Flightcell

DZMx Plus with Flightcell Controller DZP_08 Installation Manual

DZMx Plus Rev 4.0 with Firmware Rev. 4.13.0, with Flightcell Controller DZP_08 Rev 1.0 with Firmware Rev. 1.1.0

Section 1: Manual Revisions and Approvals

Revision	Effective Date	Approved By	Reasons for Change
1.0	31 May 2025	Philip Hutchings	Introduction of DZP_08 Controller for DZMx Plus Installation Manual

Contents

Section 2: Introduction

This manual provides information on the installation and configuration of the DZP_07-x1x-xxxx Flightcell DZMx Plus with the DZP_08-001 Flightcell Controller. Please contact Flightcell for configuration options.

Applicability of this Manual

This manual applies to DZP_07 Flightcell DZMx Plus revision 4.0 with firmware 4.13.0 and above, that are installed with a DZP_08 Flightcell Controller revision 1.0 with firmware 1.1.0 and above.

Section 3: Flightcell DZMx Plus Equipment

The Flightcell DZMx Plus and Flightcell Controller should be inspected when unpacked to check for any visible damage or missing components.

Connectors

Connector kits are supplied with the Flightcell DZMx Plus Transceiver DZP_07-x1x-xxxx and Flightcell Controller, DZP_08-001.

Details of the connector kit contents for the Flightcell DZMx Plus, Flightcell Controller, antennas and associated parts are provided in Appendix 1.

Section 4: Specifications

Variants, Part Number and Dash Numbers

The DZMx Plus part number is DZP_07.

The Flightcell DZMx Plus can be configured in several variants. The 3-7 digit dash number following DZP_07 indicates a specific variant. These variants differ based on the modems or combination of modems installed (refer to the Modem Variants section below for a list of supported modems).

The DZP_07-x12-xxxx variant includes a second Ethernet card to support the Flightcell Controller connection as an option. The RJ45 Ethernet connection on the unit may also be used to connect to the DZP_08 controller.

Additional optional cards are available for the Flightcell DZMx Plus, including a Software Defined Receiver.

If any of these options are required, contact tech@flightcell.com for the DZP_07 Part dash number and installation details.

Modem Variants

The DZMx Plus can be installed with up to three internal modems and one external modem or satellite phone.

Cellular Modems

The following cellular modems may be installed in the DZMx Plus:

> » A 4G (LTE) modem
> » A 450 MHz modem.

Different countries or geographic areas use different cellular bands, due to international and national radio frequency licensing agreements.

Three different 4G modem versions are available for different geographic regions:

> » EMEA (Europe, Middle East, Africa)
> » APAC (Asia/Pacific and South America)
> » Americas and Band 14 (North America, including the US Public Safety Band, B14).

There is considerable overlap in the bands offered by the different modem versions, so some modems can be used in more than one geographic area, with some reduction in the bands available.

When ordering the DZMx Plus, it is essential that the version with the correct regional modem is ordered. Please contact tech@flightcell.com for more information on the appropriate modem for your operational area.

Internal Iridium Modems

The following satellite modems may be installed in the DZMx Plus:

- » One or two internal Iridium 9523 modems
- » An Iridium 9603 modem (used for Short Burst Data only).

External Modems and Phones

In addition to the internal modem options, one external modem or satellite phone can be connected to the DZMx Plus via its RS232 serial port:

- » A Flightcell Iridium Modem
- » An Iridium handset installed in a Flightcell Iridium Extreme Phone Cradle

The modem and the phone handsets provide the same functions (except for Iridium PTT) as the internal Iridium modem, providing phone calling, messaging, and data. These functions are all controlled by the DZMx Plus, so it is not necessary to use the phone keypad.

External Iridium Certus

The DZMx Plus can also support external third-party Iridium Certus modems, providing an IP data connection and voice connection over the Iridium Certus service. This modem requires an ethernet connection to the DZMx Plus. If the DZMx Plus is using the additional ethernet card for the DZP_08 Controller for connection, then the Certus modem will be required to use the RJ45 ethernet connection, or visa versa.

Dimensions

Dimension	DZMx Plus	Controller
Faceplate Width	N/A	146.00 mm
Extrusion Width	N/A	125.80 mm
Faceplate Height	N/A	57.20 mm
Extrusion Height	N/A	54.10 mm
Depth	N/A	47.20 mm
Weight	1.6 kg (depending on configuration)	400 grams
Length	239.60 mm	N/A
Width	58.00 mm	N/A
Height	188.00 mm	N/A

Electrical

DZMX PLUS TRANCIEVER UNIT		
Part/Item	**Parameter**	**Value**
Power	Input Voltage	12-32VDC
	Power Supply Current	Up to 1.5A @28VDC
ICS to DZM Audio	Input Levels	20mVrms to 1.15Vrms, adjustable
		775mVrms to 1.15RMS nominal
	Input Impedance	600Ω
Microphone bias voltage		12V via 2.2kΩ
DZM to ICS Audio	Output levels	Up to 5Vrms, adjustable
		775mVRMS nominal
	Output Impedance	150Ω
GPS	Antenna bias voltage	5V
	Antenna current	Up to 100mA
	Sensitivity	-162dBm (with Flightcell Antenna)
	Time to first fix	26s
Wi-Fi	Tx power (dBm)	16
	Antenna gain (dBi)	2.0
	Total power (dBm)	18
	Total power (mW)	63.1
Bluetooth	Tx power (dBm)	10
	Antenna gain (dBi)	2.0
	Total power (dBm)	12.0
	Total power (mW)	15.9
Satellite Iridium	RF Frequency Range	L band 1616 MHz to 1626.5 MHz
	Tx power (max)	7W
	Antenna gain (dBi)	3

	RF RX Sensitivity	-118 dBm
	Max Cable Loss	3 dB
	Antenna impedance	50 Ω
General Purpose Outputs	Levels (Vout)	0 to 32VDC
	Max Current (Iout)	500mA
General Purpose Inputs	Input Levels	0 to 28VDC with over/under voltage protection to +/- 32VDC
Data connection	Ethernet	2x Ethernet data interface 10/100 BASE T Front RJ45 ETH0 Secondary Ethernet ETH1 via the main connector (Interface to Flightcell Controllers)

USER INTERFACE	
Power switch	Momentary action switch PWR on/off with backlight
LEDs	Transceiver Status Indicator x3

SOFTWARE DEFINED RECIEVER	
RX Power	-5dBm +/-1dB
RX Power (RX amplifier disabled)	+10dBm +/-1dB
Operating frequency	1 MHz to 2 GHz

FLIGHTCELL CONTROLLER		
Part/Item	**Parameter**	**Value**
Power	Input Voltage	12-32VDC
	Power Supply Current	~0.278A @ 28VDC (<8W)
Data connection	Ethernet	Ethernet data interface between Controller and Flightcell DZMx Plus 10/100 BASE T ports
General Purpose Output	Levels (Vout)	0 to 32VDC
	Max Current (Iout)	500mA
General Purpose Digital Inputs	Input Levels	0 to 28VDC with over/under voltage protection to +/- 32VDC
Backlighting	Input Dimming Control	User-configurable fixed level or controlled from an external lighting dimmer. 0-28VDC or user-configurable response
	Colour	Dual Mode: 65K-Colours (Day/Night)/ NVIS A or NVIS B (Night operation)
USER INTERFACE		
Keypad	16 Button Keypad	
LCD Display	2.4" 240 x 320 RGB TFT Graphics IPS LCD	

Environmental/EMI Qualifications

The Flightcell DZMx Plus and Flightcell Controller are designed against RTCA DO-160G.

Details of the DO-160G compliance are provided in the Flightcell DZMx Plus Declaration of Design and Performance (DDP) (Flightcell document 120-00003 DZP_07 DZMx Plus DDP).

The Flightcell Controller Declaration of Design and Performance (DDP) (Flightcell document 120-00008 DZP_08 Flightcell Controller DDP)

DO-160G test reports are available on request from tech@flightcell.com.

Section 5: Installation

Mounting the DZMx Plus

The Flightcell DZMx Plus is comprised of the Transceiver Unit and the Flightcell Controller.

The Flightcell DZMx Plus Transceiver Unit is designed to be installed in the Flightcell 2MCU DZMx Plus Tray, part number MEP_01-000.
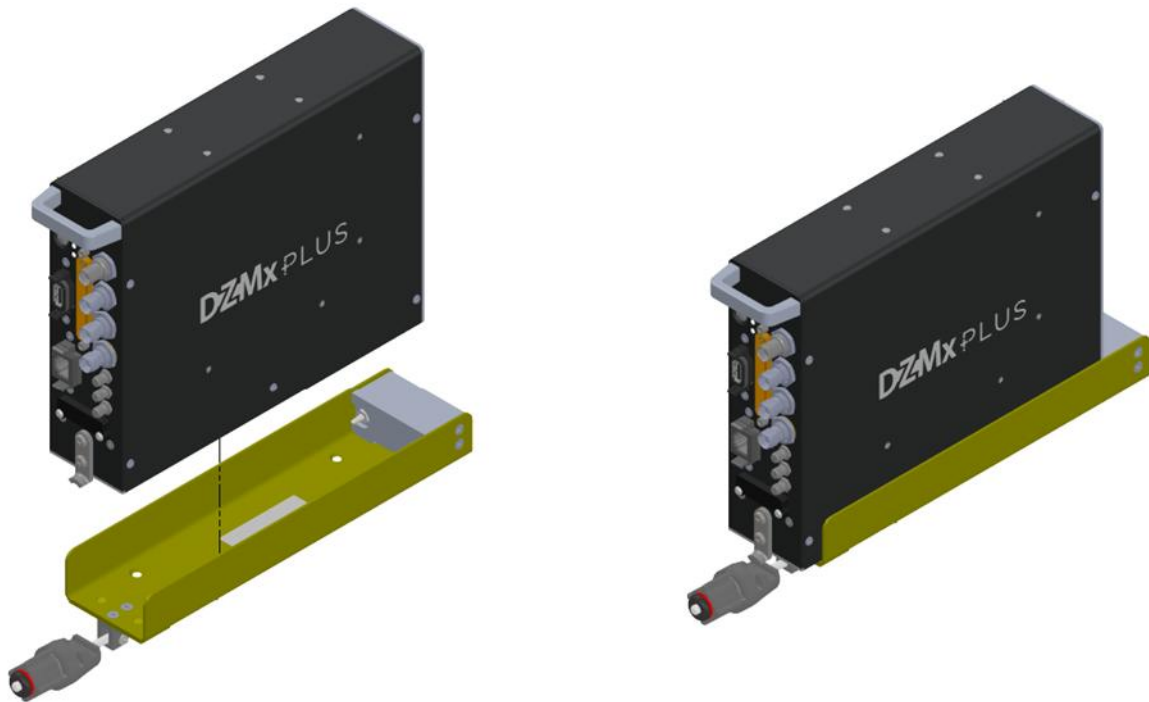
Flightcell DZMx Plus Mechanical Assembly for Flightcell 2MCU DZMx Plus Tray

The Flightcell Controller is designed to be installed in DZUS rails.

Mechanical drawings for the Flightcell DZMx Plus, Flightcell Controller and mounting tray showing dimensions and mounting details are provided on the Flightcell website https://www.flightcell.com/support/documentation.

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

Mounting the Flightcell Controller

The Flightcell Controller is DZUS rail mounted and should be mounted where the flight crew or radio operator have a clear view of the display and can easily use the keypad.

If the Flightcell Controller 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.

Additional Flightcell Controllers may be fitted in the cockpit or cabin as required.

Flightcell DZMx Plus Wiring Guide

Wiring diagrams for the Flightcell DZMx Plus, Flightcell Controller and associated equipment are available in Flightcell document *114-00026, DZMx Plus with Flightcell Controller Interconnect Drawings*, available on the Flightcell website at https://www.flightcell.com/support/documentation

Necessary Installations

The following are essential parts of the DZMx Plus installation:

>> Power Supply

>> DZMx Plus Antennas

>> SIM Cards

Power Supply

The Flightcell DZMx Plus unit, Flightcell Controller and other components require aircraft DC power. Operating range is 12-32VDC. It is recommended that the Flightcell DZMx Plus and Flightcell Controller be connected to the emergency (primary) power bus on the aircraft. This is to ensure successful operation of tracking (including engine start/stop data) and emergency calls.

When operating on a nominal 28V supply, circuit breakers or fuses of the following rating should be used between Flightcell DZMx Plus and Flightcell Controller system components and the power supply: (if M22759/32 AWG 22 cabling is used)

>> A 4-amp circuit breaker/fuse is recommended for the Flightcell DZMx Plus

>> A 1-amp circuit breaker/fuse is recommended for the Flightcell External Iridium module, if installed

>> A 1-amp circuit breaker/fuse is recommended for a Flightcell Iridium phone cradle, if installed

>> A 1-amp circuit breaker/fuse is recommended for the Flightcell Controller

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 AWG22 wiring specification is recommended: M22759/xx and M27500-xx

Grounding and Shielding Terminations

The Flightcell DZMx Plus chassis ground connection is on the Transceiver Unit's primary connector.

If the Flightcell Controller is mounted in a DZUS rack, the housing is grounded to the DZUS rails via the DZUS connectors and contact between the front panel metalwork and the DZUS rails or the grounding point on the case can be used if required.

Installing Data Ports

The DZMx Plus has several data connections wired off the main connector:

» RS232 – used as a debug port or for serial data connections to:

  » A Flightcell Iridium phone cradle
  » A Flightcell Iridium satellite modem
  » Other external data sources such as water tank controllers

» RS422/RS485 – used for serial data connections.

» ARINC 429 – only if this data card is installed. This is used to send and receive over the aircraft ARINC429 data bus. See Appendix 5 for more details

» Second Ethernet – used to provide an ethernet connection to the Flightcell Controller or Iridium Certus terminal. This is an additional card that needs to be fitted.

The DZMx Plus also has two external data ports

» USB – Used for uploading and downloading phone book, settings etc.

» Ethernet – Used to provide an ethernet connection to for example Iridium Certus terminal or the Flightcell Controller

Connector Pinouts

Wiring diagrams for the Flightcell DZMx Plus Transceiver and Flightcell Controller are available on the Flightcell website https://www.flightcell.com/support/documentation

Refer to the figure below for the layout of the connections on the DZMx Plus Transceiver front plate.
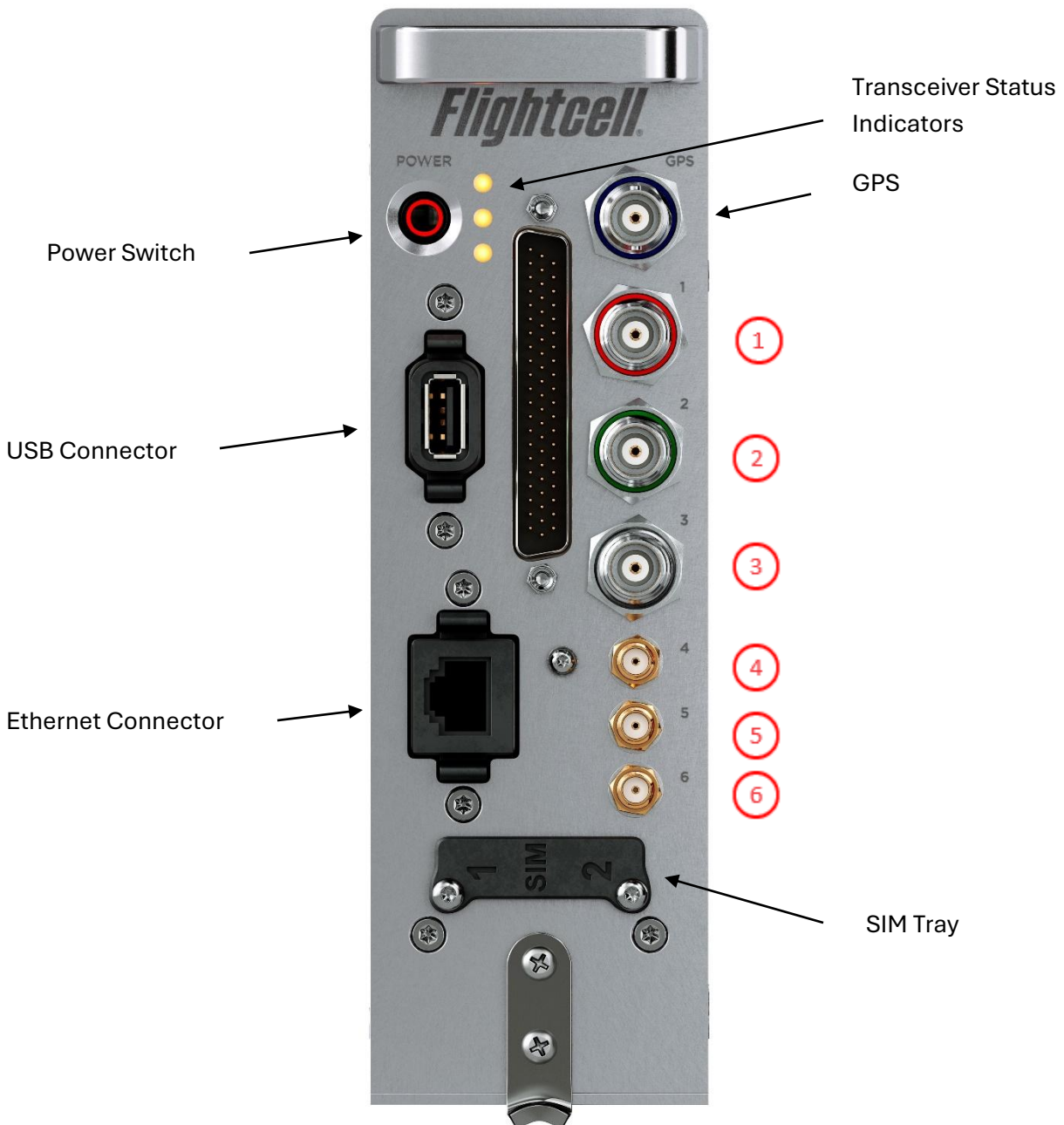
CONNECTORS	
Main Connector:	D-SUB 62 HD male
	Ethernet
	USB
Antenna Connectors:	GPS: BNC
	(1) SAT: TNC
	(2) CELL: TNC
	(3) SAT/CELL: TNC
	(4) Wi-Fi: RP SMA
	(5) Bluetooth: SMA
	(6) Special purpose transceiver/SDR: SMA

OTHER	
Power switch	Momentary Action PWR On/Off
LEDs	Transceiver Status Indicator x3
	GREEN – Good Signal
	AMBER – Medium Signal
	RED – Bad Signal
	OFF – No Signal
SIM TRAY	Transceivers 1 and 2

Flightcell DZMx Plus Main Connector D-SUB62

Pin No	Connector	Direction	Notes
1	POWER GROUND	Ground	
2	AUDIO FROM DZM2 HI	Output	HI audio output to ICS 2
3	AUDIO FROM DZM2 LO	Output	LO audio output to ICS 2
4	AUDIO FROM DZM1 HI	Output	HI audio output to ICS 1
5	AUDIO FROM DZM1 LO	Output	LO audio output to ICS 1
6	NC		
7	RS485 Rx+	Input	
8	NC	I/O	
9	AUX DATA GND	Ground	
10	GND	Ground	
11	GND	Ground	
12	RH_KEY	Input	On control from controller pin 8
13	SPARE SHIELD	Ground	
14	POWER GROUND	Ground	
15	OUTPUT 1A	Output	Isolated output 1 Terminal A
16	OUTPUT 1B	Output	Isolated output 1 Terminal B
17	OUTPUT 2A	Output	Isolated output 2 Terminal A
18	OUTPUT 2B	Output	Isolated output 2 Terminal B
19	NC		
20	GENERAL PURPOSE INPUT 1	Input	
21	DC SUPPLY POSITIVE	Power	12-32 VDC
22	POWER GROUND	Ground	
23	NC	Ground	
24	NC	I/O	
25	NC	Power	
26	AUDIO TO AUX TXCVR HI	Output	
27	AUDIO TO AUX TXCVR LO	Output	
28	NC		
29	RS485 Rx-	Input	

Flightcell DZMx Plus Main Connector D-SUB62 (continued)

Pin No	Connector	Direction	Notes
30	SPARE SHIELD	Ground	
31	POWER GROUND	Ground	
32	SPARE SHIELD	Ground	
33	GPIO1	I/O	Reserved for Optional Capabilities
34	GPIO2	I/O	Reserved for Optional Capabilities
35	POWER GROUND	Ground	
36	POWER GROUND	Ground	
37	AUX DATA RX	Output	
38	MIC TO DZMx Plus 2 HI	Input	Unbiased/biased (configurable)
39	MIC TO DZMx Plus 2 LO	Input	Return for audio input from ICS 2
40	GPIO5	I/O	Reserved for Optional Capabilities or controller
41	GPIO6	I/O	Reserved for Optional Capabilities or controller
42	DC SUPPLY POSITIVE	Power	12-32 VDC
43	CHASSIS GND	Ground	Internally connected to DZMx Plus Chassis
44	NC	I/O	
45	AUDIO FROM AUX TXCVR HI	Input	
46	AUDIO FROM AUX TXCVR LO	Input	
47	MIC TO DZMx Plus 1 HI	Input	Unbiased/biased (configurable)
48	RS485 Tx+	Output	
49	MIC TO DZMx Plus 1 LO	Input	Return for audio input from ICS 1
50	RS485 Tx-	Output	
51	AUX DATA TX	Input	
52	NC		
53	GPIO3	I/O	Reserved for Optional Capabilities or controller
54	GPIO4	I/O	Reserved for Optional Capabilities or controller

Flightcell DZMx Plus Main Connector D-SUB62 (continued)

Pin No	Connector	Direction	Notes
55	GPIO9	I/O	Reserved for Optional Capabilities
56	GPIO8	I/O	Reserved for Optional Capabilities
57	GPIO7	I/O	Reserved for Optional Capabilities
58	GENERAL PURPOSE INPUT 5	Input	
59	GENERAL PURPOSE INPUT 4	Input	
60	GENERAL PURPOSE INPUT 3	Input	
61	GENERAL PURPOSE INPUT 2	Input	
62	DC SUPPLY POSITIVE	Power	12-32 VDC
D62 Shell	CHASSIS GND	Ground	

Flightcell Controller Connector D-38999

Pin No	Connector	Direction	Notes
1	CHASSIS GND	Ground	Internally connected to Flightcell Controller chassis
2	ETH1 10/100 Rx+	Input	
3	ETH1 10/100 Tx+	Output	
4	ETH1 10/100 Tx-	Output	
5	ETH2 10/100 Tx-	Output	
6	ETH2 10/100 Tx+	Output	
7	OUTPUT 1A	Ground	Ground
8	OUTPUT 1B	Output	On control of DZMx Plus pin 12
9	LIGHTING	Input	Used for variable lighting control
10	LIGHTING (DAY/NIGHT)	Input	Used for optional day/night lighting switch
11	GENERAL PURPOSE INPUT GND	Ground	
12	AUX DATA Tx	Input	
13	AUX DATA Rx	Output	
14	AUX DATA GND	Ground	
15	RESERVED		
16	RESERVED		
17	RESERVED		
18	RESERVED		
19	GENERAL PURPOSE INPUT 1	Input	
20	ETH1 10/100 Rx-	Input	
21	RESERVED		
22	ETH2 10/100 Rx-	Input	
23	ETH2 10/100 Rx+	Input	
24	SPARE SHIELD	Ground	
25	SPARE SHIELD	Ground	
26	SPARE SHIELD	Ground	
27	RESERVED		

Flightcell Controller Connector D-38999 (continued)			
Pin No	**Connector**	**Direction**	**Notes**
28	GENERAL PURPOSE INPUT GND	Ground	
29	RESERVED		
30	GENERAL PURPOSE INPUT 2	Input	
31	DC SUPPLY VOLTAGE	PWR	DC supply input 12-32VDC
32	DC SUPPLY VOLTAGE	PWR	DC supply input 12-32VDC
33	OUTPUT 2A	Output	
34	OUTPUT 2B	Output	
37	SHIELD	Ground	
35	POWER GROUND	Ground	
36	POWER GND	Ground	

Installing a Flightcell Controller

The Flightcell Controller is a remotely located control panel for the DZMx Plus, with a display and keypad.

Wiring the Flightcell Controller

The Flightcell Controller connects to the Flightcell DZMx Plus Transceiver Unit via an Ethernet data connection.

It is recommended that the Flightcell Controller be connected to the DZMx Plus second Ethernet connection. Should this connection not be available, then the front panel RJ45 connection may be used.

The Flightcell Controller requires an independent connection to a 12-32VDC power supply, and a chassis ground.

The Flightcell Controller should have a connection wired to enable the DZMx Plus to be powered off and on from the Flightcell Controller keypad.

Backlighting brightness and Day/Night control of the Flightcell Controller can be configured individually or can be connected to a cockpit lighting controller if required.

Wiring diagrams for the Flightcell DZMx Plus system are available on the Flightcell website at https://www.flightcell.com/support/documentation.

Flightcell DZMx Plus Antennas

Antennas are required to be ordered separately for the Flightcell DZMx Plus for the following configurations:

» Single Iridium modem: Use a Flightcell dual Iridium/GPS antenna, part number ANP_00043.

» Dual Iridium modems: Use a Flightcell Iridium/GPS antenna, part number ANP_00043, and a single Iridium antenna, ANP_00045.

» Single cellular modem: Use a Flightcell cellular antenna, part number ANP_00033.

» Dual cellular modems: Use two ANP_00033 antennas.

» Wi-Fi and Bluetooth antennas will be required. Refer to Wi-Fi Bluetooth section of the manual.

> Note: A GPS antenna is required for date time stamping of data and messages. If the Flightcell ANP_00043 antenna is not used, an appropriate 3rd party GPS antenna MUST be fitted.

Installation of Iridium and GPS Antennas

Mechanical / Specification drawings for the above antennas are available on the Flightcell website https://www.flightcell.com/support/documentation. It is the responsibility of the installer to obtain the correct certification to install antennas on the airframe.

The Flightcell Iridium/GPS antenna and Iridium antenna should be installed on the top of the aircraft where they 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 750mm 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.

Installation of Cellular Antennas

A Flightcell cellular antenna should preferably be installed on the underside of the aircraft to provide best connection to the cellular network. The minimum recommended separation between the cell antenna and other antennas is 600mm. Antennas should be mounted in a position that keeps coax lengths as short as practical to minimize attenuation of transmit and receive signals.

Guidelines for Antenna Cables

Iridium and cellular antenna cables must be selected to keep signal loss within accepted levels. Total signal loss on the Iridium connection between the Flightcell DZMx Plus or Iridium phone cradle and the antenna should not exceed 3dB at 1625MHz.

Total loss of on the cellular connection should be kept as close as possible to not exceed 3dB for the frequency range of 700MHz to 2700MHz. It is highly recommended to use a high-quality low loss cable.

To prevent RF connector damage while staying within the 3 dB total cable loss for Iridium systems:

> » The primary RF cable may remain a larger, lower-loss type for most of the run.

> » For the final 300 mm (maximum 1 ft) leading into the LRU TNC connector, the cable must transition to a lighter, more flexible coax such as RG400 or equivalent, using a certified adapter or splice.

> » This transition section must be installed with appropriate strain relief and cable support, ensuring compliance with aviation standards and maintaining RF performance.

This minimizes mechanical load on the RF connector of the LRU especially during installation and removal, preventing failures while preserving signal integrity within the allowable loss margin.

The maximum recommended length for different common antenna cable types is:

Cable Length	Cable Specification
Up to 3m	RG58C/U or RG400
Up to 6.5m	LMR200 or RG142A/U-9006 cellfoil
Up to 8m	RG213
Up to 17m	LMR400
Up to 26m	LMR600

This table is a guideline, and a suitable equivalent may be used.

Antenna connectors on the DZMx Plus are colour coded to reduce installation errors, as follows:

Antenna Type	Colour
Iridium	Red
Cellular	Green
GPS	Blue

Antenna for Software Defined Receiver

An antenna is required if the Software Defined Receiver is installed in the DZMx Plus, for best results the appropriate frequency band antenna must be installed. This is due to the wide frequency range and multiple modes available of operation.

The DZMx supports the following software defined receiver capabilities:

- » AM reception – AM mono audio channels
- » FM reception – wide band (200kHz channel bandwidth) mono FM audio reception.
- » NBFM – narrow band (12kHzchannel bandwidth) FM mono audio reception.
- » ADSB-IN 1090 reception
- » UAT 978MHz reception
- » AIS 162.00MHz reception

SIM Cards

SIM cards may be required for operation of the DZMx Plus modems

- » A SIM card is required for a DZMx Plus cellular modem
- » A SIM card is required for an internal Iridium 9523 if it is to be used for phone calling and SMS messaging
- » A SIM card is <u>not</u> required for the Iridium 9523 modem if it is to be used only for Iridium PTT or for Iridium SBD
- » A SIM card is <u>not</u> required for an Iridium 9603 (SBD only) modem.

The DZMx Plus uses standard SIM cards, rather than the micro and nano versions.

SIM Slot Designation

SIM card slots are allocated as follows:

- » SIM 1 is allocated to the modem (Iridium or cell) in internal slot 4.
- » SIM 2 is allocated to the modem (Iridium or cell) in internal slot 5.

Installing SIM cards

SIM cards are installed in the SIM card tray inserted in the front of the DZMx Plus. 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 front of the DZMx Plus and secure in place with the two cap screws.
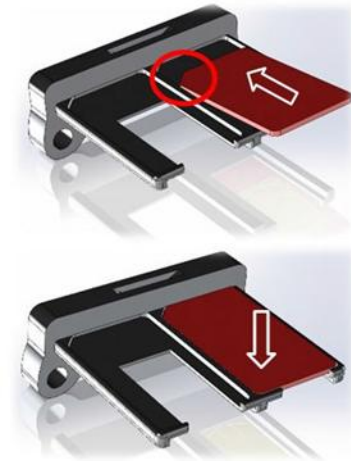
> Note: Ensure that the SIM cards are in the correct slots, as they may be permanently damaged if incorrectly installed.

Iridium SIM cards supplied with your DZMx Plus

If selected by the customer at time of order, the DZMx Plus with Iridium modems can be shipped with an unregistered Iridium SIM. This must be registered to your Iridium Service Provider's account (ISP) when you are ready to activate your Iridium service.

To transfer the SIM card to your ISP, please contact Flightcell International at tech@flightcell.com advising the serial number of your DZMx Plus, the serial number of the supplied Iridium Sim and the name of your ISP.

Section 6: Configuration

Configuration Interfaces

The DZMx Plus and Flightcell Controller have multiple interfaces which can be used to configure their different functions. The following table aims to outline the different interfaces and how to access them:

Configuration Interface	Device	Accessible via
DZMx Connect	Flightcell DZMx Plus	Ethernet, WiFi
Controller Connect	Flightcell Controller	Ethernet
Controller Local Menu	Flightcell Controller	Front screen + keypad
Controller DZMx Menu	Flightcell Controller	Front screen + keypad

DZMx Connect contains the largest range of settings available and will be regularly referred to in this manual.

Navigating This Section

This manual contains information for configuring both the DZMx Plus and Flightcell Controller. There are often multiple different interfaces which can be used to configure various device functions. These include:

- » DZMx Connect (for configuring DZMx Plus over Ethernet/Wifi)

- » Controller Connect (for configuring Controller over Ethernet)

- » Controller Local Menu (for configuring Controller using the keypad and screen)

- » Controller DZMx Menu (for configuring DZMx Plus using keypad and screen)

In sections below where it is possible to configure a feature using different interfaces, they may be described in a tabular format, e.g.:

DZMx Connect
Settings > Audio > ICS1 > Mic Bias
Controller DZMx Menu
Settings > Audio > ICS1 > Mic Bias

These steps, separated by a ">", indicate "clicks" or button presses required to navigate to the required setting.

These settings all expect that the installer has authenticated or logged in at an installer level, to gain proper access.

Ensure you are in installer mode (Maintenance -> Enable Installer Mode -> Enter Installer PIN (default passkey 2468) then navigate the respective menu.

Accessing Installation and Configuration Settings

Many of the Flightcell DZMx Plus configuration settings are hidden during normal operation. To access these settings, Installer Mode needs to be activated. If a menu item mentioned in this manual cannot be found, ensure that Installer Mode has been activated.

Flightcell Controller Keypad References

The Flightcell Controller has a multi-functional keypad which provides:

» Function Keys **F1** to **F4** which operate as soft keys for the corresponding functions shown on the display

» MENU key for showing an extended description of the function key's function

» User Interface navigation with **Up**, **Down**, **Left**, **Right, Back and ENTER** keys.

» Keys 0 to 9 for

» Entering numbers and dialling calls

» Entering text, space and punctuation using multi-tap

» POWER key for powering the DZMx Plus and Flightcell Controller on and off

Navigating the Menus

The keypad is used to access the DZMx Plus functions. The function keys **F1** to **F4** are used to select the corresponding function shown on the display.

- » Press **MENU** to see an expanded expression of the displayed functions

- » Press **F4** to scroll down the menu options, and **BACK** to go to the top of the menu.

- » Use the **UP** and **DOWN** arrow keys to

  - » Scroll up or down lists
  - » Increase or decrease settings levels.

- » Press **ENTER** to select the highlighted item or to confirm a setting change.

- » Press **BACK** to cancel a setting or to move back a menu level.

Flightcell Controller Main Screen Function Key Functions

The following table outlines the main screen carousel items and their corresponding functions.

Most carousel items may be moved or disabled via *Maintenance* > (installer mode) *Configure Main Menu*. This is for hiding unused features and can also be particularly useful for dual-controller installations for limiting DZMx Plus functions to different areas in the cockpit.

Icon	Can Reorder	Can Disable	Function
⟨⟩	N	N	Switch Tab (available when in call)
↓	N	N	Next – Scroll carousel
📞	Y	Y	Phonebook
💬	Y	Y	SMS
📍	Y	Y	Mark (short/long press)

	Y	Y	Toggle Bluetooth
	Y	Y	Hobbs Timers
	Y	Y	SDR
	Y	Y	Toggle WiFi
	Y	Y	Edit Phonebook
	Y	Y	Settings
	Y	Y	Switch Sat Mode (Satellite calling & SBD / Iridium PTT)
	Y	N	Maintenance menu
	Y	Y	Load App
	Y	Y	Forms App
	Y	Y	A.R.M. or Alert Mode
	Y	Y	Geofence
	Y	Y	Toggle cellular flight mode

Main Screen Key Functions

The following table outlines the main screen key functions.

Key	Short Press Function	Long Press Function
BACK	Reset menu items to the top of the list	Disconnect from the Controller from the DZMx Menu and enter Controller Local Menu
POWER		Power off DZMx Plus and Flightcell Controller
MENU	Show function button descriptions	
EMER		Toggle emergency mode

Configuring the Flightcell Controller

The Flightcell Controller may be configured using the following interfaces:

» Local Menu: using the Controller keypad and screen

» Controller Connect: using the Controller's Ethernet connection

Ethernet Configuration

The Controller has two Ethernet ports.

Controller Ethernet can be configured to suit the network configuration on the aircraft.

The Controller can be set as a DHCP server, a DHCP client, or allocated a fixed IP address.

» DHCP client mode is the default mode. It can be used where the Controller is connected to a device operating as a DHCP server. The DZMx Plus operates as a DHCP server by default. The Controller will be allocated an IP address by the connected device.

» DHCP server may be used where no other device on the network acts as a DHCP server.

» A static IP address may be required in some network configurations.

These options can be selected using:

DZMx Connect
Settings > Network > WAN
Controller Local Menu
Settings (F3) > Network > WAN

> Note: It is recommended to configure Ethernet settings on the Controller screen.

To determine the IP address the Controller is using, go to Controller Local Menu -> Device Diagnostics (F2).

> Note: The Controller IP address will only be shown in the diagnostics page if the Controller has an Ethernet connection.

DHCP Client Mode Configuration

In this mode, NAT can be activated if required.

DHCP Server Mode Configuration

The Controller operates as an internet router while in DHCP Server mode. The default IP address for the Controller is 192.168.24.1.

When a device is connected to the Controller Ethernet connection, the Controller DHCP server will allocate the connected device an IP address in the range 192.168.24.xxx.

In this mode, NAT can be activated if required.

Static IP Address Configuration

The Controller is able to configure its Ethernet connections with a host IP address, gateway IP address, and DNS server.

Host IP address

The host IP address is the IP address of the Controller.

Default Gateway Configuration

The default gateway is the IP address of the network node that serves as an access point to the rest of the network.

DNS Configuration

Optionally, the DNS server settings can be configured to set up to two separate DNS servers (primary and secondary).

In this mode, NAT can be activated if required.

Summary of Controller Ethernet configuration options:

DHCP Server	DHCP Client	Static IP Address
NAT	NAT	Host IP Address Host Subnet Mask Gateway IP Address DNS Primary Server DNS Secondary Server NAT

Configuring on the Local Menu

» Ensure you are in installer mode (Maintenance -> Enable Installer Mode -> Enter Installer PIN (default passkey 2468)

» On the main screen press and hold the * key

» Disconnect from the DZMx

» Select **Settings** to review or change Controller settings.

» Enter the Installer PIN to review or change Controller settings.

Configuring over Ethernet

» Connect to the Controller Ethernet port

» Enter the Controller IP address into a browser; the Flightcell Controller Connect application will open

» Login in as Installer (default passkey 2468).

Changing Controller PIN Codes

The Controller has two levels of permissions for accessing the various settings and functions. Refer to the following table for the users and their default pin codes:

Role	PIN number	Responsibility
Installer	2468	The installer can edit all settings and hardware options.
Operator	2580	Operator has restricted access to make changes to the device outside of operational needs

These pins can be changed in:

Controller Connect
Settings > Preferences > Access Management > Installer/Operator PIN
Controller Local Menu
F3 (Settings) > Preferences > Access Management > Installer/Operator PIN

> **Note:** to change a PIN, you will need to have authenticated at that level.

Changing Controller Local Menu Access

By default, the Controller must be in installer mode to access the local menu from the main screen by pressing the * key. This can be changed to make the local menu accessible to operators as well. This can be changed at:

Controller Connect
Settings > Preferences > Access Management > Operator Local UI Access
Controller Local Menu
F3 (Settings) > Preferences > Access Management > Operator Local UI Access

Changing Device Mode

By default, the controller will connect to any DZMx Plus on the same subnet (Discovery Mode). After connecting, the Controller will be paired to that DZMx Plus and not be able to connect to any other DZMx Plus. This is done by IP address, so if the DZMx Plus is replaced but has the same IP address no extra configuration on the Controller is needed.

To set a static configuration or change to a new DZMx Plus IP address, select the DZMx Plus on the Local Menu (press enter key if a DZMx exists) and then press F4.

To set a static configuration manually:

First, change the Default Device Mode to DZMx Plus.

This can be changed at:

Controller Connect
Settings > Preferences > Default Device Configuration > Default Device Mode
Controller Local Menu
F3 (Settings) > Preferences > Default Device Configuration > Default Device Mode

Second, change the Default Device IP to the IP address of the DZMx Plus.

This can be changed at:

Controller Connect
Settings > Preferences > Default Device Configuration > Default Device IP
Controller Local Menu
F3 (Settings) > Preferences > Default Device Configuration > Default Device IP

Changing Controller Edit Phonebook Access

By default operators can edit the phonebook contacts. This can be disabled.

This can be changed at:

Controller Connect
Settings > DZMx App > Access Management > Operator can Edit Phonebook
Controller Local Menu
F3 (Settings) > DZMx App > Access Management > Operator can Edit Phonebook

Configuring the DZMx Plus

The DZMx Plus can be configured using the DZMx Plus Controller keypad and display or using DZMx Connect. Most settings are available on both interfaces.

It is recommended that the DZMx Plus be configured using the DZMx Connect application.

Some settings may also be configured from the Flightcell Controller, by going to *Settings*.

DZMx Connect can be used to configure the DZMx Plus, change settings and edit the DZMx Plus phonebook and Quick Message Library, as well as to access several other DZMx Plus functions.

However, it is useful to use the Controller keypad when real-time feedback on the following is preferred:

- » Adjusting audio settings.
- » Configuring the general purpose inputs.

DZMx Connect is available as a browser application on a PC or smart device.

Using DZMx Connect over an Ethernet connection

The default IP address for a DZMx Plus has a different default IP address and subnet for each Ethernet interface. The default network configuration for the network interfaces are:

Ethernet 0 (eth0):

- » DHCP server

- » Host IP: 192.168.4.1

- » Subnet mask: 255.255.255.0

Ethernet 1 (eth1):

- » DHCP server

- » Host IP: 192.168.42.1

- » Subnet mask: 255.255.255.0

To connect to DZMx Connect via an Ethernet port:

- » Connect a computer to a DZMx Plus Ethernet port.

- » Power up the DZMx Plus and wait for it to fully initialise.

- » Open a web browser, type in the Host IP address bar and press *ENTER*. The home screen of DZMx Connect will open in the browser.

For DZMx which have modified network settings, it may be possible to look up the IP address from the Controller DZMx Menu:

Controller DZMx Menu
Maintenance > Diagnostics > DZMx Details > Eth 0/1 IP

Using DZMx Connect over a Wi-Fi connection

- » Connect a laptop, smartphone or tablet to the DZMx Plus Wi-Fi

  - » Default SSID: DZMx Plus Wi-Fi
  - » Default password: *flightcell* (all lower case)

- » Open a web browser and type in 192.168.2.1 then press *ENTER*; the home screen of DZMx Connect will open within the browser.

The initial screen is a discovery screen and the DZMx Plus should be discovered automatically. The *DISCOVER* button is only required if the process needs to be repeated.

If the DZMx Plus Wi-Fi IP address has been changed, it will be necessary to enter the new IP address. The Wi-Fi address can be found in diagnostics:

Controller DZMx Menu
Maintenance > Diagnostics > DZMx Details > WiFi IP

Permission levels

Permission levels allow control over how the DZMx Plus is configured. Two levels or roles with individually configurable passwords are available within DZMx Connect.

To access Permissions using DZMx Connect:

» Select **LOGIN** at the top of the screen. The login screen will open.

» Select **Installer** or **Administrator** from the dropdown list to the right of Authenticate as:

» Enter the applicable **PIN** number (see default pins in table below).

Role	PIN number	Responsibility
Installer	2468	The installer can edit all settings and hardware options.
Administrator	2580	An administrator can access all application features and configuration but is unable to access hardware configurations.

Note: Flightcell recommends for device security that customers change the default pins.

The installer password can be changed as required:

DZMx Connect
Settings > Preferences > Access Management.
Controller DZMx Menu
To Enter Installer Mode: *Maintenance > Enable Installer Mode* > Enter Installer Password   To Change Installer PIN: *Maintenance > Change Installer Pass* > Enter new PIN

Note: It is important to record the password. If the password is forgotten, it will be necessary to reset the DZMx factory settings before the password protected functions can be used again

Configuring Main Menu Items

The Flightcell Controller provides installers the option to reorder and hide the DZMx Plus main menu functions. Installer mode needs to be active to access the menu item editor, which can be found at:

Controller DZMx Menu
Maintenance > Configure Main Menu

See the table below for an overview of the key functions:

Key	Function
F1	Toggle visibility of highlighted menu item
F2	Toggle moving of highlighted menu item
F3	Save all changes and exit editor
Key	Function
F4	Cancel all changes and exit editor
UP DOWN	Change highlighted menu item or move highlighted item if **F2** is toggled on

Configuring Flightcell Controller Lighting

The Flightcell Controller has two separate lighting modes:

- » Day mode – the display is backlit in colour; the keypad is not backlit

- » NVIS (night) mode – the display and keypad are both backlit using either;

  - » NVIS A or B Green, Or
  - » Full colour

The Flightcell Controller has inputs for various aircraft control schemes, including:

- » Variable Lighting Input

  - » For controlling the night brightness from an external dimmer control
  - » Configurable detent to switch between NVIS and Day brightness

- » NVIS switch
  - » For toggling off and on NVIS (night) mode from an external switch

Refer to the following table for lighting settings and their descriptions:

Setting	Function
Lighting Voltage	Max voltage expected on the variable voltage input (5V, 28V or Supply voltage)
Default Day Brightness	Screen brightness while in Day Mode
NVIS Min Level	Minimum screen brightness level while in NVIS (night) mode

Setting	Function
NVIS Max Level	Maximum screen brightness level while in NVIS (night) mode
NVIS Keypad Min Level	Minimum keypad brightness level while in NVIS (night) mode
NVIS Keypad Max Level	Maximum keypad brightness level while in NVIS (night) mode
Level Control Type	Determines whether the variable lighting input uses a detent to switch between Day and NVIS (night) modes
Detent Threshold	Calibration value for setting the location of the detent on the variable lighting input
Level Control Mode	Sets the direction of the NVIS (night) mode dimming relative to the variable lighting input: **Dimmer Control:** brightness decreases as variable lighting input voltage increases **Brightness Control:** brightness increases as variable lighting input voltage increases

NVIS Color Mode	Setting to set whether NVIS (night) mode should use green or color LEDs
Enable Day/Night Switch	Setting to enable the NVIS (night) mode switch input to allow switching between Day and NVIS (night) modes.
Day/Night Switch Polarity	Setting to determine the polarity of the NVIS (night) mode switch input. **NVIS Low**: active low **NVIS High:** active high
NVIS Curve	Operator setting to change NVIS brightness curve
NVIS Curve[1234] Gamma	Various brightness gamma curves for different operator brightness profiles

> **Note:** If both the detent and NVIS mode switch settings are enabled, only the NVIS switch will change the lighting mode between Day and NVIS (night) mode.

Configuring Day mode brightness

The Day brightness level can be adjusted at:

Controller Connect
Settings > Lighting > Levels > Default Day Brightness
Controller DZMx Menu
Settings > Device Brightness > Brightness Level
Controller Local Menu
Settings > Lighting > Levels > Default Day Brightness

Configuring NVIS (Night) mode brightness

During NVIS (night) mode, the brightness can be adjusted using the variable lighting input. There are two ways to switch between Day and NVIS (night) modes:

  » Using a detent on the variable voltage input

  » Using the Day/Night input switch

> **Note:** Detent should not be configured if using the additional Day/Night switch input.

Configuring variable lighting input voltage

If the Flightcell Controller is to be used with the variable lighting input, ensure the Lighting Voltage setting is set to the max input voltage (5V, 28V or Supply voltage).

This setting can be found at:

Controller Connect
Settings > Lighting > Levels > Lighting Voltage
Controller Local Menu
Settings > Lighting > Levels > Lighting Voltage

Configuring the Day/Night Switch

Install a day/night switch connected to the Flightcell Controller on pin 10. The Day/Night switch and polarity can be enabled at:

Controller Connect
Settings > Lighting > NVIS > Enable Day/Night Switch
Settings > Lighting > NVIS > Day/Night Switch Polarity
Controller Local Menu
Settings > Lighting > NVIS > Enable Day/Night Switch
Settings > Lighting > NVIS > Day/Night Switch Polarity

Configuring the Variable Lighting Input Detent

The variable lighting input adjusts the NVIS (night) mode brightness level. When it clicks down through the detent, the lighting mode changes to Day mode.

To change the variable lighting input setting to enable the detent and set the detent threshold, adjust the settings found at:

Controller Connect
Settings > Lighting > NVIS > Level Control Type
Settings > Lighting > NVIS > Detent Threshold
Controller Local Menu
Settings > Lighting > NVIS > Level Control Type
Settings > Lighting > NVIS > Detent Threshold

Configuring Min and Max Night Mode Brightness

The minimum and maximum brightness levels can be adjusted separate for both the Controller screen and the keypad. This lets installers set the upper and lower limits for the screen and keypad brightness. These settings can be found at:

Controller Connect
Settings > Lighting > NVIS Min Level   (screen only)
Settings > Lighting > NVIS Max Level   (screen only)
Settings > Lighting > NVIS Keypad Min Level   (keypad only)
Settings > Lighting > NVIS Keypad Max Level   (keypad only)
Controller Local Menu
Settings > Lighting > NVIS Min Level   (screen only)
Settings > Lighting > NVIS Max Level   (screen only)
Settings > Lighting > NVIS Keypad Min Level   (keypad only)
Settings > Lighting > NVIS Keypad Max Level   (keypad only)

Audio Installation and Configuration

The DZMx Plus supports the following audio services:

» Telephony over the Iridium and cellular networks (depending on the modems installed in the DZMx Plus).

» Iridium PTT, a Push-to-Talk service using the Iridium network to provide one-to-many PTT calling.

» Telephony over a mobile phone connected to the DZMx Plus Bluetooth service.

Configuring DZMx Plus Audio

The DZMx Plus audio settings can be found in the following locations:

DZMx Connect
Settings > Audio
Controller DZMx Menu
Settings > Audio

Connection to the Aircraft Audio System

Audio from the above services is connected into the aircraft audio system or intercom (ICS) to enable aircrew, mission crew or passengers to use these connections.

The DZMx Plus can be connected to the aircraft audio system or ICS in several ways, depending on the aircraft configuration and type of operation.

It is recommended that audio from the DZMx Plus is connected to spare radio positions on the ICS if possible.

Modem connections to the ICS are configured:

DZMx Connect
Settings > Audio > Modems

Single or Dual ICS Connections

The DZMx Plus supports one or two connections to the audio panel/ICS, ICS1 and ICS2.

The dual ICS connections may be used to allow the DZMx Plus to be connected to two different audio panels on the aircraft, or to allow different audio connections to be used simultaneously.

Mirroring audio on dual ICS connections

If the DZMx Plus has connections to two audio panels, but it is desirable to have the same audio mirrored to both:

DZMx Connect
Settings > Audio > Modems > Mirror Audio to ICS2
Controller DZMx Menu
Settings > Audio > Modems > Mirror Audio to ICS2

Designating Modems to ICS Connections

The two ICS connections may be used to allow the DZMx Plus modems or connected Bluetooth device to connect to separate ICS channels, allowing separate calls to occur on the separate respective ICS channels. Each modem, Bluetooth and Certus device can be designated to either ICS1 or ICS2 in the modem audio settings:

DZMx Connect
Settings > Audio > Modems
Controller DZMx Menu

Settings > Audio > Modems

Dual Calling

The DZMx Plus can make two calls simultaneously:

- » If the two ICS connections are wired, separate calls on ICS1 and ICS2.

- » If only ICS1 is wired to the audio system, two calls on the single ICS channel.

Modem Call Priority

A modem which has been given priority will automatically mute all other calls on the same ICS when it makes or receives a call. When a priority call has ended, it automatically unmutes the other call.

This can be particularly useful if a call on a modem is vital to vehicle aircraft operations. By default, call priority is off; however it can be enabled using the **"***Call Priority"* setting for each modem and Certus device. This setting is particularly useful where simultaneous calls may be active on a single ICS channel.

DZMx Connect	
Settings > Modems Settings > Certus > General > Call Priority	Select the modem then select the priority order.

Audio from the DZMx Plus to the ICS

Audio from the DZMx Plus is connected direct to the ICS input, and its levels adjusted using the DZMx Plus audio menu.

Audio from the ICS to the DZMx Plus (microphone installation)

The DZMx Plus 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 https://www.flightcell.com/support/documentation for wiring diagrams for the microphone connections.

Low Impedance Microphones

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

High Impedance Microphones

There are several options for connecting the DZMx Plus into an audio panel/ICS with high impedance microphones. The way in which the DZMx Plus is connected will depend on your system configuration and operational requirements.

As the Iridium satellite phone and cell phone are both full duplex, it is preferable to use the DZMx Plus on a hot mic connection, rather than PTT (keyed). The DZMx Plus 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 DZMx Plus should have mic bias disabled.
- » The way this is configured will depend on how many headsets are to have access to the DZMx Plus:
    - » If only the pilot is to use the DZMx Plus, its MIC TO DZMx Plus 1 HI/LO lines are connected only to the pilot's microphone line.
    - » If both pilot and co-pilot are to use the DZMx Plus, 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 DZMx Plus, an external switch is required to select the active microphone input.
- » Connecting to a Cell Phone Port on the Audio Panel. The DZMx Plus 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 Controllers at each crew position, this option enables crew to use the DZMx Plus and connected phones individually on demand. In this case it may be necessary to provide mic bias.

Configuring Microphone Bias

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

To activate bias power on the mic line:

DZMx Connect
Settings > Audio > ICS1 or ICS2 > Mic Bias
Controller DZMx Menu
Settings > Audio > ICS1 or ICS2 > Mic Bias

Ensure you are in installer mode (Maintenance -> Enable Installer Mode -> Enter Installer PIN - default passkey 2468)

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 DZMx Plus if required. The side tone setting provides for three operational states:

- » **Off** – The DZMx Plus will provide no side tone

- » **When On Call** – The DZMx Plus will only provide side tone while in a call

- » **Always On** – The DZMx Plus side tone will always be on

The side tone setting can be found at:

DZMx Connect
Settings > Audio > ICS1 or ICS2 > Side Tone
Controller DZMx Menu
Settings > Audio > ICS1 or ICS2 > Side Tone

Ensure you are in installer mode (Maintenance -> Enable Installer Mode -> Enter Installer PIN - default passkey 2468)

Configuring Notification Tones

Notification tones are used to notify the crew of specific events. Notification tones can be enabled or disabled in the audio menu. Notification tones include:

- » Keypad tones.

- » Message queue full, which sounds when the tracking message queue is full.

- » Warnings, which notify when there is an issue or fault

- » Incoming call tone via Iridium or cellular calls

- » Incoming or outgoing call tones from Bluetooth calls

DZMx Connect
Settings > Audio > Tones
Controller DZMx Menu
Settings > Audio > Notification Tones

Ensure you are in installer mode (Maintenance -> Enable Installer Mode -> Enter Installer PIN - default passkey 2468)

Configuring ring tones

The DZMx Plus provides ring tones on incoming and outgoing calls.

- » Sip Client Ring Tone; Stops the DZMx ringtone generation if Certus G6/G6-S has it's ringtone enabled.

- » Some operators find the incoming tone obtrusive or distracting and prefer to install an alternative call annunciator. The ring tone for incoming calls can be suppressed by going to:

DZMx Connect
Settings > Audio > Tones > set the required tones
Controller DZMx Menu
Settings > Audio > Tones > set the required tones

Ensure you are in installer mode (Maintenance -> Enable Installer Mode -> Enter Installer PIN - default passkey 2468)

Adjusting Audio Volume

Audio volume can be adjusted on DZMx Connect or the Controller, however as there is a short lag when using DZMx Connect, it is recommended that audio levels are adjusted using the Controller.

To adjust audio volumes to the ICS audio volumes, navigate to the settings at:

DZMx Connect
Settings > Audio > ICS1 (or 2)
Controller DZMx Menu
Settings > Audio > ICS 1 (or 2)

Ensure you are in installer mode (Maintenance -> Enable Installer Mode -> Enter Installer PIN (default passkey 2468)

The volume settings that can be adjusted are:

- » **Ear ICS Volume:** output volume from the DZMx Plus to the ICS

- » **Mic ICS V3:** input volume from the ICS to the DZMx Plus

Iridium Push-To-Talk (IrPTT)

Iridium PTT is a licensed feature.

If you wish to use IrPTT, it is necessary to

» Subscribe to the IrPTT service through your Iridium Service Provider

» Purchase an Iridium PTT licence from Flightcell to activate the IrPTT service.

The internal satellite modems have two modes of operation, IrPTT and standard mode. In IrPTT mode, only IrPTT calling is available. The satellite mode of operation can be switched at any time by pressing the Switch Sat Mode button on the main menu. This icon only shows up if IrPTT is licensed and enabled. This allows operators to switch back to standard mode if they need to make standard voice calls, SMS, or send SBD messages.

Configuring the DZMx for IrPTT

To enable and configure your DZMx Plus for IrPTT, the DZMx needs to be set to IrPTT in DZMx Connect

DZMx Connect
Settings > Modem > Sat Group

» **PTT Enable:** Allows the internal satellite modem to operate in IrPTT mode
» **Start PTT on boot:** The DZMx Plus will start the internal satellite modem in IrPTT mode

Once configured in DZMx Connect, IrPTT can set to ON, on the Controller

Controller DZMx Menu
Menu > Switch Sat Mode > switching sat mode will be displayed

The display can now be toggled between IrPTT and Home screen. To revert out of IrPTT mode, toggle Home Screen, scroll to Switch sat mode tab and select.

The available IrPTT settings include Refresh Talk Groups or Set Default

To update IrPTT talkgroups:

Controller DZMx Menu	
With Sat modem in PTT mode: *Switch tab* (if not on PTT tab) > *F2* (PTT Talk Groups)	Use *UP* and *DOWN* to select a talk group, then use F2 to set as default, or F4/ENTER to switch to selected talk group.

Configuring the IrPTT Input

When operating in IrPTT mode, transmissions must be triggered, in one of three ways:

» Using the pilot's radio PTT switch (the preferred option).

» A dedicated remote mounted IrPTT switch

» If a PTT switch is not configured, from the Controller keypad. PTT calls can be triggered and terminated from the Controller PTT tab using **F4**.

Configuring the audio panel and DZMx to trigger an IrPTT transmission

If using IrPTT, the DZMx should be connected to a spare transceiver position. The PTT keyline for that transceiver position is then wired to one of the DZMx General Purpose Inputs – see DZMx Plus Inputs Section and Wiring Diagram for details of how to wire and configure the Input.

If a spare transceiver position is not available, then a vacant receiver position for audio can be used and a separate PTT switch should be installed to trigger IrPTT transmissions.

> Note: The Call Priority setting can be useful for automatically muting a IrPTT call when making a call on another modem.

Advanced Audio Settings

DZMx Connect contains a powerful audio system which provides many advanced audio configuration options, including:

» Mute

» Output volumes

» Mixer volume levels (for adjusting individual audio levels)

» Equaliser

» Vox Control

» Lo Frequency Filter (ICS1, ICS2, External Transceiver & AUX only)

These features can be found and adjusted in DZMx Connect under Audio Manager. Installers may also reset, download, and upload audio configuration files from Audio Manager to share configurations between aircraft.

Modem Configuration

The DZMx Plus can be configured with up to three internal modems and one external modem or satellite phone.

Cellular Modems

The following cellular modems may be installed in the DZMx Plus:

- » A 4G (LTE) modem
- » A 450 MHz modem.

Different countries or geographic areas use different cellular bands, due to international and national radio frequency licensing agreements.

In the DZMx Plus, three different modem versions are used for different geographic regions. The three modem options are:

- » EMEA (Europe, Middle East, Africa)
- » APAC (Asia/Pacific and South America)
- » Americas and Band 14 (North America, including the US Public Safety Band, band 14).

There is considerable overlap in the bands offered by the different modem versions, so some modems can be used in more than one geographic area, with some reduction in the bands available.

When ordering the DZMx Plus, it is essential that the version with the correct regional modem is ordered. Please contact tech@flightcell.com for more information on the appropriate modem for your operational area.

Iridium Modems

Internal modems

The following satellite modems may be installed in the DZMx Plus:

- » One or two internal Iridium 9523 narrowband modems; this modem provides voice, tracking and short burst data services
- » An Iridium 9603 modem (used for Short Burst Data only).

External Modems and Phones

One external modem or satellite phone can be connected to the DZMx Plus via its RS232 serial port:

- » A Flightcell Iridium Modem
- » An Iridium handset installed in a Flightcell Iridium Extreme Phone Cradle

The modem and the phone handsets provide the same functions (except for Iridium PTT) as the internal Iridium modem, providing phone calling, messaging, and data. These functions are all controlled by the DZMx Plus, so it is not necessary to use the phone keypad.

To configure the DZMx Plus for the connected phone or modem, in DZMx Connect, go to *Settings > Hardware > External > Debug Port Config*, select the modem or cradle version:

- » Iridium 9505A
- » Iridium 9555

» Iridium Module

» Iridium Extreme

You will need to check the detailed configuration for each modem and external device in *Settings > Modem*.

Iridium Certus modems

If a satellite data service is required, the Guardian G6 or G6S Iridium Certus midband terminals can be installed and integrated with the DZMx. These terminals provide

» An IP data connection at 88kbps uplink and downlink

» A voice service.

Configuring the DZMx Plus RS232 Port

The DZMx Plus RS232 serial port can be configured for various external devices. The DZMx Plus needs to be configured to recognise and control the connected device. To configure the RS232 port setting:

DZMx Connect
Settings > Hardware > External > Debug Port Config

The following configurations are currently supported:

» Debug

» Iridium 9505A

» Iridium 9555

» Iridium Module

» Iridium Extreme

» Rhotheta Direction Finder

» Erickson AWTC

» ETM Cycle Counter

» AFDAU (Automated Fire Data Acquisition Unit).

If you have selected an external iridium device, you may optionally configure the external modem settings:

DZMx Connect
Settings > Modem > External

Configuring Modem Settings

The DZMx Plus is configured prior to shipment with default settings for the installed modems. Additional modem settings include:

Configure which modems are used to transmit tracking data

By default, tracking messages are enabled for all modems. If more than one Iridium device or more than one cell modem is installed, only one of each should be activated for tracking.

If the internal Iridium 9523 modem is used for Iridium PTT, then the other Iridium modem (9523 or 9603) or external Iridium device should be configured for tracking.

Configure Iridium or cellular voice calling capability

By default, voice calling is enabled for all modems, except for the Iridium 9603 modem, which is used for SBD messaging only, and the 450 MHz cellular modem, which is for data only.

Configure Iridium SBD Transmission

If your Iridium modem has been provisioned to send SBD messages to your chosen tracking provider, then ensure SBD transmission is enabled for your Iridium device. If you do not wish your device to send SBD messages, then disable SBD transmission.

Configure the Iridium Service Centre

Most Iridium accounts use the standard Iridium Service Centre for handling SMS messages. However, some Iridium Service Providers use service centres (e.g. Telstra and Pivotel in Australia; DISA for US military).

If **(No SMS)** is displayed next to the Iridium modem's status message on the Controller main screen, the service centre number is incorrectly set. The service centre number can be set from:

DZMx Connect
Settings > Modem > Modem 1 > Service Centre Number

Configure the cellular APN

It is necessary to set the APN (Access Point Name) for the cellular modems to allow the modem to use cellular data services. You will need to determine the APN for your cellular provider; this can normally be obtained from their website.

Enable or disable data

Use this setting to enable or disable data services for the selected modem.

Data Roaming

If a cell modem is operated outside its home country, it is usually necessary to activate data roaming to allow use of local cellular services.

Disabling Cell Modems

In some cases, it may be a requirement to disable cell modems in flight for operational or regulatory reasons. This is called Flightmode.

The DZMx Plus may be configured so that:

> » Cell modems are always enabled.

> » Cell modems can be disabled via softkey – the modem can be disabled manually on the Controller, using the "Toggle Cell Flightmode" softkey ( )

> » Cell modems are automatically disabled when the aircraft is in flight.

When a cell modem is disabled, all transmit and receive functions are completely disabled.

DZMx Connect
Settings > Modem > Cell modems > Disable Cell Devices

> Note: When set to automatically disable in flight, the manual disable/enable key can override the automatic option until the next take-off or landing.

Configuring the cellular bands used by the DZMx Plus cellular modem

The cellular modems installed in the DZMx Plus can access 4G (LTE) and if available, 3G and 2G (GSM) services on the cell networks. For each of these services, there will usually be several cellular frequency bands.

3G and 2G services are being retired on cell networks around the world, but the timing of this varies by country and network.

The cell modem will switch automatically between services and bands, under the control of the network. This may result in the modem operating on a service and band which does not provide the best available performance, e.g. the modem may be operating on 3G even though a faster service is available on 4G.

The cellular bands used by the DZMx Plus can be configured to improve its performance. On DZMx Plus, the cell modems can be locked into 4G using the DZMx Plus Advanced Band Select settings.

To lock to specific services and bands

DZMx Connect	
Settings > Preferences > Regional > Cell Modem Region	Set to **Advanced Band Select**

Then, Settings > Preferences > Advanced Band Select	Select the required cell bands

The following table shows the cellular bands and frequencies for the different regional variants in the DZMx Plus.

Region	LTE (4G)	UMTS (3G)	GSM (2G)
Asia Pacific / South America	B1 (2100)	B1 (2100)	
	B3 (1800)	B5 (850)	900
	B5 (850)	B8 (900)	1800
	B7 (2600)		
	B8 (900)		
	B28 (700)		
Europe	B1 (2100)	B1 (2100)	
	B3 (1800)	B8 (900)	900
	B7 (2600)		1800
	B8 (900)		
	B20 (800)		
	B28 (700)		
Europe 450MHz	B3 (1800)	B1 (2100)	900
	B7 (2600)	B8 (900)	1800
	B20 (800)		
	B31 (450)		
Americas	B2 (1900)	B2 (1900)	-
	B4 (1700)	B4 (1700)	
	B5 (850)	B5 (850)	
	B12 (700)		
	B13 (700)		
	B14 (700)		
	B17 (700)		
	B66 (1700)		

The following guidelines can be considered when using advance band select:

» Locking into LTE only will generally give better data speeds, but if the LTE coverage in your area is not as extensive as 3G, you may need to select both 3G and 4G bands

» Lower frequency cellular bands (in the range 700 to 850 MHz) will generally give better service than higher frequency bands.

Ethernet Network Configuration

The DZMx Plus has two Ethernet ports:

» The primary Ethernet port (ETH0) on its front panel

» A secondary Ethernet port (ETH1) on the rear main connector

The Primary and Secondary Ethernet settings can be found at:

DZMx Connect
Settings > Network > Ethernet

Flightcell recommends double checking any changes in DZMx Plus network settings. Configuring the network incorrectly may lock an installer out from making further changes.

Each DZMx Plus Ethernet interface supports the following network modes:

» DHCP Server

» DHCP Client

» Fixed/Static IP

To change the Ethernet mode for the primary or secondary Ethernet port:

DZMx Connect
Settings > Network > Ethernet > Ethernet Configuration
Settings > Network > Ethernet > Secondary Ethernet Configuration

The following Ethernet settings found in DZMx Connect apply to the listed modes above:

DHCP Server	DHCP Client	Static IP Address
Ethernet Configuration	Ethernet Configuration	Ethernet Configuration
	DZM NAT Interface	Host IP Address
		Host Subnet Mask
		Gateway IP Address

DNS Primary Server

DNS Secondary Server

DZM NAT Interface

DHCP Server Mode

The DZMx Plus can configure its Ethernet ports to DHCP server. The host IP addresses and subnets are fixed and unique to the individual network interface. The host IP subnets for each interface are:

- » Primary Ethernet: 192.168.4.1/24

- » Secondary Ethernet: 192.168.42.1/24

Static IP Address Mode

The DZMx Plus can be assigned static IP settings. This includes the following network configuration options, each Ethernet interface can be configured separately with the following settings:

- » Host IP Address

- » Subnet Mask

- » Gateway IP Address (optional)

- » DNS Server #1 (optional)

- » DNS Server #2 (optional)

Ethernet NAT

The DZMx Plus allows installers to enable NAT on the Ethernet connections when configured as a DHCP client or static IP address. This can be enabled individually for the primary and secondary ethernet:

DZMx Connect
Settings > Network > Ethernet > Dzm Eth Nat Interface
Settings > Network > Ethernet > Dzm Eth1 Nat Interface
Controller DZMx Menu
Settings > Network > Ethernet > Dzm Eth Nat Interface
Settings > Network > Ethernet > Dzm Eth1 Nat Interface

WiFi Ethernet IP packet forwarding

The DZMx Plus provides a mechanism to enable/disable IP forwarding between Wi-Fi and Ethernet, to allow wired networks to be isolated from the wireless network.

DZMx Connect
Settings > Network > Firewall > Allow Wi-Fi Ethernet Forwarding

This setting will change the network behaviour to:

» Enabled: Data can be forwarded between the Ethernet and Wi-Fi networks.

» Disabled: Ethernet and Wi-Fi networks are isolated from each other.

DZMx Plus Wi-Fi

The DZMx Plus has Wi-Fi service by default. The DZMx Plus can be supplied without Wi-Fi if this is a requirement – this must be specified when the DZMx Plus is ordered.

The DZMx Plus acts as an access point to connected devices, enabling routed to connected devices, including:

» PCs

» Tablets

» Smartphones

» Medical devices

» Other specialised devices

» Provide WPA2 encryption security to wireless devices.

When Wi-Fi is running, a wireless icon will appear at the top right of the Controller main screen.

The default Wi-Fi settings are:

» SSID *DZMx Wi-Fi*

» Passcode *flightcell*

> Note: It is strongly recommended the SSID and Passkey be changed to unique values for each DZMx installation (aircraft).

Starting Wi-Fi

Wi-Fi can be started and stopped from DZMxConnect and Controller main screen:

DZMx Connect
Connectivity > Wi-Fi > On
Controller DZMx Menu
» Refer to the Toggle Wi-Fi button on the main screen Flightcell Controller Main Screen Function Key Functions

Configuring Wi-Fi Settings

DZMx Connect	
Connectivity > Wi-Fi	The following settings can be modified: » SSID. » Passkey. » Wireless Local Area Network (WLAN) channel. » Wi-Fi Dynamic Host Configuration Protocol (DHCP) Server settings.

Wi-Fi Access Control

The DZMx Plus Wi-Fi can be configured with an Accept or Deny list for providing another layer of security. This allows installations to either allow only specific devices, or block certain devices, based upon their MAC address. The mode can be specified in:

DZMx Connect
Connectivity > Wi-Fi > Access Control List Mode

The two modes are:

» **Accept All except in Deny List:** This allows for all devices to connect except for specific MAC addresses listed in the Deny list

» **Deny All Except in Accept List:** This denies all devices unless their MAC address is specified in the Accept list.

MAC addresses can then be added to either the Accept or Deny list depending on the above setting.

To remove devices from the list, click on the X next to the MAC address.

DZMx Plus Bluetooth™

Supported Bluetooth Profiles

The DZMx Plus supports the following Bluetooth profiles:

- » **HFP:** DZMx Plus operates as a hands-free headset for handling calls from a connected device

- » **A2DP:** DZMx Plus operates as a hands-free headset for playing audio from a connected device

- » **PBAP:** Phonebook Access Profile: DZMx Plus can pull down the phonebook from a connected device

> Note: Cellphone and Bluetooth technologies are regularly changing. Autoconnection and maintenance of a reliable connection between cellphones and the DZMx Plus via Bluetooth cannot be guaranteed.
>
> A cellphone connected via Bluetooth to the DZMx Plus should not be used for mission critical communication.

Enabling Bluetooth

Once Bluetooth is enabled, it is possible to toggle it on and off from the front panel. Scroll down the menu until you see the Bluetooth key and toggle as required.

When Bluetooth is enabled, the Bluetooth icon will appear at the top right of the screen on the front panel.

Bluetooth can be disabled in the DZMx Plus Control Head menu:

Controller DZMx Menu
MENU > Hardware Config > Wireless and Networks > Bluetooth Enable.

Pairing

- » Check that the Bluetooth icon is showing on the DZMx Plus Control Head display.

- » Make the DZMx Plus Bluetooth discoverable using the:

DZMx Connect
Connectivity > Bluetooth. Ensure Bluetooth is toggled **On**
Controller DZMx Menu
MENU. > Hardware Config > Wireless and Networks > Bluetooth Discoverable.

» Enable Bluetooth on the mobile device settings and select the 'DZMx Plus Bluetooth' device.

» A pairing notification message with a confirmation code will appear on the DZMx Plus Control Head and the mobile device. Ensure they are the same number.

» Press the ENTER key on the DZMx Plus Control Head, then select Pair on the mobile device.

Connecting paired Bluetooth devices

The DZMx Plus may be configured to require devices to be connected manually each time, or to automatically connect the last connected device.

DZMx Connect
*Connectivity > Bluetooth***.** Toggle Discoverable **ON** and Auto connect **ON**.
Controller DZMx Menu
MENU > Hardware Config > Wireless and Networks > Bluetooth Autoconnect.

> Note: The auto-connect functionality may vary depending on the mobile device and the level of support provided by the operating systems.
>
> A high degree of variability is present across all Android devices. They may need to be connected manually

Changing Bluetooth Settings

The following settings are available for the DZMx Plus Bluetooth:

» Discoverable (enable to allow new devices to find and pair with the DZMx Plus)

» Autoconnect

» Phonebook Sync

» Device Name (default Bluetooth name is "**DZMx-Bluetooth**"):

These settings can be changed in:

DZMx Connect
Connectivity > Bluetooth > Name
Controller DZMx Menu
Settings > Bluetooth > Device Name

Changing the Bluetooth name requires a reboot of the DZMx Plus to take effect.

Bluetooth Operator Controls

The DZMx Plus has a setting to disable operator access to the Bluetooth controls for:

- » Bluetooth Enable/Disable

- » Discovery

- » Autoconnect

- » Pairing

By default, operators have access to these functions, but can be disabled by changing the setting found at:

DZMx Connect
Settings > Preferences > Access Management Settings > Operator BT Controls

Enabling and Disabling Bluetooth

Bluetooth can be toggled off and on from the following locations:

DZMx Connect
Connectivity > Bluetooth > On
Controller DZMx Menu
Refer to the Toggle Bluetooth button on the main screen: *Flightcell Controller Main Screen Function Key* Functions

When Bluetooth is enabled, the Bluetooth icon will appear at the top right of the main screen on the Controller.

Bluetooth Icons

The Flightcell Controller will display various icons on the main screen to represent the current state of the Bluetooth system. This includes:

Icon	Function
	Bluetooth is powered on
	Bluetooth is powered on and discoverable for pairing
	Hands-free device is connected
	Audio streaming device is connected
	Bluetooth hardware fault detected

Wi-Fi and BT Antennas

Wi-Fi and Bluetooth antennas are required should you want to use the DZMx Plus Wi-Fi and BT features. Wi-Fi and Bluetooth antennas need to meet the specifications below.

Antenna Specifications for BT and Wi-Fi - Generic

Port ID	Function	Connector on Device	Required Antenna Connector
4	Wi-Fi (2.4 GHz)	RP-SMA Female	RP-SMA Male
5	Bluetooth (2.4 GHz)	SMA Female	SMA Male

General Electrical Requirements

Parameter	Specification
Frequency Range	2.400 – 2.500 GHz
Impedance	50 Ohms
VSWR	≤ 3:1
Gain (per element)	2 – 5 dBi
Polarization	Linear
Radiation Pattern	Omni-directional preferred
Isolation (MIMO configs)	> 15 dB isolation between antenna feeds
Antenna Count	1–2 elements (single or dual feed)
Max Power Input	> 1W
Recommended RF Cable	KSR-200-P/LMR200 or KSR240/LMR240 or RG142 or equivalent low loss cable. <0.69dB/m attenuation. 50R, <1.2 VSWR @ 2500MHz

Antenna Protocol Compatibility

» **Wi-Fi Antenna (Port ID 4)**
The antenna must be suitable for use with **IEEE 802.11-compliant devices** operating in the **2.4 GHz band** (e.g., 802.11b/g/n).
It must support omni-directional radiation patterns and be capable of handling modulation schemes and bandwidths used in standard Wi-Fi applications.

» **Bluetooth Antenna (Port ID 5)**
The antenna must be compatible with **Bluetooth wireless communication** operating in the **2.4 GHz ISM band**.
It should support omni-directional patterns suitable for short-range communication and be optimized for Bluetooth Classic and/or Bluetooth Low Energy (BLE) as applicable.

Flightcell supplied antennas

The Taoglas WA.500W.301151 antenna can be used. You will require a RP-SMA adaptor for the Bluetooth connection. Two of these antennas will be required if Wi-Fi and Bluetooth are to be used. Contact Flightcell for further information.

Alternatively, the Satcom Direct 900110 Wi-Fi antenna can be purchased from Flightcell or an approved supplier.

Any external antennas selected for Bluetooth/Wi-Fi should meet or exceed the RF specifications as tabled above when used with the DZMx Plus

- » Frequency range: 2.4–2.5 GHz (dual-band acceptable)

- » Gain: 2 dBi

- » Polarization: Linear

- » Impedance: 50 ohms

- » VSWR: < 2.5:1

- » Return Loss: < –10 dB (if possible)

IMPORTANT NOTE RELATING TO DZMx Plus BLUETOOTH MODEM: To comply with FCC requirements, the BT800 must not be co-located or operating in conjunction with any other antenna or transmitter.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.

2. Increase the separation between the equipment and receiver.

3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

4. Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

DZMx Plus Messaging

The DZMx Plus can send and receive text messages (SMS) over its satellite and cellular connections.

Messages can be composed and sent from the Controller or from DZMx Connect.

The DZMx Plus also has a Quick Message Library containing up to 50 pre-defined messages. These can also be sent to a cell phone or satellite phone or attached to a position report (see Manual Reports).

Details of how to compose or select, then transmit a message, are provided in the DZMx Plus Operators' manual.

Editing the Quick Message library

Quick Messages can be added, deleted or edited in DZMx Connect in *Quick Messages*.

Sending Quick Messages to Contacts Lists

Quick messages can be sent to multiple phonebook contacts when the Mark key is configured to one of the following modes:

Mark Short Button Press:

- » Mark and Text Contacts
- » Text Contact List Only

Mark Long Button Press:

- » Position with Text Msg

> Note: Each contact can be linked to any of the first 10 Quick Messages from the phonebook editor in DZMx Connect.

Adding a position to Quick Messages

The DZMx Plus can be configured to include the aircraft position when a quick message is sent. The received message will show the position and a small preview, and the position can be opened on Google Maps.

To provide for attachment of a position, in DZMx Connect go to *Settings > Tracking > General* and turn on *Include Position in Quick Msg*.

Viewing Quick Message Mark Contacts

The contacts linked to a Quick Message can be viewed in DZMx Connect from the Quick Messages tab. Drag the slider to the left and click the "VIEW" button to see all listed contacts that will receive that message.

DZMx Plus Tracking

The DZMx Plus has an embedded GPS, which provides precise location information and the current state of the aircraft.

This information can be sent to a tracking provider to enable the aircraft state to be monitored and its movements tracked.

The DZMx Plus tracking system provides information on:

>> Latitude, longitude, altitude, heading and speed

>> Flight state: example- on ground, hovering, course change, take-off, landing

To use the DZMx Plus tracking capability, it is necessary to enter a contract with a tracking service to receive, process and display tracking information. The DZMx Plus must then be configured to work with that tracking service.

Position reports are sent at intervals. The DZMx Plus cannot provide continuous tracking due to the constraints of the networks used but can transmit position reports with an event code attached at regular pre-programmed intervals.

As well as periodic position reports, the DZMx Plus can be configured to automatically send event reports – these are position reports with an event code attached.

> Note: If a cellular only unit is installed, an appropriate GPS antenna is required for Tracking. (Flightcell ANP_00043 antenna is an Iridium/GPS TSO'd antenna)

> Note: Most of the menu settings will not be visible unless the user has unlocked the Installer Menu

Changing Tracking Modes

The DZMx Plus tracking system has three modes:

>> **On:** Turns tracking on until it is disabled or suspended.

>> **Suspend:** Suspends tracking until the DZMx Plus is next powered on

» **Off:** Turns tracking off until it is manually enabled.

To change the tracking mode:

DZMx Connect
Settings > Tracking > General > Tracking mode
Controller DZMx Menu
Settings > Tracking > General > Tracking Mode

Locking the Tracking Menu

By default, some tracking settings are unlocked and can be altered by the crew to change the main tracking timers.

To lock the tracking menu so the crew cannot change these settings:

DZMx Connect
Settings > Tracking > General > Lock Tracking Menu

The Tracking Menu will be hidden from view when the DZMx Plus is next restarted.

Tracking Providers

Flightcell does not provide a tracking service but works with tracking service providers who support DZMx Plus tracking data. Contact Flightcell for information on available tracking service providers or refer to the list of providers on the Flightcell website (https://www.flightcell.com/support/tracking-providers).

If you have a preferred tracking provider who is not currently supported by Flightcell, please contact us at info@flightcell.com. We are always prepared to support additional providers.

Setting up the Tracking Service Provider

Before your tracking service provider can configure your tracking account, you may need to provide them with the following information:

» **DZMx Plus Serial Number:** Used to identify your aircraft when data is sent to a tracking provider. You can find your serial number in one of three places:

» On the DZMx Plus packaging

» On the serial number label on the back plate of the DZMx Plus.

» On the Controller, go to Maintenance > Diagnostics > S/N

- » **International Mobile Equipment Identity (IMEI):** This is a unique 16-digit number which is located on the backplate label of the DZMx Plus or under the battery of the (optional) Iridium External Device.

- » This can also be found by on the Controller by going to *Maintenance > Diagnostics* and scrolling right to the Sat Device screen. The IMEI number will be displayed.

- » **SIM Card:** The DZMx Plus will usually be delivered with an unlocked, inactivated Iridium SIM Card installed. To activate an account on this SIM card, contact Flightcell and advise the name of your Iridium Service Provider. The contract of this SIM card can then be transferred to your ISP, who will activate an account for this SIM Card.

- » **Iridium Phone Number** if you have an Iridium SIM card installed.

- » **Cellular Phone Number** if you have a cell modem installed.

Tracking Transmission

The DZMx Connect can send position reports over:

- » The cellular network: Using an IP data connection.

- » The Iridium network: Using the Short Burst Data service (SBD) or SMS.

If you wish to enable a particular modem for tracking, ensure the "**Use for Tracking"** modem setting is enabled and additionally, the "**SBD Enable**" modem setting is enabled for any Iridium modems.

Preferred Transmission Mode

The DZMx Plus can prioritise the available networks used for sending tracking messages. This is particularly useful to allow you to prioritise the cheapest transmission method, enabling least cost tracking while allowing the DZMx Plus to fall back to the alternate network if there is no coverage on the preferred network.

DZMx also allows tracking messages to be sent from a modem while the other is in use for calls or messaging.

The DZMx Plus support the following Transmission modes:

- » **Sat SBD/SMS First:** Prioritise transmitting tracking messages over Iridium SBD and SMS, over Certus and Cellular IP.

- » **Certus/Cell IP First:** Prioritise transmitting tracking messages over Certus and Cellular IP connections, over Iridium SBD and SMS

- » **Sat SBD/SMS Only:** The DZMx Plus will only transmit tracking messages over Iridium SBD or SMS

» **Certus/Cell IP Only:** The DZMx Plus will only transmit tracking messages over Certus and Cellular IP.

When sending over Certus and Cellular IP, the DZMx Plus will use the network that is currently configured as the default route for the DZMx. For more details refer to section GPS

Configuring DZMx Plus GPS

The default setting for the GPS receiver in the DZMx Plus provides for a maximum operating altitude of 12,000 meters and a maximum ground speed of 310m/s (603 knots, or 1116 km/hr).

If the aircraft operates at high speed or *high-altitude you can change the* GPS settings using DZMx Connect. Go to *Settings > Preferences > GPS* and select **General Purpose, High Altitude** or **High Speed** from the dropdown box. Select **OK** followed by **DONE**.

Setting	Max Altitude (*m*)	Max Horizontal Speed (m/s; knots; km/hr)	Max Vertical Speed (m/s; knots; km/hr)
General Purpose	12,000	310; 603; 1116	50; 97; 180
High Altitude	50,000	250; 486; 900	100; 184; 360
High Speed	50,000	500; 972; 1800	100; 184; 360

Exporting GPS Data

The DZMx Plus can stream NMEA data from its internal GPS system to an external device (such as a Flightcell SmartHUB) as UDP over its data connection.

To activate, in DZMx Connect, go to *Settings > Preferences > GPS* and turn on GPS Agent.

The destination IP address and port can be configured if required.

The default setting is IP address 192.168.4.255, port 3131.

GPS Logging Rate

The GPS logging rate can be set at 1 Hz or 4 HZ. This is the internal logging rate and external logging rate.

Activate in DZMx Connect. Go to Settings > Preferences > GPS > GNSS Logging Rate

Configuring DZMx Plus Data.

The preferred transmission mode setting can be found at:

DZMx Connect
Settings > Tracking > Transmission > Preferred Device

Controller DZMx Menu
Settings > Tracking > Transmission > Tracking Preferred Device

> Note: During a satellite call, SBD will be unavailable. To ensure tracking is not interrupted, the satellite modem will default to Iridium SMS for tracking, until the call has ended.

Configuring DZMx Plus Tracking Destinations

Once the Tracking Service Provider has your account set up, the DZMx Plus can be configured to send tracking messages to your selected providers. The destination gateways for Iridium and cellular networks need to be configured for each tracking service, they will provide you with the destination addresses. The following tracking gateways can be used with the DZMx Plus:

» **Iridium SBD**: Destination addresses are configured by your tracking service provider on the Iridium service SPNet.

» **Iridium SMS:** An email address (20 characters or less) or a phone number to send an SMS over the Iridium network.

» **Tracking Destination (Hostname/IP)**: The IP tracking destination for Cellular and Certus tracking

The tracking destination setting for Iridium SMS and IP Tracking can be found at:

DZMx Connect
Settings > Tracking > Transmission

> Note: If a method of transmission is not supported by your tracking provider, leave the destination address for that transmission blank.

Configuring Tracking over IP using Cellular Data

If supported by your tracking provider, the DZMx Plus can be configured to send tracking messages via the cellular data connection to an IP address when a data connection is available.

DZMx Connect	
Settings >Modem	» **Access Point Name (APN)** for your cellular network**:** this can be obtained from your cellular service provider or from their website. The normal default APN is

	Internet » **Enable Data:** This setting must be set to **On**. There must be a data connection active to send tracking messages to an IP port.
Settings > Tracking > Transmission	» **IP address:** Your tracking provider will advise you what IP address setting to use. An example is: 123.123.5.6 » **IP port:** Your tracking provider will advise you what IP port number to use. An example is: 12021. » **IP Timeout Profile:** There are three possible settings; Short, Medium (default) and Long.

The IP timeout configures the delay used to wait on the connection to the IP gateway from the tracking provider when attempting to send the messages. The shorter the delay, the faster the tracking system will fall back onto another network service to send tracking messages if transmission over IP fails. Setting this to Long will make the system more resilient when the connection is poor, and maximise the use of tracking over IP, but messages could take longer to send.

Configuring Periodic Events

The DZMx Plus can be configured to send position reports at designated intervals, which depend on aircraft activity. The following events or timers can be configured individually:

» **Periodic Timer:** The time, in minutes, between sending automated position reports while in flight (15 seconds for HD tracking).

» **On Ground Timer:** The time, in minutes, between sending automated position reports while on the ground (not in flight).

» **Taxiing Timer:** The time, in minutes, between sending automated position reports while taxiing.

» **Hover Timer:** The time, in minutes, between sending automated position reports while hovering. Hover events will replace the periodic events when they are due to be sent. Hovering can only be reported for a helicopter which has a collective or weight on wheels switch to detect take-off and landing. The hover timer cannot be enabled if using speed only.

» **Heading Timer:** The minimum time, in minutes, between position reports when the aircraft is changing heading.

 The settings for the timers above can be found at:

DZMx Connect
Settings > Tracking > Periodic
Controller DZMx Menu
Settings > Tracking > Periodic

> Note: Any timer can be disabled by setting its interval to zero.

While tracking interval over Iridium is set in minutes, with tracking over cellular IP, the interval can be reduced to 15 seconds (High Definition Tracking).

DZMx Connect
Settings > Tracking > General > HD Tracking Mode
Controller DZMx Menu
Settings > Tracking > General > HD Tracking Mode

To enable or disable HD Tracking, and select one of the following options:

» **On**: Enables HD tracking, thus allowing up to 1 tracking message to be sent every 15 seconds by the DZMx Plus while a data connection is available.

» **Off**: Turns HD tracking off, reverts to the periodic tracking interval as set-up in "Periodic Events".

» **Cell HD**: Turns HD tracking on for cell, sending position reports every 15 seconds. If messages start to queue, due to being in a poor signal area, then the frequency of the tracking messages will drop back to standard periodic intervals. The rate will switch back to using the HD interval setting as soon as the cell modem gets a good signal and cell data becomes available again.

» **Full HD**: Turns HD tracking on for cell, sending position reports every 15 seconds, and stores positions every 15 seconds on sat, sending them as a group every minute. The DZMx Plus will send messages out via an SBD message at 1-minute intervals to maintain an HD interval track log when cell data is not available. If cell data is disabled, or no cell modem is fitted it is possible to track in Full HD mode continuously using SBD exclusively. Each SBD message will contain up to 3 crumbs as historical reports, as well as the current position. If the HD interval is set to longer than 15 seconds, then the SBD message interval will also change in Full HD mode e.g. to every 2 minutes when the HD interval is set to 30 seconds.

> Note: The DZMx Plus will not track at the HD rate when on the ground. The DZMx Plus will use the On Ground periodic timer setting (which may be disabled by setting to 0).

Configuring the Heading Timer

If the **Heading Timer** is configured, a position report will be sent as soon as a specified change in heading occurs.

To set the heading variation that triggers a heading change report, go to

DZMx Connect
Settings > Tracking > Periodic > Heading Variation
Controller DZMx Menu
Settings > Tracking > Periodic > Heading Variation

> Note: The heading timer only specifies a minimum delay between heading events.

Configuring Automated Event Reports

Power Up

To send a position report when aircraft power is supplied to the DZMx Plus and when the DZMx Plus is powered off, go to:

DZMx Connect
Tracking > Triggered > Power Notification.
Controller DZMx Menu (Installer Mode)
Settings >Tracking Group >Triggered>Tracking Power Notifications

> Note: It is recommended that the DZMx Plus be connected to the primary power bus on the aircraft so that the power up message is created when the aircraft is first powered on.

Take-off and Landing Events

The DZMx Plus can be configured to send take-off and landing event reports at the start and end of each flight leg. The simplest approach is to use aircraft speed to trigger take-off and landing reports. This is ideal for fixed wing aircraft. However, while this approach can be used for helicopters, it is not ideal as it can result in false take-off and landing reports when hovering.

To configure the DZMx Plus for take-off and landing events using aircraft speed, go to *DZMx Connect > Settings > Triggered* and set a speed just below take-off speed for the aircraft, and a landing speed just below the aircraft's landing speed.

For helicopters, it is recommended that a collective switch or squat switch (also known as a "wheels on ground" or "weight on wheels" switch) be used to activate these reports. See DZMx Plus Inputs for details on wiring and configuring the inputs.

Hovering

If in HD tracking mode and hover is enabled, and the aircraft is hovering (speed < 15kts), then the HD tracking rate will drop to 30 seconds on cell and will drop back further to use the slower Periodic Timer rate when cell data is not available, messages are queueing, or speed = 0 (and drops out of HD Mode). If the aircraft is hovering, and hover is not enabled, then the tracking rate will drop to using the standard Periodic Timer rate whilst the aircraft speed is 0 but will switch back to HD as soon as the aircraft is moving again.

Engine Start and Stop Events

The DZMx Plus can be configured to send an event report when the engine starts and stops. Typically, this is triggered by the transmission oil pressure warning light circuit. See DZMx Plus Inputs for details on wiring and configuring the inputs.

Configuring Manual Position Reports

The **MARK** key on the Controller can be configured to send a variety of manual reports:

» Long press of **MARK** hotkey can be configured to either send a:

  » **Position report only:** sent to the tracking service provider
  » **Position with text message:** select a pre-programmed text message from a pop-up list that will be sent with the manual position report to the tracking service provider

» Short press of **MARK** hotkey:

  » **A position report only:** sent to the tracking service provider
  » **A mission mark:** prompts the user to select one of the colour code options, then enter the mission number; this is sent to the tracking service
  » **Text Contact List Only** –the DZMx Plus will prompt the operator to send a Quick Message to all contacts associated with that Quick Message
  » **Mark and Text Contacts** – works in the same way as Text Contact List Only, and additionally sends a position report to the tracking provider.

These options are configured using DZMx Connect. Go to *Settings > General > Mark Long Button Press/Mark Short Button Press*.

> Note: These options are not supported by all tracking service providers. Check with your service provider before activating these options.

Sending messages to contact groups

Pre-defined messages can be sent to one or more contacts when *Mark and text contacts* is selected.

Additional information can optionally be included with the message if the following options are configured in *Settings > Tracking > General Settings*:

» The aircraft registration number is entered; if the registration number is not entered, the DZMx serial number will be used instead

» The aircraft position will be included if selected.

Configuring message recipients

The recipients for each Quick Message can be designated using DZMx Connect.

» In DZMx Connect, go to *Contacts*

» For the selected contact, swipe the arrow to the left and click *Edit*

» Click Quick Message Groups

» Tick the index numbers of the messages you want to be sent to this contact

» Repeat for additional contacts.

If both the phone number and email address are filled out for a contact, the message will be sent by both email and SMS. If only the phone number or the email address is filled out, the message will be sent only by SMS or email, respectively.

> Note: If different messages are to be sent to the same recipient by email and SMS, it is necessary to create duplicate contacts for that recipient.

Configuring transmission of event reports to selected recipients

The DZMx Plus can send automated event reports to the tracking service.

It can also be configured to send event reports by SMS and/or email to selected recipients.

Additional information can optionally be included with the event report if the following options are configured in *Settings > Tracking > General Settings*:

» The aircraft registration number is entered; if the registration number is not entered, the DZMx Plus serial number will be used instead

» The aircraft position will be included if selected

» Flight timer information will be included in take-off and landing event reports if selected

> **Note**: Event reports can be sent by SMS and/or email even if DZMx Plus tracking is not being used.

Configuring recipients for event reports

One or more recipients for each event report can be designated using DZMx Connect.

» In DZMx Connect, go to *Contacts*

» For the selected contact, swipe the arrow to the left and click *Edit*

» Click Event Message Groups

» Tick the event reports to be sent to this contact.

Events that can optionally be sent are power up and power down, engine start/stop, take-off/landing, emergency events and exceedance events.

If both the phone number and email address are filled out for a contact, the event report will be sent by both email and SMS. If only the phone number or the email address is filled out, the event report will be sent only by SMS or email, respectively

> **Note**: If different messages are to be sent to the same contact by email and SMS, it is necessary to create duplicate contacts.

Managing the DZMx Plus Message Queue

The DZMx Plus sends position reports and other messages to the selected networks as soon as they are created. Occasionally, the DZMx Plus may lose network connection, which will cause messages to be stored in a message queue until a network connection is restored.

The Message Queue can be configured using DZMx Connect. Go to *Settings > Tracking > Queue*

> » **Queue size:** can be set up to store up to 50 messages
>
> » **Queue type:** can be set to either **Send Newest First** or **Send Oldest First**.
>
> » **Restore Unsent Msgs:** unsent messages in the queue are retained in DZMx Plus memory when it is powered down and sent when the DZMx Plus is started up again. This function can be toggled on or off. Messages older than 24 hours will not be restored.

Note: Some tracking providers are unable to cope with tracking messages that are out-of-order, so it may be required to use the Send Oldest First setting.

Automated Rescue Monitoring

Automated Rescue Monitoring (A.R.M.) also known as Automated Flight Following (AFF) is an optional automated flight monitoring system. When A.R.M. is activated, your tracking service monitors position reports from the aircraft and raises an alert when reports are overdue by a specified period, or (optionally) if the aircraft is stationary for a specified period.

Enabling A.R.M. allows for the feature to be activated when the A.R.M. key is pressed (⚠). To enable the A.R.M. function using the Controller screen go to Settings > Tracking > Automated Rescue Monitoring -> Arm Enabled.

Not all Flightcell tracking providers support A.R.M. Before activating A.R.M., contact your tracking service provider to determine if they support this function.

Note: A.R.M. can only be configured with tracking providers who support this application.

Alert Mode

Alert Mode allows users to send special alert messages in specific circumstances (e.g. Under Fire). To turn Alert Mode on with the Controller, go to *Settings > Tracking > Automated Remote Monitoring*. Toggle "*Arm Enabled*" off and "*Alert Mode Enabled*" on.

When enabled, Alert mode is activated using a long press on the Controller keypad **A.R.M.** key (⚠).

Note: A.R.M. and Alert mode cannot be enabled at the same time.

Geofence Suspend Mode

The Geofence Suspend application allows operators to suspend tracking while the aircraft remains within a set geographical radius. This enables position reports to be supressed while the aircraft is operating in a localised area, e.g. during crop dusting or Airwork operations.

Moving outside the geofence perimeter will cause geofence mode to be cancelled and normal tracking to resume. Whilst within the perimeter, periodic tracking is suspended and depending on how geofence suspend mode is configured, triggered events, such as take-offs and landings, can also suspended.

Setting the Geofence Mode

» Set the Geofence radius using:

  » DZMx Connect app. Go to *Settings > Tracking > Geofence > Geofence Settings> Geofence Radius*. Enter the Geofence radius then select **Done**.

  » Controller keypad. Go to Settings > Tracking > Geofence > Geofence Radius. Use the left ◄ key to reduce the Geofence radius and the right ► key to increase the Geofence radius. Press ENTER to save.

» Configure the Geofence Mode Using:

  » DZMx Connect app. Go to *Settings > Tracking > Geofence > Geofence Mode*. Select the Geofence Mode from the list below. When selected, select OK then select DONE.

  » Controller keypad. Go to *Settings > Tracking > Geofence > Geofence Mode*. Select the Geofence mode from the list below.

    » **Disabled** to disable the Geofence application. This will remove the geofence function from the Controller menu.

    » **Without Events** mode to suspend all tracking messages, except emergency, forms, ETM1000 and manual mark messages.

    » **With Events** mode to suspend periodic and course change tracking messages as above, but all triggered events will still be transmitted.

    » **Events on Cell Only** mode to operate as per With Events mode but with the additional cost-saving feature to only send event messages via cell modem.

Triggered event messages will be queued if the cell modem has no signal until the cell modem obtains a connection to the cell network,   or the aircraft flies out of the geofence perimeter. Refer to the DZMx Plus Operators Manual for details of how to activate a geofence.

DZMx Plus Inputs

The DZMx Plus has General Purpose Inputs (GPIs) which can be configured to trigger alerts or tracking messages during operation, or to signify some event. The DZMx Plus has five inputs by default, with another seven inputs available on the optional DZMx Plus Input Expansion Card (IEC).

An input may be used for a range of functions:

Uses include:

» Indicating an event, including, but not limited to:

  » **Engine start and engine stop** (e.g. Oil pressure switch)
  » **Take-off and landing** (e.g. Collective or Weight on Wheels switch)
  » **Release of water** from a fire-fighting tank
  » **Indicating a level**, such as the amount of water in a fire fighting tank

» Triggering an action on the DZMx Plus, for example

  » **Vary backlighting** on the DZMx Plus when controlled from an external controller
  » **PTT button** to start/stop a PTT transmission
  » **Custom button** to cancel DZMx Plus audio alerts
  » **Custom button** to turn on or off Wi-Fi and Bluetooth
  » **Custom button** to trigger a MARK tracking report

» To trigger an event report; connect to a:

  » **Collective switch** or **Weight on Wheels** (Weight on Ground) switch to generate take-off tracking messages
  » **Oil pressure switch:** To generate engine start and stop messages.
  » **Cockpit lighting control** to control DZMx Plus brightness externally from the dimmer control (only   available on input 5).
  » **Rotor brake light** to trigger a Rotor Brake On/Off report.
  » **Winch control** to trigger winch out/in report.
  » Custom key to trigger a **Mark** report.

» To trigger an action; connect to a:

  » PTT button to start/stop a IrPTT transmission.
  » Custom button to turn on or off Wi-Fi and Bluetooth.

Additional applications can be activated on the DZMx Plus which provides a large range of additional functions for the inputs including:

» Firefighting Application (see details in the DZMx Plus Aerial Firefighting Application Manual Appendix).

» TODO load app etc.

Custom Inputs can be used for custom applications in addition to those provided already provided on the DZMx Plus.

Wiring the inputs

The inputs can tolerate a voltage range of 0-28VDC, with an over/under voltage protection to ±32VDC. The inputs have two states, **Open** (high voltage) or **Closed** (low voltage).

A ground return pin is provided for the five primary GPIs (pin 11); this is 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.

Configuring the inputs

These inputs can be set up on either the DZMx Plus Control Head keypad (at *MENU > Hardware Config > Input Configuration*) or using DZMx Connect (*Settings > Inputs*). In practice, it is easier to set them up using the DZMx Plus control head as the DZMx Plus reports the status of the input in real time.

Inputs 1 to 12 can be used either as two-state or as variable inputs.

Inputs 6-12 (on the input expansion card) can only be configured as variable inputs using DZMx Connect.

> Note: If Input 5 is to be used for the cockpit dimmer control, it cannot be used for other functions.

To set up the inputs:

Using the Controller DZMx Menu:

» Go to Settings > Inputs.

» Select the function that you want to assign to an input (e.g. Takeoff Switch)

» Select **Input Designation**, then select the input which has been wired for that function or select *Not Installed*.

» A pop-up will show the current state the DZMx Plus reads from this input and the recent history (see below). The voltage that is considered On/Off can be modified from this page. Press F3 to set the High Calibration Voltage (voltage expected when signal is high), and F4 to set the Low Calibration Voltage (voltage expected when signal is low).

» If the state is wrong (e.g. DZMx Plus reports "**Collective State UP**" when it is down), go to **Input Configuration** and change the selected condition.
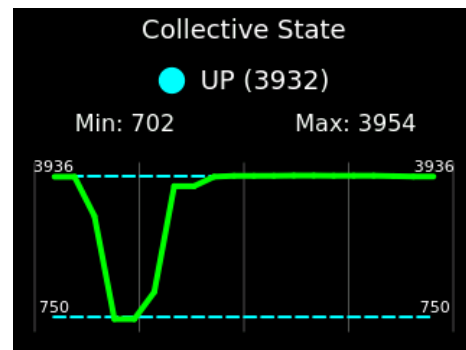
» Some inputs additionally have a field **Input Type** to change the type of that input. For example, the Takeoff Switch can be a Collective Switch or a Squat Switch (weight on wheels).

> **Note:** Some specialised input functions will only appear in the Input Configuration menu if the application (e.g. airline, firefighting or PTT) is enabled.

DZMx Plus Outputs

The DZMx Plus has two outputs, which are switches that can be used to turn an electrical signal on or off. A typical use of an output is to energise a ring alert light on the aircraft panel.

Each output has two terminals, A and B. The output consists of an isolated switch, internal to the DZMx Plus. 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). The outputs can be configured to flash or simply turn on/off.

The events that can be configured to trigger the outputs on the DZMx Plus are:

» **Off Hook:** Turned on when the operator is dialling, or in a call.

» **Incoming Call:** Alerts the operator when there is an incoming call.

» **PTT Transmitting:** A device in the talk group is transmitting.

» **Received Msg:** Alerts the operator when a text message has been received or a call has been missed.

» **Power Indicator**: Alerts the operator when the DZMx Plus is powered on.

Each event consists of three settings;

» Output Selection - [Disabled | Output 1 | Output 2]

» Output Mode - [Off | Solid | Blink]

» Pattern – Custom pattern using pattern R,D,T[,D,T]... where;

  » R is repeat count (0 = repeat until event cleared)
  » D is duty cycle (0-100)
  » T is duration (ms)
  » Multiple [,D,T] can be added to create custom blink patterns

> **Note:** the custom patterns are only used by an output when the Output Mode is set as Blink.

GPS

Configuring DZMx Plus GPS

The default setting for the GPS receiver in the DZMx Plus provides for a maximum operating altitude of 12,000 meters and a maximum ground speed of 310m/s (603 knots, or 1116 km/hr).

If the aircraft operates at high speed or high-altitude you can change the GPS settings using DZMx Connect. Go to *Settings > Preferences > GPS* and select **General Purpose, High Altitude** or **High Speed** from the dropdown box. Select **OK** followed by **DONE**.

Setting	Max Altitude (*m*)	Max Horizontal Speed (m/s; knots; km/hr)	Max Vertical Speed (m/s; knots; km/hr)
General Purpose	12,000	310; 603; 1116	50; 97; 180
High Altitude	50,000	250; 486; 900	100; 184; 360
High Speed	50,000	500; 972; 1800	100; 184; 360

Exporting GPS Data

The DZMx Plus can stream NMEA data from its internal GPS system to an external device (such as a Flightcell SmartHUB) as UDP over its data connection.

To activate, in DZMx Connect, go to *Settings > Preferences > GPS* and turn on GPS Agent.

The destination IP address and port can be configured if required.

The default setting is IP address 192.168.4.255, port 3131.

GPS Logging Rate

The GPS logging rate can be set at 1 Hz or 4 HZ. This is the internal logging rate and external logging rate.

Activate in DZMx Connect. Go to Settings > Preferences > GPS > GNSS Logging Rate

Configuring DZMx Plus Data

Enabling Cellular Data

To enable or disable cellular data:

DZMx Connect
Settings > Modems > Modem 1 (or 2) > Enable Data

Controller DZMx Menu
Settings > Modems > Cellular (Slot 4 or 5)

If the DZMx Plus has one cell modem, this will be designated Modem 2. If dual cell modems are installed, these will be Modem 1 and Modem 2.

> Note: Data roaming can incur significant charges

Setting the Access Point Name (APN)

The APN setting must be configured and correct to establish a connection to LTE networks. The Access Point Name (APN) is the name your cellular modem uses to set up a connection to the gateway between your carrier's cellular network and the public Internet. The APN you need to specify will depend on the cellular network service provider. The APN is usually published on the service provider's web site.

DZMx Connect
Settings > Modems > Modem 1 (or 2) > APN

DZMx Plus Data Logging

The DZMx Plus provides several data logging functions.

GPS Data Logging

The DZMx Plus logs GPS data at one second intervals, including aircraft position, speed, heading and altitude, and GPS quality metrics. Logging rate can be set to 1HZ or 4Hz, refer to Configuring GPS section.

Cellular Network Data Logging

The DZMx Plus logs network parameters for the cellular network, along with aircraft position, altitude, speed and heading. An optional speed test can also be activated, which records uplink and downlink speeds at programmed intervals.

> Note: The DZMx speed test uses a significant amount of data so should only be used when necessary to gather link bandwidth data.

Transmitting Log Data

The DZMx Plus can automatically transmit log data using the DZMx Plus Email Outbox feature.

Using DZMx Connect, go to *Settings > Preferences > Logging Email Reporting* to specify which logs are transmitted and to activate automatic emailing of the logs.

DZMx Plus Email Outbox

The DZMx Plus can transmit data logs via email. To do this, the email outbox must be configured.

Using DZMx Connect go to *Settings > Preferences > Outgoing Email Account*.

Enter the following settings: (these can be for an existing email account, or you can set up an email account):

>> Email SMTP Server.

>> Email SMTP email Login.

>> Email SMTP Password.

>> Email SMTP Port.

An example of these settings using a Gmail account for sending the data, and an in-house account as the destination is shown to the right.

Next, configure the DZMx Plus to transmit the data:

>> Go to *Settings > Preferences > Logging Email Reporting*

>> Enter the destination email address

>> Select what data is to be emailed

>> Toggle *Logging Send Email Data Automatically* on if you want the data to be sent automatically. If selected, the DZMx Plus will send the data for each flight when it is next powered on.

DZMx Plus Flight Data Recorder

The DZMx Plus has an inbuilt flight data recording function that includes an inertial measurement unit and barometric pressure sensor. The output from these sensors is logged at one second intervals.

The following raw sensor data is logged:

>> Angular rotation in all 3 axes (radians per second, relative to the DZMx Plus).

» Acceleration in all 3 axes (G force, relative to the DZMx Plus).

The inertial data is fused and logged to provide:

» Airframe pitch (degrees).

» Airframe roll (degrees).

» Pressure (millibars).

» Pressure altitude (reference to 1013.25 millibars).

Disclaimer

The Flight Data Recording system in the DZMx Plus uses a six degree of freedom sensor fusion technique and thus all pitch and roll values output are a best estimate based on measured angular rate (prone to drift) and estimated gravity vector (which can be distorted by accelerations). This must not be used for navigational or control purposes.

Setting up the Flight Data Recorder

The DZMx Plus flight recorder must be calibrated for the orientation of the DZMx Plus to provide a baseline for measures of pitch and roll.

The baseline is set based on the aircraft orientation on the ground.

The DZMx Plus factory setting has zero offsets. To set it's Mounting Offsets:

» Install the DZMx Plus in its final location

» Using DZMx Connect go to *Flight > Flight Icon*

» Note down the pitch and roll shown on the artificial horizon (AH) gauge

» If the DZMx Plus is installed at an angle to the longitudinal axis of the aircraft, estimate the offset in degrees

» Click on the gear icon on the top right

» Enter the following (in degrees)

    » Pitch recorded from the AH

    » Roll recorded from the AH

    » Estimated yaw.

» Click *Enter* to confirm the orientation on the flight display. The AH should now show zero pitch or roll.

> **Note:** If the DZMx Plus is not aligned to any of the aircraft axes, data readings will be incorrect unless this step is performed at installation.

Transmitting flight exceedances

The DZMx Flight Data system can detect and transmit flight exceedances:

- » Rapid ascent and descent

- » Excess G Force

- » Excess turn rate

- » Excess pitch change.

To set up transmission of flight exceedances:

- » Go to Settings > Tracking > Flight Monitor Settings

- » Select which exceedances to transmit

- » Set the exceedance threshold for each

- » Enter the email address for exceedance reports

- » Select if the exceedance reports are to be sent

  - » Via email the nominated email address, and/or
  - » To your tracking service provider attached to a position report.

Accessing DZMx Plus Flight Data

This data can be accessed by the user in several ways:

- » Using DZMx Connect to view the data live.

- » Using DZMx Connect to download the data for a given flight. Go to *Flight > Flight Icon > Folder Icon*

- » Using Flightcell International's DZMx Plus Application Programming Interface (API) the data can be accessed and incorporated into a third-party application.

- » Emailed automatically using the DZMx Plus email outbox.

Recording and Transmitting Maintenance Data

The DZMx Plus supports maintenance timers (also known as a Hobbs Meter). The DZMx Plus can record and transmit the following:

» **TTAF** (Total Airframe Flight Time (hrs)). This records all flight time in hours and tenths of hours. The aircraft airframe hours are entered on installation, and this is incremented during every flight.

> Note: The starting TTAF value can only be done once so it is important to set it correctly. A pin number or Hobbs password is required from Flightcell to change the flight hours after the initial set up.

» **DFT** (Daily Flight Time) This is a continuous timer that records flight time in hours and tenths of hours. It must be manually resent and can be reset daily or reset periodically to allow the user to measure a flight or sequence of flights.

» **Trip** (Trip time (hh:mm)) This is an hour and minute timer that resets every flight. It can also be reset mid-flight to record certain operations or flight legs.

» **Lands** (Landings)

» **Starts** (Engine Starts)

» **Check Due –** to record hours since the last maintenance check and alert when the next check is due.

Maintenance data can be accessed on the DZMx Plus, and can be sent automatically to the tracking service, and emailed automatically to an address configured on the DZMx Plus.

The destination address for the maintenance data can be set in DZMx Connect. Go to *Settings > Preferences > Hobbs and Maintenance* to enter the maintenance email address and second maintenance address.

The maintenance data can be accessed on the DZMx Plus. Go to *Flight > Flight Timers*.

DZMx Connect
Go to Flight > Flight Timers
Controller DZMx Menu
Select Hobbs ⏱ Timers

Daily Flight Reporting

DFT can be manually reset either each day, or at the end of a series of flights. It is not possible to reset any timers our counters while the aircraft is in flight.

The landing and start counters are reset automatically when the DFT is reset; they cannot be reset individually.

On DZMx Connect go to Flight > Flight Timers > Reset

If a maintenance email address is specified, a maintenance email (or emails) will be sent automatically before the counters are reset.

Check Due Counter

The DZMx Plus can record hours since the last maintenance check and advise when a check is due.

This can be configured in DZMx Connect by going to *Settings > Preferences > Hobbs and Maintenance.* Here you can set:

» Hours till next check

» Check due warning – hours advance warning that a check is due.

The DZMx Plus maintains an 'hours since last check' timer and subtracts it from the *Check Due* hours and displays the result as *Check Due* on the DZMx Connect *Flight Timers* page.

The DZMx Plus will add new flight hours to the 'hours since last check' timer while in flight, resulting in the displayed *Check Due* counter decrementing when in flight.

If the hours since last check exceed the *Check Due* hours setting, then the *Check Due* will change to *Check Overdue* along with a negative value on the **Timers** menu on DZMx Connect.

To set the 'hours since last check' counter

» Using the DZMx Plus Controller, select *Check Due,* then enter the number of hours flown since the last check. Hold down the +/0 key to enter part hours to one decimal place.

» Using DZMx Connect, go to *Flight > Flight Timer > Check Due > Set* and enter the hours since last check, then *SUBMIT*.

Content of a Maintenance Email

The data is emailed to the tracking provider. Two email Maintenance email addresses can be nominated.

The subject line of the maintenance email will be: ***DZMx Plus Maintenance Report from <serial number>***

The maintenance email will contain the following text:

DZMx Maintenance Report

- Report Date: Wed, 02 Sep 2020 01:37:16 UTC
- Serial Number: E09111961

Total Airframe Hours	3650.0
Daily Flight Time	0.2
Daily Engine Starts	2
Daily Landings	3

» The **TTAF** and daily flight timers are sent in the take-off message to the tracking provider.

» The **TTAF, DFT, Trip, Lands** and **Starts** are sent in the landing message to the tracking provider

» The **Trip** counter is not included in the email since this is automatically reset on every flight.

Maintenance Email Attached Data File

Attached to the maintenance email will be a JSON formatted file which will contain all the maintenance data. The data in the attachment will be as follows:

```
{
  "report_type":"dzmx_maintenance",
  "report_created":"Wed, 02 Sep 2020 01:37:16 UTC",
  "dzmx_details":{
   "serial_number":"E09111961",
   "firmware_version":"dzmx-3.5.1r799",
   "aircraft_reg":"ZK-QFC"
  },
  "maintenance data":{
   "TTAF":3650.0,
   "DFT":0.2,
   "daily_engine_starts":2,
   "daily_landings":3

   }
}
```

Configuring the DZMx Plus for maintenance reporting

Prerequisites:

» The **Outgoing Email Account Settings** must be set up first for the Maintenance email to be transmitted,

» **Tracking** must be enabled and either a take-off or a take-off speed must be configured for Hobbs and maintenance email data to be included in landing and take-off messages,

» An **Oil Pressure Input** must be configured for engine starts to be counted and visible in the **Timer** page,

» A **Take-Off Input** or a **Take-Off Speed** must be configured for landings to be counted and visible on the **Timer** page.

» The **Maintenance Email Address** and/or 2nd Maintenance Address must be set for a maintenance email to be sent. To setup using DZMx Connect go to **Settings > Preferences > Hobbs and Maintenance**

» The **Check Due Hours** setting must be set and the **Check Due Warning Hours** must be set to see a check due warning pop-up message.

Configuring Maintenance Data Using DZMx Connect

Maintenance data to be sent can be selected by both the Installer and the Operator using DZMx Connect. The maintenance email is sent automatically when the daily timers are reset.

Using DZMx Connect go to *Settings > Preferences > Hobbs and Maintenance* to modify the following settings:

- » **Count Engine Starts:** (This can be toggled on/off)
- » **Count Landings:** (This can be toggled on/off)
- » **Check Due Hours:** (Min 1, Max 10000): Enter the Flight Hours.
- » **Check Due Warning Hrs:** (Min 0, Max 10): Adjust using the scroll bar or type in the number of hours.
- » **Send in Tracking Msg:** (This can be toggled on/off) If this is toggled off none of the counters or timers will appear in the landing message sent to the tracking provider.
- » **Maintenance Email Address:** This can be a different email address to what was set up in the DZMx Plus Outbox.
- » **2nd Email Address:** This is an additional email setting to allow for a second maintenance email to be sent.

Forms

Forms is a feature developed to aid operators to collect data and analyse flight trends. Forms can be used to enter and report operational data. Data can be entered into forms on the DZMx Plus keypad or on DZMx Connect.

Form design and modification requires installer privileges. Only New Data and View Data options are visible to Operators.

Forms are created and configured using DZMx Connect.

Manage Forms Using DZMx Connect

To Create a Form

Up to 25 user-defined form templates can be created. A maximum of 50 recorded data entry lines can be recorded in this file. Older ones will drop off the end and are not written to the file.

To create a form on DZMx Connect, go to *Forms*, click on the "**+**" icon, and enter a name for the form. Click **SUBMIT** to create the form template.

> **Note:** The form name is limited to 25 characters.

The *General* page provides the following prompt options:

- » Transmission Options

  - » *Include Position* – Toggle On or Off. Includes speed and altitude when sent.
  - » *Report to Tracking Provider* – Toggle On or Off

- » *Email Address* – data can be sent to an email address via cellular

- » Form Triggers

» Form prompt – options are No Prompt, On Start-up, On Landing and Flight Timer.

» Flight Time prompted forms will prompt after the given number of hours specified from when the form was enabled. After a Flight Time prompted form has been filled in, the next prompt will occur at the number of hours specified since the prompt trigger time (i.e. not the time since the form was filled in).

The *Fields* page is used to create data entry fields in the form:

» Select the "**+**" symbol.

» A *Form Editor* window will open.

» Enter a unique *Field Name* **>** select whether the field must be entered (*Mandatory*) or does not have to be completed *(Optional)*. If Mandatory is selected the form cannot be completed unless all the mandatory fields are filled in.

» Type: Select the response e.g. *On/Off, Yes/No, Number or Text*.

> **Note:** The *Number* and *Text* fields have a maximum length of 25 characters.

Enter, view, edit or delete data

Go to *FORMS* > *Available Forms*. Select the required form.

Sliding left will expose the following options:

» **New Data** -This option will only be available if the form has been enabled and allows the user to fill in a form entry.

» **View Data** – shows any form data

» **Edit** – Edit the form template

» **Delete** – Removes the template and any associated data.

To view, export or delete data

» Go to **View Data**.

» A specific entry can be viewed in detail by clicking on it.

» The complete form data can be downloaded using the download button ⬇ located at the top right of the title bar. Data is downloaded to the downloads file on a PC, or to a selected destination on a smart device.

» The form data can be deleted using the delete button located at the top right of the title bar.

Enable/Disable specific form(s)

The tick box ☑ to the left of the form name allows the installer to enable/disable the form. A tick indicates the form is enabled.

Disabling a form will cancel any active trigger on that form. It will also cause the flight hours to reset to 0 for that form if the trigger type is set to Flight Time. Flight time will only start to accrue for the form when it is re-enabled.

Forms Controller Interface

This section describes what forms application functions are available and configurable using the Controller main screen.

The Forms List

To see which forms are available select Forms in the menu list on the Controller. If there are no form templates Forms will not appear in the menu list.

Disabled Forms

By default, the forms list will show only enabled forms. Select Disabled Forms (F2) to view any disabled forms. An operator cannot fill in a disabled form and disabled forms will never be triggered. To enable the form on the Controller go to Forms > Disabled Forms (F2) > (select the disabled form) > Enable Form (F4)

Triggered Forms

Forms in the forms list prefixed with an alert icon (ⓘ) have been triggered and the icon indicates that the form is due to be filled in. The time between triggering a new prompt to complete a new form is between 0 (Disabled) and 1200 minutes. The icon will disappear once the form has been completed.

Filling a Form

- » Go to Forms. The number of forms in the list is displayed at the top of the screen.

- » If a form has been triggered by an event (e.g. Start-up or flight time), the DZMx will beep and display the Form Field list. The name of the triggered form be highlighted and appear at the top of the list.

- » Press ENTER to access the field entry screen. Form fields will be one of the following types:
  - » No/Yes
  - » On/Off
  - » Number
  - » Text

- » Select Submit Form (F1) to save the entry. The form will transmit to the email recipients as per the template settings.

- » The screen will return to the list of forms and the cursor will highlight the next form in the list to be completed.

Incomplete Forms

If a form has not been completed the data entered will remain and can be completed later. If however, the unit is powered off the data will be lost.

Form Entry Required

When a form requires completion, Form Entry Required will be displayed on the top of the Controller main screen. It is not possible to complete a form if any mandatory fields have not been filled in. Go to the forms screen to fill the forms out.

If the DZMx is powered off before an actively prompted form has been completed the form will appear on the screen when the DZMx is next powered on.

Clear Form

To remove data from a Form Entry field prior to selecting Form Complete.

>> Press Clear Form (F2) while on the Form Entry screen.

>> "Form Cleared" will appear on the screen.

Form List Sub-menu

To access the Forms sub menu go to *Forms > (highlight the form) > Settings (F1)*.

The following form editing options are available in the sub menu:

Sub Menu	Operator	Installer
Form Configuration	x	x
Form Enabled	x	x
Export Form History	x	x
Delete Form History		x

Form Configuration

Selecting *Form Configuration* will show the following settings (This is a view only screen, the displayed information cannot be edited):

>> Report to Track Provider: Yes/No

>> Email:<email address >

>> Include Position: Yes/No

>> Prompt Trigger: <trigger type > e.g. On Landing

Form Enabled

Select **Form Enabled** > Confirm by selecting either **No** or **Yes**

Note: Disabling a form will cancel any active trigger on that form. It will also cause the flight hours to reset to 0 for that form. If the trigger type is set to Flight Time. Flight time will only start to accrue for the form when it is re-enabled.

Export Form History

Exports the data for the selected form to a USB stick. If no USB stick is inserted or if there is no data to export a *Form error USB error* message will appear.

Delete Form History

All data records that have been recorded for the selected form can be deleted.

Select *Delete Form History* > Confirm by selecting either *No* or *Yes*.

Section 7: DZMx Plus Applications

Flightcell has developed specialised applications on the DZMx Plus to support specific types of operation.

DZMx Plus Applications and Licences

Some DZMx Plus applications require a licence to be activated. If the licence has been purchased with the DZMx Plus, then the application will be activated before delivery. If the licence is required after delivery of the DZMx Plus, the application licences can be installed using DZMx Connect.

To purchase an application licence, contact Flightcell at info@flightcell.com.We will send you a licence file.

To load the licence file:

- » Open DZMx Connect and enter the installer password.

- » Go to *About*; this will show a list of licences currently installed on the DZMx Plus.

- » Click on **UPLOAD LICENSE** and follow the prompts.

- » Restart the DZMx Plus.

DZMx Plus Applications

These following licensed applications are described in this manual:

- » Iridium Push-To-Talk (PTT).

- » Firefighting application.

- » Iridium Certus.

- » Software Defined Receiver – for ADSB-in, AIS, ATIS, UAT, FM Radio

For information on the following applications, contact Flightcell International at info@flightcell.com

- » Dropbox file transfer application.

- » SBD mailbox application.

- » Airline application.

- » Agriculture application.

- » Loadcell application.

Section 8: Maintenance, Diagnostics and Support

DZMx Plus Firmware Upgrades

Flightcell regularly releases firmware upgrades to provide new features, enhancements to existing features and bug fixes.

Flightcell does not recommend downgrading firmware versions.

The duration of the upgrade will vary and is dependent on the previous firmware version installed. It will take between 5 and 40 minutes to complete.

The DZMx Plus must remain connected to a power supply at all times.

A firmware upgrade can be carried out in two ways:

- » Using DZMx Plus USB port upgrade method.

- » Using DZMx Connect upgrade method.

If using the USB upgrade method, download the firmware directly from www.flightcell.com/support/firmware and save it to a USB memory stick.

If using DZMx Connect upgrade method, download the firmware directly from www.flightcell.com/support/firmware and save it to the PC or laptop hard drive.

Ensure the aircraft is on ground power or there is enough battery power to run the DZMx Plus for at least 1 hour (DZMx Plus draws approximately 1A at 28VDC).

To perform the upgrade:

Using the DZMx Plus USB port:

- » Insert the USB memory stick into the DZMx Plus USB port.

- » On the Controller, go to *Maintenance > Enable Installer mode,* enter the installer password and press *Enter*

- » Go to *Maintenance > DZMx USB Upgrade*

- » Follow the prompts on the Controller display.

Using DZMx Connect:

- » Open DZMx Connect on a connected laptop or PC

- » Go to *About*

- » Select *Upgrade* and browse to the saved firmware file.

» Select *Upload* and wait for the firmware file to upload to the DZMx Plus. Once the file has been fully uploaded the upgrade process will start automatically. The display and keyboard may alternatively flash on and off during this period, and the DZMx Plus will reboot.

Controller Firmware Upgrades

Controller firmware can be upgraded from Controller Connect.

Using Controller Connect:

» Open Controller Connect on a connected laptop or PC

» Login as an Installer

» Go to *About*

» Select *Upgrade*

» Drag and drop or browse for a firmware file upload

» Select *Upload* and wait for the firmware file to upload to the DZMx Plus. Once the file has been fully uploaded the upgrade process will start automatically.

Using DZMx Connect

The DZMx Plus provides the capability to upgrade the software packages of connected controllers via DZMxConnect. This feature enables installers to upgrade multiple controllers simultaneously, thereby eliminating the necessity of accessing each controller individually for manual upgrades. Furthermore, installers can monitor the upload and upgrade status, which includes corresponding progress percentages for each operation

Controller Connection Status

On DZMxConnect under Remote Devices, installers can access a detailed inventory of connected Controllers and their connection status; **Connected** or **Disconnected**. This page also provides the following information for each connected Controller:

» Serial number

» IP Address

» Firmware version
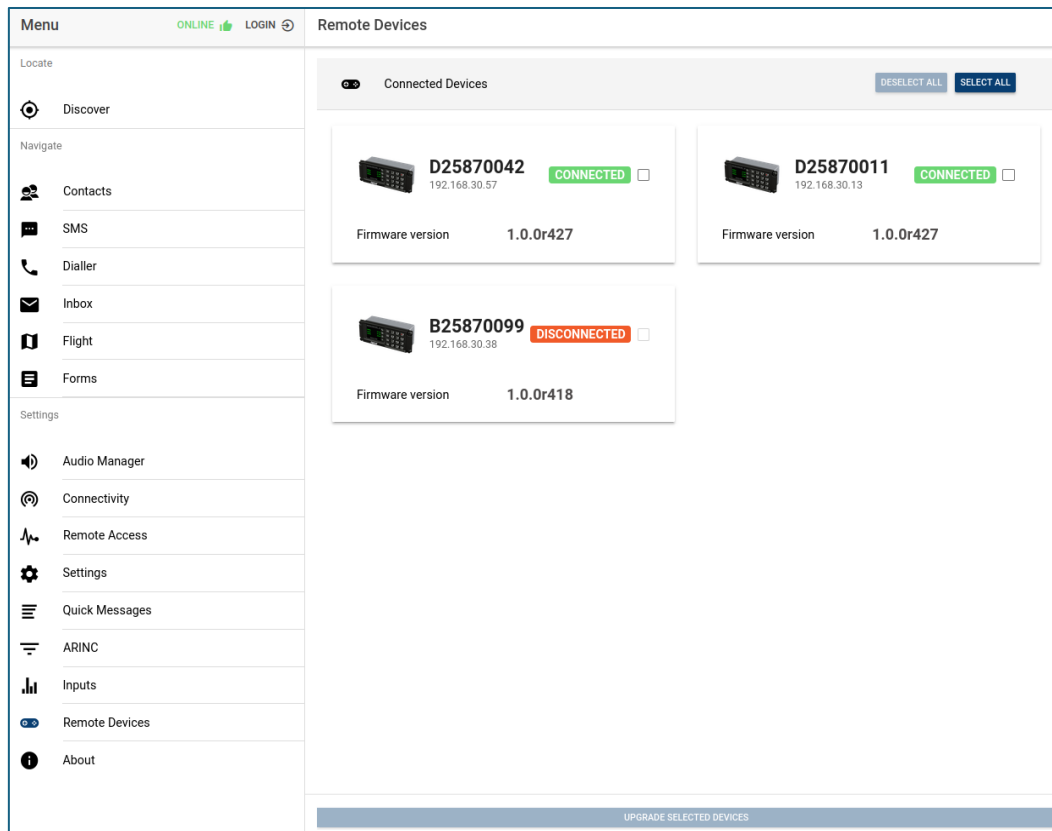
Controller Remote Upgrade

To initiate a remote upgrade of the controller, the first step is to obtain the software package that corresponds to the version you are targeting.

To initiate the upgrade, please follow these steps:

1. Select devices to upgrade
   a) "Select All" to select all devices in the list with "Connected" state
   b) Toggle to select/deselect the checkbox of the device, e.g:

2. Click "Upgrade Selected Device"

3. To select the software package, you can either click "Browse" to open the file explorer or simply "Drag and Drop" the file into the designated drop area below.

4. Click on "Start Upgrade." To proceed with the upload, confirm by selecting "Yes"; if you wish to cancel, choose "No". Once the upload begins, a progress bar will display the percentage of the file being transferred to the device, accompanied by a status message that reads "Uploading."

Note: Users can cancel the upload at any time by clicking the "Cancel Upload" button. However, once the upload is complete, it is no longer possible to cancel the operation.

Remote Devices

Connected Devices

2 Selected DESELECT ALL SELECT ALL

D25870042 CONNECTED ☑
192.168.30.57

Firmware version   1.0.0r427

D25870011 CONNECTED ☑
192.168.30.13

Firmware version   1.0.0r427

B25870099 DISCONNECTED ☐
192.168.30.38

Firmware version   1.0.0r418

UPGRADE SELECTED DEVICES

Remote Devices

Connected Devices

DESELECT ALL SELECT ALL

☁ Uploading Firmware   controller-1.0.0r427-upgrade.swu

45%

D25870011 UPLOADING
192.168.30.13

Firmware version   1.0.0r418

D25870042 UPLOADING
192.168.30.57

Firmware version   1.0.0r418

B25870099 DISCONNECTED
192.168.30.38

Firmware version   1.0.0r418

CANCEL UPLOAD

5. Once the file has finished uploading to the selected device, the upgrade operation will commence. A loading progress bar will appear, indicating the "Upgrading" status as the controller executes the upgrade process.
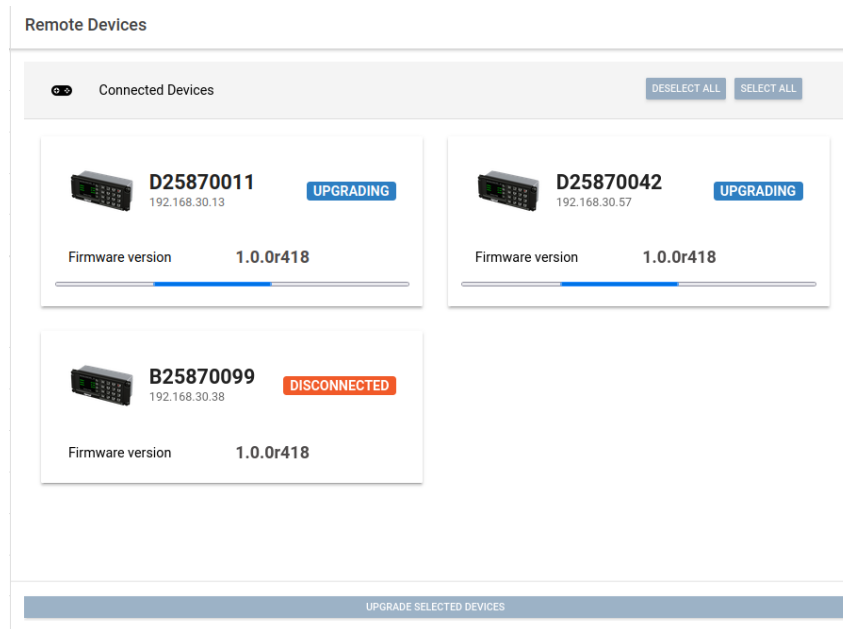
6. Once the controller initiates the upgrade operation, the loading bar transforms into a percentage bar that accurately reflects the upgrade status for each controller.

7. Once the upgrade operation is complete, the devices will temporarily disconnect from DZMx and display a "Disconnected" status. The controller will then carry out the final upgrade, which may take some time before the controller returns to the "Connected" state.

8. Upon successfully completing the upgrade process, the device will reconnect to the DZMx and display a "Connected" status. Additionally, it will indicate the latest firmware version to which it has just been upgraded.
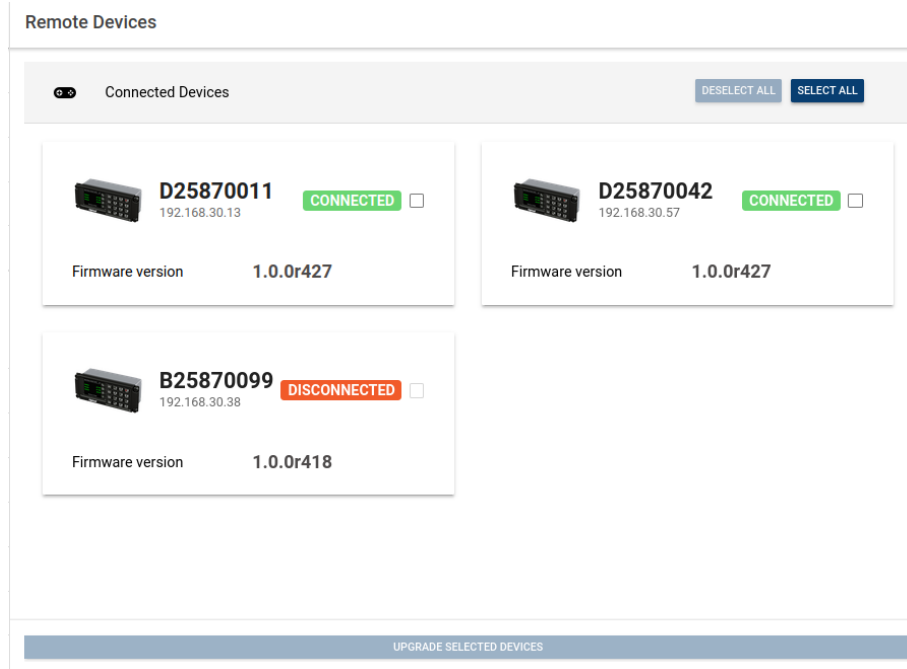
Exporting Diagnostic Log Files

The DZMx Plus maintains diagnostic log files, capturing key information on system performance.

DZMx Plus log files can be downloaded on DZMx Connect. Go to **About**, click on the bar graph icon on the top right corner, then click **Device Logs** and finally click **DOWNLOAD ALL (ZIP)**.

The Controller also maintains its own diagnostic log files.

Controller log files can be downloaded on Controller Connect. Go to **About** and find the **Logs** section. Click on **DOWNLOAD ALL (ZIP)**.

The ZIP file should be forwarded to Flightcell Support (tech@flightcell.com), with a description of the fault/ issue.

Flightcell Controller Maintenance Screens

The Flightcell Controller maintenance menu contains several functions for the maintenance of the DZMx Plus. It contains options for Diagnostics, Remote Assistance, Emailing Logs, Deleting Queued Messages, and Enabling Installer Mode.

Enabling installer mode provides access to the following additional options: DZMx USB Upgrade, Configure Main Menu and Change Installer Password.
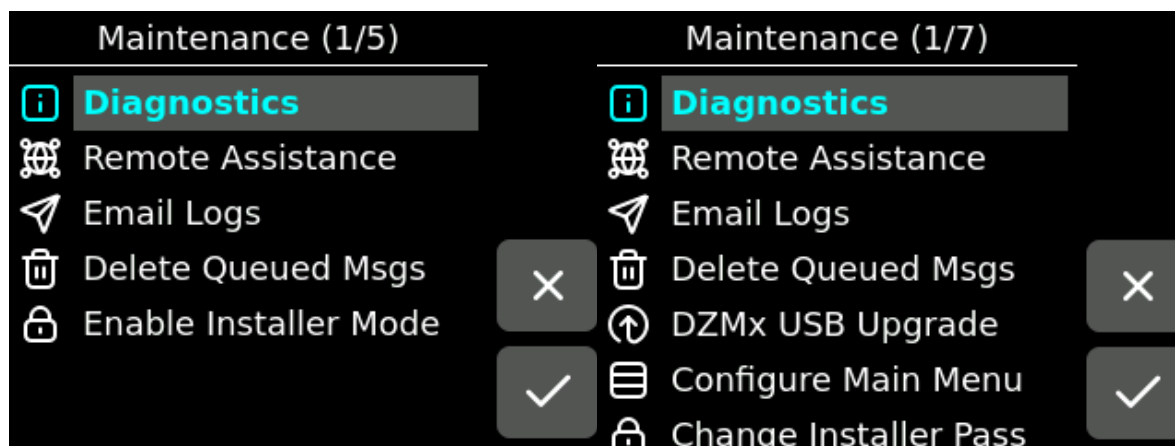
Diagnostics

The diagnostics screens contain information about the DZMx Plus. The left and right arrows switch the diagnostic screen displayed. The up and down arrows allow for seeing more information on each diagnostic screen. The different diagnostic screens are as follows:

» **DZMx Details** – Contains the DZMx Plus firmware version, serial number, IP addresses and whether the audio is valid.

» **GPS Diagnostics** – Contains information on the GPS connection.

» **MPU Diagnostics** – Contains information on the motion of the aircraft from the Motion Processing Unit.

» **Modem Details** – Contains the IMEI and network status of the modem. There is a different diagnostic screen for each modem (e.g. satellite, cellular, Certus).

» **Connectivity Diagnostics** – Contains information on the status of the Bluetooth and Wi-Fi connections.

» **Input Diagnostics** – Contains diagnostics on the current status of the DZMx General Purpose Inputs. Pressing ENTER on this screen brings up a real-time graph of the input level and allows for calibration of the high and low levels.

Remote Assistance

Flightcell Remote Assistance allows Flightcell support staff to diagnose issues remotely by connecting to a DZMx Plus using a secure encrypted VPN. This requires either a cellular data connection or a wired Ethernet connection. It can be done on the ground or in-flight. There are three steps involved:

Remote Assistance Setup

Remote Assistance must be set up on the DZMx Plus before it can be used. This is a one-off configuration step and will never need to be repeated.

To set up a connection:

» Request a password from Flightcell International Support (tech@flightcell.com). You will need to provide the serial number of the DZMx Plus.

» Using the Controller go to Maintenance > Remote Assistance > Setup Connection or using DZMx Connect go to Remote Access.

» Enter the password provided by Flightcell and press enter.

> **Note:** If the DZMx connection has been set up previously, the **Setup a Connection** option will not be displayed and instead you will have three menu options: **Connect VPN**, **Reset Connection** and **Enable at Start up**. In this instance go direct to step 2 **"Establish a VPN Connection".**

Controlling the VPN

The VPN provides a secure connection between the DZMx Plus and Flightcell support team. The support staff will receive a notification and they will be able to remotely access the DZMx Plus.

The DZMx Plus will operate normally throughout this process.

To start the VPN connection:

» Using the Controller go to *Maintenance > Remote Assistance > Connect VPN* and press *enter*, or go to DZMx Connect, select *Remote Access* and toggle Connect to *ON*.

To stop the VPN connection:

» Using the Controller go to *Maintenance > Remote Assistance > Disconnect VPN* and press *enter*, or go to DZMx Connect, select *Remote Access* and toggle Connect to *OFF*.

Other Menu Options

» **Reset Connection** – This menu option resets and updates the Remote Assistance connection and you will typically be directed to do this by Flightcell Support.

» **Enable at Start-up** – This menu option forces the DZMx Plus to automatically establish a VPN Remote Assistance connection on start-up. This feature is useful for long-term monitoring and diagnosis.

Email Logs

This allows for sending logs from the DZMx Plus to an installer-defined email account. This would normally be done as part of support when diagnosing issues. The following options are available:

» Flight Logs
» Settings File
» Log Files

Delete Queued Msgs

This maintenance option allows operators and installers to delete queued tracking messages, SMS text messages and emails.

Enable Installer Mode

This maintenance option enables installer mode to provide access to the extended settings and DZMx Plus functions.

DZMx USB Upgrade

This maintenance option allows installers to kick off a firmware upgrade on the DZMx Plus when a USB stick with DZMx Plus firmware is plugged into the USB port.

Configure Main Menu

This maintenance option allows installers to reorder and/or hide main screen functions. This allows aircraft operators optimise what functions are available for easy access for aircraft crew, and hide unused functions.

Change Installer Pass

This maintenance options allows installers to change the installer password.

Exporting & Importing Controller Configurations

The Controller supports importing and exporting Controller configuration files. The currently support Controller configuration files are:

  » Controller Settings (settings.tsv)
  » Main Menu Layout Settings (carousel.json)

Exporting Config Files

The configuration files can be exported from Controller Connect in the settings tab:
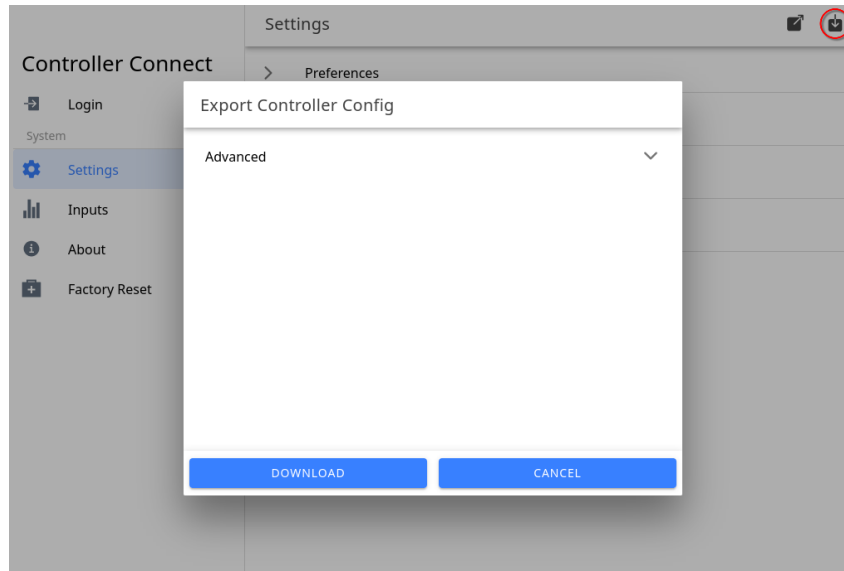
Individual files can be selected or unselected for download using the "Advanced" option (all files are selected by default):
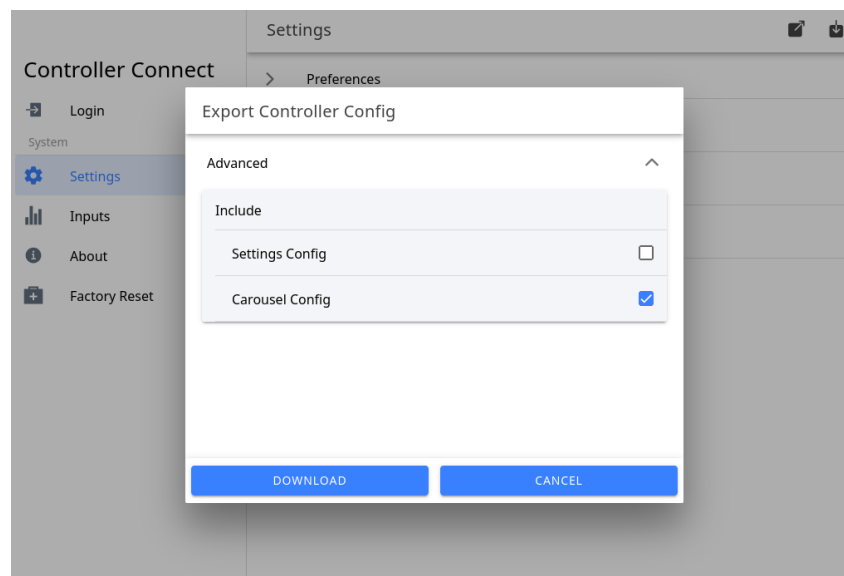
Clicking **DOWNLOAD** will download a zip file containing all the selected configuration files:
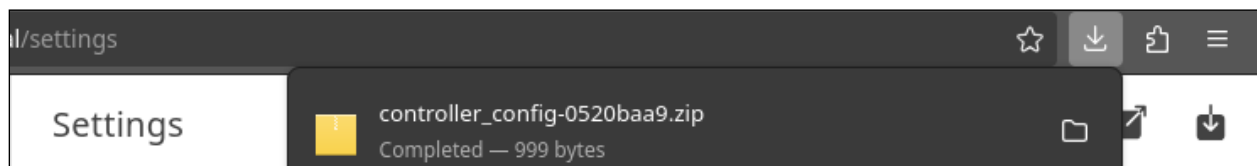
The zip file name will be in the format "controller_config-MD5SUM", where the MD5SUM is first 32bits of the md5 sum of the entire zip file. This is a useful check to ensure the configuration file is not corrupted as it is copied between storage devices.

> **Note:** any manual modifications to the configuration files will invalidate the md5 sum value.

Importing Config Files

The configuration files can be imported from Controller Connect in the settings tab:
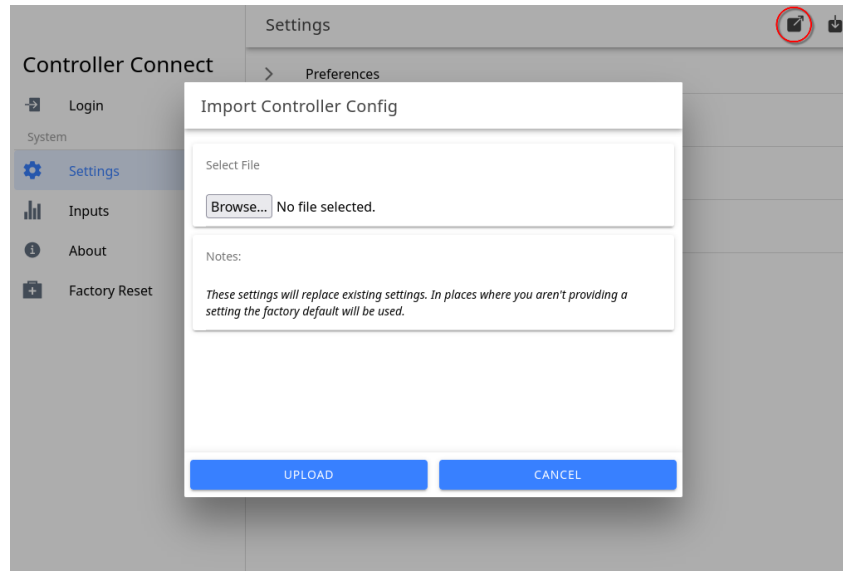
After the import is successful, the md5 sum of the supplied configuration file will be displayed. All files will be validated on the Controller before they are applied to the system. Any detected errors will abort the import and display an error. E.g.:
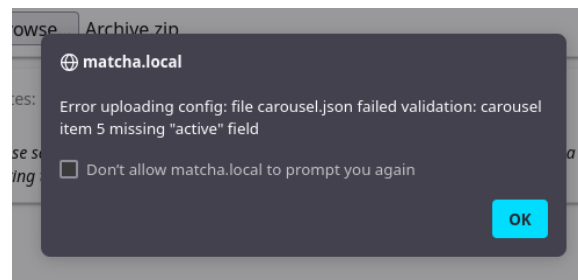
Controller Factory Reset

The controller can be factory reset with Controller Connect in the Factory Reset tab, as shown below. After a factory reset the controller should be back online within two minutes.

Controller Connect

Login

System

⚙ Settings

📊 Inputs

ℹ About

➕ Factory Reset

Factory Reset

Factory Reset

Factory reset will reset all user settings to factory defaults

FACTORY RESET
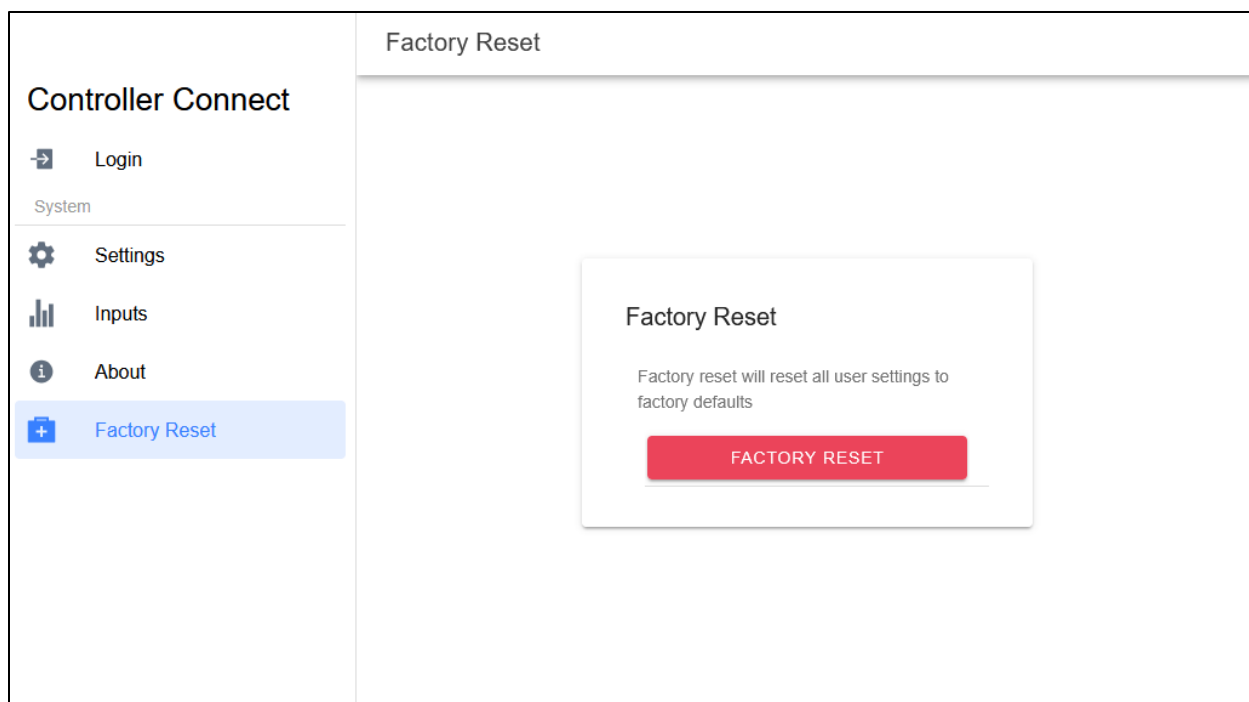
Inspections/Continued Airworthiness/Maintenance

Periodic maintenance of the Flightcell DZMx Plus and Flightcell Controller is not required and is "on condition" only. Instructions for Continued Airworthiness (ICA) are not required per 14 CFR Part 21 for these products as they have not received FAA approval or endorsement. Flightcell recommends the DZMx Plus and Flightcell Controller be inspected for proper operation, secure attachment, integrity of connectors and wiring, and any evidence of damage including the external antennas as part of the required annual or periodic aircraft inspection.

The Flightcell DZMx Plus and Flightcell Controller do not contain batteries.

Flightcell does recommend that an annual check be carried out on the inertial measurement unit for correct post installation calibration with the aircraft on the ground and referenced to the aircraft A/H.

Refer to DZMx Plus Installation Manual, Flight Data Recorder – Setting up the Flight Data Recorder section.

Controller Failure Modes
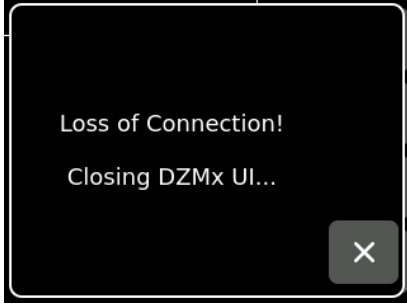
This appendix aims to outline the various failure modes of the DZMx Plus and Controller. This appendix should only be used as a reference, as failure messages and codes are subject to change between variants and firmware versions.

Controller Fault Icons
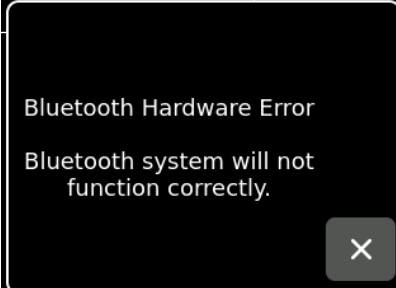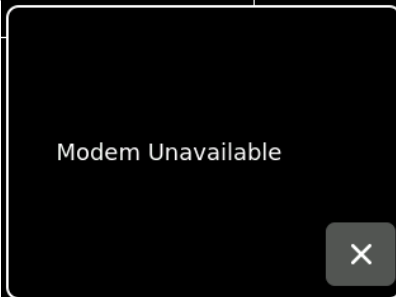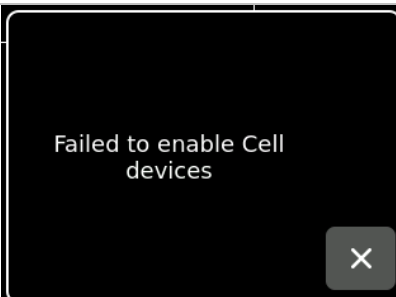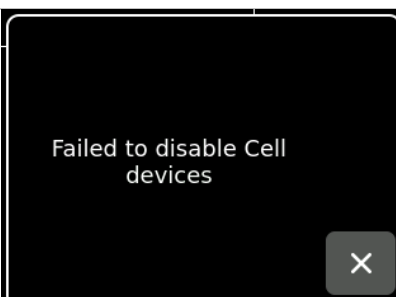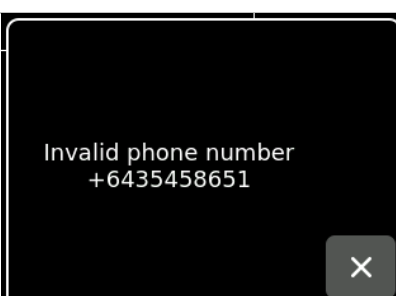
The following icons are displayed in the top right corner of the Controller when the fault is detected:
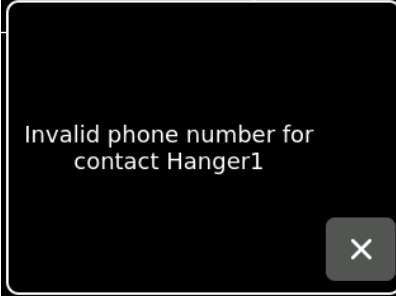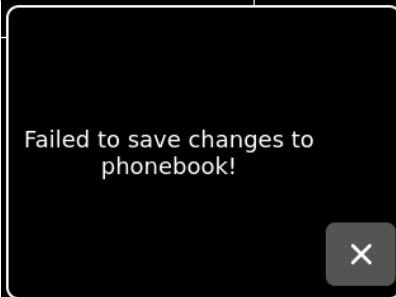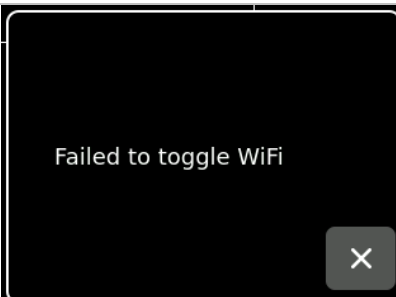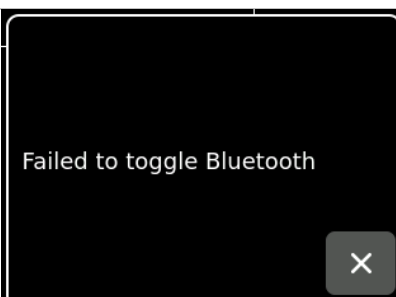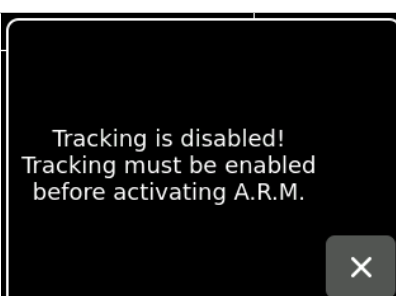
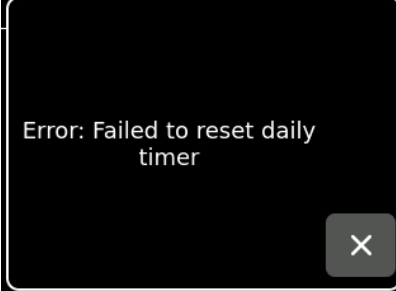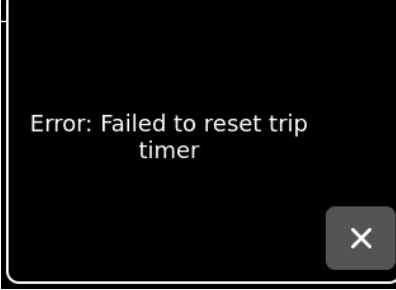| Icon	Description
⚠	Bluetooth hardware fault detected
⚠	Audio hardware fault detected
⚓	Automatic Water Tank Controller (AWTC) connected and communicating with the DZMx Plus
⚠	Controller has lost connection to the DZMx Plus
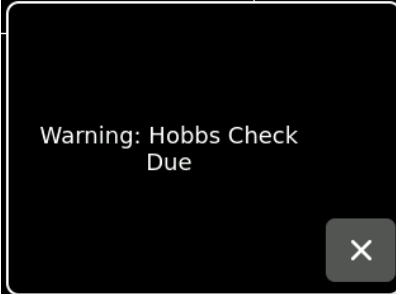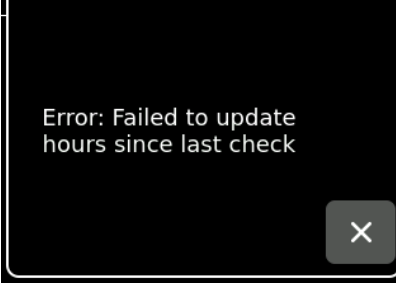
Controller Fault Popups
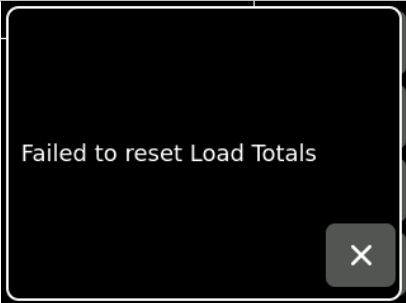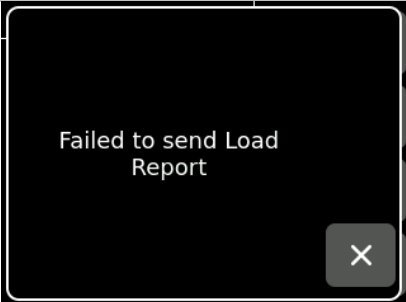
Screen	Description
DZMx Connection timeout!	Controller is enable to connect to DZMx Plus
Loss of Connection! Closing DZMx UI... ✕	Controller has lost connection to the DZMx Plus and will attempt to reconnect.

Key Exchange Timeout! **Closing DZMx UI...** ✕	Controller has connected to the DZMx Plus, but has failed its security key handshake
Warning: **DZMx Firmware Version** **Not Recognised!** **Application may not** **function correctly.** ✕	Controller has connected to the DZMx Plus, but cannot recognise the firmware version
Warning: **Firmware Version** **Mismatch Detected!** **Application may not** **function correctly.** **Upgrade Controller** **Firmware.** ✕	Controller has connected to the DZMx Plus, and has detected the DZMx Plus firmware is newer than the current Controller firmware supports. Controller firmware should be upgraded.
Warning: **Firmware Version** **Mismatch Detected!** **Application may not** **function correctly.** **Upgrade DZMx Firmware.** ✕	Controller has connected to the DZMx Plus, and has detected the DZMx Plus firmware is older than the current Controller firmware supports. DZMx Plus firmware should be upgraded.
Critical Error: **Failed to restore audio** **subsystem** ✕	DZMx Plus audio system has encountered an unrecoverable audio failure.

Bluetooth Hardware Error Bluetooth system will not function correctly. ✕	DZMx Plus Bluetooth system has encountered an unrecoverable failure.
Modem Unavailable ✕	Displayed when an operator attempts to dial a call or send an SMS on a modem which is either not capable, or not in the correct state to use that feature.
Failed to enable Cell devices ✕	DZMx Plus cell modems were unable to leave Flightmode (cellular transmitting functions remain off)
Failed to disable Cell devices ✕	DZMx Plus cell modems were unable to enter Flightmode (cellular transmitting functions remain on)
Invalid phone number +6435458651 ✕	Operator is attempting to dial or SMS using an invalid number

Invalid phone number for contact Hanger1	Operator is attempting to dial or SMS using a contact with an invalid phone number in the phonebook
Failed to save changes to phonebook!	Controller failed to save the phonebook changes to the DZMx Plus
Failed to toggle WiFi	Failed to toggle WiFi power state (same pop-up for enabling and disabling WiFi)
Failed to toggle Bluetooth	Failed to toggle Bluetooth power state (same pop-up for enabling and disabling Bluetooth)
Tracking is disabled! Tracking must be enabled before activating A.R.M.	Operator has tried to enable A.R.M. but the DZMx Plus tracking enable setting is currently disabled

Warning: Hobbs Check Due ✕	Hobbs timer has triggered, indicating maintenance may be required.
Error: Failed to reset flight hours ✕	Hobbs total flight hours count failed to reset
Error: Failed to reset daily timer ✕	Hobbs daily flight timer failed to reset
Error: Failed to reset trip timer ✕	Hobbs trip timer failed to reset
Error: Failed to update hours since last check ✕	Hobbs failed to set update the time when the last maintenance check was completed

Failed to reset Load Totals	Failed to reset Load Totals for the DZMx Plus Load App
Failed to send Load Report	Failed to send the Load Report for the DZMx Plus Load App
Loss of Power!	DZMx Plus has lost power and is running on UPS power (popup displays at the bottom of the screen)
Power Restored!	DZMx Plus has regained power after a power loss (popup displays at the bottom of the screen)

Modem Status Lines

The following table outlines the modem status messages, their corresponding description, and whether they are valid states for the various modem types:

Modem Status	Description	Cell	Sat	Certus
Ready	Modem has initialised and is fully operational (data off)	Y	Y	N
Online	Modem has initialised and is fully operational (data on)	Y	Y	Y
Initialising	Modem is powering up and initialising	Y	Y	Y
SIM Error	Modem is detecting a error with the SIM card	Y	Y	N
Ready (SBD Only)	Modem has no SIM card but is registered for SBD	N	Y	N
Voice Only	Certus modem is able to make voice calls. Data is offline.	N	N	Y
Not Registered	Certus modem is not registered with the Iridium network	N	N	Y
Searching	Modem has initialised and is searching for signal	Y	Y	N

Low Signal	Modem has low signal. Performance may be impaired	Y	Y	N
No Service	Modem is currently not registered on the network	Y	Y	N
Service Centre Error	Service centre number is incorrectly configured	N	Y	N
Device Error	DZMx Plus is unable to communicate with the modem	Y	Y	N
Not Responding	DZMx Plus is not receiving responses from the modem	Y	Y	N
No modem fitted	DZMx Plus is not detecting any modem	Y	Y	N
Startup Err	Modem has failed during initialisation	Y	Y	N
Call Queued	Modem is busy, call will proceed when modem is free	Y	Y	N
Incoming Call...	Modem is ringing from an incoming call	Y	Y	Y
No Certus Found	Certus modem is not detectable on the network	N	N	Y
Disabled	Cell modem has Flightmode enabled	Y	N	N
Calling...	Modem is dialling a call out	Y	Y	Y
On Call	Modem is on a call and no caller ID is available	Y	Y	Y
SIM Lock	Modem is detecting the SIM card is locked	Y	Y	N
Sending Data..	Modem is attempting to send an IP message	Y	N	Y
Receiving SBD	Modem is receiving an SBD message	N	Y	N
Receiving SMS	Modem is receiving an SMS message	Y	Y	N
SBD Sent	Modem has successfully sent an SBD message	N	Y	N
IP msg Sent	Modem has successfully sent an IP message	Y	N	Y
SMS Failed!	Modem failed to send an SMS message	Y	Y	N
IP msg Failed!	Modem failed to send an IP message	Y	N	Y
SBD Failed!	Modem failed to send an SBD message	N	Y	N
Not Inserted	External satphone is not inserted in the cradle	N	Y	N
PTT: no talkgroup	PTT registered but no talkgroup is selected	N	Y	N
PTT: Requesting	PTT is requesting to talk	N	Y	N
PTT: Registering	PTT is registering with Iridium for PTT services	N	Y	N
PTT: Transmitting	PTT is transmitting on the current talkgroup	N	Y	N
PTT: Receiving	PTT is receiving a transmission from the current talkgroup	N	Y	N
Firmware Upgrade	Cell modem is performing an Over-The-Air upgrade	Y	N	N

GPS Status

Status	Description
No GPS Lock	DZMx is not able to get a GPS lock from the receiver

Section 9: Documentation and Information

Documentation

Comprehensive documentation is available on the Flightcell website at
www.flightcell.com/resources..

Documentation, user instructions and technical information can be ordered by contacting Flightcell.

Technical support

For technical support contact Flightcell

- » By email, tech@flightcell.com
- » By phone, +64 3 545 8651

Contact Details

Mailing Address

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PO Box 1481

Nelson 7040 New Zealand

Physical Address

Flightcell International Limited

98 Vickerman Street

Nelson 7010 New Zealand

Telephone+64 3 545 8651

Fax+64 3 548 8091

Emailinfo@flightcell.com

Websitehttp://www.flightcell.com

Section 10: Warranty

Flightcell International Limited's quality products are proudly designed and manufactured to the highest standards in New Zealand. Your DZMx Plus and Flightcell Controller are 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 DZMx Plus and Flightcell Controller are registered on our product registration system. To register your product, go to www.flightcell.com/support.

The DZMx Plus/Flightcell Controller warranty covers Flightcell manufactured items only. Any ancillary items may be covered by individual manufacturer warranties.

The warranty is void if any labels are removed or if it is determined that your DZMx Plus or Flightcell Controller 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 117-00023 Flightcell DZMx Plus with Flightcell Controller 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 DZMx Plus or Flightcell Controller is deemed to be faulty or in need of repair, please complete a Returned Materials Authorization form on https://www.flightcell.com/support/product-return-and-service-information or contact Flightcell International info@flightcell.com.

Section 11: Abbreviations

Abbreviation	Definition
ADS-B	Automatic Dependent Surveillance Broadcast
AIS	Automatic Identification System – Marine
A.R.M	Automated Rescue Monitoring
A2DP	Advanced Audio Distribution Profile
AFF	Automated Flight Following
API	Application Programming Interface
AWTC	Automatic Water Tank Controller
Calib	Calibration
Config	Configuration
DFT	Daily Flight Timer
DTMF	Dual Tone Multiple Frequency
EMER	Emergency
Ext	External
GPS	Global Positioning System
HD Tracking	High-Definition Tracking
HFP	Hands Free
ICS	Internet Connection Sharing
IP	Internet Protocol address
IRPTT	Iridium Push to Talk
LCD	Liquid Quartz Display
NOTAM	Notices to Airmen
PTT	Push to Talk (radio/ICS)
SATCOM	Satellite Communication
SBD	Iridium Short Burst Data
SDR	Software Defined Receiver
SIM	Subscriber Identity Module
SMS	Short Message Service
TTAF	Total Time Airframe Hours
VoIP	Voice over Internet protocol
VPN	Virtual Private Network

Appendix 1: Connector kits supplied with DZMx Plus and associated parts

Connector kit for associated parts supplied with DZMx Plus:

Description	Supplied with	Component description	Qty/ kit
CNP_00054 - Flightcell DZMx Plus with Controller Connector Kit	Flightcell Controller	112116 – BNC Straight Crimp Plug, RG58	1
		122108 – TNC Straight Crimp Plug, RG58	3
		132113 – SMA Straight Crimp Plug, RG58	2
		132113RP – SMA Straight Crimp Plug, Reverse Polarity, RG58	1
		8655MH3701BLF - Metal Back Shell for DD Size connectors Straight (62 way)	1
		M24308/2-14F - DD62S M24308 Crimp and Poke Socket with Contacts (Female)	1
		D38999/26WD35SN – D38999/26WD-35SN Straight Plug	1
		M85049/39S15W – D38999 Strain Relief D Shell Right Angle	1
		RBCE-01-E-00.50-BC-C5E - Panel Mount Ethernet Cable Assembly 0.5m T568A	1
		DCA-RPBE-01-01-L - Samtec RPBE IP67 Locking Dust Cap Ethernet	1
		RCEF-G-02 Rectangular Field Terminated Ethernet	1
CNP_00004 - Flightcell Cradle D25 Connector Kit	Flightcell Iridium Phone Cradles with civilian connectors	122108- TNC crimp plug, RG58	1
		M24308/2-3F Crimp and Poke Socket with Contacts (Female)	1
		5-1478762-3- Metal Back Shell for DB Size connectors Straight (25 way)	1
CNP_00005 - Dual	Dual Iridium/GPS	112182 - BNC plug R/A 50 OHM Crimp	1

Antenna BNC/TNC Connector Kit	antennas	122150 – TNC plug R/A 50 OHM Crimp	1
CNP_00029 - Single Antenna TNC Connector Kit	Single Iridium antennas	122150 – TNC plug R/A 50 OHM Crimp	1
CNP_00042 – Dual Antenna TNC Connector Kit	Dual Iridium/CELL antennas	122150 - TNC Plug R/A 50 OHM Crimp	2
CNP_00039 - Flightcell Iridium Modem Connector Kit	Flightcell Iridium modem	M24308/4-2F – DA15P M24308 Crimp and Poke Plug with Contacts (Male)	1
		5-1478762-2 – Metal Backshell for DA Size connectors Straight (15 way)	1
		122108 – TNC Straight Crimp Plug, RG58	1

Appendix 2: Advanced routing functions
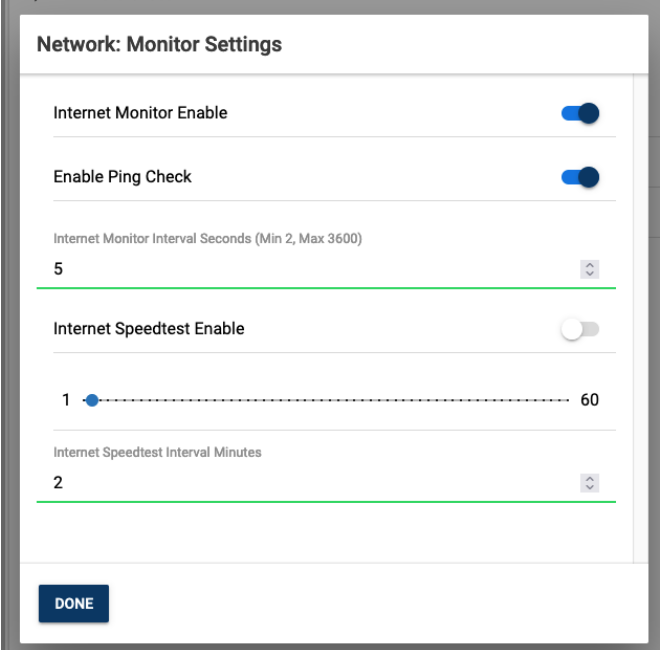
Configuring advanced routing

Where the DZMx Plus has more than one data-capable modem (e.g. two cell modems and/or a Certus modem), the DZMx Plus advanced routing provides for improved data connections and automatic failover when moving in and out of network coverage. For example, the DZMx Plus can switch its data from a preferred cellular network to a second network depending on network coverage, and switch to Certus satellite data when outside cellular coverage.

Configuring preferred gateway and automatic fail over

The DZMx Plus supports an advanced internet monitor and routing interface to allow a user to configure their preferred gateway (cellular or satellite) and select a policy for automatic failover. The system is based around two components:

» Network Monitor – this system runs periodically on each internet connected interface using a logical OR of three methods to establish if that gateway has internet connectivity (ping, DNS request and http request).

» The network monitor can also be used to run an automated speed-test periodically. This is only run on cellular interfaces to avoid high satcom costs. The speed-test is disabled by default.

Note: the ping can be disabled from the connectivity test if required.

» Routing Manager – this system also runs periodically. It uses the output of the internet monitor and the selected routing policy to determine the best interface to use for internet connectivity.
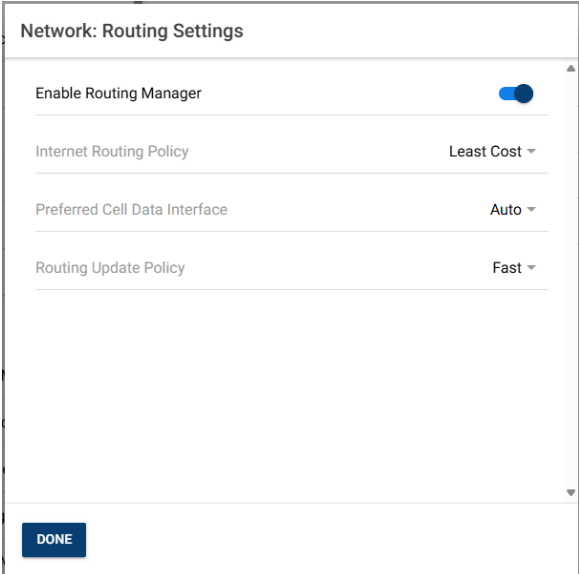
Network routing can be enabled and disabled. When disabled, the DZMx Plus will use a default static cellular configuration without automatic failover.

Network Routing Settings

Network routing is configured in Settings>Network Routing.

The automated routing options available are as follows:

» Cellular only –satcom interfaces are ignored

» Satcom only – all cellular interfaces are ignored

» Prefer cellular – always use cellular when available otherwise use satcom

» Prefer satcom – always use satcom when available otherwise use cellular

» Least cost – same as cellular.

» Dual Cell, Dual Gateway – use Cell Modem 1 for all traffic over ETH1 (secondary ethernet) and Wi-Fi, use Cell Modem 2 for all traffic over ETH (primary ethernet)

Additionally, when two cell modems are installed, the preferred interface may be selected:

» Auto

» Slot 4

» Slot 5

Notes:

The Dual Cell, Dual Gateway Option is a fixed routing option designed for circumstances where two separate networks are required e.g. medical applications where cell modem1 may be for public traffic and cell modem 2 for medical equipment/data. In this mode:

» There is no failover mechanism between modems

» The primary ethernet must be configured as DHCP server or in static mode. In static mode the installer may need to manually configure:

  » A default route through the DZMx i.e. specify DZMx IP address as gateway

  » A DNS server to be used i.e. 8.8.8.8 for google DNS

» The Controller display will only indicate traffic (up/down arrows) for the cell modem 1 on the top line of the display.

» When changing network routing configurations or ethernet DHCP modes, the system may require a reboot for all changes to correctly take effect.

Connectivity & Diagnostics
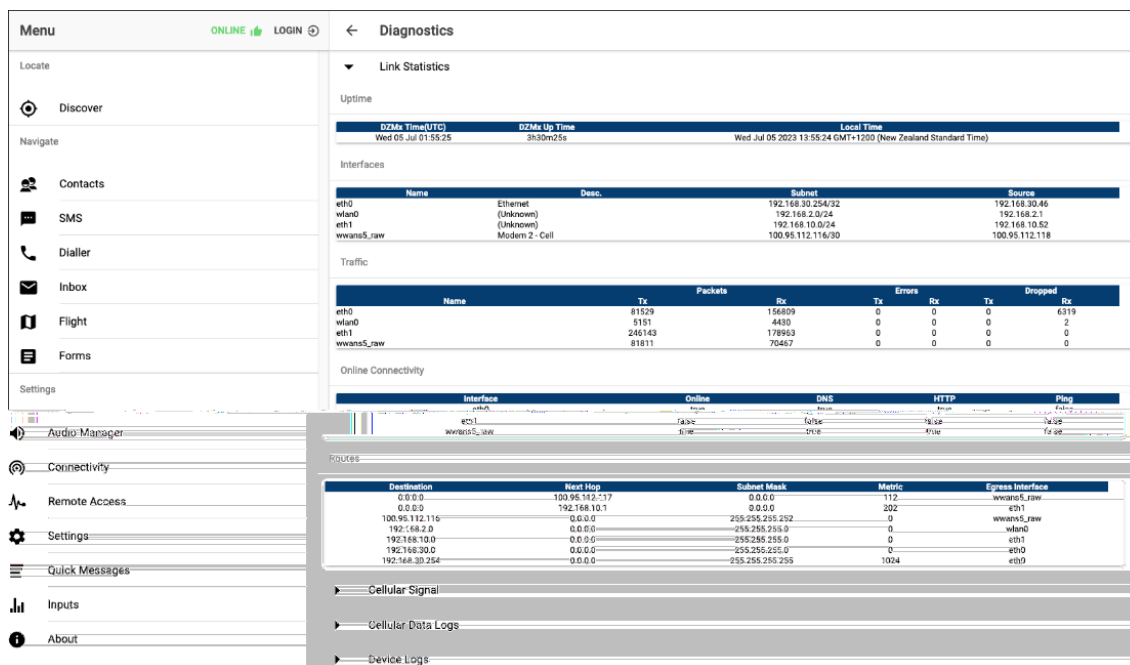
Once enabled, the DZMx will use the available data connections in accordance with the routing policy set on the device. In the most common scenarios, the Satcom data connection will be used only when lower-cost cellular interfaces are unavailable.

The active route is shown by an icon ⇅ on the Controller display

The online connection status can be obtained on the *About > Diagnostics > Link Statistics*, in the Online Connectivity page on DZMx Connect. If the terminal is connected to the primary ethernet, the *eth0* row is the relevant row. If the terminal is connected to the secondary ethernet, the *eth1* row is the relevant row.

> Note: *The diagnostics page is accessed via the icon at the top right of the About page .*

The currently used connection is identified in the first row of the Routes table.

Network Monitor API endpoints

Two non-authenticated HTTP endpoints exist to let an external agent query the internet and interface connectivity status:

http://<ipaddress>:8080/datamanager/api/internetstatus/

This endpoint shows the current global connectivity and interface in use. The json response is shown below.

```
{

        "dns_ok": true,

        "http_ok": true,

        "ping_ok": false,

        "online": true,

        "timestamp": "2023-09-07T00:15:46Z",

        "interface": "Generic",

        "defaultRoute": {

                "nexthop": "192.168.30.254",

                "metric": "200",

                "name": "eth0",

                "destination": "0.0.0.0",

                "mask": "0.0.0.0"

        }

}
```

http://<ipaddress>:8080/datamanager/api/interfacestatus/

This endpoint shows the connectivity status of all available gateway interfaces. The json response is shown below.

```
[

{

        "timestamp": 1694045994,

        "interface": "eth0",
```

```
        "online": true,

        "http_ok": true,

        "dns_ok": true,

        "ping_ok": false,

        "latency": -1
},
{

        "timestamp": 1694045994,

        "interface": "wwans5_raw",

        "online": true,

        "http_ok": true,

        "dns_ok": true,

        "ping_ok": true,

        "latency": 320
}
]
```

Custom Route Configuration

Overview

The DZMx provides a gateway to the internet for connected devices, but not all devices are capable of internet access. In some cases "certified" devices are only capable of connecting and/or addressing requests directly to the device/router directly connected by Ethernet cable (DZMx Plus in this case).

The DZMx now provides a custom route configuration that allows such devices to communicate with an external server (i.e. located in the internet) through a specific port. Once configured the DZMx will perform DNAT (destination network address translation) and SNAT (source network address translation) and the necessary forwarding to ensure that all traffic using a defined port on a specific ethernet interface is routed to the same port on the external server.

Notes:

» This address translation and forwarding is gateway ambivalent. i.e. it will work with the DZMx gateway failover capability.

» This routing will provide bi-directional traffic flow, however cellular providers implement a variety of NAT techniques for sharing one IP address between multiple cellular devices. This can prevent server initiated (push) traffic from reaching the DZMx since the cellular providers block that at source unless a device has a static IP address. In practice this means that a DZMx connected device should operate on a polling basis to determine if it needs to request updated data from the external server.

» Care should be taken when using this custom routing in conjunction with the Network->Firewall->Wi-Fi/Ethernet Forwarding Setting. It is recommended that this setting is enabled.

Custom Route Configuration

The custom route configuration can be accessed through an "Installer" login in DZMx Connect. To access the configuration go to Settings → Network → Custom Routing

There are 4 settings used to control the routing function:

» Enable Custom Device Route – this turns the routing on (if valid settings are in place) or off.

» Custom Device Ethernet Interface – this specified the DZMx interface that the relevant device is connected to.

» External Server Hostname/IP Address – this specifies the internet hostname or IP address of the external server

» External Server/Custom Device Port – this specifies the port to be re-routed to/from the external server.
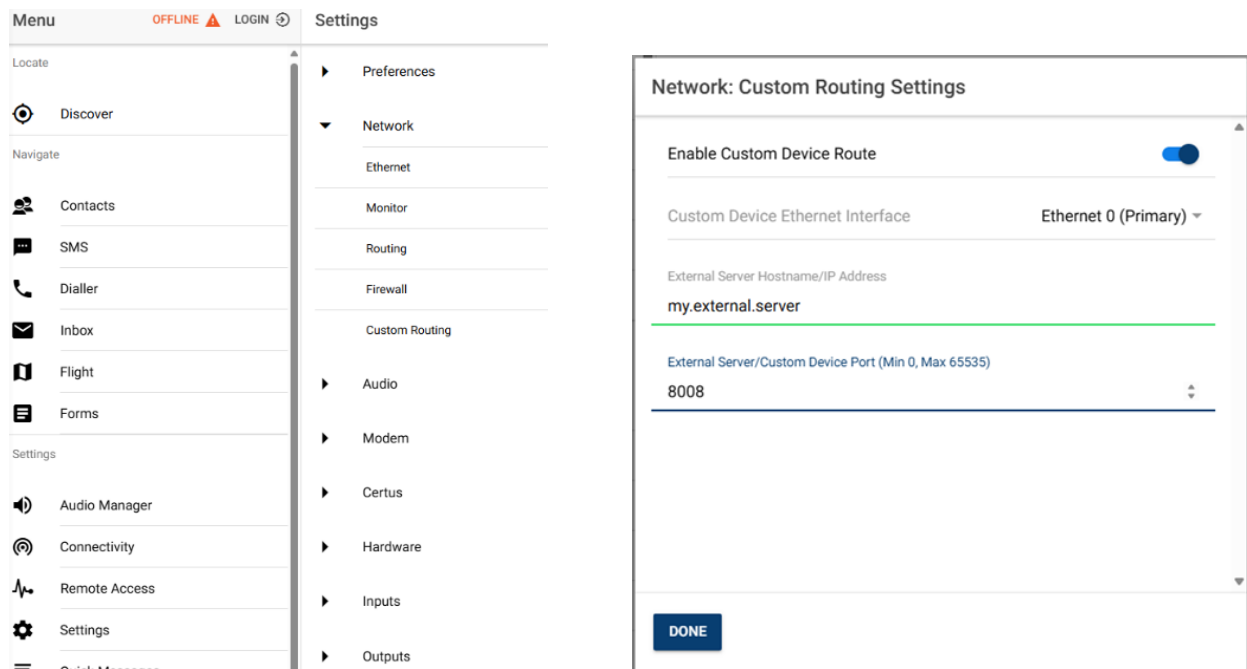
Appendix 3: Iridium Certus

The DZMx Plus supports an Iridium Certus modem, providing an IP data connection and voice connection over the Iridium Certus service.

Initial support is for the Guardian G6 and G6-S mid-band Iridium Certus modems. Please refer to the 114-00026 Rev 1.6 DZMx Plus With Flightcell Controller wiring diagrams.

For detailed installation instructions for the Guardian Mobility G6/G6-S, please refer to the following installation documents:

» G6-S Installation Reference Manual document 102124

» G6 Model G6-I-AX-IN Installation Reference Manual(37-pin) document 102003

Configuration of Iridium Certus service

The DZMx Plus can support an externally connected Certus Satellite terminal, providing:

» Data connectivity

» Voice services.

The Guardian G6 and G6-S provide an IP data connection at 88kbps uplink and downlink.

Certus License and Application Activation

To use Certus, the DZMx Plus must be connected via ethernet to the G6 and have the Certus license.

Data connectivity and voice services can be managed through the DZMx Connect Application and the Flightcell Controller user interface.

Certus Network Settings

For the correct operation of a connected Certus G6 terminal, the following network configuration can be used. The primary DZMx Plus ethernet port (designated eth0) should be used for the Certus G6 terminal, with the secondary (eth1) port being used for the Flightcell Controller interface.

Primary Port Settings (Settings > Network > Ethernet Settings)

Eth0 Settings for Certus	Suggested Value
Eth0 Ethernet Configuration	Static IP
Eth0 Host IP Address	192.168.10.52
Eth0 Subnet Mask	255.255.255.0
Eth0 Gateway Address	192.168.10.1
Eth0 DNS Server #1	8.8.8.8

Eth0 DNS Server #2	
DZMx Eth Nat Interface	On

Certus General Settings

The Certus settings available in DZMx Connect are split into General Settings and G6 Specific Settings.

For general Certus device settings, navigate to Settings > Certus > General Settings.

Setting	Suggested Value
Certus Terminal Type	G6 or G6S (Certus 100)
Use For Voice	On/Off: activates voice services
Call Audio Priority	3rd priority
Use For Tracking	On/Off: See Tracking: Transmission Settings Note: Ensure Certus data enabled
Enable Data	On: Allow system to use Certus as an active data connection according to advanced routing rules

Guardian G6 and G6S Settings

The specific device settings for configuring the Guardian G6 and G6S can be found in DZMxConnect at Settings > Certus > G6 Settings. See the following table for the suggested settings and values.

Setting	Suggested Value
G6 IP Address	192.168.10.1
G6 MQTT Port	8001
G6 API user	admin
G6 API Password	See G6 documentation
SIP Server Address	192.168.10.1
SIP User	user1 or user2
SIP Password	See G6 documentation

> Note: The Certus G6 uses a VOIP system to provide the voice calling interface via the DZMx. This relies on a SIP server on the G6 system. To ensure voice calling is possible, the SIP settings must be correct in accordance with the G6 documentation.

The Certus terminal data is enabled via the setting shown in the previous section. Once enabled, the DZMx Plus will use the G6 data connection in accordance with the routing policy set on the DZMx Plus. *(Settings > Network > Monitor & Settings > Network > Routing)*. In the most common scenarios, the Satcom (Certus) data connection will be used only when lower-cost cellular interfaces are unavailable. Other routing options allow for Satcom (Certus) only, Cellular only or preferred interface connections.

The online connection status is shown in *About > Diagnostics > Link Statistics*, in the Online Connectivity section, eth0 row is the relevant row.

The currently used connection is identified in the first row of the Routes table.

> Note: The diagnostics page is accessed via the icon at the top right of the About page

Enabling Certus Data

To enable or disable data over a Certus modem:

DZMx Connect
Settings > Certus > General Settings > Enable Data
Controller DZMx Menu
Settings > Modems > Certus > Data Enable

Certus Diagnostics

Diagnostic information relating to the Certus terminal may be found by accessing the DZMx Plus diagnostics:

Controller DZMx Menu
Menu > Maintenance > Diagnostics > Certus

Appendix 4: Software Defined Receiver (SDR)

Overview

The DZMx Plus supports the following software defined receiver capabilities:

- » AM reception – AM mono audio channels

- » FM reception – wide band (200kHz channel bandwidth) mono FM audio reception.

- » NBFM – narrow band (12kHz channel bandwidth) FM mono audio reception.

- » ADS-B-IN 1090 reception

- » UAT 978MHz

- » AIS 162MHz reception

The SDR can store several preset channels to allow easy switching between user defined presets.

The SDR function is limited to platform 4 variants of the DZMx Plus.

Antenna

The SDR covers a wide frequency range and multiple modes. Aircraft may use different antenna types, dependent on primary mode of operation.

It is recommended that installers use an appropriate frequency band antenna for optimizing receiver accuracy.

To ensure of the correct antenna off set, you need to use the SDR web interface (see section "Flightcell SDR Web Interface"). Select the antenna in the top left and choose between ADSB-Default, Cell Default or AIS-Default.

Proximity to high power transmitters

Care should be taken when locating the SDR antenna as high-power transmitters could introduce a risk to the RF amplifier.

Ensure that the supplied 50-ohm Broadband Limiter is connected to the SDR SMA RF connector. (This only applies to those variants with the SDR fitted)

Mitigation at installation

Ensure that the antenna is not plugged/unplugged when the unit is powered

Ensure correct antenna spacing as per Standard Practices recommendations where possible

Isolating SDR during HF transmissions

SDR License and Application Activation

To use SDR facilities the DZMx Plus must include the radio hardware module and have the appropriate **SDR** and **marine-AIS** license.

Once licensed the SDR menu screen can be accessed through the Controller keypad via the SDR key ( ) or through DZMx Connect on a connected mobile device or laptop by entering http://<unit-ip-address>/radio

With Firmware v4.13.0 or higher the SDR and marine-AIS License is not required.

Radio User Interfaces

The SDR can be operated through either a web interface through a connected device, or through the Controller front panel. This document will cover the use of both interfaces.
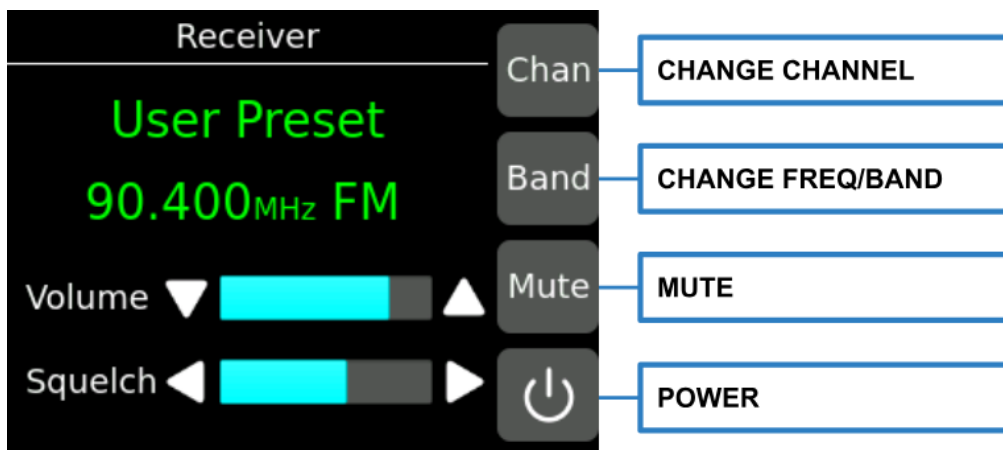
Controller Interface

The Controller interface is available by pressing the SDR key ( )

The Controller SDR display looks like the image below when inactive.

The Controller SDR display looks like the image below when active.

The SDR Controller Interface has the following features:

» **SDR state** – The green text on the screen represents the channel name, frequency, and

mode. The station name will only display if the SDR is in audio mode (AM, FM, NBFM).

» **Chan button** – Opens a menu for changing the channel from a list of presets. Adding or editing channels cannot be done here and should be done in the web interface.

» **Band button** – Opens a menu with options for changing the SDR frequency, or the SDR receiver band. Band options are: AM, FM, NBFM, ADS-B IN, AIS, and UAT.

» ADS-B IN, UAT and AIS are pre-programmed, so frequencies do not need to be entered.

» AM, FM and NBFM, once Band selected, you need to ensure that the correct frequency has been set for the required band selection.

» **Mute button** – Toggles mute. Only has an effect if the SDR is in audio mode (AM, FM, NBFM).

» **Power button** – Turns the SDR on or off.

» **Volume bar** – Use the Up and Down buttons to increase or decrease the SDR volume. Only visible if the SDR is in audio mode.

» **Squelch bar** – Use the left and right buttons to increase or decrease the SDR squelch. Only visible if the SDR is in audio mode. Increasing squelch will suppress background noise. Setting it too high will cause real transmissions to be lost as well. It is recommended to set it just above the background noise level.

Note: The DZMx will save the last manually entered frequency as "User Preset" to enable easier recall of manually entered stations. It will only update the user preset if that frequency is not already available in a stored preset

Flightcell SDR Web Interface

The Flightcell SDR web interface is available through the wireless or wired network interfaces at the following locations:

» http://192.168.4.1/radio (ethernet when configured as DHCP server)

» http://<dzmx-ip-address>/radio (ethernet when configured as DHCP client or DHC static)

» http://192.168.2.1/radio (when user device is connected to the DZMx Plus Wi-Fi)

The web interface presents more options for radio control than the front panel user interface and is the preferred interface for preset station entry and management by using a connected PC or iPad

The Flightcell SDR Web looks like the image below when inactive.
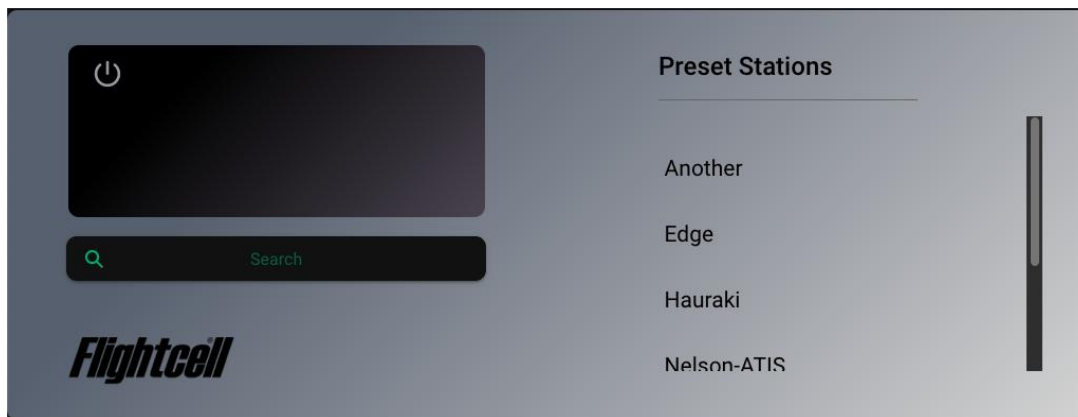
The image below shows a typical SDR display, once activated using the green Power button (item 1). When activated the radio will be set to the configuration in use when it was de-activated.
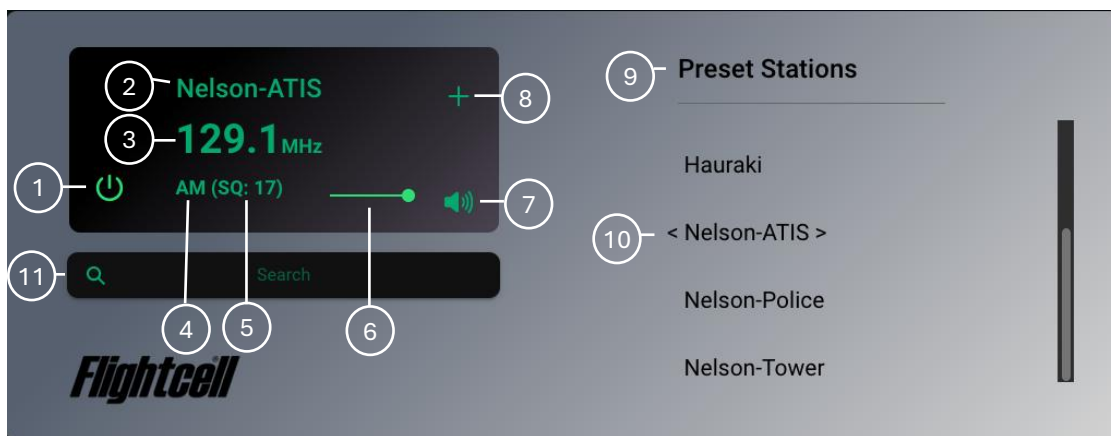

1 – Power indication and switch (click to toggle)

2 – Station name indicator (click to edit)

3 – Frequency indicator (click to edit)

4 – Reception mode indicator (click to change)

5 – Squelch level indicator (click to edit)

6 – Volume indicator (drag to change)

7 – Mute/Unmute (click to toggle)

8 – Preset add/update (click to store/update current settings)

9 – Preset station list (hover over to show import/export functions)

10 – Currently activated preset

11 – Preset search filter

Changing Radio Configuration

To change any aspect of the current configuration (items 1to 8) the user can click on the green text or icon. For items 2 -5 a dialog will be presented to allow a new value to be entered:
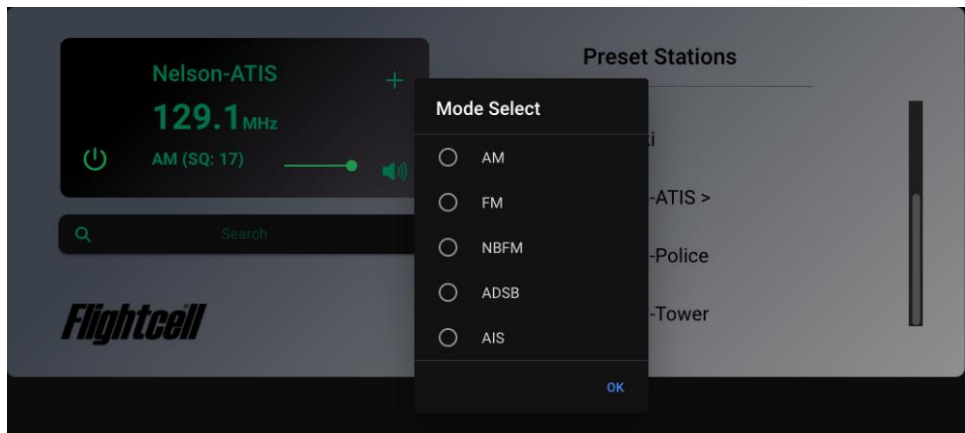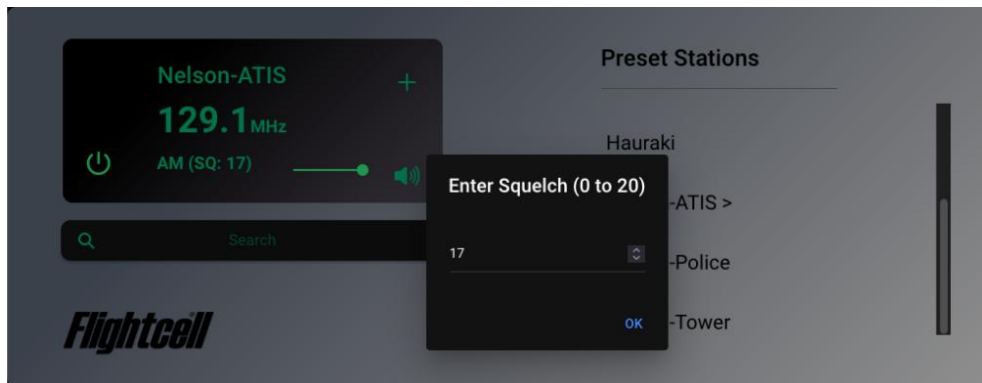
Station Name
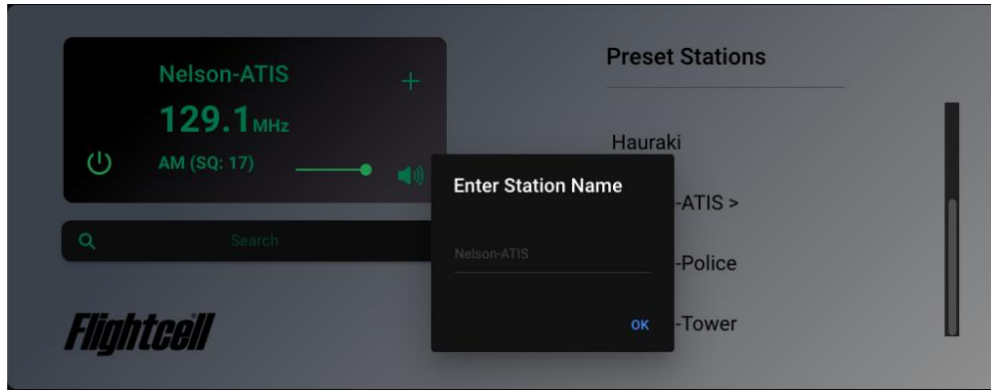
Frequency adjustment in MHz
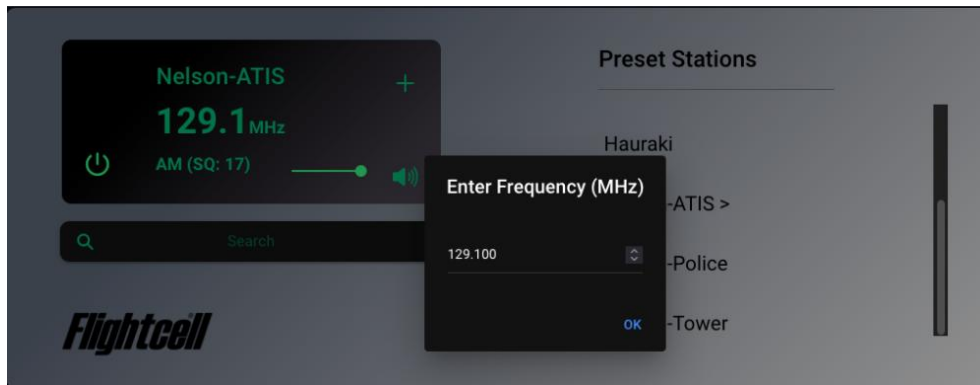
Reception mode selection

Squelch level 0 = No squelch, 20 = Full squelch

The volume control is a slider that can be dragged.

The mute/unmute is a button that toggles the mute setting. This is independent of volume control and overrides the volume setting i.e. setting mute enabled will mute the system regardless of volume level.

Preset Station Management

Preset Update/Add

The green plus button (item 8) is used to store the current radio configuration to a named preset.

> » If the name exists (or is not edited), it will update the existing preset with the new settings.

> » If the station name entered is new, a new preset will be added

Preset Activation

To activate a preset, the user simply needs to click on the list item.

Preset Deletion

To delete a preset, the user can place/hover the mouse over the preset name in the list. A delete button will appear that allows the user to permanently delete the stored preset.
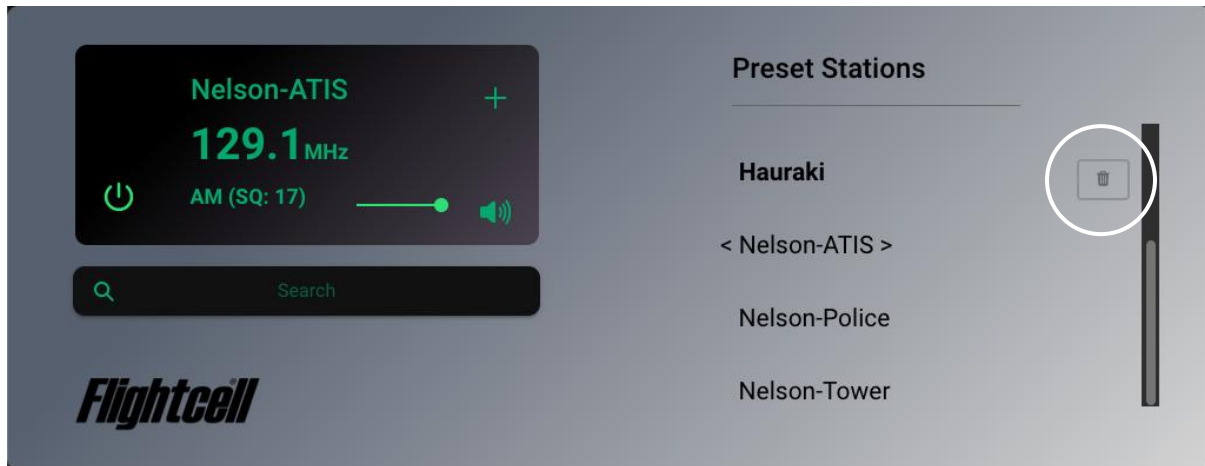

Preset Search

To find a preset, the user simply needs to type part of the name into the search box to filter the list of presets down to those matching the search term

Preset Import/Export

The user can also import and export a list of preset stations from/to a text file if desired. Placing the mouse over the Preset Stations heading (item 9) will cause the import and export buttons to be displayed. (items 12,13)
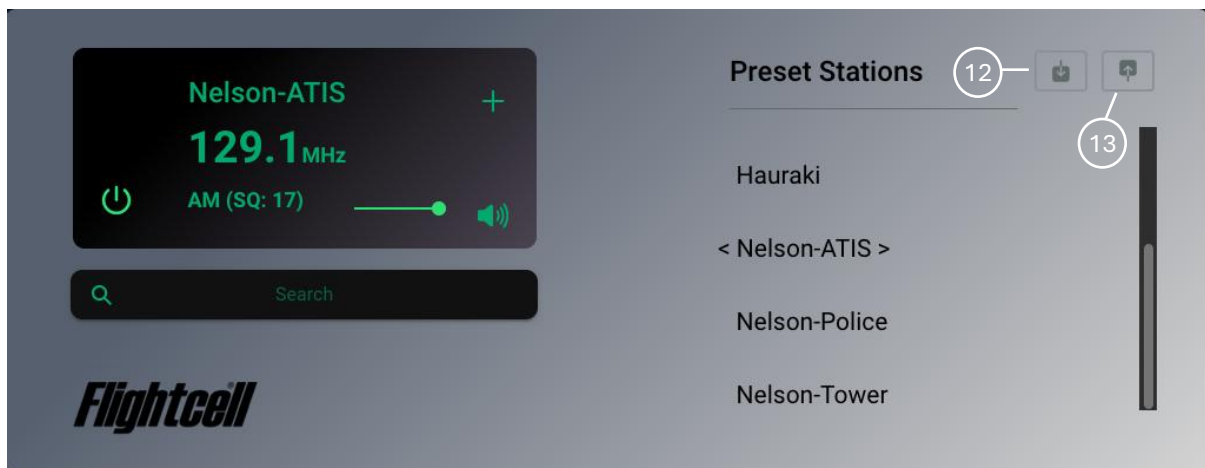
Clicking the export button (item 12) will download a file to the user's device.

Clicking the import button (item 13) will open a dialog to select an appropriate file for import.

Preset File Format

> Note: The import/export files use a standard format called JSON. Each station is defined between curly brackets. The square brackets enclose the list of stations, separated by commas. These files can be edited/generated manually but must retain this format and the correct field names/capitalisation.

```
[{
"name": "Nelson-ATIS",
"mode": "am",
"frequency": 129100000,
"squelch": 10,
"volume": 100,
"mute": false
}, {
"name": "Nelson-Tower",
"mode": "am",
"frequency": 127400000,
"squelch": 12,
"volume": 100,
"mute": false
}]
```

Radio Modes

The radio has six operational modes (AM, FM, NBFM, AIS, UAT & ADSB-IN).

The first three are audio modes and when activated the audio will be available to the user through the DZMx Plus BTL and BTR audio channels.

The ADSB-IN 1090MHz, UAT 978MHz and AIS 162.0MHz modes are fixed frequency digital channels. When selected the non-relevant controls (frequency, volume, squelch, mute, preset store etc.) become inactive until an audio mode is selected. Since ADSB-IN, UAT and AIS are fixed modes, they cannot be stored as presets.

SDR Settings

The SDR settings available in DZMx Connect relate only to the hardware slot options. The radio is now an option in the hardware for slots 2-5.
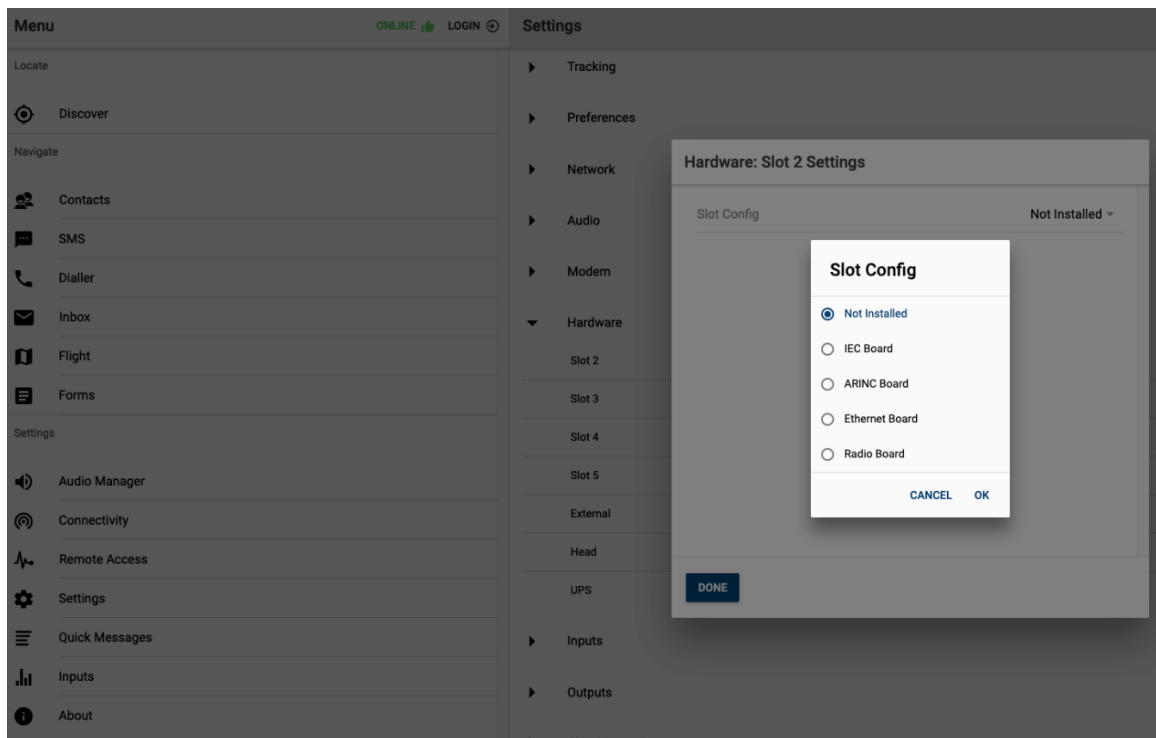
Operator configurable start up modes

The operator can set the Flightcell SDR to start up in a mode of their choice. This reduces the need to switch on the SDR by starting in a selected mode on initial power up or not. The SDR start up modes are as follows.

- » Enable at Startup – On - Off

- » Receiver Mode on Startup

    - » ADSB

    - » UAT

    - » AIS

    - » Last Station

- » This configuration is only available on DZMx Connect. To enable, go to **Settings->Preferences->Receiver**

- » Press Done when completed
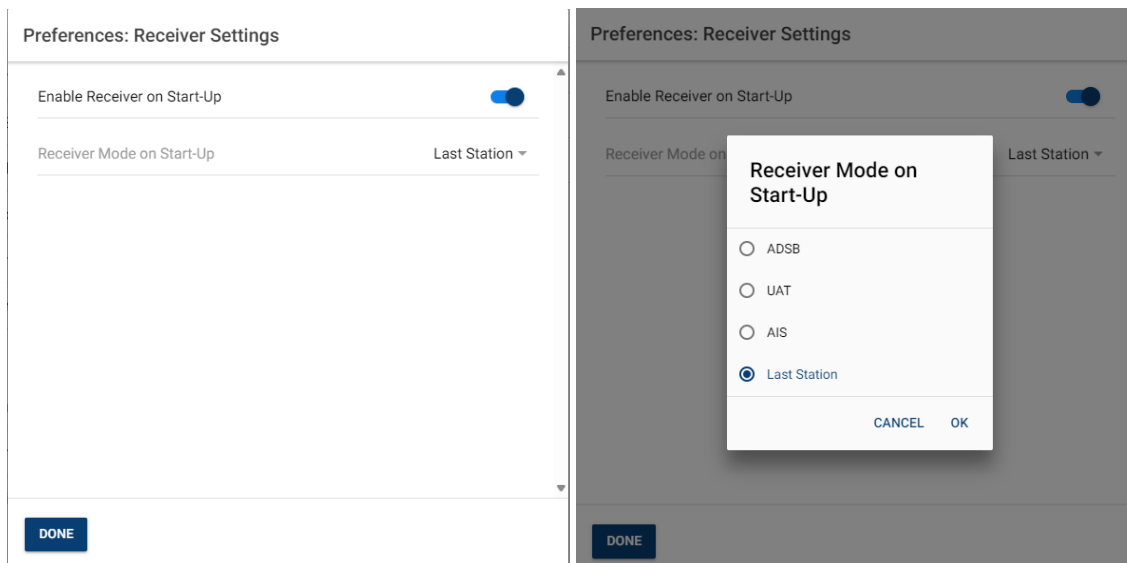
» This will enable the selected mode setting at start up

» The operator can change the selection during operation to any other radio mode

» Should the SDR be switched off during flight while the DZMx Plus is still powered, it will restore to receiver Mode on start-up when switched on again.

» The SDR can also be set to auto-mute when on a phone call. To enable this in DZMx Connect, go to **Settings->Preferences->Receiver** and set to on Auto-Mute Receiver on Call. If set the receiver will automatically mute and unmute during a DZMx Plus call. If unset, the receiver will continue to play audio during any DZMx Plus call.

SDR ADS-B IN and UAT 978MHz

Overview

The SDR ADS-B IN receive function has an associated GDL-90 data stream transmission capability. When enabled the DZMx Plus will stream GDL-90 messages over a broadcast UDP link on an assigned port. This can be used by external Electronic Flight Bag applications to provide a situational awareness view on a connected tablet.

ADSB-IN 1090MHZ and UAT 978MHz

The SDR provides a 1090MHz S-Mode ADSB-IN and UAT 978MHz (USA only) reception capability. Once activated, the user can use the Flight Page in DZMx Connect to view aircraft in the vicinity. The Map tab and Air Traffic tabs provide two different views. The Air Traffic view provides a TCAS like representation of traffic.

Both views identify:

» Other traffic – Green on map, blue hollow diamond on TCAS

- » Proximate traffic – Yellow on map, blue filled diamond on TCAS

- » Traffic advisory – Red on map, yellow circle on TCAS

On the map display the aircraft colour fades slowly to transparent after it loses contact, before fully disappearing after 120seconds. Hovering over an aircraft will show flight details for that aircraft.

In the air traffic view, the slider adapts the scale of the display.

Configuration

GDL-90 License and Application Activation

To use the GDL-90 streaming capability, the DZMx Plus must be connected via Wi-Fi to the receiving device and have the valid SDR licenses. (Firmware v4.13.0 and higher, SDR license is not required)

The ADS-B mode of the frequency monitor should be selected.

The UDP streaming function can be configured using the DZMx Connect interface.

GDL-90 Settings

The GDL-90 settings available in DZMx Connect may be found in (Settings -> Preferences -> ADSB)
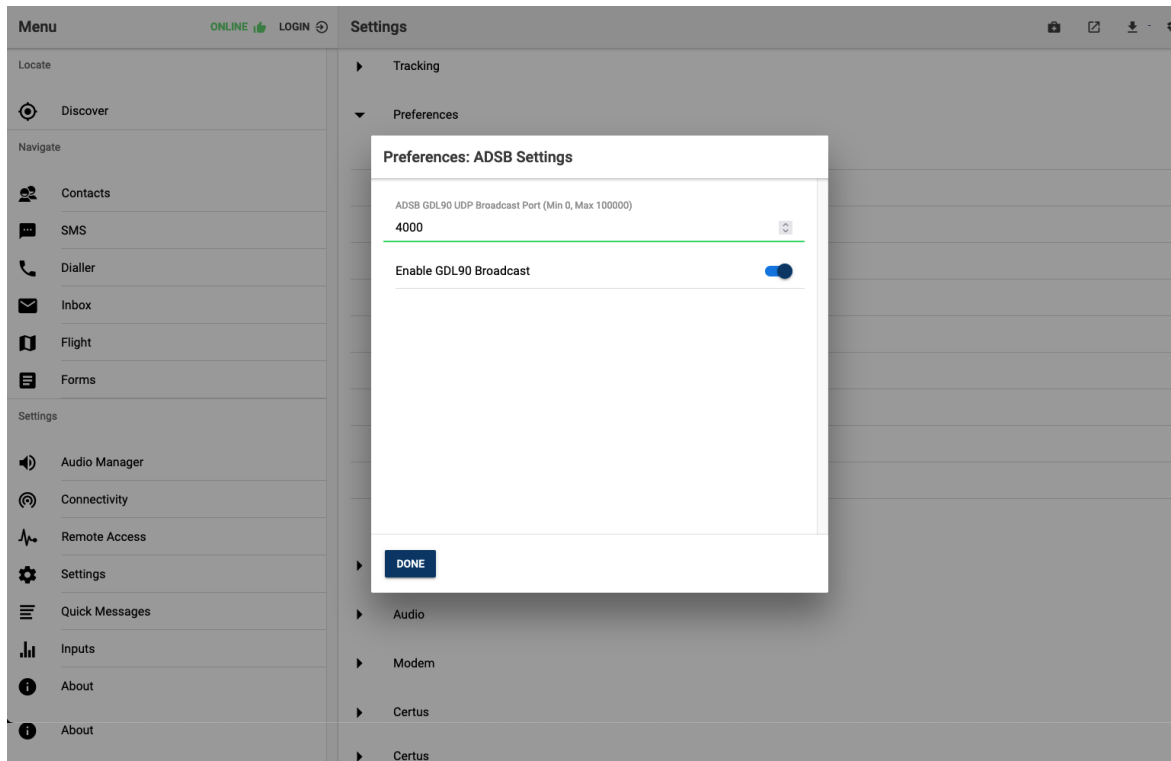
Note: The DZMx will require a power cycle if the port setting is changed to ensure the change takes effect.

Setting	Suggested Value
ADSB GDL90 UDP Broadcast Port	4000
Enable GDL90 Broadcast	On/Off: activates/disables the streaming function

GDL-90

Supported Message Types

When the GDL-90 UDP streaming function is enabled and the frequency monitor is set to ADSB mode, the following message types will be broadcast:

- » Heartbeat – once per second

- » Own ship report – once per second

- » Own ship geometric altitude report – once per second

- » Foreflight ID Message – once per second

- » Traffic Report – on reception of traffic data

Electronic Flight Bag Configuration

The device to be used should be connected to the DZMx Plus Wi-Fi.

To receive ADS-B data the external application should be set to receive on the same port as the DZMx Broadcasts UDP. The configuration will be according to the EFB provider instructions. Once setup, ADS-B IN traffic should then be available in the application. Check with your EFB provider if GDL-90 ADS-B data is supported over Wi-Fi or contact Flightcell International tech@flightcell.com

The application display can be compared to the Flight Page in DZMx Connect to verify the traffic is correctly received.
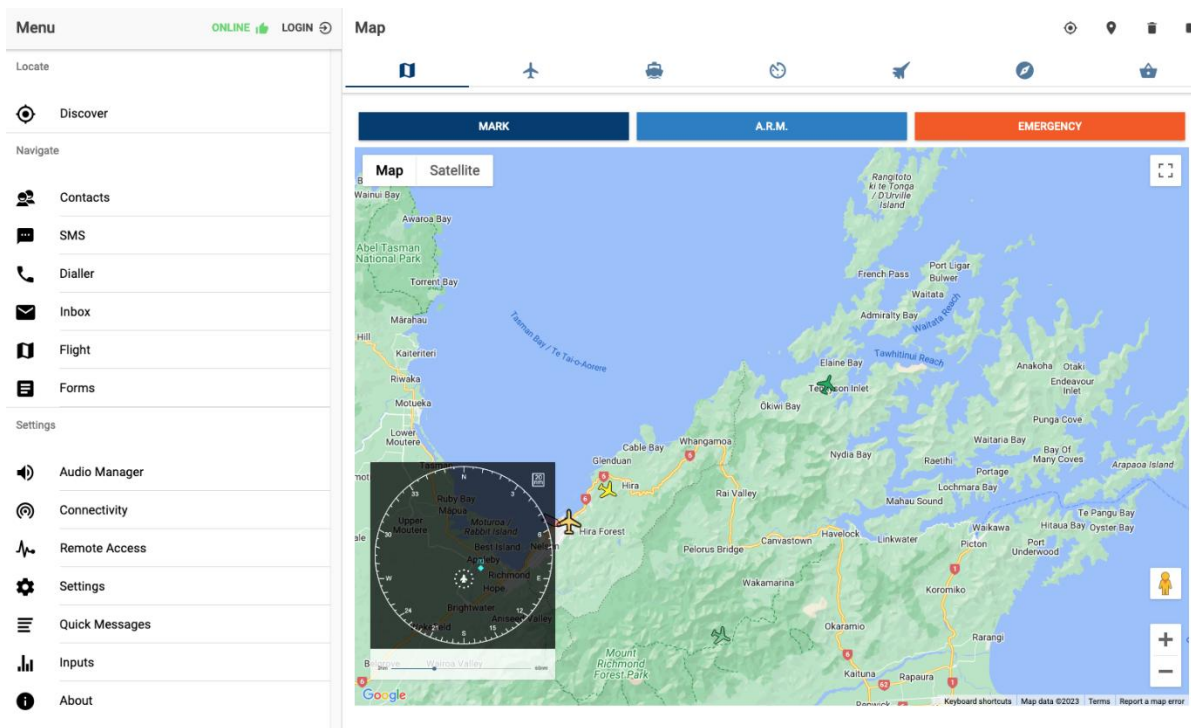
SDR AIS

Overview

The SDR provides a 162MHz AIS reception capability. Although AIS may work using various antennas, it is recommended that installers use an appropriate frequency band antenna for accurate results.

The SDR AIS receive function has an associated NMEA data stream transmission capability. When enabled the DZMx Plus will stream NMEA AIS messages over a broadcast UDP link on an assigned port. This can be used by external Electronic Flight Bag applications to provide a situational awareness view on a connected tablet.

AIS

The SDR provides a 162MHz AIS reception capability. The radio must be assigned as a source for AIS displays using DZMx Connect (**Settings->Preferences->AIS**) if the user wishes to view the information on the DZMx Connect Flight Page.
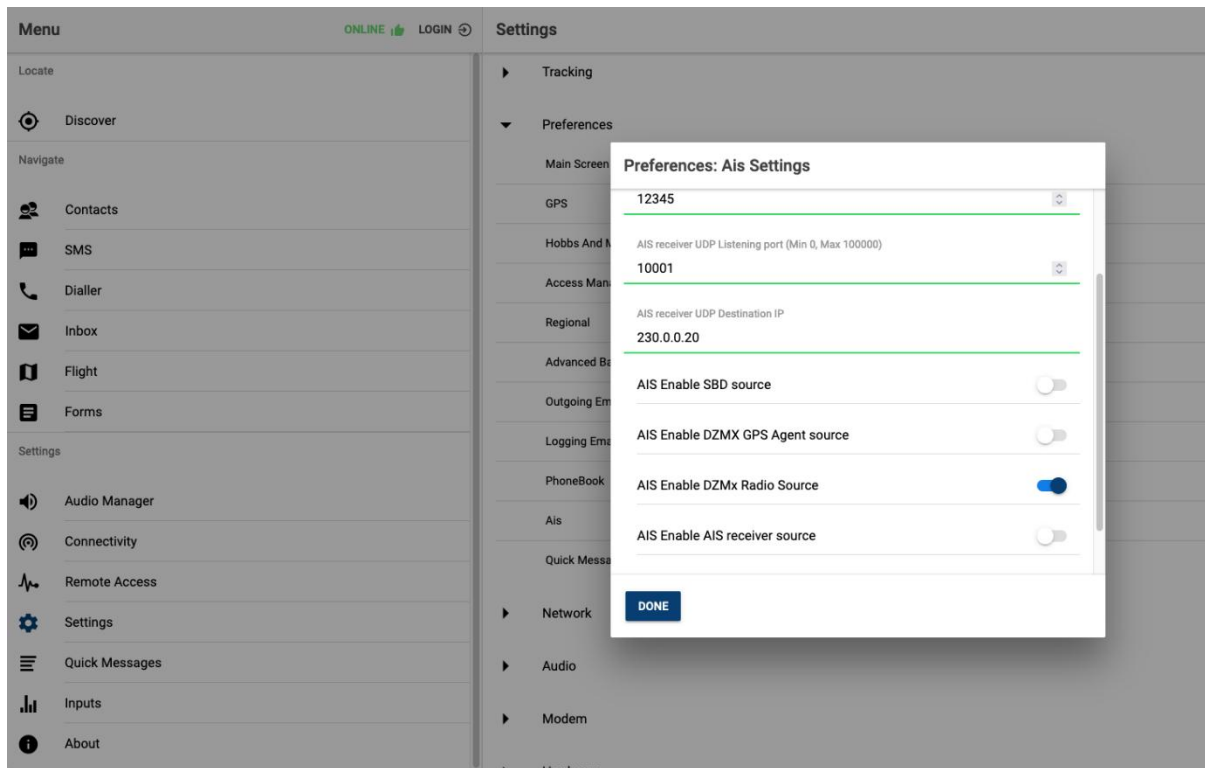
Once activated on the SDR and assigned as a source in DZMx Connect, the user can use the Flight Page in DZMx Connect to view vessels in the vicinity. The Map tab and Marine Traffic tabs provide two different views. The Marine Traffic view provides an AIS instrument like representation of traffic.

On both displays the vessel colour fades slowly to transparent after it loses contact, before fully disappearing after 10minutes.

Clicking on a vessel in the map view will provide vessel information and details on a "Fly to Course" including bearing, distance and ETA to that vessel.

Clicking on a vessel in the marine traffic view list will highlight that vessel in the display by filling in the icon. The slider can be used to adapt the scale

Note: The DZMX stores a list of vessel names, MMSI and type internally to make recall easier

Configuration

AIS License and Application Activation

To use the NMEA streaming capability, the DZMx Plus must be connected via Wi-Fi to the receiving device and have a valid **SDR** and **marine-AIS** license. (Firmware v4.13.0 and higher, SDR license is not required)

The AIS mode of the frequency monitor should be selected.

The data streaming function to a connected device (UDP - User Datagram Protocol) can be configured using the DZMx Connect interface

AIS UDP Broadcast Settings

The AIS UDP Broadcast settings available in DZMx Connect may be found in (**Settings -> Preferences -> AIS**). Scroll down to find them.

Setting	Suggested Value
AIS NMEA UDP Broadcast Port	10110
Enable AIS NMEA Broadcast	On/Off: activates/disables the streaming function

> *Note: The DZMx will require a power cycle if the port setting is changed to ensure the change takes effect*

External Application Configuration

The device to be used should be connected to the DZMx Plus Wi-Fi.

To receive AIS data the external application should be set to receive on the same port as the DZMx Broadcasts UDP. The configuration will be according to the provider instructions. Once setup, AIS traffic should then be available in the application.

The application display can be compared to the Flight Page in DZMx Connect to verify the marine traffic is correctly received.

AIS Displayed on Electronic Flight Bags (EFB's)

AIS data can be displayed over Wi-Fi to DZMx Connect and some 3rd Party EFB's

Contact Flightcell International to find out which 3rd Party EFB's are available to display AIS
tech@flightcell.com

Appendix 5: DZMx ARINC 429 Installation

Overview

The DZMx supports an optional ARINC 429 dual receiver, single transmitter expansion card.

An authorised installer can set the ARINC 429 logging functions as follows.

>> enable the recording of data from the two ARINC 429 receivers into a CSV file in the DZMx flight data directory

>> modify, download and upload an ARINC 429 label filter to ensure only the desired labels are recorded

>> set the speed, label flip and parity enforcement on each receiver channel

>> setup auto-send via email of ARINC 429 flight data on power up, in a similar manner to other flight data logs

Note: The DZMx can receive ~500 ARINC 429 100kbps messages per second per receive channel without data loss. The HW filter should be used to ensure that the message rate to be logged does not exceed that.

ARINC 429

For the ARINC 429 dual receiver to used, the ARINC 429 hardware card must be installed in the DZMx and it must be running firmware v4.12 or higher

Configuration

To configure the DZMx ARINC 429 receiver, you need to be logged in to DZMx Connect as an Installer.

To log in, refer to Section 6: Configuration in the DZMx Installation Manual.

Setting the DZMx for ARINC 429

Once logged into DZMx Connect as an installer, go to **Settings > Preferences > ARINC 429**

Set ARINC 429 settings as below and select Done

Preferences: Arinc429 Settings

Logging Email Reporting Settings

The DZMx can automatically transmit log data using the DZMx Email Outbox feature. Using DZMx Connect, go to **Settings > Preferences > Logging Email Reporting** to specify which logs are transmitted and to activate automatic emailing of the logs.

Using DZMx firmware v4.12 or later, ARINC 429 Data is available for selection together with other **"logging email reporting"** settings as required.

Preferences: Logging Email Reporting Settings

+

ARINC 429 DZMx Connect Interface

The Arinc 429 status, label filter and data feed can all be accessed through the DZMx Connect sidebar menu ARINC page. The user must be logged in as an Installer to do this.

Settings

🔊 Audio Manager

◎ Connectivity

⩘ Remote Access

⚙ Settings

☰ Quick Messages

▼ ARINC

📊 Inputs

ⓘ About

ARINC 429 Status

The ARINC 429 Status shows the current status of the ARINC 429 settings.

ARINC429 Status

Setting	Status
ARINC429 Logging	Enabled
ARINC429 Label Filter	Enabled
ARINC429 Log Autosend	Enabled
XUI Interface	Enabled

ARINC 429 Label Filter

The ARINC 429 Label Filter allows the user to click on a label to activate/de-activate a label filter.

ARINC429 Label Filter (Octal)

| 0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17
20	21	22	23	24	25	26	27	30	31	32	33	34	35	36	37
40	41	42	43	44	45	46	47	50	51	52	53	54	55	56	57
60	61	62	63	64	65	66	67	70	71	72	73	74	75	76	77
100	101	102	103	104	105	106	107	110	111	112	113	114	115	116	117
120	121	122	123	124	125	126	127	130	131	132	133	134	135	136	137
140	141	142	143	144	145	146	147	150	151	152	153	154	155	156	157
160	161	162	163	164	165	166	167	170	171	172	173	174	175	176	177
200	201	202	203	204	205	206	207	210	211	212	213	214	215	216	217
220	221	222	223	224	225	226	227	230	231	232	233	234	235	236	237
240	241	242	243	244	245	246	247	250	251	252	253	254	255	256	257
260	261	262	263	264	265	266	267	270	271	272	273	274	275	276	277
300	301	302	303	304	305	306	307	310	311	312	313	314	315	316	317
320	321	322	323	324	325	326	327	330	331	332	333	334	335	336	337
340	341	342	343	344	345	346	347	350	351	352	353	354	355	356	357
360	361	362	363	364	365	366	367	370	371	372	373	374	375	376	377

As defined by the ARINC 429 specifications these labels are in Octal (base 8) format. This section also allows a user to download and upload a JSON formatted filter table by selecting on the upload or download icons in the top righthand corner

ARINC 429 Feed

The ARINC 429 Feed displays the current output being logged into file. Since ARINC can run at high speed, this feed may lag the actual log file. It is provided mainly for diagnostic and setup purposes. This section also allows the user to download the current log file.

ARINC429 Feed   ⬇

Index	Channel	Label (Octal)	Label Flipped	Raw Data (Hex)
0	0	36	0	0x 12345678
1	0	36	0	0x 12345678
2	0	36	0	0x 12345678
3	0	36	0	0x 12345678
4	0	36	0	0x 12345678
5	0	36	0	0x 12345678

Select the Download icon in the top right corner to do this.

Appendix 6: Aerial Firefighting Application Manual

Firmware Version 4.12.0 and later

Introduction

The Flightcell DZMx Plus can be used to provide automated reporting of aerial firefighting operations, to meet the requirements of fire management agencies such as the National Aerial Firefighting Centre (NAFC) in Australia and the US Forest Service (USFC). It collects data from the aircraft and sends real-time firefighting events and GPS position information to tracking providers and fire authorities.

Where does the firefighting data come from?

The DZMx Plus can capture firefighting data in two ways:

> » From the DZMx Plus General Purpose Inputs (GPIs). which can be connected to various parts of the firefighting installation.

> » From the data output of an Automatic Water Tank Controller (AWTC). This data is sent as regular reports over a serial data connection.

What data is produced?

Firefighting data is sent as event reports to a tracking service provider in real-time. There are three fire-specific events sent to tracking providers:

> » Fill Event, including amount of water picked up

> » Drop Start Event

> » Drop End Event, including amount of water dropped

How to install?

Before configuring the Fire App, make sure that the DZMx Plus is set up for tracking, and can send position reports to the tracking provider. Refer to the DZMx Plus Installation Manual, DZMx Plus Tracking section.

Then, follow the appropriate steps in the Fire App Installation Guide below.

Then, verify the configuration with the Fire App Testing Guide below.

For configurations that require using the DZMx Plus GPIs, general information can be found in the DZMx Plus Installation Manual, DZMx Plus Inputs and Outputs section. Note that an input expansion card may be needed for some firefighting configurations, especially if both a bucket and tank are installed. The DZMx Plus comes with five GPIs. The input expansion card provides seven additional GPIs. Information on the Input Expansion Card option can be provided by your Flightcell reseller or installer.

Settings Reference

This is a reference for all the settings directly related to the Firefighting Application, and what they mean.

Firefighting Inputs

The firefighting application supports the following inputs:

Input name	Connects to	States	Used to detect	Used to report	Calibration value(s)
Fill Pump	Fill Pump	Off, on	Pump start and stop	Amount of water loaded into the tank Amount of water dropped	Pump flow rate
Drop Release / Bucket Drop Release	Tank or bucket door	Open, closed Door open	Door opened	Tank or bucket door opened (momentary release, door closes passively) Tank or bucket door open (door maintained open until switch released)	
Drop Type Select	Drop Type Select input	Door 1 selected, Both doors selected	What doors are open	Whether a drop is a partial (50%) drop or a full drop	
Fill Level / Bucket Load Cell	Fill level indicatior / Bucket load cell indicator	Variable input	Fill Level / Load on hook	Amount of water loaded into the tank Amount of water dropped	High and low calibration values
Additive Pump	Additive pump	Off, on	Additive pump start	Whether additive was used (momentary input)	Pump flow rate

			Additive pump time active	Amount of additive injected (maintained input)	
Additive Type Select	Additive type select switch	Foam, gel	Type of additive selected	Type of additive used	
Bucket Connected	Bucket connected switch	Open, closed	Whether a bucket is connected	Which container is selected (bucket or tank)	

Two separate water containers can be configured, a tank and a bucket. The settings for the tank are as follows:

» **Fill Pump**: Tank pump status (on or off).

» **Fill Level**: Volume of water in the tank (variable voltage).

» Only one of these two inputs (Fill Pump or Fill Level) need to be configured. If both are configured, Fill Level will take priority.

» **Drop Release**: Tank drop release input. Can also be used for the bucket if used in conjunction with the Bucket Connected input. Using the Drop Release Input Type setting, the drop release input can be configured as a momentary release button or a maintained 'door open' input.

» **Drop Type Select**: Indicates a full or half release of the tank. If half the tank is already released, attempting to release half the tank again will result in no water being dropped. For use with a Fill Pump input.

The settings for buckets are as follows:

» **Bucket Load Cell**: Load cell input for measuring the volume of water in the bucket (variable voltage).

» **Bucket Drop Release**: Bucket drop release input. Using the Bucket Drop Release Input Type, the bucket drop release input can be configured as a momentary release button or a maintained 'door open' input

» **Bucket Connected**: Indicates whether the tank or bucket is connected. Required when the installation allows for switching between a tank and a bucket.

By using the Bucket Connected input, if two containers are installed, they can share a single drop release input if desired. If so, the Bucket Drop Release input should not be configured, and the

Drop Release input should be configured for both the tank and bucket. However, the Drop Type Select input will not work for the bucket in this configuration.

The DZMx Plus can also be configured to add additive to either container. If two containers are in use, then the DZMx Plus will use the Bucket Connected input to determine which container to use:

- » **Additive Pump**: Additive pump status (on or off) + **Additive Pump Input Type**: The additive pump can be configured as a button or a timed input

Using the Additive Pump Input Type setting, the additive pump can be configured as a button (momentary) or a timed input (maintained).

- » **Additive Type Select**: Switches between Gel/Foam as the selected additive.

These inputs can be used on any of the DZMx Plus Inputs. See "DZMx Plus Inputs" in the Installation Manual, for information on wiring and configuring the inputs.

Firefighting Settings

The following settings can be used to configure the Fire App:

- » **Firefighting Enable**: Enables the fire app.
- » **Kawak AWTC Connected**: Allows a Kawak AWTC to be connected to the DZMx Plus RS-485 port.
- » **Debug Port Config**: Setting this to 'Erickson AWTC' allows an Erickson AWTC to be connected to the DZMx Plus RS-232 port. This is not a Fire App setting, it is under Hardware -> External on DZMx Connect, or Settings -> Hardware -> Debug on the Controller.
- » **Hover**: Enables detecting if an aircraft is hovering or not. Required for Fire App configurations with a helicopter and no AWTC. This is not a Fire App setting, it is under Tracking -> Periodic on DZMx Connect, or Settings -> Tracking -> Periodic on the Controller.
- » **On Board Units**: Unit of volume the tank/bucket capacity is measured in. Options are Litres/U.S. Gallons/Imperial Gallons. All other Fire App settings (e.g. tank volume, fill pump rate) are assumed to be in the same unit that is configured in the Onboard Units setting.
- » **Event Report Units**: Unit of volume to use in the messages to the tracking provider when reporting fill and drop events. Options are Litres/U.S. Gallons/Imperial Gallons.
- » **Tank Volume**: The capacity of the water tank, specified in 'on board units'.
- » **Bucket Volume**: The capacity of the bucket, specified in 'on board units'.
- » **Fill Flow Rate**: The flow rate of the fill pump specified in 'on board units' per minute.
- » **Additive Flow Rate**: The flow rate of the additive pump specified in 'on board units' per minute.
- » **Additive Type Loaded**: What type of additive has been loaded into the additive tank. Options are Foam/Gel/Retardant.

» **Min Valid Drop Time**: Advanced setting. A drop release duration less than this time is ignored. The unit is seconds. Not to be used in conjunction with the Drop Type Select Input. 1 is not a valid value for this setting.

» **Partial Drop Time Limit**: Advanced setting. If a tank is configured with no Drop Type Select input and no Fill Level input, then configuring this setting allows for detection of a partial or full drop. The time unit is seconds. If the drop duration is less than Partial Drop Time Limit, then the drop volume will be reported as half the volume in the tank. The next drop will always be reported as a full drop. Note that 1 is not a valid value for this setting.

» **Max Valid Fill Time**: Advanced setting. Sets a maximum time the Fill Pump input can be active for a fill to be valid. The unit is seconds.

» **Maximum Fill Speed**: Only for fixed wing aircraft with a Fill Level input installed. Setting this to a value other than 0 will cause the DZMx Plus to record the tank level on the ground instead of in the air. It will only record the tank level as long as it is stable and under the set speed. The unit is knots.

» **Water Tank Calibration Volume**: For use with the Fill Level input. Normally this will be set as part of installation, not manually. Specified in 'on board units'. The Fill Level input has low and high calibration values in the Input Config settings. The low calibration value is always for an empty tank, but the high calibration value is for the Water Tank Calibration Volume. Ideally, this would be a full tank to increase accuracy.

» **Bucket Calibration Volume**: For use with the Bucket Load Cell input. Normally this will be set as part of installation, not manually. Specified in 'on board units'. The Bucket Load Cell input has low and high calibration values in the Input Config settings. The low calibration value is always for an empty tank, but the high calibration value is for the Bucket Calibration Volume. Ideally, this would be a full bucket to increase accuracy.

» **Fire Tank Data Logging**: Advanced setting. Logs fire app data until the DZMx Plus is powered off and on again. For diagnostic support.

Fire App Logic

This section describes when tracking messages are sent from the Fire App. It leaves out many details and edge cases. If you want more detail on how the tracking system works, contact Flightcell.

Filling Logic Table

Water Level method	Fill Position Marked	Fill Level measured and Fill Event Created
Fill Pump	When the fill pump is switched off.	When the fill pump is switched off. The fill level is calculated based on the fill pump running time.

Fill Level / Load Cell	At Take-off, or when moving out of Hover (if enabled), and only if the water level has increased since the last reported Fill or Drop event.	The measured water volume is level. This is typically a few seconds after moving out of hover or after take-off.
Erickson AWTC	When the water level stops rising quickly.	When the measured water volume is level.
Kawak AWTC	When the fill pump is switched off.	When the measured water volume is level and the aircraft is not hovering.

Dropping Logic Table

Water Level method	Drop Release Config	Drop Start Position	Drop End Position Marked	Drop Volume Calculated and Drop End Event Created
Fill Pump	Drop Release	When door/button activated	When door closed/ button released	When button released. Uses the Drop Type Select input or the Partial Drop Time limit to determine the amount dropped. Assumes 100% if no Drop Type Select input or Partial Drop Type limit configured
Fill Level or Load Cell	Drop Release Momentary	When button pressed	When empty or as Fill Level drop rate starts to level off.	After button released and when the Fill Level input is level or when empty
Fill Level or Load Cell	Drop Release Maintained	When door opened	When empty or when door closed	When door is shut and the Fill Level input is level, or when empty
Erickson AWTC	Erickson AWTC	When drop button pressed and tank not empty	When tank door closed or tank volume is level	When tank volume is level
Kawak	Kawak	When drop	When tank	When tank volume is level

AWTC	AWTC	button pressed and tank not empty	door closed or tank empty	

Fire App Installation Guide

This section contains instructions to configure a DZMx Plus to use the Firefighting Application. Follow the Fire App General Installation Instructions section first, and then the section relevant to the aircraft's configuration.

The Fire App settings are available either on the Controller screen or through DZMx Connect (see table below). You must be in installer mode to access the fire app settings. Instructions in the rest of this section use the Controller screen unless otherwise specified. For more information on configuring inputs, refer to Section 6 of the Installation manual, input configuration section.

	Controller Screen	**DZMx Connect**
Enable Installer Mode	Maintenance -> Enable Installer Mode -> Enter Installer PIN (default passkey 2468))	Login -> Select Installer from Dropdown menu in top right -> Enter Installer PIN (default passkey 2468))
Main Settings	Settings -> Tracking Group -> Fire	Settings -> Tracking -> Fire
Input Settings	Settings -> Inputs	Settings -> Inputs -> Fire

The DZMx Plus currently supports the following configurations:

- » Bucket with fill/drop input lines
- » Tank with fill/drop input lines
- » Erickson AWTC
- » Kawak AWTC
- » AFDAU-T1
- » Tank or bucket with fill/drop input lines and switch to indicate whether a tank or bucket is connected

Fire App General Installation Instructions

Before installing, ensure the following general steps have been taken:

» Ensure you have the Fire license. If you do not, you will be unable to use the Fire App. Licenses can be checked through DZMx Connect -> About -> License. If you do not have the Fire license, contact Flightcell support.

Using the Controller:

» Turn Firefighting Mode on
(**Settings -> Tracking -> Fire > Firefighting Enable**).

» If the aircraft will be filling while hovering, turn hovering on
(**Settings -> Tracking -> Periodic -> Hover**) as some configurations rely on detecting the difference between hovering and flying.

» Set Onboard Units
(**Settings -> Tracking -> Fire -> Onboard Units**) to the unit the tank/bucket capacity is measured in. The options are Litres, U.S. Gallons, or Imperial Gallons. **All other Fire App settings (e.g. tank volume) are assumed to be in the same unit that is configured in the Onboard Units setting.** Changing the Onboard Units setting will not change the value of any other settings. For example, if you set the tank volume to 100 liters, then change the Onboard Units to US gallons, then the tank volume will now be 100 gallons.

» Set Event Report Units
(**Settings -> Tracking -> Fire -> Event Report Units**) to the unit your tracking provider wishes to receive the fill/drop amounts in. The options are Litres, U.S. Gallons, or Imperial Gallons. For example, NAFC likes to receive their reports in Litres.

After installing, make sure to test the configuration. See the Fire App Testing Guide section for more information.

Instructions for Aircraft with a Bucket

Using the Controller

» Set Bucket Volume to the volume of the bucket
(**Settings -> Tracking -> Fire -> Bucket Volume**).

» Connect the Bucket Drop Release input to one of the DZMx Plus input lines, and configure the input
(**Settings -> Inputs -> Bucket Drop Release -> Input Designation**). Also configure the Input Type (maintained or momentary) and Input Configuration (normally closed or normally open).

» Optionally, set up additive inputs if you wish to track additives (See section 'Instructions for Additive Inputs').

» Connect the Bucket Load Cell input to one of the DZMx Plus input lines, and configure the input

(**Settings -> Inputs -> Bucket Load Cell -> Input Designation**).

» Connect the Bucket Connected input to one of the DZMx Plus input lines, and configure the input

(**Settings -> Inputs -> Bucket Connected -> Input Designation**). Also configure the Input Configuration (normally closed or normally open).

» Calibrate the Bucket Load Cell input:

   » With an empty bucket suspended, select Calibrate Low Level from the Bucket Load Cell menu

   (**Settings -> Inputs -> Bucket Load Cell -> Calibrate Levels -> Calibrate Low (F4)**) and press **ENTER** to calibrate.

   » With a full bucket suspended, select Calibrate High Level from the Bucket Load Cell menu

   (**Settings -> Inputs -> Bucket Load Cell -> Calibrate Levels -> Calibrate High (F4)**) and press **ENTER**.

   » The Controller will then prompt for the current volume in the bucket. After entering in the amount, press ENTER to complete calibration. If you are reading the load off the load cell to enter into the high calibration setting, remember to take off the weight of the bucket from the displayed weight. The volume entered cannot be higher than the full bucket volume specified in the Bucket Volume setting.

   » Note that (**Settings -> Inputs -> Bucket Load Cell -> Calibrate Levels -> Input Reading (F2)**) contains a graph to see how the input is changing over time.

   » Note that if any part of the system is modified (i.e. changing to a different bucket) then the Bucket Load Cell input must be recalibrated. This can be performed while doing the first fill using the new bucket.

» Ensure the Fill Level, Fill Pump and Drop Release inputs are not installed: (Bucket Drop Release should be installed, Drop Release should not)

   » Settings -> Inputs -> Fill Level -> Input Designation

   » Settings -> Inputs -> Fill Pump -> Input Designation

   » Settings -> Inputs -> Drop Release -> Input Designation

Instructions for Aircraft with a Tank

Using the Controller

» Set Tank Volume to the volume of the tank
  (**Settings -> Tracking -> Fire -> Tank Volume**).

» Connect the Drop Release input for the tank to one of the DZMx Plus input lines, and configure the input
  (**Settings -> Inputs -> Drop Release -> Input Designation**). Also configure the Input Type (maintained or momentary) and Input Configuration (closed when doors closed or open when doors closed).

» Optionally, set up additive inputs if you wish to track additives (See section 'Instructions for Additive Inputs').

» Tanks can be set up to work with either a Fill Pump input or a Fill Level input. Only one needs to be set up. If you have the choice, Flightcell recommends using a Fill Level input, because with a Fill Pump input there is no way to tell exactly how much water has been dropped, and performing partial drops requires wiring an extra input.

» To set up a tank with a Fill Level input:

  » Connect the Fill Level input to one of the DZMx Plus input lines, and configure the input

  » (**Settings -> Inputs -> Fill Level -> Input Designation**).

  » If the aircraft is fixed wing, and the aircraft is being filled on the ground, set the Maximum Fill Speed setting (Tracking -> Firefighting Options -> Maximum Fill Speed). This records the tank level on the ground instead of in the air, if the tank level is stable and under the set speed. This is not mandatory, but it is recommended for more accurate fill level tracking. To disable this, leave the Maximum Fill Speed setting at zero.

  » Calibrate the Fill Level input:

    » With an empty tank, select Calibrate Low Level from the Fill Level menu (**Settings -> Inputs -> Fill Level -> Calibrate Levels -> Calibrate Low (F4)**) and press ENTER to calibrate.

    » With a full, or almost full tank, select Calibrate High Level from the Fill Level menu

    » (**Settings -> Inputs -> Fill Level -> Calibrate Levels -> Calibrate High (F3)**) and press ENTER.

    » The Controller will then prompt for the current volume in the tank. After entering in the amount, press ENTER to complete calibration. The volume entered cannot be higher than the full tank volume specified in the Tank Volume setting.

    » Note that (**Settings -> Inputs -> Fill Level -> Calibrate Levels -> Input Reading (F2)**) contains a graph to see how the input is changing over time.

> » Note that if any part of the system is modified (i.e. changing to a different tank) then the Fill Level input must be recalibrated. This can be performed while doing the first fill using the new tank.

» To set up a tank with a Fill Pump input:

> » Connect the Fill Pump input to one of the DZMx Plus input lines, and configure the input (**Settings -> Inputs -> Fill Pump -> Input Designation**). Also configure the Input Configuration (closed when pump off or open when pump off).
>
> » Set the Fill Flow Rate to the flow rate of the pump per minute (**Settings -> Tracking -> Fire -> Fill Flow Rate**).
>
> » If setting up partial drops is desired, connect the Drop Type Select input to one of the DZMx Plus input lines, and configure the input (**Settings -> Inputs -> Drop Type Select -> Input Designation**). Also configure the Input Configuration. This input selects either dropping only door one or both doors. It is used to report partial drops (either dropping 50% of the tank, or all of it).

Instructions for Aircraft with an Erickson AWTC

Using the Controller

» Set the Debug Port Configuration to "Erickson AWTC" (**Settings -> Hardware -> External -> Debug Port Config > Erickson AWTC**).

» Connect the Erickson AWTC to the DZMx Plus RS-232 Debug Port.

» Optionally, set up additive inputs if you wish to track additives (See section 'Instructions for Additive Inputs').

Instructions for Aircraft with a Kawak AWTC

Using the Controller

» Turn the Kawak AWTC Connected setting on (**Settings -> Tracking -> Fire -> Kawak AWTC Connected**)

» Set Tank Volume to the volume of the tank (**Settings -> Tracking -> Fire -> Tank Volume**).

» Connect the Kawak AWTC to the DZMx Plus RS-485 Port, refer to wiring diagrams for correct connection

» The Kawak AWTC already tracks additives, so no additional inputs are required

Instructions for Aircraft with an AFDAU-T1

Using the Controller

» Set the Debug Port Configuration to "AFDAU"

(**Settings -> Hardware -> External -> Debug Port Config -> AFDAU**).

» Connect the AFDAU-T1 to the DZMx Plus RS-232 Debug Port, refer to wiring diagrams for correct connection

» The AFDAU tracks required telemetry, so no additional inputs are required.

Instructions for Additive Inputs

The DZMx Plus will report additives in drop events if they are configured. There are several ways to configure additive inputs.

There are two options for telling the DZMx Plus what additive the aircraft is using.

» The **Additive Type Loaded** setting - Always uses the selected additive. This has options for Foam, Gel, Retardant, or None. Set the setting to a value other than None to use this method using the Controller

(**Settings -> Tracking -> Fire -> Additive Type Loaded**).

» The **Additive Type Select** input - Allows for switching between Foam and Gel additives. Retardant is not usable with this method. To do this, connect the Additive Type Select input to one of the DZMx Plus input lines, and configure the input. Using the Controller

(**Settings -> Inputs -> Additive Type Select -> Input Designation**). Also configure the Input Configuration.

There are three options for telling the DZMx Plus when the additive has been added and quantity.

» **No Additive Pump input** - The additive will be always added. The concentration of the additive will not be stored.

» **Additive Pump input (momentary)** - If the input is activated, the additive will be added. The concentration of the additive will not be stored.

» **Additive Pump input (maintained)** - If the input is activated, the additive will be added. The concentration of the additive will be stored based on the Additive Flow Rate and how long the input was activated for. This is the only option which allows for reporting how much additive has been dropped.

For options 2 and 3, to configure the Additive Pump input, connect the Additive Pump input to one of the DZMx Plus input lines, and configure the input. Using the Controller

(**Settings -> -> Inputs -> Additive Pump -> Input Designation**).

Also configure the Input Type (maintained or momentary) and Input Configuration (closed when pump off or open when pump off).

Instructions for Aircraft with a Tank or Bucket

This is an advanced configuration.

- » Install a tank and bucket as normal following the instructions above. However:
- » To save an input, do not install the Bucket Drop Release switch. Instead, the tank and bucket can share the standard Drop Release switch. This is optional.
- » Tank events will only be recorded when the Bucket Connected input is off. Bucket inputs will only be recorded when the Bucket Connected input is on.

Advanced settings

There are several settings for the Fire App that haven't been described in the main installation instructions. See the Fire App Settings Reference section above for more information. Some of these settings are only available through DZMx Connect. They are as follows:

- » Max Valid Fill Time
- » Min Valid Drop Time
- » Partial Drop Time Limit
- » Fire Tank Data Logging

Fire App Testing Guide

This section contains tests to verify your configuration. There are tests for the following configurations:

- » Fill Pump configured
- » Fill Level / Bucket Load Cell configured
- » Erickson AWTC configured
- » Kawak AWTC configured

Before starting any of these tests:

- » Restart the DZMx Plus to ensure any settings changes have been applied.
- » Ensure you are properly connected to your tracking provider. For example, press the MARK key to send a tracking message, and view it through the tracking provider.

» Open the fire diagnostics screen on the Controller screen (**Maintenance -> Diagnostics -> Fire Tank Diagnostics / Fire Bucket Diagnostics / AWTC Diagnostics**). This page contains useful information to help test the Fire App.

Fill Pump configured

» Start with the tank empty.

» Turn the fill pump on for a similar amount of time to how long a real fill would take (or, do a real fill).

» Check tank volume has increased on the diagnostics screen and a fill message has been sent.

» Turn drop release on for a similar amount of time to how long a real drop would take (or, do a real drop).

» Check tank volume has dropped and drop start/drop end messages have been sent.

Fill Level / Bucket Load Cell configured

» Start with the tank/bucket empty, and the aircraft grounded or hovering.

» Add water to tank/bucket (at least 20% of max volume)

» Check tank/bucket volume has increased on the diagnostics screen.

» Start flying.

» Check fill message has been sent and tank/bucket state has returned to level.

» Turn drop release on and drop some water, then turn drop release off.

» Check tank/bucket volume has dropped, drop start/drop end messages have been sent, and tank/bucket state has returned to level.

Erickson AWTC configured

» Start with the tank empty.

» Fill it with at least 250 gal of water.

» Check tank volume has increased on the diagnostics screen and a fill message has been sent.

» Activate drop signal, drop some water and then deactivate drop signal.

» Check tank volume has dropped on the diagnostics screen and drop start/drop end messages have been sent.

Kawak AWTC configured

» Start with the tank empty, and the aircraft grounded.

» Fill it with at least 250 gal of water.

» Check tank volume has increased on the diagnostics screen and a fill message has been sent.

» Activate drop signal, drop some water and then deactivate drop signal.

» Check tank volume has dropped on the diagnostics screen and drop start/drop end messages have been sent.

Appendix 7: DZMx Connect

DZMx Connect is a versatile web application designed to configure and operate the DZMx Plus.

Accessing DZMx Connect

1. Wired Ethernet Connection

 » Connect a computer to the DZMx Plus Ethernet port.

 » Open a web browser and enter 192.168.4.1 in the address bar, then press enter. The DZMx Connect home screen will appear.

2. Wireless Laptop Connection

 » Power on the DZMx Plus and allow it to complete its initialization.

 » Check for the Wi-Fi icon at the top right of the Controller display. If the icon is not visible, enable Wi-Fi following the instructions for setting up Wi-Fi in section DZMx Plus Wi-Fi

 » Open a web browser on your laptop, enter 192.168.2.1 in the address bar, and press enter. The DZMx Connect home screen will be displayed.

Permission Levels

Permission levels control how users can configure the DZMx Plus, with three distinct roles available within DZMx Connect:

1. **Operator**: Upon power-up, DZMx Connect is automatically in operator mode. This role has access to all standard functions of the DZMx Plus. Only a limited range of settings which may need adjustment by the operator are accessible.
2. **Installer and Administrator**: These roles have access to additional functions and settings that are password-protected. Details about these roles can be found in the Installation Manual.

DZMx Connect on Mobile

Adding DZMx Connect to Home Screen

The user can add an Icon for DZMx Connect to their home screen from a mobile browser, by selecting Add to Home Screen from the relevant browser menu.

Switching between Mobile/Desktop Site Versions

When using DZMx Connect through the Chrome browser on iOS/Android (as opposed to the native application), pages that contain an upload function do not display those buttons. This is because the site has been loaded as a mobile version.

To resolve this, the user may click the three dots to the right of the address bar and select "Request Desktop Site". They will then need to re-authenticate with the DZMx and the relevant buttons should now be available.

Page Descriptions

Contact Page

Enables contacts to be added or edited. Swiping left on a contact opens options for that contact, including calling, sending SMS messages, editing the contact, and deleting the contact. A contact's quick message groups & event message groups can also be edited.

Contacts can be added with the + symbol in the top left.

The buttons in the top right corner allow for uploading and downloading phonebooks. This can be used to transfer contacts across multiple DZMx Plus devices.

SMS Page

Allows for browsing past SMS conversations and sending SMS messages.

New messages can be sent with the pencil symbol in the top left.

Dialler Page

Allows for calls to be dialled. The call history can also be viewed. Pressing X on a modem will hang that modem up if it is in a call.

Inbox Page

The Flightcell SBD transmission protocol allows DZMx Plus to send and receive messages, files and data between tracking providers and the DZMx Plus. The Flightcell SBD transmission protocol allows files larger than the max SBD transmission size to be sent as a multi-part file over multiple SBD messages. Flightcell can provide a separate integration guide for customers wishing to utilise DZMx APIs and SBD features.

Flight Page

There are 7 possible tabs within this page. Not all may be accessible, depending on the DZMx Plus configuration:

- » **Map** - Provides a moving map showing aircraft position (when a cellular data connection is available), and allows for pressing Mark, A.R.M. and Emergency.

- » **Air Traffic** - If an SDR is installed and set to ADS-B mode, this provides a TCAS-style display with nearby air traffic. The table lists all nearby aircraft detected.

- » **Marine Traffic** - If an SDR is installed and set to AIS mode, this provides a TCAS-style display with nearby marine traffic. The table lists all nearby watercraft detected.

- » **Flight Timers** - Includes Hobbs Timers (or maintenance timers) allowing the user to track flight time and other flight statistics.

- » **Flight Data** - Includes several flight instruments based on the position of the DZMx Plus. Not to be used for flight control or navigation.
- » **Direction Finder** - The Direction Finder is a licensed feature that allows a user to operate a subset of the controls of a connected Rotheta RT-600 device. This DZMx Connect tab contains:
  - » The unit status
  - » The RT-600 output
  - » Frequency range selector
  - » Frequency control slider
  - » Volume slider
  - » Squelch slider
  - » Dimming control
  - » On the map tab, a map overlay will indicate the direction finder heading and min/max readings with a triangle originating from the current aircraft position.
- » **Load Status** - The Load App is not supported with the Controller at the moment. There are plans to support it in the future.

Forms Page

Allows for managing and filling out forms. See TODO for more information.

Connectivity

Allows for managing Data, Wi-Fi, and Bluetooth connections.

Remote Access

Allows Flightcell to provide remote support for the DZMx Plus with Controller. This is described in detail in the Installation Manual.

Settings

Allows for managing various DZMx Plus settings.

Flightcell

Technical support

117-00023 Rev 1.0 Flightcell DZMx Plus with Flightcell Controller Installation Manual

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