

## **Opus-Two SC Installation Notes**

Document updated: Mar 2, 2006

This note provides information for installation of the Opus-Two SC Module.

This list is intended to be an informative update for cards in the field. Any questions should be sent to [dmilton@igs.net](mailto:dmilton@igs.net) or by phone: 613-592-3988 / 613-769-2570.

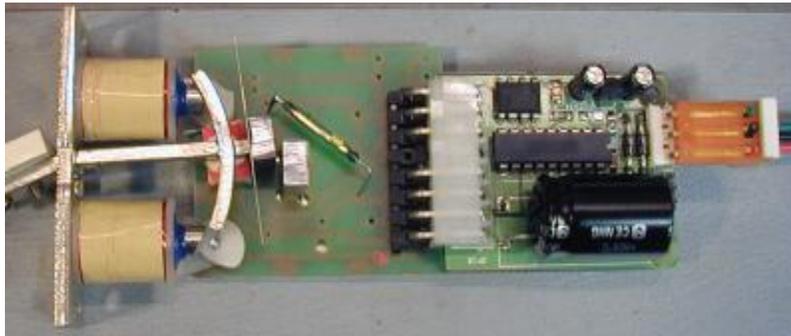
Should you need materials or further assistance please do not hesitate to contact us.

Regards,  
Dave Milton

The Opus-Two SC unit may be directly mounted on Syndyne or Peterson SAM units having the 8 pin header. The unit plugs in with the large black capacitor towards the bottom.

In most cases, it is also possible to use the SC unit with other SAM units. Some method of mounting a header can usually be devised so that the SC unit can plug onto this header directly.

The next sections will go into detail for each of the types that have been encountered to date.



### Daisy chain wiring for the SC

The SC units are designed to be daisy chain wired in a stop rail. A 3 pin right angle header is provided on the back of the SC for this purpose. Using the above photo as a guide the pins are numbered 1 to 3, top to bottom.

Pin 1: is GND Connect to console DC power gnd.

Pin 2: is SC Signal

Pin 3: is PWR. Connect to console DC power positive. In some cases an independent supply may need to be used. Satisfactory operation of the SC with the SAM is normally achieved with a supply voltage of approx 15V. Some SAM units are designed for operation at 24V. The SC units may be operated at voltages up to 30V.

For small #'s of SC units { 80 or less per rail }, 22 ga wire is sufficient. These are the 4 pin red IDC headers. The headers are designed for daisy chain or through wiring. A 4 pin header is used now so that the 4th pin, adjacent to the pwr pin, can have a keying plug inserted. This helps to avoid mis-plugging the connector.

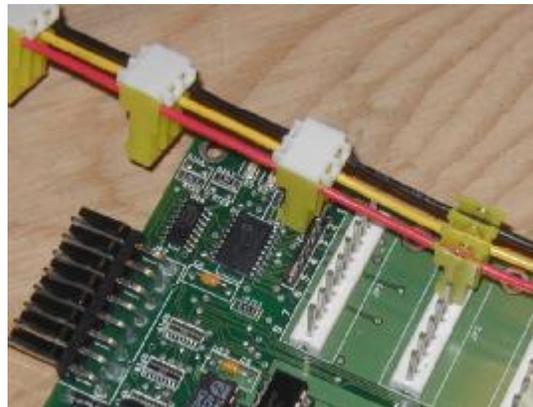
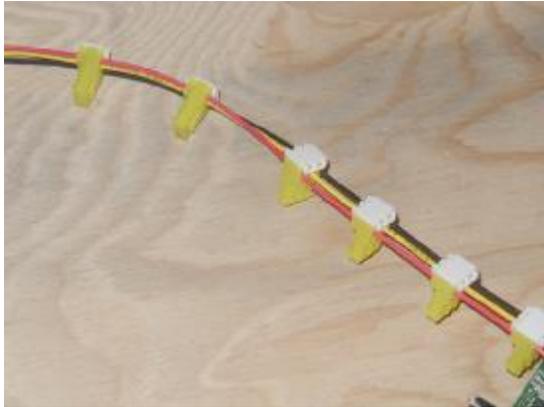
When wiring the daisy chain leave a bit of slack wire between units so that the header could be removed if needed.

The small 3 pin vertical header on the SC unit is only used for SC program updates and is not normally used when unit installed in a stop rail.

The daisy chain wiring can be made up more easily by measuring the connector to connector spacing that is needed for an installation, then using an Opus-Two input or output card as a

'holder' for the wire header. It's much easier to punch down the wires on a rigid base than the back of a wobbly SAM unit.

The sequence of photos following show a daisy chain cable under construction, then it's installation on a number of SAM units on a stop rail.



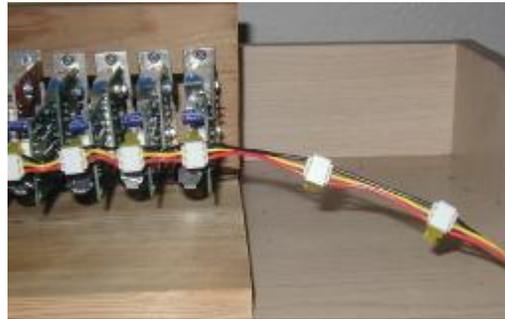
### Daisy Chain Cable Assembly



Daisy Chain Cable installed on SC units on a stop rail

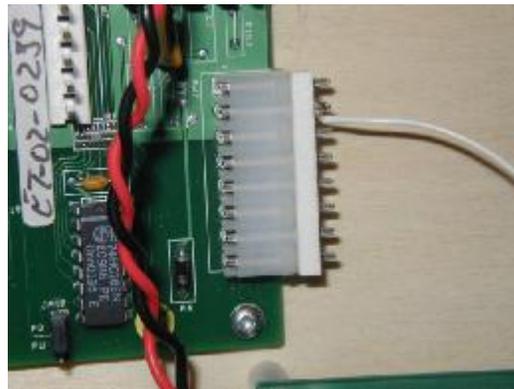
A small amount of slack wire is left between connectors so that a single unit can be removed or adjusted if needed.

{ Photos still show yellow 3 pin connector, this will be updated to show red 4 pin connector with keying plug }



It may be desired to leave a few extra headers on the cable for expansion of other SC functions

#### Daisy Chain wiring Connections to Opus-Two cards



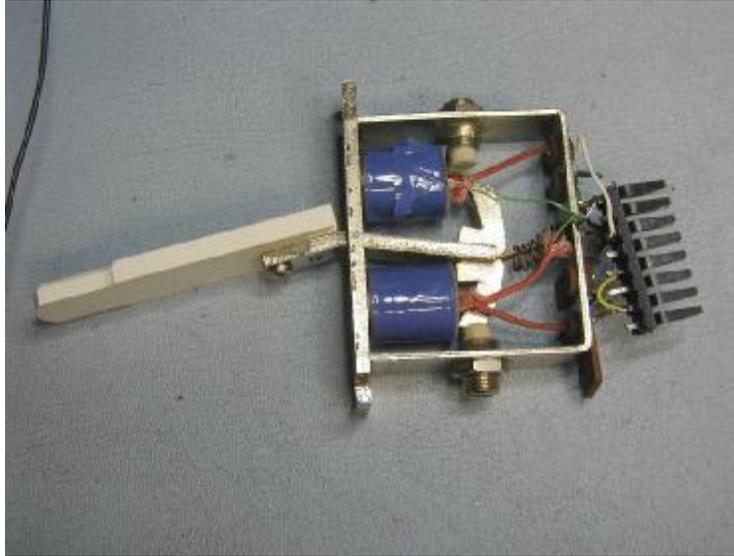
The middle wire of the SC daisy chain is connected to Pin 2 of an available Opus-Two card chain connection. A straight or right angle header may be used for this connection.

It is recommended that the power & ground for the SC daisy chain be connected to the terminal strips for the wiring board, not the power connections that are available on the SC card chain.

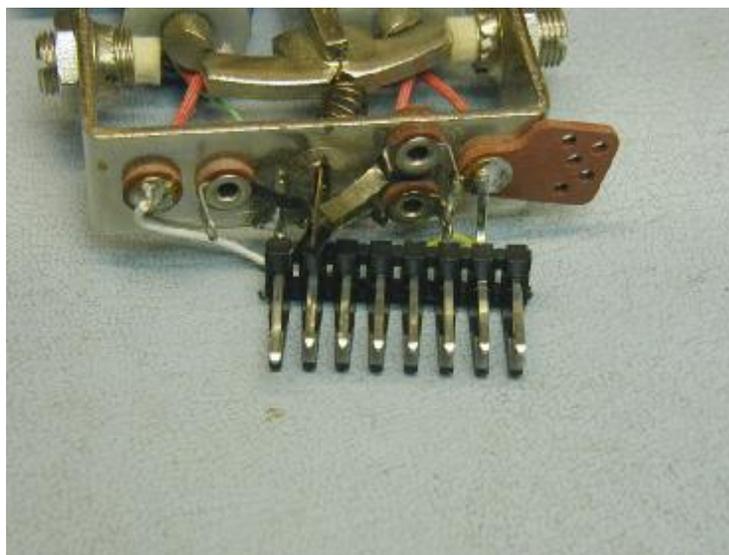
Please refer to SC Group Wiring diagram for detail wiring information re SC units and data line connections to the Controller-III.

### Reisner C3

The photo shows an 8 pin header attached to a Reisner C3.



For discussion purposes, the pin #'s are referenced as 1 at the top of the header and 8 at the bottom. When placing the header on the SAM unit it is probably best to clip the right angle portion of the pins of 2, 3, 4, 5 and 8. The header is affixed to the C3 unit by 3 pins, 1, 6 & 7. When placing the header on the C3 unit, be sure to leave clearance room for the mechanical switch wiper to operate. This usually means that the right angle tip of pin 7 is at the centerline of the solder lug for the coil connections.



Pin 1: Connects to the steel frame of the C3. This is the 'coil' common connection. This is probably the hardest connection to make as the frame is plated steel and is more difficult to solder than the other connections.

Pin 2: No connection. Clip the pin off to get it out of the way of the switch.

Pin 3: Take a wire from this pin to the coil terminal at the top of the C3 { the 'on' coil }

Pin 4: No connection: Clip the pin off to get it out of the way of the switch.

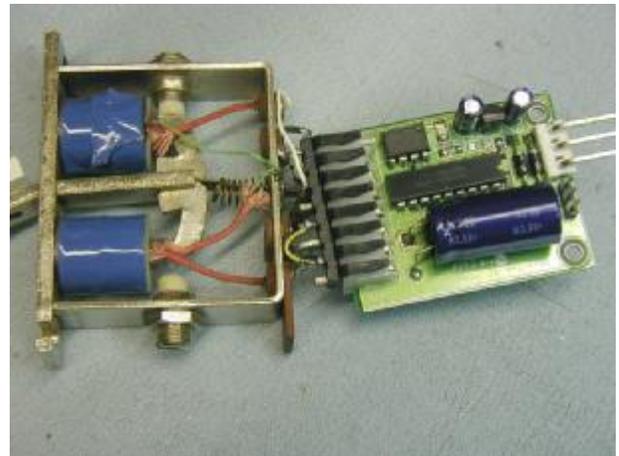
Pin 5: see pin 7 instructions

Pin 6: This pin is soldered to the 2 contacts for the mechanical switch. Usually the pin is soldered to one side only. The 2<sup>nd</sup> wiper contact is optional.

Pin 7: This pin is soldered to the connection lug for the "off" coil. Connect a wire from Pin 7 to pin 5.

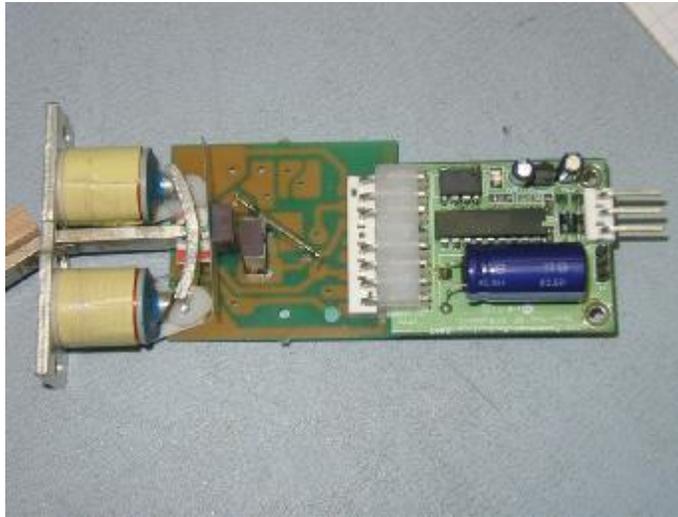
Pin 8: No connection. Clip the pin off.

The C3 SAM stop switch had 1 contact for the 'off' position and 2 for the 'on' position. The SC unit only uses the 'on' position contact.



The above photo shows the SC unit attached to the header on the C3 SAM

**Syndyne SAM**

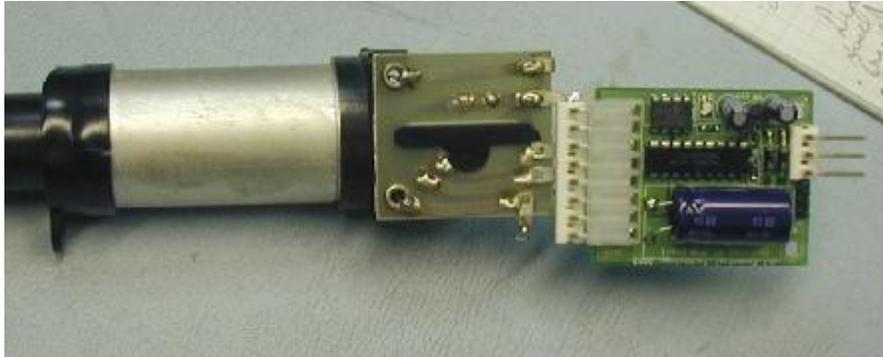


NB: Some Syndyne units use the ceramic magnets. These units usually need to be operated at a higher voltage { 18 to 24V to achieve satisfactory operation }. The Opus-Two SC will operate at voltages up to 32V DC.

**Peterson SAM**



**Klann Drawknob**



The wiring header is attached to the drawknob unit as shown above. Only 1 wire is needed from hdr pin 6 to the solder tab along the bottom edge of the drawknob pcb.

**Harris Drawknob**

{ units tested, photo not yet available }

**Compton SAM**

{ units tested, photo not yet available }

**Peterson Drawknob**

{ units tested, photo not yet available }

## SC Setup Configuration

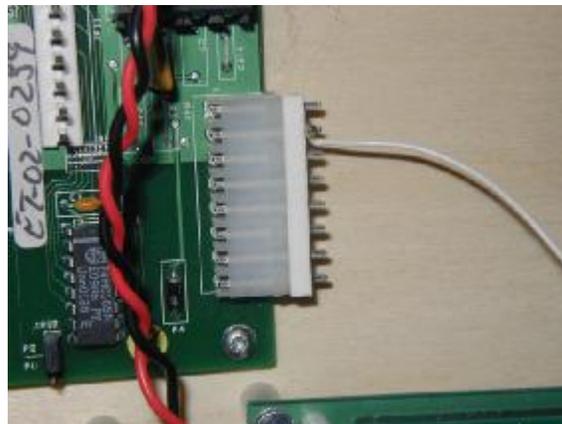
In order for the SC units to be used with an Opus-Two controller to operate with the SC based stop-rail, a final bit of setup is done in-place via a menu screen on the Opus-Two Display panel. Note that this requires the proper version of Opus-Two software for the C-III controller - this will be provided as part of your system configuration update.

The purpose of the SC setup is to give each SC a unique address. This address is associated with that particular stop tab and is used by the Opus-Two system to identify physical stop tabs. The addresses are assigned in numerical order, however the placement of the tabs is entirely dependant on an installation.

This setup procedure only needs to be done once or if SC units are changed, added or removed from a previous installation.

The steps needed are as follows:

1. Connect the SC units with the daisy chain cable that has been made up for the stop-rail. Connect the center wire of the daisy chain connection to pin 2 of an available Opus-Two card chain as shown below.



2. Connect power to the SC daisy chain as needed for the stop rail. This is normally 15V but in some cases may be higher.
3. The power may now be turned on.
4. Be sure that a suitable version of configuration firmware is installed in the C-III controller.
5. Press the “Menu” button on the Opus-Two display until the “SC Init” screen is displayed.

6. The options on the SC Init screen are as follows:

Menu - go to next Opus-Two Display screen

Clear -clears the address setting in all SC unit This also loads the defined de-bounce Parameter into the SC units.

Dbnc+ - Increments the de-bounce setting. The number can go from 0 to 15 and will cycle.

Back - Go back to the SC Setup screen

Up - put all SC unit in the 'on' position

Dn - put all SC units in the 'off' position

The "Clear" command is used to initialize all the SC units { that have the tab down } and set the de-bounce parameter. The SC units can be tested by repeated use of the up / dn buttons. Should a tab not operate correctly the de-bounce parameter can be increased. If the tab does not operate at all, check the wiring connections to the SC and check to see that the SC unit is plugged onto the back of the SAM correctly.

If the tabs are in the on position when the clear command is done, the tabs will be moved to the off position. This also indicates that the SC units are receiving instructions from the controller properly. Only units with tabs down will accept 'clear' commands.

7. The options available on the SC Setup screen are as follows:

The SC Setup screen shows the currently SC address setting. This address is the one that will be used to assign an address to a stop tab. It is reset to 1 by an init, and incremented during address assignment.

Satisfactory operation of the SC stop rail assembly requires that an address be assigned only once. Should this not be achieved { ie a single address gets assigned to more than 1 SC, all that is needed is to repeat this Setup process }.

Menu - go to next Opus-Two Display screen

Set+ - sets the currently displayed address into the stop tab which has not had an address set and has it's stop tab in the 'on' position & increments the address.

Init -Resets the display address { Does not reset the addresses that may have been set inside the SC units.

Incr - Incr the display address counter. This is the address that will be set into the next

SC unit. { allows addresses to be skipped if desired }

- Up - toggle the stop tab associated with the display address counter.
- Dn - toggle the stop tab associated with the display address counter.

**Procedure:**

Put all stop tabs in the “off” position

Use “Init” to clear the displayed address { & use incr to adjust to desired start address }.

Repeat for each stop tab:

1. For the stop tab that is to be associated with the current display address, put the tab in the “on” position. Physically SC units can be programmed in any order, just pick a scheme that makes sense for the stop tab assignment order that has been selected for the stop rail.
2. Press the “Set+” button on the display. This sets the current display address into the above selected tab. Once an address is “set” the tab may be left on. This provides a visual indicator of what tabs remain to be setup. The address display will auto-increment.
3. Repeat 1 & 2 for all SC tabs.
- 4 . The up/dn togl may be used to verify that the SC unit understands it’s address and that it’s the only one assigned to that address. Init will reset the displayed address.
5. Press “incr” to advance the address counter.

Once all the SC’s are setup, they may be used as stop tabs. Assignment of tab addresses to stop definitions is done elsewhere in the configuration system.

**Programming Update for SC Units { Optional Field Programming }**

{ This procedure / programming cable will be updated shortly }

SC units may need programming update from time to time. Initial SC units that were shipped contained a test program that toggles the tab continuously. In order for the SC units to operate properly in a stop-rail with the Opus-Two Controller, new firmware needs to be installed.

Note that units that have been shipped after May 15, 2004 will probably not need the SC Programming update.

Materials needed { Do not make connections until instructed later in this procedure }

1. Opus-Two SC Programming module. This unit plugs into the same PC parallel port that is used for programming other Opus-Two controller & I/O cards. A multi-plug cable is also supplied with the programming adapter. The 6 pin plug plugs into a header on the programming adapter. The large 3 pin plug is for the right angle connector on each SC. The small 3 pin plug is for the small 3 pin vertical header on the SC { right beside the 3 pin rt angle one }. The plug end that has an 8 pin rt angle header plus into the tail end of an Opus-Two card chain in order to pick up power for the programmer & the SC unit.

2. A PC with the Opus-Two utilities. WinPicProg is used to program the SC units. Refer to the "Opus-Two Configuration Update" for specific information on setup & use of this program.

3. SC units

4. A SC configuration file { Opus\_SC\_xxxx.hex }

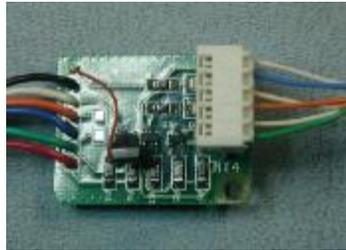
Procedure:

It is recommended that the SC unit be removed from the SAM and daisy chain.

1. Prepare & setup WinPicProg to operate the SC Programming adapter. Instructions for this are in the "Opus-Two Configuration Update" document.

2. Plug the SC programming module into the PC parallel port. Plug the 8 pin rt angle connector of the programming cable into the end of an Opus-Two card string.

3. Plug the 6 pin header of the programming cable into the SC Programming adapter.



The cable to the PC comes of from the left of the above photo. Be sure that the programming cable is plugged into the header is shown above - nasty problems could happen if it is reversed.

The green wire should be on the bottom as shown.

4. Turn power on to the SC Programming adapter.

Repeat for each SC

1. With the SC unit removed from the SAM & daisy chain, plug the large 3 pin header from the programming cable onto the SC unit.



The above photo shows connection of the large 3 pin header to the SC to be programmed.

2. Plug the small 3 pin plug onto the vertical header on the SC unit.



The above photo shows the small 3 pin programming plus attached to the SC. The SC may now be programmed.

3. "Erase" the SC. The bottom of the WinPicProg screen should show successful results. Any errors will be reported.
4. Re-open the configuration file { Opus\_SC\_xxxx.hex }
5. "Write" the SC. The bottom of the WinPicProg screen should show successful results. Any errors will be reported.
6. At the end of programming, the LED of the SC will probably flash 5 times. This is normal & indicates a successful programming cycle.  
If the unit does not flash 5 times, remove the small 3 pin plug from the SC, remove the large 3 pin plug for a several seconds, then re-attach. The SC led should flash 5 times.
7. Re-install the SC in the stop rail & connect the daisy chain header.

Precautions

1. SC daisy chain wiring should be checked to ensure that Each SC has a good connection to the common. Should this connection fail or be missing, higher voltages can appear on the SC data line causing problems with other SC units or the controller.

To help prevent damage in this case, it is recommended that some form of voltage clamp be connected between each SC data line and GND, preferably close to the controller.

The protection device can be a 3W or 5W 5.1V Zener diode { cathode or banded end on SC data line, anode end to GND }. One or 2 such devices per SC data line is fine.

Alternately the Opus-Two Data line clamp can be used. This is designed to clamp data lines to a safe voltage level.

2. Larger installations { > 100 SC units } will typically require multiple daisy chains. It is recommended that each SC data line set of up to 100 SC units be connected to the C-III controller SC data points.

3. When 1st powering up an SC system, it is suggested to initially use 12 to 15V to check out the wiring and to be sure that all SC units are powering up ok { 5x LED flash on powerup }. A 'pink' glow can be seen from each SC unit when connected to a Controller-III with appropriate config software in place. { Note that absence of an appropriate config will cause the LED's to be off }.

Later installations are recommending the use of a variable power supply for the SC power. Initially set this supply for approx 15V to do some initial tests, then set power supply for typical best tab / drawknob response. This will be approximately as follows:

Syndyne normal tabs:	22V
Peterson PowerTabs:	22V
Peterson Drawknobs:	22V
Syndyne 'stiff magnet':	30V

Best tab response may be obtained by adjusting the voltage slightly up or down, or by adjusting the DBNC parameter up or down. The current SC algorithm using a DBNC value of 4 has been found to work well with most tabs using above voltage settings.