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Model 130D20

ICP microphone with integral preamplifier, 45mV/Pa, BNC connector.

Installation and Operating Manual

**For assistance with the operation of this product,
contact PCB Piezotronics, Inc.**

Toll-free: 800-828-8840
24-hour SensorLine: 716-684-0001
Fax: 716-684-0987
E-mail: info@pcb.com
Web: www.pcb.com





PCB PIEZOTRONICS INC.
A PCB GROUP COMPANY

Warranty, Service, Repair, and Return Policies and Instructions

The information contained in this document supersedes all similar information that may be found elsewhere in this manual.

Total Customer Satisfaction – PCB Piezotronics guarantees Total Customer Satisfaction. If, at any time, for any reason, you are not completely satisfied with any PCB product, PCB will repair, replace, or exchange it at no charge. You may also choose to have your purchase price refunded in lieu of the repair, replacement, or exchange of the product.

Service – Due to the sophisticated nature of the sensors and associated instrumentation provided by PCB Piezotronics, user servicing or repair is not recommended and, if attempted, may void the factory warranty. Routine maintenance, such as the cleaning of electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the physical material of construction, is acceptable. Caution should be observed to insure that liquids are not permitted to migrate into devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth and never submerged or have liquids poured upon them.

Repair – In the event that equipment becomes damaged or ceases to operate, arrangements should be made to return the equipment to PCB Piezotronics for repair. User servicing or repair is not recommended and, if attempted, may void the factory warranty.

Calibration – Routine calibration of sensors and associated instrumentation is recommended as this helps build confidence in measurement accuracy and acquired data. Equipment calibration cycles are typically established by the users own quality regimen. When in doubt about a calibration cycle, a good "rule of thumb" is to recalibrate on an annual basis. It is also good practice to recalibrate after exposure to any severe temperature extreme, shock, load, or other environmental influence, or prior to any critical test.

PCB Piezotronics maintains an ISO-9001 certified metrology laboratory and offers calibration services, which are accredited by A2LA to ISO/IEC 17025, with full traceablility to N.I.S.T. In addition to the normally supplied calibration, special testing is also available, such as: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For information on standard recalibration services or special testing, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment – *Following these procedures will insure that your returned materials are handled in the most expedient manner.* Before returning any equipment to PCB Piezotronics, contact your local distributor, sales representative, or factory customer service representative to obtain a Return

Materials Authorization (RMA) Number. This RMA number should be clearly marked on the outside of all package(s) and on the packing list(s) accompanying the shipment. A detailed account of the nature of the problem(s) being experienced with the equipment should also be included inside the package(s) containing any returned materials.

A Purchase Order, included with the returned materials, will expedite the turn-around of serviced equipment. It is recommended to include authorization on the Purchase Order for PCB to proceed with any repairs, as long as they do not exceed 50% of the replacement cost of the returned item(s). PCB will provide a price quotation or replacement recommendation for any item whose repair costs would exceed 50% of replacement cost, or any item that is not economically feasible to repair. For routine calibration services, the Purchase Order should include authorization to proceed and return at current pricing, which can be obtained from a factory customer service representative.

Warranty – All equipment and repair services provided by PCB Piezotronics, Inc. are covered by a limited warranty against defective material and workmanship for a period of one year from date of original purchase. Contact PCB for a complete statement of our warranty. Expendable items, such as batteries and mounting hardware, are not covered by warranty. Mechanical damage to equipment due to improper use is not covered by warranty. Electronic circuitry failure caused by the introduction of unregulated or improper excitation power or electrostatic discharge is not covered by warranty.

Contact Information – International customers should direct all inquiries to their local distributor or sales office. A complete list of distributors and offices can be found at www.pcb.com. Customers within the United States may contact their local sales representative or a factory customer service representative. A complete list of sales representatives can be found at www.pcb.com. Toll-free telephone numbers for a factory customer service representative, in the division responsible for this product, can be found on the title page at the front of this manual. Our ship to address and general contact numbers are:

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ECN: 17900

PCB PIEZOTRONICS INC
VIBRATION DIVISION

OPERATING GUIDE FOR 130 SERIES MICROPHONES

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130D21

130D20

Fig. 1

1.0 Introduction:

Congratulations on the purchase of a quality, ICP® Microphone. In order to ensure the highest level of performance for this product, we recommend that you follow the basic installation and operation procedures of the product. By following these procedures, along with utilizing this Microphone in conjunction with other PCB equipment (Signal Controllers, Power Supplies, Cables, Calibrators, etc...) you will ensure years of trouble free usage. If after reading this manual, you have additional questions concerning the microphone or its application, feel free to call a factory Application Engineer at 716-684-0001, or your nearest PCB Sales Representative.

2.0 Product Description:

The PCB 130 series of Array Microphones are prepolarized, condenser microphones coupled with ICP® sensor powered preamps and are thus referred to as ICP® microphones. The 130 series provide an extremely cost effective method for large channel count sound pressure measurements. This eliminates the purchase of a separate preamplifier. Typical applications include sound pressure mapping, acoustic mode analysis, near field acoustic holography, and vibro-acoustic testing, along with other applications.

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The 130D20 and 130D21 (Fig.1) are Array Microphones with integral preamplifiers. These Microphones are 1/4" diameter, with a dynamic range up to 122dB. The 130D21 unit has a 10-32 connector, while the 130D20 utilizes a BNC connector. The 130 series are Prepolarized. By utilizing a high temperature polymer material, which contains frozen electrical charges, applied to the top of the backplate, we are able to eliminate the need for external Polarization. This saves you money and time.

The 130 Series Array Microphones have the following Features:

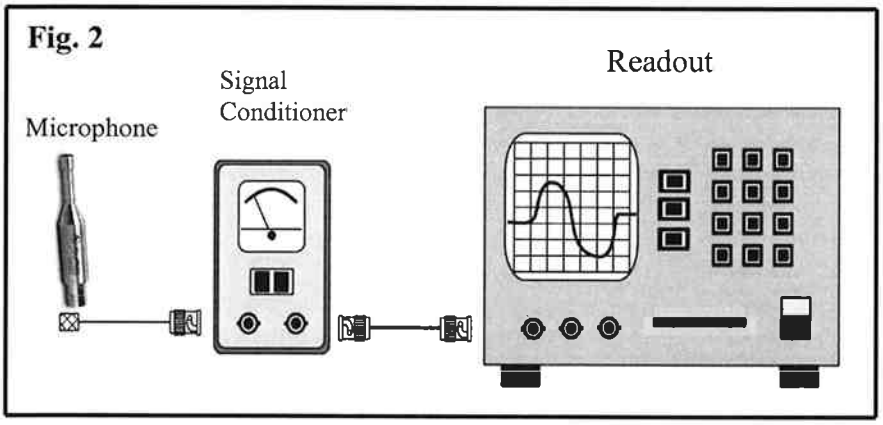
- Lower per Channel Cost
- Use ICP® Sensor Power
- Prepolarized
- Reduce Test Time
- Increase Data Consistency
- Integrate with Signal Conditioners
- Provide A-Weighting Option
- Provide for TEDS option

With an integrated ICP® preamplifier and Prepolarization, these units can be powered by simple inexpensive, constant-current Signal Conditioners. These units are easy to operate and interface with many standard signal analysis, data acquisition and recording instruments. They utilize low-impedance cable that can be driven long distances with very minimal signal loss.

A cost effective system can be obtained by combining the 130 series microphones with Modular Signal Conditioners that handle up to 16 channels per module. The 130 series is available with the Transducer Electronic Data Sheet (TEDS) option, compliant with IEEE P1451.4, and these Array Microphones are available with A-Weighting filter option. For additional Specifications or information on optional equipment, visit our website: www.pcb.com

3.0 Powering:
All ICP® powered microphones require the correct constant-current excitation for proper operation. For this reason, use only PCB constant-current signal conditioners or other approved constant-current sources. The signal conditioner consists of a regulated, 18-30 VDC source. The power is regulated by a current-limiting circuit, which provides the constant current excitation required for proper operation of the ICP microphone. In general, battery powered devices offer versatility for portable low-noise measurements, whereas line-powered units provide the capability for continuous monitoring. A typical system schematic is shown in FIG 2.

Fig. 2



Note: Under no circumstances should a voltage be supplied to an ICP® microphone without a current-regulating diode or equivalent electrical circuit. This may include ohmmeters, multi-meters and continuity testers. Damage to the built-in electronics resulting from the application of incorrect power, or the use of an unapproved power source is NOT covered under warranty.

Certain models of signal conditioners have Meters or LEDS, which enable users to monitor the bias voltage output signal, check microphone operation, and detect cable faults. Normally, a "yellow" reading indicates an open circuit (example...a cable disconnected); "green" indicates normal operation and a "red" reading indicates a short circuit (example: a shorted cable). The signal conditioner provides a zero-based, AC-coupled output signal that is compatible with most standard readout devices.

Today, many FFT analyzers, data acquisition modules, and data collectors have the proper constant-current excitation built-in for direct use with ICP® microphones. Before using this feature, check that the supply voltage and constant current are within acceptable limits for your use with your particular microphone. (Check enclosed **Specification Sheet**). Consult the Vibration Division's product catalog for more information about signal conditioners.

4.0 Installation and Operation:

There are numerous methods of supporting the microphone, from as simple as placing the microphone in a clip and taking measurements, to using a 2D array stand. This will be dictated by both application and budget. Once you have removed the microphone from the package and read the operating guide, attach the appropriate cable between the Signal Conditioner and the microphone. For the 130D20 series, this will be a standard coaxial cable with a BNC to BNC connector. The 130D21 has a smaller profile, and thus, requires a smaller cable connector on the microphone. For the 130D21, you would use a standard coaxial cable with a 10-32 connector on one end and a BNC on the opposite end. You will need to then attach a second cable to connect from the Signal Conditioner to your Readout device. This is a standard Coaxial cable with BNC connectors on each side. PCB offers the cables in a variety of lengths for any application.

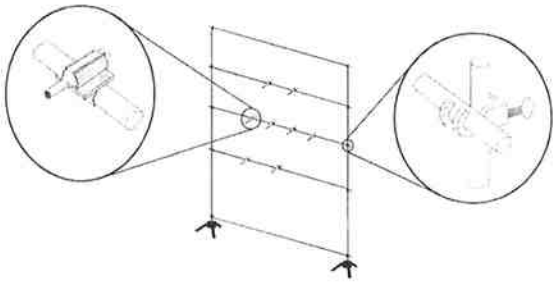


Fig. 3

When used in conjunction with a large number of signals, for simultaneous measurement, the microphones can be clipped onto a grid network to form a complete array. See Fig. 3

All of the 130 series Array Microphones are "Free-Field" type. This type of microphone is direction sensitive and should be pointed directly at the object that you are measuring. The "Free-Field" type of microphone is best suited for applications where the sound is coming from one defined direction, without any disturbing objects or hard surfaces that will reflect the sound or cause reverberation. After completing the system setup, switch the signal conditioner on and allow 1 to 2 minutes for the system to stabilize. The meter (or LRD) on the signal conditioner should be reading "green" (depending upon model, some use LED's.) This indicates proper operation and you may begin taking measurements. If a faulty condition is indicated (red or yellow reading), first check all system connections, then check the functionality of the cable and signal conditioner. If the system still does not operate properly, consult a PCB factory representative.

5.0 Calibration:
All of PCB microphones come with certificate of calibration and compliance with ISO 9001, and ANSI/NCSL Z540-1-1994. The microphone is traceable to N.I.S.T., and calibration records are on file. PCB utilizes the "Back-to-Back Reference" of calibration. The microphone is checked against a laboratory microphone and must meet specifications before it can be shipped. An example of one of the tests is shown below (Fig. 4.)

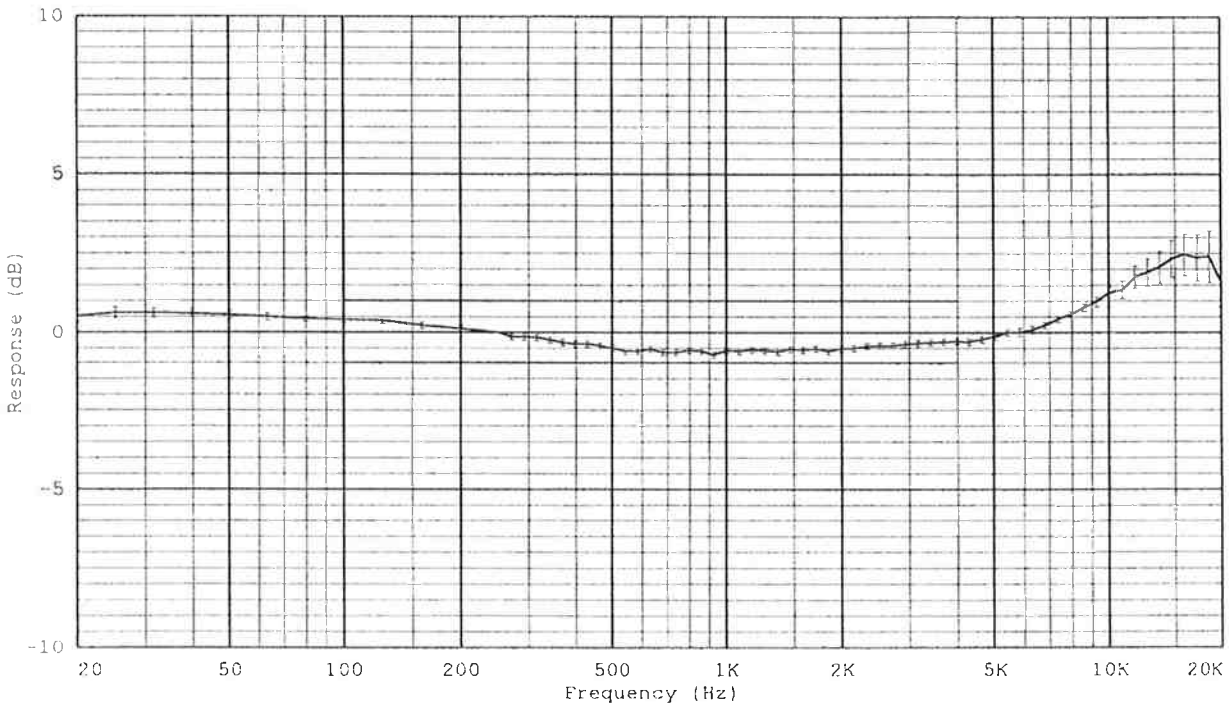


Fig. 4

Microphone calibration provides, with a definable degree of accuracy, the necessary link between the physical quantity being measured and the electrical signal generated by the microphone. In addition, other useful information concerning operational limits, physical parameters, electrical characteristics or environmental influences may be determined. Under normal conditions, microphones are very stable. However, the microphone may be temporarily or permanently affected by harsh influences, such as moisture, dirt, accidentally dropped or other unusual conditions that may cause the microphone accuracy to deviate from the normal specifications. This may manifest itself in a number of ways, ranging from a loss in frequency range, to total failure of the built-in microelectronic circuit due to high mechanical shock.

It is for this reason that PCB recommends that a recalibration cycle be established for each microphone. This schedule is unique and is based upon a variety of factors, such as: extent of use, environmental conditions, accuracy requirements, trend information obtained from previous calibration records, contractual regulations, and risk associated with incorrect readings. PCB recommends 12 to 24 month intervals, depending upon the above factors. Contact your PCB representative to schedule your recalibration of your microphone.

6.0 Service:
See the supplemental sheet, contained with this manual, for information on our service, repair and return policies, procedures and instructions. When unexpected problems arise, call our 24-Hour SensorLine℠ (716-684-0001) to discuss your immediate dynamic instrumentation needs with a factory representative.

7.0 Warranty:
All equipment and repair services provided by PCB Piezotronics, Inc. are covered by a limited warranty against defective material and workmanship for a period of one year. Contact PCB for a complete statement of our warranty.

PCB guarantees **Total Customer Satisfaction**. If, at any time, for any reason, you are completely satisfied with any PCB product, PCB will repair, replace, or exchange it at no charge. You may also choose within the warranty period to have your purchase price refunded.

PCB PIEZOTRONICS INC
VIBRATION DIVISION

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Fax: 716-6853886
Vibration Division toll-free: 888-684-0013

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Manual Number: 22327
Manual Revision: A
ECO#: 29456

VIB-130D Manual – 02-03
Printed in the U.S.A.

Model Number	ICP® ELECTRET ARRAY MICROPHONE	Revision: F
130D20		ECN #: 29545

Performance	ENGLISH	SI	
Nominal Microphone Diameter	1/4"	1/4"	
Frequency Response Characteristic(at 0° incidence)	Free-Field	Free-Field	
Frequency Response(± 1 dB)	100 to 4000 Hz	100 to 4000 Hz	
Frequency Response(-2 to 5 dB)	20 to 15,000 Hz	20 to 15,000 Hz	
Phase Match(100 Hz to 5 kHz)	± 5 °	± 5 °	[2]
Sensitivity(@ 1 kHz)	45 mV/Pa	45 mV/Pa	
Sensitivity(± 3 dB)(@ 1 kHz)	-26.9 dB re 1 V/Pa	-26.9 dB re 1 V/Pa	
Inherent Noise(1/3 Octave @ 1 kHz)	<15 dB	<15 dB	
Inherent Noise(Linear Spec. 100 Hz to 10 kHz)	<30 dB	<30 dB	
Dynamic Range(3% Distortion Limit)	>122 dB	>122 dB	
Environmental			
Temperature Range(Operating)	+14 to +122 °F	-10 to +50 °C	
Temperature Effect on Output(-10 to +50 °C)	<0.7 dB	<0.7 dB	
Electrical			
Excitation Voltage	18 to 30 VDC	18 to 30 VDC	
Constant Current Excitation	2 to 20 mA	2 to 20 mA	
Output Bias Voltage	5 to 12 VDC	5 to 12 VDC	
Output Impedance	70 ohm	70 ohm	[1]
Physical			
Housing Material	Stainless Steel	Stainless Steel	
Sealing	Epoxy	Epoxy	
Electrical Connector(Output)	BNC Jack	BNC Jack	
Size (Diameter x Length)(overall)	0.5 in x 2.67 in	12.7 mm x 67.8 mm	
Size (Diameter x Length)(head)	0.275 in x 0.25 in	7 mm x 6.35 mm	
Weight	0.66 oz	18.5 gm	[1]

CE [3]

All specifications are at room temperature unless otherwise specified.
In the interest of constant product improvement, we reserve the right to change specifications without notice.

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OPTIONAL VERSIONS

Optional versions have identical specifications and accessories as listed for the standard model except where noted below. More than one option may be used.

T - TEDS Capable of Digital Memory and Communication Compliant with IEEE P1451.4
TLD - TEDS Capable of Digital Memory and Communication Compliant with IEEE 1451.4

Output Bias Voltage	5.5 to 13 VDC	5.5 to 13 VDC

NOTES:
[1] Typical.
[2] ± 3° from 100 Hz to 3 kHz typical
[3] See PCB Declaration of Conformance PS023 for details.

SUPPLIED ACCESSORIES:
Model ACS-21 Calibration of Array Microphone (1)

Entered: BLS	Engineer: JE	Sales: MV	Approved: EB	Spec Number:
Date: 10-17-08	Date: 10-13-08	Date: 10-15-08	Date: 10-16-08	20970

PCB PIEZOTRONICS™
VIBRATION DIVISION
3425 Walden Avenue, Depew, NY 14043

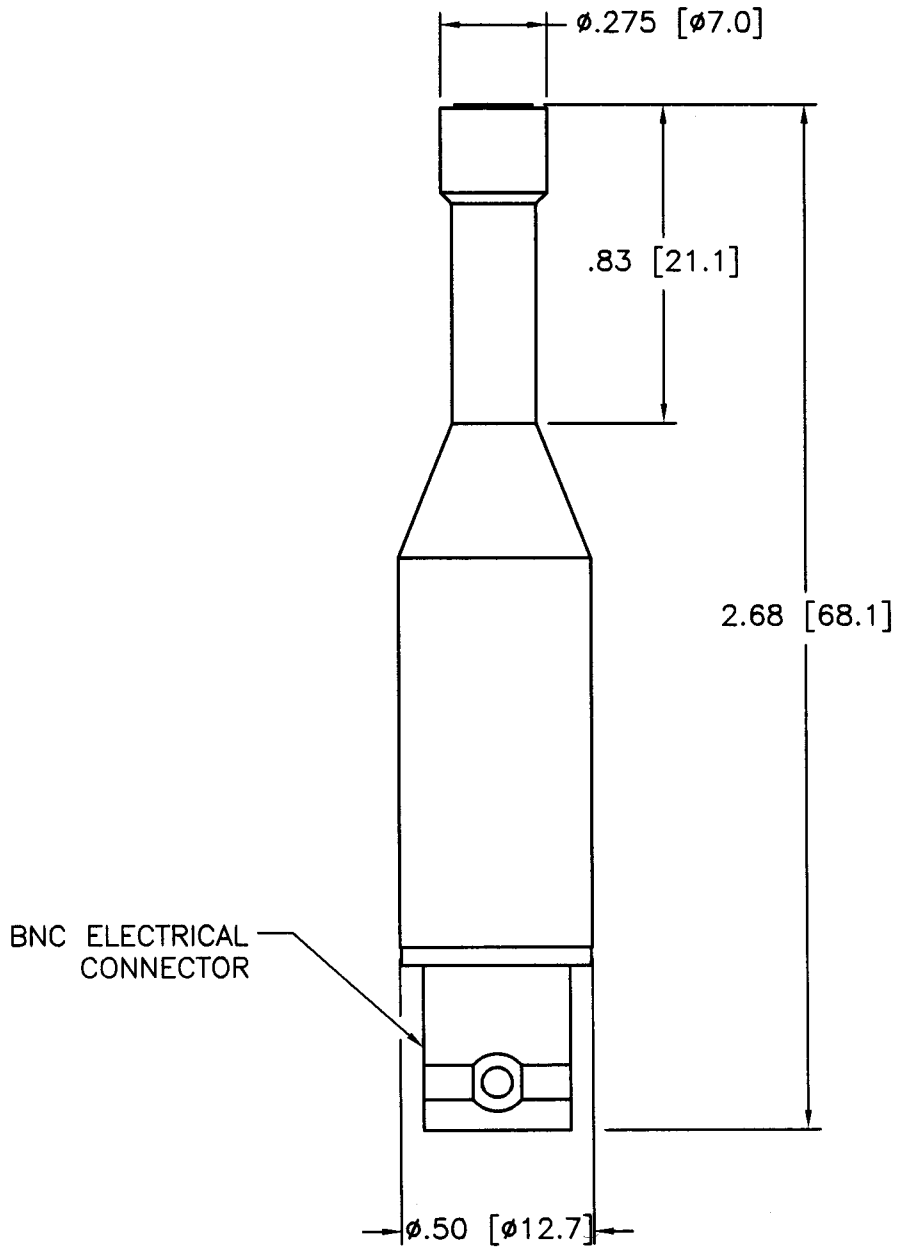
Phone: 716-684-0001
Fax: 716-685-3886
E-Mail: vibration@pcb.com

16829

APPLICATION		
NEXT ASS'Y	USED ON	VAR

REVISIONS				
REV	DESCRIPTION	ECN	DATE	APP'D
A	UPDATED DESIGN	15798	10/21/02	DM

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UNLESS SPECIFIED TOLERANCES	
DIMENSIONS IN INCHES DECIMALS XX ±.01 XXX ±.005 ANGLES ±2 DEGREES	DIMENSIONS IN MILLIMETERS [IN BRACKETS] DECIMALS XX ±0.3 XXX ±0.13 ANGLES ±2 DEGREES
FILLETS AND RADII .003 – .005	FILLETS AND RADII [0.07 – 0.13]
DD011 REV. B 03/13/98	

DRAWN	[signature]	10/25/02	MFG	AL	10/28/02
CHK'D	DM	10/25/02	ENGR	ABC	10/22/02
APP'D	[signature]	10/29/2	SALES	WJK	10/22/2

TITLE
OUTLINE DRAWING
MODEL 130D20
ICP MICROPHONE

PCB PIEZOTRONICS
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0001 EMAIL: SALES@PCB.COM

CODE IDENT. NO.	DWG. NO.
52681	16829

SCALE: 2X | SHEET 1 OF 1

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We're here to make your life easier. How can we help you today?

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