

INSTRUCTIONAL EQUIPMENT REQUEST 2016-2017

Internal Use

IE #: FALL 58

Total \$: 53,135.14

Requester Name: Keith Level

Division Name: MSEPS

SECTION 1: SUMMARY INFORMATION

Brief Title of the Request:

Tektronics Oscilloscopes / PLS 6.150D SS Laser Cutter

Equipment Location Building: 1800

Room: 1824

SECTION 2: EQUIPMENT DESCRIPTION

The equipment is: A Replacement An Upgrade New Equipment/Technology

Describe the specific equipment requested and how it will be used to replace, upgrade or provide new technology to LPC from what is currently in place:

The 12 oscilloscopes will be an upgrade from the oscilloscopes currently used in ENGR 44 (Intro to Circuit Analysis). The current oscilloscopes in the lab portion of this course are 10 years old. The number of students taking ENGR 44 has increased substantially in the past 3 years, and it is now time to upgrade the old oscilloscopes to the requested 12 new Tektronix oscilloscopes. Oscilloscopes are one of the fundamental pieces of test equipment used by electrical engineers, and are used in approximately 5 of the 12 overall lab assignments in ENGR 44.

The PLS 6.150D SS Universal laser system is a versatile tool used in manufacturing and prototyping; it consists of a laser platform and two CO2 laser sources. Laser cutting is a safe technology that uses a laser to cut materials, and is typically used for industrial manufacturing applications, and is starting to be used by schools to prepare students for its common use in industry and design. The Laser Cutter will be used to upgrade the newly formed "Maker Space", which currently has four 3D printers.

If applicable, describe the legal requirement, mandate, or safety concern for purchase of this equipment, making specific reference to the legal requirement or regulation:

Oscilloscopes: Same safety concerns as applies to other electronic equipment used in ENGR 44 laboratory assignments.

Laser Cutter:

Laser cutting works by directing the output of a high-power laser through an optical device. The laser optics and CNC (computer numerical control) are used to direct the material or the laser beam generated. The focused laser beam is directed at the material, which then either melts, burns, vaporizes away, or is blown away by a jet of gas, leaving an edge with a high-quality surface finish.

Typically, LASER cutters are classified by the American National Standards Institute (ANSI) as Class 1 LASERs. Class 1 LASERs emit low levels of energy that are not hazardous to the eyes or skin. However, enclosed within these devices are often Class 3B or 4 LASERs, which are capable of emitting high levels of energy, and are hazardous to the eyes and skin. Therefore, the beams generated by these devices are safe when operated according to manufacturer's instructions, only trained personnel should perform maintenance and other procedures that involve breaching the enclosure.

All users of LASER cutter systems should be trained as to its use and how to use it safely. In addition, written procedures should be present and reviewed by users prior to use. These procedures should include steps to take in the event of fire or other emergency.

SECTION 3: LPC MISSION STATEMENT AND LPC PLANNING PRIORITIES

LPC MISSION STATEMENT:

LPC is an inclusive learning-centered institution providing educational opportunities and support for completion of students' transfer, degree, basic skills, career-technical, and retraining goals.

LPC PLANNING PRIORITIES:

- ❖ Establish regular and ongoing processes to implement best practices to meet ACCJC standards.
- ❖ Provide necessary institutional support for curriculum development and maintenance.
- ❖ Develop processes to facilitate ongoing meaningful assessment of SLOs and integrate assessment of SLOs into college processes.
- ❖ Expand tutoring services to meet demand and support student success in Basic Skills, CTE, and Transfer courses.

Specify how the equipment supports *LPC's Mission Statement and Planning Priorities:*

The oscilloscopes, for use in ENGR 44, support the transfer goal in the LPC Mission Statement. Their purchase also reinforce the Planning Priority to maintain curriculum necessary in laboratory-based course for engineering transfer students.

The laser cutter will be used in the developing Maker Space and ENGR 22 (Engineering Design Graphics) course. The laser cutter can also be used in other engineering courses as part of new curriculum in the future. As stated above: Laser cutting is a professional standard in the areas of engineering design and manufacturing prototyping, and is used across the design world. It supports the Career-technical and transfer goals in LPC planning priority and mission statement.

SECTION 4: EDUCATIONAL ITEMS – PROGRAM REVIEW

Specify the educational programs this equipment supports:

The oscilloscopes will support the laboratory course which is part of ENGR 44 (Intro to Circuit Analysis). This course, a 2nd-year Engineering Transfer course, has now grown in enrollment to now offer two laboratory sections in the spring, and may potentially be expanded to be offered during Fall semester in the future.

The laser cutter is new technology, and will be used in both the Maker Space and in ENGR 22 to further students' understanding of design to manufacturing process. The laser system will be used in other engineering courses as part of new curriculum in the future and to further expand the development of a Maker Space.

If this equipment is included in your Program Review, please include the exact wording. If equipment is not included, explain why:

Exact wording in Program Review (Oct 2015)

Assessments in ENGR 44 indicate a continuing need for more directed coverage and direction in operating electrical circuits equipment, including oscilloscopes, power supplies, and digital multimeters. Some of this need for improvement may be addressed by reducing the size of the lab sections, which has been addressed for Spring 2016 semester by adding an additional lab section for ENGR 44.

Exact wording in Program Review update (Oct 2016):

Continuing to develop and grow the Makers Space
Continue to expand laboratory equipment for use in ENGR 44 and ENGR 46.

SECTION 5: TEACHING AND LEARNING

Describe in detail the impact this equipment will have on teaching:

The oscilloscopes in ENGR 44 will be explained and demonstrated to students, and will reinforce the connection between alternating current (AC) signals and the mathematics used to model them.

Laser cutting benefit to faculty and staff:

Faculty will be able to use the latest technology in the classroom to: teach at industry standards, quickly test ideas of their own (as the speed of cutting is dramatically faster than 3D-printing), and have a tool that engages student imagination.

Laboratory technicians would be able to use the laser cutter to produce new demonstrations and experiments for students with professional detail and quality. There are some designs and materials that are not possible with traditional cutting tools.

As an added benefit: Organization is important to education; the laser system could be used to engrave text for cataloging purposes (ie. Engrave the name of a component or serialized number), permanently mark tools for student use, or mark warning signs on equipment, etc.

Describe in detail the impact this equipment will have on learning:

The oscilloscopes in ENGR 44 will allow students to individually experience the setup, adjustment, and measurement of electrical signals in a variety of circuits.

The laser cutter and engraver will be used in a variety of projects including (but not limited to): the design and production of gears, sprockets, model car chassis, drone chassis, bridge design components, wheels, circuit board design, 2D design, and art projects. ENGR22 currently has access to 4 3D-printers; if a part, with intricate design, needs to be produced, it could take the 3D-printer as long as 6 hours or longer to produce; with a laser cutter the same part from similar material can be produced in minutes. Furthermore, the laser cutter will allow for testing and build projects with a wider range of materials, as the laser cutter is not constrained to one type of material like the 3D-printers.

Students in other Engineering courses could make parts in classroom-time, as opposed to, waiting hours for a part to be produced. Because the materials the laser system can cut are broad, ENGR 46 students can look at the different material properties encountered by the laser; ENGR 44 students may be able to make their own circuit boards; ENGR 35 students will be able to design components to make structures and test the strength of the design. Finally, laser systems are industry standard in engineering design, prototyping, manufacturing, and many other design industries. This equipment is used from textiles to aerospace design; exposure to this technology has become necessary for students to learn and become familiar with before they enter the work field.

Each academic year, this equipment will impact: 6 # of classes/sections 120 # of students

SECTION 6: OUTCOMES (SLOs)

Using your documented SLOs, specify how the equipment will enable student learning outcomes to be achieved?

Oscilloscopes will enable the following SLOs:

ENGR 44 SLO: Demonstrate the ability to analyze a 2nd-order RLC electrical circuit, including analysis of damping type and boundary conditions.

ENGR 44 SLO: Students will analyze and demonstrate understanding of the electrical behavior of first and second order DC circuits, using various circuit analysis techniques.

ENGR 44 SLO: While working in groups, utilize electronic equipment to physically measure and analyze electrical circuits.

Laser Cutter will enable the following SLOs:

ENGR 10 SLO: Design and demonstrate a solution, using the engineering design process, to an engineering design problem

What are the consequences related to learning outcomes if request is not funded?

Without upgrading the oscilloscopes, each student will have reduced exposure to learning how to use this fundamental piece of electronics test equipment. The learning outcome is difficult to measure should there be no upgrade to the oscilloscopes.

Without a laser cutter, it is also difficult to measure the learning outcomes, but many projects will be delayed or incomplete if every project requires several hours to complete.

SECTION 7: TOTAL COST OF OWNERSHIP (FINANCIAL & SUSTAINABILITY)

What is the potential life span of the requested equipment?

Oscilloscopes: about 10-15 year life span

Laser Cutter: about 15-20 year life span

If new storage is needed, describe the storage, location, and costs: (Specific storage costs should be detailed in the "Part A: Initial Start-up Costs" section below.)

Room 1824 will need to have 220V power rewired to the room. LPC Maintenance & Operations estimates the installation will be no more than \$1000.

What will be required to maintain the equipment, such as regular servicing or upkeep? (Specific on-going costs should be detailed in the "Part B: On-Going Annual Operating Costs" sections below as applicable.)

Once a year the air filters will have to be replaced. The funds will come from Engineering consumable funding.

Explain how this equipment meets or exceeds basic sustainability efforts and/or provides renewable resources to the college:

The laser cutter can take what would otherwise be trash (say scrapes of wood or metal) and reuse it in either in design or art.

Part A: Initial Start-up Costs

<u>Item</u>	<u>Cost</u>	<u>Comments</u>
Equipment or Materials	47,612.00	47,612.00
Taxes (9.5%)	4,523.14	4,523.14
Shipping or Delivery Charge	0.00	
Installation Costs *	0.00	
Miscellaneous Costs:		
Facilities Modifications	1,000.00	1,000.00
Operator Training	0.00	
Maintenance & Repair Training	0.00	
Other:	0.00	
Vendor Discount		
Grand Total:	53,135.10	52,135.14

Part B: On-Going Annual Operating Costs

<u>Item</u>	<u>Cost</u>	<u>Comments</u>
Annual Service or Maintenance	0.00	
Estimated Parts Replacement Per Year	100.00	
Outside Standardization or Calibration Costs	0.00	
Storage Costs	0.00	
New Supply Costs	0.00	
Miscellaneous Costs:	0.00	
Maintenance & Repair Labor		
Other:		
Annual Operating Costs:	100.00	

Indicate the source of funding for on-going annual operating costs:

Filter replacement coast will come from Engineering budget.

Part C: Incremental Labor Costs

OPERATOR:

Indicate the key operator: Andrew Lozano

Is this in their current scope of duties? Yes

Indicate cost to train key operator (include in Initial Start-up Costs above): Included in the price of equipment

Indicate amount of time per month key operator will use equipment: 20 hours

MAINTENANCE & REPAIRS:

Indicate the person performing maintenance and repairs: Andrew Lozano

Is this in their current scope of duties? Yes

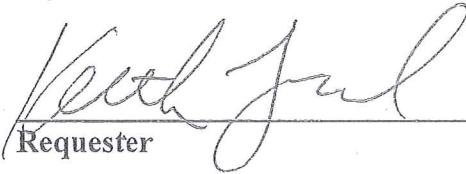
Indicate cost to train for maintenance and repairs: Included in the cost of equipment

Indicate amount of time per month maintenance will be required: Maintenance is regular cleaning after use

SECTION 8: APPROVALS

Funded requesters will be expected to respond to a brief RAC feedback survey by a requested deadline. Requests for computer-related equipment and printers must be reviewed by the LPC IT Department.


Signatures:


Requester

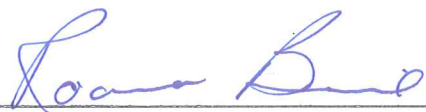
OCT 17 2016
Date

IT Department (if required)

Date

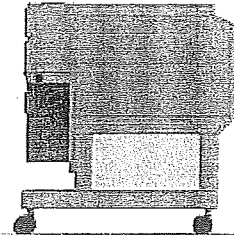
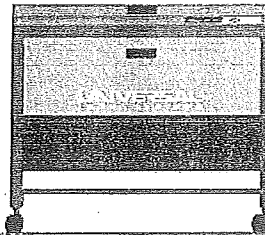
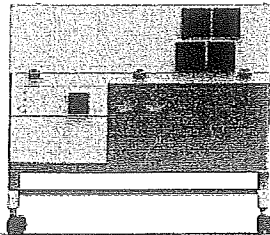
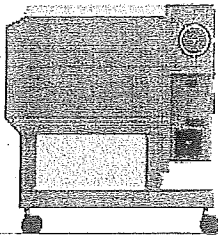
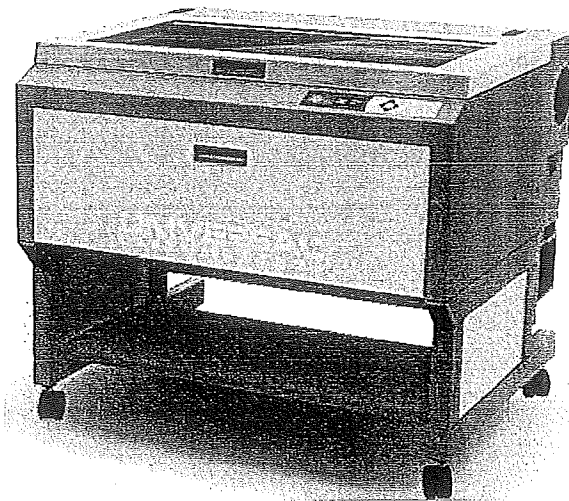

Dean/Manager

10-17-16
Date


Vice President

10/18/16
Date

PLS 6.150D SS



PRESENTED TO:
Andrew Lozano

Electro Imaging Systems
6553 Las Positas Road
Livermore, CA 94551
DUNS# 878518885 : CAGE # 3BMA1
Senior Laser Applications Consultant
Matthew Hudson 925-752-2711

Executive Summary



Uniquely Universal Features

Universal Laser Systems is an innovator in the field of laser engraving, laser cutting and laser marking equipment, and the laser material processing systems we manufacture are the products of decades of experience and a commitment to research and development. Our laser systems deliver everything you have come to expect from a high quality product—including excellent precision, performance and reliability—but they also offer several exclusive, Uniquely Universal features. These patented, proven laser processing innovations were designed to make laser processing more effective, productive and profitable. And you can only get them from Universal Laser Systems.

Laser Technology

Universal's laser systems are versatile manufacturing and prototyping tools that consist of a laser platform and one or more laser sources. The laser platform houses the system CPU, operating software, safety equipment, processing stage and the laser optics delivery system, a series of special mirrors and motors that directs the laser beam to the target location. The laser beam itself is generated by the laser source, which also includes an air-cooling apparatus and a red dot laser pointer for beam positioning.

High Power Density Focusing Optics (HPDFO)[™]:

The HPDFO option provides the smallest laser spot size available for CO₂ and fiber lasers. This provides very finely detailed marking and engraving, and can also be used for cutting on CO₂ systems. The small spot size also concentrates the laser beam to enable the only CO₂ laser process that can mark directly on steel, stainless steel and titanium without the need for metal marking compound.



About EIS

Since 1994, Electro Imaging Systems, Inc. has been providing businesses with superior office technology and service. We provide full service to a multitude of customers throughout the San Francisco Bay Area and across the United States. Whether you need a new copier, piece of technology, Laser equipment, or a complete managed technology solution let us show you that EIS can help you to achieve your business goals to save you a great deal of time, money, and headache.

About Universal Laser Systems

Universal Laser Systems has been advancing the application of modern CO2 laser technology since 1988. R&D efforts have resulted in numerous patents, with several pending, in our continual pursuit to develop and enhance laser systems that benefit the customer. Our R&D philosophy and execution is based upon designing highly modular platforms that can be easily configured with interchangeable laser power cartridges and field upgradeable system options. This robust system configuration capability, unique to Universal, gives customers the flexibility and investment protection to optimize laser systems as their business evolves.

Our solely owned, custom-built, state-of-the-art engineering and manufacturing facilities are located in Scottsdale, Arizona, where we manufacture both lasers and laser systems. Additional operating offices are located in Vienna, Austria and Yokohama, Japan to assist Universal Laser Systems customers and distributors. The Universal Laser Systems Global Factory Authorized Service network is on call around the globe for local system installation, service and maintenance. Our Applications Lab, dedicated to the continual advancement of laser material processing, has developed unique solutions for thousands of customers.

Universal's commitment for servicing customers has culminated in the industry's most comprehensive product line of laser engraving, marking, graphic imaging and cutting systems. As the leading provider of CO2 laser technology solutions, there is a Universal laser system installed in every country in the world with customers ranging from small, family-run operations to highly automated Global 2000 companies. Each customer shares a common thread – our systems help them make money and create additional business opportunities.

Whether you are a start-up company or an established business, we have the technology, people and experience necessary to help you develop and maintain a competitive advantage. No other company has a more comprehensive portfolio of R&D, systems, global service and material processing experience in CO2 laser equipment than Universal Laser Systems.

PLS6.150D
 32" x 18" Work Area

System Specifications

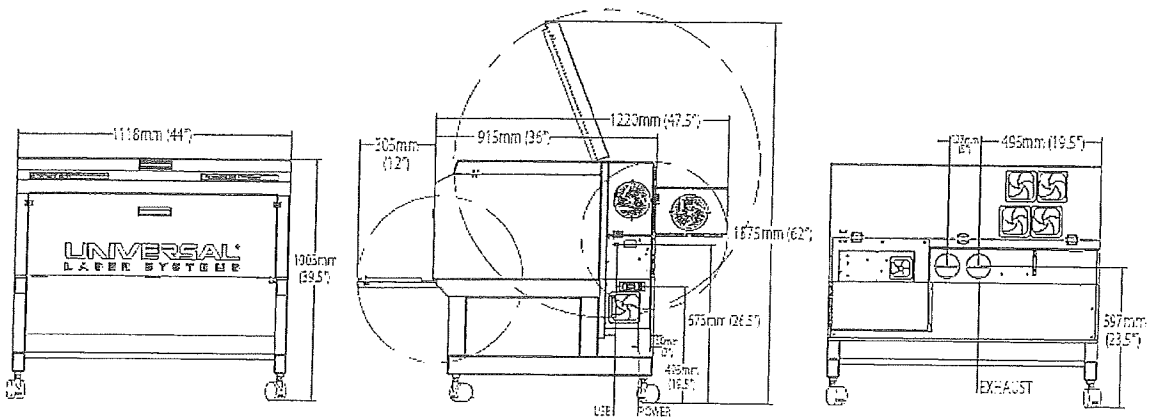
Work Surface Area	32 x 18 in (815 x 457mm)
Maximum Part Size	37 x 23 x 9 in (940 x 584 x 229mm)
Dimensions	44 x 39 x 36 in (1118 x 991 x 914 mm)
Rotary Capacity	Max Diameter 8 in (203 mm)
Motorized Z Axis Lifting Capacity	40 lbs (18 kg)
Available Focus Lenses CO2	1.5 in (38 mm) 2.0 in (51 mm) *standard 2.5 in (64 mm) 4.0 in (102 mm)
Laser Platform Interface Panel	Keypad and LCD display shows current file name, laser power, engraving speed, PPI, and run time.
Operating System Compatibility	Requires a dedicated PC to operate. Compatible with Windows XP/Vista/7 32/64 bit
PC Connection	USB 2.0
Optics Protection	Air Assist Available
Cabinet Style	Floor-Standing
Laser Options	10, 25, 30, 40, 50, 60 and 75 Watts equipped for two lasers - must be of equal power
Approximate Weight	345 lbs (156 kg)
Power Requirements	110V/10A or 220V-240V/15A
Exhaust Connection	Two 4 in (102 mm) ports 500 CFM @ 6 in static pressure (850 m ³ /hr at 1.5 kPa)

System Features

- Laminated Safety Glass
- Over-temp Alarm (for fire safety)
- Multiple Automatic Focusing Modes
- Precision Digital Motors
- LCD display
- Wraparound Top and Front Door
- Multiple Language Support
- Permanently Sealed Bearings
- Proportional Pulse Control
- Stretch-Free Keypads Belts

Laser Features

- Laser Fan Control (to reduce noise)
- Smart Lasers
- Laser Pointer
- Wide Selection of Power Levels
- Air-Cooled Laser Cartridge
- Patented Permaalign™
- No Optical Beam Alignment Required
- Patented Cross-Platform Compatibility
- Patented Free-Space Gas Slab Laser Design
- High Reliability, Excellent Power Stability
- Warranty Available Up To 5 Years



Pricing

Universal Laser Systems		Price
PLS6.150D Platform 220v	130-0103-00	\$19,252.00
75 Watt Tube	131-0248-00	\$6,836.00
75 Watt Tube	131-0248-00	Included
Extended Rotary	130-0104-00	\$2,000.00
Advantage IQ 1000 Filter	L0761-0003	\$5,107.00
Cutting Table	131-0027-00	\$1,000.00
Compressor	131-0805-01	\$3,000.00
Air Assist PLS6	131-0302-01	\$1,430.00
Dual Exhaust hose	SBHK-2524	\$252.00
Software		
1-Touch Laser Photo™ Software	010-0010-00-A	\$200.00
Direct Import Feature	010-0011-00-A	\$895.00
Coreldraw X7	B00IVFDZBC	\$300.00
Lenses		
Lens Kit 210 1.5	145-0091-00	\$398.00
Warranty, Installation & Training:		
Installation & Training Two Days		Included
Shipping		Included
Sub Total		\$40,670.00
Tax 9.75%		\$4,132.53
Total Package Price		\$44,635.32

System Features

- Laminated Safety Glass
- Over-temp Alarm (for fire safety)
- Multiple Automatic Focusing Modes
- Precision Digital Motors
- LCD display
- Wraparound Top and Front Door
- Multiple Language Support
- Permanently Sealed Bearings
- Proportional Pulse Control
- Stretch-Free Kevlar® Belts

Laser Features

- Laser Fan Control (to reduce noise)
- Smart Laser Source Technology
- Laser Pointer
- Patented Permalign™
- Patented Cross-Platform Compatibility
- Patented Free-Space Gas Slab Laser Design
- High Reliability, Excellent Power Stability

LAS POSITAS COLLEGE Equipment, Apparatus and Service Requisition

#R

TAX ID# _____

FOR OFFICE USE ONLY

SUGGESTED VENDOR **EIS Electro Imaging Systems**

RETURN COPY OF REQUISITION TO:
L. Cross, A. Lozano

NAME OF STAFF MEMBER **Andrew Lozano**

DATE WRITTEN **10/14/2016**

DATE REQUIRED **12/31/2016**

DIVISION/ DEPARTMENT **MSEPS**

ROOM # where equipment will reside: **1824**

DESCRIPTION	(PRODUCT, TYPE, SIZE, COLOR, STOCK NUMBER)	UNIT	QTY	UNIT PRICE	EXTENDED COST
Leaser Cutter and Engraver	PLS 6.150D SS Universal Laser Systems Inc. PLS 6.150D SS. See full quote attached for individual details on pricing		1	\$ 40,670.00	\$ 40,670.00

Vendor Information/ Remit To: **Deliver To, include room # (optional):**
Room 1824

Comments: **Instructional Equipment Request**
Please Contact Sales Rep: Matthew Hudson (925-752-2711) before purchase. Also, please let Andrew Lozano know when the requisition is approved via email.
Original invoices and receipts must be attached for payment. Include current taxes unless incorporated in price.

Subtotal	\$	40,670.00
Tax	\$	9.570
Shipping (if available):	\$	0.0975
	\$	3863.65
	\$	3,965.33
	\$	\$0.00

TOTAL COST	\$	44,635.33		
ACCOUNT #	FUND	ORG	ACCT	PROGRAM
APPROVALS	Supervisor/ Coordinator/ Director	Dean/ VP/ President	Business Office	

44533.65



CONTINENTAL RESOURCES, INC.

Phone: (310) 782-1522
Fax: (310) 782-1413

Continental Resources is a Small Business, Women Owned Company
CAGE Code: 2G127
NAICS Code: 334515

2377 Crenshaw Blvd., Suite 210
TORRANCE CA 90501-3347

QUOTATION

Las Positas College
3000 Campus Hill Drive
LIVERMORE CA 94551-7623
USA

ATTN: Andrew Lozano
alozano@laspositascollege.edu

Employee Resp:	Ken Barnard 80sales@conres.com
Fax#	
Sales Contact:	Hank Haight hhaight@conres.com
Fax#	

QUOTE NO. 20147907		QUOTE DATE 09/30/2016	CUSTOMER NO. 128827	SALES GROUP Torrance, CA	VALIDITY PERIOD 09/30/2016 - 12/30/2016	
ITEM	QTY	PRODUCT	DESCRIPTION		UNIT PRICE	AMOUNT
0010	12	TBS1072B	*** New Equipment Sale *** Digital Storage O'Scope, 70MHz 2CH 1GS/s		712.00	8,544.00
0020	12		Educational Discount *		133.50-	1,602.00-
			Total w/o Taxes, Freight, Ins.			6,942.00
			* Subject to manufacturer's terms and conditions.			

TERMS: Subject to Credit Approval and subject to credit review.

Above Sales Quotation is subjected to ConRes terms and conditions outlined at www.conres.com
Pricing subject to change. Delivery is conveyed F.O.B. shipping point. For Sale of Equipment, Title passes to Customer when payment is made in full and is received by ConRes. Title on all rental or leased equipment remains with Continental Resources Inc. and or Continental Leasing Co. Inc. Risk of loss is FOB shipping point. Payment of Freight Insurance modifies Risk of Loss to FOB destination. Taxes, Freight, and Insurance are not included in above quote. Return rights are restricted to vendor or manufacturers policy in existence at time of return. Third party leases must be identified before shipment and Lessor must be judged credit worthy by ConRes. All payments are in United States Dollars.

License and Maintenance Agreements: If customer agrees to purchase any items that carry a license or maintenance agreement and if invoice(s) for these product(s) is (are) not paid within approved credit terms. Continental Resources, Inc. reserves the right to and customer grants permission to revoke the agreement(s).

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See detailed terms and conditions at www.conres.com

