

## TECHNICAL MANUAL

---

# COCKPIT VOICE / FLIGHT DATA RECORDER DOWNLOAD PROCEDURES FOR INTEGRATED VEHICLE HEALTH MANAGEMENT SYSTEM (IVHMS)

U.S. ARMY UH-60A/L

P/N K277-0101  
(IVHMS INSTALLATION KIT)



## SENSORS AND INTEGRATED SYSTEMS

Distribution D: Distribution authorized to Department of Defense and U.S. DoD contractors only for administrative or operational use as of 27 June 2002. Other requests shall be referred to the Utility Helicopters Project Management Office at:

United States Army Aviation and Missile Command  
Sparkman Center, Building 5308, 4th Floor  
SFAE-AV-UH  
Redstone Arsenal, AL 35898-5000

WARNING - This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C., Sec 2751, et seq.) or the Export Administration Act of 1979, as amended, Title 50, U.S.C., App. 2401 et seq. Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25

THESE ARTICLES OR TECHNICAL DATA ARE CONTROLLED BY THE INTERNATIONAL TRAFFIC IN ARMS REGULATIONS (ITAR). THEY ARE SUBJECT TO THE EXPORT CONTROL LAWS OF THE US GOVERNMENT. THEY ARE NOT TO BE PLACED IN THE PUBLIC DOMAIN, EXPORTED FROM THE US, OR GIVEN TO ANY FOREIGN PERSON IN THE US, WITHOUT THE PRIOR, SPECIFIC WRITTEN AUTHORIZATION OF GOODRICH AND THE US DEPARTMENT OF STATE.

USE, DUPLICATION OR DISCLOSURE IS SUBJECT TO THE RESTRICTIONS AS STATED IN AGREEMENT  
DAAH10-99-9-0001 and DMH10-02-9-0002 BETWEEN THE GOVERNMENT AND GOODRICH

---

DATA IS SUBJECT TO THE RESTRICTIONS ON THE TITLE PAGE



**SENSORS AND INTEGRATED SYSTEMS**

Simmonds Precision Products, Inc.

100 Panton Road

Vergennes, Vermont 05491 USA

Phone: (802) 877-2911

FAX: (802) 877-4113

FMC 89305

---

TABLE OF CONTENTS  
COCKPIT VOICE / FLIGHT DATA RECORDER DOWNLOAD PROCEDURES  
FOR  
INTEGRATED VEHICLE HEALTH MANAGEMENT SYSTEM  
(IVHMS)

---

CONTENTS

<u>Subject</u>	<u>Page Number</u>
1. SYSTEM DESCRIPTION .....	5
A. Built In Test (BIT) .....	5
B. Mechanical Diagnostics .....	5
C. Structural Usage Monitoring .....	5
D. Exceedance Monitoring .....	5
E. Engine Monitoring .....	5
F. Rotor Trim And Balance (ROTAB) .....	5
G. System Power .....	6
H. Cockpit Voice / Flight Data Recorder (CVFDR) .....	6
2. DOWNLOADING CVFDR DATA FROM THE IVHMU .....	7
A. Setup Procedures For Downloading CVFDR Data With IVHMU Installed In The Aircraft .....	7
B. Setup Procedures For Downloading CVFDR Data With The IVHMU Removed From The Aircraft .....	7
C. CVFDR Download Procedures .....	9

## LIST OF FIGURES

---

<u>Subject</u>	<u>Page Number</u>
Figure 1. IVHMU Programming Cable (P/N 51179-0102) . . . . .	8
Figure 2. IVHMU Connector Identification . . . . .	8
Figure 3. IVHMU Programming Cable - Aircraft ID Switch Box . . . . .	9
Figure 4. Navigating To Network Connections . . . . .	10
Figure 5. Accessing Local Area Connection - Properties . . . . .	10
Figure 6. Accessing Internet Protocol (TCP/IP) Properties . . . . .	11
Figure 7. Setting The IP Address . . . . .	11
Figure 8. Connecting To The CVFDR . . . . .	12
Figure 9. CVFDR Interface . . . . .	12
Figure 10. CVFDR Interface - File Download Page . . . . .	13
Figure 11. CVFDR Interface - File Download Save Pop-up Window . . . . .	14
Figure 12. CVFDR Interface - File Download Save As Pop-up Window . . . . .	14
Figure 13. CVFDR Interface - File Download Save Progress Window . . . . .	15
Figure 14. CVFDR Interface - File Download Save Successful Page . . . . .	15
Figure 15. CVFDR Interface - File Download Page . . . . .	16

---

LIST OF TABLES

---

Subject

Page Number

TABLE 1. AIRCRAFT IDENTIFICATION DISCRETE SETTINGS ..... 9

This page intentionally left blank.

## 1. SYSTEM DESCRIPTION

IVHMS will perform the following functions: built in test, mechanical diagnostics, structural usage monitoring, exceedance monitoring, engine monitoring, and rotor trim and balance. Absence or failure of one or more system function or segment will not affect the performance of any other function (e.g., inoperative mechanical diagnostics functions will not affect the rotor trim and balance function). The IVHMS also incorporates a crash survivable Cockpit Voice Flight Data Recorder (CVFDR) which is located inside in the IVHMU.

### A. Built In Test (BIT)

IVHMS will perform BIT checks of all system line replaceable units (LRUs) and accelerometers. The BIT is also designed to detect failure modes associated with the inputs to the LRUs.

### B. Mechanical Diagnostics

This segment of IVHMS performs advanced mechanical diagnostics for life-limited components. This function will identify degraded components and types of faults for all monitored components. It is designed to perform mechanical diagnostics functions in an automatic mode to collect data without aircrew input during all flights and is also designed to include a manual mode that will collect data on aircrew demand for advanced mechanical diagnostics functions.

### C. Structural Usage Monitoring

The structural usage monitoring function measures actual aircraft usage to aid in determining maintenance needs. The system is designed to account for aircraft deterioration accumulated for all the flight regimes flown by the aircraft including, but not limited to regimes listed in the aircraft mission spectrum. To accomplish this task, the system is designed to assign appropriate life usage penalties to aircraft components based on the record of regimes flown each flight. State-of-the-aircraft parameters used by the system to recognize flight regimes for structural usage are normally recorded at a low data rate (most at 1 Hz). The system will record this data at a higher rate (most at 10 Hz) if the aircrew prompts the

system to record or a structural usage high data rate threshold is breached.

### D. Exceedance Monitoring

The goal of the exceedance monitoring function is to observe and record all aircraft exceedances and their duration to allow for more accurate maintenance troubleshooting and repair. All exceedances detected by IVHMS will be recorded onto the DTU memory unit and will be displayed to the aircrew during the flight debrief on the Ground Station (GS). During an exceedance, the system will record relevant data to the DTU memory unit at a configured data rate, typically higher than the normal log rate.

### E. Engine Monitoring

The purpose of the engine monitoring function is to automate engine performance checks and trend usage data. This function will also identify and record selected engine cycles and run times. Engine Monitoring data is analyzed and displayed in tabular or graphic format using the GS.

### F. Rotor Trim And Balance (ROTAB)

The purpose of the ROTABS function is to monitor aircraft vibrations in order to decrease the overall maintenance and number of flights associated with main and tail rotor trim and balance. It is expected that this function will enable the transition from time-based trim and balance maintenance to on-condition maintenance. ROTABS acquires main and tail rotor balance and main rotor trim data every flight; and allows the user to use these acquisitions to calculate adjustments when necessary. It provides day and night trim and balance capabilities using active or passive blade tracker modes as the situation dictates. The ROTABS function operates automatically to collect data without aircrew input during all flights, and also operates in a manual mode to collect data on aircrew command. It can calculate and display trim and balance adjustments in the GS. The ROTABS function will provide trim and balance adjustments with only a partial data set (e.g., 120 knot data point not collected), and is designed to enable restricted maintenance actions. The ROTABS function also includes prediction software to

give an indication of what the aircraft vibrations levels are expected to be if a recommended adjustment is performed.

#### **G. System Power**

Power to the system is provided by the aircraft No. 2 Primary DC bus. Three circuit breakers (labeled IVHMU/RDC, CDU, and CVFDR) provide system circuit protection (**Figure 1**). All are located on the co-pilot's auxiliary circuit breaker panel.

#### **H. Cockpit Voice / Flight Data Recorder (CVFDR)**

The Cockpit Voice and Flight Data Recorder (CVFDR) is an airborne crash survivable recording device built into the IVHMU to accommodate mandatory recording of cockpit voice and flight data.

The CVFDR simultaneously records up to four (4) channels of audio; three (3) channels for crew, one(1) channel for area.Each channel retains the most recent 120 minutes of all recorded audio, digital, and timing data, and a minimum of 13 hours of flight data information at data rates of 1024 (12 bit) words per second.

**2. DOWNLOADING CVFDR DATA FROM THE IVHMU**

**NOTE**

Data will be downloaded from the IVHMU CVFDR into a host PC (laptop) via the IVHMU Programming Cable, P/N 51179-0102 (**Figure 1**).

**A. Setup Procedures For Downloading CVFDR Data With IVHMU Installed In The Aircraft**

**NOTE**

When downloading CVFDR data from the IVHMU while installed in the aircraft, AC power must be applied to the IVHMS via APU generator or external power source on the aircraft.

- (1) Gain access to the IVHMU.
- (2) Disconnect the IVHMS cable connector from the J-5 connector on the IVHMU (**Figure 2**).
- (3) Using IVHMU Programming Cable P/N 51179-0102:
  - (a) Connect the P-5 connector to the J-5 connector on the IVHMU.
  - (b) Ensure that the banana clip jumpers on the P-5 connector are joined (closed).
  - (c) Connect the P-7 Ethernet connector on the IVHMU Programming Cable to the Ethernet port on the host PC.
- (4) Apply AC power to the aircraft.

**NOTE**

Allow two minutes for the IVHMS to properly boot up.

- (5) Proceed to section **1. C.** of this procedure.

**B. Setup Procedures For Downloading CVFDR Data With The IVHMU Removed From The Aircraft**

- (1) Using IVHMU Programming Cable P/N 51179-0102:

- (a) Connect the P-5 connector to the J-5 connector on the IVHMU (**Figure 2**).
  - (b) Ensure that the banana clip jumpers on the P-5 connector are joined (closed).
  - (c) Connect the P-6 connector to the J-6 connector on the IVHMU.
  - (d) Connect the P-7 Ethernet connector on the IVHMU Programming Cable to the Ethernet port on the host PC.
  - (e) Connect the BP-1 plug (Red Banana Plug) to the positive (+) jack on the 28V power supply.
  - (f) Connect the BP-2 plug (Black Banana Plug) to the negative (-) jack on the 28V power supply.
- (2) Turn the 28V power supply **ON**. Ensure 28V is applied to the IVHMU.

**NOTE**

Allow two minutes for the IVHMS to properly boot up.

- (3) Proceed to section **1. C.** of this procedure.

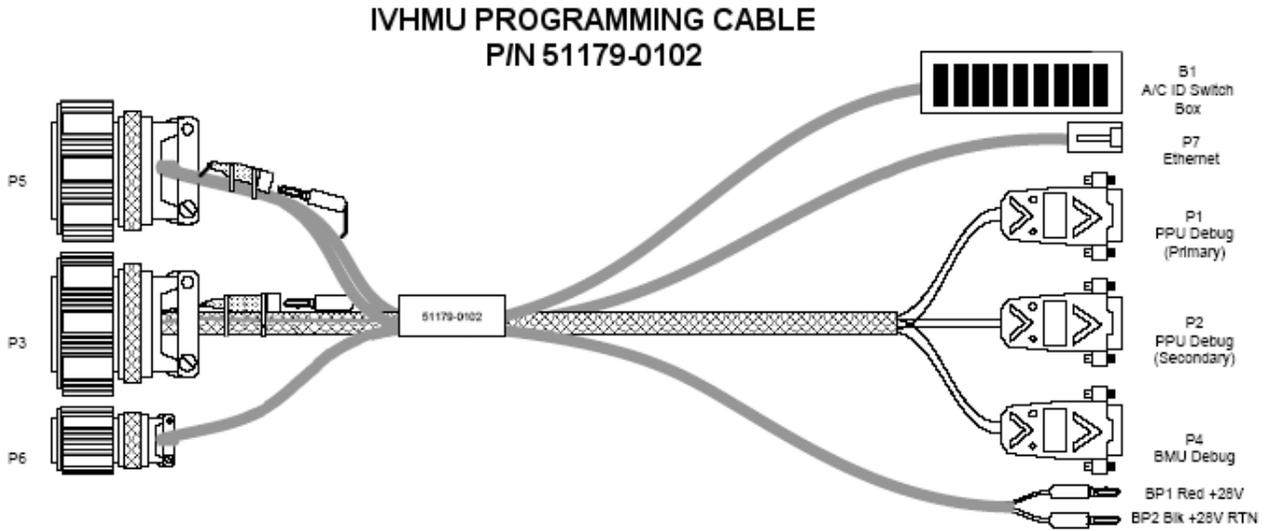


Figure 1. IVHMU Programming Cable (P/N 51179-0102)

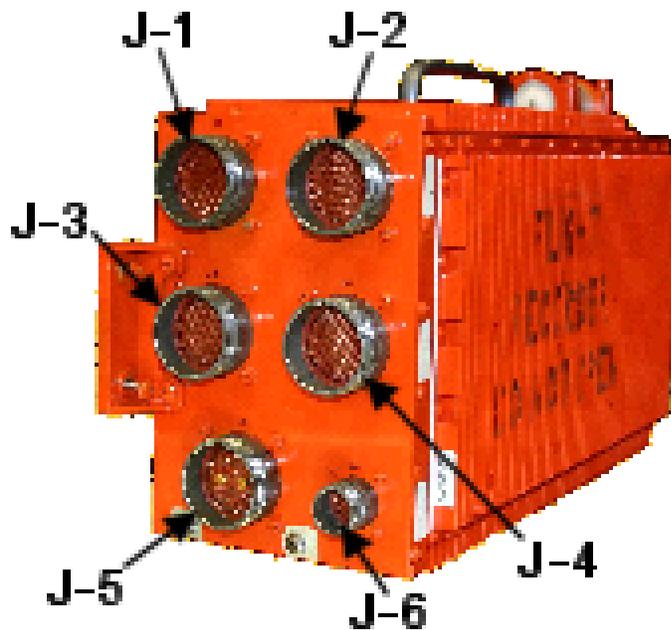


Figure 2. IVHMU Connector Identification

C. CVFDR Download Procedures

51179-0102, set the discrete switches as follows (**Figure 3**):

- (1) Using the aircraft identification switch box located on IVHMU programming cable, P/N

- (a) Refer to **TABLE 1** for appropriate aircraft settings:

**TABLE 1. AIRCRAFT IDENTIFICATION DISCRETE SETTINGS**

AIRCRAFT IDENTIFICATION DISCRETE SETTINGS		
DISCRETE	UH-60A	UH-60L
Disc 0	1	1
Disc 1	0	0
Disc 2	0	0
Disc 3	0	1
Disc 4	1	0
Disc 5	1	1
Disc 6	1	1
Disc 7	0	0
Disc 8	1	1



**Figure 3. IVHMU Programming Cable - Aircraft ID Switch Box**

- (2) Turn the host PC **ON**.
- (3) From the host PC desktop, select **Start>Settings>Network Connections** (Figure 4).
- (4) From the Network Connections window, right-Click on **Local Area Connection** then select **Properties** from the pop-up window(Figure 5).

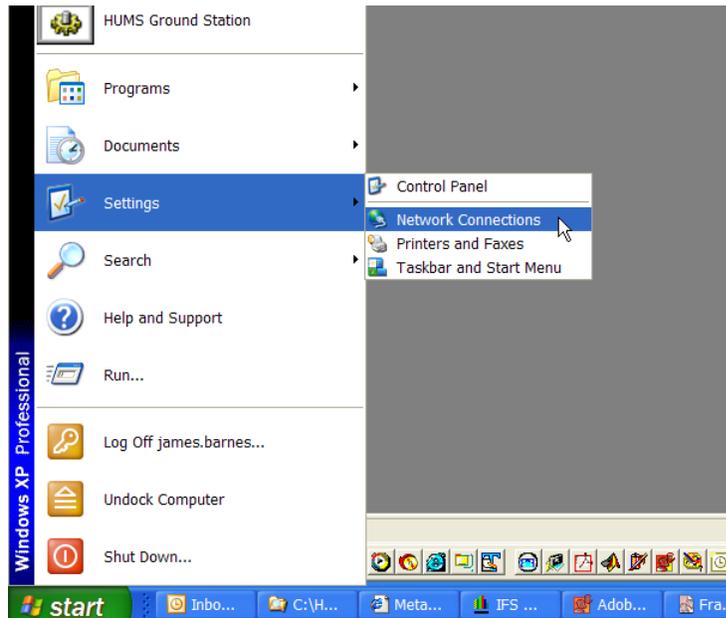


Figure 4. Navigating To Network Connections

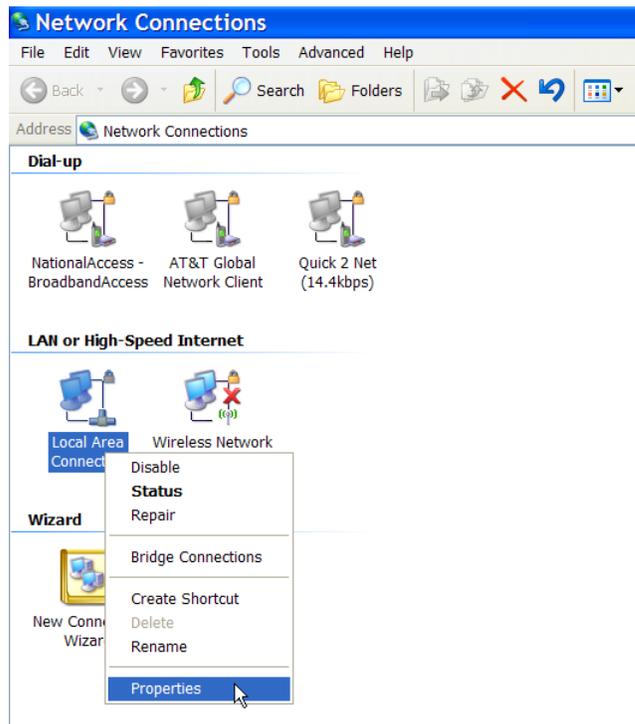


Figure 5. Accessing Local Area Connection - Properties

- (5) In the Local Area Connection Properties Item selection window, scroll down and left-click once on **Internet Protocol (TCP/IP)** to select (highlight) it then click on the **Properties** button (Figure 6).

### NOTE

Note the current settings on the Internet Protocol (TCP/IP) Properties - General tab. When finished downloading the CVFDR data, these settings should be restored to the original configuration.

- (6) From the Internet Protocol (TCP/IP) Properties window, select the **Use the following IP address:** radio button then enter the following settings (Figure 7):

- (7) In the **IP address:** window, enter **10.0.0.50**
- (8) In the **Subunit mask:** window, enter **255.0.0.0**.
- (9) Click the **OK** button.

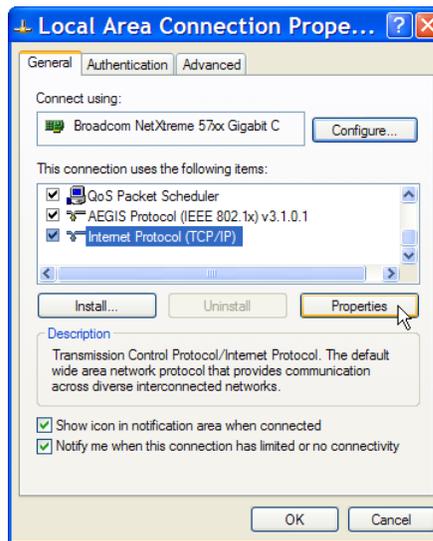


Figure 6. Accessing Internet Protocol (TCP/IP) Properties

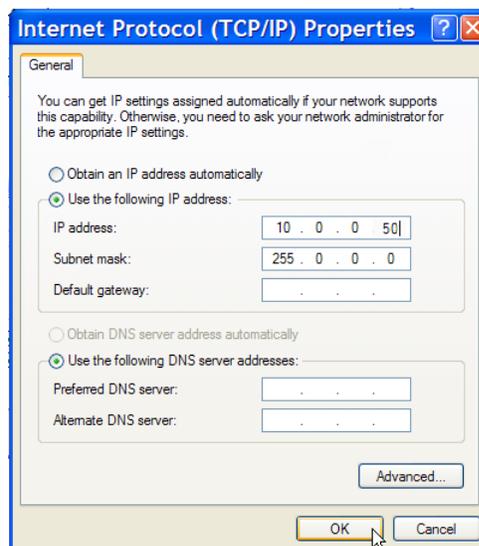


Figure 7. Setting The IP Address

- (10) Click the **Close** button on the Local Area Connection Properties window.
- (11) Close the Internet Connections window.
- (12) Open an Internet Explorer window on the host PC.
- (13) In the Address Bar of the Internet Explorer window, type the following address: **10.0.0.100** then press the **ENTER** key (Figure 8).

- (14) Once communication with the CVFDR is established, the Crash Survivable Memory Unit Ground Support Interface will be displayed.
- (15) From the Navigation panel, click the **File Download** option (Figure 9).

**NOTE**

Files from each recording element are available for download independently.

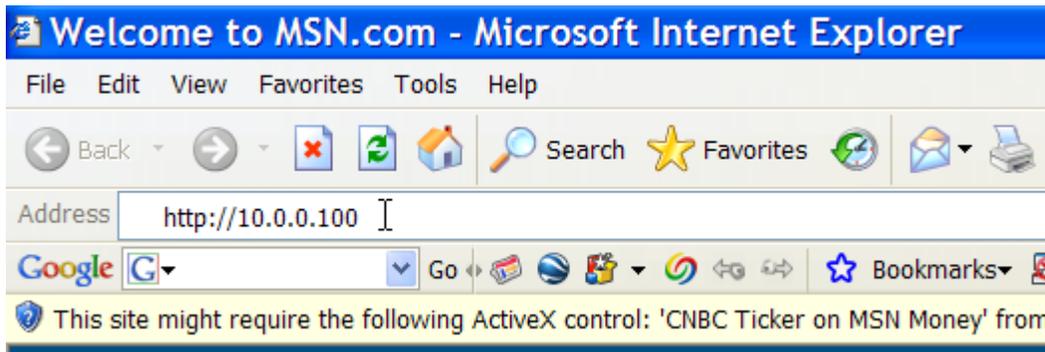


Figure 8. Connecting To The CVFDR

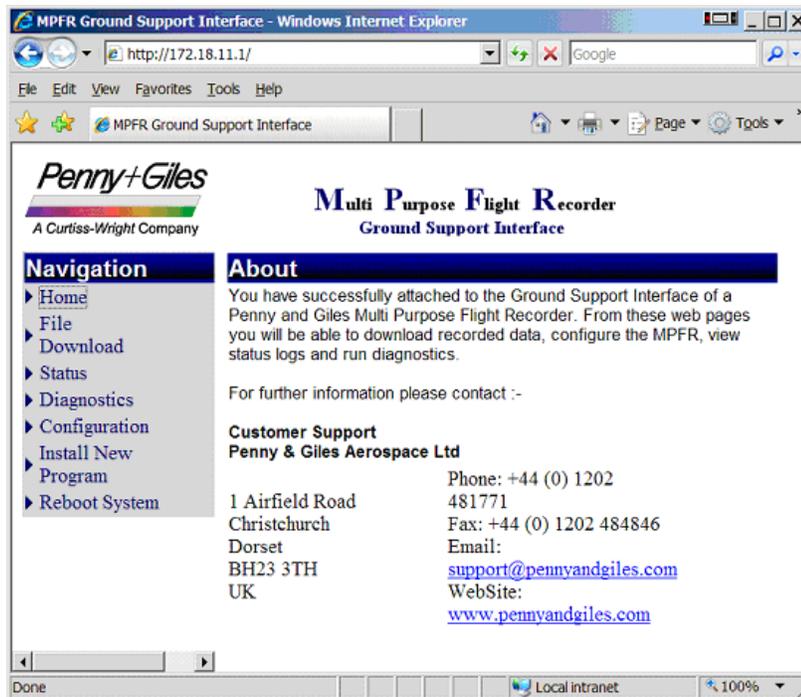


Figure 9. CVFDR Interface

- (16) From the File Download selection screen, click on Voice Recorder - **Channel 1** option (Figure 10).



Figure 10. CVFDR Interface - File Download Page

(17) A File Download pop-up will appear. Click on the **Save** button (Figure 11).

(18) Select an appropriate directory on the host PC to store the file, then click on the **Save** button (Figure 12).

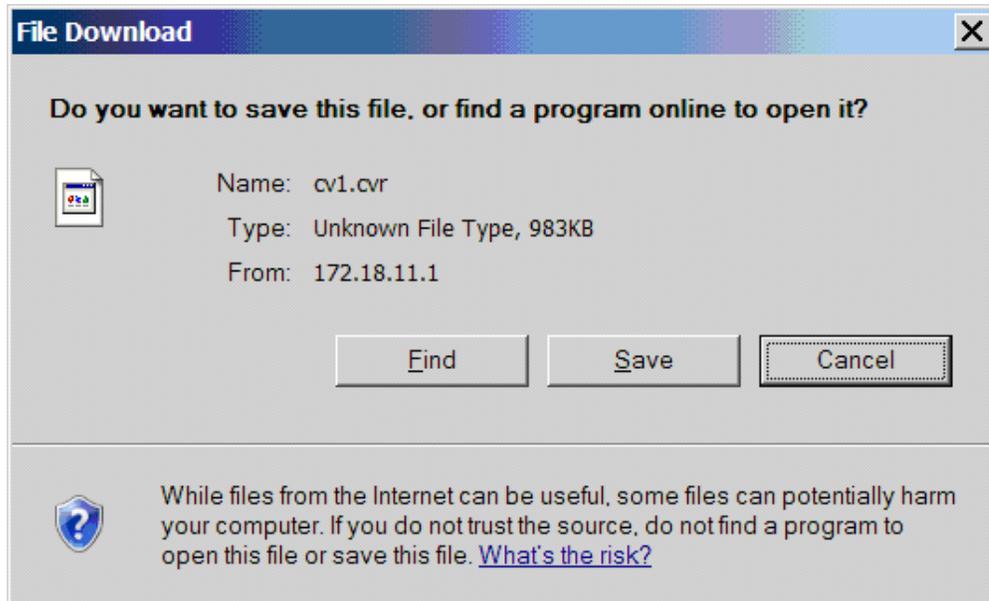


Figure 11. CVFDR Interface - File Download Save Pop-up Window

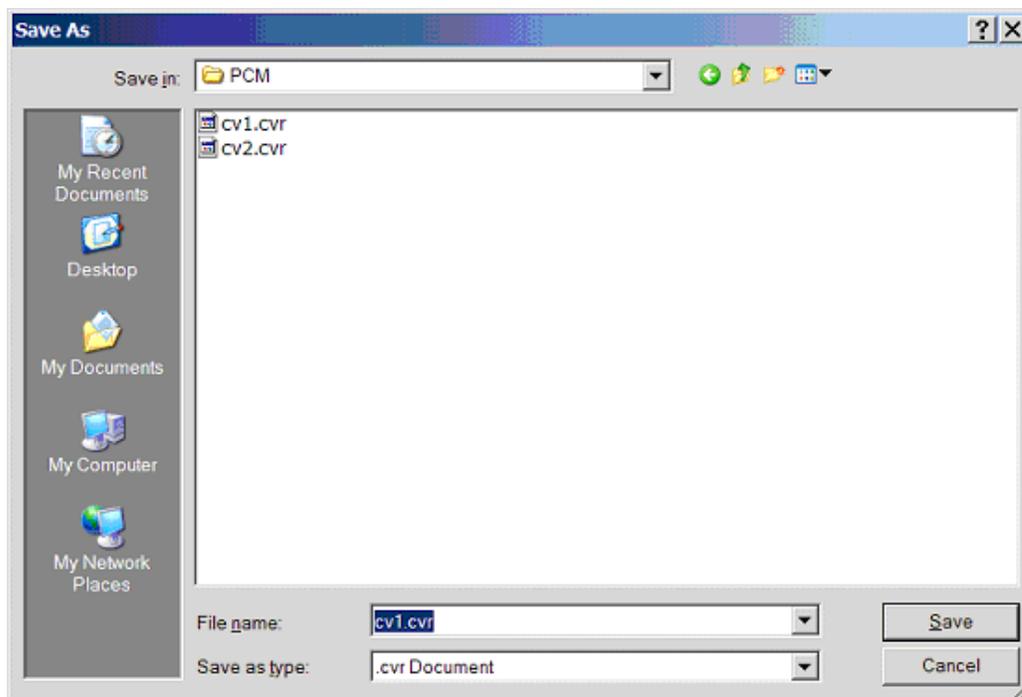


Figure 12. CVFDR Interface - File Download Save As Pop-up Window

(19) A progress bar will appear while the file is transferring (Figure 13).

(20) When the transfer is complete, the Crash Survivable Memory Unit Ground Support Interface will be displayed (Figure 14).

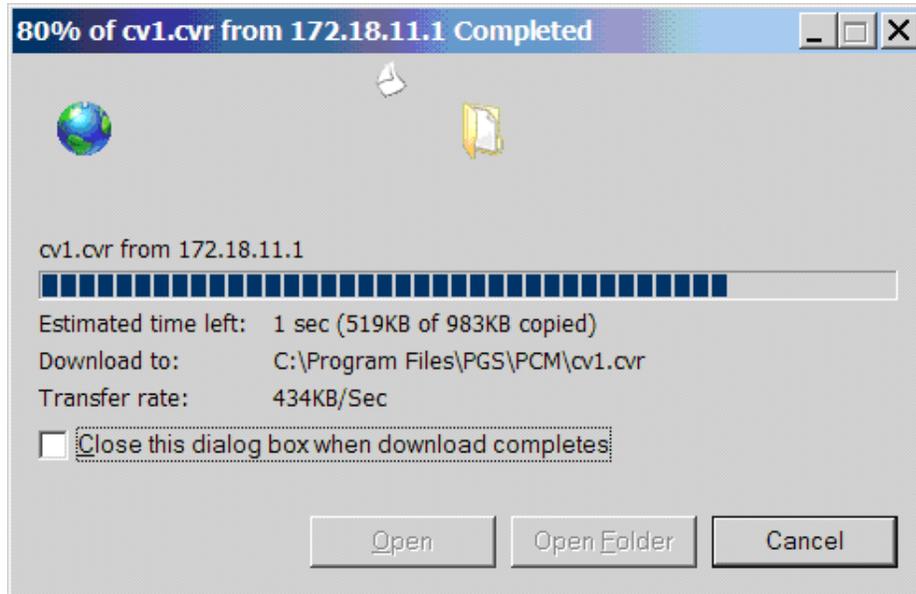


Figure 13. CVFDR Interface - File Download Save Progress Window



Figure 14. CVFDR Interface - File Download Save Successful Page

- (21) Repeat steps (15) - (20) for Voice Recorder **Channel 2, Channel 3**, for Flight Data Recorder **Flight Data Master** and **Secure Flight Data**, for MPFR System Log **Device #1, Device #2, Device #3** and **Device #4** for MPFR Configuration **Device #1, Device #2, Device #3** and **Device #4** files (Figure 15).
- (22) On the Navigation Panel, click the **Status** option.
  - (a) A Status Window will open. Select **File, Save as**, and select File Type - .html.

Save this .html file in the same directory as previously used in step (18).

- (23) On the Navigation Panel, click the **Configuration** option.
- (24) Select **File, Save as**, and select File Type - .html. Save this .html file in the same directory as previously used in step (18). When finished, click the **Home** option in the Navigation panel.
- (25) Close the Internet Explorer window.



Figure 15. CVFDR Interface - File Download Page

- (26) Shut down the aircraft and/or external power supply.
- (27) Disconnect the IVHMU Programming cable from the IVHMU and the host PC.
- (28) If files were downloaded with the CVFDR installed in the aircraft:
  - (a) Reconnect the aircraft IVHMS harness to the J-5 connector on the IVHMU.
  - (b) Replace any panels removed to access the IVHMU.
  - (c) Complete a normal power-up and BIT check of the IVHMS to ensure the system is functioning properly.
  - (d) When finished shut down the aircraft.

**END OF PROCEDURE**

**This page intentionally left blank.**