Chapter 3B AIR DATA SYSTEM

LIST OF CONTENTS

	Para.		Para.
DESCRIPTION		*Height and rate-of-climb display* ...	7
General	1	*Speed display unit*	10
Pressure heads	4	*Air data computer*	12
Pitot/static transducer	5	*Power supplies*	13
Static transducer	6	*Test socket*	14

LIST OF ILLUSTRATIONS

	Fig.
Pictorial diagrams	
Height and rate-of-climb display...	1
Speed display unit	2
Routeing diagrams	
Air data system (Strip 1)	3-3A
Air data system (Strip 2)	4-4A
Air data system (Strip 3)	5-5A
Air data system (Strip 4)	6-6A

DESCRIPTION

General

1. The air data system chiefly comprises that section of the integrated flight instrument and control system concerned with pitot and static pressure information. The main components used in the air data system are:-

- Two pressure heads
- Pitot/static transducer
- Static transducer
- Air data computer
- Height and rate-of-climb display
- Speed display

2. Inputs of pitot and static pressures are taken to the transducer units, where they are measured and converted into electrical signals.

3. Outputs and applications of the air data system are principally:-

- Indicated airspeed - speed display and the flight control system computer
- Mach number - as above
- Barometric height - height display and the flight control system computer
- Rate of change of height - rate-of-climb display and AI 23C system
- True airspeed - AI 23C
- Height switches, Mach switches, I.A.S. switches - Flight control computer

Their operation and connection to various units of equipment is described in Chap.5, of this section.

Pressure heads

4. The two electrically-heated pressure heads used in the main and secondary pitot and static systems of the aircraft are fitted at the main nose intake.

Pitot/static transducer

5. The pitot/static transducer is a servo-mechanism, installed between frames 8 and 9 starboard, providing accurate P/S information which is fed as synchro signals to the air data computer. The main components in the unit are a pitot/static capsule assembly, and magnetic and transistorized amplifiers. On the front panel of the instrument are two multi-pole electrical plugs and two adapters, one marked PITOT and the other STATIC, used to connect the unit to the pitot and static pipelines.

Static transducer

6. This unit installed between frames 8 and 9, port, is a servo-mechanism which provides barometric height measurements which are fed as electrical outputs to the air data computer and also to the pilot's height display. The unit mainly comprises a static capsule assembly and magnetic and transistorized amplifiers. The front panel of the transducer carries two multi-pole electrical plugs and an adapter used to connect the instrument to the aircraft static line.

Height and rate-of-climb display

7. The Type B height and rate-of-climb display registers and presents the aircraft altitude in feet, and the aircraft vertical speed in feet/minute, when linked to the synchro units of the air data computer. It incorporates facilities indicating aircraft command and target height in feet and also provides voltage signals to other equipment, corresponding to the difference between aircraft target height and aircraft barometric height.

8. The face of the instrument contains a barometric height three-digit counter, a dial and pointer presentation for the vertical speed, two further two-digit counters showing command and target heights respectively, a millibar counter and setting control, and a power failure warning disc.

9. Illumination of the display is by integral lamps operating from the 4-volt a.c. lighting circuit *(Sect.6, Chap.8)*.

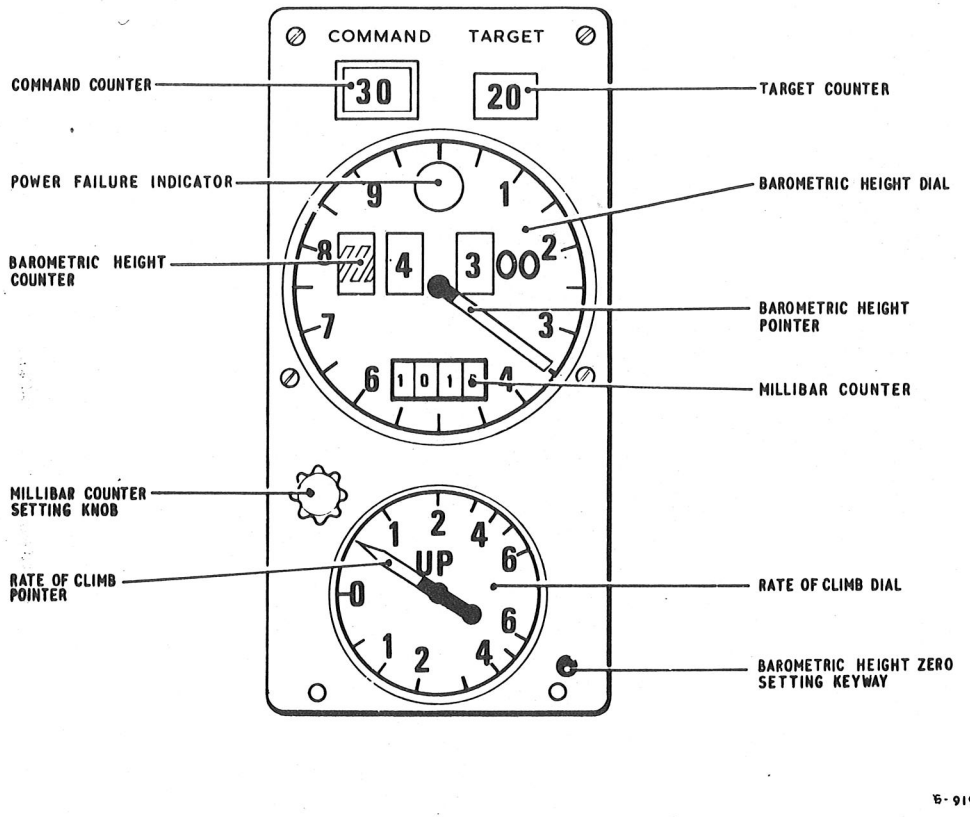

Fig.1. Height and rate-of-climb display

Speed display unit

10. The speed display presents Mach number and indicated air speed in knots from the synchro outputs of the air data computer. It also incorporates facilities to indicate the aircraft command Mach number. Both indicated airspeed and Mach number are shown instantaneously on separate scales by a common pointer. The indicated airspeed is fixed and is graduated from 80–700 knots. The Mach scale is a moving tape, scaled from 0.3 to 2.8. Between the two scales the indicator pointer, a white strip on a moving tape, determines the reading. A further moving tape beneath the transparent pointer tape gives indication of command Mach number. A three-digit counter at the bottom left corner of the presentation also shows the command Mach number. The unit incorporates a curved dial glass to eliminate troublesome reflections. It is secured in the display rack by two 'Z' section clamps.

11. Illumination of the display is by

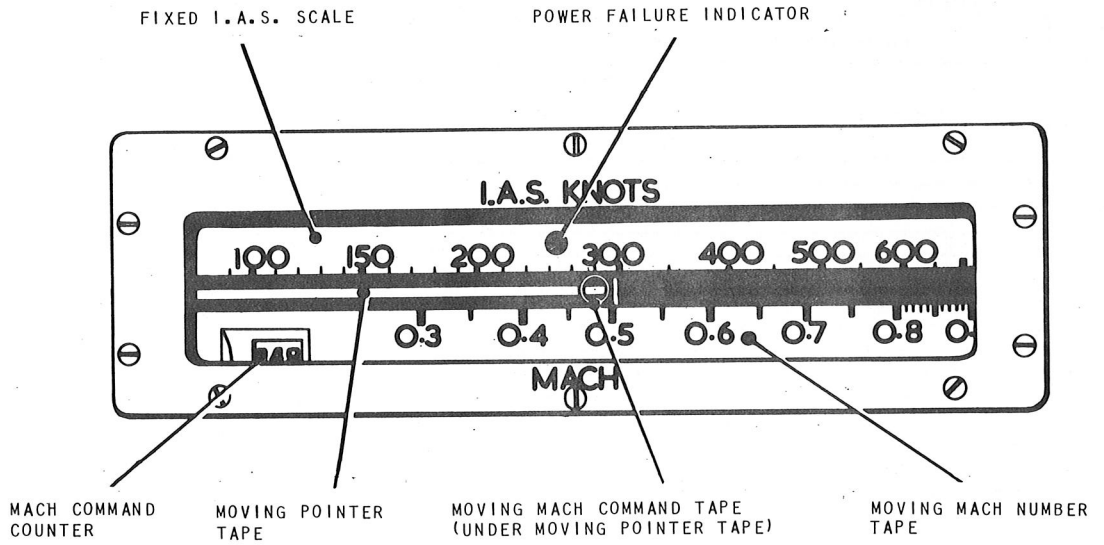

Fig.2. Speed display unit E2562-1

integral lamps operating from the 4-volt lighting circuit *(Sect.6, Chap.8)*.

Air data computer

12. The air data computer, housed in the main equipment compartment, receives basic aerodynamic information in the form of electrical signals from the pitot/static and static transducers. This information is then computed to provide the following output signals; Mach number, vertical speed, height, indicated airspeed, and true airspeed. Further height and rate-of-climb signals are derived within the transducers, but for convenience, these are routed directly through the computer without computation, appearing as computer outputs. The outputs are routed to the height and rate-of-climb display, the flight control system and the AI 23C computing circuit. ◀

Power supplies

13. The air data system requires both a.c. and d.c. voltages for its operation, the former being 115-volts, 3-phase, 400 Hz whilst the latter are derived from the computer via a transformer, rectifier, and smoothing network. ▶

Test socket

14. A plug and socket test connection, AD4, is mounted on the computer box shell and is accessible through the port side of the main equipment compartment.

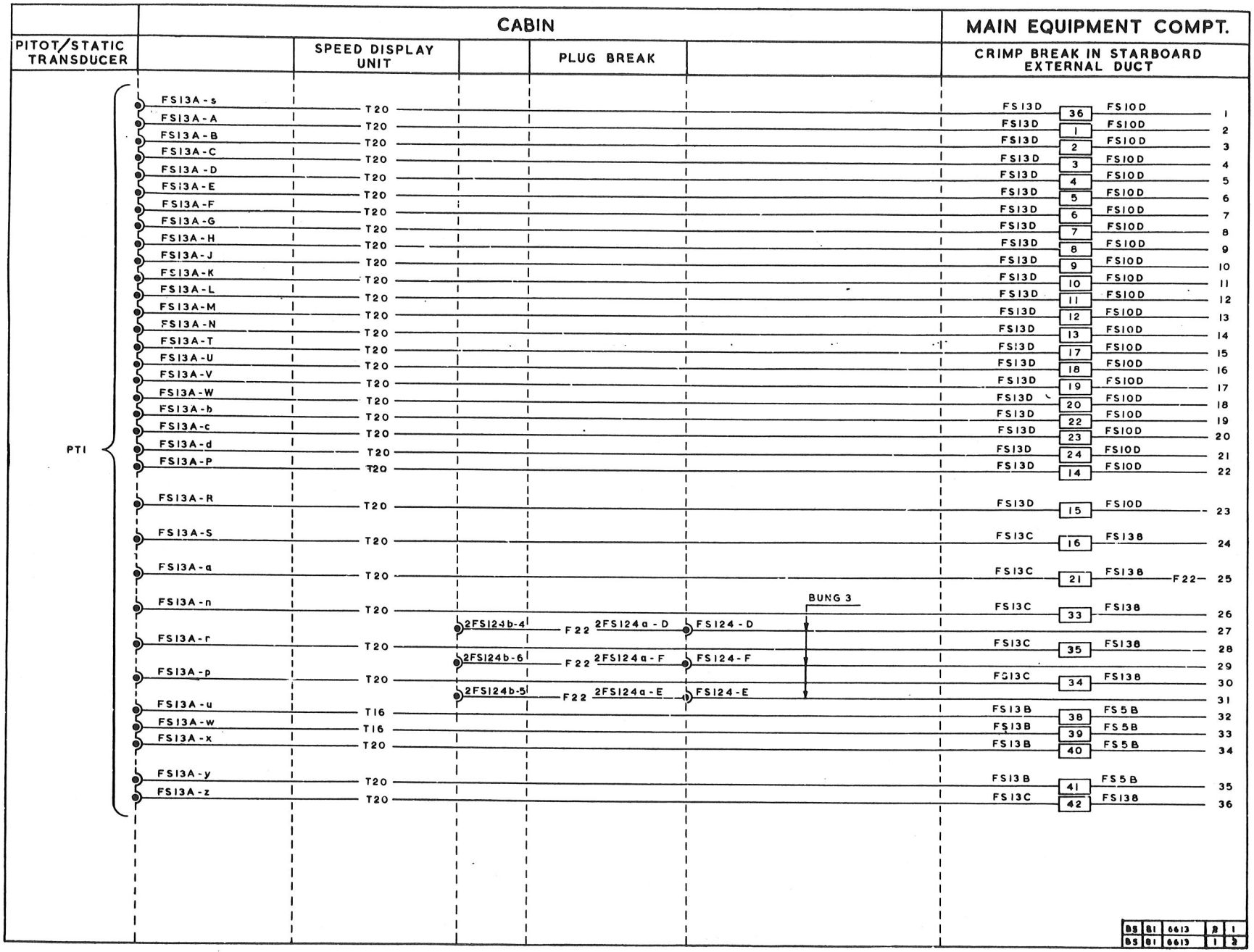

FIG.3. AIR DATA SYSTEM (STRIP 1)

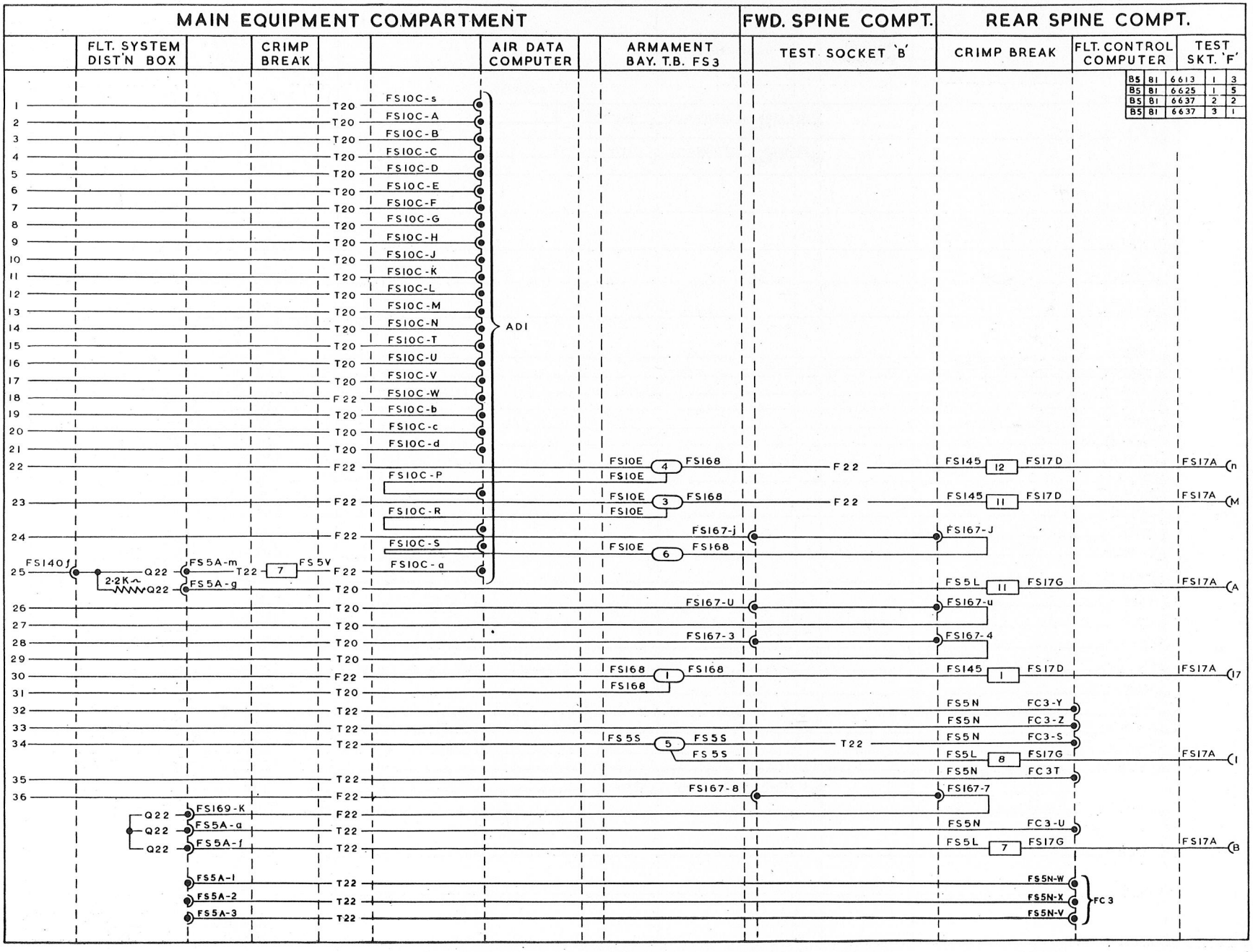

FIG. 3A. AIR DATA SYSTEM

◀MOD. 4199 ADDED▶

(STRIP 1)

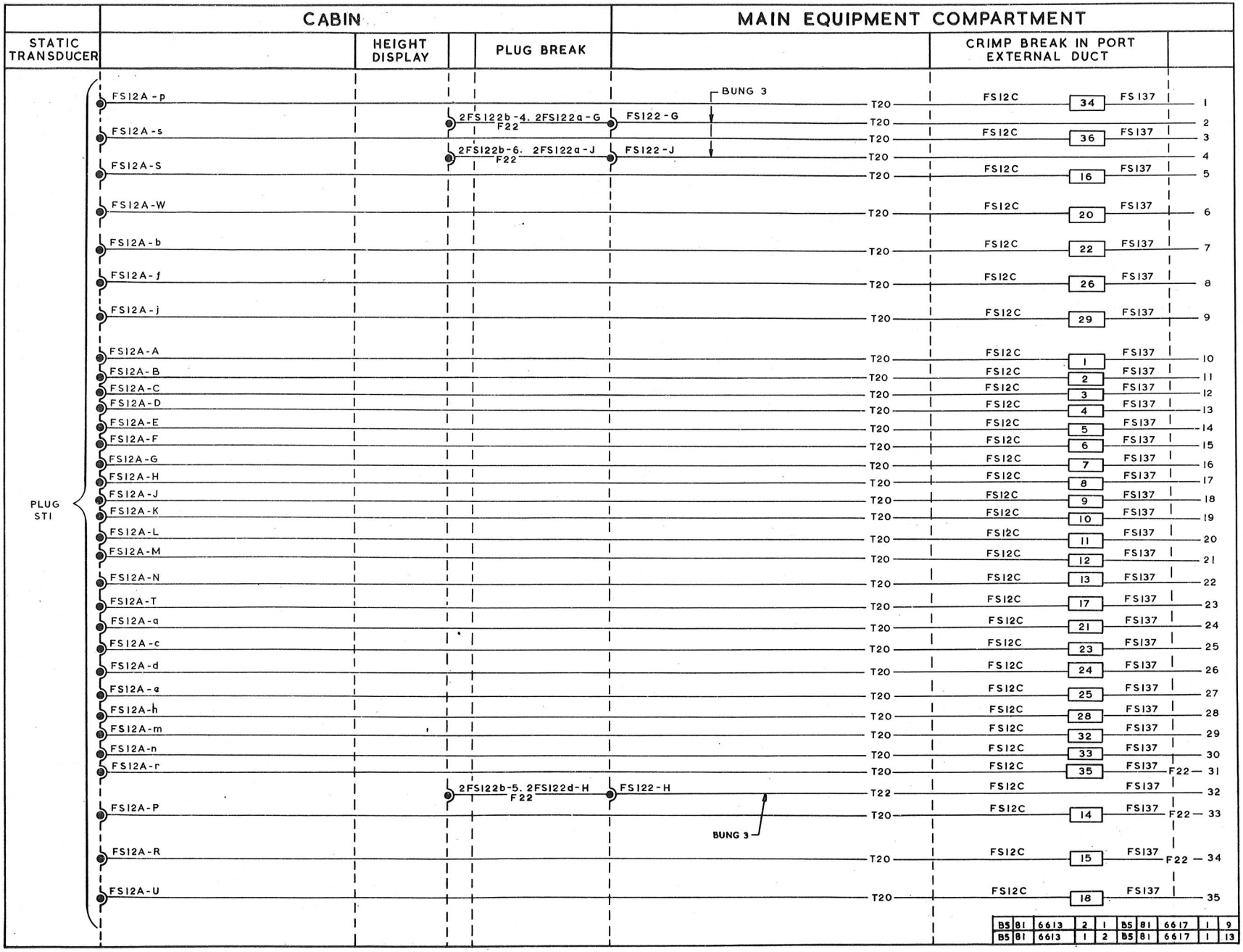

FIG.4. AIR DATA SYSTEM (STRIP 2)

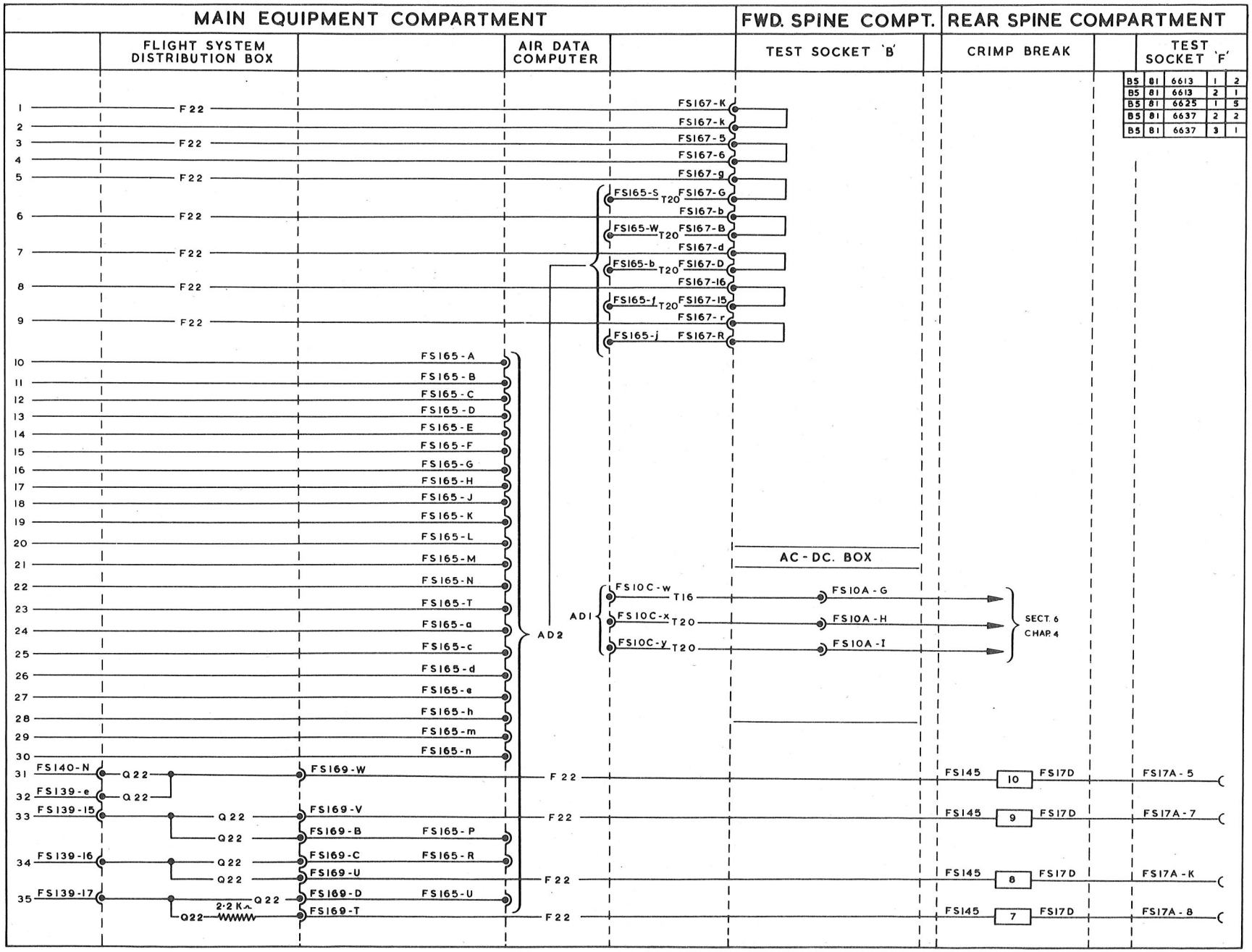

FIG.4A. AIR DATA SYSTEM (STRIP 2)

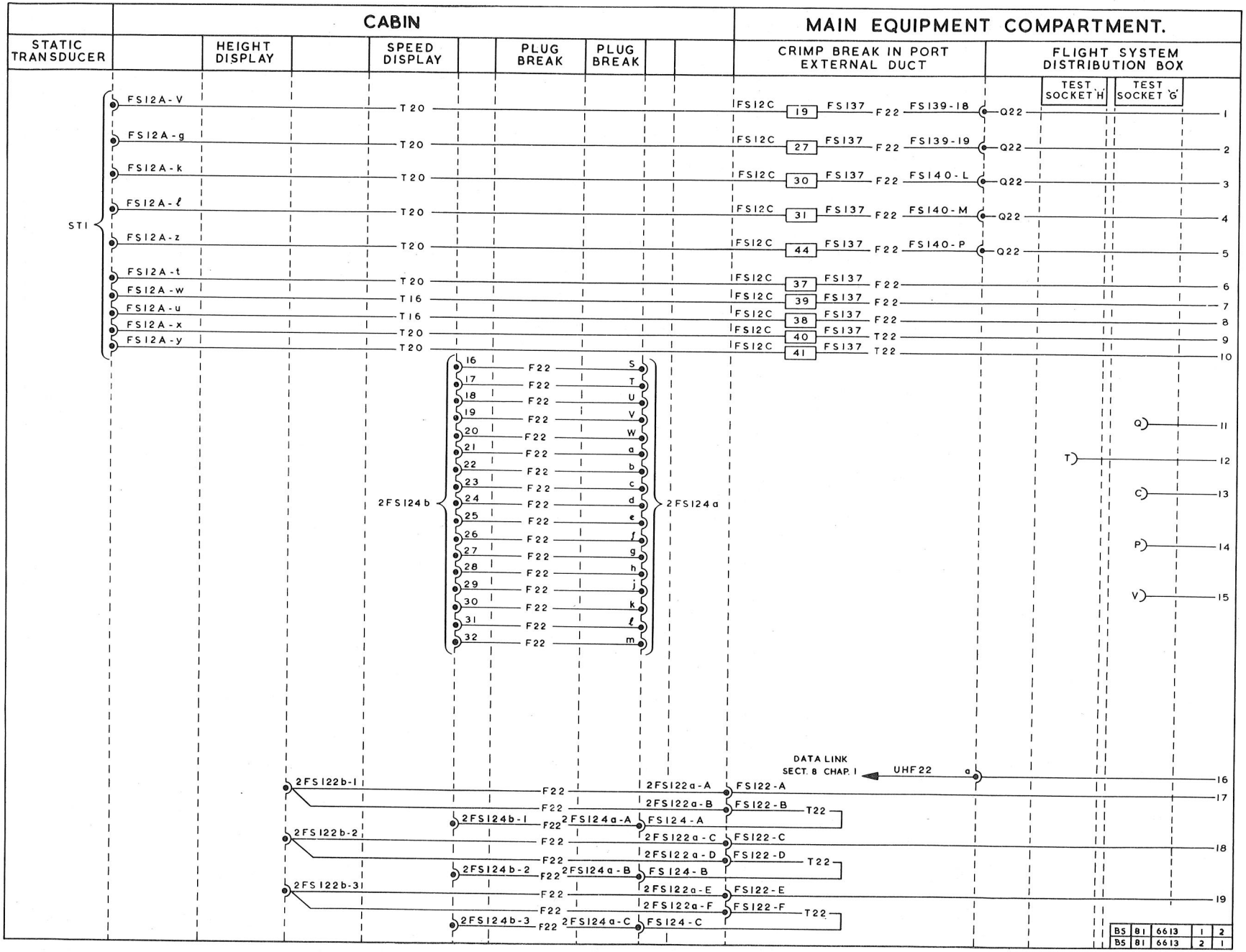

FIG.5. AIR DATA SYSTEM (STRIP 3)

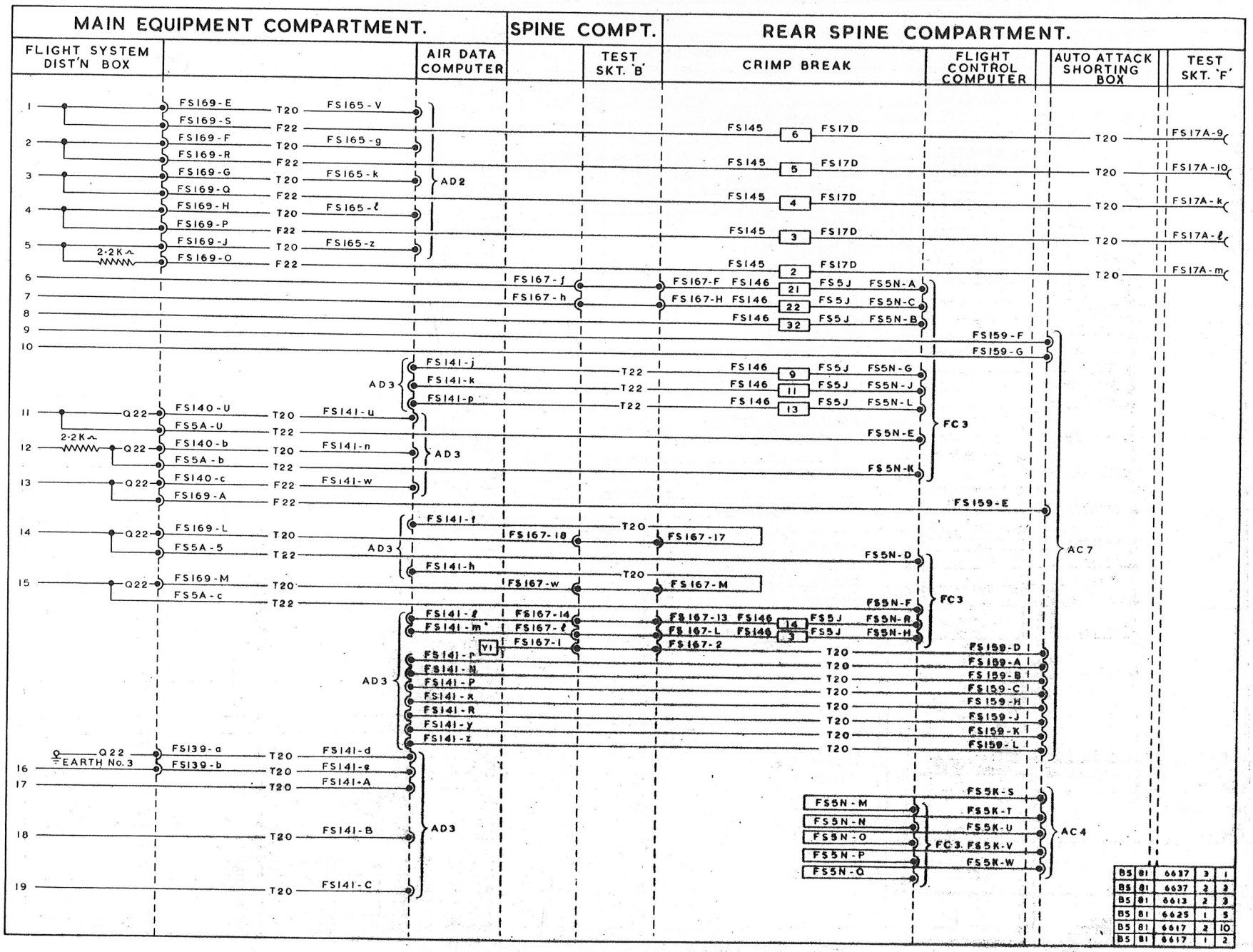

FIG. 5A. AIR DATA SYSTEM
◀ MOD. 4199 ADDED ▶
(STRIP 3)

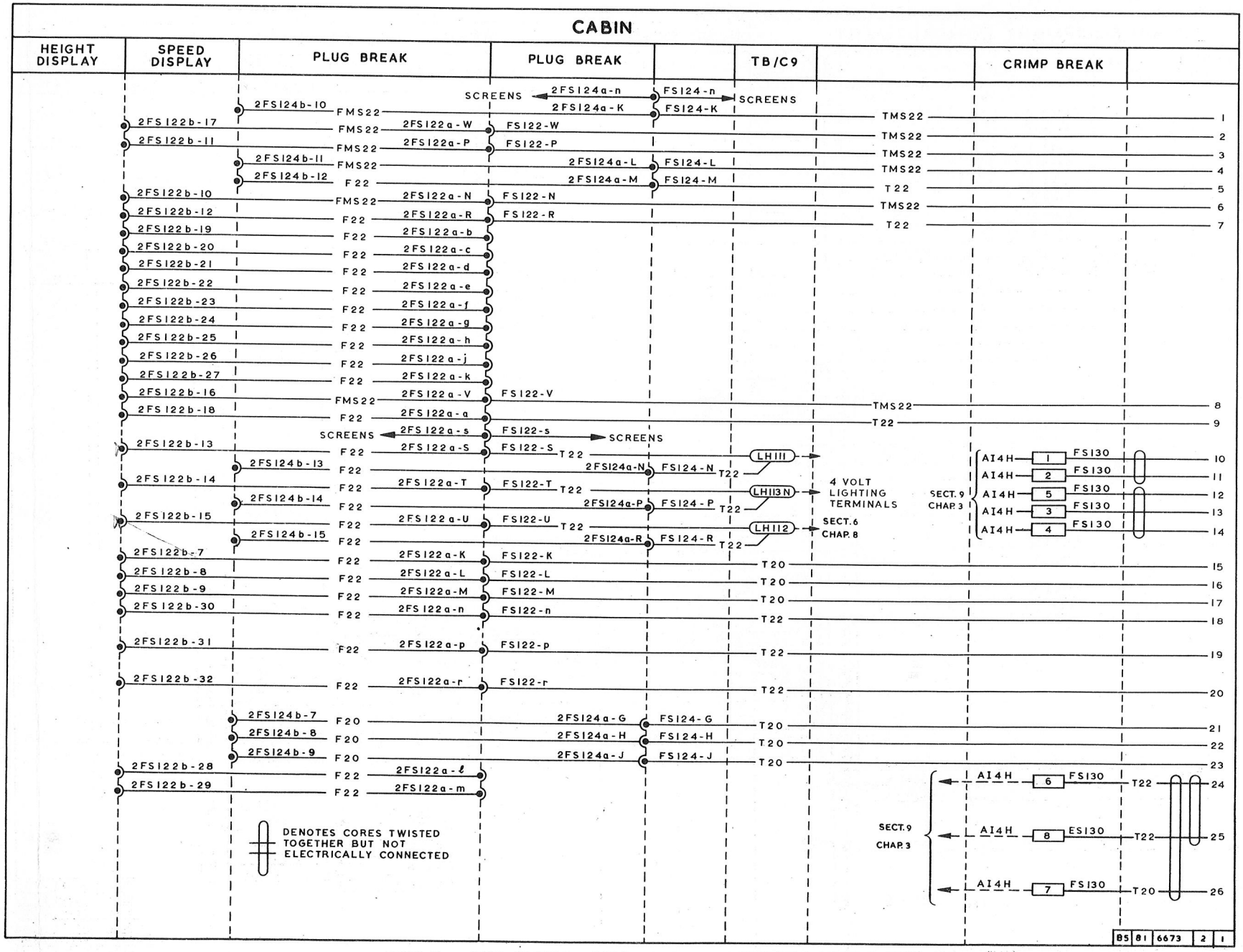

FIG.6. AIR DATA SYSTEM (STRIP 4)

1018-1005-18/44/462602/375/1-70/BAC/1405

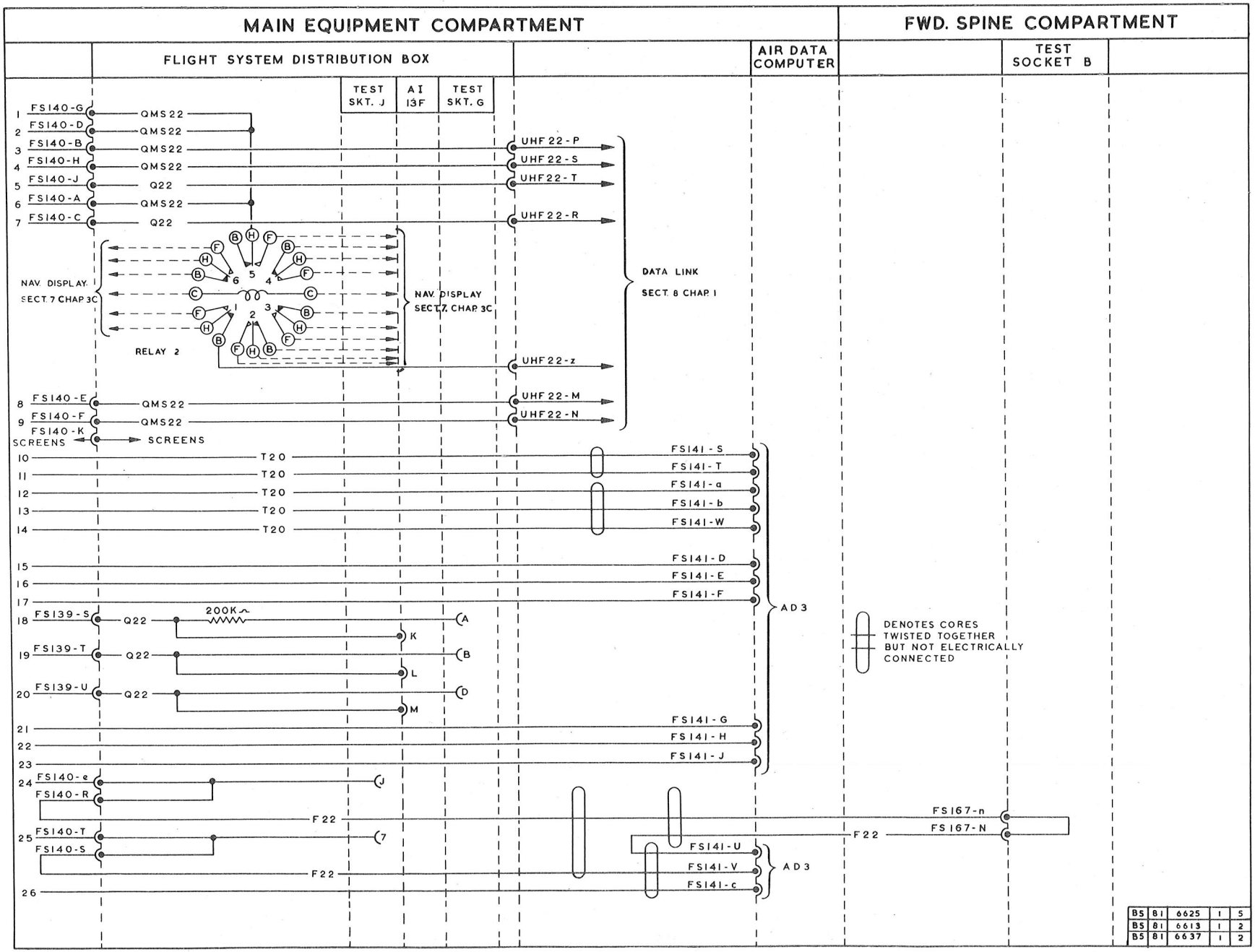

FIG.6A. AIR DATA SYSTEM (STRIP 4)