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March 4, 1966

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Westinghouse Astronuclear Laboratory

Operational Manual for ETS-1 TSCS
Printout Switching Chassis

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INFORMATION CATEGORY

Unclassified

F. S. Malick 3/7/66

Authorized Classified Date

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PRINTOUT SWITCHING CHASSIS OPERATIONAL MANUAL

1.0 INTRODUCTION

This manual section describes the installation, operation, and maintenance of the Printout Switching Chassis of the ETS-1 Test Stand Control System. The Printout Switching Chassis provides switching functions and auxiliary circuitry for the Printout Switching System. The chassis is located in the Control Point Building in Rack 01R and has the reference designation 01RA3.

2.0 GENERAL DATA

2.1 Safety Precautions

Normal safety precautions should be practiced. The maximum voltage applied to the unit is 28VDC and voltages in excess of that should not be present within the unit. If corrective maintenance, component removal or other service becomes necessary, power should be disconnected by disengaging the power connector J1 at the rear of the unit.

2.2 Weight and Dimensions

2.2.1 Weight 40 lbs.

2.2.2 Dimensions 19" wide
22 3/8" deep
7" high

2.3 Power Requirements

The Printout Switching Chassis has no self-contained power supplies. Power is obtained from external sources and enters the unit through the rear mounted 16 pin connector, J1. The following are the voltage and nominal current requirements:

+15VDC, 100 ma

-15VDC, 100 ma

+28VDC, 320 ma

2.4 Fuse Complement

The following fuses are required in the chassis:

-15VDC 0.5 amp, 250V-F02B250 1/2 AS

+15VDC 0.5 amp, 250V-F02B250 1/2 AS

+28VDC 1.0 amp, 250V-F02B2501AS

3.0 DESCRIPTION

3.1 Front Panel

The front panel dimensions of the Printout Switching Chassis are 19 inches in width and 6.95 inches in height. A handle is mounted at each side of the panel. The left handle is equipped with a spring-operated mechanical latch to retain the chassis in the closed position in the rack. A button at the upper end of this handle releases the latch when pressed. The right handle is equipped with a key lock. The key is removable only when the lock is in the lock position.

There are three rotary selector switches mounted on the front panel. On the left is the FUNCTION switch, S2, which has ten poles and eight positions. Only seven poles and seven positions are used. The positions indicated on the panel are: OFF, θ_d , LnNd, T_d , P_d , d , and VARIABLE reading clockwise. To the right of the FUNCTION switch in the center of the panel is the PRINTOUT switch, S1, which has 64 poles and 6 positions. The 64 poles are on 8 sections or decks designated A through H from the handle end and each section has 8 poles designated A through H. (See Drawing 937J798 for typical section layout.) Only 52 poles and 4 positions are used. The positions indicated on the panel are: OFF, FUNCTION ANALYSIS, POWER INCREASE TIME, and LOG POWER reading clockwise. To the right of

the PRINTOUT switch is the ANALYSIS switch, S3, which has 2 poles and 8 positions. Two poles and 7 positions are used. The positions indicated on the panel are: OFF, 1, 2, 3, 4, 5, and 6, reading clockwise.

At the lower left under the FUNCTION switch are 2 push-button switches. The left switch of the pair is the PRINT switch, S4, which is an alternate action switch. On the lens of this switch are marked RUN and STOP. To the right of the PRINT switch is the PROGRAM START switch, S5, which is a momentary action switch.

Below the PRINTOUT switch in the lower center of the panel are 3 indicating fuseholders marked +15VDC, -15VDC, and +28VDC from left to right.

Below the ANALYSIS switch in the lower right of the panel is the LAMP VERIFY switch, S6, which is a momentary action switch.

A nameplate is attached in the upper left corner of the panel.

3.2 Chassis

The chassis consists of a frame with chassis slides bolted to the sides. Inside the chassis is the component plate to which the printed circuit board guides and connectors are mounted. On the right side of the component plate a row of 11 board guides and connectors are mounted that are spares. On the left side is a row of 11 guides and ten connectors. The connectors, from front to rear, are J10 through J19. In place of the eleventh connector in the rear is the GROUNDING MODULE, E2. The following printed circuit boards are mounted in the left row of guides from front to rear: 5 CODE INVERTER boards, A1 through A5; a BUFFER AMPLIFIER, A6; a CONTROL AMPLIFIER, A7; a DC HOLD INVERTER, A8; a RELAY MODULE, A9; and a LIMITER CIRCUIT, A10.

On the rear of the chassis are 3 connector plates. Looking at the rear of the chassis, the top plate contains J3 through J8, the lower left plate contains J1 and the lower right plate contains J9, J20, and J2 from right to left. Connector J1 is a 16 pin connector, J2 through J9 are 55 pin connectors and J20 is a BNC connector.

3.3 Component Panel

Bolted across the top of the chassis at the front is the component panel. At the left end of the plate is the black 28V RET tip jack, TP6. Above TP6 is the red +28V tip jack, TP7. To the right of TP6 is the orange -15V tip jack TP4 and above TP4 is the red +5V tip jack, TP3. To the right of TP3 is the brown COMM tip jack, TP5. Below TP5 is a spare white tip jack which is unmarked. On the right side of the component panel are the PRINTER REF VOLTAGE potentiometers and tip jacks. The left pot and white tip jack, TP1, are for "0" STATE and to the right of these are the white tip jack, TP2 and pot for "1" STATE.

4.0 INSTALLATION

Mount the removable portion of the chassis slides at the desired level in a standard 19 inch rack and insert the Printout Switching Chassis in the slides. WANL Drawing 937J791 gives the mounting dimensions, plan view and construction details of the chassis, panel and connectors. Connect the mating cables to the connectors on the rear of the chassis.

5.0 PRINCIPLES OF OPERATION

The primary function of the Printout Switching Chassis is to provide control of connections to the Printer (01RA4) in the Printout System. This function is accomplished entirely through the Printout Switch, S1. Other functions are as follows:

- a) To provide switching for the Transfer Function Analyzer (01RA2) generator output signal.
- b) To provide signal amplitude limiting on the Transfer Function Analyzer generator output voltage.
- c) To provide switching for the return signal to the Transfer Function Analyzer correlator input.
- d) To provide DC rejection from the return signal to the Transfer Function Analyzer.
- e) To provide BCD code inversion and signal level correction for Range Clock signals applied to the Printer.
- f) To provide a RUN-STOP control on the Printer.
- g) To provide a PROGRAM START control for the Programmer (01RA1).
- h) To provide BCD reference voltage signals to the Printer.

5.1 Printout Switch, S1

The Printer is capable of printing out any one of three functions, FUNCTION ANALYSIS, POWER INCREASE TIME, or LOG POWER, depending upon the position of the Printout Switch, S1. Poles AA through FH of this switch control BCD coded information from the Transfer Function Analyzer, Power Increase Time Driver (03A1), and Log Power Monitor Driver (04A2) to the 12 Printer wheels. Pole GA controls the Printer positive inhibit or hold-off pulses. Pole GB controls the print command signals to the Printer. Pole GE disconnects the Transfer Function Analyzer generator output signal for all positions of the Printout switch except the FUNCTION ANALYSIS position. This prevents signals from reaching the control system when transfer functions are not being printed out. Pole GF controls the ribbon shift circuit to the Printer. The ribbon shift is used during Power Increase Time printout only. The remainder of the poles of S1 are not used. An OFF position is provided which disconnects all circuits through S1.

5.2 Function Switch, S2 and Amplitude Limiter A10

The Function Switch is used to switch the Transfer Function Analyzer generator output signal to any one of 5 fixed input points in the control system. One position of the switch, VARIABLE, connects the signal to a patch board where any point may be patched in. An OFF position is provided to disconnect the signal generator circuit from all input points. All input signal leads to the control system are shorted through S2 to the input signal return leads when a signal from the generator is not being applied.

The Amplitude Limiter is a diode clamp circuit between the Transfer Function Analyzer generator output and switch S2. This circuit limits the signal positive and negative peak amplitudes to plus and minus 16 volts in the event of an overvoltage fault in the generator by clamping to the plus and minus 15VDC supplies. Redundancy in the diode circuits is employed for greater reliability. A current limiting resistor, R1, to prevent excessive current between the signal generator and the 15VDC supplies. During normal operation, the diodes are not conducting.

A resistor, R2, on board A10 is used as a current limiting resistor between the minus 15VDC in the Printout Switching Chassis and the Programmer contacts providing BCD information to the Printer during transfer function printout.

5.3 Analysis Switch, S3

The Analysis switch receives up to 6 return signals from the control system through connections at a patchboard. Any of the signals can be selected by S3 to be applied to the Transfer Function Analyzer correlator input through the DC rejection circuit. Both signal and signal return are switched by S3.

5.4 DC Rejection Circuit, A6, A7, and A8

The function of the DC Rejection circuit is to remove the DC component from the return signal from the control system to prevent saturation or cut-off of the amplifiers in the correlator of the Transfer Function Analyzer. The circuit consists of a buffer amplifier, A6, with a gain of 0.5, a DC Hold Inverter, A8 and an Amplifier, A7, with a gain of 4. The DC Hold Inverter is an integrator circuit with the input circuit connected through a set of normally open contacts of relay K1 on the Relay Module, A9.

Prior to the introduction of a test signal from the Transfer Function Analyzer signal generator to the control system, the DC signal level out of the control system exists at the input of A6. Relay K1 is energized and the output of A6 is applied to the inputs of A7 and A8. The output of A8 assumes the same amplitude but opposite polarity of its input and is applied to one input of A7. With the output of A6 also applied directly to the other input of A7, the net input to A7 is zero. This gives a zero output from A7 which is fed to the correlator input of the Transfer Function Analyzer through J20 on the Printout Switching Chassis.

At the time that the analyzer applies an AC test signal to the control system, relay K1 is deenergized and the input to A8 is opened. The output of A8 holds at the level it had just before the input was opened, thus biasing A7 by an amount proportional to the DC component of the control system output. The control system AC and DC components come through A6 and are applied to A8. The output of A8 will contain the AC component only.

5.5 Code Inverters, A1 through A5

The code inverters are used to modify the Range C lock BCD signals for use by the Printer when the Printout Switch is in the POWER INCREASE TIME and LOG POWER positions. Each of boards A1 through A5 handles one digit of Range Clock information consisting of 4 lines of BCD--1, 2, 4, and 8. The inverters receive from the Range Clock one state negative signals with a binary "1" level of minus 6 volts DC and a binary "0" level of zero volts DC. The inverter outputs provide one state positive signals with a binary "1" level of zero volts DC and a binary "0" level of minus 15 volts DC.

5.6 Print Switch, S4

The Print switch is an alternate action switch providing for RUN or STOP conditions for the Printer. This switch is in parallel with a similar switch located on the LRE Console Startup Panel and in series with the positive print command lead to the Printer. When either or both switches are in their RUN positions, the print command circuit is completed and the Printer will print on receipt of a command pulse. When both switches are in their STOP positions, the print command circuit is open and the printer cannot receive a command to print.

5.7 Program Start Switch, S5

The Program Start switch is a momentary action switch used to initiate the beginning of a program on the Programmer by momentarily applying I & C ground to the program start circuit in the Programmer.

5.8 Reference Voltages

Reference voltages for the Printer binary circuits are derived from potentiometers mounted on the Printout Switching Chassis component panel. The "0" state reference voltage is derived from R1 and the "1" state from R2.

6.0 OPERATING INSTRUCTIONS

Once the chassis has been installed and the Operational Checkout and Alignment have been completed, no further procedures are required other than the manipulation of the front panel switches for desired operation.

7.0 OPERATIONAL CHECKOUT

Following the installation of the chassis the Functional Tests as described in Paragraph 3.3 of the Printout Switching Chassis Acceptance Test Specification and Procedure should be performed.

8.0 ALIGNMENT

Circuit alignment consists of balancing the amplifiers on boards A6, A7, and A8 by conventional means and setting the "0" STATE reference voltage at minus 12 ± 0.5 volts DC and the "1" STATE reference voltage at minus 4 ± 0.5 volts DC. Allow at least one-half hour warm-up prior to making alignment adjustments. The circuit on A8 should be set to obtain less than 100 millivolt drift per minute at the output.

9.0 MAINTENANCE

9.1 Preventive Maintenance

Under normal conditions, no routine periodic maintenance is required other than good housekeeping practices of dusting, cleaning, and inspection.

9.2 Corrective Maintenance

Major corrective maintenance is performed at the factory or by a Westinghouse field representative. Alignment and replacement of obviously faulty components may be performed locally by a skilled technician. There are no specially selected or matched components used,

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therefore, components may be replaced by locally available parts of identical value and tolerance. The Acceptance Test Specification and Procedure may be used as an aid in trouble shooting.

DRAWING LIST

Printout Switching Chassis ETS-1 TSCS

Schematic Diagram	937J797
Wiring Diagram	937J798
Printout Switching Chassis	937J791G01
Code Inverter	978D771G01
Buffer Amplifier	978D896G01
DC Hold Inverter	978D897G01
Amplifier	979D556G01
Relay Module	978D763G03
Amplitude Limiter	978D987G01

TEST SPECIFICATION NUMBER T-711845

TITLE

Acceptance Test Specification and Procedure

PRINTOUT SWITCHING CHASSIS ETS-1 TSCS

DATE: January, 1966

PREPARED BY:

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Quality Engineering

INFORMATION CATEGORY

W. B. R. 3/11/66
Authorized Classifier/Date

REVISION	
A	LIMITED V INCREASED FROM 12 TO 16 V. PAR 3.3.4.2 CHANGED. <u>R. Bartholomew 3/14/66</u>
B	PAR 2.1, Rev. — ADDED. PAR 3.3.1 WAS NASA. PAR 3.2.2.4 ADDED. PAR 3.3.3.1, J2-M TO J1-F ADDED. PAR 3.3.5 ADDED. <u>R. Bartholomew 3/13/66</u>
C	PAR. 2.3.4.3 WAS 16 VOLTS. PAR 3.3.3.4 WAS 16 VOLTS. <u>R. Bartholomew 3/17/66</u> <u>R. Kelly</u>

ACCEPTANCE TEST SPECIFICATION AND PROCEDURE

PRINTOUT SWITCHING CHASSIS (TSCS)

1.0 SCOPE

The scope of this document is to provide the test specifications for the ETS-1 Test Stand Control System (TSCS) Printout Switching Chassis (Westinghouse Drawing No. 937J791G01) and define the acceptance test procedures to be followed prior to incorporation into the ETS-1 TSCS Printout System.

2.0 ACCEPTANCE TEST SPECIFICATION

The acceptance test shall be performed in the order of and as specified in the procedure. Discrepancies found during the visual examination shall be corrected and reinspected before performing the functional test. Failure or inability to obtain a required measurement during formal functional testing shall result in establishing a "hold" on the test. The failure or inadequacy shall be recorded by Quality Control and shall be reviewed by the WANL Engineering Review Board (ERB). The equipment shall be repaired and sections of the test repeated as determined by the ERB. Visual examination shall be performed on the reworked or repaired areas before resuming testing.

2.1 Applicable Documents

937J791 Printout Switching XE Control System (TSCS). Rev. _____

937J797 Schematic Diagram - Printout Switching XE Control System (TSCS). Rev. _____

937J798 Wiring Diagram - Printout Switching XE Control System (TSCS). Rev. _____

NDC-118A NERVA Design Criteria, EST-1 TSCS (U) (AGC)

2.2 Equipment Required

1 Multimeter (Simpson 269 or equivalent)

1 Digital Voltmeter - Accuracy $\pm .1\% \pm 1$ digit

- 1 Variable Voltage (0-20 VDC) power supply with $\pm 0.1\%$ regulation and 0.1% ripple
- 1 $+15 \pm .05$ source with $\pm 0.05\%$ regulation and 1 mv. ripple
- 1 $-15 \pm .05$ VDC source with $\pm 0.05\%$ regulation and 1 mv. ripple
- 1 $+28 \pm 1$ VDC source with $\pm 0.5V$ regulation and 1 mv. ripple

2.3 Tests

The following tests shall be performed on the Printout

Switching Chassis:

- 2.3.1 Visual Examination -To be performed by Quality Control.
 - 2.3.1.1 Workmanship, Assembly and Fit
 - 2.3.1.2 Materials, Parts and Finishes
 - 2.3.1.3 Treatment for Precaution of Corrosion
 - 2.3.1.4 Marking
- 2.3.2 Weight-To be performed by Quality Control.
- 2.3.3 Switch Wiring-To be performed by Instrumentation and Control and witnessed by Quality Control.
- 2.3.4 Functional Tests-To be performed by Instrumentation and Control and witnessed by Quality Control.
 - 2.3.4.1 Test Point and Reference Voltage Check
 - 2.3.4.2 Lamp Tests
 - 2.3.4.3 Amplitude Limiter Test
 - 2.3.4.3.1 Circuit shall limit signal to a maximum of $16\frac{1}{2}$ volts.
 - 2.3.4.4 DC Rejection Circuit Test
 - 2.3.4.4.1 Circuit output shall not drift more than $\pm .100$ volts in a 30 second period.
 - 2.3.4.5 Code Inverter Test
 - 2.3.4.5.1 Output voltage shall be >14 volts for inputs <0.5 volts and $<one$ volt for inputs between 5 and 7 volts.

3.0 ACCEPTANCE TEST PROCEDURE

3.1 Visual Examination

The equipment under test shall be presented in its final form together with the applicable schematic, wiring diagram, and assembly drawing. The visual examination shall consist of the following parts:

3.1.1 Workmanship, Assembly, and Fit

The inspector shall inspect the equipment for workmanship to WANL requirements, and to assure that the overall chassis is of the proper dimensions per the assembly drawing, Westinghouse Drawing Number 938J791. Record dimensions: Height ____ inches; Width ____ inches; Depth ____ inches.

3.1.2 Weight

The chassis shall be weighed and the weight recorded.

Record Weight: ____ pounds

3.1.3 Materials, Parts, and Finishes

The equipment shall be inspected to assure that the materials, parts, and finishes are in accordance with the applicable assembly drawings. Incoming inspection records on materials, parts, and finishes shall be utilized to determine conformance to the assembly drawings where possible. Check when completed. ____.

3.1.4 Treatment for Prevention of Corrosion

The equipment shall be inspected to assure that the coatings for prevention of corrosion have not been impaired during the manufacturing cycle. Check when completed. ____.

3.1.5 Safety Requirements

The equipment shall be inspected to insure that no safety hazard, such as sharp edges, etc., exist on the equipment which are potential hazards to personnel operating or maintaining the equipment. Check when completed. _____.

3.1.6 Marking

The markings on the equipment shall be inspected to ensure conformance to the applicable drawings and to assure that they are acceptable as to permanence and readability. Check when completed.

3.1.7 Visual Examination Review

After the visual examination of the equipment has been completed, all deficiencies shall be reviewed by WANL Engineering and Quality Control and corrected by one of the following methods:

- a. Drawing changes where drawing deficiencies are noted.
- b. Design changes if necessitated.
- c. Rework of the parts affected if required.

3.2 Switch Wire Checks

No power is to be applied to the chassis during the following wire checks:

3.2.1 Switch S1 Wire Check

Using a Simpson Model 269 or equivalent, verify the wiring to switch S1 through the pins on connectors J3 through J8. Check when completed: _____

3.2.2 Switch S2 Wire Check

Using a Simpson Model 259, or equivalent, verify the wiring to switch S2 as follows:

3.2.2.1 Connect ohmmeter between J2-C and J2-m.

Reading should be greater than ten megohms
for each position of S2. Record: _____ ohms (MINIMUM)

3.2.2.2 Connect a jumper between pins J2-C and J2-m and

make the following resistance measurements.

Record 1.8K measured values and use check for

< 1 ohm measurements.

	<u>BETWEEN</u>	<u>S2 POSITION</u>	<u>REQUIRED</u>	<u>RECORD</u>
a)	J2-D & E	Θ_d	1.8K $\pm$ 10%	
b)	"	ALL EXCEPT Θ_d	< 1 ohm	
c)	J2-F & G	LnNd	1.8K $\pm$ 10%	
d)	"	ALL EXCEPT LnNd	< 1 ohm	
e)	J2-H & J	T _d	1.8K $\pm$ 10%	
f)	"	ALL EXCEPT T _d	< 1 ohm	
g)	J2-K & L	P _d	1.8K $\pm$ 10%	
h)	"	ALL EXCEPT P _d	< 1 ohm	
i)	J2-M & N	d	1.8K $\pm$ 10%	
j)	J2-M U N	ALL EXCEPT d	< 1 ohm	
k)	J2-P & R	VAR	1.8K $\pm$ 10%	
	"	ALL EXCEPT VAR	< 1 ohm	

3.2.2.3 Remove jumper from between pins J2-C and J2-m.

3.2.2.4 Connect ohmmeter between J2-e and J1-M. Reading

should be 10K $\pm$ 10%.

Record: _____ ohms

3.2.3 Switch S3 Wire Check

Using Simpson Model 269, or equivalent, verify the wiring to S3 through the pins on connector J2 and pin 4 on J15. Check when completed. _____

3.2.4 Switch S4 Print Stop-Run Wire Check

Connect a Simpson Model 269, or equivalent, between J2-g & h. Repeatedly pressing the Print Stop-Run button should result in alternate meter readings of ≤ 1 ohm and > 10 megohms. Check when completed. _____

3.2.5 Switch S5 Program Start Wire Check

Connect a Simpson Model 269, or equivalent, between J2-A & J2-B. The meter should read ≤ 1 ohm when the button is depressed and > 10 megohms when it is released. Check when completed. _____

3.3 Functional Tests

Check to insure that the proper fuses are installed in the +15 VDC, -15VDC and +28VDC fuseholders. Connect the chassis to +15VDC, -15VDC, and +28VDC through connector J1 as indicated on the Schematic Diagram 937J797. Pin J1-F is the return for the +15VDC and -15VDC supplies.

3.3.1 Test Point and Reference Voltage Check

3.3.1.1 Connect a DC voltmeter between TP7 and TP6.

Voltage should read 28V nominal with TP7 positive. Check when completed. _____

3.3.1.2 Connect a DC voltmeter between TP3 and TP5.

Voltage should read 15V nominal with TP3 positive. Check when completed. _____

3.3.1.3 Connect a DC voltmeter between TP4 and TP5.

Voltage should read 15V nominal with TP5 positive.

Check when completed. _____

3.3.1.4 Connect a DC voltmeter between TP1 and TP5 with the positive lead at TP5. The meter should read $0 \pm .5$ volts with the "0" STATE pot turned fully CCW and should increase to $15 \pm .5$ volts as the pot is turned to its fully CW position. Record: CCW _____volts; CW _____volts.

3.3.1.5 Connect a DC voltmeter between TP2 and TP5 with the positive lead at TP5. The meter should read $0 \pm .5$ volts with the "1" STATE pot turned fully CCW and should increase to $15 \pm .5$ volts as the pot is turned to its fully CW position. Record: CCW _____volts; CW _____volts.

3.3.2 Lamp Tests _____

3.3.2.1 Depress the Print Stop-Run button to light the Run light. The Run light should remain lit when the button is released. The Stop light should be out. Check when completed. _____

3.3.2.2 Depress the Print Stop-Run button again. Stop light should light and remain lit when the button is released. The Run button should be out. Check when completed. _____

3.3.2.3 Depress the Program Start button. The Program Start button should light and go out when the button is released. Check when completed. _____

3.3.2.4 Depress the Lamp Verify button. The Lamp Verify button should not light. The Print Stop button should remain lit and the Print Run and Program

Start buttons should light. Holding the Lamp Verify button in, depress the Print Stop-Run button. The Print Run, Print Stop, and Program Start buttons should remain lit. When the Lamp Verify button is released, all button lights except Print Stop should go out. Check when completed. _____

3.3.3 Limiter Circuit (A10) Test

Record all measurements in this section as indicated.

- 3.3.3.1 Place the Function Switch in the Θ_d position. Connect J2-m to J1-F. Connect the variable voltage source (0-20VDC) positive terminal to J2-m and negative terminal to J2-C. With a digital voltmeter, set the source voltage to $10 \pm .01$ volts. Record: _____ volts
- 3.3.3.2 Using the same voltmeter used in Step 3.3.3.1, measure the voltage between J2-D and J2-E (J2-E will be positive). The reading should be within 20 mv of the reading obtained in Step 3.3.3.1. Record: _____ volts
- 3.3.3.3 Repeat Steps 3.3.3.1 and 3.3.3.2 for opposite polarity by reversing source leads to J2-m and J2-C. J2-m will now be negative. The polarity of the measurements will also be reversed. Record: _____ volts; _____ volts
- 3.3.3.4 Repeat Steps 3.3.3.1, 3.3.3.2, and 3.3.3.3 except in Step 3.3.3.1 set the voltage at 20 ± 0.5 volts and in Step 3.3.3.2 and 3.3.3.3 the meter readings should not exceed $16\frac{1}{2}$ volts. Record: _____ volts; _____ volts; _____ volts; _____ volts.
- 3.3.3.5 Remove jumper between J2-m and J1-F.

3.3.4 DC Rejection Circuit Test

Circuit boards A6, A7, and A8 must be properly aligned before proceeding with this test. Connect a jumper between J2-f and J1-F and place the Analysis Switch S3 in the "1" position. Record all measurements in this section as indicated.

3.3.4.1 Apply a $5 \pm .5$ VDC signal with 0.1% ripple between J2-S and J2-T with J2-S positive. Connect the digital voltmeter between J2-S and J2-T with J2-S positive. Record: _____ volts.

3.3.4.2 Momentarily short J16-16 and J16-11 on A8. After the short is removed, move the digital voltmeter positive lead from J2-S to J20. The meter should read within $\pm 5\%$ of two times the voltage recorded in 3.3.4.1. Record: _____ volts.

3.3.4.3 Momentarily jumper J2-k to J1-F. After the jumper is removed, the meter should read zero volts ($\pm .100$ volts) for a period of 30 seconds. If the reading drifts out of tolerance during this time, check the current offset alignment of the DC Hold Inverter A8 and the possibility of drift in the 5VDC signal (Step 3.3.4.1). Record: _____ volts after 30 seconds.

3.3.5 Code Inverter Test

The following describes the procedures to be used for checking the code inverter circuits on board A5. The same procedure shall be followed for checking the code inverters on boards A1, A2, A3 and A4 using their respective points on J9 as shown on the Schematic Diagram 937J797.

937J797 and Wiring Diagram 937J798. Record all measurements in this section as indicated.

3.3.5.1 Connect a Simpson 269, or equal, between J9-EE and J1-F with J1-F positive. Connect the 0-15 volt variable DC signal supply between J9-Z and J1-F with J1-F positive. As the DC signal voltage is varied from zero to 7 volts, the meter should read greater than 14 volts for signal voltages less than 0.5 volt and less than one volt for signal voltages between 5 and 7 volts. Record: _____volts;
_____volts

3.3.5.2 Repeat Step 3.3.5.1 substituting J9-FF for J9-EE and J9-a for J9-Z. Record: _____Volts;
_____volts

3.3.5.3 Repeat Step 3.3.5.1 substituting J9-GG for J9-EE and J9-b for J9-Z. Record: _____volts; _____vol

3.3.5.4 Repeat Step 3.3.5.1 substituting J9-HH for J9-EE and J9-i for J9-Z. Record: _____volts; _____volts

3.3.5.5 Remove all power and jumpers.

3.4 Ground Tests

3.4.1 Using a Simpson Model 269, or equivalent, verify that the resistance between J1-E (Safety Ground) and chassis is <1 ohm. Check if OK _____.

3.4.2 Using a Simpson Model 269, or equivalent, verify that the resistance between J1-F (Signal Ground) and chassis is >10 megohms. Check if OK _____.