



Signatech

Intensity Controller Manual

MS210 / MS220 / CS410 / CS420



The shipping container should contain the following items:



· **Signatech Controller Unit**



· **RS-232 communications cable**



· **Software**

Models

The following models are covered by this manual:

CS410	Dual Output Intensity Controller
CS420	Dual Output Intensity Controller
MS210	Four Channel Intensity Controller
MS220	Four Channel Intensity Controller

Model Characteristics

Model	Channel Control	Output Configuration	Hardware UI
CS410	no	independent	no
CS420	no	independent	yes
MS210	yes	slaved	no
MS220	yes	slaved	yes

24 Peavine Dr
Rochester, Vermont 05767
802.767.3830
Fax 802.767.3831



Intensity Controller Manual

Contents

Hardware layout	pg.2
Hardware setup	pg.3
User interface (CS420/MS220 only)	pg.4
Software	pg.5
Installation	pg.5
Using configuration	pg.5
Using control applet	pg.6
Control interface pinout	pg.7
RS-232 protocol	pg.8
Specifications	pg.10
Warranty	pg.11
Troubleshooting	(see reverse manual,pg.12)

Features

All SignaTech DC Current Source models feature dual outputs with digitally controlled current sources, RS-232 communications with a simple, text based protocol, and an 8 terminal control interface.

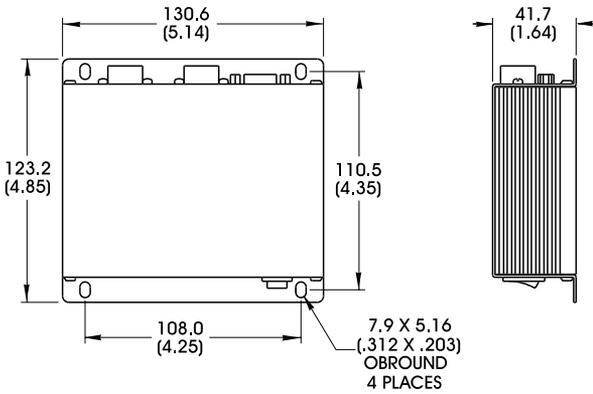
About SignaTech

SignaTech is an automatic configuration and optimization technology now built into all **ADVANCED ILLUMINATION** DC Current Sources and light heads. Upon connection, a light is automatically identified by the current source; internal power settings are adjusted to ensure both maximum intensity and maximum lifespan. Since different lights have different power requirements, power settings used with the SignaTech DC Current Sources are now expressed simply as a percentage of this maximum safe power, from 0.0% to 100%.

For lights without a SignaTech signature inside; the controller will default to a maximum current of 50 mA (MS) or 60 mA (CS) per channel.

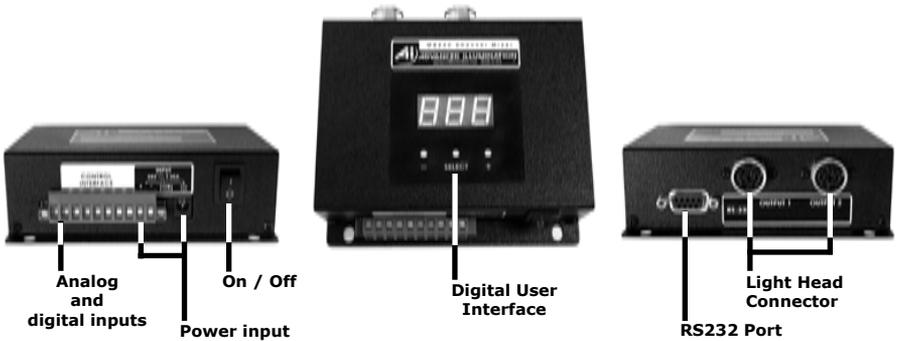
MS & CS Series

Intensity Controller Dimensions



DIMENSIONS ARE IN MILLIMETERS (INCHES)

MS220 / CS420



MS210 / CS410



Hardware Setup

1. Connect the lights

Connect one or two lights to the output connectors on the back of the unit. If you will be using a Y-cable, connect the Y-cable to the controller and two identical light heads to the opposite end. For more information about using Y-cables, please refer to ADVANCED ILLUMINATION Light head cable spec sheet, available at our web site, www.advancedillumination.com.

NOTE: Light heads should never be connected or disconnected with the unit power on. Always turn the unit off to change or add light heads.

2. Connect your PC

Connect the supplied RS-232 cable to the RS-232 port on the Intensity Controller and to a free 9 pin serial port on your

3. External Hardware Control

The SignaTech Current Source has both digital (on/off) and analog (intensity control) external interfaces. Refer to Appendix A for pinout and connection information.

4. Connecting Power

Power can be connected with either the standard round plug **or** via two screw terminals. **Never connect power sources to both.** The controller can safely operate with any voltage between 12v and 24v, however less than 24v may not be sufficient to power some lights. The controller may run cooler with a lower voltage incoming power. If local heating is a concern, experiment with a lower voltage, but never less than 12v.

5. Power On

Upon initial power-up, the controller defaults to 100% intensity on all channels and/or outputs. Use either the supplied software or the hardware user interface (CS-420/MS-220 only) to set a custom power level other than 100%.

User Interface

(CS-420, MS-220 only)

The image shows a seven-segment LED display showing the text "CH.4" in a monospaced, digital font.

MS-220 display

The image shows a seven-segment LED display showing the text "OP.2" in a monospaced, digital font.

CS-420 display

The hardware user interface of the CS-420 and MS-220 lets the user set custom power levels without a PC. The three LED digits display power levels as a percentage, between 0.0% and 100%.

The SELECT button switches between Outputs (CS-420) or Channels (MS-220). The new selection is briefly shown on the display, followed by the power level. The **+** and **-** buttons are then used to adjust the power level (0.0 to 100%).

MS-220

- CH.1* Channel 1 is selected
- CH.2* Channel 2 is selected
- CH.3* Channel 3 is selected
- CH.4* Channel 4 is selected

CS-420

- OP.1* Output 1 is selected
- OP.2* Output 2 is selected

Installation

1. Insert Installation CD. If "Autoplay" is disabled, double click on "My Computer" and open the CD drive (usually "E").
2. Click the MS210/220 or CS410/420 button to initiate installation.
3. Close all open applications when prompted and press **OK**.
4. If necessary change the installation folder (using the default recommended) and click the large button to begin the installation.
5. Select a Program Group or use the default (Signa Tech) and click Continue.
6. To run program go to Start, Programs, SignaTech and select the Control Applet

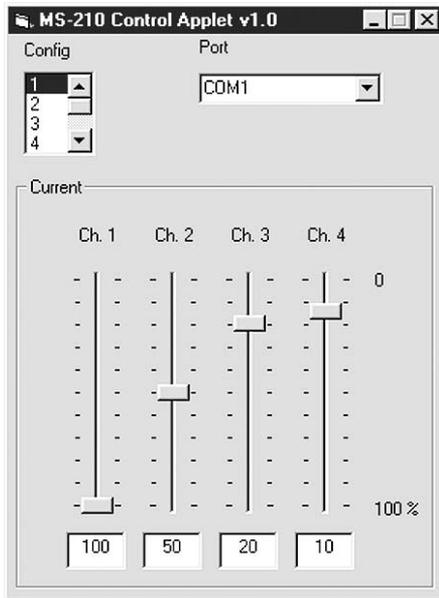
Using Configurations

The latest SignaTech Intensity Controllers introduce the concept of a "configuration." A configuration refers to all programmable settings in the controller, including power levels and option settings. Up to seven configurations can be stored in the SignaTech Intensity Controllers, and switching between configurations is done via a short RS-232 command (see Appendix A).

The Control Applet has a small menu in the upper left corner used to display both the current configuration number and to select a new configuration. Any setting changes made are automatically saved to the configuration number shown. Clicking on a different number automatically switches configurations and reads those settings from the controller, updating the sliders.

Configurations provide the user with a convenient method for switching back and forth between predetermined settings.

Using the MS-210/220 Control Applet

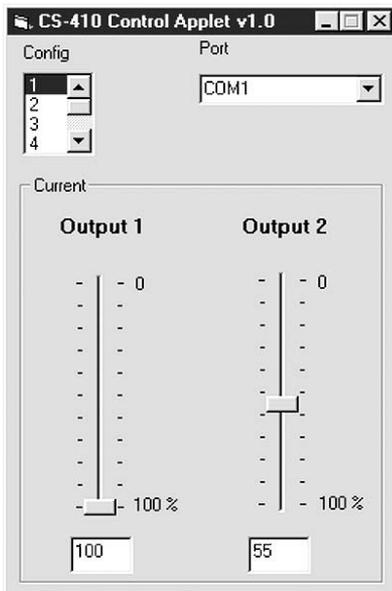


Setting Power Levels

The two outputs of the MS-210/220 are slaved together (current settings are identical).

The MS-210/220 Control Applet has four slider controls that are used to set the intensity of each channel from 0 to 100%.

Using the CS-410/420 Control Applet



Setting Power Levels

The CS-410/420 Control Applet has two slider controls that are used to set the intensity of each independent output from 0 to 100%.

Appendix A Control Interface Pinout

Pin	Direction	MS-210/220	CS-410/420
1	input	Digital + ¹	Digital 1 + ¹
2	input	Digital -	Digital 1 -
3	input	Analog Master ²	Analog Master 1 ²
4	input	Analog Chan 1 ^{2,3}	No connection
5	input	Analog Chan 2 ^{2,3}	Digital 2 + ¹
6	input	Analog Chan 3 ^{2,3}	Digital 2 -
7	input	Analog Chan 4 ^{2,3}	Analog Master 2 ²
8	output	+5v DC out (50 mA max)	+5v DC out (50 mA max)

¹ Digital inputs are unpolarized (above polarizing symbols are for notation only), optically isolated, 24v tolerant inverting inputs. Recommended operating range is TTL level (0 – 5v). When a logic high is detected, the corresponding output turns off. Digital inputs can be disabled in software.

² Analog inputs operate between 0 and 5v, where 0 is 0.0% intensity and 5v is 100% intensity. Analog interfaces are fully buffered and have a 1M input impedance for –0.5 to +Vsupply. Above +Vsupply or below –0.5v, the impedance is 1k.

³ Analog Channel interfaces (MS-210/220 only) are sampled every 50mS and therefore are not real-time inputs.

Appendix B RS-232 protocol

Data Format: 19200, 8, N, 1
19,200 baud, 8 data bits, No parity, 1 stopbit

<u>Command</u>	<u>Syntax</u>	<u>Reply</u>
Set Channel Power	Scnnnn	Ucnnnn
Read Channel Power	Rc	Ucnnnn
Enable Digital Inputs	OSb	OK
Switch Active Configuration	OCn	OCn
Reset Device	OR	OK
Clear All Configurations	OE	OEM
Set Display Digits	Odgggp	OK
Read Buttons	IB	IBt
Read SignaTech IDs	ID	IDxxyy
Read Incoming Power Voltage	IV	IVxx
Get Firmware Revision String	IF	IFssss
Read Current Configuration	IC	ICn

Fig. 7 Quick reference table

Set Channel Power

Scnnnn

c is the channel number (0-1 for 410/420, 0-3 for (210/220)
nnnn four digits 0000-1000 representing a fixed point
decimal number between 000.0% - 100.0%

Reply: Ucnnnn

c is the channel number (0-3) nnnn like above,
rounded to the nearest possible discrete
value

Read Channel Power

Rc

c is the channel number (0-3)

Reply: same as Set Channel

Option Digital Input

OTb

b 0 disable
 1 enable

Reply: Ok

Option Switch Config

OCn

n new configuration number (0-6)

Reply: OCn

Option Reset

OR

Reply: Ok

Option Clear All Configurations

OE

Reply: OEM

Option Set Display

ODgggp

ggg

p

three digits/letters

decimal point position (0-3, 0=no DP)

Information ID

ID

Reply: IDxxyy

xx

Output 1 ID2,ID1 in hex

yy

Output 2 ID2,ID1 in hex

Information Voltage

IV

Reply: IVxx

xx

power supply voltage in hex (0 = 0v, FF=56.15v)

Information Firmware Revision

IF

Reply: IFdnnn

d

C CS410

D CS420

M MS210

N MS220

nnn

firmware revision number

Information Read Configuration No.

IC

Reply: ICn

n

current configuration number (0-6)

Information Read Buttons

IB

Reply: IBb

b

button state, active low, bitmap: 0=plus, 1=minus,

2=Select

Specifications

Input Power

12 – 24 volts @ 1.25 Amps

Output Power

150mA max @ 12-24v per channel

Digital Input

Maximum Input Voltage	Vsupply
Impedance	1k ohm
Threshold Voltage	1.6V
Turn Off Delay	30 μ s
Turn On Delay	610 μ s

Analog Input

Maximum Input Voltage	Vsupply
Impedance	1M ohm (note ¹)

¹ Analog interfaces are fully buffered and have a 1M input impedance for -0.5 to +Vsupply. Above +Vsupply or below -0.5v, the impedance is 1k.



LIMITED TWO YEAR WARRANTY

Every ADVANCED ILLUMINATION, INC. (Ai) product is thoroughly inspected and tested before leaving the factory. Products are warranted to be free of defects in workmanship and materials for a period of TWO YEARS from the original date of purchase. Should a defect develop during this period, return the complete product, freight prepaid, to one of Ai's distributors or to the Ai factory. Ai will inspect the unit, and if a defect is found will, at our option, repair or replace the product without charge. Ai disclaims liability for any implied warranties, including implied warranties of "merchantability" and "fitness for a specific purpose."

NO LIABILITY FOR CONSEQUENTIAL DAMAGES

In no event shall ADVANCED ILLUMINATION, INC. be liable for any consequential, special, incidental or indirect damages of any kind arising from the sale or use of the products.

DELIVERY and SHIPPING

Unless specified otherwise, all products are shipped as follows:*

Domestic: UPS Ground **International:** UPS Worldwide Express

All shipments are FOB Rochester, VT. Federal Express or corporate account shipping can be arranged by contacting our Customer Service Department at **802.767.3830 x237**

Purchase orders must arrive at the factory by 12:00 noon EST to be processed same day. Orders must be signed, detail the product ordered, and have customer's Purchase Order Number. *Orders received after noon may not be processed until the next business day.*

Standard product, when in stock, can be shipped within 24 hours after receipt of the PO. *When not immediately available, standard product will be shipped within three business days after receipt of the order.*

For quotes, placing an order for standard product, or to find the dealer in your area, please contact our Sales Department at **802.767.3830 x237** between the hours of 8:30 am and 5 pm EST. Quotes are valid for a period of 60 days and are subject to change without notice after the expiration date.

PAYMENT POLICY

Full payment is due within 30 days of the invoice date on all orders with prior credit approval. Alternate forms of prepayment are also available. US orders MAY be paid with Mastercard or Visa. All prices are in US currency.

Standard Products may be returned within 30 days of receipt of the order. Products must be in resalable condition, in function and appearance, with shipping charges prepaid. A restocking fee of **15%** will be applied to all items accepted for return to stock. Please call our Customer Service Department at **802.767.3830 x237**

For returns, please contact our Customer Service Department for a Return Authorization Number. Clearly mark the outside of the package with the number.

Troubleshooting : DC & Strobe Units

The light doesn't come on.

- Make sure all connections are secure and the unit is plugged in.
- Is the wire from the power source securely inserted into the power jack or screwed into the terminal block?
- Is the power supply switch on?
- Is the light infrared? *You often are able to see a bit of red from most infrared and near-infrared light heads, but you may not when there is a large amount of ambient light. Never look directly into a light head!*
- Have you programmed the controller for trigger mode? (Strobe only) *The strobe controller in trigger mode only turns the light on in response to a trigger signal.*
- Have all the channel(s) and/or output(s) been programmed to zero intensity? (intensity and strobe controllers only) *Use the respective SignaTech software to program all channels to a value higher than zero. Some devices and/or lights may require a value higher than five to generate visible light (excluding IR and UV, which may never become visible, nor should you look directly into them!).*

The unit does not appear to be powered up.

- When on, the rocker switch will be in the 'I' position.
- If you are supplying power via a terminal block, make sure the positive wire (white) is inserted into the positive input and the negative wire (black) is inserted into the negative input.

Only half the LEDs come on when I plug the light in.

- How old is the light? *Some older Advanced Illumination light heads are wired in a manner that is not wholly compatible with SignaTech. Usually, these lights will illuminate only one half of a complete light head. A specific adapter cable for the light is required.*
- Is the light ID registering on the screen? (The ID will appear in the upper right corner of the user interface.) *If the ID on the screen and on the cable tag match, try programming the channel(s) and/or output(s) to a higher intensity.*

The light comes on, but does not appear as bright as it did when attached to a different power supply.

- How old is the light?
- If your light pre-dates Signatech, it is not wired with signature elements. To protect older lights, the maximum available current is 50mA per channel (MS) or 60mA per channel (CS).

The light comes on, but I am not able to change intensity.

- How old is the light?
- Is the light ID# registering on the screen? (The ID will appear in the upper right corner of the user interface.)

Troubleshooting : Strobe Units

The light doesn't strobe.

- Have you selected Trigger mode? *The strobe controller must be set to Trigger mode to enable strobe events. In the Constant and Test modes, external trigger signals are ignored, though Test mode does generate an internal trigger signal.*
- Is the trigger cable connected securely. *This is a common problem. Try reseating the trigger cable.*
- Is your light registering an ID? If so, is the ID that appears in the upper right corner of the user interface the same as the ID printed on the white tag on the power cord? *Older Advanced Illumination light heads (manufactured before August 2000) may not contain a SignaTech signature and require an adapter cable.*
- Are you using a Dell PC or a laptop? *Try disconnecting your RS-232 cable and cycling power on the controller. Some PCs (especially Dell machines) can not be left connected to the strobe controller.*
- Are your trigger signal levels sufficient? *A trigger pulse of 2.8 volts (rising) or 0.8 volts (falling) must be active for a minimum of 3 microseconds in order to be detected by the strobe controller.*

When I program a second light on the S6000, the first light stops working correctly.

- Reprogram the first channel again.

After changing the settings in the Windows interface, a communications error message appears when I hit the "Program" button.

- Ensure all connections are secure and the controller is turned on.
- Ensure the controller is connected to the communications port selected communications in the drop down window beneath the Program button.
- If you are using a laptop, try unplugging the RS232 cable from the strobe controller. In many instances the settings have been recognized and after disconnecting the RS-232 cable and cycling power the light will function as programmed. *Some laptops and desktops, including many made by Dell, are unable to communicate properly with the strobe controller and therefore should not be used.*

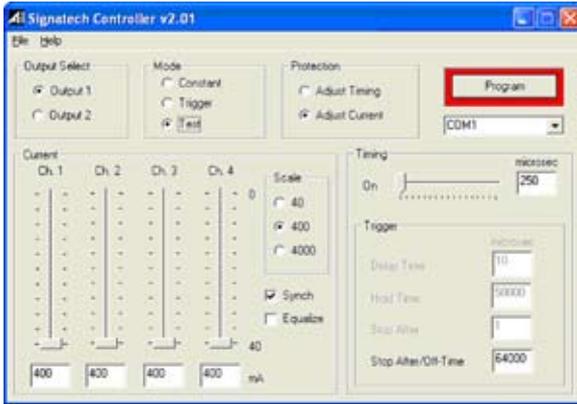
Trigger troubleshooting for S4000/S6000/S6000-AS.

A: Verify proper operation of the light.

* Program the Signatech Controller Software as follows:

Output Select: Output 1
Mode: Test
Protection: Adjust Current
Current: All channels at 400 ma
Timing: On time 250 microseconds
Stop After/Off-Time: 64000

These settings are shown below.



Press Program. The light should blink at approximately 10 pulses per second. If there is no light output there is trouble with the either the light, the controller or the inter-connection between the two. Note: IR (880 nm) lights are not humanly visible. A camera is required to verify that IR lights are illuminating.

If the light blinks as expected continue to the next section.

B: Verify proper operation of the trigger circuit:

* Program the Signatech Controller Software as follows:

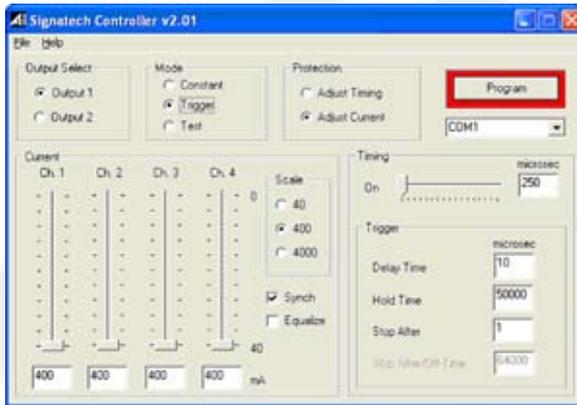
Change the Mode to Trigger
Delay Time: 10 microseconds.
Hold Time: 50000 microseconds
Stop After: 1

Leave all other settings as in step A.

Press Program: The light may stop blinking.

If possible, measure the voltage between the trailing edge trigger input (Pin 1 White) and trigger ground (Pin 5 Orange). This voltage should be approximately 24 volts. If 24 volts is not present then the controller has an internal fault and requires repair.

1. Test the trailing edge trigger: Short the trailing edge trigger input (Pin 1 White) to trigger ground (Pin 5 Orange). This should result in a light pulse.
2. Test the leading edge trigger: Short the leading edge trigger input (Pin 3 Blue) to +24V DC (Pin 2 Red). This should result in a light pulse.



If no light pulse resulted from one or both of the previous tests ensure that the trigger cable is properly installed. Inspect the connector end of the trigger cable to ensure that all of the pins are straight and not corroded or otherwise damaged.

If both of the trigger tests resulted in light pulses then the trigger circuitry in the controller is functioning properly.

C. Now connect your trigger source to the controller.

Your trigger ground should go to Pin 5 Orange and your trigger signal should go to the leading edge trigger input (Pin 3 Blue) or the trailing edge trigger input (Pin 1 White) as desired. Light pulses should appear synchronous to your trigger signal.

If there are no light pulses verify that your signal is producing transitions from less than 0.8 volts to greater than 2.4 volts for leading edge trigger, and from greater than 2.4 volts to less than 0.8 volts for trailing edge transitions.

Notes