QRTMD Alpha Level 1

AL1

Functional Specifications

Document Revision: 1.02
Date of Issue: March 15, 2013

Disclaimer and Rights Granted

The information contained in this document and any other information or documentation related to this specification and associated message formats (collectively, along with any upgrades, updates and new versions or releases provided to you by TSX Inc. ("TSX") from time to time, referred to as the "AL1 Functional Specifications", are provided "as is", and neither TSX nor any of its affiliates makes any representation or warranty, express or implied, as to the contents of the AL1 Functional Specifications (or the results obtained by using it) and each such person specifically disclaims any representation, warranty or condition of accuracy, completeness, merchantability, fitness for a particular purpose or that it is error-free. By using the AL1 Functional Specifications, you are agreeing o assume the entire risk associated with its use.

TSX and its affiliates shall have no liability for damages of any kind arising in any manner out of or in connection with your use of, or your inability to use, the AL1 Functional Specifications, whether direct, indirect, incidental, special or consequential (including, without limitation, loss of data, loss of use, third party claims, lost profits, lost revenues and strict liability), arising under contract or otherwise, whether or not TSX has been advised of, or otherwise might have anticipated the possibility of, such damages.

Please note that TSX will require prior certification of any system designed to connect to its trading and market information as well as your participation from time to time in connection with the testing of changes or upgrades to the AL1 Functional Specifications or the systems used to connect to TSX.

The information contained in the AL1 Functional Specifications is proprietary and confidential information belonging to TSX and its licensors or service providers, as applicable. Copyright and trade-mark rights and any other intellectual property in the AL1 Functional Specifications belong to TSX (or its licensors or service providers, as applicable). Your permitted use of the AL1 Functional Specifications, in whole or in part, is limited to the non-exclusive, non-transferable, revocable, non-assignable, personal right for you only to build a connection between your systems and TSX's trading and market information system. You are not permitted to use all or any part of the AL1 Functional Specifications for order entry other than on Toronto Stock Exchange, TSX Venture Exchange, TMX Select, or Alpha. Any uses not specifically set out herein are prohibited. TSX may revoke this right at any time, on notice to you, and you agree to promptly comply with such notice. Do not reproduce, disclose, distribute, publish, sell, commercialize or make any part of the AL1 Functional Specifications available, in whole or in part, to any person without TSX's prior written consent. If you do not agree with, or do not wish to comply with, any of the above, please notify TSX and, in accordance with TSX's instructions, either return or destroy any copies or versions of the AL1 Functional Specification in your possession.

Contact Information

For questions, contact TMX Vendor Services, vendor_services@tmx.com, 416-947-4705.

Table of Contents

Chapter 1   Introduction

This specification defines the communications interface and the information records transmitted on the Quantum RTMD (QRTMD) Alpha Level 1 (AL1) service.

These data feeds are comprised of trades, quotes, symbol, stock state, and market state messages from Alpha.

The intended audience of this specification consists of business analysts and programmer analysts.

- Business analysts should focus primarily on Chapter 3, "Business Content Messages" and Chapter 4, "Equity Price Updating Rules". These sections define how the trading information is defined in the Alpha Level 1 services. In addition to these sections, the business analysts should be familiar with the trading rules and trading scenarios that these messages represent.

- Programmer analysts should be familiar with the entire specification, although their focus should be on message structure and parsing.

To develop and implement systems that can receive and process AL1 data, this document must be used with the *Quantum RTMD Protocol Specification and Service Access Guide*.

Chapter 2   Transmission Format

Each message is framed by STX and ETX characters. The format used is:

STX	HEADER	MESSAGE	ETX

STX and ETX indicate the beginning and end of the record being transmitted.

2.1   Data format

All times contained in messages are based on a 24-hour clock, Eastern Standard Time (EST).

Whenever a field is "blank", it contains the ASCII space character (HEX 20). Unless stated otherwise:

- All numeric fields are right justified, zero-filled.
- All alphanumeric fields are left justified, blank filled

2.2   Message header

The following standard message header is supplied on each message (size in bytes, fields in ASCII):

Message Length	Sequence Number	Service Identifier	Retransmission Identifier	Continuation Identifier	Message Type	Exchange Identifier
4	9	3	1	1	2	2

- **Message Length**: Does not include the STX and ETX characters
- **Sequence Number**: Every message is assigned a sequence number from 000000001 to 999999999 (decimal, ASCII), with wrap-around. The sequence number is incremented by 1 for each message sent.
- Service Identifier: "AL1"
- **Re-transmission Identifier**: Contains the following value:

0	Normal transmission

- **Continuation Identifier**: Contains the following value:

0	Stand-alone message

- **Message Type**: Left justified, padded with a blank when necessary.
- **Exchange Identifier**: Left justified, padded with a blank when necessary and contains the value of "A" for the AL1 service.

Related topics:

- Chapter 3, "Business Content Messages"

2.3 Message retransmission

The Level 1 services includes support for automated message retransmission as described in Reference [1].

Chapter 3   Business Content Messages

This chapter provides the message record formats and definitions for the following messages.

Table 1: Messages transmitted on Level 1

Message Type	Message
A	Equity Trade
B	Symbol Status
D	Stock State
E	Equity Quote
G	General
H	Equity Trade Cancellation
S	Market State
T	Trading Tier Status
X	Equity Trade Correction

3.1   Message Type A – Equity Trade

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Message Header	22			See Section 2.2
Symbol	8	Alphanumeric	Stock symbol	"XXX.XX.X"
Volume	9	Numeric	Volume of shares traded	
Trade Price	11	Numeric	Price at which the transaction took place	6 digits + 5 digits, no decimal. Divide by 100,000 to obtain the price.
Buyer ID	3	Numeric	Identifies the buying broker	
Seller ID	3	Numeric	Identifies the selling broker	
Trade Time Stamp	6	Numeric	Time of trade	HHMMSS
Last Sale	11	Numeric	Last sale price of the symbol	6 digits + 5 digits, no decimal. Divide by.100,000 to obtain the actual last sale price.
Trade ID	9	Numeric	Unique identifier per stock assigned to each trade	
Cross Type	1	Alphanumeric	Refers to one of five specialty cross types. These crosses are treated differently from regular crosses with respect to interference and or price validation	Valid values are: • I: Internal • B: Basis • C: Contingent • S: STS (Special Trading Session) • V: VWAP (Volume Weighted Average Price) • Default: " "
MOC	1	Alphanumeric		Default "N" for all symbols trading in Alpha.

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Bypass	1	Alphanumeric	To indicate orders are tradable against only visible/disclosed volumes and bypasses Iceberg orders and special terms book. Any part of the OrderQty balance not filled immediately is "killed/cancelled".	"Y" | "N"; default is "N"
Opening Trade	1	Alphanumeric	An indicator as to whether the trade occurred at the opening or was the first board lot trade of the day.	"Y" | "N"; default is "N"
Settlement Terms	1	Alphanumeric	Settlement terms associated with the order	Valid values are: • " ": Default • "C": Cash • "N": NN (non-net) • "M": MS (derivatives-related contingent equity trade) • "T": CT (cash today) • "D": If there is a valid Settlement Date associated with the order
IsDark	1	Alphanumeric	Indicates that one side of the trade is IntraSpread dark.	"Y" | "N"; default is "N".
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)

Total:　　**108**

3.2   Message type B – Symbol Status

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Message Header	22			See Section 2.2
Symbol	8	Alphanumeric	Stock symbol	"XXX.XX.X"
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)
Exchange ID	3	Alphanumeric	Identifies the exchange from which the message originated	
CUSIP	12	Alphanumeric	Clearing and settlement registration number	
Board Lot	9	Numeric	Board lot volume	BoardLot = Volume
Currency	1	Alphanumeric	The currency of a price	"C" | "U"
Face Value	9	Numeric	The face value of a debenture	6 digits +3 digits, no decimal. Divide by 1,000 to obtain the actual face value.
Last Sale	11	Numeric	Last sale price of the symbol	6 digits + 5 digits, no decimal. Divide by.100,000 to obtain the actual last sale price.
MOC Eligible	1	Alphanumeric	Identifies whether the stock is eligible to participate in the Market On Close session each day.	Default "N" for all symbols trading in Alpha.
Product Type	1	Alphanumeric	The product type for a symbol	Valid values are: • "B": Debenture • "E": Equity
Symbol Name	40	Alphanumeric	The security/issue symbol's complete company name	1*40PrintableASCII ; no default
Stock Group	2	Numeric	An indicator of stock group	1*2Digit

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Stock State	2	Alphanumeric	The state of the stock	Valid Values are: • "AR": AuthorizedDelayed • "IR": InhibitedDelayed • "AS": AuthorizedHalted • "IS": InhibitedHalted • "AG": AuthorizedFrozen • "IG": InhibitedFrozen • "A": Authorized • "I": Inhibited
Listing Market	1	Alphanumeric	The market on which a security is listed	Valid values are: • "T": TSX • "V": TSXV • "A": Alpha

Total   **142**

3.3   Message type D – Stock State

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Message Header	22			See Section 2.2
Symbol	8	Alphanumeric	Stock symbol	"XXX.XX.X"
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)
Comment	40	Alphanumeric		
Stock State	2	Alphanumeric	The state of the stock	Valid Values are: • "AR": AuthorizedDelayed • "IR": InhibitedDelayed • "AS": AuthorizedHalted • "IS": InhibitedHalted • "AG": AuthorizedFrozen • "IG": InhibitedFrozen • "A": Authorized • "I": Inhibited
Opening Time	6	Numeric	The opening time for a stock	HHMMSS
Total	**98**			

3.4   Message type E – Equity Quote

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Message Header	22			See Section 2.2
Symbol	8	Alphanumeric	Stock symbol	"XXX.XX.X"
Bid Price	9	Numeric	Bid price for the equity	6 digits + 3 digits, no decimal. Divide by 1,000 to obtain the actual bid price.
Bid Size	9	Numeric	Volume on the bid side.	Volume
Ask Price	9	Numeric	Ask price for the equity	6 digits + 3 digits, no decimal. Divide by 1,000 to obtain the actual ask price.
Ask Size	9	Numeric	Volume on the ask side.	Volume
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)

Total   **86**

If either the bid or the ask has changed, a full update quote is transmitted.

When the stock resumes trading, a new quote is sent.

3.5   Message type G – General Message

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Message Header	22			See Section 2.2
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)
Bulletin Indicator	1	Alphanumeric	Indicates the message is a bulletin	"Y"	"N"; default is "N"
Message Text	80	Alphanumeric	Bulletin in textual format	Left justified and blank filled
Total	**123**			

3.6   Message type H – Equity Trade Cancellation

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules/Comments
Msg Header	22			See Section 2.2
Symbol	8	Alphanumeric	Stock symbol	"XXX.XX.X"
Volume	9	Numeric	Volume of shares traded	
Trade Price	11	Numeric	Price at which the transaction took place	6 digits + 5 digits, no decimal. Divide by 100,000 to obtain the price.
Buyer ID	3	Numeric	Identifies the buying broker	
Seller ID	3	Numeric	Identifies the selling broker	
Trade Time Stamp	6	Numeric	Time of trade	HHMMSS
Original Trade ID	9	Numeric	Trade number	
Last Sale	11	Numeric	Last sale price of the symbol	6 digits + 5 digits, no decimal. Divide by.100,000 to obtain the actual last sale price.
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)

Total   102

Message types H is used to transmit trade cancellations of equity trades.

A trade cancellation reduces total volume, value, and transactions by the amount of the cancellation.

3.7   Message type S – Market State

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules
Message Header	22			See Section 2.2
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)
Stock Group	2	Numeric	An indicator of stock group	1*2Digit
Market State	1	Alphanumeric	The indication of the current market state.	Valid Values are: • "P": Pre-open • "O": Opening • "S": Open • "C": Closed • "R": Extended Hours Open • "F": Extended Hours Close • "N": Extended Hours CXLs

Total   45

3.8   Message type T – Trading Tier Status

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules
Message Header	22			See Section 2.2
Exchange ID	3	Alphanumeric	Identifies the exchange from which the message originated	
Total Number of Symbols	5	Numeric	The total number of stocks per trading tier and Exchange ID	
Total Number of Stock Groups	3	Numeric	Total number of stock groups per trading tier and exchange ID	
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)
Trading Tier ID	6	Alphanumeric	A Trading Engine identifier	
Total	**59**			

XATS sends Trading Tier Status messages to the client at the beginning of each trading day. The Trading Tier Status message provides statistical information on the number of symbols and stock groups for the current trading day.

3.9   Message type X – Equity Trade Correction

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules
Message Header	22			See Section 2.2
Symbol	8	Alphanumeric	Stock symbol	"XXX.XX.X"
Volume	9	Numeric	Volume of shares traded	
Trade Price	11	Numeric	Price at which the transaction took place	6 digits + 5 digits, no decimal. Divide by 100,000 to obtain the price.
Buyer ID	3	Numeric	Identifies the buying broker	
Seller ID	3	Numeric	Identifies the selling broker	
Trade Time Stamp	6	Numeric	Time of trade	HHMMSS
Last Sale	11	Numeric	Last sale price of the symbol	6 digits + 5 digits, no decimal. Divide by.100,000 to obtain the actual last sale price.
Trade ID	9	Numeric	Unique identifier per stock assigned to each trade	
Cross Type	1	Alphanumeric	Refers to one of five specialty cross types. These crosses are treated differently from regular crosses with respect to interference and or price validation	Valid values are: • I: Internal • B: Basis • C: Contingent • S: STS (Special Trading Session) • V: VWAP (Volume Weighted Average Price) • Default: " "
MOC	1	Alphanumeric		Default "N" for all symbols trading in Alpha.

Field Name	Length (Bytes)	Data Type	Definition	Validation Rules
Bypass	1	Alphanumeric	To indicate orders are tradable against only visible/disclosed volumes and bypasses Iceberg orders and special terms book. Any part of the OrderQty balance not filled immediately is "killed/cancelled".	"Y"	"N"; default is "N"
Opening Trade	1	Alphanumeric	An indicator as to whether the trade occurred at the opening or was the first board lot trade of the day.	"Y"	"N"; default is "N"
Settlement Terms	1	Alphanumeric	Settlement terms associated with the order	Valid values are: • " ": Default • "C": Cash • "N": NN (non-net) • "M": MS (derivatives-related contingent equity trade) • "T": CT (cash today) • "D": If there is a valid Settlement Date associated with the order
Original Trade ID	9	Numeric	Trade number	
IsDark	1	Alphanumeric	Indicates that one side of the trade is IntraSpread dark.	"Y"	"N"; default is "N".
Trading System Time Stamp	20	Numeric	The time at which the business action occurred	YYYYMMDDHHMMSSmmmmmm (year, month, day, hour, minute, second, millionths of a second)
Total	**117**			

Chapter 4   Equity Price Updating Rules

4.1   Odd Lot trades

Trades for less than a board lot (odd lot) do not set official open, high, low, and last prices. Vendors should indicate that trading prices for such messages reflect odd lot trading only and are not official statistics for that trading session.

The Alpha does not set open, high, low and last prices until the first board lot trade.

Odd Lot prices remain in effect only for the current day and do not establish previous closing prices. The previous closing price is always set by the last board lot trade price.

Note: If the *only* trades for the day are odd lot trades, previous close for the stock will not be changed.

Odd Lot trades increase the volume, value, and number of transactions totals. Odd lot trade cancellations will reduce these totals.

4.2   Board Lot trades

Trades for board lot multiples set the open, high, low, and last price for the stock and are used to establish the next day's previous closing price. Board Lot trades will increase the volume, value, and number of transactions totals. Board Lot trade cancellations will reduce these totals.

4.3   Board lot rules

Price	Board lot Amount
Under $0.10	1,000 shares
$0.10 to $0.99	500 shares
$1.00 & over	100 shares

4.4   Equity price rules

Price	Increments
less than $0.50	half cents or $0.005
$0.50 & above	one cent or $0.01

4.5   Cross types

Term	Description
Basis	A transaction whereby a basket of securities or an index participation unit is transacted at prices achieved through the execution of related exchange-traded derivative instruments, which may include index futures, index options and index participation units in an amount that will correspond to an equivalent market exposure. Basis trades are included in the volume, value, and transaction totals but do not affect open, high, low, last sale, and close prices.
By-Pass Trade	Regulatory Trade – indicating the "hidden" or iceberg portion of the order was not satisfied. Depending on whether the trade was used to move the price down in accordance with UMIR, or the ByPass Cross was put up, it may or may not set the last sale price. They are also included in the volume, value, and number of transactions.
Contingent Trade	Results from an order (e.g. to sell) placed by a Participating Organization (PO) on behalf of a client for one security which is contingent on the execution of a second order (e.g. to buy) placed by the same client for an offsetting volume of a related security Contingent trades can set the open, high, low, last sale and close prices. They are also included in the volume, value, and number of transactions.
Internal Cross	An "internal cross" is defined as a cross between two client accounts of a Participating Organization which are managed by a single firm acting as portfolio manager with discretionary authority to manage the investment portfolio granted by each of the clients.
STS (Special Trading Session)	Results from an order placed by a PO on behalf of a client for execution in the Special Trading Session at the last sale price. STS trades are executed at the closing price and are included in the volume, value of number of transactions.
VWAP	A transaction for the purpose of executing trades at a volume-weighted average price of the security traded for a continuous period on or during a trading day on the exchange. VWAP trades are included in the volume, value, and transaction totals but do not affect open, high, low, last sale, and close prices.

4.6   Settlement terms

Term	Description
Cash (C)	A trade that is settled the next day. Cash trades are included in the volume, value, and transaction totals but do not affect open, high, low, last sale, and close prices.
Delayed Delivery (D)	A transaction in which delivery of the security will be delayed beyond the normal settlement period. Delayed delivery trades are included in the volume, value, and number of transaction totals but do not affect the open, high, low, last sale, and close prices.
Special Terms Trading (M, T, N)	All trades executed and settled in other than the regular manner. Special Terms Trades do not affect the open, high, low, and last prices (as indicated by the trade markers). Special terms' trades are included in the volume, value, transactions totals.

Chapter 5   Operating Sequence

5.1   Transmission times

1. Clients can listen on the AL1 port between 3:00 a.m. and 6:00 p.m. EST on any business day.
2. The following table contains message transmission times:

Message Type	Message Name	Transmission Times (EST)		Notes
		Start (approx)	End (approx)	
A	Equity Trade	9:30 a.m.	5:00 p.m.	As trades occur
B	Symbol Status			Symbol Status messages are disseminated at approximately 3:05 a.m.
D	Stock State			Sent only when there is a change in stock status on the Trading Engine
E	Equity Quote	4:30 a.m.	4:35 a.m.	Start of day quotes
		7:00 a.m.	5:00 p.m.	Intra-Day quotes
G	General			Sent when a General message is sent from the Trading Engine.
H	Equity Trade Cancellation	9:30 a.m.	5:00 p.m.	As required
S	Market State			Sent when market state changes or the trading session changes in Trading Engine.
T	Trading Tier Status			One for each Trading Engine sent at beginning of the day at approximate 3:00 a.m.
X	Equity Trade Correction			Sent when a previously matched trade gets cancelled

5.2   Trading hours

Regular Trading Session (EST)			Last Sale Trading Session (EST)		
Pre-Open	Open	Close	Pre-Open	Open	Close
7:00 a.m.	9:30 a.m.	4:00 p.m.	N/A	4:15 p.m.	5:00 p.m.

Appendix A Symbology Rules

Description	Symbology
Debenture	.DB
Installment Receipt	.IR
Preferred Share	.PR
Preferred Share	.PE
Preferred Share	.PF
Rights	.RT
Notes	.NO
Notes	.NS
Notes	.NT
Units	.UN
Warrants	.WT
Class	See table below for Share Class

A.1 Share Classes

Note: All share classes will have a Level 1 Type of ' . '

Description	Descriptor
Class A, B, C, X	.A, .B, .C
Equity Dividend	.E
Capital Pool Company	.P
Legended Share	.L
BOOMS	.M
Subscription Receipt	.R
Second Subscription Receipts	.N
Third Subscription Receipts	.O
U.S. Trading Terms	.S
Second U.S. Trading Terms	.T
USD Traded Issue	.U
Second USD Traded Issue	.V
When Issued	.W
Second When Issued	.I
Redeemable Common Shares	.Y

A.2   Symbology Notes

Description	Note	Example
All	Symbol Roots can be 1, 2 or 3 digits in length	A – valid AB – valid ABC – valid ABCD – not valid
All	In limited cases, common and preferred shares can have different symbol roots. These cases arise when a company name change is only applicable to common share issues but preferred shares remain under the old company name	TransAlta Corp Common share – TA Preferred share – TAU.PR.A
All	A symbol cannot contain two single letter extensions	ABC.XX.Y – valid ABC.X.Y – not valid
Preferred Share	.PR, .PE, .PF extension must be followed by a second, single letter, extension	ABC.PR.A
Unit	.UN extension cannot be followed by a second, single letter, extension. A second Unit issue for the same issuer will be denoted with a single letter extension	1st Unit Issue – ABC.UN 2nd Unit Issue – ABC.A
Warrant	.WT extension can be followed by a single letter extension for additional warrant issues	1st Warrant – ABC.WT 2nd warrant – ABC.WT.A
Right	.RT extension can be followed by a single letter extension for additional rights issues	1st Right – ABC.RT 2nd Right – ABC.RT.A
Debenture	.DB extension can be followed by a single letter extension for additional debenture issues	1st debenture – ABC.DB 2nd debenture – ABC.DB.A

Appendix B ASCII Character Set

HEX	ASCII	HEX	ASCII	HEX	ASCII
00	NUL	2D	-	5A	Z
01	SOH	2E	.	5B	
02	STX	2F	/	5C	
03	ETX	30	0	5D	
04	EOT	31	1	5E	
05	ENQ	32	2	5F	
06	ACK	33	3		
07	BEL	34	4	5B	
08	BS	35	5	5C	
09	HT	36	6	5D	
0A	LF	37	7	5E	
0B	VT	38	8	60	
0C	FF	39	9	61	a
0D	CR	3A		62	b
0E	SO	3B		63	c
0F	SI	3C		64	d
10	DLE	3D		65	e
11	DC1	3E		66	f
12	DC2	3F		67	g
13	DC3	40	@	68	h
14	DC4	41	A	69	i
15	NAK	42	B	6A	j
16	SYN	43	C	6B	k
17	ETB	44	D	6C	l
18	CAN	45	E	6D	m
19	EM	46	F	6E	n
1A	SUB	47	G	6F	o
1B	ESC	48	H	70	p
1C	FS	49	I	71	q
1D	GS	4A	J	72	r
1E	RS	4B	K	73	s
1F	US	4C	L	74	t
20	SP	4D	M	75	u

HEX	ASCII	HEX	ASCII	HEX	ASCII
21	!	4E	N	76	v
22	"	4F	O	77	w
23	#	50	P	78	y
24	$	51	Q	79	z
25	%	52	R	7A	
26	&	53	S	7B	
27	'	54	T	7C	
28	(	55	U	7D	
29	)	56	V	7E	
2A	*	57	W	7F	DEL
2B	+	58	X		
2C	,	59	Y		

Appendix C References

[1]   *STAMP Specification*, Version 6.4, TMX Group, November 2012.

[2]   *QRTMD Protocol Specification and Service Access Guide*, Version 2.0 TMX Group, December 2012.

[3]   *QRTMD AL2 Functional Specifications*, Version 1.01, TMX Group, January 2013.

[4]   *RFC 791, Internet Protocol*, J. Postel, September 1981, http://www.ietf.org.

[5]   *RFC 792, Internet Control Message Protocol*, J. Postel, September 1981, http://www.ietf.org.

[6]   *RFC 793, Transmission Control Protocol*, J. Postel, September 1981, http://www.ietf.org.

[7]   *RFC 822, Standard for the Format of ARPA Internet Text Messages*, David M. Crocker, August 1982, http://www.ietf.org.

[8]   *RFC 2117, Protocol Independent Multicast Sparse Mode,* D. Estrin et al, June 1997, http://www.ietf.org.

[9]   *RFC 2770, GLOP Addressing in 233/8*, http://www.ietf.org.

Appendix D Glossary

AL1	Alpha Level 1
ASCII	American Standard Code for Information Interchange
CPA	Closing Price Acceptance
CUSIP	Committee on Uniform Security Identification Procedures
EST	Eastern Standard Time
ETX	End Of Text
LSTS	Last Sale Trading Session
PO	Participating Organization
QRTMD	Quantum RTMD
RFC	Request for Comment
STAMP	Securities Trading Access Message Protocol
STS	Special Trading Session
STX	Start Of Text
UMIR	Universal Market Integrity Rules
XATS	Alpha Trading Systems Limited Partnership, Alpha
VWAP	Volume Weighted Average Price

Appendix E Revision History

Version	Date	Changes
1.02	2013/03/15	Removed value L from Market State tag in message type S.
1.01	2013/01/08	Added information about QRTMD Protocol Specification and Service Access Guide to Introduction.
1.0	2012/12/10	Document published.