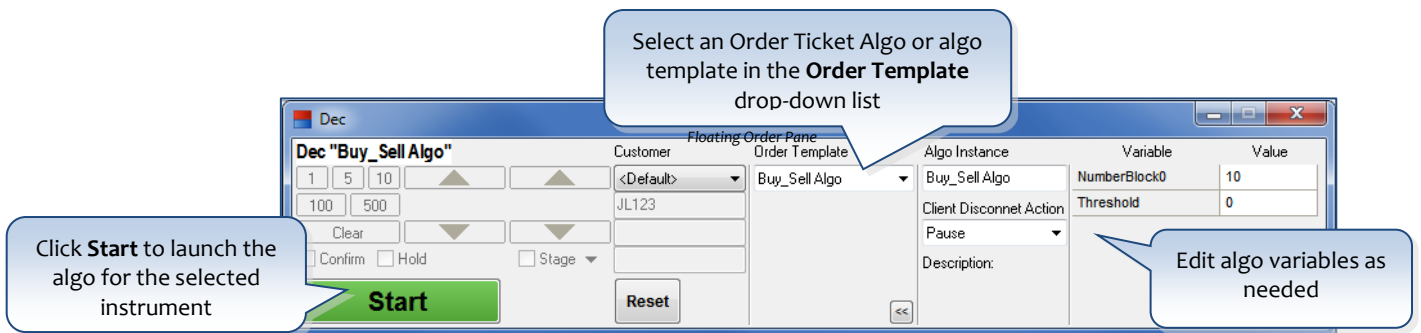
Launching Algos (continued)

To start an Order Ticket Algo or Algo Template from the Order Pane...

1. Click an instrument in the **Market Grid** to seed the **Order Pane**.

2. Click the **Order Template** drop-down list. This displays a list of all Order Ticket Algos and their associated algo templates.

3. Select the desired algo (or algo template). This displays the **Algo Variable Form**.

4. Set the **Price** and **Quantity**. Depending upon the algo selected, these fields may be disabled.

5. Select a Customer in the **Customer List** field.

6. Edit algo variables as needed.

7. Click **Start** to launch the algo.

   Note:

   - If the algo includes an **Order Quantity** variable, and **Order Price** variable, then those fields will enable in the **Order Pane** and require valid values before launching the algo.

   - If the algo includes an **Order** block that is set to **Flip Side for Sell Orders**, then the standard **Buy**/**Sell** buttons will display (instead of the **Start** button). The algo will launch upon selecting either the **Buy** or **Sell** button.

MD Trader

There are a couple of ways to start Order Ticket Algos in **MD Trader**. For example, you can select algos and algo templates from the **Order Type** drop-down list or assign algos to **MD Trader Order Buttons**. Each method displays the **Algo Variable [OTA]** dialog box.

To start an Order Ticket Algo or Algo Template using the Order Type drop-down list...

1. Click the **Order Type** drop-down to display a list of all Order Ticket Algos and their associated algo templates.

2. Select the desired algo (or algo template). The **Order Type** drop-down list displays with a yellow background and the **Algo Variable [OTA]** dialog box displays.
   Note: The customer displayed in the **Algo Variable [OTA]** dialog box corresponds to the customer selected in the **MD Trader Customer List**.

3. Edit algo variables as needed.

4. Left-click the **Bid** or **Ask** column to start the algo. The selected algo continues to display in the **Order Type** field.
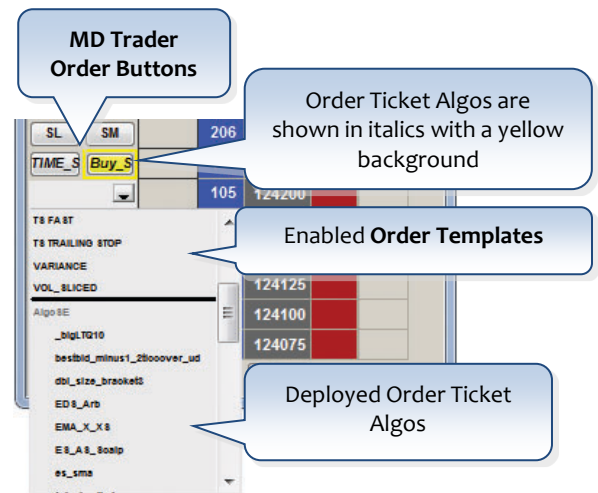

MD Trader Order Type Drop-Down List

Launching Algos (continued)

To start an Order Ticket Algo or Algo Template using MD Trader Order Buttons...

1. Assign the Order Ticket Algo or algo template to an **Order Button**.

   a. Right-click **MD Trader** and select **Properties**. This displays the **MD Properties** dialog box.

   b. In the **Order Button** section, select the desired algo.

      Note: You may also assign **algo templates** to **Order Buttons**. Template names follow the algo name separated with a backslash (\).

   c. Repeat **Step b** for each **Order Button** that you would like to configure.

   d. Click **OK** when you are finished.
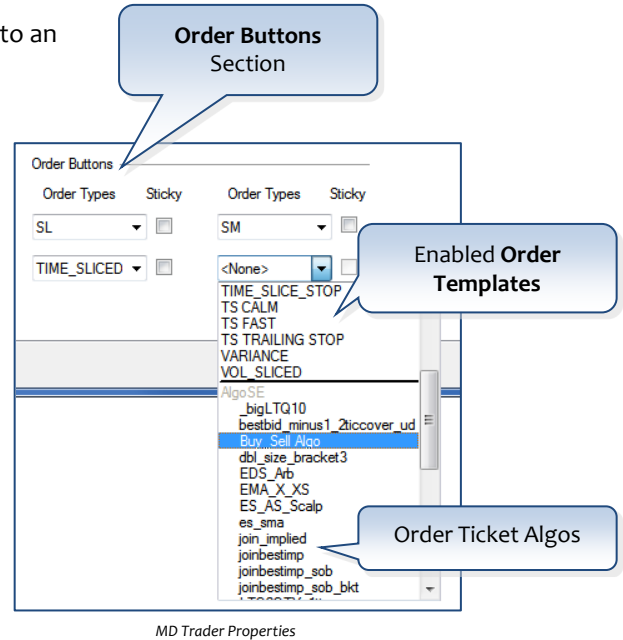
MD Trader Properties

2. Once the Order Ticket Algo or algo template is assigned to an order button, click the **Order Button**. This displays the **Algo Variable [OTA]** dialog box.

   The customer displayed in the **Algo Variable [OTA]** dialog box corresponds to the customer selected in the **MD Trader Customer List**.

3. Edit algo variables as needed.

4. Click the **Bid** or **Ask** column to start the algo.
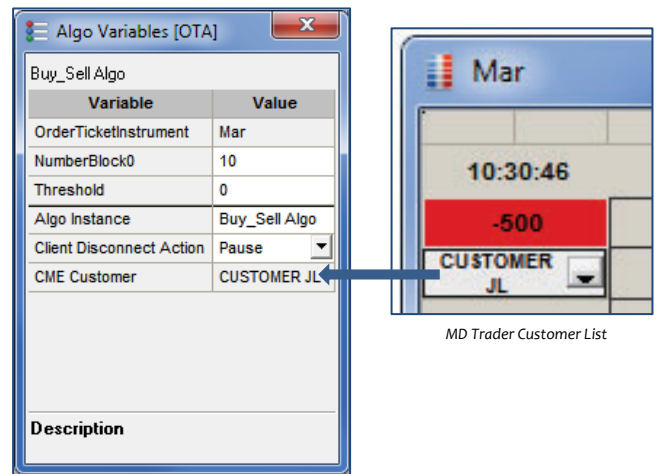
Algo Variables [OTA] Dialog Box
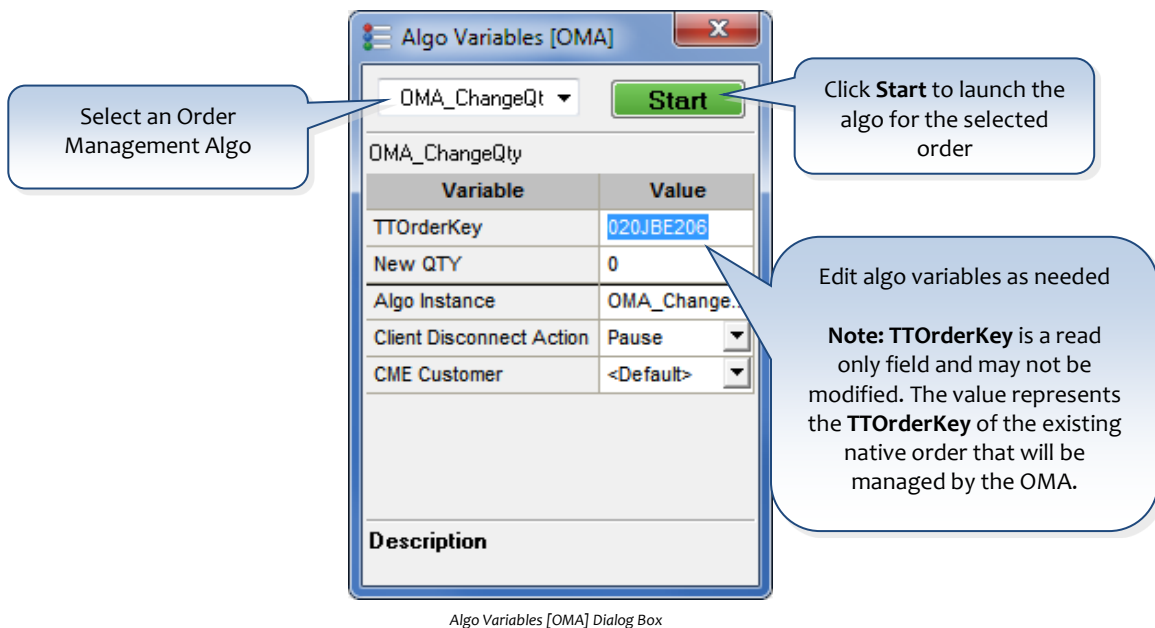
MD Trader Customer List

Applying Algos to Existing Non-Algo Orders

≣ Algo Variable [OMA] Dialog Box

With ADL, you can create **Order Management Algos (or OMA)**, allowing you to apply algos to existing native non-algo orders displayed in the **Orders and Fills Window** or **Floating Order Book**. When the OMA is started, it will not disrupt the priority of the working order but will have the authority to modify or delete the order once the order management algo is applied.

An order management algo can also be applied to the child order of another order management algo.

Select an Order Management Algo

Click **Start** to launch the algo for the selected order

Edit algo variables as needed

Note: TTOrderKey is a read only field and may not be modified. The value represents the **TTOrderKey** of the existing native order that will be managed by the OMA.

Algo Variables [OMA] Dialog Box

If you pause an Order Management Algo, the native order to which the Order Management Algo was applied will continue to work.

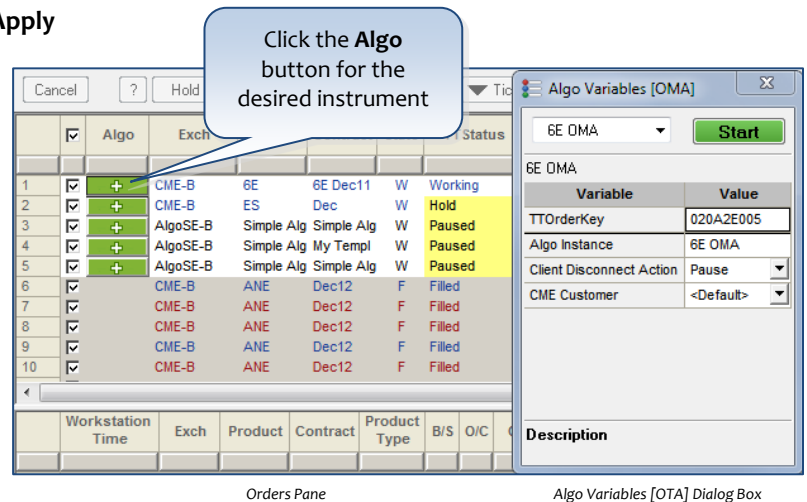# Applying Algos to Existing Non-Algo Orders (continued)

Orders and Fills Window

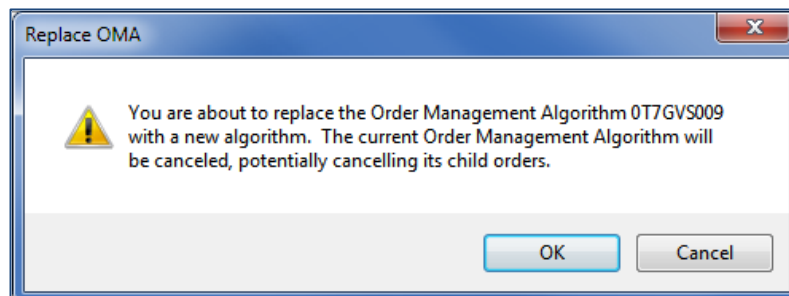**To start an Order Management Algo from the Orders and Fills Window...**

1. Display the **Algo** column in the **Orders Pane**.

   a. Right-click the **Orders Pane** and select **Show/Hide Columns...** from the context menu.

   b. Select **Algo** and click **OK**. This displays the **Algo** column in the **Orders Pane**.

2. Start the Algo.

   a. Left-click the **Algo** button adjacent to the existing order to which you want to apply the algo. This displays the **Algo Variables [OMA]** dialog box.
   Note: You may also select **Apply Algo...** from the right-click context menu.

   b. Select the desired order management algo in the **Algo** drop-down list.

   c. Edit algo variables as needed.

   d. Click **Start** to launch the Order Management Algo. The Order Management Algo displays as a parent order in the **Orders Pane**. **Algo** displays in the **Link Type** field in the algo parent order. **OMA** displays in the **Link Type** field in the child order. The parent order's **TTOrderKey** displays in the child order's **Related Key** column.

Orders Pane   *Algo Variables [OTA] Dialog Box*

The following dialog box displays if you click the **Algo** button adjacent to a child order already running an Order Management Algo and select a different Order Management Algo. Clicking **OK** cancels the running OMA and possibly its child orders, and replaces it with the new OMA.

Applying Algos to Existing Non-Algo Orders (continued)

Floating Order Book

To start an Order Management Algo from the Floating Order Book...

1. Middle mouse click an existing order in the trading window (e.g., **Orders and Fills Window or MD Trader**). This displays the **Floating Order Book** with an **Algo** button adjacent to the working order.

   Note: A green plus button in the **Algo** column indicates that you can apply an OMA to the working order. A blue **Algo** button in the **Mod** column indicates that an algo is already applied to the selected order; you may update algo variables using the **Algo Variables** dialog box. A gray **Algo** button indicates that algo functionality is not available for the selected order.

Orders and Fills Window – Orders Pane

Floating Order Book

Click the **Algo** button to display the **Algo Variables [OMA]** dialog box

2. Click the **Algo** button adjacent to the order. This displays the Algo **Variables [OMA]** dialog box.

3. Select the desired order management algo in the **Algo** drop-down list.

4. Edit the variables as needed.

5. Click **Start** to launch the Order Management Algo. The Order Management Algo displays in the **Algo Dashboard** and in the **Parent Order Book** and **Orders and Fills Window**. **Algo** displays in the **Link Type** field in the algo parent order. **OMA** displays in the **Link Type** field of the child order. The parent order's **TTOrderKey** displays in the child order's **Related Key** column.
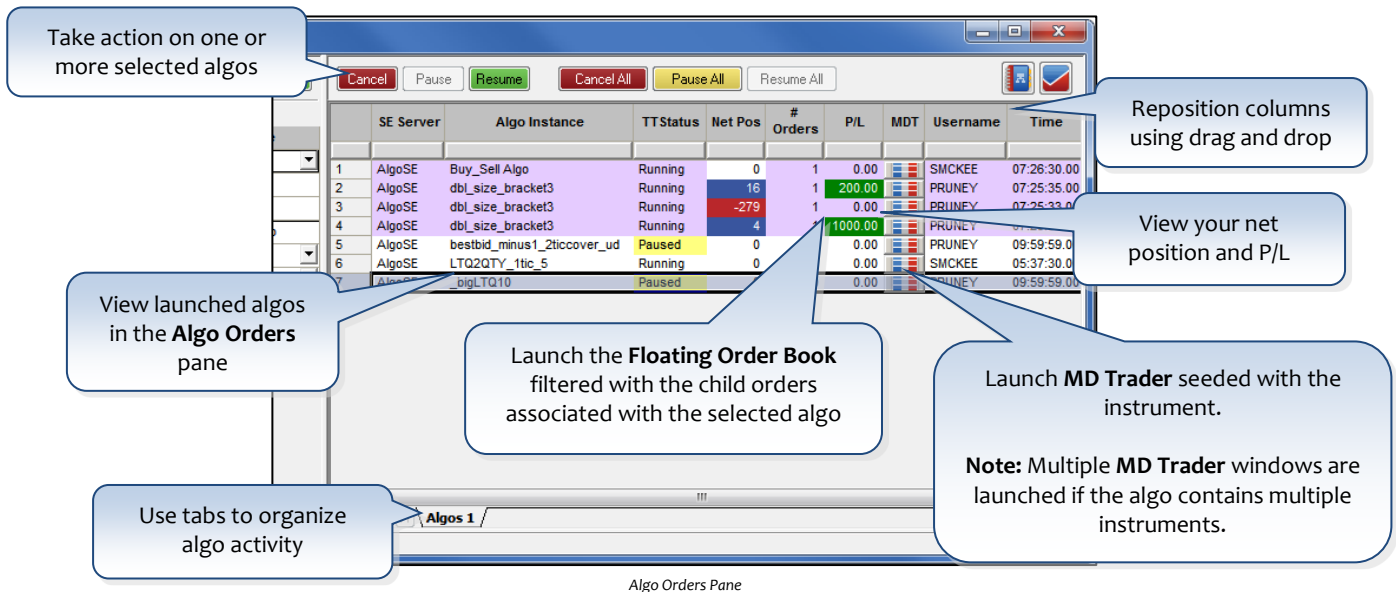
You can also start Order Management Algos from the **Algo Dashboard Algo Variable** pane if you supply the existing order's **TTOrderKey**.

Managing Working Algos

X_TRADER provides several ways to manage your algos. For example, you can manage your algos from the **Algo Dashboard, Orders and Fills Window,** and the **Parent Order Book.**

Algo Dashboard

The **Algo Orders** pane, located on the right side of the **Algo Dashboard,** displays information about your launched algos as well as algos started by users with whom you share an order book.

Take action on one or more selected algos

Reposition columns using drag and drop

View your net position and P/L

View launched algos in the **Algo Orders** pane

Launch the **Floating Order Book** filtered with the child orders associated with the selected algo

Launch **MD Trader** seeded with the instrument.

Note: Multiple **MD Trader** windows are launched if the algo contains multiple instruments.

Use tabs to organize algo activity

Algo Orders Pane

The ability to display continuous output values of ADL blocks in the **Algo Dashboard** and **Parent Order Book** allows you to monitor the status and progress of your algos. Five optional columns, **A, B, C, D,** and **E** allow you to monitor your export values in real-time. Enable these columns by selecting **Show/Hide Columns...** from the **Algo Orders** pane right-click context menu.

Using Algo Row Colors

Algo rows are color-coded based upon the algo's current status. The color dynamically changes as the algo's order status changes.

Color	Status
White background	Running Algo with no working orders
Light Purple background	Running Algo with working orders
Yellow TT Status field	Paused Algo

These colors are customizable on the **Settings | Properties | Color** tab.

Managing Working Algos (continued)

Using the Dashboard Toolbar

The **Dashboard Toolbar** located at the top of the **Algo Orders** pane allows you to take a single action on one or more working algos. For example, you may cancel, pause, and resume algos. The following table describes the functionality provided by the **Dashboard Toolbar** buttons.

Button	Description
Cancel	Terminates one or more selected algos and removes canceled algo parent rows from the **Algo Orders** pane. • If **Leave Orders on Cancel** is enabled, working child orders are left in the market. • If **Leave Orders on Cancel** is disabled, working child orders are canceled.
Pause	Stops all further actions on one or more selected algos in the **Running** state and continues to display the paused algo order rows in the **Algo Orders** pane; changes **TTStatus** field to **Paused** with a yellow background • If **Leave Orders on Pause** is enabled, working child orders are left in the market. • If **Leave Orders on Pause** is disabled, working child orders are canceled.
Resume	Resumes actions on one or more selected algos In the **Paused** state
Pause All	Stops all further actions on all **Running** algos displayed on the current **Algo Orders** pane tab and continues to display the algo rows in the **Algo Orders** pane • If **Leave Orders on Pause** is enabled, working child orders are left in the market. • If **Leave Orders on Pause** is disabled, working child orders are canceled.
Cancel All	Cancels all algos displayed on the current **Algo Orders** pane tab and removes canceled algo rows from the **Algo Orders** pane • If **Leave Orders on Cancel** is enabled, working child orders are left in the market. • If **Leave Orders on Cancel** is disabled, working child orders are canceled.
Resume All	Resumes action on all **Paused** algo orders displayed on the current **Algo Orders** pane tab
	Launches the **Parent Order Book** filtered with the selected algo orders **Note:** You can also use the **Algo Orders** pane right-click context menu to launch the **Parent Order Book** filtered with the selected orders.
	Launches the **Orders and Fills Window** filtered with the selected algo orders **Note:** You can also use the **Algo Orders** pane right-click context menu to launch the **Orders and Fills Window** filtered with the selected orders.

The buttons on the **Dashboard Toolbar** can be applied to more than one algo at a time. When multiple algos are selected, and an action is taken that applies to some of the selected orders, only the pertinent orders will be affected. For example, clicking the **Resume** button on multiple orders will only resume actions on those algos that are currently in a **Paused** state; the **Resume** button will not impact the other selected non-paused orders.

Also, the **Pause All** and **Cancel All** actions do not apply to algo instances hidden by filters applied to the displayed **Algo Orders** pane tab.

Managing Working Algos (continued)

Filtering and Organizing Algos

Columns in the **Algo Orders** pane can be customized to filter and organize algos displayed in the **Algo Orders** pane. To set a column filter, click the box immediately below any column heading. Select one or more variables for the selected column and click **OK** to activate the filter. You may also double-click on a cell to filter the entire column on that cell's content. When you set a column filter, the box below the column heading turns red and displays the filter you selected or an asterisk if filtering on multiple variables. The filter box can be resized by mouse dragging the filter box border. To clear column filters, click the **CLR** button in the upper-left corner of the **Algo Orders Pane**.

Sorting Algos

A custom three-level sort is available from the **Algo Orders** pane right-click context menu. For example you could sort by **Algo SE Server**, **Username**, and **Algo Instance**. When a custom sort is used, new algo rows are dynamically inserted according to the specified sort parameters. When custom sort parameters are cleared, the **Algo Orders** pane reverts back to using the default properties.


Select a custom three-level sort
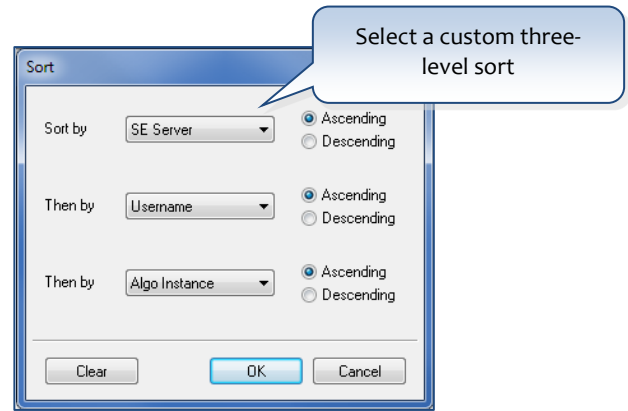
Sort Dialog Box

Similar to other X_TRADER grid windows, you may quickly sort **Algo Orders** pane data in ascending or descending order by double-clicking a column heading for a column containing sortable values. For example, to sort by **Algo Instance**, double-click the **Algo Instance** column heading. This sorts the data in ascending order and overrides any custom sort parameters. Double-click the **Algo Instance** column heading again to sort the data in descending order.

Displaying the Audit Trail

You can also launch the **Audit Trail** from the **Algo Orders** pane right-click context menu filtered on the selected algo instance allowing you to quickly view all activity for the selected algo. The **Audit Trail** option is available when you select one algo row and have not exceeded the maximum number of open **Audit Trail** windows.

*Launch the **Audit Trail** filtered on the selected algo instance*
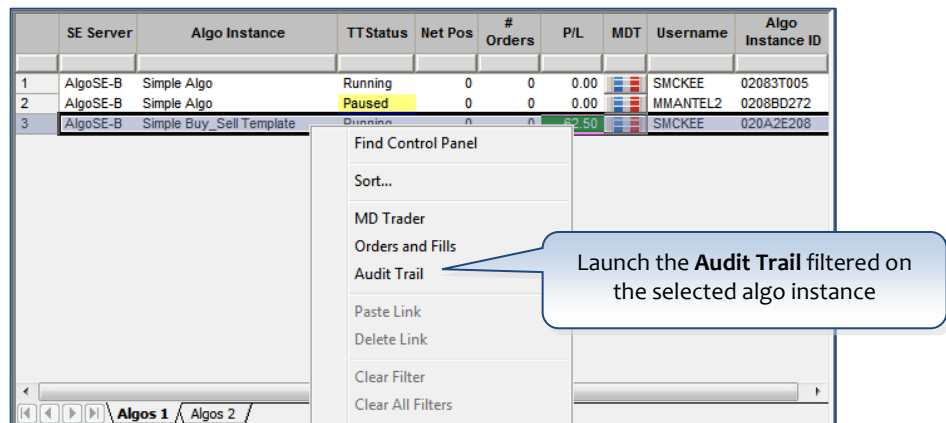
Algo Orders Pane Right-Click Context Menu

Managing Working Algos (continued)

📕 Parent Order Book

The **Parent Order Book** displays TT order types that generate parent orders (e.g., Algo orders) allowing you to quickly view and manage in one window all related child orders and fills for the selected order type. The **Order Toolbar** in the **Parent Order Book** contains a drop-down button allowing you to select the parent order type (e.g., **Algo**) that you would like to view in the window.

You can launch the **Parent Order Book** from the **Algo Dashboard** filtered with your selected algos or from the X_TRADER Control Panel if you wish to display all of your algos.

Parent Order Book

The **Parent Order Book** is comprised of four distinct panes when using the window in **Algo View**: the **Parent Order Pane**, the **Algo Variable Pane**, the **Working Child Order Pane**, and the **Filled Child Order Pane**. The buttons displayed on the **Order Toolbar** coincide with the parent order type selected. For example, the **Algo** view provides many of the buttons found on the **Algo Dashboard Toolbar** allowing you to cancel, pause, and resume algos.

Parent orders display in the **Parent Order Pane** using the color-coding described in the **Algo Dashboard** section. Child algo rows display in the color of their buy/sell orientation. Algos that do not specify a specific buy/sell direction (such as a spreader) or algos that trade multiple instruments in multiple buy/sell directions display with black text.

Managing Working Algos (continued)

Orders and Fills Window

You can also manage algo orders using the **Orders and Fills Window** allowing you to cancel, pause, and resume parent algo orders and related child orders. By default, the **Pause, Pause All, Resume,** and **Resume All** buttons are not displayed on the **Order Toolbar**. Toolbar buttons are configurable on the **Settings | Properties | Orders** tab. You may add buttons, remove buttons, change button location, and customize the space between them. See the Orders and Fills Window and Position Window Setup Guide if you would like to explore **Order Toolbar** settings in greater detail.

Like the **Parent Order Book,** you can launch the **Orders and Fills Window** from the **Algo Dashboard** filtered with your selected algos or from the X_TRADER Control Panel if you wish to display all of your algos.

Orders and Fills Window

By default, parent orders display in the **Orders Pane** using the color-coding described in the **Algo Dashboard** section. Child algo order rows display in the color of their buy/sell orientation. Algos that do not specify a specific buy/sell direction (such as a spreader) or algos that trade multiple instruments in multiple directions display with black text.

Launched algos display in the **Orders Pane** in the Working (**W**) state. The algo order will remain in this state while the algo is in the **Running** or **Paused** status.

The **TTStatus** field displays the status of the algo (e.g., **Running** or **Paused**). **Exchange** displays the Algo SE server to which the algo is working the algo. **Product** displays the algo name and **Contract** displays the algo instance name.

Managing Working Algos (continued)

Algo parent orders display in bold. Orders are grouped together by their parent/child relationships with OTA child orders located directly below its parent order. Child orders are assigned a key which is displayed in their **Parent Key** column. This key is the parent order's **TTOrderKey,** a unique key that does not change during the life of the parent order. Use the **Parent Key** column to quickly filter all related child orders.

The **Username** field displays the user who last touched the algo. The **Username** is attached to the algo order and all future related child orders and fills that occur while the algo is running under that **Username**. When sharing an order book and another user modifies the algo order, the **Username** updates to reflect the last person who touched the algo instance.

The **Link Type** field displays the relationships between orders and can be used to filter algo orders from other orders in the **Orders Pane**. For example,

- **Algo** displays for the algo parent order

- **AlgoC** ('C' for Cancel) displays if child orders were submitted with either the **Leave Orders on Pause** or **Leave Orders on Cancel** parameter disabled

- **AlgoL** ('L' for Leave) displays if child orders were submitted with either the **Leave Orders on Pause** or **Leave Orders on Cancel** parameter enabled.

💡 The **Leave Orders on Pause** and **Leave Orders on Cancel** are configured during order block design within **ADL.**

Algo parent orders display the default account number associated with the **Username** logged into the Algo SE, not the account associated with child the orders. Child orders display the account associated with the order submitted to the exchange.

Account Number	Username
	SMCKEE
ts003002	SMCKEE
ABC	SMCKEE
JL123	SMCKEE
JL123	SMCKEE
JL123	SMCKEE
ts003002	SMCKEE
ts003002	SMCKEE

Orders Pane Columns

📝 Audit Trail

The **Audit Trail** logs actions and events relating to algo orders.

13:28:19.928	AlgoSE	ALERT	Pause				Algo (Demo)	My Template	
13:32:34.412	CME-B	OK	Fill	B	10	ES	Mar	116050	Limit
13:32:39.670	CME-B	OK	Add	S	10	ES	Mar	116075	Limit
13:33:27.599	AlgoSE	OK	Resume				Algo (Demo)	My Template	
13:33:27.599	CME-B	OK	Add	S	10	ES	Mar	116100	Limit
13:34:57.751	AlgoSE	OK	Add				Algo (Demo_Leave)	Demo_Leave	
13:34:57.856	CME-B	OK	Add	B	10	ES	Mar	116025	Limit
13:35:43.156	AlgoSE-	OK	Add	B			Algo (basic.order)	basic.order	

Audit Trail

Managing Working Algos (continued)

Managing Algo Parent Orders from Algo Child Orders

In ADL, you can set the color of the order submitted by the **Order** block and **Discrete Order** block making it easy to identify algo child orders. The color displays with the order similar to the **Autospreader** vertical bar indicator in **MD Trader,** the **Market Window,** and **Floating Order Book.**
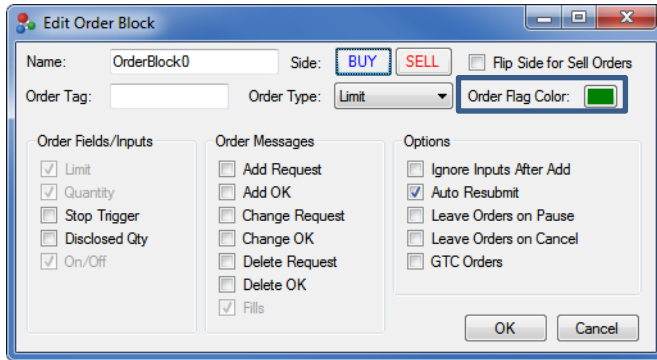
ADL Edit Order Block Parameters

Identify child algo orders using the Order Flag Color

MD Trader

You can manage parent orders via the **Floating Order Book** when an algo child is selected in the trading window (e.g., **Market Window, MD Trader, Orders and Fills Window**). Four parent order columns display when you mouse hover over an algo child order in the **Floating Order Book.**

MD Trader

Floating Order Book
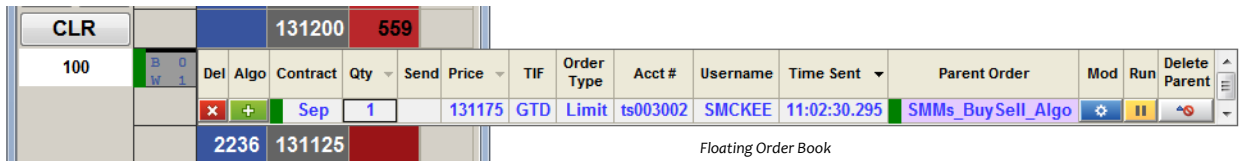
Column/Button	Description
Parent Order	Displays the algo instance name of the algo parent order
Mod	Lunches the Algo Variable Dialog box allowing you to modify the algo parent order
Run	Pauses or resumes the algo parent order
Delete Parent	Cancels the algo parent order

Modifying Algo Variables

X_TRADER provides several ways to modify working algos. In this section, we will explore how to modify algo variables from the **Parent Order Book** and the **Orders and Fills Window**.

Parent Order Book

The **Algo Variable Pane** on the right-side of the **Parent Order Book** allows you to modify and apply algo variables to one or more selected algos. If applying a change to mu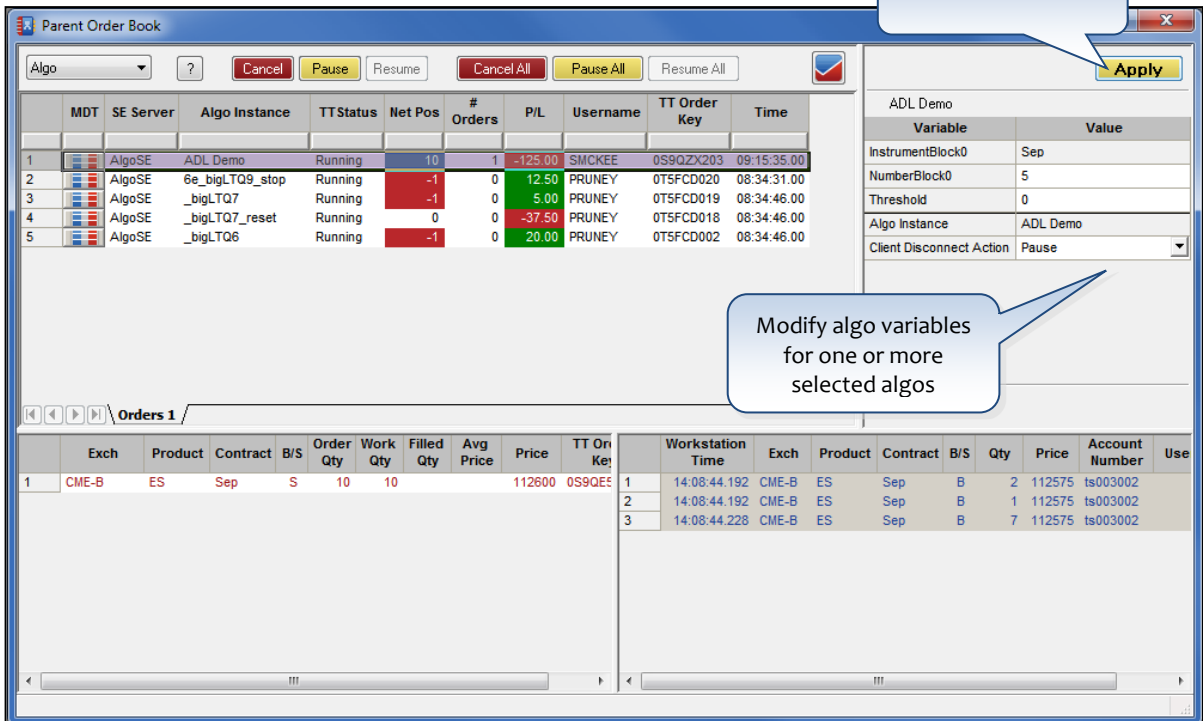ltiple instances of an algo, the algo instances must all originate from the same algo version and cannot contain Excel links. For example, we could create an algo with a 'Threshold' variable and duplicate the algo so that we have algo instances for March, June, September and December. After starting them, we could select the four algo instances and change all of their Threshold values at the same time in the **Algo Variable Pane**.

When multiple algo orders are selected, only dynamic parameters (e.g., multiplier) and the Client Disconnect action are configurable. Quantity and Price are not configurable.

Parent Order Book

To modify algo variables in the Algo Variable Pane...

1. Select **Algo** from the **Parent Order Type** drop-down list. This displays the four panes comprising the **Parent Order Book** in **Algo View**.

2. Select the desired algo order in the **Parent Order Pane**. This populates the algo's variables in the **Algo Variable Pane**.

3. Edit the algo variables as needed.

   Note: The algo variables available for editing depend upon the type of algo selected.

4. Click **Apply** to apply the variable changes.

Modifying Algo Variables (continued)

✉ Orders and Fills Window

You can also modify algo variables from the **Orders and Fills Window.** The **Algo Variables** dialog box accessible from the **Orders Pane** or the **Orders Pane** right-click context menu allows X_TRADER Pro users with proper Algo credentials in TT User Setup to modify and apply algo variables.

To access the **Algo Variables** dialog box, algos must have a **TTStatus** of **Working, Running, Partially Filled,** or **Paused**.

To modify algo variables from the Orders and Fills Window...

1. Display the **Algo** column in the **Orders Pane**.

    a. Right-click the **Orders Pane** and select **Show/Hide Columns...** from the context menu.

    b. Select **Algo** and click **OK**. This displays the **Algo** column in the **Orders Pane**.

2. Modify the algo variables.

    a. Left-click the blue **Algo** button adjacent to the desired parent order. This displays the **Algo Variables** dialog box seeded with the algo's variables.

        Note: You may also right-click the parent order and select **Modify Algo Parameters...** from the context menu.

    b. Edit the algo variables as needed.

        Note: The algo variables available for editing depend upon the type of algo selected.

    c. Click **Apply**. This applies your changes and closes the **Algo** Variables dialog box.

Algo Variables Dialog Box

The **Orders and Fills Window** also allows you to apply an **Order Management Algo (OMA)** to an existing non-algo order using the **Algo Variables [OMA]** dialog box. See the *Applying Algos to Non-Algo Orders section* if you would like to explore this in greater detail.
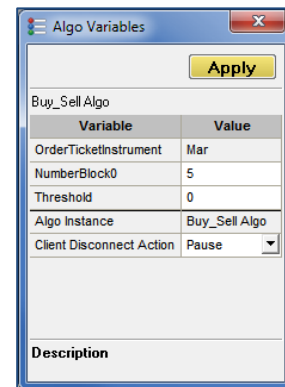
Algo Order Management

Algo orders can be in one of the states described in the table below.

TTStatus	Order Condition	Ends when...
Running	An algo order that has been started	The algo is paused or canceled, or there is a change in Algo SE server status (e.g., server cycled)
Paused	An algo order that has been paused	The algo either resumes working or gets canceled, or there is a change in Algo SE server status
Deleting	An algo order that has been deleted displays in the **Deleting** state while the Algo SE server performs the delete action	The Algo SE server completes deletion of child orders and Position Reserve orders

Algo orders may display in one of the following states if the Algo SE server is shutdown or an error occurs.

TTStatus	Order Condition	Ends when...
Failed	Algo SE server attempts to delete child orders if their **Leave Orders on Cancel** parameter is disabled during normal server shutdown	The server puts the parent order in the **FAILED** state if it cannot delete all of the child orders **Note:** All synthetic spread orders are automatically deleted upon server shutdown, since synthetic spread orders do not support the **Leave Orders on Cancel** setting.

Algo Order Management (continued)

Supported Changes to Algo Parent Orders

X_TRADER and the Algo SE server support the following changes to algo parent orders:

Supported Changes	X_TRADER 7.11.2 Synthetic SE 7.2.2 (or higher)
Cancel parent order	Applies to parent orders in the **Running** or **Paused** state Leaves all related child orders when **Leave Orders on Cancel** is enabled
Pause/Resume parent order	Applies to parent order in **Running** or **Paused** state Leaves all related child orders when **Leave Orders on Pause** is enabled
Modify the price	Applies to parent orders in the **Running** or **Paused** state Depending upon the algo, you may be able to modify the price using the **Algo Variable** pane If the algo is in the **Paused** state, the change will take effect when the algo is resumed
Modify the quantity	Applies to parent orders in the **Running** or **Paused** state Depending upon the algo, you may be able to modify the quantity using the **Algo Variable** pane If parent order is in the **Paused** state, the change will take effect when the algo is resumed

Supported Changes to Algo Child Orders

Algo child orders order with the **Leave Orders on Pause** or **Leave Orders on Cancel** parameter enabled will have a **TTStatus** of **Working** when the parent order is either paused or canceled. Depending upon algo design, X_TRADER 7.11.2 with Algo SE server 7.2.2 supports the following actions on these algo child orders:

- Modify price
- Modify quantity
- Cancel
- View order details
- Inquire
- Repeat
- Place order on Hold

Algo Order Management (continued)

Minimum X_TRADER Version

Every X_TRADER user who shares an order book and works algo orders must use X_TRADER Pro version 7.11.2 (or higher). Failure to do so can result in unsupported behavior.

Algo Behavior When X_TRADER is Shutdown

All Algos, including algos containing synthetic spreads, remain in their current **Running** or **Paused** state when the owner of a working algo instance closes X_TRADER. The following dialog box displays warning the owner of these algo orders.
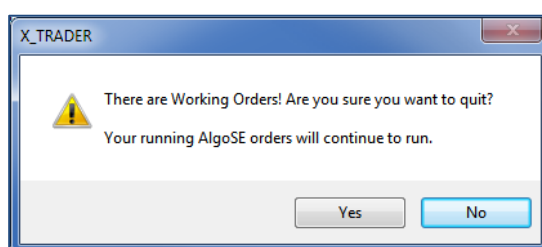
When the owner logs back into X_TRADER, they will remain the owner of all algo instances that have not come under the control of another X_TRADER user sharing the order book.

All X_TRADER users that share but do not own an algo instance will see the standard "There are Working Orders! Are you sure you want to quit?" message when exiting X_TRADER.

Algo Behavior at Market Close

ADL provides order block parameters which when used in combination allow you to specify how to handle your algos when the trading session ends:

Parameter	Description
Ignore Market State	• Applies to the entire algo (i.e., parent and all related child orders) • When enabled, the algo continues to run even if an instrument used by the algo closes • **Note:** By default, parent algo orders are paused when the market closes.
Leave Orders on Pause	• Applies to an algo child order • When enabled and the parent algo order is paused, the child order continues to work in the market
Leave Orders on Cancel	• Applies to an algo child order • When enabled and the parent algo order is canceled, the child order continues to work in the market
Good 'til Cancel (GTC)	• Applies to an algo child order • When enabled, the child order is sent to the exchange as a GTC order • **Note:** GTD child orders are canceled according to exchange rules.

Algo Order Management (continued)

The following table provides examples of how these parameters can be used to instruct Algo SE to take specific actions on the algo and its child orders at the end of the trading session.

Note: In the table below, *"Order X"* represents a child order to which these parameters are applied.

Ignore Market State	Leave on Pause	Leave on Cancel	GTC	Actions Taken Upon Launch	Actions Taken At End of Trading Session
✓	✓	✓	✓	Algo immediately begins operation, submitting relevant child orders • If order is rejected, algo pauses and attempts to delete all child orders; Algo leaves *Order X* (assuming Order X was successfully added) • If all orders are accepted, algo continues operation	• Algo continues to run past the close • *Order X* remains in the market
✓	✓	✓			• Algo continues to run past the close • Exchange deletes *Order X* from its book since it is not a GTC order
✓			✓	Algo immediately begins operation, submitting relevant child orders • If order is rejected, algo pauses and attempts to delete all child orders • If orders accepted, algo continues operation	• Algo continues to run past the close • *Order X* remains in the market
✓					• Algo continues to run past the close • Exchange deletes *Order X* from its book since it is not a GTC order
	✓	✓	✓	Algo waits for all instruments used by the algo to be in the "Trading" state and then begins operation	• Algo pauses but leaves *Order X* in the market • Order X remains in the market
	✓	✓			• Algo pauses but leaves *Order X* in the market • Exchange deletes *Order X* from book since it is not a GTC order
			✓		• Algo pauses and deletes *Order X*

Parent order Time-in-Force restrictions of Fill or Kill (FOK), Immediate or Cancel (IOC), Good in Session (GIS), and Good 'til Date (GTDate) are not supported.

Algo Order Management (continued)

Algo Behavior When the Algo SE Server is Restarted

When the Algo SE server is restarted, all algos marked as persisted are loaded and made available for use. Algos that were not tagged as persistent when the algo was deployed will not be available and will need to be re-deployed.

The following table describes what happens to algo parent orders and their related child orders when X_TRADER loses connectivity to the Algo SE server.

Scenario	Action taken to parent order	Action taken to child orders
Algo SE is stopped normally	Algo SE… • Stops algos in **Running** state • Deletes algo parent orders	Algo SE takes the following actions to child orders for which the corresponding TT Gateway is available: • Deletes child orders of an ASE block • Removes the OMA indicator from all child orders controlled by an OMA • Leaves all non-OMA orders in the market whose **Leave Orders on Cancel** is enabled • Deletes all non-OMA child orders whose **Leave Orders on Cancel** is disabled
X_TRADER detects loss of connectivity to Algo SE while algo instance owner connected to server		X_TRADER deletes all non-ASE orders if either of the following are true: • **Client Disconnect Action** (parent) is set to **Pause**, and **Leave Orders on Pause** (child) is not enabled • **Client Disconnect Action** (parent) is set to **Cancel** and **Leave Orders on Cancel** (child) is not enabled X_TRADER deletes all ASE child orders if **Client disconnect Action** is set to either **Pause** or **Delete**
X_TRADER exits normally	Algo SE… • Continues to run algo instances owned by the user if the algo does not rely on Microsoft Excel links • Leaves **Paused** algos instances owned by the user in the **Paused** state	Algo SE… • Leaves child orders working in the market

The Algo SE server always cancels running algos whose input parameters contain Excel links.

See the Algo SE Systems Administration Manual for additional scenarios.

Algo Properties

Algo Order Color

The light purple (default) background color can be customized on the **Settings | Properties | Color** tab.

Orders and Fills Window Order Toolbar Configuration

By default, the **Pause, Pause All**, **Resume**, and **Resume All** buttons are not displayed on the **Order Toolbar**. You may add these buttons by selecting **Order Toolbar Buttons** on the **Settings | Properties | Orders** tab. See the Orders and Fills Window and Position Window Setup Guide if you would like to explore **Order Toolbar** settings in greater detail.

Available Hotkeys

Hotkeys are available to quickly Pause (**P**), Pause All (**Alt+P**), Resume (**Right Arrow**), and Resume All (**Alt+Right Arrow**) algo orders using the keyboard. These keystroke combinations can be customized on the **Settings | Properties | Hotkeys** tab.

Alerts Properties

ADL provides an **Alert** block that can generate an **Audit Trail** message, a message box, or an email alert. The **Audit Trail** and message box options are configured at design time within **ADL**. Use the **Settings | Properties | Alerts** tab to configure email alerts.

Global Properties Alerts Tab

Risk Management

Pre-Risk Management

On the Algo SE server, there is a parameter called **RiskPLChecking** that determines how the Algo SE server risk-checks algo orders. If **RiskPLChecking** is enabled, i.e., set to one (1), Algo SE server performs a complete risk check (Max Order Quantity, Max Position, and P&L) for all orders that it routes on behalf of all users. Thus, Algo SE server needs a complete picture of a trader's risk before routing an order to ANY TT Gateway. In this scenario, the following rules apply:

- A trader must be mapped to the same, or a subset of, TT Gateways to which the Algo SE server is configured to connect.
- The MemberGroupTrader IDs (MGTs) to which the trader is mapped must be the same hierarchically below those the Algo SE server uses to log into the TT Gateways

If **RiskPLChecking** is disabled, i.e., set to zero (0), Algo SE server performs only a partial risk check (Max Order Quantity and Max Position) for all orders that it routes on behalf of all users. Thus, Algo SE server needs a complete picture of the trader's risk for the order's target TT Gateway. In this scenario, the MGT to which a user is mapped for a particular TT Gateway must be the same, or hierarchically below, the MGT Algo SE server users to log into this TT Gateway.

In both cases, the Algo SE server performs a risk check on all orders that it submits on behalf of algos using the risk limits associated with the user who launched the algo.

Note: If desired, risk managers can disable the credit portion of the risk checking for all Algo SE server users.

ADL Risk Block

The **Risk** block available in ADL allows you to impose multiple pre-risk checks that are specific to the algo. See [ADL Online Help](#) to learn about **Risk** blocks in greater detail.