

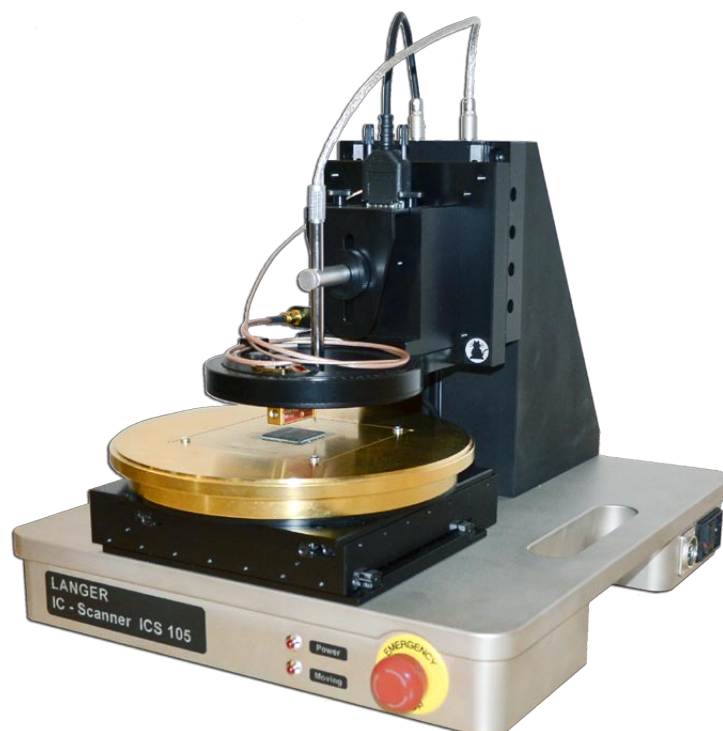


**LANGER**  
EMV-Technik

# IC TEST SYSTEM

IC Scanner  
ICS 105

User manual



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# 1. Measurement Setup

## 1.1 Safety Instructions

This product complies with the requirements of the following European Community Directives: 2004/108/EC (Electromagnetic Compatibility) and 2006/95/EC (Low Voltage)

### 1.1.1 Safety Precautions

The IC Scanner has been designed for IC measurements with near-field microprobes. Any other use is not permitted.

When using the IC Scanner please observe the following basic safety instructions to protect yourself against electric shock and the risk of injury:

- read and comply with the operating manual
- keep the operating manual in a safe place for subsequent use
- follow the safety instructions and warnings on the unit
- always perform a visual check of the IC Scanner before use
- keep hands away from moving and rotating parts
- do not leave the IC Scanner unsupervised
- read the explanation of the symbols on the unit in the operating manual
- do not switch the IC Scanner unit on until it has been completely assembled
- damaged connection cables are extremely dangerous!

### 1.1.2 Warranty

We will remedy any faults due to faulty materials or manufacturing during the statutory warranty period at our discretion, either by a repair or the supply of spare parts. The warranty period is subject to the applicable law of the country in which the IC Scanner was purchased.

The warranty is only valid under the following conditions:

- the IC Scanner and the micro probes have been treated properly
- the operating instructions have been followed
- only genuine spare parts have been used where necessary
- external components (spectrum analyzer, etc.) – separate warranty terms of the relevant manufacturer apply

The warranty is forfeited if:

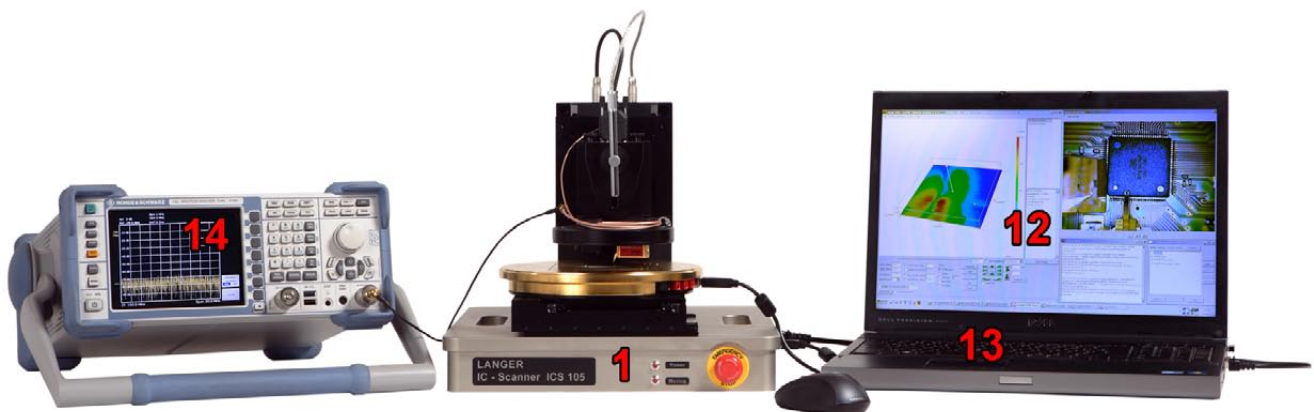
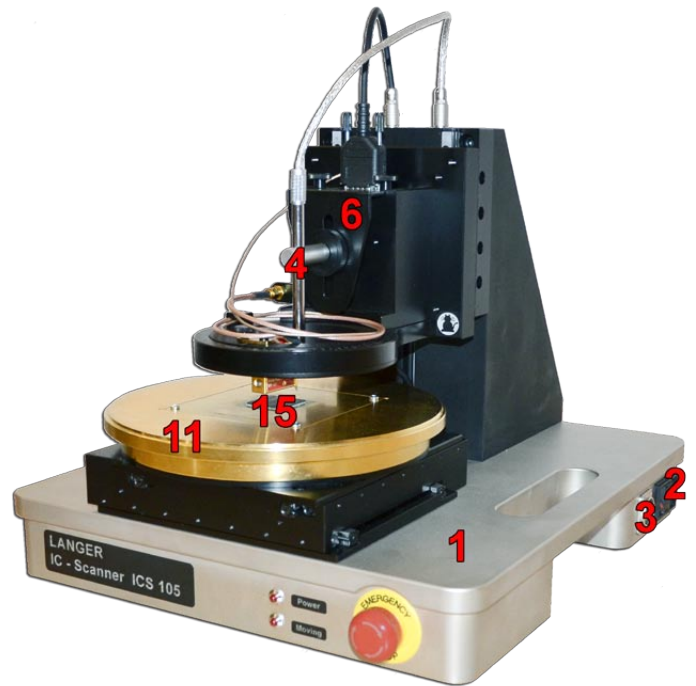
- attempts have been made to repair the IC Scanner
- the IC Scanner has been altered
- the IC Scanner has been used incorrectly

### 1.1.3 Safety Instruction

1. In order to meet the requirements of the European Community (CE) safety directives, the IC Scanner must be placed in an enclosure.  
The enclosure will prevent the operator from entering the IC Scanners work area and will generate an emergency stop signal if the enclosures door switch is opened while the robot is running.
2. Make sure the robot and accessories are connected to a properly grounded power source.
3. Do not connect or disconnect any cable while the IC Scanner is powered on.
4. Do not drop or spill foreign objects or material such as screws or liquids into the IC Scanner.
5. Do not touch any moving parts while the IC Scanner is running.
6. Loading and unloading of parts and material must be done when the IC Scanner is not running.
7. Changing of fixtures or tooling must be done with the power source disconnected.
8. The IC Scanner should only be operated in an environment of 0 to 40 degrees centigrade and humidity of 20 to 95 percent with no condensation.
9. Do not store or install the IC Scanner in an area where it is exposed to direct sunlight.
10. Do not operate the IC Scanner where electrical noise is present.
11. Only use a neutral detergent for cleaning.

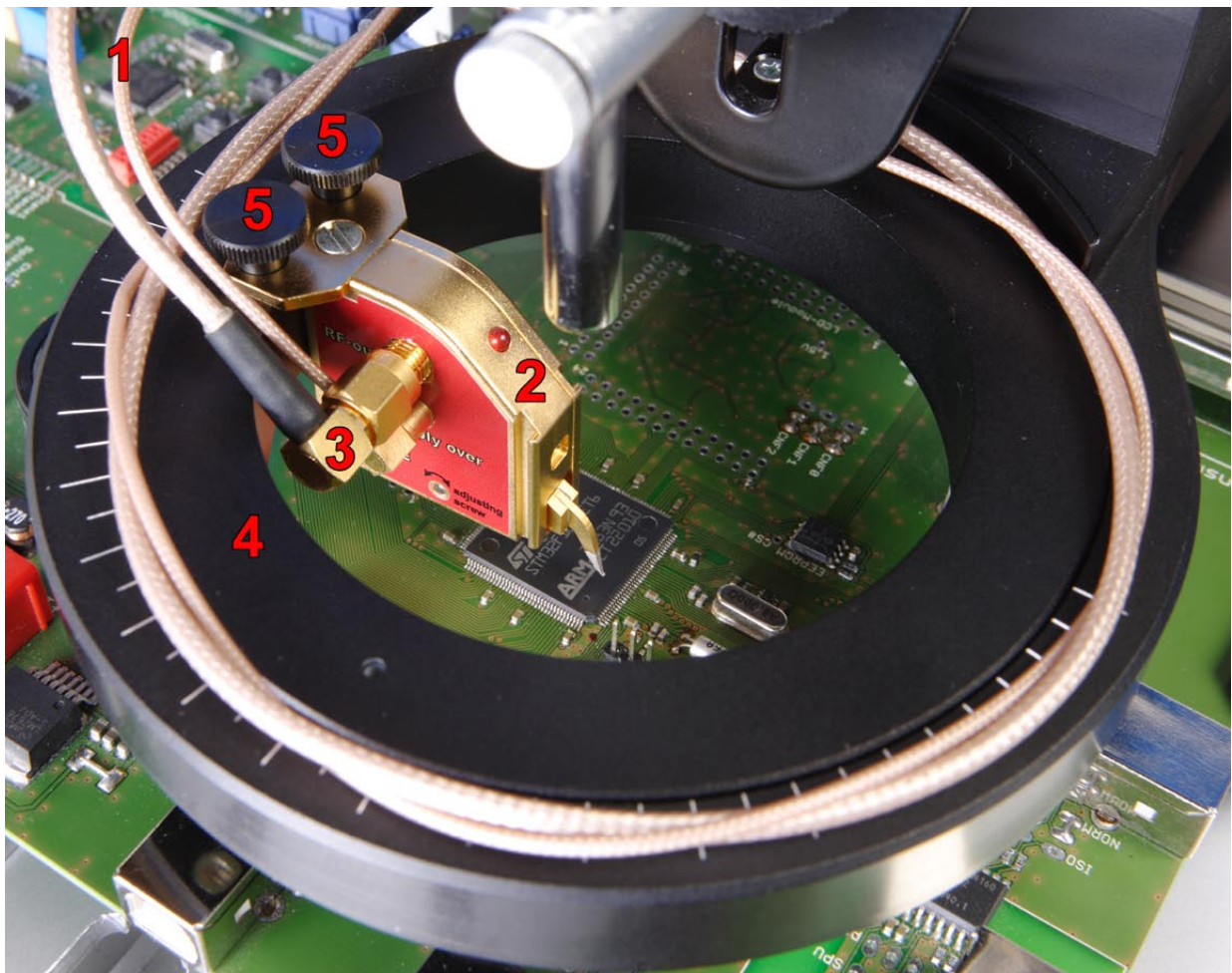
## 1.2 Setup Parts

- Mover system for 4 axes (1)
  - + Cable for power supply (2)
  - + USB cable with 'Hi-Speed USB' (USB 2.0) certification (3)
- Optical control unit
  - + Video Microscope (4)
  - + Prism (5)
  - + Camera holder mounted on the Mover (6)
- Probes
  - + ICR near-field microprobe (7)
  - + Bias tee (8) with power supply unit (9)
  - + Documentation
  - + Measuring cable (10)
- Ground Plane (11)
- ChipScan Scanner software (12)
- PC (13)
- Spectrum analyzer (14)
- DUT (Device Under Test) (15)



### 1.3 Mounting of the ICR Near-Field Microprobe

1. Attach the depth test cable (1) to the ICR near-field microprobe (2).
2. Attach the measurement cable (3) to the probe.
3. Screw the probe with its protective cap still present to the ring of the rotation axis (4) with the two black finger screws (5).
4. Remove the protective cap of the ICR probe right before you want to start a measurement and re-attach it again once you are done measuring to protect the tip of the probe.



## 2. Software Installation

The setup of the entire system hardware needs to be completed first in accordance to chapter 1. To start the installation process please insert the delivered installation CD into your CD drive.

### 2.1 General Installation Requirements and ChipScan Scanner Installation

Please open the folder *Documentation* on the installation CD and see the ChipScan Scanner manual *chip-scan.pdf* chapter 1 for details.

### 2.2 Installation of TMCM-6110 Driver

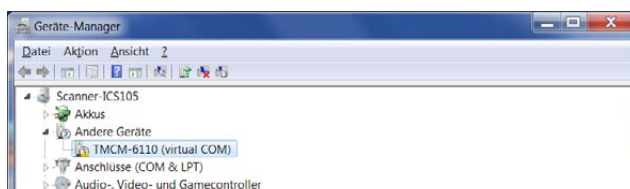
As Windows cannot install the driver for the TMCM-6110 built into the IC Scanner this driver installation needs to be done as follows:

- 1) Power-on the IC Scanner so Windows can install all the IC Scanner device drivers except the driver for the TMCM-6110.

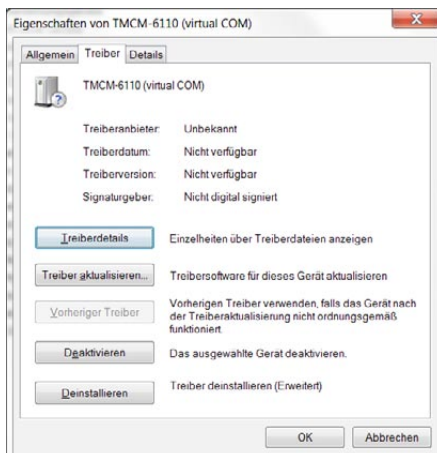


- 2) Open the Windows *Device Manager* from the Windows *System control*.

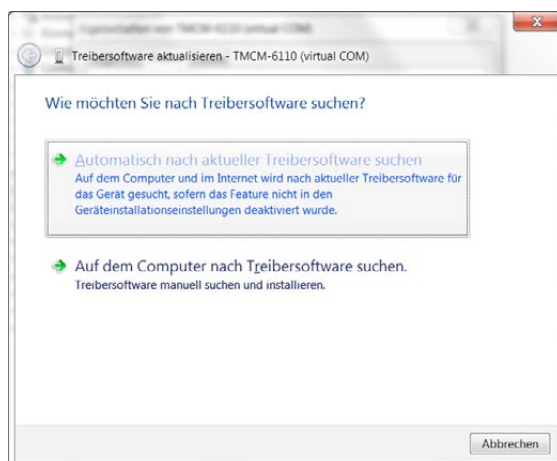
- 3) Within the Windows *Device Manager* double click on the *TMCM-6110 (virtual COM)* entry.



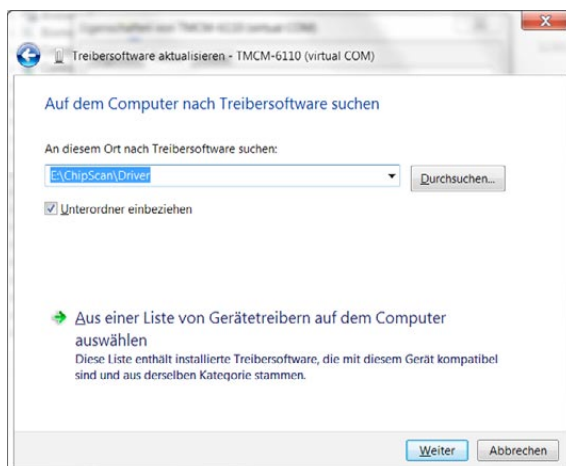
4) In the appearing properties dialog select the *Driver* tab and click on *Driver update*.



5) In the following dialog choose the entry to look on the computer for the driver software (so do not choose the automatic driver detection option).

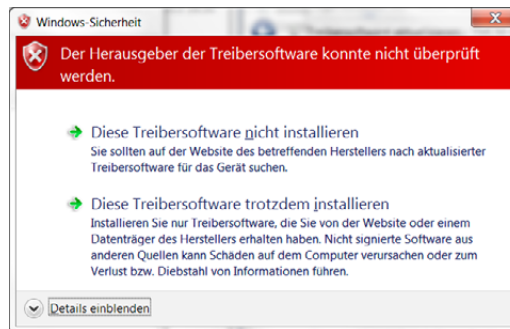


6) Use the browse button, select the CD drive where you inserted the delivered ChipScan Scanner installation CD, select the *Driver* subdirectory from the CD and press the *Continue* button.





7) In the following warning from Windows choose to install the driver software nevertheless.



8) The driver is installed and finally it should appear in the Windows *Device Manager* as follows.



## 3. Setting up and Commissioning

Please be sure to have completed chapter 1 and 2 from this manual.

To confirm the proper operation of the IC Scanner please follow the following steps. Details on specific steps can be found in the ChipScan Scanner manual which you can open from within ChipScan Scanner by clicking on the menu *Help* entry *Manual...*

1. Switch on
  - the IC Scanner
  - your PC
2. Start ChipScan Scanner
3. Connect ChipScan Scanner to the IC Scanner
  - within ChipScan Scanner click on the menu *Devices* entry *Show Device Manager*
  - within the Device Manager dialog:
    - to speed up the detection of the IC Scanner you may do the following in the section *Scanner*:
      - select the COM port the IC Scanner is connected to in the *RS232* choice box
      - select the *Langer ICS105* in the choice box to speed up its detection
    - press the *Detect Devices* button
    - the device detection takes a little while and afterwards you should find the following in the section *Identified devices used for measurement*:
      - in the *Video Device* choice box *Video Device 1*
      - in the *Scanner* choice box *Langer ICS105*

You may find further details in the ChipScan Scanner manual chapter 4.

### 4. Open the Video View

If you want to be using the Video Microscope click on the menu *Devices* entry *Show Video View*.

### 5. Start using the IC Scanner via the XMLRPC interface

You may find further details in the ChipScan Scanner manual chapter 5. Also you may have a look at the XMLRPC client demo *XMLRPC example client.py* written in the Python programming language in the *Documentation\XMLRPC Python example client* directory on the delivered ChipScan Scanner installation CD.

## 4. Operational Notes

### 4.1 Connecting the IC Scanner to your PC

When connecting the IC Scanner to your PC make sure to use a USB cable which has a 'Hi-Speed USB' certification (USB 2.0) and has a maximum length of 2 meters.

### 4.2 Placing a Probe at a Specific Distance above a DUT

Attention: The following instructions may cause damage to your probe, your DUT or both. Before starting especially make sure to power off your DUT to avoid any short circuit. Also keep in mind the tip of your probe is very fragile. Make sure your DUT surface is evenly and positioned leveled to the surface of the scanner to avoid the probe scratching along the DUT's surface during movements. In any circumstances please proceed with caution.

In many cases it is required to place a probe at a specific distance above your DUT. To accomplish this task complete the steps of the following procedure.

1. Power off your DUT.
2. Move the probe over the point of interest while keeping a safe distance to the DUT.
3. Put a prism right next to the point of interest.
4. Use the prism's sloped surface as a mirror to identify the space between the probes' tip and DUT's surface with the Video Microscope.
5. Move down your probe using an appropriate vertical distance.
6. If the vertical distance is not appropriate anymore decrease it, e.g. divide it by ten.
7. Repeat steps 5. and 6. under permanent examination of the probe tip with the Video Microscope until the probe almost touches the DUT's surface.
8. Reduce the vertical moving distance to the minimum of 20  $\mu\text{m}$ .
9. Try to move down your probe, while checking the distance between probe and DUT using the prism and Video Microscope.
10. If the probe is finally touching the surface of your DUT move the probe up for a specific distance.

### 4.3 Determine the Duration of a Measurement with the IC Scanner

The duration of a measurement with the IC Scanner will increase linearly with the number of measurement points. In addition the duration mainly depends on the following three properties:

- The time for the movement between two adjacent measurement points.
- The time for a full sweep of the spectrum analyzer.
- The time to transfer a trace from the spectrum analyzer to your computer.

#### 4.3.1 Moving Distance

The smaller the distance between two adjacent measurement points, the less time is required for the movement.

#### 4.3.2 Sweep Time

The higher the sweep time, the more time is required for measurement. Keep in mind the sweep time itself may take up a multiple of the time required to move the probe and to transfer the trace. Especially if a wide span and a small resolution bandwidth is used the sweep time may take several seconds. Also if you use 'Average' the sweep time is multiplied by the set 'Average Count'.

#### 4.3.3 Transfer Time

The time to transfer a trace from the spectrum analyzer to your computer mainly depends on the type of transfer interface being used. When using GPIB and VXI the time needed to transfer a trace with 1000 points will be in the range of milliseconds. In contrast if you use the RS232 interface with a low baudrate the transfer time may be in the range of seconds.

### 4.5 Relation between Span, Resolution Bandwidth and Points per Trace

The amount of points per trace set in the spectrum analyzer limits the frequency resolution. In fact the span is divided by the number of points per trace. At these frequency points the spectrum analyzer will measure a signal using the currently set resolution bandwidth.

For example a signal measured with a very wide span and a small resolution bandwidth might have good signal to noise ratio but will miss several frequency components if the number of points per trace is low. For further information have a look at your spectrum analyzer manual.

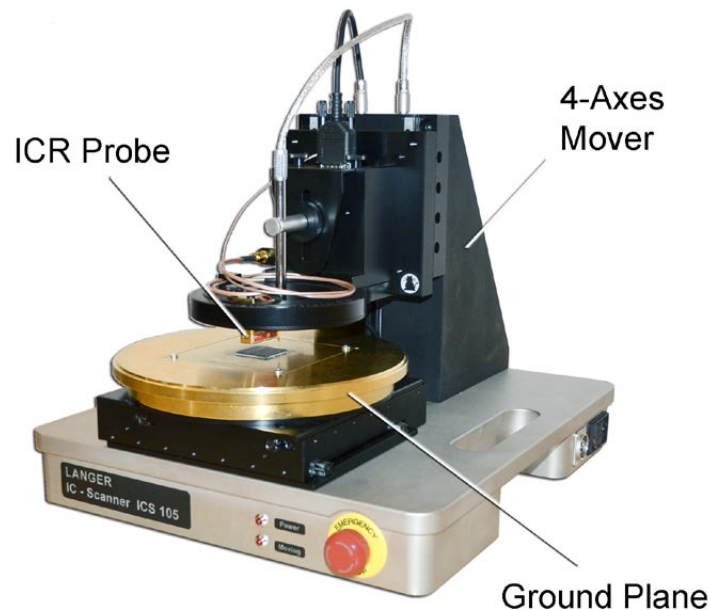
## 5. Technical Characteristics

### Application:

- Surface scans over ICs in accordance with IEC61967-3
- Volume scans over ICs
- PIN scans

### System component parts:

- 4-axis positioning system
- Video microscope
- Ground plane (type GND 25)
- ChipScan Scanner control and measurement software
- optional: Near-field microprobes for E- and H-fields (type ICR)



### Properties:

The IC Scanner can be adapted with different ICR probes to measure E- and H-near fields. The probes can be moved above the chip surface in all three axes and around the z-axis. The scanner allows the user to check the position of the probe tip visually through a video microscope. The scanner is controlled via PC with the ChipScan Scanner software.

Axes	x	y	z	$\alpha$ -rotation
Max. measuring range	50 mm	50 mm	50 mm	+/- 180°
Accuracy	10 $\mu$ m	10 $\mu$ m	10 $\mu$ m	1°
Repeatability	+/- 1 $\mu$ m	+/- 1 $\mu$ m	+/- 1 $\mu$ m	+/- 1°
Speed	2 mm/s	2 mm/s	2 mm/s	45°/s

Control	USB
Supply voltage	110 / 230 V
Dimensions / total weight	(350 x 400 x 420) mm / 23 kg

Software:	<p><b>ChipScan Scanner</b></p> <ul style="list-style-type: none"> <li>• zero position, manual or script-based probe movement</li> <li>• reading the data from a spectrum analyser</li> <li>• visualisation of the measuring results in 2D or 3D</li> <li>• output as csv and image files</li> </ul>
Optional accessories:	<ul style="list-style-type: none"> <li>• UH-DUT universal holder for mounting the electronics</li> <li>• ICR near-field microprobes for E and H fields</li> </ul>
Scope of delivery:	<ul style="list-style-type: none"> <li>• ICS 105 IC Scanner</li> <li>• Video microscope with holder</li> <li>• GND 25 ground plane</li> <li>• ChipScan Scanner software</li> <li>• Flight case</li> </ul>