



# Service Information Letter

<b>SIL Number:</b>	<b>606-00006-002</b>		
<b>To:</b>	<b>Installers, Owners, and Operators of Avidyne EXP5000 Primary Flight Displays (PFD) in Cirrus aircraft that also have a DFC90 autopilot loaded with Release 2 software</b>		
<b>Subject:</b>	<b>Underspeed Alerting in DFC90 and SIU-Equipped Cirrus Aircraft</b>		
<b>Purpose:</b>	<b>This Service Information Letter (SIL) advises installers, owners and operators of Avidyne Entegra EXP5000 PFD and DFC90 Release 2-equipped, non-primary engine (“SIU”) Cirrus aircraft on an issue with Underspeed Alerting during Full-time Envelope Alerting situations.</b>		
<b>Revision:</b>	02	<b>Date:</b>	10/03/12

## Issue Description

This Service Information Letter (SIL) advises installers, owners and operators of Avidyne Entegra EXP5000 PFD and DFC90 Release 2-equipped, non-primary engine (“SIU”) Cirrus aircraft of an issue with Underspeed Alerting during Full-time Envelope Alerting situations.

For DFC90-equipped Cirrus aircraft, Release 2 of the DFC90 code added a feature called “Full-time Envelope Alerting” that, among other things, added Underspeed Alerting even when the DFC90 is in standby (“AP Ready”) state. It further contained logic that was intended to suppress Full-time Envelope Alerting in the landing phase. One of the inputs to this suppression logic is the manifold pressure value as understood by the PFD. Non-primary engine aircraft (i.e. those equipped with a “SIU” engine interface unit and round-dial engine gauges on the instrument panel) do not supply manifold pressure data to the PFD and therefore PFD Rel 8.0.4 (or 8.0.5) / DFC90 Rel 2 combined systems do not receive input to allow Underspeed alerts in SIU-equipped aircraft to be suppressed.

In addition, the system description as found in 600-00252-000 Rev 04, DFC90 Digital Autopilot Pilot Guide, pages 1-10 (“Full-time Envelope Alerting” section) and 6-4 (“Software Compatibility and Notes” section) should be amended to address the compatibility issue with Underspeed Alerting behaviors for SIU-equipped aircraft.

Primary-engine (“DAU”) Cirrus aircraft are unaffected by this issue.

Piper aircraft equipped with the DFC90 autopilot are unaffected by this issue.



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## Solution

Avidyne has created and is distributing a revision to the Avidyne EXP5000 PFD software (identified as "PFD Release 8.0.6") in which Underspeed Alerts will be suppressed during all Full-time Envelope Alerting conditions in SIU-equipped Cirrus aircraft. (As a reminder, the fundamental difference between Envelope Protection (EP) and Envelope Alerting (EA) is whether the servos are engaged or not. EP is when the servos are engaged and the DFC will move the airplane on its own. EA is when the servos are not engaged and we will try to detect an envelope excursion and alert the pilot but it's up to the pilot to do something about it.).

By way of review, one of the elements of EA is Underspeed Alerting. The PFD and DFC units strive to prevent potential nuisance alerts including during normal/nominal approach and landing phase. The systems use several parameters such as an engine at or near idle (via Manifold Pressure values) and full flaps as a proxy to determine if the airplane is in the landing phase. If the combination of those parameters conclude the airplane is in the landing phase, underspeed EA aural alerting is suppressed by design. Of course, in SIU-equipped Cirrus aircraft, Manifold Pressure is not available and therefore the combined PFD-DFC system could not conclude the airplane was in the landing phase.

PFD Release 8.0.6 knows if the Cirrus is a SIU or DAU equipped airplane and if SIU-equipped, it ALWAYS assumes the low power state so those aircraft only need to have full flaps for Underspeed Alerting in EA to be suppressed. Another way to view this is whenever SIU-equipped Cirrus aircraft set full flaps, and the servos are NOT coupled ("AP Ready" or Flight Director only modes), then the pilot will never hear "Caution, Underspeed". This was done to prevent possibly distracting nuisance Underspeed alerts while in the landing phase.

Note that if flaps are anything other than full flaps, EA Underspeed Alerting is still available. Note also that EP Underspeed Protection is unaffected – that is to say normal underspeed protection is still fully functional when in coupled (autopilot servos engaged) flight.

This updated PFD "8.0.6" software is capable of being upgraded at approved Avidyne Service Centers. Avidyne has also updated the 600-00252-000 DFC90 Digital Autopilot Pilot Guide to accompany that new PFD code. PFD Release 8.0.6 is now available.

## Effectivity

<b>Description</b>	EXP5000 PFD
<b>Avidyne Part Number</b>	700-00006-000
<b>Avidyne Software Release</b>	The combination of PFD Release 8.0.4 (530-00214-002 Rev 04) or 8.0.5 (530-00214-002 Rev 05) <b>and</b> DFC90 Release 2 (530-00219-000 Rev 02), when installed in a non-primary engine ("SIU") Cirrus aircraft



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### Accomplishment Instructions:

As of 19 September, 2012, PFD Release 8.0.6 is available and should be loaded on the affected units (SIU-equipped Cirrus aircraft with an installed DFC90 and PFD software earlier than Release 8.0.6) to address this condition. That software is field loadable per Avidyne Service Bulletin 601-00006-111 530-00214-( ) *Software Load Service Bulletin for 8 0 6.*

### Until PFD Release 8.0.6 is loaded:

The first action to take is to apply the following amendments to 600-00252-000 Rev 04, DFC90 Digital Autopilot Pilot Guide:

1. Page 1-10, "Note Suppression of Full-time Envelope Alerting" – Add new sentences to the end of the boxed note to read, "In those aircraft where the PFD does not receive manifold pressure from the engine sensor (e.g. non-primary engine or "SIU" Cirrus aircraft), Full-time Envelope Alerting will not be suppressed in the landing phase. This may result in nuisance Underspeed alerts in the landing phase and pilots should be aware and prepared for these potential alerts."
2. Page 6-4, Add a new entry in the Operational Notes column in the PFD 8.0.4 / AP 2 row to read, "No suppression of Full-time Envelope Alerting in the landing phase is available in non-primary engine or "SIU" Cirrus aircraft".

The attached errata sheets (pages 5, 6, 7 of this SIL) that reflect these two temporary textual changes to 600-00252-000 Rev 04 can be used in the affected aircraft until such time the PFD 8.0.6 software is loaded in the PFD.

Additionally, it is recommended that the Pilot-in-Command (PIC) of SIU, PFD Rel 8.0.4 (or 8.0.5), DFC90 Rel 2 equipped Cirrus aircraft brief all passengers ahead of time to the likelihood of hearing nuisance Underspeed Alerts in the landing phase.

If an owner, operator, or installer believes a particular aircraft is, or may be, affected, Avidyne requests you establish contact with Avidyne Technical Support to confirm that aircraft is on the list of known affected aircraft.

### Once PFD Release 8.0.6 is loaded:

- Underspeed Alerting in EA will be suppressed whenever flaps are set to full;
- The errata and addendum to the PFD and DFC Pilot Guides should be removed;
- DFC90 operation and behavior is fully described by the newest release of the DFC90 Pilot Guide, 600-00252-000 Rev 05 (this is the same revision that also describes DFC90 operations and behavior when combined with an Aspen PFD).



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### **Warranty Information:**

Upgrading of any affected aircraft to PFD Rel 8.0.6 (or backing out the DFC90 code to Rel 1) will be treated as a warranty item.

### **Contact Information:**

Any installer or owner who has a question can contact Avidyne Technical Support. The US Toll Free Number is 1-888-723-7592. International Toll Free Numbers are listed at <http://www.avidyne.com/contact/intphones.asp>



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## FULL-TIME ENVELOPE ALERTING

### NOTE

#### Envelope Alerting Requires Flap Input

For the underspeed Full-Time Envelope Alerting function to be available when the autopilot is in standby ("AP Ready"), a wiring modification must be made that allows the autopilot to recognize actual flap position. Not accomplishing this optional wiring modification to the aircraft harnessing means there is no Full-time Envelope Alerting for underspeed conditions when the autopilot is in standby mode.

The underspeed Full-time Envelope Alerting function is not available in SIU-equipped aircraft.

The DFC90 autopilot provides speed-based and attitude-based envelope alerting when the autopilot is not engaged (servos not coupled). [Requires Avidyne PFD Rel 8.0.4 or Rel 8.0.5 and DFC90 Rel 2 or later.]

Full-time Envelope Alerting is triggered when the DFC90 recognizes an underspeed (not available in SIU-equipped aircraft), overspeed, flap overspeed or excessive bank angle condition and will alert the pilot via text alerts on the PFD and aural alerts.

Full-time Envelope Alerting is provided during flight director operations (servos not coupled). Full-time Envelope Alerting is also provided (underspeed requires the flap wiring modification) even when the autopilot and flight director are off and the autopilot is in the standby position as noted by the **AP READY** mode annunciator on the top strip of the PFD.



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## NOTE

### Suppression of Full-time Envelope Alerting

Full-time Envelope Alerting is suppressed during very low power (near idle) conditions when flaps are set to the full-flap position in order to minimize nuisance calls in the landing phase. Full-time Envelope Alerting is also suppressed anytime Indicated Airspeed is less than 50 KIAS.

In those aircraft where the PFD does not receive manifold pressure from the engine sensor (e.g. non-primary engine or "SIU" Cirrus aircraft), Full-time Envelope Alerting will not be suppressed in the landing phase. This may result in nuisance Underspeed alerts in the landing phase and pilots should be aware and prepared for these potential alerts.

In Flight Director operations, the flight director command bars will continue to direct a pilot to fly to the commanded pitch and roll targets as defined by the bug and nav source entries but if an underspeed condition is recognized, a "**UNDERSPEED**" text alert is displayed on the PFD and a "CAUTION, UNDERSPEED" aural alert is played in the headsets and is repeated approximately every 6 seconds until the condition is no longer valid. The autopilot mode annunciators do not flash during Envelope Alerting\*. The trigger for this Envelope Alerting underspeed alert is when the system has determined  $1.2V_s$  has been reached. Flap position, bank angle and g-loading are taken into account to define  $V_s$  at any point in time (assumes max gross weight).





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## SOFTWARE COMPATIBILITY AND NOTES

The following table identifies authorized combinations of PFD and autopilot code and any associated operational notes. For the purposes of this table, differences noted in the Operational Notes column are when compared to DFC90 Pilot Guide 600-00252-000 Rev 04.

PFD Version	AP Version*	Wired for Flap Position?	Operational Notes
8.0.4 or 8.0.5	2	Yes	<p>Full functionality per DFC90 Pilot Guide 600-00252-000 Rev 04</p> <p>No suppression of Full-time Envelope Alerting in the landing phase is available in non-primary engine or "SIU" Cirrus aircraft</p>
8.0.4 or 8.0.5	2	No	<p>No Flap Overspeed alert</p> <p>Underspeed alerts in both Envelope Protection and Envelope Alerting use a more conservative no-flap speed value</p> <p>No Envelope Alerting Underspeed functionality when AP is in standby (AP Ready) state</p> <p>Underspeed alerts are not suppressed in the flare and on rollout</p>