

STACKLINK

LABLINK

USER MANUAL



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WARNING- -










This product may be used only in the manner described in this manual.

When used other than as specified, the safety protections provided by the equipment may be impaired.

TABLE OF SYMBOLS:

The following symbols are to alert your attention to important information or warnings that may present some hazards. These symbols may not appear in the manual or on the product.

 WARNING	Possible hazardous situation could result in serious injury.
 NOTE	A statement that is cautionary; operating tip; instrument damage may occur if not followed.
 HINT	Helpful hints and additional information
 LIST	List of instructions; parts
	Important information
	Specifications
 CAUTION	Electrical Hazard

CHAPTER 1-Introduction

Overview

The StackLink (Figure 1) is an automated microplate stacker, which also drives a high speed, modular and expandable track system that delivers lab ware to multiple laboratory instruments. A part of **LabLinx** track system, the StackLink is capable of handling up to 120 (60 x 2 stacks) 96-well, 384-well or 1536-well standard microliter plates.

The StackLink includes Hudson Robotics' SoftLinx software, which provides an easy-to-use interface to coordinate the LabLinx operation with other automated instruments. Softlinx is written in the Visual Basic for Applications programming language and can run on Windows Vista, Windows 7. The StackLink can be interfaced with readers, washers, liquid handlers, labelers, pipettors, etc.

The StackLink is equipped with optional expandable tracks, known as TrackLinks (Figure 2), as well as up to 8 plate-stop modules called StopLinks (Figure 3). The StopLink uses proximity sensors in line with quick plate catching "fingers" to stop and position the microplate in precise locations.



Figure 1

Tracklink



Figure 2

StopLink



Figure 3

StackLink w/ TrackLink and StopLink options



Figure 4

Computer Requirements

The following are recommended for proper operation of the PlateCrane EX and Softlinx:

- ◆ Operating System: Windows XP SP3, Windows XP x64, Windows Vista 32, Windows Vista 64, Windows 7 32, Windows 7 64
- ◆ 2.5GHz Quad Core Pentium processor or faster, 4GB RAM or higher, CD-Rom drive, 2 available USB Ports
- ◆ 3GB MB of free disk space available
- ◆ .NET Framework 4.0

- ◆ The Computer has the recommended number of working serial ports (You can Purchase USB-to-serial convertors from Hudson Robotics If Needed- Please contact your local Sales Manager)
- ◆ Power and communication cables for third party devices being connected have been verified

External Air Requirements

- ◆ 60 PSI compressed air

Chapter 2-Installation

Unpacking the StackLink

WARNING- -



Power switch must be turned OFF during entire installation procedure
DO NOT loosen or tighten any screws or touch parts not specified in the instructions
Never force any component to fit
The StackLink weighs \approx 30 lbs. and should be handled with care to avoid mishaps

Overview:

1. Remove StackLink from carton (Once you have a firm grasp on the unit gently lift the unit straight up out of the carton. Make sure that the StackLink is separated from the shipping foam)
2. Unpack any other accessories (TrackLinks, StopLinks, Alignment Bases) shipped with the unit.
3. Position the StackLink on the Bench, with the flat side of StackLink facing towards the end user. Unless limited by installation or layout.
4. Install Stack(s) into stack positions 1 and 2 on the unit. Make sure the stacks are securely positioned on the unit. The open top section of the stacks should face out and away from each other. This allows for the end user to remove or add plates easily.
5. Install any TrackLinks included in the system. First, remove the two clamp bars from the StackLink. Slowly slide the TrackLink into the StackLink, make sure that the gear on the StackLink and TrackLink align correctly. Then secure the TrackLink by screwing down the clamp bars back into the StackLink.
6. Position any StopLinks where required by fastening them to the side of the track with the provided Phillips head screws. Plug the modular plug into the desired port on the side of the StackLink.
7. Position the plate stops across from the StopLinks and secure them with the provided Phillip head screws. These plate stops prevent the plate from being pushed off of the track when the StopLinks close.
8. Connect 1/4 "air line tubing supplying a minimum 60psi of compressed air to the regulator located on the rear of the instrument.
9. Connect power cord and communication cable to the rear of the StackLink
10. Install Softlinx Software (see Chapter 3)



NOTE:

Please refer to the parts list to verify that all parts are included in the StackLink carton. If any parts are missing, please contact Hudson Robotics.

DO NOT DISCARD the StackLink carton. This carton has been specially created for this product and must be used for any additional shipping of the instrument to prevent damage.

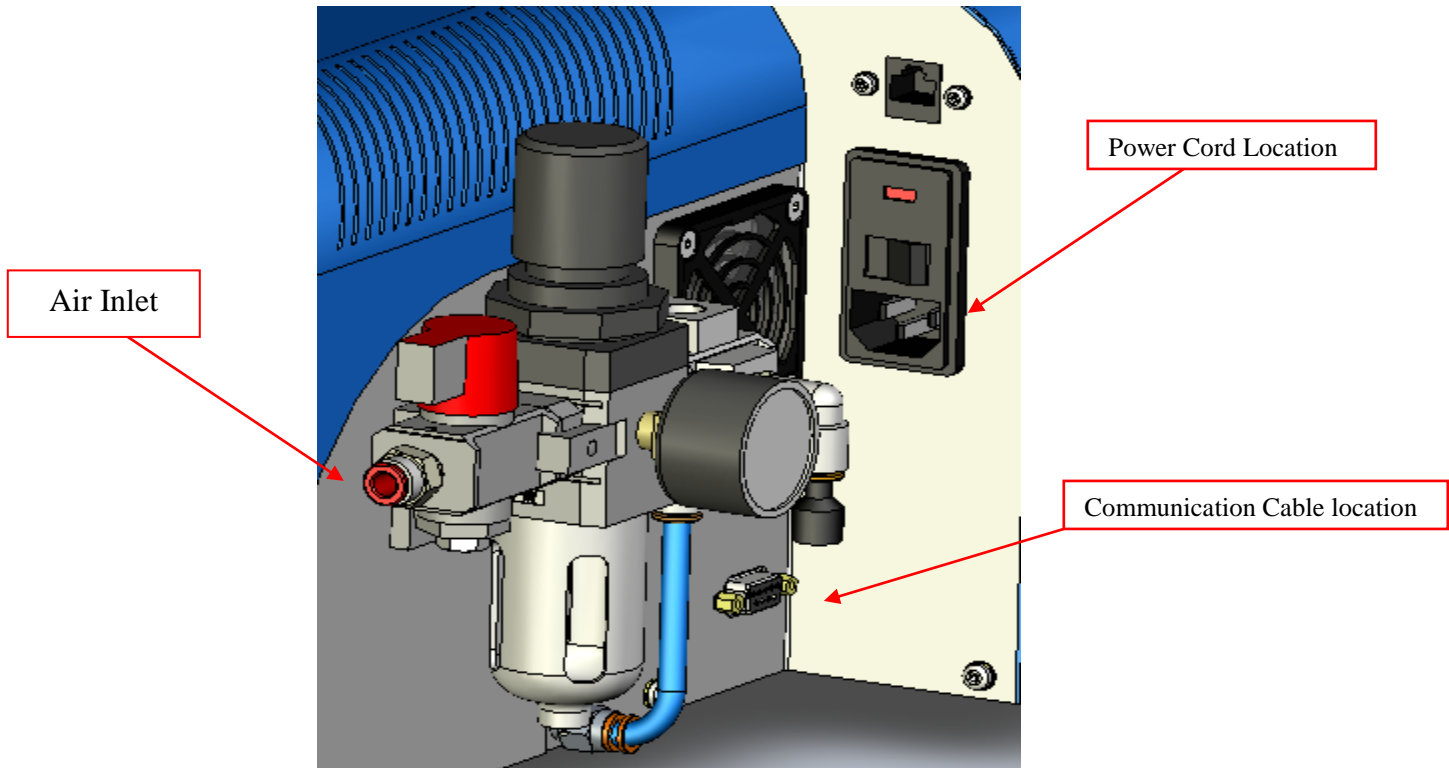


Figure 5

Parts List

The StackLink carton(s) should include the following:

- StackLink
- 2 Extruded Stacks (double Stacks optional)
- Power cord
- Communication cable
- User Manual (This document)
- CD containing Softlinx and interfaces
- StopLink(s) (optional)
- Modular cord for each StopLink (optional)
- Alignment Bases for instrument(s) (optional)
- TrackLinks (optional)
- TrackLink connection assemblies (for linking multiple tracks) (optional)
- Clamp Bars (for securing TrackLinks to StackLink unit)

Setting up the StackLink

- Remove the StackLink from the carton and carefully remove the protective plastic covering.
- Un-wrap any TrackLinks and/or StopLinks included.
- Remove the Stacks from the carton, then remove the stack from the packaging
- Install the supplied Stacks on the StackLink securely.

Setting up the TrackLink(s)

- Position the TrackLink into either side of the StackLink and insert the track so the grooves match and fit into place (Figure 7).

NOTE: Be sure the TrackLink and StackLink gearing is properly positioned and aligned for correct operation

- Secure the track with the included Clamp Bars (Figure 11). Repeat if connecting an additional TrackLink if required.
- Secure the TrackLink to any instrument nests.

NOTE: Calibration and/or origin adjustments may need to be set for these instruments. (I.E. PlateCrane positions, Micro10 dispensing origin, etc.)

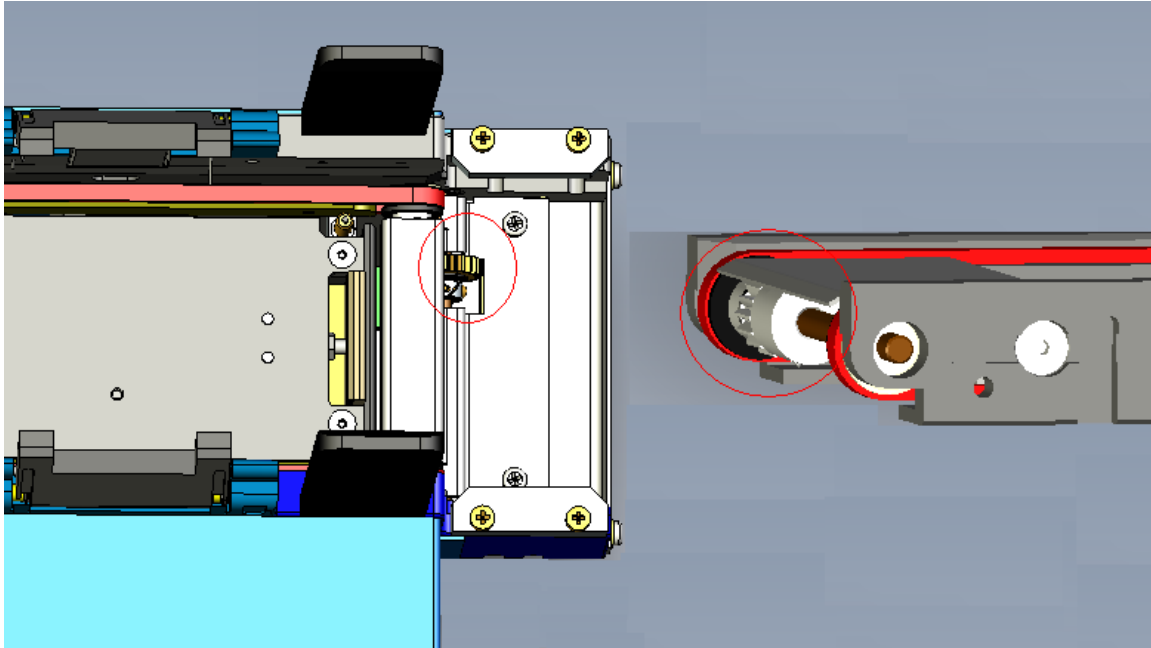


Figure 7

Setting Up StopLink(s)

- Position the StopLink in the desired location on the track and secure its position with the supplied Phillips head screws. (Figure 12)
- Connect modular plugs of the black coiled cable into both the StopLink and the desired port on the side of the StackLink (Figure 9/10).
- Adjustments may be needed depending on the size and type of plates used. Place a plate on the track in front of the StopLink sensor to activate the fingers. Loosen the 2 hex screws on the StopLink (Figure 8) and adjust the width of the sides so the plate is secure between the fingers without any movement.

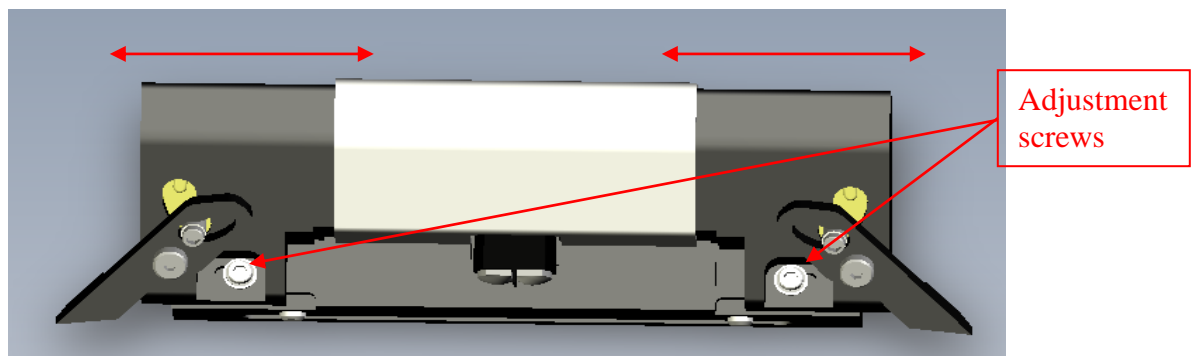


Figure 8

StopLink Positions 1-4

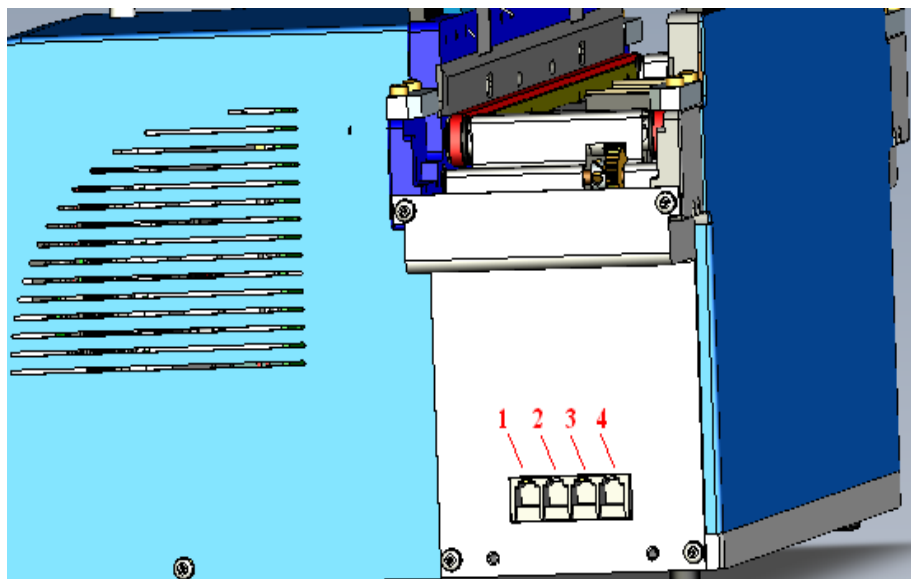


Figure 9

StopLink Positions 7-10

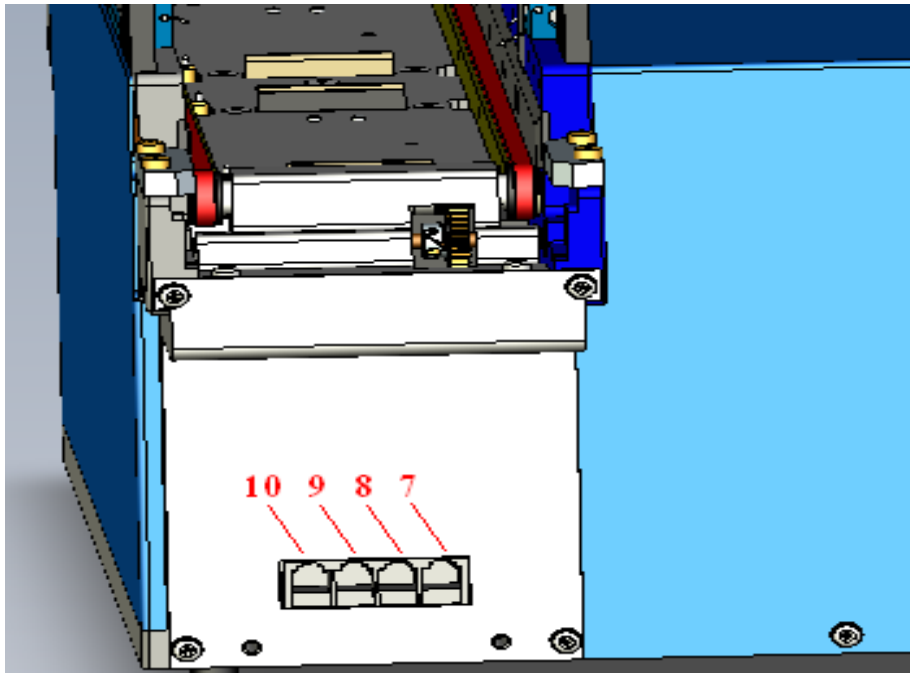


Figure 10

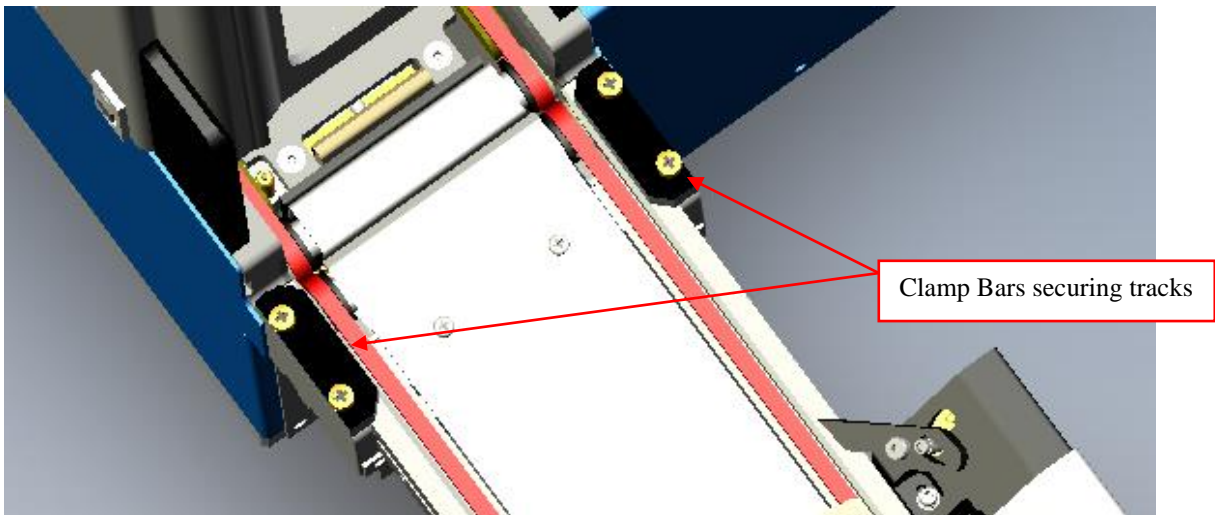


Figure 11

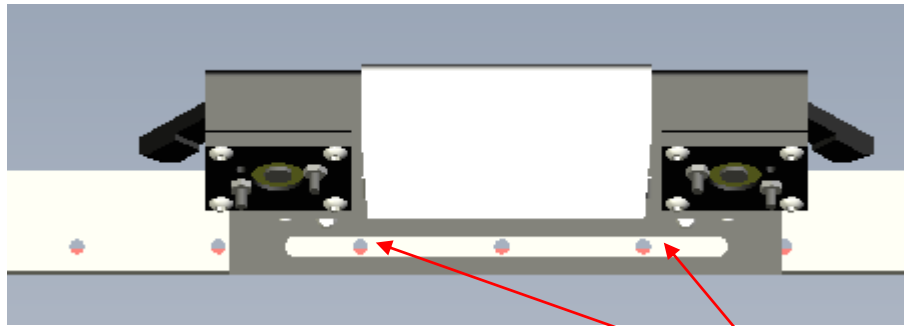


Figure 12

Phillips Head
screws positioning

Connect Power Cord & Communication Cable:

Note: Power switch must be turned OFF

Remove power cord and communication cable from StackLink carton. On the rear side of the base unit housing connect one end of the 9-pin to 9-pin serial cable (see Figure 7), and attach the other end into COM1 port on Host Computer.

Plug power cable into the StackLink's AC inlet located on rear side of the base unit housing (see Figure 7).

Note: The communication cable & power cord should be securely plugged into the StackLink and computer.

Switching AC Line Voltage 110VAC/220VAC

The power supplies installed in the unit are switching power supplies. That means they are able to handle both 110VAC and 220VAC without any changes to their configuration. The Run the StackLink on 220VAC perform the following:








- Make sure the unit is powered off
- Install the power cord that is supplying the 220VAC
- Turn on unit

CHAPTER 3-StackLink Software

Brief Description of Software

Hudson's standard StackLink application software (SoftLinx) can be found on one (1) installation CD. This CD can be loaded onto any PC running Microsoft's Windows 98 SE, NT 4.0. w\ service pack 6, 2000, or XP. This software provides a complete set of utilities to run the StackLink and any instruments purchased by the end user. Hudson's LabLinx is an easy-to-use, dynamic scheduling software program for control of integrated lab automation workcells and systems. LabLinx includes a multitasking core executable combined with device interfaces that are written in VBA (Visual Basic for Applications). The user sets up a method using a drag-and-drop icon-based method editor.

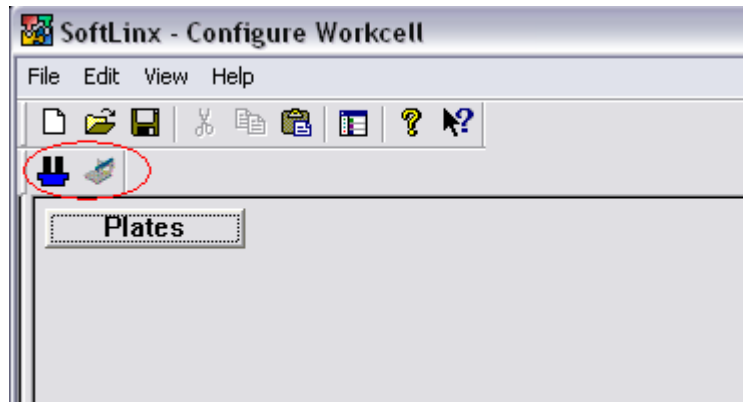
How to Install Software

-  Turn computer ON. Start Windows, if it's not already running.
-  Insert CD into CD-ROM drive, and then close the drawer
-  The CD has an auto run function, so the installation of the software is automatic
-  If the CD does not auto run, then click on the Start menu
-  Click the run menu, then type in the location of the CD and Setup.exe (E:\Setup.exe)
-  Then click OK to start installation
-  Follow instructions as prompted to complete the installation.

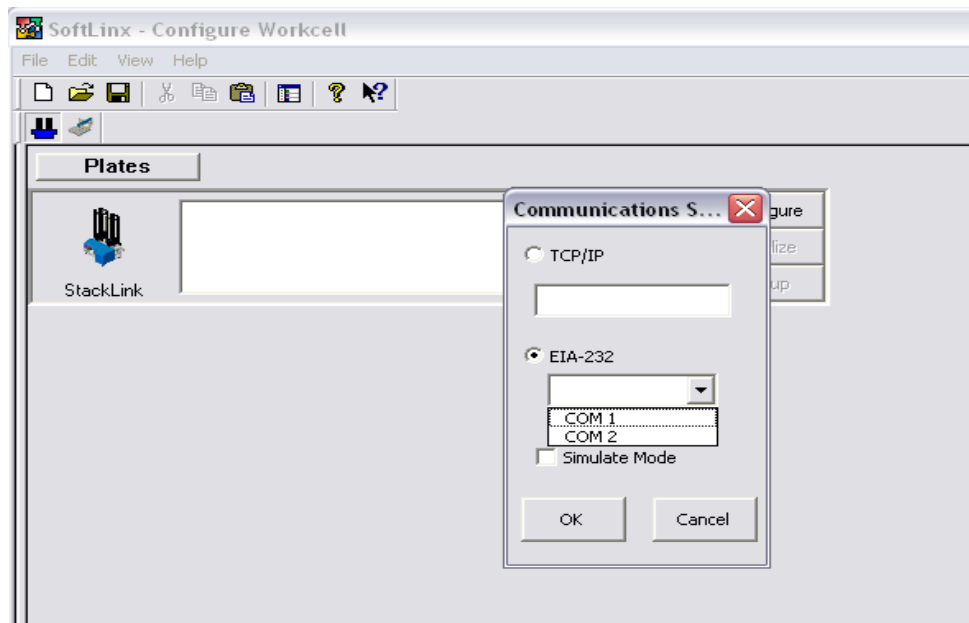
After installing LabLinx, open it by clicking the shortcut installed on your desktop.

Configuring a Workcell

- Click on the Configure Workcell icon on the screen.

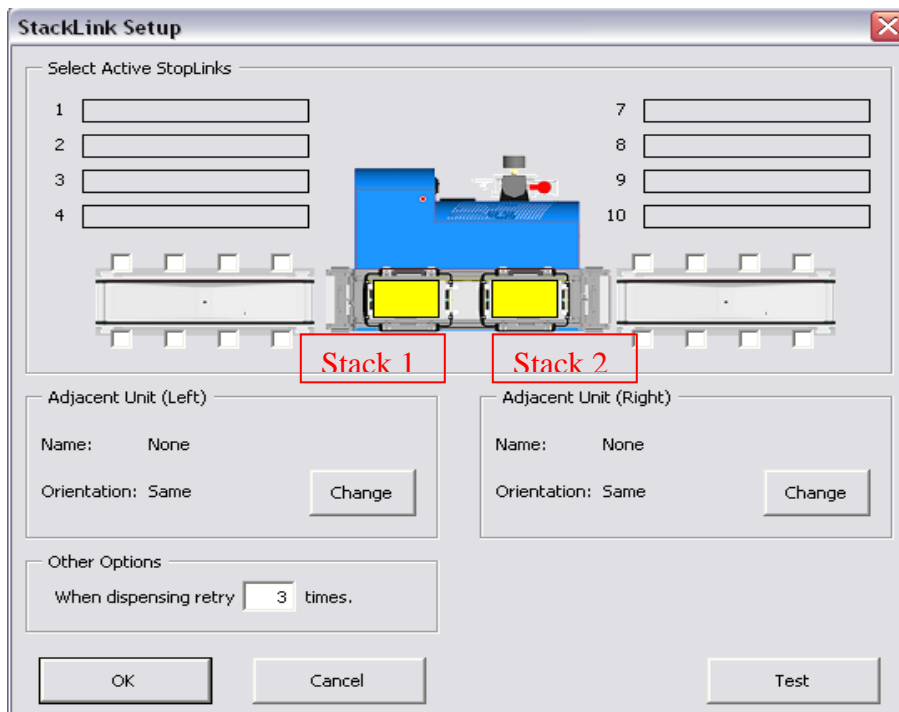


- Click and drag the corresponding icon for each instrument into the workcell and select the communication port the instrument is assigned to.

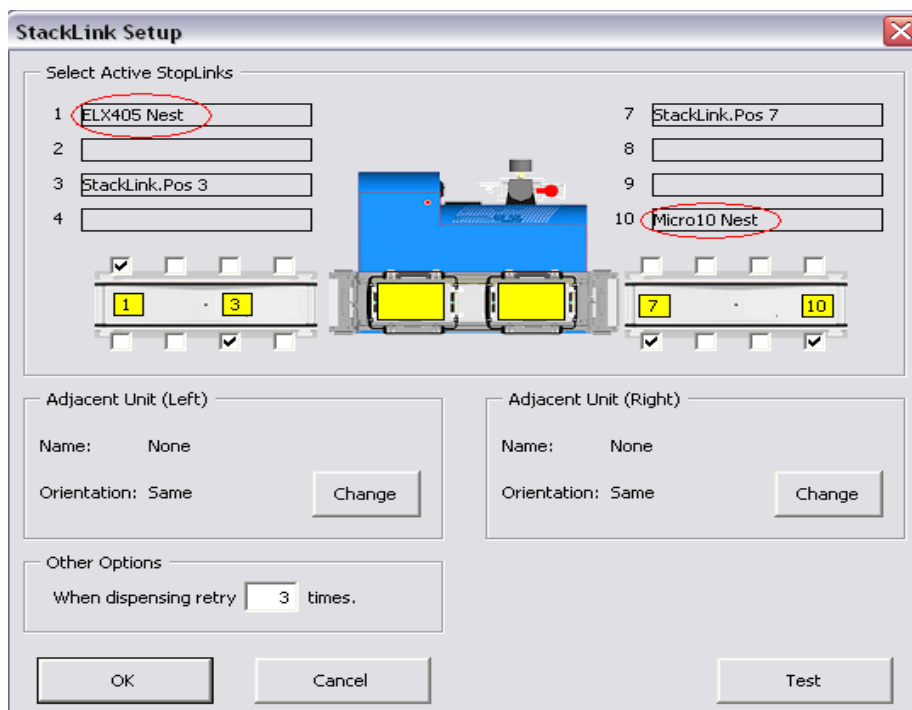


- Click the Return to Run View icon (same as Configure Workcell) and you will be prompted to save the workcell you have just created.

- Click the Setup button under the StackLink icon.



- Select each StopLink position(s) with the corresponding side of the TrackLink you have secured the StopLink to.





NOTE: Be sure to match the correct instrument nest name from the pull down menu or errors will occur when attempting to run methods.



HINT: Clicking on the Test Button will allow you to test the operation of LabLinX by allowing you to dispense, return, and shift plates.

Setting Up Plate Parameters

Entering correct dimensions for the plates you will be using is used only for the proper handling of those plates by the PlateCrane EX as it automatically adjusts its positions for each different plate-type used in every method *based solely on the information entered into that plate's definition.*

While not running a method, the user may click on the 'Plates' button located just above the first configured instrument panel on SoftLinX' 'Run' screen. The following 'Plate Setup' form will be displayed:

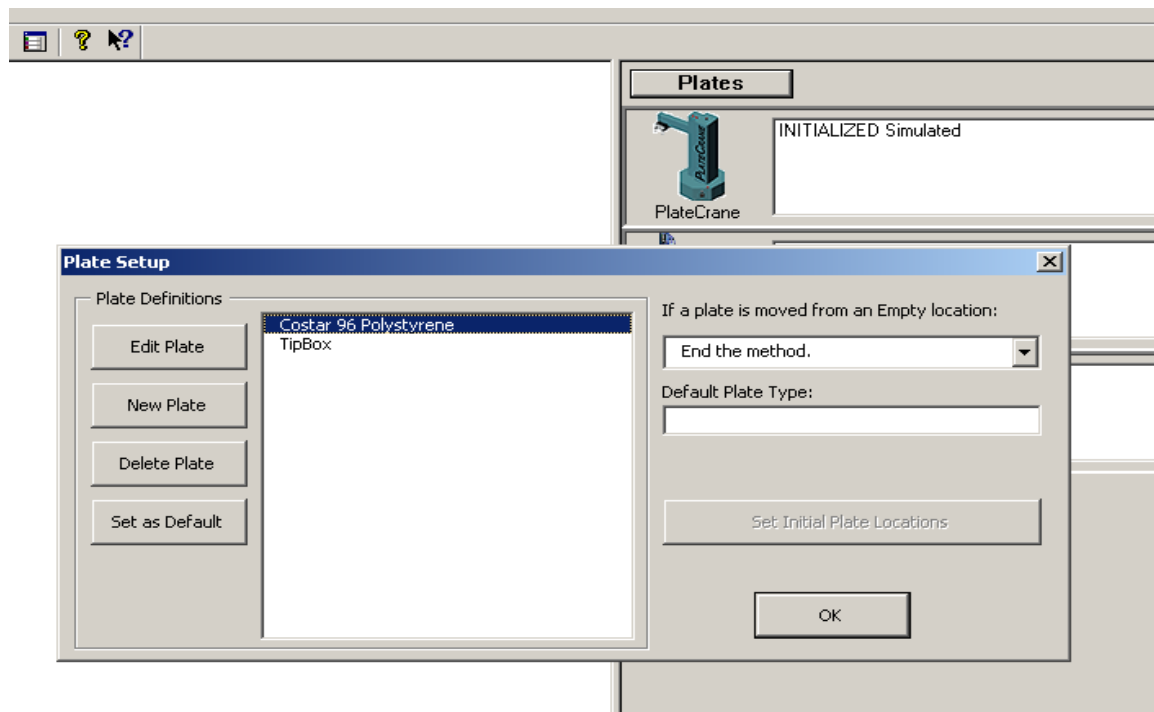


Figure 13

Click on the ‘Edit Plate’ button to change the parameters of a previously defined plate, or click on ‘New Plate’ to create a new plate definition. Then, the following form will be displayed:

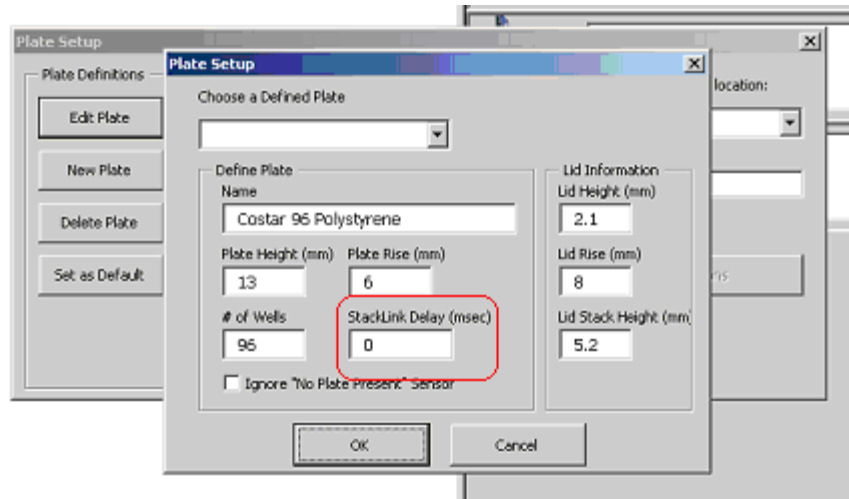


Figure 14

 **HINT: The only parameter value important to the StackLink is:**

StackLink Delay (msec)

- The delay time (in milliseconds) it takes the Plate Seats to close after the stack elevator begins to descend.
- This is used when using microplates with special extrusions that may interfere with dispensing.

CHAPTER 5-StackLink Components

DriveLink System

The StackLink's elevator and plate handling components use mostly pneumatic controls to function. The LabLink system uses a variety of sensors to feedback the plates positioning to the unit's computer controller. The StackLink also uses a powerful bi-directional belt and pulley system driven by a reversible 110 VAC motor to shift plates along the LabLink track.

Stacks

The standard StackLink includes two extruded aluminum stacks. Each stack can hold up to 30 standard-height microliter plates. The stacks are from an aluminum extrusion for rigidity and precision. The stacks are held in position by plastic guide blocks on the StackLink. Double stacks are also available to increase plate capacity.

Power Cord/Communication Cable Connection

The power cord plugs into the AC inlet on the rear of the StackLink. Input power is either 120V or 230V, 50 or 60 Hz. The communication cable is connected from the rear of the StackLink to the chosen serial port on the computer (usually COM 1).

Power Switch

The power switch is located on the back plate with the power cord and communication cable (see Figure 5). It has a 0 and 1 engraved on it to show the OFF and ON power condition of the StackLink. StackLink power is ON when the switch is pressed in the 1 position and PWR LED on the top of the StackLink is illuminated.

Optional Components

The following are additional items available for the StackLink:

- *Double Stacks* -- Expands StackLink capacity of up to 120 microliter plates (4 stacks).
- *TrackLink (24" & 36")*—Linkable tracks that transport plates to various locations of the workcell.
- *StopLink (up to 8)* – Modules that catch and release microplates along the TrackLink path to allow other instruments to access these plates.

- *Instrument alignment bases* – Enables the instruments to be locked to the TrackLink so they will not shift.
- *DriveLink*: A separate instrument that provides the additional power needed to drive the TrackLink system if additional lengths of track are required.

CHAPTER 6-Hardware Specifications

General



Note: Specifications are subject to change without notice.

- ◆ Plate Capacity: Standard-- Up to 30 plates without lids or 25 plates with lids.
Additional-- Up to 120 plates without lids or up to 100 plates with lids.
- ◆ Plate Storage Device: 2 removable stacks (Double Stacks available)
- ◆ Housing Material: Painted steel covering cast aluminum housing.
- ◆ Gripper Material: Black anodized aluminum; textured neoprene rubber inserts.
- ◆ DriveLink length: 15 inches

TrackLink

- ◆ Gearing: Guarded power transmitting shaft assembly
- ◆ Pulley System: 2 - 3/16" wide 1/5 pitch timing belts
- ◆ Available Lengths: 24" and 36" tracks
- ◆ Maximum Track Length: 159" (up to 4 -36" tracks) for 1 StackLink

StopLink

- ◆ Plate Detection: Photoelectric sensor
- ◆ Stopping Mechanism: 2 plate stop fingers (left & right) operated by rotary solenoids
- ◆ Communication: 13" coiled cord (8 pos RJ-12 modular plug)

Mechanical Description

- ◆ DriveLink Motor: AC reversible motor 110V 60Hz
- ◆ DriveLink Gearhead: Frame #2, 200 RPM
- ◆ Elevator Lift: Pneumatic lift cylinder assembly
- ◆ Plate Gripper: Pneumatic fired gripper pads (10mm bore, 5mm stroke)
- ◆ Pressurized Air Supply: Regulator with filter and gauge (1/4" air supply fitting)

- ◆ Internal Air Tubing: Parflex Polyurethane tubing 1/16" ID, 1/8" OD
Parflex Polyurethane tubing 2.4mm ID, 4.00mm OD
- ◆ Stack Present: Proximity switch
- ◆ Plate Sensor: Type MH photoelectric sensor
- ◆ Seat Opener: Double rod air cylinder, 10mm x 10mm
- ◆ Plate Stops: 4 – (pneumatic firing) extruding pins

Dimensions

- ◆ Height: 26.25" (incl. extruded stack)
- ◆ Weight: ≈30 lbs.

Electrical

- ◆ Power Input: 120V / 230V AC, 50/60 Hz
(Determined by position of fuse holder)
- ◆ Fuses: For 120V / 230V
One 2A Time Delay, 5mm x 20mm
(.205 in. x .787 in.)
- ◆ Grounding: Through the power cord, must be properly earth
Grounded
- ◆ Computer Interface: RS-232 serial cable



Environmental

- ◆ Operating Temperature: 15° to 40°C (59° to 104°F)
- ◆ Operating Humidity: 0 to 85%, no condensation
- ◆ Storage Temperature: -20° to 65°C (-4° to 149°F)
- ◆ Altitude: Up to 2000m
- ◆ Ventilation Fan requires +2" of free space in front of it
 - Indoor Use Only

CHAPTER 7-Maintenance

Maintenance

WARNING- -

-  Qualified personnel can perform all maintenance procedures in this manual. Only Hudson representatives should perform any maintenance not discussed in this manual.
-  Gloves should be worn during any cleaning procedure.

Cleaning the StackLink

 **Note:** DO NOT use/spray abrasive cleaners onto the StackLink.


- Clean the outside surfaces of StackLink and/or TrackLink using cloth or sponge dampened with alcohol, water, or mild glass cleaner.
- Clean finger pads of gripper with alcohol or other residue-free solvent.
- Clean any spills on the StackLink, TrackLink, or StopLink immediately.
- Only clean the exterior of the unit. DO NOT remove instrument covers to clean inside.
- Never allow water or fluid to leak inside the StackLink.


Change the Fuse(s)

Fuses burn out occasionally and must be replaced. The following fuses are used with the StackLink:

- Metric: 1 x 2 amp, 5 x 20 mm Time Delay Fuse

WARNING- -

-  Be sure the power to the StackLink is OFF and the power cord is unplugged from the instrument or power source before proceeding with the following instructions.

-  Turn the StackLink OFF and remove the power cord from the AC inlet on the back of the unit.

- ☞ Using a small flat head screwdriver, gently pry the fuse holder tray away from its housing to access the fuses. The Fuse holder door swings down.
- ☞ Remove the blown fuse. Replace it with the spare fuse.
- ☞ Slide the fuse holder tray back into the AC inlet until it clicks. Make sure when re-installing the holder the AC line voltage reads the correct way on the inlet
- ☞ Reconnect the power cord to the StackLink and reconnect all other cables previously disconnected.
- ☞ Verify correct fuse replacement by turning the StackLink switch to ON position-- the light will illuminate immediately.

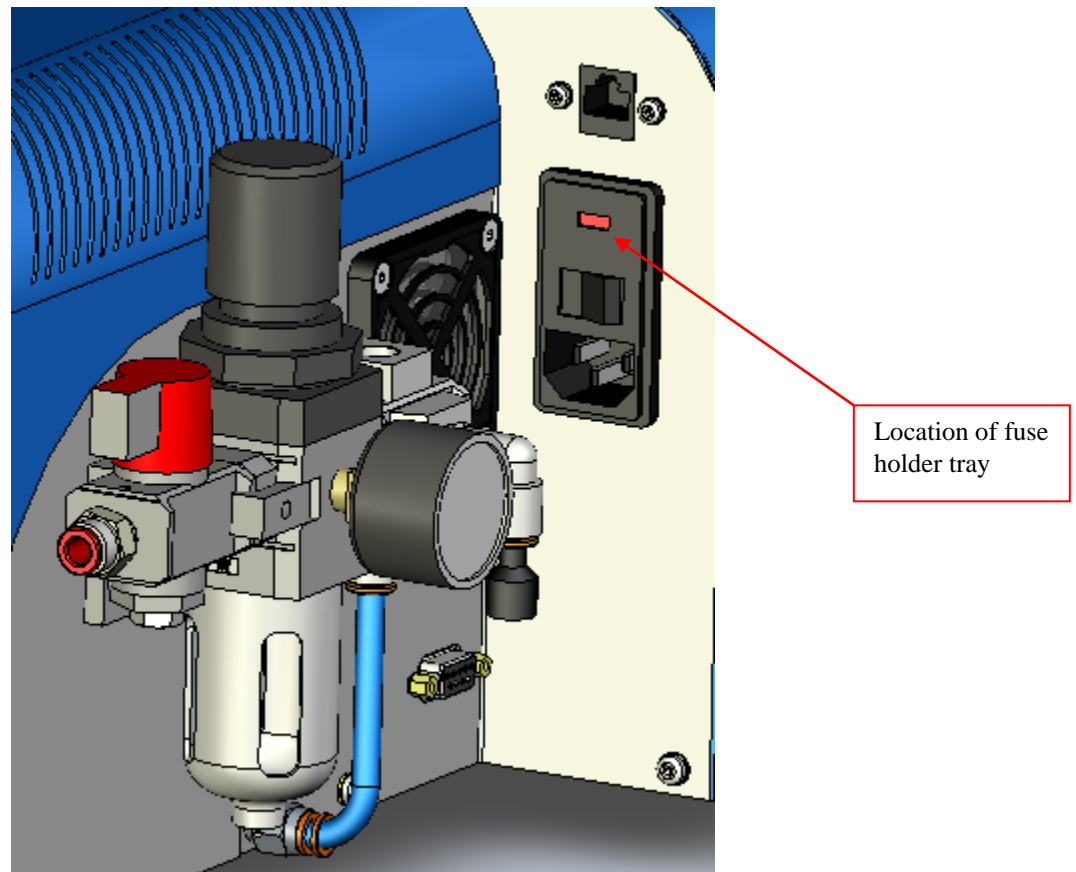


Figure 15

Appendix A:

Hudson's LabLinx™ Communications and Command Set

Version 1.0

Hudson's LabLinx System is designed to respond to a simplified set of ASCII commands to allow any user program capable of reading/writing via an RS-232 port or TCP/IP connection to exercise all the features of the LabLinx Units.

Protocol Description

For RS-232 communication, a single RS-232 port is used to communicate to each LabLinx device attached to the system.

The RS-232 connection for the LabLinx system operates with the following communication specifications:

Baud Rate:	38400
Data Bits:	8
Stop Bits:	1
Parity:	None
Handshake:	None
Device Type:	DCE
Connector:	9-pin, female

For TCP/IP communication, each unit must have a unique IP address assigned. This can be accomplished with the SETIP command. The computer should then connect to this IP address on TCP port 7.

LabLinx unit commands have the following format:

```
{command}[{parameter1},{parameter2},...]<13><10>
```

The {command} portion is the actual command to be executed by the receiving unit. This may be followed by a comma-separated list of parameters as specified in the individual command descriptions.

All LabLinx commands are terminated by a carriage return / line feed combination (ASCII characters 13 and 10). The command is then delivered to the addressed unit, which parses, validates, and executes the requested command before returning a response. Commands may be sent to units while they are processing other commands. Each unit can queue up to 10 commands. The behavior when the queue is overloaded is

currently unspecified. There is currently no message indicating that the command queue has been overloaded.

The following example would send the DISPENSE command, with an argument indicating to dispense from Stack 1.

```
DISPENSE 1<13><10>
```

Command Responses

The controller will echo every byte of the command back to the sender as it is received. Upon detecting the two bytes <13><10>, the controller will execute the command. Upon completing execution, the controller will respond in one of two ways:

1. For query commands, where a data response is required, it will return:
 {data response}<13><10>
2. For action commands or invalid queries, it will return:
 {error code} {error description}<13><10>

If an action is requested, or an error occurs the response will be a 4 digit error code, a space (ASCII character 32), and a short description of the error that occurred. A response of "0000 Success" represents a correctly executed command. Other responses will indicate an error.

As examples:

1. Valid query command:
 Command: READINPUT 0,2<13><10>
 Echo: READINPUT 0,2<13><10>
 Response: 0<13><10> (i.e., input no. 2 is OFF)
2. Valid action command:
 Command: CLOSE <13><10>
 Echo: CLOSE <13><10>
 Response: 0000 Success<13><10> (i.e., action successfully executed)
3. Invalid query command ("WASHER" is an unknown position):
 Command: GETPOINT WASHER<13><10>
 Echo: GETPOINT WASHER<13><10>
 Response: 0002 Invalid Parameter<13><10> (invalid point name)

Note: If any command contains an error, the StackLink sends the response immediately, otherwise the response is sent at the completion of execution.

StackLink Command Set

The StackLink Unit recognizes the following commands:

1. ACKNOWLEDGESEND

The ACKNOWLEDGESEND command is used to indicate that a plate transfer between two conveyor-based LabLink units has been completed, and that the recipient of the command should turn off the conveyor. See the RECEIVEPLATE and SENDPLATE commands for more information.

Example:

Command: ACKNOWLEDGESEND<13><10>
Response: 0000 Success<13><10>

2. DISPENSE [Stacks]

DISPENSE will cause the StackLink to dispense a plate from the specified stacks. The Stacks parameter is bit mask indicating the stacks to dispense from. Bit 1 indicates Stack1, bit 2 indicates Stack2. Currently only values from 1-3 are accepted. Plates under one of the stacks when this command is issued will remain in place at the completion of the command.

Example:

Command: DISPENSE 2<13><10>
Response: 0000 Success<13><10>

3. GETCONFIG

The GETCONFIG command returns a bit mask indicating the currently available positions on the StackLink unit. There are 10 possible positions, allowing configuration values between 0 and 1023. Normally bits 5 and 6 will be active indicating the presence of Stacks 1 and 2. Other bits may be active depending on the connected TrackLink and StopLink units. This value is set using the SETCONFIG command.

Example:

Command: GETCONFIG<13><10>
Response: 112<13><10>

4. GETDISPENSEDELAY

GETDISPENSEDELAY returns the additional time in milliseconds that the plate seats will be held open when dispensing a plate. This allows the stacker to

dispense double-flanged or otherwise oddly shaped plates. This time is set using the SETDISPENSEDELAY command. This time should be 0 for most plates.

Example:

Command: GETDISPENSEDELAY <13><10>
Response: 0<13><10>

5. GETIP

GETIP returns the current IP address of the unit.

Example:

Command: GETIP<13><10>
Response: 10.1.1.5<13><10>

6. GETMOVETIME

GETMOVETIME returns the current number of seconds the StackLink waits for labware to arrive at a location before returning a failure to move the labware. This value is set using the SETMOVETIME command.

Example:

Command: GETMOVETIME<13><10>
Response: 10<13><10>

7. GETPOSNAME {Position Number}

GETPOSNAME returns the name assigned to the indicated position number. This command allows applications to assign useful names to various StackLink position numbers. These names are not currently used in any StackLink commands other than the GETPOSNUM command.

Example:

Command: GETPOSNAME 5<13><10>
Response: Stack1<13><10>

8. GETPOSNUM {Position Name}

GETPOSNUM will return the position value associated with the specified position name.

Example:

Command: GETPOSNUM Stack1<13><10>
Response: 5<13><10>

9. GETSTOPDELAY

GETSTOPDELAY will return the number of milliseconds before the stops will capture a plate when the plate is placed on the track by another instrument.

Example:

Command: GETSTOPDELAY<13><10>
Response: 300<13><10>

10. LISTPOINTS

The LISTPOINTS command returns a list of the currently available positions and the names assigned to them. The line “End of List” is returned to indicate the end of the command.

Example:

Command: LISTPOINTS<13><10>
Response: 5: Stack1<13><10>
 6: Stack2<13><10>
 7: MyWasher<13><10>
 End of List<13><10>

11. MOVEPLATE {Start}, {End}

The MOVEPLATE command moves a plate between the indicated start and end position numbers. The positions must be available according to the current configuration. There must be labware in the start position. And the path between the start and end positions must be clear. If any of these conditions is not met an appropriate error will be returned.

Example:

Command: MOVEPLATE 5,7<13><10>
Response: 0000 Success<13><10>

12. NAMEPOS {Position Number}, {Position Name}

The NAMEPOS command assigns the indicated name to the indicated position number.

Example:

Command: NAMEPOS 7, MyWasher<13><10>

Response: 0000 Success<13><10>

13. READINPUT {Card Number}, {Input Number}

READINPUT returns the current state of the input located at the indicated I/O card number and input number. A 0 indicates the input is not active, a 1 indicates that the input is active.

Example:

Command: READINPUT 0,0<13><10>

Response: 0<13><10>

14. RECEIVEPLATE {Direction}, {End}

The RECEIVEPLATE indicates that the StackLink should activate its conveyor and begin looking for labware to arrive at the indicated end location. The direction parameter indicates which direction to turn the conveyor. A 1 designates forward motion, and a 0 indicates reverse motion. The conveyor will turn off when the labware arrives at the indicated location, or the current move time has elapsed. See the commands SENDPLATE and ACKNOWLEDGSEND for more information.

Example:

Command: RECEIVEPLATE 1,6<13><10>

Response: 0000 Success<13><10>

15. RELAYOUT {Card}, {Relay}, {State}

The RELAYOUT command activates the indicated relay on the indicated relay card. A state of 1 indicates that the relay should close. A 0 indicates that the relay should open.

Example:

Command: RELAYOUT 1,2,1<13><10>

Response: 0000 Success<13><10>

16. RETURN [Stacks]

RETURN will place plates located under the indicated stacks into the stacks. The Stacks parameter is a bit mask indicating the stacks to return to. Omitting the Stacks parameter causes the StackLink to return any plates under both stacks. Plates under stacks not specified in the mask will remain at their current location.

Example:

Command: RETURN 1<13><10>
Response: 0000 Success<13><10>

17. SENDPLATE {Direction}, {Start}

SENDPLATE indicates the StackLink should send the labware located at the start position off the conveyor in the indicated direction. A 1 indicates forward motion. A 0 indicates reverse. The conveyor remains active until an ACKNOWLEDGSEND command is received.

Example:

Command: SENDPLATE 1,5<13><10>
Response: 0000 Success<13><10>

18. SETCONFIG {Configuration}

SETCONFIG sets a bit mask indicating the available positions on the StackLink unit. There are 10 possible positions allowing values between 0 and 1023.

Example:

Command: SETCONFIG 112<13><10>
Response: 0000 Success<13><10>

19. SETDISPENSEDELAY {Time}

SETDISPENSEDELAY sets the additional time in milliseconds that the plate seats will be held open when dispensing a plate. This allows the stacker to dispense double-flanged or otherwise oddly shaped plates. This time should be 0 for most plates.

Example:

Command: SETDISPENSEDELAY 0<13><10>
Response: 0000 Success<13><10>

20. SETIP {IP Address}

SETIP will set the IP address of the unit. This change is immediate and may cause loss of communication if used during a TCP/IP session.

Example:

Command: SETIP 10.1.1.5
Response: 0000 Success <13><10>

21. SETMOVETIME {Timeout}

SETMOVETIME sets the number of seconds the StackLink waits for a plate to arrive at its destination before returning an error.

Example:

Command: SETMOVETIME 30<13><10>
Response: 0000 Success<13><10>

22. SETSTOPDELAY {DelayTime}

SETSTOPDELAY sets the amount of time the StackLink will wait before closing the stops if a plate is placed on the track by another instrument. The DelayTime is in milliseconds.

Example:

Command: SETSTOPDELAY 300<13><10>
Response: 0000 Success<13><10>

23. SHIFT {Direction}, [Positions], [Receive]

The SHIFT command will move plates one position in the indicated direction. A Direction of 1 indicates forward motion. A Direction of 0 indicates reverse motion. If the Positions parameter is included, only the plates at the indicated positions will be shifted. If the Positions parameter is omitted, all plates will be shifted. Issuing a command to shift the plate located at the end position off of the StackLink will cause the unit to behave as if a SENDPLATE command had been issued. The StackLink will shift the indicated plates, and then continue to run the conveyor until an ACKNOWLEDGESEND command is received. If the Receive parameter is included, it will indicate whether or not the StackLink should expect to receive a plate from an adjacent unit. The plate will always be received into the end position of the StackLink. A Receive value of 1 indicates that a plate is expected. A Receive value of 0 indicates no plate is expected.

Example:

```
Command:      SHIFT 1,112,1<13><10>
Response:     0000 Success<13><10>
```

24. VERSION

VERSION returns the unit firmware version.

Example:

```
Command:      VERSION<13><10>
Response:     StackLink Unit v0.2<13><10>
```

25. WRITEOUT {Card}, {Output}, {State}

WRITEOUT changes the state of the indicated output on the indicated I/O card. A state of 1 indicates the output should be active. A 0 indicates the output should become inactive.

Example:

```
Command:      WRITEOUT 0,0,1<13><10>
Response:     0000 Success<13><10>
```

Error Code Description

The PlateCrane controller will report one of the following response codes at the completion of each command:

General Errors:

- 00 Success
- 01 Unrecognized Command
- 02 Invalid Parameter
- 03 Bad Echo From Unit

StackLink Errors:

- 0100 Path is blocked.
- 0101 Nothing to move
- 0102 Position not available
- 0103 Failed to move plate
- 0104
- 0105
- 0106 Invalid position name
- 0107
- 0108
- 0109
- 0110 Elevator Jammed
- 0111 Elevator Blocked
- 0112 No Plate Dispensed
- 0113 Failed to Return Plate