



# Genium INET<sup>®</sup>

## AMD Protocol Specification

NFX



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# 1 Summary Of Changes

Changes between this version and version v2048 (4.1.1240).

No	Changes	Comment
1	Removed field "Effective Expiration Date" and added a note for field "Expiration Date" in subchapter <a href="#">Order Book Directory on page 8</a> .	
2	Added fields "Strategy Subtype" and "Minimum Quantity and Multiple" in subchapter <a href="#">Order Book Directory on page 8</a> .	
3	Renamed subchapter "Combination Order Book Leg Directory" to <a href="#">Combination Order Book Leg on page 10</a> .	
4	Added fields "Leg Price Future", "Leg Delta", and "Leg Quantity Future" in subchapter <a href="#">Combination Order Book Leg on page 10</a> .	
5	Changed message type of Reported Trade message to "r" in <a href="#">Reported Trade on page 12</a> .	
6	Added a note about Reverse and Overtake in section <a href="#">Broken Trade Message on page 13</a> .	

## 2 About the Manual

The purpose of this document is to describe the AMD protocol.

### 2.1 References

For more information, refer to the following document:

*Genium INET ITCH Protocol Specification*

### 3 AMD Overview

Auxiliary Market Data (AMD) is an ITCH-like direct data feed product that distributes complementary market data not contained in the regular ITCH feed. To help interpret the message flow, the AMD feed contains the same Reference Data messages as ITCH. AMD uses the same MoldUDP64 transport protocol as ITCH.

Auxiliary Market Data features the following data elements:

- Time Messages - Timestamps
- Reference Data messages - AMD includes the same Order book Directory messages as ITCH.
- Event and State Change Messages
- Reported Trade messages - AMD supports trade messages to reflect trades that were negotiated privately and reported to the marketplace.
- Broken Trade messages - To inform consumers of trade breaks. Note that these also include broken trades generated from auto-matched orders published via ITCH.
- Open Interest messages
- Price messages

#### 3.1 Architecture

The AMD feed is made up of a series of sequenced messages. Each message is variable in length based on the message type. The messages will be binary encoded using MoldUDP64. The messages that make up the AMD protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

MoldUDP64 is a light-weight networking protocol built on top of UDP that provides a mechanism for listeners to detect and re-request missed packets.

Each message is explicitly sequence numbered. If a packet loss is detected by the client, it can re-request that packet from the MoldUDP64 gateway, and it will be resent as a UDP unicast to the requesting client.

#### 3.2 Data Types

All Integer fields are composed of binary encoded numbers.

Table 1:

Type	Size	Notes
Numeric	1, 2, 4 or 8 bytes	Unsigned big-endian binary encoded numbers. NOTE: The transport layer, SoupBinTCP or MoldUDP64, uses big-endian for its numeric values.
Alpha	variable	Composed of non-control ISO 8859-1 (Latin-1) encoded bytes. Left justified and padded on the right with spaces.
Price	4 bytes	Prices are signed integer fields. Number of decimals is specified in the Order book Directory message. NOTE: The Tick Size Table Entry message contains an 8 Byte Price field.
Date	4 bytes	Four byte integer value derived from the Numeric data type. The decoded value represents a Date in YYYYMMDD-format.

Type	Size	Notes
Datetime	8 bytes	Eight byte integer value derived from the Numeric data type. The decoded value represents a Date and time in YYYYMMDDHmSSss-format.

## 4 Message Formats

The AMD feed is composed of a series of messages that describe orders added to, removed from, and executed on the Trading system. It also contains messages for basic reference data of the order books as well as state changes and halts.

### 4.1 Time Messages

For bandwidth efficiency reasons, timestamps are separated into two pieces:

Table 2:

Timestamp portion	Message Type	Notes
Seconds	Standalone message	Unix time (number of seconds since 1970-01-01 00:00:00 UTC) NOTE: A Timestamp – Second message will be disseminated for every second for which there is at least one payload message.
Nanoseconds	Field within individual messages	Reflects the number of nanoseconds since the most recent Timestamp-Seconds message that the payload message was generated.

#### 4.1.1 Seconds Message

This message is sent every second for which at least one AMD message is being generated. The message contains the number of seconds since the start of 1970-01-01 00:00:00 UTC, also called Unix Time.

Table 3: Timestamp - Seconds Message

Name	Offset	Length	Value	Notes
Message Type	0	1	"T"	T - Seconds Message
Second	1	4	Numeric	Unix time (number of seconds since 1970-01-01 00:00:00 UTC)

## 4.2 Reference Data Messages

### 4.2.1 Order Book Directory

At the start of each trading day, Order book directory messages are disseminated for all active securities, including halted securities, in the system.

**Note**

Intra-day transmissions of this message may occur when new order books are added to the system. Updates to existing order books may also be represented by intra-day Order book Directory messages.

Table 4: Order book Directory

Name	Offset	Length	Value	Notes
Message Type	0	1	"R"	R - Order book Directory Message



Name	Offset	Length	Value	Notes
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Order book ID	5	4	Numeric	Denotes the primary identifier of an order book. NOTE: Expired Order book IDs may be reused for new instruments.
Symbol	9	32	Alpha	Security short name.
Long Name	41	32	Alpha	Human-readable long name of security.
ISIN	73	12	Alpha	ISIN code identifying security.
Financial Product	85	1	Numeric	Values: 0 = Not applicable 1 = Option 2 = Forward 3 = Future 4 = FRA 5 = Cash 6 = Payment 7 = Exchange Rate 8 = Interest Rate Swap 9 = REPO 10 = Synthetic Box Leg/Reference 11 = Standard Combination 12 = Guarantee 13 = OTC General 14 = Equity Warrant 15 = Security Lending
Trading Currency	86	3	Alpha	Trading currency.
Number of decimals in Price	89	2	Numeric	This value defines the number of decimals used in price for this order book. NOTE: A value of 256 means that the instrument is traded in fractions (each fraction is 1/256).
Number of decimals in Nominal Value	91	2	Numeric	This value defines the number of decimals in Nominal Value.
Odd Lot Size	93	4		Indicates the number of securities that represent an odd lot for the order book. NOTE: A value of 0 indicates that this lot type is undefined for the order book.
Round Lot Size	97	4		Indicates the quantity that represent a round lot for the issue
Block Lot Size	101	4		Indicates the number of securities that represent a block lot for the order book. NOTE: A value of 0 indicates that this lot type is undefined for the order book.
Nominal Value	105	8	Numeric	Nominal value.
Number of Legs	113	1	Numeric	Number of legs. NOTE: Only applicable for combination instruments.
Underlying Order book ID	114	4	Numeric	Order book ID of underlying instrument. NOTE: Only applicable for derivative instruments except for combinations
Strike Price	118	4	Price	NOTE: Only applicable for derivative instruments.

Name	Offset	Length	Value	Notes
Expiration Date	122	4	Date	Date of expiration. NOTE: Only applicable for derivative instruments. NOTE: If the effective expiration date is set in the system, it is also contained in this field.
Number of decimals in Strike Price	126	2	Numeric	This value defines the number of decimals used in Strike Price for this order book. NOTE: Only applicable for derivative instruments.
Put or Call	128	1	Numeric	Option type. Values: 1 = Call 2 = Put NOTE: A value of 0 indicates that Put or Call is undefined for the order book.
Market ID	129	2	Numeric	Market ID
Strategy Subtype	131	1	Byte	Strategy subtype. Values: 0 = Not applicable 1 = Covered Option
Minimum Quantity and Multiple	132	4	Numeric	Minimum quantity and quantity multiple for Covered Options calculated by the system.

#### 4.2.2 Combination Order Book Leg

This message provides a mapping between a combination order book and one of the combination leg order books.

A Combination instrument (standard or Tailor-Made) is a synthetic instrument consisting of two or more real instruments. In Genium INET, combination instruments are set up as regular order books in which orders can be placed.

The Combination instrument and each of the leg instruments are represented by Order book Directory messages in AMD. The Combination Order book Leg message represents a mapping between a combination order book and one of its leg order books. For each combination order book, one Combination Order book Leg message will be generated per leg that the combination consists of.

##### **Note**

Intra-day transmissions of this message may occur when new combination order books are added to the system. This is typically the case for tailor-made combinations. Updates to existing combination order books may also be represented by intra-day Order book Directory messages.

Table 5: Combination Order book Leg Directory

Name	Offset	Length	Value	Notes
Message Type	0	1	"M"	Combination Order book Directory Message
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Combination Order book ID	5	4	Numeric	Denotes the primary identifier of an order book. NOTE: Expired Order book IDs may be reused for new instruments.

Name	Offset	Length	Value	Notes
Leg Order book ID	9	4	Numeric	Order book ID of Leg instrument
Leg Side	13	1	Alpha	Values: B = As Defined C = Opposite
Leg Ratio	14	4	Numeric	
Leg Price Future	18	4	Numeric	The price of the Future leg as specified in the TMC for Covered Options
Leg Delta	22	4	Numeric	The leg delta as specified in the TMC for Covered Options
Leg Quantity Future	26	4	Numeric	The quantity multiple of the Future leg in the TMC for Covered Options, as calculated by the system

### 4.2.3 Tick Size Table Entry

This message contains information on a tick size for a price range. Together, all Tick Size messages with the same Order book ID form a complete Tick Size Table. Each Order book has a set of Tick Size Table Entries to define its tick size table.

**Note**

The number of decimals in prices are given by the Order book Directory message for this Order book.

**Note**

If tick sizes are configured for both CLOB trades (orders) and block trades (trade reports), then there will be two Tick Size structures sent. The Tick Size structure for the CLOB trades will always be sent as the first of these structures, followed by one for the block trades.

Table 6: Tick Size Table Entry

Name	Offset	Length	Value	Notes
Message Type	0	1	"L"	L - Tick Size Message.
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Order book ID	5	4	Numeric	The order book this entry belongs to.
Tick Size	9	8	Price	Tick Size for the give price range
Price From	17	4	Price	Start of price range for this entry.
Price To	21	4	Price	End of price range for this entry. Zero (0) means infinity.

## 4.3 Event and State Change Messages

### 4.3.1 System Event Message

The system event message type is used to signal a market or data feed handler event.

Table 7: System Event Message

Name	Offset	Length	Value	Notes
Message Type	0	1	"S"	S – System Event Message.
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Event Code	5	1	Alpha	The system supports the following event codes on a daily basis: "O" = Start of Messages. Outside of time stamp messages, the start of day message is the first message sent in any trading day. "C" = End of Messages. This is always the last message sent in any trading day.

### 4.3.2 Order Book State Message

The Order book state message relays information on state changes.

Table 8: System Event Codes - Daily

Name	Offset	Length	Value	Notes
Message Type	0	1	"O"	Order book State Message.
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Order book ID	5	4	Numeric	Order book identifier
State Name	9	20	Alpha	Name of Order book State

## 4.4 Reported Trades Messages

### 4.4.1 Reported Trade

The Reported Trade Message is used to publish trades that occurs off-book and are reported to the marketplace.

Table 9: Reported Trade Message (Exchange Trade)

Name	Offset	Length	Value	Notes
Message Type	0	1	"r"	r - Reported Trade Message
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Orderbook ID	5	4	Numeric	Orderbook ID.
Traded Quantity	9	8	Numeric	

Name	Offset	Length	Value	Notes
Match ID	17	8	Numeric	
Combo Group ID	25	4	Numeric	Used to group combination order book executions and the trades in the constituent order books together.
Time of trade execution	29	8	Datetime	
Time of trade agreement	37	8	Datetime	
Time of trade dissemination	45	8	Datetime	
Trade Price	53	4	Price	
Trade Type	57	2	Numeric	Values: 1 = Block Trade 2 = Exchange for Physical 11 = Exchange for Risk 14 = Exchange for Options
Reserved	59	7		
Reserved	66	7		

## 4.5 Broken Trade Message

The Broken Trade Message is sent whenever an execution is broken. A trade break is final; once a trade is broken, it cannot be reinstated.

Participants using the AMD feed to create trade tickers or calculate market statistics should be prepared to process the broken trade message.

### **Note**

If a trade is rectified (Reverse and Overtake), the trading system will send one message for the Reversal and one message for each of the Overtaking order books.

Table 10: Broken Trade Message

Name	Offset	Length	Value	Notes
Message Type	0	1	"B"	B – Broken Trade Message.
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Match ID	5	8	Numeric	The Match ID of the execution that was broken. This refers to a Match ID from a previous Trade Message.

## 4.6 Open Interest Message

This message is used to publish Open Interest for a given instrument.

Table 11: Open Interest Message

Name	Offset	Length	Value	Notes
Message Type	0	1	"o"	o - Open Interest Message.
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Orderbook ID	5	4	Numeric	Orderbook ID.
Open Interest	9	8	Numeric	Open interest.

## 4.7 Price Message

The Price Message is used to publish different types of prices.

Table 12: Price Message

Name	Offset	Length	Value	Notes
Message Type	0	1	"p"	p – Price Message.
Timestamp – Nanoseconds	1	4	Numeric	Nanoseconds portion of the timestamp.
Price Type	5	1	Alpha	Type of price published. Valid values: "P" = Preliminary Settlement Price "F" = Final Settlement Price "I" = Index Price "U" = Underlying Price
Orderbook ID	6	4	Numeric	
Price	10	4	Price	If set to MIN_INT (decimal -2147483648), it means that no price is available.