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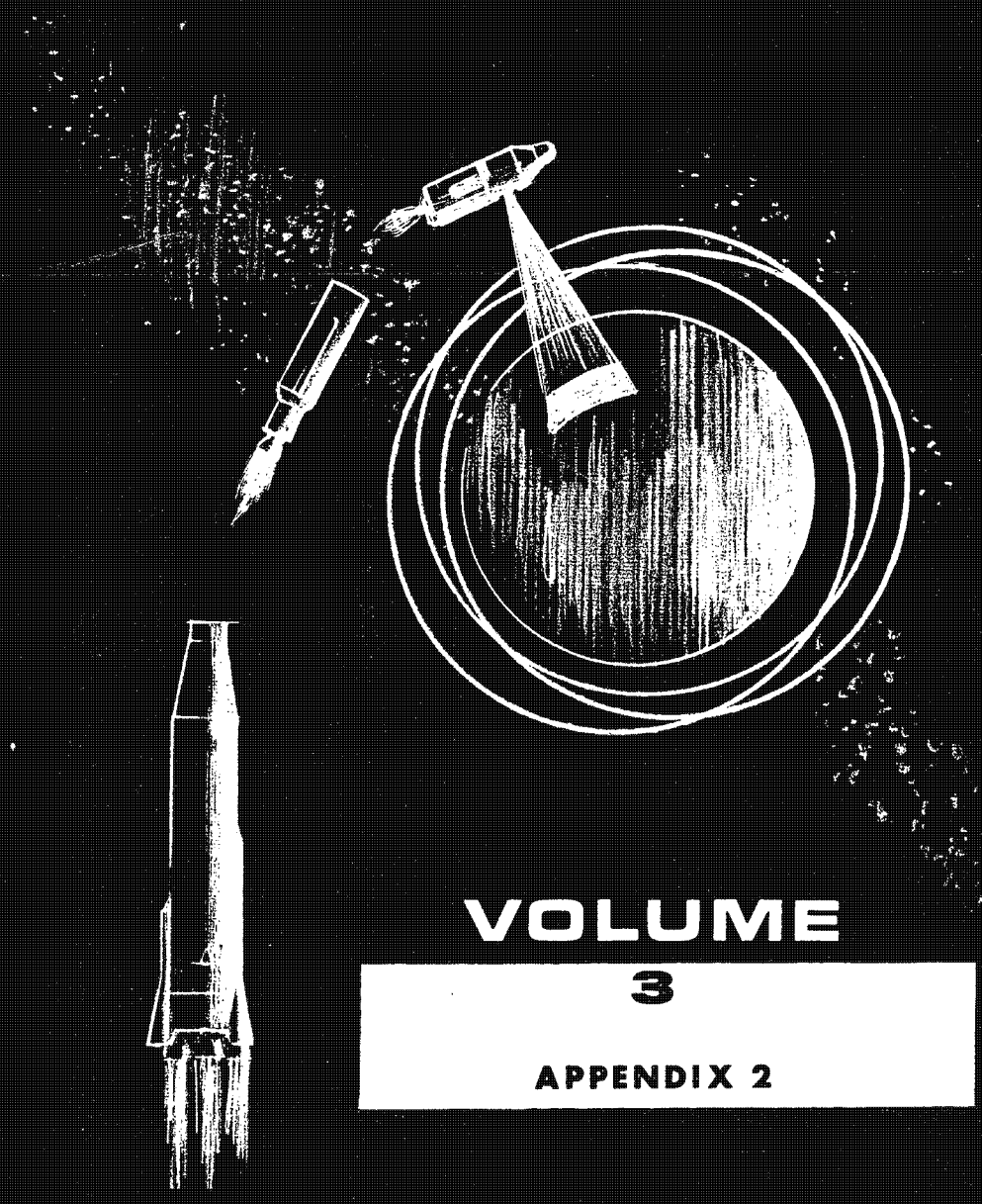
PROGRAM REPORT



VOLUME 3

APPENDIX 2

THIS DOCUMENT CONTAINS 247 PAGES
NOVEMBER 1967

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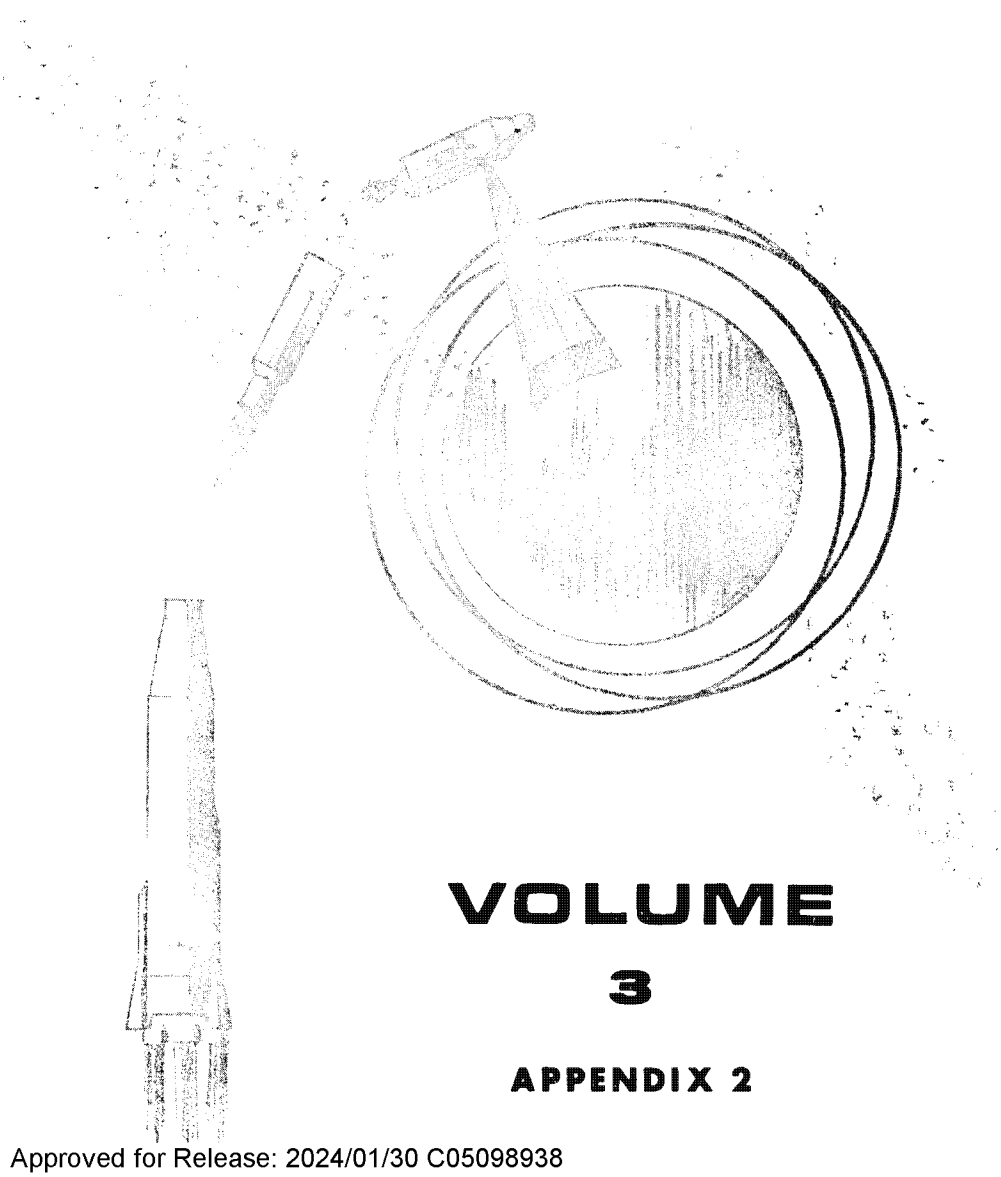
PROGRAM REPORT



VOLUME 3

APPENDIX 2

CONTENTS

APPENDIX 2

PAYLOAD SUBSYSTEM ACCEPTANCE TEST PROCEDURE

Sheets 245

Copy No.

CAMERA PAYLOAD SUBSYSTEM

ACCEPTANCE TEST PROCEDURE

NO. 804-104

Prepared by
EASTMAN KODAK COMPANY
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Release Date: 9/14/62

Rev.	Pages Affected	Date	Approved by
L	DCO-K-1, K-2, K-3, K-4 Inc. Revised shts. 14, 19, 23, 25, 29, 30, 31, 33, 35, 36, 45, 46, 54, 69, 73a, 75a, 76, 83, 101, 102, 103, 105, 109, 110, 115, 116, 128, 131, 132, 141a, &147. Retyped Shts. 17, 18, 22, 24, 28, 34, 41, 53, 58, 59, 64, 65, 67, 68, 70, 79, 80, 93, 95, 97, 100, 106, 119, 127, 133, 144, 148, 152, 158, 193, 195, 198, 203, & 204.	9/29/66	See DCO-K-1, K-2, K-3, K-4

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Acceptance Test Procedure — Camera Payload Subsystem

Procedure No. 804-104 — Release Date: 9/14/62

1.0 PURPOSE

To determine the functional conformance of the Camera Payload Subsystem to the Flight Payload Model Specification No. 802-153.

2.0 REFERENCES

2.1 Specification

2.1.1 "Phase II Flight Payload Model Specification," EKC Specification No. 802-153.

2.2 Drawings

2.2.1 Space Chamber Assembly, EKC Dwg. No. 805-101.

2.2.2 "In-process Inspection Procedure and Check List for General Inspection of 805-101, "EKC Procedure No. QC-A-515.

2.2.3 "In-process Procedure for Space Chamber Record Supply and Record Storage Alignment," EKC Procedure No. QC-A-509.

2.2.4 "Pre-Vibration Inspection Procedure and Check List for Pre-Vibration Space Chamber Assy, "EKC Procedure No. QC-A-541.

2.2.5 In-process Inspection Procedure and Check List for Pre-Vibration Space Chamber Handling," EKC Procedure No. QC-A-513.

2.2.6 "Inspection Procedure and Check List for Post-Vibration Space Chamber Handling, "EKc Procedure No. QC-A-514.

2.2.7 "Post-Vibration Inspection Procedure and Check List for Space Chamber Assy," EKC Procedure No. QC-A-531.

2.2.8 "In Process Inspection Procedure and Check List for Handling Space Chamber for Weight and Balance," EKC Procedure No. QC-A-534.

2.2.9 "In-process Inspection Procedure and Check List for Post-Acceptance Testing Inspection", EKC Procedure No. QC-A-518.

2.2.10 "In-process Inspection Procedure and Check List for Space Chamber Pre-Packaging, " EKC Procedure No. QC-A-516.

2.2.11 "In-process Inspection Procedure and Check List for Packaging Inspection", EKC Procedure No. QC-A-526.

3.0 FACILITIES

3.1 Instrumentation

EKC DRAWING NUMBERS	ITEMS
534-100	Test Console
542-122	Cable Test Point Board
544-294	Break Out Box
550-100	Portable Test Set
635-100	Weight & Balance Test Set
745-100	Record Viewer
833-300	300-Inch Collimator
833-450	Moving Target Assembly
833-668	Focus Traget Assembly
833-668	Focus Target Assembly
838-110	Line-Of-Sight Test Set
639-120	Leak Rate Test Set
	MB Model C210 exciter and driver
	Oscilloscope, Tektronix Model 545A with Type CA preamplifier

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1 current shunt, custom

2 Multimeters, Simpson Model 260

2 Dial Indicators (0.0001 inch scale divisions) with standard and mounting clamp.

Megohm Bridge, Industrial Instruments, 10 Volt test.

Focus Mode Switch Box, Custom

Resistance Bridge, General Radio Model 1652 A or equivalent

2 Resistance Decade Boxes, 0 to 999,999 ohms in 1 ohm steps; General Radio Model 1432 or equivalent.

3.2 Fixtures and Tools

Eastman Kodak Company

208-629	C/P Vibration Fixture
635-100	Weight and Balance Fixture
644-700	Erector
648-100	Cradle
648-113	Space Chamber Lifting Yoke
744-100	Record Storage Bracket
208-1280	C/P Interface Gages

749-295		Record Storage Mount and Enclosure
813-323		Record Tape Assembly, Simulated
833-222		Test Unit Mounting Assembly
844-150		Space Chamber Integration Lifting Yoke
848-200		Truck
		Depth Micrometer, 2" to 3"
		12" parallel bar
		Slit Evaluation Lamp Assembly
		Heat Gun
		12 Inch Screw Jack
		Leak Rate Test Cover Plate for Air Supply
	(2)	Air Supply Relieve Valve Test Plugs
		Padded Jaw Gas Pliers
		Veeder Root Footage Counter

3.3 Special Test Areas

3.3.1 Environmentally controlled room for photographic testing with 2 ton over-head hoist.

3.3.2 Vibration test cell with 10-ton over-head hoist.

3.3.3 Weight and Center of Gravity measurements room with 2 over-head hoists.

3.4 Power Requirements

3.4.1 Test Console -115V, AC, 60 amps, at a receptacle for an Appleton AEP-6422 plug.

3.4.2 Portable Test Set - 115V, AC, 60 cps, 15 amps at duplex receptacle ground pin.

3.5 Expendable Supplies

3.5.1 Brush, 8 channel oscillograph paper (1 roll).

3.5.2 Circuit Chillit Spray Can

3.5.3 4 750 foot capacity film reels and cans.

3.5.4 2 3000 foot rolls of flight film, Kodak High Definition Aerial Film, Estar thin base, Type 4404.

3.6 Personnel

3.6.1 One quality control engineer to serve as test director.

3.6.2 Two quality control technicians to perform the over-all testing.

3.6.3 Evaluation personnel, as required, to perform record evaluation functions.

3.6.4 Assembly personnel, as required, to perform all payload handling functions.

3.6.5 Environmental Laboratory personnel, as required, to operate vibration equipment.

3.6.6 Inspection Personnel - as required to monitor all assembly functions.

3.7 Special Services

Service for processing all record generated during acceptance testing.

4.0 CONDITIONS

4.1 Fixture Accuracy - All test instruments shall be certified for accuracy within their specified tolerances through approved standardization facilities.

4.2 Quality Control

4.2.1 Inspection - Inspection shall have been completed by Quality Control prior to acceptance testing. If at any time during testing the payload is subjected to any disassembly, repairs or modifications, it shall be reinspected before any testing is resumed.

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4.2.2 Component Testing - Component testing shall have been completed by Quality Control prior to C/P acceptance testing. If at any time during testing the C/P is subjected to any disassembly, repairs or modification, the affected components shall be retested in accordance with the applicable portions of the component in-process test procedure before the component is reassembled in the C/P.

4.3 Test Environment

4.3.1 Ambient Conditions - Except where specifically stated, all testing shall be performed under the following ambient conditions:

Temperature:	70F + 10F - 30F
Pressure:	29.5 in ± 1.0 in Hg
Humidity:	50% ± 5% R.H.

4.3.2 During all photographic testing the Payload shall be maintained at an average temperature of 69.5° ± 1.0 F.

4.3.3 Simulated "Zero G" Environment - During all Line of Sight measurements and all collimator testing the Stereo Mirror Assembly shall be counter balanced to eliminate "1g" stresses in the Stereo Mirror and Structure Assembly. The counter-balance force shall be applied along the Stereo Mirror Trunnion Axis. The magnitude of this force shall be determined prior to the start of acceptance testing and shall be equal to the force required to return the trunnion to trunnion diameter of the Stereo Mirror Assembly to its measured diameter when the mirror is lying in a horizontal position on its back. After application of the counter balance force the Stereo Servo shall be actuated four times between positions 1 and 3 to relieve any binding in the trunnions.

(G)

4.4 Test Preparation - Verify the availability of all instrumentation, fixtures, and supplies referenced in Section 3.0.

4.5 Precautions

4.5.1 Once the C/P has been cleaned and assembled, the internal film path shall be sealed if the C/P is removed from the final assembly and test area.

4.5.2 All lens and mirror covers shall be installed during handling operations.

4.5.3 Upon recognition of any electrical or mechanical failure or any out-of-tolerance conditions, the payload power shall be turned off immediately pending a disposition of the problem by a quality control engineer.

4.6 Documentation - All acceptance test data shall be retained in a payload log book which shall include the following:

1. a) Acceptance Letter
   b) Interface Compliance
   c) Qualification Status

2. Component Drawings, Test Procedure and Serial Number List.

3. Non-Conformance Report

   a) Variations from Specification 802-153
   b) Variations from Procedure 804-104.

4. Running Time Record

   a) Component (in-process test operating time)
   b) Payload (acceptance test operating time)

5. Payload Calibration Data

   a) Instrumentation Calibration
   b) Environmental Control Operating Temperatures
   c) Operating Current Profile

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6. Acceptance Test Report

a) Operational Test Data Sheets
b) Film Evaluation Data
c) Vibration Test Data
d) Weight and Center of Gravity Data

7. Graphic Summary of Test Activity

4.7 Identification of Test Data - All machine recorded data and all photographic record shall be marked with the reference procedure paragraph, the date of test, the payload serial number, and any other pertinent information.

4.8 Order of Testing - The order of performing the Pre- or Post-Vibration Performance Tests may be rearranged if necessary to meet special demands of the over-all test activity.

4.9 Operating Time Log - A running list of operational functions and time shall be maintained on the C/P operating time log sheets. An entry shall be made at the end of each work shift by the Test Director.

5.0 TEST PROCEDURE

5.1 Outline - The outline which follows is intended to assist in understanding objectives of these tests. Specific objectives are summarized below for each type of test.

I. Preliminary Electrical Checkout

A. To determine the leakage resistance between each non-grounded electrical interface connection and the payload structure ground.

B. To check the stand-by operating and heater power consumption of the C/P.

II. **Pre-Vibration Performance Test**

A. Camera Payload Film Tracking Test

1. Verify proper threading and operation of the film handling system and to calibrate the record take-up quantity and reel rotation instrumentation.

2. To verify satisfactory operation of the film handling system under specified conditions of misalignment.

B. Power, Command, Control and Response

1. Crab Servo Checkout - To verify proper response of the crab servo to all commands including command verification, instrumentation response, mirror positioning, transition time between positions and, ability to recover from mechanical end stops.

2. Stereo Servo Checkout - To verify proper response of the stereo servo to all commands; including command verification, instrumentation response, mirror positioning, transition time between positions and, ability to recover from mechanical end stops.

3. Timing Signal Amplifier Operation - To verify operability of the timing signal amplifiers and to calibrate the timing signal amplifier instrumentation output.

4. Power Control Check - To determine the power requirements of the payload for various modes of operation and to calibrate the power instrumentation monitors.

5. Focus Mode Operation - To verify operability of the focus mode command circuitry.

6. Focus Adjust Operation - To verify operability of the focus adjust mechanism at input voltage extremes and to perform a calibration of physical platen position versus focus position instrumentation output.

7. Film Drive System Operation - To verify proper film drive amplifier output frequency for each speed step, proper operation of the film drive logic, and record tension instrumentation.

8. Port Open Telltale - To calibrate the Port Open Telltale instrumentation output.

9. Slit Positioner Operation - To verify proper response of the slit positioner to all commands including command verification and instrumentation response.

C. Environmental Control Checkout

(J) 1. To verify the proper switching of all heater controllers and to determine the maximum heater power consumption.

2. To verify the calibration of all absolute temperature instrumentation outputs.

3. To verify the calibration of the elevation mirror and lens barrel temperature gradient amplifier instrumentation outputs.

D. Collimator Set-Up

1. To prepare the test equipment for photographically testing the payload.

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2. To determine the proper drum target oscillator frequencies based on the payload lens and collimator focal lengths and the motor speed drive frequencies.

E. Photographic Focus Run - To determine the best optimum focus position of the camera at field angles of +2.7°, 0°, and -2.7°.

F. Focus Sensor Calibration - To verify the calibration of the focus control component output versus platen position.

G. Dynamic Photo Test - To determine the photographic capability of the Camera Payload Subsystem, and to evaluate the performance of the film drive mechanism.

H. Record Evaluation - To provide an analysis summary concerning the photographic output of the camera payload subsystem.

I. Remove from Collimator - To provide instructions for properly removing the Camera Payload from the test configuration.

III. Vibration Test - To assure that there are not assembly or workmanship defects which might result in the failure of an otherwise qualified design.

IV. Post-Vibration Inspection and Interface Gaging - To ascertain that vibration has produced no visual failures, and to verify physical conformance of the C/P to the Mechanical Interface Space allocation.

V. Post-Vibration Performance - To ascertain that vibration has produced no functional failures.

VI. Post-Vibration Proof Pressure and Leak Rate Test - To verify the capability of the EK portion of the film path enclosure to maintain a specified level of pressurization.

VII. Weight and Balance - To determine the weight and center of gravity of the Camera Payload.

VIII. Final Inspection - To verify that the Camera Payload is properly assembled and has incurred no physical damage during testing.

IX. Prepare to Ship - To verify that the Camera Payload has been properly handled, prepared, and packaged for shipment.

(End of Outline - Test Procedure Follows)

5.2 Certification of Test Equipment - Verify that the test equipment calibration is certified at the time of test. List the calibrated and calibration due dates on the data sheets.

5.3 Verify that the assembly has satisfactorily passed inspection for conformance to Assembly Drawing No. 805-101 and Inspection Procedure QC-A-515. The test engineer shall approve and sign the QC-A-515 report before processing with the Acceptance test.

5.4 Preliminary Electrical Checkout

5.4.1 Test Configuration Set-Up (to be performed by assembly personnel)

5.4.1.1 Place the Cradle mounted C/P on a truck.

5.4.1.2 Assemble the Forward Record Storage Bracket to the Cradle.

5.4.1.3 Mount the Photographic Chute and Enclosure and the Forward Record Storage on the Forward Record Storage Bracket.

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5.4.1.4 Remove the covers from the Camera and the Film Supply Cassette.

5.4.1.5 Ascertain that the Camera aperture slit plate is set with the Test slit positioned at the aperture. If necessary adjust the plate so that the aperture slit is in the test position.

5.4.1.6 Install a 3000-foot roll of flight type film in the supply cassette.

NOTE: At any time the film is installed in the C/P the film can number should be recorded in the Engineer's log.

5.4.1.7 Thread film through the entire C/P subsystem in accordance with Figure 1 of Appendix E.

5.4.2 Measurement of leakage resistance from C/P subsystem electrical interface connections to structure ground.

5.4.2.1 Connect the Breakout Box to connectors J654, J695, J696, J697, J698, and J699 on the Test Box.

5.4.2.2 Connect the TEST lead from the megohm bridge to the C/P structure by installing a spade lug under one of the test box mounting screws.

5.4.2.3 Turn on the megohm bridge power and allow the bridge to warm up. Then set the test voltage to 10 volts d.c.

5.4.2.4 Measure and record the leakage resistance between the electrical interface connections and the C/P structure ground by connecting the HIGH test lead from the bridge to the following points one at a time.

CONNECTOR	PIN	FUNCTION
J695	B	Auxiliary Record Advance
	C	C/P Continuity Loop Input
	D	C/P Continuity Loop Output
	E	CPL 26 (VP50)
	F	CPL 27 (VP51)
	G	Spare
	H	Spare
	J	CPL 21 (VP5)
	K	CPL 22 (VP1)
	M	CB 8A (VP6)
	N	CB 8b (VP7)
	P	CB 8c (VP8)
	R	CB 9a (VP9)
	S	CP 9b (VP10)
	T	CB 9c (VP11)
	U	CPL 23 (VP12)
	V	+5 v.d.c. supply (VP13)
	W	Auto Focus Lead A (VP14)
	X	Auto Focus Lead B (VP15)
	Y	Focus Motor Lead A (VP16)
	Z	Focus Motor Lead B (VP17)
	a	CB 10a (VP18)
	b	CB 10b (VP19)
	c	CB 10c (VP20)
	d	CB 11a (VP21)
	e	CB 11b (VP22)

CONNECTOR	PIN	FUNCTION
J695	f	CB 11c (VP23)
	g	CB 12a (VP24)
	h	CB 12b (VP25)
	i	CB 12c (VP26)
	j	CB 1a (VP27)
	k	CB 1b (VP28)
	m	CB 2a (VP29)
	n	CB 2b (VP30)
	p	CB 3a (VP31)
	q	CB 3b (VP32)
	r	CB 4a (VP33)
	s	CB 4b (VP34)
	t	CB 5a (VP35)
	u	CB 5b (VP36)
	v	CB 6a (VP37)
	w	CB 6b (VP38)
	x	CB 7a (VP39)
	y	CB 7b (VP40)
	z	CB1-7c (VP41)
	AA	DATA SIGN. "A" (VP42)
	BB	DATA SIG. "B" Return (VP43)
	CC	-22 v.d.c. Supply (VP44)
	DD	+22 v.d.c Supply (VP45)
	EE	+28 v.d.c Supply (VP46)
	FF	D.C. Return (VP47)
	HH	CB 15a (VP49)

CONNECTOR	PIN	FUNCTION
J696	B	VTP 32
	C	VTP 30
	D	Instrumentation Return
	E	VTP 28
	F	VTP 25
	G	VTP 24
	H	VTP 31
	J	VTP 33
	K	VTP 34
	L	VTP 20
	M	VTP 19
	N	VTP 18
	P	VTP 35
	R	VTP 14
	S	VTP 13
	T	VTP 11
	U	VTP 10
	V	VTP 9
	W	VTP 8
	X	VTP 7
	Y	VTP 6
	Z	VTP 5
	a	VTP 4
	b	VTP 3
	c	VTP 1
	d	VTP 2
	e	VTP 29
	f	VTP 15
	g	VTP 16
	h	VTP 17

CONNECTOR	PIN	FUNCTION
J697	A	CB 20a
	B	CB 20b
	C	CB 20c
	D	CB 21a
	E	CB 21b
	F	CB 21c
	G	Slide, Test Bit, N.C.
	H	Slide, Test Bit, Com.
	J	Slide Test
	M	CPL 31
	N	CPL 33
	P	CPL 34
	R	CPL 35
	S	CB 24a
	h	CB 8a
	i	CB 8b
	j	CB 8c
	k	CB 9a
	m	CB 9b
	n	CB 9c
	s	CB 15a
	u	Auto Focus Lead A
	w	Auto Focus Lead B
	x	Focus Motor Lead A
	y	Focus Motor Lead B
	z	CB 10a
	AA	CB 10b
	BB	CB 10c
	CC	CB 11a
	DD	CB 11b
	EE	CB 11c

CONNECTOR	PIN	FUNCTION
J697	FF	CB 12a
	GG	CB 12b
	HH	CB 12c
J698	A	CPL 12
	B	CPL 29
	C	CPL 28
	D	CPL 16
	E	BBT-1
	F	Instrumentation Return
	G	Instrumentation Return
	H	CPL 26
	J	CPL 27
	K	+5 v.d.c. Supply
	L	BBT-2
	M	CPL 25
	N	CPL 24
	P	CPL 23
	R	CPL 22
	S	CPL 21
	T	CPL 20
	U	CPL 19
	V	CPL 18
	W	CPL 17
	X	BBT-6
	Z	CPL-14
	b	CPL 32
	D	CPL 30

CONNECTOR	PIN	FUNCTION
J698	a	CPL 13
	c	CPL 11
	d	CPL 10
	e	CPL 9
	f	CPL 8
	g	CPL 7
	h	CPL 6
	i	CPL 5
	j	CPL 4
	k	CPL 3
	m	+22 v.d.c. Supply
	n	CPL 1
	q	BBT-3
	r	BBT-4
	s	BBT-5
	t	Umbilical Return
J699	B	22 v.d.c. Return
	D	Spare
	E	Spare
	H	CB 1a
	J	CB 1b
	K	CB 2a
	L	CB 2b
	M	CB 3a

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CONNECTOR	PIN	FUNCTION
J699	N	CB 3b
	P	CB 4a
	R	CB 4b
	S	CB 5a
	T	CB 5b
	U	CB 6a
	V	CB 6b
	W	CB 7a
	X	CB 7b
	Y	CB1-7c
	Z	CB1-7c
	a	Data Signal A
	b	Data Signal A Return
	c	Data Signal B
	d	Data Signal B Return
	f	+28 v.d.c. Supply
	g	+28 v.d.c Supply
	h	+28 v.d.c. Environmental Supply
	i	+28 v.d.c. Environmental Supply
	j	D.C. Return
	k	D.C. Return
	n	D.C. Return
	p	CB 13a
	q	CB 13a
	r	Spare
	s	Spare

(E)

CONNECTOR	PIN	FUNCTION
J 654	B	Spare
	C	CPL 2
	D	Instrumentation Return
	F	CPL 15
	H	Take-Up Motor Drive Feed
	J	Take-Up Motor Drive Return
	K	Take-Up Motor Drive Feed
	L	Take-Up Motor Drive Return
	P	DC return
	X	+ 22 v.d.c. Supply
	Z	DC return
	a	Spare
	g	Continuity Loop
	h	Continuity Loop

5.4.2.5 Turn off the megohm bridge and disconnect the Breakout Box cables. Connect the test console cables to the C/P.

5.4.3 Conduct the Test Console Set-Up Procedure, Appendix A.

NOTE: A Portable Test Set, in conjunction with an oscillograph recorder, may be used in place of the test console whenever necessary.

5.4.4 Initial Turn-On.

554.4.1 Set the OPERATING POWER to 28.

5.4.4.2 Apply power to the C/P.

5.4.4.3 Record the value of the OPERATING POWER current.

5.4.4.4 Set the HEATER POWER to 28.0 volts and apply power to the C/P.

5.4.4.5 Record the value of HEATER POWER current.

5.4.4.6 Set the DIGITAL VOLTMETER (DVM) selector to EXTERNAL. Using the DVM external probe measure and record the values of CPL-26 VP-13, VP-44, VP-45, VP-46, VP-50.

5.4.4.7 Turn off the HEATER and OPERATING POWER.

5.5 Pre-Vibration Performance

5.5.1 Camera Payload Film Tracking Test

NOTE: The Acceptance Test May be performed using the companion FRS to the C/P or a test FRS unit. If the test FRS is used some section 5.5.1 calibration data is not applicable. The CPL-15 and 29 calibrations supplied in the log will represent nominal operation.

5.5.1.1 Subsystem Film Tracking Verification

5.5.1.1.1 Insert pins in the INSTRUMENTATION PATCHBOARD to make the following connections:

CPL Point	Readout Inst.	Function
13	Chart Recorder 1	Stereo Position
14	Chart Recorder 2	Crab Position
15	Chart Recorder 3	Film Quantity, Coarse No. 1
17	Chart Recorder 4	Looper Position
16	Chart Recorder 5	Film Quantity, fine
28	Chart Recorder 6	Film Quantity, Coarse No. 2
20	Chart Recorder 7	Platen Pos., coarse
27	Chart Recorder 8	Platen Pos., fine

NOTE: With the exception of Crab and Stereo Servo Checkout and Focus Sensor Calibration, this programming of the recorder shall be maintained throughout the Acceptance Test.

5.5.1.1.2 Start the OSCILLOGRAPH CHART RECORDER at a speed of 0.4 mm/sec. Set the Operating Power to 28.0 volts. Apply Operating Power to the C/P.

NOTE: Throughout Acceptance Testing the oscillograph recorder shall be in operation at all times when power is applied to the C/P.

5.5.1.1.3 CPL-16 Calibration.

5.5.1.1.3.1 Using the DVM external probe to read the value of CPL-16, manually rotate the pot in the Air Supply until CPL-16 is at its minimum value. The manual rotation must be in the same direction as that produced by normal film travel. At a convenient place near the exit of the Air Supply, mark the record using a ball point pen.

5.5.1.1.3.2 Record the Value of CPL-16 and VTP 16.

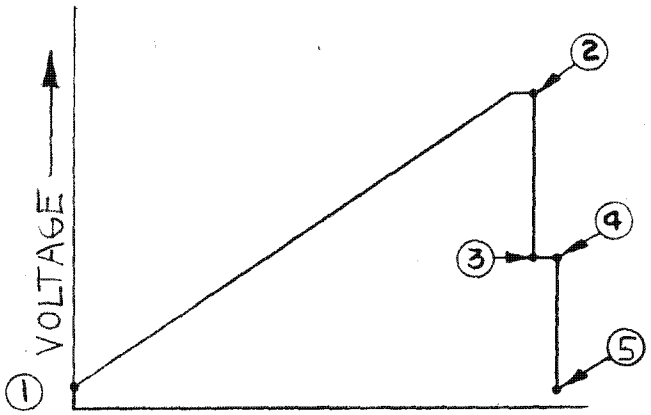
5.5.1.1.3.3 Command Motor Speed 01 ON and run the Camera until CPL-16 reaches 4.8v.

5.5.1.1.3.4 Manually rotate the take-up reel until CPL 16 reaches a maximum (Point 2 in sketch). Record CPL 16 and VTP 16. Rotate the take-up reel slowly until CPL 16 drops to approximately 2.5 volts (Point 3 in sketch). Record CPL 16 and VTP 16. Again mark the record near the exit of the Air Supply.

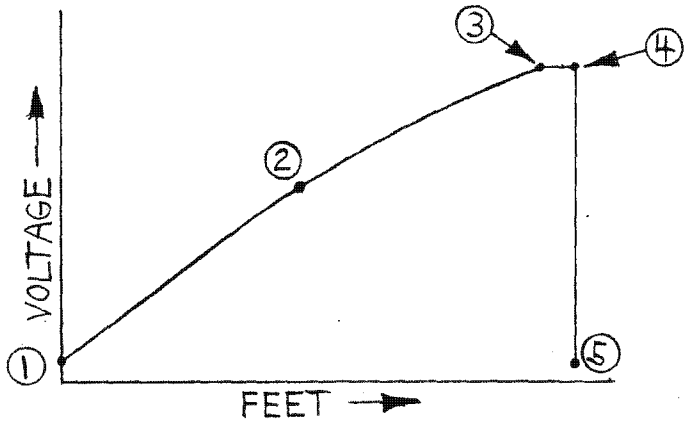
5.5.1.1.3.5 Manually rotate the takeup reel until CPL-16 drops to minimum. Record CPL-16 and VTP-16. Mark the record.

5.5.1.1.3.6 Command Motor Speed 01 ON and run the Camera until the mark of paragraph 5.5.1.1.3.5 is on its takeup reel. Command the Camera OFF and turn OFF the Operating Power.

5.5.1.1.3.7 Have Assembly personnel remove the record from the takeup reel and measure the distances between marks. Record these distances as lengths to Points 2, 3, 4 & 5 per sketch below.



CPL-16 AND CPL-28



CPL-15

5.5.1.1.4 Apply Operating Power to the C/P.

5.5.1.1.5 Using the DVM external probe to read the value of CPL-28, rotate the pot in the Air Supply to set the CPL-28 output voltage to its minimum value. Record the values of CPL-28 and VTP-28. Attach the Veeder Root footage counter to the spring tension arm of the Forward Record Storage Assembly so that the tracking wheel runs on the core of the film spool. Reset the counter to read 0 feet. During the tracking tests which follow, record the values of CPL-28 and VTP-28 at points 2, 3, 4 and 5 per the sketches.

5.5.1.1.5.1 Using the component serial number list supplied by the Q.C. Inspection group, obtain the 804-106 test report for the Forward Record Storage Assembly to be used with this C/P. Transfer the CPL-15 test results (voltage vs footage) to the data sheet supplied for each point evident in sketch.

(J)

5.5.1.1.6 Program MOTOR SPEED 01 ON and EXECUTE the command. After a minimum of sixty seconds EXECUTE the MOTOR OFF command. During the run, verify the film tracking is satisfactory by observing the following conditions:

1. No slack film develops in any portion of the film path.
2. Film travels from supply reel to take-up reel with no damage to film edges.

5.5.1.1.7 Repeat step 5.5.1.1.6 at speed 33.

5.5.1.1.8 Repeat step 5.5.1.1.6 at speed 64.

5.5.1.1.9 Set the OPERATING to 32.5 volts.

5.5.1.1.10 Repeat steps 5.5.1.1.6 through 5.5.1.1.7 through 5.5.1.1.8.

5.5.1.1.11 Reset the OPERATING POWER to 28.0 volts.

5.5.1.1.12 For Models S/N 205 and up the following steps should be performed to calibrate the CPL-15 output for indication of take-up reel rotation.

(J) 5.5.1.1.12.1 Program MOTOR SPEED 64 ON and EXECUTE the command.

5.5.1.1.12.2 Record the CPL-15 output when the take-up reel starts rotating. When the take-up starts, command the camera OFF and manually stall the take-up reel and again record the value of CPL-15.

CAUTION: The reel should not be stalled any longer than is necessary to perform the measurement. However, some time will be required for stabilization since the circuit has a large time constant.

5.5.1.1.12.3 EXECUTE the MOTOR OFF command.

(E)

5.5.1.1.13 Turn off the OPERATING POWER and the OSCILLOGRAPH CHART RECORDER.

5.5.1.2 Forward Record Storage Misalignment Capability.

5.5.1.2.1 Using the clinometer, gauge blocks, and wedges misalign the Forward Record Storage with respect to the exit roller of the air supply as follows:

Angular Misalignment - 0.52° in the positive direction about the Z axis, and 0.58° in the positive direction about the X axis.

Translational Misalignment - 0.425 inches in the -Y direction.

(See Appendix E, Figure 3 for C/P reference axes)

5.5.1.2.2 Repeat steps 5.5.1.1.4 through 5.5.1.1.8.

5.5.1.2.3 Re-align the forward record storage as follows:

Angular Misalignment - 0.52° in the negative direction about the Z axis, and 0.58° in the negative direction about the X axis.

Translational Misalignment - 0.425 inches in the +Y direction.

5.5.1.2.4 Repeat steps 5.5.1.1.4 through 5.5.1.1.8.

5.5.1.2.5 Turn off the OPERATING POWER.

5.5.1.2.6 Re-align the forward record storage assembly to its proper orientation.

5.5.2 Power, Command, Control and Response.

5.5.2.1 Crab Servo Checkout (Azimuth).

5.5.2.1.2 Make the following INSTRUMENTATION PATCHBOARD pin changes for the monitor points listed below:

CPL Point	Readout Instr.	Function
14	Chart Recorder 1	Crab Position
1	Chart Recorder 2	CB12 Monitor
24	Chart Recorder 3	CB10 Monitor
30	Chart Recorder 4	CB8 Monitor
31	Chart Recorder 5	CB9 Monitor
32	Chart Recorder 6	CB11 Monitor
33	Chart Recorder 7	Stereo Servo Control Ckt
34	Chart Recorder 8	Crab Servo Control Ckt

NOTE: This programming of the recorder shall be maintained throughout Crab Servo Checkout.

(L) 5.5.2.1.3 Attach the "Line of Sight Test Set" Theodolite Mounting Bracket to the Cradle and the variable transformer to its mounting plate on the bracket.

(L) 5.5.2.1.4 Mount the Theodolite on the bracket so that the circular level extends in the direction of the -Z C/P axis and so the leveling screws on each side of the circular level are in a line parallel to the C/P X axis.

(L) 5.5.2.1.5 Have assembly personnel remove the camera platen and set up a flood light to back light the slit plate.

(L) 5.5.2.1.6 Attach the Pentaprism to the Theodolite making sure that all three mounting points are seated and hand tighten the mounting screws. Attach the scale illuminator, reticle illuminator, and the reticle illuminator power cord to the Theodolite.

(L) 5.5.2.1.7 Set the variable transformer switches to 4 volts and OFF. Connect the transformer line cord to a 115 vac power source.

(L) 5.5.2.1.8 Using the circular level as an indicator, level the Theodolite by means of the three adjusting screws. Then perform a final leveling using the Theodolite spirit level as an indicator. Alternately rotate the Theodolite and Pentaprism between two azimuth positions 90° apart and make fine adjustments of the three screws until the spirit level indicates that the Theodolite is level in any position about the azimuth (horizontal) circle. When the Theodolite is level verify that the spirit level on the Pentaprism also indicates a level condition. If it does not, remount the Pentaprism paying particular attention to proper seating of the Pentaprism mounting pads.

5.5.2.1.9 Turn the transformer on and set the telescope to 90°0'0" on the zenith circle. (The operator is referred to the Theodolite instruction manual for detailed Theodolite operating and reading instructions.) Turn the transformer off.

5.5.2.1.10 Turn on the flood lamp to illuminate the Camera slit. Set the Camera slit control so that the focus slit containing the horizontal fiducial mark is at the aperture.

5.5.2.1.11 Rotate the Theodolite and Pentaprism until the Camera slit can be seen through the telescope and the center of the Theodolite reticle lies on the slit.

5.5.2.1.12 Adjust the Theodolite leveling screw opposite the circular level until the vertical line is parallel to the Camera slit. This adjustment is critical and must be performed with great care. Loosen the zenith lock on the theodolite telescope and scan the entire length of the camera slit. The slit image must remain between the two vertical theodolite reticle marks over the full length of the slit.

5.5.2.1.13 Adjust the other two leveling screws until the horizontal reticle line is colinear with the horizontal fiducial mark on the Camera slit.

5.5.2.1.14 With the vertical reticle line colinear with the center of the Camera slit, turn the transformer on and adjust the azimuth (horizontal) circle to 0°0'0" with the knob located just below the spirit level on the Theodolite. By means of the two screw jacks on one end of the C/P truck and a separate jack screw in the center of the other end, level the entire set-up until the spirit level on the theodolite indicates that the theodolite is level.

(L) 5.5.2.1.15 Remove the Pentaprism from the Theodolite. Recheck the level of the theodolite. If it is no longer level return it to a level attitude by adjusting the three theodolite leveling screws.

(L) 5.5.2.1.16 Set the OPERATING POWER to 28 volts and then apply power to the C/P. Command and EXECUTE Crab (AZIMUTH) position 1 and Stereo (ELEVATION) position 2.

(L) 5.5.2.1.17 Command and EXECUTE the Mirror to the various Crab positions as designated in the 0° to -3½° Crab Position Change Table. For each mirror position change, perform one or more of the following functions as shown in the table.

NOTE: Start by performing step B for Crab (Azimuth) positions 1 and 8. Have assembly adjust the Crab lead screw as necessary until these end positions are in tolerance and then pin the loead screw locking nuts.

FUNCTIONS

A. Measure, by using the oscillograph chart recorder, and record the time required for the mirror to travel between the indicated positions.

B. Autocollimate the Theodolite off the Elevation Mirror and record the azimuth (horizontal) and zenith (vertical) scale readings.

C. Measure and record the following instrumentation outputs using the DVM external probe.

CPL-13	VP-6	VP-11	VP-22
CPL-14	VP-7	VP-18	VP-23
VTP-13	VP-8	VP-19	VP-24
VTP-14	VP-9	VP-20	VP-25
	VP-10	VP-21	VP-26

NOTE: Some of the VP command lines have a capacitive filter element to the circuit return and require time to stabilize to 0 volts after removing power from the command line.

D. Verify, by observing the oscillograph chart that the Servo does not hunt or overshoot during position changes.

(J) 31.

(E)

0° to -3½° RANGE

CRAB POSITION CHANGE TABLE

STEP	Position FROM	Position TO	Perform Functions A	B	C	D
1	-	1		X	X	X
2	1	2	X	X	X	X
3	2	1	X	X		X
4	1	2		X		
5	2	1		X		
6	1	3		X	X	
7	3	2		X		X
8	2	3	X	X		X
9	3	2	X	X		
10	2	4		X	X	
11	4	3		X		X
12	3	4	X	X		X
13	4	3	X	X		
14	3	5		X	X	
15	5	4		X		X
16	4	5	X	X		X
17	5	4	X	X		
18	4	6		X	X	
19	6	5		X		X
20	5	6	X	X		X
21	6	5	X	X		
22	5	7		X	X	
23	7	6		X		X
24	6	7	X	X		X
25	7	6	X	X		
26	6	8		X	X	
27	8	7		X		X
28	7	8	X	X		X
29	8	7	X	X		
30	7	8		X		

(L) 5.5.2.1.18 Compute the average mirror positions in the 0° to -3½° Crab range by performing the calculations indicated on the data sheets.

(L) 5.5.2.1.19 Turn off the OPERATING POWER. Using a pair of padded jaw pliers manually turn the Crab Servo shaft until the mirror reaches the mechanical stop near position 8. Turn on the OPERATING POWER and verify that the Servo returns the mirror to position 8.

CAUTION: In turning the servo shaft apply only enough pressure to the pliers to overcome the servo drive friction.

(L) 5.5.2.1.20 Command and EXECUTE Crab position 1 and measure the time required for the mirror to travel from position 8 to position 1.

(L) 5.5.2.1.21 Turn the OPERATING POWER off. Using a pair of padded jaw pliers manually turn the Crab Servo shaft until the mirror reaches the mechanical stop near position 1. Turn on the OPERATING POWER and verify that the Servo returns the mirror to position 1.

CAUTION: In turning the servo shaft apply only enough pressure to the pliers to overcome the servo drive friction.

5/5.2.2 Stereo Servo Checkout (ELEVATION)

5.5.2.2.2

CPL Point	Readout Instr.	Function
13	Chart Recorder 1	Stereo Position
1	Chart Recorder 2	CB12 Monitor
24	Chart Recorder 3	CB10 Monitor
30	Chart Recorder 4	CB8 Monitor
31	Chart Recorder 5	CB9 Monitor
32	Chart Recorder 6	CB11 Monitor
33	Chart Recorder 7	Stereo Servo Control Ckt.
34	Chart Recorder 8	Crab Servo Control Ckt.

NOTE: This programming of the recorder shall be maintained throughout Stereo Servo Checkout.

5.5.2.2.3 Command and EXECUTE the mirror to the various Stereo positions as designated in the Stereo Position Change Table. For each mirror position change perform one or more of the following functions as shown in the table.

FUNCTIONS

A. Measure, by using the oscillograph, and record the time required for the mirror to travel between the indicated positions.

B. Autocollimate the Theodolite off the elevation mirror and record the azimuth (horizontal) and zenith (vertical) scale readings.

C. Measure and record the following instrumentation outputs using the DVM external probe.

CPL-13	VP-6	VP-11	VP-22
CPL-14	VP-7	VP-18	VP-23
VTP-13	VP-8	VP-19	VP-24
	VP-10	VP-21	VP-26

NOTE: Some of the VP command lines have a capacitive filter element to the circuit return and require time to stabilize to 0 volts after removing power from the command line.

D. Verify by observing the oscillograph chart that the Servo does not hunt or overshoot during position changes.

STEP	Position FROM	TO	Perform Functions A	B	C	D
1	-	1		X	X	
2	1	2	X	X		X
3	2	1	X	X		X
4	1	2		X	X	
5	2	1		X		
6	1	3		X		X
7	3	2		X		
8	2	3	X	X	X	
9	3	2	X	X		X
10	2	3		X		X

(L) 5.5.2.2.4 Compute the average mirror positions in the Stereo range by performing the calculations indicated on the data sheets.

(L) 5.5.2.2.5 Turn off the OPERATING POWER. Using a pair of padded jaw pliers manually turn the Stereo Servo shaft until the mirror reaches the mechanical stop near Stereo position 3. Turn on the OPERATING POWER and verify that the Servo returns the mirror to Stereo position 3.

CAUTION: In turning the servo shaft apply only enough pressure to the pliers to overcome the servo drive friction.

(L) 5.5.2.2.6 Command and EXECUTE Stereo position 1 and measure the time required for the mirror to travel from position 3 to position 1.

(L) 5.5.2.2.7 Turn the OPERATING POWER off. Using a pair of padded jaw pliers manually turn the Stereo Servo shaft until the mirror reaches the mechanical stop near Stereo position 1. Turn on the OPERATING POWER and verify that the Servo returns the mirror to Stereo position 1.

CAUTION: In turning the servo shaft apply only enough pressure to the pliers to overcome the servo drive friction.

(L) 5.5.2.2.8 Command and EXECUTE Stereo position 2 and Crab position 1.

(L) 5.5.2.2.9 Turn off the OPERATING POWER and the variable transformer.

(L) 5.5.2.2.10 Have assembly personnel re-install the camera platen and thread the payload for operation.

(L) 5.5.2.2.11 Remove the variable transformer, the Theodolite and the Theodolite Mounting Bracket. Replace these items in their respective carrying cases.

5.5.2.3 Timing Signal Amplifier Operation.

5.5.2.3.1 Insert the Cable Test Point Board between P683 and J683 and the special Data Signal B cable insertion fixture between P684 and J684 on the MOTOR SPEED DRIVE.

5.5.2.3.2 Turn on the C/P OPERATING POWER. Command DRIVE SPEED 01 ON and EXECUTE the command.

5.5.2.3.3 Using the DVM external probe, measure and record the values of CPL-19 and VTP-19 under the following conditions:

1. Data Signal Channels A and B off.
2. Data Signal Channel A on, Channel B off.
3. Data Signal Channel B on, Channel A off.
4. Data Signal Channels A and B on.

(J)

NOTE: In the Test Console, Data Signal A control is interlocked through the Data Signal B control, ie, Data Signal A is not connected to the C/P interface without the presence of Data Signal B. Data Signals A & B may be turned ON or OFF individually per the following table:

Data Signal	Test Console control		Special J/P 684 Chan. B Test Fixt.
	A	B	
A & B off	-----	OFF	----------
A on, B off	ON	ON	OFF
B on, A off	OFF	ON	ON
A & B on	ON	ON	ON

5.5.2.3.4 Command and EXECUTE the MOTOR OFF.

5.5.2.3.5 Connect the Tektronix Model 545A oscilloscope to the Data Signal Amplifier A output. This signal is available at the Cable Test Point Board as follows:

J683 pin h Amplified Signal A
pin f Amplified Signal A return

5.5.2.3.6 Command and EXECUTE MOTOR SPEED 01 ON. Using the oscilloscope measure and record the on and off amplitudes and the rise and decay times of the pulses. Command and EXECUTE the MOTOR off.

NOTE: Rise time is the time required for the instantaneous amplitude to go from 90 percent to 10 percent of the peak value.

5.5.2.3.7 Connect the oscilloscope to the Data Signal Amplifier B output. This signal is available at the cable test point board as follows:

J683 pin t Amplified Signal B
pin d Amplified Signal B return

5.5.2.3.8 Command and EXECUTE MOTOR SPEED 01 ON. Measure and record the on and off amplitudes and the rise and decay times of the pulses. Command and EXECUTE MOTOR OFF.

5.5.2.3.9 Turn the OPERATING POWER off. Remove the Cable Test Point Board from the P683-J683 junction.

5.5.2.4 **Power Control Check.**

5.5.2.4.1 **Operating and Instrumentation Power Consumption Measurement.**

5.5.2.4.1.1 **Connect the Breakout Box between the Test Console and C/P connectors** J654, J697, J698 and J699.

BE SURE THAT ALL SHORTING PLUGS ARE IN THE BREAKOUT BOX JACKS FOR J654, J697, J698 and J699.

5.5.2.4.1.2 **Remove the shorting plugs from the 28 volt supply jacks which are** J699 f and g **and install the 1 ohm shunt for current transient measurements.**

5.5.2.4.1.3 **Set up the Tektronix oscilloscope for external trigger mode of operation. Connect the scope input across the 1 ohm shunt, and connect the "HOT" side of the shunt to the external trigger input on the oscilloscope.**

5.5.2.4.1.4 **Using the oscilloscope measure and record the peak current and the recovery time from peak to 37% of the difference between peak and steady state currents for each of the following power functions.**

FUNCTION	MEASUREMENT LINE
1. OPERATING POWER turn-on	J699 f and g
2. FOCUS POWER turn-on (CB-15)	J699 f and g
3. Focus Adjust Motor turn-on (CB 17-18)	J697 x
4. Supply Brake turn-on (CB-24)	J697 S
5. MOTOR SPEED 48 turn-on (CB1-7)	J699 f and g
6. Stereo Servo turn-on (CB8-9)	J699 f and g
7. Crab Servo turn-on (CB10-12)	J699 f and g
8. T/U Motor	J654 K & H
9. Slit Positioner turn-on (CB 20-21)	J699 f and g

NOTE: Measure each function individually except for function 1 which must remain ON in order to perform the remaining functions.

5.5.2.4.1.5 Turn the OPERATING POWER off.

5.5.2.4.1.6 Remove the 1 ohm shunt from the Breakout Box.

5.5.2.4.1.7 Connect the Breakout Box ammeter to read the current through the J699 pins f and g parallel path. The shorting plugs should be left plugged in to provide meter protection and removed only while taking a reading.

5.5.2.4.1.8 Turn on the OPERATING POWER. Measure and record the steady state current for each of the following conditions of operations:

FUNCTION	MEASUREMENT LINE
1. OPERATING POWER on	J669 f and g
2. FOCUS POWER on*	J699 f and g
3. Focus Adjust Motor on	J697 x
4. Supply Brake on	J697 S
5. MOTOR SPEED DRIVE on*	J699 f and g
6. Stereo Servo running*	J699 f and g
7. Crab Servo running*	J699 f and g
8. T/U Motor	J654 K & H
9. Slit Positioner*	J699 f and g

"EFFECTIVE F-206 and FOLLOWING"

While measuring the take-up motor current also measure and record the value of CPL-29.

NOTE: Measure the current for each condition individually except that the OPERATING POWER* shall remain on for measurements marked "*".

(G)

5.5.2.4.1.9 Remove the ammeter from the J654 pin K connection and replace the shorting plugs in the jacks.

5.5.2.4.1.10 Connect the 0-15 milliameter in the J698 pin K line. The shorting plug should be left in to protect the meter and removed only when making a reading.

5.5.2.4.1.11 Turn on the OPERATING POWER.

5.5.2.4.1.12 Measure the Instrumentation Supply current with the milliammeter and record the value on the data sheet.

5.5.2.4.1.13 Turn the OPERATING POWER off.

5.5.2.4.1.14 Remove the milliammeter from the J698 pin K connection and replace the shorting plug. Disconnect the Breakout Box cables and connect the console cables to the C/P.

5.5.2.4.2 Power Instrumentation Calibration.

5.5.2.4.2.1 Turn on the OPERATING POWER and set the voltage to 27.0 volts as read on the DVM.

5.5.2.4.2.2 Using the DVM external probe, measure and record the values of VP-13, 44, 45, 46 and CRL35 and VTP 35.

5.5.2.4.2.3 Repeat step 5.5.2.4.2.2.at OPERATING POWER voltages of 28.0, 29.0, 30.0, 31.0, 32.0 and 33.0 volts.

5.5.2.4.2.4 Reset the OPERATING POWER to 28.0 volts and turn the power off.

5.5.2.4.2.5 Turn on the HEATER POWER and set the voltage to 14.0 volts as read on the DVM.

5.5.2.4.2.6 Using the DVM external probe, measure and record the values of VP-50 and CPL-26.

5.5.2.4.2.7 Repeat step 5.5.2.4.2.6 at HEATER POWER voltages of 18.0, 22.0, 26.0, 30.0 and 34 volts.

5.5.2.4.2.8 Reset the HEATER POWER to 28.0 volts and turn the power off.

5.5.2.5 Focus Mode Operation

5.5.2.5.1 Remove P682 from the Gain Control and connect it through the Cable Test Point Board.

5.5.2.5.2 Connect a 0-30 v.d.c. voltmeter as follows using the focus mode switch box:

Meter 1	positive to P682 pin B negative to P682 pin T
Meter 2	positive to P682 pin C negative to P682 pin T

5.5.2.5.3 Verify that the GAIN CONTROL and INSTRUMENTATION MODE selector is set for MANUAL operation.

5.5.2.5.4 Turn on the OPERATING POWER and record the meter readings.

5.5.2.5.5 Set the MANUAL control switch to FORWARD and push the EXECUTE button. Record the meter readings with the EXECUTE button depressed.

5.5.2.5.6 Set the MANUAL control switch to REVERSE and push the EXECUTE button. Record the meter readings with the EXECUTE button depressed.

5.5.2.5.7 Set the GAIN CONTROL and INSTRUMENTATION MODE switch to AUTOMATIC. Verify that the execution of a FORWARD or REVERSE manual command results in no command voltage indication on either meter.

5.5.2.5.8 Reset the GAIN CONTROL and INSTRUMENTATION MODE switch to MANUAL and turn the OPERATING POWER off.

5.5.2.5.9 Remove the Cable Test Point Board and reconnect P682 to J682 on the Gain Control. Remove the Breakout Box from the test setup.

5.5.2.6 Focus Adjust Operation

5.5.2.6.1 Operation at Input Voltage Extremes

5.5.2.6.1.1 Turn on the OPERATING POWER and adjust the voltage to 27.0 volts as read on the DVM.

5.5.2.6.1.2 EXECUTE the GAIN CONTROL MANUAL command in the REVERSE direction until the platen reaches its limit of travel.

5.5.2.6.1.3 EXECUTE the GAIN CONTROL MANUAL command in the FORWARD direction. Measure and record the time required for the platen to travel between its end stops while traveling in the forward direction.

5.5.2.6.1.4 EXECUTE the GAIN CONTROL MANUAL command in the REVERSE direction. Measure and record the time required for the platen to travel between its end stops while traveling in the reverse direction.

5.5.2.6.1.5 Adjust the OPERATING POWER voltage to 32.5 volts as read on the DVM.

5.5.2.6.1.6 Repeat steps 5.5.2.6.1.3 and 5.5.2.6.1.4.

5.5.2.6.1.7 Reset the OPERATING POWER to 28.0 volts and turn the power off.

5.5.2.6.2 Focus Position Instrumentation Calibration.

5.5.2.6.2.1 Place the Parallel Bar on top of the Camera case so that it spans the case across the upper end of the Platen.

(E)

5.5.2.6.2.2 Using the micrometer depth gage measure the distance from the top reference surface of the bar to the surface of each end of the platen when the platen is in the maximum reverse position.

5.5.2.6.2.3 Compute the platen reverse stop reference dimension by subtracting the thickness of the Parallel Bar from the measurement of step 5.5.2.6.2.2.

5.5.2.6.2.4 Mount a dial indicator, readable to 0.0001 inches, to measure motion of the platen with respect to the Camera case at each end of the platen. Make sure that the indicator plungers are perpendicular to the surface of the platen in the plane of motion.

5.5.2.6.2.5 Turn on the OPERATING POWER.

5.5.2.6.2.6 Record the two indicator readings and the values of CPL-20, CPL-27, VTP-20, and VP-51 as read on the digital voltmeter.

5.5.2.6.2.7 Command and EXECUTE the FORWARD (away from Lens) GAIN CONTROL MANUAL command to produce platen position changes in steps of 0.0005 inches as read on the lower dial indicator. At each position record the two indicator readings and the values of CPL-20, CPL-27.

5.5.2.6.2.8 From the indicator readings at the end stops compute and record the total platen travel.

5.5.2.6.2.9 Remove the indicators from the Camera and connect the DVM external probe to BBT-6.

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5.5.2.6.2.10 Command and EXECUTE the GAIN CONTROL in the REVERSE direction and record the time required for the platen to travel between the end stops. Also record the value of BBT-6. Command and EXECUTE the GAIN CONTROL in the FORWARD direction, recording the time required for the platen to travel between end stops and, also, the value of BBT-6. (L)

5.5.2.6.2.11 From the total platen travel determined in step 5.5.2.6.2.8 and the times determined in steps and 5.5.2.6.2.10 compute and record the rate of focus adjustment in inches per second for Operating Power Voltages of 27.0, 28.0, and 32.5 volts dc.

5.5.2.7 Film Drive Capability Test

5.5.2.7.1 Speed Check

5.5.2.7.1.1 Set the COUNTER INPUT switch to BBT-2. Set the COUNTER FUNCTION switch to FREQ. A and the TIME INTERVAL switch to 10.

5.5.2.7.1.2 Connect the DVM external probe to CPL-18.

5.5.2.7.1.3 Set the OPERATING POWER to 28.0 volts and apply power to the C/P.

5.5.2.7.1.4 Command and EXECUTE MOTOR SPEED 01 ON. Record the frequency of the BBT-2 signal and the output of CPL-18.

5.5.2.7.1.5 Repeat step 5.5.2.7.1.4 to obtain a reading for BBT-2 and CPL-18 at each of the remaining motor speeds (2 through 64).

5.5.2.7.1.6 EXECUTE the MOTOR OFF command.

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5.5.2.7.1.7 Turn OFF the Operating Power Supply.

5.5.2.7.1.8 Connect the oscilloscope to monitor BBT-2.

CAUTION: Oscilloscope must be isolated from AC ground.

5.5.2.7.1.9 Connect the Cable Test Point Board to cable W-3 and the MSD at connector J683.

5.5.2.7.1.10 Turn ON the Operation Power Supply.

5.5.2.7.1.11 Command and EXECUTE MOTOR SPEED 33 ON.

5.5.2.7.1.12 Using the oscilloscope measure the level of the dc component of the BBT-2 signal and the peak to peak voltage of the ac component.

5.5.2.7.1.13 Connect the oscilloscope between pins F and b of connector J683. Measure and record the peak value of the leading motor phase voltage.

5.5.2.7.1.14 Connect the oscilloscope between pins H and c of connector J683. Measure and record the peak value of the lagging motor phase voltage.

5.5.2.7.1.15 Command and EXECUTE the MOTOR OFF. Turn OFF the Operating Power Supply.

5.5.2.7.1.16 Disconnect the oscilloscope and Cable Test Point Board.

5.5.2.7.2 Logic Check

5.5.2.7.2.1 EXECUTE the MOTOR SPEED 64 and ON commands. Allow the looper to fill and empty five times and verify that there is no loss of film tension in the system at any time. EXECUTE the MOTOR OFF command and verify that the Forward Record Storage continues to operate until the take-up looper empty limit switch actuates.

5.5.2.7.2.2 Repeat step 5.5.2.7.2.1 with the OPERATING POWER set at 27.0 and 32.5 volts respectively.

5.5.2.7.2.3 Reset the OPERATING POWER to 28.0 volts and turn the power off.

5.5.2.7.2.4 Remove connector P661 (console cable W-2) from the Forward Record Storage Assembly.

5.5.2.7.2.5 Turn on the OPERATING POWER.

5.5.2.7.2.6 Manually move the looper truck to the extreme take-up looper empty position and record the value of CPL-17.

5.5.2.7.2.7 Manually move the looper truck to the extreme take-up looper full position and record the value of CPL-17.

5.5.2.7.2.8 Turn the OPERATING POWER off.

5.5.2.7.2.9 Reconnect P661 to the Forward Record Storage Assembly, turn on the OPERATING POWER long enough to allow the Forward Record Storage to empty the take-up looper then turn power off. Remove connector P661.

5.5.2.7.2.10 Manually move the looper truck until it just actuates the take-up looper empty switch. Turn on the OPERATING POWER, then record the values of BBT-1, CPL-17 and VTP-17.

5.5.2.7.2.11 Manually move the looper truck until it just actuates the take-up looper full switch and record the values of BBT-1, CPL-17 and VTP-17.

5.5.2.7.2.12 Turn the OPERATING POWER off.

5.5.2.7.2.13 Reconnect P661 to the Forward Record Storage Assembly.

5.5.2.7.2.14 Place a mark on the film at a convenient reference point in the Supply Cassette.

5.5.2.7.2.15 Turn on the OPERATING POWER long enough to allow the Forward Record Storage to empty the take-up looper then turn power off.

5.5.2.7.2.16 Using the reference point selected in step 5.5.2.7.2.14 place another mark on the film.

5.5.2.7.2.17 Determine the capacity of the looper by measuring the distance between the two marks on the film.

5.5.2.7.2.18 Again remove P661 from the Forward Record Storage Assembly.

5.5.2.7.2.19 Manually pull film from the supply reel until the film is slightly slack.

(J) 5.5.2.7.2.20 Connect the DVM external probe to monitor CPL-17.

(J) 5.5.2.7.2.21 Turn on the OPERATING POWER. Measure and record the value of CPL-17.

(J) 5.5.2.7.2.22 Manually release the supply reel brake band tension and move the looper truck to its mid-position.

(J) 5.5.2.7.2.23 With band brake still released push the CB 24 command button. Record the value of BBT-5 and verify that the supply reel takes up the slack film.

(J) 5.5.2.7.2.24 Restore the supply reel brake band tension.

(J) 5.5.2.7.2.25 Turn off the OPERATING POWER and reconnect P661 to the Forward Record Storage Assembly.

(J) 5.5.2.7.2.26 At a convenient point in the Camera mark the edge of the film and a reference mark on the frame of the camera using a ball point pen.

(J) 5.5.2.7.2.27 Turn on the OPERATING POWER.

(J) 5.5.2.7.2.28 After the Forward Record Storage has emptied the take-up looper measure and record the distance that the mark on the film has moved with respect to the mark on the camera frame.

(J) 5.5.2.7.2.29 Turn the OPERATING POWER off.

(J) 5.5.2.7.2.30 Connect the Cable Test Point Board to J658 on the C/P.

(J) 5.5.2.7.2.31 Connect J658 pin AA to the Trigger Input of the Oscilloscope. Connect J658 pin p to the Channel A Input. Connect J658 pin z to the oscilloscope chassis.

(J) 5.5.2.7.2.32 Turn on the Operating Power.

(H)

5.5.2.7.2.33 Execute the Motor Speed 01 command ON. Run the Camera for eight seconds and execute the Motor OFF command.

5.5.2.7.2.34 Repeat step 5.5.2.7.2.33 as necessary to obtain the following measurements:

1. Supply Brake Delay - Measure and record the time delay from the start of the sweep to the leading edge of the positive pulse. (Approx. 10 ms).
2. Measure and record the width of the positive pulse. (Approx. 1 second).

5.5.2.7.2.35 Turn off the Operating Power.

5.5.2.8 Port Open Telltale Calibration.

5.5.2.8.1 Mount the Port Open Telltale Light Source on a strut of the C/P structure so the P.O.T. detector is completely covered by the Light Source tube.

5.5.2.8.2 Remove cable W-13 from the console and connect W-23 between J-115 on the console and J-201 on the P.O.T. Light Source.

5.5.2.8.3 Turn on the ILLUMINATOR power and adjust the current to the appropriate value as posted on the P.O.T. Light Source.

5.5.2.8.4 Turn the OPERATING and HEATER POWER D.C. ON and set the voltages to 28 volts. Connect the DVM to read CPL-25.

(J)

5.5.2.8.5 By switching the DOOR INTENSITY switch from LOW to HIGH record the values of CPL-25 for the steps in the table below.

DOOR INTENSITY	CPL-25 NOMINAL
LOW	1v
HIGH	5v
LOW	2v
HIGH	5v
LOW	3v
HIGH	5v
LOW	4v
HIGH	5v
LOW	1v

5.5.2.8.6 Turn off the ILLUMINATOR, HEATER, and OPERATING power.

5.5.2.8.7 Remove calbe W-23 and the P.O.T. light source from the C/P. Reconnect W-13 to J115 on the console.

5.5.2.9 Slit Positioner Operation.

5.5.2.9.1 Turn ON the OPERATING POWER.

5.5.2.9.2 Command and EXECUTE the Slit (SLIDE) to position 1.

5.5.2.9.3 Command and EXECUTE the Slit (SLIDE) to the various positions shown in the Slit Position Change Table. For each position change perform the measurements indicated in the table.

Slit Position Change Table

Step	Position From	Position To	Measurements CPL-12	Measurements VP-2,3,4,48
1	1	2	X	X
2	2	1	X	X
3	1	3	X	X
4	3	2	X	-
5	2	4	X	X
6	4	3	X	-
7	3	5	X	X
8	5	4	X	-
9	4	5	-	-

5.5.2.9.4 Turn OFF the OPERATING POWER.

5.5.2.10 **Slit Transition Time Check.**

5.5.2.10.1 **Connect the Breakout Box between the Test Console and C/P connector J699.**

BE SURE THAT ALL SHORTING PLUGS ARE IN THE BREAKOUT BOX JACKS FOR J699.

5.5.2.10.2 **Remove the shorting plugs from the 28 volt supply jacks which are J699 f and g and install the 1 ohm shunt for current measurements in terms of the voltage drop across these pins.**

5.5.2.10.3 **Isolate the Tektronix oscilloscope from equipment grounds and surrounding test equipment chassis for these measurements.**

5.5.2.10.4 **Using internal trigger mode of operation, connect the scope input across the 1 ohm shunt and measure Slit transition time (current drain duration) between positions indicated on data sheet.**

NOTE: The waveshape to be monitored will appear on the scope as a step function above the steady state operating power waveform.

5.5.3 **Environmental Control Checkout.**

5.5.3.1 **Temperature Probe Instrumentation Calibration Check at 70°F.**

5.5.3.1.1 **Move the Breakout Box, Cable Test Point Board, the resistance bridge, and a Simpson 260 meter along side of the C/P.**

5.5.3.1.2 **Set up the Portable Test Set or console.**

5.5.3.1.3 **Connect the Cable Test Point Board to P655, P657, and P658. Use both cables for each connector so that no C/P circuitry is interrupted. Also connect the Breakout Box cables for P699 to the Test Box and Console or test set.**

5.5.3.1.4 Ascertain that the OPERATING POWER is off.

5.5.3.1.5 Using the resistance bridge, measure the thermistor probe resistances as follows:

INST. PT.	PROBE	FROM	TO
CPL 3	RT901	J657 Y	J657 Z
CPL 3	RT902	J657 W	J657 X
CPL 5	A-902	J655 L	J655 M
BBT 3	A-915	J655 NN	J655 PP
BBT 4	A-916	J655 LL	J655 MM

5.5.3.1.6 Remove all test lead plugs from the front panel of the Cable Test Point Board.

5.5.3.1.7 Set the OPERATING POWER to 28.0 volts and apply power to the C/P.

5.5.3.1.8 Using the DVM external probe read and record the values of following instrumentation points:

CPL-2	VTP-2	CPL-8	VTP-8
CPL-4	VTP-4	CPL-9	VTP-9
CPL-6	VTP-6	CPL-10	VTP-10
CPL-7	VTP-7	CPL-11	VTP-11

5.5.3.1.9 Turn off the OPERATING POWER.

5.5.3.1.10 Obtain the QC-A-302 test report for each temperature probe assembly. Copy the appropriate resistance value onto the data sheets for each temperature listed in the DECADE column for each temperature probe.

5.5.3.1.11 Connect the resistance decade box to each of the following sets of pins on the Cable Test Point Board such that the decade box is connected to the Distribution Box and the temperature probe is disconnected.

CPL	J-658	J-657
4	j	g
5	j	t
6	j	n
7	j	k
8	j	i
9	j	f
11	j	e

(L)

5.5.3.1.12 For each CPL point, read the output with the decade box set to each resistance value listed on the data sheet.

NOTE: Turn Operating Power OFF while changing connection points and setting first resistance value.

5.5.3.1.13 Remove wire No. 634 from terminal 2 on terminal strip TB614 in the Take-up Assembly. Connect the decade box between terminals 1 and 2 of TB614. Read the CPL-2 output for each resistance value listed on the data sheet.

5.5.3.1.14 Turn the Operating Power OFF and replace wire No. 634 on terminal 2 of TB614.

5.5.3.2 Heater Turn-On and Turn-Off Verification.

5.5.3.2.1 Connect the Breakout Box milliammeter between J699 pins h and i (on top) and pins h and i (on the bottom). Set the HEATER POWER to 28.0 volts and apply to the C/P.

5.5.3.2.2 Attach the voltmeter in turn to each designated monitor point as designated in the Heater System table. To test each heater circuit verify that the heater is not on by moring presence of 28 volts at the monitor point. Spray coolant on the C/P no closer than 6 inches from the heater circuit sensor under test.

NOTE: Use coolant sparingly to avoid reducing the temperature too rapidly.

(K)

HEATER SYSTEM TABLE

Heater System	Thermostat and Location	Monitor Points
3	RT903 - Structural Mounting Ring	Heater Control A910, terminals 1 & 5
4	RT904 - Structural Mounting Ring	Heater Control A911, terminals 1 & 5
5	RT905 - Structural Mounting Ring	Heater Control A912, terminals 1 & 5
6	RT906 - Outside rear Comp.	TB907, terminal 6 and chassis
10	RT907 - Black Dot near TP904	TP904 and chassis
11	RT908 - Black Dot near TP903	TP903 and chassis
12	RT909 - Black Dot near TP902	TP902 and chassis
13	RT910 - Black Dot near TP906	TP906 and chassis
14	RT911 - Black Dot near TP907	TP907 and chassis
15	RT912 - Black Dot near TP908	TP908 and chassis
16	RT913 - Outside rear Comp. Support Tube	TB905, terminal 4 and chassis
17	RT914 - Black Dot near TP905	TP905 and chassis
18	RT915 - Black Dot near TP901	TP901 and chassis

5.5.3.2.3 When the monitor voltage drops from 28 to 0 volts, record the change in heater current as read on the milliammeter and indicate turn-on operation "OK" on the data sheet.

5.5.3.2.4 Allow the thermostat to return to room temperature. When the monitor voltage rises from 0 to 28 volts indicate turn-off operation "OK" on the data sheet.

NOTE: If the thermostat does not actuate by the time room temperature is reached, apply heat with a heat gun, but no closer than 6 inches from the thermostat being tested until the thermostat actuates. Apply heat sparingly to avoid raising the temperature too rapidly.

5.5.3.2.5 Add all the individual heater system currents and enter the total heater current on the data sheet.

5.5.3.2.6 Obtain the in-process (QC-A-329) test report for the Component Support tubes on the payload under test. The heater system switching temperatures recorded in this report shall be included in the payload log book.

5.5.3.2.7 Turn off the HEATER POWER.

5.5.3.3 **Lens Barrel Temperature Amplifier Calibration.**

5.5.3.3.1 Connect one resistance decade box to pins L and M of J655 such that the decade box is connected to the amplifier and thermistor probe A902 is disconnected.

5.5.3.3.2 Determine the serial number of probe A902 from the Q.C. inspection log and obtain the QC-A-302 test report for this probe (dwg. No. 516-100).

5.5.3.3.3 From the QC-A-302 test report determine the resistance of A902 at 70°F. Record this value in the appropriate space on the data sheet.

5.5.3.3.4 Calculate and record on the data sheet, the remaining resistance values for A902 by using the following resistance - temperature table:

A902 resistance at 60° = 1.2904 x resistance at 70°

A902 resistance at 65° = 1.1346 x resistance at 70°

A902 resistance at 75° = 0.8835 x resistance at 70°

A902 resistance at 80° = 0.7823 x resistance at 70°

5.5.3.3.5 Turn ON the Operating Power Supply and adjust it for a 28 volt output.

5.5.3.3.6 Adjust the decade box to the set of values for A902 which have been recorded on the data sheet. For each setting of the decade box, record the value of CPL-5 and VTP-5.

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5.5.3.3.7 Turn the OPERATING POWER off.

5.5.3.3.8 Disconnect the decade box from the Cable Test Point Board.

5.5.3.4 Stereo Mirror Temperature Gradient Amplifier Calibration.

5.5.3.4.1 CONNECT decade A between J657 y and J657 z and decade B between J657 w and J657 x.

5.5.3.4.2 DETERMINE the serial numbers of probes RT901 and RT902 from the Q.C. inspection log and obtain the QC-A-364 test reports for the two probes (dwg. No. 516-224).

5.5.3.4.3 FROM the QC-A-364 test reports determine the resistance of RT-901 and RT-902 at 55°, 70°, and 85°F. Record these values in the appropriate spaces on the data sheet.

5.5.3.4.4 Calculate, and record on the data sheet, the remaining resistance values for RT-901 by using the following:

55° AMBIENT

RT-901 resistance at 54° = 1.0284 x resistance at 55°
" " " 56° = 0.9725 x " " 55°
" " " 57° = 0.9458 x " " 55°
" " " 58° = 0.9200 x " " 55°

70° AMBIENT

RT-901 resistance at 69° = 1.0268 x resistance at 70°
" " " 71° = 0.9740 x " " 70°
" " " 72° = 0.9488 x " " 70°
" " " 73° = 0.9243 x " " 70°

85° AMBIENT

RT-901 resistance at 84° = 1.0253 x resistance at 85°
" " " 86° = 0.9754 x " " 85°
" " " 87° = 0.9515 x " " 85°
" " " 88° = 0.9282 x " " 85°

5.5.3.4.5 Turn ON the Operating Power Supply and adjust it for a 28 volt output.

5.5.3.4.6 Adjust the decade boxes to the sets of values for RT-901 and RT-902 which have been recorded on the data sheet. For each setting of the decade boxes record the values of CPL-3 and VTP-3.

5.5.3.4.7 Turn the OPERATING POWER off.

5.5.3.4.8 Disconnect decade boxes A and B.

5.5.3.4.9 Disconnect all cables from the C/P.

5.5.4 Collimator Set-Up.

5.5.4.1 C/P to Collimator Alignment.

5.5.4.1.1 Have assembly personnel install the C/P on the Test Unit Mounting Assembly. Verify that the counterbalance is correctly positioned below the flat mirror cell trunnion shaft. Attach thermocouples to the C/P mounting frame to measure air temperature as follows:

Thermocouple	Location
#16	Just above the Meniscus.
#17	Unibal support at the primary mirror end of the support tubes.
#18	Bottom center of the support tubes.
#19	On "A" frame near the camera.

5.5.4.1.2 Perform the Test Console set-up procedure (Appendix A).

5.5.4.1.3 Turn the OPERATING POWER on.

5.5.4.1.4 Execute Azimuth position 1, MOTOR OFF, and consecutively positions 1,3 and 2 of the Elevation servo.

5.5.4.1.5 Turn the OPERATING POWER off.

5.5.4.1.6 Remove all film from the take-up reel and install a full 3000 feet roll of virgin record in the air supply. The partially used roll of record just removed shall be placed in a sealed can and set aside for future use.

5.5.4.1.7 Turn on the OPERATING POWER. EXECUTE MOTOR SPEED 51 to ON. After all splices have run through the C/P and on to the take-up reel EXECUTE the MOTOR OFF command.

5.5.4.1.8 Turn the OPERATING POWER off.

5.5.4.1.9 Have assembly personnel install the Camera and Air Supply Covers.

5.5.4.1.10 Set the POSITIONER control location switch on the Test Console to REMOTE No. 1.

5.5.4.1.11 Install the Alignment Telescope on the bracket inside the access post opposite the target.

5.5.4.1.12 Mount the Moving Target Assembly in position on the Collimator making certain that the assembly is in contact with all locating stops. Connect the cables and air hose to the MTA.

5.5.4.1.13 Release the drum detent on the Moving Target Assembly and rotate the drum until the detent pin engages the drum locating slot. (In this position, the target alignment fiducial is at the collimator image plane.)

5.5.4.1.14 Turn the ILLUMINATOR LAMP power on and adjust the lamp current to 2.0 amperes.

5.5.4.1.15 Verify visually with the alignment telescope that the Camera slit plate is properly positioned with the 0.0083 inch slit at the Camera aperture.

5.5.4.1.16 Using the Alignment Telescope observe the location of the target fiducial image on the camera slit.

5.5.4.1.17 If necessary adjust the Test Unit Mounting Fixture, by means of the Positioner, so that the Camera slit is parallel to and centered on the target vertical reticle line; and the slit plate fiducial line is centered on the target vertical reticle line. (See figure II of appendix E).

5.5.4.1.17.1 Centering of the slit image on the target vertical reticle in the X direction shall be accomplished by turning the handwheel located at the left rear of the positioner.

5.5.4.1.17.2 Centering of the slit fiducial line image on the target horizontal reticle line in the Y direction shall be accomplished by operating the positioner motor.

5.5.4.1.17.3 Alignment of the slit image to the target reticle about the Z axis is determined by the location of the rear unibal support on the cradle.

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CAUTION: THE UNIBAL MOUNT ON THE CRADLE HAS BEEN PROPERLY SET FOR THE P/L IN THE CRADLE AND SHOULD NEVER BE RE-ADJUSTED WHILE THE STOW PINS ARE INSTALLED IN THE PAYLOAD.

5.5.4.1.17.4 Operate the Positioner and observe the tracking of the Camera slit with respect to the target verticle line. If a deviation from tracking is observed the C/P must be readjusted as stated in step 5.5.4.1.17.1.

5.5.4.1.17.5 Repeat steps 5.5.4.1.17.1 through 5.5.4.1.17.3 until alignment is achieved.

5.5.4.1.18 Adjust the POSITIONER INDICATOR needle on the Test Console, to read 0 degrees when the Camera slit and target drum reticle is aligned.

5.5.4.1.19 Remove the Alignment Telescope from its bracket and replace the collimator access port.

5.5.4.1.20 Release the Moving Target detent pin from the locating slot.

5.5.4.1.21 Decrease the ILLUMINATOR LAMP current to zero but do not turn the lamp power off.

5.5.4.2 Determination of Target Drum Oscillator Frequencies.

5.5.4.2.1 Obtain a copy of the following data from other Q.C. test reports.

1. Camera Film Speed vs MSD Frequency data, test report QC-A-250.
2. Curve II, Drum Motor Frequency vs Drum Speed for the target, test report QC-A-209.
3. Focal length of the C/P lens, test report QC-A-321.
4. Focal length of the Collimator, test report QC-A-204.

5.5.4.2.2 Fill in the heading of the Target Drum Oscillator Frequency data sheet.

5.5.4.2.3 Look up the MSD frequencies for speeds 1, 9, 17, 25, 31, 33, 41, 49, 57 and 64 as recorded in steps 5.5.2.7.1.4 and 5.5.2.7.1.5. Enter these values on the chart.

5.5.4.2.4 Calculate the Camera Film Speed Ratio (CFSR) at the five speeds for which data is given the Camera test report QC-A-250 using:

$$\text{CFSR} = \frac{\text{linear camera film speed (in/sec)}}{\text{camera drive frequency (cps)}}$$

Calculate the arithmetic average of these five values and enter the resultant CFSR on the data sheet. Determine the value of S_F for speed steps 1,9,17,25,31,33,41,49,57 and 64 using: S_F = average CFSR x MSD freq. (cps)

5.5.4.2.5 Calculate the drum speed for each MSD frequency by using the relationship:

$$S_D = S_F \times \frac{f_c}{f_1}$$

where:

S_D = drum speed in inches per second

S_F = film speed in inches per second

f_c = collimator focal length in inches

f_1 = C/P lens focal length in inches

5.5.4.2.6 Determine the value of F_D (Target Drum Oscillator Frequency) from Curve II for each value of S_D and enter these values on the chart.

5.5.4.2.7 Obtain the latest calibration curve for the MTA illuminator assembly and enter the illuminator current on the data sheet for each of the designated speeds.

5.5.4.2.8 Unless otherwise stated all dynamic focus and resolution tests are performed at 1/400 second exposure. For the 0.0083 inch slit a camera film velocity of 3.336 inches per second is required. Check the S_p column on the data sheet for the value most closely equal to 3.336 and use the corresponding camera speed step for all photographic runs. This will be step 31 for payloads FM-11 and following.

5.5.5 Photographic Focus Run

5.5.5.1 Ascertain that the record storage enclosure is sealed.

5.5.5.2 Set the COMMAND switches for MOTOR SPEED (31) ON, ELEVATION position 2, and AZIMUTH position 1.

NOTE: If the mirror has been repositioned at assembly time, alignment of the C/P to the collimator must be re-checked.

5.5.5.3 Turn ON the OPERATING POWER D.C. The HEATER POWER may be turned on intermittently during the stabilization period to help equalize the temperatures of the C/P.

HEATER POWER must be OFF during photo testing.

5.5.5.4 Push the COMMAND EXECUTE button. Run the Camera for 4 minutes then EXECUTE the MOTOR OFF command. Turn the OPERATING POWER D.C. OFF.

5.5.5.5 Set the COUNTER INPUT switch to OSCILLATOR and adjust the OSCILLATOR until the COUNTER reads the correct frequency for speed 31 as determined in section 5.5.4.2.

5.5.5.6 Start the ILLUMINATOR MOTOR.

5.5.5.6.1 Set the direction switch for REVERSE operation.

5.5.5.6.2 Turn the START SPEED control fully counterclockwise.

5.5.5.6.3 Depress the ON switch.

5.5.5.6.4 Set the START-RUN switch to the START position.

5.5.5.6.5 Turn the START SPEED control in the clockwise direction until the TARGET DRUM starts to rotate.

5.5.5.6.6 Set the START-RUN switch to the RUN position.

5.5.5.6.7 Visually verify that the drum is rotating in a clockwise direction as viewed from the top.

5.5.5.7 Adjust the ILLUMINATOR LAMP current to the proper level for the test speed to be used.

5.5.5.8 With the Collimator tent still open turn on the large tunnel fan.

NOTE: FROM THIS TIME ON, NO PERSONNEL SHALL ENTER THE COLLIMATOR TUNNEL, ACCESS DOORS, THE TENT, OR WALK ON THE COLLIMATOR PAD.

5.5.5.9 Fifteen minutes after completing step 5.5.2.8 close the collimator tent. Using the DVM measure the values of CPL 2, 3, 4, 5, 6, 7, 8, 9 and 11 and record data on the PHOTO TEST TEMPERATURE DATA SHEET along with the temperatures indicated by the thermometers outside the tent area and the following thermocouples: 1, 8, 9, 13, 15, 16, 17, 18, 19 and 20. Sixty minutes after completing step 5.5.5.8 repeat the above temperature measurements. If any of the CPL values are out of spec additional stabilization time shall be allowed until the temperatures are within required limits and are stable. At such time the test may be started.

5.5.5.10 Set the GAIN CONTROL - MANUAL DRIVE switch to REVERSE. Push and hold the EXECUTE button until the platen carriage actuates the reverse limit switch.

5.5.5.11 Set the GAIN CONTROL - MANUAL DRIVE switch to the FORWARD position.

5.5.5.12 Select focus positions at 0.125 volt increments over the CPL-20 range of 1.25 to 3.75 volts dc. Record these values on the focus run data sheet.

5.5.5.13 EXECUTE the GAIN CONTROL - MANUAL DRIVE FORWARD command until CPL-20 indicates the value for the first position on the focus run data sheet.

5.5.5.14 Set the DATA SIGNAL TEST NUMBER switches to 0, 1 and turn on the CHANNEL A and CHANNEL B switches.

5.5.5.15 EXECUTE the MOTOR-ON command. Run the Camera for 12 seconds and EXECUTE the MOTOR-OFF command.

5.5.5.16 Using consecutive DATA SIGNAL TEST NUMBERS repeat paragraphs 5.5.5.13 through 5.5.5.15 for the remaining 20 positions listed on the focus run data sheet.

NOTE: While running the test completely fill out the headings of the Focus Analysis data sheets.

5.5.5.17 Set the POSITIONER CONTROL LOCATION switch to CONSOLE.

5.5.5.18 Adjust the POSITIONER to obtain a reading of +0.5 on the indicator.

5.5.5.19 Repeat steps 5.5.5.10, 5.5.5.11 and 5.5.5.13.

5.5.5.20 Set the DATA SIGNAL TEST NUMBER switches to 0, 1.

5.5.5.21 EXECUTE the MOTOR-ON command. Run the Camera for 12 seconds and EXECUTE the MOTOR-OFF command.

5.5.5.22 Using consecutive DATA SIGNAL TEST NUMBERS repeat step 5.5.5.21 for the remaining 20 positions listed on focus run data sheet.

5.5.5.23 Adjust the POSITIONER to obtain a reading of -0.5 on the indicator.

5.5.5.24 Repeat steps 5.5.5.10, 5.5.5.11, and 5.5.5.13.

5.5.5.25 Set the DATA SIGNAL TEST NUMBER switches to 0, 1.

5.5.5.26 EXECUTE the MOTOR-ON command. Run the Camera for 12 seconds and EXECUTE the MOTOR-OFF command. Repeat paragraph 5.5.5222.

5.5.5.27 Adjust the POSITIONER to obtain a reading of +2.8 on the indicator.

5.5.5.28 Repeat steps 5.5.5.10, 5.5.5.11, and 5.5.5.13.

5.5.5.29 Set the TEST NUMBER switches to 0, 1.

5.5.5.30 EXECUTE the MOTOR-ON command. Run the Camera for 12 seconds and EXECUTE the MOTOR-OFF command. Repeat paragraph 5.5.5.22.

5.5.5.31 Adjust the POSITIONER to obtain a reading of -2.8 on the indicator.

5.5.5.32 Repeat steps 5.5.5.10, 5.5.5.11 and 5.5.5.13.

5.5.5.33 Set the TEST NUMBER switches to 0, 1.

5.5.5.34 EXECUTE the MOTOR-ON command. Run the Camera for 12 seconds and EXECUTE the MOTOR-OFF command. Repeat paragraph 5.5.5.22.

5.5.5.35 Turn off the ILLUMINATOR LAMP and MOTOR.

5.5.5.36 Adjust the POSITIONER to obtain a reading of 0 on the indicator. Execute the MOTOR SPEED 51 and MOTOR ON commands.

5.5.5.37 After 60 seconds execute the MOTOR OFF command. Using the DVM measure the values of CPL 2, 3, 4, 5, 6, 7, 8, 9, and 11 and record data on the PHOTO TEST TEMPERATURE DATA SHEET along with the temperatures indicated by the thermometers outside the tent area and the following thermocouples: 1, 8, 9, 13, 15, 16, 17, 18, 19 and 20. Turn the OPERATING POWER OFF.

(L)

5.5.5.38 Have assembly personnel remove the exposed focus runs from the Forward Record Storage assembly and rethread the film from the C/P on to the take-up reel.

5.5.5.39 Seal the focus run film in a film container and forward it to the processing group along with the following paper work:

1. A "PINK" Request for Processing Ticket
2. An "ORANGE" Process Control Card
3. The film evaluation data sheets

NOTE: The test engineer is responsible for identifying the film when it is returned from processing.

5.5.5.40 The processed focus runs shall be evaluated in accordance with appendix C.

5.5.5.41 A minimum of 3 hours after completion of paragraph 5.5.5.37, repeat paragraphs 5.5.5.1 through 5.5.5.26 and 5.5.5.35 through 5.5.5.40.

5.5.5.42 A minimum of 3 hours after completion of paragraph 5.5.5.41, through 5.5.5.40.

5.5.5.43 A minimum of 3 hours after completion of paragraph 5.5.5.42, repeat paragraphs 5.5.5.1 through 5.5.5.26 and 5.5.5.35 through 5.5.5.40.

5.5.5.44 Record the values of CPL-20 and CPL-27 for best photographic focus as determined by the evaluation process of appendix C.

5.5.6 Focus Sensor Calibration

5.5.6.1 Remove the Moving Target Assembly from the collimator and replace it with the Gain Target Assembly.

5.5.6.2 Set the ILLUMINATOR illumination level to 3.0 amperes. (L)

5.5.6.3 Start the Target Drum by performing paragraph 5.5.5.6.1 through 5.5.5.6.7.

5.5.6.4 Using the Alignment Telescope adjust the Test Unit Mounting Assembly until the target image, as viewed through the Alignment Telescope, completely covers the focus sensor reticle. This adjustment is made with the handwheel at the left rear of the positioner.

5.5.6.5 Make the following INSTRUMENTATION PATCHBOARD pin changes for the monitor points listed below:

CPL Point	Readout Inst.	Function
13	Chart Recorder 1	Stereo Position
14	Chart Recorder 2	Crab Position
17	Chart Recorder 3	Looper Position
20	Chart Recorder 4	Platen Pos., coarse
27	Chart Recorder 5	Platen Pos., fine
21	Chart Recorder 6	Gain Sensor Output
22	Chart Recorder 7	Gain Fwd. Chan. Output
23	Chart Recorder 8	Gain Rev. Chan. Output

NOTE: This programming of the recorder shall be maintained throughout Focus Sensor Calibration.

(J)

5.5.6.6 Start the OSCILLOGRAPH CHART RECORDER at a speed of 0.8 mm/sec. Turn the OPERATING POWER ON and record temperatures as in para. 5.5.5.9 or 5.10.5.12.12. Set GAIN CONTROL POWER switch to ON.

NOTE: DO NOT OPERATE GAIN CONTROL MORE THAN ONE (1) HOUR CONTINUOUSLY. AFTER ONE HOUR ON TIME, TURN OFF FOR ONE HOUR.

5.5.6.7 Adjust the drum oscillator to the proper frequency as indicated below:

C/P Model No.	Oscillator Frequency	Simulated C/P Height
F201-F203	2960 cps	132.5 miles
F204-F216	3700 cps	80 miles
F217 and following	5030 cps	80 miles

5.5.6.8 Command and EXECUTE the MANUAL DRIVE in the REVERSE direction (toward the lens) until it reaches the reverse stop. Record the output of CPL-20, CPL-21, CPL-22, CPL-23, CPL-27, VTP-20, VP-1, VP-5, VP-12, and VP-51.

5.5.6.9 Command and EXECUTE the MANUAL DRIVE in the FORWARD direction (away from the lens) in steps of 0.250 vdc, as indicated by CPL-20, until reaching the forward stop. Record the values of CPL-20, CPL-21, CPL-22, and CPL-23 for each step.

5.5.6.10 With the platen positioned at the forward stop EXECUTE the MANUAL DRIVE in the REVERSE direction until CPL-20 indicates BPF. Record the values of CPL-20 and CPL-21.

5.5.6.11 With the platen positioned at the reverse stop EXECUTE the MANUAL DRIVE in the FORWARD direction until CPL-20 indicates BPF. Record the values of CPL-20 and CPL-21.

5.5.6.12 Repeat step 5.5.6.10.

5.5.6.13 Repeat step 5.5.6.11.

5.5.6.14 With the platen positioned at the reverse stop EXECUTE the MANUAL DRIVE FORWARD command until CPL-21 indicates 2.5 volts

dc. Record the values of CPL-20 and CPL-21.

5.5.6.15 With the platen positioned at the forward stop EXECUTE the MANUAL DRIVE REVERSE COMMAND until CPL-21 indicates 2.5 volts dc. Record the values of CPL-20 and CPL-21.

5.5.6.16 Command and EXECUTE the MANUAL DRIVE in the REVERSE direction until reaching the reverse stop. Command the AUTOMATIC mode of GAIN CONTROL operation. After the automatic adjustment has been completed record the values of CPL-20 and CPL-21. Command the MANUAL mode of GAIN CONTROL operation.

5.5.6.17 Repeat step 5.5.6.16 five times.

5.5.6.18 Command and EXECUTE the MANUAL DRIVE in the FORWARD direction until reaching the forward stop. Command the AUTOMATIC mode of GAIN CONTROL operation. After the automatic adjustment has been completed, record the values of CPL-20 and CPL-21. Command the MANUAL mode of GAIN CONTROL operation.

5.5.6.19 Repeat steps 5.5.6.18 five times.

5.5.6.20 Command and EXECUTE the MANUAL DRIVE in the FORWARD direction until reaching the forward stop. Reduce ILLUMINATOR LAMP current to a minimum setting and record the values of CPL-20, 21, 22, and 23.

5.5.6.21 Repeat step 5.5.6.20 at the reverse stop position.

5.5.6.22 Turn off the ILLUMINATOR MOTOR and the OPERATING POWER D.C.

5.5.6.23 Place a 0.0051 inch spacer between the Gain Target Assembly locating pin and collimator front stop.

5.5.6.24 Repeat steps 5.5.6.2, 5.5.6.3, 5.5.6.5, and 5.5.6.6.

5.5.6.25 Adjust the drum oscillator to 3280 cps.

(J)

5.5.6.26 Repeat steps 5.5.6.8 thru 5.5.6.22 with the following variation:

In steps 5.5.6.10 and 5.5.6.11, EXECUTE the MANUAL DRIVE until the output of CPL-20 is 0.085 vdc below its value at best focus position. This value of platen position telemetry indicates the corrected BPF for an altitude of 120 nautical miles.

5.5.6.27 Place a 0.0025 inch spacer between the Gain Target Assembly locating pin and collimator front stop.

5.5.6.28 Repeat steps 5.5.6.2, 5.5.6.3, 5.5.6.5 and 5.5.6.6.

5.5.6.29 Adjust the drum oscillator to 4100 cps.

5.5.6.30 Repeat steps 5.5.6.8 thru 5.5.6.22 with the following variation:

In steps 5.5.6.10 and 5.5.6.11, EXECUTE the MANUAL DRIVE unitl the output of CPL-20 is 0.050 vdc below its value at best focus position. This value of platen position telemetry indicates the corrected BPF for an altitude of 100 nautical miles.

5.5.6.31 Reinstate INSTRUMENTATION PATCHBOARD pin connections per step 5.5.1.1.1.

5.5.7 Dynamic Photo Test

5.5.7.1 Remove the Gain Target Assembly from the Collimator and replace it with the Moving Target Assembly.

5.5.7.2 Realign the C/P to the Collimator by performing the steps of Section 5.5.4.1.

(J)

5.5.7.3 Install the Forward Record Storage cover.

5.5.7.4 Set the OPERATING POWER to 28.0 vdc.

5.5.7.5 Turn the OPERATING POWER D.C. ON.

5.5.7.6 Command and EXECUTE the MANUAL DRIVE in the REVERSE direction until the output of CPL-20 is approximately 0.5 volts below its value at BPF position as determined in paragraph 5.5.5.33.

5.5.7.7 Command and EXECUTE the MANUAL DRIVE in the FORWARD direction to the BPF position as indicated by the outputs of CPL-20 and CPL-27 determined in paragraph 5.5.5.33.

5.5.7.8 Command the ELEVATION to 2, the AZIMUTH to 1, the MOTOR SPEED to 31 and the MOTOR to ON. EXECUTE the commands. Turn DATA SIGNALS CHANNEL A and CHANNEL B on.

5.5.7.9 Command the MOTOR to OFF after one minute running time.

5.5.7.10 Command the Slit (SLIDE) to position 1.

5.5.7.11 Verify that the Dark Tent is in place and properly adjusted for photographic testing.

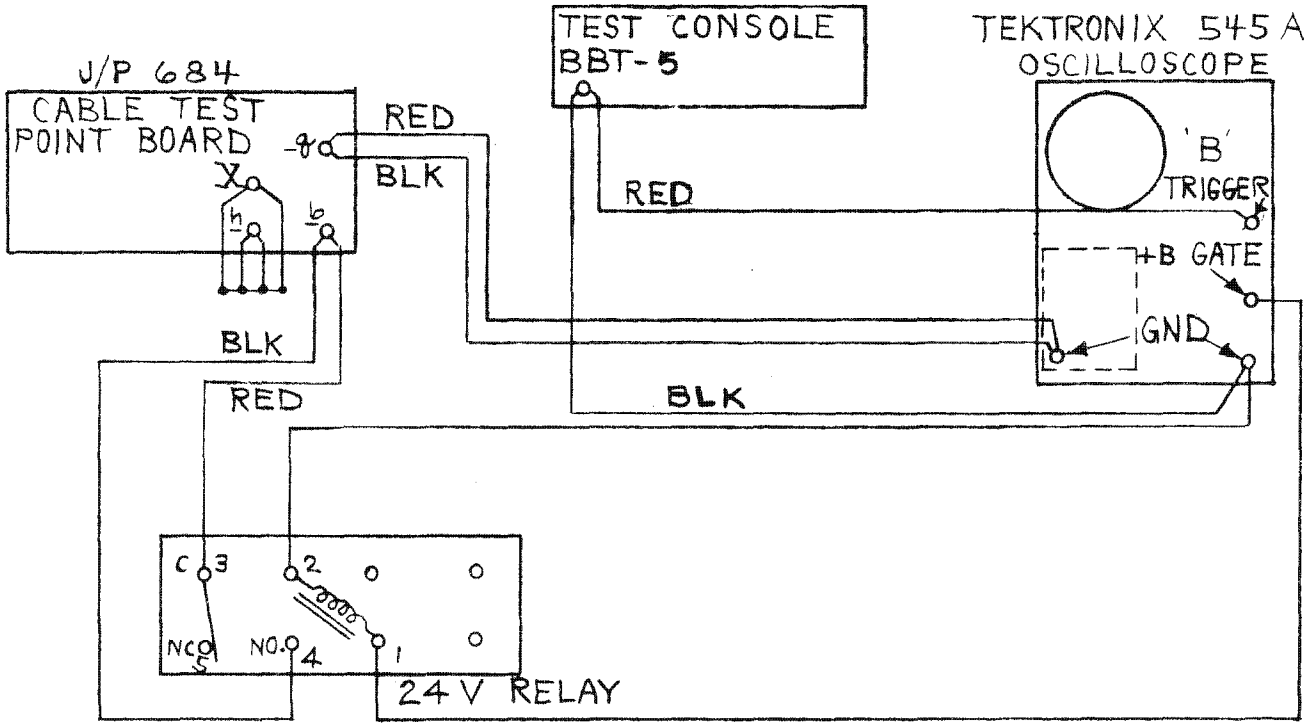
5.5.7.12 Slit to Data Lamp Alignment and Interframe Marker Positioning Check.

5.5.7.12.1 Turn off DATA SIGNAL B. Both CHANNEL A and CHANNEL B lights will go out.

5.5.7.12.2 Connect the Cable Test Point Board to P684 and J684 at the MSD.

5.5.7.12.3 Set up the test equipment as shown in the diagram below:

CAUTION: (IN THIS TEST THE OSCILLOSCOPE MUST BE ISOLATED FROM BUILDING GROUND.)



5.5.7.12.4 Adjust the Tektronix 545A Oscilloscope as follows:

5.5.7.12.4.1 Use the Horizontal Display Switch to select time base "B".

5.5.7.12.4.2 Adjust the "B" Sweep Rate (TIME/CM or DELAY TIME) for 2 ms./cm.

5.5.7.12.4.3 Place the Trigger Mode Selector on DC and the Trigger Slope to + EXT.

5.5.7.12.4.4 Turn the Trigger Level to indicate + and adjust the Stability so the scope trace is triggered.

5.5.7.12.4.5 Adjust the Delaying Sweep Control (LENGTH) to obtain a 7.5 cm long trace on the screen. This gives a pulse of 15 milliseconds duration at the + B gate.

5.5.7.12.4.6 Adjust the Stability control such that when Test Console command CB-24 is depressed the sweep is triggered.

5.5.7.12.5 Turn on the OPERATING POWER and set the voltage to 28 vdc.

5.5.7.12.6 Depress CHANNEL A button, then CHANNEL B button. This results in Data Signal A off and Data Signal B illuminator lit but off due to no trigger from CB-24.

5.5.7.12.7 Depress the DATA SIGNAL-CHANNEL A button ON and OFF as quickly as possible, the ON time not to exceed 1 second.

(K)

5.5.7.12.8 While monitoring oscilloscope for sweep occurrence, depress Test Console command CB-24.

5.5.7.12.9 Turn the ILLUMINATOR LAMP power on and adjust the lamp current to 3.5 amperes for a duration of 15 seconds.

NOTE: Slit exposure may be made either with the MTA drum rotating or drum stationary in the detent engaged alignment position.

(J)

5.5.7.12.10 Command the MOTOR ON for 5 seconds then OFF.

5.5.7.12.11 Repeat Steps 5.5.7.12.7 through 5.5.7.12.10.

5.5.7.12.12 Command the Slit (SLIDE) to position 2.

5.5.7.12.13 Repeat steps 5.5.7.12.7 through 5.5.7.12.11.

5.5.7.12.14 Command the Slit (SLIDE) to position 3.

5.5.7.12.15 Repeat steps 5.5.7.12.7 through 5.5.7.12.11.

5.5.7.12.16 Command the Slit (SLIDE) to position 4.

5.5.7.12.17 Repeat steps 5.5.7.12.7 through 5.5.7.12.11.

5.5.7.12.18 Turn OFF the OPERATING POWER and remove all leads associated with Slit to Data Lamp Alignment.

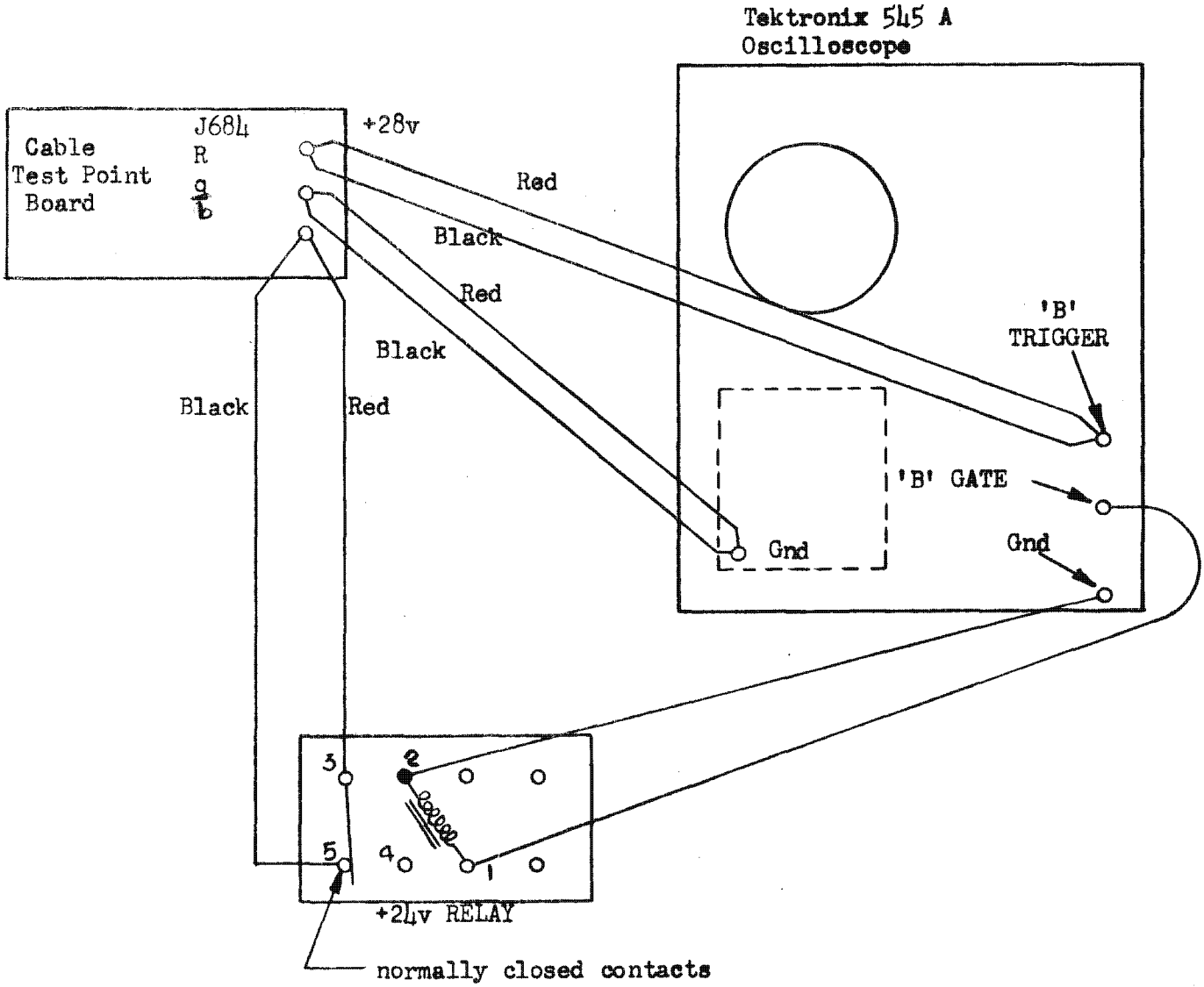
5.5.7.12.19 Although no extra test effort is required for Slit to Interframe Marker Positioning Check the necessary measurements should be performed using the exposure obtained in the performance of paragraph 5.5.7.12.12 and 5.5.7.12.13 and the processed record should be marked accordingly.

5.5.7.13 Film START and STOP TRANSIENT MEASUREMENTS.

5.5.7.13.1 Set up the test equipment as shown in the following diagram.

CAUTION: (IN THIS TEST THE OSCILLOSCOPE MUST BE ISOLATED FROM BUILDING GROUND.)

(K)



5.5.7.13.2 Adjust the tektronix 545 A Oscilloscope as follows:

5.5.7.13.2.1 Use the Horizontal Display Switch to select time base "B".

5.5.7.13.2.2 Adjust the "B" Sweep Rate for .2 sec/cm.

5.5.7.13.2.3 Place the Trigger Mode Selector on DC and the Trigger Slope to + EXT.

5.5.7.13.2.4 Turn the Trigger Level to indicate + and adjust the Stability so the scope trace is triggered.

5.5.7.13.2.5 Adjust the Delaying Sweep Control (LENGTH) to obtain a 7.5 cm long trace on the screen. This gives a pulse of 1.5 sec duration at the +B gate.

5.5.7.13.2.6 Adjust the Stability control so that the sweep is triggered when the camera is commanded ON.

5.5.7.13.3 Turn ON data signal generators A and B on the test console.

5.5.7.13.4 Command the camera ON at speed 1. After approximately 5 seconds turn the camera OFF.

5.5.7.13.5 After a 30 second waiting period repeat step 4.

5.5.7.13.6 Repeat steps .4 and .5 for camera speeds 9,17,25,33,41,49, 57 (L) ie, 2 Start-Stop runs at each camera speed except speed 64 which requires 3 runs.

5.5.7.13.7 Turn off data signal generators A & B on the test console.

5.5.7.13.8 Run four looper cycles of record through the space chamber to advance the test run into the forward record storage.

5.5.7.13.9 Turn off the operating power and remove all leads from the cable test point board.

(J)

5.5.7.14 AVERAGE FILM VELOCITY TEST

5.5.7.14.1 Rotate the moving target drum so that the alignment cross hairs are at the focal plane and engage the detent pin.

5.5.7.14.2 Turn on the MTA illuminator and set the lamp current to 3.2 amperes. (In this application the MTA is used only to fog the film and aid in identification of this test).

5.5.7.14.3 Turn on the OPERATING POWER and adjust to 27.0 volts dc.

5.5.7.14.4 Turn on the DATA SIGNAL A & B generators.

5.5.7.14.5 Command the camera ON at speed 1. After 12 seconds turn the camera OFF.

5.5.7.14.6 Repeat step 5.5.7.14.5 for camera speeds 9, 17, 25, 33, 41, 49, 57 and 64.

5.5.7.14.7 Set the OPERATING POWER to 28.0 volts dc.

5.5.7.14.8 Repeat steps 5.5.7.14.5 and 5.5.7.14.6.

5.5.7.14.9 Set the OPERATING POWER to 32.5 volts dc.

5.5.7.14.10 Repeat steps 5.5.7.14.5 and 5.5.7.14.6.

5.5.7.14.11 Turn OFF the ILLUMINATOR LAMP.

5.5.7.14.12 Turn OFF the DATA SIGNAL A & B generators.

5.5.7.14.13 Reset the OPERATING POWER to 28.0 volts dc.

5.5.7.14.14 Command the camera ON at speed 64. After approximately 1 minute command the camera OFF.

5.5.7.14.15 Turn OFF the OPERATING POWER.

5.5.7.14.16 Have assembly personnel remove the test record from the take-up spool and seal it in a film can.

5.5.7.14.17 Forward the test film to the processing group with the following paper work:

1. A "Pink" Request for Processing Ticket.
2. An "Orange" Process Control Card.
3. The Film Evaluation Data Sheets.

NOTE: The test engineer is responsible for identifying the film when it is returned from processing.

5.5.8 Record Evaluation

5.5.8.1 All Acceptance Test Dynamic Photo Runs shall be evaluated in accordance with Appendix C.

5.5.8.2 All Acceptance Test Dynamic Photo Run evaluation data shall be recorded on the photographic analysis data sheets.

5.6 Remove from Collimator.

5.6.1 Remove the Supply Cassette cover IN THE DARK.

5.6.2 Remove the partially used roll of film from the Supply Cassette and place it in a film container. Save this roll for post-vibration photographic testing.

5.6.3 Measure the amount of film on the spool that was removed in step 5.5.4.1.6. If there is 1500 or more feet by this roll install it in the air supply. If there is less than 1500 feet install a new 3000 foot roll of film in the air supply.

5.6.4 Thread the C/P in accordance with diagram 1 of Appendix E.

5.6.5 Turn on the OPERATING POWER D.C.

5.6.6 Command and EXECUTE MOTOR SPEED 51 ON. Run the Camera until all splices are out of the C/P and EXECUTE the MOTOR OFF command. During the run verity that tracking is satisfactory.

5.6.7 Command the Elevation Mirror to elevation position 2 and azimuth position 1.

5.6.7.1 Command the slide to position E.

5.6.7.2 Command the platen to the forward stop.

5.6.8 Remove test cables W-1 through W-10 from the C/P.

5.6.9 Have Assembly Personnel remove the Cradle mounted C/P from the Test Unit Mounting Assembly and place it on a truck.

5.6.10 Remove the Record Storage Bracket and Enclosure from the C/P and Cradle.

5.6.11 Fasten the film, under tension, at the forward exit of the Supply Cassette.

5.6.12 Turn the payload over inspection for performance of the Pre-Vibration Inspection Procedure, QC-A-541. Prior to vibration the report resulting from this inspection must be approved and signed by the Payload Test Engineer. Its approval should be documented by the Test Engineer's signature on the Payload data sheet.

5.7 VIBRATION

5.7.1 Pre-Vibration Handling Operations

5.7.1.1 Request Assembly Personnel to move the C/P to the Vibration test area and install it in the vibration test fixture. This operation shall be monitored by Quality Control in accordance with the "Inspection Procedure and Check List for Pre-Vibration Space Chamber Handling," (QC-A-513).

5.7.1.2 Upon completion of the handling operation the Acceptance Test Director shall review and sign the check list before proceeding with the vibration test. The completed check list shall be included in the C/P log.

5.7.2 Condition of the C/P for Vibration.

5.7.2.1 The supply reel shall contain a minimum of 1500 feet of film.

5.7.2.2 The C/P shall be completely assembled in accordance with Dwg. No. 805-101.

5.7.2.3 The C/P shall be properly loaded and threaded with film.

5.7.2.4 The looper truck shall be in the normal take-up empty position.

5.7.2.5 The Supply Torque motor shall be energized during vibration.

5.7.3 Vibration Levels - The C/P shall be vibrated in accordance with the requirements of paragraph 4.3.1 of Specification No. 802-153.

5.7.4 Documentation - A copy of the vibration levels shall be included in the C/P log.

5.7.5 Interface Gaging

NOTE: If necessary to facilitate test scheduling, these measurements may be performed prior to vibration.

5.7.5.1 The following measurements shall be performed in accordance with Appendix F "Inspection Procedure for Interface Gaging", and the data recorded on the appropriate data sheet.

5.7.5.1.1 The length of the C/P aft of Station 125.25.

5.7.5.1.2 The length of the C/P forward of Station 125.25.

5.7.5.1.3 The position of the torsion pin and holder.

5.7.5.1.4 Go-No Go radial profiles at Stations 174.50, 145.00, 139.25, and 188.25.

5.7.5.1.5 The alignment of the index markinge on the Socket Meunting and Primary Structural Rings.

5.7.5.1.6 The Interface mounting dimensions at Stations 125.25 and 210.50.

5.8 POST VIBRATION HANDLING AND INSPECTION

5.8.1 Post-Vibration Handling Operations.

5.8.1.1 Request Assembly Personnel to remove the C/P from the vibration fixture and move it into the final assembly area. This operation shall be monitored by Quality Control in accordance with the "Inspection Procedure and Check List for Post-Vibration Space Chamber Handling", (QC-A-514).

5.8.1.2 Upon completion of the handlingoperations, the Acceptance Test Director shall review and sign the check list. The completed check list shall be included in the C/P log.

(J)

5.8.2 Inspection

5.8.2.1 The Reference Mirror should be installed on the payload at this time for Post-Vibration Testing.

5.8.2.2 Have the C/P insepected in accordance with procedure QC-A-531 for any signs of visible damage or failures paying particular attention to the following areas.

5.8.2.2.1 Interface Mounts.

5.8.2.2.2 Component Mountings.

5.8.2.2.3 Optics.

5.8.2.2.4 Structural Welds.

5.8.2.3 The Acceptance Test Director shall sign the QC-A-531 report and the inspection ticket and record its serial number on the data sheet before proceeding with the test.

5.9 PRELIMINARY ELECTRICAL CHECKOUT

5.9.1 Test Configuration Set-Up (to be performed by Assembly Personnel).

5.9.1.1 Assemble the Forward Record Storage Bracket to the Cradle.

5.9.1.2 Mount the Chute and Enclosure and the Forward Record Storage Assembly on the Forward Record Storage Bracket.

5.9.1.3 Ascertain that the Camera aperture slit plate is set with the Test Slit positioned at the aperture. If necessary adjust the slit plate to the Test Slit (SLIDE position 5).

5.9.1.4 Thread the film from the C/P through the chute and fasten it to the take-up reel.

5.9.2 Measurement of Leakage Resistance from the C/P Subsystem Electrical Interface Connections to Structure Ground.

5.9.2.1 Connect the Breakout Box to connectors J654, J695, J696, J697, J698 and J699 on the Test Box.

5.9.2.2 Connect the TEST lead from the megohm bridge to the C/P structure by installing a spade lug under one of the Test Box mounting screws.

5.9.2.3 Set the test voltage to 10 volts D.C. Turn on the megohm bridge power and allow the bridge to warm up.

5.9.2.4 Measure and record the leakage resistance between the electrical interface connections and the C/P structure ground by connecting the HIGH test lead from the bridge to the following points one at a time:

Connector	Pin	Function
J695	B	Auxiliary Record Advance
	C	C/P Continuity Loop Input
	D	C/P Continuity Loop Output
	E	CPL 26 (VP50)
	F	CPL 27 (CP51)
	G	Spare
	H	Spare
	J	CPL 21 (VP5)
	K	CPL 22 (VP1)
	M	CB 8a (VP6)
	N	CB 8b (VP7)

(E)

Connector	Pin	Function
J695	P	CB 8c (VP8)
	R	CB 9a (VP9)
	S	CB 9b (VP10)
	T	CB 9c (VP11)
	U	CPL 23 (VP12)
	V	+5 vdc Supply (VP13)
	W	Auto Focus Lead A (VP14)
	X	Auto Focus Lead B (VP15)
	Y	Focus Motor Lead A (VP16)
	Z	Focus Motor Lead B (VP17)
	a	CB 10a (VP18)
	b	CB 10b (VP19)
	c	CB 10c (VP20)
	d	CB 11a (VP21)
	e	CB 11b (VP22)
	f	CB 11c (VP23)
	g	CB 12a (VP24)
	h	CB 12b (VP25)
	i	CB 12c (VP26)
	j	CB 1a (VP27)

Connector	Pin	Function
J695	k	CB 1b (VP28)
	m	CB 2a (VP29)
	n	CB 2b (VP30)
	p	CB 3a (VP31)
	q	CB 3b (VP32)
	r	CB 4a (VP33)
	s	CB 4b (VP34)
	t	CB 5a (VP35)
	u	CB 5b (VP36)
	v	CB 6a (VP37)
	w	CB 6b (VP38)
	x	CB 7a (VP39)
	y	CB 7b (VP40)
	z	CB 1 - 7c (VP41)
	AA	Data Signal "A" (VP42)
	BB	Data Signal "A" Return (VP43)
	CC	-22 vdc Supply (VP44)
	DD	+22 vdc Supply (VP45)
	EE	+28 vdc Supply (VP46)
	FF	D.C. Return (VP47)
	HH	CB 15a (VP49)

Connector J696	Pin	Function
	B	VTP 32
	C	VTP 30
	D	Instrumentation Return
	E	VTP 28
	F	VTP 25
	G	VTP 24
	H	VTP 31
	J	VTP 33
	K	VTP 34
	L	VTP 20
	M	VTP 19
	N	VTP 18
	P	VTP 35
	R	VTP 14
	S	VTP 13
	T	VTP 11
	U	VTP 10
	V	VTP 9
	W	VTP 8
	X	VTP 7
	Y	VTP 6
	Z	VTP 5
	a	VTP 4
	b	VTP 3
	c	VTP 1
	d	VTP 2
	e	VTP 29
	f	VTP 15

Connector	Pin	Function
J696	g	VTP 16
	h	VTP 17
J697	A	CB 20a
	B	CB 20b
	C	CB 20c
	D	CB 21a
	E	CB 21b
	F	CB 21c
	G	Slide, Test Bit, NC
	H	Slide, Test Bit, Com
	J	Slide Test
	M	CPL 31
	N	CPL 33
	P	CPL 34
	R	CPL 35
	S	CB 24a
	h	CB 8a
	i	CB 8b
	j	CB 8c
	k	CB 9a
	m	CB 9b
	n	CB 9c
	s	CB 15a
	u	Auto Focus Lead A
	w	Auto Focus Lead B
	x	Focus Motor Lead A
	y	Focus Motor Lead B
	z	CB 10a
	AA	CB 10b
	BB	CB 10c

Connector	Pin	Function
J697	CC	CB 11a
	DD	CB 11b
	EE	CB 11c
	FF	CB 12a
	GG	CB 12b
	HH	CB 12c
(G) J698	A	CPL-12
	B	CPL-29
	C	CPL-28
	D	CPL-16
	E	BBT-1
	F	Instrumentation Return
	G	Instrumentation Return
	H	CPL 26
	J	CPL 27
	K	+5 vdc Supply
	L	BBT-2
	M	CPL 25
	N	CPL 24
	P	CPL 23
	R	CPL 22
	S	CPL 21
	T	CPL 20
	U	CPL 19

Connector	Pin	Function
J698	V	CPL 18
	W	CPL 17
	X	BBT-6
	Z	CPL 14
	a	CPL 13
	b	CPL 32
	c	CPL 11
	d	CPL 10
	e	CPL 9
	f	CPL 8
	g	CPL 7
	h	CPL 6
	i	CPL 5
	j	CPL 4
	k	CPL 3
	m	+22 vdc Supply
	n	CPL 1
	p	CPL-30
	q	BBT-3
	r	BBT-4
	s	BBT-5
	t	Umbilical Return

Connector	Pin	Function
J699	B	22 vdc Return
	D	Spare
	E	Spare
	H	CB 1a
	J	CB 1b
	K	CB 2a
	L	CB 2b
	M	CB 3a
	N	CB 3b
	P	CB 4a
	R	CB 4b
	S	CB 5a
	T	CB 5b
	U	CB 6a
	V	CB 6b
	W	CB 7a
	X	CB 7b
	Y	CB 1 - 7c
	Z	CB 1 - 7c
	a	Data Signal A

Connector	Pin	Function
J699	b	Data Signal A Return
	c	Data Signal B
	d	Data Signal B Return
	f	+28 vdc Supply
	g	+28 vdc Supply
	h	+28 vdc Environmental Supply
	i	+28 vdc Environmental Supply
	j	D.C. Return
	k	D.C. Return
	n	D.C. Return
	p	CB 13a
	q	CB 13a
	r	Spare
	s	Spare
J654	B	Spare
	C	CPL 2
	D	Instrumentation Return
	F	CPL 15
	H	Take-Up Motor Drive Feed
	J	Take-Up Motor Drive Return
	K	Take-Up Motor Drive Feed
	L	Take-Up Motor Drive Return
	P	DC return
	X	+22 vdc Supply
	Z	DC return
	a	Spare
	g	Continuity Loop
	h	Continuity Loop

5.9.2.5 Turn off the megohm bridge and disconnect the Breakout Box cables. Connect the test console cables to the C/P.

5.9.3 Conduct the Test Console Set-Up procedure Appendix A.

5.9.4 Initial Turn-on.

5.9.4.1 Set the OPERATING POWER to 28.0 volts.

5.9.4.2 Apply power to the C/P.

5.9.4.3 Record the value of the OPERATING POWER current.

5.9.4.4 Set the HEATER POWER to 28.0 volts and apply power to the C/P.

5.9.4.5 Record the value of HEATER POWER current.

5.9.4.6 Set the DIGITAL VOLTMETER (DVM) selector to EXTERNAL. Using the DVM external probe measure and record the values of CPL-26, VP-13, VP-44, VP-45, VP-46 and VP-50.

5.9.4.7 Turn off the HEATER and OPERATING POWER.

5.10 Post-Vibration Performance.

5.10.1 Camera Payload Film Tracking Test.

5.10.1.1 Subsystem Film Tracking Verification.

5.10.1.1.1 Insert pins in the INSTRUMENTATION PATCH BOARD to make the following connections:

(L)

CPL POINT	READOUT INST.	FUNCTION
13	Chart Recorder 1	Stereo Position
14	Chart Recorder 2	Crab Position
15	Chart Recorder 3	Film Quantity, Coarse No. 1
17	Chart Recorder 4	Looper Position
16	Chart Recorder 5	Film Quantity, fine
28	Chart Recorder 6	Film Quantity, Coarse No. 2
20	Chart Recorder 7	Platen Pos., coarse
27	Chart Recorder 8	Platen Pos., fine

NOTE: With the exception of Crab and Stereo Servo Checkout and Focus Sensor Calibration, this programming of the recorder shall be maintained throughout the Acceptance Test.

5.10.1.1.2 Start the OSCILLOGRAPH CHART RECORDER at a speed of 0.4 mm/sec. Set the Operating Power to 28.0 volts. Apply Operating Power to the C/P.

NOTE: Throughout Acceptance Testing the oscillograph recorder shall be in operation at all times when power is applied to the C/P.

5.10.1.1.3 CPL-16 Calibration

5.10.1.1.3.1 Using the DVM external probe to read the value of CPL-16, manually rotate the pot in the Air Supply until CPL-16 is at its minimum value. The manual rotation must be in the same direction as that produced by normal film travel. At a convenient place near the exit of the Air Supply, mark the record using a ball point pen.

5.10.1.1.3.2 Record the value of CPL-16 and VTP 16.

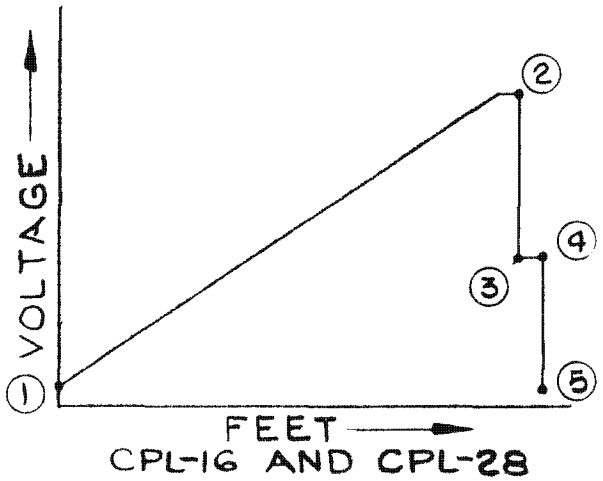
5.10.1.1.3.3 Command Motor Speed 01 ON and run the Camera until CPL-16 reaches 4.8v.

5.10.1.1.3.4 Manually rotate the take-up reel until CPL 16 reaches a maximum (Point 2 in sketch). Record CPL 16 and VTP 16. Rotate the take-up reel slowly until CPL 16 drops to approximately 2.5 volts (Point 3 in sketch). Record CPL 16 and VTP 16. Again mark the record near the exit of the Air Supply.

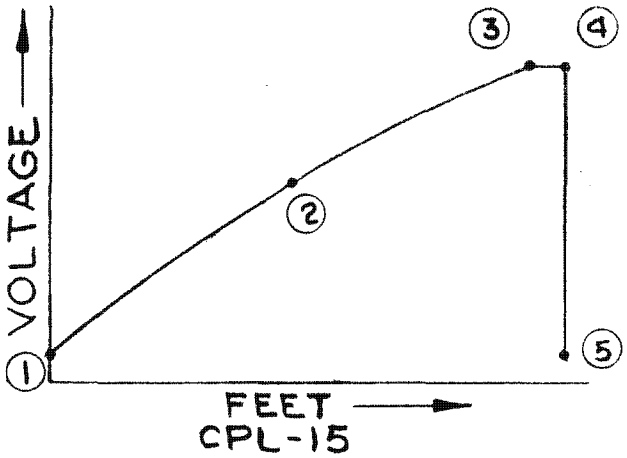
5.10.1.1.3.5 Manually rotate the takeup reel until CPL-16 drops to minimum. Record CPL-16 and VTP 16. Again command the Motor Speed 01 ON and run the camera until CPL-16 reaches 4.8 volts. Manually rotate the take-up reel until CPL-16 drops to minimum and mark the record. Repeat this procedure until a total of 10 cycles of CPL-16 have been completed.

5.10.1.1.3.6 Command Motor Speed 01 ON and run the Camera until the mark of paragraph 5.10.1.1.3.5 is on its takeup reel. Command the Camera OFF and turn OFF the Operating Power.

5.10.1.1.3.7 Have Assembly personnel remove the record from the takeup reel and measure the distances between marks. Record these distances as lengths to Points 2, 3, 4, & 5 per sketch below. The footage recorded at point 5 is to be the average of the 10 cycles recorded in para. 5.10.1.1.3.5.



CPL-16 AND CPL-28



CPL-15

5.10.1.1.3.8 Apply Operating Power to the C/P.

5.10.1.1.4 Using the DVM external probe to read the value of CPL-28, rotate the pot in the Air Supply to set the CPL-28 output voltage to its minimum value. Record the values of CPL-28 and VTP-28. Attach the Veeder Root footage counter to the spring tension arm of the Forward Record Storage Assembly so that the tracking wheel runs on the core of the film spool. Reset the counter to read 0 feet. During the tracking tests which follow, record the values of CPL-28 and VTP-28 at points 2,3,4 and 5 per the sketches.

5.10.1.1.5 Program MOTOR SPEED 1 ON AND EXECUTE the command after a minimum of 60 seconds EXECUTE the MOTOR OFF command. During the run verify that film tracking is satisfactory by observing the following conditions:

1. No slack film develops in any portion of the film path.
2. Film travels from supply reel to take-up reel with no visible damage to film edges.

5.10.1.1.6 Repeat paragraph 5.10.1.1.5 at speed 33.

5.10.1.1.7 Repeat paragraph 5.10.1.1.5 at speed 64.

(L)

5.10.1.1.8 Set the OPERATING POWER to 32.5 volts.

5.10.1.1.9 Repeat paragraphs 5.10.1.1.5 through 5.10.1.1.7.

5.10.1.1.10 Reset the OPERATING POWER to 28.0 volts.

5.10.1.1.11 For models S/N 205 and up the following steps should be performed to calibrate the CPL-15 output for indication of take-up reel rotation.

(J) 5.10.1.1.11.1 Program MOTOR SPEED 64 ON and EXECUTE the command.

5.10.1.1.11.2 Record the CPL-15 output when the take-up reel starts rotating. When the take-up has almost emptied the looper manually stall the take-up reel and again record the value of CPL-15.

CAUTION: The reel should not be stalled any longer than is necessary to perform the measurement. However, some time will be required for stabilization since the circuit has a large time constant.

5.10.1.1.11.3 EXECUTE the MOTOR OFF command.

5.10.1.1.12 Turn off the OPERATING POWER.

5.10.1.2 Forward Record Storage Misalignment Capability.

5.10.1.2.1 Using a collimator gauge blocks, and wedges misalign the Forward Record Storage with respect to the exit roller of the Supply Cassette as follows:

Angular misalignment: 0.52 degrees in the positive direction about the Z axis, and 0.58 degrees in the positive direction about the X axis.

Translational misalignment: 0.425 inches in the -Y direction.

(See Figure 3 of Appendix E for the C/P reference axes)

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(E)

5.10.1.2.2 Repeat paragraphs 5.10.1.1.2, 5.10.1.1.3, and 5.10.1.1.5 through 5.10.1.1.7.

5.10.1.2.3 Re-align the Forward Record Storage as follows:

Angular misalignment: 0.52 degrees in the negative direction about the Z axis, and 0.58 degrees in the negative direction about the X axis.

Translational misalignment: 0.425 inches in the +Y direction.

5.10.1.2.4 Repeat paragraphs 5.10.1.1.2, 5.10.1.1.3, and 5.10.1.1.5 through 5.10.1.1.7.

5.10.1.2.5 Turn off the OPERATING POWER.

5.10.1.2.6 Re-align the Forward Record Storage assembly to its proper orientation.

5.10.2 Power, Command, Control and Response.

5.10.2.1 Crab Servo Checkout (Azimuth).

5.10.2.1.2 Make the following INSTRUMENTATION PATCHBOARD pin changes for the monitor points listed below:

CPL Point	Readout Instr.	Function
14	Chart Recorder 1	Crab Position
1	Chart Redorder 2	CB12 Monitor
24	Chart Recorder 3	CB10 Monitor
30	Chart Recorder 4	CB8 Monitor
31	Chart Recorder 5	CB9 Monitor
32	Chart Recorder 6	CB11 Monitor
33	Chart Recorder 7	Stereo Servo Control Ckt
34	Chart Recorder 8	Crab Servo Control Ckt.

NOTE: This programming of the recorder shall be maintained throughout Crab Servo Checkout.

5.10.2.1.3 Mount the Theodolite on the bracket so that the circular level extends in the direction of the -Z C/P axis and so the leveling screws on each side of the cirdular leveling screws on each side of the circular level are in a line parallel to the C/P X axis.

5.10.2.1.4 Have assembly personnel remove the camera platen and set up a flood light to back light the slit plate.

5.10.2.1.5 Attach the Pentaprism to the Theodolite making sure that all three mounting points are seated and hand tighten the mounting screws. Attach the scale illuminator power cord to the Theodolite.

5.10.2.1.6 Set the valiable transformer switches to 4 volts and OFF. Connect the transformer line cord to a 115v power source.

(L) 5.10.2.1.7 Using the circular level as an indicator, level the Theodolite by means of the three adjusting screws. Then perform a final leveling using the Theodolite spirit level as an indicator. Alternately rotate the Theodolite and Pentaprism between two azimuth positions 90° apart and make fine adjustments of the three screws until the spirit level indicates that the Theodolite is level in any position about the azimuth (horizontal) circle. When the Theodolite is level verify that the spirit level on the Pentaprism also indicates a level condition. If it does not, remount the Pentaprism paying particular attention to proper seating of the mounting pads.

(L) 5.10.2.1.8 Turn the transformer on and set the telescope to 90°0'0" on the zenith circle. (The operator is referred to the Theodolite instruction manual for detailed operating and reading instructions.) Turn the transformer off.

(L) 5.10.2.1.9 Turn on the flood lamp to illuminate the camera slit. Set the camera slit control so that the focus slit containing the horizontal fiducial mark is at the aperture.

(L) 5.10.2.1.10 Rotate the Theodolite and Pentaprism until the Camera slit can be seen through the telescope and the center of the Theodolite reticle lies on the slit.

(L) 5.10.2.1.11 Adjust the Theodolite leveling screw opposite the circular level until the vertical line is parallel to the Camera slit. THIS ADJUSTMENT IS CRITICAL AND MUST BE PERFORMED WITH GREAT CARE AS FOLLOWS:
LOOSEN THE ZENITH LOCK ON THE THEODOLITE TELESCOPE AND SCAN THE ENTIRE LENGTH OF THE CAMERA SLIT.
THE SLIT IMAGE MUST REMAIN BETWEEN THE TWO VERTICAL THEODOLITE RETICLE MARKS OVER THE FULL LENGTH OF THE SLIT.

(L) 5.10.2.1.12 Adjust the other two leveling screws until the horizontal reticle line is colinear with the horizontal fiducial mark on the Camera slit.

(L) 5.10.2.1.13 With the vertical reticle line colinear with the center of the Camera slit, turn the transformer on and adjust the aximuth (horizontal) circle to 0°0'0" with the knob located just below the spirit level on the Theodolite. By means of the two screw jacks on one end of the C/P truck, and a separate jack screw in the center of the other end, level the entire set-up until the spirit level on the Theodolite indicates that the Theodolite is level.

(L) 5.10.2.1.14 Remove the Pentaprism from the Theodolite. Recheck the level of the theodolite. If it is no longer level return it to a level attitude by adjusting the three theodolite leveling screws.

(L) 5.10.2.1.15 Set the OPERATING POWER to 28.0 volts and apply D.C. power to the C/P. Command and EXECUTE Crabe (AZIMUTH) position 1 and Stereo (ELEVATION) position 2.

(J)

Ⓛ 5.10.2.1.16 Command and EXECUTE the mirror to the various Crab positions as designated in the 0° to +3½° Crab Position Change Table. For each mirror position change perform one or more of the following functions as shown in the table.

FUNCTIONS

A. Measure, by using the oscillograph chart recorder, and record the time required for the mirror to travel between the indicated positions.

B. Autocollimator the Theodolite off the Elevation Mirror and record the azimuth (horizontal) and zenith (vertical) scale readings.

0° to 3½° RANGE

CRAB POSITION CHANGE TABLE

STEP	POSITION FROM	POSITION TO	PERFORM FUNCTIONS A	B	C	D
1	-	1		X	X	X
2	1	2	X	X	X	X
3	2	1	X	X		X
4	1	2		X		
5	2	1		X		
6	1	3		X	X	
7	3	2		X		X
8	2	3	X	X		X
9	3	2	X	X		
10	2	4		X	X	
11	4	3		X		X
12	3	4	X	X		X
13	4	3	X	X		
14	3	5		X	X	
15	5	4		X		X
16	4	5	X	X		X
17	5	4	X	X		
18	4	6		X	X	
19	6	5		X		X
20	5	6	X	X		X
21	6	5	X	X		
22	5	7		X	X	
23	7	6		X		X
24	6	7	X	X		X
25	7	6	X	X		
26	6	8		X	X	
27	8	7		X		X
28	7	8	X	X		X
29	8	7	X	X		
30	7	8		X		

(E)

C. Measure and record the following instrumentation outputs using the DVM external probe.

CPL-13	VP-6	VP-11	VP-22
CPL-14	VP-7	VP-18	VP-23
VTP-13	VP-8	VP-19	VP-24
VTP-14	VP-9	VP-20	VP-25
	VP-10	VP-21	VP-26

NOTE: Some of the VP command lines have a capacitive filter element to the circuit return and require time to stabilize to 0 volts after removing power from the command line.

D. Verify by observing the oscillograph chart that the servo does not hunt or overshoot during position changes.

(K) 5.10.2.1.17 Compute the average mirror positions in the 0° to +3½° Crab range by performing the calculations indicated on the data sheets.

(L) 5.10.2.1.18 Turn off the OPERATING POWER. Using a pair of padded jaw pliers manually turn the Crab Servo shaft until the mirror reaches the mechanical stop near position 8. Turn on the OPERATING POWER and verify that the servo returns the mirror to position 8.

CAUTION: In turning the servo shaft apply only enough pressure to the pliers to overcome the servo drive friction.

(L) 5.10.2.1.19 Command and EXECUTE AZIMUTH position 1 and measure the time required for the mirror to travel from position 8 to position 1.

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(E)

5.10.2.1.20 Turn the OPERATING POWER off. Using a pair of padded jaw pliers manually turn the Crab Servo shaft until the mirror reaches the stop near position 1. Turn on the OPERATING POWER and verify that the servo returns the mirror to position 1.

CAUTION: In turning the servo shaft apply only enough pressure to the pliers to overcome the servo drive friction.

5.10.2.2 Stereo Servo Checkout (ELEVATION)

5.10.2.2.2 Make the following INSTRUMENTATION PATCHBOARD pin changes for the monitor points listed below:

CPL Point	Readout Instr.	Function
13	Chart Recorder 1	Stereo Position
1	Chart Recorder 2	CB12 Monitor
24	Chart Recorder 3	CB10 Monitor
30	Chart Recorder 4	CB8 Monitor
31	Chart Recorder 5	CB9 Monitor
32	Chart Recorder 6	CB11 Monitor
33	Chart Recorder 7	Stereo Servo Control Ckt.
34	Chart Recorder 8	Crab Servo Control Ckt.

NOTE: This programming of the recorder shall be maintained throughout Stereo Servo Checkout.

5.10.2.2.3 Command and EXECUTE the mirror to the various Stereo positions as designated in the Stereo Position Change Table. For each mirror position change perform one of more of the following functions as shown in the table.

FUNCTIONS

A. Measure, by using the oscillograph, and record the time required for the mirror to travel between the indicated positions.

B. Autocollimate the Theodolite off the elevation mirror and record the azimuth (horizontal) and zenith (vertical) scale readings.

C. Measure and record the following instrumentation output using the DVM external probe.

CPL-13	VP-6	VP-11	VP-22
CPL-14	VP-7	VP-18	VP-23
VTP-13	VP-8	VP-19	VP-24
VTP-14	VP-9	VP-20	VP-25
	VP-10	VP-21	VP-26

NOTE: Some of the VP command lines have a capacitive filter element to the circuit return and require time to stabilize to 0 volts after removing power from the command line.

D. Verify by observing the oscillograph chart that the servo does not hunt or overshoot during position changes.

STEREO POSITION CHANGE TABLE

	POSITION		PERFORM FUNCTIONS			
STEP	FROM	TO	A	B	C	D
1	-	1		X	X	
2	1	2	X	X		X
3	2	1	X	X		X
4	1	2		X	X	
5	2	1		X		
6	1	3		X		X
7	3	2		X		
8	2	3	X	X	X	
9	3	2	X	X		X
10	2	3		X		X

(E)

(L) 5.10.2.2.4 Compute the average mirror positions in the Stereo range by performing the calculations indicated on the data sheets.

(L) 5.10.2.2.5 Turn off the OPERATING POWER. Using a pair of padded jaw pliers manually turn the Stereo Servo shaft until the mirror reaches the stop near Stereo position 3. Turn on the OPERATING POWER and verify that the servo returns the mirror to Stereo position 3.

(L) 5.10.2.2.6 Command and EXECUTE ELEVATION position 1 and measure the time required for the mirror to travel from position 3 to position 1.

(L) 5.10.2.2.7 Turn the OPERATING POWER off. Using a pair of padded jaw pliers manually turn the Stereo Servo shaft until the mirror reaches the stop near position 1. Turn on the OPERATING POWER and verify that the servo returns the mirror to Stereo position 1.

(L) 5.10.2.2.8 Command and EXECUTE ELEVATION position 2 and AZIMUTH position 1.

(L) 5.10.2.2.9 Rotate the Theodolite to the right and autocollimate with the Reference Mirror. If necessary have assembly personnel properly adjust the mirror position and apply back tite to the adjustment screws. Record the azimuth (horizontal) and zenith (vertical) scale readings.

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(E)

(L) 5.10.2.2.10 Turn off the OPERATING POWER and the variable transformer.

(L) 5.10.2.2.11 Remove the variable transformer, the Theodolite and the Theodolite Mounting Bracket. Replace these items in their respective carrying cases.

(L) 5.10.2.2.12 Have assembly personnel re-install the camera platen and thread the payload for operation.

5.10.2.3 Timing Signal Amplifier Operation

5.10.2.3.1 Insert the Cable Test Point Board between P683 and J683 and the special Data Signal B cable insertion fixture between P684 and J684 on the MOTOR SPEED DRIVE.

5.10.2.3.2 Turn on the C/P OPERATING POWER. Command MOTOR SPEED 1 ON and EXECUTE the command.

5.10.2.3.3 Using the DVM external prove measure and record the values of CPL-19 and VTP-19 under the following conditions:

1. Data Signal Channels A & B off.
2. Data Signal Channel A on, Channel B off.
3. Data Signal Channel B on, Channel A off.
4. Data Signal Channels A and B on.

NOTE: In the Test Console, Data Signal A control is interlocked through the Data Signal B control, ie, Data Signal A is not connected to the C/P interface without the presence of Data Signal B. Data Signals A & B may be turned ON or OFF individually per the following table:

(J)

Data Signal	Test Console control		Special J/P 684 Chan. B Test Fixt.
	A	B	
A&B off	----	OFF	----------
A on, B off	ON	ON	OFF
B on, A off	OFF	ON	ON
A & B on	ON	ON	ON

5.10.2.3.4 Command and EXECUTE the MOTOR OFF command.

5.10.2.3.5 Connect the Tektronix Model 545A oscilloscope to the Data Signal A output. This signal is available at the Cable Test Point Board as follows:

J683 pin h Amplified Signal A
pin f Amplified Signal A return

5.10.2.3.6 Command and EXECUTE MOTOR SPEED 1 ON. Using the oscilloscope measure and record the ON and OFF amplitudes and the rise and decay times of the pulses. Command and EXECUTE MOTOR SPEED 1 OFF.

NOTE: Rise time is the time required for the instantaneous amplitude to go from 10 percent to 90 percent of the peak value.

Decay time is the time required for the instantaneous amplitude to go from 90 percent to 10 percent of the peak value.

5.10.2.3.7 Connect the oscilloscope to the Data Signal B output. This signal is available at the Cable Test Point Board as follows:

J683 pin t Amplified Signal B
pin d Amplified Signal B return

5.10.2.3.8 Command and EXECUTE MOTOR SPEED 1 ON. Measure and record the on and off amplitudes and the rise and decay times of the pulses. Command and EXECUTE the MOTOR OFF command.

5.10.2.3.9 Turn the OPERATING POWER off. Remove the Cable Test Point Board from the P683-J683 junction.

5.10.2.4 Power Control Check

5.10.2.4.1 Operating and Instrumentation Power Consumption Measurement.

5.10.2.4.1.1 Connect the Breakout Box between the Test Console and C/P connectors J654, J697, J698 and J699.

BE SURE THAT ALL SHORTING PLUGS ARE IN THE BREAKOUT BOX JACKS FOR J654, J697, J698, and J699.

5.10.2.4.1.2 Remove the shorting plugs from the 28 volt supply jacks which are J699 pins f and g and install the 1 ohm shunt for current transient measurements.

5.10.2.4.1.3 Set up the Tektronix oscilloscope for external trigger mode of operation. Connect the oscilloscope input across the 1 ohm shunt and connect the "HOT" side of the shunt to the external trigger input on the oscilloscope.

5.10.2.4.1.4 Using the oscilloscope measure and record the peak current and the recovery time from peak to 37% of the difference between peak and steady state currents for each of the following power functions:

FUNCTION	MEASUREMENT LINE
1. OPERATING POWER turn-on	J699 f and g
2. FOCUS POWER turn-on (CB-15)	J699 f and g
3. Focus Adjust Motor turn-on (CB17-18)	J697 x
4. Supply Brake turn-on (CB-24)	J697 S
5. MOTOR SPEED 48 turn-on (CB1-7)	J699 f and g

(J)

FUNCTION	MEASUREMENT LINE
6. Stereo Servo turn-on (CB 8-9)	J699 f and g
7. Crab Servo turn-on (CB-10-12)	J699 f and g
8. T/U Motor	J654 K and H
9. Slit Positioner turn-on (CB 20-21)	J699 f and g
10. Slit Positioner*	J699 f and g

NOTE: Measure each function individually except for function 1 which must remain ON in order to perform the remaining functions.

5.10.2.4.1.5 Turn the OPERATING POWER off.

5.10.2.4.1.6 Remove the 1 ohm shunt from the Breakout Box.

5.10.2.4.1.7 Connect the Breakout Box Ammeter to read the current through the J699 pins f and g parallel path. The shorting plugs should be left plugged in to provide meter protection and removed only while taking a reading.

5.10.2.4.1.8 Turn on the OPERATING POWER D.C. Measure and record the steady state current for each of the following conditions of operation:

FUNCTION	MEASUREMENT LINE
1. OPERATING POWER on	J699 f and g
2. FOCUS POWER ON*	J699 f and g
3. Focus Adjust Motor on	J697 x
4. Supply Brake on	J697 S
5. MOTOR SPEED DRIVE ON*	J699 f and g
6. Stereo Servo running*	J699 f and g
7. Crab Servo running*	J699 f and g
8. T/U Motor	J654 K + H

"EFFECTIVE F-206 AND FOLLOWING" while measuring the take-up motor current also measure and record the value of CPL-29

NOTE: Measure the current for each condition individually except that the OPERATING POWER shall remain on for measurements marked *.

5.10.2.4.1.9 Measure the T/U motor current as well as the value of CPL-29 at Operating Supply voltages of 27 and 32.5 volts d.c. Reset the Operating Power Supply to 28 volts and turn the supply off.

5.10.2.4.1.10 Remove the ampere D.C. meter from the J699 pin f and g connection and replace the shorting plugs in the jacks.

5.10.2.4.1.11 Connect the 0-15 milliammeter in the J698 pin K line. The shorting plug should be left in to protect the meter and removed only when making a reading.

5.10.2.4.1.12 Turn on the OPERATING POWER.

5.10.2.4.1.13 Measure the Instrumentation Power Supply current with the milliammeter and record the value on the data sheet.

5.10.2.4.1.14 Turn the OPERATING POWER off.

5.10.2.4.1.15 Remove the milliammeter from the J698 connection and replace the shorting plug. Disconnect the Breakout Box cables and connect the console cables to the C/P. (L)

5.10.2.4.2 Power Instrumentation Calibration.

5.10.2.4.2.1 Turn on the OPERATING POWER D.C. and set the voltage to 27.0 volts as read on the DVM.

(G)

(J) 115

5.10.2.4.2.2 Using the DVM external probe, measure and record the values of VP-13, 44, 45, and 46 and CPL 35 and VTP 35. (L)

5.10.2.4.2.3 Repeat paragraph 5.10.2.4.2.2 at OPERATING POWER voltages of 28.0, 29.0, 30.0, 31.0, 32.0, and 33.0 volts.

5.10.2.4.2.4 Reset the OPERATING POWER to 28.0 volts and turn the power off.

5.10.2.4.2.5 Turn on the HEATER POWER and set the output to 14.0 volts as read on the DVM.

5.10.2.4.2.6 Using the DVM external probe, measure and record the values of VP-50 and CPL-26.

5.10.2.4.2.7 Repeat paragraph 5.10.2.4.2.6 at HEATER POWER voltages of 18.0, 22.0, 26.0, 30.0, and 34.0 volts.

5.10.2.4.2.8 Reset the HEATER POWER to 28.0 volts and turn the power off.

5.10.2.5 Focus Mode Operation

5.10.2.5.1 Remove P682 from the Gain Control and insert the cables from the Cable Test Point Board.

5.10.2.5.2 Connect a 0-30 v.d.c. voltmeter as follows using the focus mode switch box.

Meter 1 Positive to P682 pin B
Negative to P682 pin T

Meter 2 Positive to P682 pin C
Negative to P682 pin T

5.10.2.5.3 Verify that the GAIN CONTROL AND INSTRUMENTATION MODE selector is set for MANUAL OPERATION.

5.10.2.5.4 Turn on the OPERATING POWER and record the meter readings.

5.10.2.5.5 Set the MANUAL DRIVE switch to FORWARD and push the EXECUTE button. Record the meter readings with the EXECUTE button depressed.

5.10.2.5.6 Set the MANUAL DRIVE switch to REVERSE and push the EXECUTE button. Record the meter readings with the EXECUTE button depressed.

5.102.5.7 Set the GAIN CONTROL MODE switch to AUTO. Verify that the execution of FORWARD or REVERSE MANUAL control results in no command voltage indication on either meter.

5.10.2.5.8 Reset the GAIN CONTROL MODE switch to MANUAL and turn the OPERATING POWER off.

5.10.2.5.9 Remove the Cable Test Point Board and the Breakout Box from the test setup.

5.10.2.6 Focus Adjust Operation.

5.10.2.6.1 Operation at Input Voltage Extremes.

5.10.2.6.1.1 Turn on the OPERATING POWER and adjust the voltage to 27.0 volts as read on the DVM.

5.10.2.6.1.2 EXECUTE the GAIN CONTROL MANUAL DRIVE command in the REVERSE direction until the platen reaches its limit of travel.

5.10.2.6.1.3 EXECUTE the GAIN CONTROL MANUAL DRIVE command in the FORWARD direction. Measure and record the time required for the platen to travel between its end stops while traveling in the forward direction.

5.10.2.6.1.4 EXECUTE the GAIN CONTROL MANUAL DRIVE command in the REVERSE direction. Measure and record the time required for the platen to travel between its end stops while traveling in the reverse direction.

5.10.2.6.1.5 Adjust the OPERATING POWER voltage to 32.5 volts as read on the DVM.

5.10.2.6.1.6 Repeat paragraphs 5.10.2.6.1.3 and 5.10.2.6.1.4.

5.10.2.6.1.7 Reset the OPERATING POWER to 28.0 volts and turn the power off.

5.10.2.6.2 Focus Position Instrumentation Calibration.

5.10.2.6.2.1 Place the Parallel Bar on top of the Camera case so that it spans the case across the upper end of the Platen."

5.10.2.6.2.2 Using the micrometer depth gage measure the distance from the top reference surface of the bar to the surface of each end of the platen when the platen is in the maximum reverse position.

5.10.2.6.2.3 Compute the platen reverse stop reference dimension by subtracting the thickness of the Bar from the measurement of paragraph 5.10.2.6.2.2.

5.10.2.6.2.4 Mount a dial indicator, readable to 0.0001 inches, to measure motion of the platen with respect to the Camera case at each end of the platen. Make sure that the indicator plungers are perpendicular to the surface of the platen in the plane of motion.

(J)

5.10.2.6.2.5 Turn on the OPERATING POWER D.C.

5.10.2.6.2.6 Record the two indicator readings and the values of CPL-20, CPL-27, VTP-20, and VP-51 as read on the DVM.

5.10.2.6.2.7 Command and EXECUTE the GAIN CONTROL MANUAL DRIVE FORWARD command (Away from the lens) to produce platen position changes in steps of 0.0005 inches as read on the lower dial indicator. At each position record the two indicator readings and the values of CPL-20, CPL-27.

5.10.2.6.2.8 From the indicator readings at the end stops compute and record the total platen travel.

5.10.2.6.2.9 Remove the indicators from the Camera and connect the DVM external probe to BBT-6.

5.10.2.6.2.10 Command and EXECUTE the GAIN CONTROL MANUAL DRIVE in the REVERSE direction and record the time required for the platen to travel between the end stops. Also record the value of BBT-6. Command and EXECUTE the GAIN CONTROL in the FORWARD direction, recording the time required for the platen to travel between end stops and, also, the value of BBT-6.

5.10.2.6.2.11 From the total platen travel determined in step 5.10.2.6.2.8 and the times determined in step 5.10.2.6.2.10 compute and record the rate of focus adjustment in inches per second for Operating Power voltages of 27.0, 28.0, and 32.5 volts d.c.

5.10.2.7 Film Drive Capability Test

5.10.2.7.1 Speed Check

5.10.2.7.1.1 Set the COUNTER INPUT switch to BBT-2. Set the COUNTER FUNCTION switch to FREQ. A and the TIME INTERVAL switch to 10.

5.10.2.7.1.2 Connect the DVM external probe to CPL-18.

5.10.2.7.1.3 Set the OPERATING POWER to 28.0 volts and apply power to the C/P.

5.10.2.7.1.4 Command and EXECUTE MOTOR SPEED 01 ON. Record the frequency of the BBT-2 signal and the output of CPL-18.

5.10.2.7.1.5 Repeat paragraph 5.10.2.7.1.4 to obtain a reading for BBT-2 and CPL-18 at each of the remaining motor speeds (2 through 64).

5.10.2.7.1.6 EXECUTE the MOTOR OFF command.

5.10.2.7.1.7 Turn OFF the Operating Power Supply.

5.10.2.7.1.8 Connect the oscilloscope to monitor BBT-2.

CAUTION: Oscilloscope must be isolated from AC ground.

5.10.2.7.1.9 Connect the Cable Test Point Board to cable W-3 and the MSD at connector J683.

5.10.2.7.1.10 Turn ON the Operating Power Supply.

5.10.2.7.1.11 Command and EXECUTE MOTOR SPEED 33 ON.

5.10.2.7.1.12 Using the oscilloscope measure the level of the dc component of the BBT-2 signal and the peak to peak voltage of the ac component.

5.10.2.7.1.13 Connect the oscilloscope between pins F and b of connector J683. Measure and record the peak value of the leading motor phase voltage.

5.10.2.7.1.14 Connect the oscilloscope between pins H and c of connector J683. Measure and record the peak value of the lagging motor phase voltage.

5.10.2.7.1.15 Command and EXECUTE the MOTOR OFF. Turn OFF the Operating Power Supply.

5.10.2.7.1.16 Disconnect the oscilloscope and Cable Test Point Board.

5.10.2.7.2 Logic Check

5.10.2.7.2.1 EXECUTE the MOTOR SPEED 64 and ON commands. Allow the looper to fill and empty five times and verify that there is no loss of film tension in the system at any time. EXECUTE the MOTOR OFF command and verify that the Forward Record Storage continues to operate until the take-up looper empty limit switch actuates.

5.10.2.7.2.2 Repeat paragraph 5.10.2.7.2.1 with the OPERATING POWER at 27.0 and 32.5 volts respectively.

5.10.2.7.2.3 Reset the OPERATING POWER to 28.0 volts and turn the power off.

5.10.2.7.2.4 Remove connector P661 (console cable W-2) from the Forward Record Storage Assembly.

5.10.2.7.2.5 Turn on the OPERATING POWER D.C.

5.10.2.7.2.6 Manually move the looper truck to the extreme take-up looper empty position and record the value of CPL-17.

5.10.2.7.2.7 Manually move the looper truck to the extreme take-up looper full position and record the value of CPL-17.

5.10.2.7.2.8 Turn the OPERATING POWER off.

5.10.2.7.2.9 Reconnect P661 to the Forward Record Storage Assembly, turn on the OPERATING POWER long enough to allow the Forward Record Storage to empty the take-up looper then turn power off. Remove connector P661.

5.10.2.7.2.10 Manually move the looper truck until it just actuates the take-up looper empty switch. Turn on the OPERATING POWER, then record the values of BBT-1, CPL-17 and VTP-17.

5.10.2.7.2.11 Manually move the looper truck until it just actuates the take-up looper full switch and record the values of BBT-1, CPL-17 and VTP-17.

5.10.2.7.2.12 Turn the OPERATING POWER off.

5.10.2.7.2.13 Reconnect P661 to the Forward Record Storage Assembly.

5.10.2.7.2.14 Place a mark on the film at a convenient reference point in the Supply Cassette.

5.10.2.7.2.15 Turn on the OPERATING POWER long enough to allow the Forward Record Storage to empty the take-up looper, then turn the power off.

5.10.2.7.2.16 Using the reference point selected in paragraph 5.10.2.7.2.10 place another mark on the film.

5.10.2.7.2.17 Determine the capacity of the looper by measuring the distance between the two marks on the film.

5.10.2.7.2.18 Again remove P661 from the Forward Record Storage Assembly.

5.10.2.7.2.19 Manually pull film from the supply reel until the film is slightly slack.

5.10.2.7.2.20 Connect the DVM external probe to monitor CPL-17.

5.10.2.7.2.21 Turn on the OPERATING POWER D.C. Measure and record the value of CPL-17.

5.10.2.7.2.22 Manually release the supply reel brake band tension and move the looper struck to its mid position.

5.10.2.7.2.23 Push the CB 24 command botton. Record the values of BBT-5 and verify that the supply reel takes up the slack film.

5.10.2.7.2.24 Restore the supply reel brake band tension.

5.10.2.7.2.25 Turn off the OPERATING POWER and reconnect P661 to the Forward Record Storage Assembly.

5.10.2.7.2.26 At a convenient point in the Camera mark the edge of the film and a reference mark on the frame of the camera using a ball-point pen.

5.10.2.7.2.27 Turn on the OPERATING POWER.

5.10.2.7.2.28 After the Forward Record Storage has emptied the take-up looper measure and record the distance that the mark on the film has moved with respect to the mark on the camera frame.

5.10.2.7.2.29 Turn the OPERATING POWER off.

5.10.2.7.2.30 Connect the Cable Test Point Board to J658 and P658 on the C/P.

5.10.2.7.2.31 Connect J658 pin AA to the Trigger Input of the oscilloscope. Connect J658 pin p to the Channel A Input. Connect J658 pin z to the oscilloscope chassis.

(J)

5.10.2.7.2.32 Turn on the Operating Power.

5.10.2.7.2.33 Execute the Motor Speed 01 command ON. Run the Camera for eight seconds and execute the Motor OFF command.

5.10.2.7.2.34 Repeat step 5.5.2.7.2.29 as necessary to obtain the following measurements:

1. Supply Brake Delay - Measure and record the time delay from the start of the sweep to the leading edge of the positive pulse. (Approx. 10 ms)
2. Measure and record the width of the positive pulse (Approx. 1 second)

5.10.2.7.2.35 Turn off the OPERATING POWER.

5.10.2.8 Port Open Telltale Calibration

5.10.2.8.1 Mount the Port Open Telltale Light Source on a strut of the C/P structure so the P.O.T. detector is completely covered by the Light Source tube.

5.10.2.8.2 Remove cable W-13 from the console and connect W-23 between J-115 on the console and J-201 on the P.O.T. Light Source.

5.10.2.8.3 Turn on the ILLUMINATOR power and adjust the current to the appropriate value as posted on the P.O.T. Light Source.

5.10.2.8.4 Turn the OPERATING AND HEATER POWER D.C. ON and set the voltages to 28 volts. Connect the DVM to read CPL-25.

(J)

5.10.2.8.5 By switching the Door INTENSITY switch from LOW to HIGH record the values of CPL-25 for the steps in the table below:

DOOR INTENSITY	CPL-25 NOMINAL
LOW	1v
HIGH	5v
LOW	2v
HIGH	5v
LOW	3v
HIGH	5v
LOW	4v
HIGH	5v
LOW	1v

5.10.2.8.6 Turn off the ILLUMINATOR HEATER, and OPERATING power.

5.10.2.8.7 Remove cable W-23 and the P.O.T. light source from the C/P. Reconnect W-13 to J115 on the console.

5.10.2.9 Slit Positioner Operation

5.10.2.9.1 Turn ON the OPERATING POWER.

5.10.2.9.2 Command and EXECUTE the Slit (SLIDE) to position 1.

5.10.2.9.3 Command and EXECUTE the Slit (SLIDE) to the various positions shown in the Slit Position Change Table. For each position change perform the measurements indicated in the table.

SLIT POSITION CHANGE TABLE

Step	Position From	Position To	Measurements CPL-12	Measurements VP-2,3,4,48
1	1	2	X	X
2	2	1	X	X
3	1	3	X	X
4	3	2	X	-
5	2	4	X	X
6	4	3	X	-
7	3	5	X	X
8	5	4	X	-
9	4	5	-	-

5.10.2.9.4 Turn OFF the OPERATING POWER.

5.10.2.10 Slit Transition Time Check

5.10.2.10.1 Connect the Breakout Box between the Test Console and C/P connector J 699.

BE SURE THAT ALL SHORTING PLUGS ARE IN THE BREAK OUT BOX JACKS FOR J699.

5.10.2.10.2 Remove the shortingplugs from the 28 volt supply jacks which are J699 f and g and install the 1 ohm shunt for current measurements in terms of the voltage drop across these pins.

5.10.2.10.3 Isolate the Tektronix oscilloscope from equipment grounds and surrounding test equipment chassis for these measurements.

5.10.2.10.4 Using internal trigger mode of operation, connect the scope input across the 1 ohm shunt and measure Slit transition time (current drain duration) between positions indicated on data sheet.

NOTE: The waveshape to be monitored will appear on the scope as a step function above the steady state operating power waveform.

(J)

5.10.3 **Environmental Control Checkout**

5.10.3.1 **Temperature Probe Instrumentation Calibration Check at 70°F.**

5.10.3.1.1 Move the Breakout Box, Cable Test Point Board, the resistance bridge, and a Simpson Model 260 meter along side of the C/P.

5.10.3.1.2 Set up the Portable Test Set or Console.

5.10.3.1.3 Connect the Cable Test Point Board to P655, P657, and P658. Use both cables for each connector so that no C/P circuitry is interrupted. Also connect the Breakout Box cables for P699 to the Test Box and Console or Test Set.

5.10.3.1.4 Ascertain that the OPERATING POWER is off.

5.10.3.1.5 Using the resistance bridge, measure the thermistor probe resistances as follows:

INST. PT.	PROBE	FROM	TO
CPL 3	RT901	J657 Y	J657 Z
CPL 3	RT902	J657 W	J657 Z
CPL 5	A-902	J655 L	J655 M
BBT 3	A-915	J655 NN	J655 PP
BBT 4	A-916	J655 LL	J655 MM

5.10.3.1.6 Remove all test lead plugs from the front panel of the Cable Test Point Board.

5.10.3.1.7 Set the OPERATING POWER to 28.0 volts and apply power to the C/P.

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5.10.3.1.8 Using the DVM external probe read and record the values of the following instrumentation points:

VTP-2	CPL-10, VTP-10
CPL-2	CPL-11, VTP-11
CPL-4, VTP-4	
CPL-6, VTP-6	
CPL-7, VTP-7	
CPL-8, VTP-8	
CPL-9, VTP-9	

(L)

5.10.3.1.9 Turn off the OPERATING POWER.

5.10.3.1.10 Obtain the QC-A-302 test report for each temperature probe assembly. Copy the appropriate resistance value onto the data sheets for each temperature listed in the DECADE column for each temperature probe.

5.10.3.1.11 Connect the resistance decade box to each of the following sets of pins on the Cable Test Point Board such that the decade box is connected to the Distribution Box and the temperature probe is disconnected.

CPL	J-658	J-657
4	j	q
5	j	t
6	j	n
7	j	k
8	j	i
9	j	g
11	j	c

(L)

5.10.3.1.12 For each CPL point, read the output with the decade box set to each resistance value listed on the data sheet.

NOTE: Turn Operating Power OFF while changing connection points and setting first resistance value.

5.10.3.1.13 Remove wire No. 634 from terminal 2 on terminal strip TB614 in the Take-up Assembly. Connect the decade box between terminals 1 and 2 of TB614. Read the CPL-2 output for each resistance value listed on the data sheet.

5.10.3.1.14 Turn the Operating Power OFF and replace wire No. 634 on terminal 2 of TB614.

5.10.3.2 Heater Turn-On and Turn-Off Verification.

5.10.3.2.1 Connect the Breakout Box milliammeter between J699 pins h and i (on the top) and pins h and i (on the bottom). Set the HEATER POWER to 28.0 volts and apply power to the C/P.

(K)

HEATER SYSTEM TABLE

Heater System	Thermostat & Location	Monitor Points
3	RT903 - Structural Mounting Ring	Heater Control A911, terminals 1 & 5
4	RT904 - Structural Mounting Ring	Heater Control A911, terminals 1 & 5
5	RT905 - Structural Mounting Ring	Heater Control A913, terminals 1 & 5
6	RT906 - Outside rear Comp. Support Tube	TB907, Terminal 6 and chassis
10	RT907 - Black Dot near TP904	TP904 and chassis
11	RT908 - Black Dot near TP903	TP903 and chassis
12	RT909 - Black Dot near TP902	TP902 and chassis
13	RT910 - Black Dot near TP906	TP903 and chassis
14	RT911 - Black Dot near TP907	TP907 and chassis
15	RT912 - Black Dot near TP908	TP908 and chassis
16	RT913 - Outside rear Comp. Support Tube	TB905, Terminal 1 and chassis
17	RT914 - Black Dot near TP905	TP905 and chassis
18	RT915 - Black Dot near TP901	TP901 and chassis

5.10.3.2.2 Attach the voltmeter, in turn to each monitor point as designated in the Heater System Table. To test each heater circuit, verify that the heater is not on by noting the presence of 28 volts at the monito point. Spray coolant on the C/P but no closer than 6 inches from the heater circuit sensor under test.

5.10.3.2.3 When the monitor voltage drops from 28.0 volts, record the change in heater current as read on the milliammeter and indicate turn-on operation "OK" on the data sheet.

5.10.3.2.4 Allow the thermostat to return to room temperature. When the monitor voltage rises from 0 to 28 volts indicate turn-off operation "OK" on the data sheet.

NOTE: If the thermostat does not actuate by the time room temperature is reached, apply heat with a heat gun, but not closer than 6 inches from the thermostat being tested, until the thermostat actuates. Apply heat sparingly to avoid raising the temperature too rapidly.

5.10.3.2.5 Add all the individual heater system currents and enter the total heater current on the data sheet.

5.10.3.2.6 Turn off the HEATER POWER.

5.10.3.3 Lens Barrel Temperature Amplifier Calibration.

5.10.3.3.1 Connect one resistance decade box to pins L and M of J655 such that the decade box is connected to the amplifier and thermistor probe A902 is disconnected.

5.10.3.3.2 Determine the serial number of probe A902 from the Q.C. inspection log and obtain the QC-A-302 test report for this probe (dwg. No. 516-100).

5.10.3.3.3 From the QC-A-302 test report determine the resistance of A902 at 70°F. Record this value in the appropriate space on the data sheet.

5.10.3.3.4 Calcualte and record on the data sheet, the remaining resistance values for A902 by using the following resistance - temperature table:

A902 resistance at 60° = 1.2904 x resistance at 70°

A902 resistance at 65° = 1.1346 x resistance at 70°

A902 resistance at 75° = 0.8835 x resistance at 70°

A902 resistance at 80° = 0.7823 x resistance at 70°

5.10.3.3.5 Turn ON the Operating Power Supply and adjust it for a 28 volt output.

5.10.3.3.6 Adjust the decade box to the set of values for A902 which have been recorded on the data sheet. For each setting of the decade box, record the value of CPL-5 and VTP-5.

5.10.3.3.7 Turn the OPERATING POWER off.

5.10.3.3.8 Disconnect the decade box from the Cable Test Point Board.

5.10.3.4 Stereo Mirror Temperature Gradient Amplifier Calibration.

5.10.3.4.1 Connect decade A between J657 y and J657 z and decade B between J657 w and J657 z.

(L)

(J)

5.10.3.4.2 Determine the serial numbers of probes RT901 and RT902 from the Q.C. inspection log and obtain the QC-A-364 test reports for the two probes. (dwg. no. 516-224).

5.10.3.4.3 From the QC-A-364 test reports determine the resistance of RT-901 and RT-902 at 55°, 70°, and 85°F. Record these values in the appropriate spaces on the data sheet.

5.10.3.4.4 Calculate, and record on the data sheet, the remaining resistance values for RT-901 by using the following:

55° AMBIENT

RT-901 resistance at 54° = 1.0284 x resistance at 55°
" " " 56° = 0.9725 x " " 55°
" " " 57° = 0.9458 x " " 55°
" " " 58° = 0.9200 x " " 55°

70° AMBIENT

RT-901 resistance at 69° = 1.0268 x resistance at 70°
" " " 71° = 0.9740 x " " 70°
" " " 72° = 0.9488 x " " 70°
" " " 73° = 0.9243 x " " 70°

85° AMBIENT

RT-901 resistance at 84° = 1.0253 x resistance at 85°
" " " 86° = 0.9754 x " " 85°
" " " 87° = 0.9515 x " " 85°
" " " 88° = 0.9282 x " " 85°

5.10.3.4.5 Turn ON the Operating Power Supply and adjust it for a 28 volt output.

5.10.3.4.6 Adjust the decade boxes to the sets of values for RT-901 and RT-902 which have been recorded on the data sheet. For each setting of the decade boxes record the values of CPL-3 and VTP-3.

5.10.3.4.7 Turn the OPERATING POWER off.

5.10.3.4.8 Disconnect decade boxes A and B.

5.10.3.4.9 Disconnect all cables from the C/P.

5.10.4 Collimator Set-Up.

5.10.4.1 C/P to Collimator Alignment.

5.10.4.1.1 Have assembly personnel install the C/P on the Test Unit Mounting Assembly. Verify that the counterbalance is correctly positioned below the flat mirror cell trunnion shaft. Attach thermocouples to the C/P mounting frame to measure air temperature as follows:

Thermocouple	Location
#16	Just above the Meniscus
#17	Unibal support at the primary mirror end of the support tubes.
#18	Bottom center of the support tubes.
#19	On "A" frame near the camera

5.10.4.1.2 Perform the Test Console set-up procedure (Appendix A).

5.10.4.1.3 Turn the OPERATING POWER on.

5.10.4.1.4 Execute Azimuth position 1, MOTOR OFF, and consecutively positions 1, 3, and 2 of the Elevation servo.

5.10.4.1.5 Turn the OPERATING POWER off.

5.10.4.1.6 Remove all of the film from the take-up reel. Remove the partially used roll of film from the air supply, place it in a film can and return it to film stock.

5.10.4.1.7 The partially used roller of film left from pre-vibration photo testing (step 5.6.2) should now be installed in the air supply and threaded through the C/P in accordance with Appendix E, diagram I.

5.10.4.1.8 Turn on the OPERATING POWER D.C. EXECUTE MOTOR SPEED SET to ON. After 30 seconds EXECUTE the MOTOR OFF command.

5.10.4.1.9 Turn the OPERATING POWER OFF.

5.10.4.1.10 Have Assembly Personnel install the Camera and Air Supply cov

5.10.4.1.11 Set the POSITIONER control location switch to REMOTE NO. 1

5.10.4.1.12 Install the Alignment Telescope on the bracket inside the access port opposite the target.

5.10.4.1.13 Mount the Moving Target Assembly in position on the Collimator making sure that the assembly is in contact with all locating stops. Connect the cables and air hose to the MTA.

5.10.4.1.14 Release the drum detent on the Moving Target Assembly and rotate the drum until the detent pin engages the drum locating slot. (In this position the target alignment fiducial is at the Collimator image plane.)

5.10.4.1.15 Turn the ILLUMINATOR LAMP power on and adjust the lamp current to 2.0 amperes. (J)

5.10.4.1.16 Visually verify with the alignment telescope that the Camera slit plate is properly positioned with the 0.0063 inch slit at the Camera aperture.

5.10.4.1.17 Using the Alignment Telescope, observe the location of the target fiducial image on the Camera slit.

5.10.4.1.18 If necessary adjust the Test Unit Mounting Assembly, by means of the POSITIONER, so that the Camera slit is parallel to and centered on the target vertical reticle line; and the slit plate fiducial line is centered on the target horizontal reticle line. (See Figure II of Appendix E).

5.10.4.1.18.1 Centering of the slit image on the target vertical reticle in the X direction shall be accomplished by turning the hand wheel located at the left rear of the positioner.

5.10.4.1.18.2 Centering of the slit fiducial line image on the target horizontal reticle line in the Y direction shall be accomplished by operating the Positioner motor.

5.10.4.1.18.3 Alignment of the slit image to the target reticle about the Z axis shall be accomplished by adjusting the C/P elevating screw which is located on the Cradle support at the unibal assembly.

NOTE: The referenced elevating screw is locked by means of four clamping screws.

5.10.4.1.18.4 Operate the Positioner and observe the tracking of the Camera slit with respect to the target vertical reticle line. If a deviation from tracking is observed the C/P must be readjusted as stated in step 5.10.4.1.17.1.

5.10.4.1.18.5 Repeat steps 5.10.4.1.17.1 through 5.10.4.1.17.4 until proper alignment is achieved.

5.10.4.1.19 Adjust the POSITIONER INDICATOR needle, on the Test Console, to read 0 dgrees when the Camera slit and the target drum reticle are aligned.

5.10.4.1.20 Remove the Alignment Telescope from its bracket and replace the collimator access port.

5.10.4.1.21 Release the Moving Target detent pin from the drum locating [illegible].

(J) 5.10.4.1.22 Decrease the ILLUMINATOR LAMP current to zero **but do not turn the** lamp power off.

5.10.4.2 Determination of Target Drum Oscillator Frequencies.

NOTE: This section may be omitted and the Pre-Vibration [illegible] as determined in paragraph 5.5.4.2, may be used if the same serial no. items of test equipment are used.

5.10.4.2.1 Obtain a copy of the following data from other Q.C. test reports.

1. Camera Film Speed vs MSD Frequency data, test report QC-A-[illegible]
2. Curve II, Drum Motor Frequency vs Drum Speed for the Target, test report QC-A-209.
3. Focal length of the C/P lens, test report QC-A-321.
4. Focal length of the Collimator, test report QC-A-204.

5.10.4.2.2 Fill in the heading of the Target Drum Oscillator Frequency data sheet.

(F) 5.10.4.2.3 Look up the MSD frequencies for speeds 1, 9, 17, 25, 31, 33, 41, 49, 57 and 64 as recorded in paragraphs 5.10.2.7.1.4 and 5.10.2.7.1.5. Enter these values on the chart.

5.10.4.2.4 Calculate the Camera Film Speed Ratio (CFSR) at the five speeds for which data is given in the Camera Test Report QC-A-250 using:

$$\text{CFSR} = \frac{\text{linear camera film speed (inches/sec)}}{\text{camera drive frequency (cps)}}$$

Calculate the arithmetic average of these five values and enter the resultant Average CFSR on the data sheet.

(F)

Determine the value of S_F for speed steps 1, 9, 17, 25, 31, 33, 41, 49, 57 and 64 using: (F)

S_F = Average CFSR x MSD freq (cps)

5.10.4.2.5 Calculate the drum speed for each MSD frequency by using the relationship:

$$S_D = S_F \times \frac{f_c}{f_1}$$

where:

S_D = drum speed in inches/second

S_F = film speed in inches/second

f_c = collimator focal length in inches

f_1 = C/P lens focal length in inches

5.10.4.2.6 Determine the value of F_D (Target Drum Oscillator Frequency) from Curve II for each value of Sp and enter these values on the chart.

5.10.4.2.7 Obtain the latest calibration curve for the MTA illuminator assembly and enter the illuminator current on the data sheet for each of the designated speeds.

5.10.4.2.8 Unless otherwise stated all dynamic focus and resolution tests are performed at 1/400 second exposure. For the 0.0083 inch slit a camera film speed of 3.336 inches per second is required. Check the S_F dolumn on the data sheet for the value most closely equal to 3.336 and use the corresponding camera speed step for all photographic resolution runs. This will be step 31 for payloads FM-11 and following. (F)

(E)

5.10.5 Dynamic Photo Test

5.10.5.1 Install the Forward Record Storage cover.

5.10.5.2 Set the OPERATING POWER to 28.0 volts.

5.10.5.3 Turn on the OPERATING POWER D.C.

5.10.5.4 Command and EXECUTE the MANUAL DRIVE in the REVERSE direction until the output of CPL-20 is approximately 0.5 volts below its value at the best focus position determined in paragraph 5.5.5.44.

5.10.5.5 Command and EXECUTE the MANUAL DRIVE in the FORWARD direction to the best focus position as indicated by the outputs of CPL-20 and CPL-27 determined in paragraph 5.5.5.44

5.10.5.6 Command the ELEVATION to 2, the AZIMUTH to 1, the MOTOR SPEED to 51, and the MOTOR to ON. EXECUTE the commands. Turn DATA SIGNALS CHANNEL A and CHANNEL B on.

5.10.5.7 Command and EXECUTE the MOTOR to OFF after one minute running time.

5.10.5.8 Command the Slit (SLIDE) to position 1.

5.10.5.9 Verify that the dark tent is in place and properly adjusted for photographic testing.

5.10.5.10 Slit-Data Lamp Alignment

(J) 5.10.5.10.1 Turn off DATA Signal B. Both CHANNEL A and CHANNEL B lights will go out.

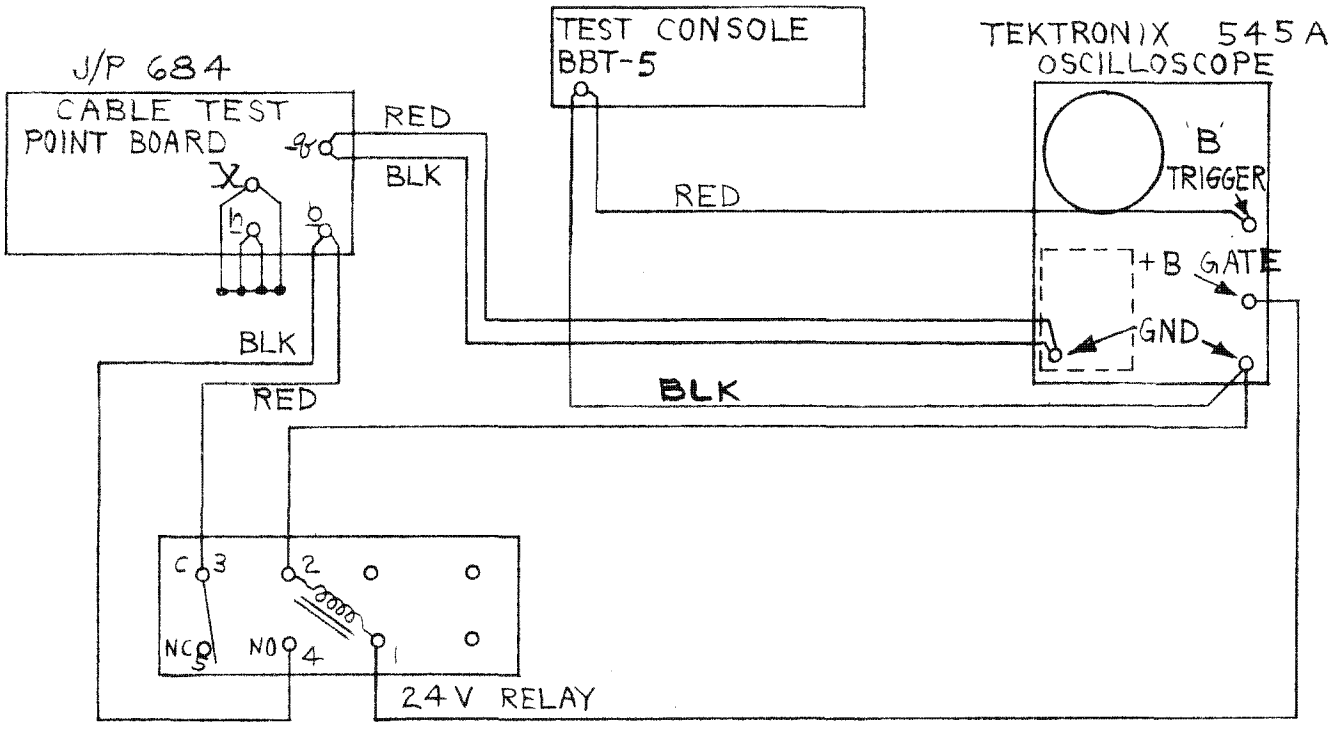
5.10.5.10.2 Connect the Cable Test Point Board to P684 and J684 at the MSD.

(J) 5.10.5.10.3 Set up the test equipment as shown in the diagram below:

CAUTION: (IN THIS TEST THE OSCILLOSCOPE MUST BE ISOLATED FROM BUILDING GROUND.)

(J) 139

(G)



5.10.5.10.4 Adjust the Tektronix 545A Oscilloscope as follows:

5.10.5.10.4.1 Use the Horizontal Display Switch to select time base "B".

5.10.5.10.4.2 Adjust the "B" Sweep Rate (TIME/CM or DELAY TIME) for 2 ms/cm.

5.10.5.10.4.3 Place the Trigger Mode selector on DC and the Trigger Slope to + EXT.

5.10.5.10.4.4 Turn the Trigger Level to indicate + and adjust the Stability so the scope trace is triggered.

5.10.5.10.4.5 Adjust the Delaying Sweep Control (LENGTH) to obtain a 7.5 cm long trace on the screen. This gives a pulse of 15 milliseconds duration at the + B gate.

5.10.5.10.4.6 Adjust the Stability control such that when Test Console command CB-24 is depressed the sweep is triggered.

5.10.5.10.5 Turn on the OPERATING POWER and set the voltage to 28 vdc.

5.10.5.10.6 Depress CHANNEL A button, then CHANNEL B button. This results in Data Signal A off and Data Signal B illuminator lit but off due to no trigger from CB-24.

5.10.5.10.7 Depress the DATA SIGNAL-CHANNEL A button ON and OFF as quickly (K) as possible, the ON time not to exceed 1 second.

5.10.5.10.8 While monitoring oscilloscope for sweep occurrence, depress Test Console command CB-24.

5.10.5.10.9 Turn the ILLUMINATOR LAMP power on and adjust the lamp current to 3.5 amperes for a duration of 15 seconds.

NOTE: Slit exposure may be made either with the MTA drum rotating or drum stationary in the detent engaged alignment position.

5.10.5.10.10 Command the MOTOR ON for 5 seconds then OFF.

5.10.5.10.11 Repeat steps 5.10.5.10.7 through 5.10.5.10.10.

5.10.5.10.12 Command the Slit (SLIDE) to position 2.

(J)

5.10.5.10.13 Repeat steps 5.10.5.10.7 through 5.10.5.10.11.

5.10.5.10.14 Command the Slit (SLIDE) to position 3.

5.10.5.10.15 Repeat steps 5.10.5.10.7 through 5.10.5.10.11.

5.10.5.10.16 Command the Slit (SLIDE) to position 4.

5.10.5.10.17 Repeat steps 5.10.5.10.7 through 5.10.5.10.11.

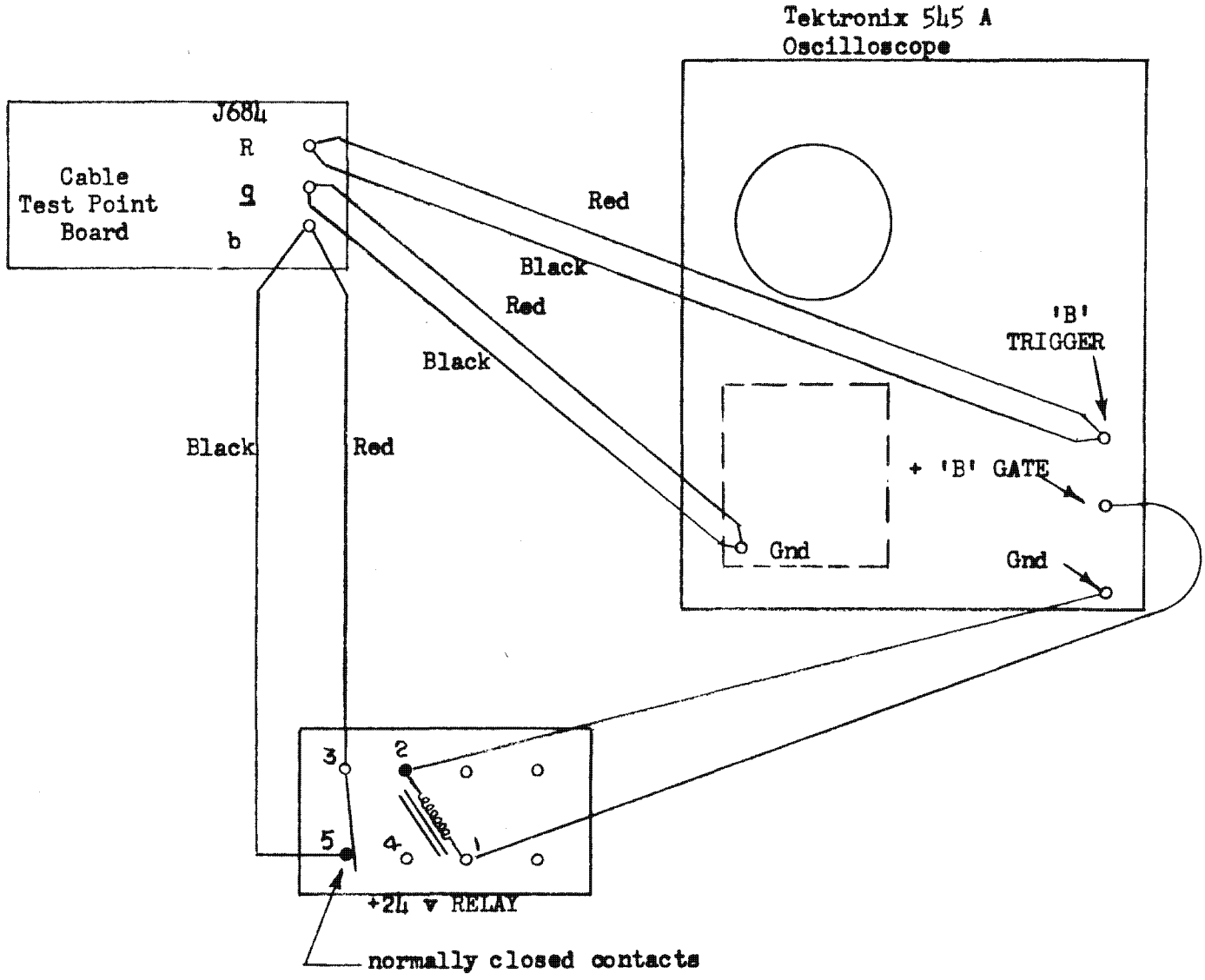
5.10.5.10.18 Turn OFF the OPERATING POWER and remove all leads associated with Slit to Data Lamp Alignment.

5.10.5.10.19 Although no extra test effort is required for Slit to Interframe Marker Positinning Check the necessary measurements should be performed using the exposure obtained in the performance of paragraph 5.5.7.12.12 and 5.5.7.12.13 and the processed record should be marked accordingly.

5.10.5.11 Film START and STOP TRANSIENT MEASUREMENTS.

5.10.5.11.1 Set up the test equipment as shown in the diagram below:

CAUTION: (IN THIS TEST THE OSCILLOSCOPE MUST BE ISOLATED FROM BUILDING GROUND.)



(G)

(J) 141 a

5.10.5.11.2 Adjust the Tektronix 545 A Oscilloscope as follows;

5.10.5.11.2.1 Use the Horizontal Display Switch to select time base "B".

5.10.5.11.2.2 Adjust the "B" Sweep Rate for .2 sec/cm.

5.10.5.11.2.3 Place the Trigger Mode Selector on DC and the Trigger Slope to +EXT.

5.10.5.11.2.4 Turn the Trigger Level to indicate + and adjust the Stability so the scope trace is triggered.

5.10.5.11.2.5 Adjust the Delaying Sweep Control (LENGTH) to obtain a 7.5 cm long trace on the screen. This gives a pulse of 1.5 sec duration at the +B gate.

5.10.5.11.2.6 Adjust the Stability control so that the sweep is triggered when the camera is commanded ON.

5.10.5.11.3 Turn ON data signal generators A and B on the test console.

5.10.5.11.4 Command the camera ON at speed 1. After approximately 5 seconds turn the camera OFF.

5.10.5.11.5 After a 30 second waiting period repeat step 4.

5.10.5.11.6 Repeat steps .4 and .5 for camera speeds 9.17,25,33,41,49,57, 64,ie, 2 Start-Stop runs at each camera speed except speed 64 which requires 3 runs.

5.10.5.11.7 Turn off data signal generators A & B on the test console.

5.10.5.11.8 Run four looper cycles of record through the space chamber to advance the test run into the Forward Record Storage.

5.10.5.11.9 Turn off the operating power and remove all leads from the cable test point board.

5.10.5.12 Resolution and Film Format

5.10.5.12.1 Turn ON the OPERATING POWER D.C. The HEATER POWER may be turned on intermittently during the stabilization period to help equalize the temperatures of the C/P.

HEATER POWER must be OFF during photo testing.

5.10.5.12.2 Command the MANUAL DRIVE in the REVERSE direction until the output of CPL-20 is 0.5 volts below its value at best focus as determined in paragraph 5.5.5.44.

5.10.5.12.3 Command the MANUAL DRIVE in the FORWARD direction to the best focus position as indicated by the outputs of CPL-20 and CPL-27 as determined in paragraph 5.5.5.44. Record the values of CPL-20 and CPL-27.

5.10.5.12.4 Command the ELEVATION to 2, the AZIMUTH to 1, the MOTOR SPEED to 31, and the MOTOR to ON. EXECUTE the commands.

5.10.5.12.5 EXECUTE the MOTOR OFF command after one minute running time.

5.10.5.12.6 Start the ILLUMINATOR MOTOR.

5.10.5.12.6.1 Set the DIRECTION switch to REVERSE.

5.10.5.12.6.2 Turn the START SPEED control fully counter clockwise.

5.10.5.12.6.3 Adjust the Drum OSCILLATOR to 2500 cps.

5.10.5.12.6.4 Turn ON the ILLUMINATOR MOTOR.

5.10.5.12.6.5 Set the START-RUN switch to the START Position.

5.10.5.12.6.6 Turn the START-SPEED control in the clockwise direction until the Moving Target Drum starts to rotate.

5.10.5.12.6.7 Set the Start-Run switch to the RUN position.

5.10.5.12.6.8 Visually verify that the drum is rotating in a clockwise direction as viewed from the top.

5.10.5.12.7 For all of the following photographic testing refer to Appendix D for Test Number Identification.

5.10.5.12.8 For all of the following photographic testing refer to the results obtained in paragraph 5.10.4.2.6 for settings of oscillator frequency vs Camera speed and illumination levels.

5.10.5.12.9 Set the Collimator Positioner to 0°.

5.10.5.12.10 Set the proper illumination level and Oscillator frequency for MOTOR SPEED 01. Set the proper TEST NUMBER.

5.10.5.12.11 With the collimator tent still open turn on the large tunnel fan.

NOTE: FROM THIS TIME ON, NO PERSONNEL SHALL ENTER THE COLLIMATOR TUNNEL, ACCESS DOORS, THE TENT, OR WALK ON THE COLLIMATOR PAD.

5.10.5.12.12 Fifteen minutes after completing step 5.5.2.8 close the collimator tent. Using the DVM measure the values of CPL 2, 3, 4, 5, 6, 7, 8, 9 and 11 and record data on the PHOTO TEST TEMPERATURE DATA SHEET along with the temperatures indicated by the thermometers outside the tent area and the following thermocouples: 1, 8, 9, 13, 15, 16, 17, 18, 19 and 20. Sixty minutes after completing step 5.5.5.8 repeat the above temperature measurements. If any of the CPL values are out of spec additional stabilization time shall be allowed until the temperatures are within required limits and are stable. At such time the test may be started.

5.10.5.12.13 EXECUTE the MOTOR SPEED 01 ON command.

5.10.5.12.14 EXECUTE the MOTOR OFF command after 25 seconds of running time.

5.10.5.12.15 Repeat paragraphs 5.10.5.12.10 and 5.10.5.12.13 for MOTOR SPEED 09, 17, 25, 33, 41, 49, 57, and 64. EXECUTE the MOTOR OFF command after 20 seconds running time at each speed.

5.10.5.12.16 Set the MOTOR SPEED to 31, for a 1/400 second exposure.

5.10.5.12.17 Repeat paragraphs 5.10.5.12.10 and 5.10.5.12.13 for MOTOR SPEED 31. EXECUTE the MOTOR OFF command after 20 seconds running time.

5.10.5.12.18 Set the Collimator Positioner to $+0.5^{o}$.

5.10.5.12.19 Repeat paragraphs 5.10.5.12.10 and 5.10.5.12.13 for MOTOR SPEED 31. EXECUTE the MOTOR OFF command after 20 seconds running time.

5.10.5.12.20 Set the Collimator Positioner to -0.5^{o}.

5.10.5.12.21 Repeat paragraphs 5.10.5.12.10 and 5.10.5.12.13 for MOTOR SPEED 31. EXECTUE the MOTOR OFF command after 20 seconds running time.

5.10.5.12.22 Set the Collimator Positioner to 0^{o}.

5.10.5.12.23 Set the OPERATING POWER to 27.0 volts.

(G) 5.10.5.12.24 Record the outputs of CPL-20 and CPL-27 and verify that they indicate best photographic focus as determined in paragraph 5.5.5.44.

5.10.5.12.25 Repeat paragraphs 5.10.5.12.9, 5.10.5.12.10 and 5.10.5.12.13 through 5.10.5.12.17.

5.10.5.12.26 Set the OPERATING POWER to 32.5 volts.

(G) 5.10.5.12.27 Record the outputs of CPL-20 and CPL-27 and verify that they indicate best photographic focus as determined in paragraph 5.5.5.44.

5.10.5.12.28 Repeat paragraphs 5.10.5.12.9, 5.10.5.12.10 and 5.10.5.12.13 through 5.10.5.12.17.

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(J) 145.

5.10.5.12.29 Set the OPERATING POWER to 28.0 volts.

5.10.5.12.30 Adjust the Camera Slit Aperture Plate to the 0.0166 inch slit and check the alignment with the alignment telescope.

5.10.5.12.31 Repeat the stabilization procedure defined by paragraphs 5.10.5.12.10 through 5.10.5.12.12 for speed 31 and the 0.0166 slit.

5.10.5.12.32 EXECUTE the MOTOR SPEED 31 ON command. After 20 seconds EXECUTE the MOTOR OFF command.

5.10.5.12.33 Turn OFF the ILLUMINATOR LAMP and MOTOR.

5.10.5.12.34 Open the Slip Door on the Record Storage Bracket and Enclosure in total darkness. Using a pointed object such as a pencil, make a protrusion approximately one inch from the lower edge of the film.

5.10.5.12.35 EXECUTE the MOTOR SPEED 64 ON command. After 10 seconds EXECUTE the MOTOR OFF command.

5.10.5.12.36 Make another protrusion in the same manner as step 5.10.5.12.34. (This section of the film will be exposed by Photo Sciences to determine the light transmission factor of the C/P optics.)

5.10.5.12.37 EXECUTE the MOTOR SPEED 51 and MOTOR ON commands.

5.10.5.12.38 After 60 seconds execute the MOTOR OFF command. Using the DVM measure the values of CPL2, 3, 4, 5, 6, 7, 8, 9, and 11 and record data on the PHOTO TEST TEMPERATURE DATA SHEET along with the temperatures indicated by the thermometers outside the tent area and the following thermocouples: 1, 8, 9, 13, 15, 16, 17, 18, 19, and 20. Turn the OPERATING POWER OFF.

5.10.5.12.39 Repeat paragraphs 5.5.5.6 through 5.5.5.42.

5.10.5.12.40 Remove the exposed film from the Forward Record Storage Assembly and deliver it to the Photo Science Lab to have sensitometric strip exposures made between the punch marks. Then deliver the film to the processing group along with the following paper work:

1. A "PINK" Request for Processing Ticket
2. An "ORANGE" Process Control Card
3. The Film Evaluation Data Sheets

NOTE: The Test Engineer is responsible for identifying the film after it is returned from processing.

5.10.6 Focus Sensor Calibration

5.10.6.1 Remove the Moving Target Assembly from the Collimator and replace it with the Gain Target Assembly.

5.10.6.2 Set the ILLUMINATOR illumination level to 3.0 amperes. (L)

5.10.6.3 Start the target drum by performing paragraphs 5.10.5.12.6.1 through 5.10.5.12.6.8.

5.10.6.4 Using the Alignment Telescope adjust the Test Unit Mounting Assembly until the target image, as viewed through the Alignment Telescope, completely covers the focus sensor reticle. This adjustment is made with the hand wheel at the left rear of the positioner.

5.10.6.5 Make the following INSTRUMENTATION PATCHBOARD pin changes for the monitor points listed below:

CPL Point	Readout Inst.	Function
13	Chart Recorder 1	Stereo Position
14	Chart Recorder 2	Crab Position
17	Chart Recorder 3	Looper Position
20	Chart Recorder 4	Platen Pos., coarse
27	Chart Recorder 5	Platen Pos., fine
21	Chart Recorder 6	Gain Sensor Output
22	Chart Recorder 7	Gain Fwd. Chan. Output
23	Chart Recorder 8	Gain Rev. Chan. Output

NOTE: This programming of the recorder shall be maintained throughout Focus Sensor Calibration.

5.10.6.6 Start the OSCILLOGRAPH CHART RECORDER at a speed of 0.8 mm/sec. Turn the OPERATING POWER ON and record temperatures as in para. 5.5.5.9 or 5.10.5.12.12. Set GAIN CONTROL POWER switch to ON.

NOTE: DO NOT OPERATE GAIN CONTROL MORE THAN ONE((1) HOUR CONTINUOUSLY. AFTER ONE HOUR ON TIME, TURN OFF FOR ONE HOUR.

5.10.6.7 Adjust the drum oscillator to the proper frequency as indicated below:

C/P Model No.	Oscillator Frequency	Simulated C/P Height
F201-F203	3960 cps	132.5 miles
F204-F216	3700 cps	80 miles
F217 and following	5030 cps	80 miles

5.10.6.8 Command and EXECUTE the MANUAL DRIVE in the REVERSE direction (toward the lens) until it reaches the reverse stop. Record the output of CPL-20, CPL-21, CPL-22, CPL-23, CPL-27, VTP-20, VP-1, VP-5, VP-12 and VP-51.

5.10.6.9 Command and Execute the Manual Drive in the Forward direction (away from the Lens) in steps of 0.250 vdc as indicated by CPL-20. When CPL-21 output voltage starts to increase from its minimum value, thru CPL-21 equal to 5 vdc, the increments shall be 0.125 vdc as indicated by CPL-20. Record the values of CPL-20, CPL-21, CPL-22, CPL-23 for each step.

5.10.6.10 With the platen positioned at the forward stop EXECUTE the MANUAL DRIVE in the REVERSE direction until CPL-20 indicates BPF. Record the values of CPL-20 and CPL-21.

5.10.6.11 With the platen positioned at the reverse stop EXECUTE the MANUAL DRIVE in the FORWARD direction until CPL-20 indicated BPF. Record the values of CPL-20 and CPL-21.

5.10.6.12 Repeat step 5.10.6.10

5.10.6.13 Repeat step 5.10.6.11

(L)

5.10.6.14 With the platen positioned at the reverse stop EXECUTE the MANUAL DRIVE FORWARD command until CPL-21 indicates 2.5 volts dc. Record the values of CPL-20 and CPL-21.

5.10.6.15 With the platen positioned at the forward stop EXECUTE the MANUAL DRIVE REVERSE COMMAND until CPL-21 indicates 2.5 volts dc. Record the values of CPL-20 and CPL-21.

5.10.6.16 Command and EXECUTE the MANUAL DRIVE in the REVERSE direction until reaching the reverse stop. Command the AUTOMATIC mode of GAIN CONTROL operation. After the automatic adjustment has been completed record the values of CPL-20 and CPL-21. Command the MANUAL Mode of GAIN CONTROL operation.

5.10.6.17 Repeat step 5.10.6.16 five times.

5.10.6.18 Command and EXECUTE the MANUAL DRIVE in the FORWARD direction until reaching the forward stop. Command the AUTOMATIC mode of GAIN CONTROL operation. After the automatic adjustment has been completed, record the values of CPL-20 and CPL-21. Command the MANUAL mode of GAIN CONTROL operation.

5.10.6.19 Repeat steps 5.10.6.18 five times.

5.10.6.20 Insert a 0.6 neutral density filter in front of the target. Repeat steps 5.10.6.8 and 5.10.6.9. Remove the neutral density filter.

5.10.6.21 Insert a 1.2 neutral density filter in front of the target. Repeat steps 5.10.6.8 and 5.10.6.9. Remove the neutral density filter.

5.10.6.22 Command and EXECUTE the MANUAL DRIVE in the FORWARD direction until reaching the forward stop. Reduce ILLUMINATOR LAMP current to a minimum setting and record the values of CPL-20, 21, 22 and 23.

5.10.6.23 Repeat step 5.10.6.22 at the reverse stop position.

5.10.6.24 Turn off the ILLUMINATOR MOTOR and the OPERATING POWER D.C.

5.10.6.25 Place a 0.0051 inch spacer between the Gain Target Assembly locating pin and collimator front step.

5.10.6.26 Repeat steps 5.10.6.2, 5.10.6.3, 5.10.6.5 and 5.10.6.6.

5.10.6.27 Adjust the drum oscillator to 3280 cps.

5.10.6.28 Repeat steps 5.10.6.8 thru 5.10.6.24 with the following variation: In steps 5.10.6.10 and 5.10.6.11, MANUAL DRIVE until the output of CPL-20 is 0.085 vdc below its value at best focus position. This value of platen position telemetry indicates the corrected BPF for an altitude of 120 nautical miles.

5.10.6.29 Place a 0.0025 inch spacer between the Gain Target Assembly locating pin and collimator front stop.

5.10.6.30 Repeat steps 5.10.6.2, 5.10.6.3, 5.10.6.5 and 5.10.6.6.

5.10.6.31 Adjust the drum oscillator to 4100 cps.

5.10.6.32 Repeat steps 5.10.6.8 thru 5.10.6.24 with the following variation: In steps 5.10.5.10 and 5.10.6.11, EXECUTE the MANUAL DRIVE until the output of CPL-20 is 0.050 vdc below its value at best focus position. This value of platen position telemetry indicates the corrected BPF for an altitude of 100 nautical miles.

5.10.6.33 With no illumination, turn ON the Operating Power and the Gain Power, Read the outputs of CPL's 20, 21, 22 & 23.

5.10.6.34 Command Motor Speed 1 ON. Read the outputs of CPL's 20, 21, 22 & 23. Command Motor OFF.

5.10.6.35 Command Motor Speed 32 ON. Read the outputs of CPL's 20, 21, 22 & 23. Command Motor OFF.

5.10.6.36 Command Motor Speed 64 ON. Read the outputs of CPL's 20, 21, 22 & 23. Command Motor OFF.

5.10.6.37 With the Target Film Strip removed from the Gain Target Assembly,

adjust the illumination to 3.7 amperes. Read the outputs of CPL's 20, 21, 22 & 23.

5.10.6.38 Insert a 0.6 neutral density filter in front of the target. Read the outputs of CPL's 20, 21, 22 & 23. Remove the neutral density filter.

5.10.6.39 Insert a 1.2 neutral density filter in front of the target. Read the outputs of CPL's 20, 21, 22 & 23. Remove the neutral density filter.

5.10.6.40 With the collimator alignment telescope in place, move the collimator positioner in the minus direction until the target image is at the extreme end of the reticle. Record the field angle.

5.10.6.41 Repeat steps 5.10.6.37 thru 5.10.6.39 at this field angle.

5.10.6.42 Turn off the Gain Power, Operating Power and target illumination.

5.10.6.43 Reinstate INSTRUMENTATION PATCHBOARD pin connections per step 5.10.1.1.1.

5.10.7 Film Drive Smoothness (tapered and operational slits) and Dynamic Slit Evaluation Tests.

5.10.7.1 Have assembly personnel clean the slit aperture plate with a static brush and solvent if necessary. Rethread the C/P in accordance with Diagram I of Appendix E.

5.10.7.2 Turn on the OPERATING POWER, and command MOTOR SPEED 1 ON for 30 seconds to run the splices through the C/P.

5.10.7.3 Replace the Air Supply, Camera and FRS Enclosure covers so that the film path is light tight.

5.10.7.4 Turn OFF the OPERATING POWER and disconnect the test console cables from the C/P.

5.10.7.5 Have assembly personnel remove the C/P from the collimator and set it on a truck.

5.10.7.6 Move the truck mounted C/P to the test console and connect the cables to the C/P.

5.10.7.7 Tapered Slit Film Drive Smoothness Test.

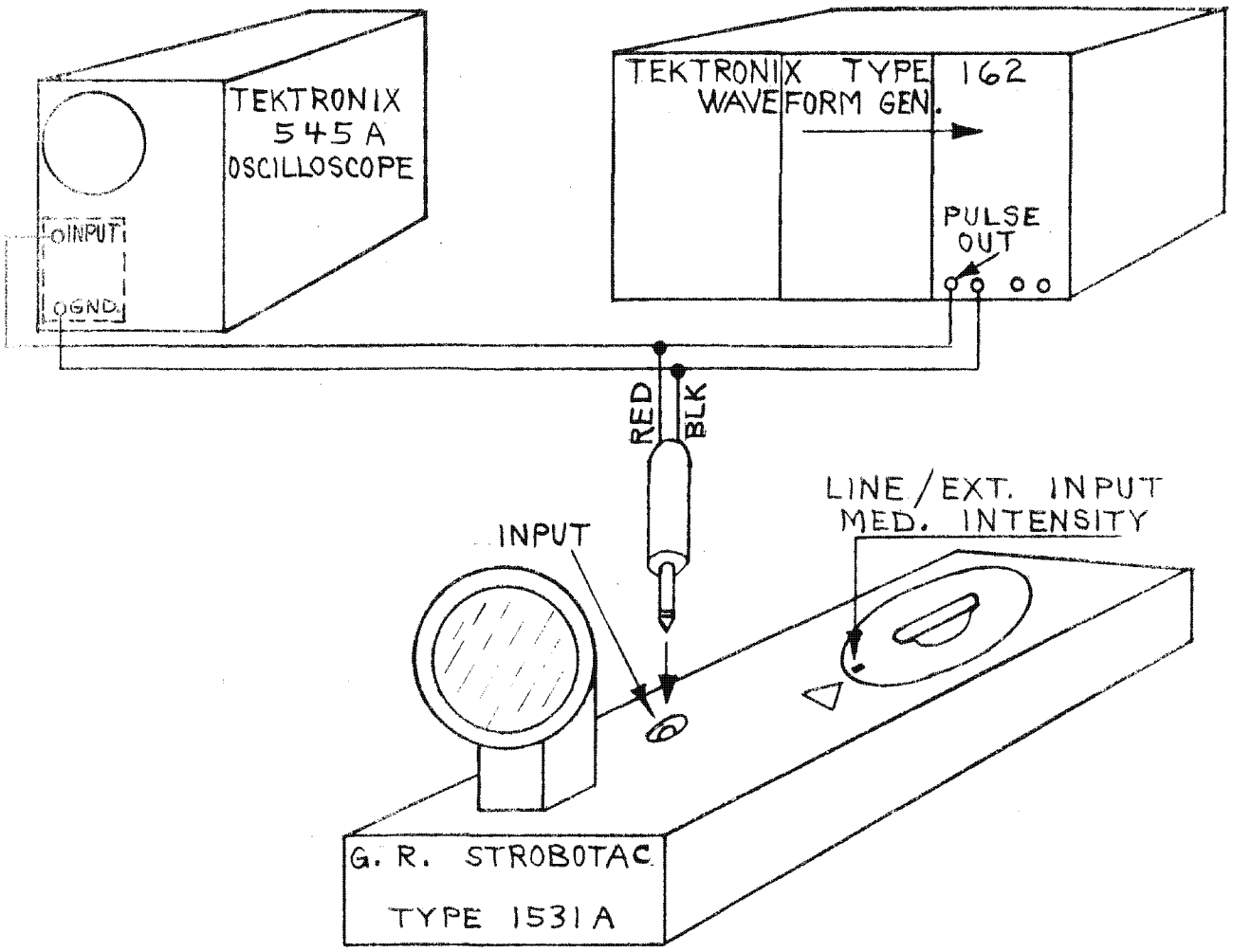
5.10.7.7.1 For this test it is necessary to have a total of 3000 feet of record in the C/P film handling system, at least 200 feet of which must be on the Take-up Spool. If it is found necessary to add record to the Take-Up spool, determine physical measurements using graphical information in Appendix D of this procedure.

5.10.7.7.2 Verify that the tapered slit (programmable slit position #5) is commanded into its operational position.

5.10.7.7.3 Set up and connect the equipment as shown by the following diagram: (see next sheet)

5.10.7.7.4 Position Strobotac to give the optimum amount of light transmitted to the tapered slit. This can be accomplished by checking for the greatest amount of reflection off the back aluminized surface of the slit plate while taking care not to position the Strobotac in such a manner that the light will be partially blocked by the 45° mirror housing.

5.10.7.7.5 Prior to performing smoothness exposures, clear a minimum of 5 loopers of record through the C/P film handling system. This must be done in order to exclude film set condition which will be undesirable in determination of velocity variation measurements.



Waveform Generator Setup Conditions:

a. OPERATING MODE selector at RECURRENT position.

b. MULTIPLIER selector at 10. position.

c. Output termination toggle switch in PULSE OUT position.

d. Adjust WAVEFORM DURATION OR PULSE INTERVAL and VERNIER selectors such that the correct pulse repetition rate is monitored on oscilloscope.

5.10.7.7.6 If at any time during smoothness test 5 minutes have elapsed between exposures, it will be necessary to repeat para. 5.10.7.7.5.

5.10.7.7.7 Using the oscilloscope, monitor the trigger pulse repetition rate and adjust as necessary using the appropriate Waveform Generator controls for each Film Drive Smoothness Test speed step to be performed according to the following table:

SPEED STEP	TRIGGER PULSE REP. RATE IN MILLISEC.	RECORD LENGTH OF EXPOSURE
1	35.4	2 loopers
33	25.7	2 loopers
64	18.8	2 loopers

5.10.7.7.8 Execute the MOTOR SPEED 64 ON command. After a 5 looper clear cycle execute the MOTOR OFF command

5.10.7.8 Set up the Film Drive Smoothness and Slit Evaluation Lamp Box on a cart and wheel it up to the bumper on the C/P truck so that the lighted face of the box shines into the C/P aperture mask.

5.10.7.9 Connect the Lamp Box power cord to connector J115 on the rear of the Test Console.

5.10.7.10 Verify that no Moving Target or Gain Target Illuminator is connected to the Collimator Junction Box.

5.10.7.11 For each Film Drive Smoothness Test to be run in the succeeding steps determine the proper C/P speed step, slit, and Lamp Current from the following table:

SPEED STEP		LAMP CURRENT
1	0.0166 yellow or 0.0126 clear	3.23
9		3.28
17		3.32
25		3.37
33		3.42
41		3.46
49		3.51
57		3.56
64		3.60

5.10.7.11.1 Select the proper data table for the operational orbit of the C/P under test.

5.10.7.11.2 Set the Slit Aperture Plate to the medium operational slit. (0.0166" yellow or 0.0126 clear)

5.10.7.11.3 Turn off the room lights.

5.10.7.11.4 Turn on the C/P OPERATING POWER.

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5.10.7.11.5 Turn on the ILLUMINATOR LAMP and set the current to the proper value for speed 1.

5.10.7.11.6 Command the MOTOR SPEED 1 on for 15 seconds and then command the MOTOR OFF.

5.10.7.11.7 Repeat step 5.10.7.10.6 for speeds 9, 17, 25, 33, 41, 49, 57 and 64.

5.10.7.11.8 Turn the ILLUMINATOR LAMP Off.

5.10.7.11.9 Command the MOTOR SPEED 1 on for 5 seconds and then command the MOTOR OFF.

5.10.7.12 Slit Evaluation Test

5.10.7.12.1 For each Slit Evaluation Test run in the succeeding steps determine the proper C/P speed step and lamp current from the following table for the slit to be used:

SLIT	SPEED STEP	LAMP CURRENT
0.0083 yellow or 0.0063 clear	1	4.14
0.0166 yellow or 0.0126 clear	1	3.78
0.0332 yellow or 0.0252 clear	1	3.76

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5.10.7.12.2 Select the proper data table for the operational orbit of the C/P under test.

5.10.7.12.3 Set the Slit Aperture Plate to the narrow operational slit. (0.0083" yellow or 0.0063" clear)

5.10.7.12.4 Turn ON the ILLUMINATOR LAMP and set the current to the proper level for the narrow slit.

5.10.7.12.5 Command the MOTOR ON at the proper speed for the narrow slit. After 15 seconds command the MOTOR OFF.

5.10.7.12.6 Set the Slit Aperture Plate to the medium operational slit. (0.0166" yellow or 0.0126" clear)

5.10.7.12.7 Repeat steps 5.10.7.12.4 and 5.10.7.12.5 for the medium slit.

5.10.7.12.8 Turn OFF the ILLUMINATOR LAMP.

5.10.7.12.9 Command MOTOR SPEED 64 ON. After 60 seconds command the MOTOR OFF.

5.10.7.12.10 Turn OFF the OPERATING POWER.

5.10.7.12.11 Remove the exposed film from the Forward Record Storage and deliver it to the processing group along with the following paper work:

1. A"PINK" Request for Processing Ticket
2. An "ORANGE" Process Control Card
3. The Film Evaluation Data Sheets

NOTE: The test engineer is responsible for identifying the film after it is returned from processing.

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5.10.7.12.12 Evaluation

5.10.7.12.12.1 The Film Smoothness Test Film (operational slit) shall be identified by film speed and C/P serial number at the very edge of the film (opposite side from data tracks) and be placed in a film can for shipment to the customer.

5.10.7.12.12.2 The Slit Evaluation Test Film shall be evaluated in accordance with with Appendix C.

5.10.7.13 Turn the OPERATING POWER ON.

5.10.7.13.1 Ascertain that the elevation servo is in position 2 and the azimuth servo is in position 1.

5.10.7.13.2 Ascertain that the slide is in position E.

5.10.7.13.3 Ascertain that the platen is at the forward stop.

5.10.7.13.4 Ascertain that the MOTOR SPEED and GAIN CONTROL are OFF.

5.10.7.13.5 Turn the OPERATING POWER OFF.

5.10.7.14 Remove the supply reel and film.

5.10.7.15 Leaving the C/P threaded with film, fasten the ends of the film at the rollers nearest the supply reel and the Supply Cassette exit port respectively.

5.10.7.16 Install the simulated Record Tape Assembly in the Supply Cassette. (This assembly simulates a nominal roll of film for purposes of weight and balance determination.)

5.10.7.17 Reinstall the Supply Cassette cover making sure that all screws are tight.

5.10.7.18 Remove test cables W-1 through W-10 from the C/P.

5.10.7.19 Remove the Record Storage Bracket and Enclosure from the C/P and Cradle.

5.11 Proof Pressure and Leak Rate Test

5.11.1 Install the Leak Rate Test Cover Plate over the forward exit port of the Supply Cassette.

5.11.2 Identify and install a new chart in the Test Pressure Chart Recorder on the Leak Rate Test Set.

5.11.3 If necessary wind the chart recorder clock motor.

5.11.4 Close the THROTTLE VALVE, BLEED OFF VALVE and RECORDER VALVE, then rotate PRESSURE REGULATOR control full C.C.W. Open REFERENCE VALVE and the valve on the gas supply bottle inside of cabinet. Check the gas supply pressure on the TANK PRESSURE gauge. Replace the tank if the pressure is below 100 psig.

5.11.5 Connect the gas line from the Leak Rate Test Set to the quick disconnect pressure fitting on top surface of the Supply Cassette.

5.11.6 Open the THROTTLE VALVE and RECORDER VALVE.

5.11.7 Observe that the pressure indicated on the TEST PRESSURE recorder and the OUTLET PRESSURE gauge are both 0 psig.

5.11.8 Close the RECORDER VALVE.

5.11.9 Remove the two pressure relief valves from the Supply Cassette, then install closure plugs thereby sealing both mounting holes.

5.11.10 Rotate the PRESSURE REGULATOR control C.W. until the OUTLET PRESSURE gauge indicates 4.0 psig and maintain this pressure for 10 minutes. Observe the film path enclosure for mechanical failures.

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5.11.11 Close the THROTTLE VALVE and the PRESSURE REGULATOR (rotate C.C.W.)

5.11.12 Bleed the film path enclosure pressure back to 0 psig by slowly opening the BLEED OFF VALVE.

5.11.13 Remove the two plugs and replace the pressure relief valves in the Supply Cassette.

5.11.14 Close the BLEED OFF VALVE, then open the RECORDER VALVE and THROTTLE VALVE.

5.11.15 Observe that the pressure indicated on the TEST PRESSURE recorder and the OUTLET PRESSURE gauge are both 0 psig.

5.11.16 Rotate the PRESSURE REGULATOR control C.W. until the TEST PRESSURE recorder indicates a pressure of 7.0 inches of water.

5.11.17 Observe the TEST PRESSURE recorder and when the test pressure drops to 6.93 inches of water mark the recorder chart "Start of Test."

5.11.18 Observe the TEST PRESSURE recorder and determine the time required for the TEST PRESSURE to decrease to 0.69 inches of water. If after 10 minutes the pressure has not decreased to 0.69 inches of water record the pressure and time.

5.11.19 Disconnect the Leak Rate Test Set gas line from the C/P.

5.11.20 Remove the chart from the TEST PRESSURE recorder and file it in the C/P data file.

5.11.21 Remove the Leak Rate Test Cover Plate from the forward exit port of the Supply Cassette.

5.12 Weight and Center of Gravity Determination

Determine the weight and center of gravity of the C/P in accordance with Appendix F. Handling of the C/P during this operation shall be in accordance with procedure QC-A-534.

5.13 Final Inspection

At the completion of all testing of C/P shall be inspected in accordance with procedure QC-A-518 by Quality Control personnel.

5.14 Preparation for Shipment

Quality Control Personnel shall monitor all preparations and handling the C/P in accordance with procedure QC-A-516.

Packing shall be in accordance with procedure QC-A-526.

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APPENDIX A

TEST CONSOLE SET-UP PROCEDURE

1.0 PURPOSE

To provide instructions for the proper checkout and connection of the Test Console to the Package.

2.0 REFERENCES

2.1 Specifications - "Phase II Specification for the Test Console", Specification No. 802-107.

2.2 Drawings

2.2.1 "Test Console Block Intercabling Diagram", Dwg. No. 534-393.

2.2.2 Test System Cabling, Figure 1.

3.0 FACILITIES

3.1 Power Requirements - 115 ± 5 volts ac, 60 cps ± 1%, single phase.

4.0 CONDITIONS

4.1 Environmental Conditions - The test console shall be operated only in the following range of conditions.

4.1.1 Temperature - 45F to 110F

4.1.2 Pressure - 28 to 32 inches of Hg.

4.1.3 Relative Humidity - 10% to 90%.

4.2 Test Preparation - This procedure shall be followed prior to any QC Package Acceptance Test and prior to resuming testing after any break in the QC Package Acceptance Test Program.

4.3 Fixture Accuracy - The test console and associated equipment shall be certified for accuracy within the specified limits through approved standardization facilities, prior to the performance of this procedure.

5.0 SET-UP PROCEDURE

5.1 Power Off Set-Up

5.1.1 Cable Connections - Refer to Figure 1 and connect the following cables:

CABLE	FROM	TO
W-12	Console	Positioner Junction Box
W-13	Console	Illuminator Junction Box
W-14	Console	Illuminator Junction Box
W-15	Illum. Junction Box	Remote Motor Control
W-16	Console	Oscillograph Recorder
W-17	Console	Oscillograph Recorder
W-18	Illum. Junction Box	Target
W-19	Illum. Junction Box	Trigger Switch
W-11	Console	AC Line

CAUTION: CABLES W-1 THROUGH W-10 SHOULD NOT BE CONNECTED TO THE PACKAGE AT THIS TIME.

5.1.2 Instrumentation Loading - Open the lower front access door on bay 2 of the console and insert pins to load and bias the instrumentation circuits in accordance with the following chart:

INST. PT.	LOAD KILOHMS	LOAD RES. COLOR	BIAS VDC	BIAS CHANNEL
CPL-1	123	Yellow	2.50	2
2	148	Orange	2.50	1
3	148	Orange	2.50	1
4	123	Yellow	2.50	2
5	123	Yellow	2.50	2
6	123	Yellow	2.50	2
7	123	Yellow	2.50	2
8	123	Yellow	2.50	2
9	123	Yellow	2.50	2
10	123	Yellow	2.50	2
11	148	Orange	2.50	1
12	148	Orange	2.50	1
13	148	Orange	2.50	1
14	148	Orange	2.50	1
15	148	Orange	2.50	1
16	148	Orange	2.50	1
17	148	Orange	2.50	1
18	148	Orange	2.50	1
19	148	Orange	2.50	1
20	148	Orange	2.50	1
21	113	Brown	0.00	5 (GND.)
22	148	Orange	2.50	1
23	148	Orange	2.50	1
24	123	Yellow	2.50	2
25	148	Orange	2.50	1
26	148	Orange	2.50	1
27	148	Orange	2.50	1
28	148	Orange	2.50	1
29	148	Orange	2.50	1
30	148	Orange	2.50	1
31	148	Orange	2.50	1
32	123	Yellow	2.50	2
33	148	Orange	2.50	1
34	148	Orange	2.50	1
35	148	Orange	2.50	1

5.1.3 Check the paper supply in the oscillograph recorder. Install new paper if needed.

5.1.4 Ascertain that all console cabinet doors are tightly closed and latched.

5.2 Power Turn On.

5.2.1 Turn the CONSOLE POWER main circuit breaker to ON.

5.2.2 Set the various panel controls as follows:

5.2.2.1 Counter

Power	ON
Display time	12 o'clock
Time Interval	1 sec.
Function	TEST
Sensitivity	+1
Trigger Level	+

5.2.2.2 Illuminator Lamp

Adjust	Full CCW
Power	OFF

5.2.2.3 Illuminator Motor

Start Speed	Full CCW
On Switch	OFF

5.2.2.4 Counter Input - Oscillator

5.2.2.5 Fixed Lamp

Power	OFF

5.2.2.6 Positioner

Control Location	CONSOLE
Run	OFF

5.2.2.7 Oscillator

Power	ON
Coarse freq.	3 kc

5.2.2.8 Heater Power

AC	ON
DC	OFF
Adjust	Full CCW

5.2.2.9 Operating Power

AC	ON
DC	OFF
Adjust	Full CCW

5.2.2.10 Gain Control and Instrumentation

CAUTION: The gain control should always be set to MANUAL except when specifically testing the automatic mode of operation. Always set the gain control to MANUAL when turning the gain control power on or off.

Power	OFF
Mode	MANUAL
Manual Drive	FORWARD

Set all five meter function controls to zero.

5.2.2.11 Set all six Instrumentation Metering function controls to zero.

5.2.2.12 Command

Motor	OFF
Speed	0,0
Elevation	2
Azimuth	1
CB 24	OFF

5.2.2.13 Data Signal

Test numbers	0,0
Channel 1	OFF
Channel 2	OFF

5.2.2.14	Instrumentation Patchboard - Remove all pins.	
5.2.2.15	Digital Voltmeter	
	Sensitivity	3o'clock
	Operate/Calibrate	OPERATE
	Off/standby/on	ON
5.2.2.16	Digital Voltmeter Remote Reading and Control	
	Mode	OFF
	Stop	27
	Start	01
5.2.2.17	Digital Clock	
	Power	SET
5.2.2.18	Printer	
	Power	ON
	Record	OFF
	Space Selector	1
5.2.2.19	Oscillograph Recorder	
	Power	ON
	Chart Speed	STOP
	DC amplifiers	.2 Volts/chart line

5.3 Post Warm-Up Check - (after 30 min. warm-up period)

5.3.1 Counter - Test reading should be 100 Kcps ± 1 count.

5.3.2 Illuminator Lamp

5.3.2.1 Push the power switch to turn the power ON.

5.3.2.2 Increase the adjust in the CW direction until the meter reads 1 ampere DC.

5.3.2.3 Check to see that the lamp is lit and that the blower is operating.

5.3.2.4 Turn the adjust control full CCW and push the power button to turn power OFF.

5.3.3 Illuminator Motor

5.3.3.1 Set the direction switch to REVERSE.

5.3.3.2 Set the mode switch to START.

5.3.3.3 Set the oscillator frequency to approximately 3 kc.

5.3.3.4 Set the COUNTER INPUT to ILLUMINATOR MOTOR.

5.3.3.5 Push the ILLUMINATOR MOTOR ON button and turn until the counter indicates that the motor is operating.

5.3.3.6 Push the mode button to obtain a RUN indication and verify, from the COUNTER reading, that the drum is rotating.

5.3.3.7 Push the ON button to stop the illuminator motor.

NOTE: An ON condition of the red disabled light indicates that the illuminator motor is not properly connected or pinned to its mounting.

5.3.4 Positioner

5.3.4.1 Using the CW and RUN and CCW and RUN buttons respectively, verify that the positioner operates in both directions.

5.3.4.2 Return the positioner to the zero position.

5.3.5 Heater Power.

5.3.5.1 Set the DVM selector to PACKAGE HEATER.

5.3.5.2 Push the DC button to turn on HEATER POWER.

5.3.5.3 Adjust the variac until the DIGITAL VOLTMETER indicates 28.0 volts.

5.3.5.4 Push the OFF button to turn the HEATER POWER OFF and push the AC button to turn the supply back ON.

5.3.5.5 Reset the HEATER POWER elapsed time indicator to zero.

5.3.6 Operating Power

5.3.6.1 Set the DVM SELECTOR to PACKAGE OPERATING.

5.3.6.2 Push the DC button to turn ON the OPERATING POWER.

5.3.6.3 Adjust the variac until the DIGITAL VOLTMETER indicates 28.0 volts.

5.3.6.4 Push the OFF button to turn the OPERATING POWER OFF.

5.3.6.5 Reset the OPERATING POWER elapsed time indicator to zero.

5.3.7 Console Power

5.3.7.1 Check the console power supplies by switching the DVM SELECTOR to CONSOLE: +5, +28, +12 and -12 respectively.

5.3.8 Instrumentation Metering

5.3.8.1 Set the zero position on all six Instrumentation Meters and the five GAIN CONTROL Instrumentation Meters.

5.3.8.2 Switch all 11 meter function switches to the READ position.

5.3.8.3 Set the DVM SELECTOR to PIN BOARD.

5.3.8.4 Insert 15 pins in the INSTRUMENTATION PATCH BOARD to connect CPL-1 to all monitoring instruments except the

5.3.8.5 Push the SELF TEST button on the TEST panel and set the SELF TEST ADJUST so that the Digital Voltmeter reads 5.0 volts.

5.3.8.6 Check to see that all six Instrumentation Meters read 5 volts.

5.3.9 Test Status

5.3.9.1 With the package cables disconnected, the cable indicator shall show NO GO.

5.3.10 Data Signal

5.3.10.1 Turn the COUNTER Function Switch to FREQ.

5.3.10.2 Set the COUNTER INPUT SWITCH to DATA SIGNAL.

5.3.10.3 Push the Channel A and Channel B DATA SIGNAL buttons to obtain an ON indication. Set MOTOR SPEED to 39 and TEST NUMBER to 00. EXECUTE the MOTOR ON command.

5.3.10.4 Verify from the COUNTER reading that the data signal is being generated.

5.3.10.5 EXECUTE the MOTOR OFF command.

5.3.11 Digital Voltmeter

5.3.11.1 Turn the MODE switch to the CALIBRATE position and verify indication of the proper calibration voltage.

5.3.11.2 Reset the mode switch to the OPERATE position.

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5.3.12	Test
5.3.12.1	Press the LAMP TEST button and verify that all console indicator lamps light.
5.3.13	Instrumentation Bias Supplies
5.3.13.1	Set the DVM selector to BIAS 1 and set the Bias 1 supply to 6.3 vdc.
5.3.13.2	Set the DVM SELECTOR to BIAS 2 and set the Bias 2 supply to 2.5 vdc.
5.3.14	Instrumentation Readout Group
5.3.14.1	Set the DIGITAL VOLTMETER REMOTE READING AND CONTROL PACKAGE switch to VOLTAGE.
5.3.14.2	Push the SELF-TEST button on the TEST panel and adjust the self-test voltage to 5.0 volts as read on the DIGITAL VOLTMETER.
5.3.14.3	Set the SCANNER for AUTO CYCLE operation.
5.3.14.4	By means of the push buttons, reset the DIGITAL CLOCK to zero and turn the POWER switch to the RUN position.
5.3.14.5	Turn the PRINTER RECORD switch to ON.
5.3.14.6	Push the SCANNER START button and allow the printer to record a value for CPL-1 through 27.
5.3.14.7	Push the SCANNER STOP button, and turn the DIGITAL CLOCK POWER switch to SET.

5.3.14.8 Check the PRINTER tape to see that the time and correct self-test voltage are printed for each CPL print.

5.3.14.9 Start the OSCILLOGRAPH by pushing the 10mm/sec. CHART SPEED button and check to see that each pin deflects 2.5 cm. Remove all pins from the pinboard.

5.3.14.10 Push the SELF-TEST button to turn off the self-test voltage and check to see that all oscillograph pens return to the zero position. Make adjustments if necessary.

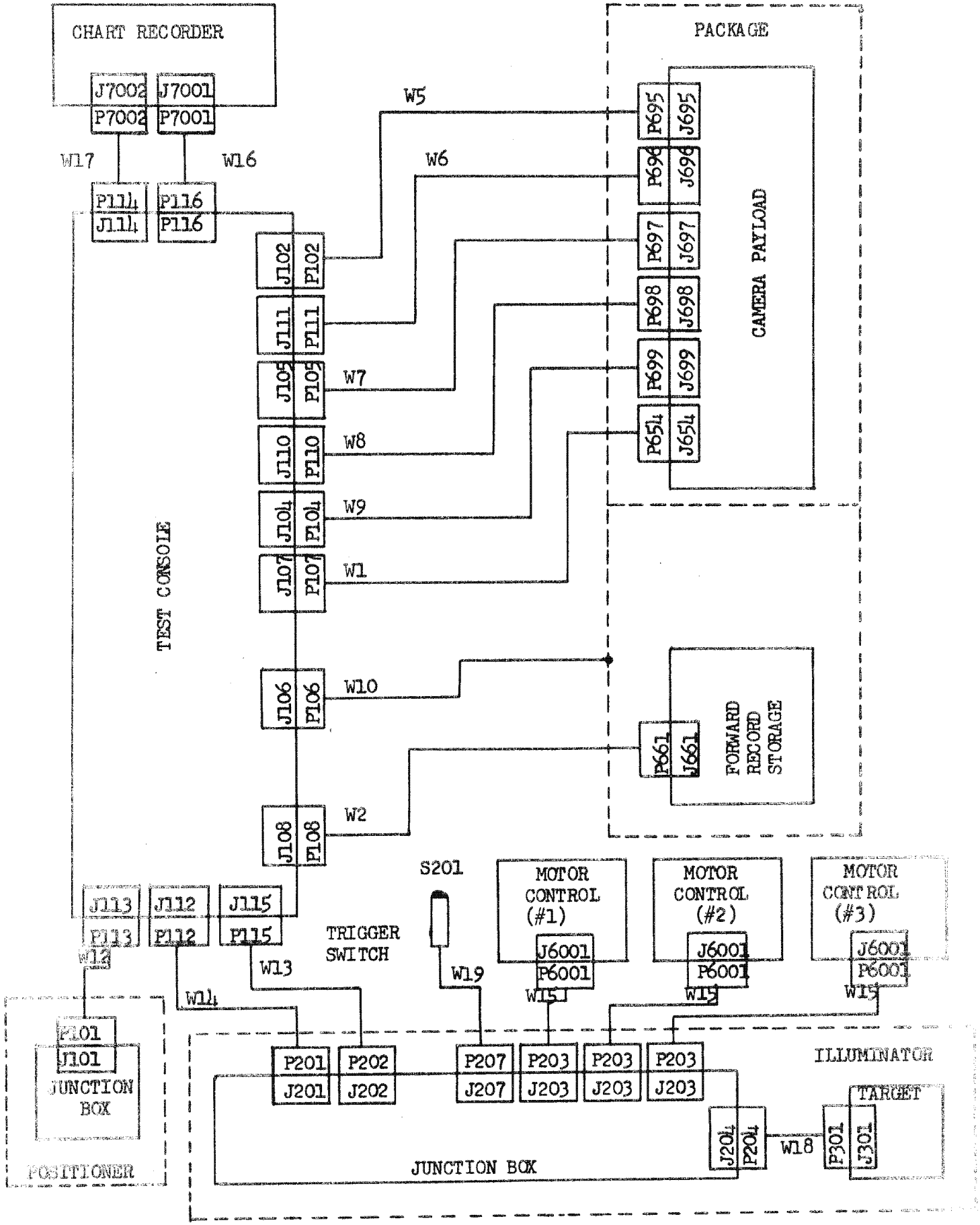
5.3.14.11 Push the OSCILLOGRAPH CHART SPEED STOP button.

5.3.15 Reset all RUNNING TIME meters to zero.

5.4 If performance of this procedure indicates any failure or out-of-tolerance condition of the test equipment, the Quality Control test engineer shall be notified for disposition of the condition before proceeding with the test.

5.5 Check to verify that both the HEATER and OPERATING DC POWER are OFF.

5.6 Connect test cables W-1 through W-10 to package (refer to Figure 1).



APPENDIX A - FIGURE 1
TEST CONSOLE INTERCABLING DIAGRAM

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APPENDIX B

PORTABLE TEST SET CHECKOUT PROCEDURE

APPENDIX B

PORTABLE TEST SET CHECKOUT PROCEDURE

1.0 PURPOSE

To provide instructions for proper checkout and connection of the Portable Test Set to the package.

2.0 REFERENCES

2.1 Specifications - "Phase II Specification for the Portable Test Set", Specification No. 802-108.

2.2 Diagrams - Test System Cabling Diagram, Figure 1.

3.0 FACILITIES

3.1 Power Requirements - 115 ± 5 volts ac, 60 cps ± 1%, single phase.

4.0 CONDITIONS

4.1 Environmental Conditions - The Portable Test Set shall be operated only in the following range of conditions.

4.1.1 Temperature - 45F to 110F.

4.1.2 Pressure - 28 to 32 inches of Hg.

4.1.3 Relative Humidity - 10% to 90%.

4.2 Test Preparation - This procedure shall be followed prior to any QC Package Acceptance Test and prior to resuming testing after any break in the QC Package Acceptance Test Program.

4.3 Fixture Accuracy - The Portable Test Set shall be certified for accuracy within the specified limits through approved standardization facilities prior to performance of this procedure.

5.0 CHECK-OUT PROCEDURE

5.1 Power-Off Set-Up

5.1.1 Connect the ac power line cord to a supply which meets requirements of paragraph 3.1.1.

CAUTION: CABLES W-1 THROUGH W-10 SHOULD NOT BE CONNECTED TO THE PACKAGE AT THIS TIME.

5.1.2 Instrumentation Loading - Open the rear access door on the Test Set and insert pins to load and bias the instrumentation circuits in accordance with the following chart:

INST. PT.	LOAD KILOHMS	LOAD RES. COLOR	BIAS VDC	BIAS CHANNEL
CPL-1	123	Yellow	2.50	2
2	148	Orange	2.50	1
3	148	Orange	2.50	1
4	123	Yellow	2.50	2
5	123	Yellow	2.50	2
6	123	Yellow	2.50	2
7	123	Yellow	2.50	2
8	123	Yellow	2.50	2
9	123	Yellow	2.50	2
10	123	Yellow	2.50	2
11	148	Orange	2.50	1
12	148	Orange	2.50	1
13	148	Orange	2.50	1
14	148	Orange	2.50	1
15	148	Orange	2.50	1
16	148	Orange	2.50	1
17	148	Orange	2.50	1
18	148	Orange	2.50	1
19	148	Orange	2.50	1
20	148	Orange	2.50	1
21	113	Brown	0.00	5 (GND.)

INST. PT.	LOAD KILOHMS	LOAD RES. COLOR	BIAS VDC	BIAS CHANNEL
CPL-22	148	Orange	2.50	1
23	148	Orange	2.50	1
24	123	Yellow	2.50	2
25	148	Orange	2.50	1
26	148	Orange	2.50	1
27	148	Orange	2.50	1
28	148	Orange	2.50	1
29	148	Orange	2.50	1
30	148	Orange	2.50	1
31	148	Orange	2.50	1
32	123	Yellow	2.50	2
33	148	Orange	2.50	1
34	148	Orange	2.50	1
35	148	Orange	2.50	1

5.2 Power Turn On

5.2.1 Turn the CONSOLE POWER main circuit breaker ON.

5.2.2 Set the various panel controls as follows:

5.2.2.1 Heater Power

AC	ON
DC	OFF
Adjust	Full CCW

5.2.2.2 Operating Power

AC	ON
DC	OFF
Adjust	Full CCW

5.2.2.3 Command

Motor	OFF
Speed	0.0
Elevation	2
Azimuth	1
CB 24	OFF

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5.2.2.4 Digital Voltmeter

Sensitivity	3o'clock
Input	DC
Mode	STD BY

5.2.2.5 Gain Control

CAUTION: The Gain Control shall always be set to MANUAL except when specifically testing the automatic mode of operation. Always set the Gain Control to MANUAL before turning the Gain Control POWER ON or OFF.

Power	OFF
Mode	MANUAL
Manual Drive	FORWARD

5.3 Post Warm-Up Check (after 30 min. warm-up period)

5.3.1 Digital Voltmeter

5.3.1.1 Turn the DIGITAL VOLTMETER INPUT Control to CAL.

5.3.1.2 Turn the mode switch to the ON position and verify that the digital voltmeter reads the proper calibration voltage.

5.3.1.3 Turn turn the DIGITAL VOLTMETER INPUT Control to DC.

5.3.2 Heater Power

5.3.2.1 Push the DC button to turn on HEATER POWER.

5.3.2.2 Adjust the variac until the voltmeter indicates 28.0 volts.

5.3.2.3 Push the OFF button to turn HEATER POWER off.

5.3.2.4 Reset the HEATER POWER ELAPSED TIME Indicator to zero.

5.3.3 Operating Power

5.3.3.1 Push the DC button to turn on OPERATING POWER.

5.3.3.2 Adjust the variac until the voltmeter indicates 28.0 volts.

5.3.3.3 Push the OFF button to turn OPERATING POWER off.

5.3.3.4 Reset the OPERATING POWER ELAPSED TIME Indicator to zero.

5.3.4 Console Power

5.3.4.1 Verify that the +12, -12, and +28 volt indicators are lit.

5.3.5 Running Time

5.3.5.1 Reset all Running Time meters to zero.

5.4 If performance of this procedure indicates any failure or out of tolerance condition of the Test Set, the Quality Control Test Engineer shall be notified for disposition of the substandard condition before proceeding with the test.

5.5 Verify that both the HEATER and OPERATING DC POWER are off.

5.6 Connect test Cables W-1 through W-10 to the package (refer to Figure 1).

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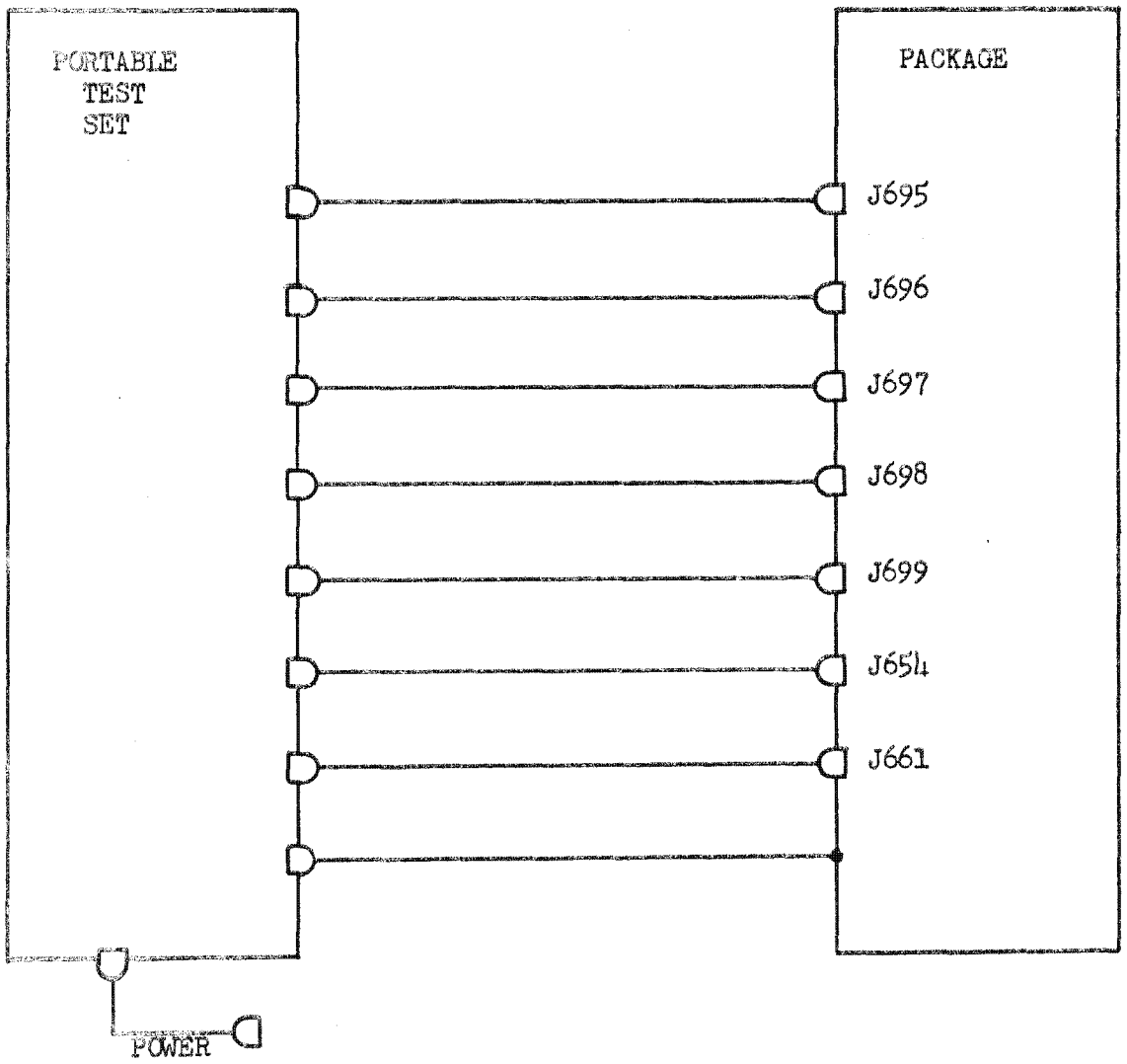
APPENDIX B - FIGURE 1

TEST SYSTEM CABLING DIAGRAM



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APPENDIX C

FILM EVALUATION PROCEDURE

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5.5.7 Slit to Data Lamp Alignment Measurements

5.5.8 Start & Stop Transient Measurements

5.5.9 Distance Between TTA and TTB

5.5.10 % RMS Record Drive Velocity Variation Measurement

5.5.11 Slit Evaluation Measurements

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C/P	Camera Payload
IMC	Image Motion Compensation is a programmed film-speed adjust to compensate for image motion over the expected ranges of altitude and camera aiming angles.
Positive IMC Error	The film in the camera is moving, faster than the target image. Therefore, the horizontal diameter of the IMC circle is no longer than the vertical diameter.
Negative IMC Error	The film in the camera is moving slower than the target image. Therefore, the horizontal diameter of the IMC circle is shorter than the vertical diameter.
Horizontal Lines	The horizontal lines are perpendicular to the 9.5 inch dimention of the film.
Vertical Lines	The vertical lines are parallel to the 9.5 inch dimension of the film.
Resolution	A measure of the resolving power of a system. Resolution has the dimension of lines/millimeter, and shall be determined as follows:

1. A chart element is resolved whenever 3 bars and 2 spaces can just be distinguished both for number and direction.
2. Whenever an unresolved element is followed by only one more resolved finer element, the finer element is not considered resolved. The resolution reading shall be followed with a subscript(s) noting this condition.

3. Whenever an unresolved element is followed by two or more consecutive finer resolved elements, the finest consecutive element is considered resolved.

4. If two consecutive elements are unresolved, regardless whether finer elements are resolved, the target element to be recorded is the value preceding the unresolved elements.

Target	The target, according to drawing 833-966, shall contain a step tablet, sine wave response charts, resolving power charts, a photographic scene, a test pattern, and a geometric pattern. It shall be used for the purpose of sub-system performance evaluation.
Chart	Each target contains a minimum of 21 resolution charts capable of resolution from 31 to 235 lines/mm on the payload film.
Elements	The horizontal and vertical groups of lines which compose the chart and from which the resolution readings are taken.
Section of an Element	A three line group of either horizontal or vertical lines of an element.
Target Frame	The image, on the payload film, of one complete revolution of the target drum.
G.M.	Geometric Mean is the Nth root of a product of N numbers.

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Positive	A positive field angle is obtained when the payload is rotated counter clockwise from 0°, as seen from the positive X axis. When a positive field angle exists the image of the target is between the 0° image position and the data tracks.
Negative Field Angle	A Negative field angle is obtained when the payload is rotated clockwise from 0°, as seen from the positive X axis. When a negative field angle exists the image of the target is between the 0° image position and the edge of the film on the side away from the data tracks.
TTA	Time Track A consists of a 20 bit per second code, plus a periodic data code, located near the edge of the film. It is closer of the two time tracks to the edge of the film.
TTB	Time Track B consists of a 20 bit second code, plus a periodic data code, located near the edge of the film. It is approximately 0.040" further from the edge of the film than TTA.

APPENDIX C

FILM EVALUATION PROCEDURE

1.0 PURPOSE

To define the conditions, controls, and methods for evaluating the acceptance test generated photographic output of the C/P assembly.

2.0 REFERENCES

2.1 Specifications

802-153 Phase II, Flight Payload Model Specification

802-134 Target for Moving Target Assembly

2.2 Drawings

808-103 Film Format "B"

3.0 FACILITIES

3.1 Instrumentation

3.1.1 Record Viewer, EKC Dwg. No. 745-100

3.1.2 Eastman Electronic Densitiometer Model 31A, or equivalent

3.2 Power Requirements

110 volts, 60 cycle, single phase

3.3 Evaluation Personnel

Personnel as required to read out the resolving power capabilities of the C/P subsystem. All personnel evaluating acceptance test generated film shall be subject to the control of paragraph 4.3.

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4.0 CONDITIONS

4.1 Certification of Instrumentation

All test instruments and fixtures shall be certified for accuracy within their specified tolerances through approved standardization facilities.

4.2 Environment

Evaluation shall be conducted at room conditions.

4.3 Film Reader Evaluation

Evaluation shall be made by readers who are qualified to read film by experience and training.

4.4 Control of Processing

Verify that all film has been processed within the processing limits defined in Specification 802-153.

4.5 Documentation

All test data shall be retained on suitable data sheets as a permanent record for each unit.

5.0 EVALUATION OF C/P PHOTOGRAPHIC OUTPUT

5.1 Verify that the test equipment used is in calibration.

5.2 Determination of Best Photographic Focus

5.2.1 The test engineer is responsible for completing the headings on the data sheets during the focus test, and also for identifying the film after processing.

5.2.1.1 The film shall be identified by the following characteristics: Film Speed, Collimator, Slit, Illumination, C/P Serial Number, Field Angle, CPL-20, CPL-27, process ticket number, test procedure number, and test paragraph number.

5.2.1.2 The data sheet packet for Determination of Best Photographic Focus includes the following sheets:

Quantity	Form No.	Title
1	G-ATR-1	Focus Run Density
9	G-ATR-2	Focus Analysis
3	G-ATR-3	Focus Analysis Graphical

5.2.2 Density Measurements

5.2.2.1 Control Data - With a Eastman Electronic Densitometer, Model 31A (or equivalent), read and record on the Density Data Sheet the densities of the 21 step control exposures accompanying the test film roll. If more than one control exposure is present, read each and record the arithmetic average of the densities for each step.

5.2.2.2 Compute the gamma and the speed point from the results obtained in paragraph 5.2.2.1 and record the values on the Density Data Sheet.

5.2.2.3 Measure the density of steps 7 and 9 of the density step tablet and record these values on the density data sheet. Step 7 shall be measured on the second complete frame at CPL-20 approximately equal to 2.5 volts for the 0° and $\pm 3^{\circ}$ focus runs. Step 9 shall be measured on the second complete frame at CPL-20 approximately equal to 2.5 volts at 0° only.

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5.2.3 **Resolution Measurement**

5.2.3.1 **Two readers shall read only the second complete target frame for each focus step. A sufficient number of steps shall be read to determine the shape of the focus curves at 0°, $\pm 0.5^{\circ}$ and $\pm 2.8^{\circ}$. Record the resolution of charts 1, 5,13,17,19, and 21 of the target frame on the focus analysis data sheets.**

5.2.3.2 **If any of these charts has a unique defect, read the next chart and make a note of the change on the data sheet.**

5.2.3.3 **Calculate the horizontal arithmetic average, the vertical arithmetic average, and the geometric mean from the averages of the two evaluators. Record these values on the Focus Analysis Data Sheet.**

5.2.3.4 **Plot the horizontal average (X) and the vertical average (Y) resolutions, and also, the geometric mean of these values for each field angle on the graph of Resolution versus Focus Voltage CPL-20 and CPL-27, located on the Focus Analysis (Graphical) Data Sheet.**

5.2.4 **Determination of Best Photographic Focus Position.**

5.2.4.1 **After the first 3 qualified*Focus Runs have been read (there will be a minimum of 4, the first one at 0°, $\pm .5^{\circ}$ and $\pm 2.8^{\circ}$ and the remainder at 0° and $\pm .5^{\circ}$) enter the geometric means from the Focus Analysis Data Sheets in the appropriate columns on the BPF Computation Sheet.**

NOTE: **The $\pm 2.8^{\circ}$ data is not used at this time.**

***The qualification of each Focus Run shall be determined by the Test Director.**

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5.2.4.2 Calculate the total and the average G.M. for each CPL-20 position. The BPF will be the CPL-20 position which has the highest average GM.

5.2.5 Determination of Image Motion Compensation Error.

5.2.5.1 Using the CPL-20 voltage focus step approximately equal to BPF of the 0° focus run, center the IMC circle of the second complete target frame under the record viewer eyepiece.

5.2.5.2 Adjust the microscope so that the vertical hairline is centered on the right extreme of the IMC circle at the horizontal diameter.

5.2.5.3 Adjust the microscope so that no parallax is present.

5.2.5.4 Record the reading of the horizontal microscope position indicator on the focus analysis data sheet.

5.2.5.5 Adjust the microscope so that the vertical hairline is centered on the left extreme of the IMC circle at the horizontal diameter. Record the horizontal position reading at this point on the focus analysis data sheet.

5.2.5.6 Subtract the second reading from the first (5.2.5.5) from 5.2.5.4) to obtain the length of the horizontal diameter (A) of the IMC circle. Record this value on the Focus Analysis Data Sheet.

5.2.5.7 Adjust the microscope so that the horizontal hairline is centered on the top extreme of the IMC circle at the vertical diameter. Record the reading of the vertical microscope position indicating at this point.

5.2.5.8 Adjust the microscope so that the horizontal hairline is centered on the lower extreme of the IMC circle at the vertical diameter. Record the vertical position indicator reading at this point.

5.2.5.9 Subtract the second reading (5.2.5.8) from the first reading (5.2.5.7) to obtain the length of the vertical diameter (B), of the IMC circle. Record this value on the focus analysis data sheet.

5.2.5.10 Calculate $\frac{(A-B)}{B} \times 100$ and enter as the IMC error on the data sheet.

5.2.5.11 Repeat paragraphs 5.2.5.2 through 5.2.5.10 for three focus steps each side of the focus step selected in 5.2.5.1.

5.3 Pre-Vibration Dynamic Photo Test

5.3.1 The test engineer shall be responsible for completing the headings on the Dynamic Photo Test Data Sheets during the test and also for identifying the film as outlined in para. 5.2.1.1. The data sheet packet for the Pre-Vibration Dynamic Photo Test includes the following sheets:

Quantity	Form No.	Title
1	G-ATR-4	Dynamic Density
1	G-ATR-5	Data Sheet for Record Evaluation
1	G-ATR-6	Dimensional Analysis

5.3.2 Examine the film for scratches, nicks and other physical defects, spurious interframe marks, plus evidence of fogging anywhere in the film handling system. Record all defects and improper exposures on the Dimensional Analysis Data Sheet.

5.3.3 Density Measurements

5.3.3.1 Control Data - Read and record on the Density Data Sheet the 21 step control exposures accompanying the test film roll. Plot the H and D curve.

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5.3.3.2 Compute the gamma and the speed point from the results obtained in paragraph 5.3.3.1 and record the values on the Density Data Sheet.

5.3.3.3 Base and Fog Density - Measure the density of an obviously unexposed portion of the film near the time tracks of speeds 1 and 64. Record the values under "D min" on the Density Data Sheet.

5.3.3.4 Data Image Density - Using a projection microscope and the EK densitometer (or equivalent) measure the density of the two data track images at speeds 1 and 64 in the area of the 0° run. Record the values under TTA and TTB on the Density Data Sheet.

5.3.3.5 From the curve of 5.3.3.1, find the log E values for TTA and TTB and record on the Density Data Sheet.

5.3.3.6 Using the record viewer, measure (to the nearest thousandth) the distance from the centerline of the No. 1 operational slit to a point midway between the centerlines of the two (2) adjoining interframe markers.

5.3.3.6.1 Using the EK densitometer (or equivalent) measure the density of the interframe marks, their maximum width and spacing at fog level, their minimum width at a density level of 0.8 above fog and their centerline-to-centerline distance.

5.3.3.6.2 From the curve of 5.3.3.1, find the log E values for the interframe marks.

5.3.4 Film Speed Measurements

5.3.4.1 Film speed measurements are to be made at the following conditions:

0°, 27 volts and speeds 1, 9, 17, 25, 33, 41, 49, 57, 64
0°, 28 volts and speeds 1, 9, 17, 25, 33, 41, 49, 57, 64
0°, 32,5 volts and speeds 1, 9, 17, 25, 33, 41, 49, 57, 64

5.3.4.2 Adjust the film so that the second complete frame of the run being measured is under the eyepiece. Set the vertical hairline parallel to the vertical diameter of the IMC circle.

5.3.4.3 Adjust the microscope so that the vertical hairline is positioned on the left edge of one bit of TTA. Record the reading of the vertical microscope position indicator on the Dimensional Analysis Data Sheet beside "Bit 1 Ref. Dim."

5.3.4.4 Adjust the microscope so that the vertical hairline is positioned to the left edge of the 21st bit from the 1st bit selected in

paragraph 5.3.4.3. Record the reading of the vertical microscope position indicator on the data sheet beside "Bit 21 Ref. Dim."

NOTE: Care should be taken not to include the speed and run bit information with the above measurements.

5.3.4.5 Subtract the reading of paragraph 5.3.4.3 from the reading of paragraph 5.3.4.4 and enter the value beside Film Speed (difference, in/sec) on the Dimensional Analysis Data Sheet.

5.3.5 Slit Data Lamp Alignment.

5.3.5.1 Position the No. 1 Slit/Data Lamp exposure under the microscope.

5.3.5.2 Align the vertical hairline with the center of the slit image. Note the vertical position indicator reading.

5.3.5.3 Align the vertical hairline with the center of the TTB bit. Note the vertical position indicator reading.

5.3.5.4 Align the vertical hairline with the center of the TTA bit. Note the vertical position indicator reading.

5.3.5.5 Calculate and record on the Record Evaluation Data Sheet the horizontal distance the direction of misalignment between the slit and the TTB bit, and between the slit and the TTA bit.

5.3.5.6 Repeat steps 5.3.5.1 through 5.3.5.5 for No's 2, 3, and 4 slit exposures.

5.3.5.7 Examine the exposures for No's 1, 2, 3, and 4 slits to determine that there are no occlusions caused by vignetting on any of the yaw slits. Record any occlusions on the Record Evaluation Data Sheet.

5.3.6 Start and Stop Transients.

5.3.6.1 Start and stop transients are performed at 0°, 28 volts and speeds 1, 9, 17, 25, 33, 41, 49, 57, and 64 only.

5.3.6.2 Start Transients

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5.3.6.2.1 Position the speed 1 start transient on the viewer light plate.

5.3.6.2.2 Measure the distance from the slit image where the camera was turned on to the first TTB bit that appears on the film. Record this value on the Record Evaluation Data sheets.

NOTE: In test the TTB bit is turned on 1.5 seconds after camera turn-on.

5.3.6.2.3 Align the microscope vertical hairline with the left edge of the first 20 cps TTA bit that occurs after the start of the TTB image. Note the vertical positioner reading.

5.3.6.2.4 Align the microscope vertical hairline with the left edge of the next 20 cps TTA bit and note the vertical positioner reading.

5.3.6.2.5 Subtract the reading of step 5.3.6.2.4 from the reading of step 5.3.6.2.3 and record the answer in the space for the speed 1 start transient on the data sheet.

5.3.6.2.6 Repeat steps 5.3.6.2.1 through 5.3.6.2.5 for the start transients at the remaining speeds.

5.3.6.3 Stop Transients

5.3.6.3.1 Position the speed 1 stop transient on the viewer light table.

5.3.6.3.2 The stop transient is defined by the distance between the turn off of both TTA and TTB and the turn-on of the camera for the next test.

5.3.6.3.3 Measure the distance described in the above step and record the value in the space for the speed 1 stop transient on the Record Evaluation Data Sheet.

5.3.6.3.4 Repeat step 5.3.6.3.3 for the stop transients at the remaining speeds.

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5.3.7 Distance between TTA and TTB.

5.3.7.1 Set the horizontal hairline of the microscope parallel to the horizontal diameter of the IMC circle.

5.3.7.2 Move the microscope until the hairline is positioned on the lower edge of TTA.

5.3.7.3 Record the reading of the horizontal microscope position indicator on the Dimensional Analysis Data Sheet.

5.3.7.4 Move the microscope until the hairline is positioned on the lower edge of TTB.

5.3.7.5 Record the reading of the horizontal microscope position indicator on the Dimensional Analysis data sheet.

5.3.7.6 Record the difference of the measurements made in paragraphs 5.3.7.3 and 5.3.7.5 on the data sheet.

5.4 Post Vibration Determination of Best Photographic Focus Position. This test is identical with the Pre Vibration test and should be evaluated in accordance with Section 5.2.

5.5 Post-Vibration Dynamic Photo Test.

5.5.1 Identify Film

5.5.1.1 The test engineer shall be responsible for completing the headings on the Dynamic Photo Test Data Sheets during the test and also for identifying the film as outlined in paragraph 5.2.1.

5.5.1.2 The data sheet packet for the Post Vibration Dynamic Photo Test includes the following sheets:

QUANTITY	FORM NO.	TITLE
1	G-ATR-4	Dynamic Density
5	G-ATR-7	Resolution Analysis
1	G-ATR-8	28v Resolution Summary
1	G-ATR-9	27v, 32,5 Resolution Summary
2	G-ATR-7	Resolution Analysis
1	G-ATR-10	Medium & Wide Slit Resolution Analysis
2	G-ATR-2	Focus Analysis
1	G-ATR-3	Focus Analysis Graphical
1	G-ATR-5	Data Sheet for Record Evaluation
1	G-ATR-6	Dimansional Analysis
12	G-ATR-11	% RMS Record Drive Velocity Variation
3	G-ATR-12	Data Sheet for Slit Evaluation
3	G-ATR-13	Slit Evaluation Graphical

5.5.2 Examine the film for scratches, nicks and other physical defects, spurious interframe marks, plus evidence of fogging anywhere in the film handling system. Record all defects and improper exposures on the Dimensional Analysis Data Sheet.

5.5.3 Density Measurements.

5.5.3.1 Control Data - Read and record on the density data sheet the 21 step control exposures accompanying the test film roll. Plot the H and D curve.

5.5.3.2 Compute the gamma and speed point from the result obtained in paragraph 5.5.3.1 and record the values on the Density Data Sheet.

5.5.3.3 Base and Fog Density - Measure the Density of an obviously unexposed portion of the film near the time tracks of speeds 1 and 64. Record the values under "D min" on the Density Data Sheet.

5.5.3.4 Data Image Density - Using a projection microscope and the EK densitometer (or equivalent) measure the density of the two data track images at speeds 1 and 64 in the area of the 0° run. Record the values under TTA and TTB on the Density Data Sheet.

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5.5.3.5 From the curve of 5.5.3.1, find the log E values for TTA and TTB and record on the Density Data Sheet.

5.5.3.6 Using the second complete target frame of the following conditions, measure the densities of steps 7 and 9.

Speed 31	0°	28 volts
Speed 31	+.5°	28 volts
Speed 31	-.5°	28 volts
Speed 31	0°	27 volts
Speed 31	0°	32.5 volts

Record the results on the proper Resolution Analysis Data Sheets.

5.5.3.7 Determination of Lens System Transmittance

5.5.3.7.1 From paragraph 5.5.3.6 determine the density of step 9 (D_9) for the speed 31, 0°, 28 volts run.

5.5.3.7.2 Locate the above density on the H & D curve from the process control strip. Read on the horizontal axis the log E corresponding to D_9.

5.5.3.7.3 Take the anti-log (E) of this log E value and using the following equation calculate the decimal transmittance of the unit.

$$\text{Transmittance} = \frac{E \times 4 \times (f/\#)^2}{10.8\ (\text{exp time})\ 890}$$

where f/# = 4.0 and exposure time = 0.0025 sec, transmittance = 2.66E

5.5.3.8 Using the record viewer, measure (to the nearest thousandth) the distance from the centerline of the No. 1 operational slit to a point midway between the centerlines of the two (2) adjoining interframe markers.

5.5.3.8.1 Using the EK densitometer (or equivalent) measure the density of the interframe marks, their maximum width and spacing at fog level, their minimum width at a density level of 0.8 above fog and their centerline-to-centerline distance.

5.5.3.8.2 From the curve of 5.3.3.1, find the log E values for the interframe marks.

5.5.4 Resolution Measurements

5.5.4.1 Resolution charts shall be evaluated by two readers. Each reader will read the second and third complete target frames at each condition listed in paragraph 5.5.3.5 and record the values for all 21 charts on the Resolution Analysis Data Sheet. If a chart has a physical defect, place a D in the appropriate section of the Resolution Data Sheet.

5.5.4.2 Tally the element numbers on the Resolution Analysis Data Sheets

5.5.4.2.1 Fill in the frequency and accumulated frequency columns of the Resolution Computation Sheets from the tallies on the Resolution Analysis Data Sheets.

5.5.4.2.2 Divide the total frequency by two to obtain the median. If the result is a fraction, round off the next higher whole number. Record this number on the Resolution Computation Data Sheet.

5.5.4.2.3 Starting at the top of the "X" Cum list, count down until the number arrived at in paragraphs 5.5.4.2.2 is reached and circle it. Record the corresponding resolution reading only if the number arrived at in paragraph 5.5.4.2.2 occurs as a value on the "X Cum" list, otherwise interpolation must be used to obtain the correct resolution reading. When this value has been found it shall be recorded on the Median Value space provided on the Resolution Computation Data Sheet.

5.5.4.2.4 Repeat paragraph 5.5.4.2.3 for the "Y" Cum list.

5.5.4.2.5 Compute the geometric mean from the values obtained in paragraphs 5.5.4.2.3 and 5.5.4.2.4. Record the G.M. on the Resolution Computation Data Sheet.

5.5.4.2.6 Total the geometric means of the five resolution conditions and take the arithmetic average of these values. Record the five geometric means, their sum, and the average geometric mean on the second Resolution Computation Data Sheet.

5.5.4.3 Repeat the reading and tally procedure of paragraphs 5.5.4.1 thru 5.5.4.2.5 for the 28 volt, 0° run using the 0.0166 slit.

5.5.5 Post-Dynamic Focus Position Verification.

5.5.5.1 Resolution Measurement

5.5.5.1.1 Two readers shall read only the second complete target frame for each focus step. A sufficient number of steps shall be read to determine the shape of the focus curves through 0°. Record the resolution of charts 1, 5, 13, 17, 19 and 21 of the target frame on the Focus Analysis Data Sheet.

5.5.5.1.2 If any of these charts has a unique defect, read the next chart and make a note of the change on the data sheet.

5.5.5.1.3 Calculate the horizontal arithmetic average, the vertical arithmetic average, and the geometric mean from the average of the two evaluators. Record these values on the Focus Analysis Data Sheets.

5.5.5.2 Graphical Determination of Best Photographic Focus Position.

5.5.5.2.1 Plot the horizontal average (X) and the vertical average (Y) resolutions, and also, the geometric mean of these values for each field angle on the graph of resolution versus focus voltages CPL-20 and CPL-27, located on the Focus Analysis (Graphical) data sheet.

5.5.5.2.2 The test engineer shall determine the position of best photographic focus from the Focus Analysis Graph. The position for each field angle must be chosen at the same CPL-20 and CPL-27 outputs. Normally, each position shall pass through the maximum of the G.M. curve and come as close as possible to the maximum of both the X and the Y curves. However, if astigmatism is present, the position shall be chosen so as to maximize the depth of focus; i.e. avoid choosing a position where the slope of either the X or the Y curve is changing rapidly.

5.5.5.3 Determine the Image Motion Compensator Error in accordance with the steps in section 5.2.5. Record the measured values on the Focus Analysis Data Sheets.

5.5.6 Average Film Speed Measurements

5.5.6.1 Film Speed measurements are to be made at the following conditions:

0°, 27 volts and speeds 1, 9, 17, 25, 33, 41, 49, 57, 64
0°, 28 volts and speeds 1, 9, 17, 25, 33, 41, 49, 57, 64
0°, 32.5 volts and speeds 1, 9, 17, 25, 33, 41, 39, 57, 64

5.5.6.2 Adjust the film so that the second complete frame of the run being measured is under the eyepiece. Set the vertical hairline parallel to the vertical diameter of the IMC circle.

5.5.6.3 Adjust the microscope so that the vertical hairline is positioned on the left edge of one bit of TTA. Record the reading of the vertical microscope position indicator on the Dimensional Analysis Data Sheet beside "Bit 1 Ref Dim."

5.5.6.4 Adjust the microscope so that the vertical hairline is positioned to the left edge of the 21st bit from the 1st bit selected in paragraph 5.3.4.3. Record the reading of the vertical microscope position indicator on the data sheet beside "Bit 21 Ref. Dim."

NOTE: Care should be taken not to include the speed and run bit information with the above measurements.

5.5.6.5 Subtract the reading of paragraph 5.3.4.3 from the reading of paragraph 5.3.4.4 and enter the value beside Film Speed (difference, in/sec) on the Dimensional Analysis Data Sheet.

5.5.7 Slit-Data Lamp Alignment

5.5.7.1 Position the No. 1 Slit/Data Lamp exposure under the microscope.

5.5.7.2 Align the vertical hairline with the center of the slit image. Note the vertical position indicator reading.

5.5.7.3 Align the vertical hairline with the center of the TTB bit. Note the vertical position reading.

5.5.7.4 Align the vertical hairline with the center of the TTA bit. Note the vertical position indicator reading.

5.5.7.5 Calculate and record on the Record Evaluation Data Sheet the horizontal distance and the direction of misalignment between the slit and the TTB bit, and between the slit and the TTA bit.

5.5.7.6 Repeat steps 5.3.5.1 through 5.3.5.5 for the No's 2, 3, and 4 slit exposures.

5.5.7.7 Examine the exposures for No's 1, 2, 3, and 4 slits to determine that there are no occlusions caused by vignetting on any of the yaw slits. Record any occlusions on the Record Evaluation Data Sheet.

5.5.8 Start and Stop Transients

5.5.8.1 Start and stop transients are performed at 0°, 28 volts and speeds 1, 9, 17, 25, 33, 41, 49, 57, and 64 only.

5.5.8.2 Start Transients

5.5.8.2.1 Position the speed 1 start transient on the viewer light plate.

5.5.8.2.2 Measure the distance from the slit image where the camera was turned on to the first TTB bit that appears on the film. Record this value on the Record Evaluation Data Sheets.

NOTE: In test the TTB bit is turned on 1.5 seconds after camera turn-on.

5.5.8.2.3 Align the microscope vertical hairline with the left edge of the first 20 cps TTA bit that occurs after the start of the TTB image. Note the vertical positioner reading.

5.5.8.2.4 Align the microscope vertical hairline with the left edge of the next 20 cps TTA bit and note the vertical positioner reading.

5.5.8.2.5 Subtract the reading of step 5.3.6.2.4 from the reading of step 5.3.6.2.3 and record the answer in the space for the speed 1 start transient on the data sheet.

5.5.8.2.6 Repeat steps 5.3.6.2.1 through 5.3.6.2.5 for the start transients at the remaining speeds.

5.5.8.3 Stop Transients.

5.5.8.3.1 Position the speed 1 stop transient on the viewer light table.

5.5.8.3.2 The stop transient is defined by the distance between the turn-off of both TTA and TTB and the turn-on of the camera for the next test.

5.5.8.3.3 Measure the distance described in the above step and record the value in the space for the speed 1 stop transient on the Record Evaluation Data Sheet.

5.5.8.3.4 Repeat step 5.3.6.3.3 for the stop transients at the remaining speeds.

5.5.9 Distance Between TTA and TTB.

5.5.9.1 Set the horizontal hairline of the microscope parallel to the horizontal diameter of the IMC circle.

5.5.9.2 Move the microscope until the hairline is positioned on the lower edge of TTA.

5.5.9.3 Record the reading of the horizontal microscope position indicator on the Dimensional Analysis Data Sheet.

5.5.9.4 Move the microscope until the hairline is positioned on the lower edge of TTB.

5.5.9.5 Record the reading of the horizontal microscope position indicator on the Dimensional Analysis data sheet.

5.5.9.6 Record the difference of the measurements made in paragraph 5.3.7.3 and 5.3.7.5 on the data sheet.

5.5.10 Percent RMS Record Drive Velocity Variation Measurement.

5.5.10.1 Examine the record to be sure that the 500 cycle data track has been recorded.

5.5.10.2 Evaluation of the 500 cycle data track shall be performed on the following resolution runs:

Speed 1 28 volts
Speed 33 28 volts
Speed 64 28 volts

5.5.10.3 Measurements shall be made starting at the beginning of the second complete frame in each respective run.

5.5.10.4 Install the test record on the Record Evaluation Viewer and insert the graduated glass reticle eyepiece in the Viewer microscope.

5.5.10.5 Measurement Procedure

5.5.10.5.1 On each run measure the length of 100 consecutive groups of 500 cps data marks. Each group shall be composed of 10 marks and spaces. X_b shall designate the beginning of each group and Xe the end of each group. The difference $\Delta X = X_b - \Sigma_e$ shall designate an individual group measurement.

5.5.10.5.2 Read out the three runs and record the values of X_b, X_e ΔX on the data sheets.

5.5.10.5.3 Calculate the X avg for each of the three runs by subtracting X_e for the 100th reading from X_b for the 1st reading and divide the result by 100. Record the X avg values for the three runs on the data sheets.

5.5.10.5.4 Calculate the value of X - X avg. for each group and enter the values on the data sheets.

5.5.10.5.5 Calculate the mean variation $(\Delta X - X \text{ avg})^2$, for each group and enter the values on the data sheets.

5.5.10.5.6 Compute the RMS variation for each of the three runs using the equation:

$$RMS = \sqrt{\frac{\Sigma (\Delta X - X \text{ avg})^2}{100}}$$

5.5.10.5.7 Compute the % RMS velocity variation for each of the three runs using the equation:

$$\text{RMS } \Delta \text{ V\%} = \frac{\text{RMS} \times 100}{\text{I avg}}$$

Record this value on the first data sheet for each of the three runs.

5.5.11 Slit Evaluation Measurements

5.5.11.1 Examine the record to be sure that the proper exposure was obtained. (e.g. the background density is 1.0 ± 0.3).

5.5.11.2 Cut and remove a 6 inch wide piece of record from the test roll for each of the two slits.

5.5.11.3 Identify each piece of record and mark off 2 inch segments across each piece starting from the edge containing the data marks.

5.5.11.4 Submit the two samples to the Photo Science Group to have microdensitometer recordings made using a 10 x 364 micron aperture.

5.5.11.5 Examine and identify the microdensitometer recording chart paper for each referenced 2 inch segment of each slit.

5.5.11.6 Construct a microdensitometer calibration curve from the calibration data at the beginning of the recording. Plot the recording chart scale reading vs density.

5.5.11.7 Calculate the density difference per chart line from the straight line equation of the calibration curve.

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5.5.11.8 Obtain the following measurements from the chart recording for each referenced segment.

5.5.11.8.1 Measure the distance from each respective starting reference line to each density defect within that particular segment.

5.5.11.8.2 Measure the width of each density defect.

Note: The minimum defect width to be measured is 1/16 inch on the chart recording.

5.5.11.8.3 Measure the scale difference from the average density on the chart for each density defect as well as the direction of change (i.e. + or -).

5.5.11.8.4 Calculate and record the defect widths and locations with respect to the film by dividing the readings of paragraphs 5.5.11.8.1 and 5.5.11.8.2 by 16.3.

5.5.11.8.5 Calculate and record the density difference for each defect by multiplying the values in paragraph 5.5.11.8.3 by the density difference per chart line determined in paragraph 5.5.11.7.

Note: Only defects causing a density difference greater than ±0.03 shall be recorded.

5.5.11.8.6 For each defect plot the density difference with its correct sign and corresponding width on the ΔD vs defect width graph sheet for the appropriate slit. Any defect plots which fall outside the specification curve shall be recorded as non-conformances.

5.5.11.8.7 For each slit determine the combined width of all defects by adding the individual defect widths. Compute the % of defective slit width using the equation:

$$\% = \frac{\text{combined defect width} \times 100}{8.618}$$

Enter this value at the bottom of the defect width column on the data sheet for each slit.

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APPENDIX D

DIAGRAMS

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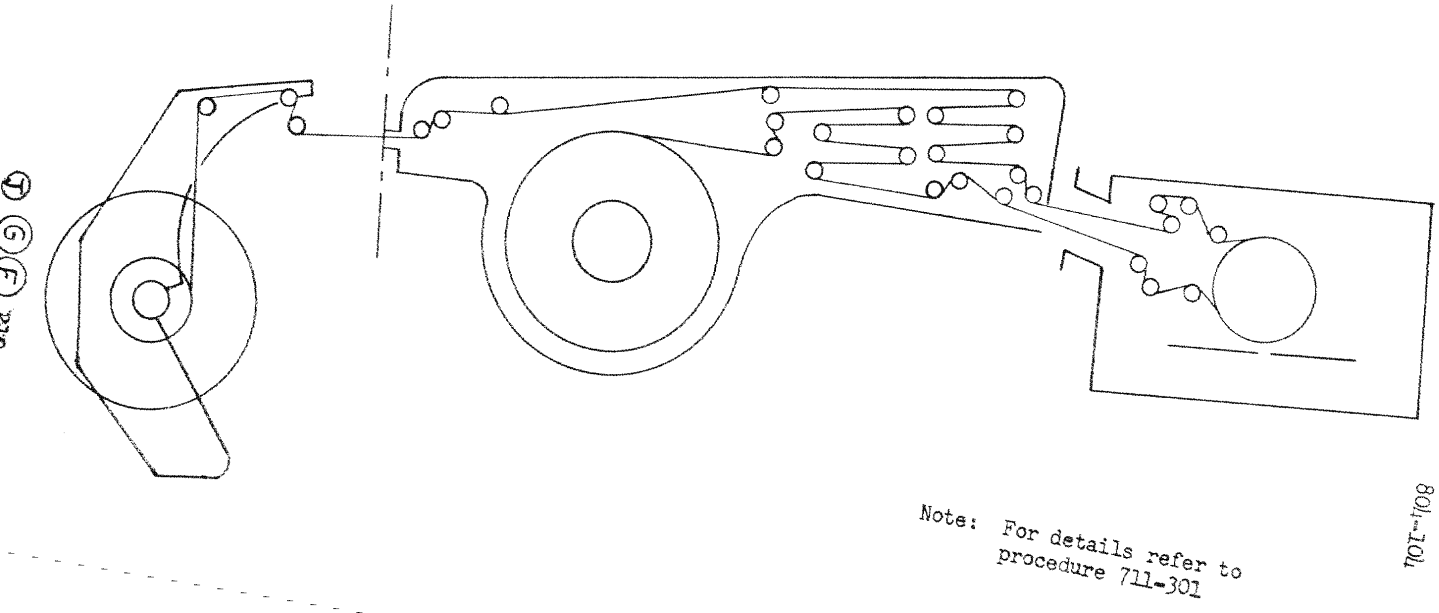
APPENDIX D DIAGRAM I

C/P RECORD THREADING DIAGRAM



Note: For details refer to procedure 711-301

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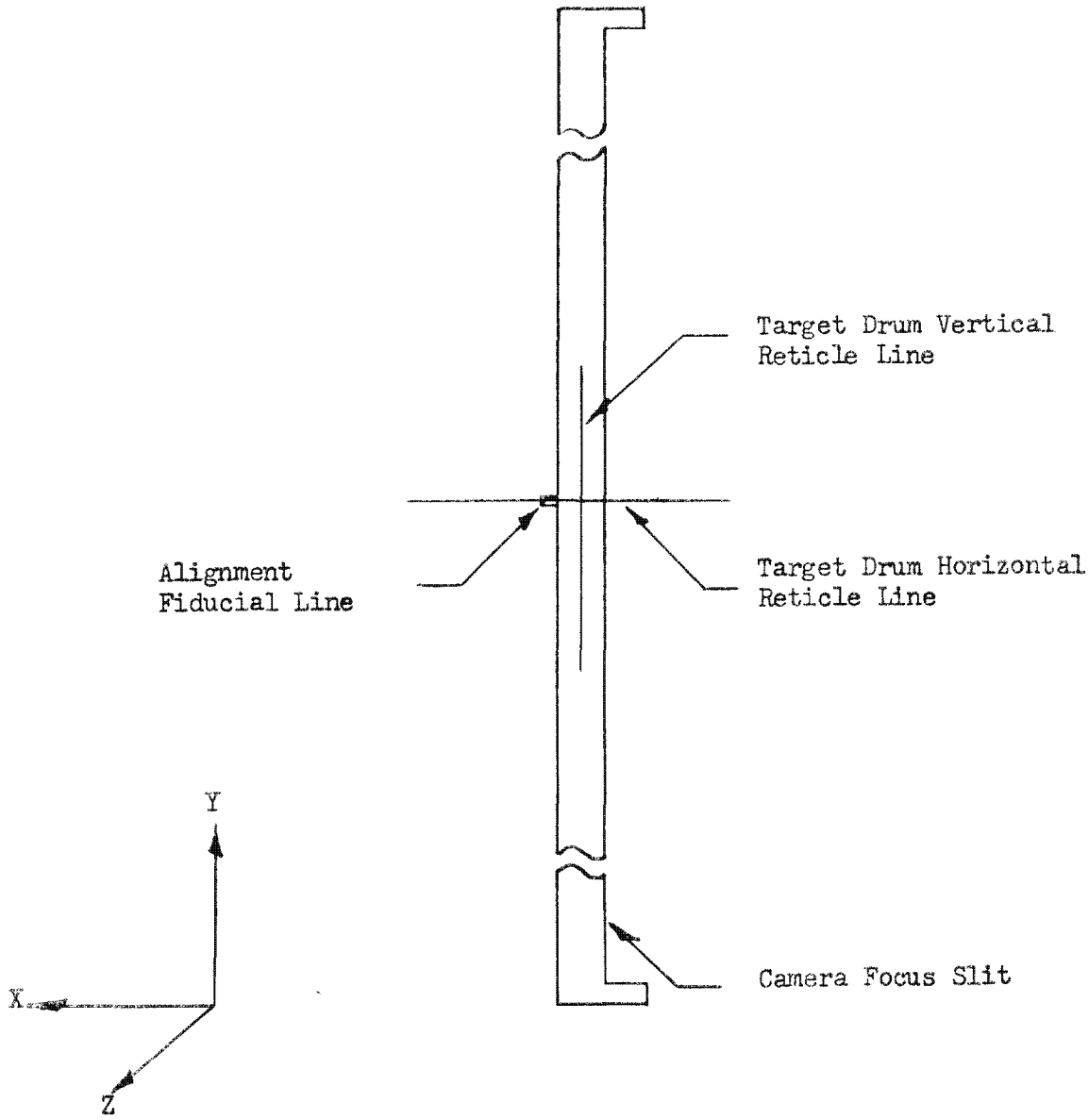
APPENDIX D DIAGRAM II

C/P TO COLLIMATOR OPTICAL ALIGNMENT



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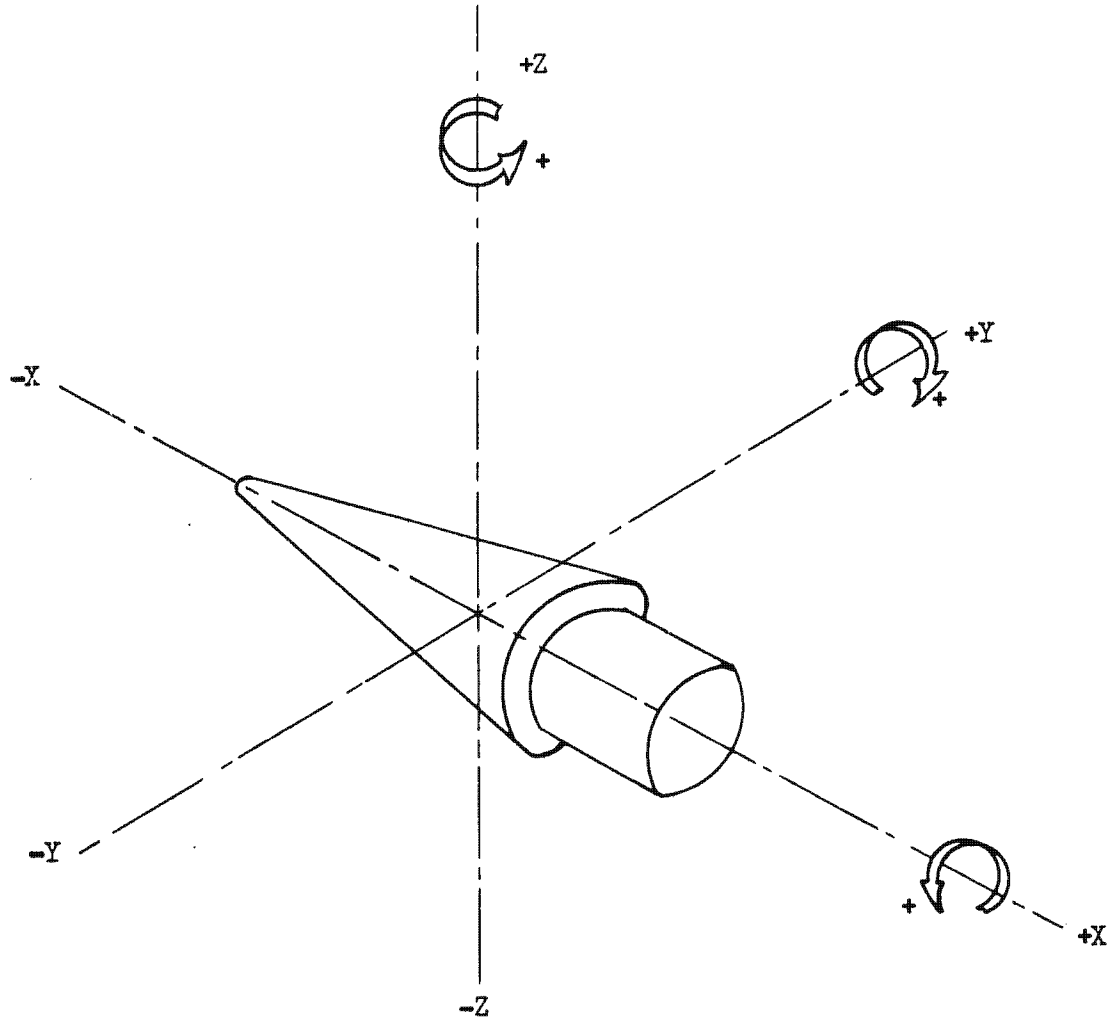
APPENDIX D DIAGRAM III

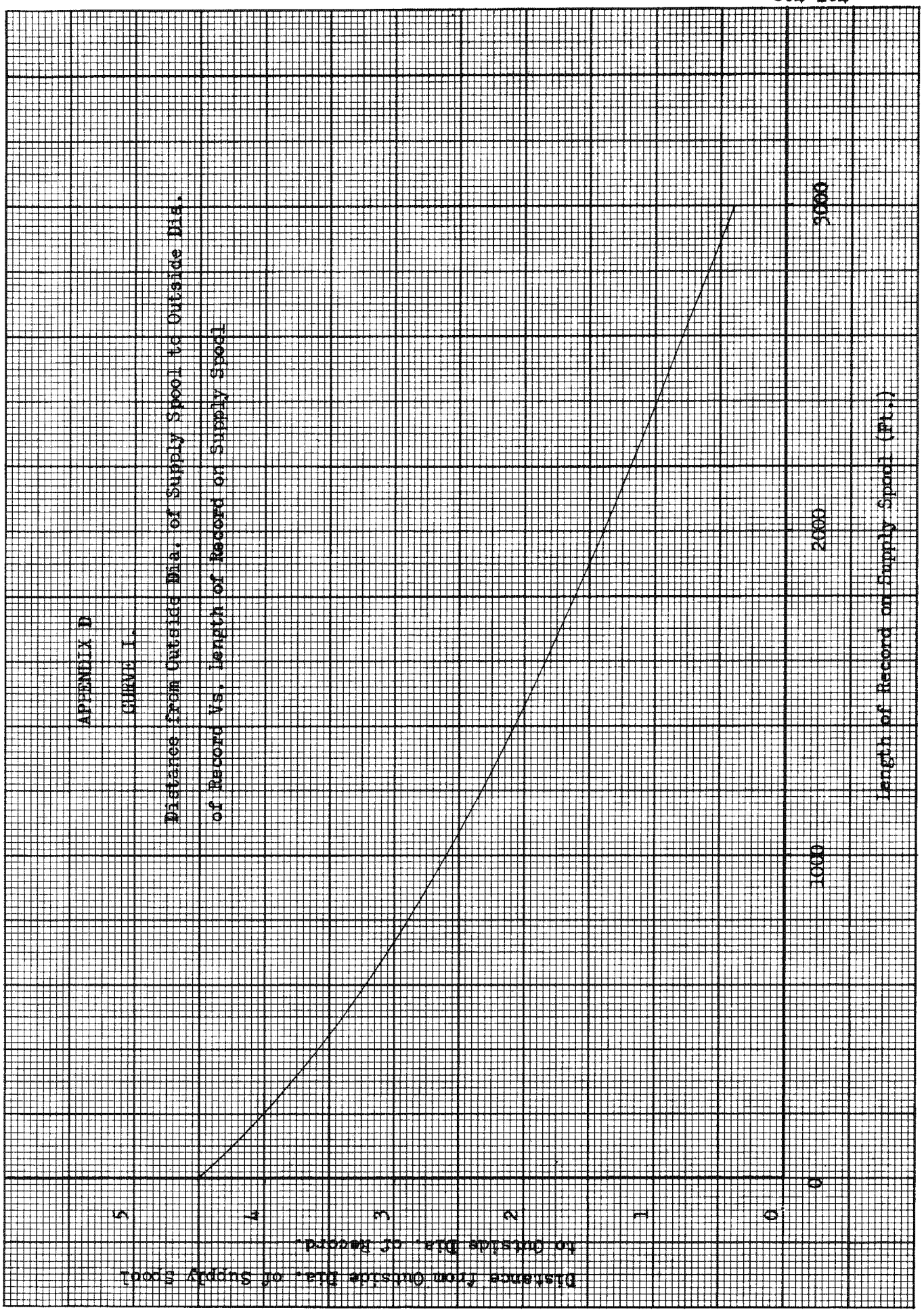
C/P REFERENCE AXES



APPENDIX B

CURVE I.

Distance from Outside Dia. of Supply Spool to Outside Dia. of Record Vs. Length of Record on Supply Spool



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APPENDIX D
CURVE II

Distance from Outside Dia. of Take-up Spool to Outside Dia. of Record Vs. Length of Record on Take-up Spool

Distance from Outside Dia. of Take-up Spool to Outside Dia. of Record

0 1 2 3 4 5

0 1000 2000 3000

Length of Record on Take-up Spool (Ft.)

212 b

APPENDIX E

WEIGHT AND BALANCE PROCEDURE

1.0 PURPOSE

To determine the weight and location of the center of gravity of the Space Chamber Assembly.

2.0 REFERENCES

2.1 Applicable Specification

802-153 Phase II, Flight Payload Model Specification

2.2 Reference Drawings

805-101 Space Chamber Assembly

635-139 Instruction Manual for Weight and Center-of-Gravity Measuring Equipment

QC-A-337 In-Process Procedure for the Forward Record Storage Assy

3.0 FACILITIES

Instrumentation

635-100 Weight and Center-of-Gravity Measuring System for Space Chamber M/S Standard physical test laboratory equipment

3.2 Fixtures

208-639 Fixture, Record Storage Weight and C.G.

208-640 Balance Plate, Record Storage Weight and C.G.

Knife Edge Support

1½ inch dia. steel ball

Brass cylinder

3.3 Support Equipment

Buffalo Scale 0-200 lbs, or equivalent

3.4 Power Requirements

115 vac, 60 cycle, single phase

4.0 CONDITIONS

4.1 Test Equipment Accuracy

All test instruments and fixtures shall be certified for accuracy within specified tolerances through approved standardization facilities.

4.2 Environment

Testing shall be conducted under prevailing indoor conditions of temperature, humidity and atmospheric pressure.

4.3 Test Preparation

Obtain the items listed in paragraph 3.0 and transfer them to the Weight and C.G. Testing Lab.

4.4 Precautions

Extreme caution must be exercised when handling the Space Chamber.

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4.5 Documentation

All test data shall be retained on suitable data sheets as a permanent test record for each unit.

5.0 TEST PROCEDURE FOR M/S PAYLOAD

5.1 Certification of Test Equipment

Verify that the test equipment calibration is certified at the time of test.

5.2 Inspection

Verify that the Space Chamber has satisfactorily passed inspection for conformance to drawings, and workmanship in accordance with Drawing 401-104-2.

5.3 Preparation for Preliminary System Check

5.3.1 Turn the Digital Voltmeter Power Switch to STANDBY position. Allow unit to warm up for 30 minutes.

5.3.2 Turn the Digital Voltmeter Range Switch to AUTO position.

5.3.3 Turn DC-Ration Switch to RATIO position.

5.3.4 Turn the Sensitivity Switch to MAX. position

NOTE: The proper position for the Sensitivity Switch in operation is at the highest setting toward maximum which will still provide a stable digital indicator reading.

5.3.5 Turn control panel Power Switch to ON. Allow unit to warm up for 30 minutes.

5.3.6 Back off the the three table support nuts.

5.3.7 Using the Lifting and Handling Yoke, raise the Fixture and rotate it so that the plane established by the X-Y axis is in the horizontal position. Be sure that 6 mounting bolts for the C/P are included with the fixture.

-CAUTION-

When raising the Lifting and Handling Yoke, with or without the Fixture, be sure that the lifting eye and the balancing weights are in their proper position respectively.

5.3.8 Place the Fixture on the Test Stand, guiding the two dowel pins into their respective holes.

5.3.9 Withdraw the Lifting and Handling Yoke.

5.3.10 Readjust weights to level yoke.

5.3.11 Remove the Pivoting Bracket from the Fixture. <u>This bracket must not be on when performing system checks.</u>

5.4 Preliminary System Check

5.4.1 Turn Mode Switch to Y INCHES position.

5.4.2 Turn Check Switch to LAMP position. (All four button lamps in center of panel will go on.)

5.4.3 Turn Check Switch to ZERO position. (All four button lamps in center of panel will go off. If any button lamp does not go off, press it. It should then go off.)

5.4.18 Press ADD 1000 LBS. button. (Button lamp will go on.) Digital indicator reading should change by 1000 pounds from WT. calibration value.

5.4.19 Press ADD 1000 LBS. button. (Button lamp will go off.) Digital indicator will return to WT. calibration value.

5.4.20 Turn Mode Switch to X INCHES position.

5.4.21 Adjust X Span knob until digital indicator reads value as shown on SPECIMEN CALIB. READ chart on panel.

5.4.22 Turn Mode Switch to Y INCHES position.

5.4.23 Adjust Y Span knob until digital indicator reads Y value as shown on SPECIMEN CALIB. READ chart on panel.

5.4.24 Turn Check Switch to ZERO position.

5.4.25 Turn Mode Switch to WT., X, AND Y positions to verify that the zero settings have not changed during span adjustments.

5.4.26 Turn Check Switch to CALIB. position.

5.4.27 Turn Mode Switch to WT., X, AND Y positions to verify that the calibrate settings have not changed.

5.4.28 Turn Check Switch to ZERO position.

5.4.29 Turn Mode Switch to Z INCHES position (AXIS CONFLICT light should go on.)

5.4.30 Reassemble the Pivoting Bracket.

5.4.4 Turn Mode Switch to WT. LBS. position and Voltmeter Power Switch to ON.

5.4.5 Adjust W zero knob until digital indicator reads zero.

5.4.6 Press WEIGHT REF. ZERO button. (Button lamp will go on.)

5.4.7 Adjust REF. zero knob until digital indicator reads zero.

5.4.8 Press WEIGHT REF. ZERO button. (Button lamp will go out.)

5.4.9 Turn Mode Switch to X INCHES position. (ADD 10 INCHES lamp will go on.)

5.4.10 Adjust X zero knob until digital indicator reads "4.966" inches.

5.4.11 Press and hold POLARITY check button. (Digital Indicator will read approximately -0.022). (ADD 10 INCHES lamp will go off.)

5.4.12 Release POLARITY check button. (Digital indicator should read 4.966 inches.) (ADD 10 INCHES lamp will go on.)

5.4.13 Turn Mode Switch to Y INCHES position. (ADD 10 INCHES lamp will go off.)

5.4.14 Adjust Y zero knob until digital indicator reads - 0.141.

5.4.15 Turn Mode Switch to WT. LBS. position.

5.4.16 Turn Check Switch to CALIB. position.

5.4.17 Adjust W Span knob until digital indicator reads value as shown on SPECIMEN CALIB. READ chart on panel.

5.4.31 Using the Lifting and Handling Yoke, raise the Fixture at least 12 inches above the Test Stand and rotate 90° so that the X-Z plane is horizontal.

5.4.32 Place the Fixture on the Test Stand, guiding the two dowel pins into their respective holes. (The AXIS CONFLICT lamp will go out.)

5.4.33 Remove the Pivoting Bracket.

5.4.34 Adjust Z zero knob until the digital indicator reads 4.516.

5.4.35 Press and hold POLARITY check button. (Digital Indicator should read +.016).

5.4.36 Turn Check Switch to CALIB. position. (Digital indicator should read Z value, as shown on SPECIMEN CALIB. READ chart on panel.)

5.4.37 Turn Check Switch to ZERO position.

5.4.38 Turn Mode Switch to WT. and Z position to verify that the zero settings have not changed.

5.4.39 Assemble the Pivoting Bracket.

5.4.40 Using the Lifting and Handling Yoke, remove the Fixture from the Test Stand and place it on the dolly.

5.5 Handling of Test Specimen

5.5.1 Attach the Space Chamber Lifting Yoke to the Cradle. Be sure that the yoke is balanced for lifting a cradle with a Space Chamber.

5.5.2 Using the Space Chamber Lifting Yoke, transfer the cradle, with the Space Chamber, from the Dolly to the Erector and clamp securely.

5.5.3 Withdraw the Space Chamber Lifting Yoke.

5.5.4 Using the Erector, rotate the Space Chamber through 90° so that the X-axis is vertical.

5.5.5 Adjust the Y-Z lifting eye setting of the Space Chamber Integration Lifting Yoke to the latest estimated value of the location of the Space Chamber C.C. in the X-Z plane.

5.5.6 Attach the Space Chamber Integration Lifting Yoke to the Space Chamber.

5.5.7 Remove the Space Chamber mounting bolts and the three Spherical Bearing Assembly mounting screws.

5.5.8 Using the hoist, gradually raise the Space Chamber. Adjust the lifting eye of the Space Chamber Integration Yoke, if necessary, so that the Space Chamber does not tilt more than 1°. Check this by placing a level on the Primary Structural Ring.

5.5.9 Remove the Space Chamber from the cradle completely and leave suspended on the hoist clear of the Erector.

5.5.10 Rotate the Erector 90° so that the cradle is located in the horizontal position.

5.5.11 Attach the Space Chamber Lifting Yoke to the cradle. Be sure that the balance weights are positioned for lifting an empty cradle.

5.5.12 Remove the cradle from the Erector and place it on the dolly.

5.5.13 Using the same hoist, lift the Fixture, which is still attached to the Lifting and Handling Yoke, place it in the Erector and clamp securely.

5.5.14 Detach and withdraw the Lifting and Handling Yoke.

5.5.15 Rotate the Fixture in the Erector to the vertical position.

5.5.16 Remove the lateral access cross brace from the Fixture.

5.5.17 Place the Space Chamber 1/2 inch above its mounting position in the Fixture.

5.5.18 Reassemble the lateral access cross brace to the Fixture.

5.5.19 Attach the Spherical Bearing Assembly to the Fixture.

CAUTION: Do not tighten screws until assurance is made that no axial pull will be transmitted to the lens due to the retaining ring on the spindle.

5.5.20 Gradually lower the Space Chamber into position in the Fixture and bolt securely using the three bolts provided with the Fixture.

5.5.21 Withdraw the Space Chamber Integration Lifting Yoke.

5.5.22 Rotate the Space Chamber in the Erector until the X axis is horizontal.

5.5.23 Unclamp the Fixture from the Erector.

5.5.24 Using the Lifting and Handling Yoke, raise the Space Chamber clear of the Erector and rotate so that the X-Y plane is in the horizontal position.

5.5.25 Place the Space Chamber on the Test Stand, guiding the two dowel pins into their respective holes.

5.5.26 Withdraw the Lifting and Handling Yoke, and remove Pivoting Bracket.

5.6 Weight and C.G. Measurement of OCV Components.

5.6.1 Turn Check Switch to OPERATE position.

5.6.2 Turn Mode Switch to WT. LBS. position. The Digital Indicator will read the Space Chamber weight directly in pounds. Record this value on data sheet. Calculate the weight of the S/C less stow pins reference mirror and record by subtracting 5.9.2 from the indicator reading and record the value on the data sheet.

5.6.3 Turn Mode Switch to X INCHES position. The Digital Indicator will read the C.G. along the X-Axis directly in inches. To translate this value to Station 0.0 of the S/C add 125.25 to the Digital Indicator reading and record the result on the data sheet.

5.6.4 Turn Mode Switch to Y INCHES position. The Digital Indicator will read the C.G. along the Y-Axis directly in inches. Record this value on the data sheet.

5.6.5 Using the Lifting and Handling Yoke, raise the Space Chamber at least 1 foot off the Test Stand and rotate it 90° so that the X-Z plane is horizontal.

5.6.6 Place the Space Chamber on the Test Stand, guiding the two dowel pins into their respective holes.

5.6.7 Turn MODE switch to Z INCHES position. (The axis conflict light should be out.) The Digital Indicator will read the C.G. along the Z-Axis directly in inches. Subtract 4.5 from this value and record on data sheet.

5.7 Removal of Space Chamber after Measurement.

5.7.1 Using the Lifting and Handling Yoke, raise the Space Chamber from the Test Stand and place it in the Erector Clamp Fixture securely in the Erector.

5.7.2 Withdraw the Lifting and Handling Yoke.

5.7.3 Rotate the Space Chamber in the Erector so that the X-Axis is vertical.

5.7.4 Attach the Space Chamber Integration Lifting Yoke to the Space Chamber.

5.7.5 Remove the mounting bolts and Spherical Bearing Assembly mounting screws. Slowly raise the Space Chamber until it is approximately 1/2 inch off the mounting surface of the Fixture.

5.7.6 Remove the lateral access cross brace from the Fixture.

5.7.7 Lift the Space Chamber clear of the Fixture.

5.7.8 Replace the three mounting bolts in the Fixture.

5.7.9 Reassemble the lateral access cross brace to the Fixture.

5.7.10 Rotate the Fixture in the Erector to the horizontal position.

5.7.11 Using the Lifting and Handling Yoke, remove the Fixture from the Erector and place it on the dolly.

5.7.12 Using the Space Chamber Lifting Yoke, place the cradle in the Erector and clamp securely.

5.7.13 Withdraw the Space Chamber Lifting Yoke.

5.7.14 Rotate the cradle 90° so that it is in the vertical position.

5.7.15 Using the Space Chamber Integration Lifting Yoke, place the Space Chamber in the cradle and bolt securely.

5.7.16 Withdraw the Space Chamber Integration Lifting Yoke.

5.7.17 Rotate the Space Chamber in the Erector 90° to the horizontal position.

5.7.18 Using the Space Chamber Lifting Yoke, transfer the Space Chamber and cradle from the Erector to the Dolly.

5.7.19 Obtain the 804-106 test report for the Forward Record Storage and transfer the weight and c.g. data to the C/P Log Weight and C.G. Summary sheet. To translate the X axis C.G. value to C/P Station 0.00 add 28.544 to the X axis C.G. location given in the 804-106 report.

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APPENDIX F

INTERFACE GAGING PROCEDURE

APPENDIX F

1.0 PURPOSE

To determine the conformance of the S/C to 801-116 interface.

2.0 REFERENCES

2.1 Drawings

801-116, Interface drawing

3.0 FACILITIES

3.1 208-609, Main Environmental Test Fixture

3.2 Interface Gages

208-1280-1
208-1280-2
208-1280-3
208-1280-4

208-1734, Gage and Handling Yoke

3.3 Gage Blocks

3.4 Adjustable Parallels

3.5 Feeler Gages

3.6 Micrometer, 0-1 inch

3.7 Vernier Caliper, 6 inch

4.0 CONDITIONS

4.1 Test equipment calibration shall be certified.

4.2 The S/C shall be completed and fully inspected.

4.3 The test will be conducted in Bldg 13 under prevailing conditions.

4.4 The interface gages shall be handled by a minimum of three persons. Extreme care shall be used in mounting the gage on to the environmental fixture so as not to damage the S/C.

5.0 *TEST PROCEDURE FOR INTERFACE GAGING.*

5.1 Mount the Space Chamber in the Main Environmental Fixture with the three stow pins installed and ascertain that the three mounting bolts, three unibal bolts, and four torsion pin holder bolts are tight.

5.2 Length measurement aft of Station 125.25

5.2.1 Using gage blocks or adjustable parallels, measure the Minimum distance between the six screw heads on the end of the component support tube and the center face of the Main Environmental Fixture, as shown in Figure 1. Subtract the measured value from 210.550 and enter the result on the data sheet.

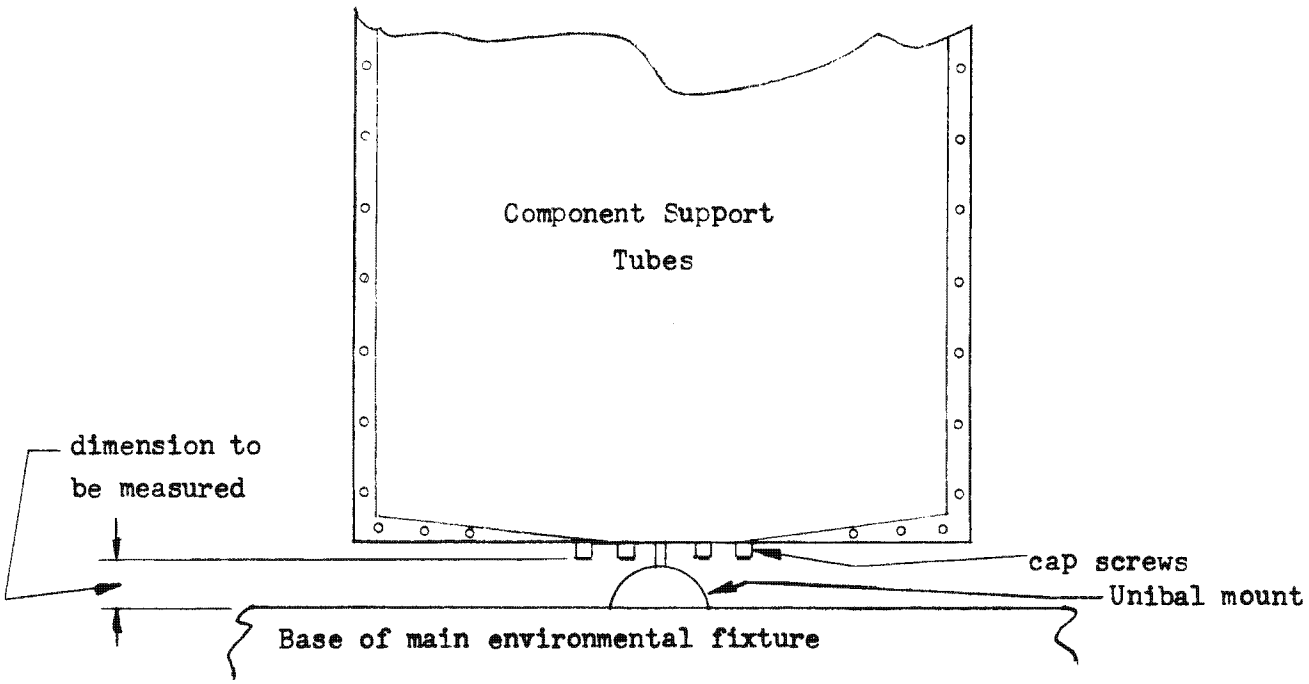

FIGURE 1

5.2.2 Using gage blocks or adjustable parallels, measure the clearance between the torsion pin holder and the block on the Main Environmental Fixture, as shown in Figure 2. Subtract the measured value from 209-300 and record the result on the data sheet.

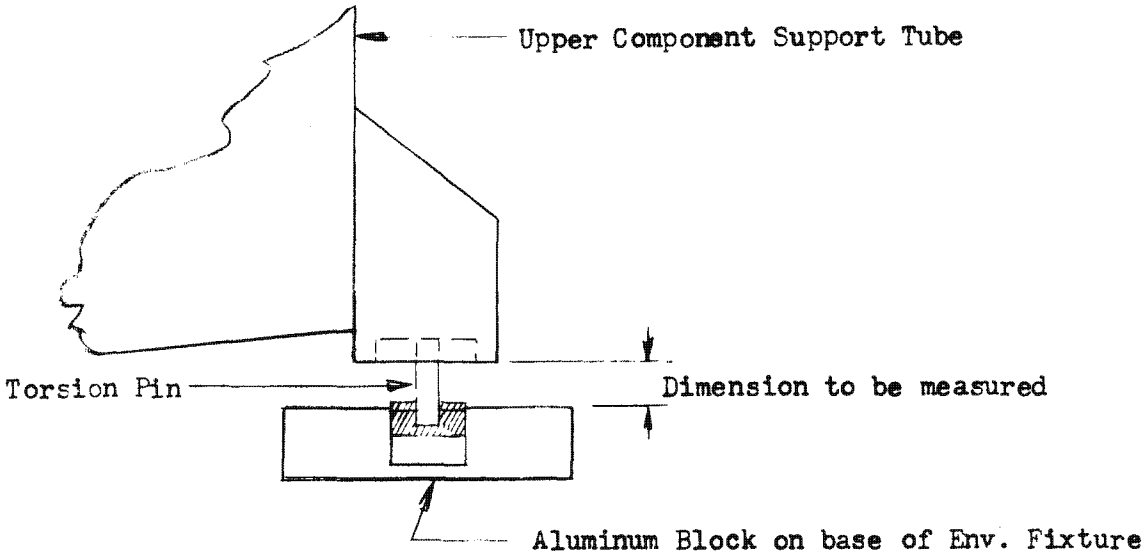

FIGURE 2

5.2.3 Add 1.375 to the result of Par. 5.2.2 and record the value on the data sheet.

5.3 Length Measurements Forward of Station 125.25.

5.3.1 Request Ass'y. Personnel to move the Interface Gage, 208-1734, over the Space Chamber and lower it so that each of its three feet rests on one of the S/C mounting pads on the Main Environmental Fixture, 208-609. Make certain that the knife edge on the gage is parallel to the exit port of the Air Supply.

CAUTION: 1) When moving the Interface Gage, use care so not to damage or loosen the three screw-feet. 2) Two men, one on each side of the S/C, should guide the Interface Gage when lowering it over the S/C.

(K)

5.3.2 *Disconnect the Lifting* Yoke from the Interface Gage.

5.3.3 Carefully adjust the Interface Gage so that the knife edge is parallel to and as close as possible to the center of the Air Supply exit port. Do NOT adjust the screw-feet of the gaging fixture.

5.3.4 Using gage blocks, measure the distance between the knife edge and the machined surface on the Air Supply at the +Y and -Y sides of the exit port. Record these values in the data sheets.

5.3.5 Subtract 0.187 from each of the values obtained in paragraph 5.3.4. Record the results.

5.3.6 Subtract each of the values obtained in paragraph 5.3.5 from 42.900. Record the results.

5.3.7 Subtract each of the values obtained in paragraph 5.3.6 from 125.25 and record the results.

5.3.8 Request Ass'y. Personnel to remove the Interface Gage. The same cautions should be observed as in paragraph 5.3.1.

5.3.9 After the Interface Gage is in its storage location, place connector caps under the screw-feet to prevent damage.

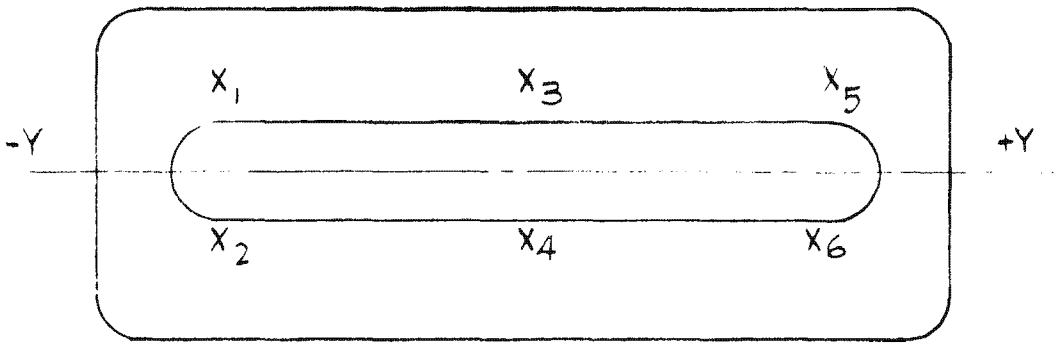

FIGURE 4

5.4 Interface measurements of Component Support Tube Flanges.

NOTE: AT NO TIME SHOULD ANYONE OF THE GAGES TOUCH ANY PORTION OF THE S/C OR ITS HARDWARE.

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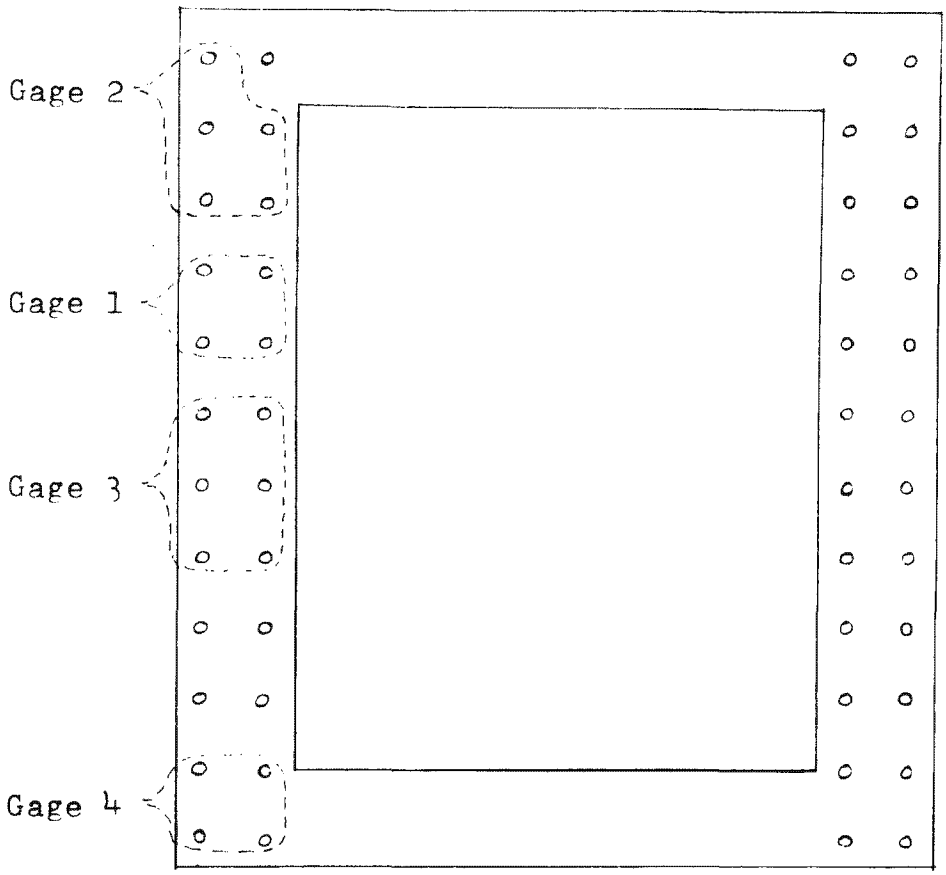
5.4.1 GAGE #2 - This gage is mounted with its face against the bottom edge of the top cross bar of the MAIN ENVIRONMENTAL FIXTURE as shown in figure 4. Be very careful when sliding the gage in that it does not touch any hardware. With the gage securely bolted to the fixture measure the clearances between the component support tube flanges and the gage. Record the values on the data sheet. This gage is below the hardware profile which is in question. Visually look from above and below to determine if any part of the camera cover is below the gage profile. Note any interference on the data sheet.

5.4.2 Gage #1 - Caution, this gage cannot be directly inserted at its designated mounting point. This gage should be started from a nose down position between the fourth and fifth set of bosses, between the boxes on the support tube as shown in figure 4. Measure the clearance between the tube flanges and the gages. Record the values on the data sheet.

5.4.3 Gage #3 - This gage is mounted on bosses 6, 7 and 8 as shown in figure 4. Again, caution must be used in mounting this gage. The gage fits just below the electrical connector on the -Y side of the support tube and extreme care must be taken not to damage the wiring. The gage should be raised vertically from the nose down position and bolted in place. Measure the clearances between the tube flanges and the gage. Record the values on the data sheet.

5.4.4 This gage may be mounted by resting it on the bottom of the fixture and then bolting through the top four holes of the gage into the bottom two boss sets on the fixture as shown in figure 4. MEASURE the clearances between the tube flanges and the gage. Record the values on the data sheet.



Gage Template Mounting Locations on Main Environmental Fixture

FIGURE 4

804-104

NOTICE

When Government drawings, specifications or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished or in any way supplied the said drawings, specifications or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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