

**OFF AIRCRAFT MAINTENANCE  
WITH ILLUSTRATED PARTS BREAKDOWN**

**TESTING AND TROUBLESHOOTING**

**A/A24A-56 HELMET UNIT, INTEGRATED  
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

Description and Principles of Operation .....	WP003 00
Cleaning and Inspection .....	WP005 00
A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) .....	WP008 00
Upper Helmet Vehicle Interface .....	WP009 00
Helmet Display Unit .....	WP010 00
Purge Relay Optics Assembly .....	WP012 00

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Record of Applicable Technical Directives

None

1. TESTING.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Computer	COMMERCIAL	N/A
Helmet Display Unit Test Set Cable	620992-01-00	06VL3
Helmet Mounted Display Test Set	620900-02-01	06VL3
QMB	178-5936	99747

Materials Required

None

**NOTE**

Functional test must be done to A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) before each flight.

2. Functionally test the A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) on the Helmet Mounted Display Test Set (HMDTS). The HMDTS comes supplied with Unit Under Test (UUT) test cable, RS232 cable, DB9 to DB25 adapter, and power cable. The HMDTS requires a computer with the below characteristics as a host:

- a. IBM PC compatible
- b. MICROSOFT WINDOWS 95/98/2000/NT
- c. 16 MB of RAM
- d. 5 MB of available hard disk space
- e. 1 available serial port

3. INITIAL SETUP.

4. CABLING.



To prevent damage to equipment, make sure that the HMDTS power switch is in the OFF position.

a. Connect RS232 cable from J4 of the HMDTS to an unused serial port of the computer (Use the DB9 to DB25 adapter if required). Refer to figure 1.

b. Connect HMDTS power cable from J5 of the test set to an AC power source (85-120vac, 47-63 Hz).

c. Connect UUT test cable, to J1, J2, and J3 of the HMDTS.

5. SOFTWARE INSTALLATION.

a. Power up the host computer if it is not already on.

**NOTE**

The HMDTS software has been added to the Navy Marine Corps Intranet (NMCI) Central Design Authority (CDA) list. NMCI users should contact their local help desk for software installation. All other users should contact the CDA POC at (812) 854-2372.

b. If HMDTS software has been loaded, go to paragraph 9 OPERATION.

6. CONTROLS.

7. The substeps below describe the controls of the HMDTS.

a. **START:** Starts the testing sequence. A message window above this button provides the operator with information concerning the test sequence.

b. **ABORT:** Aborts testing and shuts down the high voltages to the UUT.

c. ACCEPT/RECORD: Receives the testing results and records the data to the hard drive on the host computer only in the occurrence of a failure. The data recorded is in ASCII text format and is made up of the below information:

- (1) Failed Tests
- (2) HMD Serial Number
- (3) CRT Assembly Serial Number
- (4) IPD Switch Setting
- (5) HMD Elapsed Time Indicator
- (6) CRT Elapsed Time Indicator
- (7) Test Set Serial Number
- (8) Test Date and Time
- (9) Fault Record

d. EXIT: Exits the test environment and returns to the operating system desktop display.

e. PATTERN BRIGHTNESS: Sets the primary display pattern intensity in 1/4 full-scale increments. The default value is 1/2. When the intensity is changed using the radio buttons, the pattern may blank for a short period of time as values are loaded in the test set and other parameters are adjusted. This is a result of the test set having only one serial input from the host PC which must control the test set and its HVPS (CU) as well as the HMD. Activation of the Custom subcontrol allows the operator to vary the brightness over a wider range of values by moving a slider. The slider position is received and the display brightness is changed when the operator releases the control.

f. PASS and FAIL Buttons: The below tests require the test operator to evaluate the results. In each case a pair of PASS/FAIL buttons is provided for the operator to activate.

- (1) Primary Display
- (2) HMD Camera
- (3) Puppets
- (4) QMB Interlock

g. HELP Menu: The HELP menu provides both help information and information about the HMDTS software. When HELP is selected, various help information windows appear as the operator drags the mouse cursor over the screen areas. To disable the help feature, deactivate it in the HELP menu. The ABOUT window provides added information about the software.

## 8. INDICATORS.

### **NOTE**

For all LED indicators, Green = pass or closed, and RED = fail or open.

a. TOP ROW INDICATOR: The top row of indicators provides display of the UUT configuration and the HMDTS serial number. The elapsed times are updated each 60 seconds while the test is running.

b. PUPPETS: The operation of the puppets is displayed in two windows. The text area between the windows shows which puppet has been commanded and the intensity or blink rate.

c. ABC SENSOR: The ABC sensor meter display shows the output of the ABC sensor with 75 % of full-scale equal to the ambient light at the start of testing.

d. SERIAL COMMUNICATIONS: The serial communications LED monitors the data to and from the microcontroller within the UUT. In the case where there are intermittent failures, the Failed Attempts indicator displays a running count of failed transmissions.

e. MRU: MRU LED indicates the status of the Helmet Tracker MRU test.

f. TEST SET BIT: The Test Set BIT LED indicates the status of the HMDTS Built-in Test.

g. TEST PATTERN: The primary display pattern produced by the test set is displayed in the central window.

h. HV INTERLOCK: The Interlock LED indicates the status of the HV Interlock. This signal goes from the Test Set through the test cable, helmet cable, and helmet and is wrapped around in the HDU.

i. QMB: The QMB LED indicates the status of the QMB located in the Pilot Side QDC. The QMB is a magnetically enabled switch that is only closed in the presence of a strong magnet placed in close proximity to the switch.

j. HDU EEPROM Fault Record: The window displays data read from the HDU and CRT EEPROM fault records in interpreted test format. The data displayed represents system faults detected and set by the aircraft Electronics Unit (EU). These values are not under the control of the HMDTS.

k. SOFTWARE CONTROL/VERSION NUMBER: The HMDTS software control/version number is located at the upper right hand corner of the test set window. The operator should refer to this number in any reports issued.

## 9. OPERATION.

### NOTE

The HMDTS is operated in either helmet mounted display test or camera alignment mode. The HMDTS is not

designed to do both functions simultaneously. Before launching the helmet test software, close the camera alignment software on the PC. Before launching the camera alignment software, close the helmet test software on the PC.

a. Determine whether the HMDTS is to be used for HMD functional testing or camera alignment. These two operating modes are mutually exclusive. If the HMDTS is to be used for helmet display unit functional testing, go to the next step. If the HMDTS is to be used for camera alignment, go to OPERATION FOR CAMERA ALIGNMENT, WP010 00.

### WARNING

If any arcing or similar noise is heard, immediately abort the test.

b. Connect the Unit Under Test (UUT) to the HMDTS using the QDC. If QDC will not mate, push plunger (release button) in while pushing QDC halves together until an audible click is heard. Demate QDC and then try to remate normally.

c. Power on the test set using TEST SET POWER.

d. Power on host computer and monitor.

e. Select the HMDTS icon from the desktop of the host computer. The main window of the test software is displayed on the computer monitor.

f. Using the mouse, click on the "Start" button from the main window of the test software that is displayed on the computer monitor.

g. The message window above the "Start" button displays the status of the test set operations.

h. Wait until the message reads "Test Running" before continuing.

i. The helmet should be placed securely on the operator's head or table and the visor rotated into operating position.

j. Observe the operation of the primary display and puppers. The primary display should match the Test Pattern window on the computer screen. The puppers should operate in the below continuous sequence:

- (1) Left pupper HIGH brightness.
- (2) Left pupper LOW brightness.
- (3) Right pupper HIGH blink rate.
- (4) Right pupper LOW blink rate.

k. Activate the applicable PASS or FAIL buttons for the Primary Display Test and Puppets Test.

l. Observe the HELMET CAMERA LCD monitor on the HMDTS front panel. This monitor provides continuous display of the HMD Camera.

m. Activate the applicable PASS or FAIL buttons for the Camera Test.

n. Connect the upper QDC to the QMB. Note that the QMB display LED shows CLOSED (GREEN) when the magnet exists and OPEN (RED) when there is no magnet.

o. Activate the applicable PASS or FAIL buttons for the QMB.

p. Activate ACCEPT/RECORD. This completes the testing process. If any operator tests were not done, a message is displayed requesting the operator to enter PASS or FAIL for those tests. If the ABC sensor (WP003 00) was inconclusive (for example, three readings did not vary from ambient by at least 10 %), the operator is instructed to hold their hand in front of the sensor for approximately 3 seconds. If a previous record for an individual HDU exist (i.e., same serial number), the operator is prompted with alternates to overwrite the existing file or keep the file under a new name.

q. Disconnect the A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) from the UUT test cable. The HMDTS may be left in the powered on state if more helmet units are to be tested or power off when not in use for a significant amount of time.

r. On the computer, close the helmet mounted display test software by selecting EXIT.

10. TROUBLESHOOTING.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Computer	COMMERCIAL	N/A
Helmet Display Unit	620992-01-00	06VL3
Test Set Cable		
Helmet Mounted Display Test Set	620900-02-01	06VL3
QMB	178-5936	99747

Materials Required

None



HIGH VOLTAGE EXISTS - Do not try testing if any arcing noises are heard from the helmet.

11. When replacement of part specified in testing procedures does not correct the failure, refer to Helmet Display Unit Schematic, figure 2, to isolate the problem.

12. ERROR MESSAGES. Refer to table 1.



Do not try to repair bent pins. Doing so may damage mating connector permanently. Replace equipment.

a. For all failures, be sure all cables are correctly connected, the QDC is correctly mated, and the HDU securely latched to the helmet by way of the UC.

b. If the failure continues, the operator should note the details of error messages, if any, and should include any and all information pertinent to the failure on any test failure report issued.

**NOTE**

other users should contact the CDA POC at (812) 854-2372.

The HMDTS software has been added to the Navy Marine Corps Intranet (NMCI) Central Design Authority (CDA) list. NMCI users should contact their local help desk for software installation. All

c. If the fault isolation leads to suspect HMDTS, contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.

Table 1. Error Messages

Error Messages	Possible Causes	Remedy
1. Unable to Communicate	1. Test Set not powered. 2. Test Set RS232 cable not correctly connected. 3. RS232 Cable fault. 4. Test Set hardware fault. 5. Not correctly loaded test set software on host PC. 6. PC COM Port not correctly configured. 7. Another application currently using the COM Port.	1. Correctly connect power. 2. Inspect and fully connect. 3. Replace cable - 1:1 connection. NO Null Modem. 4. Replace HMDTS. 5. Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372. 6. Refer to user manual for host PC. Be sure COM Port in use is configured in the default or industry standard mode for that port. (Usually address 3F8H and IRQ4 for COM 1 and 2F8H and IRQ3 for COM 2). 7. Close the offending application and retry.
2. CRT Checksum Failed	Checksum for any block of data within the CRT EEPROM is not correct when read by the HMDTS.	Replace CRT (WP01000).
3. CRT Serial Number Does Not Match (Update Unavailable)	CRT and/or the HDU has not been updated to the most current revision of EEPROM format which permits CRT interchangeability in the field. The operator is given the selection of proceeding with the test or aborting. This configuration is not recommended, as the system optical distortion error will be outside the nominal range.	Return HDU to Depot for required updates (WP00800).

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
4. DU Checksum Failed	Checksum for any block of data within the DU EEPROM is not correct when read by the HMDTS.	Replace [H]DU [WP008]00).
5. DU Checksum Failed and CRT Checksum Failed	Checksum for any block of data within the CRT and DU EEPROM is not correct when read by the HMDTS.	Replace [H]DU [WP008]00).
6. CRT Serial Number does not Match  “Do you want to produce new coefficients...”	<ol style="list-style-type: none"> <li>1. Result of field replacement of the CRT assembly. The operator is given the alternate to produce new optical distortion coefficients for the system or aborting testing.</li> <li>2. If replacement of the CRT has not been done, there is the possibility of data corruption in either EEPROM that is not detectable with the checksum feature.</li> </ol>	<ol style="list-style-type: none"> <li>1. If generation is done, the data in both EEPROMS will then match and no further messages of this type should be seen.</li> <li>2. [R]eplace [H]DU [WP008]00).</li> </ol>
7. CRT Serial Number does not Match  “DU stored data, however...?”	CRT and/or HDU has not been updated to the most current revision of EEPROM format.	Continue with testing or abort. Continuing with testing will result in optical distortion of the pattern.
8. Attempted Invalid State	Programming logic error.	<ol style="list-style-type: none"> <li>1. Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.</li> <li>2. Replace HMDTS.</li> </ol>
9. Invalid Communications Port	Programming logic error.	<ol style="list-style-type: none"> <li>1. Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.</li> <li>2. Replace HMDTS.</li> </ol>
10. CU/DU response not correct	<ol style="list-style-type: none"> <li>1. Defective HDU or HMDTS CU.</li> <li>2. RS232 Cable between host PC and test set has an intermittent connection.</li> <li>3. UUT Test Cable has a break or intermittent connection.</li> </ol>	<ol style="list-style-type: none"> <li>1. [R]eplace [H]DU [WP008]00).</li> <li>2. Inspect and replace if required.</li> <li>3. Inspect and replace if required.</li> </ol>
11. ETI Checksum Failure	1. Defective HDU.	1. [R]eplace [H]DU [WP008]00).

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
	<ol style="list-style-type: none"> <li>2. RS232 Cable between host PC and test set has an intermittent connection.</li> <li>3. UUT Test Cable has a break or intermittent connection.</li> </ol>	<ol style="list-style-type: none"> <li>2. Inspect and replace if required.</li> <li>3. Inspect and replace if required.</li> </ol>
 <p>Do not try to repair bent pins. Doing so may permanently damage mating connector.</p>		
<p>12. Error Communicating with the MRU</p>	<ol style="list-style-type: none"> <li>1. Defective MRU.</li> <li>2. RS232 Cable between host PC and test set has an intermittent connection.</li> <li>3. UUT Test Cable has a break or intermittent connection.</li> <li>4. Defective HMDTS.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove and reconnect HDU to UC. If error still exists, replace HDU (WP008 00).</li> <li>2. Inspect and replace if required.</li> <li>3. Inspect and replace if required.</li> <li>4. Replace HMDTS.</li> </ol>
<p>13. Time-out waiting for MRU sync to change</p>	<ol style="list-style-type: none"> <li>1. Defective MRU.</li> <li>2. RS232 Cable between host PC and test set has an intermittent connection.</li> <li>3. UUT Test Cable has a break or intermittent connection.</li> <li>4. Defective HMDTS.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove and reconnect HDU to UC. If error still exists, replace HDU (WP008 00).</li> <li>2. Inspect and replace if required.</li> <li>3. Inspect and replace if required.</li> <li>4. Replace HMDTS.</li> </ol>
<p>14. Test Set Built in Test Failure</p>	<p>HMDTS BIT failures.</p>	<p>Replace HMDTS.</p>
<p>15. Serial Port Write Time-out</p>	<ol style="list-style-type: none"> <li>1. RS232 Cable between host PC and test set has an intermittent connection.</li> <li>2. UUT Test Cable has a break or intermittent connection.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect and replace if required.</li> <li>2. Inspect and replace if required.</li> </ol>

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
	3. Defective HDU or HMDTS.	3. Replace HDU (WP008 00) or HMDTS.
		
Do not try to repair bent pins. Doing so may permanently damage mating connector.		
16. Serial Port Read Time-out	1. RS232 Cable between host PC and test set has an intermittent connection. 2. UUT Test Cable has a break or intermittent connection. 3. Defective HDU or HMDTS.	1. Inspect and replace if required. 2. Inspect and replace if required. 3. Replace HDU (WP008 00) or HMDTS.
17. Can Not Continue	1. CRT or HDU does not contain the factory-installed information. 2. RS232 Cable between host PC and test set has an intermittent connection. 3. UUT Test Cable has a break or intermittent connection. 4. Defective HMDTS.	1. Replace CRT (WP010 00) or HDU (WP008 00). 2. Inspect and replace if required. 3. Inspect and replace if required. 4. Replace HMDTS.
18. Test Set Error, CU Reports...	1. Failure of the CU detected by its internal BIT circuitry. 2. If the condition persists.	1. Remove connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling. Replace UUT Test Cable, or subassembly with bent pins. 2. Replace HMDTS.
19. Test Set Error, Anode/Focus	HDU Failure detected by CU BIT.	Remove and reconnect HDU to UC. If error still exists, replace HDU (WP008 00).

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
 <p>Do not try to repair bent pins. Doing so may permanently damage mating connector.</p>		
<p>20. Test Set Error, DDIP Reports...</p>	<p>CU Faults</p> <ol style="list-style-type: none"> <li>1. There is a possibility of an intermittent UUT Test Cable or not correctly mated connector. Remove connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling.</li> <li>2. Defective HMDTS.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace UUT Test Cable, or subassembly with bent pins.</li> <li>2. Replace HMDTS.</li> </ol>
<p>21. Test Set Error, Deflection Fail</p>	<p>Inspect for intermittent UUT Test Cable, not correctly mated connectors, or bent pins.</p>	<p>Replace UUT Test Cable, or subassembly with bent pins.</p>
<p>22. Test Set Error, Cathode Fail</p>	<p>Inspect for intermittent UUT Test Cable, not correctly mated connectors, or bent pins.</p>	<p>Replace UUT Test Cable, or subassembly with bent pins.</p>
<p>23. Test Set Error, Filament Open</p>	<ol style="list-style-type: none"> <li>1. Inspect for intermittent UUT Test Cable, not correctly mated connectors, or bent pins.</li> <li>2. Defective CRT.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace UUT Test Cable, or subassembly with bent pins.</li> <li>2. Replace CRT (WP010 00).</li> </ol>
<p>24. Test Set Error, Crowbar</p>	<ol style="list-style-type: none"> <li>1. HDU not correctly seated.</li> <li>2. HDU has failed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reconnect HDU to UC.</li> <li>2. Replace HDU with known good HDU (WP008 00). If problem clears, replace HDU. If problem continues, replace UHVI (WP009 00).</li> </ol>

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
25. Power Supply Fail	11vdc fail ±12vdc fail ±15vdc fail +27vdc fail	Replace HMDTS.
26. Power Supply Has Shut Down For Unknown Reasons	1. RS232 Cable between host PC and test set has an intermittent connection.  2. UUT Test Cable has a break or intermittent connection.  3. Broken or intermittent connection between the QDC and the CRT in the HDU.  4. Defective CU.	1. Inspect and replace if required.  2. Inspect and replace if required.  3. Inspect the helmet and HDU connection at the UC for bent pins. Remate all connections from the test set to the HDU.  Replace HDU or helmet (WP00800).  4. Replace HMDTS.
27. Interlock Failure	1. RS232 Cable between host PC and test set has an intermittent connection.  2. UUT Test Cable has a break or intermittent connection.  3. Broken or intermittent connection between the QDC and the CRT in the HDU.  4. Defective CU.	1. Inspect and replace if required.  2. Inspect and replace if required.  3. Inspect the helmet and HDU connection at the UC for bent pins. Remate all connections from the test set to the HDU.  Replace HDU or helmet (WP00800).  4. Replace HMDTS.
28. DU EEPROM Map File Does Not Exist	File was either not created by the program or was deleted before being loaded into DU EEPROM.	1. Abort and restart the test set software and do the instructions for generating new coefficients on the host PC.  2. If that fails to correct the problem, shutdown and restart the host PC.

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
29. CRT EEPROM Map File Does Not Exist	File was either not created by the program or was deleted before being loaded into CRT EEPROM.	<ol style="list-style-type: none"> <li>1. Abort and restart the test set software and do the instructions for generating new coefficients on host PC.</li> <li>2. If that fails to correct the problem, shutdown and restart the host PC.</li> </ol>
30. Missing Pattern File	“Test Pattern.txt” is not in the same directory as the program. One or the other has moved or the pattern file was deleted.	Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.
31. Error - Cannot Proceed: New Offset Location Resides Outside Limit Region	<ol style="list-style-type: none"> <li>1. Error in entering one or both of the camera offset values.</li> <li>2. Mechanical misalignment of the camera causing the needed offset values to be too large.</li> <li>3. Failure in the HMDTS.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repeat camera alignment procedure.</li> <li>2. Return HDU (WP00800).</li> <li>3. Replace HMDTS.</li> </ol>

13. FAILURE INDICATIONS. Refer to table 2



Do not try to repair bent pins. Doing so may damage mating connector permanently. Replace equipment.

a. For all failures, be sure all cables are correctly connected, the QDC is correctly mated, and the HDU securely latched to the helmet by way of the UC.

b. If the failure continues, the operator should note the details of error messages, if any, and should

include any and all information pertinent to the failure on any test failure report issued.

c. If the fault isolation leads to suspect HMDTS, contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.

d. If the fault isolation leads to suspect the HDU, first test with a known good HDU. If the display is good, replace CRT of suspected HDU. If display is bad with good HDU, test with known good helmet assembly. If the display is good, then replace the upper HVI of suspected HDU. If the display is still bad, suspect the HMDTS. Replace HMDTS.

Table 2. Failure Indications

Fault Indication	Possible Causes	Remedy
 Do not try to repair bent pins. Doing so may damage mating connector permanently.		
1. Bright Spots On Display  If bright spots are shown on the display even when the display intensity is reduced to a low value, one of the below problems may be the cause.	There is a break (open) electrical connection between the HMDTS and the HDU electronics or a wrong G2 setting in the CRT EEPROM.	Inspect all connection points for bent pins and then remate connectors. Then test by wiggling the cabling at each connection point. Finally try another helmet or HDU. If changing any component prevents the condition from occurring, replace that component.
2. Intermittent Operation	Loose or intermittent test set UTT cable at either the test set or the QDC (not correctly connected) or not correctly mated HDU to helmet UC.	Remove Test Set connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling.
3. Loss of Pattern or No Pattern	Failed CRT or wrong test setup.	Make sure HDU is secure on the helmet, UC is latched completely, and QDC is fully engaged (CLICK when mated), and Test Set Cable is fully attached to HMDTS.
4. Blurred Image, Distorted, or Partially Missing Symbology.	Moisture in Optics Module, finger prints on optics, or failed CRT.	If finger prints exist, clean optics (WP005 00). If blurred image remains and moisture exists, purge Relay Optics Assembly (WP012 00). If blurred image or partially missing symbology remains, replace CRT (WP010 00). If replacing CRT does not fix problem, replace HDU (WP008 00).
 Do not try to repair bent pins. Doing so may damage mating connector permanently.		

Table 2. Failure Indications (Continued)

Fault Indication	Possible Causes	Remedy
<p>5. HMD Camera</p> <p>No image on HMDTS.</p>	<p>Wrong viewing angle for test set display. Intermittent or broken signal path between HMDTS and HDU.</p>	<p>LCD displays have limited viewing angles. Reposition for a more perpendicular view and move the helmet to see if there is motion in the display.</p> <p>Inspect all connection points for bent pins and then remate connectors. Then test by wiggling the cabling at each connection point. Finally try another helmet or HDU. If changing any component prevents the condition from occurring, replace that component.</p>
<p>6. Puppers</p> <p>No puppers seen even though test set indicates they should be flashing and there are no test set errors or lack of communications with the HDU.</p>	<p>Intermittent or broken signal path between HMDTS and HDU.</p>	<p>Inspect all connection points for bent pins and then remate connectors. Then test by wiggling the cabling at each connection point. Finally try another helmet or HDU. If changing any component prevents the condition from occurring, replace that component.</p>
<p>7. QMB Interlock</p>	<p>If the QMB Interlock switch fails to change from red to green, the possibility of not correctly placing the magnet or using too weak of a magnet may be the cause of the failure.</p>	<p>Using a known good helmet, verify the placement and strength of magnet used are correct. If the Interlock switch changes from red to green with the replacement helmet, replace the suspected helmet upper HVI. If test fails with a known good helmet and magnet, exit the test set software and restart, or contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.</p>



Do not try to repair bent pins. Doing so may permanently damage mating connector.

Table 2. Failure Indications (Continued)

Fault Indication	Possible Causes	Remedy
<p>8. ABC Sensor</p> <p>Failure to complete a pass indication even after partly obscuring the sensor.</p>	<p>If there are no communications errors noted by the test set, the possible causes are:</p> <p>Not covering the ABC sensor completely.</p> <p>Not covering the ABC sensor for a long enough period of time.</p> <p>Defective ABC sensor.</p>	<p>Retry obscuring the sensor in the presence of stronger (ambient) light for about 3 seconds.</p> <p>If ABC sensor still does not operate, replace HDU (WP00800).</p>
<p>9. HMDTS Not Operating</p>	<p>If the HMDTS does not appear to be operating and there are no error messages, there is a possibility of corrupt HMDTS software residing on the Host PC.</p>	<p>Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372. If this does not correct the problem, replace the HMDTS.</p>
<p>10. Test Set Intermittent Operation</p>	<p>Loose or intermittent test set UTT cable at either the test set or the QDC (not correctly connected) or not correctly mated HDU to helmet UC.</p>	<p>Remove connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling.</p>
<p>11. Test Set Overheating</p>	<p>Air vents obstructed or internal fan not operating.</p>	<p>Make sure the air vents on the HMDTS are not obstructed and that the internal fan is operating. Turn the unit off for 30 minutes.</p>

14. SHUTDOWN.



Do not disconnect test set cables from tester while power is applied.

- a. Power down test set.

- b. Power down computer.

- c. Disconnect test set from computer.

15. SOFTWARE UPDATES.

16. Released versions of the HMDTS software will be updated for all users through NMCI. For units that do not have access to NMCI contact CDA POC at (812) 854-2372.

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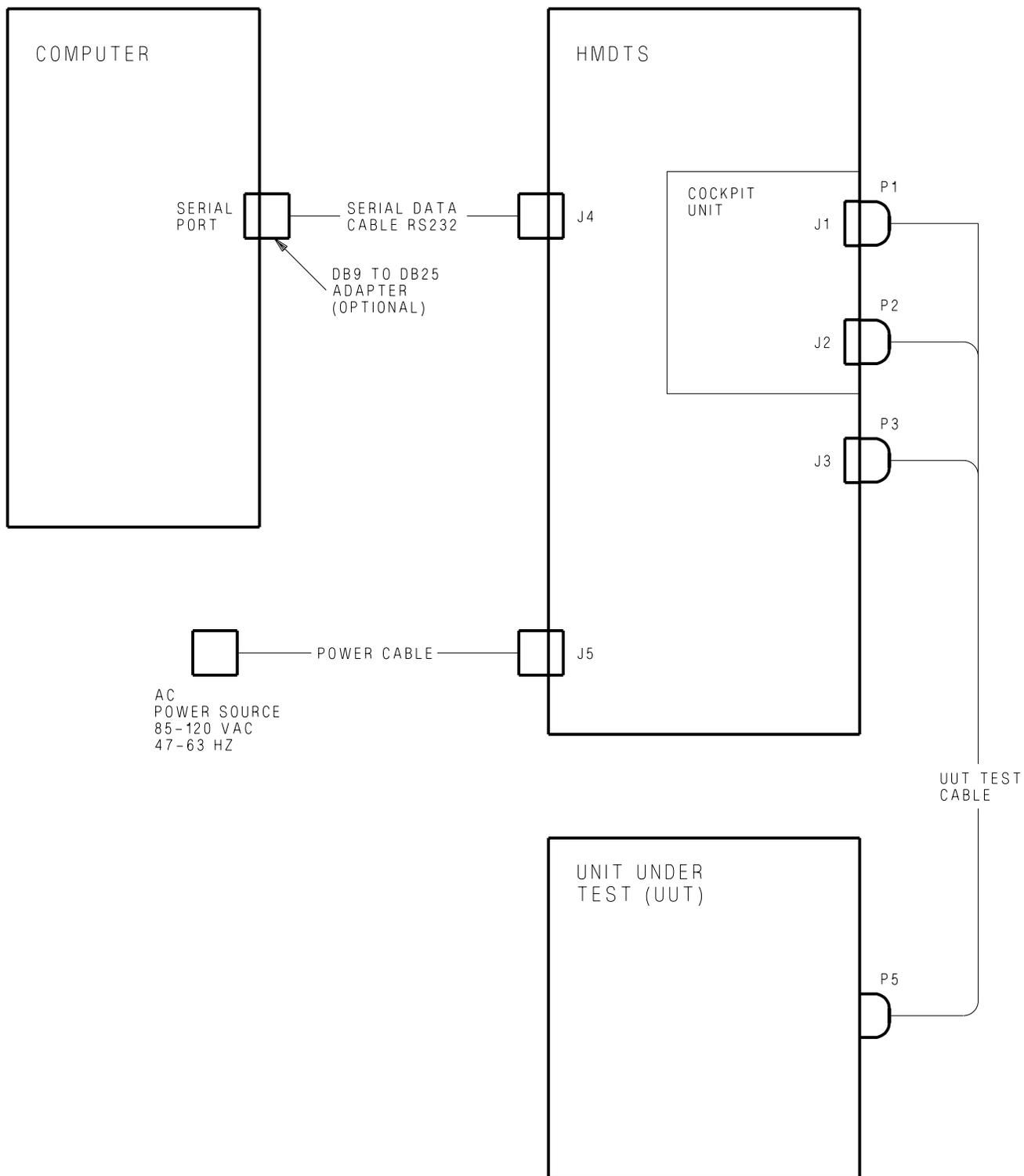


Figure 1. Test Set Hookup

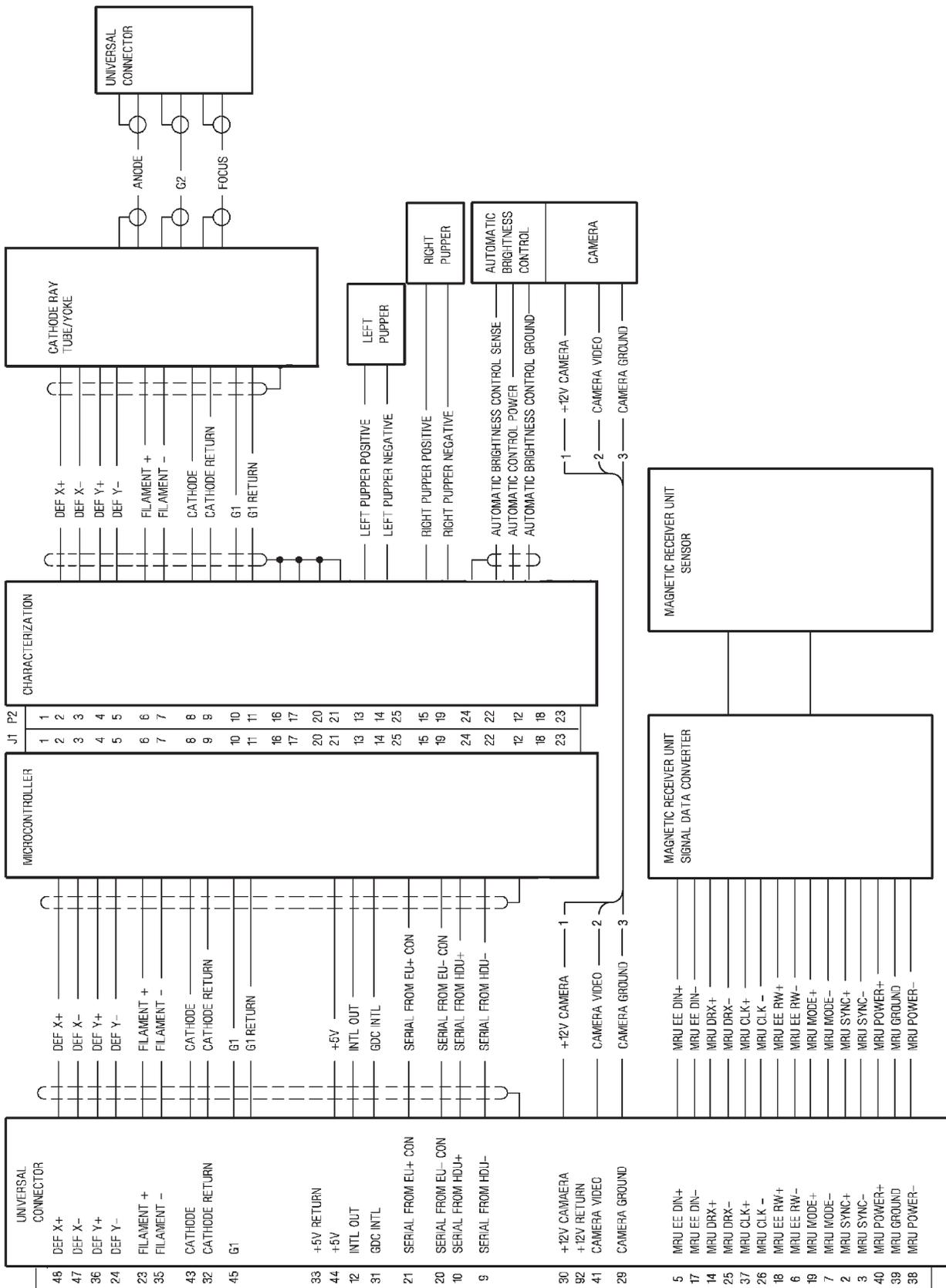


Figure 2. Helmet Display Unit Schematic