Computer–to-Computer Interface (CTCI)
For Order-Entry
Programming Specifications

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1 Introduction

1.1 Document Overview

This document contains the subscriber requirements for using NASDAQ's Computer-to-Computer Interface (CTCI) to access the NASDAQ market center[1]. The document outlines only the messages transmitted via CTCI and not via other entry points to NASDAQ.

This document should be used by NASDAQ member firms acting on their own behalf and by third party software vendors/service bureaus acting on behalf of a NASDAQ participant.

The document contains these sections:

- Standard input messages;
- Standard output messages;
- ACES;
- NASDAQ Market Center trading;
- Appendix A: TCP/IP Connection;
- Appendix B: IBM WebSphere MQ; and

The standard input and output sections detail the formats for messages to and from the NASDAQ Switch. The other sections detail the input and output messages that are specific to a particular application. Appendix A describes how a subscriber can submit and receive messages to and from the CTCI using the TCP/IP protocol. Appendix B provides a link to *CTCI WebSphere MQ V1.1 Subscriber Intercommunication Specification.*

These conventions are used throughout the document:

- Fields defined as required must be present in the message.
- Fields defined as alphabetic can only hold A-Z (no spaces or numbers).
- Fields defined as numeric can only hold 0-9 (no spaces or alpha characters).
- Embedded spaces cannot be entered in alphabetic or numeric fields.
- Messages are limited to 1024 characters (including the header and trailer).
- Lines within messages are limited to 253 characters, including the end-of-line delimiter.
- All lines are terminated by a CR/LF pair.
- Fields within square brackets are optional.
- Multiple fields within brackets must all be present if any are.

[1]MFQS and TRACE specifications are in separate documents.
http://www.nasdaqtrader.com/asp/ctcidisclaim4.asp#MFQS
http://www.nasd.com/mkt_sys/trace_techspec.asp

1.2 CTCI Overview

NASDAQ provides a CTCI facility that allows subscribers to record and to report NASDAQ securities transactions from their computer systems to NASDAQ's computer systems via the NASDAQ Message Switch (Switch) using a two-way communications link over dedicated point-to-point circuits. ACES and NASDAQ market center trading are available via the CTCI.

There are nearly 500 circuits in production, handling more than 2 million transactions a day. CTCI uses a Transmission Control Protocol/Internet Protocol (TCP/IP) interface connection that allows incremental bandwidth.

NASDAQ supports IBM WebSphere MQ over the CTCI TCP/IP interface connection. IBM WebSphere MQ, a message queue middleware that extends business applications and enables them to communicate with one another, offers customers the ability to incorporate different systems a common messaging infrastructure. CTCI TCP/IP customers may implement WebSphere MQ software to facilitate interaction between their computer-to-computer-interface and other internal systems. See Appendix B: IBM WebSphere MQ.

CTCI Frequently Asked Questions can be found on the NASDAQ Trader website at: http://www.nasdaqtrader.com/trader/tradingservices/productservices/productdescriptions/ctcifaqs.stm.

1.3 Allowable Subscriber Entry Times (All times Eastern)

Entry of	Start time	End time
ADMIN or SUPER Messages	Anytime switch is up. These are not orders but admin messages or retransmission requests.	Until switch taken down
NASDAQ Market Center Trading Orders	7:00	20:00

1.4 NASDAQ Customer Support Information

NASDAQ Technical Help Desk	**800.243.4284**

1.5 Communication Protocols

Computerized firms that elect to use the CTCI will conform to the TCP/IP protocol detailed in Appendix A.

The subscriber is responsible for all line and equipment costs required for the use of the CTCI. In the TCP/IP environment, the system will support bandwidth from 56 kbps up to full T1 rates. A subscriber may order a redundant line(s) for backup.

CTCI permits a firm acting as a Service Bureau to interface with NASDAQ applications on behalf of multiple firms. Two station configuration methods for this Service Bureau capability are available:

1. One or more stations can be defined for each Service Bureau client. Since each client station will be configured and used just as if it were a direct link to the actual client, *no* Service Bureau-specific message formatting rules contained herein apply to this type of configuration.

2. Multiple clients can be associated to one or more Service Bureau stations. Since the Service Bureau station will be configured and used on behalf of multiple clients, *all* Service Bureau-specific message formatting rules contained herein apply to this type of configuration.

2 Standard Input Messages

The NASDAQ Message Switch supports three types of input messages:

- Application (section 2.2);
- ADMIN (section 2.3); and
- SUPER (section 2.4).

Application messages carry application-specific data in the message body to the NASDAQ application system designated in the message header. For example, an order-entry message is an application message.

ADMIN messages are text messages sent to and logged in the Switch as communication checks.

SUPER messages are used to communicate with the NASDAQ Message Switch itself. These messages are used to notify the switch of the status of the user station, to turn sequence number checking on or off, to reset the sequence numbers, and to initiate retransmission of missed or lost CTCI output messages.

2.1 General Message Format

Input messages consist of:

- a message header that defines the message origin, category, and destination;
- a message body that consists of one or more lines of text; and
- an optional message trailer that consists of one line of text carrying the message sequence number.

Message headers, body, and trailers are constructed from lines of text. Each line consists of one or more data fields. All lines except the last line must be terminated with an end-of-line delimiter, which is either a Carriage Return/Line Feed pair <CR/LF> or a single Line Feed <LF> (for the sake of uniformity only the <CR/LF> pair will be used throughout this document to represent the end-of-line delimiter). Some of the data fields may be optional depending on the message category or destination. When an optional field is omitted and the result is a blank line the required end-of-line delimiter must still be provided.

Messages delivered to the NASDAQ Message Switch via TCP/IP are enclosed within a message envelope consisting of a 13-byte header and a 2-byte sentinel ("UU"). These 15 bytes are in addition to the header, body, and trailer described here. Transmission of blocked messages is not permitted, that is, each 15 byte "message envelope" must contain only one message, regardless of the message destination. Please see Appendix A: TCP/IP Connection for more details.

2.1.1 Message Header Format

Line 0:	[Origin] **<CR/LF>**
Line 1:	[Data] **<CR/LF>**
Line 1A:	[Category] **space** [Destination] **<CR/LF>**
Blank Line:	**<CR/LF>**

The header consists of four lines. The first line is line 0 and contains the origin of the message. The second line is line 1 and contains the data. The third line is line 1a and contains the category and destination of the message. The fourth line is always a blank line.

2.1.2 Message Body Format

Line 2:	[first line of message body]	**<CR/LF>**
Line 3:	[possible 2nd line]	**<CR/LF>**
Line n:	[possible additional lines]	**<CR/LF>**

The body consists of one or more lines. The first line is always line 2. For application messages, the content of the message body varies according to the destination application and the function being specified. For ADMIN messages, the body consists of one or more lines of user-defined text. For SUPER messages, the body consists of one or more lines of Switch-defined text.

2.1.3 Message Trailer Format

Trailer 1: [trailer data]

The trailer consists of a single line carrying the message sequence number. If the user elects to provide message sequence numbers for validation by the Switch, the message trailer line is required for all input messages. If the user elects not to provide message sequence numbers for validation by the Switch, the message trailer line can be omitted from ADMIN and application input messages. It cannot be omitted for SUPER messages. The message trailer is the last line of a message and is, therefore, never terminated with a <CR/LF>.

The NASDAQ Switch supports four input message trailer formats:

Format	Description	Examples
Format 1	A fixed 4-digit, zero-filled sequence number.	`0034`
Format 2	A hyphen (-), followed by a 1-4 digit sequence number.	`-34`

Format 3	The letters "OL" followed by an optional third alphabetic character and/or a space followed by a 1-4 digit sequence number. The sequence number can be zero-filled if desired. This sequence can appear anywhere on the last line. A space is used to separate the sequence number from any following user-defined data.	`OL34`
		`OLX 0034`
		`[user-defined data]OLX 0034[`*space*`user-defined data]`

Format 4	A 1-4 digit sequence number at the beginning of the line, followed by a space and a user-defined character string starting with a *non-numeric* character. The sequence number can be zero-filled if desired.	`34`*space*`AXD` `0034`*space*`/200008041717`

If a user elects to provide message sequence numbers for validation by the Switch, the following should be kept in mind:

1. The allowed range for sequence numbers is 0001 to 9999.
2. Once 9999 is reached, the number rolls over to 0001 (not 0000), and any currently outstanding gaps for the station will be erased.
3. Each station requires its own unique sequence number series.

   For example:
   - The first message from Station 1 will be number 0001.
   - The second message from Station 1 will be number 0002.
   - If the next message is from Station 2, it will be number 0001, starting a new series specifically for Station 2.

4. The Switch will issue a NUMBER GAP message to any station where a gap in the provided message sequence numbers has been detected. The user is strongly urged to fill any gap (by retransmitting the missed message including the original i.e., missing, sequence number) as soon as possible, as the Switch allows only 16 outstanding gaps per station.
5. The sequence number in the required trailer of SUPER messages can have any value because this message type is never used to detect or fill a gap.
6. The station input sequence number, maintained by the Switch:
    - has value of the next expected sequence number from the user without exception;
    - has a start-of-day value of 0001;
    - can be altered programmatically with SUPER messages;
    - can be altered manually by NASDAQ Tandem Operations staff;
    - all input messages, including SUPER messages, "consume" a station input sequence number. For example, if two non-SUPER messages are sent with the legitimate sequence numbers 0041 and 0042, then two SYSTEM CHECK (SUPER) messages are sent with sequence number values of 0001 and 0100, and then another non-SUPER message is sent, then the SUPER message sequence numbers will not be flagged as out of the ordinary in any way. The non-SUPER message sent must contain the input sequence number 0045 because the two SUPER messages "consumed" the input sequence numbers 0043 and 0044.
7. The subscriber may retransmit a SUPER message, but the message will not fill a gap reported by any NUMBER GAP message. A self-addressed ADMIN message should be sent to fill a gap caused by a missed SUPER message.
8. A SUPER message should never be the first message sent to a station when a session is restored after a communication outage. If messages were in-flight when the session was lost, any SUPER message sent to stations as the first message following session reestablishment will adversely affect input gap detection, and one or more missing messages from the previous session will not be reported with a NUMBER GAP message. It is recommended that a self-addressed ADMIN message be the first message sent to stations when a session is re-established.

To read more about ADMIN messages, see section 2.3. To read more about SUPER messages, see section 3.2. Number Gap Messages are explained in section 3.2.2.

2.2 Application Messages

Application messages carry application-specific data in the message body to the NASDAQ application system designated in the message header.

2.2.1 Message Header Format

Input Application Message Header Format

Line 0: [Entry Originator] **<CR/LF>**
Line 1: [Branch Office] **space** [Branch Office Seq. #] **<CR/LF>**
Line 1A: **Category space Destination <CR/LF>**
Blank Line: **<CR/LF>**

Examples for line 1:

ABCD**space**1234**<CRLF>**

A**space**7**<CRLF>**

DR 2850/120601**<CRLF>** (optional format for ACES only)

Line	Field	Description	Req'd
0	Entry Originator	1 to 6 characters For service bureaus, the field must contain the 4-character MMID (as specified by NASD) of the firm represented by the transaction. The NASDAQ Switch will populate the field if it is not supplied.	Y for firms acting as a service bureau & when either "PMXR" or "PMXN" is used in the destination field, even if the user is not a service bureau N for firms not acting as a service bureau
	<CR/LF>	line delimiter	Y even if the Entry Originator field is not entered
1	Branch Office*	1 to 4 alpha characters. Used to denote the firm's branch office.	Y for ACES
	Branch Office Seq. #	1 to 4 numeric characters	Y for ACES and NASDAQ market center
	Optional Entry date (ACES only)		N
	<CR/LF>	line delimiter	Y

Line	Field	Description	Req'd
1A**	Category	"ORDER" or "OTHER" For NNMS and NASDAQ Market Center, this field must contain the string "ORDER". For all other NASDAQ applications this field must contain the string "OTHER".	Y
	space	field separator	Y if destination is filled in
	Destination	For **ACES**: Must contain one of the following: A lower case "c", or "ACES" followed by a space and the MMID of the ACES market maker. If the MMID is included in the message body it can be omitted from this line. "ACESP" for messages from an ACES market maker that are to be "passed through" to the order entry firm.	Y
	<CR/LF>	line delimiter	Y
blank line	<CR/LF>	line delimiter used to separate the message header from the message body	Y

** Line 1A is required for all new CTCI users. When omitted, the destination of the message is determined by the content of the SECID field in the message body. New CTCI users should always populate the destination field as omission of the destination may cause incorrect routing. Current CTCI users are encouraged to do this as well.

2.2.2 Message Body Format

ADMIN message body format is discussed in section 2.3.2. SUPER message body format is discussed in sections 3.2.1.1 and 3.2.1.2.

The body of each application message (versus SUPER or ADMIN) sent from the user to the Switch is application-specific. Please refer to one of the following sections for information about the format of the application message body:

- NASDAQ Market Center trading messages are described in Section 4.

2.2.3 Message Trailer Format

Trailer 1: [trailer data]

The NASDAQ Switch supports four input message trailer formats:

Format	Description	Examples
Format 1	A fixed 4-digit, zero-filled sequence number.	0034
Format 2	A hyphen (-), followed by a 1-4 digit sequence number.	-34
Format 3	The letters "OL" followed by an optional third alphabetic character and/or a space followed by a 1-4 digit sequence number. The sequence number can be zero-filled if desired. This sequence can appear anywhere on the last line. A space is used to separate the sequence number from any following user-defined data.	OL34 OLX 0034 [user-defined data]OLX 0034[spaceuser-defined data]
Format 4	A 1-4 digit sequence number at the beginning of the line, followed by a space and a user-defined character string starting with a *non-numeric* character. The sequence number can be zero-filled if desired.	34spaceAXD 0034space/200008041717

2.3 Admin Messages

Input Admin messages should be used in the following recovery situations.

- A self-addressed ADMIN message should be sent in place of a SUPER message when the Switch sends the user a NUMBER GAP message (see Section 4) and the gap corresponds to a missed SUPER message; the sequence number of the missing SUPER message must be used by this ADMIN message in order to remove the gap created by the missed SUPER message. If necessary, the SUPER message can be resent after the gap has been filled by the ADMIN message.
- When a session is restored after a communications problem, an ADMIN message should be the first message sent to a station, so that the input gap detection by the Switch is accurate. An application message may also be used for this purpose.

When an ADMIN message is used as described above, it is recommended that the destination field on Line 1A be populated with a value that will cause the message to be routed back to the originator; the user can obtain the "address" for this specific purpose from the output message trailer <DestId> field, described in section 3.1.3. Such a self-addressed message not only handles the situations described above, but also proves to the user that data can flow in both directions.

2.3.1 Message Header Format

Input Admin Message Header Format

Line 0: <Originator>**<CR/LF>**
Line 1: **<CR/LF>**
Line 1A: <Category>**space**<Destination>**<CR/LF>**
Blank Line: **<CR/LF>**

Line	Field	Description	Req'd
0	Entry Originator	1 to 6 characters The NASDAQ Switch will populate the field if it is not supplied.	N for firms not acting as a service bureau
	<CR/LF>	line delimiter	Y even if the Entry Originator field is not entered
1	Variable Data	0 to 253 characters Field that the CTCI subscriber may use to enter any data.	N
	<CR/LF>	line delimiter	Y
1a	Category	"ADMIN" Identifies the message category. This field must contain the string "ADMIN".	Y

Line	Field	Description	Req'd
	space	field separator	Y
	Destination	1 to 6 character address code Holds the address of the message destination. It is recommended that this field be populated with an address that will route it back to the originator (a "self-addressed" message). The NASDAQ Customer Subscriber Test group (CST) can provide the user with the appropriate destination code for use in sending themselves self-addressed Admin messages.	Y
	<CR/LF>	line delimiter	Y
blank	<CR/LF>	Blank line used to separate the message header from the message body.	Y

2.3.2 Message Body Format

Input Admin Message Body Format

Line 2: [Variable Data] **<CR/LF>**
Line 3 … : [Additional Data] **<CR/LF>**

Line	Field	Description	Req'd
2	Variable Data	This is a free format message containing information destined for the individual address identified in the Destination field of the message header.	Y
	<CR/LF>	line delimiter	Y
3	Additional Data	Free form additional lines of message text. Each line requires a <CR/LF> to separate it from the following line.	N

2.3.3 Message Trailer Format

Trailer 1: [trailer data]

The NASDAQ Switch supports four input message trailer formats:

Format	Description	Examples
Format 1	A fixed 4-digit, zero-filled sequence number.	`0034`
Format 2	A hyphen (-), followed by a 1-4 digit sequence number.	`-34`

Format	Description	Examples
Format 3	The letters "OL" followed by an optional third alphabetic character and/or a space followed by a 1-4 digit sequence number. The sequence number can be zero-filled if desired. This sequence can appear anywhere on the last line. A space is used to separate the sequence number from any following user-defined data.	OL34 OLX 0034 [user-defined data]OLX 0034[*space*user-defined data]
Format 4	A 1-4 digit sequence number at the beginning of the line, followed by a space and a user-defined character string starting with a *non-numeric* character. The sequence number can be zero-filled if desired.	34*space*AXD 0034*space*/200008041717

2.4 SUPER Messages

Input SUPER messages are used to communicate with the NASDAQ Message Switch. These messages are used to notify the switch of the status of the user station, to turn sequence number checking on or off, to reset the sequence numbers, and to initiate retransmission of missed or lost CTCI output messages.

2.4.1 Message Header Format

Line 0: [Entry Originator] **<CR/LF>**
Line 1: [Variable Data] **<CR/LF>**
Line 1A: [Category] **<CR/LF>**
Blank Line: **<CR/LF>**

Line	Field	Description	Req'd
0	Entry Originator	1 to 6 characters For service bureaus, the field must contain the 4-character MMID (as specified by the NASD) of the firm represented by the transaction. The NASDAQ Switch will populate the field if it is not supplied.	Y for firms acting as a service bureau N for firms not acting as a service bureau
	<CR/LF>	line delimiter	Y even if the Entry Originator field is not entered
1	Variable Data	0-253 characters Field which the CTCI subscriber may use to enter any data.	N
	<CR/LF>	line delimiter	Y
1a	Category	"SUPER" Identifies the message category. This field must contain the string "SUPER". SUPER messages do not have a destination field.	Y
	<CR/LF>	line delimiter	Y
blank	<CR/LF>	blank line used to separate the message header from the message body.	Y

2.4.2 Message Body Format

In order to be processed automatically by the Switch, the message body portion of a SUPER Message must match one of the expected SUPER message formats. If the text does not conform to one of the specified formats, the message will be rejected.

Line 2: **[Function Text]**
Line 3-n: **[Additional Lines of Text as required]**

Line	Field	Description	Req'd
2	Function Text	See the following table for the supported SUPER message functions. In some cases, the Function Text may consist of multiple lines, with a <CR/LF> between each one. The last line does not require a <CR/LF> as a terminator.	Y

SUPER Message Functions

SUPER Function Text	Processing
GOOD MORNING	Indicates the subscriber is ready to begin receiving messages from the Switch.
GOOD NIGHT	Indicates the subscriber has no further traffic to send and is no longer prepared to receive traffic. This command will cause the station output queue to be drained.
SUSPEND SEQ CHECK	Instructs the Switch to suspend input sequence number checking for this subscriber station. This command is only valid if sequence checking was previously instituted.
ALLOW SEQ CHECK	Instructs the Switch to resume input sequence number checking from the next received input sequence number. This command is only valid if suspension of sequence checking was previously instituted.
SYSTEM CHECK	A test message allowing a subscriber to check its ability to communicate with the Switch.
RESET ORDER SEQ<CR/LF> nnnn or RESET ORDER SEQ<CR/LF> ANY	Instructs the Switch to expect a new input sequence number. Two options are provided: nnnn - Numeric string specifying the sequence number provided with the next input message. ANY - Literal indicating that sequence number checking is to commence from the sequence number of the next input message. Either form of this message will erase all previously created number gaps.
REVERT TO SEQ 1	Instructs the Switch to reset to start-of-day numbering in both directions (input and output). This message will erase all previously created number gaps.
RESTART LAST RCVD<CR/LF> nnnn	Instructs the Switch that a subscriber switching facility has been restored after a failure.

SUPER Function Text	Processing
	The Switch will reset the next output sequence number to nnnn + 1, where nnnn is typically the last message sequence number that had been received by the subscriber.
RTVL LAST OUT [mm] or RTVL OUT nnnnn mm Other options: ROUTE=[ADDR] ID=[SID]	Permits a subscriber to request a resend of messages previously transmitted by the Switch. The optional field mm is the number of messages to be retrieved and must be between 1 and 15 (default is 1). If more than 15 messages are requested then multiple SUPER messages must be used. LAST OUT mm instructs the Switch to resend the most recent mm messages. OUT nnnnn mm instructs the Switch to resend mm messages starting with the message which had output retrieval number nnnnn. Valid values for nnnnn are 1 through 65535. Retrieval of INPUT messages is no longer supported. If the "ROUTE=" option is used, the retrieved messages will be sent to <ADDR>. If the "ID=" option is used, the retrieved messages will be messages belonging to the station defined by <SID>. A station may only use the ROUTE= and ID= options if it has been granted those privileges. NOTE: The previous specification showed <CR/LF> after the RTVL. This is still a valid input format. However, the response to this command echoes this information as a single line, i.e., no <CR/LF> after RTVL. While both formats are acceptable, we choose to represent it in this spec with a single line in an attempt to avoid confusion.
NUMBER GAP nnnnn or NUMBER GAP nnnnn nnnnn Other options: ROUTE=[ADDR] ID=[SID]	As input to the Switch: Indicates that a subscriber has detected a gap in the Switch assigned output sequence number and is requesting the resend of the message originally sent with retrieval number nnnnn. The Switch will resend the related message with a new output sequence number; the optional second trailer line in the output message will indicate the retrieval number previously assigned to the message i.e., nnnnn. Up to two messages can be retrieved by a single NUMBER GAP message (nnnnn nnnnn denotes 2 distinct retrieval numbers, not a range). Valid values for nnnnn are 1 through 65535 only.

SUPER Function Text	Processing
	See the discussion of the RTVL command for info about the optional ROUTE= and ID= fields. NOTE: The previous specification showed <CR/LF> after the NUMBER GAP. This is still a valid input format. However, the response to this command echoes this information as a single line, i.e., no <CR/LF> after NUMBER GAP. While both formats are acceptable, we choose to represent it in this spec with a single line in an attempt to avoid confusion.

Because the station output queue is a first-in-first-out (FIFO) queue, the subscriber CTCI design must take into account the fact that SUPER message rejects and acknowledgements are always appended to the existing (and potentially deep) queue. There is currently no way to push output messages onto the top of an output queue.

2.4.3 Message Trailer Format

Trailer 1: [trailer data]

The NASDAQ Switch supports four input message trailer formats:

Format	Description	Examples
Format 1	A fixed 4-digit, zero-filled sequence number.	`0034`
Format 2	A hyphen (-), followed by a 1-4 digit sequence number.	`-34`

Format 3	The letters "OL" followed by an optional third alphabetic character and/or a space followed by a 1-4 digit sequence number. The sequence number can be zero-filled if desired. This sequence can appear anywhere on the last line. A space is used to separate the sequence number from any following user-defined data.	`OL34`
		`OLX 0034`
		`[user-defined data]OLX 0034[`*space*`user-defined data]`

Format 4	A 1-4 digit sequence number at the beginning of the line, followed by a space and a user-defined character string starting with a *non-numeric* character. The sequence number can be zero-filled if desired.	`34`*space*`AXD` `0034`*space*`/200008041717`

3 Standard Output Messages

3.1 General Message Format

Output messages consist of:

- a message header that defines the start of the message, its origin, its destination, its output sequence number, and the message type;
- a message body that consists of one or more lines of text; and
- an optional message trailer that carries the date and time, the message retrieval number, and other information.

Messages sent from the NASDAQ Message Switch via TCP/IP are enclosed within a message envelope consisting of a 13-byte header and a 2-byte sentinel ("UU"). These 15 bytes are in addition to the header, body, and trailer described here. Please see Appendix A for more details.

Message headers and trailers are constructed from lines of text. Each line consists of one or more data fields and is terminated by a Carriage Return/Line Feed pair <CR/LF>.

An output message header consists of up to 4 fields with a user defined field separator between each field. The separator defaults to space if the user has not specified something else. The user can select which fields they would like to receive and can specify the order in which the fields should be placed in the header.

Assuming that the user has elected to receive all fields in the default order, the format is as follows:

3.1.1 Message Header Format

The message header format is one line containing four fields. The field separators can, however, be <CR/LF>, which makes the message header four lines.

Line 1:	[Destination Code]	[field separator]
	[Originator Code]	[field separator]
	[Sequence Number]	[field separator]
	[Message Type]	**<CR/LF>**

Line	Field	Description
1	Destination Code	The Destination Code is a 1-6 character identifier that defaults to the Station ID of the user. The user may specify a custom code. Custom codes may also be specified for each message. See field 4. The user may elect not to receive this field.
	Field Separator	The field separator is defined by the user (**space**, **<CR/LF>**, **<LF>**, etc.). If the user does not specify a separator, a **space** is used by default.

Line	Field	Description
	Originator Code	The Originator Code is a 1-6 character identifier that defaults to the Station ID of the originator of the message. The user may specify custom Originator Codes for each message type. See field 4. The user may elect not to receive this field.
	Field Separator	The field separator is defined by the user (**space**, **<CR/LF>**, **<LF>**, etc.). If the user does not specify a separator, a **space** is used by default.
	Sequence Number	4 numeric characters. Output message sequence number. The number is in the range 0001 to 9999. When 9999 is reached, the number wraps to 0001 (0000 is not used). The "REVERT TO SEQ 1" Super Message resets this field. The user may elect not to receive this field.
	Field Separator	The user defines the field separator (**space**, **<CR/LF>**, **<LF>**, etc.). If the user does not specify a separator, a **space** is used by default.
	Message Type	The message type is a 1-character code that specifies the nature of the message. The user may select the user's own codes. If custom codes are not used, the defaults are as follows: R = Report A = Admin S = Status P = Super T = Other The type of an application output message is determined by the Category Field of Input Header Line 1A of the message input to the switch by the application. It does not indicate which application produced the message. Standard Input information is in section three of this document. The user may elect not to receive this field.
	<CR/LF>	Line delimiter. A **<CR/LF>** is used to separate the output message header from the message body. It is present even if the user elects not to receive any of the fields defined above.

As part of NASDAQ's on-going effort to maximize Switch performance and capacity, NASDAQ will require that the last three characters of the six-character Common Message Switch (CMS) output header Originator Code be reserved for NASDAQ's use. If you, therefore, plan to code your firm's internal systems to use the Originator Code to identify system of origin, you should compare the first three characters of the Originator Code.

Below are the three-letter codes that should be used to identify the system of origin:

System of Origin	(Mnemonic)
ACES Pass-Thru[SM]	ACE
NASDAQ Market Center	HSW
ITS	ITS

NASDAQ reserves the right to change an application mnemonic at any time.

3.1.2 Message Body Format

An output message body consists of one or more lines, with the first line referred to as Line 1. The number of lines and their content varies with the class of the message.

Line 1: [first line of message body] **<CR/LF>**
Line 2: [possible 2nd line] **<CR/LF>**
Line n: [possible additional lines] **<CR/LF>**

See Sections 3.1.4 - 3.3.2 for format information specific to each message class.

3.1.3 Message Trailer Format

An output message trailer consists of either one or two lines depending upon the type of message. Each line in the trailer is optional and the user may elect to not receive either one. If present, the format is as follows:

Trailer 1: [Date/Time]**space**[Dest ID]**slash**[Rtvl #]**<CR/LF>**
Trailer 2: [Resend]**space**[Alt Route]**space**[Poss Dup]

Line	Field	Description
Trailer 1	Date/Time	12 character numeric field. The format of the Date/Time field is HHMMSSDDMMYY (hours, minutes, seconds, day, month, year).
	space	Field separator.
	DestID	1-6 character Destination Station ID. This is identical to the default Destination Code found in the output message header. It is not affected if the user chooses to have a custom Destination Code.
	slash	Field separator (/).
	Rtvl #	4 or 6 character numeric field. The switch maintains a 6-digit retrieval number (RN) from 000001 to 065535. When 065535 is reached, the number wraps to 000001. A user will receive the default 4-digit RN or can choose to receive the 6-digit RN (recommended). The 4-digit RN is merely the rightmost 4 digits of the number maintained by the switch. The 4-digit wrapping sequence is [00]0001 to [00]9999,

Line	Field	Description
		[01]0000 to [01]9999, [02]..., [06]0000 to [06]5535, [00]0001 to [00]9999 and so on.
	<CR/LF>	Line delimiter. The **<CR/LF>** is only present if the trailer includes Trailer Line 2.
Trailer 2*	Resend	An optional **"RSND"** followed by **[destID] / [Rtvl #].** Used when the switch resends a message (due to an input Super RTVL or Super Number Gap message). The switch places the character string "RSND" in this field, followed by a 1-6 character Destination Id, a **slash**, and the 4 or 6 character retrieval number of the original message. Optional.
	space	Field separator. A **space** will be present if another field follows the Resend field
	Alt Route	Holds the 1-6 character Destination ID of the original location the message was addressed to when the message has been rerouted. Optional.
	space	Field separator. A **space** will be present if another field follows the Alt Route field.
	Poss Dup	An optional "**PD**". Holds the string value "PD" if the switch needs to indicate that this message may possibly be a duplicate of an earlier attempt to deliver the message. Optional.

*Trailer Line 2 is present only when the Switch must indicate unusual situations to the user (message resend, alternate routing, and possible duplicate message). If the line is present, it will consist of one, two, or all three of the fields, with a **space** between each one.

A message that successfully passes the Switch validation and safestore procedures is forwarded to the specified application, which performs additional validation on the text of the message. If an error is detected, the user will receive a reject message explaining why the original message could not be processed. All reject messages sent from applications will be forwarded to the subscriber via the Switch and will be contained in a Standard Switch Output Message.

If the text from an application is too large, the Switch will replace the text with the character string "-->" so that the message does not exceed 1024 characters. This string replaces the entire echo.

See section 3.3.2 for additional reject information.

3.1.4 Message Numbers

Each output message delivered by the Switch is assigned two numbers:

1. A Message Sequence Number located in the output header.
2. A Message Retrieval Number located in the output trailer.

The Message Sequence and Message Retrieval numbers are independently maintained for each station and will normally be sequential.

The user detects missing messages by monitoring the Message Sequence Number for gaps, but must request message retrievals by using the Message Retrieval Number. The Message Sequence Number may wrap, be set back to 0001 via a REVERT TO SEQ 1 (SUPER) Message, or be manually altered by the Tandem Operations Staff, at any time so the Message Retrieval Number is necessary to uniquely identify all transmitted messages.

The Retrieval Number wraps to 0 after 65,535. Only the most recently output 65,535 messages are ever retrievable, so if output message counts for a particular station are expected to exceed 65,535 during the trading day the user may opt to configure multiple stations and employ the Switch's Balanced Delivery feature.

"Balanced Delivery" is a Message Switch configuration feature that allows subscriber-bound messages to be queued in round robin fashion to more than one output queue. This technique spreads like-addressed output messages over many output stations, effectively reducing the number of messages transmitted per station while increasing overall throughput.

This feature requires that multiple stations be configured for the firm and that any addresses used to direct messages to the 'prime' station queue be added to our Balanced Delivery Configuration (BDFILE) file. Configuration must be coordinated and tested with the NASDAQ Testing Facility (NTF).

3.2 SUPER Messages

3.2.1 Message Acknowledgment

Super Messages received by the Switch are subject to message validation, except that the Switch does not validate the value of the message sequence number contained in the trailer of a message. If the Switch rejects the message, a reject message is sent to the user. If the Switch accepts the message, a response is sent to the user to indicate the disposition of the Super Message. The format of the Super Message Acknowledgment is the Standard Switch Output Message format, as described in Section 3.1. The Super Message Acknowledgment message is a STATUS message.

If the Super message was processed successfully, the body of the Super Acknowledgement message is formatted as follows:

3.2.1.1 Acknowledgement Message Body Format #1

Line 1: [message category] **<CR/LF>**
Line 2: [message text] **<CR/LF>**

Line	Field	Description
1	message category	"STATUS". This field identifies the message category and will contain "**STATUS**".
	<CR/LF>	Line delimiter
2	message text	"SUPER MSG PROCESSED". This field contains the string "SUPER MSG PROCESSED", indicating that the function requested in the Super message has been performed.

If the message could not be processed due to an error in content or formatting or it could not be processed immediately, the body will contain:

3.2.1.2 Acknowledgement Message Body Format #2

Line 1: [message category] **<CR/LF>**
Line 2: [message text] **<CR/LF>**
Line 3: [additional clarification] **<CR/LF>**
Line 4-n: [input msg echo] **<CR/LF>**

Line	Field	Description
1	message category	"STATUS". This field identifies the message category and will contain "**STATUS**".
	<CR/LF>	Line delimiter
2	message text	"SUPER MSG RECEIVED". This field contains the string "SUPER MSG RECEIVED", indicating that the switch received the Super message.
	<CR/LF>	Line delimiter

Line	Field	Description
3	additional clarification	Variable text.
	<CR/LF>	Line delimiter
4-n	input msg echo	Copy of the super message. These lines are a copy of the entire input Super message, including the header.
	<CR/LF>	Line delimiter

3.2.2 Number Gap Message

If input message sequence checking is enabled and the Switch receives a message with a sequence number other than the number expected, the Switch will generate either a Number Gap status message or a Sequence Number Reject message. This message will be formatted as a separate output message in the Standard Switch Output Message format, as described in Section 3.1. Number Gap messages are SUPER messages.

The body of the Number Gap message is formatted as follows:

Line 1: [message category] **<CR/LF>**
Line 2: [message type] **<CR/LF>**
Lines 3 - 6: [nnnn] [nnnn] [nnnn] [nnnn] **<CR/LF>**

Line	Field	Description
1	message category	"STATUS". This field identifies the message category and will contain "**STATUS**".
	<CR/LF>	Line delimiter.
2	message type	"NUMBER GAP". This field contains the string "NUMBER GAP", indicating that this is a Number Gap message from the switch.
	<CR/LF>	Line delimiter.
3-6	nnnn nnnn nnnn nnnn	Up to 4 sets of 4 numeric characters. A number gap message can report up to 16 gaps, with up to 4 **space** separated sequence numbers on each line. The value **nnnn** represents the input sequence number of a missed message.
	<CR/LF>	Line delimiter

When 16 gaps become outstanding then all subsequent input will be rejected (reason: REJ-INVALID MSG SEQ NO) until one of the following occurs:

- one or more missing messages are resent with the original sequence number;
- one or more gaps are filled with the "self-addressed" ADMIN message (see Section 3.3);
- the station gap table is erased upon receipt of either the REVERT TO SEQ 1 or RESET ORDER SEQUENCE (SUPER) message;
- The Tandem Operations Staff manually sets the next expected input sequence number, which also erases the station gap table.

3.3 Reject Messages

3.3.1 Switch Reject Messages

The Switch rejects a message received from a CTCI subscriber when the message fails to pass one of the Switch validation tests. The subscriber will receive a reject message in the Standard Switch Output Message format, as described in Section 3.1. All reject messages are STATUS messages.

The body of a reject message is formatted as follows:

Line 1:	[message category]		**<CR/LF>**
Line 2:	[message type]	[reason]	**<CR/LF>**
Lines 3 - n:	[input msg Echo]		**<CR/LF>**

Line	Field	Description
1	message category	"STATUS" This field identifies the message category and will contain "STATUS".
	<CR/LF>	Line delimiter
2	message type	"REJ-" This field contains the string "REJ-", indicating that this is a Reject message from the switch.
	Reason	Fixed text. This field indicates the reason for the rejection. If there was a problem with the input message, the following text may be reported in the reason field: • MSG EXCEEDS MAX SIZE, message is greater than 1024 chars • INVALID FIRM, origin code is invalid • INVALID BRID/SEQ NO, branch office identifier is invalid • INVALID CATEGORY, category is invalid • DESTINATION INVALID, destination code is invalid • FORMAT ERROR, message is not in the proper format • INVALID MSG SEQ NO, message sequence number is missing, badly formatted, equal to zero, or the maximum number of gaps (16) was exceeded • SEQ NO REPEATED, sequence number duplicates the number of an earlier message. The message will not be accepted. • TOO MANY DESTINATIONS, Admin Message contains too many destination codes. • NOT ACCEPTING INPUTS, input station has been closed by the System Operator or the User. • UNKNOWN STATION, MMID entered on Line 0 by a Service Bureau firm does not equal the first four characters of the station associated with the select address. • REJspace-spaceSYSTEM UNAVAILABLE, The destination

Line	Field	Description
		application/system is unavailable.
3-n	input msg echo	This is a copy of the entire rejected message, including the header and trailer.
	<CR/LF>	line delimiter

3.3.2 Application Reject Messages

A message that successfully passes the Switch validation and safestore procedures is forwarded to the specified application, which performs additional validation on the text of the message. If an error is detected, the user will receive a reject message explaining why the original message could not be processed. All reject messages sent from NASDAQ applications will be forwarded to the subscriber via the Switch and will be contained in General Output Message format, as described in Section 3.1. All reject messages are STATUS messages.

If the application cannot process a message received from the user it will generate a Status Message that will indicate why the message was rejected. The format of an application reject message body is as follows:

Application Reject Message Body

Line 1: [optional MMID] **<CR/LF>**
Line 2: [message category] **<CR/LF>**
Line 3: [reason] **<CR/LF>**
Line 4-n: [echo] **<CR/LF>**

Line	Field	Description
1	optional MMID	4 characters (if present). Contains the 4-character MMID of the entering firm or the MMID of the firm the Service Bureau is acting for. If this option is utilized for multi-station lines, it will equal the 4-character MMID associated with the station.
	<CR/LF>	Line delimiter
2	message category	"STATUS". This field identifies the message category and will contain "STATUS".
	<CR/LF>	Line delimiter
3	reason	This field contains the text explaining why the application rejected the message.
	<CR/LF>	Line delimiter
4-n	Echo	These lines are a copy of the entire input Application message, including the header and trailer.
	<CR/LF>	Line delimiter

Because the Switch may change the category destination to "OTHER m" on inbound messages to NASDAQ market center, "OTHER m" is a valid Category/Destination combination for reject messages sent from NASDAQ Market Center to Users (Line 4-n echo of original message). The destination code "m" is, however, not valid for inbound messages (user to NASDAQ Market Center). While NASDAQ Market Center does echo back the original message, the echo may contain "m" because the destination code was changed to "m" before NASDAQ Market Center received the message.

4 NASDAQ Market Center Trading Messages

This section describes the format of the message text used to interface through the switch to the NASDAQ Market Center application.

The NASDAQ Market Center is a fully integrated order display and execution system that aggregates quotes and orders, thereby providing access to a greater number of possible trades as well as greater depth and transparency of the market. The NASDAQ Market Center responds to today's market factors of fragmentation, decimalization, and best execution obligations by creating a stronger natural center of liquidity, multiple execution options for market participants, and pre-trade anonymity.

All messages sent to the NASDAQ Market Center via CTCI will conform to modified Common Message Switch (CMS) formats. Only one NASDAQ Market Center message may be placed in a single CTCI message. A firm may enter an order, cancel an open order, or cancel and replace an order.

4.1 Input Message Formats

4.1.1 Order Entry

The standard message header (see section 2.1.1) is followed by:

Required Lines[2]:

Line 2: ['POSS DUPE' *sp*] **Side *sp* '.SM' <*CR/LF*>**
Line 3: **Quantity *sp* Secid *sp* Price** [*sp* Reserve]**<*CR/LF*>**
Line 3a: [TIF] [*sp* Capacity] [*sp* 'DNI'] [*sp* 'DNR'] [*sp* 'PRI' *sp* priority] [*sp* 'ANON'] [*sp* 'AIQ' *sp* value] [*sp* 'TYP' *sp* Order Type] **<*CR/LF*>**

Optional Lines:

[Line 4:] [['.UID' *sp* User Order ID] <***CR/LF***>]
[Line 4a:] [['BCH'] [*sp* '.RCV' *sp* order rcv date] <***CR/LF***>]
[Line 4b:] [['GU' *sp* giveup id] <***CR/LF***>]
[Line 4c:] [':'[Preferenced MMID] [*sp* 'MAQ' *sp* quantity] <***CR/LF***>]
[Line 4d:] [['PEG' *sp* Peg Type] [*sp* 'CAP' *sp* Cap Price] [*sp* 'OFF' *sp* Offset Value] [*sp* 'DIS'] [*sp* 'DIF' *sp* Discretionary Offset] <***CR/LF***>]

Optional line for exchange-listed securities:

[Line 4e:] [[*sp* 'BLK' *sp* Block Indicator] <***CR/LF***>]

Message Format

Line	Field	Description	Req'd
0	Entry Originator	1-6 character field - filled in by the Switch if not provided by the Order entry firm. For firms acting as a Service bureau. Must hold the 4-character MMID of the firm represented by the transaction.	Y for firms acting as a Service Bureau
	<***CR/LF***>	Line terminator.	Y
1	Branch Office	1-4 character alpha field used to identify the firm's branch office.	Y
	Branch Office Sequence #	1-4 character numeric sequence number field.	Y
	<***CR/LF***>	Line terminator.	Y

[2] Fields are separated by a space character, ***sp***
All lines are terminated by a CR/LF pair, **<*CR/LF*>**
Fields in bold are required, **Category**
Fields in quotes are keywords, **'.SM'**
Fields within square brackets are optional, [*sp* Reserve]
Multiple fields within brackets must all be present if any are, [*sp* 'PRI' *sp* priority]

Line	Field	Description	Req'd
1a	Category	Field identifying the message category. For NASDAQ market center messages, this always will be "ORDER".	Y
	Destination	Always contains "b" for NASDAQ Market Center messages.	Y
	Preferenced MMID	Can be present only if no Preferenced MMID in line 4c. Preferenced MMID indicating the exchange the order-entry firm wishes to route to. In the event that a value is present in both 1a and 4c, the system will ignore 1a. Allowed values are: NADQ = NASDAQ only order INET = NASDAQ only order DOTA = Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If marketable against other markets upon entry, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book. SCAN = First attempts to execute against orders available on the NASDAQ book at a price equal to or better than the NBBO. After executing any marketable orders on the NASDAQ book, the order will be displayed via TotalView-ITCH at the most aggressive price possible that would not result in a trade through for 20 to 30 milliseconds, after which it will then route to other markets. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. STGY = Behaves similar to SCAN, except that the order will route out again after posting to the NASDAQ book if the order is subsequently locked or crossed. DOTM — Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO; if marketable against other markets upon entry, or if	N

Line	Field	Description	Req'd
		locked/crossed subsequent to posting on the NASDAQ book, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book. DOTI - Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If unfilled, it will then route to NASDAQ OMX BX (BX) where it will also attempt to execute at the NBBO or better. If still unfilled, the order will route to the NYSE or NYSE Alternext where the order will remain until being executed or cancelled. DOTD - Routes directly to the NYSE or Amex without checking the NASDAQ book. TFTY – Routes to Nasdaq BX, dark pools, and NYSE or AMEX without checking the NASDAQ book first. Directed Order – Order routed directly to market center identified. See Directed Order Destination Code table MOPP - Route to protected quotes for display size only, then resides in the NASDAQ book. Once it posts on the book it will not route out again if the market moves. All orders, except IOC orders, will post to the book if not filled in the market. SKIP - Behaves like SCAN and opts out of sending orders to Dark Pools SKNY - Behaves like STGY and opts out of sending orders to Dark Pools SAVE - accesses BX, NASDAQ, NYSE, all other protected quotes and additional destinations. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. QSAV - Behaves like SAVE but routes to	

Line	Field	Description	Req'd
		NASDAQ first. QTFY - Behaves like TFTY but routes to NASDAQ first. DOTZ – Behaves like DOTI and opts out of sending orders to Nasdaq BX LIST - Enables firms to participate in the opening and closing processes of each security's primary listing market and also take advantage of NASDAQ's liquidity during the remainder of the trading day. CART - will enable firms to check the BX, PSX and NASDAQ book before (optionally) posting to the NASDAQ book SOLV - will be similar to the SAVE strategy but will route out again after posting if the NASDAQ book is subsequently locked or crossed.	
	<***CR/LF***>	Line terminator	Y
	Blank Line		Y
	<***CR/LF***>	To terminate the Message Header	Y
2	'POSS DUPE'	9-character field that indicates that the message may be a duplicate.	N
	Side	Alpha field indicating whether the order is a buy, sell, or short sale. Allowed values: B = buy BUY = buy S = sell SL = sell SSHRT = short sale SSHRT EXEMPT = short sale exempt	Y
	'.SM'	Field used to indicate that the message is in NASDAQ market center format and that the firm is prepared to receive Response Messages in NASDAQ market center format.	Y
	<***CR/LF***>	Line terminator.	Y

Line	Field	Description	Req'd
3	Quantity	1-6 character numeric field, in the range of 1-999999, representing the number of shares in the order. Exchange-listed securities can be in round lots and mixed lots only. For a NASDAQ Crossing Network order, only round lot values accepted.	Y
	SECID	1-14 character security identifier. This symbol must represent a CQS security and must be in CMS format for exchange-listed securities. For example: OXY PRB or ROY PR.	Y
	Price	Field which must contain either: "MKT" to denote a market order, a 1-10 character decimal price, or "NBBO" if the order is pegged. Pegged orders are not allowed for exchange-listed securities.	Y
	Reserve	1-6 character field indicating the quantity of the Reserve Size. Must be in shares in either round lot multiples or mixed lots.	N
	<***CR/LF***>	Line terminator.	Y
3a	TIF	Field indicating Time-in-Force. Allowed values for NMS securities: IOC = immediate or cancel, executable from market open to market close (default) DAY = executable from market open to market close, cancelled at market close (default if pegged, discretionary, or summary). GTC = good till cancel, executable from market open to market close, cancelled one year from entry IOX = immediate or cancel, executable from pre-market session to market close X = cancel at market close, executable from pre-market session to market close GTX = good till cancel, executable from pre-market session to market close, cancelled one year from entry OO = executable only during Opening Cross OC = executable only during Closing Cross REG = order will participate in all regular hours crosses with unexecuted shares being immediately canceled after the last regular cross. NXT = order will participate in the next scheduled regular hours cross with unexecuted shares being immediately canceled after that cross. ALX = order will participate in all crosses (regular	Y

Line	Field	Description	Req'd
		and after-hours) with unexecuted shares being canceled after the after-hours cross. Allowed values for other exchange-listed securities: IOC = immediate or cancel, executable from market open to market close (default) DAY = executable from market open to market close (default if pegged, discretionary, or summary), cancelled at market close GTC = good till cancel, executable from market open to market close, cancelled one year from entry IOX = immediate or cancel, executable from market open to session close X = cancel at session close, executable from market open to session close GTX = good till cancel, executable from market open to session close, cancelled one year from entry REG = order will participate in all regular hours crosses with unexecuted shares being immediately canceled after the last regular cross. NXT = order will participate in the next scheduled regular hours cross with unexecuted shares being immediately canceled after that cross. ALX = order will participate in all crosses (regular and after-hours) with unexecuted shares being canceled after the after-hours cross.	
3a	Capacity	Field indicating on whose behalf the order was entered. Allowed values: A = agency (this is the default) P = principal R = riskless	Y
	'DNI'	Do Not Increase flag. 3-character keyword used to indicate that the order quantity and number of shares should not be increased as the result of a stock split.	N
	'DNR'	Do Not Reduce flag. 3-character keyword used to indicate that the order price should not be reduced because of a cash dividend.	N
	'PRI' *sp* priority	3-character keyword followed by a value that indicates which execution algorithm is to be utilized. Allowed values for NMS securities: T = price/time	N

Line	Field	Description	Req'd
		I = Imbalance Only for open and close (only allowed TIFs are "OC" and "OO") Allowed values for exchange-listed securities: T = price/time S = Intermarket Sweep Order (ISO)	
	'ANON'	4-character keyword indicating that the order is non-attributable. If this value is not given, then the order is attributable – Price to Display. Allowed values: ANON = anonymous - Price–to–Display. CNON = anonymous - Price–to–Comply.	N
	'AIQ' *sp* value	3-character keyword followed by a value used to specify whether internalization is allowed on this order. Keep in mind that AIQ means *self match prevention.* Allowed values: I = do not internalize first, but allow this order to match orders with same MPID	N
	'TYP' *sp* Order Type	3-character keyword followed by a value to indicate the type of order. Allowed values: O = Order	Y
	<***CR/LF***>	Line terminator. This line terminator is required if any of the following optional lines are present, even if none of the optional fields found on Line 3a are supplied.	Y
4	'.UID' *sp* User Order ID	4-character keyword followed by a 1-20 character field that holds an order ID used by the entering firm for internal processing. Valid characters are A-Z and 0-9. Embedded spaces are invalid.	N
	<***CR/LF***>	Line terminator if Optional Line 4 is present.	Y
4a	'.B' or 'BCH'	Keyword used to indicate bunched orders.	N
	'.RCV' *sp* order rcv date	4-character keyword followed by an 8-character user-specified date in MMDDYYYY format.	N
	<***CR/LF***>	Line terminator if Optional Line 4a is present.	Y
4b	'GU' *sp* giveup id	2-character keyword followed by a space and the 4-character identifier of another firm (the give up firm) the order was entered on behalf of.	N
	<***CR/LF***>	Line terminator if Optional Line 4b is present.	Y

4c	`:'MMID	Can be present only if no Preferenced MMID in line 1a. In the event that a value is present in both 1a and 4c, the system will ignore 1a. Preferenced MMID indicates the exchange the market maker wishes to route to. In the event that a value is present in both 1a and 4c, the system will ignore 1a. Allowed values are: NADQ = NASDAQ only order INET = NASDAQ only order DOTA = Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If marketable against other markets upon entry, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book. SCAN = First attempts to execute against orders available on the NASDAQ book at a price equal to or better than the NBBO. After executing any marketable orders on the NASDAQ book, the order will be displayed via TotalView-ITCH at the most aggressive price possible that would not result in a trade through for 20 to 30 milliseconds, after which it will then route to other markets. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. STGY = Behaves similar to SCAN, except that the order will route out again after posting to the NASDAQ book if the order is subsequently locked or crossed. DOTM = Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO; if marketable against other markets upon entry, or if locked/crossed subsequent to posting on the NASDAQ book, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book.	N

		DOTI - Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If unfilled, it will then route to NASDAQ OMX BX (BX) where it will also attempt to execute at the NBBO or better. If still unfilled, the order will route to the NYSE or NYSE Alternext where the order will remain until being executed or cancelled. DOTD - Routes directly to the NYSE or Amex without checking the NASDAQ book. TFTY – Routes to Nasdaq BX, dark pools, and NYSE or AMEX without checking the NASDAQ book first. Directed Order – Order routed directly to market center identified. See Directed Order Destination Code table MOPP - Route to protected quotes for display size only, then resides in the NASDAQ book. Once it posts on the book it will not route out again if the market moves. SKIP = Behaves like SCAN and opts out of sending orders to Dark Pools SKNY = Behaves like STGY and opts out of sending orders to Dark Pools SAVE - accesses BX, NASDAQ, NYSE, all other protected quotes and additional destinations. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. QSAV - Behaves like SAVE but routes to NASDAQ first. QTFY - Behaves like TFTY but routes to NASDAQ first. DOTZ – Behaves like DOTI and opts out of sending orders to Nasdaq BX	

		LIST - Enables firms to participate in the opening and closing processes of each security's primary listing market and also take advantage of NASDAQ's liquidity during the remainder of the trading day. CART - will enable firms to check the BX, PSX and NASDAQ book before (optionally) posting to the NASDAQ book SOLV - will be similar to the SAVE strategy but will route out again after posting if the NASDAQ book is subsequently locked or crossed.	
	'MAQ' *sp* quantity	3-character keyword followed by up to a 6 character Minimum Acceptable Quantity for a NASDAQ Crossing Network order. Round lot values only, no minimum value.	N
	<***CR/LF***>	Line terminator if Optional Line 4c is present.	Y
4d	'PEG' *sp* Peg Type	3-character keyword followed by a value indicating the order's peg type. If this field is not present in the message, the default is not pegged. Pegged orders are not allowed for other exchange-listed securities. Allowed values: G or H = regular pegged to NBBO R or Q = reverse pegged to NBBO N = Not pegged	N
	'CAP' *sp* Cap Price	3-character keyword followed by a price. Cap price must contain a 1-10 character decimal price. If the field is not present in the message, the Cap price will default to 0. Pegged orders are not allowed for other exchange-listed securities.	N
	'OFF' *sp* Offset Value	3-character keyword followed by a 2-digit value (00-99) that indicates the Peg Offset value. This field is applicable to Pegged orders and indicates the numerical offset that is applied to the current inside bid/offer to derive the current display price for the order. If the "PEG" value is G, this field should be set to a minimum of 00. If the "PEG" value is R, this field should be set to a minimum of 01. Pegged orders are not allowed for other exchange-listed securities.	N
	'DIS'	3-character keyword indicating the order is discretionary. If the field is not present in the message, the order is not discretionary.	N
	'DIF' *sp* Discretionary Offset	3-character keyword followed by a 1-2 character numeric value. If a discretionary order is entered this field must contain a non-zero value. If an order is entered that is not discretionary, this field	N

		cannot be entered.	
	<***CR/LF***>	Line terminator if Optional Line 4d is present.	Y
4e	'BLK' *sp* Block Indicator	3-character keyword indicating the Block Indicator field followed by a block indicator value that allows you to submit a block order for exchange-listed securities. This field is applicable only if it is indicated on an ITS commitment. It will be ignored if the order is preferenced to an exchange-listed security participant or exchange-listed security trading only. Allowed values: Y N.	N
	<***CR/LF***>	Line terminator if Optional Line 4e is present.	Y

Directed Order Destination Codes	
Market Center	**Destination Code**
AMEX	ISAM
ARCA/PCX	ISPA
Nasdaq OMX BX	ISBX
CBOE	ISCB
CHSX	ISCX
CINN/NSX	ISCN
DATA	ISDA
ISE	ISIS
LavaFlow	ISLF
NYSE	ISNY
TRAC	ISTR
BATS	ISBZ
BATS Y Exchange	ISBY
EDGA	ISNA
EDGX	ISNX
Nasdaq OMX PSX	ISPX

4.1.2 Order Cancel

SAMPLE MESSAGE

```
ADVS
B1
ORDER b
<CR/LF>
CXL SSHRT EXEMPT .SM
100 UBCD 11.99
<CR/LF>
RE A1/060203 0B3035Q000N1
OE CTCI TESTING  -0100
```

The standard message header (see section 2.1.1) is followed by:

Required Lines:

Line 2: **'CXL' *sp* Side *sp* `.SM' *<CR/LF>***
Line 3: **Quantity *sp* Secid *sp* Price** [*sp* Reserve] ***<CR/LF>***
Line 3a: [TIF] [*sp* Capacity] ***<CR/LF>***
Line 5: **'RE' *sp* Branch Office *sp* Branch Office Seq. # '/' date *sp* Order Reference Id** <***CR/LF***>

Message Format

Line	Field	Description	Req'd
0	Entry Originator	1-6 character field - filled in by the Switch if not provided by the Order entry firm. This is a required field for firms acting as a Service bureau and must hold the 4-character MMID of the firm represented by the transaction.	Y for firms acting as a Service Bureau
	<CR/LF>	Line terminator.	Y
1	Branch Office	1-4 character alpha field used to identify the firm's branch office.	N
	Branch Office Sequence #	1-4 character numeric sequence number field.	N
	<CR/LF>	Line terminator.	Y
1a	Category	Identifies the message category. For NASDAQ Market Center messages, this always will be "ORDER".	Y
	Destination	Always contains "b" for NASDAQ Market Center messages.	Y
	<CR/LF>	Line terminator.	Y
	Blank Line		
	<CR/LF>	Required to terminate the Message Header.	Y
2	'CXL'	3-character keyword indicating that this message is a Cancel Order Message.	Y

Line	Field	Description	Req'd
	Side	Alpha field indicating whether the order was a buy, sell or short sale. Allowed values: B = buy BUY = buy S = sell SL = sell SSHRT = short sale SSHRT EXEMPT = short sale exempt	N
	'.SM'	Used to indicate that the message is in NASDAQ Market Center format and that the firm is prepared to receive Response Messages in NASDAQ market center format.	Y
	<CR/LF>	Line terminator.	Y
3	Quantity	1-6 character numeric field, in the range of 1-999999, representing the number of shares in the original order.	Y
	SECID	1-14 character security identifier. This symbol must represent a CQS security and must be in CMS format for other exchange-listed securities. For example: OXY PRB or ROY PR.	Y
	Price	Holds the price of the original order. The precision of the price (i.e. the number of decimal positions) should be the same as in the original order.	Y
	Reserve	1-6 character field indicating the quantity of the Reserve Size. Must be in shares in either round lot multiples or mixed lots.	N
	<CR/LF>	Line terminator.	Y
3a	TIF	As per original order	N
	Capacity	Field indicating on whose behalf the original order was entered. Allowed values: A = agency (this is the default) P = principal R = riskless	N
	<CR/LF>	Line terminator. Required even if TIF and Capacity are not present.	Y
5	'RE'	Required 2-character keyword indicating that this line defines the order to which this Cancel refers.	Y
	Branch Office	1-4 character alpha field used to identify the branch office of the original order.	N
	Branch Office Sequence #	1-4 character numeric field indicating the sequence number of the original order.	N
	'/' date	A slash followed by the 6-character entry date of the order to be canceled in MMDDYY format.	Y

Line	Field	Description	Req'd
	Order Reference ID	12-character Order Reference ID of the order to be canceled. This identifier is returned to the Order Entry Firm via the NASDAQ Market Center Order Entry Acknowledgement Message.	Y
	<CR/LF>	Required line terminator if optional line 5 is present.	Y if line 5 is present

4.1.3 Order Cancel/Replace (Version One)

SAMPLE MESSAGE

```
<CR/LF>
CA12
ORDER b
<CR/LF>
B .SM
100 UBCD 12
GTC
CXL B
200 UBCD 12
RE A 1/051303 0B3035J000MJ
```

The standard message header (see section 2.1.1) is followed by:

New Order:

Line 2: **['POSS DUPE'] Side *sp* '.SM' <*CR/LF*>**
Line 3: **Quantity *sp* Secid *sp* Price** [*sp* Reserve] **<*CR/LF*>**
Line 3a: [Capacity] [*sp* DNI] [*sp* DNR] **<*CR/LF*>**

Order being Canceled:

Line X: **'CXL' *sp* Side <*CR/LF*>**
Line X1: **Quantity *sp* Secid *sp* Price** [*sp* Reserve] **<*CR/LF*>**
Line X2: **'RE' *sp* Branch Office *sp* Branch Office Seq. # '/' date *sp* Order Reference ID** <***CR/LF***>

Message Format

Line	Field	Description	Req'd
0	Entry Originator	1-6 character field. Filled in by the Switch if not provided by the Order entry firm. Must hold the 4-character MMID of the firm represented by the transaction.	Y for firms acting as service bureaus
	<CR/LF>	Line terminator.	Y
1	Branch Office	1-4 character alpha field used to identify the firm's branch office	Y
	Branch Office Sequence #	1-4 character numeric sequence number field.	Y
	<CR/LF>	Line terminator.	Y
1a	Category	Identifies the message category. For NASDAQ Market Center messages, this always will be "ORDER".	Y
	Destination	Always contains "b" for NASDAQ Market Center messages.	Y
	<CR/LF>	Required line terminator	Y

Line	Field	Description	Req'd
	Blank Line:		
	<CR/LF>	Required to terminate the Message Header.	Y
2	['POSS DUPE']	9-character field that indicates that the message may be a duplicate.	N
	Side	Alpha field indicating whether the order is a buy, sell, or short sale. Allowed values: B = buy BUY = buy S = sell SL = sell SSHRT = short sale SSHRT EXEMPT = short sale exempt	Y
	'.SM'	Indicates that the message is in NASDAQ Market Center format and that the firm is prepared to receive Response Messages in NASDAQ Market Center format	Y
	<CR/LF>	Line terminator	Y
3	Quantity	1-6 character numeric field, in the range of 1-999999, representing the number of shares in the order. Can be expressed as a delta (an adjustment to the Quantity of the original order) by including a "+" or "-" in front of the numeric value.	Y
	SECID	1-14 character security identifier.	Y
	Price	Must contain either: "MKT" to denote a market order, a 1-10 character decimal price, or "NBBO" if order is pegged.	Y
	Reserve	1-6 character field indicating the quantity of the Reserve Size. Must be in shares in either round lot multiples or mixed lots. This value can be expressed as a delta (an adjustment to the Reserve of the original order) by including a "+" or "-" in front of the numeric value.	N
	<CR/LF>	Line terminator.	Y
3a	Capacity	Will be ignored by NASDAQ market center. Optional field indicating on whose behalf the order was entered. Allowed values: A = agency (default) P = principal R = riskless	N
	'DNI'	As per Original Order Entry message.	N
	'DNR'	As per Original Order Entry message.	N
	<CR/LF>	Line terminator.	Y

Line	Field	Description	Req'd
X	'CXL'	3-character keyword identifying this portion of the message as representing the order being canceled.	Y
	Side	Alpha field indicating whether the order is a buy, sell or short sale. Allowed values: B = buy BUY = buy S = sell SL = sell SSHRT = short sale SSHRT EXEMPT = short sale exempt	Y
	<CR/LF>	Line terminator.	Y
X1	Quantity	1-6 character numeric field in the range of 1-999999 representing the current number of shares in the order being updated.	Y
	SECID	1-14 character security identifier.	Y
	Price	Holds the price of the original order.	Y
	Reserve	1-6 character field indicating the quantity of the Reserve Size. Must be in shares in either round lot multiples or mixed lots.	N
	<CR/LF>	Line terminator.	Y
X2	'RE'	2-character keyword indicating that this line defines the order to which this Cancel refers.	Y
	Branch Office	Required one to four character alpha field used to identify the branch office of the original order.	Y
	Branch Office Sequence #	Required one to four character numeric field indicating the sequence number of the original order.	Y
	'/' date	A slash followed by the 6-character entry date of the order to be canceled in MMDDYY format.	Y
	Order Reference ID	12-character Order Reference ID of the order to be canceled. This identifier is returned to the Order-Entry Firm via the NASDAQ Market Center Order Entry Acknowledgement Message. This number must be supplied if an order acknowledgement message that includes the order reference number was received.	Y
	<CR/LF>	Line terminator.	Y

4.1.4 Order Cancel/Replace (Version Two)

SAMPLE MESSAGE

```
<SELECT --EE>
<STX> <ESC>1 DALL <LF>
DALL1234<LF>
ORDER b<LF>
<LF>
B .SM<LF>
100 CNET 1.25  <LF>
DAY <LF>
<LF>
<LF>
<LF>
<LF>
PEG G CAP 1.30 <LF>
CXL 08C03D2000N4 <LF>
OE CTCI TESTING  -0100<ETX>
```

The standard message header (see section 2.1.1) is followed by:

Required Lines:

Line 2: [‘POSS DUPE’ *sp*] **Side *sp* '.SM' <*CR*/*LF*>**
Line 3: **Quantity *sp* Secid *sp* Price** [*sp* Reserve] **<*CR*/*LF*>**
Line 3a: [*sp* Capacity] [*sp* ‘DNI’] [*sp* ‘DNR’] [*sp* ‘PRI’ *sp* priority] [*sp* ‘ANON’] [*sp* ‘AIQ’ *sp* value] [*sp* ‘TYP’ *sp* Order Type] **<*CR*/*LF*>**

Optional Lines:

[Line 4:] [[‘.UID’ *sp* User Order ID] <***CR*/*LF***>]
[Line 4a:] [[‘BCH’] [*sp* ‘.RCV’ *sp* order rcv date] <***CR*/*LF***>]
[Line 4b:] [[‘GU’ *sp* giveup id] <***CR*/*LF***>]
[Line 4c:] [‘:’[Preferenced MMID] [*sp* ‘MAQ’ *sp* quantity] <***CR*/*LF***>]
[Line 4d:] [‘PEG’ *sp* Peg Type] [*sp* ‘CAP’ *sp* Cap Price] [*sp* ‘OFF’ *sp* Offset Value] [sp ‘DIS’] [*sp* ‘DIF’ *sp* Discretionary Offset] <***CR*/*LF***>]

Optional line for other exchange-listed security trading:

[Line 4e:] [[*sp* ‘BLK’ *sp* Block Indicator] <***CR*/*LF***>]

Order being Canceled:

Line X: **‘CXL’ *sp* Order Reference ID <*CR*/*LF*>**

Message Format

Line	Field	Description	Req'd
0	Entry Originator	1-6 character field - filled in by the Switch if not provided by the Order entry firm. For firms acting as a Service bureau and must hold the four character MMID of the firm represented by the transaction.	Y for firms acting as a Service Bureau
	<***CR/LF***>	Line terminator.	Y
1	Branch Office	1-4 character alpha field used to identify the firm's branch office.	Y
	Branch Office Sequence #	1-4 character numeric sequence number field.	Y
	<***CR/LF***>	Line terminator.	Y
1a	Category	Field identifying the message category. For NASDAQ market center messages, this always will be "ORDER".	Y
	Destination	Always contains "b" for NASDAQ market center messages.	Y
	Preferenced MMID	Can be present only if no Preferenced MMID in line 4c. Preferenced MMID indicating the exchange the order entry firm wishes to route to. In the event that a value is present in both 1a and 4c, the system will ignore 1a. Allowed values are: NADQ = NASDAQ only order INET = NASDAQ only order DOTA = Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If marketable against other markets upon entry, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book. SCAN = First attempts to execute against orders available on the NASDAQ book at a price equal to or better than the NBBO. After executing any marketable orders on the NASDAQ book, the order will be displayed via TotalView-ITCH at the most aggressive price possible that would not result in a trade through for 20 to 30 milliseconds, after which it will then route to other markets. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order	N

Line	Field	Description	Req'd
		is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. STGY = Behaves similar to SCAN, except that the order will route out again after posting to the NASDAQ book if the order is subsequently locked or crossed. DOTM = Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO; if marketable against other markets upon entry, or if locked/crossed subsequent to posting on the NASDAQ book, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book. DOTI - Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If unfilled, it will then route to NASDAQ OMX BX (BX) where it will also attempt to execute at the NBBO or better. If still unfilled, the order will route to the NYSE or NYSE Alternext where the order will remain until being executed or cancelled. DOTD - Routes directly to the NYSE or Amex without checking the NASDAQ book. TFTY – Routes to Nasdaq BX, dark pools, and NYSE or AMEX without checking the NASDAQ book first. Directed Order – Order routed directly to market center identified. See Directed Order Destination Code table MOPP - Route to protected quotes for display size only, then resides in the NASDAQ book. Once it posts on the book it will not route out again if the market moves. SKIP = Behaves like SCAN and opts out of sending orders to Dark Pools SKNY = Behaves like STGY and opts out of sending orders to Dark Pools SAVE - accesses BX, NASDAQ, NYSE, all other	

Line	Field	Description	Req'd
		protected quotes and additional destinations. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. QSAV - Behaves like SAVE but routes to NASDAQ first. QTFY - Behaves like TFTY but routes to NASDAQ first. DOTZ – Behaves like DOTI and opts out of sending orders to Nasdaq BX LIST - Enables firms to participate in the opening and closing processes of each security's primary listing market and also take advantage of NASDAQ's liquidity during the remainder of the trading day. CART - will enable firms to check the BX, PSX and NASDAQ book before (optionally) posting to the NASDAQ book SOLV - will be similar to the SAVE strategy but will route out again after posting if the NASDAQ book is subsequently locked or crossed.	
	<***CR/LF***>	Line terminator	Y
	Blank Line		
	<***CR/LF***>	To terminate the Message Header	Y
2	'POSS DUPE'	9-character field that indicates that the message may be a duplicate.	N
	Side	Alpha field indicating whether the order is a buy, sell or short sale. Allowed values: B = buy BUY = buy S = sell SL = sell SSHRT = short sale SSHRT EXEMPT = short sale exempt	Y

Line	Field	Description	Req'd
	'.SM'	Field used to indicate that the message is in NASDAQ Market Center format and that the firm is prepared to receive Response Messages in NASDAQ Market Center format.	Y
	<***CR/LF***>	Line terminator.	Y
3	Quantity	1-6 character numeric field in the range of 1-999999, representing the number of shares in the order. Other exchange-listed securities can be only round lots and mixed lots. For a NASDAQ Crossing Network order, only round lot values accepted.	Y
	SECID	1-14 character security identifier. For exchange-listed securities, this symbol must represent a CQS security and must be in CMS format. For example: OXY PRB or ROY PR.	Y
	Price	Field which must contain either: "MKT" to denote a market order, a 1-10 character decimal price, or "NBBO" if order is pegged. Pegged orders are not allowed for other exchange-listed securities. Please note that changing a limit order to a market order is not allowed.	Y
	Reserve	1-6 character field indicating the quantity of the Reserve Size. Must be in shares in either round lot multiples or mixed lots.	N
	<***CR/LF***>	Line terminator.	Y
3a	Capacity	Field indicating on whose behalf the order was entered. Allowed values: A = agency (default) P = principal R = riskless	N
	'DNI'	As per original Order-Entry message.	N
	'DNR'	As per original Order-Entry message.	N
	'PRI' *sp* priority	3-character keyword followed by a value that indicates which execution algorithm is to be utilized. Allowed values for NMS securities: T = price/time I = Imbalance Only for opening and close (only allowed TIFs are "OC" or "OO") S = Intermarket Sweep Order (ISO) Allowed values for exchange-listed securities: T = price/time S = Intermarket Sweep Order (ISO)	N

Line	Field	Description	Req'd
	'ANON'	4-character keyword indicating that the order is non-attributable. If this value is not given, then the order is attributable – Price to Display. Allowed values: ANON = anonymous - Price–to–Display. CNON = anonymous - Price–to–Comply.	N
	'AIQ' *sp* value	3-character keyword followed by a value used to specify whether internalization is allowed on this order. Keep in mind that AIQ means *self match prevention.* Allowed values: I = do not internalize first, but allow this order to match orders with same MPID	N
	'TYP' *sp* Order Type	3-character keyword followed by a value to indicate the type of order. Allowed values: O = Order	N
	<***CR/LF***>	Line terminator. This line terminator is required if any of the following optional lines are present, even if none of the optional fields found on Line 3a are supplied.	Y
4	'.UID' *sp* User Order ID	4-character keyword followed by a 1-20 character field that holds an order ID used by the entering firm for internal processing. Valid characters are A-Z and 0-9. Embedded spaces are invalid.	N
	<***CR/LF***>	Line terminator if Optional Line 4 is present.	Y
4a	'.B' or 'BCH'	Keyword used to indicate bunched orders.	N
	'.RCV' *sp* order rcv date	4-character keyword followed by an 8-character user-specified date in MMDDYYYY format.	N
	<***CR/LF***>	Line terminator if Optional Line 4a is present.	Y
4b	'GU' *sp* giveup id	2-character keyword followed by a space and the 4-character identifier of another firm (the give up firm) the order was entered on behalf of.	N
	<***CR/LF***>	Line terminator if Optional Line 4b is present.	Y
4c	':'MMID	Can be present only if no Preferenced MMID in line 1a. In the event that an MPID is present in both 1a and 4c, the system will ignore 1a. Preferenced MMID indicating the exchange the market maker wishes to route to. In the event that an MPID is present in both 1a and 4c, the system will ignore 1a. Allowed values are: NADQ = NASDAQ only order INET = NASDAQ only order	N

Line	Field	Description	Req'd
		DOTA = Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If marketable against other markets upon entry, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book. SCAN = First attempts to execute against orders available on the NASDAQ book at a price equal to or better than the NBBO. After executing any marketable orders on the NASDAQ book, the order will be displayed via TotalView-ITCH at the most aggressive price possible that would not result in a trade through for 20 to 30 milliseconds, after which it will then route to other markets. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. STGY = Behaves similar to SCAN, except that the order will route out again after posting to the NASDAQ book if the order is subsequently locked or crossed. DOTM = Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO; if marketable against other markets upon entry, or if locked/crossed subsequent to posting on the NASDAQ book, the order will IOC other market centers and any unfilled shares will re-post on the NASDAQ book. DOTI - Attempts to execute against orders in the NASDAQ book at a price equal to or better than the NBBO. If unfilled, it will then route to NASDAQ OMX BX (BX) where it will also attempt to execute at the NBBO or better. If still unfilled, the order will route to the NYSE or NYSE Alternext where the order will remain until being executed or cancelled. DOTD - Routes directly to the NYSE or Amex without checking the NASDAQ book. TFTY – Routes to Nasdaq BX, dark pools, and NYSE or AMEX without checking the NASDAQ	

Line	Field	Description	Req'd
		book first. Directed Order – Order routed directly to market center identified. See Directed Order Destination Code table MOPP - Route to protected quotes for display size only, then resides in the NASDAQ book. Once it posts on the book it will not route out again if the market moves. SKIP = Behaves like SCAN and opts out of sending orders to Dark Pools SKNY = Behaves like STGY and opts out of sending orders to Dark Pools SAVE - accesses BX, NASDAQ, NYSE, all other protected quotes and additional destinations. If shares remain unexecuted after routing they are posted on the NASDAQ book. Once the order is posted to the NASDAQ book, if it is subsequently locked or crossed, the system will not route out again. QSAV - Behaves like SAVE but routes to NASDAQ first. QTFY - Behaves like TFTY but routes to NASDAQ first. DOTZ – Behaves like DOTI and opts out of sending orders to Nasdaq BX LIST - Enables firms to participate in the opening and closing processes of each security's primary listing market and also take advantage of NASDAQ's liquidity during the remainder of the trading day. CART - will enable firms to check the BX, PSX and NASDAQ book before (optionally) posting to the NASDAQ book SOLV - will be similar to the SAVE strategy but will route out again after posting if the NASDAQ book is subsequently locked or crossed.	

Line	Field	Description	Req'd
	'MAQ' *sp* quantity	3-character keyword followed by up to a 6 character Minimum Acceptable Quantity for a NASDAQ Crossing Network order. Round lot values only, no minimum value.	N
	<***CR/LF***>	Line terminator if Optional Line 4c is present.	Y
4d	'PEG' *sp* Peg Type	3-character keyword followed by a value indicating the order's peg type. If this field is not present in the message, the default is not pegged. Allowed values: G or H = regular pegged to NBBO order R or Q = reverse pegged to NBBO order N = Not pegged Pegged orders are not allowed for other exchange-listed securities.	N
	'CAP' *sp* Cap Price	3-character keyword followed by a price. Cap price must contain a 1-10 character decimal price. If the field is not present in the message, the Cap price will default to 0. Pegged orders are not allowed for other exchange-listed securities.	N
	'OFF' *sp* Offset Value	3-character keyword followed by a 2-digit (00-99) that indicates the Peg Offset value. This field is applicable to Pegged orders and indicates the numerical offset that is applied to the current inside bid/offer to derive the current display price for the order. If the "PEG" value is G, this field should be set to a minimum of 00. If the "PEG" value is R, this field should be set to a minimum of 01. Pegged orders are not allowed for other exchange-listed securities.	N
	'DIS'	3-character keyword indicating the order is discretionary. If the field is not present in the message, the order is not discretionary.	N
	'DIF' *sp* Discretionary Offset	3-character keyword followed by a 1-2 character numeric value. If the field is not present in the message, the Discretionary Offset Value will default to 0.	N
	<***CR/LF***>	Line terminator if Optional Line 4d is present.	Y

Line	Field	Description	Req'd
4e	'BLK' *sp* Block Indicator	3-character keyword indicating the Block Indicator field followed by a block indicator value that allows you to submit a block order for other exchange-listed securities. This field is applicable only if it is indicated on an ITS commitment. It will be ignored if the order is preferenced to another exchange-listed security participant or other exchange-listed security trading only. Allowed values: Y N.	N
	<***CR/LF***>	Line terminator if Optional Line 4e is present.	Y
X	'CXL'	3-character keyword identifying this portion of the message as representing the order being canceled.	Y
	Order Reference ID	12-character Order Reference ID of the order to be canceled. This identifier is returned to the Order Entry Firm via the Order-Entry Acknowledgement Message.	Y
	<***CR/LF***>	Line terminator.	Y

4.2 Output Message Formats

4.2.1 Order-Entry Acknowledgement

The Order Entry Acknowledgement Message is a STATUS message.

SAMPLE MESSAGE

```
ADVS
<CR/LF>
STATUS  C170A
<CR/LF>
EZ 12 .SM
ACCEPTED 20030602 112451 0B3035Q000MF
UID DOMOIN111111
```

Optional MMID:

Line 0: [MMID] ***<CR/LF>***
Line 1: **Branch Office *sp* Branch Office Seq. # *sp* .SM *<CR/LF>***
Line 2: **'ACCEPTED' *sp* Date *sp* Time *sp* Order Reference Number *<CR/LF>***

Optional Lines:

[Line 4a:] [['UID' *sp* User Order ID] ***<CR/LF>***]

Message Format

Line	Field	Description	Req'd
0	MMID	May contain the 4-character MMID of the entering firm or the MMID of the firm a Service Bureau is acting for. If this option is utilized for multi-station lines it will equal the 4-character MMID associated with the station.	N
	<CR/LF>	Line terminator.	Y
1	Branch Office	1-4 character alpha field used to identify the firm's branch office.	Y
	Branch Office Sequence #	1-4 character numeric sequence number field.	Y
	.SM	3-character keyword identifying this as a NASDAQ Market Center message.	Y
	<CR/LF>	Line terminator.	Y
2	ACCEPTED	Keyword indicating that this is an Order Acknowledgement Message.	Y
	Date	8-character date in "YYYYMMDD" format.	Y
	Time	6-character time in "hhmmss" format.	Y

Line	Field	Description	Req'd
	Order Reference Number	12-character reference number assigned to this order. This number should be used in any subsequent Cancel or Cancel/Replace messages sent by the order entry firm.	Y
	<CR/LF>	Line terminator.	Y
4a	UID	3-character keyword identifying the following field as being a User Order ID.	N
	User Order ID	1-20 character field User Order ID if the order entry firm supplied provided one in Line 4 of the order message.	N
	<CR/LF>	Line terminator.	Y if line 4a is present

4.2.2 Order Cancel Acknowledgement

The Cancel Order Acknowledgement Message is an ADMIN message.

SAMPLE MESSAGE

```
ADVS
<CR/LF>
ADMIN C170A
<CR/LF>
EZ 12 .SM
SSHRT EXEMPT 100 UBCD 11.99
UR OUT 100 LVS 100
081035Q000MP
```

Optional MMID:

Line 0: [MMID] ***<CR/LF>***
Line 1: **Branch Office *sp* Branch Office Seq. # *sp* .SM *<CR/LF>***
Line 2: **Side *sp* Quantity *sp* Secid *sp* Price *<CR/LF>***
Line 3: **'UR OUT' *sp* Quantity *sp*** 'LVS' ***sp*** Quantity ***<CR/LF>***
Line 4: **Order Reference Number *<CR/LF>***

Message Format

Line	Field	Description	Req'd
0	MMID	May contain the 4-character MMID of the entering firm or the MMID of the firm a Service Bureau is acting for. If this option is utilized for multi-station lines it will equal the 4-character MMID associated with the station.	N
	<CR/LF>	Line terminator.	Y
1	Branch Office	1-4 character alpha field used to identify the firm's branch office.	Y
	Branch Office Sequence #	1-4 character sequence number field.	Y
	.SM	3-character keyword identifying this as a NASDAQ Market Center message.	Y
	<CR/LF>	Line terminator.	Y
2	Side	Field containing one of the following: B, BUY, S, SL, SSHRT or SSHRT EXEMPT.	Y
	Quantity	Number of shares in the canceled order.	Y
	SECID	Security ID of the security involved in the canceled order.	Y
	Price	Price of the canceled order.	Y
	<CR/LF>	Line terminator.	Y
3	UR OUT	6-character constant acknowledging that the order was canceled.	Y

Line	Field	Description	Req'd
	Quantity	Number of shares canceled.	Y
	LVS	3-character constant indicating that the Leaves Quantity is to follow.	N
	Quantity	Leaves quantity.	N
	<CR/LF>	Line terminator.	Y
4	Order Reference Number	12-character reference number assigned to the canceled order. If a quote is canceled, this field will be "QT".	Y
	<CR/LF>	Line terminator.	Y

4.2.3 Order Cancel/Replace Acknowledgement (Version One)

The Cancel/Replace Acknowledgement Message is an ADMIN message.

If the Cancel/Replace operation combined a complete order quantity replacement (i.e., not a quantity increment or quantity decrement), plus a Reserve decrement, two Cancel/Replace Acknowledgement Messages will be returned. The first will return information about the order canceled and order created. The second will return information about the Reserve decremented.

SAMPLE MESSAGE

```
ADVS
<CR/LF>
ADMIN C170A
<CR/LF>
CA 12 .SM
SL 900 UBCD 11.99 .RES 0
SL 800 UBCD 11.99
ADVS
0B3035Q000NC
UR OUT
```

Optional MMID:

Line 0: [MMID] ***<CR/LF>***
Line 1: **Branch Office *sp* Branch Office Seq. # *sp* .SM *<CR/LF>***

New Order Information:

Line 2: **Side *sp* Quantity *sp* Secid *sp* Price** [*sp* '.RES' *sp* Reserve][*sp* DNI] [*sp* DNR] ***<CR/LF>***

Canceled Order Information:

Line 3: **Side *sp* Quantity *sp* Secid *sp* Price** [*sp* DNI] [*sp* DNR] ***<CR/LF>***

Additional Information:

Line 4: **Order Entry Firm *<CR/LF>***
Line 5: **New Order Reference Number *<CR/LF>***
Line 6: **'UR OUT' or 'ACCEPTED' *<CR/LF>***

Message Format

Line	Field	Description	Req'd
0	MMID	May contain the 4-character MMID of the entering firm or the MMID of the firm a Service Bureau is acting for. If this option is utilized for multi-station lines it will equal the 4-character MMID associated with the station.	N
	<CR/LF>	Line terminator.	Y

Line	Field	Description	Req'd
1	Branch Office	1-4 character alpha field used to identify the firm's branch office. Branch Office will be the new Branch Office.	Y
	Branch Office Sequence #	1-4 character sequence number field. Branch Office Sequence # will be the new Branch Office Sequence #.	Y
	.SM	3-character keyword identifying this as a NASDAQ Market Center message.	Y
	<CR/LF>	Line terminator.	Y
2	Side	Field containing one of the following: B, BUY, S, SL, SSHRT or SSHRT EXEMPT.	Y
	Quantity	Open Quantity for the new or modified order. Increments: Total number of open shares after the increment. Absolute Cancel Replace: Number of shares in the new order. Decrement: Total number of open shares after the decrement. Absolute changes to Reserve and/or Refresh only: Total number of open shares for the order.	Y
	SECID	Security ID of the new order.	Y
	Price	Price of the new order.	Y
	.RES Reserve	Reserve Quantity of the new or modified order (if provided).	Y
	'DNI'	Optional Do Not Increase flag.	Y
	'DNR'	Optional Do Not Reduce flag.	Y
	<CR/LF>	Line terminator.	Y
3	Side	Field containing one of the following: B, BUY, S, SL, SSHRT or SSHRT EXEMPT.	Y
	Quantity	Number of shares in the canceled order. Since increments do not reduce shares, Quantity will be 0 for these transactions. For all other transactions, this is the number of shares canceled in the order (Reserve + Open QTY canceled).	Y
	SECID	Security ID of the canceled order.	Y
	Price	Price of the canceled order.	Y
	'DNI'	Optional Do Not Increase flag. 3-character keyword used to indicate that the order quantity and number of shares should not be increased as the result of a stock split.	Y

Line	Field	Description	Req'd
	'DNR'	Optional Do Not Reduce flag. 3-character keyword used to indicate that the order price should not be reduced because of a cash dividend.	Y
	<CR/LF>	Line terminator.	Y
4	Order Entry Firm	4-character ID of the firm that entered the order.	Y
	<CR/LF>	Line terminator.	Y
5	New Order Reference Number	12-character reference number assigned to the new or modified order. For an increment transaction, DNI, DNR changes and absolute changes to Refresh only and/or Reserve only, this will be their order reference number of the modified order.	Y
	<CR/LF>	Line terminator.	Y
6	UR OUT or ACCEPTED	6-character constant acknowledging that the old order has been completely canceled. 8-character constant acknowledging that the transaction has been accepted.	Y
	<CR/LF>	Line terminator.	Y

4.2.4 Order Cancel/Replace Acknowledgement (Version Two)

You will receive an order acknowledgement (section 4.2.1) in response to your incoming cancel/replace (version two) message, as indicated in the sample below.

SAMPLE MESSAGE

```
NFSCK SOER0A 0006 S
AAAA 11 .SM
ACCEPTED 20041007 160105 0J904BN000MC
UID HITHERE
160105071004 NFSCK/0006
-----------------------------------------------------------------------
```

4.2.5 Execution Reports

An order message that successfully passes the validation by the switch is forwarded to either the NASDAQ Market Center application for additional validation processing.

If an error is detected or the order cannot be automatically executed, the order-entry firm will receive a reject message explaining why the order could not be executed. If the order is executed, the order-entry firm shall receive an execution report notifying him of the market maker who executed the order, the number of shares executed and the execution price.

NASDAQ Operations may cancel (kill) a NASDAQ Market Center execution if both parties to the trade agree to the cancellation.

All execution reports, cancellation messages and reject messages will be forwarded to the CTCI order-entry firm via the switch and will be contained in a switch output message envelope (described in Section 3.3.2 *Application Reject messages*). Execution Reports are REPORT messages.

A firm may elect to receive NASDAQ Market Center market maker execution reports via a CTCI message. Market makers electing to receive execution reports via CTCI will also receive cancellation messages via CTCI.

4.2.5.1 Order-Entry Execution Report

Optional MMID:

Line 0: [MMID] ***<CR/LF>***

Body Text:

Line 1: Branch Office ***sp*** Branch Office Seq. # ***sp*** **.SM *<CR/LF>***
Line 2: **Execution Category *<CR/LF>***
Line 3: **Execution Quantity *sp* Secid *sp* Execution Price *<CR/LF>***
Line 4: **Original Price** [*sp* '.B'] ***<CR/LF>***
Line 4a: **Remaining Display Quantity** [*sp* Remaining Reserve Quantity]***<CR/LF>***

Optional Line if Price Improvement:

[Line 4b:] [Minimum Acceptable Quantity]***<CR/LF>***
Blank Line: ***<CR/LF>***
Line 5: **Executing Broker Clearing # *sp* MM Executed Against Size of Trade *sp* Execution Time** [*sp* '.'OEID] ***<CR/LF>***

Optional Line if Giveup on Opposite Side:

[Line 6:] [.MMID] ***<CR/LF>***
Line 7: **Order Reference Number** [*sp* **Execution Reference Number**] *sp* **Liquidity Indicator *<CR/LF>***

Optional Line if User Order ID:

[Line 8:] [User Order ID **<***CR/LF***>**]

Optional Line for other exchange-listed securities:

[Line 9:] [Trade Through *sp* Commitment Identifier **<***CR/LF***>**]

Message Format

Line	Field	Description	Req'd
0	MMID	May contain the 4-character MMID of the entering firm or the MMID of the firm a Service Bureau is acting for. If this option is utilized for multi-station lines it will equal the 4-character MMID associated with the station.	N
	<CR/LF>	Line terminator.	Y
1	Branch Office	1-4 character alpha field used to identify the receiving firm's branch office.	N
	Branch Office Sequence #	1-4 character numeric sequence number.	N
	.SM	3-character keyword identifying this as a NASDAQ Market Center message.	Y
	<CR/LF>	Line terminator.	Y
2	Execution Category	This field identifies the type of execution. Allowed values: BOT SLD SLD SHRT SLD SHRT EXEMPT	Y
	<CR/LF>	Line terminator.	Y
3	Quantity	1-6 character numeric field representing the number of shares.	Y
	SECID	1-14 character security identifier.	Y
	Execution Price	Execution Price in decimal format.	Y
	<CR/LF>	Line terminator.	Y
4	Original Price	If the original order contained "MKT" as the price, line 5 will contain "ON MKT". If the original order contained a price, line 5 will contain "ON (price) LMT" where (price) is the price entered in the original order. Pegged orders will also contain "ON (price) LMT."	Y
	.B	If the order was entered as a bunched order, the characters ".B" will follow the Original Price.	N
	<CR/LF>	Line terminator.	Y

Line	Field	Description	Req'd
4a	Remaining Display Quantity	Valid fields are "FILLS" or "LVS ######", where ###### represents shares remaining as a result of a partial execution. LVS quantity is the unexecuted display shares.	Y
	Remaining Reserve Quantity	A field containing the number shares remaining in Reserve as a result of a partial execution. This field is optional if Reserve = 0.	N
	<CR/LF>	Line terminator.	Y
4b	Minimum Acceptable Quantity (MAQ)	1-6 character quantity representing the original MAQ entered on the NASDAQ Crossing network order.	N
	<CR/LF>	Line terminator. If line 4b is present, then this field will be present also. If there is no price improvement or MAQ, then this field will not be present.	Y
Blank	<CR/LF>		Y
5	Executing Broker Clearing #	4-character clearing number of the firm who clears for the order entry firm. If a give up firm was entered in the original order, this field shall be equal to the clearing number of the firm who clears for the give up firm. If a give up firm was not entered, the clearing number shall be equal to the firm who clears for the firm who entered the original order.	Y
	MM Executed Against	4-character MMID of the Market Maker or of the exchange ID who executed the trade. If the trade is marked as anonymous, the MMID will be reported as "INET". *Please note: Upon completion of NASDAQ's system integration, the exchange ID will be "NSDQ".	Y
	Size of Trade	1-6 character field containing the actual number of shares of the execution.	Y
	Execution Time	Execution Time in HH:MM:SS format.	Y
	'.'OEID	4-character alpha identifier of the firm who entered the original order. This field will only appear if a give-up identifier was entered in the original order. If no give up firm was entered, this field shall be blank.	N
	<CR/LF>	Line terminator.	Y
6	'.'MMID	4-character alpha identifier of the give up firm on the opposite side. This line will appear only if a give-up identifier was entered on the matching order. If the trade is marked as anonymous, the give-up MMID will be suppressed. If a give up firm was not entered, this line will not appear in the message.	N

Line	Field	Description	Req'd
	<CR/LF>	Line terminator.	Y if Line 6 is present
7	Order Reference Number	12-character reference number assigned to this order. If the execution is for an order, this field will contain the 12-character order reference number. If the execution is for a quote or summary quote, this field will contain "QT" or "SQ," respectively."	Y
	Execution Ref. Number	6-character reference number assigned to this execution.	Y
	Liquidity Indicator	Allowed values: R = liquidity accessor A = liquidity provider J = Non-displayed liquidity provider L = Closing Cross liquidity provider C = Closing Cross liquidity accessor M = Opening Cross liquidity provider O = Opening Cross liquidity accessor I = Intraday Cross and Post_Close Cross billable K = Halt/IPO Cross liquidity provider H = Halt/IPO Cross liquidity accessor X = Routed D = Routed to DOT Y = Re-routed by NYSE F = Opening Trade (on NYSE) G = On-Close Execution (on NYSE) S = Odd-Lot Execution (on NYSE) U = Added Liquidity (on NYSE) B = Routed to BX E = NYSE Other P = Routed to PSX T = Opening Trade (on ARCA) Z = On-Close Execution (on ARCA)	Y
	<CR/LF>	Line terminator.	Y

Line	Field	Description	Req'd
8	User Order ID	Order ID supplied by the entering firm.	N
	<CR/LF>	Line terminator.	Y if line 8 is present
9	Trade Through	Identifies when an execution of a exchange-listed security is traded through another market center. Allowed values: Y N	N
	Commitment Identifier	5-character field for other exchange-listed securities. This field is populated when an execution is effected with an ITS participant.	N
	<CR/LF>	Line terminator.	Y if line 9 is present

4.2.5.2 Market Maker Execution Report

Optional MMID:

Line 1: [MMID] **<*CR*/*LF*>**

Body Text:

Line 2: Branch Office ***sp*** Branch Office Seq. # ***sp*** **.SM <*CR*/*LF*>**
Line 2a: **'REPORT' *sp* MMID <*CR*/*LF*>**
Line 3: **Execution Category <*CR*/*LF*>**
Line 4: **Execution Quantity *sp* Secid *sp* Execution Price** [*sp* '.B'] **<*CR*/*LF*>**
Line 4a: **'.'NNNNNN** [*sp* Remaining Reserve Quantity]**<*CR*/*LF*>**

Optional Line if Price Improvement

Line 4b: [Minimum Acceptable Quantity]
Blank Line: **<*CR*/*LF*>**
Line 5: **MM Clearing # *sp* OE Executing Broker Size of Trade *sp* Execution Time** [*sp* '.'OEID] **<*CR*/*LF*>**
[Line 6:] **Order Reference Number [*sp* Execution Reference Number] *sp* Liquidity Identifier <*CR*/*LF*>**

Optional Line for exchange-listed security trading:

[Line 7:] [Commitment Identifier **<***CR/LF***>**]

Message Format

Line	Field	Description	Req'd
1	MMID	May contain the 4-character MMID of the entering firm or the MMID of the firm a Service Bureau is acting for. If this option is utilized for multi-station lines it will equal the 4-character MMID associated with the station.	N
	<CR/LF>	Line terminator.	Y
2	Branch Office	1-4 character alpha field used to identify the receiving firm's branch office. For quotes, this field will be blank.	N
	Branch Office Sequence #	1-4 character numeric sequence number. For quotes, this field will be blank.	N
	.SM	3-character keyword identifying this as a NASDAQ Market Center message.	Y
	<CR/LF>	Line terminator.	Y
2a	REPORT	Constant to identify the message as an execution report.	Y
	MMID	Market Maker identifier.	Y
	<CR/LF>	Line terminator.	Y

Line	Field	Description	Req'd
3	Execution Category	This field identifies the type of execution. Allowed values: BOT SLD SLD SHRT SLD SHRT EXEMPT	Y
	<CR/LF>	Line terminator.	Y
4	Quantity	1-6 character numeric field representing the number of shares.	Y
	SECID	1-14 character security identifier.	Y
	Execution Price	Execution Price in decimal format.	Y
	.B	If the original order was entered as a bunched order, a ".B" will follow the execution price.	N
	<CR/LF>	Line terminator.	Y
4a	`.'NNNNNN	Actual leaves size as a result of the execution. LVS quantity is the unexecuted display shares.	Y
	Remaining Reserve Quantity	Optional field containing the number shares remaining in Reserve as a result of a partial execution. This field will not be present if Reserve = 0.	N
	<CR/LF>	Line terminator.	Y
4b	Minimum Acceptable Quantity (MAQ)	1-6 character quantity representing the original MAQ entered on the NASDAQ Crossing network order.	N
	<CR/LF>	Line terminator.	Y
blank	<CR/LF>		Y
5	MM Clearing #	4-character clearing number of the firm who clears for the market maker.	Y
	OE Executing Broker	4-character ID of the OE executing broker. If a give up firm was entered in the original order, this field will be equal to the 4 alpha character identifier of the give up firm. If a give up was not entered in the original order, this field will be equal to the 4 alpha character identifier of the firm who entered the order. If the trade is marked as anonymous, the OE executing Broker will be reported as "INET". *Please note: Upon completion of NASDAQ's system integration, if anonymous, the executing broker will be "NSDQ".	Y
	Size of Trade	1-6 character field containing the actual number of shares of the execution.	Y
	Execution Time	Execution Time in HH:MM:SS format.	Y

Line	Field	Description	Req'd
	'.'OEID	4-character alpha identifier of the firm or the ID of the exchange who entered the original order. This field will only appear if a give-up identifier was entered in the original order. If the trade is marked as anonymous, the MMID will be suppressed. If no give up firm was entered, this field will be blank.	N
	<CR/LF>	Line terminator.	Y
6	Order Reference Number	12-character reference number assigned to this order. If the execution is for an order, this field will contain the 12-character order reference number. If the execution is for a quote or summary quote, this field will contain "QT" or "SQ", respectively.	Y
	Execution Reference Number	Six character reference number assigned to this order.	Y
	Liquidity Identifier	Allowed values: R = liquidity accessor A = liquidity provider J = Non-displayed liquidity provider L = Closing Cross liquidity provider C = Closing Cross liquidity accessor M = Opening Cross liquidity provider O = Opening Cross liquidity accessor I = Intraday Cross and Post_Close Cross billable K = Halt/IPO Cross liquidity provider H = Halt/IPO Cross liquidity accessor X = Routed D = Routed to DOT Y = Re-routed by NYSE F = Opening Trade (on NYSE)free execution from NYSE G = On-Close Execution (on NYSE) S = Odd-Lot Execution (on NYSE) U = Added Liquidity (on NYSE) B = Routed to BX E =NYSE Other P = Routed to PSX	Y
	<CR/LF>	Line terminator.	Y
7	Commitment Identifier	5-character field for other exchange-listed security trading. This field is populated when an execution is effected with an ITS participant.	N
	<CR/LF>	Line terminator.	Y if line 7 is present

4.2.6 In the NASDAQ Market Center, quotes can execute against quotes. Quotes do not have branch sequence numbers. If Market Maker 1 has a quote on the book and Market Maker 2 enters a quote that executes against MM1's quote, then both firms will receive execution reports without branch sequence numbers because the opposite side is a quote. This will only occur with the market maker version of the execution reports.Exposure Warning Messages

These messages are STATUS messages. The "Position Exhausted" warning message will be sent as a quasi Status message. The message type code in the header will be the same as a regular Status message but the constant "STATUS" on Line 2 will be replaced with:

SAMPLE MESSAGES

```
ADVS
<CR/LF>
STATUS C170A
<CR/LF>
xMSOS: ADVS UBCD -QUOTE UPDATE 0 12.01 <BEL> **** 13:05
```

System generated quote updates will receive the following message:

Line 2: xMSOS: MMID SECID -QUOTE UPDATE BIDPRICE ASKPRICE **** HH:MM

4.2.7 NASDAQ Market Center Reject Messages

Reject Messages are STATUS messages.

Message Text	Message Explanation
REJ – ATTRIBUTABLE ORDER NOT ALLOWED	Request is rejected because attributable orders are not accepted.
REJ - CANNOT CANCEL QUOTE	Quote cannot be canceled.
REJ - CANNOT CANCEL/REPLACE QUOTE	Quote cannot be cancel/replaced.
REJ – ECN DOES NOT CHANGE SEPARATE ACCESS FEE	Request is rejected because price improvement is selected and firm does not charge an access fee.
REJ – ERRORS	Request is rejected because an error or errors were detected.
REJ – FIRM NOT AUTHORIZED TO USE GIVE-UPS	Entering firm is not authorized to enter a giveup.
REJ – INSUFFICIENT QUANTITY	Request is rejected because quantity is 0 or less.
REJ – INTERNAL ERROR	An error occurred internal to the application.
REJ – INVALID CAPACITY	Request is rejected because capacity is invalid.
REJ - INVALID CLEARING NUMBER	Request is rejected because clearing number format is invalid.
REJ - INVALID CLEARING RELATIONSHIP	Request is rejected because cannot find alternate clearing relationship.
REJ - INVALID DATE	Request is rejected because Order Received Date format is invalid or Order Received Date format is in the future.
REJ - INVALID FORMAT	Message does not follow NASDAQ CTCI communications format.
REJ – INVALID GIVEUP ID	Request is rejected because giveup ID is invalid.
REJ – INVALID I1I2	Request is rejected because I1I2 is invalid.
REJ - INVALID REFERENCE NUMBER	Request is rejected because Reference Number is invalid.
REJ – INVALID RESERVE/REFRESH SIZE	Request is rejected because reserve size, refresh size or both is invalid.
REJ - INVALID SECURITY TYPE	Request is rejected because security type is invalid.
REJ - INVALID SHORT SALE CODE	Request is rejected because short sale code is invalid.

Message Text	Message Explanation
REJ – INVALID SIDE	Request is rejected because side code is invalid.
REJ – INVALID SIZE	Request is rejected because size is invalid.
REJ – INVALID TIF	Request is rejected because time-in-force is invalid.
REJ – MAX MMP EXCEEDED	Request is rejected because the maximum number of MMPs has been reached in this issue.
REJ – NO CHANGE TO DATA	Request is rejected because no change is detected in transaction.
REJ – NON-ATTRIBUTABLE ORDERS NOT ALLOWED	Request is rejected because nonattributable orders are not accepted.
REJ – NOT WITHIN ALLOWABLE TIME	Request is rejected because it is not within allowable time.
REJ – ORDER NOT CREATED	Cancel Replace Request is rejected and new order has not been created.
REJ – ORDER REJECTED DUE TO SELF MATCH PREVENTION	Request is rejected due to self match prevention.
REJ – SYSTEM SUSPENDED	Request is rejected because system is suspended.
REJ - ACTION REJECTED	Request is rejected.
REJ - SELF MATCH PREVENTION NOT ALLOWED FOR PREFD ORDER	Self Match Prevention Qualifier is not valid for a preferenced order.
REJ - ALT CLR NOT ALLOWED FOR GIVEUP	Alternate clearing number is not allowed for an order with a give up.
REJ - ATTRIBUTABLE INDICATOR REQUIRED	Attributable order ID is required on this order.
REJ - CAN’T REINSTATE - ORDER NOT PURGED	Cannot reinstate. Only purged orders may be reinstated.
REJ - CAN’T REINSTATE IOC AFTER MARKET OPEN	Cancel request is rejected because a system-generated order cannot be cancelled.
REJ - CAN’T REINSTATE ODD LOT WHILE IN EW	Odd lot order is rejected because it is not marketable.
REJ - CANNOT REINSTATE A QUOTE	Cannot reinstate. Quotes cannot be reinstated.
REJ - CAN'T FIND ORDER TO CANCEL	Order to cancel cannot be found.
REJ - CLOSED QUOTE	The quote in the security is currently closed.
REJ - DUPLICATE ENTRY	The first character of the Side field is B or S.

Message Text	Message Explanation
REJ - EXCEEDS TIER MAXIMUM*	Entered quantity is greater than maximum quantity allowed for this security.
REJ - EXCESSIVE OPEN ORDER QUANTITY	Cannot increment order because open size would exceed the Maximum Order Size.
REJ - FIRM NOT AUTHORIZED TO USE GIVEUPS	The firm is not authorized to use Give Up functionality.
REJ - GU FIRM NOT ACTIVE	The give-up firm is not in the GU table for the entering firm at execution time.
REJ - GU FIRM NOT AUTH	The give-up firm is not in the GU Table as authorized for the entering firm.
REJ - INVALID ACTION	An attempt to change the price is not within the Corporate Action time frame or An internal transaction code error has occurred.
REJ - INVALID SELF MATCH PREVENTION INDICATOR	The Self Match Prevention Qualifier on the order is not valid.
REJ - INVALID BRANCH ID	The branch office identifier is not 1-4 alpha characters.
REJ - INVALID BRANCH SEQ #	The branch office sequence number is not 1-4 numeric characters.
REJ - INVALID BUNCHED ID	Bunched indicator on the order is not valid.
REJ - INVALID CANCEL	Invalid format in the cancel portion of a Cancel or Cancel/Replace message.
REJ - INVALID DELTA UPDATE, NO RESERVE SIZE	Order rejected because delta update is not entered in a Round Lot multiple or not within Minimum/Maximum Reserve Amount
REJ - INVALID DNI/DNR	Invalid DNI or DNR indicator.
REJ - INVALID GIVEUP STATUS	The give-up firm is not in the GU table for the entering firm or not in an active state.
REJ - INVALID GU	An entry is made in the GU GUID field on Line 4B, and the entry is greater than four alpha characters or An entry is made in the GU GUID field on Line 4B, and the entry is alphanumeric.
REJ - INVALID IOC	The IOC flag on the order is not valid.
REJ - INVALID NON-ATTRIBUTABLE	The attributable indicator on the order is not valid.
REJ - INVALID ORD CATEGORY	Side field is not equal to "BUY”, "B", "SL", "S",

Message Text	Message Explanation
	"SSHRT" or "SSHRT EXEMPT".
REJ - INVALID ORDER DESTINATION	Preferenced MPID is not in the MPID table.
REJ - INVALID OVERRIDE	Override indicator on order is invalid.
REJ - INVALID PRICE	The price field is not numeric or is not equal to "MKT" or The whole price is greater than 999999 or The price field, if not "MKT", is equal to zero.
REJ - INVALID PRICE FOR PREFERENCED ORDER	Request is rejected because preferenced MPID's display quote at the inside.
REJ - INVALID PRICE IMPROVEMENT	Order is rejected because price improvement indicator is invalid.
REJ - INVALID PRIORITY CODE	Order is rejected because priority code is invalid. Priority code must be T (price/time), E (modified price/time for ECNs) or Z (price/size/time).
REJ - INVALID QUANTITY	The quantity field is other than numeric in the range of 1-999999.
REJ - INVALID REFRESH SIZE	Refresh size field is invalid because it is greater than Reserve size, is not a round lot multiple, is not within Min/Max range, or Reserve is zero.
REJ - INVALID RESERVE SIZE	The reserve size is other than numeric, in the range of 1-999999, not within minimum and maximum reserve size parameters, or price is MKT.
REJ - INVALID SECID	The security symbol is other than 1-5 alpha characters.
REJ - INVALID TIME-IN-FORCE	Time-in-force field is invalid.
REJ - INVALID UPDATE, NO OPEN QTY	Request is rejected because order has no open quantity.
REJ - INVALID USER ID	Request is rejected because User Id is not valid.
REJ - ISSUE NOT UTP ELIGIBLE	Order is rejected because the issues are not eligible for UTP participation.
REJ - ISSUE NOT UTP ELIGIBLE	Order is rejected because the issue is not eligible for UTP orders.
REJ - ISSUE SET TO DELETE	Order is rejected because the issue is deleted.
REJ - LMT AWAY FROM MKT	Order returned due to Limit Price being 50% or greater away from the Inside.
REJ - MMID NOT AUTHORIZED FOR	Firm is not authorized for this action.

Message Text	Message Explanation
FUNCTION	
REJ - NO DISPLAY QUOTE FOR DESTINATION MPID	Request is rejected because preferenced MPID does not have an active quote.
REJ - NO QUOTE	The Inside Quotation is "no quote".
REJ - ODDLOT INVALID FOR PREFERENCE ORDER	Odd lot orders cannot be preferenced.
REJ - OE FIRM NOT AUTHORIZED*	At the time of entry, the OE Authorization status for the entering firm is not active.
REJ - OE NOT AUTHORIZED	Order is rejected because the firm is not authorized for order entry.
REJ - OE NOT AUTHORIZED FOR GIVEUP	Entering firm is not authorized to enter a giveup.
REJ - ONLY IOC SELL ORDERS ALLOWED IN QT MD	Order rejected because position is in quote mode that does not allow sell orders.
REJ - ORDER EXCEEDS TIER THRESHOLD SIZE	Order exceeds tier threshold size.
REJ - ORDER EX-DIVIDEND NOT REINSTATED	The order was returned because the security went ex-dividend and the ordering firm did not reinstate the order.
REJ - ORDER NO LONGER OPEN	Order you are trying to cancel is no longer open and therefore cannot be canceled.
REJ - ORDER NOT ACCEPTED, NO ATTRIBUTABLE ORDERS	Non attributable order is rejected because there are no attributable orders on the book for this issue/side.
REJ - ORDER NOT EXECUTABLE	Order is rejected because it is not executable.
REJ - ORDER NOT EXECUTED	Request is rejected because order has already been executed.
REJ - ORDER NOT FOUND	Request is rejected because order cannot be found.
REJ - ORDER TIMED OUT	Time in Force expired.
REJ - PREF MMID DUPLICATE	The preferenced MMID was entered twice; once on line 1A and once on line 4C.
REJ - PREFERENCED ORDERS MUST BE IOC	Invalid TIF for a preferenced order. Preferenced orders must be IOC.
REJ - PRICE EXCEEDS ALLOWABLE DEVIATION FROM INSIDE	Order price exceeds the allowable deviation from the inside price.
REJ - PRINCIPAL NOT ALLOWED	Request is rejected because principal orders are not allowed from this firm.
REJ - QUOTE NOT FOUND	Request is rejected because quote cannot be found.

Message Text	Message Explanation
REJ - REFRESH SIZE NOT ALLOWED	Order is rejected because either the MP type is not eligible for reserve processing.
REJ - REJECT DUE TO ISSUE STATUS	Order rejected because issue is in registration or deleted.
REJ - RESERVE ENTRY NOT ALLOWED	Order rejected because either MP type is not eligible for reserve processing, or field not entered in a Round Lot multiple or not with in. Minimum/Maximum Reserve Amount.
REJ - SECURITY IN QUOTE HALT	Request is rejected because issue is in a quote halt.
REJ - SECURITY IN TRADE HALT	Request is rejected because issue is in a trade halt.
REJ - SIZE OVER LIMIT	Request is rejected because order size, reserve or refresh size must be equal to or less than maximum limit.
REJ - SIZE SMALLER THAN DEFAULT	Request is rejected because size must be equal to or greater than default size.
REJ - SYND/PBID/PRES BID	The quote in this security is one sided.
REJ - TOO LATE TO CANCEL	Cancel request is rejected because it is too late to cancel the order due to execution, prior cancellation etc.
REJ - USER ORDER ID REQUIRED	User Order ID is required on the order.
REJ - VIOLATION SHORT SALE RULE	Order is rejected because it violates the short sale rule.
REJ –ORDERS NOT ACCEPTED, QUTOES ONLY	Request is rejected because orders are not accepted.
REJ -SHORT SALE NOT ALLOWED	Order is rejected because it violates the short sale rule.

Rejects marked with an asterisk (*) may be rejected at order entry time or after they have been accepted and placed on the Open order File.

5 Appendix A: TCP/IP Connection

This appendix describes how a subscriber can submit and receive messages to and from The NASDAQ Stock Market's Computer-to-Computer Interface (CTCI) using the TCP/IP protocol.

The information contained in this appendix is presented in a step-by-step sequence that describes what must be done to setup and to configure a TCP/IP connection with NASDAQ, how to establish a TCP/IP connection, what control messages and associated protocol must be supported for CTCI TCP/IP session management, and ultimately how to send and receive CTCI messages over a TCP/IP connection.

The document is organized as follows:

- The business of contacting NASDAQ and configuring how the subscriber will access NASDAQ through TCP/IP is discussed first under Setup and Testing.

- The basics of establishing a TCP/IP connection with NASDAQ are discussed in Establishing a TCP/IP Connection.

- The format of the CTCI TCP/IP Message is presented next in the CTCI TCP/IP Message Format. This format is used for sending and receiving the CTCI message itself and also for sending and receiving control messages necessary for session management.

- A discussion of session management follows in CTCI TCP/IP Session Management, followed by detailed descriptions and examples of each control message in Control Messages.

- Finally, the method and format for sending and receiving CTCI messages is described in Sending a CTCI Message, Receiving a CTCI Message, and CTCI Message Sequence Verification.

- Appendix A contains the Glossary. While it is sometimes redundant, it should read also, as it does contain some information that does not appear anywhere else in the document.

The subscriber should read this appendix in its entirety to ensure that the rules of the protocol and what the subscriber is required to do to use it are clearly understood prior to contacting NASDAQ for Setup.

Setup

Before attempting to establish a connection over TCP/IP, the subscriber must first contact NASDAQ to configure the connection. If necessary, more than one TCP/IP connection can be configured for the same subscriber. For each connection, NASDAQ will provide the subscriber with two pairs of IP Addresses and a Well Known Port to connect to. The same port is used for all four addresses. At the same time, the subscriber must provide NASDAQ with the IP Address that they will be connecting from when they establish the connection.

Please note that the four IP Addresses consist of a Primary address and an Alternate address for use in connecting to NASDAQ and a backup address pair for use in

connecting to the NASDAQ Disaster Recovery (D.R.) site. Please see the section Retrying failed connection attempts for more details.

For each TCP/IP connection, a client profile must be established. This process involves assigning an agreed upon ten-character logon identifier and assigning meaning to the "logical channels" that the subscriber will use to exchange CTCI messages with NASDAQ. *Note: A method of encryption will be introduced in a future release.*

The logon identifier will be associated with the client's IP Address and the IP Addresses and Well Known Port the client should be connecting to. This information will be verified when the client establishes the connection and sends a Logon control message to NASDAQ.

Over one TCP/IP connection, a subscriber can submit and receive CTCI messages on behalf of up to 63 different users and/or device locations. Messages for each user or device location are kept separated from each other by assigning them each to their own logical channel. Together with NASDAQ, the subscriber assigns a logical channel number from 1 to 63 to each of the users or device locations that the subscriber will be submitting and receiving CTCI messages on behalf of.

Use of a logical channel is up to the subscriber. A logical channel may be used for sending-only, receiving-only or both. This is solely under control of the subscriber.

Please note that a subscriber may establish multiple TCP sessions with NASDAQ over a single line if they choose to use Network Address Translation (NAT). NASDAQ will assign a unique Well Known Port for each session.

Testing

The Customer Subscriber Test System will be available, but the subscriber will have to connect to a different IP Address and Well Known Port from production. The subscriber should contact NASDAQ to obtain an IP Address and Well Known Port to connect to for testing. This means the subscriber must maintain the ability to dynamically connect to different sockets.

Establishing a TCP/IP Connection

The client (the subscriber) establishes a TCP/IP connection with the server (NASDAQ) by connecting to an IP Address and Well Known Port provided by NASDAQ, from the IP Address that the subscriber told NASDAQ they would be connecting from.

Note: The NASDAQ server follows the *Berkley Model* for establishing a socket connection.

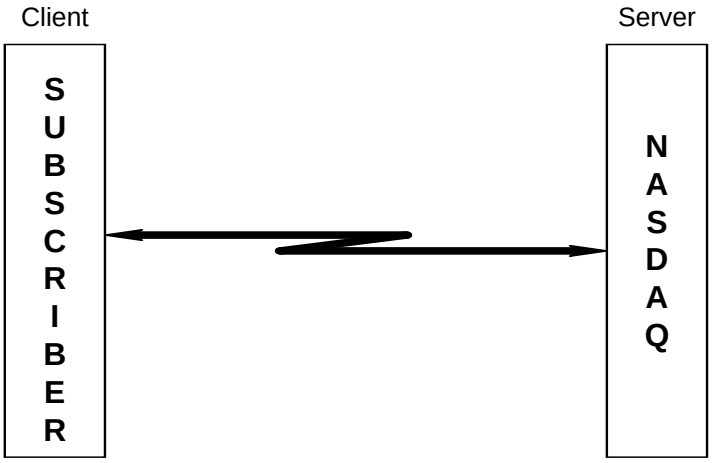

Figure Appendix A- 1 Client-Server TCP/IP Connection

Retrying failed connection attempts

The initial attempt to establish a TCP/IP connection should be to the NASDAQ Primary Address. If this attempt fails, the subscriber should delay briefly (3 seconds is recommended) and then try the NASDAQ Alternate Address. Subsequent attempts should alternate between the Primary and Alternate addresses until at least 30 seconds have elapsed. At that point the subscriber should make one attempt using the Disaster Recovery Primary Address, followed by one attempt to the Disaster Recovery Alternate Address. If a session still cannot be established, the entire cycle should begin again, starting with the NASDAQ Primary Address.

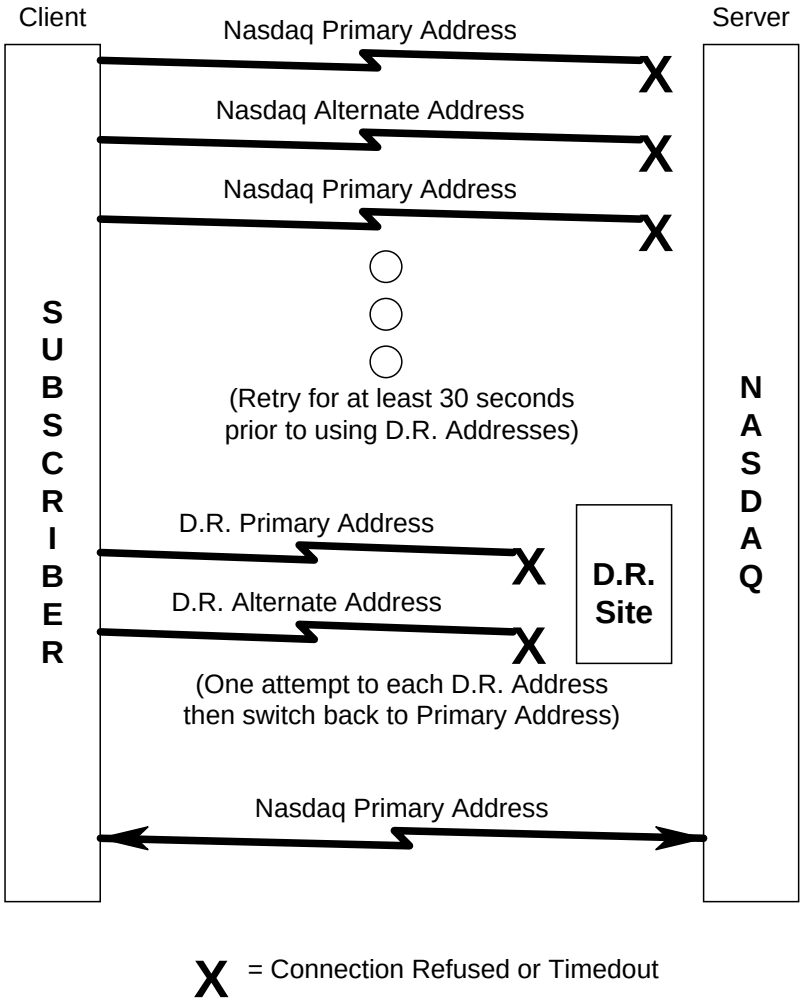

Figure Appendix A- 2 Connection Attempts

CTCI TCP/IP Message Format

The CTCI TCP/IP Message is used for sending and receiving CTCI messages, as well as session management control messages. The CTCI TCP/IP Message consists of a message "envelope" and the CTCI or control message data.

When the CTCI TCP/IP Message contains CTCI message data it is referred to as a CTCI message, and when it contains a control message it is referred to by the name of the control message (Logon, Heartbeat Query, etc.). The format of the CTCI TCP/IP Message is as follows:

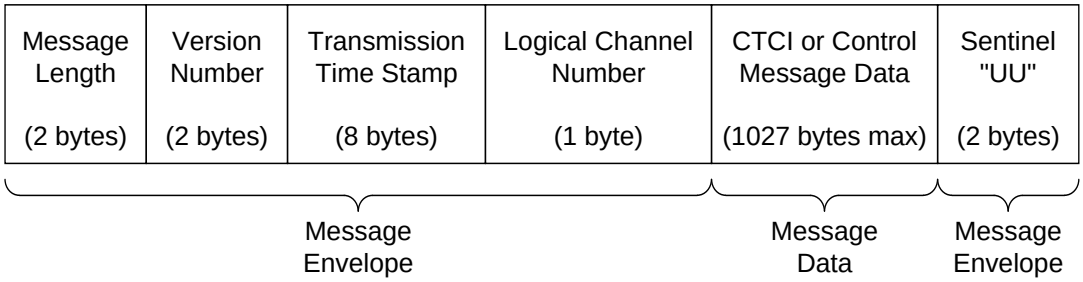

Figure Appendix A- 3 CTCI TCP/IP Message Format

The *Message Length* is a binary field that contains the total length (bytes) of the CTCI TCP/IP Message including the Message Length field at the beginning and the Sentinel field at the end. It is an unsigned integer in network byte order (NBO). Network byte order (NBO), also known as "big endian," is one standard form for transmitting binary values (including integers) in a network message. Since it is used in all TCP/IP headers uniformly, without regard to originating or receiving platform, it is also adopted for use in the CTCI TCP/IP message protocol. Technically, the most arithmetically significant bit of each byte is transmitted first, followed in order of descending significance by the remaining bits; the most significant byte of each multi-byte binary field is transmitted first, followed in order of descending significance by the remaining bytes. If a 32-bit number is to be transmitted, and the bits are numbered 0-31 in order, left to right, where the 0^{th} bit represents 2^{31}, and the 31^{st} bit represents the least significant binary digit, i.e., 0 or 1.

Currently, the largest message that can be sent is 1042 bytes. The Message Length field is the "sentinel boundary" of the message. Data flow must begin on a sentinel boundary whenever a connection is established.

The *Version Number* contains a two-character ASCII string. The first character contains the integer portion of the version number and the second character contains the decimal portion of the version number. This is version 1.0 of the interface, so the value in the first byte will be one and the value in the second byte will be zero.

The *Transmission Time Stamp* is an ASCII numeric field containing the time the CTCI TCP/IP Message was transmitted in HHMMSSCC (see Glossary) format.

The *Logical Channel Number* is a binary field that contains a value from zero through 63. If the logical channel number is zero, the CTCI TCP/IP Message is a control message. If the logical channel number is one through 63, the message is a CTCI message, and the logical channel number indicates which user or device location that the CTCI message belongs to.

CTCI or Control Message Data contains the CTCI or control message data. When the logical channel number is one through 63 it contains CTCI message data. When the

logical channel number is zero, CTCI or Control Message Data contains the fields of one of the control messages described in the following pages.

The *Sentinel* is an ASCII field that always contains a constant of "UU".

CTCI TCP/IP Session Management

The control messages – Logon, Logon Response, Heartbeat Query, Heartbeat Response, Flow Control, Logical Channel State Query, and Logical Channel State Response – are used for session management and will be sent over logical channel zero exclusively. The format, content, and further details about how each control message should be used is described in the pages that follow the session management discussion.

Once a socket connection is established, the very first thing the client must do is send a Logon control message to the server. The Logon Identifier field tells the server who the client is, the Logical Channel State fields tell the server on which logical channels the client is ready to receive CTCI messages. If the Logon fails, NASDAQ will break the connection. If the Logon is successful the server will send a Logon Response control message back to the client.

On the Logon Response control message the Logical Channel State fields tell the client on which logical channels the server is ready to receive CTCI messages. The client must not send CTCI messages to the server over any logical channel that is in not in a "ready to receive" state. If a logical channel is not in a "ready to receive" state, and the client sends CTCI messages over it to the server, the messages will be discarded.

Note: It is not necessary to verify that logical channel zero is ready to receive. This logical channel must always be in a "ready to receive" state, as there must always be a dedicated path open for control message exchange.

The client can now send CTCI messages over any logical channel that the server has indicated is ready to receive. If the client has no CTCI or control messages to be sent over any logical channel on a connection, or there are no logical channels (1-63) that server is ready to receive them on, the client must send a Heartbeat Query control message on logical channel zero every 10 seconds.

For logical channels that the server has indicated are not ready to receive, the client must wait until the server changes the logical channel state to ready to receive. The server will do this by sending the client a Flow Control message on logical channel zero.

In the event that the volume of CTCI message traffic over a logical channel becomes too much for a message receiver (client or server) to buffer and process, the message receiver can instruct the sender to suspend transmission on the logical channel by sending a Flow Control control message that places the logical channel in a "not ready to receive" state. When the receiver is ready to resume receiving messages on the logical channel again, the receiver sends a Flow Control control message that returns the logical channel to a "ready to receive" state.

At any time during the session, the client (or server) may request the state of a logical channel by sending a Logical Channel State Query Request to the server (or

client). The server (or client) must respond with a Logical Channel State Query Response that informs the receiver whether the logical channel is in a "ready to receive", "not ready to receive" or "not configured" state.

The last two bytes of *every* CTCI TCP/IP Message received should always be checked for the sentinel character string of "UU". If the last two bytes are not equal to the sentinel, the TCP/IP connection is considered no longer reliable and should be terminated.

Control Messages

Logon and Logon Response

Once a socket connection is established, the client must first send a Logon control message to the server.

If the server does not recognize the Logon Identifier as being associated with the IP Address the client has connected from or does not recognize the Logon Identifier as being associated the IP Address and Well Known Port the client is connected to, it will terminate the connection. If the Logon is successful a Logon Response control message will be returned.

Here is an example of a *Logon* control message sent on logical channel zero at 9:30 a.m.:

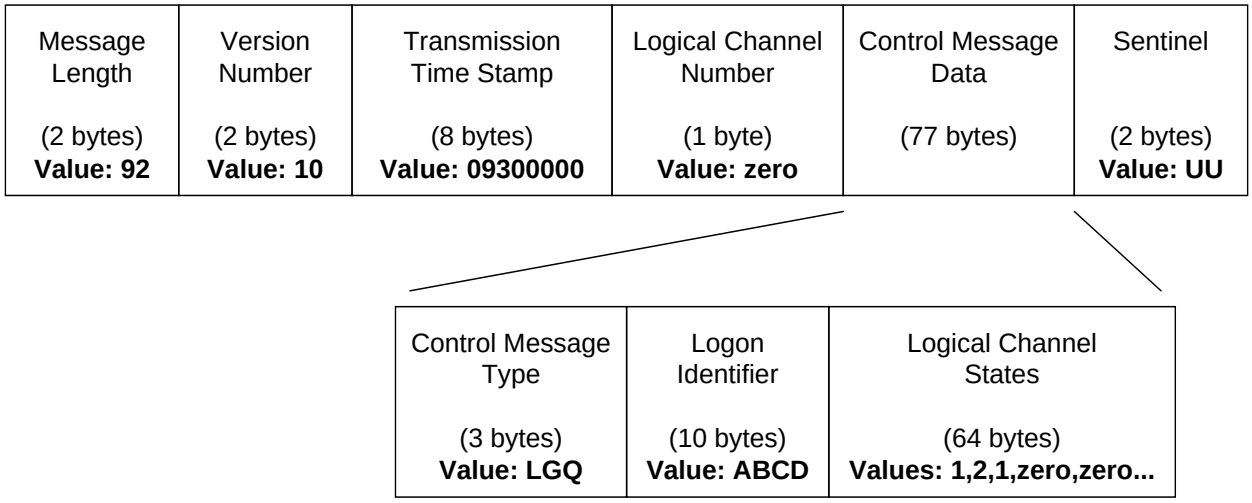

Figure Appendix A- 4 Logon control message, channel zero, 9:30 a.m.

In this example, the *Logical Channel Number* contains a value of zero, indicating the message is a control message.

The *Control Message Type* is an ASCII field that appears in every control message that indicates which control message is being sent. In this case "LGQ" represents Logon.

The *Logon Identifier* field is an ASCII field that must contain the logon identifier assigned during setup for use with the IP Address and Well Known Port. The value ABCD is shown just as an example.

In the *Logical Channel States* field, each byte contains a binary value that represents the state of a logical channel. The first byte contains the state of logical channel zero, the second the state of logical channel one, the third the state of logical channel three, up to the 64th byte that contains the state of logical channel 63. If the logical channel is ready to receive the value will be one. If it is not ready to receive the value will be 2. If the logical channel was not configured during Setup, the value will be zero.

In this example the value of the state of logical channel zero and two is one. The value of the state of logical channel one is two. The value of the state of logical channels three through 63 is zero. This means the client is ready to receive control messages on logical channel zero (always the case), not ready to receive CTCI messages on logical channel one, ready to receive CTCI messages on logical channel two, and the remaining logical channels are not configured.

Here is an example of a *Logon Response* control message sent on logical channel zero at 2/100 of a second past 9:30 a.m.:

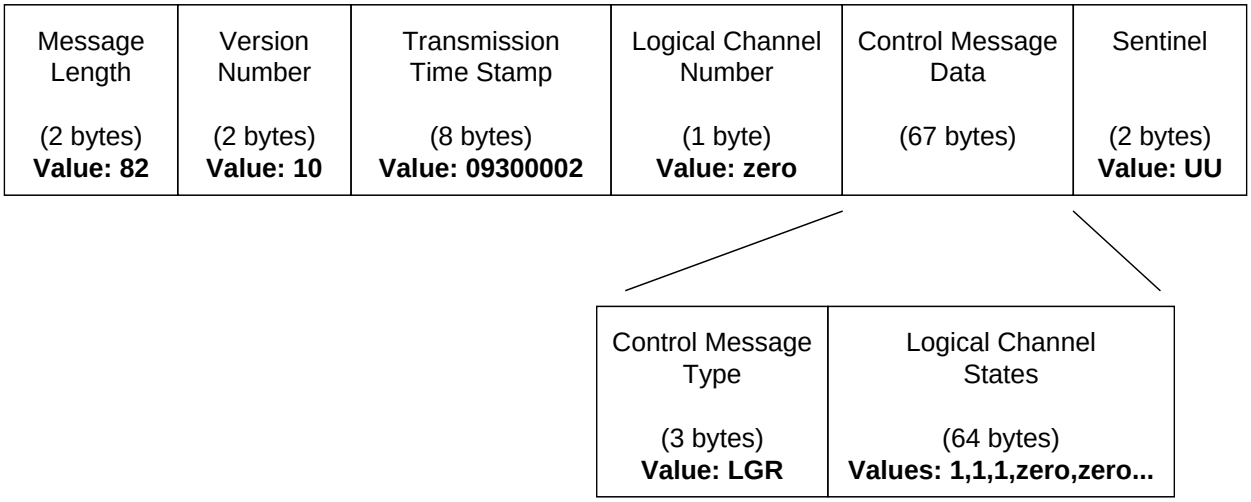

Figure Appendix A- 5 Logon Response control message

In this example, the *Logical Channel Number* contains a value of zero, indicating the message is a control message.

The *Control Message Type* is an ASCII field that appears in every control message that indicates which control message is being sent. In this case "LGR" represents Logon Response.

In the *Logical Channel States* field, each byte contains a binary value that represents the state of a logical channel. The first byte contains the state of logical channel zero, the second the state of logical channel one, the third the state of logical channel three, up to the 64th byte that contains the state of logical channel 63. If the

logical channel is ready to receive the value will be one. If it is not ready to receive the value will be 2. If the logical channel was not configured during Setup, the value will be zero.

In this example the value of the state of logical channel zero is one. The value of the state of logical channel one and two is one. The value of the state of logical channels three through 63 is zero. This means the server is ready to receive control messages on logical channel zero (always the case) and CTCI messages on logical channels one and two. The remaining logical channels are not configured.

Heartbeat Query and Response

The integrity of the data transfer connection must be constantly checked with the periodic exchange of client-issued Heartbeat Query and server-issued Heartbeat Response control messages.

If there are no other messages to be sent the client must send a Heartbeat Query every 10 seconds. The server does not require heartbeat queries during the 10-second interval if any properly formatted message has been received within the last 10 seconds, but will terminate the connection if no message is received for the duration of two, 10-second intervals.

Here is an example of a *Heartbeat Query* control message sent on logical channel zero at 2 seconds past 9:30 a.m.:

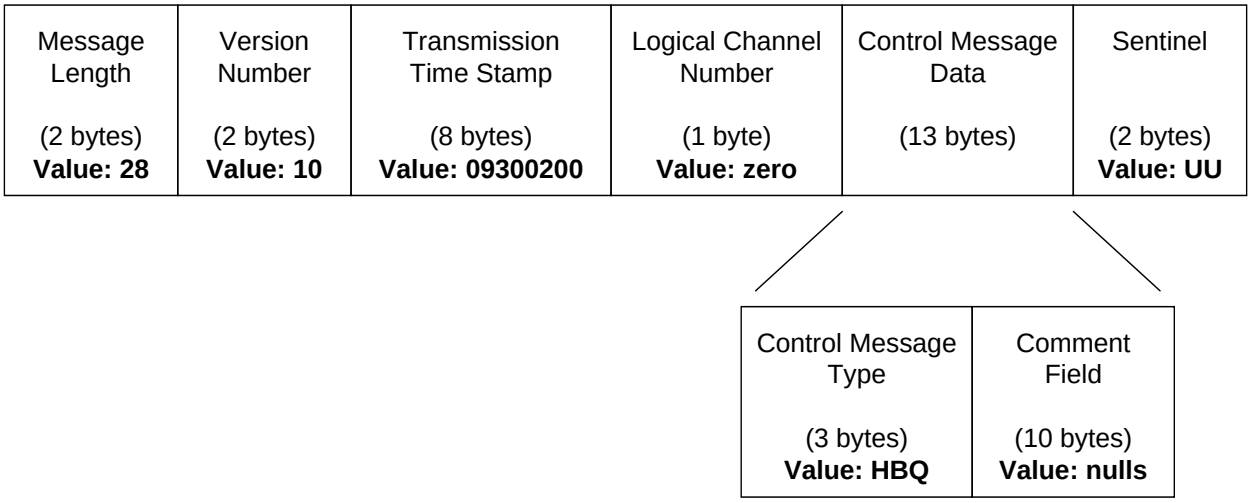

Figure Appendix A- 6 Heartbeat Query control message

In this example, the *Logical Channel Number* contains a value of zero, indicating the message is a control message.

The *Control Message Type* is an ASCII field that appears in every control message that indicates which control message is being sent. In this case "HBQ" represents Heartbeat Query.

The *Comment* field is an ASCII field that the client can use. Any data in it will be echoed back in the Comment field of the Heartbeat Response. The complete ASCII character set can be used. If the field is not used, it should be filled with ASCII nulls (binary zeros). In this example, there is no data in the Comment field, so it is filled with nulls.

Here is an example of a *Heartbeat Response* control message sent on logical channel zero at 2 and 2/100 seconds past 9:36 a.m.:

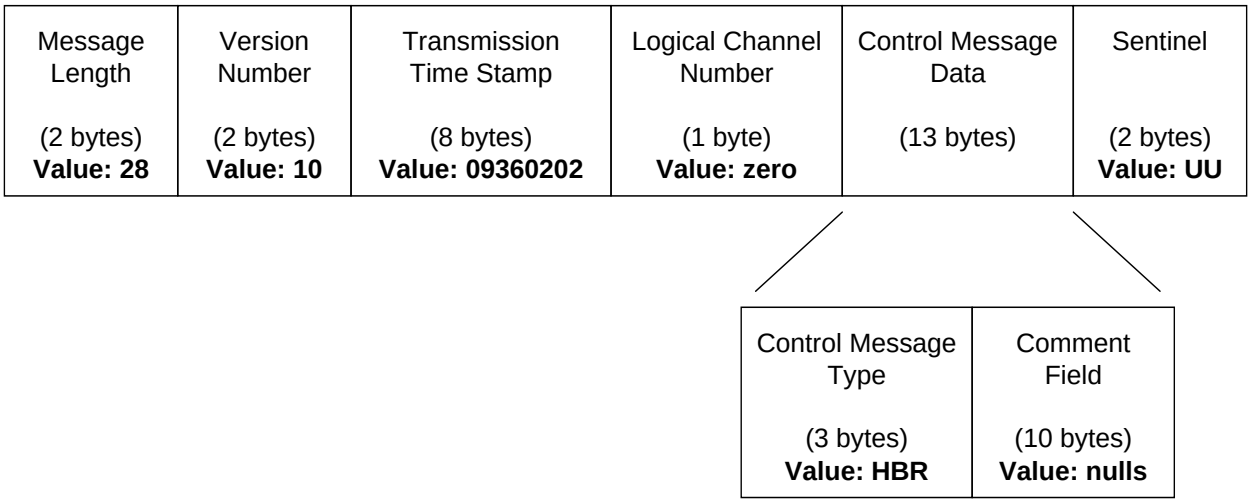

Figure Appendix A- 7 Heartbeat Response control message

In this example, the *Logical Channel Number* contains a value of zero, indicating the message is a control message.

The *Control Message Type* is an ASCII field that appears in every control message that indicates which control message is being sent. In this case "HBR" represents Heartbeat Response.

The *Comment* field is an ASCII field that contains the data sent by the client in the Comment field of the Heartbeat Query. In this example the field contains nulls, echoing this area of the input message.

Flow Control

In the event that the volume of CTCI message traffic over a logical channel becomes too much for a message receiver (client or server) to buffer and process, the message receiver can instruct the sender to suspend transmission on the logical channel by sending a Flow Control message that places the logical channel in a "not ready to receive" state. When the receiver is ready to resume receiving messages on the logical channel again, the receiver sends a Flow Control message that returns the logical channel to a "ready to receive" state.

Note: Flow control of logical channel zero is not allowed, as there must always be a dedicated path open for control message exchange. Client processing of flow control messages from the NASDAQ server is mandatory. It is not mandatory, but strongly

advised, that the client be designed with a mechanism to initiate flow control commands. Under no circumstance should the client ever stop reading the connection with a NASDAQ server while at the same time continuing to transmit data to the NASDAQ server.

Here is an example of a *Flow Control* message sent on logical channel zero at 1:30 p.m. that places logical channel one in a "not ready to receive" state:

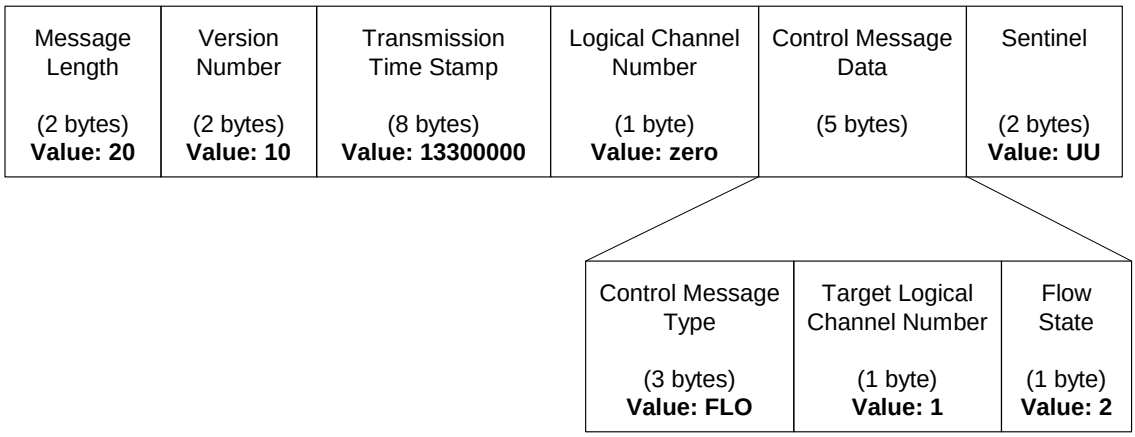

Figure Appendix A- 8 Flow Control message

In this example, the *Logical Channel Number* contains a value of zero, indicating the message is a control message.

The *Control Message Type* is an ASCII field that appears in every control message that indicates which control message is being sent. In this case "FLO" represents Flow Control.

The *Target Logical Channel Number* is a binary field that contains a value from one through 63 and indicates which logical channel should be affected. In this example, logical channel one is being affected.

The *Flow State* field is a binary field that changes the state of a logical channel to ready to receive or not ready to receive CTCI messages. A value of one changes the state to ready to receive. A value of two changes the state to not ready to receive. In this case the value is two, changing the state of the logical channel to "not ready to receive" CTCI messages.

Logical Channel State Query and Response

The client or server can request the state of a particular logical channel by sending a Logical Channel State Query control message over logical channel zero. A Logical Channel State Response must be sent back by the query recipient.

Here is an example of a *Logical Channel State Query* control message requesting the state of logical channel one, sent on logical channel zero at 23 and 85/100 seconds past 1:45 p.m.:

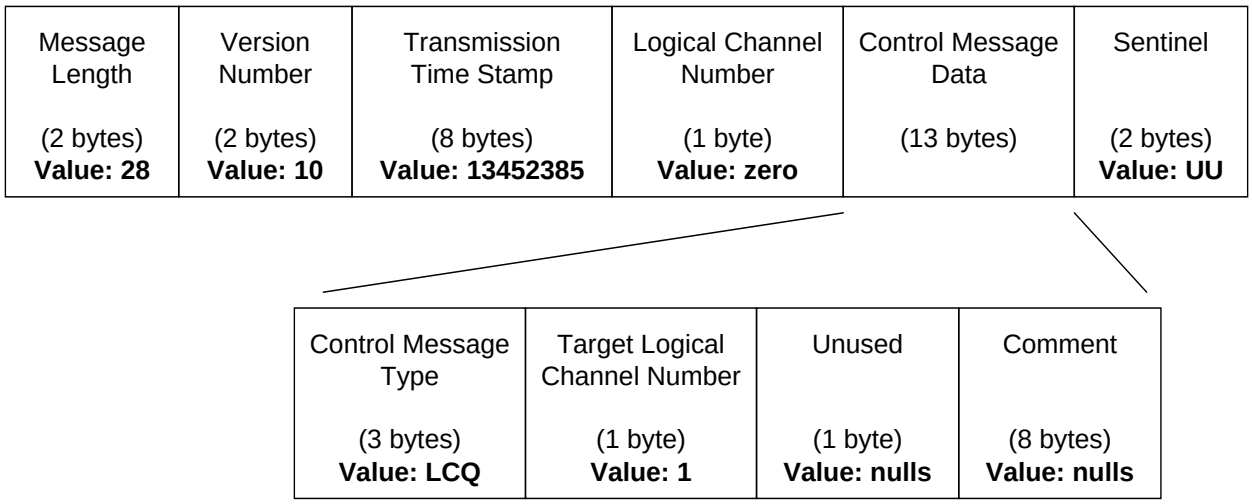

Figure Appendix A- 9 Logical Channel State Query control message

In this example, the *Logical Channel Number* contains a value of zero, indicating the message is a control message.

The *Control Message Type* is an ASCII field that appears in every control message that indicates which control message is being sent. In this case "LCQ" represents Logical Channel State Query.

The *Target Logical Channel Number* is a binary field that contains a value from one through 63 and indicates for which logical channel the state is being requested. In this example the state of logical channel one is being requested.

The *Unused* field is an ASCII field that should always be filled with ASCII nulls (binary zeros).

The *Comment* field is an ASCII field that the message initiator can use. Any data present must be echoed back in the Comment field of the Logical Channel State Response. The complete ASCII character set can be used. If the field is not used, it should be filled with ASCII nulls (binary zeros).

Here is an example of a *Logical Channel State Response* control message returning the state of logical channel one, sent on logical channel zero at 24 seconds past 1:45 p.m.:

Message Length	Version Number	Transmission Time Stamp	Logical Channel Number	Control Message Data	Sentinel
(2 bytes) **Value: 28**	(2 bytes) **Value: 10**	(8 bytes) **Value: 13452400**	(1 byte) **Value: zero**	(13 bytes)	(2 bytes) **Value: UU**

Control Message Type	Target Logical Channel Number	Logical Channel State	Comment
(3 bytes) **Value: LCR**	(1 byte) **Value: 1**	(1 byte) **Value: 2**	(8 bytes) **Value: nulls**

Figure Appendix A- 10 Logical Channel State Response control message

In this example, the *Logical Channel Number* contains a value of zero, indicating the message is a control message.

The *Control Message Type* is an ASCII field that appears in every control message that indicates which control message is being sent. In this case "LCR" represents Logical Channel State Response.

The *Target Logical Channel Number* is a binary field that contains a value from one through 63 and indicates for which logical channel the state is being reported. In this example, the state of logical channel one is being reported.

The *Logical Channel State* is a binary field that contains a value that represents the state of the logical channel. If the logical channel is ready to receive, the value will be one. If it is not ready to receive, the value will be 2. If the logical channel was not configured during Setup, the value will be zero. In this example the value is two, indicating logical channel is "not ready to receive" CTCI messages.

The *Comment* field is an ASCII field that must always contain the data sent in the Comment field of the Logical Channel State Query. In this example the field contains nulls because that's what was sent in the query.

Sending a CTCI Message

The client should format a CTCI message as usual (refer to *Subscriber Requirements for Computer to Computer Interface Utilizing the NASDMS Switch*), but to deliver it over a TCP/IP connection it must be imbedded in a CTCI TCP/IP Message "envelope."

Here is an example of a CTCI message 100 bytes long sent on logical channel 31 at 9:31 a.m.:

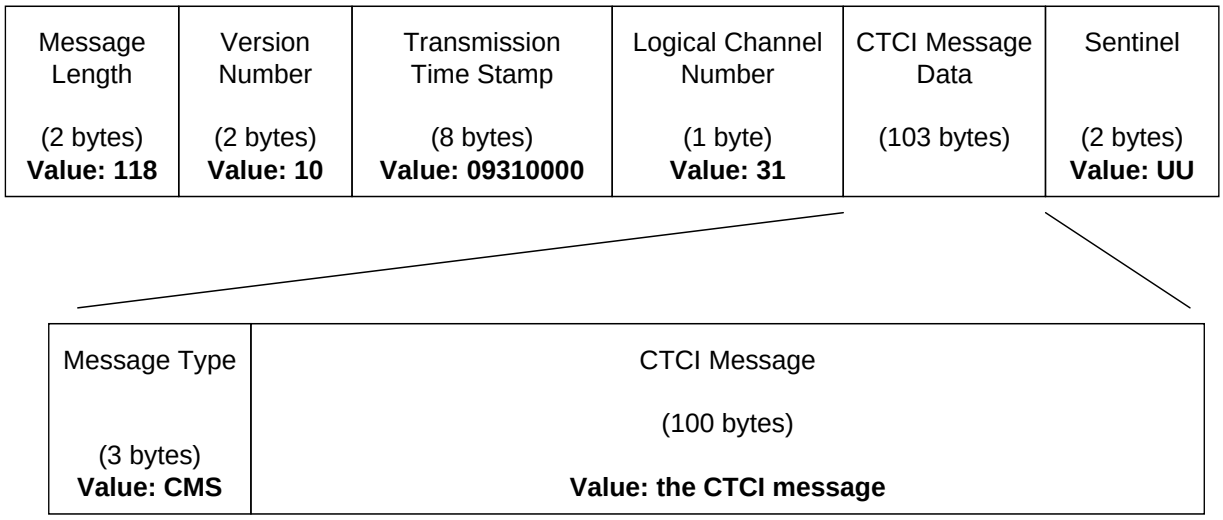

Figure Appendix A- 11 CTCI message

In this example, the *Logical Channel Number* contains a value of 31, in the range of one through 63, indicating that the message is a CTCI message.

The *Message Type* field is an ASCII field that should always have the value "CMS"..

CTCI Message is the actual CTCI message itself, beginning with line zero, line two, etc., as described in *Subscriber Requirements for Computer to Computer Interface Utilizing the NASDMS Switch*. Do not include any control characters other than those specific the composition of the CTCI message (i.e. carriage return and line feed).

Receiving a CTCI Message

NASDAQ will send CTCI messages to subscribers using the same format as described above in Sending a CTCI Message. The *CTCI Message* field will include any user-specified header line(s) followed by line zero, line two, etc., through any user-specified trailer line(s).

CTCI Message Sequence Verification

It is the responsibility of the client to detect and recover lost data by implementing CTCI message sequence number checking and message retrieval processing. It is also the responsibility of the client to respond to gap fill requests from the server for lost or discarded client to server messages. Refer to *Subscriber Requirements for Computer to Computer Interface Utilizing the NASDMS Switch* for a detailed description of these procedures. Message sequence numbers continue to be the last part of the *CTCI Message* in *CTCI Message Data*.

Glossary

Client: The Subscriber side of the TCP/IP connection.

Connection: Transmission path (including all equipment) between a sender and receiver, ready and able to exchange data.

CTCI: Computer to Computer Interface; the protocol, message standards and underlying physical structure which allows subscribers to send and receive NASDAQ transactions from/to a subscriber host computer.

Flow Control: Mechanism by which the recipient of incoming data notifies the sender to stop or start transmitting data over a specified logical channel.

Flow State: The flow state changes the state of a logical channel to ready to receive or not ready to receive CTCI messages. A value of one changes the state to ready to receive (RR - Receiver Ready to receive). A value of two changes the state to not ready to receive (RNR - Receiver Not Ready).

HHMMSSCC: Method of formatting the time day in hours, minutes, seconds and hundredths of seconds. HH = Hours in military time (00-23), MM = Minutes (00-59), SS = Seconds (00-59) CC = hundredths of seconds (00-99). For example: 9AM is 09000000, 1:35PM is 13350000, 35 and 98/100 seconds past midnight is 00003598.

IP Address: The IP Address together with the Well Known Port, is used to establish a connection to NASDAQ in order to send and receive CTCI TCP/IP Messages. Will be assigned by NASDAQ.

Logical Channel: Over one TCP/IP connection, a subscriber can submit and receive CTCI messages on behalf of 63 different users or device locations. Each logical channel represents one user or device location. Logical channel zero is reserved for session management control messages.

Logical Channel Number: Number from zero through 63 assigned to a logical channel to uniquely identify it.

Logical Channel State: A logical channel can be in one of three states:

Ready to receive CTCI messages (RR - Receiver Ready to receive).
Not ready to receive CTCI messages (RNR - Receiver Not Ready).
Not assigned a user or device location during Setup (NC - Not Configured).

Nulls: The value of the lowest occurrence in the ASCII character set (Binary zero).

Session: Synonymous with Connection.

Sentinel: A character string constant used to verify that a complete CTCI TCP/IP Message has been received. The last two characters of every CTCI TCP/IP Message must be "UU".

Sentinel Boundary: Term used to indicate that the next data to be sent (or received) on a connection must begin with the Message Length field of a CTCI TCP/IP

Message. Data flow must begin on a sentinel boundary whenever a connection is established.

Server: The NASDAQ side of the TCP/IP connection.

TCP/IP: Transmission Control Process/Internet Protocol, a method that allows communications to take place between heterogeneous systems in a multinetwork environment (Internet).

Well Known Port: A signed 16 bit binary value combined with an IP Address to form a socket (connection) name. Will be assigned by NASDAQ.

6 Appendix B: IBM WebSphere MQ

The *CTCI WebSphere MQ V1.1 Subscriber Intercommunication Specification* describes how you can submit and receive CTCI messages using the NASDMS (Switch) through IBM WebSphere MQ Middleware using WebSphere MQ API calls over TCP/IP protocol. The document also describes the required CTCI-MQ intercommunication specifications. The CTCI-MQ Interface uses the WebSphere MQ Distributed Queuing technique.

To access the document, select this link:

http://www.nasdaqtrader.com/trader/tradingservices/specsinstallguides/CTCIMQSpecs.pdf

Summary of Changes to NASDAQ CTCI for Order Entry Specification

Section	Message	Change
4.1.1	Order Entry	Added value “SOLV” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “SOLV” to fields Preferenced MMID and :MMID
4.1.1	Order Entry	Added value “CART” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “CART” to fields Preferenced MMID and :MMID

Section	Message	Change
4.1.1	Order Entry	Added value “LIST” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “LIST” to fields Preferenced MMID and :MMID
4.2.5.1	Order Entry Execution Report	Added Liquidity indicator value = “T”
4.2.5.1	Order Entry Execution Report	Added Liquidity indicator value = “Z”
		Version 2011-01

Section	Message	Change
4.2.5.1	Order Entry Execution Report	Added Liquidity indicator value = “P”
		Version 2010-05

Section	Message	Change
4.1.1	Order Entry	Added Directed Order Destination Code ISBY to directed order destination table
		Version 2010-04

Section	Message	Change
4.1.1	Order Entry	Removed Directed Order Destination Codes ISGA and ISGX from the directed order destination table
4.1.1	Order Entry	Re-introduced the short sale exempt value in the buy/sell indicator field
		Version 2010-03

Section	Message	Change
4.1.1	Order Entry	Added Directed Order Destination Codes ISNA and ISNX to directed order destination table
		Version 2010-02

Section	Message	Change
4.1.1	Order Entry	Added value “DOTZ” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “DOTZ” to fields Preferenced MMID and :MMID
		Version 2010-01

Section	Message	Change
4.1.1	Order Entry	Added value “SAVE” to fields Preferenced MMID and :MMID

4.1.4	Order Cancel/Replace (Version Two)	Added value “SAVE” to fields Preferenced MMID and :MMID
4.1.1	Order Entry	Added value “QSAV” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “QSAV” to fields Preferenced MMID and :MMID
4.1.1	Order Entry	Added value “QTFY” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “QTFY” to fields Preferenced MMID and :MMID
4.2.7	Market Center Reject Messages	Replaced “anti-internalization” with “self match prevention”
		Version 2009-07

Section	Message	Change
4.1.1	Order Entry	Removed value “SCNF” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Removed value “SCNF” to fields Preferenced MMID and :MMID
4.2.5.1	Order Entry Execution Report	Revised description of value “J” to remove routable FLASH description
4.1.1	Order Entry Execution Report	Added liquidity flag value “E” for NYSE Other
		Version 2009-06

Section	Message	Change
4.1.1	Order Entry	Added value “SGNF” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “SGNF” to fields Preferenced MMID and :MMID
4.1.1	Order Entry	Added value “SCNF” to fields Preferenced MMID and :MMID

4.1.4	Order Cancel/Replace (Version Two)	Added value “SCNF” to fields Preferenced MMID and :MMID
4.2.5.1	Order Entry Execution Report	Revised description of value “J” to represent routable FLASH
4.1.1	Order Entry	Revised description of SCAN routing strategy
4.1.4	Order Cancel/Replace (Version Two)	Revised description of SCAN routing strategy
		Version 2009-05

Section	Message	Change
4.1.1	Order Entry	Added value “TFTY” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “TFTY” to fields Preferenced MMID and :MMID
4.1.1	Order Entry	Revised description of value “DOTI” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Revised description of value “DOTI” to fields Preferenced MMID and :MMID
4.2.5.1	Order Entry Execution Report	Revised description of value “J” to represent non-routable FLASH
		Version 2009-04

Section	Message	Change
4.2.5.1	Order Entry Execution Report	Added Liquidity indicator value = “B”
		Version 2009-03

Section	Message	Change
4.2.5.1	Order Entry Execution Report	Added Liquidity indicator value = “U”

		Modified the description for liquidity indicator = “F”
		Version 2009-02

Section	Message	Change
4.2.5.1	Order Entry Execution Report	Standardized the liquidity indicator values for easier maintenance Added Liquidity indicator value = “S” Modified the description for liquidity indicator = “G” Removed Liquidity indicator values for intraday and post close cross liquidity accessor values
		Version 2009-01

Section	Message	Change
4.2.5.1	Order Entry Execution Report	Removed PHLX destination
		Version 2008-08

Section	Message	Change
4.2.5.1	Order Entry Execution Report	Added value “LJ = Non-displayed and liquidity provider” to Liquidity Identifier field
4.2.5.2	Market Maker Execution Report	Added value “LJ = Non-displayed and liquidity provider” to Liquidity Identifier field
		Version 2008-04

Section	Message	Change
4.1.1	Order Entry	Added value “SKIP” and “SKNY” to fields Preferenced MMID and :MMID

4.1.4	Order Cancel/Replace (Version Two)	Added value “SKIP” and “SKNY” to fields Preferenced MMID and :MMID
		Version 2008-03

Section	Message	Change
		Removed DOTN and DOTO routing strategies.
		Version 2008-02

Section	Message	Change
		Added value “RF” to fields Liquidity Indicator
		Added value “RG” to fields Liquidity Indicator
		Version 2008-01

Section	Message	Change
		Deleted all references to short sale exempt. Users can still enter values for short sale exempt, but Nasdaq will treat it no differently than regular short sale entry.
		Version 2007-07

Section	Message	Change
4.1.1	Order Entry	Added value “MOPP” to fields Preferenced MMID and :MMID
4.1.1	Order Entry	Removed value “SWIM” and “SPDY” from fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Added value “MOPP” to fields Preferenced MMID and :MMID
4.1.4	Order Cancel/Replace (Version Two)	Removed value “SWIM” and “SPDY” from fields Preferenced MMID and :MMID
		Version 2007-05

Section	Message	Change
4.2.5.1	Order Entry Execution Report	Added value “RY = Re-routed by NYSE” to Liquidity Identifier field
4.2.5.2	Market Maker Execution Report	Added value “RY = Re-routed by NYSE” to Liquidity Identifier field
		Version 2007-04

Section	Message	Change
4.1.1	Order Entry	Added Directed Order as possible value for Preference MMID field
4.1.4	Order Cancel/Replace (Version Two)	Added Directed Order as possible value for Preference MMID field

		Added Directed Order Destination Codes table
		Version 2007-03

Section	Message	Change
4.1.1	Order Entry	Added SWIM as possible value for Preference MMID field
4.1.4	Order Cancel/Replace (Version Two)	Added SWIM as possible value for Preference MMID field
		Version 2007-02

Section	Message	Change
4.1.1	Order Entry	Priority field – added value S = Intermarket Sweep Order ANON field – changed values to: ANON = pre-trade and post-trade non-attributable, Price–to–display. CNON = anonymous, displayed order, Price–to–Comply.
4.2.4	Order Cancel/Replace (Version Two)	Priority field – added value S = Intermarket Sweep Order ANON field – changed values to: ANON = pre-trade and post-trade non-attributable, Price–to–display. CNON = anonymous, displayed order, Price–to–Comply.
		Version 2007-01

Section	Message	Change
4.1.4	Order Cancel/Replace (Version Two)	End note deleted. Cancel Order Acknowledgements are not sent in Single Book.
4.2.4	Order Cancel/Replace Acknowledgement (Version Two)	Deleted references to the cancel acknowledgement messages.
4.2.6	Exposure Warning Messages	Added back to spec for Quote Update messages.
		Version 2006-03

Section	Message	Change
1.3	Allowable Subscriber entry Times	Updated Start and End times for NASDAQ Market Center Trading Orders to reflect Single Book hours.
4.1.1	Order Entry	Added back DNI and DNR fields
4.1.3	Order Cancel/Replace (Version One)	Added back DNI and DNR fields
4.1.4	Order Cancel/Replace (Version Two)	Added back DNI and DNR fields
4.2.3	Order Cancel/Replace Acknowledgement (Version One)	Added back DNI and DNR fields
4.2.5.1	Order Entry Execution Report	Added to Liquidity Indicator the following values: MA = Midday Cross billable HP = Halt/IPO Cross liquidity provider HA = Halt/IPO Cross liquidity accessor RD = Routed to DOT
4.2.5.2	Market Maker Execution Report	Added to Liquidity Indicator the following values: MA = Midday Cross billable HP = Halt/IPO Cross liquidity provider HA = Halt/IPO Cross liquidity accessor RD = Routed to DOT
		Version 2006-02