Chapter 2A GENERAL INFORMATION

LIST OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

DESCRIPTION

General

1. This chapter contains information regarding the armament installation which is part of an integrated weapon system operating in conjunction with AI 23D radar, an air data computer, and a light fighter sight, which supply information on weapon target assessment and aquisition. If either of these systems fail, a visual attack can be made, using the light fighter sight in a manual mode.

2. Although each installation is dealt with separately certain items of equipment in the control circuits link-up with AI 23D and are common to all systems, these are described collectively in this sub-chapter. Suitable cross-references are provided on wiring diagrams where interconnection with other systems take place.

3. The aircraft can carry either a Firestreak or a Red Top guided weapon pack housed in the armament bay which is located between frame 13 and 22, underside of the aircraft. Each pack contains the control equipment necessary for the system operation and carries two pylon-mounted missiles, one on each side. All controls and indicators are located in the cockpit.

4. The operating equipment and wiring of a pylon pack for 2-inch

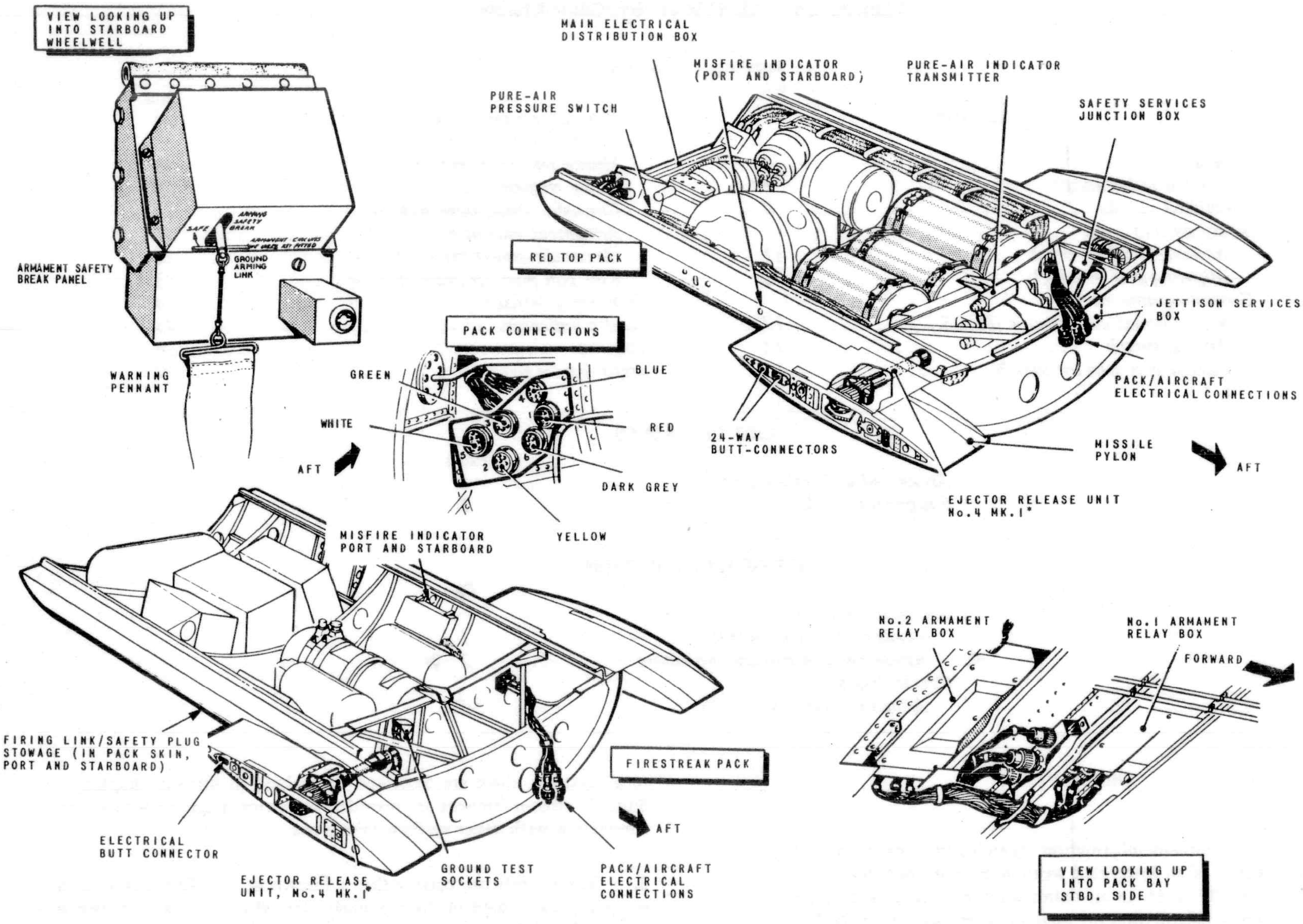

FIG.1. ARMAMENT SYSTEM DETAILS

rockets is shown on the wiring diagrams. The pack is no longer used and Mod.4785 revises part of the rocket circuitry to provide the launch warning facility.

5. A gunnery training facility via operation of the four-position master armament selector and its associated wiring provides indication of guns selected.

6. Weapon release is controlled by the firing triggers, one on each control column handle. When a trigger is operated, a G90 camera is switched on to provide a film record of the attack, and the engine relight system is energized to relight the engines if flame-out occurs due to the ingestion of weapon exhaust fumes via the engine air intake. In addition, event markers illuminate on the AI 23D indicator panel and the recorder visual *(Sect.9, Chap.3)*.

7. The L.F.S. and camera circuits are described in Sect.7, Chap.2, the air data system in Sect.7, Chap.3A, and the AI 23D system in Sect.9, Chap.3. Further information on the armament installation is given in A.P.101B-1005-1A, Sect.5, Chap.7.

Associated publications

8. General information on equipment used in this weapon system can be found in the relevant Air Publication for the particular weapon, these are listed in Table 1. In addition to a full description of the various items of equipment used, the publications include detailed information regarding the electrical data transmissions, the missile preparation, and the weapon loading and testing instructions.

Functional checks

9. Test schedules are provided covering the functional checking required on each weapon and its associated pack, and also for the aircraft armament installation. Special test simulators, in the form of portable boxes, are provided, one for each of the weapon packs and one for the aircraft wiring. All testing should be done according to the instructions given in the associated servicing procedure.

10. The following paragraphs describe the system components, the majority of which are common to all armament installations. Circuit diagrams for each installation will be found in the relevant sub-chapter, together with a detailed sequence of operations. Routeing charts are included in Chap.2E, and removal and assembly instructions in Chap.2F.

Safety devices

Armament safety break

11. To prevent the rockets or any loaded weapons being inadvertently released whilst the aircraft is on the ground, provision is made to break the armament power supply circuit. This is done at the armament safety break panel located in the starboard wheel well. The panel contains microswitch assemblies, which are operated by a key. The circuits are live when the key is withdrawn from the panel. The key is retained by the ground crew. An additional key is stowed in the cockpit on the rear pressure bulkhead, port side, and is for use when the aircraft lands away from base.

Alighting-gear interlock

12. The supplies to the arming and firing circuits are routed via the contacts of a safety relay, the coil of which is supplied by the alighting gear selector switch *(Chap.5)*. Whenever the alighting gear is selected DOWN, the relay is de-energized and the circuits broken. To enable these circuits to be operated during servicing, an alternative relay supply is provided via the ground arming link microswitch, which is mounted in the safety break panel and operated by the insertion of a special key. This key is removed and retained by the ground crew on completion of the ground servicing operations.

Control equipment

Master armament selector (M.A.S.)

13. Primary control of the weapons systems is achieved by the rotary master armament selector switch located on panel A1. The switch settings are OFF-R.B.-G.W.-GUNS, and operation of the switch to the G.W. or GUNS position energizes the associated circuit.

Arming switch

14. The arming switch, which is mounted on instrument panel A1 is used in both G.W. roles to initiate the weapon arming sequence. The

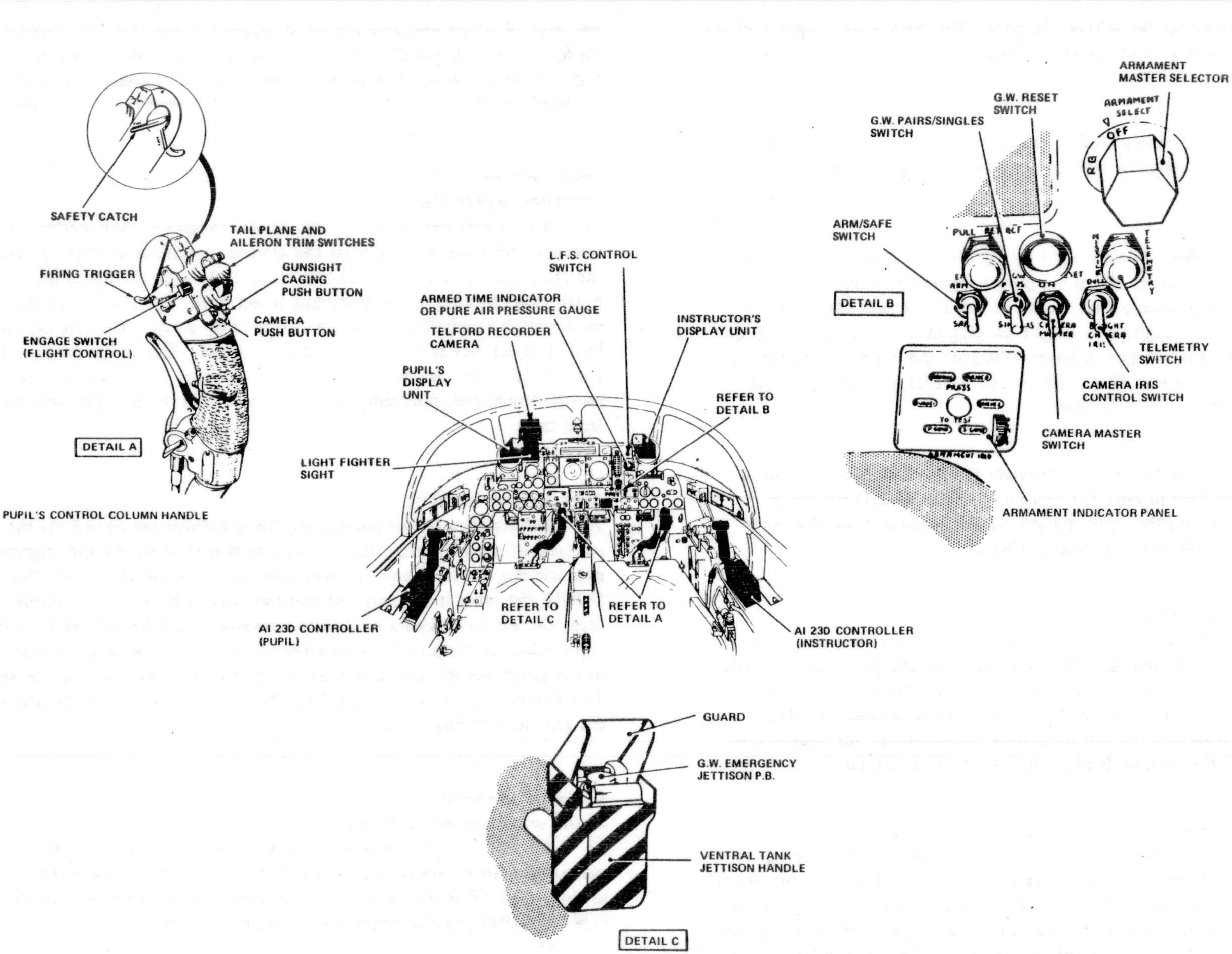

FIG. 2. ARMAMENT CONTROLS AND INDICATORS

MOD. 4831 INCORPORATED

5-9032-1

switch is labelled ARM/SAFE and when set to the ARM position connects a supply, via relays, to the missile launch sequence unit in the pack.

Pairs/singles selector switch

15. The setting of the PAIRS/SINGLES selector switch, located on panel A1, determines whether one or both missiles are to be fired. With the SINGLES position selected, the first missile to acquire the target will be released.

Fire control reset switch

16. The FIRE CONTROL - RESET switch, mounted on panel A1 is used on completion of ground testing, and after a practice acquisition, to reset the missile launching sequence.

C.R.T./L.F.S. switch

17. The C.R.T./L.F.S. switch, mounted on panel A1, enables the AI 23D radar or the light fighter sight to be selected for use. The switch is normally in the C.R.T. position and allows full attack information to be displayed on the radar indicator. With L.F.S. selected, the switch completes circuits to the light fighter sight units and Telford Camera Recorder *(Sect.7, Chap.2)* so that a manual attack can be carried out and a filmed record taken.

Missile telemetry switch

18. A spring-loaded push switch, located on panel A1 and labelled MISSILE TELEM, is used when Red Top Telemetry rounds are carried. An integral lamp in the switch illuminates when the system is switched on.

Firing triggers

19. A firing trigger, located beneath a safety catch on both control column handles, is used in all roles to initiate the firing sequence. With the trigger pressed, an associated fire committal relay is energized to complete circuits which achieve the following:-

(1) Allow fire signals generated in the AI 23D radar to reach the weapon pack in an automatic attack.

(2) Connect a supply to the pack for firing purposes in a manual attack.

(3) Connect a supply to the G90 camera system and Telford Camera Recorder *(Sect.7, Chap.2)*.

(4) Connect a supply to the EVENT 1 and EVENT 2 indicators *(para.21)* when the gunnery training role is used.

(5) Start a relight sequence on both engines *(Chap.7)* to guard against flame-out due to the ingestion of weapon exhaust fumes.

(6) Cause the event markers to illuminate on the AI 23D indicator panel and the recorder visual *(Sect.9, Chap.3)*.

Gunsight caging push button

20. The gunsight caging push button, located on the pupil's control column handle, is used to cage the L.F.S. gyro unit when the armament system is used in the gunnery training role. When the armament system is used in the guided weapons role, the push-button is in parallel with the 'reject out' switch on the AI 23D control unit in use. The precise function of the button depends upon the missile carried and the mode of operation of the AI 23D radar. With the G.W. position selected and AI 23D operating, selection of the push-button or the in-use 'reject out' switch causes event markers to illuminate on the AI 23D indicator panel and recorder visual *(Sect.9, Chap.3)*.

Armament indicator

21. Progress through the stages of a firing sequence is indicated by the armament indicator panel on the starboard console. The panel contains six illuminated windows, each of which bears a caption plate denoting the associated stage reached in the sequence. The indicator filaments can be tested by operating a PRESS TO TEST push switch on the panel but, as this is routed via the safety relay *(para.12)*, it becomes inoperative whenever the alighting gear is selected UP or the ground arming link key is inserted. If required, the captions can be dimmed by the operation of a knurled slide on the panel. The captions and their significance are as follows:-

ARMING — *G.W. roles only* – The arming switch is set to ARM and power supplies to the launch sequence unit are complete.

ARMED (steady)	*G.W. roles only* – The missile arming sequence is complete (2 min after selecting ARM).
EVENT 1	*G.W. roles only* – The port missile has acquired the target.
EVENT 2	*G.W. roles only* – The starboard missile has acquired the target.
EVENT 1 and EVENT 2	*Gunnery training role only* – The armament master selector is set to GUNS.
P. GONE	*Red Top role only* – The port missile has been released or has misfired.
S. GONE	*Red Top role only* – The starboard missile has been released or has misfired.
ARMED (flashing)	*Firestreak role only* – Both missiles have been fired, or:- 15 minutes have elapsed since the arming switch was set to ARM (the missile cooling air and ammonia supplies are exhausted). or:- A fault has developed in the pack hydraulic alternator system.

Firestreak armed time indicator

22. This indicator, which is mounted on instrument panel A1, when operating in the Firestreak role, is an electrically-controlled clock, scaled in minutes from 0-30, which indicates the elapsed arming and armed time of the missiles. A pair of normally open contacts, fitted inside the indicator, close after 15 minutes of elapsed time to connect a supply to a flasher circuit causing the ARMED caption on the armament indicator to flash. This gives warning that the missile cooling air and ammonia supplies are exhausted. The indicator pointer can be manually reset to zero by turning the resetting knob to the indicator face.

Red Top pure air pressure gauge

23. Each Red Top missile requires a supply of pure air for cooling purposes; this being stored in a bottle housed in the pack. Indication of the pure air pressure state is shown on a gauge which replaces the armed time indicator on the starboard console when operating in the Red Top role. A pressure transmitter coupled to the pure air pipelines senses the pressure and transmits signals to the gauge. The gauge scale is divided into sectors 1-6, each sector representing 1000 lb/in^2. Between 1 and 3000 the scale is further divided into increments of 200 lb/in^2. Coloured sectors are marked around the dial, 1000-1850 being red, 1850-3000 yellow, 3000-6000 white with a break at 4500 to indicate minimum take-off pressure. A white radial line between the red and yellow sectors indicates the lowest pressure at which the cooling system is likely to remain effective.

Emergency jettison

24. Each missile launching shoe is secured to the pylon by an ejector release unit, which is actuated by an integral electrically-fired cartridge. The circuit is controlled by a microswitch assembly incorporated in the handle of the ventral tank jettison lever. Operation of the microswitch assembly causes the missiles and their launching shoes to be jettisoned laterally clear of the aircraft.

Misfire indicators

25. Two solenoid-type misfire indicators are fitted in both the Firestreak and Red Top weapon packs and are connected into the armament circuit. Should an aircraft return with a missile after an attempt has been made to fire it, examination of the indicator through the aperture in the pack skin will show the circuit condition. If the indicator has been extended the circuit has functioned correctly and the fault lies in the missile. The indicator can be reset by turning a screw in the pack skin, the reset position being reached when the half-black screw head merges with the crescent shaped marking on the pack, thus forming a black semicircle.

Cameras

26. The G90 camera, housed in a compartment at the base of the radar head pylon, receives its supply via a six-pole socket which mates with a coupler plug fitted to a bracket on the aft face of frame 3 in the nose-wheel bay. The camera circuit is primarily controlled by a CAMERA MASTER switch in panel A1 and an IRIS switch which has DULL and BRIGHT positions. The Telford Recorder Camera mounted on the L.F.S. runs in parallel with the G90 camera when the C.R.T./L.F.S. switch is at the L.F.S. position. The G90 camera can be operated in either the manual or automatic role.

Light fighter sight

27. The light fighter sight is fitted as a secondary visual system which may be used when the primary AI 23D system fails, or when a visual attack has to be made.

TABLE 1

Associated air publications

A.P. Ref. No.	Title
2802A, Vol.1	Aircraft rocket installations
118C-0701-1	Firestreak weapon system
110A-0500-1	Firestreak missile handling and stowage arrangement
118B-0601-1	Red Top weapon system
101B-1005-1A, Sect.5	Aircraft handbook, contains further details of the aircraft armament system
4343 series	Information on the various types of switches, indicators and components used in the armament installation
112P-0402-1	Information on Telford recorder camera
114C-0200-1AB	Information on the AI Mk.23D system

TABLE 2

Equipment details

Equipment	Location	Access	Air Publication
Armament master selector Type 10B, No.1	Panel A.1		
C.R.T./L.F.S. switch Type 8824/B101	Panel A.1	Cabin	4343C, Vol.1, Book 1, Sect.1
Armed/Safe switch Type 8810/B104	Panel A.1		
Fire control reset switch Type C51627, Mk.11	Panel A.1		
G.W. jettison switch Type 2 PB-N6-T (micro)	In the ventral tank jettison handle	Lift catch on top of handle	4343C, Vol.1, Book.1, Sect.1
R.B. launcher emergency retract switch Type C181/C5	Panel A.1		
G.W. pairs/singles switch Type 8810/B104	Panel A.1		
Firing triggers	Part of control columns	Cabin	4343C, Vol.1, Book.1, Sect.1
Camera push-button, gunsight cage push-button	Part of control column (pupil)		
Camera master switch Type 8810/B104	Panel A.1		
Camera iris control Type 8824/B101	Panel A.1		
Armament safety break	Starboard wing	Up through wheel well	
Ground arming link Type C.1831Y, Mk.102D	Starboard wing	Up through wheel well	
Armament indicator panel Type C.3420	Panel A.1		
Armed time indicator Type Mk.2	Panel A.1	Cabin	1275A, Sect.27
Red Top pure air indicator Type S63-4-1248	Panel A.1		112G-0504-1
Armament relay box 'A'	Fr.14-15 stbd. of pack bay		
Armament relay box 'B'	Fr.16-17 stbd. of pack bay	Pack bay	
Pack connections (A/C)	Fr.21-22 stbd. of pack bay		
A.I. relay	Relay panel	Fwd. equip. comp.	
Armament relays A, C, E, F, D, S, R, T, U, AC	In armament box 'A'		
Armament relays B, H, G, N, I, V (Post mod.4832 relays are WR35PP65B)	In armament box 'B'	Pack bay	
Rectifiers No. 4-11, 16-20	In armament box 'A'		
Rectifiers No. 1, 2, 3, 15	In armament box 'B'		
Capacitors C1 and C2	In armament box 'A'		
Resistor R1 and R2	In armament box 'A'		

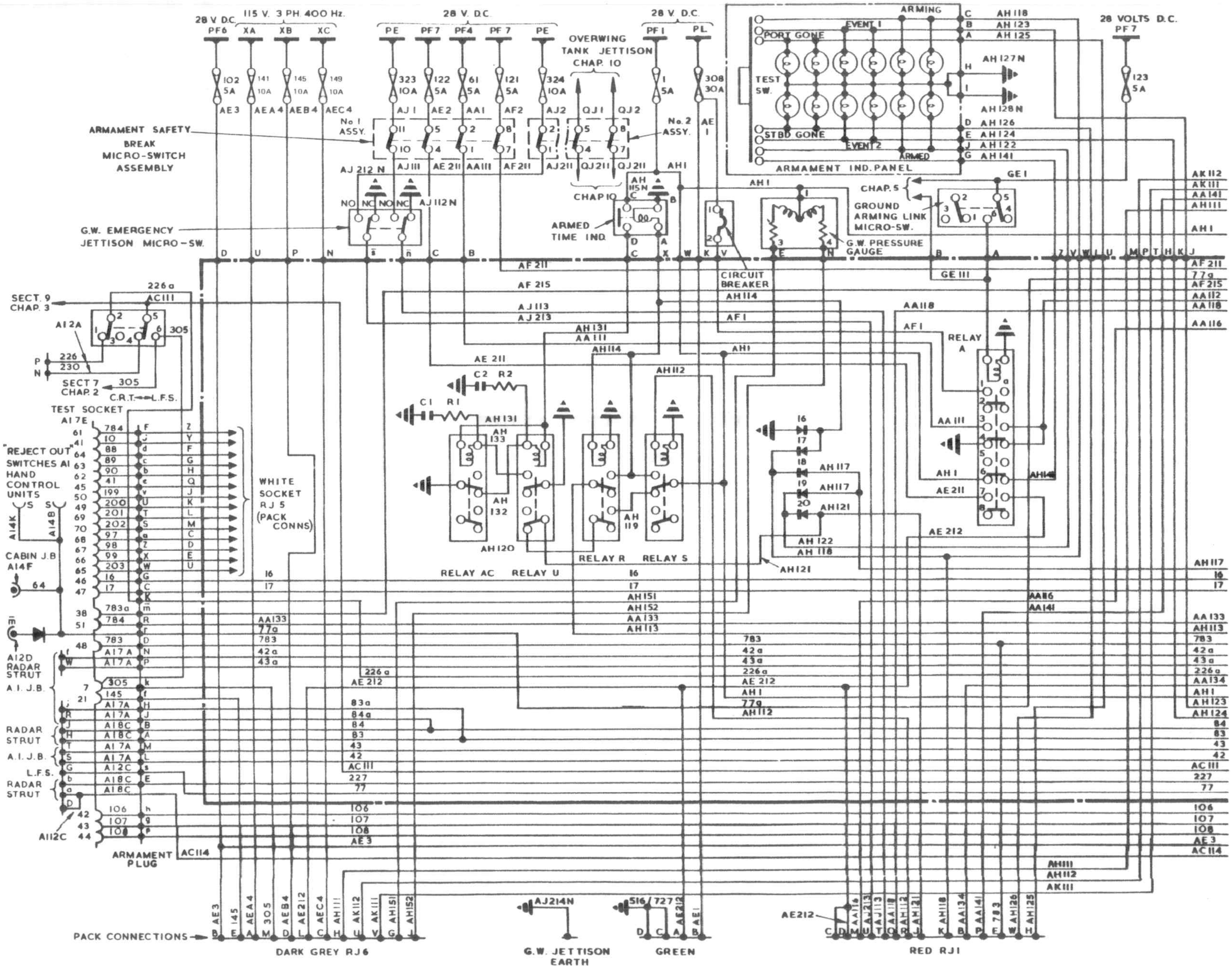

FIG. 3. ARMAMENT SYSTEM

◄ MOD. 4838 EMBODIED ►

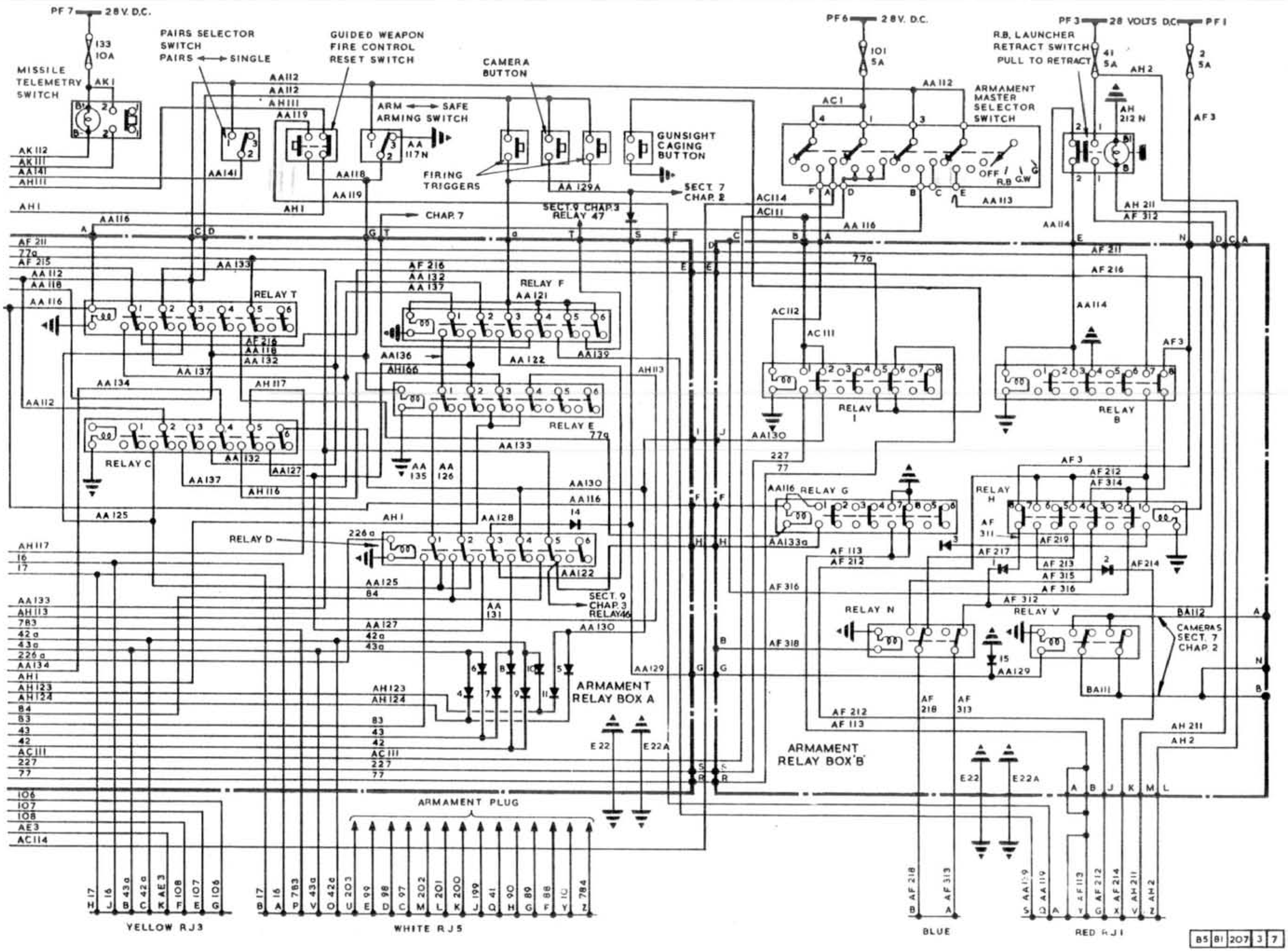

FIG. 3A. ARMAMENT SYSTEM

◄ MOD 4820 EMBODIED ►


TELEBRIEF
CONNECTIONS
E