



## Flightcell Iridium Modem



## Installation manual

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[www.flightcell.com](http://www.flightcell.com)

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# 1 Introduction

The Flightcell Iridium Modem is a robust modem designed specifically for installation with a DZMx or as a standalone modem. The modem supports Iridium voice, SMS, SBD and data services.

If the modem is installed with a DZMx, the DZMx controls the modem and provides audio integration into the aircraft ICS/audio panel. The modem must be installed with an appropriate external Iridium antenna. Several antenna options are available from Flightcell International.

## 2 Flightcell Iridium Modem Specifications

|                                   |   |   |        |
|-----------------------------------|---|---|--------|
| <b>Flightcell part number</b>     | MOP_00010   |   |        |
| <b>Material</b>                   | Faceplate and backplate – diecast Type 380 Aluminium with Alodine Chromate finish   |   |        |
|                                   | Extrusion – 6063 Aluminium with clear anodized finish   |   |        |
| <b>Input voltage</b>              | 12-32 V DC  |   |        |
| <b>Power supply current</b>       | Maximum current – 500mA @ 28V   |   |        |
| <b>RF Frequency Range</b>         | 1616MHz – 1624.5MHz   |   |        |
| <b>Average RF TX Power</b>        | During a TX slot (max)  | 7W  |        |
|                                   | During a frame (typ.)   | 0.6W  |        |
| <b>RF RX Sensitivity</b>          | -118dBm   |   |        |
| <b>Max cable loss<sup>1</sup></b> | 3dB   |   |        |
| <b>Max Antenna gain</b>           | 3dBi  |   |        |
| <b>MIC audio</b>                  | Input   | Fully Differential – 50mVrms to 1Vrms<br>Nominal 775mVrms       |        |
|                                   | Input impedance   | 600Ω  |        |
| <b>SPK audio</b>                  | Output  | Fully differential – Up to 1Vrms into 150 Ω<br>Nominal 775mVrms |        |
|                                   | Output impedance  | 600Ω  |        |
| <b>Data connection</b>            | Switchable RS-485/RS-232<br>For RS-232 - RTS/CTS Flow control only.<br>USB 2.0  |   |        |
| <b>Weight</b>                     |   | 240 grams   | 8.5 oz |
| <b>Dimensions</b>                 | Width   | 62mm  | 2.44"  |
|                                   | Height  | 33.9mm  | 1.35"  |
|                                   | Depth   | 144mm   | 5.67"  |
| <b>Main connector</b>             | DA-15F  |   |        |
| <b>Antenna connector</b>          | TNC   |   |        |
| <b>Certification</b>              | Designed to meet DO160G Sections: 4 (Temp), 6 (Humidity), 7 (Shock/Crash Safety), 8 (Vibration) 15 (Mag), 20 RF Susceptibility), 21 (EMI), 25 (ESD) |   |        |

1. The total implementation loss for antenna, connectors, cable and any other RF components between the modem and the antenna should not exceed 3dB.

**Table 1. Flightcell Iridium Modem specification**

## 3 Components required for installation

### 3.1 Connectors and fasteners

The modem is connected to a wiring harness which is in turn connected to a Flightcell DZM (or a PC/embedded device).

Table 2 shows the terminating connectors and fasteners used with the modem.

| <b>Connectors</b>                                    |                          |
|--|--------------------------|
| Main connector                                       | M24308/4-2F (DA-15 Male) |
| Antenna connector                                    | TNC                      |
| <b>Fasteners</b>                                     |                          |
| 4 x M4 screws or bolts sized to fit mounting surface |                          |

**Table 2. Connectors and fasteners required for your modem installation**

### 3.2 Antenna

The Flightcell Iridium Modem requires an antenna installed on the outside of the fuselage, or in a location with a clear view of the sky (for standalone installations).

Table 3 shows recommended Flightcell antennas. These can be obtained from Flightcell International or your authorised Flightcell dealer.

| <b>Antenna</b>  | <b>Suitable for</b> | <b>part number</b> |
|---|---------------------|--------------------|
| Dual Flat Antenna L1 GPS/Iridium BNC/TNC White TSO Cert | All aircraft - DZMx | ANP_00012          |
| Single Flat Antenna Iridium TNC                         | Stand alone         | ANP_00010          |

**Table 3. Recommended Flightcell Iridium antennas**

## 4 Installing the Flightcell Iridium modem

### 4.1 Mounting the modem

The modem should ideally be located close to the DZMx (if installed with DZMx), preferably where it is reasonably readily accessible to enable easy access to the SIM card.

Appendix 2 includes drawing references for a dimensioned drawing of the modem, showing mounting details.

### 4.2 Wiring the modem

The data and audio connections should be made as per the wiring diagrams referenced in Appendix 2.

| Modem pin | Function                |            |
|-----------|-------------------------|------------|
| 1         | DC in                   | Power      |
| 2         | Audio from Sat Lo       | Output     |
| 3         | Audio to Sat Lo         | Input      |
| 4         | Sat Data GND            | Signal GND |
| 5         | RS-232 RTS / RS-485 RX- | Input      |
| 6         | RS-232 CTS / RS-485 TX- | Output     |
| 7         | USB GND                 | Signal GND |
| 8         | USB D-                  | I/O        |
| 9         | Power GND               | Power GND  |
| 10        | Audio from Sat HI       | Output     |
| 11        | Audio to Sat HI         | Input      |
| 12        | USB VBUS / GPI          | Input      |
| 13        | RS-232 RXD / RS-485 RX+ | Input      |
| 14        | RS-232 TXD / RS-485 TX+ | Output     |
| 15        | USB D+                  | I/O        |

## 4.3 Guidelines for fabricating the wiring harness

For aviation applications, 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 (0.325mm<sup>2</sup>)

- Other cabling - 24 AWG (0.205mm<sup>2</sup>).

## 4.4 Guidelines for the antenna cable

The antenna and associated cabling should have a nominal impedance of 50Ω with a maximum attenuation of 3dB over the cable run.

The antenna cable run length and intended frequency bands of operation should be checked before the antenna cable type is selected to ensure the above requirements are met.

## 5 Setting up your modem

### 5.1 Connecting to the Iridium network

The Flightcell Iridium modem operates on the Iridium satellite network. To enable connectivity an Iridium SIM card provisioned for the desired services is required. Please contact your preferred Iridium service provider for details.

### 5.2 Configuring your DZMx to work with the modem

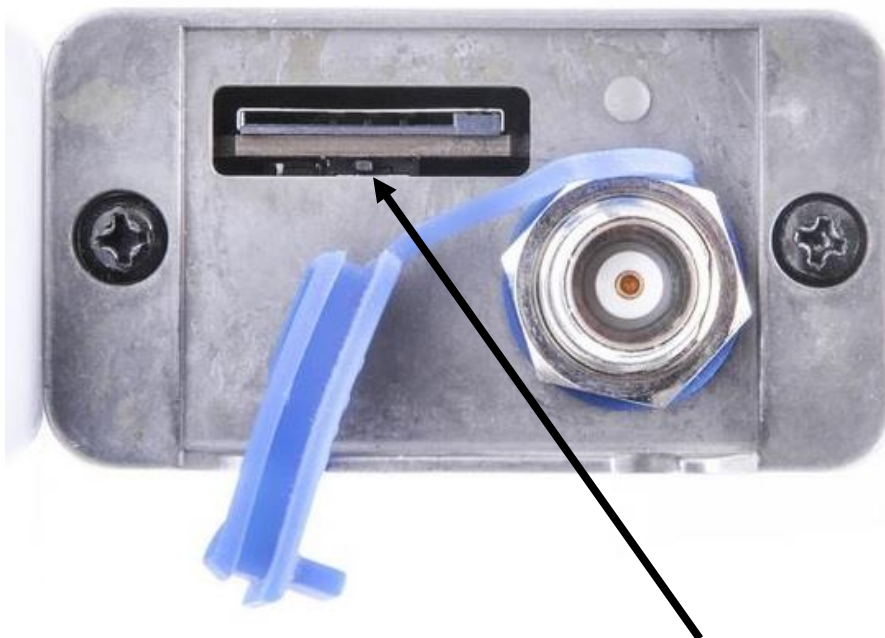
Your DZMx will need to be configured to use the Flightcell Iridium Modem. Instructions for configuring a DZMx to work with the modem can be found in the operators' manuals for DZMx products. These manuals are provided on a USB memory device supplied with your DZMx, or available from the Flightcell support page at <http://www.flightcell.com/support.aspx>.

### 5.3 Using the Modem Standalone

If the modem is to be used in standalone mode it will need to be connected to a PC (or embedded device) which can control the internal Iridium transceiver directly. The Iridium modem uses the Iridium 9523 transceiver, contact Flightcell for details of the Iridium 9523 AT interface.

### 5.4 Configuring Data Interface

The Flightcell Iridium modem can be set to use either an RS-232 or RS-485 data interface. This selection can be made using the switch which is accessible under the SIM card holder. The switch is sampled on start-up and should be in the left position for RS-232 and the right position for RS-485.



**Figure 1 SIM card slot showing data format selection switch.**



## 5.5 Installing a SIM card

The Flightcell Iridium Modem will not register on a network until a valid SIM card with a current account is installed.

The DZMx will provide an error message if either there is no SIM card installed, or there is an invalid SIM installed. Please see the Operators' manual for your DZMx for more details on error messages.

If the modem is standalone, the connected device will need to interrogate the modem via the AT interface to determine the SIM / network registration status.

To install the SIM card:

- Remove the rubber plug in the end of the modem;
- Insert the SIM card in the slot and press till it clicks into place;
- Reinsert the rubber plug.

The correct orientation of the SIM card is with the gold contacts down, and with the end of the card with the diagonal cutout inserted first. The SIM card will not fully insert in the wrong orientation.

## 6 Warranty and contact details

### Limited warranty for your Flightcell Iridium Modem

Flightcell International Ltd's quality products are proudly designed and manufactured to the highest standards in New Zealand.

Your Flightcell Iridium Modem is warranted for one year from date of sale.

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

- Connected to a power supply delivering more than 32 Volts;

- Connected with reverse polarity;

- Installed in direct contravention to the guidelines outlined in the installation manual;

- Physically damaged, or a fault has occurred due to the product being used beyond what is considered normal use, causing unusual deterioration of the product.

If the product is deemed to be faulty or in need of repair, please contact Flightcell International Ltd to obtain a Returned Materials Authorization or download from <http://www.flightcell.com/support.aspx>.

### Flightcell International contact details

Flightcell International Ltd

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New Zealand

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## Appendix 1: Version history

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| <b>Version</b> | <b>Date</b>                   | <b>Author</b> | <b>Change Note Number</b> | <b>Description</b> |
|----------------|-------------------------------|---------------|---------------------------|--------------------|
| 1.0            | 2 <sup>nd</sup> November 2016 | J. Glasgow    | FCN0708                   | Initial release.   |

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## Appendix 2: Wiring and installation drawings

The following references list the Iridium modems wiring diagrams and mechanical drawings which are available on the Flightcell website: <http://www.flightcell.com/support.aspx>

Interconnect drawings for DZMx & Standalone installations:

|             |   |                |
|-------------|---|----------------|
| WRL_MO4_001 | - | DZMx ICD       |
| WRL_MO4_001 | - | Standalone ICD |

Mechanical drawings:

|             |   |                            |
|-------------|---|----------------------------|
| DRW_MO4_001 | - | Mechanical Outline Drawing |
|-------------|---|----------------------------|