# DAKOTA ULTRASONICS

## Performance, Power & Perfection!

## The CMX Series

### Material & Coating Thickness Gauges

**Electronic Platform:**

- Powered by a 100MHz DSP platform using FPGA technology.
- Two Channels - Dual pulsers and receivers.
- Up to 140Hz pulse repetition rate.
- Display update rate of 25 times per second.
- Adjustable gain settings - vlow, low, med, hi, vhi.
- Automatic gain control (AGC).
- Time corrected gain (TCG).
- Massive data storage (32 Megabit of non-volatile RAM).

**Features:**

- Measurement modes: Pulse-Echo, Pulse-Echo w/Coating, Pulse-Echo w/Temperature Compen sation, Echo-Echo, Echo-Echo Verify & Coating Only.
- Automatic: probe zero, probe recognition, and temperature compensation.
- Stores up to 64 custom setups for specific applications.
- High Speed Scan of up to 50 readings per second.
- Audible/visual alarm with hi and lo limit settings.
- Built-in differential mode for QC inspetions.
- Time based B-Scan feature for cross section material scans.
- Data storage formats: Alpha numeric grid and sequential w/auto identifier.
- Windows PC software included.
- 2 year limited warranty.

# SOUND SOLUTIONS

# CMX & CMX DL SPECIFICATIONS

## Physical

**Size:**
Width (2.5in/63.5 mm)
Height (6.5 in/165 mm)
Depth (1.24 in/31.5 mm)

**Weight:** 13.5 ounces (with batteries).

**Keyboard:** Membrane switch pad with twelve tactile keys.

**Operating Temperature:**
14 to 140F (-10C to 60C)

**Case:** Extruded aluminum body with nickel-plated aluminum end caps (gasket sealed).

**Data Output:** Bi-directional RS232 serial port. Windows® PC interface software.

**Display:** 1/8in VGA grayscale display (240 x 160 pixels). Viewable area 2.4 x 1.8in (62 x 45.7mm). EL backlit (on/off/auto).

## Ultrasonic Specifications

**Measurement Modes:**

**Coating Off:** Pulse-Echo (P-E)

**Coating On:** Pulse-Echo Coating (PECT)

**Temp Comp:** Pulse-Echo Temperature Compensation (PETP)

**Thru-Paint:** Echo-Echo (E-E)

**Thru-Paint Verify:** Echo-Echo Verify (E-EV)

**Coating Only:** Coating (CT)

**Pulser:** Dual square wave pulsers.

**Receiver:** Dual receivers - manual or AGC gain control with 110dB range (limited).

**Timing:** Precision 25 MHz TCXO with single shot 100 MHz 8 bit ultra low power digitizer.

## Power Source

Three 1.5V alkaline or 1.2V NiCad AA cells.

Typically operates for 35 hours on alkaline and 10 hours on NiCad (charger not included).

Auto power off if idle 5 minutes.

Battery status icon.

## Transducer

Transducer Types:

Dual Element (1 to 10 MHz).

Locking quick disconnect "00" LEMO connectors.

Standard 4 foot cable.

Custom transducers and cable lengths available for special applications.

## Measuring

**Pulse-Echo Mode (P-E) -** (Pit & Flaw Detection) measures from 0.025 to 19.999 inches (0.63 to 508 millimeters).

**Pulse-Echo Coating Mode (PECT) -** (Material, Coating, Pit & Flaw Detection); Material: 0.025 to 19.999 inches (0.63 to 508 millimeters). Coating: 0.001 to 0.100 inches (0.01 to 2.54 millimeters).

**Pulse-Echo Temp Comp Mode (PETP) -** (Pit & Flaw Detection) Auto temperature compensation - measures from 0.025 to 19.999 inches (0.63 to 508 millimeters).

**Echo-Echo Mode (E-E) -** (Thru Paint & Coatings) measures from 0.100 to 4.0 inches (2.54 to 102 millimeters). Range will vary +/- depending on the coating.

**Echo-Echo Verify Mode (E-EV) -** (Thru Paint & Coatings) measures from 0.100 to 1.0 inches (2.54 to 102 millimeters). Range will vary +/- depending on the coating.

**Coating Only Mode (CT) -** (Coating Thickness) Measures from 0.0005 to 0.100 inches (0.0127 to 2.54 millimeters). Range will vary +/- depending on the coating.

**Resolution:**

+/- 0.001 inches (0.01 mm)

**Velocity Range:**

0.0492 to 0.5510 inches/µs
1250 to 13995 meters/sec

Single and Two point calibration option for material & coating, or selection of basic material types.

**Units:**

English & Metric

## Display

**Large Digits -** Standard thickness view. Digit Height: 0.700 inches (17.78 millimeters).

**B-Scan -** Time based cross section view. Display speed of 15 secs per screen.

**Scan Bar Thickness -** 6 readings per second. Viewable in B-Scan and Large Digit views.

**Repeatability Bar Graph -** Bar graph indicates stability of reading.

**Feature Status Bar -** Indicates features currently active.

## Memory (CMX DL)

**Log Formats:**

Grid (alpha numeric)

Sequential (auto identifier)

**Cell contents:**

**Graphics On:** 16,000 readings ,BScan image, & gauge settings for every reading.

**Graphics Off:** 210,000 readings (coating, material, min & max).

**OBSTRUCT** to indicate inaccessible locations.

**Memory:**

32 megabit non-volatile ram.

## Connections

**Output:** RS232 serial interface. PC software & USB converter cable included.

**Transducer Connectors:** Two LEMO 00 connectors.

## Certification

Factory calibration traceable to NIST & MIL-STD-45662A.

## Warranty

2 year limited

CE approved

## MADE IN THE USA

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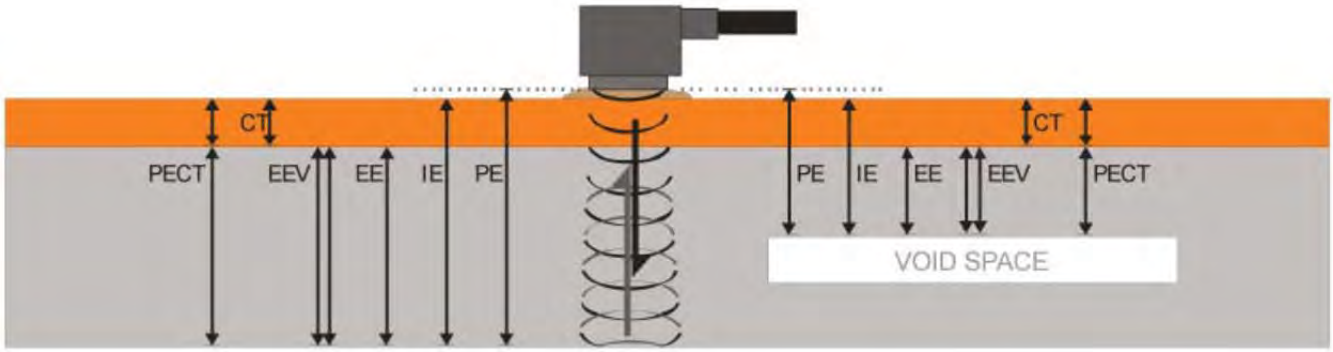
## DAKOTA CMX
## Measuring Modes





**Pulse - Echo Mode (PE)**
The normal display mode, measures the total thickness from the base of the transducer probe to the material density boundary (typically the back wall). Ideal for pit and flaw detection.


**Pulse - Echo Temp Comp Mode (PETP):**
Similar to the PE mode, PETP takes into account and compensates for the variations in measurement caused by temperature variations.


**Echo - Echo Mode (EE):**
Also known as the ThruPaint™ Mode, EE ignores the coating thickness, displaying the material thickness from the top surface of the material to the material density boundary.


**Echo - Echo Verify Mode (EEV):**
The echo-echo verify mode measures by comparing the values between 3 reflections and is mainly used to eliminate errors from surface coatings and to make measurements in multiple layered materials.


**Coating Only Mode (CT):**
Displays the thickness of the coating applied to the material.


**Pulse - Echo Coating Mode (PECT):**
Displays both the material thickness (PE) and the coating thickness (CT) at the same time.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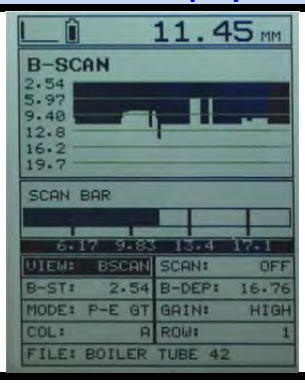
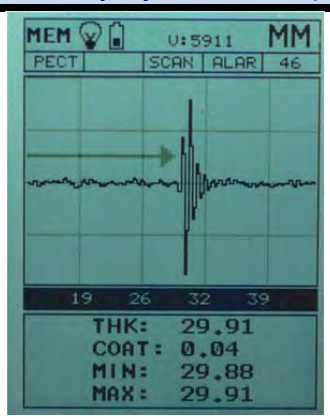
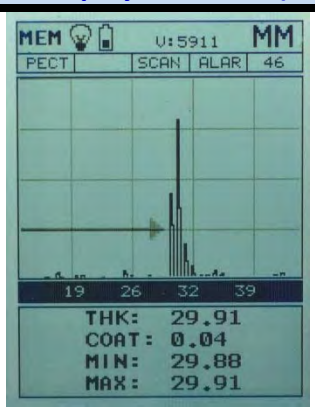
## DAKOTA CMX
## Measuring Modes
## Display Modes Explained

| Thickness Digits Display: | Scan Bar Display: | B-Scan Display: |
|---|---|---|
|  |  |  |
| The standard display on all models, this displays the numerical thickness value in either millimetres (MM)or inches (IN). | A linear graphic display which allows users to graphically monitor changes in thickness readings. As the scale range can be adjusted by the user, this display is ideal for observing tiny variations in material thicknesses. | A time based cross sectional 2D block view of the thickness provides a graphical view of the material thickness - ideal for relative depth analysis. |
| **A-Scan Display; Full Wave (RF):** | **A-Scan Display; Rectified (+ or -):** | |
|  |  |  |
| The A-Scan display shows the sine wave created by the reflected sound, or oscillation, from the material being measured. In RF mode the full wave form is displayed. | Users can select to view either the positive or the negative cycle of the full waveform (RF). This rectified(RECT) display shows the amplitude of the echo versus the transit time. | |

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