

INCH-POUND

A-A-59951

13 May 2014

## COMMERCIAL ITEM DESCRIPTION

Calibrator, Oscilloscope, Upgradeable Workstation, 3 GHZ

The General Services Administration has authorized the use of this Commercial Item Description for all federal agencies

1. **SCOPE** This Commercial Item Description (CID) describes an Automated Upgradeable Oscilloscope Calibration Workstation with amplitude of up to  $\pm 200$  volts DC into a  $1M\Omega$  load with an accuracy of  $\pm 0.025\% \pm 25\mu V$  for oscilloscope test and calibrations. This CID is meant as a minimum requirement for an Oscilloscope Calibrator and only those manufacturers that meet or surpass the following requirements are to supply the oscilloscope calibrator per this CID.

2. **CLASSIFICATION.** The test set covered by this CID should be commercially available equipment that has factory installed options and/or may be modified to the extent necessary to meet the following. The test set is Class 3, in accordance with MIL-PRF-28800.

### 3. SALIENT CHARACTERISTICS

3.1. **Item Description.** These requirements describe an Automated Upgradeable Oscilloscope Calibration Workstation for oscilloscope test and calibrations with wide functionality.

3.2. **Frequency Range.** The Oscilloscope Calibrator shall be capable of operating at frequency range of 1 Hz to 3 GHz. This instrument shall be designed such that the range shall be upgradeable up to a minimum of 6 GHz with enhance parameters. This can be achieved with the use of an active head or adapter.

3.3. **Rise Time.** The Oscilloscope Calibrator shall have a rise time capability that is less than 150ps. It shall also have a selectable rise time between 150ps and 500ps with the use of capable active head or adapter.

3.4. **DC Voltage Operation**

Comments, suggestions, or questions on this document should be addressed to: WR-ALC, 404 SCMS/GUEEA, 235 BYRON ST STE 19A, Robins AFB GA 31098-1813. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

AMSC N/A

FSC 6625

DISTRIBUTION STATEMENT A. Approved for public release.

## A-A-59951

3.4.1. Amplitude. The Oscilloscope Calibrator shall have the capability of producing DC voltage from  $\pm 1\text{mV}$  to  $\pm 200\text{V}$  into a  $1\text{M}\Omega$  load and DC voltage from  $\pm 1\text{mV}$  to  $\pm 5\text{V}$  into a  $50\Omega$  load.

3.4.2. Accuracy. The Oscilloscope Calibrator shall have a DC voltage accuracy of  $\pm 0.025\% \pm 25\mu\text{V}$ .

3.4.3. Ranging. The Oscilloscope Calibrator shall have a DC voltage range in steps of 1, 2, 5 or 1, 2, 2.5, 4, 5 or continuous variable.

3.4.4. Deviation. The Oscilloscope Calibrator shall have variable amplitude deviation range of  $\pm 11.25\%$ .

### 3.5. Square Wave Parameters

3.5.1. Amplitude. The Oscilloscope Calibrator shall have the capability of producing square wave of amplitude range of  $40\mu\text{V}$  to  $200\text{Vpp}$  into a  $1\text{M}\Omega$  load and amplitude range of  $40\mu\text{V}$  to  $5\text{Vpp}$  into a  $50\Omega$  load.

3.5.2. Rise/Fall Time. The Oscilloscope Calibrator shall square wave shall rise/fall time as follows:

**Table 1**: Square wave Rise/Fall Time

<u>Voltage</u>	<u>Period</u>
$<100\text{Vpp}$	$<150\text{ns}$
$\geq 100\text{Vpp}$	$<200\text{ns}$

3.5.3. Aberrations. The Oscilloscope Calibrator shall have aberrations of less than 2% peak for first 500ns, less than 0.1% after 500ns and less than 0.01% after  $100\mu\text{s}$ .

3.5.4. Frequency. The Oscilloscope Calibrator shall have square wave frequency range of 10 Hz to 100 kHz at an accuracy of  $\pm 0.25$  ppm with the same ranging steps as the DC voltage in paragraph 3.4.3 above.

### 3.6. Low- Edge Parameters

3.6.1. Amplitude. The Oscilloscope Calibrator shall have a low-edge amplitude range of  $5\text{mV}$  to  $3\text{Vpp}$  into a  $50\Omega$  load with the same ranging steps as the DC voltage in paragraph 3.4.3 above.

3.6.2. Rise/Fall Time. The Oscilloscope Calibrator shall have a rise/fall time on the low-edge pulse of 500ps and fast rise pulse down to 25ps with polarity return to ground into a  $50\Omega$  load.

3.6.3. Frequency. The Oscilloscope Calibrator shall have low-edge frequency range of 10 Hz to 2 MHz at an accuracy of  $\pm 0.25$  ppm with the same ranging steps as the DC voltage in paragraph 3.4.3 above.

## A-A-59951

3.7. High-Edge Parameters

3.7.1. Amplitude. The Oscilloscope Calibrator shall have a high-edge amplitude range of 1V to 200Vpp into a 1M $\Omega$  load and 1V to 5Vpp into a 50 $\Omega$  load with the same ranging steps as the DC voltage in paragraph 3.4.3 above.

3.7.2. Rise/Fall Time. The Oscilloscope Calibrator shall have a rise/fall time on the high-edge pulse of less than 100Vpp for up to 150ns and greater than or equal 100Vpp for up to 200ns with polarity return to ground into a 1M $\Omega$  load.

3.7.3. Frequency. The Oscilloscope Calibrator shall have high-edge frequency range of 10 Hz to 100 kHz at an accuracy of  $\pm 0.25$  ppm with the same ranging steps as the DC voltage in paragraph 3.4.3 above.

3.8. Timing Markers

3.8.1. Timing Markers Style. The Oscilloscope Calibrator shall have Square/ Sine, Pulse and Narrow Triangle timing marker styles.

3.8.2. Square/ Sine wave Period. The Oscilloscope Calibrator shall have square wave period from 10ns to 55s and the sine shall be an extension of the square wave period from 450ps to 9ns.

3.8.3. Pulse Period. The Oscilloscope Calibrator shall have pulse period from 1ms to 55s with rise time and fall time be 1ns typical.

3.8.4. Narrow Triangle Period. The Oscilloscope Calibrator shall have narrow triangle period from 1ms to 55s with rise time and fall time be 1ns typical.

3.8.5. Amplitude. The Oscilloscope Calibrator shall have a timing markers amplitude range from 100mV to 1Vpp.

3.9. Leveled Sine Parameters

3.9.1. Frequency. The Oscilloscope Calibrator shall have frequency range of 1 Hz to 3 GHz and have the capability of expanding up to 6GHz with an appropriate adapter or active head.

3.9.2. Amplitude. The Oscilloscope Calibrator shall have a leveled sine wave amplitude range of 5mV to 5Vpp into a 50 $\Omega$  load.

3.9.3. Accuracy. The Oscilloscope Calibrator shall a leveled sine wave accuracy of  $\pm 1.5\%$  at a single reference frequency from 50 kHz to 10 MHz.

3.10. Dual Sine Parameters

## A-A-59951

3.10.1. Frequency. The Oscilloscope Calibrator shall have dual sine frequency range of 1 Hz to 3 GHz.

3.10.2. Time Alignment. The Oscilloscope Calibrator shall dual sine time alignment of  $\pm 25$ ps any channel to any channel.

3.11. Pulse Width Parameter

3.11.1. Pulse Width. The Oscilloscope Calibrator pulse width shall be 1ns to 100ns.

3.11.2. Frequency. The Oscilloscope Calibrator shall have a pulse width frequency from 1 kHz to 1 MHz.

3.11.3. Accuracy. The Oscilloscope Calibrator pulse shall have an accuracy of less than  $\pm 5\%$   $\pm 200$ ps.

3.11.4. Rise/Fall time. The Oscilloscope Calibrator pulse width shall have a rise/fall time of 450ps typical.

3.11.5. Amplitude. The Oscilloscope Calibrator pulse width shall have amplitude of 1Vpp into a 50 $\Omega$  load.

3.12. Impedance Measurement

3.12.1. Resistance Measurement. The Oscilloscope Calibrator shall be capable of resistance measurements from 10 $\Omega$  to 12M $\Omega$  loads.

3.12.2. Capacitance Measurement. The Oscilloscope Calibrator shall be capable of capacitance measurements from 1pF to 95pF loads.

3.13. Current Amplitude. The Oscilloscope Calibrator shall be capable of DC and square wave currents of amplitude from  $\pm 100\mu$ A to  $\pm 100$ mA.

3.14. Video Output. The Oscilloscope Calibrator shall have composite video output amplitude of 1Vpp.

3.15. Accessories. Accessories to be supplied by the manufacturer with each deliverable Oscilloscope Calibrator shall include but not limited to AC adapter (s), carrying case, user manual, and a traceable calibration certificate.

3.16. Interface. The Oscilloscope Calibrator shall be capable of interfacing with industry standard data interchangeable formats for files, format, storage, communication, plotting including but not limited to GPIB port compatible with IEEE 488.2, BNC connectors, SMA connectors, Parallel port, RS 232 compatible port.

3.17. Electrical Power Sources: The equipment power consumption of all components combined shall not exceed 400 watts. The Oscilloscope Calibrator shall operate from a nominal

## A-A-59951

commercial or military shipboard/ flight power source over the ranges: 120Vrms ( $\pm 10\%$  tolerance) at frequencies of 50 Hz, 60 Hz single-phase ( $\pm 5\%$  tolerance), and 220/240 Vrms at 50 Hz, 60 Hz single-phase as outlined in MIL-PRF-28800 paragraph 3.5.1.

3.18. Design and construction. The Oscilloscope Calibrator shall be design and constructed for commercial use and shall meet the definition of Commercial Off-The-Shelf (COTS) items in FAR 2.101 The Oscilloscope Calibrator shall be designed and constructed in accordance with all applicable European Union (EU) requirements in order to have the “CE” marking affixed, International Organization for Standardization (ISO), the International Electro-technical Commission (IEC), the International Telecommunication Union (ITU), Underwriters Laboratories (UL) and the American National Standards Institute (ANSI). It shall be designed and constructed so that no parts will work loose in service, and to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service.

3.19. Noise. The design shall ensure that noise created by the Oscilloscope Calibrator is compatible with the environment and minimize exposure of personnel to noise hazards during operations and maintenance activities.

3.20. Electrostatic Discharge (ESD). The design of the Oscilloscope Calibrator shall preclude equipment damage due to ESD, protect personnel from electrical shock due to static charging, and prevent ignition of explosive atmospheres due to sparking.

3.21. Operating Temperature Range. The Oscilloscope Calibrator shall meet the performance and accuracy requirements for operating temperature ranges 0 to 50 degree Celsius as outlined in class 3 of MIL-PRF-28800 paragraph 3.8.2.2.3 and Table 2.

3.22. Storage Temperature Range. The Oscilloscope Calibrator shall meet the performance and accuracy requirements for non-operating temperature ranges -40 to 71 degree Celsius as outlined in class 3 of MIL-PRF-28800 paragraph 3.8.2.1.2 and Table 2.

3.23. Humidity. The Oscilloscope Calibrator shall conform to the specified performance and accuracy for conditions where the relative humidity is 5 to 95  $\pm 5$  percent in the temperature range of 10 to 30 degrees Celsius, and it shall be subjected to conditions where the relative humidity is 5 to 75  $\pm 5$  percent in the temperature range of 30 to 40 degrees Celsius, and where the relative humidity is 5 to 45  $\pm 5$  percent in the temperature range above 40 degrees Celsius as outlined in class 3 of MIL-PRF-28800 paragraph 3.8.2.3 and 3.8.2.3.2

3.24. Altitude. The Oscilloscope Calibrator shall conform to the specified performance and accuracy requirements when operated at an altitude of up to 6500 ft. or 2000 meters as outlined in MIL-PRF- 28800 paragraph 3.8.3

3.25. Weight and dimensions. The Oscilloscope Calibrator dimension shall be suitable for use on a bench and able it fit in a standard rack in accordance with MIL-PRF-28800 paragraph 3.6.4.13 for rack mounting. Its weight including the front panel shall not exceed 40 lbs.

## A-A-59951

3.26. Calibration. The Oscilloscope Calibrator shall have a minimum of 12 months interval between calibrations that meets calibration interval requirements as outlined in MIL-PRF-28800 paragraph 3.12.

3.27. Reliability. The Oscilloscope Calibrator shall have a mean time between failures (MTBF) of at least 4,000 hours of operation with statistical certainty of 95% as outlined in MIL-PRF-28800 paragraph 3.13.

3.28. Preventive maintenance. The recommended routine preventive maintenance interval (PMI) shall be more than 15 minutes per a 30-day period. Preventive maintenance shall not require breaking of the equipment seams where calibration seals would normally be placed in accordance with MIL-PRF-28800 paragraph 3.14.2.

#### 4. REGULATORY REQUIREMENTS

4.1 Recycled Recovered Materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with 23.403 of the Federal Acquisition Regulation (FAR). However, used, rebuilt, or refurbished items shall not be provided.

4.2 Green Procurement Program. Green Procurement Program (GPP) is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable products and services. GPP requirements apply to all acquisitions using appropriated funds, including services and new requirements. FAR 23.404(b) applies and states the GPP requires 100% of EPA designated product purchase that are included in the Comprehensive Procurement Guidelines list that contains recovered materials, unless the item cannot be acquired: a) competitively within a reasonable timeframe; b) meet appropriate performance standards, or c) at a reasonable price. The prime contractor is responsible for ensuring that all subcontractors comply with this requirement.

#### 5. PRODUCT CONFORMANCE PROVISIONS

5.1 Verification. The end user at the item operational environment will perform verification of the delivered Oscilloscope Calibrator.

5.2 First Production inspection. The first production item shall be subjected to the analyses, demonstrations, examinations, and tests described in this CID.

6. PACKAGING For acquisition purposes, the packaging requirements shall be as specified in the contract or order. Each delivered Oscilloscope Calibrator shall have an identification plate permanently affixed in a readable location, which includes the identification information contained in MIL-PRF- 28800 paragraph 3.11.2. When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity

## A-A-59951

to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 7. NOTES

### 7.1 Source of Documents.

7.1.1 Military Specifications, Standards and Handbooks referenced herein may be obtained at <https://assist.dla.mil> or available from the Standardization Documents Order Desk, 700 Robbins Ave, Bldg. 4, Section D, Philadelphia, PA 19111-5094.

7.1.2 FAR. FAR may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh PA 15250-7954. Electronic copies of the FAR may be obtained from <https://www.acquisition.gov/far/>.

7.1.3 IEEE copies can be obtained online at [www.ieee.org](http://www.ieee.org) .

7.1.4 ISO documents can be obtained online at <http://www.iso.org> or from the International Organization for Standardization, ISO Central Secretariat, 1, ch de la Voie-Creuse, CP 56-CH-1211 Geneva 20, Switzerland.

7.1.5 IEC documents may be obtained at <http://www.eciaonline.org/default.aspx> or from Electronic Components Industry Association, 111 Alderman Drive, Suite 400, Alpharetta, GA 30005.

7.1.6 ITU copies can be obtained at <http://www.itu.int/en/Pages/default.aspx>.

7.1.7 Underwriters Laboratories (UL) copies may be obtained online at <http://ulstandardsinfont.com> or from: COMM 2000, 1414 Brook Drive, Downers Grove, IL 60515-5000.

7.1.8 ANSI/EIA standards may be obtained at <http://www.ansi.org> or <http://www.eia.org> or available from the Electronics Industry Association, Engineering Department, 2001 Pennsylvania Ave., N.W., Washington, D.C., 20006. Phone: 1-800-854-7179 (USA and Canada).

A-A-59951

7.2 Key Words.

Frequency  
Resistance Measurement  
Current Amplitude

Custodians:  
Air Force – 84

Preparing Activity:  
Air Force – 84

Reviewers:  
Air Force – 99

Agent:  
Air Force – 99

(Project 6625-2014-019)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil/> .