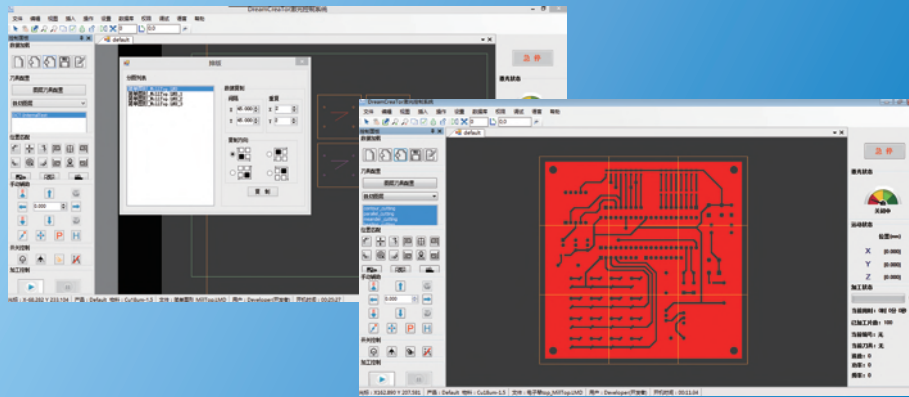# Machine Control Software DreamCreaTor

High Efficiency and Easy for Operation

Graphical operation interface for precise computer aided processing machine;

User-interactive platform for advanced system of prototyping, small batch production, precision machining and laser micromachining.
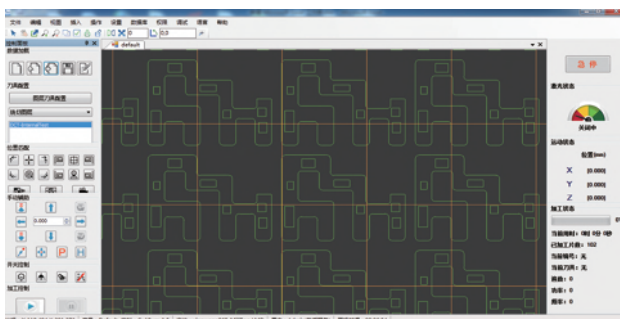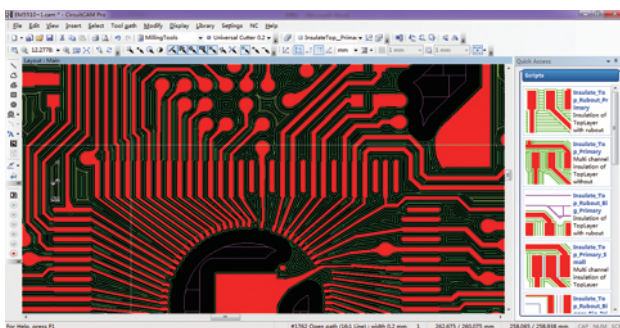
DreamCreaTor

Human-oriented, intuitive and easy to operate, continually update to meet operator's needs, the perfect unity of powerful function with friendly interface;

Rooted on application, concise and efficient, constantly optimize to match updating hardware, naturally combining of classical software architecture with flexible settings.

- Develop under Sino-Germany collaboration, inherit traditions, with proper core module, rigorous and high efficiency;
- Focus on much more operation experience, concise and intuitive interface, friendly and easy for operation;
- Make full use of resource, constantly optimize to match each detail of hardware, with multi-functions;
- Embed with application experience, preset processing parameters, "plug and play" installation, widely use in various processing areas;
- Develop potential performance, widely learn advantages from others, integrate expertise with know-how, to make equipment increase value for customers;
- Set different log accounts with different rights, well arranged, safe, reliable, and convenient for operation management;
- Machine control as you please, what you see is what you get, software is well suited and integrated with hardware
- No warry on after sales: training, support, free up-to-date upgrade constantly, remains valuable forever.

德中 DCT
Design Comes True

For equipment evaluation, usually different person has different opinion. Generally speaking, the grade of hardware, quality of material, refinement of workmanship, determine the visible price of an equipment. Moreover, the techniques, structure design, accessories, spare parts, software and service, determine the potential value of an equipment. There is lots of criterion for value judgement. But there should be no doubt that, for a computer digital controlled processing equipment, the most important factor for determining its value, is the performance of its software: it reflects the level of professionality, operation convenience and equipment intelligence, influence operation experience.

The operating system is essential and important for all kinds of intelligent equipment, just like it is quite important for computer and mobile phone. DreamCreaTor, is the operating system of DCT DM/DL series equipment, which manages and controls each part of equipment, plays the role as brain and nerve center. During equipment working, DreamCreaTor controls mechanical/laser processing head, XY motion and control system, Z-axis travel and depth precisely control, CCD fiducial system, automatic tool exchange system, WYSIWYG graphic display system, operation instructions, and power supply, compressed air, dust extraction unit and so on other basic system or hardware. DreamCreaTor not only control them to complete specified action, but

also coordinate them to finish complex function. After running-in of theory and practice, continuously optimization and lots of updating, DCT equipment operation software, DreamCreaTor, plays a role of value amplifier like data processing software CircuitCAM7: fully develop the potential of equipment, integrate resource of hardware with software and optimize, abstract application know-how and expertise, increase value of hardware. The wizards and templates of DreamCreaTor make complex operation simple and intuitive, provide a clear and smooth operation experience for user.
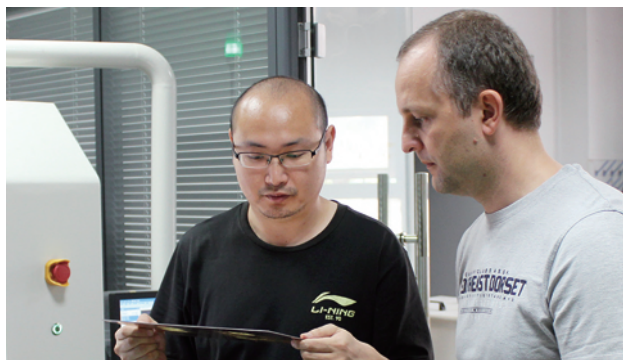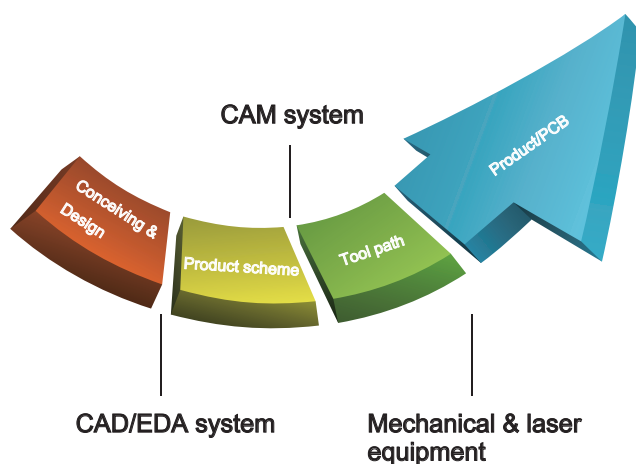
To manufacture a product from its design, EDA, CAM or processing equipment, all of them are must.

Computer-Aided Design, i.e. CAD, is fully developed and extensively used in many applications. Many new products, along with the dreams of innovation, are started from CAD design every day. In electronic industry, CAD has Electronic Design Automation function, i.e. EDA function, and make it possible for auto layout, auto routing and circuit simulation. The EDA system reduces electronic engineer's working intensity, and turns their ideas into design quickly.

The ninety miles is only half of a hundred miles journey. Please note, the design made by traditional CAD and EDA software, can only describe the final form of a product including size, shape, position, etc. It could give neither the processing steps, tools to be used, processing conditions, moving path of tools, nor the set of instructions to control machine to make products as description with high quality and efficiency.

The ultimate aim of a design is a product. No matter how the design system develops, we must face the real world. We need data processing for a design to get a detail description of a processing, to control actions of all part of machine coordinately, so that to process material or components, make design comes true and accomplish the goal of a design. CircuitCAM 7 and DreamCreaTor are professional data processing software and machine driving software separately. Both of them are indispensable parts of Computer Aided Manufacturing System. They are available in sets to complete data receiving and processing, driving kinds of mechanical and laser equipment.

CAM system

Conceiving & Design

Product scheme

Tool path

Product/PCB

CAD/EDA system

Mechanical & laser equipment

## CircuitCAM 7 - Professional CAM software, the source of direct mechanical/laser structuring

CAM is a classical software which is used for generation pre-defined tool paths for CNC process according to the design data. In addition to data preparation functions

such as photo plotting, drilling and contour milling in traditional circuit board production, CircuitCAM 7 also has special function suitable for data processing for PCBs direct mechanical/laser processing, that is, refer to pattern, bonding pad and other conductive patterns, calculate the motion trail of tools during subtractive processing.
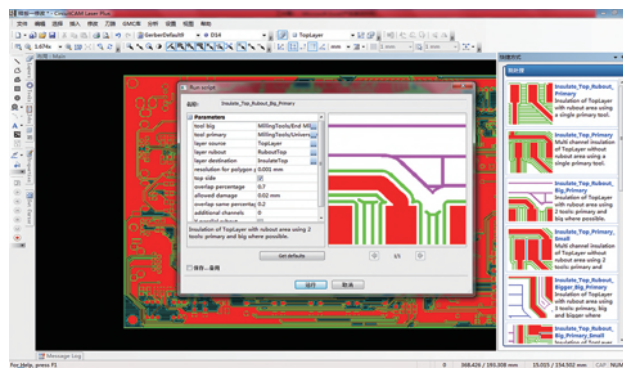
With such function, DCT direct mechanical structuring /patterning equipment DM series, and DCT direct laser structuring/patterning equipment DL series, could removal copper undesired, and leave needed copper as structure, bonding pads and other conductive patterns, to make PCBs directly from design by mechanical drilling & milling or by direct laser photo-ablation.

CircuitCAM7 can define copper rubout areas in different shapes such as circle, rectangle and polygon according to welding process, reliability and other demands. CircuitCAM7 can also configure the combination of tools with different diameters according to calculation of layout density and rubout area. In accordance with the characteristics of conductive pattern layout, CircuitCAM 7 also can assign different insulation channel layout at different place of a circuit board
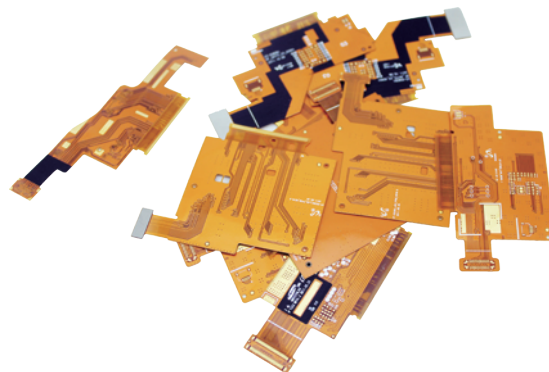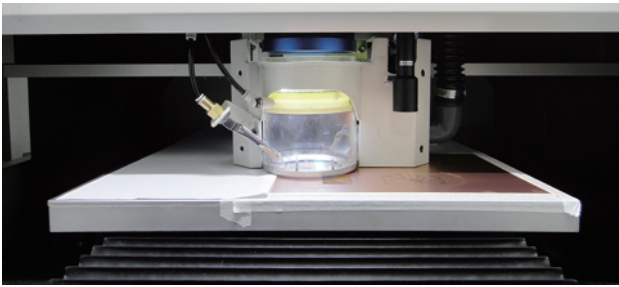
CircuitCAM7 Standard supports the function of scan field division processing. which can automatically divide processing data into suitable scan fields, and process successively with reasonable stitching according to parameters of equipment. It is suitable for processing equipment with high speed laser deliver via scanner. Meanwhile, the software can adjust uniform distribution of laser energy in the scan field according to processing technology and adjustment of tool path by calculation parameters, so as to avoid unnecessary tool path overlap and solve overheating caused by repeated laser scan. For different material, operator can assign different laser tools during processing and export the assigned data as a package. Relying on features of laser processing, CircuitCAM7 Standard can be equipped with various laser parameters and processing paths which can be selected in line with properties of material and processing requirements. Thus the processing quality and speed is obviously improved.

Processing routing algorithm which supported by new data engine, can avoid unnecessary lift up and down of tools by inspection, calculation and optimization. Moving distance of tool head can also be reduced by avoid moving back-and-forth within small size range. It saves processing time and ensures processing quality from every little detail.
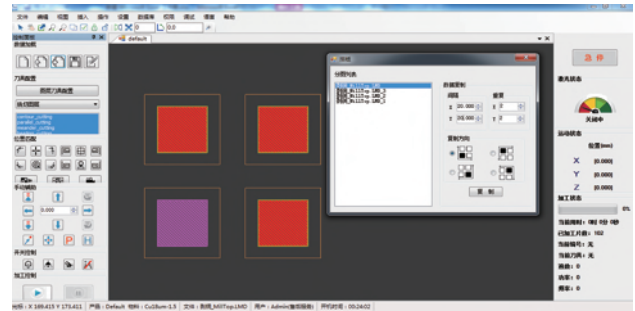
As multi-functional data processing software, CircuitCAM7 has different kinds of data processing algorithm and export style. Operator can divide data into different layers - physical layers and virtual layers, can process and export the data separately according to physical processing procedure or virtual processing procedure, as well as processing data selection freely, in order to satisfy the well-directed processing and setting on different area, processing requirements, stages, processing methods, tools and parameters, and to generate different processing path and parameters. It is flexible, convenient, effective and suitable for different applications.

## DreamCreator - operating system, the brain and nerve center of equipment

The operating system, as an intermediary between the underlying hardware and user, is a bridge of communication between user and hardware. User can input commands via interface of operating system. The operating system can explain the commands, drive the hardware, and implement requirements of user.

Direct mechanical / laser structuring equipment, is complex and consists of several subsystems. These subsystems, involving functions such as processing tool start controlling, work piece loading and positioning, many kinds of processing data acquisition and processing,

power supply, gas supply and so on, is comprised of work table for loading work pieces, precision X, Y, Z motion control system, precision spindle / laser and its driver, camera, sensor, relay, dust removal, gas supply, power supply and so on. The driving software manages and controls each parts of the equipment. In fact, it is the master of equipment. Operator sets and controls the whole system through the driving software, to complete the scheduled processing task. The driving software, in fact, is similar to computer or mobile phone operating system. Its performance plays a decisive role in the performance of the equipment, in the performance development of hardware composed of the equipment, in matching and optimization of various hardware composed of the equipment, especially in sensitive and fine processing related functions.
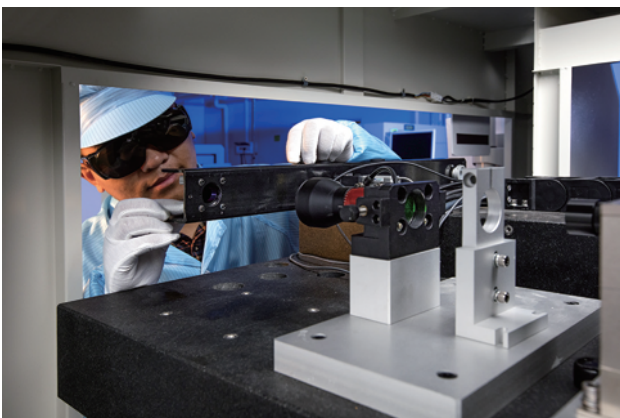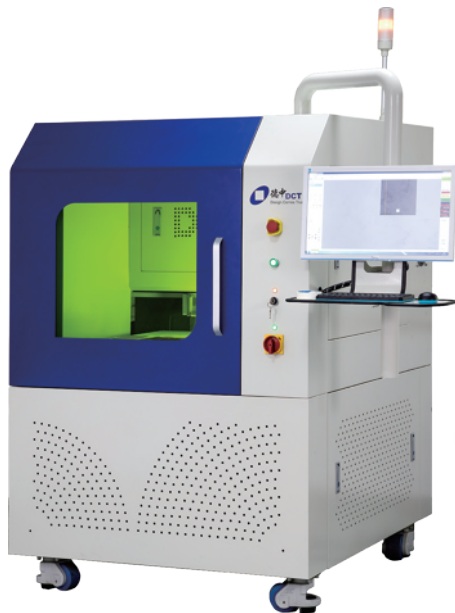

DreamCreaTor, is developed by German and Chinese teams, to drive direct mechanical / laser structuring equipment manufactured of DCT. Modular structure is adopted. The core is rigorous, efficient, reliable, and

easy to streamline or expand. It can be flexibly used to all kinds of equipment made by DCT.

We develop this software with following 3 basic principles. 1, fully integrate hardware and software resource, make software and hardware resource match each other, optimize and work in full function. 2, focus on application, try to integrate as much application experience of all aspects as possible into DreamCreaTor, pre-set expertise and know-how into the software through its parameters library, make hardware increase value through software. 3, concern for operation experience. The graphical user interface of DreamCreaTor, is intuitive, smooth, simple and quick for operation. Both novice and proficient, can quickly get started.
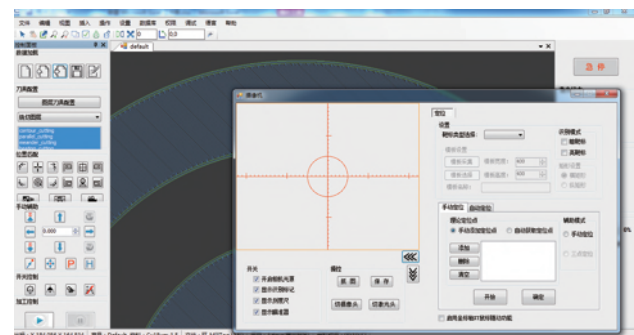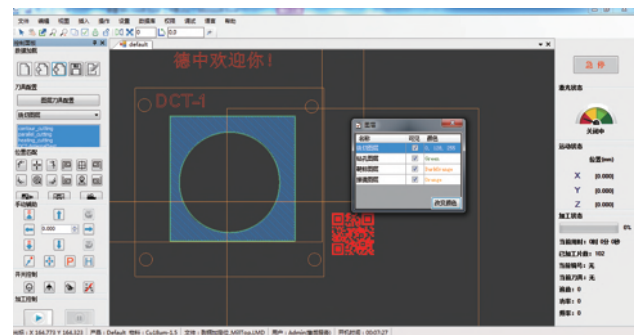
Each DCT direct structuring equipment, is equipped with driving software DreamCreaTor, with mouse, keyboard or touch screen as Human Machine Interface (HMI), to operate equipment, to complete functions of system monitoring, data storage, equipment startup, initialization and so on. DreamCreaTor can selectively interconnect with Automation Production Systems or Manufacturing Execution System (MES) of a factory.

DCT software team often operate kinds of equipment to get on-site experience, try to provide comfortable and beautiful screen visual experience to operators, reduce the cognitive burden of users by graphical and visual operation, make the operation of equipment simple, smooth and quick. Even for beginners, can also learn the software quickly and operate DCT DM/DL series of precision processing equipment successfully.
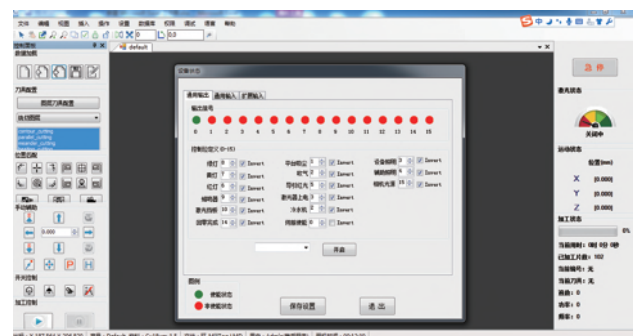
During processing, operator may interact with equipment through Graphical User Interface (GUI) of DreamCreaTor, choose processing procedure, tools and material, set processing parameters and so on.
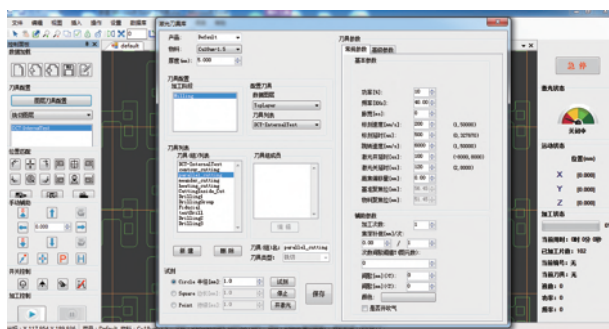
Smooth and convenient operation system – DreamCreaTor

Architecture design is adopted for DreamCreaTor. Thus it is convenient for function extension and improving. DreamCreaTor is operated with common Windows tools. Especially the setting available and changeable toolbars, the menus, dialog boxes, and visual Graphical User interface(GUI), What You See Is What You Get (WWSIWYG), are intuitive and attractive. User could understand the meaning easily by seeing the graphic. Just like Windows and many of its classic applications, DreamCreaTor has a default configuration which conforms to the habits of most people. Operators can also set up special operating interface depending on their needs or preferences.

In addition, DCT DreamCreaTor also set up menu or template in batch processing mode, with some parameter settings matching commonly used material and processing tasks. Thus user could follow the menu guide to operate step by step, make equipment work in accordance with established procedures and in proper order. Of course, the above functions are also open to customers. User, who accumulate experience in a process, can create such menu as needed, or modify existing steps, sequences, or parameter settings. For example, when the automatic feeding and unloading system is connected, push the "one key processing" button, the automatic processing procedure can be started, without any manual intervention, the system will complete the task automatically.
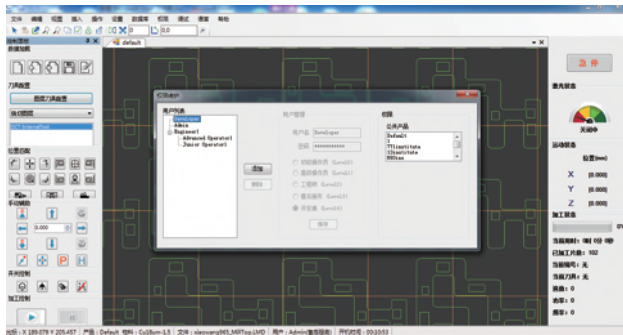
During running of DreamCreaTor, the system could automatically change the processing sequence number, record the processing progress and count the quantity of processing, refresh the processing status according to the initial setting. In addition, DreamCreaTor can also analyze vector graphics and text information, let equipment mark on material the manufacturer info, batch, time, LOGO etc. DreamCreaTor can automatically generate instant information, including QR code, control laser to remove material, leave permanent mark in the material.
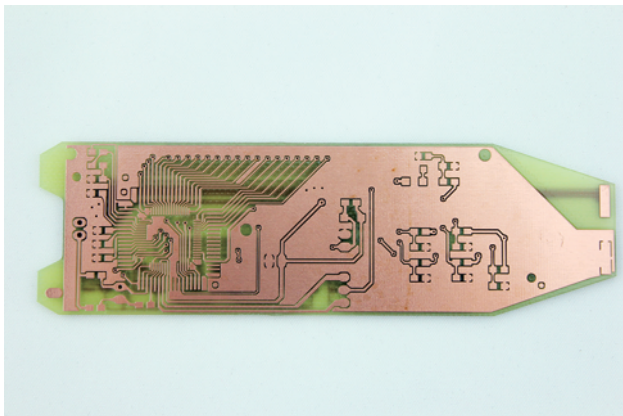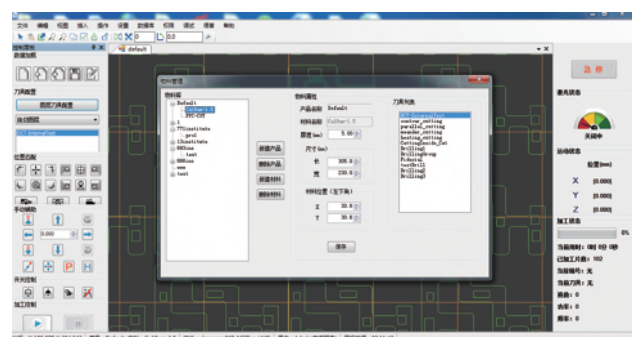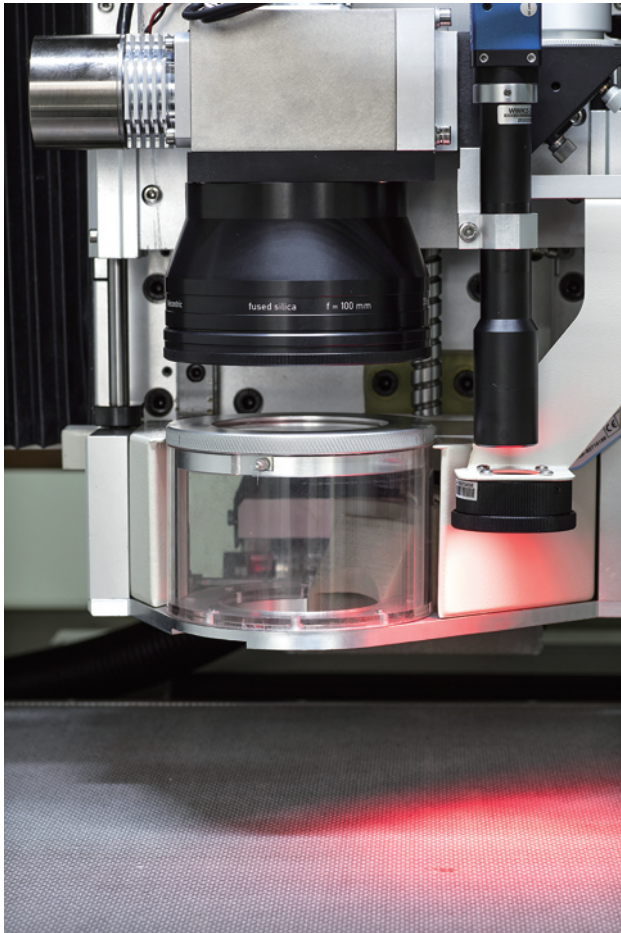

Each time you start DreamCreaTor, the system will be initialized, including zero point finding of X, Y, Z axis, configuration loading, status examination of software and hardware, so as to ensure each subsystem of the equipment is in normal state. According to configuration and environment, DCT system has automatic calibration and diagnosis function. For example, on line automatic power compensation; automatic compensation on material thickness & surface roughness of platform. These functions guarantee the consistency of processing effect in case there are changes in power of laser source or topography of material surface.
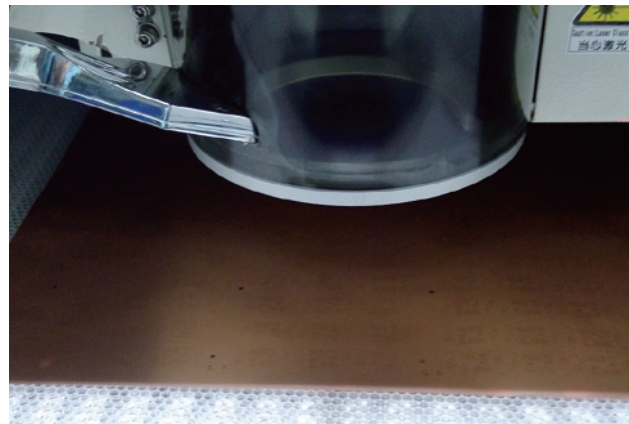
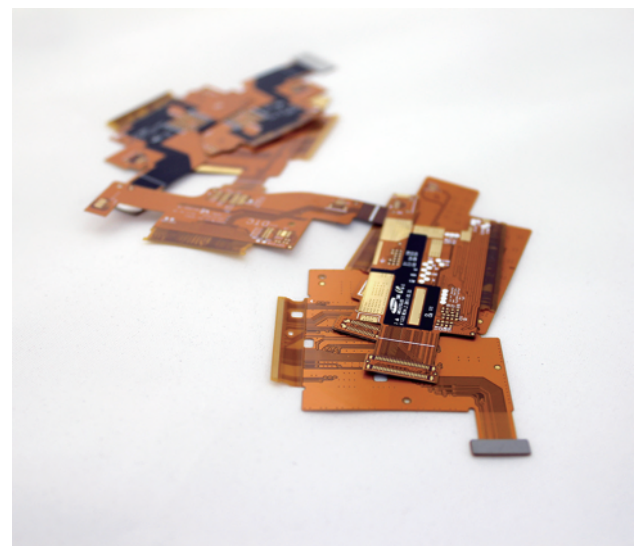## Powerful driving software – DreamCreaTor

Material size and position identification, is a special function of DreamCreaTor, which realizes the interaction between equipment and work piece, and adjusts the processing path according to actual condition of each work piece being processed. With the help of camera on the equipment, it can quickly recognize the identification or fiducial mark on the work piece, adjust the data for position, angle, direction and the stretch and compression in software, so as to match processing path with the real size of workpiece. This function allows the position of the workpiece freely (the so-called fuzzy feeding), that is, without alignment, graphics to be processed on computer could roughly match with actual position of the workpiece. The automatic positioning ability of the system, not only reduce the difficulty of uploading material and improve processing efficiency, but also are very useful during processing of double-sided or multilayer PCBs. It enable automatic precision turning plate alignment with only auxiliary hole.

In general, DCT equipment has large size of working area with high efficiency. The panel processing function of DreamCreaTor, make full use of large working area, is flexible and convenient. For FPC processing, user can choose disposable fiducial recognition and disposable stretch and compression processing for full panel to improve production capacity, or choose fiducial recognition and stretch and compression processing for each single piece to ensure the quality, depending on the extent of stretch and compression of material and final precision requirement for outline shape.

In the field of industrial applications such as FPC production, size and position recognition functions are especially important. With fiducial recognition function and material stretch and compression processing function, DCT laser equipment has outstanding advantages in FPC de-paneling, compared with traditional mechanical punching processing method. Since the characteristics of FPC material and the limitation of processing technology, there is large size deviation usually for individual FPC on different panel even for the same batch. If processing outlines of each FPC with same size, it will inevitably appear the problem of outlines could not match with the internal functional conductive structure. DreamCreaTor, together with the camera system, can quickly recognize the actual size of FPC to be processed, and stretch, compress, or even rotate the path of processing in accordance with the measured data, to ensure the functional conductive structure match with the outlines.

In addition to graphic processing technology, the bidirectional data communication & processing technology of DreamCreaTor, provides a variety of possibilities of inter-action. It can receive sensor data such as position, vacuum, height, on-off and so on. By adjustment on processing path and parameters accordingly, it can meet production requirements on size accuracy, repeatability, quality and so on, increase flexibility, versatility, automation and machining efficiency of equipment. For example, it can support processing such as circuit board repairing, filling line, remarking, continuous processing, automatic assembly line processing etc.
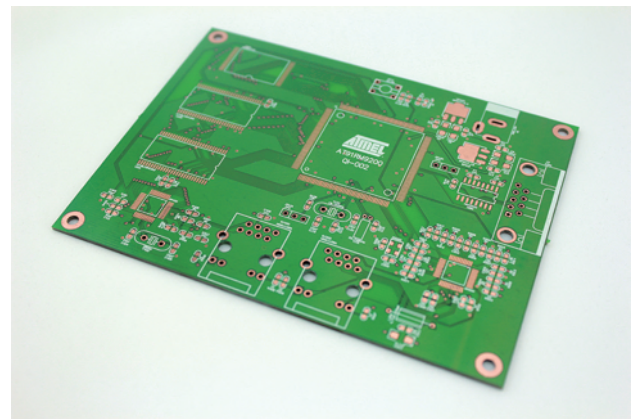
Embedded with many processing parameters, material and tools library, as well as library management function, and embedded with many application experience and expert information, DreamCreaTor has a quite high practical value. With large amount of optimized parameters, material and tool options, the operator, no need to have professional background, can use DCT equipment easily and complete all kinds of difficult and complex processing. Drilling and milling tools of different diameter and usage, or laser tools of different power and beam diameter, has different rotary speed, travelling parameters, repetition rate and travelling path for different material and different processing procedure. This makes processing easy and quality assured.
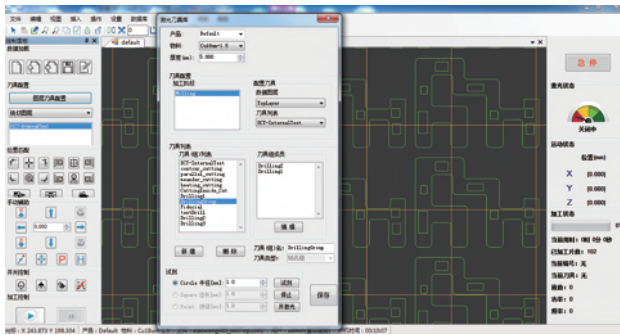
The library management function enables DreamCreaTor to be its best in detail, precision, coordination, matching and optimization DreamCreaTor. For example, for processing with complex tool combinations, the software provides tool sets modular, which can set the tool processing sequence and tool path according to needs flexibly, and automatically change tools during processing. For another example, according to different equipment and its configuration, based on the needs of material and process procedure, software could assign different scanning speed, scanning frequency, laser power, repetition rate, and processing environment. And there are 2 optional choices: tools priority, or scan field first. In case tools priority is selected, certain tool is chosen for processing. After finishing processing in a scan field, the same tool moves to next scan field for continue processing until completion of the whole field processing, and then it is replaced by other tools. In case scan field priority is selected, tools are exchanged and used in turn in one scanning field. After completion of all processing of all tools in this field, tools are moved to next scanning field, till completion of processing for all scanning field.
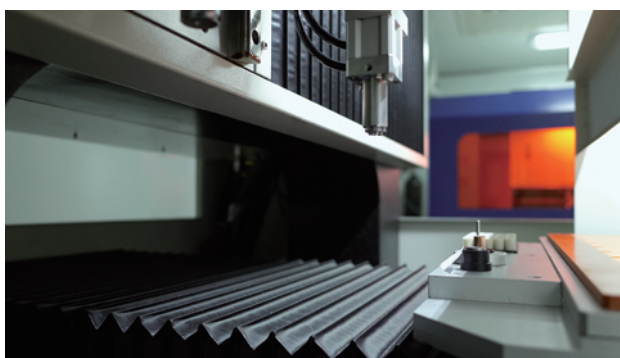
Driving software for safe production and management - DreamCreaTor

DreamCreaTor is equipped with the calibration and diagnosis module for DCT equipment. For example, start/stop and locate of the manually control machining head or workpiece loading station, observe and change status of I/O interface, check the system safety status, track processing, set/monitor/change options/ tools/ parameters beyond menu, record processing parameters and so on.
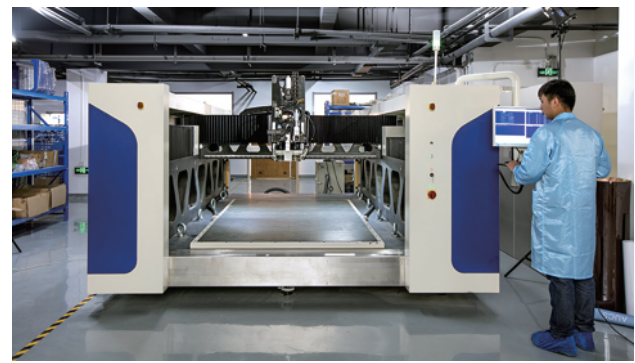
To further simplify the operation, facilitate equipment and process management, Login management of DreamCreaTor can be set into 5 different operation authority according to login information. By this way, the related person has clear rights, liabilities and separate roles. It could effectively avoid parameter and data rewritten. To a certain extent, it ensures implementation processing which effectiveness has been verified for a processing task, put an end to machining inconsistency caused by different operator or different shifts. For example, under normal circumstances, for operator level, it is possible to start the system, initialize, and choose a pre-set menu, and then process. While, for administrator level, it is possible to control each sub-system of the equipment, including: define menus, operate diagnosis, operate daily calibration, manually control working table, move or start/stop processing head etc. Of course, it is possible for the software to provide other login level and program certain rights according to actual needs.

For example, open the trial processing function, process with a tool on blank area of material, to observe the processing effect and adjust processing parameters. For another example, set a login level for processing engineers or their manager, allow them to optimize tools, material, processing parameters and processing environment and so on according to processing task.

It is possible for DCT equipment to choose and increase remote diagnose and control function. When the remote diagnose status is opened in DreamCreaTor, you can observe and control equipment through internet, without going to the site. It makes remote analysis and solve problem possible, accelerate the troubleshooting process and further reduce the risk of shutdown.

DCT believes that excellent driving software could increase value of equipment. On one hand, all hardware and software resources should be fully and efficiently used and managed. On the other hand, we should provide optimized processing plan for existing applications, provide tools to develop new application and explore potential ability of equipment. In addition, we should pay more attention to operation experience, provide concise, intuitive and beautiful interface for users, to create a fast, easy and smooth working environment. Based on above understanding, and balanced the needs of above 3 aspects, the software package, DreamCreaTor, is built for kinds of DM and DL precise direct patterning equipment by the Sino-German team of DCT.

Fast preview of main functions

- Machining head and graphic coordinate interactive function, coarse matching of theoretical graphics with position of material to be processed efficiently with multiple ways.

- Manual / automatic camera fiducial recognition and alignment function, support regular and irregular fiducial mark, automatic, accurate, fast matching theoretical graphics and actual material position.

- Various fast data edit function, such as rotating, zooming, translating and so on, without using data processing software, real-time data adjustment on-site.

- Trial processing field define function, save material and adjust processing parameters efficiently

- The intelligent tool management, built-in a variety of empirical data and expert information

- What You See Is What You Get (WYSIWYG) technology, real-time display current processing status and current position of processing head.

- The processing data measurement module, easily access to the detail size of data to be processed.

- The prompt function for special area, intuitively display pin area, camera effective area and so on.

- Operation and access level setting, facilitate production and management.

- The bidirectional data communication and processing technology, realize equipment active recognition/automation, and intelligent processing.

Technical parameter

DreamCreaTor	
import formats	LMD, extending Gerber (RS-274-X), other formats can be increased as requirements
Equipment to control	DCT DM series machining (drilling and milling) equipment DCT DL series laser processing equipment
Display functions	Zoom in/out, overview, multiple display choice, restore previous display, change display during processing
Processing status display	What You See Is What You Get(WYSIWYG). The processing progress bar shows processing progress in real-time. The status bar the coordinate of each axis, repeated times for processing, quantity of processed slices, the material and tools in using, and the core parameters of relevant tools in real-time.
Graphic operation	Move, copy, array, position matching between graphics feature points and machining head.(including random moving, rotation and mirror; automatically move graphic to processing head; automatically arrayl according to specified lines and columns.)
Mode of selection	select full or partial graphics, including: data for any processing procedure, specified parameters, cutting tools, arbitrary holes / lines / line segments, increasing or deleting from selected graphics.
Tools / laser / machining parameters management	Control rotation, traveling and stroke speed of tools, monitor position of tools, store actual working time, remind tool change in case a tool reach its pre-set service lifetime; control laser scanning/processing speed and times, control laser power and repetition, monitor kinds of parameters, set and monitor processing environment.
Library for Tools / laser / processing parameters	Provides a rich library for predefined tools / laser / processing parameters. Users can customize the tool / laser / processing parameter library, open editing functions for custom library
material & processing procedure	Provide library for a variety of predefined material, processing procedures, customize material and processing procedure, open editing functions for custom library.
Machining process control	Start processing from any graphic serial number chosen by operator; pause / continue at any time during processing; stop / start processing at any time; continue processing from break point by saving processing data; shield all other menu and button except "pause / continue", "stop / start" button during processing in case of misoperation; support mass production mode for laser equipment.
Automatic adjustment / machining	Automatic measurement of line width, automatic adjustment of cutting depth, camera / laser autofocus, automatic calibration of mirror distortion, automatic fiducial recognition and alignment, automatic correction on stretch and compression.
Manual mode	Switchable between automatic/manual tool exchange, switchable between automatic/manual measurement of line width by camera. Processing head could be moved to any position manually, or move to top left/right corner, bottom left/right corner or center just by a button automatically.
Production management	Several login-level for different operation authority, process recording & tracking function, easy and intuitive I/O diagnostic function, error reminding mechanism
Hardware and SoftWare requirements	Microsoft Windows XP/7 or higher, Pentium 1500MHz processors or better, min. 512MB RAM (1G RAM is recommended), screen resolution 1024 x 768 true color, min.100MB hard disk.

Parameter is subject to change without notice

德中DCT
Design Comes True

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SuZhou company

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