



Linkage Monitor User's Guide

Version 1.1

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Change Notices

The following change notices are provided to assist users of the Linkage Monitor system in determining the impact of changes to their processing.

If you have any questions or review comments about this document, please contact Odalys Castro at (312) 786-8817.

Date	Version	Description of Change
6/24/11	1.1	Updated version.
2/23/11	1.0	New document.

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Introduction

Purpose This document was written to assist users in utilizing the Linkage Monitoring features. The Linkage Monitor application will provide users with the ability to observe the status of orders that are routed to other exchanges through Linkage.

Intended Audience This user guide is intended for any person interested in CBOE*direct's* Linkage monitoring functions.

Conventions Used in this Guide The system was designed so that you can monitor Linkage activity from a standalone application. Some fields are sensitive to both right and left mouse clicks. Window control functions can also be activated by using keyboard commands.

There are several conventions used throughout this guide to help trigger important information:

Bolding Used to highlight menu selections (e.g., **Login**) and button names (e.g., **Update**)



This mouse graphic with the right mouse button highlighted will appear in the margin when accompanying instructions relate to functions activated by clicking the **right** mouse button.

All other mouse commands (such as double clicking to display a window) refer to a normal left mouse click.



Linkage Monitoring

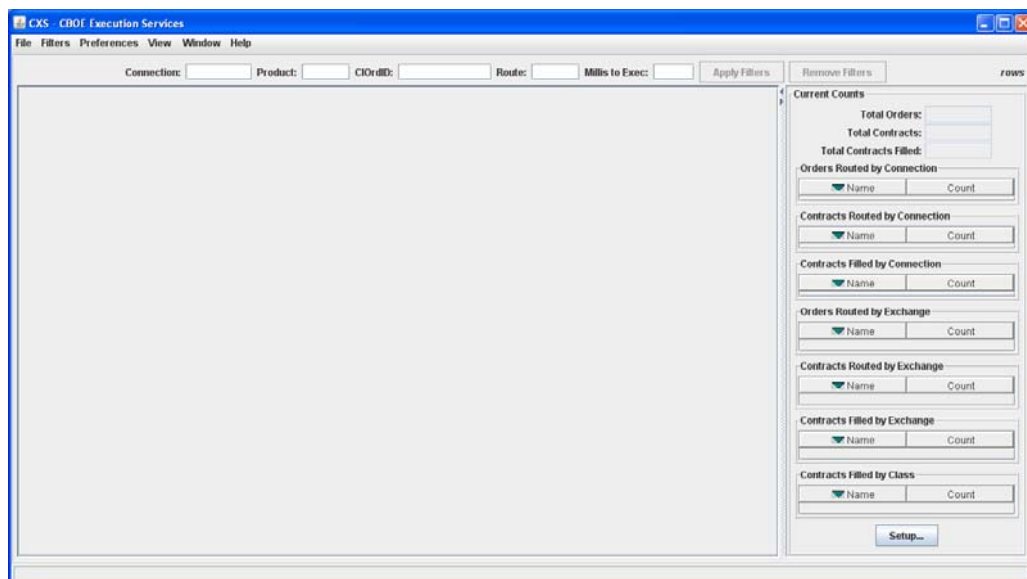
This user's guide will direct you through all the Linkage monitoring functions for CBOE*direct*.

Getting Started

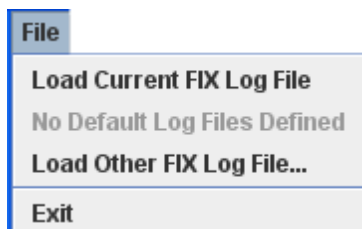
The Linkage Monitor application gives users the ability to observe the status of orders that are routed to other exchanges through Linkage. The system captures this activity by following the Linkage Cluster's FIX log file and reading in all FIX messages for the orders.

When you launch the Linkage Monitor application, the following window will display.

Launching the Linkage Monitor

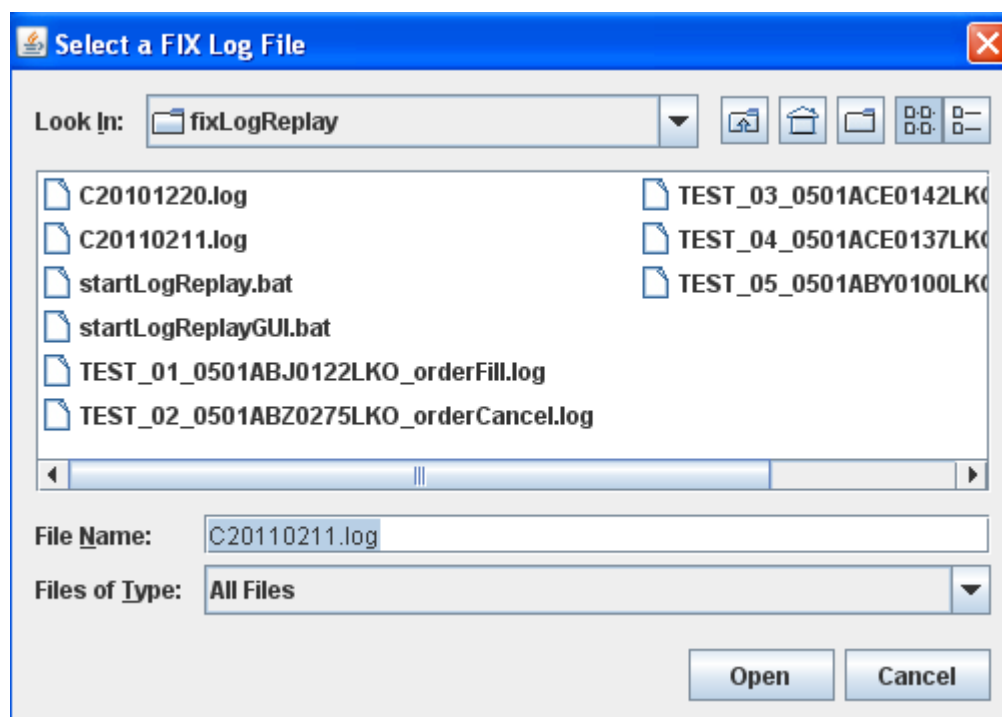


Depending on what Linkage data you want to monitor, you can choose to load the current FIX log file or a different log file. Make your selection from the **File** menu.



If you select to load the current FIX log file, the system will connect to the current real-time Linkage Cluster log file.

If you choose to load a different FIX log file, the following window will display



Select the FIX log file name and click **Open**. The Linkage Monitor application will connect to the FIX log file in real-time. You are now ready to monitor the status of orders that are routed to other exchanges.

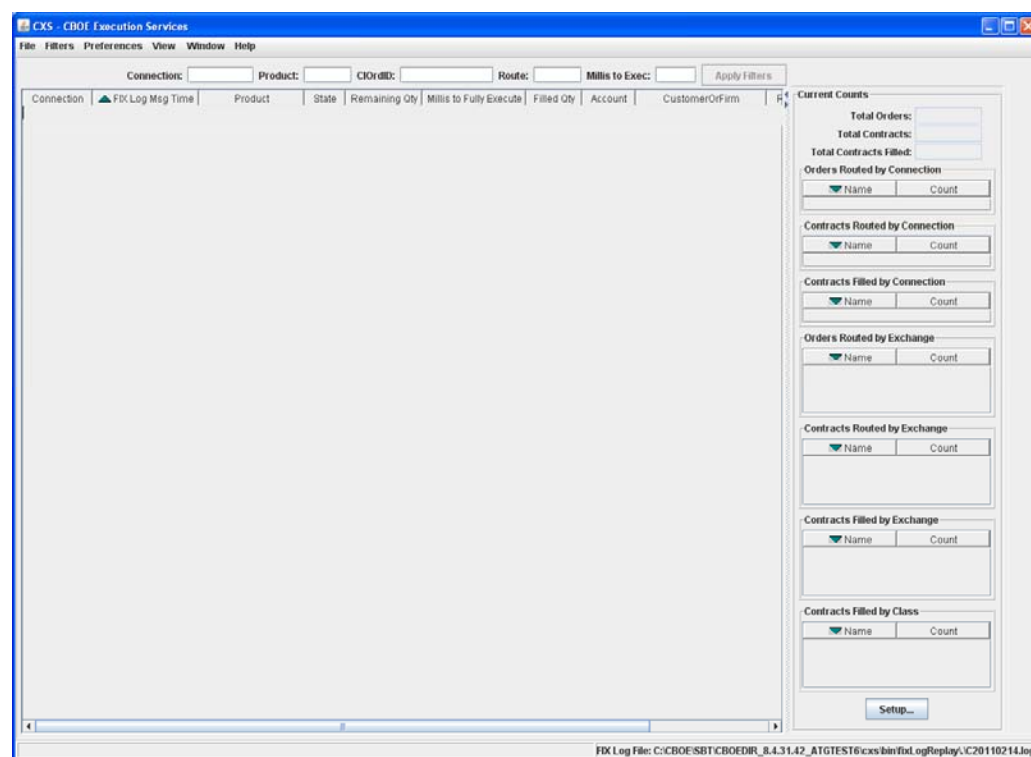
To return to the main window without selecting a FIX log file, click **Cancel**.

Monitor Linkage Activity

Once you are connected to a Linkage Cluster FIX log file, you can monitor the status of orders that are routed to other exchanges.

Order Monitoring

When an order is routed through the Linkage Cluster to another exchange the Linkage monitor will read in the corresponding FIX messages and display the order's activity.



The Linkage Monitor captures the following information.

- **FIX Log Msg Time:** the time when the FIX message was received.
- **Connection:** the Firm the system is monitoring for Linkage.
- **Product:** the product that linked away.
- **Route:** the exchange where the order was routed.
- **State:** the status of the order.
- **Remaining Qty:** the remaining order quantity after a partial fill or cancel.
- **Millis to Fully Execute:** the number of milliseconds that elapsed between when CBOE routed the order to the away exchange, and when CBOE received the order's final execution report back from the exchange. When the order is fully executed its remaining qty is zero, meaning it was fully filled and/or canceled.
- **Filled Qty:** the amount of the order that was filled.

- **Account:** the order's account type
- **Customer or Firm:** the Customer or Firm that executed the order.
- **Route:** the Exchange where the order was routed.
- **Order Qty:** the original order quantity.
- **Price:** the price of the order.
- **Side:** the side (Buy or Sell) of the order.



You can customize your window by selecting or deselecting specific columns to display and by changing your display color. To customize your display, right mouse click on a data row. Select **Edit Table Preferences**. The Edit Column Preferences window will display.

For detailed information, refer to the Edit Table Preferences section, page 25.

The **Current Counts** section of the window captures the following data:

- **Total Orders:** the number of order that routed away.
- **Total Contracts:** the number of contracts for the routed order.
- **Total Contracts Filled:** the number of routed orders that were filled.
- **Orders Routed By Connection:** the number of orders routed by Firm connection.
- **Contracts Routed By Connection:** the number of contracts routed by Firm connection.
- **Contracts Filled by Connection:** the number of contracts filled by Firm connection.
- **Orders Routed by Exchange:** the number of orders routed by exchange.
- **Contracts Routed by Exchange:** the number of contracts routed by exchange.
- **Contracts Filled By Exchange:** the number of contracts filled by exchange.
- **Contracts Filled By Class:** the number of contracts filled by class.

You can customize your Current Counts setup by selecting or deselecting specific counts to display. To customize your display, refer to the Current Counts Setup section, page 36.

Original and Filled Orders

When an order is routed to another exchange, the order is displayed on the Linkage Monitor's main table.

Current Counts

Total Orders:	1
Total Contracts:	1
Total Contracts Filled:	1

Orders Routed by Connection

Name	Count
WOLVERINE	1

Contracts Routed by Connection

Name	Count
WOLVERINE	1

Contracts Filled by Connection

Name	Count
WOLVERINE	1

Orders Routed by Exchange

Name	Count
PHLX	1

Contracts Routed by Exchange

Name	Count
PHLX	1

Contracts Filled by Exchange

Name	Count
PHLX	1

Contracts Filled by Class

Name	Count
RUT	1

Setup...

FX Log File: C:\CBOE\SBT\CBOEDIR_8.4.31.42_ATGTEST6\cxcs\bin\fd.ogf\play\IC20110214.log

Scroll to the right to view additional data fields.

Current Counts

Total Orders:	1
Total Contracts:	1
Total Contracts Filled:	1

Orders Routed by Connection

Name	Count
WOLVERINE	1

Contracts Routed by Connection

Name	Count
WOLVERINE	1

Contracts Filled by Connection

Name	Count
WOLVERINE	1

Orders Routed by Exchange

Name	Count
PHLX	1

Contracts Routed by Exchange

Name	Count
PHLX	1

Contracts Filled by Exchange

Name	Count
PHLX	1

Contracts Filled by Class

Name	Count
RUT	1

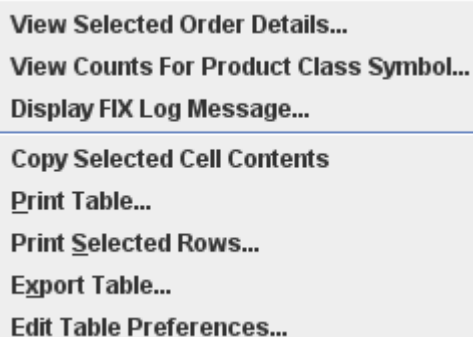
Setup...

FX Log File: C:\CBOE\SBT\CBOEDIR_8.4.31.42_ATGTEST6\cxcs\bin\fd.ogf\play\IC20110214.log

In the example above, an order was routed to the NASDAQ OMX PHLX and filled.



To view order details, right-mouse click on any data row and select **View Selected Order Details** or from the **View** menu, select **View Selected Order Details**.



The **Original Order Details** window will display.

10:27:48.155: RUT Dec10-18 560 P - SELL 1 @ \$0.15

Original Order Details

FIX Log Msg Time: 10:27:48.155

Connection: WOLVERINE

Route: PHLX

Product: RUT Dec10-18 560 P

FIX Tag Name	FIX Tag Num	Formatted FIX Value	FIX Tag Desc
Account	1	LINKAGE	Account
BeginString	8	FIX.4.2	BeginString
BodyLength	9	0252	BodyLength
CheckSum	10	232	CheckSum
CiOrdID	11	0501ABJ0122LKO:5	CiOrdID
ClientID	109	LKO	ClientID
CustomerOrFirm	204	Non-Member Market Maker	CustomerOrFirm
ExDestination	100	PHLX	Route
ExecBroker	76	00501	ExecBroker
ExecInst	18	INTERMARKET_SWEEP	ExecInst
HandlInst	21	Auto No Broker	HandlInst
MaturityDay	205	18	MaturityDay
MaturityMonthYear	200	201012	MaturityMonthYear
MsgSeqNum	34	2213	MsgSeqNum
MsgType	35	New Order	MsgType
OpenClose	77	Close	OpenClose
OrdType	40	Limit	OrdType
OrderCapacity	47	Non-Member Market Maker	OrderCapacity
OrderQty	38	1.0	OrderQty

Execution Reports

#	FIX Log Msg T...	ExecID	TransactTime	SendingTime	ExecType	Side	LastS...	Leave...	Price	Account	AvgPx	CumQty	Pl
1	10:27:48.187	2K-70J5-3U-2	16:27:48	16:27:48.177	Order Accepted	Sell		1	0.15	QEQ	0.00	0	PL
2	10:27:48.189	2K-70J5-3U-3	16:27:48	16:27:48.179	Filled	Sell	1	0	0.15	QEQ	0.15	1	PL

Close

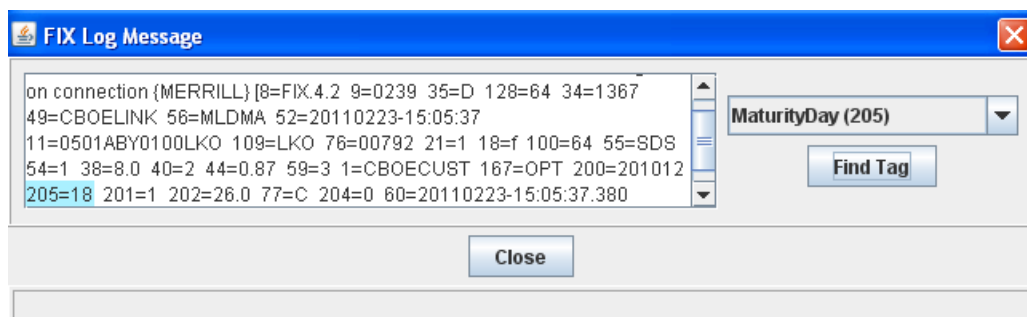
The original order details display in the top section of the window. From this section, you can view the FIX Tag (field) names and numbers along with their values.

The execution reports display in the lower section. The first execution shows the away exchange accepted the order at 10:27:48.187. The second execution shows the order was filled at 10:27:48.189. Scroll to the right to view additional data fields.

To return to the main window, click **Close**.



To view the FIX message for the order, select **Display FIX Log Message**. The following window will display.

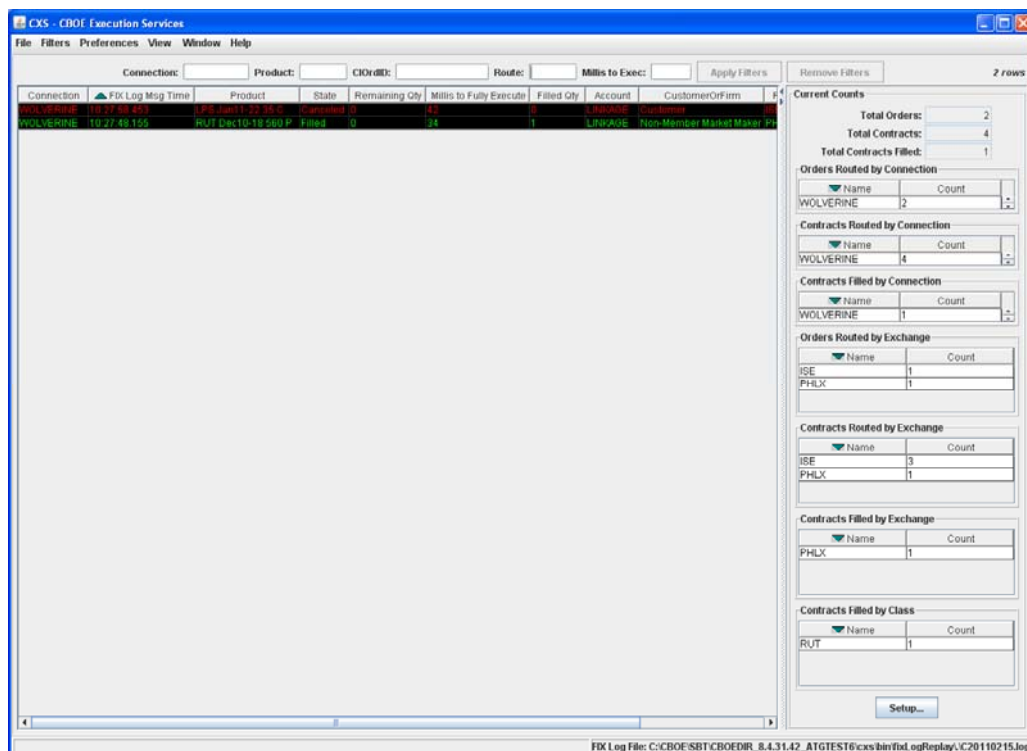


You can search for FIX tags from the drop down list. Select the tag you want to locate in the message and click **Find Tag**. The FIX tag is highlighted in the message text.

Click **Close** to exit the window.

Canceled Orders

Orders that are canceled at away exchanges appear in the Linkage Monitor. In the example below, an order was routed to ISE and cancelled.




The current counts are updated for Total Orders, Total Contracts and Total Contracts Filled.



To view order details, right-mouse click on any data row and select **View Selected Order Details** or from the **View** menu, select **View Selected Order Details**.

[View Selected Order Details...](#)
[View Counts For Product Class Symbol...](#)
[Display FIX Log Message...](#)
[Copy Selected Cell Contents](#)
[Print Table...](#)
[Print Selected Rows...](#)
[Export Table...](#)
[Edit Table Preferences...](#)

The **Original Order Details** window will display.


10:27:58.453: LPS Jan11-22 35 C - SELL 3 @ \$0.40

Original Order Details

FIX Log Msg Time:

10:27:58.453

Route:

ISE

Connection:

WOLVERINE

Product:

LPS Jan11-22 35 C

FIX Tag Name	FIX Tag Num	Formatted FIX Value	FIX Tag Desc
Account	1	LINKAGE	Account
BeginString	8	FIX.4.2	BeginString
BodyLength	9	0249	BodyLength
Checksum	10	029	Checksum
ClOrdID	11	0501ABZ0275LKO-0	ClOrdID
ClientID	109	LKO	ClientID
CustomerOrFirm	204	Customer	CustomerOrFirm
ExDestination	100	ISE	Route
ExecBroker	76	00501	ExecBroker
ExecInst	18	INTERMARKET_SWEEP	ExecInst
HandlInst	21	Auto No Broker	HandlInst
MaturityDay	205	22	MaturityDay
MaturityMonthYear	200	201101	MaturityMonthYear
MsgSeqNum	34	2214	MsgSeqNum
MsgType	35	New Order	MsgType
OpenClose	77	Close	OpenClose
OrdType	40	Limit	OrdType
OrderCapacity	47	Customer	OrderCapacity
OrderQty	38	3.0	OrderQty

Execution Reports

#	FIX Log Msg T...	ExecID	TransactTime	SendingTime	ExecType	Side	LastS...	Leave...	Price	Account	AvgPx	CumQty	
1	10:27:58.493	2K-70J6-37-2	16:27:58	16:27:58.484	Order Accepted	Sell		3	0.40		0.00	0	ISE
2	10:27:58.495	2K-70J6-37-3	16:27:58	16:27:58.485	Canceled	Sell		0			0.00	0	ISE

Close

The first execution shows the away exchange accepted the order at 10:27:58.493. The second Execution shows the order was canceled at 10:27:58.495.

Order Partially Filled and then Canceled

Partially filled orders that are later canceled display in the Linkage Monitor.

The screenshot shows the 'CXS - CBOE Execution Services' application window. It features a menu bar (File, Filters, Preferences, View, Window, Help) and a toolbar with buttons for 'Connection', 'Product', 'CBOEID', 'Route', 'Mills to Exec', 'Apply Filters', and 'Remove Filters'. Below the toolbar is a table with columns: Connection, Fx Log Msg Time, Product, State, Remaining Qty, Mills to Fully Execute, Filled Qty, Account, CustomerOrFirm, and Route. The table contains two rows of data. To the right of the table is a 'Current Counts' panel with several summary statistics and breakdowns by connection and exchange.

Connection	Fx Log Msg Time	Product	State	Remaining Qty	Mills to Fully Execute	Filled Qty	Account	CustomerOrFirm	Route
WOLVERINE	10:27:48.155	RUT Dec10-19 500 P	Filed	0	24	1	LINKAGE	Non-Member Market Maker	PHLX

Current Counts

- Total Orders: 3
- Total Contracts: 37
- Total Contracts Filled: 30

Orders Routed by Connection

Name	Count
MERRILL	1

Contracts Routed by Connection

Name	Count
MERRILL	33

Contracts Filled by Connection

Name	Count
MERRILL	29

Orders Routed by Exchange

Name	Count
AMEX	1
ISE	1
PHLX	1

Contracts Routed by Exchange

Name	Count
AMEX	33
ISE	2
PHLX	1

Contracts Filled by Exchange

Name	Count
AMEX	29
PHLX	1

Contracts Filled by Class

Name	Count
AAFL	29
RUT	1

Setup...

FX Log File: C:\CBOE\SBT\CBOEDIR_8.4.31.42_ATGTEST6\cxcs\bin\fx_log\play\c20110216.log

In the example above, an order was routed to the AMEX. The order was partially filled and then canceled.



To view order details, right-mouse click on any data row and select **View Selected Order Details** or from the **View** menu, select **View Selected Order Details**.

View Selected Order Details...
View Counts For Product Class Symbol...
Display FIX Log Message...

Copy Selected Cell Contents
Print Table...
Print Selected Rows...
Export Table...
Edit Table Preferences...

The **Original Order Details** window will display.

08:43:12.459: AAPL Dec10-3 320 C - SELL 33 @ \$1.31

Original Order Details

FIX Log Msg Time: 08:43:12.459

Connection: MERRILL

Route: AMEX

Product: AAPL Dec10-3 320 C

FIX Tag Name	FIX Tag Num	Formatted FIX Value	FIX Tag Desc
Account	1	CBOECUST	Account
BeginString	8	FIX.4.2	BeginString
BodyLength	9	0239	BodyLength
Checksum	10	049	Checksum
ClOrdID	11	0501ACE0142LKO	ClOrdID
ClientID	109	LKO	ClientID
CustomerOrFirm	204	Customer	CustomerOrFirm
DeliverToCompID	128	1	DeliverToCompID
ExDestination	100	AMEX	Route
ExecBroker	76	00792	ExecBroker
ExecInst	18	INTERMARKET_SWEEP	ExecInst
HandlInst	21	Auto No Broker	HandlInst
MaturityDay	205	03	MaturityDay
MaturityMonthYear	200	201012	MaturityMonthYear
MsgSeqNum	34	859	MsgSeqNum
MsgType	35	New Order	MsgType
OpenClose	77	Close	OpenClose
OrdType	40	Limit	OrdType
OrderQty	38	33 n	OrderQty

Execution Reports

#	FIX Log Msg Time	ExecID	TransactTime	SendingTime	ExecType	Side	LastS...	Leave...	Price	Account	AvgPx	CumQty
1	08:43:12.565	634010	14:43:12	14:43:12	Order Accepted	Sell	0	33	1.31	CBOECUST	0.00	0
2	08:43:12.565	634011	14:43:12	14:43:12	Partially Filled	Sell	11	22	1.31	CBOECUST	1.31	11
3	08:43:12.566	634012	14:43:12	14:43:12	Partially Filled	Sell	15	7	1.31	CBOECUST	1.31	26
4	08:43:12.566	634013	14:43:12	14:43:12	Partially Filled	Sell	3	4	1.31	CBOECUST	1.31	29
5	08:43:12.566	634014	14:43:12	14:43:12	Canceled	Sell	0	0	1.31	CBOECUST	1.31	29

Close

The first execution shows the away exchange accepted the order at 08:43:12.565. The second, third, and fourth executions show the order was partially filled, resulting in a "Leaves Qty" of 4. The last execution shows the remaining qty was canceled at 08:43:12.566.

Order Canceled Without an “Order Accepted” Execution

Orders that are immediately canceled display on the Linkage Monitor.

Connection	FX Log Msg Time	Product	State	Remaining Qty	Mills to Fully Execute	Filled Qty	Account	CustomerOrFirm	Route
COLVERNE	10:27:58.453	APL Jan11-12 10.0	Canceled	0	42	0	LIBRAGE	Customer	BOX
COLVERNE	10:27:58.155	RUT Dec10-18 550 P	Filled	0	31	1	LIBRAGE	Non-Member Market Maker	PHLX
MERRILL	10:43:12.465	AAPL Sep10-13 20.0	Canceled	0	103	0	LIBRAGE	Customer	BOX
COLVERNE	10:43:48.303	AAPL Sep10-13 20.0	Canceled	0	39	0	LIBRAGE	Customer	BOX

Current Counts	
Total Orders:	4
Total Contracts:	30
Total Contracts Filled:	30

Orders Routed by Connection	
Name	Count
MERRILL	1

Contracts Routed by Connection	
Name	Count
MERRILL	33

Contracts Filled by Connection	
Name	Count
MERRILL	29

Orders Routed by Exchange	
Name	Count
AMEX	1
BOX	1
ISE	1
PHLX	1

Contracts Routed by Exchange	
Name	Count
AMEX	33
BOX	1
ISE	3
PHLX	1

Contracts Filled by Exchange	
Name	Count
AMEX	29
PHLX	1

Contracts Filled by Class	
Name	Count
AAPL	29
RUT	1

In the example above, an order routed to the BOX and was immediately canceled.



To view order details, right-mouse click on any data row and select **View Selected Order Details** or from the **View** menu, select **View Selected Order Details**.

View Selected Order Details...
View Counts For Product Class Symbol...
Display FIX Log Message...

Copy Selected Cell Contents
Print Table...
Print Selected Rows...
Export Table...
Edit Table Preferences...

The **Original Order Details** window will display.

08:42:45.383: AAPL Dec10-3 320 C - BUY 1 @ \$1.35

Original Order Details

FIX Log Msg Time: 08:42:45.383 Connection: WOLVERINE
Route: BOX Product: AAPL Dec10-3 320 C

FIX Tag Name	FIX Tag Num	Formatted FIX Value	FIX Tag Desc
Account	1	LINKAGE	Account
BeginString	8	FIX.4.2	BeginString
BodyLength	9	0252	BodyLength
Checksum	10	138	Checksum
ClOrdID	11	0501ACE0137LKO:0	ClOrdID
ClientID	109	LKO	ClientID
CustomerOrFirm	204	Customer	CustomerOrFirm
ExDestination	100	BOX	Route
ExecBroker	76	00501	ExecBroker
ExecInst	18	INTERMARKET_SWEEP	ExecInst
HandlInst	21	Auto No Broker	HandlInst
MaturityDay	205	03	MaturityDay
MaturityMonthYear	200	201012	MaturityMonthYear
MsgSeqNum	34	752	MsgSeqNum
MsgType	35	New Order	MsgType
OpenClose	77	Close	OpenClose
OrdType	40	Limit	OrdType
OrderCapacity	47	Customer	OrderCapacity
OrderQty	38	1.0	OrderQty

Execution Reports

#	FIX Log Msg Time	ExecID	TransactTime	SendingTime	ExecType	Side	LastS...	Leave...	Price	Account	AvgPx	CumQty
1	08:42:45.413	2K-6Z4G-6B-2	14:42:45	14:42:45.403	Canceled	Buy		0			0.00	0

Close

The execution report shows the order was canceled at 08:42:45:413

Orders With Delayed Execution

Orders that are slow to execute appear on the Linkage Monitor.

CXS - CBOE Execution Services

File Filters Preferences View Window Help

Connection: [] Product: [] ClOrdID: [] Route: [] Mills to Exec: [] Apply Filters Remove Filters

Connection	FIX Log Msg Time	Product	State	Remaining Qty	Mills to Fully Execute	Filled Qty	Account	CustomerOrFirm	Route
WOLVERINE	08:42:45.403	APL Dec10-3 320 C	Canceled	38	0	0	LINKAGE	Customer	BOX
WOLVERINE	08:42:45.155	RUT Dec10-18 660 P	Filled	0	0	0	LINKAGE	Non-Member Market Maker	PHLX
MERRILL	08:42:37.455	SDS Dec10-11 210 C	Filled	0	0	0	CBOECU	Customer	NASDAQ
MERRILL	08:42:37.455	AAPL Dec10-3 320 C	Canceled	0	0	0	LINKAGE	Customer	BOX
WOLVERINE	08:42:45.383	AAPL Dec10-3 320 C	Canceled	38	0	0	LINKAGE	Customer	BOX

Current Counts

Total Orders: 5
Total Contracts: 48
Total Contracts Filled: 30

Orders Routed by Connection

MERRILL: 2

Contracts Routed by Connection

MERRILL: 41

Contracts Filled by Connection

MERRILL: 37

Orders Routed by Exchange

AMEX: 1
BOX: 1
ISE: 1
NASDAQ: 1

Contracts Routed by Exchange

AMEX: 23
BOX: 1
ISE: 2
NASDAQ: 8

Contracts Filled by Exchange

AMEX: 29
NASDAQ: 8
PHLX: 1

Contracts Filled by Class

AAPL: 29
RUT: 1
SDS: 8

Setup...

FIX Log File: C:\CBOE\SDT\CBOEDIR_8.4.31.42_ATTEST\cxs\bin\fixlog\replay\VC20110218.log

A new row is added to the Linkage Monitor's main table. The order's state is set to "New" for approximately 7 seconds. After about 7 seconds the order's state is changed to "Filled". The **Millis to Fully Executed** column shows that the order took 6,968 milliseconds to execute.



To view order details, right-mouse click on any data row and select **View Selected Order Details** or from the **View** menu, select **View Selected Order Details**.

View Selected Order Details...
View Counts For Product Class Symbol...
Display FIX Log Message...
Copy Selected Cell Contents
Print Table...
Print Selected Rows...
Export Table...
Edit Table Preferences...

The **Original Order Details** window will display.

09:05:37.408: SDS Dec10-18 26 C - BUY 8 @ \$0.87

Original Order Details

FIX Log Msg Time: 09:05:37.408

Connection: MERRILL

Route: NASDAQ

Product: SDS Dec10-18 26 C

FIX Tag Name	FIX Tag Num	Formatted FIX Value	FIX Tag Desc
Account	1	CBOECUST	Account
BeginString	8	FIX 4.2	BeginString
BodyLength	9	0239	BodyLength
Checksum	10	107	Checksum
ClOrdID	11	0501ABY0100LKO	ClOrdID
ClientID	109	LKO	ClientID
CustomerOrFirm	204	Customer	CustomerOrFirm
DeliverToCompID	128	64	DeliverToCompID
ExDestination	100	NASDAQ	Route
ExecBroker	76	00792	ExecBroker
ExecInst	18	INTERMARKET_SWEEP	ExecInst
HandlInst	21	Auto No Broker	HandlInst
MaturityDay	205	18	MaturityDay
MaturityMonthYear	200	201012	MaturityMonthYear
MsgSeqNum	34	1367	MsgSeqNum
MsgType	35	New Order	MsgType
OpenClose	77	Close	OpenClose
OrdType	40	Limit	OrdType
OrderQty	38	8.0	OrderQty

Execution Reports

#	FIX Log Msg Time	ExecID	TransactTime	SendingTime	ExecType	Side	LastS...	Leave...	Price	Account	AvgPx	CumQty
1	09:05:39.088	656372	15:05:37	15:05:39	Order Accepted	Buy	0	8	0.87	CBOECUST	0.00	0
2	09:05:44.376	656373	15:05:37	15:05:39	Filled	Buy	8	0	0.87	CBOECUST	0.87	8

Close

The original order's FIX Log Msg Time is 09:05:37.408 and the second Execution shows the order was filled at 09:05:44.376, resulting in the 6968 millisecond delay.

If the audible alarm is configured, the alarm will sound to alert the user that the order took more than 500 milliseconds to be fully executed. Refer to the Configure Audible Alarm section, page 23, for details on how to setup your alarm notification.

Filters Filtering options are available on the Linkage Monitor. From the data table, you can filter by Connection, Product, CIOrdID, Route and Millis to Exec.

Connection:		Product:	AAPL	CIOrdID:		Route:		Millis to Exec:		Apply Filters	Remove Filters
Connection	FIX Log Msg Time	Product	State	Remaining Qty	Millis to Fully Execute	Filled Qty	Account	CustomerOrFirm	Ro	Current Count	To
MERRILL	08:43:12.458	AAPL Dec10-3 320 C	Canceled 0	107	28	0	CBOECU	Customer	AMEX		
WOLVERINE	08:42:45.383	AAPL Dec10-3 320 C	Canceled 0	30	0	0	LINKAGE	Customer	BOV		Total

In the example above, the data table has been filtered by product AAPL. To filter by product, enter the product symbol in the **Product** text box and click **Apply Filters**. The data table will display only Linkage activity for that product. Follow these steps to filter by Connection, CIORDID, Route and Millis to Exec.

To remove the filter setup, click **Remove Filters**. The window will reset to display all Linkage activity.

Filters

Edit FIX Tag Filters...
Remove All Filters

From the **Filters** menu, you can edit FIX tag values. Click on **Filters** and then select **Edit FIX Tag Filters**. The following window will display.

From this window, you can enter specific values for FIX tags. To change a FIX value:

- Select the FIX field (tag) from the drop down list.
- Enter the Filter Value and click **Add/Update**. The FIX tag filter will display in the corresponding text box.
- To allow partial match on the value, click the checkbox in from of the **Allow Partial Match**.
- Click **OK** to save the FIX tag filter.
- Click **Cancel** to remove the filter request and return to the main window.

To remove a defined FIX filter:

- Highlight the specific FIX tag in the Selected FIX Tag Filters text box and click **Remove**.
- To remove all FIX filters, click **Remove All**. In addition, you can remove all FIX tag

filters by selecting **Remove All Filters** from the **Filters** menu.

- Click **OK** to save your changes.
- Click **Cancel** to withdrawal your changes and return to the main window.

Print



You have the ability to print your table display at any time. Right mouse click on a data row and select **Print Table**. The **Print** window will display.

View Selected Order Details...
Display FIX Log Message...
Copy Selected Cell Contents
Print Table...
Print Selected Rows...
Export Table...
Edit Table Preferences...

Print

General | **Page Setup** | **Appearance**

Print Service

Name: Adobe PDF Properties...

Status: Accepting jobs

Type:

Info: ☐ **Print To File**

Print Range

☒ **All**

☐ **Pages** 1 To 1

Copies

Number of copies: 1

☒ **Collate**

Print **Cancel**

- To print your display, set your print options and click **Print**.
- If you decide to not print the display, click **Cancel**.

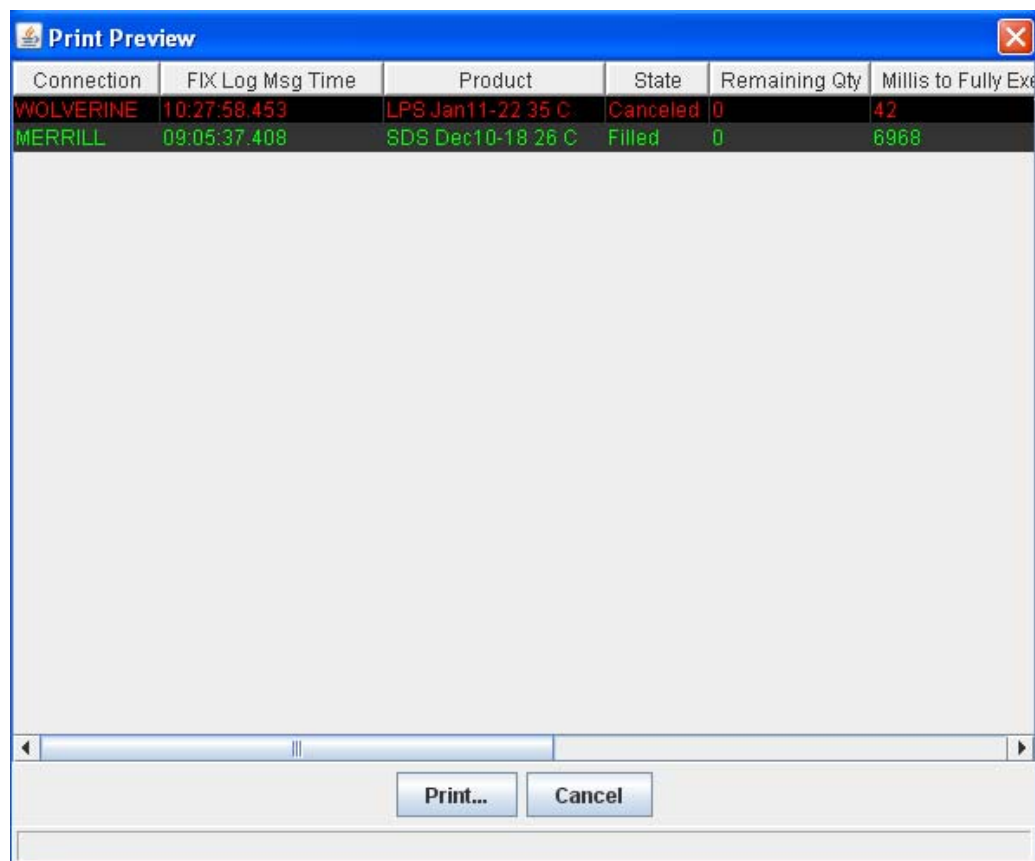
➤ **Copy Selected Cell Contents**

You can copy the value of a cell in the Linkage Monitor table. Right-mouse click on the cell you wish to copy and select **Copy Selected Cell Contents**. You can paste the cell value into any document.

➤ **Print Selected Rows**

The Linkage Monitor allows you to print a selection of rows.

- Highlight the rows you wish to print.
- Right-mouse click and select the option, **Print Selected Rows**. The following window will display.



The image shows a 'Print Preview' window from a software application. It contains a table with the following data:

Connection	FIX Log Msg Time	Product	State	Remaining Qty	Millis to Fully Exe
WOLVERINE	10:27:58.453	LPS Jan11-22 35 C	Canceled	0	42
MERRILL	09:05:37.408	SDS Dec10-18 26 C	Filled	0	6968

Below the table is a horizontal scrollbar. At the bottom of the window are two buttons: 'Print...' and 'Cancel'.

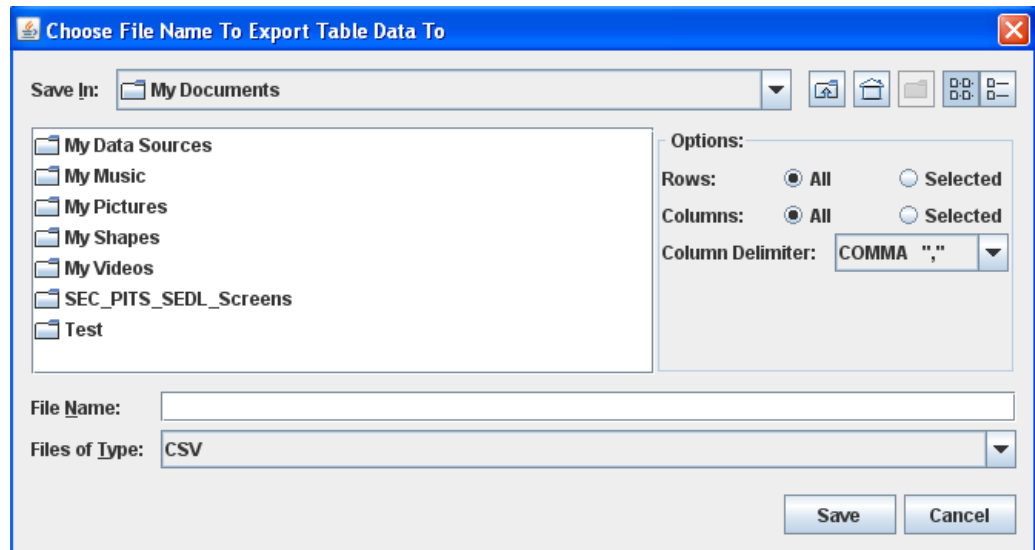
The selected rows appear in the **Print Preview** window. Click **Print** to proceed with printing the data rows.

Click **Cancel** to cancel the print request and return to the main table.

➤ **Export Table**

You can export the Linkage Monitor's table data to a .csv file.

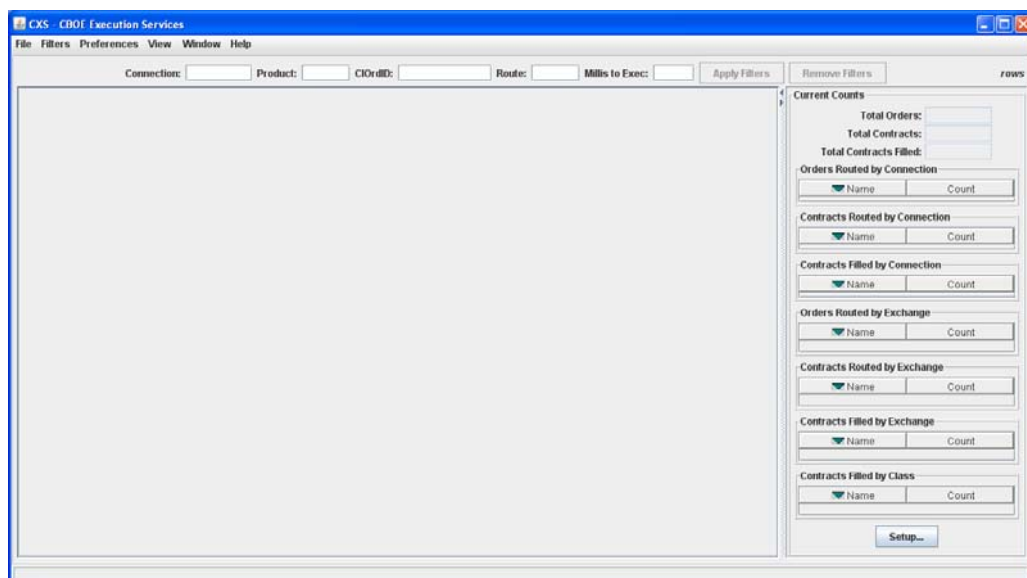
Right-mouse click on the data table and select **Export Table**. The following window will display.



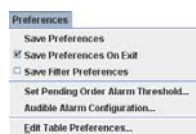
Enter the File name and click **Save**. The Linkage table data will be saved as a .csv file. If you decide you do not wish to save the file, click **Cancel**.

Configure the Linkage Monitor

The **Linkage Monitor** window is configurable. You can set it to your specifications to monitor Linkage activity in the market.



Save Preferences



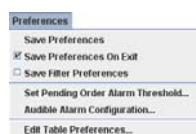
If you want the system to save your changes and automatically open the window with your customized defaults, be sure to save your configuration.

From the **Preferences** menu, click **Save Preferences on Exit**. A checkmark will appear in front of the option, enabling the feature. Setting the **Save Preferences on Exit** feature will prevent you from losing any configuration changes you make while you are monitoring Linkage activity. At exit, the system will save your configuration and make it available at your next login.

To save your preferences periodically, as you configure your display, click **Preferences, Save Preferences**.

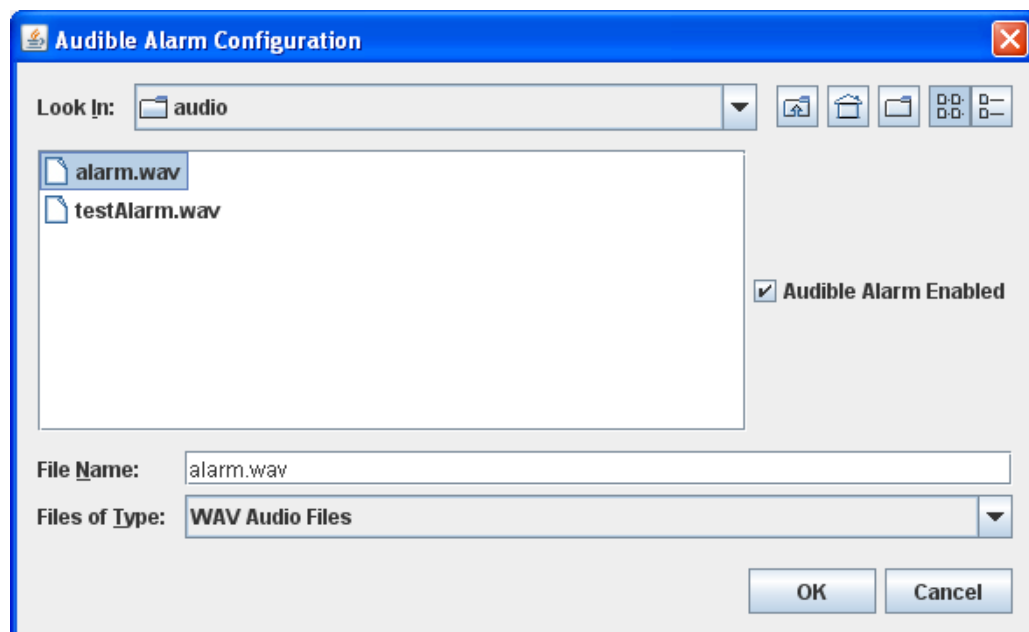
To save your filtered preferences, click **Preferences, Save Filter Preferences**. A checkmark will appear in front of the option, enabling the feature.

Configure Audible Alarm



The Linkage Monitor system allows you to set audible alarm notification for orders that are linked away to other exchanges.

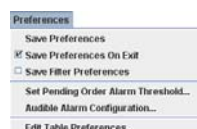
From the **Preferences** menu select **Audible Alarm Configuration**. The **Audible Alarm Configuration** window will display.



To set the alarm, click the **Audible Alarm Enabled** checkbox and select the **alarm.wav** file. Click **OK**. The audible alarm is now activated.

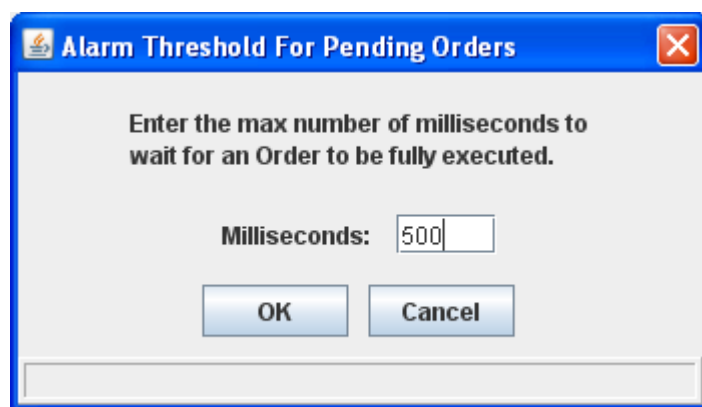
To inactivate the alarm, deselect the **Audible Alarm Enabled** checkbox and click **OK**.

Click **Cancel** to withdrawal your changes and return to the main window.



Pending Orders Alarm Threshold

To set the pending orders threshold time, select **Set Pending Order Alarm Threshold**. The **Alarm Threshold for Pending Orders** window will display.



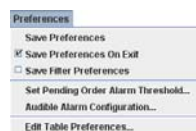
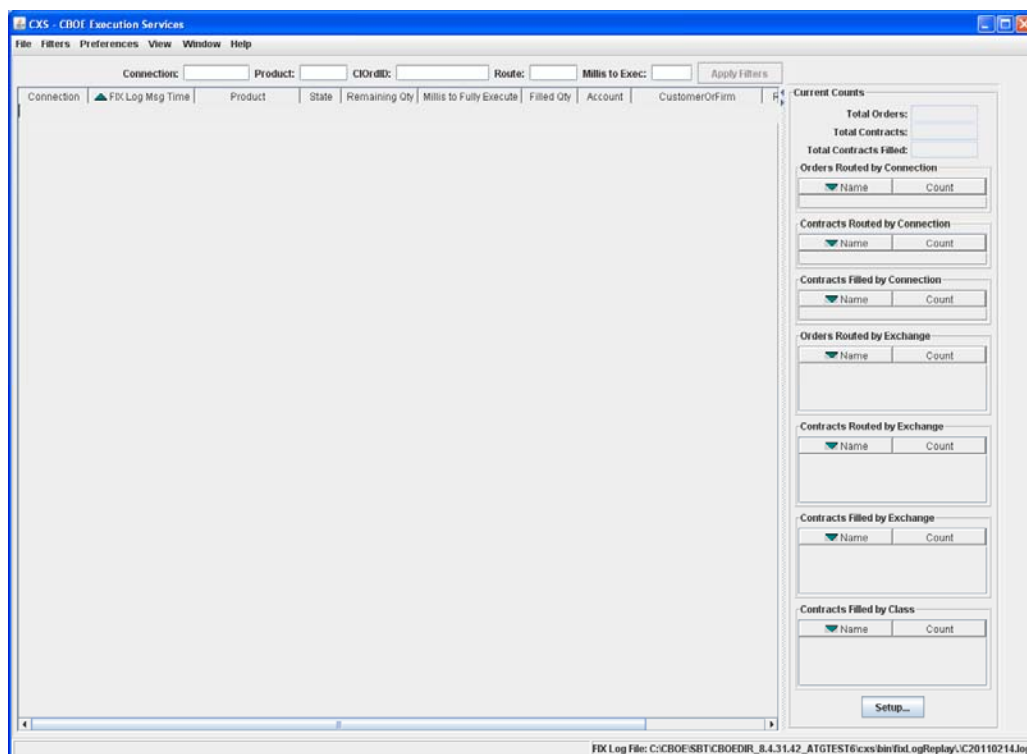
In the **Milliseconds** text box, enter the maximum number of milliseconds the system should wait for an order to be fully executed.

Click **OK** to save your changes. In the example above, the audible alarm will sound when a new order hasn't been filled for at least 500 milliseconds.

Click **Cancel** to retain the default setup and return to the main window.


Edit Table Preferences

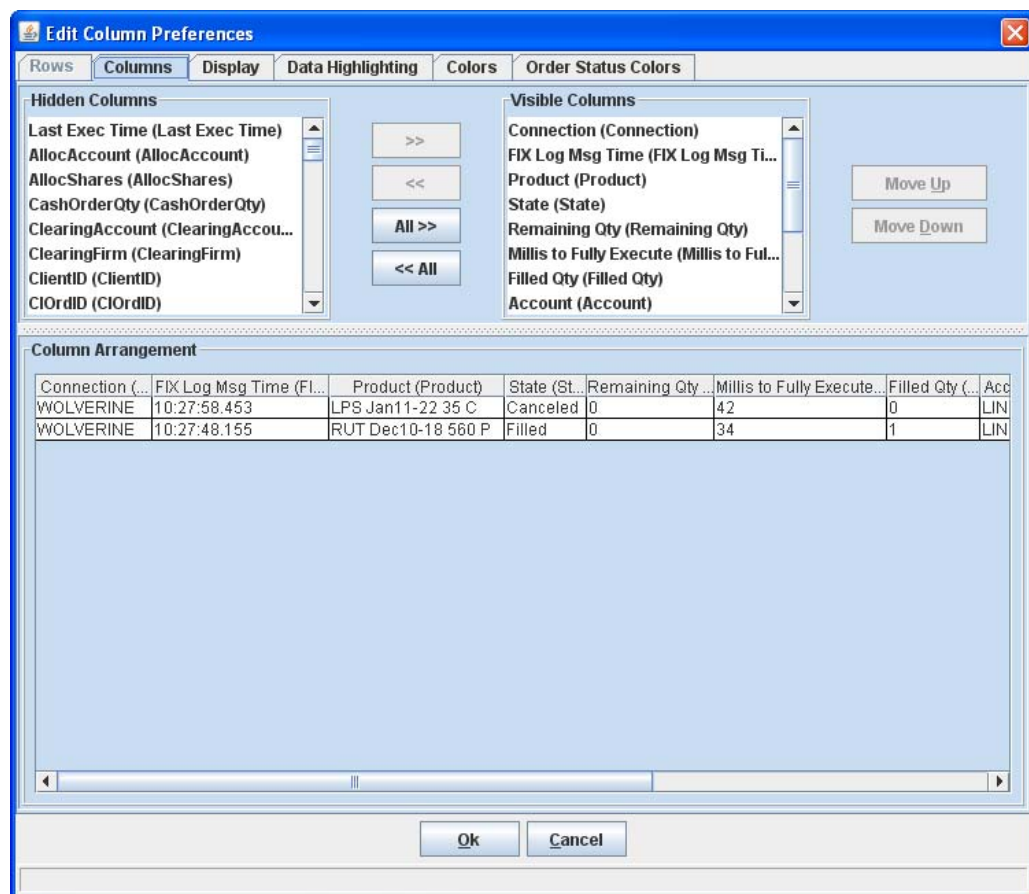
When you initially open the Linkage Monitor the default columns display for Linkage monitoring. Data that is in column format can be customized to your specifications.



To modify the column display, select **Edit Table Preferences** from the **Preferences** menu. The **Edit Column Preferences** window will display.

From this window, you can rearrange column positions and select or deselect columns for viewing.

 **Note:** Tabs that are not available are grayed out.



➤ Column Arrangement

If there is a data column you do not wish to view:


- Select the column name in the **Visible Columns** list box. To select a continuous range of columns, hold down the shift key and highlight the column names. Hold down the ctrl key to select individual, non-continuous, column names.
- Click to move the column name to the Hidden Columns list box.
- Click **Ok** to update the column arrangement.
 - If you decide to retain the default layout, click **Cancel**.

To hide all columns:


- Click to move all the column names in the Visible Columns to the Hidden Columns list box.
- Click **Ok** to update the column arrangement.
- If you decide to retain the default layout, click **Cancel** instead of Ok.

To display a hidden column:

- Select the column name(s) from the Hidden Columns list box.



- Click  to move the selected column name(s) to the Visible Columns list box.
- Click **Ok** to update the column arrangement.
- If you decide to retain the default layout, click **Cancel** instead of Ok.

To display all hidden columns:

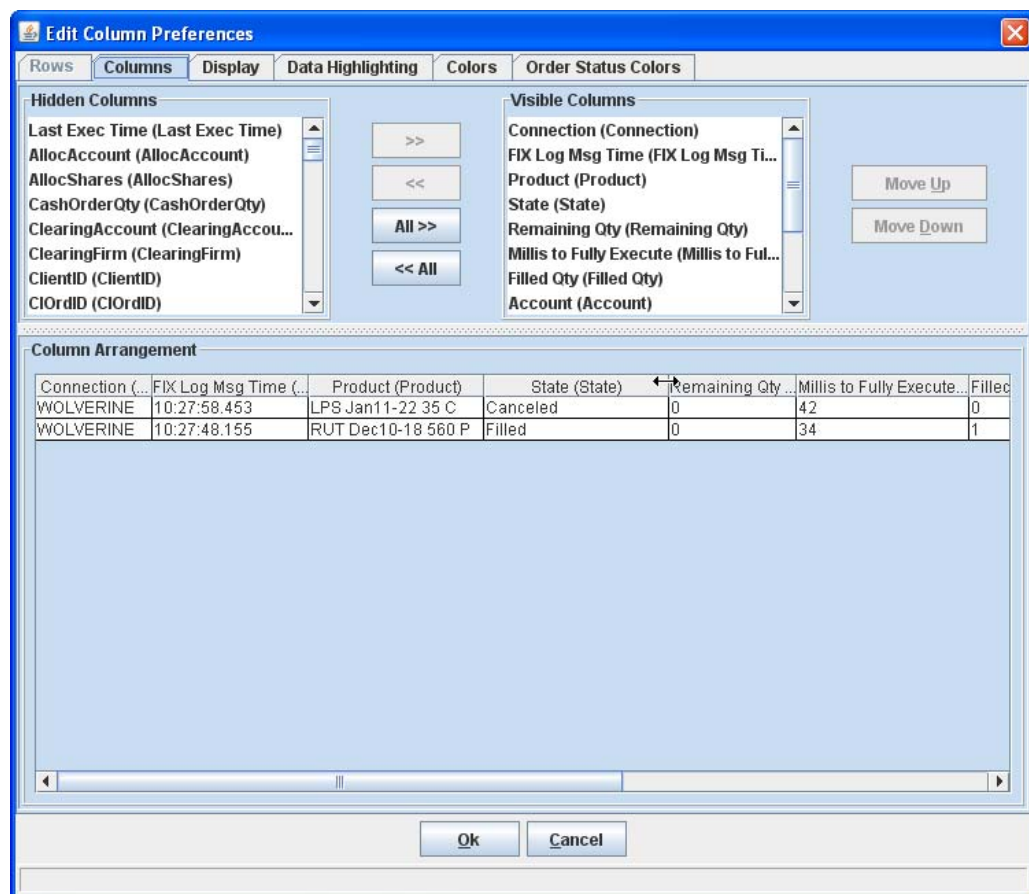
- Click  to move the column names to the Visible Columns list box.
- Click **Ok** to update the column arrangement.
- If you decide to retain the default layout, click **Cancel** instead of Ok.

You may prefer to view data columns in a different order than the default display.

To move a column:

- Highlight the column name from the Visible Columns list box.
- Click  or  until you reach the new column location.
- Click **Ok** to update the column arrangement.
- If you decide to retain the default layout, click **Cancel**.

From the Column Arrangement section of the window, the columns can be resized to make viewing information easier for you.

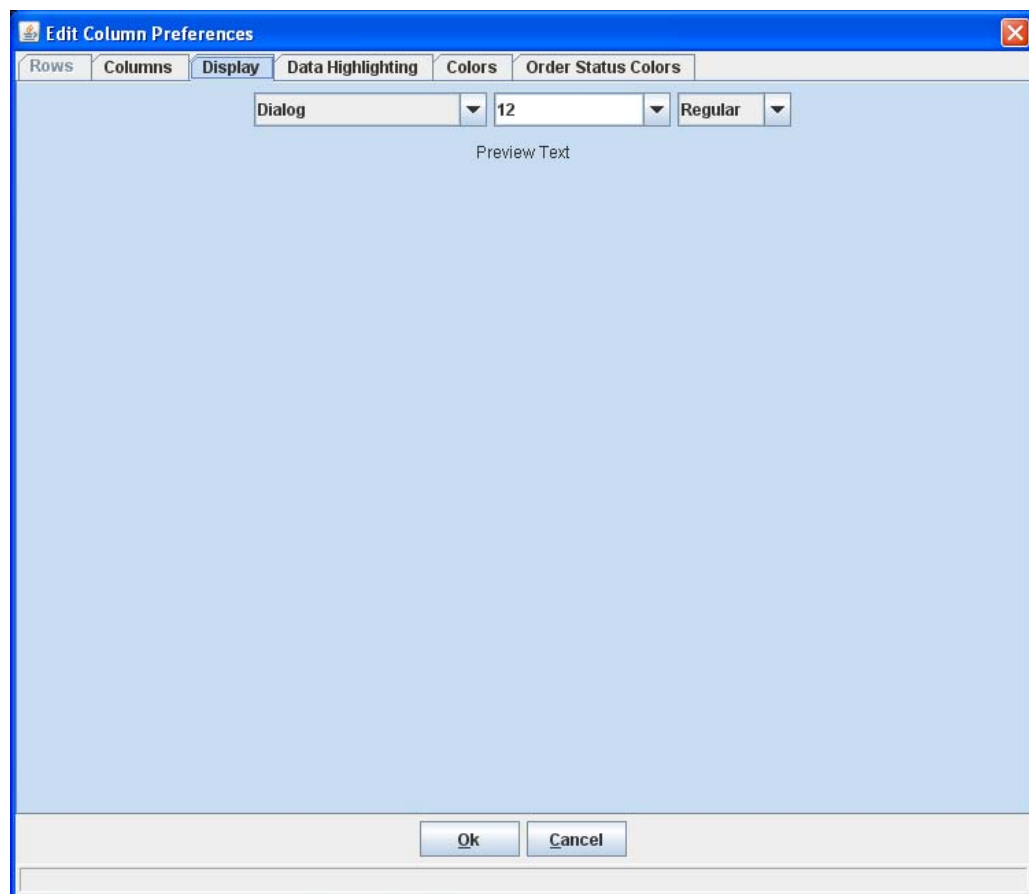


To resize a column:

- Place the mouse on the right edge of the column header (where the column titles are displayed).
- Hold the left mouse button down and move it to the desired size.
- Click **Ok** to save the new column size.
- If you decide to retain the default column size, click **Cancel** instead of Ok.

➤ **Display Specifications**

In addition to customizing column settings, you can adjust the display of the text on your windows. From the Edit Column Preferences window, select the **Display** tab.



Select the font type, font size and font style from the drop down lists. Your selection will display in the **Preview Text** section of the window.

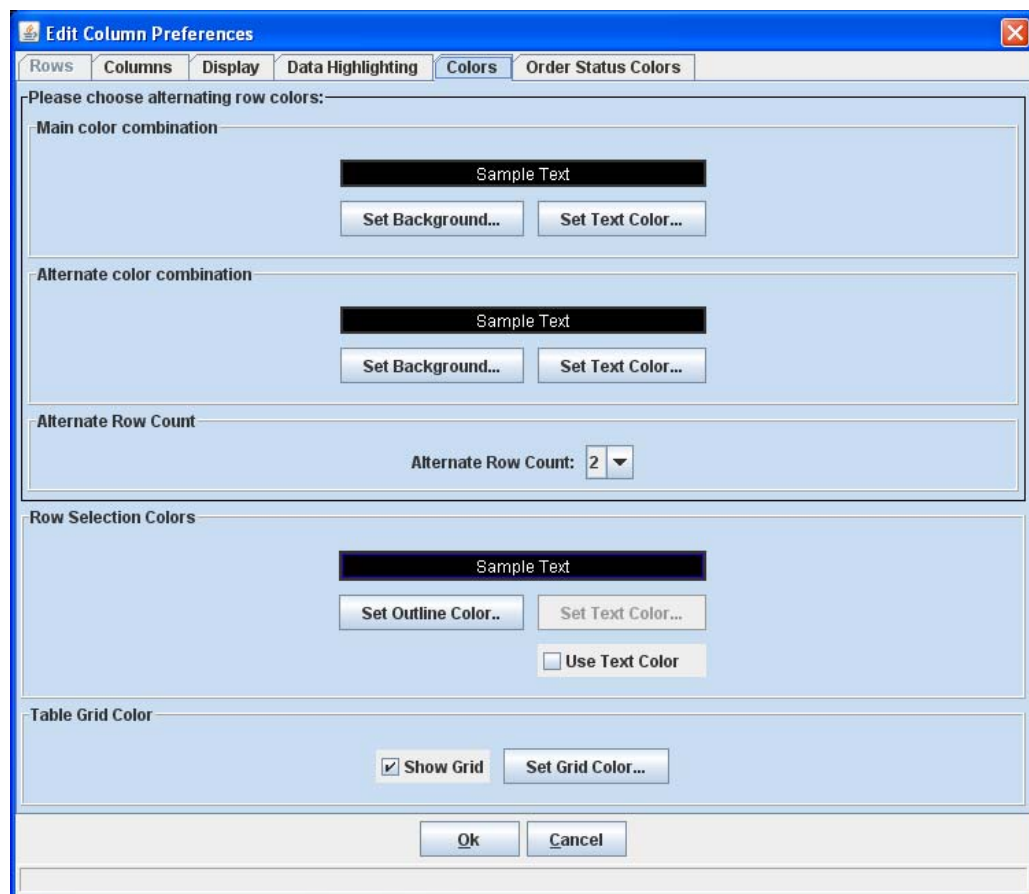
- Click **Ok** to set the new text style.
- If you wish to retain the default text settings, click **Cancel**.

➤ **Data Highlighting Options**

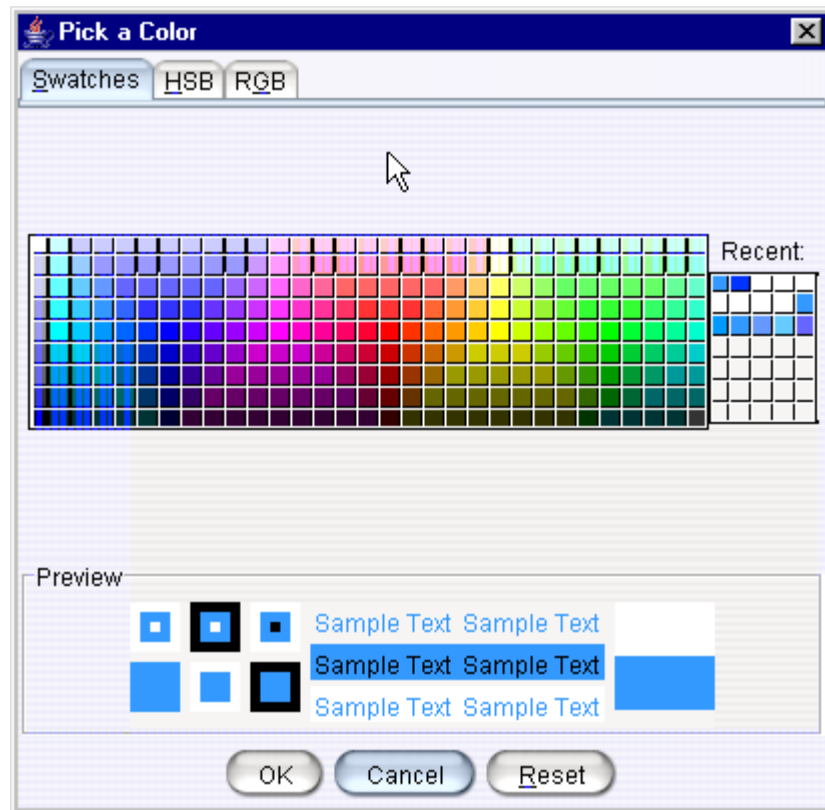
Not currently supported.

➤ **Display Color Options**

You can change the look of your Linkage Monitor display by choosing alternating row colors. Click on the **Colors** tab in the Edit Column Preferences window.

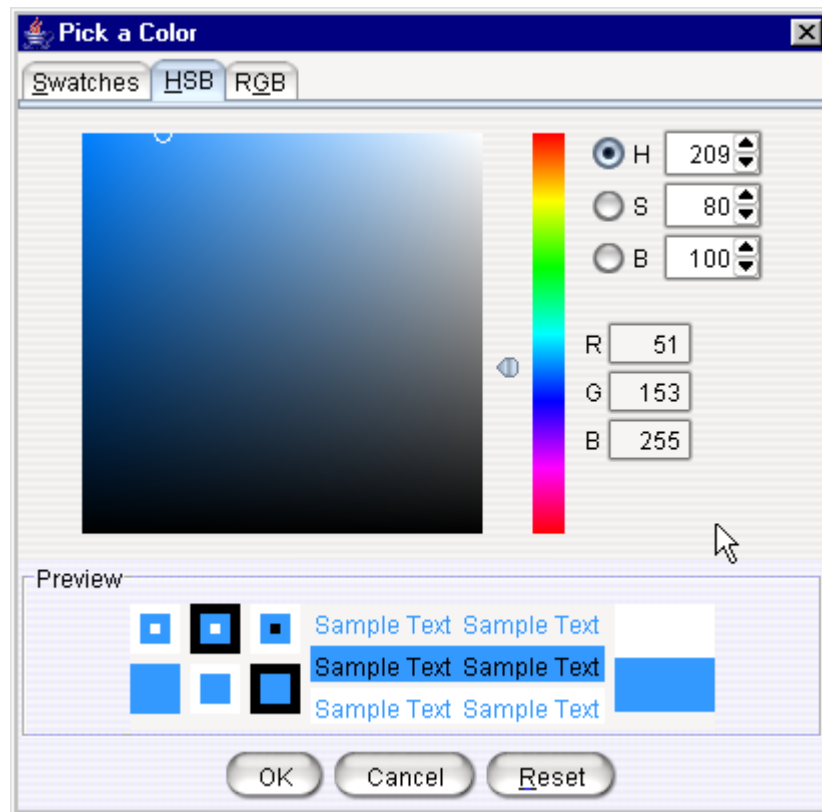


To change the background or text color, click **Set Background** or **Set Text Color** in the **Main color combination** box. The **Pick a Color** window will display. The system allows you to setup a second color combinations in the **Alternate color combination** box.



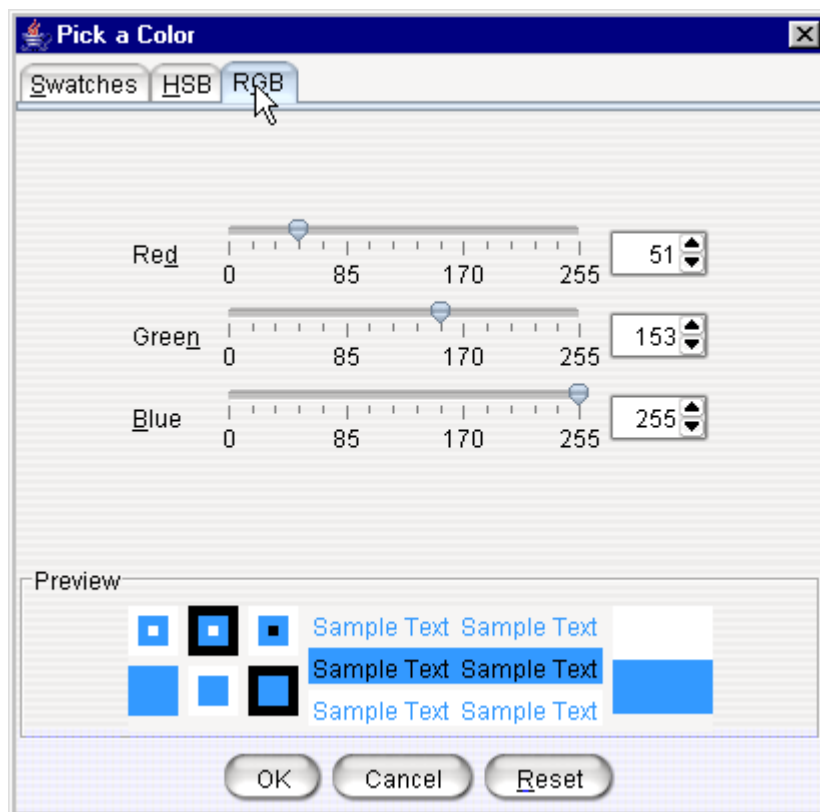
From the **Swatches** tab, click on your background color choice. An example of your color choice and text will appear in the **Preview** section of the window.

Click the **HSB** tab to set your hue, saturation and brightness. Place your mouse on the scroll bar button and adjust your color preference.

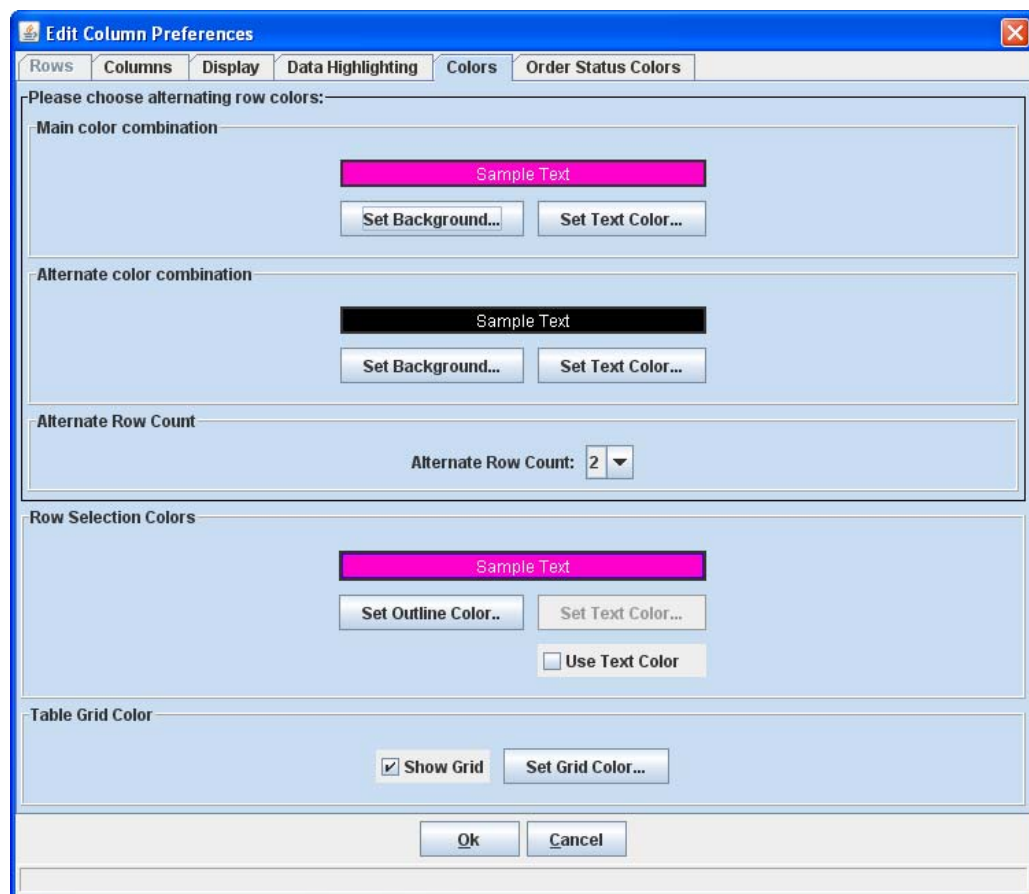


- Click **Cancel** to remove your changes and exit the window.
- Click **Reset** to retain the original settings.
- Click **OK** to save your changes. The background and text color will display in the **Preview** section of the window.

Click the **RGB** tab to set your red, green and blue color model. Place your mouse on the side scroll bar and adjust your color preference.



- Click **Cancel** to remove your changes and exit the window.
- Click **Reset** to retain the original settings.
- Click **OK** to save your changes. The background and text color will display in the **Sample Text** box.

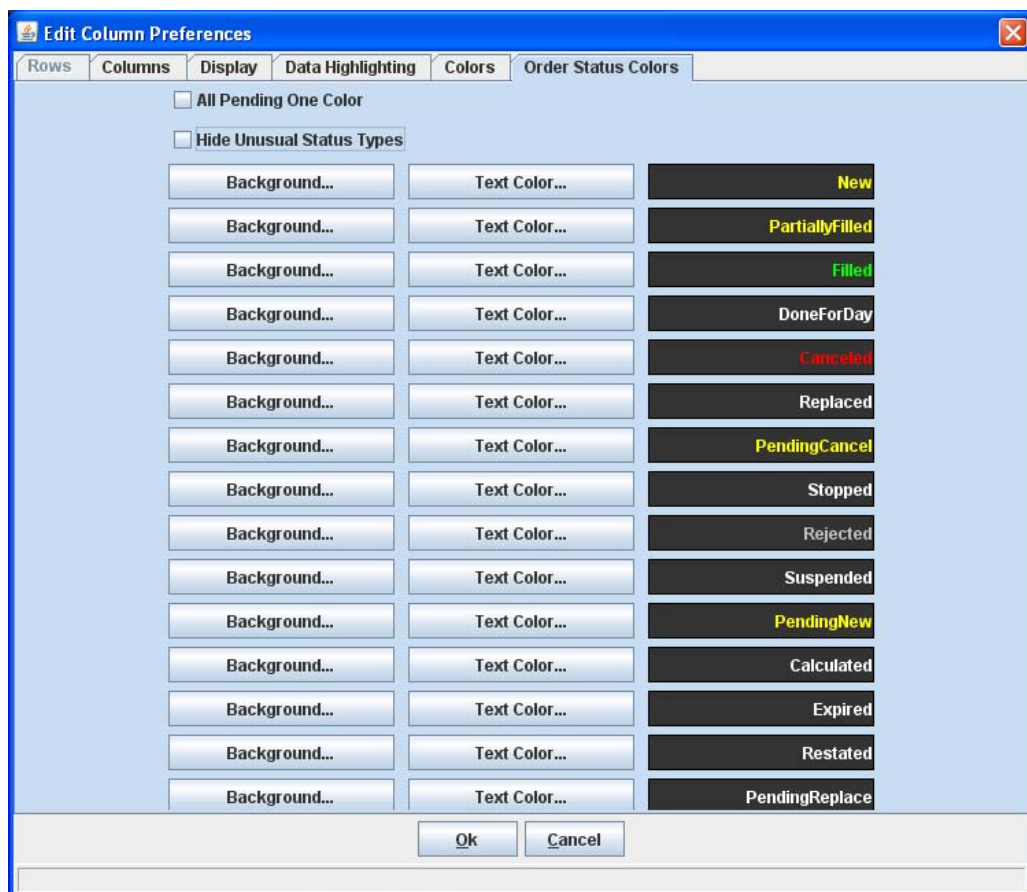


The **Row Selection Colors** correspond with the colors you choose for the main color combination.

- You can alternate the row colors by selecting from the **Alternate Row Count** drop down list.
- The **Table Grid Color** defaults to display in black. To change the color of the grid, click **Set Grid Color**. Select your table grid color from the **Pick a Color** window display.
- Click **Cancel** to retain the original settings.
- Click **Ok** to save the color combinations.

➤ **Order Status Color Options**

You can change the look of your Linkage Monitor display by choosing alternative colors for order status. Click on the **Order Status Colors** tab in the Edit Column Preferences window.



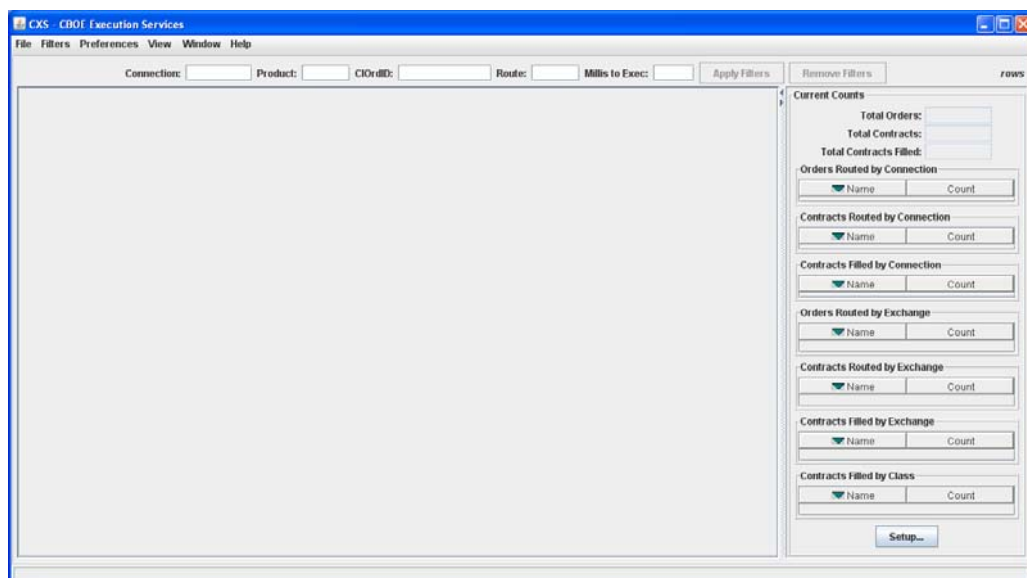
Select the Background Color and Text Color for each status type and Click **OK**. The Linkage Monitor will display each status type with its corresponding color.

To select one color for all pending order states, click the checkbox in front of the option, **All Pending One Color**.

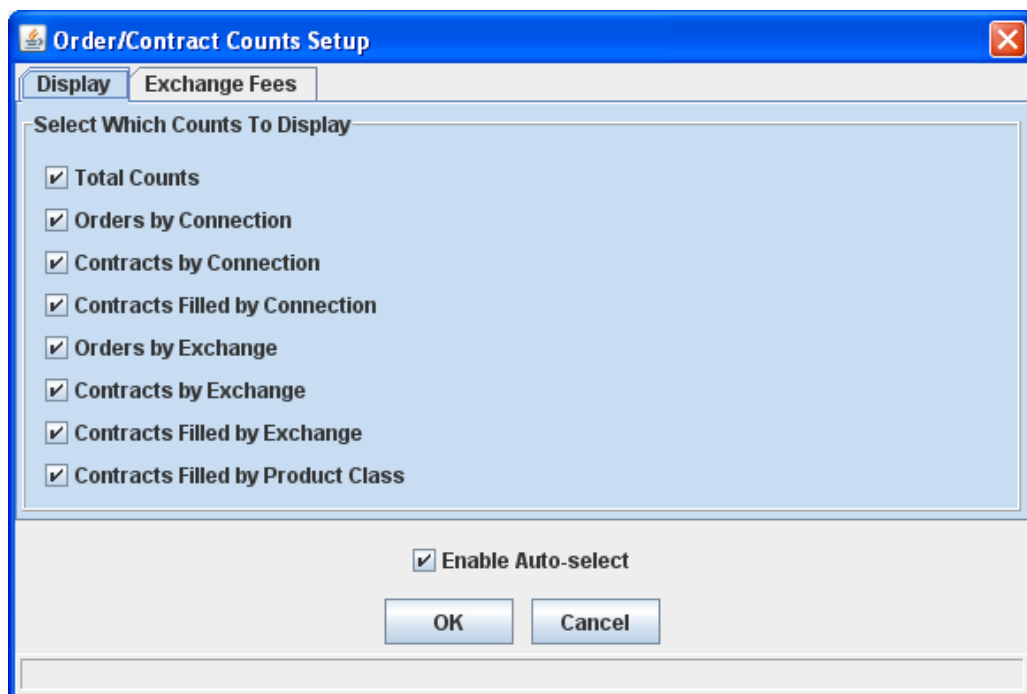
To hide order status types that are not regularly used, select the checkbox in front of the option, **Hide Unusual Status Types**.

Current Counts Setup

From the Linkage Monitor's main table, you can configure the Current Counts display to capture specific data.



Click **Setup** to customize your Current Counts display.



From the **Display** tab, select the checkbox in front of the counts you wish to display. Click **OK**. The counts will be visible in the main window.

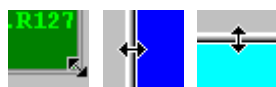
To have your options automatically displayed at startup, activate the Auto-select option. Place a checkmark in the checkbox in front of the **Enable Auto-select** option and click **OK**.

The **Exchange Fees** tab allows you to set exchange fees per contract.

- Enter the **Exchange** name and the **Fee Per Contract**.
- Click **Add/Update**. The exchange fee appears in the **Exchange Fees** text box.
- If you wish to remove the exchange fee, highlight the exchange in the Exchange Fees text box and click **Remove**.
- To remove all the exchange fees, click **Remove All**.

Sizing Windows

The CBOEdirect Opening Imbalances window is sizable. That is, it can be resized on the screen to make viewing information easier for you.





Place the mouse on any edge of the window until it becomes a two-sided arrow. Hold the left mouse button down and move it to the desired size.

Resizing a window on the corner will expand or contract it in both directions (i.e. up and down and side-to-side). Resizing it on the side or top/bottom will expand or contract the window only in that one direction.

Windows can also be resized using the center glyph in the upper right corner of the window.

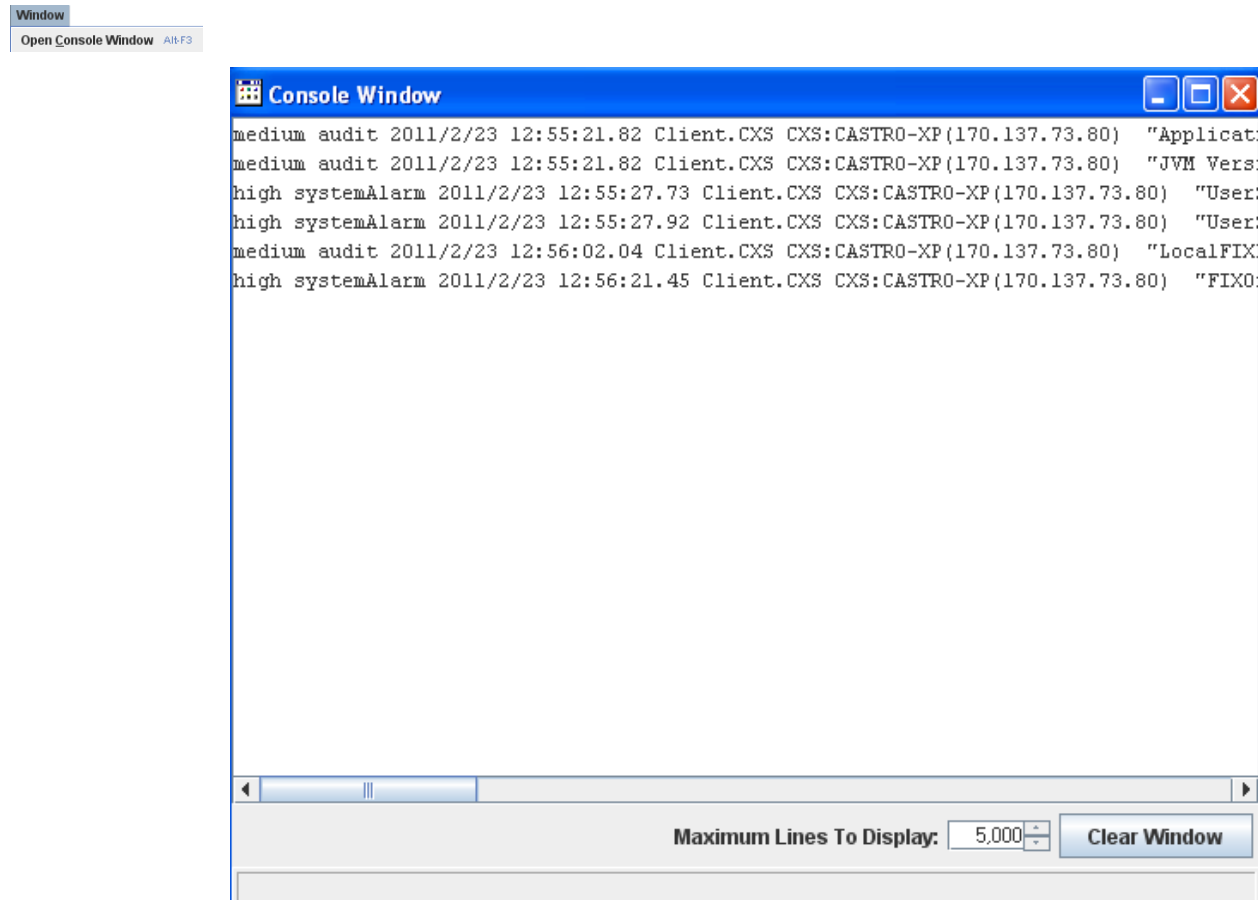


Click the left button (_) to minimize the window. Click the right button (X) to close the window. The center button is used for sizing.

If  is displayed, clicking it will increase the window size to a full-screen display. If  is displayed, clicking it will return the window to its default size.

Open Console Window

The Linkage Monitor allows you to view system messages that are generated by the functions you perform. To view these messages, select **Open Console Window** from the **Window** menu or press **[Alt-F3]** on your keyboard from anywhere on your screen. The Console Window will display.



The information in this window can be copied to any text editor on your PC. To copy text from this window,

- Place your cursor on the line you want to copy and using your mouse highlight the text.
- Press **Ctrl C** on your keyboard to copy the text.
- Open your text editor (Word, Notepad, etc.) and place your cursor in the text entry area.
- Press **Ctrl V** on your keyboard. The text is copied to your editor.

The window defaults to display 5,000 lines. You can change the maximum amount of lines to display by entering a new quantity in place of the default value, or you can select a higher/lower quantity by clicking the up/down arrows until the desired quantity is reached.

If you wish to clear the window of all its contents, click the **Clear Window** button.

Exit the System

You can log out and exit the system at any time.

Exit the System To exit the system, select **Exit** from the **File** Menu. You will be prompted to verify that you wish to close all windows and logout. Click **Yes**. The application will be closed and you will be returned to your system desktop.