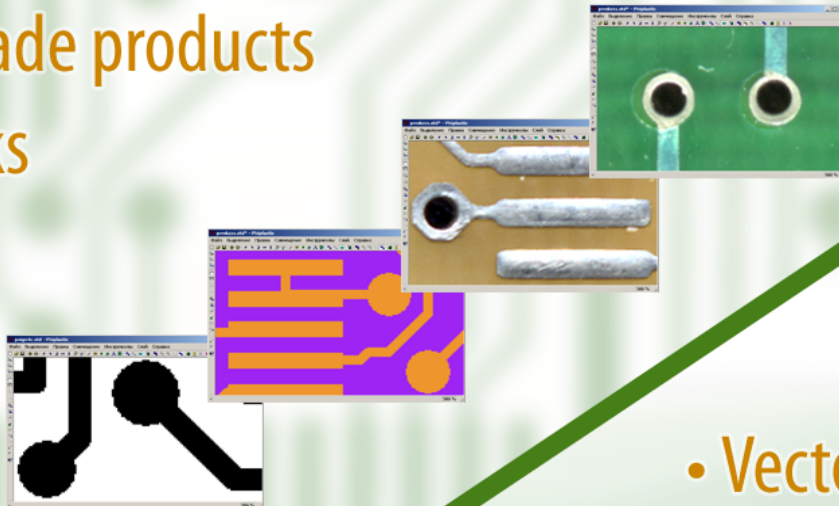


PHIPLASTIC

Automation systems for PCB and electronics production

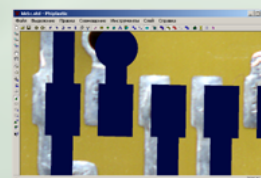
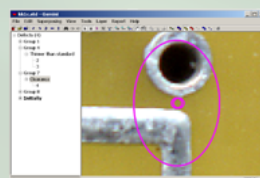
- Ready-made products
- PCB blanks
- Artworks



• Vectoring

• Optical Inspection

• Low-cost scanner-based solutions





About the company

For more than 10 years we are specialized in development of image analysis systems. Today our main activities are:

- **Printed circuit boards optical inspection** - detecting defects that have emerged during production or data preparation. The **inspection** takes place by automatic comparison with a standard.
- **Vectoring printed circuit boards** - development of a vector description applicable for any CAM system on the basis of a ready product. The **vectoring** is necessary when design files for printed boards are missing fully or partially.

Our products are designed for businesses:

- having their own **production of printed circuit boards**;
- ordering **printed boards** from other suppliers.

We develop software. To achieve printed boards images **flat-bed scanners** are used. The calculations are made on a PC. This helps us to maintain our products cost at a very attractive level. The purchase of a minimum set of automation means **Phiplastic** is affordable even for small businesses. As for major producers of the printed circuit boards and electronics, we offer advanced solutions ensuring higher productivity and **automation**.



Products

Today we offer in the market the following unique products:

- [Phiplastic Inspection](#) - **automated optical inspection** system for **printed circuit boards**;
- [Phiplastic Vector](#) - **automated vectoring** system for **printed circuit boards**;
- [Phiplastic Color](#) - module for **color image binarization**;
- [Phiplastic Gold](#) - module for creating reference samples on the basis of ready-made products and enhancement of vectoring system;

Our software is split into modules, each of them being appropriate to solve tasks of a definite type. This enables the customers to purchase only the tools that are essential in their **production**, as well as to broaden their arsenal at any time.

The most typical product sets are listed below.

Functionality	Artworks	Printed boards
<p>The minimal set. It includes:</p> <ul style="list-style-type: none"> • automated comparison of pattern and standard; • automated vectoring. <p>Price of this set is acceptable for small enterprises. The functionality is sufficient for small production volumes.</p>	Gold	+ Color
<p>Comprehensive automated inspection with starter vectoring abilities. This configuration is right for everyday inspection and occasional vectoring.</p>	Gold + Inspection	+ Color
<p>Complete vectoring toolkit with basic inspection facility. This set provides fast and convenient vectoring but inspection of articles and vectoring results may become a bottleneck in the case of high production volumes.</p>	Gold + Vector	+ Color
<p>Automatic vectoring, thorough automatic inspection of articles and vectoring results. This configuration ensures the maximum convenience and productivity.</p>	Gold + Inspection + Vector	+ Color



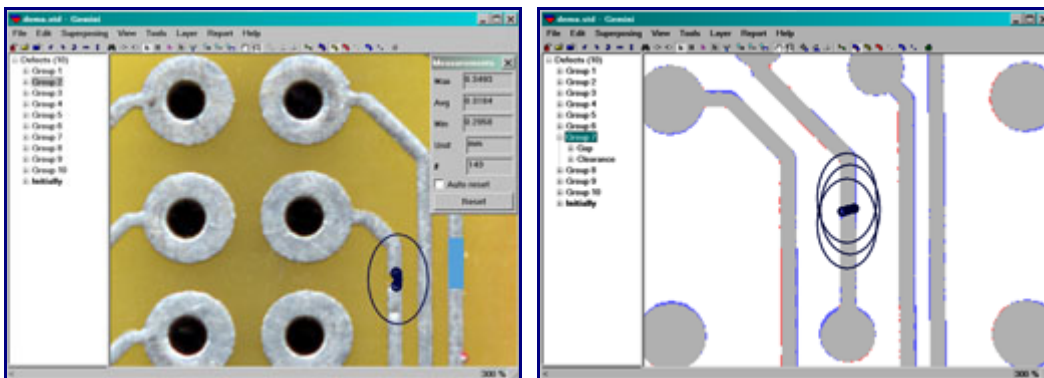
Phiplastic can be integrated with other systems. Most product features are available for external manipulation. System integrators are welcome to build end-user solutions based on Phiplastic and specialized machine vision equipment. Customers can also benefit from this open architecture by automating some routine operations that are specific to their product usage scenarios.

Our products make it possible to work with the following materials:

- **artworks** on film and glass;
- printed boards blanks (most of combinations of **substrate**, copper, metal coating, **photoresist** and other materials);
- ready-made printed circuit boards with **protective mask**.

Phiplastic Inspection

Phiplastic Inspection is an automation system for optical **inspection of the printed circuit boards**.



Main features:

- Data import from **CAD/CAM** systems and making standard;
- Tolerable limits and inspection range specification;
- Scanning of the sample inspected;
- Automatic aligning with the sample;
- Automatic defects detection;
- Size measurement with the average precision of 1.5 μm ;
- Making an electronic defects report and paper report;

The main input format for vector data is **Gerber RS-274-X**.



The **list of defects** detected automatically:

- Conductor breakup;
- Short-circuit;
- Convexity;
- Conductor pinhole;
- Other topological defects;
- Conductor width tolerance infraction;
- Infraction of tolerance of the gap between conductors;
- Excessive or insufficient metallizing.

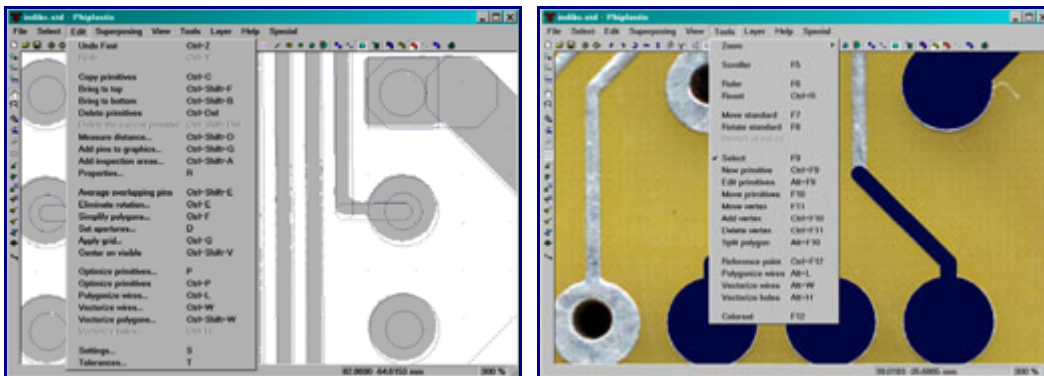
There are means of flexible adjustment of inspection tolerance, including in compliance with well-known standards.

In the event of **deficient boards** the data about that is transferred to the repair department on paper or as a file with electronic defects report. Both ways provide the staff with comprehensive data on defects: images, tolerance, positions.

The modules [Color](#) and [Gold](#) enhance the features of **Inspection**.

Phiplastic Vector

Phiplastic Vector is a system of automatic **vectoring of multilayer printed circuit boards**.



Vector transforms raster scanned image of the 'golden board' into **vector** form. As opposed to [Gold](#), high-end graphic primitives are used, such as **line** and **termination pad**. This makes it possible not only to make a copy of the printed board, but also to modify it by means of any **CAM** system. The result of vectoring is a set of layer by layer files in format **Gerber RS-274-X**, which - when imported into a **CAM** system - give a project with eliminated image tilt, accurately coincident pattern of layers, adequate aperture tables and holes centered according to termination pads.

A typical operation scenario:

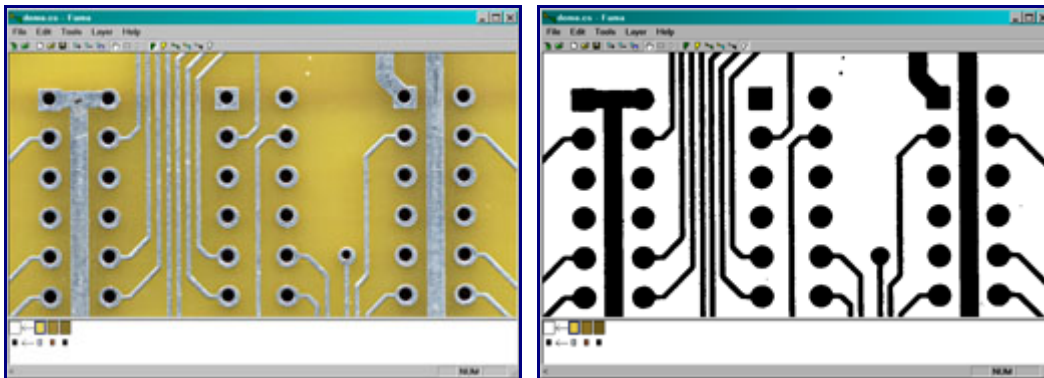
- Scanning of a corresponding board layer;
- Automatic circuit vectoring, using lines and termination pads;
- Automatic hole vectoring;
- Editing aperture list;
- Eliminating the image tilt;
- Point of reference definition;
- Applying grids to the sizes and primitives position;
- Centering primitives according to other primitives;
- Checking and correction of the results with high level of automation;
- Data export for production or additional treatment;

The features of Vector are not exhausted with what is mentioned above. The whole arsenal of available tools form a powerful **vector graphical editor** with raster layers.

Our products [Inspection](#), [Color](#) and [Gold](#) expand the features of **Vector**. Particularly, **Inspection** makes it possible to make a comprehensive comparison of the original with vectoring results, which guarantees their equivalence.

Phiplastic Color

Phiplastic Color is a module for **color image binarization**. Due to this, the scanned images of the printed boards and their blanks are transformed into the black-and-white form applicable for inspection and vectoring.



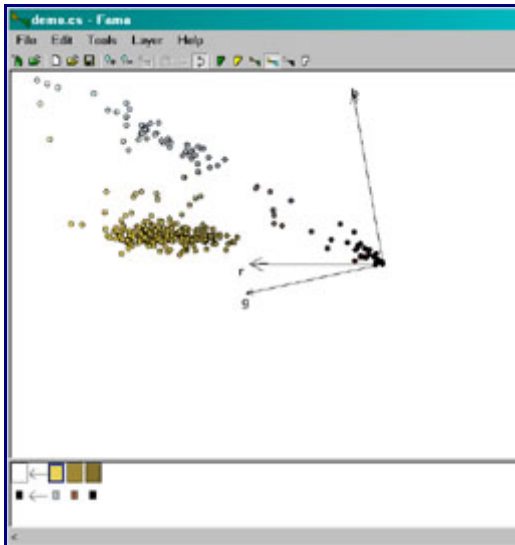
When using [Inspection](#) and [Vector](#) the module **Color** makes it possible to inspect and vectorize the **printed boards** and blanks on any 'color' stage of technological process.

It is possible to use **Color** for binarization of any other images.

The binarization process consists of two stages:

- Manual tuning on the basis of 1 or 2 boards;
- Automatic binarization of a production batch;

During manual tuning the operator indicates typical colors of 'white' and 'black' clusters, using convenient and illustrative tools. The adjustment results are saved and may be used repeatedly.



Phiplastic Gold

Phiplastic Gold is an additional module to the systems [Inspection](#) and [Vector](#), making an automatic **vectoring** of the printed circuit boards topology using **polygons**.

When interacting with [Inspection Gold](#) makes possible the inspection on the basis of '**golden board**', that is to compare the production batch with one ready-made article that has undergone a comprehensive inspection. Both artwork and printed board may play the role of a standard article. Typical working scenario:

- Scanning '**golden board**';
- Automatic creation of a minimum **polygonal** representation, ensuring required precision;
- Saving standard;
- Production batch inspection;

When interacting with [Vector Gold](#) makes it possible to put into production an accurate **polygonal** representation of the '**golden board**' or its fragments, which are not described by the lines or termination pads:

- Scanning '**golden board**';
- **Polygonization** of fragments and circuits specified by the user;
- Applying other features of **Vector**;
- Pattern export;





Frequently asked questions

Where a sample/demo version is available?

- In the [Downloads](#) section there are presentations, which describe in details all aspects of our products application. The presentations have a great deal of screen shots and explanatory comments.
- [Phiplastic Pictor](#) - the free **viewer for inspection sessions** can be also downloaded there. It displays inspection results of several boards in quite the same way as the inspection system itself.
- If this data is not sufficient, please, [send](#) us your boards or their images. We will be happy to demonstrate how Phiplastic products work on your examples. 'Live' demonstration is also possible - please, contact us.

Which computer configuration is needed?

- Processor: Dual Core AMD's are recommended;
- Frequency: 2.0 GHz (we recommend from 2.5 to 3.0 GHz);
- Memory: 1 GB (we recommend from 2 to 4 GB);
- Hard drive: from 100 GB (we recommend two SATA drives with RAID level 0);
- Operating system: Windows XP SP2.

Which scanner is needed?

The scanners are being constantly improved. To get the most recent information, please ask the question to the [developers](#). Please, specify which articles you're going to scan (artworks or printed circuit boards), and what are their sizes and precision.

Is it possible to work with the boards where the elements are installed?

No.

What does the delivery set consist of?

Software and 12 months support. It is possible to organize user's training at customer's enterprise.

What kind of support is provided?

The support includes free consultancy and upgrades up to all new software versions. After the expiration of the first year it is possible to expand the support period or to purchase upgrades.

What is more profitable - backup or upgrades?

The support is more profitable for users, as the total cost of all annual upgrades is normally 1.5 to 2 times as much as compared to the annual cost of support.



Downloads

The [brochure](#) contains general info on our products, collected in one file convenient for printing.

The presentations demonstrates our products in all details. The content is divided into the following parts:

Phiplastic Inspection [SWF](#) [HTML](#) [PDF](#)

Phiplastic Vector [SWF](#) [HTML](#) [PDF](#)

Phiplastic Color [SWF](#) [HTML](#) [PDF](#)

Phiplastic Gold [SWF](#) [HTML](#) [PDF](#)

[Phiplastic Pictor](#) is a free software for viewing **inspection sessions**:

- To our customers it allows to know Phiplastic system better. Several inspection sessions are included, allowing to see the same information that is displayed on the inspector's screen. We recommend to start from our brief introduction that can be found in the Help menu.
- To our users this program allows to distribute inspection and repairing to different departments. Session files created by the inspection system are transferred to repair station along with defective boards.

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