

MIL-STD-1665
NOTICE 2
20 March 1980

MILITARY STANDARD
TEST EQUIPMENT FOR THE
STANDARD ELECTRONIC MODULES PROGRAM

TO ALL HOLDERS OF MIL-STD-1665:

1. THE FOLLOWING PAGES OF MIL-STD-1665 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
5	20 March 1980	5	20 March 1980
6	20 March 1980	6	20 March 1980
W04-1	20 January 1978	Reprinted without change	

2. The following pages are to be added:

NEW PAGE	DATE
B04-1 and B04-2	20 March 1980
M03-1 and M03-2	20 March 1980
S02-1	20 March 1980
W04-2	20 March 1980

3. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

4. Holders of MIL-STD-1665 will verify that additions indicated above have been entered. This notice page will be retained as a check sheet. This issuance, together with the appended pages is a separate publication. Each notice is to be retained by stocking points until the Military Standard is completely revised or canceled.

Custodians:
Navy - EC
Army - ER
Air Force - 11

Review activities:
Navy - AS, OS, SH
Army - AT, MI, AR
Air Force - 13, 17, 19, 85
DLA - ES

User activities:
Army - AR
Navy - MC
Air Force -

Preparing activity:
Navy - EC
Agent:
DLA - ES

(Project 5963-0004)

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20 March 1980ITEM 804
ANALYZER, WAVE

TYPE OF EQUIPMENT - - - - - Wave analyzer.

FUNCTION PERFORMED- - - - - Frequency selective voltage measurements. Amplitude of tuned signal indicated on analog meter. Tuned frequency indicated by 5 digit LED readout.

SPECIFICATIONS

Input characteristics

Impedance- - - - - 1 MΩ, 30 pF.

Maximum input level- - - - - 100 Vrms; ±100 Vdc.

Amplitude characteristics range

Linear - - - - - 30 Vrms to 0.1 μVrms full scale.

Log- - - - - +30 dBV/dBm to -70 dBV/dBm full scale.

Internal calibration- - - - - +1.5%, at full scale, 10 kHz.

Amplitude accuracy

	LOG	LINEAR
Frequency response 15 Hz to 50 kHz - - - - -	±0.4 dB	±4%
Switching between bandwidths - - - - -	±0.5 dB	±5%
Amplitude display- - - - -	±2 dB	±2%
Input attenuator - - - - -	±0.3 dB	±3%
Amplitude reference level (IF attenuator)		
Most sensitive range- - - - -	±1 dB	±10%
All other ranges- - - - -	±1 dB	±3%

Dynamic range

Display range- - - - - >80 dB.

Noise sidebands- - - - - >70 dB below CW signal 10 bandwidths away from signal.

Spurious responses - - - - - >80 dB for signals less than 0 dBm above 100 Hz.

Zero response- - - - - >30 dB below input reference level.

IF feedthrough

Input >10 V- - - - - -60 dB or lower.

Input <10 V- - - - - -70 dB or lower.

Frequency characteristics

Range- - - - - 15 Hz to 50 kHz.

Display accuracy - - - - - ±3 Hz.

Typical stability- - - - - ±10 Hz/hr after 1 hr; ±5 Hz/°C.

Bandwidths - - - - - 3, 10, 30 and 100 Hz with a shape factor of 10; 300 Hz with a shape factor of 8.

AFC pull-in range- - - - - >5X bandwidth for 3 Hz through 100 Hz bandwidth; >800 Hz for 300 Hz bandwidth.

AFC hold-in range- - - - - ±800 Hz.

AFC lock frequency - - - - - Center of passband ±1 Hz.

Sweep characteristics

Frequency span settings- - - - - 0 Hz, 50 Hz to 50 kHz.

Sweep time accuracy- - - - - ±5% of setting.

Sweep linearity- - - - - ±1%.

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Output characteristics (tracking oscillator)

Frequency response - - - - -	±3%, 15 Hz to 50 kHz.
Frequency accuracy - - - - -	±1 Hz relative to center of passband.
Impedance- - - - -	600Ω.
Level- - - - -	0 V to >1 Vrms into 600Ω.
THD and spurious content - - - - -	>40 dB below 1 V signal level.
Operating temperature range - - - - -	0° to 55°C.
Power requirements- - - - -	100, 120, 220 or 240 V +5%, -10%; 48 to 66 Hz; 10 watts typical.
Options - - - - -	Battery supply. Rack mount. X-Y recorder.

EQUIPMENT MEETING ALL SPECIFICATIONS

Manufacturer- - - - -	Hewlett Packard Model 3581A Wave Analyzer.
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MIL-STD-1665
20 March 1980ITEM M03
MULTIFUNCTION METER, ANALOG

TYPE OF EQUIPMENT - - - - - Analog multi-function meter.

FUNCTION PERFORMED- - - - - Measures dc voltage and current, resistance and charge.

SPECIFICATIONS

DC volts- - - - - 0.001 V full scale to 10 V in nine 1X and 3X ranges.

DC current- - - - - 10^{-14} A full scale to 0.3A in twenty eight 1X and 3X ranges.

DC resistance - - - - - 100 Ω full scale to $10^{13}\Omega$ in twenty three linear 1X and 3X ranges.

Coulombs - - - - - 10^{-13} coulomb full scale to 10^{-6} coulomb in fifteen 1X and 3X ranges.

Accuracy

DC volts - - - - - $\pm 1\%$ of full scale on all ranges exclusive of noise and drift.

DC current - - - - - $\pm 2\%$ of full scale on 0.3 to 10^{-11} A ranges using the smallest available multiplier setting; $\pm 4\%$ of full scale on 3×10^{-12} to 10^{-14} A ranges.

DC resistance- - - - - $\pm 3\%$ of full scale on 100 to $10^9\Omega$ ranges using the largest available multiplier setting; $\pm 5\%$ of full scale on 3×10^9 to $10^{13}\Omega$ ranges.

Coulombs - - - - - $\pm 5\%$ of full scale on all ranges. Drift due to offset current does not exceed 5×10^{-18} coulomb per second.

Meter noise

DC volts - - - - - ± 25 μ V maximum with input shorted on most sensitive range.

DC current - - - - - Less than $\pm 3 \times 10^{-15}$ A.

Input impedance - - - - - Greater than $10^{14}\Omega$ shunted by 20 pF. Input resistance may also be selected in decade steps from 10 to $10^{11}\Omega$.

Offset current- - - - - Less than 5×10^{-15} A.

Input voltage drop- - - - - Full scale voltage drop is equal to the multiplier switch setting. Best accuracy is obtained when the smallest multiplier switch setting possible is used.

Multiplier switch ranges - - - - -

(a)	10
(b)	3
(c)	1
(d)	0.3
(e)	0.1
(f)	0.03
(g)	0.01
(h)	0.003
(i)	0.001

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M03 - Continued

Polarity- - - - - Meter switch select left-zero (posi-
tive or negative) or center-zero
scales. Meter switch does not reverse
polarity of outputs.

Battery requirements- - - - - Six 2N6 (or 246, VS305, NEDA 1602);
One RM-1W (1000 hours battery life).

EQUIPMENT MEETING ALL SPECIFICATIONS

Manufacturer- - - - - Keithley Model 602.

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20 March 1980ITEM S02
WATTMETER, AC/DC

TYPE OF EQUIPMENT - - - - - AC/DC single phase electrodynamicometer.

FUNCTION PERFORMED- - - - - Measures single phase ac or dc power.

SPECIFICATIONS

Wattage

Range

Series configuration- - - - - 0.0 to 60 W.

Parallel configuration- - - - - 0.0 to 120 W.

Accuracy - - - - - ± 0.5 percent (in percentage of full scale).

Frequency- - - - - DC and 25 to 500 Hz.

Power factor - - - - - 20 percent to 100 percent.

Maximum current

Series fields- - - - - 1A.

Parallel fields- - - - - 2A.

EQUIPMENT MEETING ALL SPECIFICATIONS

Manufacturer- - - - - Singer (Sensitive Research) Model DLW.

MIL-STD-1665
20 January 1978ITEM W04
VOLTMETER, AC

TYPE OF EQUIPMENT - - - - - AC voltmeter.

FUNCTION PERFORMED- - - - - Broadband ac measurements (indicated rms voltage in proportional to absolute average value of applied sine wave).

SPECIFICATIONS

Voltage range - - - - - 1 mV to 300 V in 1, 3, 10 sequence (12 ranges).

Frequency range - - - - - 10 Hz to 10 MHz.

Accuracy- - - - - Over temperature range from 0° to +55°C.

1 mV range at full scale - - - - - ±1 percent from 40 Hz to 500 kHz; ±2 percent from 20 Hz to 1 MHz; ±4 percent from 2 Hz to 4 MHz; ±4 percent from 10 Hz to 10 MHz; ±10 percent from 10 Hz to 10 MHz.

1 mV range at 1/3 full scale - - - - - ±3 percent from 40 Hz to 200 kHz; +3,-5 percent from 20 Hz to 200 MHz; +3,-10 percent from 2 to 4 MHz; +4,-10 percent from 10 to 20 Hz.

3 mV to 300 V ranges at full scale - - - - - ±1 percent from 40 Hz to 1 MHz; ±2 percent from 20 Hz to 4 MHz; ±4 percent from 10 Hz to 10 MHz.

3 mV to 399 V ranges at 1/3 full scale- - - - - ±3 percent from 40 Hz to 200 kHz; +3,-5 percent from 20 Hz to 4 MHz; +4,-10 percent from 10 Hz to 10 MHz.

Isolation - - - - - Instrument may be battery-operated if isolation from power lines is desired.

Input impedance - - - - - 10 MΩ shunted by 21 pF on 1 mV to 1 V ranges; 10 MΩ shunted by 8 pF on 3 to 300 V ranges.

EQUIPMENT MEETING ALL SPECIFICATIONS

Manufacturer- - - - - Hewlett-Packard Model 400E*, Model 400 EL.

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EQUIPMENT MEETING SPECIFICATIONS WITH
EXCEPTIONS AS NOTED

Manufacturer- - - - - Ballantine Laboratories Inc.
Model 3046A.

Exceptions - - - - - Function performed - Broadband ac
measurements (responds to absolute
average value of applied signal),
primarily as a dB meter with both dB
and voltage scales.

Voltage range - 1 mV to 300 V, 100 μ V
to 300 V with X0.1 range multiplier.
1, 3, 10 sequence (12 ranges), 10 dB
between ranges.

Frequency range - Usable 2 Hz to 20
MHz, calibrated 5 Hz to 15 MHz.

1 mV range at full scale - $\pm 1\%$ from
40 Hz to 2 MHz; $\pm 2\%$ from 20 Hz; $\pm(2.0$
 $+2.0)$ from 10 Hz; $\pm(1.5+1.5)$ to
4 MHz; $\pm(2.5+2.5)$ to 10 MHz; $\pm(5+5)$
from 5 Hz to 15 MHz; $\pm(\%$ of reading +
 $\%$ of reading), all ranges.

Input impedance - 10 M Ω shunted by
<24 pF on 100 μ V to 300 mV ranges;
10 M Ω shunted by nominally 20 pF on
the 1 V to 300 V ranges.