

GDB QUICK REFERENCE GDB Version 5

Essential Commands

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|---------------------------------|---|
| <code>gdb program [core]</code> | debug <i>program</i> [using coredump <i>core</i>] |
| <code>b [file:]function</code> | set breakpoint at <i>function</i> [in <i>file</i>] |
| <code>run [arglist]</code> | start your program [with <i>arglist</i>] |
| <code>bt</code> | backtrace: display program stack |
| <code>p expr</code> | display the value of an expression |
| <code>c</code> | continue running your program |
| <code>n</code> | next line, stepping over function calls |
| <code>s</code> | next line, stepping into function calls |

Starting GDB

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| <code>gdb</code> | start GDB, with no debugging files |
| <code>gdb program</code> | begin debugging <i>program</i> |
| <code>gdb program core</code> | debug coredump <i>core</i> produced by <i>program</i> |
| <code>gdb --help</code> | describe command line options |

Stopping GDB

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| <code>quit</code> | exit GDB; also <code>q</code> or EOF (eg C-d) |
| <code>INTERRUPT</code> | (eg C-c) terminate current command, or send to running process |

Getting Help

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|---------------------------|---|
| <code>help</code> | list classes of commands |
| <code>help class</code> | one-line descriptions for commands in <i>class</i> |
| <code>help command</code> | describe <i>command</i> |

Executing your Program

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| <code>run arglist</code> | start your program with <i>arglist</i> |
| <code>run</code> | start your program with current argument list |
| <code>run ... <inf>outf</code> | start your program with input, output redirected |
| <code>kill</code> | kill running program |
| <code>tty dev</code> | use <i>dev</i> as stdin and stdout for next <code>run</code> |
| <code>set args arglist</code> | specify <i>arglist</i> for next <code>run</code> |
| <code>set args</code> | specify empty argument list |
| <code>show args</code> | display argument list |
| <code>show env</code> | show all environment variables |
| <code>show env var</code> | show value of environment variable <i>var</i> |
| <code>set env var string</code> | set environment variable <i>var</i> |
| <code>unset env var</code> | remove <i>var</i> from environment |

Shell Commands

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|------------------------|--|
| <code>cd dir</code> | change working directory to <i>dir</i> |
| <code>pwd</code> | Print working directory |
| <code>make ...</code> | call “ <code>make</code> ” |
| <code>shell cmd</code> | execute arbitrary shell command string |

[] surround optional arguments ... show one or more arguments

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Breakpoints and Watchpoints

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| <code>break [file:]line</code> | set breakpoint at <i>line</i> number [in <i>file</i>] eg: <code>break main.c:37</code> |
| <code>break [file:]func</code> | set breakpoint at <i>func</i> [in <i>file</i>] |
| <code>break +offset</code> | set break at <i>offset</i> lines from current stop |
| <code>break -offset</code> | set breakpoint at address <i>addr</i> |
| <code>break *addr</code> | set breakpoint at next instruction |
| <code>break</code> | break conditionally on nonzero <i>expr</i> |
| <code>break ... if expr</code> | new conditional expression on breakpoint <i>n</i> ; make unconditional if no <i>expr</i> |
| <code>cond n [expr]</code> | temporary break; disable when reached |
| <code>tbreak ...</code> | break on all functions matching <i>regex</i> [in <i>file</i>] |
| <code>watch expr</code> | set a watchpoint for expression <i>expr</i> |
| <code>catch event</code> | break at <i>event</i> , which may be <code>catch</code> , <code>throw</code> , <code>exec</code> , <code>fork</code> , <code>vfork</code> , <code>load</code> , or <code>unload</code> . |
| <code>info break</code> | show defined breakpoints |
| <code>info watch</code> | show defined watchpoints |
| <code>clear</code> | delete breakpoints at next instruction |
| <code>clear [file:]fun</code> | delete breakpoints at entry to <i>fun()</i> |
| <code>clear [file:]line</code> | delete breakpoints on source line |
| <code>delete [n]</code> | delete breakpoints [or breakpoint <i>n</i>] |
| <code>disable [n]</code> | disable breakpoints [or breakpoint <i>n</i>] |
| <code>enable [n]</code> | enable breakpoints [or breakpoint <i>n</i>] |
| <code>enable once [n]</code> | enable breakpoints [or breakpoint <i>n</i>]; disable again when reached |
| <code>enable del [n]</code> | enable breakpoints [or breakpoint <i>n</i>]; delete when reached |
| <code>ignore n count</code> | ignore breakpoint <i>n</i> , <i>count</i> times |
| <code>commands n [silent] command-list</code> | execute GDB <i>command-list</i> every time breakpoint <i>n</i> is reached. [<i>silent</i> suppresses default display] |
| <code>end</code> | end of <i>command-list</i> |

Program Stack

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| <code>backtrace [n]</code> | print trace of all frames in stack; or of <i>n</i> frames—innermost if <i>n</i> >0, outermost if <i>n</i> <0 |
| <code>bt [n]</code> | select frame number <i>n</i> or frame at address <i>n</i> ; if no <i>n</i> , display current frame |
| <code>frame [n]</code> | select frame <i>n</i> frames up |
| <code>up n</code> | select frame <i>n</i> frames down |
| <code>down n</code> | describe selected frame, or frame at <i>addr</i> |
| <code>info frame [addr]</code> | arguments of selected frame |
| <code>info args</code> | local variables of selected frame |
| <code>info locals</code> | register values [for regs <i>rn</i>] in selected frame; <code>all-reg</code> includes floating point |
| <code>info reg [rn]...</code> | |
| <code>info all-reg [rn]</code> | |

Execution Control

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| <code>continue [count]</code> | continue running; if <i>count</i> specified, ignore this breakpoint next <i>count</i> times |
| <code>c [count]</code> | |
| <code>step [count]</code> | execute until another line reached; repeat <i>count</i> times if specified |
| <code>s [count]</code> | |
| <code>stepti [count]</code> | step by machine instructions rather than source lines |
| <code>si [count]</code> | |
| <code>next [count]</code> | execute next line, including any function calls |
| <code>n [count]</code> | |
| <code>nexti [count]</code> | next machine instruction rather than source line |
| <code>ni [count]</code> | |
| <code>until [location]</code> | run until next instruction (or <i>location</i>) |
| <code>finish</code> | run until selected stack frame returns |
| <code>return [expr]</code> | pop selected stack frame without executing [setting return value] |
| <code>signal num</code> | resume execution with signal <i>s</i> (none if 0) |
| <code>jump line</code> | resume execution at specified <i>line</i> number |
| <code>jump *address</code> | or <i>address</i> |
| <code>set var=expr</code> | evaluate <i>expr</i> without displaying it; use for altering program variables |

Display

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|--------------------------------|---|
| <code>print [/f] [expr]</code> | show value of <i>expr</i> [or last value \$] according to format <i>f</i> |
| <code>p [/f] [expr]</code> | |
| <code>x</code> | hexadecimal |
| <code>d</code> | signed decimal |
| <code>u</code> | unsigned decimal |
| <code>o</code> | octal |
| <code>t</code> | binary |
| <code>a</code> | address, absolute and relative |
| <code>c</code> | character |
| <code>f</code> | floating point |
| <code>call [/f] expr</code> | like <code>print</code> but does not display <code>void</code> |
| <code>x [/Nuf] expr</code> | examine memory at address <i>expr</i> ; optional format spec follows slash |
| <code>N</code> | count of how many units to display |
| <code>u</code> | unit size; one of b individual bytes h halfwords (two bytes) w words (four bytes) g giant words (eight bytes) |
| <code>f</code> | printing format. Any <code>print</code> format, or s null-terminated string i machine instructions |
| <code>disassem [addr]</code> | display memory as machine instructions |

Automatic Display

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| <code>display [/f] expr</code> | show value of <i>expr</i> each time program stops [according to format <i>f</i>] |
| <code>display</code> | display all enabled expressions on list |
| <code>undisplay n</code> | remove number(s) <i>n</i> from list of automatically displayed expressions |
| <code>disable disp n</code> | disable display for expression(s) number <i>n</i> |
| <code>enable disp n</code> | enable display for expression(s) number <i>n</i> |
| <code>info display</code> | numbered list of display expressions |

Expressions

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| <code>expr</code> | an expression in C, C++, or Modula-2 (including function calls), or: |
| <code>addr@len</code> | an array of <i>len</i> elements beginning at <i>addr</i> |
| <code>file::nm</code> | a variable or function <i>nm</i> defined in <i>file</i> |
| <code>{type}addr</code> | read memory at <i>addr</i> as specified <i>type</i> |
| <code>\$</code> | most recent displayed value |
| <code>\$n</code> | <i>n</i> th displayed value |
| <code>\$\$</code> | displayed value previous to \$ |
| <code>\$\$n</code> | <i>n</i> th displayed value back from \$ |
| <code>\$_</code> | last address examined with <code>x</code> |
| <code>\$_-</code> | value at address \$_ |
| <code>\$var</code> | convenience variable; assign any value |

`show values [n]` show last 10 values [or surrounding \$n]
`show conv` display all convenience variables

Symbol Table

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| <code>info address s</code> | show where symbol <i>s</i> is stored |
| <code>info func [regex]</code> | show names, types of defined functions (all, or matching <i>regex</i>) |
| <code>info var [regex]</code> | show names, types of global variables (all, or matching <i>regex</i>) |
| <code>whatis [expr]</code> | show data type of <i>expr</i> [or \$] without evaluating; <code>ptype</code> gives more detail |
| <code>ptype [expr]</code> | describe type, struct, union, or enum |

GDB Scripts

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| <code>source script</code> | read, execute GDB commands from file <i>script</i> |
| <code>define cmd command-list</code> | create new GDB command <i>cmd</i> ; execute script defined by <i>command-list</i> |
| <code>end</code> | end of <i>command-list</i> |
| <code>document cmd help-text</code> | create online documentation for new GDB command <i>cmd</i> |
| <code>end</code> | end of <i>help-text</i> |

Signals

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| <code>handle signal act</code> | specify GDB actions for <i>signal</i> : |
| <code>print</code> | announce signal |
| <code>noprint</code> | be silent for signal |
| <code>stop</code> | halt execution on signal |
| <code>nostop</code> | do not halt execution |
| <code>pass</code> | allow your program to handle signal |
| <code>nopass</code> | do not allow your program to see signal |
| <code>info signals</code> | show table of signals, GDB action for each |

Debugging Targets

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|--------------------------------|---|
| <code>target type param</code> | connect to target machine, process, or file |
| <code>help target</code> | display available targets |
| <code>attach param</code> | connect to another process |
| <code>detach</code> | release target from GDB control |

Controlling GDB

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| <code>set param value</code> | set one of GDB's internal parameters |
| <code>show param</code> | display current setting of parameter |
| Parameters understood by <code>set</code> and <code>show</code> : | |
| <code>complaint limit</code> | number of messages on unusual symbols |
| <code>confirm on/off</code> | enable or disable cautionary queries |
| <code>editing on/off</code> | control <code>readline</code> command-line editing |
| <code>height lpp</code> | number of lines before pause in display |
| <code>language lang</code> | Language for GDB expressions (<code>auto</code> , <code>c</code> or <code>modula-2</code>) |
| <code>listsize n</code> | number of lines shown by <code>list</code> |
| <code>prompt str</code> | use <i>str</i> as GDB prompt |
| <code>radix base</code> | octal, decimal, or hex number representation |
| <code>verbose on/off</code> | control messages when loading symbols |
| <code>width cpl</code> | number of characters before line folded |
| <code>write on/off</code> | Allow or forbid patching binary, core files (when reopened with <code>exec</code> or <code>core</code>) |
| <code>history ...</code> | groups with the following options: |
| <code>h ...</code> | |
| <code>h exp off/on</code> | disable/enable <code>readline</code> history expansion |
| <code>h file filename</code> | file for recording GDB command history |
| <code>h size size</code> | number of commands kept in history list |
| <code>h save off/on</code> | control use of external file for command history |
| <code>print ...</code> | groups with the following options: |
| <code>p ...</code> | |
| <code>p address on/off</code> | print memory addresses in stacks, values |
| <code>p array off/on</code> | compact or attractive format for arrays |
| <code>p demangl on/off</code> | source (demangled) or internal form for C++ symbols |
| <code>p asm-dem on/off</code> | demangle C++ symbols in machine-instruction output |
| <code>p elements limit</code> | number of array elements to display |
| <code>p object on/off</code> | print C++ derived types for objects |
| <code>p pretty off/on</code> | struct display: compact or indented |
| <code>p union on/off</code> | display of union members |
| <code>p vtbl off/on</code> | display of C++ virtual function tables |
| <code>show commands</code> | show last 10 commands |
| <code>show commands n</code> | show 10 commands around number <i>n</i> |
| <code>show commands +</code> | show next 10 commands |

Working Files

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|--------------------------------|--|
| <code>file [file]</code> | use <i>file</i> for both symbols and executable; with no arg, discard both |
| <code>core [file]</code> | read <i>file</i> as coredump; or discard |
| <code>exec [file]</code> | use <i>file</i> as executable only; or discard |
| <code>symbol [file]</code> | use symbol table from <i>file</i> ; or discard |
| <code>load file</code> | dynamically link <i>file</i> and add its symbols |
| <code>add-sym file addr</code> | read additional symbols from <i>file</i> , dynamically loaded at <i>addr</i> |
| <code>info files</code> | display working files and targets in use |
| <code>path dirs</code> | add <i>dirs</i> to front of path searched for executable and symbol files |
| <code>show path</code> | display executable and symbol file path |
| <code>info share</code> | list names of shared libraries currently loaded |

Source Files

| | |
|------------------------------|---|
| <code>dir names</code> | add directory <i>names</i> to front of source path |
| <code>dir</code> | clear source path |
| <code>show dir</code> | show current source path |
| <code>list</code> | show next ten lines of source |
| <code>list -</code> | show previous ten lines |
| <code>list lines</code> | display source surrounding <i>lines</i> , specified as: |
| <code>[file:]num</code> | line number [in named file] |
| <code>[file:]function</code> | beginning of function [in named file] |
| <code>+off</code> | off lines after last printed |
| <code>-off</code> | off lines previous to last printed |
| <code>*address</code> | line containing <i>address</i> |
| <code>list f,l</code> | from line <i>f</i> to line <i>l</i> |
| <code>info line num</code> | show starting, ending addresses of compiled code for source line <i>num</i> |
| <code>info source</code> | show name of current source file |
| <code>info sources</code> | list all source files in use |
| <code>forw regex</code> | search following source lines for <i>regex</i> |
| <code>rev regex</code> | search preceding source lines for <i>regex</i> |

GDB under GNU Emacs

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|------------------------|--|
| <code>M-x gdb</code> | run GDB under Emacs |
| <code>C-h m</code> | describe GDB mode |
| <code>M-s</code> | step one line (<code>step</code>) |
| <code>M-n</code> | next line (<code>next</code>) |
| <code>M-i</code> | step one instruction (<code>stepi</code>) |
| <code>C-c C-f</code> | finish current stack frame (<code>finish</code>) |
| <code>M-c</code> | continue (<code>cont</code>) |
| <code>M-u</code> | up <i>arg</i> frames (<code>up</code>) |
| <code>M-d</code> | down <i>arg</i> frames (<code>down</code>) |
| <code>C-x &</code> | copy number from point, insert at end |
| <code>C-x SPC</code> | (in source file) set break at point |

GDB License

| | |
|----------------------------|-------------------------------------|
| <code>show copying</code> | Display GNU General Public License |
| <code>show warranty</code> | There is NO WARRANTY for GDB. |
| | Display full no-warranty statement. |

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