FADEC - ADJUSTMENT/TEST

EFFECTIVITY: ALL

1.   General

   A.   This section gives the procedures to do the FADEC data downloading and the MFD check for no FADEC maintenance messages. The FADEC data can be downloaded with the ARINC 429 Bus Reader or with a Personal Computer, whichever is available.

   B.   The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	DESCRIPTION	EFFECTIVITY
73-22-01-700-801-A	FADEC DISCRETE LABELS - INSPECTION	ALL
73-22-01-700-802-A	FADEC MAINTENANCE MESSAGES - INSPECTION	ALL
73-22-01-700-803-A ♦	MFD ENG ( ) LT FAULT AND ENG ( ) SCHED MAINT REPAIR MAINTENANCE MESSAGES - INSPECTION	ALL

TASK 73-22-01-700-801-A
EFFECTIVITY: ALL

2. FADEC DISCRETE LABELS - INSPECTION

    A. General

       (1) This task gives the procedures to do the FADEC discrete labels inspection. The FADEC data can be downloaded with the ARINC 429 Bus Reader or with a Personal Computer, whichever is available.

       (2) This task gives the procedure to read the labels at real time mode. You can download the labels from the CMC through the Personal Computer and the applicable CMC DAS software. Refer to the applicable DAS handbook and AMM MPP 45-45-00/200.

    B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-02/100	-
AMM MPP 45-45-00/200	- MAINTENANCE PRACTICES
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE
AMM TASK 28-41-00-200-801-A/600	-
AMM TASK 45-45-00-970-802-A/200	CMC DOWNLOADING WITH THE PERSONAL COMPUTER
AMM TASK 45-45-01-000-801-A/400	CENTRAL MAINTENANCE COMPUTER (CMC) - REMOVAL
AMM TASK 45-45-01-400-801-A/400	CENTRAL MAINTENANCE COMPUTER (CMC) - INSTALLATION
AMM TASK 53-01-01-000-801-A/400	COCKPIT FLOOR PANELS - REMOVAL
AMM TASK 53-01-01-400-801-A/400	COCKPIT FLOOR PANELS - INSTALLATION
AMM TASK 71-00-01-910-801-A/200	ENGINE START PROCEDURE (NORMAL)
AMM TASK 71-00-01-910-804-A/200	ENGINE STOP PROCEDURE
Rolls-Royce Maintenance Manual CSP34022	-

    C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
221	221GF	Floor panel
223		Maintenance panel

    D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 175	Adapter Box, ARINC 429 Bus Reader	Downloading	
GSE 163	ARINC 429 Bus Reader	Downloading	

    E. Auxiliary Items

    Not Applicable

F.   Consumable Materials

Not Applicable

G.   Expandable Parts

Not Applicable

H.   Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Cockpit

I.   Preparation (for FADEC Downloading with the ARINC 429 Bus Reader) (Figure 501)

SUBTASK 841-005-A

(1)   Remove cockpit floor 221GF (AMM MPP 06-41-02/100) (AMM TASK 53-01-01-000-801-A/400).

(2)   On the circuit breaker panel, open the CMC circuit breaker.

(3)   Remove the CMC (AMM TASK 45-45-01-000-801-A/400).

(4)   Install the adapter box (GSE 175) in the location of the CMC.

(5)   Connect the ARINC 429 Bus Reader (GSE 163) to the adapter box.

(6)   On the circuit breaker panel, close the CMC circuit breaker.

(7)   Energize the aircraft with an External DC Power Supply (AMM TASK 20-40-01-860-801-A/200).

J.   Preparation (for FADEC Downloading with the Personal Computer) (Figure 501)

SUBTASK 841-006-A

(1)   Install the personal computer to read the FADEC data (AMM TASK 45-45-00-970-802-A/200).

K.   Inspect the FADEC Discrete Labels (Figure 501)

SUBTASK 720-004-A

(1)   Start the engine (AMM TASK 71-00-01-910-801-A/200).

(2)   Let the engine stay idle for one minute.

(3)   The procedure below uses the ARINC 429 BUS Reader (GSE 163) to read the FADEC discrete labels. Do the FADEC downloading as follows:

(a)   On the adapter box (GSE 175), select FADEC 1A.

(b)   Set the ARINC 429 Bus Reader (GSE 163) as follows:

NOTE: To initialize and operate the ARINC 429 Bus Reader, refer to the Operator's Manual of the Reader.

1   Energize the ARINC 429 Bus Reader.

2   Set the receiver speed to LO (low speed).

3   Set the bus type to ARINC 429.

4   Set the mode to RCV (receiver).

5   Select the BIT signal to the binary mode.

6   Select FADEC discrete labels.

NOTE: Refer to the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00 to know which labels must be selected.

(c)   Use the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00 to know which are the bit numbers for each discrete label.

(d)   On the ARINC 429 Bus Reader (GSE 163), read the bit status for each discrete label of the related FADEC and write them in table 501. Do as follows:

NOTE: •   The bit status is shown in binary code.

•   Table 501 can be photocopied and filled out after each FADEC check.

1   If the bit status shows 0 (zero), no maintenance procedures are necessary.

2   If the bit status shows 1 (one), there are maintenance procedures to do. Refer to the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00.

(e)   Do steps (a) to (d) again for the other FADECs.

(4)   This step shows the table which identifies the bit numbers (BIT No.) for each label on the ARINC 429 Bus Reader, for each FADEC. This table can be used as an example or can be photocopied for use.

Table 501 - RELATIONSHIP BETWEEN LABEL NO. X BIT NO.

FADEC IDENTIFICATION:		(__)1A	(__)1B	(__)2A	(__)2B
LABEL No.	**BIT No.**[1]																			
	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
264																			
265																			
351																			
352																			
353																			
354																			
355																			
356					X	X	X				X	X							
357																			

[1] The cells must be filled out with the value (0 or 1) read on the ARINC 429 Bus Reader, as applicable.

Table 501 - RELATIONSHIP BETWEEN LABEL NO. X BIT NO. (Continued)

FADEC IDENTIFICATION:											(__)1A			(__)1B			(__)2A		(__)2B
LABEL No.	BIT No.[1]																		
	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
360																			

[1] The cells must be filled out with the value (0 or 1) read on the ARINC 429 Bus Reader, as applicable.

(5) The procedure below uses a personal computer to read the FADEC discrete labels.

(a) Find in the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00 the table of discrete labels that must be read.

(b) Select FADEC 1A to do the downloading with the personal computer.

NOTE: • Refer to the applicable DAS handbook documentation.

• The bit status on the fields where there is an "X" indication on Table 501, are non-significant readings. They can be 0 (zero) or 1 (one), and it does not require any maintenance action according to Rolls-Royce Maintenance Manual CSP34022 05-14-00. For the other bit status that are contained in the Rolls-Royce Maintenance Manual CSP34022 05-14-00, steps C.(1) (a) and (b) must be followed.

(c) Do the readings of the bit status of each FADEC discrete label as follows:

1 On the personal computer, read the bit status for each FADEC discrete label.

a The bit status found must be equal to 0 (zero). Thus, no maintenance procedures are necessary.

b If the bit status is 1 (one), there are maintenance procedures to do. Refer to the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00.

(d) Do steps (b) and (c) again for the other FADECs.

(6) Stop the Engine (AMM TASK 71-00-01-910-804-A/200)

L. Follow-on (for FADEC Downloading with the ARINC 429 Bus Reader)

SUBTASK 842-005-A

(1) De-energize the ARINC 429 Bus Reader.

(2) De-energize the aircraft (AMM TASK 20-40-01-860-801-A/200).

(3) Disconnect the ARINC 429 Bus Reader (GSE 175) from the adapter box.

(4) Remove the adapter box (GSE 175) from the location of the CMC.

(5) Install the CMC (AMM TASK 45-45-01-400-801-A/400).

(6)   Do an inspection on the fuel quantity indication harness (AMM TASK 28-41-00-200-801-A/600).

NOTE: The inspection of fuel quantity indication harness is part of Critical Design Configuration Control Limitations (CDCCL) in the Airworthiness Limitations of the Aircraft Maintenance Program.

(7)   Install cockpit floor 221GF (AMM MPP 06-41-02/100) (AMM TASK 53-01-01-400-801-A/400).

M.   Follow-on (for FADEC Downloading with the Personal Computer)
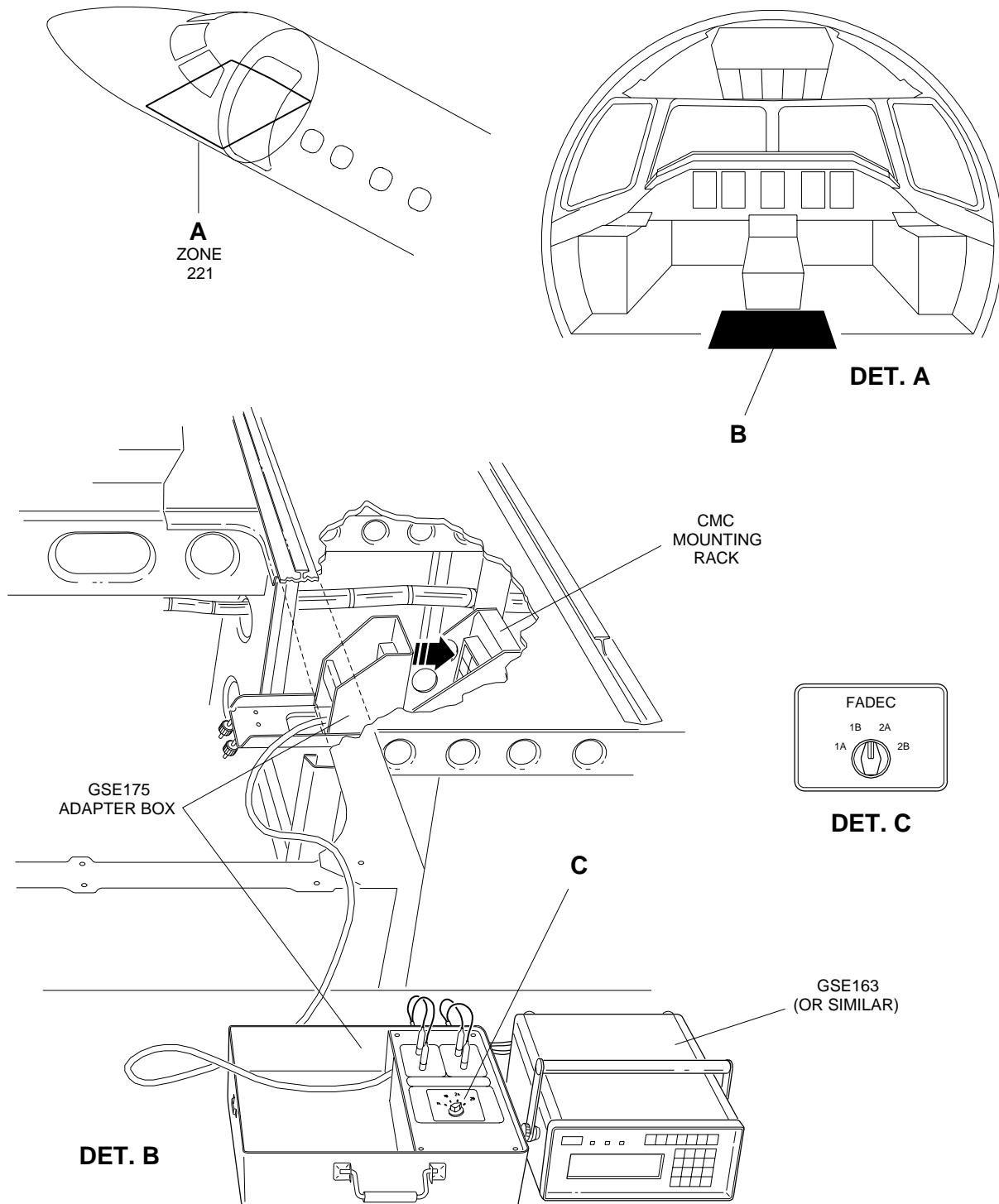
SUBTASK 842-006-A

(1)   Remove the personal computer (AMM TASK 45-45-00-970-802-A/200).

EFFECTIVITY: ALL
FADEC Downloading - Component Locations
Figure 501 - Sheet 1

A
ZONE
221

DET. A

B

CMC
MOUNTING
RACK

GSE175
ADAPTER BOX

C

FADEC

1B   2A
1A   2B

DET. C

GSE163
(OR SIMILAR)

DET. B
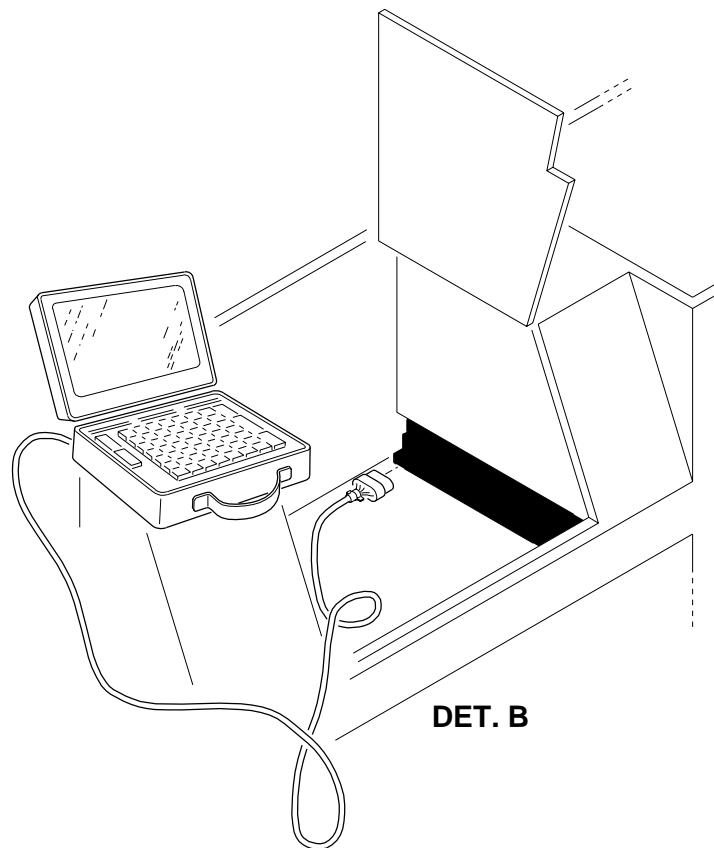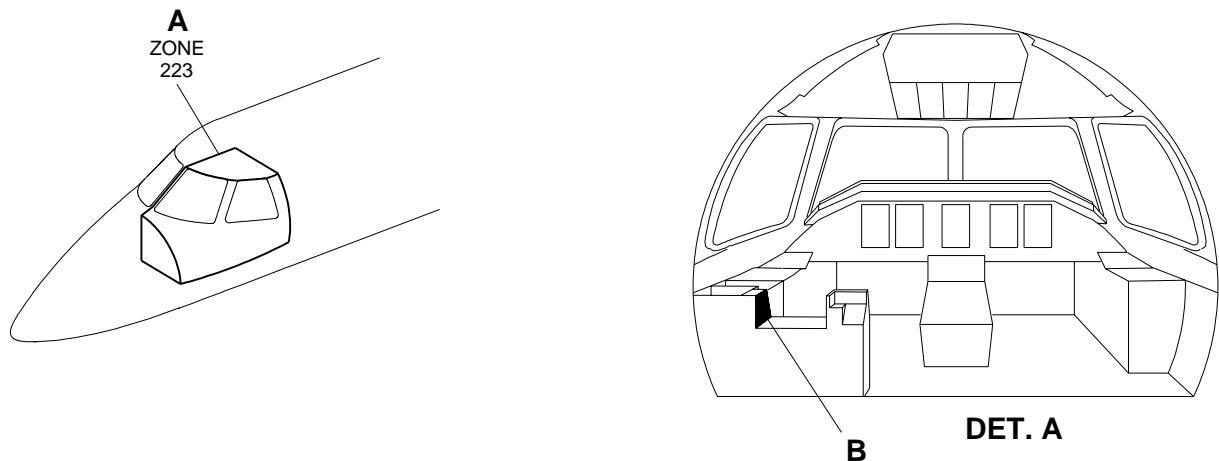
145AMM760037.MCE A

EFFECTIVITY: ALL
FADEC Downloading - Component Locations
Figure 501 - Sheet 2

A
ZONE
223

DET. A

B

DET. B

145AMM760041.MCE C

TASK 73-22-01-700-802-A
EFFECTIVITY: ALL

3. FADEC MAINTENANCE MESSAGES - INSPECTION

    A. General

        (1) This task gives the procedures to do the FADEC maintenance messages inspection. The FADEC data can be downloaded with the ARINC 429 Bus Reader or with a Personal Computer, whichever is available.

        (2) This task gives the procedure to read the labels at real time mode. You can download the labels from the CMC through the Personal Computer and the applicable CMC DAS software. Refer to the applicable DAS handbook and AMM MPP 45-45-00/200.

    B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-02/100	-
AMM MPP 45-45-00/200	- MAINTENANCE PRACTICES
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EX-TERNAL POWER SOURCE
AMM TASK 28-41-00-200-801-A/600	-
AMM TASK 45-45-00-970-802-A/200	CMC DOWNLOADING WITH THE PERSONAL COM-PUTER
AMM TASK 45-45-01-000-801-A/400	CENTRAL MAINTENANCE COMPUTER (CMC) - RE-MOVAL
AMM TASK 45-45-01-400-801-A/400	CENTRAL MAINTENANCE COMPUTER (CMC) - IN-STALLATION
AMM TASK 53-01-01-000-801-A/400	COCKPIT FLOOR PANELS - REMOVAL
AMM TASK 53-01-01-400-801-A/400	COCKPIT FLOOR PANELS - INSTALLATION
AMM TASK 71-00-01-910-801-A/200	ENGINE START PROCEDURE (NORMAL)
AMM TASK 71-00-01-910-804-A/200	ENGINE STOP PROCEDURE
Rolls-Royce Maintenance Manual CSP34022	-

    C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
221	221GF	Floor panel
223		Maintenance panel

    D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 175	Adapter Box, ARINC 429 Bus Reader	Downloading	
GSE 163	ARINC 429 Bus Reader	Downloading	

    E. Auxiliary Items

        Not Applicable

F.   Consumable Materials

Not Applicable

G.   Expandable Parts

Not Applicable

H.   Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Cockpit

I.   Preparation (for FADEC Downloading with the ARINC 429 Bus Reader) (Figure 501)

SUBTASK 841-002-A

(1)   Remove cockpit floor 221GF (AMM MPP 06-41-02/100) (AMM TASK 53-01-01-000-801-A/400).

(2)   On the circuit breaker panel, open the CMC circuit breaker.

(3)   Remove the CMC (AMM TASK 45-45-01-000-801-A/400).

(4)   Install the adapter box (GSE 175) in the location of the CMC.

(5)   Connect the ARINC 429 Bus Reader (GSE 163) to the adapter box.

(6)   On the circuit breaker panel, close the CMC circuit breaker.

(7)   Energize the aircraft with an External DC Power Supply (AMM TASK 20-40-01-860-801-A/200).

J.   Preparation (for FADEC Downloading with the Personal Computer) (Figure 501)

SUBTASK 841-003-A

(1)   Install the personal computer to read the FADEC data (AMM TASK 45-45-00-970-802-A/200).

K.   Inspect the FADEC Maintenance Messages (Figure 501)

SUBTASK 720-002-A

(1)   Start the engine (AMM TASK 71-00-01-910-801-A/200).

(2)   Let the engine stay idle for one minute.

(3)   The procedure below uses the ARINC 429 BUS Reader (GSE 163) to read the FADEC maintenance messages. Do the FADEC downloading as follows:

(a)   On the adapter box (GSE 175), select FADEC 1A.

(b)   Set the ARINC 429 Bus Reader (GSE 163) as follows:

NOTE: To initialize and operate the ARINC 429 Bus Reader, refer to the Operator's Manual of the Reader.

<u>1</u>   Energize the ARINC 429 Bus Reader.

2   Set the receiver speed to LO (low speed).

3   Set the bus type to ARINC 429.

4   Set the mode to RCV (receiver).

5   Select the BIT signal to the binary mode.

6   Select FADEC discrete labels.

NOTE: Refer to the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00 to know which labels must be selected.

(c)   Use the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00 to identify the bit number for each maintenance message text.

(d)   On the ARINC 429 Bus Reader (GSE 163), read the bit status for each maintenance message of the related FADEC and write them in table 502. Do as follows:

NOTE: •   The bit status is shown in binary code.

•   Table 502 can be photocopied and filled out after each FADEC check.

1   If the bit status shows 0 (zero), no maintenance procedures are necessary.

WARNING: •   **IF BIT STATUS 14 (DISCRETE LABEL 360/FADLRU) SHOWS 1 (ONE) FOR FADEC A AND FADEC B SIMULTANEOUSLY FOR AN ENGINE, THEN THERE IS NO PROTECTION FOR N1 OVERSPEED.**

•   **IF BIT STATUS 15 (DISCRETE LABEL 360/FADLRU) SHOWS 1 (ONE) FOR FADEC A AND FADEC B SIMULTANEOUSLY FOR AN ENGINE, THEN THERE IS NO PROTECTION FOR N2 OVERSPEED.**

2   If the bit status shows 1 (one), there are maintenance procedures to do. Refer to the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00.

(e)   Do steps (a) to (d) again for the other FADECs.

(4)   This step shows the table which identifies the bit numbers (BIT No.) for each label on the ARINC 429 Bus Reader, for each FADEC. This table can be used as an example or can be photocopied for use.

Table 502 - RELATIONSHIP BETWEEN LABEL NO. X BIT NO.

FADEC IDENTIFICATION:												(__)1A		(__)1B		(__)2A		(__)2B
LABEL No.	BIT No.[1]																	
	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
264																			
265																			
351																			
352																			
353																			
354																			
355																			
356					X	X	X				X	X							
357																			
360																			

[1]   The cells must be filled out with the value (0 or 1) read on the ARINC 429 Bus Reader, as applicable.

(5)   The procedure below uses the personal computer to read the FADEC maintenance messages.

(a)   Find in the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00 the table of maintenance messages that must be read.

(b)   Select FADEC 1A to do the downloading with the personal computer.
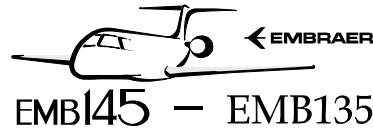
NOTE: Refer to the applicable DAS handbook documentation.

(c)   Do the readings of the bit status of each FADEC maintenance message as follows:

1   On the personal computer, read the bit status for each FADEC maintenance message.

a   The bit status found must be equal to 0 (zero); thus, no maintenance procedures are necessary.

WARNING: •   IF BIT STATUS 14 (DISCRETE LABEL 360/FADLRU) SHOWS 1 (ONE) FOR FADEC A AND FADEC B SIMULTANEOUSLY FOR AN ENGINE, THEN THERE IS NO PROTECTION FOR N1 OVERSPEED.

•   IF BIT STATUS 15 (DISCRETE LABEL 360/FADLRU) SHOWS 1 (ONE) FOR FADEC A AND FADEC B SIMULTANEOUSLY FOR AN ENGINE, THEN THERE IS NO PROTECTION FOR N2 OVERSPEED.

b   If the bit value is 1 (one), there are maintenance procedures to do. Refer to the latest revision of Rolls-Royce Maintenance Manual CSP34022 05-14-00.

(d) Do steps (b) and (c) again for the other FADECs.

(6) Stop the Engine (AMM TASK 71-00-01-910-804-A/200)

L. Follow-on (for FADEC Downloading with the ARINC 429 Bus Reader)

SUBTASK 842-002-A

(1) De-energize the ARINC 429 Bus Reader.

(2) De-energize the aircraft (AMM TASK 20-40-01-860-801-A/200).

(3) Disconnect the ARINC 429 Bus Reader (GSE 175) from the adapter box.

(4) Remove the adapter box (GSE 175) from the location of the CMC.

(5) Install the CMC (AMM TASK 45-45-01-400-801-A/400).

(6) Do an inspection on the fuel quantity indication harness (AMM TASK 28-41-00-200-801-A/600).

NOTE: The inspection of fuel quantity indication harness is part of the Critical Design Configuration Control Limitations (CDCCL) in the Airworthiness Limitations of the Aircraft Maintenance Program.

(7) Install cockpit floor 221GF (AMM MPP 06-41-02/100) (AMM TASK 53-01-01-400-801-A/400).

M. Follow-on (for FADEC Downloading with the Personal Computer)

SUBTASK 842-003-A

(1) Remove the personal computer (AMM TASK 45-45-00-970-802-A/200).

TASK 73-22-01-700-803-A
EFFECTIVITY: ALL

4.   <u>MFD ENG ( ) LT FAULT AND ENG ( ) SCHED MAINT REPAIR MAINTENANCE MESSAGES -
     INSPECTION</u>

   A.   General

     (1)   This task gives the procedures to do the MFD check for no FADEC maintenance messages.

   B.   References

REFERENCE	DESIGNATION
AMM SDS 32-30-00/1	
AMM SDS 45-45-00/1	
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EX-TERNAL POWER SOURCE

   C.   Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
223		Maintenance panel

   D.   Tools and Equipment

   Not Applicable

   E.   Auxiliary Items

   Not Applicable

   F.   Consumable Materials

   Not Applicable

   G.   Expandable Parts

   Not Applicable
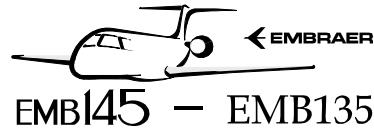
   H.   Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Cockpit

   I.   Preparation (Figure 502)

   SUBTASK 841-004-A

     (1)   Energize the aircraft with the External DC Power Supply (AMM TASK
           20-40-01-860-801-A/200).

     (2)   Make sure that the CMC system (AMM SDS 45-45-00/1) is operational and on.

J.   Inspect Multi-Function Display for ENG ( ) LT FAULT and ENG ( ) SCHED MAINT REPAIR Maintenance Messages (Figure 502)

SUBTASK 720-003-A

    (1)   On the main instrument panel, set MFD 1 to the maintenance page.
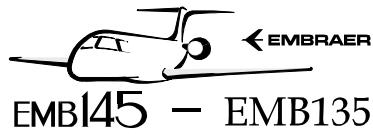
       NOTE: This page is available only on the ground (WOW) (AMM SDS 32-30-00/1).

       (a)   Push the MFD button.

       (b)   (Applicable to aircraft with dual FMS). Push the JSTK button.

       (c)   Push the MAINT button.

       (d)   (Applicable to aircraft with -011 CMC and on) A message with the CMC software version comes into view. Push the NEXT button.

       (e)   Make sure that the CMC FADEC ( ) INPUT FAIL message is not shown on the MFD maintenance page.

       (f)   Check for no ENG ( ) LT FAULT and ENG ( ) SCHED MAINT REPAIR Maintenance Message on the MFD maintenance page.

K.   Follow-on

SUBTASK 842-004-A

    (1)   Deenergize the aircraft (AMM TASK 20-40-01-860-801-A/200).
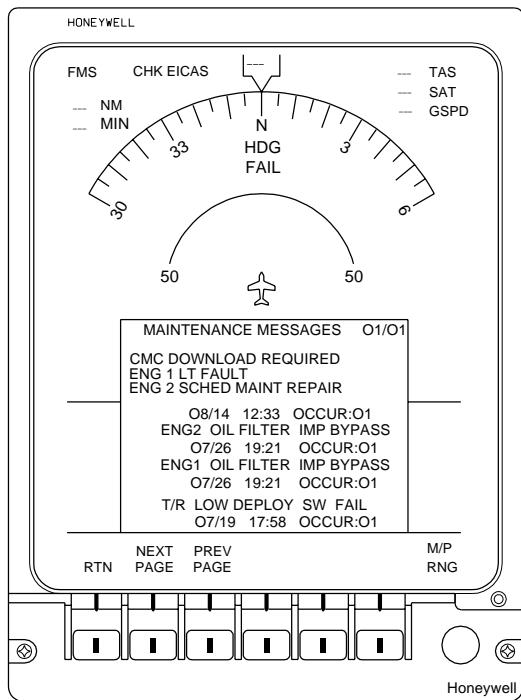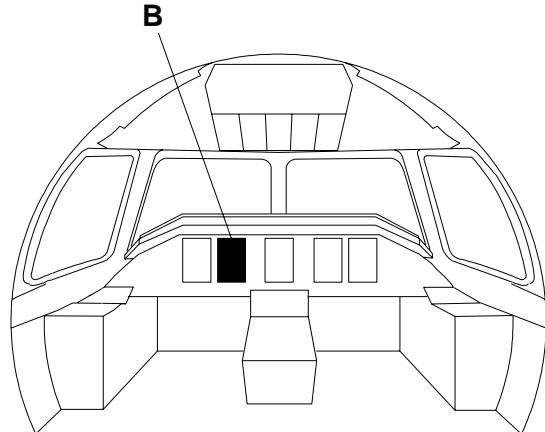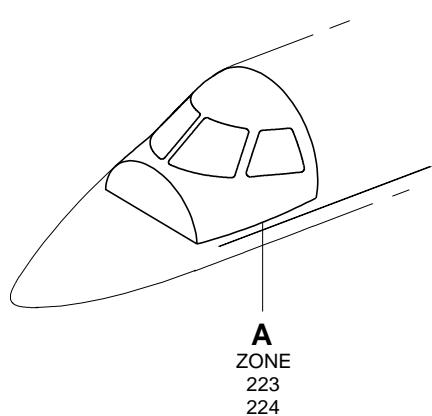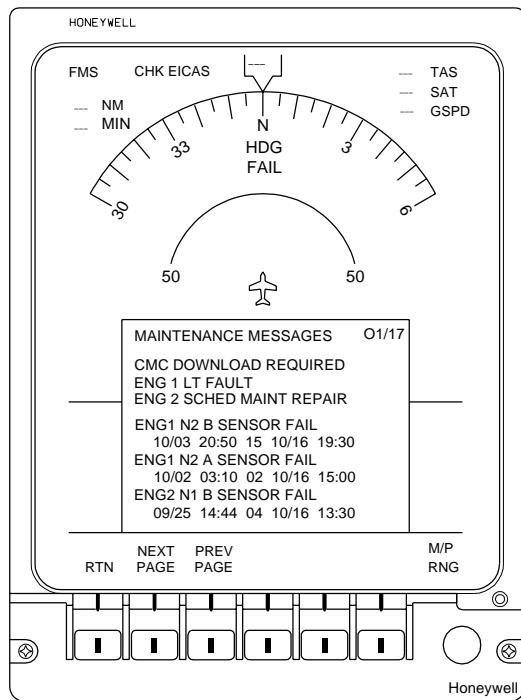
EFFECTIVITY: ALL
CMC Data - MFD Downloading
Figure 502

B

A
ZONE
223
224

DET. A

HONEYWELL

FMS   CHK EICAS   --- TAS
                             --- SAT
— NM   --- GSPD
— MIN

              N
             HDG
             FAIL

33   3

30   6

   50   50

MAINTENANCE MESSAGES   O1/O1

CMC DOWNLOAD REQUIRED
ENG 1 LT FAULT
ENG 2 SCHED MAINT REPAIR

    O8/14 12:33 OCCUR:O1
    ENG2 OIL FILTER IMP BYPASS
    O7/26 19:21   OCCUR:O1
    ENG1 OIL FILTER IMP BYPASS
    O7/26 19:21   OCCUR:O1

    T/R LOW DEPLOY SW FAIL
    O7/19 17:58 OCCUR:O1

          NEXT   PREV   M/P
   RTN   PAGE   PAGE   RNG

Honeywell

DET. B ◢1◣

HONEYWELL

FMS   CHK EICAS   --- TAS
                             --- SAT
— NM   --- GSPD
— MIN

              N
             HDG
             FAIL

33   3

30   6

   50   50

MAINTENANCE MESSAGES   O1/17

CMC DOWNLOAD REQUIRED
ENG 1 LT FAULT
ENG 2 SCHED MAINT REPAIR

ENG1 N2 B SENSOR FAIL
   10/03 20:50 15 10/16 19:30
ENG1 N2 A SENSOR FAIL
   10/02 03:10 02 10/16 15:00
ENG2 N1 B SENSOR FAIL
   09/25 14:44 04 10/16 13:30

          NEXT   PREV   M/P
   RTN   PAGE   PAGE   RNG

Honeywell

DET. B ◢2◣

◢1◣ AIRCRAFT WITH CMC −009 AND −010.

◢2◣ AIRCRAFT WITH CMC −011 AND ON.   EM145AMM730046A.DGN