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SM3A-1567

NASA  
SUPPORT MANUAL

**APOLLO SUPPORT EQUIPMENT  
MAINTENANCE**

**APOLLO TELEVISION  
BENCH MAINTENANCE  
EQUIPMENT**

**MODEL C14-175**

(PART NO. 1756251-501)

CONTRACT NAS 9-150  
EXHIBIT I; PARAGRAPH 10.9

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SECTION I  
DESCRIPTION

1-1. This support manual provides maintenance coverage for the Apollo Television Bench Maintenance Equipment (TVBME), model No. C14-175, part No. 1756251-501, modified in accordance with Modification Specification ME901-0750. It is manufactured by the Astro-Electronics Division of the Radio Corporation of America, Princeton, New Jersey. The applicability of this manual is listed in the Index of Apollo Support Manuals and Procedures, SM1A-1.

1-2. The TVBME (figure 1-1) consists of components used to exercise and to monitor the performance of the Apollo Television Camera (ATVC), model No. ME901-0090-0010, ME901-0090-0020, ME901-0090-0021, ME901-0090-0023, and ME901-0090-0050. It also provides components for self-testing of the television-picture-monitoring function.

1-3. COMPONENTS AND ACCESSORIES.

1-4. The major components of the TVBME are identified and briefly described in table 1-1. Similar information for the accessories is provided in table 1-2.

1-5. LEADING PARTICULARS.

1-6. The major characteristics of TVBME operation are provided in table 1-3.

1-7. FUNCTIONAL DESCRIPTION. (See figure 9-1.)

1-8. The primary function of the TVBME is to exercise the ATVC and to process and display the resultant composite-video responses. Support functions include the functional self-testing of the TVBME, the control and distribution of operating power for the ATVC and the TVBME, and the monitoring functions of the standard test equipments. Paragraphs 1-9 through 1-18 describe major component operation as related to accomplishment of these functions.

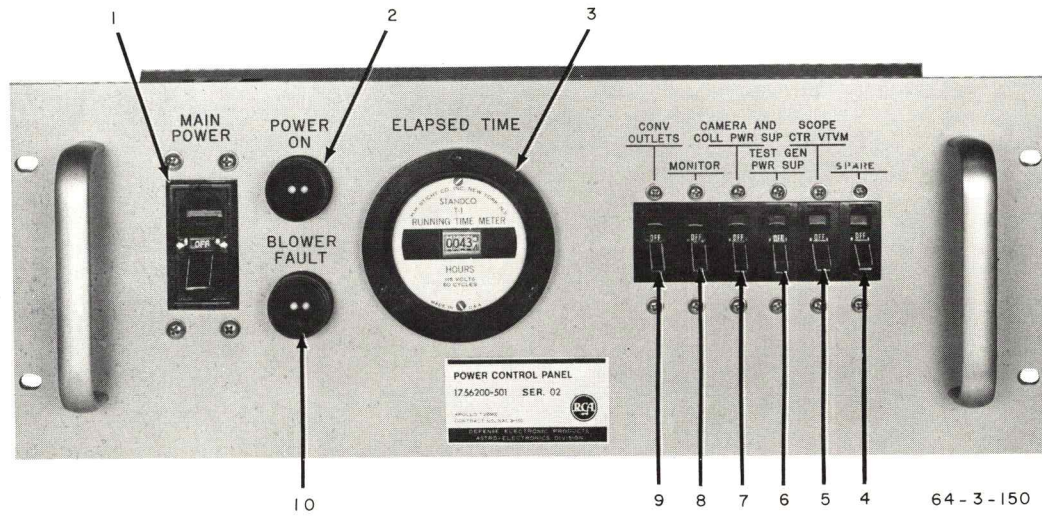
1-9. MONITORING OF TV CAMERA PICTURES.

1-10. The collimator, mounted in the proper relative position with respect to the ATVC, projects a selected optical test pattern into the lens of the ATVC. The resulting composite-video signal, in electrical form, is routed through the camera test panel to the monitor. There, a television picture is produced that is synchronized with the signals extracted from the composite-video signal, and the detected television picture is displayed on the face of the kinescope. Using the monitor camera, a photographic record of this television presentation is obtained. The photograph is examined to determine whether the tested characteristics of the ATVC picture are satisfactory. This procedure can be repeated using the three separate test patterns supplied with the collimator to determine specific picture characteristics as follows: resolution, linearity, and gray-scale rendition.

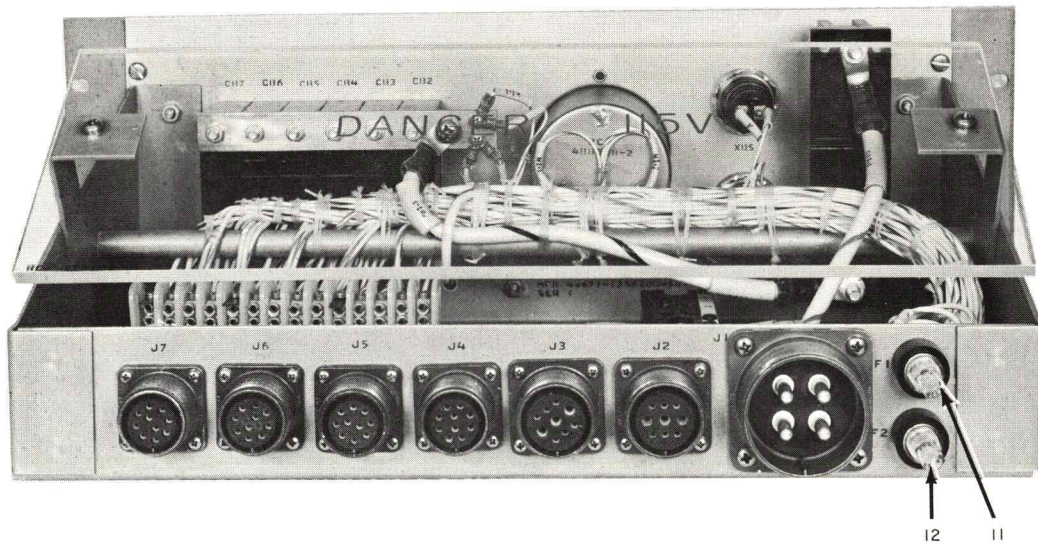
Table 1-1. Major Components (Continued)

Component	Part No.	Reference Designator	Function or Description
Power control panel	1756200-501	A9	Controls application of and provides overload protection for primary power required by the TVBME components. Records elapsed operating time and indicates blower failures.
Monitor	1756206-501	A10	Displays television information on a kinescope. Provides controls for operation and adjustment of the television presentation.
Camera power supply	1755274-501	A11	Lambda model No. LE-101FM-1557 (modified to incorporate automatic over-voltage control): Provides regulated zero-to 36-volt d-c operating power for the ATVC. Unless disabled, the special over-voltage circuit turns "off" the power supply if the output voltage attempts to rise above the preset maximum of 31 volts.
Test signal generator	1756220-501	A12	Generates composite-video test signals to check operation of the monitor.
Monitor camera assembly	1756278-501	—	Photographs selected frames of the video information displayed on the monitor.
Camera Fixture and Collimator Assembly	1756682-501	—	The collimator, Farrand part No. 117470, is used to project optical test images into the lens of the ATVC. The camera fixture provides adjustable mechanical mounting to support the ATVC in proper alignment with respect to the collimator.
Spot Photometer	1755782-501 thru 1755782-504	—	Photo Research Corp. Spectra Model UB 1/2: Used to measure the brightness of the collimator light source and of the television display on the monitor.

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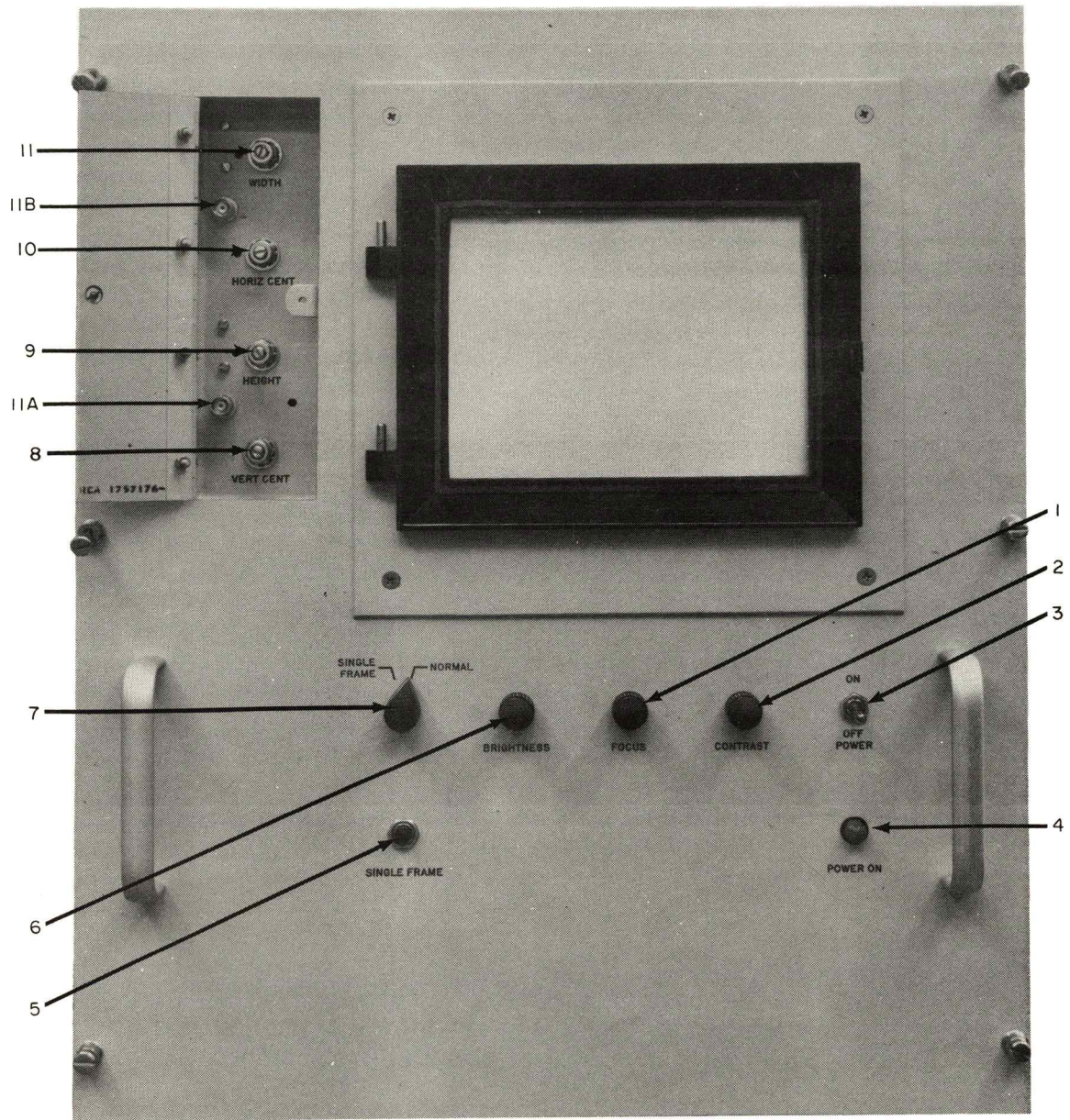


Front View



Back View

Figure 3-1. Power Control Panel Controls and Indicators

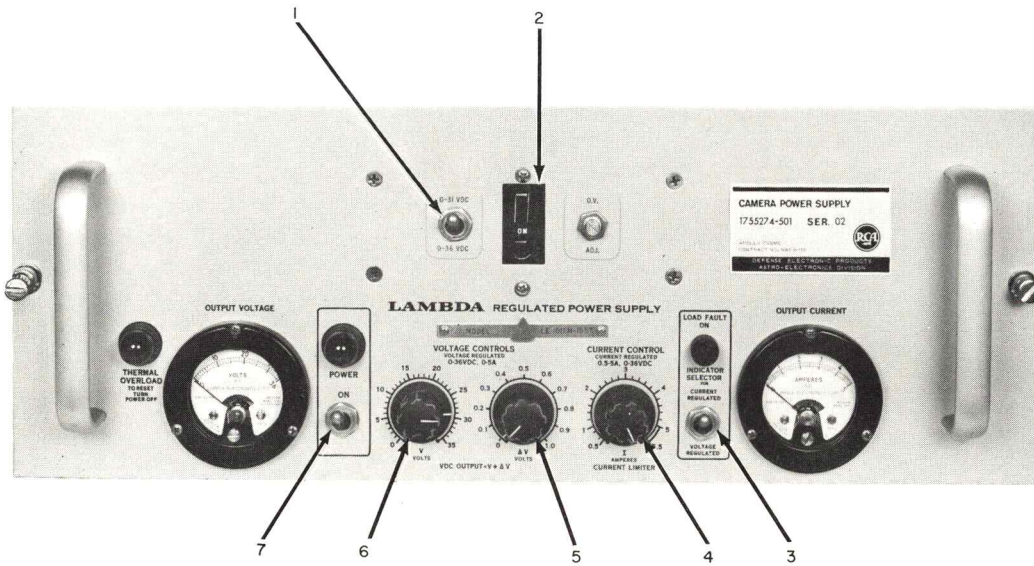


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Front View

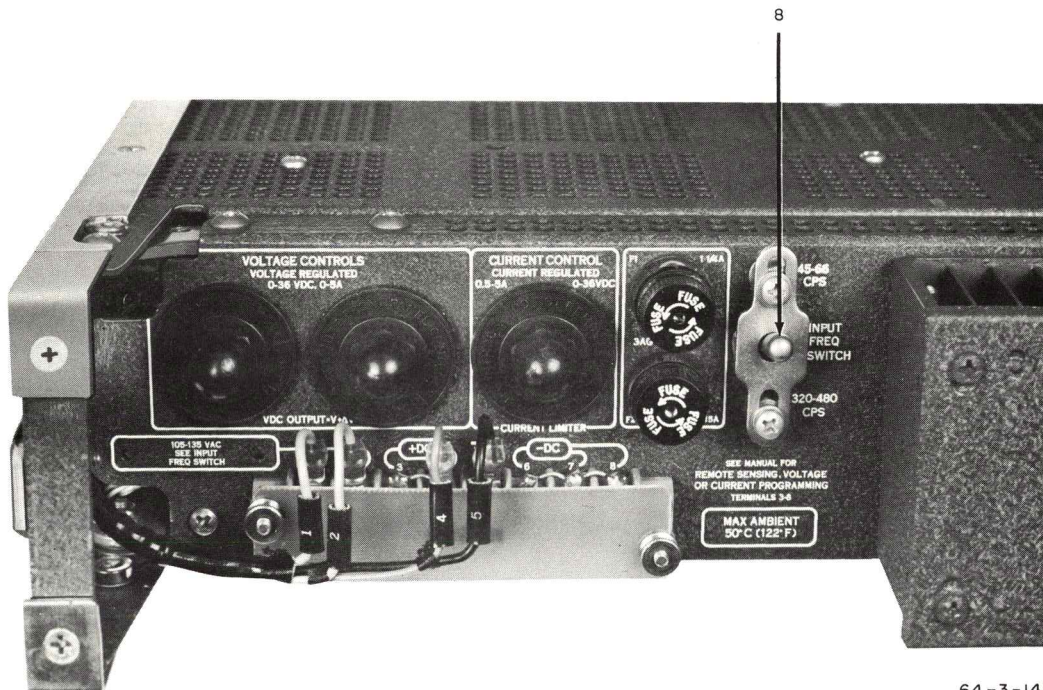
Figure 3-2. Monitor Controls and Indicators (Sheet 1 of 2)

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Front View



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Back View

Figure 3-9. Camera Power Supply

3-15. COLLIMATOR. Proceed as follows:

- a. Set the toggle switch on the +28 volts collimator power supply (1, figure 3-7) to down position (not ON).
- b. Connect the COLLIMATOR POWER plug to the jack on the collimator. (This plug is located on the first panel above the work shelf in the right-hand cabinet.)
- c. Set the toggle switch on the collimator power supply (1, figure 3-7) to ON position.
- d. Verify that the collimator lamp lights.

3-16. D-C OUTPUT VOLTAGE FOR THE ATVC. Proceed as follows:

- a. Press the CAMERA POWER pushbutton on the camera test panel (1, figure 3-2) to the lighted (green) position.
- b. Using a multimeter, check for 28 volts dc between pins 1(+) and 2(-) and between pins 1(+) and 4(-) of the output plug of test cable W2 (part No. 1758920-501).
- c. Press the CAMERA POWER pushbutton on the camera test panel (1, figure 3-3) to the unlighted (off) position.
- d. Using a multimeter, check for zero volt dc between pins 1(+) and 2(-) of the output plug of test cable W2 (part No. 1758920-501).

3-17. EQUIPMENT SHUTDOWN

3-18. ROUTINE SHUTDOWN. To accomplish a routine equipment shutdown, set the MAIN POWER circuit breaker on the power control panel (1, figure 3-1) to OFF position.

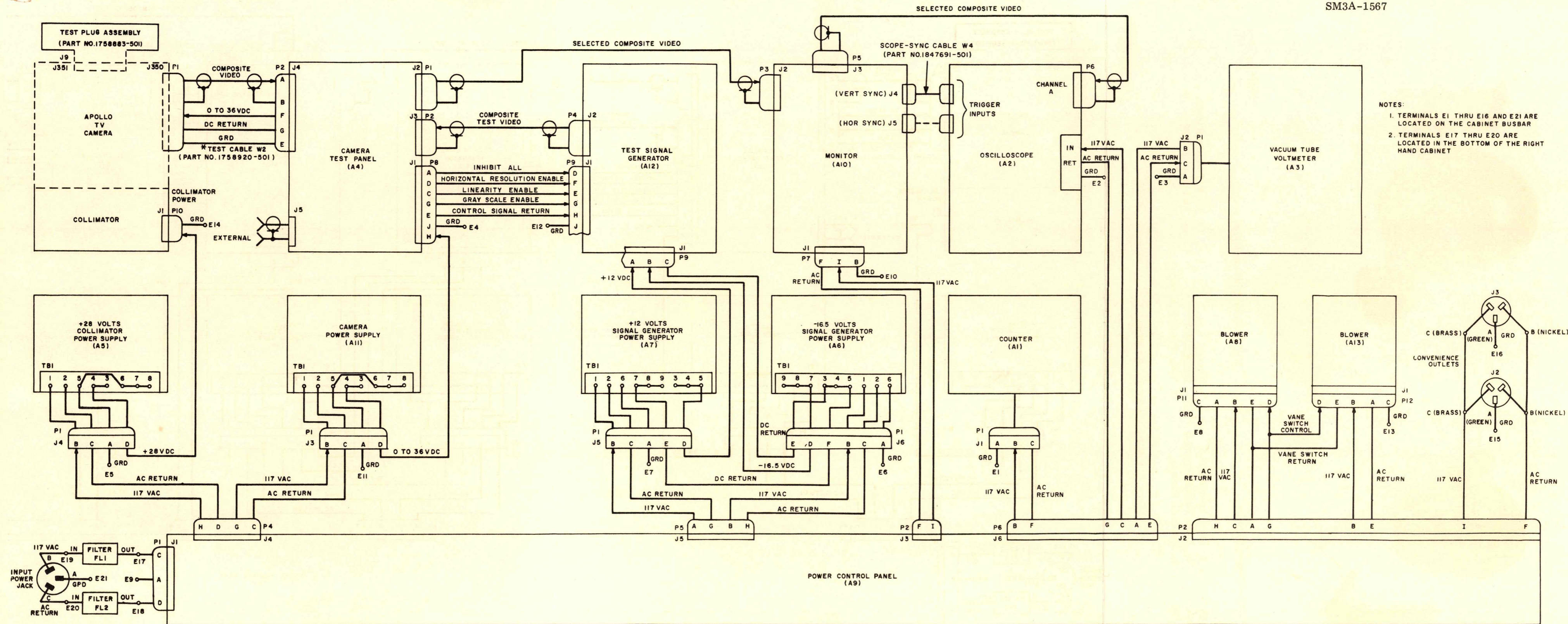
3-19. SHUTDOWN FOR STORAGE OR SHIPMENT. To accomplish a shutdown of equipment in preparation for storage or equipment, set the controls in the positions as listed in table 3-4.

3-20. OPERATION.

3-21. CONNECTION TO THE ATVC. (See figure 3-13.)

NOTE

A special wide-angle lens and its focusing tool are provided for use with ATVC Model Nos. ME901-0090-0020, ME901-0090-0021, and ME901-0090-0023.



NOTES:  
 1. TERMINALS E1 THRU E16 AND E21 ARE LOCATED ON THE CABINET BUSBAR  
 2. TERMINALS E17 THRU E20 ARE LOCATED IN THE BOTTOM OF THE RIGHT HAND CABINET

\* TEST CABLE W3 (PART NO. 1758920-502) USED WHEN TESTING CAMERAS SPECIFIED IN ME 901-0090H, DATED 2/8/65

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Figure 9-1. Apollo Television Bench Maintenance Equipment, Functional Interconnection Diagram