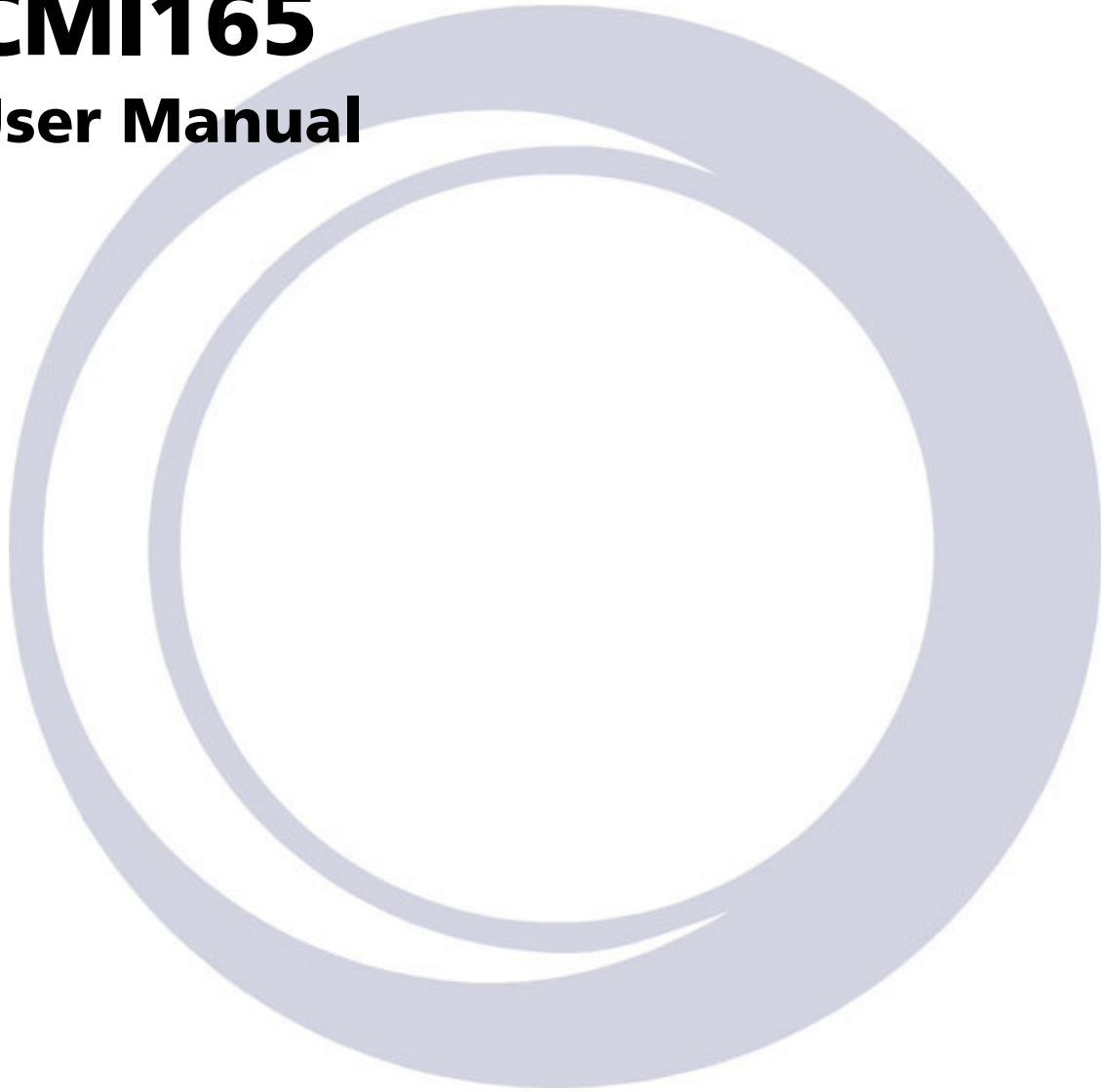

CMI165

User Manual



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INTRODUCTION

PURPOSE OF EQUIPMENT

The CMI165 is a non-destructive thickness tester. It is designed to precisely measure electrodeposited and electroless copper types, and fine line traces. The instrument has an operator replaceable probe tip with automatic temperature compensation, to ensure accurate measurements at any temperature.

ELECTRICAL SUPPLY

Each CMI165 operates on two AA alkaline batteries. The batteries should be replaced when the battery symbol in the display is not shaded.

COMMUNICATIONS OPTION

A USB connector is provided on each gauge for connection to a PC. To upload data to a PC, the Communications Option must be installed. The Communications Option package contains a USB cable, and a CD with USB drivers, communications software and installation instructions.

LOCATION OF EQUIPMENT

The CMI165 is a hand-held thickness gauge designed to be used in a shop environment.

GETTING STARTED

UNPACKING

Carefully open the shipping carton and remove all items. Notify Oxford Instruments and/or the carrier immediately in case of any damage to the unit.

POWER UP

Place the gauge on a copper surface or press any button.

MEASURING

Place the gauge on a copper surface and the measured thickness will be displayed. Press the left button to return to the menu.

OPERATOR KEYSTROKES

All paths, e.g. Settings/Display/Backlight/Yes or No, start from the Main menu. Refer to ILL 1 for a map of the menu structure.

TURN ON

Press any button or place gauge on a copper surface.

TURN OFF

Press and hold the center button.

TURN BACKLIGHT ON/OFF

Press and hold the Left button or select Settings/Display/Backlight/Yes or No.

SELECT MENU ITEM

Scroll to the item by pressing the Up and Down buttons and press the Center or Right buttons to select the item.

GO BACK TO PREVIOUS MENU

Press the Left button.

CHANGE UNITS

Select Settings/Measure/Parameters/Units/mil, um, or oz.

CHANGE MEMORY LOCATION

Select Memory/Location. Enter a number (1 to 99) by pressing the Up/Down buttons to increment/decrement a digit, and the Right/Left buttons to go to the next/previous digit. Press the Right button from the right-most position to complete the entry.

CHANGE CU TYPE

Select Settings/Measure/Parameters/Cu Type/Cu (electrodeposited copper) or ECu (electroless copper).

VIEW STATISTICS

Select Stats/View. Press the Up and Down buttons to scroll through the list and the Left button to return to the menu.

CLEAR STATISTICS

Select Stats/Clear/Clear Stats.

CLEAR LAST READING FROM STATISTICS

Press and hold the Down button after taking a measurement.

DISPLAY LAST READING FROM MENU

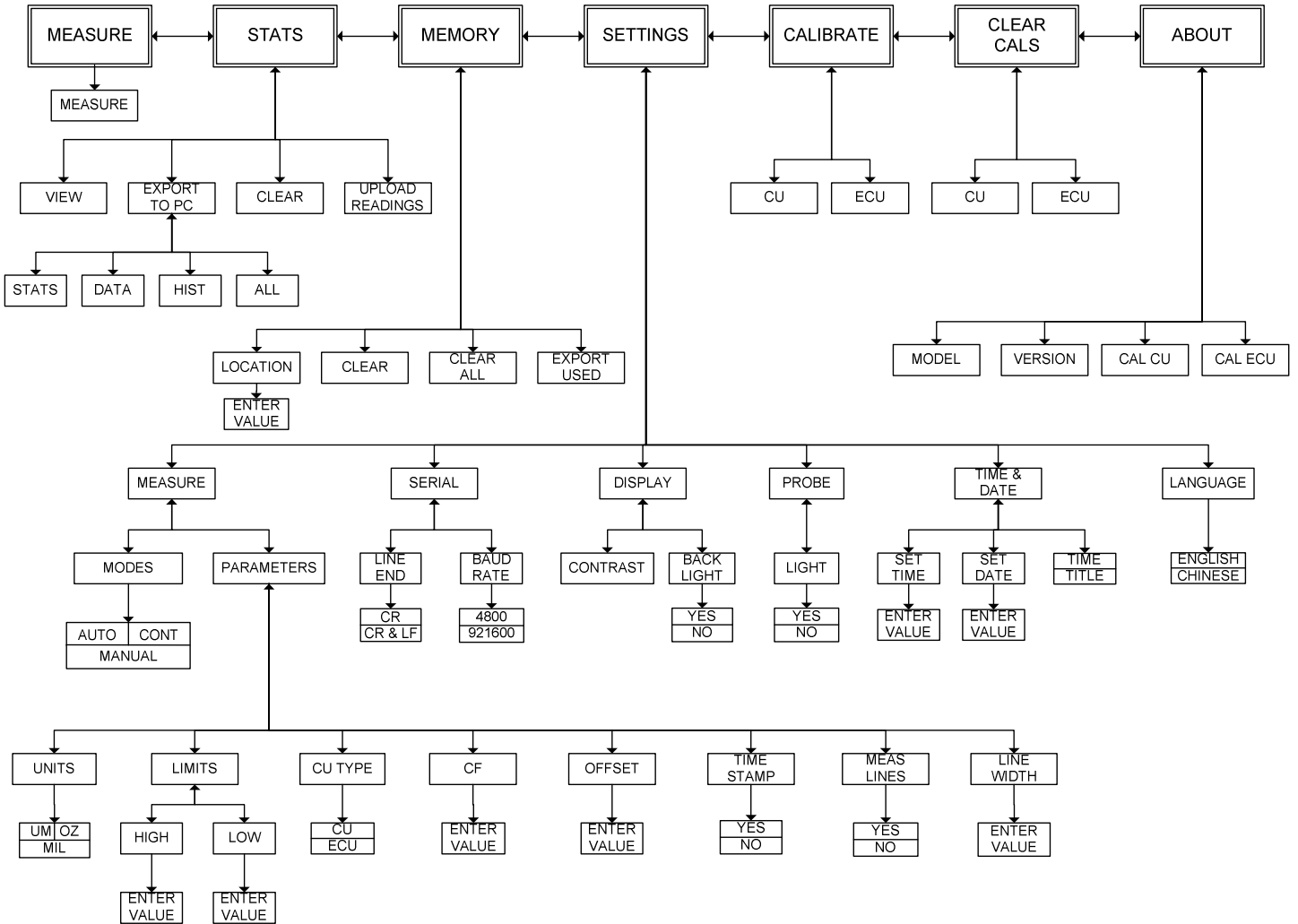
Select Measure from the Main menu.

UPLOAD STATISTICS OR READINGS TO PC

**Select Stats/Export/Stats, Data, Histogram or All; or select Stats/Upload Rdgs.
Requires that the Communications Option be installed**

MENU STRUCTURE - ILL 1

CMI165 MENU STRUCTURE



MENU DESCRIPTION

Refer to ILL 1 for memory layout and structure

MAIN MENU

Measure, Stats, Memory, Settings, Calibrate, Clear Cal, and About.

MEASURE

- Advances to measure screen.
- Last measurement taken is shown.
- Memory location is shown in the upper left corner.
- Copper type (Cu for electrodeposited and ECu for electroless) is shown in the lower left corner.
- Units are shown in the lower right corner.

STATS

View, Export, Clear and Upload Rdgs. All displayed quantities are referenced to the current memory location.

VIEW

Displays the following quantities:

Total: The total number of readings.

High: The highest reading.

Low: The lowest reading.

Range: The difference between the high and low readings.

Mean: The mean.

SDEV: The standard deviation.

%SDev: The percent standard deviation.

Accur: Accuracy.

CPK: A statistical quantity based on set user limits. Therefore, it only appears if the user sets limits.

EXPORT

Exports these quantities to a personal computer (PC).

Stats: Total, high, low, range, mean, sdev, %sdev, accur, and CPK.

Data: Readings. If Timestamp is Yes, (see Settings/Measure/Parameters/Timestamp below) date and time of each reading is included.

Histogram: Statistical graph.

All: Stats, data, and histogram.

CLEAR

Cancel: Returns to the Stats menu.

Clear Stats: Clears all statistical quantities and readings from the current memory location. The memory location remains active and ready to store future readings.

UPLOAD READINGS:

Transfers readings to a PC, all text excluded.

MEMORY

Location, Clear, Clear All, Export Used.

LOCATION

Allows user to enter value from 1 to 99 by pressing the Up and Down buttons to increment/decrement a digit and the Right and Left buttons to go to the next/previous digit. When at the farthest right position, press Right button to complete the entry.

CLEAR

Cancel: Returns to the Memory menu.

Clear: Clears all statistics and stored readings from the current memory location and deactivates that location. Deactivation means that no memory is currently allocated to store readings. If the user enters the location value again, then memory will be allocated and the channel reactivated.

CLEAR ALL

Cancel: Returns to the Memory menu.

Clear All: Clears all memory locations and deactivates them and then reactivates location 1. An active memory location means memory has been allocated for it to store readings.

EXPORT USED

Transfers all active memory locations to a PC.

SETTINGS

Measure, Serial, Display, Probe, Time & Date, and Lang.

MEASURE

These are referenced to the current memory location.

MODES: Auto, Cont, Manual.

AUTO: Measured reading is displayed and stored automatically when the user places the gage on copper.

The user must lift the gage off the copper before placing it down again in order to take the next reading.

CONT: Measured readings are continuously displayed but not stored when the user places the gage on copper.

MANUAL: Similar to the continuous mode in that measured readings are continuously displayed when the user places the gage on copper. However, whenever the user presses the Center button the last reading is stored and therefore included in the statistics.

PARAMETERS: Units, Limits, Cu Type, CF, Offset, Time Stamp, Meas Lines, Line Width.

UNITS: Toggles units between mils (1/1000 inch), um (micrometers or microns), or oz (ounces of copper). There is no storage of readings or statistics when units are oz.

LIMITS: Allows user to enter limits from 0 to 10 mils.

CU TYPE: The copper type to be measured. Toggles between Cu for electrodeposited and ECu for electroless.

CF: Used when readings differ from a known value. $CF = \text{desired reading} / \text{actual reading}$. 0.5 to 4 are allowable entries.

OFFSET: Subtracted from the reading. -10 mils to +10 mils are allowable entries.

TIMESTAMP: Toggles between Yes and No. Yes means that Stats/Export/Data will include the time and date of each reading.

MEAS LINES: Toggles between Yes and No. Yes means printed circuit board (pcb) traces will be measured and automatic correction based on line width will be implemented. Line width must be selected. See the next option.

LINE WIDTH: Allows entry of pcb trace widths from 8 mils to 3000 mils for auto correction of reading measurement when Meas Lines (previous option) is Yes.

SERIAL

Specify serial parameters for data transfer to a PC.

LINE END: Toggles between CR and CR-LF. CR means a carriage return will be included at the end of each line to be

transferred. CR-LF means a carriage return and line feed will be included at the end of each line.

BAUD RATE: Toggles between transfer rates of 4800 bytes per second or 921600 bytes per second.

DISPLAY

CONTRAST: Press the Up and Down buttons to adjust the display contrast.

BACKLIGHT: Toggles the backlight on/off.

PROBE

LIGHT: Toggles the probe light on/off.

TIME & DATE

SET TIME: Allows entry of time in an AM/PM format.

SET DATE: Allows entry of date in an yy/mm/dd format.

TIME TITLE: If Yes, time is displayed in the menu title after 2 secs from the last button press.

LANG

Select either English or Chinese for the language used.

CALIBRATE

CU

- Calibrate on 2 electrodeposited standards.
- The thickest standard is Std 1 and the thinnest Std 2.
- Press the Center Button to advance to the Calibration screen and place the gage on Std 1.
- When continuous readings stabilize press the Center button to accept, then lift gage and enter value of standard.
- Then place gage on Std 2 and repeat.
- After entering the value for Std 2 the gage will display Done if the calibration was successful.

ECU

- Calibrate on 2 electroless standards.
- Follow the same procedure as for option Cu above for calibrating on electrodeposited standards.

CLEAR CAL

CU

- **CANCEL:** Returns to the Clear Cal menu without clearing.
- **CLEAR CAL:** Clears the user calibration for electrodeposited copper.

ECU

- **CANCEL:** Press the Center button to return to the Clear Cal menu without clearing.
- **CLEAR CAL** Press the Center button to clear the user calibration for electroless copper.

ABOUT

MODEL

CMI165 is the model of the gage.

VERSION

Displays the current software version.

CAL CU

Displays User if the user has calibrated the gage for electrodeposited copper, otherwise displays Factory.

CAL ECU

Displays User if the user has calibrated the gage for electroless copper otherwise displays Factory.

SPECIFICATIONS

MATERIALS

CMI165 Gauge and patented integral probe with temperature compensation (US 7,148,712)
OICM Certified ½ oz Standard

CALIBRATION

Auto correct measurement of lines
Factory Calibrated

MEMORY STRUCTURE

- Locations 01 to 99 available
- Current location shown in the upper left of display
- Stores readings and corresponding statistics, Copper (Cu) Type, Measure Lines, Conductivity Factor (CF) and Offset parameters.

CU TYPE

- Electrodeposited: 250µin/6.35µm – 10mil/254µm
- Electroless: 10µin/0.25µm – 500µin/12.7µm

PROBE TIP

- Operator replaceable temperature compensating module

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MEASURE LINES

- Auto correction for printed circuit board traces
- Width range: 8mil/204µm to 3000mil/76,200µm

CONDUCTIVITY FACTOR (CF)

- Used when readings differ from known value
- $CF = \text{Desired reading} / \text{Actual Reading}$
- Range is 0.5 to 4

OFFSET

- Subtracted from reading
- Range is +/-the Cu type max thickness. See above

OPERATING MODES

MODE	MENU SETTING	MEASUREMENT
Auto	Auto	Last reading passed to statistics
Continuous	Cont	None taken
Manual	Manual	Last reading passed to statistics when Center button is pressed

LOW BATTERY

- Indicated when battery symbol is not shaded
- Replace batteries with two AA types

SAMPLE FOR MEASUREMENT

- Must be clean and free of surface defects

COMMUNICATIONS OPTION

- The communications option allows exporting data from the CMI165 to a PC via the USB connector on the gauge.
- The package contains a USB cable, and a CD with software programs, USB drivers and installation instructions.
- Place the CD into a drive on a PC and follow the instructions in the Readme.doc file in the Oxford CMI165 folder.

CONTACT OXFORD INSTRUMENTS

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CMI165 User Manual Part Number 51-98-4090-00012 Rev. B

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