

Review of 80-0689 Cockpit Display System Serial Number 0174

Overview of the 80-0689 Cockpit Display System:

The 80-0689 Cockpit Display System (CDS) is an electronic end item, with two LCD technology displays; one for crew alerting and one for aircraft instrumentation, which is responsible for monitoring non-critical and essential electrical inputs and for displaying the appropriate information to the flight crew.

The CDS stores two types of data in non-volatile memory (NVM) for later retrieval and analysis. Neither data type will be erased unless N1 I or N1 II increases above 20%. When one of these two signals increases over that level, the non-volatile memory device is erased of any previously stored codes and recording is allowed.

The CDS records all the cautions signals that were activated in the previous one minute in a non-volatile memory device. The CDS deletes events of more than one minute old and that are no longer active from the non-volatile memory.

The conditions for the start and end of caution state recording are as follows:

START: When either N1 I or N1 II increases above 20% the CDS erases previously stored caution states, test the integrity of the memory devices, and then commence recording (continuously) caution states which have been activated in the previous 60 seconds. The CDS deletes from memory those activated cautions which are older than 60 seconds and no longer active.

STOP: The CDS does not stop recording until both XMSN OIL P I and II cautions are turned on or when the CDS is powered down. The CDS retains the caution states which have been active in the last 60 seconds

prior to this event indefinitely (including through power down periods).
The CDS does not start recording caution states again until as specified in the previous paragraph.

The CDS stores up to 100 FADEC failure memory codes when the corresponding bit value received is equal to 1 (indicating fault condition) for one or more times. All NVM data is retrieved and displayed when the front rotary switch is placed at "M".

Review of the Findings:

Serial number 0174, which was associated with a crash on May 30th 2006, was received by Honeywell Urbana and reviewed with NTSB/FAA representative Sam Taylor in June 2006. The following photographs detail the events that occurred and the findings:







After removing the unit from the shipping container, we proceeded to apply power to the unit while ensuring the failure data would not be affected. As you can see above, the unit was functional and didn't appear to have any damage.



As can be seen above, the upper display reveals a number of cautions that were present during the last 60 seconds of operation. It is important to note the 60 second period is prior to both Systems I and II XMSN Oil Pressure failing or the CDS having had power removed, whichever ever occurred first.

The order the cautions appear on the screen is chronological from top to bottom, with the oldest caution on the top and the most recent caution on the bottom. This order is based on when the caution is received. If more than one caution is received in the same data packet, those cautions will be listed in bit order, which may differ from the true chronological order.

The MMEXC indication lists the number of occurrences where the MM Limit was exceeded.



The top line of the lower display is used to review the FADEC failure codes. These are cycled through by pressing the Scroll Up/Down buttons. This unit did not have any recorded FADEC failure codes.

Summary:

The information found on the display, indicates that both engines were placed into Manual mode. There were then several other cautions recorded. The data appears to be valid for the last 60 seconds of recorded time, but there is no way to correlate that time span to the time of the impact.