Pentair ScreenLogic IP Communication Protocol

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1 General Comments

All numeric data is transmitted in little endian format. Unless otherwise specified, it should be assumed that it is in little endian format. Assume that integers are 4 bytes and shorts is 2 bytes. When describing the messages to be sent or received, Anything in square brackets should be interpreted as comments, clarifying what each field means.

2 Find Pentair Systems on LAN

To locate the Pentair system, broadcast the system locator UDP datagram. The server will then respond as described below.

System Locator Datagram:

- **Address:** 255.255.255.255
- **Port:** 1444
- **Data:** Size - 8 bytes. Given below in order –

0	1	2	3	4	5	6	7
1	0	0	0	0	0	0	0

System Locator Response:

- **Data:** Size - 12 bytes. Given below in order –
  - (bytes 0-3) Check digit (CHK)
  - (byte 4) Ip address 1 (IP1)
  - (byte 5) Ip address 2 (IP2)
  - (byte 6) Ip address 3 (IP3)
  - (byte 7) Ip address 4 (IP4)
  - (bytes 8-9) TCP Communication Port (PORT)
  - (byte 10) Gateway Type (GT)]
  - (byte 11) Gateway Subtype (GS)

0 1 2 3	4	5	6	7	8 9	10	11
CHK	IP1	IP2	IP3	IP4	PORT	GT	GS

The Check Digit should be 2 (in little endian format). If it is not, an unknown error occured.

3 Protocol Overview

Typically the pentair intellitouch will communicate on port 80 (though this is allowed to vary). It communicates via the TCP protocol. Connect to the IP address and Port found using the system locator datagram and response. The ScreenLogic will close the connection if no messages are received for a certain amount of time (unknown how long). To prevent being logged out, the client should send a special ping message (MORE ON THIS TO COME). In lieu of the special ping message, for the time being, the client can just sent a request for information it doesn't need to maintain the connection (4.1.14 for example).

3.1 LAN Login

Upon establishing connection with the server, the first communication is the login message. The first message is the incoming connection message, indicating that the next message will be the login message. Here, only the local (LAN) login message is described, but it is possible to send a remote login as well.

Initial Connection Message: This message is the string "CONNECTSERVERHOST" followed by CR LF CR LF (ASCII Codes 13 10 13 10).

The server will not respond to this message. In Section 4 the Login message is described as it follows the same format as all other messages.

3.2 Remote Login

Uses port 500 at screenlogicserver.pentair.com.

3.3 Sending and Receiving Messages

Once logged in, you can send and receive the messages described in Section 4. The messages detailed in Section 4 are a subset of all possible messages, which are listed in Appendix A.

The messages are sent and received as the *data section* of a TCP packet. The term *header* when used below will not refer to the TCP headers but rather to the *Pool Message* headers. *Pool Message* refers to messages sent and received from the ScreenLogic2 device after successful login as these messages pertain to pool control and information queries. *Control Messages* refer to messages regarding login, etc to establish a connection with the ScreenLogic. The message format is given in Figure 1.

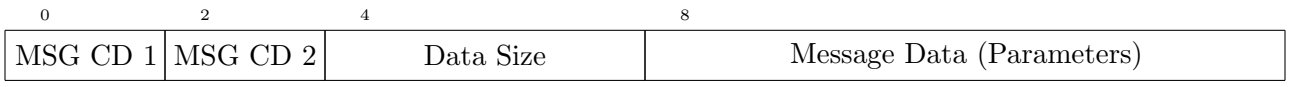

Figure 1: Generic Message Layout. The numbers refer to byte position (word position), *not* bit position. The first four bytes give the message code, but we display it here split into two short-words as this is a useful interpretation.

As shown, all messages consist of an 8 byte header followed optionally by a sequence of data bytes. The first 4 bytes give the message code and the second 4 bytes give the size of the data section (potentially zero).

4 Pool Messages – Pool Data and Pool Control Queries

This section describes messages sent after login for pool control and query. The data (if applicable) for each message will be described as a sequence of *parameters*. These fields appear in order in the data portion of the message. The datatype of the field will be given before it. The data-types given should be interpreted as the sizes in ISO C or Java. There is no padding between data elements as the message codes will indicate how the data section is to be read by the recipient.

With regards to Strings, the encoding is one byte per character. The string encoding is preceded by an integer representing the string length. Finally, the encoding of the string portion is padded to be a multiple of 4. See Figure 2.

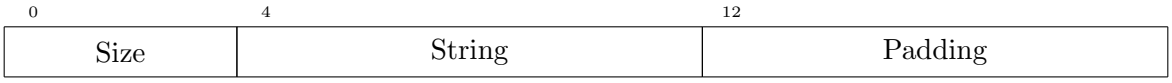

Figure 2: String Encoding Layout.

With regards to Times, the encoding is one short-integer (2 bytes) per field in the following order: Year, Month, Day of the Week (0-6), Day, Hour, Minute, Second, Millisecond. See Figure 3

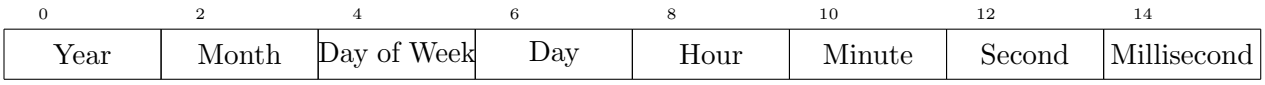

Figure 3: Time Encoding Layout.

The messages described in this section are the message codes listed in A. Not all codes appear to be used, but it is possible the server might respond. The format of each message description will be

Message Codes: MSG CD 1,MSG CD 2
Parameters:

- (type 1) Field 1
- (type 2) Field 2
  .....

4.1 Client Messages

Messages sent from the client to the ScreenLogic.

4.1.1 Add Client (Query)

Message Codes: 0,12522
Parameters:

- (int) Controller Index [use 0]
- (int) Sender ID

4.1.2 Button Press (Query)

Sends button press to ScreenLogic. Use to control turning circuits on and off.
Message Codes: 0,12530
Parameters:

- (int) Controller Index [use 0]
- (int) Circuit ID
- (int) New State [0 == Off, 1 == On]

4.1.3 Color Lights Command (Query)

Message Codes: ID,12556
Parameters:

- (int) Controller Index [use 0]
- (int) Pool Command

ID can be any random number. Pool Command is the command sent to the lights. 0 = Off, 1 = On, 2 = Set, 3 = Sync, 4 = Swim, 5 = Party, 6 = Romantic, 7 = Caribbean, 8 = American, 9 = Sun, 10 = Royal, 11 = Save, 12 = Recall, 13 = Blue, 14 = Green, 15 = Red, 16 = White, 17 = Magenta, 18 = Thumper, 19 = Next Mode, 20 = Reset, 21 = Hold. See IntelliBrite reference for more details on the meanings.

4.1.4 Configure Light (Query)

Message Codes: 0,12554
Appears to be unused.

4.1.5 Delete Scheduled Event By ID (Query)

Message Codes: 0,12546
Parameters:

- (int) 0
- (int) Event ID

4.1.6 Enable Remotes (Query)

Message Codes: 0,12578
Appears to be unused.

4.1.7 Get All Custom Names (Query)

Message Codes: 0,12562
Appears to be unused.

4.1.8 Get All Errors (Query)

Message Codes: 0,12582
Appears to be unused.

4.1.9 Get All Chem Data (Query)

Message Codes: 0,12592
Parameters:

- (int) Controller Index [use 0]

4.1.10 Get Chem History Data (Query)

Message Codes: 0,12596
Appears to be unused.

4.1.11 Get Circuit Definitions (Query)

Message Codes: 0,12510
Appears to be unused.

4.1.12 Get Circuit Info By ID (Query)

Message Codes: 0,12518
Appears to be unused.

4.1.13 Get Circuit Names (Query)

Message Codes: 0,12560
Appears to be unused.

4.1.14 Get Controller Configuration (Query)

Message Codes: 0,12532
Parameters:

- (int) 0
- (int) 0

4.1.15 Get Equipment Configuration (Query)

Message Codes: 0,12566
Appears to be unused.

4.1.16 Get History (Query)

Message Codes: 0,12534
Parameters:

- (int) Controller Index [use 0]
- (Time) Start Time
- (Time) End Time
- (int) Sender ID

Sender ID is not important.

4.1.17 Get N Circuits (Query)

Message Codes: 0,12558
Appears to be unused.

4.1.18 Get Pump Status (Query)

Message Codes: 0,12584
Appears to be unused.

4.1.19 Get SCG Configuration (Query)

Message Codes: 0,12572
Parameters:

- (int) Controller Index [use 0]

4.1.20 Get Schedule Data (Query)

Message Codes: 0,12542
Parameters:

- (int) 0
- (int) 0

4.1.21 Get Status (Query)

Message Codes: 0,12526
Parameters:

- (int) 0

4.1.22 Remove Client (Query)

Message Codes: 0,12524
Parameters:

- (int) Controller Index [Use 0]
- (int) Sender ID

Appears sender ID can be any random number.

4.1.23 Reset House Code (Query)

Message Codes: 0,12588
Appears to be unused.

4.1.24 Set Cal (Query)

Message Codes: 0,12570
Appears to be unused.

4.1.25 Set Chem Data (Query)

Message Codes: 0,12594
Parameters:

- (int) Controller Index [Use 0]
- (int) PH Set Point
- (int) ORP Set Point
- (int) Calcium
- (int) Alkalinity
- (int) Cyanuric
- (int) Salt PPM

See IntelliChlor reference for more information.

4.1.26 Set Circuit Info By ID (Query)

Message Codes: 0,12520
Appears to be unused.

4.1.27 Set Circuit Runtime By ID (Query)

Message Codes: 0,12550
Appears to be unused.

4.1.28 Set Cool Set Point (Query)

Message Codes: 0,12590
Parameters:

- (int) Controller Index [Use 0]
- (int) Body Type
- (int) Temperature

Body Type: 0 = Pool, 1 = Spa.

4.1.29 Set Custom Name (Query)

Message Codes: 0,12564
Appears to be unused.

4.1.30 Set Equipment Configuration (Query)

Message Codes: 0,12568
Appears to be unused.

4.1.31 Set Heat Mode (Query)

Message Codes: 0,12538
Parameters:

- (int) Controller Index [Use 0]
- (int) Body Type
- (int) Mode

Body Type: 0 = Pool, 1 = Spa. Mode: 0 = Off, 1 = Solar, 2 = Solar Preffered, 3 = Heat, 4 = Don't Change.

4.1.32 Set Heat Set Point (Query)

Message Codes: 0,12528
Parameters:

- (int) Controller Index [Use 0]
- (int) Body Type
- (int) Temperature

Body Type: 0 = Pool, 1 = Spa.

4.1.33 Set Pump Flow (Query)

Message Codes: 0,12586
Appears to be unused.

4.1.34 Set SCG Configuration (Query)

Message Codes: 0,12576
Parameters:

- (int) Controller Index [Use 0]
- (int) Pool Output
- (int) Spa Output
- (int) 0
- (int) 0

See IntelliChlor Manual for more information.

4.1.35 Set SCG Enabled (Query)

Message Codes: 0,12574
Appears to be unused.

4.1.36 Set Scheduled Event By ID (Query)

Message Codes: 0,12548
Parameters:

- (int) 0
- (int) Schedule ID
- (int) Start Time [minutes from 12AM?]
- (int) Stop Time [minutes from 12AM?]
- (int) Day Mask [default 127]
- (int) Flags [default 2]
- (int) Heat Command [default 4]
- (int) Heat Set Point

4.2 Server Responses

Here the responses that the Pentair system may send are described.

4.2.1 Chem Data Changed

Message Codes: 0,12505
Parameters:

- (int) Data Size [Should be 42, otherwise invalid message]
- (short) ? [can ignore]
- (short) PH
- (short) ORP
- (short) PH Set Point
- (short) ORP Set Point
- (12 bytes)
- (byte) PH Tank Level
- (byte) ORP Tank Level
- (byte) Saturation
- (short) Calcium
- (short) Cyanuric
- (short) Alkalinity
- (short) Salt PPM / 50
- (short) Temperature
- (byte) Corrosiveneess / Scaling (low bit == scaling, second lowest bit == corrosive)

4.2.2 Pool Color Update

Message Codes: 0,12504
Parameters:

- (int) Mode
- (int) Progress
- (int) Limit
- (string) Text

4.2.3 Color Lights Command (Answer)

Message Codes: 0,12557
Acknowledges receipt of 4.1.3.

4.2.4 Configure Light (Answer)

Message Codes: 0,12555
Appears to be unused.

4.2.5 Delete Scheduled Event By ID (Answer)

Message Codes: 0,12547

4.2.6 Enable Remotes (Answer)

Message Codes: 0,12579
Appears to be unused.

4.2.7 Get All Custom Names (Answer)

Message Codes: 0,12563
Appears to be unused.

4.2.8 Get All Errors (Answer)

Message Codes: 0,12583
Appears to be unused.

4.2.9 Get All Chem Data (Answer)

Message Codes: 0,12593 See message 4.2.1.

4.2.10 Get Chem History Data (Answer)

Message Codes: 0,12597
Appears to be unused.

4.2.11 Get Circuit Definitions (Answer)

Message Codes: 0,12511
Appears to be unused.

4.2.12 Get Circuit Info By ID (Answer)

Message Codes: 0,12519
Appears to be unused.

4.2.13 Get Circuit Names (Answer)

Message Codes: 0,12561
Appears to be unused.

4.2.14 Get Controller Configuration (Answer)

Message Codes: 0,12533
Parameters:

- (int) Controller ID
- (byte) Minimum Set Point (pool?)
- (byte) Maximum Set Point (pool?)
- (byte) Minimum Set Point (spa?)
- (byte) Maximum Set point (spa?)
- (byte) Degree C (?)
- (byte) Controller Type
- (byte) Hardware Type
- (byte) Controller Data (?)
- (byte) Equipment Flags (Most likely indicates IntelliChlor, Intellibrite, etc)
- (String) Generic Circuit Name (Could be called "Water Features")
- (int) Circuit Count
- *(int) Circuit ID*
- *(String) Circuit Name*
  ····· repeated italicized parameters for all circuits
- REMAINDER OF PARAMETERS ENCODE LIGHT COLORS, PUMP INFO, etc. TODO

4.2.15 Get Equipment Configuration (Answer)

Message Codes: 0,12567
Appears to be unused.

4.2.16 Get History (Answer)

Message Codes: ID,12535
Parameters:

- TODO

ID can be any number.

4.2.17 Get N Circuits (Answer)

Message Codes: 0,12559
Appears to be unused.

4.2.18 Get Pump Status (Answer)

Message Codes: 0,12585
Appears to be unused.

4.2.19 Get SCG Configuration (Answer)

Message Codes: 0,12573
Parameters:

- TODO

4.2.20 Get Schedule Data (Answer)

Message Codes: 0,12543
Parameters: TODO

4.2.21 Get Status (Query)

Message Codes: 0,12527
Parameters:

- TODO

4.2.22 History Data

Message Codes: 0,12502
See message 4.2.16.

4.2.23 Remove Client (Answer)

Message Codes: 0,12525
Appears to be unused.

4.2.24 Reset House Code (Answer)

Message Codes: 0,12589
Appears to be unused.

4.2.25 Runtime Changed

Message Codes: 0,12503
Appears to be unused.

4.2.26 Runtime Changed

Message Codes: 0,12501
Appears to be unused.

4.2.27 Set Cal (Answer)

Message Codes: 0,12571
Appears to be unused.

4.2.28 Set Chem Data (Answer)

Message Codes: 0,12595
Appears to be unused.

4.2.29 Set Circuit Info By ID (Answer)

Message Codes: 0,12521
Appears to be unused.

4.2.30 Set Circuit Runtime By ID (Answer)

Message Codes: 0,12551
Appears to be unused.

4.2.31 Set Cool Set Point (Answer)

Message Codes: 0,12591
Appears to be unused.

4.2.32 Set Custom Name (Answer)

Message Codes: 0,12565
Appears to be unused.

4.2.33 Set Equipment Configuration (Answer)

Message Codes: 0,12569
Appears to be unused.

4.2.34 Set Heat Mode (Answer)

Message Codes: 0,12539
Indicates receipt of 4.1.31.

4.2.35 Set Heat Set Point (Answer)

Message Codes: 0,12529
Appears to be unused.

4.2.36 Set Pump Flow (Answer)

Message Codes: 0,12587
Appears to be unused.

4.2.37 Set SCG Configuration (Answer)

Message Codes: 0,12577
Appears to be unused.

4.2.38 Set SCG Enabled (Answer)

Message Codes: 0,12575
Appears to be unused.

4.2.39 Set Scheduled Event By ID (Answer)

Message Codes: 0,12549
Appears to be unused.

4.2.40 Status Changed

Message Codes: 0,12500
Sent when status changes.

5 Other Messages

Other messages that can be sent to and from the ScreenLogic.

5.1 Client Messages

5.1.1 Local Login Message

Message Codes: 0,27
Parameters:

- (int) Schema [use 348]
- (int) Connection type [use 0]
- (String) Client Version [use 'Android']
- (byte[ ]) Data [use array filled with zeros of length 16]
- (int) Process ID [use 2]

5.1.2 Weather Forecast (Query)

Message Codes: 0,9807
Requests weather forecast.

5.1.3 Ping Message (Query)

Message Codes: 0,16
Ping Server at 1600ms intervals to keep connection alive.

5.1.4 Get Controller Mode

Message Codes: 0,110

5.2 Server Responses

5.2.1 MESSAGE - Login Message Accepted

Message Codes: 0,28

5.2.2 Ping Message (Answer)

Message Codes: 0,17
Response to 5.1.3.

5.2.3 Weather Forecast Changed

Message Codes: ?,9806
Can send 5.1.2.

5.2.4 Weather Forecast (Answer)

Message Codes: ?,9808
Parameters:

- TODO

A Full Pool Message Code List

Figure 4 contains a list of all the pool message codes sent and received via the ScreenLogic application. Not all of these are actually used in the current version of the app, but the app internally lists these all as possible message types. Most likely these are all valid message types. The ending "Q" signifies a message that the client can send to the screenlogic. "A" signifies a response message from the ScreenLogic2 interface. To the extent possible, the full message format for each type is given in Section 4.

Name	Message Code 2	Name	Message Code 2
Add Client (Answer)	12523	Add Client (Query)	12522
Add New Scheduled Event (Answer)	12545	Add New Scheduled Event (Query)	12544
Button Press (Answer)	12531	Button Press (Query)	12530
Cancel Delays (Answer)	12581	Cancel Delays (Query)	12580
Chem Data Changed	12505	Chem History Data	12506
Color Lights Command (Answer)	12557	Color Lights Command (Query)	12556
Color Update	12504	Configure Light (Answer)	12555
Configure Light (Query)	12554	Delete Scheduled Event By ID (Answer)	12547
Delete Scheduled Event By ID (Query)	12546	Enable Remotes (Answer)	12579
Enable Remotes (Query)	12578	End	12597
Get All Custom Names (Answer)	12563	Get All Custom Names (Query)	12562
Get All Errors (Answer)	12583	Get All Errors (Query)	12582
Get All Chem Data (Answer)	12593	Get All Chem Data (Query)	12592
Get Chem History Data (Query)	12596	Get Chem History Data (Answer)	12597
Get Circuit Definitions (Answer)	12511	Get Circuit Definitions (Query)	12510
Get Circuit Info By ID (Answer)	12519	Get Circuit Info By ID (Query)	12518
Get Circuit Names (Answer)	12560	Get Circuit Names (Query)	12561
Get Controller Configuration (Answer)	12533	Get Controller Configuration (Query)	12532
Get Equipment Configuration (Answer)	12567	Get Equipment Configuration (Query)	12566
Get History Data (Answer)	12535	Get History Data (Query)	12534
Get N Circuit Names (Answer)	12559	Get N Circuit Names (Query)	12558
Get Pump Status (Answer)	12585	Get Pump Status (Query)	12584
Get SCG Configuration (Answer)	12573	Get SCG Configuration (Query)	12572
Get Schedule Data (Answer)	12543	Get Schedule Data (Query)	12542
Get Status (Answer)	12527	Get Status (Query)	12526
History Data	12502	Remove Client (Answer)	12525
Remove Client (Query)	12524	Reset House Code (Answer)	12589
Reset House Code (Query)	12588	Runtime Changed	12503
Schedule Changed	12501	Set Cal (Answer)	12571
Set Cal (Query)	12570	Set Chem Data (Answer)	12595
Set Chem Data (Query)	12594	Set Circuit Info By ID (Answer)	12521
Set Circuit Info By ID (Query)	12520	Set Circuit Runtime By ID (Answer)	12551
Set Circuit Runtime By ID (Query)	12550	Set Cool SP (Answer)	12591
Set Cool SP (Query)	12590	Set Custom Name (Answer)	12565
Set Custom Name (Query)	12564	Set Equipment Configuration (Answer)	12569
Set Equipment Configuration (Query)	12568	Set Heat Mode (Answer)	12539
Set Heat Mode (Query)	12538	Set Heat SP (Answer)	12529
Set Heat SP (Query)	12528	Set Pump Flow (Answer)	12587
Set Pump Flow (Query)	12586	Set SCG Configuration (Answer)	12577
Set SCG Configuration (Query)	12576	Set SCG Enabled (Answer)	12575
Set SCG Enabled (Query)	12574	Set Scheduled Event By ID (Answer)	12549
Set Scheduled Event By ID (Query)	12548	Start	12500
Status Changed	12500		

Figure 4: All Pool Message Codes