
BlueMAX

Bluetooth Adapter

Installation Instructions

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Revision 5

Approved:



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Revision History

Date	Revision	Document Changes
2017-02-17	1	Initial Draft
2017-02-22	2	Revised document list
2017-02-22	3	Placard CB; Flight manual supplement
2017-04-13	4	Minor corrections to wiring instructions
2017-06-07	5	Additional information on wiring and connector identification.

Table of Contents

1	Introduction	6
1.1	<i>The BlueMAX module</i>	6
1.2	<i>Applicability</i>	6
2	Definitions.....	6
3	Specifications	7
4	Referenced Documents.....	7
5	Power requirements.....	7
6	Preparation for installation	7
6.1	<i>Aircraft identification</i>	7
6.2	<i>Connector identification</i>	7
6.3	<i>Verifying presence of SIU</i>	9
a)	Missing connectors in SIU aircraft	10
6.4	<i>Verify primary engine data on PFD for DAU aircraft</i>	10
7	Installation with MFD permanently removed	11
8	Parts required.....	12
9	Tools required	12
9.1	<i>Probing connector P1426B</i>	12
10	Installation procedure.....	13
10.1	<i>SIU aircraft - if the MFD has been permanently removed</i>	13
10.2	<i>SIU aircraft - with MFD fitted</i>	13
10.3	<i>DAU G2 Aircraft</i>	14
10.4	<i>G3 Aircraft</i>	14
11	Post install checks	14
12	Weight and balance	15
13	Flight Manual Supplement	15
14	Logbook entry.....	15
15	Instructions for continued airworthiness	15
16	Removal of the BlueMAX installation	15
17	Technical support.....	15

List of Tables

Table 1: BlueMAX Technical specifications	7
Table 2: Referenced Documents	9
Table 3: Engine monitor types	11
Table 4: BlueMAX part numbers	12

List of Figures

Figure 1 Connector locations	8
Figure 2: Analog engine instruments	10
Figure 3: Primary engine data on PFD	11
Figure 4: Probing P1426B	13

1 Introduction

1.1 The BlueMAX module

The BlueMAX module captures serial data from an Avidyne engine monitoring system and streams it via Bluetooth Low Energy to portable devices. This enables supplementary engine data to be displayed and logged on a portable device.

The BlueMAX installation is not intended to replace primary engine instruments.

Optionally, the module may also be connected to the serial GPS data transmitted by the #1 GPS navigator to the MFD, providing navigation data to the portable device via Bluetooth to enable calculations such as fuel at destination.

1.2 Applicability

The BlueMAX module is intended for installation into aircraft already fitted with an Avidyne engine monitoring system, utilizing either a Data Acquisition Unit (DAU) or a Serial Interface Unit (SIU.) The majority of such installations are in Cirrus SR22 and SR20 aircraft, and these instructions relate specifically to those models.

2 Definitions

The following abbreviations and acronyms are used in this document:

BLE	Bluetooth Low Energy – the radio protocol used by the BlueMAX module, operating at 2.4GHz.
DAU	Data Acquisition Unit – one of the two interface modules used by Avidyne to collect analog engine data and convert to RS-232 serial data.
SIU	The other Avidyne interface module, used on older aircraft.
DTU	Data Transfer Unit – a module installed in G3 aircraft which collects aircraft data and transmits it to a logging module.
EMAX	Avidyne’s product name for the engine monitoring system.
MFD	Multi Function Display – a panel-mounted display used to display non-flight-critical data, including supplementary engine data.
EX5000	The Avidyne MFD installed in Cirrus SR22 and SR20 aircraft.
PFD	Primary Flight Display – a panel mounted display for flight-critical information.
RS-232	A serial data format used for low-speed communication between electronic devices.
AMM	The Cirrus Aircraft Maintenance Manual (see Table 2: Referenced Documents.)

3 Specifications

Size (module only)	55.2 x 52 x 19mm
Weight (installed, including harness)	Less than 100g
Voltage	5-35 V DC
Current	Maximum: 10mA; Average: 2mA
Transmission protocol	Bluetooth Low Energy (2.4GHz)
Transmission power (peak)	4 dBm (2.5 mW)

Table 1: BlueMAX Technical specifications

4 Referenced Documents

The documents referred to in these instructions are listed in Table 2: Referenced Documents.

5 Power requirements

The BlueMAX module draws a maximum of only 10mA and may be supplied from an existing breaker. It is recommended that it be supplied from the convenience power breaker CB638 (5A or 3A depending on aircraft configuration) on the non-essential bus. All power wiring to the BlueMAX adapter should be 22AWG, which is rated to 5A per AC 43.13-1B, or heavier.

6 Preparation for installation

6.1 Aircraft identification

Cirrus aircraft fitted with Perspective avionics are not eligible for BlueMAX installation.

Cirrus aircraft fitted with Avidyne EMAX engine monitoring fall into two general categories – those fitted with an SIU or those fitted with a DAU. SIUs are fitted only to early serial numbers and can be identified by the presence of analog engine instruments on the right hand side of the instrument panel. Note that that the SIU was an option, and may not be fitted to all applicable aircraft. Later Avidyne-equipped aircraft do not have the analog instruments on the panel (there is a glove box in the location where the engine instruments were) and all these aircraft are fitted with a DAU. The DAU provides two RS-232 outputs, one feeds the MFD and is used for connection to the BlueMAX module, and the other feeds the PFD which displays the primary engine instrumentation.

6.2 Connector identification

Connectors installed by Cirrus are generally well labeled, but note that there is a peculiarity with the nomenclature used – connectors with male pins (which would normally be called “plugs”) are called jacks and labeled as Jnnn and connectors with

female pins (which would normally be called “sockets” or “jacks”) are called plugs and labeled as Pnnn.

If connection is to be made to GPS data from the #1 GPS on wire ANGP543-22, this is located in J518 (most aircraft) or J517 (serial numbers 22-0434 and earlier, and 20-1336 and earlier.) Refer to the Cirrus wiring manual for further information.

J518 carries RS-232 GPS #1 (wire ANGP543-22) data on pin 9 . J518 is a D-Sub plug (i.e. male pins) which connects to P518, which is mounted on the top right of the radio rack, below the MFD opening. J518 is secured by a slide-lock so is relatively easy to remove, but there may be other cables in the way that will have to be disconnected to access it.

P1047 and J1047 are present in G3 aircraft only, and are located forward of the MFD. They use metal backshells with slide-lock coupling.

P1426 and J1426 are located in the same area, and are found in all DAU aircraft. They have plastic backshells and jackscrew coupling. See Figure 1 Connector locations. Both pairs of connectors are unplugged from each other in this image. There may be variations in the hardware in different aircraft, but all should be labeled – verify identification by checking the labels.



Figure 1 Connector locations

Title	Document number	Rev	Date
Internal documents			
SIU harness	2350-07	3	2017-02-22
P528 harness	2350-06	2	2017-02-20
DAU harness	2350-08	3	2017-06-06
G3 harness	2350-11	3	2017-06-06
J719-P719 Wiring	2530-17	1	2017-06-07
BlueMAX installation – SIU	2350-09	1	2017-02-15
BlueMAX installation – DAU G2	2350-10	1	2017-02-15
BlueMAX installation – DAU G3	2350-12	1	2017-02-16
BlueMAX installation - MFD removed	2530-13	1	2017-02-17
BlueMAX module – circuit	2530-16	3	2017-02-22
BlueMAX module - mechanical	2350-01	2	2017-02-22
External documents			
AIRPLANE WIRING MANUAL FOR THE CIRRUS SR22 AND SR22T	13775-001	D4	2016-01-01
AIRPLANE WIRING MANUAL FOR THE CIRRUS SR20	12129-001	C5	2016-01-01
AIRPLANE MAINTENANCE MANUAL FOR THE CIRRUS SR20	12137-001	B7	2016-01-01
AIRPLANE MAINTENANCE MANUAL FOR THE CIRRUS SR22 AND SR22T	13773-001	B6	2016-01-01
ACCEPTABLE METHODS TECHNIQUES, AND PRACTICES—AIRCRAFT INSPECTION AND REPAIR	AC 43.13-1B	1	1998-09-08

Table 2: Referenced Documents

6.3 Verifying presence of SIU

If the aircraft is fitted with analog engine instruments as shown in Figure 2: Analog engine instruments, confirm the presence of an SIU either by verifying that the MFD displays engine data on the Engine page, or visually confirm the presence of an SIU mounted on the co-pilot side kick panel (below the analog engine instruments.) Refer to

the Cirrus AMM chapter 77-40. If the aircraft has analog engine instruments and no SIU the BlueMAX module cannot be installed.

a) Missing connectors in SIU aircraft

The SIU serial data is connected from the SIU to the MFD by cable ANMD977-22 (refer to Cirrus Wiring Manual chapter 77-00-01) and in SR22s with serial numbers 1087 and above, and SR20s with serial numbers 1456 and above, this cable incorporates a pair of connectors labelled J719/P719 which provides a convenient place to insert the adapter harness p/n 4370-03. Aircraft with serial numbers below those ranges may not have J719/P719 fitted and installation of BlueMAX will be facilitated if those connectors are installed in accordance with the Cirrus Wiring Manual chapter 77-00-01. The necessary connectors can be ordered from Control-J as part number 4370-9869 and drawing 2530-17 provides additional guidance.

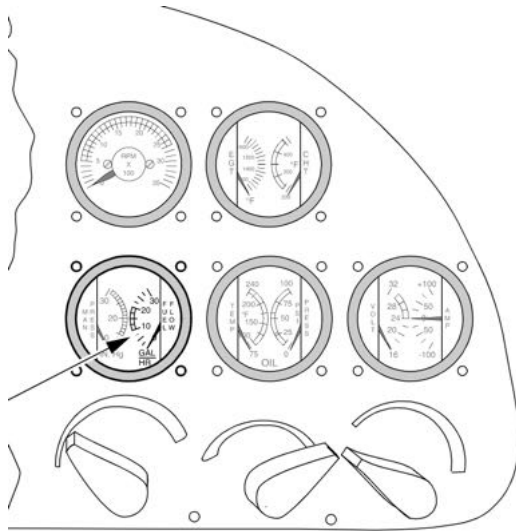


Figure 2: Analog engine instruments

6.4 Verify primary engine data on PFD for DAU aircraft

DAU equipped aircraft display primary engine data on the PFD, but this requires that the software version installed on the PFD supports this display. To verify this, power up the aircraft and inspect the lower right area of the PFD. There should be a data block with primary engine data as shown in Figure 3: Primary engine data on PFD. If this data is absent, the PFD software must be upgraded before installing BlueMAX.

The applicable aircraft models, serial numbers and configurations are summarised in Table 3: Engine monitor types.



Figure 3: Primary engine data on PFD

Model	Serial numbers	Interface type	Notes
G1/G2 SR22	0002 - 1601, 1603 - 1643 and 1645 - 1662	SIU	SIU must be fitted.
G2 SR22	1602, 1644, 1663 - 2437	DAU G2	Verify primary engine data displayed on PFD
G3 SR22 (with Avidyne Avionics)	2438 and subsequent	DAU G3	Verify primary engine data displayed on PFD
G1/G2 SR20	1005 - 1581	SIU	SIU must be fitted.
G2 SR20	1582 - 1877, 1879 - 1885	DAU G2	Verify primary engine data displayed on PFD
G3 SR20 (with Avidyne Avionics)	1878, 1886 & subsequent	DAU G3	Verify primary engine data displayed on PFD

Table 3: Engine monitor types

7 Installation with MFD permanently removed

If the MFD has been permanently removed from the aircraft, an alternative installation method is to connect the BlueMAX module to the now unused MFD connector. This connector is shown in the Cirrus Wiring Manual as P528. This provides serial engine

data, serial GPS data (SIU aircraft only) and power in a single connector. An adapter harness p/n 4370-9630 is available to plug directly into P528.

Installation in DAU equipped aircraft will be the same regardless of whether the MFD is fitted or not, as the MFD connector P528 in DAU equipped aircraft does not receive GPS data over RS232, so connection via P528 is not recommended.

8 Parts required

Installation of BlueMAX requires the BlueMAX module and an adapter harness which connects it to the aircraft wiring. The harness for SIU and DAU aircraft are different – order the correct parts as listed in Table 4: BlueMAX part numbers. The kit part numbers include the BlueMAX module and the appropriate harness and connectors (where necessary.) In addition, there may be cable ties, wire, splices and other common electrical parts required – these are not included in the kit.

Installation type	BlueMAX module	Adapter Harness	Connectors	Kit
SIU	4370-2730	4370-5146	N/A	4370-8012
SIU (J719/P719 not present)	4370-2730	4370-5146	4370-9869	4370-1477
DAU G2	4370-2730	4370-2720	N/A	4370-4451
DAU G3	4370-2730	4370-8434	N/A	4370-4734
SIU with MFD permanently removed	4370-2730	4370-9630	N/A	4370-5604

Table 4: BlueMAX part numbers

9 Tools required

For post installation checkout a BLE scanner will be required. BLE scanners are available as apps for installation on Android or iOS portable devices.

Standard tools will be required.

9.1 Probing connector P1426B

If it is required to probe the connector P1426B (this is the one that plugs into the BlueMAX module) to confirm continuity or measure power supply voltage, do NOT insert a probe into the pin opening as this will damage the terminal. Use a fine probe (0.66mm or smaller) in the probe opening below the pin opening – see Figure 4: Probing P1426B.

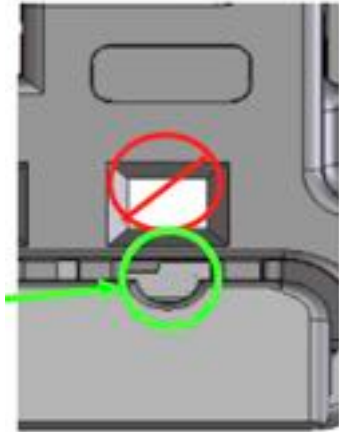


Figure 4: Probing P1426B

10 Installation procedure

Install the BlueMAX system in accordance with one of the following procedures. All wiring should be performed in accordance with AC 43.13-1B.

10.1 SIU aircraft - if the MFD has been permanently removed

- a) Gain access behind the instrument panel through the opening where the MFD was previously fitted.
- b) Plug P528 adapter harness p/n 4370-9630 into the MFD connector P528.
- c) Plug the BlueMAX module into the other end of the adapter harness.
- d) Secure the module and cabling to existing structure or wire bundles using cable ties.

10.2 SIU aircraft – with MFD fitted.

- a) Remove MFD to gain access behind the instrument panel.
- b) Locate P719 and J719. If these are not fitted locate wire ANMD977-22 running from the SIU to the MFD, and install P719 and J719 in accordance with the Cirrus Wiring Manual. Control-J drawing 2530-17 is available for guidance on the connector wiring.
- c) Disconnect P719 and J719 from each other and re-connect to the SIU harness p/n 4370-5146.
- d) If GPS data is to be connected to the BlueMAX module, locate wire ANGP543-22 which runs from GPS1 to the MFD and splice the signal wire to the inner of the shielded wire provided in the adapter harness. To avoid an earth loop do not connect the shields together (the shield is earthed at the BlueMAX module end.)
- e) If GPS data is not to be connected, cap and stow the shielded cable, or remove from the BlueMAX connector.
- f) Run the power wire in the SIU harness to the circuit breaker panel and terminate to the convenience power breaker currently labeled “12VDC OUTLET”. Relabel the breaker “12VDC OUTLET/BLUETOOTH”.
- g) Plug the BlueMAX module into the other end of the adapter harness.
- h) Secure the module and cabling to existing structure or wire bundles using cable ties.

- i) Replace MFD IAW the Cirrus AMM.

10.3 DAU G2 Aircraft

- a) Remove MFD to gain access behind the instrument panel.
- b) Locate P1426 and J1426. These will be directly behind the MFD. Disconnect P1426 and J4126 from each other and re-connect to the DAU harness p/n 4370-2720.
- c) If GPS data is to be connected to the BlueMAX module, locate connector pair P518/J518 (at the top right of the radio rack) disconnect, and remove the backshell from J518. Pin 9 in J518 should be empty.
- d) The adapter harness has a shielded wire attached terminated with a pre-crimped male pin. Insert this pin into J518 in the pin 9 position.
- e) Replace the backshell on J518, securing all cables. Reconnect J518 to P518.
- f) If GPS data is not to be connected, cap and stow the shielded cable, or remove from the BlueMAX connector.
- g) Run the power wire in the DAU harness to the circuit breaker panel and terminate to the convenience power breaker currently labeled "12VDC OUTLET". Relabel the breaker "12VDC OUTLET/BLUETOOTH".
- h) Plug the BlueMAX module into the other end of the adapter harness.
- i) Secure the module and cabling to existing structure or wire bundles using cable ties.
- j) Replace MFD IAW the Cirrus AMM.

10.4 G3 Aircraft

- a) Remove MFD to gain access behind the instrument panel.
- b) Locate P1047 and J1047. These will be directly behind the MFD. Disconnect P1047 and J1047 from each other and re-connect to the G3 harness p/n 4370-8434.
- c) Run the power wire in the DAU harness to the circuit breaker panel and terminate to the convenience power breaker currently labeled "12VDC OUTLET". Relabel the breaker "12VDC OUTLET/BLUETOOTH".
- d) Plug the BlueMAX module into the other end of the adapter harness.
- e) Secure the module and cabling to existing structure or wire bundles using cable ties.
- f) Replace MFD IAW the Cirrus AMM.

11 Post install checks

- Power up the aircraft and verify that the analog instruments (if fitted) or the PFD display primary engine data.
- Verify that the MFD (if fitted) displays supplementary engine data.
- Using a BLE scanner verify that the BlueMAX module is advertising (the default device name is EMAX.) This confirms that the module is powered up. Pull the breaker supplying the module and confirm that it stops advertising.

12 Weight and balance

The installed weight of the BlueMAX adapter and harness is approximately 80g (less than 3 ounces) and results in a change in the CG position of approximately 0.008% MAC. This is considered a negligible change per AC 43.13-1B and no weight and balance update is required.

13 Flight Manual Supplement

Complete the required information on the provided Flight Manual Supplement and insert it into the aircraft Flight Manual or POH.

14 Logbook entry

Make a suitable logbook entry documenting the installation.

15 Instructions for continued airworthiness

No routine maintenance or inspection of the BlueMAX module is required. Correct display of primary and supplementary engine data should be monitored during normal operation.

16 Removal of the BlueMAX installation

For temporary removal, disconnect the module from P1426B and remove it. For permanent removal, remove the adapter harness, and reconnect P719/J719, P1407/J1407 or P1426/P1426 as appropriate, in accordance with the Cirrus Wiring Manual.

17 Technical support

For assistance with installation issues or for service or replacement parts, contact Control-J via email admin@control-j.com.