Networx NX-584 RS-232 Gateway Interface Protocol

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This document will describe the electrical connections, handshaking, format options and message structure for the NX-584 RS-232 Gateway interface expansion module.

The NX-584 consists of an expansion card that conforms to the NX series card guide form factor and includes all of the necessary hardware for mounting inside any NX enclosure. It has a three position terminal strip for buss connection to the NX master control. A male DB-9 connector is also located on the card that contains all of the necessary RS-232 signals.

DB-9 Pin-out				
Signal Name	Direction NX------PC	Jumper Number	Pin Number	
			A Position	B Position
Cts*	⟶	J7	8**	7
Txd	⟶	J8	2	3**
Rts*	⟵	J9	8	7**
Rxd	⟵	J10	2**	3
Sig.Gnd.	⟷	--	5	
Unused	--	--	1,4,6,9	

**Note: Rts and Cts signals are not currently supported.*
***Note: Default jumper settings.*

Byte format:

The byte format for all methods and speeds of this interface will be:

1 start bit, 8 bit data, no parity, and 1 stop bit.

Length byte:

The Length byte will always follow the Start character in both the ASCII and Binary formats. The Length byte will be a hexadecimal value that is a count of all bytes that follow, with the exception of stuffed bytes (binary only), checksum bytes, and Stop characters (ASCII only). (The 'Summary of Messages' table will contain the proper length associated with each message.)

Message type byte:

The Message type byte consists of a 6-bit (bits 0-5) value that represents the Message Number and two flag bits (bits 6&7). The Bit 6 flag is reserved at this time. Bit 7 in the Message type byte is used as an Acknowledge Required flag. When the Acknowledge Required flag is set, the message must be acknowledged or the same message will be repeated. This unacknowledged condition will be considered as an Implied Negative Acknowledge. Any message that is sent with the Acknowledge Required flag being clear, should not be acknowledged! In practice all messages that are polled (request and reply) will not set the Acknowledge Required flag, it will be assumed that the message was received correctly when a valid reply is returned. Any messages that are sent due to changes or transitions will set the Acknowledge Required flag to insure that the message was received properly. Also, any messages that contain a command that does not have a specific reply should set the Acknowledge Required flag.

Checksum:

All numeric information relating to either ASCII or Binary formats will be in Hexadecimal. Both formats use a 16-bit Fletcher Checksum. The following Pseudo-code describes how the Fletcher Checksum is calculated. The bytes that are used to calculate the checksum include the Length byte and all message/data/command bytes. It will not include any Start character, stuffed bytes (Binary version) or Stop characters (ASCII version).

Fletcher Checksum using 8-bit math:

(Sum1 and Sum2 are unsigned 8-bit integers)

```
Sum1, Sum2 = 0
for I = 1 to len (string)
        if (255 - Sum1) < string(I) then
                Sum1 = Sum1 + 1
        end if
        Sum1 = Sum1 + string(I)
        if Sum1 = 255 then
                Sum1 = 0
        end if
        if (255 - Sum2) < Sum1 then
                Sum2 = Sum2 + 1
        end if
        Sum2 = Sum2 + Sum1
        if Sum2 = 255 then
                Sum2 = 0
        end if
next I
```

ASCII Version format:

The ASCII Version format will consist of a Start character, a Length (byte pair), a Message type (byte pair), any Data (byte pair(s)), Fletcher Checksum (four byte pairs), and a stop byte. With the exception of the Start and Stop bytes, all information will be sent as two ASCII characters that form a data byte. The only valid characters that may be used to form a data byte pair is, 0-9 (30h-39h) and capital A-F (41h-46h). Any other character received in the body of a message would invalidate the entire message. The Start character will be an ASCII Line Feed (0Ah), and the Stop character will be a Carriage Return (0Dh).

This is an example of an ASCII Zone Status message (acknowledge required):

	Start character	Message length		Message number		Zone number		Partition mask		Type flags 1		Type flags 2		Condition flags 1		Condition flags 2		Fletcher sum 1		Fletcher sum 2		Stop character
Hex	0Ah	07h		84h		09h		7Eh		10h		58h		01h		00h		7Ch		D1h		0Dh
Sum1	-	07h		8Bh		94h		13h		23h		7Bh		7Ch		7Ch		-		-		-
Sum2	-	07h		92h		27h		3Ah		5Dh		D8h		55h		D1h		-		-		-
Sent ASCII	LF	0	7	8	4	0	9	7	E	1	0	5	8	0	1	0	0	7	C	D	1	CR

The Sum1 and Sum2 values are shown as each byte is processed, only the final values are used in the message.

Binary Version format:

The Binary Version format will consist of a Start character, a Length byte, a Message type byte, any data bytes, and a two byte Fletcher Checksum. This format will not send any Stop character. The Start character will always be a 7Eh. Whenever a 7Eh is encountered in a stream of data, it should be used as the start of a new message. In order to allow for the value of 7Eh to be used in the message, Byte Stuffing must be used. Byte stuffing will substitute the two-byte sequence, 7Dh, 5Eh in place of a 7Eh data byte. It will also be necessary to use the two-byte sequence, 7Dh, 5Dh in place of the 7Dh data byte. The receiver will remove all 7Dh's from the incoming message and exclusive or the following byte with 20h in order to recover the original data byte. Both the Length byte and Fletcher Checksum will use the un-stuffed (recovered) message for calculations.

This is an example of an Binary Zone Status message (acknowledge required):

	Start character	Message length	Message number	Zone number	Partition mask		Type flags 1	Type flags 2	Condition flags 1	Condition flags 2	Fletcher sum 1	Fletcher sum 2
Hex	7Eh	07h	84h	09h	7Eh		10h	58h	01h	00h	7Ch	D1h
Sum1	-	07h	8Bh	94h	13h		23h	7Bh	7Ch	7Ch	-	-
Sum2	-	07h	92h	27h	3Ah		5Dh	D8h	55h	D1h	-	-
Sent Binary	7Eh	07h	84h	09h	7Dh	5Eh	10h	58h	01h	00h	7Ch	D1h

The Sum1 and Sum2 values are shown as each byte is processed, only the final values are used in the message.

Special Operational Notes:

Both this interface itself and the device it is connected to, must acknowledge any message that is formatted correctly with the Acknowledge Required flag set. That is to say, the start character was correct, the length was correct and the checksum was correct. In practice, if a message is properly formatted, but is not recognized, the Message Reject (1Fh) should be sent back as the reply. This will keep the port from locking up when unsupported messages/command/requests are passed.

Summary of Messages

Message Number	Message Name	Message Length**	Transition Capable	Acknowledged
00h	**Do not use**	**-**	**-**	**-**
01h	**Interface Configuration Message**	**11**		**Possible**
02h	**Reserved**	**-**		**-**
03h	**Zone Name Message**	**18**		**No**
04h	**Zone Status Message**	**8**	**Yes**	**Possible**
05h	**Zones Snapshot Message**	**10**	**Yes**	**Possible**
06h	**Partition Status Message**	**9**	**Yes**	**Possible**
07h	**Partitions Snapshot Message**	**9**	**Yes**	**Possible**
08h	**System Status Message**	**12**	**Yes**	**Possible**
09h	**X-10 Message Received**	**4**	**Yes**	**Yes**
0Ah	**Log Event Message**	**10**	**Yes**	**Possible**
0Bh	**Keypad Message Received**	**3**	**Yes**	**Yes**
0Ch-0Fh	**Reserved**	**-**		**-**
10h	**Program Data Reply**	**13**		**No**
11h	**Reserved**	**-**		**-**
12h	**User Information Reply**	**7**		**No**
13h-1Bh	**Reserved**	**-**		**-**
1Ch	**Command / Request Failed**	**1**		**No**
1Dh	**Positive Acknowledge**	**1**		**No**
1Eh	**Negative Acknowledge**	**1**		**No**
1Fh	**Message Rejected**	**1**		**No**
20h	**Reserved**	**-**		**-**
21h	**Interface Configuration Request**	**1**		**No**
22h	**Reserved**	**-**		**-**
23h	**Zone Name Request**	**2**		**No**
24h	**Zone Status Request**	**2**		**No**
25h	**Zones Snapshot Request**	**2**		**No**
26h	**Partition Status Request**	**2**		**No**
27h	**Partitions Snapshot Request**	**1**		**No**
28h	**System Status Request**	**1**		**No**
29h	**Send X-10 Message**	**4**		**Yes**
2Ah	**Log Event Request**	**2**		**No**
2Bh	**Send Keypad Text Message**	**12**		**Yes**
2Ch	**Keypad Terminal Mode Request**	**3**		**Yes**
2Dh-2Fh	**Reserved**	**-**		**-**
30h	**Program Data Request**	**4**		**No**
31h	**Program Data Command**	**13**		**Yes**
32h	**User Information Request with PIN**	**5**		**No**
33h	**User Information Request without PIN**	**2**		**No**
34h	**Set User Code Command with PIN**	**8**		**Yes**
35h	**Set User Code Command without PIN**	**5**		**Yes**
36h	**Set User Authorization Command with PIN**	**7**		**Yes**
37h	**Set User Authorization Command without PIN**	**4**		**Yes**
38h-39h	**Reserved**	**-**		**-**
3Ah	**Store Communication Event Command**	**6**		**Yes**
3Bh	**Set Clock / Calendar Command**	**7**		**Yes**
3Ch	**Primary Keypad Function with PIN**	**6**		**Yes**
3Dh	**Primary Keypad Function without PIN**	**4**		**Yes**
3Eh	**Secondary Keypad Function**	**3**		**Yes**
3Fh	**Zone Bypass Toggle**	**2**		**Yes**

***Note: Message Length does not include the start character, length byte, possible stuffed bytes, checksum bytes and possible end character.*

Message number: **01h**

Message name: **Interface Configuration Message**

Message length: **12 Bytes**

Acknowledged: **Yes**

Description: This message will contain the firmware version number and other information about features currently enabled. It will be sent each time the unit is reset or programmed.

Byte 1	**Message number**	**Byte 9**	**Supported request / command flags (2)**
Bytes 2-5	**Firmware version (i.e. 1.00 (ASCII))**	Bit 0	(28h) System Status Request
Byte 6	**Supported transition message flags (1)**	Bit 1	(29h) Send X-10 Message
Bit 0	(00h) Reserved	Bit 2	(2Ah) Log Event Request
Bit 1	(01h) Interface Configuration Message	Bit 3	(2Bh) Send Keypad Text Message
Bit 2	(02h) Reserved	Bit 4	(2Ch) Keypad Terminal Mode Request
Bit 3	(03h) Reserved	Bit 5	(2Dh) Reserved
Bit 4	(04h) Zone Status Message	Bit 6	(2Eh) Reserved
Bit 5	(05h) Zones Snapshot Message	Bit 7	(2Fh) Reserved
Bit 6	(06h) Partition Status Message	**Byte 10**	**Supported request / command flags (3)**
Bit 7	(07h) Partitions Snapshot Message	Bit 0	(30h) Program Data Request
Byte 7	**Supported transition message flags (2)**	Bit 1	(31h) Program Data Command
Bit 0	(08h) System Status Message	Bit 2	(32h) User Information Request with PIN
Bit 1	(09h) X-10 Message Received	Bit 3	(33h) User Information Request without PIN
Bit 2	(0Ah) Log Event Message	Bit 4	(34h) Set User Code Command with PIN
Bit 3	(0Bh) Keypad Message Received	Bit 5	(35h) Set User Code Command without PIN
Bit 4	(0Ch) Reserved	Bit 6	(36h) Set User Authorization Command with PIN
Bit 5	(0Dh) Reserved	Bit 7	(37h) Set User Authorization Command without PIN
Bit 6	(0Eh) Reserved	**Byte 11**	**Supported request / command flags (4)**
Bit 7	(0Fh) Reserved	Bit 0	(38h) Reserved
Byte 8	**Supported request / command flags (1)**	Bit 1	(39h) Reserved
Bit 0	(20h) Reserved	Bit 2	(3Ah) Store Communication Event Command
Bit 1	(21h) Interface Configuration Request	Bit 3	(3Bh) Set Clock / Calendar Command
Bit 2	(22h) Reserved	Bit 4	(3Ch) Primary Keypad Function with PIN
Bit 3	(23h) Zone Name Request	Bit 5	(3Dh) Primary Keypad Function without PIN
Bit 4	(24h) Zone Status Request	Bit 6	(3Eh) Secondary Keypad Function
Bit 5	(25h) Zones Snapshot Request	Bit 7	(3Fh) Zone Bypass Toggle
Bit 6	(26h) Partition Status Request		
Bit 7	(27h) Partitions Snapshot Request		

Message number: **03h**
Message name: **Zone Name Message**
Message length: **18 Bytes**
Acknowledged: **No**
Description: This message will contain the 16-character name for the zone number that was requested (via Zone Name Request (23h)).

Byte 1	**Message number**	**Byte 10**	**Zone name character 8**
Byte 2	**Zone number (0= zone 1)**	**Byte 11**	**Zone name character 9**
Byte 3	**Zone name character 1**	**Byte 12**	**Zone name character 10**
Byte 4	**Zone name character 2**	**Byte 13**	**Zone name character 11**
Byte 5	**Zone name character 3**	**Byte 14**	**Zone name character 12**
Byte 6	**Zone name character 4**	**Byte 15**	**Zone name character 13**
Byte 7	**Zone name character 5**	**Byte 16**	**Zone name character 14**
Byte 8	**Zone name character 6**	**Byte 17**	**Zone name character 15**
Byte 9	**Zone name character 7**	**Byte 18**	**Zone name character 16**

Message number: **04h**
Message name: **Zone Status Message**
Message length: **8 Bytes**
Acknowledged: **Possible**
Description: This message will contain all information relevant to a zone in the system.

Byte 1	**Message number**	**Byte 6**	**Zone type flags (3)**
Byte 2	**Zone number (0= zone 1)**	Bit 0	Fast loop response
Byte 3	**Partition mask**	Bit 1	Double EOL tamper
Bit 0	Partition 1 enable	Bit 2	Trouble
Bit 1	Partition 2 enable	Bit 3	Cross zone
Bit 2	Partition 3 enable	Bit 4	Dialer delay
Bit 3	Partition 4 enable	Bit 5	Swinger shutdown
Bit 4	Partition 5 enable	Bit 6	Restorable
Bit 5	Partition 6 enable	Bit 7	Listen in
Bit 6	Partition 7 enable	**Byte 7**	**Zone condition flags (1)**
Bit 7	Partition 8 enable	Bit 0	Faulted (or delayed trip)
Byte 4	**Zone type flags (1)**	Bit 1	Tampered
Bit 0	Fire	Bit 2	Trouble
Bit 1	24 Hour	Bit 3	Bypassed
Bit 2	Key-switch	Bit 4	Inhibited (force armed)
Bit 3	Follower	Bit 5	Low battery
Bit 4	Entry / exit delay 1	Bit 6	Loss of supervision
Bit 5	Entry / exit delay 2	Bit 7	Reserved
Bit 6	Interior	**Byte 8**	**Zone condition flags (2)**
Bit 7	Local only	Bit 0	Alarm memory
Byte 5	**Zone type flags (2)**	Bit 1	Bypass memory
Bit 0	Keypad sounder	Bit 2	Reserved
Bit 1	Yelping siren	Bit 3	Reserved
Bit 2	Steady siren	Bit 4	Reserved
Bit 3	Chime	Bit 5	Reserved
Bit 4	Bypassable	Bit 6	Reserved
Bit 5	Group bypassable	Bit 7	Reserved
Bit 6	Force armable		
Bit 7	Entry guard		

Message number: **05h**
Message name: **Zones Snapshot Message**
Message length: **10 Bytes**
Acknowledged: **Possible**
Description: This message will contain an abbreviated set of information for any group of 16 zones possible on the system. (A zone offset number will set the range of zones)

Byte 1	**Message number**	**Byte 4**	**Zone 3 & 4 status flags** (see byte 3)
Byte 2	**Zone offset (0= start at zone 1)**	**Byte 5**	**Zone 5 & 6 status flags** (see byte 3)
Byte 3	**Zone 1 & 2** (+offset) **status flags**	**Byte 6**	**Zone 7 & 8 status flags** (see byte 3)
Bit 0	Zone 1 faulted (or delayed trip)	**Byte 7**	**Zone 9 & 10 status flags** (see byte 3)
Bit 1	Zone 1 bypass (or inhibited)	**Byte 8**	**Zone 11 & 12 status flags** (see byte 3)
Bit 2	Zone 1 trouble (tamper, low battery, or lost)	**Byte 9**	**Zone 13 & 14 status flags** (see byte 3)
Bit 3	Zone 1 alarm memory	**Byte 10**	**Zone 15 & 16 status flags** (see byte 3)
Bit 4	Zone 2 faulted (or delayed trip)		
Bit 5	Zone 2 bypass (or inhibited)		
Bit 6	Zone 2 trouble (tamper, low battery, or lost)		
Bit 7	Zone 2 alarm memory		

Message number: **06h**
Message name: **Partition Status Message**
Message length: **9 Bytes**
Acknowledged: **Possible**
Description: This message will contain all information relevant to a single partition in the system.

Byte 1	**Message number**	**Byte 6**	**Partition condition flags (4)**
Byte 2	**Partition number (0= partition 1)**	Bit 0	LED extinguish
Byte 3	**Partition condition flags (1)**	Bit 1	Cross timing
Bit 0	Bypass code required	Bit 2	Recent closing being timed
Bit 1	Fire trouble	Bit 3	Reserved
Bit 2	Fire	Bit 4	Exit error triggered
Bit 3	Pulsing Buzzer	Bit 5	Auto home inhibited
Bit 4	TLM fault memory	Bit 6	Sensor low battery
Bit 5	reserved	Bit 7	Sensor lost supervision
Bit 6	Armed	**Byte 7**	**Last user number**
Bit 7	Instant	**Byte 8**	**Partition condition flags (5)**
Byte 4	**Partition condition flags (2)**	Bit 0	Zone bypassed
Bit 0	Previous Alarm	Bit 1	Force arm triggered by auto arm
Bit 1	Siren on	Bit 2	Ready to arm
Bit 2	Steady siren on	Bit 3	Ready to force arm
Bit 3	Alarm memory	Bit 4	Valid PIN accepted
Bit 4	Tamper	Bit 5	Chime on (sounding)
Bit 5	Cancel command entered	Bit 6	Error beep (triple beep)
Bit 6	Code entered	Bit 7	Tone on (activation tone)
Bit 7	Cancel pending	**Byte 9**	**Partition condition flags (6)**
Byte 5	**Partition condition flags (3)**	Bit 0	Entry 1
Bit 0	Reserved	Bit 1	Open period
Bit 1	Silent exit enabled	Bit 2	Alarm sent using phone number 1
Bit 2	Entryguard (stay mode)	Bit 3	Alarm sent using phone number 2
Bit 3	Chime mode on	Bit 4	Alarm sent using phone number 3
Bit 4	Entry	Bit 5	Cancel report is in the stack
Bit 5	Delay expiration warning	Bit 6	Keyswitch armed
Bit 6	Exit1	Bit 7	Delay Trip in progress (common zone)
Bit 7	Exit2		

Message number: **07h**

Message name: **Partitions Snapshot Message**

Message length: **9 Bytes**

Acknowledged: **Possible**

Description: This message will contain an abbreviated set of information for all 8 partitions on the system.

Byte 1	**Message number**	**Byte 3**	**Partition 2 condition flags**
Byte 2	**Partition 1 condition flags**	**Byte 4**	**Partition 3 condition flags**
Bit 0	Partition 1 valid partition	**Byte 5**	**Partition 4 condition flags**
Bit 1	Partition 1 ready	**Byte 6**	**Partition 5 condition flags**
Bit 2	Partition 1 armed	**Byte 7**	**Partition 6 condition flags**
Bit 3	Partition 1 stay mode	**Byte 8**	**Partition 7 condition flags**
Bit 4	Partition 1 chime mode	**Byte 9**	**Partition 8 condition flags**
Bit 5	Partition 1 any entry delay		
Bit 6	Partition 1 any exit delay		
Bit 7	Partition 1 previous alarm		

Message number: **08h**
Message name: **System Status Message**
Message length: **12 Bytes**
Acknowledged: **Possible**
Description: This message will contain all information relevant to the entire system.

Byte 1	**Message number**	**Byte 8**	
Byte 2	**Panel ID number**	Bit 0	Communication since last autotest
Byte 3		Bit 1	Power up delay in progress
Bit 0	Line seizure	Bit 2	Walk test mode
Bit 1	Off hook	Bit 3	Loss of system time
Bit 2	Initial handshake received	Bit 4	Enroll requested
Bit 3	Download in progress	Bit 5	Test fixture mode
Bit 4	Dialer delay in progress	Bit 6	Control shutdown mode
Bit 5	Using backup phone	Bit 7	Timing a cancel window
Bit 6	Listen in active	**Byte 9**	
Bit 7	Two way lockout	Bit 0	reserved
Byte 4		Bit 1	reserved
Bit 0	Ground fault	Bit 2	reserved
Bit 1	Phone fault	Bit 3	reserved
Bit 2	Fail to communicate	Bit 4	reserved
Bit 3	Fuse fault	Bit 5	reserved
Bit 4	Box tamper	Bit 6	reserved
Bit 5	Siren tamper / trouble	Bit 7	Call back in progress
Bit 6	Low Battery	**Byte 10**	
Bit 7	AC fail	Bit 0	Phone line faulted
Byte 5		Bit 1	Voltage present interrupt active
Bit 0	Expander box tamper	Bit 2	House phone off hook
Bit 1	Expander AC failure	Bit 3	Phone line monitor enabled
Bit 2	Expander low battery	Bit 4	Sniffing
Bit 3	Expander loss of supervision	Bit 5	Last read was off hook
Bit 4	Expander auxiliary output over current	Bit 6	Listen in requested
Bit 5	Auxiliary communication channel failure	Bit 7	Listen in trigger
Bit 6	Expander bell fault	**Byte 11**	
Bit 7	Reserved	Bit 0	Valid partition 1
Byte 6		Bit 1	Valid partition 2
Bit 0	6 digit PIN enabled	Bit 2	Valid partition 3
Bit 1	Programming token in use	Bit 3	Valid partition 4
Bit 2	PIN required for local download	Bit 4	Valid partition 5
Bit 3	Global pulsing buzzer	Bit 5	Valid partition 6
Bit 4	Global Siren on	Bit 6	Valid partition 7
Bit 5	Global steady siren	Bit 7	Valid partition 8
Bit 6	Bus device has line seized	**Byte 12**	Communicator stack pointer
Bit 7	Bus device has requested sniff mode		
Byte 7			
Bit 0	Dynamic battery test		
Bit 1	AC power on		
Bit 2	Low battery memory		
Bit 3	Ground fault memory		
Bit 4	Fire alarm verification being timed		
Bit 5	Smoke power reset		
Bit 6	50 Hz line power detected		
Bit 7	Timing a high voltage battery charge		

Message number: **09h**

Message name: **X-10 Message Received**

Message length: **4 Bytes**

Acknowledged: **Yes**

Description: This message contains information about an X-10 command that was requested by any device on the system bus.

Byte 1	**Message number**	**Byte 3**	**Unit code (0=unit 1)**
Byte 2	**House code (0=house A)**	**Byte 4**	**X-10 function code (**see table that follows**)**

Function #	Function performed	Function #	Function performed
08h	All units off	48h	Dim
18h	All lights on	58h	Bright
28h	On	68h	All lights off
38h	Off	All others	Reserved

Message number: **0Ah**

Message name: **Log Event Message**

Message length: **10 Bytes**

Acknowledged: **Possible**

Description: This message will contain all information relating to an event in the log memory.

Byte 1	**Message number**	**Byte 5**	**Zone** / **User** / **Device number**
Byte 2	**Event number of this message**	**Byte 6**	**Partition number** (0=partition 1, if relevant)
Byte 3	**Total log size (number of log entries allowed)**	**Byte 7**	**Month** (1-12)
Byte 4	**Event type**	**Byte 8**	**Day** (1-31)
Bits 0-6	See type definitions in table that follows	**Byte 9**	**Hour** (0-23)
Bit 7	Non-reporting event if not set	**Byte 10**	**Minute** (0-59)

Event Type	Description	Byte 5 Value*	Byte 6 Valid	Event Type	Description	Byte 5 Value*	Byte 6 Valid
0	Alarm	Zone	Yes	34	Telephone fault	None	No
1	Alarm restore	Zone	Yes	35	Telephone fault restore	None	No
2	Bypass	Zone	Yes	36	Expander trouble	Device	No
3	Bypass restore	Zone	Yes	37	Expander trouble restore	Device	No
4	Tamper	Zone	Yes	38	Fail to communicate	None	No
5	Tamper restore	Zone	Yes	39	Log full	None	No
6	Trouble	Zone	Yes	40	Opening	User	Yes
7	Trouble restore	Zone	Yes	41	Closing	User	Yes
8	TX low battery	Zone	Yes	42	Exit error	User	Yes
9	TX low battery restore	Zone	Yes	43	Recent closing	User	Yes
10	Zone lost	Zone	Yes	44	Auto-test	None	No
11	Zone lost restore	Zone	Yes	45	Start program	None	No
12	Start of cross time	Zone	Yes	46	End program	None	No
13	Not used	None	No	47	Start download	None	No
14	Not used	None	No	48	End download	None	No
15	Not used	None	No	49	Cancel	User	Yes
16	Not used	None	No	50	Ground fault	None	No
17	Special expansion event	None	No	51	Ground fault restore	None	No
18	Duress	None	Yes	52	Manual test	None	No
19	Manual fire	None	Yes	53	Closed with zones bypassed	User	Yes
20	Auxiliary 2 panic	None	Yes	54	Start of listen in	None	No
21	Not used	None	No	55	Technician on site	None	No
22	Panic	None	Yes	56	Technician left	None	No
23	Keypad tamper	None	Yes	57	Control power up	None	No
24	Control box tamper	Device	No	58-			
25	Control box tamper restore	Device	No	119	Not used	None	No
26	AC fail	Device	No	120	First to open	User	Yes
27	AC fail restore	Device	No	121	Last to close	User	Yes
28	Low battery	Device	No	122	PIN entered with bit 7 set	User	Yes
29	Low battery restore	Device	No	123	Begin walk-test	None	No
30	Over-current	Device	No	124	End walk-test	None	No
31	Over-current restore	Device	No	125	Re-exit	None	Yes
32	Siren tamper	Device	No	126	Output trip	User	No
33	Siren tamper restore	Device	No	127	Data lost	None	No

* In the case of a User or Zone number, 0=1. Device numbers require no offset.

Message number: **0Bh**
Message name: **Keypad Message Received**
Message length: **3 Bytes**
Acknowledged: **Yes**
Description: This message contains a keystroke from a keypad that is in a Terminal Mode.

Byte 1	**Message number**	**Byte 3**	**Key value**
Byte 2	**Keypad address**		

Key value	Key pressed	Key value	Key pressed
00H	Terminal mode '0' key	0BH	Terminal mode 'Chime' key
01H	Terminal mode '1' key	0CH	Terminal mode 'Exit' key
02H	Terminal mode '2' key	0DH	Terminal mode 'Bypass' key
03H	Terminal mode '3' key	0EH	Terminal mode 'Cancel' key
04H	Terminal mode '4' key	0FH	Terminal mode 'Fire' key
05H	Terminal mode '5' key	10H	Terminal mode 'Medic' key
06H	Terminal mode '6' key	11H	Terminal mode 'Police' key
07H	Terminal mode '7' key	12H	Terminal mode '*' key
08H	Terminal mode '8' key	13H	Terminal mode '#' key
09H	Terminal mode '9' key	14H	Terminal mode 'Up' key
0AH	Terminal mode 'Stay' key	15H	Terminal mode 'Down' key

Message number: **10h**
Message name: **Program Data Reply**
Message length: **13 Bytes**
Acknowledged: **Yes**
Description: This message will contain a system device's buss address, logical location, and program data that was previously requested (via Program Data Request (3Ch)).

Byte 1	**Message number**			**Byte 6**	**Data byte**
Byte 2	**Device's buss address**			**Byte 7**	**Data byte**
Byte 3	**Upper logical location / offset**			**Byte 8**	**Data byte**
Bits 0-3	Bits 8-11 of logical location			**Byte 9**	**Data byte**
Bit 4	Segment size (0=byte, 1=nibble)			**Byte 10**	**Data byte**
Bit 5	Must be 0			**Byte 11**	**Data byte**
Bit 6	Segment offset (0-none, 1=8 bytes)			**Byte 12**	**Data byte**
Bit 7	Must be 0			**Byte 13**	**Data byte**
Byte 4	**Bits 0-7 of logical location**				
Byte 5	**Location length / data type**				
Bits 0-4	Number of segments in location (0=1 segment)				
Bits 5-7	Data type :	2=Hexadecimal	5=unused		
	0=Binary	3=ASCII	6=unused		
	1=Decimal	4=unused	7=unused		

Message number: **12h**
Message name: **User Information Reply**
Message length: **7 Bytes**
Acknowledged: **No**
Description: This message will contain all digits, attributes and partitions for the requested user PIN number that was previously requested (via User Information Request with(out) PIN (32h,33h)).

Byte 1	**Message number**	**Byte 6***	**Authority flags** (if bit 7 is set)
Byte 2	**User Number** (1=user 1)	Bit 0	Output 1 enable
Byte 3	**PIN digits 1 & 2**	Bit 1	Output 2 enable
Bits 0-3	PIN digit 1	Bit 2	Output 3 enable
Bits 4-7	PIN digit 2	Bit 3	Output 4 enable
Byte 4	**PIN digits 3 & 4**	Bit 4	Arm / disarm
Bits 0-3	PIN digit 3	Bit 5	Bypass enable
Bits 4-7	PIN digit 4	Bit 6	Open / close report enable
Byte 5	**PIN digits 5 & 6**	Bit 7	Must be a 1
Bits 0-3	PIN digit 5 (pad with 0 if 4 digit PIN)	**Byte 7**	**Authorized partition(s) mask**
Bits 4-7	PIN digit 6 (pad with 0 if 4 digit PIN)	Bit 0	Authorized for partition 1
Byte 6*	**Authority flags** (if bit 7 is clear)	Bit 1	Authorized for partition 2
Bit 0	Reserved	Bit 2	Authorized for partition 3
Bit 1	Arm only	Bit 3	Authorized for partition 4
Bit 2	Arm only (during close window)	Bit 4	Authorized for partition 5
Bit 3	Master / program	Bit 5	Authorized for partition 6
Bit 4	Arm / disarm	Bit 6	Authorized for partition 7
Bit 5	Bypass enable	Bit 7	Authorized for partition 8
Bit 6	Open / close report enable		
Bit 7	Must be a 0		

Message number: **1Ch**
Message name: **Command / Request Failed**
Message length: **1 Byte**
Acknowledged: **No**
Description: This message is sent in place of a 'Positive Acknowledge' message when a command or request was received properly, but the system was unable to carry out the task correctly. This would normally occur 2.5 seconds after receiving the initial command or request.

Byte 1	**Message number**		

Message number: **1Dh**
Message name: **Positive Acknowledge**
Message length: **1 Byte**
Acknowledged: **No**
Description: This message will acknowledge receipt of a message that had the 'Acknowledge Required' flag set in the command byte.

Byte 1	**Message number**		

Message number: 1Eh
Message name: **Negative Acknowledge**
Message length: **1 Byte**
Acknowledged: **No**
Description: This message is sent in place of a 'Positive Acknowledge' message when the message received was not properly formatted. It will also be sent if an additional message is received before a reply has been returned during the 2.5 second allowable reply period of a previous message. An 'Implied Negative Acknowledge' is assumed when no acknowledge is returned with 3 seconds.

Byte 1	**Message number**		

Message number: **1Fh**
Message name: Message Rejected
Message length: **1 Byte**
Acknowledged: **No**
Description: This message is sent in place of a 'Positive Acknowledge' message when the message was received properly formatted, but not supported or disabled.

Byte 1	**Message number**		

Message number: **21h**
Message name: **Interface Configuration Message**
Message length: **1 Byte**
Acknowledged: **No**
Description: This request will cause the return of the Interface Configuration Message (01h) containing information about the options selected on the interface.

Byte 1	Message number		

Message number: **23h**
Message name: **Zone Name Request**
Message length: **2 Bytes**
Acknowledged: **No**
Description: This request will cause the return of the Zone Name Message (03h) for the zone number that was requested.

Byte 1	Message number	Byte 2	Zone number (0= zone 1)

Message number: **24h**
Message name: **Zone Status Request**
Message length: **2 Bytes**
Acknowledged: **No**
Description: This request will cause the return of the Zone Status Message (04h) for the zone number that was requested.

Byte 1	Message number	Byte 2	Zone number (0= zone 1)

Message number: **25h**
Message name: **Zones Snapshot Request**
Message length: **2 Bytes**
Acknowledged: **No**
Description: This request will cause the return of the Zones Snapshot Message (05h) with the group of zones starting at the zone 1 plus the offset value.

Byte 1	Message number	Byte 2	Zone number offset (0= start at zone 1)

Message number: **26h**
Message name: **Partition Status Request**
Message length: **2 Bytes**
Acknowledged: **No**
Description: This request will cause the return of the Partition Status Message (06h) for the partition number that was requested.

Byte 1	Message number	Byte 2	Partition number (0= partition 1)

Message number: **27h**
Message name: **Partitions Snapshot Request**
Message length: **1 Byte**
Acknowledged: **No**
Description: This request will cause the return of the Partitions Snapshot Message (07h) containing all partitions.

Byte 1	Message number		

Message number: **28h**
Message name: **System Status Request**
Message length: **1 Byte**
Acknowledged: **No**
Description: This request will cause the return of the System Status Message (08h).

Byte 1	**Message number**		

Message number: **29h**
Message name: **Send X-10 Message**
Message length: **4 Bytes**
Acknowledged: **Yes**
Description: This message will contain information about an X-10 command that should be re-sent on the system bus.

Byte 1	**Message number**	**Byte 3**	**Unit code (0=unit 1)**
Byte 2	**House code (0=house A)**	**Byte 4**	**X-10 function code (**see table at message # 0Ah**)**

Message number: **2Ah**
Message name: **Log Event Request**
Message length: **2 Byte**
Acknowledged: **No**
Description: This request will cause the return of the Log Event Message (0Ah).

Byte 1	**Message number**	**Byte 2**	**Event number requested**

Message number: **2Bh**
Message name: **Send Keypad Text Message**
Message length: **12 Bytes**
Acknowledged: **Yes**
Description: This message will contain ASCII text for a specific keypad on the bus that will be displayed during Terminal Mode.

Byte 1	**Message number**	**Byte 7**	**ASCII character for location +2**
Byte 2	**Keypad address**	**Byte 8**	**ASCII character for location +3**
Byte 3	**Keypad type (0=NX-148e)(all others not supported)**	**Byte 9**	**ASCII character for location +4**
Byte 4	**Display storage location (0=top left corner**	**Byte 10**	**ASCII character for location +5**
Byte 5	**ASCII character for location +0**	**Byte 11**	**ASCII character for location +6**
Byte 6	**ASCII character for location +1**	**Byte 12**	**ASCII character for location +7**

Message number: **2Ch**
Message name: **Keypad Terminal Mode Request**
Message length: **3 Bytes**
Acknowledged: **Yes**
Description: This message will contain the address of a keypad that should enter a Terminal Mode for the time contained. Only one keypad should be in the Terminal Mode at a time.

Byte 1	**Message number**	**Byte 3**	**Number of seconds for Terminal Mode**
Byte 2	**Keypad address**		

Message number: **30h**
Message name: **Program Data Request**
Message length: **4 Bytes**
Acknowledged: **No**
Description: This message will contain a system device's buss address and the logical location of program data that will be returned in a Program Data Reply message (10h).

Byte 1	**Message number**	**Byte 4**	**Bits 0-7 of logical location**
Byte 2	**Device's buss address**		
Byte 3	**Upper logical location / offset**		
Bits 0-3	Bits 8-11 of logical location		
Bits 4,5	Must be 0		
Bit 6	Segment offset (0-none, 1=8 bytes)		
Bit 7	Must be 0		

Message number: **31h**
Message name: **Program Data Command**
Message length: **13 Bytes**
Acknowledged: **Yes**
Description: This message will contain a system device's buss address and the logical location where the included data should be stored.

Byte 1	**Message number**			**Byte 6**	**Data byte 1 to store**
Byte 2	**Device's buss address**			**Byte 7**	**Data byte 2 to store**
Byte 3	**Upper logical location / offset**			**Byte 8**	**Data byte 3 to store**
Bits 0-3	Bits 8-11 of logical location			**Byte 9**	**Data byte 4 to store**
Bit 4	Segment size (0=byte, 1=nibble)			**Byte 10**	**Data byte 5 to store**
Bit 5	Must be 1			**Byte 11**	**Data byte 6 to store**
Bit 6	Segment offset (0-none, 1=8 bytes)			**Byte 12**	**Data byte 7 to store**
Bit 7	Must be 0			**Byte 13**	**Data byte 8 to store**
Byte 4	**Bits 0-7 of logical location**				
Byte 5	**Location length / data type**				
Bits 0-4	Number of segments in location (0=1 segment)				
Bits 5-7	Data type :	2=Hexadecimal	5=unused		
	0=Binary	3=ASCII	6=unused		
	1=Decimal	4=unused	7=unused		

Message number: **32h**
Message name: **User Information Request with PIN**
Message length: **5 Bytes**
Acknowledged: **No**
Description: This message will contain a user number for which information is being requested and a PIN that will be checked for Master capability before proceeding. The information will be returned in a User Information Reply message (12h).

Byte 1	**Message number**	**Byte 4**	**(Master) PIN digits 5 & 6**
Byte 2	**(Master) PIN digits 1 & 2**	Bits 0-3	PIN digit 5 (pad with 0 if 4 digit PIN)
Bits 0-3	PIN digit 1	Bits 4-7	PIN digit 6 (pad with 0 if 4 digit PIN)
Bits 4-7	PIN digit 2	**Byte 5**	**User number** (1=user 1)
Byte 3	**(Master) PIN digits 3 & 4**		
Bits 0-3	PIN digit 3		
Bits 4-7	PIN digit 4		

Message number: **33h**
Message name: **User Information Request without PIN**
Message length: **2 Bytes**
Acknowledged: **No**
Description: This message will contain a user number for which information is being requested, no authentication will be performed. The information will be returned in a User Information Reply message (12h).

Byte 1	**Message number**	**Byte 2**	**User number** (1=user 1)

Message number: **34h**
Message name: **Set User Code Command with PIN**
Message length: **8 Bytes**
Acknowledged: **Yes**
Description: This message will contain all digits that should be stored as the new code for the designated User number. A PIN will be checked for Master capability before proceeding. A successful programming of the user code will result in the User Information Reply (12h) returned in place of the acknowledge.

Byte 1	**Message number**	**Byte 5**	**User number** (1=user 1)
Byte 2	**(Master) PIN digits 1 & 2**	**Byte 6**	**PIN digits 1 & 2**
Bits 0-3	PIN digit 1	Bits 0-3	PIN digit 1
Bits 4-7	PIN digit 2	Bits 4-7	PIN digit 2
Byte 3	**(Master) PIN digits 3 & 4**	**Byte 7**	**PIN digits 3 & 4**
Bits 0-3	PIN digit 3	Bits 0-3	PIN digit 3
Bits 4-7	PIN digit 4	Bits 4-7	PIN digit 4
Byte 4	**(Master) PIN digits 5 & 6**	**Byte 8**	**PIN digits 5 & 6**
Bits 0-3	PIN digit 5 (pad with 0 if 4 digit PIN)	Bits 0-3	PIN digit 5 (pad with 0 if 4 digit PIN)
Bits 4-7	PIN digit 6 (pad with 0 if 4 digit PIN)	Bits 4-7	PIN digit 6 (pad with 0 if 4 digit PIN)

Message number: **35h**
Message name: **Set User Code Command without PIN**
Message length: **5 Bytes**
Acknowledged: **Yes**
Description: This message will contain all digits that should be stored as the new code for the designated User number. No authentication will be performed. A successful programming of the user code will result in the User Information Reply (12h) returned in place of the acknowledge.

Byte 1	**Message number**	**Byte 4**	**PIN digits 3 & 4**
Byte 2	**User number** (1=user 1)	Bits 0-3	PIN digit 3
Byte 3	**PIN digits 1 & 2**	Bits 4-7	PIN digit 4
Bits 0-3	PIN digit 1	**Byte 5**	**PIN digits 5 & 6**
Bits 4-7	PIN digit 2	Bits 0-3	PIN digit 5 (pad with 0 if 4 digit PIN)
		Bits 4-7	PIN digit 6 (pad with 0 if 4 digit PIN)

Message number: **36h**

Message name: **Set User Authorization Command with PIN**

Message length: **7 Bytes**

Acknowledged: **Yes**

Description: This message will contain all attributes and partitions that should be stored as the new information for the designated User number. A PIN will be checked for Master capability before proceeding.

Byte 1	**Message number**	**Byte 6***	**Authority flags** (if bit 7 is clear)
Byte 2	**(Master) PIN digits 1 & 2**	Bit 0	Reserved
Bits 0-3	PIN digit 1	Bit 1	Arm only
Bits 4-7	PIN digit 2	Bit 2	Arm only (during close window)
Byte 3	**(Master) PIN digits 3 & 4**	Bit 3	Master / program
Bits 0-3	PIN digit 3	Bit 4	Arm / disarm
Bits 4-7	PIN digit 4	Bit 5	Bypass enable
Byte 4	**(Master) PIN digits 5 & 6**	Bit 6	Open / close report enable
Bits 0-3	PIN digit 5 (pad with 0 if 4 digit PIN)	Bit 7	Must be a 0
Bits 4-7	PIN digit 6 (pad with 0 if 4 digit PIN)	**Byte 7**	**Authorized partition(s) mask**
Byte 5	**User number** (1=user 1)	Bit 0	Authorized for partition 1
Byte 6*	**Authority flags** (if bit 7 is set)	Bit 1	Authorized for partition 2
Bit 0	Output 1 enable	Bit 2	Authorized for partition 3
Bit 1	Output 2 enable	Bit 3	Authorized for partition 4
Bit 2	Output 3 enable	Bit 4	Authorized for partition 5
Bit 3	Output 4 enable	Bit 5	Authorized for partition 6
Bit 4	Arm / disarm	Bit 6	Authorized for partition 7
Bit 5	Bypass enable	Bit 7	Authorized for partition 8
Bit 6	Open / close report enable		
Bit 7	Must be a 1		

Message number: **37h**

Message name: **Set User Authorization Command without PIN**

Message length: **4 Bytes**

Acknowledged: **Yes**

Description: This message will contain all attributes and partitions that should be stored as the new information for the designated User number. No authentication will be performed.

Byte 1	**Message number**	**Byte 3***	**Authority flags** (if bit 7 is set)
Byte 2	**User number** (1=user 1)	Bit 0	Output 1 enable
Byte 3*	**Authority flags** (if bit 7 is clear)	Bit 1	Output 2 enable
Bit 0	Reserved	Bit 2	Output 3 enable
Bit 1	Arm only	Bit 3	Output 4 enable
Bit 2	Arm only (during close window)	Bit 4	Arm / disarm
Bit 3	Master / program	Bit 5	Bypass enable
Bit 4	Arm / disarm	Bit 6	Open / close report enable
Bit 5	Bypass enable	Bit 7	Must be a 1
Bit 6	Open / close report enable	**Byte 4**	**Authorized partition(s) mask**
Bit 7	Must be a 0	Bit 0	Authorized for partition 1
		Bit 1	Authorized for partition 2
		Bit 2	Authorized for partition 3
		Bit 3	Authorized for partition 4
		Bit 4	Authorized for partition 5
		Bit 5	Authorized for partition 6
		Bit 6	Authorized for partition 7
		Bit 7	Authorized for partition 8

Message number: **3Ah**

Message name: **Store Communication Event Command**

Message length: **6 Bytes**

Acknowledged: **Yes**

Description: This message will submit an event to the control's communication stack for possible transmission over its telephone or alternate communications path.

Byte 1	**Message number**	**Byte 4**	**Zone / User / Device number**
Byte 2	**Partition number** (0=partition 1, if relevant)	**Byte 5**	**Data byte 1**
Byte 3	**Event type**	**Byte 6**	**Data byte 2**
Bits 0-6	See type definitions in message 0Ah		
Bit 7	Non-reporting event if set		

*notes:

If Event Type is not equal to 11h (17), data bytes 1 and 2 are unused.

If Event Type is equal to 11h (17) then:

Partition number
- Bit 0-3: Phone selector group number
- Bit 4-6: Partition
- Bit 7: Set for listen in event

And,

If Format is Contact ID:

Data1
- Bit 0-3: Event code 100's digit
- Bit 4-7: 1 for new event 3 for new restore

Data2
- Bit 0-3: Event code 1's digit
- Bit 0-3: Event code 10's digit

IF SIA DCS:

Data1 Bit 0-7: New event first character

Data2 Bit 0-7: New event second character

Message number: **3Bh**

Message name: **Set Clock / Calendar Command**

Message length: **7 Bytes**

Acknowledged: **Yes**

Description: This message will set the clock / calendar in the system.

Byte 1	**Message number**	**Byte 5**	**Hour** (0-23)
Byte 2	**Year** (00-99)	**Byte 6**	**Minute** (0-59)
Byte 3	**Month** (1-12)	**Byte 7**	**Day of week** (1=Sunday)
Byte 4	**Day** (1-31)		

Message number: **3Ch**
Message name: **Primary Keypad Function with PIN**
Message length: **6 Bytes**
Acknowledged: **Yes**
Description: This message will contain a value that defines with function to perform, the partitions to use and a PIN value for the validation.

Byte 1	**Message number**	**Byte 5**	**Keypad function #** (see table that follows)
Byte 2	**PIN digits 1 & 2**	**Byte 6**	**Partition mask**
Bits 0-3	PIN digit 1	Bit 0	Perform on partition 1 (if PIN has access)
Bits 4-7	PIN digit 2	Bit 1	Perform on partition 2 (if PIN has access)
Byte 3	**PIN digits 3 & 4**	Bit 2	Perform on partition 3 (if PIN has access)
Bits 0-3	PIN digit 3	Bit 3	Perform on partition 4 (if PIN has access)
Bits 4-7	PIN digit 4	Bit 4	Perform on partition 5 (if PIN has access)
Byte 4	**PIN digits 5 & 6**	Bit 5	Perform on partition 6 (if PIN has access)
Bits 0-3	PIN digit 5 (pad with 0 if 4 digit PIN)	Bit 6	Perform on partition 7 (if PIN has access)
Bits 4-7	PIN digit 6 (pad with 0 if 4 digit PIN)	Bit 7	Perform on partition 8 (if PIN has access)

Function #	**Function performed**	**Function #**	**Function performed**
00h	Turn off any sounder or alarm	05h	Initiate auto-arm
01h	Disarm	06h	Start walk-test mode
02h	Arm in away mode	07h	Stop walk-test mode
03h	Arm in stay mode		
04h	Cancel	08h-FFh	Reserved

Message number: **3Dh**
Message name: **Primary Keypad Function without PIN**
Message length: **4 Bytes**
Acknowledged: **Yes**
Description: This message will contain a value that defines with function to perform, the partitions and user number to assign to the function.

Byte 1	**Message number**	**Byte 4**	**User number**
Byte 2	**Keypad function #** (see above table)		
Byte 3	**Partition mask**		
Bit 0	Perform on partition		
Bit 1	Perform on partition 2		
Bit 2	Perform on partition 3		
Bit 3	Perform on partition 4		
Bit 4	Perform on partition 5		
Bit 5	Perform on partition 6		
Bit 6	Perform on partition 7		
Bit 7	Perform on partition 8		

Message number: **3Eh**
Message name: **Secondary Keypad Function**
Message length: **3 Bytes**
Acknowledged: **Yes**
Description: This message will contain a value that defines with function to perform, and the partitions to use.

Byte 1	**Message number**		
Byte 2	**Keypad function # (**see table that follows**)**		
Byte 3	**Partition mask**		
Bit 0	Perform on partition 1		
Bit 1	Perform on partition 2		
Bit 2	Perform on partition 3		
Bit 3	Perform on partition 4		
Bit 4	Perform on partition 5		
Bit 5	Perform on partition 6		
Bit 6	Perform on partition 7		
Bit 7	Perform on partition 8		

Function #	Function performed	Function #	Function performed
00h	Stay (1 button arm / toggle interiors)	0Ah	Enable silent exit (for this arm cycle)
01h	Chime (toggle chime mode)	0Bh	Perform test
02h	Exit (1 button arm / toggle instant)	0Ch	Group bypass
03h	Bypass interiors	0Dh	Auxiliary function 1
04h	Fire panic	0Eh	Auxiliary function 2
05h	Medical panic	0Fh	Start keypad sounder
06h	Police panic		
07h	Smoke detector reset		
08h	Auto callback download		
09h	Manual pickup download	10h-FFh	Reserved

Message number: **3Fh**
Message name: **Zone Bypass Toggle**
Message length: **2 Bytes**
Acknowledged: **Yes**
Description: This message will contain a number of a zone that should be (un)bypassed.

Byte 1	**Message number**	**Byte 2**	**Zone number (0= zone 1)**