<u>PSX GLIMPSE 4.1</u>

1 Overview

1.1 Product Description

A complement to the PSX TotalView-ITCH real-time data feed product, PSX GLIMPSE 4.1 is a point-to-point data feed connection that provides direct data feed customers with the current state of the PSX Order Book.   PSX GLIMPSE 4.1 uses the same Add Order messages as the PSX TotalView-ITCH 4.1 data feed product.

1.2 Upcoming Enhancements

The PSX GLIMPSE 4.1 feed is designed to support the expanded equity symbols up to 8 characters in total length.

In addition, the PSX GLIMPSE 4.1 feed will support Symbol Directory and Trading Action messages.

2 Architecture

PSX GLIMPSE 4.1 is a point-to-point data feed product comprised of a series of sequenced messages. Each message is variable in length based on the message type. The messages that make up the PSX GLIMPSE 4.1 protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

PSX currently offers the GLIMPSE 4.1 data feed in the SoupBinTCP protocol option only. Please note that GLIMPSE users must login to SoupBinTCP for sequence 1 to correctly receive data.

3 Data Types

All integer fields are unsigned big-endian (network byte order) binary encoded numbers.

All alpha fields are left justified and padded on the right with spaces.

Prices are integer fields. When converted to a decimal format, prices are in fixed point format with 6 whole number places followed by 4 decimal digits. The maximum price in GLIMPSE is 200,000.0000 (decimal, 77359400 hex).

4 Message Formats

Upon logon to the PSX GLIMPSE service, firms will receive the following data elements with the relevant system time stamp:

- Symbol Directory messages for all security symbols in the PSX execution system;
- Trading Action messages with the current trading state value for active security symbol in the PSX execution system;
- Add Order messages for all the displayable orders on the PSX execution system at the time of login request;
- GLIMPSE Snapshot message that reflects the most recent order reference number reflected in the transmission.

Please note that PSX GLIMPSE 4.1 uses the same Symbol Directory, Trading Action, and Add Order message formats as the PSX TotalView-ITCH 4.1 data feed.

At the end of the spins, PSX GLIMPSE will send a Snapshot message to denote where firms should begin processing real-time updates via the PSX TotalView-ITCH product.

4.1 Time Stamp – Seconds

For bandwidth efficiency reasons, PSX uses separate time stamp messages for the PSX GLIMPSE 4.1 and PSX TotalView-ITCH 4.1 products. The messages will be sequenced so that data feed recipients can apply the time stamps properly.

For the PSX GLIMPSE 4.1 and PSX TotalView-ITCH 4.1 products, PSX disseminates the timestamp into two separate pieces:

Timestamp Portion	Message Type	Notes
Seconds	Standalone message on PSX GLIMPSE 4.1 feed	Reflects the number of seconds past midnight that the Timestamp message was generated. Note: A Timestamp – Second message will be disseminated for every second for which there is at least one payload message.
Nanoseconds	Field within individual message formats on PSX GLIMPSE 4.1 feed	Reflects the number of nanoseconds since the most recent Timestamp-Seconds message that the payload message was generated.

For the standalone Timestamp – Seconds message, the message format will be as follows:

TIMESTAMP - SECONDS MESSAGE				
Name	Offset	Length	Value	Notes
Message Type	0	1	"T"	Seconds Message.
Second	1	4	Integer	Number of seconds since midnight.

4.2 System Event Message

PSX GLIMPSE product is designed to support the same system event messages as the PSX TotalView-ITCH feed. On PSX GLIMPSE, PSX will send out system event messages for those events that occurred up to the time of the PSX GLIMPSE snapshot request.

SYSTEM EVENT MESSAGE				
Name	Offset	Length	Value	Notes
Message Type	0	1	"S"	System Event Message.
Timestamp	1	4	Integer	Nanoseconds portion of the timestamp.
Event Code	5	1	Alpha	See System Event Codes below.

SYSTEM EVENT CODES – DAILY	
Code	Explanation
"O"	*Start of Messages.* Outside of time stamp messages, the start of day message is the first message sent in any trading day.
"S"	*Start of System hours.* This message indicates that PSX is open and ready to start accepting orders.
"Q"	*Start of Market hours.* This message is intended to indicate that Market Hours orders are available for execution.
"M"	*End of Market hours.* This message is intended to indicate that Market Hours orders are no longer available for execution.
"E"	*End of System hours.* It indicates that PSX is now closed and will not accept any new orders today. It is still possible to receive Broken Trade messages and Order Delete messages after the End of Day.
"C"	*End of Messages.* This is always the last message sent in any trading day.

SYSTEM EVENT CODES – AS NEEDED	
Code	Explanation
"A"	*Emergency Market Condition – Halt:* This message is sent to inform PSX market participants that the EMC is in effect. No trading is allowed during the EMC.
"R"	*Emergency Market Condition – Quote Only Period:* This message is sent to inform PSX market participants that the EMC quotation only period is in effect.
"B"	*Emergency Market Condition – Resumption:* This message is sent to inform PSX market participants that EMC is no longer in effect.

4.3 Add Order Message

An Add Order Message indicates that a new order has been accepted by the PSX system and was added to the displayable book. The message includes a day-unique Order Reference Number used by PSX to track the order.

For PSX GLIMPSE 4.1 / PSX TotalView-ITCH 4.1, PSX supports two variations of the Add Order message format.

4.3.1 Add Order – No MPID Attribution
This message will be generated for unattributed orders accepted by the PSX system.

ADD ORDER MESSAGE				
Name	Offset	Length	Value	Notes
Message Type	0	1	"A"	Add Order – No MPID Attribution Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The unique reference number assigned to the new order. The order reference number is increasing, but not necessarily sequential.

Buy/Sell Indicator	13	1	Alpha	The type of order being added. "B" = buy order. "S" = sell order.
Shares	14	4	Integer	The total number of shares associated with the order being added to the book.
Stock	18	8	Alpha	The security symbol for which the order is being added.
Price	26	4	Integer	The display price of the new order. Refer to Data Types for field processing notes.

4.3.2 Add Order with MPID Attribution

Note: This message will <u>not</u> be supported for NASDAQ OMX PSX for initial market launch.

This message will be generated for attributed orders and quotations accepted by the PSX system.

ADD ORDER – MPID ATTRIBUTION MESSAGE				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"F"	Add Order with MPID Attribution Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The unique reference number assigned to the new order. The order reference number is increasing, but not necessarily sequential.
Buy/Sell Indicator	13	1	Alpha	The type of order being added. "B" = buy order. "S" = sell order.
Shares	14	4	Integer	The total number of shares associated with the order being added to the book.
Stock	18	8	Alpha	The security symbol for which the order is being added.
Price	26	4	Integer	The display price of the new order. Refer to Data Types for field processing notes.
Attribution	30	4	Alpha	PSX market participant identifier associated with the entered order.

4.4 Symbol Directory

At the start of each trading day, NASDAQ OMX PSX disseminates stock directory messages for all active symbols in the system for the current trading day. Please note that the Symbol Directory spin may include halted issues.   Firms must process the Trading Action message for current trading state information.

SYMBOL DIRECTORY				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"R"	Stock Directory Message
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.

Stock	5	8	Alpha	Denotes the security symbol for the issue in PSX.
Market Category	13	1	Alpha	Indicates listing market center or listing market tier for the issue "N" = New York Stock Exchange (NYSE) "A" = NYSE Amex "P" = NYSE Arca "Q" = NASDAQ Global Select Market^{SM} "G" = NASDAQ Global Market^{SM} "S" = NASDAQ Capital Market$^{®}$ "Z" = BATS BZX Exchange *Space* = Not available
Financial Status Indicator	14	1	Alpha	For NASDAQ-listed issues, this field indicates when a firm is not in compliance with NASDAQ continued listing requirements. "D" = Deficient "E" = Delinquent "Q" = Bankrupt "S" = Suspended "G" = Deficient and Bankrupt "H" = Deficient and Delinquent "J" = Delinquent and Bankrupt "K" = Deficient, Delinquent and Bankrupt Space = Company is in compliance, if NASDAQ-listed issue For NYSE, NYSE Amex, NYSE Arca and BATS issues, this field will also be space-filled. Redistributors should refer to SIAC feeds for code if needed.
Round Lot Size	15	4	Integer	Indicates the number of shares that represent a round lot for the issue
Round Lots Only	19	1	Alpha	Indicates if NASDAQ or PSX system limits order entry for issue "Y" = only round lots are accepted in this stock "N" = odd/mixed lots are allowed

4.5 Stock Trading Action message

Administrative messages are used to indicate the current trading status of a security to the trading community.

In the GLIMPSE transmission, PSX will send out a Stock Trading Action message for only those NASDAQ, NYSE, NYSE Amex, NYSE Arca and BATS issues that were eligible for trading during the current trading session.

For most issues, the Trading Action state would be "T" (Trading Resumption) to reflect the issue was released for trading during the current market session.

If the issue was in a halted/paused state at the time of the GLIMPSE transmission, however, the Trading Action state could be one of the other states listed below.

If the GLIMPSE transmission includes a Stock Directory message, but not a Stock Trading Action message, for an issue, firms may assume that the issue was placed in an operational or regulatory trading halt prior to the start of the current trading system.

STOCK TRADING ACTION				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"H"	Stock Trading Action Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Stock	5	8	Alpha	Stock symbol right padded with spaces.
Trading State	13	1	Alpha	Indicates the trading state for the issue at the time of the GLIMPSE transmission. Allowable values are: | Code	Value
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H	Halted/Paused across all U.S. equity markets
Q	Quotation only period for cross-market halt or pause
T	Trading on PSX	
Reserved	14	1	Alpha	Reserved.
Reason	15	4	Alpha	Trading Action reason.

4.6 Reg SHO Short Sale Price Test Restricted Indicator

In November 2010, the Securities and Exchange Commission (SEC) will implement changes to Rule 201 of the Regulation SHO (Reg SHO).   For details, please refer to SEC Release Number 34-61595. In association with the Reg SHO rule change, NASDAQ will introduce the following Reg SHO Short Sale Price Test Restricted Indicator message format.

For NASDAQ-listed issues, NASDAQ will support a full pre-opening spin of Reg SHO Short Sale Price Test Restricted Indicator messages indicating the Rule 201 status for all active issues.   NASDAQ will also send the Reg SHO Short Sale Price Test Restricted Indicator message in the event of an intraday status change.

For other exchange-listed issues, NASDAQ will relay the Reg SHO Short Sale Price Test Restricted Indicator message when it receives an update from the primary listing exchange.
NASDAQ will process orders based on the most Reg SHO Restriction status value.

REG SHO RESTRICTION				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"Y"	Reg SHO Short Sale Price Test Restricted Indicator
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Stock	5	8	Alpha	Stock symbol right padded with spaces.
Reg SHO Action	13	1	Alpha	Denotes the Reg SHO Short Sale Price Test Restriction status for the issue at the time of the message dissemination. Allowable values are: "0" = No price test in place "1" = Reg SHO Short Sale Price Test Restriction in effect due to an intra-day price drop in security

				"2" = Reg SHO Short Sale Price Test Restriction remains in effect

4.7 Snapshot message

The Snapshot message reflects the PSX TotalVIew-ITCH 4.1 sequence number at the time that the PSX GLIMPSE 4.1 spin was requested.

To maintain a real-time order display, firms should begin to process real-time PSX TotalView-ITCH 4.1 messages beginning with the sequence number stated in this PSX GLIMPSE 4.1 snapshot message.

END OF SNAPSHOT MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"G"	End of Snapshot message
Sequence number	1	20	Numeric	PSX TotalView-ITCH 4.1 sequence number when the PSX GLIMPSE 4.1 snapshot was taken. To keep the order book current, firms should process real-time PSX TotalView-ITCH 4.1 messages beginning with the message sequence number reflected in this snapshot message. Note: While PSX TotalView-ITCH 4.1 is a binary data feed, the SoupBINTCP protocol uses ASCII characters for the sequence number in the logon request message format.

5 Support

o For general product support for PSX data feeds, please contact NASDAQ OMX Global Data Products at +1 301 978 5307 or dataproducts@nasdaqomx.com.

o For technical support for PSX data feeds, please contact NASDAQ OMX Global Software Development at devsupport@nasdaqomx.com.

Appendix A

Documentation Revision Control Log

January 8, 2013: PSX GLIMPSE 4.1
NASDAQ OMX removed the Trading Action State, "P", from the Stock Trading Message.

November 6, 2012: PSX GLIMPSE 4.1
Released a new version of the GLIMPSE documentation to support the following changes:

- Added the "P" value to the Trading State in the Stock Trading Message.
- Removed the Trading State "V" related to the Volatility Guard Program.

November 1, 2011: PSX GLIMPSE 4.1
NASDAQ OMX updated the Market Category message to include the code "Z" for BATS-listed securities.

July 14, 2010: PSX GLIMPSE 4.1
NASDAQ OMX added a new Regulation SHO Short Sale Price Test Restricted Indicator message format to be introduced in the fourth quarter of 2010.

July 2, 2010 : PSX GLIMPSE 4.1

NASDAQ OMX added new Action Trading code(s) to the Stock Trading Action message for the NASDAQ Volatility Guard trading pause.

March 26, 2010 : PSX GLIMPSE 4.1
Inclusion of EMC (Emergency Market Conditions) System Event Codes

February 26, 2010 : PSX GLIMPSE 4.1

Initial release of PSX documentation.