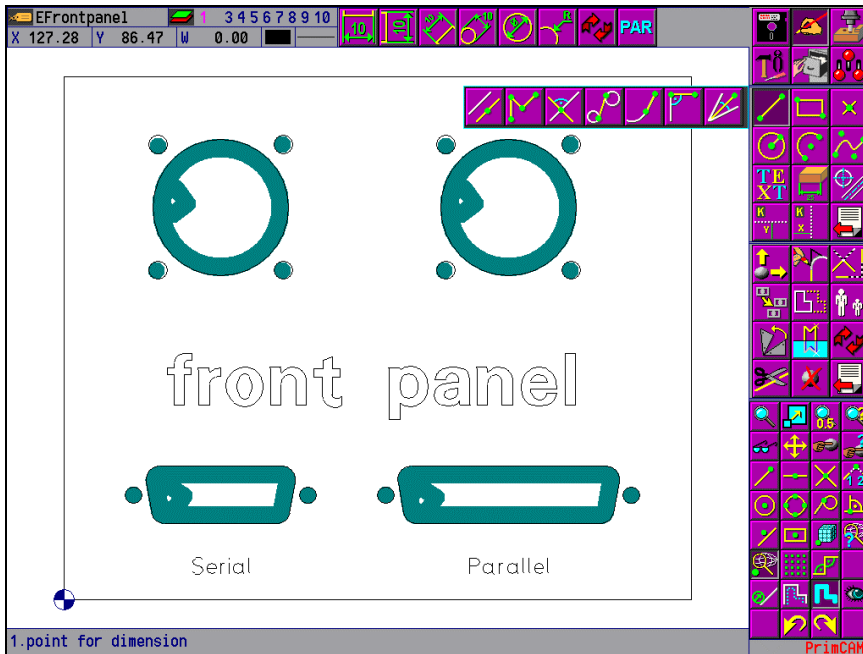# *PrimCAM*

- 2½ D CAD/CAM system
- Complete CAD integrated
- Easy definition of manufacturing
- Job manager
- Tool library
- Material library
- Part library with geometry and manufacturing
- Automatic calculation of spindle speed and feed
- Automatic generation of NC code for different machines using postprocessors
- Graphic simulation of toolpath
- for Windows 95, 98, NT, 2000 and XP

General features

- easy to learn and use thanks to a comfortable user interface with intelligible icons
- integrated CAD with dimensioning
- Import of drawings from other CAD systems
- Part libraries with geometry and manufacturing
- (M3) Use of postprocessors allows definition of manufacturing independent of the machine used later

User interface

PrimCAM has a comprehensive, user-friendly interface which guarantees quick access to all functions without working through a lot of pull-down menus. A simple, intuitive interface is possible by using the mouse driven user interface with meaningful icons. The drawing area stays as free as possible, so that a good overview is always guaranteed.

- Hierarchical icon menu bar for quick access to the extensive functions
- Big, meaningful icons for selecting the functions
- Clear menus with dialog boxes, filled with default values or recent inputs. You have to change only what is necessary.

- A context sensitive help system with cross references and a built in search utility offers extensive help for each function.
- Availability of different languages for the user interface.

CAD for creation of the drawing

The CAD part of PrimCAM includes all the functionality essential for creating drawings. So there is no need for an additional CAD-program. Should it however be necessary to import drawings from other CAD-systems (for example customer drawings), PrimCAM features the usual graphics exchange formats (for example DXF or HPGL).

- Functions for drawing lines, polylines, rectangles, circles, parallels, arcs, ellipses, curves, text and so forth
- Layer technique: different components of a drawing can be set to different layers, for example construction, dimension, text, drawing and median layers ...
- Typical zoom functions to inspect details of the drawing
- Construction lines (horizontal, vertical, angular, ...)

and construction circles on a separate construction layer. They can be hidden or deleted after use
- Editing functions like filleting, chamfering, trimming, expanding, dragging, moving, copying, rotating, scaling, mirroring, breaking, deleting ...
- Special functions like "circle tangent to 2 other circles", "circle with radius tangent to line and circle" etc.
- Cartesian and polar, absolute and relative coordinate input
- Multiple undo which undoes the last functions step by step
- Input of numbers on the keyboard with the possibility to include arithmetical calculations (functions: +, -, *, /, ( ), cos, sin, tan, acos, asin, atan, exp, ln, sqrt, **(power))
- Symmetric and asymmetric chamfers with selectable lengths
- Positioning of objects in a matrix, along a circle or along other objects
- Various snap functions, for example snap endpoint, intersection point, counter point (line, circle), snap tangential, normal, quadrant point, reference point etc.
- "Intelligent" snap function (selects the point, which is clicked with the mouse, and automatically installs the snap mode the user most probably needs)
- Support of various fonts for the drawing. In (M3), fonts can also be imported from other CAD systems (for example AutoCAD SHP/SHX, Windows TrueType)
- Possibility to automatically correct non-CAM-like drawings (overlapping lines or little gaps between the lines makes it difficult to mill a contour)
- Possibility to check or to change the attributes of objects numerically (for example the angles of an arc)
- Dimensioning possibilities for drawings
- (M1) Simple dimensioning possibilities for drawings (horizontal and vertical)
- (M2) (M3) Advanced dimensioning possibilities (radius, diameter)
- Advanced options to change characteristics like color, layer, text heigt for several objects together (e.g. change diameter of all circles to 10mm)

CAM part for programming of the manufacturing

The CAM part features efficient functions which are necessary for the creation of 2.5D NC-programs. The purpose of PrimCAM is to generate a complete NC-program automatically, so that there's no need for the user to make additional modifications. The option to make modifications is, however, left open. For

example, the approach and departure paths for milling contours will be created automatically, but can be altered by the user manually. One of the most significant features, resulting from the object oriented design of PrimCAM, is the fact that geometry and manufacturing are connected to each other. This means you are able to rotate, move, mirror, or copy an already manufactured part without reprogramming the manufacturing again afterwards. The tool paths are automatically changed during modification of the drawing. Parts can also be inserted together with the manufacturing into a library and can be recalled again in later projects, increasing efficiency.

- Contour and path milling.
- Pocket milling with islands.
- Different approach and depart methods (tangential, rectangular, along the contour).
- Different plunging methods (straight down, angular, helical).
- Rough cutting offsets for contour milling, path milling and pocket milling.
- Efficient algorithms for automatic calculation of tool paths for pockets with islands, paths, contours and so forth.
- Automatic or manual creation of the approach and depart paths for milling
- Modifications in geometry automatically change tool paths. Objects already programmed can be changed without loosing their manufacturing process.
- Various technologies, for instance spot-drilling, drilling, tapping, reaming, fine drilling cycle, engraving, and digitizing
- Manufacturing processes can be stored in the library
- Printing of tool database, job-schedule, material and tool library
- (M3) NC-Programs can be generated for different controls at any time just by selecting other post-processors
- Possibility to program rough cutting with offset and end milling without offset with the same tool in a single job
- Automatic repetition of a contour with deepen milling
- Matrix copy function with count of parts in X and Y and distance between copies
- The tool offsets for calculation of the tool paths come automatically from the tool library
- Simulation of tool paths of the completed piece
- Customizable libraries for tools, materials, cutting tables
- Automatic selection of the tool and calculation of optimal speed and feed rate relying on material, tool libraries, and cutting feed rate tables.
- Empirical database where the user can store optimal values for spindle speed / feed. These optimal values can be used under similar conditions (material,

cutting depth ...)
- (M3) Use of the capabilities of the machine control by supporting machine specific (cycles defined in the control, for example different drill-cycles like high speed peck drilling)

Part libraries with geometry and manufacturing

With PrimCAM you can create part libraries which not only contain the geometry, like common CAD-systems, but also the whole manufacturing for a part. An example: You need repetitively sparings for 9, 15 and 25 Pol Dsub connectors. With PrimCAM you can insert sparings for these connector types in the part library together with the manufacturing, that means with the program for drilling, milling and so forth. If you need these sparrings, they are simply loaded and placed (rotated and scaled appropriately) from the library.

- (M2) (M3) Possibility to have more than one part library
- (M2) (M3) Library manager, unlimited number of library parts
- (M1) Maximum of 24 library parts
- Parts can be equipped and saved with an icon. Then they can be reloaded by clicking the same icon.
- An icon editor permits the creation of icons for library parts
- Library parts can be "photographed" and saved as an icon

Technology database

PrimCAM integrates various databases for the management of tools, materials, cutting feed rate tables, machine controls and so forth. These permit the automatic calculation of speed and feed rates from the material and tools chosen.

- Tool library with saved values for tool material; diameter and length correction for automatic calculation of the compensated tool paths
- Material library with user definable cutting feed and speed rates for the different material classes
- Cutting feed rate tables for milling, drilling and reaming. These indicate for each diameter and each material class the feed rate per round or per tooth. Those tables are delivered with PrimCAM, already filled in. But they can easily be changed by the user any time.
- Feed and speed rate tables with empiric values gained by everyday use of the machine. These values can be

used instead of the mathematically calculated values when the conditions (cutting depth, material, diameter...) are similar to a value stored in the table.
- (M3) Machine library with machine specific data like postprocessor, communication interface parameters, maximal feed and speed rates, tool change point and so forth.

Data transfer

PrimCAM (M3) has an integrated data transfer capability to the CNC machine (send and receive).

- Transmits NC programs from the PC to the control and vice versa
- Data transfer through RS232 interface COM 1-4
- user defined transmission parameters: word length, stop bits, parity, baudrate,...

NC editor

PrimCAM (M2) und (M3) contain an editor using window technique, with which NC-programs or post-processors can be changed or created.

- ASCII editor for NC-programs and post processors
- Selection of commands by icons
- Delete, insert, move, block and search functions

Simulation

PrimCAM contains a graphic simulator the created NC programs can be simulated with. Errors in programs will be discovered and eliminated at an early state. The calculation of the manufacturing time for a part permits a disposition of the present CNC-machines.

- Two views of the part
- Current indication of the coordinates, time, feed rate, speed, tool and so forth
- Estimation of the total machining time
- Speed for the simulator can be adjusted

Text engraving / fonts / font editor

It is often necessary to provide an article number or serial number on a work piece. This can be managed with the engraving features of PrimCAM. PrimCAM itself is already delivered with a number of different fonts, which you can engrave in any size and direction. Because of the vectorial structure of these fonts, their

quality is guaranteed during scaling.

- Engraving with integrated text fonts
- (M3) Font editor for creating or modifying fonts yourself
- (M3) Font editor can make use of the functions of the CAD part (construction lines, curves, arcs, ...)
- (M3) Automatic minimization of the manufacturing time in a font
- (M3) Possibility to import fonts from external formats and save them in the PrimCAM format (for example AutoCAD SHP/SHX, Windows TrueType)

Import and export functions

The import and export functions of PrimCAM enable data transfer to and from various other systems. For instance, construction drawings, fonts and so forth can be imported from other CAD systems. PrimCAM also supports various export formats to communicate with other systems and printers.

DXF import is supported in all versions of PrimCAM

- DXF   AutoCAD drawing interchange file format

PrimCAM (M2) and (M3) feature the following import and export formats

Import (M2) and (M3):
- HPGL   Hewlett Packard Graphics Language
- Excellon   PCB-drill files
- NC-Drill   PCB drill files
- BMP   Windows Bitmap

Export (M2) and (M3):
- DXF   AutoCAD drawing interchange file format
- HPGL   Hewlett Packard Graphics Language
- BMP   Windows Bitmap

Postprozessors

PrimCAM (M3) can create NC code for different machines. Defining the manufacturing steps is independent from the machine, meaning that you can choose the particular machine for the manufacturing process after the definition of the manufacturing steps. For that purpose you simply select the postprocessor for the appropriate control and regenerate the machine specific NC code automatically within seconds.

- (M3) The postprocessors are open and can be created

or changed by the customer himself
- (M3) Post processors for common control types are already available, for example GE Fanuc, Heidenhain (DIN/ISO and Dialog), Deckel, Maho, Excellon, Datron CAD-3D etc.
  The list of disposable post processors is extended currently.
- (M3) When possible, higher machine commands are supported (for instance drilling cycles, ...)
- Possibility of automatically documenting the machine code (for example with the names for the manufacturing steps as "DRILLING WITH D10")

Modules

There are different expansion modules available for PrimCAM.
- Laser module for laser cutting, welding, engraving with support for lasers from Fisba, Haas, Lasag
- dispensing module with delay time for on and off

Hardware requirements

- IBM compatible PC with processor 486 or higher
- 16 MB RAM
- 20 MB harddisk space
- Operating system: Windows 95, 98, NT, 2000 or XP
- free RS232 port (only necessary for serial transmission of NC programs to a machine)
- Graphics card with a resolution of 1024x768 points, 256 colors (at least 1MB memory)

Demo version

Under www.primusdata.com, you can download further information, manuals and the program.
Without hardlock, it runs in demo mode with the following restrictions:
- Drawings can't be saved or exported
- The postprocessor generates files up to about 50 lines