Polaris

FIX PROTOCOL SPECIFICATION – NYSE FLOOR BROKERS

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Introduction

This document describes the implementation of the FIX 4.2 protocol as supported by the FIX Gateway provided by Pragma for clients to send orders to the NYSE Floor Brokers using Polaris. In Phase 1 of the deployment on the NYSE Floor, this will support only One-touch Closing dOrders.

This document assumes the reader has a thorough understanding of the FIX 4.2 protocol available at http://www.fixprotocol.org/. As such, it is not intended as a guide to constructing a FIX client. Rather, it is a reference to ensure that a firm's FIX client, constructed according to the FIX 4.2 specifications, will be compatible with the Polaris FIX Gateway.

DEFINITIONS

- **Polaris FIX Gateway** — For the purpose of this document, the FIX Gateway provided by Pragma for clients to send orders to the NYSE Floor Brokers using Polaris.
- **Firm** — Floor Broker Firm.
- **Client** — Client sending orders to Floor Broker Firm for execution. This may be a buy-side, a non-member broker, or a member-broker.
- **ClientGroup** — A specific trading desk at the Client. This is primarily used for Credit Risk checks by the Firm.
- **ClientTrader** — An individual trader at the Client. This is primarily used for Credit Risk checks by the Firm.

To help with backwards compatibility, the following fields are defined:

- **OnBehalfOfMPID** —The NYSE MPID of the NYSE member originating the order. In the NYSE Pillar Gateway FIX Protocol Specification, this was tag 115.
- **OnBehalfOfSubMPID** — A NYSE sub-MPID of the NYSE member originating the order. In the NYSE Pillar Gateway FIX Protocol Specification, this was tag 116. NYSE recently updated the term "mnemonic" to "sub-MPID".
- **DeliverToID** — NYSE Floor Broker Agency ID. In the NYSE Pillar Gateway FIX Protocol Specification, this was tag 128.

IDENTIFIERS

Each session on the Floor Broker FIX Gateway is configured to allow access to the community of Firms on Polaris. Orders must explicitly identify the Client sending the order, the targeted Firm, the order's Destination, the ClientGroup, the OnBehalfOfMPID (MPID executing the order on NYSE), the OnBehalfOfSubMPID. The orders can optionally identify the ClientTrader sending the order, the DeliverToID (Agency), Retail Designation and the FDID.

MESSAGE TYPE	CLIENT*	FIRM*	DESTINATION*	Client Group*	Client Trader	OnBehalfOf MPID*	OnBehalfOf SubMPID*	RETAIL DESIGNATION	Deliver ToID	FDID
D, G	Tag 115	Tag 128	Tag 57	Tag 116	Tag 50	Tag 9115	Tag 9116	Tag 9050	Tag 9128	Tag 9001
8	Tag 128	Tag 115	Tag 50	Tag 129	Tag 57	Tag 9128	Tag 9116		Tag 9115	Tag 9001

*** Required**

NOTE: Orders will be rejected if they have an invalid or missing tag 115, 128, 57, 9115, or 9116. Polaris does not expose a ClientID / tag 109 field. This field is used by NYSE to narrow the scope of orders included in Self-Trade Prevention; please see the NYSE Pillar Gateway FIX Protocol Specification for more information.

CAT REPORTING

The following FIX tags are used to identify the Client and the Firm in CAT reporting:

- 115 - Client
- 9001 - FDID
- 128 - Firm

For orders sent to Polaris by brokers (broker clients, tag 115 must be the CAT reporting MPID for the client. tag 9001 should be blank.

For orders sent directly to Polaris by buy-sides, tag 9001 must be the CAT reporting FDID for the client. Tag 115 is required and client-defined; it must be agreed upon between Pragma and Client. Only orders with an FDID will be reported as a New Order event to CAT by Polaris.

WORKFLOW

The following FIX tag is used to identify the workflow in Polaris:

- 21 – HandlingInst

Tag21 may be either "1" or "3": "1" is a One-touch order "3" is a High-touch order. A number of tags/values are only valid for either 21=1 or 21=3. These tags are shown in the following table:

TAG	FIELD NAME	ONE-TOUCH VALUES	HIGH-TOUCH VALUES NON-ALGO	HIGH-TOUCH VALUES ALGOS
847	TargetStrategy	**1001** – dOrder	Not valid	**1** – VWAP **2** – POV **2001** – TWAP **2002** – Close **2003** – Open
59	TimeInForce	**0** – Day **2** – At the Opening	**0** – Day	**0** – Day
100	ExDestination	**XNYS** – NYSE	Not valid	Not valid
126	ExpireTime	Not valid	Not valid	UTC Timestamp (27)
168	EffectiveTime	Not valid	Not valid	UTC Timestamp (27)
849	ParticipationRate	Not valid	Not Valid	Percentage (4)
9303	RoutingInst	**N** – Non-Routable	Not Valid	Not valid

FAILURE RECOVERY

Each session on the Polaris FIX Gateway is assigned two pairs of destination IP addresses, and one port number used by all four IPs. The IP/Port pairs correspond to the Primary and DR production environments.

- Primary Production Environment – Polaris FIX Gateway users may log in to the primary IP addresses.
  - In the event if the primary destination becomes unavailable, the user should attempt to log in on the secondary IP address.
    - Cancel on Disconnect will be triggered if the outage was caused by a gateway failure
    - The sequence number on the secondary IP address will always continue from the last FIX message transacted on the primary IP (and vice versa). Application layer messages will be recoverable. Session Layer messages will not be recoverable but are counted in determining the next sequence number expected from the client.

- DR Production Environment – In the event that the Pragma Primary Production environment becomes unavailable, Polaris FIX Gateway users may log in to the DR IP addresses configured for their sessions.
  - Pragma will attempt to cancel all open orders, regardless of whether the user attempts to log back in or not and regardless of the Cancel on Disconnect configuration for the session. Please note that this will be constrained by NYSE-imposed limitations such as the freeze period for On Close orders.
  - UROUTs will not be sent for the orders.
  - Messages transacted on the affected session prior to the outage will not be recoverable. Sequence numbers will start with 1.

DATA TYPES

A data type and length are provided for each FIX tag in this specification. These length values represent systemic limits enforced by the Polaris FIX Gateway. All values entered by firms are subject to additional validations, as indicated in the "Values" column of the tables. Firms should not null pad a FIX tag to equal the systemic limit. Instead, each tag should be populated with the natural length of the intended value.

SELF-TRADE PREVENTION

The Polaris FIX Gateway does not implement Self-Trade Prevention functionality, it is simply passing the STP values to NYSE for consideration in NYSE STP processing. Polaris supports all values which NYSE supports, except for zero (0) which is session default. This means that a Self-Trade Prevention value is required on all orders, and there is no default. Please refer to NYSE specifications to understand the Self-Trade Prevention processing.

CANCEL-ON-DISCONNECT (COD)

By default, all sessions have CoD enabled. Sessions can have CoD disabled upon request.

In addition, individual orders can be opted in or out of CoD via tag 21018 (CoDIndicator), bypassing the session setting for that order. For example, for a session defaulted with CoD enabled, orders received with CoD disabled will not be cancelled even if CoD is otherwise triggered on the session.

Order-level CoD settings cannot be changed via a 35=G Cance/Replace request.

Cancellation / UROuts due to CoD will be reflected in tag 58 in 35=8 ExecutionReport with the text "Cancel-on-Disconnect."

MESSAGE THROTTLING

Inbound messages from a given session are read at a rate of 5,000 messages per second. Message types counted against this limit are: 35=D, G, F, in a message-in-flight manner. This means that the FIX session will send a message to the sequencer for processing, and will not send another until the previous one has been processed.

In addition to the session throttle limits, Polaris has a platform throttle limit of 14,000 messages per second. Once reached, messages from all sessions are throttled equally.

CONTACT US

The Polaris support team can be reached at polarisfixsupport@pragmatrading.com

FIX Header & Trailer

HEADER

All FIX messages sent and received via the Polaris FIX Gateway must include a Header and Trailer as defined below.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
8	BeginString	String (7)	Y	FIX.4.2	Always first field in message.
9	BodyLength	Int (6)	Y	Message length, in bytes, forward to the CheckSum field.	Always second field in message.
35	MsgType	String (1)	Y	**A** – Logon **0** – Heartbeat **1** – Test Request **2** – Resend Request **3** – Session Layer Reject **4** – Sequence Reset **5** – Logout **D** – New Order Single **F** – Order Cancel Request **G** – Order Cancel/Replace Request **8** – Execution Report **9** – Order Cancel Reject	Always third field in message.
34	MsgSeqNum	Int (20)	Y	First message sent has sequence of 1.	Last sequence number processed.
43	PossDupFlag	Boolean (1)	C	**Y** – Yes **N** – No	Conditionally required if the message is a retransmission.
49	SenderCompID	String (32)	Y		Values on incoming messages will identify Port owner, to be assigned by Pragma. Values will be echoed in tag 56 in outgoing messages.
50	SenderSubID	String (20)	N		Values on incoming messages will optionally identify ClientTrader. Values will be echoed in tag 57 in outgoing messages.
52	SendingTime	UTC Timestamp (27)	Y	YYYYMMDD-HH:MM:SS.mmm	Time of message transmission on incoming messages from Clients & outgoing messages from Polaris.
56	TargetCompID	String (32)	Y		Values on incoming messages will be equal to "POLARIS". Values will be echoed in tag 49 in on outgoing messages.
57	TargetSubID	String (20)	Y	NYSEFB	Values will be echoed in tag 50 in outgoing messages
97	PossResend	Boolean (1)	C	**Y** – Yes **N** – No	Conditionally required if the message is a resend.
115	OnBehalfOfCompID	String (20)	Y		Values on incoming messages will identify originating Client. For clients who are brokers, this must match their CAT reporting MPID. For buy-sides who are directly sending orders to Polaris, this will be assigned by Pragma. Values will be echoed in tag 128 in outgoing messages.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
116	OnBehalfOfSubID	String (20)	Y		Values on incoming messages will identify originating specific entity/trading desk/ClientGroup. Values will be echoed in tag 129 in outgoing messages.
128	DeliverToCompID	String (20)	Y		Values on incoming messages will targe the Firm, to be assigned by Pragma. Values will be echoed in tag 115 in outgoing messages.
122	OrigSendingTime	UTC Timestamp (27)	N	YYYYMMDD-HH:MM:SS.mmm	Original time of message transmission when transmitting orders as the result of a resend request.

TRAILER

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
10	CheckSum	String (6)	Y	Three byte, simple checksum that serves, with the trailing <SOH>, as the end-of-message delimiter.	Always last field in message. Always unencrypted.

FIX Session Layer

This section describes the protocol for the initiation, operation, and termination of FIX sessions with the Polaris FIX Gateway. TCP/IP is the required transmission protocol, and FIX 4.2 is the required application protocol supplemented by certain custom tags and values as defined in this specification.

POLARIS FIX SESSION LAYER HANDLING

The Polaris FIX Gateway validates and handles inbound Session Layer messages according to the following rules:

- MsgSeqNum as expected – all messages with a sequence number equal to the expected value will be accepted and processed in full, provided they pass basic message type format validations. This includes both Session and Application Layer messages, regardless of the PossDup or GapFillFlag values indicated on the inbound message.
- MsgSeqNum greater than expected – in general, upon receipt of a message with a sequence number greater than the expected value, Polaris FIX Gateway will neither accept nor process the message and will not increment the expected client-side sequence number. The gateway will respond with a Resend Request with BeginSeqNo = the expected value, and EndSeqNo = 0 (infinity).

  However, there are two cases with special handling:

  - Login Request with MsgSeqNum greater than expected – Polaris FIX Gateway will send a Logon Response, immediately followed by the Resend Request.

- Sequence Reset with GapFillFlag set to N, or not set – Polaris FIX Gateway will accept and process the request, provided it passes basic message type format validations. The expected client-side sequence number will be adjusted according to the NewSeqNo specified in the Sequence Reset message, as long as the requested number is higher than the next expected value.

- MsgSeqNum less than expected – in general, upon receipt of a message with a sequence number less than the expected value, Polaris FIX Gateway will respond with a Logout message, then close the TCP connection. The expected client-side sequence number will not be incremented.

  However, there are two cases with special handling:

  - Any Message with PossDup set to Y – Polaris FIX Gateway will silently ignore the message.
  - Sequence Reset with GapFillFlag set to N, or not set – Polaris FIX Gateway will accept and process the request, provided it passes basic message type format validations. The expected client-side sequence number will be adjusted according to the NewSeqNo specified in the Sequence Reset message, as long as the requested number is higher than the next expected value.

LOGON

This single message format is used as either a Logon Request or Logon Response depending on the message direction:

USAGE	DESCRIPTION	DIRECTION
Logon Request	Request to establish a FIX session.	Client to Gateway
Logon Response	Confirmation a FIX session has been established successfully.	Gateway to Client

The Polaris FIX Gateway authenticates the Logon Request by checking the SenderCompID [49]. If the Logon Request is authenticated, the Polaris FIX Gateway will respond with a confirmation Logon Response. The format for the Logon Request message is below:

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=A
98	EncryptMethod	Int (1)	Y	0	Must be 0 (No encryption)
108	HeartBtInt	Int (2)	Y	1—60	The Heartbeat interval in seconds.
141	ResetSeqNumFlag	Boolean (1)	N	N	Indicates both sides of a FIX session should reset sequence numbers. If included, this tag must be set to N.
	Standard Trailer		Y		

The format for the successful Logon Response message is below:

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=A
98	EncryptMethod	Int (1)	Y	0	Must be 0 (No encryption)

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
108	HeartBtInt	Int (2)	Y	1—60	The Heartbeat interval in seconds.
	Standard Trailer		Y		

LOGOUT

The format for the Logout message is below:

TAG	FIELD NAME	DATA TYPE	REQ'D	NOTES
	Standard Header		Y	MsgType[35]=5
58	Text	String (40)	N	Logout description.
	Standard Trailer		Y	

HEARTBEAT AND TEST REQUEST

The client must send a Heartbeat message [35=0] if the interval specified in the Logon Message HeartBtInt [108] passes without the client sending any messages. If HeartBtInt seconds pass without the Polaris FIX Gateway receiving any messages from the client, the Polaris FIX Gateway will send a Test Request [35=1] to solicit a Heartbeat from the client. If an additional HeartBtInt seconds pass without receiving any messages, the Polaris FIX Gateway will send a logout and close the TCP connection.

It is recommended that the client implements similar monitoring for messages received from the Polaris FIX Gateway. The Heartbeat message format is below:

TAG	FIELD NAME	DATA TYPE	REQ'D	NOTES
	Standard Header		Y	MsgType[35]=0
112	TestReqID	String (20)	C	Conditionally required when the Heartbeat is in response to a Test Request. Must be the same value as in the Test Request that solicited the Heartbeat.
	Standard Trailer		Y	

The Test Request message format is below:

TAG	FIELD NAME	DATA TYPE	REQ'D	NOTES
	Standard Header		Y	MsgType[35]=1
112	TestReqID	String (20)	Y	Identifier included in Test Request message to be returned in resulting Heartbeat.
	Standard Trailer		Y	

MESSAGE RETRANSMISSION

If Pragma receives a MsgSeqNum [34] higher than expected, Pragma will disregard the message, and issue a Resend Request, as described in the "Polaris FIX Session Layer Handling" section of this specification.

Clients may issue a Resend Request to Pragma. In response, Pragma will retransmit Application Layer messages only. Pragma will never retransmit any Session Layer messages (including Session-Level Rejects).

The format for the Resend Request message is below:

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=2
7	BeginSeqNo	Int (20)	Y	1—9223372036854775807	The message sequence number of the first message in the range of messages to be re-sent.
16	EndSeqNo	Int (20)	Y	0—9223372036854775807	The message sequence number of the last message in the range of messages to be re-sent. If the request is for all the messages since the BeginSeqNo, set EndSeqNo to 0.
	Standard Trailer		Y		

NOTE: Pragma will ignore the contents of PossResend [97] beyond basic message integrity validations and will treat all messages with PossResend = Y as new messages.

SEQUENCE RESET

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=4
123	GapFillFlag	Boolean (1)	Y	**Y** – Gap Fill Reset (MsgSeqNum[34] validated) **N** – Sequence Reset (MsgSeqNum[34] ignored)	Indicates the mode in which the message is to be interpreted.
36	NewSeqNo	Int (20)	Y	1—9223372036854775807	The new valid sequence number.
	Standard Trailer		Y		

SESSION-LEVEL REJECTS

Pragma generates a Session-Level Reject upon receipt of a message containing a session-level rule violation (e.g. a required FIX tag is missing). Error details are contained in SessionRejectReason [373] and 58 [Text], while the tag causing the error (if applicable) is identified in RefTagID [371].

The Session-Level Reject message format is below:

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=3
45	RefSeqNum	Int (20)	Y	1—9223372036854775807	The sequence number of the rejected message.
373	SessionRejectReason	Int (2)	N	**0** – Invalid Tag Number **1** – Required Tag Missing **2** – Tag Not Defined for this Message Type **3** – Undefined Tag **4** – Tag specified without a value **5** – Value is incorrect (out of range) for this tag **6** – Incorrect data format for value **7** – Decryption problem **8** – Signature problem **9** – CompID problem (SenderCompID, TargetCompID, or both) **10** – SendingTime accuracy problem **11** – Invalid MsgType **13** – Tag Appears More than Once (non-repeating group tags only) **14** – Tag specified out of required order **15** – Repeating group fields out of order **99** – Other	A code, which identifies the reason for the session level reject.
371	RefTagID	Int (9)	N	1—999999999	The tag number of the FIX field being referenced.
372	RefMsgType	String (1)	N		The MsgType of the FIX message being referenced.
58	Text	String (60)	N		Reject text, which identifies the reason for the rejected message.

FIX Application Layer

This section describes the FIX Application messages currently supported by the Polaris FIX Gateway. Only the message types represented here will be accepted.

```
*NOTE: The following applies to tags 1, 11, 41, 58
Only printable ASCII characters allowed, excluding comma, semicolon, pipe delimiter, "at"
symbol, greater than/less than, ampersand (&) and single/double quotation mark.
```

NEW ORDER – SINGLE

This message is used to send a New Order.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=D.
1	Account	String (16)	N		*See ***NOTE** p. 11.*
11	ClOrdID	String (20)	Y		Unique ID of the new Order request as assigned by the firm. *See ***NOTE** p. 11.*
18	ExecInst	String (1)	Y	**1** – Not held **5** – Held	
21	HandlInst	Char (1)	Y	**1** – Automated execution order, no intervention **3** – Manual order, best execution	See the Workflow section for details.
38	OrderQty	Qty (9)	Y	1—999999999	
40	OrdType	Char (1)	Y	**1** – Market **2** – Limit	See Appendix B – Polaris FIX Order Matrix for more details.
44	Price	Price (14)	C	Required for Limit Orders	The Minimum Price Variation ("MPV") for orders entered into Polaris shall be $0.01 for orders priced $1.00 or greater, and $0.0001 for orders priced below $1.00. Only valid for OrdType (40) of [2]=Limit. See Appendix B – Polaris FIX Order Matrix for more details.
54	Side	Char (1)	Y	**1** – Buy **5** – Sell Short **2** – Sell **6** – Sell Short Exempt	
55	Symbol	String (16)	Y		Valid NYSE Equities Ticker Symbol (E.g.: Berkshire Class A would be 55=BRK 65=A).
58	Text	String (40)	N		Value in incoming Messages from Firm will not be passed back in any response messages. **NOTE p. 11*
59	TimeInForce	Char (1)	Y	**0** – Day **2** – At the Opening	See Appendix B – Polaris FIX Order Matrix for more details.
60	TransactTime	UTC Timestamp (27)	Y	YYYYMMDD-HH:MM:SS.mmm	Customer application time
65	SymbolSfx	String (10)	N		Valid NYSE Suffix value (E.g.: Berkshire Class A would be 55=BRK 65=A)
100	ExDestination	String (4)	C	**XNYS** – NYSE	Conditionally required when 21=1.
114	LocateReqd	Boolean (1)	C	**N** – No	Conditionally required when 54=5 or 54=6, LocateReqd must be set to N.
126	ExpireTime	UTC Timestamp (27)	N		Strategy end time. Must be after EffectiveTime. Only supported for algo order types (VWAP, POV, TWAP in 847).
168	EffectiveTime	UTC Timestamp (27)	N		Strategy start time. Must be the current time or later. Only supported for algo order types (VWAP, POV, TWAP in 847).
386	NoTradingSessions	Int (1)	Y	1	

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
336	TradingSessionID	Char (1)	Y	**2** – Core Trading Session	
528	OrderCapacity	Char (1)	Y	**A** – Agency **P** – Principal **Q** – Error Account **R** – Riskless Principal	
847	TargetStrategy	Int (4)	C	**1** – VWAP **2** – POV **1001** – dOrder **2001** – TWAP **2002** – Close **2003** – Open	See Appendix B – Polaris FIX Order Matrix for more details.
849	ParticipationRate	Percentage (4)	C	0.01 – 1.00	Only supported for algo order types (VWAP, POV, TWAP in 847).
5700	LocateBroker	String (5)	N		Information only.
7928	SelfTradeType	Char (1)	Y	**T** – No Self-Trade Protection **N** – Cancel Newest **O** – Cancel Oldest (Letter O, not zero) **C** – Cancel Both* **D** – Cancel Decrement*	* Note: C and D are not supported for Discretionary orders
9001	FDID	String (40)	C		Conditionally required for orders sent to Polaris directly by a buy-side. Required by CAT. Value to be assigned by agreement between the client and the broker. When assigned, must match CAT.
9050	RetailDesignation	String (3)	N	**RET** – Retail Firm	Identifies if the order qualifies as Retail at NYSE. Polaris will pass this tag through to NYSE. Please contact NYSE directly to discuss this tag - including when it can be sent, and what NYSE functionality it drives.
9115	OnBehalfOfMPID	String (4)	Y		Values on incoming messages will identify the NYSE MPID executing the order. Values will be echoed in tag 9128 in outgoing messages.
9116	OnBehalfOfSubMPID	String (4)	Y		Values on incoming messages will identify sub-MPID. Values will be echoed in tag 9116 in outgoing messages.
9128	DeliverToID	String (5)	N		Values on incoming messages will optionally identify Broker Agency ID or Badge. Values will be used for display purposes only; will not be passed to NYSE. Values will be echoed in tag 9115 in outgoing messages.
9303	RoutingInst	Char (1)	N	**N** – Non-Routable	Only valid where 21=1.
21018	CoDIndicator	Char (1)	N	**0** – Do not Cancel-on-Disconnect **1** – Cancel-on-Disconnect	If tag not sent, CoD behaves according to session default.
	Standard FIX Trailer		Y		

ORDER CANCEL REQUEST

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=F
11	ClOrdID	String (20)	Y		Unique ID of the Cancel request as assigned by the Client. *See ***NOTE** p. 11*
41	OrigClOrdID	String (20)	Y		Represents the ClOrdID of the previously entered order intended for cancellation (NOT necessarily the initial order of the day). *See ***NOTE** p. 11*
54	Side	Char (1)	Y	**1** – Buy **5** – Sell Short **2** – Sell **6** – Sell Short Exempt	
55	Symbol	String (16)	Y		Valid NYSE Equities Ticker Symbol (E.g.: Berkshire Class A would be 55=BRK 65=A)
60	TransactTime	UTC Timestamp (27)	Y	YYYYMMDD-HH:MM:SS.mmm	Customer application time
65	SymbolSfx	String (10)	N		Valid NYSE Suffix value Conditionally required if received in original order. (E.g.: Berkshire Class A would be 55=BRK 65=A)
	Standard FIX Trailer		Y		

ORDER CANCEL/REPLACE REQUEST

Only a limited number of fields can be changed via the cancel/replace request (35=G), All other fields should be retransmitted as sent in the original order (35=D), identified in table below. Polaris will validate that non-modifiable fields have not been modified on an amendment. *Changeable tags.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=G
1	Account	String (16)	N		*See ***NOTE** p. 11*
11*	ClOrdID	String (20)	Y		Unique ID of the new Cancel/Replace request as assigned by the Client. *See ***NOTE** p. 11*
18	ExecInst	String (1)	Y	**1** – Not held **5** – Held	
21	HandlInst	Char (1)	Y	**1** – Automated execution order, no intervention **3** – Manual order, best execution	
38*	OrderQty	Qty (9)	Y	1 —999999999	
40	OrdType	Char (1)	Y	**1** – Market **2** – Limit	See Appendix B – Polaris FIX Order Matrix for more details
41*	OrigClOrdID	String (20)	Y		ClOrdID of the previously entered order intended for cancellation or replacement (NOT necessarily the initial order of the day). *See ***NOTE** p. 11*

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
44*	Price	Price (14)	C	Required for Limit Orders	The Minimum Price Variation ("MPV") for orders entered into Polaris shall be $0.01 for orders priced $1.00 or greater, and $0.0001 for orders priced below $1.00. Only valid for OrdType (40) of [2]=Limit See Appendix B – Polaris FIX Order Matrix for more details
54	Side	Char (1)	Y	**1** – Buy **5** – Sell Short **2** – Sell **6** – Sell Short Exempt	
55	Symbol	String (16)	Y		Valid NYSE Equities Ticker Symbol. (E.g.: Berkshire Class A would be 55=BRK 65=A)
58*	Text	String (40)	N		Value in incoming messages from Firm will not be passed back in any response messages. *See ***NOTE** p. 11*
59	TimeInForce	Char (1)	Y	**0** – Day **2** – At the Opening	See Appendix B – Polaris FIX Order Matrix for more details
60	TransactTime	UTC Timestamp (27)	Y	YYYYMMDD-HH:MM:SS.mmm	Customer application time
65	SymbolSfx	String (10)	C		Valid NYSE Suffix value. Conditionally required if received in original order. (E.g.: Berkshire Class A would be 55=BRK 65=A)
100	ExDestination	String (4)	C	**XNYS** – NYSE	
114	LocateReqd	Boolean (1)	C	**N** – No	Conditionally required for 54=5 or 54=6, LocateReqd must be set to N
126	ExpireTime	UTC Timestamp (27)	N		Strategy end time. Must be after EffectiveTime.
168	EffectiveTime	UTC Timestamp (27)	N		Strategy start time. Must be the current time or later.
386	NoTradingSessions	Int (1)	Y	1	
336	TradingSessionID	Char (1)	Y	**2** – Core Trading Session	
528	OrderCapacity	Char (1)	Y	**A** – Agency **P** – Principal **Q** – Error Account **R** – Riskless Principal	
847	TargetStrategy	Int (4)	C	**1** – VWAP **2001** – TWAP **2** – POV **2002** – Close **1001** – dOrder **2003** – Open	See Appendix B – Polaris FIX Order Matrix for more details
849	ParticipationRate	Percentage (4)	C	0.01 – 1.00	Only supported for algo order types (VWAP, POV, TWAP in 847).
5700	LocateBroker	String (5)	N		Information only.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
7928	SelfTradeType	Char (1)	Y	**T** – No Self-Trade Protection **N** – Cancel Newest **O** – Cancel Oldest (Letter O, not zero) **C** – Cancel Both* **D** – Cancel Decrement*	* Note: C and D are not supported for Discretionary orders
9001	FDID	String (40)	C		Conditionally required for orders originated by a buy-side. Required by CAT. Value to be assigned by the broker. When assigned, must match CAT.
9050	RetailDesignation	String (3)	N	**RET** – Retail Firm	Identifies if the order qualifies as Retail at NYSE. Polaris will pass this tag through to NYSE. Please contact NYSE directly to discuss this tag - including when it can be sent, and what NYSE functionality it drives.
9115	OnBehalfOfMPID	String (4)	Y		Values on incoming messages will identify the NYSE MPID executing the order. Values will be echoed in tag 9128 in outgoing messages.
9116	OnBehalfOfSubMPID	String (4)	Y		Values on incoming messages will optionally identify sub-MPID. Values will be echoed in tag 9116 in outgoing messages.
9128	DeliverToID	String (5)	N		Values on incoming messages will optionally identify Broker Agency ID or Badge. Values will be used for display purposes only; will not be passed to NYSE. Values will be echoed in tag 9115 in outgoing messages.
9303	RoutingInst	Char (1)	N	**N** – Non-Routable	
21018	CoDIndicator	Char (1)	N	**0** – Do not Cancel-on-Disconnect **1** – Cancel-on-Disconnect	If tag not sent, CoD behaves according to session default
	Standard FIX Trailer		Y		

ORDER CANCEL REJECT

This message is used to reject a Cancel or Cancel/Replace Request.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=9
11	ClOrdID	String (20)	Y		Returned from the Cancel or Cancel/Replaced Request – the ClOrdID of the message that is rejected (Cancel or Cancel/Replace request).
37	OrderID	String (20)	Y		OrderID of the order intended for cancellation or replacement. Unique identifier of most recent order as assigned by Polaris.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
39	OrdStatus	Char (1)	Y	**0** – New **1** – Partially Filled **2** – Filled **3** – Done for Day **4** – Cancelled **5** – Replaced **6** – Pending Cancel **8** – Rejected **A** – Pending New **E** – Pending Replace	
41	OrigClOrdID	String (20)	Y		Returned from Order Cancel or Cancel/Replace Request. Represents the ClOrdID of the previously entered order intended for cancellation or replacement (NOT necessarily the initial order of the day). *See ***NOTE** p. 11*
58	Text	String (40)	N		
60	TransactTime	UTC Timestamp (27)	Y	YYYYMMDD-HH:MM:SS.mmm	
434	CxlRejResponseTo	Char (1)	Y	**1** – Order Cancel Request **2** – Order Cancel/Replace Request	
20009	Nanosecond SendingTime	String (27)	Y	YYYYMMDD-HH:MM:SS.sssssssss	Time of message transmission on outgoing message from Polaris. **NOTE:** this represents the same reference time as provided in the Standard FIX Header tag SendingTime (52), with more granular resolution.
20010	Nanosecond TransactTime	String (27)	Y	YYYYMMDD-HH:MM:SS.sssssssss	Polaris application time. **NOTE:** this represents the same reference time as provided in the standard FIX tag TransactTime (60), with more granular resolution.
	Standard FIX Trailer		Y		

EXECUTION REPORT

This message is used to confirm new orders, cancellations, replacements, fills, trade busts and order rejections.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
	Standard Header		Y		MsgType[35]=8
1	Account	String (16)	N		
6	AvgPx	Price (16)	Y	0—999999.999999	
11	ClOrdID	String (20)	Y		Unique ID of the new Order, Cancel, or Cancel/Replace request as assigned by the Client.
14	CumQty	Qty (9)	Y	0—999999999	
17	ExecID	String (32)	Y		Unique identifier of the outgoing FIX message, assigned to all FIX MsgType 8.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
18	ExecInst	String (1)	Y	**1** – Not held **5** – Held	
19	ExecRefID	String (32)	C		Conditionally sent if 20=1, Contains the ExecID (tag 17) value of the Fill that is busted
20	ExecTransType	Char (1)	Y	**0** – New (ack, pending cancel, pending replace, partial fill, fill, order reject) **1** – Cancel (Trade Break Only)	
30	LastMkt	String (4)	C	MIC Code	On fills and partial fills, Market Identifier Code (MIC) of the sending market.
31	LastPx	Price (16)	C	0—999999.999999	Price of current partial fill or fill message (set to 0 on all non-fills).
32	LastQty	Qty (9)	C	0—999999999	Quantity of current partial fill or fill message (set to 0 on all non-fills).
37	OrderID	String (20)	C		Unique identifier of most recent order as assigned by Polaris.
38	OrderQty	Qty (9)	Y	1—999999999	
39	OrdStatus	Char (1)	Y	**0** – New **1** – Partially Filled **2** – Filled **3** – Done for Day **4** – Cancelled **5** – Replaced **6** – Pending Cancel **8** – Rejected **A** – Pending New **E** – Pending Replace	Status of the order
40	OrdType	Char (1)	Y	**1** – Market **2** – Limit	See Appendix B – Polaris FIX Order Matrix for more details
41	OrigClOrdID	String (20)	C		Returned from Order Cancel or Cancel/Replace Request. Represents the ClOrdID of the previously entered order intended for cancellation or replacement (NOT necessarily the initial order of the day). *See ***NOTE** on p. 11*
44	Price	Price (14)	C	Required for Limit Orders	The Minimum Price Variation ("MPV") for orders entered into Polaris shall be $0.01 for orders priced $1.00 or greater, and $0.0001 for orders priced below $1.00. Only valid for OrdType (40) of [2]=Limit See Appendix B – Polaris FIX Order Matrix for more details
54	Side	Char (1)	Y	**1** – Buy **5** – Sell Short **2** – Sell **6** – Sell Short Exempt	
55	Symbol	String (16)	Y		Valid NYSE Equities Ticker Symbol. (Example: Berkshire Class A would be 55=BRK 65=A)
58	Text	String (40)	N		

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
59	TimeInForce	Char (1)	Y	**0** – Day **2** – At the Opening	See Appendix B – Polaris FIX Order Matrix for more details
60	TransactTime	UTC Timestamp (27)	Y	YYYYMMDD-HH:MM:SS.mmm	
65	SymbolSfx	String (10)	C		Valid NYSE Suffix value. Conditionally if received in original order. (Example: Berkshire Class A would be 55=BRK 65=A)
114	LocateReqd	Boolean (1)	C	**N** – No	
126	ExpireTime	UTC Timestamp (27)	N		Strategy end time. Must be after EffectiveTime..
168	EffectiveTime	UTC Timestamp (27)	N		Strategy start time. Must be the current time or later.
150	ExecType	Char (1)	Y	**0** – New **1** – Partially Filled **2** – Filled **3** – Done for Day **4** – Cancelled **5** – Replaced **6** – Pending Cancel **8** – Rejected **A** – Pending New **E** – Pending Cancel/Replace	
151	LeavesQty	Qty (9)	C	0—999999999	
386	NoTradingSessions	Int (1)	Y	1	
336	TradingSessionID	Char (1)	Y	**2** – Core Trading Session	
528	OrderCapacity	Char (1)	Y	**A** – Agency **P** – Principal **Q** – Error Account **R** – Riskless Principal	
847	TargetStrategy	Int (4)	Y	**1** – VWAP **2** – POV **1001** – dOrder **2001** – TWAP **2002** – Close **2003** – Open	See Appendix B – Polaris FIX Order Matrix for more details
849	ParticipationRate	Percentage (4)	C	0.01 – 1.00	
5700	LocateBroker	String (5)	N		
7928	SelfTradeType	Char (1)	Y	**T** – No Self-Trade Protection **N** – Cancel Newest **O** – Cancel Oldest (Letter O, not zero) **C** – Cancel Both* **D** – Cancel Decrement*	*Note: C and D are not supported for Discretionary orders
9001	FDID	String (40)	C		Conditionally required for orders originated by a buy-side.
9115	OnBehalfOfMPID	String (5)	C		Values optionally echo back Broker Agency ID or Badge, conditional on tag 9128 in the incoming messages.
9116	OnBehalfOfSubMPID	String (4)	Y		Values identify sub-MPID.

TAG	FIELD NAME	DATA TYPE	REQ'D	VALUES	NOTES
9128	DeliverToID	String (5)	Y		Values will target the MPID, echoing back tag 9115 in the incoming messages.
9170	ClExecID	String (32)	N		Values are a copy of the value received in ExecID field from child executions for fills, partial fills, or trade cancels/busts. This is specifically intended to help with the reconciliation of NYSE drop copy fill events to Polaris fill events, as NYSE currently uses the same ExecID on their drop copy fills as they do on their order entry fills.
9303	RoutingInst	Char (1)	N	**N** – Non-Routable	
9483	DealID	String (20)	C		Unique identifier of a transaction, assigned by the Exchange to both Execution reports representing the two sides of a single trade. Busts – original DealID of the transaction that is being busted.
9730	LiquidityIndicator	String (5)	C		Only provided on partial fill and fills. This is a pass-through of the values provided by the market in field 9730. For more information, please refer to the venue's documentation on LiquidityIndicator (9730). Where Tag 30 = XNYS, this can be mapped to historical Billing Indicators.
20009	Nanosecond SendingTime	String (27)	Y	YYYYMMDD-HH:MM:SS.sssssssss	Time of message transmission on outgoing message from Polaris. **NOTE:** this represents the same reference time as provided in the Standard FIX Header tag SendingTime (52), with more granular resolution.
20010	Nanosecond TransactTime	String (27)	Y	YYYYMMDD-HH:MM:SS.sssssssss	Polaris application time. **NOTE:** this represents the same reference time as provided in the standard FIX tag TransactTime (60), with more granular resolution.
	Standard FIX Trailer		Y		

Appendix A – MULTIPLE CANCEL/REPLACE OR CANCEL REQUESTS IN SUCCESSION

1. If the order is in pending replace and a new replace request arrives, the new replace request is rejected immediately.
2. If the order is in pending replace and a new cancel request arrives, the order will enter pending cancel state. The client will receive replace accept OR replace reject followed by cancel accept or cancel reject.
3. If the order is pending cancel, both replace requests and cancel requests are rejected immediately.

Appendix B – POLARIS FIX ORDER MATRIX

Order Types	HandlInst	ExDestination	Target Strategy	Price	OrdType	TimeInForce
Opening dOrder	1	XNYS	1001	Not sent or LimitPrice	1 or 2	2
Closing dOrder	1	XNYS	1001	Not sent or LimitPrice	1 or 2	0
Day	3	N/A	N/A	Not sent or LimitPrice	1 or 2	0
MOC	3	N/A	2002	Not sent	1	0
LOC	3	N/A	2002	LimitPrice	2	0
MOO	3	N/A	2003	Not sent	1	0
LOO	3	N/A	2003	LimitPrice	2	0
VWAP	3	N/A	1	Not sent or LimitPrice	1 or 2	0
POV	3	N/A	2	Not sent or LimitPrice	1 or 2	0
TWAP	3	N/A	2001	Not sent or LimitPrice	1 or 2	0

Document Version History

Date	Version	Note
09/07/22	1.1	■ Self-Trade Prevention ▸ Clarified that there is no value for session default, unlike Pillar spec ■ Identifiers ▸ Added FDID ▸ DeliverToID echoed back in 35=8 via tag 9115 ▸ Expanded on Note ▸ Added CAT Reporting ■ Tag 18 ExecInst ▸ Removed n – dOrder ■ Tag 44 Price ▸ Changed from 0.000001-999999999.999999 to 0.0001—999999999.9999 ▸ Changed from Required=(Y)es to (C)onditional on 40=2 Limit orders ▸ Changed Data Type from Price (16) to Price (14) ■ Tag 50 SenderSubID ▸ Values (for 35= D, G) do not need to be confirmed with Pragma ■ Tag 55 Symbol and tag 65 SymbolSfx ▸ Added clarification example of 55=BRK 65=A ■ Tag 59 TimeInForce ▸ Changed from 7-On Close to 0-Day ■ Tag 115 OnBehalfOfCompID ▸ Values (for 35=D, G) should match CAT IMID for brokers or will be assigned by Pragma for buy-sides ■ Tag 116 OnBehalfOfSubID ▸ Values (for 35=D, G) does not need to be assigned by Pragma ■ Tag 847 TargetStrategy ▸ Added 10–1 - dOrder ■ Tag 9001 FDID added ■ Order Cancel/Replace Request ▸ Added “Polaris will validate that non-modifiable fields have not been modified on an amendment.”

Date	Version	Note	
11/18/22	1.2	■ Tag 6 AvgPx ▸ Added ■ Tag 49/56 SenderCompID/TargetCompID ▸ Changed from “POLARIS.” to “POLARIS” (removing the period) ■ Appendix A ▸ Multiple Cancel/Replace or Cancel requests in succession – added	■ Tags 50/57/115/128/116/129 ▸ Moved from message body into FIX Header ■ Tag 116 ClientGroup ▸ Changed from optional to required ■ Tag 9116 OnBehalfOfSubMPID ▸ Changed from optional to required
12/23/22	1.3	■ Tag 21018 CoDIndicator ▸ Added (Cancel-on-Disconnect) ■ Tag 7928 SelfTradeType ▸ Clarified that C and D are not supported for Discretionary orders ■ Tag 114 LocateReqd ▸ Not required for 54=6 SS Exempt	■ Tag 9170 ClExecID ▸ Added ■ Tag 5700 LocateBroker ▸ Length in ExecReport updated from 16 to 5, to be inline with Order and Cancel/Replace ■ Tag 44 Price ▸ Clarified price constraint
5/3/23	1.4	■ Tag 114 LocateReqd ▸ For 54=5, 54=6 must be set to N ▸ Y is no longer a valid value ■ Tag 528 OrderCapacity ▸ Added values for R=Riskless Principal and Q=Error Account	■ Tag 59 TimeInForce ▸ Added 2=OPG ■ Message Throttling ▸ Added ■ Appendix B – Polaris FIX Order Matrix Added
6/9/23	1.5	■ Tag 847 TargetStrategy ▸ Added 1=VWAP, 2=POV, 2001=TWAP ■ Tag 168 EffectiveTime ▸ Added ■ Tag 9303 RoutingInst ▸ Added ■ Tag 9001 FDID ▸ MaxLength changed from 2 to 40	■ Tag 849 ParticipationRate ▸ Added ■ Tag 126 ExpireTime ▸ Added ■ Tag 528 OrderCapacity ▸ Removed values for R=Riskless Principal and Q=Error Account ■ Tag 9050 RetailDesignation ▸ Added
8/3/23	1.6	■ Workflow ▸ Added ■ Appendix B –POLARIS FIX ORDER MATRIX ▸ Updated ■ Tag 847 TargetStrategy ▸ Changed from required to conditionally required ▸ Added 2002=Close, 2003=Open ■ Tag 30 LastkMkt ▸ Changed from XNYS to MIC code	■ Tag 21 HandlInst ▸ Added 3=Manual order, best execution ■ Tag 100 ExDestinoation ▸ Changed from required to conditionally required ■ Tag 528 OrderCapacity ▸ Added values for R=Riskless Principal and Q=Error Account