

Flightcell SVS Installation Manual



Section 1: Revisions & Approvals

Manual Revision	Effective Date	Approved By	Reasons for Change
1.0	30 July 2022	James Mace	New issue for product revision 1.5 and up
1.1	30 August 2022	Brodie Hemmings-Sykes	Updated revision
1.2	20 September 2023	Hannes Booyse	HW-2238

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Section 2: Introduction

Thank you for selecting and purchasing a quality Flightcell product.

This manual has been prepared to guide you through the installation and configuration of your Flightcell SVS. Please read this manual carefully before using your SVS for the first time. Keep this manual in a safe place and use it as your first point of reference.

Due to continual product development Flightcell reserves the right to alter specifications or the appearance of the device.

Applicability of this Manual

This manual applies to the Flightcell SVS part number HFP_01, revision 2.0 and up.

Revision 2.0 and up operate firmware version 1.2.2.

Section 3: Specifications

Dimensions

Dimension	DZUS mount
Faceplate Width	146mm
Extrusion Width	126mm
Faceplate Height	57mm
Extrusion Height	54mm
Depth (from Front face to Rear face)	110mm

Electrical

Part/Item	Parameter	Value
Power	Input Voltage	12-32VDC
	Supply Current	Up to 1A @ 28VDC
ICS to SVS	Input Levels (VRMS)	20mV to 1.15V, adjustable
		775mV nominal
	Input Impedance	600Ω
	Microphone Bias Voltage	12V via 2.2kΩ
SVS to ICS	Output Levels (VRMS)	Up to 5V, adjustable
		775mV nominal
	Output Impedance	150Ω
Backlighting	Input Dimming Control	0 to 28VDC
		Scaled from 0-100% based on DC input voltage
	Colour	Dual mode: White (Daylight operation) NVIS Green A (Night operation)
General Purpose Inputs	Inputs Levels (Vin)	0 to 28VDC
General Purpose Outputs	Levels (Vout)	0 to 32VDC
	Max Current (Iout)	500mA

Environmental and EMI Qualifications

The SVS has been tested to the following DO-160G and MIL categories:

Test Name	DO160G Test Section	Category	Notes
Ground Survival Low and Short Time Operating Low Temp	Section 4	F1	Combined test
Operating Low Temp	Section 4	F1	Combined test
Ground Survival High and Short Time Operating High Temp	Section 4	F1	Combined test
Operating High Temp	Section 4	F1	Combined test
Altitude	Section 4	F1	Combined test
Overpressure Test	Section 4	A2	-15,000 Ft
Temperature Variation	Section 5	B	
Humidity	MIL-STD-810H		Method 507.6, Procedure II (aggravated)
Functional & Crash Hazard Shock	MIL-STD-810H		Method 516.8, Procedure I (functional) & Procedure V (crash hazard)
Vibration	MIL-STD-810H		Method 514.8, Procedure I (general), tailored per Boeing 901-910-034, Rev C, Vibration Zone 2
Explosive Atmosphere	MIL-STD-810H		Method 511.7, Procedure I
Rain Drip	MIL-STD-810H		Method 506.6, Procedure III
Thermal Shock	MIL-STD-810H		Method 503.6, Procedure I-C
Bench Handling Shock	MIL-STD-810H		Method 516.8, Procedure VI
Blowing Dust	MIL-STD-810H		Method 510.7, Procedure I
Fungus Resistance	Section 13	F	
Salt Fog	Section 14	S	
Magnetic Effect	Section 15	Z	X
Power Input	Section 16	Z	X
Voltage Spike	Section 17	A	X
AF Conducted Susceptibility	Section 18	Z	X
Induced Signal Susceptibility	Section 19	AC	X
RF Conducted Susceptibility	MIL-STD-461G		Method CS114, Bulk Cable Injection, 10KHz to 200MHz
RF Conducted Susceptibility	MIL-STD-461G		Method CS116, Damped Sinusoidal Transients, Cables and Power Leads
RF Conducted Susceptibility	MIL-STD-461G		Method CS117, Lightning Induced Transients, Cables and Power Leads
RF Susceptibility (Radiated)	MIL-STD-461G		Method RS103 2MHz to 18GHz
RF Emissions (Radiated)	MIL-STD-461G		Method RE102 10KHz to 18GHz

RF Emissions (Conducted)	Section 21	M	X
ESD	Section 25	A	X

Please contact Flightcell for more information on the Environmental and EMI Qualifications.

Section 4: Installation

Mounting the SVS

The SVS should be mounted where the flight crew or radio operator have a clear view of the display and can easily use the keypad, preferably where there is minimal sunlight shining on the display. The ideal location is in the panel where it is readily viewed by, and accessible to the pilot or pilots.

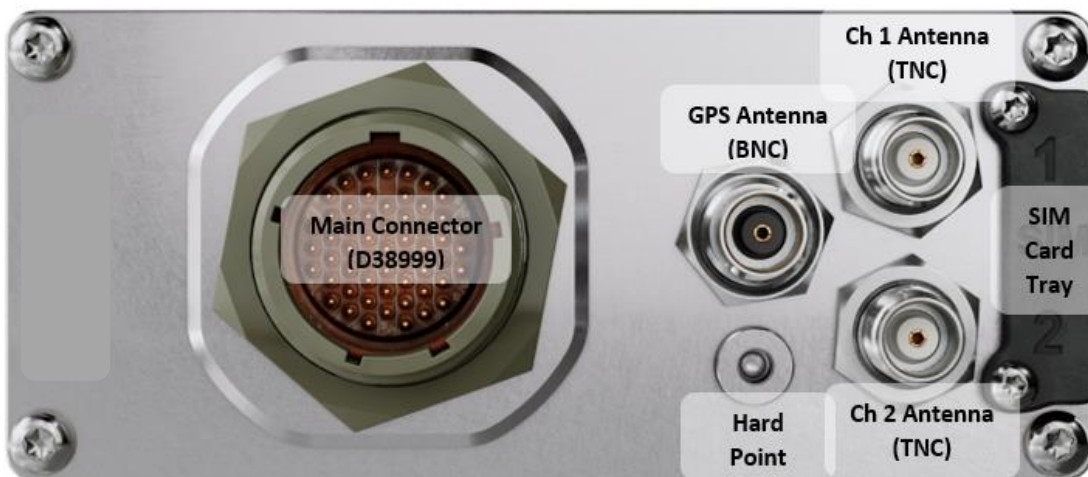
If the SVS is installed in the pedestal, for ease of use it is preferable to install it as near to the front of the pedestal as possible.

Refer to the latest versions of the mechanical drawings available from the Flightcell website at www.flightcell.com/resources for dimensions and mounting details of for the SVS.

CAD solid model files are also available on request from Flightcell International. Contact tech@flightcell.com for more information.

The SVS Backplate

All SVS connectors, and the SIM card tray, are mounted on its backplate.



Note: The GPS Antenna BNC connector is a placeholder for future variants of the device. This is not currently used.

Necessary Installations

The following are essential parts of the SVS installation:

- » Antenna(s)

- » SIM Cards

Antennas

Flightcell supplies a range of antennas, the choice of which will depend on SVS modem configuration:

- » Single Iridium modem: Use a Flightcell single Iridium antenna, P/N ANP_00045
- » Dual Iridium modems: Use two Flightcell single Iridium antennas, P/N ANP_00045 with a minimum spacing of 1m between the antennas.

Installation of Iridium Antennas

Installation drawings for the antennas are available at www.flightcell.com/resources.

The Flightcell Iridium antenna should be installed on the top of the aircraft where it will have an unrestricted view of the sky, mounted as close to horizontal as possible. The following should be considered when determining a mounting location:

- » Maintain good separation from other antennas. Preferred separation is 1m from L-band (GPS), TCAS or transponder antennas, but a lesser separation can be applied if there is limited space on the aircraft.
- » On a helicopter, the antenna can be installed below the rotor blades, but avoid installing it close to the rotor hub, as the hub and inner rotor can block the antenna's view of the sky.

Keep coax cable lengths short to minimize attenuation of transmit and receive signals.

Guidelines for Antenna Cables

Iridium antenna cables must be selected to keep signal loss within accepted levels. Total signal loss on the Iridium connection between the SVS and the antenna should not exceed -3dB at 1626MHz.

Refer to the table below for the recommended length of cables.

Cable Specification	Maximum Cable Length
RG58C/U or RG400	Up to 3m
LMR400	Up to 17m
LMR600	Up to 26m

It is recommended that the antenna cable be reduced to RG58 for the last 300mm to the SVS to assist with installation in the panel.

SIM cards

The SVS may have one or two Iridium modems.

The primary modem must be configured for Safety Voice Services.

The secondary modem may be configured for Safety Voice Services or may be configured for standard Iridium services.

A SIM card is required for each Iridium modem. If the modem is used for Safety Voice Services, then a SIM for Safety Voice Services is required. This must be obtained from an Iridium service provider authorised to provide this service.

A SIM card for standard Iridium services can be obtained from any Iridium service provider.

SIM Slot Designation

SIM card slots are allocated as follows:

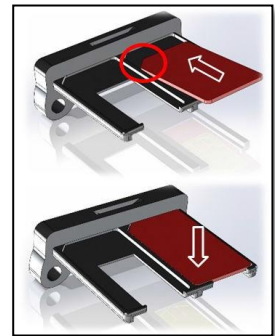
- » SIM 1 is allocated to the primary modem.
- » SIM 2 is allocated to the secondary modem (if installed).

Installing SIM cards

SIM cards are installed in the SIM card tray inserted in the back of the SVS.

To install SIM cards:

- » Undo the screws securing the SIM card tray and remove the tray.
- » Preferably place the tray on the edge of a hard surface such as a table or book.
- » Position the SIM card with the bevelled corner (circled in drawing) forward and contacts downward, then slide the front edge into the recess in the front of the tray.
- » Tilt the card downward until it clicks into the groove in the tray.
- » Insert the tray into the slot on the back of the SVS and secure in place with the two cap screws.



Wiring the SVS

Refer to the wiring diagrams for the Flightcell SVS and associated equipment (available from www.flightcell.com/resources)

Fabricating Wiring Harnesses

All wiring should be carried out with aviation specification fireproof cable.

Screened cable should be used where indicated in the wiring diagrams. Where cable screen connections are not explicitly shown, they should be left unterminated.

The following minimum wiring specification is recommended:

- » Power supply - 22 AWG stranded (0.325mm²)
- » Ethernet Cabling - CAT5e or better twisted pair cable
- » USB Cabling - Up to 5m length of shielded USB Cable to ensure compliance with the USB 2.0 cable delay specification. This is essential for the operation of the USB interface.
- » Other cabling - 24 AWG stranded (0.205mm²).

It is recommended that enough slack be left in the main cable to enable the SVS to be partially removed from the aircraft panel for service or to exchange the Iridium SIM cards.

Grounding and Shielding Terminations

The SVS provides a chassis ground connection on the primary connector. This can be connected to a local aircraft chassis ground point if required. If the SVS is mounted in a DZUS rack, the housing is grounded to the SVS rails via the DZUS connectors and contact between the front panel metalwork and the SVS rails.

SVS Main Connector

The SVS uses a single D38999 connector. Refer to the figure below for the layout of the SVS backplate, connector type: D38999/24WE-35PN. The mating part is D38999/26WE-35SN (or equivalent).

Connector Pinouts are shown in the following table.

Pin No	Name	Description	Direction
1	ETH 10/100 TX-	Ethernet port used for configuration / phonebooks	OUTPUT
2	ETH 10/100 RX+	Ethernet port used for configuration / phonebooks	INPUT
3	ETH 10/100 RX-	Ethernet port used for configuration / phonebooks	INPUT
4	AUDIO FROM SVS ICS2 LO	ICS2 Audio port	OUTPUT
5	ETH 10/100 TX+	Ethernet port used for configuration / phonebooks	OUTPUT
6	RESERVED		-
7	RESERVED		-
8	CHASSIS GND	Chassis Ground connection	CHASSIS
9	RESERVED		-
10	AUDIO FROM SVS ICS2 HI	ICS2 Audio port	OUTPUT
11	OUTPUT 3A	Output 3 - Degraded Operations	OUTPUT
12	AUDIO FROM SVS ICS1 HI	ICS1 Audio port	OUTPUT
13	OUTPUT 1B	Output 1 - Modem 1 Call Status	OUTPUT
14	OUTPUT 1A	Output 1 - Modem 1 Call Status	OUTPUT
15	OUTPUT 2B	Output 2 - Modem 2 Call Status	OUTPUT
16	RESERVED		-
17	POWER GROUND	DC Power Return	INPUT
18	OUTPUT 3B	Output 3 - Degraded Operations	OUTPUT
19	AUDIO FROM SVS ICS1 LO	ICS1 Audio port	OUTPUT
20	RESERVED		-
21	RESERVED		-
22	RESERVED		-
23	OUTPUT 2A	Output 2 - Modem 2 Call Status	OUTPUT
24	INPUT 6 (LIGHTING MODE)	Input 6 - Lighting mode input	-
25	DC IN	DC Power IN - 28VDC	INPUT
26	MIC TO SVS ICS2 HI	ICS2 Audio port	INPUT
27	MIC TO SVS ICS2 LO	ICS2 Audio port	INPUT
28	RESERVED		-
29	RESERVED		-
30	RESERVED		-
31	USB D+	USB Upgrade port	I/O
32	RESERVED		-
33	OUTPUT 4A	Reserved for future use	OUTPUT
34	MIC TO SVS 1 LO	ICS1 Audio port	INPUT
35	RESERVED		-
36	RESERVED		-
37	RESERVED		-
38	USB VBUS	USB Upgrade port	PWR
39	USB D-	USB Upgrade port	I/O
40	RESERVED		-
41	OUTPUT 4B	Reserved for future use	OUTPUT

Pin No	Name	Description	Direction
42	MIC TO SVS 1 HI	ICS1 Audio port	INPUT
43	INPUT GND	Input Ground return	-
44	RESERVED		-
45	RESERVED		-
46	USB GND	USB Upgrade port	GROUND
47	RESERVED		-
48	RESERVED		-
49	INPUT GND	Input Ground return	Ground
50	INPUT 2	Input 2 - EMCON Mode	INPUT
51	INPUT 1	Input 1 - Aural Notification Suppression	INPUT
52	INPUT 5 (LIGHTING)	Input 5 - Lighting level input 0-28VDC Signal	INPUT
53	INPUT 3	Input 3 - Modem 1 Call Answer/Terminate	INPUT
54	INPUT 4	Input 4 - Modem 2 Call Answer/Terminate	INPUT
55	INPUT GND	Input Ground return	GROUND

Necessary Connections

- » Power Supply
- » Audio System
- » Inputs
- » Outputs

Power Supply

The SVS unit and other components require aircraft DC power. Operating range is 12-32VDC. It is recommended that the SVS be connected to the emergency (primary) power bus on the aircraft. This is to ensure successful operation of emergency calls.

When operating on a nominal 28V supply, a 2-amp circuit breaker/fuse is recommended to protect the SVS system.

The SVS has a non-resettable internal 5A fail-safe fuse to protect the aircraft power bus from major malfunctions.

Audio

Audio from the SVS to the Aircraft Audio System

The SVS supports an isolated audio channel for each of the Iridium SATVOICE channels installed in the unit. Audio from the SVS is connected direct to the ICS input, and its levels adjusted using the SVS setting.

Audio from the ICS to the SVS (microphone installation)

The SVS can be installed in aircraft systems with either high impedance or low impedance microphones. Most (but not all) civil aircraft operate high impedance (electret) microphone systems. Most (but not all) military aircraft operate low impedance microphone systems. Refer to www.flightcell.com/resources for wiring diagrams for the microphone connections.

Low Impedance Microphones

When installing the SVS with an ICS that uses low impedance mics, the SVS must be connected to a line level Radio/Comms port. If a line-level port is not available and the SVS is to be connected direct to the mic line, then a tactical radio adaptor will be needed to match impedances. Options include the NAT AA34-300, Jupiter JA34-001 or PS Engineering 200-002-0002.

High Impedance Microphones

There are several options for connecting the SVS into an audio panel/ICS with high impedance microphones. The way in which the SVS is connected will depend on your system configuration and operational requirements. As the Iridium satellite phones are full duplex, it is preferable to use the SVS on a hot mic connection, rather than PTT (keyed). The SVS will typically be installed in one of the following ways:

Connecting Directly to a Headset Microphone Line

The MIC lines are spliced to one or more headset microphone inputs on the audio panel. As these microphone inputs have mic bias provided by the audio panel, the SVS should have mic bias disabled. The way this is configured will depend on how many headsets are to have access to the SVS:

If only the pilot is to use the SVS, its MIC TO SVS 1 HI/LO lines are connected only to the pilot's microphone line.

If both pilot and co-pilot are to use the SVS, the MIC lines are connected to the pilot microphone line and the MIC lines are connected to the co-pilot microphone line.

If more than two microphones need to have access to the SVS, an external switch is required to select the active microphone input.

Connecting to a Cell Phone Port on the Audio Panel

The SVS MIC line can be connected to the cell phone port on the audio panel.

Connecting to a Spare Radio Position on the Audio Panel

On aircraft with separate audio control panels at each crew position, this option enables crew to use the SVS and connected phones individually on demand. In this case it may be necessary to provide mic bias.

Inputs

The SVS has six Inputs which are assigned the following functions:

Input	Input type	Input function
1	Digital	Audio Annunciation Suppression Mode Enable
2	Digital	EMCON mode Enable
3	Digital	Primary Comms Answer/End
4	Digital	Secondary Comms Answer/End
5	Analog	Backlight Dimming
6	Digital	Backlight Day/Night Mode

Wiring the inputs

The inputs can tolerate a voltage range of 0-28VDC, with an over/under voltage protection to ± 32 VDC. The inputs have two states, Open (high voltage) or Closed (low voltage). Refer to the Flightcell website at www.flightcell.com/resources for the wiring diagrams.

Two ground return pins are provided for the five primary GPIs (pin 3 and pin 17 of the primary connector); these are internally connected to power ground and aircraft chassis ground, so the aircraft chassis can be used as a ground return for these GPIs if required.

Outputs

The SVS has four outputs, which are switches that can be used to turn an electrical signal on or off.

These can each be wired to a light on the aircraft panel.

Each output has two terminals, A and B. The output consists of an isolated switch, internal to the SVS. When the output is active, the switch is closed (terminals A and B are connected). When output is inactive, the switch is open (terminals A and B are disconnected).

Output functions are assigned as follows:

Output Number	Description	Off State	Toggling State	On State
1	Primary Comms Call state	Idle	Incoming Call	In Call
2	Secondary Comms Call state	Idle	Incoming Call	In Call
3	Degraded Operations and EMCON state	Device is operating in a degraded capacity	EMCON mode is enabled	Device is operating normally
4	Reserved			

Management Ports

In order to configure the SVS, and to export and import settings files and phonebooks, a management port is required.

The SVS has two management ports, Ethernet and USB.

- » The Ethernet port can be used for configuration and to export and import settings files and phonebooks
- » The USB port can be used as a backup port for configuration only.

Management ports can be installed either on the aircraft, or on a management loom in the workshop.

Wiring of the management ports is shown in the SVS Wiring Diagrams.

Section 5: Configuration

A number of settings on the SVS can be user configured via a connected PC using the Command Line Interface.

Accessing the Command Line Interface

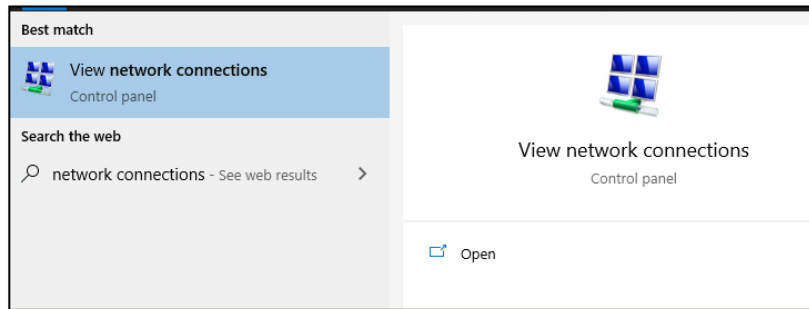
The Command Line Interface is usually accessed over the SVS Ethernet connection but can also be accessed over the SVS USB connection.

Using the Ethernet Interface

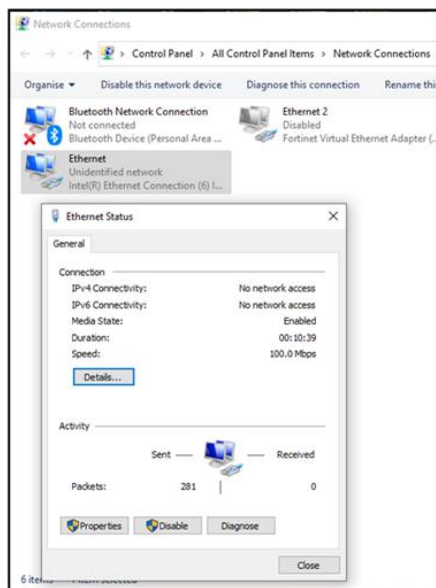
The Ethernet Interface on the SVS uses a static IP address and does not support DHCP. The host PC connected to the SVS needs to have an ethernet interface statically configured in the same IP address range as the SVS to provide access to the telnet and web server functionality.

The following are steps to configure a Windows PC to connect to the SVS.

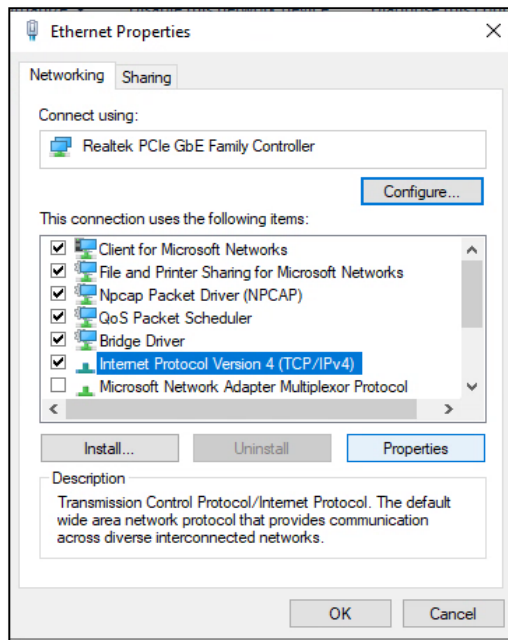
- 1: Connect the SVS ethernet interface via an RJ45 cable to an ethernet port on the host PC.
- 2: In the windows search bar type in **Network Connections**.



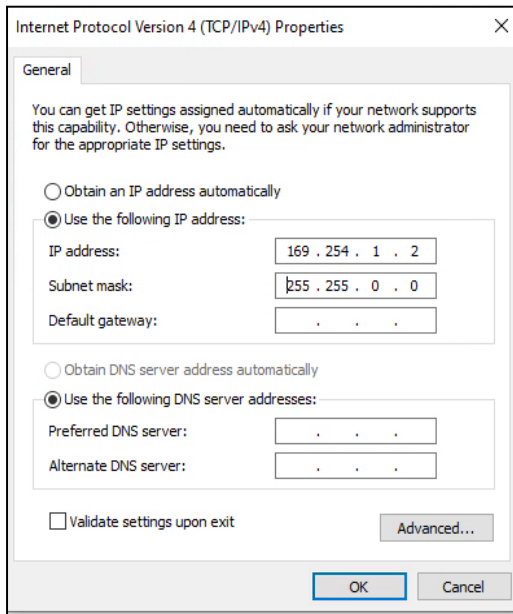
- 3: Select the networking interface the SVS is connected to (usually named Ethernet) and select properties.



4: Select “Internet Protocol Version 4 (TCP/IPv4)” and press the Properties button to open the IP address configuration window.



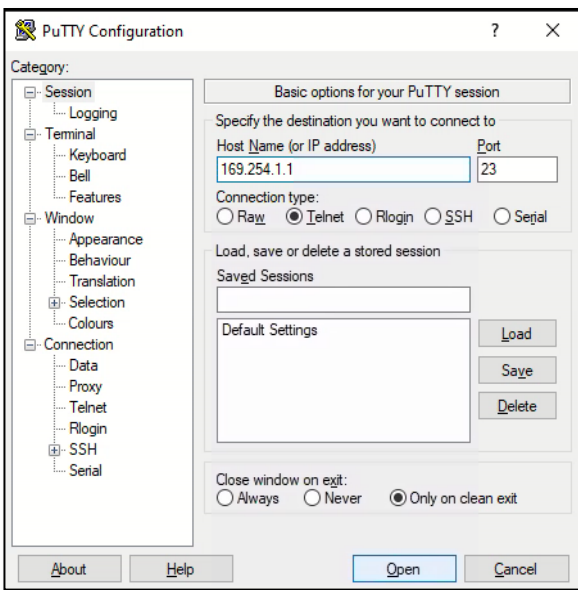
5: Select “Use the following IP Address” and enter the parameters shown in the following image:



6: Press OK to apply the configuration.

Note: If the configured Ethernet port is the primary port for the PC, it should be reset to “Obtain an IP address automatically” in step 5 to access the internet when SVS configuration is complete.

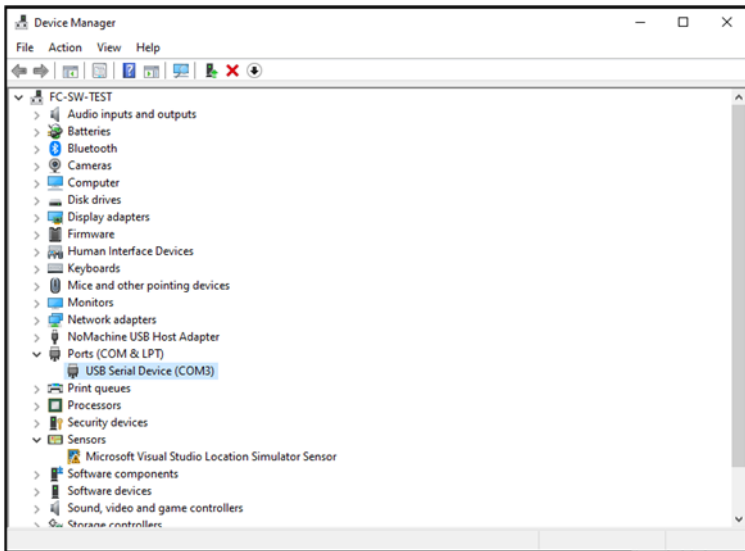
Once the host PC is connected to the SVS, open Putty or a similar Telnet compatible client, select the Telnet protocol and connect to the address 169.254.1.1.

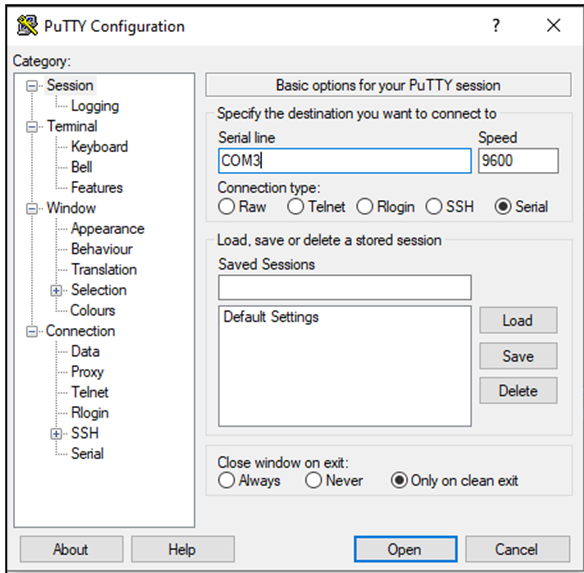


Using the USB Interface

1: Connect a PC to the SVS via the USB connection

2: Open a serial terminal to the SVS com port using a serial terminal client such as Putty. In Windows, the correct COM port to select can be found using the Device Manager. In the windows search bar type in Device Manager.



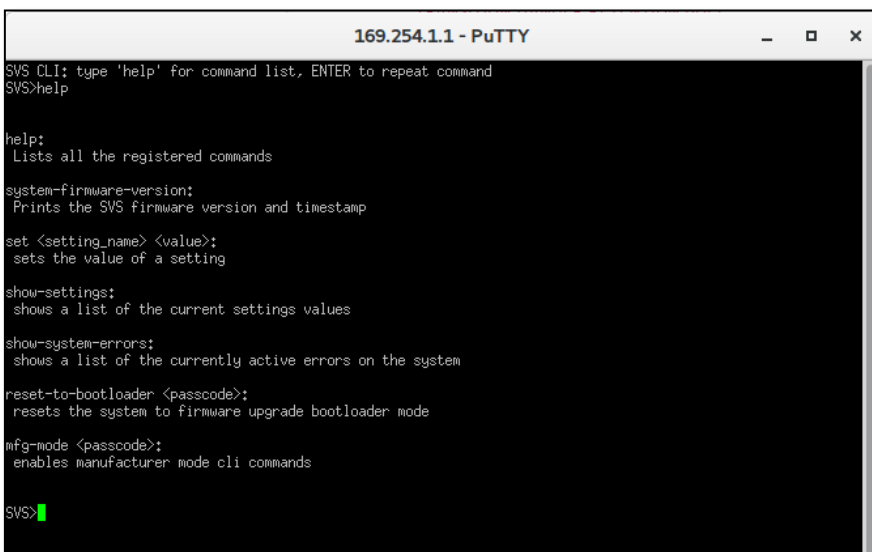
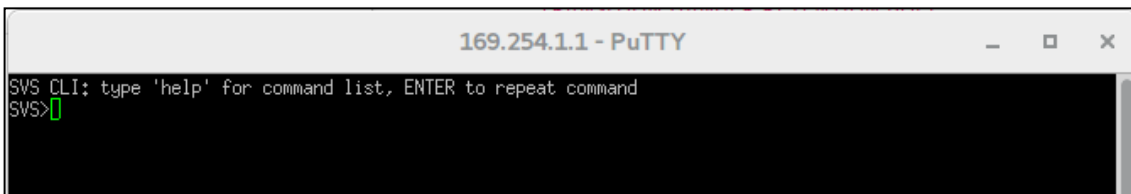


Note: It is not necessary to set the serial configuration such as baud rate.

Using the Command Line Interface

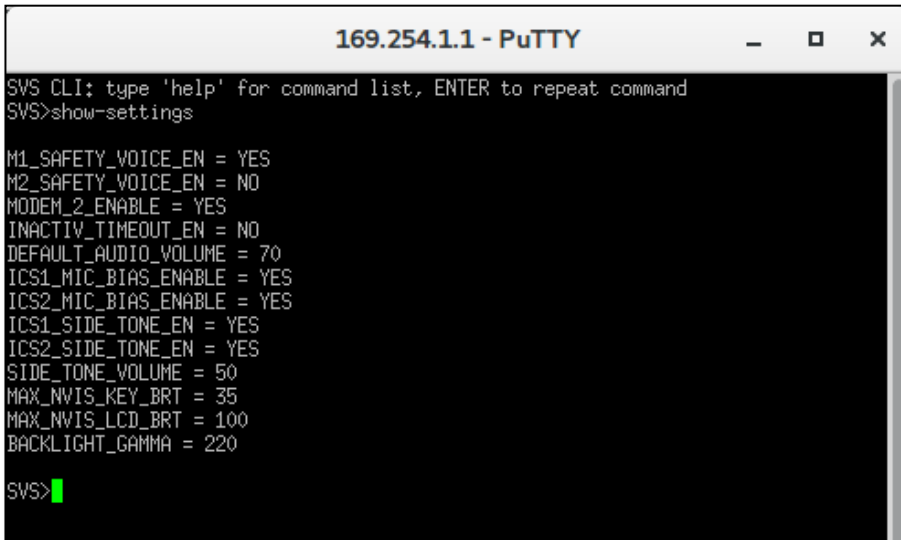
Upon connecting to the command line interface, the following will be presented:

Commands can be input one at a time, using the **ENTER** key to execute the command. To show a list of commands use the **help** command which will output the following:



Configuring the SVS

To view a list of all settings and their current values, the **show-settings** command can be used which will present the following:



```
169.254.1.1 - PuTTY
SVS CLI: type 'help' for command list, ENTER to repeat command
SVS>show-settings

M1_SAFETY_VOICE_EN = YES
M2_SAFETY_VOICE_EN = NO
MODEM_2_ENABLE = YES
INACTIV_TIMEOUT_EN = NO
DEFAULT_AUDIO_VOLUME = 70
ICS1_MIC_BIAS_ENABLE = YES
ICS2_MIC_BIAS_ENABLE = YES
ICS1_SIDE_TONE_EN = YES
ICS2_SIDE_TONE_EN = YES
SIDE_TONE_VOLUME = 50
MAX_NVIS_KEY_BRT = 35
MAX_NVIS_LCD_BRT = 100
BACKLIGHT_GAMMA = 220

SVS>
```

To change a setting use the **set** command with the setting name and a value which is either **YES** or **NO** for Boolean settings or an integer value.

For example, to change the Maximum brightness of the NVIS keypad backlight the following command would be entered:



```
169.254.1.1 - PuTTY
SVS CLI: type 'help' for command list, ENTER to repeat command
SVS>set MAX_NVIS_KEY_BRT 80

OK

SVS>
```

Modem Configuration

The SVS can be configured with one or two Iridium 9523 Satellite modems for use with either the ATS Safety Voice network or the standard Iridium SATVOICE network.

The default modem configuration for the SVS is:

- » Primary modem - configured for Safety Voice Services
- » Secondary modem (if installed) - configured for standard Iridium services.

Secondary Modem Activation

The secondary modem on the SVS can be enabled or disabled via a setting depending on the number of modems installed. This will be pre-configured prior to shipment, unless otherwise requested.

To activate or deactivate the secondary modem set the following setting to **YES** or **NO** respectively.

- » MODEM_2_ENABLE

Safety Voice Functionality Activation

Each modem onboard the SVS can be configured to operate in safety voice mode. This extends the standard SATVOICE functionality to provide call priority and call pre-emption awareness to the user.

By default, the SVS will be configured with safety voice functionality enabled on the primary modem and disabled on the secondary modem. This setting should be enabled for any modems with an ATS safety voice SIM card installed.

To activate or de-activate the safety voice functionality on a modem set the following settings to **YES** or **NO** respectively:

» M1_SAFETY_VOICE_EN

» M2_SAFETY_VOICE_EN

Importing and Exporting Settings and Phone Books

SVS settings and phone books may be exported and imported.

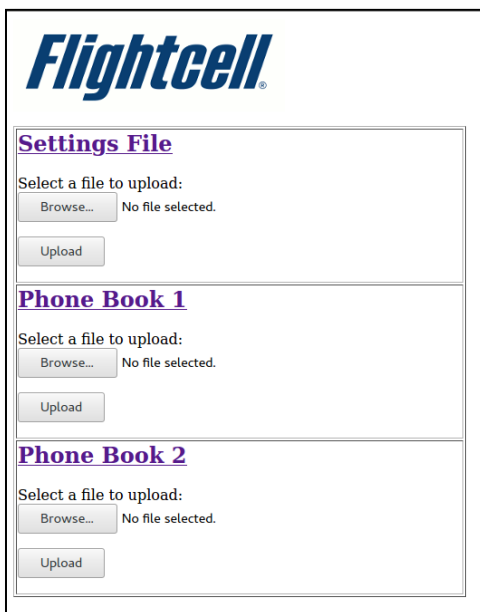
Settings files on an SVS can be exported to enable settings to be replicated across multiple SVS units.

Phonebooks can be imported and exported, enabling the phonebook to be edited offline, and replicated across multiple SVS units.

Both settings files and phonebooks are Tab Separated (TSV) files and are imported and exported via a webserver through the ethernet interface.

To access the SVS webserver, configure the host PC to use the ethernet interface as described in Using the Ethernet Interface on Page 16 and open the following URL in a web browser:
<http://169.254.1.1>

The following page will be displayed.



The screenshot shows the Flightcell web interface. At the top is the Flightcell logo. Below it are three sections, each with a title and a file upload form:

- Settings File**: "Select a file to upload:" with a "Browse..." button (showing "No file selected.") and an "Upload" button.
- Phone Book 1**: "Select a file to upload:" with a "Browse..." button (showing "No file selected.") and an "Upload" button.
- Phone Book 2**: "Select a file to upload:" with a "Browse..." button (showing "No file selected.") and an "Upload" button.

To export a file, right click on the file name link and select *Save as*.

To import a file, browse for the file and click Upload.

Settings File

The SVS settings file can be imported/exported via the webserver to replicate the configuration across multiple SVS units. The file contains a CRC32 checksum to verify file integrity in case of a filesystem error and cannot be manually edited.

Phone Book File

The phone books can be exported, edited, and imported into the unit to add or remove entries into either the primary or secondary phone book on the SVS. The files must conform to the following format:

- » A header line
- » One phone book entry per line delimited by a new line character “\n”
- » Each field for a phone book entry is delimited by a tab character “\t”
- » Each entry should have the following fields and acceptable values:
 - » Name (7-bit ASCII characters only)
 - » Number/short code/call id (numerals and the + character only)
 - » Default priority (0 - 4, where 0 is unspecified)

Refer to example below.

```
Name → number → priority
Kabul ACC (mobile number) → 440101 → 0
Tirana ACC → 420101 → 0
Algiers ACC → 460501 → 0
Luanda ATC/FIS → 460301 → 0
Adelaide Approach/Radio → 450301 → 0
```

Audio Configuration

Configuring Microphone Bias

In some aircraft with high impedance headsets, where the mic line is connected direct to the SVS, it is necessary to provide bias power to energise the headset microphone.

To activate MIC bias the following settings can be set to YES:

- » ICS1_MIC_BIAS_ENABLE
- » ICS2_MIC_BIAS_ENABLE

Configuring Side Tone

Side tone is normally provided by the aircraft audio panel or ICS, but in some installations may not be available. Side tone can be supplied by the SVS if required by setting the following settings to YES:

- » ICS1_SIDE_TONE_EN
- » ICS2_SIDE_TONE_EN

The volume of the played back side tone can be adjusted using the setting. The acceptable values are between 0 and 100%.

- » SIDE_TONE_VOLUME

Configuring Global Default Audio Levels

The SVS supports the following setting for adjusting the default audio level for both audio channels. The acceptable values are between 0 and 100%.

DEFAULT_AUDIO_VOLUME

Whilst in call, each Iridium SATVOICE channel's volume level can be adjusted on the fly in the in-call screens. Refer to the Operator Manual for instructions. Once the call has ended, the volume level for the corresponding audio channel will be reset to the default value set by the installer.

Backlighting

The SVS has a dual mode backlighting system for the keypad and LCD display:

- » Day Mode uses a white backlight on the LCD display and no keypad backlighting
- » Night Mode uses NVIS compliant green backlights for both the LCD and Keypad.

Backlight Control

In order to switch between Day and Night Mode, and vary lighting levels, the inputs must be wired into the SVS.

- » Day/Night Mode is controlled by input 6
- » Backlight intensity is controlled via the dimming control on input 5.

If the inputs are not wired in, the SVS will operate by default in Day Mode.

The backlight dimming control input takes a variable voltage in the range of 0v to the input DC voltage, where a level of 0 volts dims the backlight to the minimum factory configured brightness, while the maximum input value drives the backlight at maximum brightness.

Backlight Control Options

The following settings can be adjusted to set the maximum Night Mode brightness of the LCD and keypad as well as the linearity of the dimming control from the command line interface. The dimming controls when the backlights are set to Day Mode can also be disabled to provide maximum brightness regardless of the dimming input level.

Setting	Description
MAX_NVIS_KEY_BRT	Sets the maximum brightness of the keypad backlight in Night mode. This can be used to balance the brightness between the LCD and the keypad.
MAX_NVIS_LCD_BRT	Sets the maximum brightness of the LCD backlight in Night mode. This can be used to limit the maximum brightness of the LCD to prevent oversaturation of NVIS equipment.
BACKLIGHT_GAMMA	Sets the linearity factor when dimming the backlights, a value of 100 is completely linear (i.e., Brightness increases linearly with input voltage), a value < 100 is a digressive curve and a value > 100 is a progressive curve. A value of 220 is suggested for a linear response to the human eye.
DAY_MODE_DIMMING_EN	Enable/disable for dimming the day mode backlight output via the dimming discrete input

Section 6: Diagnostics

Real-Time Diagnostics

The following screens are available from the menu screen to help diagnose any issues that may occur during the operation of the SVS. These screens can be accessed by pressing the **MENU** key from the home screen.

- » **SYSTEM ERRORS:** Shows any system errors that are currently affecting the SVS.
- » **MODEM ONE INFO:** Shows the current status and IMEI of the primary modem installed in the system.
- » **MODEM TWO INFO:** Shows the current status and IMEI of the secondary modem installed in the system.
- » **DISCRETE INPUTS:** Shows real-time readings and states of the six inputs as well as the analogue reference reading.
- » **SYSTEM INFO:** Shows device specific information including the serial number, software version, non-volatile storage status and Ethernet interface status.

Section 7: Documentation and Information

Comprehensive documentation for the SVS is available on the Flightcell website <http://www.flightcell.com/resources>.

Contact Details

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Warranty

Flightcell International Limited's quality products are proudly designed and manufactured to the highest standards in New Zealand. Your SVS is warranted for one year from date of sale. Your warranty can be extended to five years if you have purchased the extended warranty and your SVS is registered on our product registration system, <https://www.flightcell.com/support/product-registration>.

The warranty is void if any labels are removed or if it is determined that your SVS has been:

- » Connected to a power supply delivering power outside the designs operational range (12-28V)
- » Installed incorrectly as per the guidelines outlined in either the Flightcell SVS Operator or Installation Manuals.
- » Physically damaged, or a fault has occurred due to the SVS being used beyond what is considered normal use, causing unusual deterioration of the product.

If the SVS is deemed to be faulty or in need of repair, please complete a Returned Materials Authorization form on www.Flightcell.com/RMA or contact Flightcell International info@flightcell.com