

GDCT User's Manual

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**How to use the Graphical
Database Configuration Tool**

The Graphical Database Configuration Tool (GDCT) allows the user to build EPICS databases and visualize links between records and process variables.

Definitions

- “.database” - The EPICS binary database file.
- “.db” - The ASCII representation of the records in a given “.database” file.
- Drawing Area - The area in the tool where records are shown graphically and links are visualized.
- Hidden Records - Records that exist in the current database being edited, but are not seen graphically.

Basic Principles

GDCT creates and maintains two files: a graphical information file and a “.db” file. The “.db” file contains only the information that EPICS needs and understands to create a “.database” file. This information is basically just EPICS records and fields. The graphical information file contains the graphic representation of the records and links in the “.db” file.

Understanding the Files

The tool is designed to edit graphical files and “.db” files; a “.database” file is generated by the user from the current session. When a session is saved by the user, the graphical file is saved with a name given by the user. The “.db” file is also saved, it has the same

name as the graphical file with an extension of “.db”. The graphical file is the file that is opened by the user. The “.db” file is read in along with it. The “.database” file name when generated is completely unrelated to the graphical file and “.db” file. It can be specified independent of these two file names. The tool comes up with an empty, unnamed database ready for records to be added. The default “.database” file name for an unnamed database is XXX_noname_XXX. The first time that a session is saved, a check is made to see if the “.database” file has been named, if it has not, the “.database” file name is set to the graphical file name. When the user generates a “.database” under these circumstances, it will be named the same as the graphical file with the extension “.database”.

Starting the Tool

GDCT is run from an application directory. A default.dctsdrr should be present in the directory where the tool is run. If a default.dctsdrr file is not present, the tool can be started using the “-s” option as follows:

```
gdct -s the_default_dctsdrr_file_to_use
```

Two windows will appear on the screen, one is the tool palette, the other is the main drawing area with menu bar. The tool palette contains items that act on the drawing area. Selecting a tool with the left mouse button makes it the currently active tool.

The main window contains a menu bar with file and edit operations, an information line, and the main drawing area. The information line shows the name of the current graphic file name on the left and the current database name on the right. In the lower right corner of the screen are controllers for panning around the drawing area.

As mentioned previously, the tool comes up editing an empty unnamed database.

Editing

All selecting is done with the left mouse button. A tool selected from the tool palette will be used at the point where the left mouse button is pressed in the drawing area. The items found in the tool palette are: select, move, scale, examine, text, circle, rectangle, record/type, and external link.

Tool Palette

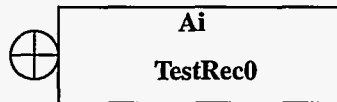
- | | |
|--------------|--|
| Select: | Used to select items in the drawing area to act upon. |
| Move: | Move a item or a group of selected items in the drawing area. |
| Scale: | Change the size of an item or group of items in the drawing area. |
| Text: | Create a text annotation in the drawing area. |
| Circle: | Create a circle in the drawing area. Intended for annotating the database. |
| Rectangle: | Create a rectangle in the drawing area. Intended for annotating the database. |
| Record/Type: | Create a record instance graphic in the drawing area at the point where the mouse is. A dialog box will appear to ask for the name and type of record to create. |

- External Link:** Create a graphic for connecting to a process variable external to this database. This is used for visualizing channel access links.
- Examine:** This tool is used by holding down the left mouse button on a graphical object in the drawing area and selecting an item from the pop up menu. The items on the menu describe actions to be carried out on the graphical object. The examine tool provides the ability to edit internal attributes of a graphical object, rename the object, and other functions described later.
- Linkage Tool:** Allow the user to connect two linkage nodes together and show link attributes of PP/NPP and MS/NMS.

Creating a Record

When a new record graphic is to be created, a dialog box appears. The dialog box lists the available record type and has a place to enter a new record name. The three buttons available are show, create, and done. The show will be explained later. Create makes the record with the name in the new name entry field. Done removes the dialog without doing anything. A object will appear similar to the one in figure one. The circle with the cross hairs on the left is a linkage point. All links will contain these nodes. The node as it appears here on the record graphic is where a forward link to the record will connect.

FIGURE 1. Record Graphic



When a record is created, no fields are available to link to. The examine tool must be used to produce the list of available fields. Selecting fields from the field list makes them visible as part of the record object. The reason for making GDCT work this way is that records have many fields, most of which have no link information. This mechanism allows the user to see only the fields relevant to linking. Adding unnecessary fields to the graphic should be avoided, they take up a large amount of screen real state and do not convey any important information.

Linking

The direction of flow through link is from left to right; data enters the record on the left and exits from the right. There are three types of fields that can appear as part of the record: data, in, and out fields. Data fields hold a piece of data, such as the VAL or HIHI fields of a record. Since the data fields can be populated by other record's output fields and read by other record's input fields, a connection node will appear on the left and right side of the field. Input links appear with a connection node on the left side and output links appear with a connection node on the right side. Linking a record requires that the linkage tool be selected for use. A multi-point wire will can be drawn between any two linkable nodes on the screen. Each time the left mouse button is hit, a new bend will be introduce on the wire. The wire is terminated by hitting the middle mouse button.

Links have attributes which can be modified with the examine tool. When the examine tool is selected and mouse is depressed anywhere on a connection wire, the user can

select the edit attributes option. A dialog will appear allowing for the PP/NPP and MS/NMS to be adjusted.

Editing Fields

Records contain attributes also which can be modified using the examine tool. A dialog box will appear showing fields which can be modified. Current values are shown and can be modified by selecting the edit box and typing a new value. The done button dismisses the dialog. There are several very important rules which are followed regarding visible link fields and the fields which appear in the edit attributes field edit dialog box. **Any link field that is linked on the record graphic will not be modifiable in the field editing dialog box.** A link field can be visible on the record graphic and not linked, and it will still be available for editing in the field edit dialog box. The DTYP (device type) field is special. This is due to the fact that a change in the DTYP field implies that OUT or INP of the record be adjusted based on the type of link (VME, GPIB, etc.). To accommodate this, the DTYP field on the field edit dialog has a "form" button which pop's up a dialog for the device link information (such as card, signal). If a record is defined by the DTYP to be a soft record and the OUT/INP field is a process variable link (graphically linked), then updates to the DTYP field will not be applied to the database. In order to change the DTYP field in this case, the link must be deleted.

Using DCT Short Forms

Short form reports from DCT can be converted to the new ".db" format (see section on command line tool). The converted records can be imported to a GDCT session. The tool maintains two sets of records: graphically defined records and hidden records. The intention here is to allow users to retain all the information they have in their current databases, not to automatically generate a graphic picture of their old databases.

A converted short form (now a ".db" file) is read into the current session by using the "import records" option in the main menu bar pull down menu "file". A dialog box appears to enter the name of the ".db" file.

Graphical records are seen in the drawing area and all tools in the tool palette apply. Hidden records are not seen at all. Records can be transferred from the hidden world to the graphical world using the record/type tool. The top button "show" on the create graphical record dialog box will show all the hidden records for a selected record type. One of the hidden records can be selected from the list. When create is hit, a graphic will be created for the hidden record and it will be transferred to the graphic world.

Editing Hidden Records

Hidden record can be created and edited. Under the file option on the menu bar is an option called "hidden record edit". This option brings up a dialog which will perform the following functions: edit, delete, copy, and duplicate. To create a new hidden record, select a record type, enter a name in the new name edit box, and hit the "edit" button. The dialog which appears is identical to the field edit dialog of the graphic world. To copy a record, select a record type and hit "show". Selected a record to be copied and enter a name in the new name entry box and press "copy". Delete and duplicate work the same way.

Menu Bar Options

The menu bar contains two pull down menus: file and edit. The file menu contains options for operating on the current database and the edit menu contains options for manipulating selected records.

File menu bar

The file menu contains the following options:

- New: Start a editing a new, fresh database, deleting the current one.
- Open: Open an existing graphical file (and associated “.db” file).
- Save: Save the current working database graphical file and “.db” file are saved. The name on the left of the information line in used as the tropical file name.
- SaveAs: Give a new name to the current database graphical file (also names the “.db” file).
- Print: Print the current database. This feature is not currently working.
- Make Database: Generate a “.database”. The name on the right of the information line will be used with “.database” appended to it.
- Rename Database: Rename the current “.database” file name. Do not include the extension.
- Import Records: Enter a “.db” file name here and the records will become hidden records.
- Hidden Record Edit: Bring up the hidden record dialog box.
- Quit: Exit the tool.

It is important to remember that open and save are used on the graphical file, not the “.db” or the “.database” files.

Edit menu bar

The edit menu contains the following options:

- Delete: Delete the selected record(s).
- Duplicate: Duplicate a currently selected record.

The delete operation will only delete record which are not linked. The duplicate operation will duplicate a record and append a sequence number on the end of the record name. No link information is duplicated with this operation.

Command Line Tools

Two important utilities exist for manipulating files from the command line. The first tool named “sf2db” converts short form reports from DCT to “.db” files for GDCT. The second tool named “db2database” provides a way to compose “.database” files from one or many “.db” files. Both of these tool will give a detailed explanation of themselves and their options if run with no parameters.

**Short Form Report
Converter**

The "sf2db" program acts as a filter, it is fed a short form report in from stdin (by pipe or redirection) and produces the new ".db" file to stdout (the screen). The short form report does not easily identify the name of the ".database" file which it is associated with, therefore the "sf2db" tool requires that a name be given to the database on the command line. Remember that this name has nothing to do with the ".db" file name.

".db" to ".database" Tool

The "db2database" program basically takes a list of one or more ".db" files and a default.dctsdrr file and generates a ".database" file. This tool can be used completely independent of GDCT. A file can be created with a text editor such as vi using the format of a ".db" file and this tool will generate a ".database" from it. Here is an example of a ".db" file:

```
database(a_name)
{
  nowhere()
  {
    record(ai,recname_1)
    record(ao,recname_2)
    record(stringout,recname_3)
    {
      field(VAL,"this is a string")
      field(FLNK,"recname_1.VAL PP MS")
    }
  }
}
```

When db2database is run with this data, a ".database" file is created with the file name a_name.database. The nowhere() will tell GDCT (if these records are imported to it) that these are hidden records. The first two record() statements create records with default values, the third creates a record and modifies the VAL and FLNK fields. Part of the output of db2database is a ".db" (to stdout - the screen) which contained expanded versions of the records, so the output of db2database would have all the fields and there values listed under each of the records created.

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GDCT Documentation (postscript version)

Sample GDCT Screen.

