

**GRAPHIC WORKING STATIONS – The MeCad Program**

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**Introduction**

In the knitted goods manufacturing, the CAD/CAM systems have become as important as the knitting machines. There is a multitude of systems made by the knitting machine manufacturers that make the command of the machine through the computer, having CAD-like annexes, as well as driving "on line" installations of the machines from the productive sections. There are companies or departments specialized in producing the soft that can work independently or in collaboration with the manufacturers of the knitting machines.

**1. The Programming Stations Configuration**

The simplest programming station is composed of: a computer and a 32 bite processor, a 300 MB hard disk and a minimum of 33 MHz frequency, a high resolution color monitor, keyboard and mouse.

There can be added to this configuration a variable number of peripherals: graphic tablet, plotter, scanner, video camera, white and black or color laser or ink jet printer. The installations are completed most of the times easily with the driving "on line" machine or with the modem (by phone line).

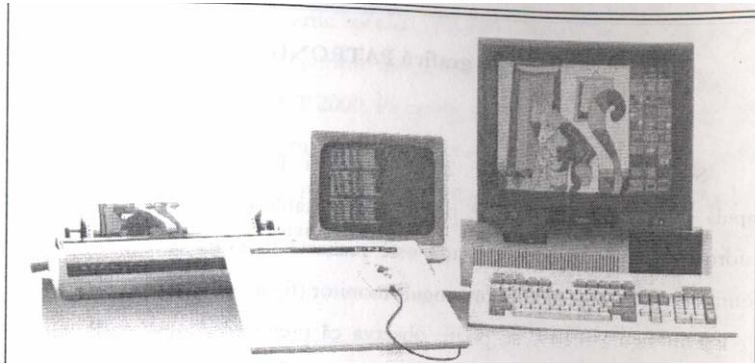
**2. The Graphic Station of the Variatex T.E.J.2500 Machine**

The Variatex T.E.J. 2500 machine (Transfer /Electronic/Jacquard) takes part of the Variatex series produced by the Mec-Mor company. This machine combines the high production of the circular machines with the possibilities of making panels of different width as well as of some curling-like structures specific to rectilinear machines.

The similitude among the technological possibilities of the Variatex T.E.J. 2500 machine with the Steiger Electra Baby rectilinear machine determined the Mec-Mor company to initiate a collaboration with the latter one, resulting in a software compatible for both machines. Therefore, the rectilinear machine was used for manufacturing the samples, which, after approval, were transposed by programming on the circular machine used for the production itself, the productivity having visibly increased.

All the knitting machine functions are controlled by a 4 Mb memory computer, which, according to the necessities, can be extended in order to obtain higher capacities. The knitting program is transmitted through a 3, 5" floppy disk or directly to the knitting machine through the "on-line" variant. The soft, that is used, permits to obtain the information concerning the functioning of the machine as well as the production.

The Graphic Station (fig. 1.) is composed of a 20" color monitor (256 colors). The number of colors can vary up to 16 millions hues. The drawing is done on this monitor or can be taken over from the graphic tablet. For the knitting program we use another color monitor. The central unit is of 386 type with 33 MHz, with a 90/130 Mb hard disk, a floppy disk of 5, 25" and 3, 5". The keyboard used is standard 101 keys. The graphic tablet uses a mouse-like reader and permits the making and the reading of the A3 format drawings. Optionally, a color printer is delivered. The soft program is accompanied by a HELP program that enables the user to solve any problem regarding the drawing or the program.



**Fig.1.** The graphic station from Variatex T.E.J. 2500[1]

### **3. The MeCad Program**

The MeCad program is conceived for the circular knitting machine Variatex T.E.J. 2500 that knits wool and wool-like threads, of different sharpness, according to the sharpness of the knitting machine, in chain panels for outdoor wear. This program is convertible, thus the drawings can be made on other knitting machines of the STOLL, JUMBERCA, SHIMA companies and vice-versa.

When opening the computer all the programs are load, the C :\> appears, complete with "graphic", press ENTER and the main menu appears on the screen. The available commands in the program:

- 1-change the page menu;
- 2-choose the color and make the outline of a circle or ellipsis, of requested dimensions, rendered in the X and Y coordination system;
- 3-choose the color and make the outline of a square or rectangular, of requested dimensions;
- 4-choose the color and make a full circle of requested dimensions;
- 5-choose the color and make a full square of requested dimensions;
- 6-choose the color and make only the margins of a polygon or a series of segments of requested dimensions, in the X and Y coordination system, rendered in number of rows (number of needles in work), and respectively number of lines;
- 7-choose the color and make right lines;
- 8-no command is active;

- 9-change the colors, combine the three primary colors – red – green – blue – in order to obtain the requested hues;
- 10-dispaly the dimensions of the model, in rows and lines;
- 11-replace one color with a drawing;
- 12-optimal increase of a model or detail; selection of an area and bring it to the same plan;
- 13-detail display window (can be adjusted and one can work with a chosen color);
- 14-the window of total delete of the screen (the color zero by all means);
- 15-establish the model size; the dimensions are increased or decreased, the number of needles (length) and of rows (height);
- 16-no functions;
- 17-color change in a selected area;
- 18-color change on the whole screen;
- 19-make a copy of the model;
- 20-insert and delete some lines of the mode on the whole page or on portions;
- 21-repeat the model;
- 22-color certain areas in the model with one color;
- 23, 24-non-functional windows;
- 25-make of Lynx models, with colors at option;
- 26-write the texts in the model, in the position and with the chosen color ;
- 27-move the model of the drawing in other position;
- 28-display the details of the model;
- 29-delete the screen;
- 30-verify and change the colors;

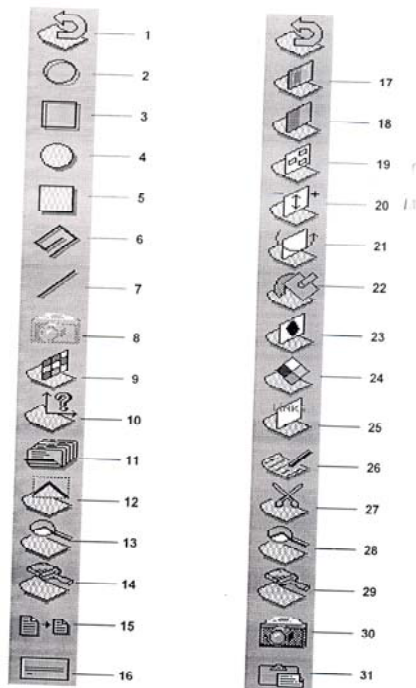


Fig.2. Available commands [3]

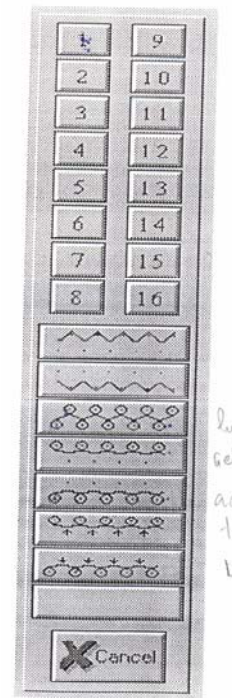


Fig.3. Choice of the structure [3]

A click on "SET-UP" enables the choice of the working cursor, the choice of the size of text characters, the change of the window dimensions, the activation and deactivation of the cursor, the choice for work of the mouse or of a graphic tablet, the set up of the dimensions of the graphic tablet and the choice of the language.

The menu "COLORS" groups all the colors that can be changed or redefined by the operator and enables: choice of standard color, 256, present in this palette, activation of the standard color by pressing "palette2"; choice of the color, defined on a scale from 4 to 16 (2 – green); activation of the color palette; a color from the drawing can be transparent (invisible).

The operator has six levels of increasing the drawing. With the help of the cursor a point on the drawing can be positioned

#### 4. The Preparation of the model

The preparation of a new model requires the covering of the following steps:

- 1.) Choice of color from "Working symbols";
- 2.) Choice of structure from "Special stitch";
- 3.) Establish the cymosa;
- 4.) Add the options for automatic functions;
- 5.) Definition of the cycles for encoding;
- 6.) Choice of the separation type and of the dividing line;

1) By selecting "Symbols" from the main menu enables the choice of the color, from 1 to 16, encoded with the numbers from 113 to 128, the choice of the structure: loops on the back, loops on the front, normal eyes on the back, normal eyes on the front, eye transfer on the back, eye transfer on the front, choice of the dimension of the drawing: maximal number of rows = number of needles = 1600 and number of lines = 1500, preparation of the model in view of the next dimension of the model, creation of the model, from down upwards, starting with : starting loops, tubes, elastic thread (if the case is), margin, transfer of eyes for passing to the panel body, the body of the panel – by areas according to the number of colors and to the structure, the additional lines and the dividing line.

2) At the choice of the structure, the operator has the possibility to prepare the drawing using the pre-defined structures from the menu "Special stitch" (figure 3). The pre-defined structures enables: choice of the report of working needle setting 1x1; 2x1; 3x1, choice of the structure, choice of the type of eyes crossed on the needles from the cylinder or from the disc; choice of one or another structure is made according to the elasticity of the thread and its resistance.

Also, one can opt for knitting the open work orifices by transferring the eyes from the cylinder into the disc, enables the choice of two types of curling (crossed eyes) of the cylinder and of the disc; offers the possibility of knitting the open work orifices by transferring the eyes on a certain number of needles (from -4 to +4), enables the move of the eyes from the cylinder to the disc and vice-versa. Choice of special colors for complex eyes, transfer or other functions: non available functions; Lynx knit fabric on

the cylinder eye, Lynx knit fabric on the disc eyes; transfer of the eyes from the disc into the cylinder; transfer of the eyes from the cylinder into the disc; transfer from Jacquard to Lynx on the cylinder; transfer from Jacquard to Lynx on the disc; flat knit fabric on disc with transfer from cylinder to disc; flat knit fabric on disc with transfer from disc to cylinder (for Lynx), flat knit fabric on disc with transfer from cylinder to disc, flat knit fabric on cylinder and transfer from cylinder into disc, flat knit fabric on cylinder and transfer from disc into cylinder.

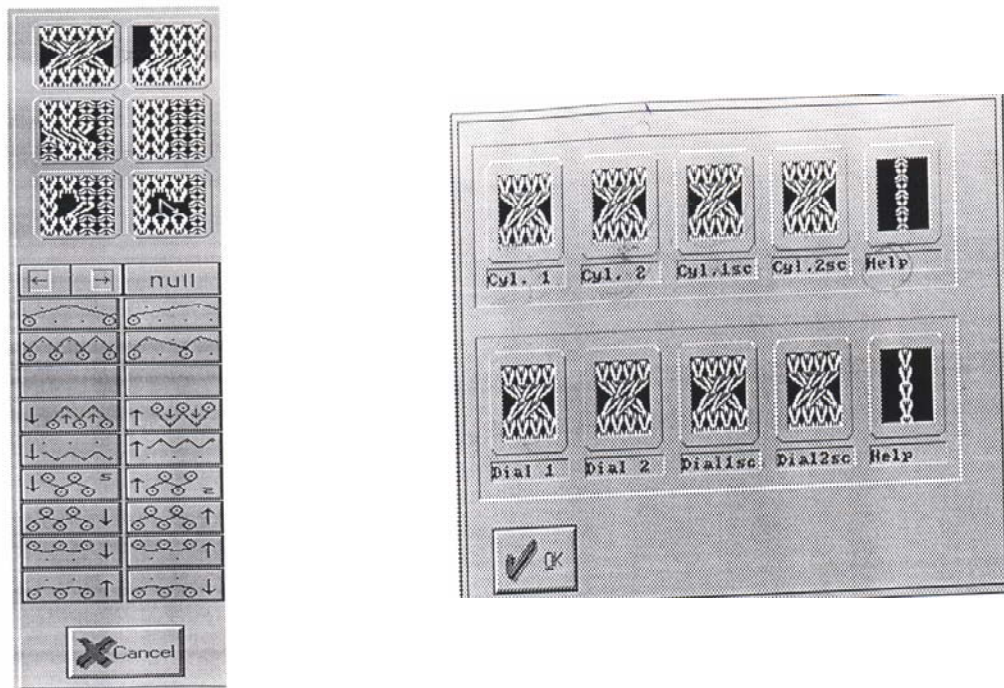


Fig.4..Pre-defined structures [3]

3) The compilation of the cymosa represents the separation margin of the panel on the vertical. The structure of the cymosa is according to the structure of the panel body and the operator opts for one of the 18 pre-defined structures established by the MecMor company through the MeCad program (figure 5).

4) Adding the options for automatic functions

Select from the menu bar "Process", the figure 5 appears and open "Option Lines" and from the window from figure 6 complete the table with the number of cycles (portions with different structures on the height of the panel); economizer: automatic repetition of a cycle as many a times as needed; creation of the starting net; establishing the number of free needles; choice of the font color, number of needles that form the net; choice of the dividing thread; automatic knitting of the panel.

5) Definition of the cycles for encoding. In order to define the encoding cycles there are five encoding cycles: 1.....49 available cycles for the operator to create drawings; 50.....100 cycles reserved for separation; 101....150 free cycles; 151....252 spare cycles.

For each cycle enter the menu "Machine commands" for encoding the sample.



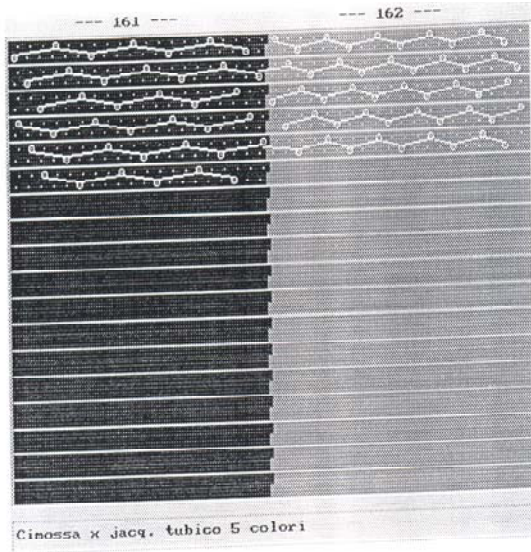


Fig.5. Cymosa [3]

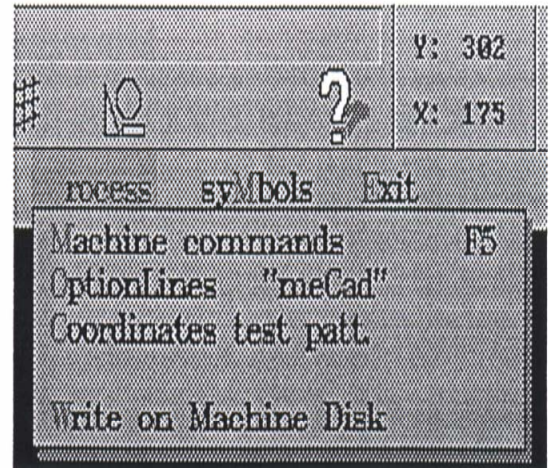


Fig. 5. Options of the command "Process" [3]

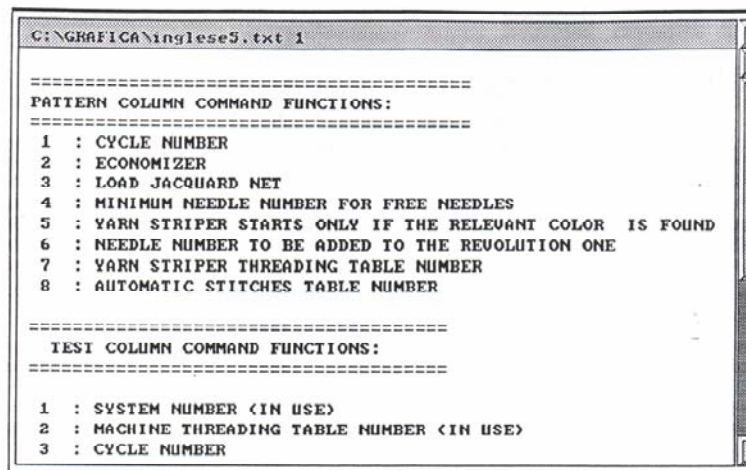


Fig.6. Table with the option command [3]

#### 6) Choice of the Jacquard type and of the colors

To separate the panels we knit a number of additional lines in a certain structure and of certain color and we knit at a knitting system from a different thread, of another color and sharpness.

Click "Symbols" select "Separation and test symbols" and the operator can opt for the Jacquard type.

Click "Information" in "Symbols Information", the operator opts for encoding the Jacquard type and the colors.

## **5. Conclusions**

The use of the CAD/CAM systems for projecting the structures and the products, as well as for drawing up the knitting programs, pursue the improvement of the product quality ensured by the program that is tested before use, the minimization of the waiting times of the machines when changing the articles, with implications on the increase of the production and the shortening of the manufacturing cycle and the shortening of the project-prepare stage of the programs.

### **Bibliography:**

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- [4.] \*\*\*Variatex T.E.J. 2500-Prospectul mașinii-Firma MecMor