National Defence / Défense nationale

C-12-114-000/MB-Z04

OPERATING INSTRUCTIONS

CT114 TUTOR – SNOWBIRD AIRCRAFT GENERAL

AIRCRAFT OPERATING INSTRUCTIONS SUPPLEMENT

(ENGLISH)

(This CFTO supplements C-12-114-000/MB-001, CT114 Tutor – Avionics Update, Aircraft Operating Instructions, dated 2002-09-01.)

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INTRODUCTION

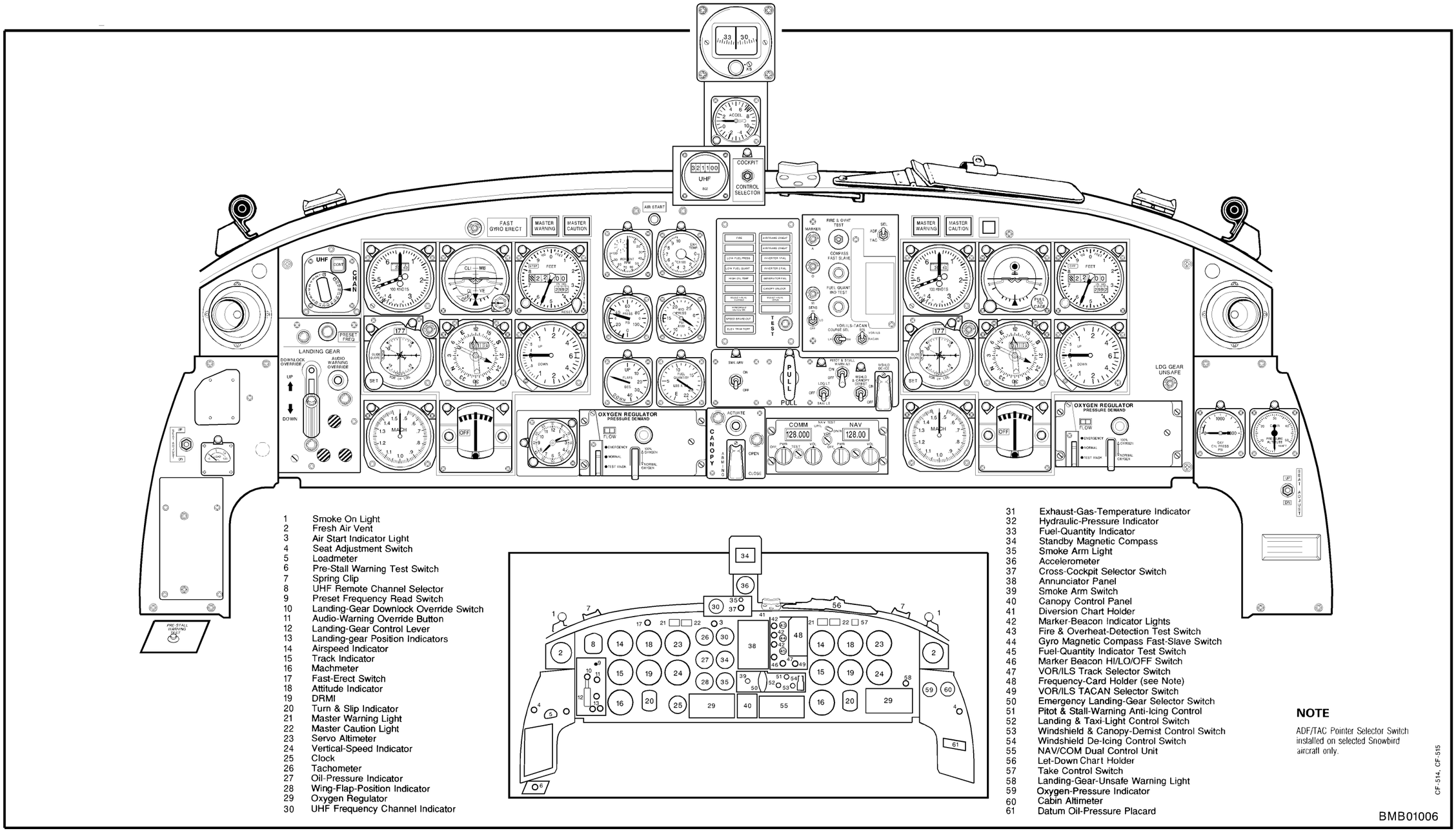
GENERAL

1. This supplement provides operating instructions for the CT114 Snowbird aircraft. This document is to be used in conjunction with C-12-114-000/MB-001. For descriptive maintenance instructions, refer to the applicable CFTO. For the interior arrangement of the aircraft, see Figure 1-1.

2. Modification C-12-114-000/CF-544 allows for provision for the ARU-13/A attitude indicator to be installed in the Right Hand (RH) seat position whenever the Snowbird position in formation dictates that the aircraft is to piloted from the RH seat.

NOTE

Any time the attitude indicators are interchanged, the CF 339 (Section V - Additional Information) shall be annotated to state that the ARU-13/A is installed in the RH side.



1 Smoke On Light
2 Fresh Air Vent
3 Air Start Indicator Light
4 Seat Adjustment Switch
5 Loadmeter
6 Pre-Stall Warning Test Switch
7 Spring Clip
8 UHF Remote Channel Selector
9 Preset Frequency Read Switch
10 Landing-Gear Downlock Override Switch
11 Audio-Warning Override Button
12 Landing-Gear Control Lever
13 Landing-gear Position Indicators
14 Airspeed Indicator
15 Track Indicator
16 Machmeter
17 Fast-Erect Switch
18 Attitude Indicator
19 DRMI
20 Turn & Slip Indicator
21 Master Warning Light
22 Master Caution Light
23 Servo Altimeter
24 Vertical-Speed Indicator
25 Clock
26 Tachometer
27 Oil-Pressure Indicator
28 Wing-Flap-Position Indicator
29 Oxygen Regulator
30 UHF Frequency Channel Indicator

31 Exhaust-Gas-Temperature Indicator
32 Hydraulic-Pressure Indicator
33 Fuel-Quantity Indicator
34 Standby Magnetic Compass
35 Smoke Arm Light
36 Accelerometer
37 Cross-Cockpit Selector Switch
38 Annunciator Panel
39 Smoke Arm Switch
40 Canopy Control Panel
41 Diversion Chart Holder
42 Marker-Beacon Indicator Lights
43 Fire & Overheat-Detection Test Switch
44 Gyro Magnetic Compass Fast-Slave Switch
45 Fuel-Quantity Indicator Test Switch
46 Marker Beacon HI/LO/OFF Switch
47 VOR/ILS Track Selector Switch
48 Frequency-Card Holder (see Note)
49 VOR/ILS TACAN Selector Switch
50 Emergency Landing-Gear Selector Switch
51 Pitot & Stall-Warning Anti-Icing Control
52 Landing & Taxi-Light Control Switch
53 Windshield & Canopy-Demist Control Switch
54 Windshield De-Icing Control Switch
55 NAV/COM Dual Control Unit
56 Let-Down Chart Holder
57 Take Control Switch
58 Landing-Gear-Unsafe Warning Light
59 Oxygen-Pressure Indicator
60 Cabin Altimeter
61 Datum Oil-Pressure Placard

NOTE

ADF/TAC Pointer Selector Switch installed on selected Snowbird aircraft only.

CF-514, CF-515

BMB01006

Cockpit Layout (Sheet 1 of 5) Figure 1-1

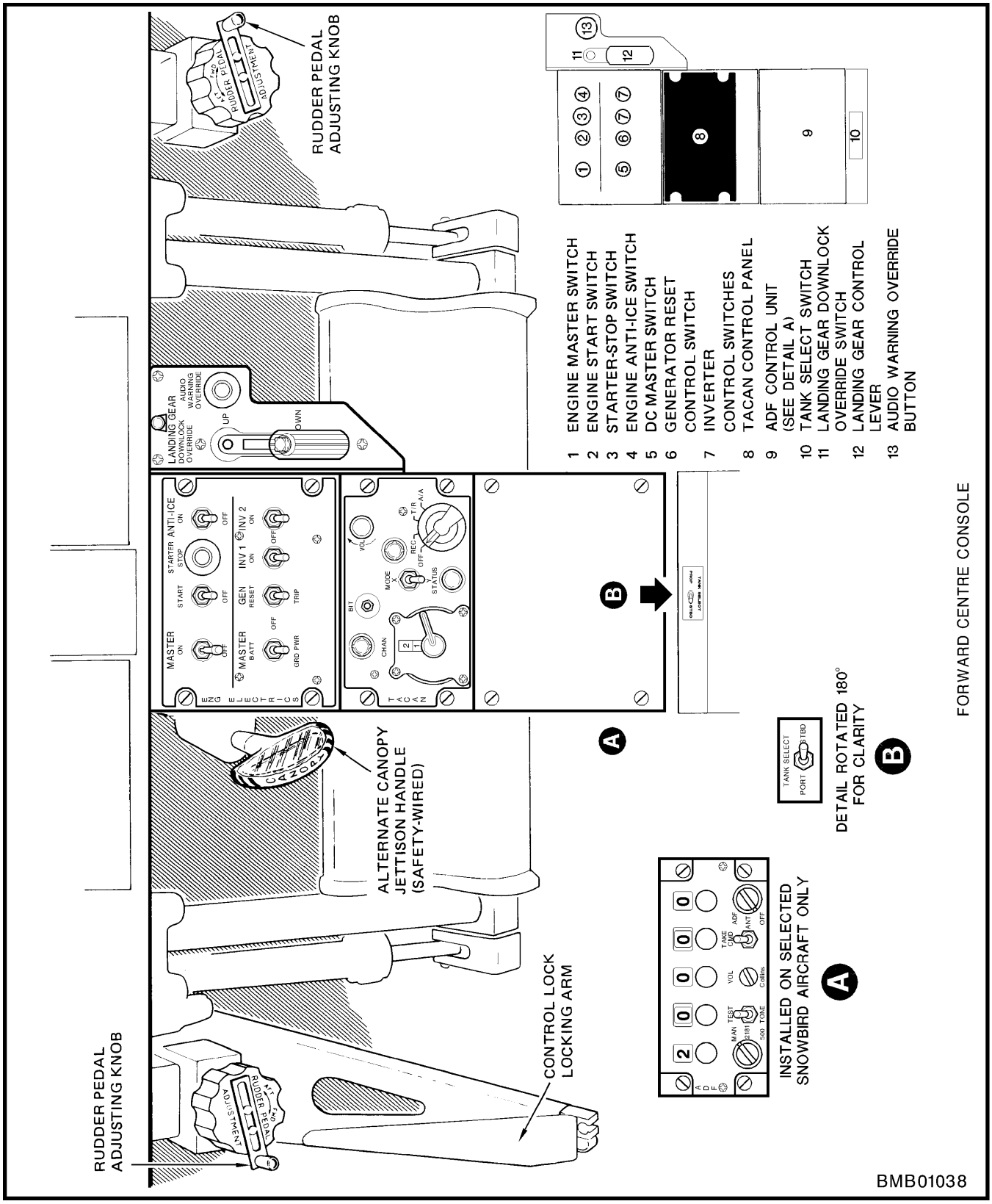


Figure 1-1 (Sheet 2 of 5) Cockpit Layout

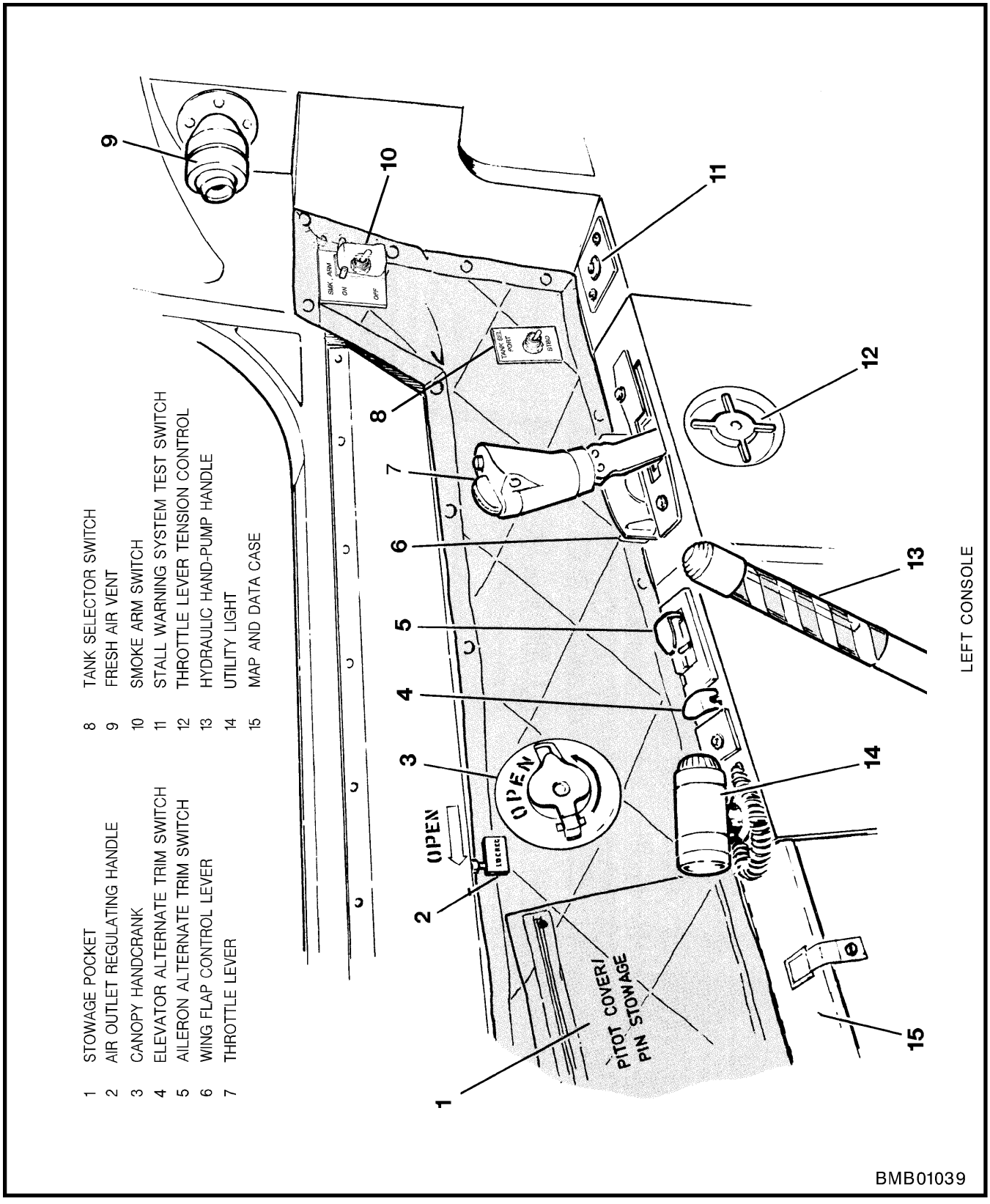
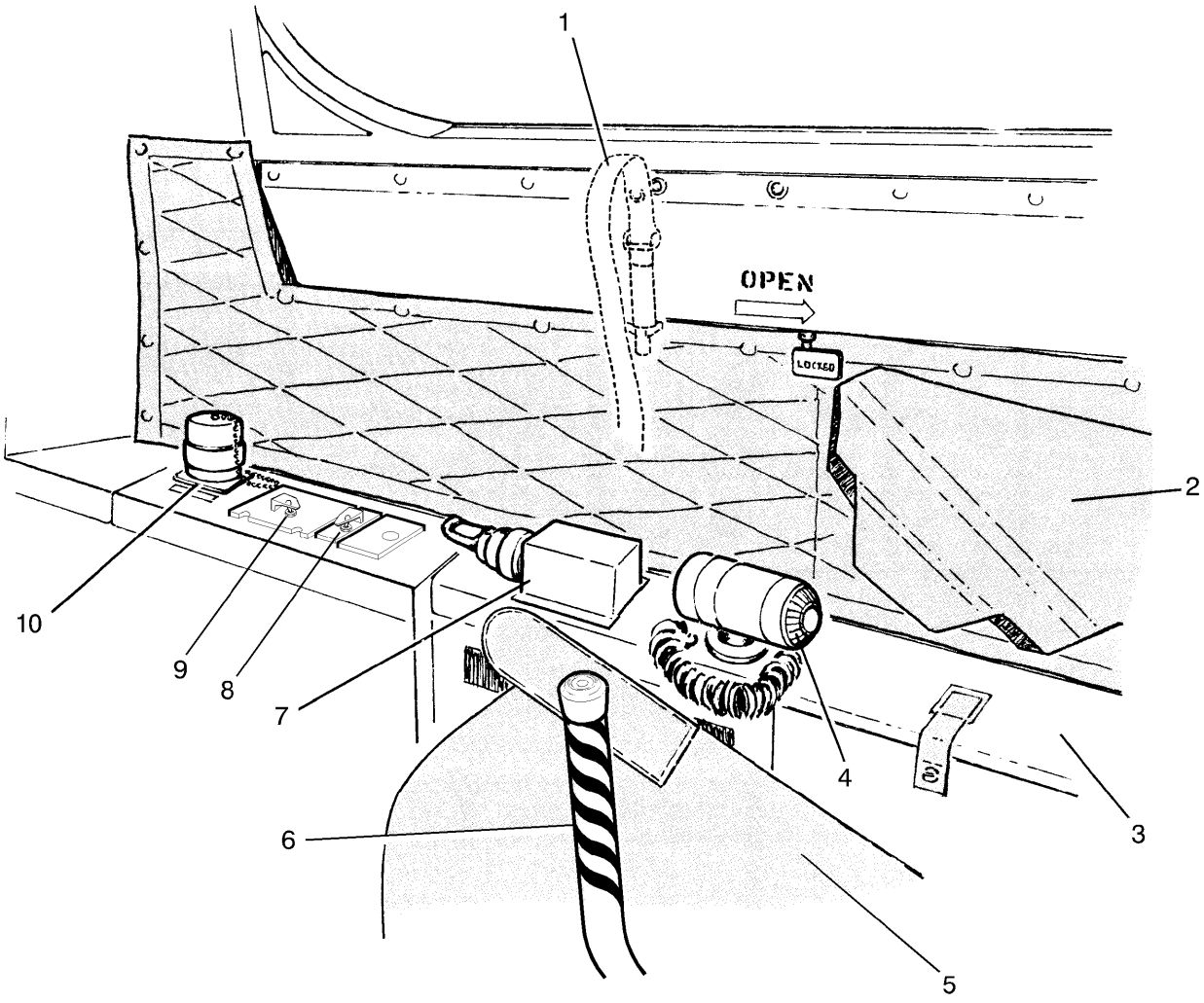


Figure 1-1 (Sheet 3 of 5) Cockpit Layout

1 SEAT PACK LANYARD STOWAGE POST
2 PIN STORAGE POCKET
3 INTAKE/TAIL PIPE COVERS
4 UTILITY LIGHT
5 BLIND FLYING VISOR STORAGE POSITION
6 HYDRAULIC HAND-PUMP HANDLE
7 AUDIBLE WARNING UNIT
8 ELEVATOR ALTERNATE TRIM SWITCH
9 AILERON ALTERNATE TRIM SWITCH
10 ALTIMETER TEST POINT



RIGHT CONSOLE

BMB01040

Figure 1-1 (Sheet 4 of 5) Cockpit Layout

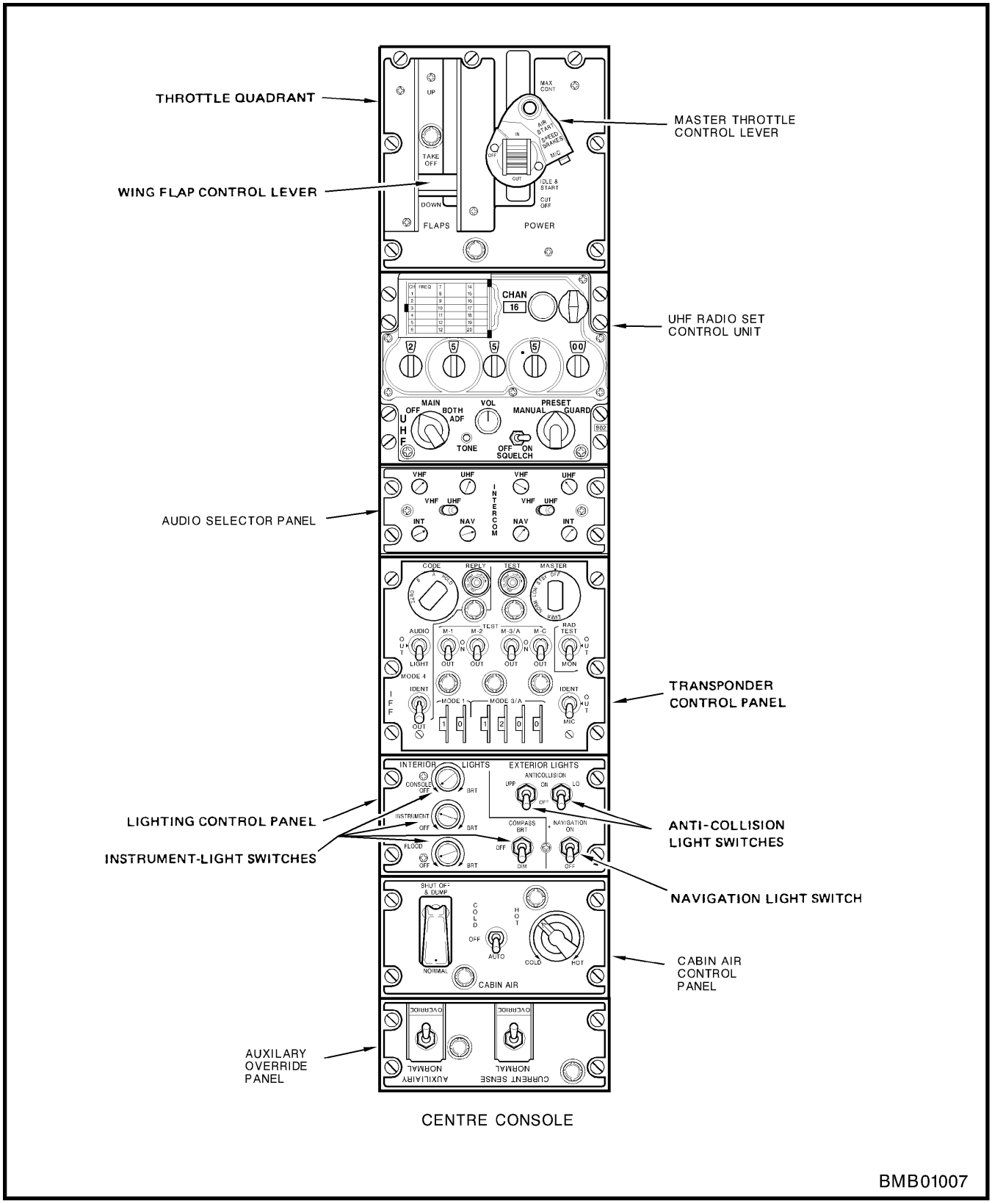


Figure 1-1 (Sheet 5 of 5) Cockpit Layout

PART 2

GENERAL DESCRIPTION

HYDRAULIC SYSTEM

1. A second hydraulic hand pump is installed on the floor of the cockpit, outboard of the right seat (see Figure 2-1).

EMERGENCY LANDING-GEAR SELECTOR HANDLE

2. The emergency landing-gear selector handle is installed in the centre of the instrument panel.

ELECTRICAL SYSTEM

3. For a schematic of the electrical power distribution, see Figure 2-2. For circuit-breakers location, see Figure 2-3.

COCKPIT CONTROL SELECTOR

3A. The cockpit control selector switch is a two-position lever-lock toggle switch marked LH and RH, mounted in a bracket centered on top of the instrument panel. The position of this switch will determine which cockpit has control of the speed brakes, landing gear, smoke system tank sel switches and alternate trim switches. An internal safety latching relay will prevent an inadvertent selection of the landing gear should the switch be selected without first matching the position of the landing gear control levers in the left and right cockpit.

CAUTION

The position of the landing gear control levers in the left and right cockpit must be matched before moving the cockpit control selection switch to prevent inadvertent selection should the safety latching relay fail.

THROTTLE CONTROL LEVERS

4. The master control lever is mounted on the centre console and the slave is mounted on the left console.

AILERON ALTERNATE TRIM SYSTEM SWITCH

5. A second aileron alternate trim system switch is installed on the right console.

ELEVATOR ALTERNATE TRIM SYSTEM SWITCH

6. A second elevator alternate trim system switch is installed on the right console.

NORMAL ELEVATOR TRIM SYSTEM SWITCH

6A. The elevator gear tab is rigged to the full nose down position for formation flying (refer to C-12-114-0A0/MF-001 for procedures). Flight characteristics are not changed.

PRE-STALL WARNING SYSTEM

7. The PITOT & STALL WARN A/I switch is located in the centre of the instrument panel.

LANDING-GEAR CONTROL PANEL

8. A second landing gear control panel containing a landing gear control lever, an AUDIO WARNING OVERRIDE button and a DOWNLOCK OVERRIDE switch is installed on the forward centre console.

AUDIBLE WARNING SIGNAL AND CUT-OUT CONTROLS

9. The HORN CUT OUT button has been removed from the aircraft.

LANDING-GEAR UP SELECTION OVERRIDE SWITCH

10. The LDG GEAR UP SELECTION override switch has been removed from the aircraft.

WINDSHIELD DEMIST

11. The control switch for the demisting system is located in the centre of the instrument panel.

PITOT TUBE AND LIFT-TRANSDUCER ANTI-ICING

12. The control switch common to both systems, is installed in the centre of the instrument panel.

LANDING AND TAXI LIGHTS

13. The control switch common to both lights, is installed in the centre of the instrument panel. In the Snowbird configuration, the taxi light bulb is a landing light, and the taxi light and landing lights operate independently.

NOTE

Operation of the taxi light is restricted to a maximum of five minutes continuous operation on the ground.

MASTER LIGHTS

14. A second set of master lights is installed on the upper right side of the instrument panel, above the airspeed indicator.

VHF PRESS TO TALK SWITCHES

15. On snowbird aircraft, the mute switches installed on the control columns are used as VHF press-to-talk (PTT) switches.

16. With the AIC-504 VHF/UHF switch set to VHF, the VHF transmits from the throttle PTT switch and the control column mute switches. If the AIC-504 VHF/UHF switch is set to UHF, the UHF transmits from the PTT switches on the throttle while the VHF transmits from the control mute switches.

DF-206A ADF SYSTEM

17. The DF-206A Automatic Direction Finder (ADF) system is installed only on selected Snowbird aircraft. The control panel is installed on the forward centre console (see Figure 1-1). On non-selected Snowbird aircraft a blanking plate is installed instead of the control panel.

18. The DF-206A ADF system which requires both AC and DC power, is a combination direction-finding and radio receiver system that uses broadcast and range stations within the frequency range of 100 to 2199.5 kHz for navigational purposes. The DF-206A ADF system consist of a DFC-206A ADF control, a DFR-206A ADF receiver (see Figure 2-4), two Distance Radio Magnetic Indicators (DRMI). A DFA-206A ADF antenna (see Figure 2-4) containing two loop antennas and one omnidirectional sense antenna producing a combined signal is installed under the fuselage. An ADF/TAC SEL bearing pointer selector switch is also installed in the centre of the instrument panel.

19. The DFR-206A ADF receiver accepts the combined antenna signals and sends them to the aircraft intercommunication system. It also compares the combined signals with an internal 87 Hz to provide relative bearing signals to the RH and LH DRMI when the control mode selector and the ADF/TAC SEL switches are set to ADF.

DFC-206A ADF CONTROL

20. The DFC-206 ADF control is located on the forward centre console and incorporates the following controls:

a. **System Mode Selector Switch.** The ADF/ANT/OFF switch selects the mode of system operation as follows:

(1) **ADF.** In the ADF position, the signals are received and sent to DRMI and intercommunication system.

(2) **ANT.** In the ANT position, the signals are received and sent to intercommunication system only.

(3) **OFF.** The OFF position removed power from the system.

b. **Frequency Mode Selector.** The MAN/2182/500 switch selects mode of frequency selection as follows:

(1) **MAN.** Allows frequency selection with the frequency selection knobs.

(2) **2182.** Selects 2182 kHz as the operating frequency.

(3) **500.** Selects 500 kHz as the operating frequency.

c. **TEST/TONE Switch.** Selects test or tone as follows:

(1) **TEST.** Momentary setting that selects the self-test.

(2) **TONE.** This setting selects a tome generator for continuous wave operation.

d. **Volume Control (VOL).** The VOL controls the received signal volume in 12 discrete steps.

e. **Frequency Selection Knobs.** Five frequency selector knobs are used to select the desired frequency when MAN is set on the frequency mode selector switch. The selected frequency is shown on the frequency windows.

f. **Take Command Switch.** The TAKE CMD switch is not used in this installation.

MISCELLANEOUS INSTRUMENTS

21. The oxygen pressure and cabin altitude indicators are located on the RH facia panel. Modification C-12-114-000/CF-531 allows for provision for a Hand Held GPS (HHGPS). Installation of the HHGPS is in a bracket and mount to the centre post of the windshield. Power and antenna connections are also provided so the unit is powered from the aircraft electrical system. The HHGPS is not intended to be used as a primary navigation aid, but as a supplementary VFR navigation aid used in conjunction with those instruments currently available in the CT-114.

NOTE

The standby compass swing procedure requires the bracket with the pivot pin to be removed. In the event of a total electrical failure, the unit must be removed and stowed to use the standby compass as the primary heading indicator

SMOKE SYSTEM

22. The smoke system, powered by 28 Vdc, contains two smoke tanks installed on existing pylons under the fuselage. The smoke tanks each have a capacity of 84.1 litres (18.5 gal) of diesel fuel and are pressurized to 103 ±14 kPa (15 ±2 psi). Piping is installed from the smoke tanks to the tail pipe for the diesel fuel from either tanks (as selected) to flow through the nozzles into the exhaust and generate smoke.

23. The smoke system can be armed using the left or right SMK ARM switches, located one on the instrument panel and one above the left console, which provide power to the trigger switches on the LH and RH control columns. A COCKPIT CONTROL SELECTOR switch, mounted in a bracket on top of the instrument panel, is used to select either the left or right TANK SEL switches. The TANK SEL switches, installed one above the left console and one on the centre console, are then used to select the PORT or STBD smoke tanks. Once a smoke tank has been selected, the trigger switch on either the LH or RH control column can be activated. SMK ON lights are also installed on the LH, RH and centre windshield frame, illuminating when the smoke system is armed and operating.

WARNING

Following flight, the smoke tanks will be pressurized, to release pressure prior to opening smoke tank fuel cap, carefully remove smoke tank vent cap attached to fuel cap. Failure to vent pressure from smoke tanks after flight may result in fire if excess pressure releases smoke oil from the nozzles into the tail pipe.

CAUTION

Failure to deactivate the smoke system with the trigger switch before de-arming the system will cause the smoke system to be activated next time it is armed.

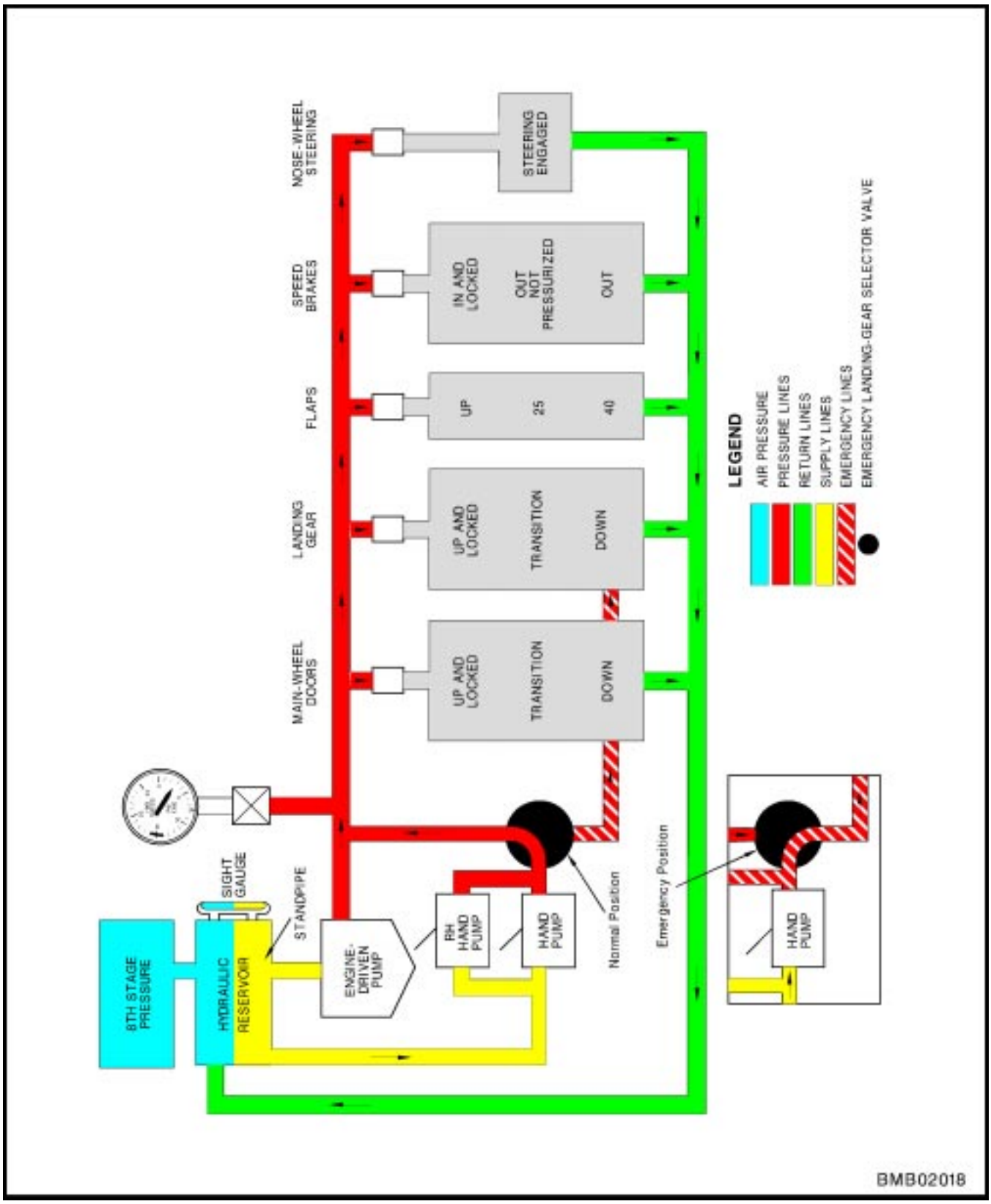


Figure 2-1 Hydraulic System – Schematic

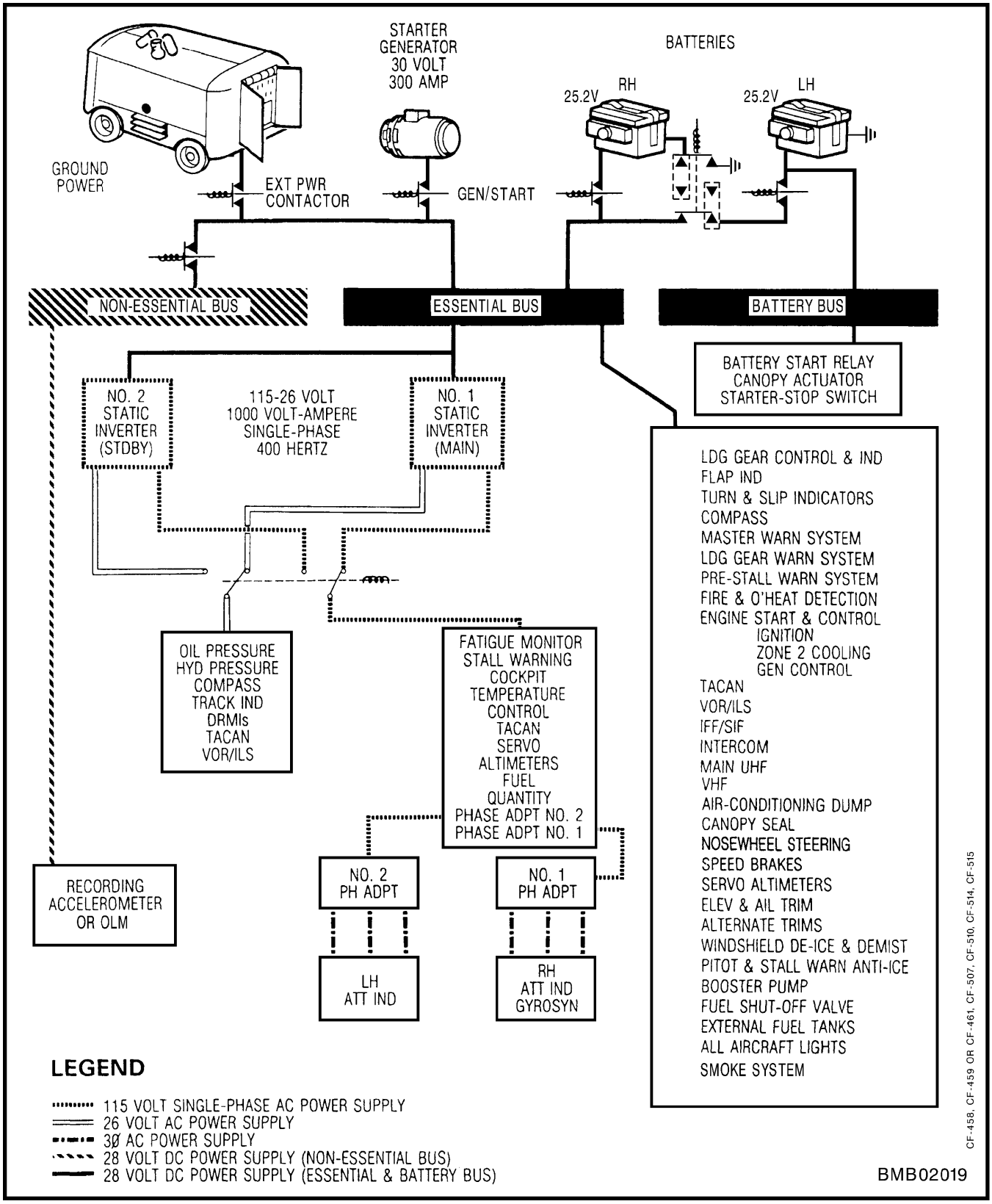


Figure 2-2 Electrical System – Schematic

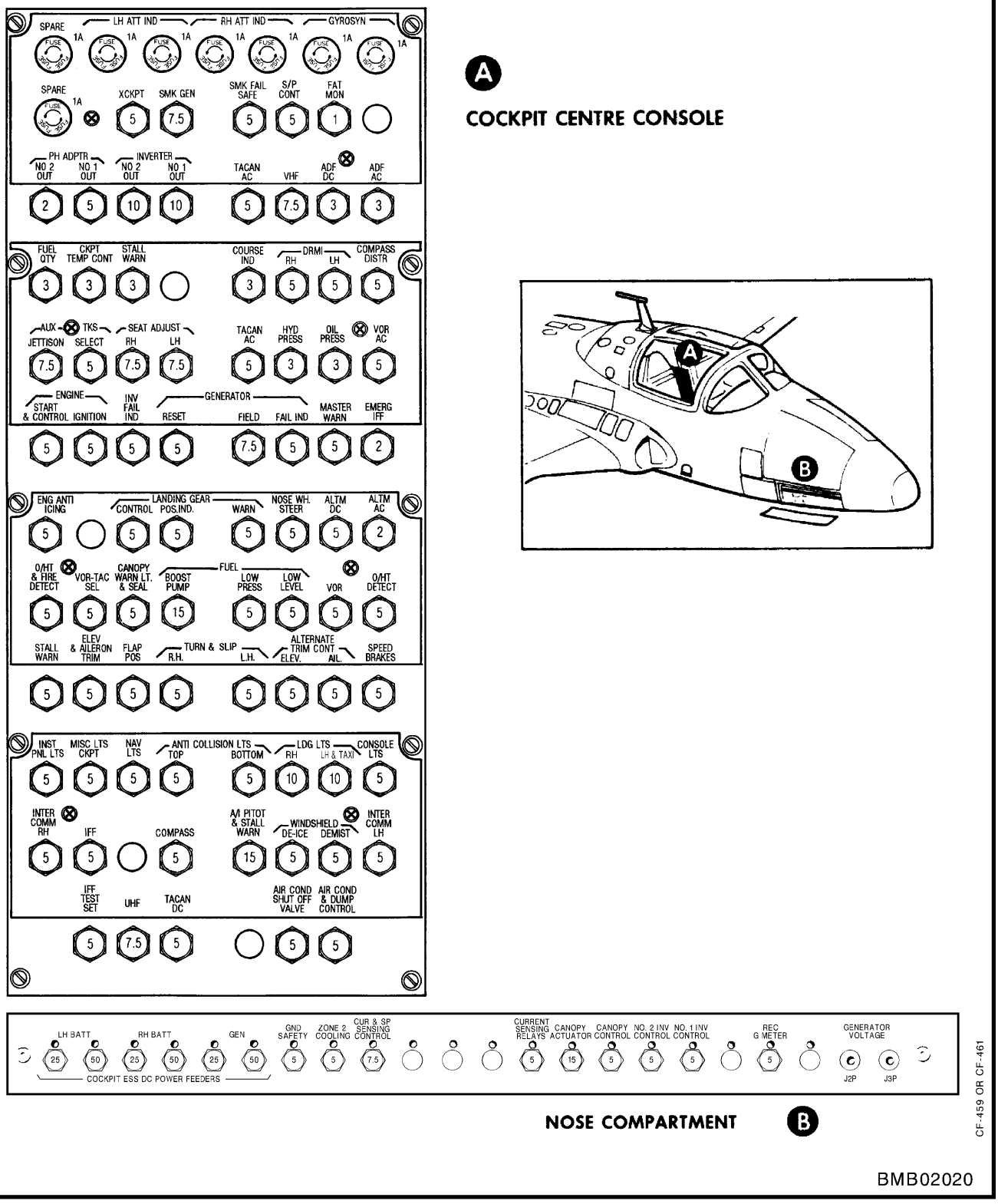


Figure 2-3 Circuit-Breaker Locations

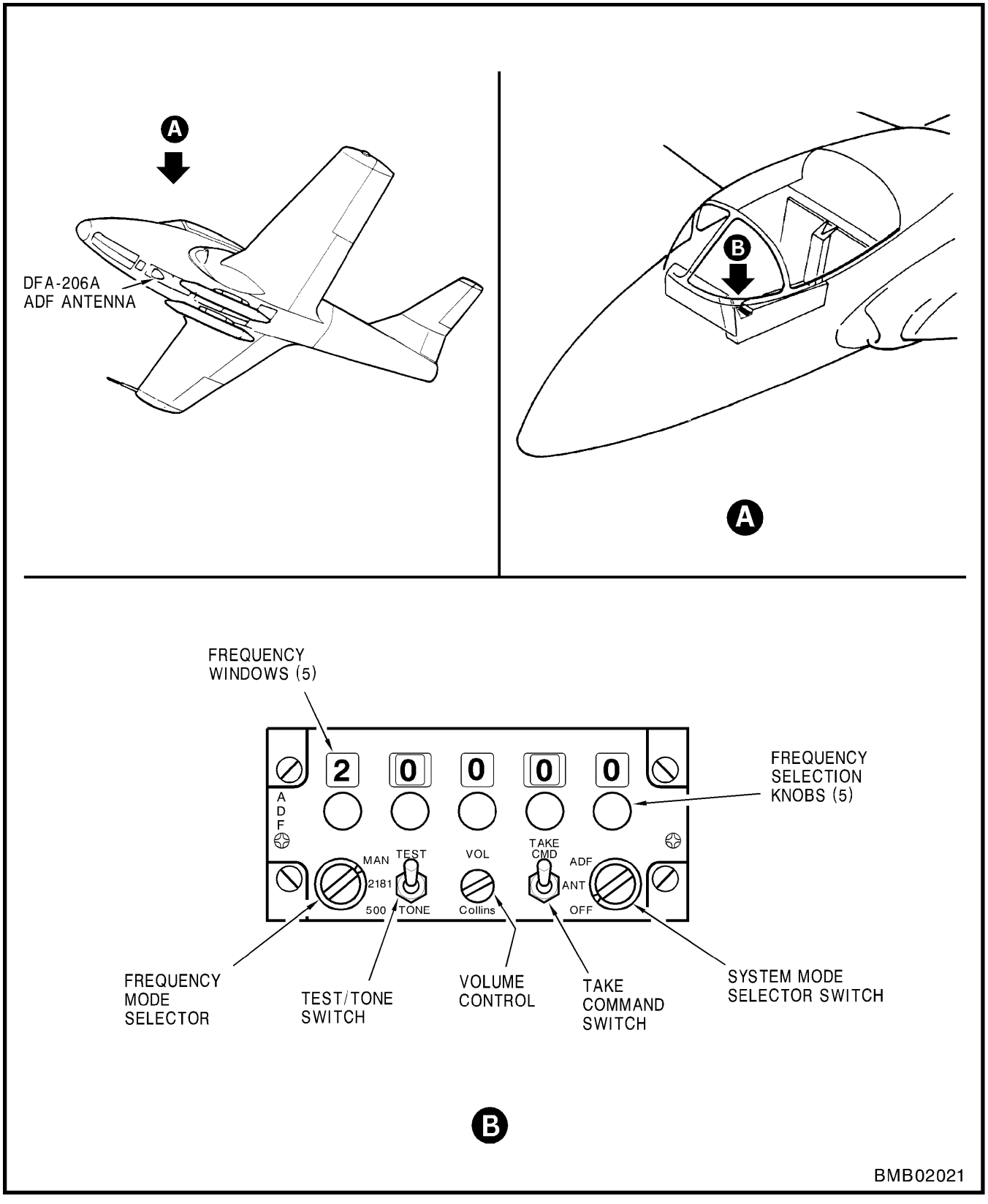


Figure 2-4 ADF Antenna and Control Unit

PART 3

NORMAL OPERATING PROCEDURES

GENERAL

1. The following procedures and checks are an expansion of the check list and may include procedures that are not fully detailed in the check list. While the check list is the in-flight reference document, a complete understanding of this manual is critical for the safe operation of the aircraft.

NOTES

1. Spins and stall are prohibited with smoke tanks installed.

2. 431 Sqn Snowbird aircraft are authorized to a limit of 20 seconds of continuous zero or negative g during practice or show sequences.

PRE-EXTERNAL CHECK

2. In addition to the standard pre-external procedures, check for the condition of the following items:

a. Smoke system fairings and valves.

b. External smoke lines and tanks.

RIGHT OR LEFT SEAT SECURITY FOR SOLO FLIGHT

3. The aircraft can be flown solo from either seat. Check the unoccupied seat for security.

PRE-START

NOTE

The Snowbird aircraft is cross cockpit configured.

4. In addition to the standard pre-start procedure, the following steps are required:

a. **COCKPIT CONTROL SELECTOR Switch.** LH or RH (set to seat aircraft is being flown from).

NOTE

Ensure speed brake switch is in the IN position during Snowbird practice, air shows and formation flights.

b. **TANK SEL Switch (As Required).**

(1) PORT or STBD (LH side wall).

(2) PORT or STBD (centre console).

c. **SMK ARM Switch (As Required).**

(1) OFF (LH side wall).

(2) OFF (centre instrument panel).

d. **RH Throttle.** CUT OFF.