Barrett GCL (Grasper Control Language)

Friday, September 08, 2006

{MOTORS}COMMAND{ PARAMETER}{ VALUE}

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Examples:
=> HI              "Initialize all four motors"
=> 12C             "Close fingers 1 and 2"
=> 4FSET DP 1300   "Set the Default Position of motor 4 to 1300"
=> PGET TEMP       "Get the Temperature of the hand"
=> SFGET MCV       "Get the Max Close Velocity of the Spread motor"
=> GSM 2000        "Move the Grasp and Spread to position 2000"
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Motor Selectors:
{ "1",       "Finger/motor 1"},
{ "2",       "Finger/motor 2"},
{ "3",       "Finger/motor 3"},
{ "4",       "Spread/motor 4"},
{ "S",       "Spread/motor 4"},
{ "G",       "Grasp (fingers 1, 2, & 3)"},
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GCL commands:
{ "O",       "Open"},
{ "C",       "Close"},
{ "TO",      "Torque Open"},
{ "TC",      "Torque Close"},
{ "IO",      "Incremental open"},
{ "IC",      "Incremental close"},
{ "M",       "Move to position"},
{ "T",       "Terminate motor power"},
{ "HOME",    "Go to home position"},
{ "HI",      "Initialize and go to home"},
{ "RESET",   "Reset hand software"},
{ "VERS",    "Print hand software information"},
{ "ERR",     "Print meaning of error number"},
{ "?<cmd>", "Print help for a command"},
{ "?",       "List commands"},
{ "A?",      "List all commands"},
{ "LOOP",    "Start loop control"},

Finger parameter commands:
{ "FSET",    "Set finger parameters"},
{ "FGET",    "Get finger parameters"},
{ "FLOAD",   "Load finger parameters"},
{ "FSAVE",   "Save finger parameters"},
{ "FDEF",    "Set finger parameters to default"},
{ "FLIST",   "List finger parameters"},
{ "FLISTV", "List finger parameter values"},
{ "FLISTA", "List all finger parameters"},
{ "FLISTAV","List all finger parameter values"},

Hand parameter commands:
{ "PSET",    "Set global parameters"},
{ "PGET",    "Get global parameters"},
{ "PLOAD",   "Load global parameters"},
{ "PSAVE",   "Save global parameters"},
{ "PDEF",    "Set global parameters to default"},
{ "PLIST",   "List global parameters"},
{ "PLISTV", "List global parameter values"},
{ "PLISTA", "List all global parameters"},
{ "PLISTAV","List all global parameter values"},

Hand debugging commands:
{ "MDRO",    "Motor Debug Rotate Open"},
{ "MDRC",    "Motor Debug Rotate Close"},
{ "MDADD",   "Motor Debug Address"},
{ "MDDAT",   "Motor Debug Data"},
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Finger Parameters (use FGET, FSET):
{ "S",       "Current motor state" },
{ "P",       "Current motor position" },
{ "SG",      "Current strain gauge reading" },
{ "MOV",     "Maximum open velocity" },
{ "MCV",     "Maximum close velocity" },
{ "MSG",     "Maximum allowable finger strain" },
{ "HSG",     "Highest allowable finger strain" },
{ "LSG",     "Lowest allowable finger strain" },
{ "DS",      "Default step size for IO/IC" },
{ "DP",      "Default position for M" },
{ "OD",      "Odometer: total motor counts divided by 1000" },
{ "BDAT",    "Breakaway detection acceleration threshold" },
{ "BD",      "Flag: breakaway detected during last motion" },
{ "BP",      "Position of last detected breakaway" },
{ "BS",      "Flag: motor should stop if breakaway detected" },
{ "IVEL",    "Initialization Velocity" },
{ "IOFF",    "Initialization Offset" },
{ "IHIT",    "Initialization stop hit count" },
{ "OT",      "Open Target position" },
{ "CT",      "Close Target position" },
{ "ACCEL",   "Acceleration" },
{ "MPE",     "Max dist from desired pos before error" },
{ "TSTOP",   "Time in ms before motor considered stopped" },
{ "HOLD",    "Flag: motor should hold position" },
{ "SGFLIP", "Flag: strain gauge value reversed" },
{ "EN",      "Flag: motor is by default selected" },

Hand Parameters (use PGET, PSET):
{ "TEMP",    "Temperature, in tenths of a degree C" },
{ "PTEMP",   "Peak temperature, in tenths of a degree C" },
{ "OTEMP",   "Overtemp temperature, in tenths of a degree C (0 = no max)" },
{ "UPSECS", "Total powered-up time, in seconds" },
{ "SN",      "Serial number" },
{ "BAUD",    "Baud rate divided by 100" },
{ "CCEE",    "Enable status code feedback upon receiving ^C from host" },
{ "LOCK",    "Combination lock to set secure variables" },

Low-level motor control parameters (use FGET, FSET):
{ "FPG",     "Proportional gain for motor filter" },
{ "FDZ",     "Derivative zero for motor filter" },
{ "FTPG",    "Torque-mode proportional gain for motor filter" },
{ "FIP",     "Integral pole for motor filter" },
{ "SAMPLE", "Sample time register value for HCTL-1100" },

Realtime Loop Parameters (configure LOOP control and feedback blocks):
{ "LCV",     "Flag: loop control block contains velocity" },
{ "LCVC",    "LCV is multiplied by this to get control velocity" },
{ "LCPG",    "Flag: loop control block contains proportional gain" },
{ "LFV",     "Flag: loop feedback block contains velocity" },
{ "LFVC",    "Velocity is divided by this to get LFV" },
{ "LFS",     "Flag: loop feedback block contains strain" },
{ "LFAP",    "Flag: loop feedback block contains absolute position" },
{ "LFDP",    "Flag: loop feedback block contains delta position" },
{ "LFDPC",   "Delta position is divided by this to get LFDP" },
{ "LFT",     "Flag: loop feedback block contains temperature" },
{ "LFDPD",   "Flag: loop feedback delta pos overflow discarded" },
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Error Codes (Errors are additive, ERR 5 =
  No motor board found + Motor not initialized):
{ 0,         "No error"},
{ 1,         "No motor board found"},
{ 2,         "No motor found"},
{ 4,         "Motor not initialized"},
{ 16,        "Couldn't reach position"},
{ 32,        "Unknown command"},
{ 64,        "Unknown parameter name"},
{ 128,       "Bad value"},
{ 256,       "Tried to write read-only parameter"},
{ 1024,      "Too many arguments for this command"},
{ 2048,      "Bad loop control block header"},
{ 4096,      "Command cannot have motor prefix"},
{ 8192,      "Overtemperature"},
{ 16384,     "^C sent from host (see CCEE parameter)"},
```