TM 11-6760-239-12

TECHNICAL MANUAL

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL

TEST SET, ANALYZER, CAMERA LS-80A (NSN 6760-878-0593)

This copy is a reprint which includes current pages from Change 1.

H E A D QU AR T E RS, D E P A RTMEN T O F T H E A R MY

SEPTEMBER 1972

WARNING

Be careful when working on the 115-volt, 400-Hertz line connections. Serious injury or death may result from contact with these terminals.

DON'T TAKE CHANCES!

CHANGE)

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 23 February 1978

Operator's and Organizational Maintenance Manual
TEST SET, ANALYZER, CAMERA LS-80A
(NSN 6760-00-878-0593)

Current as of 29 August 1977

TM 11-6760-239-12, 12 September 1972, is changed as follows:
1. The title of the manual is changed as shown above.
2. New or change material is indicated by a vertical bar in the margin.
3. Remove and insert pages as indicated in the page list below.

Remove	Insert
i and ii	i and ii
1-1 and 1-2	1-1, 1-2 and 1-2.1
B-1 through B-4	B-1 through B-6
C-1 through C-5	None

4. File this change sheet in front of the manual for reference purposes.

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, Direct and General Support maintenance requirements for OV1-A, B, C, and OV-1D aircraft.

TECHNICAL MANUAL

No. 11-6760-23912

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 12 September 1972

Operator's and Organizational Maintenance Manual

TEST SET, ANALYZER, CAMERA LS-80A
(NSN 6760-00-878-0593)

LIST OF ILLUSTRATIONS

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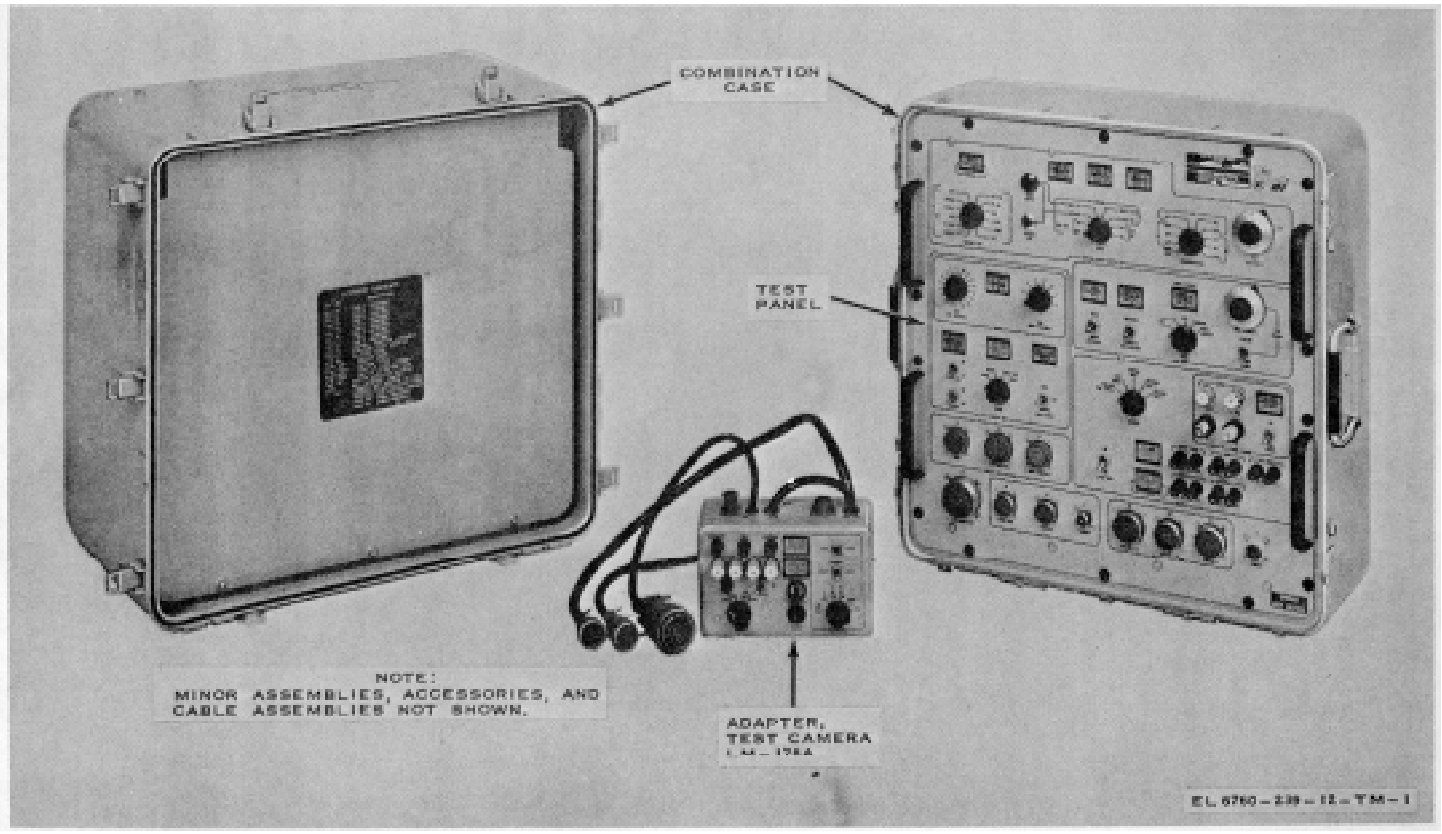

Figure 1-1. Test Set, Analyzer, Camera LS-80A.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Test Set, Analyzer, Camera LS-80A (figs. 1-1 through 1-3), and provides instructions for installation, operation, and operator's and organizational maintenance. It includes instructions for operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available to the operator and organizational maintenance repairman.

b. The maintenance allocation chart (MAC) is contained in appendix B; the organizational repair parts list is contained in appendix C.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DLAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/ MCO P4610.19C and DLAR 4500.15.

1-3.1. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407 (Maintenance Request). Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed directly to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished directly to you.

1-4. Administrative Storage

Refer to TM 740-90-1 for requirements when storing the equipment.

1-5. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703.

Section II. DESCRIPTION AND DATA

1-6. Purpose and Use

(figs. 1-1 through 1-3)

a. Purpose. Test Set, Analyzer, Camera LS-80A provides a means of making operational checks on Control, Power Supply LA-406A; Lens Cones, Camera, Aerial Reconnaissance LA-370A, LA-371A, LA-372A, and LA-374A; Light Sensor, Aircraft Camera LA-407A; and Body Drive, Aircraft Camera LA-373A.

b. Use. Test Set, Analyzer, Camera LS-80A, in conjunction with Simulator, Control System, Camera LS-36A, is used to provide all power, control voltages, and signals required to operate and dynamically perform the following:

(1) Overall check of Control, Power Supply LA-406A; including separate checks of PC board and component module, intervalometer module and film drive amplifier module.

(2) Overall checks of Lens Cones, Camera, Aerial Reconnaissance LA-370A, LA-371A, and LA-372A, and LA-374A; including calibration checks, and separate checks of servo drive assemblies and S/C switch assemblies.

(3) Checks of Light Sensor, Aircraft Camera LA-407A.

(4) Overall checks of Body Drive, Aircraft Camera LA-373A; including separate checks of

right chassis and components assembly, left chassis and components assembly, and motor clutch plate.

NOTE

In addition to testing component parts of Camera, Still Picture KA-76A, Test

Set, Analyzer, Camera LS-80A also checks the completely assembled camera. This check is provided by Adapter, Test Camera LM-178A (part of the LS 80A) used in conjunction with Simulator, Control System, Camera LS-36A and Analyzer Set, Photographic Surveillance System LS-89A (TM 11 6760-245-12). Test Set, Analyzer, Camera LS-80A does not test Shutter, Photographic LA-375A (part of Camera, Still Picture KA-76A). This test is provided by Test Set, Control Panel, Focal Plane Shutter LS-78A (TM 11-6760-23812).

1-7. Technical Characteristics

Power requirements:
- Ac ..... 115 volts, 400 Hz, 5.0 amperes.
- Dc ..... 28 volts, 5.0 amperes.

Power requirements for Adapter, Test Camera LM-178A:
- Ac ..... 115 volts, 400 Hz, 100 ma (provided by Simulator, Control System, Camera LS-36A).
- Dc ..... 28 volts, 1.0 ampere.

Test mode selection. Control, power supply (LA-406A).
Lens cones.
Camera Body.
Internal test 1.
Internal test 2.

Temperature range:
- Operating . -40° F(-865°C) to 131° F (+55' C).
- Storage - -85° F(-65° C) to 185° F (+85' C).

1-8. Items Comprising Test Set, Analyzer, Camera LS-80A

(figs. 1-1 through 1-3)

Table 1-1. Items Comprising Test Set, Analyzer, Camera LS-80A

FSN	Item	Quantity	Dimensions (in.) Height	Depth	Width	Weight (lb)
6760-878-0593	Test Set, Analyzer, Camera LS-80A consisting of:					86
6760-1.S-1955	Test panel	1	20	8 1/2	19	
6760-131-6371	Case, photographic equipment	1	213/8	21 1/4	20 1/4	
6760-131-6370	Toolbox, storage containing:	1	8 1/4	3 1/4	10 7/8	
6670-130-5598	Scale, spring	1				
6760-126-9076	Vacuum plate assembly, platen	1				
5315-867-7098	Pin, locking shuttle cam	1				
5220-868-1874	Gage, switch adjusting	1				
6685-462-3069	Gage, vacuum	1				
6760-126-9091	Cable assembly, special purpose, electrical (W1, right relay assembly test).	1	3 ft lg			
676(-1269092	Cable assembly, special purpose, electrical (W2, left relay assembly test).	1	3 ft lg			
6760-126-9089	Cable assembly, special purpose, electrical (W3, lens cone test).	1	3 ft lg			
6760-126-9081	Cable assembly, special purpose, electrical (W4, camera body test).	1	3 ft lg			
6760-126-9083	Cable assembly, special purpose electrical (W5, control 1).	1	4 ft lg			
6760-126-9084	Cable assembly, special purpose, electrical (W6, control 2).	1	4 ft lg			
6760-126-9082	Cable assembly, special purpose, electrical (W7, sensor test).	1	4 ft lg			
6760-126-9080	Cable assembly, special purpose, electrical (WS, servo drive and S/C).	1	3 ft lg			
6760-126-9088	Cable assembly, special purpose, electrical (W9, input power).	1	7 ft lg			
6760-130-5826	Adapter, module test	1				
6760-129-6076	Adapter, exposure test	1	1 3/16	1 1/4	1 3/8	
6760-8780591	Adapter, Test, Camera LM-178A including:	1	5 3/16	3 1/2	8.0	4.25
6760-131-6369	Cable assembly, special purpose, electrical (cone-shutter test).	1	2ft lg			0.5
6760-131-1959	Cable assembly, special purpose, electrical (body-shutter test).	1	3 ft lg			0.75
	System simulator adapter P/N 7912-147	1				
	BNC adapter P/N 1269	1				

Change 1 1-2.1

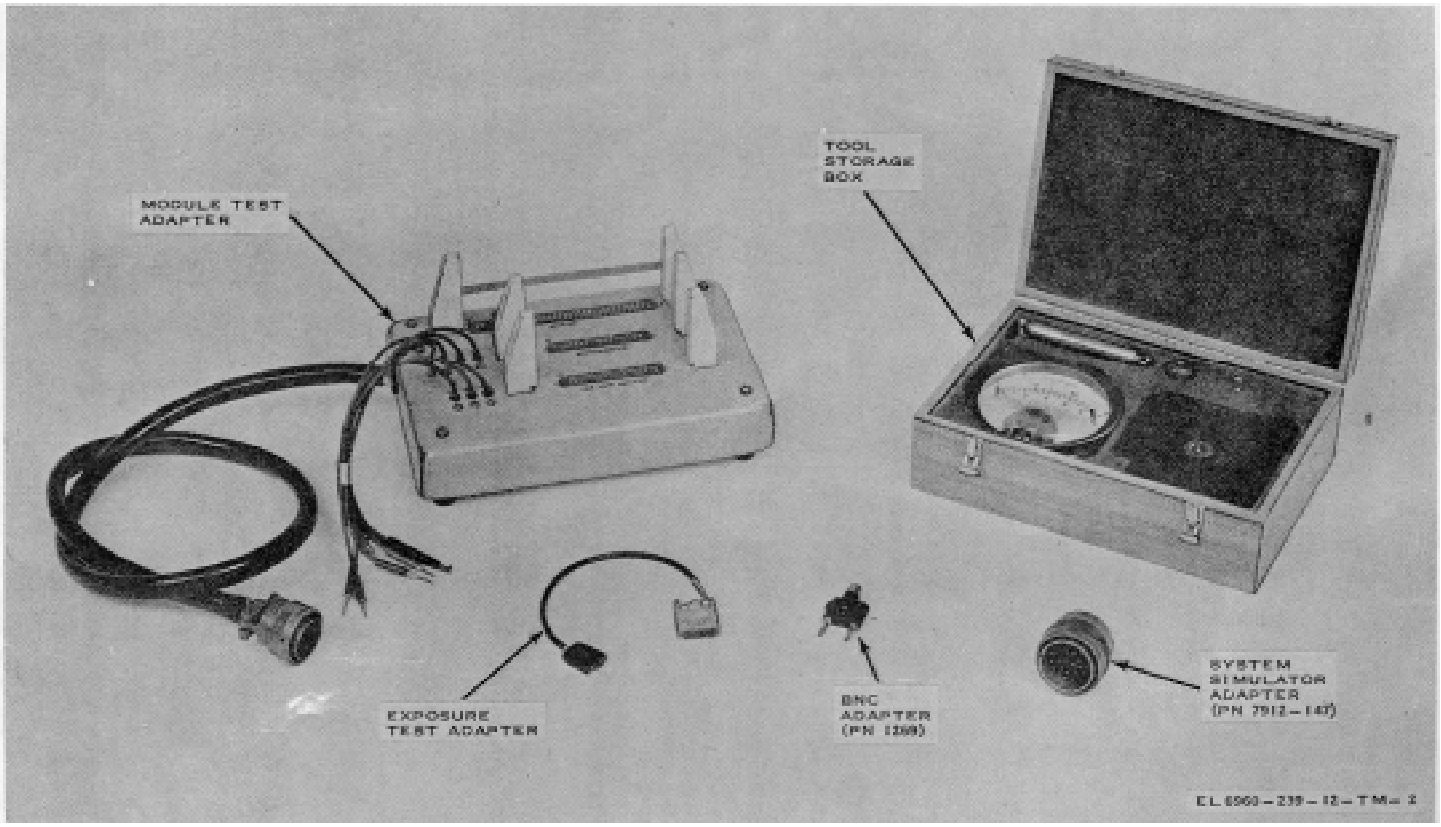

Figure 1-2. Test Set, Analyzer, Camera LS-80A, minor assemblies and accessories..

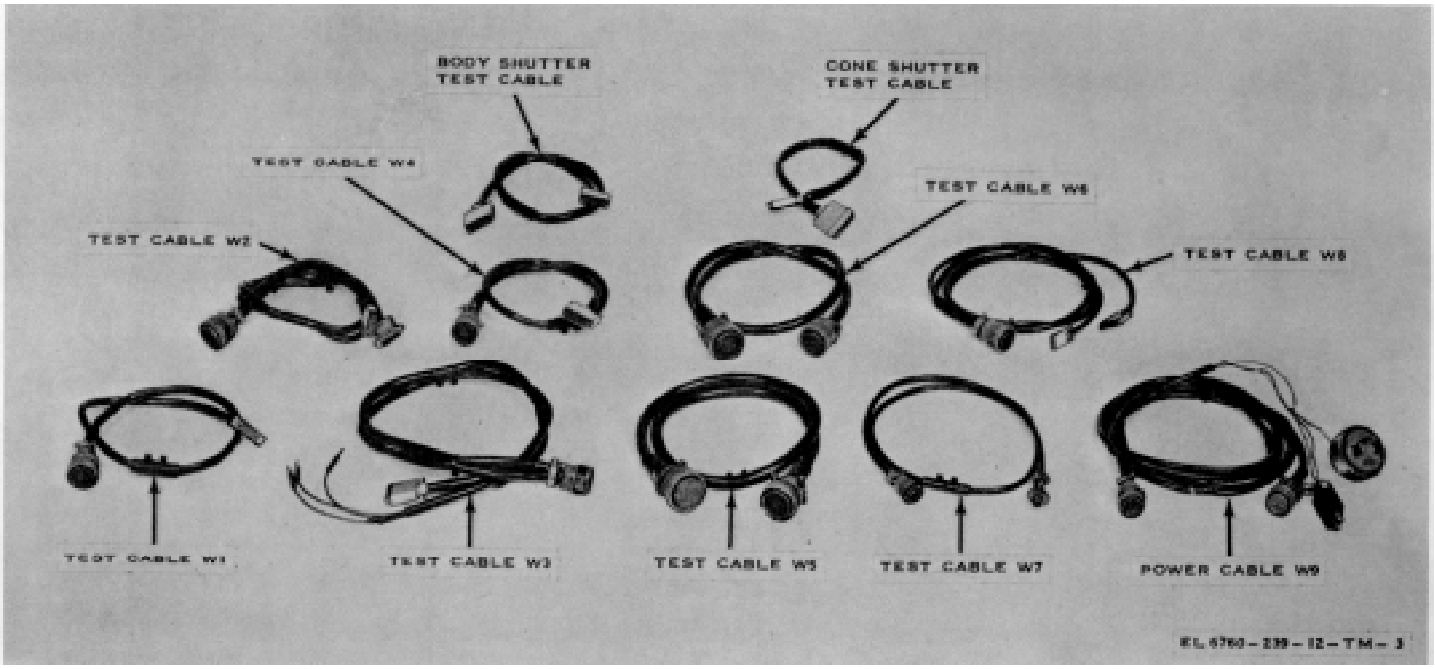

Figure 1-3. Test Set, Analyzer, Camera LS-80A, cable assemblies.

1-9. Common Names

Common names have been assigned to the items listed in table 1-2 below.

Table 1-2. Common Names

Common name	Nomenclature
Camera analyzer	Test Set, Analyzer, Camera LS-80A
Test cable W1	Cable assembly, special purpose, elec--trical: (W1, right relay assembly test).
Test cable W2	Cable assembly, special purpose, elec-trical: (W2, left relay assembly test).
Test cable W3	Cable assembly, special purpose, electrical: (W3, lens cone test).
Test cable W4	Cable assembly, special purpose, electrical: (W4, camera body test).
Test cable W5	Cable assembly, special purpose, electrical: (W5, control 1).
Test cable W6	Cable assembly, special purpose, electrical: (W6, control 2).
Test cable W7	Cable assembly, special purpose, electrical: (W7, sensor test).
Test cable W8	Cable assembly, special purpose, electrical: (WS, servo drive and S/C).
Power cable W9	Cable assembly, special purpose, electrical: (W9, input power).
Camera test adapter.	Adapter, Test, Camera LM-178A
Cone shutter test cable.	Cable assembly, special purpose, electrical: (cone-shutter test).
Body shutter test cable.	Cable assembly, special purpose, electrical: (body-shutter test).

1-10. Description of Camera Analyzer

(figs. 1-1 through 1-3)

The camera analyzer consists of the following: combination case (a below), test panel (b below), exposure test adapter (c below), module test adapter (d below), tool storage box (e below), test cable W1 (f below), test cable W2 (g below), test cable W3 (h below), test cable W4 (i below), test cable W5 (j below), test cable W6 (k below), test cable W7 (I below), test cable W8 (m below), power cable W9 (n below), camera test adapter (q below), cone shutter test cable (p below), body shutter test cable (o below), system simulator adapter (r below), BNC adapter (s below).

a. Combination Case (fig. 1-1). The two-part combination case is joined by two separable hinges along one side. Snap latches are provided for securing the case top to the case bottom. An air relief valve (not shown) provides for sealing the case against humidity and dust, and permits equalization of the air pressure

inside and outside the case before it is opened. The combination case top contains a compartmented cushion for storage with a hinged door which is secured by two twistlock fasteners. When not in use, the test adapter, tool storage box, and test cables are stored in the storage compartment. The camera analyzer is shock-mounted in the combination case bottom. Two folding carrying handles on the case bottom permit handcarrying the combination case.

b. Test Panel (fig. 1-1). The test panel contains the operating controls, indicators, fuses, and connectors required for operation of the equipment. The controls and indicators are grouped in sections with each section marked to indicate the use of its controls and indicators. The MASTER switch, which is used in conjunction with the sectionalized controls and indicators, is in the MASTER section at the lower right center of the test panel. The binding posts in the MASTER section provide for interconnection of the equipment under test, and for the connection of power to the test panel.

c. Exposure Test Adapter (fig. 1-4). The exposure test adapter consists of a connector and hood assembly and a connector, joined by an 8-inch sleeve covered chain. The connector and hood assembly has two female guide pins. The exposure test adapter connectors are plugged into the lens cone to facilitate lens cone calibration adjustments.

d. Module Test Adapter (fig. 1-5). The module test adapter consists of a test adapter box, a 48-inch pendent interconnection cable, and seven test leads, and is used to test the modules of Control, Power Supply LA-406A. The module test adapter box contains receptacle connectors for insertion of the printed circuit boards of Control, Power Supply LA-406A under test. Three guides are provided for proper insertion and retention of the printed circuit boards into the connectors. The top connector (auxiliary connector J1) provides for insertion of the auxiliary printed circuit board, the middle connector (intervalometer connector J2) provides for insertion of the intervalometer printed circuit board, and the bottom connector (film drive amplifier connector J3) provides for insertion of the film drive amplifier printed circuit board. The inter-connecting cable has a 55-prong male connector for connecting the module test adapter to the test panel. The 10-inch test leads are used for measurements at the test points of the printed circuit board under test; six are terminated by tip plugs and one is terminated by a clip.

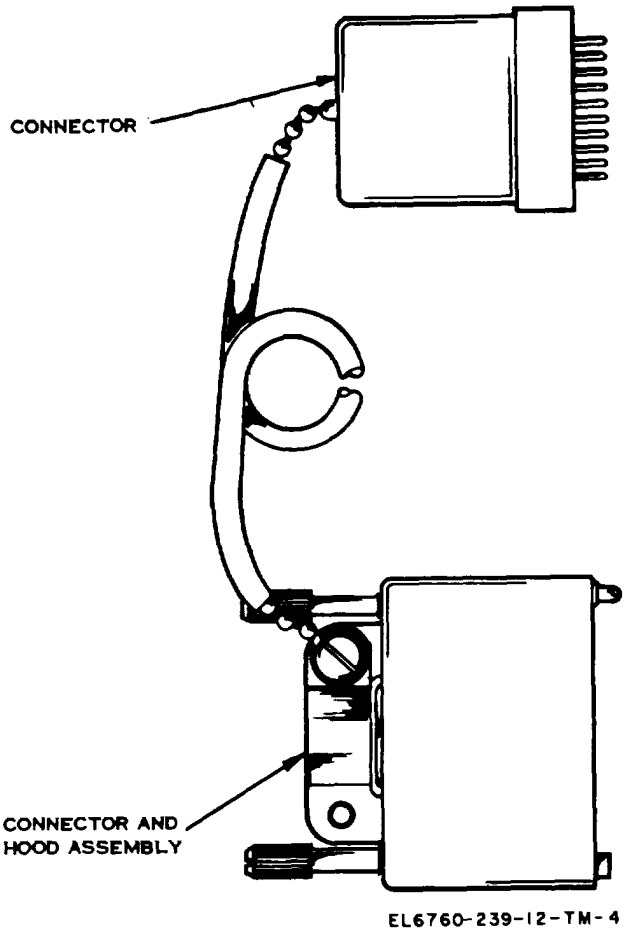

Figure 1-4. Exposure test adapter.

e. Tool Storage Box (fig. 1-6). The tool storage box consists of a box with a hinged cover that is fastened by two snap latches. The box contains polyfoam cushion material with cavities cut out to store the spring scale ((1) below), the vacuum plate ((2) below), the vacuum gage ((8) below), the shuttle cam locking pin ((4) below), and the switch adjusting gage ((5) below).

(1) Spring scale (fig. 1-7). The spring scale is used to measure the amount of restraining tension on the film between the metering roller and pressure roller in the camera body assembly under test. The portable weighing scale is graduated from 1 to 82 ounces, in 1-ounce increments.

(2) Vacuum plate (fig. 1-8). The vacuum plate is used to measure the level of the vacuum at the platen of the camera body assembly under test. The vacuum plate is a square-shaped aluminum fixture with a neoprene gasket cemented around the outer edges. A threaded hexagonal nipple over the hole in the vacuum plate provides for attachment of the vacuum gage ((8) below). The vacuum plate is positioned on the platen of the camera body assembly with the gasket side down. A cutout is provided on one corner of the vacuum plate for the optical faceplate of the camera data recording unit.

(3) Vacuum gage (fig. 1-8). The vacuum gage is used to indicate the level of the vacuum at the platen of the camera body assembly under test. The vacuum gage has a dial that is calibrated from 0 to 15 inches of water in 1/2-inch increments. A threaded fitting at the back of the vacuum gage provides for connection of the vacuum gage to the vacuum plate ((2) above).

(4) Shuttle cam locking pin (fig. 1-9). The shuttle cam locking pin is used to position the shuttle cam shaft of the camera body assembly under test for proper alignment of the autocycle shutter and autocycle vacuum cams. The shuttle cam locking pin has a knurled knob at one end as a finger grip and central threaded portion to secure the pin in the camera body assembly. The other end of the shuttle cam locking pin is turned down and chamfered for insertion into the alignment hole in the shuttle cam.

(5) Switch adjusting gage (fig. 1-10). The switch adjusting gage is used to position the autocycle vacuum and autocycle trip switches of the camera body assembly under test. The switch adjusting gage is a special cam, machined to slip onto the end of the shuttle cam shaft. The gage is fitted with a knurled knob for manual positioning of the gage on the shuttle cam shaft.

f. Test Cable W1 (fig. 1-3). Test cable W1 is a 29-conductor cable used for interconnecting the test panel and the right chassis and components assembly of the camera body assembly under test. One end of the cable is terminated by a 32-prong male connector for connection to the test panel. The other end of the cable is terminated by a 34-pin female connector for connection to the right chassis and components assembly.

g. Test Cable W2 (fig. 1-). Test cable W2 is a 40-conductor cable used for interconnecting the test panel and the left chassis and components assembly of the camera body assembly under test. One end of the cable is terminated by a 41- prong male connector for connection to the test panel. The other end of the cable is divided into two branches, each terminated by a connector, for connection to the fixed and pendent

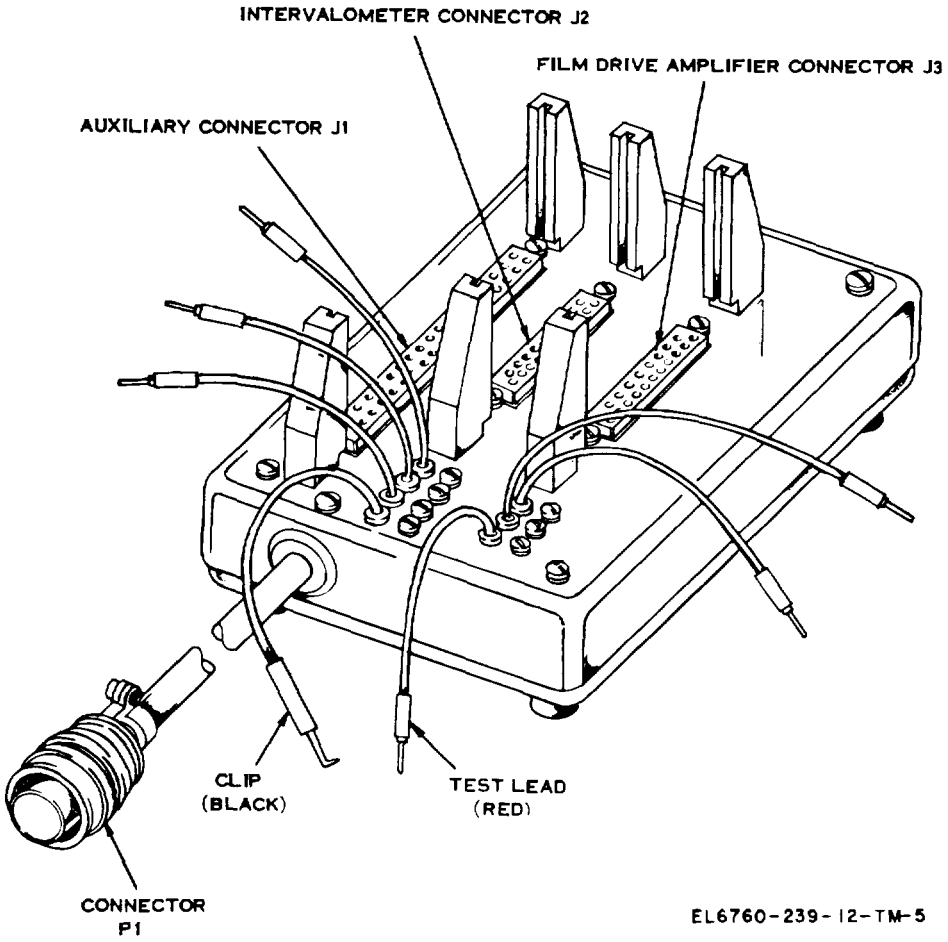

Figure 1-5. Module test adapter.

connectors on the left chassis and components assembly of the camera body assembly under test. One branch is terminated by a 15-pin female connector; the other branch is terminated by a 34-pin female connector.

h. Test Cable WS (fig. 1-3). Test cable W3 is a 20-conductor cable with three additional test leads at one end. It is used for interconnecting the test panel and lens cone assembly under test. One end of the cable is terminated by a 26-prong male connector for connection to the test panel. The other end of the cable is terminated by a 23-pin female connector and three test leads terminated with red plugs for connection to the lens cone assembly under test.

i. Test Cable W4 (fig. 1-3). Test cable W4 is a 27-conductor cable used for interconnecting the test panel and the camera body assembly under test. One end of the cable is terminated by a 32-prong male connector for connection to the test panel. The other end of the cable is terminated by a 34-pin female connector for connection to the camera body assembly under test.

j. Test Cable W5 (fig. 1-3). Test cable W5 is a 34-conductor cable used for interconnecting the test panel and Control, Power Supply LA-406A under test. One end of the cable is terminated by a 55-prong male connector for connection to the test panel. The other end of the cable is terminated by a 57-pin female connector for connection to Control, Power Supply LA-406A under test.

k. Test Cable W6 (fig. 1-3). Test cable W6 is a 21-conductor cable used for interconnecting the test panel and Control, Power Supply LA-406A under test. One end of the cable is terminated by a 39-pin female connector for connection to the test panel. The other end of the cable is terminated by a 57-prong male connector for connection to Control, Power Supply LA-406A under test.

a.

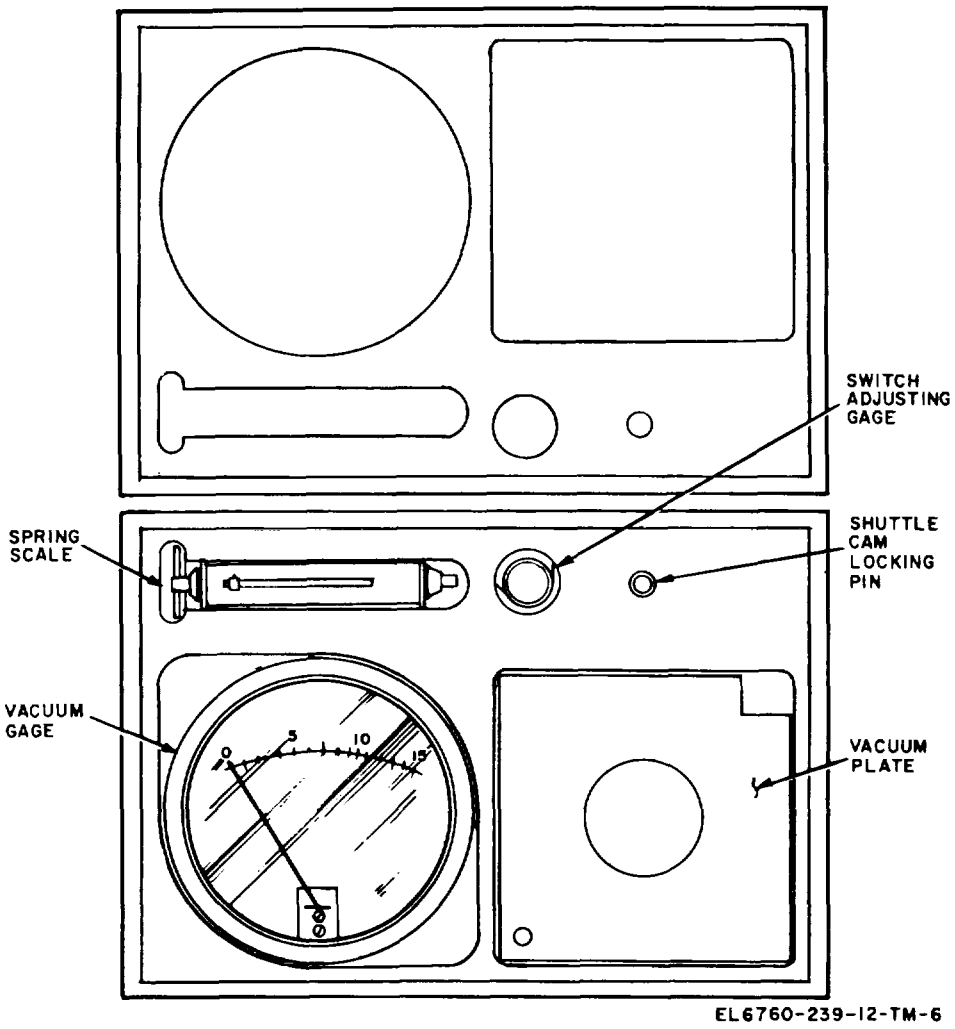

Figure 1-6. Tool storage box.

l. Test Cable W7 (fig. 1-3). Test cable W7 is a two-conductor cable used for interconnecting the test panel and Light Sensor, Aircraft Camera LA-402A under test. One end of the cable is terminated by a six-prong male connector for connection to the test panel. The other end of the cable is terminated by a four-pin female connector for connection to Light Sensor, Aircraft Camera LA-402A under test.

m. Test Cable W8 (fig. 1-3). Test cable W8 is a 12-conductor cable used for interconnecting the test panel and the servo drive and S/C modules of the lens cone assembly under test. One end of the cable is terminated by a 26-prong male connector for connection to the test panel. The other end of the cable is divided into two branches, each terminated by a connector for connection to a module of the lens cone assembly under test. One branch is terminated by a seven-pin female connector; the other branch is terminated by a 26-pin female connector.

n. Power Cable W9 (fig. 1-3). Power cable W9 is a six-conductor cable used for connecting the test panel to the direct current (dc) and alternating current (ac) sources of power. One end of the cable is terminated by a 12-pin female connector for connection to the test panel. The other end is divided into two branches; one branch terminated by four color coded and tinned leads for connection to the sources of input power, the other branch terminated by a seven-pin female connector.

o. Body Shutter Test Cable (fig. 1-3). The body shutter test cable is a 27-conductor cable used for interconnecting Body Drive, Aircraft Camera LA-373A (camera body) and Shutter, Photographic LA-375A (shutter assembly) of the

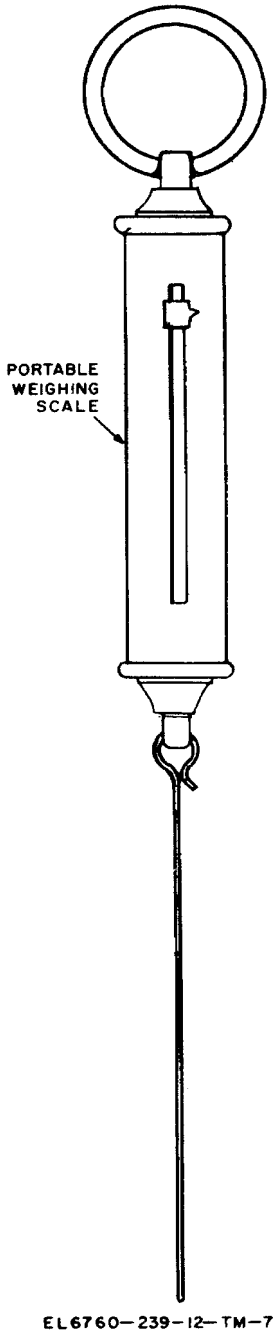

Figure 1-7. Spring scale.

camera under test. One end of the cable is terminated by a 34-pin female connector for connection to the camera body. The other end of the cable is terminated by a 34-prong male connector for connection to the shutter assembly.,

NOTE

The body shutter test cable is used in conjunction with the camera test adapter.

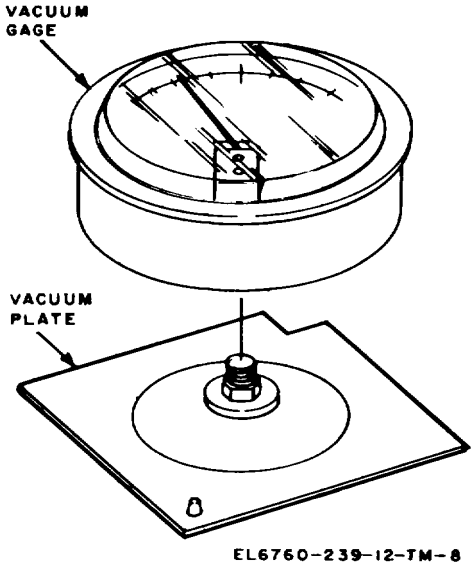

Figure 1-8. Vacuum plate and vacuum gage.

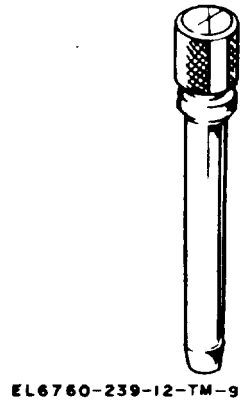

Figure 1-9. Shuttle cam locking pin.

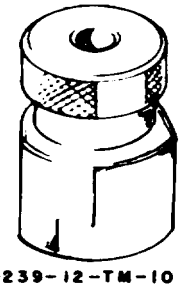

Figure 1-10. SWITCH ADJUSTING GAGE.

when checking completely assembled Camera, Still Picture KA-76A.

p. Cone Shutter Test Cable (fig. 1-3). The cone shutter test cable is a 19-conductor cable used for interconnecting the shutter assembly and the camera lens cone. One end of the cable is terminated by a 26-prong male connector for connection to the camera shutter assembly. The other end of the cable is terminated by a 26-pin female connector for connection to the camera lens cone.

NOTE

The cone shutter test cable is used in conjunction with the camera test adapter when checking completely assembled Camera, Still Picture KA-76A.

q. Camera Test Adapter (fig. 1-1). The camera test adapter is a rectangular-shaped box consisting of front panel-mounted controls, indicators, and binding post connectors. Three pendent connector cables and two receptacle-type connectors are provided on one of its sides. Two of the pendent connector cables connect to Camera, Still Picture KA-76A; the remaining one connects to a +28-volt power source. The camera test adapter is used independently of the camera analyzer when checking completely assembled Camera, Still Picture KA-76A.

r. System Simulator Adapter P/N 7912-147. The system simulator adapter is a 27-prong male connector used to adapt the system simulator (LS-36A) for checking Camera, Still Picture KA-76A. The system simulator adapter connects to KA-30A J706 connector on the LS-36A.

s. BNC Adapter P/N 1269. The BNC adapter is a standard 2-prong banana-type plug adapter, It is used to provide connection of Timer, Digital, Electronic LS-387A to the camera analyzer PULSE TIMER PULSE and GRD binding posts.

1-11. Additional Equipment Required

Table 1-3 lists the additional equipment required to perform the test listed in the manual (para 3-4b), but is not furnished as part of the camera analyzer.

Table 1-3. Additional Equipment Required

Item	Common Name
Simulator, Control System, Camera LS-36A.	System simulator
Voltmeter, Differential ME-202A/U	Vtvm
Multimeter TS-352B/U	Multimeter
Timer, Digital, Electronic LS-387A	Digital timer
R/C bridge AN/URM-90	R/C bridge
Oscilloscope AN/USM-281	Oscilloscope
The following components of Test Set, Photographic Surveillance System LS-47A are required:	
Light Source, Calibrated LA-233A	Light box
Neutral density filter No. 1 (CAI part No. 2998-933-1) 25% transmissibility filter.	
Neutral density filter No. 2 (CAI part No. 2998-933-2) 8% transmissibility filter.	
Neutral density filter No. 3 (CAI part No. 2998-933-3) 1-6% transmissibility filter.	
Neutral density filter No. 4 (CAI part No. 2998-933-4) 0.5% transmissibility filter.	

CHAPTER 2

SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unpacking

(fig. 2-1)

a. Packing and Packing Data. When packed for shipment, the components of the camera analyzer are secured in the combination case and packed in corrugated carton. A typical corrugated carton and its contents are shown in figure 2-1. The corrugated carton is 24 inches high by 23 inches wide by 24 inches deep. The total weight is 94 pounds and the volume is 7.5 cubic feet.

b. Unpacking.

CAUTION

When opening the shipping container, take care not to cut or scratch the surface of the combination case.

(1) Carefully cut the gummed tape at the top of the corrugated carton and fold back the flaps.

(2) Open the wrap of filler material and remove the waterproof package containing the technical manual. Cut the tape securing one side of the waterproof package and remove the technical manual.

(3) Remove the camera analyzer from the corrugated carton.

(4) Cut and remove the lock wire from the air relief valve (fig. 2-1). Turn the air relief valve to OPEN.

(5) Unfasten the 10 snap latches. Lift the combination case top and slide it to the right to disengage the separable hinges.

(6) Open the hinged door by releasing the two twistlock fasteners.

(7) Remove the retaining cushion.

(8) Remove the components from their cut-outs in the compartment cushion.

(9) Remove the special tools from the tool storage case.

2-2. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3).

b. Check the equipment against the component listing (para 1-8) and the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of TM 38-750. The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing.

c. Check to see whether the equipment has been modified. (Equipment which has been modified will have the MWO number on the front panel, near the nomenclature plate.) Check also to see whether all currently applicable MWO's have been applied. If modified, see that any operational instruction changes resulting from the modification have been entered in the equipment manual.

NOTE

Current MWO's applicable to the equipment are listed in DA Pam 310-7.

2-3. Seating of Fuses

a. Camera Analyzer Fuses (fig. 3-1). The camera analyzer is shipped with its fuses installed.

CAUTION

Use only fuses of the correct value when replacing a fuse. Overrated fuses can result in damage to the equipment.

(1) See that the 5-ampere, 115-volt fuses are installed in their fuse holders; one in the 5 AMP AC fuse holder, the other in the 5 AMP SPARE fuse holder.

(2) See that the 5-ampere, 28-volt fuses are installed in their fuse holders; one in the 5 AMP DC fuse holder; the other in the 5 AMP SPARE fuse holder.

b. Camera Test Adapter Fuses (fig. 3-2). The camera test adapter is shipped with its fuses installed.

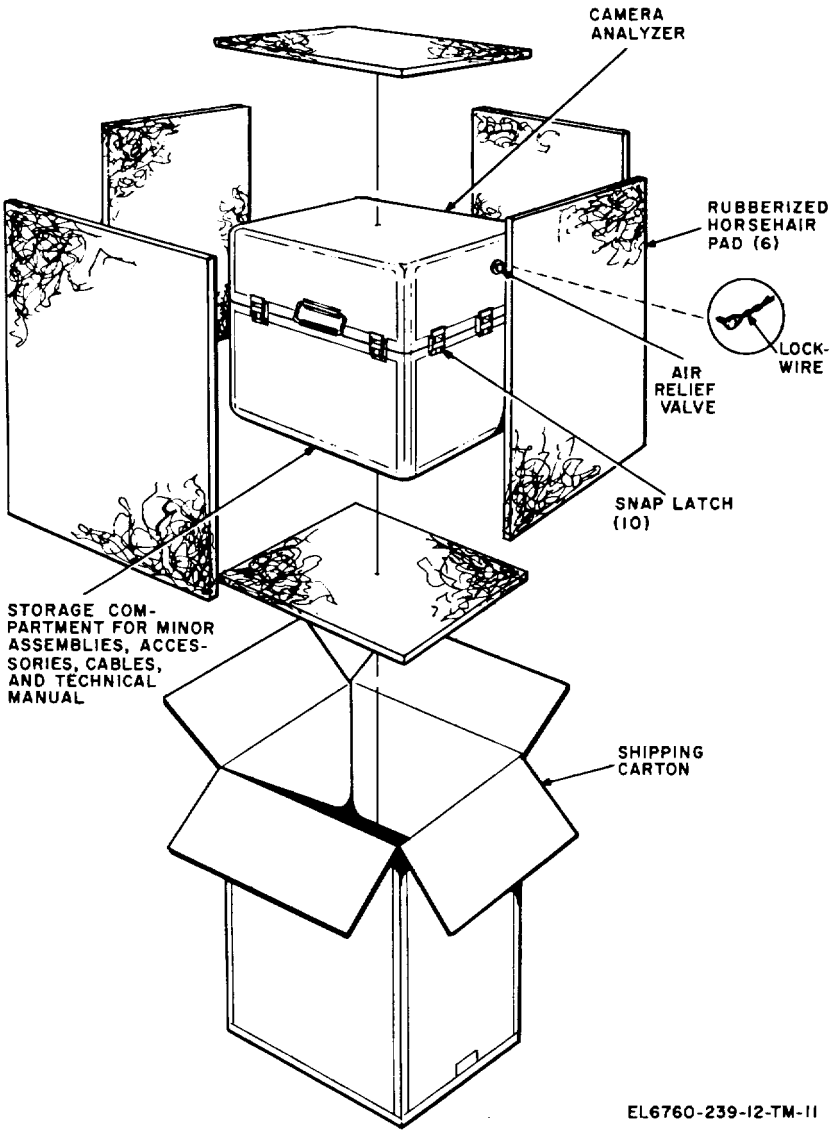

Figure 2-1. Camera analyzer, typical packaging diagram.

(1) See that the 1.5-ampere de fuses are installed in their fuse holders; one in the 1.5 AMP DC fuse holder; the other in the SPARE fuse holder.

(2) See that the 15-ampere dc fuses are installed in their fuse holders; one in the 15 AMP DC fuse holder; the other in the SPARE fuse holder.

2-4. Primary Power Connections

a. Camera Analyzer Primary Power Connections. Two primary power sources, 115 volts, 400 Hz and 28 volts de, are required for camera analyzer operation. After the camera analyzer has been placed in the operating position, make the following power connections:

WARNING

Check to be sure that no voltage is present at the terminals of the power source before making the connections.

(1) Set the camera analyzer POWER switch (fig. 3-1) to OFF.

(2) Connect the black DC GRD lead of power cable W9 to the ground (negative) side of the 28-volt dc power source, and the red 28 volt dc lead from power cable W9 to the positives side of the dc power source.

(3). Connect the blue AC GRD lead of power

cable W9 to the neutral side of the 11S-volt ac power source, and the yellow 115-volt ac lead of power cable W9 to the ac output terminal of the ac power source.

(4) Connect power cable W9 to POWER connector J1 (fig. 3-1) on the camera analyzer.

(5) Check the camera analyzer operation by performing the procedures given in paragraph 3-5.

b. Connections. Two primary power sources (para 1-7) are required for operation of the camera test adapter. After the camera test adapter has been placed in the operating position, proceed as follows:

WARNING

Check to be sure that no voltage is present at the terminals of the power source before making the connections.

(1) Set the camera test adapter POWER switch (fig. 3-2) to OFF.

(2) Connect the black DC GRD lead from power cable W9 to the ground (negative) side of the 28-volt dc power source, and the red lead from power cable W9 to the positive side of the dc power source.

(3) Connect power cable W9 to POWER connector J1 on the camera test adapter.

(4) Check the camera test adapter operation by performing the procedures given in paragraph 3-6.

NOTE

The camera test adapter is used independently from the camera analyzer when checking completely assembled Camera, Still Picture KA-76A. Ac power (115 volts, 400 Hz), is applied to the camera test adapter from the system simulator (LS-36A). Refer to TM 11-6720-236-35 for complete details of the test setup.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. OPERATOR'S CONTROLS, INDICATORS AND CONNECTORS

3-1. Camera Analyzer Controls, Indicators, and Connectors
(fig. 3-1)

-Tables 3-1 and 3-2 contain a listing of controls, indicators, and connectors used by the operator of the equipment. These tables cover only those items used by the operator; items used by higher category of maintenance personnel are covered in instructions for the appropriate maintenance category.

Table 3-1. Camera Analyzer Controls and Indicators

Control or indicator	Function
MASTER section:	
PANEL POWER subsection:	
POWER switch	Two-position toggle switch: *Position* — *Function* OFF — Disconnects input power from camera analyzer. ON — Applies input power to circuits of camera analyzer.
Indicator assembly	Two-section indicator lamp assembly: *Section* — *Function* DC PWR — Lights with POWER switch at ON to indicate dc power is applied to camera analyzer. AC PWR — Lights with POWER switch at ON to indicate ac power is applied to camera analyzer.
MASTER switch	Five-position rotary switch: *Position* — *Function* CONTROL PWR SUPPLY. — Programs camera analyzer for testing Control, Power Supply LA-406A. LENS CONES — Programs the camera analyzer for testing lens cone assemblies of camera. CAMERA BODY — Programs camera analyzer for testing camera body assembly of camera. INTERNAL TEST 1. — Programs camera analyzer for testing of its internal circuits. INTERNAL TEST 2. — Programs camera analyzer for testing its internal circuits.
LAMP TEST switch	Two-position toggle switch: *Position* — *Function* OFF — Removes power from indicator assembly lamps on camera analyzer.
LAMP TEST switch	ON — Applies 28 vdc and ground to light all lamps in indicator assemblies on camera analyzer (except DC PWR and AC PWR) to check operation of bulbs.
COUNTER indicator assembly	Four-section indicator lamp assembly: *Section* — *Function* SCOPE — Lights to indicate waveform is to be checked by external oscilloscope con-

Table 3-1. Camera Analyzer Controls and Indicators-Continued

Control or indicator	Function
	Position — *Function* nected to SCOPE VERT and GRD binding posts. VOM DC — Lights to indicate voltage is to be measured by external voltohmmeter connected to VOM + and - binding posts. WIDTH — Lights to indicate pulse width is to be measured by external pulse timer connected to PULSE TIMER PULSE and GRD binding posts.
COUNTER indicator assembly	INTVL — Lights to indicate pulse interval is to be measured by external pulse timer connected to PULSE TIMER PULSE and GRD binding posts.
Indicator assembly	Two-section indicator assembly: Section — Function R/C BRDG — Lights to indicate voltage to be measured is present at R/C BRDG + and - binding posts. DC VOLTS — Lights to indicate de voltage to be measured is present at DC VOLTS INPUT and GRD binding posts.
CAMERA BODY section: MODE switch	Four-position rotary switch: *Position* — *Function* AUTO — Programs camera analyzer to test operation of camera body assembly in autocycle mode. PULSE — Programs camera analyzer to test operation of camera body assembly in pulse mode. PULSE IMC. — Programs camera analyzer to test operation of camera body assembly in pulse IMC mode. NIGHT — Programs camera analyzer to test operation of camera body assembly in night (open shutter) mode.
CYCLE PULSE switch	Three-position toggle switch: *Position* — *Function* MANUAL — Initiates 1 cycle of camera body assembly operation. AUTO — Operates camera body assembly rate of 1 cycle per second. OFF — Nonoperative position of switch.
SIM OPR switch I	Two-position toggle switch: *Position* — *Function* ON — Applies operate signal to system simulator. OFF — Removes operate signal from system simulator.
BODY OPR switch	Two-position toggle switch: *Position* — *Function* ON — Applies operate signal to camera body assembly. OFF — Removes operate signal from camera body assembly.
Indicator assembly (left)	Four-section indicator lamp assembly: Section — Function EXP RESET — Lights to indicate shutter trip relay in camera body assembly is deener-

Table 3-1. Camera Analyzer Controls and Indicators-Continued

Control or indicator	Function
	Section — *Function* gized; extinguishes when relay is energized. SIM OPR — Lights when ground is applied to system simulator. BODY RDY — Lights to indicate operate ground is applied to camera body assembly. BODY OPR — Lights to indicate operate relay is de-energized after operate ground is applied to camera body assembly.
Indicator assembly (center)	Four-section indicator lamp assembly: *Section* — *Function* FILM FAIL — Lights when camera film is broken or depleted, or cassettes are improperly installed. AUTO TRIP — Lights to indicate actuation of autocycle vacuum switch and autocycle trip switch on camera body assembly. NIGHT INTLK — Lights when camera body assembly is programmed for night operation. NIGHT — Lights when night relay is energized.
Indicator assembly (right)	Two-section indicator lamp assembly: *Section* — *Function* CYCLE PULSE — Flashes when cycle pulse is applied to camera body assembly. RECYCLE INITIATE. — Flashes when recycle pulse is applied to camera body assembly.
MODULE subsection:	
TEST LEFT ASSEMBLY switch	Seventeen-position rotary switch: *Position* — *Function* 1 through 13, 15 through 17. — Tests continuity of circuits in left chassis and components assembly module of camera body assembly. 14 and 16 — Tests operation of re network in left chassis and components assembly module of camera body assembly.
TEST RIGHT ASSEMBLY switch	Eight-position rotary switch: *Position* — *Function* 1 and 8 through 8 — Tests continuity of circuits in right chassis and components assembly module of camera body assembly. 2 — Tests operation of re network in right chassis and components assembly module of camera body assembly.
Indicator assembly	Four-section indicator lamp assembly: *Section* — *Function* LEFT A — Lights to indicate circuit continuity in section A of left chassis and components assembly module. LEFT B — Lights to indicate circuit continuity in section B of left chassis and components assembly module. RIGHT A — Lights to indicate circuit continuity in section A of right chassis and components assembly module. RIGHT B — Lights to indicate circuit continuity in section B of right chassis and components assembly module.

Table 3-1. Camera Analyzer Controls and Indicators-Continued

Control or indicator	Function
CONTROL, POWER SUPPLY section:	
MODULE TEST switch	Twelve-position rotary switch: *Position* — *Function* INTVL R9 BAL — Tests setting of potentiometer R9 in intervalometer module of Control, Power Supply LA-406A. INTVL R7 BAL — Tests setting of potentiometer R7 in intervalometer module of Control, Power Supply LA-406A. INTVL OPR — Establishes input operating conditions and instrumentation for intervalometer operation and testing. INTVL + 40VDC — Tests +40 vdc output of intervalometer module in Control, Power Supply LA-406A. INTVL -40VDC — Tests -40 vdc output of intervalometer module in Control, Power Supply LA406A. INTVL TP3 — Tests voltage at test point TP3 of intervalometer module in Control, Power Supply LA-406A. FDA R13 ADJ — Tests setting of potentiometer R13 in film drive amplifier module of Control, Power Supply LA-406A. FDA R9 ADJ — Tests setting of potentiometer R9 in film drive amplifier module of Control, Power Supply LA-406A. FDA OPR — Establishes input operating conditions and instrumentation for film drive amplifier operation and testing. FDA +6VDC — Tests +6 vdc output of film drive amplifier module of Control, Power Supply LA-406A. FDA -6VDC — Tests -6 vdc output of film drive amplifier module of Control, Power Supply LA406A. FDA TP2 — Tests voltage at test point TP2 of film drive amplifier module of Control, Power Supply LA-406A.
OPERATE OFF switch	Pushbutton switch; when depressed, removes camera analyzer E V/H test signal from control power supply.
PLUS OUTPUT switch	Pushbutton switch; when depressed, applies camera analyzer E V/H test signal to Control, Power Supply LA406A.
TEST switch	Eight-position rotary switch: *Position* — *Function* SYSTEM RDY GRD OFF. — Removes system ready ground signal from Control, Power Supply LA-406A. SYSTEM RDY GRD ON. — Applies system ready ground signal to Control, Power Supply LA406A. SYSTEM OPERATE. — Applies operate voltage to interlock and ready relays to place Control, Power Supply LA-406A in operation. SYSTEM MAN PIC. — Operates manual picture relay in Control, Power Supply LA-406A. SYSTEM NIGHT FLASH. — Operates night relay in Control, Power Supply LA-406A. SYSTEM FLASH RDY. — Operates flash interlock relay in Control, Power Supply LA406A. AUX BD INTVL — Checks resistances on auxiliary board in Control, Power Supply LA-406A

Table 3-1. Camera Analyzer Controls and Indicators-Continued

Control or indicator	Function
	Position — *Function* that are associated with intervalometer module operation. AUX BD FDA — Checks resistances on auxiliary board in Control, Power Supply LA-406A that are associated with film drive amplifier module operation.
CONFIGURATION switch	Ten-position rotary switch: *Position* — *Function* 44MM VERT — Checks operation of Control, Power Supply LA-406A under simulated 44-mm (1%) inch lens cone assembly conditions. 3 IN. 15°R — Checks operation of Control, Power Supply LA-406A under simulated 3-inch lens cone assembly in 15° right swing position conditions. 3 IN. 30°R — Checks operation of Control, Power Supply LA-406A under simulated 3-inch lens cone assembly in 30° right swing position conditions. 3 IN. VERT — Checks operation of Control, Power Supply LA-406A under simulated 3-inch lens cone assembly in vertical position conditions. 6 IN. 15°L — Checks operation of Control, Power Supply LA-406A under simulated 6-inch lens cone assembly in 15° left swing position conditions. 6 IN. 30°L — Checks operation of Control, Power Supply LA-406A under simulated 6-inch lens cone assembly in 30° left swing position conditions. 6 IN. VERT — Checks operation of Control, Power Supply LA406A under simulated 6-inch lens cone assembly in vertical position conditions. 12 IN. 15°L — Checks operation of Control, Power Supply LA406A under simulated 12-inch lens cone assembly in 15° left swing position conditions. 12 IN. 80°L — Checks operation of Control, Power Supply LA-406A under simulated 12-inch lens cone assembly in 80° left swing position conditions. 12 IN. VERT — Checks operation of Control, Power Supply LA-406A under simulated 12-inch lens cone assembly in vertical position conditions
E V/H 0-50 VOLTS control	Potentiometer; sets level (adjustable from 0 to 50 volts) of camera analyzer E V/H test signal output to Control, Power Supply LA406A.
MODULE indicator assembly	Three-section indicator lamp assembly: *Section* — *Function* INTERVAL PULSE. — Flashes to indicate intervalometer pulses are functioning. INTVL — Lights to indicate intervalometer module is being tested. FILM DRIVE — Lights to indicate film drive amplifier is being tested.

Table 3-1. Camera Analyzer Controls and Indicators-Continued

Control or indicator	Function
Indicator assembly (left)	Four-section indicator lamp assembly: *Section* — *Function* MOUNT AC — Lights to indicate 44-mm (I1 inch) relay in Control, Power Supply LA-406A is deenergized. AC OA — Lights to indicate phase A power is available through power relay in Control, Power Supply LA-406A. CAM 28V — Lights to indicate de power relay is energized in Control, Power Supply LA-406A. AC OB — Lights to indicate phase B power is available through power relay in Control, Power Supply LA-406A.
Indicator assembly (center)	Four-section indicator lamp assembly: *Section* — *Function* INTVL PULSE — Flashes when interval pulse is received from intervalometer module; lights steady when manual picture relay is energized. MAN PIC — Lights when TEST switch is at SYSTEM MAN PIC. VERT POS — Lights to indicate camera is programmed for operation in vertical position. RELAY OPR — Lights when any one of four swing position relays (15°L, 15 assembly:°R, 30°L, 30°R) is energized.
Indicator assembly (right)	Four-section indicator lamp assembly: *Section* — *Function* SYS READY — Lights to indicate ready and interlock relays of Control, Power Supply LA-406A are energized. FLASH AC — Lights to indicate night relay of Control, Power Supply LA-406A is energized to supply operating voltage to flasher. NIGHT EXP — Lights to indicate ground is completed through night relay of Control, Power Supply LA406A for exposure increase. FLASH DC — Lights when dc operating voltage to flasher unit is completed through night relay of Control, Power Supply LA406A.
LENS CONE section: TEST switch	Five-position rotary switch: *Position* — *Function* S/C A — Checks resistance of section A of S/C switch in lens cone assembly. S/C B — Checks resistance of section B of S/C switch in lens cone assembly. CAL — Used to calibrate exposure system. OPERATE — Used to test aperture settings of lens cone assembly for various simulated exposures. PHOTO SENSOR — Used to check light sensor for calibration.
EXPOSURE switch C	Two-position toggle switch: *Position* — *Function* OVER — Applies de ground test signal to over-exposure relay in lens con assembly to increase exposure by one f/stop.

Table 3-1. Camera Analyzer Controls and Indicators-Continued

Control or indicator	Function
	Position — *Function* UNDER — Applies de ground test signal to under-exposure relay in lens cone assembly to decrease exposure by one f/stop.
DC EXPOSURE switch	Two-position toggle switch: *Position* — *Function* INCREASE — Applies exposure signal of correct polarity to increase diaphragm opening in lens cone assembly. DECREASE — Applies exposure signal of correct polarity to decrease diaphragm opening in lens cone assembly.
EXP SIGNAL RANGE switch	Two-position toggle switch: *Position* — *Function* 0-100 — Establishes simulated light current range of 0-100 foot-lamberts. 0-10000 — Establishes simulated light current range of 0-10000 foot-lamberts.
EXP SIGNAL FOOT-LAMBERTS control	Potentiometer; sets level of simulated light sensor output signal in foot-lamberts for application to lens cone assembly.
Indicator assembly (left)	Two-section indicator lamp assembly: *Section* — *Function* OVER — Lights when overexposure circuit in lens cone assembly is functioning to increase exposure one f/stop. UNDER — Lights when underexposure circuit in lens cone assembly is functioning to decrease exposure one f/stop.
Indicator assembly (center)Four-section indicator lamp assembly:	*Section* — *Function* INCR LIM — Lights when diaphragm of lens cone assembly is fully opened. DECR LIM — Lights when diaphragm of lens cone assembly is fully closed. INCR — Lights when diaphragm of lens cone assembly is opening. DECR — Lights when diaphragm of lens cone assembly is closing.
FOCAL LENGTH indicator assembly	Four-section indicator lamp assembly: *Section* — *Function* 44MMLights when 1% inch (44-mm) lens cone assembly is connected to camera analyzer. 3 IN. — Lights when 3-inch lens cone assembly is connected to camera analyzer. 6 IN. — Lights when 6-inch lens cone assembly is connected to camera analyzer. 12 IN. — Lights when 12-inch lens cone assembly is connected to camera analyzer.

Table 3-2. Camera Analyzer Connectors

Connector	Function
CONTROL POWER SUPPLY section:	
CONTROL (J1) J9	55-pin female connector; provides for connection of camera analyzer to Control, Power Supply LA-406A connector J1.
CONTROL (J2) J10	39-prong male connector; provides for connection of camera analyzer to Control, Power Supply LA-406A connector J2.
MODULES J11	55-pin female connector; provides for connection of camera analyzer to modules of Control, Power Supply LA-406A.

Table 3-2. Camera Analyzer Connectors - Continued

Connector	Function
LE1NS CONE section:	
LENS CONE J6	26-pin female connector; provides for connection of camera analyzer to lens cone assembly of camera being tested.
MODULE J8	26-pin female connector; provides for connection of camera analyzer to modules of lens cone assembly.
SENSOR J7	6-pin female connector; provides for connection of camera analyzer to light w sensor of camera being tested.
CAMERA BODY-	
MODULES section:	
BODY J3	32-pin female connector; provides for connection of camera analyzer to camera body.
LEFT ASSEMBLY J4	41-pin female connector; provides for connection of camera analyzer to left chassis and components assembly module of camera body assembly.
RIGHT ASSEMBLY J5	32-pin female connector; provides for connection of ca mera analyzer to right chassis and components assembly module of camera body assembly.
MASTER section:	
PULSE TIMER PULSE and GRD	Binding posts; provides for connection of an external pulse timer to camera analyzer.
VOM + and -	Provides for connection of an external volt-ohm-milliammeter to the camera analyzer.
R/C BRDG + and	Binding posts; provide for connection of an external R/C bridge to camera analyzer.
DC VOLTS INPUT and GRD	Binding posts; provide for connection of an exter nal dc voltmeter to camera analyzer.
SCOPE VERT and GRD	Binding posts; provide for connection of an external oscilloscope to camera analyzer.
POWER J1	12-prong male connector; provides for connection of camera analyzer to ac and dc power sources.
SYS SIMULATOR J2	37-prong male connector; provides for connection of system simulator to camera ' analyzer.

3-2. Camera Test Adapter Controls, Indicators, and Connectors

(fig. 3-2)

-Tables 3-3 and 3-4 contain a listing of controls, indicators, and connectors used by the operator of the camera test adapter. These tables cover only those items used by the operator; items used by high category of maintenance personnel are covered in instructions for the appropriate maintenance category.

Table 3-3. Camera Test Adapter Controls and Indicators

Control or indicator	Function
MODE switch	Four-position rotary switch: *Position* — *Function* AUTO — . Allows ACCS photo control panel to program camera for operation in au- tocycle mode. PULSE — Completes dc ground circuit to pro- gram camera for operation in pulse mode. IMC PULSE — Completes de ground circuit to program camera for operation in IMC pulse mode. NIGHT — Completes dc ground circuit to program camera for operation in night (night open shutter) mode.
EXPOSURE switch	Six-position rotary switch: *Position* — *Function* 44MM CAL — Applies dc exposure signal to camera with 44-mm (1% inch) lens cone as- assembly to check and, if necessary, calibrate camera exposure circuits.

Table 3-3. Camera Test Adapter Controls and Indicators

Control or indicator	Function
	Position — *Function* 3 IN. CAL — Applies dc exposure signal to camera with 3-inch lens cone assembly to check and, if necessary, calibrate camera exposure circuits. 6 IN. CAL — Applies dc exposure signal to camera with 6inch lens cone assembly to check and, if necessary, calibrate camera exposure circuits. 12 IN. CAL — Applies dc exposure signal to camera with 12-inch lens cone assembly to check and, if necessary, calibrate camera exposure circuits. OPR ALL — Applies dc exposure signal to camera to check response of camera shutter and diaphragm exposure circuits. SEN — For checking camera shutter and diaphragm exposure circuits with light sensor using light box (part of LS-47A) as light source.
NORM-INCR switch	Two-position toggle switch: *Portion* — *Function* INCRB — Completes dc ground circuit to obtain lowest shutter and maximum aperture opening. NORM — Interrupts de ground circuit completed when switch is at INCR.
OVER-NORMAL-UNDER switch	Three-position toggle switch: OVER — Completes de ground path to increase camera exposure one f/stop. NORMAL — Interrupts de ground path completed when switch is at OVER or UNDER. UNDER — Completes de ground path to decrease camera exposure one f/stop.
CYCLE switch	Pushbutton switch: *Portion* — *Function* Depressed momentarily. — Applies +28 vdc pulse to camera to Initiate cycle operation in all modes except autocycle.
LAMP TEST	Pushbutton switch: *Portion* — *Function* Depressed — Completes 28-volt circuit to all indicator assemblies on camera test adapter to light lamps and check internal wiring. Released — Switch inoperative.
POWER switch	Two-position toggle switch: *Position* — *Function* OFF — Disconnects power from camera test adapter. ON — Applies power to camera test adapter.
Indicator assembly (upper)	Four-section indicator lamp assembly: *Portion* — *Function* OPR ON — Lights to indicate completion of camera operate circuits. FILM FAIL — Lights to indicate completion of film failure interlock switch circuit in camera body assembly to simulate film runout or breakage.

Table 3-3. Camera Test Adapter Controls and Indicators Continued

Control or indicator	Function
	Position — *Function*
	INTLK — Lights to indicate completion of +28 vdc input line between system simulator, camera test adapter, and camera body assembly.
	NIGHT — Lights to indicate completion of camera body assembly night relay circuit.
Indicator assembly (lower)	Four-section indicator lamp assembly:
	Position — *Function*
	SYNC — Lights each time autocycle vacuum and autocycle trip switch in camera body assembly are completed.
	FLASH — Lights momentarily for each camera cycle to indicate actuation of electronic flash switch in camera shutter assembly.
	DATA — Lights dimly during camera operation; momentarily lights brightly each time data trip switch in camera shutter assembly is completed for camera cycling. body operate-indicate switch in camera
	CYCLE — Lights to indicate completion of camera body operate-indicate switch in camera shutter assembly.
Power lamp	Lights to indicate application of power to camera test adapter.

Table 3-4. Camera Test Adapter Connectors

Connector	Function
J1 -	12-prong male connector; provides for connection o f camera test adapter to external +28 vdc power source.
J2	6-pin female connector; provides for connection of camera test adapter to a light sensor.
EXPOSURE J3	Binding post connector; provides a test point for measuring error input to exposure circuit in lens cone assembly under test.
- TACH J4	Binding post connector; provides test point for measuring negative tach (generator) output voltage,
COMMON J5	Binding post connector; provides common ground connection for auxiliary test equipment.
P1	16-pin female pendent connector; provides for connection of camera test adapter to shutter assembly.
P2	16-pin female pendent connector; provides for connection of camera test adapter to shutter assembly.
P3	28-prong male pendent connector; provides for connection of camera test adapter to system simulator.

3-3. Module rest Adapter Connectors

(fig. 1-5)

-Table 3-5 contains a listing of the module test adapter connectors. These connectors provide the operator of the equipment with module test facilities.

Table 3-5. Module Test Adapter Connectors

Connector	Function
AUXILIARY J1	Provides for connection of auxiliary printed circuit board module of Control, Power Supply LA-406A under test to module test adapter.
INTERVALOMETER J-2	Provides for connection of intervalometer printed circuit board module of -_ Control, Power Supply LA-406A under test to module test adapter.
FILM DRIVE 4MILYFIER J3	Provides for connection of film drive amplifier printed circuit board module of Control, Power Supply LA-406A under test to module test adapter.

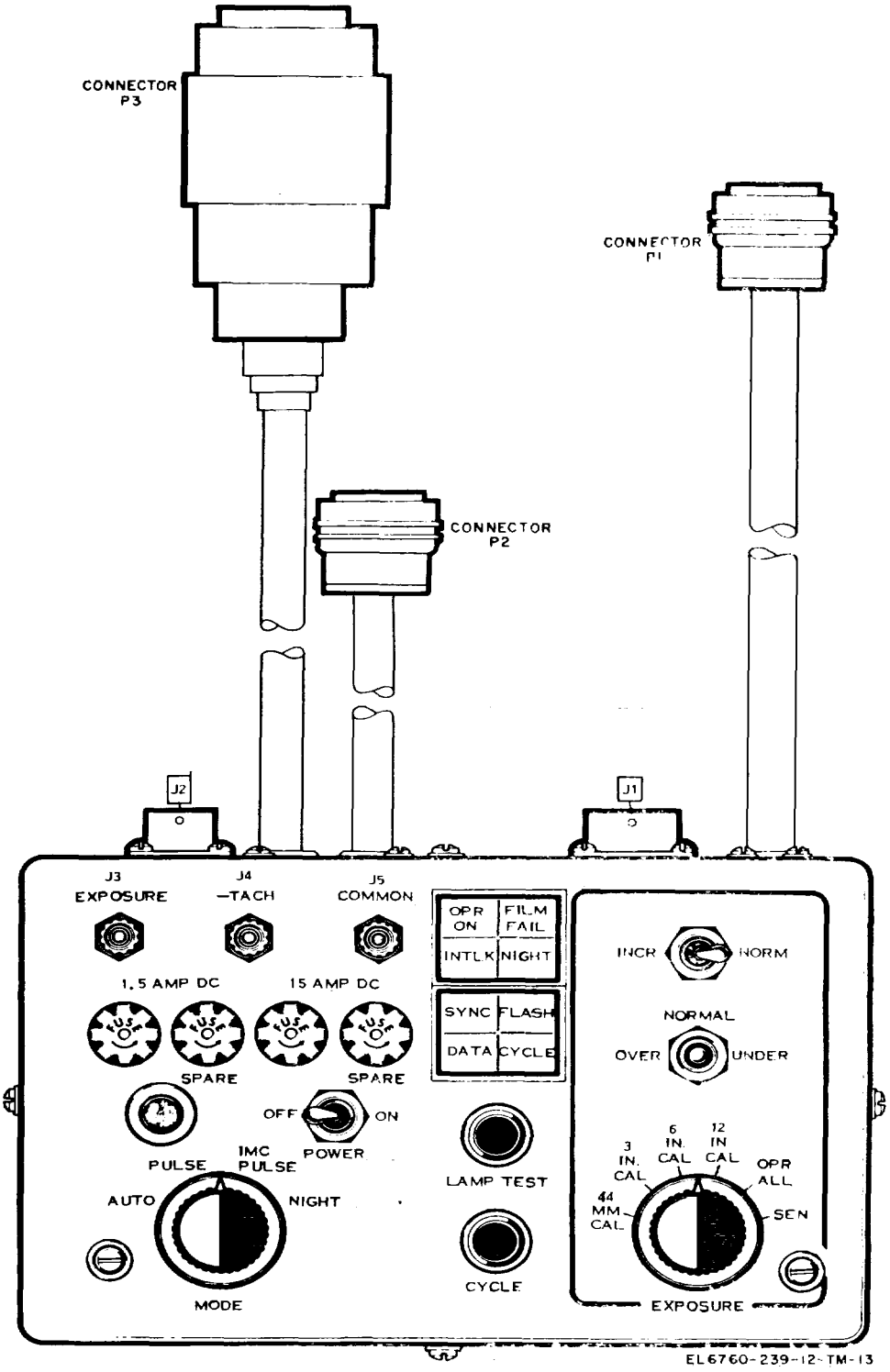

Figure 3-2. Camera test adaptet, controls, indicators, and connectors.

Section II. OPERATION UNDER USUAL CONDITIONS

3-4. Types of Operation

a. General. The camera analyzer performs an overall operational check on Control, Power Supply LA-406A (part of Photographic Surveillance Systems, Airborne KS-113A, KS-104A, and KS-104B); including separate functional checks of PC board and component module, intervalometer module, and film drive amplifier module. It is also used to test the major components of Camera, Still Picture KA-76A. The testing of Camera, Still Picture KA-76A as a complete unit is performed using the camera test adapter and associated test equipments (para 1-11). References are made to the basic equipment manuals for the performance of these tests. Preliminary operating procedures and procedures for checking the internal operation of the camera analyzer and camera test adapter are given in this section.

b. Test Performed. The tests performed by the camera analyzer and camera test adapter are listed below:

(1) Camera analyzer internal checks (para 3-b).
(2) Control, Power Supply LA-406A operational check; including separate functional checks of PC board and component module, intervalometer module, and film drive amplifier module.

NOTE

The procedures for testing Control, Power Supply LA-406A and its modules ((2) above) are contained in TM 11-6720-250-35.

(3) Lens cones assemblies (LA-370A, LA-371A, LA-372A, and LA-374).
(4) Lens cones assemblies calibration (LA-370A, LA-871A, LA-72A, or LA-74A).
(5) Lens cones assemblies controls (LA-870A, AL-371A, LA-372A, or LA-74A).
(6) Servo drive assembly (part of LA-870A, LA-871A, LA-372A, or LA-74A).
(7) S/C switch assembly (part of LA-70A, LA-371A, LA-372A, or LA-374A).
(8) Light Sensor, Aircraft Camera LA-407A.
(9) Body Drive, Aircraft Camera LA373A.
(10) Right chassis and components assembly (part of Body Drive, Aircraft Camera LA-373A).
(11) Left chassis and components assemble (part of Body Drive, Aircraft Camera LA-373A).
(12) Camera, Still Picture KA-76A (complete).
(13)

NOTE

The procedures for testing the major components of the camera and the completely assembled camera ((3) thru (12) above) are contained in TM 11-6720-236-35.

3-5. Camera Analyzer Preliminary Procedures

The following procedures are used to check the internal operation of the camera analyzer test panel prior to use. After making the connections (a below), perform the internal checks (b below).

NOTE

Before performing this procedure, make sure that all test panel switches and controls are set to their off or extreme counterclockwise positions.

a. *Connections* (fig. 34).
(1) Connect power cable W9 to primary power source and to POWER connector J1 of camera analyzer test panel.
(2) Connect multimeter to VOM + and - terminals on camera analyzer test panel. Set multimeter to indicate negative voltage.
(3) Connect vtvm to DC VOLTS INPUT and GRD terminals on camera analyzer test panel.
(4) Connect the digital timer to the camera analyzer test panel as follows:
(a) Using clip lead, connect center conductor of input A of digital timer to SCOPE VERT terminal.
(b) Using adapter (part No. 1269), connect input B of digital timer to PULSE TIMER PULSE and GRD terminals.
b. *Internal Checks* (fig. 3-3).
(1) Set the POWER switch to ON; the AC PWR and DC PWR indicators should light.
(2) Set the LAMP TEST switch to ON; all remaining indicators should light.

(3) Set the MASTER switch to INTERNAL TEST 1; the COUNTER INTVL, VOM DC, DECR LIM, and DC VOLTS indicators should light, the multimeter should indicate -20 to -30 volts dc and the vtvm should indicate -3.34 volts Ic ±0.01.

(4) Set the CYCLE. PULSE switch to MANUAL momentarily, the digital timer should indicate 10 to 15 milliseconds.

(5) Set E V/H control to 25. (See Note 1 below.)

(6) Set the MASTER switch INTERNAL TEST 2; the DC VOLTS indicator should light, the vtvm should indicate the setting of the EV/H control. With the E V/H control set to 25, the vtvm should indicate 25 volts de +0.1.

(7) Set the POWER switch to OFF; all indicators should extinguish.

(8) Disconnect the internal check setup.

NOTES

1. The E V/H control is adjustable from 0 to 50 volts. Five complete revolutions of the control sets the camera analyzer E V/H for 50 volts and is indicated by the numeral 5 appearing at the window directly above the control. For example, to set the camera analyzer E V/H for 25 volts, as stated in b(5) above, rotate the control 2 complete revolutions (indicated by the numeral 2 appearing at the control window); then rotate the control to the 50 position on the control dial.
2. The EXP SIGNAL FOOT-LAMBERTS control is operated in a manner similar to that of the E V/H control. Each complete revolution of the control is indicated from 1 through 9 on the window directly above the control. The following are examples of the use of EXP SIGNAL FOOT-LAMBERTS control.

a. To set the camera analyzer for a simulated light current range of 55 foot lamberts, proceed as follows:
(1) Set the EXP SIGNAL RANGE switch to 100.
(2) Rotate the control 5 complete revolutions (indicated by the numeral 5 appearing at the window above the control).
(3) Rotate the control to the 50 position on the control dial.

b. To set the camera analyzer for a simulated light current range of 6500 foot-lamberts, proceed as follows:
(1) Set the EXP SIGNAL RANGE switch to 10,000.
(2) Rotate the control 6 complete

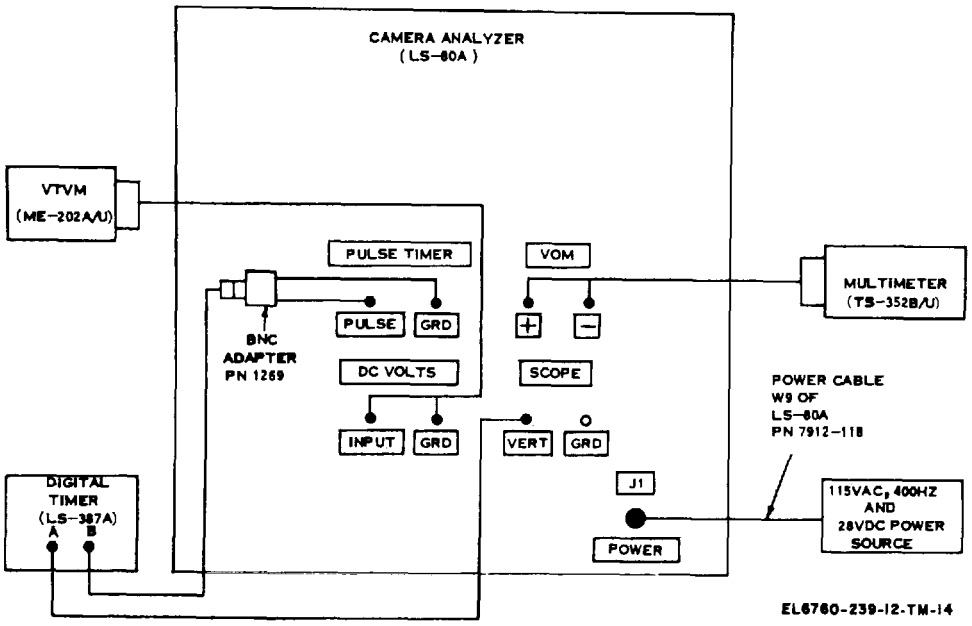

Figure 3-3. Camera analyzer, internal check setup

revolutions (indicated by the numeral 6 appearing at the window above the control).

(3) Rotate the control to the 50 position on the control dial.

3-6. Camera Test Adapter Preliminary Procedures

NOTE

The camera test adapter is used independently from the camera analyzer to check the completely assembled camera.

The following procedures are used to check internal op

NOTE

Before performing this procedure, make sure that all camera test adapter test switches are set to their off or extreme counterclockwise positions.

a. Connect power cable W9 to a 28-volt dc power source and to connector J1 on camera test adapter.

b. Set POWER switch to ON; power lamps should light.

c. Depress and hold LAMP TES'' pushbutton switch; all indicator lamps should light.

d. Release LAMP TEST pushbutton switch; all indicator lamps should go out.

3-7. Operating Procedure

Refer to TM 11-6720-236-3, and TM 11-6720-250-35 for performance of the tests listed in paragraph 3-4.

3-8. Stopping Procedures

a. Camera Analyzer.

(1) Set the camera analyzer POWER switch (PANEL POWER section) (fig. 3-1) tot OFF.

(2) Disconnect all cables from the test panel and units under test.

(3) Replace special tools (if used) in the tool storage box.

(4) Loosen the twistlock fasteners and open the hinged door on the storage compartment in the combination case. Remove the retaining cushion. Stow all cables and accessories in the cutouts in the compartmented cushion, and replace the retaining cushion. Close and secure the hinged door.

(5) Place the technical manuals in the pocket on the hinged door.

(6) Install the top of the combination case on the bottom by engaging the separable hinges and sliding the top to the left; then secure the snap latches.

(7) Turn the air relief valve to CLOSE.

b. Camera Test Adapter.

(1) Set the camera test adapter POWER switch to OFF.

(2) Disconnect all cables from the camera test adapter.

(3) Store the cone shutter and body shutter test cables, and the camera test adapter in their respective compartments in the combination case for the camera analyzer.

Section III. OPERATION UNDER UNDER UNUSUAL CONDITIONS

3-9. Operation in Arctic Areas

The equipment will operate properly at temperatures as low as 590 F (15° C), and may be stored at temperatures as low as -20° F (-29° C).

a. Equipment operated at low temperature should be kept in low-temperature storage when not in use. Store the equipment in the combination case for the LS-80A at, or near, the temperature at which it will be used. When the camera analyzer or the camera test adapter is to be used at a temperature higher than 300 F (16° C) above the storage temperature, follow the procedures given below before attempting to operate the equipment.

(1) Transfer the equipment from the cold to the warm location, and allow it to remain in the combination case covered with water-repellent material for 6 hours.

(2) Before operating the equipment, use a lint free cloth to remove any moisture that has condensed on the outer surface.

b. When the equipment is to be operated at: freezing temperatures, follow the given procedures below before operating the equipment.

(1) Keep the equipment in low-temperatule storage when not in use.

(2) Before operating the equipment, use a lint free cloth to remove any moisture that has condensed on the outer surface.

3-10. Operation in Desert and Tropical Areas

When the equipment is used in extreme heat and humidity such as desert and tropical regions, observe the following precautions:

a. Desert Regions.. Before using the equipment in desert regions, remove all external sand and dust with a camel's-hair brush. Store the equipment in the combination case when not in use.

b. Tropical Region). In climates of high humidity such as the tropics, inspect the equipment daily for fungus, mold, insects, and metallic corrosion. Remove all fouling immediately. Store the equipment in the combination case when not in use; place the required number of activated desiccant units (SB 38-106) and a humidity indicator inside the combination case.

3-11. Operation in Maritime, High. Altitude, or Rainy Areas

To prevent corrosion from salt-laden air or salt water spray, and rust caused by condensation w-hen the equipment is stored, wipe all exposed metal surfaces with a soft, clean, lint free cloth moistened with lubricating oil, general purpose, FED VV-L-800 (FSN 9150-273-2389). To avoid condensation, transfer the equipment from cold to warmer temperatures by gradual stages. Pack the equipment in its compartment in the combination case. Check the condition of the equipment before and after each operation; clean all accessible parts "without disassembling any major components. When storing equipment, pack it in the combination case and cover the combination case with water-repellent material (SB 38-100).

CHAPTER 4
MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S MAINTENANCE

4-1. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of the camera analyzer and camera test adapter are listed below with references to the paragraphs for the particular maintenance function. Primarily, the duties are limited to visual inspection, cleaning, and replacement of fuses.

a. Daily preventive maintenance inspections and services (para 4-4).

b. Weekly preventive maintenance inspections and services (para 4-4).

c. Cleaning (para 4-5).

d. Visual inspection (para 4-6).

e. Fuse replacement (para 4-7).

4-2. Materials Required for Operator's Maintenance

a. Trichloroethane FSN 6810-664-0273 (cleaning compound).

b. Lint free cloth (FSN 8305-170-5062).

c. Camel's-hair brush (FSN 8020-246-8806).

d. Fungus removal solution (mixture of Iso-propyl alcohol 65%o and Freon 35%o) (FSN 6850-133-0695).

e. Sandpaper, fine (FSN 5350-235-0124).

4-3. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to prevent downtime, and to insure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 4-4 through 4-7 cover routine systematic care and cleaning essential to the proper upkeep and operation of the camera analyzer.

b. Preventive Maintenance Checks and service. The preventive maintenance checks and services (tables 4-1 and 4-2) outline functions to be performed at specific intervals. The checks and services are to maintain Army photographic equipment in a combat serviceable condition; that is, in good general (physical) and operating condition. If a defect cannot be corrected by the operator, higher category of maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements of TM 38-750.

c. Preventive Maintenance Checks and Services Periods. Preventive maintenance checks and services on the camera analyzer are required daily and weekly. Table 4-1 specifies the checks and services that must be accomplished daily. The first column lists the interval and sequence that a particular check or service is required. This column is subdivided into three columns: B (Before operation), D (During operation); and A (After operation). The second column lists the item to be inspected and the procedure. The third column (Worktime (M/H)) lists the man-hours it should take the operator to perform the check or service. This time is expressed in tenths of hours. Table 4-2 specifies the checks and services that must be accomplished weekly.

4-4. Operator's Preventive Maintenance Checks and Services

a. Daily. Perform the preventive maintenance checks and services listed in table 4-1. If the equipment is not used daily, make sure these checks and services are performed prior to use.

b. Weekly. Perform the preventive maintenance checks and services listed in table 4-2. Equipment in limited storage (requires service before operation) does not require weekly maintenance.

Table 4-1. Operator/Crew Daily Preventive Maintenance Checks and Services

B-Before Operation Time required: 0.3 | D-During Operation Time required: 0.2 | A-After Operation Time required: 0.1

ITEM NO.	INTERVAL B	INTERVAL D	INTERVAL A	Item to be inspected procedure Procedure	Work-time (M/H)
				Note. Perform the following checks and services daily only if the equipment is being used. If the equipment is not used daily, perform these checks and services only when used. Do not allow the equipment to go beyond 1 week without performing both the daily and weekly preventive maintenance checks and services.	
1				CAMERA ANALYZER Remove dirt and moisture from exposed surfaces of combination case, test panel, test 0.2 fixtures, tools, interconnecting plugs, and cables (para 4-5).	0.2
2				TEST PANEL (KNOBS, SWITCHES, CONNECTIONS, AND INDICATOR ASSEMBLIES) Visually inspect exterior items for damage. Inspect each control and switch for tight-ness. Replace setscrews that require frequent tightening (para 4-6).	0.05
3				TEST PANEL CONTROLS Inspect each control on test panel and camera test adapter for binding or scraping. Tap controls lightly for cutout due to loose contacts. See that action is positive without binding or scraping (para 4-6).	0.05
	4			OPERATION Perform equipment preliminary operating procedures given in paragraphs 3-5 and 3-6. Be alert for any unusual performance or conditions.	0.2
			5	COMPLETENESS See that all components and accessories are stowed in their compartments after use (para 1-8).	0.1

Table 4-2. Operator/Crew Weekly Preventive Maintenance Checks and Services

W-Weekly
Time required: 0.4

Sequence no.	Item to be Inspected Procedure	Word-time (M/H)
1	TEST SET CABLES AND WIRING Visually inspect cables and internal wiring for breaks, cuts, kinks, deterioration, strain, or fraying (para 4-6).	0.1
2	FUSES AND CONNECTORS Inspect fuses; check connectors for snug fit and good contact	0.05
3	INDICATOR ASSEMBLIES Perform preliminary operating procedures (para 3-5 and 3-6). See that each indicator assembly is operating properly.	0.2
4	EXPOSED METAL SURFACES Inspect metal surfaces for any signs of rust and corrosion	0.05

4-5. Cleaning

Trichloroethane is not flammable, but exposure of the fumes to an open flame

a. Brush dirt and dust from the exterior surfaces of the test panel with a camel's-hair brush

used. Do NOT use near an open flame.

converts the fumes to highly toxic dan-
and a clean, lint free cloth.
gerous gases.
b. If any mildew or fungus is present, moisten
a clean, lint free cloth in the fungus removal solu-
tion (para 4-2d) and rub the area until the
ened (not wet) with trichloroethane.
fungus is removed. Dry the area with a dry,
clean, lint free cloth.
WARNING
The fumes of trichloroethane are toxic.
Provide thorough ventilation whenever

c. Remove and ground-sn dirt from the
carrying case and components; use a cloth damp-

d. Remove dust or dirt from plugs and connec-
tors with a brush.
e. Remove rust and corrosion from metal sur-
faces by lightly sanding them with fine sand-

paper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TB 746-10.

4-6. Operator's Visual Inspection

a. When the camera analyzer or camera test adapter fails to perform properly, turn off the power and check the items listed below.

WARNING

Do not check any items with power on.

(1) Wrong settings of switches or controls.
(2) Cables that are disconnected or poorly connected.
(3) Defective fuses.

b. If the above checks do not locate the trouble, refer the equipment to higher category of maintenance.

4-7. Fuse Replacement

CAUTION

Use fuses of the specified rating. Use of fuses of a higher rating may result in damage to the equipment.

Operating fuses for the camera analyzer are located in the PANEL POWER section of the test panel for the ac and dc power circuits. Operating fuses for the camera test adapter are located on the front panel for the dc circuits. Spare fuses are in the fuse holders marked SPARE. If spare fuses are used, replace them as soon as possible. Replace a defective fuse as follows:

a. Turn the fuse holder cap counterclockwise and pull it out of the holder.

b. Remove the defective fuse from the cap and replace it with a new one.

c. Place the fuse holder cap on the fuse holder and turn it clockwise until it is firmly seated.

Section II. ORGANIZATION MAINTENANCE

4-8. Scope of Organizational Maintenance

Organizational maintenance of the camera analyzer and the camera test adapter consists of the following:

a. Monthly preventive maintenance checks and services (table 4-3).

b. Quarterly preventive maintenance checks and services (table 4-4).

c. Visual inspection (para 4-12).

d. Troubleshooting (para 4-13).

e. Replacement of indicator assembly bulbs (para 4-14).

f. Checking cable continuity (para 4-15).

4-9. Tools, Materials, and Test Equipment Required for Organizational Maintenance

The tools, materials, and test equipment required for organizational maintenance are listed below.

a. Tools. Tool Kit, Photographic Repair TK-77,/GF is required for organizational maintenance of the camera analyzer and camera test adapter.

b. Materials. The materials required for organizational maintenance are the same as those for operator's maintenance (para 4-2).

c. Test Equipnment. The only test equipment required is Multimeter AN/URM-105.

4-10. Organizational Preventive Maintenance

Preventive maintenance checks at the organizational level are made monthly and quarterly unless directed otherwise by the commanding officer. Table 4-3 specifies the monthly preventive maintenance checks and services. Table 4-4 specifies the quarterly preventive maintenance checks and services. Additional preventive maintenance information is contained in paragraph 4-4.

Table 4-3. Organizational Monthly Preventive Maintenance Checks and Services

M-Monthly
Total man-hours required: 0.65

Sequence no.	Item to be Inspected Procedure	Word-time (M/H)
1	COMBINATION CASE Check handles, latches, and hinges for signs of damage. See that all attaching hardware is secured to its fittings. Items not readily repairable with tools allocated to the organizational repairman should be referred to high category of maintenance (para 4-12).	0.1

Figure 4-3. Organizational Monthly Preventive Maintenance Checks and Services-Continued

Sequence no.	Item to be Inspected Procedure	Word-time (M/H)
2	GASKET Check gasket on combination case for worn or loose edges. Secure or replace loose or worn gasket.	0.1
3	TEST PANEL CONNECTORS Check connectors for signs of damage such as bent pins, and dented or deformed casings. Refer damaged connectors to higher category of maintenance (para 4-12).	0.1
4	CAMERA TEST ADAPTER Inspect camera test adapter indicator assemblies, connectors, controls, cables, fuses, etc. Replace damaged items or refer to higher category of maintenance. Perform operational check (para 3-6).	0.1
5	MODULE TEST ADAPTER Inspect overall module test adapter for signs of damage. Check module receptacles for dirt, fungus, or obstruction (para 4-5). Check cable and wiring for cuts, frayed insulation, or kinks.	0.2
6	TOOL STORAGE BOX AND TOOLS Check contents of tool storage box for completeness (para 1-8). Inspect condition of tools. Replace damaged tools.	0.5

Table 4-4. Organizational Quarterly Preventive Maintenance Checks and Services

Q-Quarterly
Time required: 1.5 man-hours

Sequence no.	Item to be Inspected Procedure	Word-time (M/H)
1	INTERIOR OR CHASSIS AND COMBINATION CASE Clean interior of chassis and combination case (para 4-5)	0.2
2	PLUCKOUT ITEMS Inspect seating of readily accessible items of a pluckout nature; connectors, lamps, plug-in relays, etc. Do not twist to inspect. Use only direct pressure to insure item is fully seated (para 4-12).	0.1
3	RESISTORS AND CAPACITORS Inspect resistors and capacitors for cracks, blistering, or other obvious defects	0.1
4	DIODES AND TRANSISTORS Inspect diodes and transistors for loose connections and other obvious defects	0.1
5	SWITCHES AND CONTROLS Inspect switches and controls for smooth operation and alignment of positions (para 4-12).	0.1
6	PRESERVATION Check all surfaces for evidence of fungus. Remove rust and corrosion and touchup-paint bare spots (para 4-11).	0.3
7	CABLES Check cables for continuity (para 4-15)	0.2
8	PUBLICATIONS Check DA Pam 310-4 to see that all publications are current, complete, and serviceable.	0.2
9	MODIFICATIONS Check DA Pam 310-7 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	0.2

4-11. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TB 746-10.

Section III. TROUBLESHOOTING

4-12. Visual Inspection

Before operating the equipment, inspect it. Inspection will save repair time and may also avoid further damage to the equipment. Inspect the equipment for the following defects:

a. Broken cable connectors.

b. Breaks, cuts, or fraying on the cable assemblies.

c. Loose or broken wires on terminal boards.

d. Damaged connectors on module test adapter.

e. Broken knobs, switches, or controls on test panel and camera test adapter.

f. Broken handles, latches, or other damaged hardware items.

NOTE

If the above checks do not locate the trouble, proceed to the troubleshooting procedures (para 4-13).

4-13. Troubleshooting Procedures

The troubleshooting procedures contained in tables 4-5 and 4-6 provide a procedure for systematically checking equipment performance. All corrective actions that the organizational repairman can perform are in the Corrective action column. Tables 4-5 and 4-6 list the most common faults the organizational repairman will encounter. This listing of malfunctions assumes that power is connected to the camera analyzer and the cables are properly connected (para 3-5). If the corrective actions do not correct the defect, troubleshooting is required by higher category of maintenance personnel. Note on the repair tag how the equipment performed and the corrective actions that were taken.

Table 4-5. Camera Analyzer Troubleshooting

Malfunction	Probable cause	Corrective action
AC PWR and DC PWR indicators do not light.	a. Defective lamps ..... b. Defective fuses ..... c. Defective power cable W9	a. Replace lamps (para 3-14). b. Replace fuses (para 4-7). c. Check continuity on power cable W9. If defective, refer to higher category of maintenance.
With LAMP TEST switch in MASTER section set to ON, Lamp(s) do not light. Note. AC PWR and DC PWR do not light when LAMP TEST switeb s met to ON.	Defective lamp(s) in indicator assembly.	Replace faulty lamp(s) in indicator assembly.
With MASTER switch set to INTERNAL TEST 1, COUNTER, INTVL, VOM DC, and DC VOLTS indicators do not light.	a. Defective lamp(s) ..... d Defective fuses ..... c. Defective power cable W9.....	a. Replace lamp(s) (para 4-14). b. Replace fuses (para 4-7). c. Check continuity on power cable W9. If defective, refer to higher category of maintenance.

Table 4-6. Camera Test Adapter Troubleshooting

Malfunction	Probable cause	Corrective action
Power Indicator does not light	a. Defective lamp ..... b. Defective dc fuse ..... c. Defective power cable W9.....	a. Replace lamp (para 4-14). b. Replace fuse (para 4-7). c. Check continuity on power cable W9. If defective, refer to higher category of maintenance.
With LAMP TEST pushbutton depressed, lamp(s) do not light.	a. Defective lamp(s) ..... b. Defective fuses ..... c. Defective power cable W9	a. Replace lamp(s) (para 4-14). b. Replace fuses (para 4-7). c . Check continuity on power cable W9. If defective, refer to higher category of maintenance.

4-14. Replacement of Indicator Assembly Bulbs

(fig. 4-1)

To replace a defective indicator assembly bulb, proceed as follows:

a. Insert fingernails under lens guard and remove guard.

b. Insert fingernails in cutout in lens, and pull lens away from indicator body.

c. Rotate lens 90° counterclockwise, push in slightly to remove tension on index key, and pull complete bulb assembly from indicator body.

d. Pull the defective bulb from its socket with the fingernails; be careful not to loosen the silicone rubber boot over the bulb.

e. Slip new bulb into socket.

f. Insert bulb assembly so that bulb board slot is aligned with index.

g. Rotate lens assembly 90° clockwise with slight inward pressure to reset index key.

h. Push lens back in indicator body.

i. Replace lens guard.

4-15. Checking Cable Continuity

Defective equipment cables will be indicated when it is apparent that power is not being applied to the camera analyzer or camera test adapter, or when it is apparent that signals and volt-ages are not being interconnected between the test equipment and the equipment under test. Check the continuity of the suspected cable with Multimeter AN/URM-105. Figures 4-2 through 4-12 are wiring diagrams of the cables and should be used as guides when checking continuity. If an open circuit is indicated during continuity checking, the wiring is defective. Replace the defective cable and forward the defective cable to a higher category of maintenance.

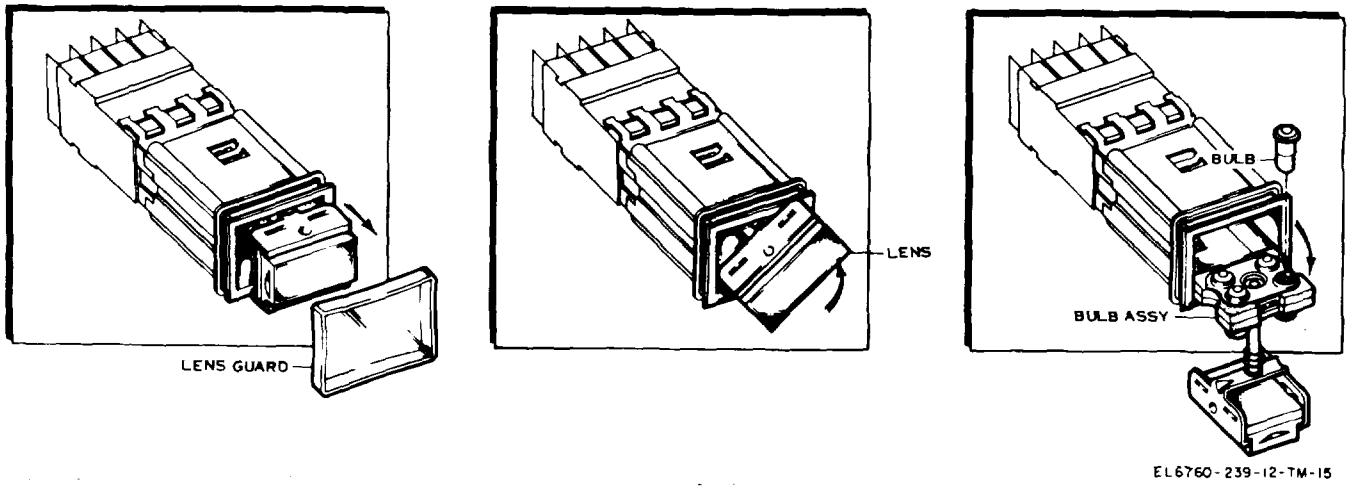

Figure 4-1. Removal and replacement of bulbs in multiple-section indicators

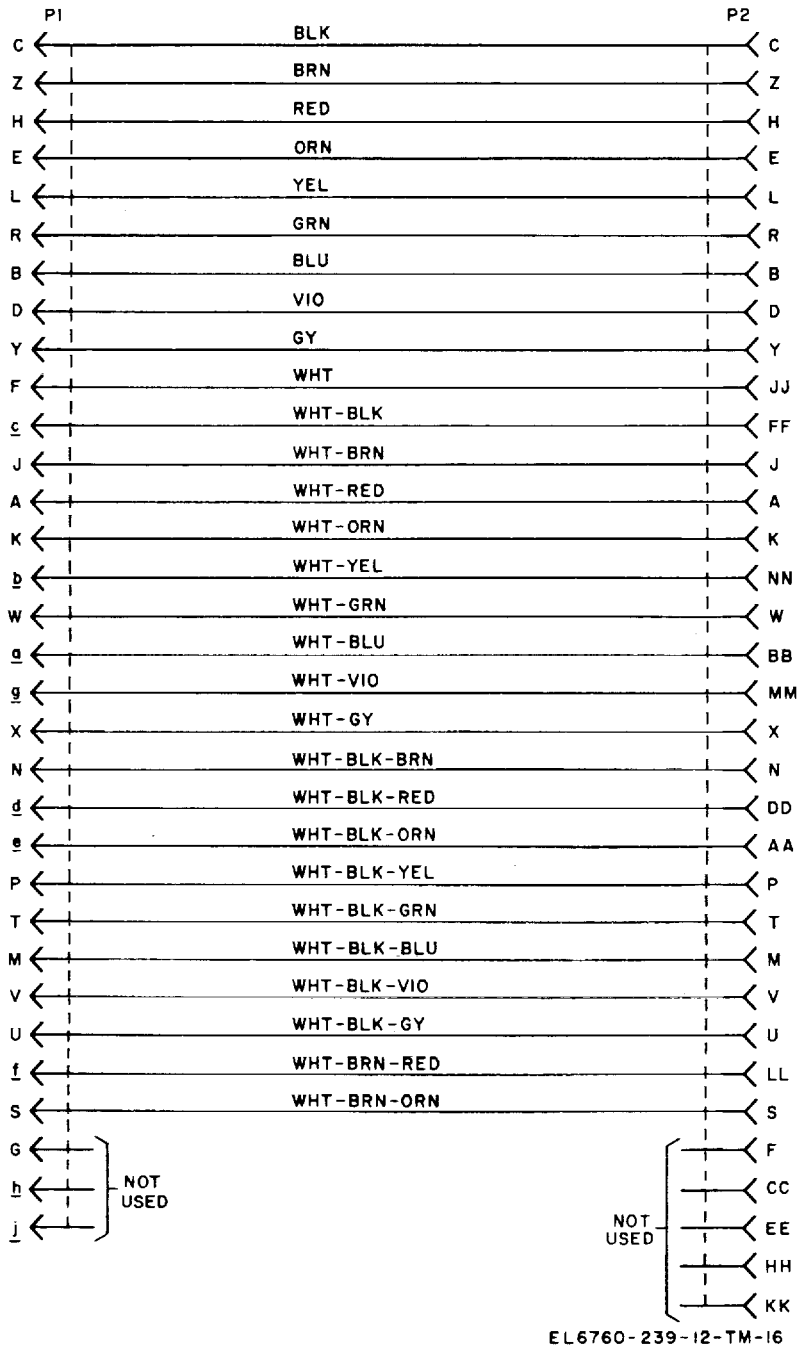

Figure 4-2. Test cable W1, wiring diagram.

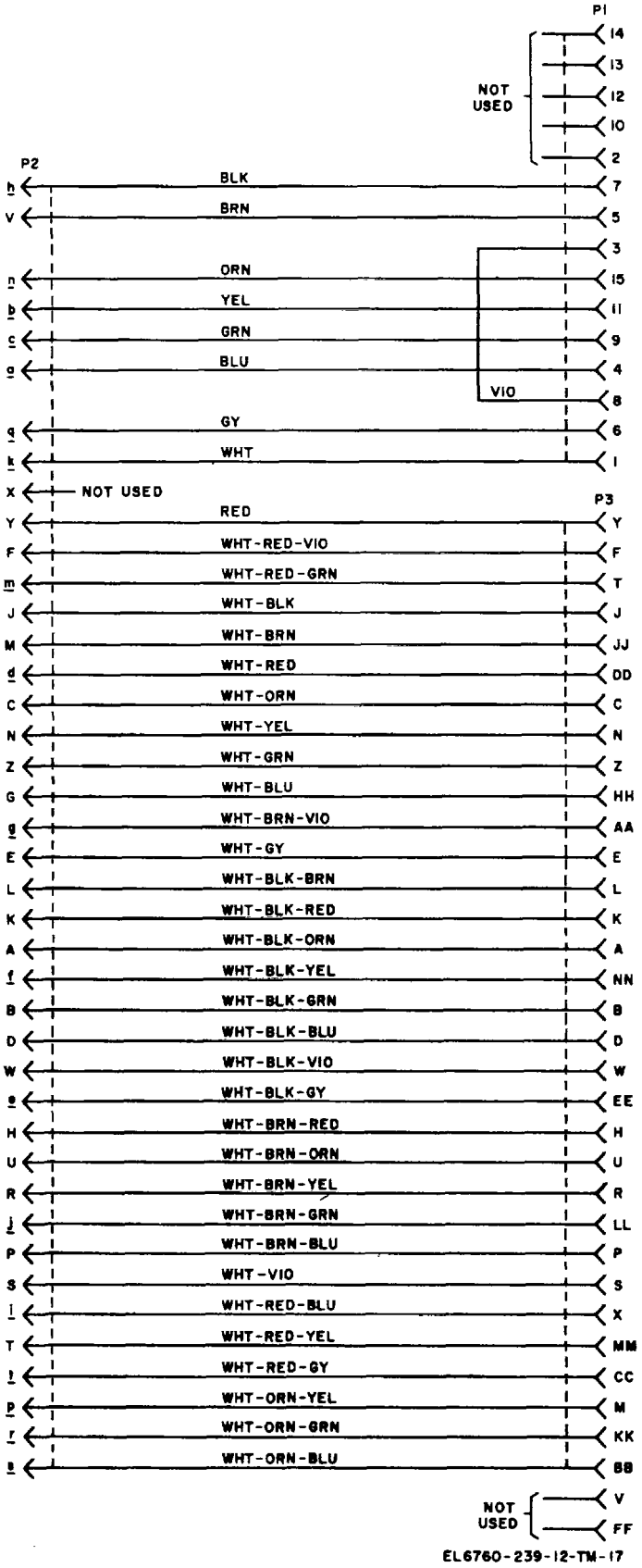

Figure 4-3. Test cable W2, wiring diagram

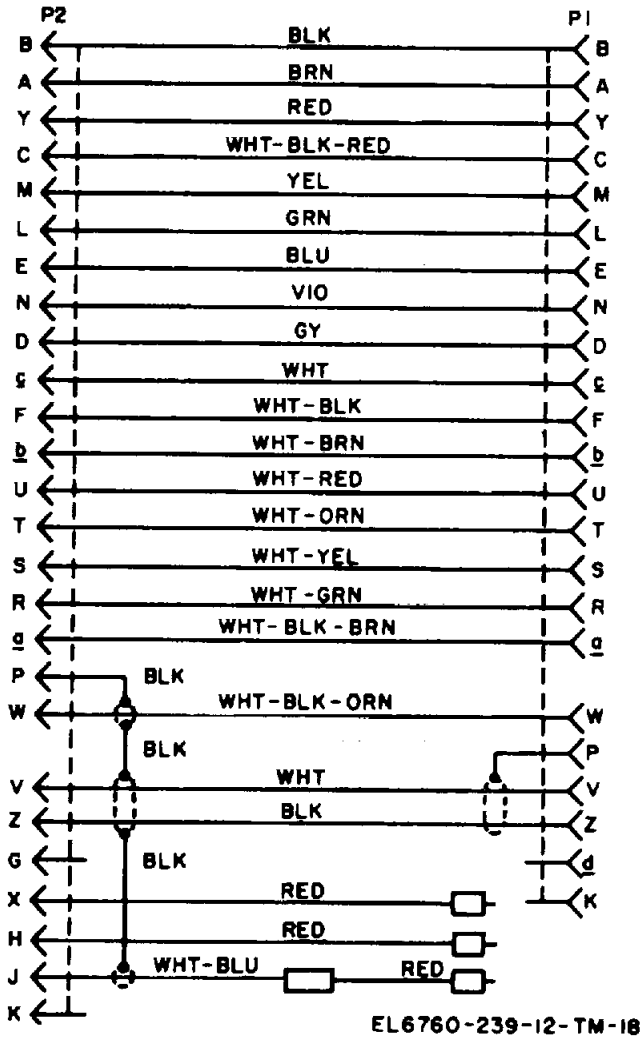

Figure 4-4. Test cable W3, wiring diagram

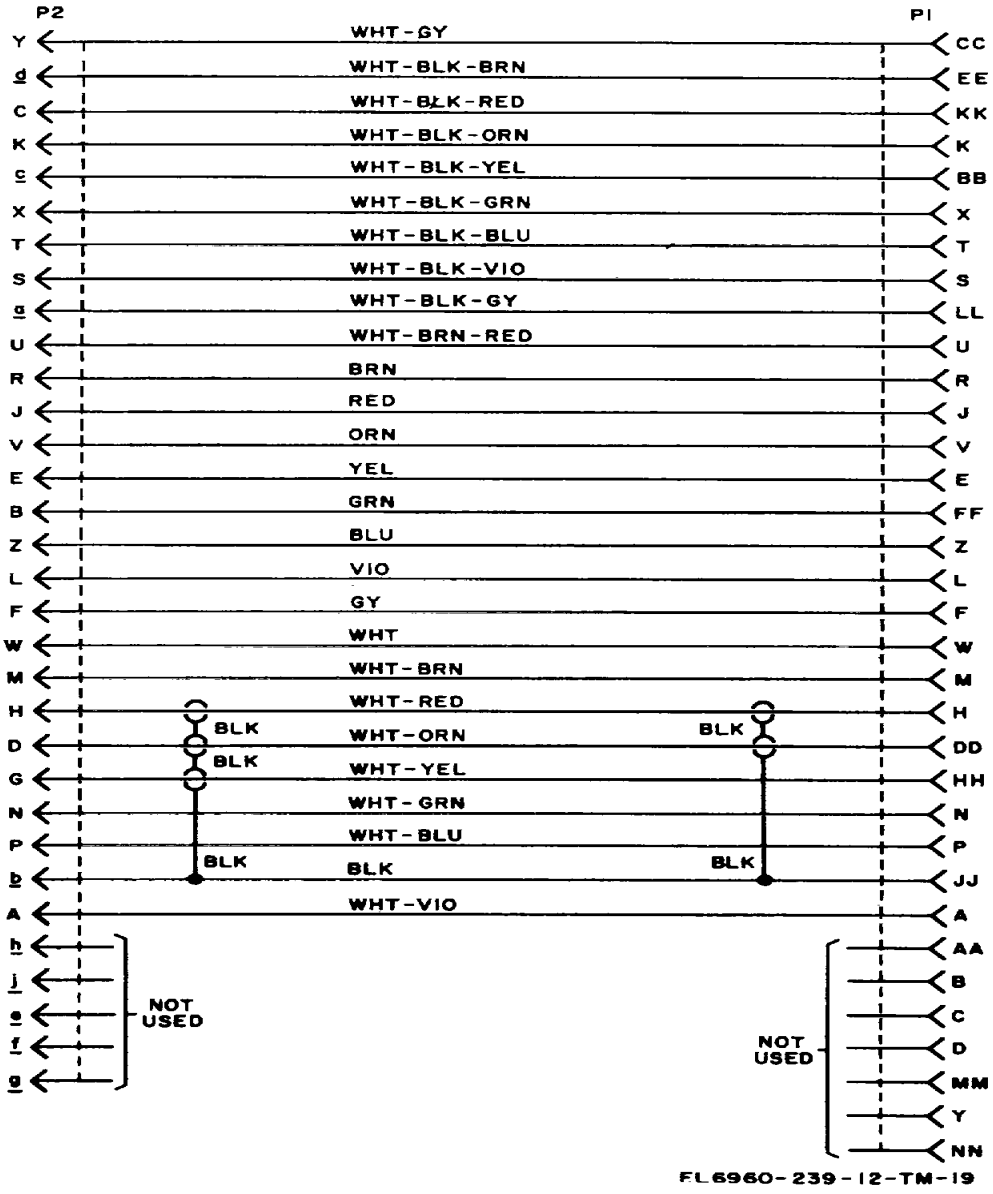

Figure 4-5. Test cable W4, wiring diagram

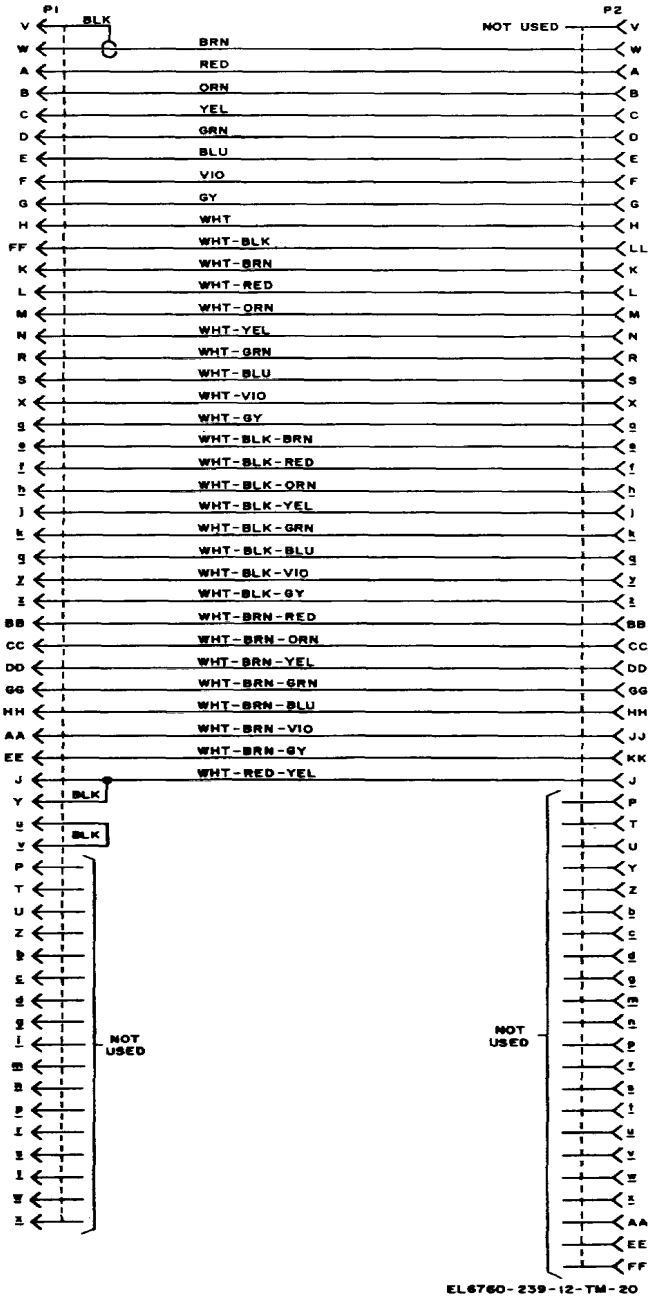

Figure 4-6. Test cable W5, wiring diagram

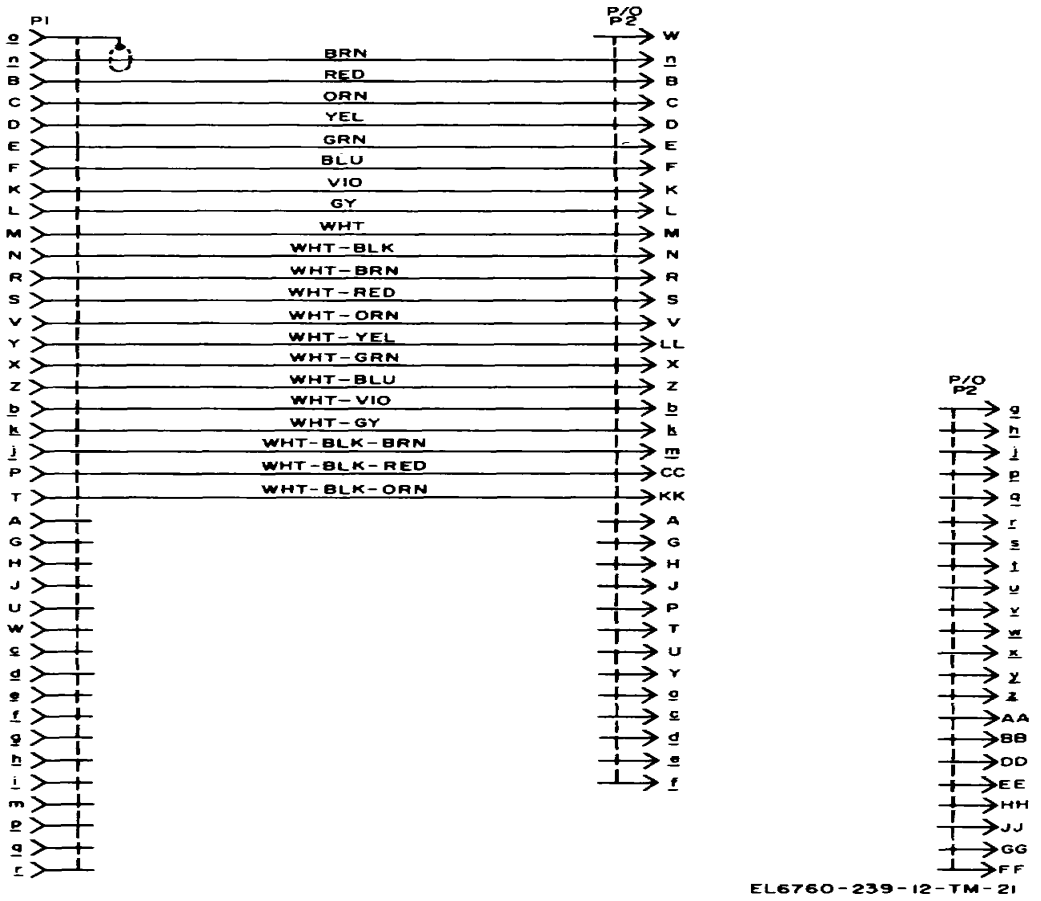

Figure 4-7. Test cable W6, wiring diagram

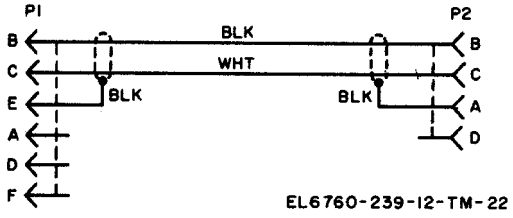

Figure 4-8. Test cable W7, wiring diagram

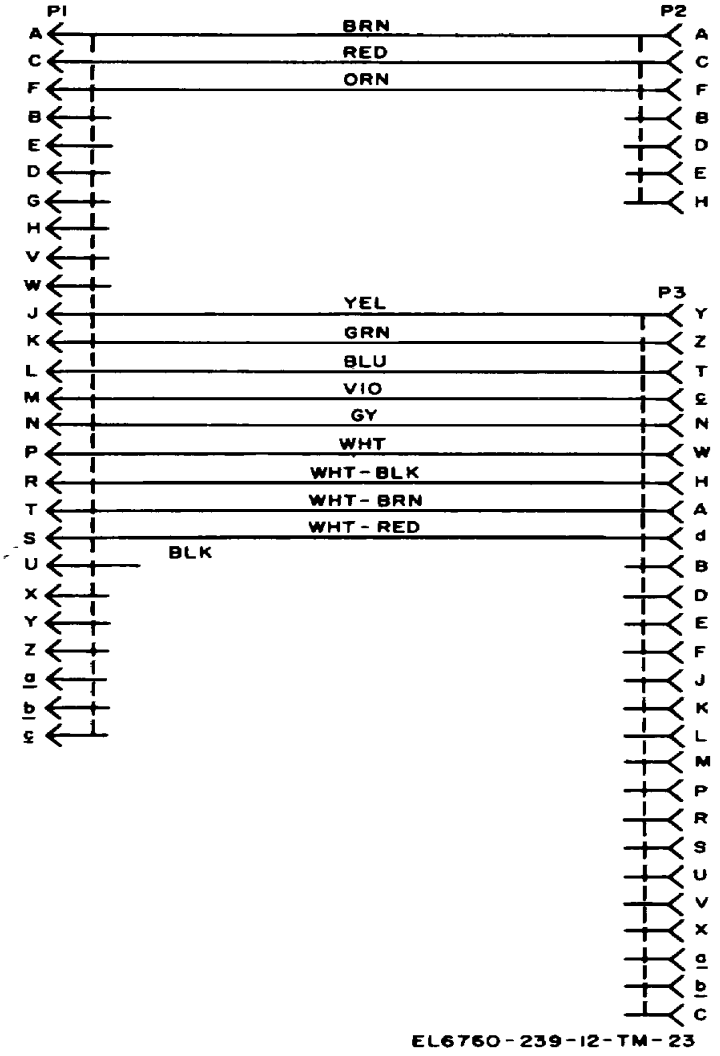

Figure 4-9. Test cable W8, wiring diagram

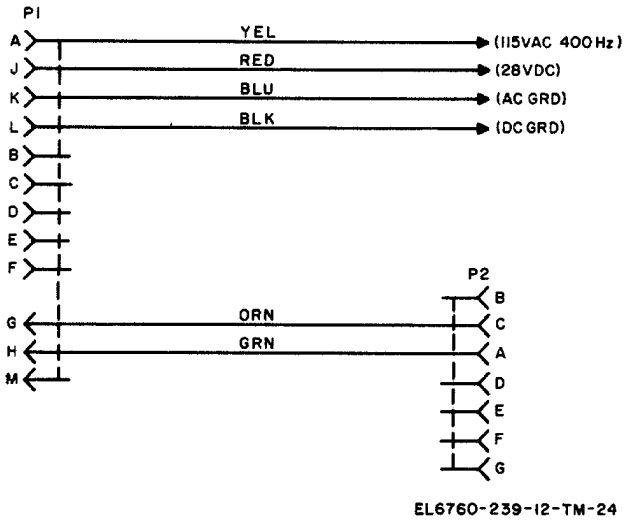

Figure 4-10. Power cable W9, wiring diagram

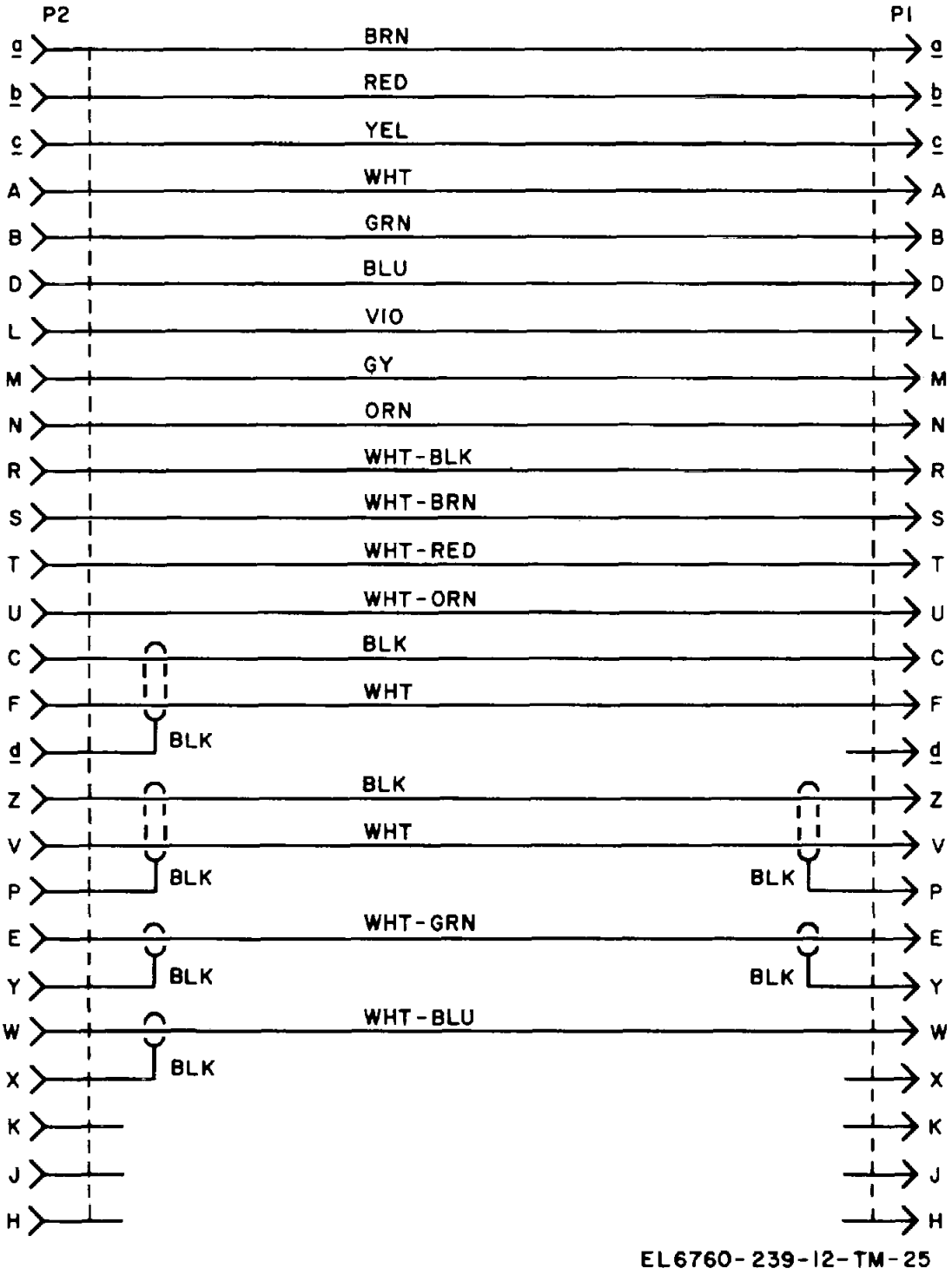

Figure 4-11. Cone shutter test cable, wiring diagram.

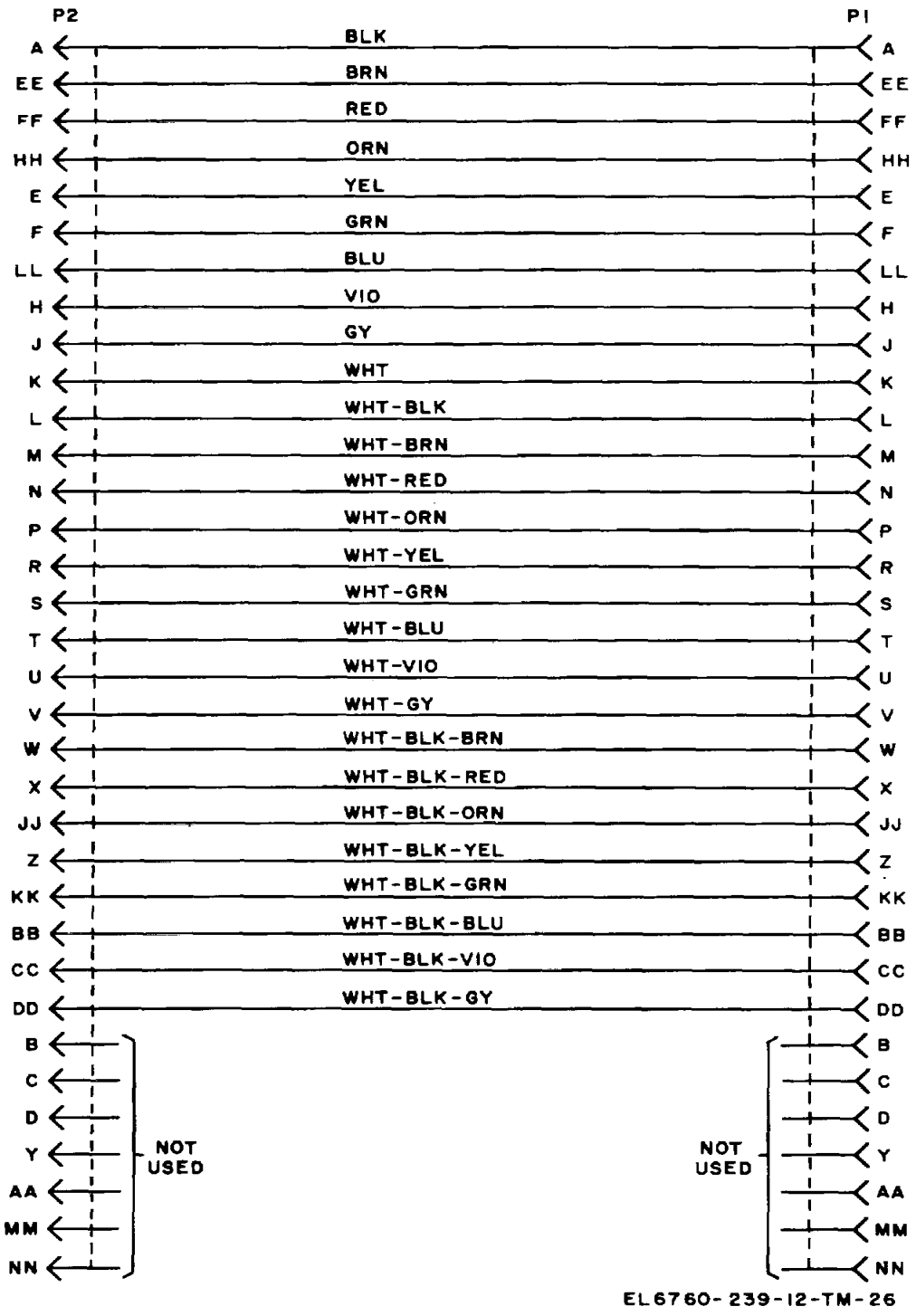

Figure 4-12. Body shutter test cable, wiring diagram.

CHAPTER 5
SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

5-1. Disassembly of Equipment

Prepare the equipment for shipment and storage as follows:

a. Disconnect all cables from the camera analyzer.

b. Disconnect all cables from the camera test adapter and disconnect its pendent cable connectors from the external equipment.

c. Place the special tools in the tool storage box.

d. Place the camera test adapter, cables, and accessories in the storage compartments in the combination case.

e. Close the hinged door and secure the twist-lock fasteners.

f. Inclose the technical manual in an envelope of waterproof paper and seal it with waterproof tape.

g. Place the packaged technical manuals in the combination case.

h. Place the required number of activated desiccant units (SB 38-100) in the case with an activated humidity indicator.

i. Install the combination case top on the bottom by engaging the separable hinges. Close the combination case and secure the snap latches.

j. Turn the air relief valves to CLOSE, and secure with a lock wire.

5-2. Repacking for Shipment or Limited Storage

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored.

a. Material Requirements for Camera Analyzer. The following materials are required for packaging the camera analyzer. For stock numbers of the materials, consult SB 38-100.

Material	*Quantity*
Waterproof tape	13 ft
Corrugated cardboard carton	7.5 cubic feet
Gummed tape	As required
Shock pads	8

b. Material Requirements for Camera Test Adapter. The following materials are required for packaging the camera test adapter. For stock numbers of the materials, consult SB 38-100.

Material	*Quantity*
Waterproof tape	13 ft
Corrugated cardboard carton	0.65 cubic foot
Gummed tape	As required

NOTE

The above material requirements for the camera adapter are required only when the unit is to be shipped or stored independently from the camera analyzer. Normally, it is stored in the sectionalized compartment of the analyzer combination case.

c. Packaging and Packing.

d.

(1) Check to be sure the procedures in paragraph 5-1 have been performed.

(2) Cushion all surfaces of the camera analyzer with pads of filler material.

(3) Wrap the cushioned camera analyzer with waterproof paper and seal with waterproof tape.

(4) Place the wrapped camera analyzer in the corrugated cardboard carton and seal with gummed tape.

Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

5-3. Authority for Demolition

Use the demolition procedures given in paragraph 5-4 to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.

5-4. Methods of Destruction

Any or all of the methods of destruction given below may be used. The time available will be the major determining factor for the methods to be used in most instances when destruction of equipment is undertaken. The tactical situation also will determine how the destruction order will be carried out. In most cases, it is preferable to demolish completely some portions of the equipment rather than partially destroy all the equipment.

a. Smash. Smash the equipment.

(1) Use the heaviest tool on hand to smash the knobs, switches, and indicators.

(2) Remove the test panel from the combination case and smash the exposed parts of the chassis and panel face.

b. Cut. Cut cables, cords, and wiring in a number of places.

WARNING

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

c. Burn. Burn the technical manual first. Burn as much of the equipment as is flammable. Use incendiary grenades to complete the destruction of the equipment.

d. Explode. Use explosives to complete demolition or to cause maximum damage when time does not permit complete demolition by other means.

e. Dispose. Bury or scatter destroyed parts or throw them into nearby waterways. This is particularly important if a number of parts have not been completely destroyed.

APPENDIX A

REFERENCES

The following publications contain information applicable to the operation and organizational maintenance of Test Set, Analyzer, Camera LS-560A.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Index of Modification Work Orders.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment used by the Army.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 11-1510-204-20-2/1	Organizational Maintenance Manual: Signal Electronic Equipment Configuration, Army Model OV-1D Aircraft.
TM 11-6625-203-12	Operator and Organizational Maintenance Manual: Multimeter AN/URM-105, Including Multimeter ME-77/U.
TM 11-6625-366-15	Operator's Organizational, DS, GS, and Depot Maintenance Manual: Multimeter TS-352B/,U.
TM 11-6625-537-15-1	Operator's, Organizational, DS, GS, and Depot Maintenance Manual: Voltmeter, Electronic ME-202A/U.
TM 11-6625-1703-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Oscilloscope AN,/USM-281A.
TM 11-6720-236-12	Operator's and Organizational Maintenance Manual: Camera, Still Picture KA-76A and Lens Cones, Camera, Aerial Reconnaissance LA-370A, LA-371A, and LA-372A.
TM 11-6720-236-35	DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Camera, Still Picture KA-76A and Lens Cones, Camera, Aerial Reconnaissance LA-370A, LA-371A, and LA-372A.
TM 11-6720-250-12	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List: Photographic Surveillance System, Airborne KS-113A.
TM 11-6720-250-35	Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Photographic Surveillance System, Airborne KS-113A.
TM 11-6760-220-12	Operator and Organizational Maintenance Manual: Test System, Photographic Surveillance LS-34A; Analyzer, Still Picture Camera LS-44A; Test System, Photographic Surveillance System LS-45A; Tool Kit, Still Picture Camera Maintenance LS-48A; Test Set, Converter, Altitude-Ground Speed Ratio LS-50A; Test Set, Scanner Alignment LS-51A; and Test Set, Vacuum Regulator Assembly LA-185A; as used for Testing: Camera, Still Picture KA-30A; and Photographic Surveillance Systems, Airborne KS-59( ) and KS-61A.
TM 11-6760-238-12	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tool Lists for Test Set, Control Panel, Focal Plane Shutter LS-78A.

TM 11-6760-242-15	Operator's Organizational, DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Timer, Digital Electronic LA-387A.
TM 11-6760-245-12	Operator's and Organizational Maintenance Manual for Analyzer Set, Photographic Surveillance System LS-89A Including Repair Parts and Special Tool Lists.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 55-1510-204-10/5	Operator's Manual: OV-1D Aircraft.
TM 740-90-1	Administrative Storage of Equipment.

APPENDIX B
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations for LS-80A. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, re-machining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/ action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

B-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time" figure represents the average time required to re-

store an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance alllocation chart. Subcolumns of column 4 are as follows:

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. Tool and Test Equipment Requirements (Sect. III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

B-5. Remarks (Sect. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

Section II. MAINTENANCE ALLOCATION CHART
FOR
TEST SET, ANALYZER, CAMERA LS-80A

(1) Group number	(2) COMPONENT/ASSEMBLY	(3) Maint. function	(4) Maint. category C	O	F	H	D	(5) Tool/ AND EQPT	(6) Remarks
00	TEST SET, ANALYZER, CAMERA LS-80A	Inspect	0.2						
		Service	0.2						
		Test		0.5				8	
		Service		0.3				1	
		Test			0.5			1 thru 6	
		Test				1.0		1 thru 7	
		Overhaul						20.0	
		Repair		0.3				1	
		Repair			0.5			1 thru 6	
01	CAMERA ANALYZER TEST PANEL	Repair		0.1				1	
		Test			0.5			1 thru 6	
		Adjust			0.8			1. h	
		Repair			0.5			1, 2, 4	
		Test				1.0		1 thru 7	
		Repair		0.1				1, 2	
		Repair				1.0		1, 2. 4	
		Service		0.2				1	
0101	CONTROL CARD ASSEMBLY AND COMPONENT ASSEMBLY	Replace			0.3			1, 2	
		Repair				1.0		1, 2	
		Test				1.0		3, 4, 5	
0102	CHASSIS AND COMPONENT ASSEMBLY	Repair			0.5			1, 2	
		Repair		0.1				1, 2	
		Repair				1.0		1, 2	
		Test				1.0		1 thru 7	
02	ADAPTER, CAMERA TEST LM-178A	Service		0.2				1	
		Replace		0.2					
		Service			0.5			1, 2	
		Repair			0.5			1, 2	
		Test			0.5			1, 3, 4	
		Repair	0.1					1, 2	
		Repair				1.0		1, 2	
		Test				1.0		1, 3, 4	
0201	PRIRTED CIRCUIT BOARD	Replace	0.3			1, 2			
		Repair				1.0		1, 2	
		Test				0.5		3, 4, 5	
0202	CABLE ASSEMBLY, CONE-SHUTTER TEST P/I 7912-310 (11871)	Test		0.3				8	
		Replace		0.1					
		Repair			0.5			1, 2, 3	
0203	CABLE ASSEMBLY BODY-SHOTTER TEST P/H 7912-311 (11871)	Test		0.3				3	
		Replace		0.1					
		Repair			0.5	1,		2, 3	
03	MODULE TEST ADAPTER	Service	0.1						
		Test		0.2	3				
		Replace		0.2					
		Repair			0.5			1, 2	
		Test			0.3			3	
04	TOOL STORAGE BOX	Service	0.1						
		Repair		0.2				A	
0401	VACUUM GAGE	Replace		0.1					
		Repair					2.0		
		Test					0.5		
05	EXPOSURE TEST ADAPTER	Replace	0.1						
		Repair		0.3				1, 2	
06	CASE, COMBINATION	Replace	0.1						
		Repair	1.0					1, 2	
07	CABLE ASSEMBLY (W1)	Test		0.3				8	
		Replace		0.1					
		Repair			0.5			1, 2, 3	
08	CABLE ASSEMBLY (WV2)	Test		0.3			5		
		Replace		0.1					
		Repair			0.5			1, 2, 3	

Section II. MAINTENANCE ALLOCATION CHART
FOR
TEST SET, ANALYZER, CAMERA LS-80A

(1) Group number	(2) COMPONENT/ASSEMBLY	(3) Maint. function	(4) Maint. category C	O	F	H	D	(5) Tool/ AND EQPT	(6) Remarks
09	CABLE ASSEMBLY (W3)	Test		0.3				8	
		Replace		0.1					
		Repair			0.5			1, 2, 3	
10	CABLE ASSEMBLY (wh)	Test		0.3	8				
		Replace		0.1					
		Repair			0.5			1, 2, 3	
11	CABLE ASSEMBLY (W5)	Test		0.3	8				
		Replace		0.1					
		Repair			0.5			1, 2, 3	
12	CABLE ASSEMBLY (w6)	Test		0.3	8				
		Replace		0.1					
		Repair			0.5			1, 2, 3	
13	CABLE ASSEMBLY (W7)	Test		0.3	8				
		Replace		0.1					
		Repair			0.	5		1, 2, 3	
14	CABLE ASSEMBLY (W8)	Test		0.3	8				
		Replace		0.1					
		Repair			0.5			1, 2, 3	
15	CABLE ASSEMBLY (W9)	Test		0.3	8				
		Replace		0.1					
		Repair			0.5			1, 2, 3	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
TEST SET, ANALYZER, CAMERA LS-80A

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	0, F, H, D	TOOL KIT, PHOTOGRAPHIC REPAIR TK-TT/T	5180-00-52-9068	
2	0, F, H, D	TOOL KIT, PHOTOGRAPHIC REPAIR TK-109/GF	5180-00-856-9653	
3	F, , D	MULTIMER TS-352B/U	6625-00-242-5023	
4	F, H. D	VOLTMETER ME-202A/U	6625-00-709-0288	
5	F, H, D	OSCILLOSCOPE AN/UMH-281A	6625-00-228-2201	
6	F, K, D	DIGITAL TIMER LA-387A	6645-00-877-8380	
7	H, D	BRIDGE, RESISTANCE-CAPACITANCE AN/URM-90	6625-00-534-7458	
8	0	MULTIMETER AN/URn105	6625-00-581-2036	

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	REPLACE ALL TOOLS

By Order of the Secretary of the Army:

BRUCE PALMER, JR.
General, U.S. Army
Acting Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

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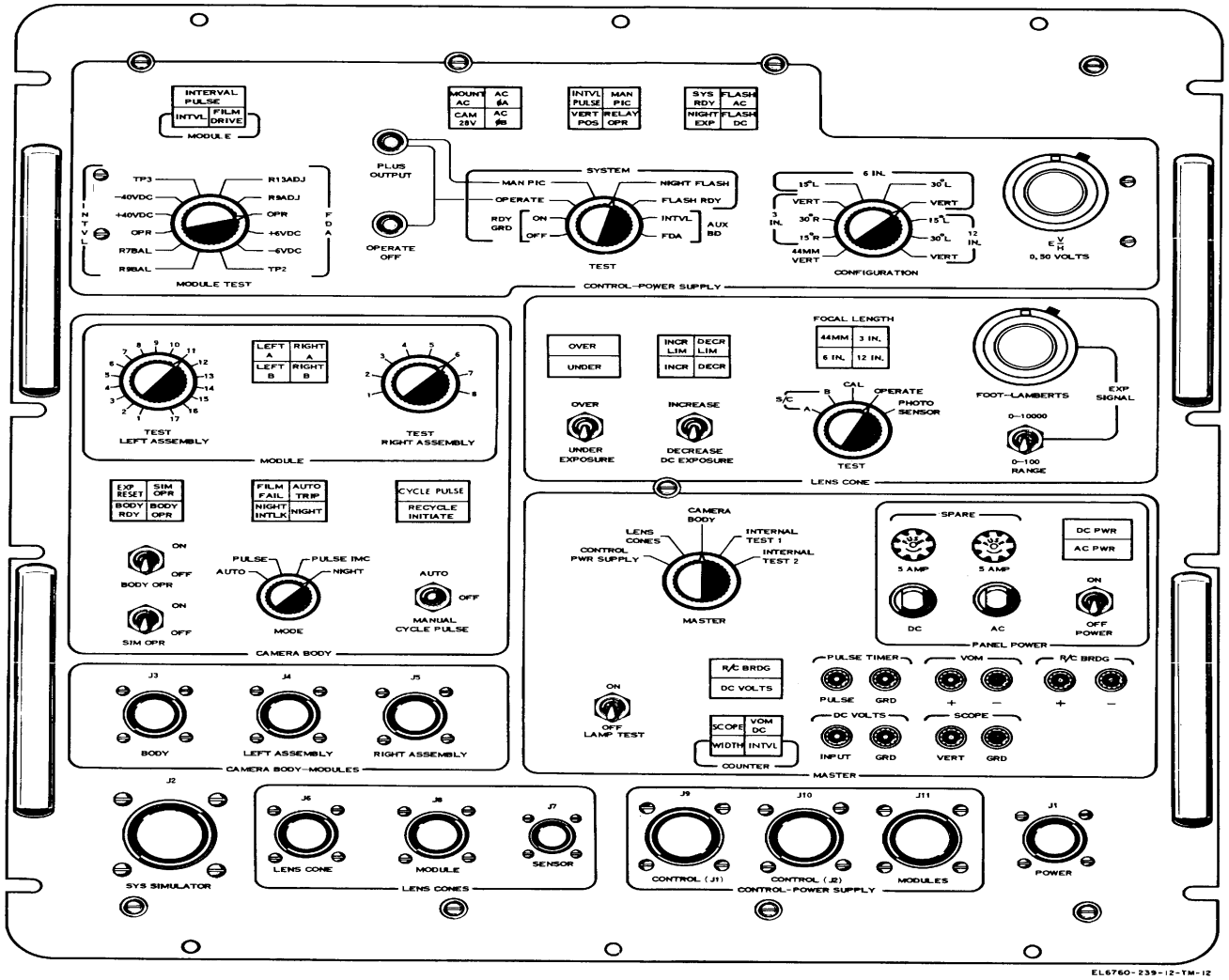

Figure 3-1. Camera analyzer test panel, controls, indicators, and connectors.

PIN: 021169-000