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CHAPTER 31 – INDICATING/RECORDING SYSTEMS

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INDICATING/RECORDING SYSTEMS - DDG MAINTENANCE PROCEDURES

1. General
   A. The dispatch deviations guide (DDG) procedures have the maintenance tasks that prepare the airplane for flight with certain components of the indicating/recording system inoperative.
   B. Each DDG procedure has two tasks. The first task is necessary for dispatch of the airplane in a nonstandard configuration under the requirements of the master minimum equipment list (MMEL). The second task is a procedure to put the airplane back to its usual condition after operation under the MMEL requirements.
   C. These are the DDG procedures for the components in the indicating/recording system:
      (1) DDG 31-41-1 Preparation - Engine Indicating and Crew Alerting Systems (EICAS) Inoperative
      (2) DDG 31-41-1 Restoration - Engine Indicating and Crew Alerting Systems (EICAS) Inoperative
      (3) DDG 31-61-4 Preparation - EICAS Status Messages Inoperative
      (4) DDG 31-61-4 Restoration - EICAS Status Messages Inoperative
      (5) DDG 31-61-5 Preparation - EICAS Signal Consolidation Card (SCC) Inoperative
      (6) DDG 31-61-5 Restoration - EICAS Signal Consolidation Card (SCC) Inoperative

TASK 31-00-00-049-116

2. DDG 31-41-1 Preparation - Engine Indicating and Crew Alerting Systems (EICAS) Inoperative
   A. General
      (1) This task gives the maintenance steps which prepare the airplane for flight with an EICAS computer or its CRT display unit inoperative.
      (2) The CRT display units are interchangeable.
      (3) Except for extended range (ER) operations, one EICAS computer or CRT display unit may be unserviceable if:
         (a) All engine parameters operate correctly.
         (b) Standby Engine Instruments are turned on.
         (c) Electronic Engine Control or auto-throttle operates correctly.
         (d) At least one autopilot operates correctly.
         (e) Repairs or replacement are made within one flight day.
      (4) For an unserviceable EICAS computer, you must also make sure that these conditions exist:
         (a) The two EICAS CRT displays operate correctly.
         (b) Service bulletin SB 767-79-2, or equivalent dual oil temperature sensors, are installed.

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(5) For an unserviceable EICAS CRT display, you must also make sure that these conditions exist:
  (a) The two EICAS computers operate correctly.
  (b) The Cargo FIRE/OVHT test is done prior to each departure.
(6) EICAS Status Messages:
  (a) EICAS DISAGREE
  (b) EICAS DISPLAY
  (c) UPPER DU FAIL
  (d) LOWER DU FAIL

B. Equipment
(1) Lock-Circuit Breaker, Approved for Flight (commercially available)

C. References
(1) AMM 20-10-13/401, Pressure Sensitive Placards
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 31-41-01/401, EICAS Display Units
(4) AMM 31-41-02/401, EICAS Computer

D. Access
(1) Location Zones
  211/212 Flight Compartment

E. Deactivate the Unserviceable EICAS Computer

S 049-057
(1) For the unserviceable EICAS computer, open the applicable circuit breaker and attach a circuit breaker lock (collar):
  (a) P11 Overhead Circuit Breaker Panel:
    1) 11J2, EICAS CMTR L
    2) 11J29, EICAS CMTR R

S 869-063
(2) Make a placard which identifies an INOP condition for the unserviceable EICAS computer.

S 869-064
(3) Do this task to install the INOP placard adjacent to the COMPUTER select switch on the EICAS display select panel: Replace the Placard (AMM 20-10-13/401).

S 869-062
(4) Set the COMPUTER select switch to the operative switch position (L or R, as applicable) on the EICAS display select panel.

S 719-068
(5) Do the EICAS Computer Test on the operative EICAS computer (AMM 31-41-02/401).

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F. Deactivate the Unserviceable EICAS CRT Display

S 049-058
(1) For the unserviceable EICAS CRT Display, open the applicable circuit breaker and attach a circuit breaker lock (collar):
(a) P11 Overhead Circuit Breaker Panel:
1) 11J3, EICAS UPPER DSPL
2) 11J30, EICAS LOWER DSPL

S 869-059
(2) Make a placard which identifies an INOP condition for the unserviceable EICAS CRT display.

S 869-082
(3) Do this task to install the INOP placard on the unserviceable EICAS CRT display: Replace the Placard (AMM 20-10-13/401).

S 719-066
(4) Do the Display Unit Test for the operative EICAS CRT display (AMM 31-41-01/401).
(a) If upper EICAS display unit is operative, make sure that the EICAS message UPPER DU FAIL does not show after TEST IN PROGRESS message goes off.
(b) If lower EICAS display unit is operative, make sure that the EICAS message LOWER DU FAIL does not show after TEST IN PROGRESS message goes off.

G. Put the Airplane Back to Its Usual Condition

S 869-016
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-00-00-449-017

3. DDG 31-41-1 Restoration - Engine Indicating and Crew Alerting Systems (EICAS) Inoperative

A. General
(1) This task puts the airplane back to its usual condition after operation with an EICAS computer or CRT display unit inoperative.

B. References
(1) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 31-41-01/401, EICAS Display Units
(4) AMM 31-41-02/401, EICAS Computer

C. Access
(1) Location Zones

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119/120 Main Equipment Center
211/212 Flight Compartment

(2) Access Panels
119AL Main Equipment Center Access Door

D. Prepare to Reactivate the EICAS Computer

S 869-018
(1) Remove the circuit breaker lock and attach a DO-NOT-CLOSE tag to the applicable open circuit breaker:
(a) P11 Overhead Circuit Breaker Panel:
1) 11J2, EICAS CMTR L
2) 11J29, EICAS CMTR R

S 919-020

CAUTION: DO NOT MOVE THE EICAS COMPUTER BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE (AMM 20-41-01/201). THE ELECTROSTATIC DISCHARGE CAN CAUSE ELECTRICAL DAMAGE TO THE EICAS COMPUTER.

(2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

E. Reactivate the EICAS Computer

S 449-069
(1) Do the tasks to replace the unserviceable EICAS computer (AMM 31-41-02/401).

S 869-022
(2) Remove the placard from the COMPUTER select switch on the EICAS display select panel.

S 869-024
(3) Remove the DO-NOT-CLOSE tags and close the applicable circuit breakers:
(a) P11 Overhead Circuit Breaker Panel:
1) 11J2, EICAS CMTR L
2) 11J29, EICAS CMTR R

S 719-070
(4) Do the EICAS computer test (AMM 31-41-02/401).

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F. Prepare to Reactivate the EICAS CRT Display

S 869-115

(1) Remove the circuit breaker lock and attach a DO-NOT-CLOSE tag to the applicable open circuit breaker:
   (a) P11 Overhead Circuit Breaker Panel:
      1) 11J3, EICAS UPPER DSPL
      2) 11J30, EICAS LOWER DSPL

S 919-071

CAUTION: DO NOT MOVE THE EICAS CRT DISPLAY UNIT BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE (AMM 20-41-01/201). THE ELECTROSTATIC DISCHARGE CAN CAUSE ELECTRICAL DAMAGE TO THE EICAS CRT DISPLAY.

(2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

G. Reactivate the EICAS CRT Display

S 449-072

(1) Do the tasks to replace the unserviceable EICAS CRT display (AMM 31-41-01/401).

S 869-073

(2) Remove the INOP placard adjacent to the EICAS CRT display.

S 869-074

(3) Remove the DO-NOT-CLOSE tags and close the circuit breakers:
   (a) P11 Overhead Circuit Breaker Panel:
      1) 11J3, EICAS UPPER DSPL
      2) 11J30, EICAS LOWER DSPL

S 719-075

(4) Do the Display Unit Test for the EICAS CRT displays (AMM 31-41-01/401).

H. Put the Airplane Back to Its Usual Condition

S 869-076

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 31-00-00-049-027

4. DDG 31-61-4 Preparation - EICAS Status Messages Inoperative

A. General

(1) This task gives the steps which prepare the airplane for flight with certain EICAS status messages inoperative.

(2) An inoperative message is a message that is shown when there is no actual equipment fault.

(3) All EICAS messages of STATUS level or higher affect airplane dispatch. Conditions causing their appearance must be corrected prior to flight or the dispatch deviations guide (DDG), if any, must be obeyed.

(4) Dispatch with certain inoperative status level messages is permitted until repairs can be done if:

(a) You make sure the system and its components which are related to the inoperative EICAS status message operate normal

(b) Or you obey the DDG procedure (if any) for the equipment related to the inoperative EICAS status message.

(c) You test the related system and its components each flight day until repairs are made to correct the unserviceable condition.

(5) The DDG includes a list of EICAS messages that refer to the applicable DDG procedures (if any) which may possibly permit dispatch.

(6) The EICAS messages are applicable if the systems and components are installed on the airplane. Most airplanes will only include a subset of the EICAS messages.

(7) Maintenance level EICAS messages have no effect on dispatch.

(8) Service letter 767-SL-31-032 (dated March 8, 1994) gives procedures to verify normal operation of equipment known to experience nuisance EICAS messages. These nuisance messages are listed in the table that follows.

KNOWN NUISANCE EICAS MESSAGE (767-SL-31-032)	LEVEL
AFT DET FAN	M
AFT WASTE SNSR	M
AILERON LOCKOUT	C
ANTISKID/AUTOBRK	M
CABIN ALT AUTO 1	S, M

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KNOWN NUISANCE EICAS MESSAGE (767-SL-31-032)	LEVEL
CABIN ALT AUTO 2	S, M
COMPARATOR BITE	S
EICAS BITE	M
EICAS DISAGREE	S
EICAS SCC	S
FUEL CONFIG	C
FUEL QTY BITE	S, M
FUEL QTY CHANNEL	S
FWD DET FAN	M
FWD WASTE SNSR	M
GND PROX BITE	S
IDG OUT TEMP	M
IDG RISE TEMP	M
LDG GEAR MONITOR	S
LE SLAT ASYM	B
LE SLAT DISAGREE	B
LR ENG CONTROL	C, S, M
LDG GEAR MONITOR	S
L,R ENG CONTROL	C, S, M
L,R ENG EEC C1	S, M
L,R ENG FIRE LP 1,2	S

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KNOWN NUISANCE EICAS MESSAGE (767-SL-31-032)	LEVEL
L,R ENG O/S GOV	S, M
L,R IDG TEMP SENS	S, M
L,R PACK TEMP	C
L,R PIMU	C
RUDDER RATIO	C
SPOILERS	C, M
STAB TRIM	M
TCAS FAIL	C
WARN ELEX	S, M

B. References
   (1) AMM 24-22-00/201, Electrical Power - Control
   (2) AMM 31-41-00/001, Engine Indication and Crew Alerting System
   (3) SL 767-SL-31-032, Nuisance EICAS Messages

C. Procedure

S 869-092
(1) Refer to the EICAS message list in the DDG to find the applicable MMEL item (if any) that may permit dispatch.

S 869-093
(2) If there is a DDG procedure, do it to configure the plane for dispatch.

S 719-086
(3) If there is no DDG procedure, do an operational test of the system or its components related to the EICAS message before each flight until the condition is corrected .
   (a) Refer to the EICAS MESSAGES table to locate the EICAS message and identify the applicable maintenance manual to do the operational test (AMM 31-41-00/001).
   (b) Do the operational test of the related system and components.

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S 719-112
(4) If the system and its components operate normal, make sure the EICAS status message is not a known EICAS nuisance message.

S 719-094
(5) If it is a known nuisance EICAS message, do the approved procedure given in service letter 767-SL-31-032.

NOTE: The procedures in the service letter may give you a simple solution that does not require repair. It may also require a series of complex tests and repair or alternative methods given to correct the condition. The decision to do the tests depends on many factors, such as these: The EICAS message level, the built-in-test capabilities of the affected systems, whether or not the recommended upgrades to the equipment are installed, and what alternative DDG requirements are available for dispatch.

D. Put the Airplane Back to Its Usual Condition

S 869-084
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-00-00-449-042

5. DDG 31-61-4 Restoration - EICAS Status Messages Inoperative

A. General
(1) This task puts the airplane back to its usual condition after operation with certain EICAS status level messages inoperative.

B. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) FIM 31-41-00/101, Engine Indication and Crew Alerting System
(3) SL 767-SL-31-032, Nuisance EICAS Messages

C. Procedure

S 449-097
(1) Do one or all of these methods to reactivate the unserviceable EICAS message:
(a) For nuisance EICAS messages, do the repair procedures described in service letter 767-SL-31-032.
(b) Refer to the EICAS MESSAGES table to identify the applicable chapter in the fault isolation manual (FIM) to troubleshoot the unserviceable EICAS message (FIM 31-41-00/101).
(c) Do the procedure necessary to troubleshoot and correct the unserviceable EICAS message.

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D. Put the Airplane Back to Its Usual Condition

S 869-113

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-00-00-049-053

6. DDG 31-61-5 Preparation - EICAS Signal Consolidation Card (SCC) Inoperative

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the EICAS signal consolidation card inoperative.

(2) The EICAS signal consolidation card (SCC) can be inoperative for dispatch if:

(a) The DDG procedures (if any) for system and components related to the EICAS SCC are done.

(b) You make sure the fuel quantity indication is normal before each flight.

(3) The EICAS messages related to the EICAS SCC are applicable if the systems and components are installed on the airplane. Most airplanes will only include a subset of the EICAS messages.

(4) The EICAS maintenance level messages have no effect on dispatch.

(5) The EICAS messages listed in the table that follows are related to the EICAS SCC. These messages have no effect on dispatch.

EICAS MESSAGE (INFORMATION ONLY)	LEVEL
AFT CAB REST SYS	M
AFT WASTE SNSR	M
AUX TEMP BITE	M
BLEED SYSTEM	M
CAPT PVD	C, S, M
FLT DECK HUMID	C
FLT REST SMK VAL	S, M
FLT REST SOV	S, M
FLT REST SYS	M

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EICAS MESSAGE (INFORMATION ONLY)	LEVEL
F/O PVD	C, S, M
FWD CAB REST SYS	M
FWD WASTE SNSR	M
L ENG AUTOSTART	B
L OIL PRESS MON	S, M
L OIL PRESS SNS	S, M
L SPOILER MDL 1	M
L SPOILER MDL 2	M
L SPOILER MDL 3	M
MID CAB REST SYS	M
PRIMARY BLD SYS	S, M
R ENG AUTOSTART	B
R OIL PRESS MON	S, M
R OIL PRESS SNS	S, M
R SPOILER MDL 1	M
R SPOILER MDL 2	M
R SPOILER MDL 3	M
SLAT ISLN VAL	M
TCAS SYSTEM	S, M

(6) The EICAS Messages in the table that follows are related to the EICAS SCC and do have an effect on dispatch.

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EICAS MESSAGE (EFFECT ON DISPATCH)	LEVEL	REMARKS
FUEL QTY CHANNEL	S	
FUEL QTY IND	S	
TIRE PRESSURE	C, S	
TIRE PRESS SYS	S, M	
L ENG SCAV FILTER	S, M	ON -800 SERIES -901 (RR) EICAS (REFER TO MMEL 79-35-3)
R ENG SCAV FILTER	S, M	ON -800 SERIES -901 (RR) EICAS (REFER TO MMEL 79-35-3)
CARGO A/C CONT	C	ON -600, -800 SERIES EICAS (REFER TO MMEL 21-28-1)
CARGO A/C CTRLR	S, M	ON -400, -602, -703 SERIES EICAS (REFER TO MMEL 21-28-1)
CARGO A/C CONT	S, M	ON -600, -700, -800, -900 SERIES EICAS (REFER TO MMEL 21-28-1)
MN CARGO LP 1	S, M	ON -901 EICAS (REFER TO MMEL 26-16-2)
MN CARGO LP 2	S, M	ON -901 EICAS (REFER TO MMEL 26-16-2)

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CAPT STDY INV	S, M	ON -901 EICAS (REFER TO MMEL 26-26-2)

B. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 28-41-00/501, Fuel Quantity Indicating System

C. Access
(1) Location Zones
211/212 Flight Compartment

D. SCC Deactivation

S 049-103
(1) Make sure the EICAS SCC message is not an EICAS nuisance message. Do the applicable procedure (if any) in service letter 767-SL-31-032.

S 049-104
(2) Do the applicable DDG procedure (if any) for the EICAS messages.

S 719-107
(3) Do an operational test of the fuel quantity indication system (FQIS) to make sure the FQIS operates correctly before each flight until the condition is corrected (AMM 28-41-00/501).

E. Put the Airplane Back to Its Usual Condition

S 869-102
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-00-00-449-055

7. DDG 31-61-5 Restoration - EICAS Signal Consolidation Card (SCC) Inoperative

A. General
(1) This task puts the airplane back to its usual condition after operation with the signal consolidation card inoperative.

B. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 31-41-07/401, EICAS Signal Consolidation Card

C. Access
(1) Location Zones
119/120 Main Equipment Center
211/212 Flight Compartment

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D. Reactivate the EICAS SCC

S 449-114

(1) Replace the EICAS signal consolidation card (AMM 31-41-07/401).

E. Put the Airplane Back to Its Usual Condition

S 869-101

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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1. General
   A. The data in this section, 31-01-XX, will help you find the electrical components that are installed in the electrical/electronic panels in the airplane.

      NOTE: In general, the XX is the panel number.
      Examples: P6 panel is in 31-01-06
      P36 panel is in 31-01-36.

      (1) These components are shown and identified:

         NOTE: Examples of the electrical equipment numbers for these components are shown in parentheses.

         (a) Contactors (Txxxx)
         (b) Current Sensors (TSxxxx)
         (c) Modules (Mxxxxx)
         (d) Relays (Kxxxxx)
         (e) Terminal Blocks (TBxxxx)
         (f) Transformers (Txxxxx)

      (2) These components are shown for reference only:
         (a) Circuit Breakers
         (b) Panel Switches

      (3) The resistors and diodes that are usually installed on the terminal blocks are not shown.

   B. Instructions to Help You Use the Data in this Section
      (1) Assumptions
         (a) You know the electrical equipment number of the component you want to find.
         (b) You know the panel number where the component is installed.
      (2) Find the Component
         (a) Figure 101 has a list of the components in order of component type and electrical equipment number.

            NOTE: Figure 101A in this procedure gives you a list of the panels that are shown in this section, 31-01-XX.

            1) Find the component in the component list.
            2) The number below the "Fig. 102 Sht" column tells you which sheet shows the component. The (X) below the Access/Area refers to the view on Figure 102 that shows the component.
            3) Go to the applicable Figure 102 sheet to find the illustration of the panel.

Electrical/Electronic Panels - Component Location
Figure 101 (Sheet 1)

G27615
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(b) Figure 102 shows the location of the panel and the components that are in the panels.

NOTE: Figure 102 in this procedure shows the location of the panels that are in this section, 31-01-XX.

1) These illustrations will show the area that contains the component.
2) The list of components shown for each area on Fig. 102 are in numeric order to help you find the component. They are not listed in the order that they are installed on the panel.
3) Use the placards in the panel to identify the specific location of the component.

Electrical/Electronic Panels - Component Location
Figure 101 (Sheet 2)

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ELECTRICAL/ELECTRONIC PANELS

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
P6, MAIN POWER DISTRIBUTION PANEL	2	1	FLT COMPT, RIGHT SIDE	31-01-06
P19, FORWARD LIGHTING DISTRIBUTION PANEL	1	1	PASS. COMPT, CEILING LEFT OF CENTERLINE, NEAR FORWARD ENTRY DOOR	31-01-19
P25, AFT LIGHTING DISTRIBUTION PANEL	1	1	PASS. COMPT, CEILING CENTERLINE	31-01-25
P29, LIGHTING EQUIPMENT PANEL	3	1	119AL, MAIN EQUIP CTR, RIGHT SIDE	31-01-29
P31, LEFT GENERATOR POWER PANEL	3	1	119AL, MAIN EQUIP CTR, LEFT SIDE	31-01-31
P32, RIGHT GENERATOR POWER PANEL	3	1	119AL, MAIN EQUIP CTR, RIGHT SIDE	31-01-32
P33, FORWARD MISCELLANEOUS ELECTRICAL EQUIPMENT PANEL	3	1	119AL, MAIN EQUIP CTR, CENTERLINE	31-01-33
P34, APU EXTERNAL POWER PANEL	3	1	119AL, MAIN EQUIP CTR, RIGHT OF CENTERLINE	31-01-34
P35, FORWARD COMPARTMENT CARGO HANDLING ACCESSORY PANEL	2	1	FORWARD CARGO COMPT, RIGHT SIDE-WALL, FORWARD OF THE CARGO DOOR	31-01-35
P36, LEFT MISCELLANEOUS ELECTRICAL EQUIPMENT PANEL	3	1	119AL, MAIN EQUIP CTR, LEFT SIDE	31-01-36
P37, RIGHT MISCELLANEOUS ELECTRICAL EQUIPMENT PANEL	3	1	119AL, MAIN EQUIP CTR, RIGHT SIDE	31-01-37
P39, AFT COMPARTMENT CARGO HANDLING ACCESSORY PANEL	1	1	AFT CARGO COMPT, RIGHT SIDEWALL, FORWARD OF THE CARGO DOOR	31-01-39
P49, APU AUXILIARY PANEL	1	1	AFT CARGO COMPT, RIGHT SIDE, E6 RACK, AFT OF CARGO DOOR	31-01-49
P61, RIGHT SIDE PANEL	2	1	FLT COMPT, RIGHT SIDE	31-01-61
P65, HYDRAULIC GENERATOR POWER PANEL 1	3	1	119AL, MAIN EQUIP CTR, LEFT SIDE	31-01-65
P87, FORWARD LEFT MISCELLANEOUS ELECTRICAL PANEL	3	1	119AL, MAIN EQUIP CTR, CENTERLINE	31-01-87

1 ETOPS AIRPLANES

Electrical/Electronic Panels - Component Index
Figure 101A

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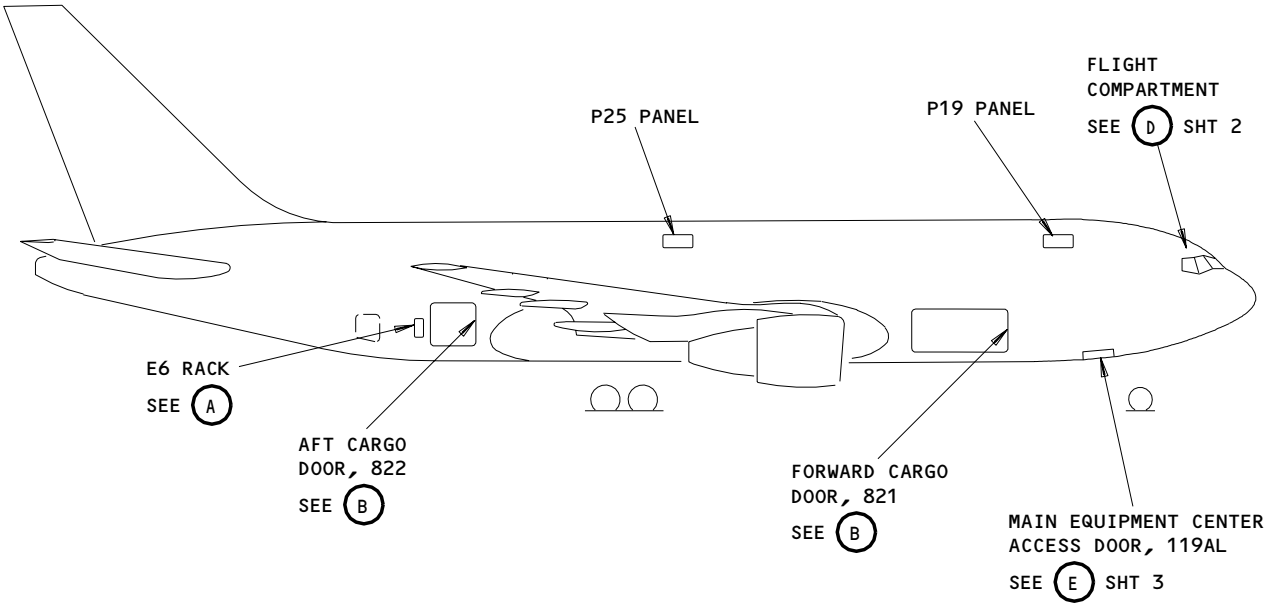
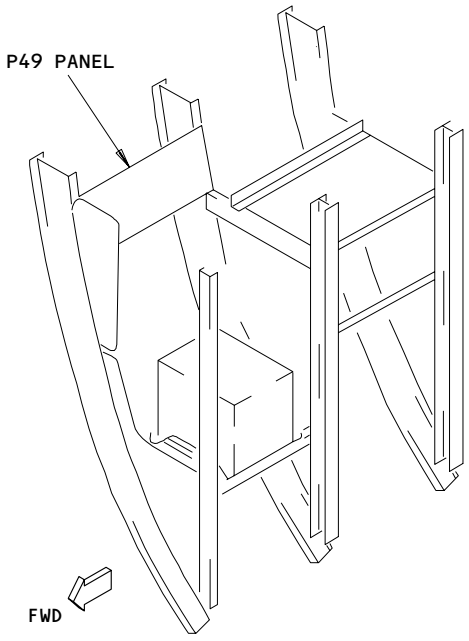
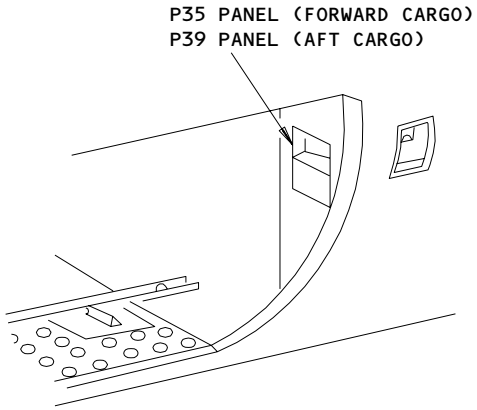




E6 RACK

A



FORWARD CARGO DOOR, 821
OR
AFT CARGO DOOR, 822

B

Electrical/Electronic Panels - Component Location
Figure 102 (Sheet 1)

A57449

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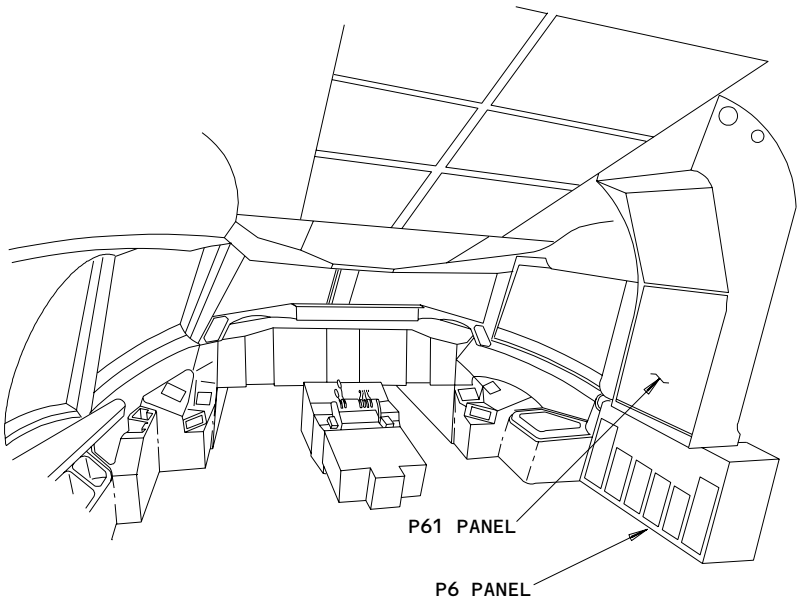

FLIGHT COMPARTMENT

(D)

NOTE: VIEW (C) NOT USED

Electrical/Electronic Panels - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

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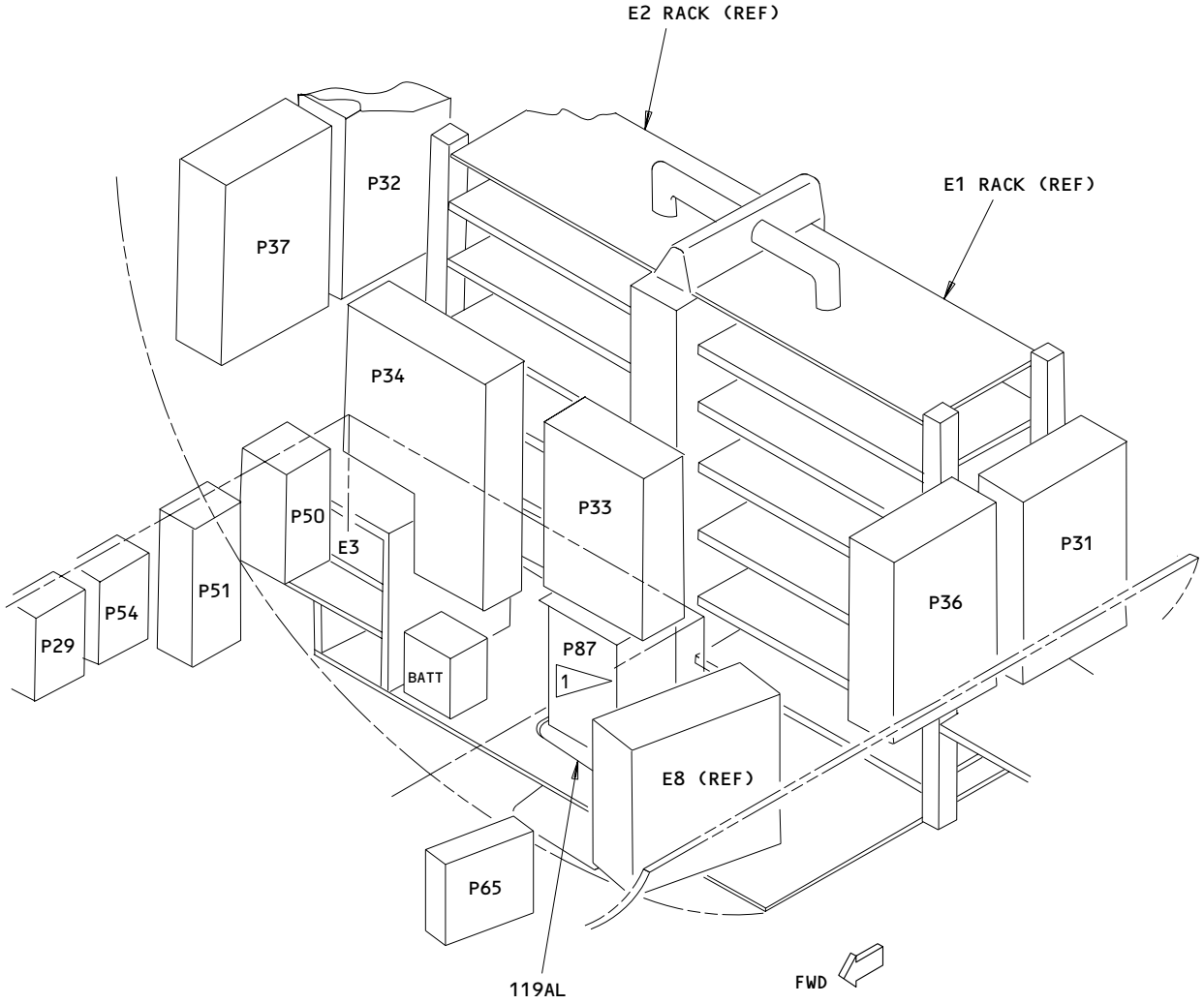

MAIN EQUIPMENT CENTER

(E)

1 IF INSTALLED

Electrical/Electronic Panels – Component Location (Detail from Sht 1)
Figure 102 (Sheet 3)

A57506

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MAIN POWER DISTRIBUTION PANEL, P6

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
MODULES -			FLT COMPT, P6	
M540	2	1	(A)	*
M1079	3	1	(B)	*
M1217	3	1	(B)	*
M10334	4	1	(C)	*
M10335	4	1	(C)	*
RELAYS -			FLT COMPT, P6	
K104	2	1	(A)	24-33-02
K105	2	1	(A)	24-33-01
K106	2	1	(A)	24-33-02
K107	2	1	(A)	*
K108	2	1	(A)	*
K109	2	1	(A)	24-33-01
K110	2	1	(A)	*
K113	2	1	(A)	*
K122	2	1	(A)	*
K123	2	1	(A)	*
K137	2	1	(A)	*
K138	2	1	(A)	*
K467	3	1	(B)	*
K468	3	1	(B)	*
K469	3	1	(B)	*
K470	3	1	(B)	*
K657	4	1	(C)	*
K658	4	1	(C)	*
K659	4	1	(C)	*
K660	4	1	(C)	*
K661	4	1	(C)	*
K662	4	1	(C)	*
K663	4	1	(C)	*
K664	4	1	(C)	*
K665	4	1	(C)	*
K666	4	1	(C)	*
K694	2	1	(A)	*
K695	2	1	(A)	*
K696	2	1	(A)	*
K701	4	1	(C)	*
K702	4	1	(C)	*
K703	4	1	(C)	*
K704	4	1	(C)	*
K705	4	1	(C)	*
K706	4	1	(C)	*
K707	4	1	(C)	*
K708	4	1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIGURE 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Main Power Distribution Panel, P6 - Component Index
Figure 101 (Sheet 1)

A65486

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAYS (CONT) -			FLT COMPT, P6	
K709	4	1	(C)	*
K710	4	1	(C)	*
K711	4	1	(C)	*
K712	4	1	(C)	*
K713	4	1	(C)	*
K714	4	1	(C)	*
K715	4	1	(C)	*
K728	4	1	(C)	*
K743	4	1	(C)	*
K744	4	1	(C)	*
K747	4	1	(C)	*
K748	4	1	(C)	*
K749	4	1	(C)	*
K770	2	1	(A)	24-33-01
K771	4	1	(C)	*
K772	4	1	(C)	*
K773	4	1	(C)	
K791	2	1	(A)	
K794	4	1	(C)	*
K2048	4	1	(C)	*
K2127	2	1	(A)	*
K2128	2	1	(A)	*
K10247	4	1	(C)	*
K10250	4	1	(C)	*
RESISTOR -			FLT COMPT, P6	
R556	4	1	(C)	*
TERMINAL BLOCK -			FLT COMPT, P6	
TB0014	2	1	(A)	*
TB0016	3	1	(B)	*
TB0018	4	1	(C)	*
TB0022	4	1	(C)	*
TB5002	3	1	(B)	*
TB5008	3	1	(B)	*
TB5010	2	1	(A)	*
TB5012	3	1	(B)	*
TB5014	2	1	(A)	*
TRANSFORMERS -			FLT COMPT, P6	
T123	3	1	(B)	*
T124	3	1	(B)	*
T193	3	1	(B)	*
T194	3	1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIGURE 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Main Power Distribution Panel, P6 - Component Index
Figure 101 (Sheet 2)

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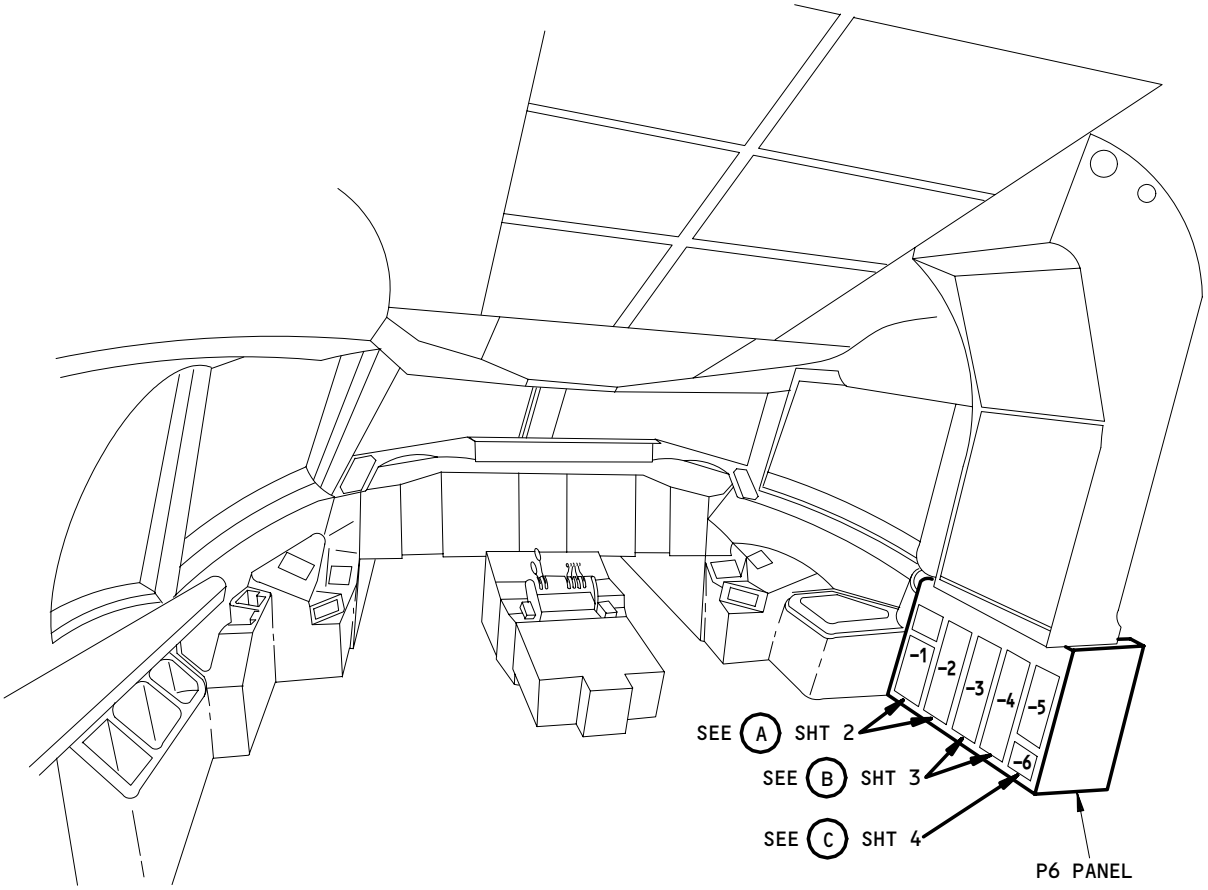

FLIGHT COMPARTMENT

Main Power Distribution Panel, P6 - Component Location
Figure 102 (Sheet 1)

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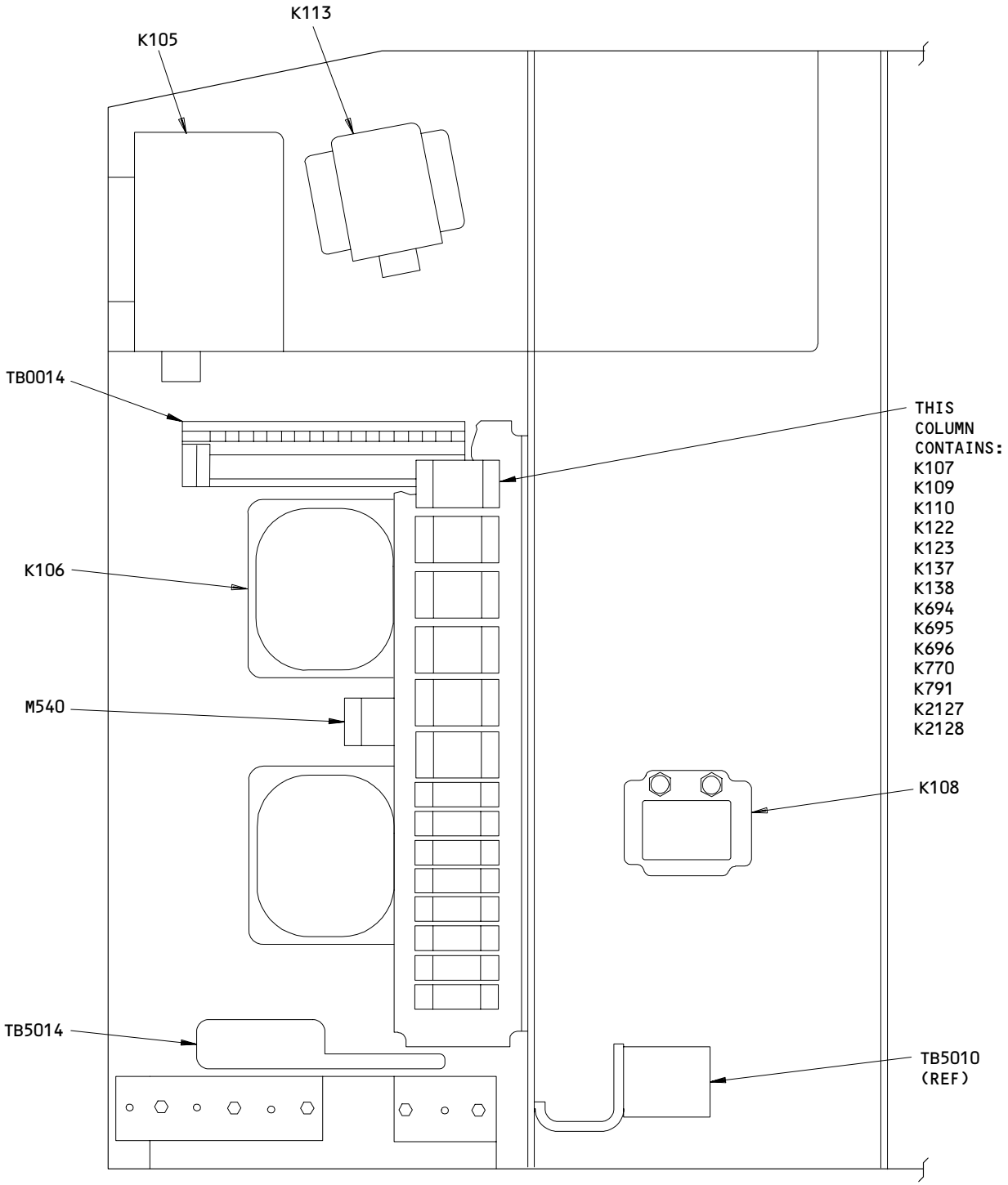

P6-1,P6-2 PANELS

(A)

Main Power Distribution Panel, P6 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

A65249

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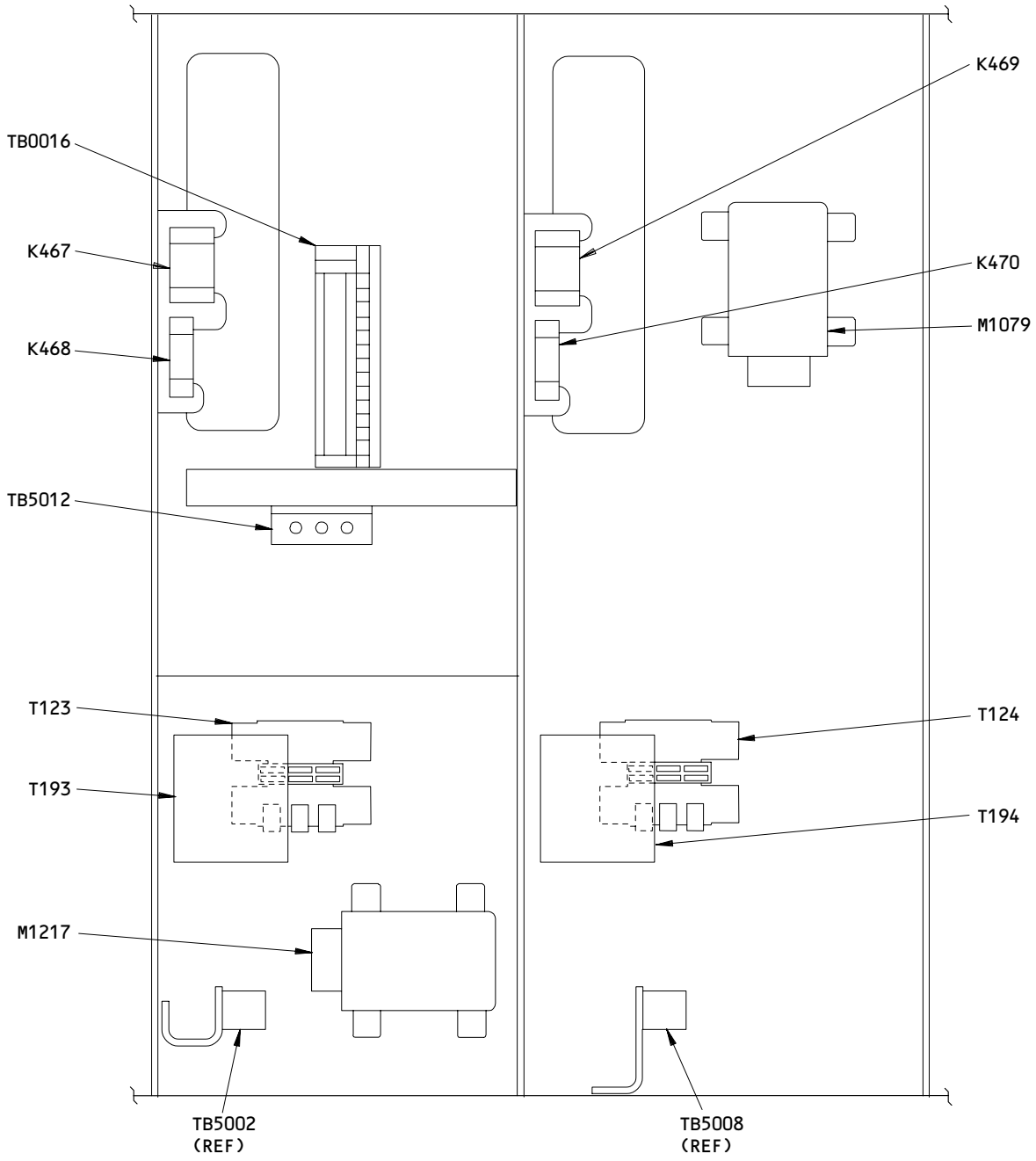

P6-3,P6-4 PANELS

B

Main Power Distribution Panel, P6 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 3)

A65257

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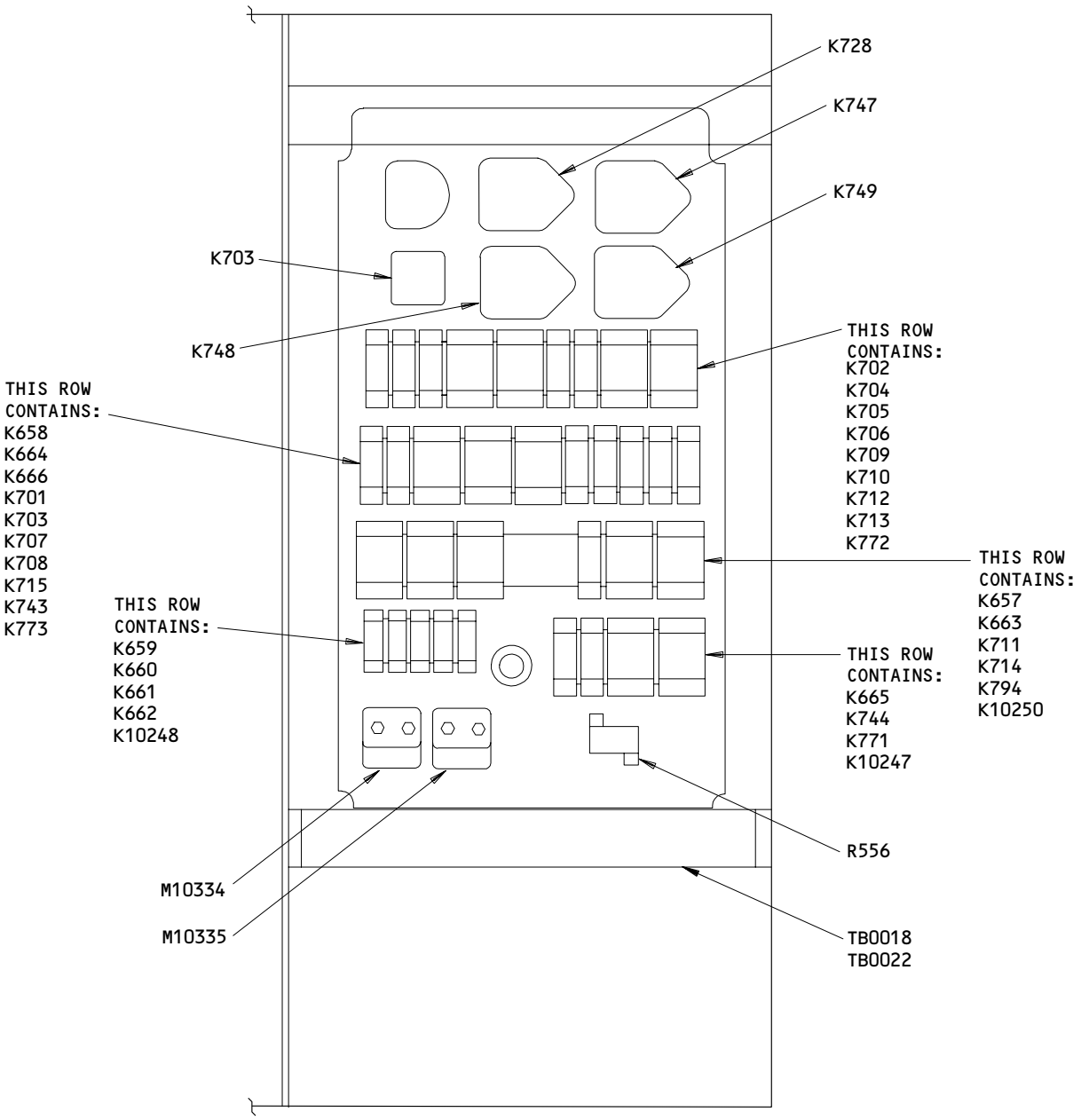

P6-5 PANEL

C

Main Power Distribution Panel, P6 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 4)

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FORWARD LIGHTING DISTRIBUTION PANEL, P19

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
MODULE -			831, MAIN PASS CABIN, P19	
M1152	2	1	(A-A)	*
RELAYS -			831, MAIN PASS CABIN, P19	
K4	2	1	(B)	*
K7	2	1	(B)	*
K8	2	1	(B)	*
K42	2	1	(B)	*
K69	2	1	(B)	*
K78	2	1	(B)	*
K79	2	1	(B)	*
K80	2	1	(B)	*
K81	2	1	(B)	*
K321	2	1	(B)	*
K322	2	1	(B)	*
K323	2	1	(B)	*
K324	2	1	(B)	*
K325	2	1	(B)	*
K326	2	1	(B)	*
K358	2	1	(B)	*
K364	2	1	(B)	*
K365	2	1	(B)	*
K370	2	1	(B)	*
K371	2	1	(B)	*
K380	2	1	(B)	*
K381	2	1	(B)	*
K383	2	1	(B)	*
K384	2	1	(B)	*
K385	2	1	(B)	*
K417	2	1	(B)	*
K418	2	1	(B)	*
K455	2	1	(B)	*
K466	2	1	(B)	*
K524	2	1	(B)	*
K604	2	1	(B)	*
K605	2	1	(B)	*
K606	2	1	(B)	*
K642	2	1	(B)	*
K767	2	1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Lighting Distribution Panel, P19 - Component Index
Figure 101 (Sheet 1)

A63817

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS (CONT) -			831, MAIN PASS CABIN, P19	
K837	2	1	(B)	*
K838	2	1	(B)	*
K839	2	1	(B)	*
K844	2	1	(B)	*
K845	2	1	(B)	*
K846	2	1	(B)	*
K866	2	1	(B)	*
K868	2	1	(B)	*
K889	2	1	(B)	*
K930	2	1	(B)	*
K931	2	1	(B)	*
K1138	2	1	(B)	*
K1139	2	1	(B)	*
K1140	2	1	(B)	*
K1200	2	1	(B)	*
K1201	2	1	(B)	*
K1202	2	1	(A-A)	*
K1203	2	1	(A-A)	*
K1208	2	1	(B)	*
K1209	2	1	(B)	*
K1254	2	1	(B)	*
K1256	2	1	(B)	*
K1298	2	1	(B)	*
K2122	2	1	(B)	*
K2130	2	1	(B)	*
K2131	2	1	(B)	*
K2132	2	1	(B)	*
				*
TRANSFORMERS -	2		831, MAIN PASSENGER CABIN, P19	
T180		1	(B)	*
T183		1	(B)	*
T184		1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Lighting Distribution Panel, P19 - Component Index
Figure 101 (Sheet 2)

A63820

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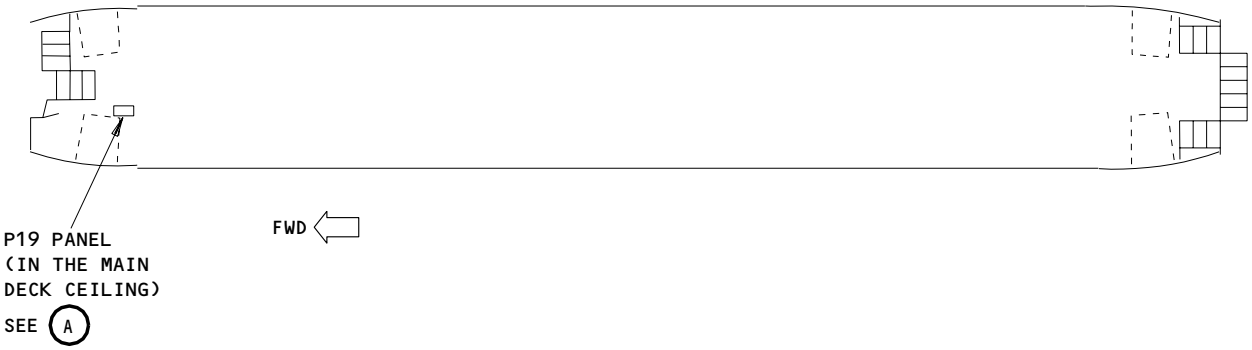

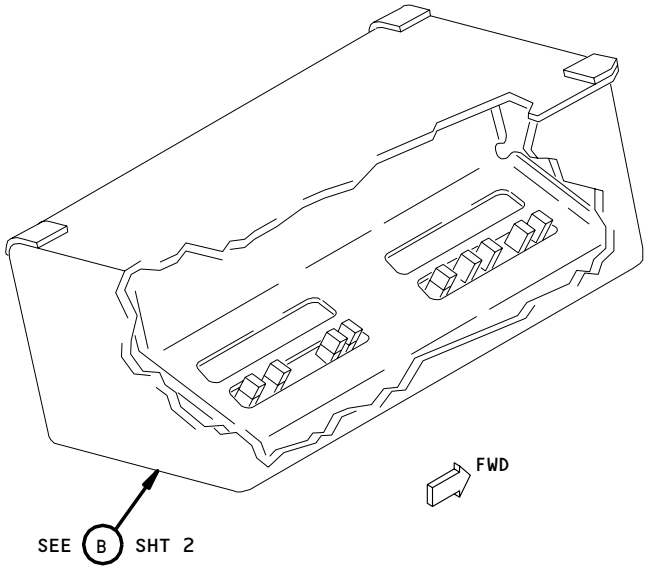

P19 PANEL
A

Forward Lighting Distribution Panel, P19 - Component Location
Figure 102 (Sheet 1)

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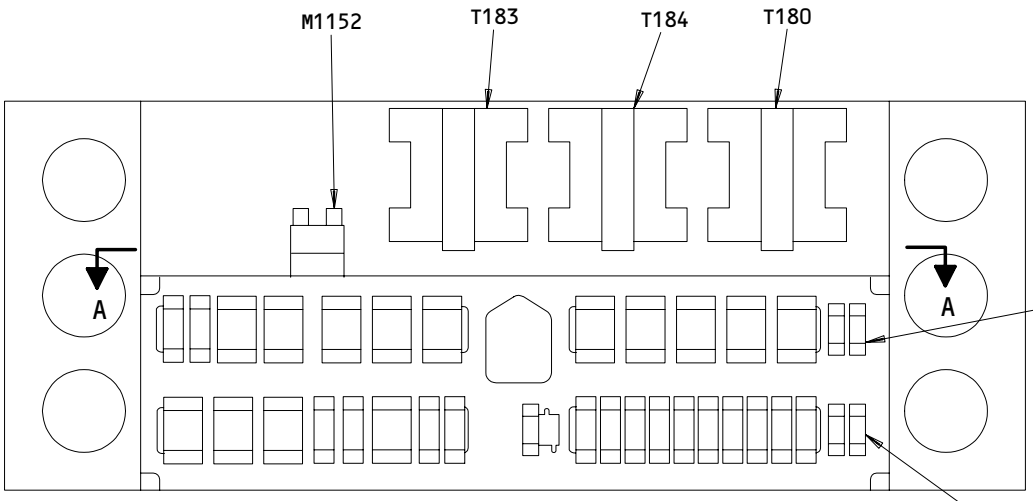

P19 PANEL

B

THIS ROW CONTAINS:
K4
K7
K8
K42
K69
K380
K383
K384
K385
K417
K418
K466
K604
K767
K839
K846
K868
K1208
K1256
K1298
K2132

THIS ROW CONTAINS:
K78
K79
K80
K81
K321
K322
K323
K324
K325
K326
K358
K364
K365
K370
K371
K381
K455
K524
K605
K606
K642
K837
K838
K844
K845
K866
K889
K930
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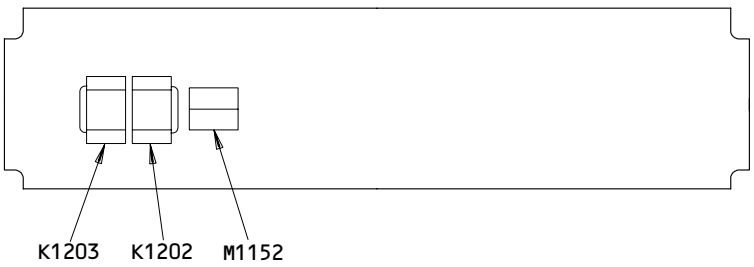
K1140
K1200
K1201
K1209
K1254
K2122
K2130
K2131



A–A

Forward Lighting Distribution Panel, P19 – Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

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AFT LIGHTING DISTRIBUTION PANEL, P25

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS -			PASS. COMPT, P25 PANEL, CEILING CENTERLINE	
K82	2	1	(B)	*
K83	2	1	(B)	*
K314	2	1	(B)	*
K315	2	1	(B)	*
K316	2	1	(B)	*
K317	2	1	(B)	*
K318	2	1	(B)	*
K327	2	1	(B)	*
K328	2	1	(B)	*
K382	2	1	(B)	*
K386	2	1	(B)	*
K387	2	1	(B)	*
K388	2	1	(B)	*
K389	2	1	(B)	*
K390	2	1	(B)	*
K391	2	1	(B)	*
K392	2	1	(B)	*
K393	2	1	(B)	*
K530	2	1	(B)	*
K867	2	1	(B)	*
K902	2	1	(B)	*
K903	2	1	(B)	*
K1012	2	1	(B)	*
K1013	2	1	(B)	*
K1014	2	1	(B)	*
K1015	2	1	(B)	*
K1019	2	1	(B)	*
K1020	2	1	(B)	*
K1203	2	1	(B)	*
K1204	2	1	(B)	*
K1205	2	1	(B)	*
K1218	2	1	(B)	*
K1257	2	1	(B)	*
K1300	2	1	(B)	*
K1301	2	1	(B)	*
K1302	2	1	(B)	*
K2191	2	1	(B)	*
K2194	2	1	(B)	*
K2195	2	1	(B)	*
TIME DELAY -			PASS. COMPT, P25 PANEL, CEILING CENTERLINE	
S732	2	1	(B)	*
TRANSFORMERS -			PASS. COMPT, P25 PANEL, CEILING CENTERLINE	
T150	2	1	(D1)	*
T177		1	(A1)	*
T181		1	(C1)	*
T182		1	(B1)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Aft Lighting Distribution Panel, P25 - Component Index
Figure 101

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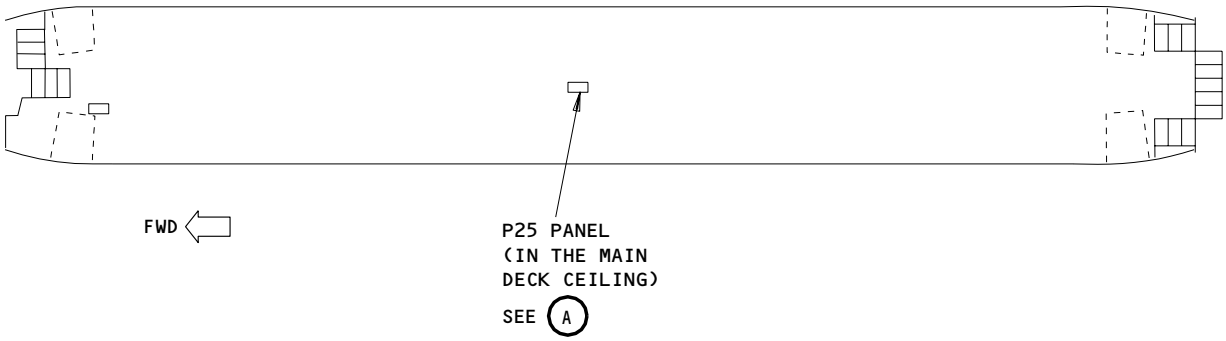

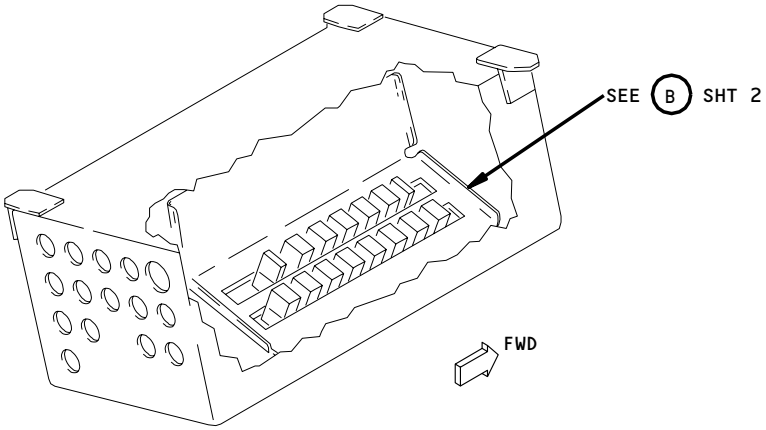

P25 PANEL
A

Aft Lighting Distribution Panel, P25 - Component Location
Figure 102 (Sheet 1)

A62849

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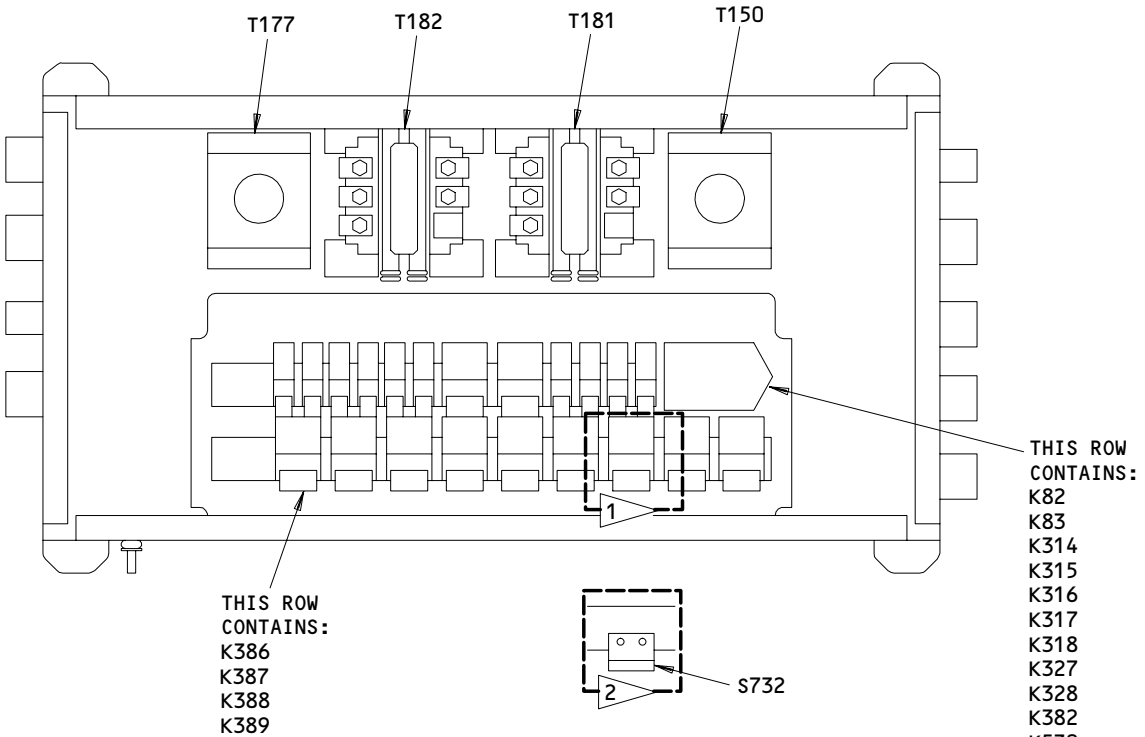

1 AIRPLANES WITH RELAY INSTALLED
2 AIRPLANES WITH TIME DELAY INSTALLED

Aft Lighting Distribution Panel, P25 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

A62863

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LIGHTING EQUIPMENT PANEL, P29

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
MODULE -			119AL, MAIN EQUIP CTR, P29	
M001	2	1	(B)	*
M002	2	1	(B)	*
M003	2	1	(B)	*
M004	2	1	(B)	*
M005	2	1	(B)	*
M006	2	1	(B)	*
M007	2	1	(B)	*
M008	2	1	(B)	*
M009	2	1	(B)	*
M010	2	1	(B)	*
				*
RELAYS -			119AL, MAIN EQUIP CTR, P29	
K1	2	1	(B)	*
K2	2	1	(B)	*
K3	2	1	(B)	*
K4	2	1	(B)	*
K5	2	1	(B)	*
K6	2	1	(B)	*
K7	2	1	(B)	*
K8	2	1	(B)	*
K9	2	1	(B)	*
K10	2	1	(B)	*
K11	2	1	(B)	*
K12	2	1	(B)	*
K13	2	1	(B)	*
K14	2	1	(B)	*
K15	2	1	(B)	*
K16	2	1	(B)	*
K17	2	1	(B)	*
K18	2	1	(B)	*
K19	2	1	(B)	*
TERMINAL BLOCKS -			119AL, MAIN EQUIP CTR, P29	
TB0001	2	1	(B)	*
TB0002	2	1	(B)	*
TB0003	2	1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Lighting Equipment Panel, P29 - Component Index
Figure 101

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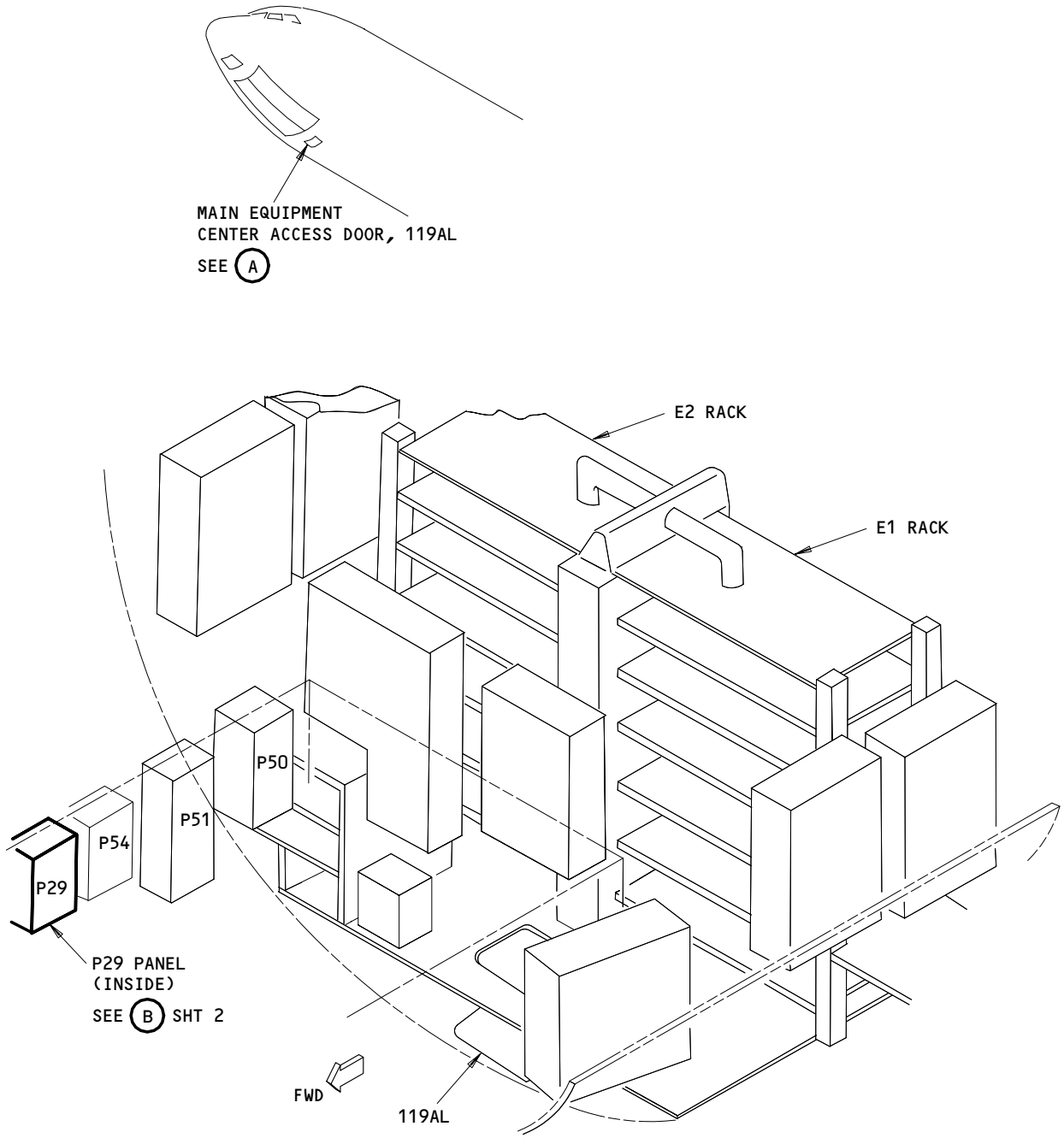

MAIN EQUIPMENT CENTER

A

Lighting Equipment Panel, P29 - Component Location
Figure 102 (Sheet 1)

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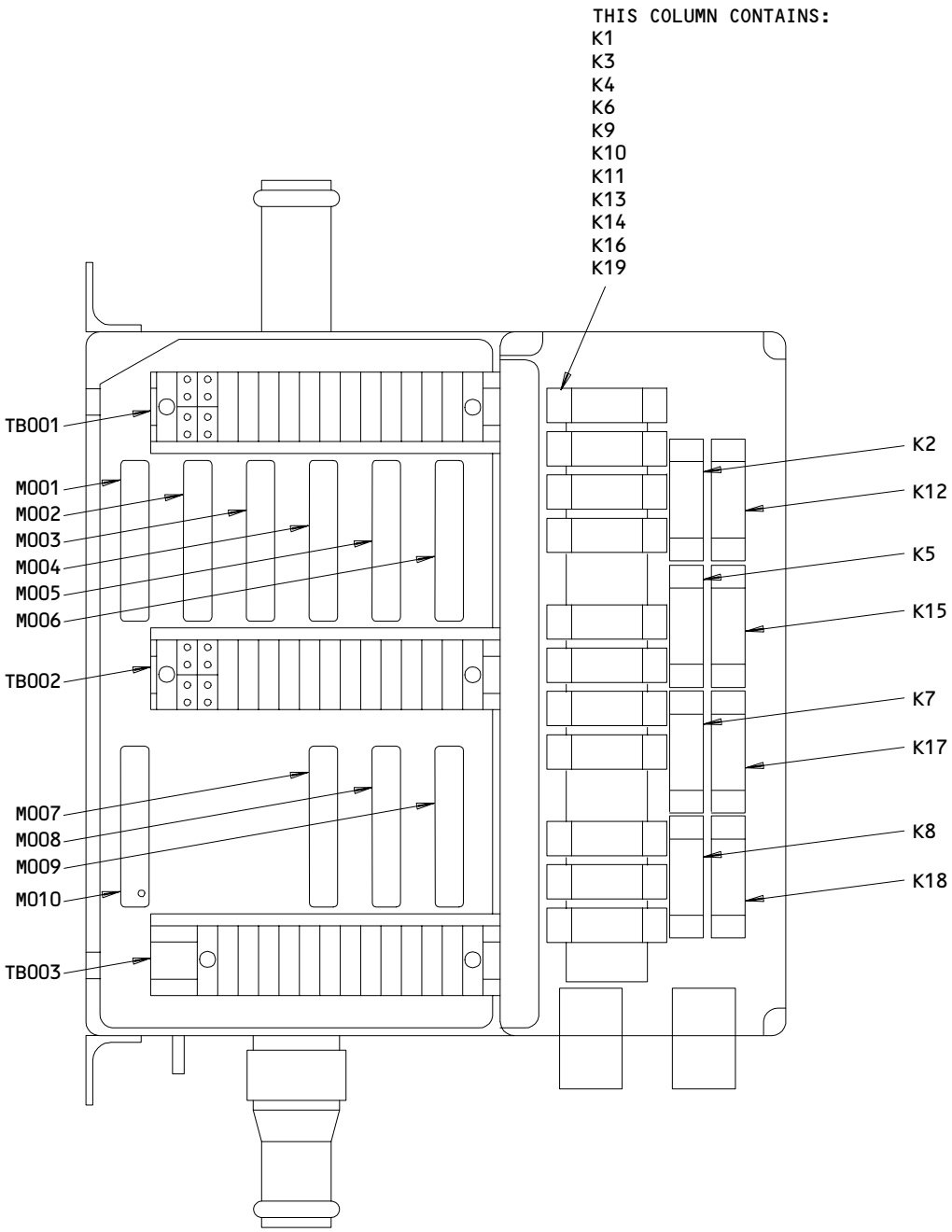

P29 PANEL (INSIDE)

B

Lighting Equipment Panel, P29 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

159588

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LEFT GENERATOR POWER PANEL, P31

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
MODULES –			119AL, MAIN EQUIP CTR, P31	
M226	2	1	(B)	*
M227	2	1	(B)	*
M303	2	1	(B)	*
M896	2	1	(B)	*
M897	2	1	(B)	*
M1241	2	1	(B)	*
M1636	2	1	(B)	*
RELAYS –			119AL, MAIN EQUIP CTR, P31	
K14	2	1	(B)	*
K119	2	1	(B)	24-51-05
K526	2	1	(B)	*
K1295	2	1	(B)	*
TERMINAL BLOCKS –			119AL, MAIN EQUIP CTR, P31	
TB5032	2	1	(B)	*
TB0028	2	1	(B)	*
TB0030	2	1	(B)	*
TRANSFORMERS –	2		119AL, MAIN EQUIP CTR, P31	
T105	2	1	(B)	24-23-01
T112	2	1	(B)	24-23-01
T127	2	1	(B)	24-23-01
T155	2	1	(B)	*
T157	2	1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Generator Power Panel, P31 – Component Index
Figure 101

174565
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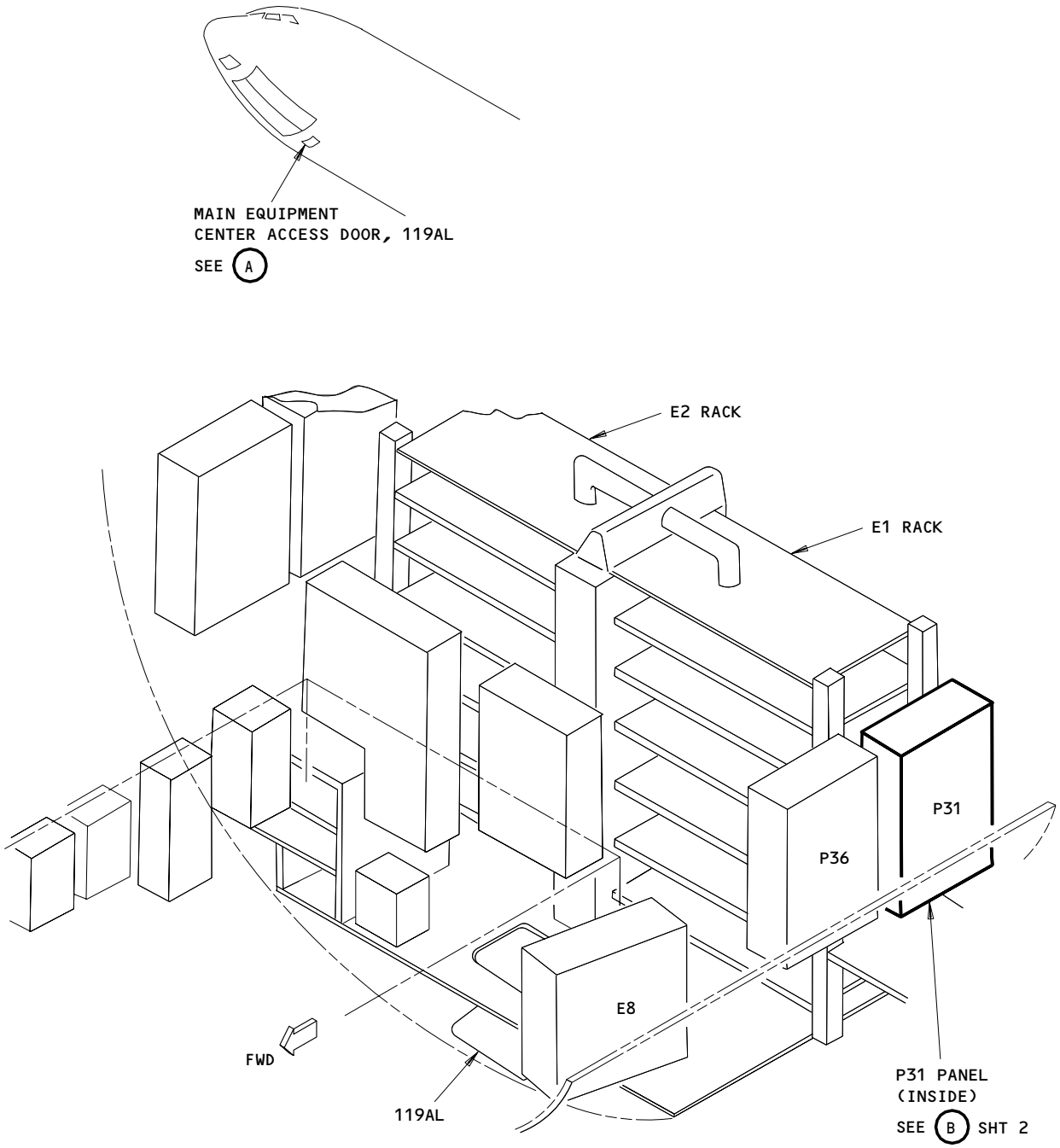

MAIN EQUIPMENT CENTER
A

Left Generator Power Panel, P31 - Component Location
Figure 102 (Sheet 1)

A61783

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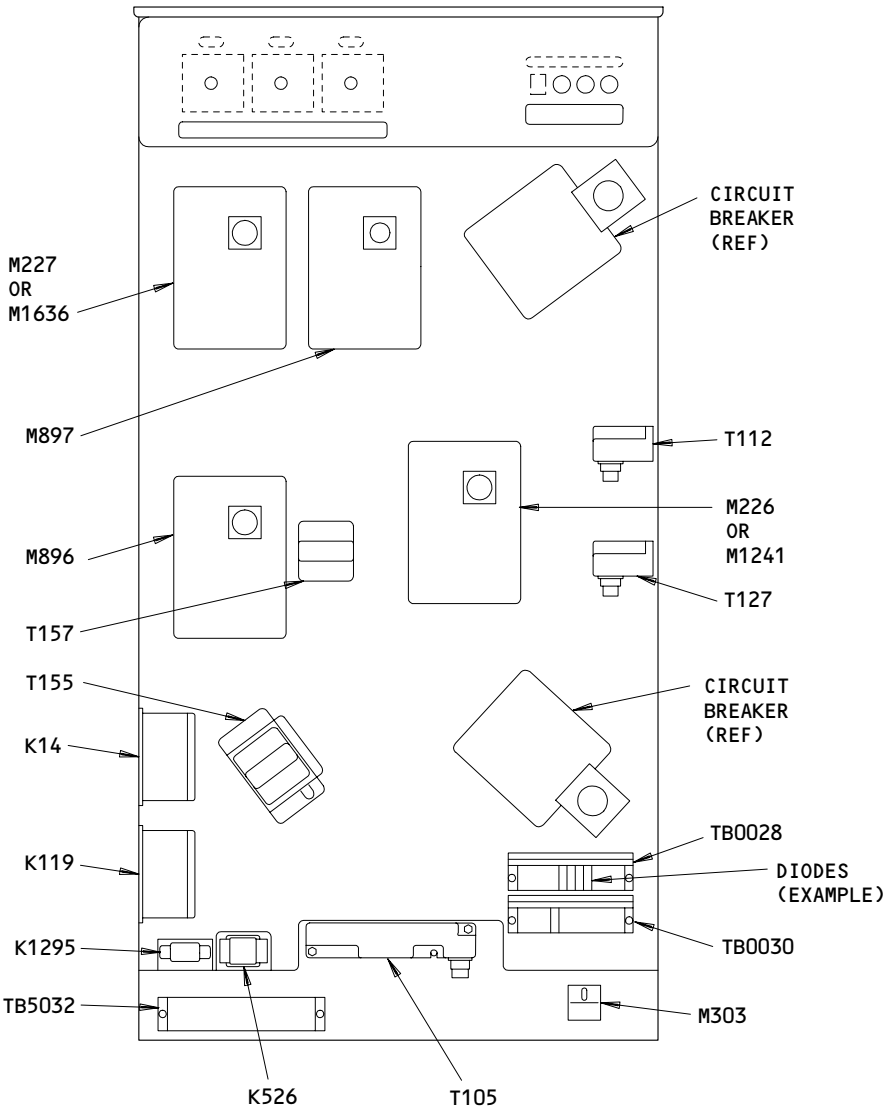

P31 PANEL
(INSIDE)
B

Left Generator Power Panel, P31 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

A66178

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RIGHT GENERATOR POWER PANEL, P32

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
MODULES –			119AL, MAIN EQUIP CTR, P32	
M225	2	1	(B)	*
M226	2	1	(B)	*
M304	2	1	(B)	*
M895	2	1	(B)	*
M898	2	1	(B)	*
M1241	2	1	(B)	*
RELAYS –			119AL, MAIN EQUIP CTR, P32	
K14	2	1	(B)	*
K102	2	1	(B)	24-51-03
K120	2	1	(B)	24-51-05
K527	2	1	(B)	*
K1296	2	1	(B)	*
TERMINAL BLOCKS –			119AL, MAIN EQUIP CTR, P32	
TB0032	2	1	(B)	24-23-01
TB0034	2	1	(B)	24-23-01
TB5034	2	1	(B)	*
TRANSFORMERS, CURRENT –			119AL, MAIN EQUIP CTR, P32	
T107	2	1	(B)	24-23-01
T113	2	1	(B)	24-23-01
T128	2	1	(B)	24-23-01
T156	2	1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Right Generator Power Panel, P32 – Component Index
Figure 101

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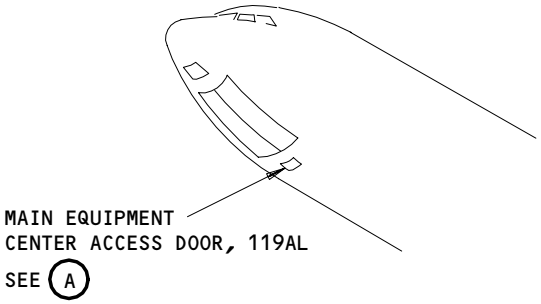

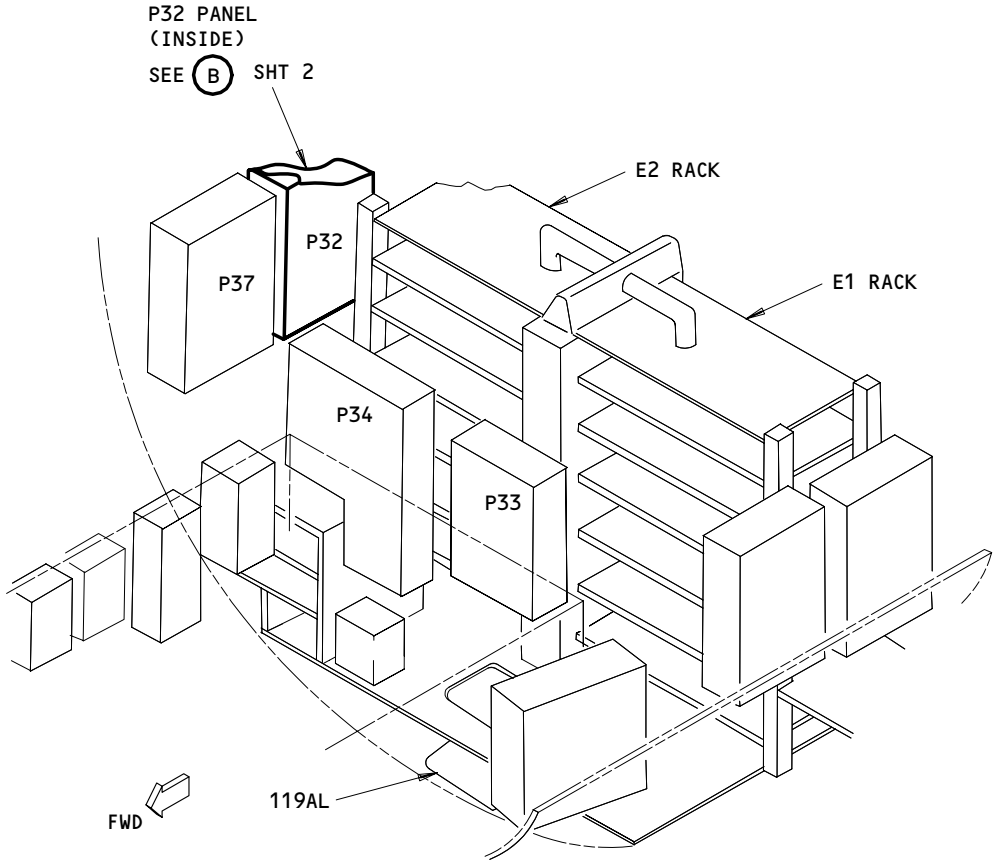

MAIN EQUIPMENT CENTER

(A)

Right Generator Power Panel, P32 - Component Location
Figure 102 (Sheet 1)

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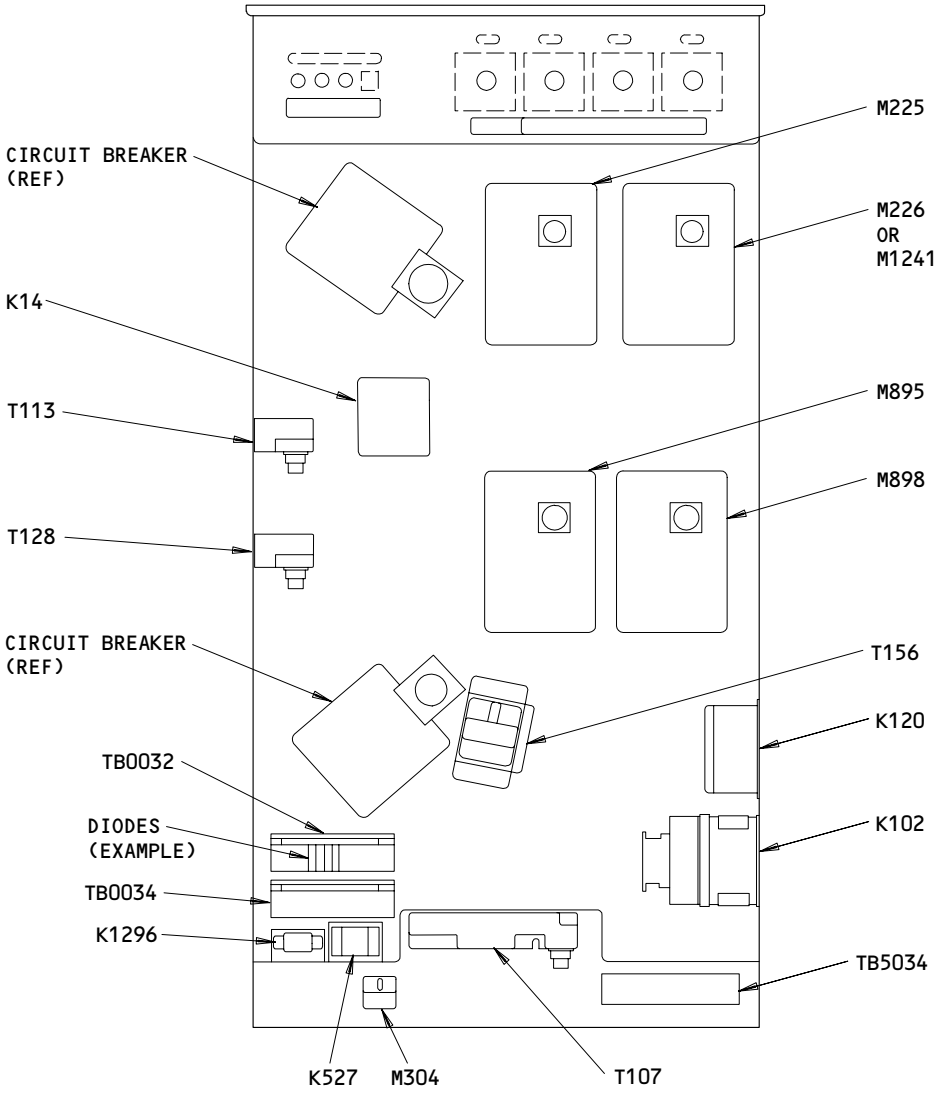

P32 PANEL (INSIDE)

B

Right Generator Power Panel, P32 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

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FORWARD MISCELLANEOUS ELECTRICAL EQUIPMENT PANEL, P33

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
MODULE -			119AL, MAIN EQUIP CTR, P33	
M299	5	1	(F)	*
M300	5	1	(F)	*
M500	5	1	(F)	*
M605	3	1	(C)	*
M606	3	1	(C)	*
M920	5	1	(F)	*
M924	5	1	(F)	*
M963	5	1	(F)	*
M1084	5	1	(F)	*
M1990	6	1	(G)	*
M1991	6	1	(G)	*
M10439	5	1	(F)	*
M10440	5	1	(F)	*
RELAY -			119AL, MAIN EQUIP CTR, P33	
K49	4	1	(D)	*
K50	4	1	(D)	*
K51	3	1	(C)	*
K52	3	1	(C)	*
K53	3	1	(C)	*
K54	3	1	(C)	*
K55	3	1	(C)	*
K56	3	1	(C)	*
K87	3	1	(C)	*
K88	3	1	(C)	*
K115	4	1	(D)	*
K126	3	1	(C)	*
K127	3	1	(C)	*
K128	3	1	(C)	*
K188	4	1	(D)	*
K216	3	1	(C)	*
K217	3	1	(C)	*
K218	3	1	(C)	*
K220	3	1	(C)	*
K241	3	1	(C)	*
K243	3	1	(C)	*
K310	4	1	(D)	*
K312	4	1	(D)	*
K350	4	1	(D)	*
K352	3	1	(C)	*
K353	3	1	(C)	*
K359	5	1	(E)	*
K360	5	1	(E)	*
K361	5	1	(E)	*
K372	4	1	(D)	*
K373	4	1	(D)	*
K374	4	1	(D)	*
K376	4	1	(D)	*
K400	3	1	(C)	*
K401	4	1	(D)	*
K402	3	1	(D)	*
K403	4	1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Index
Figure 101 (Sheet 1)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P33	
K411	3	1	(C)	*
K414	4	1	(D)	*
K458	5	1	(F)	*
K459	5	1	(F)	*
K460	3	1	(C)	*
K494	3	1	(C)	*
K498	4	1	(D)	*
K513	4	1	(D)	*
K514	4	1	(D)	32-09-02
K515	3	1	(E)	32-09-02
K516	3	1	(C)	32-09-02
K517	4	1	(D)	32-09-02
K518	4	1	(D)	32-09-02
K520	4	1	(D)	32-09-02
K522	4	1	(D)	32-09-02
K528	4	1	(D)	32-09-02
K550	3	1	(C)	*
K552	3	1	(C)	32-09-02
K622	5	1	(E)	*
K623	4	1	(D)	*
K634	4	1	(D)	*
K643	4	1	(D)	*
K644	3	1	(C)	*
K645	3	1	(C)	*
K646	4	1	(D)	*
K717	3	1	(C)	*
K729	4	1	(D)	*
K762	3	1	(C)	*
K777	3	1	(C)	*
K928	3	1	(C)	*
K1040	4	1	(D)	*
K1069	3	1	(C)	*
K1148	3	1	(C)	*
K1149	3	1	(C)	*
K1150	4	1	(D)	*
K1153	4	1	(D)	*
K1154	4	1	(D)	*
K1155	3	1	(C)	*
K1156	3	1	(C)	*
K1189	4	1	(D)	*
K2160	6	1	(G)	*
K2161	6	1	(G)	*
K2181	6	1	(G)	*
K2182	6	1	(G)	*
K2185	6	1	(G)	*
K2186	6	1	(G)	*
K2187	6	1	(G)	*
K2188	6	1	(G)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Index
Figure 101 (Sheet 2)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS (CONT) -			119AL, MAIN EQUIP CTR, P33	
K1305	4	1	(D)	*
K2075	4	1	(D)	*
K2110	4	1	(D)	*
K2111	4	1	(D)	*
K2112	4	1	(D)	*
K2113	4	1	(D)	*
K2114	4	1	(D)	*
K2115	4	1	(D)	*
K2116	4	1	(D)	*
K2151	4	1	(D)	*
K2152	4	1	(D)	*
K10316	4	1	(D)	*
K10317	3	1	(C)	*
K10318	3	1	(C)	*
K10358	3	1	(C)	*
K10359	4	1	(D)	*
TERMINAL BLOCKS -			119AL, MAIN EQUIP CTR, P33	
TB90	4	1	(D)	*
TB92	3	1	(C)	*
TB186	2	1	(B)	*
TB188	2	1	(B)	*
TB196	2	1	(B)	*
TB200	2	1	(B)	*
TB266	4	1	(D)	*
TB268	3	1	(C)	*
TRANSFORMER -			119AL, MAIN EQUIP CTR, P33	
T126	5	1	(E)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Index
Figure 101 (Sheet 3)

A61576

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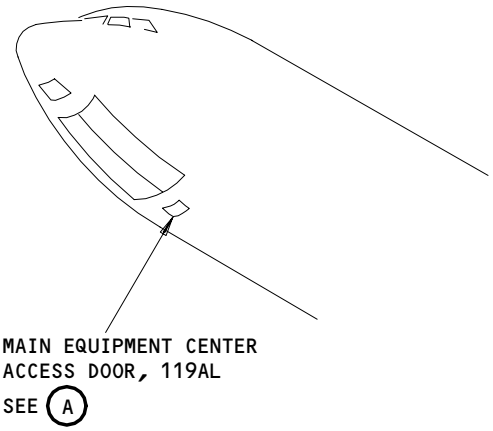

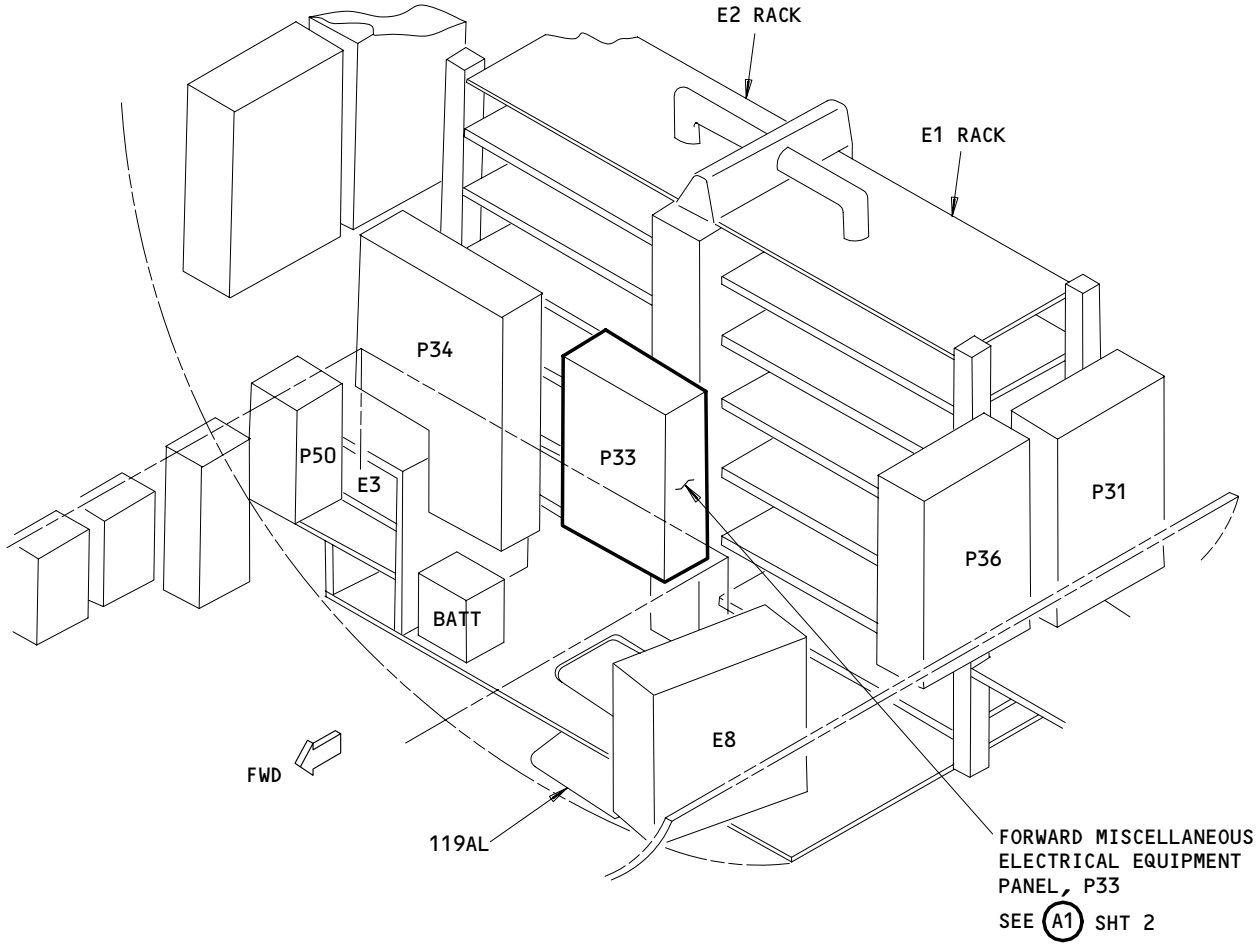

MAIN EQUIPMENT CENTER
A

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Location
Figure 102 (Sheet 1)

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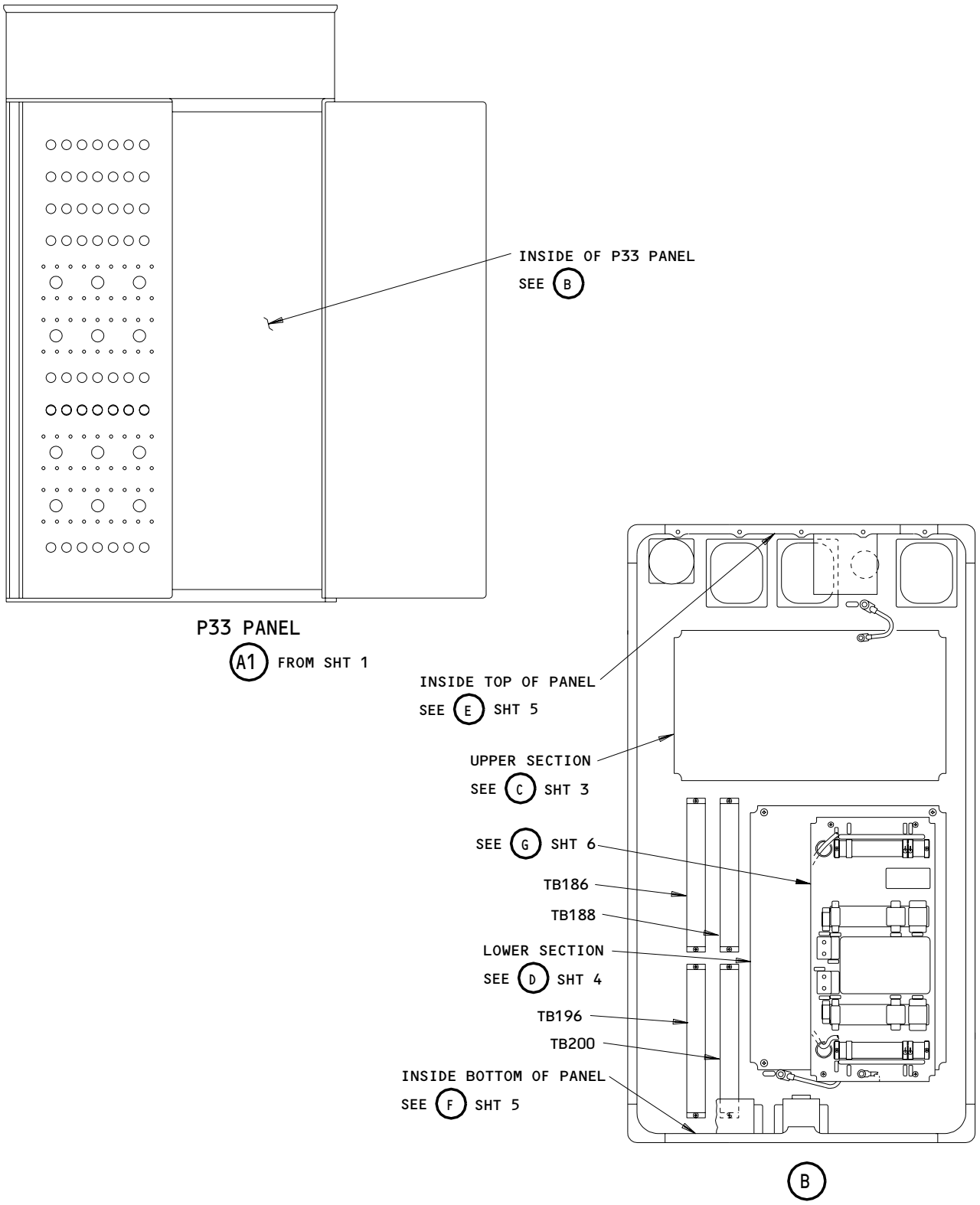

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Location
Figure 102 (Sheet 2)

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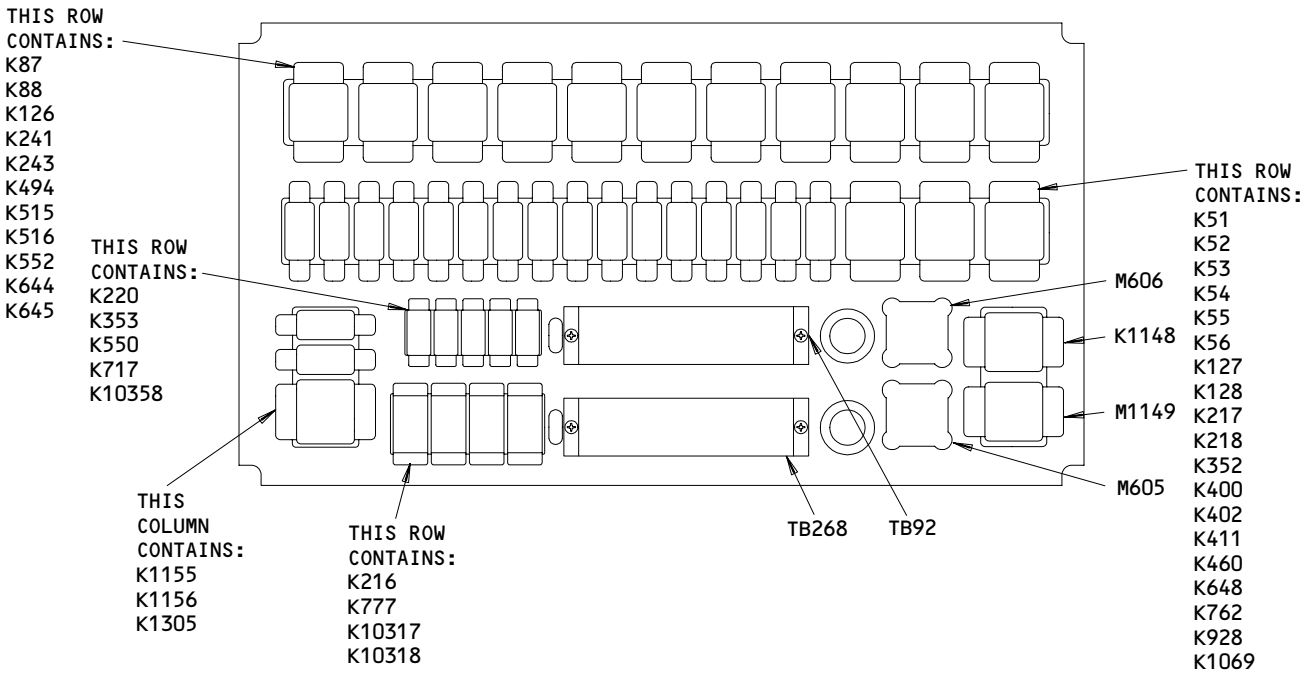

P33 PANEL
(UPPER SECTION)

C

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Location
(Detail from Sht 2)
Figure 102 (Sheet 3)

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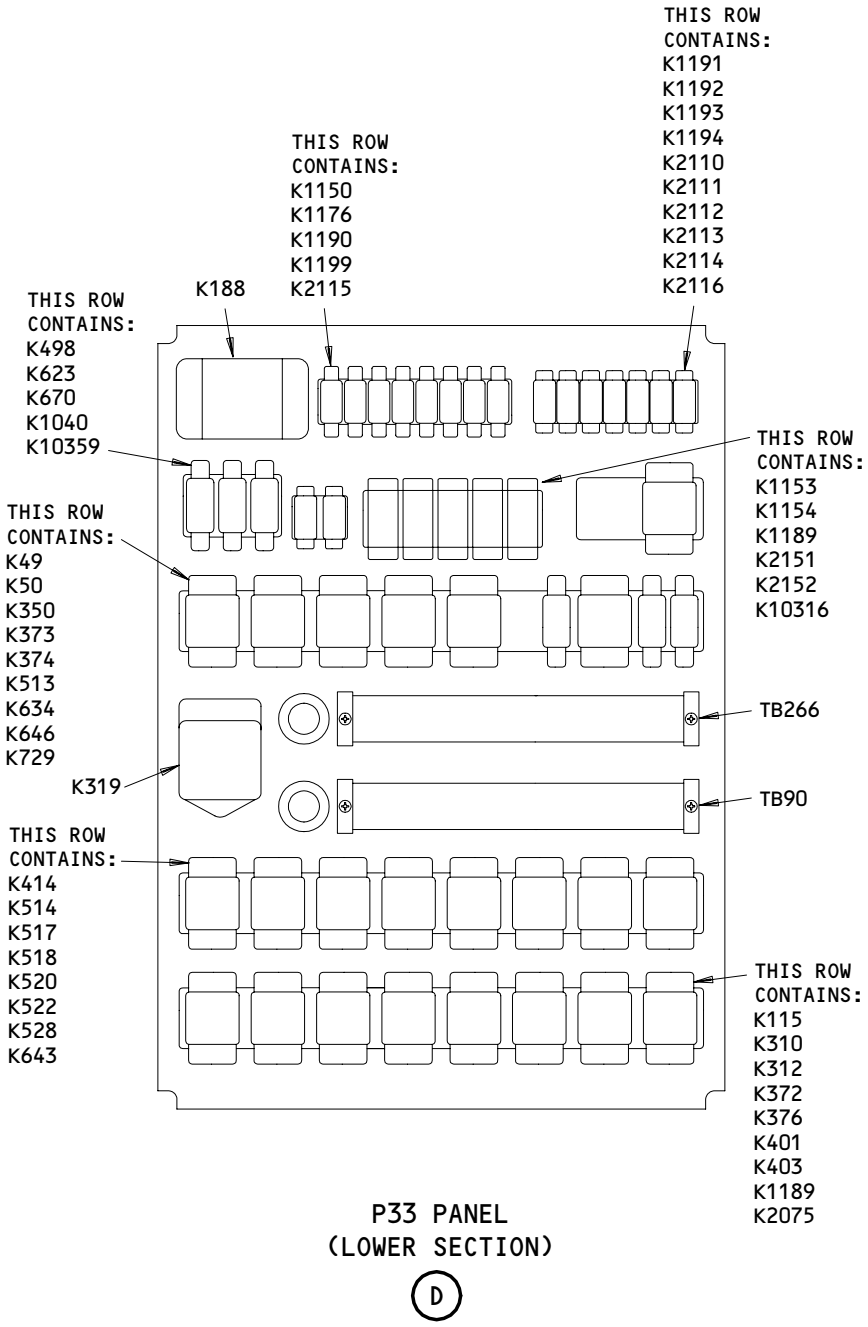

P33 PANEL
(LOWER SECTION)

D

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Location
(Detail from Sht 2)
Figure 102 (Sheet 4)

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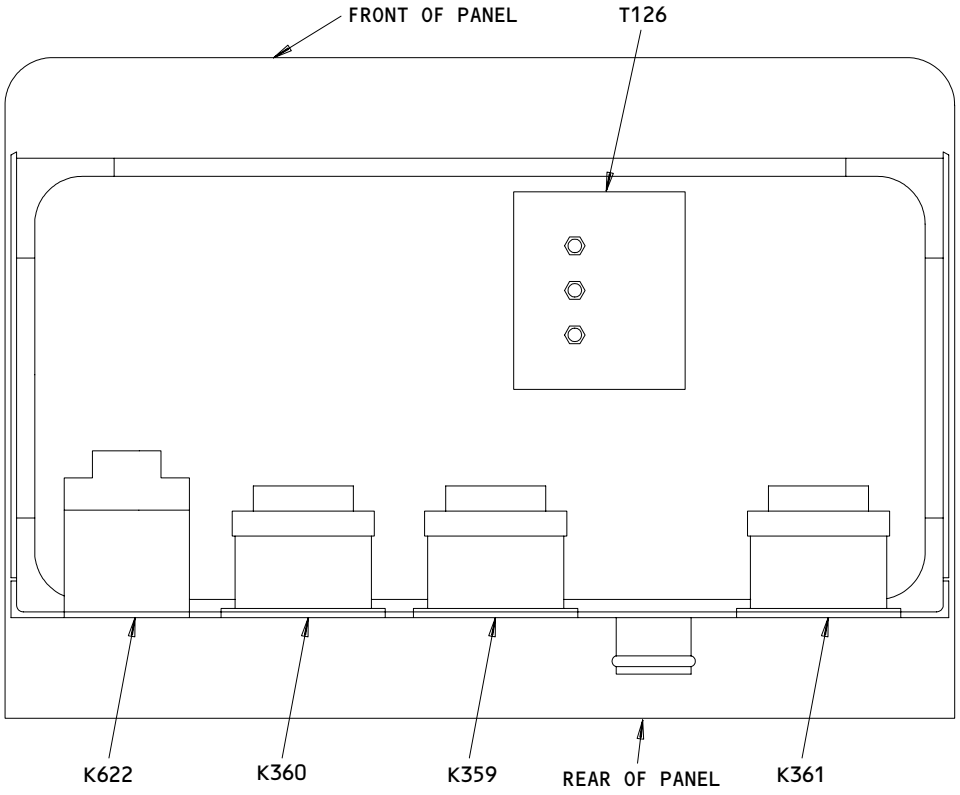
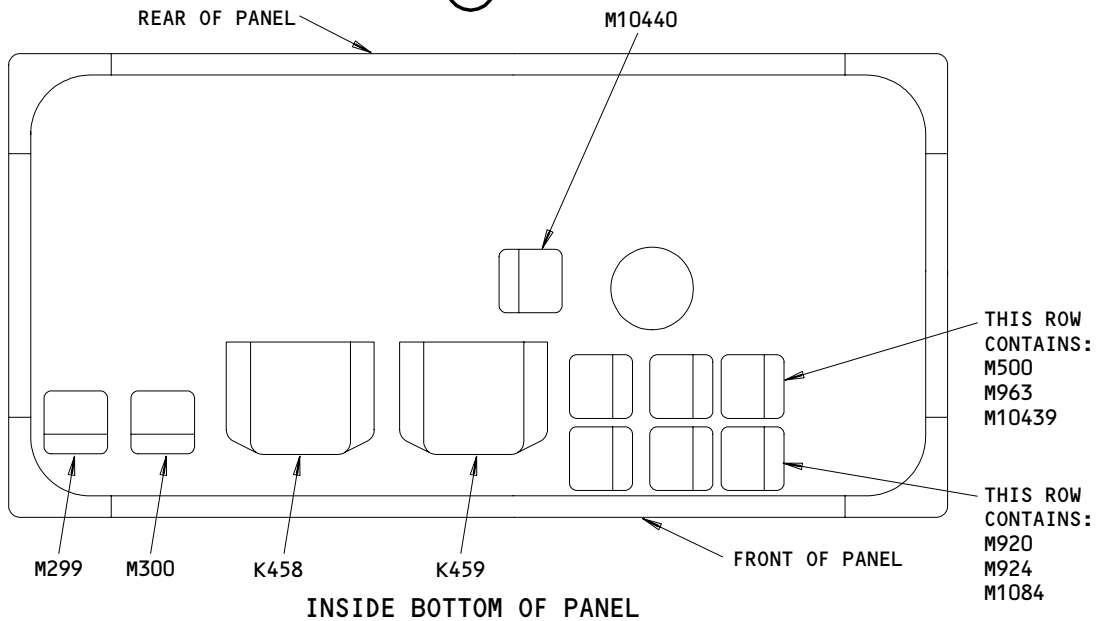


INSIDE TOP OF PANEL

E



INSIDE BOTTOM OF PANEL

F

Forward Miscellaneous Electrical Equipment Panel, P33 - Component Location
(Details from Sht 2)
Figure 102 (Sheet 5)

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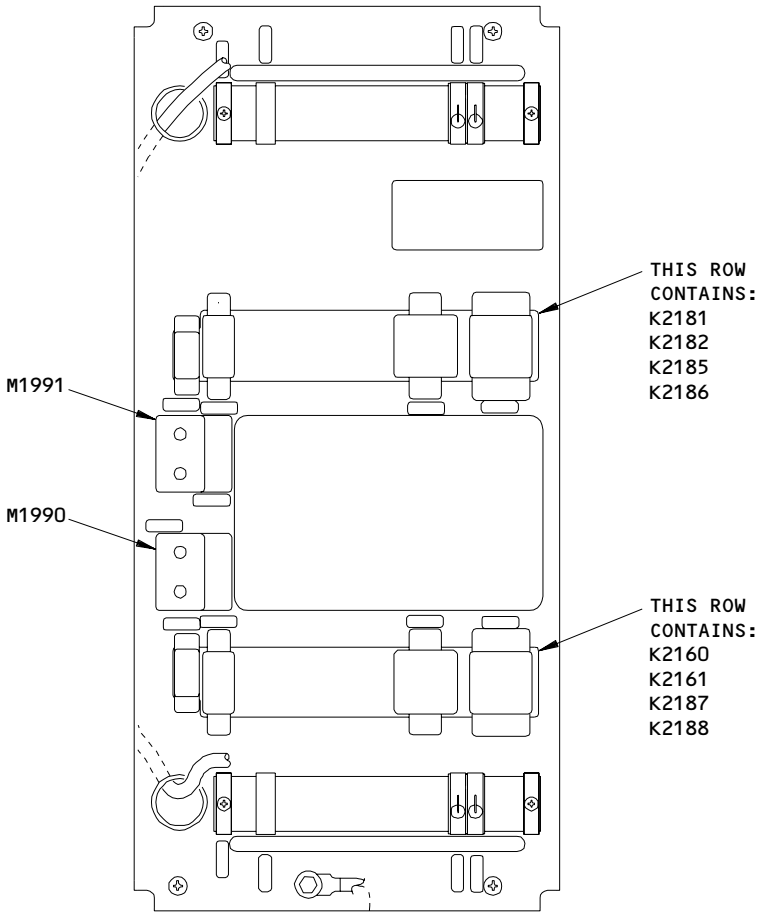

P33 PANEL
(LOWER SECTION)

G

Foward Miscellaneous Electrical Equipment Panel, P33 - Component Location
(Detail from Sht 2)
Figure 102 (Sheet 6)

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APU EXTERNAL POWER PANEL, P34

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS -	2		119AL, MAIN EQUIP CTR, P34	
K101		1	(B)	*
K103		1	(B)	*
K114		1	(B)	*
TERMINAL BLOCK -	2		119AL, MAIN EQUIP CTR, P34	
TB0024		1	(B)	*
TRANSFORMERS -	2		119AL, MAIN EQUIP CTR, P34	
T103		1	(B)	*
T111		1	(B)	*
T115		1	(B)	*
T116		1	(B)	*
T122		1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

APU External Power Panel, P34 - Component Index
Figure 101

160449
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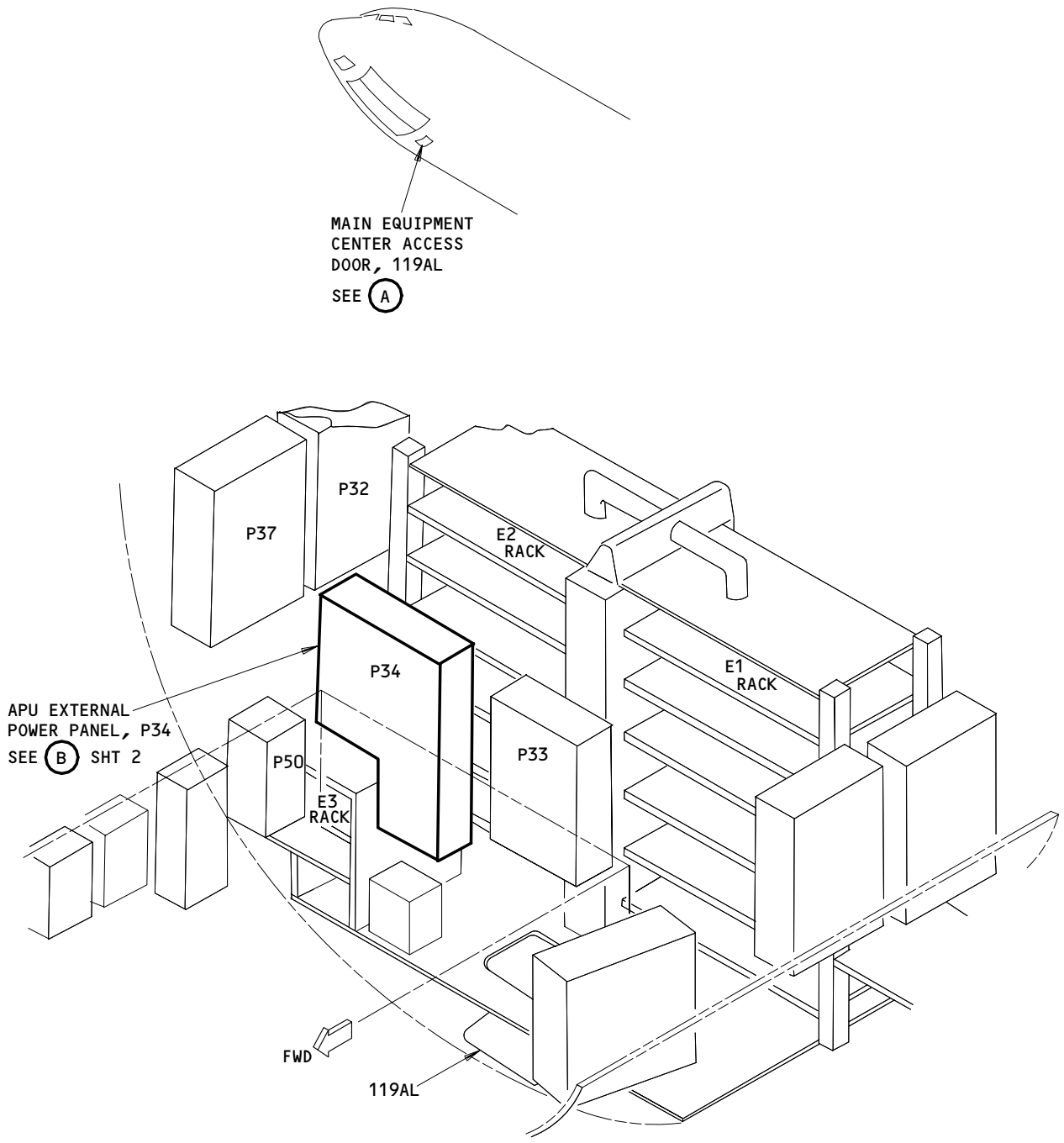

MAIN EQUIPMENT CENTER

A

APU External Power Panel, P34 - Component Location
Figure 102 (Sheet 1)

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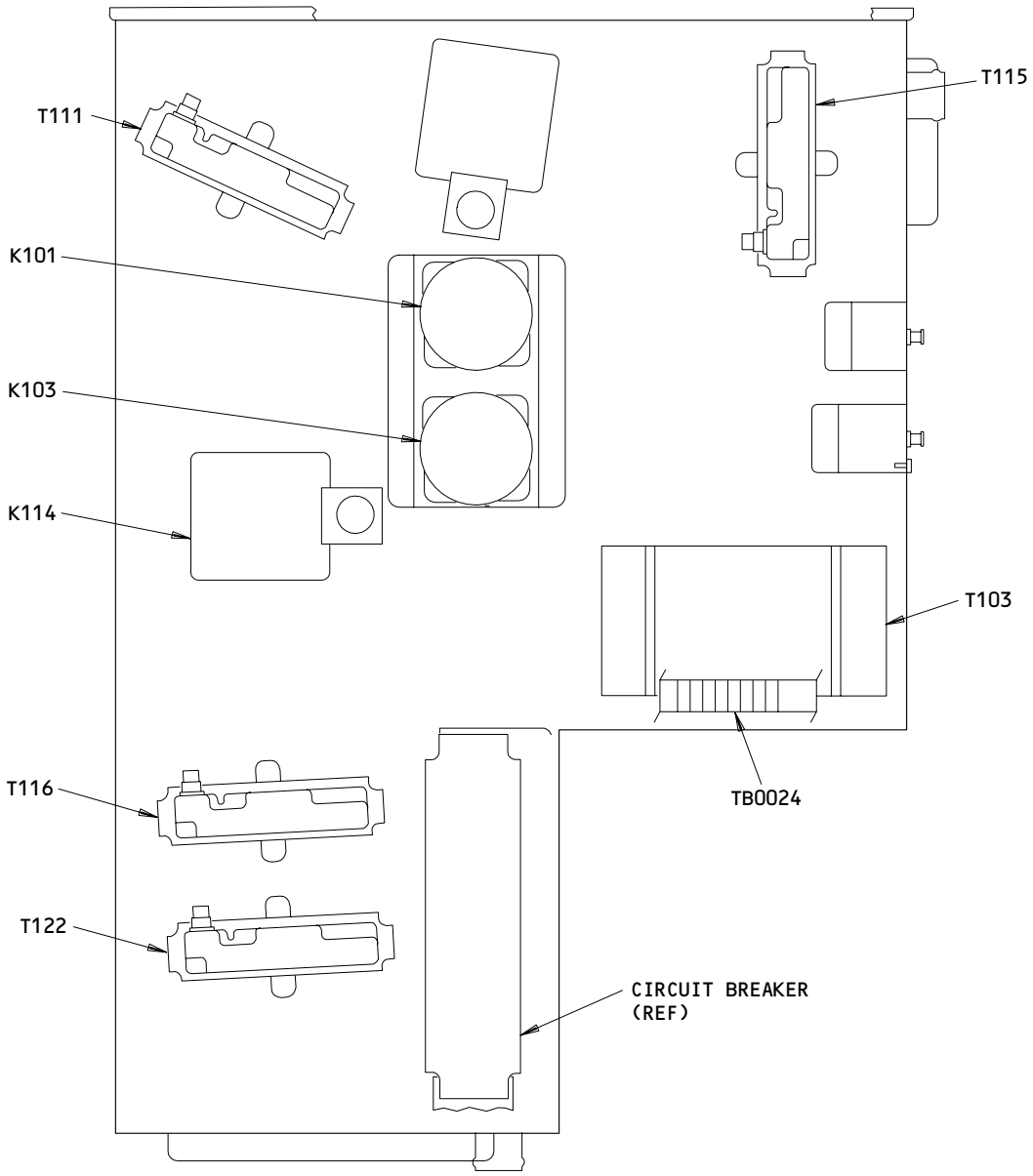

P34 PANEL
B

APU External Power Panel, P34 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

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FORWARD COMPARTMENT CARGO HANDLING ACCESSORY PANEL, P35

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS -	2		821, FWD CARGO DOOR, P35	
K30		1	(C)	*
K31		1	(C)	*
K32		1	(C)	*
K33		1	(C)	*
K34		1	(C)	*
K35		1	(C)	*
K76		1	(C)	*
K77		1	(C)	*
K245	3	1	(C)	*
K246	2	1	(C)	*
K247		1	(C)	*
K256		1	(C)	*
K257		1	(C)	*
K258		1	(C)	*
K262		1	(C)	*
K264		1	(C)	*
K265		1	(C)	*
K266		1	(C)	*
K267		1	(C)	*
K268		1	(C)	*
K270		1	(C)	*
K275		1	(C)	*
K277		1	(C)	*
K331		1	(C)	*
K332		1	(C)	*
K333		1	(C)	*
K334		1	(C)	*
K488		1	(C)	*
K489		1	(C)	*
K506		1	(C)	*
K542		1	(C)	*
K543		1	(C)	*
K553		1	(C)	*
K576		1	(C)	*
K577		1	(C)	*
K578		1	(C)	*
K579		1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Compartment Cargo Handling Accessory Panel, P35 - Component Index
Figure 101 (Sheet 1)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS (CONT) -	2		821, FWD CARGO DOOR, P35	
K580		1	(C)	*
K581		1	(C)	*
K582		1	(C)	*
K583		1	(C)	*
K584		1	(C)	*
K585		1	(C)	*
K589		1	(C)	*
K590		1	(C)	*
K591		1	(C)	*
K592		1	(C)	*
K593		1	(C)	*
K594		1	(C)	*
K595		1	(C)	*
K596		1	(C)	*
K600		1	(C)	*
K979		1	(C)	*
K980		1	(C)	*
K981		1	(C)	*
K982		1	(C)	*
K983		1	(C)	*
K1000		1	(C)	*
K1082		1	(C)	*
SWITCHES -	3		821, FWD CARGO DOOR, P35	
S383		1	(D)	*
S384		1	(D)	*
S387		1	(D)	*
S388		1	(D)	*
S402		1	(D)	*
S563		1	(D)	*
S675	3	1	(D)	*
S676	3	1	(D)	*
S677	3	1	(D)	*
S678	3	1	(D)	*
S679	3	1	(D)	*
S698	3	1	(D)	*
TRANSFORMERS -	3		821, FWD CARGO DOOR, P35	
T148		1	(D)	*
T186		1	(D)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Compartment Cargo Handling Accessory Panel, P35 - Component Index
Figure 101 (Sheet 2)

213186
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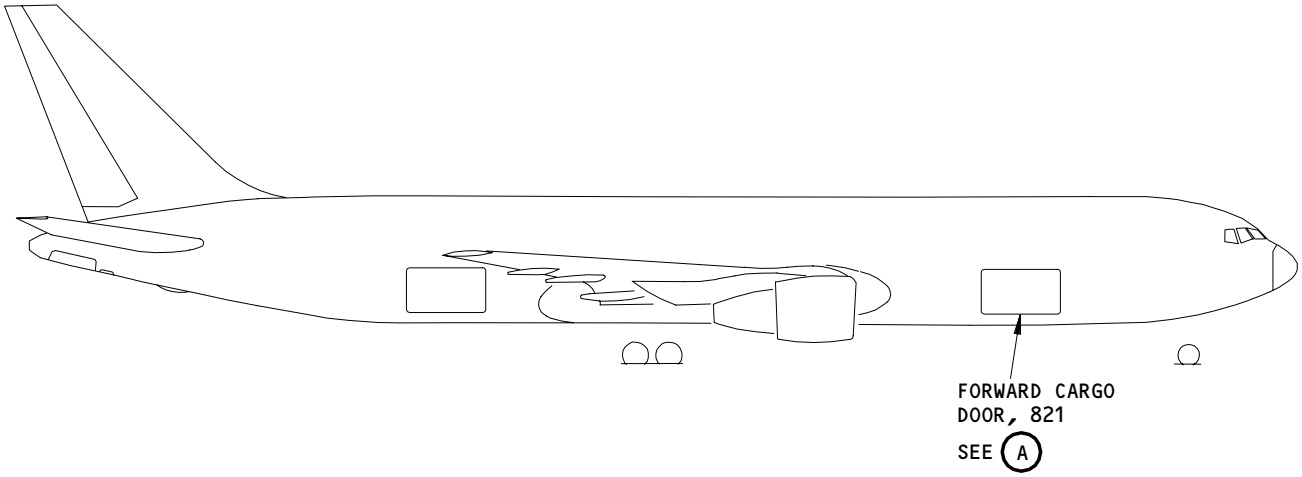
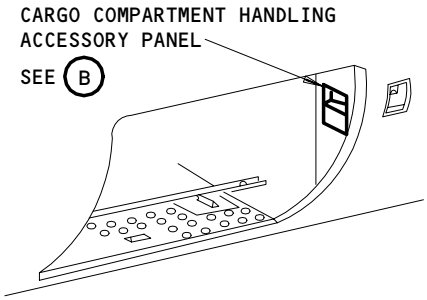
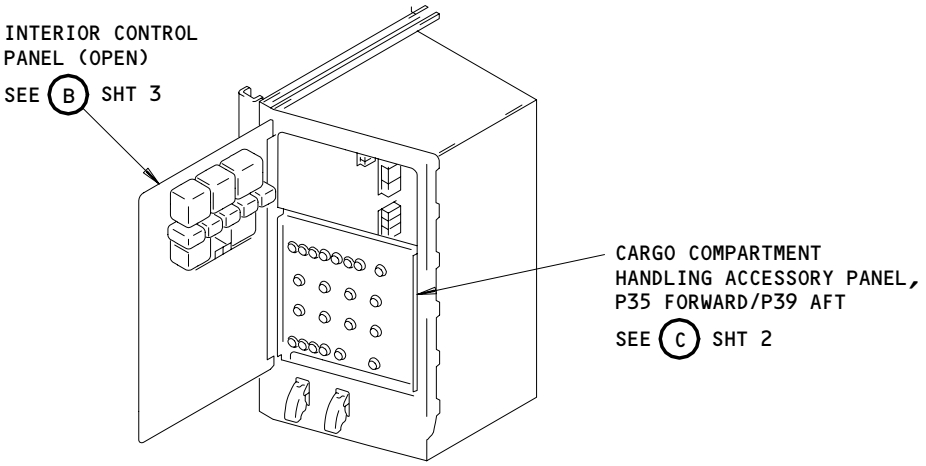




A



B

Forward Compartment Cargo Handling Accessory Panel, P35 - Component Location
Figure 102 (Sheet 1)

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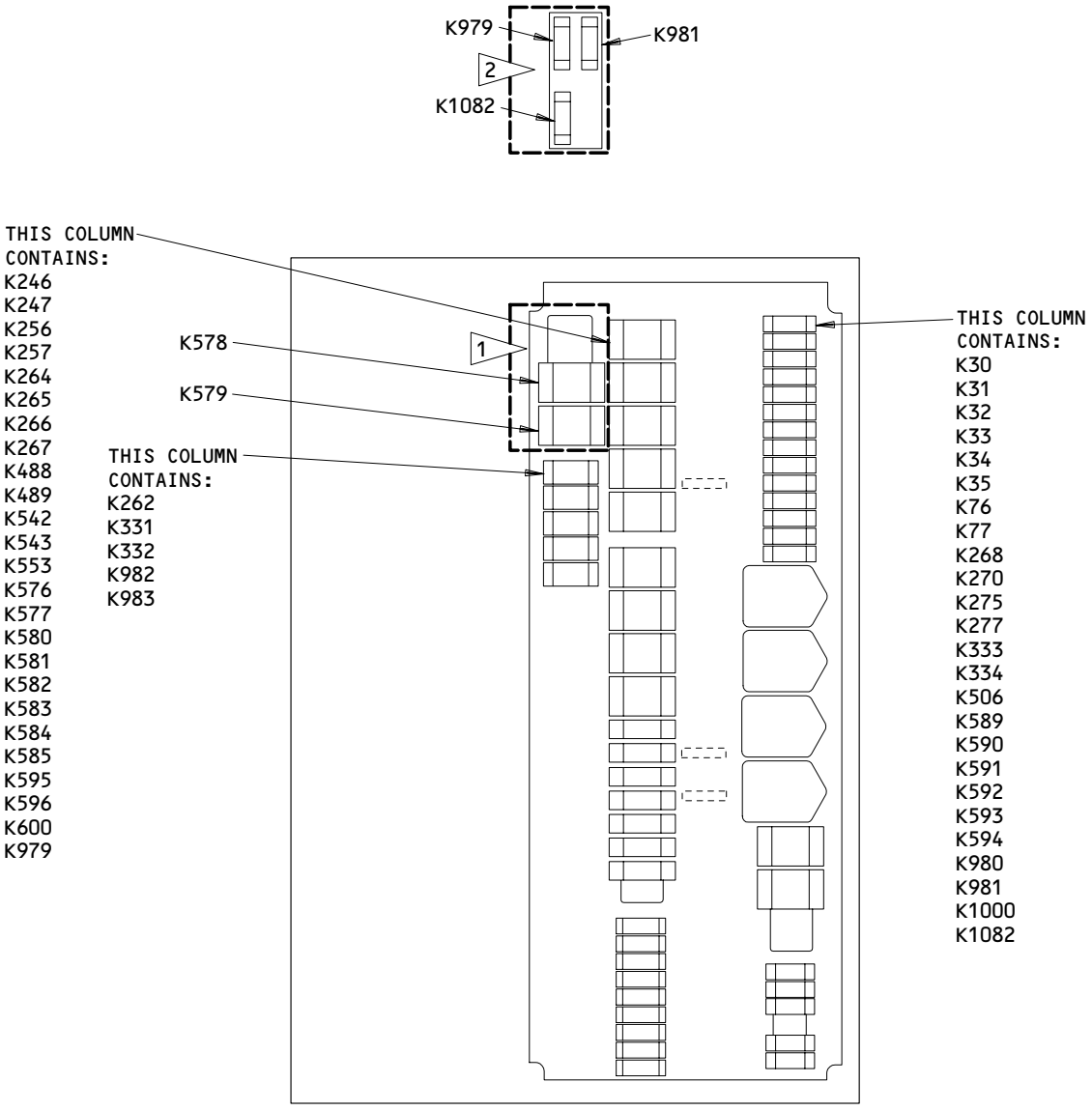

P35 PANEL
C

Forward Compartment Cargo Handling Accessory Panel, P35 - Component Location
(Detail from Sht 1)
Figure 102 (Sheet 2)

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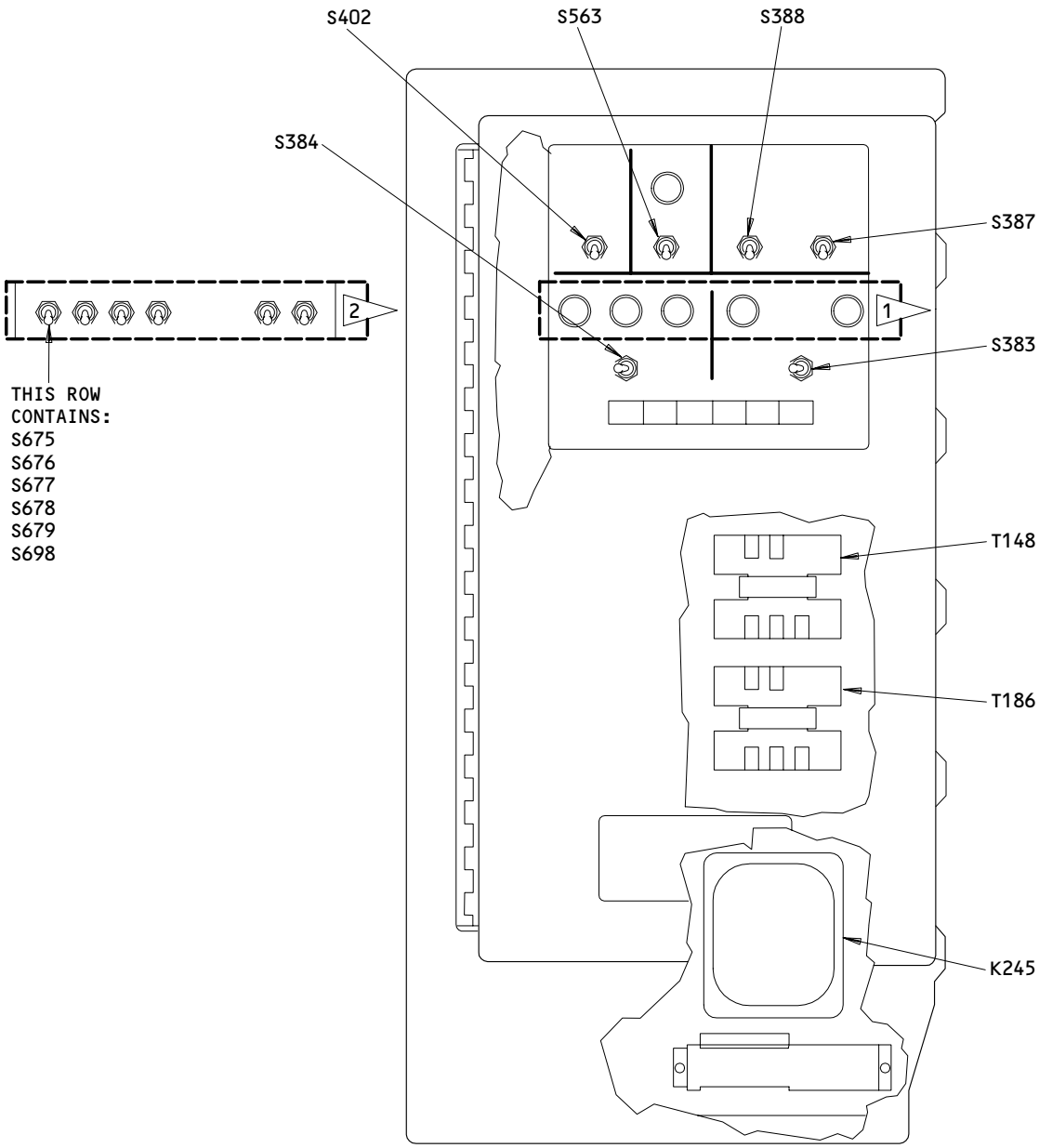

Forward Compartment Cargo Handling Accessory Panel, P35 - Component Location
(Detail from Sht 1)
Figure 102 (Sheet 3)

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LEFT MISCELLANEOUS ELECTRICAL EQUIPMENT PANEL, P36

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY -			119AL, MAIN EQUIP CTR, P36	
K10	5	1	(F)	*
K16	5	1	(F)	*
K21	5	1	(F)	*
K22	5	1	(F)	*
K26	5	1	(F)	*
K28	4	1	(D)	*
K43	5	1	(F)	*
K45	3	1	(C)	*
K46	3	1	(C)	*
K57	5	1	(F)	*
K58	5	1	(F)	*
K59	5	1	(F)	*
K60	5	1	(F)	*
K61	5	1	(F)	*
K62	5	1	(F)	*
K63	5	1	(F)	*
K64	5	1	(F)	*
K124	5	1	(F)	32-09-02
K140	5	1	(F)	32-09-02
K141	5	1	(F)	32-09-02
K142	5	1	(F)	32-09-02
K143	5	1	(F)	32-09-02
K144	5	1	(F)	32-09-02
K145	5	1	(F)	32-09-02
K146	5	1	(F)	32-09-02
K147	5	1	(F)	32-09-02
K148	5	1	(F)	32-09-02
K149	5	1	(F)	32-09-02
K150	3	1	(C)	*
K151	3	1	(C)	*
K152	3	1	(C)	*
K153	3	1	(C)	*
K161	6	1	(G)	*
K163	3	1	(C)	*
K165	5	1	(F)	*
K166	5	1	(F)	*
K167	5	1	(F)	

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS TO FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Miscellaneous Electrical Equipment Panel, P36 - Component Index
Figure 101 (Sheet 1)

A62544

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS (CONT) -			119AL, MAIN EQUIP CTR, P36	
K168	3	1	(C)	*
K170	5	1	(F)	32-09-02
K172	6	1	(G)	*
K177	5	1	(F)	32-09-02
K178	5	1	(F)	32-09-02
K179	3	1	(C)	*
K180	3	1	(C)	*
K181	3	1	(C)	*
K183	3	1	(C)	*
K184	3	1	(C)	*
K185	3	1	(C)	*
K186	3	1	(C)	*
K187	3	1	(C)	*
K190	4	1	(D)	*
K199	5	1	(F)	32-09-02
K227	5	1	(F)	*
K228	5	1	(F)	*
K230	5	1	(F)	*
K278	3	1	(C)	*
K329	4	1	(D)	*
K335	3	1	(C)	*
K336	3	1	(C)	*
K337	3	1	(C)	*
K338	3	1	(C)	*
K339	5	1	(F)	*
K340	3,5	1	(C),(F)	*
K341	5	1	(F)	*
K342	5	1	(F)	*
K343	6	1	(G)	*
K347	6	1	(G)	*
K351	5	1	(F)	*
K356	5	1	(F)	*
K357	3	1	(C)	*
K369	3	1	(C)	*
K415	6	1	(G)	*
K419	3	1	(C)	*
K434	4	1	(D)	*
K435	6	1	(G)	*
K443	3	1	(C)	*
K446	3	1	(C)	*
K447	3	1	(C)	*
K448	3	1	(C)	*
K449	3	1	(C)	*
K450	3	1	(C)	*
K451	3	1	(C)	*
K452	3	1	(C)	*
K453	3	1	(C)	*
K454	3	1	(C)	*
K455	3	1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS TO FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Miscellaneous Electrical Equipment Panel, P36 - Component Index
Figure 101 (Sheet 2)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P36	
K497	5	1	(F)	*
K499	3	1	(C)	*
K511	4	1	(D)	*
K525	3	1	(C)	*
K529	5	1	(F)	32-09-02
K546	5	1	(F)	*
K551	5	1	(F)	*
K603	3	1	(C)	*
K609	3	1	(C)	*
K628	3	1	(C)	*
K633	3	1	(C)	*
K650	4	1	(D)	*
K672	4,5	1	(D),(F)	*
K676	4	1	(D)	*
K684	3	1	(C)	*
K697	3,5	1	(C),(F)	*
K698	3	1	(C)	*
K699	3	1	(C)	*
K700	3	1	(C)	*
K716	5	1	(F)	32-09-02
K757	4	1	(D)	*
K751	4	1	(D)	*
K752	4	1	(D)	*
K759	4	1	(E)	*
K760	4	1	(E)	*
K761	3	1	(C)	*
K763	4	1	(D)	*
K769	3	1	(C)	*
K775	4	1	(E)	*
K785	3	1	(C)	*
K834	3	1	(C)	*
K836	5	1	(F)	*
K840	5	1	(F)	*
K850	3	1	(C)	*
K886	4	1	(E)	*
K892	5	1	(F)	*
K893	5	1	(F)	*
K894	3	1	(F)	*
K895	3	1	(C)	*
K896	5	1	(F)	*
K904	3	1	(C)	*
K950	3	1	(C)	*
K1005	4	1	(D)	*
K1006	4	1	(D)	*
K1007	4	1	(D)	*
K1008	4	1	(D)	*
K1009	4	1	(D)	*
K1010	4	1	(D)	*
K1011	4	1	(D)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Miscellaneous Electrical Equipment Panel, P36 - Component Index
Figure 101 (Sheet 3)

A62586
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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P36	
K1021	3	1	(C)	*
K1023	3,4	1	(C),(E)	*
K1025	4	1	(E)	*
K1031	4	1	(E)	*
K1033	4	1	(D)	*
K1034	4	1	(E)	*
K1036	4	1	(E)	*
K1037	4	1	(E)	*
K1041	3	1	(C)	*
K1043	5	1	(F)	*
K1068	4	1	(D)	*
K1077	4	1	(D)	*
K1091	5	1	(F)	*
K1115	4	1	(E)	*
K1116	4	1	(E)	*
K1117	4	1	(E)	*
K1118	4	1	(E)	*
K1119	4	1	(E)	*
K1120	4	1	(E)	*
K1128	5	1	(F)	*
K1129	5	1	(F)	*
K1130	5	1	(F)	*
K1131	5	1	(F)	*
K1132	5	1	(F)	*
K1142	5	1	(F)	*
K1146	5	1	(F)	*
K1169	4	1	(D)	*
K1170	4	1	(D)	*
K1173	5	1	(F)	*
K1177	3	1	(C)	*
K1180	4	1	(D)	*
K1181	4	1	(D)	*
K1182	4	1	(D)	*
K1183	4	1	(D)	*
K1187	5	1	(F)	*
K1188	3	1	(C)	*
K1195	3	1	(C)	*
K1206	4	1	(E)	*
K1207	3,4	1	(C),(D)	*
K1215	3	1	(C)	*
K1219	3	1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Miscellaneous Electrical Equipment Panel, P36 - Component Index
Figure 101 (Sheet 4)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P36	
K1226	3	1	(C)	*
K1230	3	1	(C)	*
K1233	3	1	(C)	*
K1237	5	1	(F)	*
K1239	4	1	(E)	*
K1248	4	1	(D)	*
K1250	3	1	(C)	*
K1251	3	1	(C)	*
K1253	5	1	(F)	*
K1255	3	1	(C)	*
K1272	6	1	(G)	*
K1274	3,4	1	(C),(D)	*
K1276	3,4	1	(C),(D)	*
K1278	3	1	(C)	*
K1280	4	1	(E)	*
K1282	3	1	(C)	*
K1287	4	1	(E)	*
K1289	3	1	(C)	*
K1293	3,4	1	(C),(D)	*
K1314	3	1	(C)	*
K1324	5	1	(F)	*
K2044	3	1	(C)	*
K2058	3	1	(C)	*
K2059	3	1	(C)	*
K2060	4	1	(D)	*
K2061	4	1	(D)	*
K2062	3	1	(C)	*
K2063	4	1	(D)	*
K2064	4	1	(D)	*
K2071	3	1	(C)	*
K2073	3	1	(C)	*
K2075	3	1	(C)	*
K2077	3	1	(C)	*
K2079	3	1	(C)	*
K2089	6	1	(G)	*
K2091	6	1	(H)	*
K2093	6	1	(G)	*
K2095	6	1	(G)	*
K2103	3	1	(C)	*
K2105	4	1	(D)	*
K2107	4	1	(D)	*
K2109	4	1	(D)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS TO FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Miscellaneous Electrical Equipment Panel, P36 - Component Index
Figure 101 (Sheet 5)

A62651

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P36	
K2154	3	1	(C)	*
K2155	3,4	1	(C),(D)	*
K2156	6	1	(G)	*
K2164	3	1	(C)	*
K2171	5	1	(F)	*
K2173	5	1	(E)	*
K2175	3,4,6	1	(C),(D),(A-A)	*
K2190	6	1	(A-A)	*
K10109	4	1	(E)	*
K10136	4	1	(E)	*
K10229	3	1	(C)	*
K10230	3	1	(C)	*
K10231	3	1	(C)	*
K10232	3	1	(C)	*
K10233	3	1	(C)	*
K10234	4	1	(D)	*
K10236	4	1	(D)	*
K10315	5	1	(F)	*
K10391	4	1	(E)	*
TERMINAL BLOCK -			119AL, MAIN EQUIP CTR, P36	
TB74	5	1	(F)	*
TB76	5	1	(F)	*
TB78	3	1	(C)	*
TB80	3	1	(C)	*
TB216	2	1	(B)	*
TB218	2	1	(B)	*
TB220	2	1	(B)	*
TB222	2	1	(B)	*
TB250	4	1	(D)	*
TB252	4	1	(E)	*
TB260	5	1	(F)	*
TB268	5	1	(F)	*
TB272	2	1	(B)	*
TB302	7	1	(B-B)	*
TB318	7	1	(B-B)	*
TB5136	7	1	(B-B)	*
TB5138	7	1	(B-B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS TO FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Miscellaneous Electrical Equipment Panel, P36 - Component Index
Figure 101 (Sheet 6)

C12747
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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
TIME DELAY -			119AL, MAIN EQUIP CTR, P36	
M305	3,6	1	(C),(H)	*
M497	3,6	1	(C),(H)	*
M498	3	1	(C)	*
M919	3,6	1	(C),(H)	*
M922	3,6	1	(C),(H)	*
M1154	7	1	(B-B)	*
M1161	4,6	1	(D),(H)	*
M1162	4,6	1	(D),(H)	*
M1992	4	1	(D)	*
M10440	4,6	1	(D),(H)	*
TRANSFORMER -			119AL, MAIN EQUIP CTR, P36	
T139	6	1	(H)	*
T142	6	1	(H)	*
T143	6	1	(H)	*
T144	6	1	(H)	*
T153	6	1	(H)	*
TRANSFORMER, CURRENT -			119AL, MAIN EQUIP CTR, P36	
TS102	6	1	(G)	*
TS192	6	1	(G)	*
TS246	6	1	(G)	*
TS289	6	1	(G),(H)	*
TS459	6	1	(G)	*
TS524	7	1	(B-B)	*
TS526	7	1	(B-B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS TO FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Left Miscellaneous Electrical Equipment Panel, P36 - Component Index
Figure 101 (Sheet 7)

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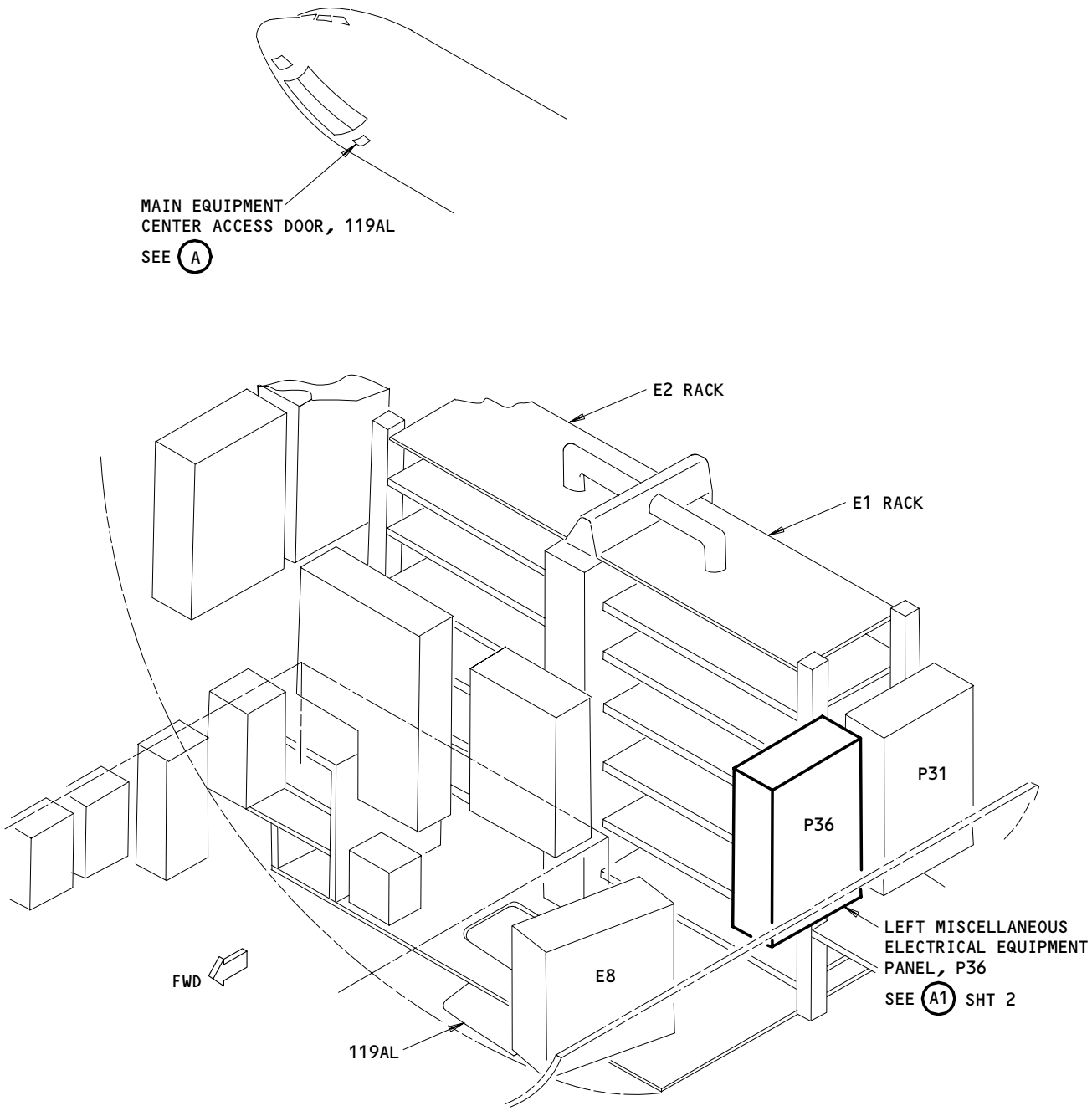

MAIN EQUIPMENT CENTER

A

Left Miscellaneous Electrical Equipment Panel, P36 - Component Location
Figure 102 (Sheet 1)

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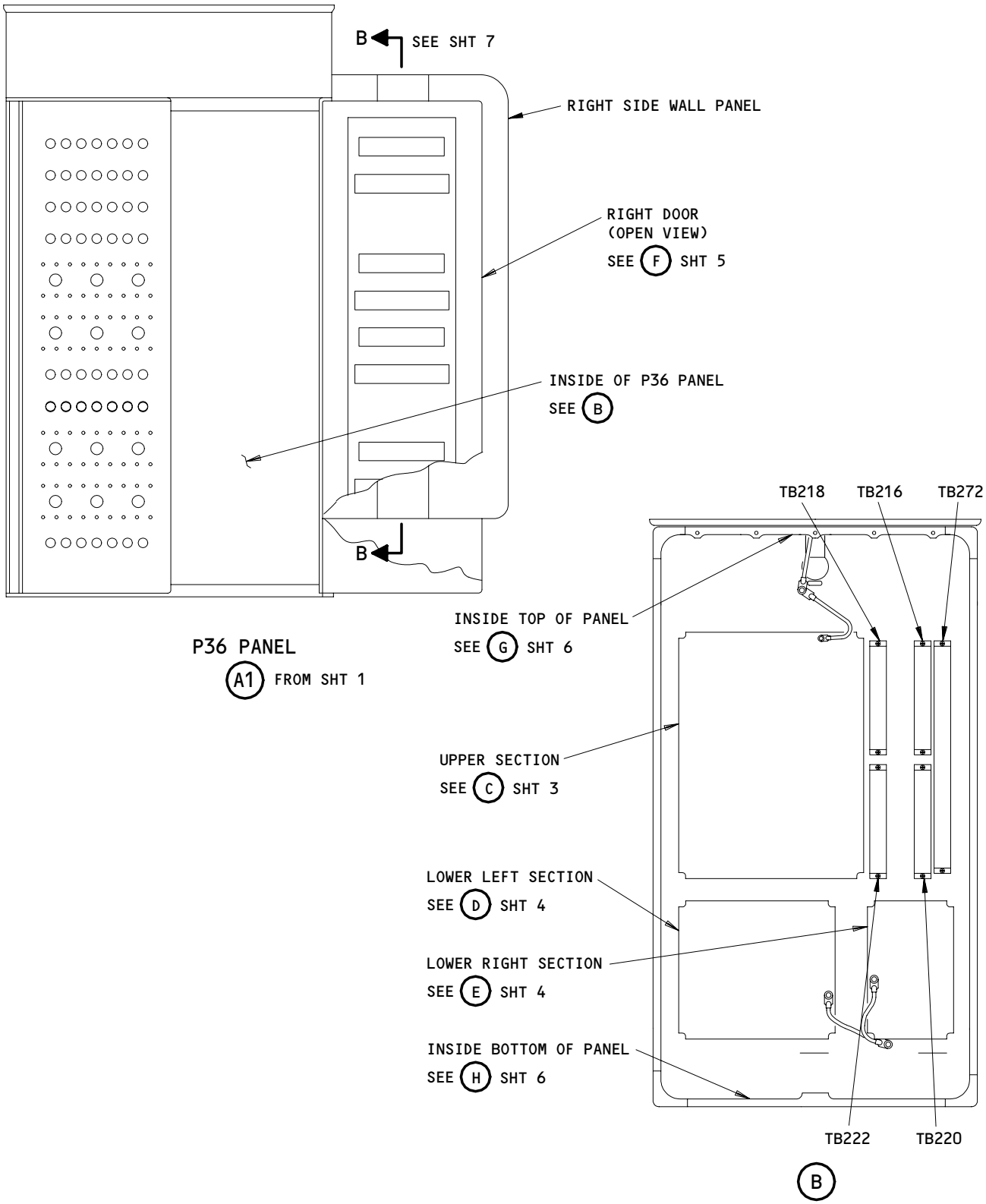

Left Miscellaneous Electrical Equipment Panel, P36 - Component Location
Figure 102 (Sheet 2)

A54558

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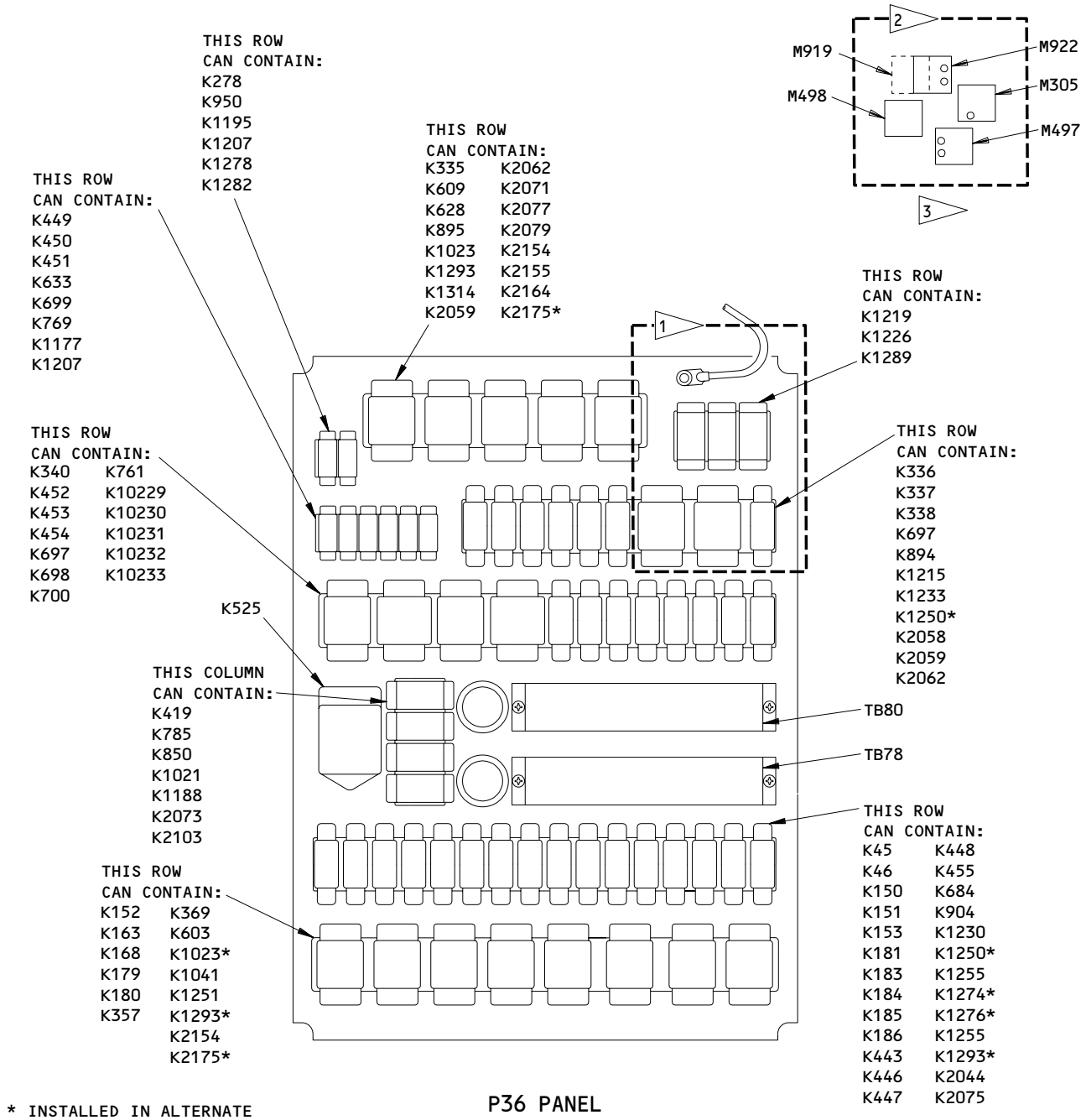

* INSTALLED IN ALTERNATE LOCATIONS

P36 PANEL
(UPPER SECTION)
(C)

1 AIRPLANES WITH RELAYS INSTALLED

2 AIRPLANES WITH TIME DELAYS INSTALLED

3 THESE TIME DELAYS CAN ALSO BE INSTALLED AT THE BOTTOM OF THE PANEL. SEE (H)

Left Miscellaneous Electrical Equipment Panel, P36 - Component Location
(Detail from Sheet 2)
Figure 102 (Sheet 3)

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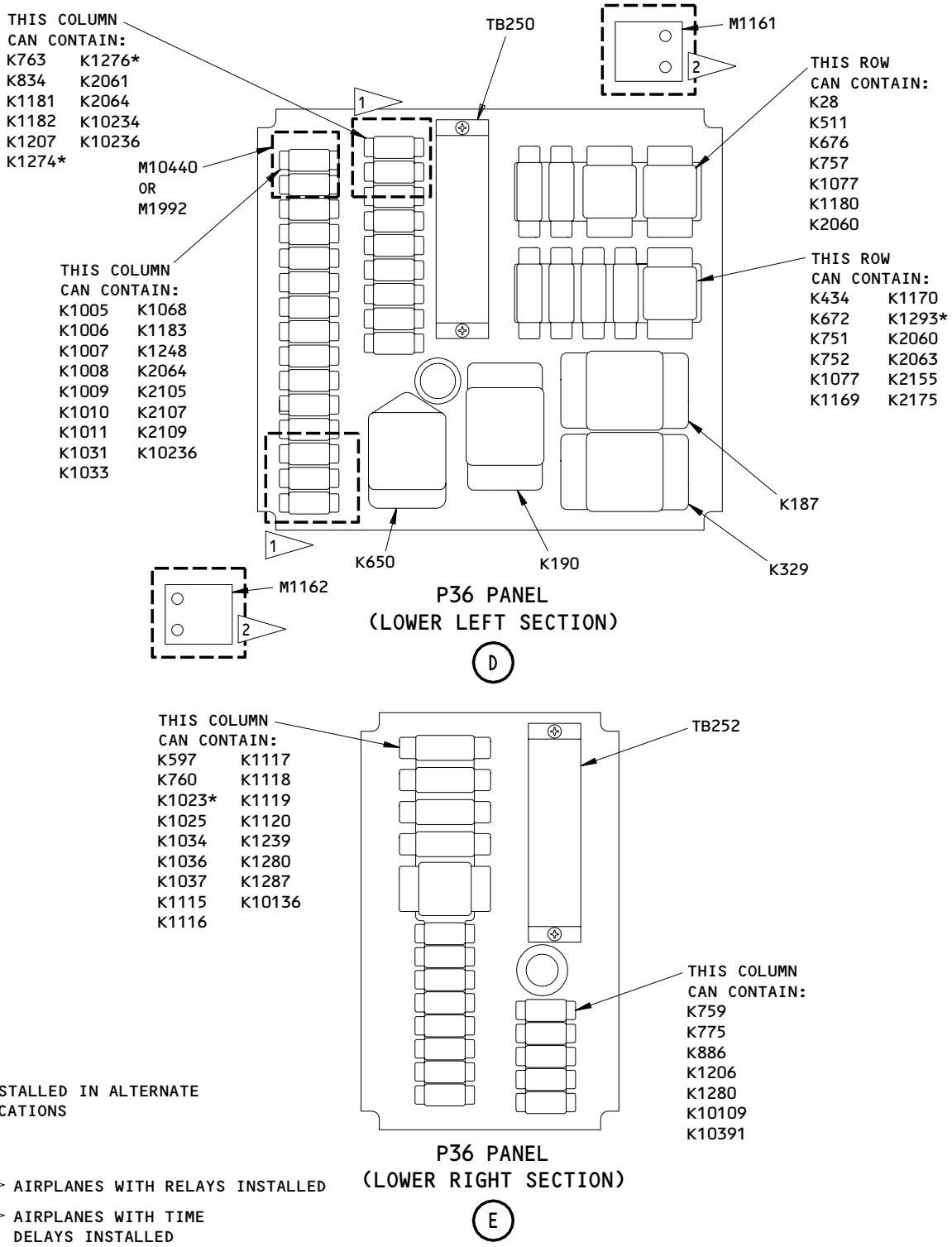

Left Miscellaneous Electrical Equipment Panel, P36 - Component Location
(Details from Sheet 2)
Figure 102 (Sheet 4)

A64383

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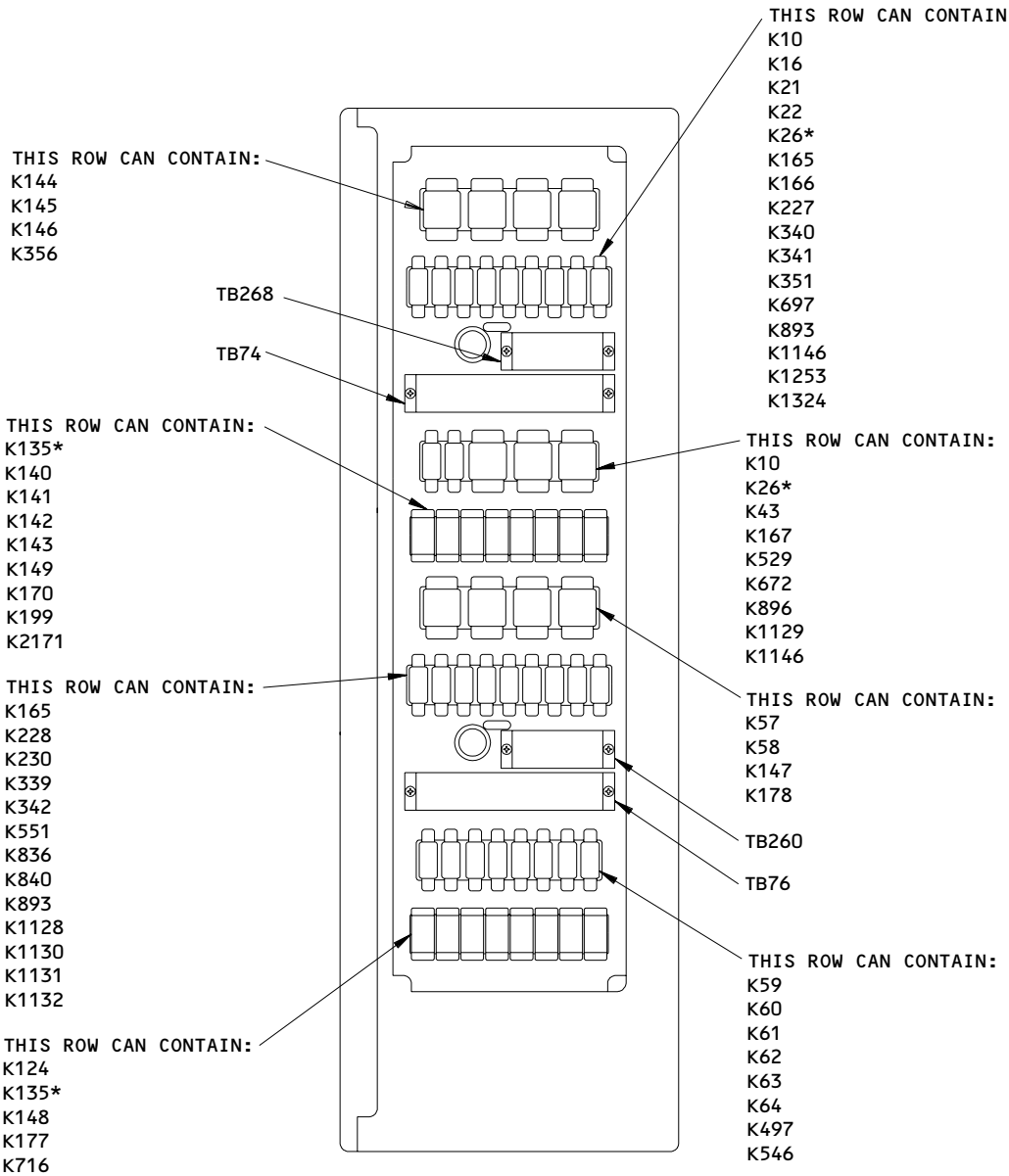

P36 PANEL
RIGHT DOOR
F

* INSTALLED IN ALTERNATE LOCATIONS

Left Miscellaneous Electrical Equipment Panel, P36 - Component Location
(Detail from Sht 2)
Figure 102 (Sheet 5)

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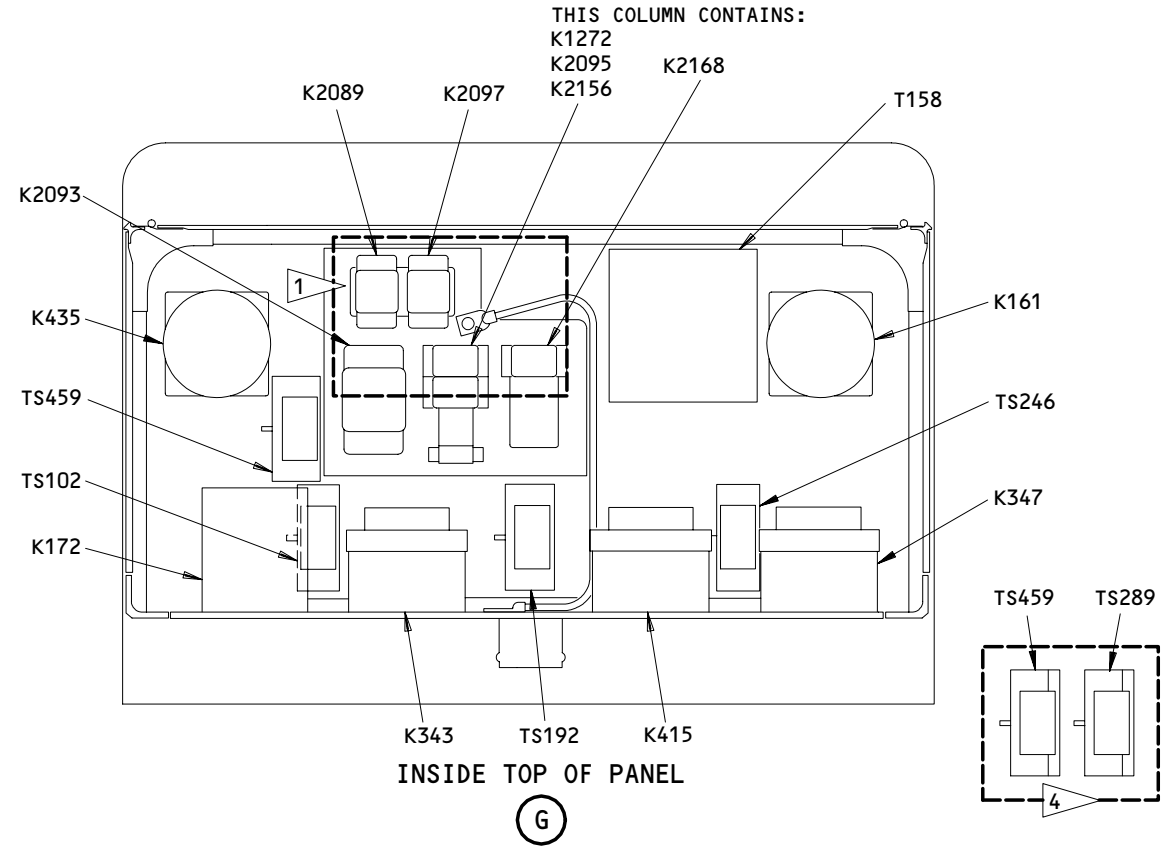

Left Miscellaneous Electrical Equipment Panel, P36 - Component Location
(Details from Sht 2)
Figure 102 (Sheet 6)

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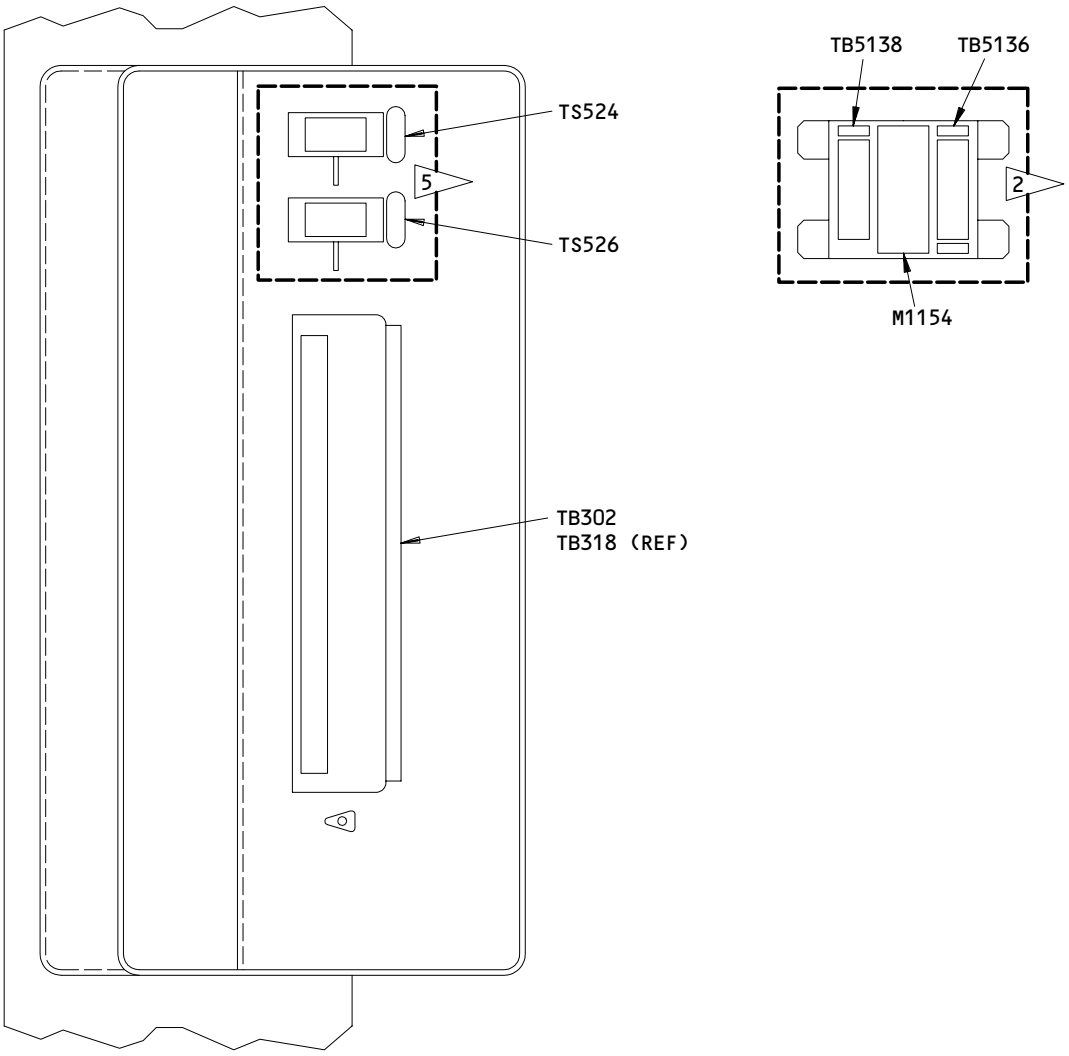

P36 PANEL
(RIGHT SIDE WALL PANEL)
B-B

2 AIRPLANES WITH TIME DELAY INSTALLED
5 AIRPLANES WITH CURRENT SENSOR INSTALLED

Right Miscellaneous Electrical Equipment Panel, P36 - Component Location
(Details from Sht 2)
Figure 102 (Sheet 7)

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RIGHT MISCELLANEOUS ELECTRICAL EQUIPMENT PANEL, P37

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY -			119AL, MAIN EQUIP CTR, P37	
K15	3	1	(C)	*
K18	5	1	(F)	*
K19	5	1	(F)	*
K27	5	1	(F)	*
K29	3	1	(C)	*
K130	5	1	(F)	*
K131	5	1	(F)	*
K134	5	1	(F)	*
K162	5	1	(F)	*
K164	4	1	(D)	*
K166	5	1	(F)	*
K169	4	1	(D)	*
K174	3	1	(C)	*
K175	4	1	(D)	*
K189	4	1	(D)	*
K191	4	1	(D)	*
K192	4	1	(D)	*
K200	5	1	(F)	32-09-02
K201	5	1	(F)	32-09-02
K202	5	1	(F)	32-09-02
K203	5	1	(F)	32-09-02
K204	5	1	(F)	32-09-02
K205	5	1	(F)	32-09-02
K206	5	1	(F)	32-09-02
K207	5	1	(F)	32-09-02
K209	5	1	(F)	32-09-02
K210	5	1	(F)	32-09-02
K211	5	1	(F)	32-09-02
K213	5	1	(F)	32-09-02
K214	5	1	(F)	32-09-02
K215	5	1	(F)	32-09-02
K219	5	1	(F)	32-09-02
K221	6	1	(G)	*
K222	6	1	(G)	*
K223	6	1	(G)	*
K224	6	1	(G)	*
K225	6	1	(G)	*
K226	3	1	(C)	*
K231	3	1	(C)	*
K238	5	1	(C)	*
K239	5	1	(F)	*
K240	5	1	(F)	*
K293	5	1	(F)	32-09-02
K330	4	1	(D)	*
K344	6	1	(G)	*
K345	6	1	(G)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Right Miscellaneous Electrical Equipment Panel, P37 - Component Index
Figure 101 (Sheet 1)

955347
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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P37	
K346	6	1	(G)	*
K348	5,6	1	(F),(G)	*
K349	5,6	1	(F),(G)	*
K368	6	1	(G)	*
K397	5	1	(F)	*
K398	3,6	1	(C),(G)	*
K416	6	1	(G)	*
K421	4	1	(D)	*
K433	4	1	(D)	*
K442	4	1	(D)	*
K495	3	1	(D)	*
K496	3	1	(C)	*
K504	3	1	(C)	*
K505	4	1	(D)	*
K510	4	1	(D)	*
K512	4	1	(D)	*
K523	4	1	(D)	*
K554	3	1	(C)	*
K586	5	1	(F)	*
K587	5	1	(F)	*
K602	4	1	(D)	*
K606	4	1	(D)	*
K614	3	1	(C)	*
K621	3	1	(C)	*
K624	5	1	(F)	*
K625	5	1	(F)	*
K626	3	1	(C)	*
K629	3	1	(C)	*
K631	4	1	(D)	*
K632	4	1	(D)	*
K649	3	1	(C)	*
K680	3	1	(C)	*
K681	3	1	(C)	*
K693	4	1	(D)	*
K721	3	1	(C)	32-09-02
K744	4	1	(D)	*
K753	3	1	(C)	*
K754	3	1	(C)	*
K758	3	1	(C)	*
K764	3	1	(C)	*
K768	4	1	(D)	*
K774	3	1	(C)	*
K776	3,4	1	(C),(D)	*
K778	3	1	(C)	*
K779	3	1	(C)	*
K782	3	1	(C)	*
K786	3	1	(C)	*
K793	4	1	(D)	*
K822	5	1	(F)	*
K823	5	1	(F)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Right Miscellaneous Electrical Equipment Panel, P37 - Component Index
Figure 101 (Sheet 2)

A63063
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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P37	
K826	4,5	1	(D),(F)	*
K831	5	1	(F)	*
K832	5	1	(F)	*
K833	5	1	(F)	*
K835	4	1	(D)	*
K842	5	1	(F)	*
K847	3	1	(C)	*
K848	3	1	(C)	*
K849	5	1	(F)	*
K851	5	1	(F)	*
K881	5	1	(F)	*
K887	3	1	(C)	*
K897	3	1	(C)	*
K929	3	1	(C)	*
K938	3	1	(C)	*
K971	3	1	(C)	*
K1022	3	1	(C)	*
K1024	3	1	(C)	*
K1026	5	1	(F)	*
K1032	3	1	(C)	*
K1034	3	1	(C)	*
K1035	5	1	(F)	*
K1038	3	1	(C)	*
K1039	3	1	(C)	*
K1064	5	1	(F)	*
K1078	3,5	1	(C),(F)	*
K1084	4	1	(D)	*
K1085	3	1	(C)	*
K1090	4	1	(E)	*
K1114	4	1	(E)	*
K1121	4	1	(E)	*
K1122	4	1	(E)	*
K1123	4	1	(E)	*
K1124	4	1	(E)	*
K1125	4	1	(E)	*
K1126	4	1	(E)	*
K1133	3	1	(C)	*
K1134	3	1	(C)	*
K1136	3	1	(C)	*
K1137	3	1	(C)	*
K1171	5	1	(F)	*
K1172	5	1	(F)	*
K1174	4	1	(D)	*
K1175	3	1	(C)	*
K1210	3	1	(E)	*
K1211	3,4	1	(C),(E)	*
K1212	3	1	(C)	*
K1213	3	1	(C)	*
K1214	3	1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Right Miscellaneous Electrical Equipment Panel, P37 - Component Index
Figure 101 (Sheet 3)

A63378

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY (CONT) -			119AL, MAIN EQUIP CTR, P37	
K1220	3	1	(C)	*
K1221	3	1	(C)	*
K1222	3	1	(C)	*
K1227	3,4	1	(C),(E)	*
K1231	3	1	(C)	*
K1234	3	1	(C)	*
K1235	3	1	(C)	*
K1236	3	1	(C)	*
K1238	3	1	(C)	*
K1249	3	1	(C)	*
K1252	4	1	(D)	*
K1269	3	1	(C)	*
K1271	3	1	(C)	*
K1273	6	1	(G)	*
K1275	3,4	1	(C),(D)	*
K1277	3,4	1	(C),(D)	*
K1279	4	1	(E)	*
K1281	4	1	(E)	*
K1283	3	1	(C)	*
K1285	3,4	1	(C),(E)	*
K1286	3	1	(C)	*
K1288	4	1	(E)	*
K1290	3	1	(C)	*
K1294	3,4	1	(C),(E)	*
K1328	5	1	(F)	*
K2045	5	1	(F)	*
K2082	5	1	(F)	*
K2090	6	1	(G)	*
K2092	6	1	(G)	*
K2094	6	1	(G)	*
K2096	6	1	(G)	*
K2098	6	1	(G)	*
K2119	4	1	(E)	*
K2123	3	1	(C)	*
K2126	6	1	(G)	*
K2157	3,5,6	1	(C),(F),(C-C)	*
K2165	5	1	(F)	*
K2170	3,6	1	(C),(C-C)	*
K2172	3	1	(C)	*
K2174	3	1	(C)	*
K2189	6	1	(C-C)	*
K10235	3	1	(C)	*
K10237	3	1	(C)	*
K10312	3	1	(C)	*
K10313	3	1	(C)	*
K10363	3	1	(C)	*
K10364	3	1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Right Miscellaneous Electrical Equipment Panel, P37 - Component Index
Figure 101 (Sheet 4)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
SENSOR, CURRENT –			119AL, MAIN EQUIP CTR, P37	
TS103	6	1	(G)	*
TS193	6	1	(G)	*
TS230	6	1	(G)	*
TS245	6	1	(G)	*
TS493	4	1	(H)	*
TS494	6	1	(G)	*
TS525	7	1	(A–A)	*
TS527	7	1	(A–A)	*
TERMINAL BLOCK –			119AL, MAIN EQUIP CTR, P37	
TB82	5	1	(F)	*
TB84	5	1	(F)	*
TB86	4	1	(D)	*
TB88	3	1	(C)	*
TB210	2	1	(B)	*
TB212	2	1	(B)	*
TB254	3	1	(C)	*
TB262	5	1	(F)	*
TB264	5	1	(F)	*
TB274	2	1	(B)	*
TB304	7	1	(A–A)	*
TB314	4	1	(D)	*
TB320	7	1	(A–A)	*
TB5078	6	1	(G)	*
TB5140	7	1	(A–A)	*
TIME DELAY –			119AL, MAIN EQUIP CTR, P37	
M301	3,7	1	(C),(B–B)	*
M302	3,7	1	(C),(B–B)	*
M499	3,7	1	(C),(B–B)	*
M921	3,7	1	(C),(B–B)	*
M925	3,7	1	(C),(B–B)	*
M1155	7	1	(A–A)	*
M1163	3,4,7	1	(C),(D),(B–B)	*
M1164	3,4,7	1	(C),(D),(B–B)	*
M1993	3	1	(C)	*
TRANSFORMER –			119AL, MAIN EQUIP CTR, P37	
T140	6	1	(G)	*
T147	6	1	(H)	*
T162	6	1	(G)	*
T191	6	1	(H)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Right Miscellaneous Electrical Equipment Panel, P37 – Component Index
Figure 101 (Sheet 5)

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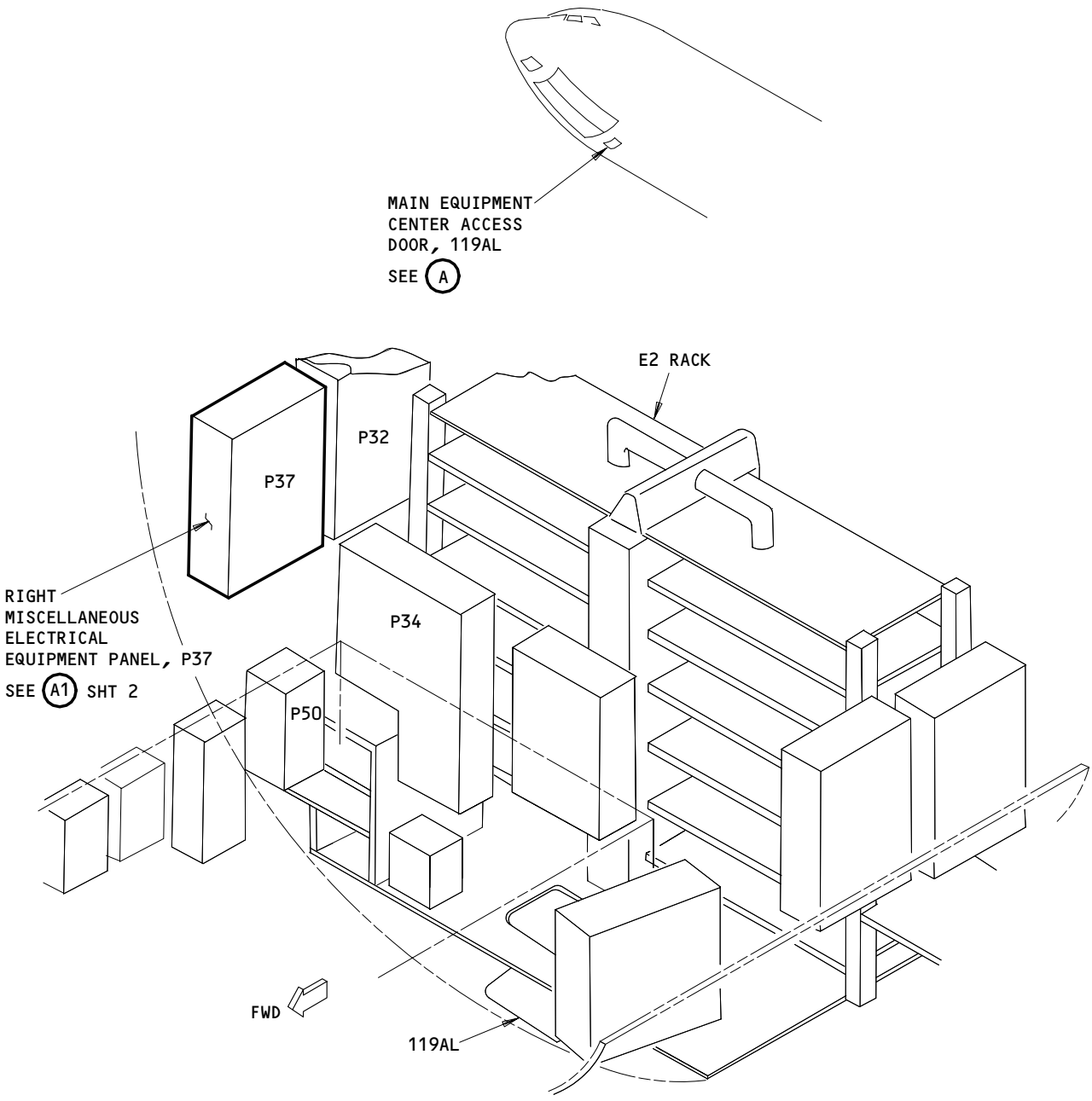

MAIN EQUIPMENT CENTER
A

Right Miscellaneous Electrical Equipment Panel, P37 - Component Location
Figure 102 (Sheet 1)

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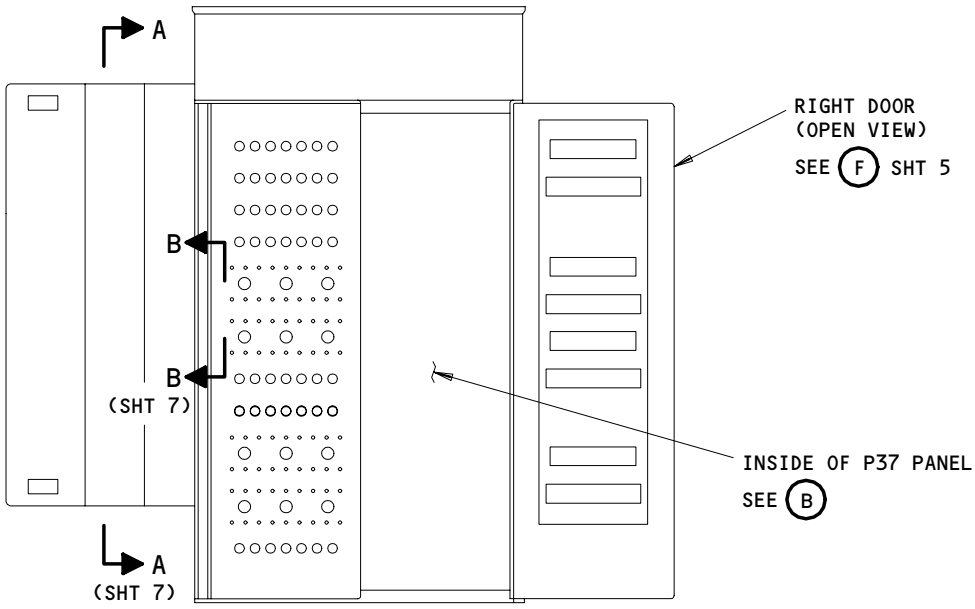
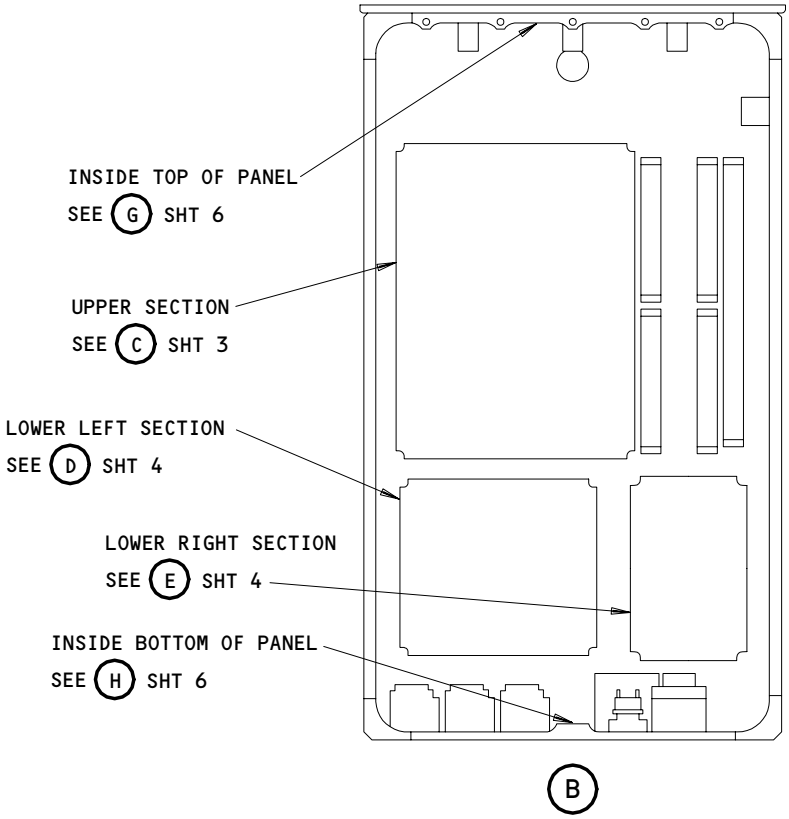


P37 PANEL

A1 FROM SHT 1



Right Miscellaneous Electrical Equipment Panel, P37 - Component Location
Figure 102 (Sheet 2)

A54415

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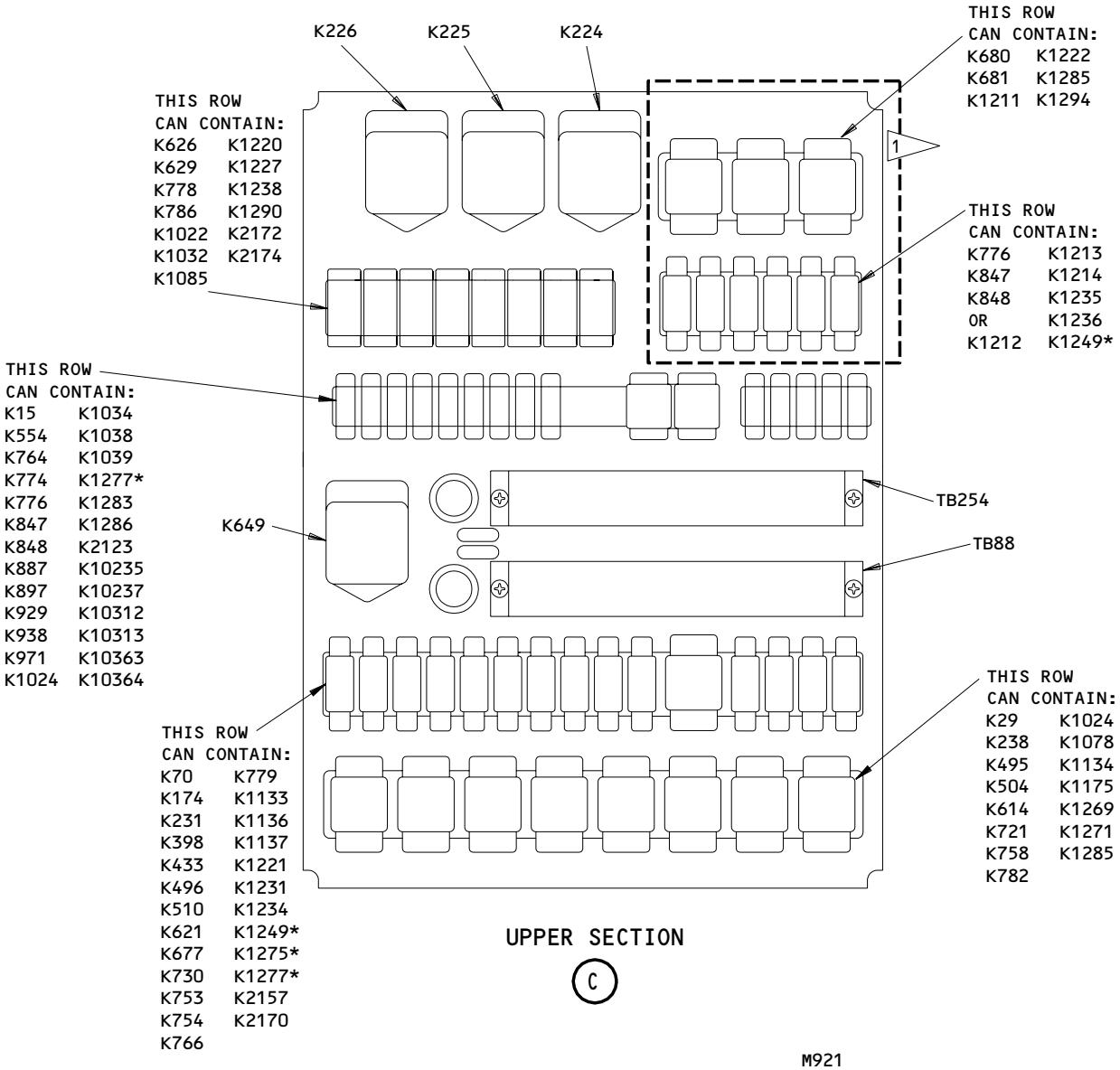

* INSTALLED IN ALTERNATE LOCATIONS

1 AIRPLANES WITH RELAYS INSTALLED

2 AIRPLANES WITH TIME DELAYS INSTALLED

Right Miscellaneous Electrical Equipment Panel, P37 - Component Location
(Detail from Sht 2)
Figure 102 (Sheet 3)

A54467

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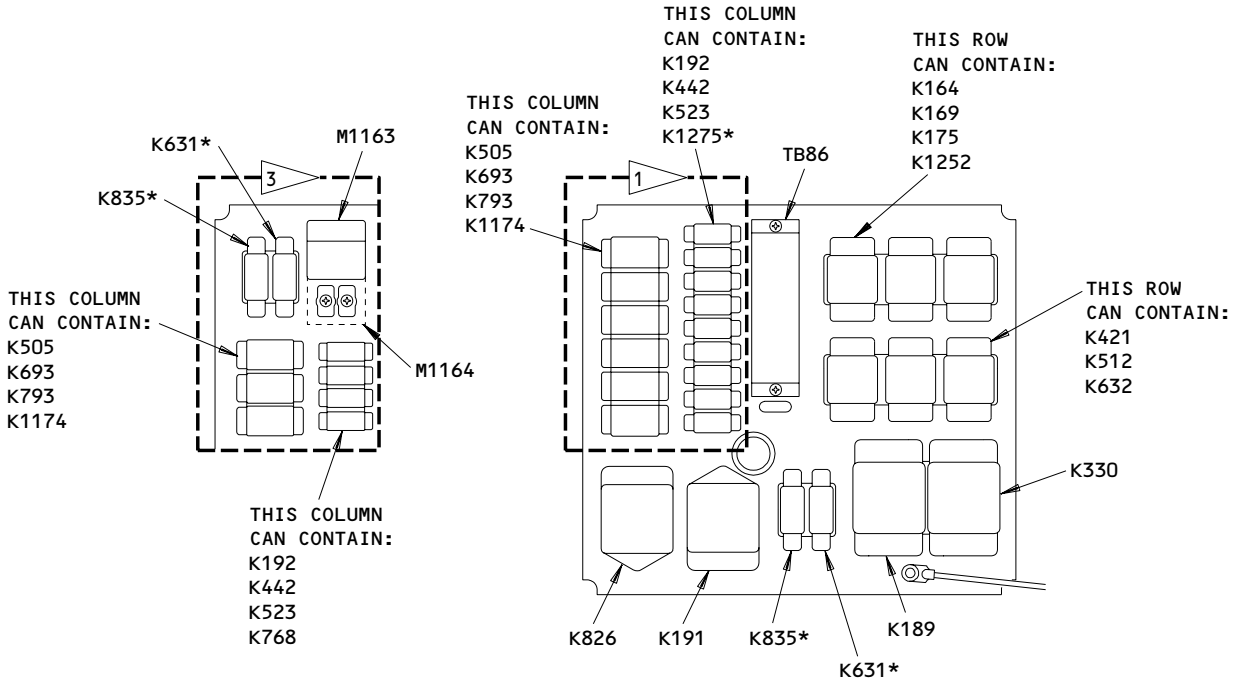
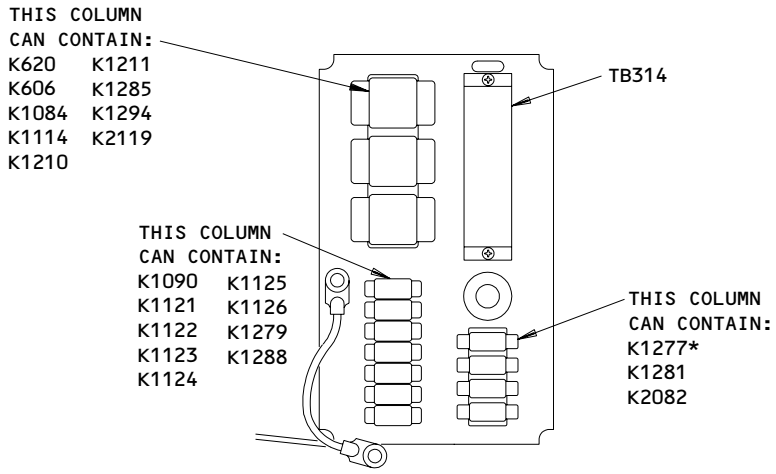


LOWER LEFT SECTION

D



LOWER RIGHT SECTION

E

* INSTALLED IN ALTERNATE LOCATIONS

1 AIRPLANES WITH RELAYS INSTALLED

3 AIRPLANES WITH RELAYS AND TIME DELAY INSTALLED

Right Miscellaneous Electrical Equipment Panel, P37 - Component Location
(Details from Sht 2)
Figure 102 (Sheet 4)

A64191

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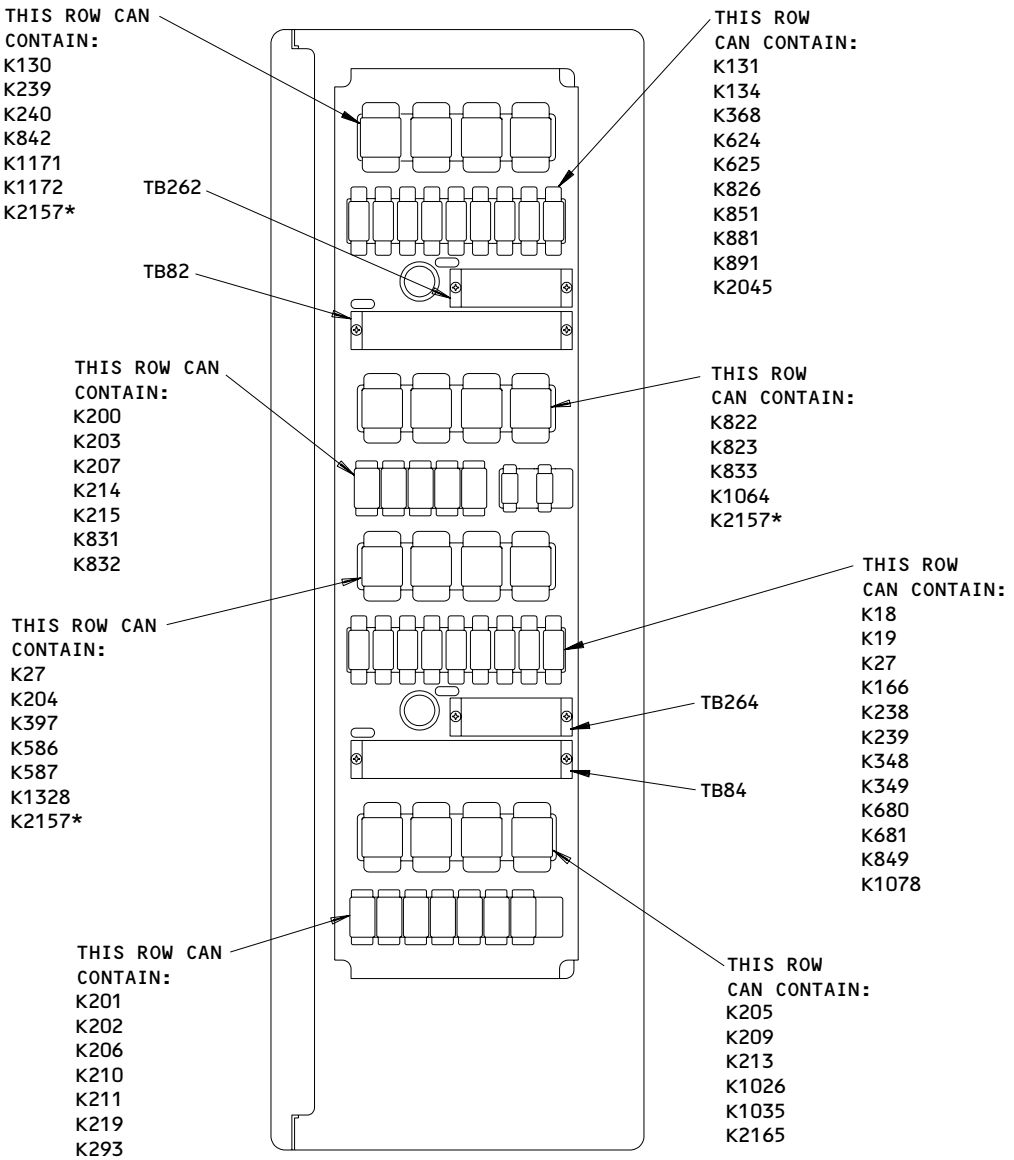

RIGHT DOOR

F

* INSTALLED IN ALTERNATE LOCATIONS

Right Miscellaneous Electrical Equipment Panel, P37 - Component Location
(Detail from Sht 2)
Figure 102 (Sheet 5)

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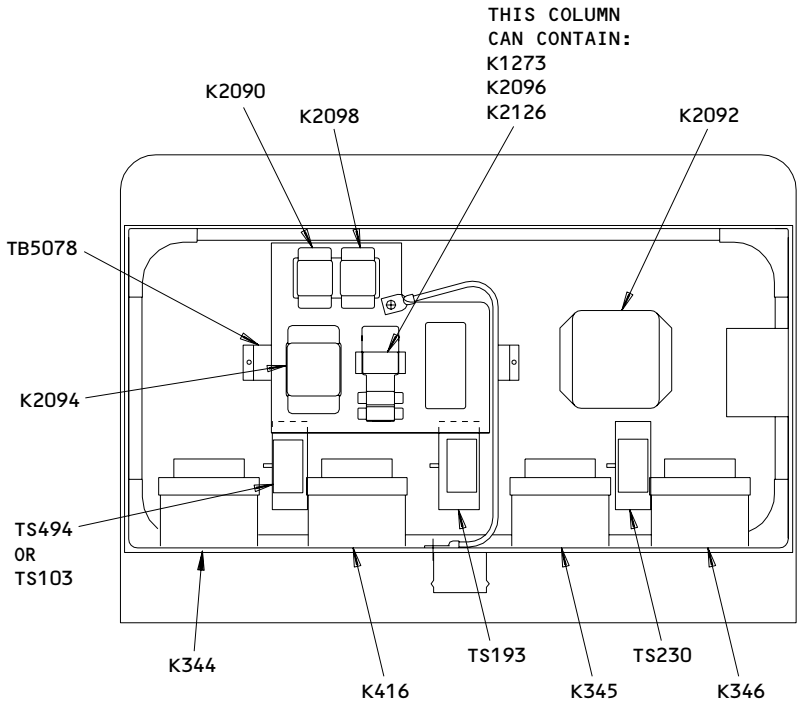
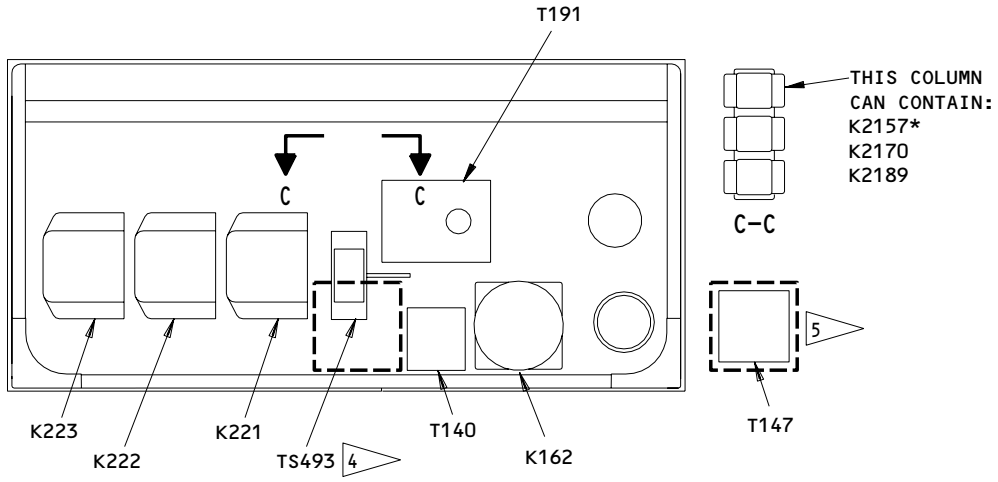


INSIDE TOP OF PANEL

G



INSIDE BOTTOM OF PANEL

H

4 AIRPLANES WITH CURRENT SENSOR INSTALLED

5 AIRPLANES WITH TRANSFORMER INSTALLED

* INSTALLED IN ALTERNATE LOCATIONS

Right Miscellaneous Electrical Equipment Panel, P37 - Component Location
(Details from Sht 2)
Figure 102 (Sheet 6)

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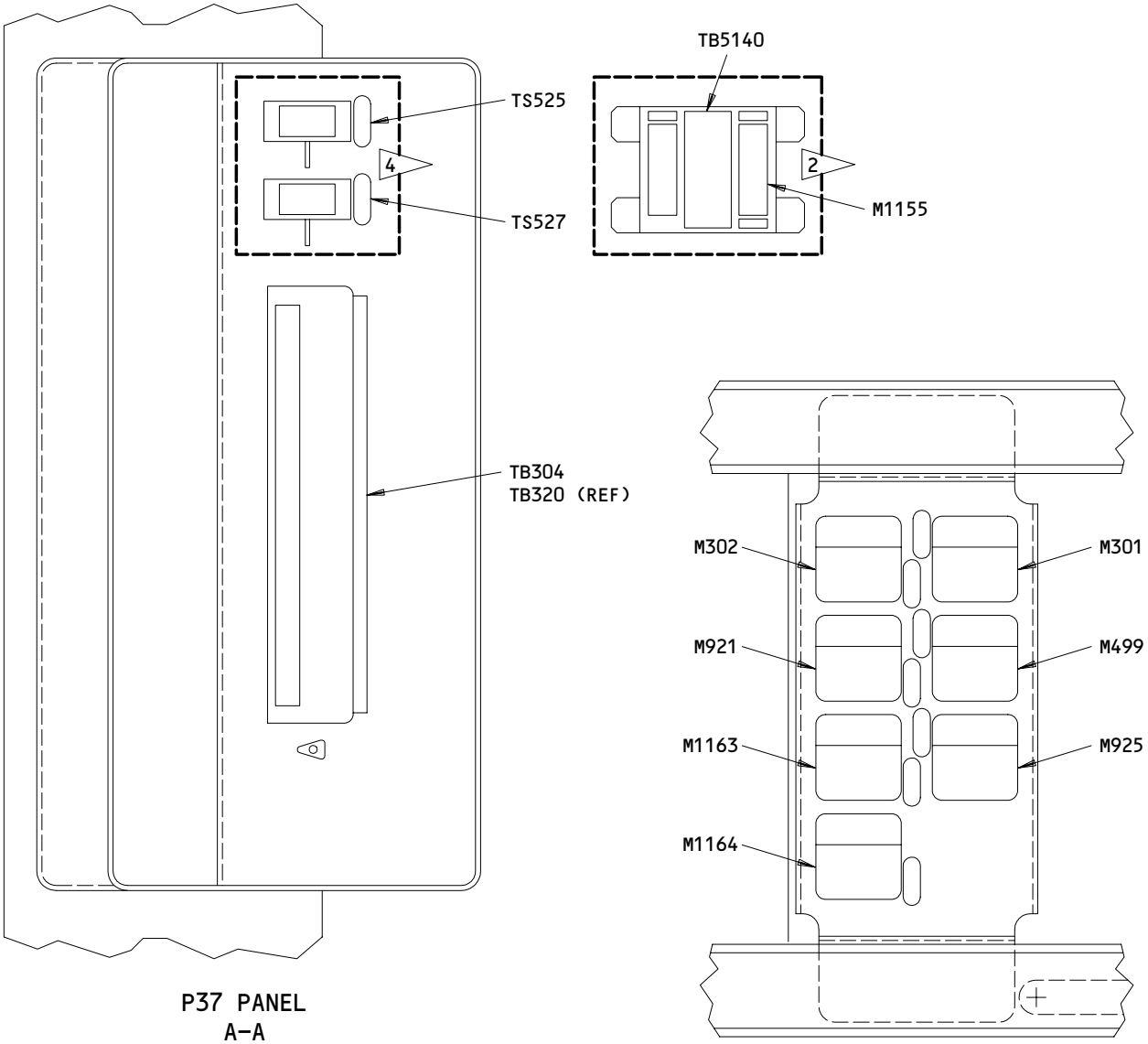

P37 PANEL
A–A

P37 PANEL
(LEFT WALL PANEL)
B–B

2 AIRPLANES WITH TIME DELAY INSTALLED
4 AIRPLANES WITH CURRENT SENSOR INSTALLED

Right Miscellaneous Electrical Equipment Panel, P37 – Component Location
(Details from Sht 2)
Figure 102 (Sheet 7)

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AFT COMPARTMENT CARGO HANDLING ACCESSORY PANEL, P39

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS -			822, AFT CARGO DOOR, P39	
K36	3	1	(D)	*
K37	3	1	(D)	*
K38	3	1	(D)	*
K39	3	1	(D)	*
K40	3	1	(D)	*
K41	3	1	(D)	*
K67	3	1	(D)	*
K73	3	1	(D)	*
K74	3	1	(D)	*
K278	2	1	(C)	*
K279	3	1	(D)	*
K280	3	1	(D)	*
K281	3	1	(D)	*
K282	3	1	(D)	*
K283	3	1	(D)	*
K284	3	1	(D)	*
K285	3	1	(D)	*
K286	3	1	(D)	*
K287	3	1	(D)	*
K288	3	1	(D)	*
K289	3	1	(D)	*
K290	3	1	(D)	*
K291	3	1	(D)	*
K292	3	1	(D)	*
K294	3	1	(D)	*
K295	3	1	(D)	*
K296	3	1	(D)	*
K297	3	1	(D)	*
K298	3	1	(D)	*
K300	3	1	(D)	*
K301	3	1	(D)	*
K302	3	1	(D)	*
K303	3	1	(D)	*
K304	3	1	(D)	*
K422	3	1	(D)	*
K423	3	1	(D)	*
K490	3	1	(D)	*
K491	3	1	(D)	*
K507	3	1	(D)	*
K533	3	1	(D)	*
K539	3	1	(D)	*
K544	3	1	(D)	*
K545	3	1	(D)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIGURE 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Aft Compartment Cargo Handling Accessory Panel, P39 - Component Index
Figure 101 (Sheet 1)

A65515

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS (CONT) –				
K905	3	1	(D)	*
K906	3	1	(D)	*
K907	3	1	(D)	*
K908	3	1	(D)	*
K909	3	1	(D)	*
K910	3	1	(D)	*
K911	3	1	(D)	*
K912	3	1	(D)	*
K913	3	1	(D)	*
K914	3	1	(D)	*
K915	3	1	(D)	*
K916	3	1	(D)	*
K917	3	1	(D)	*
K918	3	1	(D)	*
K926	3	1	(D)	*
K932	3	1	(D)	*
K933	3	1	(D)	*
K934	3	1	(D)	*
K998	3	1	(D)	*
K999	3	1	(D)	*
K1001	3	1	(D)	*
K1004	3	1	(D)	*
K1083	3	1	(D)	*
TERMINAL BLOCK –			822, AFT CARGO DOOR, P39	
TB122	2	1	(C)	*
TRANSFORMERS –			822, AFT CARGO DOOR, P39	
T151	2	1	(C)	*
T152	2	1	(C)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIGURE 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Aft Compartment Cargo Handling Accessory Panel, P39 – Component Index
Figure 101 (Sheet 2)

A65573
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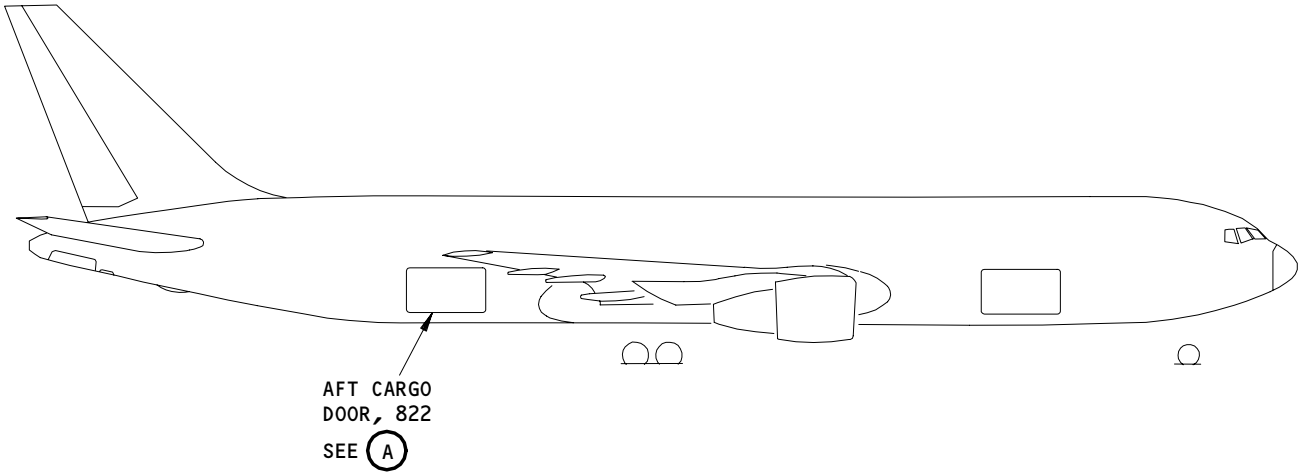

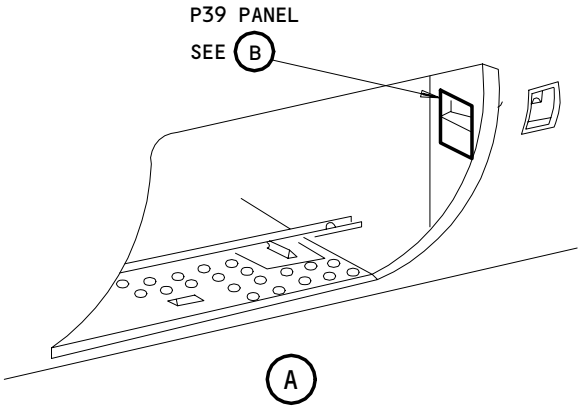

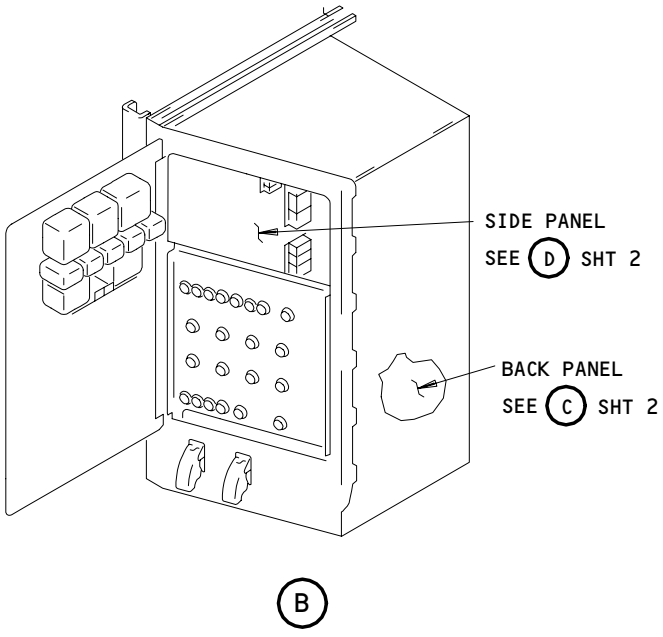

Aft Compartment Cargo Handling Accessory Panel, P39 - Component Location
Figure 102 (Sheet 1)

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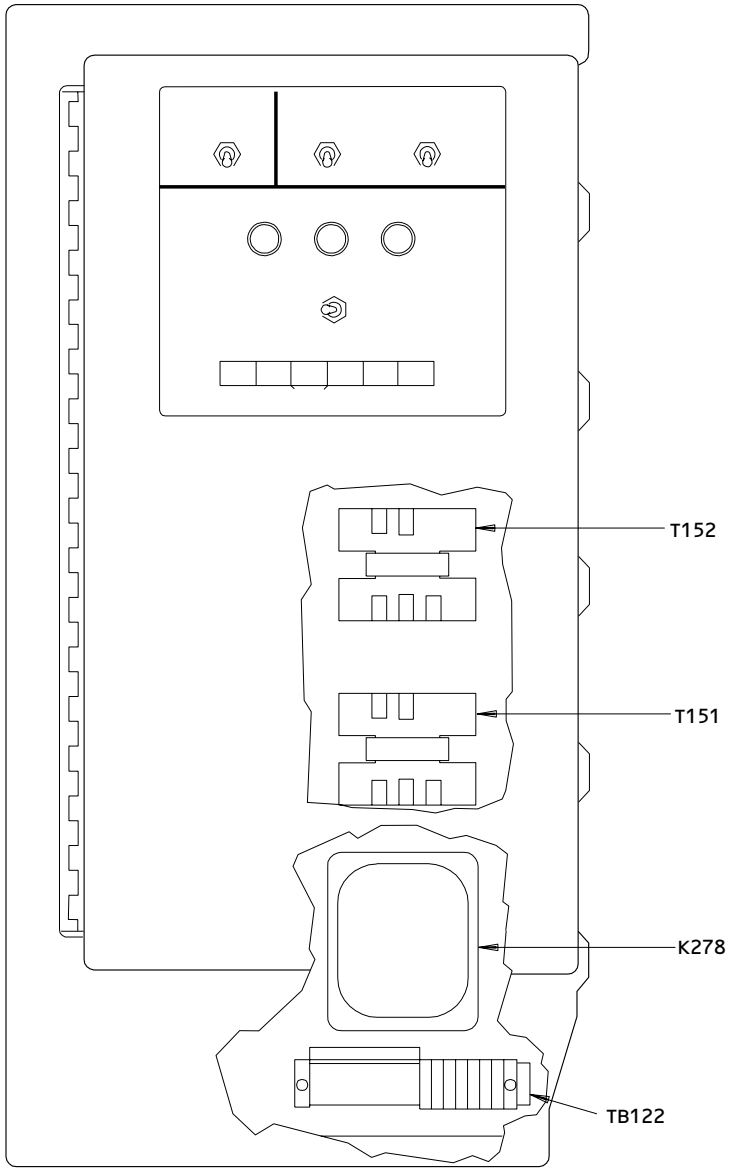

BACK PANEL

C

Aft Compartment Cargo Handling Accessory Panel, P39 - Component Location
(Detail from Sht 1)
Figure 102 (Sheet 2)

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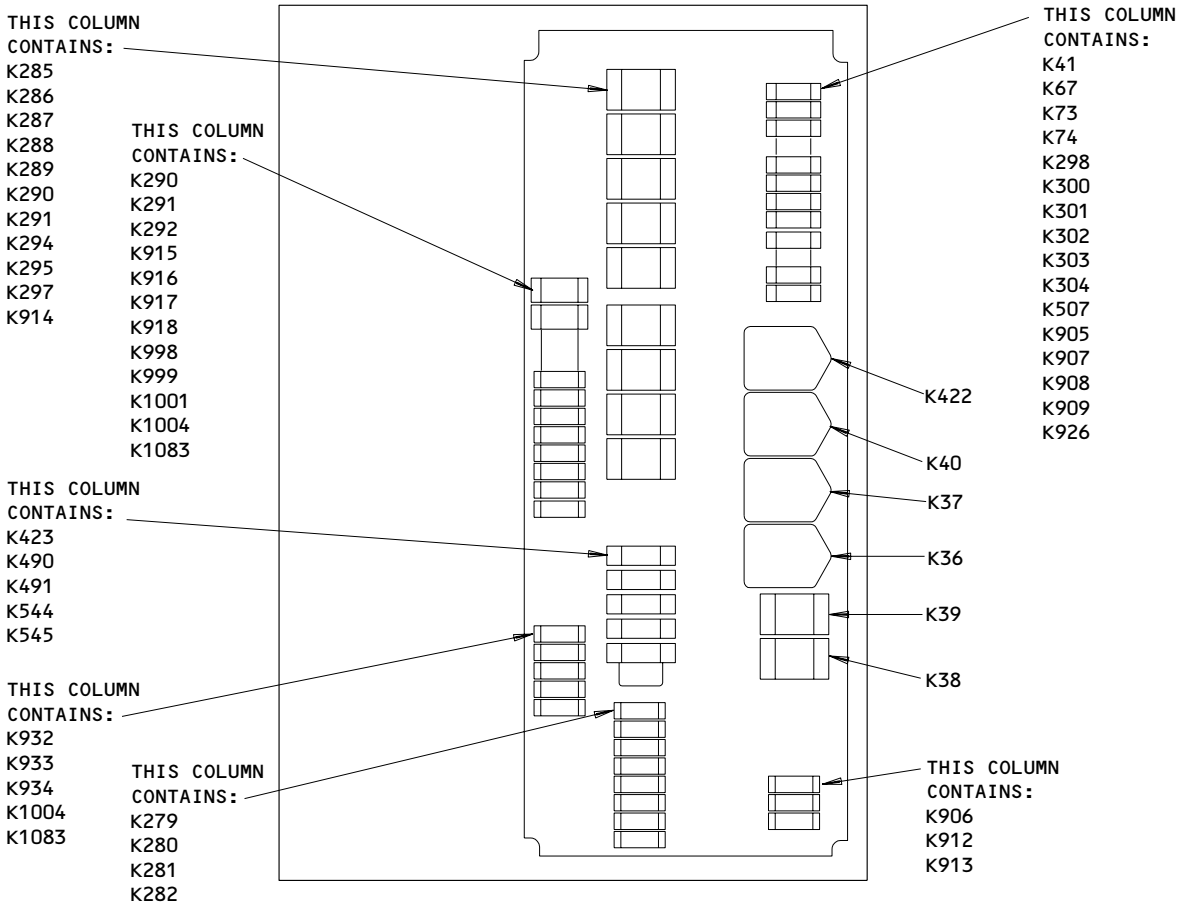

Aft Compartment Cargo Handling Accessory Panel, P39 - Component LOcation
(Detail from Sht 1)
Figure 102 (Sheet 3)

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APU AUXILIARY PANEL, P49

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
BATTERY MONITOR –			882, AFT CARGO DOOR, E6 RACK, P49	
M1172	2	1	(B)	*
MODULE –			882, AFT CARGO DOOR, E6 RACK, P49	
M228	2	1	(B)	24-31-01
RELAYS –			882, AFT CARGO DOOR, E6 RACK, P49	
K6	2	1	(B)	*
K23	2	1	(B)	*
K24	2	1	(B)	*
K25	2	1	(B)	*
K116	2	1	(B)	24-31-01
K117	2	1	(B)	*
K118	2	1	(B)	*
K173	2	1	(B)	*
K174	2	1	(B)	*
K176	2	1	(B)	*
K197	2	1	(B)	*
K229	2	1	(B)	*
K547	2	1	(B)	*
K565	2	1	(B)	*
K615	2	1	(B)	*
K616	2	1	(B)	*
K617	2	1	(B)	*
K618	2	1	(B)	*
K619	2	1	(B)	*
K765	2	1	(B)	*
K787	2	1	(B)	*
K788	2	1	(B)	*
K789	2	1	(B)	*
K790	2	1	(B)	*
K1145	2	1	(B)	*
K2144	2	1	(B)	*
K2145	2	1	(B)	*
TERMINAL BLOCK –			882, AFT CARGO DOOR, E6 RACK, P49	
TB294	2	1	(B)	*
TB300	2	1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFER TO VIEW A.

APU Auxiliary Panel, P49 – Component Index
Figure 101

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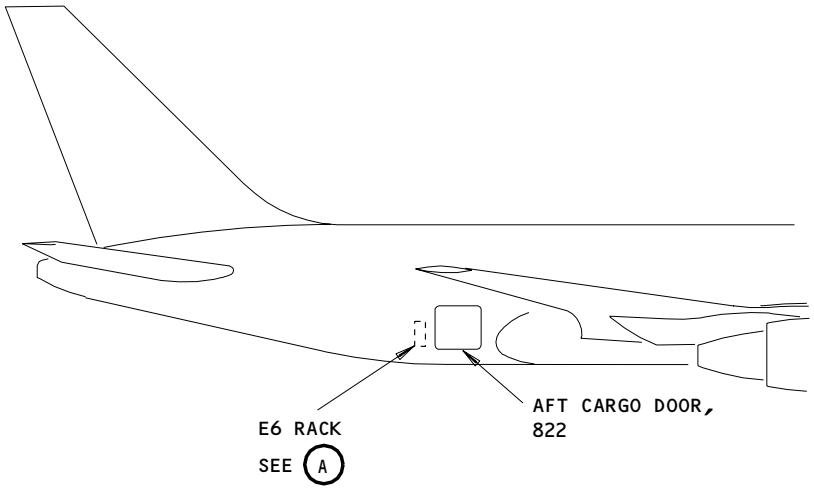

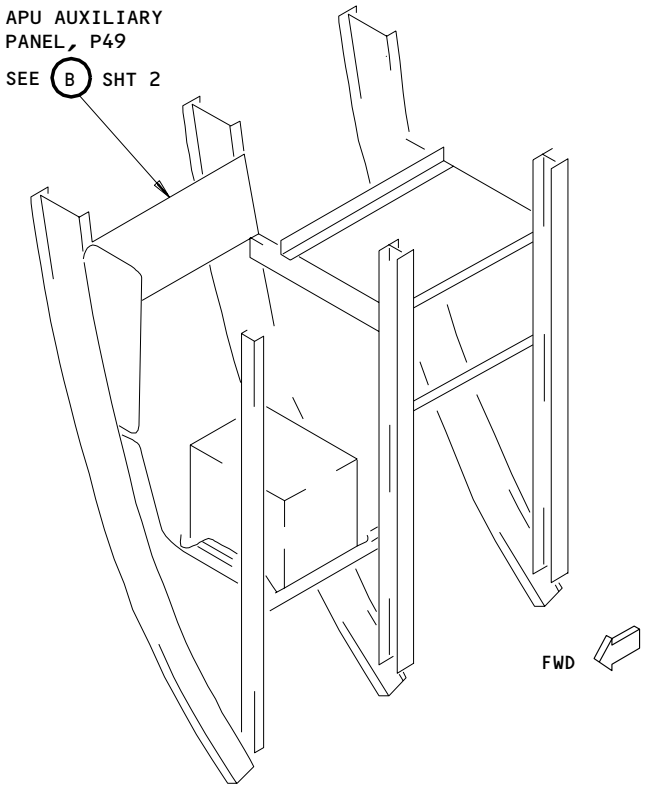

E6 RACK
A

APU Auxiliary Panel, P49 - Component Location
Figure 102 (Sheet 1)

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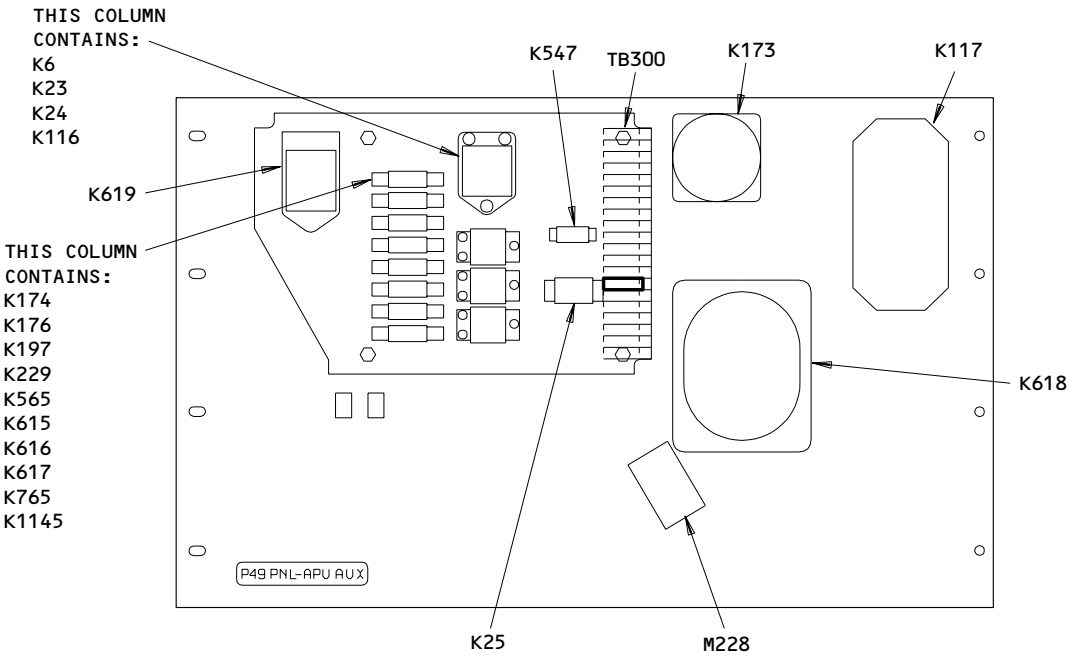
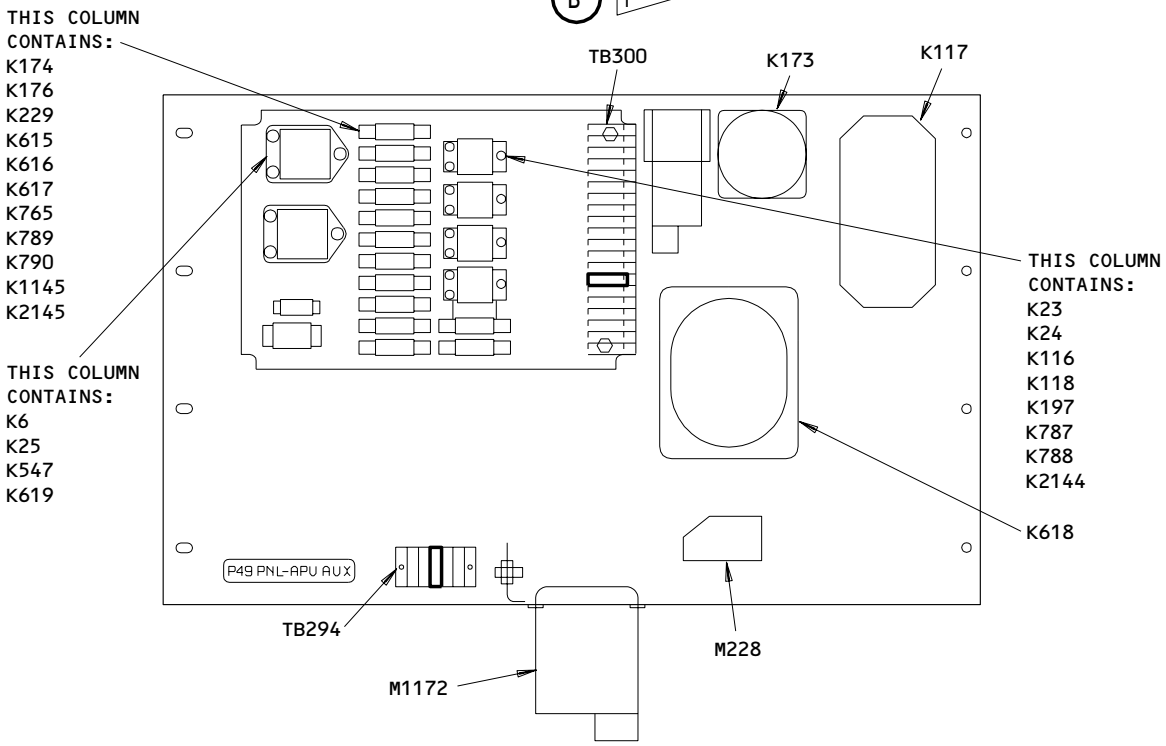


P49 PANEL

B 1



1 AIRPLANES WITH TWO COLUMNS OF RELAYS INSTALLED

2 AIRPLANES WITH THREE COLUMNS OF RELAYS INSTALLED

P49 PANEL

B 2

APU Auxiliary Panel, P49 - Component Location
(Detail from Sht 1)
Figure 102 (Sheet 2)

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RIGHT SIDE PANEL, P61

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
TERMINAL BLOCKS –			FLT COMPT, P61	
TB096	2	1	(A)	*
TB098	2	1	(A)	*
TB100	2	1	(A)	*
TB102	2	1	(A)	*
TB104	2	1	(A)	*
TB106	2	1	(A)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS YOU FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Right Side Panel, P61 – Component Index
Figure 101

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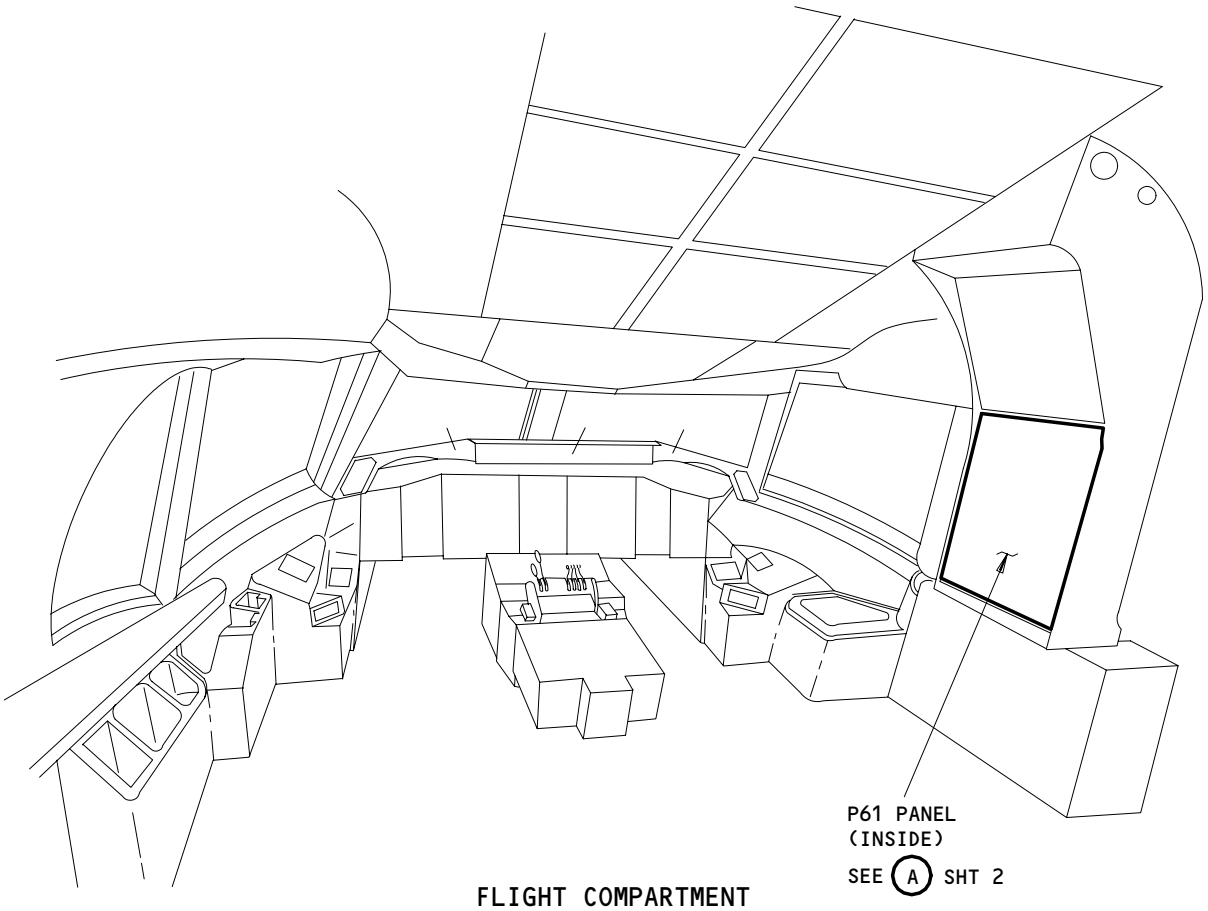

Right Side Panel, P61 - Component Location
Figure 102 (Sheet 1)

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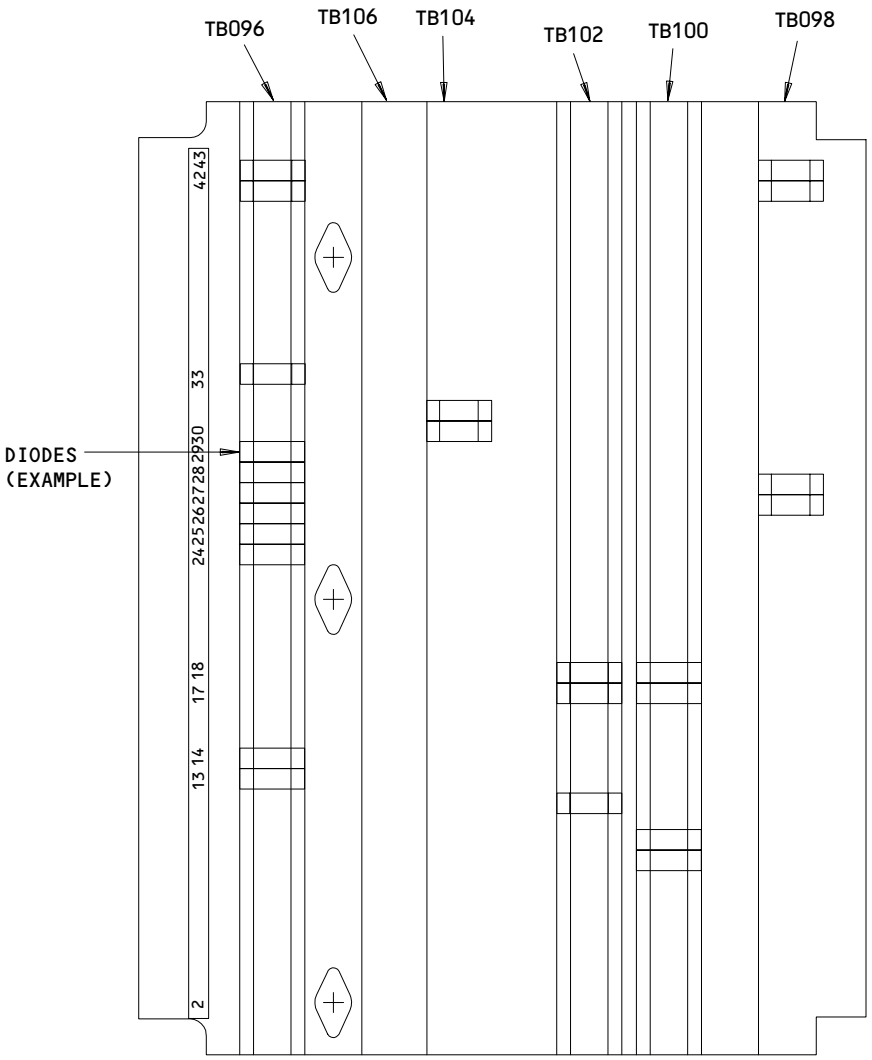

Right Side Panel, P61 - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)

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HYDRAULIC GENERATOR POWER PANEL, P65

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
MODULES –			119AL, MAIN EQUIP CTR, P65	
M1226	2	1	(B)	*
M1228	2	1	(B)	*
M1230	2	1	(B)	*
RELAYS –			119AL, MAIN EQUIP CTR, P65	
K858	2	1	(B)	*
K859	2	1	(B)	*
K860	2	1	(B)	*
K861	2	1	(B)	*
K862	2	1	(B)	*
K863	3	1	(B)	*
K864	2	1	(B)	*
K865	2	1	(B)	*
K873	2	1	(B)	*
K1242	2	1	(B)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS TO FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Hydraulic Generator Power Panel, P65 – Component Index
Figure 101

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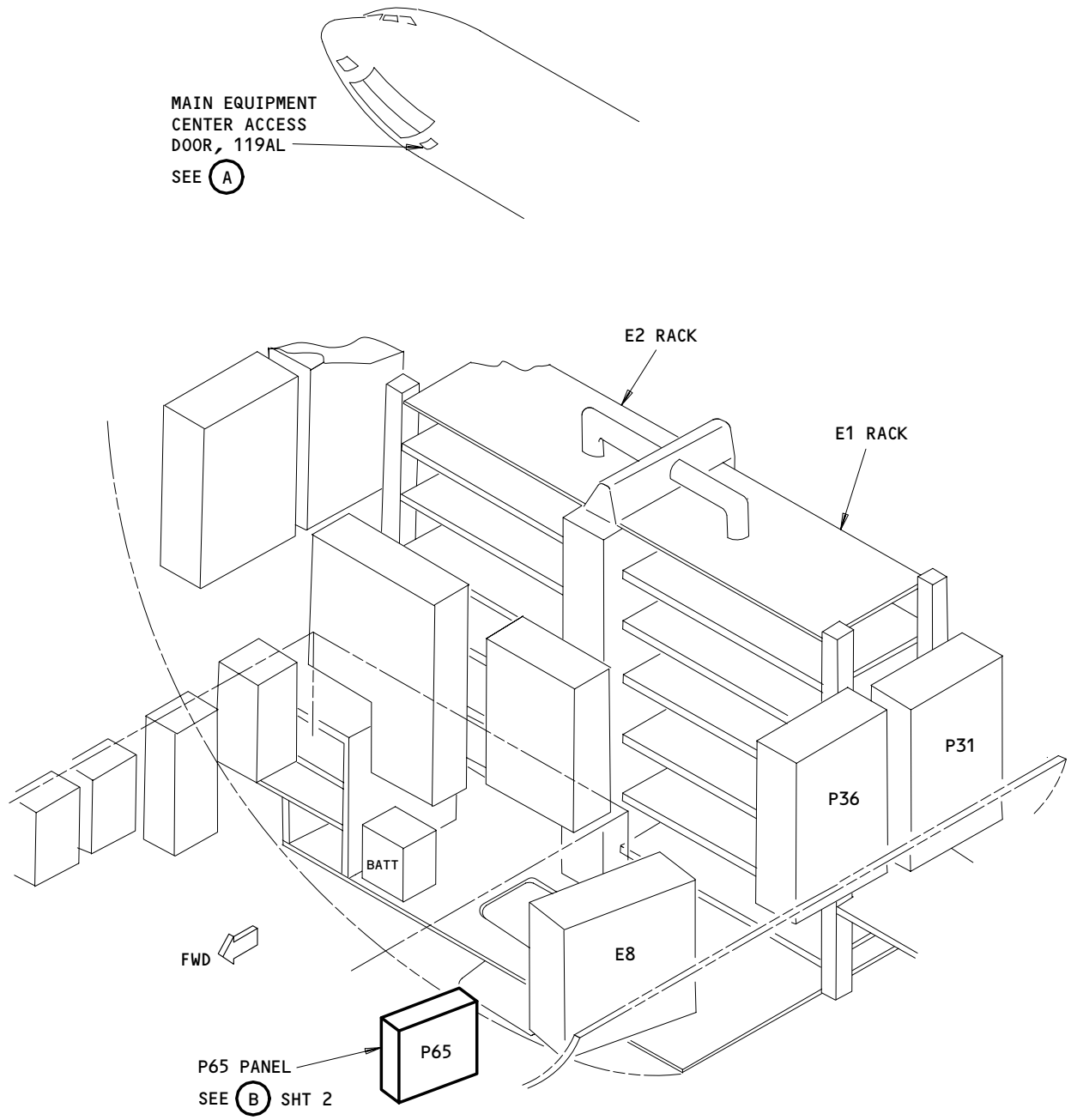

MAIN EQUIPMENT CENTER
A

Hydraulic Generator Power Panel, P65 - Component Location
Figure 102 (Sheet 1)

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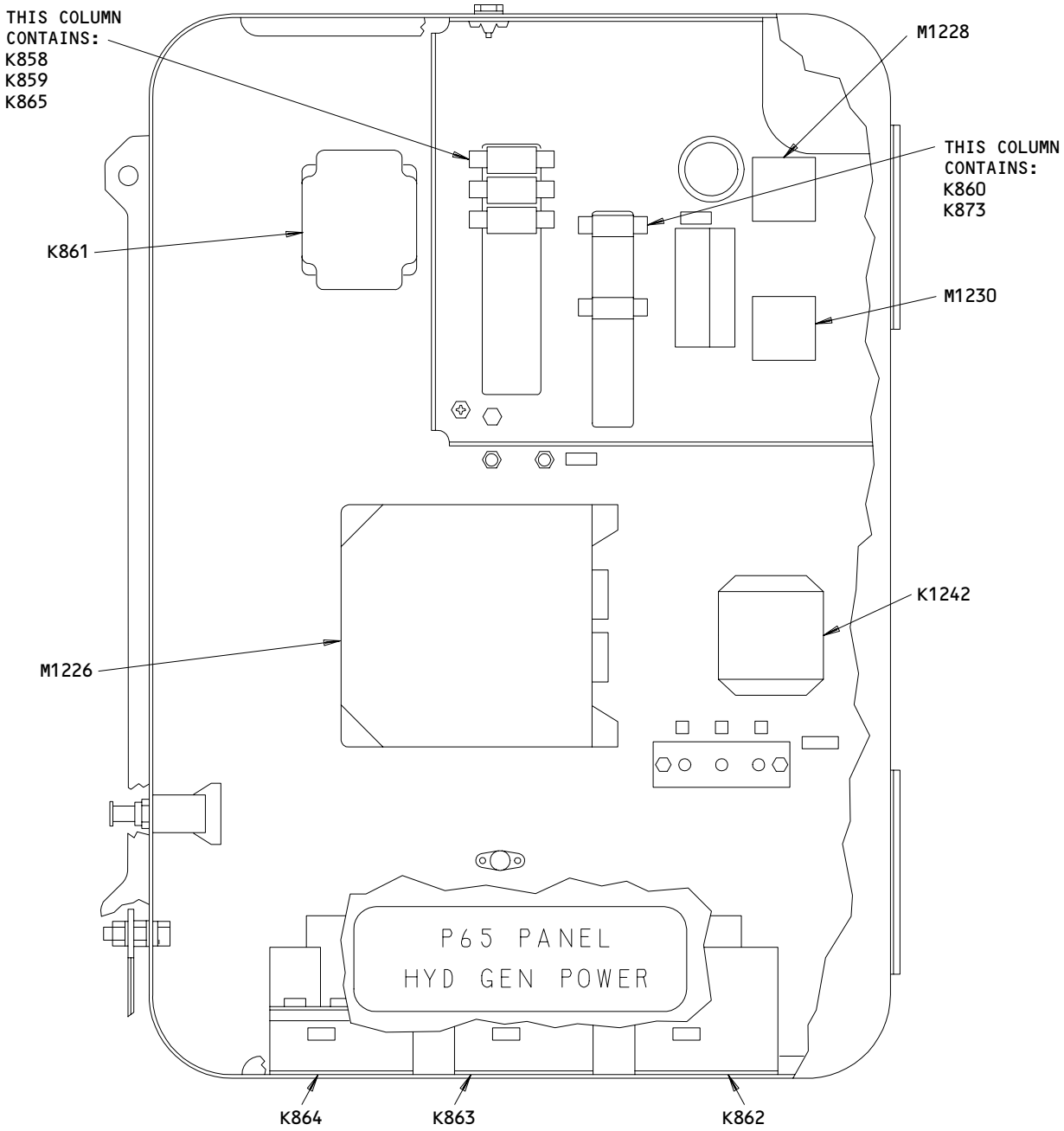

P65 PANEL
B

Hydraulic Generator Power Panel, P65 - Component Location (Detail from Sheet 1)
Figure 102 (Sheet 2)

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FORWARD LEFT MISCELLANEOUS ELECTRICAL PANEL, P87

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY -			119AL, MAIN EQUIP CTR, P87	
K1316		1	(A)	*
K1317		1	(A)	*
K1318		1	(A)	*
K1319		1	(A)	*
K1325		1	(A)	*
K1326		1	(A)	*
TERMINAL BLOCK -			119AL, MAIN EQUIP CTR	
TB454		1	(A)	*
TB456		1	(A)	*

* SEE THE WDM EQUIPMENT LIST

NOTE: THE (X) BELOW THE ACCESS/AREA REFERS TO THE VIEW SHOWN ON FIG. 102. THIS HELPS TO FIND THE COMPONENTS ON THE ILLUSTRATION. FOR EXAMPLE, (A) REFERS TO VIEW A.

Forward Left Miscellaneous Electrical Panel, P87 - Component Index
Figure 101

E97558
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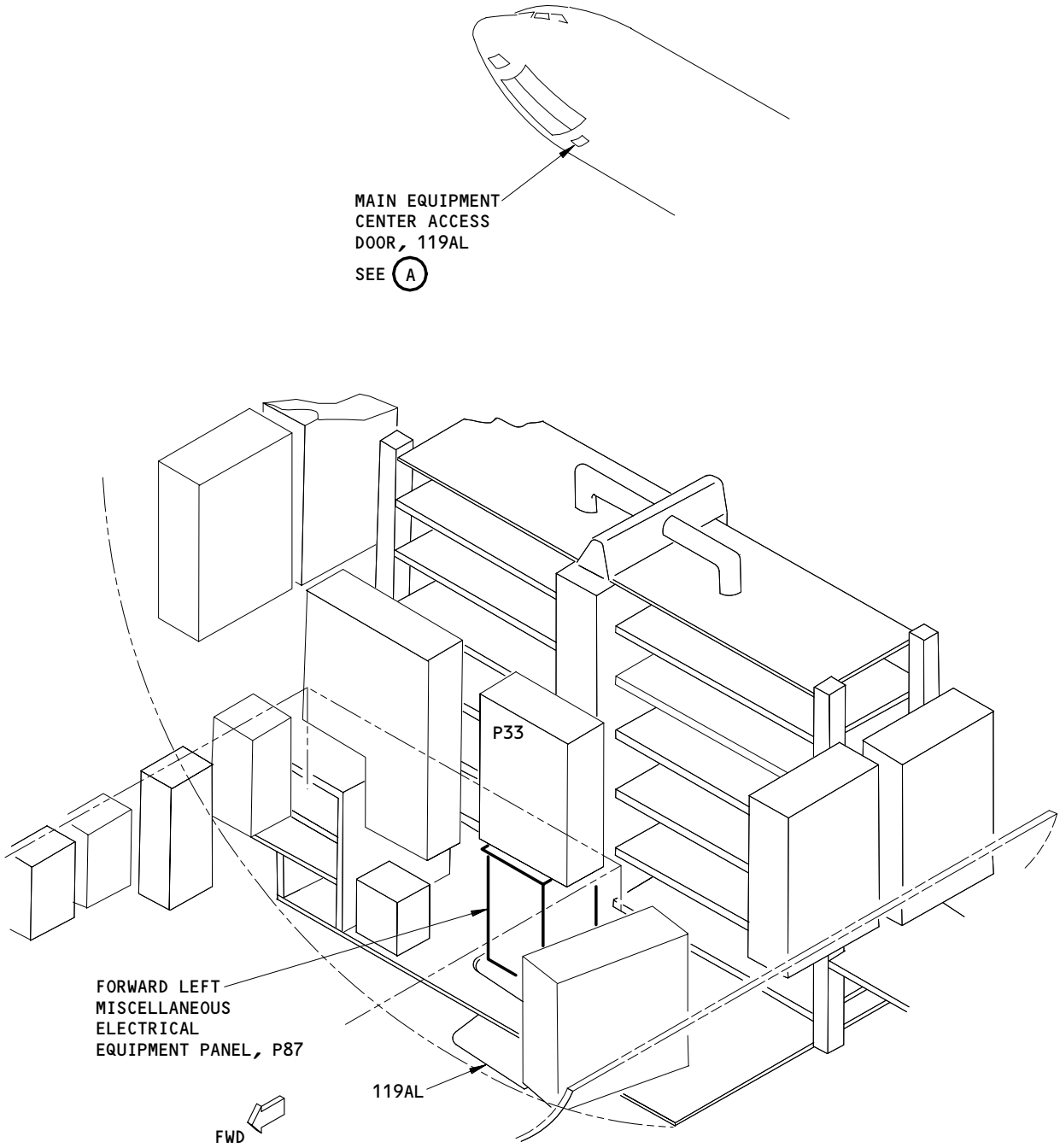

Forward Left Miscellaneous Electrical Equipment Panel, P87 - Component Location
Figure 102 (Sheet 1)

F14237
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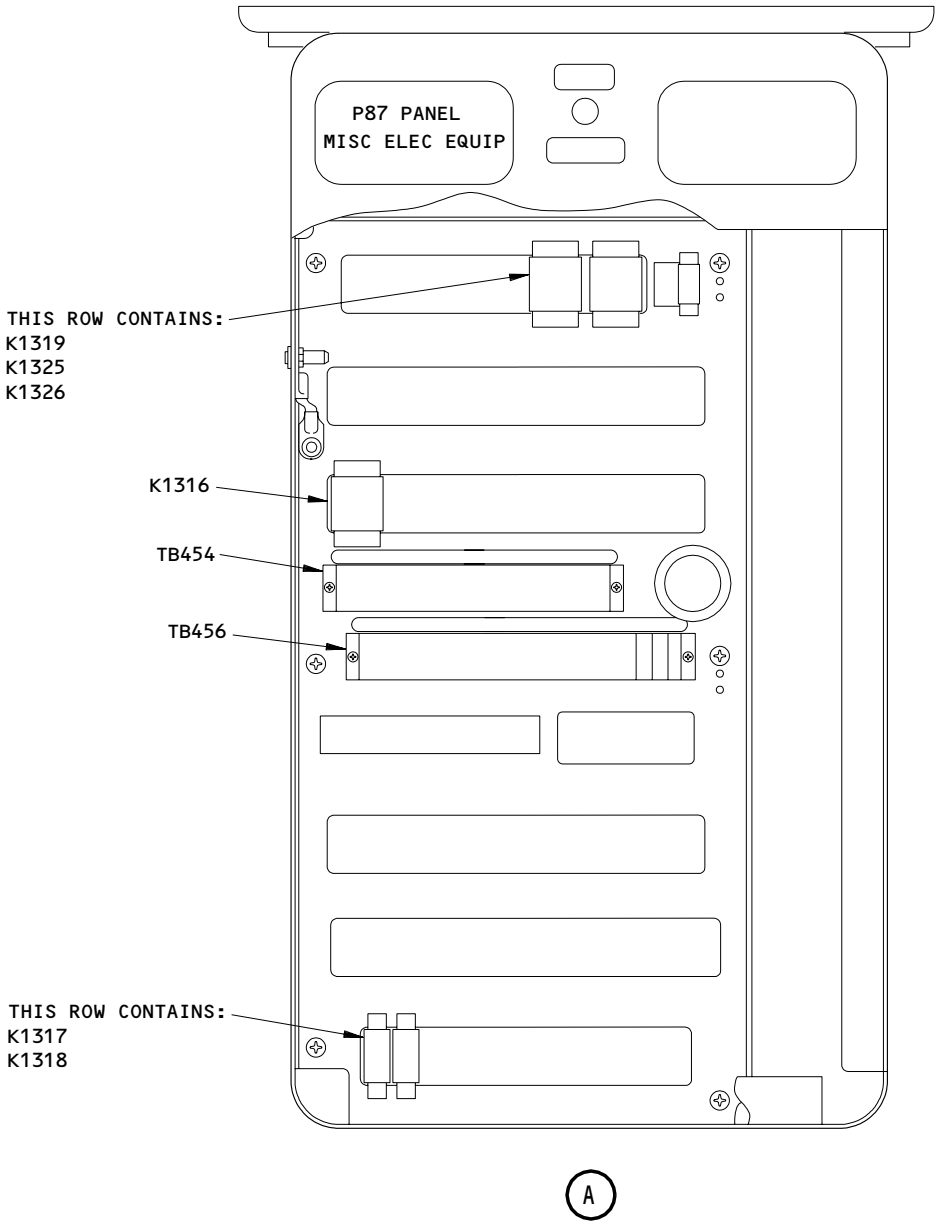

Forward Left Miscellaneous Electrical Panel, P87 - Component Location
Figure 102 (Sheet 2)

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CLOCKS - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The clocks provide the flight crew with a primary time reference. They display Greenwich Mean Time (GMT) continuously and when selected, elapsed time or chronograph time. There is one captain's and one first officer's clock. Both are identical.
   B. SAS 275, 276, 281-999;
      The clocks also provide the flight crew with the day, month, and year.
   C. SAS 001-274, 277-280;
      The clocks also provide GMT as a data output on an ARINC 429 digital data bus. The captain's clock provides GMT to the left flight management computer and the digital flight data acquisition unit (DFDAU). The first officer's clock provides GMT to the right flight management computer. The flight management computer control display units (FMC-CDU) display the clock's GMT output (AMM 34-61-00). The GMT output is provided in hours, minutes, and seconds. The time is accurate to ±1 second per 200 hours at 25°C unless power to the clock is interrupted.
   D. The clocks also provide GMT/DATE as a data output on an ARINC 429 digital data bus. The captain's clock provides GMT/DATE to the left flight management computer and the digital flight data acquisition unit (DFDAU). THe first officer's clock provides GMT/DATE to the right flight management computer. The flight management computer control display units (FMC-CDU) display the clock's GMT output (AMM 34-61-00). The GMT output is provided in hours, minutes, and seconds. The time is accurate to ±1 second per 200 hour at 25°C unless power to the clock is interrupted.
   E. SAS 275, 276, 281-999;
2. Component Details (Fig. 1)
   A. Clocks
      (1) The electronic clocks are located on the captain's and first officer's instrument panels, respectively. They are microprocessor controlled with two LCD displays, controls, and a sweep second hand.
      (2) The upper display (GMT) provides GMT continuously from 00 hours 00 minutes to 23 hours 59 minutes. The GMT display is controlled by the GMT switch or the SET switch. This switch is located in the lower corner of the indicator as follows:
         (a) The RUN setting of this switch is the normal operating position for the clock. GMT is shown continuously while in this mode.
         (b) The HLD (hold) setting is used to freeze the GMT display. Setting the switch to this position will hold the display at its present indicated value.
         (c) The SS (slow slew) or MS (minute slew) setting is used for slow slew operation. When set to this position, the seconds display is reset to zero. The minute display automatically advances at a rate of 1 minute/second. The hours display is frozen at its present indicated value.

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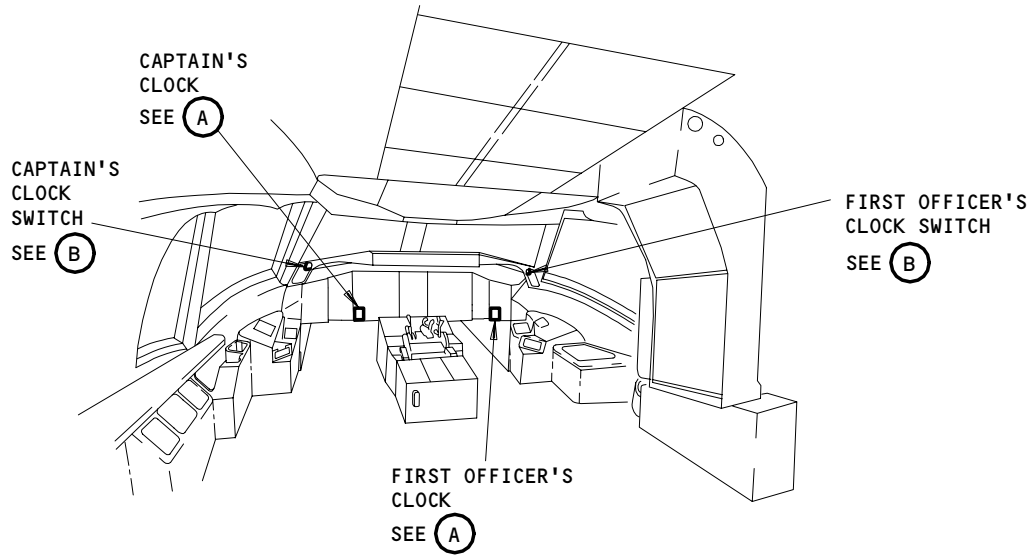
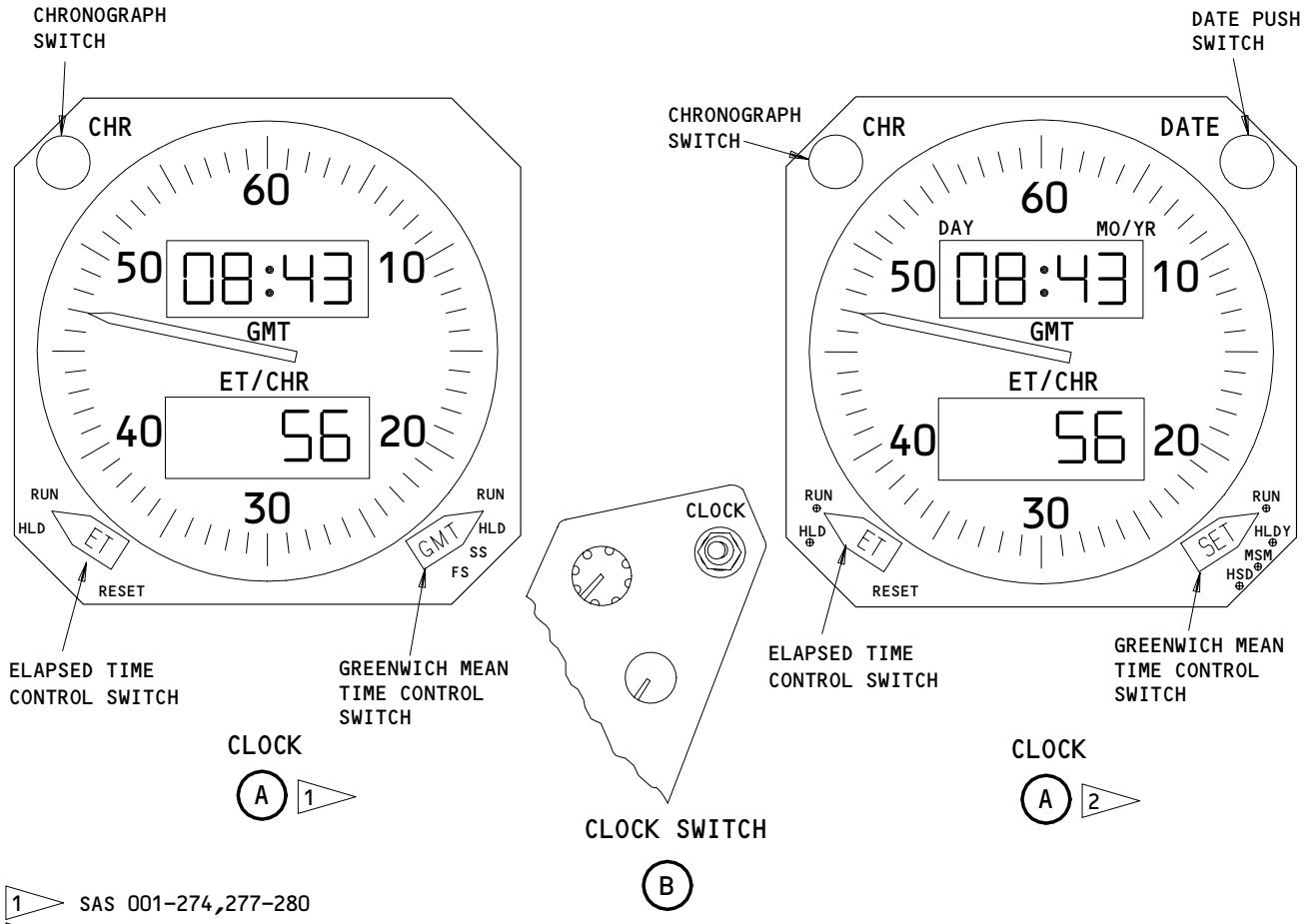


FLIGHT COMPARTMENT



Clocks - Component Location
Figure 1

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(d) The FS (fast slew) or the HS (hour slew) setting is used for fast slew operation. When in this position, the hours display automatically advances at a rate of 1 hour/second. The minutes display is frozen at its present indicated value.

(3) SAS 275, 276, 281-999;
Setting the date can be accomplished by the combined use of the SET switch and the pushbutton DATE switch. The day control function on the SET switch positions are: D, M, and Y, which are located adjacent to HS, MS, and HLD of the GMT control, respectively. Each function is operated as follows:
(a) The D setting is used for changing the day display. When in this position, the day display automatically advances at a rate of one day per second up to maximum value of 31, 30, 29, or 28 depending on the month setting and reincrementing from 01. The month display does not change.
(b) The M setting is used for changing month display. When in this position, the month display automatically advances at a rate of one month per second, up to maximum value of 12 and reincrementing from 01. The day display does not change.
(c) The Y setting is used for changing year display. Turning the SET switch to Y position will cause the two right hand digits to update one year per second up to maximun value of 99 and reincrementing from 00. The two left hand digits will be blank.

(4) The lower display provides elapsed time (ET) from 00 hours 00 minutes to 99 hours 59 minutes and chronographic time (CHR) from 00 minutes 00 seconds to 99 minutes 59 seconds. Control of this display is provided by the ET and CHR switches.

(5) The elapsed time (ET) control switch is located in the lower left corner. This switch operates as follows:
(a) In the RESET position, the ET display is blanked and the elapsed time indication is set to zero. The RESET position is spring loaded to return the switch to the HLD positon.
(b) The HLD (hold) position of the switch freezes the ET display at the present indicated value.
(c) In the RUN position, time is accumulated from the last hold or reset condition. The display automatically advances from this indicated value.

(6) The CHR switch is located in the upper left corner. This switch operates as follows:
(a) The first press of the switch starts the chronograph running.
(b) A second press of the switch freezes the chronograph display at the present indicated value.

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(c) A third press of the switch resets the CHR accumulator to zero. The contents of the ET accumulator is then displayed. If the ET accumulator contains zero, the elapsed time display is blanked and the sweep second hand goes to zero.

(d) Chronograph operation replaces the display of the elapsed time, but does not affect the internal operation of the ET accumulator.

B. Clock Switch

(1) The Captain's and F/O's CLOCK switches are located on either side of the glareshield (P7).

(2) The CHR and remote clock switches are connected in parallel and operate the chronograph display. Both switches cycle the chronograph through the start, hold and reset functions of the chronograph mode.

C. FMC

(1) The clock GMT output is displayed on the FMC-CDU's (AMM 34-61-00) POS INIT page. Since the FMC-CDUs have a cross-talk connection, they both use the same clock output. Both CDUs display GMT from the capt's clock, unless it has failed. For a capt's clock failure, both FMCs would then switch over automatically and the CDUs would display GMT from the F/O's clock. The FMC-CDU GMT hour display can be manually changed through the FMC, but the minutes and seconds will still be that which is received from the clocks.

3. Operation (Fig. 2)

A. Functional Description

(1) Power

(a) The 28 vdc hot battery bus operates the digital displays, the sweep second hand, and the time base electronics. The 28 vdc primary bus is monitored by the clock for failure.

(b) When primary dc power is interrupted, or it drops below 18V, or is lost, the LED in the voltage detector (optoisolator) dims or turns off. This causes the photo transistor to switch off informing the power supply that the primary dc power has failed.

(c) Loss of 28V dc primary power causes inactivation of all clock controls, blanks the display, and freezes the sweep second hand. When 28V dc primary power comes on again, all functions are restored to the correct times without loss of accuracy.

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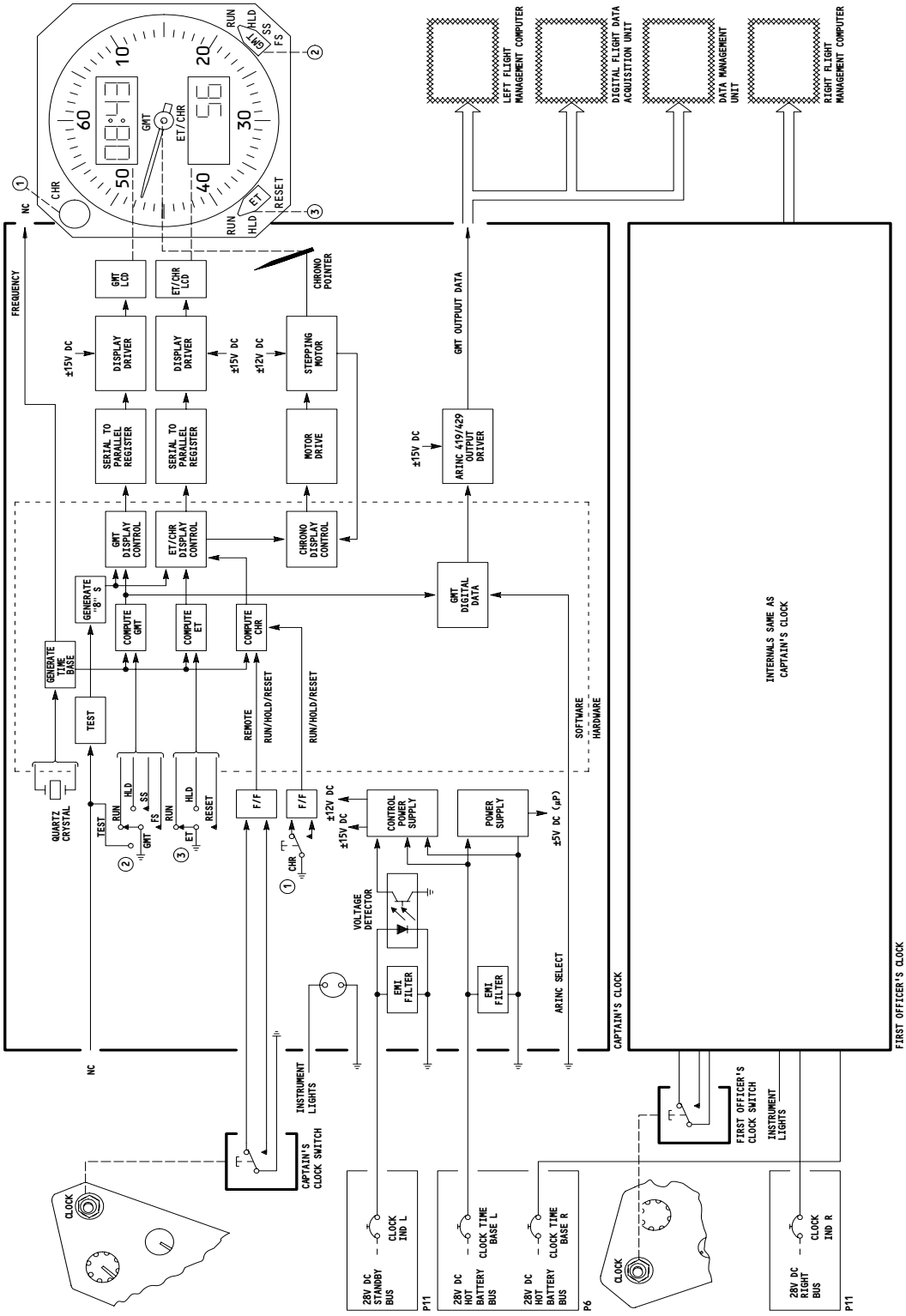

Clock Schematic
Figure 2 (Sheet 1)

581897

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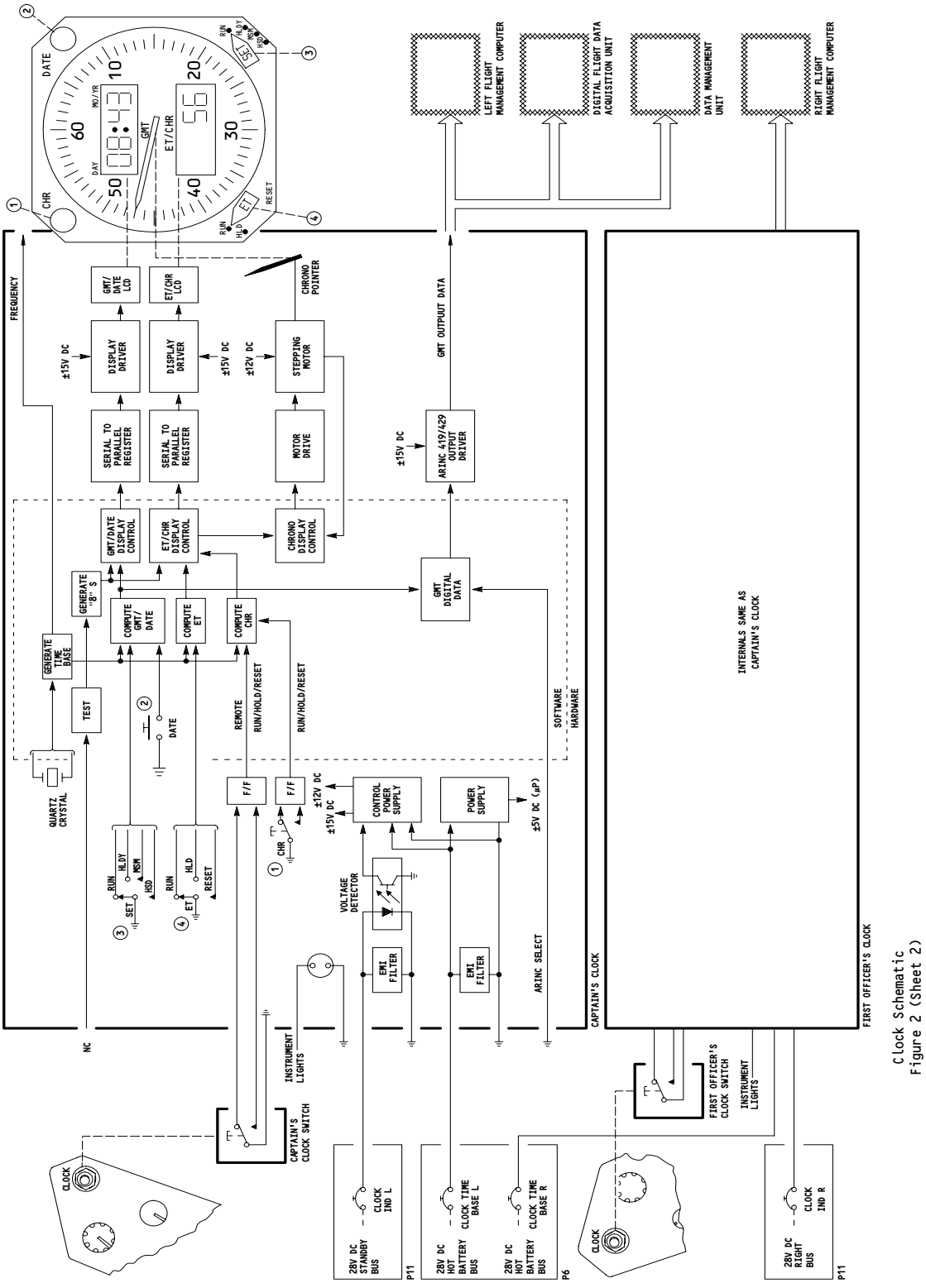

Clock Schematic
Figure 2 (Sheet 2)

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(d) Loss of back-up battery power for more than 200 ms disables all clock controls, indications, and outputs. When power comes on again, all functions return to zero. They hold at zero until the GMT control is turned to slew for a minimum of one count on the GMT display. This restores all functions to normal.

NOTE: Partial loss of battery power may cause the time base microprocessor to "latch up" such that the unit displays are blank when normal power is reapplied. If this occurs, the microprocessor can be reinitialized by cycling the time base battery bus circuit breakers. Clock reset can then be accomplished per par. 3.C.(1) thru (5) of this section.

(2) Clock

(a) A crystal controlled oscillator provides the time reference. The microprocessor, under software control, uses the oscillator signal to generate the time base. Computation of GMT, ET, and CHR time is done by software. Countdown functions produce hours, minutes, and seconds. Microprocessor output data is converted to serial form to drive the LCD's. With pin 16 floating, data is sent out in ARINC 429 digital format. Binary and BCD GMT data works are transmitted sequentially for a total of 10 words/sec. The chronograph pointer is driven by seconds data from the microprocessor using a stepping motor with a closed loop controller.

(b) The control switches provide electrical grounds for logic circuits in the microprocessor. The clock and CHR switches are latch (F/F) circuits to prevent interference from the switch contacts. Grounding the test pin (10) causes the seven segment display to show all 8's.

B. BITE

(1) All clock failures are indicated in the same manner. The clock displays go blank and the sweep second hand is frozen. In addition, transmission of GMT output data words is halted.

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C. Control
(1) Supply electrical power (AMM 24-22-00/201).
(2) Close the following main power distribution panel P6 circuit breakers:
(a) 6G3, CLOCK TIME BASE L
(b) 6G4, CLOCK TIME BASE R
(3) Close the following overhead panel P11 circuit breakers:
(a) 11B17, CLOCK IND L
(b) 11J36, CLOCK IND R
(4) Operate the GMT switch to control and display Greenwich Mean Time.
(5) SAS 275, 276, 281-999;
Press the DATE pushbutton to display DATE. To control DATE display press and hold DATE pushbutton and operate SET switch.
(6) Operate the ET switch to control and display Elapsed Time or operate the CHR switch or the remote CLOCK switch to display the Chronographic Time, as applicable.

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CLOCKS

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER -	--		FLT COMPT, P6	*
CLOCK TIME BASE L, C563		1	6G3	
CLOCK TIME BASE R, C576		1	6G4	*
CIRCUIT BREAKER -	--		FLT COMPT, P11	
CLOCK IND L, C573		1	11B17	*
CLOCK IND R, C574		1	11J36	*
CLOCK - CAPT, N2	--	1	FLT COMPT, P1	31-25-01
CLOCK - F/O, N42	--	1	FLT COMPT, P3	31-25-01
COMPUTER - (FIM 34-61-00/101)				
FLT MGT LEFT, M134				
FLT MGT RIGHT, M135				
SWITCH - CAPT CLOCK, S320	--	1	FLT COMPT, P7	31-25-01
SWITCH - F/O CLOCK, S321	--	1	FLT COMPT, P7	31-25-01
UNIT - (FIM 31-31-00/101)				
DGTL FLT DATA ACQ, M138				
UNIT - (FIM 31-35-00/101)				
DATA MGT, M1200				

* SEE THE WDM EQUIPMENT LIST

Clocks - Component Index
Figure 101

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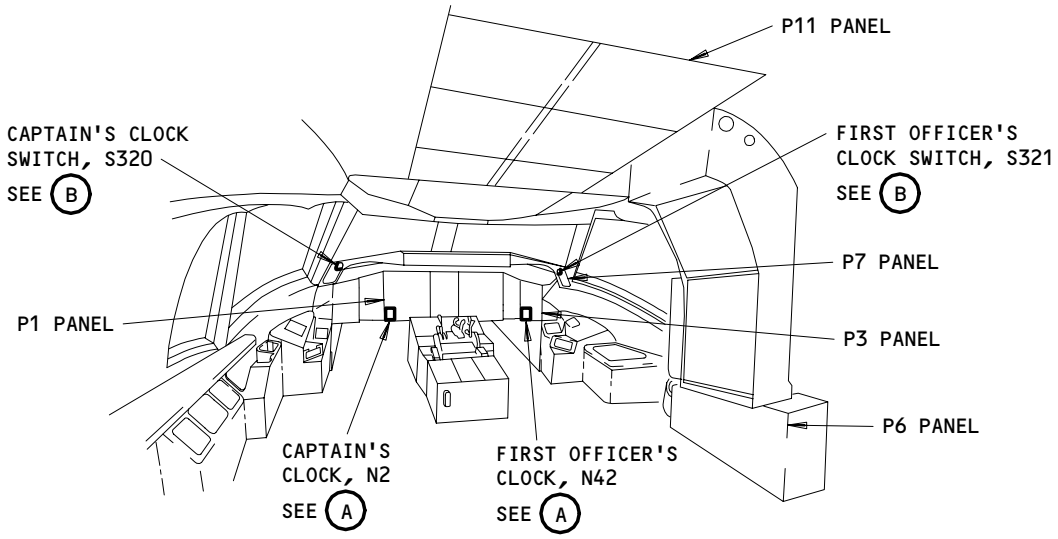
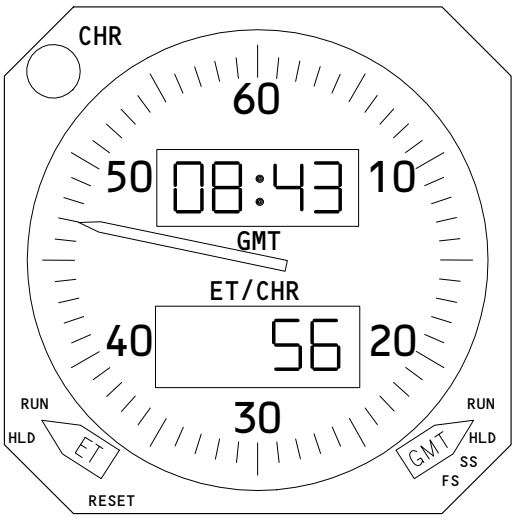
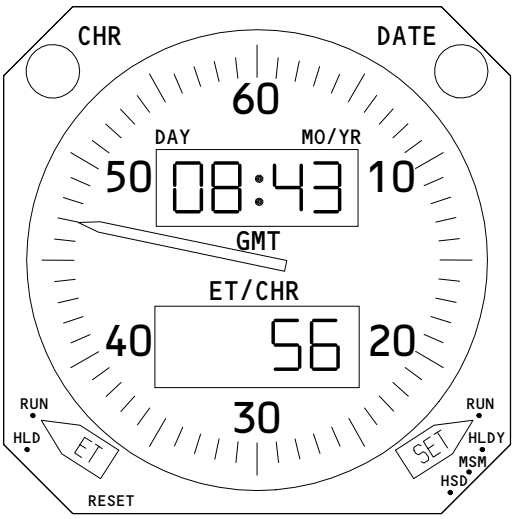


FLIGHT COMPARTMENT



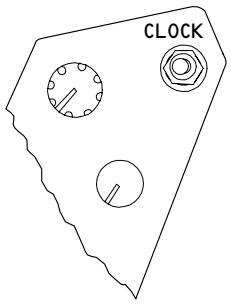
CLOCK N2,N42

A 1



CLOCK N2,N42

A 2



CLOCK SWITCH S320,S321

B

1 SAS 001-274,277-280

2 SAS 275,276,281-999

Clocks - Component Location
Figure 102

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CLOCKS - ADJUSTMENT/TEST

1. General
   A. This subject has one procedure: an operational test of the clocks.

   TASK 31-25-00-715-001

2. Operational Test - Clocks
   A. General
      (1) This task is an operational test to make sure the basic operation of each clock and its control works correctly. A system test is not required.
   B. Reference
      (1) AMM 24-22-00/201, Control (Power Supply)
   C. Access
      (1) Location Zone
          211 Flight Compartment (Left)
          212 Flight Compartment (right)

   D. Equipment
      (1) Stop Watch
   E. Preconditions

      S 865-223
      (1) These conditions are necessary for this task:
          (a) Electrical power is available (AMM 24-22-00/201).
   F. Prepare for Test

      S 865-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 865-003
      (2) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
          (a) 6G3, CLOCK TIME BASE L
          (b) 6G4, CLOCK TIME BASE R

      S 865-004
      (3) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tags:
          (a) 11B17, CLOCK IND L
          (b) 11J36, CLOCK IND R

      S 865-006
      (4) Make sure each clock display does not show.

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G. Captain's Clock Operational Test

NOTE: Wait 5 minutes before you proceed.

S 865-098
(1) Set the ET and the SET (or the GMT) controls on the captain's clock to the RUN position.

S 865-010
(2) Remove the DO-NOT-CLOSE tags and close this P6 panel circuit breaker:
(a) 6G3, CLOCK TIME BASE L

S 865-011
(3) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 11B17, CLOCK IND L

S 865-229
(4) On the overhead panel P5, push and hold the test switch on the captain's lighting control panel.

S 215-012
(5) Make sure the GMT and the ET/CHR shows all zeros on the display.

S 865-013
(6) Push in the CHR control switch on the upper left corner of the clock.

S 215-014
(7) Make sure the second hand does not move.

S 865-016
(8) Set the GMT control to the RUN position.

S 865-120
(9) SAS 001-274, 277-280;
Do the steps that follow:
(a) Set the clock GMT control to SS, until one digit appears on the clock GMT display.
(b) Set the GMT control to the RUN position.

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S 865-123
(10) SAS 275, 276, 281-999;
Do the steps that follow:
(a) Set the clock SET control to MS, until one digit appears on the clock GMT display.
(b) Set the SET control to the RUN position.

S 865-018
(11) Set the ET control switch to the RESET position.

S 865-017
(12) Let the ET control switch go back to the HLD position.

S 865-019
(13) Push the CHR switch once.

S 215-020
(14) Make sure the second hand operates and the ET/CHR shows only one zero.

S 865-021
(15) Push the CHR switch again.

S 215-022
(16) Make sure the second hand and the ET/CHR stops.

S 865-023
(17) Push the CHR switch again.

S 215-024
(18) Make sure the second hand goes back to zero.

S 865-025
(19) On the left glareshield, panel P7, push the captain's remote CLOCK switch.

S 215-026
(20) Make sure the second hand operates and the ET/CHR shows only one zero.

S 865-027
(21) Push the CLOCK switch again.

S 215-028
(22) Make sure the second hand and the ET/CHR display stops.

S 865-029
(23) Push the CLOCK switch again.

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S 215-030
(24) Make sure the second hand goes back to zero.

H. First Officer's Clock Operational Test

S 865-090
(1) Set the ET and the GMT or the SET control switch on the first officer's clock to the RUN position.

S 865-034
(2) Remove the DO-NOT-CLOSE tags and close the P6 panel circuit breaker:
(a) 6G4, CLOCK TIME BASE R

S 865-035
(3) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
(a) 11J36, CLOCK IND R

S 865-231
(4) On the overhead panel P5, push and hold the test switch on the captain's lighting control panel.

S 215-036
(5) Make sure the GMT and the ET/CHR shows all zeros on the clock.

S 865-037
(6) Push in the CHR control switch on the upper left corner of the clock.

S 215-038
(7) Make sure the second hand does not move.

S 865-126
(8) SAS 001-274, 277-280;
Do the steps that follow:
(a) Set the clock GMT control to SS, until one digit appears on the clock GMT display.
(b) Set the GMT control to the RUN position.

S 865-129
(9) SAS 275-276,281-999;
Do the steps that follow:
(a) Set the clock SET control to MS, until one digit appears on the clock GMT display.

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(b) Set the SET control to the RUN position.

S 865-041
(10) Set the ET control switch to the RESET position.

S 865-042
(11) Permit the ET control switch to go back to the HLD position.

S 865-043
(12) Push the CHR switch once.

S 215-044
(13) Make sure the second hand operates and the ET/CHR shows only one zero.

S 865-045
(14) Push the CHR control switch again.

S 215-046
(15) Make sure the second hand and the ET/CHR display stops.

S 865-047
(16) Push the CHR control switch again.

S 215-048
(17) Make sure the second hand goes back to zero.

S 865-049
(18) On the first officer's right glareshield panel P7, push the remote CLOCK switch.

S 215-050
(19) Make sure the second hand operates and the ET/CHR shows only one zero.

S 865-051
(20) Push the CLOCK switch again.

S 215-052
(21) Make sure the second hand and the ET/CHR display stops.

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S 865-053
(22) Push the CLOCK switch again.

S 215-108
(23) Make sure the second hand goes back to zero.

I. Elapsed Time Operational Test of All Clocks

S 865-070
(1) Set the ET control switch on the lower left corner of the clock to the RESET position.

S 215-071
(2) Make sure the ET/CHR display goes out of view.

S 865-072
(3) Set the ET control switch to the RUN position.

S 215-073
(4) Make sure the ET/CHR display reads 00:00.

S 865-074
(5) Do the elasped time operation again for the other clock.

J. SAS 275, 276, 281-999;
The DATE Operational Test

S 715-081
(1) Do the date test on the Captain's clock and the first officer's clock.
  (a) Make sure the GMT changes one time for each second.
  (b) Push the DATE switch on the clock.
    1) Make sure the DAY MO/YR display shows day and month.
  (c) Set the SET switch to D and start the stopwatch at the same time.
    1) Make sure the DAY MO/YR changes to 31 days when the stopwatch shows 30 to 32 seconds.

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2) Make sure the two right numbers stay constant.

(d) Put the SET switch to M.

1) Make sure the numbers of the DAY MO/YR change 12 months.

2) Make sure the stopwatch shows 11.5 to 12.5 seconds.

3) Make sure the two DAY numbers stay the same.

(e) Put the SET switch to Y.

1) Make sure the numbers of the DAY MO/YR display change 99 years.

2) Make sure the stopwatch shows 11.5 to 12.5 seconds.

3) Make sure the two DAY numbers do not show.

(f) Put the SET switch to RUN.

(g) Push the DATE switch on the clock.

K. Put the Airplane Back to Its Usual Condition

S 715-228

(1) Push the DATE switch on the clock.

(a) Make sure the time shows agin.

S 865-107

(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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CLOCKS - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks:
      The first task is the removal of a clock.
      The second task is the installation of a clock.

   TASK 31-25-01-004-001

2. Remove the Clock
   A. Access
      (1) Location Zones
          211 Flight Compartment (Left)
          212 Flight Compartment (Right)

   B. Procedure

      S 864-002
      (1) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
          (a) For the left clock:
              1) 6G3, CLOCK TIME BASE L
          (b) For the right clock:
              1) 6G4, CLOCK TIME BASE R

      S 864-003
      (2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) For the left clock:
              1) 11B17, CLOCK IND L
          (b) For the right clock:
              1) 11J36, CLOCK IND R

      S 034-004
      (3) Loosen the clamp screws that hold the clock.

      S 024-005
      (4) Move the clock out of the panel.

      S 034-006
      (5) Disconnect the electrical cable.

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S 024-007
(6) Remove the clock from the panel.

TASK 31-25-01-404-008

3. Install the Clock

A. Reference
(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 31-25-00/501, Adjustment Test

B. Access
(1) Location Zones
211 Flight Compartment (Left)
212 Flight Compartment (Right)

C. Procedure

S 864-009
(1) Make sure these P6 panel circuit breakers are open:
(a) For the left clock:
1) 6G3, CLOCK TIME BASE L
(b) For the right clock:
1) 6G4, CLOCK TIME BASE R

S 864-011
(2) Make sure these P11 panel circuit breakers are open:
(a) For the left clock:
1) 11B17, CLOCK IND L
(b) For the right clock:
1) 11J36, CLOCK IND R

S 434-012
(3) Connect the electrical cable to the clock.

S 424-013
(4) Move the clock into the panel.

S 434-014
(5) Tighten the clamp screws that hold the clock.

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S 864-015

(6) Supply electrical power (AMM 24-22-00/201).

S 864-016

(7) Remove the DO-NOT-CLOSE tags and close the P6 panel circuit breakers:
   (a) For the left clock:
      1) 6G3, CLOCK TIME BASE L
   (b) For right clock:
      1) 6G4, CLOCK TIME BASE R

S 864-017

(8) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
   (a) For left clock:
      1) 11B17, CLOCK IND L
   (b) For the right clock:
      1) 11J36, CLOCK IND R

S 714-043

(9) Make sure the clock display comes on.

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D. Put the airplane back to Its Usual Condition.

S 864-042

(1) Do the steps in this task to adjust the time and date on the clock: Clocks - Operational Test (MM 31-25-00/501).

S 864-021

(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FLIGHT DATA RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The digital flight data recorder system records selected flight parameters that includes FAA mandatory parameters. The recorded data contains the last 25 hour of the airplane operation.
   B. The system consists of a digital flight data acquisition unit (DFDAU) and a digital flight data recorder (DFDR). It also consists of a flight recorder control panel, an accelerometer, relays and sensors.
      (1) ALL MTH AIRPLANES;
      SAS 155-999;
      The system also contains a control display unit (CDU).
   C. All input signals are connected to the DFDAU. The DFDAU conditions the input signals to produce a digital output which is sent to the DFDR for recording. The recorded data is stored in a crash protected container inside the DFDR.
   D. The system is turned on automatically when the airplane is in flight, or on the ground when an engine is running. The system is also turned on manually or tested by means of a toggle switch on the flight recorder control panel.
   E. The BITE operation in the flight recorder system is monitored continuously. System failures are shown on the FRCP, the DFDAU, and the Engine Indication and Crew Alerting System (EICAS).
   F. ALL MTH AIRPLANES;
   SAS 155-999;
   A brief description about the Airplane Conditioning Monitoring System are as follows:
      (1) The Flight Data Recorder System (FDRS) is closely interrelated with the Airplane Condition Monitoring System (ACMS) (Ref 31-35-00). Both systems monitor and record airplane flight parameters.
      (2) The DFDAU receives all FAA mandatory parameters and sends them to the DFDR for recording and to the Data Management Unit (DMU) where they are reformatted. The DMU transmits these parameters along with additional parameters it receives to the Quick Access Recorder (QAR) for storage and to the printer.
      (3) The Control Display Unit provides the means for inserting documentary data into DMU and retrieving data from the DMU as well.
2. Component Details (Fig. 1)
   A. Flight Recorder Control Panel
      (1) The flight recorder control panel (FRCP) provides system manual power control and indicates system status. The control panel consists of a function (ON-NORM-TEST) switch, a relay and OFF annunciator.

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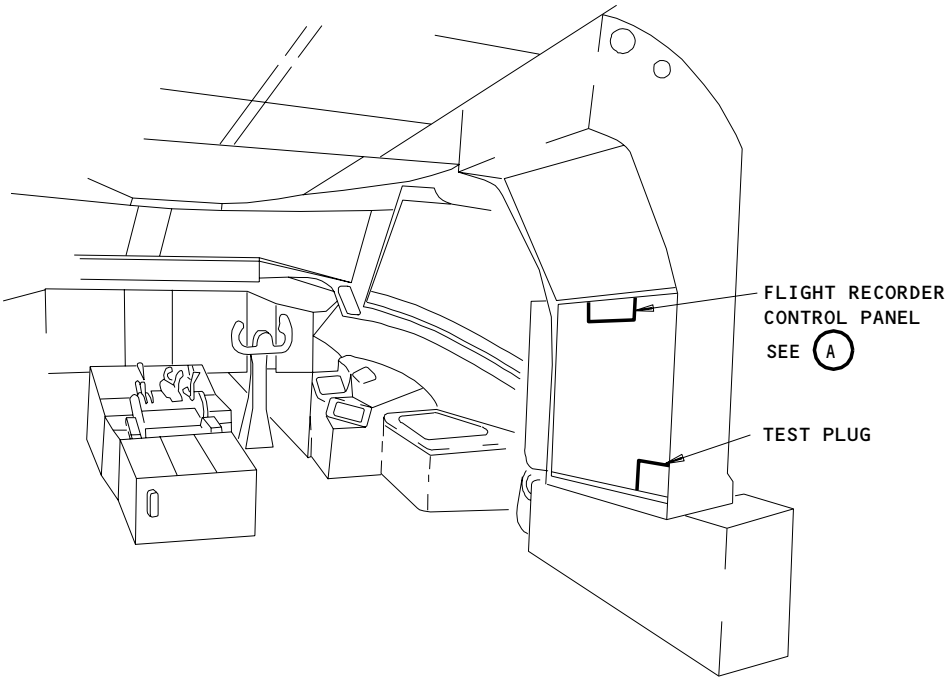
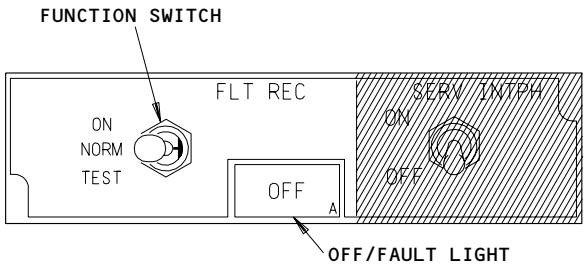


FLIGHT COMPARTMENT



FLIGHT RECORDER CONTROL PANEL
A

Flight Data Recorder System Component Location
Figure 1 (Sheet 1)

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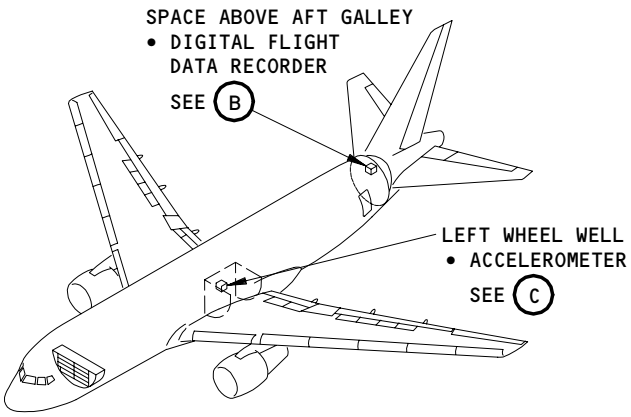
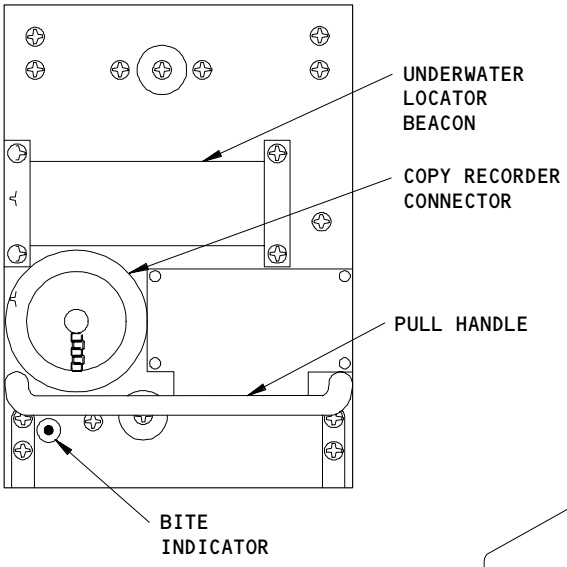
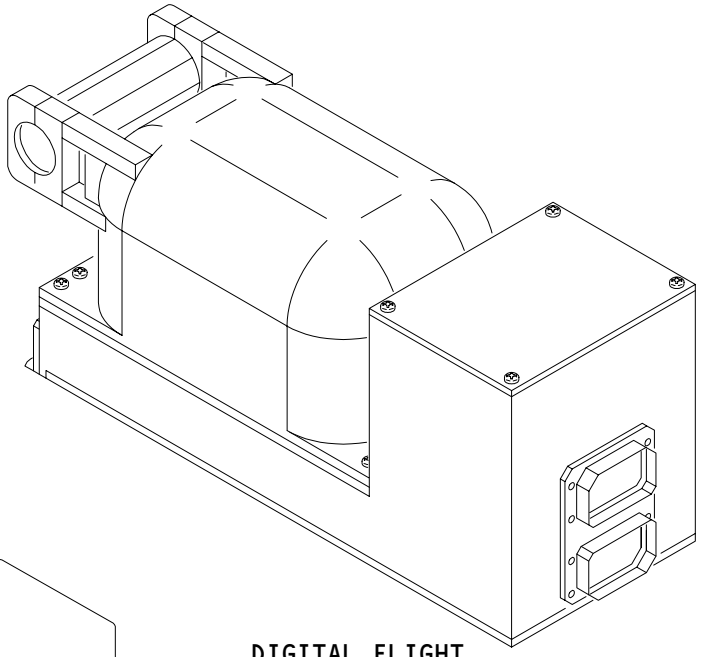
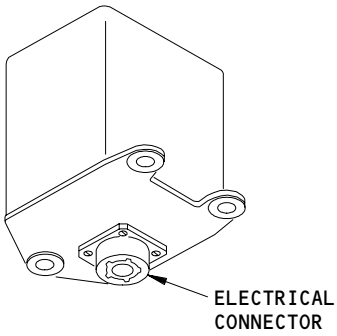




DIGITAL FLIGHT DATA RECORDER
B 1



DIGITAL FLIGHT DATA RECORDER
B 2



ACCELEROMETER
C

1 SAS 050-280
2 SAS 281-999

Flight Data Recorder System - Component Location
Figure 1 (Sheet 2)

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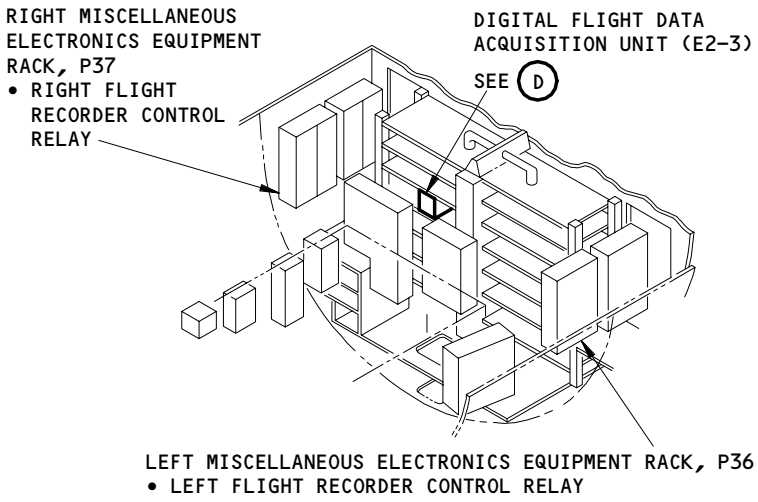
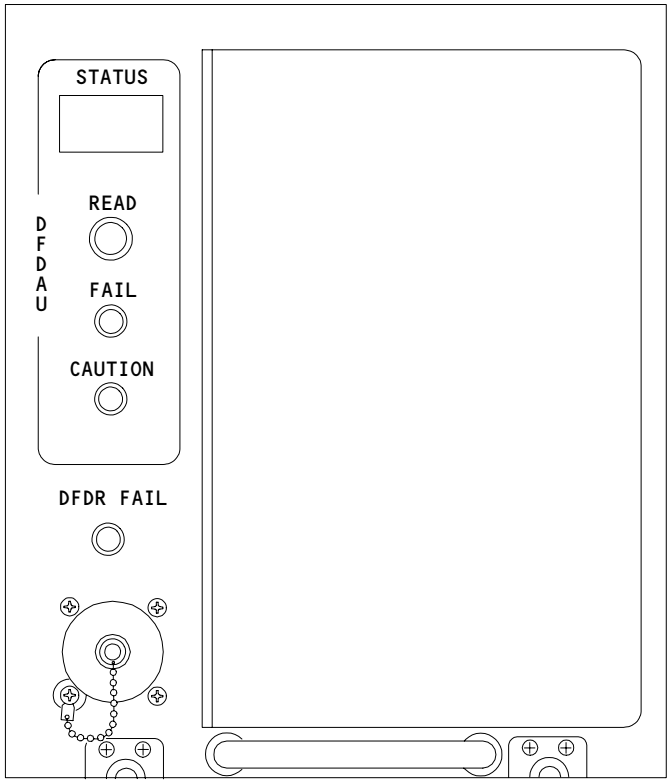


MAIN EQUIPMENT CENTER



DIGITAL FLIGHT DATA AQUISITION UNIT

(D)

Flight Data Recorder System – Component Location
Figure 1 (Sheet 3)

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(2) The function switch is normally set to the NORM position. In this position, power to the system is automatically controlled through the system power relays. The ON position is used manually to turn on the DFDR. The TEST position is spring-loaded and is used to turn on power to the DFDAU and the DFDR for testing purposes.

(3) The OFF light on the FRCP comes on when the DFDR and/or the FDAU fails, the system is not turned on, or in the absence of electrical power.

B. Accelerometer

(1) The accelerometer provides vertical, lateral, and longitudinal acceleration signals to the DFDAU. The accelerometer measures vertical acceleration from -3G to +6G. It measures lateral and longitudinal accelerations from -1G to +1G.

C. Flight Recorder System Relays

(1) The flight recorder system relays include the left and right FLIGHT REC CONT relays, SYS NO. 2 AIR/GND relay, the FLT REC ADC I/P SW relay, and the FLT REC EFIS I/P SWITCHING relay. The FLIGHT REC CONT relays provide AC power to the DFDR and DFDAU when the corresponding engine is running. The SYS NO. 2 AIR/GND relay also provides AC power to the DFDR and DFDAU when the airplane is airborne. The FLT REC ADC I/P SW and EFIS I/P SWITCHING relays select the ADC and EFIS inputs to the DFDAU either from normal or alternate source as selected by the captain.

D. Digital Flight Data Acquisition Unit

(1) The DFDAU is a microprocessor controlled unit that sequentially receives specific data from various airplane systems and sensors. The acquired data is scaled and formatted into a digital data format. The DFDAU outputs this data to the DFDR for recording.

(2) The function of the FDAU are as follows:

(a) A READ switch, an ATE connector, fault indicators and a fault display are located on the front panel of the DFDAU. The READ switch is used to display stored fault codes in the fault display. These fault codes are used for bench maintenance. The READ switch is also used to test the fault indicators. ATE connector is provided to connect external test equipment. The DFDAU FAIL and DFDR FAIL lights come on to indicate that the corresponding component has failed. The CAUTION light comes on if the DFDAU input circuits are at fault.

(3) The DFDAU coding and aircraft ident shorting receptacles are located behind the DFDAU. Access is through the partition from the forward cargo compartment.

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E. Digital Flight Data Recorder (DFDR)
   (1) SAS 050-280;
   The DFDR records the data output by the DFDAU. Data from the last 25 hours of operation is stored on 1/4-inch wide magnetic tape. The tape is located in a crash-proof container within the DFDR.
   (2) SAS 281-999;
   The flight data recorder writes the data for the last 25 hours of airplane operation. The data is stored in solid state memory. The solid state memory is in a crash proof container in the flight data recorder.
   (3) The DFDR is installed on the voice and flight recorder rack E7. This rack is located above the aft galley ceiling. The exterior of the DFDR is painted bright orange and has reflective tape affixed to it to aid in its location in the event of an accident.
   (4) The front panel of the DFDR contains an underwater locater beacon and a connector for retrieving data from the DFDR. The connector for retrieving data from the DFDR allows the airline to inspect the data on the DFDR.

F. Underwater Locator Beacon
   (1) The underwater locator beacon (ULB) aids in location of a submerged DFDR by sending out an acoustic signal when the unit is submerged in water.
   (2) The ULB is contained in a cylindrical watertight case designed to withstand high impact shock and deep water immersion. It is mounted on the front panel of the DFDR.
   (3) The ULB battery is designed to operate for at least 30 days when immersed. It will withstand water depths of 20,000 feet and has a maximum detection range of 2,000 to 4,000 yards depending upon exposure and sea state.

G. ALL MTH AIRPLANES;
   SAS 155-999;
   Control Display Unit (CDU)
   (1) The CDU (AMM 34-61-00) provides controls and keys for inserting documentary data into the DMU and requesting data display of any DFDAU and DMU parameters. It also provides the means to request a print command for printout on the printer. The CDU consists of a keyboard, function switches, and a data display.

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(2) To check the Aircraft Identification, (A/C ID) the user can go to the MENU on theCDU display and select the Line Select Key (LSK) as follows:
(a) Select DFDAU.
(b) Select ACQUISITION.
(c) Select A/C ID.
(d) The AIRCRAFT ID will appear on the CDU display.

3. Operation

A. Functional Description (Fig. 2)

(1) Power Distribution and Control

(a) During normal operation, ac power is supplied to the flight recorder system through the left and right flight recorder control relays. The relays are wired in parallel so that any one relay can provide power to the DFDR.

(b) The left and right flight control relays are actuated when the corresponding engine is first started. The engine ignition switches and fuel control switches control the operation. At engine start, when an engine ignition switch is first turned on, the corresponding flight control relay (left or right) is energized. After the fuel control switch is set to RUN, it will cause the flight recorder control relay to remain energized after the ignition switch is selected to OFF. The relays remain energized until the fuel control switches are set to CUTOFF.

(c) The system No. 2 AIR/GND relay is also wired in parallel with the flight recorder control relays to provide power to the flight recorder system. This relay de-energizes when the airplane becomes airborne, resulting in a contact closure that provides an additional means to maintain power to the system during flight.

(d) Manual power switching is accomplished with the ON-NORM-TEST switch on the flight recorder control panel. During normal operation, the switch is set to NORM and power is controlled by the automatic switching network. When the switch is set to either ON or to the momentary TEST position, power is supplied to the system.

(e) The OFF light on the flight recorder control panel is a status indictor. It is controlled by the status relay within the control panel. When the flight recorder system is powered and no faults exist, the status relay is energized and the OFF light is off. 28v dc from the DFDR system status output and a ground from the DFDAU BITE output energizes the relay. If power is interrupted or if a system fault occurs, the network opens, the status relay de-energizes and the OFF light comes on.

(2) Parameter Inputs

(a) The DFDAU receives inputs from sensors and signals from other airplane systems. The inputs are grouped as analog, discrete, and ARINC 429 digital inputs.

(b) Accelerometer Input

1) The accelerometer receives 28-volt dc power from the DFDAU.

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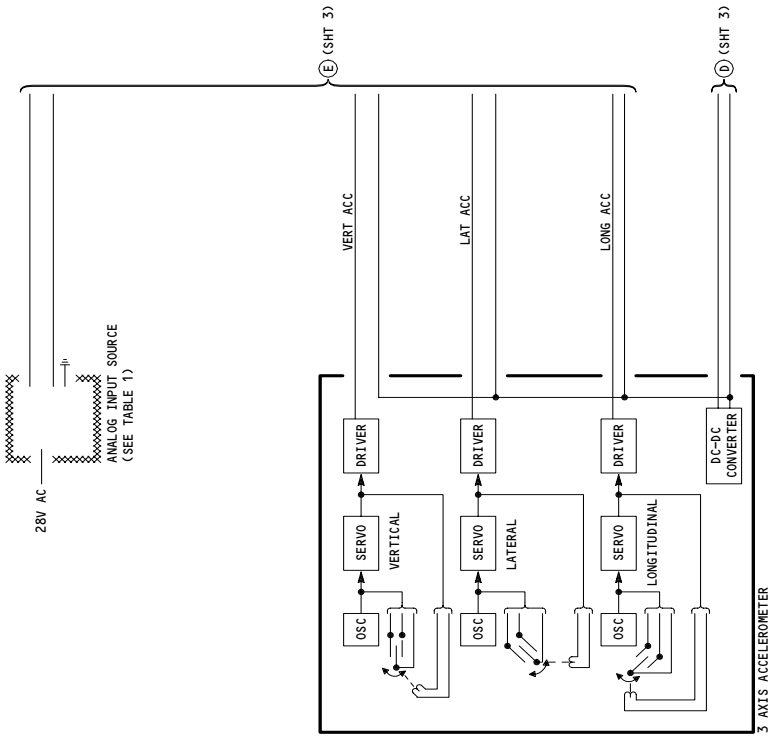
TABLE 1	
DATA	TYPE
TE FLAP POSITION - RO	SYNCHRO
TE FLAP POSITION - LO	SYNCHRO
TE FLAP POSITION - RI	LLDC
TE FLAP POSITION - LI	LLDC
HORIZ STAB POSN	SYNCHRO
RUDDER PEDAL POSN	SYNCHRO
CONT WHEEL POSN	SYNCHRO
CONT COLUMN POSN	SYNCHRO
CABIN PRESSURE	LLDC
FLAP HANDLE POSN	LLDC
CABIN PRESS O/F VALVE POSN	DCVR
APPLIED BRAKE PRESS - R MAIN	ACVR 2
APPLIED BRAKE PRESS - R ALT	ACVR 2
APPLIED BRAKE PRESS - L MAIN	ACVR 2
APPLIED BRAKE PRESS - L ALT	ACVR 2
FUEL TEMP	VAR RESISTANCE
CONTROL COLUMN FORCE - L	ACVR
CONTROL COLUMN FORCE - R	ACVR
CONTROL WHEEL FORCE - L	ACVR
SYNCHRO REF B	REF



Flight Data Recorder System Schematic
Figure 2 (Sheet 1)

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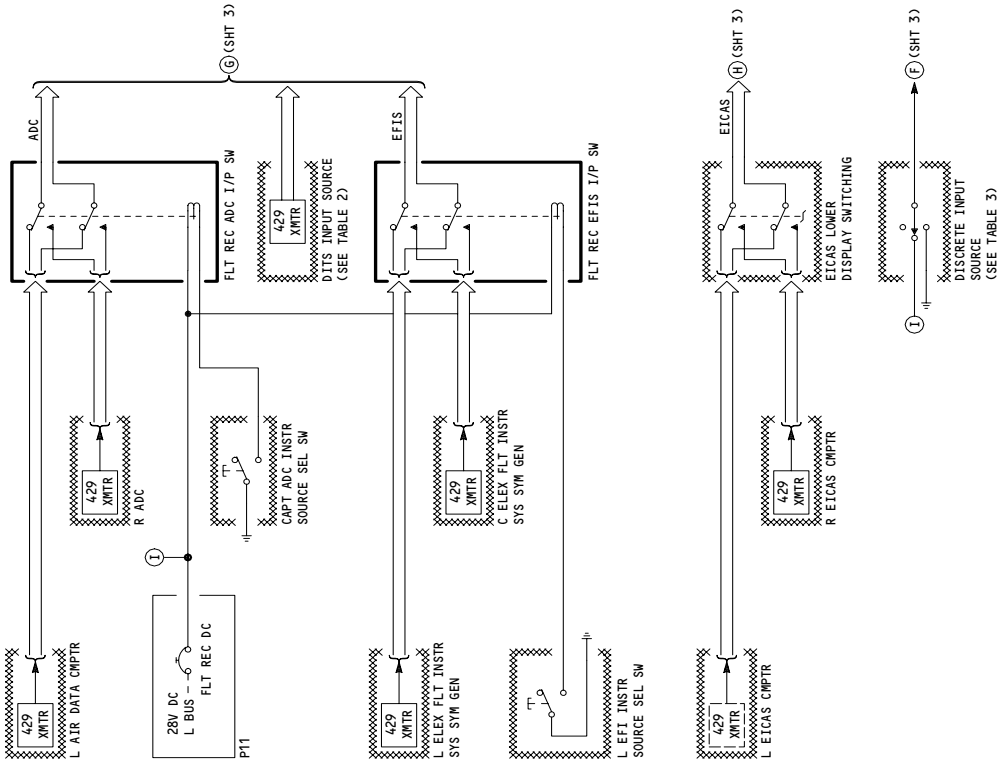
TABLE 2
DITS INPUT SOURCE
L FCC
TMC
CLOCK (GMT)
L DME
R DME
EEC – L CHAN A OR CHAN B
EEC – R CHAN A OR CHAN B
L FMC BUS D
R ILS
L ILS
L RA
R RA
C RA
GPWC
FCC – MCP
R – FMC BUS D
L – IRU

TABLE 3
DISCRETE INPUT SOURCE
L YAW DAMPER ENGAGE
R YAW DAMPER ENGAGE
L HF KEY
R HF KEY
L VHF KEY
R VHF KEY
C VHF KEY
L STICK SHAKER
R STICK SHAKER
SPOILER 1L MOD
SPOILER 2L MOD
SPOILER 3L MOD
SPOILER 1R MOD
SPOILER 2R MOD
SPOILER 3R MOD
L OUT SLATS EXT
L IN SLATS EXT
SLATS ALL FULL
SLATS AGREE
R OUT SLATS EXT
R IN SLATS EXT
SLATS ALL PART
APU AIR OPEN RLY
APU AIR HOSE RLY
APU INLET DOOR RLY
L EEC CHAN SEL
R EEC CHAN SEL
L TRIM UP
L TRIM DOWN
R TRIM UP
R TRIM DOWN

TABLE 3 (CONT)
DISCRETE INPUT SOURCE
EVENT MARKER
EICAS CMPTR SEL
NOSE GEAR SQUAT SW
L GEAR TILTED
R GEAR TILTED
IN AIR
L BRAKE PEDAL
R BRAKE PEDAL
AUTO. BRK RTO
AUTO. BRK DISARM
AUTO. BRK 2
AUTO. BRK 4
AUTO. BRK OFF
AUTO. BRK 1
AUTO. BRK 3
AUTO. BRK MAX
NOSE GEAR DN/LOCKED
R GEAR DN/LOCKED
LDG GEAR LEV UP
LDG GEAR LEV DN
L ADC SW POS
R ADC SW POS
ALTITUDE ADV
L EFIS SW POS
L FMC SW POS
R FMC SW POS
L IRS SW POS
R IRS SW POS
R EFIS SW POS
MIDDLE MARKER
OUTER MARKER
INNER MARKER
APU AIR INLET DR ACTR STA
VIB FILTER SEL
L ENG START
R ENG START
DFDR BITE
L ENG START VALVE
R ENG START VALVE
APU START
CAPT'S MASTER WARNING
F/O'S MASTER WARNING



Flight Data Recorder System Schematic
Figure 2 (Sheet 2)

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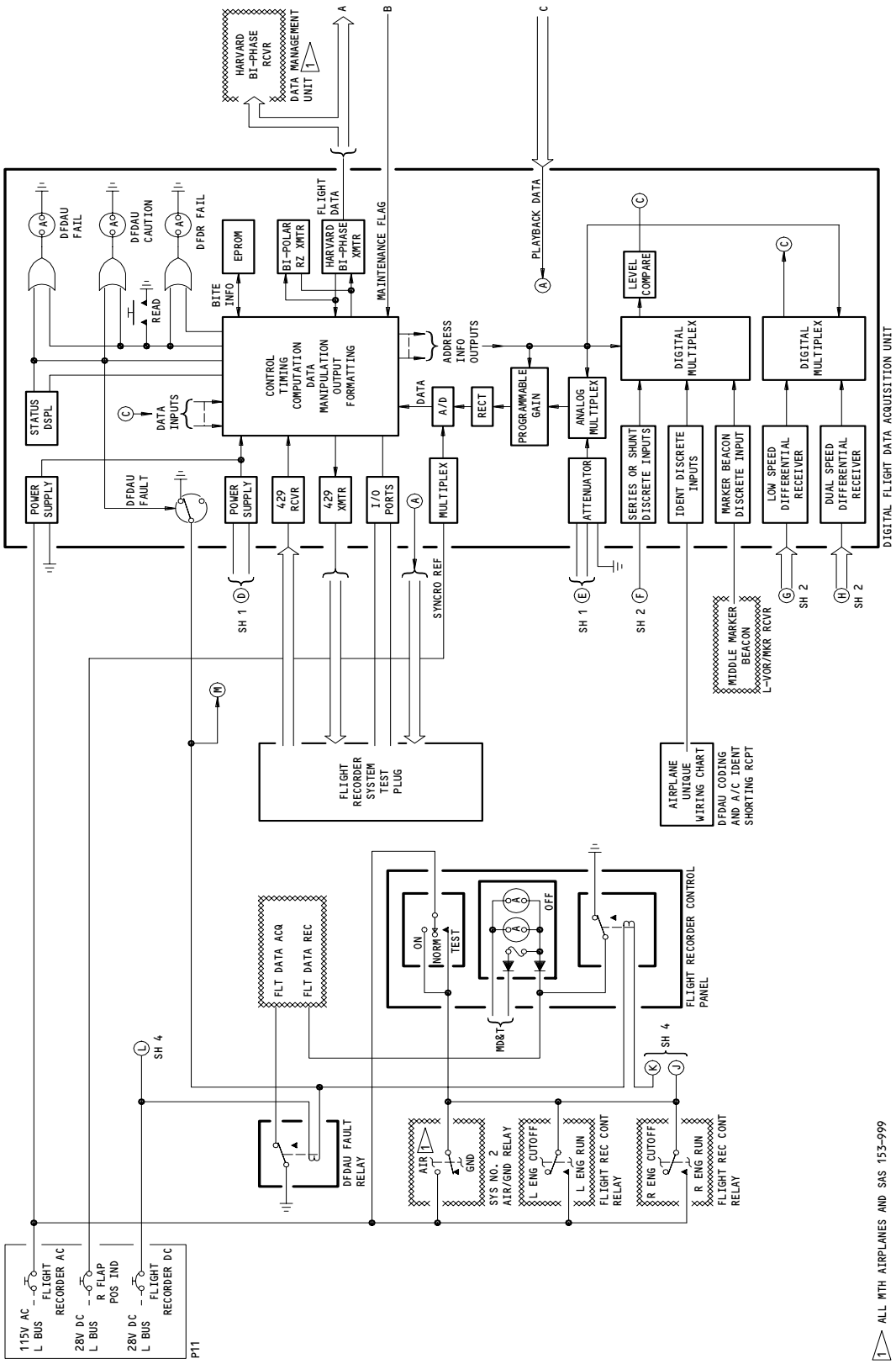

Flight Data Recorder System Schematic
Figure 2 (Sheet 3)

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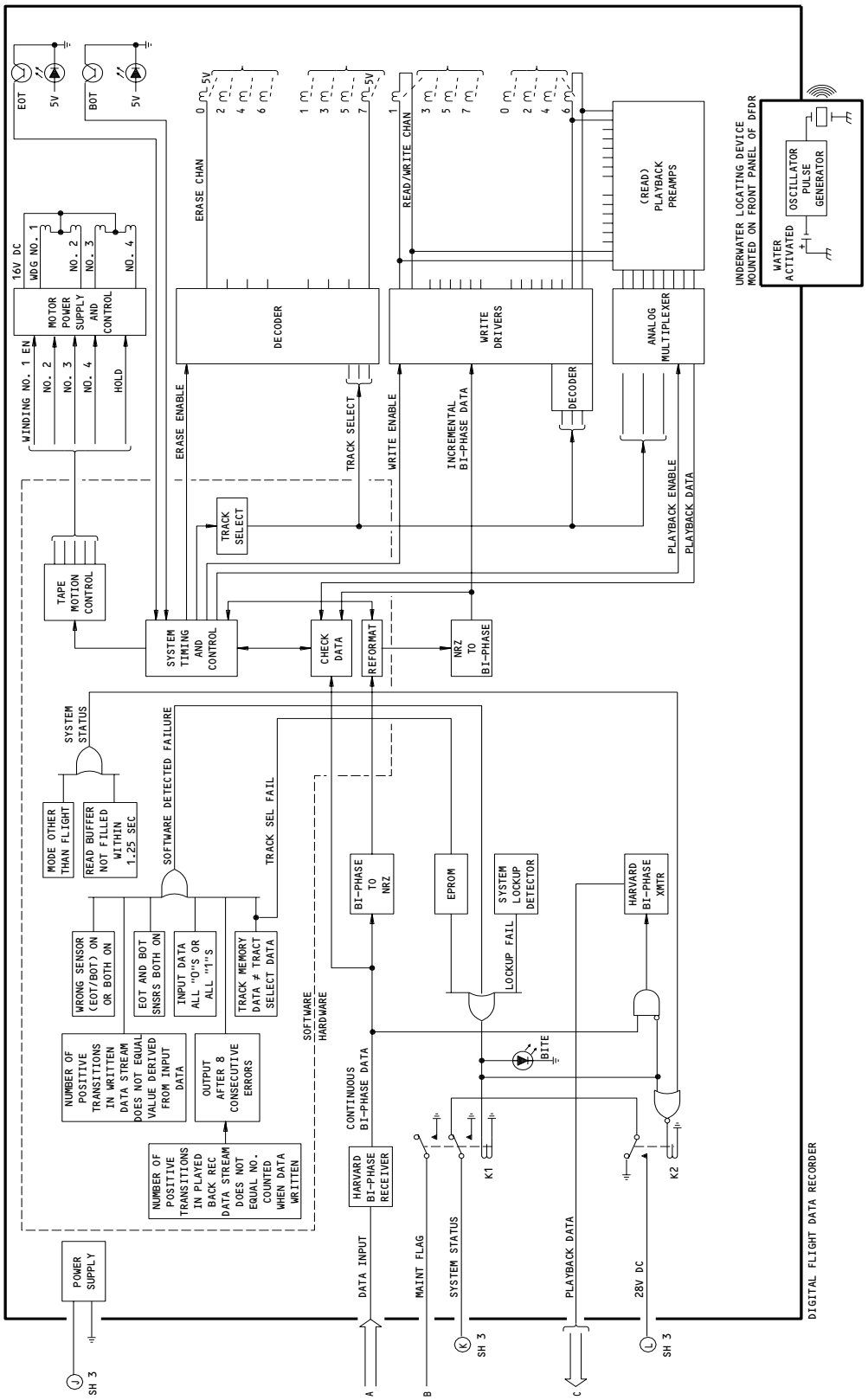

Flight Data Recorder System Schematic
Figure 2 (Sheet 4)

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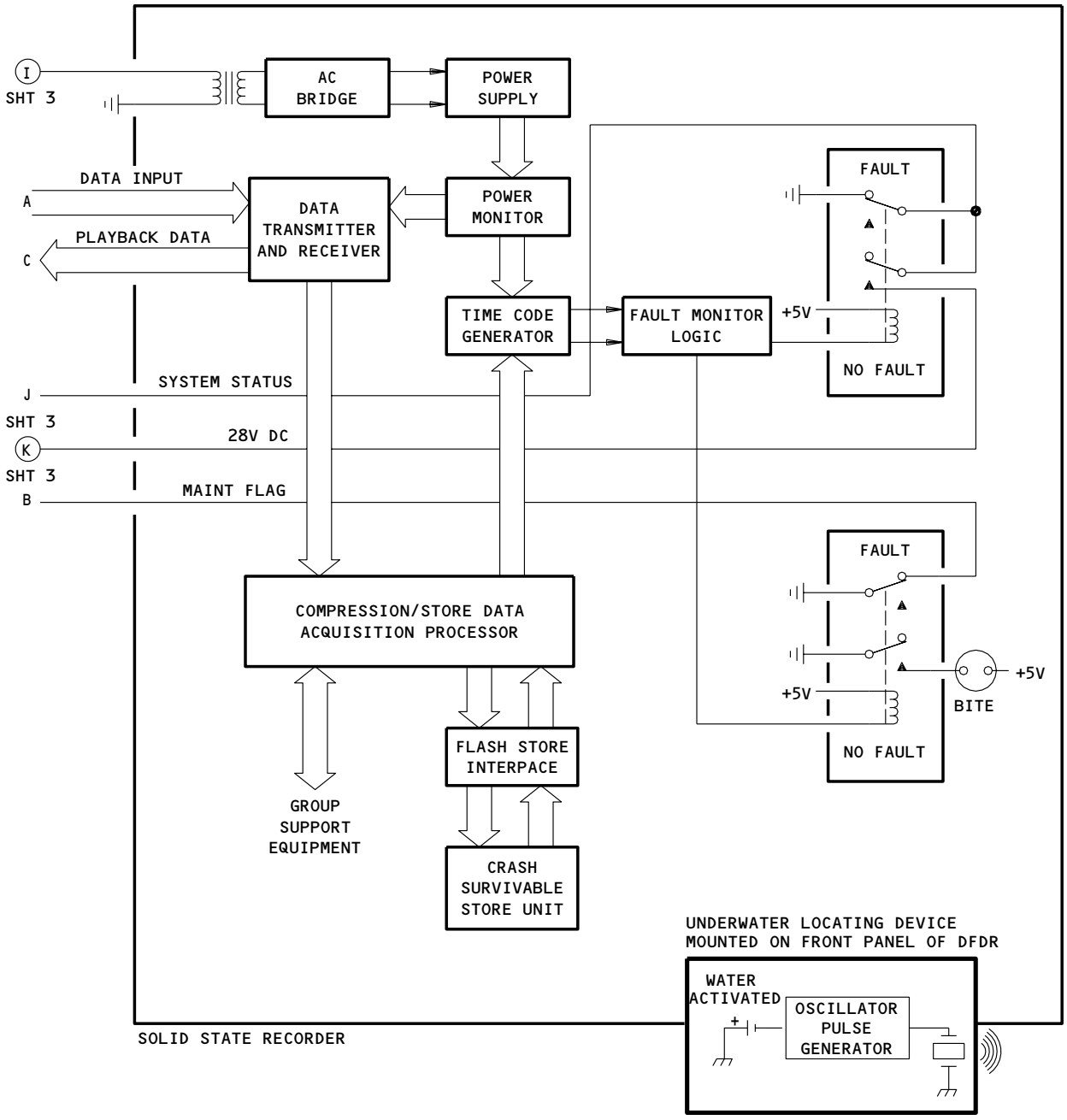

Flight Data Recorder System Schematic
Figure 2 (Sheet 5)

E74447

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2) The unit consists of three independent accelerometers, one for each axis. Each accelerometer operates as a closed loop servo system that is responsive to linear acceleration along its sensitive axis. An applied acceleration results in a force on a seismic pendulum which disturbs the servos capacitive balanced bridge. As a result of this imbalance, the servo applies current to a torquer coil to return the pendulum to its original position. A sensing resistor in series with the torquer coil, provides a voltage that is proportional to the acceleration input. The voltage is then amplified and output to the DFDAU.

(c) ARINC 429 Digital Information Transfer System (DITS) Inputs

1) The EICAS provides the following signals to the DFDAU:
   a) Left and right elevator position
   b) Left and right inboard aileron position
   c) Left and right outboard aileron position
   d) Left and right rudder position
   e) Left and right thrust reverser position
2) The electronic engine control (EEC) provides the following signals to the DFDAU:
   a) Engine Pressure Ratio (EPR)
   b) Engine N1 RPM
3) The ADC provides altitude and airspeed signals.
4) The EFIS provides pitch and roll attitude, and magnetic heading signals.
5) The IRU provides vertical speed signals.
6) The left FCC provides flight direction signals to the DFDAU.
7) The fuel quantity processing unit provides fuel quantity signals.
8) The captain's clock provides GMT signal.
9) Yaw Damper provides a yaw damper engaged signal.

(3) Digital Flight Data Acquisition Unit Function

(a) The DFDAU receives 115v ac power from the FLIGHT RECORDER AC circuit breaker through either the manual or automatic switching circuits. The DFDAU contains a switching regulator power supply that generates the necessary internal voltages and provides excitation outputs as follows:
   1) 28v dc for accelerometer excitation.
   2) 5v dc for potentiometer sensor excitation.
   3) Constant current sources for temperature probe excitation.

(b) The DFDAU receives the flight parameters to be recorded. It processes and formats the signals. It then transmits the data to the DFDR for recording. Data acquisition, signal processing and output data streams are controlled by the central processing unit (CPU).

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(c) Each analog input signal is fed into an isolation network that adjusts the input level. A CPU controlled multiplexer selects one channel at a time for signal processing when it is required for output to the DFDR. The selected input signal then passes through a CPU controlled conditioner that demodulates and scales the signal prior to A/D conversion. The A/D network converts the signal into a 12 bit binary word for further processing by the CPU. Calibration of the analog interface is accomplished automatically by processing a known simulated input signal and revising the signal conditioner gain and offset constants as necessary.

(d) Each discrete input enters the DFDAU through a buffer network. When this signal is required for output to the DFDR, it is seleted by the CPU controlled multiplexer. The selected input signal then passes through a comparator that threshold compares the signal against a logical 1 and logical 0 criteria. The signal is next converted to CPU compatible levels for further processing.

(e) Each digital information transfer system (DITS) input signal enters by a pair of differential comparators that encode the data in a format suitable for processing. The channels are then selected by a multiplexer which is controlled by the DITS channel sequencer.

(f) The digital information transfer system (DITS) input signals are coded in ARINC 429 digital data format and come either at low speed or high speed. Four of the DITS input channels have the capability to accept either high or low speed ARINC 429 data while the rest of the channels accept only low speed data. Each DITS input signal enters by a pair of differential comparators that encode the data in a format suitable for processing. The channels are then selected by a multiplexer which is controlled by a DITS channel sequencer. The label is read from the incoming data word to identify whether or not the data is utilized by the DFDAU. When a word is accepted, the data is stored in the DITS data RAM in a specific location based on input port and label. The CPU then samples the appropriate location in the DITS data RAM to obtain parameter data for output.

(g) The CPU acquires the input data from the analog and discrete input multiplexers and from the DITS data RAM. The CPU formats the data in 12 bit words that are output in a serial data stream. The output data is bussed to a harvard bi-phase transmitter for output to the DFDR.

(h) ALL MTH AIRPLANES;
SAS 155-999;
The output data is also bussed to a bi-polar transmitter for output to the ACMS recorder.

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(i) The DFDAU BITE continuously performs internal circuit checks as soon as power is applied. A BITE detected fault is output in a status word to the DFDR and stored in a non-volatile memory for access by shop test equipment. The stored fault data provides a history of intermittent faults as well as identifying current faults. Current faults are indicated by the fault indicator on the DFDAU's front panel. Current faults are also output to the flight recorder panel to turn the OFF light on and to the EICAS for message generation.

(4) SAS 050-280;
DFDR Function

(a) The DFDR receives 115v ac power from the FLIGHT RECORDER AC circuit breaker through either the manual or automatic switching network. The DFDR contains a regulated power supply that generates the necessary operating voltages.

(b) The DFDR receives flight data from the DFDAU in a 768 bit per second harvard bi-phase format. The data is converted to NRZ format and one second data blocks are alternately stored in two 768 bit blocks of RAM. Data from one block of RAM is converted back to harvard bi-phase format, written on the tape and verified for proper recording. At the same time, the other block of RAM is storing information.

(c) The data is sequentially recorded on either tape tracks to achieve a 25 hour history of airplane operation. Two four track erase heads and two four track read/write heads are used for recording and playback. The proper read/write and erase channels are selected under CPU control based upon the track being recorded and/or operational mode. In the recording mode, the CPU monitors EOT and BOT sensors to initiate track changes at the completion of recording on each track. When the EOT/BOT sensor is detected, the direction of tape travel is changed and the next track is selected for recording. Data that identifies the track being recorded is stored in NVM so that in the event of power interruption, recording can continue on the same track after power is restored.

(d) The tape transport is driven by a CPU controlled stepper motor. When operating in the recording mode, the tape is sequentially step driven two increments forward and one increment backward. During the first forward increment, the previously recorded data block is read and verified. During the second forward increment, the 768 bit data is written on the tape. The tape is next driven backward one increment in preparation for the next cycle.

(e) The playback data is routed to the DFDR front panel connector and to the DFDAU for output to a flight deck test connector. This enables the transfer of the recorded data to a portable copy recorder for ground processing. All eight channels are transferred simultaneously.

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(f) A primary function of the BITE is to monitor the recording verification that is accomplished during each step. The BITE also monitors tape motion, EOT and BOT sensors, track select, presence of input data, and CPU lock-up. The occurrence of any BITE failure, except for loss of input data, results in the BITE LED on the DFDR's front panel being lit. A fault signal is also sent to the DFDAU, flight recorder control panel and to EICAS.

(5) SAS 281-999;
DFDR function

(a) The DFDR receives 115v ac power from the FLIGHT RECORDER AC circuit breaker through either the manual or automatic switching network. The DFDR contains a regulated power supply that generates the necessary operating voltages.

(b) The data is sequentially recorded on a flash memory chip to achieve a 25 hour history of airplane operation. Each chip has an associated chip enable, output enable, and write enable.

(c) The Non - Volatile Memory (NVM) is a electrically eraseable programmable read only memory used for storing BITE messages generated during BIT. An elapsed time indicator, repair history, bad memory locations, and pointers to the most recent data are also stored. The NVM will not lose data after power has been removed.

(d) The playback data is routed to the DFDR front panel connector and to the DFDAU for output to a flight deck test connector.

(6) Underwater Locator Beacon

(a) The underwater locator beacon is powered by a self contained battery. The ULB is activated when its water switch is immersed in water. The water switch is part of a low-current trigger circuit that turns on the oscillator circuit. The oscillator output drives a transducer that is mechanically coupled to the units case, radiating 37 kHz acoustic energy into the surrounding water. It sends out acoustic rf pulses when it is immersed in water up to 20,000 feet. It has a detection range of 2,000 to 4,000 yards.

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(7) System Self Test

(a) A system self test may be performed by momentarily setting the function switch on the control panel to the TEST position. The OFF light will extinguish if no fault is detected. The OFF light and the relevant fault lights on the DFDAU and DFDR will stay on if a failure exists.

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FLIGHT DATA RECORDER SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACCELEROMETER – FLIGHT RECORDER, TS28	2	1	LEFT WHEEL WELL	31-31-05
BEACON – UNDERWATER LOCATOR	2	1	AFT PASS. CABIN, E7	31-31-02
CIRCUIT BREAKER –	1		FLT COMPT, P11	
ACMS AC POWER, C643		1	11J4	*
ACMS SENSOR, C572		1	11J6	*
FLIGHT RECORDER AC, C561		1	11J7	*
FLIGHT RECORDER DC, C578		1	11J8	*
DIODE – R267		1	119AL, MAIN EQUIP CTR, E2-3	*
PANEL – FLIGHT RECORDER CONTROL, M33	1	1	FLT COMPT, P61	31-31-04
PLUG – TEST, M968	1	1	FLT COMPT, P8	*
PRINTER – (FIM 31-35-00/101)				
M1631 1				
RECORDER – (FIM 31-35-00/101)				
QUICK ACCESS, M1134 1				
RECORDER – DIGITAL-FLIGHT DATA, M200	2	1	AFT PASS. CABIN, E7	31-31-01
RELAY – (FIM 31-01-36/101)				
DFDAU BITE, K834				
FLT REC CONTROL, K163				
RELAY – (FIM 31-01-37/101)				
FLT REC ADC I/P SWITCHING, K554				
FLT REC CONTROL, K164				
FLT REC EFIS I/P SWITCHING, K15				
TRANSDUCER –				
CABIN PRESSURE, TS356	3	1	119AL, MAIN EQUIP BAY	31-31-12
CONTROL COLUMN POSITION, TS353	1	1	113AL, FWD EQUIP BAY	31-31-08
CONTROL WHEEL POSITION, TS354	1	1	119AL, MAIN EQUIP CTR	31-31-09
LEFT ALTERNATE BRAKE PRESSURE, TS474	1	2	LEFT WHEEL WELL	31-31-15
LEFT BRAKE PRESSURE, TS452	1	2	LEFT WHEEL WELL	31-31-13
RIGHT ALTERNATE BRAKE PRESSURE, TS473	1	2	RIGHT WHEEL WELL	31-31-15
RIGHT BRAKE PRESSURE, TS451	1	2	RIGHT WHEEL WELL	31-31-13
RUDDER PEDAL POSITION, TS355	1	1	113AL FWD EQUIP BAY	31-31-10
UNIT – FIM 31-35-00/101)				
DATA MANAGEMENT, M1200 1				
UNIT – DIGITAL FLIGHT DATA ACQUISITION, M138	3	1	119AL, MAIN EQUIP CTR, E2-3	31-31-03

* SEE THE WDM EQUIPMENT LIST

1 ALL MTH AIRPLANES; SAS 155-999

Flight Data Recorder System – Component Index
Figure 101

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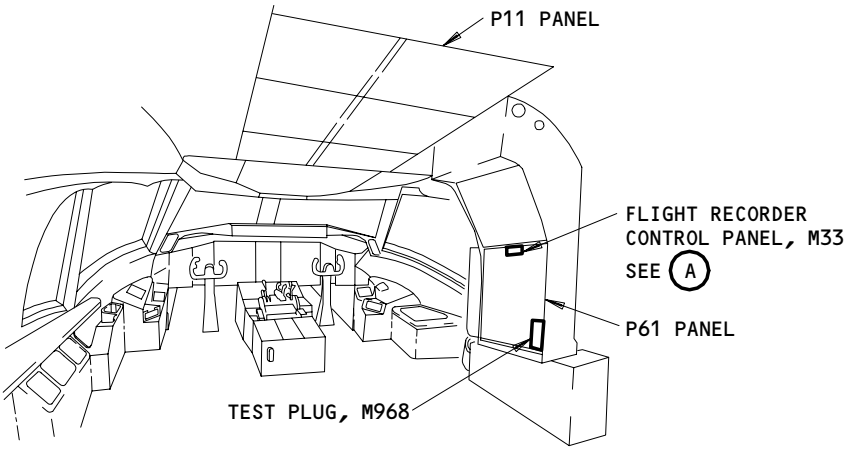
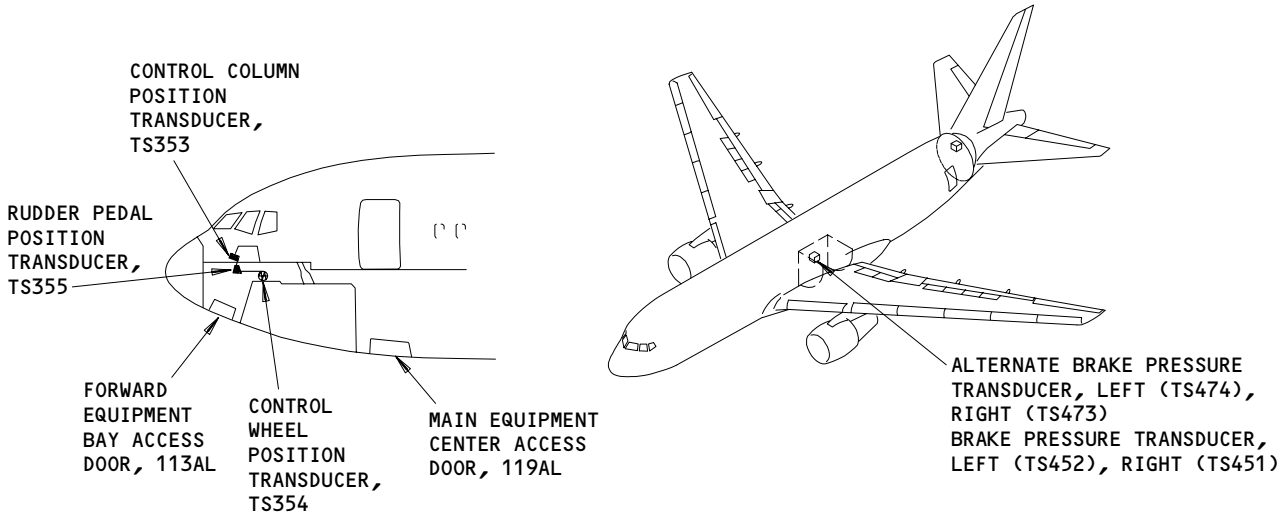
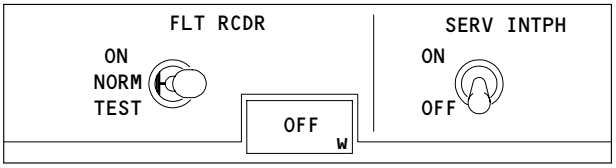


FLIGHT COMPARTMENT





FLIGHT RECORDER CONTROL PANEL, M33

A

Flight Data Recorder System - Component Location
Figure 102 (Sheet 1)

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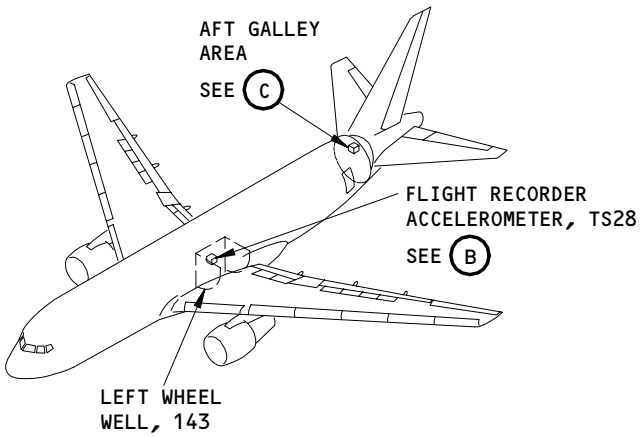
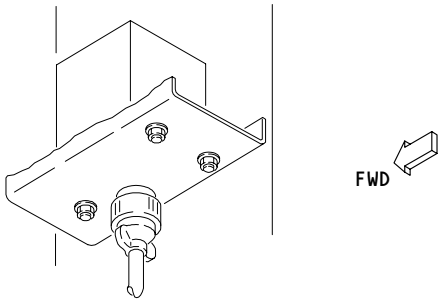
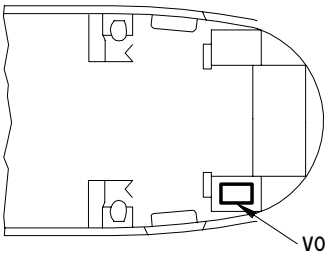




FLIGHT RECORDER ACCELEROMETER, TS28

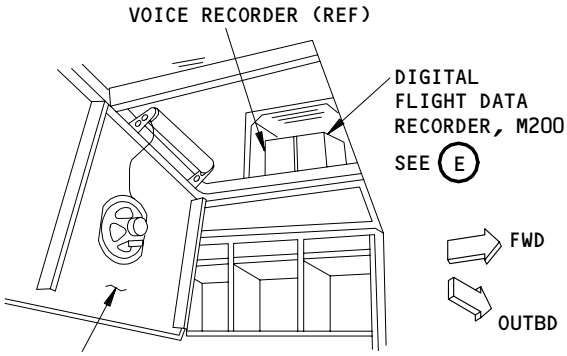
B



AFT GALLEY AREA

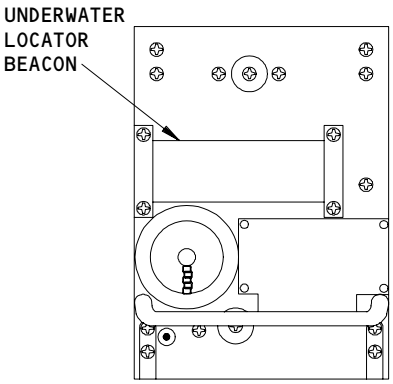
C

VOICE
AND FLIGHT
RECORDER
ELECTRONIC
EQUIPMENT RACK,
E7
SEE D



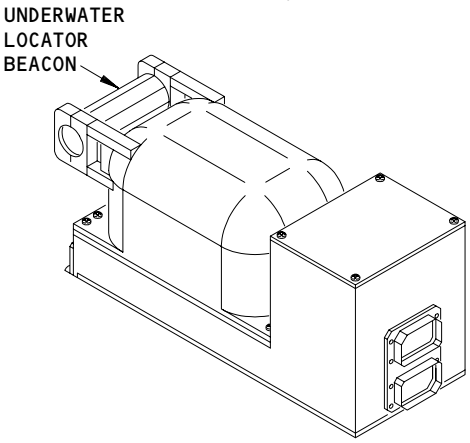
ELECTRONIC EQUIPMENT RACK, E7

D



DIGITAL FLIGHT DATA RECORDER, M200

E 1



DIGITAL FLIGHT DATA RECORDER, M200

E 2

1 SAS 050-280

2 SAS 281-999

Flight Data Recorder System - Component Location
Figure 102 (Sheet 2)

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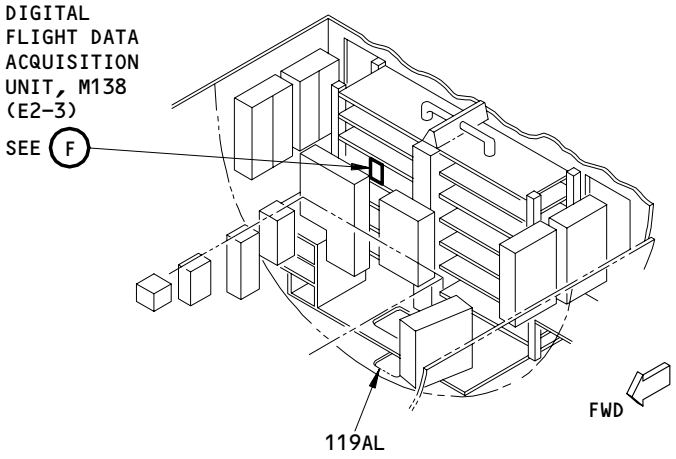
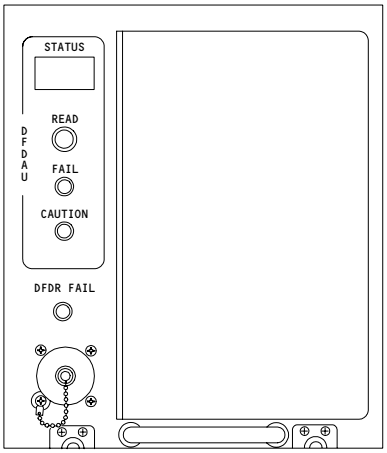


MAIN EQUIPMENT CENTER



DIGITAL FLIGHT DATA
ACQUISITION UNIT, M138
F

Flight Data Recorder System - Component Location
Figure 102 (Sheet 3)

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FLIGHT DATA RECORDER SYSTEM - ADJUSTMENT/TEST

1. General
   A. There are two tasks in this subject. They are the operational test and the system test.

TASK 31-31-00-715-001

2. Flight Data Recorder System - Operational Test
   A. General
      (1) The operational test makes sure the switches for the manual and automatic power source works correctly. A BITE test is also included in this operational test. No test equipment is necessary.
   B. References
      (1) 24-22-00/201, Electrical Power Control
      (2) 31-31-01/401, Flight Data Recorder
      (3) 31-31-03/401, Flight Data Aquisition Unit
      (4) 31-41-00/201, Engine Indication and Crew Alerting System (EICAS)
      (5) 32-09-02/201, Air/Gnd Relays
   C. Access
      (1) Location Zone
          212 Control Cabin - Sect 41 (Right)
   D. Prepare for Test

      S 865-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 865-003
      (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
          (a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALTN (If present)
          (b) 11D19, ENGINE START CONT L
          (c) 11D20, ENGINE START CONT R
          (d) 11D25, ENGINE FUEL CONTROL VALVE L
          (e) 11D26, ENGINE FUEL CONTROL VALVE R
          (f) 11J4, ACMS AC POWER

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(g) 11J6, ACMS SENSOR
(h) 11J7, FLIGHT RECORDER AC
(i) 11J8, FLIGHT RECORDER DC
(j) 11U24, POSITION AIR/GND SYS 2

S 865-004
(3) Make sure the Engine Indication Crew and Alerting System (EICAS) operates correctly (AMM 31-41-00/201).

E. Flight Recorder Operational Test

S 735-005
(1) Flight Recorder Control Switch Test
(a) Make sure the two fuel control switches on the P10 panel are in the CUT-OFF position.
(b) Make sure the two Engine Start switches on the P5 panel are in the OFF position.

(c) Make sure the ON-NORM-TEST switch on the FRCP is set at the NORM position.
(d) Make sure the OFF light on the FRCP is on.
(e) Set the ON-NORM-TEST switch on the FRCP to the TEST position.
(f) Make sure the OFF light on the FRCP goes off.
(g) Set the ON-NORM-TEST switch on the FRCP to the NORM position.
(h) Make sure the OFF light on the FRCP comes on.
(i) Set the ON-NORM-TEST switch on the FRCP to the ON position.
(j) Make sure the OFF light on the FRCP is off.
(k) Set the ON-NORM-TEST switch on the FRCP to the NORM position.
(l) Make sure the OFF light on the FRCP is on.

S 735-006
(2) Air/Ground Switch Test
(a) Make sure the OFF light on the FRCP is on.

WARNING: PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERATE AND CAUSE INJUIRES TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) Prepare the safety-sensitive systems for air mode simulation (AMM 32-09-02/201).

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(c) Open these circuit breakers on the overhead panel, P11, and attach the DO-NOT-CLOSE tags:
1) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALTN (IF INSTALLED)
2) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

(d) Make sure the OFF light on the FRCP goes off.

(e) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
1) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALTN (IF INSTALLED)
2) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

(f) Make sure the OFF light on the FRCP comes on.

S 735-007

(3) Engine Automatic Switch Test

(a) Make sure the Left and Right FUEL CONTROL switches at the control stand are at the CUTOFF position.

(b) Make sure the L and R ENG START switches on the overhead panel, P5, are set at the Off position.

(c) Make sure the ON-NORM-TEST switch on the FRCP is set to the NORM position.

(d) Make sure the OFF light on the FRCP comes on.

(e) Make sure the Left and Right ENG VALVE and SPAR VALVE indicators are off.

(f) Open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
1) 6E1, FUEL VALVES L SPAR
2) 6E2, FUEL VALVES R SPAR

(g) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tags:
1) 11D7, ENGINE STBY IGN 1
2) 11D8, ENGINE STBY IGN 2
3) 11M1, ENGINES IGNITION 1 L
4) 11M2, ENGINES IGNITION 1 R
5) 11M28, ENGINES IGNITION 2 L
6) 11M29, ENGINES IGNITION 2 R

(h) Make sure these circuit breaker on the overhead circuit breaker panel, P11 is closed:
1) 11D19, ENGINE START CONT L

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(i) Open the circuit breaker on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tag:
    1) 11D20, ENGINE START CONT R
(j) Set the L FUEL CONTROL switch at the control stand to the RUN position.
(k) Make sure the OFF light on the FRCP is off.
(l) Set the L FUEL CONTROL switch to the CUTOFF position.
(m) Make sure the OFF light on the FRCP comes on.
(n) Set the R FUEL CONTROL switch at the control stand to the RUN position.
(o) Make sure the OFF light on the FRCP stays on.
(p) Set the Right Fuel Control Switch to the CUTOFF position.
(q) Make sure the OFF light on the FRCP stays on.
(r) Set the L ENG START switch on the overhead panel P5 to the GND position.
(s) Make sure the OFF light on the FRCP goes off.
(t) Set the L ENG START switch to the OFF position.
(u) Make sure the OFF light on the FRCP comes on.
(v) Remove DO-NOT-CLOSE tag and close the P11 panel circuit breaker:
    1) 11D20, ENGINE START CONT R
(w) Set the two FUEL CONTROL switches to the RUN position.
(x) Make sure the OFF light on the FRCP goes off.
(y) Set the two FUEL CONTROL switches at the control stand to the CUTOFF position.
(z) Make sure the OFF light on the FRCP comes on.
(aa) Open the circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tag:
    1) 11D19, ENGINE START CONT L
(ab) Set the R FUEL CONTROL switch to the RUN position.
(ac) Make sure the OFF light on the FRCP goes off.
(ad) Set the R FUEL CONTROL switch to the CUTOFF position.
(ae) Make sure the OFF light on the FRCP comes on.
(af) Set the L FUEL CONTROL switch to the RUN position.
(ag) Make sure the OFF light on the FRCP stays on.

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(ah) Set the L FUEL CONTROL switch to the CUTOFF position.
(ai) Make sure the OFF light on the FRCP stays on.
(aj) Set the R ENG START switch on the overhead panel P5 to the GND position.
(ak) Make sure the OFF light on the FRCP goes off.
(al) Set the R ENG START switch to the OFF position.
(am) Make sure the OFF light on the FRCP comes on.
(an) Remove the DO-NOT-CLOSE tag and close the P11 panel circuit breaker:
1) 11D19, ENGINE START CONT L

S 865-010
(4) Remove the DO-NOT-CLOSE tags and close the P6 panel circuit breakers:
(a) 6E1, FUEL VALVES L SPAR
(b) 6E2, FUEL VALVES R SPAR

S 865-011
(5) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:

NOTE: If the EICAS Flight Recorder Messages Test is to be done next, these circuit breakers should be left opened:

(a) 11D7, ENGINE STBY IGN 1
(b) 11D8, ENGINE STBY IGN 2
(c) 11M1, ENGINES IGNITION 1 L
(d) 11M2, ENGINES IGNITION 1 R
(e) 11M28, ENGINES IGNITION 2 L
(f) 11M29, ENGINES IGNITION 2 R

S 735-012
(6) EICAS Flight Recorder Messages Test
(a) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
1) 11D7, ENGINE STBY IGN 1

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2) 11D8, ENGINE STBY IGN 2
3) 11L9, LEFT ENGINE OIL PRESS EICAS REF
4) 11L36, RIGHT ENGINE OIL PRESS EICAS REF
5) 11M1, ENGINES IGNITION 1 L
6) 11M2, ENGINES IGNITION 1 R
7) 11M28, ENGINES IGNITION 2 L
8) 11M29, ENGINES IGNITION 2 R

(b) Do the "Engine Shutdown Input Removal" (AMM 31-41-00/201).
(c) Make sure the circuit breakers on the overhead circuit breaker panel, P11, are closed
1) 11D19, ENGINE START CONT L
2) 11D20, ENGINE START CONT R
3) 11U24, POSITION AIR/GND SYS 2
(d) Set the ON-NORM-TEST switch on the FRCP to the ON position.
(e) Push the ECS MSG and AUTO EVENT switch on the EICAS MAINT panel on the right side panel, P61.
(f) Make sure the EICAS message(s), FLT DATA ACQ and/or FLT DATA REC, does not show on the bottom display.
(g) If the EICAS message, FLT DATA ACQ and/or FLT DATA REC, are shown, push the AUTO-EVENT READ switch at the page where either or both the messages are shown and then hold the ERASE switch for 3 seconds.
(h) Set the L and R FUEL CONTROL switches on control stand to the RUN position.

NOTE: Wait at least 4 minutes before proceeding.

(i) Set the computer switch on the EICAS DISPLAY select panel to the L position.
(j) Push the ECS MSG switch on the EICAS MAINT panel on the right side panel, P61.
(k) Make sure the EICAS message(s), FLT DATA ACQ and/or FLT DATA REC is not shown on the bottom display.
(l) Set the computer switch on the EICAS DISPLAY select panel to the R position.

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(m) Make sure the EICAS message(s), FLT DATA ACQ and/or FLT DATA REC is not shown on the bottom display.
(n) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC
(o) Remove the DFDR from its mounting tray (AMM 31-31-01/401).

NOTE: Wait 60 seconds before proceeding.

(p) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC
(q) Set the computer switch on the EICAS DISPLAY select panel to the L position.
(r) Make sure the EICAS message, FLT DATA REC is shown on the bottom display.
(s) Make sure the EICAS message, FLT DATA ACQ is not shown on the bottom display.
(t) Set the computer switch on the EICAS DISPLAY select panel to the R position.
(u) Make sure the EICAS message, FLT DATA REC is shown on the bottom display.
(v) Make sure the EICAS message, FLT DATA ACQ is not shown on the bottom display.
(w) Open the circuit breaker on the overhead panel, P11, and attach DO-NOT-CLOSE tag:
1) 11J7, FLIGHT RECORDER AC
(x) Wait 60 seconds before the next step.
(y) Make sure the EICAS message, FLT DATA ACQ is shown on the bottom display.
(z) Make sure the EICAS message, FLT DATA REC is not shown on the bottom display.
(aa) Set the computer switch on the EICAS DISPLAY select panel to the L position.

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(ab) Make sure the EICAS message, FLT DATA ACQ is shown on the bottom display.
(ac) Make sure the EICAS message, FLT DATA REC is not shown on the bottom display.
(ad) Open the circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tag:
1) 11J8, FLIGHT RECORDER DC
(ae) Install the DFDR back to the mounting tray (AMM 31-31-01/401).
(af) Remove the DO-NOT-CLOSE tag and close the P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC
(ag) Set the L and R FUEL CONTROL switches to the CUTOFF position.
(ah) Put the Engine Shutdown Input to the EICAS back to its usual condition (AMM 31-41-00/201).
(ai) Set the ON-NORM-TEST switch on the FRCP to the NORM position.

S 865-013
(7) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
(a) 11D7, ENGINE STBY IGN 1
(b) 11D8, ENGINE STBY IGN 2
(c) 11L9, LEFT ENGINE OIL PRESS EICAS REF
(d) 11L36, RIGHT ENGINE OIL PRESS EICAS REF
(e) 11M1, ENGINES IGNITION 1 L
(f) 11M2, ENGINES IGNITION 1 R
(g) 11M28, ENGINES IGNITION 2 L
(h) 11M29, ENGINES IGNITION 2 R

S 735-014
(8) BITE Test
(a) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
1) 11J1, PRINTER
2) 11J4, ACMS AC POWER

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3) 11J6, ACMS SENSOR
4) 11J7, FLIGHT RECORDER AC
5) 11J8, FLIGHT RECORDER DC

(b) Set the ON-NORM-TEST switch on the FRCP to the ON position.
(c) Make sure the OFF light on the FRCP is off.
(d) Push and hold the READ switch on the front panel of the DFDAU.
(e) Make sure the CAUTION, FAIL and DFDR FAIL indicators comes on.
(f) Make sure the STATUS window shows FFF then 888.
(g) After around 4 seconds, Make sure the the CAUTION, FAIL, and the DFDR FAIL light indicators go off.
(h) Make sure the STATUS window shows 000.
(i) Set the ON-NORM-TEST switch on the FRCP to the NORM position.
(j) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-31-00-705-021

3. Flight Data Recorder System Test

A. General

(1) The system test has procedures to do tests of all the inputs to the flight data recorder system. You can do the tests out of sequence. You can do each test independently.
(2) To do the system test, much time can be necessary. A different procedure, which makes sure the system writes the parameters correctly, is the copy recorder procedure (AMM 31-31-01/201).
(3) These tasks use the word SUBFRAME 0, 5, or 6 to make a selection of a parameter. Some portable testers or on board test equipments do not have a switch position for SUBFRAME 0, 5, or 6. On these test sets, make a selection of SUBFRAMES as follow:
For SUBFRAME 0, use SUBFRAME 1, 2, 3, and 4
For SUBFRAME 5, use SUBFRAME 1 and 3.
For SUBFRAME 6, use SUBFRAME 2 and 4.

B. Equipment

(1) 9540 System Test Panel (STP) - Hamilton Standard 775419
Hamilton Standard Division United Technologies
Bradley Field Road
Windsor locks, CT 06096
(2) Multi-Purpose AIDS Display Units - AACO INC. FAA-0032-001
AACO Inc.
5011 Barton Place
Seattle, WA 98118
(3) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701

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(4) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(5) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(6) 704-2567-001 Adapter cable - Tester
(7) Portable Tester - Teledyne P/N 2222786
Teledyne Controls
12333 W. Olympic Blvd.
West Los Angeles, CA 90064
(8) A31007-1 Adapter Cable - Tester
(9) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls
12333 W. Olympic Blvd.
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(10) A31007-59 Adapter Cable - Tester
(11) 2 Proximity Sensor Actuator/Deactuator Set - A27092-84

C. References
(1) 21-31-00/501, Pressurization Control System
(2) AMM 22-10-00/501, Autopilot - Flight Control
(3) AMM 22-21-00/501, Yaw Damper System
(4) AMM 22-32-00/501, Thrust Management System
(5) AMM 23-11-00/501, HF Communication System
(6) AMM 23-12-00/501, VHF Communication System
(7) AMM 24-22-00/201, Electrical Power - Control
(8) AMM 25-22-02/401, Lowered Ceiling Panels
(9) AMM 27-11-00/501, Aileron and Aileron Trim Control System
(10) AMM 27-21-00/501, Rudder and Rudder Trim Control System
(11) AMM 27-31-00/501, Elevator Control System
(12) AMM 27-32-00/501, Stall Warning System
(13) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
(14) AMM 27-51-00/501, Trailing Edge Flap System
(15) AMM 27-61-00/501, Spoiler/Speedbrake Control System
(16) AMM 27-81-00/501, Leading Edge Flap System
(17) AMM 29-11-00/201, Main Hydraulic Systems
(18) AMM 31-25-00/501, Clocks
(19) AMM 31-41-00/501, Engine Indicator and Crew Alert System (EICAS)
(20) AMM 32-09-02/201, Air/Ground Relays
(21) AMM 32-42-00/501, Antiskid/Autobrake System
(22) AMM 32-44-00/501, Parking Brake System
(23) AMM 34-12-00/501, Air Data Computing System
(24) AMM 34-16-00/501, Altitude Alert System
(25) AMM 34-21-00/501, Inertial Reference System.
(26) AMM 34-22-00/501, Flight Instrument System
(27) AMM 34-31-00/501, ILS Navigation System

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(28) AMM 34-33-00/501, Radio Altimeter System
(29) AMM 34-32-00/501, Marker Beacon System
(30) AMM 34-46-00/501, Ground Proximity Warning System
(31) AMM 34-51-00/501, VOR System
(32) AMM 34-55-00/501, DME System
(33) AMM 34-61-00/501, Flight Management Computer System
(34) AMM 71-00-00/201, Power Plant
(35) AMM 77-35-00/001, Electronic Engine Control (EEC) Monitoring System
(36) AMM 78-31-00/501, Fan Thrust Reverser System

D. Access

(1) Location Zone
212 Control Cabin - Sect 41 (Right)
253 Area above passenger cabin ceiling (Left)

E. Prepare for Test

S 705-675
(1) Do this task: DFDAU Software Configuration Check (AMM 31-31-03/201).

S 865-022
(2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11J7, FLIGHT RECORDER AC
(b) 11J8, FLIGHT RECORDER DC

S 485-023
(3) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

S 425-024
(4) If you use the hand held download unit (HHDLU), do these steps:

NOTE: The HHDLU can only be connected to the Allied-Signal flight data recorder (FDR).

(a) To get access to the FDR, open the lowered ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).
(b) Attach the HHDLU to the test connector at the front side of the flight data recorder.

S 865-025
(5) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the overhead equipment panel P11:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 865-027
(6) Supply electrical power (AMM 24-22-00/201).

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S 865-028

(7) With the DSDU tester, set the control switches on the tester as follows:
   (a) Set the POWER switch to the ON position.
   (b) Set the INPUT switch to the ARINC INPUT DATA position.
   (c) Set the SYNC switch to the SYNC B position.
   (d) Set the DATA PARAMETER/DOCUMENTARY switch to the DATA PARAMETER position.
   (e) Set the OCTAL DISPLAY switch to the 12 BIT position.
   (f) Set the SUBFRAME and WORD as specified.

S 865-030

(8) With the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for airplanes equipped with Alliedsignal FDR only.

   (a) On the flight recorder control panel (FRCP), set the function switch to the ON position.
   (b) Push the red button on top of the HHDLU.
   (c) Set the DSDU switch.
   (d) Set the BASE switch.
   (e) In the BASE SELECT menu, set OCT for octal values.
   (f) Set the SUBFRAME and WORD as specified.

NOTE: The HHDLU do not have a selection for subframe 0. Make a selection of subframe ALL or subframe 1 thru 4 when a task uses subframe 0.

S 865-031

(9) With the STP tester, set the swiches on the tester as follows:
   (a) Set the ON/OFF switch to the ON position.
   (b) Push the SYS TEST switch and make sure there is no failure message on the tester display.
   (c) Push the CLR switch.
   (d) Push the FDAU switch.
   (e) Set the UPDATE switch to the AUTO position.
   (f) Set the DATA switch to the 12 BIT position.
   (g) Set the SUBFRAME and WORD as specified.

S 865-032

(10) With the Teledyne tester (P/N 2222786), set the switches on the tester as follows:
   (a) Set the POWER switch to the ON position.
   (b) Set the READOUT switch to the ACTF DATA position.
   (c) Set the UPDATE switch to the AUTO position.
   (d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
   (e) Set the DATA switch to the 12 BIT position.
   (f) Set the SUBFRAME and WORD as specified.

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S 865-033
(11) With the Teledyne tester (P/N 2229738), set the switches on the tester as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT switch.
(c) Set the SUBFRAME and WORD as specified.

S 865-035
(12) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11J4, ACMS AC POWER
(b) 11J6, ACMS SENSOR

F. GMT Test

S 735-058
(1) Do the GMT test that follows:
(a) Make sure the clock system is operational (AMM 31-25-00/501).
(b) Set the SUBFRAME to 1 and the WORD to 2.
(c) Set the captain's clock to 10 hrs, 42 min. (AMM 31-25-00/501).
(d) Make sure the tester shows 52xx.

NOTE: XX means do not care.

S 865-059
(2) Set the captain's clock to the normal time.

G. Air Data Computer (ADC) Select Switch Test

S 735-061
(1) Do the ADC switch test that follows:
(a) Make sure the ADC system is operational (AMM 34-12-00/501).
(b) Set the SUBFRAME to 3 and the WORD to 63.
(c) Set the captain's and first officer's ADC source select switch to the NORM position.
(d) Make sure the BIT DISCRETE 1 and 2 show a 1.
(e) Set the captain's and the first officer's ADC source select switch to the ALTN position.
(f) Make sure the BIT DISCRETE 1 and 2 show a 0.

S 865-064
(2) Set the captain's and first officer's ADC source select switch to the NORM position.

H. Air Data Computer (ADC) Data Bus Test

S 735-066
(1) Do the ADC data bus test that follows:
(a) Make sure the ADC is operational (AMM 34-12-00/501).
(b) Set the SUBFRAME to 0 and the WORD to 10.
(c) Set the captain's ADC source select switch to the ALTN position.

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(d) On the miscellaneous test panel at the P61 panel, push and hold the right ADC test switch for more than 7 seconds.
(e) Make sure the tester shows between 1043 to 1053.
(f) Release the test switch on the miscellaneous test panel.

S 865-071
(2) Set the captain's ADC source select switch to the NORM position.

I. Flight Management Computer (FMC) Source Select Switch Test

S 735-072
(1) Do the FMC switch test that follows:
(a) Make sure the FMC system is operational (AMM 34-61-00/501).
(b) On the tester, set the SUBFRAME and WORD listed in the table that follows for each captain's FMC select switch.
(c) Make sure the tester shows the correct value shown on the table that follows.

TESTER SETUP		CAPTAIN'S FMC SWITCH POS.	TESTER DISPLAY	
SUBFRAME	WORD		BIT (DISCRETE)	VALUE
3	2	L FMC	1	1
		R FMC	1	1
		L CDU	1	0
		L FMC	2	1
		R FMC	2	0
		L CDU	2	0

(d) On the tester, set the SUBFRAME and WORD listed in the table that follows for each first officer's FMC select switch.
(e) Make sure the tester shows the correct value shown on the table that follows.

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SELECT		FIRST OFFICER'S SWITCH POS.	TESTER DISPLAY	
SUBFRAME	WORD		BIT (DISCRETE)	VALUE
3	2	L FMC	3	0
		R FMC	3	1
		R CDU	3	0
		L FMC	4	1
		R FMC	4	1
		R CDU	4	0

J. Thrust Management Computer (TMC) Data Bus Test

S 735-077

(1) Do the TMC data bus test that follows:
   (a) Make sure the left, right and center IRU's are ALIGNED (AMM 34-21-00/201).
   (b) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
      1) 11A10, AIR DATA CMPTR L
      2) 11C20, POSITION AIR/GND SYS 1
   (c) Make sure the TMC system is operational (AMM 22-32-00/501).
   (d) On the P55 panel,set the autothrottle arm switch to the A/T ARM position.
   (e) Operate the A/T disconnect switch on the thrust lever.
   (f) Set the SUBFRAME to 0 and the WORD to 22.
   (g) Make sure the BIT (DISCRETE) 1 shows a 1.
   (h) Set the autothrottle arm switch to the OFF position.
   (i) Make sure the BIT (DISCRETE) 1 shows a 0.

S 865-081

(2) Set the TMC back to normal.

K. FCC/MCP Data Bus Test

S 735-083

(1) Do the steps that follow:
   (a) Make sure the autopilot flight control system is operational (AMM 22-10-00/501).
   (b) Set the altitude of 18,700 feet on the mode control panel.
   (c) Set the SUBFRAME to 4 and the WORD to 33.
   (d) Open the circuit breaker, 11J7, for at least one second and then close the circuit breaker.
   (e) Make sure the tester display shows 1110 after 48 seconds.

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S 865-084

(2) Set the control panel back to normal.

L. Yaw Damper Engage Test

S 735-085

(1) Do the yaw damper test that follows:

(a) Make sure the yaw damper system is operational (AMM 22-21-00/501).

NOTE: No hydraulic pressure is required.

(b) Set the IRS Mode Select Panel on the P5 panel to the NAV mode.

(c) Make sure the left, right and center IRU's are ALIGNED (AMM 34-21-00/501).

(d) Make sure the left and right yaw dampers are not engaged.

(e) On the tester, set the SUBFRAME to 0 and the WORD to 6.

(f) Engage the left yaw damper (AMM 22-21-00/501).

NOTE: After the yaw damper is engage, wait 30 seconds before test data is read.

(g) Make sure the BIT (DISCRETE) 1 shows a 1.

(h) Disengage the left yaw damper (AMM 22-21-00/501).

NOTE: After the yaw damper is disengage, wait 30 seconds before test data is read.

(i) Engage the right yaw damper (AMM 22-21-00/501).

NOTE: After the yaw damper is engage, wait 30 seconds before test data is read.

(j) Set the SUBFRAME to 0 and the WORD to 38.

(k) Make sure the BIT (DISCRETE) 1 shows a 1.

(l) Disengage the right yaw damper (AMM 22-21-00/501).

S 865-086

(2) Set the yaw damper system back to normal (AMM 22-21-00/501).

M. IRS Instrument Source Select Switch Test

S 735-087

(1) Do the IRS switch test that follows:

(a) Make sure the captain's and first officer's IRS instrument source switches are set to the NORM position.

(b) Set the SUBFRAME to 2 and the WORD to 63.

(c) Make sure the BIT (DISCRETE) 1 and 2 shows a 1.

(d) Set the captain's and first officer's IRS instrument source select switch to the ALTN position.

(e) Make sure the BIT (DISCRETE) 1 and 2 shows a 0.

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S 865-089

(2) Set the captain's and the first officer's IRS instrument source select switch to the NORM position.

N. IRS Data Bus Test

S 735-093

(1) Do the IRS data bus test that follows:
   (a) Make sure the IRS is operational (AMM 34-21-00/501).
   (b) Set the L IRS mode select switch to the NAV position.
   (c) Set the SUBFRAME to 0 and the WORD to 57.
   (d) Push and hold the TEST switch on the left IRU for more than 10 seconds.
   (e) Make sure the tester display shows 7732.

O. EFI Instrument Source Select Switch Test

S 735-096

(1) Do the EFIS switch test that follows:
   (a) Make sure the EFIS system is operational (AMM 34-22-00/501).
   (b) Make sure the left and right EFI source select switches are set at the NORM position.
   (c) Set the SUBFRAME to 1 and the WORD to 63.
   (d) Make sure the BIT (DISCRETE) 1 and 2 shows a 1.
   (e) Set the left and right EFI source select switch to the ALTN position.
   (f) Make sure the BIT (DISCRETE) 1 and 2 shows a 0.
   (g) Set the left and right EFI source select switch to the NORM position.

P. EFIS Data Bus Test

S 735-098

(1) Do the EFIS data bus test that follows:
   (a) Make sure the captain's IRU and EFIS instrument source select switches are in the NORM position.
   (b) Set the L IRS mode select switch to the NAV position.
   (c) Set the SUBFRAME to 0.
   (d) Push the TEST switch on the left EFIS symbol generator.
   (e) On the pilot's overhead panel, push the TEST switch.
   (f) Make sure the tester display shows between 1000 and 1003 for the WORD 6 and 38.
   (g) Set the SUBFRAME to 0 and the WORD to 13.
   (h) Set the captain's EFIS source select switch to the ALTN position.
   (i) Push the TEST switch on the center EFIS symbol generator.
   (j) Make sure the tester display shows between 0000 and 0003.
   (k) Set the L EFI instrument source select switch to the NORM position.

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Q. FCC Data Bus Test

S 735-100

(1) Do the FCC data bus test that follows:
  (a) Make sure the left autopilot flight control system is operational (AMM 22-10-00/501).
  (b) Make sure the first officer's flight director FD switch on the glareshield is set at the OFF position.
  (c) Set the SUBFRAME to 0 and the WORD to 62.
  (d) Make sure the BIT (DISCRETE) 2 shows a 0.
  (e) Set the first officer's F/D switch to the ON position.
  (f) Make sure the BIT (DISCRETE) 2 shows a 1.

S 865-105

(2) De-energize the autopilot-flight control system (AMM 22-10-00/501).

R. Ground Proximity Warning System Test

S 735-109

(1) Do the ground proximity warning test that follows:
  (a) Make sure the ground proximity warning system is operational (AMM 34-46-00/501).
  (b) Set the SUBFRAME to 0 and the WORD to 31.
  (c) Make sure the BIT (DISCRETE) 2 shows a 0.
  (d) Set the test switch on the miscellaneous test panel on the P61 to the GND PROX position for 3 seconds.
  (e) Make sure the BIT (DISCRETE) 2 shows a 1.

NOTE: When the GND PROX test switch is pushed, the glideslope aural warning will sound for approximately 1 to 2 seconds and then the PULL-UP warning will sound. The tester display will indicate a 1 for only a short time. It may be necessary to repeat the GND PROX test to determine the proper sequence and test data.

S. EICAS Select Switch Test

S 735-110

(1) Do the EICAS switch test that follows:
  (a) Make sure the EICAS computer system is operational (AMM 31-41-00/501).
  (b) Set the SUBFRAME to 4 and the WORD to 59.
  (c) Set the COMPUTER switch on the EICAS DISPLAY select panel to the R position.

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(d) Make sure the BIT (DISCRETE) 3 shows a 0.
(e) Set the COMPUTER switch on the EICAS DISPLAY select panel to the L position.
(f) Make sure the BIT (DISCRETE) 3 shows a 1.
(g) Set the COMPUTER switch on the EICAS DISPLAY select panel to the AUTO position.

T. EEC Data BUS Test

S 735-122

(1) Do the EEC data bus test that follows:
(a) Set the SUBFRAME to 1 and the WORD to 39.

(b) Engergize the left and right EEC with the engine not running (AMM 77-35-00).
(c) On the EEC MAINT panel on the P61 panel, set the L ENG POWER switch to the TEST position.
(d) At the control stand, set the thrust lever to the IDLE position.
(e) Make sure the tester display shows between 0550 and 0633.
(f) Set the thrust lever to the full forward position.
(g) Make sure the tester display shows between 1630 and 1737.
(h) Return the thrust lever to the IDLE position and L ENG POWER switch on the EEC MAINT panel to the NORM position.
(i) Set the SUBRAME to 2 and the WORD to 39.
(j) On the EEC MAINT panel on the P61 panel, set the R ENG POWER switch to the TEST position.
(k) At the control stand, set the thrust lever to the IDLE position.
(l) Make sure that the tester display is between 0550 and 0633.
(m) Set the thrust lever to the full forward position.
(n) Make sure the tester display shows between 1630 and 1737.
(o) Return the thrust lever to the IDLE position.

U. Flight Control Surface Position Test

S 865-126

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS APPLIED. AILERON, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSON OR EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(1) Supply hydraulic power (AMM 29-11-00/201).

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S 865-127

(2) Control Column Position (Syncro) Test

(a) Set the SUBFRAME to 0 and the WORD to 16.

(b) Set the control column to the position as shown in the table that follows:

(c) Make sure the the tester display shows the correct value as listed in the table.

TEST	POSITION	TESTER DISPLAY
CONTROL COLUMN	FULLY FORWARD	7600 to 7663
	FULLY AFT	0144 to 0227

(d) Set the control column back to the neutral position.

S 865-129

(3) Control Wheel Position (Syncro) Test

(a) Set the SUBFRAME to 0 and the WORD to 8.

(b) Set the control wheel to the position as shown in the table that follows:

(c) Make sure the tester display shows the correct value as listed in the table.

TEST	POSITION	TESTER DISPLAY
CONTROL WHEEL	FULLY CLOCKWISE	0704 to 0767
	FULLY COUNTERCLOCKWISE	7010 to 7073

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(d) Set the control wheel back to the neutral position.

S 865-134

(4) Rudder Pedal Position (Syncro) Test

(a) Set the SUBFRAME to 0 and the WORD to 22.

(b) Set the rudder pedal to the position as shown in the table that follows:

(c) Make sure the tester display shows the correct value as listed in the table.

TEST	POSITION	TESTER DISPLAY
RUDDER PEDAL	LEFT FULLY FORWARD	0220 to 0303
	RIGHT FULLY FORWARD	7474 to 7557

(d) Set the rudder pedals back to the neutral position.

TEST	POSITION	CDU DISPLAY
SPEED BRAKE HANDLE	DOWN	0034 to 7746
	UP	1536 to 1623

S 865-142

(5) Flap Handle Position Test

(a) Make sure the flap handle is operational (AMM 27-51-00/501).

(b) Make sure the flap handle is set at the 0 (UP) position.

(c) Enter 4/16/01/H from the ACMS DITS DATA page on the MCDU into LSK 1L, 2L, 3L, or 4L.

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(d) Make sure the left most hex. charater on the MCDU display shows an E or a 6.
(e) Make sure the last 5 charater on the MCDU display shows between 2AFXX and 3B6XX (hex.).

NOTE: XX = do not care.

(f) Set the flap handle to the 15 unit position.
(g) Make sure the left most hex. charater on the MCDU display shows an E or a 6.
(h) Make sure the last 5 charater on the MCDU display shows between 915XX and A2CXX (hex.).

NOTE: XX = do not care.

(i) Set the flap handle back to the normal position.

S 865-146

(6) Trailing Edge Flaps Outboard Position Test
(a) Make sure the trailing edge flap system is operational (AMM 27-51-00/501).
(b) Make sure the trailing edge flaps are up.
(c) Make sure these circuit breaker on the overhead circuit breaker panel, P11, is closed:
1) 11J16, FLAP POS IND R
(d) Open the circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tag:
1) 11J15, FLAP POS IND L
(e) Set the SUBFRAME to 2 and the WORD to 26.
(f) Make sure the tester display shows between 6724 and 7053.
(g) Set the flaps to the 25 units detent position.
(h) Make sure the tester display shows between 3620 and 4157.
(i) Remove the DO-NOT-CLOSE tag and close the P11 panel circuit breaker:
1) 11J15, FLAP POS IND L
(j) Set the SUBFRAME to 3 and the WORD to 26.
(k) Set the flaps to the 20 units detent position.
(l) Make sure the tester display shows between 2604 and 3173.
(m) Set the flaps to the 0 detent (UP) position.
(n) Make sure the tester display shows between 6724 and 7053.

S 865-148

(7) Trailing Edge Flap Inboard Test
(a) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
1) 11J17, FLAP/STAB POS SENSING L

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2) 11J26, FLAP/STAB POS SENSING R

(b) Make sure the trailing edge flaps are up.
(c) Set the SUBFRAME to 1 and the WORD to 26.
(d) Make sure the tester display shows between 1146 and 1432.
(e) Set the flaps to the 20 unit detent position.
(f) Make sure the tester display shows between 4476 and 5054.
(g) Set the SUBFRAME to 4 and the WORD to 26.
(h) Set the flaps to the 0 detent (UP) position.
(i) Make sure the tester display shows between 1146 and 1432.
(j) Set the flaps to the 20 unit detent position.
(k) Make sure the tester display shows between 4476 and 5054.
(l) Set the flaps back to the normal position.

S 865-149

(8) Leading Edge Slat Position Test
(a) Make sure the leading edge slat system is operational (AMM 27-81-00/501).
(b) Set the SUBFRAME and WORD listed in the table that follows for each parameter/condition.
(c) Make sure the tester display shows the correct value as listed in the table.

PARAMETER/CONDITION	TESTER SETUP		TESTER DISPLAY	
	SUBFRAME	WORD	BIT (DISCRETE)	VALUE
RIGHT OUTBD SLAT NOT EXTENDED	3	2	10	1
RIGHT OUTBD SLAT EXTENDED	3	2	10	0
LEFT OUTBD SLAT NOT EXTENDED	3	2	8	1
LEFT OUTBD SLAT EXTENDED	3	2	8	0
RIGHT INBD SLAT NOT EXTENDED	3	2	9	1
RIGHT INBD SLAT EXTENDED	3	2	9	0
LEFT INBD SLAT NOT EXTENDED	3	2	7	1
ANY SLAT NOT FULLY EXTENDED	0	51	5	1
ANY SLAT NOT PARTIAL	0	51	9	1
ALL SLAT AT PARTIAL	0	51	9	0
ANY SLAT IN-TRANSIT	0	46	2	0
ALL SLAT FULLY EXTENDED	0	51	5	0

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S 865-154

(9) ALTERNATE Stabilizer Trim Position Test

(a) Make sure the ALT STAB TRIM switch on the quadrant stand P10 is not in detent position.

(b) Set the SUBFRAME to 0 and the WORD to 61.

(c) ALL MTH AIRPLANES;
SAS 050-149;
Make sure the BIT (DISCRETE) 1 shows a 0

(d) SAS 150-999;
Make sure the BIT (DISCRETE) 1 shows a 1

(e) Set the ALT STAB TRIM switch in the detent position.

(f) ALL MTH AIRPLANES;
SAS 050-149;
Make sure the BIT (DISCRETE) 1 shows a 1

(g) SAS 150-999;
Make sure the BIT (DISCRETE) 1 shows a 0.

S 865-156

(10) Electrical Stabilizer Trim Position Test

(a) Make sure the STAB TRIM switch on the captain's and first officer's control wheels are in the center position.

(b) On the tester, set the SUBFRAME and WORD for each PARAMETER/CONDITION in the table that follows:

(c) Make sure the tester display shows the correct value as shown in the table.

PARAMETER/CONDITION	TESTER SETUP		TESTER DISPLAY	
	SUBFRAME	WORD	BIT (DISCRETE)	VALUE
CAPTAIN'S STAB TRIM SWITCH- NOSE DOWN	0	8	2	0
CENTERED (RELAXED)	0	8,48	2	1
NOSE UP	0	48	2	0
FIRST OFFICER'S STAB TRIM SWITCH- NOSE UP	0	16	2	0
CENTERED (RELAXED)	0	16	2	1
	0	40	2	0
NOSE DOWN	0	40	2	0

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S 865-158

(11) Spoiler Control Module (SCM) Fault Test

(a) Set the SUBFRAME and WORD for each SCM as listed in the table that follows.

(b) Simulate the SCM fault (AMM 27-61-00/501).

(c) Make sure the the tester shows the correct value as shown in the table that follows:

TESTER SETUP		SCM	CONDITION	TESTER DISPLAY	
SUBFRAME	WORD			BIT (DISCRETE)	VALUE
2	59	LEFT SCM 1	NORMAL	8	1
			FAULT	8	0
4	59	LEFT SCM 2	NORMAL	8	1
			FAULT	8	0
2	59	LEFT SCM 3	NORMAL	9	1
			FAULT	9	0
3	59	RIGHT SCM 1	NORMAL	8	1
			FAULT	8	0
1	59	RIGHT SCM 2	NORMAL	9	1
			FAULT	9	0
3	59	RIGHT SCM 3	NORMAL	9	1
			FAULT	9	0

(d) Set the SCM back to normal (AMM 27-61-00/501).

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S 865-160
(12) Elevator Position Test

S 865-165
(13) Thrust Reverser Position Test
(a) Make sure the thrust reverser system is operational (AMM 78-31-00/501).

WARNING: OPERATION OF TRANSLATING COWL IS ACHIEVED IN APPROXIMATELY 2 SECONDS. MAKE SURE ALL PERSONNEL ARE CLEAR OF IMMEDIATE AREA OR INJURY TO PERSONNEL MAY OCCUR.

CAUTION: MAKE SURE THE THRUST REVERSER IS CLEAR OF EQUIPMENT, TOOLS, AND LOOSE ARTICLES. IF NOT REMOVED, DAMAGE WILL OCCUR TO REVERSER DURING TRANSITION.

(b) Make sure the equipment(s) and perssonel(s) are cleared from the thrust reverser area.
(c) Set the SUBFRAME and WORD for each signal and set the thrust reverser levers as shown in the table that follows.
(d) Make sure the tester display shows the correct value as shows in the table that follows:

THRUST REVERSER	CONDITION	TESTER SETUP		TESTER DISPLAY	
		SUBFRAME	WORD	BIT (DISCRETE)	VALUE
LEFT	NOT IN-TRANSIT IN-TRANSIT	0	11	2 2	0 1
	NOT DEPLOYED FULLY DEPLOYED	0	11	1 1	0 1
RIGHT	NOT IN-TRANSIT IN-TRANSIT	0	43	2 2	0 1
	NOT DEPLOYED FULLY DEPLOYED	0	43	1 1	0 1

S 865-166
(14) Horizontal Stabilizer Position Test
(a) Make sure the horizontal stabilizer trim control system is operational (AMM 27-41-00/501).
(b) Set the SUBFRAME to 0 and the WORD to 27.
(c) Set the stabilizer to the 2.0 trim position.
(d) Make sure the tester shows between 7224 and 7323.

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(e) Set the stabilizer to the 13.0 trim position.
(f) Make sure the tester shows between 0510 and 0607.
(g) Set the stabilizer back to the normal position (AMM 27-41-00).

S 865-171
(15) Remove the power from the left, right, and center hydraulic systems (AMM 29-11-00/201).

V. Cabin Pressure Test

S 735-176
(1) Do the cabin pressure test that follows:
(a) Make sure the the cabin pressure is at ambient
(b) Set the SUBFRAME to 4 and the WORD to 34.
(c) Make sure the tester display shows the barometric pressure at test site is in range as the table that follows.

NOTE: This test assumes that test site barometric pressure is below 31.1 In Hg. at time of test.

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AMBIENT PRESSURE (IN. HG)	TESTER DISPLAY
29.0	7014 to 7054
29.1	7044 to 7105
29.2	7074 to 7136
29.3	7125 to 7166
29.4	7156 to 7217
29.5	7206 to 7247
29.6	7237 to 7300
29.7	7267 to 7330
29.8	7320 to 7351
29.9	7350 to 7401
30.0	7371 to 7432
30.1	7421 to 7462
30.2	7452 to 7513
30.3	7502 to 7544
30.4	7533 to 7574
30.5	7564 to 7625
30.6	7614 to 7655
30.7	7645 to 7705
30.8	7666 to 7726
30.9	7716 to 7756
31.0	7747 to 7777

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W. Master Warning Test

S 865-185

(1) Prepare to do the master warning test.
  (a) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
    1) 11A33, IND LIGHTS 1
    2) 11A34, IND LIGHTS 2
    3) 11A35, IND LIGHTS 3
    4) 11B18, WARN ELEX B
    5) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (IF INSTALLED)
    6) 11J34, WARN ELEX A
    7) 11R29, R IND LTS 2
    8) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2
  (b) Make sure the parking brake is on (AMM 32-44-00/501).

S 735-186

(2) Do the master warning test that follows:
  (a) Set the SUBFRAME to 0 and the WORD to 51.
  (b) Make sure the Capt's and F/O's master warning light is not on.
  (c) Make sure the BIT (DISCRETE) 10 shows a 1.
  (d) On the misc test panel at P61, set and hold the CONFIG switch to the T/O position.
  (e) Make sure the BIT (DISCRETE) 10 shows a 0.
  (f) Release the CONFIG TEST switch.

X. VHF Test

S 735-189

(1) Do the VHF test that follows:
  (a) Make sure the VHF communication system is operational (AMM 23-12-00/501).
  (b) Tune the left, right and center VHF transceivers to an authorized frequency.
  (c) Set the SUBFRAME to 0 and the WORD to 51.
  (d) On the audio selector panel, push the L VHF position.
  (e) Make sure the BIT (DISCRETE) 11 shows a 1.
  (f) Momentarily push the PTT switch on the captain's or first officer's control wheel.
  (g) Make sure the BIT (DISCRETE) 11 shows a 0.
  (h) On the audio selector panel, push in the R VHF.
  (i) Make sure the BIT (DISCRETE) 12 shows a 1.
  (j) Momentarily push the PTT switch on the captain's or first officer's control wheel.
  (k) Make sure the BIT (DISCRETE) 12 shows a 0.
  (l) Set the SUBFRAME to 0 and the WORD to 22.
  (m) On the audio selector panel, push the C VHF.
  (n) Make sure the BIT (DISCRETE) 2 shows a 1.
  (o) Momentarily push the PTT switch on the captain's or first officer's control wheel.
  (p) Make sure the BIT (DISCRETE) 2 shows a 0.

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S 865-191
(2) Set the VHF system back to its usual condition (AMM 23-12-00).

Y. HF Test

S 735-192
(1) Do the HF test that follows:
(a) Make sure the HF communication system is operational (AMM 23-11-00/501).
(b) Tune left and right HF transceivers to an authorized frequency.
(c) Set the SUBFRAME to 0 and the WORD to 51.
(d) Make sure the BIT (DISCRETE) 11 and 12 shows a 1.
(e) On the audio selector panel, push the L HF.
(f) Momentarily push PTT switch on the captain's or first officer's control wheel.
(g) Make sure the BIT (DISCRETE) 11 shows a 0.
(h) On the audio selector panel, push the R HF.
(i) Momentarily push the PTT switch on the captain's or first officer's control wheel.
(j) Make sure the BIT (DISCRETE) 12 shows a 0.

S 865-193
(2) Set the HF system back to its usual condition (AMM 23-11-00/501).

Z. DME Data Bus Test

S 735-194
(1) Do the DME data bus test that follows:
(a) Make sure the DME system is operational (AMM 34-55-00/501).
(b) On the P55 panel, set the captain's and the first officer's VOR/DME control to the MAN position.
(c) Set the SUBFRAME and WORD as shown in the table that follows.
(d) Make sure the DME shows the correct value as listed in the table.

TEST	TESTER SETUP		TEST COND DME DISTANCE ON RDMI	TESTER DISPLAY
	SUBFRAME	WORD		
LEFT DME	1	33	149.0 to 151.0	2250 to 2270
RIGHT DME	3	33	149.0 to 150.0	2250 to 2270

S 865-195
(2) Set the DME system back to normal.

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AA. ILS Data Bus Test

S 735-196

(1) Do the ILS data bus test that follows:
  (a) Make sure the ILS Navigation System is operational (AMM 34-31-00/501).
  (b) Set the SUBFRAME to 1 and the WORD to 50.
  (c) At the main equipment center, push and hold the self-test switch on the left ILS receiver located at the E1-3 rack.
  (d) Make sure the tester display shows between 0300 and 0367.
  (e) Release the test switch On the L ILS.
  (f) Set the SUBFRAME to 4 and the WORD to 50.
  (g) At the main equipment center, push and hold the self-test witch on the right ILS receiver located on the E1-5 rack.
  (h) Make sure the tester display shows between 0300 and 0367.
  (i) Release the test switch on the R ILS.
  (j) Set the SUBFRAME to 2 and the WORD to 50.
  (k) At the main equipment center, push and hold the self-test switch on the center ILS receiver located at the E1-4 rack.
  (l) Make sure the tester display shows between 0300 and 0367.

S 865-197

(2) Set the ILS system back to normal.

AB. Radio Altimeter Data Bus Test

S 735-198

(1) Do the radio altimeter data bus test that follows:
  (a) Make sure the Radio Altimeter System is operational (AMM 34-33-00/501).
  (b) Set the SUBFRAME to 3 and the WORD to 9.
  (c) At the main equipment center, push and hold test switch on the left RA located at the E5-1 rack.
  (d) Make sure the tester display shows between 0105 to 0106.
  (e) Release the test switch on the L RA.
  (f) Set the SUBFRAME to 4 and the WORD to 9.
  (g) Push and hold the test switch on the right RA.
  (h) Make sure the tester display shows between 0105 to 0106.
  (i) Release the test switch on the R RA.
  (j) Set the SUBFRAME to 2 and the WORD to 9.
  (k) Push and hold the test switch on the center RA.
  (l) Make sure the tester display shows between 0105 to 0106.

S 865-199

(2) Release the test switch on the C RA and set the RA system back to normal.

AC. Marker Beacon Test

S 735-202

(1) Do the marker beacon test that follows:
  (a) Make sure the marker beacon system is operational (AMM 34-32-00/501).

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(b) Set the SUBFRAME and WORD as shown in the table that follows.
(c) At the main equipment bay, push and hold the TEST switch on the left VOR/MRK receiver, located at the the E2-2 rack, for 5 seconds.
(d) Make sure the marker beacon shows the correct value as listed in the table.

TEST		TESTET SETUP		TESTER DISPLAY	
		SUBFRAME	WORD	BIT (DISCRETE)	VALUE
INNER MARKER	OFF	0	58	10	1
	ON				0
MIDDLE MARKER	OFF	0	58	11	1
	ON				0
OUTER MARKER	OFF	0	64	2	1
	ON				0

S 865-203
(2) Set the marker beacon system back to its usual condition (AMM 34-22-00/501).

AD. Stick Shaker Test

S 735-223
(1) Do the stick shaker test that follows:
(a) Make sure the stall warning system is operational (AMM 27-32-00/501).
(b) Set the SUBFRAME to 0 and the WORD to 27.
(c) On the miscellaneous test panel, set the switch to the L STALL POSITION .
(d) Make sure the BIT (DISCRETE) 1 shows a 0.
(e) Release the L STALL switch.
(f) Make sure the BIT (DISCRETE) 1 shows a 1.
(g) Set the SUBFRAME to 0 and the WORD to 59.

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(h) On the miscellaneous test panel, set the switch to the R STALL position.
(i) Make sure the BIT (DISCRETE) 11 shows a 0.
(j) Release the R STALL switch.
(k) Make sure the BIT (DISCRETE) 11 shows a 1.

S 865-224
(2) Set the stall warning system back to NORMAL.

AE. Main Gear Tilt Test

S 735-227
(1) Do the main gear tilt test that follows:
(a) Operate the 1L GEAR TILT switch S245 to simulate the air/ground relays to inflight mode (AMM 32-09-02/201).
(b) Set the SUBFRAME to 0 and the WORD to 24.
(c) Make sure the BIT (DISCRETE) 2 shows a 1.
(d) Remove the actuator from the sensor S245.
(e) Make sure the BIT (DISCRETE) 2 shows a 0.
(f) Operate the 1R GEAR TILT switch S246 to simulate air/ground relays to in flight mode (AMM 32-09-02/201).
(g) Set the SUBFRAME to 0 and the WORD to 56.
(h) Make sure the BIT (DISCRETE) 2 shows a 1.
(i) Remove the actuator the from sensor S246.
(j) Make sure the BIT (DISCRETE) 2 shows a 0.

AF. Wheel Brake Test

S 735-235
(1) Do the wheel brake test that follows:
(a) Make sure the parking brake is off.
(b) Set the SUBFRAME to 0 and the WORD to 6.
(c) Make sure the BIT (DISCRETE) 2 shows a 0.
(d) Apply pressure to the left brake.
(e) Make sure the BIT (DISCRETE) 2 shows a 1.
(f) Release pressure from the left brake.
(g) Set the SUBFRAME to 0 and the WORD to 38.
(h) Make sure the BIT (DISCRETE) 2 shows a 0.

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(i) Apply pressure to the right brake.
(j) Make sure the BIT (DISCRETE) 2 shows a 1.
(k) Release the pressure from the right brake.

AG. Air/Ground Discrete Test

S 735-237

(1) Do the air/ground test that follows:
(a) Make sure these circuit breakers on the overhead circuit breaker panel, P11, is closed:
1) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALTN (IF INSTALLED)
2) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2
(b) Set the SUBFRAME to 0 and the WORD to 16.
(c) Make sure the BIT (DISCRETE) 1 shows a 0.

WARNING: PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERATE AND CAUSE INJUIRES TO PERSONS AND DAMAGE TO EQUIPMENT.

(d) Prepare the safety-sensitive systems for air mode simulation (AMM 32-09-02/201).
(e) Open these P11 panel circuit breakers:
1) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALTN (IF INSTALLED)
2) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2
(f) Make sure the BIT (DISCRETE) 1 shows a 1.

S 865-238

(2) Close the P11 panel circuit breakers:
(a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALTN (IF INSTALLED)
(b) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-239

(3) Set the airplane back to the ground mode (AMM 32-09-02/201).

AH. Brake Pressure Test

S 865-241

(1) Prepare to do the brake pressure test.
(a) Make sure the two landing gear wheels are chocked.

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(b) Pressurize right and center hydraulic system and reservoir (AMM 29-11-00/201).
(c) On the control stand, P10, release the parking brake.

S 735-242
(2) Do the brake pressure test that follows:
(a) Set the SUBFRAME to 0 and the WORD to 15.
(b) Make sure the tester display shows between 00XX and 06XX.

NOTE: X = Don't care.

(c) Apply the left brake pressure on the brake pedal.
(d) Make sure the left two octal digits is between 30XX and 77XX.

NOTE: X= don't care.

(e) Apply pressure to the right brake pedal.
(f) Make sure the right two octal digits is between XX30 and XX70.

NOTE: X= don't care.

(g) Release the pressure on the brake pedal.
(h) Set the parking brake.

S 865-243
(3) Remove the pressure from the right and center hydraulic systems and reservoirs (AMM 29-11-00/201).

AI. Accelerometer Test

S 735-258
(1) Do the accelerometer test that follows:
(a) On the tester, set the SUBFRAME and WORD in table that follows.
(b) Make sure the tester display shows the correct data as shown in the table that follows.

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TEST	TESTER SETUP		TESTER DISPLAY
	SUBFRAME	WORD	
VERTICAL	0	50	3476 to 3661
LATERAL	0	47	4031 to 4213
LONGITUDINAL	0	46	4031 to 4213

AJ. Put the Airplane back to the usual condition.

S 865-554

(1) If you used the HHDLU, do the steps that follow:
   (a) Set the function switch on the flight recorder control panel to the NORM position.
   (b) Remove the HHDLU adapter cable from the flight data recorder.
   (c) Install the test plug to the test connector at the flight data recorder.
   (d) Close the lowered ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).

S 865-660

(2) If you used test equipment other than the HHDLU, do the steps that follow:
   (a) Turn the tester off.
   (b) Open the circuit breaker on the P11 panel and attach DO-NOT-CLOSE tag:
      1) 11J7, FLIGHT RECORDER AC
   (c) Disconnect the tester from the test connector at the P61 panel.
   (d) Remove the DO-NOT-CLOSE tag and close the P11 panel circuit breaker:
      1) 11J7, FLIGHT RECORDER AC

S 865-563

(3) Remove electrical power if it is no longer necessary (AMM 24-22-00/201).

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FLIGHT DATA RECORDER - MAINTENANCE PRACTICES

1. General
   A. Use the applicable copy recorder to make a copy of the flight data recorder (FDR) data.
   B. The FDR is installed in the voice and flight recorder rack, E7.

TASK 31-31-01-912-104

2. A Copy of the Data from the FDR with the Universal Copy Recorder
   A. General
      (1) The copy recorder makes a copy of the data from the Sundstrand tape based FDR without the removal of the FDR from the airplane. Approximately 30 minutes is necessary to make a copy of the data from the FDR.
      (2) The copy recorder is connected to the ATE connector on the front panel of the FDR.
   B. Equipment
      (1) UFDR Copy Recorder - Sundstrand 981-6024-002
      Sundstrand Aviation Division, P.O. Box 7002,
      4747 Harrison Ave., Rockford, IL 61101
      (2) Magnetic Tape
   C. References
      (1) AMM 24-22-00/201, Electrical Power - Control
      (2) AMM 25-22-02/401, Lower Ceiling Panel
   D. Access
      (1) Location Zone
      253 Area above passenger cabin ceiling (Left)

   E. Procedure

      S 862-105
      (1) Supply electrical power (AMM 24-22-00/201).

      S 862-106
      (2) Open these circuit breakers and attach DO-NOT-CLOSE tags:
      (a) On the overhead equipment panel, P11:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC

      S 862-107
      (3) Set the ON-NORM-TEST switch on the flight recorder control panel (FRCP) to the NORM position.

      S 012-115
      (4) At the aft galley, open the ceiling panel No. 1 to get access to the FDR (AMM 25-22-02/401).

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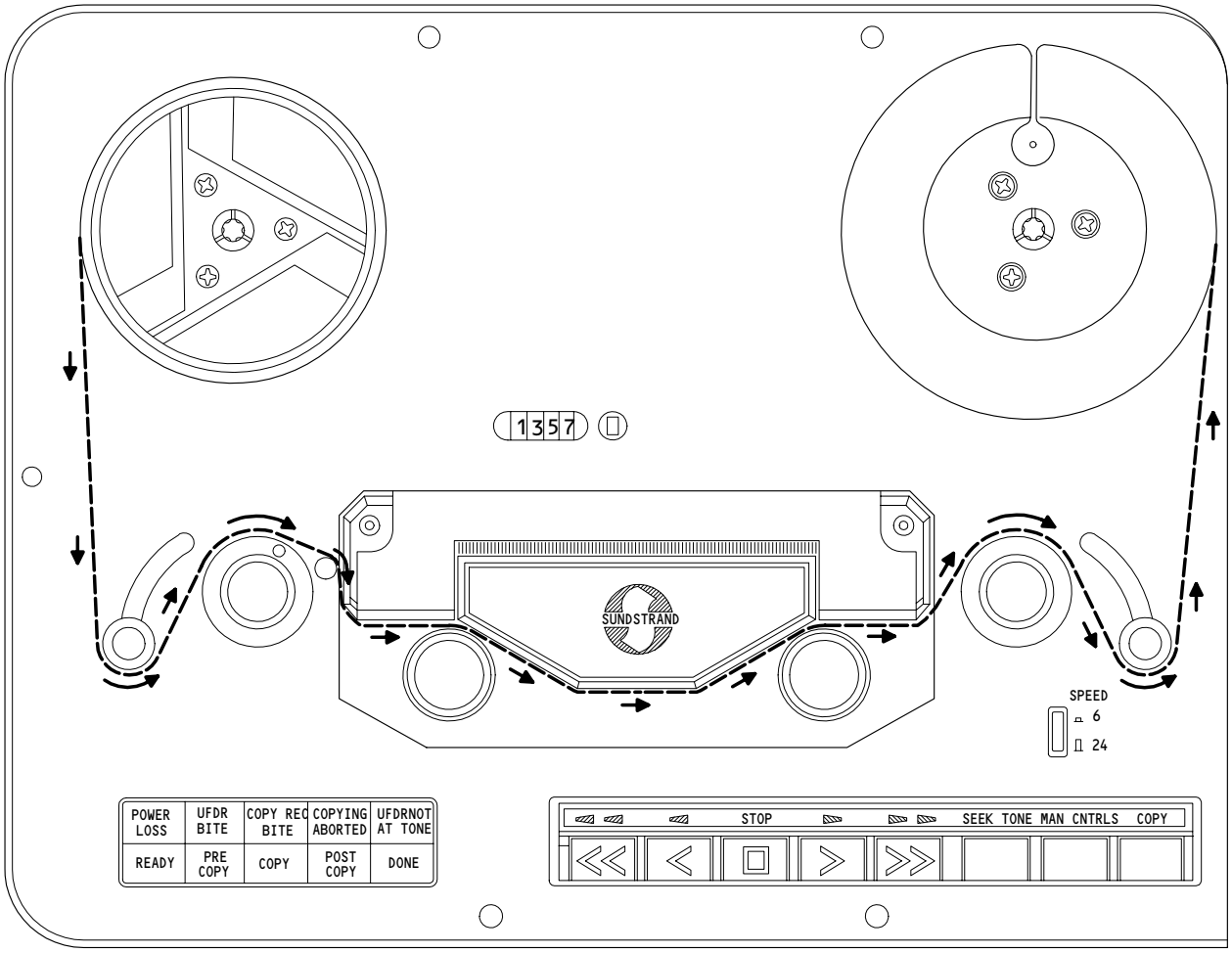

Copy Recorder
Figure 201

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S 432-116
(5) Connect the copy recorder to the front connector of the FDR with the cable supplied with the copy recorder.

S 862-117
(6) Set the tape speed switch to 6 IPS.

S 862-118
(7) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 862-317
(8) Set the ON-NORM-TEST switch on the FRCP to the ON position.
(a) Make sure the POWER LOSS light flashes.

S 862-128
(9) Push the STOP switch to remove the POWER LOSS light.
(a) Make sure the READY light comes on and the copy recorder is set to 6 IPS.

NOTE: If the COPY ABORTED light comes on when the power is supplied to the copy recorder, ignored the light.

S 862-130
(10) Install a full reel of tape on the left hub.

S 862-131
(11) Install an empty reel on the right hub.

S 862-132
(12) Put the tape along the path (Fig. 201).

S 862-134
(13) Wind the Tape 3 to 5 turns on the right reel.

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S 862-135
(14) Set the counter to zero.

S 862-136
(15) Turn the right reel counterclockwise until the counter shows 0003.

S 862-137
(16) Set the counter to zero.

S 862-138
(17) Push the COPY switch one time.

NOTE: Do not push the COPY switch again or the FDR will not find its initial position.

S 212-140
(18) Make sure the steps occur as follows:
(a) The light sequence is PRE COPY, COPY, POST COPY and DONE.
(b) The UFDR NOT AT TONE light will go off approximately 12 seconds before the DONE light comes on.
(c) The UFDR BITE, COPY REC BIT, POWER LOSS, and COPY ABORTED lights must stay off during the copy procedure.
(d) The copy recorder tape will go forward for approximately 1 minute after the POST COPY light turns on.
(e) When the copy procedure is completed, only the DONE light will stay on.

S 862-141
(19) Push the STOP switch.

S 862-142
(20) At the same time, push the MAN CNTRLS switch and the REWIND switch.

S 862-145
(21) Set the ON-NORM-TEST switch on the FRCP to the NORM position.

S 032-150
(22) Disconnect the copy recorder from the FDR.

S 862-151
(23) Put the connector cover on the front of the FDR.

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TASK 31-31-01-972-216

3. Make a Copy of the Flight Data with a Sundstrand Hand Held Download Unit

A. General

(1) This task uses a hand held download unit (HHDLU) to make a copy of the flight data from a flight data recorder that records on solid state.

(2) You can use the HHDLU to make a copy of the flight data without the removal of the solid state flight data recorder (FDR) from the airplane. A different procedure to access the flight data is to remove the FDR from the airplane (AMM 31-31-01/401). The data is then removed from the FDR.

(3) The ATE connector is on the front of the FDR.

B. Equipment

(1) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100 NW 62ND ST,
Fort Lauderdale, FL 33309

C. References

(1) AMM 24-22-00/201, Electrical Power - Control

(2) AMM 25-22-02/401, Lower Ceiling Panel

D. Access

(1) Location Zone
253 Area Above Passenger Cable Ceiling, LH

E. Prepare to Make a Copy of the Flight Data from the FDR

S 862-202

(1) Supply electrical power (AMM 24-22-00/201).

S 862-180

(2) Open these circuit breakers and attach DO-NOT-CLOSE tags:

(a) On the overhead equipment panel, P11:

1) 11J7, FLIGHT RECORDER AC

2) 11J8, FLIGHT RECORDER DC

S 012-212

(3) To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).

S 422-203

(4) Connect the connector of the HHDLU cable to the FDR ATE connector.

S 422-204

(5) Install the removable media into the HHDLU.

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S 862-183
(6) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 862-184
(7) At the P61 panel, set the ON-NORM-TEST switch on the flight recorder control panel (FRCP) to the ON position.

S 862-185
(8) Set the power switch, adjacent to the HHDLU's RS-422 port.

NOTE: Approximately 30 seconds after the power is supplied to the HHDLU, the main menu is shows on the HHDLU.

(a) Make sure the HHDLU display shows DNLD in the main menu.

F. Procedure

S 912-186
(1) Push the DNLD key.
(a) Make sure the DOWNLOAD MENU shows on the display.

NOTE: The maximum quantity of flight data the HHDLU can make a copy of is 27.2 hrs. If the file DOWNLOAD01.DLU already exists on the removable media, the HHDLU will change the filename until a filename that is not used is found. To change the time or filename, push the TIME or FILE key.

S 862-205
(2) Push the GO key.
(a) If the HHDLU display shows DISK FULL, do these steps:
1) Push a key.
a) Make sure the DELETE FILE menu shows on the display.

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2) Use the NEXT or PREV key to move up and down the filenames.
   a) Make sure the CONFIRM DELETE menu shows on the display.
3) Push the YES key to erase the file.
4) Erase files until sufficient memory is available to make a copy of the flight data.

   NOTE: After each file is erased, the HHDLU makes sure the HHDLU has sufficient memory, the HHDLU will start to make a copy.

5) Make sure the HHDLU display shows REC BLKS and XFER BLKS.

   NOTE: REC BLKS is the number of blocks the HHDLU will move to the removable media. XFER BLKS is the number of blocks the HHDLU will move from the FDR. The REC BLKS and XFER BLKS fields will change during the copy procedure.

(b) After the copy procedure is completed, push the key to show main menu.

G. Put the Airplane to Its Usual Condition

S 022-264
(1) Remove the media from the HHDLU.

S 862-208
(2) At the P61 panel, set the FRCP to the NORM position.

S 022-209
(3) Disconnect the interface cable from the FDR.

S 862-210
(4) Put the cover on the FDR ATE connector.

S 862-211
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FLIGHT DATA RECORDER - REMOVAL/INSTALLATION

1. General
   A. This subject has these tasks:
      (1) A removal of the flight data recorder (FDR).

TASK 31-31-01-004-027

2. Flight Data Recorder Removal (Fig. 401)
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 25-22-02/401, Lowered Ceiling Panels
   B. Access
      (1) Location Zone
          253 Area above passenger cabin ceiling (Left)
   C. Procedure

      S 864-029
      (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
          (a) On the overhead equipment panel, P11:
              1) 11J7, FLIGHT RECORDER AC
              2) 11J8, FLIGHT RECORDER DC

      S 014-030
      (2) To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).

      S 024-054

      CAUTION: DO NOT TOUCH THE CONNECTOR PINS OR OTHER CONDUCTORS ON THE FLIGHT DATA RECORDER. IF YOU TOUCH THESE CONDUCTORS, ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE FLIGHT DATA RECORDER.

      (3) To remove the FDR, do this task: E/E Box Removal (AMM 20-10-01/401).

          NOTE: If the replacement flight recorder does not have an underwater locator beacon (ULB) installed, do this task: Underwater Locator Beacon Removal (AMM 31-31-02/201).

TASK 31-31-01-404-034

3. Flight Data Recorder (FDR) Installation (Fig. 401)
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 24-22-00/201, Electrical Power Control

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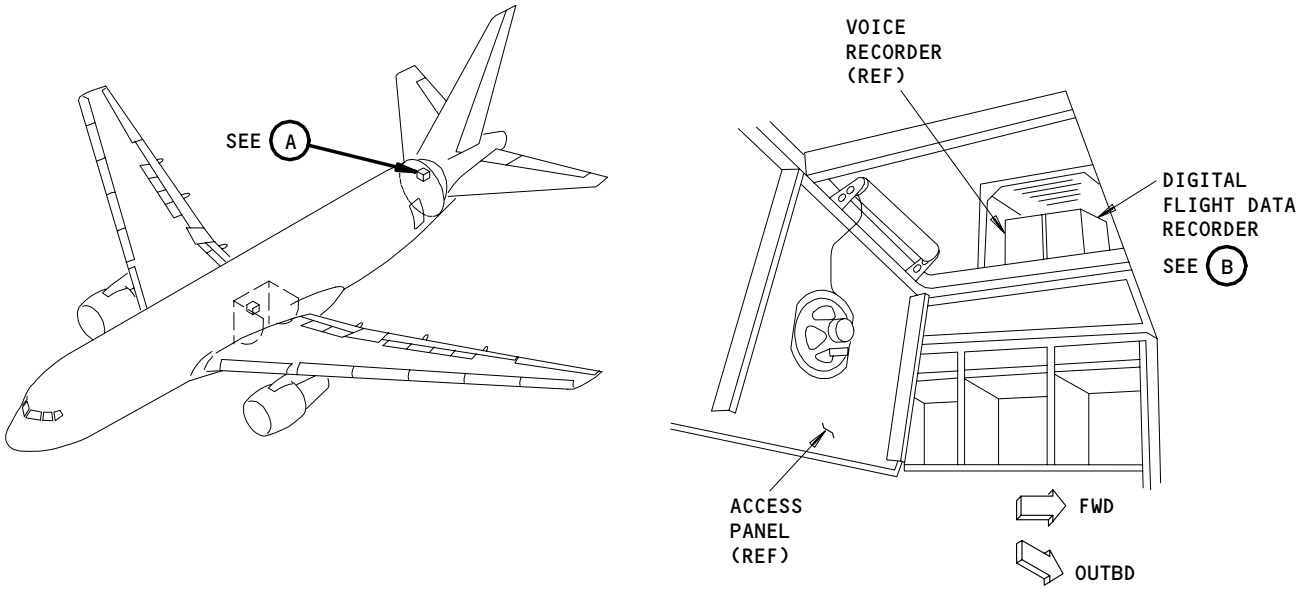
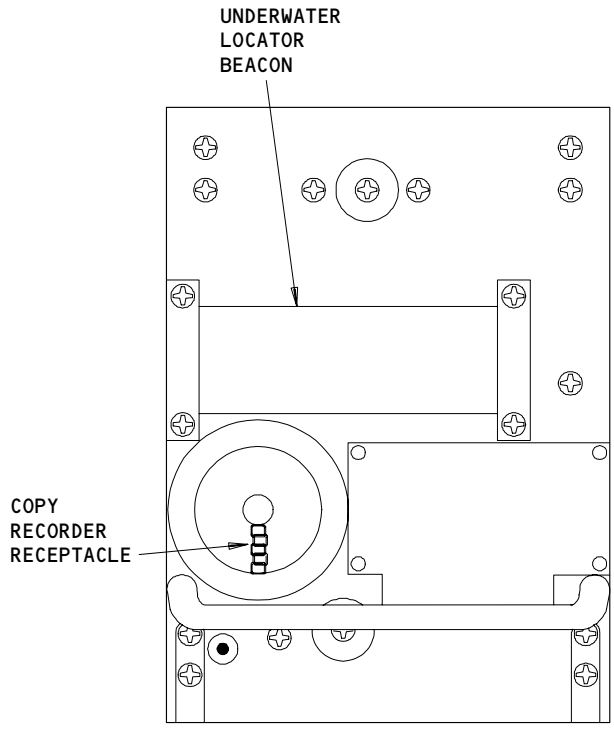


VOICE AND FLIGHT RECORDER
(ELECTRONIC EQUIPMENT RACK, E7)

A



DIGITAL FLIGHT DATA RECORDER

B

Digital Flight Data Recorder Installation
Figure 401 (Sheet 1)

D16215

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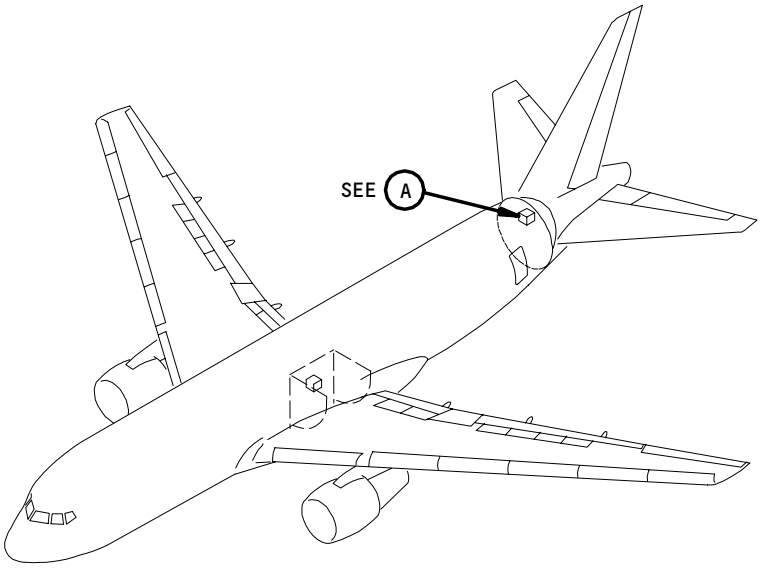
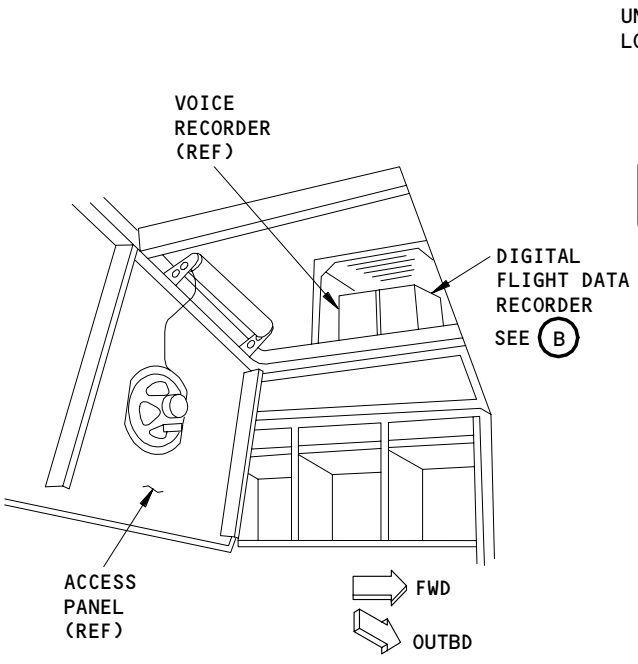
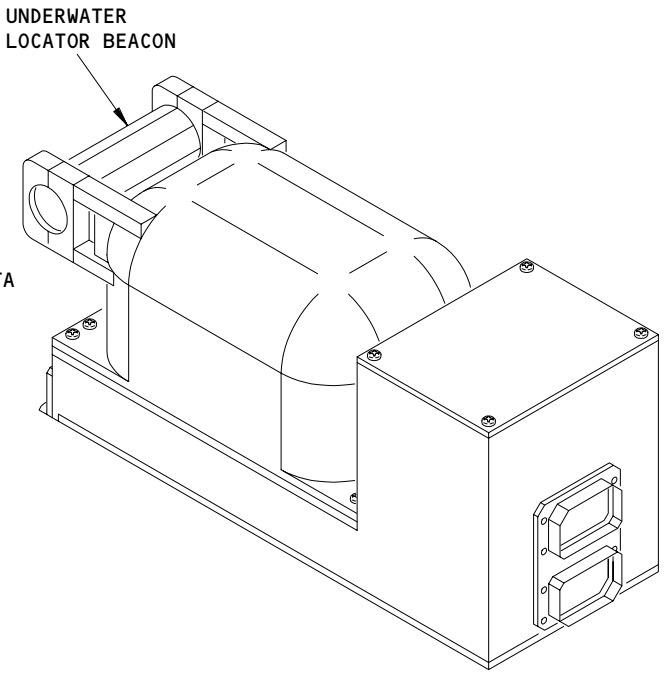




VOICE AND FLIGHT RECORDER
(ELECTRONIC EQUIPMENT RACK, E7)

A



DIGITAL FLIGHT DATA RECORDER

B

Digital Flight Data Recorder Installation
Figure 401 (Sheet 2)

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(3) AMM 25-22-02/401, Lower Ceiling Panel

B. Access

(1) Location Zone

253 Area above passenger cabin ceiling - section 46 (Left)

C. Procedure

S 864-035

(1) Make sure these circuit breakers are open:

(a) On the overhead equipment panel, P11:

1) 11J7, FLIGHT RECORDER AC

2) 11J8, FLIGHT RECORDER DC

S 424-055

CAUTION: DO NOT TOUCH THE CONNECTOR PINS OR OTHER CONDUCTORS ON THE FLIGHT DATA RECORDER. IF YOU TOUCH THESE CONDUCTORS, ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE FLIGHT DATA RECORDER.

(2) To install the FDR, do this task: E/E Box Installation (AMM 20-10-01/401).

NOTE: If the flight recorder does not have an underwater locator beacon (ULB) installed, do this task: "Underwater Locator Beacon Removal" (AMM 31-31-02/201).

S 864-040

(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:

(a) On the P11 panel:

1) 11J7, FLIGHT RECORDER AC

2) 11J8, FLIGHT RECORDER DC

S 414-041

(4) Close the lower ceiling panel No. 1 (AMM 25-22-02/401).

D. Installation Test

S 864-042

(1) Supply electrical power (AMM 24-22-00/201).

S 714-057

(2) On the flight recorder control panel (FRCP), do the steps that follow:

(a) Set the ON-NORM-TEST switch on the FRCP to the ON position.

1) Make sure the OFF light on the FRCP goes off.

(b) Set the ON-NORM-TEST switch on the FRCP to the NORM position.

1) Make sure the OFF light on the FRCP comes on.

S 864-052

(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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UNDERWATER LOCATOR BEACON (ULB) - MAINTENANCE PRACTICES

1. General
   A. This procedure has these tasks:
      (1) A removal of the underwater locator beacon (ULB).
      (2) A replacement of the ULB battery.
      (3) An operational test of the ULB.
      (4) An installation of the ULB.
   B. The underwater locator beacon (ULB) is attached to the front of the flight data recorder. The flight data recorder is installed on the E7 rack in the aft passenger compartment.

TASK 31-31-02-002-007

2. Underwater Locator Beacon Removal (Fig. 201)
   A. General
      (1) The ULB has a battery as the power source. The ULB has no external electrical connections.
   B. References
      (1) AMM 31-31-01/201, Digital Flight Data Recorder
      (2) AMM 25-22-02/401, Lowered Ceiling Panels
   C. Access
      (1) PASSENGER AIRPLANE;
          Location Zones
             253 Area Above Passenger Compartment Ceiling, Left - Section 46
             254 Area Above Passenger Compartment Ceiling, Right - Section 46
   D. Procedure

          S 012-008
      (1) PASSENGER AIRPRLANE;
          Open the lowered ceiling panel (AMM 25-22-02/401) to get access to the flight data recorder in the aft passenger compartment.

          S 022-065
      (2) Do this task: Remove the DFDR (AMM 31-31-01/201).

          S 022-068
      (3) Remove the underwater locator beacon from the flight data recorder:
          (a) Loosen the four screws that hold the ULB.
          (b) Remove the two screws and the clamp from one end of the ULB.
          (c) Remove the ULB.
          (d) Keep the two screws and the clamp.

TASK 31-31-02-962-009

3. FLIGHT DATA RECORDERS WITH DUKANE ULBs;
   Underwater Locator Beacon Battery Replacement (Fig. 202)
   A. General
      (1) This procedure contains these tasks:
          (a) A removal of the Dukane ULB Battery

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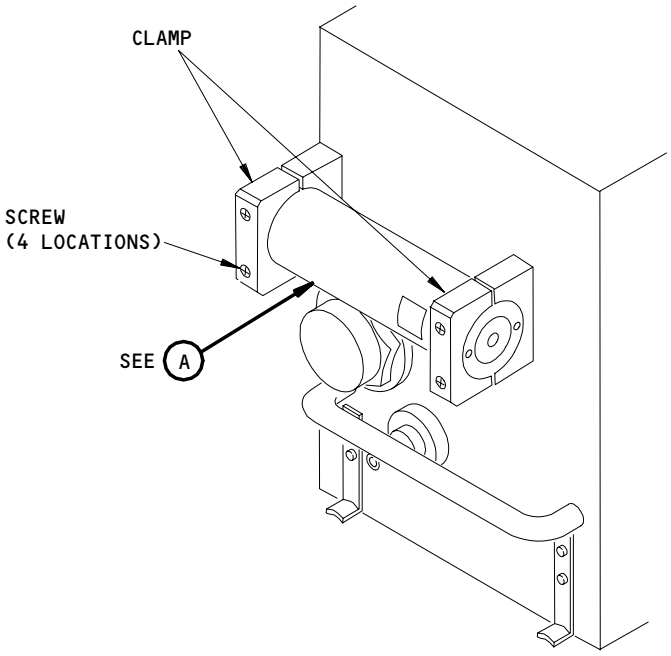
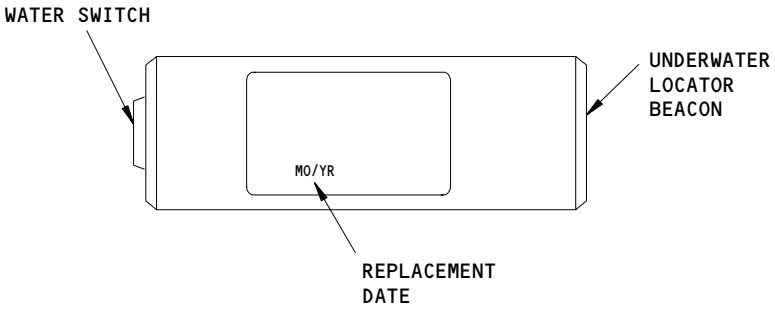


DIGITAL FLIGHT DATA RECORDER



UNDERWATER LOCATOR BEACON

A

Underwater Locator Beacon Installation
Figure 201 (Sheet 1)

E12730

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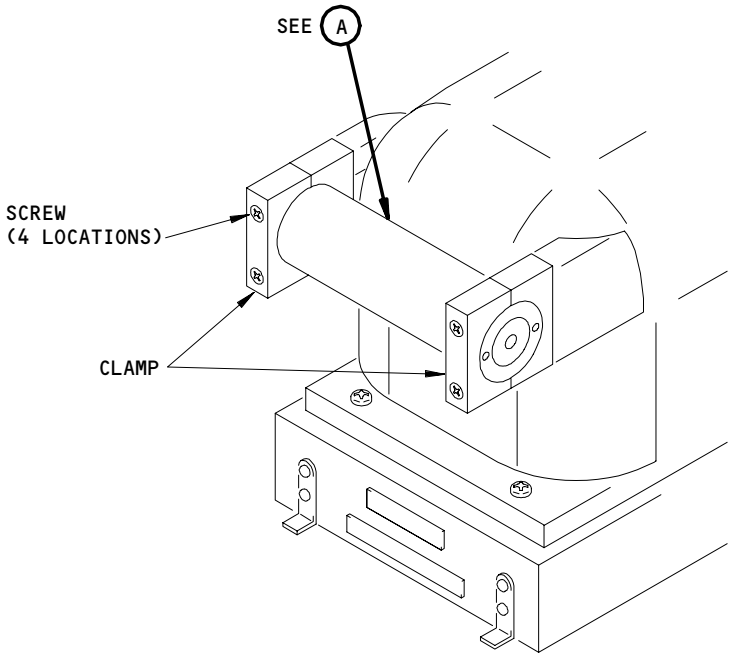
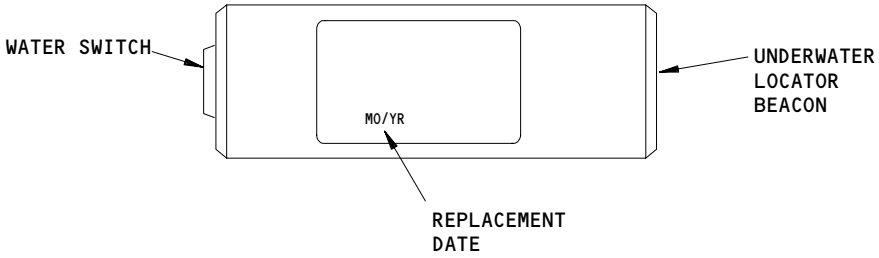


DIGITAL FLIGHT DATA RECORDER



UNDERWATER LOCATOR BEACON

A

Underwater Locator Beacon Installation
Figure 201 (Sheet 2)

E12732

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(b) An installation of the Dukane ULB Battery

B. Equipment

(1) 810-325, Spanner Wrench, Used on Underwater Locator Beacon
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174

(2) Split Radiator Hose
1-1/4-inch diameter, 5 inches in length

C. Consumable Materials

(1) G02440 Battery, Dukane 810-2007/K

D. Removal Procedure

S 512-034

WARNING: DO NOT REMOVE THE BATTERY FROM THE DK100/DK130 ULB. DO NOT CAUSE DAMAGE TO THE DK100/DK130 ULB. DO NOT DISCARD THE DK100 /DK130 ULB. THE MANUFACTURER HAS A REPLACEMENT PROGRAM FOR EXPIRED ULBs. ON OR BEFORE THE EXPIRED DATE, SEND THE DK100 /DK130 TO THE MANUFACTURER FOR SERVICING. THE BATTERY CONTAINS DANGEROUS CHEMICAL MATERIALS WHICH CAN CAUSE INJURIES TO PERSONNEL.

(1) If you have a DK100/DK130 ULB, send it to the manufacturer for servicing.

S 022-012

(2) If you do not have a DK100/DK130 ULB, remove the ULB battery:

CAUTION: DO NOT HOLD THE UNDERWATER LOCATOR BEACON WITH A VISE. THIS CAN CAUSE DAMAGE TO THE UNDERWATER LOCATOR BEACON.

(a) Hold the ULB body with a split radiator hose.
(b) Use a spanner wrench to remove the end cover that is identified BATTERY ACCESS.
(c) Remove the rubber shock cushion from the battery end if it is not removed with the cap.
(d) Hit the ULB body lightly to remove the battery.

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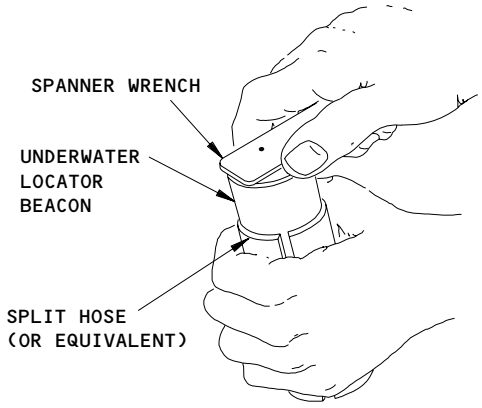

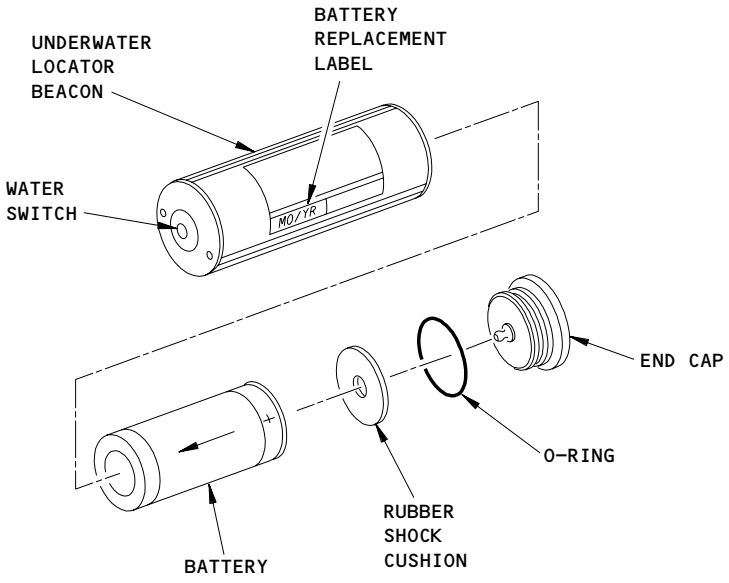

BATTERY INSTALLATION

Underwater Locator Beacon Battery Replacement
Figure 202

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E. Installation Procedure

S 422-012

(1) Install the ULB battery:

NOTE: The Dukane 810-2007/K battery is a 6 year lithium battery used in the Dukane model DK120/DK140 ULB.

(a) Put a new battery replacement date label on the ULB body.
(b) Write the next scheduled replacement date for the new ULB that you installed.

NOTE: The date label is blank so you can write in a replacement date based on your maintenance schedule.

CAUTION: INSTALL THE ULB BATTERY CORRECTLY. INCORRECT POLARITY WILL CAUSE PERMANENT DAMAGE TO THE ULB.

(c) Put the new battery in the ULB with the end identified by INSERT THIS END in first.
(d) Remove and discard the used O-ring from the end cap.

CAUTION: DIRT OR OTHER UNWANTED MATERIALS CAN CAUSE DAMAGE TO THE THREADS AND THE O-RING SEAL. THIS CAN PERMIT WATER LEAKAGE.

(e) Clean the threads and the O-ring groove in the ULB body.
(f) Apply a thin layer of lubricant to the O-ring, O-ring groove, and threads.
(g) Install a new O-ring on the end cap.
(h) Put the rubber shock cushion smoothly on the end cap.
(i) Put the end cap into the ULB body.
(j) Tighten the end cap until the cap flange touches the ULB body.

NOTE: Only use hand force on the spanner wrench.

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S 702-126

(2) Do a test of the Underwater Locator Beacon: Task 31-31-02-712-013.

TASK 31-31-02-962-031

4. FLIGHT DATA RECORDERS WITH TELEDYNE BENTHOS ULBs;
Underwater Locator Beacon Battery Replacement (Fig. 202)

A. General

(1) This procedure contains these tasks:

(a) Prepare for the removal of the Teledyne Benthos ULB Battery.

(b) A removal of the Teledyne Benthos ULB Battery.

(c) An installation of the Teledyne Benthos ULB Battery.

B. Equipment

(1) B362-09111, Torque Adapter, Used on Underwater Locator Beacon
Teledyne Benthos, Inc
49 Edgerton Drive
North Falmouth, MA 02556

(2) Split Radiator Hose
1-1/4-inch diameter, 5 inches in length

C. Consumable Materials

(1) B362-06192-2, Teledyne Benthos.

NOTE: B362-06192-2 contains a lithium battery P/N C362-04270-2, a 2-022 O-Ring, an O-Ring lubricant packet and replacement instruction.

D. Prepare for the Removal

S 862-141

(1) Measure the battery voltage of the ELP-362D ULB. Use a high-impedance digital voltmeter with a minimum input impedance of 10 Megohms.

(a) Put the negative meter lead on the water switch.

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(b) Put the positive meter lead on the bare aluminum surface of the beacon housing.
(c) Read the voltmeter.

E. Removal Procedure

S 512-035
(1) If the measured voltage is less than 6.0 Volts, send the ELP-362D ULB to the manufacturer for servicing.

S 022-033
(2) If the measured voltage is 6.0 Volts or more, remove the battery from the ELP-362D ULB:

CAUTION: DO NOT HOLD THE UNDERWATER LOCATOR BEACON WITH A VISE. THIS CAN CAUSE DAMAGE TO THE UNDERWATER LOCATOR BEACON.

(a) Hold the ULB body with a split radiator hose.
(b) Use the torque adapter to remove the end cap that is identified as BATTERY ACCESS.
(c) Turn the housing up to remove the battery from the unit.
(d) Discard the battery.

NOTE: Refer to local instructions when you discard the battery.

F. Installation Procedure

S 422-033
(1) Install the new ULB battery:

NOTE: The Teledyne Benthos C362-04270-2 battery is a six year battery.

(a) Set the the battery until the arrow points to the top end of the unit.

NOTE: The battery label has an arrow mark.

(b) On the date label, write the next scheduled replacement date for the new ULB that you installed.

NOTE: The date label is blank so you can write in a replacement date based on your maintenance schedule.

CAUTION: INSTALL THE ULB BATTERY CORRECTLY. INCORRECT POLARITY WILL CAUSE PERMANENT DAMAGE TO THE ULB.

(c) Put the new battery in the ULB with the end identified by INSERT THIS END in first.
(d) Remove the O-ring from is from its groove in the end cap.

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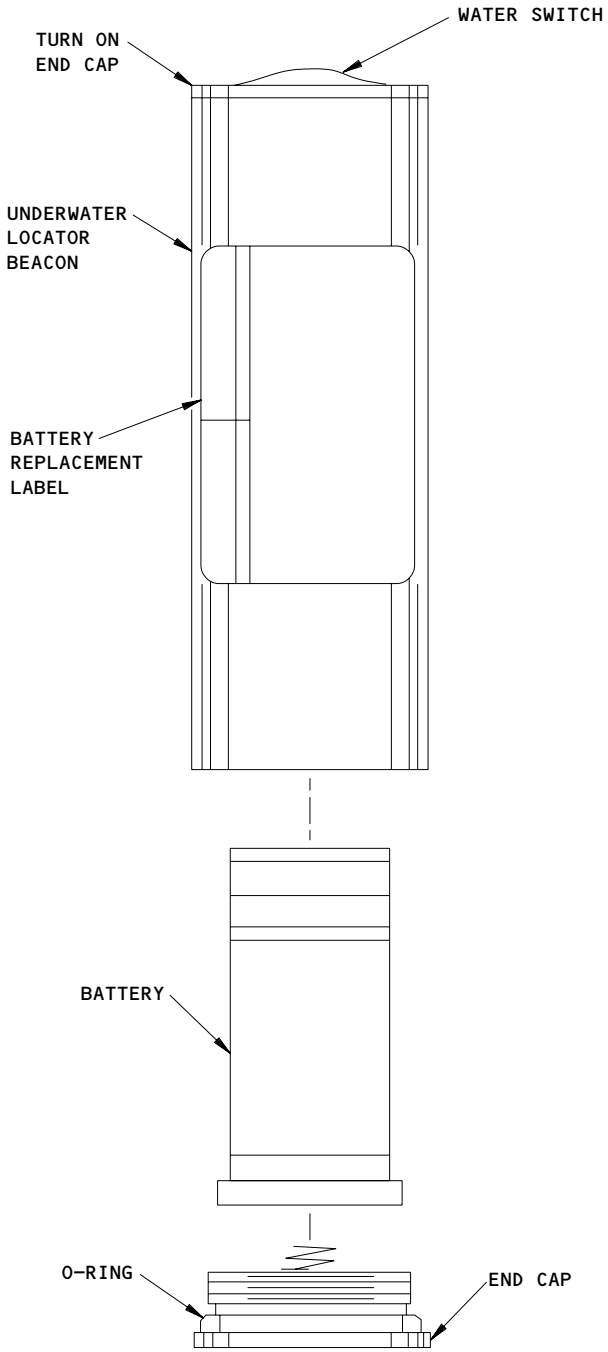

BATTERY INSTALLATION

Underwater Locator Beacon Battery Replacement
Figure 203

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CAUTION: DIRT OR OTHER UNWANTED MATERIAL CAN CAUSE DAMAGE TO THE THREADS AND THE O-RING SEAL. THIS CAN PERMIT WATER LEAKAGE.

(e) Clean the O-ring groove of dirt, lint, and other unwanted materials.
(f) Apply the O-ring lubricant to the new O-ring.
(g) Put the lubricated O-ring in the end cap groove.
(h) Attach the end cap to the housing.
(i) Use the torque adapter to install the end cap tightly.

NOTE: Only use hand force on the torque adapter.

(j) Torque the end cap to 25 to 30 inch-pounds.

S 702-127

(2) Do a test of the Underwater Locator Beacon: Task 31-31-02-712-013.

TASK 31-31-02-712-013

5. Underwater Locator Beacon - Operational Test

A. Equipment

(1) Ultrasonic Test Set, 42A12 Series (alternative)
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174

(2) Ultrasonic Test Set, PL1
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174

(3) PL3 Ultrasonic Test Set
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174

(4) Acoustic Test Set, ATS-260
Datasonics INC.
1400 Route 28A
Cataumet, MA 02534

(5) Ultrasonic Test Set, TS200
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174

B. Consumable Materials

(1) A00448 Tape-Adhesive

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C. Procedure

S 712-028

(1) If you have a 42A12C test set, do this test of the ULB:

NOTE: 42A12 can do a test for all Dukane and Teledyne Benthos ULBs.

(a) Put the test set approximately 3 feet from ULB.
(b) Set the OFF-GAIN control switch on test set to middle position.
1) Make sure that you hear sounds through the earphone on the test set.
(c) Set the TUNING CONTROL to 37 ±1 kHz.
(d) Set the INPUT SELECTOR switch to the INT position.
(e) Make sure the test set operates correctly.
1) Rub your thumb and fingers together in front of the microphone to make sure it operates.

NOTE: This will produce a rushing noise from the speaker.

a) Make sure you hear sounds through the test set earphone.
(f) Use any kind of tape to attach a piece of flexible metal conductor to the ULB case and the center of the water switch.

NOTE: This will make a short circuit from the center of the water switch to the outer part of the ULB.

1) Make sure you hear a pulsed tone at 1-second intervals.
(g) Remove the metal conductor from the ULB case and center of the water switch.
1) Make sure you do not hear a pulsed tone.
(h) Set the OFF-GAIN control switch to the OFF position.

S 712-029

(2) If you have a PL1 test set, do this test of the ULB:

NOTE: PL1 can only do a test for the DK100 ULB.

(a) Use tape to attach a flexible metal conductor to the ULB case and the center of the water switch.

NOTE: This will make a short circuit from the center of the water switch to the outer part of the ULB.

(b) Put the end of the test set against the ULB, approximately one inch from the water switch.
(c) Push and hold operation switch on the test set.
1) Make sure the BEACON ACTIVE WHEN FLASHING light flashes.
2) Remove the metal conductor from the ULB case and center of the water switch.

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3) Make sure the BEACON ACTIVE WHEN FLASHING light does not flash.

(d) Release the operation switch on the test set.

(e) Remove the test set.

S 862-072

(3) If you have a PL3 test set, do this test of the ULB.

NOTE: PL3 can only do a test for the DK100 and DK120 ULBs.

(a) Put the end of the PL3 test set against the ULB water switch.
1) Make sure you hear a tone.
2) Make sure the LED light flashes.

(b) Remove the PL3 test set from the ULB.

S 712-030

(4) If you have an ATS-260 test set, do this test of ULB:

NOTE: ATS-260 can only do a test for the ELP-362D ULB.

(a) Put the test set clip on the ULB.

(b) Push and hold the PUSH TO TEST button.

(c) Put the test set probe on the ULB water switch.
1) Make sure a green LED shows.
2) Make sure you can hear sounds from the test set.
3) Make sure the amber LED flashes.

(d) Release the PUSH TO TEST button.

(e) Remove the test set.

S 712-140

(5) If you have a TS100 Portable Test Set, do this test of the ULB:

NOTE: TS100 can only do a test for the DK100 and DK120 ULBs.

(a) Connect the probe head of the TS100 Test Set to the beacon in its mount.

(b) Slide the switch on the side of the Test Set housing to ON and make sure the LCD display on the TS100 Test Set shows TESTING.

(c) Press the button in the center of the TS100 Test Set to do a retest and make sure the LCD display shows TESTING.

(d) Make sure that within a few seconds, the LCD display shows BEACON PASSED.
1) If the LCD display shows one of these messages, take the applicable corrective action:
a) BATTERY FAULT (Beacon is not operating correctly)
b) NO PULSE OUTPUT (Beacon is not operating correctly)
c) PULSE FAULT (Beacon is not operating correctly)
d) FREE-RUN FAULT (Beacon is not operating correctly)
e) TEST SET FAULT (Replace Test Set batteries)
f) NEED SERVICE (Beacon is not operating correctly)

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g) OPEN PROBE/BATT (Probe is not correctly attached or beacon battery is dead).

(e) After approximately 10 seconds, the LCD display changes from the BEACON PASSED message to READY FOR TEST message.

(f) Remove the TS100 probe head from the beacon.

S 712-135

(6) If you have a TS200 test set, do this test of the ULB:

NOTE: TS200 can do a test for all Dukane ULBs.

(a) Attach the test probe clip of the test set to the beacon in its mount.

(b) Put the tip of the probe on the silver pad of the water switch at the end of the beacon.

1) The LCD display will show the battery voltage of the beacon.

(c) Refer to the applicable battery code for the minimum permitted range of the beacon battery voltage:

NOTE: Examine the battery replacement label to find the battery code.

1) Code A - 3.55 Volts
2) Code B - 2.97 Volts
3) Code C - 2.97 Volts
4) Code D - 2.97 Volts

(d) Push the red button on the test set.

1) The beacon starts and you hear a pinging noise from the test set.

(e) Remove the test probe clip of the test set from the ULB.

(f) Replace the ULB if necessary.

TASK 31-31-02-402-020

6. Underwater Locator Beacon Installation

A. Consumable Materials

(1) B00541 Detergent, General Purpose

B. References

(1) AMM 31-31-01/201, Digital Flight Data Recorder

(2) AMM 25-22-02/401, Lowered Ceiling Panels

C. Access

(1) PASSENGER AIRPLANE;
Location Zones
253 Area Above Passenger Compartment Ceiling, Left - Section 46
254 Area Above Passenger Compartment Ceiling, Right - Section 46

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D. Procedure

S 422-053

(1) Install the underwater locator beacon on the flight data recorder:
  (a) Make sure the water switch end of the ULB has no grease or dirt.
    1) Clean the water switch on the ULB with a weak detergent.
  (b) Put the ULB into its bracket.
  (c) Install the clamp on the end of the ULB with the two screws.
  (d) Make sure you can read the replacement date on the ULB.
  (e) Tighten the four screws.

S 422-066

(2) Do this task: Install the DFDR (AMM 31-31-01/201).

S 412-034

(3) PASSENGER AIRPLANE;
Close the lowered ceiling panels (AMM 25-22-02/401) in the aft passenger compartment.

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FLIGHT DATA ACQUISITION UNIT (FDAU) - MAINTENANCE PRACTICES

1. General
   A. The Flight Data Acquisition Unit (FDAU) is also referred to as the DFDAU, DFDMU, or DFDAMU.
   B. This procedure contains:
      (1) The DFDAU software configuration check.
      (2) An installation of the flight data acquisition unit (FDAU) software with the use of an airborne data loader.
      (3) An installation of the flight data acquisition unit (FDAU) software with the use of a portable data loader.
      (4) An installation of the flight data acquisition unit (FDAU) software with the use of the PCMCIA interface on the FDAU.
      (5) A task to make a copy of ACMS data from the FDAU to a PCMCIA card.
   C. DFDAU WITHOUT PCMCIA INTERFACE;
      These are the requirements for software installation in the DFDAU:
      (1) The DFDAU can accept software installation through an on-airplane data loader.
      (2) There is a data loader control panel with a DFDAU or ACMS switch position on the P61 panel.
      (3) There is an airborne data loader or an interface connector for a portable data loader on the P61 panel.
   D. DFDAU WITH PCMCIA INTERFACE;
      These are the requirements for software installation in the DFDAU:
      (1) There is a PCMCIA card interface on the front panel of the DFDAU.

TASK 31-31-03-702-046

2. DFDAU Software Configuration Check
   A. General
      (1) This procedure tells you how to make sure the correct DFDAU software is installed.
   B. References
      (1) AMM 24-22-00/201, Supply Electrical Power
   C. Access
      (1) Location Zone
          212 Flight Compartment - Right

   D. Procedure

      S 862-050
      (1) Do this task: Supply Electrical Power (AMM 24-22-00/201)

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S 712-047
(2) Make sure these circuit breakers are closed:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 862-086
(3) AIRPLANES WITH TWO SWITCHES ON THE DATA CONTROL PANEL (P61);
Make sure the upper switch on the data loader control panel is set to SINGLE SYS.

S 862-087
(4) Set the system select switch on the data loader control panel (P61) to the applicable position.
(a) DFDAU position for the FDAU mandatory software.
(b) ACMS position for the FDAU non-mandatory software.

S 702-082
(5) Do these steps to do the software configuration check of the DFDAU:

NOTE: You must know the correct DFDAU software part number for the DFDAU or the ACMS. For the DFDAU or the ACMS to be approved installation, the correct software part number must be installed.

(a) On the MCDU, do these steps:
1) Set the line select key (LSK) labeled ACMS
2) Set the LSK labeled VERSION.
a) Make sure the the screen shows VERSIONS.
b) Make sure the DFDAU mandatory software and the ACMS software part number are shown on the screen.

NOTE: If the software part number is not correct, then install the correct software (AMM 31-31-03/201) or replace the the DFDAU (AMM 31-31-03/401).

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3) Push the MENU function key to get back to the original screen.

S 022-088

(6) Do these steps to put the airplane back to its usual condition:
(a) Set the system select switch on the data loader control panel to NORMAL.
(b) Do this task: Remove Electrical Power (AMM 24-22-00/201).

TASK 31-31-03-402-001

3. Flight Data Acquisition Unit (FDAU) Software Installation with an Airborne Data Loader (ADL)

A. General

(1) This procedure tells you how to install software in the flight data acquisition unit (FDAU).
(a) The FDAU must contain these pieces of software:
1) Mandatory FDAU software
2) ACMS non-mandatory FDAU software
(2) An airborne data loader (ADL) and a control display unit (CDU) are necessary for this procedure.
(3) The airplane must be on the ground with the engines shut down before you can install software.
(4) Some airlines keep the circuit breaker for the data loader open when the data loader is not necessary. This increases the length of time that the data loader is serviceable. Make sure this circuit breaker is closed before you start the procedure:
(5) To read about software installation times and data loaders, do this task: On-Airplane Software Installation - Maintenance Practices (AMM 20-15-11/201).
(a) Circuit Breaker Panel, P11:
1) 11G24, DATA LOADER

B. Reference

(1) AMM 20-15-11/201, On-Airplane Software Installation - Mainrenance Pratices
(2) AMM 24-22-00/201, Electrical Power Control

C. Access

(1) Location Zone
212 Flight Compartment - Right

D. Procedure

S 862-002

(1) Do this task: Supply Electrical Power (AMM 24-22-00/201).

S 702-003

(2) Make sure this circuit breaker is closed:
(a) On the P11, panel:
1) 11G24, DATA LOADER

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S 412-004

(3) Do these steps to prepare for the software installation:
  (a) Make sure you know the correct software part number for the FDAU. For the FDAU to be an approved installation, the correct software part number must be installed.
  (b) Make sure the system select switch on the data loader control panel (P61) is set to NORMAL.
  (c) AIRPLANES WITH ONE SWITCH ON THE DATA LOADER CONTROL PANEL (P61);
  Set the system select switch on the data loader control panel to the applicable position.
    1) DFDAU position to install the mandatory FDAU software.
    2) ACMS position to install the non-mandatory FDAU software.
  (d) AIRPLANES WITH TWO SWITCHES ON THE DATA LOADER CONTROL PANEL (P61);
  Do these steps at the data loader control panel:
    1) Set the upper switch to SINGLE SYS.
    2) Set the system select switch to the applicable position.
      a) DFDAU position to install the mandatory FDAU software.
      b) ACMS position to install the non-mandatory FDAU software.

S 022-005

(4) Do these steps to install the software:
  (a) Put the correct disk in the disk drive.
  (b) Follow the prompts on the data loader to complete the installation.
    1) If a prompt on the data loader does not show do the following:
    2) Open these P11 panel circuit breakers:
      a) 11J7, FLIGHT RECORDER AC
      b) 11J8, FLIGHT RECORDER DC
    3) Close these P11 panel circuit breakers:
      a) 11J7, FLIGHT RECORDER AC

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b) 11J8, FLIGHT RECORDER DC

4) If there is more than one disk to install, wait for 10 seconds after each disk is completed before you remove and install the next disk.

NOTE: CHNG, CHANGE DISK, DISK CHANGE and INSERT DISK are examples of data loader prompts for a subsequent disk.

(c) Remove the disk from the disk drive when the software installation is completed.

NOTE: COMP, LOAD COMPLETE, and TRANSF COMPLETE are examples of data loader prompts for a complete installation.

S 862-006

(5) Set the system select switch on the data loader control panel to NORMAL.

S 862-089

(6) Do the task: DFDAU Software Configuration Check (AMM 31-31-03/201).

S 862-090

(7) Do these steps to put the airplane back to its usual condition:
(a) Set the system select switch on the data loader control panel to NORMAL.
(b) Do this task: Remove Electrical Power (AMM 24-22-00/201).

TASK 31-31-03-472-009

4. Flight Data Acquisition Unit (FDAU) Software Installation with a Portable Data Loader (PDL)

A. General

(1) This procedure tells you how to install software in the flight data acquisition unit (FDAU).
(a) The FDAU must contain these pieces of software:
1) Mandatory FDAU software
2) ACMS non-mandatory FDAU software

(2) A portable data loader (PDL), PDL interface connector on the P61 panel, and a control display unit (CDU) are necessary for this procedure.

(3) A PDL is not a Boeing supllied part. Refer to the PDL supplier for instructions for operation. PDLs have a disk drive for software installtion from disks. Some PDLs have an internal mass storage device. If the software is stored in the PDL, then disks are not necessary.

(4) The airplane must be on the ground with the engines shutdown before you can install software.

(5) To read about software installation times and data loaders, do this task: On-Airplane Software Installation - Maintenance Practices (AMM 20-15-11/201).

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B. Reference
(1) AMM 20-15-11/201, On-Airplane Software Installation - Mainrenance Pratices
(2) AMM 24-22-00/201, Electrical Power Control

C. Equipment
(1) Data Loader (or alternative tool)
(a) 11615-02 Loader - Data, Portable, ARINC 615-3 (alternative).
Qualtair Equipment and Engineering (Vendor Code 1HEC2)
15720 Mill Creek Boulevard, Suite 200, Mill Creek, WA 98012
(b) 11615-20 Loader - Data, Portable, ARINC 615-3, Includes Mass Storage Device (alternative)
Qualtair Equipment and Engineering (Vendor Code 1HEC2)
15720 Mill Creek Boulevard, Suite 200, Mill Creek, WA 98012
(c) 18000-02 Loader - Data, Portable, ARINC 615/A with Mass Storage Device (alternative)
Qualtair Equipment and Engineering (Vendor Code 1HEC2)
15720 Mill Creek Boulevard, Suite 200, Mill Creek, WA 98012
(d) 2231560-1-B Loader - Data, Portable, ARINC 615 with 2-3.5-Inch Disk Drives (alternative).
Teledyne Controls (Vendor Code 98571)
12333 W. Olympic Blvd., Los Angles, CA 90064-1021
(e) 30100 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Demo Systems, Inc. (Vendor Code OBAW0)
379 Science Dr., MoorPark, CA 93021
(f) 465130-01-01 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Litton Systems, Inc. (Vendor Code 30782)
6101 Condor Drive, Moorpark, CA 93021-2602
(g) 80000-03-01010203 Loader - Data, Portable, ARINC 615/A with Mass Storage Device (alternative)
Demo Systems, Inc. (Vendor Code OBAW0)
379 Science Dr., MoorPark, CA 93021
(h) 964-0400-024 Loader - Data, Portable, ARINC 615, 3.5-Inch Diskette, 1 MEGABYTE Database (Alternative)
Honeywell, Inc. (Vendor Code 97896)
15001 N.E. 36th St., P.O. Box 97001, Redmond WA 98073-9701
(i) 964-0400-025 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Honeywell, Inc. (Vendor Code 97896)
15001 N.E. 36th St., P.O. Box 97001, Redmond WA 98073-9701
(j) 964-0400-055 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Honeywell, Inc. (Vendor Code 97896)
15001 N.E. 36th St., P.O. Box 97001, Redmond WA 98073-9701
(k) YV68A110 Loader - Data, Portable, ARINC 615 (alternative)
SFIM (Vendor Code F6158)
SA 13 AV Marcel Ramofo Garmier, Massy, 91301 France

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D. Access
(1) Location Zone
212 Flight Compartment - Right

E. Procedure

S 862-010
(1) Do this task: Supply Electrical Power (AMM 24-22-00/201).

S 412-011
(2) Do these steps to prepare for the software installation:
(a) Make sure you know the correct software part number for the FDAU. For the FDAU to be an approved installation, the correct software part number must be installed.
(b) Make sure the system select switch on the data loader control panel (P61) is set to NORMAL.

CAUTION: MAKE SURE THE DATA LOADER CIRCUIT BREAKER IS OPEN BEFORE YOU CONNECT OR REMOVE THE DATA LOADER CABLE. IF THE CIRCUIT BREAKER IS NOT OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open this circuit breaker and attach a DO-NOT-CLOSE tag:
1) Circuit Breaker Panel, P11:
a) 11G24, DATA LOADER

CAUTION: MAKE SURE THE POWER SWITCH FOR THE PORTABLE DATA LOADER IS SET TO OFF BEFORE YOU CONNECT OR REMOVE THE INTERFACE CABLE. IF THE POWER SWITCH IS NOT OFF, DAMAGE TO THE PORTABLE DATA LOADER CAN OCCUR.

(d) Connect the interface cable of the portable data loader, to the DATA TRANSFER UNIT RECEPTACLE on the P61 panel.
(e) Remove the DO-NOT-CLOSE tag and close this circuit breaker:
(f) Circuit Breaker Panel, P11:
1) 11G24, DATA LOADER
(g) AIRPLANES WITH ONE SWITCH ON THE DATA LOADER CONTROL PANEL (P61);
Set the system select switch on the data loader control panel to the applicable position.
1) DFDAU position to install the mandatory FDAU software.
2) ACMS position to install non-mandatory FDAU software.
(h) AIRPLANES WITH TWO SWITCHES ON THE DATA LOADER CONTROL PANEL (P61);
Do these steps at the data loader control panel:
1) Set the upper switch to SINGLE SYS.
2) Set the system select switch to the applicable position:
a) DFDAU position to install the mandatory FDAU software
b) ACMS position to install the non-mandatory FDAU software

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S 022-012
(3) SOFTWARE INSTALLATION WITH A PDL DISK DRIVE;
Do these steps to install the software:

NOTE: For more information on how to use the data loader, refer to the supplier's instructions for the data loader.

(a) Set the power switch on the data loader to the ON position.
(b) Put the correct disk in the disk drive.
(c) Follow the prompts on the data loader to complete the installation.
1) If there is more than one disk to install, wait 10 seconds after each disk is completed before you remove and install the subsequent disk.

NOTE: CHNG, CHANGE DISK, DISK CHANGE and INSERT DISK are examples of data loader prompts for a subsequent disk.

(d) Remove the disk from the disk drive when the software installation is completed.

NOTE: COMP, LOAD COMPLETE, and TRANSF COMPLETE are examples of data loader prompts for a complete installation.

S 862-125
(4) SOFTWARE INSTALLATION WITH A PDL MASS STORAGE DEVICE;
Follow the PDL supplier instructions to install the software.

S 862-013
(5) Set the system select switch on the data loader control panel to NORMAL.

S 862-126
(6) Set the power switch on the PDL to the off position.

S 022-014
(7) Do the task: DFDAU Software Configuration Check (AMM 31-31-03/201).

S 022-015
(8) Do these steps to put the airplane back to its usual condition:

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CAUTION: MAKE SURE THE DATA LOADER CIRCUIT BREAKER IS OPEN BEFORE YOU CONNECT OR REMOVE THE DATA LOADER CABLE. IF THE CIRCUIT BREAKER IS NOT OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Open this circuit breaker and attach a DO-NOT-CLOSE tag:
    1) Circuit Breaker Panel, P11:
        a) 11G24, DATA LOADER
(b) Remove the interface cable from the DATA TRANSFER UNIT RECEPTACLE.
(c) Remove the DO-NOT-CLOSE tag and close this circuit breaker:
    1) Circuit Breaker Panel, P11:
        a) 11G24, DATA LOADER
(d) Do this task: Remove Electrical Power (AMM 24-22-00/201).

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FLIGHT DATA ACQUISITION UNIT - REMOVAL/INSTALLATION

1. General
   A. Two tasks are provided in this procedure. The first task is the removal of the flight data acquisition unit (FDAU) and the second task is the installation of the FDAU.
   B. The FDAU (M138) is located in the main equipment center E2. All electrical connections are made through connectors at the rear of the unit.

TASK 31-31-03-004-026

2. Flight Data Acquisition Unit (FDAU) Removal
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
   B. Access
      (1) Access Panel
          119BL Main Equipment Center
   C. Removal Procedure

      S 014-081
      (1) Open these circuit breakers and attach DO-NOT-CLOSE Tags:
          (a) On the overhead equipment panel, P11:
              1) 11J7, FLIGHT RECORDER AC
              2) 11J8, FLIGHT RECORDER DC

      S 014-089

      CAUTION: DO NOT TOUCH THE CONNECTOR PINS OR OTHER CONDUCTORS ON THE FLIGHT DATA ACQUISITION UNIT. IF YOU TOUCH THESE CONDUCTORS, ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE FLIGHT DATA ACQUISITION UNIT.

      (2) Remove the FDAU from the E2-3 equipment rack (AMM 20-10-01/401).

TASK 31-31-03-404-025

3. Flight Data Acquisition Unit (FDAU) Installation
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 24-22-00/201, Electrical Power Control

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(3) AMM 31-31-03/201, Flight Data Acquisition Unit (FDAU) - Maintenance Practices

B. Access

(1) Access Panel
119BL Main Equipment Center

C. Procedure

S 864-004

(1) Make sure these circuit breakers are open:
(a) On the overhead equipment panel, P11:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-060

CAUTION: DO NOT TOUCH THE CONNECTOR PINS OR OTHER CONDUCTORS ON THE FLIGHT DATA ACQUISITION UNIT. IF YOU TOUCH THESE CONDUCTORS, ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE FLIGHT DATA ACQUISITION UNIT.

(2) Install the FDAU (AMM 20-10-01/401).

D. FDAU Test

S 704-064

(1) On the flight recorder control panel (FRCP), do the steps that follow:
(a) Make sure that the OFF light on the flight recorder control panel (FRCP) is on.
(b) Set the function switch on the FRCP to the TEST position.
1) Make sure that the OFF light on the FRCP goes off.
(c) Release the function switch on the FRCP.
1) Make sure the OFF light on the FRCP is on.

E. SAS 278;
DFDAU Software Configuration Check

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S 704-115
(1) Do this task: Software Configuration Check task (AMM 31-31-03/201).

S 864-114
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FLIGHT RECORDER CONTROL PANEL - REMOVAL/INSTALLATION

1. General
   A. There are two task procedure in this subject. The first task is the removal of the flight recorder control panel (FRCP) and the second task is the installation of the FRCP.

TASK 31-31-04-004-001

2. Remove the Flight Recorder Control Panel (FRCP)
   A. Access
      (1) Location Zone
          212 Flight Compartment - Section 41 (Right)

   B. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11C23, INTERPHONE CABIN SERVICE
          (b) 11J7, FLIGHT RECORDER AC
          (c) 11J8, FLIGHT RECORDER DC

      S 034-003
      (2) Loosen the screws that hold the FRCP to the side panel.

      S 864-004
      (3) Move the FRCP out of the side panel.

      S 034-005
      (4) Disconnect the electrical connectors from the FRCP.

      S 024-006
      (5) Remove the FRCP from the side panel.

TASK 31-31-04-404-007

3. Install the Flight Recorder Control Panel
   A. References
      (1) AMM 23-41-00/501, Service Interphone

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(2) AMM 24-22-00/201, Eletrical Power Control

B. Access

(1) Location Zone

212 Flight Compartment - Section 41 (Right)

C. Procedure

S 864-008

(1) Make sure these circuit breakers are open:

(a) 11C23, INTERPHONE CABIN SERVICE

(b) 11J7, FLIGHT RECORDER AC

(c) 11J8, FLIGHT RECORDER DC

S 434-009

(2) Install the electrical connectors to the FRCP.

S 864-010

(3) Move the FRCP into the right side panel.

S 434-011

(4) Tighten the screws that hold the FRCP to the side panel.

S 864-012

(5) Remove the DO-NOT-CLOSE tags and close these circuit breakers:

(a) 11C23, INTERPHONE CABIN SERVICE

(b) 11J7, FLIGHT RECORDER AC

(c) 11J8, FLIGHT RECORDER DC

D. Flight Recorder Control Panel Test

S 864-013

(1) Supply the electrical power (AMM 24-22-00/201).

S 214-014

(2) Make sure the OFF light on the FRCP is on.

S 864-016

(3) Momentarily set the function switch on the FRCP to the TEST position.

S 214-017

(4) Make sure the OFF light goes off.

S 864-018

(5) Set the SERV INTPH switch to the ON position.

S 864-019

(6) Make a service interphone voice communication from the audio selector panel to an exterior jack location (AMM 23-41-00/501).

S 864-021

(7) Set the SERV INTPH switch to the OFF position.

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S 864-020

(8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FLIGHT RECORDER (3-AXIS) ACCELEROMETER - REMOVAL/INSTALLATION

1. General
   A. Two tasks are provided in this subject. The first task is the removal of the accelerometer. The second task is the installation of the accelerometer.
   B. The accelerometer is mounted on a bracket attached to the inboard wall of the left main landing gear wheel well. The accelerometer measures vertical, longitudinal and lateral accelerometer for input to the flight recorder system.

TASK 31-31-05-004-001

2. Remove the Accelerometer (Fig. 401)
   A. References
      (1) AMM 32-00-15/201, Landing Gear Door Ground Operation and Locking Procedure
      (2) AMM 32-00-20/201, Landing Gear Downlocks
   B. Access
      (1) Location Zone
          731 Main Landing Gear

   C. Procedure

      S 864-046
      (1) Open these overhead panel P11 circuit breakers and attach DO-NOT-CLOSE tags:
          (a) 11J7, FLIGHT RECORDER AC
          (b) 11J8, FLIGHT RECORDER DC

      S 834-003
      (2) Make sure the main gear downlock pins are installed (AMM 32-00-20/201).

      S 914-004

      WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

      (3) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

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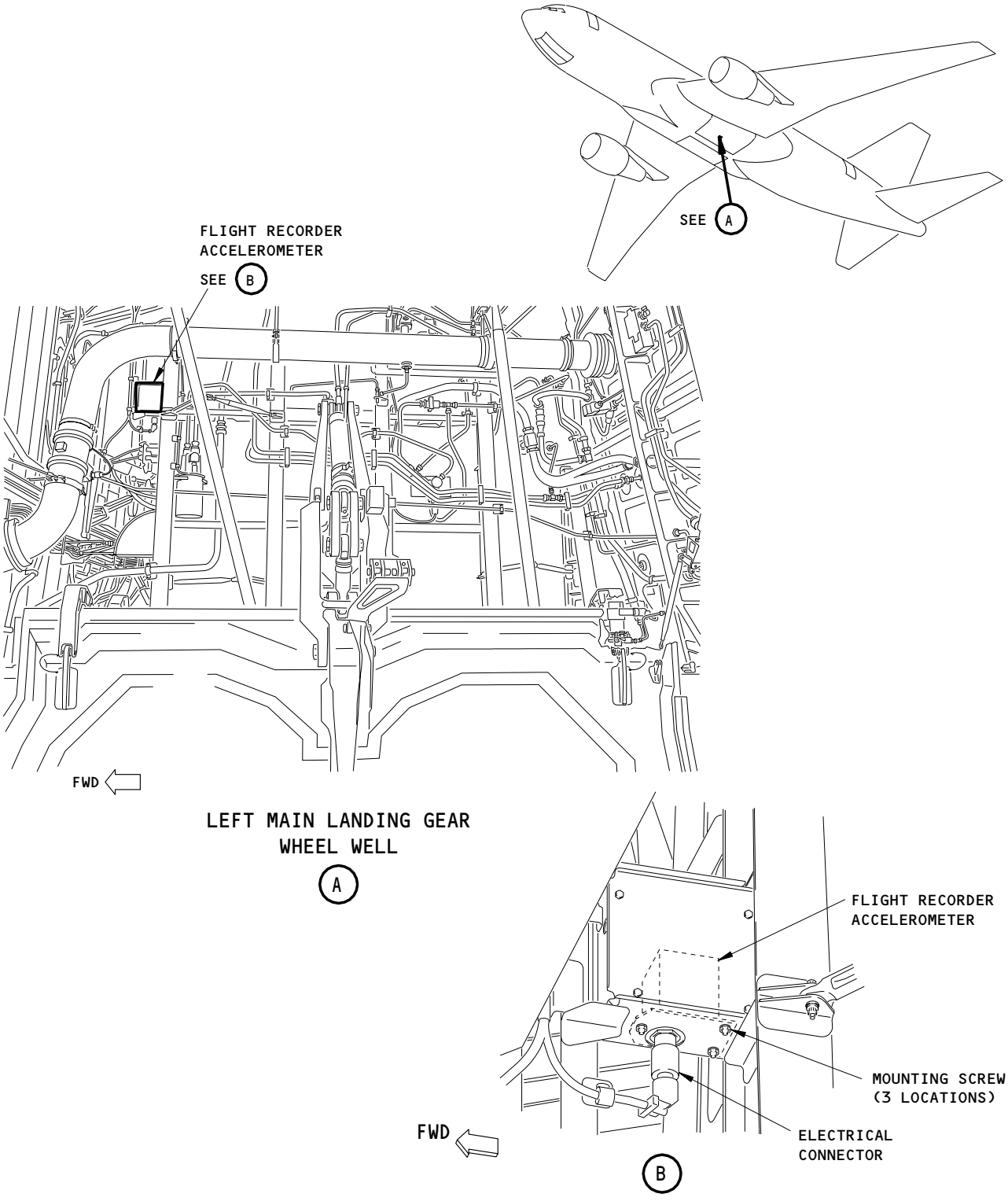

Flight Recorder Accelerometer Installation
Figure 401

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S 024-035
(4) Remove the cover to get access to the accelerometer.

S 034-005
(5) Disconnect the electrical cable from the accelerometer.

S 024-006
(6) Remove the screws from the accelerometer.

S 034-007
(7) Remove the accelerometer from the airplane.

TASK 31-31-05-404-008

3. Install Accelerometer (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power
      (2) AMM 25-22-02/401, Lower Ceiling Panel
      (3) AMM 32-00-15/201, Landing Gear Door Ground Operation and Locking Procedure
   B. Equipment
      (1) Portable Tester - Teledyne P/N 2222786 Teledyne Controls, 12333 W. Olympic BLVD., West Los Angeles, CA 90064
      (2) A31007-1 Adapter Cable - Tester
      (3) 981-6301-002 Data Signal Display Unit (DSDU) Alliedsignal Air Transport Avionics P.O. BOX 97001 15001 NE 36TH ST Redmond, WA 98073-9701
      (4) A31007-49 Adapter Cable - Tester (recommended) A31007-30 Adapter Cable - Tester (alternative)
      (5) 964-0446-001 Hand Held Download Unit (HHDLU) 27914 Allied-Signal Inc., DBA Allied-Signal Aerospace 2100NW 62ND ST, Fort Lauderdale, FL 33309
      (6) 704-2567-001 Adapter cable - Tester
      (7) Multi-Purpose AIDS Display Unit (MADU) - AACO INC FAA-0032-001; AACO INC., 5011 Barton Place, Seattle, WA 98118

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(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls, 12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(9) A31007-59 Adapter Cable - Tester

C. Access
(1) Location Zone
253 Area above passenger cabin ceiling, Left.
212 Flight Compartment - Right Side
731 Main Landing Gear

D. Procedure

S 864-009
(1) Make sure these overhead panel P11 circuit breakers are open:
(a) 11J7, FLIGHT RECORDER AC
(b) 11J8, FLIGHT RECORDER DC

S 424-010
(2) Install the accelerometer to the mounting bracket.

S 434-011
(3) Connect the electrical cable to the accelerometer.

S 424-036
(4) Install the access cover of the accelerometer.

S 944-055

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Remove the doors locks from landing gear doors and close the doors (AMM 32-00-15/201).

E. Accelerometer Test

S 864-075
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

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S 864-078
(2) If you use the hand held download unit (HHDLU), do these steps:

NOTE: The HHDLU can only be connected to the Allied-Signal flight data recorder (FDR).

(a) To get access to the FDR, open the lowered ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).
(b) Attach the HHDLU to the test connector at the front side of the flight data recorder.

S 864-015
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-047
(4) Supply electrical power (AMM 24-22-00/201).

S 864-021
(5) If you use the Teledyne tester (P/N 2222786), set the control switches as follows:
(a) Set the POWER switch to the ON position.
(b) Set the READOUT switch to the ACFT DATA position.
(c) Set the UPDATE switch to the AUTO position.
(d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
(e) Set the DATA switch to the 12 BIT position.
(f) Set the SUBFRAME and WORD as specified.

S 864-022
(6) If you use the DSDU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the on Position.
(b) Set the SYNC switch to SYNC B.
(c) Set the INPUT switch to the ARINC INPUT DATA position.
(d) Set the OCTAL DISPLAY switch to 12 BITS.
(e) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.

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(f) Set the SUBFRAME and WORD as specified.

S 864-073

(7) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the red button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.
(e) In the BASE SELECT menu, set OCT for octal values.
(f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

S 864-079

(8) If you use the MADU tester, set the control switches as follow:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch, then enter numeric 5 on the MADU.
(c) Push the DATA switch, then numeric 03.
(d) Push the FUN switch, then numeric 03 for SUBFRAME.
(e) Push the DATA switch, then numeric 4 for WORD.
(f) Set the SUBFRAME and WORD as specified.

S 864-066

(9) If you use the teledyne tester (2229738), set the control switches as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT key.
(c) Set the SUBFRAME and WORD as specified.

S 864-007

(10) Set the SUBFRAME to 0 and the WORD to 60.

S 704-008

(11) Make sure the tester shows between 3476 and 3661.

F. Put the airplane back to the usual condition.

S 864-074

(1) If you used the HHDLU, do the steps that follow:
(a) Set the function switch on the flight recorder control panel to the NORM position.
(b) Push the red button on top of the HHDLU.
(c) Remove the HHDLU adapter cable from the flight data recorder.
(d) Install the test plug to the test connector at the flight data recorder.

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(e) Close the lowered ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).

S 864-076

(2) If you used test equipment other than the HHDLU, do the steps that follow:
   (a) Turn the tester off.
   (b) Open these P11 panel circuit breakers:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC
   (c) Disconnect the tester from the right side of the P61 panel.
   (d) Install the test plug to the test connector at the P61 panel.
   (e) Close these P11 panel circuit breakers:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC

S 864-050

(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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STABILIZER TRIM-HANDLE POSITION SWITCH - REMOVAL/INSTALLATION

1. General
   A. Two task are provided in this procedure. The first task is the removal of the stabilizer trim handle position switch. The second task is the installation of the switch.
   B. The switch is located at the right side of the control stand P10.

TASK 31-31-07-004-001

2. Remove the Stabilizer Trim Handle Position Switch
   A. References
      (1) AMM 29-11-00/201, Main Hydraulic Systems
      (2) AMM 76-11-10/401, Control Stand Lever's Rails, Covers, and Seals
   B. Access
      (1) Location Zone
          212 Flight Compartment - Right Side
   C. Procedure

S 864-001

WARNING: REMOVE THE ELECTRICAL POWER FROM THE FLIGHT COMPARTMENT SEATS. FAILURE TO DO SO CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.

(1) Open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
   (a) 6H15, CAPT SEAT
   (b) 6J21, F/D SEAT

S 864-013

(2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
   (a) 11J6, ACMS SENSOR
   (b) 11J7, FLIGHT RECORDER AC
   (c) 11J8, FLIGHT RECORDER DC

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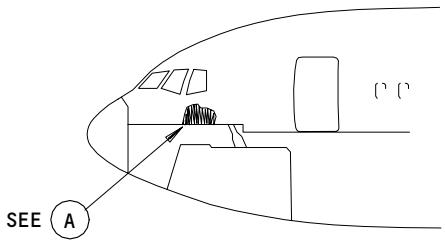

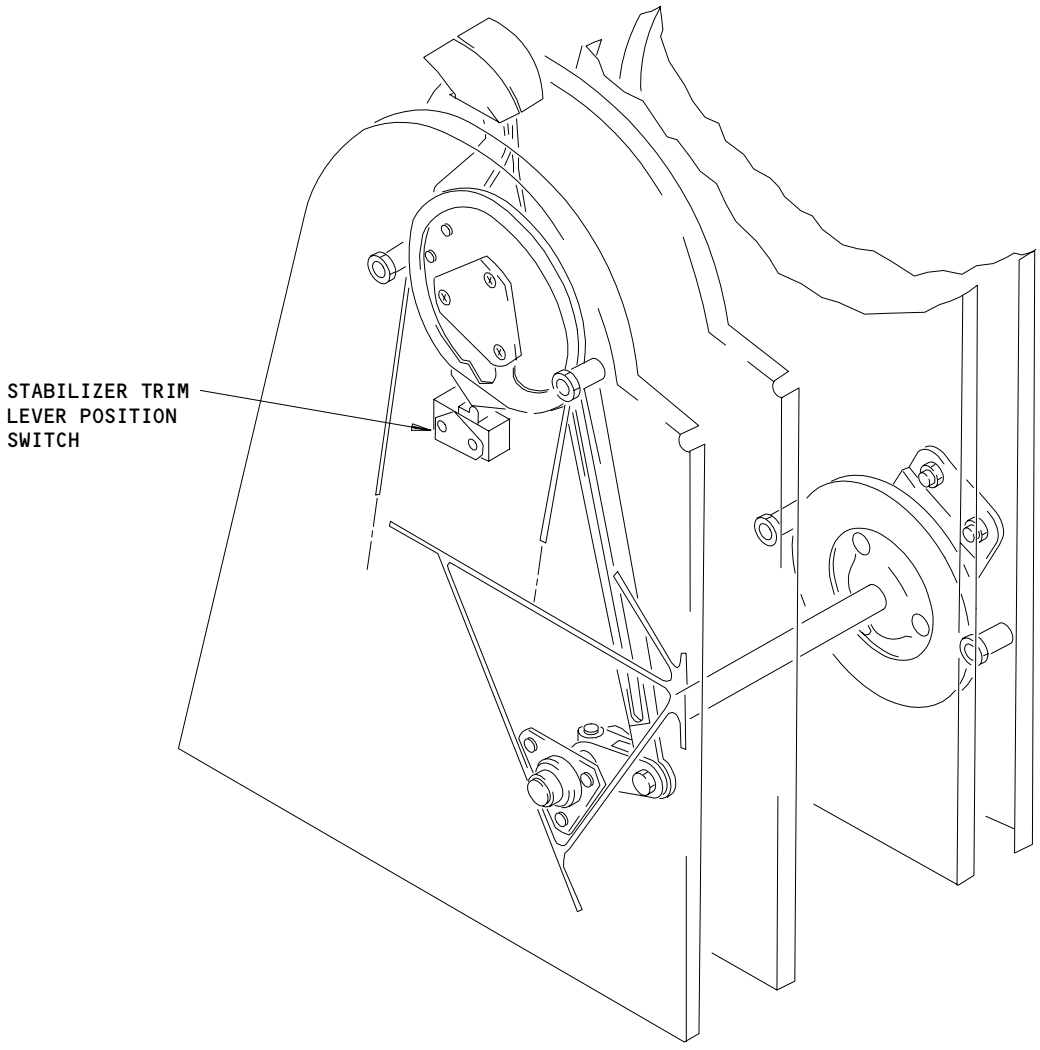

CONTROL STAND (P10)

A

Stabilizer Trim Handle Position Switch Installation
Figure 401

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S 864-033
(3) Make sure the hydraulic power is not available to the airplane (AMM 29-11-00/201).

S 864-004
(4) Make sure the STAB TRIM handle is in the NEUTRAL position.

S 914-005
(5) Do the Control Stand Lever's Rails, Covers and Seals removal procedure (AMM 76-11-10/401).

S 034-006
(6) Remove the access panel from the right side of the control stand P10.

S 034-007
(7) Disconnect the switch's electrical wire from the terminal points in the control stand, P10.

S 034-008
(8) Remove the screws that hold the switch.

S 034-015
(9) Remove the switch from the plate assembly.

S 034-014
(10) Remove the shim from the plate assembly.

TASK 31-31-07-404-009

3. Install Stabilizer Trim Handle Position Switch (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Eletrical power control
      (2) AMM 29-11-00/201, Main Hydraulic Systems
      (3) AMM 76-11-10/401, Control Stand Lever's Rails, Covers, and Seals
   B. Equipment
      (1) 981-6301-002 Data Signal Display Unit (DSDU)
          Alliedsignal Air Transport Avionics
          P.O. BO 97001
          15001 NE 36TH ST
          Redmond, WA 98073-9701

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(2) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(3) Portable Tester - Teledyne P/N 2222786
(alternative)
Teledyne Controls,
12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(4) A31007-1 Adapter Cable - Tester
(5) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(6) 704-2567-001 Adapter cable - Tester
(7) Multi-Purpose AIDS Display Unit (MADU) - AACO INC FAA-0032-001
AACO INC.,
5011 Barton Place,
Seattle, WA 98118
(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls,
12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(9) A31007-59 Adapter Cable Tester

C. Access
(1) Location Zone
253 Area above passenger cabin ceiling, Left.
212 Flight Compartment - Right Side

D. Procedure

S 864-010
(1) Make sure the STAB TRIM handle is in the NEUTRAL position.

S 434-011
(2) Install the shim to the plate assembly.

S 434-009
(3) Install the switch to the plate assembly.

S 434-012
(4) Install the screws that hold the switch.

S 434-014
(5) Connect the electrical wires to the terminal points in the control
stand, P10.

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E. Test Stabilizer Trim Handle Position Switch

S 014-040
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

S 014-041
(2) If you use the hand held download unit (HHDLU), attach the HHDLU to the test connector at the front side of the flight data recorder.

NOTE: To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401). The HHDLU is to be used on the Alliedsignal solid state FDR only.

S 864-022
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J6, ACMS SENSOR
2) 11J7, FLIGHT RECORDER AC
3) 11J8, FLIGHT RECORDER DC

S 864-034
(4) Supply the electrical power (AMM 24-22-00/201).

S 864-020
(5) If you use the DSDU tester, set the control switches as follows:
(a) Set the POWER switch to the ON position.
(b) Set the INPUT DATA SELECTOR switch to ARINC INPUT DATA.
(c) Set the SYNC switch to the SYNC B position.
(d) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.
(e) Set the OCTAL DISPLAY switch to 12 BITS.
(f) Set the SUBFRAME and WORD as specified.

S 864-044
(6) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the red button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.
(e) In the BASE SELECT menu, set OCT for octal values.

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(f) Set the SUBFRAME and WORD as specified.

NOTE: The HHDLU do not have a selection for subframe 0. Make a selection of subframe ALL or subframe 1 thru 4 when a task uses subframe 0.

S 864-026

(7) If you use the Teledyne tester (P/N 2222786), set the control switches as follows:
(a) Set the POWER switch to the ON position.
(b) Set the READOUT switch to the ACFT DATA position.
(c) Set the UPDATE switch to the AUTO position.
(d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
(e) Set the DATA switch to the 12 BIT position.
(f) Select the SUBFRAME and WORD as specified.
(g) Set the SUBFRAME and WORD as specified.

S 864-045

(8) If you use the teledyne tester (2229738), set the control switches as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT key.
(c) Set the SUBFRAME and WORD as specified.

S 864-046

(9) If you use the MADU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch, then enter numeric 5 on the MADU.
(c) Push the DATA switch, then numeric 03.
(d) Push the FUN switch, then numeric 03 for SUBFRAME.
(e) Push the DATA switch, then numeric 4 for WORD.
(f) Set the SUBFRAME and WORD as specified.

S 864-005

(10) Set the STAB TRIM handle to the not in detent position.

S 864-007

(11) On the tester, set the SUBFRAME to 0 and the WORD to 48.
(a) Make sure the BIT (DISCRETE) 2 shows a 0.

S 864-036

(12) Set the STAB TRIM handle to the detent position.
(a) Make sure the BIT (DISCRETE) 2 shows a 1.

S 864-037

(13) Set the STAB TRIM handle to the NEUTRAL position.

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F. Put the airplane back to the usual condition.

S 864-042
(1) If you used the HHDLU, do the steps that follow:
  (a) Set the function switch on the flight recorder control panel to the NORM position.
  (b) Push the red button on top of the HHDLU.
  (c) Remove the HHDLU adapter cable from the flight data recorder.
  (d) Install the test plug to the test connector at the flight data recorder.

S 864-043
(2) If you used test equipment other than the HHDLU, do the steps that follow:
  (a) Turn the tester off.
  (b) Open these P11 panel circuit breaker:
    1) 11J7, FLIHT RECORDER AC
    2) 11J8, FLIGHT RECORDER DC
  (c) Disconnect the tester from the right side of the P61 panel.
  (d) Instsall the test plug to the test connector at the P61 panel
  (e) Close these P11 panel circuit breakers:
    1) 11J7, FLIGHT RECORDER AC
    2) 11J8, FLIGHT RECORDER DC

S 434-029
(3) Install the access panel to the right side of the control stand P10.

S 914-030
(4) Do the Control Stand Lever's Rails, Covers and Seals installation procedure (AMM 76-11-10/401).

S 864-012
(5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the power distribution panel.
  (a) 6H15, CAPT SEAT
  (b) 6J21, F/O SEAT

S 864-031
(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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CONTROL COLUMN POSITION TRANSDUCER - REMOVAL/INSTALLATION

1. General
   A. Two tasks are provided in this procedure. The first task is the removal of the control column position transducer. The second task is the installation of the transducer.
   B. The control column position transducer is installed on the pilot's column torque tube.

TASK 31-31-08-004-001

2. Remove the Captain's Control Column Position Transducer (Fig. 401)
   A. References
      (1) AMM 20-10-24/201, Rig Pins - Maintenance Practices
      (2) AMM 29-11-00/201, Main Hydraulic System
   B. Equipment
      (1) A20004-XX Rig Pin Set (AMM 20-10-24/201)
          (a) A20004-22 Rig Pin E-1
          (b) A20004-22 Rig Pin E-2
   C. Access
      (1) Location Zone
          113 Area Forward of NLG Wheel Well (Left)

   D. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11J6, FLIGHT RECORDER SENSOR
          (b) 11J7, FLIGHT RECORDER AC
          (c) 11J8, FLIGHT RECORDER DC

      S 864-003
      (2) Make sure the hydraulic power is not available to the airplane (AMM 29-11-00/201).

      S 864-004
      (3) Push the L, C, and R TAIL FLT CONTROL SHUTOFF switches on the P61 panel to the OFF position.

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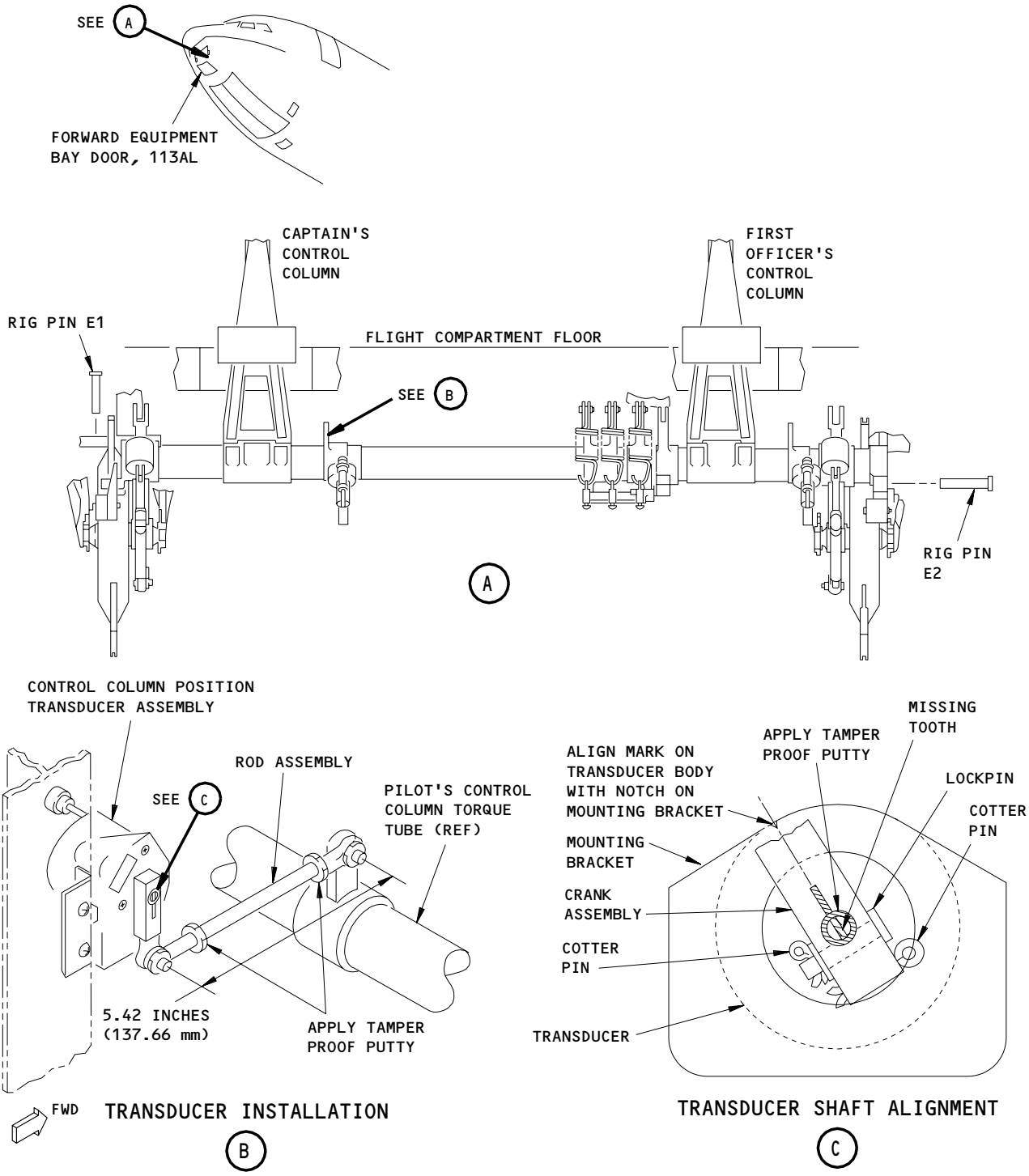

CAPTAIN'S CONTROL COLUMN POSITION TRANSDUCER

Control Column Position Transducer Installation
Figure 401

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S 214-005
(4) Make sure the OFF indicators are on.

S 864-006
(5) Open these overhead panel P11 circuit breakers and attach DO-NOT-CLOSE tags:
(a) 11H17, FLT CONT SHUTOFF TAIL L
(b) 11H18, FLT CONT SHUTOFF TAIL CENTER
(c) 11H27, FLT CONT SHUTOFF TAIL R

S 864-007
(6) Set the control column in the neutral position.

S 864-008
(7) Attach the DO-NOT-OPERATE tag to the captain and F/O control wheels.

S 834-009
(8) Install the rig pins E1 and E2 in the control column torque tube.

S 034-010
(9) Disconnect the control column position transducer electrical connector.

S 034-011
(10) Remove the cotter pin from the lockpin in the crank assembly.

S 034-012
(11) Remove the washer and the pin.

S 034-013
(12) Remove the crank assembly from the transducer shaft.

S 034-014
(13) Remove the screws that hold the transducer shaft to the mount plate.

S 024-015
(14) Remove the transducer.

TASK 31-31-08-404-016

3. Install the Captain's Control Column Position Transducer (Fig. 401)

A. References
(1) AMM 20-10-24/201, Rig Pins

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(2) AMM 24-22-00/201, Electrical Power Control
(3) AMM 25-22-02/401, Lower Ceiling Panel
(4) AMM 29-11-00/201, Main Hydraulic System

B. Equipment

(1) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701
(2) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(3) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(a) AIRPLANES WITH FDR P/N 980-4700-042;
The HHDLU must have mod 1 completed.
(4) 704-2567-001 HHDLU Adapter Cable - Tester
(5) Portable Tester - Teledyne 2222786; Teledyne Controls, 12333 W. Olympic Blvd., West Los Angeles, CA 90064
(6) A31007-1 Adapter cable - Tester
(7) Multi-Purpose AIDS Display Unit (MADU) - AACO Inc FAA-0032-001; AACO INC, 5011 Barton Place, Seattle, WA 98118
(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls, 12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(9) A31007-59 Adapter Cable - Tester
(10) A20004-XX Rig Pin Set (AMM 20-10-24/201)
(a) A20004-22 Rig Pin E-1
(b) A20004-22 Rig Pin E-2

C. Consumable Materials

(1) A00226 Compound - Sealing BMS 8-45 (Tamper Proof Putty)

D. Access

(1) Location Zone
113 Area Forward of NLG Wheel Well (Left)

253 Area above passenger cabin ceiling, Left.
212 Flight Compartment - Right Side

E. Procedure

S 864-017
(1) Make sure the control column is in the neutral position.

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S 424-018
(2) Install the control column position transducer to the transducer bracket.

S 214-019
(3) Make sure the transducer body align mark is aligned with the notch on the transducer bracket.

S 434-020
(4) Install the screws that hold the transducer.

S 434-021
(5) Install the crank assembly on the transducer shaft so the crank's index mark is aligned with the missing tooth on the shaft.

S 434-022
(6) Install the pin and the washer in the crank assembly.

S 434-023
(7) Install the cotter pin in the crank assembly.

S 864-024
(8) Apply the tamper proof putty to the crank index mark on the crank assembly.

S 434-025
(9) Connect the electrical connector to the transducer.

S 834-026
(10) Remove the E1 and E2 rig pins from the control column torque tube.

S 864-029
(11) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
(a) 11H17, FLT CONT SHUTOFF TAIL L
(b) 11H18, FLT CONT SHUTOFF TAIL CENTER
(c) 11H27, FLT CONT SHUTOFF TAIL R
(d) 11J6, ACMS SENSOR

F. Prepare for the Installation Test

S 864-126
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

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S 864-127

(2) If you use the hand held download unit (HHDLU), attach the HHDLU to the test connector at the front side of the flight data recorder.

NOTE: To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401). The HHDLU is used on the AlliedSignal solid state FDR only.

S 414-131

(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
   (a) On the P11 panel:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC

S 864-129

(4) Supply electrical power (AMM 24-22-00/201).

S 864-032

(5) If you use the teledyne tester (P/N 2222786), set the switches as follows:
   (a) Set the power switch to the on position.
   (b) Set the READOUT switch to the ACFT DATA position.
   (c) Set the UPDATE switch to the AUTO position.
   (d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
   (e) Set the DATA switch to the 12 BIT position.
   (f) Set the SUBFRAME and WORD as specified.

S 864-132

(6) If you use the teledyne tester (2229738), set the control switches as follows:
   (a) Push the CLR switch two or three times to clear all inputs.
   (b) Push the DFDR switch and then the ENT key.
   (c) Select the SUBFRAME and WORD as specified.

S 864-123

(7) If you use the DSDU tester, set the control switches as follows:
   (a) Set the ON/OFF power switch to the ON position.
   (b) Set the SYNC switch to SYNC B.
   (c) Set the INPUT switch to the ARINC INPUT DATA position.
   (d) Set the OCTAL DISPLAY switch to 12 BITS position.
   (e) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.
   (f) Set the SUBFRAME and WORD as specified.

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S 864-130

(8) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.
(e) In the BASE SELECT menu, set OCT for octal values.
(f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

S 864-125

(9) If you use the MADU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch.
(c) Push the 5 switch.
(d) Push the DATA switch.
(e) Push the 03 switch.
(f) Push the FUN switch.
(g) Push the 03 switch for SUBFRAME.
(h) Push the DATA switch.
(i) Push the 04 switch for the WORD.
(j) Set the SUBFRAME and WORD as specified.

G. Control Column Position Transducer Test

S 864-072

(1) Set the SUBFRAME to 0 and the WORD to 16.

S 864-055

(2) Set the control column to the position as shown in the table that follows:

S 204-056

(3) Make sure the the tester display shows the correct value as listed in the table.

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TEST	POSITION	TESTER DISPLAY
CONTROL COLUMN	FULLY FORWARD	7600 to 7663
	FULLY AFT	0144 to 0227

S 824-048

(4) If the data is not in range, adjust the rod length until the correct value is shown.

S 864-049

(5) Apply tamper proof putty to the rod assembly locknuts.

H. Put the Airplane Back to Its Usual Condition

S 864-134

(1) If you used the HHDLU, do the steps that follow:
   (a) Set the function switch on the flight recorder control panel to the NORM position.
   (b) Push the button on top of the HHDLU.
   (c) Remove the HHDLU adapter cable from the flight data recorder.
   (d) Install the test plug to the test connector at the flight data recorder.

S 864-135

(2) If you used test equipment other than the HHDLU, do the steps that follow:
   (a) Turn the tester off.
   (b) Open these P11 panel circuit breakers:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC
   (c) Disconnect the tester from the right side of the P61 panel.
   (d) Install the test plug to the test connector at the P61 panel.
   (e) Close these P11 panel circuit breakers:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC

S 864-137

(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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CONTROL WHEEL POSITION TRANSDUCER - REMOVAL/INSTALLATION

1. General
   A. Two tasks are provided in this procedure. The first task is the removal of the control wheel position transducer. The second task is the installation of the transducer.
   B. The control wheel position transducer is installed on the aileron control drum assembly.

TASK 31-31-09-004-001

2. Remove the Wheel Position Transducers (Fig. 401)
   A. References
      (1) AMM 20-10-24/201, Rig Pins
      (2) AMM 29-11-00/201, Main Hydraulic System
   B. Equipment
      (1) A20004-XX Rig Pin Set (AMM 20-10-24/201)
         (a) A20004-15 Rig Pin A-1
   C. Access
      (1) Location
         113 Area Forward of NLG Wheel Well (Left)

   D. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
         (a) 11J6, ACMS SENSOR
         (b) 11J7, FLIGHT RECORDER AC
         (c) 11J8, FLIGHT RECORDER DC

      S 864-005
      (2) Make sure the hydraulic power is not available to the airplane (AMM 29-11-00/201).

      S 864-004
      (3) Push the L, C, and R WING FLT CONTROL SHUTOFF switches on the P61 panel to the OFF position.

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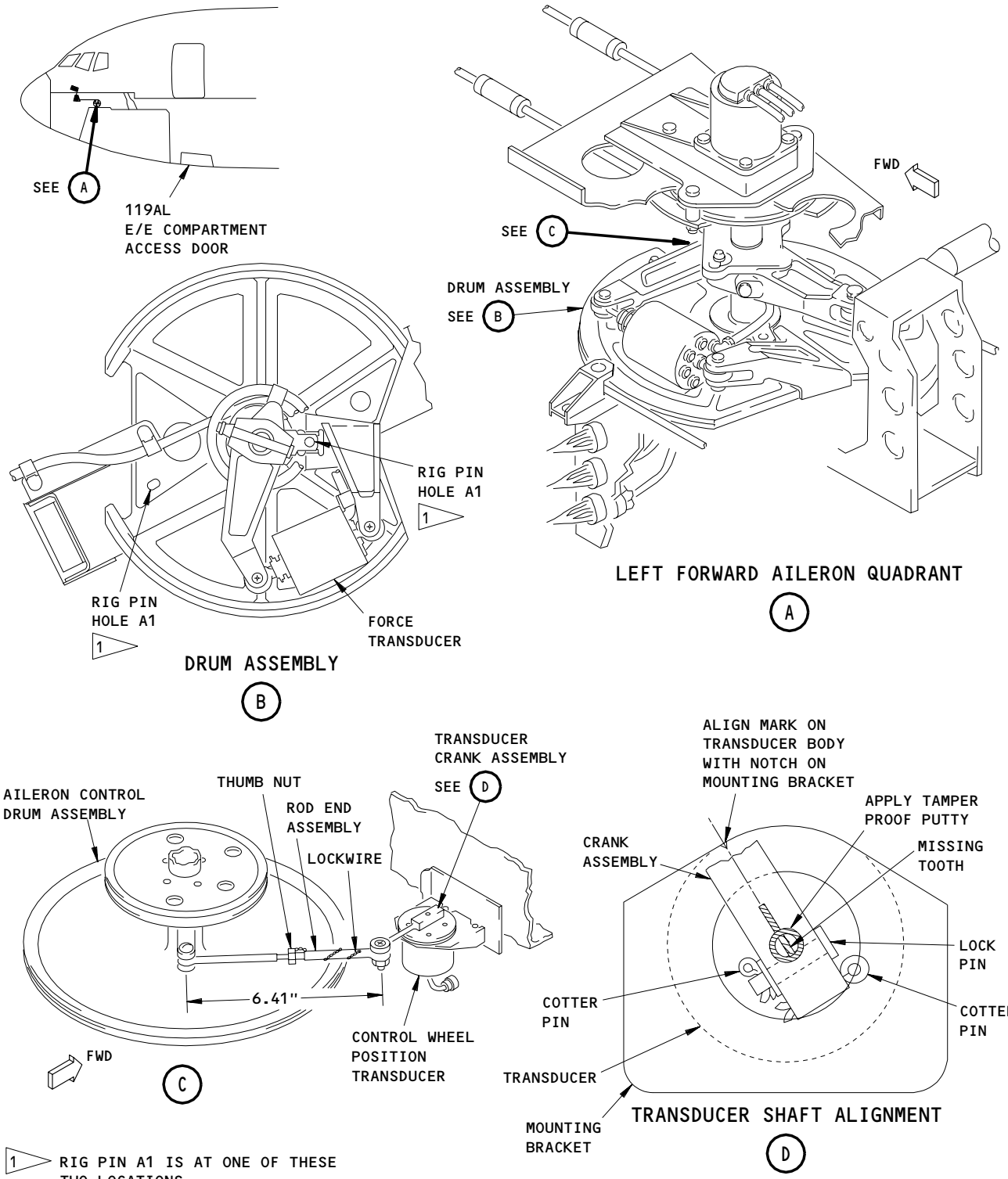

Control Wheel Position Transducer Installation
Figure 401

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S 214-003
(4) Make sure the OFF indicators are on.

S 864-006
(5) Open these overhead panel P11 circuit breakers and attach DO-NOT-CLOSE tags:
(a) 11H15, FLT CONT SHUTOFF WING L
(b) 11H16, FLT CONT SHUTOFF WING CENTER
(c) 11H26, FLT CONT SHUTOFF WING R

S 864-009
(6) Set the control wheel in the neutral position.

S 864-008
(7) Attach the DO-NOT-OPERATE tag to the captain and F/O control wheels.

S 834-007
(8) Install the rig pins A1 in the aileron control drum assembly.

S 034-010
(9) Disconnect the control wheel position transducer electrical connector.

S 034-011
(10) Remove the cotter pin from the pin in the crank assembly.

S 034-012
(11) Remove the washer and the pin.

S 034-013
(12) Remove the crank assembly from the transducer shaft.

S 034-014
(13) Remove the screws that hold the transducer body to the mount plate.

S 024-015
(14) Remove the transducer.

TASK 31-31-09-404-016

3. Install the Control Wheel Position Transducer (Fig. 401)

A. References
(1) AMM 20-10-23/401, Lockwires

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(2) AMM 20-10-24/201, Rig Pins
(3) AMM 24-22-00/201, Electrical Power Control
(4) AMM 25-22-02/401, Lower Ceiling Panel

B. Equipment

(1) System Test Panel (STP) - Hamilton Standard 775419; Hamilton Standard Division United Technologies, Bradley Field Road Windsor locks, CT 06096
(2) Multi-Purpose AIDS Display Unit (MADU) - AACO INC FAA-0032-001; AACO Inc, 5011 Barton Place, Seattle, WA 98118
(3) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701
(4) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(5) Portable Tester - Teledyne P/N 2222786 (alternative)
Teledyne Controls,
12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(6) A31007-1 Adapter Cable - Tester
(7) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(a) AIRPLANES WITH FDR P/N 980-4700-042;
The HHDLU must have mod 1 completed.
(8) 704-2567-001 Adapter cable
(9) Portable Tester
(a) Teledyne 2229738-1; (Preferred)
Teledyne Controls, 12333 W. Olympic Blvd.,
West Los Angeles, CA 90064

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(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)

(10) A31007-59 Adapter Cable - Tester

(11) A20004-XX Rig Pin Set (AMM 20-10-24/201)

(a) A20004-15 Rig Pin A-1

C. Consumable Materials

(1) A00226 Compound - Sealing, BMS 8-45 (Tamper Proof Putty)

D. Access

(1) Location Zone

253 Area above passenger cabin ceiling, Left.

212 Flight Compartment - Right Side

E. Procedure

S 204-017

(1) Make sure the control wheel is in the neutral position.

S 424-018

(2) Install the control wheel position transducer to the transducer bracket.

S 204-019

(3) Make sure the transducer body align mark is aligned with the notch on the transducer bracket.

S 434-020

(4) Install the screws that hold the transducer.

S 434-021

(5) Install the crank assembly on the transducer shaft so the crank index mark is aligned with the missing tooth on the shaft.

S 434-022

(6) Install the pin and the washer in the crank assembly.

S 434-023

(7) Install the cotter pin in the crank assembly.

S 864-024

(8) Apply the tamper proof putty to the crank index mark on the crank assembly.

S 434-025

(9) Connect the electrical connector to the transducer.

S 834-026

(10) Remove the rig pin A1 from the control drum assembly.

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S 864-029
(11) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
(a) 11H15, FLT CONT SHUTOFF WING L
(b) 11H16, FLT CONT SHUTOFF WING CENTER
(c) 11H26, FLT CONT SHUTOFF WING R
(d) 11J6, ACMS SENSOR

F. Prepare for the Installation Test

S 864-104
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

S 864-110
(2) If you use the hand held download unit (HHDLU), do these steps:

NOTE: The HHDLU can only be connected to the Allied-Signal flight data recorder (FDR).
(a) To get access to the FDR, open the lowered ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).
(b) Attach the HHDLU to the test connector at the front side of the flight data recorder.

S 414-109
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-072
(4) Supply electrical power (AMM 24-22-00/201).

S 714-105
(5) If you use the STP tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the STP test switch.
(c) Make sure there is no failure message on the tester display.
(d) Push the CLR switch on the tester.
(e) Push the FDAU switch.
(f) Set the update switch to the AUTO position.
(g) Set the DATA switch to the 12 BIT position.
(h) Set the SUBFRAME and WORD as specified.

S 864-032
(6) If you use the teledyne tester, set the switches as follows:
(a) Set the power switch to the on position.
(b) Set the READOUT switch to the ACFT DATA position.
(c) Set the UPDATE switch to the AUTO position.
(d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.

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(e) Set the DATA switch to the 12 BIT position.
(f) Set the SUBFRAME and WORD as specified.

S 864-062
(7) If you use the DSDU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the ON position.
(b) Set the SYNC switch to SYNC B.
(c) Set the OUTPUT/INPUT switch to the ARINC INPUT DATA position.
(d) Set the OCTAL DISPLAY switch to 12 BITS position.
(e) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.
(f) Set the SUBFRAME and WORD as specified.

S 864-106
(8) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.
(e) In the BASE SELECT menu, set OCT for octal values.
(f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

S 864-107
(9) With the MADU tester, set the switches as follows:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch.
(c) Push the 5 switch.
(d) Push the DATA switch.
(e) Push the 03 switch.
(f) Push the FUN switch.
(g) Push the 03 switch for the SUBFRAME.
(h) Push the DATA switch.
(i) Push the 04 switch for the WORD.
(j) Set the SUBFRAME and WORD as specified.

S 864-108
(10) If you use the teledyne tester (2229738), set the control switches as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT key.
(c) Select the SUBFRAME and WORD as specified.

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G. Control Wheel Position Transducer Test

S 864-373
(1) Set the SUBFRAME to 0 and the WORD to 08.

S 864-053
(2) Set the control wheel to the position as shown in the table that follows:

S 204-054
(3) Make sure the tester display shows the correct value as listed in the table.

TEST	POSITION	TESTER DISPLAY
CONTROL WHEEL	FULLY CLOCKWISE	0705 to 0772
	FULLY COUNTERCLOCKWISE	7010 to 7075

S 824-043
(4) If the data is not in range, do the steps that follow:
(a) Remove the lockwire from the rod end assembly.
(b) With the thumb nut, adjust the rod length till the correct value is shown.
(c) Install the lockwire to the thumb nut and the rod end assembly (AMM 20-10-23/401).

H. Put the Airplane Back to its Usual Condition

S 864-113
(1) If you used the HHDLU, do the steps that follow:
(a) Set the function switch on the flight recorder control panel to the NORM position.
(b) Push the button on top of the HHDLU.
(c) Remove the HHDLU adapter cable from the flight data recorder.
(d) Install the test plug to the test connector at the flight data recorder.
(e) Close the lowered ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).

S 864-114
(2) If you used test equipment other than the HHDLU, do the steps that follow:
(a) Turn the tester off.
(b) Open these P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC
(c) Disconnect the tester from the right side of the P61 panel.

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(d) Install the test plug to the test connector at the P61 panel.
(e) Close these P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-050
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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RUDDER PEDAL POSITION TRANSDUCER - REMOVAL/INSTALLATION

1. General
   A. There are two tasks in this procedure. The first task is the removal of the rudder pedal transducer. The second task is the installation of the transducer.
   B. The transducer is installed on the outboard side of the captain's jack shaft housing.

TASK 31-31-10-004-001

2. Remove the Rudder Pedal Position Transducer (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage Access Doors and Panel
      (2) AMM 20-10-24/201, Rig Pins
   B. Equipment
      (1) A20004-XX Rig Pin Set (AMM 20-10-24/201)
         (a) A20004-14 Rig Pin R3
   C. Access
      (1) Location Zone
         113 Area forward of NLG wheel well (left)

   D. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel,P11, and attach DO-NOT-CLOSE tags :
         (a) 11H17, FLT CONT SHUTOFF TAIL L
         (b) 11H18, FLT CONT SHUTOFF TAIL CTR
         (c) 11H27, FLT CONT SHUTOFF TAIL R
         (d) 11J6, ACMS SENSOR
         (e) 11J7, FLIGHT RECORDER AC
         (f) 11J8, FLIGHT RECORDER DC

      S 204-003
      (2) Make sure the hydraulic power is not available to the airplane (AMM 29-11-00/201).

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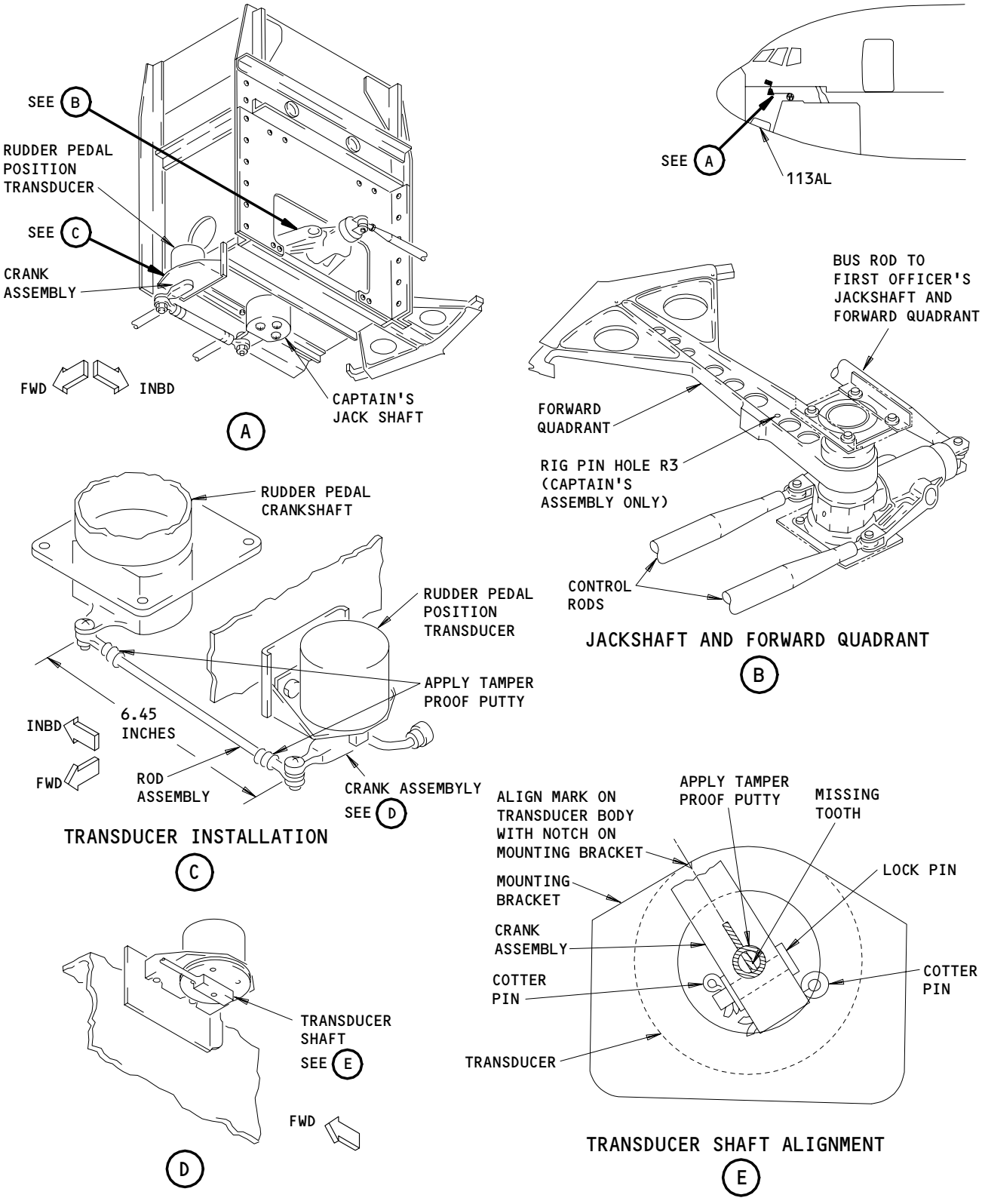

Rudder Pedal Position Transducer Installation
Figure 401

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S 864-004
(3) Push the left, right, and center TAIL FLT CONTROL SHUTOFF switches on the P61 panel to the OFF position.

S 204-005
(4) Make sure the OFF indicators are on.

S 864-006
(5) Attach the DO-NOT-OPERATE tags on the above switches.

S 864-007
(6) Position the rudder pedals in the neutral position and attach DO-NOT-OPERATE tags to the Capt's and F/O's rudder pedals.

S 014-008
(7) Open the forward access door to get to the forward quadrant (AMM 06-41-00/201).

S 424-009
(8) Install the rig pin R3 in the captain's forward quadrant jack shaft.

S 034-010
(9) Disconnect the transducer electrical connector.

S 024-011
(10) Remove the cotter pin from the pin in the crank assembly.

S 034-012
(11) Remove the washer and the pin from the crank assembly.

S 034-013
(12) Remove the crank assembly from the transducer shaft.

S 034-014
(13) Remove the mounting screws that hold the transducer to the mount plate.

S 024-015
(14) Remove the transducer from the mount plate.

TASK 31-31-10-404-016

3. Install the Rudder Pedal Position Transducer (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 25-22-02/401, Lower Ceiling Panel

B. Equipment
(1) Multi-Purpose AIDS Display Unit - AACO INC
FAA-0032-001; AACO INC, 5011 Barton Place
Seattle, WA 98118

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(2) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701
(3) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(4) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(5) 704-2567-001 Adapter cable
(6) Portable Tester - Teledyne 2222786; Teledynes Controls, 12333 W. Olympic Blvd., West Los Angeles, CA 90064
(7) Test adapter cable - A31007-1
(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls, 12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(9) A31007-59 Adapter Cable - Tester
(10) A20004-XX Rig Pin Set (AMM 20-10-24)
(a) B20004-14 Rig Pin R3

C. Consumable Material
(1) A00226 Compound - Sealing, BMS 8-45 (Tamper Proof Putty)

D. Access
(1) Location Zone
113 Area forward of NLG wheel well (left)
253 Area above passenger cabin ceiling, Left.
212 Flight Compartment - Right Side

E. Procedure

S 204-017
(1) Make sure the rudder pedals are in the neutral position.

S 424-018
(2) Install the transducer to the mounting bracket.

S 204-019
(3) Make sure the transducer align mark is align with the notch on the mounting bracket.

S 434-020
(4) Install the mounting screws to the bracket.

S 434-021
(5) Install the crank assembly to the transducer shaft.

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S 204-022
(6) Make sure the crank index mark is aligned with the shaft without the tooth.

S 434-023
(7) Install the pin, and the washer with the cotter pin.

S 434-024
(8) Connect the electrical connector to the transducer.

S 034-025
(9) Remove the R3 rig pin from the forward quadrant jack shaft.

S 864-029
(10) Remove the DO-NOT-CLOSE tags and close the P11 panel circuit breakers:
(a) 11H17, FLT CONT SHUTOFF TAIL L
(b) 11H18, FLT CONT SHUTOFF TAIL CTR
(c) 11H27 FLT CONT SHUTOFF TAIL R
(d) 11J6, ACMS SENSOR

S 864-030
(11) Remove the DO-NOT-OPERATE tags and push the left, right and center TAIL FLT CONTROL SHUTOFF switches to the ON position.

F. Prepare for the Installation Test

S 864-134
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

S 864-135
(2) If you use the hand held download unit (HHDLU), do these steps:

NOTE: The HHDLU can only be connected to the Allied-Signal flight data recorder (FDR).
(a) To get access to the FDR, open the lowered ceiling panel No. 1 above the aft galley (AMM 25-22-02/401).
(b) Attach the HHDLU to the test connector at the front side of th flight data recorder.

S 414-130
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-083
(4) Supply electrical power (AMM 24-22-00/201).

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S 864-127

(5) If you use the STP tester, set the control switches as follows:
  (a) Set the ON/OFF power switch to the ON position.
  (b) Push the STP TEST switch and make sure there is no failure message on the tester.
  (c) Push the CLR switch.
  (d) Push the FDAU switch.
  (e) Set the UPDATE switch to the AUTO position.
  (f) Select the SUBFRAME and WORD as specified.

S 864-128

(6) If you use the MADU tester, set the control switches as follows:
  (a) Set the ON/OFF power switch to the ON position.
  (b) Push in the FUN switch, then enter numeric 5 on the MADU.
  (c) Push the DATA switch, then numeric 03.
  (d) Push the FUN switch, then numeric 03 for SUBFRAME.
  (e) Push the DATA switch, then numeric 4 for WORD.
  (f) Set the SUBFRAME and WORD as specified.

S 864-074

(7) If you use the DSDU tester, set the control switches as follows:
  (a) Set the ON/OFF power switch to the ON position.
  (b) Set the SYNC switch to the SYNC B.
  (c) Set the INPUT switch to the ARINC INPUT DATA position.
  (d) Set the OCTAL DISPLAY switch to the 12 BIT position.
  (e) Set the DATA PARAMETER/DOCUMENTARY switch to the DATA PARAMETER position.
  (f) Set the SUBFRAME and WORD as specified.

S 864-129

(8) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

  (a) Set the function switch on the flight recorder control panel to the ON position.
  (b) Push the button on top of the HHDLU.
  (c) Set the DSDU switch.
  (d) Set the BASE switch.
  (e) In the BASE SELECT menu, set OCT for octal values.
  (f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

G. Rudder Pedal Position Transducer Test

S 864-044

(1) On the tester, set the SUBFRAME to 0 and the WORD to 22.

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S 864-045
(2) Move the left rudder pedal to the full forward position.

S 204-049
(3) Make sure the tester display shows between 0220 and 0303.

S 864-051
(4) Move the right rudder pedal to the full forward position.

S 204-055
(5) Make sure the tester display shows between 7474 and 7557.

S 864-057
(6) If the tester display is not in tolerance, adjust the rod length until the correct value is shown.

S 914-059
(7) Apply the tamperproof putty to the locking nuts.

S 914-060
(8) Apply tamperproof putty to crank index mark on the crank assembly.

H. Put the Airplane Back to it Usual Condition.

S 864-132
(1) If you used the HHDLU, do the steps that follow:
  (a) Set the function switch on the flight recorder control panel to the NORM position.
  (b) Push the button on top of the HHDLU.
  (c) Remove the HHDLU adapter cable from the flight data recorder.
  (d) Install the test plug to the test connector at the flight data recorder.
  (e) Close the lowered ceiling panel No./1 above the aft galley (AMM 25-22-02/401).

S 864-133
(2) If you used test equipment other than the HHDLU, do the steps that follow:
  (a) Turn the tester off.
  (b) Open these P11 panel circuit breakers:
    1) 11J7, FLIGHT RECORDER AC
    2) 11J8, FLIGHT RECORDER DC
  (c) Disconnect the tester from the right side of the P61 panel.
  (d) Install the test plug to the test connector at the P61 panel.
  (e) Close these P11 panel circuit breakers:
    1) 11J7, FLIGHT RECORDER AC
    2) 11J8, FLIGHT RECORDER DC

S 864-136
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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CABIN PRESSURE TRANSDUCER - REMOVAL/INSTALLATION

1. General
   A. There are two tasks in this procedure. The first task is the removal of the cabin pressure transducer and the second task is the installation of the transducer.
   B. The transducer is installed on top of the main equipment center.

TASK 31-31-12-004-001

2. Remove the Cabin Pressure Transducer (Fig. 401)
   A. Access
      (1) Location Zones
          119 Main Equipment Center
   B. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE Tags:
          (a) 11J6, ACMS SENSOR
          (b) 11J7, FLIGHT RECORDER AC
          (c) 11J8, FLIGHT RECORDER DC

      S 034-003
      (2) Disconnect the transducer electrical connector.

      S 034-004
      (3) Loosen the bolts and clamps from the transducer.

      S 024-005
      (4) Remove the transducer from the structure.

TASK 31-31-12-404-036

3. Install Cabin Pressure Transducer (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Eletrical Power Control
   B. Equipment
      (1) Portable Tester - Teledyne 2222786
          Teledyne Controls,
          12333 West Olympic Blvd.,
          West Los Angeles, CA 90064

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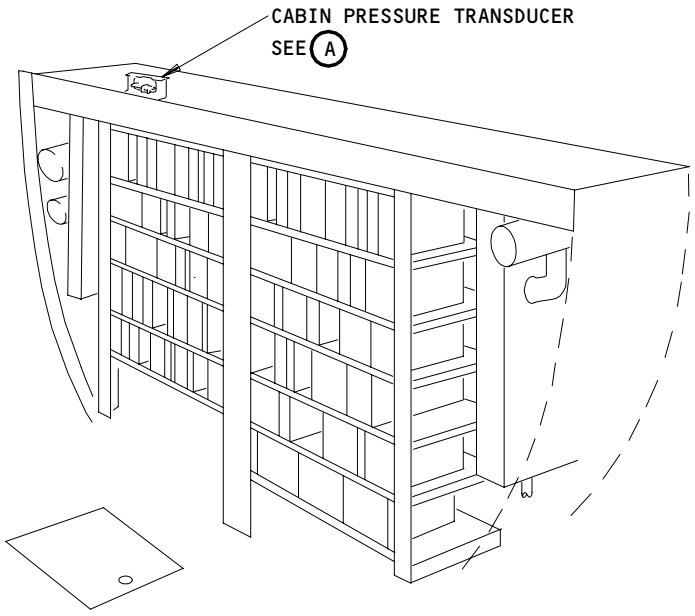

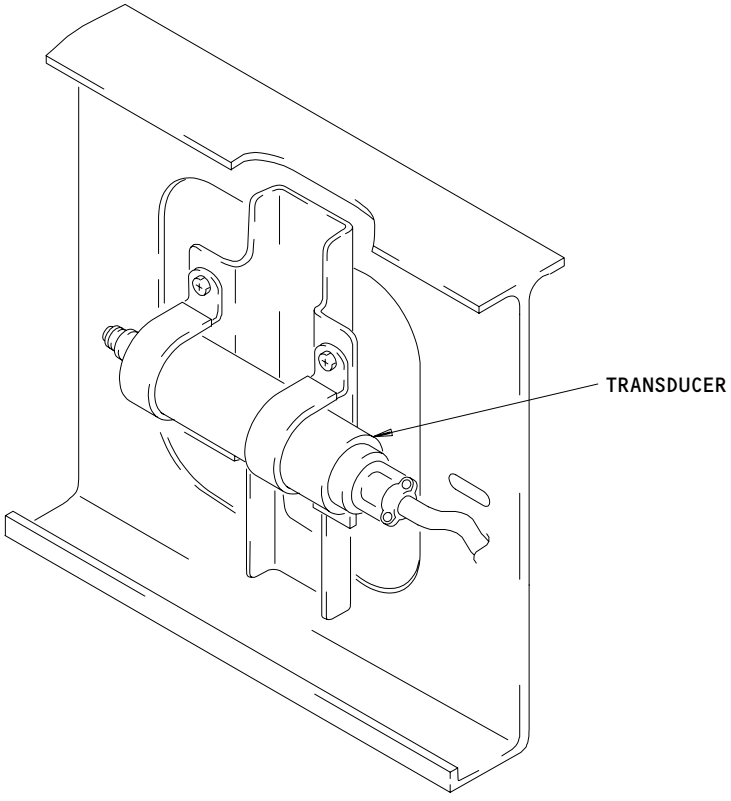

CABIN PRESSURE TRANSDUCER

A

Cabin Pressure Transducer Installation
Figure 401

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(2) A31007-1 Adapter Cable - Tester
(3) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701
(4) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(5) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(6) 704-2567-001 Adapter cable - Tester
(7) Multi-Purpose AIDS Display Unit (MADU) - AACO INC FAA-0032-001
AACO INC.,
5011 Barton Place,
Seattle, WA 98118
(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls,
12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(9) A31007-59 Adapter Cable - Tester

C. Access
(1) Location Zone
212 Flight Compartment - Right side
253 Area above passenger cabin ceiling, Left
119 Main Equipment Center

D. Procedure

S 424-006
(1) Install the transducer to the structure on top of the main equipment shelf.

S 434-007
(2) Tighten the transducer to the clamps with the bolts.

S 434-008
(3) Connect the electrical connector to the transducer.

S 864-012
(4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11J5, AIDS AC
(b) 11J6, ACMS SENSOR

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E. Cabin Pressure Transducer Test

S 864-057
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

S 864-058
(2) If you use the hand held download unit (HHDLU), attach the HHDLU to the test connector at the front side of the flight data recorder.

NOTE: To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401). The HHDLU is to be used on the Alliedsignal solid state FDR only.

S 864-059
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-042
(4) Supply electrical power (AMM 24-22-00/201).

S 864-052
(5) If you use the DSDU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the on Position.
(b) Set the SYNC switch to SYNC B.
(c) Set the INPUT switch to the ARINC INPUT DATA position.
(d) Set the OCTAL DISPLAY switch to 12 BITS.
(e) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.
(f) Set the SUBFRAME and WORD as specified.

S 864-053
(6) If you use the Teledyne tester (P/N 2222786), set the control switches as follows:
(a) Set the POWER switch to the ON position.
(b) Set the READOUT switch to the ACFT DATA position.
(c) Set the UPDATE switch to the AUTO position.
(d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
(e) Set the DATA switch to the 12 BIT position.
(f) Set the SUBFRAME and WORD as specified.

S 864-054
(7) If you use the teledyne tester (2229738), set the control switches as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT key.
(c) Set the SUBFRAME and WORD as specified.

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S 864-055

(8) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the red button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.
(e) In the BASE SELECT menu, set OCT for octal values.
(f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

S 864-056

(9) If you use the MADU tester, set the control switches as follow:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch, then enter numeric 5 on the MADU.
(c) Push the DATA switch, then numeric 03.
(d) Push the FUN switch, then numeric 03 for SUBFRAME.
(e) Push the DATA switch, then numeric 4 for WORD.
(f) Set the SUBFRAME and WORD as specified.

S 864-022

(10) Set the SUBFRAME to 4 and the WORD to 34.

S 204-029

(11) Make sure the display is in range as shown in the table that follows for the barometric pressure at the area of the test.

NOTE: The equipment is set for a barometric pressure that is below 31.1 inches Hg.

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AMBIENT PRESSURE (IN. Hg)	TESTER DISPLAY
29.0	7014 to 7054
29.1	7044 to 7105
29.2	7074 to 7136
29.3	7125 to 7166
29.4	7156 to 7217
29.5	7206 to 7247
29.6	7237 to 7300
29.7	7267 to 7330
29.8	7320 to 7351
29.9	7350 to 7401
30.0	7371 to 7432
30.1	7421 to 7462
30.2	7452 to 7513
30.3	7502 to 7544
30.4	7533 to 7574
30.5	7564 to 7625
30.6	7614 to 7655
30.7	7645 to 7705
30.8	7666 to 7726
30.9	7716 to 7756
31.0	7747 to 7777

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F. Put the Airplane Back to it Usual Condition.

S 864-060
(1) If you used the CDU, push the CLR switch several times and clear the CDU display.

S 864-061
(2) If you used the HHDLU, do the steps that follow:
  (a) Set the function switch on the flight recorder control panel to the NORM position.
  (b) Push the red button on top of the HHDLU.
  (c) Remove the HHDLU adapter cable from the flight data recorder.
  (d) Install the test plug to the test connector at the flight data recorder.

S 864-062
(3) If you used test equipment other than the HHDLU, do the steps that follow:
  (a) Turn the tester off.
  (b) Open these P11 panel circuit breakers:
    1) 11J7, FLIGHT RECORDER AC
    2) 11J8, FLIGHT RECORDER DC
  (c) Disconnect the tester from the right side of the P61 panel.
  (d) Install the test plug to the test connector at the P61 panel.
  (e) Close these P11 panel circuit breakers:
    1) 11J7, FLIGHT RECORDER AC
    2) 11J8, FLIGHT RECORDER DC

S 864-033
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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BRAKE PRESSURE TRANSDUCER - REMOVAL/INSTALLATION

1. General
   A. There are two tasks in this procedure. The first task is the removal of the Brake Pressure Transducers. The second task is the installation of the Transducers.
   B. The left (TS452) and the right (TS451) Brake Pressure Transducers are installed in the left and right wheel wells.

TASK 31-31-13-004-051

2. Remove the Brake Pressure Transducer (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power Control
      (2) AMM 29-11-00/201, Main Hydraulic Systems
      (3) AMM 32-00-15/201, Landing Gear Door Locks
      (4) AMM 32-00-20/201, Landing Gear Downlocks
   B. Equipment
      (1) Main Gear Door Locks (AMM 32-00-15/201)
   C. Access
      (1) Location Zones
          730 Left Main Landing Gear and Doors
          740 Right Main Landing Gear and Doors

   D. Procedure

      S 864-001
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11J6, ACMS SENSOR
          (b) 11J7, FLIGHT RECORDER AC
          (c) 11J8, FLIGHT RECORDER DC

      S 424-060

      WARNING: MAKE SURE THAT THE DOWNLOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

      (2) Make sure the downlocks for the main landing gear are installed in the nose and main landing gear (AMM 32-00-20/201).

      S 914-003
      (3) Make sure to put the chocks on the wheels.

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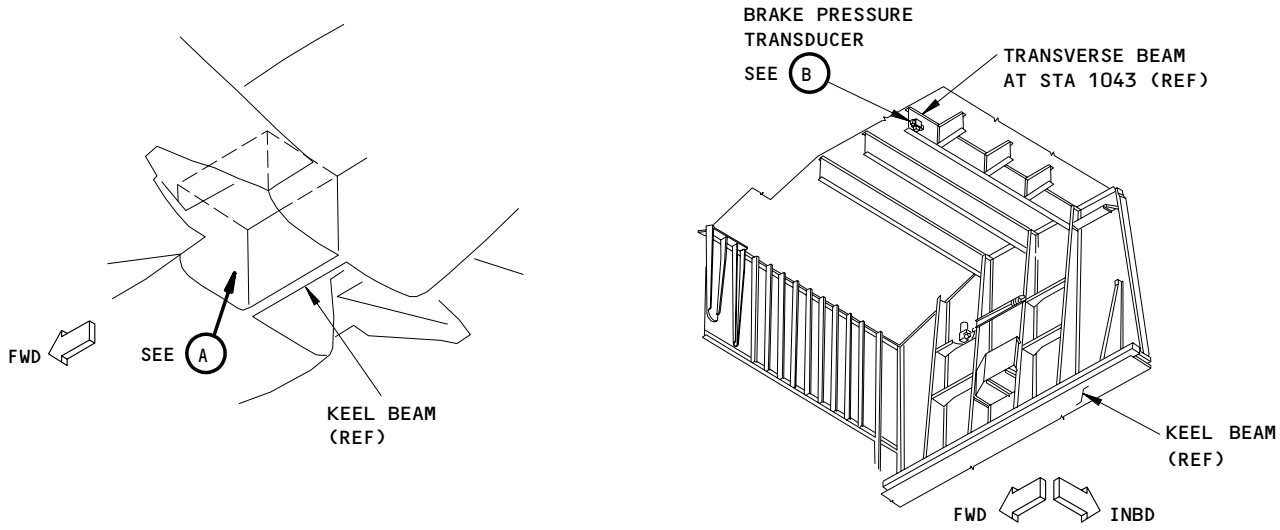
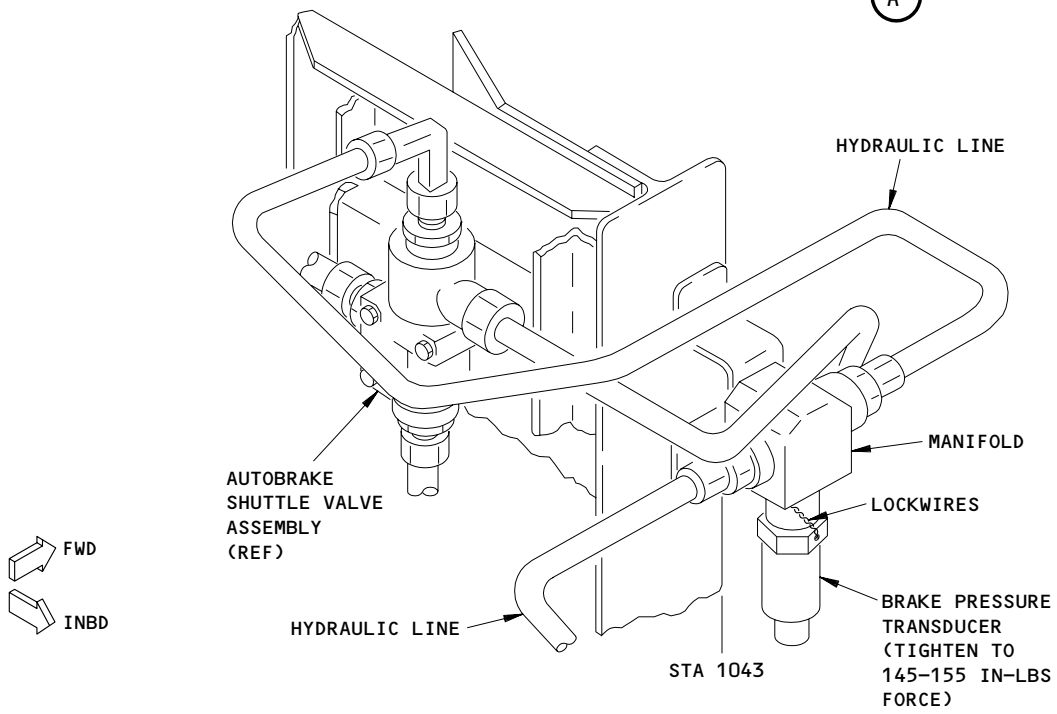


L WHEEL WELL SHOWN
(R WHEEL WELL SIMILAR)

A



LEFT BRAKE PRESSURE TRANSDUCER INSTALLATION SHOWN
(RIGHT BRAKE PRESSURE TRANSDUCER INSTALLATION SIMILAR)

B

Brake Pressure Transducer Installation
Figure 401

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S 494-004

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(4) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-006

(5) Release the parking brake.

S 864-007

(6) Remove the pressure from the right hydraulic system and the hydraulic reservoir (AMM 29-11-00/201).

S 864-008

(7) Operate the brake pedal fully from seven to eight times to let out the hydraulic pressure from the brake accumulator.

S 034-009

(8) Disconnect the electrical connector from the brake pressure transducer.

S 034-010

(9) Remove the lockwires from the transducer.

S 034-011

(10) Remove the transducer from the manifold.

S 434-012

(11) Install a plug in the manifold hole.

S 034-013

(12) Remove and discard the transducer's O-rings.

TASK 31-31-13-404-014

3. Install the Brake Pressure Transducer (Fig. 401)

A. References

(1) AMM 20-10-23/401, Lockwires

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(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 25-22-02/401, Lower Ceiling Panel
(4) AMM 29-11-00/201, Main Hydraulic Systems
(5) AMM 32-00-15/201, Landing Gear Door Locks

B. Equipment
(1) Portable Tester - Teledyne P/N 2222786
Teledyne Controls,
12333 W. Olympic BLVD.,
West Los Angeles, CA 90064
(2) A31007-1 Adapter Cable - Tester
(3) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701
(4) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(5) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(6) 704-2567-001 Adapter cable - Tester
(7) Multi-Purpose AIDS Display Unit (MADU) - AACO INC FAA-0032-001
AACO INC.,
5011 Barton Place,
Seattle, WA 98118
(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls,
12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(9) A31007-59 Adapter Cable - Tester
(10) Torque Wrench - commerically available (For
torque ranges, Ref Fig. 401)

C. Consumable Materials
(1) D00153 Hydraulic Fluid - BMS 3-11

D. Access
(1) Location Zones
253 Area above passenger cabin ceiling, Left.
212 Flight Compartment - Right Side
730 Left Main Landing Gear and Doors
740 Right Main Landing Gear and Doors

E. Procedure

S 434-015
(1) Install the new O-rings on the transducer.

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S 644-016
(2) Lubricate the O-rings with the hydraulic fluid.

S 034-097
(3) Remove the cap from the manifold.

S 434-017
(4) Install the transducer into the manifold.

S 434-018
(5) Tighten the transducer to the manifold to 145-155 inch-pounds.

S 434-019
(6) Install a lockwire between the transducer and the manifold (AMM 20-10-23/401).

S 434-020
(7) Connect the electrical connector to the transducer.

F. Brake Pressure Transducer Test

S 864-080
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

S 864-081
(2) If you use the hand held download unit (HHDLU), attach the HHDLU to the test connector at the front side of the flight data recorder.

NOTE: To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401). The HHDLU is to be used on the Alliedsignal solid state FDR only.

S 014-082
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J6, ACMS SENSOR
2) 11J7, FLIGHT RECORDER AC
3) 11J8, FLIGHT RECORDER DC

S 864-079
(4) Supply electrical power (AMM 24-22-00/201).

S 864-075
(5) If you use the Teledyne tester (P/N 2222786), set the control switches as follows:
(a) Set the POWER switch to the ON position.
(b) Set the READOUT switch to the ACFT DATA position.
(c) Set the UPDATE switch to the AUTO position.

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(d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
(e) Set the DATA switch to the 12 BIT position.
(f) Set the SUBFRAME and WORD as specified.

S 864-076
(6) If you use the DSDU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the on Position.
(b) Set the SYNC switch to SYNC B.
(c) Set the INPUT switch to the ARINC INPUT DATA position.
(d) Set the OCTAL DISPLAY switch to 12 BITS.
(e) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.
(f) Set the SUBFRAME and WORD as specified.

S 864-077
(7) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the red button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.
(e) In the BASE SELECT menu, set OCT for octal values.
(f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

S 864-083
(8) If you use the MADU tester, set the control switches as follow:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch, then enter numeric 5 on the MADU.
(c) Push the DATA switch, then numeric 03.
(d) Push the FUN switch, then numeric 03 for SUBFRAME.
(e) Push the DATA switch, then numeric 4 for WORD.
(f) Set the SUBFRAME and WORD as specified.

S 864-078
(9) If you use the teledyne tester (2229738), set the control switches as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT key.
(c) Set the SUBFRAME and WORD as specified.

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S 204-025
(10) Make sure the chocks are on the wheels.

S 864-061

WARNING: KEEP PERSONS AND EQUIPMENT CLEAR OF THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(11) Pressurize the right hydraulic system and reservoir (AMM 29-11-00/201).

S 204-027
(12) Make sure the parking brake is released.

S 864-029
(13) On the tester, set the SUBFRAME to 0 and the WORD to 15.

S 704-058
(14) Without pressure to the brake pedals, make sure the tester display shows between 00XX and 06XX.

NOTE: X = Don't care.

S 864-033
(15) For the left brake transducer, apply pressure on the left brake pedal.

S 704-086
(16) Make sure the left two octal digits are between 30XX and 77XX.

NOTE: X = don't care.

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S 864-112
(17) For the right brake transducer, apply brake pressure on the right brake pedal.

S 864-113
(18) Make sure the left two octal digits are between XX30 and XX77.

NOTE: X = don't care.

S 864-036
(19) Remove the pressure from the brake pedal.

G. Put the Airplane Back to its Usual Condition.

S 864-084
(1) If you used the HHDLU, do the steps that follow:
(a) Set the function switch on the flight recorder control panel to the NORM position.
(b) Push the red button on top of the HHDLU.
(c) Remove the HHDLU adapter cable from the flight data recorder.
(d) Install the test plug to the test connector at the flight data recorder.

S 864-085
(2) If you used the test equipment other than the HHDLU, do the steps that follow:
(a) Turn the tester off.
(b) Open these P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC
(c) Disconnect the tester from the right side of the P61 panel.
(d) Install the test plug to the test connector at the P61 panel.
(e) Close these P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-039
(3) Set the parking brake.

S 094-040

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(4) Remove the door locks (AMM 32-00-15/201).

S 864-041
(5) Remove the power from the right hydraulic system (AMM 29-11-00/201).

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S 864-042

(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 914-043

(7) Keep the landing gear downlocks installed and the chocks installed until the airplane is prepared for operation.

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ALTERNATE BRAKE PRESSURE TRANSDUCER - REMOVAL/INSTALLATION

1. General
   A. There are two tasks in this procedure. The first task is the removal of the Brake Pressure Transducers. The second task is the installation of the Transducers.
   B. The left (TS474) and the right (TS473) Brake Pressure Transducers are installed in the left and right wheel wells.

TASK 31-31-15-004-001

2. Remove the Brake Pressure Transducer (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power Control
      (2) AMM 29-11-00/201, Main Hydraulic Systems
      (3) AMM 32-00-15/201, Landing Gear Door Locks
      (4) AMM 32-00-20/201, Landing Gear Downlocks
   B. Equipment
      (1) Main Gear Door Locks (AMM 32-00-15/201)
   C. Access
      (1) Location Zones
          730 Left Main Landing Gear and Doors
          740 Right Main Landing Gear and Doors

   D. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11J6, ACMS SENSOR
          (b) 11J7, FLIGHT RECORDER AC
          (c) 11J8, FLIGHT RECORDER DC

      S 424-059

      WARNING: MAKE SURE THAT THE DOWNLOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

      (2) Make sure the downlocks for the main landing gear are installed in the nose and main landing gear (AMM 32-00-20/201).

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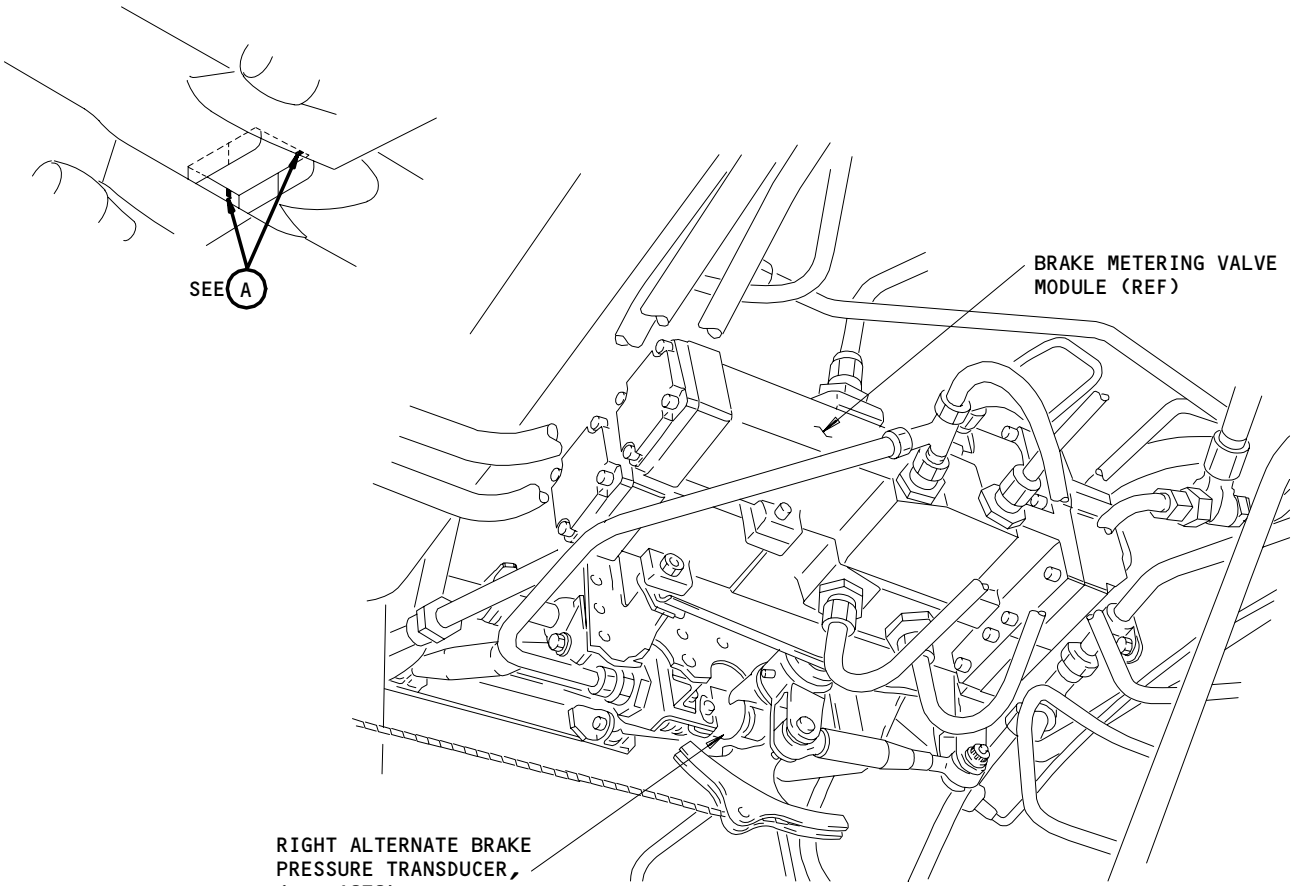
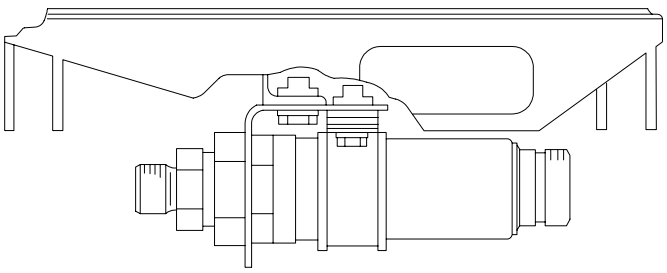


RIGHT WHEEL WELL, ALTERNATE BRAKE PRESSURE TRANSDUCER (LEFT WHEEL WELL SIMILAR)

A



ALTERNATE BRAKE PRESSURE TRANSDUCER

B

Alternate Brake Pressure Transducer
Figure 401

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S 914-004
(3) Make sure to put the chocks on the wheels.

S 494-060

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(4) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 864-006
(5) Release the parking brake.

S 044-009
(6) Remove the pressure from the right and center hydraulic systems and the hydraulic reservoirs (AMM 29-11-00/201).

S 864-008
(7) Operate the brake pedal fully from seven to eight times to let out the hydraulic pressure from the brake accumulator.

S 034-011
(8) Disconnect the electrical connector from the brake pressure transducer.

S 034-012
(9) Remove the hydraulic line from the transducer.

S 434-013
(10) Install the cap to the hydraulic line.

S 034-014
(11) Remove and discard the transducer's O-ring.

S 024-015
(12) Remove the transducer from the saddle clamp.

TASK 31-31-15-404-016

3. Install the Brake Pressure Transducer (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control

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(2) AMM 25-22-02/401, Lower Ceiling Panel
(3) AMM 29-11-00/201, Main Hydraulic Systems
(4) AMM 32-00-15/201, Landing Gear Door Locks
(5) AMM 32-41-00/201, Hydraulic Brake System

B. Equipment
(1) Portable Tester - Teledyne P/N 2222786
Teledyne Controls,
12333 W. Olympic BLVD.,
West Los Angeles, CA 90064
(2) A31007-1 Adapter Cable - Tester
(3) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701
(4) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(5) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(6) 704-2567-001 Adapter cable - Tester
(7) Multi-Purpose AIDS Display Unit (MADU) - AACO INC FAA-0032-001
AACO INC.,
5011 Barton Place,
Seattle, WA 98118
(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls,
12333 W. Olympic Blvd.,
West Los Angeles, CA 90064
(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)
(9) A31007-59 Adapter Cable - Tester
(10) Wrench - commerically available

C. Consumable Materials
(1) D00153 Hydraulic Fluid - BMS 3-11

D. Access
(1) Location Zones
253 Area above passenger cabin ceiling, Left.
212 Flight Compartment - Right Side
730 Left Main Landing Gear
740 Right Main Landing Gear

E. Procedure

S 424-017
(1) Install the transducer to the saddle clamp.

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S 434-018
(2) Tighten the screw on the saddle clamp.

S 434-019
(3) Install the new O-ring on the transducer.

S 644-020
(4) Lubricate the O-ring with the hydraulic fluid.

S 034-021
(5) Remove the cap from the hydraulic line.

S 424-022
(6) Connect the hydraulic line to the transducer.

S 434-023
(7) Connect the electrical connector to the transducer.

F. Brake Pressure Transducer Test

S 864-086
(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

S 864-087
(2) If you use the hand held download unit (HHDLU), attach the HHDLU to the test connector at the front side of the flight data recorder.

NOTE: To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401). The HHDLU is to be used on the Alliedsignal solid state FDR only.

S 014-088
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J6, ACMS SENSOR
2) 11J7, FLIGHT RECORDER AC
3) 11J8, FLIGHT RECORDER DC

S 864-079
(4) Supply electrical power (AMM 24-22-00/201).

S 864-081
(5) If you use the Teledyne tester (P/N 2222786), set the control switches as follows:
(a) Set the POWER switch to the ON position.

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(b) Set the READOUT switch to the ACFT DATA position.
(c) Set the UPDATE switch to the AUTO position.
(d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
(e) Set the DATA switch to the 12 BIT position.
(f) Set the SUBFRAME and WORD as specified.

S 864-082
(6) If you use the DSDU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the on Position.
(b) Set the SYNC switch to SYNC B.
(c) Set the INPUT switch to the ARINC INPUT DATA position.
(d) Set the OCTAL DISPLAY switch to 12 BITS.
(e) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.
(f) Set the SUBFRAME and WORD as specified.

S 864-083
(7) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the red button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.
(e) In the BASE SELECT menu, set OCT for octal values.
(f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

S 864-084
(8) If you use the MADU tester, set the control switches as follow:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch, then enter numeric 5 on the MADU.
(c) Push the DATA switch, then numeric 03.
(d) Push the FUN switch, then numeric 03 for SUBFRAME.
(e) Push the DATA switch, then numeric 4 for WORD.
(f) Set the SUBFRAME and WORD as specified.

S 864-085
(9) If you use the teledyne tester (2229738), set the control switches as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT key.
(c) Set the SUBFRAME and WORD as specified.

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S 864-076
(10) Make sure the chocks are on the wheels.

S 864-078

WARNING: KEEP PERSONS AND EQUIPMENT CLEAR OF THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(11) Pressurize the center hydraulic systems and reservoir (AMM 29-11-00/201).

S 864-030
(12) Bleed the main gear wheel brake system (AMM 32-41-00/201).

S 204-031
(13) Make sure there is no leak on the hydraulic line that was connected to the transducer.

S 864-032
(14) On the tester, set the SUBFRAME to 0 and the WORD to 15.

S 704-052
(15) Without pressure to the brake pedal, make sure the tester display shows between 00XX and 06XX.

NOTE: X = Don't care.

S 864-034
(16) For the right alt brake transducer, Apply brake pressure on the right brake pedal.

S 204-047
(17) Make sure the tester display shows between 30XX and 77XX.

NOTE: X = Don't care.

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S 864-112
(18) For the left alt brake transducer, apply brake pressure on the left brake pedal.

S 704-117
(19) Make sure the tester display shows between 30XX and 77XX.

NOTE: X = Don't care.

S 864-036
(20) Remove the pressure from the brake pedal.

G. Put the Airplane Back to its Usual Condition.

S 864-090
(1) If you used the HHDLU, do the steps that follow:
(a) Set the function switch on the flight recorder control panel to the NORM position.
(b) Push the red button on top of the HHDLU.
(c) Remove the HHDLU adapter cable from the flight data recorder.
(d) Install the test plug to the test connector at the flight data recorder.

S 864-091
(2) If you used test equipment other than the HHDLU, do the steps that follow:
(a) Turn the tester off.
(b) Open these P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC
(c) Disconnect the tester from the right side of the P61 panel.
(d) Install the test plug to the test connector at the P61 panel.
(e) Close these P11 panel circuit breakers:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-040
(3) Set the parking brake.

S 024-062
(4) Remove the door locks (AMM 32-00-15/201).

S 864-042
(5) Remove the power from the right and center hydraulic systems (AMM 29-11-00/201).

S 864-043
(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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S 864-044

(7) Keep the landing gear downlocks installed and the chocks installed until the airplane is prepared for operation.

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WHEEL BRAKE SWITCH - REMOVAL/INSTALLATION

1. General
   A. This procedure has these tasks:
      (1) A removal of the wheel brake switch.
      (2) An installation of the wheel brake switch.
   B. The wheel brake switches are installed on the left and right main landing gear brake cranks.

TASK 31-31-18-004-001

2. Wheel Brake Switch Removal (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 20-10-24/201, Rig Pins
   B. Equipment
      (1) A20004-XX Rig Pin Set (AMM 20-10-24/201)
         (a) Rig Pin LGB1
         (b) Rig Pin LGB2
   C. Access
      (1) Location Zone
         113 Area Forward of Nose Landing Gear (NLG) Wheel Well (Left)

      (2) Access Panel
         113AL Forward Equipment Bay

   D. Removal Procedure

      S 864-002
      (1) Open this circuit breaker and attach the DO-NOT-CLOSE tag:
         (a) On the overhead equipment panel P11:
            1) 11J8, FLIGHT RECORDER DC

      S 014-003
      (2) Open the forward equipment bay door (AMM 06-41-00/201).

      S 014-004
      (3) Do the steps that follow to remove the wheel brake switch.
         (a) At the area forward of the NLG wheel well, install the rig pins LGB1/LGB2 to the bellcrank to set the brakes in the neutral position.
         (b) Disconnect the electrical connector from the wheel brake switch.
         (c) Remove the screws and spacers that hold the wheel brake switch to the mount plate.
         (d) Remove the wheel brake switch.

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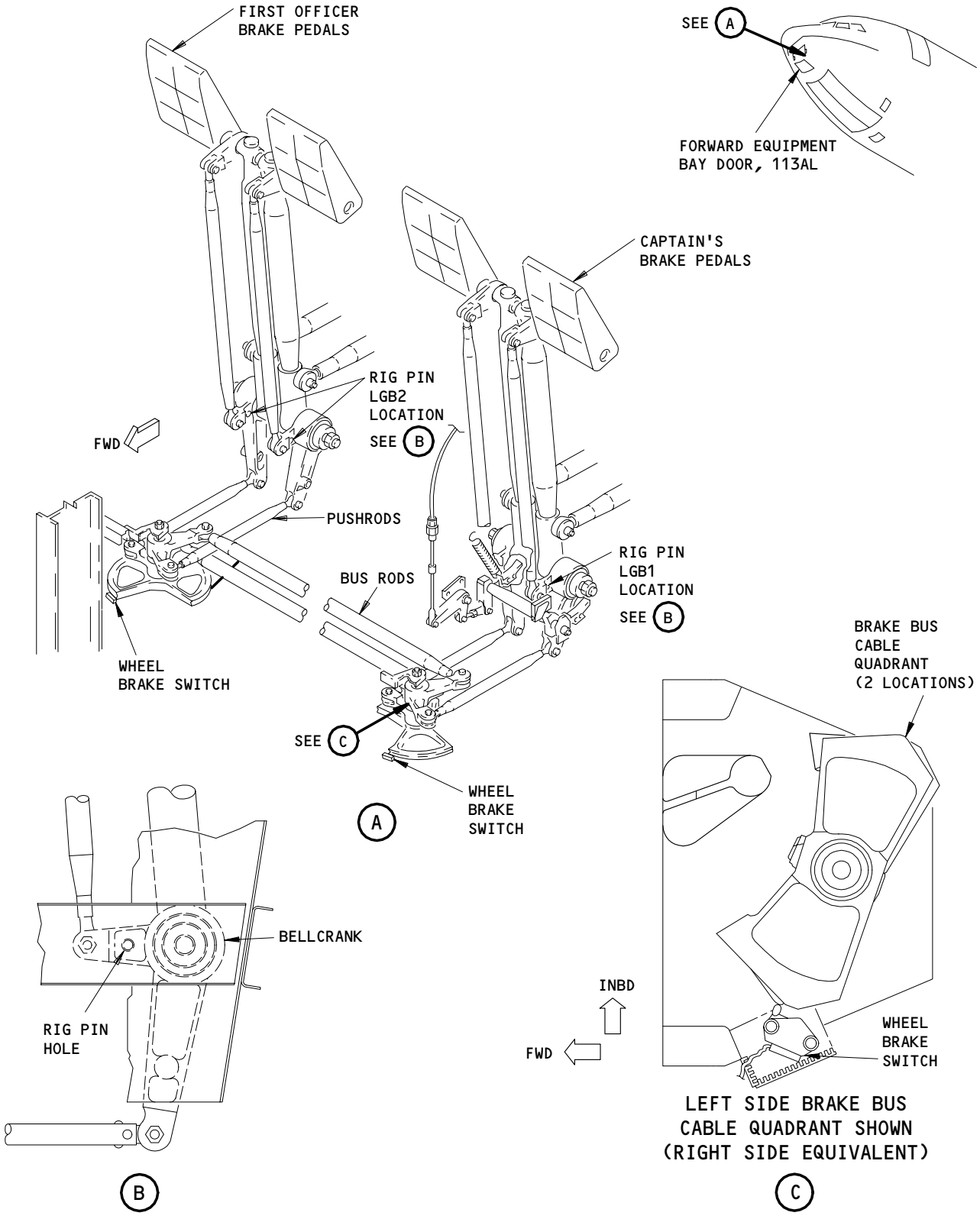

Wheel Brake Switch Installation
Figure 401

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TASK 31-31-18-404-005

3. Wheel Brake Switch Installation (Fig. 401)

A. References

(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 20-10-24/201, Rig Pins
(3) AMM 24-22-00/201, Control
(4) AMM 25-22-02/401, Lower Ceiling Panel

B. Equipment

(1) Portable Tester - Teledyne P/N 2222786
Teledyne Controls,
12333 W. Olympic BLVD.,
West Los Angeles, CA 90064
(2) A31007-1 Adapter Cable - Tester
(3) 981-6301-002 Data Signal Display Unit (DSDU)
Alliedsignal Air Transport Avionics
P.O. BOX 97001
15001 NE 36TH ST
Redmond, WA 98073-9701
(4) A31007-49 Adapter Cable - Tester (recommended)
A31007-30 Adapter Cable - Tester (alternative)
(5) 964-0446-001 Hand Held Download Unit (HHDLU)
27914 Allied-Signal Inc., DBA Allied-Signal Aerospace
2100NW 62ND ST,
Fort Lauderdale, FL 33309
(6) 704-2567-001 Adapter cable - Tester
(7) Multi-Purpose AIDS Display Unit (MADU) - AACO INC FAA-0032-001
AACO INC.,
5011 Barton Place,
Seattle, WA 98118
(8) Portable Tester
(a) Teledyne P/N 2229738-1 (Preferred)
Teledyne Controls,
12333 W. Olympic Blvd.,
West Los Angeles, CA 90064

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(b) HT717-1 ARINC 717 TESTER (Optional)
Ballard Technology
3229A Pine Street,
Everett, WA 98201(use with 16021 adapter cable)

(9) A31007-59 Adapter Cable - Tester

(10) A20004-XX Rig Pin Set (AMM 20-10-24/201)
(a) Rig Pin LGB1
(b) Rig Pin LGB2

C. Access

(1) Location Zone
253 Area above passenger cabin ceiling, Left.
113 Area Forward of Nose Landing Gear (NLG) Wheel Well (Left)
212 Flight Compartment - Right Side

(2) Access Panel
113AL Forward Equipment Bay

D. Installation Procedure

S 864-006

(1) Make sure this circuit breaker is open:
(a) On the overhead equipment panel P11:
1) 11J8, FLIGHT RECORDER DC

S 424-007

(2) Do the steps that follow to install the wheel brake switch.
(a) At the area forward of the NLG wheel well, make sure the rig pins LGB1/LGB2 are installed to the bellcrank of the brake pedal rods.
(b) Install the screws and spacers that hold the wheel brake switch to the mount plate.
(c) Tighten the screws.
(d) Connect the electrical connector to the wheel brake switch.
(e) Remove the rig pins LGB1/LGB2 from the bellcrank of the brake pedal rods.

S 414-018

(3) Close the forward equipment bay door (AMM 06-41-00/201).

E. Installation Test

S 864-044

(1) If you use test equipment other than the hand held download unit (HHDLU), install the tester to the test connector at the right side panel, P61.

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S 864-045
(2) If you use the hand held download unit (HHDLU), attach the HHDLU to the test connector at the front side of the flight data recorder.

NOTE: To get access to the FDR, open the lower ceiling panel No. 1 above the aft galley (AMM 25-22-02/401). The HHDLU is to be used on the Alliedsignal solid state FDR only.

S 014-046
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J7, FLIGHT RECORDER AC
2) 11J8, FLIGHT RECORDER DC

S 864-047
(4) Supply electrical power (AMM 24-22-00/201).

S 864-048
(5) If you use the Teledyne tester (P/N 2222786), set the control switches as follows:
(a) Set the POWER switch to the ON position.
(b) Set the READOUT switch to the ACFT DATA position.
(c) Set the UPDATE switch to the AUTO position.
(d) Set the DFDAU/DFDR DATA SELECTOR switch to the DFDAU position.
(e) Set the DATA switch to the 12 BIT position.
(f) Set the SUBFRAME and WORD as specified.

S 864-049
(6) If you use the DSDU tester, set the control switches as follows:
(a) Set the ON/OFF power switch to the on Position.
(b) Set the SYNC switch to SYNC B.
(c) Set the INPUT switch to the ARINC INPUT DATA position.
(d) Set the OCTAL DISPLAY switch to 12 BITS.
(e) Set the PARAMETER DATA/DOC DATA switch to the PARAMETER DATA position.
(f) Set the SUBFRAME and WORD as specified.

S 864-050
(7) If you use the hand held download unit (HHDLU), do the steps that follow:

NOTE: These steps are for for airplanes equipped with Alliedsignal FDR only.

(a) Set the function switch on the flight recorder control panel to the ON position.
(b) Push the red button on top of the HHDLU.
(c) Set the DSDU switch.
(d) Set the BASE switch.

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(e) In the BASE SELECT menu, set OCT for octal values.
(f) Set the SUBFRAME and WORD as specified.

NOTE: For SUBFRAME 0, select ALL.

S 864-051
(8) If you use the MADU tester, set the control switches as follow:
(a) Set the ON/OFF power switch to the ON position.
(b) Push the FUN switch, then enter numeric 5 on the MADU.
(c) Push the DATA switch, then numeric 03.
(d) Push the FUN switch, then numeric 03 for SUBFRAME.
(e) Push the DATA switch, then numeric 4 for WORD.
(f) Set the SUBFRAME and WORD as specified.

S 864-052
(9) If you use the teledyne tester (2229738), set the control switches as follows:
(a) Push the CLR switch two or three times to clear all inputs.
(b) Push the DFDR switch and then the ENT key.
(c) Set the SUBFRAME and WORD as specified.

S 704-012
(10) Do the Test of the left wheel brake switch as follows:
(a) On the tester set the SUBFRAME to 0 and the WORD to 6.
1) Make sure the BIT DISCRETE 2 shows a 0.
(b) Apply pressure to the left brake pedal.
1) Make sure the BIT DISCRETE 2 shows a 1.
(c) Release pressure to the left brake pedal.

S 704-013
(11) Do the Test of the right wheel brake switch as follows:
(a) On the tester set the SUBFRAME to 0 and the WORD to 38.
1) Make sure the BIT DISCRETE 2 shows a 0.
(b) Apply pressure to the right brake pedal.
1) Make sure the BIT DISCRETE 2 shows a 1.
(c) Release pressure to the right brake pedal.

F. Put the Airplane Back to Its Usual Condition

S 864-042
(1) If you used the HHDLU, do the steps that follow:
(a) Set the function switch on the flight recorder control panel to the NORM position.
(b) Push the red button on top of the HHDLU.
(c) Remove the HHDLU adapter cable from the flight data recorder.
(d) Install the test plug to the test connector at the flight data recorder.

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S 864-043

(2) If you used test equipment other than the HHDLU, do the steps that follow:
   (a) Turn the tester off.
   (b) Open these P11 panel circuit breakers:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC
   (c) Disconnect the tester from the right side of the P61 panel.
   (d) Install the test plug to the test connector at the P61 panel.
   (e) Close these P11 panel circuit breakers:
      1) 11J7, FLIGHT RECORDER AC
      2) 11J8, FLIGHT RECORDER DC

S 864-053

(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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AIRPLANE CONDITION MONITORING SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. Airplane condition monitoring system (ACMS) collects and records operational data. This permits detail analysis of the airplane's performance and maintenance requirements. The data is aquired by the flight data acquisition unit (FDAU) and/or the data management unit (DMU).
   B. ACMS data which contains some of the same data sent to the flight data recorder (FDR) is sent to the quick access recorder (QAR). The QAR is a recorder similar to a flight data recorder but without the crash protection features.
   C. Airplane maintenance personnel will periodically remove the recorded data from the QAR and analyze the data using the ACMS ground equipment.
   D. Primary electrical power for the printer, QAR and the DMU is 115v AC. Electrical power for the FDAU is also 115v AC (AMM 31-31-00/001).
2. Component Details (Fig. 1)
   A. Data Management Unit (DMU)
      (1) The data management unit (DMU) is located on shelf E2-2 of the main equipment center. The DMU is a microprocessor controlled unit that sequentially receives all selected airplane systems, sensors and DFDAU data. The acquired data is scaled and formatted into digital data format.
      (2) The DMU is also programmable to meet individual airline requirements in collecting and displaying airplane data. This can be accomplished by using the carry-on data loader which is carried to the cockpit and connected to the P61 panel.
      (3) A test signal is provided for each signal type for the data acquisition circuitry portion of the DMU. This self-contained test (BITE) indication as well as those provided from other system LRU's, is provided as a discrete input to the DMU. A self-test routine is also provided for the arithmetic unit and certain portions of the memory. The computer combines these BITE signals and will output a system BITE indication to the CDU. The CDU can then be used, via computer callup capability, to display the code corresponding to the faulty LRU.
      (4) A READ switch, an ATE connector, DMU FAIL indicator and a STATUS display are located on the front panel of the DMU. The READ switch is used to display stored fault codes in the STATUS display. These fault codes are used for bench maintenance. The READ switch is also used to test the fault indicator. The ATE connector is provided to connect external test equipment. The DMU FAIL indicator comes on to indicate that the component has failed.

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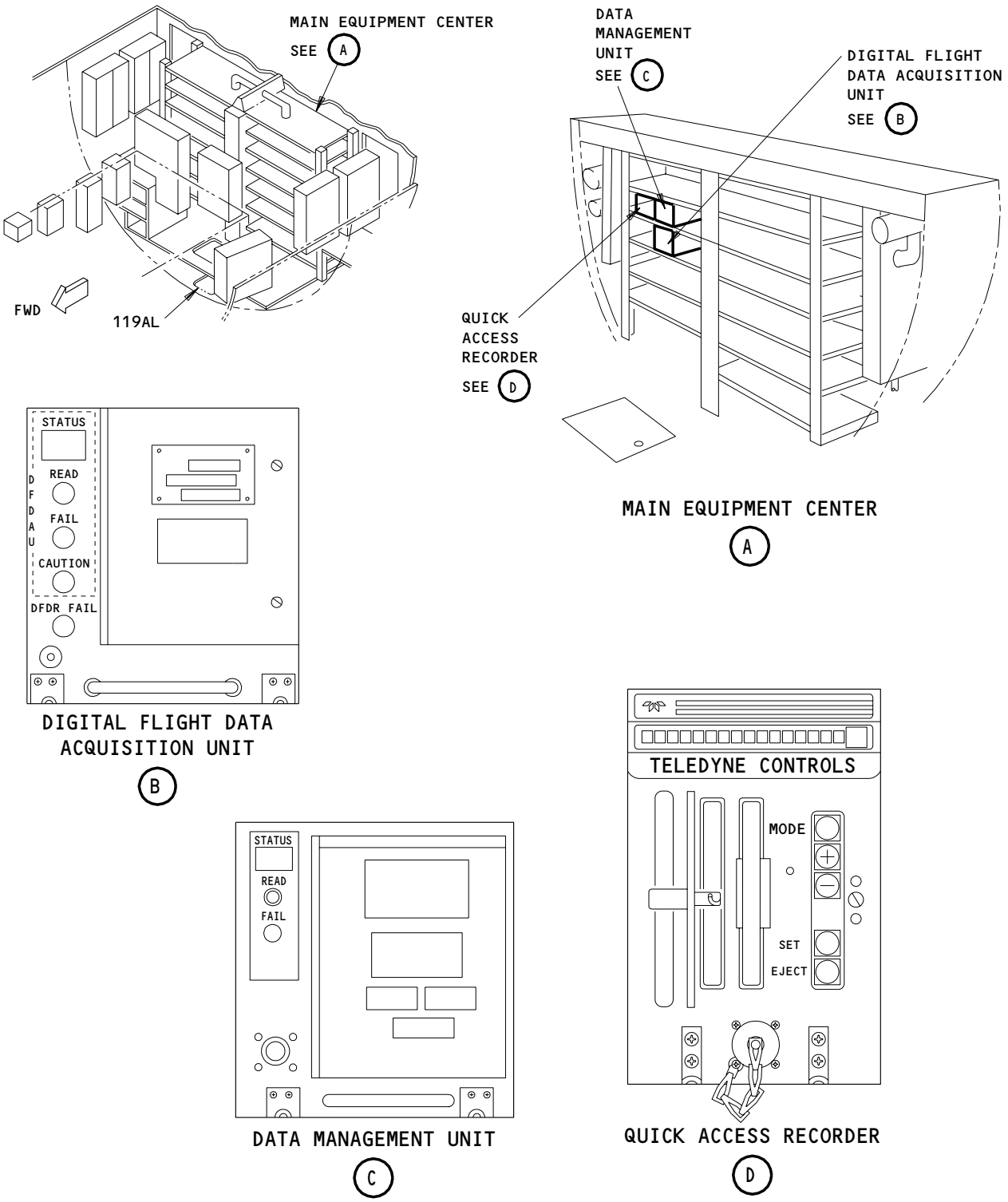

Airplane Condition Monitoring System – Component Location
Figure 1 (Sheet 1)

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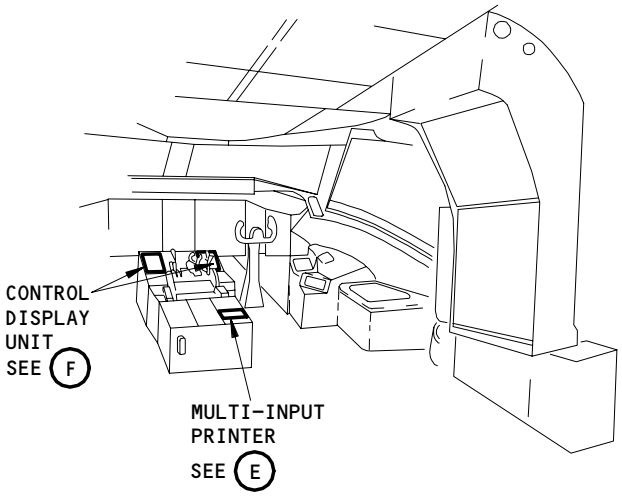
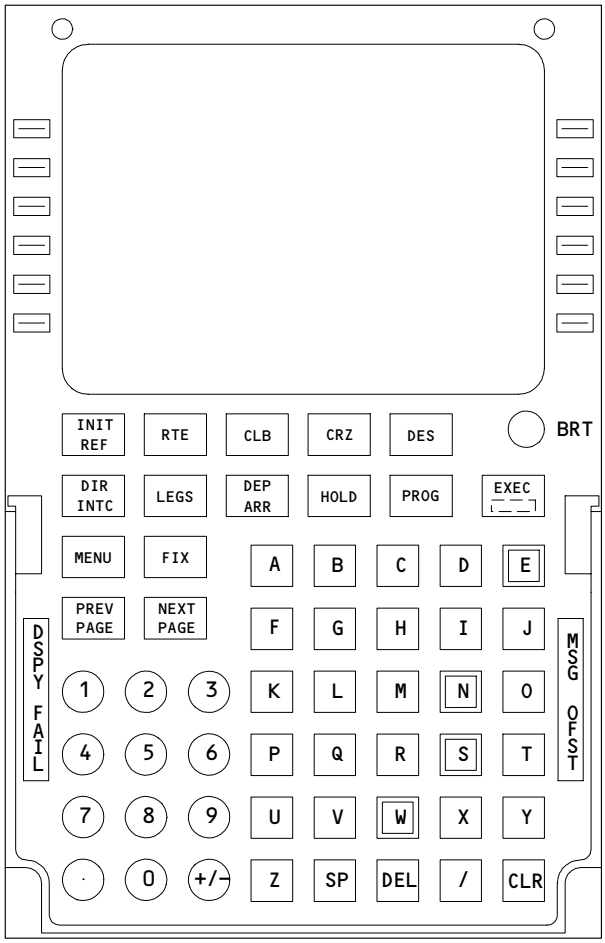
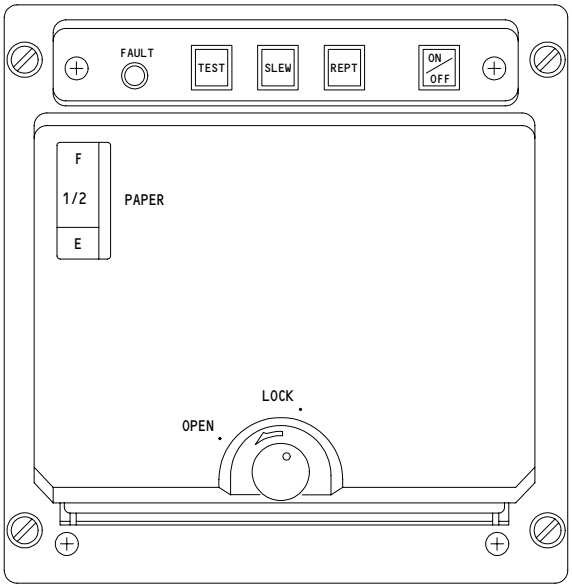




CONTROL DISPLAY UNIT
F



MULTI-INPUT PRINTER
E

Airplane Condition Monitoring System - Component Location
Figure 1 (Sheet 2)

585857

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(5) The DMU is shared with the flight data recorder system. It receives and processes parameter input signals and converts the signals into proper format for recording by the printer (AMM 31-31-00/001).

B. Quick Access Recorder

(1) The Quick Access Recorder (QAR) stores digital flight information as part of the ACMS. The QAR provides an intelligent storage device with expandable storage capacity using industry standard 3.5 inch rewritable optical media for convenient data interchange with a common personal computer using standard DOS media formats.

(2) New features include in flight synchronization of raw data, real time clock/calender and user programmability of the data recording process. The in flight synchronization of raw data and the speed advantage of the optical disk can significantly reduce the ground processing time for the flight data analysis process.

(3) The QAR operating controls, optical drive, and spare disk bracket are located on the front panel behind a hinged locking door. The 16 alpha numeric display is located above the door.

(4) The momentary contact switch on the QAR operates as follows:

(a) MODE - The MODE switch select the QAR operating modes.

(b) (+) - The + switch increment the menu listing and adjust the parameters

(c) (-) - The - switch decrement the menu listing and adjust the parameters

(d) SET - The SET switch select the display menu function and test the parameters.

(e) EJECT - The EJECT switch ejects the disk from the QAR disk drive.

(5) The FAIL indicator on the QAR indicates system failure.

C. Flight Data Acquisition Unit (FDAU)

(1) The FDAU is installed in the main equipment center at the E2-2 rack. The FDAU aquires airplane performance data for the ACMS. These data are for maintenance purposes. Airline personnel retrieve the ACMS data collected by the FDAU and use it to check the operation of the airplanes systems and engines. The engine data is particularly useful for identifying engine performance trends. The FDAU is also shared with the flight recorder system (AMM 31-31-00/001).

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D. Control Display Unit (CDU)
(1) The CDU is located on the P9 panel. It interfaces with the ACMS and the FMCS. It provides controls and keys to request for data display of any ACMS parameter. It consists of a keyboard, function switches, and a data display (AMM 34-61-00/001).

E. Printer
(1) The printer prints out reports of selected data. The printing function is controlled by the DMU. The printout is initiated automatically in certain system modes, or manually from the CDU.
(2) The front panel controls operate in the following manner:
(a) MSG Indicator - This indicator illuminates upon reciept of a source input ARINC - 429 data. The message light is turned off using the reset switch.
(b) Paper Advance Pushbutton - The pushbutton labeled SLEW advances paper as long as the pushbutton is pressed.
(c) Self-Test Pushbutton - Actuation of the pushbutton labeled TEST causes the printer to print a test pattern.
(d) Fault light - The FAULT light will illuminate when the printer is out of paper or the door is not closed.
(e) Printer Repeat Button - Actuating the switch labeled REPT will send a signal over the status lines and repeat previous data over again.
(f) ALRT RST Switch - Actuation of the alert reset switch causes to reset of the aural/visual alert function.

3. Operation
A. Functional Description (Fig. 2)
(1) The DMU is the major element of the ACMS. It provides data acquisition, data management and data distribution functions to the ACMS. The DMU transmits data to the QAR for airline maintenance purposes and automatically initiates printout function in certain system modes.
(2) Control Display Unit (CDU) (AMM 34-61-00/001)
(a) The CDU is a microprocessor-based device which provides a communications link between the flight crew and ACMS.
(b) The CDU communicates directly with the DMU by means of two ARINC 429 DITS inputs, which are multiplexed into one receiver and an ARINC 429 low speed transmitter. These communication lines provide the DMU with CDU data outputs, requests for data and information necessary for the display of data. If the CDU is malfunctioning, a CDU FAIL message will appear on the CDU display.

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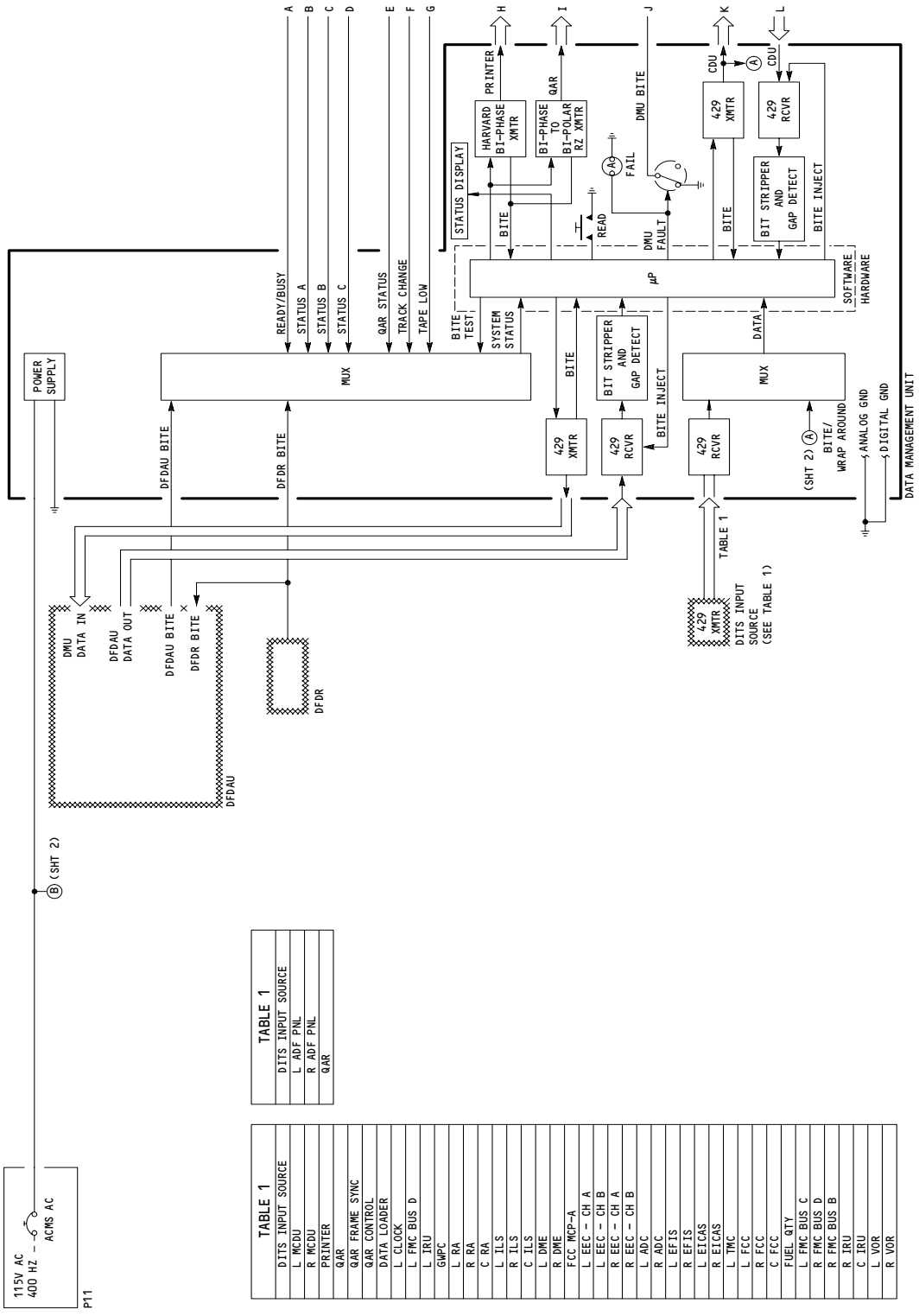

ACMS Schematic
Figure 2 (Sheet 1)

611758

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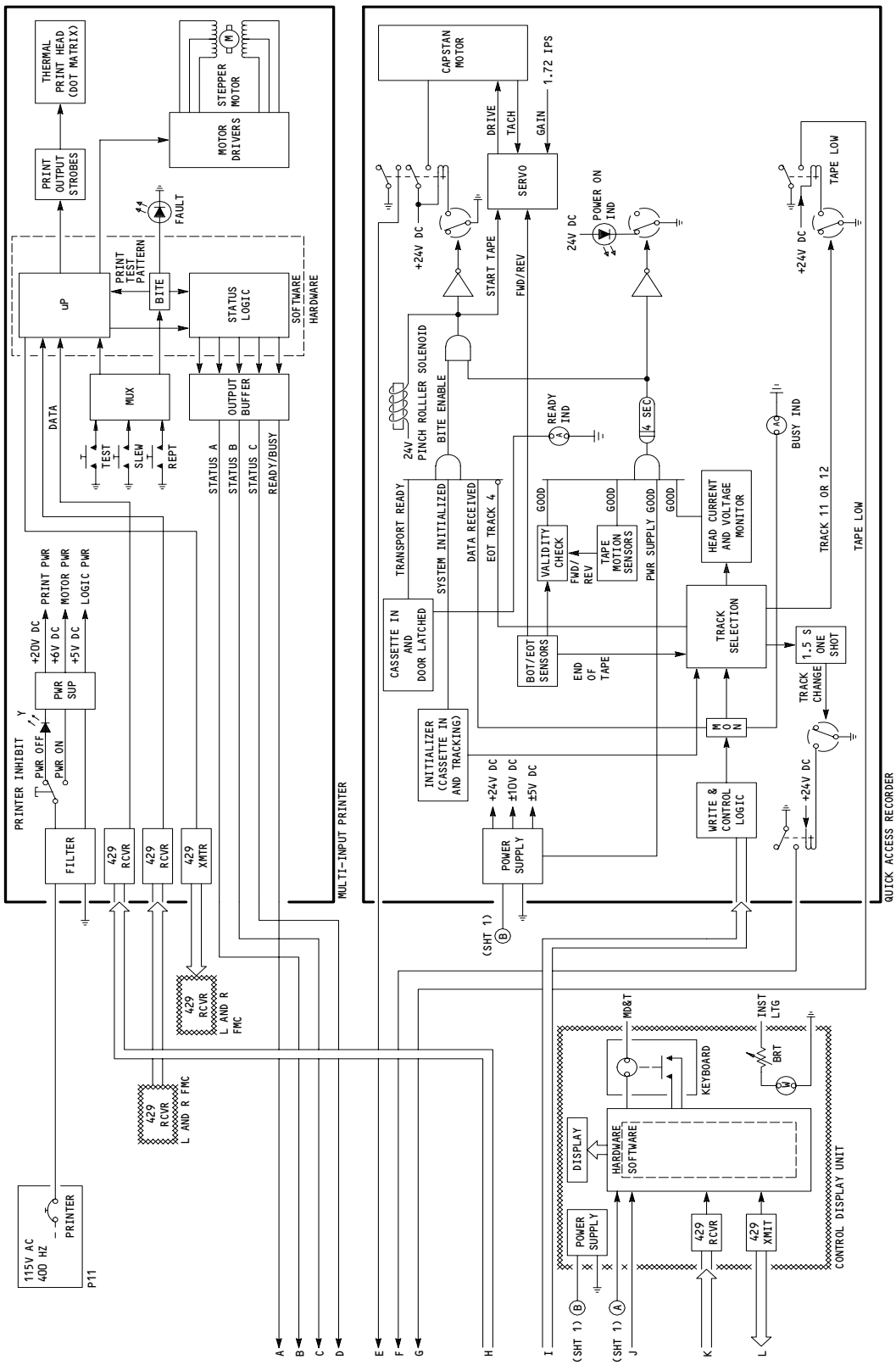

ACMS Schematic
Figure 2 (Sheet 2)

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(3) To access the ACMS main menu on the CDU, press the MENU key, then press the line select key (LSK) next to ACMS. From the ACMS main menu, the CDU will display the following functions:
   (a) REPORT
   (b) REPROGRAM
   (c) ADL
   (d) DATA DISPLAY
   (e) DOC DATA
   (f) MAINT ACTION
   (g) RT PRINT

(4) The REPORTs function provides a summary of ACMS generated and stored reports. ACMS reports can be displayed with a manual request through the CDU or printed on the printer by pressing LSK key.

(5) The REPROGRAM function shows the DMU part number, serial number, software version number, reprogram notes and a selection to continue the reprogram function.

(6) The airborn data loader (ADL) function provides the DMU the ability to receive or transmit data from and to the ADL.

(7) The DATA DISPLAY function provides a selection for ACMS data display in real-time.

(8) The DOC DATA function allows the pilots to enter documentary data to the ACMS using the CDU.

(9) MAINT ACTION menu is used to reset, activate, or change simple constants and variables in the DMU. The maintenance action functions are easily changed to meet the needs of individual airlines.

(10) The RT Print function allows the CDU user to either trigger one of the five available CDU real-time reports or to reprogram the parameters on one of the reports. The contents of each CDU real-time report are stored in nonvolatile memory so that they can also be available at a later time, if so desired.
   (a) If the DMU malfunctions, the CPU generates a DMU signal. It turns on the solid state switch which removes the ground from the fault relay on the control panel to turn on the OFF light. The fault signal also enables the logic gate which turns on the DMU FAULT light on the front of the DMU and provides a signal to the CDU which will then display the DMU FAIL message.

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(b) The printer interface circuits transmit the print command and data signals to the printer upon command of the input/output control when the ready signal from the printer is present.

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AIRPLANE CONDITION MONITORING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
CIRCUIT BREAKERS	1		FLT COMPT, P11	
ACMS AC POWER, C569		1	11J4	*
ACMS SENSOR, C672		1	11J6	*
FLIGHT RECORDER AC, C561		1	11J7	*
FLIGHT RECORDER DC, C578		1	11J8	*
PRINTER, C671		1	11J1	*
PLUG - (REF 31-31-00, FIG. 101)				
FLIGHT RECORDER TEST, M968				
PRINTER - MULTI-INPUT, M1631	1	1	FLT COMPT, P8	31-35-06
RECORDER - QUICK ACCESS, M1134	2	1	119AL, MAIN EQUIP CTR, E2-2	31-35-04
TRANSDUCER - LEFT AILERON CONTROL FORCE, TS16	1	1	113AL, FWD EQUIP BAY	31-35-11
TRANSDUCER - LEFT ELEVATOR CONTROL FORCE, TS15	1	1	113AL, FWD EQUIP BAY	31-35-10
TRANSDUCER - RIGHT ELEVATOR CONTROL FORCE, TS14	1	1	113AL, FWD EQUIP BAY	31-35-10
UNIT - (REF 34-61-00, FIG. 101)				
LEFT CONTROL DISPLAY, M76				
RIGHT CONTROL DISPLAY, M77				
UNIT - DATA MANAGEMENT, M1200	2	1	119AL, MAIN EQUIP CTR, E2-2	31-35-08
UNIT - (REF 31-31-00, FIG. 101)				
DIGITAL FLIGHT DATA ACQ, M138				

* SEE THE WDM EQUIPMENT LIST

Airplane Condition Monitoring System - Component Index
Figure 101

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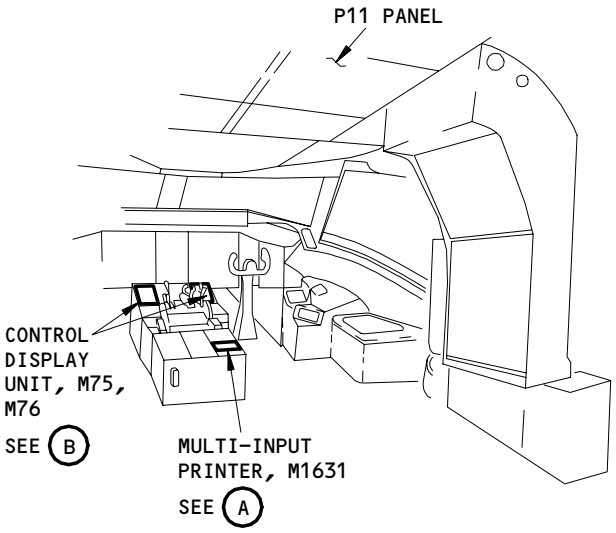
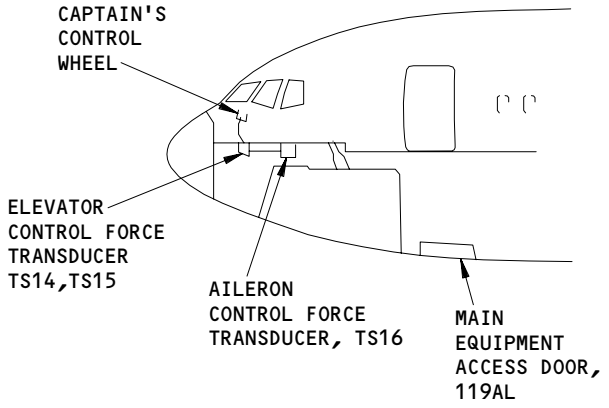
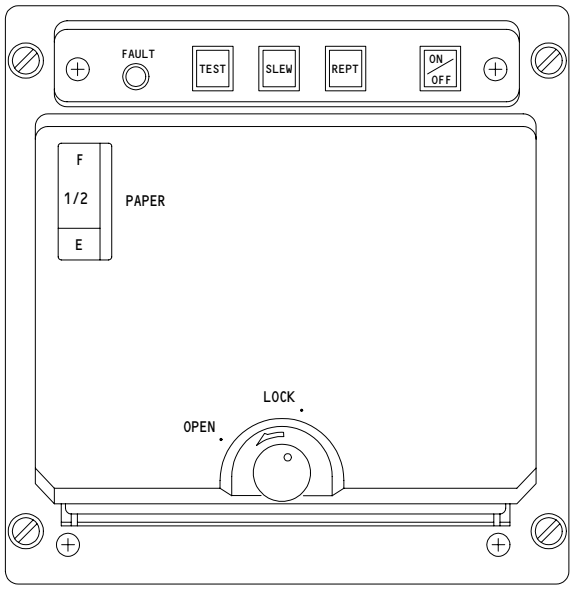


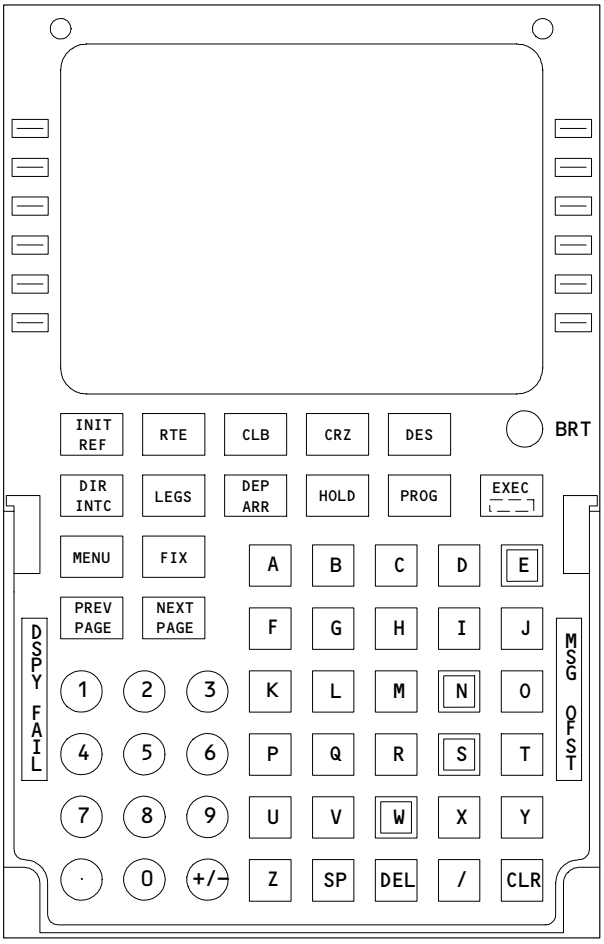
FLIGHT COMPARTMENT





MULTI-INPUT PRINTER, M1631

A



CONTROL DISPLAY UNIT, M76,M77

B

Airplane Condition Monitoring System - Component Location
Figure 102 (Sheet 1)

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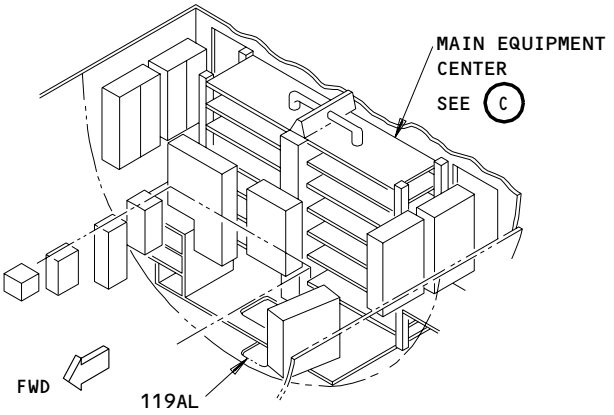
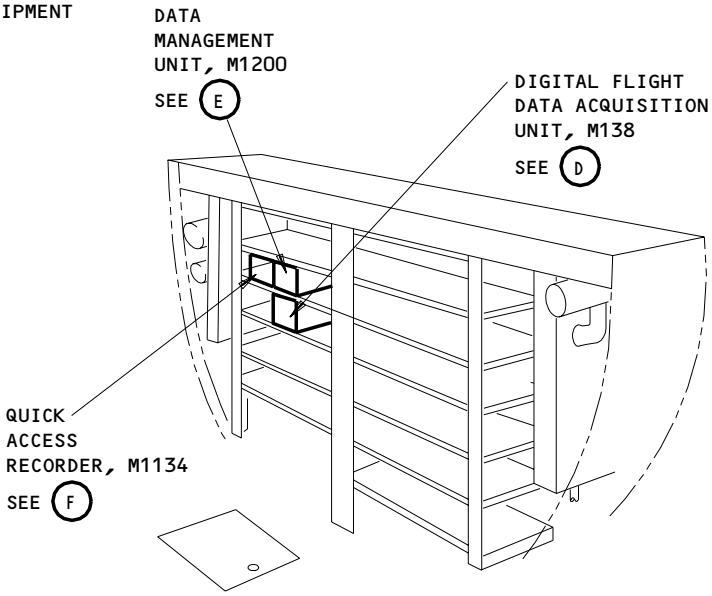
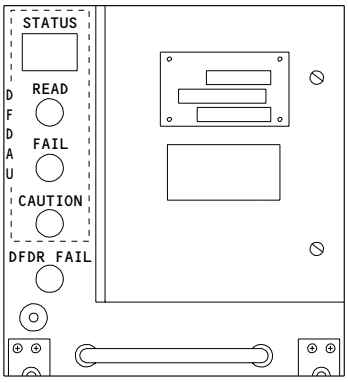
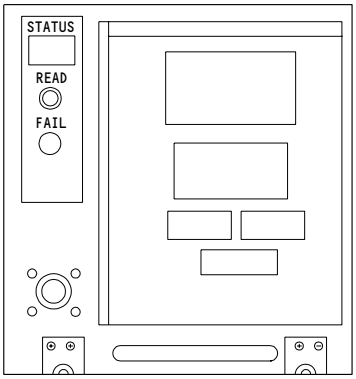




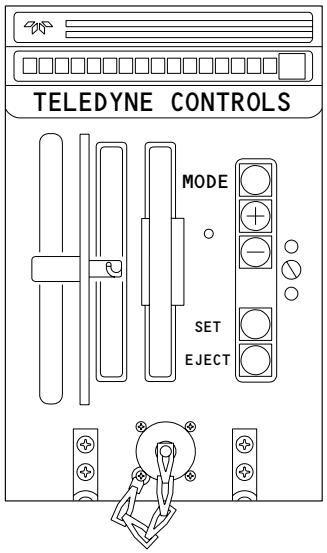
MAIN EQUIPMENT CENTER
C



DIGITAL FLIGHT DATA ACQUISITION UNIT, M138
D



DATA MANAGEMENT UNIT, M1200
E



QUICK ACCESS RECORDER, M1134
F

Airplane Condition Monitoring System – Component Location
Figure 102 (Sheet 2)

F38857

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AIRPLANE CONDITION MONITORING SYSTEM - ADJUSTMENT/TEST

1. General
   A. There are two task in this procedure. They are the operational test and the system test.

TASK 31-35-00-715-156

2. Airplane Condition Monitoring System Operational Test
   A. General
      (1) This operational test make sure the Quick Access Recorder (QAR) and the printer works correctly. No test equipment is necessary for this Test.
   B. References
      (1) AMM 24-22-00/201, Electrical Power Control
   C. Access
      (1) Location Zone
          212 Flight Compartment (Right)
          119 Main Equipment Center

   D. Prepare for the test

      S 865-226
      (1) Supply electrical power (AMM 24-22-00/201).

      S 865-239
      (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
          (a) 11J1, PRINTER
          (b) 11J4, ACMS AC
          (c) 11J6, ACMS SENSOR
          (d) 11J7, FLIGHT RECORDER AC
          (e) 11J8, FLIGHT RECORDER DC
   E. QAR Test

      S 715-252
      (1) Do the steps that follows:
          (a) Make sure the optical disk is installed in the QAR drive.

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(b) On ther QAR display, make sure that the < OQAR MAIN MENU is shown on the display.

NOTE: If < OQAR MAIN MENU is not shown on the QAR display, push the MODE switch on the QAR until it shows.

(c) On the QAR, push the + or - switch until < ACQ STATS shows on the QAR display.
(d) On the QAR, push the SET switch.

NOTE: This will set the acquisition and recording status display.

(e) On the FMC CDU, do the steps that follows:
1) Set < ACMS.
2) Set < DEVICE INTERFACES.
3) Set < QAR
4) Set < START QAR.
(f) On the QAR, make sure the QAR display shows as follows:
1) BZZZZ:XXXXX:YYYYY

NOTE: B = Bi-polar: ZZZ = Ignore this value: XXXXX = Input subframe counter: YYYYY = Record data subframe counter.

(g) On the FMC CDU, set < STOP QAR.
(h) On the QAR, push the MODE switch to show < OQAR MAIN MENU.
(i) On the QAR, push the + or - switch until < DIAGNOSTICS shows on the QAR display.
(j) On the QAR, push the SET switch.

NOTE: This will set the diagnostics menu.

(k) On the FMC CDU, set < QAR STATUS.
1) Make sure the left FMC CDU shows as follows:

.....STATUS.....OK
.....TAPE LOW ....NOT LOW

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(l) On the QAR, push the EJECT switch.
(m) On the left FMC CDU, make sure the display shows as follows:

.....STATUS.....FAULT.....
.....TAPE LOW ....LOW.....

(n) On QAR, install the disk to the QAR disk drive.
(o) On the FMC CDU, set < EXTENDED STATUS.
(p) On the left FMC CDU, make sure the display shows as follows:

... QAR EXTENDED STATUS.....
... RS422 ACTIVE YES.....

S 705-344
(2) Do the QAR software configuration check (AMM 31-35-01/201).

F. Printer Test

S 015-149
(1) At the side wall panel, open the door on the printer.

S 205-150
(2) Make sure there are papers in the printer.

S 865-151
(3) On the CDU, go to the ACMS MAIN MENU page and set the REPROGRAM function.

S 205-152
(4) Make sure the ACMS REPROGRAM page shows the DMU part number.

S 865-153
(5) On the CDU, set the PRINT function.

S 205-154
(6) On the printer, make sure the DMU part number is the same part number shown on the CDU.

NOTE: All data on the printer is satisfactory.

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S 865-155
(7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-35-00-735-157

3. Airplane Condition Monitoring System Test

A. General
(1) This procedure is a system test that test all the inputs that are connected to the flight recorder.
(2) The Control Display Unit (CDU) is used as the on board test equipment.

B. References
(1) AMM 21-31-00/501, Pressurization Control System
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 29-11-00/201, Main Hydraulic System
(4) AMM 31-31-00/501, Flight Data Recorder System
(5) AMM 32-00-20/201, Landing Gear Downlock System
(6) AMM 32-09-02/201, Air/Ground Relays
(7) AMM 32-42-00/501, Antiskid/Autobrake System
(8) AMM 34-16-00/501, Altitude Alert System
(9) AMM 34-46-00/501, Ground Proximity Warning System
(10) AMM 34-61-00/501, Flight Management Computer System
(11) AMM 36-00-00/201, Pneumatic System

C. Access
(1) Location Zone
212 Flight Compartment

D. Prepare to do the Test

S 205-001
(1) Make sure the CDU is operational (AMM 34-61-00).

S 865-002
(2) On the CDU, do the steps that follow:
(a) Get into the ACMS menu on the CDU.
(b) On the ACMS MAIN MENU page push the switch for the DATA DISPLAY.
(c) On the ACMS DATA DISPLAY page push the switch for DITS DATA.

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(d) Set the PORT, LABEL, and the SDI shown in the test procedure.

S 865-158

(3) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11J1, PRINTER
(b) 11J4, ACMS AC POWER
(c) 11J6, ACMS SENSOR
(d) 11J7, FLIGHT RECORDER AC
(e) 11J8, FLIGHT RECORDER DC

E. MTH 280 WITH SB 31-76;
Data Management Unit (DMU) and Supplemental Control Unit (SCU) Interface Test

S 865-253

(1) On the P61 panel, set the EEC MAINT L ENG POWER switch to the TEST position.

S 865-254

(2) On the control display unit (CDU), set the DMU to show label 46 and SDI 00 on port 39 as follows:
(a) Get into the ACMS menu.
(b) On the ACMS menu page, set the switch for the DATA DISPLAY.
(c) On the ACMS DATA DISPLAY page, set the switch for DITS DATA.
(d) Set the PORT to 39, LABEL to 46 and the SDIto 00.

S 205-255

(3) Make sure the numeric data shown on the CDU.

S 865-256

(4) On the P61 panel, set the EEC MAINT L ENG POWER switch to the NORM position.

S 205-257

(5) Make sure that the LABEL NOT FOUND is shown on the CDU.

F. Left Tank Fuel Temperature Test

S 205-004

(1) Make sure the circuit breaker on the P11 panel is closed:
(a) 11M12, FUEL TEMP

S 865-005

(2) On the CDU, set the PORT to 04, LABEL to 055 and the SDI to 01.

S 865-007

(3) Read the fuel indicator that is installed on the P5 panel.

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S 205-006

(4) Make sure the CDU display shows the correct value for the temperature shown in the table that follows:

INDICATED FUEL TEMP (DEG. C)	CDU DISPLAY	
	MIN	MAX
-18	(7 or F) F4OXX	(7 or F) FAOXX
-15	(7 or F) F58XX	(7 or F) FB8XX
-12	(7 or F) F7OXX	(7 or F) FDOXX
- 9	(7 or F) F88XX	(7 or F) FE8XX
- 6	(7 or F) FAOXX	(6 or E) OOOXX
- 3	(7 or F) FB8XX	(6 or E) O18XX
- 0	(7 or F) FDOXX	(6 or E) O3OXX
3	(7 or F) FE8XX	(6 or E) O48XX
6	(6 or E) OOOXX	(6 or E) O6OXX
9	(6 or E) O18XX	(6 or E) O78XX
12	(6 or E) O3OXX	(6 or E) O9OXX
15	(6 or E) O48XX	(6 or E) OA8XX
18	(6 or E) O6OXX	(6 or E) OCOXX
21	(6 or E) O78XX	(6 or E) OD8XX

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INDICATED FUEL TEMP (DEG. C)	CDU DISPLAY	
	MIN	MAX
24	(6 or E) 090XX	(6 or E) 0F0XX
27	(6 or E) 0A8XX	(6 or E) 108XX
30	(6 or E) 0C0XX	(6 or E) 120XX
33	(6 or E) 0D8XX	(6 or E) 138XX
36	(6 or E) 0F0XX	(6 or E) 150XX
39	(6 or E) 108XX	(6 or E) 168XX

G. Alternate Flap Drive Discrete Test.

S 865-008
(1) On the CDU, set the PORT to 04, LABEL to 213 and the SDI to 10.

S 865-009
(2) At the P3 panel, set the ALTN FLAP switch to the ALTN position.

S 205-010
(3) On the CDU, make sure the BIT (DISCRETE) 17 shows a 1.

S 865-011
(4) Set the ALTN FLAP switch to the NORM position.

S 205-011
(5) Make sure the BIT (DISCRETE) 17 shows a 0.

H. Flap Override Switch Position Test

S 865-012
(1) On the CDU, set the PORT to 04, LABEL to 207 and the SDI to 10.

S 865-013
(2) At the P3 panel, set the GND PROX FLAP OVRD switch to the OVRD position.

S 205-014
(3) On the CDU, make sure the BIT (DISCRETE) 16 shows a 1.

S 865-015
(4) Set the GND PROX FLAP OVRD switch to the usual position.

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S 205-015
(5) On the CDU, make sure the BIT (DISCRETE) 16 shows a 0.

I. Altitude Alert Advisory Test

S 205-016
(1) Make sure the altitude alert system is operational (AMM 34-16-00).

S 865-018
(2) Set the captain's and the first officer's ADC source switch to the NORM position.

S 865-019
(3) Adjust the BARO set knob on the captain's and the first officer's altimeter to read 0 ±40 feet altitude.

S 865-020
(4) Set the altitude on the mode control panel (MCP) to 10,000 feet.

S 205-021
(5) Make sure the captain's and the first officer's ALT light on the altimeters are off.

S 865-022
(6) On the CDU, set the PORT to 04, LABEL to 206 and the SDI to 10.

S 205-023
(7) Make sure the BIT (DISCRETE) 15 shows a 1.

S 865-024
(8) Adjust the altitude to 600 ±200 feet above the altimeter altitude.

S 205-025
(9) Make sure the ALT light on the captain's and the first officer's altimeter come on.

S 205-026
(10) Make sure the BIT (DISCRETE) 15 shows a 0.

S 865-229
(11) Set the altitude alert system back to normal (AMM 34-16-00/501).

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J. Airplane Identification Test

S 865-027
(1) On the CDU, set the PORT to 04, LABEL to 212 and the SDI to 10.

S 205-028
(2) Make sure the BIT (DISCRETE) 16 and 20 shows a 1 and BIT (DISCRETE) 17, 18, 19, and 21 shows a 0.

S 865-029
(3) On the CDU, set the PORT to 04, LABEL to 211 and the SDI to 10.

S 205-173
(4) Make sure the CDU display shows the correct value for the given airplane that follows:

AIRPLANE SAS	CDU DISCRETE STATE BIT											
	26	25	24	23	22	21	20	19	18	17	16	15
150	0	0	0	0	0	0	0	1	0	0	0	0
151	0	0	0	0	0	0	1	0	0	0	0	0
152	0	0	0	0	0	0	1	1	0	0	0	0
153	0	0	0	0	0	1	0	0	0	0	0	0
154	0	0	0	0	0	1	0	1	0	0	0	0
155	0	0	0	0	0	1	1	0	0	0	0	0
275	0	0	0	0	0	0	0	1	0	0	0	1
276	0	0	0	0	0	0	1	0	0	0	0	1

K. SAS 050-274;
Control Column Force Test

S 205-030
(1) Make sure the hydraulic system is not pressurized (AMM 29-11-00).

S 865-031
(2) On the CDU, set the PORT to 04, LABEL to 034 and the SDI to 01.

S 865-032
(3) Set the control column to the full forward position.

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S 205-033
(4) On the CDU, make sure the left most hex character is F or 7 and the last 5 characters decrease to at least EE8XX.

S 865-034
(5) Set the control column to the full aft position.

S 205-035
(6) On the CDU, make sure the left most hex character is E or 6 and the last 5 characters increase to at least 118XX.

S 865-036
(7) Set the control column to the neutral position.

S 865-259
(8) On the CDU, set the PORT to 04, LABEL to 036 and the SDI to 01.

S 865-260
(9) Set the control column to the full forward position.

S 205-261
(10) On the CDU, make sure the left most hex character is F or 7 and the last 5 characters decrease to at least EE8XX.

S 865-262
(11) Set the control column to the full aft position.

S 205-263
(12) On the CDU, make sure the left most hex character is E or 6 and the last 5 characters increase to at least 118XX.

S 865-264
(13) Set the control column to the neutral position.

L. SAS 050-274;
Left Control Wheel Force Test

S 205-037
(1) Make sure the hydraulic system is not pressurized (AMM 29-11-00).

S 865-038
(2) On the CDU, set the PORT to 04, LABEL to 035 and the SDI to 01.

S 865-230
(3) Set the left control wheel at the neutral position.

S 205-039
(4) Make sure the CDU display shows E0BFXX or 60BFXX for the maximum value and FF42XX or 7F42XX for the minimum value.

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S 865-040
(5) Turn the left control wheel to the full clockwise position and hold.

S 205-041
(6) Make sure the CDU display shows E17EXX or 617EXX.

S 865-042
(7) Turn the control wheel fully counterclockwise and hold it.

S 205-043
(8) Make sure the CDU display shows FE82XX or 7E82XX.

S 865-044
(9) Set the control wheel back to the neutral position.

M. Cabin Outflow Valve Position Test

S 205-045
(1) Make sure the Pressurization Control System is operational (AMM 21-31-00).

S 865-175
(2) On the CDU, set the PORT to 04, LABEL to 027 and the SDI to 01.

S 865-046
(3) Open the Cabin Outflow Valve until the Cabin Altitude Control Valve indicator on the P5 panel shows OP (open).

S 205-047
(4) Make sure the CDU display reads between DFXXX and EAXXX.

S 415-178
(5) Close the Cabin Outflow Valve until the Cabin Altitude Control Valve indicator on the P5 panel shows CL (closed).

S 205-048
(6) Make sure the CDU display reads between A6XXX and 9CXXX.

N. Nose Gear Squat Switch Test

S 205-049
(1) Make sure the circuit breaker on the P11 panel is closed:
(a) 11U15, AIR/GND SYS 1

S 865-050
(2) On the CDU, set the PORT to 04, LABEL to 206 and the SDI to 10.

S 205-051
(3) Make sure the BIT (DISCRETE) 14 shows a 0.

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S 045-052

WARNING: DO THE DEACTIVATION PROCEDURE FOR FLIGHT MODE SIMULATION BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. WHEN YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS, THE AIRPLANE IS IN THE FLIGHT MODE. IN THE FLIGHT MODE, MANY OF THE AIRPLANE SYSTEMS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do the deactivation procedure for flight mode simulation (AMM 32-09-02).

S 865-053

(5) Open the circuit breaker on the P11 panel:
(a) 11U15, AIR/GND SYS 1

S 205-054

(6) Make sure the BIT (DISCRETE) 14 shows a 1.

S 865-231

(7) Close the circuit breaker on the P11 panel.
(a) 11U15, AIR/GND SYS 1

S 865-055

(8) Set the airplane to the ground mode (Ref 32-09-02).

O. Autobrake Position Test

S 715-227

(1) Make sure the autobrake system is operational (AMM 32-42-00).

S 865-056

(2) On the CDU, set the PORT, LABEL and the SDI for each signal as shown in the table that follows:

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AUTOBRAKE POSITION	TESTER SETUP			CDU DISPLAY	
SELECTOR SW POSITION	PORT	LABEL	SDI	BIT	STATE
RTO NOT SELECTED	04	207	10	19	0
RTO SELECTED					1
OFF NOT SELECTED	04	214	10	24	0
OFF SELECTED					1
DISARM NOT SELECTED	04	214	10	25	0
DISARM SELECTED					1
1 NOT SELECTED	04	207	10	20	0
1 SELECTED					1
2 NOT SELECTED	04	207	10	21	0
2 SELECTED					1
3 NOT SELECTED	04	207	10	22	0
3 SELECTED					1
4 NOT SELECTED	04	207	10	23	0
4 SELECTED					1
MAX AUTO NOT SELECTED	04	207	10	24	0
MAX SELECTED					1

S 865-057

(3) Set the autobrake selector switch to the OFF position.

P. Landing Gear Lever Position Test

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S 495-058

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED ON THE NOSE AND MAIN LANDING GEAR BEFORE YOU MOVE THE CONTROL LEVER FOR THE LANDING GEAR. IF YOU MOVE THE CONTROL LEVER WITHOUT THE DOWNLOCKS INSTALLED, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20).

S 865-059

(2) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00).

S 865-060

(3) On the CDU, set the PORT to 04, LABEL to 211 and the SDI to 10.

S 865-061

(4) At the P3-1 panel, set the landing gear lever in the DN position.

S 205-062

(5) On the CDU, Make sure the BIT (DISCRETE) 11 shows a 0.

S 865-063

(6) Set the landing gear lever in the OFF position.

S 205-064

(7) On the CDU, make sure the BIT (DISCRETE) 11 shows a 1.

S 865-065

(8) On the CDU, set the LABEL to 214.

S 865-066

(9) Set the landing gear lever in the UP position.

S 205-186

(10) On the CDU, make sure the BIT (DISCRETE) 26 shows a 1.

S 865-067

(11) Set the landing gear lever at the OFF position.

S 865-068

(12) On the CDU, make sure the BIT (DISCRETE) 26 shows a 0.

Q. Ground Proximity Warning Test

S 205-069

(1) Make sure the ground proximity warning system is operational (Ref 34-46-00).

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S 865-070
(2) On the CDU, set the PORT to 04, LABEL to 207 and the SDI to 10.

S 865-071
(3) At the P61 panel, set the GND PROX to the TEST position.

S 205-072
(4) On the CDU, make sure the BIT (DISCRETE) 12 shows a 0.

S 865-073
(5) Set the GND PROX to the NORM position.

S 205-074
(6) On the CDU, make sure the BIT (DISCRETE) 12 shows a 1.

R. Seat Belt Sign Test

S 205-075
(1) Make sure the circuit breaker on the P11 panel is closed:
(a) 11P9, PASS SIGN CONT

S 205-076
(2) Make sure the circuit breaker on the P33 panel is closed:
(a) 33J1, S/BELT CONT

S 865-077
(3) At the passenger sign control installed at the pilot overhead panel, set the SEAT BELTS switch to the ON position.

S 865-078
(4) On the CDU, set the PORT to 04, LABEL to 207 and the SDI to 10.

S 205-079
(5) On the CDU, make sure the BIT (DISCRETE) 25 shows a 1.

S 865-232
(6) Set the SEAT BELTS switch to the ON position.

S 205-080
(7) On the CDU, make sure the BIT (DISCRETE) 25 shows a 0.

S. Engine Driven Hydraulic Pump Test

S 205-081
(1) Make sure the hydraulic system are not pressurized during this test (AMM 29-11-00).

S 205-082
(2) Make sure the circuit breakers on the P11 panel are closed:
(a) 11L14, HYDRAULIC L ENG PUMP DEPRESS
(b) 11L23, HYDRAULIC R ENG PUMP DEPRESS

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S 865-083
(3) On the CDU, set the PORT to 04, LABEL to 204 and the SDI to 10.

S 865-084
(4) On the Hydraulic Control panel, set the L PRIMARY HYD PUMPS ENG switch to the ON position.

S 205-085
(5) On the CDU, make sure the BIT (DISCRETE) 24 shows a 1.

S 865-086
(6) Set the L PRIMARY HYD PUMPS ENG switch to the OFF position.

S 205-087
(7) On the CDU, make sure the BIT (DISCRETE) 24 shows a 0.

S 865-088
(8) Set the R PRIMARY HYD PUMPS ENG switch to the ON position.

S 205-089
(9) On the CDU, make sure the BIT (DISCRETE) 23 shows a 1.

S 865-090
(10) Set the R PRIMARY HYD PUMPS ENG switch to the OFF position.

S 205-091
(11) On the CDU, make sure the BIT (DISCRETE) 23 shows a 0.

T. Electrical Hydraulic Pump Test

S 205-092
(1) Make sure the electric hydraulic pumps is operational (AMM 29-11-00).

S 205-093
(2) Make sure the circuit breakers on the P11 panel is closed:
(a) 11L15, C1 HYDRAULIC ELEC PUMP
(b) 11L16, R HYD ELEC PUMP
(c) 11L24, C2 HYD ELEC PUMP
(d) 11L25, L HYD ELEC PUMP

S 865-094
(3) On the CDU, set the PORT to 04, LABEL to 204 and the SDI to 10.

S 865-095
(4) At the pilot's overhead panel, set the L DEMAND HYD PUMP ELEC on the hydraulic control panel to the OFF position.

S 205-096
(5) On the CDU, make sure the BIT (DISCRETE) 22 shows a 0.

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S 865-097
(6) On the hydraulic control panel, set the L DEMAND HYD PUMP ELEC switch to the ON position.

S 205-098
(7) On the CDU, make sure the BIT (DISCRETE) 22 shows a 1.

S 865-099
(8) On the CDU, set the LABEL to 206.

S 865-100
(9) On the Hydraulic Control Panel, set the R DEMAND HYD PUMP ELEC switch to the OFF position.

S 205-102
(10) On the CDU, make sure the BIT (DISCRETE) 13 shows a 0.

S 865-103
(11) On the hydraulic control panel, set the R DEMAND HYD PUMP ELEC switch to the ON position.

S 205-104
(12) On the CDU, make sure the BIT (DISCRETE) 13 shows a 1.

S 865-105
(13) On the CDU, set the LABEL to 213.

S 865-106
(14) On the hydraulic control panel, set the C PRIMARY HYD PUMPS ELEC 1 switch to the OFF position.

S 205-107
(15) On the CDU, make sure the BIT (DISCRETE) 19 shows a 0.

S 865-108
(16) On the hydraulic control panel, set the C PRIMARY HYD PUMPS ELEC 1 switch to the ON position.

S 205-109
(17) On the CDU, make sure the BIT (DISCRETE) 19 shows a 1.

S 865-110
(18) On the hydraulic control panel, set the C PRIMARY HYD PUMPS ELEC 2 switch to the OFF position.

S 205-111
(19) On the CDU, make sure the BIT (DISCRETE) 20 shows a 0.

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S 865-112
(20) On the hydraulic control panel, set the C PRIMARY HYD PUMPS ELEC 2 switch to the ON position.

S 205-113
(21) On the CDU, make sure the BIT (DISCRETE) 20 shows a 1.

U. Engine Start Test

S 205-114
(1) Make sure that pneumatic power is not available to the engine (AMM 36-00-00).

S 865-115
(2) Open these circuit breakers on the P6 panel and attach the DO-NOT-CLOSE tags:
(a) 6E1, FUEL VALVES L SPAR
(b) 6E2, FUEL VALVES R SPAR

S 865-116
(3) Open these circuit breakers On the P11 panel and attach the DO-NOT-CLOSE tags:
(a) 11D7, ENGINE STBY IGN 1
(b) 11D8, ENGINE STBY IGN 2
(c) 11M1, ENGINES IGNITION 1L
(d) 11M2, ENGINES IGNITION 1R
(e) 11M28, L IGN 2
(f) 11M29, R IGN 2

S 205-117
(4) Make sure these circuit breakers on the P11 panel are closed:
(a) 11D19, ENGINE START CONT L
(b) 11D20, ENGINE START CONT R
(c) 11D25, ENGINE FUEL CONTROL VALVE L
(d) 11D26, ENGINE FUEL CONTROL VALVE R

S 865-118
(5) On the pilot's overhead panel, set the left engine start switch to the GND position.

S 865-119
(6) On the CDU, set the PORT to 04, LABEL to 207 and the SDI to 10.

S 205-120
(7) On the CDU, make sure the BIT (DISCRETE) 26 shows a 0.

S 865-121
(8) Set the left engine start switch to the OFF position.

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S 205-122
(9) At the control stand, make sure the left fuel control switch is set at the CUTOFF position.

S 205-123
(10) On the CDU, make sure the BIT (DISCRETE) 26 shows a 1.

S 865-124
(11) On the pilot's overhead panel, set the right engine start switch to the GND position.

S 205-125
(12) On the CDU, make sure the BIT (DISCRETE) 27 shows a 0.

S 865-126
(13) Set the right engine start switch to the OFF position.

S 205-127
(14) On the control stand, make sure the right fuel control switch is set at the CUTOFF position.

S 205-128
(15) On the CDU, make sure the BIT (DISCRETE) 27 shows a 1.

S 865-129
(16) Remove DO-NOT-CLOSE tags and close the circuit breakers on the P6 panel:
(a) 6E1, FUEL VALVES L SPAR
(b) 6E2, FUEL VALVES R SPAR

S 865-130
(17) Remove the DO-NOT-CLOSE tags and close the circuit breakers on the P11 panel: :
(a) 11D7, ENGINE STBY IGN 1
(b) 11D8, ENGINE STBY IGN 2
(c) 11M1, ENGINES IGNITION 1L
(d) 11M2, ENGINES IGNITION 1R
(e) 11M28, L IGN 2
(f) 11M29, R IGN 2

S 865-233
(18) Remove electrical power if it is not necessary (Ref 24-22-00).

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OPTICAL QUICK ACCESS RECORDER (OQAR) - MAINTENANCE PRACTICES

1. General
   A. This procedure has these tasks:
      (1) The OQAR software configuration check.
      (2) An installation of the Optical Quick Access Recorder (OQAR) software.

TASK 31-35-01-702-001

2. OQAR Software Configuration Check
   A. General
      (1) This procedure tells you how to make sure the correct OQAR software is installed.
   B. References
      (1) AMM 24-22-00/201, Supply Electrical Power
   C. Access
      (1) Location Zone
          119 Main Equipment Center (Left)

   D. Procedure

      S 862-002
      (1) Do this task: Supply Electrical Power (AMM 24-22-00/201)

      S 712-003
      (2) Make sure these circuit breakers are closed:
          (a) On the P11 panel:
              1) 11J4, ACMS AC
              2) 11J7, FLIGHT RECORDER AC
              3) 11J8, FLIGHT RECORDER DC

      S 702-107
      (3) Do these steps to do the software configuration check of the OQAR:

          NOTE: You must know the correct software part number for the OQAR. For the OQAR to be approved installation, the correct software part number must be installed.

          (a) On the OQAR, do these steps:
              1) Push the mode switch
              2) Push the (+) switch until S/W version shows on the display.

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3) Push the SET switch.
   a) Make sure the software part number appears on the OQAR display.

      NOTE: If the software installed is not correct, do the software installation task.

4) Push the MODE switch.
5) Push the (+) switch until Diagnostic shows on the display.
6) Push the SET switch.
7) Push the (+) switch until flash ID shows on the display.
8) Push the SET switch.
   a) Make sure the flash status is OK.
9) Push the SET switch again to start the flash erase procedure.
   a) After several minutes, make sure that PASS (Reset) shows.
   b) After the QAR does a rest procedure, make sure the OQAR READY shows.

S 022-043

(4) Do these steps to put the airplane back to its usual condition:
   (a) Do this task: Remove Electrical Power (AMM 24-22-00/201).

TASK 31-35-01-402-044

3. Optical Quick Access Recorder (OQAR) Software Installation

A. General
   (1) This procedure tells you how to install software in the Optical Quick access Recorder (OQAR).
   (2) The airplane must be on the ground with the engines shut down before you can install software.

B. Reference
   (1) AMM 24-22-00/201, Electrical Power Control

C. Access
   (1) Location Zone
       119 Main Equipment Center (Left)

D. Procedure

S 862-045

(1) Do this task: Supply Electrical Power (AMM 24-22-00/201).

S 702-046

(2) Make sure this circuit breaker is closed:
   (a) On the P11, panel:
      1) 11J4, ACMS AC
      2) 11J7, FLIGHT RECORDER AC
      3) 11J8, FLIGHT RECORDER DC

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S 412-047

(3) Do these steps to prepare for the software installation:

(a) Make sure you know the correct software part number for the OQAR. For the OQAR to be an approved installation, the correct software part number must be installed.

S 022-048

(4) On the OQAR, Do these steps to install the software:

(a) Push the EJECT switch if a data disk is installed.

(b) Insert the the OQAR application diskette in the OQAR.

1) Push and hold the SET switch until the BOOTABLE OPTICAL message appears on the OQAR display.

NOTE: The OQAR will display BAD CARTRIDGE for approximately one minute before BOOTABLE OPTICAL is shown. Then it will take approximately 30 minute to complete the software load. The load is complete when SUM XXXXXXX OK? is shown.

(c) Push the SET switch to eject the disk.

(d) Reset the OQAR after the load is complete.

(e) Do the software configuration check to make sure the correct software is installed.

S 022-058

(5) Do these steps to put the airplane back to its usual condition:

(a) Do this task: Remove Electrical Power (AMM 24-22-00/201).

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QUICK ACCESS RECORDER - REMOVAL/INSTALLATION

1. General
   A. There are two tasks in this procedure. The first task is the removal of the Quick Access Recorder (QAR). The second task is the installation of the QAR.
   B. The QAR is installed in the main equipment center at the E2 rack.

TASK 31-35-01-004-005

2. Remove the QAR
   A. References
      (1) AMM 20-10-01/401, EE Rack Mounted Components
   B. Access
      (1) Location Zone
          119 Main Equipment Center

   C. Procedure

      S 864-002
      (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
          (a) On the overhead equipment panel P11:
              1) 11J4, ACMS AC
              2) 11J7, FLIGHT RECORDER AC
              3) 11J8, FLIGHT RECORDER DC

      S 024-091

      CAUTION: DO NOT TOUCH THE CONNECTOR PINS OR OTHER CONDUCTORS ON THE QAR. IF YOU TOUCH THESE CONDUCTORS, ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE QAR.

      (2) Remove the QAR from the equipment rack (AMM 20-10-01/401).

TASK 31-35-01-404-004

3. Install the QAR
   A. References
      (1) AMM 20-10-01/401, EE Rack Mounted Components
      (2) AMM 24-22-00/201, Electrical Power Control
      (3) AMM 34-61-00/501, Flight Management Computer System

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B. Access
(1) Location Zone
119 Main Equipment Center

C. Procedure

S 424-090

CAUTION: DO NOT TOUCH THE CONNECTOR PINS OR OTHER CONDUCTORS ON THE QAR. IF YOU TOUCH THESE CONDUCTORS, ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE QAR.

(1) Install the QAR in the equipment rack (AMM 20-10-01/401).

S 864-008
(2) Supply electrical power (AMM 24-22-00/201).

S 864-009
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11J4, ACMS AC
2) 11J7, FLIGHT RECORDER AC
3) 11J8, FLIGHT RECORDER DC

S 204-101
(4) Do the steps that follow:
(a) On the QAR, open the access door.
1) Make sure the disk is installed in the QAR.
2) On ther QAR display, make sure that the < OQAR MAIN MENU is shown on the display.

NOTE: If < OQAR MAIN MENU is not shown on the QAR display, push the MODE switch on the QAR until it shows.

S 704-126
(5) Do the Software Configuration Check

NOTE: You must know the correct software part number for the OQAR. For the OQAR to be approved installation, the correct software part number must be installed.

(a) On the OQAR, push the (+) until the software part number appears.

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(b) Push the SET switch.
1) Make sure the correct software version appears on the OQAR display.

NOTE: If the software part number is not correct, do this task:
Optical Quick Access Recorder (OQAR) Software Installation (AMM 31-35-01/201)

(c) Push the MODE switch,
(d) Push the (-) key to get back to the original display.

S 864-029
(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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PRINTER - SERVICING

1. General
   A. There is one task in this procedure. That one task is to install the paper to the printer. The printer is installed on the P8 panel.
   B. The paper low indicator has a color edge on the paper which shows 1 meter before the end of the paper.

TASK 31-35-06-613-001

2. Install the Paper into the Printer

   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zone
          212 Flight Compartment
   C. Procedure

      S 863-007
      (1) Open this circuit breaker on the overhead panel, P11, and attach the DO-NOT-CLOSE tag:
          (a) 11J1, PRINTER

      S 403-074
      (2) To install the paper into the printer, do the steps that follow:
          (a) Turn the latch (2) on the front face of the printer to the OPEN position and pull the the door (1) open.
          (b) Remove the empty spool:
              1) Push the release mechanism (3) with one hand while you lift the spool (4) out of the printer with the other hand.
              2) Remove the plastic end caps (5) from the cardboard tube and discard the tube.
          (c) Install a new roll of paper:
              1) Put the plastic end caps (5) into a new roll of paper.

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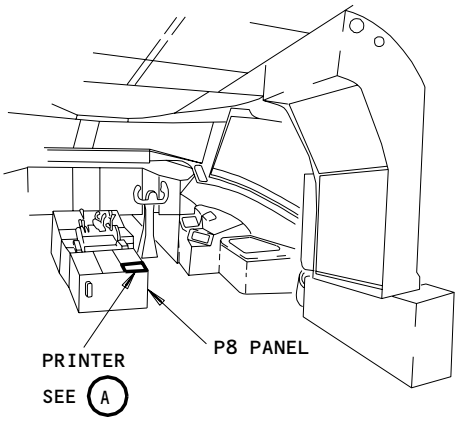
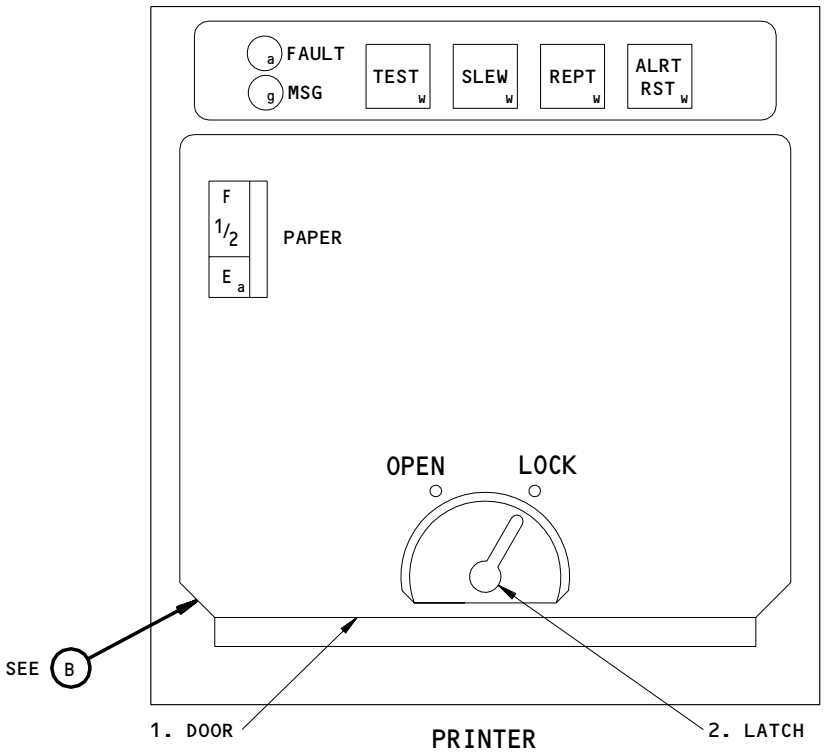
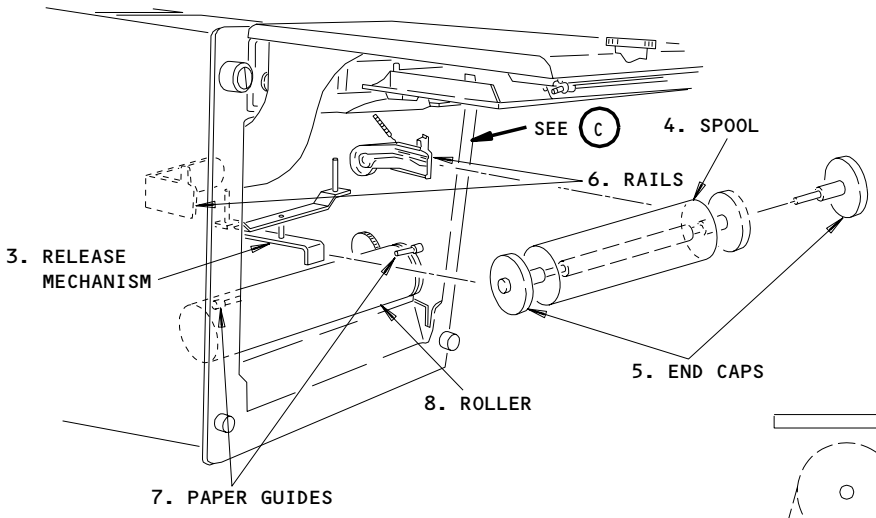


FLIGHT COMPARTMENT



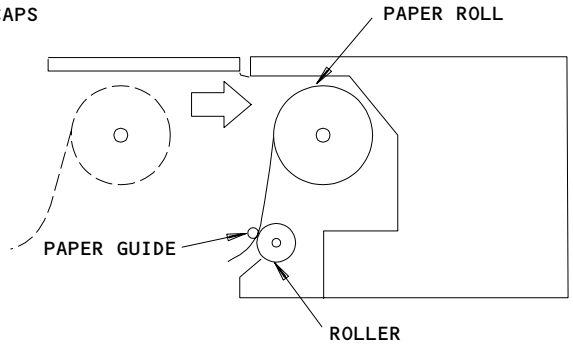
PRINTER

(A)



INSIDE VIEW OF PRINTER

(B)



PRINTER PAPER LOADING

(C)

Printer Servicing
Figure 301

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2) Align the end caps in the rails (6) in the sides of the printer and push the roll until it engages.

NOTE: The paper must wind clockwise off the roll.

3) Wind the paper off the roll between the paper guides (7) and the roller (8).

(d) Close the printer door and set the latch to the lock position.

S 863-003

(3) Remove the DO-NOT-CLOSE tag and close the circuit breaker on the P11 panel:
(a) 11J1, PRINTER

S 863-011

(4) On the printer, push the SLEW switch.

S 203-004

(5) Make sure the paper moves forward.

S 863-006

(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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PRINTER - REMOVAL/INSTALLATION

1. General
   A. There are two tasks in this procedure. The first task is the removal of the printer and the second task is the installation of the printer.
   B. The printer is installed on the control stand.

TASK 31-35-06-004-001

2. Printer Removal
   A. Access
      (1) Location Zone
          212 Flight Compartment

   B. Procedure

      S 864-002
      (1) Open the circuit breaker on the overhead panel, P11, and attach the DO-NOT-CLOSE tag:
          (a) 11J1, PRINTER

      S 034-003
      (2) Loosen the screws that hold the printer to the control stand.

      S 864-005
      (3) Move the printer from the control stand.

      S 014-026
      (4) Disconnect the electrical connector from the printer

      S 034-007
      (5) Remove the printer from the control stand.

TASK 31-35-06-404-021

3. Printer Installation
   A. References
      (1) AMM 24-22-00/201, Elecrtical Power Control
   B. Access
      (1) Location Zone
          212 Flight Compartment

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C. Procedure

S 434-009
(1) Connect the electrical connector to the printer.

S 414-010
(2) Install the printer to the control stand.

S 424-072
(3) Tighten the screws that hold the printer to the control stand.

S 864-012
(4) Remove the DO-NOT-CLOSE tag and close the circuit breaker on the P11 panel:
(a) 11J1, PRINTER

D. Printer Test

S 864-020
(1) Supply electrical power (AMM 24-22-00/201).

S 204-016
(2) Make sure the printer has paper.

S 864-027
(3) Push the SLEW switch.

S 204-015
(4) Make sure the paper moved forward.

S 864-025
(5) Push the TEST switch on the front of the printer.

S 204-018
(6) Make sure the printer does the following:
(a) The switch buttons and light indicators come on.

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(b) The FAIL indicator goes off when the test is complete.
(c) The printer will give a short test print.
(d) The printed page will print a solid black bar at the top of the page and a set of characters.
(e) The printed page will also display the installed software.
(f) Use this to verify which software is installed.

NOTE: Software installation must be performed off aircraft with the instructinos that come with the printer.

S 864-019

(7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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DATA MANAGEMENT UNIT - REMOVAL/INSTALLATION

1. General
   A. There are two tasks in this procedure. The first task is the removal of the Data Management Unit (DMU) and the second task is the installation of the DMU.
   B. The DMU is installed on the E2-2 rack in the main equipment center.

TASK 31-35-08-004-001

2. Remove the DMU
   A. References
      (1) 20-10-01/401, E/E Rack Mounted Components
      (2) 20-41-01/201, Electrostatic Sensitive Devices
   B. Access
      (1) Location Zone
          119Bl Main Equipment Center, E2-2

   C. Procedure

      S 864-002
      (1) Open the circuit breaker on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tag:
          (a) 11J4, ACMS AC POWER

      S 914-003

      CAUTION: DO NOT TOUCH THE DMU BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE DMU.

      (2) Do the procedure Removal/Installation of the ESDS Metal Units (Ref 20-41-01).

      S 024-019
      (3) Remove the DMU from the E2-2 equipment rack (Ref 20-10-01).

TASK 31-35-08-404-004

3. Install the DMU
   A. References
      (1) 20-10-01/401, E/E Rack Mounted Components

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(2) 24-22-00/201, Electrical Power Control

B. Access

(1) Location Zone

119BL Main Equipment Center, E2-2

C. Procedure

S 204-009

(1) Make sure the circuit breaker on the P11 panel is open:

(a) 11J4, ACMS AC POWER

S 914-018

CAUTION: DO NOT TOUCH THE DMU BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE DMU.

(2) Do the procedure Removal/Installation of the ESDS Metal Units (Ref 20-41-01).

S 204-006

(3) Examine the DMU electrical connectors and rack connectors for loose, dirt, or broken pins.

S 424-008

(4) Install the DMU to the E2-2 equipment rack (Ref 20-10-01).

S 864-010

(5) Remove the DO-NOT-CLOSE tag and close the circuit breaker on the P11 panel:

(a) 11J4, ACMS AC POWER

D. DMU Test

S 864-011

(1) Supply the electrical power (Ref 24-22-00).

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S 864-020

(2) Push and hold the READ switch on the front panel of the DMU.

(a) Make sure the DMU shows FFF, 888, and then 000 on the status window.

(b) After approximately 4 seconds, the DMU FAIL indicator goes off and the STATUS window shows 000.

S 864-017

(3) Remove the electrical power if it is not necessary.

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ELEVATOR CONTROL FORCE TRANSDUCER - REMOVAL/INSTALLATION

1. General (Fig. 401)
   A. There are two tasks in this procedure. The first task is the removal of the Elevator Control Force Transducer. The second task is the installation of the transducer.
   B. The transducer is installed on the crank and arm assembly below the flight compartment. Access to the transducer is through the forward equipment door.

TASK 31-35-10-004-001

2. Remove the Elevator Control Force Transducers
   A. Equipment
      (1) A20004-XX Rig Pin Set (AMM 20-10-24/201)
          (a) Rig Pin E-1
          (b) Rig Pin E-2
   B. References
      (1) 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) 20-10-24/201, Rig Pins
      (3) 22-00-02/201, Autoflight BITE
      (4) 24-22-00/201, Electrical Power - Control
      (5) 29-11-00/201, Main (Left, Center, and Right) Hydraulic Systems
   C. Access
      (1) Location Zones
          113 Area Forward of NLG Wheel Well (Left)
          119 Main Equipment Center (Left)

      (2) Access Panels
          113AL Flight/Landing Gear/Engine Control Components
          119BL Main Equipment Center

   D. Prepare For Removal

      S 864-002
      (1) Supply electrical power (Ref 24-22-00).

      S 864-003
      (2) Put the L, C, and R TAIL FLIGHT CONTROL SHUTOFF switches, on the P61 right side panel, in the OFF position.

      S 864-004
      (3) Put the two F/D switches on the MCP in the OFF position.

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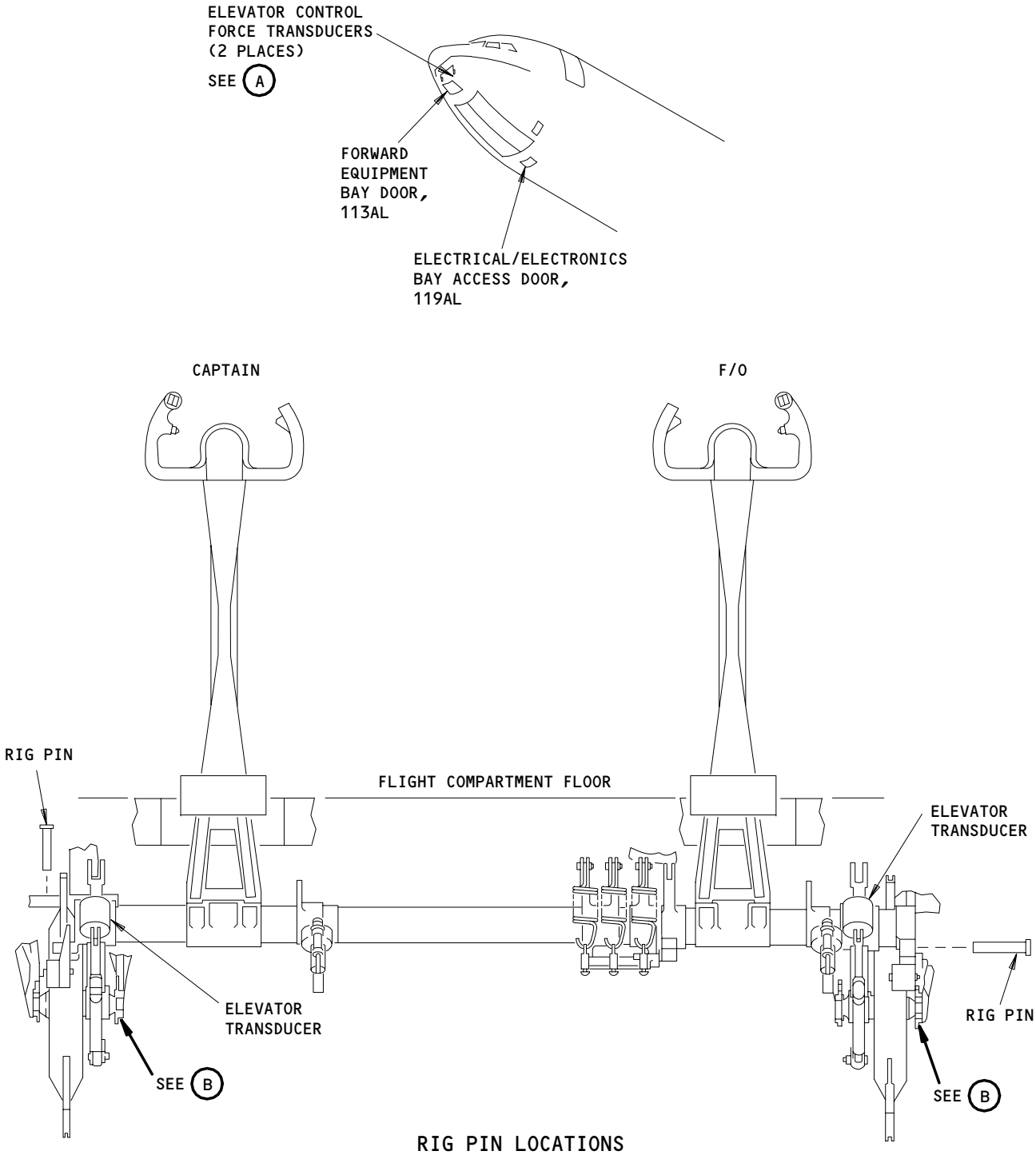

Elevator Control Force Transducer
Figure 401 (Sheet 1)

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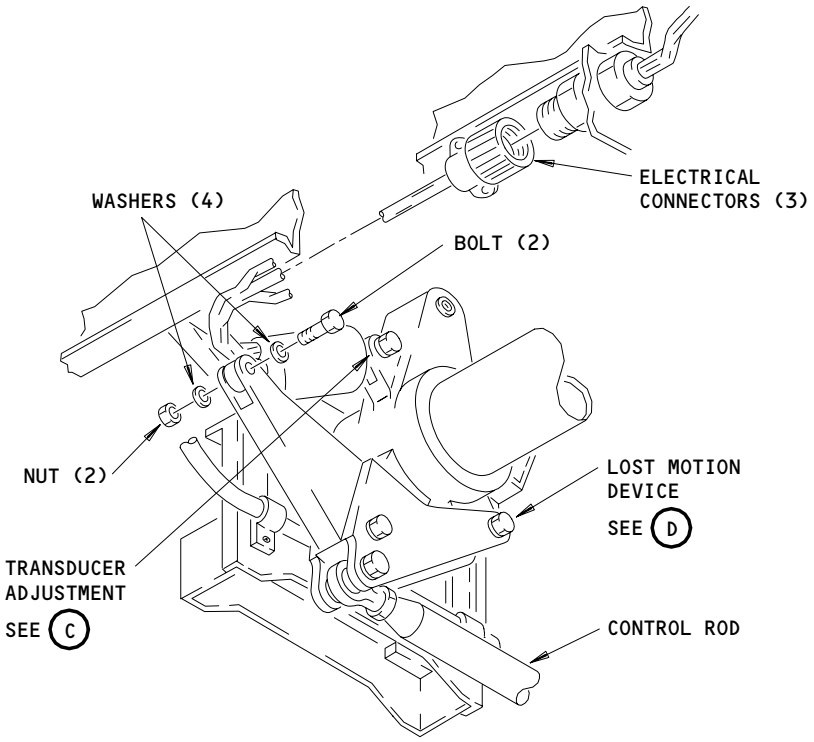

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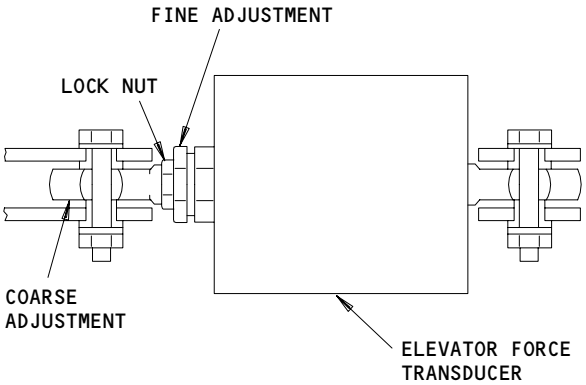

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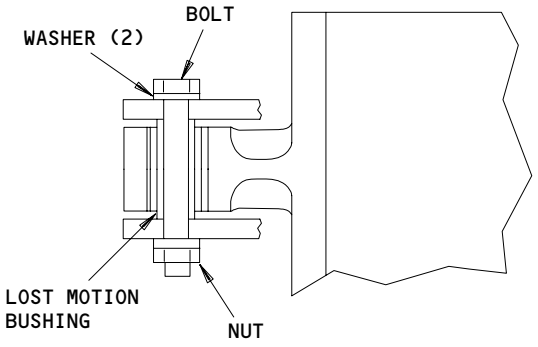

D

Elevator Control Force Transducer
Figure 401 (Sheet 2)

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S 864-005
(4) Open these circuit breakers on the overhead circuit breaker panel, P11, and install DO-NOT-CLOSE tags:
(a) 11E16, MODE CONT PNL L
(b) 11E17, FLT CONT CMPTR PWR L
(c) 11E18, FLT CONT CMPTR SERVO L
(d) 11E20, FLT CONT CMPTR PWR C
(e) 11E21, FLT CONT CMPTR SERVO C
(f) 11E34, MODE CONT PNL R
(g) 11E35, FLT CONT CMPTR PWR R
(h) 11E36, FLT CONT CMPTR SERVO R
(i) 11H17, FLT CONT SHUTOFF TAIL L
(j) 11H18, FLT CONT SHUTOFF TAIL CENTER
(k) 11H27, FLT CONT SHUTOFF TAIL R
(l) ON SAS 155-999;
11J4, ACMS AC POWER
(m) 11J6, ACMS SENSOR
(n) 11J7, FLIGHT RECORDER AC
(o) 11J8, FLIGHT RECORDER DC

S 014-006
(5) Open the access panel, 113AL (Ref 06-41-00).

S 494-007
(6) For the left transducer, install rig pin E-1 in the left column torque tube.

S 494-008
(7) For the right transducer, install rig pin E-2 in the right column crank assembly.

S 864-009
(8) Attach DO-NOT-OPERATE tags on the pilots' elevator control columns.

E. Procedure

S 034-010
(1) Disconnect the transducer's three electrical connectors.

S 014-011
(2) Remove the wire bundle clamp from the transducer.

S 014-012
(3) Remove the bolts, washers, and nuts from transducer rod-ends.

S 024-013
(4) Remove the transducer from the arm and crank assembly.

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TASK 31-35-10-404-014

3. Install the Elevator Control Force Transducer

A. Equipment

(1) A20004-XX Rig Pin Set (AMM 20-10-24/201)
  (a) Rig Pin E-1
  (b) Rig Pin E-2

(2) A27025-1 Force Transducer Rigging Equipment
  (a) Rod (Rig Pin)
  (b) Bushing

B. References

(1) 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) 20-10-24/201, Rig Pins
(3) 22-00-02/201, Autoflight BITE
(4) 24-22-00/201, Electrical Power - Control
(5) 29-11-00/201, Main (Left, Center, and Right) Hydraulic Systems
(6) 34-61-00/501, Flight Management Computer System

C. Access

(1) Location Zones
  113 Area Forward of NLG Wheel Well (Left)
  119 Main Equipment Center (Left)

(2) Access Panels
  113AL Flight/Landing Gear/Engine Control Components
  119BL Main Equipment Center

D. Procedure

S 424-015

(1) Install the transducer non-adjustable rod-end to the arm assembly with the bolt, washers, and nut.

S 034-016

CAUTION: DO NOT APPLY EXTERNAL LOADS TO THE TRANSDUCER DURING INSTALLATION AND RIGGING.

(2) Loosen the locknut on the transducer.

S 984-017

(3) Adjust the rod-end length and install the transducer on the crank assembly with the bolt (Detail C).

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S 014-018
(4) Remove the bolt, washer, and nut from arm and crank assembly.

S 014-019
(5) Remove the lost-motion bushing (Detail B).

S 494-020
(6) Replace the lost-motion bushing with the rigging set bushing.

S 824-021
(7) Adjust the transducer rod-end to make sure the rigging set pin can go through freely through the crank assembly and the rigging bushing.

S 984-022
(8) Lock the adjustment and make sure that the pin can move freely.

S 204-023
(9) Make sure there is no load on the transducer assembly.

S 024-024
(10) Remove the rigging bushing and install the lost-motion bushing.

S 434-025
(11) Connect the crank and arm assemblies with the bolts, washers, and the nuts.

S 434-026
(12) Connect the transducer's electrical connectors to the airplane wire bundle.

S 414-027
(13) Install the wire bundle clamp.

S 014-028
(14) Remove the rig pins E-1 and E-2.

S 864-029
(15) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11E16, MODE CONT PNL L
(b) 11E17, FLT CONT CMPTR PWR L
(c) 11E18, FLT CONT CMPTR SERVO L
(d) 11E20, FLT CONT CMPTR PWR C
(e) 11E21, FLT CONT CMPTR SERVO C
(f) 11E34, MODE CONT PNL R
(g) 11E35, FLT CONT CMPTR PWR R
(h) 11E36, FLT CONT CMPTR SERVO R
(i) 11H17, FLT CONT SHUTOFF TAIL L
(j) 11H18, FLT CONT SHUTOFF TAIL CENTER

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(k) 11H27, FLT CONT SHUTOFF TAIL R
(l) ON SAS 155-999;
11J4, ACMS AC POWER
(m) 11J6, ACMS SENSOR
(n) 11J7, FLIGHT RECORDER AC
(o) 11J8, FLIGHT RECORDER DC

S 864-054
(16) Put the L, C, and R TAIL, FLT CONTROL SHUTOFF switches in the ON position.

S 024-053
(17) Remove the DO-NOT-OPERATE tags from the control columns.

S 864-052
(18) Pressurize the L, C, and R Hydraulic Systems (Ref 29-11-00).

E. Elevator Control Force Transducer Test.

S 204-030
(1) Make sure the CDU operates (Ref 34-61-00).

S 864-031
(2) On the CDU, set the data source as follows:
(a) Push the ACMS switch.
(b) Set the DATA DISPLAY on the ACMS MAIN MENU page.
(c) Set the DITS DATA on the ACMS DATA DISPLAY page.
(d) For the left elevator control force trancducer, set the PORT to 04, LABEL to 034, and the SDI to 01.
(e) For the right elevator control force trancducer, set the PORT to 04, LABEL to 036, and the SDI to 01.

S 864-035
(3) Set the control column to the full forward position.

S 204-037
(4) On the CDU, make sure the left most hex charater is F or 7 and the last 5 characters decrease to at least EE8XX.

NOTE: X = DON'T CARE

S 864-038
(5) Set the control column to the full aft position.

S 204-040
(6) On CDU, make sure the left most hex character is E or 6 and the last 5 characters increase to at least 118XX.

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S 864-041
(7) Set the control column to the neutral position.

S 864-042
(8) Turn off the CDU.

F. Put the airplane back to its initial condition.

S 864-044
(1) Remove the pressure from the L, C and R hydraulic systems if it is not necessary (Ref 29-11-00).

S 864-045
(2) Remove electrical power if it is not necessary (Ref 24-22-00).

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AILERON CONTROL FORCE TRANSDUCER - REMOVAL/INSTALLATION

1. General (Fig. 401)
   A. There are two tasks in this procedure. The first task is the removal of the Aileron Control Force Transducer (CFT). The second task is the installation of the CFT.
   B. The transducer is installed on the left aileron drum on the Captain's forward quadrant. Access to the transducer is through the forward equipment door.

TASK 31-35-11-004-001

2. Remove the Aileron Control Force Transducer (Fig. 401)
   A. Equipment
      (1) A20004-XX Rig Pin Set (AMM 20-10-24/201).
          (a) Rig Pin A1
   B. References
      (1) 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels.
      (2) 20-10-24/201, Rig Pins
      (3) 24-22-00/201, Electrical Power - Control.
   C. Access
      (1) Location Zone
          117 Area Outboard and Above NLG Wheel Well (Left Side)

      (2) Access Panel
          119AL Main Equipment Center

   D. Prepare for the Removal of the Aileron Control Force Transducer

      S 864-002
      (1) Supply electrical power (Ref 24-22-00).

      S 864-003
      (2) Turn the control wheel ±30 degrees and slowly move the wheel to the center position.

      S 864-004
      (3) Attach the DO-NOT-OPERATE tags to the control wheels.

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S 864-005
(4) Set the L, C, and R WING, FLT CONTROL SHUTOFF switches on the right side panel, P61, to the OFF position.

S 864-006
(5) Set the two F/D switches on the MCP to the OFF position.

S 864-007
(6) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tags:
(a) 11E16, MODE CONT PNL L
(b) 11E17, FLT CONT CMPTR PWR L
(c) 11E18, FLT CONT CMPTR SERVO L
(d) 11E20, FLT CONT CMPTR PWR C
(e) 11E21, FLT CONT CMPTR SERVO C
(f) 11E34, MODE CONT PNL R
(g) 11E35, FLT CONT CMPTR PWR R
(h) 11E36, FLT CONT CMPTR SERVO R
(i) 11H15, FLT CONT SHUTOFF WING L
(j) 11H16, FLT CONT SHUTOFF WING CENTER
(k) 11H26, FLT CONT SHUTOFF WING R
(l) SAS 155-999;
11J4, ACMS AC POWER
(m) 11J6, ACMS SENSOR
(n) 11J7, FLIGHT RECORDER AC
(o) 11J8, FLIGHT RECORDER DC

S 014-008
(7) Open the main equipment center access door, 119AL (Ref 06-41-00).

S 494-009
(8) Install the rig pin A1 in the left aileron drum (Ref 20-10-24).

E. Remove the Aileron Control Force Transducer

S 034-010
(1) Disconnect the three electrical connectors.

S 034-011
(2) Remove the transducer's electrical cable from the cable clamps.

S 034-012
(3) Remove the aileron CFT electrical cable from the quadrant shaft.

S 034-013
(4) Remove the bolts, nuts, and washers from each end of the CFT.

S 034-014
(5) Remove the transducer from the aileron drum.

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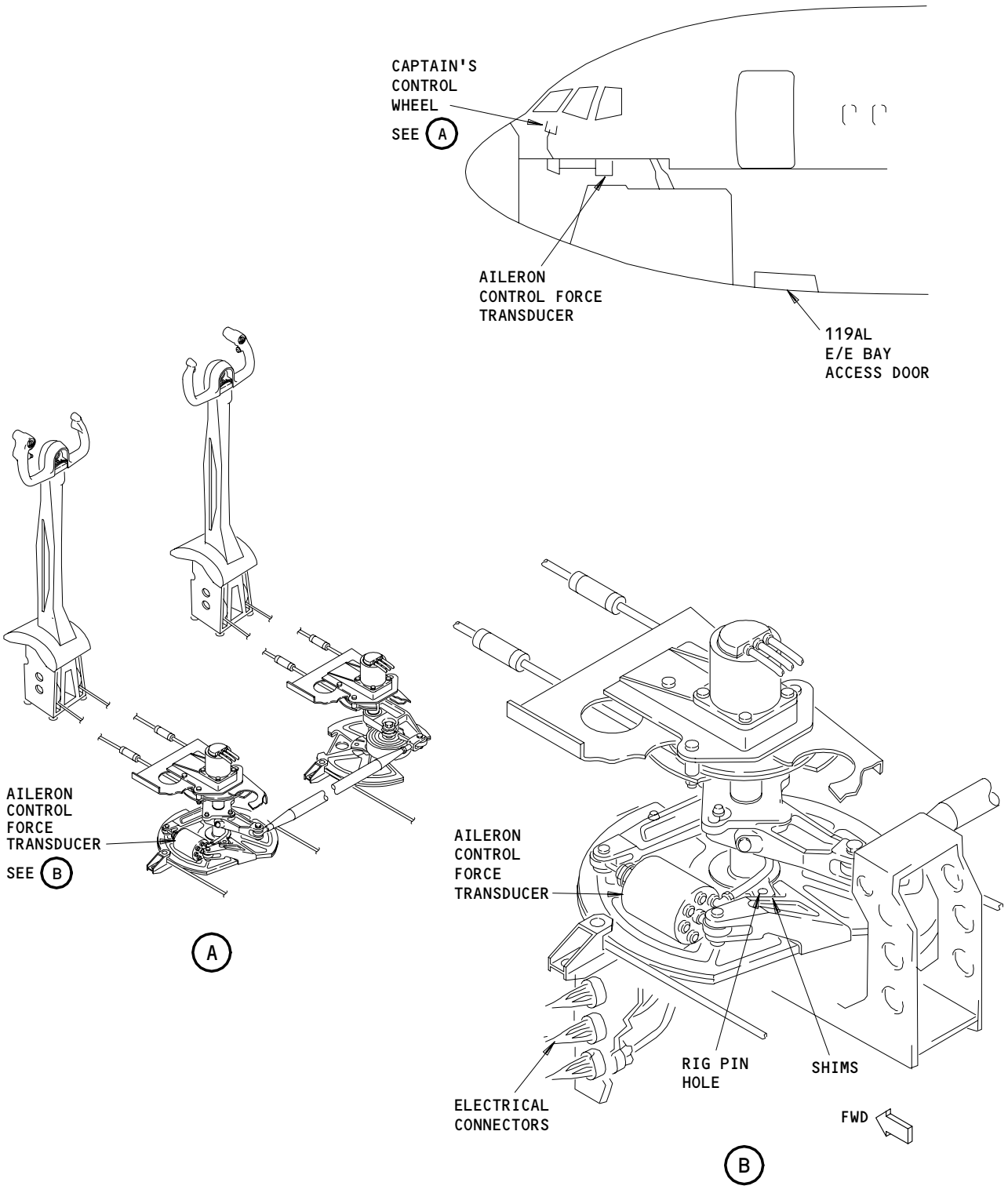

Aileron Control Force Transducer
Figure 401

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TASK 31-35-11-404-015

3. Install the Aileron Control Force Transducer (Fig. 401)

A. Equipment

(1) Shims or feeler gauge (2) -0.020 (+0.004/-0.0) inch

(2) A20004-XX Rig Pin Set (AMM 20-10-24/201).
(a) Rig Pin A1

(3) SAS 150-154;
ARINC 429 EB Data Bus Analyzer - J.C. AIR, J.C. AIR Instrumentation, 400 Industrial Parkway, Industrial Airport, KS 66031, (Perferred)
AIRINC 429 Data Bus Analyzer - Interface Technology Model 429-2, Interface Technology, 150 E. Arrow Highway, San Daimas, CA 91773 (option)

B. Consumable Materials

(1) A00101 Loctite - MIL-S-22473, grade C or CV compound

C. References

(1) 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) 20-10-24/201, Rig Pins
(3) 22-00-02/201, Autoflight BITE
(4) 24-22-00/201, Electrical Power - Control
(5) 29-11-00/201, Main (Left, Center, and Right) Hydraulic Systems

D. Access

(1) Location Zone
117 Area Outboard and Above NLG Wheel Well (Left Side)

(2) Access Panel
119AL Main Equipment Center

E. Prepare for Installation of the Aileron Control Force Transducer

S 864-016

(1) Supply electrical power (Ref 24-22-00).

S 864-017

(2) Remove the pressure from the Left, Center, and Right hydraulic systems (Ref 29-11-00).

S 984-018

(3) Move the control wheels to the center position and attach the DO-NOT-OPERATE tags.

S 494-019

(4) Install the rig pin A1 in the left forward quadrant if it is not installed (Ref 20-10-24).

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F. Install the Aileron Control Force Transducer

S 494-020
(1) Install the shims between the shaft and drum.

S 204-021
(2) Make sure the gap is 0.020 (+0.004/-0.0) inch on each side of the shaft.

S 034-022
(3) Remove the primer from the parts that make the clearance if there is some on the parts.

S 034-023
(4) Loosen the jamnut on CFT rod end.

S 824-024
(5) Turn the fine adjustment nut to align the holes in the CFT end fittings with the holes in the drum and shaft assembly.

S 204-025
(6) Make sure the there is no load on the CFT.

S 424-026
(7) Install the CFT with the bolts, nuts and washers.

S 394-027
(8) Put the Loctite on the threads which will be under the jamnut.

S 434-028
(9) Tighten the jamnut.

S 094-029
(10) Remove the shims.

S 204-030
(11) Make sure the clearance is 0.020 (+004/-0.0) inch on each side of the shaft.

S 434-031
(12) Put a lockwire on the jamnut.

S 434-032
(13) Coil the CFT electrical cable around the shaft approximately 1 1/4 turns (14.8 to 15 inches of cable length between the centers of the cable clamps).

S 094-033
(14) Remove the rig pin A1 (Ref 20-10-24).

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S 204-034
(15) Make sure the control wheel moves freely in each direction.

S 824-035
(16) Adjust the CFT electrical cable if it is necessary.

S 494-036
(17) Install the rig pin A1.

S 434-037
(18) Attach the cable clamps to the CFT electrical cable.

S 434-038
(19) Connect the electrical connectors.

S 094-039
(20) Remove the rig pin A1.

S 864-040
(21) Remove the DO-NOT-OPERATE tags from the control wheel.

G. Test the Aileron Control Force Transducer.

S 864-041
(1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11E16, MODE CONT PNL L
(b) 11E17, FLT CONT CMPTR PWR L
(c) 11E18, FLT CONT CMPTR SERVO L
(d) 11E20, FLT CONT CMPTR PWR C
(e) 11E21, FLT CONT CMPTR SERVO C
(f) 11E34, MODE CONT PNL R
(g) 11E35, FLT CONT CMPTR PWR R
(h) 11E36, FLT CONT CMPTR SERVO R
(i) 11H15, FLT CONT SHUTOFF WING L
(j) 11H16, FLT CONT SHUTOFF WING CENTER
(k) 11H26, FLT CONT SHUTOFF WING R
(l) SAS 155-999;
11J4, ACMS AC POWER
(m) 11J6, ACMS SENSOR
(n) 11J7, FLIGHT RECORDER AC
(o) 11J8, FLIGHT RECORDER DC

S 864-042
(2) Set the L, C, and R WING, FLT CONTROL SHUTOFF switches on the right side panel, P61, to ON.

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S 914-043

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABLIIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(3) Pressurize the left, center, and right hydraulic systems (Ref 29-11-00).

S 984-044

(4) Manually operate the ailerons three or more times.

S 204-045

(5) Make sure the CDU operates (Ref 34-61-00).

S 864-059

(6) On the CDU, set the data source as follows:
   (a) Set the ACMS.
   (b) Set the DATA DISPLAY on the ACMS MAIN MENU page.
   (c) Set the DITS DATA on the ACMS DATA DISPLAY page.
   (d) Set the PORT to 04, LABEL to 035, and the SDI to 01.

S 864-061

(7) Set the left control wheel to the neutral position.

S 204-049

(8) On the CDU, make sure E0BFXX or 60BFXX is shown for the maximum value and FF42XX or 7F42XX for the minimum value.

NOTE: X = DON'T CARE

S 864-050

(9) Set the left control wheel to the full clockwise position and hold.

S 204-052

(10) On the CDU or the tester, make sure 17EXX or 617EXX is shown on the display.

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S 864-053
(11) Set the left control wheel to the full counter clockwise position and hold.

S 204-055
(12) On the CDU, make sure FE82XX or 7E82XX is shown on the display.

S 864-062
(13) Set the control wheel to the neutral position.

H. Put the Airplane Back to Its Usual Condition

S 414-056
(1) Close the door at the main equipment center, 119AL (Ref 06-41-00).

S 864-057
(2) Set the CDU to off.

S 864-063
(3) Remove the hydraulic power if it is not necessary (Ref 29-11-00).

S 864-064
(4) Remove the electrical power if it is not necessary (Ref 24-22-00).

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ENGINE INDICATION AND CREW ALERTING SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The Engine Indication and Crew Alerting System (EICAS) is an automatic engine monitoring and centralized alerting system. The system provides display for engine parameters and crew alerts. It also provides status information and ground maintenance data.
   B. EICAS consists of two multicolored display cathode ray tubes, two control panels, a signal consolidation card, and two redundant computers. Each computer receives analog and digital input signals from airplane systems and sensors. This information is analyzed and the desired data is displayed on the two CRTs. Only one computer drives the display units at any one time. The other computer is used as a backup.
   C. The EICAS computers are software loadable. There are two types of software, the OPS and the OPC. The OPS (Operational Program Software) is the core software and application software that contains the EICAS functions. The OPS is installed in all airplanes with EICAS computers and will possibly not change. The OPC (Operational Program Configuration file) is the specified software that sets the EICAS configuration of your airplane. The OPC will change when your EICAS configuration changes.
   D. The two display units are centrally located one above the other in the flight deck. The top display unit shows primary engine thrust data and crew alerting messages. The bottom display unit shows secondary engine parameters and airplane status data. In addition, the bottom display can show maintenance data while on the ground. All information can be shown on either the top or bottom display unit in case of an in-flight failure of one of the units.
   E. EICAS incorporates automatic display changes. These changes occur only to indicate engine or system abnormality. Continuous BITE monitoring circuits detect faults that can affect the integrity of the displays. If a fault is detected in EICAS, automatic failure modes and system redundancy provide for maximum data display.
   F. Control of EICAS is provided by two different control panels in the flight deck. The EICAS display select panel is used for in-flight selection of display formats. The EICAS maintenance panel is used for selection of ground maintenance displays.
   G. The Signal Consolidation Card (SCC) is located in the Warning Electronic Unit P51. The EICAS SCC takes analog signals and converts them to digital signals which are then sent to the EICAS computers.
   H. Discrete warning and caution lights provide back-up for EICAS displays and messages. In addition, the standby engine indicator will provide primary engine thrust information if both computers or both display units fail.

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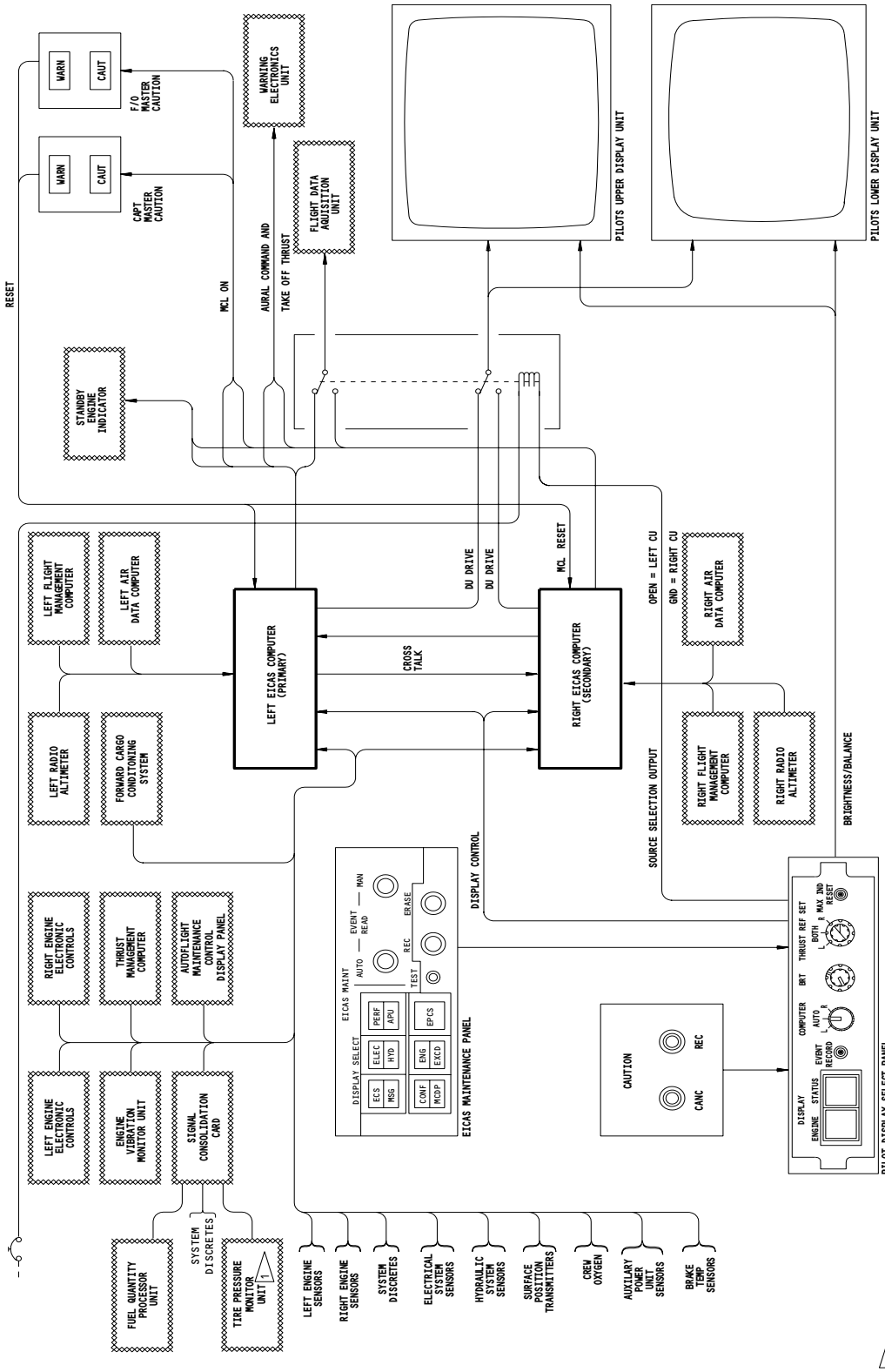

EICAS Simplified Block Diagram
Figure 1

723068

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I. Configuration
(1) EICAS Computer
(2) The -1001 EICAS computer is installed on all airplanes.
(3) The -206 Display Select Panel is basic.

2. Component Details (Fig. 2)
A. EICAS Computers
(1) Each EICAS computer receives inputs in the form of both analog signals and ARINC 429 digital data words. These inputs are processed and formulated into various display formats for presentation of engine, status, and maintenance data.
(2) Each computer also receives analog discrete inputs for the generation of EICAS messages. These messages are processed and included in the proper formats for display.
(3) Each computer has program pins for selection of display options. These options reflect customer requirements and the type and model of engines.
(4) Loadable software selects the display options. These options reflect customer requirements and the type and model of engines.
(5) There is a connector on the front of the EICAS computer to load data via a portable data loader.
(6) Each EICAS computer receives control input data from the EICAS display select panel. The computer uses this data to determine the desired mode of operation. The proper display format is then selected for display.
(7) The EICAS computers assemble data from their analog and digital inputs and from internal programming into analog output signals. These analog outputs are used to drive the video display units.
(8) The computers incorporate BITE for self checks and to monitor overall system health. Digital input words are checked for presence and validity. In addition, all data processed by each computer is sent to the other computer over high speed crosstalk data buses. This allows cross comparison of analog signals received by both computers to determine if their processed values are valid, invalid, or disagree between computers. A test mode can also be initiated manually by pressing a TEST button in the flight deck. This test mode processes signals through the computers and checks the results. The test also monitors system LRU fail discretes and displays the test results on the EICAS display units.

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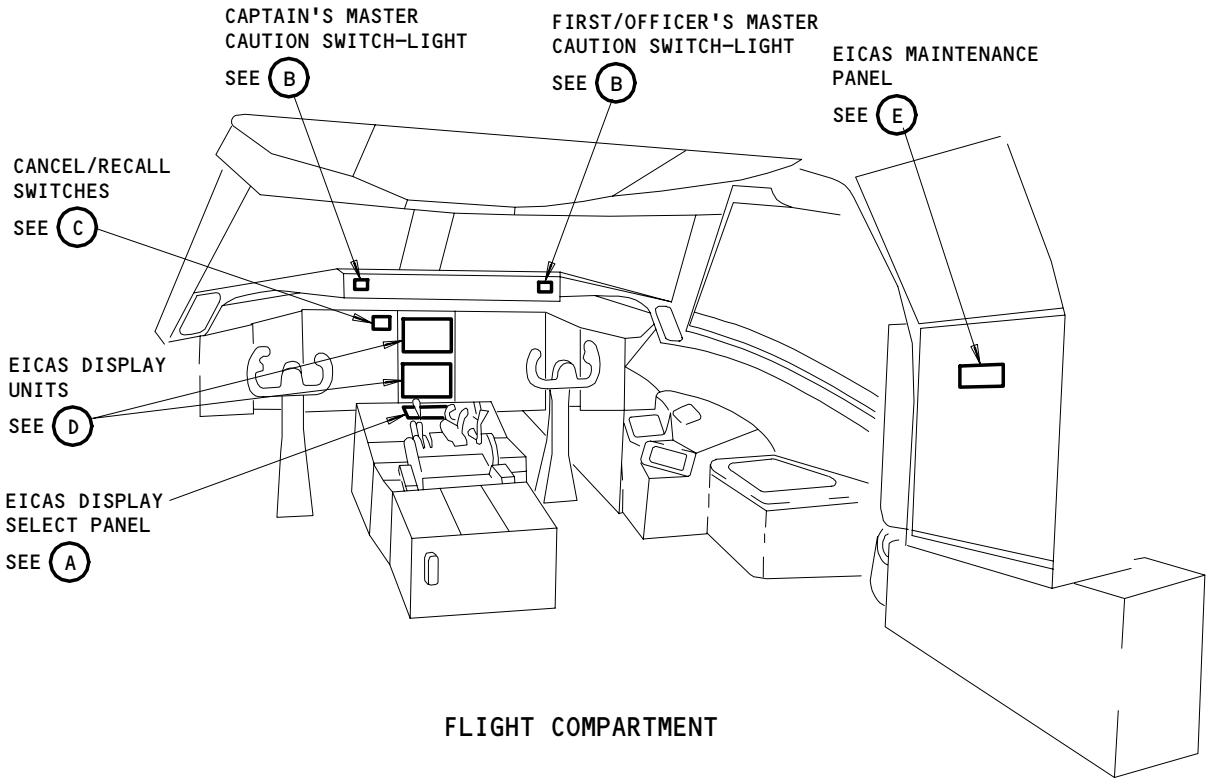
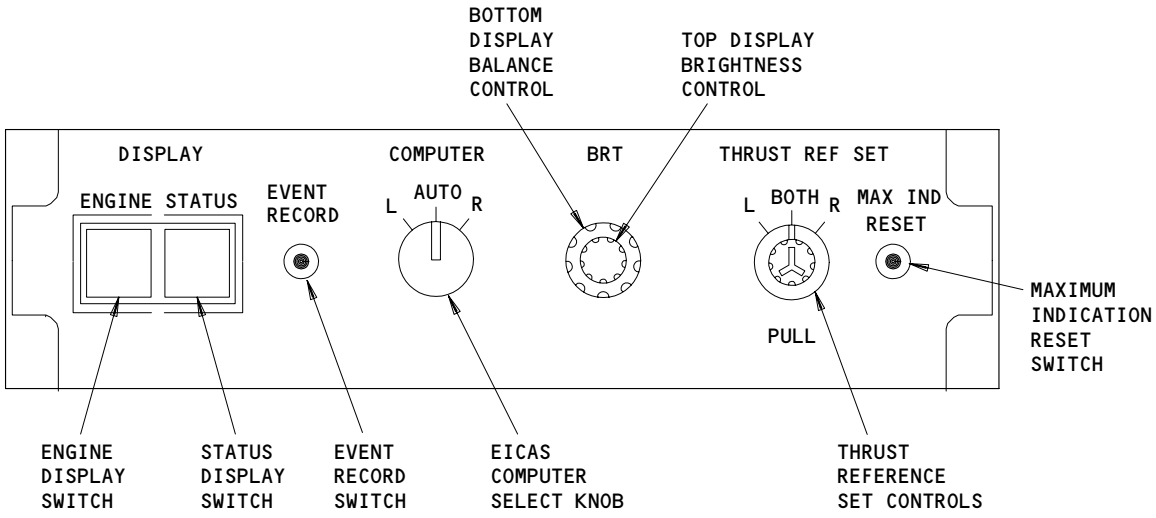


FLIGHT COMPARTMENT



EICAS DISPLAY SELECT PANEL

A

EICAS - Component Detail
Figure 2 (Sheet 1)

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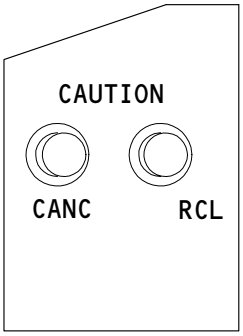
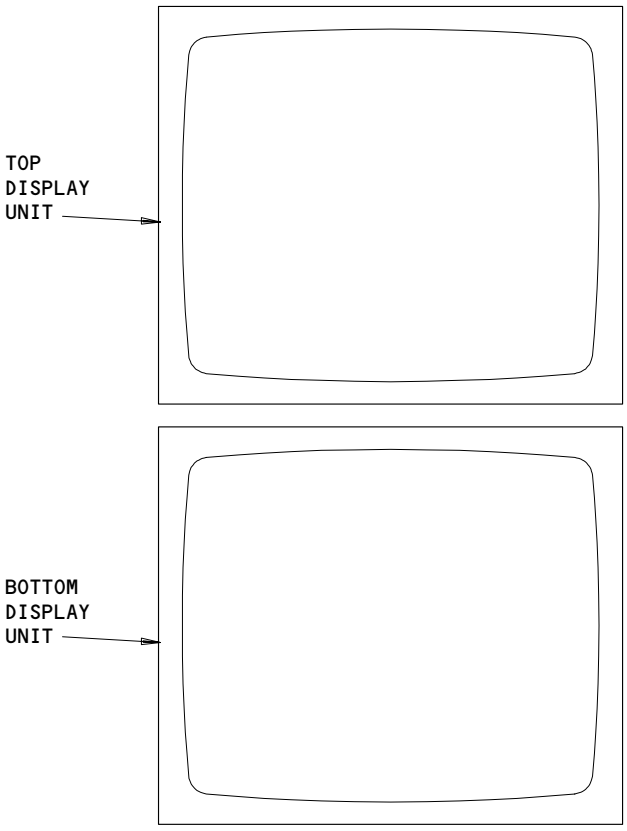
MASTER CAUTION SWITCH-LIGHT
(EXAMPLE)

B



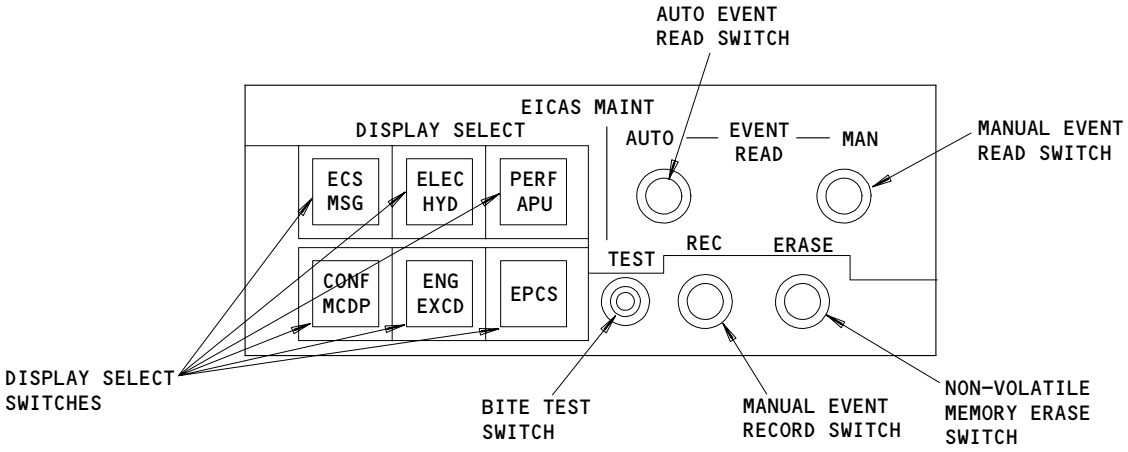
CANCEL/RECALL SWITCHES

C



EICAS DISPLAY UNITS

D



EICAS MAINTENANCE PANEL

E

EICAS - Component Detail
Figure 2 (Sheet 2)

283528

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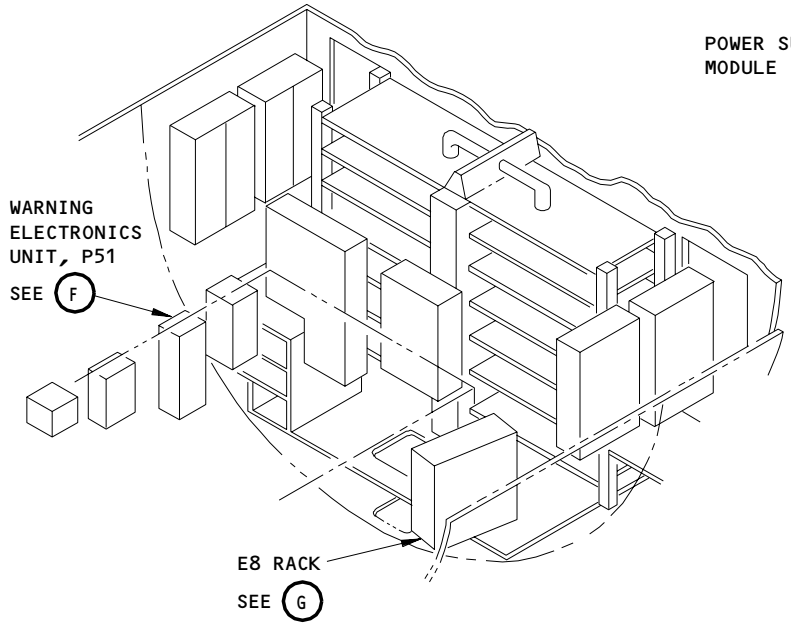
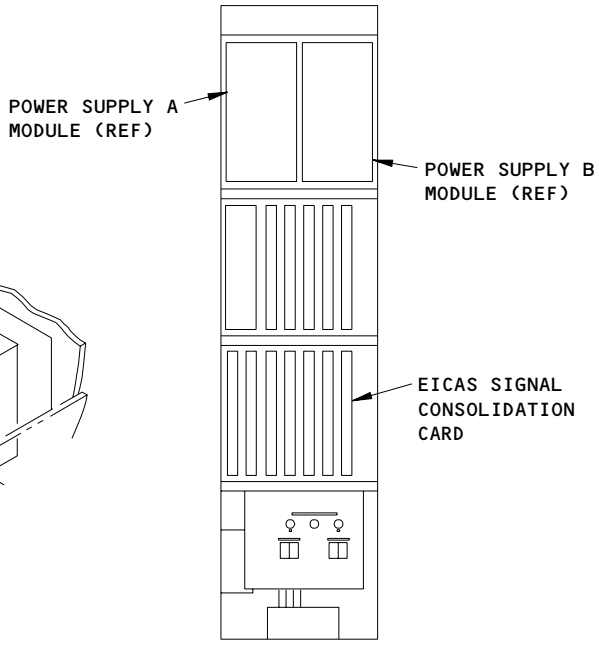
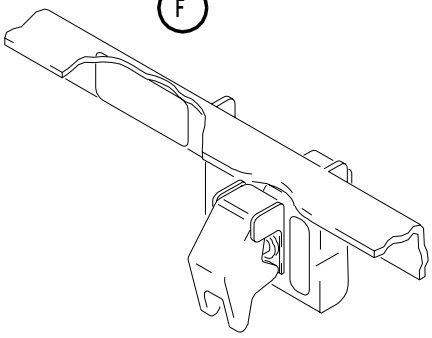


MAIN EQUIPMENT CENTER



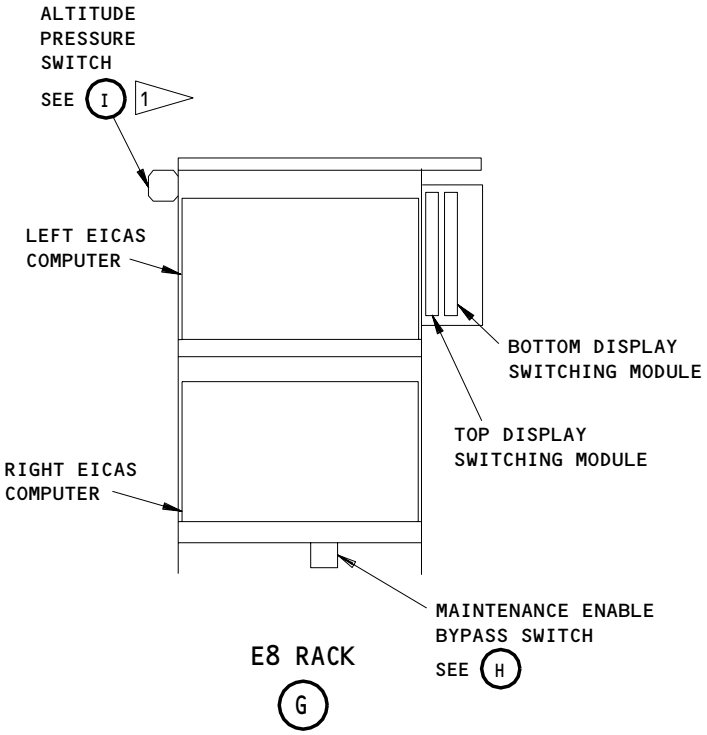
WARNING ELECTRONICS UNIT, P51

F



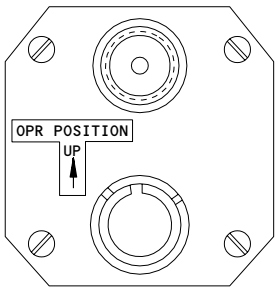
MAINTENANCE ENABLE BYPASS SWITCH

H



E8 RACK

G



ALTITUDE PRESSURE SWITCH

I 1

1 SAS 050,150,152-157,162-167 WITH SB 31-73,
AND SAS 052-149,158-161,168-274,281-999

EICAS - Component Detail
Figure 2 (Sheet 3)

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B. EICAS Switching Modules
   (1) The two EICAS switching modules interface between the EICAS computers and the EICAS display units. Each EICAS computer provides video signals to both switching modules. Video driving signals for the top display unit come from the top switching module. Signals for the bottom display unit come from the bottom switching module.
   (2) The EICAS switching modules also interface between the EICAS computers and the flight data recorder system. The computer which is currently driving the displays sends high speed digital data to the flight data recorder.
   (3) The EICAS computers and switching modules are located on rack E8 in the main equipment center. Their front panels have no controls or indicators.

C. Master Caution Lights
   (1) The yellow master CAUTION light/switches are located on both ends of the pilots' glareshield (P7). The lights come on when either EICAS computer generates a caution signal, which is done in conjunction with the display of a level B alert message. The warning system also generates a caution aural from a signal from EICAS (AMM 31-51-00). Pressing either indicator light cap will turn off both lights.
   (2) An Engine Shutdown Inhibit in the EICAS computer prevents the CAUTION lights from coming on when both fuel control switches (P9) are in cutoff.

D. EICAS Display Select Panel
   (1) The display select panel provides control functions to the EICAS computers for system operation. These functions include display format and computer source selection. Also a display brightness/balance control and thrust reference setting control are provided. Controls for clearing displayed engine exceedance data and for recording system parameters are also provided. The panel is located on the forward electronics panel (P9).
   (2) The two DISPLAY switches are momentary pushbutton switches. They control the mode of operation selected for the EICAS computers as follows:
      (a) Pressing the ENGINE switch will display all secondary engine parameters. This data will be displayed in full secondary format on the bottom display unit under normal conditions. Pressing ENGINE a second time will clear secondary parameters from the display.
      (b) Pressing the STATUS switch will display status mode information on the bottom display unit. Status information includes dedicated system information such as control surface positioning and a single page of status messages. The STATUS switch is also used to page through additional status messages if necessary. Pressing the STATUS switch will cycle through the status message list. Once all messages have been displayed, pressing the STATUS switch again will clear the status format. In the event of a display unit failure, the STATUS switch is inhibited when the airplane is in the air.

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(3) The EVENT RECORD button is used to store the instantaneous values of system parameters in non-volatile memory. This is known as a Manual Event recording. Pressing EVENT RECORD will record a Manual Event for the ECS, ELEC/HYD, PERF/APU, and EPCS formats.

(4) The COMPUTER select switch provides automatic or manual switching of the EICAS computers. When the select switch is in L or R position, the left or right computer, respectively, will drive the EICAS display units. When the select switch is in the AUTO position, the left computer will normally drive the EICAS displays. If the left computer fails, the system automatically switches to the right computer.

(5) The BRT controls consist of two concentric rotary knobs. Clockwise rotation of the outer control will cause the bottom display unit to increase in intensity. Clockwise rotation of the inner control knob will cause the top display unit to increase in intensity. Under normal operation, the two knobs are mechanically clutched to rotate together.

(6) The THRUST REF SET controls are used to manually set the thrust reference readout. They also set the reference cursor on the left and right primary thrust indicators.

(a) The engine selector switch (outer control knob) is a three position rotary switch. This switch is used to select the L (left), BOTH, or R (right) primary thrust indicator references.

(b) The inner control knob is a 12-detent rotary switch combined with a two-way push-pull switch. When initially set (pulled out) the reference readout (and cursor) are set to 1.55 EPR on the selected EPR indicator(s). Rotating the knob clockwise will increase the reference readout (and cursor) by 0.01 EPR per detent. EPR reference values can be set between values of 1.00 and 2.00 EPR.

(7) The MAX IND RESET button is a momentary switch that clears maximum engine exceedance readouts from the display. Pressing this button will clear only engine exceedance data for which the exceedance no longer exists.

E. Cancel/Recall Switches

(1) The CANCEL and RECALL switches are momentary pushbutton switches located on the pilots center instrument panel (P1). Pressing CANCEL will remove the caution (level B) and advisory (level C) messages that are currently displayed. The next page of B and C messages will then be displayed. Pressing RECALL will return the first page of B and C messages to the display. Warning (level A) messages are unaffected by these switches.

F. EICAS Display Units

(1) The EICAS display units are installed, one above the other, on the pilots' center instrument panel (P2). These units are identical to the EHSIs and are interchangeable with them.

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(2) The top display unit is used to show the primary engine format and level A, B, and C alert messages. The bottom display unit is used to show the secondary engine, status, or maintenance formats. All formats can be shown on either display in the event of a single unit failure. A compacted format is used when both primary and secondary engine parameters need to be shown.

(3) The EICAS display units provide a multicolor (red, yellow, cyan (light blue), magenta (pink), white, and green) CRT presentation of EICAS data. Video display and deflection signals from the EICAS switching modules are provided to drive the CRTs. Manual and automatic intensity signals are provided from the display select panel and from remote light sensors. Temperature sensor circuits and monitor circuits are also included to provide signals to the EICAS computers for BITE monitoring. The display units require 115 volts ac, 400 Hz single phase power.

(4) A local integral light sensor is located on each display unit in the top right hand corner of the front panel. Each local sensor provides an automatic dimming signal to both display units. The integral light sensors require 0-5 volts ac, 400 Hz single phase airplane power.

G. EICAS Maintenance Panel

(1) The EICAS maintenance panel provides for selection of ground maintenance displays. It has momentary pushbuttons for display selection, memory control, and self-test. The maintenance panel functions only on the ground. The panel is located on the right side panel (P61).

(2) The DISPLAY SELECT switches control which maintenance format is to be displayed. These switches are the ECS/MSG, ELEC/HYD, PERF/APU, CONF/MCDP, EPCS, and ENG EXCD (for EXC format). When a DISPLAY SELECT switch is pressed, its respective maintenance data format is displayed. In addition, the ECS/MSG switch is used to cycle through additional maintenance messages, if necessary.

(3) The EVENT READ buttons allow display of pre-recorded maintenance data. After a maintenance display format has been selected, pressing an EVENT READ button will display data recorded for that format. Pressing AUTO displays data recorded automatically by the EICAS system. Pressing MAN displays data that has been recorded manually with either the EVENT RECORD or REC buttons.

(4) The REC button is used to record maintenance data in non-volatile memory. When REC is pressed, the parameters of only the maintenance format that is currently displayed in the Real-Time mode are stored in memory. Data previously stored manually is lost.

(5) When REC is used to record either the PERF/APU page or the EPCS page, it will simultaneously record both pages.

(6) The ERASE button is used to erase data that has been previously stored in non-volatile memory. This includes both manually and automatically stored data. Only the format currently displayed will be erased.

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(7) The TEST button is used to initiate the BITE self-test routine. When pressed, BITE signals are processed through the system, and a test pattern is displayed on the display units. When the BITE routine is successfully finished, EICAS will display TEST OK or TEST FAIL. Any EICAS failure messages for BITE detected LRU faults will be displayed at this time. When TEST is pressed a second time, EICAS will return to its normal mode.

H. EICAS MAINT ENABLE Bypass Switch

(1) The EICAS MAINT ENABLE bypass switch is installed on rack E8 in the main equipment center. This two position guarded switch bypasses the air ground relay discrete to the EICAS maintenance panel. When the switch is in BYPASS position, the maintenance panel is fully operational in flight and all maintenance pages can be shown.

(2) The EICAS MAINT ENABLE bypass switch is required to be in the NORMAL position during all revenue flights.

I. SAS 050, 150, 152-157, 162-167 POST SB 31-73 AND
SAS 052-149, 158-161, 168-274, 281-999;
Altitude Pressure Switch

(1) The altitude pressure switch is installed on the rack E8 in the main equipment center. This switch automatically enables the EICAS maintenance panel to be fully operational above 10,000 feet. During this operation, all usual maintenance pages can be shown.

J. EICAS Signal Consolidation Card

(1) The EICAS signal consolidation card is used to convert analog discrete signals into ARINC 429 digital data words. The card receives analog discrete inputs from various sensors and systems and digital information from the Fuel Quantity Processor unit and the Tire Pressure Monitor Unit (optional). These signals are combined and then sent out as a digital signal to the EICAS computers. These signals are shown in SSM 31-41-08. For a complete description of the EICAS signal consolidation card and its signal inputs, see CMM 31-41-16.

(2) When a failure occurs in the signal consolidation card, the message EICAS SCC will be displayed on the STATUS page of EICAS.

(3) If a signal consolidation card interface failure occurs, the message EICAS SCC I/F will be displayed on the STATUS page of EICAS.

K. EICAS Display Pages

(1) Primary Engine Parameters (Fig. 3)

(a) The primary engine format is shown on the top EICAS display unit. Engine parameters shown on this format are only those that are required to set and monitor engine thrust. These parameters are displayed continuously in both an analog round dial and a digital readout for both left and right engines. The primary engine parameters shown are Engine Pressure Ratio (EPR), N1, and Exhaust Gas Temperature (EGT).

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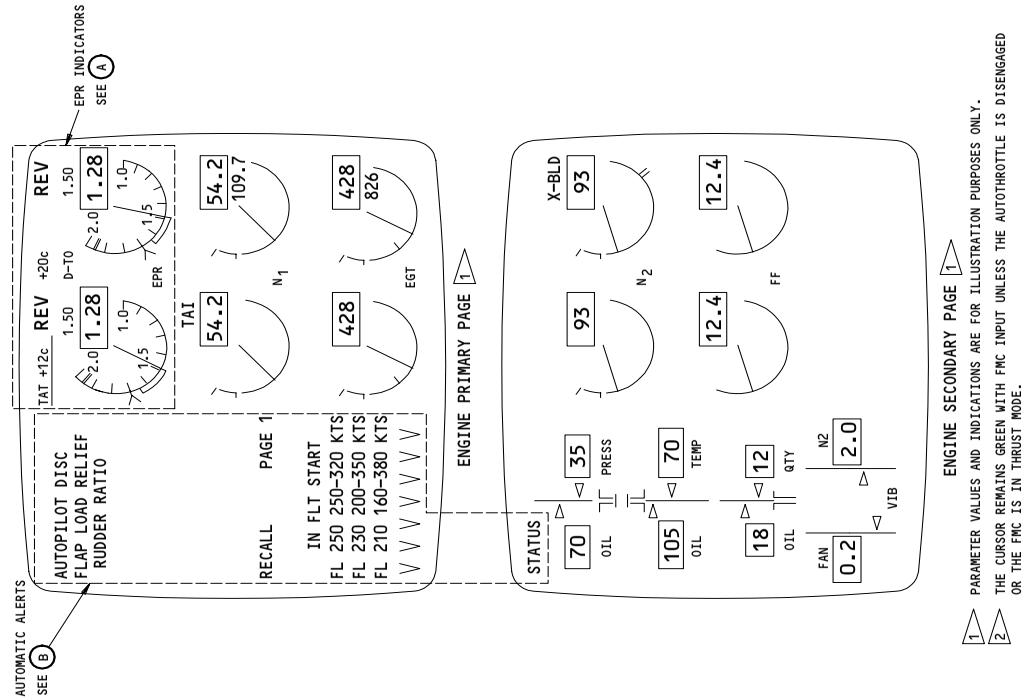
SYMBOL	NAME	PRIME SOURCE	REMARKS
	(A) EPR INDICATORS		
1.28	ACTUAL EPR	EEC	COLOR – WHITE FUNCTION – SHOWS ACTUAL THRUST WITH BOTH ANALOG POINTER AND DIGITAL READOUT
	COMMAND SECTOR	EEC	COLOR – WHITE FUNCTION – SHOWS MOMENTARY DIFFERENCE BETWEEN ACTUAL AND COMMANDED THRUST
	MAXIMUM LIMIT MARKER	EEC/TMC	COLOR – YELLOW FUNCTION – SHOWS MAXIMUM THRUST LIMIT AS CALCULATED BY TMC
1.50	REFERENCE TARGET READOUT AND CURSOR	TMC/FMC	COLOR – READOUT IS GREEN – CURSOR IS PINK (FMC) OR GREEN (TMC OR MANUAL CONTROL) 2 FUNCTION – SHOWS TARGETED THRUST
+20c D-TO	SELECTED THRUST MODE AND DERATE TEMPERATURE	TMC	COLOR – GREEN FUNCTION – SHOWS SELECTIONS MADE ON THRUST MODE SELECT PANEL
REV	THRUST REVERSER READOUT	THRUST REVERSER	COLOR – GREEN (DEPLOYED) OR YELLOW (INTRANSIT) FUNCTION – SHOWS POSITION OF THRUST REVERSERS. BLANK FOR INFLIGHT MODE
TAT42C	TOTAL AIR TEMPERATURE	TMC/ADC	COLOR – WHITE FUNCTION – SHOWS TOTAL AIR TEMPERATURE AS CALCULATED BY ADC
	(B) AUTOMATIC ALERTS		
AUTOPILOT DISC FLAP LOAD RELIEF RUDDER RATIO	ALERT MESSAGES	VARIOUS (SEE TEXT)	COLOR – WARNINGS ARE RED – CAUTIONS AND ADVISORIES ARE YELLOW FUNCTION – SEE TEXT
RECALL PAGE 1	PAGE INDEX	CANCEL/RECALL SWITCHES	COLOR – WHITE FUNCTION – SEE TEXT
IN FLT START FL250 250–320 KTS FL230 200–350 KTS FL210 160–380 KTS	RESTART ENVELOPE	EICAS COMPUTER	COLOR – PINK FUNCTION – SHOWS FLIGHT CONDITIONS NEEDED FOR INFLIGHT START
V V V V V V	SECONDARY DATA CUE	EICAS COMPUTER	COLOR – BLUE FUNCTION – SHOWS PRESENCE OF DATA ON LOWER DISPLAY
STATUS	STATUS CUE	EICAS COMPUTER	COLOR – BLUE FUNCTION – SHOWS PRESENCE OF NEW STATUS MESSAGE



EICAS Display – Engine Pages
Figure 3 (Sheet 1)

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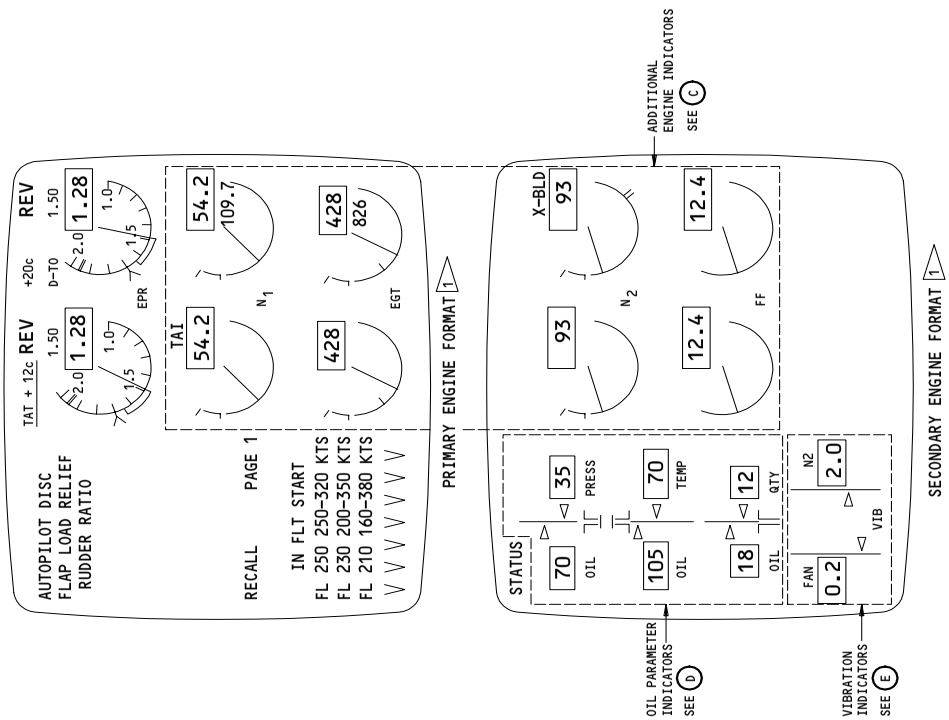
SYMBOL	NAME	PRIME SOURCE	REMARKS
(C) ADDITIONAL ENGINE INDICATORS			
54.2	ACTUAL PARAMETER VALUE	N1 – SENSOR EGT – EEC/SENSOR N2 – ECC/SENSOR FF – FUEL FLOW SENSOR	COLOR – WHITE, YELLOW (EGT ONLY), RED FUNCTION – SHOWS ACTUAL PARAMETER VALUE WITH BOTH ANALOG POINTER AND DIGITAL READOUT
	EXCEEDANCE LIMITS	EICAS COMPUTER	COLOR – YELLOW, RED FUNCTION – SHOW ENGINE OPERATIONAL EXCEEDANCES FOR N1, EGT, AND N2 ▷3◁
TAI	TAI ANNUNCIATION	NACELLE TAI SWITCH	COLOR – GREEN FUNCTION – SHOWS TAI SYSTEM IS ACTIVATED
X-BLD	INFLIGHT START ANNUNCIATIONS	READOUT – EICAS COMPUTER CURSORS – EICAS COMPUTER/ADC	COLOR – PINK FUNCTION – CURSORS SHOW WINDMILLING RPM REQUIRED FOR RESTART ON N2 – READOUT SHOWS WHEN CROSSBLEEDING ACTION IS REQUIRED
EGT	HOT START LIMIT	EICAS COMPUTER	COLOR – RED FUNCTION – SHOWS EGT LIMIT DURING ENGINE START
109.7	MAXIMUM EXCEEDANCE	EICAS COMPUTER	COLOR – WHITE FUNCTION – SHOWS HIGHEST RED LINE EXCEEDANCE VALUE REACHED FOR N1,EGT,N2
(D) OIL PARAMETER INDICATORS			
70 35	ACTUAL OIL PARAMETER VALUE	ENGINE SENSOR	COLOR – SEE TEXT FUNCTION – SHOWS ACTUAL VALUE WITH BOTH ANALOG POINTER AND DIGITAL READOUT
	EXCEEDANCE LIMITS	EICAS COMPUTER	COLOR – YELLOW, RED FUNCTION – SHOWS OIL PARAMETER OPERATIONAL EXCEEDANCES ▷3◁
(E) VIBRATION INDICATORS			
FAN 0.2 N2 2.0 VIB	ACTUAL VIBRATION VALUE	ENGINE VIBRATION MONITOR	COLOR – WHITE FUNCTION – SHOWS ACTUAL ENGINE VIBRATION AND SENSOR SOURCE

▷3◁ SEE TEXT FOR EXCEEDANCE OPERATIONS.



EICAS Display – Engine Formats
Figure 3 (Sheet 2)

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(b) EPR Indicators

1) Actual engine thrust as measured by engine sensors is indicated both by an actual thrust pointer and by digital readout. Any momentary difference between actual thrust and commanded thrust is shown by the command sector. Maximum thrust limit as calculated by the EEC is shown by an amber marker on the analog scale.

2) Target thrust is shown by both a reference cursor on the analog scale and a digital readout above the actual thrust readout. Thrust mode readout and derate temperature readout, if selected, are shown above the thrust indicators.

3) Also shown above the thrust indicators are readouts for Total Air Temperature (TAT) and thrust reverser status. If a thrust reverser is fully deployed, the readout will be green. If in transit, the readout will be yellow. For normal in-flight mode position, the readout will be blank.

(c) N1 Indicators

1) The low compressor rotor speed is indicated by both an actual N1 pointer and by digital readout. The maximum N1 rpm exceedance reached is shown beneath the actual N1 readout.

2) A thermal anti-ice (TAI) readout is shown above the left or right N1 indicator when the respective engine inlet TAI system is activated.

(d) EGT Indicators

1) Actual exhaust gas temperature (EGT) is indicated by both an analog EGT pointer and digital readout. The maximum EGT exceedance readout is shown beneath the respective actual EGT readout for each engine.

2) An EGT Hot Start limit is displayed on the EGT scale during engine start. When actual EGT exceeds the hot start limit, the analog pointer changes to red in color (Ref 78-00-00).

(e) In-Flight Start Annunciations

1) An IN FLT START envelope is shown in tabular form on the bottom left part of the screen. This table lists the required airspeed for the present and next two bottom flight levels where start is possible.

(f) Alert messages are automatically shown in the top left corner of the display when necessary. These messages are discussed in a later section.

(g) Secondary Data Cue

1) The secondary data cue is present whenever data is being shown on the bottom display unit. This includes both when an exceedance is automatically displayed and when the ENGINE switch is pressed to select the engine format. The data cue protects against loss of data display when a display unit fails in a way that might go undetected by the EICAS computers.

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(2) Secondary Engine Parameters (Fig. 3)
  (a) The secondary engine format is shown on the bottom display unit. Oil pressure, temperature, and quantity, engine vibration, N2, and Fuel Flow (FF) are displayed for each engine.
  (b) The bottom display unit is normally blank. If an exceedance condition occurs for N2, the display parameter automatically comes on. If it occurs for either engine for oil pressure or temperature, all oil parameters for both engines are automatically displayed.
  (c) All secondary engine parameters are displayed if the secondary engine format is selected. This is done by pressing the ENGINE switch on the display select panel.
  (d) STATUS Cue
    1) A STATUS cue appears in the top left corner when a new status message has been generated. These status messages will be discussed in a later section. This cue only appears if the status format is not already selected for display. The status cue will disappear as soon as the status format is selected.
  (e) Oil Parameter Indicators
    1) The engine oil parameters are shown in a vertical scale format. Actual values are shown by both analog pointers and by digital readouts.
  (f) Engine Vibration Indicators
    1) Engine vibration indicators are shown in a vertical scale format. Actual values are shown by both analog pointers and digital readouts. A rotor identification readout is located above the actual vibration readout. EICAS displays the vibration value and callout identification of the rotor with the most severe vibration.
      a) The rotor/modes that show are FAN, N1, N2, or BB.
      b) If any rotor speed signal should fail, the EICAS will display an overall broadband (BB) vibration value for that engine.
  (g) N2 Indicators
    1) N2 compressor rotor speed is shown in a round dial format. Maximum rpm exceedance readouts are located below the actual rotor speed digital readouts.
    2) An in-flight-start windmilling "FUEL ON" cursor appears on the analog N2 scale during ground start or inflight XBLD starts. Inflight, it is displayed in conjunction with the in-flight-start annunciators on the primary engine format and always indicates the minimum N2 required for fuel ON. If crossbleed action is required, an X-BLD readout appears above the N2 indicator.
  (h) Fuel Flow Indicators
    1) The rate of fuel flow for each engine is shown in round dial format. Actual values are shown as both pointers and digital readouts.

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(3) Exceedance Operations

(a) Primary Engine Parameters

1) Red band exceedance areas are displayed at the upper end of the analog scales for N1 and EGT. If an actual value pointer reaches or exceeds the red band area, the pointer and digital readout become red in color.

2) The highest red band exceedance reached is displayed in white digital form below the actual digital readout. This maximum exceedance can be cleared from the display using the MAX IND RESET button only if the exceedance no longer exists.

3) The EGT indicators also have a yellow band exceedance area. This area is at the upper end of the scale immediately below the red line. If the actual value pointer enters the yellow band area, both the pointer and digital readout become yellow in color.

(b) Secondary Engine Parameters

1) When a yellow band exceedance area is entered by any secondary engine readout, automatic display of that readout occurs. The yellow band and red band color changes for secondary readouts operate the same way as the primary engine readouts.

2) N2 red band limits operate the same way as the N1 indicator limits. N2 also has a maximum red band exceedance readout.

3) Oil pressure has a lower level red band limit. Exceeding this limit will cause the PERF auto event - OIL P RED.

4) When an oil pressure exceedance has been reached, all oil parameters are automatically displayed. The oil pressure exceedance limit is inhibited when the engines are shut down.

5) The oil temperature displays have upper level yellow band and red band limits, as well as lower level yellow band limits. All oil displays will be automatically displayed when a temperature exceedance has been reached. Exceeding these limits will cause the PERF auto event - OIL T YEL or OIL T RED.

6) The oil quantity displays have a lower limit (white). All oil parameters will be automatically displayed when a oil quantity exceedance to the white limit has been reached. Exceeding this limit causes the PERF auto event - OIL Q.

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(c) SAS 155, 163 PRE-SB 31-233;
SAS 050-154, 156-162, 164-999;
Takeoff/Go-Around Mode
1) When the thrust management computer is in either the takeoff or go-around mode, the yellow band exceedance operations for EGT are inhibited for five minutes. Automatic secondary data initiation does not occur until the red band area is entered. All parameter pointers and readouts remain white until the red band area is entered.

(d) SAS 155, 163 POST-SB 31-233;
Takeoff/Go-Around Mode
1) When the thrust management computer is in either the takeoff or go-around mode, the yellow band exceedance operations for EGT are inhibited for five minutes (ten minutes when only one engine is in operation). Automatic secondary data initiation does not occur until the red band area is entered. All parameter pointers and readouts remain white until the red band area is entered.

(4) Status Page (Fig. 4)

(a) The status format is shown, when selected, on the bottom EICAS display unit. This selection is made using the STATUS switch on the EICAS display select panel.

(b) The status format consists of subsystem digital readouts and control surface position indicators shown on the left side of the display. Status messages, individual brake temperature, and individual tire pressure readouts are displayed along the right side of the format.

(c) Control surface position indicators are provided for the rudder, left and right inner and outer ailerons, and left and right elevators.

(d) The status message list indicates conditions critical only to dispatch of the airplane and, while available to the pilot, are not needed in flight. They are explained later in the EICAS messages section.

(e) Brake temperature readouts are provided for each individual brake. Both box and readout are normally light blue in color. When at threshold temperatures, the box of the brake with the highest temperature in each set (left or right) will change to white. If any temperature reaches abnormal conditions, both the box and number turn white.

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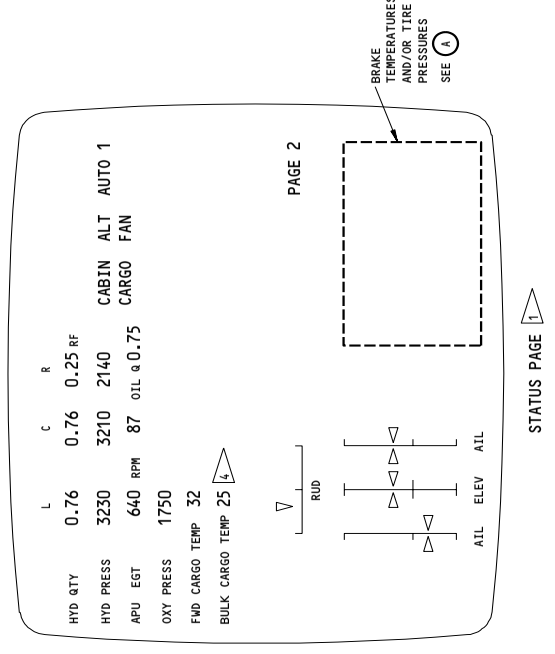
SYMBOL	NAME	PRIME SOURCE	REMARKS
L C R HYD QTY 0.76 0.76 0.25 RF	HYDRAULIC QUANTITY	QUANTITY MONITOR MODULE	LIMITS: 0.00 TO 1.50% FULL NORMAL COLOR IS WHITE. REFILL (RF) IS MAGENTA
HYD PRESS 3230 3210 2140	HYDRAULIC PRESSURE – LEFT, RIGHT, AND CENTER SYSTEMS	HYDRAULIC PRESSURE SENSORS	LIMITS: 0 TO 4000 PSI
APU EGT 640 RPM 87 OIL q 0.75	APU PARAMETERS	APU CONTROL UNIT	LIMITS: EGT, 0 TO 900°C RPM, 0 TO 120% OIL Q, ADD TO FULL
OXY PRESS 1750	OXYGEN PRESSURE	CREW OXYGEN SYSTEM PRESSURE	LIMITS: 0 TO 2500 PSI
FWD CARGO TEMP 32	FORWARD CARGO TEMPERATURE	FORWARD CARGO TEMPERATURE SENSOR	LIMITS: –60 TO 200°C
BULK CARGO TEMP 25	BULK CARGO TEMPERATURE	CARGO TEMPERATURE SENSOR	LIMITS: –60 TO 200°C
RUD AIL ELEV AIL	SURFACE POSITION INDICATORS	POSITION TRANSMITTERS	RUDDER LIMITS: –27° TO +27° AILERON INNER LIMITS: –21° TO +22° AILERON OUTER LIMITS: –13.5° TO +32.5° ELEVATOR LIMITS: –21.5° TO +29.5°
CABIN ALT AUTO 1 CARGO FAN	STATUS MESSAGES	VARIOUS	SEE TEXT
PAGE 2	PAGE INDEX	EICAS COMPUTER	SHOWS OVERFLOW OF STATUS MESSAGES
2 3 1 2 5 1 2 1 BRAKE TEMP	BRAKE TEMPERATURES	BRAKE TEMPERATURE SENSORS	LIMITS: 0 TO 9 UNITS COLOR: SEE TEXT
160 160 160 50 160 160 160 160 160 160 /TIRE PRESS	NOSE GEAR TIRE PRESSURES MAIN GEAR TIRE PRESSURES	TIRE PRESSURE MONITOR UNIT	LIMITS: 0 TO 400 PSI COLOR: CYAN IF TIRE PRESSURE IS NORMAL; WHITE IF A LOW TIRE PRESSURE, DIFFERENTIAL TIRE PRESSURE, OR DEVIATION FROM AN AVERAGE TIRE PRESSURE DISCRETE IS SET



1 PARAMETER VALUES AND INDICATIONS ARE FOR ILLUSTRATION PURPOSES ONLY.
2 SAS 150-152
3 MTH 275-276, AND SAS 050-149, 153-156, 158-161, 163-999;
SAS 157, 162 PRE-SB 32-214
4 SAS 050-999

EICAS Displays – Status Page
Figure 4

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(f) ALL MTH AIRPLANES, AND SAS 050-149, 155-156,158-161,163-999; SAS 157,162 PRE-SB 32-214;
tire pressure readouts are provided for each individual tire. The readouts are normally light blue in color. The readouts will change to white if a tire pressure is low, a differential tire pressure between two tires is too high, or a tire has too high a pressure deviation from the averege tire pressure.

(g) In the event of an EICAS display unit failure, the status format cannot be selected while the airplane is in the air. The status format can still be selected when the airplane is on the ground. When this is done, the standby engine indicator will display primary engine parameters.

(5) Compacted Mode Format

(a) The compacted mode format displays both primary and secondary engine indicators and alert messages on a single display unit. The compacted mode appears under both normal operating conditions and during failure modes.

(b) The full compacted format is displayed when a display unit has failed and the ENGINE key has been pressed. All primary and secondary parameters are then displayed, except for fuel flow.

(c) The full compacted format is also shown when a maintenance format is selected. The compacted format will then show on the top display unit and the maintenance format on the bottom display unit.

(d) When a pilot's display unit fails, the primary engine format including alert messages, appears normally on the remaining display unit. If a secondary engine parameter goes into an exceedance condition it will automatically be displayed as usual, but only in digital readout form. This is known as a partial-compacted format.

(6) Maintenance Display Pages (Fig. 5A thru 5F)

(a) Six different maintenance formats can be shown on the bottom display unit. These formats are controlled using the EICAS maintenance panel.

1) The ECS/MSG Format contains both Environmental Control System (ECS) parameters and EICAS maintenance messages (MSG). These messages consist of repeats of most status messages as well as additional maintenance only messages. Maintenance messages are discussed further in a later section.

NOTE: Airplanes without the pack flow processor (SB 21-129) do not show the pack flow indication on the ECS/MSG page (Fig. 5A). The EICAS maintenance messages for the pack flow will also not show on these airplanes.

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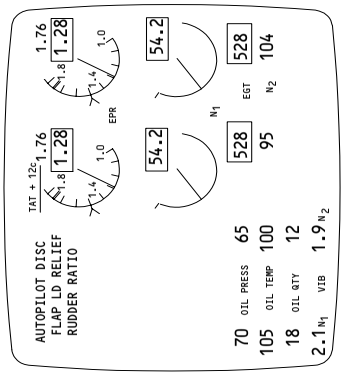
SYMBOL 1	NAME	PRIME SOURCE	REMARKS
ECS/MSG	PAGE IDENTIFIER	EICAS COMPUTER	INDICATES ENVIRONMENTAL CONTROL SYSTEM/MESSAGES PAGE
AUTO EVENT OR MAN EVENT	NON-VOLATILE MEMORY IDENTIFIER	EICAS COMPUTER	INDICATES EITHER THE AUTO EVENT OR MANUAL EVENT MEMORY HAS BEEN SELECTED FOR DISPLAY

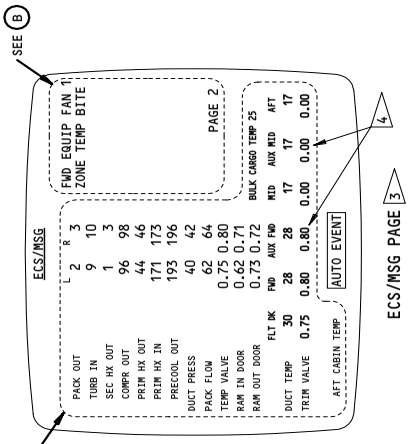
A ENVIRONMENTAL CONTROL SYSTEM

PACK OUT	2 3	PACK OUTLET TEMPERATURE	L AND R PACK CONTROL UNIT	–60 TO +200°C
TURB IN	9 10	TURBINE INLET TEMPERATURE	L AND R PACK CONTROL UNIT	–60 TO +200°C
SEC HX OUT	1 3	SECONDARY HEAT EXCHANGER OUTLET TEMPERATURE	L AND R PACK CONTROL UNIT	–60 TO +200°C
COMPR OUT	96 98	COMPRESSOR OUTLET TEMPERATURE	L AND R PACK CONTROL UNIT	–60 TO +300°C
PRIM HX OUT	44 46	PRIMARY HEAT EXCHANGER OUTLET TEMPERATURE	L AND R PACK CONTROL UNIT	–60 TO +200°C
PRIM HX IN	171 173	PRIMARY HEAT EXCHANGER INLET TEMPERATURE	L AND R PACK CONTROL UNIT	–60 TO +300°C
PRECOOL OUT	193 196	PRECOOLER OUTLET TEMPERATURE	L AND R PACK CONTROL UNIT	–60 TO +200°C
DUCT PRESS	40 42	DUCT PRESSURE	L AND R PACK CONTROL UNIT	0 TO 100 PSI
PACK FLOW	62 64	INLET PACK AIRFLOW	L AND R PACK CONTROL UNIT	0 TO 70 CUBIC METERS/MIN
TEMP VALVE	0.75 0.80	TEMPERATURE CONTROL VALVE POSITION	L AND R PACK CONTROL UNIT	0 (CLOSED) TO 1.00 (OPEN)
RAM IN DOOR	0.62 0.71	RAM INLET DOOR POSITION	L AND R PACK CONTROL UNIT	0 (OPEN) TO 1.00 (CLOSED)
RAM OUT DOOR	0.73 0.72	RAM OUTLET DOOR POSITION	L AND R PACK CONTROL UNIT	0 (OPEN) TO 1.00 (CLOSED)
BULK CARGO TEMP	25	BULK CARGO TEMPERATURE	CARGO TEMPERATURE SENSOR	–60 TO +200°C
DUCT TEMP		DUCT TEMPERATURES	L AND R PACK CONTROL UNIT	–60 TO +200°C
TRIM VALVE		TRIM VALVE POSITIONS	L AND R PACK CONTROL UNIT	0 (CLOSED) TO 1.00 (OPEN)
AFT CABIN TEMP		AUTO EVENT FAILURE MESSAGE (EXAMPLE MESSAGE)	VARIOUS	INDICATES CONDITION THAT CAUSED AUTO EVENT

B MAINTENANCE MESSAGES

FWD EQUIP FAN 1 ZONE TEMP BITE	MAINTENANCE MESSAGE LIST	VARIOUS	REFER TO TEXT
PAGE 2	PAGE INDEX	EICAS COMPUTER	INDICATES OVERFLOW OF MAINTENANCE MESSAGES





1. THE EICAS COMPUTER IS THE SOURCE FOR FUNCTION IDENTIFIERS. IDENTIFIERS ARE LIGHT BLUE IN COLOR; NUMERIC DISPLAYS ARE WHITE IN COLOR.
2. SEE TEXT FOR EXPLANATION
3. PARAMETER VALUES AND INDICATIONS ARE FOR ILLUSTRATION PURPOSES ONLY
4. ALL MTH AIRPLANES AND SAS 150-999

EICAS Displays – Compacted and ECS/MSG Pages
Figure 5A

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SYMBOL [1]	NAME	PRIME SOURCE	REMARKS
ELEC/HYD	PAGE IDENTIFIER	EICAS COMPUTER	INDICATES ELECTRICAL/HYDRAULIC PAGE
AUTO EVENT OR MAN EVENT	NON-VOLATILE MEMORY IDENTIFIER	EICAS COMPUTER	PRESENCE INDICATES EITHER AN AUTO EVENT OR MANUAL EVENT MEMORY HAS BEEN SELECTED FOR DISPLAY

(A) ELECTRICAL SYSTEMS

SYMBOL	NAME	PRIME SOURCE	REMARKS
HYD GEN, STBY /BAT, L, R, APU /BAT, GND PWR LOAD: 0.78 0.85 0.00 0.00 AC-V: 0 120 125 0 0 FREQ: 0 0 402 398 0 0 DC-A: 10 140 150 0 DC-V: 0 28 28 27 28 IDG OUT: 145 150 IDG RISE: 35 37	ELECTRICAL POWER SYSTEM PARAMETERS	HYD GEN - HYDRAULIC MOTOR DRIVEN GENERATOR STBY/BAT- STANDBY INVERTER L AND R - LEFT AND RIGHT GENERATORS APU/BAT - APU GENERATOR GND PWR - GROUND POWER	LOAD - 0 TO 150% LOAD [4] AC-V - 100 TO 130V AC < 100 VAC, DISPLAY = 0 FREQ - 380 TO 420 Hz < 380 HZ, DISPLAY = 0 DC-A - 0 TO 150 AMPS (TRU) -150 TO +150 AMPS (BAT) DC-V - 0 TO 40V DC IDG OUT - 0 TO 180°C IDG RISE - 0 TO 180°C
STANDBY BUS OFF	ELECTRICAL AUTO EVENT MESSAGE (EXAMPLE)	VARIOUS	INDICATES CONDITION THAT CAUSED AUTO EVENT

(B) HYDRAULIC SYSTEMS

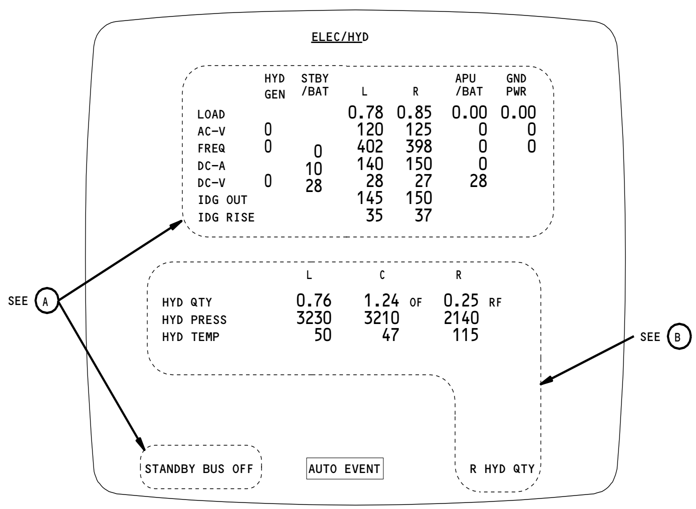
SYMBOL				NAME	PRIME SOURCE	REMARKS
HYD QTY	0.76	1.24 OF	0.25 RF	HYDRAULIC SYSTEM PARAMETERS	QUANTITY MONITOR MODULE	LIMITS - 0 TO 150% FULL [2]
HYD PRESS	3230	3210	2140		HYDRAULIC PRESSURE SENSOR	LIMITS - 0 TO 4000 PSI
HYD TEMP	50	47	115		L AND R HYDRAULIC CONTROL UNIT	LIMITS - -60 TO +200°C
R HYD QTY				HYDRAULIC AUTO EVENT MESSAGE (EXAMPLE)	VARIOUS	INDICATES CONDITION THAT CAUSED AUTO EVENT

[1] THE EICAS COMPUTER IS THE SOURCE FOR FUNCTION IDENTIFIERS. UNLESS OTHERWISE NOTED, IDENTIFIERS ARE LIGHT BLUE IN COLOR, NUMERIC DISPLAYS ARE WHITE IN COLOR.

[2] NORMAL COLOR IS WHITE. OVERFULL (OF) AND REFILL (RF) ARE PINK.

[3] PARAMETER VALUES AND INDICATIONS ARE FOR ILLUSTRATION PURPOSES ONLY.

[4] FOR SYSTEMS NOT IN USE, LOAD VALUES OF 0.10 (10%) OR LESS WILL BE CONSIDERED RESIDUAL VALUES CAUSED BY STRAY VOLTAGES OR NOISE ON THE EICAS LOAD INPUTS FROM THE BPCU/GCU AND ARE TO BE IGNORED.



ELEC/HYD PAGE [3]
(BOTTOM DISPLAY)

EICAS Displays - ELEC/HYD Page
Figure 5B

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PERF/APU FORMAT 3
(LOWER SCREEN)

SYMBOL 1	NAME	PRIME SOURCE	REMARKS
PERF/APU	FORMAT IDENTIFIER	EICAS COMPUTER	INDICATES PERFORMANCE/AUXILIARY POWER UNIT FORMAT
AUTO EVENT OR MAN EVENT	NON-VOLATILE MEMORY IDENTIFIER	EICAS COMPUTER	PRESENCE INDICATES EITHER AN AUTO EVENT OR MANUAL EVENT MEMORY HAS BEEN SELECTED FOR DISPLAY

(A) PERFORMANCE DISPLAYS 2

GROSS WT 85.3	AIRPLANE GROSS WEIGHT	FMC	SHOWN IN 1000 KG
CAS 245 TAT +12 MACH 0.615 ALT 21030	AIR DATA PARAMETERS	CAS – ADC MACH – ADC TAT – TMC ALT – ADC	LIMITS – CAS (30 TO 450 KNOTS) – MACH (0.1 TO 1.0 MACH) – TAT (–60 TO +90°C) – ALT (–1000 TO +50,000 FT)
1.523 EPR CMD 1.001 1.284 EPR ACT 0.902	EPR COMMANDED EPR ACTUAL	EEC	LIMITS – 0.965 TO 2.05 EPR
54.2 N1 21.3	N1 SPEED	EEC/SENSOR	LIMITS – 0 to 120% RPM
528 EGT 825	EXHAUST GAS TEMPERATURE	EEC/SENSOR	LIMITS – 0 TO 1000°C
104.2 N2 23.4	N2 SPEED	EEC/SENSOR	LIMITS – 0 TO 130% RPM
5.653 FF 6.96	FUEL FLOW	FUEL FLOW SENSOR	LIMITS – 0 TO 13,000 KG/HOUR 4 0 TO 13,600 KG/HOUR 5
86 FP 84	FUEL PRESSURE	FUEL FLOW SENSOR	LIMITS – 0 TO 100 PSI
320 BURN PR 350	BURNER PRESSURE	EEC/SENSOR	LIMITS – 0 TO 1024 PSI
40 DUCT PR 40	DUCT PRESSURE	L AND R PACK CONTROL UNIT	LIMITS – 0 TO 100 PSI
70 OIL PRESS 35 105 OIL TEMP 70 18 OIL QTY 12	ENGINE OIL PARAMETERS	ENGINE SENSORS	LIMITS – PRESSURE (0 TO 400 PSI) – TEMPERATURE (–99 TO 999°C) – QUANTITY (0 TO 27 LITERS)
VIB 1.2 N1 0.3 0.9 N2 2.2 1.1 BB 1.6	ENGINE ROTOR AND BROADBAND VIBRATIONS	ENGINE VIBRATION MONITOR	LIMITS – SCALE RANGE IS 0 TO 5 – SCALE SHOWS RELATIVE AMOUNT OF ENGINE VIBRATION
R EGT RED	PERFORMANCE AUTO EVENT (EXAMPLE MESSAGE)	EICAS COMPUTER	INDICATES CONDITION THAT CAUSED AUTO EVENT

(B) APU DISPLAYS

APU: EGT 640 RPM 87 OIL Q 0.25	APU PARAMETERS	APU SENSORS	LIMITS – EGT (0 TO 900°C) – RPM (0 TO 120% RPM) – OIL Q (ADD TO FULL)
APU OIL QTY	APU AUTO EVENT (EXAMPLE MESSAGE)	VARIOUS	INDICATES CONDITION THAT CAUSED AUTO EVENT

1 EICAS COMPUTER IS THE SOURCE FOR FUNCTION IDENTIFIERS. IDENTIFIERS ARE LIGHT BLUE IN COLOR; DIGITAL READOUTS ARE WHITE IN COLOR.

2 SOME PERFORMANCE DATA IS ALSO SHOWN ON THE ENGINE FORMAT DISPLAYS (FIG. 3)

3 PARAMETER VALUES AND INDICATIONS ARE FOR ILLUSTRATION PURPOSES ONLY.

4 AIRPLANES WITH –603 AND PRIOR EICAS COMPUTERS

5 AIRPLANES WITH –604 EICAS COMPUTER AND PW4062 ENGINES

EICAS Displays – PERF/APU Format
Figure 5C

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ENG EXCD PAGE [3]
(BOTTOM DISPLAY)

(A) ENGINE EXCEEDANCE DISPLAYS [2]

SYMBOL [1]	NAME	PRIME SOURCE	REMARKS
ENG EXCD	PAGE IDENTIFIER	EICAS COMPUTER	INDICATES ENGINE EXCEEDANCE PAGE
106.7 :06 N1 RED	N1 RED LIMIT EXCEEDANCE	EICAS COMPUTER	SHOWS MAXIMUM VALUE OF N1, EGT START, EGT AND N2 FOR LEFT AND RIGHT ENGINES. ALSO SHOWS TOTAL ACCUMULATED TIME (IN MINUTES AND SECONDS) THAT EACH PARAMETER WAS IN EXCEEDANCE RANGE.
649 :12 EGT START	EGT START LIMIT EXCEEDANCE	EICAS COMPUTER	
EGT RED	EGT RED LIMIT EXCEEDANCE	EICAS COMPUTER	
N2 RED 103.9 :03	EGT RED LIMIT EXCEEDANCE	EICAS COMPUTER	
MAX L EGT START 649 635 :02.7 625 :03.5 615 :04.4 605 :05.2 595 :06.3 585 :07.6 575 :08.5 565 :09.1 555 :10.4 545 :11.3 535 :12.2	START LIMIT EXCEEDANCE PROFILE	EICAS COMPUTER	SHOWS PROFILE OF START LIMIT EXCEEDENCE OR YELLOW BAND/ REDLINE EXCEEDENCE FOR LEFT AND RIGHT ENGINES. THE PROFILES BEGIN AT THE EXCEEDENCE VALUE AND INCREASE AT A PRESET DELTA. THERE ARE UP TO 11 TEMPERATURES WITH THE TOP LINE SHOWING THE MAX TEMPERATURE REACHED. THE ACCUMULATED TIME AT EACH TEMPERATURE IS ALSO SHOWN.
R EGT AMBER MAX 660 1:09.5 687 640 1:11.2 620 1:13.3 600 1:15.7	EGT AMBER EXCEEDANCE PROFILE	EICAS COMPUTER	

[1] THE EICAS COMPUTER IS THE SOURCE FOR FUNCTION IDENTIFIERS. IDENTIFIERS ARE LIGHT BLUE IN COLOR; NUMERIC DISPLAYS ARE WHITE IN COLOR.

[2] SEE TEXT FOR EXPLANATION

[3] PARAMETER VALUES AND INDICATIONS ARE FOR ILLUSTRATION PURPOSES ONLY.

EICAS Display – ENG EXCD Page
Figure 5D

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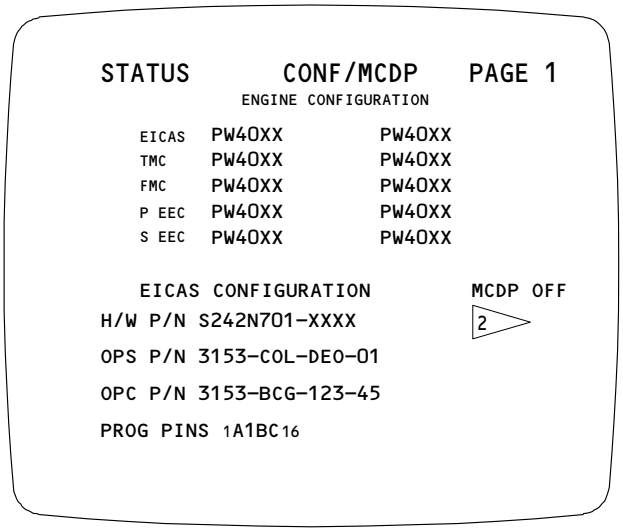

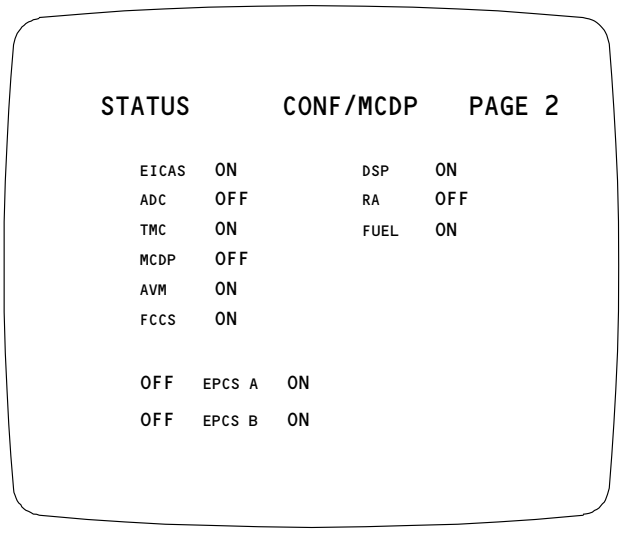

1 PARAMETER VALVES AND INDICATIONS ARE FOR ILLUSTRATION PURPOSES ONLY.

2 WHEN MCDP IS ON, THE MESSAGES THAT ARE DISPLAYED ON THE MCDP FRONT PANEL ARE REPEATED HERE.

EICAS Display - CONF/MCDP Page
Figure 5E (Sheet 1)

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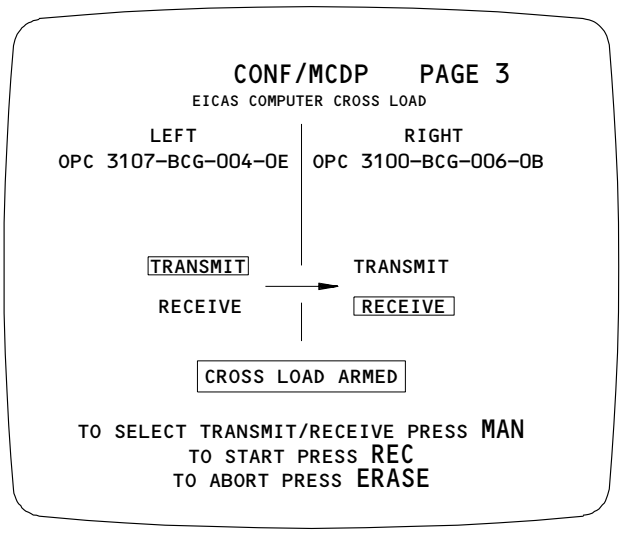

1 PARAMETER VALUES AND INDICATIONS ARE FOR ILLUSTRATION PURPOSES ONLY.

EICAS Display - CONF/MCDP Page
Figure 5E (Sheet 2)

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EPCS PAGE 3 4
(BOTTOM SCREEN)

(A) PERFORMANCE DISPLAYS 2

SYMBOL 1			NAME	PRIME SOURCE	REMARKS
EPCS			PAGE IDENTIFIER	EICAS COMPUTER	IDENTIFIES ELECTRONIC PROPULSION CONTROL SYSTEM (EPCS) PAGE
PAGE 1			PAGE NUMBER	EICAS COMPUTER	PUSH THE EPCS SWITCH ONCE TO SEE THE PARAMETERS PAGE AND TWICE TO SEE THE STATUS LABELS PAGE
A		B	CHANNEL IDENTIFIER	EEC	THE LETTER IDENTIFIES THE ECC CHANNEL FOR THE EICAS DISPLAY
			CHANNEL-IN-CONTROL		A WHITE BOX AROUND THE CHANNEL IDENTIFIER SHOWS THAT THE EEC CHANNEL SHOWN IS IN CONTROL OF THE ENGINE
21.3	TRA	54.2	THRUST LEVER RESOLVER ANGLE	EEC/SENSOR	LIMIT – (-99.9) TO 180°
-9.3	SVA	12.4	STATOR VANE POSITION	EEC/SENSOR	LIMIT – (-128) TO 128% OPEN
-12	BVA	102	BLEED VALVE ACTUATOR	EEC/SENSOR	LIMIT – (-99) TO 128% OPEN
104.2	N_2C	73.2	CORRECTED N2	EEC/SENSOR	LIMIT – 0 TO 128% RPM
-12	T_2	12	INLET TOTAL TEMP	EEC/SENSOR	LIMIT – (-99) TO 128°C
10.5	P_S	9.2	STATIC PRESSURE	EEC/SENSOR	LIMIT – 0 TO 32 PSI
12.3	P_2	11.3	INLET TOTAL PRESSURE	EEC/SENSOR	LIMIT – 0 TO 32 PSI
101.5	RP	-12.7	THRUST REVERSER POSITION LVDT	EEC/SENSOR	LIMIT – (-99.9) TO 128 DEG
79	SCAV	106	SCAV OIL TEMP	EEC/SENSOR	LIMIT – (-99) TO 256°C
7.9	P_5	10.6	EXHAUST PRESSURE	EEC/SENSOR	LIMIT – 2 TO 26.5 PSIA
-46	AOC	102	AIR/OIL COOLER	EEC/SENSOR	LIMIT – (-5) TO 102% OPEN
-72	TCC	116	TURBINE CASE COOLER	EEC/SENSOR	LIMIT – (-5) TO 105% OPEN
AUTO EVENT	OR	MAN EVENT	NON-VOLATILE MEMORY IDENTIFIER	EICAS COMPUTER	PRESENCE INDICATES EITHER AN AUTO EVENT OR MANUAL EVENT MEMORY HAS BEEN SELECTED FOR DISPLAY
OIL T YEL			PERFORMANCE AUTO EVENT (EXAMPLE MESSAGE)	EICAS COMPUTER	INDICATES CONDITION THAT CAUSED AUTO EVENT

1 THE EICAS COMPUTER IS THE SOURCE FOR FUNCTION IDENTIFIERS. IDENTIFIERS ARE LIGHT BLUE IN COLOR; NUMERIC DISPLAYS ARE WHITE IN COLOR.

2 SOME PERFORMANCE DATA IS ALSO SHOWN ON THE ENGINE DISPLAY PAGES (FIG. 3)

3 PARAMETER VALUES ARE FOR ILLUSTRATION PURPOSES ONLY.

4 THE EPCS DATA WILL NOT BE SHOWN WHEN THE AIRPLANE IS ON THE GROUND WITH THE ENGINES SHUTDOWN UNLESS THE EEC IS POWERED. THE EEC CAN BE POWERED BY SETTING THE L AND R ENG POWER SWITCHES ON THE EEC MAINT PANEL TO THE TEST POSITIONS.

5 ON AIRPLANES WITH EICAS COMPUTERS -603 AND SUBSEQUENT, THE PAGE NUMBER IS SHOWN DURING REAL TIME DISPLAYS. IT IS NOT SHOWN DURING AUTO OR MAN EVENT DISPLAYS.

EICAS Displays – EPCS Page
Figure 5F (Sheet 1)

724266

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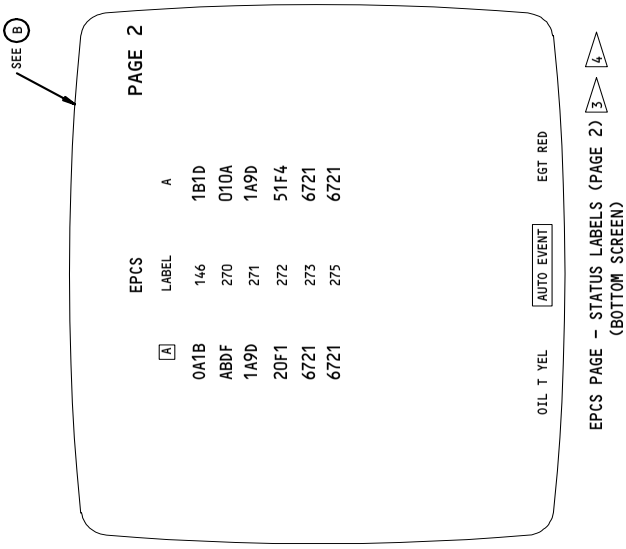

EPCS PAGE - STATUS LABELS (PAGE 2) 3 4
(BOTTOM SCREEN)

B PERFORMANCE DISPLAYS 2

SYMBOL 1	NAME	PRIME/SEC SOURCE	REMARKS
PAGE 2	PAGE NUMBER	EICAS COMPUTER	PUSH THE EPCS SWITCH ONCE TO SEE THE PARAMETERS PAGE AND TWICE TO SEE THE STATUS LABELS PAGE
EPCS	PAGE IDENTIFIER	EICAS COMPUTER	IDENTIFIES ELECTRONIC PROPULSION CONTROL SYSTEM (EPCS) PAGE
	LABEL IDENTIFIER	EEC	IDENTIFIES THE LABEL OF THE HEXIDECIMAL CODE DISPLAY
A LABEL A	CHANNEL IDENTIFIER		THE LETTER IDENTIFIES THE ECC CHANNEL FOR THE EICAS DISPLAY
	CHANNEL-IN-CONTROL		A WHITE BOX AROUND THE CHANNEL IDENTIFIER SHOWS THAT THE EEC CHANNEL SHOWN IS IN CONTROL OF THE ENGINE
A LABEL B	CHANNEL-IN-CONTROL	EEC	A WHITE BOX AROUND A OR B INDICATES THE CHANNEL PROVIDING THE DATA
0A1B 146 1B1D	HEXIDECIMAL CODES FOR THE EEC STATUS WORDS (LABELS 146, 270,271,272,273, AND 275)	EEC	THIS PAGE SHOWS THE STATUS WORDS FOR THE EEC (REF. FIM 77-35-00) NOTE: THE PIMU BITE PROCEDURE (REF. FIM 77-35-00) GIVES THE MAINTENANCE WORDS FOR THE EEC.
ABDF 270 010A		EEC	
1A9D 271 1A9D		EEC	
20F1 272 51F4		EEC	
6721 273 6721		EEC	
6721 275 9821		EEC	

EICAS Displays - EPCS Page
Figure 5f (Sheet 2)

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2) The ELEC/HYD Format contains both Electrical (ELEC) and Hydraulic (HYD) System data.
3) The PERF/APU Format contains both engine performance (PERF) data and Auxiliary Power Unit (APU) data. The PERF data includes all those contained on the primary and secondary engine formats, plus data from the air data system and the FMC.
4) The EPCS Format shows engine-related data from the EEC.
5) The CONF/MCDP Format provides configuration (CONF) data and Maintenance Control Display Panel (MCDP) readouts. The CONF data includes engine configurations for avionics computers, and EICAS part number, input data bus activity and program pins. The MCDP readout provides a flight deck display of the MCDP but no MCDP controls are provided.
6) The CONF data also includes the EICAS software part numbers (OPS and OPC).
7) The ENG EXC Format displays maximum exceedances of engine parameters. It also displays the accumulated time of the exceedance, and exceedance profiles for certain conditions.

(b) EICAS continuously receives maintenance data from many subsystems. This data is in the form of either present condition (real-time) data, or individual maintenance message signals. Even though this data cannot be displayed in flight, it is all still present at the EICAS computers.

(c) Maintenance Formats will be displayed, when selected, during primary and secondary engine exceedances. This includes instances when fuel control switches are out of cutoff. Exceedances will be displayed on the upper DU in a full-compacted mode while maintenance messages will be displayed on the lower DU.

(d) Maintenance Data - Event Recording
1) Two non-volatile memories are dedicated to each maintenance subsystem monitored by EICAS. One of these memories is for data stored automatically by EICAS. The other memory is for manually stored data. Manual data storage is initiated by either the flight crew in the air or by the maintenance crew while on the ground. Once data is stored in these memories it cannot be lost, even during electrical power failure.
2) The ECS, ELEC, HYD, and APU sets of maintenance subsystem parameters can be automatically recorded by EICAS. This happens when certain messages are initiated by that subsystem. Which messages will cause an automatic recording to be taken, known as an Auto Event, are determined by software programming. Auto Event messages are noted in the message table which appears later in this text. A subsequent Auto Event occurring in these subsystems will be ignored. This leaves the initial failure message and associated values stored in memory.

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3) The PERF and EPCS subsystem parameters can also be stored in an Auto Event. If any primary or secondary engine parameter enters the yellow exceedance area, an Auto Event is taken of the PERF and EPCS formats. A subsequent yellow Auto Event will be ignored. If a parameter then enters the red exceedance area, a second Auto Event will be taken that overrides and erases the first. Any more yellow or red Auto Events will then be ignored. The Auto Event message stored identifies the parameter and level (yellow or red) of the exceedance.
4) Separate PERF and EPCS Format Auto Events are stored and indicated for each engine.
5) Maintenance subsystem parameters can also be manually recorded. This is known as a Manual Event and can be done in two ways. Pressing EVENT RECORD on the display select panel will record all ECS, ELEC/HYD, PERF/APU, and EPCS parameter data regardless of the EICAS page currently displayed. Pressing REC on the maintenance panel will record all parameters of just the maintenance subsystems currently displayed. The EVENT RECORD button would normally be used by the flight crew while in the air. The REC button can only be used on the ground. Both buttons record subsystem data into the same memory. Subsequent presses of either button will overwrite new data into memory and erase any data previously recorded.

(7) EICAS Messages

(a) EICAS monitors over 450 analog input discretes from airplane systems and sensors. When any abnormal condition is detected, an EICAS message is generated. This message will be an alert, status, or maintenance message, depending on the urgency of the detected abnormality.

(b) Alert messages are automatically shown in the top left corner of the primary engine format. These alert messages are further divided into three levels.
1) Level A-Warning messages indicate an abnormal condition that requires immediate corrective or compensory action. Warning messages are red in color and are displayed at the top of the alert message list.
2) Level B-Caution messages indicate an abnormal condition that requires immediate crew awareness with some future compensory action. Caution messages are yellow in color and are displayed below the last warning message.
3) Level C-Advisory messages indicate an abnormal condition that requires only immediate crew awareness. Advisory messages are also yellow in color and are displayed below the last caution message. Advisory messages are indented one space to distinguish them from caution messages.

(c) Alert messages are displayed in order of occurrence. The latest occurring message is positioned on the top line of its proper A, B, or C level. Any alert message is cleared from the display when the condition causing the alert is cleared.

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(d) When a new level A warning message appears, the warning system provides warning aurals and drives the master warning lights (AMM 31-51-00). The warning system also provides a caution aural when a new level B caution message appears, unless inhibited by the engines being shut down. The master caution lights also come on with a new level B message. Level C advisory messages have no aural indications.

(e) Message Inhibits

1) An Engine Start inhibit is applied to all messages (except level A, level B L ENG SHUTDOWN, R ENG SHUTDOWN, L STARTER CUTOUT, R STARTER CUTOUT, L ENG PRV, R ENG PRV, level C L ENG STARTER, R ENG STARTER and Master Caution and Aural) during either engine start.

2) This inhibit prevents nuisance displays of messages and associated alerts that occur during engine start. The engine start inhibit begins when starter is engaged and ends when engine is running, engine start is aborted or after 2 min.

3) Another type of inhibit occurs during an engine starter cutout condition. If the (level B) STARTER CUTOUT message has been generated, all other currently existing level B and level C messages are removed from display. If a new level C message is generated during this inhibit period, they are not displayed.

4) This STARTER CUTOUT inhibit is removed in one of the following ways:
   a) When the starter cutout condition no longer exists.
   b) When a new level B message has been generated,
   c) When 20 seconds have elapsed since initiation.

5) An Engine Shutdown inhibit is in effect when the fuel control switch is in the CUTOFF position or when the ingine fire switch is pulled. The level B L or R ENG SHUTDOWN EICAS message will show. All other currently existing level B (except for levlel B L STARTER CUITOUT, R STARTER CUTOUT) and level C messages are removed from display. if a new level C message is generated during this inhibit period, they are not displayed.

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6) This Engine Shutdown inhibit is removed in one of the following ways:
   a) When the respective fuel control switch is shut off, or when the engine fire switch is disengaged.
   b) When a new level B message has been generated.
   c) Pushing the CANCEL/RECALL SWITCH on the P1-3 panel.

(f) Status messages are shown on the top right half of the status format. They are only seen if the status format has been selected for display. Status messages, white in color, indicate a condition for which crew awareness is only required at dispatch.

(g) Maintenance messages for all systems are shown on the top right half of the ECS/MSG maintenance data format. They are only seen if the ECS/MSG format has been selected. Maintenance messages, white in color, are for most cases a repeat of the messages displayed on the status format. There are also maintenance messages that indicate conditions which do not require flight crew attention. These are generated only to assist the maintenance crew.

(h) Communication messages notify the flight crew of incoming data links and other normal communications. They direct the flight crew to the appropriate system. Communication messages are displayed in the top left corner of the top EICAS display, in the alert field. They are displayed at the bottom of the alert field (alert messages are displayed at the top of the alert field). There are two levels of communication messages; COMM Medium (level E) and COMM Low (level F). Both are white and are preceded by a white bullet. COMM Medium messages are accompanied by an aural chime. COMM Low messages are indented one space. COMM Medium messages are displayed above COMM Low messages. The most recent message is displayed at the top of each group.

(i) Message Paging and Overflow
   1) Each category of messages has multiple paging capability. Up to eleven messages will be displayed in each list. If more than eleven messages exist, only ten will be displayed. The bottom message will be replaced by a page indicator. The additional messages can be accessed by incrementing to the next page. A different control is used for each list to increment to the next page.
   2) Alert messages are cycled using the CANCEL and RECALL switches. Pressing CANCEL will remove all level B and level C messages presently displayed and cause subsequent level B and C messages to be displayed. Level A messages are unaffected. If a new message is generated after all current B and C messages are cleared, it will still be automatically displayed. Pressing RECALL will return the message list to page 1. The word RECALL will momentarily be displayed on the bottom line of the list.

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3) Status messages are cycled using the STATUS switch. Once the status format is selected, subsequent presses of STATUS will display additional pages of status messages. The PAGE readout will also be incremented. Pressing STATUS once more after all messages have been cycled will clear the status format from display.

4) Maintenance messages are cycled using the ECS/MSG switch. Once the ECS/MSG format is selected, subsequent presses of the ECS/MSG switch will display additional pages of maintenance messages. The PAGE readout will also be incremented. Pressing ECS/MSG after all messages have been cycled will clear the ECS/MSG Format from display.

(j) Messages - Non-volatile Memory

1) Certain status and maintenance messages have been designated to be stored in non-volatile memory (NVM). These messages will still be displayed even after the condition generating them no longer exists.

2) Messages displayed when the ECS/MSG auto event format is selected are those that are stored in NVM. They are also displayed in the list of status or maintenance messages, as applicable. Messages stored in NVM can only be erased when the ECS/MSG auto event format is displayed.

(8) EICAS Message Table

(a) The MESSAGE column indicates the exact nomenclature of each message.

1) Numerical flagnotes in the MESSAGE column indicate if an Auto Event occurs in association with that message.

2) The *[5] PERF and EPCS Auto Event messages indicate an auto event has occurred as the result of an engine exceedance. These messages are only displayed on the PERF/APU and EPCS page.

*[1] ECS Auto Event
*[2] ELEC Auto Event
*[3] HYD Auto Event
*[4] APU Auto Event
*[5] PERF and EPCS Auto Event (Auto Event Messages Only)

(b) The LEVEL column indicates the urgency and corresponding list each message appears in. These categories are alert (level A, B, or C), status (level S), and maintenance (level M) messages. In addition, if NVM is called out in this column beneath a particular message level, that message is stored in non-volatile memory.

(c) The SYSTEM INPUT column lists the general conditions required for a discrete signal to generate each message.

(d) The CHAP/SEC column lists the ATA chapter and section where the message originates.

(9) The EICAS message table is located in the FIM EICAS MESSAGE LIST, at the front of the manual.

3. Operation

A. Functional Description (Fig. 6)

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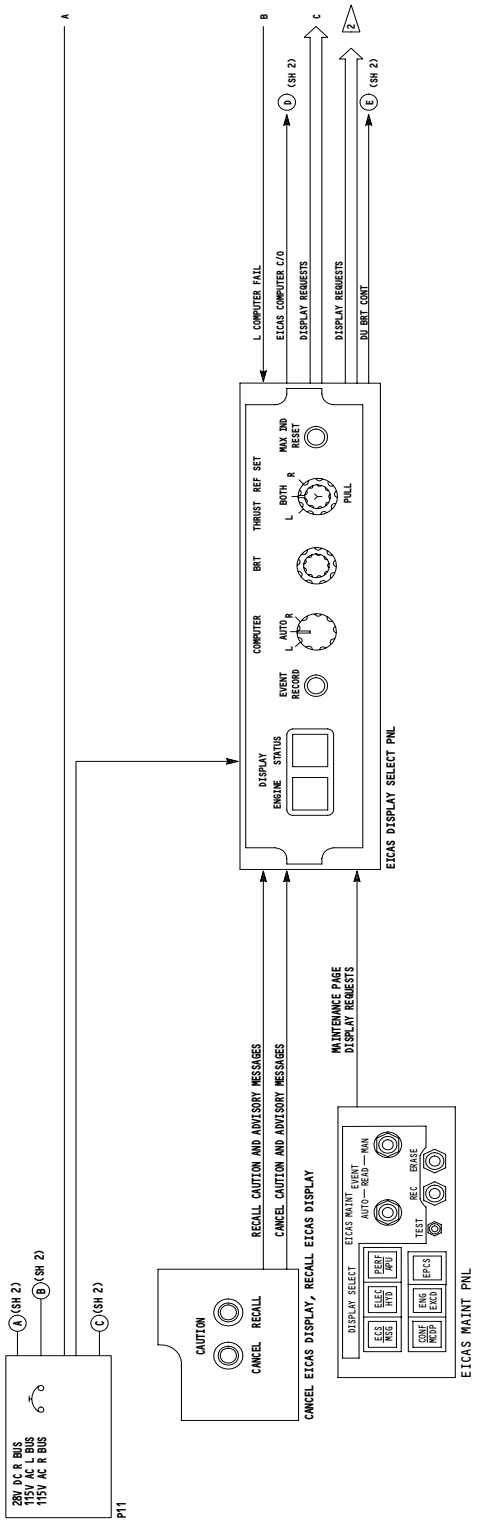

EICAS Computer - Schematic
Figure 6 (Sheet 1)

1 LEFT SHOWN, RIGHT EQUIVALENT
2 TO/FROM RIGHT EICAS COMPUTER
3 PROVISIONS FOR RIGHT SIDE DISPLAY UNIT.

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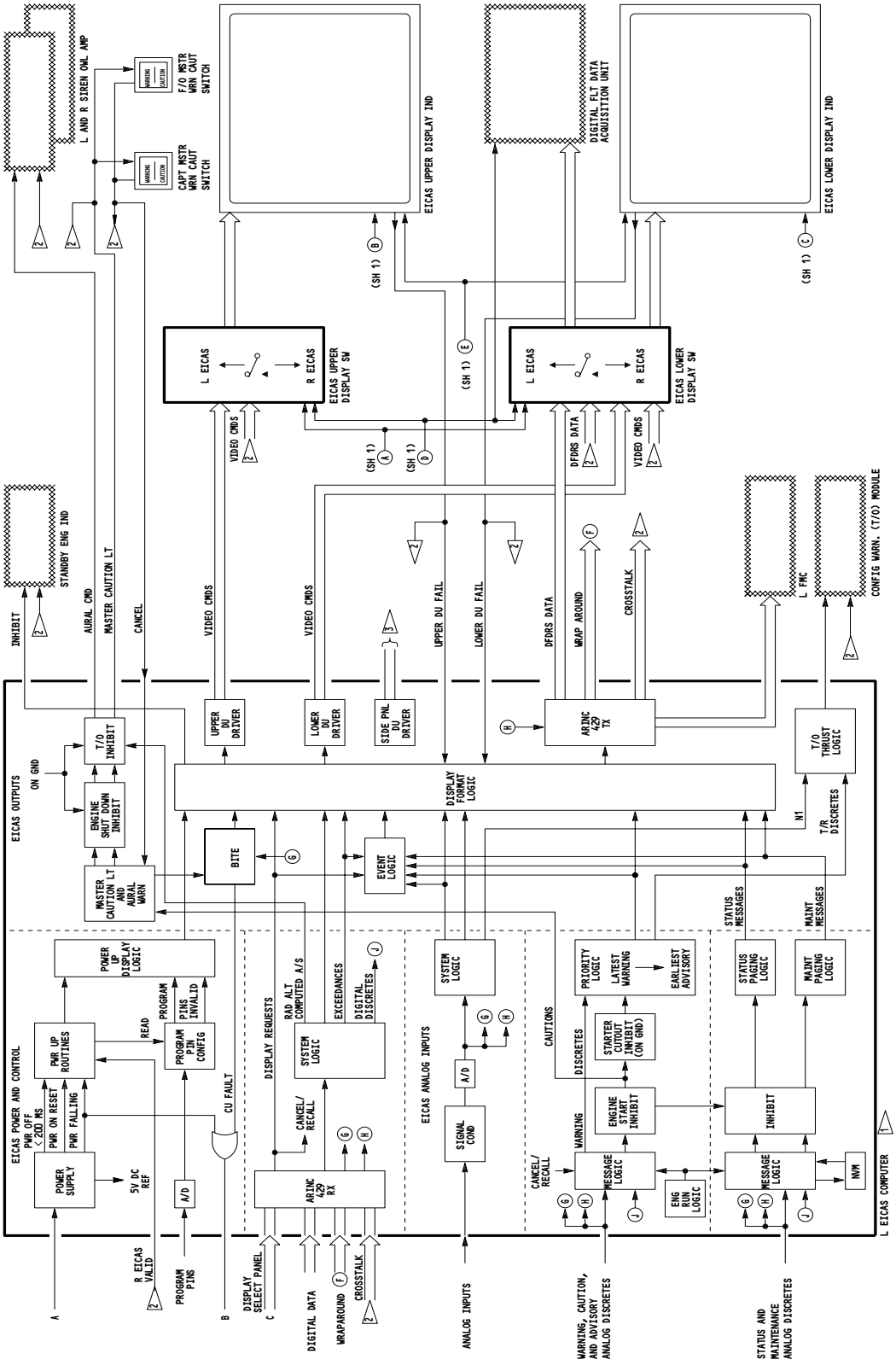

EICAS Computer – Schematic
Figure 6 (Sheet 2)

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(1) The EICAS maintenance panel and caution CANCEL/RECALL switches provide signals to the display select panel. The display select panel in turn provides all control signals over data buses to the EICAS computers.

(2) The operation of the left and right computers is similar so only the left is described. The input functions can be divided into the following:
   (a) Power up routines (see EICAS Power and Control).
   (b) Digital data bus receivers (see EICAS Digital Inputs).
   (c) Analog signal conditioning and multiplexing (see EICAS Analog Inputs).
   (d) Warning, caution, and advisory message discrete logic and display (see Alert message Discrete Inputs).
   (e) Status and maintenance message discrete logic and display (see Status and Maintenance Message Discrete Inputs).

(3) The computer assembles data from all its inputs into display formats (see EICAS Displays). It provides outputs to the display switching modules, caution and warning system, the other EICAS computer, and other airplane systems (see EICAS Outputs).

(4) The display switching modules route video driving signals from the left or right computer to the EICAS display units for display.

(5) EICAS Power (Fig. 7)
   (a) The left EICAS computer and upper EICAS display unit receive 115 Vac, 400 Hz single phase power from the left ac bus. The right EICAS computer, lower EICAS display unit, EICAS display select panel, and both EICAS switching modules receive 115 Vac, 400 Hz single phase power from the right ac bus.
   (b) The EICAS display select panel receives 5 Vac from the master dim and test circuits for panel lighting.
   (c) Power interrupts.
      1) If a power interrupt of less than 200 msec is sensed by the EICAS computer, a short term power interrupt routine is initiated. During this routine, the same formats appearing on both displays prior to the interrupt are retained. All messages retain their correct order.
      2) Long term power interrupts (greater than 200 msec) are handled with a different routine as follows:
         a) When the EICAS computer powers up after the power interrupt, it first determines if the other, or offside computer is running. If it is, a request is sent for a block transfer of synchronization data. If this data is received within 2.5 seconds and all validity tests pass, power up is complete. The computer is now running with format and data from the offside computer.

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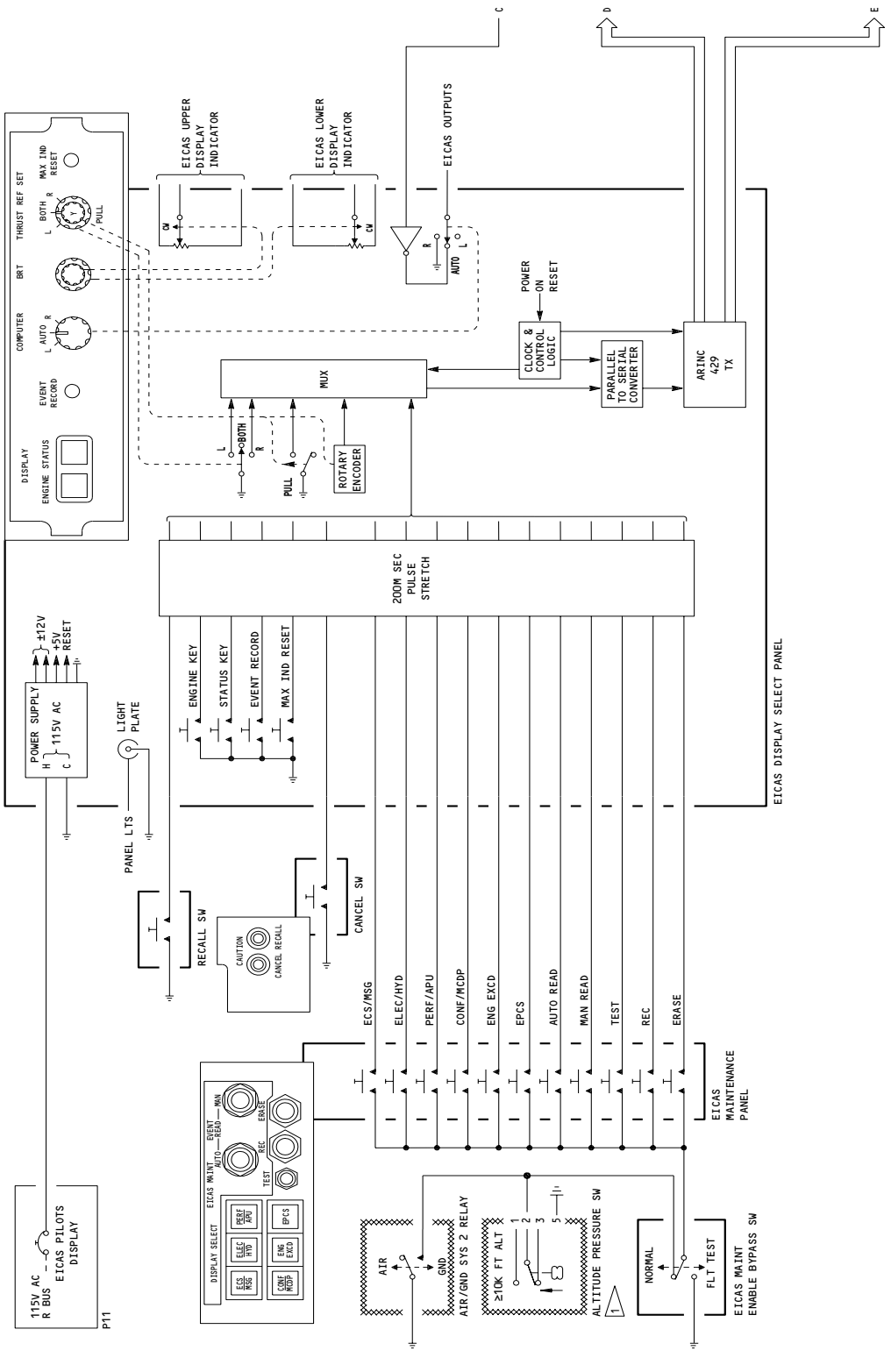

EICAS Power and Control Schematic
Figure 7 (Sheet 1)

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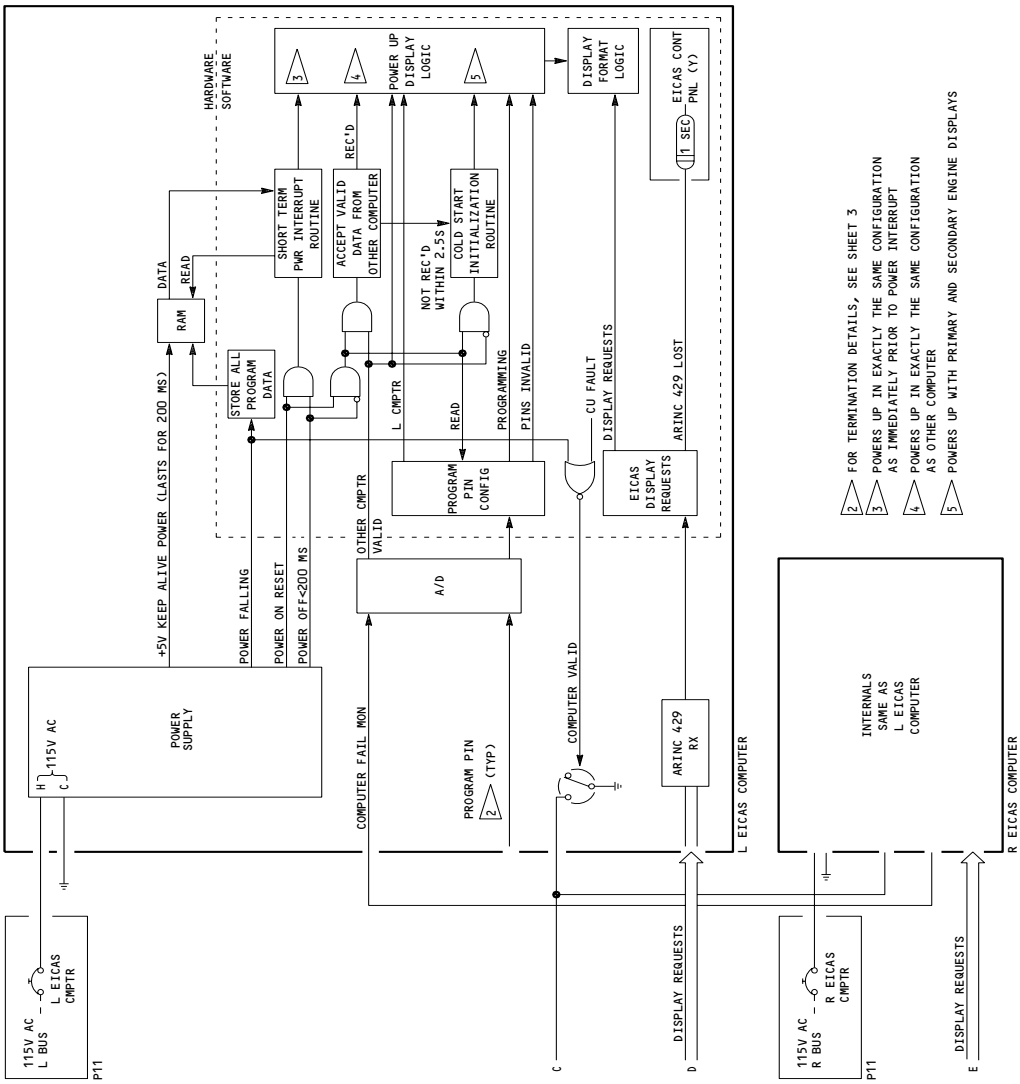

EICAS Power and Control Schematic
Figure 7 (Sheet 2)

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-1000 SERIES EICAS COMPUTERS

PIN NO.	PROGRAMMED WHEN GROUNDED
1	L ENG MODEL
2	
3	
4	SIGNAL CONSOLIDATION
5	L INSTLN
6	R ENG MODEL
7	
8	
9	FREIGHTER
10	SPARE
11	767 INSTLN=1
12	SPARE
13	ENGINE MANUFACTURER
14	
15	
16	PARITY (ODD)

EICAS Power and Control Schematic
Figure 7 (Sheet 3)

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b) If offside synchronization cannot be performed, the computer initializes a cold start. The computer first reads the program pins to determine if a proper and valid configuration has been selected. If not, the computer automatically shows the EICAS test format if on the ground with the parking brake set. If the program pins are properly configured, the computer will show the primary engine parameters on the top display unit. The secondary engine parameters will be shown on the bottom display unit.

(6) Control (Fig. 7)

(a) Display Intensity Control

1) The left EFIS remote light sensor (Ref 34-22-00) is located on the top side of the glareshield. The sensor measures outside ambient light intensity. An automatic dimming signal is provided by this sensor to the top and bottom EICAS displays.

2) Each EICAS display receives automatic dimming signals from a local light sensor on each EICAS display. A day/night discrete is also received by each EICAS display from the master dim and test system.

3) A manual brightness control signal is sent to each EICAS display from the EICAS display select panel. Each display uses these automatic and manual signals to set intensity of the display stroke signals.

(b) The EICAS Maintenance Panel contains no logic components and has no power inputs. A test switch and nine display control switches are located on this panel. All are single grounding discrete switches, and except for AUTO, MAN, and REC, are enabled by the air/ground relay. The AUTO, MAN, and REC switches are enabled, by software, only when one of the five maintenance formats have been selected.

(c) An EICAS MAINT ENABLE Bypass switch allows selection of maintenance formats while in the air. When set to the FLIGHT TEST position, a ground signal bypasses the air ground relay logic to the maintenance panel. This switch must remain in the guarded NORMAL position for revenue flights.

(d) The EICAS Display Select Panel receives ten input discretes from the maintenance panel. It also receives one each from the CANCEL and RECALL switches. These twelve discretes, along with nine more from controls on the display select panel, are used by the data management controller to produce display requests. These requests are sent in identical digital data words to both EICAS computers over separate ARINC 429 buses.

(e) A computer select discrete is sent from the display select panel to relays in the EICAS switching modules. If this line is an open circuit, the left computer will drive the displays. If this line is grounded, the right computer will drive the displays.

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(f) An LCU fail discrete is used to accomplish automatic switching to the right computer if the left computer fails. This grounding discrete is sent from the left computer to the display select panel. If the computer select switch is set to AUTO, the computer select discrete line is grounded, switching the display units and modules over to the right computer.

(7) Digital Inputs (Fig. 8)

(a) Each EICAS computer receives digital inputs in both high and low speed ARINC 429 formats.

(b) The sources that follow send low speed data to the EICAS computers listed:

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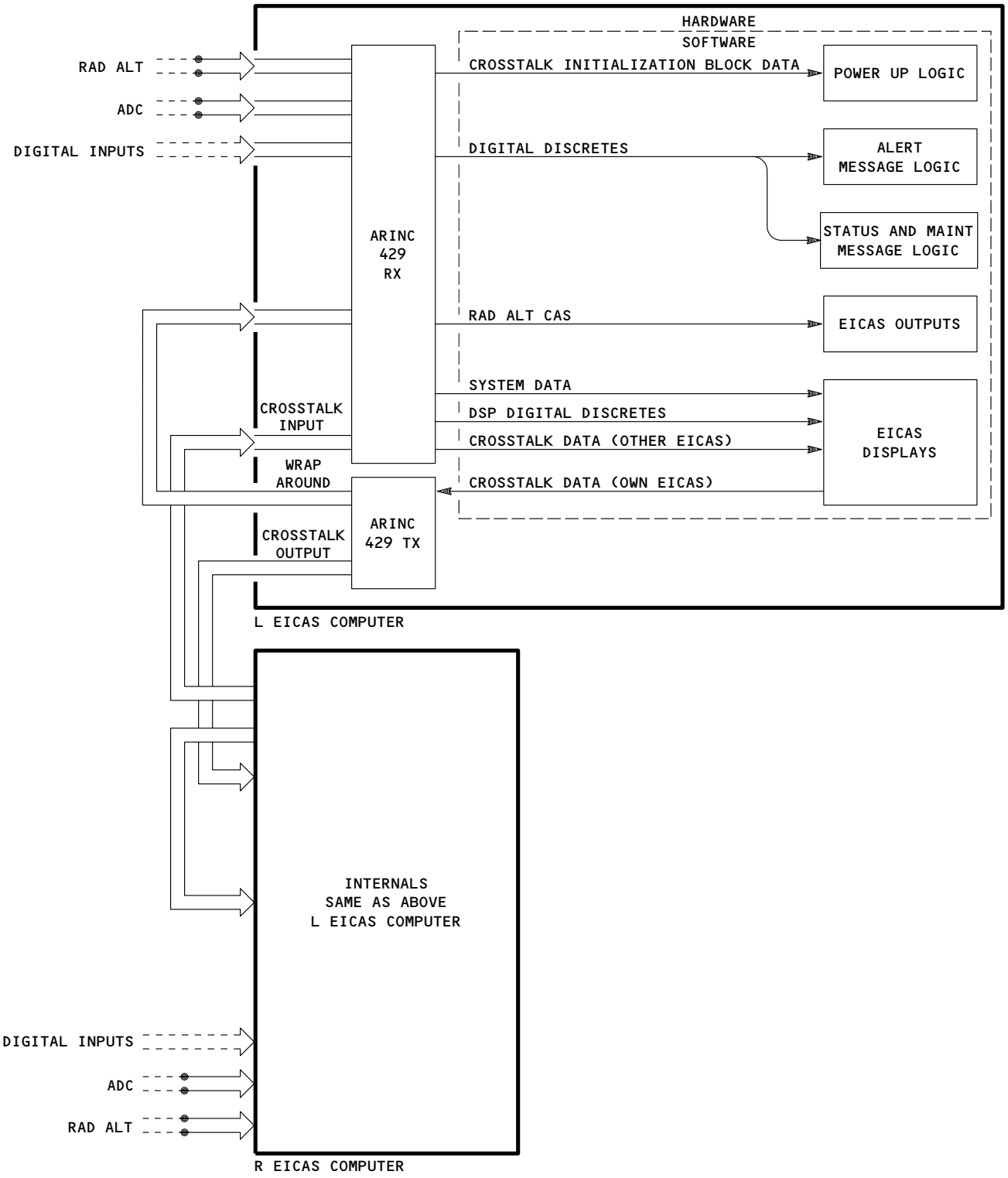

EICAS Digital Inputs Schematics
Figure 8

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SOURCE	EICAS COMPUTER (S)
left EEC	L,R
right EEC	L,R
airborne vibration monitoring unit	L,R
thrust management computer	L,R
left air data computer	L
left radio altimeter	L
left flight management computer	L
right air data computer	R
right radio altimeter	R
right flight management computer	R
EICAS display units	L,R
fuel quantity processor unit	L,R
forward cargo conditioning system	L,R
ALL MTH AIRPLANES, AND SAS 050-149, 155-999;	
tire pressure monitor unit	L,R

(c) The maintenance control/display panel sends high speed data to both EICAS computers when the MCDP is in use. Each EICAS computer also receives high speed ARINC 429 data from the other computer over a crosstalk bus. These buses are used to share uniquely received parameters, as well as to compare parameters received by both computers for BITE disagreement checks.

(8) Analog Signal Inputs (Fig. 9)

(a) Analog signals are received from engine sensors and airplane subsystems. These parameters are received as dc voltage and current inputs, ac voltage inputs, variable frequency and pulse sensing inputs, and temperature resistance bulb inputs.

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ANALOG INPUT PORT TYPES

DC VOLTS – VOLTAGE QUANTITY READ DIRECTLY, AS IN THE CASE OF BATTERY VOLTAGE, OR IN PROPORTION TO ANOTHER QUANTITY, SUCH AS APU OIL QUANTITY, OR BRAKE TEMPERATURE.

DC RATIO – DETERMINES % OPENING OF VALVE OR DOOR BY RATIO OF DC VOLTAGES.
EXAMPLES: RAM OUT DOOR, TRIM VALVE.

DISCRETE – ANALOG SIGNAL INDICATES COMPONENT OR SYSTEM STATUS CHANGE.
EXAMPLES: IDG TEMP RISE SWITCH, ENG TAI, BK TEMP WARN, THRUST REVERSER IN TRANSIT.

TEMP BULB – RESISTANCE MEASUREMENT FOR TEMPERATURE. USED TO MEASURE TEMPERATURES IN COMPARTMENTS, HEAT EXCHANGER INLETS AND OUTLETS, OIL TEMPERATURE.

THERMOCOUPLE – USED TO MEASURE EXHAUST GAS TEMPERATURE (EGT).

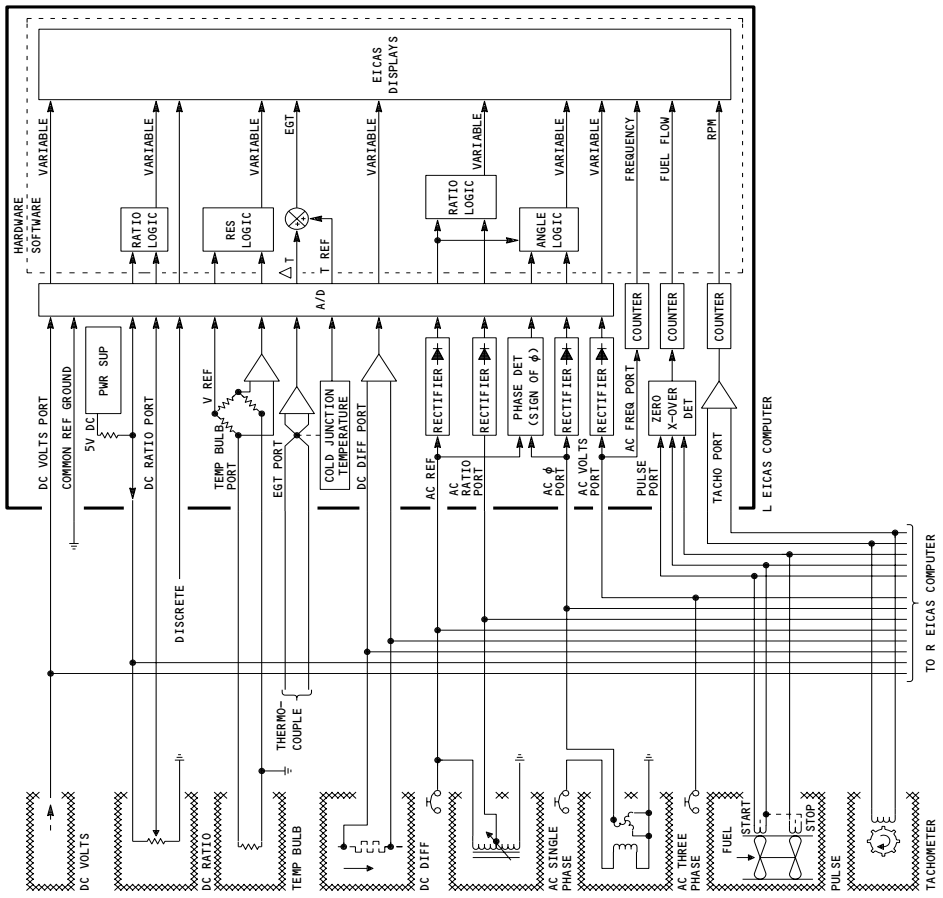
DC DIFF – MEASURES VOLTAGE DIFFERENCE ACROSS A SET RESISTANCE. USED FOR BATTERY CURRENT OUTPUT MEASUREMENT, ALSO FOR CREW OXYGEN PRESSURE.

FREQ/AC VOLTS – MEASURES FREQUENCY AND AC VOLTS UTILIZING INTERNAL EICAS COUNTERS AND RECTIFIERS USED FOR ELECTRICAL POWER BUS INDICATION.

Aϕ – MEASURES AC PHASE DIFFERENCE FROM SYNCHRO TRANSMITTERS TO DETERMINE POSITION CHANGE OF AILERONS, RUDDER, ELEVATORS.

PULSE – FUEL FLOW IS MEASURED BY A FUEL FLOW TRANSMITTER, WHICH CONVERTS THE FUEL FLOW RATE TO ELECTRICAL PULSE SIGNALS. EICAS MEASURES THE START AND STOP TIMES OF THE PULSES TO DETERMINE FLOW RATE.

TACHOMETER – COIL MEASURES RPM TURNING RATE OF N1 AND N2 ROTORS.



EICAS Analog Inputs Schematic
Figure 9

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(b) All analog inputs are parallel to both computers except temperature resistance bulb inputs. The left system temperature parameters are only received by the left computer. The right temperatures are only received by the right computer. These parameters are then shared using the crosstalk bus.

(c) Analog inputs enter the computer and are all multiplexed down to a common A/D converter. Each input is read at a rate required by its particular characteristics.

(d) Filtering and/or smoothing of the signals is mostly under software control. Each type of signal is filtered differently. Iteration rate, frequency response, resolution requirements, and noise characteristics of the input data are all taken into account.

(9) Analog Discrete Inputs (Fig. 10 and 11)

(a) Most signals sent by airplane subsystems for the generation of EICAS messages are analog discrete inputs. These include all alert, status, and maintenance messages.

(b) Thirty two analog discretes are received as program pin inputs. These program pins define airplane and engine model configuration, plus any and all customer selected display options.

(c) Airplane switch inputs are received from the air/ground and nose compression systems #1 and #2. These signals are used by the computers for display format and central warning interface inhibits. Other switch inputs are received from the Master Caution Light Reset and the IDG Temp Switch.

(d) The EICAS display units send failure discretes for DU Beam Test Fail, DU Anomaly, and DU Overheat to both computers (Fig. 12).

(e) Each computer has spare discrete inputs that can be allocated for any category using only software modification. These spare inputs provide for growth in the system.

(f) All analog discrete inputs are paralleled and thus both EICAS computers receive the same inputs.

(10) EICAS Outputs (Fig. 12)

(a) Analog Discrete Outputs

1) Two output discretes control operation of the master CAUTION light and aural. Each computer sends a discrete to both master CAUTION light/switches to turn on the light. A separate discrete is routed to the WEU from each computer to enable the caution aural.

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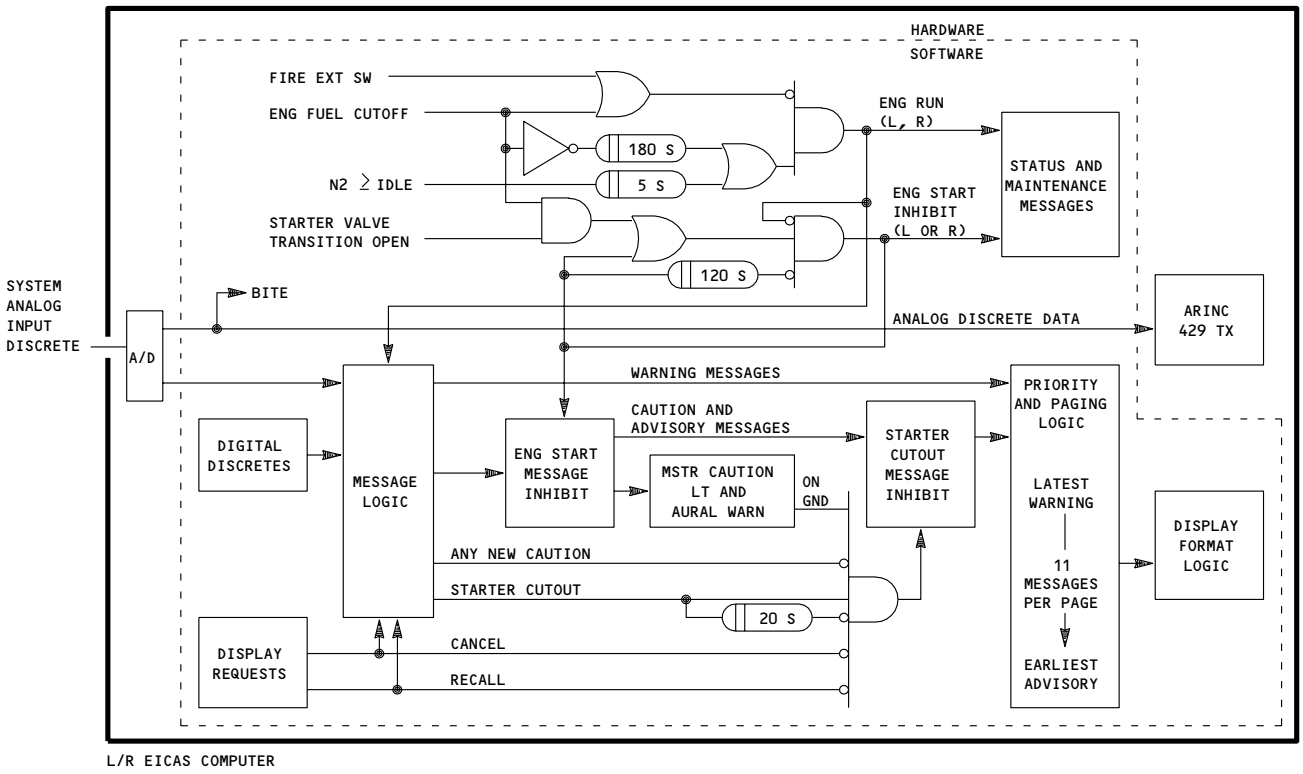

EICAS Warning, Caution, and Advisory Analog Discretes - Schematic
Figure 10

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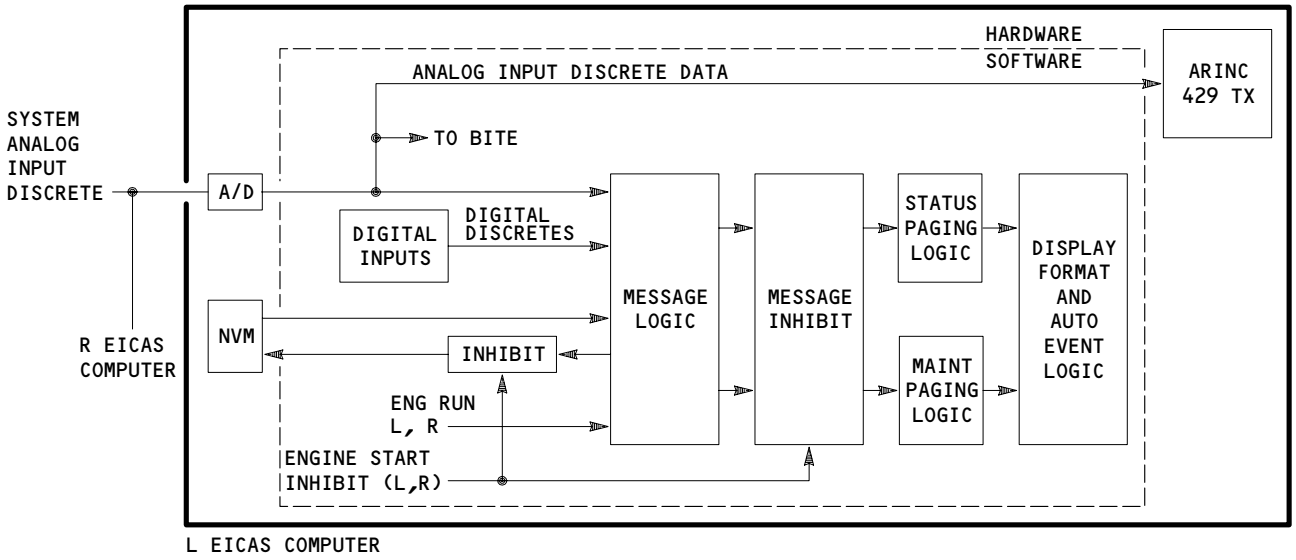

EICAS Status and Maintenance Analog Discretes Schematic
Figure 11

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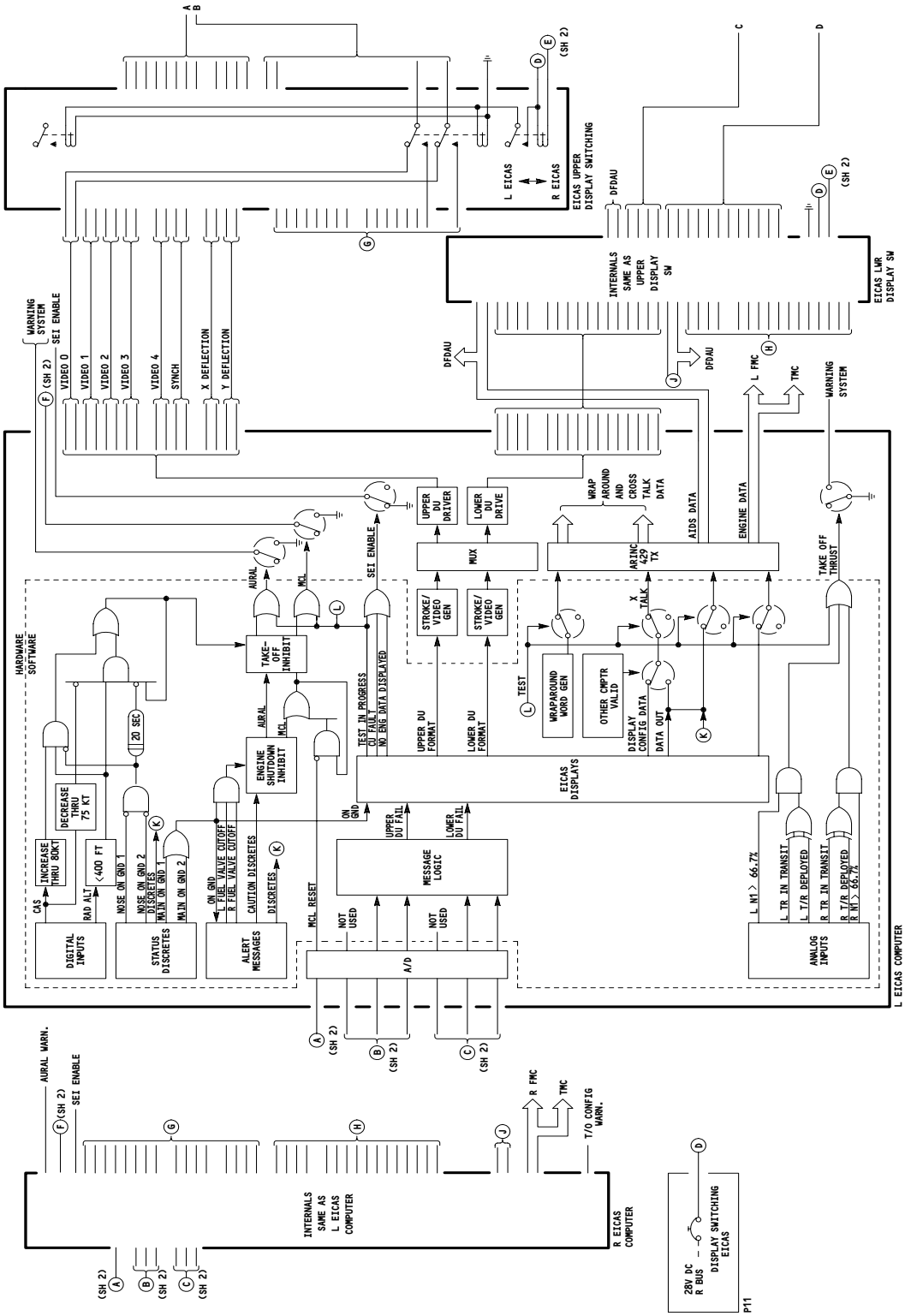

EICAS Outputs Schematic
Figure 12 (Sheet 1)

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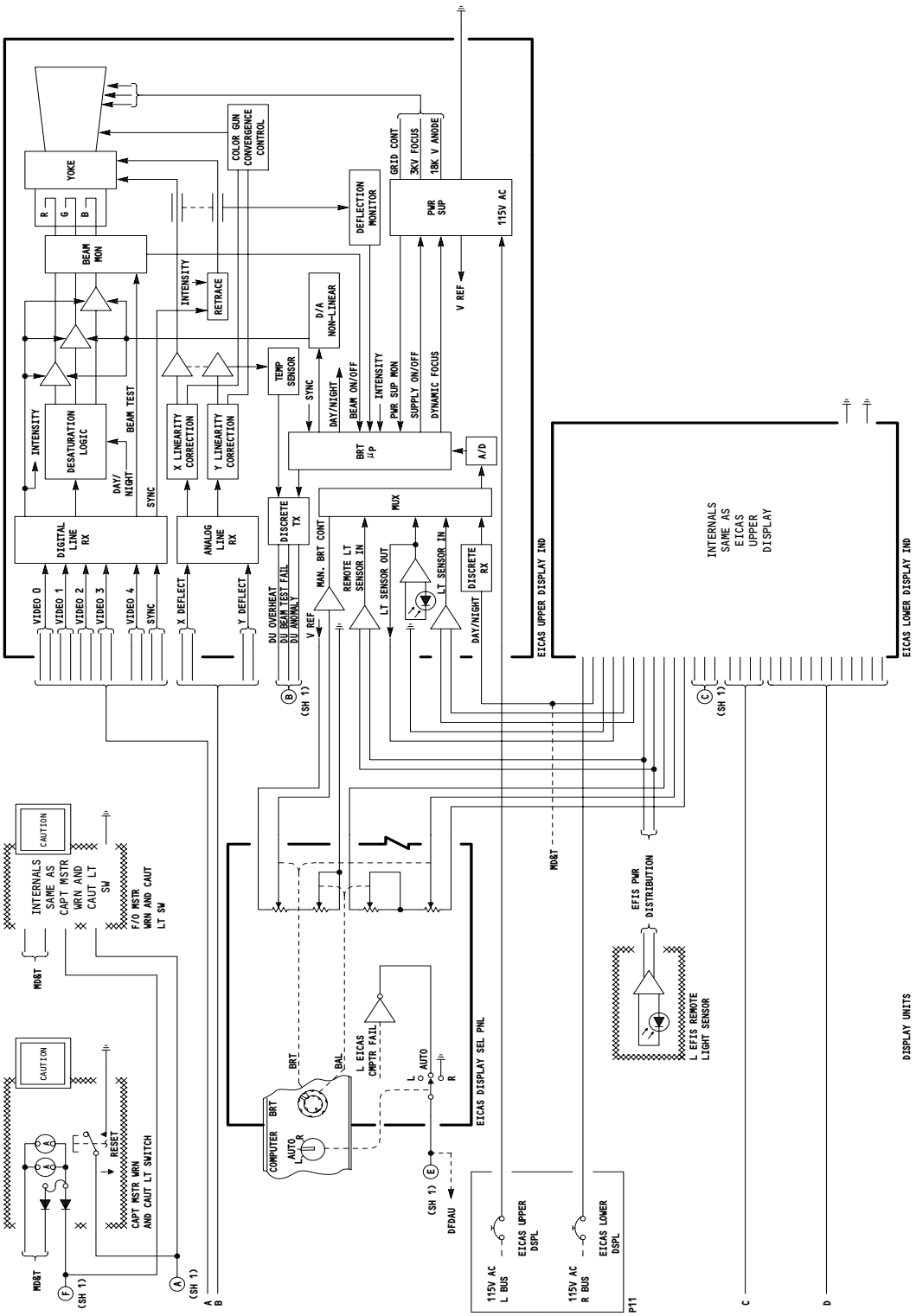

EICAS Outputs Schematic
Figure 12 (Sheet 2)

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2) The master CAUTION light/switches are turned on and the caution aural is sounded when level B alert messages are displayed, unless inhibited as follows:
   a) Master CAUTION lights will not come on when Air/Ground systems 1 or 2 indicate the airplane is on the ground and both fuel control switches are at cutoff. Any level B message present when the inhibit is removed will not turn on the lights.
   b) During takeoff the master CAUTION lights will not come on when computed airspeed is greater than 80 knots and radio altitude is less than 400 feet, unless 20 seconds has elapsed. The 20 second timer starts at nose wheel lift-off. Any non-reset condition present when the inhibit is removed will turn on the lights.
   c) The output to the WEU for caution aural tone generation is inhibited in the same manner as the master CAUTION lights.
3) When the master CAUTION lights are on and the condition clears, the light will go off. You can also shut off the light manually before the condition clears if you push the switch-light.
4) Each computer sends a computer fail discrete to the other EICAS computer. In addition, the left computer fail discrete is sent to the display select panel for automatic display switching.
5) An SEI enable discrete is sent by both computers to the Standby Engine Indicator. This enable will be set to an open circuit whenever both pilots display units are faulty, both computers are faulty, the BITE Test Format has been selected, or a single display has failed and the Status Format is being displayed.
6) A Take-off Thrust discrete is sent to the WEU for T/O configuration warning. This discrete is set to ground when engine thrust exceeds a fixed value and the thrust reversers are stowed properly.

(b) Digital Outputs
1) First, the display format logic selects the data that is to be displayed. Then, an ARINC 429 transmitter converts this data to serial data words for transmittal to other airplane systems.
2) Both left and right EICAS computers have two low speed ARINC 429 digital output ports. One bus is fed to the left or right FMC, respectively, to provide the FMC with fuel flow data. The other port is connected to a general EICAS output bus.
3) A hi-speed ARINC 429 data bus is connected from the left EICAS computer to the right and one from the right EICAS computer back to the left.

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4) A hi-speed ARINC 429 bus is connected from each computer to the bottom display switching module. A single data bus is then connected from this switching module to the DFDAU. The DFDAU will be switched to receive data from only the computer that is currently providing information to the EICAS display units.
5) All digital outputs transmitted are also internally fed back into 429 receivers. This internal wraparound is used by BITE for failure detection.

(c) Data Display.
1) Analog discretes are received by each computer from the top and bottom display units. These discretes indicate a display unit failure. When received, the caution discrete logic will generate the level C message, EICAS DISPLAY. The display format logic uses DU fail information to establish proper display states.
2) Once the proper display states have been selected, commands are sent to the display controller. This unit uses these commands, along with commands from the display generator file, to control the video/timing generator and display sequencers.
3) The video/timing generator provides red, green, and blue color signals, strobe intensity, beam test, and video sync signals to both the top and bottom display units. The display sequences provide signals to stroke generators, which in turn control the X and Y display drivers. The display drivers then provide X-deflection and Y-deflection signals to drive both upper and lower display units.

(d) Analog Signal Outputs
1) Each EICAS computer provides 16 analog signal outputs for driving the color CRTs of the display units. Six video and two deflection signals from the left computer and eight similar signals from the right computer are sent to the top display switching module. Eight signals from the left computer and eight more from the right are similiarly routed to the bottom display switching module.
2) Each switching module has eight dedicated outputs to their respective display units. When the computer select switch on the display select panel is set to L or R position, relays in the switching modules are switched to received video signals from the left or right computer, respectively.
3) When the computer select switch is set to AUTO position, the relays in the switching modules are set to the left computer inputs. If the left computer fails, it will ground its LCU fail discrete, which in turn causes the relays to switch to the right computer inputs.

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(e) Display Units

1) Each display unit receives intensity control signals from its own local light sensor, the other display unit light sensor, the left EFIS remote light sensor, and from the display select panel. These signals, along with a day/night discrete from the master dim and test system, provide information to the brightness control microprocessor.

2) Digital line receivers take red, green, and blue analog signals and send them on through color desaturation logic to the beam monitor. The monitor then uses the X and Y deflection signals, sync and strobe/intensity signals, and the bright intensity microprocessor outputs to drive the display crt.

(11) Display Formats (Fig. 13)

(a) The display format logic uses inputs to the computer to assemble display formats. Analog and digital inputs provide direct input to the logic for parameter indicators, as well as providing information for automatic exceedance display state changes. If an exceedance occurs, this information is also used to take an auto event snapshot, if necessary. Alert, status and maintenance message page logic provide inputs to include messages on the display formats.

(b) Manual and Auto Event data for ECS/MSG, ELEC/HYD, PERF/APU, and EPCS formats is stored in non-volatile memory (NVM). When the display format logic chooses maintenance data for display, it selects Manual Event, Auto Event, or real-time data for display.

(c) Display requests from the display select panel control which format is to be displayed. When an event occurs to cause a display change, the display state logic looks at the present display conditions on the upper and lower display units to decide what new formats should be displayed. Display commands are then sent to the display controller.

B. BITE (Fig. 14)

(1) EICAS provides extensive BITE monitoring. This monitoring isolates system failures to LRU's, if possible. It also provides detected faults using EICAS messages. A self-test mode can also be initiated manually.

(2) Automatic Monitoring

(a) EICAS display unit anomalies are detected within each display unit. These abnormalities include beam stuck on or off, no beam test, overtemperature condition and no X/Y deflection. Once a problem has been detected, the display unit will output a discrete to the EICAS computers.

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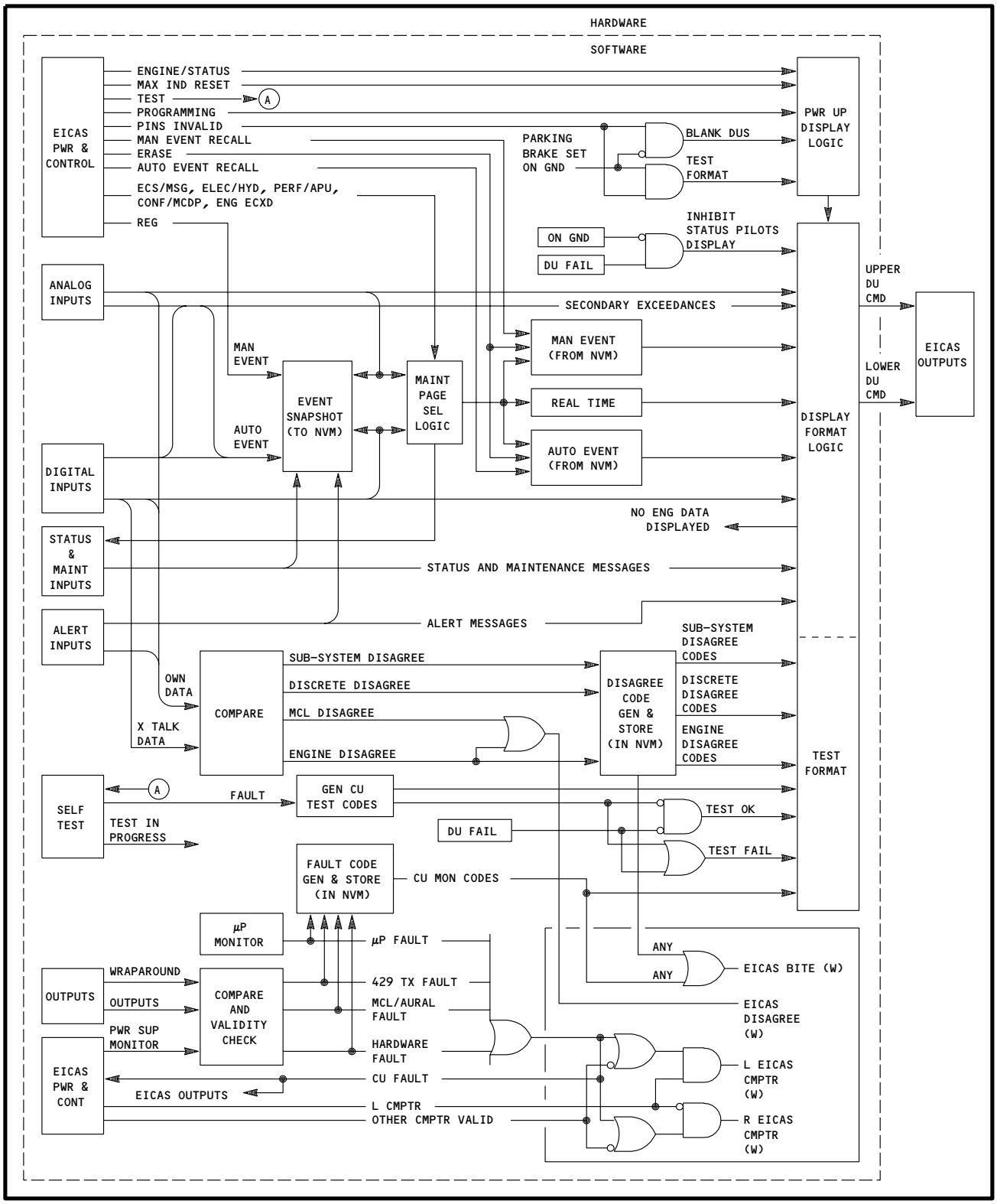

EICAS Displays Schematic
Figure 13

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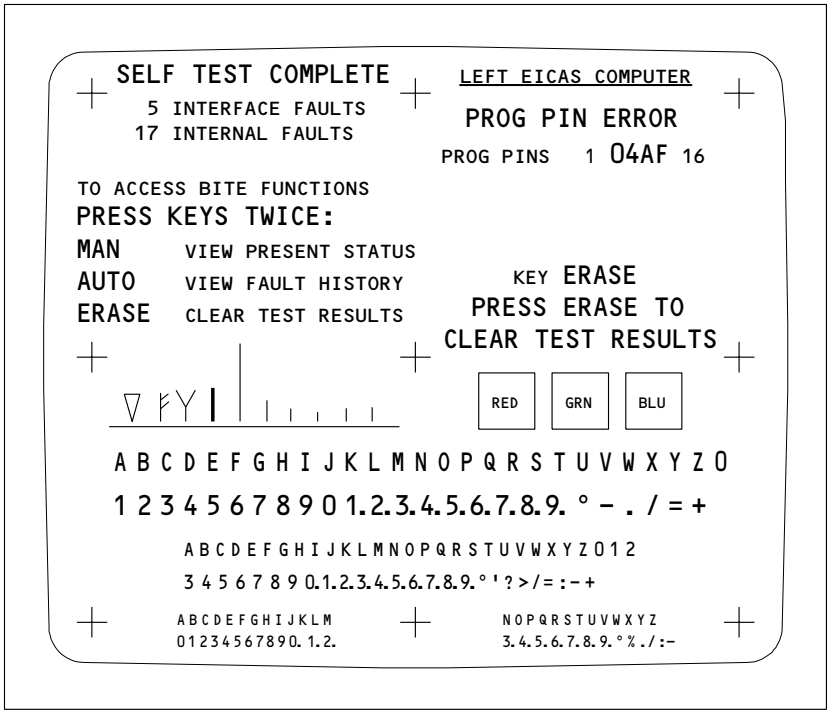

EICAS Test Format
Figure 14 (Sheet 1)

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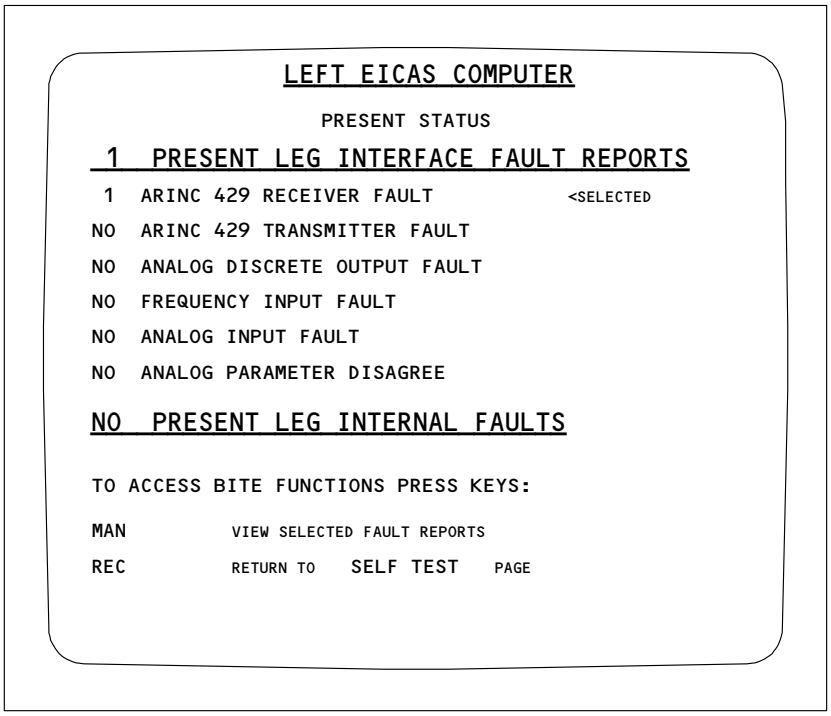
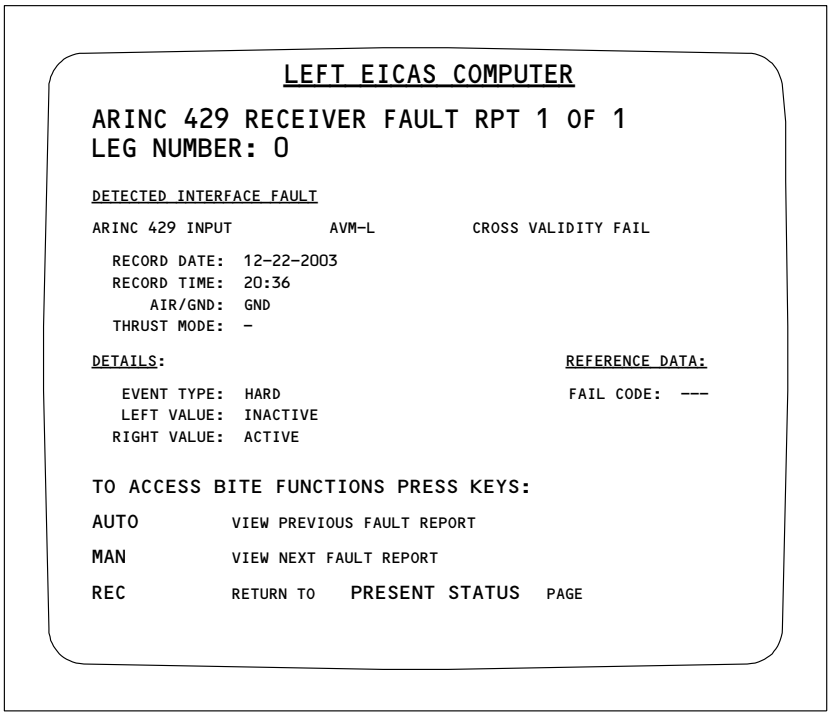


PRESENT STATUS
(SUMMARY PAGE)



PRESENT STATUS
(FAULT REPORT PAGE)

EICAS Test Format
Figure 14 (Sheet 2)

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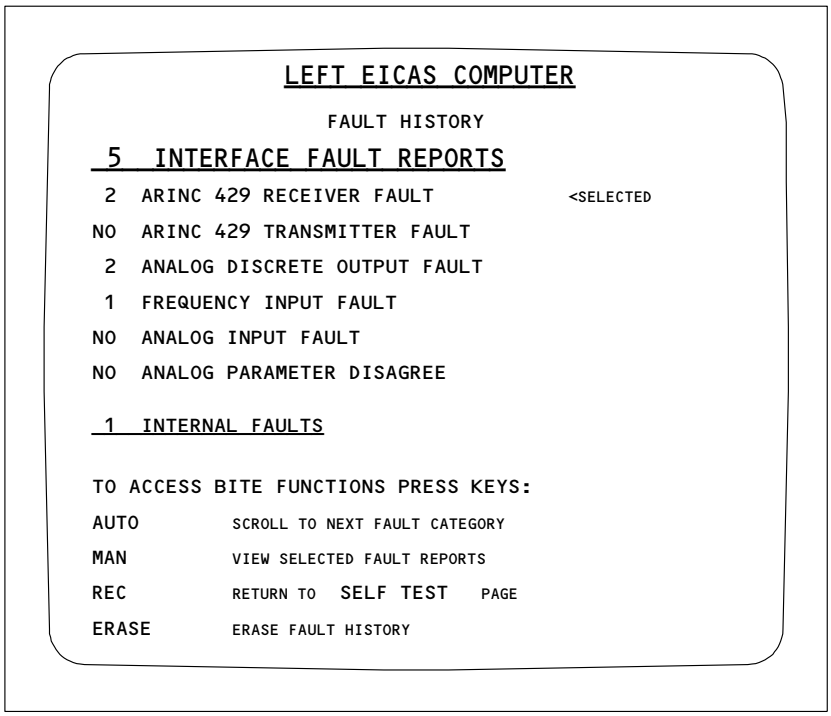
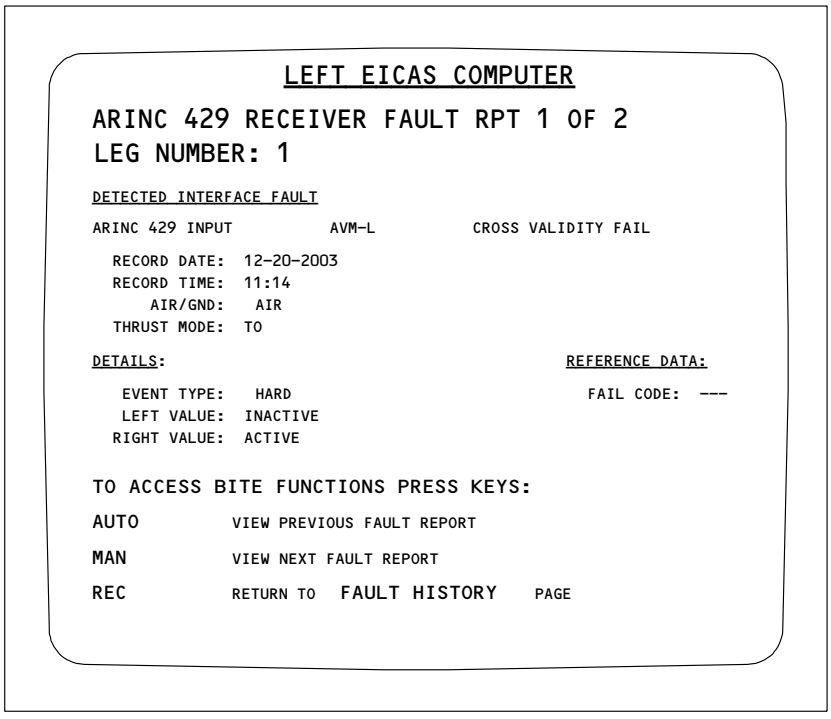


FAULT HISTORY
(SUMMARY PAGE)



FAULT HISTORY
(FAULT REPORT PAGE)

EICAS Test Format
Figure 14 (Sheet 3)

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CU TEST/CU MONITOR CODE	BINARY TO HEXADECIMAL CONVERSION	BIT	FAILURE
( ) 000 0000	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F (1, 2)		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	1	CROSS VALIDITY
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	2	WRAPAROUND
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	3	NO HANDSHAKE
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	4	IOC RAM TEST
0( )00 0000	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	5	READ AFTER WRITE
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	6	READ/WRITE ALT "1"/"0"
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	7	WRAPAROUND (3)
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	8	CHECK SUM
00( )0 0000	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	9	BACKGROUND SLOW
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	10	FOREGROUND SLOW
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	11	TEST INSTRUCTION
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	12	FROZEN PAGE 1
000( ) 0000	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	13	UNDEFINED INSTRUCTION
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	14	STACK UNDERFLOW
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	15	STACK OVERFLOW
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	16	FROZEN PAGE 2

(1) EXAMPLE: IF "CU MONITOR 8000 0000" IS SHOWN, THEN ONLY BIT 1 IS SET AND THE ONLY FAILURE IS CROSS VALIDITY

(2) EXAMPLE: IF "CU MONITOR C000 0000" IS SHOWN, THEN BITS 1 AND 2 ARE SET AND THERE ARE CROSS VALIDITY AND WRAPAROUND FAILURES

(3) WRAPAROUND FOR MASTER CAUTION LIGHT, AURAL WARNING, AND TAKEOFF THRUST

(4) WRAPAROUND FOR CU VALID AND STANDBY ENGINE INDICATOR

CU TEST/CU MONITOR Hex Codes and Failures
Figure 15 (Sheet 1)

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CU TEST/CU MONITOR CODE	BINARY TO HEXADECIMAL CONVERSION	BIT	FAILURE
0000 ( )000	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	17	Y DEFLECTION
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	18	X DEFLECTION
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	19	SEQUENCER ACTIVITY
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	20	SEQUENCER ACTIVITY
0000 0( )00	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	21	UNDEFINED INSTRUCTION
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	22	NO HANDSHAKE
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	23	BITE
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	24	BITE
0000 00( )0	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	25	WRAPAROUND
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	26	BITE
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	27	CROSS VALIDITY
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	28	BITE
0000 000( )	HEXADECIMAL CODE 0 1 2 3 4 5 6 7 8 9 A B C D E F		
	0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1	29	CROSS VALIDITY
	0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1	30	TEST VOLTAGES
	0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1	31	CROSS VALIDITY
	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	32	TEST VOLTAGES

CU TEST/CU MONITOR Hex Codes and Failures
Figure 15 (Sheet 2)

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(b) The EICAS display select panel does not monitor itself. In case of failure the EICAS computers will detect a loss of data or invalid data from the display select panel.

(c) The EICAS computer is divided into three subsystems for BITE self-monitoring purposes. These subsystems are input/output (I/O) interface, central processing unit (CPU) and display generator. The three subsystems detect faults in each other by means of a heartbeat monitor. If any one of the three subsystems stops, all activity in the other two subsystems stops also.

(d) If the I/O interface, CPU, and display generator are all working properly, the CPU then tests the system in the following areas:

1) It tests itself, the program memory, scratch pad memory, and non-volatile memory.
2) It detects sensor input values that are out of range, and ARINC 429 sensors that are not transmitting frequently enough.
3) It exchanges sensor data that is received by both computers with that of the other computer. It does this in order to isolate the device responsible for invalid sensor data.
4) It confirms that all discrete and ARINC 429 output transmitters are working correctly. It does this by comparing the value sent out with the value read from receivers connected to each transmitter.
5) It monitors the power supply voltages used by the I/O interface.
6) It isolates display faults to the computer or a display unit, by analyzing the data supplied by the display generator.
7) It monitors an over temperature indication from the power supply.

(e) Once BITE has detected an abnormality in the system, EICAS will respond in one of the following ways.

1) For a detected display unit problem, the affected display is shut down or blanked. The level C message EICAS DISPLAY will be displayed on the remaining display unit.
2) If either computer detects invalid or loss of data from the display select panel, the computers revert to the full up mode display. In addition, the level C message EICAS CONT PNL is displayed.
3) For a detected fault in a computer that affects in-flight operation of the system, the faulty computer is shut down. Display switching to the other computer is performed if applicable. The status message L EICAS CMPTR or R EICAS CMPTR, as applicable, is generated for display when selected.

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4) Crosstalk Comparison
   a) Each computer receives analog signals, and then filters, scales, and analyzes them. The results are sent over to the other computer. The other computer receives the same analog signals, processes them in the same manner, and sends its own results back to the first computer. Each computer then compares the two values.
   b) If both units decide an analog signal is outside of the allowable range, or invalid, the matching section of the affected display format is blanked.
   c) If one computer determines an analog signal is invalid, but the other determines the signal is valid, a fault condition exists. If both computers process a valid analog signal, but yet they disagree on the final result by more than a preset amount, a fault exists. The fault could be in the wiring circuit between the two computers, or in the input receiving circuitry of either computer.
   d) The cross comparison of the discrete inputs is inhibited if the state of the discrete input has changed since the last comparison. Three consecutive cycles of 20 seconds are required to register a disagree code.
   e) If the disagreement exists with an engine parameter, the status message EICAS DISAGREE is displayed. A decimal code is displayed on the BITE test format when the self test is run.
   f) If the disagreement exists with a non-engine parameter or an analog discrete, the maintenance message EICAS BITE is displayed. A decimal code is displayed on the test format during manual test.
5) The Maintenance message EICAS BITE will also be generated for any other BITE-detected faults not covered by other messages. These faults include failures in nonvolatile memories or other faults not affecting in-flight operation of the system.
6) Any fault detected during self-monitoring will set a fault bit in the CU MONITOR code which is displayed on the BITE test format. This hexadecimal code readout provides data to the shop personnel for use in fault isolation of the LRU. If the CU MONITOR code displays all zeros, no faults were detected during self-monitoring (Ref. Fig. 15 for a list of CU MONITOR codes and failures).
7) When a computer receives invalid data from an input that is not connected in parallel to the other computer (i.e. temperatures), the matching section of display will be blanked.

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(f) EICAS DISAGREE Trouble-Shooting

1) The EICAS status level message, EICAS DISAGREE, or the maintenance level message, EICAS BITE, can occur from one or more of the conditions that follow:

a) Engine Parameter Disagreement

When one of the EICAS computers finds a disagreement between its value and the value from the other computer and the two values are in range, an ENGINE DISAGREE code is put in NVM. This code will show on the TEST page. The code will be put in NVM when the disagreement occurs for 60 seconds (3 consecutive background cycles) for the engine parameters in the table that follows:

PARAMETER	CODE FOR LEFT ENGINE	CODE FOR RIGHT ENGINE
FF	510	511
N1	514	515
N2	516	517
OIL P	520	521
OIL Q	522	523
VIB (ANALOG AVM)	526	527

b) If the same disagree code is put in the two computers and they pass the self-test, you can make sure the failure is correct in two different ways. You can monitor the parameter during the usual operation and switch between the two computers or you can remove the two computers and do ATE tests on them.

If the disagree code is put in only one computer, or the two computers have different codes, it is probably not a correct failure. Too much noise on the input signal can cause random disagreements. It is possible that a computer can see 3 disagreements in a row which will cause the disagree code.

If the same disagree code occurs on more than 2 different flights for a length of time and the computers were replaced, the failure is probably a result of bad sensors or airplane wiring.

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c) Analog Discrete Output Disagreement

If there is a disagreement between the commanded condition and the actual condition of the Master Caution Light, aural tone, or takeoff thrust output, a CU MONITOR code (0200 0000) will be put into NVM for display on the TEST page.

If the CU MONITOR code is set in one or two computers, the failure will probably show during the self-test. You can isolate the failure more easily if you do the self-test for one computer at a time and observe which output causes the failure.

(3) Manual Self-Test

(a) In addition to automatic monitoring, an EICAS system self-test routine can be requested. This request is only honored when the airplane is on the ground and the parking brake is set.

(b) The BITE self-test mode is initiated by pressing the TEST button on the EICAS Maintenance Panel. A second press of the TEST button or release of the parking brake will cause the computers to exit the test mode.

(c) The BITE self-test mode is also initiated by a program pin error.

(d) A self-test routine involves an end-to-end test of system health. When the TEST button is pressed, internally produced signals drive the input receivers of each computer. Each EICAS computer responds independently to the test. All the automatic monitoring described above continues. However, crosstalk input data comparison is halted. Any disagreement previously detected using crosstalk during monitoring is retained.

(e) The system conducts a single self-test cycle and responds in the following manner:

1) The Test Format appears on both EICAS display units.
2) The master caution light output discrete is set to ground. This causes the two master CAUTION lights to come on.
3) The aural command output discrete is set to ground. This signal causes the WEU to sound the caution aural (AMM 31-51-00).
4) The take-off thrust output discrete is set to ground. This signal causes the WEU to output its takeoff-configuration warning signals (AMM 31-51-00).
5) The test format displays TEST IN PROGRESS during test signal processing. After processing is finished, the ground is removed from the output discretes. The warning siren from the WEU will cease, but the master CAUTION lights will remain on until they are manually reset, or until the TEST switch is pushed again.

(f) The results of the test are displayed as follows:

1) The message SELF TEST COMPLETE appears in the top left.

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2) The two classes of faults, INTERFACE FAULTS and INTERNAL FAULTS, appear below the SELF TEST COMPLETE message.
   a) If faults are found, the quantity of faults appear to the left of fault type.
   b) If there are no faults, the word NO appears instead of the quantity.
3) The faults are stored in fault reporting pages; PRESENT STATUS and FAULT HISTORY.
4) VIEW PRESENT STATUS and CLEAR TEST RESULTS show if there were any faults recorded during the current flight leg.
5) The faults for the current flight leg are found in the PRESENT STATUS fault reporting page(s).
6) From the EICAS self test page, you push the MAN switch twice to show the PRESENT STATUS summary page.

   NOTE: The PRESENT STATUS page will only show if there are faults. The display will not change if there are no faults.

7) The title LEFT(RIGHT) EICAS COMPUTER, along with PRESENT STATUS, appears at the top center of the summary page.
8) The PRESENT STATUS summary page shows the faults, grouped by types, for flight leg 0.
9) You can have PRESENT LEG INTERFACE FAULTS and PRESENT LEG INTERNAL FAULTS.
10) The PRESENT LEG INTERFACE FAULTS are further divided into these types:
   a) ARINC 429 RECEIVER FAULTS,
      ARINC 429 TRANSMITTER FAULTS,
      ANALOG DISCRETE OUTPUT FAULTS,
      FREQUENCY INPUT FAULTS,
      ANALOG INPUT FAULTS and
      ANALOG PARAMETER DISAGREE
11) If no faults are found, the word NO is shown to the left of the fault type.
12) If faults are found, the <SELECTED cursor points to the first type with a fault.
13) You push the AUTO switch to move the <SELECTED cursor to next catagory.
14) You push the MAN switch to show the selected FAULT REPORT page within a catagory.
   a) The FAULT REPORT page shows more details about the fault.
   b) You push the MAN switch to show the next fault report.
   c) You push the AUTO switch to show the previous fault report.
   d) You push the REC switch to return to the PRESENT STATUS summary page.

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15) From the summary page, you push the REC switch to return to the self test page.
    a) You push the TEST switch to return the EICAS to normal operation.
16) The faults for the previous flight legs are found in FAULT HISTORY fault reporting page(s).
17) VIEW FAULT HISTORY shows on the self test page if there were any faults recorded during the previous flight leg(s).
18) From the EICAS self test page, you push the AUTO switch twice to show the FAULT HISTORY summary page.

    NOTE: The FAULT HISTORY page will only show if there are faults. The display will not change if there are no faults.

19) The title LEFT(RIGHT) EICAS COMPUTER, along with FAULT HISTORY, appears at the top center of the summary page.
20) The FAULT HISTORY summary page shows the faults, grouped by types, for flight legs 1 through 9.
21) You can have INTERFACE FAULTS and INTERNAL FAULTS.
22) The INTERFACE FAULTS are further divided into these types:
    a) ARINC 429 RECEIVER FAULTS,
       ARINC 429 TRANSMITTER FAULTS,
       ANALOG DISCRETE OUTPUT FAULTS,
       FREQUENCY INPUT FAULTS,
       ANALOG INPUT FAULTS and
       ANALOG PARAMETER DISAGREE
23) If no faults are found, the word NO is shown to the left of the fault type.
24) If faults are found, the <SELECTED cursor points to the first type with a fault.
25) You push the AUTO switch to move the <SELECTED cursor to next catagory.
26) You push the MAN switch to show the selected FAULT REPORT page within a catagory.
    a) The FAULT REPORT page shows more details about the fault, including the flight leg number.
    b) You push the ERASE switch to erase all fault records for flight legs 1 through 9.
    c) You push the MAN switch to show the next fault report.
    d) You push the AUTO switch to show the previous fault report.
    e) You push the REC switch to return to the PRESENT STATUS summary page.
27) From the summary page, you push the REC switch to return to the self test page.
    a) You push the TEST switch to return the EICAS to normal operation.
28) From the EICAS self test page, you push the ERASE switch twice to clear all present leg (flight leg 0) faults.

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(g) Proper switch operation can be verified by BITE while in the self-test mode. When the following switches are pressed, a corresponding KEY message will be displayed: ENGINE, STATUS, CANCEL, RECALL, ECS/MSG, ELEC/HYD, PERF/APU, CONF/MCDP, ENG EXC, EPCS, AUTO, MAN, REC, and ERASE.

C. Control

(1) To turn on EICAS, perform the following steps:
(a) Provide electrical power (AMM 24-22-00).
(b) Check that EICAS circuit breakers (6 places) on panel P11 are closed.
(c) Adjust display intensity as desired using BRT/BAL controls on the display select panel.

(2) To select computer display control, set COMPUTER switch on display select panel as follows:
(a) Set switch to L position for left computer display,
(b) Set switch to R position for right computer display,
(c) Set switch to AUTO position for automatic display switching.

(3) To clear engine maximum exceedances from display press MAX IND RESET switch on display select panel.

(4) Display Formats - Selection and Control
(a) To select or clear the Secondary Engine Format on the lower display unit, press the ENGINE switch on the display select panel.
(b) To select or clear the Status Format on the bottom display unit, push the STATUS switch on the display select panel.
(c) To select or clear a Maintenance Format (ECS/MSG, PERF/APU, ELEC/HYD, CONF/MCDP, ENG EXC, EPCS) on the bottom display unit, push the corresponding DISPLAY SELECT switch on the EICAS Maintenance Panel.
(d) To select a non-volatile memory (NVM) Maintenance Format for display, perform the following steps:
1) Select the desired format as described in the previous step.
2) Press the AUTO switch on the maintenance panel to select Auto Event memory for display.
3) Press the MAN switch on the maintenance panel to select Manual Event memory for display.
(e) To erase a recorded NVM Maintenance Page, do these steps:
1) Select the desired NVM display format as described in previous step.
2) Push and hold the ERASE switch on the EICAS Maintenance Panel for approximately 3 seconds.
(f) To record a NVM Maintenance Page, do these steps:

NOTE: With the REC switch you can only record the parameter data in Real-Time mode for the Maintenance Page that is currently displayed. This data is then stored in the manual event NVM and overwrites any previous data.

(g) Select the desired NVM Maintenance Page as described in the previous step.

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(h) Push the REC switch on the EICAS Maintenance Panel for approximately 3 seconds.

(5) Message Selection and Control

(a) To cycle level B and level C alert messages, operate the CANCEL and RECALL switches as follows:

1) Press the CANCEL switch to remove current level B and level C displayed messages and to view any additional messages, if present.

2) Press the RECALL switch to return to the beginning of the alert message list.

(b) To cycle status messages, operate the STATUS switch as follows:

1) Press the STATUS switch to remove any currently displayed status messages and to view any additional messages, if present. The Status Format will blank when all status messages have been displayed.

2) Press STATUS again to return to the beginning of the status message list.

(c) To cycle maintenance messages, operate the ECS/MSG switch as follows:

1) Press ECS/MSG to remove current maintenance messages displayed and view additional messages, if present. The ECS/MSG format will blank when all maintenance messages have been displayed.

2) Press ECS/MSG again to return to the beginning of the maintenance message list.

(d) To erase a status/maintenance message or maintenance message, perform the following steps:

1) On EICAS maintenance panel at P61, press ECS/MSG switch and check that ECS/MSG format appears.

2) Press AUTO-EVENT READ switch and check that AUTO EVENT readout appears at bottom display.

3) Press and hold ERASE switch for about 3 seconds.

NOTE: The ERASE switch is used to both erase the currently displayed page of messages and at the same time advance the display to the next page of NVM messages, if present.

All data displayed on ECS/MSG Auto Event format will be erased when the ERASE switch is pressed. To track intermittant faults, maintenance messages may be recorded for future reference.

4) Check for additional messages. If readout is blank, skip this step. If readout shows an additional page of messages, push and hold the ERASE switch for approximately 3 seconds.

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5) Repeat previous two steps until page readout goes blank or only currently true messages show.

NOTE: All maintenance messages which remain after erase procedure show current existing status. Messages erased by above procedure depict transitory or intermittent conditions.

(e) To erase EICAS BITE or EICAS DISAGREE messages the self-test page should be accessed and erased as follows: To erase LRU failure messages or any disagree code from the BITE self-test mode, perform the following steps:
1) Initiate manual self-test.
2) Press and hold ERASE switch and check that KEY message appears. Release switch.
3) Press and hold ERASE switch until LRU failure message disappears.
4) Press test switch to return displays to normal.

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ENGINE INDICATION AND CREW ALERTING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CARD – EICAS SIGNAL CONSOLIDATION, M10727	1	1	119AL, MAIN EQUIPMENT CENTER	31-41-07
CIRCUIT BREAKER –	2		FLIGHT COMPARTMENT, P11	
EICAS CMPTR L, C4078		1	11J2	*
EICAS CMPTR R, C4079		1	11J29	*
EICAS DSPL SELECT, C4094		1	11J32	*
EICAS DSPL SW, C4189		1	11J31	*
EICAS LOWER DSPL, C4082		1	11J30	*
EICAS UPPER DSPL, C4081		1	11J3	*
COMPUTER – LEFT EICAS, M10181	1	1	119AL, MAIN EQUIPMENT CENTER, E8	31-41-02
COMPUTER – RIGHT EICAS, M10182	1	1	119AL, MAIN EQUIPMENT CENTER, E8	31-41-02
INDICATOR – EICAS DISPLAY BOTTOM, N10014	2	1	FLIGHT COMPARTMENT, P2	31-41-01
INDICATOR – EICAS DISPLAY TOP, N10013	2	1	FLIGHT COMPARTMENT, P2	31-41-01
MODULE – EICAS DISPLAY SWITCHING, BOTTOM, M10418	1	1	119AL, MAIN EQUIPMENT CENTER, E8	31-41-04
MODULE – EICAS DISPLAY SWITCHING, TOP, M10417	1	1	119AL, MAIN EQUIPMENT CENTER, E8	31-41-04
PANEL – EICAS DISPLAY SELECT, M10195	2	1	FLIGHT COMPARTMENT, P9	31-41-03
PANEL – EICAS MAINTENANCE, M10372	2	1	FLIGHT COMPARTMENT, P61	31-41-05
RELAY – (FIM 31-01-36/101)		1		
SYSTEM NO. 2 AIR/GND, K202				
SENSOR – (FIM 34-22-00/101)		1		
EFIS REMOTE LIGHT, TS187				
SWITCH – ALTITUDE PRESSURE, S921 1>	1	1	119AL, MAIN EQUIPMENT CENTER, E8	*
SWITCH – CANCEL, S10170	2	1	FLIGHT COMPARTMENT, P1	*
SWITCH – CAPT MASTER CAUTION, LIGHTED, S507	2	1	FLIGHT COMPARTMENT, P7	*
SWITCH – F/O MASTER CAUTION, LIGHTED, S508	2	1	FLIGHT COMPARTMENT, P7	*
SWITCH – MAINT ENABLE BYPASS, S612	1	1	119AL, MAIN EQUIPMENT CENTER, E8	*
SWITCH – RECALL, S10230	2	1	FLIGHT COMPARTMENT, P1	*

* SEE THE WDM EQUIPMENT LIST

1> SAS 050,150,152-157,162-167 WITH SB 31-73, AND SAS 052-149,158-161,168-274,281-999

Engine Indication and Crew Alerting System – Component Index
Figure 101

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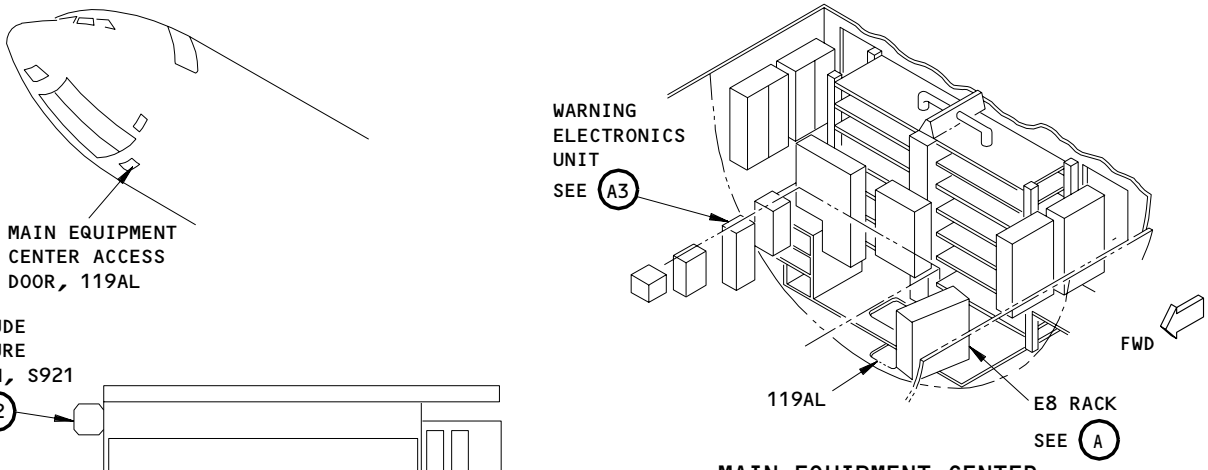

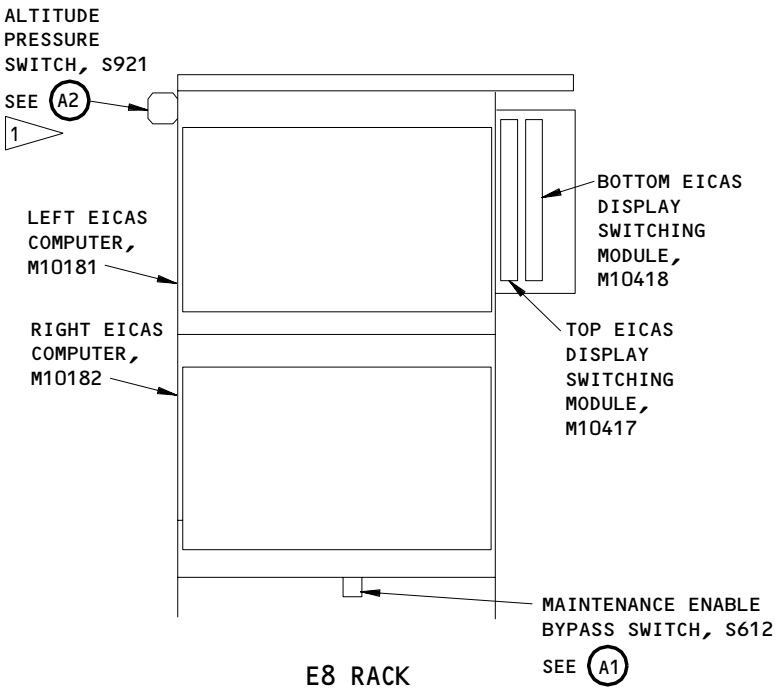

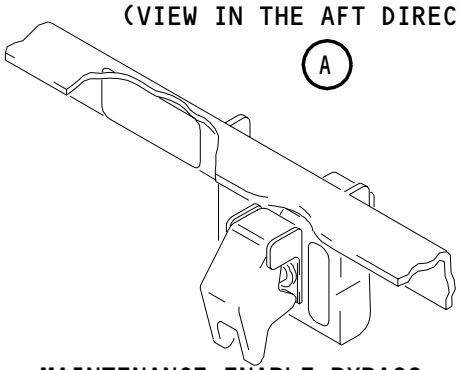

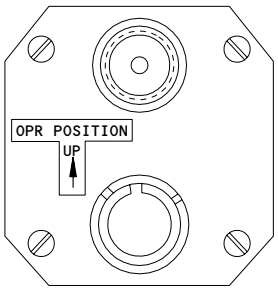

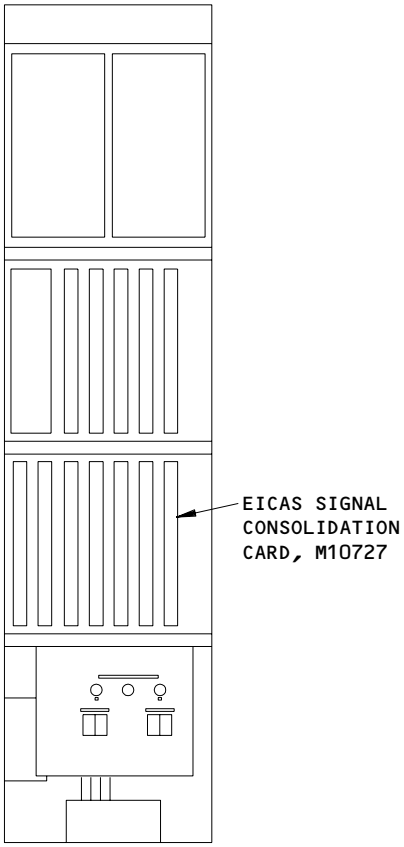

1 SAS 050,150,152-157,162-167 WITH SB 31-73, AND SAS 052-149,158-161,168-274,281-999

Engine Indication and Crew Alerting System - Component Location
Figure 102 (Sheet 1)

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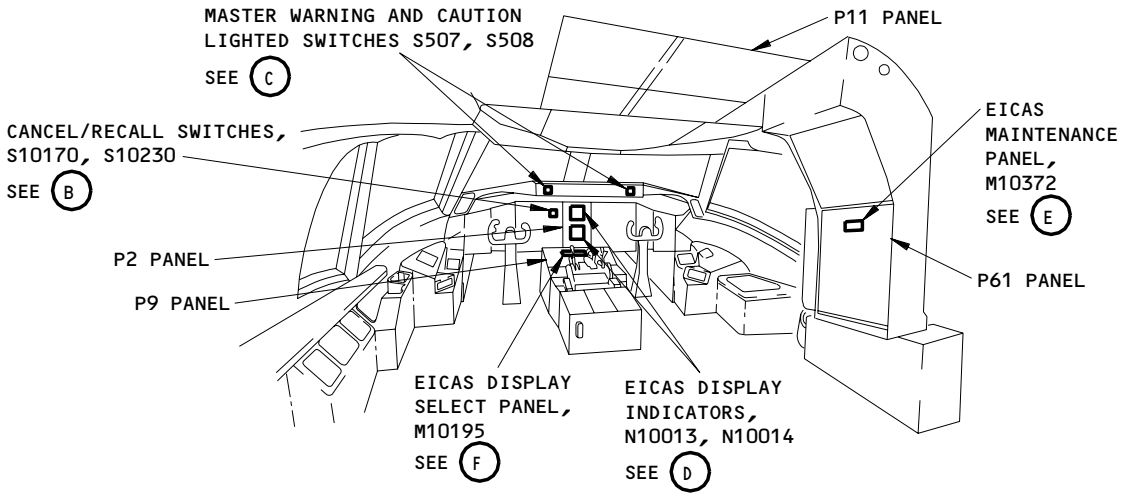
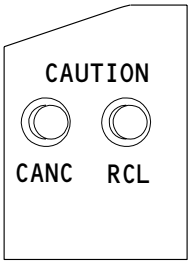


FLIGHT COMPARTMENT

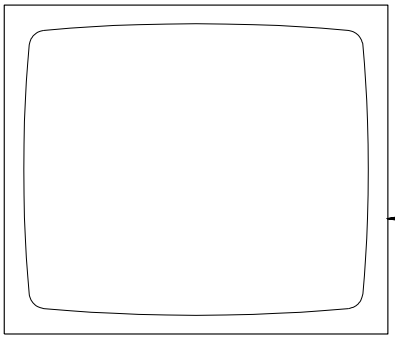


CANCEL/RECALL SWITCHES, S10170, S10230

B

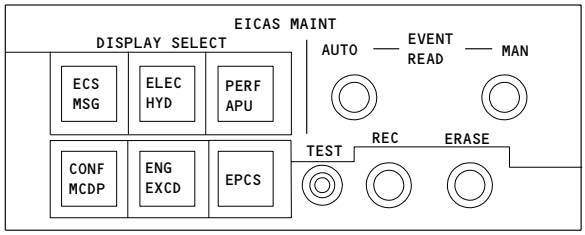
MASTER WARNING AND CAUTION LIGHTED SWITCH (EXAMPLE)

C



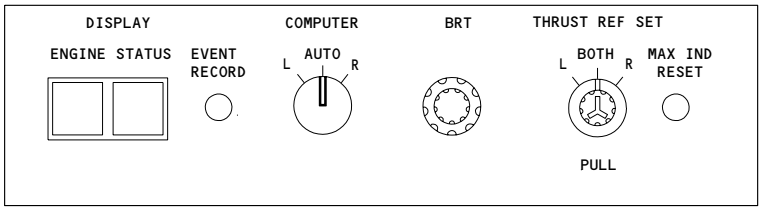
EICAS DISPLAY INDICATORS

D



EICAS MAINTENANCE PANEL, M10372

E



EICAS DISPLAY SELECT PANEL, M10195

F

Engine Indication and Crew Alerting System – Component Location
Figure 102 (Sheet 2)

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EICAS - MAINTENANCE PRACTICES

1. General
   A. The EICAS Maintenance Practices include the procedures that follow:
      (1) EICAS Message Display Procedure
      (2) Maintenance Message Erase Procedure
      (3) AUTO EVENT, MAN EVENT, and ENG EXCD Erase Procedures
      (4) Engine Shutdown Input Removal
      (5) EICAS SCU Program Pin Codes

      (6) How to Show an EICAS Software Part Number
      (7) How to Show an EICAS Fault Reporting Page
      (8) How to Clear EICAS Faults from the Fault Reporting Pages

   TASK 31-41-00-912-001
2. EICAS Message Display Procedure
   A. General
      (1) EICAS messages are divided into alert, status, and maintenance message lists. Alert messages, which include level A (Warning), level B (Caution), and level C (Advisory) messages show on the top display unit. Status and maintenance messages show on the bottom display unit.
   B. References
      (1) AMM 24-22-00/201, Electrical Power Control
   C. Access
      (1) Location Zones
          211/212 Flight Compartment

   D. Procedure

      S 862-199
      (1) Supply electrical power (AMM 24-22-00/201).

      S 862-047
      (2) Make sure that the EICAS circuit breakers that follow are closed:
          (a) 11J2, EICAS CMPTR LEFT
          (b) 11J3, EICAS UPPER DSPL
          (c) 11J29, EICAS CMPTR RIGHT
          (d) 11J30, EICAS LOWER DSPL
          (e) 11J31, EICAS DSPL SW

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(f) 11J32, EICAS DSPL SELECT

S 752-002

(3) Do the steps that follow to show all the EICAS alert messages:

NOTE: The first page of WARNING, CAUTION and Advisory messages show automatically.

(a) If PAGE 1 shows, push the CANC switch on the captain's main instrument panel, P1.
(b) Continue to push the CANC switch as necessary to see all the additional pages.
(c) Push the RCL switch to go back to the start of the message list.

S 752-003

(4) Do the steps that follow to show all the EICAS status messages:
(a) Push the STATUS switch on the EICAS DISPLAY select panel, P9, to show the status page and the first page of status messages.
(b) If PAGE 1 shows, push the STATUS switch again.
(c) Continue to push the STATUS switch as necessary to see all the additional pages.
(d) The bottom EICAS display will go out of view after all of the status messages show. Push the STATUS switch again to go back to the start of the message list.

S 752-049

(5) Do the steps that follow to show all the EICAS maintenance messages:
(a) Push the ECS/MSG switch on the EICAS MAINT panel on the right side panel, P61, to show the ECS MSG page and the first page of maintenance messages.
(b) If PAGE 1 shows, push the ECS MSG switch again.
(c) Continue to push the ECS MSG switch as necessary to see all the additional pages.
(d) After all of the pages of messages show, the ECS MSG page will show without the message list. Push the ECS MSG switch again to to back to the secondary engine page.

S 752-050

(6) Do the steps that follow to show all the EICAS EPCS messages:
(a) Push the EPCS switch to show the EPCS page and the first page of EPCS messages.
(b) If PAGE 1 shows, push the EPCS switch again.
(c) Continue to push the EPCS switch as necessary to see all the additional pages.
(d) After all of the pages of messages show, the EPCS page will show without the message list. Push the EPCS switch again to go back to the secondary engine page.

NOTE: Additional data on the EPCS is included in AMM 77-35-00.

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S 862-200

(7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-912-009

3. Maintenance Message Erase Procedure

A. General

(1) The EICAS computer keeps a record of some EICAS status, maintenance, and EPCS messages in non-volatile memory (NVM) because these messages have intermittent conditions or only show with special input logic. An example of special input logic is engine operation.

(2) If a failure which caused an NVM message is removed, the message will still show until it is erased from the EICAS computer memory. This procedure gives steps to manually erase these messages.

(3) NVM messages that have special input logic will not show after they are erased. If the failure condition continues, they still will not show until the special input logic again occurs.

B. References

(1) AMM 24-22-00/201, Electrical Power - Control

C. Message Erase Procedure

S 862-013

(1) Supply electrical power (AMM 24-22-00/201).

S 862-010

(2) Make sure that the EICAS circuit breakers that follow are closed:

(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 862-011

(3) Do the steps that follow to erase an EICAS maintenance message:

(a) Push the ECS MSG switch on the EICAS MAINT panel on the right side panel, P61, to see the ECS MSG page.

(b) Make a record of all of the messages on the ECS MSG pages for trouble shooting.

NOTE: Additional messages can show during trouble shooting. Ignore these messages.

(c) Push the AUTO-EVENT READ switch.

(d) Make sure that AUTO EVENT shows at the bottom of the bottom display.

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(e) Push and hold the ERASE switch for 3 seconds.

NOTE: The ERASE switch has two functions as follows:
- It erases all messages that are in view.
- It moves the display forward to show the next page of NVM messages.

(f) Continue to push the ERASE switch until PAGE does not show or until PAGE 1 shows again.

NOTE: All maintenance messages that still show after the erase procedure identify continued failures.

S 862-012

(4) Do the steps that follow to erase an EPCS maintenance message:
(a) Push the EPCS switch on EICAS MAINT panel on the right side panel, P61.
(b) Make sure that the EPCS page shows on the bottom display.
(c) Make a record of all of the messages on the EPCS pages for trouble-shooting.

NOTE: Additional messages can show during trouble-shooting. Ignore these messages.

(d) Push the AUTO-EVENT READ switch.
(e) Make sure that AUTO EVENT shows at the bottom of the bottom display.
(f) Push and hold the ERASE switch for 3 seconds.

NOTE: The ERASE switch has two functions as follows:
- It erases all messages that are in view.
- It moves the display forward to show the next page of NVM messages.

(g) Continue to push the ERASE switch until PAGE does not show or until PAGE 1 shows again.

NOTE: All EPCS maintenance messages that still show after the erase procedure identity continued failures.

S 862-014

(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-912-015

4. AUTO EVENT, MAN EVENT, and ENG EXCD Erase Procedures

A. General

(1) Auto Events occur for the ECS, ELEC, HYD, PERF, APU and EPCS systems when given EICAS messages show (Ref Table 1 or FIM Table 102).

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(2) Auto Events also occur for the PERF and EPCS systems when an engine value is in an exceedance range. At the same time, the EICAS computer keeps records of the exceedance on the ENG EXCD page.
(3) The EICAS computer keeps a record of a MAN EVENT for the ECS, ELEC/HYD, PERF/APU, or EPCS systems page when you push the REC switch on the EICAS MAINT panel. The EICAS computer keeps a record of a MAN EVENT for the ECS, ELEC/HYD, PERF/APU, and EPCS systems pages when you push the EVENT REC switch on the EICAS DISPLAY select panel.

B. References
(1) AMM 24-22-00/201, Electrical Power - Control

C. Access
(1) Location Zones
211/212 Control Cabin - Sect 41

D. Prepare to Erase

S 862-016
(1) Supply electrical power (AMM 24-22-00/201).

S 862-017
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

E. AUTO EVENT Erase Procedure.

S 862-020
(1) Push the ECS MSG, ELEC HYD, PERF APU, or EPCS switch for the maintenance page that has an unwanted AUTO EVENT.

S 752-021
(2) Make sure that the correct page shows.

S 862-022
(3) Push the AUTO EVENT READ switch.

S 752-023
(4) Make sure that AUTO EVENT shows at the bottom of the bottom display.

S 862-162
(5) Push and hold the ERASE switch for 3 seconds.

NOTE: The ERASE switch has two functions as follows:
- It erases all the data on the maintenance AUTO EVENT page.
- If you erase an ECS AUTO EVENT page, the ERASE switch will also erase the NVM maintenance messages.

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F. MAN EVENT Erase Procedure

S 862-024
(1) Push the ECS/MSG, ELEC/HYD, or PERF/APU switch for the maintenance page that has an unwanted MAN EVENT.

S 752-025
(2) Make sure that the correct page shows.

S 862-026
(3) Push the MAN EVENT READ switch,

S 752-027
(4) Make sure that MAN EVENT shows at the bottom of the bottom display.

S 862-028
(5) Push and hold the ERASE switch for 3 seconds.

G. ENG EXCD Erase Procedure

S 862-029
(1) Push the ENG EXCD switch on the EICAS maintenance panel, P61.

S 752-031
(2) Make sure that the ENG EXCD page shows.

S 862-032
(3) Push and hold the ERASE switch for 3 seconds.

H. Put the Airplane Back to Its Usual Condition.

S 862-033
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-912-037

5. Engine Shutdown Input Removal

A. General
(1) An Engine Shutdown Input in the EICAS computers prevents the output to the CAUTION lights and caution aurals when the engines are not operating. The messages that have engine operation logic also will not show.
(2) The procedures that follow give steps to remove the EICAS engine shutdown input so that caution lights, caution aurals and messages with engine logic will not be inhibited. The procedure also gives steps to put the EICAS back to its usual condition.

B. References
(1) AMM 24-22-00/201, Electrical Power - Control

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C. Access
(1) Location Zones
211/212 Flight Compartment

D. Prepare to Remove Input

S 862-039
(1) Supply electrical power (AMM 24-22-00/201).

S 862-040
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 862-156
(3) Make sure the ENG START switches on panel P5 are in the OFF position and install DO-NOT-OPERATE tags.

S 862-263
(4) Make sure the four (4) L/R PUMPS PRESS switches and the two (2) C PUMPS PRESS switches on panel P5 are in the OFF position.

S 862-195
(5) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
(a) 11D7, ENGINE STBY IGN 1
(b) 11D8, ENGINE STBY IGN 2
(c) 11M1, ENG L IGN 1
(d) 11M2, ENG R IGN 1
(e) 11M28, ENG L IGN 2
(f) 11M29, ENG R IGN 2

S 862-044
(6) Make sure these main power distribution panel, P6, circuit breakers are closed:
(a) 6E1, FUEL VALVE L SPAR
(b) 6E2, FUEL VALVE R SPAR

S 862-045
(7) Make sure these overhead P11 panel circuit breakers are closed:
(a) 11D25, ENGINE FUEL CONT VLV & EEC CHAN B RESET L

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(b) 11D26, ENGINE FUEL CONT VLV & EEC CHAN B RESET R

S 862-201

(8) Make sure that the L and R fuel control switches on the control stand, P10, are in the CUTOFF position.

S 752-047

(9) Make sure the left and right ENG VALVE and SPAR VALVE lights do not show.

S 862-202

CAUTION: OPEN THESE CIRCUIT BREAKERS TO PREVENT FUEL LEAKAGE INTO THE ENGINES. FAILURE TO OPEN THESE CIRCUIT BREAKERS CAN CAUSE AN ENGINE FIRE.

(10) Open these P6 panel circuit breakers and attach DO-NOT-CLOSE tags:
(a) 6E1, FUEL VALVES L SPAR
(b) 6E2, FUEL VALVES R SPAR

S 752-052

(11) Make sure the left and right SPAR VALVE lights show.

E. Remove the Engine Shutdown Input

S 862-205

(1) Put the L and R fuel control switches in the RUN position.

NOTE: The engine oil parameter indicators will automatically show on the secondary page on the lower EICAS display after the time shown below:

AIRPLANES WITH -602 EICAS COMPUTERS, 180 seconds
AIRPLANES WITH -603 EICAS COMPUTERS, 300 seconds

If you want to show the STATUS page or a maintenance page, push the STATUS switch on the EICAS DISPLAY select panel or a maintenance switch on the EICAS MAINT panel.

F. Put the Engine Shutdown Input to EICAS Back to Its Usual Condition.

S 862-203

(1) Put the L and R fuel control switches in the CUTOFF position.

S 752-039

(2) Make sure that the left and right ENG VALVE lights comes on.

S 862-147

(3) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 6E1, FUEL VALVES L SPAR

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(b) 6E2, FUEL VALVES R SPAR

S 862-054

(4) Make sure the left and right ENG VALVE lights do not show.

S 862-204

(5) Remove the DO-NOT-OPERATE tags from the ENG START switches.

S 842-058

(6) If one of the two fuel control switches was in the RUN position for more than the time shown below, do the steps that follow:

AIRPLANES	TIME
WITH -602 EICAS COMPUTERS	180 SECONDS
WITH -603 EICAS COMPUTERS	300 SECONDS

(a) Push the PERF/APU switch on the EICAS MAINT panel.
(b) Push the AUTO EVENT READ switch on the EICAS MAINT panel.
(c) Push and hold the ERASE switch for 3 seconds.
(d) Push the ENG EXCD switch on the EICAS MAINT panel.
(e) Push the AUTO EVENT READ switch on the EICAS MAINT panel.
(f) Push and hold the ERASE switch for 3 seconds.
(g) Push the ECS MSG switch on the EICAS MAINT panel.
(h) Push the AUTO EVENT READ switch on the EICAS MAINT panel.
(i) Push and hold the ERASE switch for 3 seconds.

S 862-196

(7) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 11D7, ENGINE STBY IGN 1
(b) 11D8, ENGINE STBY IGN 2
(c) 11M1, ENG L IGN 1
(d) 11M2, ENG R IGN 1
(e) 11M28, ENG L IGN 2
(f) 11M29, ENG R IGN 2

S 862-059

(8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-912-179

6. -603 AND SUBSEQUENT EICAS COMPUTERS;
EICAS SCU Program Pin Codes
A. General
(1) The EICAS supplementary program pin codes must be changed if an engine without an SCU is installed on an SCU airplane or an engine with an SCU is installed on a non-SCU airplane. This procedure gives the steps to change the supplementary program pin codes.

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B. References
(1) SWPM 20-10-15, Standard Wiring Practices Manual
(2) SWPM 20-90-12, Standard Wiring Practices Manual
(3) AMM 24-22-00/201, Electrical Power - Control

C. Access
(1) Location Zones
119/120 Main Equipment Center
211/212 Flight Compartment

D. Change the EICAS Supplementary Program Pin Codes

S 862-177
(1) Open these P11 panel circuit breakers and attach DO-NOT-CLOSE tags:
(a) 11J2, EICAS CMPTR L
(b) 11J29, EICAS CMPTR R

S 912-178
(2) Do these steps if you install an engine without SCU on an SCU airplane:
(a) For the left engine, disconnect and remove the wire between connector D881F, pin B4, on the left EICAS computer and terminal block TB239, pin Z38 (SWPM 20-10-15, SWPM 20-90-12).
(b) For the right engine, disconnect and remove the wire between connector D881D, pin K9, on the left EICAS computer and terminal block TB239, pin Z38.
(c) For the left engine, disconnect and remove the wire between connector D883F, pin B4, on the right EICAS computer and the terminal block TB239, pin Z39.
(d) For the right engine, disconnect and remove the wire between connector D883D, pin K9, on the right EICAS computer and the terminal block TB239, pin Z39.

S 912-180
(3) Do these steps if you install an engine with an SCU on a non-SCU airplane:
(a) For the left engine, connect a wire between connector D881F, pin B4, on the left EICAS computer and terminal TB239, pin Z38 (SWPM 20-10-15, SWPM 20-90-12).
(b) For the right engine, connect a wire between connector D881D, pin K9, on the left EICAS computer and terminal block TB239, pin Z38.
(c) For the left engine, connect a wire between connector D883F, pin B4, on the right EICAS computer and terminal block TB239, pin Z39.
(d) For the right engine, connect a wire between connector D883D, pin K9, on the right EICAS computer and terminal block TB239, pin Z39.

E. Supplementary Program Pin Configuration Check

S 862-181
(1) Supply electrical power (AMM 24-22-00/201).

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S 862-182
(2) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 11J2, EICAS CMPTR L
(b) 11J29, EICAS CMPTR R

S 862-183
(3) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the L position.

S 862-184
(4) Push the CONF/MCDP switch on the EICAS MAINT panel, P61.

S 742-185
(5) Make sure these supplementary program pin codes show:

SAS

L. EICAS	R. EICAS	AIRPLANES
A000	A000	Without Ice Detection or TCAS
A400	A400	Without Ice Detection but with TCAS
B000	B000	With Ice Detection but without TCAS
B400	B400	With Ice Detection and TCAS

F. Put the Airplane Back to Its Usual Condition.

S 862-186
(1) Push the CONF/MCDP switch on the EICAS MAINT panel, P61.

S 862-187
(2) Turn the COMPUTER switch on the EICAS DISPLAY select panel, P9, to the AUTO position.

S 862-188
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-912-190
7. EICAS Maintenance and EPCS Messages

NOTE: This is a scheduled maintenance task.

A. References
(1) AMM 24-22-00/201, Electrical Power - Control

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B. Access
(1) Location Zones
211/212 Flight Compartment

C. Procedure

S 862-206
(1) Supply electrical power (AMM 24-22-00/201).

S 862-207
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 752-208
(3) Do the steps that follow to show all the EICAS maintenance messages:
(a) Push the ECS/MSG switch on the EICAS MAINT panel on the right side panel, P61, to show the ECS MSG page and the first page of maintenance messages.
(b) If PAGE 1 shows, push the ECS MSG switch again.
(c) Continue to push the ECS MSG switch as necessary to see all the additional pages.
(d) After all of the pages of messages show, the ECS MSG page will show without the message list. Push the ECS MSG switch again to go back to the secondary engine page.

S 752-209
(4) Do the steps that follow to show all the EICAS EPCS messages:
(a) Push the EPCS switch to show the EPCS page and the first page of EPCS messages.
(b) If PAGE 1 shows, push the EPCS switch again.

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(c) Continue to push the EPCS switch as necessary to see all the additional pages.
(d) After all of the pages of messages show, the EPCS page will show without the message list. Push the EPCS switch again to go back to the secondary engine page.

NOTE: Additional data on the EPCS is included in AMM 77-35-00.

S 862-210
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-752-228

8. How to Show an EICAS Software Part Number

A. General
(1) This task shows how to retrieve EICAS software part numbers from the EICAS configuration maintenance page.

(2) The EICAS software contains two part numbers, the OPS (Operational Program Software) and the OPC (Operational Program Configuration).

B. References
(1) AMM 24-22-00/201, Electrical Power Control

C. Access
(1) Location Zones
211/212 Flight Compartment

D. Procedure

S 862-225
(1) Supply electrical power (AMM 24-22-00/201).

S 862-226
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT

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(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 752-227
(3) Do the steps that follow to show the EICAS software part numbers:
(a) Push the CONF/MCDP switch on the EICAS MAINT panel.
(b) Observe the OPS and OPC P/Ns (part numbers) on the bottom EICAS display.

NOTE: The OPS and OPC P/Ns (part numbers) show on the lower half of page 1 on the CONF/MCDP page.

S 862-224
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-752-230

9. How to Show an EICAS Fault Reporting Page

A. General
(1) This task shows how to retrieve EICAS fault reporting pages from the EICAS self test page.

(2) The fault reporting pages contain either PRESENT STATUS faults or FAULT HISTORY faults.
(a) The PRESENT STATUS faults occurred during flight leg 0.
(b) The FAULT HISTORY faults occurred during flight leg 1 through flight leg 9.

B. References
(1) AMM 24-22-00/201, Electrical Power Control

C. Access
(1) Location Zones
211/212 Flight Compartment

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D. Procedure

S 862-232
(1) Supply electrical power (AMM 24-22-00/201).

S 862-233
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 752-234
(3) Do the steps that follow to show the fault reporting pages:
(a) Push the TEST switch on the EICAS MAINT panel.

NOTE: Stop for 1 to 3 minutes. Some faults have time delays.

(b) Push the MAN switch twice to show PRESENT STATUS faults.

NOTE: The PRESENT STATUS page will only show if there are faults. The display will not change if there are no faults.

1) Follow the instruction on the screen to show the fault reporting page(s).
(c) Push the AUTO switch twice to show FAULT HISTORY faults.

NOTE: The FAULT HISTORY page will only show if there are faults. The display will not change if there are no faults.

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1) Follow the instruction on the screen to show the fault reporting page(s).

S 862-235

(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 31-41-00-752-255

10. How to Clear EICAS Faults from the Fault Reporting Pages

A. General

(1) After you repair an EICAS fault, you must remove it from the fault reporting pages.

(2) This task shows how to remove EICAS faults from the fault reporting pages.

(3) The fault reporting pages contain either PRESENT STATUS faults or FAULT HISTORY faults.

(a) The PRESENT STATUS faults occurred during flight leg 0.

(b) The FAULT HISTORY faults occurred during flight leg 1 through flight leg 9.

B. References

(1) AMM 24-22-00/201, Electrical Power Control

C. Access

(1) Location Zones

211/212 Flight Compartment

D. Procedure

S 862-249

(1) Supply electrical power (AMM 24-22-00/201).

S 862-248

(2) Make sure that the EICAS circuit breakers that follow are closed:

(a) 11J2, EICAS CMPTR LEFT

(b) 11J3, EICAS UPPER DSPL

(c) 11J29, EICAS CMPTR RIGHT

(d) 11J30, EICAS LOWER DSPL

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(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 752-247
(3) Do the steps that follow to remove EICAS faults:
(a) Push the TEST switch on the EICAS MAINT panel.

NOTE: Stop for 1 to 3 minutes. Some faults have time delays.

(b) Record any faults you find.
(c) If you have present leg faults, push the ERASE key two times to erase the present leg faults.
(d) If you have previous leg faults, push the AUTO key two times to show the fault history page.
1) Push the ERASE key two times to erase the previous leg faults.
(e) Push the TEST switch on the EICAS MAINT panel to exit the test.

NOTE: Stop for 1 to 3 minutes. Some faults have time delays.

1) Make sure the faults are removed.
(f) If necessary, repeat the procedure for the right (left) EICAS computer.

S 862-254
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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EICAS - ADJUSTMENT/TEST

1. General
   A. This procedure has two tasks. The first task is the Operational Test which uses only equipment on the airplane. The second task is the System Test which uses equipment on the airplane and external test equipment.
   B. The EICAS system has an interface with many other airplane systems. This EICAS adjustment/test does not include an input test for all of the interface systems. Tests for the correct installation and operation of the EICAS components are included.

TASK 31-41-00-715-001

2. Operational Test - EICAS
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
      (2) AMM 31-41-02/201, EICAS Computer - Maintenance Practices
   B. Access
      (1) Location Zones
          211/212 Flight Compartment

   C. Procedure

      S 865-002
      (1) Supply electrical power (AMM 24-22-00).

      S 865-003
      (2) Make sure that these circuit breakers on the overhead circuit breaker panel, P11, are closed:
          (a) 11B16, AURAL WARN SPKR L
          (b) 11B18, WARN ELEX B
          (c) 11E19, GR POS AIR/GND SYS 2 ALT
          (d) 11H35, AURAL WARN SPKR R
          (e) 11J2, EICAS CMPTR L
          (f) 11J3, EICAS UPPER DSPL
          (g) 11J29, EICAS CMPTR R
          (h) 11J30, EICAS LOWER DSPL

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(i) 11J32, EICAS DSPL SELECT
(j) 11J34, WARN ELEX A
(k) 11U15, LANDING GEAR AIR/GND SYS 1
(l) 767-300 AIRPLANES;
11U23, LANDING GEAR POSITION AIR/GND SYS 2
(m) 767-200 AIRPLANES;
11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-004

(3) Make sure that the airplane parking brake is engaged.

S 845-184

WARNING: FAILURE TO OPEN THE CIRCUIT BREAKER IN THE FOLLOWING STEP CAN RESULT IN PERSONAL INJURY, DEATH, FIRE, EXPLOSION, OR DAMAGE TO EQUIPMENT.

(4) Open these P11 panel circuit breakers:
(a) 11F02, WX RADAR, LEFT
(b) 11F23, WX RADAR, RIGHT

S 865-005

(5) Set the COMPUTER select switch on the DISPLAY select panel to the L position.
(a) Make sure that the engine primary page shows on the top display unit and engine secondary page shows on the bottom display unit.

S 715-048

(6) Push the TEST button on the EICAS MAINT panel.

S 715-049

(7) Make sure that the indications that follow show:
(a) Both master CAUTION switch-lights come on.
(b) Caution owl aural and warning siren aural indications come on.
(c) Test page shows on the two display units.
(d) L EICAS TEST shows at the top of the right side of the two display units.
(e) TEST IN PROGRESS message shows in the message list at the top of the left side of the two display units for approximately 5 seconds.
(f) SELF TEST COMPLETE replaces the TEST IN PROGRESS message.
(g) Make sure NO INTERFACE FAULTS shows and NO INTERNAL FAULTS shows.
(h) All aural indications stop.

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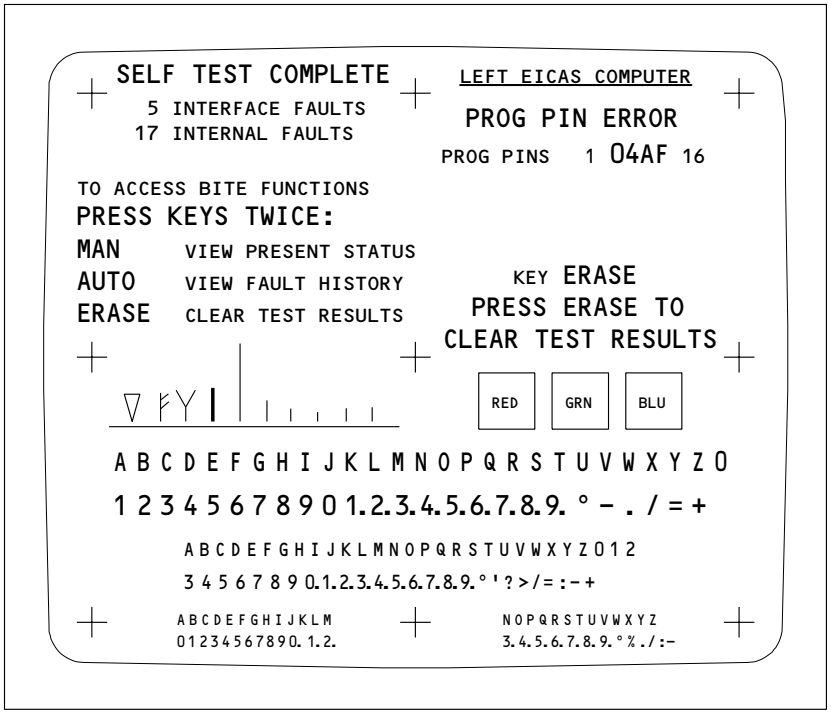

EICAS Test Format
Figure 501 (Sheet 1)

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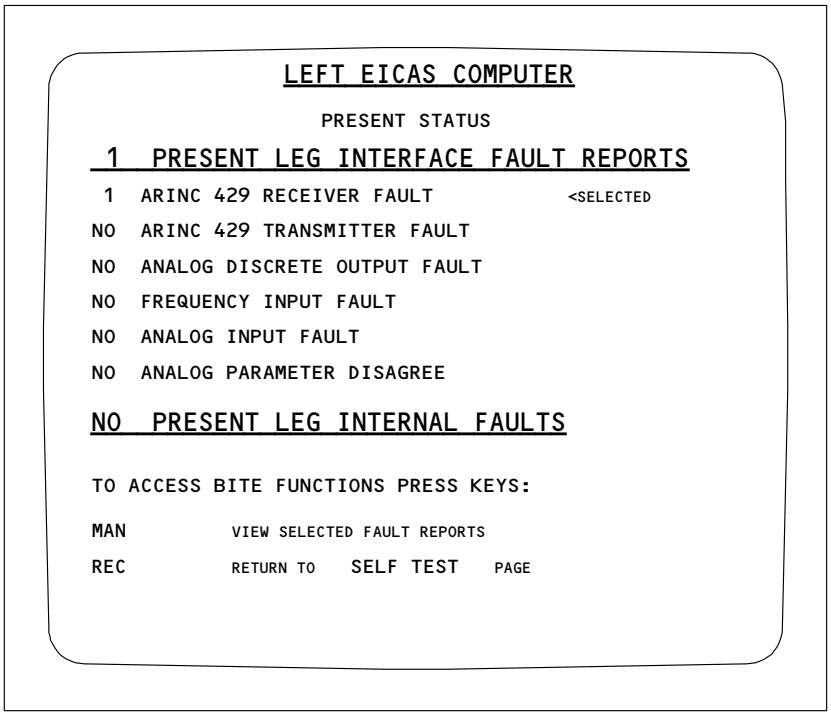
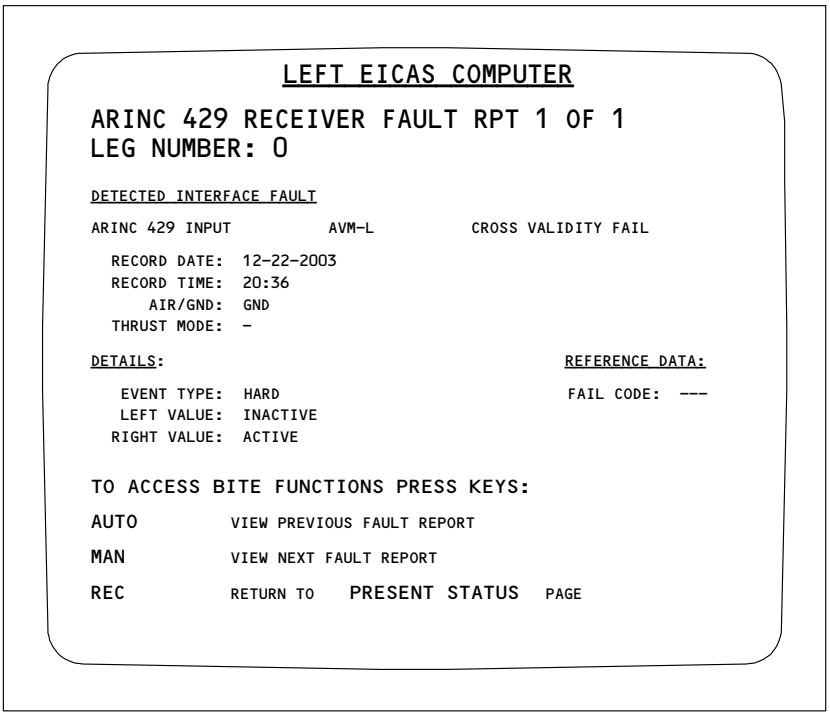


PRESENT STATUS
(SUMMARY PAGE)



PRESENT STATUS
(FAULT REPORT PAGE)

EICAS Test Format
Figure 501 (Sheet 2)

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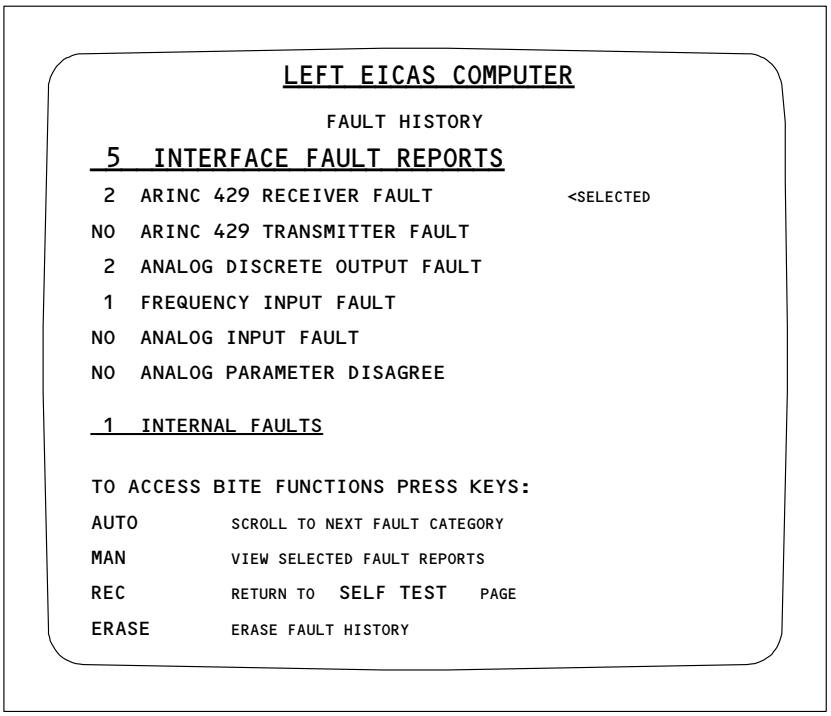
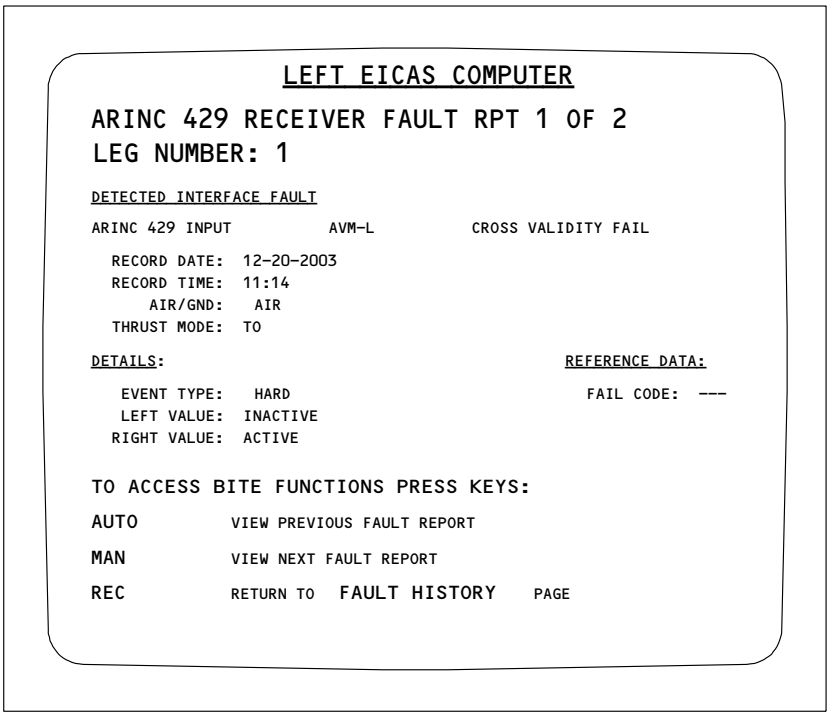


FAULT HISTORY
(SUMMARY PAGE)



FAULT HISTORY
(FAULT REPORT PAGE)

EICAS Test Format
Figure 501 (Sheet 3)

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(i) CMPTR FAIL and DU FAIL messages do not show.

(j) Red, green, and blue color blocks show on the two displays.

S 755-157

(8) Perform this configuration check:

NOTE: Make sure you know the correct software part number for the EICAS computer you will check. For the EICAS computer to be an approved installation, the correct software must be checked.

(a) Press the CONF/MCDP switch on the EICAS MAINT panel (P61).
1) Make sure the correct OPS software part number shows on the CONF/MCDP page.
2) Make sure the correct OPC software part number shows on the CONF/MCDP page.
3) If the correct software part number does not show, install the correct software (AMM 31-41-02/201).

S 715-168

(9) Make sure that the EICAS program pin codes that follow show for the left (right) computer as applicable:

(a) SAS 050-051,150-157,162-167,275-278,280-281;
5A20 (5221)

S 715-050

(10) Push the left master CAUTION switch/light after the TEST OK message shows.
(a) Make sure that both master CAUTION switch/lights go off.

S 715-014

(11) Set the COMPUTER switch on the DISPLAY select panel to the R position and do the step before to test the program pin codes for the right EICAS computer.

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S 715-015
(12) Make sure that the indications that follow show for the right EICAS computer:

(a) NO INTERFACE FAULTS shows and NO INTERNAL FAULTS shows.
(b) CMPTR FAIL and DU FAIL messages do not show.
(c) Red, green, and blue color blocks show on the two displays.

S 715-016
(13) Push and release the TEST switch on the EICAS MAINT panel two times to stop the test mode and start it again.
(a) Wait 10 seconds, make sure TEST OK or SELF TEST COMPLETE shows.

S 715-017
(14) Push the right master CAUTION switch/lights and make sure that both master CAUTION lights go off.

S 715-019
(15) Set the COMPUTER switch to L.
(a) Make sure that TEST OK or SELF TEST COMPLETE shows.

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S 715-021
(16) Push and release each of the switches listed in the table that follows.

S 715-022
(17) Make sure that the message related to each switch shown in the table shows on the TEST page:

PANEL	SWITCH	MESSAGE
DISPLAY SELECT PANEL	ENGINE STATUS EVENT RECORD MAX IND RESET	ENGINE STATUS RECORD MAX RESET
EICAS MAINT PANEL	ECS MSG ELEC HYD PERF APU CONF MCDP ENG EXCD AUTO READ MAN READ	ECS/MSG ELEC/HYD PERF/APU CONF/MCDP ENG/EXCD AUTO MAN
	ERASE EPCS	ERASE - PRESS ERASE TO CLEAR MEMORY EPCS

S 745-105
(18) Push and release the TEST switch.
(a) Make sure that the primary page shows on the top display and the secondary page shows on the bottom display.

S 865-183
(19) Close these P11 panel circuit breakers:
(a) 11FO2, WX RADAR, LEFT

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(b) 11F23, WX RADAR, RIGHT

D. EICAS Signal Consolidation Card Test

S 865-108

(1) Push and release the STATUS switch on EICAS DISPLAY select panel.
(a) Stop for 5 seconds.
(b) Make sure that the message EICAS SCC does not show on the bottom display.
(c) Make sure that the message EICAS SCC I/F does not show on the bottom display.

S 865-118

(2) Open this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 755-177

(3) Stop for 5 seconds.

S 755-119

(4) Make sure that the message EICAS SCC does not show on the bottom display.

S 755-120

(5) Make sure that the message EICAS SCC I/F does not show on the bottom display.

S 865-128

(6) Open this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 755-130

(7) Make sure that the message EICAS SCC I/F shows on the bottom display.

S 865-138

(8) Close this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 755-178

(9) Stop for 5 seconds.

S 755-139

(10) Make sure that the message EICAS SCC does not show on the bottom display.

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S 755-140
(11) Make sure that the message EICAS SCC I/F does not show on the bottom display.

S 865-148
(12) Close this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 865-071
(13) Remove electrical power if it is not necessary (AMM 24-22-00).

TASK 31-41-00-725-033

3. System Test - EICAS

A. General
(1) This task includes tests for brightness control, air/ground relay interfaces, EICAS connections, and maintenance panel operation.

B. Equipment
(1) Light source - commercially available

C. References
(1) 24-22-00/201, Electrical Power - Control

D. Access
(1) Location Zones

115/116	NLG Wheel Well
211/212	Flight Compartment

E. Prepare for the Test

S 845-034
(1) Supply electrical power (AMM 24-22-00).

S 845-035
(2) Make sure that these P11 panel circuit breakers are closed:
(a) 11B16, AURAL WARN SPKR L
(b) 11B18, WARN ELEX B
(c) 11E19, GR POS AIR/GND SYS 2 ALT
(d) 11H35, AURAL WARN SPKR R
(e) 11J2, EICAS CMPTR L
(f) 11J3, EICAS UPPER DSPL
(g) 11J29, EICAS CMPTR R
(h) 11J30, EICAS LOWER DSPL
(i) 11J32, EICAS DSPL SELECT
(j) 11J34, WARN ELEX A

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(k) 11U15, LANDING GEAR AIR/GND SYS 1
(l) 767-300 AIRPLANES;
11U23, LANDING GEAR POSITION AIR/GND SYS 2
(m) 767-200 AIRPLANES;
11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 845-036
(3) Make sure that the airplane parking brake is engaged.

F. EICAS Test

S 715-037
(1) Do the EICAS Operational Test.

S 725-038
(2) Air/Ground Connections Test

WARNING: FAILURE TO OPEN THE CIRCUIT BREAKER IN THE FOLLOWING STEP CAN RESULT IN PERSONAL INJURY, DEATH, FIRE, EXPLOSION, OR DAMAGE TO EQUIPMENT.

(a) Open these P11 panel circuit breakers:
1) 11F02, WX RADAR, LEFT
2) 11F23, WX RADAR, RIGHT

WARNING: MAKE SURE THE AIRPLANE IS ON LEVEL GROUND. PUT CHOCKS AROUND THE WHEELS BEFORE YOU RELEASE THE PARKING BRAKE. YOU CAN CAUSE INJURY OR EQUIPMENT DAMAGE IF YOU DO NOT PUT CHOCKS AROUND THE WHEELS.

(b) Put chocks around the wheels.
(c) Release the parking brake.
(d) Set the COMPUTER switch on the DISPLAY select panel to AUTO.
(e) Open this circuit breaker on the P11 panel:
1) 11J29, EICAS CMPTR RIGHT
(f) Push the TEST switch on the EICAS MAINT panel.
1) Make sure that there are no changes in the top or bottom displays.
(g) Engage the parking brake.
(h) AIRPLANES WITH THE ALTITUDE PRESSURE SWITCH;
Do the altitude pressure switch interconnect test as follows:
1) Disconnect wire, W768-053, at the P37 panel from ground.
2) Push the TEST switch on the EICAS MAINT panel.
a) Make sure there are no changes in the top or bottom displays.
3) Connect wire W768-053 to ground.
4) Open these circuit breakers on the P11 panel:
a) 11C30, LDG GR POSITION-AIR/GND SYS 1
b) 11U15, LANDING GEAR AIR/GND SYS 1
c) 11U23, LANDING GEAR POSITION AIR/GND SYS 2

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5) Push the STATUS switch on the EICAS DISPLAY select panel.
6) Push the TEST switch on the EICAS MAINT panel.
   a) Make sure there are no changes in the top or bottom displays.
7) Make sure the Maint Enable Bypass Switch, on the E8 rack, is in the NORM position.
8) Remove connector D20950 from the altitude pressure switch on the E8 rack.
9) Install a jumper between pins 1 and 2 of connector D20950.
10) Push the CONF/MCDP switch on the EICAS MAINT panel.
   a) Make sure the CONF/MCDP page shows.
11) Remove the jumper between pins 1 and 2 of connector D20950.
12) Connect connector D20950 to the altitude pressure switch.
13) Push the STATUS switch on the EICAS display select panel.
14) Set the Maint Enable Bypass Switch to the ENABLE position.
15) Push the CONF/MCDP switch on the EICAS MAINT panel.
   a) Make sure the CONF/MCDF page shows.
16) Set the MAINT Enable Bypass Switch to the NORM position.
17) Close these circuit breakers on the P11 panel:
   a) 11C30, LDG GR POSITION-AIR/GND SYS 1
   b) 11U15, LANDING GEAR-AIR/GND SYS 1
   c) 11U23, LANDING GEAR POSITION AIR/GND SYS 2

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(i) Do the deactivation procedure for the spoilers (AMM 27-61-00) or move all persons and equipment away from the spoilers.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(j) Do the Flight Mode Simulation procedure for the No. 1 air/ground system (AMM 32-09-02).
(k) Push the TEST switch on the EICAS MAINT panel.
   1) Make sure that the EICAS TEST page shows on the two displays.
   2) Make sure that both master CAUTION switch/lights show.
   3) Make sure that the message TEST IN PROGRESS shows for 5 seconds.
   4) Make sure that no CMPTR FAIL messages show.
   5) Make sure that all of the DISAGREE codes are zero.
   6) Make sure that the message TEST OK shows at the end of the test.
(l) Push and release the TEST switch to stop the test mode.

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WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECLTY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(m) Do the Flight Mode Simulation procedure for the No. 2 air/ground system (AMM 32-09-02).
(n) Open this circuit breaker on the P11 panel:
    1) 11J30, EICAS LOWER DSPL
(o) Push the STATUS switch on the DISPLAY select panel.
    1) Make sure that the STATUS page does not show on the top display.
(p) Put the No. 1 air/ground system back to the ground mode by deactivating switches S245 and S246 (AMM 32-09-02).
(q) Push the STATUS switch on the DISPLAY select panel.
    1) Make sure that the STATUS page shows on the top display.
(r) Push the TEST switch on the EICAS MAINT panel.
    1) Make sure that there are no changes in the top or bottom displays.
(s) Close this circuit breaker on the P11 panel:
    1) 11J30, EICAS LOWER DSPL
(t) Put the No. 2 air/ground system back to the ground mode by deactivating switches S267 and S268 (AMM 32-09-02).
(u) Push the TEST switch on the EICAS MAINT panel.
    1) Make sure that the two master CAUTION switch/lights show.
(v) Make sure that the TEST page shows on the two displays.
    1) Make sure that the test page and the message L EICAS TEST show on the two displays.
    2) Make sure that the message TEST IN PROGRESS shows for 5 seconds.
    3) Make sure that no CMPTR FAIL messages show.
    4) Make sure that all of the DISAGREE codes are zero.
    5) Make sure that the message TEST OK shows at the end of the test.
(w) Push and release the TEST switch to stop the test mode.
(x) Open this circuit breaker on the P11 panel:
    1) 11J2, EICAS CMPTR LEFT
(y) Close this circuit breaker on the P11 panel:
    1) 11J29, EICAS CMPTR RIGHT

WARNING: MAKE SURE THAT THE AIRPLANE IS ON LEVEL GROUND. PUT CHOCKS AROUND THE WHEELS BEFORE YOU RELEASE THE PARKING BRAKE. INJURY OR DAMAGE CAN OCCUR IF YOU DO NOT PUT CHOCKS AROUND THE WHEELS.

(z) Put chocks around the wheels.
(aa) Release the parking brake.
(ab) Push the TEST switch on the EICAS MAINT panel.
    1) Make sure that there are no changes in the top or bottom displays.
(ac) Engage the parking brake.

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WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECLTY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(ad) Do the Flight Mode Simulation procedure for the No. 1 air/ground system (AMM 32-09-02).
(ae) Push the TEST switch on the EICAS MAINT panel.
1) Make sure that the two master CAUTION switch/lights come on.
2) Make sure that the test page and message R EICAS TEST show on the two display units.
3) Make sure that the message TEST IN PROGRESS shows for 5 seconds.
4) Make sure that no CMPTR FAIL messages show.
5) Make sure that all of the DISAGREE codes are zero.
6) Make sure that the message TEST OK shows at the end of the test.
(af) Push and release the TEST switch to stop the test mode.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(ag) Do the Flight Mode Simulation procedure for the No. 2 air/ground system (AMM 32-09-02).
(ah) Open this circuit breaker on the P11 panel and attach a DO-NOT-CLOSE tag:
1) 11J30, EICAS LOWER DISPLAY
(ai) Push the STATUS switch on the DISPLAY select panel.
1) Make sure that the STATUS page does not show on the top display.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(aj) Put the No. 1 air/ground system back to the ground mode by deactivating switches S245 and S246 (AMM 32-09-02).
(ak) Push the STATUS switch on the DISPLAY select panel.
1) Make sure that the STATUS page shows on the top display.
(al) Push the TEST switch on the EICAS MAINT panel.
1) Make sure that the TEST page does not show on the top display.

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(am) Close this circuit breaker on the P11 panel:
1) 11J30, EICAS LOWER DISPLAY
(an) Put the No. 2 air/ground system back to the ground mode by deactivating switches S267 and S268 (AMM 32-09-02).
(ao) Do the activation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00).
(ap) Push the TEST switch on the EICAS MAINT panel.
1) Make sure that the two master CAUTION switch/lights come on.
2) Make sure the test page shows the two display units and R EICAS TEST shows at the top of the right side of the displays.
3) Make sure the message list shows TEST IN PROGRESS for approximately 5 seconds.
4) Make sure the TEST OK message shows at the end of test.
5) Make sure that no CMPTR FAIL messages show.
6) Make sure that all of the DISAGREE codes are zero.
(aq) Push and release the TEST switch to stop the test mode.
(ar) Remove the DO-NOT-CLOSE tag and close this P11 panel circuit breaker:
1) 11J2, EICAS CMPTR L
(as) Close these P11 panel circuit breakers:
1) 11F02, WX RADAR, LEFT
2) 11F23, WX RADAR, RIGHT

S 725-039
(3) Light Intensity Control Test
(a) Make sure that this P11 panel circuit breaker is closed:
1) 11E6, HSI LEFT
(b) Push the OVRD switch on the left overhead lighting control module to the OFF position.
(c) Turn the IND LTS switch on the right overhead lighting control module to the BRT position.
(d) Turn the BRT control on the DISPLAY select panel to a position half of the distance between the minimum and the maximum light intensity positions.
(e) Put black tape on the left EFIS remote light sensor on panel P7.
1) Make sure that the light intensity of the two display units decreases.
(f) Remove the tape from the left EFIS sensor.
(g) Turn the IND LTS switch to the DIM position.
1) Make sure that there is no change in the light intensity of the displays.
(h) Put black tape on the left EFIS remote light sensor and on the top EICAS display unit light sensor.

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(i) Flash a light source at the bottom display unit light sensor once.
1) Make sure that the light intensity of the display units increases as you flash the light into the sensor.
(j) Remove the cover from the top display unit light sensor.
(k) Put black tape on the bottom display unit light sensor.
(l) Flash a light source at the top display unit light sensor once.
1) Make sure that the light intensity of the display units increases as you flash the light into the sensor.
(m) Remove the cover from the bottom display unit light sensor and the left EFIS remote light sensor.
(n) Change the brightness control on the DISPLAY select panel.
(o) Make sure that the light intensity of the displays change as follows:
1) Turn the outer BRT control in a clockwise direction.

NOTE: During usual operation, the inner and outer BRT controls are connected together and rotate together.

a) Make sure that the light intensity of the bottom display increases.
2) Turn the inner BRT control in a clockwise direction.
a) Make sure that the light intensity of the top display increases.
(p) Push the OVRD switch on the left overhead lighting control module to the ON position.
(q) Adjust the BRT control to the necessary position.

S 725-041
(4) EICAS Interconnection Test
(a) Make sure that the P11 panel circuit breaker that follows is closed:
1) 11D28, ENGINE STBY IND

CAUTION: OPEN THE LEFT AND RIGHT ENGINE FIRE EXTINGUISHING BOTTLE CIRCUIT BREAKERS. THE FIRE EXTINGUISHING BOTTLES WILL OPERATE ACCIDENTALLY IF THESE CIRCUIT BREAKERS ARE CLOSED.

(b) Open these circuit breakers on the main power distribution panel, P6, and install DO-NOT-CLOSE tags:
1) 6H1, FIRE EXTINGUISHING ENG L BTL 1
2) 6H2, FIRE EXTINGUISHING ENG L BTL 2
3) 6H3, FIRE EXTINGUISHING ENG R BTL 1
4) 6H4, FIRE EXTINGUISHING ENG R BTL 2

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(c) Make sure that the ENG START switches on panel P5 are in the OFF position.
(d) Install DO-NOT-OPERATE tags on the ENG START switches.
(e) Make sure the four (4) L/R PUMPS PRESS switches and the two (2) C PUMPS PRESS switches on panel P5 are in the OFF position.
(f) Make sure that these circuit breakers on the P6 panel are closed:
    1) 6E1, FUEL VALVES L SPAR
    2) 6E2, FUEL VALVES R SPAR
(g) Make sure that these circuit breakers on the P11 panel are closed:
    1) 11D25, ENGINE FUEL CONTROL VALVE L
    2) 11D26, ENGINE FUEL CONTROL VALVE R
(h) Make sure that the left and right fuel control switches on control stand, P10, are in the CUTOFF position.
(i) Make sure that the left and right ENG VALVE and SPAR VALVE lights do not show.
(j) Open these P11 panel circuit breakers:
    1) 11J29, EICAS CMPTR R
    2) 11J31, EICAS DSPL SW
(k) Turn the switch on the Standby Engine Indicator to the AUTO position.
(l) Set the COMPUTER switch on the DISPLAY select panel to the L position.
(m) Make sure that the top display shows the primary engine page and the bottom display shows the secondary engine page.
(n) Make sure that the message L ENG SHUTDOWN and R ENG SHUTDOWN show on the top display.
(o) Set the L FUEL CONTROL switch on the control stand to the RUN position.
    1) Make sure that the message L ENG SHUTDOWN does not show on the top display.
(p) Push the L manual override switch under the L FIRE HANDLE on the control stand, panel P10.
(q) Pull, but do not rotate, the left engine fire handle.
(r) Install a DO-NOT-OPERATE tag on the left engine fire handle.
    1) Make sure that the message L ENG SHUTDOWN shows on the top display.
(s) Set the right engine fuel control switch to the RUN position.
    1) Make sure that the message R ENG SHUTDOWN does not show on the top display.
(t) Push the R manual override switch under the R FIRE HANDLE on the control stand, panel P10.

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(u) Pull, but do not rotate, the right engine fire handle.
(v) Install a DO-NOT-OPERATE tag on the right engine fire handle.
    1) Make sure that the message R ENG SHUTDOWN shows on the top display.
(w) Push the STATUS switch on the DISPLAY select panel.
    1) Make sure that the STATUS page and the message R EICAS CMPTR shows on bottom display.

        NOTE: If there are more than 11 STATUS messages, R EICAS CMPTR may show on PAGE 2 of the STATUS pages.

(x) Close this circuit breaker on the P11 panel:
    1) 11J31, EICAS DISPLAY SW
(y) Make sure that there are no changes in the top or bottom displays.
(z) Set the COMPUTER switch on the DISPLAY select panel to AUTO.
    1) Make sure that there are no changes in the top or bottom displays.
(aa) Set the COMPUTER switch to the R position.
    1) Make sure that both displays go out of view.
(ab) Set the COMPUTER switch to the AUTO position.
(ac) Close this circuit breaker on the P11 panel:
    1) 11J29, EICAS CMPTR RIGHT
(ad) Make sure that the message R EICAS CMPTR does not show on the bottom display.
(ae) Set the COMPUTER switch to the R position.
    1) Make sure that there are no changes in the top or bottom displays.
(af) Open this circuit breaker on the P11 panel:
    1) 11J2, EICAS CMPTR LEFT
(ag) Make sure that the message L EICAS CMPTR shows on the bottom display.
(ah) Make sure that the message L ENG SHUTDOWN and R ENG SHUTDOWN show on the top display.
(ai) Remove the left engine fire handle DO-NOT-OPERATE tag.
(aj) Push the left engine fire handle.
    1) Make sure that the message L ENG SHUTDOWN does not show on the top display.
(ak) Set the left engine fuel control switch to the CUTOFF position.
    1) Make sure that the message L ENG SHUTDOWN shows on the top display.
(al) Remove the right engine fire handle DO-NOT-OPERATE tag.

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(am) Push the right engine fire handle.
  1) Make sure that the message R ENG SHUTDOWN does not show on the top display.
(an) Set the right engine fuel control switch to the CUTOFF position.
  1) Make sure that the message R ENG SHUTDOWN shows on the top display.
(ao) Set the COMPUTER switch to the AUTO position.
  1) Make sure that there are no changes in the top or bottom displays.
(ap) Set the COMPUTER SWITCH to the R position.
(aq) Close this circuit breaker on the P11 panel:
  1) 11J2, EICAS CMPTR LEFT
(ar) Make sure that the message L EICAS CMPTR does not show on the bottom display.
(as) Push the ENGINE switch on the DISPLAY select panel.
(at) Make sure that the SECONDARY page shows on the bottom display.
(au) Open this circuit breaker on the P11 panel:
  1) 11J3, EICAS UPPER DISPLAY
(av) Make sure that the COMPACTED page shows on the bottom display and the top display shows no data.
(aw) Set the COMPUTER switch to the L position.
  1) Make sure that there are no changes in the top or bottom displays.
(ax) Close this circuit breaker on the P11 panel:
  1) 11J3, EICAS UPPER DISPLAY
(ay) Open this circuit breaker on the P11 panel:
  1) 11J30, EICAS LOWER DISPLAY
(az) Make sure that the COMPACTED page shows on the top display and the bottom display shows no data.
(ba) Set the COMPUTER switch to the R position.
  1) Make sure that there are no changes in the top or bottom displays.
(bb) Open this circuit breaker on the P11 panel:
  1) 11J3, EICAS UPPER DISPLAY
(bc) Make sure that both display units show no data.
(bd) Make sure that the Standby Engine Indicator (SEI) operates.
(be) Close these circuit breakers on the P11 panel:
  1) 11J3, EICAS UPPER DISPLAY
  2) 11J30, EICAS LOWER DISPLAY
(bf) Make sure that the two displays go back to usual operation.
(bg) Make sure that the SEI does not operate.

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(bh) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
1) 6H1, FIRE EXTINGUISHING ENG L BTL 1
2) 6H2, FIRE EXTINGUISHING ENG L BTL 2
3) 6H3, FIRE EXTINGUISHING ENG R BTL 1
4) 6H4, FIRE EXTINGUISHING ENG R BTL 2

S 725-042

(5) Maintenance Panel Test
(a) Push the ECS MSG switch on the EICAS MAINT panel.
1) Make sure that the ECS/MSG page shows on the bottom display.
(b) Push the PERF APU switch.
1) Make sure that the PERF/APU page shows on the bottom display.
(c) Push the AUTO-READ switch on the EICAS MAINT panel.
1) Make sure that AUTO EVENT shows on the bottom of the PERF/APU page.
(d) Push the MAN-READ switch.
1) Make sure that MAN EVENT shows at the bottom of the PERF/APU page.
(e) Push the ENG EXCD switch.
1) Make sure that the ENG/EXCD page shows.
(f) Push the CONF/MCDP switch.
1) Make sure that the CONF/MCDP page shows.
(g) Push the EPCS switch.
1) Make sure that the EPCS page shows.
(h) Push the ELEC HYD switch.
1) Make sure that the ELEC/HYD page shows.
(i) Push the REC switch on the EICAS MAINT panel.
(j) Push the MAN-READ switch.
1) Make sure that the ELEC/HYD data still shows.
(k) Push and hold the ERASE switch for 3 seconds.
1) Make sure that no numerical data shows on the bottom display.
(l) Turn the COMPUTER switch to the L position.
(m) Push the CONF/MCDP switch.
1) Make sure that the data that follows shows on the bottom display.
a) The CONF/MCDP page.
b) The correct EICAS part number as follows: PART NO S242N701-XXX.
c) The ARINC 429 input bus activity: EICAS ON.

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(n) Turn the COMPUTER switch to the R position.
1) Make sure that the CONF/MCDP page shows.
2) Push the CONF/MCDP switch again,
Make sure that the input bus still shows EICAS ON.
(o) Turn the COMPUTER switch to AUTO.
(p) Push the ENG EXCD switch.
1) Make sure that the ENG EXCD page shows on the bottom display.
(q) Push the CAUTION RCL switch on the P1 panel.
1) Make sure that the message RECALL shows for 1 second below the WARNING and CAUTION messages.
(r) Push the CAUTION CANC switch on the P1 panel.
1) Make sure that all of the yellow messages that were shown before do not show.

NOTE: Any overflow messages on PAGE 2 or subsequent pages will replace the PAGE 1 messages after you ERASE them.

S 725-044
(6) Digital Data Bus Inputs Test
(a) Set the two flight director (F/D) switches on the mode control panel to the OFF position.
(b) Check that these P11 panel circuit breakers are closed:
1) 11A10, AIR DATA CMPTR L
2) 11E9, FMCS CMPTR LEFT
3) 11F5, RAD ALTM LEFT
(c) Open these P11 panel circuit breakers and attach DO-NOT-CLOSE tags:
1) 11E30, FMCS CMPTR RIGHT
2) 11F26, RAD ALTM RIGHT
3) 11F30, AIR DATA CMPTR RIGHT
(d) Set the COMPUTER switch on the DISPLAY select panel to the L position.

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(e) Push the CONF MCDP switch on the EICAS MAINT panel.
  1) Make sure that the CONF/MCDP page shows on the bottom display.
  2) Push the CONF/MCDP switch again.
  3) Make sure that the data that follows shows on the CONF/MCDP page:
    a) EICAS: ON
    b) ADC: ON or NCD or TEST or FAIL
    c) RA: ON or NCD or TEST or FAIL
    d) FMC: ON or NCD or TEST or FAIL
    e) All other digital data sources: ON or NCD or TEST or FAIL or OFF

(f) Set the COMPUTER switch to on the DISPLAY select panel to the R position.
  1) Make sure that the data that follows shows on the CONF/MCDP page:
    a) EICAS: ON
    b) ADC: OFF
    c) RA: OFF
    d) FMC: OFF
    e) All other digital data sources: ON or NCD or TEST or FAIL or OFF

(g) Close these P11 panel circuit breakers:
  1) 11E30, FMCS CMPTR RIGHT
  2) 11F26, RADIO ALTM RIGHT
  3) 11F30, AIR DATA CMPTR RIGHT

(h) Open these circuit breakers on the P11 panel:
  1) 11A10, AIR DATA CMPTR LEFT
  2) 11E9, FMCS CMPTR LEFT
  3) 11F5, RADIO ALTM LEFT

(i) Make sure that the data that follows shows on the CONF/MCDP page:
  1) EICAS ON
  2) ADC: ON or NCD or TEST
  3) RA: ON or NCD or TEST
  4) FMC: ON or NCD or TEST

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(j) Set the COMPUTER switch on the DISPLAY select panel to the L position.
1) Make sure that the data that follows shows on the CONF/MCDP page:
a) EICAS: ON
b) ADC: OFF
c) RA: OFF
d) FMC: OFF

S 845-045
(7) Put the Airplane Back to Its Usual Condition
(a) Close these circuit breakers on the P11 panel:
1) 11A10, AIR DATA CMPTR LEFT
2) 11E9, FMCS CMPTR LEFT
3) 11F5, RADIO ALTM LEFT
(b) Remove electrical power if it is not necessary (AMM 24-22-00).

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EICAS DISPLAY UNITS - REMOVAL/INSTALLATION

1. General
   A. Two EICAS display units (N10013 - top, N10014 - bottom) are installed in pilot's center instrument panel, P2. Each unit has a handle that turns out from the unit for removal. All electrical connectors are located at the rear of the unit. The EICAS display units are the same as the EHSI display units. All of these units are interchangeable.
   B. This procedure has two tasks. One is for the EICAS display unit removal, the other is for the EICAS display unit installation.

TASK 31-41-01-004-001

2. Remove the EICAS Display Unit (Fig. 401)
   A. References
      (1) 20-41-01/201, Electrostatic Discharge Sensitive Devices
      (2) 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          211/212 Flight Compartment

   C. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11J3, EICAS UPPER DSPL
          (b) 11J30, EICAS LOWER DSPL

      S 034-003

      CAUTION: DO NOT MOVE THE EICAS DISPLAY UNITS BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE EICAS DISPLAY UNITS.

      (2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01).

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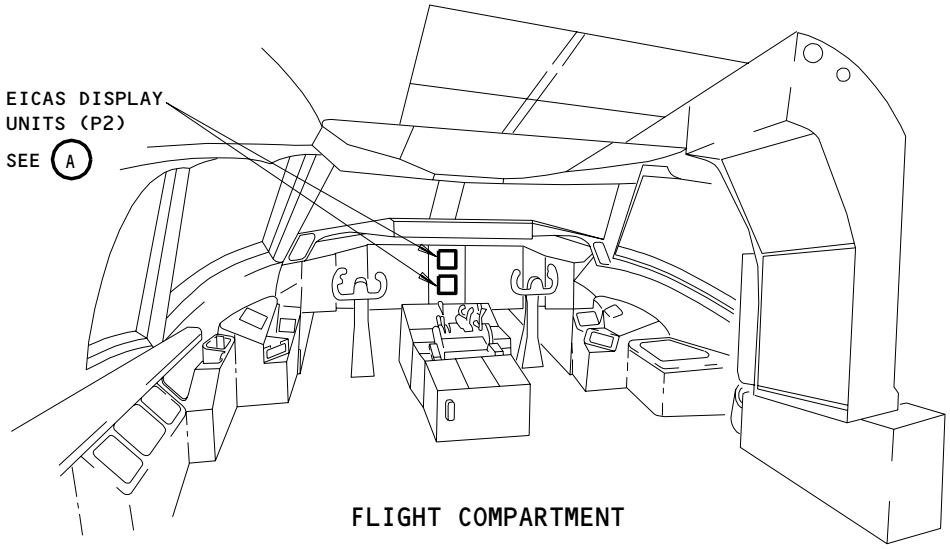
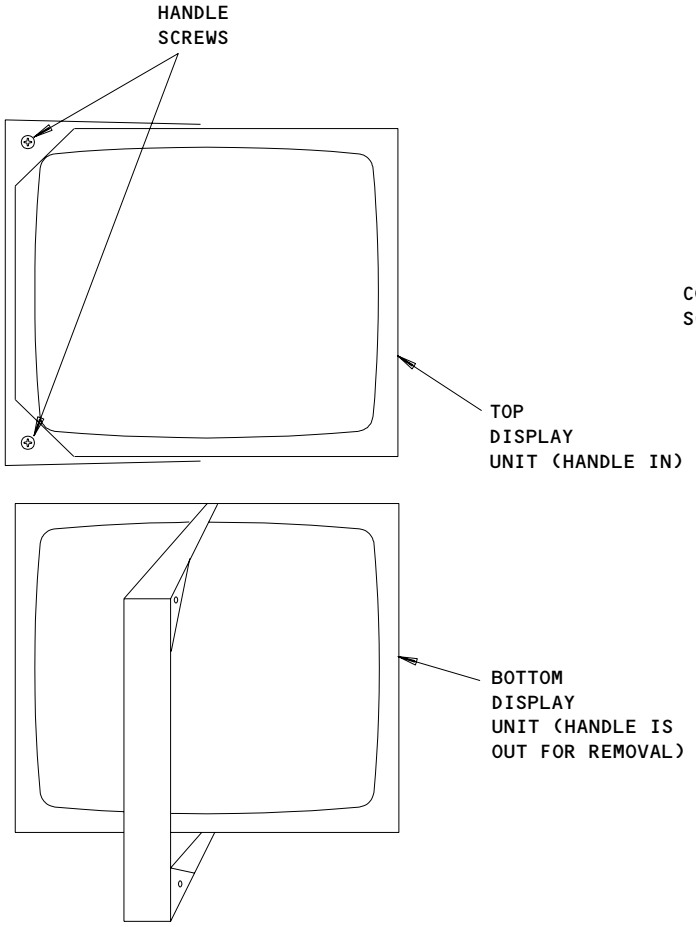
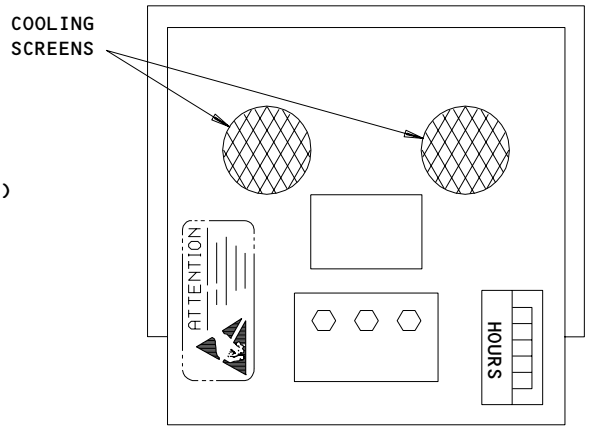


FLIGHT COMPARTMENT



EICAS DISPLAY UNIT

(A)



EICAS DISPLAY UNIT
(REAR VIEW)

EICAS Display Units
Figure 401

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S 024-003

CAUTION: DO NOT PULL THE CRT HANDLE. THE HANDLE TURNS OUT AUTOMATICALLY WHEN THE SPRING IS RELEASED. HOLD THE HANDLE UNTIL IT IS COMPLETELY RELEASED FROM THE SCREWS. YOU CAN CAUSE DAMAGE TO THE HANDLE IF YOU TURN IT OUT BEFORE IT IS RELEASED FROM THE SCREWS.

(3) Hold the handle in the flat position against the unit.

S 024-004

(4) Loosen the handle screws at the top left and bottom left corners of the display unit.

NOTE: Do not completely remove the handle screws.

S 024-005

(5) Pull the handle out and to the right.

NOTE: If the handle is not fully extended when you remove the CRT, springs installed in the instrument panel can come out.

S 024-006

(6) Carefully pull the display unit from the center instrument panel, P2.

TASK 31-41-01-404-002

3. Install the EICAS Display Unit (Fig. 401)

A. References

(1) 20-41-01/201, Electrostatic Discharge Sensitive Devices
(2) 24-22-00/201, Electrical Power - Control
(3) 34-22-00/201, Cathode Ray Tube (CRT)

B. Access

(1) Location Zones
211/212 Flight Compartment

C. Procedure

S 864-008

(1) Make sure that these P11 panel circuit breakers are open:
(a) 11J3, EICAS UPPER DSPL

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(b) 11J30, EICAS LOWER DSPL

S 434-009

CAUTION: DO NOT MOVE THE EICAS DISPLAY UNITS BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE EICAS DISPLAY UNITS.

(2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01).

S 164-010

(3) Clean the cooling air inlet screen at the rear of the display unit as necessary (Fig. 401).

S 424-011

(4) Make sure that the handle is in the fully extended position.

S 424-012

(5) Carefully move the display unit into the correct position.

S 434-013

CAUTION: HOLD THE CRT HANDLE IN THE FLAT POSITION AGAINST THE UNIT WHILE YOU TURN THE SCREWS IN. YOU CAN CAUSE DAMAGE TO THE HANDLE IF YOU DO NOT HOLD IT UNTIL THE SCREWS ARE TIGHT.

(6) Turn and hold the CRT handle to the left and into the flat position.

S 434-014

CAUTION: DO NOT TIGHTEN THE SCREWS TOO MUCH. TOO MUCH PRESSURE CAN DAMAGE THE THREADS.

(7) Tighten the CRT handle screws.

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S 844-015
(8) Remove the DO-NOT-CLOSE tags an close these circuit breakers on the P11 panel:
(a) 11J3, EICAS UPPER DSPL
(b) 11J30, EICAS LOWER DSPL

D. Display Unit Test

S 864-016
(1) Make sure the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 714-018
(2) Supply electrical power (AMM 24-22-00).

S 844-020
(3) Make sure that the airplane parking brake is engaged.

S 714-021
(4) Push and release the TEST switch on the EICAS MAINT panel.

S 714-023
(5) Make sure that the TEST page shows on the display units.

S 714-024
(6) After TEST IN PROGRESS message goes out of view, make sure that the UPPER DU FAIL and the LOWER DU FAIL messages do not show.

S 714-026
(7) Push and release the TEST switch to go out of the TEST page.

E. Put the Airplane Back to Its Usual Condition

S 844-027
(1) Push and release the left master CAUTION switch/light.

S 114-028
(2) Clean the CRT face (AMM 34-22-00).

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S 864-029

(3) Remove the electrical power if it is not necessary (AMM 24-22-00).

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EICAS COMPUTER - MAINTENANCE PRACTICES

1. General
   A. This procedure has these tasks:
      (1) How to install software in an EICAS computer with the Airborne Data Loader (ADL) in the flight compartment.
      (2) How to install software in the EICAS computer with the Portable Data Loader (PDL) through the connector on the front of the EICAS computer.
   B. To install software in the EICAS computer in the flight compartment, these requirements must be met:
      (1) There is a data loader control panel on the P61 panel.
      (2) There are EICAS switch positions on the data loader control panel.
   C. If you cannot install the software from the flight compartment, then you can install the software through the connector at the front of the EICAS computer.
   D. You will possibly install the OPC. The OPS is the core software and will possibly not change.
   E. You can load the one EICAS computer using the disks and the other EICAS computer via cross-loading. You can cross-load the OPC. The OPS cannot be cross-loaded.

TASK 31-41-02-422-002

2. Load EICAS Software with Airborne Data Loader
   A. General
      (1) This procedure tells you how to install software in the EICAS computer.
         (a) The EICAS computer must contain these pieces of software:
            1) operational program software (OPS)
            2) operational program configuration (OPC)
      (2) There is no required order in loading the OPS and OPC software. The loading of one does not affect the loading of the other.
      (3) You must install the same OPS(OPC) part numbers in the two EICAS computers. "EICAS SOFTWARE" will show if you install different OPS(OPC) part numbers.
      (4) An airborne data loader (ADL) and a data loader control panel with an EICAS switch position are necessary for this procedure (P61).
      (5) These conditions must exist before you install software,
         (a) the airplane is on the ground,
         (b) the engines are off and
         (c) the parking brake is set.
      (6) To read about software installation times and data loaders, do this task: On-Airplane Software Installation (AMM 20-15-11/201).
      (7) Some airlines keep the circuit breaker for the data loader open when the data loader is not necessary. This increases the length of time that the data loader is serviceable.
   B. Equipment
      (1) The most up to date disk(s) for the EICAS computer.

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C. References
(1) AMM 20-15-11/201, On-Airplane Software Installation
(2) AMM 24-22-00/201, Electrical Power - Control

D. Access
(1) Location Zone
212 Flight Compartment

E. Procedure

S 862-003
(1) Supply electrical power (AMM 24-22-00/201).

S 862-014
(2) Make sure this circuit breaker is closed before you start the procedure:
(a) On the P11 Panel
1) 11G24, DATA LOADER

S 472-015
(3) Use an airborne data loader (ADL) to install software in the EICAS computer.

NOTE: Make sure you know the correct software part number for the EICAS computer you are loading. For the EICAS computer to be an approved installation, the correct software must be loaded.

S 862-011
(4) Make sure these conditions exist before loading software:
(a) The airplane is on the ground,
(b) The engines are off and
(c) The parking brake is set.

S 862-004
(5) Do these steps to install the software:

NOTE: There is no required order in loading the OPS and OPC software. The loading of one does not affect the loading of the other.

NOTE: You must install the same OPS(OPC) part numbers in the two EICAS computers. "EICAS SOFTWARE" will show if you install different OPS(OPC) part numbers.

(a) Make sure the system select switch on the data loader control panel is set to NORMAL.
(b) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
1) 11J2, EICAS CMPTR LEFT
2) 11J3, EICAS UPPER IND

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3) 11J29, EICAS CMPTR RIGHT
4) 11J30, EICAS LOWER IND
5) 11J31, EICAS DSPL SW
6) 11J32, EICAS PILOT DSPL

(c) Open the data loader disk cover to access the disk drive.

(d) Close these circuit breakers on the overhead circuit breaker panel, P11, and remove the DO-NOT-CLOSE tags:
1) 11J3, EICAS UPPER IND
2) 11J30, EICAS LOWER IND
3) 11J31, EICAS DSPL SW
4) 11J32, EICAS PILOT DSPL

(e) If you are loading the left EICAS computer, close this circuit breaker on the overhead circuit breaker panel, P11, and remove the DO-NOT-CLOSE tag:

NOTE: The circuit breaker for the EICAS computer you are not loading must be open while you are installing software.

1) 11J2, EICAS CMPTR LEFT

(f) If you are loading the right EICAS computer, close this circuit breaker on the overhead circuit breaker panel, P11, and remove the DO-NOT-CLOSE tag:

NOTE: The circuit breaker for the EICAS computer you are not loading must be open while you are installing software.

1) 11J29, EICAS CMPTR RIGHT

(g) AIRPLANES WITH ONE SWITCH ON THE DATA LOADER CONTROL PANEL; Set the system select switch on the data loader control panel to the L (R) EICAS position.

(h) AIRPLANES WITH TWO SWITCHES ON THE DATA LOADER CONTROL PANEL; Do these steps at the data loader control panel:
1) Set the upper switch to the L (R) position.
2) Set the system select switch to EICAS.

(i) Do these steps at the ADL to install the software:
1) Put the correct disk in the disk drive.

NOTE: It may take 1 to 2 minutes for loading to begin.

2) Follow the prompts on the data loader to complete the installation.

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3) Remove the disk from the disk drive when the software installation is completed.

NOTE: COMP, LOAD COMPLETE and TRANSF COMPLETE are examples of data loader prompts for a completed installation.

(j) Set the system select switch on the data loader control panel to NORMAL.
(k) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker on the P11 panel:
1) 11J2, EICAS CMPTR LEFT
2) 11J29, EICAS CMPTR RIGHT
(l) Do these steps to do a software configuration check for the EICAS computer:
1) Press the CONF/MCDP switch on the EICAS MAINT panel.
2) Make sure the correct OPS software part number shows on the CONF/MCDP page.
3) Make sure the correct OPC software part number shows on the CONF/MCDP page.
(m) If necessary, you can load the right (left) EICAS computer via cross-loading.
1) Make sure these conditions exist before cross-loading,
a) The airplane is on the ground,
b) The engines are off and
c) The parking brake is set.
2) Press the CONF/MCDP switch until you get to the cross-loading page.
3) Press and hold the ECS/MSG, ELEC/HYD and PERF/APU switches for 3 seconds.
4) Follow the instructions to perform the cross-load.
(n) If necessary, repeat the procedure for the right (left) EICAS computer.
(o) If you installed the OPS, push each of the display select switches on the EICAS Maintenance Panel to examine the maintenance pages.

NOTE: The display select switches are ECS/MSG, ELEC/HYD etc.

1) If incorrect displays are shown, push the ERASE switch on the EICAS Maintenance Panel to erase the NVM.

NOTE: Incorrect displays can occur on the maintenance pages after you install the OPS. You remove the incorrect displays when you erase the NVM.

S 862-013
(6) Put the Airplane Back to Its Usual Condition
(a) Return the airplane into a serviceable condition.

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TASK 31-41-02-402-006

3. Portable Data Loader Through The Front Of The EICAS-Software Installation

A. General

(1) This procedure tells you how to install software in the EICAS computer through the connector on the front of the EICAS.

(a) The EICAS computer must contain these pieces of software:

1) operational program software (OPS)

2) operational program configuration (OPC)

(2) There is no required order in loading the OPS and OPC software. The loading of one does not affect the loading of the other.

(3) You must install the same OPS(OPC) part numbers in the two EICAS computers. "EICAS SOFTWARE" will show if you install different OPS(OPC) part numbers.

(4) A portable data loader (PDL) is necessary for this procedure.

(5) A PDL is not a Boeing supplied part. Refer to the PDL supplier for instructions for operation. PDLs have a disk drive for software installation from disks. Some PDLs have an internal mass storage device. If the software is stored in the PDL, then disks are not necessary.

(6) These conditions must exist before you install software,

(a) the airplane is on the ground,

(b) the engines are off and

(c) the parking brake is set.

(7) To read about software installation times and data loaders, do this task: On-Airplane Software Installation (AMM 20-15-11/201).

B. Equipment

(1) The most up to date disk(s) for the EICAS computer, if applicable.

(2) Data Loader (or alternative tool)

(a) 11615-02 Loader - Data, Portable, ARINC 615-3 (alternative)
Qualtair Equipment and Engineering (Vendor Code 1HEC2)
15720 Mill Creek Boulevard, Suite 200, Mill Creek, WA 98012

(b) 11615-20 Loader - Data, Portable, ARINC 615-3, Includes Mass Storage Device (alternative)
Qualtair Equipment and Engineering (Vendor Code 1HEC2)
15720 Mill Creek Boulevard, Suite 200, Mill Creek, WA 98012

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(c) 18000-02 Loader - Data, Portable, ARINC 615/A with Mass Storage Device (alternative)
Qualtair Equipment and Engineering (Vendor Code 1HEC2)
15720 Mill Creek Boulevard, Suite 200, Mill Creek, WA 98012

(d) 2231560-1-B Loader - Data, Portable, ARINC 615, with Two 3.5 Inch Disk Drives (alternative)
Teledyne Controls (Vendor Code 98571)
12333 W. Olympic Blvd., Los Angeles, CA 90064-1021

(e) 30100 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Demo Systems, Inc. (Vendor Code OBAW0)
379 Science Dr., MoorPark, CA 93021

(f) 465130-01-01 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Litton Systems, Inc. (Vendor Code 30782)
6101 Condor Drive, Moorpark, CA 93021-2602

(g) 80000-03-01010203 Loader - Data, Portable, ARINC 615/A with Mass Storage Device (alternative)
Demo Systems, Inc. (Vendor Code OBAW0)
379 Science Dr., MoorPark, CA 93021

(h) 964-0400-024 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Honeywell, Inc. (Vendor Code 97896)
15001 N.E. 36th St., P.O. Box 97001, Redmond WA 98073-9701

(i) 964-0400-025 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Honeywell, Inc. (Vendor Code 97896)
15001 N.E. 36th St., P.O. Box 97001, Redmond WA 98073-9701

(j) 964-0400-055 Loader - Data, Portable, ARINC 615, 3.5 Inch Diskette (alternative)
Honeywell, Inc. (Vendor Code 97896)
15001 N.E. 36th St., P.O. Box 97001, Redmond WA 98073-9701

(k) YV68A110 Loader - Data, Portable, ARINC 615 (alternative)
SFIM (Vendor Code F6158)
SA 13 AV Marcel Ramofo Garmier, Massy, 91301 France

C. References

(1) AMM 20-15-11/201, On-Airplane Software Installation

(2) AMM 24-22-00/201, Electrical Power - Control

D. Access

(1) Location Zone

119/120 Main Equipment Center
211/212 Flight Compartment

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E. Procedure

S 862-009
(1) Set the airplane parking brake.

S 862-007
(2) Supply electrical power (AMM 24-22-00/201).

S 472-016
(3) Use a portable data loader (PDL) to install software in the EICAS computer.

NOTE: Make sure you know the correct software part number for the EICAS computer you are loading. For the EICAS computer to be an approved installation, the correct software must be loaded.

S 862-010
(4) Make sure these conditions exist before loading software:
(a) The airplane is on the ground,
(b) The engines are off and
(c) The parking brake is set.

S 472-008
(5) Prepare the software data loader:

NOTE: There is no required order in loading the OPS and OPC software. The loading of one does not affect the loading of the other.

NOTE: You must install the same OPS(OPC) part numbers in the two EICAS computers. "EICAS SOFTWARE" will show if you install different OPS(OPC) part numbers.

CAUTION: MAKE SURE THE CIRCUIT BREAKER FOR THE DATA LOADER IS OPEN BEFORE YOU CONNECT OR REMOVE THE INTERFACE CABLE FOR THE PORTABLE DATA LOADER. IF THE CIRCUIT BREAKER IS NOT OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
1) 11J2, EICAS CMPTR LEFT
2) 11J3, EICAS UPPER IND
3) 11J29, EICAS CMPTR RIGHT
4) 11J30, EICAS LOWER IND
5) 11J31, EICAS DSPL SW
6) 11J32, EICAS PILOT DSPL
(b) Connect the PDL interface cable to the ARINC 615 connector on the front of the left (right) EICAS computer.

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(c) Close these circuit breakers on the overhead circuit breaker panel, P11, and remove the DO-NOT-CLOSE tags:
1) 11J3, EICAS UPPER IND
2) 11J30, EICAS LOWER IND
3) 11J31, EICAS DSPL SW
4) 11J32, EICAS PILOT DSPL

(d) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
1) 11S15, LDG GEAR AIR/GND SYS1
2) 11S19, LDG GEAR AIR/GND SYS2
3) 11C30, LDG GEAR POS SYS1
4) 11S23, LDG GEAR POS SYS2

(e) Make sure this circuit breaker on the overhead circuit breaker panel, P6, is closed:
1) 6F4, LDG GEAR PARKING BRAKE VLV

(f) If you are loading the left EICAS computer, close this circuit breaker on the overhead circuit breaker panel, P11, and remove the DO-NOT-CLOSE tag:

NOTE: The circuit breaker for the EICAS computer you are not loading must be open while you are installing software.

1) 11J2, EICAS CMPTR LEFT

(g) If you are loading the right EICAS computer, close this circuit breaker on the overhead circuit breaker panel, P11, and remove the DO-NOT-CLOSE tag:

NOTE: The circuit breaker for the EICAS computer you are not loading must be open while you are installing software.

1) 11J29, EICAS CMPTR RIGHT

S 472-041

(6) Do these steps to install software:

(a) SOFTWARE INSTALLATION WITH A PDL DISK DRIVE;
Do these steps at the PDL:

NOTE: For more information on how to use the PDL, refer to the supplier's instructions for the PDL.

1) Set the power switch on the PDL to the on position.
2) Put the correct disk in the disk drive.

NOTE: It may take 1 to 2 minutes for loading to begin.

3) Follow the prompts on the PDL to complete the installation.

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4) Remove the disk from the disk drive when the software installation is completed.

NOTE: COMP, LOAD COMPLETE and TRANSF COMPLETE are examples of data loader prompts for a completed installation.

(b) SOFTWARE INSTALLATION WITH A PDL MASS STORAGE DEVICE;
Follow the PDL supplier instructions to install the software.
(c) Set the power switch on the PDL to the off position.
(d) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker on the P11 panel:
1) 11J2, EICAS CMPTR LEFT
2) 11J29, EICAS CMPTR RIGHT
(e) Do these steps to do a software configuration check for the EICAS computer:
1) Press the CONF/MCDP switch on the EICAS MAINT panel.
2) Make sure the correct OPS software part number shows on the CONF/MCDP page.
3) Make sure the correct OPC software part number shows on the CONF/MCDP page.
(f) If necessary, you can load the right (left) EICAS computer via cross-loading.

S 862-048
(7) Put the Airplane Back to Its Usual Condition

NOTE: You must stop for 30 seconds to let the start-up sequence complete before you remove power to disconnect the PDL.

CAUTION: MAKE SURE THE CIRCUIT BREAKER FOR THE DATA LOADER IS OPEN BEFORE YOU CONNECT OR REMOVE THE INTERFACE CABLE FOR THE PORTABLE DATA LOADER. IF THE CIRCUIT BREAKER IS NOT OPEN, DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
1) 11J2, EICAS CMPTR LEFT
2) 11J29, EICAS CMPTR RIGHT
(b) Disconnect the PDL interface cable from the EICAS computer.
(c) Close these circuit breakers on the overhead circuit breaker panel, P11, and remove the DO-NOT-CLOSE tags:
1) 11J2, EICAS CMPTR LEFT
2) 11J29, EICAS CMPTR RIGHT
(d) Return the airplane into a serviceable condition.

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EICAS COMPUTER - REMOVAL/INSTALLATION

1. General
   A. Two EICAS computers (M10181 - left, M10182 - right) are installed on rack E4-2 in the main equipment center. The front of the computers do not have system condition lights or BITE test buttons. All electrical connections are at the rear of the unit.
   B. This procedure has two tasks. One is for EICAS computer removal; the other is for EICAS computer installation.
   C. You will possibly have to install new software when you install the EICAS computer. You will possibly install the OPC. The OPS is the core software and will possibly not change.

TASK 31-41-02-024-001

2. EICAS Computer Removal
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

   C. Prepare for Removal

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11J2, EICAS CMPTR L
          (b) 11J29, EICAS CMPTR R

      S 024-003

      CAUTION: DO NOT TOUCH THE EICAS COMPUTERS BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE (AMM 20-41-01/201). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE EICAS COMPUTERS.

      (2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

      S 024-005
      (3) Remove the EICAS computer (AMM 20-10-01/401).

TASK 31-41-02-424-025

3. EICAS Computer Installation
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components

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(2) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
(3) AMM 31-41-00/201, EICAS
(4) AMM 31-41-02/201, EICAS Computer - Maintenance Practices

B. Access

(1) Location Zones

119/120 Main Equipment Center
211/212 Flight Compartment

C. Prepare for Installation

S 864-004

(1) Make sure that these P11 panel circuit breakers are open:
(a) 11J2, EICAS CMPTR L
(b) 11J29, EICAS CMPTR R

S 424-026

CAUTION: DO NOT TOUCH THE EICAS COMPUTERS BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE (AMM 20-41-01/201). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE EICAS COMPUTERS.

(2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

D. Procedure

S 214-079

(1) Examine the unit and rack connectors for unwanted materials and loose or damaged pins.
(a) Use the vacuum cleaner to clean the rear connectors, ventilation holes, installation tray connector(s), cooling air supply and return plenums, mounting fasteners, and mounting surfaces.

S 424-028

(2) Install the EICAS computer (AMM 20-10-01/401).

S 864-049

(3) Supply electrical power (AMM 24-22-00/201).

S 864-051

(4) Make sure that these P11 panel circuit breakers are closed:
(a) 11J2, EICAS CMPTR L
(b) 11J29, EICAS CMPTR R

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S 754-047
(5) Make sure these conditions exist before you verify the software configuration:
(a) The airplane is on the ground,
(b) The engines are off and,
(c) The parking brake is set.

S 754-036
(6) Do these steps to make sure that the correct software is installed:

NOTE: Make sure you know the correct software part number for the EICAS computer you will check. For the EICAS computer to be an approved installation, the correct software must be checked.

(a) Press the CONF/MCDP switch on the EICAS MAINT panel (P61).
(b) If the correct OPS software does not show, install the correct OPS (AMM 31-41-02/201).

S 844-006
(7) Do the AUTO EVENT, MAN EVENT, and ENG EXCD Erase Procedures (AMM 31-41-00/201).

S 714-030
(8) Do the EICAS Computer Test procedure.

TASK 31-41-02-714-029

4. EICAS Computer Test

A. References
(1) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones
119/120 Main Equipment Center
211/212 Flight Compartment

C. Procedure

S 864-007
(1) Supply electrical power (AMM 24-22-00/201).

S 864-008
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

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S 714-010
(3) Turn the COMPUTER switch on the EICAS DISPLAY select panel to the L or R position as applicable.

S 714-027
(4) Make sure that the top display shows the engine primary page and the bottom display shows the engine secondary page.

S 864-011
(5) Make sure that the parking brake is engaged.

S 744-012
(6) Push and release the TEST switch on the EICAS MAINT panel, P61.

S 744-014
(7) Make sure that the TEST page shows on both displays.

S 744-015
(8) Continue after the message TEST IN PROGRESS goes out of view.

S 744-042
(9) If the message X INTERNAL FAULTS shows, do the EICAS BITE procedure (FIM 31-41-00/101).

S 744-052
(10) Make sure that the EICAS program pin codes that follow show for the left (right) computer as applicable:

(a) SAS 050-051,150-157,162-167,275-278,280-281;
5A20 (5221)

S 744-019
(11) Turn the COMPUTER switch on the EICAS DISPLAY select-panel to the other computer.

S 744-020
(12) Make sure that the EICAS program pin code for the other computer is correct.

NOTE: The codes for both computers are given before this step.

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S 744-021
(13) Make sure the the CMPTR FAIL messages do not show.

S 744-024
(14) Push and release the left master CAUTION switch/light.

S 744-022
(15) Push and release the TEST switch to go out of the TEST mode.

D. Put the Airplane Back to Its Usual Condition

S 864-023
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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EICAS DISPLAY SELECT PANEL - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks. One is for the EICAS DISPLAY select panel removal; the other is for the EICAS DISPLAY select panel installation.
   B. The EICAS DISPLAY select panel, M10195, is installed on the forward electronics control stand, P9. All electrical connections are made at the rear of the unit.

TASK 31-41-03-004-001

2. Remove the EICAS Display Select Panel
   A. References
      (1) 20-41-01/201, Electrostatic Sensitive Devices
   B. Access
      (1) Location Zones
          211/212 Flight Compartment

   C. Procedure

      S 914-021

      CAUTION: DO NOT MOVE THE EICAS DISPLAY SELECT PANEL BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE EICAS DISPLAY SELECT PANEL.

      (1) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01).

      S 864-022
      (2) Open these circuit breakers on the overhead circuit breaker panel, P11 and attach a DO-NOT-CLOSE tag:
          (a) 11J32, EICAS DISPLAY SELECT
          (b) 11J2, EICAS CMPTR L
          (c) 11J3, EICAS UPER DSPL

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(d) 11J29, EICAS CMPTR R
(e) 11J30, EICAS LOWER DSPL

S 024-004
(3) Loosen the screws that hold the control panel.

S 024-005
(4) Move the panel out.

S 024-006
(5) Disconnect the electrical cable.

S 024-007
(6) Remove the panel.

TASK 31-41-03-404-008

3. Install the EICAS Display Select Panel

A. References
(1) 20-41-01/201, Electrostatic Sensitive Devices
(2) 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones
211/212 Flight Compartment

C. Procedure

S 044-009
(1) Make sure that this circuit breaker on the P11 panel is open:
(a) 11J32, EICAS DISPLAY SELECT

S 424-010
(2) Connect the electrical cable to the control panel.

S 424-011
(3) Install the panel.

S 424-012
(4) Tighten the screws that hold the control panel.

S 444-013
(5) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11J32, EICAS DISPLAY SELECT

D. EICAS DISPLAY Select Panel Test.

S 864-014
(1) Supply electrical power (Ref 24-22-00).

S 864-015
(2) Make sure that these EICAS circuit breakers are closed:
(a) 11J2, EICAS CMPTR LEFT

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(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 714-016
(3) Make sure that the top display shows the engine primary page and that the bottom display shows the engine secondary page.

S 714-017
(4) Make sure that the EICAS message EICAS CONT PNL does not show on the top display.

E. Put the Airplane Back in Its Usual Condition.

S 864-018
(1) Remove the electrical power if it is not necessry (Ref 24-22-00).

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EICAS DISPLAY SWITCHING MODULE - REMOVAL/INSTALLATION

1. General
   A. Two display switching modules (M10417 - top, M10418 - bottom) are installed. They are mounted on a rack on shelf E8 inside panel P69 in the main equipment center. The modules are the same and interchangeable.
   B. This procedure has two tasks. One is for the EICAS Display Switching Module removal; the other is for the EICAS Display Switching Module installation.

TASK 31-41-04-004-001

2. Remove the EICAS Display Switching Module
   A. References
      (1) 20-10-01/401, E/E Rack Mounted Components
      (2) 31-41-02/401, EICAS Computer - Removal/Installation
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

   C. Procedure

      S 044-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and install DO-NOT-CLOSE tags:
          (a) 11J2, EICAS CMPTR L
          (b) 11J29, EICAS CMPTR R
          (c) 11J31, EICAS DSPL SW

      S 024-003
      (2) Remove the display switching module (Ref 20-10-01).

TASK 31-41-04-404-004

3. Install the EICAS Display Switching Module
   A. References
      (1) 20-10-01/401, E/E Rack Mounted Components

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(2) 24-22-00/201, Electrical Power - Control
(3) 31-41-02/401, EICAS Computer - Removal/Installation

B. Access

(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment

C. Procedure

S 044-005
(1) Make sure that these circuit breakers on the P11 panel are open:
(a) 11J2, EICAS CMPTR L
(b) 11J29, EICAS CMPTR R
(c) 11J31, EICAS DSPL SW

S 424-006
(2) Install the display switching module.

S 444-007
(3) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 11J2, EICAS CMPTR L
(b) 11J29, EICAS CMPTR R
(c) 11J31, EICAS DSPL SW

D. Display Switching Module Test

S 864-008
(1) Make sure that the 6 EICAS circuit breakers on the P11 panel are closed.

S 864-009
(2) Supply electrical power (AMM 24-22-00).

S 744-010
(3) Set the COMPUTER switch on the display select panel to the L position.

S 864-011
(4) Make sure that the airplane parking brake is engaged.

S 744-012
(5) Push the TEST switch on the EICAS Maintenance Panel.

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S 744-029
(6) Make sure that the EICAS program pin codes that follow shows for the left (right) computer as applicable:
(a) SAS 050-051,150-157,162-167,275-278,280-281;
5A20 (5221)

S 744-016
(7) Turn the COMPUTER switch on the EICAS DISPLAY select-panel to the other computer.

S 744-017
(8) Make sure that the EICAS program pin code for the other computer is correct.

NOTE: The codes for both computers are given before this step.

S 744-018
(9) Make sure that the CMPTR FAIL messages do not show.

S 864-022
(10) Push and release the left master CAUTION switch-light.

S 744-020
(11) Push and release the TEST switch to go out of the TEST mode.

E. Put the Airplane Back to Its Usual Condition.

S 864-021
(1) Remove electrical power if it is not necessary (AMM 24-22-00).

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EICAS MAINTENANCE PANEL - REMOVAL/INSTALLATION

1. General
   A. The EICAS maintenance panel, M10372, is installed on the right side panel, P61. All electrical connections are at the rear of the panel.
   B. This procedure has two tasks. One is for the EICAS maintanance panel removal; the other is for the EICAS maintenance panel installation.

TASK 31-41-05-004-006

2. Remove the EICAS Maintenance Panel
   A. Access
      (1) Location Zones
          211/212 Flight Compartment

   B. Procedure

      S 044-001
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and install a DO-NOT-CLOSE tag:
          (a) 11J32, EICAS DSPL SELECT

      S 024-002
      (2) Loosen the screws that hold the control panel.

      S 024-003
      (3) Move the panel out.

      S 024-004
      (4) Disconnect the electrical cables.

      S 024-005
      (5) Remove the panel.

TASK 31-41-05-404-012

3. Install the EICAS Maintenance Panel
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control

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B. Access
(1) Location Zones
211/212 Flight Compartment

C. Procedure

S 044-007
(1) Make sure that this circuit breaker on the P11 panel is open:
(a) 11J32, EICAS DSPL SELECT

S 424-008
(2) Connect the electrical cables to the control panel.

S 424-009
(3) Install the panel.

S 424-010
(4) Tighten the screws that hold the control panel.

S 444-011
(5) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11J32, EICAS DSPL SELECT

D. Maintenance Panel Test

S 864-013
(1) Supply electrical power (AMM 24-22-00/201).

S 864-014
(2) Make sure that the six EICAS circuit breakers on the P11 panel are closed.

S 864-016
(3) Make sure that the airplane parking brake is engaged.

S 714-017
(4) Push the TEST switch on the EICAS maintenance panel.

S 714-018
(5) Make sure that the TEST page shows on the two displays.

S 714-019
(6) Push each of the switches that follow and make sure that the message that shows is the same as the name on the switch.
(a) ECS/MSG

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(b) ELEC/HYD
(c) PERF/APU
(d) CONF/MCDP
(e) ENG EXCD
(f) AUTO
(g) MAN
(h) REC
(i) ERASE
(j) EPCS

E. Put the Airplane Back to Its Usual Condition

S 864-020

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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EICAS SIGNAL CONSOLIDATION CARD (SCC) - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks. One is for the EICAS SCC removal; the other is for the EICAS SCC installation.
   B. The EICAS SCC, M10727, is located in the warning electronics unit (WEU), panel P51. All electrical connections are at the rear of the card.

TASK 31-41-07-024-001

2. Remove the EICAS SCC (Fig. 401)
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
   B. Access
      (1) Location Zones
          120 Main Equipment Center (RH side)
          211/212 Flight Compartment

   C. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11B18, WARN ELEX B
          (b) 11J34, WARN ELEX A

      S 914-018

      CAUTION: DO NOT TOUCH THE EICAS SCC BEFORE YOU DO THE PROCEDURE "REMOVAL/INSTALLATION OF ESDS CIRCUIT CARDS" (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE EICAS SCC.

      (2) Do the procedure Removal/Installation of ESDS Circuit Cards (AMM 20-41-01/201).

      S 014-003
      (3) Open the WEU access door.

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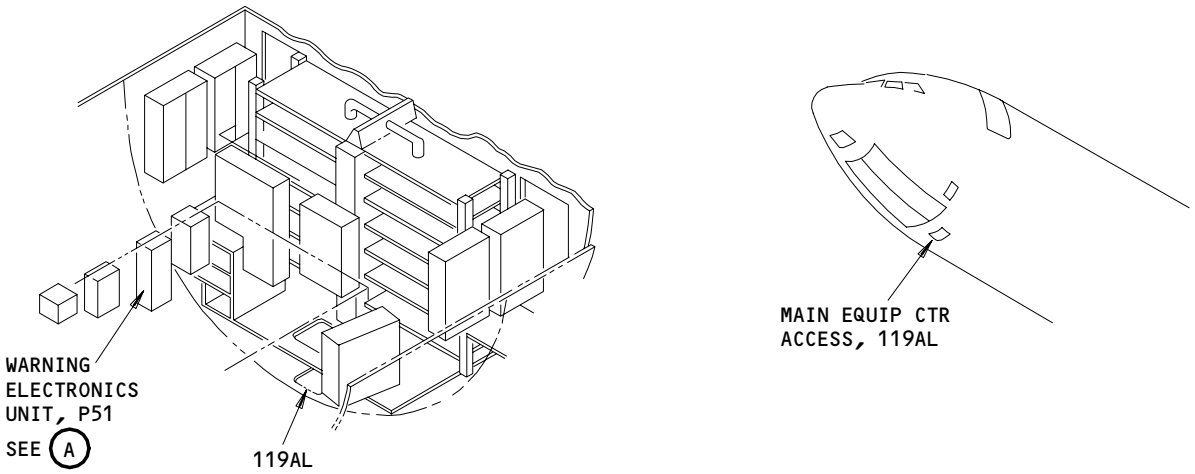
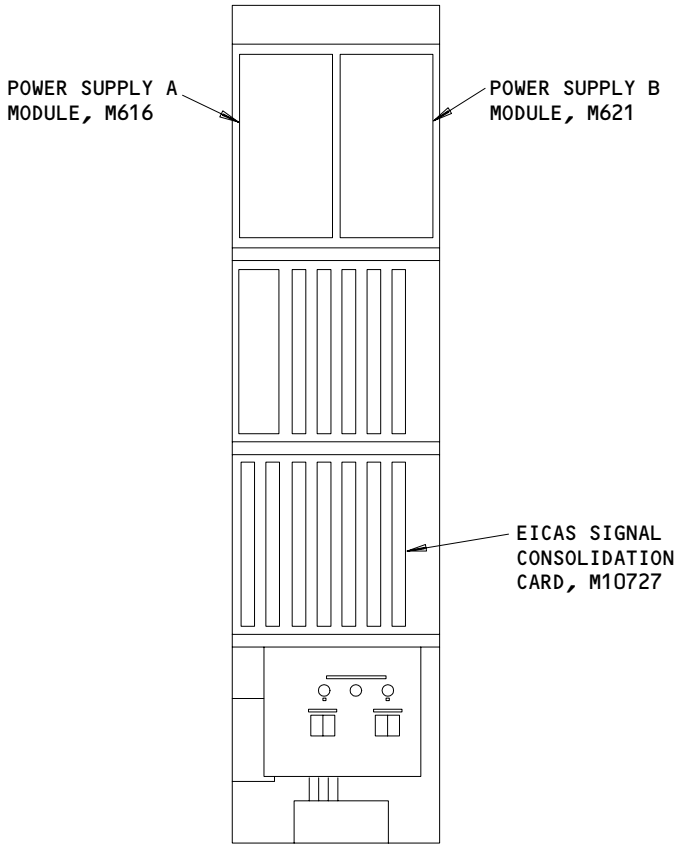


MAIN EQUIP CTR



WARNING ELECTRONICS UNIT, P51

(A)

EICAS Signal Consolidation Card Installation
Figure 401

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S 024-004
(4) Remove the EICAS SCC (AMM 20-10-01/401).

TASK 31-41-07-424-005

3. Install the EICAS SCC (Fig. 401)

A. References
(1) AMM 20-10-01/401, E/E Rack Mounted Components
(2) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
(3) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones
120 Main Equipment Center (RH side)
211/212 Flight Compartment

C. Procedure

S 864-006
(1) Make sure that these circuit breakers on the overhead circuit breaker panel, P11 are open:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

S 914-007

CAUTION: DO NOT TOUCH THE EICAS SCC BEFORE YOU DO THE PROCEDURE "REMOVAL/INSTALLATION OF ESDS CIRCUIT CARDS" (AMM 20-41-01). ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE EICAS SCC.

(2) Do the procedure Removal/Installation of ESDS Circuit Cards (AMM 20-41-01/201).

S 424-008
(3) Install the EICAS SCC (AMM 20-10-01/401).

S 414-009
(4) Close the WEU access door.

S 864-010
(5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

D. EICAS SCC Test

S 864-011
(1) Supply electrical power (AMM 24-22-00/201).

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S 864-012
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 864-020
(3) Push the STATUS switch on the EICAS DISPLAY select-panel, P9.

S 754-021
(4) Make sure that the STATUS page shows on the bottom display.

S 754-024
(5) Stop for 5 seconds.

S 754-022
(6) Make sure the EICAS message EICAS SCC does not show on the bottom display.

E. Put the Airplane Back to Its Usual Condition

S 864-019
(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ALTITUDE PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General
   A. There is one altitude pressure switch, S921. These procedures give instructions for removal, installation, and a check of the altitude pressure switch.

TASK 31-41-08-004-001

2. Altitude Pressure Switch Removal
   A. Access
      (1) Location Zones
          119 Main Equipment Center

   B. Procedure

      S 034-003
      (1) Loosen the two larger mounting clamp screws adjacent to the switch.

      S 024-004

      CAUTION: CAREFULLY MOVE THE SWITCH OUT OF THE BRACKET. THIS WILL PREVENT DAMAGE TO THE CABLE AND THE PNEUMATIC HOSE AT THE BACK OF THE SWITCH.

      (2) Move the switch out of the bracket.

      S 034-005
      (3) Disconnect the electrical cable.

      S 034-006

      CAUTION: MAKE SURE THE PITOT-STATIC SYSTEM IS AT AMBIENT PRESSURE BEFORE YOU DISCONNECT THE PNEUMATIC HOSE. THIS WILL PREVENT DAMAGE TO THE INSTRUMENTS.

      (4) Use the quick disconnect to disconnect the static pressure hose.

TASK 31-41-08-404-007

3. Altitude Pressure Switch Installation
   A. General
      (1) You do not have to do a leak test when you connect a quick-disconnect fitting. A visual examination of the quick-disconnect for a complete seal is necessary. You must do a leak test when you cannot make sure that the quick-disconnect has a complete seal.

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B. References
(1) AMM 34-11-00/501, Pitot-Static System

C. Access
(1) Location Zones
119 Main Equipment Center

D. Procedure

S 434-008
(1) If the new switch does not have a quick-disconnect installed on it, remove the quick-disconnect from the old switch.

S 434-009
(2) Inspect the O-ring for damage and replace if necessary.

S 434-010
(3) Install the quick-disconnect on the new switch.

S 434-011
(4) Connect the electrical cable to the switch.

S 434-012

CAUTION: MAKE SURE THE PITOT-STATIC SYSTEM IS AT AMBIENT PRESSURE BEFORE YOU CONNECT THE PNEUMATIC HOSE. THIS WILL PREVENT DAMAGE TO THE INSTRUMENTS.

(5) Connect the static hose to switch.

S 754-013
(6) Visually make sure the quick-disconnect fittings are fully mated and the connection is locked in a sealed position.

S 794-014
(7) If you installed the quick-disconnect fitting on the new indicator, do a low range leakage test on the alternate static system (AMM 34-11-00/501).

S 424-016

CAUTION: CAREFULLY PUT THE SWITCH INTO THE BRACKET. THIS WILL PREVENT DAMAGE TO THE CABLE AND PNEUMATIC HOSE AT THE BACK OF THE SWITCH.

(8) Put the switch into position in the bracket and tighten the mounting clamp screws.

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WARNING SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)
   A. The warning system provides the flight crew with visual and aural warnings. Warnings are provided for abnormal airplane system conditions. They are also provided for airplane out of configuration conditions for various operating modes.
   B. The warning system consists of a warning electronics unit, aural warning loudspeakers, aural cancel switch, and test switches. It also includes the master WARNING switch-lights, SPEEDBRAKES light, and discrete warning light.
   C. Input signals are received from airplane sensors, other airplane systems, or generated by the pilots. Signals are processed within the warning electronics unit (WEU).
   D. The visual displays are level A warning messages on the display unit and red WARNING lights. The aural signals are bell, siren, owl, and ground proximity warning system voice messages.
2. Component Details (Fig. 1)
   A. Warning Electronics Unit (WEU)
      (1) The warning electronics unit (WEU) P51 is located in the forward electrical/electronic equipment area.
      (2) The WEU contains two power supply modules with fault indicators and reset switch, and plug-in modules which generate warning signals. The WEU provides output signals to the warning loudspeakers, master warning lights, and discrete warning lights. The unit weighs 33 lbs and is cooled by externally blown air.
      (3) The modules located in the WEU and their functions are as follows:
         (a) Power Supply Modules
            1) The two redundant power supplies receive 115 volts ac power and develop the +5 volts and ±12 volts dc power required for all warning modules. There are two ball type fault indicators, one for each module. Each ball latches to black when the corresponding power supply is operating properly and latches to yellow when a fault occurs. The RESET switch is provided to set the fault balls back to the operational mode.
            2) The two power supply fault indicators and a reset switch are located on the WEU BITE module inside P51.

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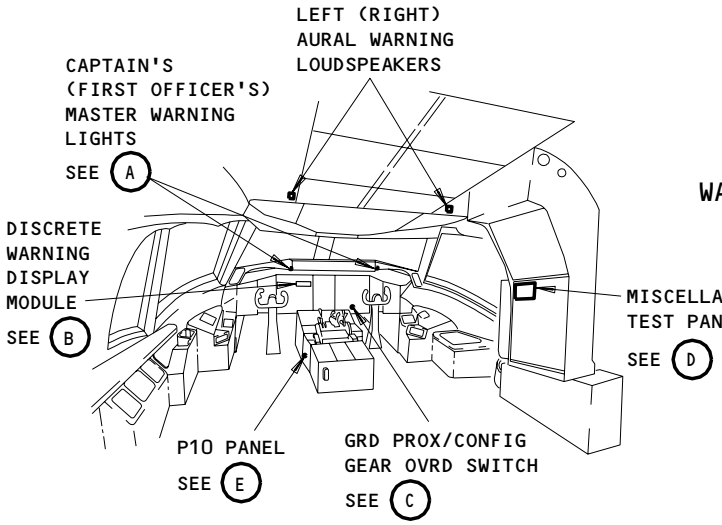
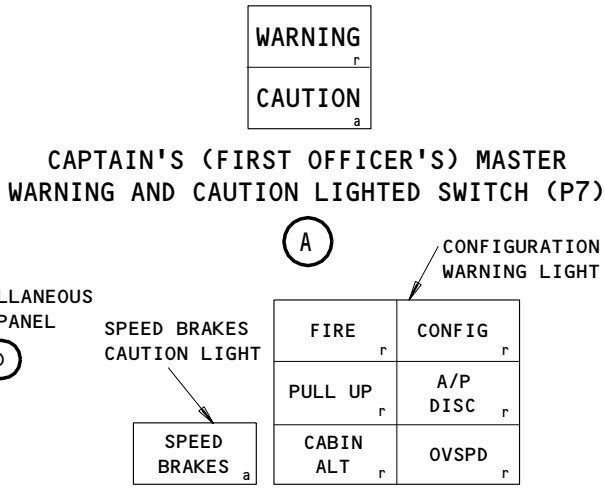


FLIGHT COMPARTMENT

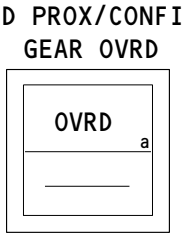


CAPTAIN'S (FIRST OFFICER'S) MASTER WARNING AND CAUTION LIGHTED SWITCH (P7)

A

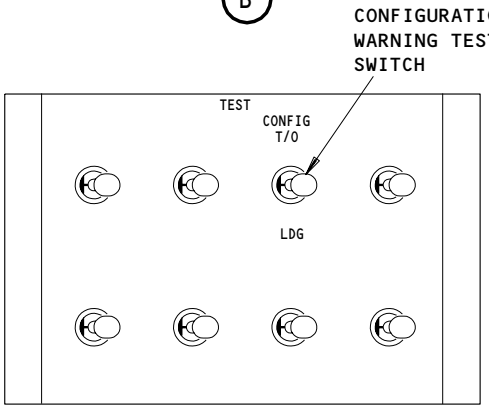
DISCRETE WARNING DISPLAY MODULE

B



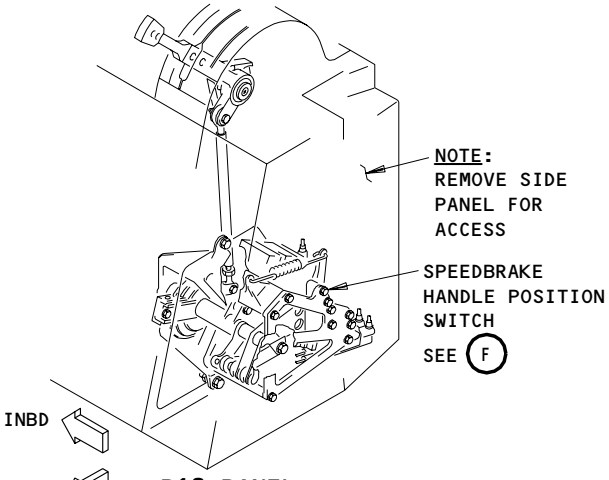
GND PROX/CONFIG GEAR OVRD SWITCH

C



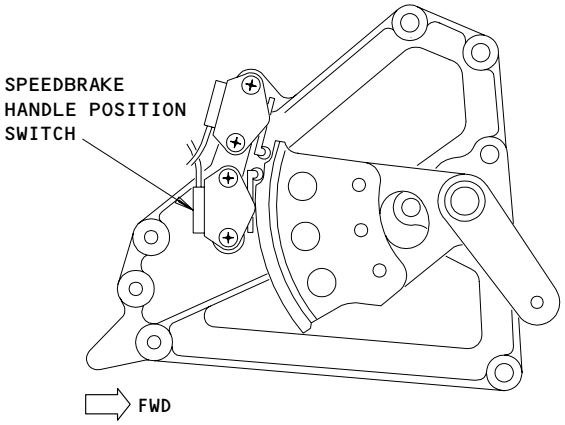
MISCELLANEOUS TEST PANEL

D



P10 PANEL

E



SPEEDBRAKE HANDLE POSITION SWITCH

F

Warning System – Component Location
Figure 1 (Sheet 1)

331781
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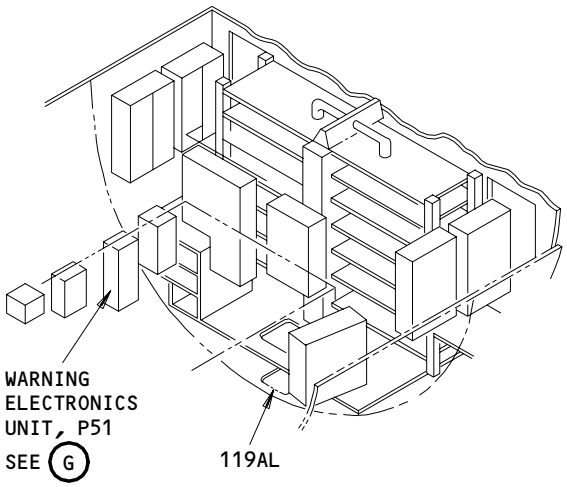
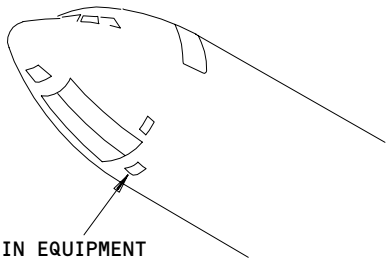
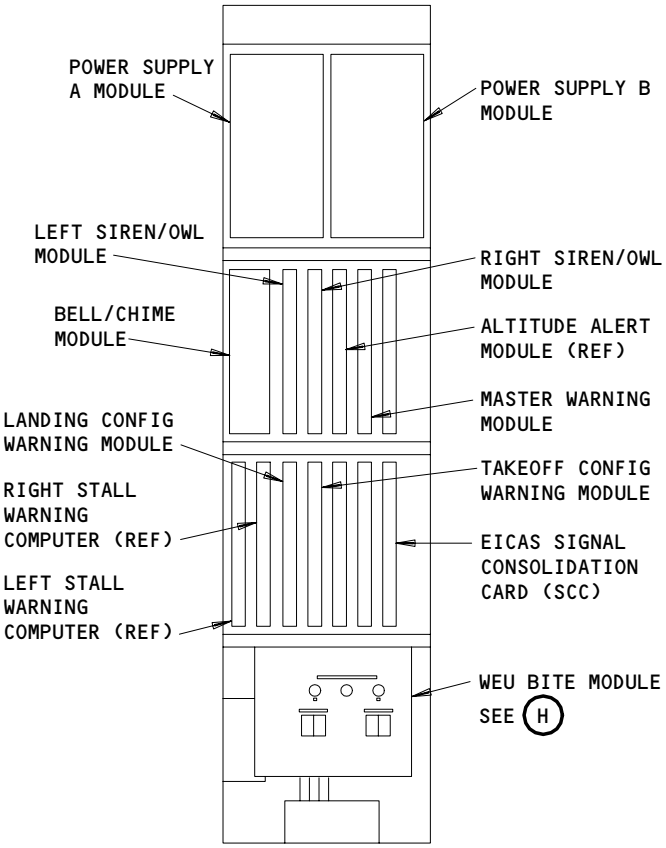


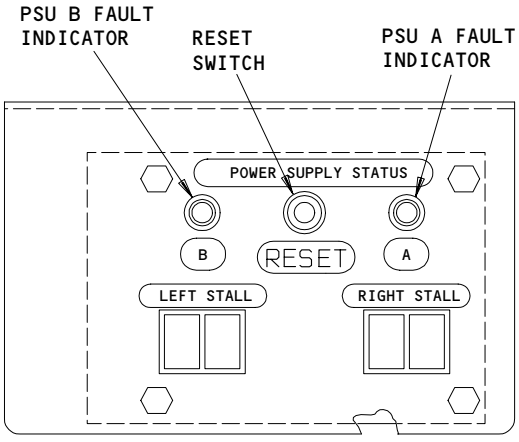
MAIN EQUIPMENT CENTER





WARNING ELECTRONICS UNIT, P51

G



WEU BITE MODULE

H

Warning System – Component Location
Figure 1 (Sheet 2)

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(b) EMI Filter Module
  1) There are two EMI filter modules in the WEU. Each filter module is paired with a power supply module. The EMI filter module connects to the power line and filters the AC line noise.
(c) Stall Warning Module
  1) There are two stall warning modules. The left module provides the captain's warning signal and the right module, the first officer's warning signal. The modules are each microprocessor controlled. Refer to 27-32-00 for a description of the stall warning modules.
(d) WEU BITE Module
  1) The WEU BITE module provides fault indications for the two power supplies and the two stall warning computers. Refer to 27-32-00 for a description of the WEU BITE module.
(e) Altitude Alert Module
  1) The altitude alert module is microprocessor controlled. It provides altitude acquisition advisory and deviation cautions. Refer to 34-16-00 for a detailed description of the altitude alert module.
(f) Takeoff Configuration Warning Module
  1) The takeoff configuration warning module provides warning signals for improper airplane configuration during takeoff.
(g) Landing Configuration Warning Module
  1) The landing configuration warning module is microprocessor controlled. It provides warning signals for improper airplane configuration during landing and speed brake caution signals.
(h) Master Warning Module
  1) The master warning module is microprocessor controlled and provides the warning signals to turn on the master warning lights.
(i) Bell/Chime Aural Warning Module
  1) The bell/chime aural warning module provides fire bell warning and crew call chime signals to the audio amplifiers in the siren/owl aural warning modules.
(j) Siren/Owl Aural Warning Module
  1) The left and right siren/owl aural warning modules supply level A warning and level B caution signals.
  2) The siren warning is activated by autopilot disconnect, overspeed, cabin altitude exceedance, T/O configuration warnings, and landing configuration warnings.
  3) The owl warning is activated by level B EICAS messages and altitude alert.
  4) The siren/owl modules also supply amplification of the bell/chime warnings and ground proximity voice.

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5) SAS 281-999;
the siren/owl modules also amplify voice messages received from the TCAS.

(k) EICAS Signal Consolidation Card (SCC)

1) The EICAS SCC converts analog signals to digital signals which are then sent to the EICAS function. Refer to AMM 31-41-00 for a description of the SCC.

B. Configuration Warning Test Switch

(1) The configuration warning test switch is located on the miscellaneous test panel on the right side panel. It is a two-position, spring loaded switch. The T/O position is for testing the takeoff configuration warning circuits. The LDG position is for testing the landing configuration warning circuits.

C. Gnd Prox/Config Gear Ovrd Switch

(1) The Gnd Prox/Conf Gear Ovrd Switch is located on the first officer's instrument panel. It is an alternate action light switch. The switch cancels the landing configuration aural warning and displays the amber OVRD message when pressed.

D. Master Warning Lights

(1) The red master WARNING lights are located on both ends of the pilots' glareshield P7. The lights come on when the master warning module in the warning electronics unit generates a warning signal. Pressing the indicator light cap will turn off the light and silence the fire bell warnings, landing configuration warning, or the cabin altitude warning.

(2) AIRPLANES WITH OVERSPEED WARNING CANCEL;
Pressing the indicator light cap silences the overspeed aural warning.

E. Discrete Warning Light

(1) The red CONFIG discrete warning light is located on the center instrument panel. The light comes on when the configuration warning module in the warning electronics unit generates a warning signal. The light is powered by the master dim and test circuit (AMM 33-16-00).

F. Loudspeakers

(1) The warning loudspeakers are located above the captain's and first officer's seats. Each loudspeaker is a permanent magnet speaker driven by an internal single stage amplifier. The two speakers provide aural tones and messages when turned on by either the left or right siren/owl aural warning module.

G. Speed Brake Handle Position Switch

(1) The speed brake handle position switch is located on the control stand. The switch is a thru-contact microswitch with a roller control arm. If the switch is set at the down detent position, a ground is applied to the takeoff configuration warning module. A warning is given when the switch is not in the down detent.

3. Operation

A. Functional Description

(1) Warning System Interfaces (Fig. 2)

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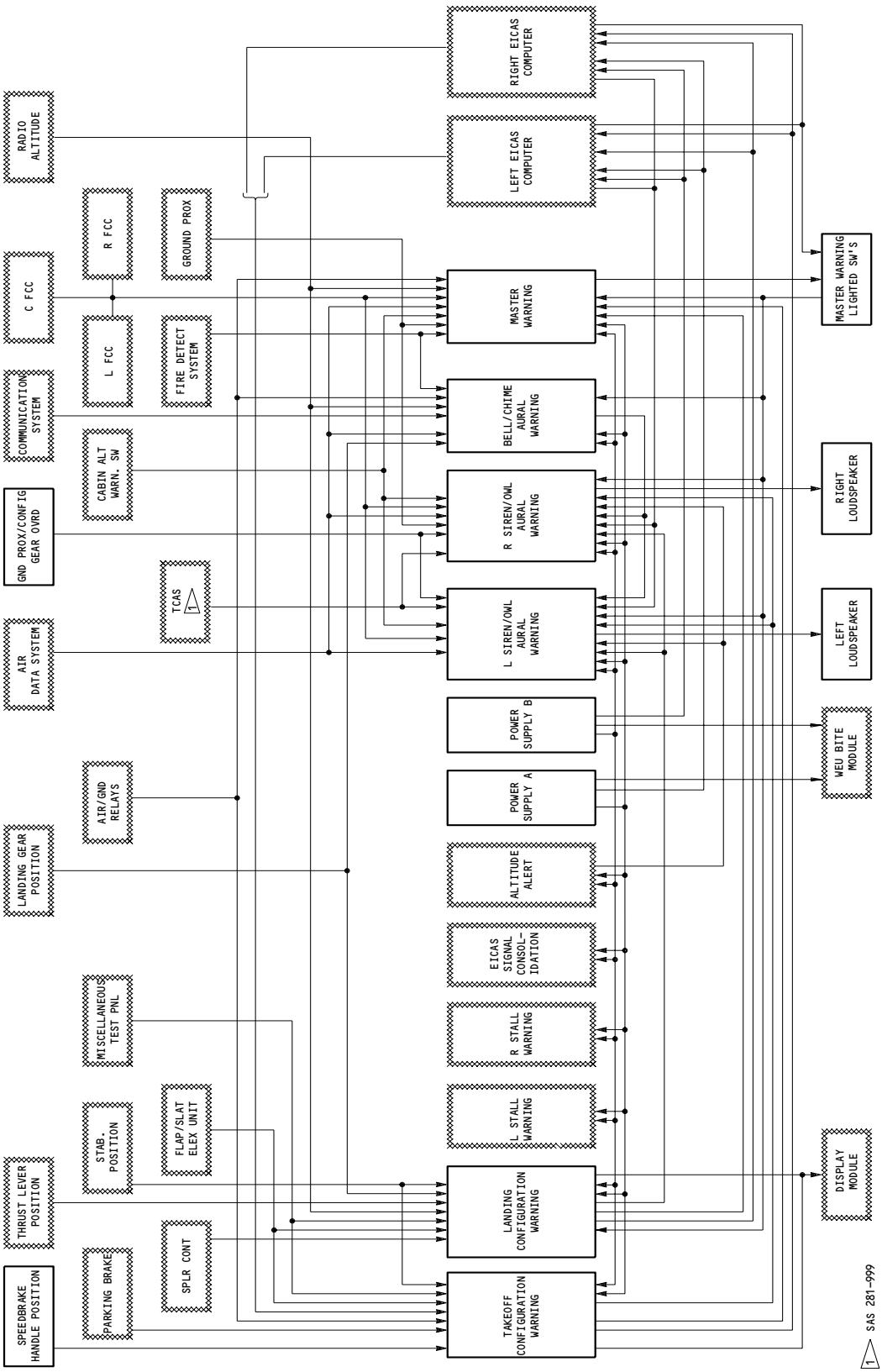

Warning System Block Diagram
Figure 2

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(a) The warning electronics unit (WEU) power supply modules receive 115 volts ac from the WARN ELEX A and B circuit breakers. The warning speakers receive 28 volts dc from the AURAL WARN SPKR L and R circuit breakers. The master WARNING lights receive 28 volts dc from the master dim and test circuits (AMM 33-16-00).

(b) The WEU receives digital input signals on the ARINC 429 digital bus from four sources. These include the radio altimeter, ground proximity warning computer, air data computer and the autopilot system. It also receives analog status discrete signals from many airplane systems. These signals are processed by different modules in the WEU under microprocessor control to provide the warning signals.

(c) SAS 281-999;
the WEU also receives digital input signals from the TCAS on the ARINC 429 digital bus.

(d) The WEU modules provide analog discrete signals to the loudspeakers. They also provide discrete signals to turn on the master WARNING lights, the discrete warning lights, the SPEEDBRAKES light, and to the EICAS computer.

(e) The WEU monitor circuits continuously perform operational checks of the input and output power supply circuits. The fault balls on the front of the WEU come on when a fault within the power supply module is detected.

(f) The warning visual indications consist of the master and CONFIG warning lights. The aural indications are the fire bell, chime, and the siren.

(g) The red master WARNING lights come on continuously when level A warnings are displayed on the display unit. The lights come on for level A warnings associated with five conditions. These are fire, overspeed, autopilot disconnect, cabin altitude, and takeoff and landing configuration warnings. There is a one-half second delay for the autopilot disconnect warnings. The light contains a manual reset switch. Pressing the light will provide a ground signal to the master warning module to extinguish the light. The warning circuit is then rearmed for the next warning.

(h) The CONFIG light is turned on by either the takeoff or landing configuration warning function.

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(i) The fire bell comes on and operates on an intermittent cycle during fire warnings and is repeated until the warning is cancelled. The bell may be cancelled by pressing either master warning light, by pulling one of the engine or APU fire handles, or by arming the FWD or AFT cargo compartment fire select switches. Wheel well fire warnings may be cancelled by lowering the landing gear (in the air mode).

(j) When the nose wheel oleo switch is extended during takeoff, the master WARNING lights and the fire bell are inhibited. At this time, a 20-second delay timer is also initiated. The inhibit function is cancelled after 20 seconds, or when the radio altitude is greater than 400 feet. The stored warnings will turn on the WARNING lights as soon as the inhibit function is cancelled.

(k) The siren comes on during the configuration, overspeed, cabin altitude exceedance above 10,000 feet, and autopilot (A/P) disconnect warnings. There is a one-half second delay for A/P disconnect warnings. The siren is on at all times until the warning condition is corrected. Pressing the GND PROX/CONFIG GEAR OVRD switch cancels the siren when radio altitude is below 800 feet, throttles at idle, and landing gears are not down and locked.

(l) AIRPLANES WITH OVERSPEED SIREN CANCEL;
The overspeed siren warning is cancelled by pressing the red master WARNING light.

(m) The SPEEDBRAKES light and level B EICAS message are generated in either of the following conditions:
1) RA >15 feet and speedbrake lever is above the trip point (spoilers extended) and flaps are in the landing position.
2) 15 feet < RA < 800 feet and speedbrake lever is above the trip point (spoilers extended).

(2) WEU Power Supply Function (Unit A typical) (Fig. 3)

(a) The warning electronics unit (WEU) power supply A receives 115 volts ac through the WARN ELEX A circuit breaker from the right unswitched ac bus. It rectifies the input ac voltage and provides +5 volts and ±12 volts dc output to the warning modules. Power supply B receives 115 volts ac through the WARN ELEX B circuit breaker from the 115 volt ac standby bus. It provides the same output voltages as power supply A.

(b) During normal operation, the fault ball on the front of the WEU shows black. The presence of ±12 volt dc also energizes the fault relay to remove the ground from the power supply failure discrete signal to the EICAS function.

(c) Each regulated power output is monitored for an under or overvoltage condition. These conditions will relax the fault relay to provide a WARN ELEX failure discrete signal to the EICAS function. The fault ball also latches to yellow to show a fault condition.

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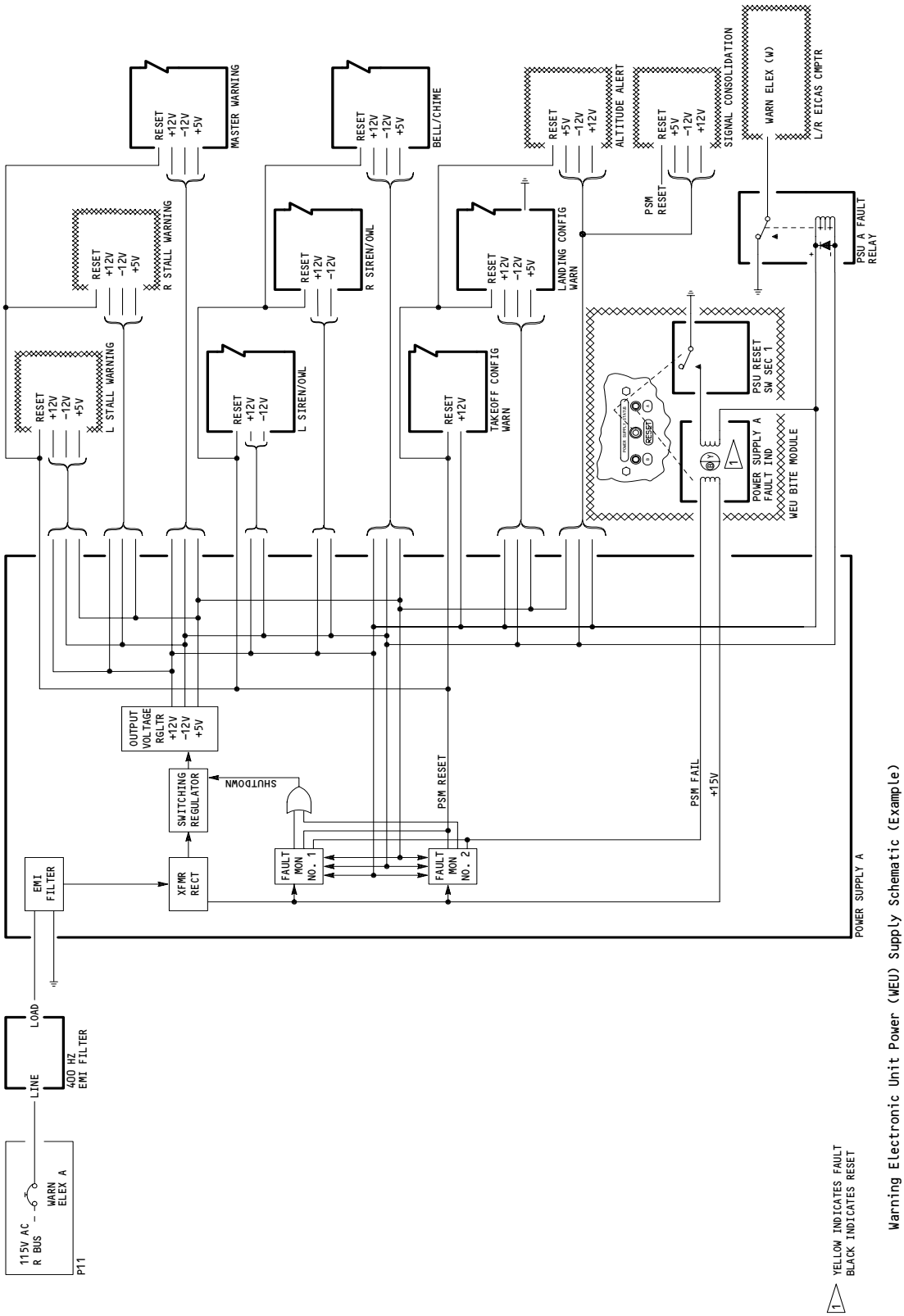

Warning Electronic Unit Power (WEU) Supply Schematic (Example)
Figure 3

582723

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(d) Pressing the RESET switch on the warning electronics unit resets the fault ball to black (normal). When the warning electronics unit returns to normal, the ±12 volts dc is applied to the fault relay. The relay is energized and the WARN ELEX failure discrete signal to the EICAS function is removed.

(3) Master Warning Module Function (Fig. 4)

(a) The master warning module provides the warning signals to turn on the master WARNING lights. The master warning module receives ±12 volts dc and +5 volts dc generated by the power supply modules.

(b) The following warning signals are applied to the master warning module when they occur:

1) Takeoff and landing configuration warning ground signals from the configuration warning module.
2) An overspeed ground signal from the left or right air data computer.
3) Mode 1 and Mode 2 ground signals from the ground proximity warning computer.
4) An autopilot warning No. 2 normal and battery ground signals from the left, center and right flight control computer.
5) Cabin pressure warning from the cabin pressure warning switch when cabin altitude exceeds 10,000 feet.
6) Fire warning ground signals from the left and right engine, auxiliary power unit, wheel well, and the forward and aft cargo compartments.

(c) The warning signals are received by the interface circuits, and are processed when the reset switch is open. In addition, the fire detection warning signals are processed when the takeoff inhibit function is not operating. The processed warning signals are applied to the output circuits if not inhibited by the power supply monitor reset signal. This enables the solid state switches to turn on the master WARNING lights.

(d) When the nose wheel oleo switch is extended during takeoff, the fire detection master warning output circuits are inhibited. It also initiates a 20-second time delay. The inhibit function expires after 20 seconds, or when the radio altitude attains to more than 400 feet.

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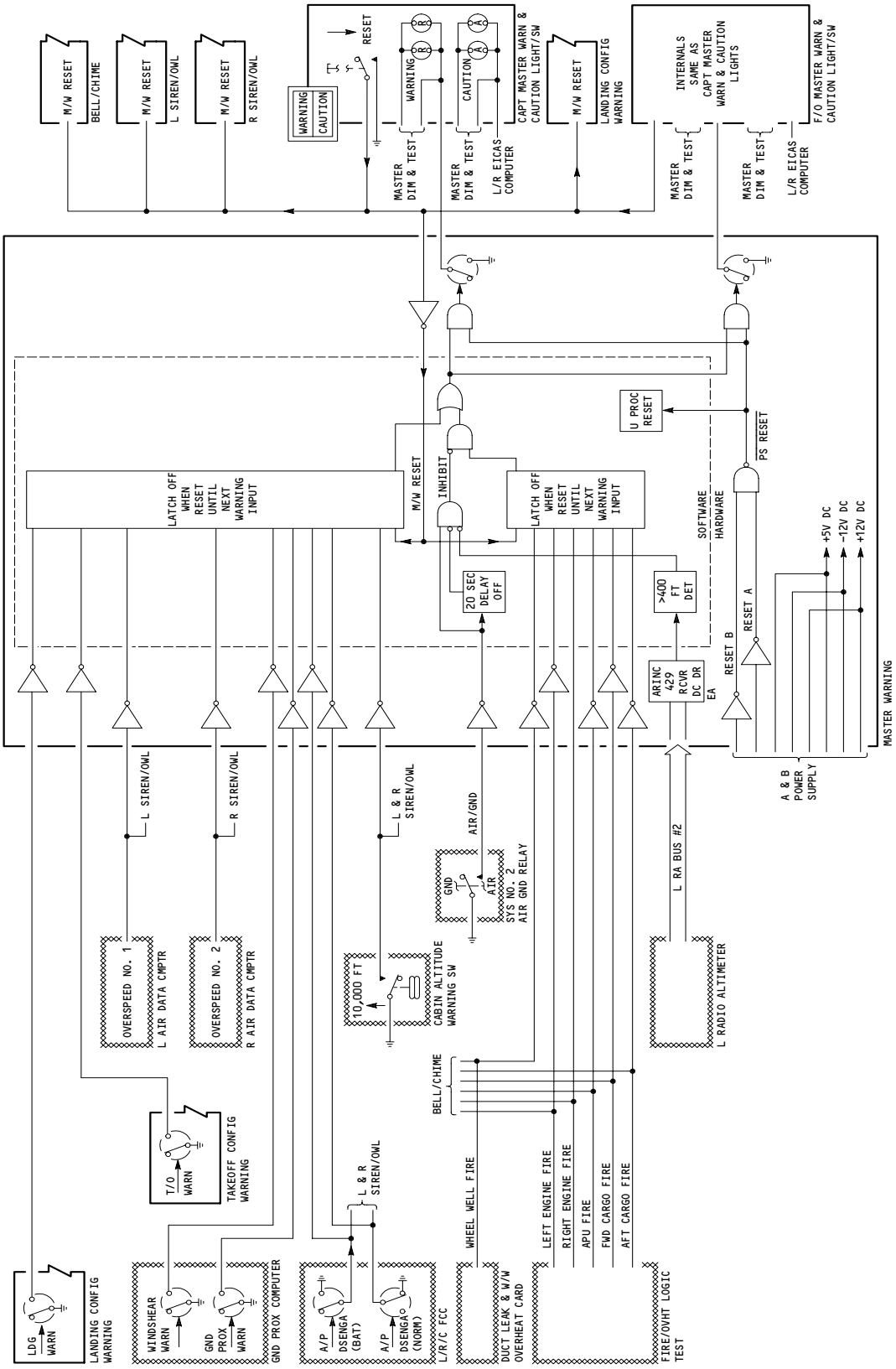

Master Warning Module Schematic
Figure 4

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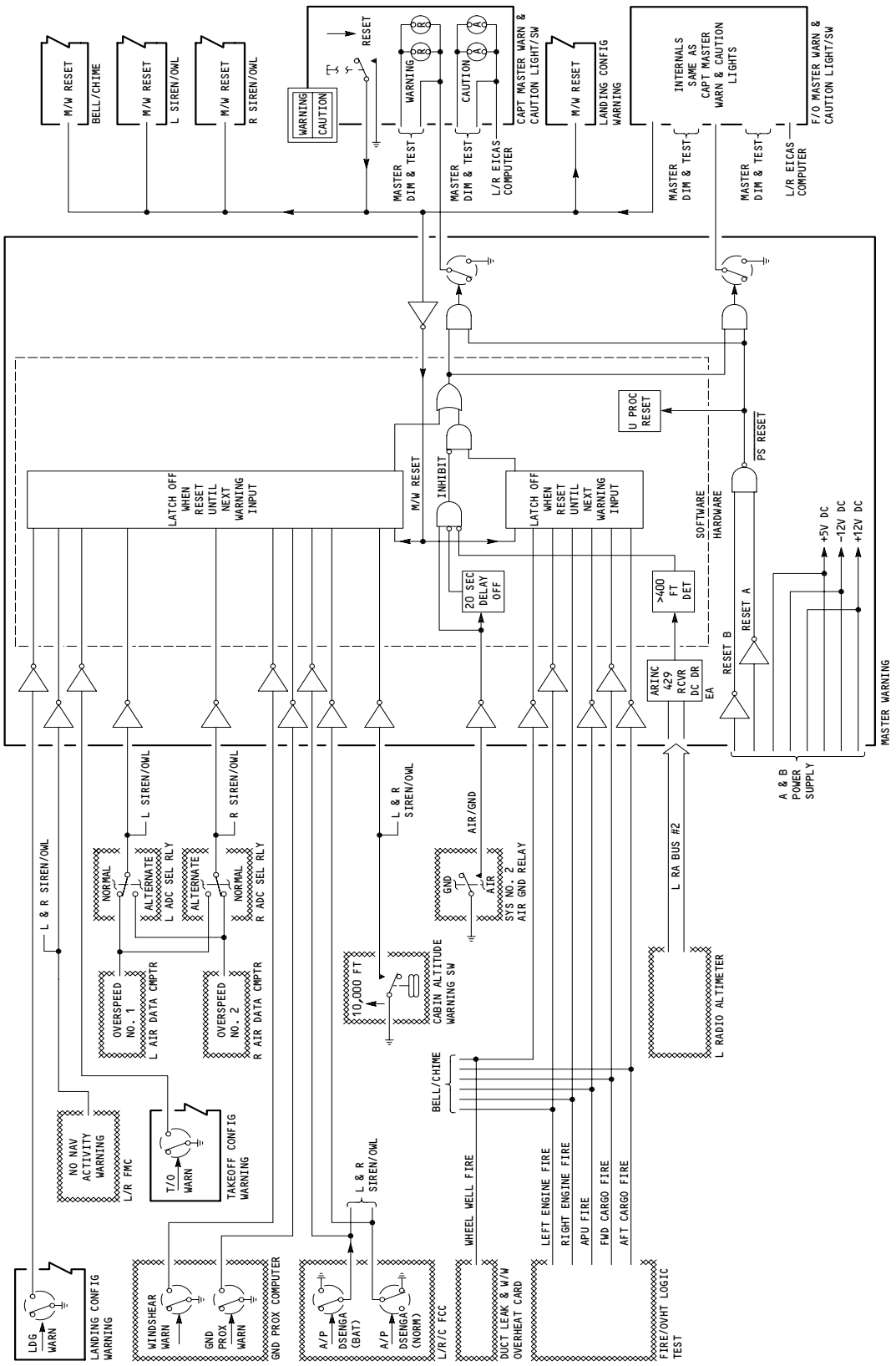

Master Warning Module Schematic
Figure 4A

F55442

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(e) Pressing the master warning light applies a ground signal to the input interface circuits. It disables the solid state switch which extinguishes the master WARNING lights.

(4) Bell/Chime Aural Warning Module Function (Fig. 5)

(a) The bell/chime aural warning module generates the signals to drive the firebells and the communication system chimes. The module receives +5 volts dc and ±12 volts dc generated by the power supply modules.

(b) Fire bell function

1) The firebell logic circuit receives six analog discrete fire warning signals from the fire detector control panel. These signals are the left and right engine, the auxiliary power unit, wheel well, and the forward and aft cargo compartment fire signals. The analog discrete inputs provide a logic 0 signal to the inverting input buffer circuits.

2) The buffer circuit digital output is sent to the microprocessor that controls the firebell sequence. The processed signal is routed to the firebell aural generator through the takeoff inhibit logic. If there is no inhibit signal, the warning is routed through to the preamplifier and out to the loudspeakers.

3) The firebell preamplifier gain control monitors the five conditions that follow to change between the three levels of gain in the table that follows:

a) The airplane is in the air
b) The gear is retracted
c) The takeoff inhibit is not enabled
d) The altitude is less than 32,000 feet and the MACH airspeed is more than 0.6
e) Duty Cycle.

GAIN (dB)	Conditions a) thru d)	Duty Cycle e)
90	All occur	First
84	All occur	Subsequent
84	One or more did not occur	First
78	One or more did not occur	Subsequent

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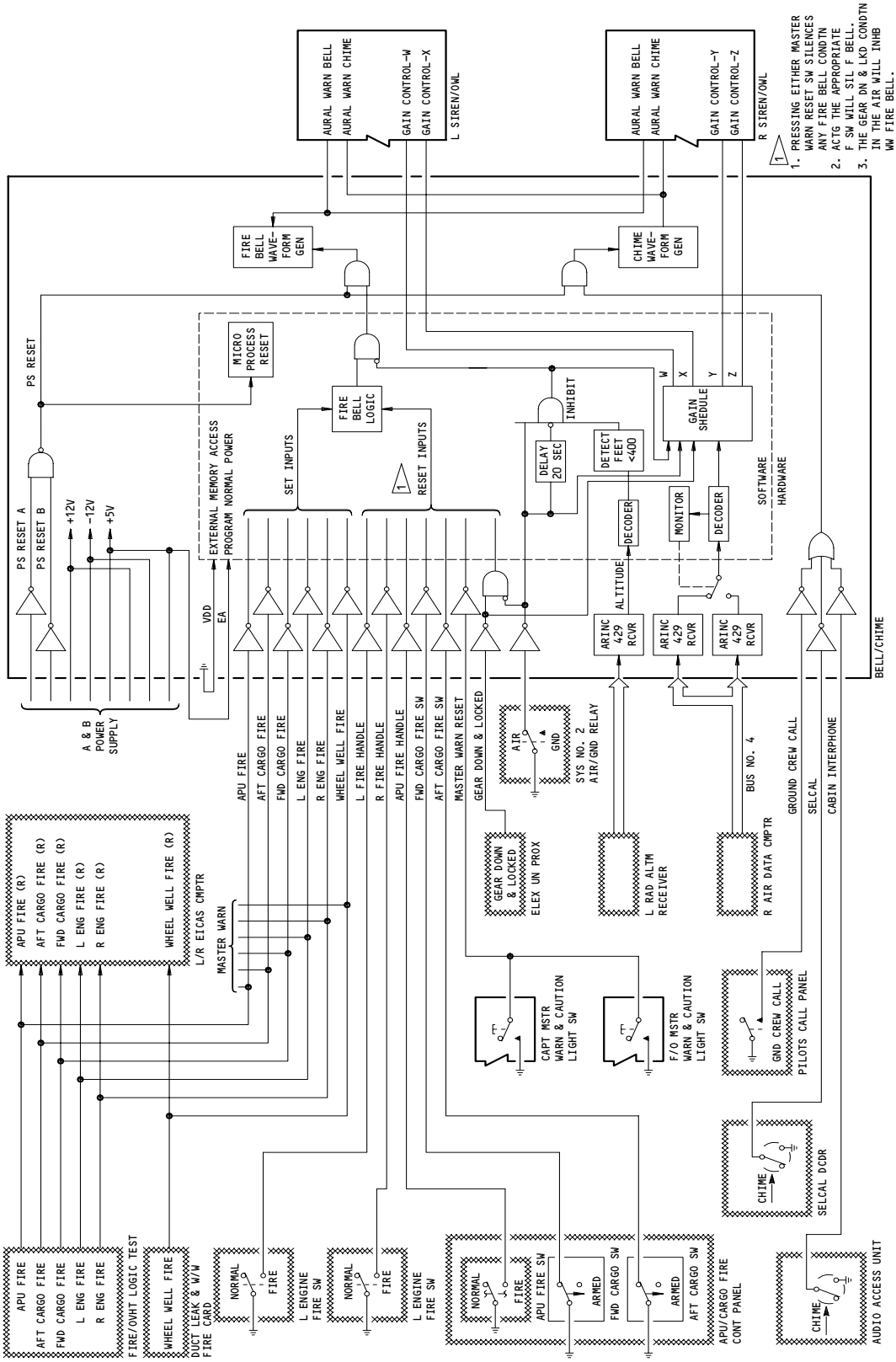

Bell/Chime Aural Warning Schematic
Figure 5

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4) The firebell warning is inhibited during takeoff. The inhibit is initiated when a logic 0 signal from the No. 2 AIR/GND relay is applied to the interface buffer circuit. The buffer circuit output is fed to the microprocessor. It processes the signal through the inhibit override logic to generate a logic 1 takeoff inhibit signal. It also starts the 20-second delay timer.
5) After 20 seconds or after 400 feet of radio altitude is reached, the microprocessor generates a logic 0. This signal is applied to the inhibit logic to cancel the inhibit functions.
6) The firebell function is cancelled if one of the following occurs:
   a) The left or right engine fire handle switch is pulled.
   b) The auxiliary power unit fire handle switch is pulled.
   c) The cargo compartment fire switch is set to the FWD or AFT position.
   d) Either the captain's or first officer's master WARNING light is pressed.
   e) The wheel well fire warning may be cancelled by placing the landing gear in down and locked position.
7) A fire bell self test is initiated by pressing the WHL WELL or the ENG/APU/CARGO switch on the FIRE/OVHT TEST panel on the pilots' control stand. The bell rings when the switch is pressed.

(c) Chime Function
1) There are three analog discrete input signals that enable the chime function on the aural warning module. These inputs provide logic 0 to the interface inverting buffer circuits. The discrete signals are generated when any of the following occur:
   a) The audio accessory unit sends a signal to the aural warning module when it receives an input from an attendant call to the flight compartment.
   b) A crew call is made from the APU remote shutdown panel, P40, in the nose wheel well.
   c) A selcal signal is generated from the selcal decoder, when installed.
2) The inverting buffer output signals enable the logic circuits which control the chime generator. The chime output is routed through the preamplifiers to the loudspeakers to provide the chime sound. The chime sound lasts for .9 seconds.

(5) Siren/Owl Aural Warning Module (Fig. 6)
(a) Two siren/owl aural warning modules are installed. The operation of the modules are identical and parallel. The left module drives the left aural warning loudspeaker. The right module drives the right aural warning loudspeaker. The modules receive ±12v dc generated by the power supply modules.

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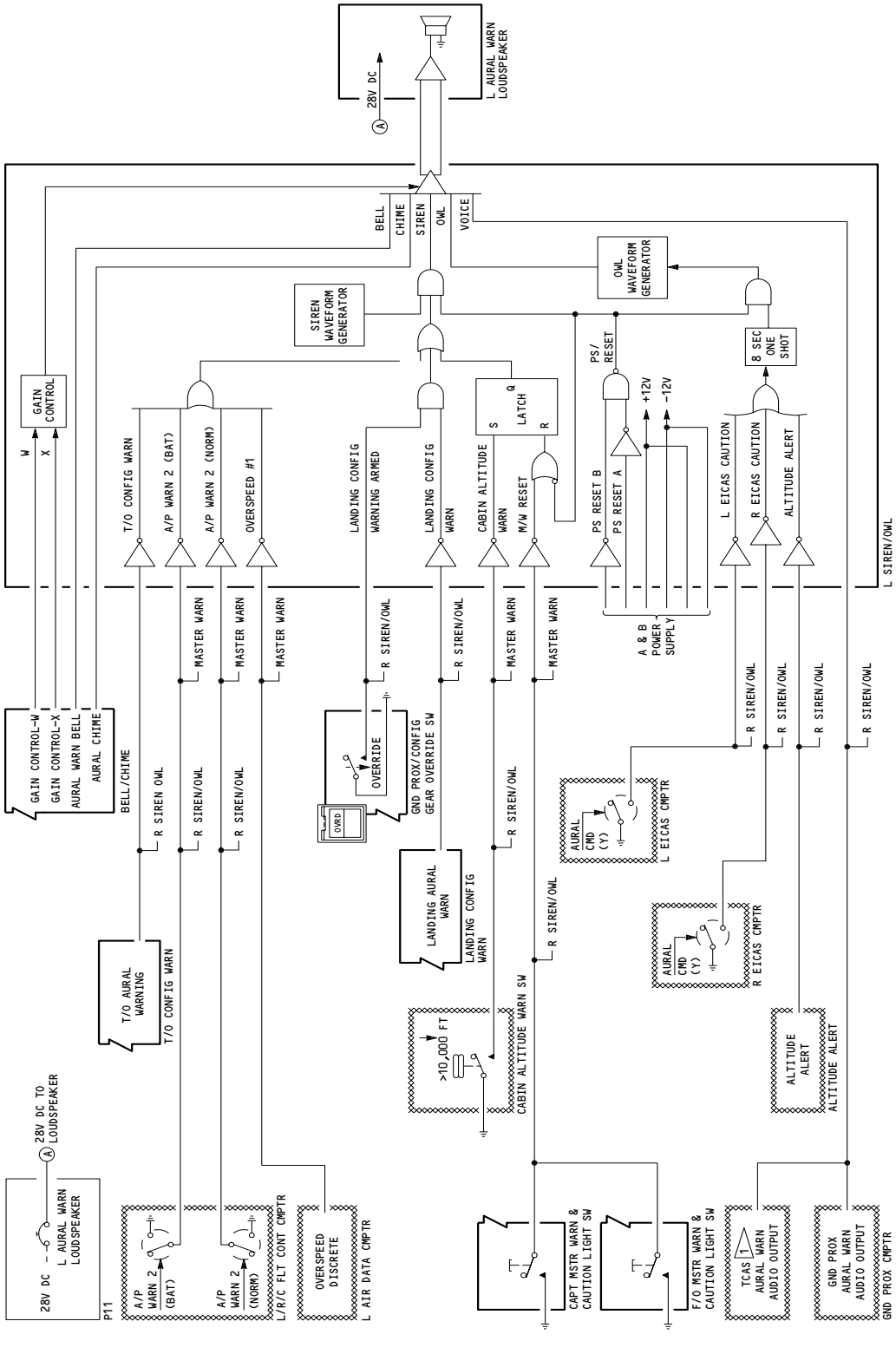

Siren/Owl Aural Warning Schematic (Example)
Figure 6

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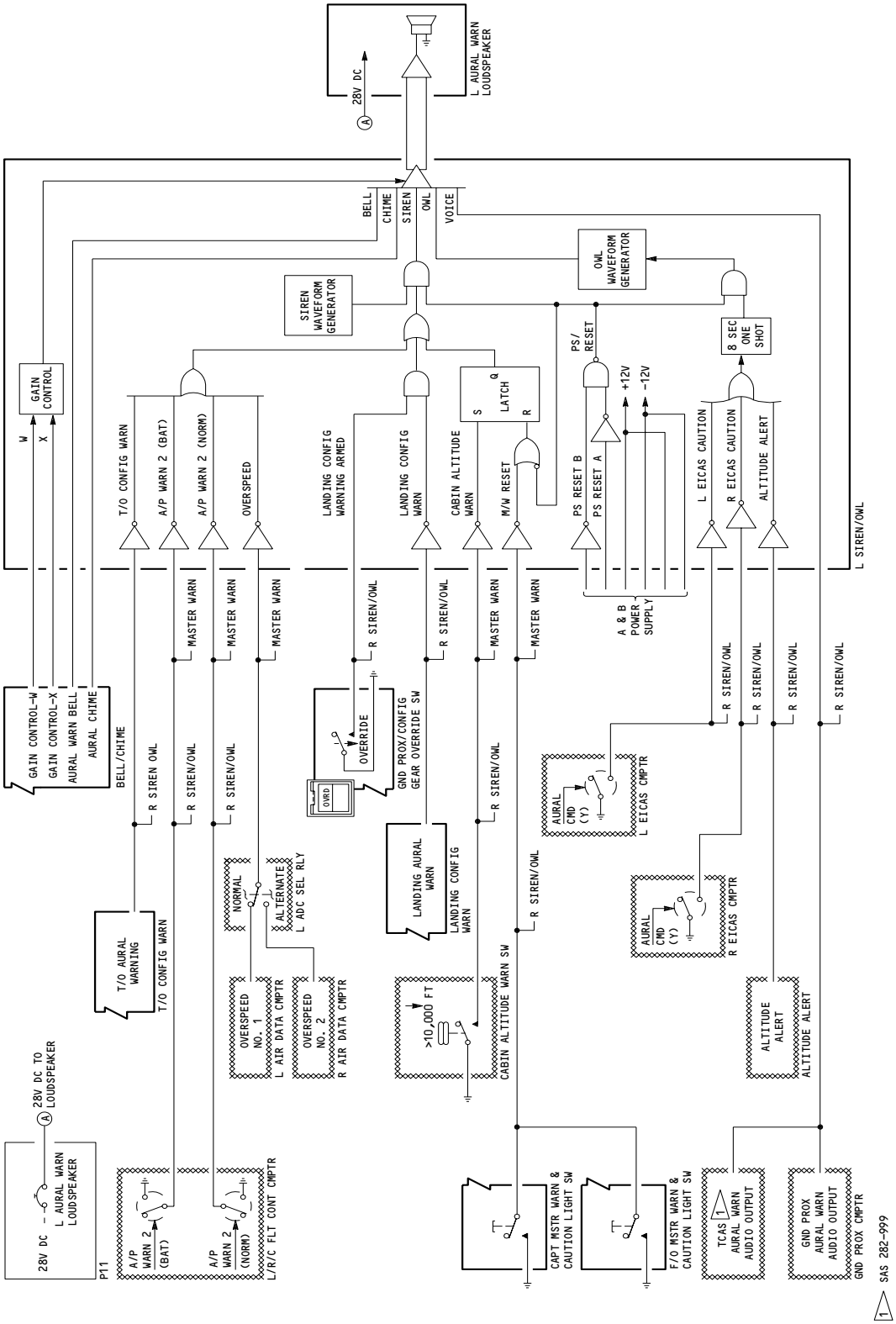

Siren/Owl Aural Warning Schematic (Example)
Figure 6A

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(b) Siren Function

1) The analog discrete input signals from other systems enable the siren function of the aural warning module. These are overspeed, autopilot disconnect, cabin altitude exceedance, and takeoff and landing configuration warning signal discretes. The overspeed discrete is supplied from the left or right air data computer or the air data inertial reference system . Autopilot disconnect No. 1 and No. 2 signals are supplied from the left, center, and right flight control computers. The 10,000 feet cabin altitude exceedance signal is provided by the cabin altitude warning switch. Takeoff and landing warnings are supplied from the configuration warning modules. The analog discretes provide a logic 0 to the module interface buffer circuit.

2) The inverting buffer output signals enable two sets of logic circuits. These circuits control two identical siren aural generators. The output signals are then routed through preamplifiers to the loudspeakers to give the siren sound. The siren sounds continuously until the warning condition is corrected or manually cancelled for the landing warning.

3) The landing configuration warning aural can be cancelled by pressing the GND PROX/CONFIG GEAR OVRD switch. This provides a logic 0 signal to the inverting input buffer circuit. The inverter buffer output signal controls the landing warning cancel circuit.

4) The 10,000 feet cabin altitude exceedance aural can be cancelled by pressing the master warning light.

(c) Owl Caution Aural (Level B) Function

1) The analog discrete input signals from other systems enable the electronic owl caution aural. These signals provide a logic 0 to the interface inverter buffer circuits. The discrete input signals from other systems are the following:

a) Altitude alert signals from the WEU altitude alert module

b) Level B cautions generated from the EICAS function.

2) The inverting buffer output signals enable two sets of logic circuits. These circuits control two identical caution aural generators. The output signals are then routed through the preamplifiers to the loudspeakers to provide the caution aural sound. The caution aural generators function in a leader/follower manner same as the siren generators.

(d) The siren/owl modules supply amplification for the bell/chime warnings and the ground proximity voice.

(e) SAS 281-999;
the siren/owl modules also amplify the TCAS aural outputs.

(6) Takeoff Configuration Warning Module Function (Fig. 7)

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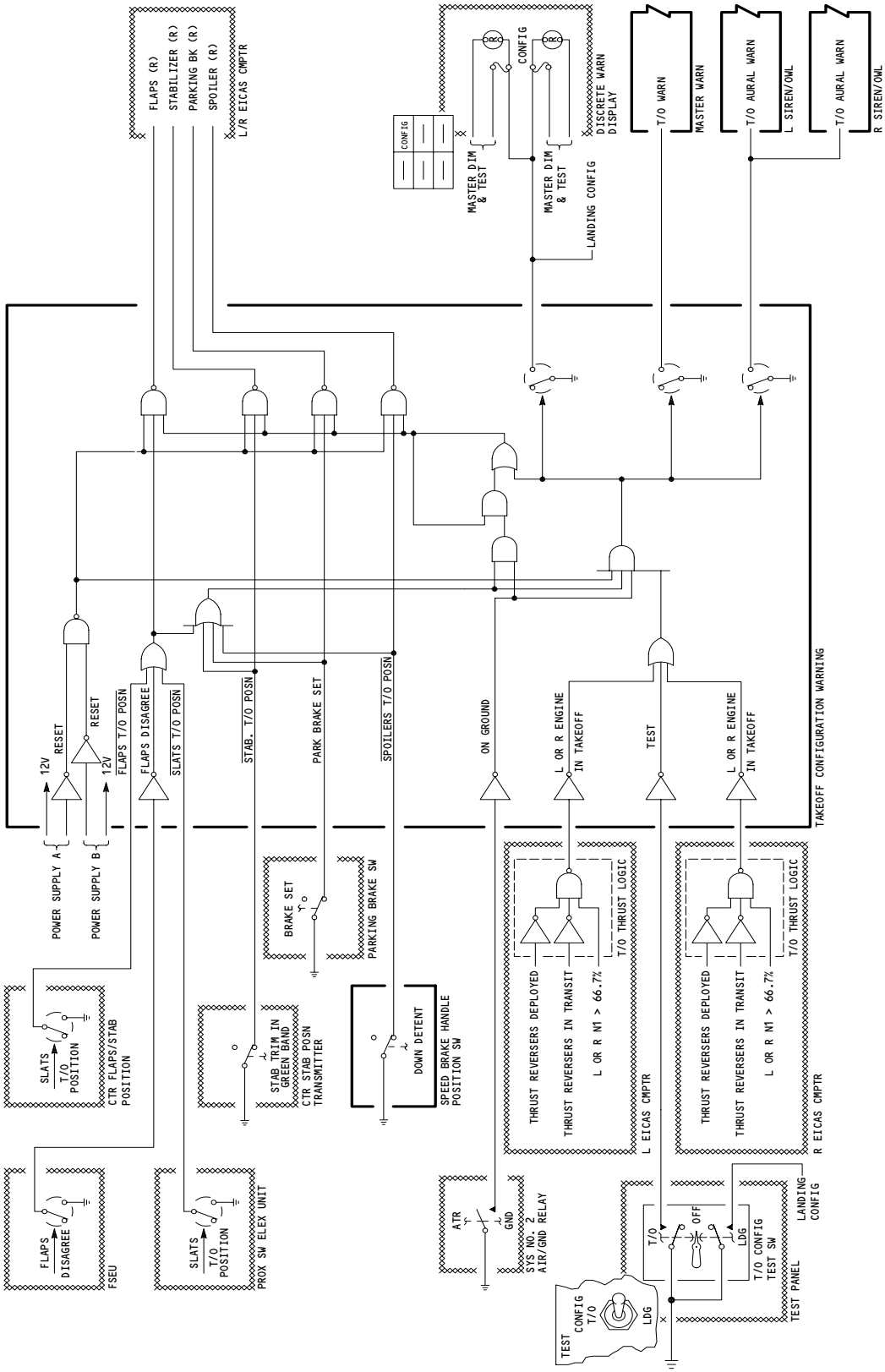

Takeoff Configuration Warning Schematic
Figure 7

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(a) The takeoff configuration warning module provides aural and visual warnings for improper airplane configuration during takeoff. The module receives a dual input of ±12 volts dc and +5 volts dc from power supply modules A and B.

(b) Seven areas are monitored for takeoff configuration warning. These are the flaps, slats, horizontal stabilizer, speed brake, parking brake, air/ground logic, and takeoff thrust logic.

(c) The takeoff warning logic is armed by signals from the air/ground logic and the takeoff thrust logic in the arming discrete circuits. The air/ground relay must be in the ground position. The L or R thrust lever must be in the takeoff position (N1 greater than 66.7 percent) with the thrust reverser not deployed or in transit. The enable output of the arming discrete circuits is routed to the four warning logic circuits.

(d) One of the arm/warning logic gates is enabled for each of the following conditions:

1) The FLAPS message logic circuit is enabled when any of the following conditions occur:
   a) The leading edge slats are not in the takeoff position.
   b) The trailing edge flaps are not in the takeoff position.
   c) The trailing edge flaps are not in the takeoff position.

      NOTE: ON 767-200 AIRPLANES, the flap positions for takeoff are 1, 5, 15, and 20. ON 767-300 AND 767-400 AIRPLANES, the flap positions for takeoff are 5, 15, and 20.

   d) The trailing edge flap positions disagree.
2) The STABILIZER message logic circuit is enabled when the horizontal stabilizer is not in the takeoff position (green band).
3) The PARKING BRAKE message logic circuit is enabled when the parking brake is in the SET position.
4) The SPOILERS message logic circuit is enabled when the speed brake handle is not in the down detent position.

(e) The output signal from each message logic circuit is applied to the latch circuit in the thrust lever logic path. This holds the warning condition after the thrust lever is returned to the idle position. It is then removed when the warning condition is corrected, or 8 to 15 seconds after the throttles are retarded.

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(f) The logic circuit control switching output circuits provide ground signals to the EICAS function. The EICAS function formats the FLAP, STABILIZER, PARKING BRAKE and SPOILERS messages for the upper display unit. Ground signals are also applied to the master warning module and configuration warning light. This turns on the master WARNING and CONFIG warning lights. In addition, a ground discrete is provided to the aural warning module which causes it to sound the siren.

(g) A takeoff configuration warning test is initiated by the CONFIG T/O - LDG test switch. Setting the test switch to T/O position simulates that the engine N1 is in the takeoff condition which arms the takeoff warning logic. One or all configuration error conditions are set to generate the test. The master warning turns on the CONFIG light and the siren. In addition, the EICAS displays the associated configuration error. The test stops when the test switch is released. The EICAS message displays remain on for 8 to 15 seconds.

(7) Landing Configuration Warning Module Function (Fig. 8)

(a) The landing configuration warning module provides aural and visual warnings for improper airplane configuration during landing. The module receives a dual input of ±12 volts dc and +5 volts dc from power supply modules A and B.

(b) The landing configuration warning consists of the master WARNING light, siren aural warning, CONFIG light, and level A EICAS message.

(c) The landing configuration warning logic is enabled when the module receives the landing gear not down and locked discrete signal from the proximity switch electronics unit.

(d) When this logic is enabled and any of the following conditions occur, the landing configuration warning is provided. The outputs for each condition are as listed below:

1) The trailing edge flaps are set to 25 or 30 degrees:
   a) red master WARNING lights
   b) amber CONFIG light
   c) siren aural warning
   d) level A EICAS message
2) Both left and right thrust levers are set to idle and the radio altitude is below 800 feet:
   a) red master WARNING lights
   b) amber CONFIG light
   c) siren aural warning
   d) level A EICAS message
3) Either left or right thrust lever is set to idle, the radio altitude is below 800 feet, and the time delay as noted below has expired:
   a) red master WARNING lights

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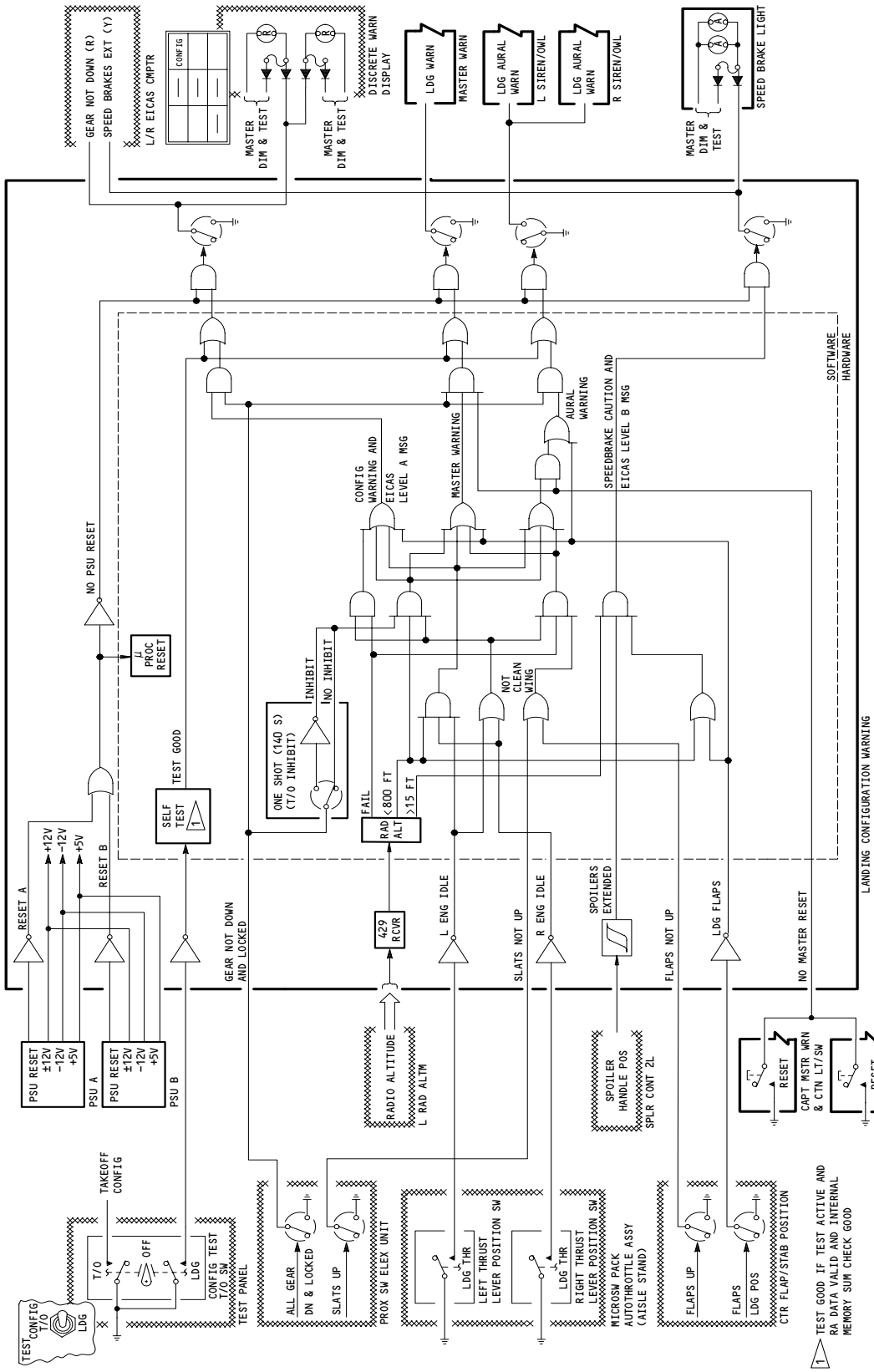

Landing Configuration Warning Schematic
Figure 8

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b) amber CONFIG light
c) siren aural warning
d) level A EICAS message

NOTE: A one time delay of 140 seconds is triggered by the edge of the landing-gear-up transition pulse. This delay allows the airplane to reach an altitude of greater than 800 feet and prevents a warning if only one engine is throttled back at takeoff or go-around. If either 140 seconds have elapsed or the airplane has exceeded 800 feet altitude, the system reverts back to providing a warning from a single engine throttle back.

4) A radio altimeter failure exists, either thrust lever is set to the idle position, and the airplane is in a clean wing configuration (flaps and slats are fully retracted):
   a) amber CONFIG light
   b) level A EICAS message
5) A radio altimeter failure exists, either thrust lever is set to the idle position, and either the flaps or slats are not fully retracted (NOT CLEAN WING):
   a) red master WARNING
   b) siren aural warning

(e) The microprocessor switching output circuits provide a ground signal to turn on the CONFIG warning light. It also provides ground signals to the master warning module for the master WARNING light, to the siren/owl aural warning module for the siren aural, and to the EICAS function for the level A EICAS message.

(f) Pressing either master WARNING light will close the reset switch and inhibit some output signals from the microprocessor switching circuits. This reset will always cancel the master WARNING lights. It will inhibit all aural warnings with the exception of the configuration of landing flaps and gear not down and locked. The CONFIG light and EICAS message will remain on until the improper configuration is corrected.

(g) The landing configuration aural warning may also be cancelled by pressing the GND PROX/CONFIG GEAR OVRD switch on the P3 panel. This is a L/R siren/owl aural warning module function (Fig. 6).

(h) A landing configuration warning test is initiated by means of the CONFIG T/O - LDG test switch on the miscellaneous test panel. Setting the test switch to LDG position provides a logic 0 discrete signal to the microprocessor. This initiates a circuit check and generates the siren aural warning and display of the master WARNING lights, CONFIG light, and level A EICAS message.

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(i) The speedbrake warning is generated by the landing configuration warning module in either of the following conditions:
1) RA > 15 feet and speedbrake lever is above the trip point (spoilers extended) and flaps are in the landing position.
2) 15 feet < RA < 800 feet and speedrake lever is above the trip point (spoilers extended).

(j) The speedbrake warning output from the landing warning module consists of the SPEEDBRAKES light and discrete output to EICAS. The microprocessor switching output circuits provide a ground signal to turn on the SPEEDBRAKES light. Ground signals are also provided to the EICAS function which generate an EICAS message, master CAUTION lights, and owl aural caution.
1) Pressing the master caution light will reset only the caution light and owl aural caution. The SPEEDBRAKES amber light and the EICAS message will remain on until the improper configuration is corrected by retracting the speedbrakes, climbing to 800 feet, or retracting the flaps.
2) The speedbrakes circuit can be tested by deploying the speedbrakes and pressing the LDG CONFIG test switch. This initiates a circuit test and generates the master CAUTION light, owl aural caution, SPEEDBRAKES light, and level B EICAS message.

B. BITE

(1) The WEU power supply fault indicators, one for each module, latches to black when the corresponding power supply is operating properly. When a fault occurs, the indicator latches to yellow. In addition, a fault discrete signal is sent to the EICAS function. To display a STATUS cue on the display unit, press the STATUS switch on the display select panel to display the status message.

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WARNING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER –	2		FLIGHT COMPARTMENT, P11	
AURAL WARN SPKR LEFT, C567		1	11B16	*
AURAL WARN SPKR RIGHT, C568		1	11H35	*
WARN ELEX A, C565		1	11J34	*
WARN ELEX B, C566		1	11B18	*
FILTER – 400 Hz EMI, M1102 (PSU A)	1	1	119AL, MAIN EQUIP CTR, P51	31-51-01
FILTER – 400 Hz EMI, M1103 (PSU B)	1	1	119AL, MAIN EQUIP CTR, P51	31-51-01
INDICATOR – WEU PSU A FAULT 1	1	1	119AL, MAIN EQUIP CTR, P51	*
INDICATOR – WEU PSU B FAULT 1	1	1	119AL, MAIN EQUIP CTR, P51	*
LIGHT – SPEEDBRAKES, L716	2	1	FLIGHT COMPARTMENT, P1-3	*
LOUDSPEAKER – LEFT AURAL WARNING, B56	2	1	FLIGHT COMPARTMENT – OVHD	*
LOUDSPEAKER – RIGHT AURAL WARNING, B57	2	1	FLIGHT COMPARTMENT – OVHD	*
MODULE – (FIM 27-32-00/101) LEFT STALL WARNING, M615 RIGHT STALL WARNING, M938 WEU BITE, M1411				
MODULE – (FIM 31-41-00/101) EICAS SIGNAL CONSOLIDATION CARD (SCC), M10727				
MODULE – (FIM 34-16-00/101) ALTITUDE ALERT, M617				
MODULE – BELL/CHIME AURAL WARNING, M1000	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
MODULE – DISCRETE WARNING DISPLAY, M779	1	1	FLIGHT COMPARTMENT, P1-3	*
MODULE – LANDING CONFIGURATION WARNING, M983	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
MODULE – LEFT SIREN/OWL AURAL WARNING, M999	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
MODULE – MASTER WARNING, M618	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
MODULE – POWER SUPPLY A, M616	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
MODULE – POWER SUPPLY B, M621	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
MODULE – RIGHT SIREN/OWL AURAL WARNING, M619	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
MODULE – T/O CONFIGURATION WARNING, M620	1	1	119AL, MAIN EQUIP CTR, P51	31-51-04
PANEL – (FIM 30-32-00/101) MISCELLANEOUS TEST, M10398				
RELAY – PSU A FAULT, K598	1	1	119AL, MAIN EQUIP CTR, P51	*
RELAY – PSU B FAULT, K599	1	1	119AL, MAIN EQUIP CTR, P51	*
SWITCH – CAPTAIN'S MASTER WARNING AND CAUTION LIGHTED, S507	2	1	FLIGHT COMPARTMENT, P7	*
SWITCH – CONFIGURATION WARNING TEST, S3	2	1	FLIGHT COMPARTMENT, P61	*
SWITCH – FIRST OFFICER'S MASTER WARNING AND CAUTION LIGHTED, S508	2	1	FLIGHT COMPARTMENT, P7	*
SWITCH – GND PROX/CONFIG GEAR OVRD, S604	2	1	FLIGHT COMPARTMENT, P3-1	*
SWITCH – SPEEDBRAKE HANDLE POSITION, S493	2	1	FLIGHT COMPARTMENT, P10	31-51-03
SWITCH – WEU PSU RESET 1	1	1	119AL, MAIN EQUIP CTR, P51	*

* SEE THE WDM EQUIPMENT LIST

1 THE PSU RESET AND THE PSU A AND B FAULT INDICATORS ARE IN THE WEU BITE MODULE.

Warning System – Component Index
Figure 101

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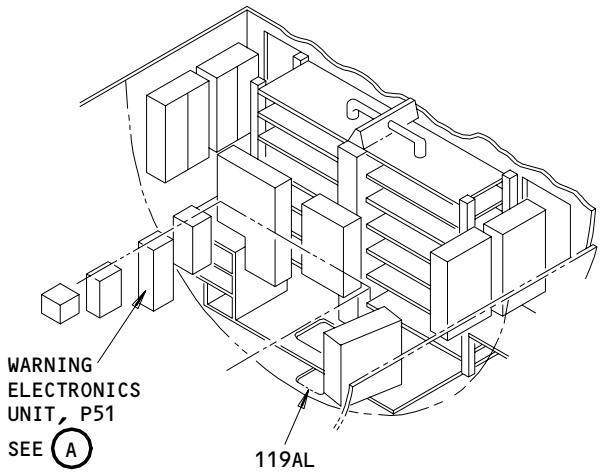
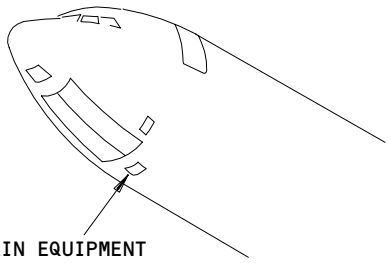
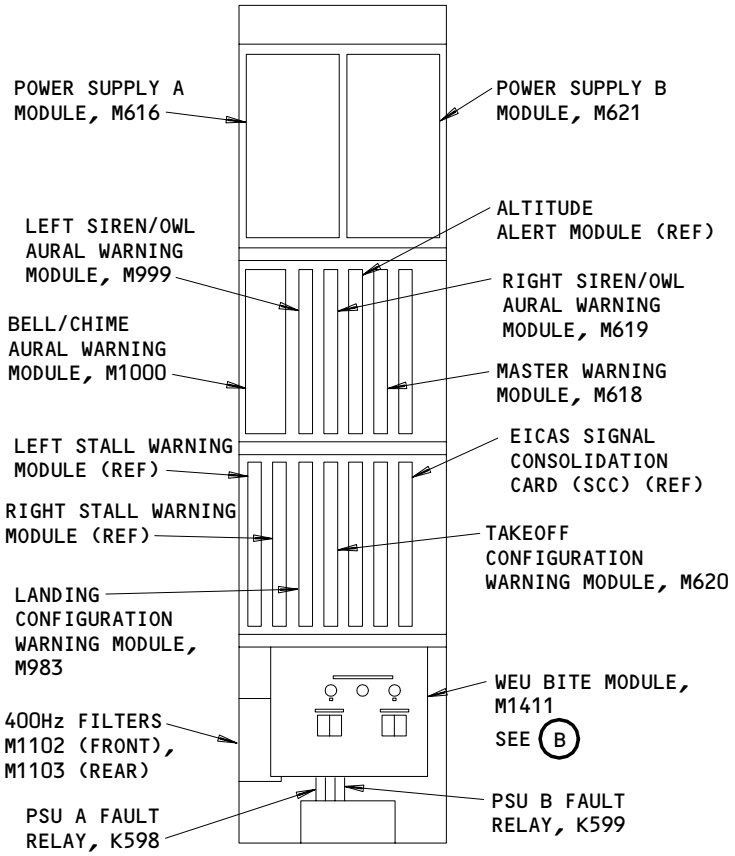


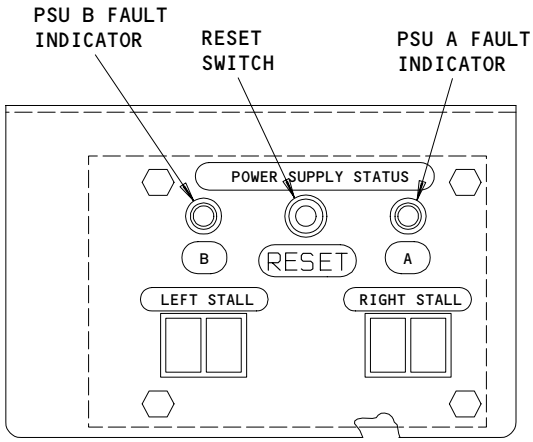
MAIN EQUIPMENT CENTER





WARNING ELECTRONICS UNIT, P51

A



WEU BITE MODULE, M1411

B

Warning System - Component Location
Figure 102 (Sheet 1)

586287
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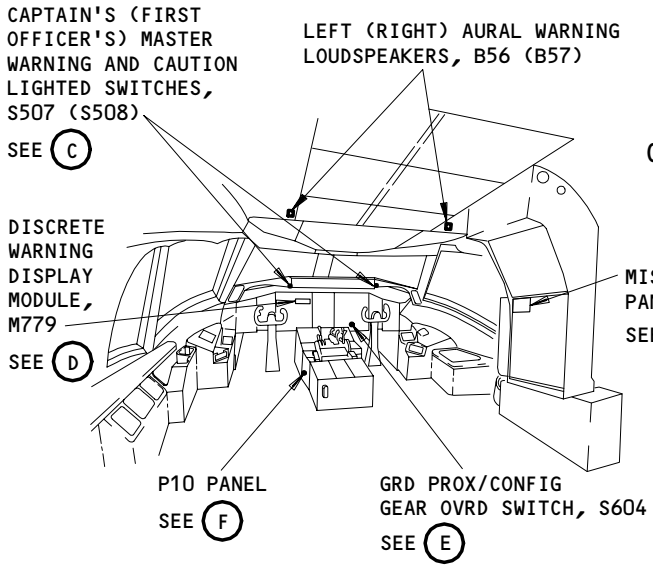
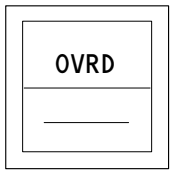


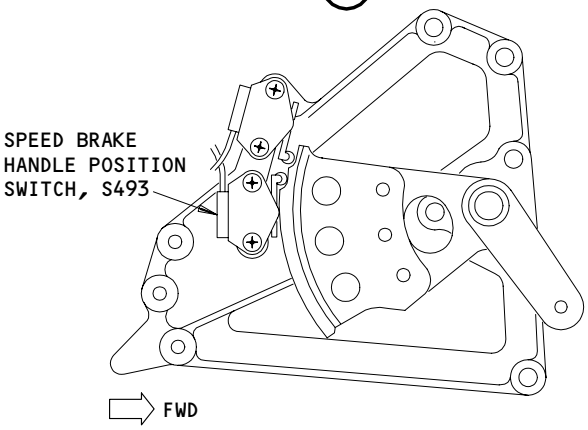
FLIGHT COMPARTMENT



GND PROX/CONFIG GEAR OVRD

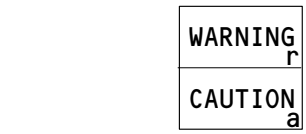
GND PROX/CONFIG GEAR OVRD SWITCH, S604

E



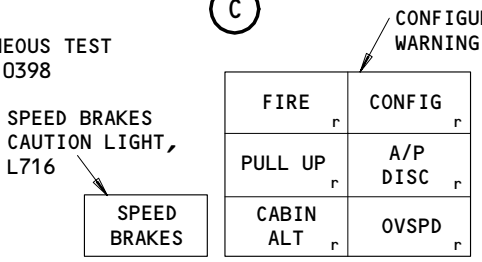
SPEED BRAKE

G



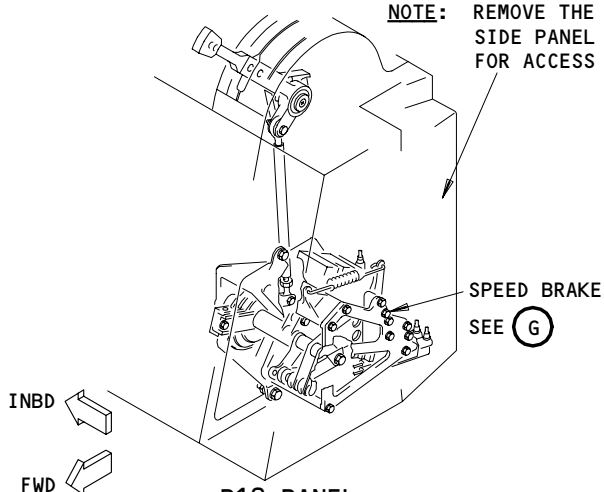
CAPTAIN'S (FIRST OFFICER'S) MASTER WARNING AND CAUTION LIGHTED SWITCHES, S507 (S508)

C



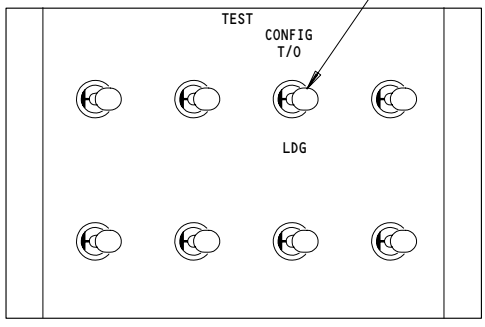
DISCRETE WARNING DISPLAY MODULE, M779

D



P10 PANEL

F



MISCELLANEOUS TEST PANEL, M10398

H

Warning System - Component Location
Figure 102 (Sheet 2)

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WARNING SYSTEM - ADJUSTMENT/TEST

1. General
   A. The Warning System Adjustment/Test supplies procedures for a test of the inputs to the system. Tests of the warning electronics unit (refer to as the WEU) power supply, master warning, aural warning, and configuration warning modules for correct operation are also done. The stall warning and altitude alert module tests are done in AMM 27-32-00 and AMM 34-16-00.

   TASK 31-51-00-725-001
2. System Test - Warning System
   A. Equipment
      (1) Airspeed/Altitude Simulator - ERA 82305
          Era Manufacturing Company
          Division of Ocean Technology Corporation
          789 Front Street
          Burbank, CA 91505 (Recommended)

          Commercially Available (Alternative)
      (2) Proximity Sensor Actuator/Deactuator Set - A27092-84 (3 rectangular sensor actuators are necessary for each system)

          NOTE: The actuators are not necessary if you lift the airplane to simulate the air mode.

      (3) Warn Electrical Shorting Module - A31006-7
      (4) Sound Level Meter - General Radio 1565-9910
          Genrad Inc.
          300 Baker Avenue
          Concord, MA 01742
   B. References
      (1) AMM 10-11-01/201, Normal Parking
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
      (3) AMM 20-41-01/201, Electrostatic Sensitive Devices

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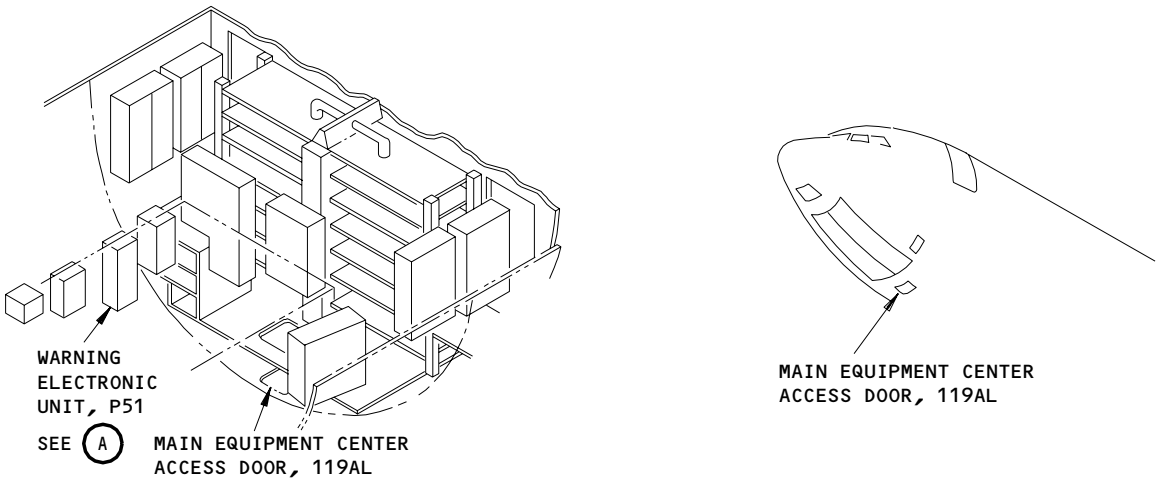
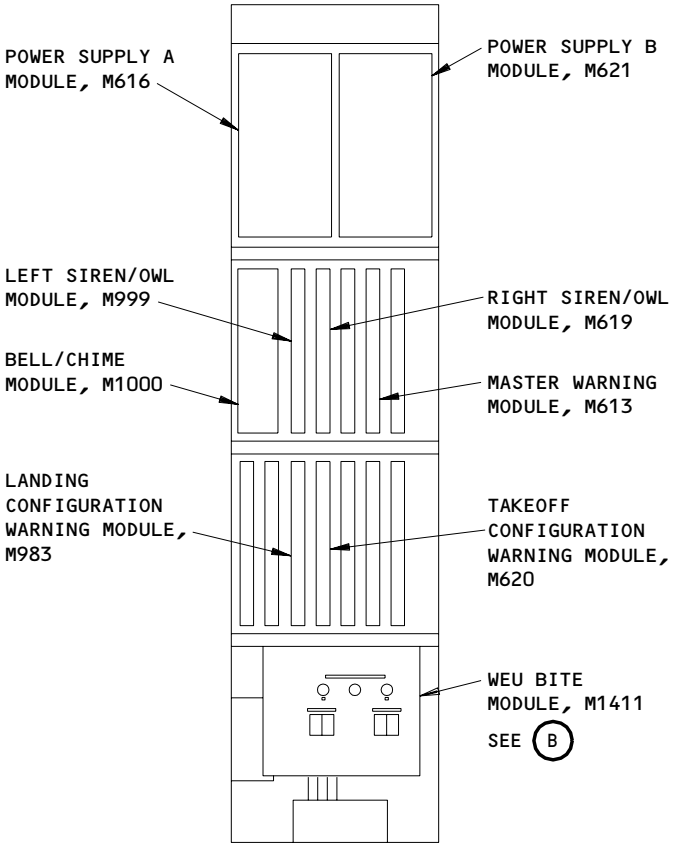
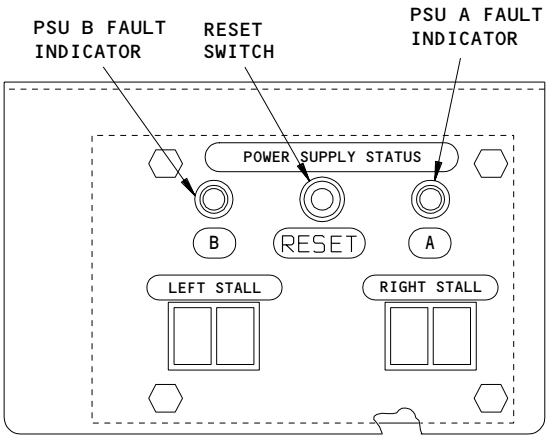


MAIN EQUIPMENT CENTER



WARNING ELECTRONICS UNIT, P51

A



WEU BITE MODULE, M1411

B

Warning Electronics Unit - Component Location
Figure 501

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(4) AMM 21-31-00/501, Pressurization Control
(5) AMM 23-21-00/501, Selcal System
(6) AMM 23-41-00/501, Service Interphone System
(7) AMM 23-42-00/501, Cabin Crew Call System
(8) AMM 23-43-00/501, Ground Crew Call System
(9) AMM 24-22-00/201, Electrical Power - Control
(10) AMM 26-11-00/501, Engine Fire Detection System
(11) AMM 26-15-00/501, APU Fire Detection System
(12) AMM 26-16-00/501, Lower Cargo Compartment Smoke Detection System
(13) AMM 27-48-00/501, Stabilizer Trim Position Indicating System
(14) AMM 27-61-00/201, Spoiler/Speedbrakes System
(15) AMM 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
(16) AMM 31-41-00/201, Engine Indication and Crew Alerting System
(17) AMM 31-51-04/401, Warning Electronics Unit Card Modules
(18) AMM 32-09-02/201, Air/Ground Relays
(19) AMM 34-11-00/201, Pitot-Static System
(20) AMM 34-12-00/501, Air Data Computing System
(21) AMM 34-12-00/501, Air Data Computing System
(22) AMM 34-33-00/201, Radio Altimeter System
(23) AMM 34-46-00/501, Ground Proximity Warning System

C. Access

(1) Location Zones

211/212	Flight Compartment
312	Area Aft of Pressure Bulkhead to BS 1787.45

(2) Access Panels

119AL	Main Equipment Center Access Panel

D. Prepare for Test

S 865-002
(1) Supply electrical power (AMM 24-22-00/201).

S 865-003
(2) Make sure that the six EICAS circuit breakers are closed.

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S 865-005
(3) Do the procedure for the removal of the EICAS Engine Shutdown Inhibit (AMM 31-41-00/201).

S 485-006
(4) Connect the RA test set to the left Radio Altimeter Transceiver in the main equipment center (AMM 34-33-00/201).

E. Master Warning/Caution Light Test

S 865-007
(1) On the right overhead light control panel, push the TEST switch.

S 215-008
(2) On the glareshield, make sure that the captain's and first officer's WARNING and CAUTION lights come on.

S 215-009
(3) On the instrument panel, make sure that the red CONFIG light comes on.

S 865-010
(4) On the right overhead light control panel, push the TEST switch to remove the electrical power from the test circuits.

F. Power Supply Fault Indicators Test

S 865-011
(1) Open these circuit breakers on the overhead circuit breaker panel, P11:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

S 845-012

CAUTION: DO NOT TOUCH THE MASTER WARNING MODULE BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE MASTER WARNING MODULE.

(2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

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S 035-013
(3) Remove the master warning module, M618, from the WEU (P51 panel), and replace with the Warn Electronic shorting module (AMM 31-51-04/401).

S 865-014
(4) Close and then open the P11 panel circuit breakers that follow within five seconds:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

S 215-015
(5) On the WEU BITE module, make sure that both Power Supply Unit (PSU) lower P51 panel fault indicators show a yellow fault ball.

NOTE: The left fault indicator identifies a PSU B, M621, failure. The right fault indicator identifies a PSU A, M616, failure.

S 485-016
(6) Remove the Warn Electronic shorting module and replace with the master warning module (AMM 31-51-04/401).

S 865-017
(7) Close the P11 panel circuit breaker that follows:
(a) 11J34, WARN ELEX A

S 865-018
(8) Push the POWER SUPPLY RESET switch on the WEU bite module.
(a) Make sure that the PSU A failure indicator changes from yellow ball to a black ball.

S 865-019
(9) Close the P11 panel circuit breaker that follows:
(a) 11B18, WARN ELEX B

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S 865-020
(10) Push the POWER SUPPLY RESET switch on the WEU bite module.
(a) Make sure that the PSU B failure indicator changes from yellow ball to a black ball.

G. Owl Input Discretes Test

S 865-021
(1) Make sure the following circuit breaker on the P11 panel is closed:
(a) 11J29, EICAS CMPTR R

S 865-022
(2) Open the following P11 panel circuit breaker:
(a) 11J02, EICAS CMPTR L

S 865-023
(3) Set the Parking Brake to on.

S 865-024
(4) Push and release the EICAS Self Test button on the right side panel P61
(a) Make sure that the OWL AURAL sounds.

NOTE: The siren aural warning and CAUTION lights will also come on. These signals can be ignored.

S 865-025
(5) Open the following P11 panel circuit breaker:
(a) 11J29, EICAS CMPTR R

S 865-026
(6) Close the following P11 panel circuit breaker:
(a) 11J02, EICAS CMPTR L

S 865-027
(7) Push and release the EICAS Sefl Test button on the right side panel P61.

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S 215-028
(8) Make sure that the OWL AURAL sounds.

S 865-029
(9) Push and release the EICAS Self Test button to return EICAS to normal operation.

S 865-030
(10) Close the following P11 panel circuit breaker:
(a) 11J29, EICAS CMPTR R

H. Crew Call Test

S 865-031
(1) Make sure that these P11 circuit breakers are closed:
(a) 11B16, AURAL WARN SPKR L
(b) 11B18, WARN ELEX B
(c) 11C23, INTERPHONE CABIN SERVICE
(d) 11H32, GND CALL
(e) 11H35, AURAL WARN SPKR RIGHT
(f) 11J34, WARN ELEX A

S 865-032
(2) Make sure that the cabin interphone system operates correctly (AMM 23-42-00/501).

S 865-034
(3) Momentarily push the FLIGHT DECK call switch on the APU shutdown panel in the nose wheel well.
(a) Make sure that a chime sound is heard.

S 865-035
(4) Open this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 865-036
(5) Momentarily push the PILOT switch on a cabin interphone headset.
(a) Make sure that a chime sound is heard from the two aural warning speakers.

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S 865-038
(6) Close this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 865-039
(7) Open this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 865-040
(8) Momentarily push the PILOT switch on a cabin interphone headset.
(a) Make sure that a chime sound is heard from the two aural warning speakers.

S 865-042
(9) Close this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 845-043
(10) Do the SELCAL System Adjustment/Test to make sure that a chime sound can be made from the SELCAL system (AMM 23-21-00).

I. Fire Bell Warning Signals Test

S 865-044
(1) Make sure you did the Prepare for Test.

S 865-045
(2) Set the Radio Altimeter test set to 390 feet.

S 865-046
(3) Make sure that these P11 panel circuit breakers are closed:
(a) 11B16, AURAL WARN SPKR L
(b) 11B18, WARN ELEX B
(c) 11B20, FIRE DETECTION LEFT ENG 1
(d) 11B21, FIRE DETECTION LEFT ENG 2
(e) 11H35, AURAL WARN SPKR R
(f) 11J34, WARN ELEX A

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S 845-047

WARNING: PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE # YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERATE. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Prepare the safety-sensitive systems for air mode simulation (AMM 32-09-02/201).

S 865-048

(5) Open these P11 panel circuit breakers:
(a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)
(b) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-049

(6) Activate the nose gear not-compressed system 2 sensor switch, S266. to simulate an in-air condition.

NOTE: The switch can be activated with a sensor actuator. The actuator is to be held within 0.15 inches of the sensor. Masking tape or the equivalent can be used to hold the actuator in the necessary position.

S 865-050

(7) Close the following P11 panel circuit breakers:
(a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)
(b) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS2

NOTE: This starts the 20 second timer for the fire bell so it will not come on during takeoff. Perform the next two steps within these 20 seconds. If these steps are not completed within the time limit, open and close the LANDING GEAR POSITION AIR/GND SYS 2 and the LANDING GEAR POSITION AIR/GND SYS 2 ALT circuit breakers and begin again.

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S 865-051
(8) Push and hold the ENG/APU CARGO (or the FIRE/OVHT TEST) test button.
  (a) Make sure that the FIRE BELL and Master Warning lights are off for approximately 20 +/- 5 seconds after closing the CB/s in the previous step, and that the Master Warning Lights are on and FIRE BELL sounds continuously thereafter.

    NOTE: Allow 40 seconds to complete step.

S 865-052
(9) Release the ENG/APU CARGO (or FIRE/OVHT) test button.
  (a) Make sure the Master Warning Lights go off and FIRE BELL does not sound.

S 865-053
(10) Make sure the safety-sensitive system is prepared for the air-mode simulation (32-09-02/201).

S 865-054
(11) Open these P11 panel circuit breakers:
  (a) 11U23 or 11U24, LANDING GEAR POSITON AIR/GND SYS 2
  (b) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)

S 865-055
(12) Set the Radio Altimeter Test set to 410 feet.

S 865-056
(13) Close these P11 panel circuit breakers:
  (a) 11CU23 or 11U24, LANDING GEAR POSITION AIR/GND SYS 2
  (b) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 - ALT (if installed)

    NOTE: This starts the 20 second timer for the fire bell so it will not come on during takeoff. Perform the next two steps within these 20 seconds. If these steps are not completed within the time limit, open and close the LANDING GEAR POSITION AIR/GND SYS 2 and the LANDING GEAR POSITION AIR/GND SYS 2 ALT circuit breakers and begin again.

S 865-057
(14) Push and hold the ENG/APU CARGO (or FIRE/OVHT) test button.
  (a) Make sure the Master Warning Lights are on and FIRE BELL sounds.

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S 865-058
(15) Push and release the Capt's or F/O's Master WARNING Switch on P7 glareshield.
(a) Make sure the Master Warning lights are off and the Fire bell does not sound.

NOTE: At least 11 seconds must be allowed.

S 865-059
(16) Release the ENG/APU CARGO (or FIRE/OVHT) test button.

S 865-060
(17) Close this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 865-061
(18) Open this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 865-062
(19) Push and hold the ENG/APU CARGO (or FIRE/OVHT) test button.
(a) Make sure the Master Warning lights come on and Fire bell sounds.

NOTE: ALL SAS AIRPLANES;
The fire bell comes on for approximately 0.8 seconds at 10.0 second intervals.

NOTE: ALL MTH AIRPLANES;
The fire bells comes on for approximately 2.0 seconds at 5.0 second intervals.

S 865-063
(20) Push and release the Captain's or F/O's Master Warning Lights switch on P7 glareshield.
(a) Make sure the Master Warning lights are off and Fire bell does not sound.

NOTE: At least 11 seconds must be allowed.

S 865-064
(21) Release the ENG/APU CARGO (or FIRE/OVHT) switch.

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S 865-065
(22) Close this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 865-066
(23) Remove all test actuators or deactuators from the air/ground relays.

J. Wheel Well Fire Test

S 865-067
(1) Make sure these P11 panel circuit breakers are closed:
(a) 11B10, W/W FIRE/DUCT LEAK (or WW FIRE DETECTION)
(b) 11B33, W/W FIRE IND (or WHEEL WELL FIRE IND/TEST)

S 865-068
(2) Make sure these P11 panel circuit breakers are closed:
(a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1
(b) 11U23 or 11U24, LANDING GEAR POSITION AIR/GND SYS 2
(c) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 - ALT (if installed)

S 865-069
(3) Make sure that these gear down-and-locked switches are actuated:

NOTE: The switches can be activated with a sensor actuator. The actuator is to be held within 0.15 inches of the sensor. Masking tape or the equivalent can be used to hold the actuator in the necessary position.

(a) S232, Nose Gear Down
(b) S233, Nose Gear Locked
(c) S236, Left Side Brace Down
(d) S237, Left Drag Brace Down
(e) S240, Right Side Brace Down
(f) S241, Right Drag Brace Down
(g) S254 Nose Gear Down
(h) S255 Nose Gear Locked
(i) S258 Left Side Brace Down
(j) S259 Left Drag Brace Down
(k) S262 Right Side Brace Down
(l) S263 Right Drag Brace Down

S 865-070
(4) Make sure the Master Warning lights on glareshield are off, and Fire bell does not sound.

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S 865-071
(5) Push and hold the WHL WELL Fire Test switch on the Aft pilot control stand P8.
(a) Make sure the Master Warning lights are on and Fire Bell sounds.

NOTE: At least 20 seconds must be allowed.

S 865-072
(6) Release the WHL WELL FIRE test switch.
(a) Make sure Master Warning lights are off and Fire bell does not sound.

S 865-073
(7) Put on an actuating device adjacent to this proximity sensor:
(a) S266 Nose Gear Not Compressed SYS 2

NOTE: The maximum actuation gap is 0.15 inches. The actuator may touch the sensing surfaces of the sensors.

S 865-074
(8) Deactuate one of the following system 2 landing gear proximity switches:
(a) S254 NOSE GEAR DOWN
(b) S255 NOSE GEAR LOCKED
(c) S258 LEFT SIDE BRACE DOWN
(d) S259 LEFT DRAG BRACE DOWN
(e) S262 RIGHT SIDE BRACE DOWN
(f) S263 RIGHT DRAG BRACE DOWN

S 865-075
(9) Make sure the Master Warning lights on glareshield are off and Fire bell does not sound.

S 865-076
(10) Push and hold the WHL WELL Fire Test switch on the Aft pilot control stand P8.
(a) Make sure the Master Warning lights on the glareshield are on and Fire bell remains off.

NOTE: At least 20 seconds must be allowed.

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S 865-077
(11) Release the WHL WELL Fire test switch.
(a) Make sure the Master Warning lights are off and Fire bell does not sound.

S 865-078
(12) Open this P11 panel circuit breaker:
(a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1

S 865-079
(13) Verify the following:
(a) Master Warning lights on the glareshield are on
(b) Siren aural warning sounds
(c) Red EICAS message, GEAR NOT DOWN, shows on the EICAS display

S 865-080
(14) Adjust Radio Altimeter to 850 feet.
(a) Make sure the Master Warning lights on glareshield are off and Fire bell does not sound.

S 865-081
(15) Push and hold the WHL WELL Fire test switch on the Aft pilot control stand P8.
(a) Make sure the Master Warning lights on glare shield are on and Fire bell sounds.

NOTE: At least 20 seconds must be allowed

S 865-082
(16) Release the WHL WELL Fire test switch.
(a) Make sure the Master Warning lights are off and Fire bell does not sound.

S 865-083
(17) Actuate the following system 2 landing gear proximity switches:
(a) S254 NOSE GEAR DOWN
(b) S255 NOSE GEAR LOCKED
(c) S258 LEFT SIDE BRACE DOWN
(d) S259 LEFT DRAG BRACE DOWN
(e) S262 RIGHT SIDE BRACE DOWN
(f) S263 RIGHT DRAG BRACE DOWN

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S 865-084
(18) Push and hold the WHL WELL Fire test switch on the Aft pilot control stand P8.
(a) Make sure the Master Warning lights on glareshield are on and Fire bell does not sound.

NOTE: At least 20 seconds must be allowed.

S 865-085
(19) Release the WHL WELL Fire test switch.
(a) Make sure the Master Warning lights on glareshield are off and Fire bell does not sound.

S 865-086
(20) Close this P11 panel circuit breaker:
(a) 11C30, LANDING GEAR POSITION AIR/GND SYS 1

S 865-087
(21) Deactuate the nose gear not-compressed sensor switch.

S 845-088
(22) Put the deactivated systems back to their usual condition (AMM 32-09-02).

NOTE: The other fire bell inputs are examined in these adjustment/tests:
- Engine Fire Detection (AMM 26-11-00/501)
- APU Fire Detection (AMM 26-15-00/501)
- Lower Cargo Compartment Smoke Detection (AMM 26-16-00/501)

K. Ground Proximity Warning System Aural Signals Test

S 845-089
(1) Make sure that the Ground Proximity Warning System operates correctly (AMM 34-46-00).

S 865-090
(2) Open these P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11H35, AURAL WARN SPKR R

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S 865-091
(3) Set the GND PROX switch on the TEST panel to the test position for approximately three seconds.
(a) Make sure that the GLIDESLOPE aural warning comes on from the captain's aural warning speaker.
(b) Make sure that the master warning lights come on.

S 865-092
(4) Open these P11 panel circuit breakers:
(a) 11B16, AURAL WARN SPKR L
(b) 11J34, WARN ELEX A

S 865-093
(5) Close these P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11H35, AURAL WARN SPKR R

S 865-094
(6) Set the GND PROX switch on the TEST panel to the test position for approximately three seconds.
(a) Make sure that the GLIDESLOPE, WHOOP-WHOOP PULL-UP aural warning comes on from the first officer's aural warning speaker.
(b) Make sure that the master warning lights come on.

S 865-095
(7) Close these P11 panel circuit breakers:
(a) 11B16, AURAL WARN SPKR L
(b) 11J34, WARN ELEX A

L. Cabin Altitude Warning Signals Test

S 485-096
(1) Connect the airspeed/altitude simulator to the cabin altitude warning switch, S431 (Ref 21-31-00).

S 865-097
(2) Slowly adjust the simulator to increase the flight compartment altitude.
(a) Make sure that the WARNING lights come on when the flight compartment altitude is 10,000 +/-300 feet.

S 865-098
(3) Slowly decrease the flight compartment altitude to 0 feet.
(a) Make sure that the WARNING lights go off.

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S 085-099
(4) Disconnect the airspeed/altitude simulator (Ref 21-31-00).

M. Overspeed Warning Signals Test

S 865-100
(1) Make sure that the AIR DATA circuit breakers on the P11 panel (six locations) are closed.

S 865-101
(2) Make sure that there is no pressure on the pitot-static system.

S 865-102
(3) Push and hold the right Air Data CMPTR test switch on the P61 right side test panel.
(a) Make sure that the Master WARNING lights come on.
(b) Make sure that the siren aural sounds for approximately two seconds on the F/O's warning speaker only.
(c) Push one of the WARNING lights.
1) AIRPLANES WITH OVERSPEED SIREN CANCEL FEATURE;
Make sure that the siren aural warning goes off.

S 865-103
(4) Release the right Air Data CMPTR test switch on the P61 right side test panel.

S 865-104
(5) Close this P11 panel circuit breaker:
(a) 11A10, AIR DATA CMPTR L

S 865-105
(6) Push and hold the left Air Data CMPTR test switch on the P61 test panel.
(a) Make sure the siren sounds for approximately two seconds on Captain's warning speaker only.

S 865-106
(7) Release the left Air Data CMPTR test switch on the P61 test panel.

S 865-107
(8) Put on 370 +/- 2 KTS (equivalent to 0.569 M) pressure to the pitot line.
(a) Make sure Master Warning Lights are on
(b) Make sure siren sounds on both Capt's and F/O's speakers.
(c) Make sure the red EICAS message, OVERSPEED, shows on the EICAS display.

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S 865-108
(9) Push and release the Captain Master Warning switch on glareshield.
(a) Make sure Master Warning Lights go off.
(b) AIRPLANES WITH OVERSPEED SIREN CANCEL FEATURE;
Make sure the siren go off.
(c) Make sure the red EICAS message, OVERSPEED, remains on the EICAS display.

S 865-109
(10) Put on 350 +/- 2 KTS (equivalent to 0.538 M) pressure to the pitot line.
(a) Make sure the red EICAS message, OVERSPEED, goes out of view on the EICAS display.

S 865-110
(11) Put on 370 +/- KTS (equivalent to .569 M) pressure to the pitot line.
(a) Make sure Master Warning Lights are on
(b) Make sure the siren is on.
(c) Make sure the red EICAS message, OVERSPEED, shows on the EICAS display.

S 865-111
(12) Push and release the F/O's Master Warning switch on glareshield.
(a) Make sure Master Warning Lights are not on.
(b) AIRPLANES WITH OVERSPEED SIREN CANCEL FEATURE;
Make sure the siren go off.
(c) Make sure the red EICAS message, OVERSPEED, remains on the EICAS display.

S 865-112
(13) Put on 0 KTS (equivalent to .5 M) pressure to the pitot line.
(a) Make sure the red EICAS message, OVERSPEED, goes out of view on the EICAS display.

N. Aural Amplifier Gain Signal Test

S 865-113
(1) Connect the pitot-static test set to the F/O's pitot-static system (AMM 34-11-00/201).

S 865-114
(2) Open this P11 panel circuit breaker:
(a) 11H35, AURAL WARN SPKR R

S 865-115
(3) Make sure these P11 panel circuit breakers are closed:
(a) 11B16, AURAL WARN SPKR L

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(b) 11J34, WARN ELEX A

S 865-116
(4) Set the Parking Brake to on.

S 865-118
(5) Push and hold the CONFIG switch on the P61 panel in the T/O position.

S 865-119
(6) Set the sound lever meter to DBA and slow response.

S 865-120
(7) Measure the acoustic output at 23.5 through 24.5 inches perpendicularly from the center of the Capt's speaker.
(a) Make sure the acoustic output to be 90 +/- 5 dba.

S 865-122
(8) Release the T/O CONFIG on the P61 Test panel.

S 865-123
(9) Close this P11 panel circuit breaker:
(a) 11H35, AURAL WARN SPKR R

S 865-124
(10) Open this P11 panel circuit breaker:
(a) 11B16, AURAL WARN SPKR L

S 865-125
(11) Push and hold the T/O CONFIG switch on the P61 Test Panel.

S 865-126
(12) Set the sound level meter to DBA and slow response.

S 865-127
(13) Measure the acoustic output at 23.5 to 24.5 inches perpendicularly from the center of the F/O's speaker.
(a) Make sure the acoustic output is 90 +/- 5 dba.

S 865-128
(14) Make sure the Radio Altimeter is set to 850 feet.

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S 865-129
(15) Put on an actuator to the NOSE GEAR NOT COMPRESSED system 2 sensor switch, S266, to simulate an in-air condition.

NOTE: The maximum gap is 0.15 inches. The actuator may touch the sensing surfaces of the sensors.

S 865-130
(16) Put on a deactuator to one of the following system 1 and one of the system 2 proximity sensors to simulate GEAR NOT DOWN AND LOCKED condition:

SYS 1	SYS 2	
S232	S254	NOSE GEAR DOWN
S233	S255	NOSE GEAR LOCKED
S236	S258	LEFT SIDE BRACE DOWN
S237	S259	LEFT DRAG BRACE DOWN
S240	S262	RIGHT SIDE BRACE DOWN
S241	S263	RIGHT DRAG BRACE DOWN

S 865-131
(17) Make an altitude equivalent to 1000 feet and an airspeed equivalent to 325 knots on the right ADC (AMM 34-11-00/201).

S 865-132
(18) Push and hold the CONFIG switch on the TEST panel in the LDG position.
(a) Make sure that the siren comes on.

S 865-133
(19) Hold the sound level meter 24 (±1/2) inches perpendicular from the center of the F/O's aural warning speaker.
(a) Make sure that the output is 4 to 8 dB less than the F/O's speaker high gain decibel output in your record.

S 865-134
(20) Release the CONFIG switch.

S 865-135
(21) Slowly put the pitot-static system back to the ambient pressure condition.

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S 865-136
(22) Open this P11 panel circuit breaker:
(a) 11H35, AURAL WARN SPKR R

S 865-137
(23) Close this P11 panel circuit breaker:
(a) 11B16, AURAL WARN SPKR L

S 865-138
(24) Push and hold the CONFIG switch on the TEST panel in the Landing position.
(a) Make sure that the siren comes on.

S 865-139
(25) Hold the sound level meter 24 (±1/2) inches perpendicular from the center of the Captain's aural warning speaker.
(a) Make sure that the output is 90 (±5) dba.
(b) Make a record of the Captain's speaker high gain decibel output.

S 865-140
(26) Release the CONFIG switch.

S 865-141
(27) Make an altitude equivalent to 1000 feet and an airspeed equivalent to 325 knots on the right ADC (AMM 34-11-00).

S 865-142
(28) Push and hold the CONFIG switch on the TEST panel in the LDG position.
(a) Make sure that the siren comes on.

S 865-143
(29) Hold the sound level meter 24 (±1/2) inches perpendicular from the center of the Captain's aural warning speaker.
(a) Make sure that the output is 4 to 8 dB less than the Captain's speaker high gain decibel output in your record.

S 865-144
(30) Release the CONFIG switch.

S 865-145
(31) Close this P11 panel circuit breaker:
(a) 11B16, AURAL WARN SPKR L

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S 865-146
(32) Slowly put the pitot-static system back to the ambient pressure condition.

S 085-147
(33) Remove the pitot-static test equipment (AMM 34-11-00/201).

S 865-148
(34) Put the proximity switches in their usual condition.

S 865-149
(35) Set the Parking Brake to off.

S 865-150
(36) Close this P11 panel circuit breaker:
(a) 11H35, AURAL WARN SPKR R

O. Landing Configuration Warning Signals Test

S 865-151
(1) Make sure that the EICAS circuit breakers (six locations) are closed.

S 865-152
(2) Make sure that these P11 panel circuit breakers are closed:
(a) 11A33, IND LIGHTS 1
(b) 11A34, IND LIGHTS 2
(c) 11A35, IND LIGHTS 3
(d) 11B16, AURAL WARN SPKR L
(e) 11C8, FLT CONT ELEC 2L AC
(f) 11C9, FLT CONT ELEC 2L DC
(g) 11H35, AURAL WARN SPKR R
(h) 11R29, RIGHT IND LTS 2

S 865-153
(3) Open the following P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

S 865-154
(4) Set the left and right Engine Throttles fully forward to the T/O position.
(a) Make sure the red CONFIG light is not on.

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(b) Make sure the Master Warning Lights on the glareshield are not on.

NOTE: Push to reset the Capt and F/O Master Warning Lights if they are on.

(c) Make sure the red EICAS message, GEAR NOT DOWN, does not show on the EICAS display when the EICAS Computer switch is in the L and R positions.

S 865-155
(5) Set the Radio Altitude output label 164 to -6 feet.

S 865-156
(6) Make sure the GND Prox/CONFIG Gear Ovrd switch on the P3-1 panel is not selected.

S 865-157
(7) Make sure this P11 panel circuit breaker is closed:
(a) 11J34, WARN ELEX A

S 865-158
(8) Open this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 865-159
(9) Push and hold the CONFIG switch on the P61 Test panel to the LDG position.
(a) Make sure the red CONFIG light is on.
(b) Make sure the warning lights are on.
(c) Make sure the siren aural warning is on.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the top EICAS display when the EICAS Computer switch is in the L, and R positions.

S 865-160
(10) Release the CONFIG switch.

S 865-161
(11) Open this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 865-162
(12) Close this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

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S 865-163
(13) Push and hold the CONFIG switch on the P61 Test panel to the LDG position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the warning lights come on.
(c) Make sure the siren aural warning comes on.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on top EICAS display when the EICAS Computer switch is in both L, and R postion.

S 865-164
(14) Release the CONFIG switch.

S 865-165
(15) Make sure these P11 panel circuit breakers are closed:
(a) 11C30, LANDING GEAR POS AIR/GND SYS 1
(b) 11G15, FSEU POS SENSOR 2
(c) 11G16, FSEU SECTION 2 CONT PWR
(d) 11G22, FSEU POS SENSOR 3
(e) 11G23, FSEU CONT 3
(f) 11H23, INBD SLATS ALTN CONT
(g) 11H24, OUTBD SLATS ALTN CONT
(h) 11J15, L T.E. FLAP POS INDICATOR
(i) 11J16, FLAP POSITION INDICATOR
(j) 11J17, FLAP/STAB POS SENSING L
(k) 11J24, T.E. FLAPS ALTN CONT
(l) 11J26, FLAP/STAB POS SENSING R

S 865-385
(16) Make sure the P11 panel circuit breaker is open:
(a) 11J14, FLAP SHUTOFF

S 865-166
(17) Make sure the FLIGHT CONTROL (Wing and Tail) shutoff valves on P61 panel are set to OFF and control surfaces are safe.

S 865-167

WARNING: KEEP PERSONS AND EQUIPMENT CLEAR OF THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(18) Supply hydraulic power to the Center System (AMM 29-11-00/201).

S 865-168
(19) Set the LE ALTN and TE ALTN switches to the normal positions.

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S 865-169

(20) Set the Flap lever to the UP position.
  (a) Let the flaps and slats move to the UP position.

S 865-170

(21) Set the LE ALTN switch to the ALTN position.

S 865-171

(22) Set the Flap lever to the 25-unit position.
  (a) Let the flaps move to the 25-unit position.

S 865-172

(23) Set the TE ALTN switch to the ALTN positon.

S 865-173

(24) Make sure the following switches are actuated:

S254 AND S232	NOSE GEAR DOWN
S255 AND S233	NOSE GEAR LOCKED
S258 AND S236	LEFT SIDE BRACE DOWN
S259 AND S237	LEFT DRAG BRACE DOWN
S262 AND S240	RIGHT SIDE BRACE DOWN
S263 AND S241	RIGHT DRAG BRACE DOWN

NOTE: Switches may be activated by placing an actuating device adjacent to the sensor of the switches. Maximum actuation gap is 0.15 inches.

  (a) Make sure the red CONFIG light is off.
  (b) Make sure the warning lights are off.
  (c) Make sure the siren aural warning is not on.
  (d) Make sure the EICAS message, GEAR NOT DOWN, does not show on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

S 845-174

WARNING: PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERRATE. THIS CAN CAUSE INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(25) Prepare the safety-sensitive system for the air mode simulation (AMM 32-09-02/201).

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S 865-175
(26) Open these P11 panel circuit breakers:
(a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)
(b) 11C30, LANDING GEAR POSITION AIR/GND SYS 1
(c) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-176
(27) Verify the following:
(a) Make sure that the red CONFIG light on the instrument panel is on.
(b) Make sure that the WARNING lights on the glareshield come on.
(c) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L, and R positons.

S 865-177
(28) Close these P11 panel circuit breakers:
(a) 11U23 or 11U24, LANDING GEAR POS AIR/GND SYS 2
(b) 11C29, LANDING GEAR POS AIR/GND SYS 2 - ALT (if installed)

S 865-178
(29) Verify the following:
(a) The red CONFIG light on the Instrument Panel is not on.
(b) The WARNINGS lights on the glareshield are not on.
(c) The siren Aural Warning does not sound.
(d) The EICAS message, GEAR NOT DOWN, does not show on the upper EICAS display when the EICAS computer switch is in both L, and R positions.

S 865-179

WARNING: PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERRATE. THIS CAN CAUSE INJURIES TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(30) Prepare the safety-sensitive system for air-mode simuation (AMM 29-11-00/201).

S 865-180
(31) Open these P11 panel circuit breakers:
(a) 11U23 or 11U24, LANDING GEAR POS AIR/GND SYS 2
(b) 11C29, LANDING GEAR POS AIR/GND SYS 2 - ALT (if installed)

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S 865-181
(32) Verify the following:
(a) The red CONFIG light on the Instrument Panel is on.
(b) The Warning lights on the glareshield are on.
(c) The siren Aural Warning is on.
(d) The red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

S 865-182
(33) Push the GND PROX/ GEAR OVRD switch on the P3-1 panel to OVRD.
(a) Make sure the Aural warning stops.

S 865-183
(34) Push the GND PROX/CONFIG GEAR OVRD switch to normal.
(a) Make sure the siren Aural warning is on.
(b) Make sure the red CONFIG light on the Instrument Panel comes on.
(c) Make sure the Warning lights on the glareshield are on.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

S 865-384
(35) Set the LE ALTN and TE ALTN switches to the NORMAL position.

S 865-184
(36) Set the flap lever to the 5-unit position.
(a) Let the flaps and slats move to 5-unit positon.

S 865-185
(37) Set the TE ALTN switch to the ALTN position.
(a) Make sure the red CONFIG light is not on.
(b) Make sure the Warning lights are not on.
(c) Make sure the siren Aural warning is not on.
(d) Make sure the EICAS message, GEAR NOT DOWN, does not show on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

S 865-186
(38) Set the Left Engine Throttle to idle (Full Aft).

NOTE: Make sure at least 150 seconds have elapsed since opening circuit breaker 11C30, LANDING GEAR POS AIR/GND SYS 1.

(a) Make sure the red CONFIG light comes on.
(b) Make sure the Warning lights come on.
(c) Make sure the siren Aural warning comes on.

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(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

S 865-187

(39) Push the Capt Master Warning to reset.
(a) Make sure the EICAS message, GEAR NOT DOWN, shows on the upper EICAS display.
(b) Make sure the red CONFIG light is on.
(c) Make sure the Warning lights are off.
(d) Make sure the siren Aural warning stops.

S 865-188

(40) Set the left Engine Throttle fully foward to the Takeoff positon.

S 865-189

(41) Set the right Engine Throttle to idle (Full Aft).
(a) Make sure the red CONFIG light comes on.
(b) Make sure the Warning lights come on.
(c) Make sure the siren Aural warning comes on.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

S 865-190

(42) Set Radio Altitude Simulator to off.

S 865-191

(43) Set the TE ALTN switch to the normal position.

S 865-192

(44) Set the flap lever to the UP position.
(a) Let the flaps and slats move to the UP position.

S 865-193

(45) Set the TE ALTN switch to the ALTN position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the Warning lights come on.
(c) Make sure the siren Aural warning comes on.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

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S 865-395
(46) SAS 155, 163, 164 PRE-SB 34-0332;
Set the TE ALTN switch to the ALTN position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the Warning lights come on.
(c) Make sure the siren Aural warning comes on.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L and R positions.

S 865-406
(47) SAS 155, 163, 164 POST-SB 34-0332;
Set the TE ALTN switch to the ALTN position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the Warning lights are not on.
(c) Make sure the siren Aural warning stops.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L and R positions.

S 865-194
(48) Set the LE ALTN switch to the normal position.

S 865-195
(49) Set the flap lever to the 5-unit position.

S 865-196
(50) Set the LE ALTN switch to the ALTN position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the Warning Lights come on.
(c) Make sure the siren Aural warning comes on.
(d) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display when the EICAS computer switch is in the L, and R positions.

S 865-197
(51) Push the F/O's Master Warning to reset
(a) Make sure the red CONFIG light is on.
(b) Make sure the red EICAS message, GEAR NOT DOWN, shows on the upper EICAS display.
(c) Make sure the Warning lights are not on.
(d) Make sure the siren Aural warning stops.

S 865-198
(52) Close this P11 panel circuit breakers:
(a) 11C30, LANDING GEAR POS AIR/GND SYS 1
(b) 11U23 or 11U25, LANDING GEAR POS AIR/GND SYS 2
(c) 11C29, LANDING GEAR POS AIR/GND POS SYS 2 - ALT (if installed)

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S 865-199
(53) Remove the actuators and deactuators from the landing gear position sensors.

S 865-200
(54) Put the airplane back to its usual condition.

P. Takeoff Configuration Warning Signals Test

S 865-201
(1) Open these P11 panel circuit breakers:
(a) 11J34, WARN ELEX A
(b) 11B18, WARN ELEX B
(c) 11J29, EICAS CMPTR R

S 865-202
(2) Make sure these P11 panel circuit breakers are closed:
(a) 11A33, IND LIGHTS 1
(b) 11A34, IND LIGHTS 2
(c) 11A35, IND LIGHTS 3
(d) 11B16, AURAL WARN SPKR L
(e) 11H35, AURAL WARN SPKR R
(f) 11R29, RIGHT IND LTS 2

S 865-203
(3) Set the left and right Engine Throttles to the takeoff position.

S 865-204
(4) Make sure this P11 panel circuit breaker is closed:
(a) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 755-205
(5) Make sure the siren aural warning is not on.

S 755-206
(6) Make sure the red CONFIG light is not on.

S 755-207
(7) Make sure the WARNING lights are not on.

NOTE: If the WARNING lights are on, push the captain's or first officer's WARNING switch-light.

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S 755-208
(8) Make sure these red warning messages do not show on the top EICAS display:

NOTE: The yellow EICAS messages, SPOILERS or PARKING BRAKE, may show on the top display.

(a) SPOILERS
(b) FLAPS
(c) PARKING BRAKE
(d) STABILIZER

S 865-209
(9) Close this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 845-210

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

(10) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-211

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY OR DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(11) Supply the center hydraulic power (AMM 29-11-00/201).

S 865-213
(12) 767-200 AIRPLANES;
Set the FLAP lever to a takeoff position between 1 and 20 units.

S 865-214
(13) 767-300 AIRPLANES;
Set the FLAP lever to a takeoff position between 5 and 20 units.

S 865-216
(14) Release the parking brake to off.

S 865-217
(15) Make sure the STAB TRIM indicator is in the green band range.

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S 865-218
(16) Make sure the SPEED BRAKE control is in the DOWN position.

S 865-219
(17) Hold the CONFIG switch on the P61 TEST panel in the T/O position.
(a) Make sure the red CONFIG light is not on.
(b) Make sure the WARNING lights are off.
(c) Make sure the siren aural warning is not on.
(d) Make sure these red warning messages do not show on the top EICAS display:

NOTE: The yellow EICAS messages, SPOILERS or PARKING BRAKE, may show on the top display.

1) SPOILERS
2) FLAPS
3) PARKING BRAKE
4) STABILIZER

S 865-220
(18) Release the CONFIG switch.

S 865-221
(19) Set the parking brake to the ON position.

S 865-222
(20) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the WARNING lights come on.
(c) Make sure the siren aural warning comes on.
(d) Make sure the red EICAS message, PARKING BRAKE, shows on the EICAS display when the L is selected on the EICAS computer selector switch.

S 865-223
(21) Release the CONFIG switch.

S 865-224
(22) Open these P11 panel circuit breakers:
(a) 11J2, EICAS CMPTR L
(b) 11J34, WARN ELEX A

S 865-225
(23) Close these P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11J29, EICAS CMPTR R

S 865-226
(24) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red CONFIG light comes on.

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(b) Make sure the siren aural warning comes on.
(c) Make sure the WARNING lights come on.
(d) Make sure the red EICAS message, PARKING BRAKE, shows on the EICAS display when the R is selected on the EICAS computer selector switch.

S 865-227
(25) Release the CONFIG switch.

S 865-228
(26) Close these P11 panel circuit breakers:
(a) 11J2, EICAS CMPTR L
(b) 11J34, WARN ELEX A

S 865-229
(27) Set the parking brake to the OFF position.

S 865-230
(28) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red EICAS message, PARKING BRAKE, does not show on the EICAS display when both L and then R are selected on the EICAS computer selector switch.

S 865-231
(29) Release the CONFIG switch.

S 865-232
(30) Make sure these P6 panel circuit breakers are closed:
(a) 6D21, ALTN SLAT INBD PWR
(b) 6D24, ALTN FLAP PWR
(c) 6F24, ALTN SLAT OUTBD PWR

S 865-233
(31) Make sure these P11 panel circuit breakers are closed:
(a) 11C14, FLAP/STAB POS SENSING C
(b) 11C30, LANDING GEAR POS SYS 1
(c) 11G15, FLAP SLAT ELEC UNIT 2 SENSOR
(d) 11G16, FLAP SLAT ELEC UNIT 2 CONT
(e) 11G22, FLAP SLAT ELEC UNIT 3 SENSOR
(f) 11G23, FLAP SLAT ELEC UNIT 3 CONT
(g) 11H23, SLAT ALTN CONT INBD
(h) 11H24, FLAP SLAT ALTN CONT OUTBD
(i) 11J15, FLAP POS IND L
(j) 11J16, FLAP POS IND R
(k) 11J17, FLAP/STAB POS SENSING L
(l) 11J24, FLAP ALTN CONT
(m) 11J26, FLAP/STAB POS SENSING R

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S 845-234

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY OR DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(32) Supply the center hydraulic power (AMM 29-11-00/201).

S 865-235

(33) Move the FLAP lever to the 5-unit position.

S 865-236

(34) Make sure the ALTN FLAPS position selector on panel P3-1 is in the NORM position.

S 865-237

(35) Remove the power of center hydraulic system (AMM 29-11-00/201).

S 865-238

(36) Hold the CONFIG switch on the TEST panel in the T/O position.

NOTE: During the takeoff configuration warning test, messages will show on the EICAS display. The messages will show for only 5 to 15 seconds after the CONFIG switch is released. To make sure of the message status, the CONFIG switch should be put in the T/O position.

(a) Make sure the red EICAS message, FLAPS, does not show on the top display when both L and then R are selected on the EICAS computer selector switch.

S 865-239

(37) Release the CONFIG switch.

S 865-240

(38) Set the FLAP lever to the 15-unit position.

S 865-241

(39) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the WARNING lights come on.
(c) Make sure the siren aural warning comes on.

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(d) Make sure the red EICAS message, FLAPS, shows on the top display when both L and then R are selected on the EICAS computer selector switch.

S 865-242

(40) Release the CONFIG switch.

S 845-243

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

(41) Do the deactivation procedure for the spoilers (Ref 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-244

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY OR DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(42) Supply the center hydraulic power (AMM 29-11-00/201).

S 865-245

(43) Put the LE ALTN switch in the ALTN position.

S 865-246

(44) Set the FLAP lever in the 25-unit position.

NOTE: Permit time for the flaps to get into the 25-unit position.

S 865-247

(45) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the WARNING lights come on.
(c) Make sure the siren aural warning comes on.
(d) Make sure the red EICAS message, FLAPS, shows on the top display.

S 865-248

(46) Release the CONFIG switch.

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S 865-249
(47) Press the LE ALTN switch to the NORM position.

NOTE: Permit time for the Slats to get into landing position.

S 865-250
(48) Press the LE ALTN switch to ALTN position.

S 865-251
(49) Set the FLAP lever to the 5-unit position.

NOTE: Permit time for the flaps to get into the 5-unit position.

S 865-252
(50) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the WARNING lights come on.
(c) Make sure the siren aural warning comes on.
(d) Make sure the red EICAS message, FLAPS, shows on the top display when both L and then R are selected on the EICAS computer selector switch .

S 865-253
(51) Release the CONFIG switch.

S 865-254
(52) Put the LE ALTN switch in the NORM position.

NOTE: Permit time for the flaps to stop their movement.

S 865-257
(53) 767-300 AIRPLANES;
Do these steps:
(a) Set the FLAP lever to the 1-unit position.
(b) Hold the CONFIG switch on the TEST panel in the T/O position.
1) Make sure the red CONFIG light is on.
2) Make sure the WARNING lights come on.
3) Make sure the siren aural warning comes on.
4) Make sure the red EICAS message, FLAPS, shows on the top display when both L and then R are selected on the EICAS computor selector switch.
(c) Release the CONFIG switch.

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S 865-259
(54) 767-200 AIRPLANES;
Set the FLAP lever to a takeoff position between 1 and 20 units.

S 865-260
(55) 767-300 AIRPLANES;
Set the FLAP lever to a takeoff position between 5 and 20 units.

S 865-262
(56) Put the ALTN FLAPS control in the NORM position.

S 865-263
(57) Make sure the SPEED BRAKE control is in the DOWN position.

S 865-264
(58) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red EICAS message, SPOILERS, does not show on the top display when the EICAS COMPUTER switch is in the L and R positions.

NOTE: The yellow EICAS message, SPOILERS, may show on the top display if there is a fault in the spoiler system.

S 865-265
(59) Release the CONFIG switch.

S 865-266
(60) Put the SPEED BRAKE control in the UP position.

S 865-267
(61) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the WARNING lights come on.
(c) Make sure the siren aural warning comes on.
(d) Make sure the red EICAS message, SPOILERS, shows on the top display when the EICAS COMPUTER switch is in the L and R positions.

S 865-268
(62) Release the CONFIG switch.

S 865-269
(63) Put the SPEED BRAKE control in the DOWN position.

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S 865-270
(64) Set the parking brake to the ON position.

S 845-271

WARNING: PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERATE. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(65) Prepare the safety-sensitive systems for air mode simulation (AMM 32-09-02/201).

S 865-272
(66) Open these P11 panel circuit breakers:
(a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)
(b) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-273
(67) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red EICAS message, PARKING BRAKE, does not show on the top display.

NOTE: The yellow EICAS message, PARKING BRAKE, may show on the top display.

S 865-274
(68) Release the CONFIG switch.

S 865-275
(69) Close these P11 panel circuit breakers:
(a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)
(b) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-276
(70) Set the parking brake to the OFF position.

S 865-277
(71) Make sure these P11 panel circuit breakers are closed:
(a) 11H10, STAB TRIM POS IND L
(b) 11H11, STAB TRIM CONT L
(c) 11H19, STAB TRIM POS IND R

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S 865-278
(72) Make sure the L and C STAB TRIM shut off switches on the aisle control stand are in the NORM positions.

S 865-279
(73) Use the control wheel STAB TRIM controls to move the stabilizer such that the stabilizer trim position indicator is in the green band (AMM 27-48-00/501).

S 865-280
(74) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red CONFIG light is not on.
(b) Make sure the WARNING lights are not on.
(c) Make sure the siren aural warning is not on.
(d) Make sure the red EICAS message, STABILIZER, does not show on the top display.

S 865-281
(75) Use the control wheel STAB TRIM controls to move the stabilizer such that the stabilizer trim position indicator is equal or great than 1/2 unit of trim outside the green band.

S 865-282
(76) Hold the CONFIG switch on the test panel in the T/O position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the WARNING lights come on.
(c) Make sure the siren aural warning comes on.
(d) Make sure the red EICAS message, STABILIZER, shows on the EICAS display.

S 865-283
(77) Release the CONFIG switch.

Q. Autopilot Disconnect Signal Test

S 865-284
(1) Close these P11 panel circuit breakers:
(a) 11A17, AUTO FLIGHT WARN
(b) 11B16, AURAL WARN SPKR L
(c) 11E17, FLT CONT CMPTR PWR L
(d) 11E20, FLT CONT CMPTR PWR CENTER
(e) 11E35, FLT CONT CMPTR PWR RIGHT
(f) 11H35, AURAL WARN SPKR R
(g) 11J34, WARN ELEX A

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S 865-285
(2) Open this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 865-286
(3) Push the captain's or first officer's WARNING switch-light.
(a) Make sure that the A/P DISC warning light is not on.
(b) Make sure that all of the aural warnings are off.

S 865-287
(4) Push and hold the captain's wheel autopilot disconnect switch.
(a) Make sure that the red A/P DISC light comes on.
(b) Make sure the siren aural warning comes on from the captain's and first officer's speakers.
(c) Make sure that the WARNING lights come on.

S 865-288
(5) Release the captain's wheel autopilot disconnect switch.

S 865-289
(6) Close this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 865-290
(7) Open this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 865-291
(8) Push and hold the captain's wheel autopilot disconnect switch.
(a) Make sure that the red A/P DISC light comes on.
(b) Make sure the siren aural warning comes on from the captain's and first officer's speakers.
(c) Make sure that the WARNING lights come on.

S 865-292
(9) Release the autopilot wheel disconnect switch.

S 865-293
(10) Close this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

R. Put the Airplane Back to Its Usual Condition

S 865-294
(1) Return the flaps and slats to their usual position.

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S 865-295
(2) Set the parking brake to the ON position.

S 865-296
(3) Put the left and right engine throttles back to the IDLE positions.

S 865-297
(4) Put the safety-sensitive systems back to the initial conditions (AMM 32-09-02/201).

S 865-298
(5) Do the activation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00/201).

S 865-299
(6) Remove the center hydraulic power if it is not necessary (AMM 29-11-00).

S 865-300
(7) Push the POWER SUPPLY RESET switch on the P51 panel.

S 865-301
(8) Remove electrical power if it is not necessary (AMM 24-22-00).

TASK 31-51-00-725-302

3. Takeoff Configuration Warning Test

NOTE: This is a scheduled maintenance task.

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 27-48-00/501, Stabilizer Trim Position Indicating System
(3) AMM 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
(4) AMM 31-41-00/501, Engine Indication and Crew Alerting System (EICAS)
(5) AMM 32-09-02/201, Air/Ground Relays

B. Access
(1) Location Zones
211/212 Flight Compartment

C. Prepare for Test

S 865-303
(1) Supply electrical power (AMM 24-22-00/201).

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S 865-304

(2) Make sure the EICAS operates (AMM 31-41-00/501).

D. Takeoff Configuration Warning Signals Test

S 865-305

(1) Open these P11 panel circuit breakers:
  (a) 11J34, WARN ELEX A
  (b) 11B18, WARN ELEX B
  (c) 11J29, EICAS CMPTR R

S 865-306

(2) Set the COMPUTER switch on the EICAS control panel to the L position.

S 865-307

(3) Set the left and right engine throttles fully forward to the takeoff position.
  (a) Make sure the siren aural warning is not on.
  (b) Make sure the red CONFIG light is not on.
  (c) Make sure the WARNING lights are not on.

NOTE: If the WARNING lights are on, push the captain's or first officer's WARNING switch-light.

  (d) Make sure these red EICAS messages do not show on the EICAS display:
    1) SPOILERS
    2) FLAPS
    3) PARKING BRAKE
    4) STABILIZER

S 865-308

(4) Close this P11 panel circuit breaker:
  (a) 11J34, WARN ELEX A

S 865-309

WARNING: KEEP PERSONS AND EQUIPMENT CLEAR OF THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(5) Supply hydraulic power to the center system (AMM 29-11-00/201).

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S 865-310

(6) Do these steps to set the airplane in the takeoff configuration:

(a) 767-200 AIRPLANES;
Set the flap lever to the takeoff position between 1 and 20 units.

(b) 767-300 AIRPLANES;
Set the flap lever to the takeoff position between 5 and 20 units.

(c) Make sure the LE ALTN and TE ALTN switch indicators are in the normal positions (lights off).

(d) Make sure the ALTN FLAPS switch is in the NORM position.

(e) Make sure the parking brake is off.

(f) Make sure the STAB TRIM indicator is in the green band range.

(g) Make sure the SPEED BRAKE control is in the DOWN position.

S 865-311

(7) Hold the CONFIG switch on the TEST panel in the T/O position.

(a) Make sure the red CONFIG light is not on.

(b) Make sure the WARNING lights are off.

(c) Make sure the siren aural warning is not on.

(d) Make sure these red EICAS messages do not show on the EICAS display:

1) SPOILERS
2) FLAPS
3) PARKING BRAKE
4) STABILIZER

S 865-312

(8) Release the CONFIG switch.

S 865-313

(9) Set the parking brake to on.

E. Power Supply Interface Test

S 865-314

(1) Push the TEST switch on the EICAS MAINT control panel:

(a) Make sure the red CONFIG light comes on.

(b) Make sure the WARNING lights come on.

(c) Make sure the siren aural warning comes on during the test.

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S 865-315
(2) Push the TEST switch on the EICAS MAINT control panel again in less than 3 seconds to cancel the EICAS test.
(a) Make sure the EICAS message, PARKING BRAKE, shows on the EICAS display.

NOTE: The red PARKING BRAKE message will show if you push the TEST switch again in less than 6 seconds. After 6 seconds, only the yellow PARKING BRAKE message will show.

S 865-316
(3) Open these P11 panel circuit breakers:
(a) 11J2, EICAS CMPTR L
(b) 11J34, WARN ELEX A

S 865-317
(4) Close these P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11J29, EICAS CMPTR R

S 865-318
(5) Set the COMPUTER switch on the EICAS control panel to the R position.

S 865-319
(6) Push the TEST switch on the EICAS MAINT control panel:
(a) Make sure the red CONFIG light comes on.
(b) Make sure the WARNING lights come on.
(c) Make sure the siren aural warning comes on during the test.

S 865-320
(7) Push the TEST switch on the EICAS MAINT control panel again in less than 3 seconds to cancel the EICAS test.
(a) Make sure the EICAS message, PARKING BRAKE, shows on the EICAS display.

NOTE: The red PARKING BRAKE message will show if you push the TEST switch again in less than 6 seconds. After 6 seconds, only the yellow PARKING BRAKE message will show.

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S 865-321
(8) Close these P11 panel circuit breakers:
(a) 11J2, EICAS CMPTR L
(b) 11J34, WARN ELEX A

F. Parking Brake Interface Test

NOTE: During this test you will do a check for EICAS messages. The EICAS messages will show for only 5-15 seconds from when you hold the CONFIG switch in the T/O position.

S 865-322
(1) Set the parking brake to off.

S 865-323
(2) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the EICAS message, PARKING BRAKE, does not show on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-324
(3) Release the CONFIG switch.

S 865-325
(4) Set the parking brake to on.

G. Flaps, Slats, and Disagree Interface Test

S 845-326

WARNING: KEEP PERSONS AND EQUIPMENT CLEAR OF THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Supply hydraulic power to the center system (AMM 29-11-00/201).

S 865-327
(2) Make sure the LE ALTN and TE ALTN switch indicators are in the normal position (lights off).

S 865-328
(3) Set the flap lever to the 5-unit position.
(a) Let the flaps and slats move to the 5-unit position.

S 865-329
(4) Make sure the ALTN FLAPS switch is in the NORM position.

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S 865-330
(5) Remove hydraulic power from the center system (AMM 29-11-00/201).

S 865-331
(6) Hold the CONFIG switch on the P61 TEST panel in the T/O position.
  (a) Make sure the EICAS message, FLAPS, does not show on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-332
(7) Release the CONFIG switch.

S 865-333
(8) Set the flap lever to the 15-unit position.

NOTE: The flaps and slats will stay at the 5-unit position.

S 865-334
(9) Hold the CONFIG switch on the P61 test panel in the T/O position.
  (a) Make sure the EICAS message, FLAPS, shows on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-335
(10) Release the CONFIG switch.

S 865-336

WARNING: KEEP PERSONS AND EQUIPMENT CLEAR OF THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(11) Supply hydraulic power to the center system (AMM 29-11-00/201).
  (a) Let the flaps and slats move to the 15-unit position.

S 865-337
(12) Put the LE switch in the ALTN position.

S 865-338
(13) Put the flap lever in the 25-unit position.
  (a) Let the flaps move to the 25-unit position.

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S 865-339
(14) Hold the CONFIG switch on the P61 test panel in the T/O position.
(a) Make sure the EICAS message, FLAPS, shows on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-340
(15) Release the CONFIG switch.

S 865-341
(16) Put the LE ALTN switch in the normal position (light off).
(a) Let the slats move to the 25-unit position.

S 865-342
(17) Put the LE ALTN switch in the ALTN position.

S 865-343
(18) Put the flap lever in the 5-unit position.
(a) Let the flaps move to the 5-unit position.

S 865-344
(19) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the EICAS message, FLAPS, shows on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-345
(20) Release the CONFIG switch.

S 865-346
(21) Put the LE ALTN switch in the normal position (light off).
(a) Let the slats move to the 5-unit position.

S 865-347
(22) Set the flap lever to the 0-unit position.
(a) Let the flaps and slats move to the fully retracted position.

S 865-348
(23) Set the flap lever to the 1-unit position.
(a) Let the slats move to the 1-unit position.

S 715-349
(24) Hold the CONFIG switch on the P61 test panel in the T/O position.
(a) 767-200 AIRPLANES;
Make sure the EICAS message, FLAPS, does not show on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

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(b) 767-300 AIRPLANES;
Make sure the EICAS message, FLAPS, shows on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-350
(25) Release the CONFIG switch.

S 865-351
(26) Put the flap lever in the 5-unit position.
(a) Let the flaps move to the 5-unit position.

S 715-352
(27) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the EICAS message, FLAPS, does not show on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-353
(28) Release the CONFIG switch.

S 865-354
(29) Set the flap lever to 0-unit position.
(a) Let the flaps and slats move to the fully retracted position.
(b) Hold the CONFIG switch on the TEST panel in the T/O position.
1) Make sure the EICAS message, FLAPS, shows on the EICAS display when EICAS COMPUTER switch is in the L and R position.

H. Spoiler Interface Test

S 865-355
(1) Make sure the SPEED BRAKE lever is in the DOWN position.

S 865-356
(2) Hold the CONFIG switch on the P61 test panel in the T/O position.
(a) Make sure the red EICAS message, SPOILERS, message does not show on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-357
(3) Release the CONFIG switch.

S 865-358
(4) Put the SPEED BRAKE lever in the UP position.

S 865-359
(5) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure the red EICAS message, SPOILERS, shows on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

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S 865-360

(6) Release the CONFIG switch.

S 865-361

(7) Put the SPEED BRAKE lever in the DOWN position.

I. Air/Ground Relay Interface Test

S 845-362

WARNING: PREPARE THE SAFETY-SENSITIVE SYSTEMS FOR THE AIR MODE BEFORE YOU OPEN THE AIR/GROUND CIRCUIT BREAKERS. IN THE AIR MODE, MANY OF THE AIRPLANE SYSTEMS CAN OPERATE. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Prepare the safety-sensitive systems for air mode simulation (AMM 32-09-02/201).

S 865-363

(2) Open these P11 panel circuit breakers:
   (a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)
   (b) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

S 865-364

(3) Hold the CONFIG switch on the P61 test panel in the T/O position.
   (a) Make sure that these red EICAS messages do not show on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.
      1) SPOILERS
      2) FLAPS
      3) PARKING BRAKE
      4) STABILIZER

S 865-365

(4) Close these P11 panel circuit breakers:
   (a) 11C29, LANDING GEAR POSITION AIR/GND SYS 2 ALT (if installed)
   (b) 11U23 OR 11U24, LANDING GEAR POSITION AIR/GND SYS 2

J. Stabilizer Interface Test

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S 865-366

WARNING: KEEP PERSONS AND EQUIPMENT CLEAR OF THE FLIGHT CONTROL SURFACES, THE THRUST REVERSERS, AND THE LANDING GEAR. THESE COMPONENTS CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Supply hydraulic power to the center system (AMM 29-11-00/201).

S 865-367

(2) Set the flap lever to the 5-unit position.
   (a) Let the flaps and slats move to the 5-unit positon.

S 865-368

(3) Make sure the LE ALTN and TE ALTN switch indicators are in the normal positions (lights off).

S 865-369

(4) Make sure the L and C STAB TRIM shut off switches on the aisle control stand are in the NORM positions.

S 865-370

(5) Use the control wheel STAB TRIM controls to move the stabilizer such that the stabilizer trim position indicator is in the green band (AMM 27-48-00/501).

S 865-371

(6) Hold the CONFIG switch on the P61 test panel in the T/O position.
   (a) Make sure the EICAS message, STABILIZER, does not show on the EICAS display when the EICAS COMPUTER switch is in the L and R positions.

S 865-372

(7) Release the CONFIG switch.

S 865-373

(8) Use the control wheel STAB TRIM controls to move the stabilizer such that the stabilizer trim position indicator is equal or greater than 1/2 unit "NOSE UP" of the trim outside the green band.

S 865-374

(9) Hold the CONFIG switch on the P61 test panel in the T/O position.
   (a) Make sure the EICAS message, STABILIZER, shows on the EICAS display when the EICAS COMPUTER switch is in the L and then R positions.

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S 865-375
(10) Release the CONFIG switch.

K. Put the Airplane Back to Its Usual Condition

S 865-377
(1) Return the flaps and slats to their usual position.

S 865-378
(2) Set the parking brake to on.

S 865-379
(3) Set the left and right engine throttles to the idle positions.

S 865-380
(4) Put the safety-sensitive systems back to the initial conditions (AMM 32-09-02/201).

S 865-381
(5) Remove hydraulic power from the center system if it is not necessary (AMM 29-11-00/201).

S 865-382
(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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WARNING SYSTEM - INSPECTION/CHECK

1. General
   A. The Warning System inspection and check procedure is an operational test of the fire bell, siren, owl, and chime aural indicators.

   TASK 31-51-00-206-001

2. WEU Aural Indicators Check
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          211/212 Flight Compartment

   C. Prepare for the Check

      S 866-002
      (1) Supply electrical power (AMM 24-22-00/201).

   D. Fire Bell Check

      S 746-004
      (1) On the P8 electronics panel, push and hold the WHL WELL switch on the FIRE/OVHT test panel.
          (a) Make sure that the fire bell comes on.

              NOTE: ALL SAS AIRPLANES;
              The fire bell comes on for approximately 0.8 seconds each 10 seconds.

              NOTE: ALL MTH AIRPLANES;
              The fire bell comes on for approximately 2 seconds each 5 seconds.

      S 746-005
      (2) Release the WHL WELL switch.

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E. Siren/Owl Check with EICAS Inputs

S 866-006

(1) Make sure that the parking brake is engaged.
  (a) Make sure that the EICAS message, PARKING BRAKE, shows on the top EICAS display.

S 746-007

(2) On the right side panel, P61, momentarily push the TEST switch on the EICAS MAINT panel.

S 756-017

(3) Make sure these indications occur:
  (a) Make sure you hear the siren aural warning.

    NOTE: The siren comes on for approximately 4 seconds at a time.

  (b) Make sure you hear the owl aural warning.

    NOTE: You hear the owl warning for approximately 1 second.

  (c) Make sure that the MASTER and CAUTION WARNING lights on the glare shield come on.
  (d) Make sure that the MASTER WARNING lights go off when the test is complete.

    NOTE: The aural warnings also go off when test is complete.

S 746-009

(4) On the glare shield, momentarily push one of the MASTER CAUTION switch-lights.
  (a) Make sure that the MASTER CAUTION lights go off.

S 746-008

(5) On the EICAS MAINT panel, momentarily push the TEST switch to remove electrical power from the test circuits.

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F. Siren Check with Autopilot Inputs

S 866-019

(1) Engage the left autopilot in CMD.

S 866-020

(2) Push the captain's A/P Disengage switch to disengage the autopilot.
    (a) Make sure that you hear the aural warning siren.

S 866-021

(3) Push the captain's A/P Disengage switch again to cancel the disengage aural warning.

G. Chime Check

S 746-013

(1) On a cabin interphone handset, momentarily push the PILOT switch.
    (a) Make sure that you hear one chime sound.

H. Put the Airplane Back to Its Usual Condition

S 866-014

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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EMI FILTER MODULE - REMOVAL/INSTALLATION

1. General
   A. This procedure has these tasks:
      (1) A removal of the EMI filter module
      (2) An installation of the EMI filter module.
   B. The EMI filter modules are installed in the warning electronics unit (WEU), P51. The WEU is in the forward electrical/electronic equipment area.

TASK 31-51-01-004-001

2. EMI Filter Module Removal (Fig. 401)
   A. References
      (1) AMM 20-41-01/201, Electrostatic Sensitive Devices
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

   C. Removal Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11B18, WARN ELEX B
          (b) 11J34, WARN ELEX A

      S 914-003

      CAUTION: DO NOT TOUCH THE WEU BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE WEU.

      (2) Before you touch the WEU, do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

      S 014-004
      (3) Remove the six fasteners that attach the WEU, P51, to the airplane.

      S 014-005
      (4) Carefully pull the WEU out to get access to the rear panel.

      S 014-006
      (5) Remove the eight fasteners from the rear panel of the WEU.

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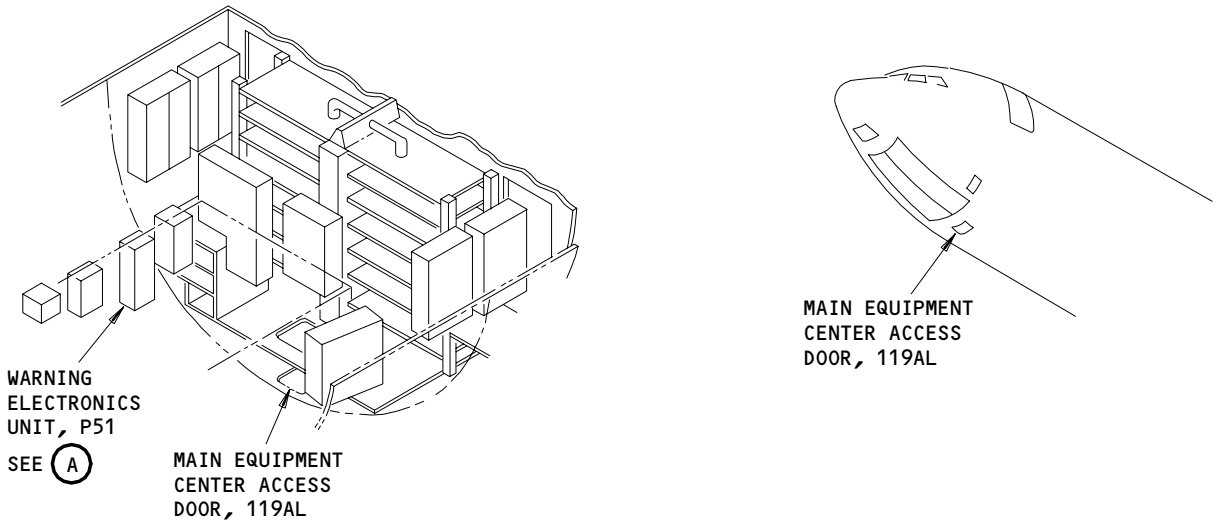
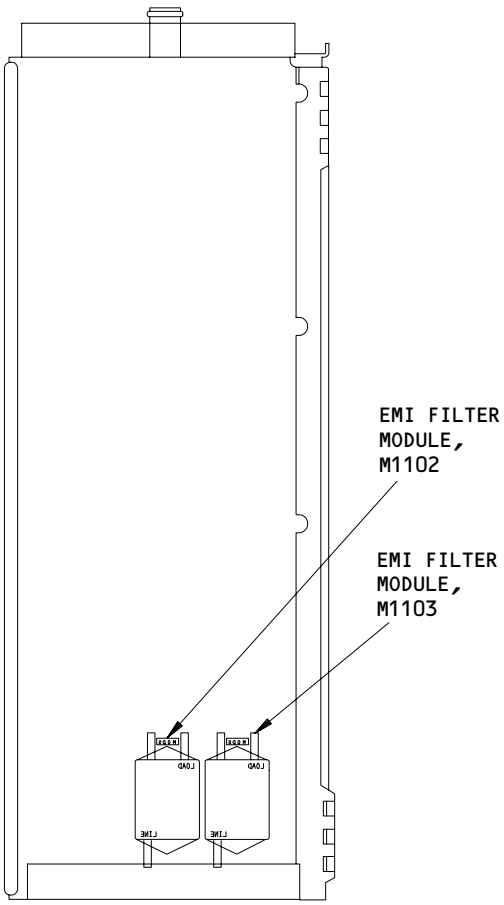


MAIN EQUIPMENT CENTER



WARNING ELECTRONICS UNIT, P51 (LEFT SIDE VIEW)

(A)

EMI Filter Module Installation
Figure 401

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S 014-007
(6) Remove the rear panel from the WEU.

S 024-008
(7) Remove the EMI filter module:
(a) Remove the two fasteners that attach the EMI filter module to the WEU.
(b) Remove the EMI filter module from the WEU.

TASK 31-51-01-404-009

3. EMI Filter Module Installation (Fig. 401)

A. References
(1) AMM 20-41-01/201, Electrostatic Sensitive Devices
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 27-32-00/501, Stall Warning System
(4) AMM 31-51-04/401, Warning Electronics Unit (WEU) Card Modules

B. Access
(1) Location Zones
119/120 Main Equipment Center
211/212 Flight Compartment

C. Installation Procedure

S 864-010
(1) Make sure that these P11 panel circuit breakers are open:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

S 914-011

CAUTION: DO NOT TOUCH THE WEU BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE WEU.

(2) Before you touch the WEU, do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 424-012
(3) Install the EMI filter module:
(a) Put the EMI filter module into position on the WEU.
(b) Install the two fasteners to attach the module to the WEU.

S 414-013
(4) Put the rear panel into position on the WEU.

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S 424-014
(5) Install the eight fasteners to attach the rear panel to the WEU.

S 414-015
(6) Put the WEU into position for installation.

S 414-016
(7) Install the six fasteners to attach the WEU to the airplane.

S 864-017
(8) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

D. Installation Test

S 864-018
(1) Supply electrical power (AMM 24-22-00/201).

S 724-019
(2) Do the WEU Card Modules Test (AMM 31-51-04/401).

S 724-020
(3) Do the Stall Warning System - Operational Test (AMM 27-32-00/501).

S 864-021
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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SPEED BRAKE HANDLE POSITION SWITCH - REMOVAL/INSTALLATION

1. General
   A. This procedure has two tasks. The first task is the switch removal. The second task is the switch installation.
   B. The handle position switch for the speed brake is installed on the speed brake mechanism. The speed brake mechanism is found in the aisle control stand on the left side.

TASK 31-51-03-004-001

2. Handle Position Switch Removal (Fig. 401)
   A. Access
      (1) Location Zones
          211/212 Flight Compartment

   B. Prepare for Removal

      S 864-002

      WARNING: DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

      (1) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
          (a) 6H15, CAPT SEAT
          (b) 6J21, F/O SEAT

      S 864-003
      (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11B18, WARN ELEX B
          (b) 11J34, WARN ELEX A

      S 014-004
      (3) Remove the left access panel from the aisle control stand.

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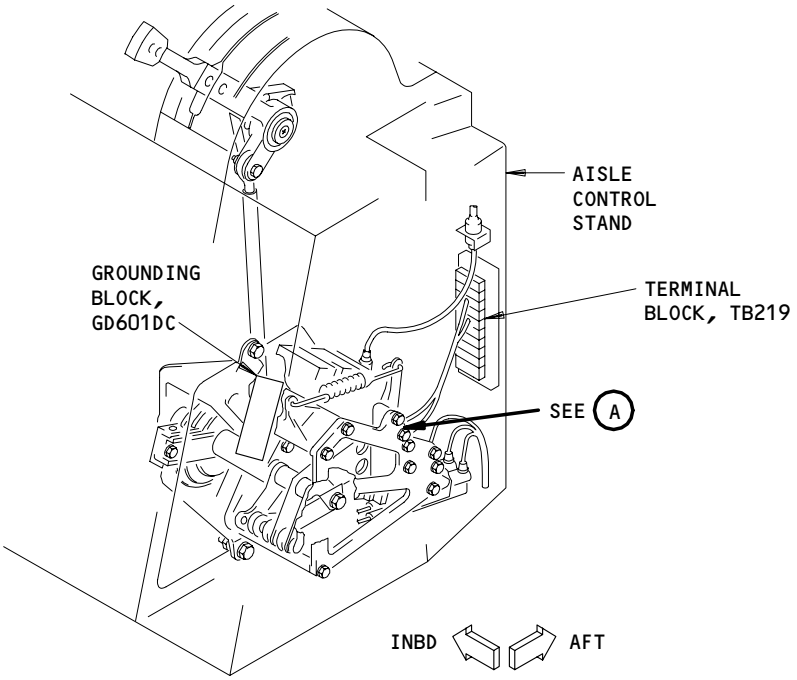

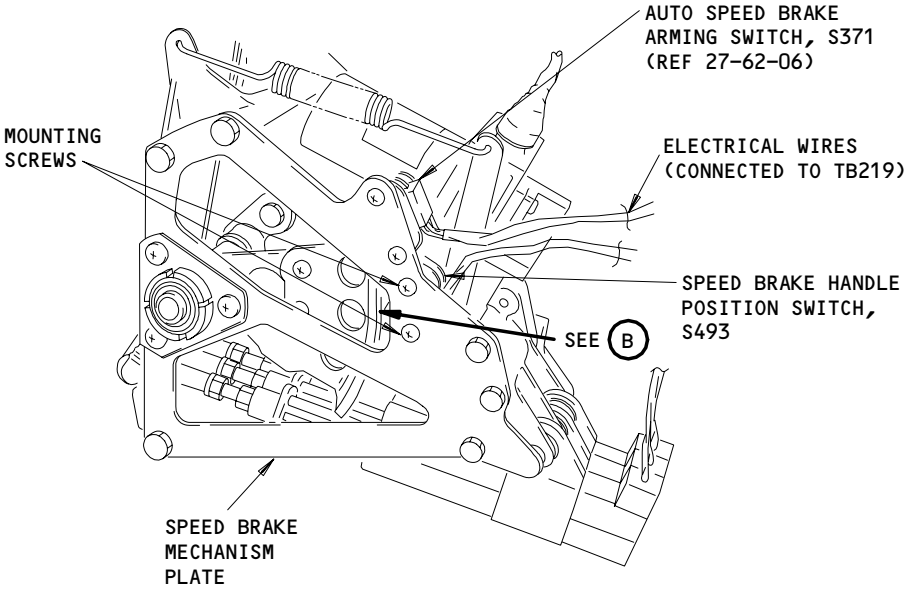

A

Speed Brake Handle Position Switch
Figure 401 (Sheet 1)

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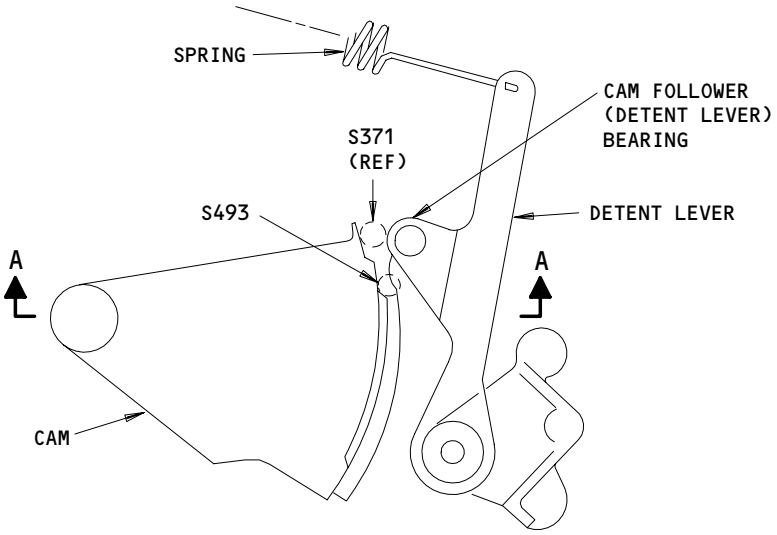
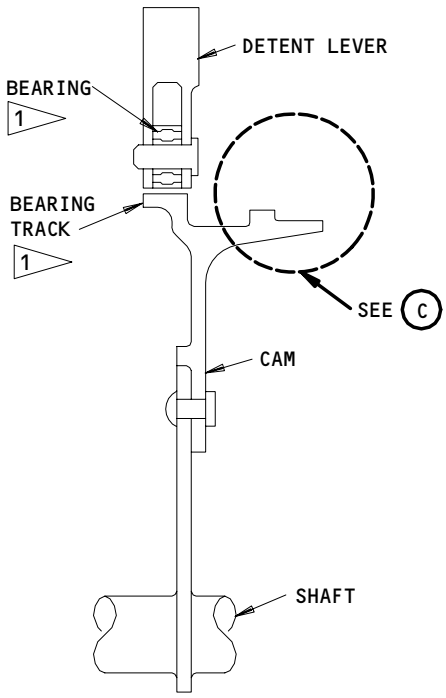
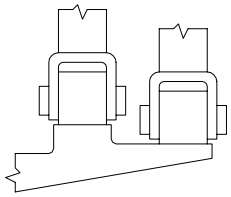


DETENT LEVER AND SWITCH ROLLERS
(SPEED BRAKE HANDLE DOWN POSITION)

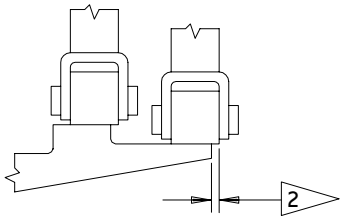
B



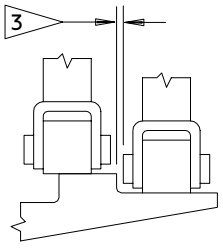
A–A



S493, NORMAL TRACKING



S493, TRACKING LIMITS



S493, TRACKING LIMITS

C

1 THE OUTER EDGE OF THE BEARING SHOULD NOT EXTEND OVER THE TRACK FOR THE FULL RANGE OF CAM MOTION

2 0.03 INCH MAXIMUM (EITHER SIDE)

3 0.002 INCH MINIMUM CLEARANCE OVER THE FULL TRACK

Speed Brake Handle Position Switch
Figure 401 (Sheet 2)

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S 034-005
(4) Remove the two screws from the handle position switch, S493.

S 034-006
(5) Remove the wire-bundle connectors.

S 034-007
(6) Disconnect the switch wires from the terminal blocks.

S 024-008
(7) Remove the handle position switch from the mechanism.

TASK 31-51-03-404-009

3. Handle Position Switch Installation (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 27-62-00/501, Auto Speedbrake Control System

B. Consumable Materials
(1) Heat-shrink

C. Access
(1) Location Zones
211/212 Flight Compartment

D. Prepare for Installation

S 864-010
(1) Make sure that these P11 panel circuit breakers are open:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

S 424-011
(2) Install the handle position switch on the mechanism.

S 434-012
(3) Install the speed brake mechanism with the two screws.

S 864-013
(4) Make sure that the two switches are within the tracking limits.

S 624-014
(5) Apply yellow heat-shrink from the switch wire handle to the terminal block, TB219.

S 434-015
(6) Connect the switch wires to the terminal blocks.

S 434-016
(7) Connect the wire bundle together.

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S 864-017
(8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
(a) 6H15, CAPT SEAT
(b) 6J21, F/O SEAT

S 864-018
(9) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

E. Handle Position Switch Test

S 864-019
(1) Supply electrical power (AMM 24-22-00).

S 864-020
(2) Make sure that the EICAS circuit breakers that follow are closed:
(a) 11J2, EICAS CMPTR LEFT
(b) 11J3, EICAS UPPER DSPL
(c) 11J29, EICAS CMPTR RIGHT
(d) 11J30, EICAS LOWER DSPL
(e) 11J31, EICAS DSPL SW
(f) 11J32, EICAS DSPL SELECT

S 864-022
(3) Set the speed brake handle in the UP position.

S 744-037
(4) Hold the CONFIG switch on the TEST panel in the T/O position.
(a) Make sure that the EICAS message, SPOILERS, shows on the display.

S 744-038
(5) Release the CONFIG switch.

S 864-025
(6) Set the speed brake handle in the DOWN position.

S 744-039
(7) Hold the CONFIG switch in the T/O position.
(a) Make sure that the EICAS message, SPOILERS, does not show on the display.

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S 744-040

(8) Release the CONFIG switch.

F. Put the Airplane Back to Its Usual Condition

S 864-027

(1) Remove electrical power if it is not necessary (AMM 24-22-00).

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WARNING ELECTRONICS UNIT (WEU) CARD MODULES - REMOVAL/INSTALLATION

1. General
   A. The card modules are installed in the warning electronics unit (refer to as WEU), P51. The WEU is found right of aft in the electronic equipment compartment. The modules included in these procedures are as follows:
      (1) M616 - Power Supply Module A
      (2) M618 - Master Warning Module
      (3) M619 - Right Siren/Owl Module
      (4) M620 - T/O Configuration Warning Module
      (5) M621 - Power Supply Module B
      (6) M983 - Landing Configuration Warning Module
      (7) M999 - Left Siren/Owl Module
      (8) M1000 - Bell/Chime Module

   TASK 31-51-04-004-133
2. Remove the Card Modules (Fig. 401)
   A. References
      (1) 20-10-01/401, E/E Rack-Mounted Components
      (2) 20-41-01/201, Electrostatic Sensitive Devices
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

   C. Prepare for Removal

      S 864-012
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11B18, WARN ELEX B
          (b) 11J34, WARN ELEX A

      S 014-134
      (2) Open the WEU door.
   D. Procedure

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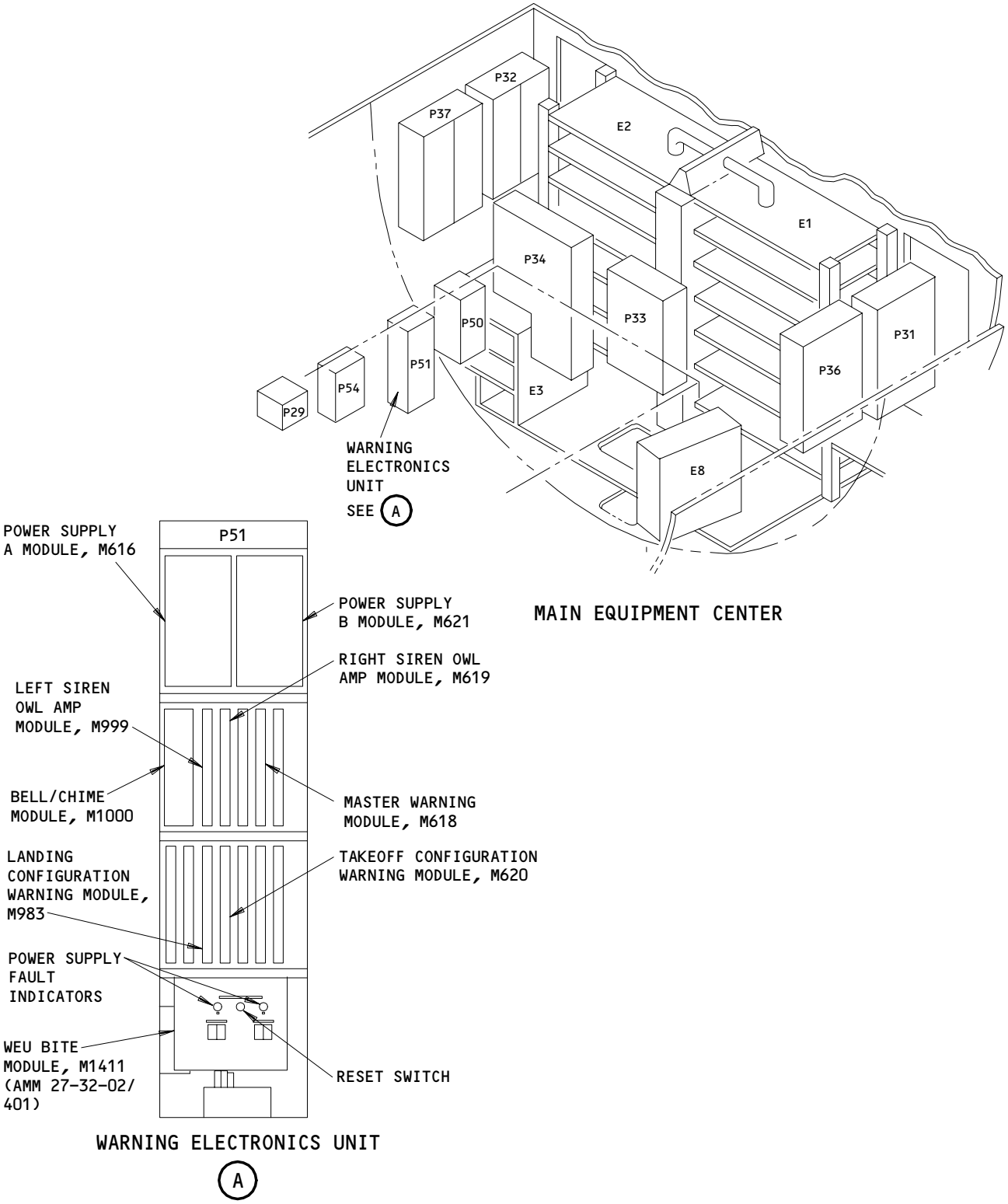

Warning Electronic Unit Card Module
Figure 401

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S 914-136

CAUTION: DO NOT TOUCH THE CARD MODULES BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CARD MODULES.

(1) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01).

S 024-013

(2) Remove the applicable card module (AMM 20-10-01).

TASK 31-51-04-404-014

3. Install the Card Modules

A. References

(1) 20-10-01/401, E/E Rack-mounted Components

(2) 20-41-01/201, Electrostatic Sensitive Devices

B. Access

(1) Location Zones

119/120 Main Equipment Center

211/212 Flight Compartment

C. Prepare for Installation

S 864-015

(1) Make sure that these P11 panel circuit breakers are open:

(a) 11B18, WARN ELEX B

(b) 11J34, WARN ELEX A

D. Procedure

S 864-150

CAUTION: DO NOT TOUCH THE CARD MODULES BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CARD MODULES.

(1) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01).

S 424-151

(2) Install applicable card module (AMM 20-10-01).

S 414-024

(3) Close the WEU door.

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S 864-025
(4) Remove the DO-NOT-CLOSE tags and close these P11 panel circuit breakers:
(a) 11B18, WARN ELEX B
(b) 11J34, WARN ELEX A

E. Installation Test

S 714-178
(1) For the applicable card module, do this task: WEU Card Module Test (AMM 31-51-04/401).

TASK 31-51-04-724-154

4. WEU Card Module Test

A. References
(1) 22-10-00/501, Autopilot Flight Control
(2) 24-22-00/201, Electrical Power - Control
(3) 31-41-00/501, Engine Indication and Crew Alerting System (EICAS)
(4) 31-51-00/501, Warning System
(5) 32-09-02/201, Air/Ground Relays
(6) 34-12-00/501, Air Data Computer
(7) 34-22-00/501, EFIS
(8) 34-33-00/501, Radio Altimeter System

B. Access
(1) Location Zones
119/120 Main Equipment Center
211/212 Flight Compartment

C. Prepare for the Test

NOTE: The procedures that follow make sure that the card modules are installed correctly. The complete system test is found in the Warning System - Adjustment/Test (AMM 31-51-00/501).

S 864-026
(1) Supply electrical power (AMM 24-22-00).

S 864-027
(2) Make sure that the EICAS system operates correctly (AMM 31-41-00).

S 864-028
(3) Make sure that these P11 panel circuit breakers are closed:
(a) 11B16, AURAL WRN SPKR L
(b) 11B18, WARN ELEX B

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(c) 11F5, RAD ALTM L
(d) 11G3, SELCAL
(e) 11H35, AURAL WARN SPKR R
(f) 11J34, WARN ELEX A
(g) 11U15, AIR/GND SYS 1
(h) 767-300 AIRPLANES;
11U23, POSITION AIR/GND SYS 2
(i) 767-200 AIRPLANES;
11U24, POSITION AIR/GND SYS 2

D. Power Supply Card Module Test

S 864-029
(1) Push the RESET switch on the WEU.
(a) Make sure that the PS-A fault indicator shows black.
(b) Make sure that the PS-B fault indicator shows black.

E. Master Warning Card Module Test

S 864-030
(1) Open this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

S 214-031
(2) Make sure the WARNING lights on the P7 panel and the CONFIG light on the P1 panel are off.

S 864-032
(3) Push and hold the CONFIG switch on the miscellaneous test panel in the LDG position.
(a) Make sure that the WARNING lights and the CONFIG light come on.

NOTE: "GEAR NOT DOWN" light may display on the upper EICAS.

(b) Momentarily push the captain's or first officer's WARNING light.
1) Make sure that the two master warning lights go off.

S 864-035
(4) Release the CONFIG switch.

S 864-036
(5) Close this P11 panel circuit breaker:
(a) 11B18, WARN ELEX B

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S 864-037
(6) Open this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

S 214-038
(7) Make sure that the WARNING and CONFIG lights are off.

S 864-039
(8) Push and hold the CONFIG switch on the miscellaneous test panel in the LDG position.
(a) Make sure that the WARNING lights and CONFIG light come on.
(b) Momentarily push the captain's or first officer's WARNING light.
1) Make sure that the two master warning lights go off.

S 864-042
(9) Release the CONFIG switch.

S 214-043
(10) Make sure that the WARNING and CONFIG lights go off.

S 864-044
(11) Close this P11 panel circuit breaker:
(a) 11J34, WARN ELEX A

F. Bell/Chime Aural Warning Card Module Test

S 864-045
(1) Make sure that these P11 panel circuit breakers are closed:
(a) 11B10, WW FIRE/DUCT LEAK 1
(b) 11B33, WW FIRE IND

S 864-050
(2) Open this P11 circuit breaker:
(a) 11B18, WARN ELEX B

S 864-051
(3) Push and hold the WHEEL WELL test switch on the aft electronic control panel.
(a) Make sure that the fire bell aural warning comes on.
1) ALL SAS AIRPLANES;
the fire bell sequence is 0.8 second on and 9.2 seconds off.
2) ALL MTH AIRPLANES;
the fire bell sequence is 2 seconds on and 3 seconds off.

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S 864-003

(4) Release the WHEEL WELL switch.

(a) Make sure that the fire bell aural warning goes off.

NOTE: Do not continue for a minimum of 20 seconds.

S 864-052

(5) Close this P11 panel circuit breaker:

(a) 11B18, WARN ELEX B

G. Siren/Owl Card Module Test

S 864-176

(1) Make sure these P11 panel circuit breakers are closed:

(a) 11B16, AURAL WARN SPKR L

(b) 11B18, WARN ELEX B

(c) 11H35, AURAL WARN SPKR R

(d) 11J34, WARN ELEX A

S 864-161

(2) Make sure the parking brake is engaged.

(a) Make sure the EICAS message, PARKING BRAKE, shows in yellow on the top EICAS display.

S 744-162

(3) On the right side panel, P61, momentarily push the TEST switch on the EICAS MAINT panel.

(a) Make sure you hear the siren aural warning from the captain's and first officer's speakers.

NOTE: The siren comes on for approximately 4 seconds at a time.

(b) Make sure you hear the owl aural warning from the captain's and first officer's speakers.

NOTE: The owl comes on for approximately 1 second at a time.

(c) Make sure the master WARNING lights on the glareshield come on.

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S 744-167
(4) On the EICAS MAINT panel, momentarily push the TEST switch to remove electrical power from the test circuits.
(a) Make sure the siren goes off.
(b) Make sure the owl goes off.
(c) Make sure the master WARNING lights go off.

H. Landing Configuration Warning Card Module Test

S 864-169
(1) Make sure the Radio Altimeter is operational (Ref 34-33-00/501).

S 864-170
(2) Make sure the red CONFIG light on the center instrument panel is off.

S 864-171
(3) If the master WARNING lights are on, push the captain's or first officer's WARNING switch-light.

S 744-172
(4) Hold the CONFIG switch on the TEST panel in the LDG position.
(a) Make sure the red CONFIG light comes on.
(b) Make sure the master WARNING lights come on.
(c) Make sure you hear the siren aural warning.
(d) Make sure the EICAS message, GEAR NOT DOWN, shows on the top display.

S 744-175
(5) Release the CONFIG switch.

I. Takeoff Configuration Warning Card Module Test

S 864-108
(1) Set the parking brake to the ON position.

S 214-005
(2) Make sure this EICAS message, PARKING BRAKE, shows on the top display.

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S 864-006

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY OR DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(3) Supply hydraulic power (AMM 29-11-00/201).

S 864-109
(4) Set the flaps to the 0 position.

S 864-007
(5) Move the stabilizer out of the green band area.

S 864-008
(6) Put the SPEED BRAKE lever in the UP position.

S 214-110
(7) Make sure that the red CONFIG light is off.

S 864-111
(8) Push the captain's and first officer's WARNING lights if they are illuminated.

S 214-112
(9) Make sure that these red EICAS messages do not show:
  (a) SPOILERS
  (b) FLAPS
  (c) PARKING BRAKE
  (d) STABILIZER

S 864-113
(10) Push and hold the CONFIG switch in the T/O position.
  (a) Make sure that the red CONFIG light, WARNING lights, and siren aural warning come on.
  (b) Make sure that the red PARKING BRAKE, SPOILERS, FLAP, and STABILIZER messages show on the EICAS display unit.

S 864-114
(11) Release the CONFIG switch.

S 864-115
(12) Return the stabilizer to the green band area.

S 864-009
(13) Put the SPEED BRAKE lever in the DOWN position.

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S 864-160

(14) Remove hydraulic power (AMM 29-11-00/201).

J. Put the Airplane Back to Its Usual Condition

S 864-156

(1) Remove electrical power if it is not necessary (Ref 24-22-00).

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AURAL WARNING SPEAKER - REMOVAL/INSTALLATION

1. General
   A. This procedure has three tasks. The tasks are: a removal, an installation, and a test of the aural warning speakers. The aural warning speakers are in the control cabin.
   B. Power is supplied through the AURAL WARN (L & R) circuit breakers on the overhead circuit breaker panel P11.

TASK 31-51-05-004-001

2. Aural Warning Speaker Removal (Fig. 401)
   A. Access
      (1) Location Zone
          211/212 Flight Compartment - Overhead panel
   B. Procedure

      S 864-002
      (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
          (a) P11 Overhead Circuit Breaker Panel
              1) 11H35, AURAL WARN R
              2) 11B16, AURAL WARN L

      S 024-003
      (2) Remove the speaker:
          (a) Loosen the four screws that hold the speaker to the ceiling.
          (b) Pull the speaker from the ceiling.
          (c) Remove the wires that connect to the speaker.
              1) Identify the wires with labels, if it is necessary.

TASK 31-51-05-314-011

3. Aural Warning Speaker Installation (Fig. 401)
   A. Access
      (1) Location Zone
          Flight Compartment - Overhead panel

   B. Procedure

      S 424-005
      (1) Install the speaker:
          (a) Connect the speaker wires to the speaker pins.
          (b) Put the speaker in the ceiling.
          (c) Tighten the four screws.

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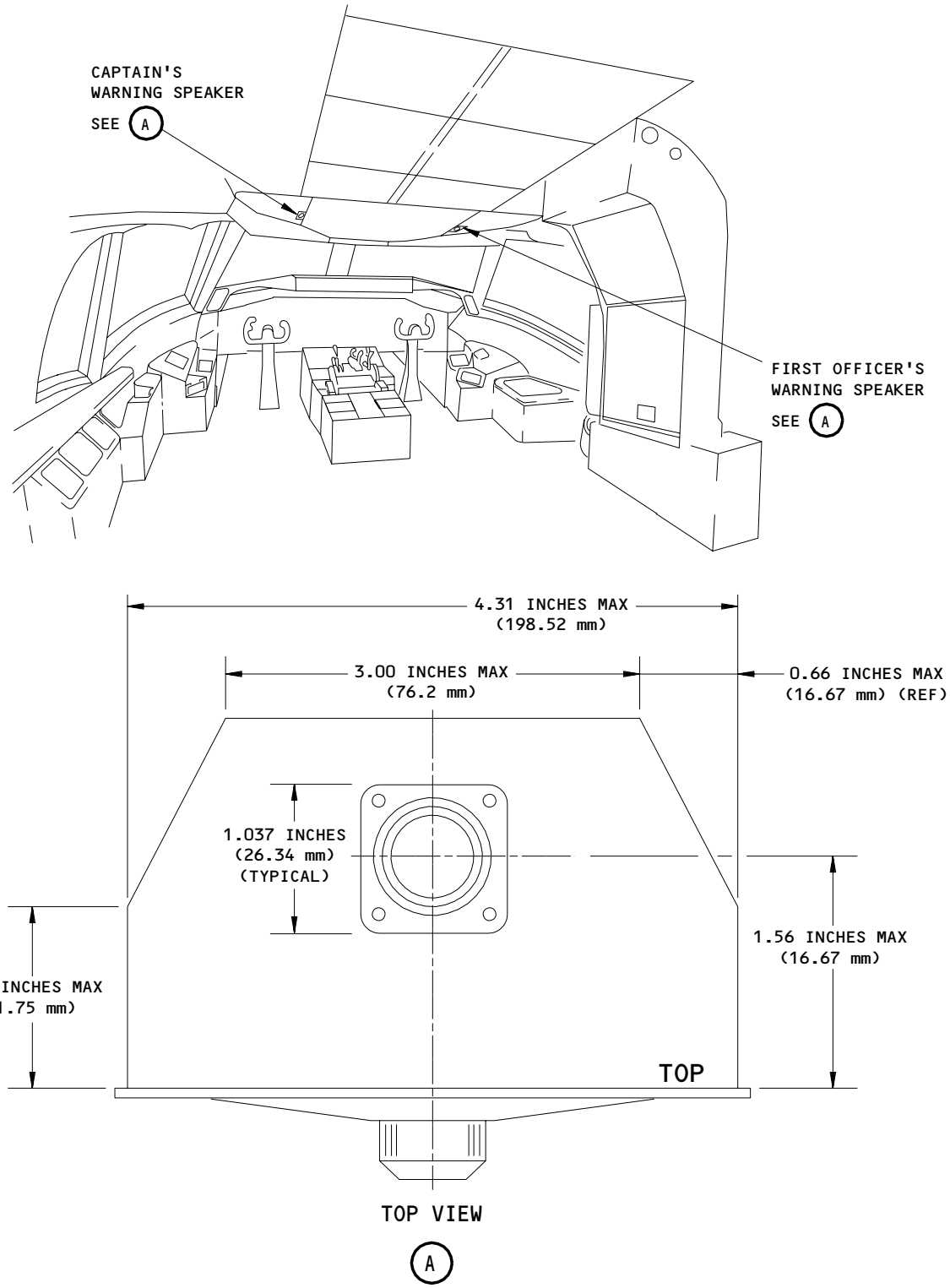

Aural Warning Speaker Installation
Figure 401

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S 864-006
(2) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P11 Overhead Circuit Breaker Panel
1) 11H35, AURAL WARN R
2) 11B16, AURAL WARN L

TASK 31-51-05-314-012

4. Aural Warning Speaker Test

A. References
(1) AMM 31-51-00/501, Aural Warning Adjustment Test
(2) AMM 24-22-00/201, Electrical - Control

B. Access
(1) Location Zone
211/212 Flight Compartment - Overhead panel

C. Procedure

S 864-008
(1) Supply electrical power (AMM 24-22-00/201).

S 734-009
(2) Do this task to make sure the aural warning speakers operate correctly: "Owl Input Discretes Test " (AMM 31-51-00/501).
(a) Make sure you hear a 1000 Hz tone from each speaker.

NOTE: The length of the tone is 500 ms.

S 864-010
(3) Remove electrical power if it is not necessary (Ref 24-22-00/201).

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