APPAREO

RECOVERABLE DATA MODULE MODEL 300

DESCRIPTION

The RDM-300 is a lightweight, flexible, and affordable crash-hardened memory storage device. The RDM-300 is built with a rugged and compact enclosure to withstand intense DO-160G category tests to ensure the survival of critical flight data. At a weight of less than 2 pounds, the RDM-300 perfectly balances rigorous survivability needs while optimizing the size and weight of the product.

The RDM-300 can be used in conjunction with the Appareo Conexus® line of connectivity modules to further data storage, acquisition, and transmission options.
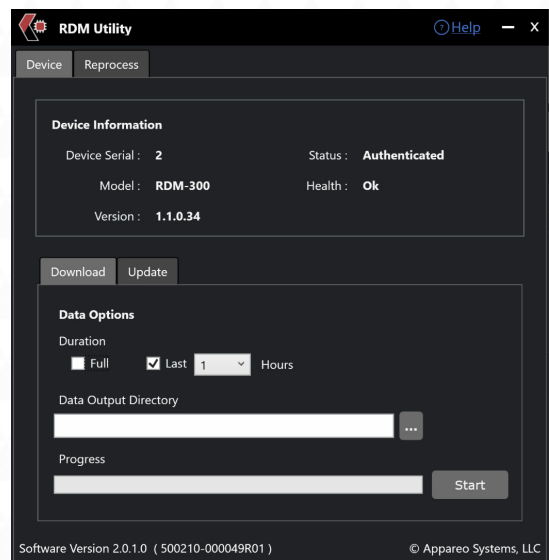
HARDWARE FEATURES

- Configurable ARINC 429 Data Decoding
- ARINC 429 High or Low Speed Receiver
- RS-422 Transmitter and Receiver
- Optional RS-422 Transmitter
- 5 GB eMMC Storage
- Less than 2 Pounds
- AS Flight Compatible
- Integrates with Appareo Conexus® modules
- Can receive and store flight data from AIRS-400
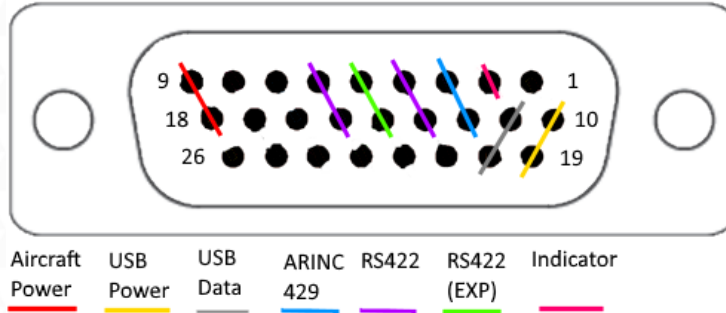
SOFTWARE UTILITY FEATURES

- Configurable ARINC 429 Data Decoding
- Compatible with Windows 10 and 11
- USB Communication
- Report RDM Health
- RDM Firmware Update
- RDM Data Offload
    - ARINC 429 to GPX format (for AS Flight)
    - ARINC 429 to CSV
    - ARINC 429 to BIN
    - Download Diagnostic Data to CSV
- Format RDM eMMC
- RDM ARINC Bus Speed Configuration

RDM Utility ? Help — X

Device | Reprocess

Device Information

Device Serial : 2   Status : **Authenticated**

Model : **RDM-300**   Health : **Ok**

Version : **1.1.0.34**

Download | Update

Data Options

Duration

☐ Full   ☑ Last [1 ⌄] Hours

Data Output Directory

[ ] ...

Progress

[ ] Start

Software Version 2.0.1.0 (500210-000049R01)   © Appareo Systems, LLC

QUALIFICATIONS

DO-160G | DO-178B Level E

INPUT / OUTPUT

Connector Pin	Signal Name	Function
1	Reserved	Reserved
2	IND_OUT	Indicator Output
3	ARINC429_L	ARINC 429 Low
4	RS422_H_RX	RS422 High Receive
5	RS422_E_H_TX	RS422 High Transmit
6	RS422_H_TX	RS422 High Transmit
7	Reserved	Reserved
8	Reserved	Reserved
9	AIR_PWR_IN	Aircraft Power In
10	USB_GND	USB Ground In
11	USB_DP	USB Data +
12	ARINC429_H	ARINC 429 High
13	RS422_L_RX	RS422 Low Receive
14	RS422_E_L_TX	RS422 Low Transmit
15	RS422_L_TX	RS422 Low Transmit
16	Reserved	Reserved
17	Reserved	Reserved
18	AIR_GND	Aircraft Ground
19	USB_PWR_IN	USB Power In
20	USB_DM	USB Data -
21	Reserved	Reserved
22	Reserved	Reserved
23	Reserved	Reserved
24	Reserved	Reserved
25	Reserved	Reserved
26	Reserved	Reserved

ABSOLUTE MAXIMUM RATINGS

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating conditions for extended periods may affect device reliability and lifetime.

Parameter	Value
Storage Temperature	-55 to 85°C
Operating Temperature	-55 to 70°C

ENVIRONMENTAL SPECIFICATIONS

Section	Section Title	DO-160G Category
4	Temperature and Altitude	C4
5	Temperature Variation	A
6	Humidity	A
7	Operational Shocks and Crash Safety	A
8	Vibration	S/M, H/R
15	Magnetic Effect	B
16	Power Input	B
17	Voltage Spike	B
18	Audio Frequency Conducted Susceptibility	B
19	Induced Signal Susceptibility	BC
19.3.5	Spikes Induced into Interconnecting Cables	X (ISO 7637-2-2004)
20	Radio Frequency Susceptibility	S
21	Emission of Radio Frequency Energy	M
22	Lightning Induced Transient Susceptibility	A3XXXX
25	Electrostatic Discharge	A

SURVIVABILITY

Parameter	Value
Impact	1,000Gs x .5 mSec
Fire	1,000 degrees C / 15 minutes
Water	Immersion to 200' for 48 hours

ELECTRICAL SPECIFICATIONS

| Parameter	Min	Typ	Max	Unit
Power				
Input voltage	8	28	32.2	VDC
Current		48	70 257 (< -40°C)*	mA
ARINC 429				
Data Rate	Low Speed 12.5		High Speed 100	Kbps
RS-422				
Data Rate		230.4		Kbps
RS-422 (Expansion)**				
Data Rate	115.2			Kbps
USB				
USB Client	Meets USB 2.0 full speed			
USB Power In	4.5	5	5.5	VDC
		224	300	mA

* Low temp max current is due to internal heating element.

** The RS-422 expansion port cannot output messages as fast as the rest of the device can ingest them. Exceeding the expansion port's data rate will result in excess messages not being sent over the expansion port. This will not affect recording – all messages will still be recorded successfully – and installations not using the expansion port can disregard any errors regarding the expansion port.

INDICATOR LED

The indicator LED of the RDM-300 is used to show whether the device has encountered any errors. During normal operation, the LED shows a steady 2 Hz blink. If an applicable error or errors are encountered, the LED will show blink codes separated by long, steady on-periods. If there are multiple errors, the error codes will be cycled through. The RDM Utility can be used to retrieve more specific error reasons from the device's logs.

The following diagrams show a normal LED pattern and an error code 3 LED pattern.

NORMAL OPERATION
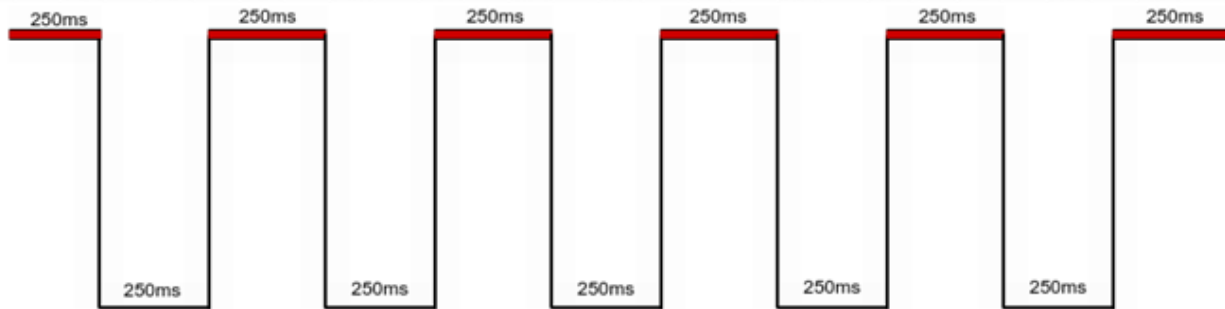
ERRORS DETECTED
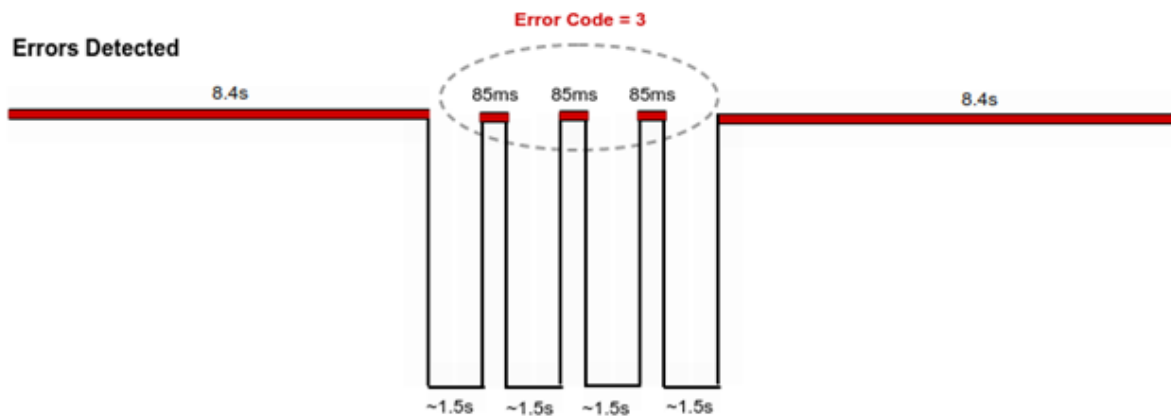
ERROR CODES AND REASON CODES

The RDM-300 records and indicates errors and warnings using "error codes". These error codes consist of more specific "reason codes".

Some error codes are indicated by the LED and/or recorded to the RDM-300 with their corresponding reason code.

Unless otherwise noted, error codes causing the LED to flash will remain flashing for the remainder of the power cycle, even if the conditions causing the error are corrected.

Error codes and reason codes recorded to the RDM-300 can be retrieved using the RDM Utility. The following table can help in understanding codes seen on the LED or recorded on the RDM-300, or to troubleshoot unexpected behavior of the RDM-300.
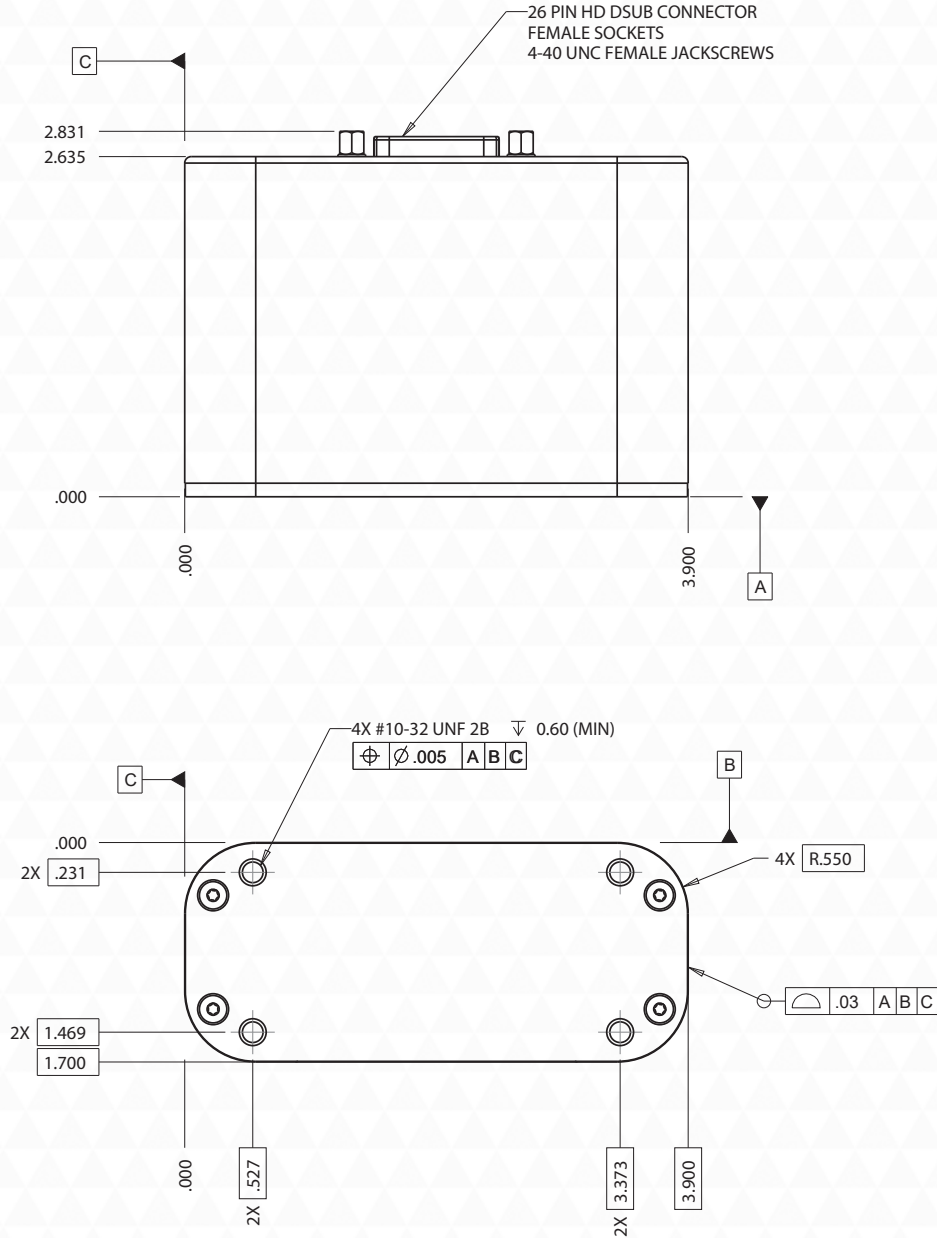
Error Code	Error Description	Reason Code	Reason Description	Checked	Shown or LED?	Recorded?	Notes
1	Power	0	Brownout condition	Continuously	Yes	No	-
		1	SDIO failure	Startup	Yes	Yes	-
		2	Initialization failure	Startup	Yes	Yes	-
		3	Configuration failure	Startup	Yes	Yes	-
		4	ECSD failure	Startup	Yes	Yes	-
		5	Device health is near failure	Startup	Yes	Yes	-
2	eMMC	6	Read failure	Continuously	Yes	Yes	-
		7	Write failure	Continuously	Yes	Yes	-
		8	Queue failure	Continuously	Yes	Yes	-
		9	Erase failure	Continuously	Yes	Yes	-
		10	Load failure	Startup	Yes	Yes	-
		11	ARINC starting location failure	Startup	Yes	Yes	-
		12	RS422 starting	Startup	Yes	Yes	-

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Error Code	Error Description	Reason Code	Reason Description	Checked	Shown or LED?	Recorded?	Notes
		13	Diagnostic starting location failure	Startup	Yes	Yes	-
		14	Configuration failure	Startup	Yes	Yes	-
		15	No data	Continuously	30s	Yes	Will display for a maximum of 30 seconds
3	ARINC 429	16	Buffer overflow (RX)	Continuously	Yes	Yes	-
		17	Cache overflow	Continuously	Yes	Yes	-
		27	Bus speed Configuration Mismatch	Continuously	Yes	Yes	If triggered the RDM may or may NOT collect A429 data
		18	Handshake failure	Continuously	Yes	Yes	-
4	RS-422	19	Buffer overflow (RX)	Continuously	Yes	Yes	-
		20	Buffer overflow (TX)	Continuously	Yes	Yes	-
		21	Cache overflow	Continuously	Yes	Yes	-
5	Expansion	22	Buffer overflow (TX)	Continuously	No	Yes	It is normal for this error to trigger if the system is ingesting data at a very high rate, in which case not all ingested messages will be outputted to the expansion port. This error can be disregarded on installations where the expansion port is not used. Data will still be recorded to the system normally.

Error Code	Error Description	Reason Code	Reason Description	Checked	Shown or LED?	Recorded?	Notes
		23	Internal firmware checksum failure	Startup	No	Yes	-
6	Firmware	24	Update Image Invalid	On Firmware Update	No	Yes	-
		25	Update image Applied	On Firmware Update	No	Yes	-
		26	Watchdog reset detected	Startup	No	Yes	-

MECHANICAL

26 PIN HD DSUB CONNECTOR
FEMALE SOCKETS
4-40 UNC FEMALE JACKSCREWS

C

2.831
2.635

.000

.000

3.900

A

4X #10-32 UNF 2B ⊽ 0.60 (MIN)
⊕ | ⌀.005 | A | B | C

C   B

.000
2X .231   4X R.550

2X 1.469
1.700   ⌒ | .03 | A | B | C

.000   2X .527   2X 3.373   3.900

Measurement Units: Inches

Weight: 1.83 lbs
IP Rating: IP67

Recommended Mating Connectors:
HD-DSUB-26M

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