Display Manager

Aug 22, 2001
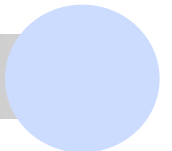
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EPICS seminar at IHEP, Beijing

Outline

1. What is display manager

2. Display Manager in EPICS

3. dm2k(or MEDM) Basic operation

What is a display manager

it is an EPICS tool to create GUI for a control system

- Pre-defined GUI components for a control system

  ▶ Meter, slider, buttons, text entry, slider, Strip chart, Cartesian plot, ...

- Design GUI screen using graphical display editor

- Each component is connected to the EPICS process database by channel name.

Display Manager(dm2k) Screen snap shot
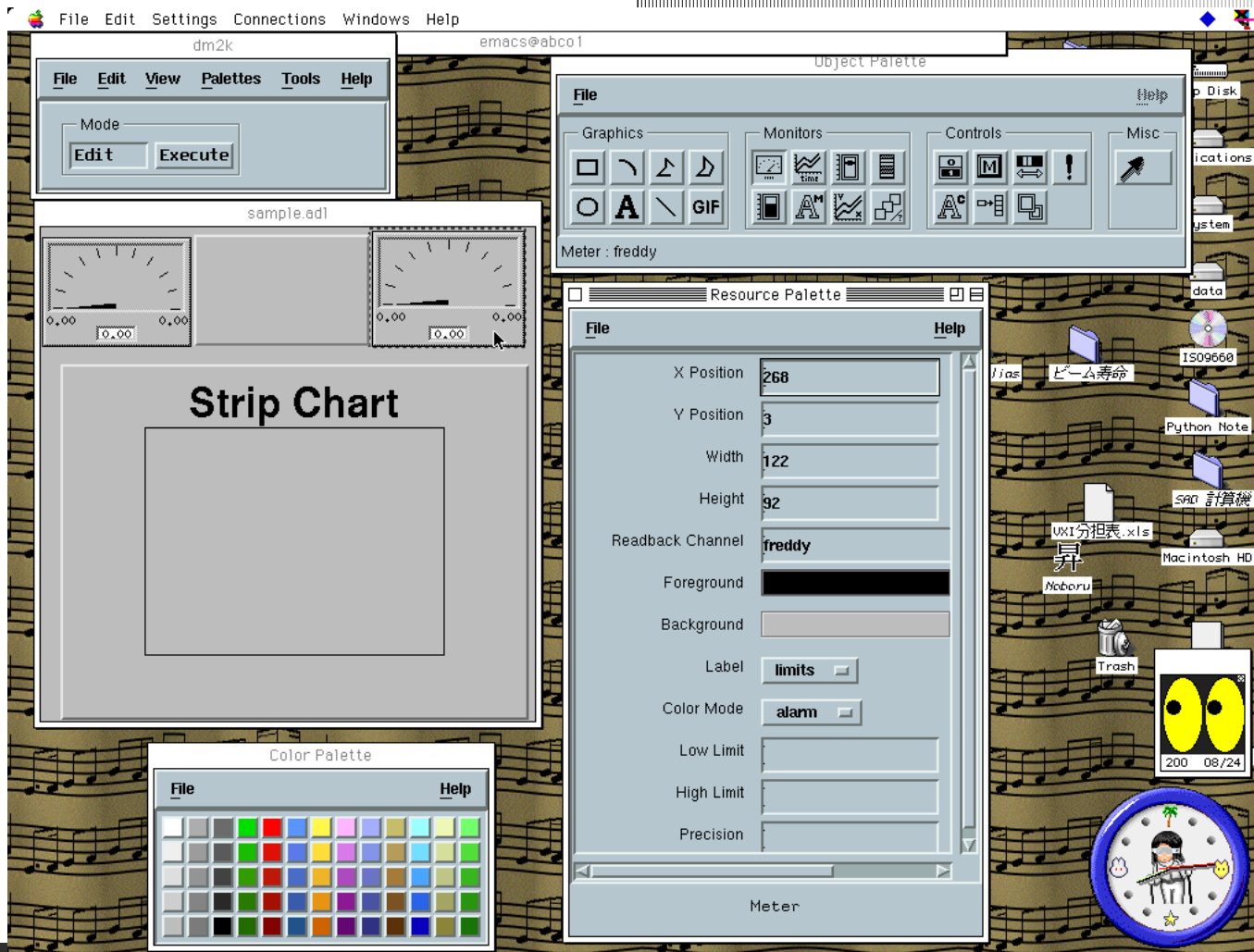
Display Manager(dm2k) Screen snap shot
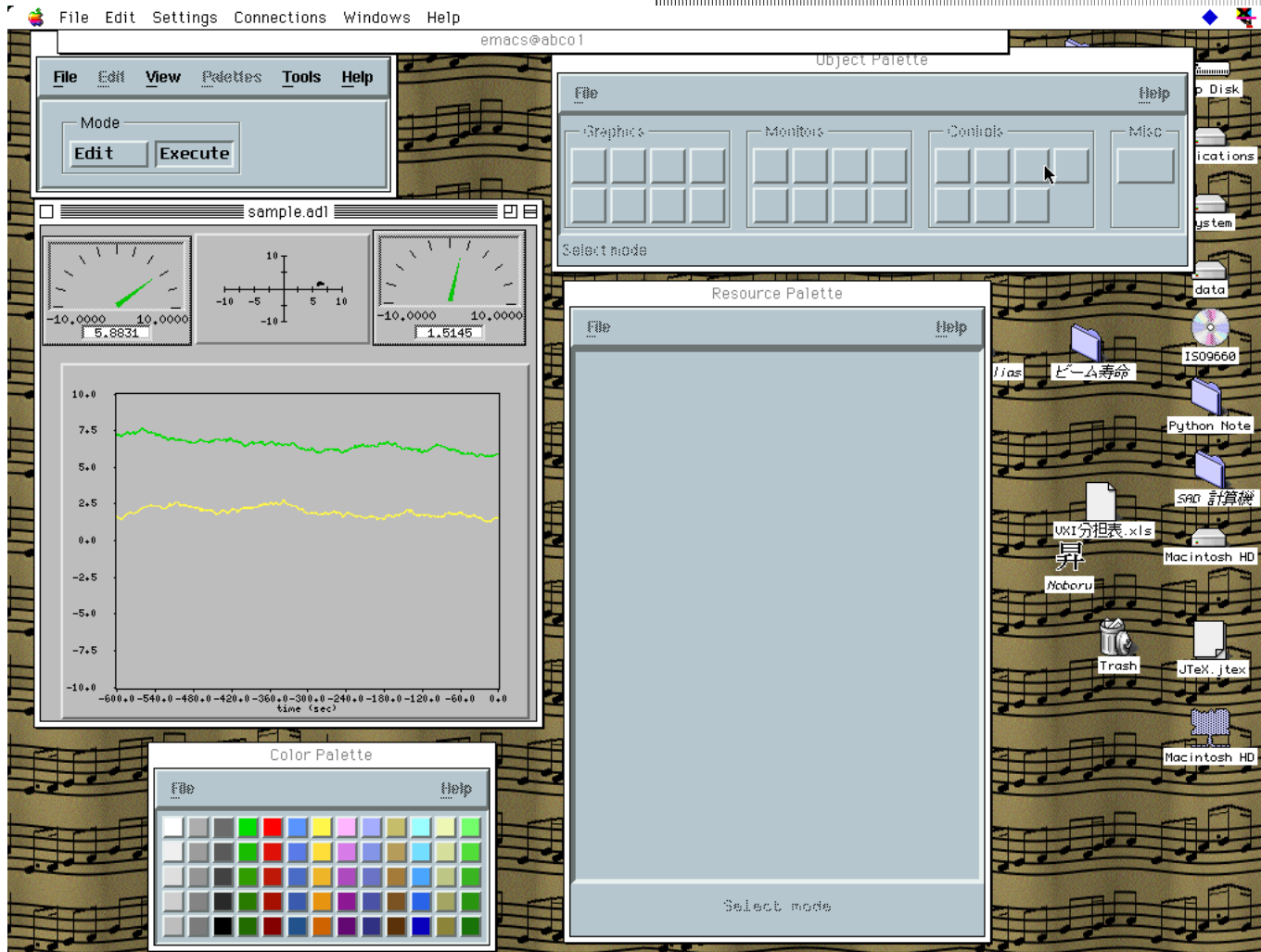
Display Managers in EPICS

EDD/DM (Display Editor and Display Manger)

- The first display manager in EPICS.

MEDM (Motif based Display manager, Editor and DM in a single program)

- Currently Maintained at APS/ANL.Latest version is 2.3.6

- Runs on Unixen and Windows(using X11 library)

- need XRTGraph or JPT(Jefferson Plotting Toolkit)

- support CDEV

DM2K

- Derived from MEDM(2.2?)

- Currently Maintained at BESSY.

More Display Managers in EPICS

JDM : Java version of display manager

- Under development at JLAB.

EDM: Extensible Display Manger

- Developed at SNS-LANL

Other tools can be also used to create GUI.
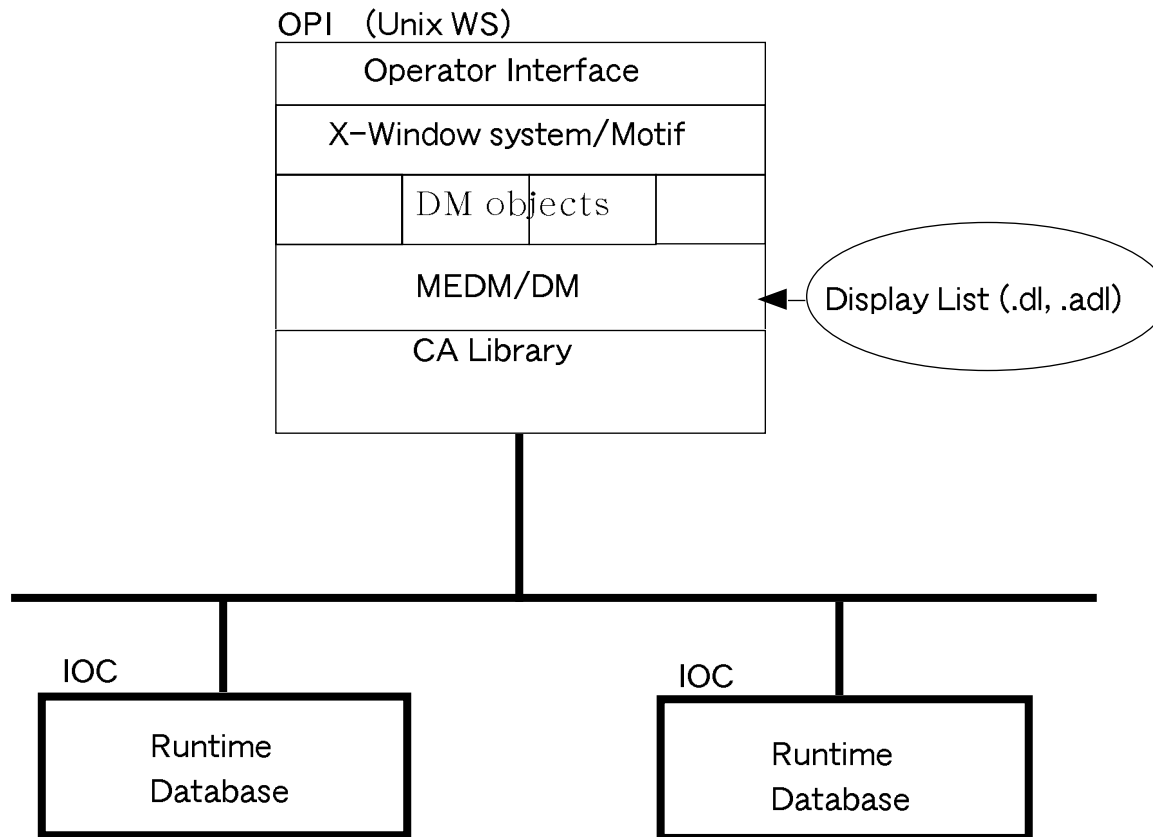
Tcl/TK
Python with Tkwidget
SAD with Tk widget
LabView, ...
Visual Basic, Delphi ,
X-window(Motif, GTK,...) ,....

Display Manager configuration file

OPI　(Unix WS)

| Operator Interface |
| X-Window system/Motif |
| DM objects |
| MEDM/DM |
| CA Library |

Display List (.dl, .adl)

IOC

| Runtime
Database |

IOC

| Runtime
Database |

JDM: Java Display Manager

JDM : Java Display Manager
Synoptic Display Package

- **Emulates MEDM widgets (at 95% level)**
  - Can parse existing .adl files
  - Supports macro substitution

- **Programmable**
  - JDM widgets and custom code can be mixed, allowing higher functionality interfaces than MEDM, and better programming language (personal taste) than tcl/tk

- **Widget set includes:**
  - primitives: line, rectangle, oval, arc, polygon, text, pixmap (can dynamically change color, visibility)
  - advanced: meter, strip chart, slider, bar chart, button, menu, text entry, x-y plot

Extensible Display Manager

Developed by John Sinclair at Oak Ridge.

Easy to add widgets.

Better color rules and visibility than any of the others,

Includes the ability to put calc record type PVs in the

local display.

Basic operation of dm2k: Startup
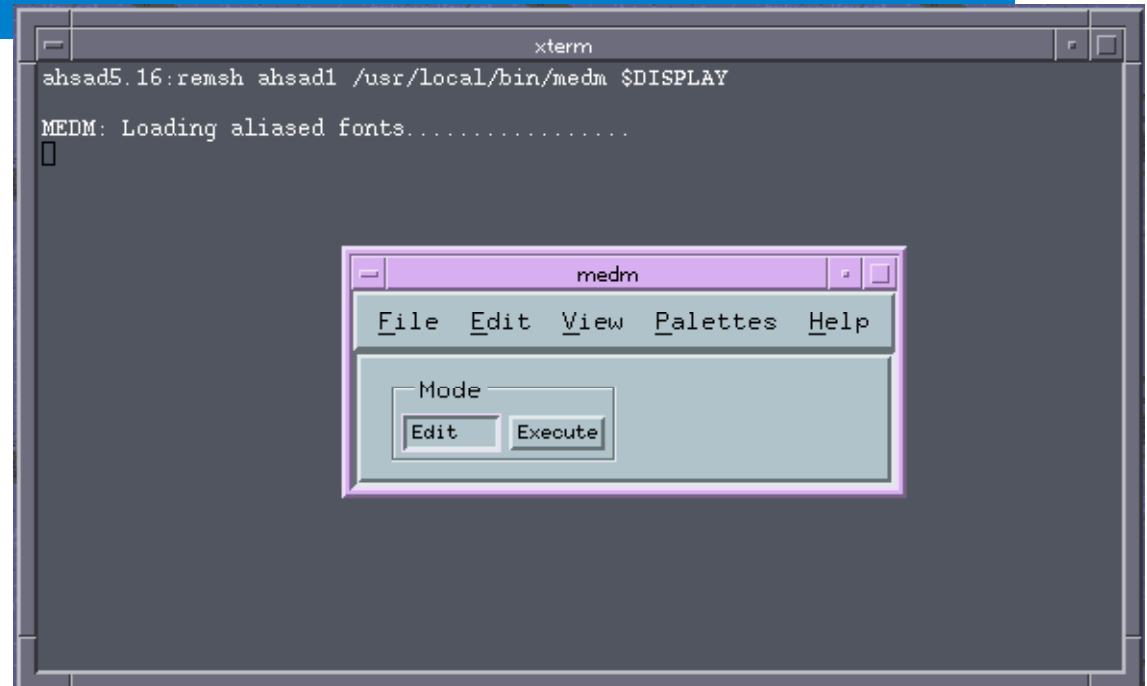
Execution modes in
MEDM/DM2K

- ► Edit mode
  Edit Display and property of

  objects on the display

- ► Execute mode
  connects objects to EPICS
  channels.

Starting MEDM/DM2K in Edit Mode:

```
% dm2k -displayFont scalable
```

or

```
%medm
```

```
xterm
ahsad5.16:remsh ahsad1 /usr/local/bin/medm $DISPLAY

MEDM: Loading aliased fonts.................

                    medm
    File  Edit  View  Palettes  Help

      Mode
      Edit    Execute
```

start dm2k in execution-only mode.
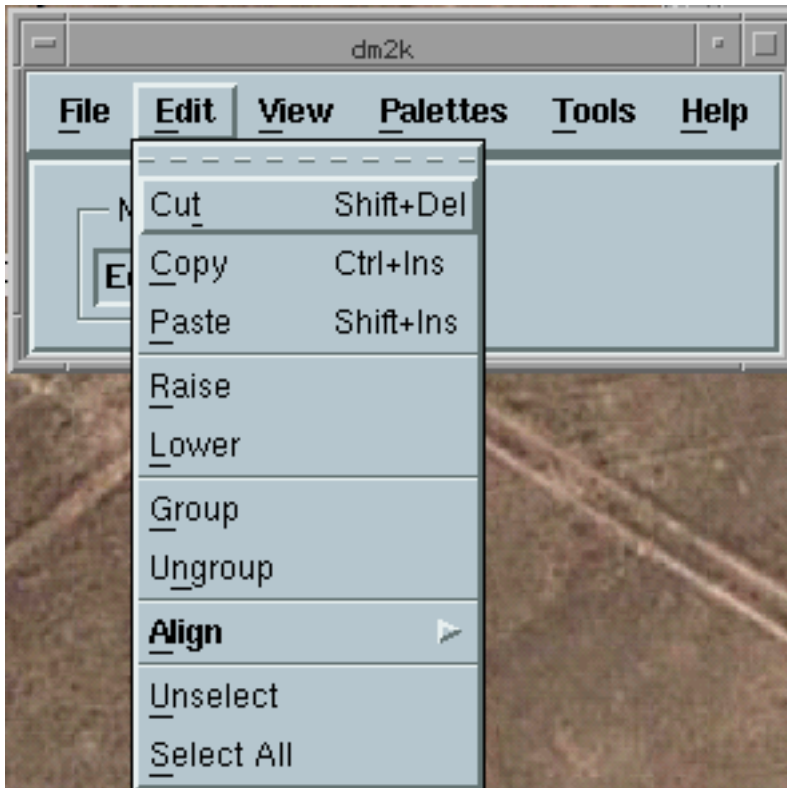
```
%dm2k –x
```
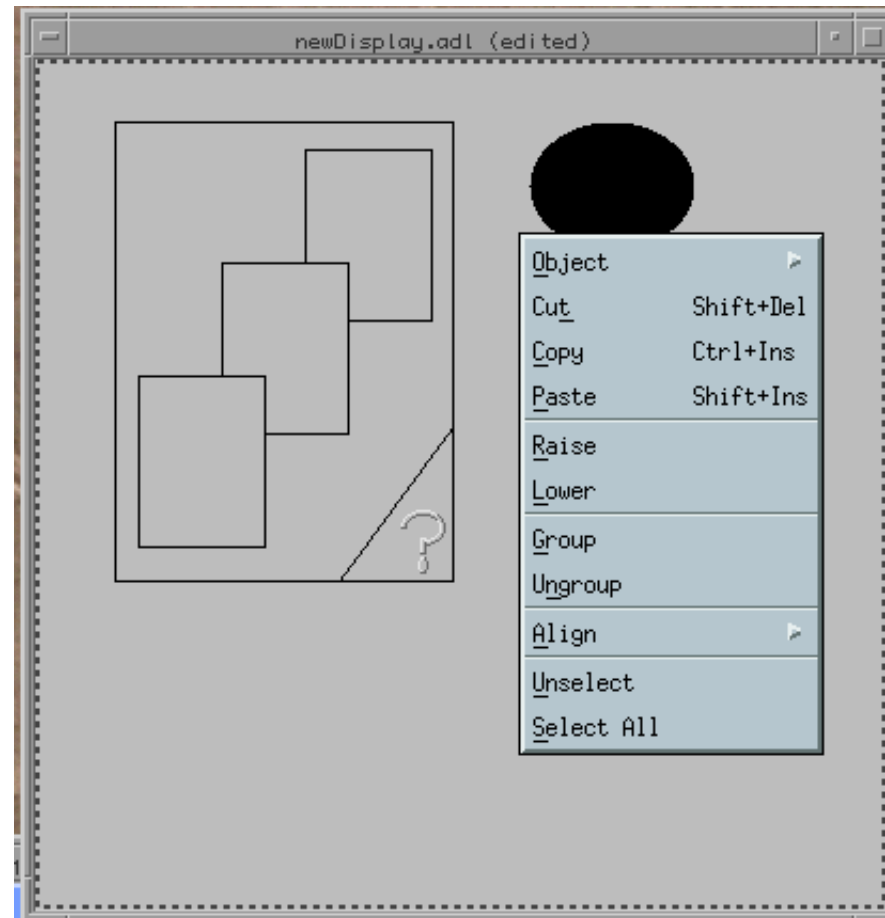
dm2k: File Menu

File menu is used to:

- Create a new display

- Open an existing display

- Save the display to the file
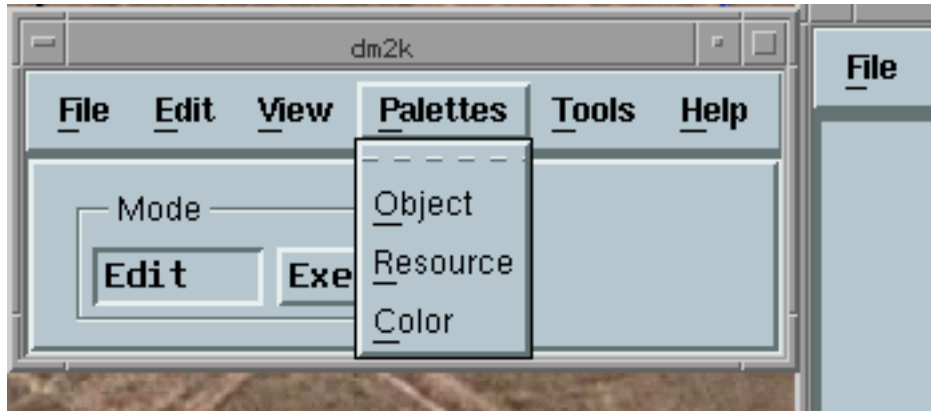
- Close the display file.

dm2k: Edit Menu

Edit Menu in main menu bar   Floating Edit Menu :Shift+mouse 3

dm2k : Object palette

Objects

- **Graphics**
  - ▶ Can change color and visibility
- **Monitor**
  - ▶ Meter, Strip Chart, Indicator, ...
- **Controls**
  - ▶ button, menu, slider, text entry, shell,

Graphics/Monitor/Controls objects can be related to the channel.
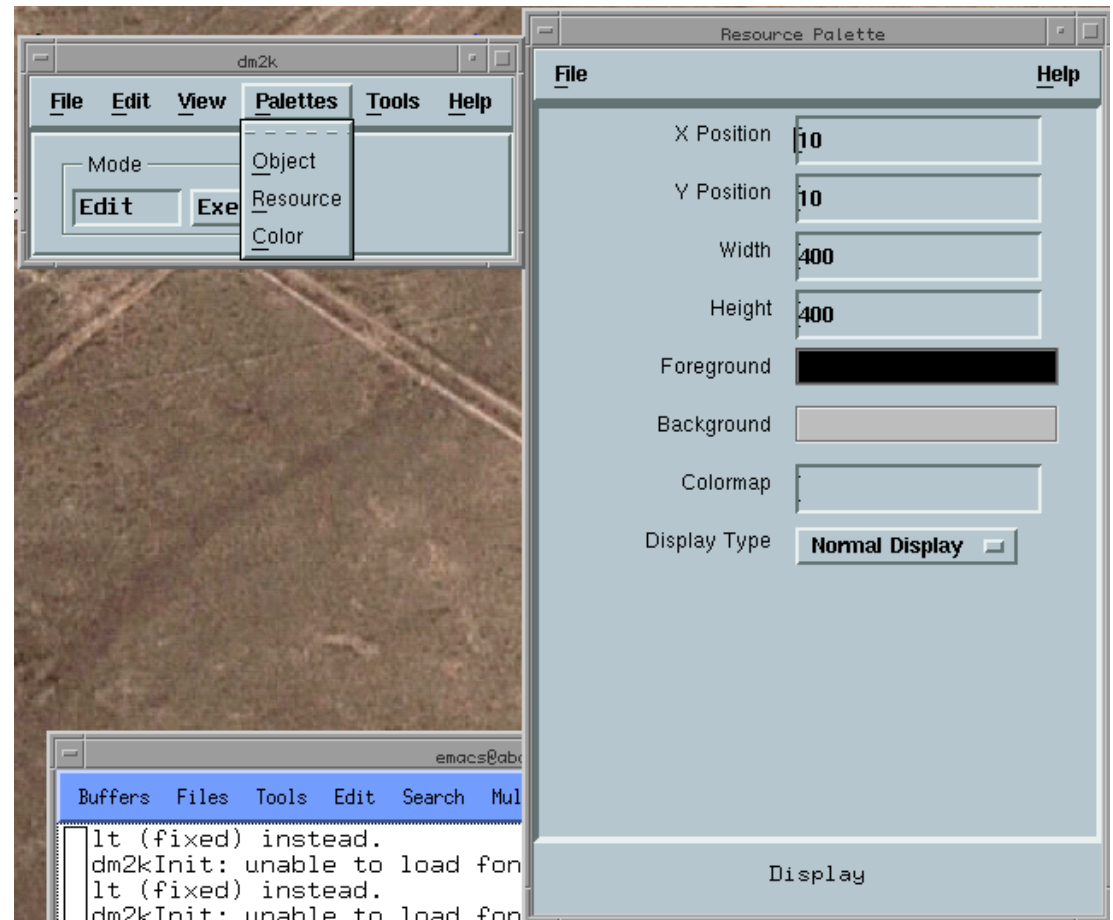
Value of the channel or change of value of the channel changes appearance of the objects.
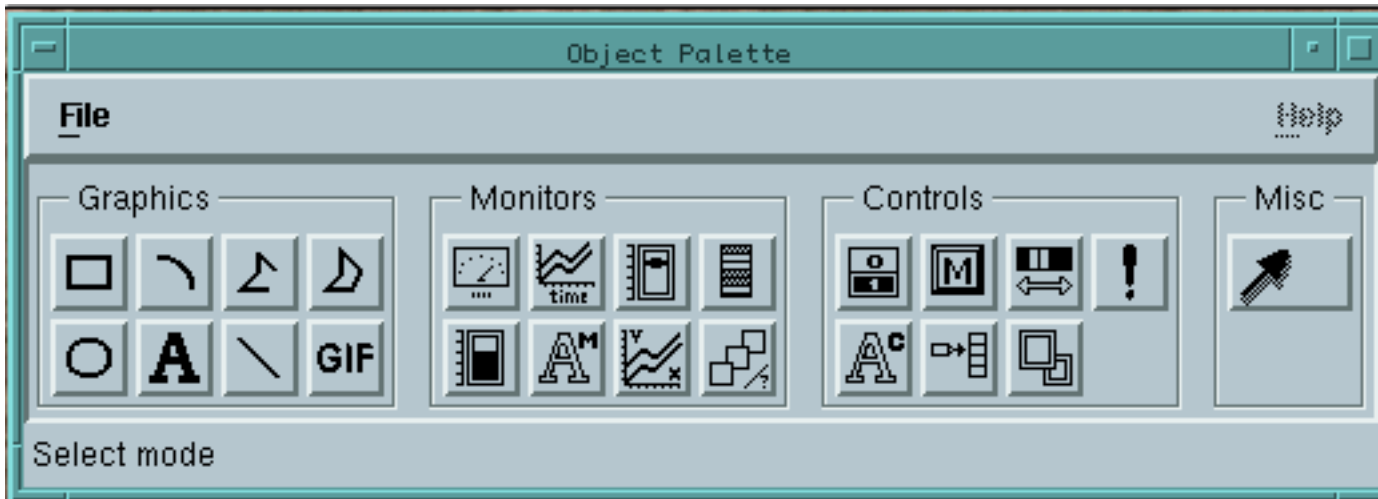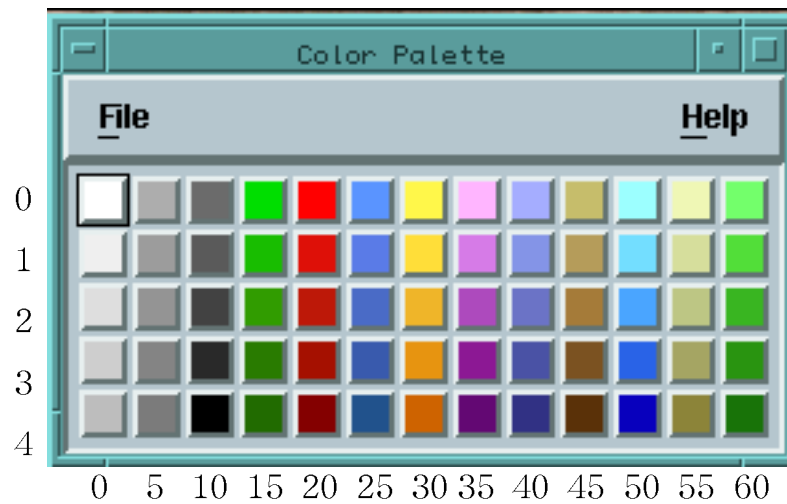
dm2k: Resource Palette

Set/Modify attributes of
Objects on a display window.

- Position of objects
- Size of objects
- Color (fg/bg)
- Colormode
- Colormap
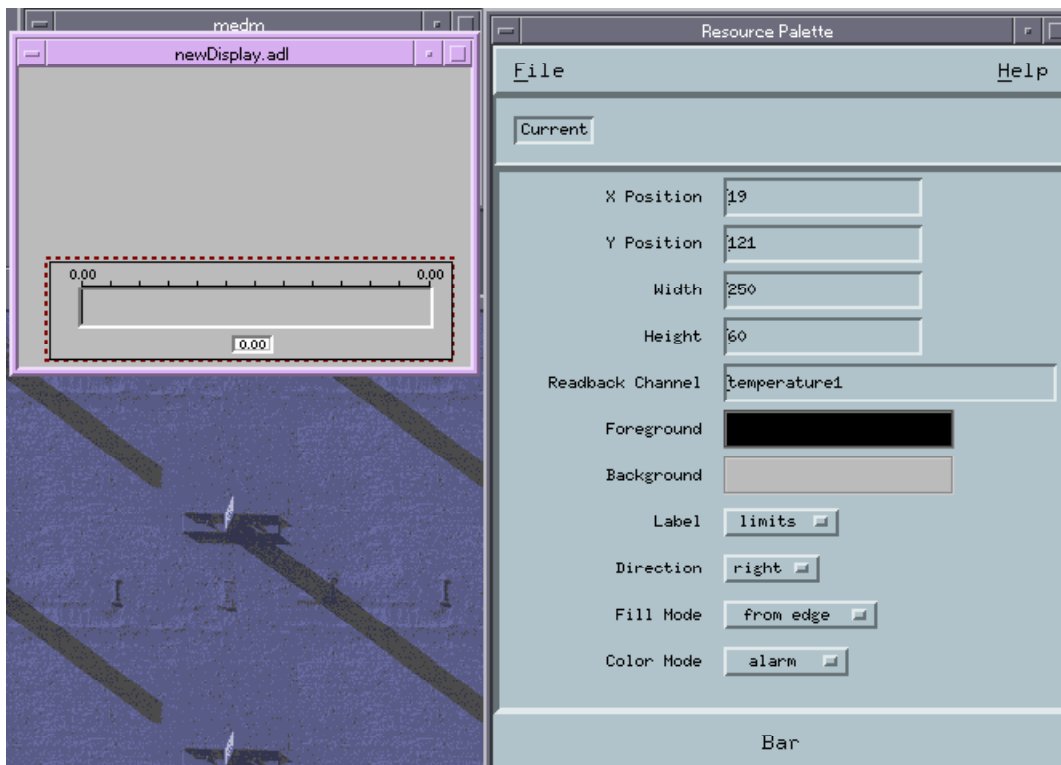- Related Channel
- .....

dm2k: Color Palette

Pick Up Color from Color Palette

dm2k: Creating display

"File -> New Display" Menu creates a newDisplay on a screen.

Basic Mouse Operation

- MB–1 : Select object

- Shift+MB–1 : Multiple Selection

- MB–2 : Move Object

- CTRL+MB–2 : resize object

- MB–3 : Floating Edit Menu

dm2k: dialogues

Normal Display
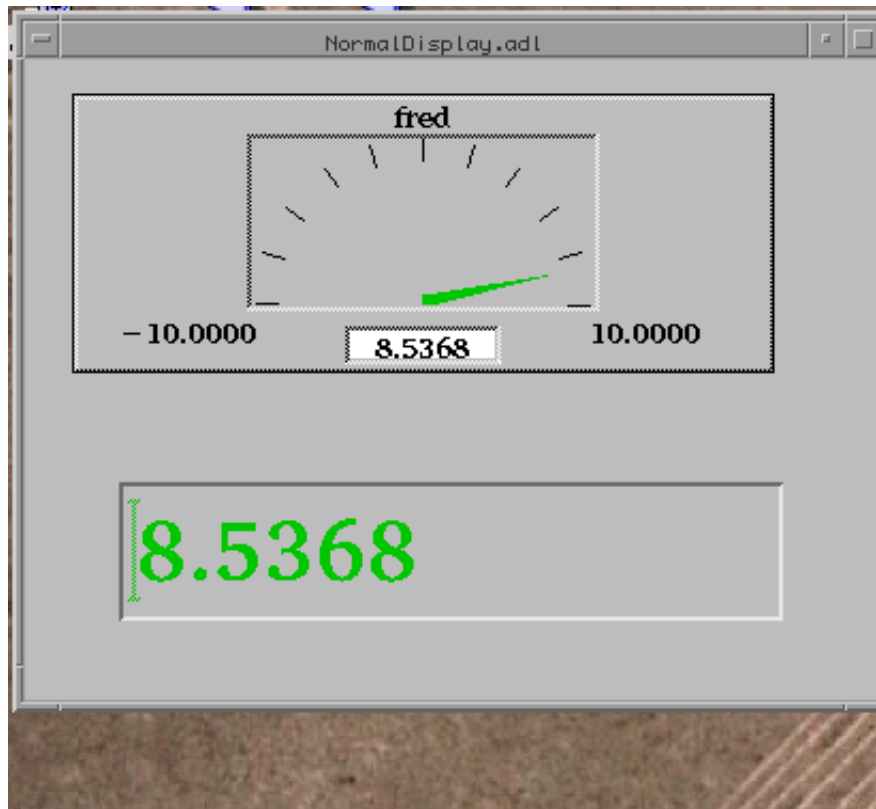
Modal/Mode less Dialogue
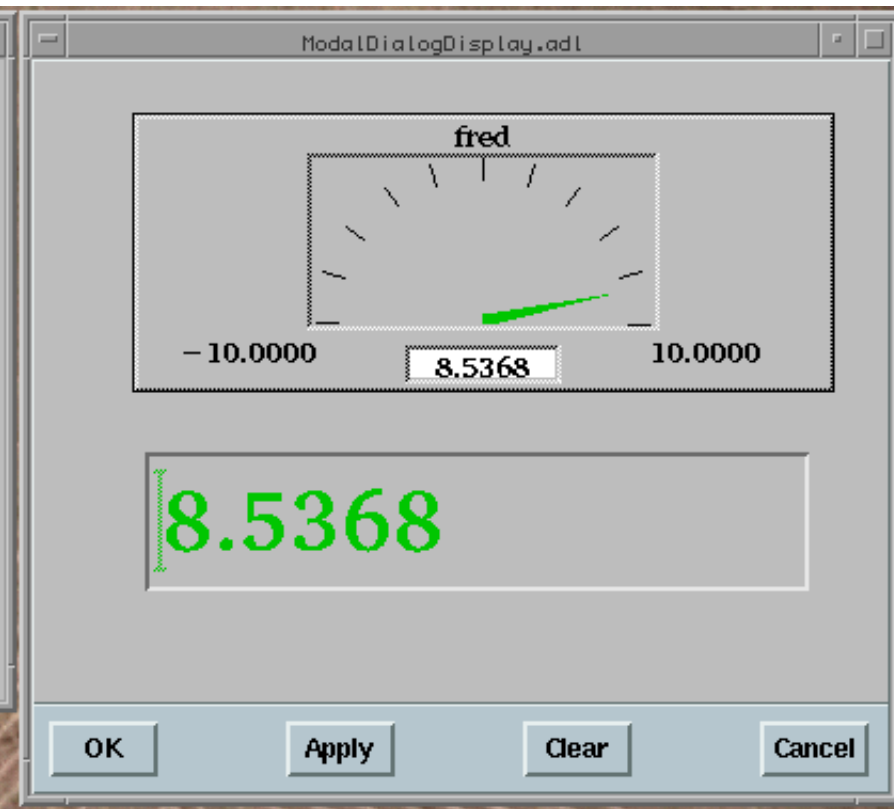
dm2k:Misc

dm2k -local

- Start multiple dm2k process on a same display

dm2k -cleanup

- After dm2k crashed, you might need this option to startup dm2k/medm.

dm2k: macro in a channel name

Default macros

- USER

- HOST

- DISPLAY

command argument

- -macro "<var>=<value>, <var>= <value>"

Related display argument

- <var>=<value>, <var>= <value>

  These values are cited as $(<var>) in an adl file.

Macros are replaced only if the display is open in execution mode.

dm2k: Color Rule

An object can can change its color according to the value of a related channel.
"Color Rule" is a table of value ranges and related color.
You can define number of color rules in a color-rule file.

Environment Variable

- ## DM2K_COLOR_RULE /MEDM_COLOR_RULE:

  - ► define Color Rule File name

  - ► "./ColorRules" is a default color rule file name

Color Rule File Format

» colorRule Zeus-FB

»   0.0   0.1   20; red

»   0.1   0.9   40; blue

»   0.9   1.0   15; green

"Zeus-FB" is a name of this colormap.
Each line has lower value, upper value, and color.
Color is specified by number in color map.

Dynamic Symbol/Graphic Rule

A "Dynamic Symbol" object can can change its according to the value of a related channel. "Graphic Rule" is a table of value ranges and related files .

DM2K_GRAPHIC_RULE:

define Graphic Rule File name

"./GraphicRules" is a default color rule file name

Graphic Rule File Format

graphicRule romsky#test

0 0 ComplexDynSymbolLib.adl test1 abc=10,def=20

1 1 ComplexDynSymbolLib.adl test2 abc=10,def=20

<lower_bound> <upper_bound> <adl file> <element name> <macros>

dm2k : Environment Variables

DM2K_READ_ONLY : (default unset)
  open panels in execute-mode but read only

DM2K_COLOR_RULE : (default: 'ColorRules')
  to define the name of color rule file. If the env is not set,
  then dm2k reads file ColorRules in current directory.
  If there is no such file, it uses default.

DM2K_GRAPHIC_RULE : (default: 'GraphicRules')
  to define the name of graphic rule file.
  If the env is not set, then dm2k reads file
  GraphicRules in current directory.

EPICS_DM2K_DEFAULT_MB3_DISPLAY : (default: unset)
  A default adl-file to be called on MB3-click on various elements.
  It is given the macro 'record=<PV>' of the PV of the selected
  element.

DM2K_MAIL_CMD_ : (default: 'mail')
  The mail-command to use in the Message Window
  The program is called the following way:
    '<mail_cmd> -s <subject> <recipient>'
  and the message is given on stdin.

DM2K_HELP : (default: unset)
  For mwm-compliant window-managers a command
  can be given to be called if e.g. 'Help' is selected from t
  he main-window-menu.

DM2K_HELP_PATH :
  (default in Makefiles: 'http://help.bessy.de/Dm2k/
  This is the basic part of the URL to call via netscape
  for the Help-system.

EPICS_DISPLAY_PATH : (default '.')
  adl-files, mfp-files and gif-files are searched in these
  colon-separated directories.

NETSCAPEPATH : (default 'netscape')
  netscape-program to call for online-help.

PSPRINTER : (default: unset)
  PostScript printer to use for printing displays

dm2k command syntax

```
Usage: dm2k [ -x|-e] [ options...]
       [ -displayFont <font>]
       [ -macro "<name>=<value>,<name>=<value>..."]
       [ X11 resource options...]
       [ display file names]


    parameters:
        -displayFont  select alias for scalable fonts
        -macro        apply macro substitution
    options:
        -readonly     run in read only mode (no CA put)
        -local        don't participate in remote display protocol
        -cleanup      support remote display protocol, ignore existing instances
        -cmap         use private color map
        -dump         dump compiled in fallback-resources to stdout and exit
        -bigMousePointer   use big cursors
        -silent       reduced error massages
        -wmPositionPolicy define the WM positioning policy : FRAME or USER
        -verbose      display verbose error messages
        -debug        provide debugging information
        -synchro      run X11 protocol in synchronous mode
        -help         print this message
    X11 resource options:
        -display
        -displayGeometry
```