LESSON 4. MISSILE TEST EQUIPMENT

MMS Subcourse No 151	**Nike Missile and Test Equipment**
Lesson Objective	**To give you a general knowledge of purpose, capabilities, and basic functions of various test set groups, to include transponder control, RF and pulse, and AF and power test set groups.**
Credit Hours	**Two**

TEXT

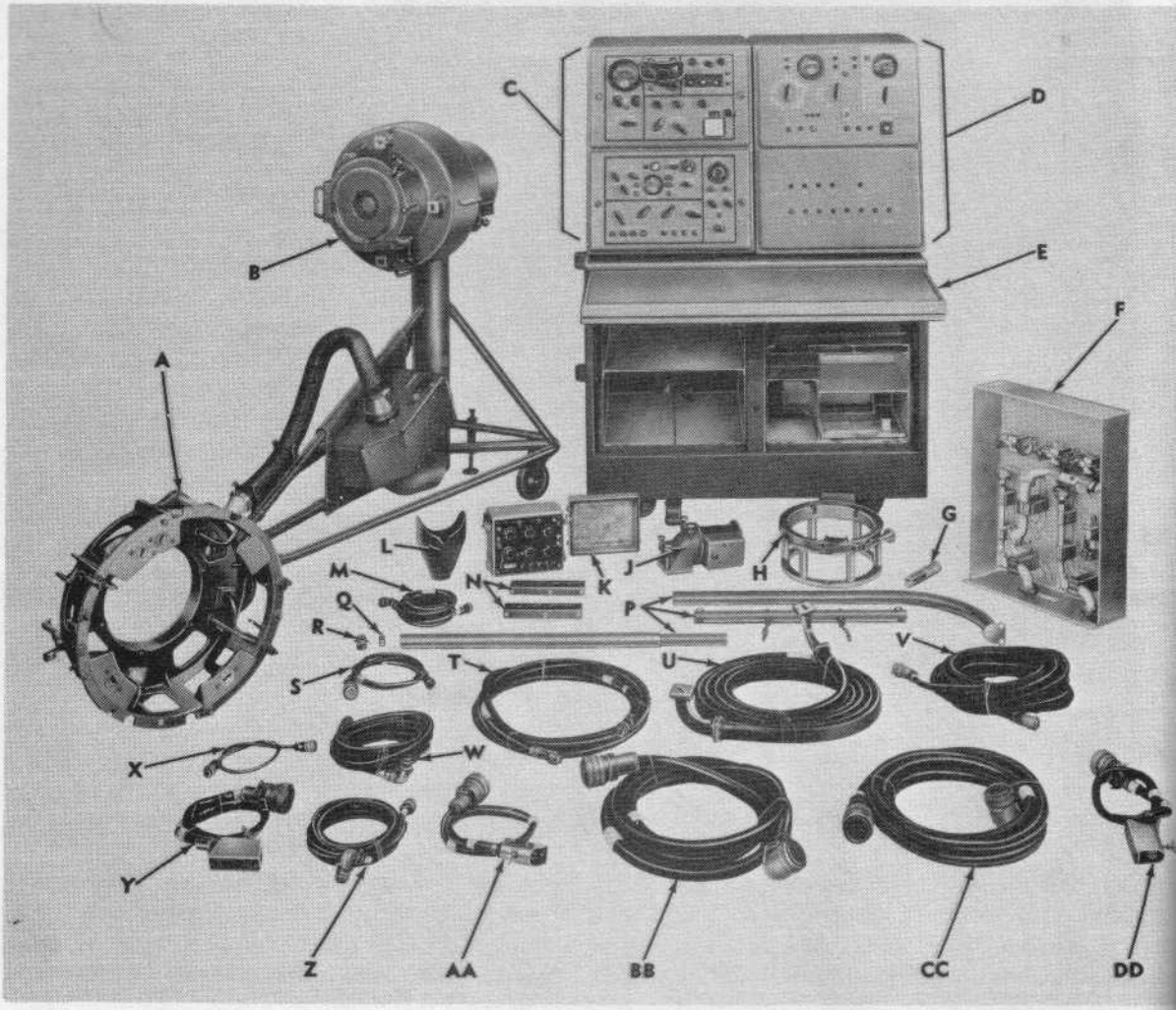
1. **INTRODUCTION.** The guidance set group test equipment consists of three separate test set groups, plus a cabinet containing an oscilloscope and a spectrum analyzer which may be used with any group. Associated with each test set group are cabinet mounted test sets, a base cabinet, test adapters, cables and test leads, and miscellaneous test equipment. This equipment provides testing facilities for testing the Nike Hercules missile guidance set, flight simulator group, and subassemblies. The test set group provides a means of testing the guidance set by supplying external power and simulating the missile tracking radar system that controls the missile in flight.

2. **TRANSPONDER CONTROL TEST SET GROUP.** This test set group (fig 1) is designed to test the overall operation of the complete Nike Hercules guidance set by determining power output, receiver sensitivity, response time, burst time, order response, signal rejection, and other functions. The [illegible] units that will be discussed are the RF test set and the electrical test set.

a. **RF test set.** The RF test set (C, fig 1) sends a group of four coded pulses, representing a specific guidance command to the missile guidance set receiving and decoding circuits. A fifth pulse is sent to simulate burst. In order to generate test signals that simulate the guidance commands normally issued by ground guidance, the missile RF test set group operates on a similar time base. The generation of these commands will be discussed in (1) through (5) below.

(1) Microsecond oscillator. The microsecond oscillator (fig 2) is essentially a Wein-bridge oscillator that provides an output to the waveform converter. The output is variable in frequency and can produce all the proper spacing between the first two pulses normally transmitted to the missile. An output is also applied to the horizontal amplifier of the oscilloscope for calibration purposes. The microsecond oscillator requires calibration every time the RF test set is used.

(2) Waveform converter. The waveform converter differentiates the output of the microsecond oscillator, thereby producing sharp positive and negative voltage spikes. These spikes are used to trigger a gating circuit, composed of two multivibrators, which gates the coded information and applies it to the mixing and switching pulse generator. The waveform converter also generates a trigger pulse in time coincidence with the second pulse. This trigger pulse is applied to the gating and switching pulse generator to start a time base (reference) for the generation of the third and fourth



A	TA 1412–8514402 (Store in storage cabinet)
B	Transponder control group test stand–8514412
C	Hercules missile RF test set group–9143471
D	Hercules missile electrical test set group–9034602
E	Electrical equipment cabinet–8516779
F	Waveguide assembly set–8514403
G	Tool–9002257
H	TA 1408–9004808 with TA 1403–9004779
J	Transponder blower assembly–8516630
K	Resistance bridge ZM-4B/U
L	Oscilloscope viewing hood–9142994
M	Cable 1407–8516597
N	Test cable grip assembly–8013758
P	Mast assembly–8171229, 8171230, and 8171234
Q	TA 1206–8516629
R	Connector–9007079
S	Cable 1410–9144545
T	Cable 1401–8514068
U	Waveguide–8160074
V	Cable 1415–8514579
W	Cable 1405–8516594
X	Cable 1402–8516591
Y	Cable 1411–8514513
Z	Cable 1406–8516596
AA	Cable 1403–9141413
BB	Cable 1413–8514672
CC	Cable 1414–8514673
DD	Cable 1404–9141415

Figure 1. Transponder control test set group.

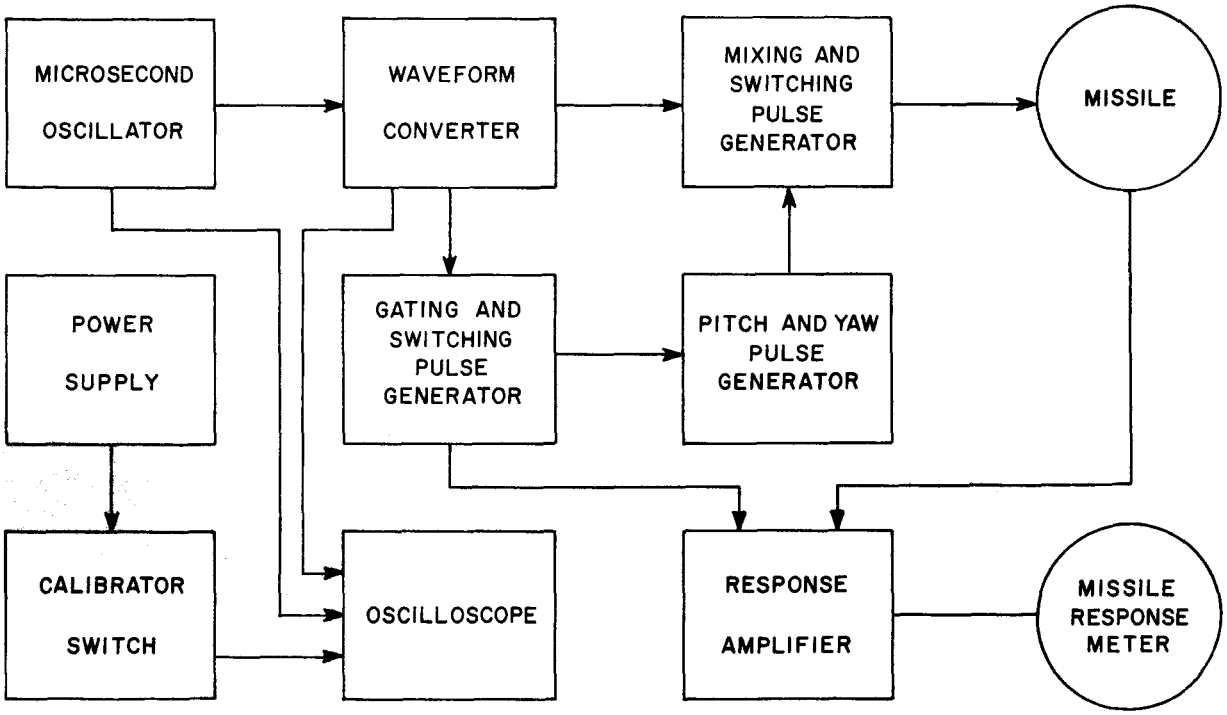


Figure 2. RF test set block diagram.

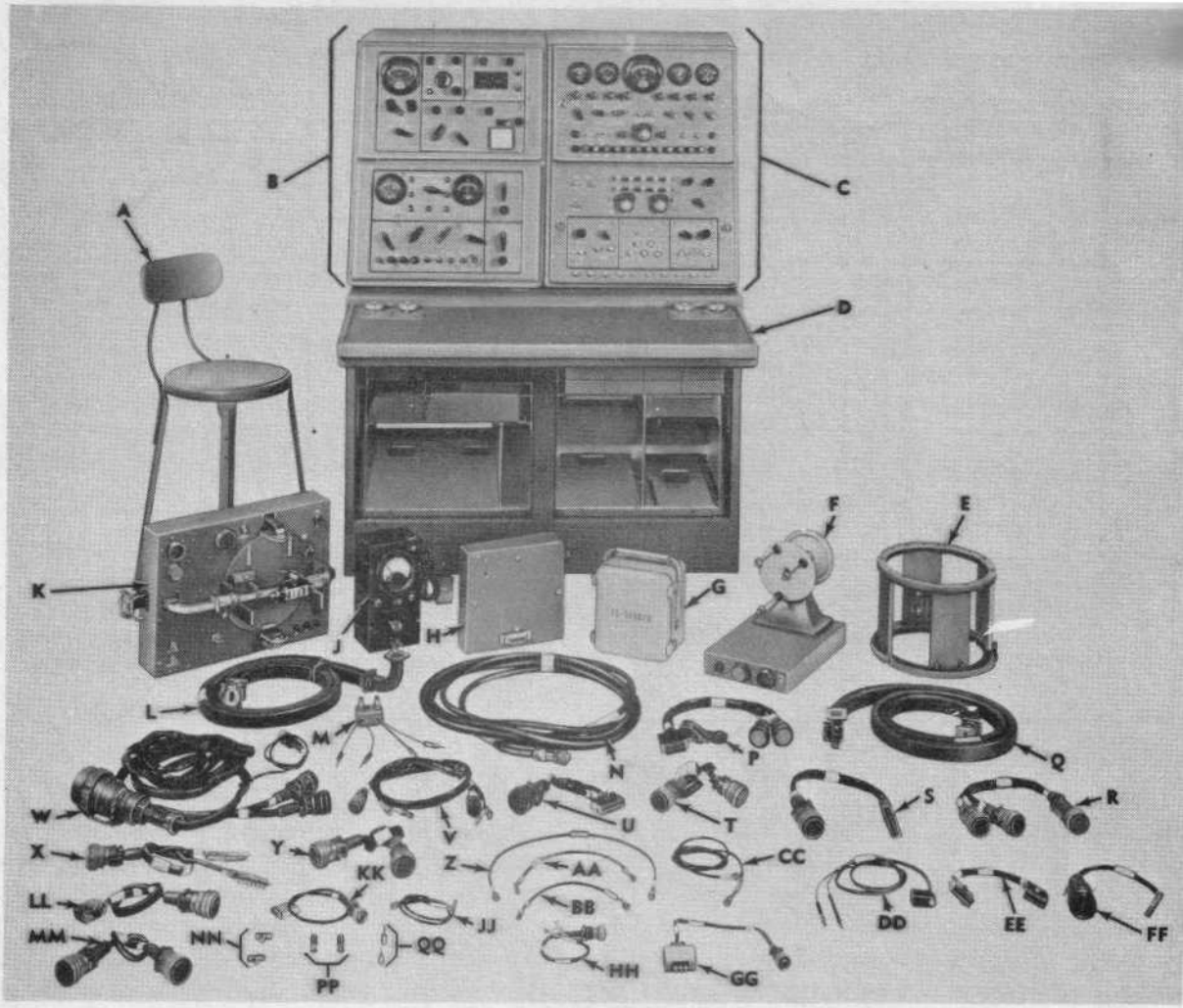
pulses. This trigger is also sent to the vertical amplifiers in the oscilloscope for calibration.

(3) Gating and switching pulse generator. The gating and switching pulse generator uses the number 2 trigger pulse from the waveform converter for the generation of a pitch and yaw command gate that will be sent to the P and Y pulse generator. It also generates a response gate voltage that controls the operation of the response amplifier and a pulse used to check the burst channel of the missile guidance set.

(4) P and Y pulse generator. This chassis in the RF test set has two command switches on the front panel; the pitch command and the yaw command. These switches send P and Y commands to the mixing and switching pulse generator where they are mixed with the number 1 and 2 pulses from the waveform converter. The output of the mixing and switching pulse generator modulates an RF signal in a klystron circuit. This RF is transferred to the missile guidance set under test by use of the waveguide (F, fig 1). These RF pulses simulate all the commands normally transmitted to the missile while it is in flight. When the guidance set is being checked by the transponder control group, meters measure the guidance set response to the commands.

(5) Calibration and measuring circuits. The RF test set provides various monitoring and metering circuits used in calibration of the test set and in evaluation of the performance of the missile guidance set. Some of these metering circuits are: the response amplifier and missile response meter, which shows the missile guidance set is responding properly to guidance commands without excessive delay time; the calibrator switch, which is used to calibrate the test set; the power supply, which furnishes voltage to the test set; and the oscilloscope, which is also used to calibrate the RF test set.

b. Missile electrical test set. The missile electrical test set (D, fig 1) is used to measure the input and output voltages of the missile guidance set power supplies, the input and output voltages of the servoamplifier, and the internal resistance of some of the circuits in the missile guidance set. The control panel consists basically of a null meter and switches for checkout of the guidance set. The bottom half of the electrical test set houses the power supply that supplies external power to the guidance set during checkout. During checkout the guidance set is locked into test adapter TA 1412 (A, fig 1). While in use, this test adapter is connected to the transponder control group test stand (B, fig 1), through which connections between the RF test set and the guidance set are made. With the guidance set mounted on the test stand, it can be manually moved to produce forces (pitch, yaw and roll) on the flight control instruments. The response of the flight control instruments can be checked by reading the null meter.



A	Straight chair–8519376
B	Ajax missile RF test set group–8021733
C	Electrical test set–9140286
D	Electrical equipment cabinet–9140085
E	TA 1203–8516490
F	TA 1202–8516730
G	Electronic multimeter TS-505D/U
H	TA 1201–8516480
J	Electronic voltmeter ME-6/U
K	TA 1204–9136059
L	Waveguide–9004735
M	TA 1205–8514628
N	Cable 1210–8516661
P	Cable 1223–9140506
Q	Waveguide–9004598
R	Cable 1224–9140527
S	Cable 1204–8514075
T	Cable 1225–9140498
U	Cable 1203–8514074
V	Cable 1226–9140467
W	Cable 1201–8514072
X	Cable 1207–8514078
Y	Cable 1217–8516669
Z	Cable 1212–8516663
AA	Cable 1220–9140462
BB	Cable 1222–9140469
CC	Cable 1213–8516664
DD	Cable 1211–8516662
EE	Cable 1221–9140501
FF	Cable 1206–8514077
GG	Cable 1209–8514085
HH	Cable 1215–8516667
JJ	Cable 1218–8155317
KK	Cable 1214–8516666
LL	Cable 1208–8514079
MM	Cable 1216–8516668
NN	Adapter connector UG-274A/U
PP	Adapter connector UG-1090/U
QQ	TA 1206–8516629

Figure 3. RF and pulse components test set group.

3. RF AND PULSE COMPONENTS TEST SET GROUP.

a. **General.** The RF and pulse components test set group (fig 3) consists of the Ajax missile RF test set (B, fig 3), the electrical test set (C, fig 3), the electrical equipment cabinet (D, fig 3), cables, adapters, and other associated test equipment. The lower part of the electrical equipment cabinet houses all the unmounted items of test equipment shown in figure 3. This test set group is designed to test RF and pulse components (chassis or modules) that are removable from the Nike Hercules or Nike Ajax guidance set.

b. **Nike Ajax test set.** This test set is similar to the Nike Hercules test set discussed in paragraph 2a above and will not be discussed in this lesson.

c. **Electrical test set.** The assemblies comprising the electrical test set (C, fig 3) are the electrical equipment cabinet, the upper electrical equipment drawer, and the lower electrical equipment drawer. The upper drawer contains the power supplies necessary for operation of the units under test and the chassis contained in the lower drawer. The lower drawer contains the pulse forming chassis used in performing tests on various pulse components of the missile guidance set.

(1) Upper equipment drawer. The upper equipment drawer contains seven plug-in units, mounted in a framework. The plug-in units are discussed in (a) through (f) below.

(a) The AC power supply (fig 4) produces regulated 120 volts, 1,700 Hz and 45 volts, 200 Hz from a -28 volt input. The regulated 120-volt, 1,700-Hz uses a transistorized series regulator. The 45-volt, 200-Hz uses an autotransformer, a vibrator, and associated filters.

(b) The -100 and +150-volt power supply furnishes regulated -100 and +150-volt outputs to other components of the electrical test set and to units under test. In addition, the power supply uses a -150-volt from the -150 and +250-volt regulated power supply to furnish a regulated -60-volt output to units of the electrical test set and to units under test.

(c) The -150 and +250-volt power supply furnishes regulated -150 and +240-volt outputs. It also furnishes unfiltered and unregulated +240 volts to other components of the electrical test set and units under test.

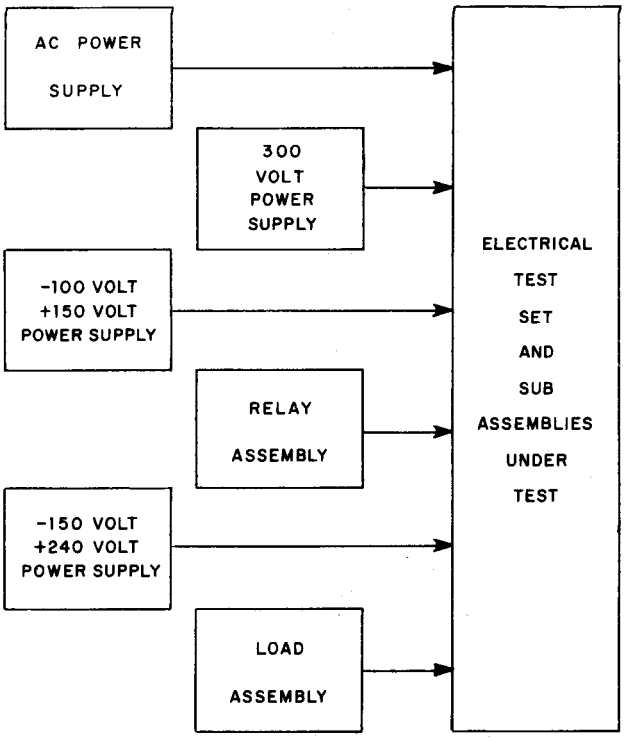


Figure 4. Upper drawer--block diagram.

(d) The 300-volt power supply contains two +300-volt regulated DC supplies and is the source of the 6.3-volt AC heater voltage for the circuits in the upper drawer.

(e) The relay assembly provides power to various chassis of the electrical test set and to the units under test. The relays are activated by the TEST-POWER switch on the electrical test set front panel (C, fig 3).

(f) The load assembly provides load resistors for various Nike Hercules missile guidance set components under test. Shunts are also provided for meters of the RF and pulse components test set group.

(2) Lower equipment drawer. The lower electrical equipment drawer contains 10 plug-in units that will be discussed in (a) through (g) below.

(a) The pulse generator (fig 5) is basically a multivibrator with two modes of operation, monostable or free running, either of which can be selected by a selector switch on the front of the lower drawer. The pulse generator generates synchronizing pulses at variable repetition rates which are applied to a 5-microsecond pulse generator, a 0.25-microsecond pulse generator, and a variable width pulse generator.

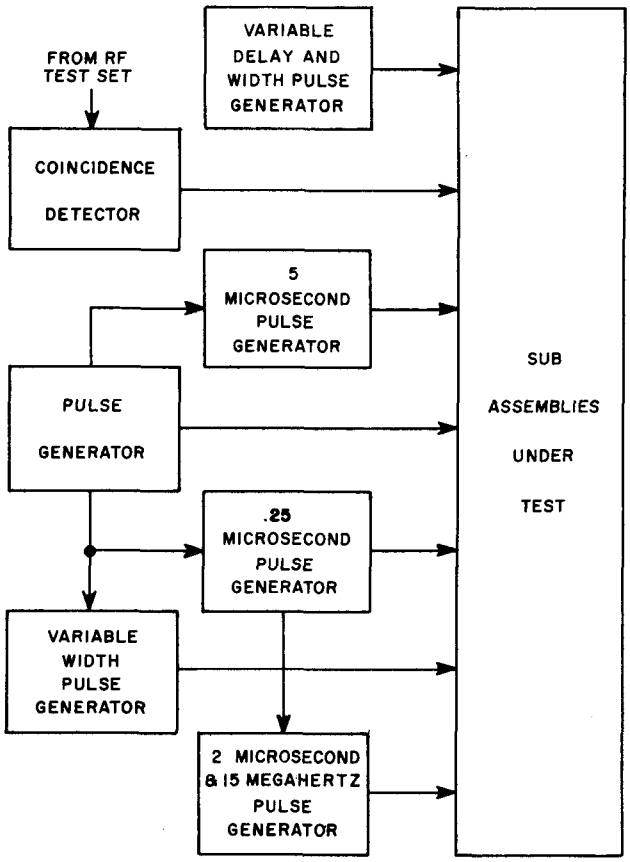


Figure 5. Lower drawer--block diagram.

(b) The 5-microsecond pulse generator supplies alternate pitch and yaw pulses (positive and negative) and a burst pulse to the units under test. This is accomplished by using trigger amplifiers, multivibrators, and blocking oscillators.

(c) The 0.25 microsecond pulse generator is made up of two identical four-stage pulse generators consisting of a cathode follower input stage, a blocking oscillator, and two stages of amplification. The output pulses are used to furnish pulses to the electrical test set and to units under test.

(d) The variable width pulse generator receives pulses of various widths and amplitudes and generates positive and negative pulses with various widths and amplitudes to be used to test components of the Nike Hercules guidance set. These pulses are controlled by the function switch on the front of the lower drawer.

(e) The coincidence detector receives a signal pulse train from the missile RF test set and furnishes undelayed, delayed, and decoded outputs for use in testing the RF and pulse components of the missile guidance set.

(f) The variable delay and width pulse generator contains two phantastron circuits. One phantastron is designed to produce a pulse that is variable in width and the other produces a pulse whose time of generation is variable. These pulses are applied to various units under test.

(g) The 2 microsecond and 15 megahertz pulse generator receives a trigger from the .25 microsecond pulse generator and produces pulses used for testing the command detonation circuits. The .25 microsecond input also triggers a ringer or shock excited oscillator. The ringer generates a 15 megahertz pulse, .25 microseconds wide, that is used for testing the RF detector.

(3) Missile guidance set test adapters.

(a) General. There are many test adapters shown in figures 1 and 3. They are used to check out the missile guidance set. Some of the major test adapters are discussed in (b) through (f) below.

(b) Adapter 1201 (W, fig 3). This adapter is used in testing signal data converters of the guidance set. The test adapter provides connection between the test equipment and the unit under test.

(c) Adapter 1202 (F, fig 3). This adapter is used in testing units from the Nike Ajax missile guidance set, to include steering order demodulators and signal data converters.

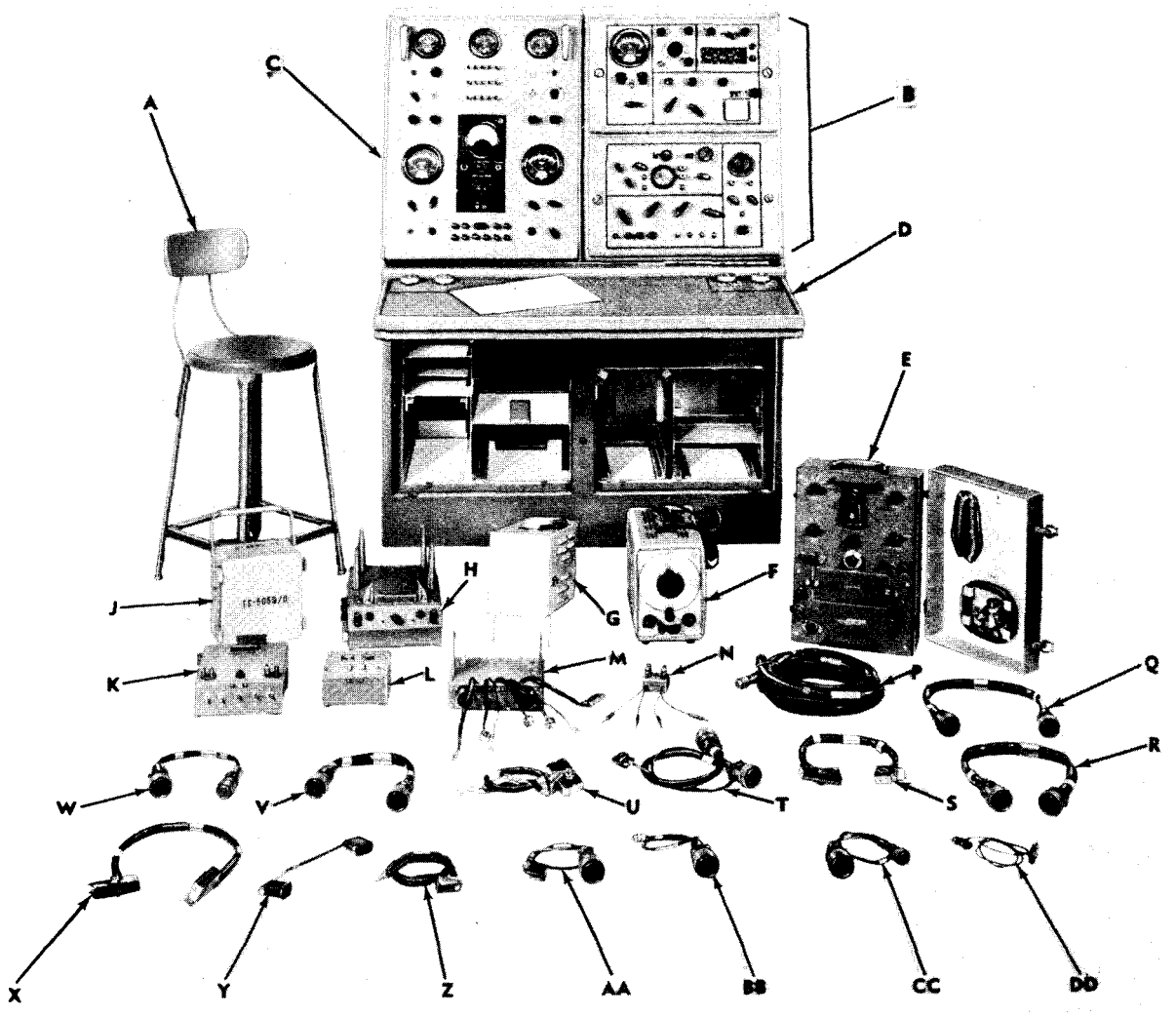
(d) Adapter 1204 (K, fig 3). This adapter is used in testing beacons, receiver-transmitters and radar modulators.

(e) Adapter 1207 (X, fig 3). This adapter is used to test vane axial fans of the guided missile flight simulator.

(f) Adapter 1211 (DD, fig 3). This adapter is used to test amplifier decoders, delay lines, radio receivers, RF detectors, and pulse delay networks.

4. AF AND POWER COMPONENTS TEST SET.

a. **General.** The AF and power components test set group (fig 6) is designed to test audiofrequency and power components (modules or chassis) within the Ni



A	Straight chair–8519376	J	Electronic multimeter TS-505 D/U	U	Cable 1305–9137867
B	Hercules missile RF test set group–9153471	K	TA 1302–8159342	V	Cable 1308–9149046
C	Electrical test set–9138293	L	TA 1304–8516830	W	Cable 1310–8516769
D	Electrical equipment cabinet–9140121	M	TA 1303–8516820	X	Cable 1303–9137868
E	Electrical test set–9005609	N	TA 1305–9137867	Y	Cable 1311–8516843
F	Signal generator–9024903	P	Cable 1301–8514067	Z	Cable 1302–8514069
G	Oscilloscope AN/USM-32	Q	Cable 1312–8516938	AA	Cable 1306–8516764
H	TA 1301–9140126	R	Cable 1307–8516766	BB	Cable 1309–8516768
		S	Cable 1304–8516762	CC	Cable 1313–9136026
		T	Cable 1318–9158772	DD	Cable 1317–9158754

Figure 6. AF and power components test set group.

Hercules missile guidance set. The RF test set (B, fig 6) will also be used with the RF and pulse components test set group (fig 3). Therefore, these two test set groups (fig 3 and 6) must be placed adjacent to each other to permit cabling between the two test set groups. Tests made at this position include DC voltage and current measurements, DC amplifier output current measurements, resistance measurements, and command and fail safe circuit measurements.

b. **Electrical test set.** The electrical test set (C, fig 6) provides power supply circuits, resistive loads, and metering circuits used in making acceptance tests on units tested with the AF and power test set group. The electrical test set is composed of an electrical test panel and subassemblies, all housed within the electrical cabinet. All operating controls, meters, external adjustments, and fuses used while tests are being made are mounted on the sloping front of the test panel. A

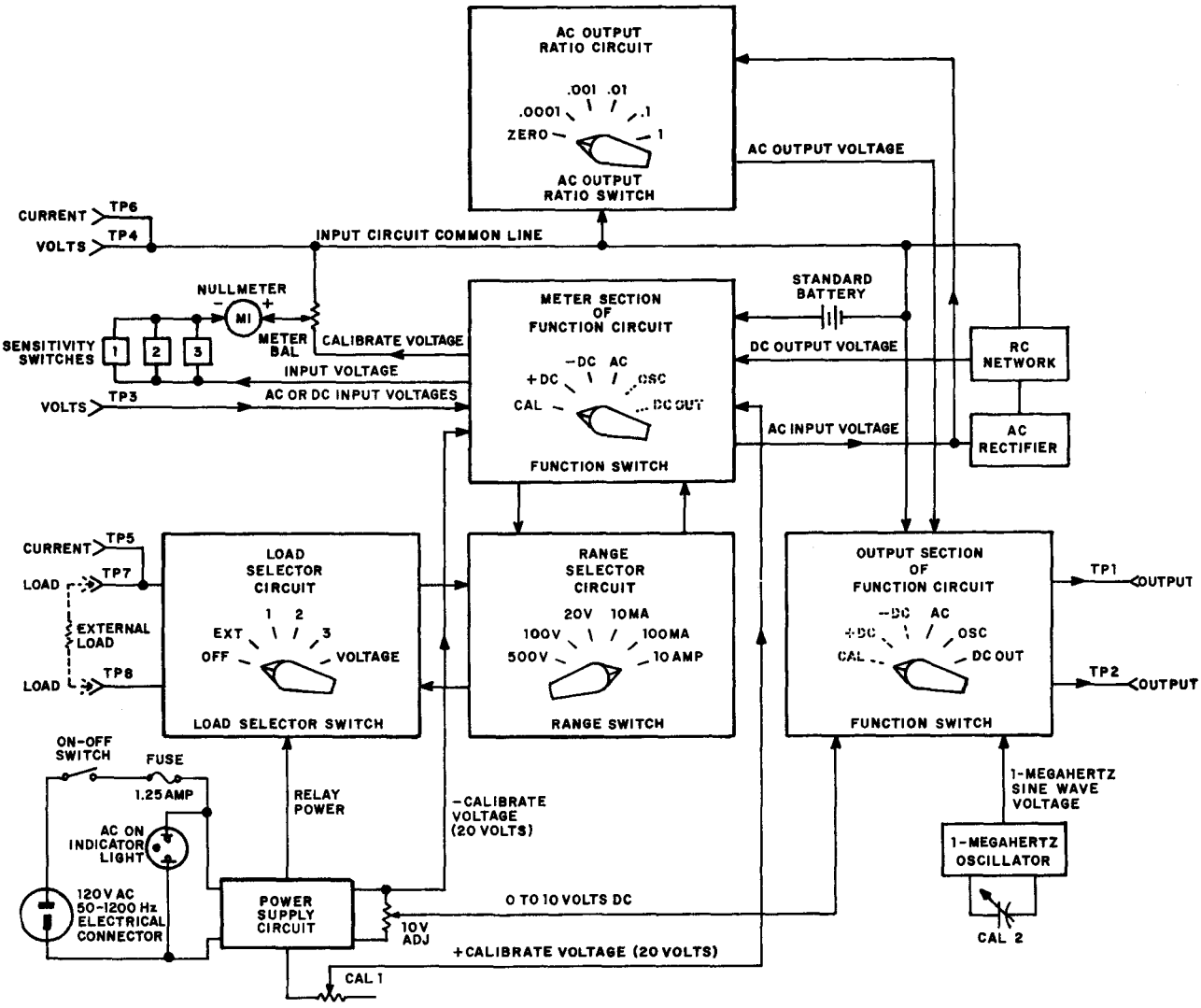


Figure 7. Electrical test set--block diagram.

work surface is provided by folding the door to the electrical equipment cabinet (fig 6) up into position. Located on the shelf are circuit connectors with associated test points which provide electrical connectors to units under test and test equipment.

c. Electrical test set (9005609).

(1) General. This test set (E, fig 6) is used to confirm the accuracy of high frequency sine waves, meters, and AC and DC power sources within the guidance set test equipment. A calibration team should calibrate this test set every 90 days. The instrument is then used by Nike support maintenance personnel to make regularly scheduled comparison checks to determine the accuracy of other test equipment and power supplies. The test set is also used in malfunction isolation. The test set contains a 1-megahertz crystal oscillator, which supplies a reference signal used in making frequency checks, and a standard battery, used to check the output of internal power supplies.

(2) Power supply circuit. A block diagram of the test set is shown in figure 7. The internal power supply operates from 120 volts AC, 50 Hz to 1.2 KHz. When the ON-OFF switch is closed, AC ON indicator light illuminates and power is applied to the power supply. The power supply produces relay power which is applied to the load selector circuit to condition relays for an external load. Another voltage produced is the 0 to 10 volt which is used to compare with the standard battery voltage. Finally, the power supply produces a 20-volt calibrate voltage which is applied to the function circuit.

(3) Calibration. Before each use, the

maintenance technician should check the standard battery to see that it was calibrated by a calibration team within the past 90 days. The voltage output of the standard battery is recorded on the battery by the calibration team and is normally near 10 volts. With the FUNCTION switch (fig 7) in the CAL position, the standard battery voltage is applied to one side of the null meter while the plus calibrate voltage is applied to the other side and CAL 1 variable resistor is adjusted for a zero reading on the null meter. This calibrates the test set.

(4) Meter circuit. Input voltages to be measured are applied to TP3 (fig 7), through the meter section of the FUNCTION switch, through three pushbutton SENSITIVITY switches, to one side of the null meter. Each of the three SENSITIVITY switches provides a different resistive input network to the meter and switch 3 gives maximum meter sensitivity. A calibrate voltage from the power supply is applied to the other side of the null meter through the meter BAL variable resistor. The meter BAL resistor contains a calibrated dial. This dial is adjusted until the meter is balanced (reads zero) and the voltage measured is determined from the dial setting.

(5) Range selector circuits. This circuit consists of a six-position switch (fig 7) and associated voltage dropping resistors. It functions along with the load selector to provide the correct circuit path to the null meter. When voltage is measured, the dropping resistors supply only a portion of the input to the meter. For current measurements, additional resistors are added into the circuits by the LOAD SELECTOR switch.

(6) Load selector circuit. The load selector circuit (fig 7) operates in conjunction with the range selector to provide the correct circuit path and resistive load for the selected current range. The current to be measured is applied to TP5 and TP6. Positions 1, 2, and 3 correspond to positions 10 ma, 100 ma, and 10 amp of the range selector which determines the maximum current that can be measured with the null meter. The VOLTAGE position is used when measuring voltage and EXT position is used for connecting an external current at TP7 and TP8. When placed to OFF, the switch breaks all voltage and current circuits to the null meter.

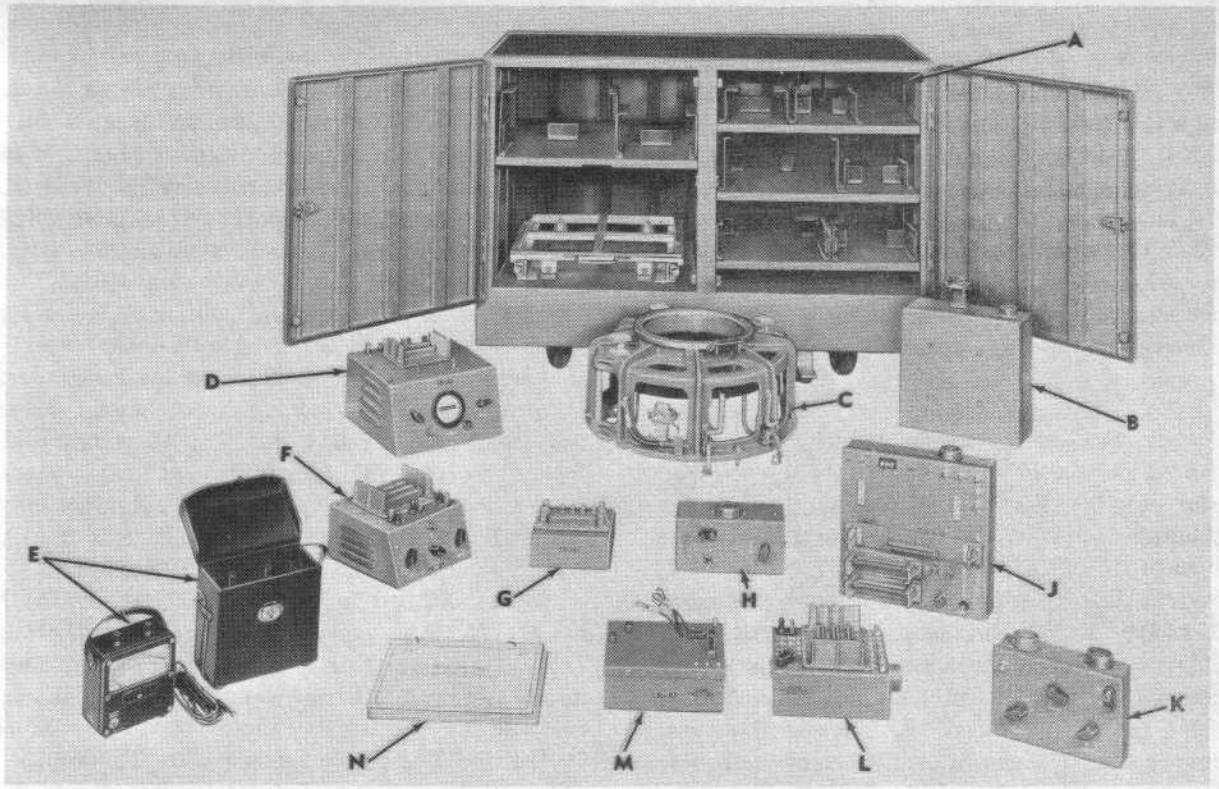
(7) Function circuit. This circuit is divided into a meter section and an output section. The meter section provides various connections to the null meter, while the output section provides output circuit connections to TP1 and TP2. In the CAL position, the standard battery and pulse calibrate voltages are applied to opposite sides of the null meter as described in c(3) above. The calibrate voltage polarity, fed to the null meter from the power supply, may be changed (plus or minus DC positions). This permits measurement of any polarity DC voltage applied between TP3 and TP4. The AC position of this switch applies the AC input voltage to a rectifier circuit. The rectified AC is filtered to a smooth DC voltage and applied through the SENSITIVITY switches to one side of the null meter. The plus or minus calibrate voltage is applied to the other side of the null meter and the meter BAL resistor is adjusted to null (zero) the meter. The effective value of the AC voltage is read from the meter BAL dial. The AC voltage is also applied to the AC output ratio circuit where a percentage of the AC is applied to the output section of the FUNCTION switch. This percentage of the AC voltage is present between TP1 and TP2 when the switch is in the AC position. The OSC position of the FUNCTION switch applies the 1-MHz sine wave between TP1 and TP2. The CAL 2 capacitor adjustment is used to calibrate the 1-MHz sine wave. The DC OUT position completes the circuit path from the 0- to 10-volt supply to TP1 and TP2 output binding posts. This voltage is adjustable from 0 to 10 volts by the 10-volt ADJ resistor.

d. Cables and test adapters. The various meters, cables, and test adapters listed in figures 1, 3, and 6 are used in making connections to the units being tested and the test equipment. Some of these are stored in the cabinet shown in figure 8.

5. OSCILLOSCOPE AND SPECTRUM ANALYZER.

a. General. The oscilloscope and spectrum analyzer electrical cabinet (fig 9) is not used to perform complete tests by itself but is used as supplementary equipment with any of the test set groups. The test set group consists of oscilloscope AN/USM-50A and spectrum analyzer TS-148/UP which are used to provide visual indications of outputs of the unit under test.

b. Oscilloscope. The oscilloscope (fig 9) is a general purpose broadband test instrument. It operates from a line voltage of 103 to 127 volts at a frequency of 50 to 1,000 Hertz. Signal input sensitivity without an attenuation probe is 10 millivolts per centimeter. Maximum signal input is 450 volts with the attenuation probe which has an attenuation ratio of 10 to 1. The nominal bandwidth is 5 Hz to 15 MHz; sine waves from 3 Hz to 20 MHz may be synchronized. A calibration dial, graduated from 10 to 100 millivolts, is used to measure amplitude. Time markers are supplied by a pulse forming assembly at 0.2, 1.5, 20, 100, 500, and



A	Storage cabinet–8514663	G	TA 1210–9136290
B	TA 1209–9137846	H	TA 1309–9158734
C	TA 1412–8514402	J	TA 1211–9137822
D	TA 1306–9158718	K	TA 1207–9137715
E	AC-DC voltmeter–9158763 (with case)	L	TA 1208–9137723
		M	TA 1212–9138106
F	TA 1307–9138008	N	Instruction cards

Figure 8. Storage cabinet and equipment.

2,000 microsecond intervals. The sweep time is continuously adjustable from 0.7 microseconds per centimeter to 0.015 second per centimeter in five bands. A jack is provided to supply an external sync for triggering the sweep. A built-in trigger provides +25-volt, 1.5-microsecond pulses with a rise time of 0.15 microsecond at a repetition rate of 10 Hz to 10 KHz.

c. **Spectrum analyzer.** The spectrum analyzer (fig 9) is a general purpose test set designed for testing the overall system performance of a radar system. It checks the frequency of signal generators, local oscillators, magnetrons, and transmit-receive (TR) and antitransmit-receive (ATR) boxes. In addition, it measures pulse width, radiofrequency spectrum width, and the quality (Q) of resonant cavities. All signals and spectrum measurements are displayed on a built-in 3-inch cathode-ray oscilloscope screen. The frequencies of the frequency meter and the signal generator are read directly from a calibrated dial.

6. **SUMMARY.** This lesson has presented a discussion of the test set groups which are used to troubleshoot and repair many of the components and assemblies taken from the missile or found in the launching area. These included the transponder control test set group which is used to determine the overall operation of the guidance set, the RF and pulse components test set group which is used to test and repair chassis or modules that are removable from the guidance set, the AF and power components test set which is also used to test chassis or modules from the guidance set. However, chassis tested at this test set operate in the DC to audio frequency range. Finally, this lesson discussed the oscilloscope and spectrum analyzer which supplements the test set groups and facilitates further analysis of operation of units tested at any of the test set groups.

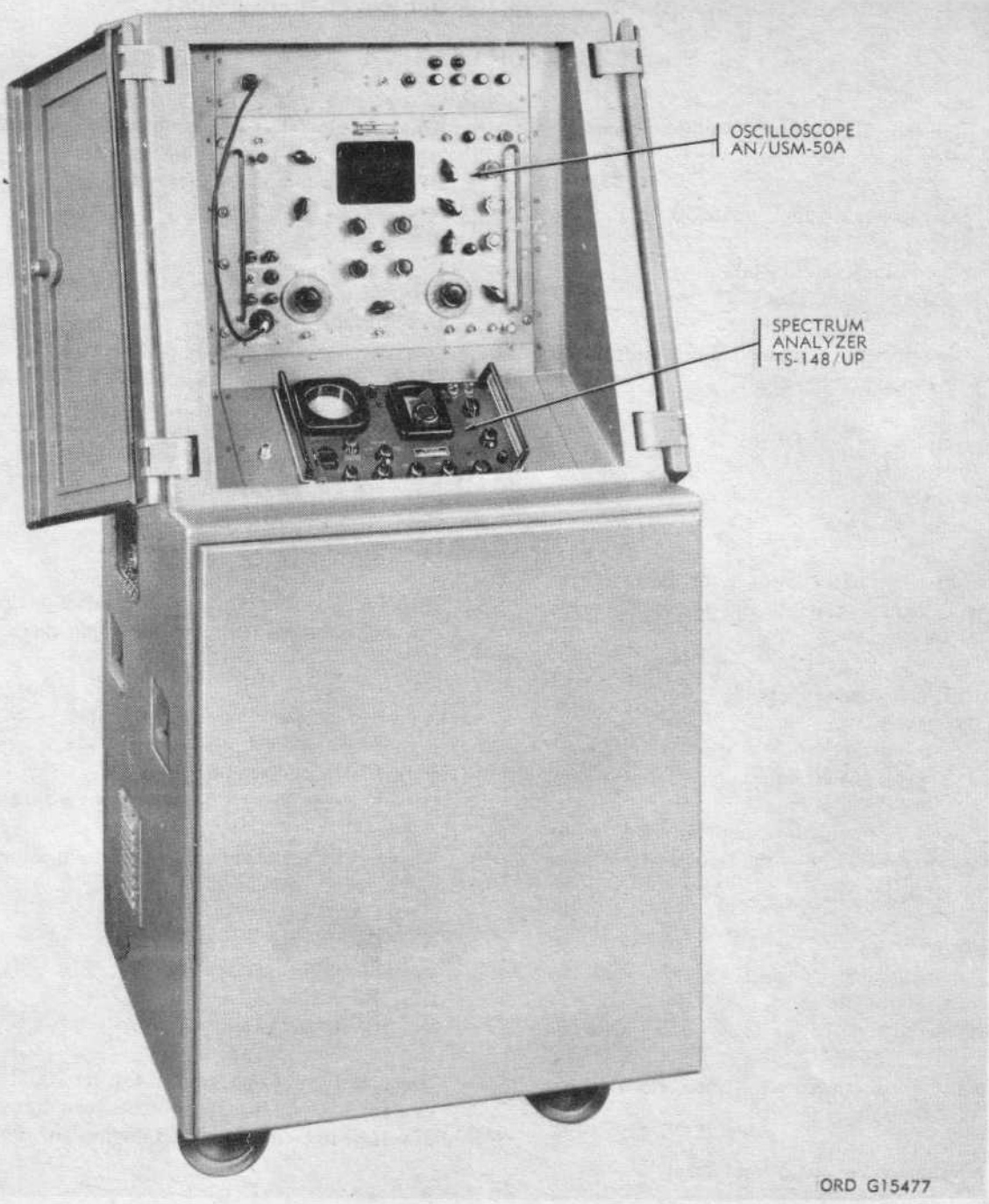


Figure 9. Oscilloscope and spectrum analyzer.

EXERCISES FOR LESSON 4

1. What furnishes external power to the guidance set during checkout?

   A. External power supply-8516630
   B. RF test set-9143471
   C. Electrical test set-9034602
   D. AF and power test set

2. How often does the microsecond oscillator in the RF test set require calibration?

   A. Monthly
   B. Bimonthly
   C. Weekly
   D. Before each use

3. What furnishes filament voltage for the circuits in the upper drawer of the RF and pulse components test set upper drawer?

   A. 300-volt power supply
   B. +240-volt power supply
   C. -60-volt power supply
   D. +150-volt power supply

4. What type of oscillator circuit is used in the microsecond oscillator of the transponder control test set group?

   A. Wein-bridge
   B. Free-running
   C. One-shot multivibrator
   D. Phantastron

5. What is the main purpose for which electrical test set 9005609 is used?

   A. Calibrate missile test equipment
   B. Isolate malfunctions
   C. Confirm accuracy of other test equipment
   D. Measure AC and DC voltage and current

6. Which voltage does the AC power supply in the RF and pulse components test set group upper drawer produce?

   A. 120 volt, 400 Hertz
   B. 120 volts, 1,700 Hertz
   C. 120 volts, 200 Hertz
   D. -28 volts, 1,700 Hertz

7. Which is a mode of operation used by the pulse generator in the lower equipment drawer of the RF and pulse components test set group?

   A. Auto sync
   B. Sync
   C. Monostable
   D. Bistable

8. Which is the attenuation ratio of the AN/USM-50A test probe?

   A. 1:1
   B. 4:1
   C. 5:1
   D. 10:1

9. What produces the positive and negative pitch and yaw pulses in the RF and pulse components test set?

   A. 0.25-microsecond pulse generator
   B. 5-microsecond pulse generator
   C. Variable delay pulse generator
   D. Variable delay and width pulse generator

10. What missile test equipment is used to measure the quality of resonant cavities?

    A. Oscilloscope
    B. Spectrum analyzer
    C. RF test set
    D. Electrical test set

11. Which test point on electrical test set 9005609 is used for a common connection between the source of voltage to be measured and the test set?

    A. TP7
    B. TP4
    C. TP3
    D. TP1

12. What is the maximum input to the AN/USM-50A oscilloscope using the test probe?

    A. 90 volts
    B. 100 volts
    C. 300 volts
    D. 450 volts

13. Which adapter is used for checking the vane axial fans from the flight simulator at the RF and pulse components test set group?

A. 1201
B. 1202
C. 1207
D. 1211

14. How is the relay assembly in the RF and pulse components test set group activated?

A. Run-down of the 5-minute timer
B. Load assembly toggle switch
C. ON-OFF switch
D. TEST-POWER switch

15. What part of the transponder control test set is used to determine if the missile guidance set is responding properly to the guidance commands?

A. Calibrator switch
B. Power supply
C. Response meter
D. Voltage amplifier

16. The start of the time base generated by the gating and switching pulse generator in the transponder control test set group is in coincidence with which coded pulse?

A. Pulse number 1
B. Pulse number 2
C. Pulse number 3
D. Burst pulse

17. What is used to transfer RF energy from the transponder control test set to the unit under test?

A. TA 11-3
B. Antenna coupler
C. Cable 1410
D. Waveguide assembly

18. What supplies the timing interval for the generation of the pitch and yaw command in the RF and pulse components test set group?

A. Coincidence detector
B. Spectrum analyzer
C. Electrical test set
D. RF test set

19. What in the transponder control test set group generates the pitch and yaw command gate?

A. P and Y pulse generator
B. Gating and switching pulse generator
C. Microsecond oscillator
D. Waveform converter

20. What is the maximum DC voltages, in volts, that can be measured with electrical test set 9005609?

A. 10
B. 20
C. 100
D. 500