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18-April-85
PS-LI Note 85-8

Description of the PIGS/MINI-GD3 package
implemented on the office machine (PDP-11-73)

Abstract

The Mini-GD3 graphics package available from DD was installed on the office machine and adapted to the Tektronix 4105 color graphics terminal. A large number of subroutines allowing 2 - and 3-dimensional curve plotting, text output in hardware or software generated characters and graphics input using the terminal's graphic cursor was thus made available. The implementation of the package was tested by installing the TRACE program on the office machine, where all graphics calls were replaced by MGD3 calls. In addition a console emulator package was written, simulating the console's touchpanel, it's subbuttons, it's color TV (Kinetics systems color TV driver), and it's numeric keypad. This note describes the differences of our MGD3 implementation to the standard DD one and it explains the programs mentioned above. The description of the standard package is available as a writeup on the IBM.

CHAPTER 1

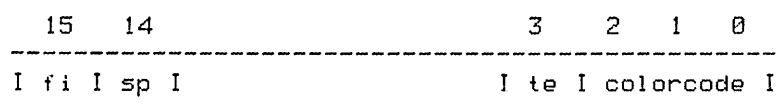
Differences between the standard MGD3 and our version

The standard MGD3 package supports only the old Tektronix terminals: 4006,4010,4012,4014,4015. In order to make the package run on the 4105 the new terminal type '4105' will now be recognized by the package (CALL TVDEV(4105)). This terminal type is also set to be the default type (in CPINIT). When calling CPINIT or TVBEG the 4105 is automatically set to tek mode, dalines = 2 and the RSX terminal driver is set to nowrap mode. A call to CPEND or TVEND (new routines) will restore the terminal to it's normal (edit) mode.

CHAPTER 2

New routines to drive the colors

Since all terminals supported by the standard package are black and white terminals new routines were necessary to drive the color possibilities of the the 4105. The routines CPCOLO(ICOLO) or TVCOLO(ICOLO) accomplish this.



The figure above shows the composition of the parameter ICOLO passed to CPCOLO. The line index, graphics text index and the fillpattern can be chosen through this call.

1. fi: If bit set, fillpattern will be set to the code given in the less significant bits.
2. sp: If bit set and fi bit set the special fillpatterns (1-16 of the tek operators manual) will be selected.
3. te: If fi not set and te set the color for the graphics text will be set. If te clear the line index is set.
4. colorcode: Specifies the color code (0 to -7 is coded as 0 to 7)

There are 2 routines to start a panel: CPBG2(X,Y,IBOUND) will start a panel in the current virtual coordinate system, while CPBG9(IX,IY,IBOUND) starts

the panel in screen coordinates. Continue the panel using the standard CPDRW2 or CPDRW9 routines. IBOUND has the same meaning as in the terminal's BEGINPANEL command. The panel is ended by a call to CPPEND.

When writing text, using Fortran WRITE (or TYPE) statements, while the terminal is in graphics mode, output resembling modern arts will be obtained. In order to avoid this, two additional calls are made available: CPEXP (TVEXP) expanding the 4105 dialog area over the full screen and setting the terminal into alpha mode and CPSHR (TVSHR) to return into normal graphics mode where the dialog area is restricted to 2 lines.

CHAPTER 3

The console simulator package

There were two different reasons for writing this package:

1. Testing of the MGD3 implementation
2. Trying if it was ergonomically possible to emulate a complete Linac console on the 4105 terminal.

These routines may later be used to run programs using console facilities via the network. For the moment only the trace program installed on the office machine makes use of these routines. It is however relatively simple to install new programs using console facilities, but not acting on the Linac control process. The following simulation routines are available:

1. CALL CONSUP(MODE): Normally: reserves console, here: puts terminal into console mode.
2. CALL CONRES: Normally: Releases console, here: puts terminal into normal (edit) mode.
3. CALL BTGET(IBUTON,IOTST): Reads the subbuttons (beyond the touchpanel) The subbuttons are emulated by the function keys F1-F4 on the 4105. IBUTON=1..4. IOSTS = 1 if action was successful, negative if device error.
4. CALL TPGET(IBUTON,IOTST): Reads the touchpanel buttons. IBUTON = 1..16. IOSTS = 1 if successful, negative if device error.
5. CALL TPPAGE(IPAGE): Reads the page text from disk and prints it on the touch panel. This routine is not yet fully implemented in the simula-

tor. The simulator routine needs the touchpanel text within the program (no disk read yet).

6. CALL TVCWRT(Y,X,BUFFER):Writes the text contained in buffer onto the color TV at coordinate X,Y. The text in buffer may be intercepted by control codes (204 set to graphic page, 205 set to normal page, control codes are given in octal). In the simulator the control codes 202,203 (for setting/resetting the flash bit) are not recognized. It is however possible to enable a third character set: CALL CPSCT(0) will use the Tektronix hardware characters while CALL CPSCT(1) will use software generated characters being point per point identical to the Kinetics driver's character set.
7. CALL COLOR(IFOR,IBACK):Set foreground and background colors for the Color TV. In the simulator the Kinetics colors are internally translated to the corresponding Tektronix colors.
8. CALL READKB(VALUE,IOTST): Reads the numeric keypad (+/- and 5 characters) Returns floating point number. All features including clear (letter C) are implemented in the simulator.