
INSTRUCTION BOOK FOR
Serial Control Board SCB-200



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Product Description

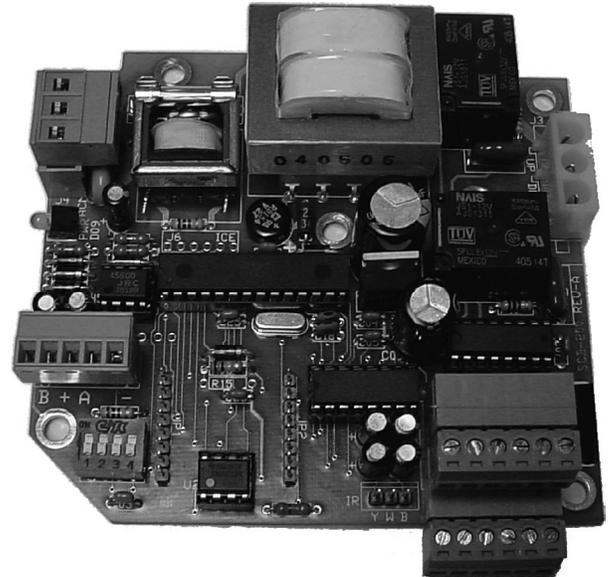
The SCB-200 is an RS-232 enabled serial controller for Da-Lite motorized screens. This low voltage controller features the basic operation of up / down and stop positioning of a screen, and when factory installed in a Da-Lite screen, is capable of advanced operation including Da-Lite's proprietary Da-Lite Screen Positioning System. Da-Lite Screen Positioning System allows for precise positioning of a standard or multiple aspect ratio screen based on the display requirements. Instead of simple commands such as "up", the SCB-200 allows more sophisticated commands, such as "go to 55 inches down". By storing these precise positions, a user can recall the preset by the press of a button.

Additional detailed status information is available to determine proper screen operation. For example, the AC current drawn by the screen may be polled to determine if it is operating within its normal range.

The SCB-200 is available as a factory-installed option in many of Da-Lite's electric screens. It is compatible with the following Da-Lite options:

- IR-200 infrared remote control and IR receiver for wireless operation
- NET-200 integrated Ethernet controller for network and Web operation
- WC-200 intelligent wall controller with IR receiver for in-room operation

The SCB-200 is also compatible with many RS-232 enabled control systems for integrated system control. A complete command protocol is supplied in Appendix A for reference by qualified integrators.



PLEASE NOTE: While Serial Controller Boards can be used to daisy chain multiple Da-Lite Screens, it is not designed to be a pass-through for RS-232 or RS-485 communication for other manufacturers products.

Specifications

I/O Ports:

2x RS-232C ports

5v IR Interface (reserved for the IR-200 infrared sensor)

12v IR Interface (reserved for the WC-200 wall controller or aftermarket IR sensor)

RS-485 bus (Used to daisy chain multiple SCB-200 screen controllers)

Termination type: Captive Screw Terminals

Power Requirements: 100-120 VAC or 220-240 VAC, 50 or 60 Hz

PLEASE NOTE: Voltage must be specified at time of order. Improper voltage connection will result in SCB-200 damage.

Fused protection: 5A (fast, 250 volts)

Optional Accessories:

NET-200 Ethernet Controller

WC-200 Wall Controller

IR-200 Infrared Sensor

RM-200 Infrared Remote Control

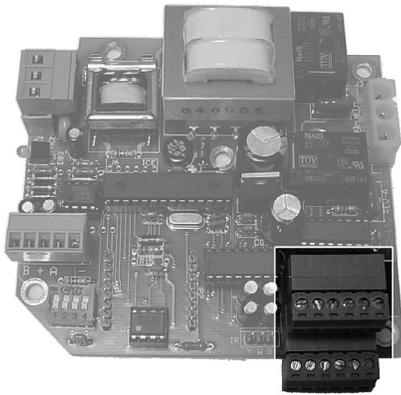
Installation

WARNING: This product possesses high voltage when connected, and may present a shock hazard when the screen cover is removed. Please disconnect power when installing or servicing.

The SCB-200 is installed as a factory option when ordering the compatible screen from Da-Lite. This is necessary because of tight integration between the SCB-200 and sensors that are used to detect the position of the screen at any time during operation. The SCB-200 is factory calibrated based on the mechanical limit switches in the screen motor. If it becomes necessary to adjust the mechanical limit switches once the screen is installed, a calibration procedure will be required to re-orient the SCB-200 to this adjustment. Contact Da-Lite technical support for more information on this procedure.

Each SCB-200 may operate a single motor, and in the case of multiple aspect ratio screens, which rely on multiple motors, or in other specialized multi-screen applications, up to eight SCB-200 controllers may be ganged together in a Master / Slave configuration for operation from a web browser or RS-232 controller.

The following terminal connections are available on the SCB-200:



- Terminal Block 1**
- 1 RS-232 #1 TX
 - 2 RS-232 #1 RX
 - 3 RS-232 #1 GND
 - 4 RS-232 #2 TX
 - 5 RS-232 #2 RX
 - 6 RS-232 #2 GND

- Terminal Block 2**
- 7 RS-485 A
 - 8 RS-485 B
 - 9 GND
 - 10 IR In
 - 11 +12vDC
 - 12 GND

Terminal block 1 provides connections for RS-232 controllers, such as the optional WC- 200 wall controller, or an integrated third-party control system. RTS / CTS connections are not supported or required for operation. Since there are two RS-232 ports on the SCB-200, two independent RS-232 controllers may be used. Ports operate in the same fashion, and may be used interchangeably. The port settings for both ports are fixed configurations, and used the following parameters:

- 9600 Band
- 8 Bit
- 1 Stop Bit
- No Parity
- Full duplex mode
- Flow Control = None

Terminal block 2 provides an RS-485 bus for connection between the SCB-200 devices when used in a master / slave configuration. When using multiple SCB-200 devices, a 2-conductor 24AWG shielded cable is connected between the SCB-200 devices. Wire 1 is connected between RS-485A and Wire 2 is connected between RS-485B.

In the event that more than two SCB-200 devices are used, the additional SCB-200 devices may be connected in a daisy-chain fashion to the other SCB-200 devices.

PLEASE NOTE: When multiple SCB-200 devices are used, the RS-232 ports and infrared ports on the MASTER SCB-200 are operational, and the optional NET-200 may ONLY be installed on the MASTER SCB-200. Ports on SCB-200 devices in SLAVE configuration are defeated. In this mode, all communication originates with the MASTER SCB-200 controller.

Figure 1 - Serial / Bus / IR Connections

Installation (Continued)

Power connections are made to the high voltage terminals available on the SCB-200. Please note that voltage must be specified at time of order. Improper voltage connection will result in SCB-200 damage. **This termination should only be performed by a licensed electrician.**

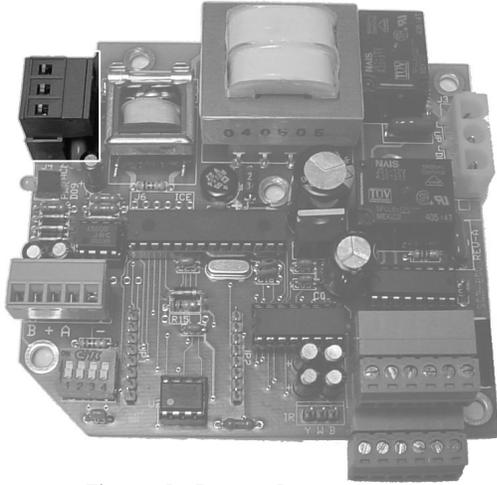


Figure 2 - Power Connector

Configuration

The SCB-200 comes pre-configured in MASTER mode, meaning that it is intended to be used without connection to other SCB-200 devices. If multiple SCB-200 are planned for use in a configuration, each must possess an independent RS-485 address. To change the address, DIP switches are provided on the SCB-200. Up to eight SCB-200 devices may be ganged together and independently addressed. Please reference the following DIP switch table for addressing each unit.

Mode	1	2	3	4
Master	*	0	0	0
Slave 1	*	0	0	1
Slave 2	*	0	1	0
Slave 3	*	0	1	1
Slave 4	*	1	0	0
Slave 5	*	1	0	1
Slave 6	*	1	1	0
Slave 7	*	1	1	1

* Please note that DIP 1 should be in the "1" position for SCB-200 devices at each end of the daisy-chain. DIP 1 should be in the "0" position for all remaining (intermediary) SCB-200 devices. A single Master screen will be set to 0000.

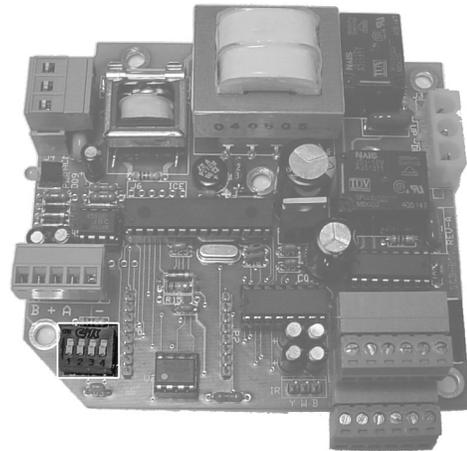


Figure 3 - Address DIP Switches

The SCB-200 is designed for automatic configuration and has a factory calibrate mode that "learns" the screen's mechanical limits and stores them in non-volatile memory, so that in the event of power loss or disconnection, the calibrated settings are retained. In the event that the screen mechanical stops are adjusted or other mechanical alterations are made to the screen, the factory calibrate mode must be performed again. A screen must be configured to "Master" if calibration is required for the screen. SLAVED screens cannot be calibrated through the master screen. The WC-200 wall controller cannot recalibrate a screen. Contact Da-Lite technical support for more information on this procedure.

Installation (Continued)

Troubleshooting

The SCB-200 tracks the screen's location through a cable connection to the B, +, A and - terminals. The cable is routed to a small black encoder, mounted to the pin end of the screen's roller. The encoder shaft must turn on a 1:1 basis and rotate with the roller pin. If the coupler wires or connector is loose the screen may not operate or may only travel a short distance rather than running to the complete motor limit setting.

Notes

Upon power up of the SCB-200, it shall immediately begin a diagnostic mode routine that verifies settings and prepares the controller for operation. During this process, the following activities shall occur:

- Load of relevant settings from EEPROM into SCB-200 memory
- Auto-detection of the presence of an optional NET-200 daughter board or slaved screens
- Initiation of the optional NET-200 settings

The power up mode shall remain in effect until each of these activities is completed. The SCB-200 will not accept or process communications with any I/O port while in this state.

During the initial configuration of the SCB-200, the following parameters may be set, using the RS-232 protocol identified in Appendix A.

- Set DHCP Support *
- Set Custom Aspect Ratios
- Set IP Address *. Additional software (Lantronix and .net framework) may be required if a static IP address is to be set or if an invalid IP has previously been assigned. www.lantronix.com/device-networking/utilities-tools/device-installer.html. Xport, Device Installer under software and utilities (Please contact Da-Lite for further assistance).

* Denotes configuration settings related to use with optional NET-200 daughter board. Refer to the NET-200 user manual for configuration of these parameters.

When setting custom aspect ratios, the screen is positioned in the desired position, and the position is stored to a desired custom preset memory position. There are five available memory positions for custom aspect ratios.

When recalling aspect ratios, the SCB-200 is aware of the physical aspect ratio of the screen. Any command that requests an aspect ratio beyond the physical limitations of the screen will result in the screen being set to its lowest position. When adjusting aspect ratio, the screen is positioned according to the image center line. Therefore, the bottom of the screen is adjusted to the proper aspect ratio position. Please note that remaining projection screen ABOVE the projected image is not eliminated when the aspect ratio is recalled.

Usage

To control a screen with an SCB-200 installed, at least one of the following controllers are required for operation and / or configuration:

- IR-200 Infrared remote control
- NET-200 Ethernet controller
- WC-200 Wall controller
- Third-party control system
- An RS-232 connected computer

There are no direct control options for the SCB-200 without one of these control mechanisms in place. From any of these control mechanisms, basic operation of the connected screen is possible. From the NET-200, third party control systems or an RS-232 connected computer, advanced controls and configuration are possible. For use of these controllers, refer to the controller user manual for more information.

Optional Controllers (sold separately)

WC-200

When properly wired, the WC-200 will have a red LED status indicator which is always on to indicate the screen's current state whether stopped or moving in a particular direction or to one of the three preset aspect ratios. Please note that the wall switch needs a minimum of five conductors connected to the SCB-200 in order to operate. The sixth wire connection would be required if the WC-200 is to function as a switch and an IR receiver for an optional IR-200 remote. Also, the conductors will need to be the same gage and a shield, foil braided or drain wire cannot be used in place of a ground conductor.

WC-200 controllers cannot be used on SLAVED screens and the WC-200 controller will only operate the Master screen. A five wire connection between the WC-200 and SCB-200 is required to properly operate the screen from the wall controller. The IR screw terminal port is not a required connection if an IR-200 is not going to be used. (Contact Da-Lite if custom stopping points are required from the WC-200 prior to order.)

NOTE: if an alternative viewing area dimension is ordered this button runs the screen to its fully deployed position.

If programming user definable aspect ratios or creating settings with different amounts of fabric out of the screen case then changing the setting for A6 or through RS-232 commands will change the Aspect 1 button on the wall switch. Aspect 1 button corresponds to A6; Aspect 2 corresponds to A7 and Aspect 3 on the WC-200 corresponds to A8 in the SCB-200 settings.

When using the optional WC-200 wall controller with integrated infrared receiver or third party, 12V compatible IR receiver, connections from the infrared receiver are made to terminals 10-12. (All six of the screw terminals will be utilized to provide full functionality of the WC-200 and the IR remote if either controller will be used to operate the screen.)

IR-200

The optional IR-200 should be connected to the IR-200 connection block only.

The WC-200 and IR-200 may not be used simultaneously.

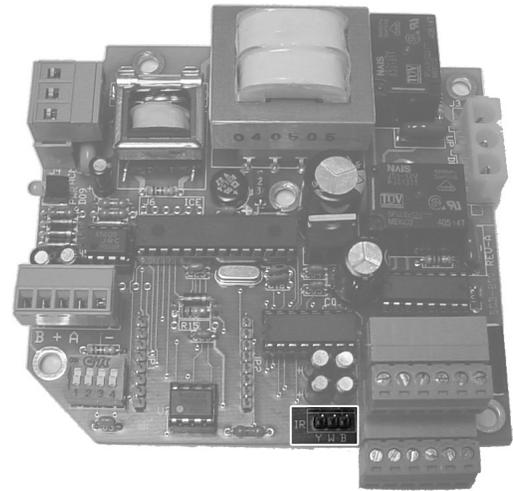


Figure 4 - IR-200 Connector

Optional Controllers (continued)

NET-200

The NET-200 is an optional daughter board that provides Ethernet connection to the SCB-200 and may be ordered as a factory installed option or can be field installed. This Ethernet adapter allows remote control and status monitoring of a screen or lift through a connected device. The controls available include basic up, down and stop controls, as well as advanced controls, such as custom aspect ratios and precise screen positioning.

The NET-200 is classified as a serial device server, which by definition means that it makes available to client connections the Da-Lite screen as a serial device (enabled by the SCB-200.) The NET-200 supports the full suite of bi-directional RS-232 commands and acknowledgements developed under the SCB-200, and allows those commands to be issued by any Ethernet enabled computer or computing device.

NET-200 Installation

The NET-200 connects directly to the SCB-200 low voltage controller at the position identified. The NET-200 will only fit into its socket in one direction; do not force the unit. When properly installed, the Ethernet connector will be facing outward from the SCB-200.

When using multiple SCB-200 controllers in Master / Slave mode, the NET-200 should only be installed on the Master SCB-200.

An Ethernet cable may be directly connected to the NET-200 and routed through the cable grommet in the end of the screen.

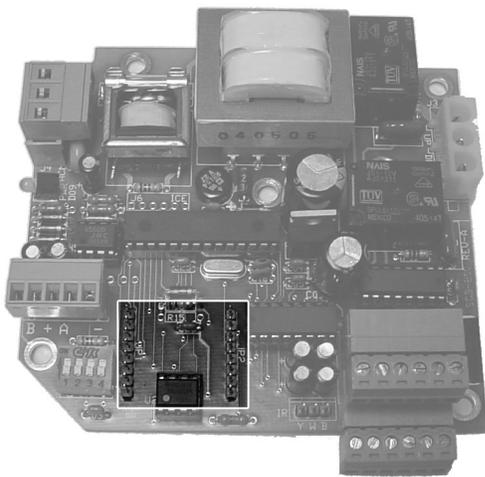


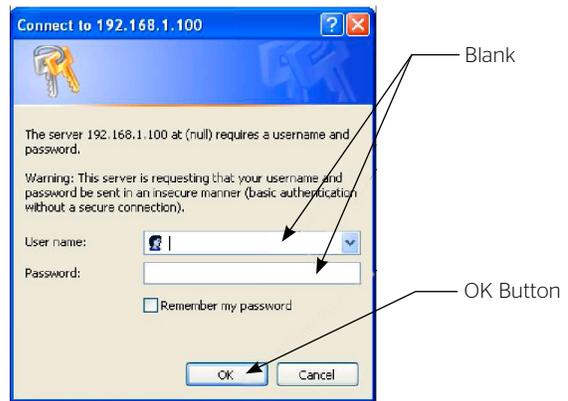
Figure 5 - NET-200 Connector

NET-200 Configuration

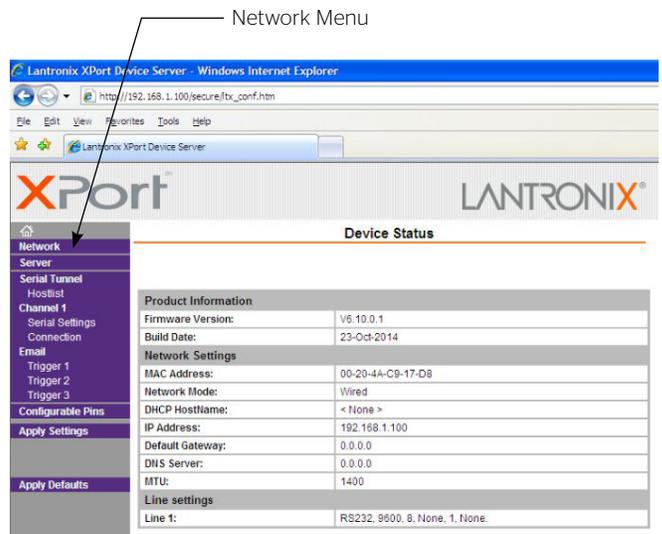
The NET-200 is designed for simple, transparent installation and configuration. By default the NET-200 is shipped with DHCP disabled. The following IP address is assigned to the NET-200.

IP Address: 192.168.1.100
Subnet: 255.255.255.0

To configure the network settings, type the IP address into your browser. It will open a new page with the setup profile. A new window will pop up asking for a user name and password. Leave the user name and password field blank and press the OK button.

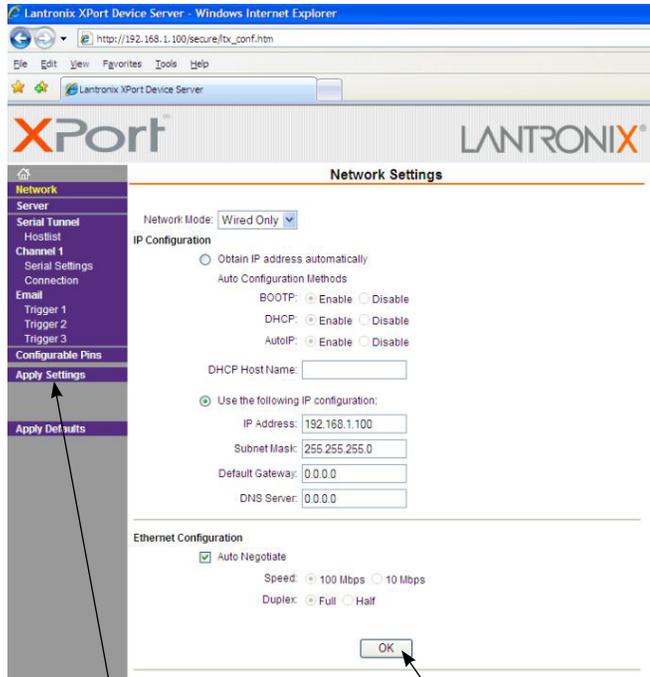


The new window will contain the configuration browser program. The menu will be located on the left side of page. Click on "Network".



Optional Controllers (continued)

For DHCP click on "Obtain IP address automatically" and type in the DHCP HostName. For Static IP leave the option "Use the following IP configuration" clicked and type in the IP address and Subnet Mask. Then click the "OK" button. Finally click on the "Apply Settings" in the left menu.



Apply Settings

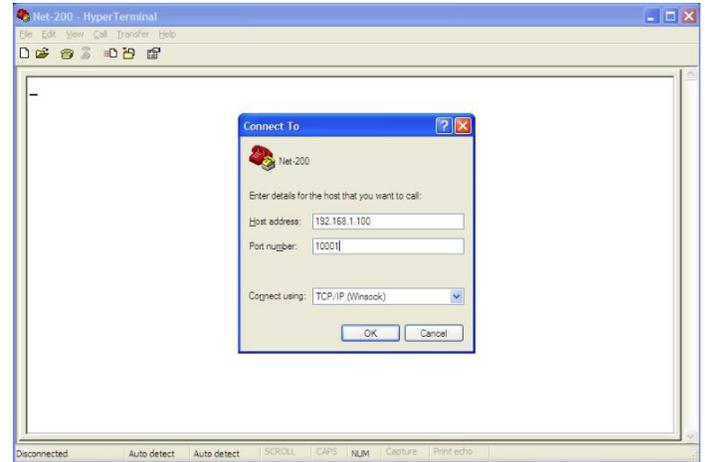
OK Button

NET-200 Usage

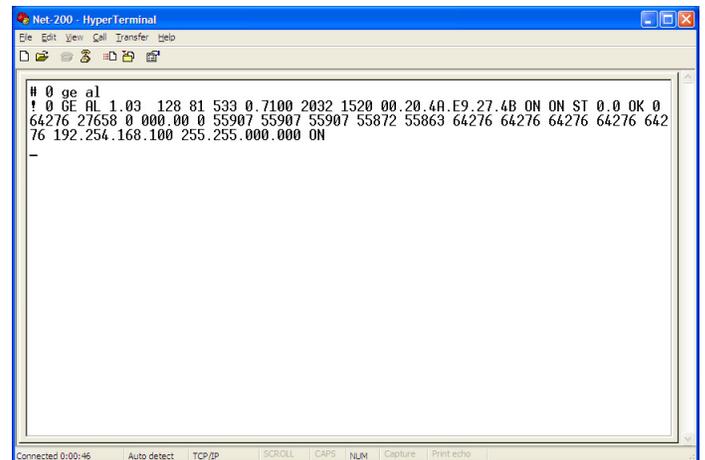
To control the screen connected through the SCB-200 to the NET-200, you will need to create a TCP/IP Winsock connection through HyperTerminal or other emulator program.

1. Create a TCP/IP Winsock connection through HyperTerminal or other emulator program.

Host Address: 192.168.1.100
Port Number: 10001



2. Type RS232 command and press enter. The full suite of RS232 commands found in the SCB-200 instructions can be used. The SCB-200 will respond back to acknowledge commands given with a "!" point in front.



Appendix A – Command Reference

Command Abbreviations:

- ID: Device ID, with a value range of 0-7, default is set to 0 using DIP switches
- TD: Target density of encoder, with the default set to 128.
- RD: Roller diameter, taking into account no screen material (mm)
- SL: Length of slack wrap (screen material that remains on the roller when the screen is fully lowered). Length of slack wrap (roller wrap of material + amount of top black drop).
- ST: Screen thickness (mm)
- SW: Viewing Area Width (mm)
- SH: Viewing Area Height (mm)
- MA: MAC address of the NET-200
- DH: DHCP NET-200 support on or off, default is set to ON (ON, OF)
- SE: Rotary sensor support on or off, default is set to ON (ON, OF)
- RE: Relay status, where UP indicates position 1 is shorted, DN indicates position 2 is shorted, and ST indicates both positions are open. (This unit is not designed for contact closure operation.)
- AC: AC Current consumed through relay, in AC amps, resolution to tenths of an amp.
- UL: Mechanical and electronic upper limit position, with a counter value of 0
- LL: Mechanical and electronic lower limit position, with a counter value of LL
- TA: Screen position to the nearest target, with a counter value between 0 and LL
- IN: Screen position to the nearest inch, resolution to hundredths of an inch
- MM: Screen position to the nearest mm
- A1: SP using aspect ratio of 1:1, where width = SW
- A2: SP using aspect ratio of 1.25:1, where width = SW
- A3: SP using aspect ratio of 1.33:1, where width = SW
- A4: SP using aspect ratio of 1:66, where width = SW
- A5: SP using aspect ratio of 1.78:1, where width = SW
- A6: SP using custom aspect ratio or amount of screen drop (user definable and accessible through NET-200 or RS-232)
- A7: SP using custom aspect ratio or amount of screen drop

(user definable and accessible through TCP/IP or RS-232)

- A8: SP using custom aspect ratio or amount of screen drop (user definable and accessible through TCP/IP or RS-232)
- A9: SP using custom aspect ratio or amount of screen drop (user definable and accessible through TCP/IP or RS-232)
- A0: SP using custom aspect ratio or amount of screen drop (user definable and accessible through TCP/IP or RS-232)
- IP: IP address of NET-200, whether DHCP or statically assigned
- SN: Subnet of the NET-200, whether DHCP or statically assigned
- AL: Device status, providing complete settings information
- RS: Reset the SCB-200 (Equivalent to a power cycle.)

Basic command rules:

- All commands shall begin with a “#” symbol.
- All values in the command shall be separated by a single ASCII space “ ”.
- All commands shall end with an ASCII carriage return “<CR>”.
- Any spaces immediately prior to the <CR> shall be ignored.
- Any invalid commands should result in an ACK of “# ID ERR” and the appropriate error code, as defined below. Commands issued to an invalid master / slave ID shall be ignored.
- Position setting values can be set as FIXed, INCrement, or DECrement. All numeric values following shall be positive integers.

SCB-200 Error Codes:

- 13: Command Timed Out
- 14: Busy Calibrating
- 15: Requires Rotary Sensor
- 16: Requires Calibration
- 17: Already Calibrated
- 18: Motor OverCurrent Fault
- 19: Motor Encoder Fault
- 20: Supported Only From NET-200
- 21: Requires NET-200
- 22: Supported Only At Master

Appendix A – Command Reference (Continued)

- 23: No Slave Response
- 24: Slave Response Timeout
- 25: Slave Response Error
- 26: Slave Expected Continue Command
- 27: Slave Received Partial Command Record
- 28: Expected WebComm Init
- 29: Command First Event

Available SET or Operating Commands:

Set Relay Status

(i.e. to run the screen in one direction)

ID SE RE [UP, DN, ST]<CR>

Sets the RE value

ACK:

! ID GE RE [UP, DN, ST]<CR>

For example: # O SE RE DN will run a Master screen down and the Acknowledgement would be ! O RE DN as it runs.

Set Target Position

ID SE TA [FIX, INC, DEC] [numeric value, LL, UL, CU, A[1-0]]<CR>

Sets the TA value, LL will lower the screen to position LL, UL will raise the screen to position UL and CU will stop the screen at the current position

ACK:

! ID SE TA OK<CR>

Set Screen Position, in Inches

(This will send the screen to a certain amount of viewing area out of the case)

ID SE IN [FIX, INC, DEC] [numeric value]<CR>

Sets the IN value

ACK:

! ID SE IN OK<CR>

An example of the above command in use on a Master screen and running the screen down 12 inches would be:

O SE IN INC 12.0

and the acknowledgement would be:

! O SE IN OKC 12.0

Set Screen Position, in MM

ID SE MM [FIX, INC, DEC] [numeric value]<CR>

Sets the MM value

ACK:

! ID SE MM<CR>

Set Custom Aspect Ratio

ID SE A[6-0] <CR>

Sets the A[6-0] value to the current position

ACK:

! ID SE A[6-0] <CR>

Reset SCB-200

ID SE RS<CR>

Resets the SCB-200. Equivalent to rebooting the firmware, but not a hard power reset.

ACK:

! ID RS<CR>

NOTE: Please contact Da-lite for additional DHCP or Networking support.

Available GET Commands:

Get All Values

ID GE AL<CR> (Example for MASTER: # 01 GE AL<CR>)

Gets current AL values

ACK:

! ID GE AL [All settings]<CR>

Get SV

ID GE SV<CR>

Returns the SCB-200 Firmware Version.

ACK:

! ID GE SV [Firmware Version]<CR>

Get Upper Limit

ID GE UL<CR>

Gets the current UL value

ACK:

! ID GE UL [numeric value]<CR>

Get Lower Limit

ID GE LL<CR>

Gets the current LL value

ACK:

! ID GE LL [numeric value]<CR>

Get Roller Diameter

ID GE RD<CR>

Gets the current RD value

ACK:

! ID GE RD [numeric value]<CR>

Get Current Screen Position, in Inches

ID GE IN<CR>

Gets the current IN value

ACK:

! ID GE IN [numeric value]<CR>

Get Current Screen Position, in MM

ID GE MM<CR>

Gets the current MM value

ACK:

! ID GE MM [numeric value]<CR>

Appendix A – Command Reference (Continued)

Get Current Aspect Ratio

ID GE A[1-0]<CR>

Gets the current A[1-0] value

ACK:

! ID GE A[1-0] [numeric value]<CR>

Get Relay Status

ID GE RE<CR>

Gets the current RE value

ACK:

! ID GE RE [UP, DN, ST]<CR>

Get AC Current

ID GE AC<CR>

Gets the current AC value

ACK:

! ID GE AC [numeric value] [OK, ERR]<CR>

Get Screen Viewing Area Width

ID GE SW<CR>

Gets the current SW value

ACK:

! ID GE SW [numeric value]<CR>

Get Screen Viewing Area Height

ID GE SH<CR>

Gets the current SH value

ACK:

! ID GE SH [numeric value]<CR>

Get sensor status

ID GE SE<CR>

Gets the current SE value

ACK:

! ID GE SE [ON, OF]<CR>

Get Calibrate Mode

ID GE CA<CR>

Gets calibration status since last reset.

ACK:

! ID CA [ON, BC, OF]<CR>

Get Current Target

ID GE TA<CR>

Gets the current TA value

ACK:

! ID GE TA [numeric value]<CR>

Get Target Density

ID GE TD<CR>

Gets current TD value

ACK:

! ID GE TD [numeric value]<CR>

Get Slack Wrap

ID GE SL<CR>

Gets the current SL value

ACK:

! ID GE SL [numeric value]<CR>

Get Screen Thickness

ID GE ST<CR>

Gets the current ST value

ACK:

! ID GE ST [numeric value]<CR>



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