# *CNC Controller DYNO KFLOP*

# *Model:KFLOP*

## *What is KFLOP?*

KFLOP is a novel motion controller that takes over the real-time requirements of your system from the host computer by buffering data and running multiple simultaneous threads deterministically. Combined with software architecture that gives you easy access to low-level functions and the ability to create your own front-end GUIs to access our libraries directly or through the .NET interface, the KFLOP motion controller is a powerful solution to your motion control needs.

In developing our flagship control board we wanted to offer accuracy, flexibility and capability for a reasonable price. What we achieved is a DSP-based microcontroller with 1.2 GFLOPs of processing power, a 100k Gate FPGA, 16 Mb SDRAM, 8 axes of control, lots of I/O and the ability to program in C and do path planning with G-Code for only $249. In addition, we throw in free software that has prepackaged filters and routines allowing full tuning capability for high-accuracy applications. You can begin controlling your mechanisms in minutes right out of the box.
Over its lifetime, KFLOP has accumulated thousands of satisfied customers around the world who are using the KFLOP for a number of applications. In particular, the CNC community has embraced the KFLOP to run a wide variety of mills, presses, lathes, and other machining equipment.

KFLOP is easily customizable to control a variety of motor types (DC Brush Motors, Brushless Motors, Stepper Motors) as well as other physical devices. KFLOP provides low-latency, guaranteed, real-time deterministic response. Because of this, KFLOP relieves a host computer from real-time requirements (i.e. Windows is not real-time, KFLOP is).

When combined with our free software, KFLOP offers a complete motion control solution to generate Step and Direction pulses for use with 3rd Party Motor Amplifiers. Or connect up to 2 Dynomotion SnapAmps that generate current to up to 25 Amps per axis. Other applications will benefit from connecting our Kanalog I/O expansion board. Both the SnapAmp and Kanalog boards enable the use of Differential Encoders, among other things. For intense stepper motor applications, our KSTEP may be the perfect add-on to your KFLOP.

## ***Here are just a few highlights of the KFLOP:***

- Real-time motion control that relieves the host computer of that duty
- High Performance 1.2 GFLOP DSP
- 64-bit Double Precision Hardware Math
- All 8 axes are sampled every 90 microseconds
- USB 2.0 Full Speed Host interface (or run standalone)
- 16 MBytes RAM
- Digital I/O

## ***Example Applications:***

- CNC machining (build a CNC from the ground-up or retrofit with a KFLOP)
  - Mills
  - Lathes
  - Brake presses
  - Grinders
  - Spinners
  - Routers
  - Saws
- Robotics
- Automation
- Camera Control
- Pick-and-place
- Data Acquisition

## ***Example Input/Outputs:***

- KFLOP by itself works well in open loop Step/Direction with ADVANCED Motion Control's DigiFlex® Performance™ DPR... and DZR... series servo drives. For PWM/Direction, KFLOP also works with the AC powered DPR... and DC powered DZR... series servo drives and the new plug-in/embedded AZBDC10A4 µ-sized servo drives. KFLOP/Kanalog also works well with all of ADVANCED Motion Control's drives that accept +/- 10V. Analog input commands and have differential encoder outputs for closed loop control.
- Other:
  - Analog Motor Amplifiers
  - Step/Direction Drives
  - PWM (Pulse-Width Modulated) Drives
  - Relays
  - Switches
  - Single-ended Encoders
  - Analog Sensors

## KFLOP Hardware:

| Function | Parameter | Specification |
|---|---|---|
| **Processor** | CPU<br>Memory | TMS320C67-200MHz DSP 1.2GFLOP<br>32/64-Bit Native Floating Point<br>FLASH 2 MBytes<br>SDRAM 16 Mbytes |
| **Interface** | Host | USB 2.0 Full Speed |
| **Connectors** | I/O General Purpose<br>I/O Com<br>Aux#0 IO<br>Aux#1 IO<br>USB<br>System Power | 26 pin Header<br>8 pin RJ45<br>16 pin Header<br>16 pin Header<br>Type B<br>Molex 4-pin (Disk drive type) |
| **Servo Loop** | Sample Rate<br>Compensation<br>Feed Forward | 90µs<br>PID + (3) IIR bi-quad Stages/Axis<br>Acceleration + Velocity |
| **Axis** | Number<br>Type | 8<br>MicroStep/Servo/Brush/Brushless/StepDirection |
| **Logic Supply** | Voltage<br>Max Current<br>Typical Current | +5V ±10%<br>2.5A<br>0.35 A |
| **User I/O** | Digital<br>Encoders | 45 Gen Purpose LVTTL (24 are 5V Tolerant)<br>(4) single-ended, 1 MHz |
| **Environment** | Operating Temperature<br>Storage Temperature<br>Humidity | 0-40° C<br>0-40° C<br>20-90% Relative Humidity, non-condensing |
| **Dimensions** | Length<br>Width<br>Height | 3.5 inches (89mm)<br>5.0 inches (127 mm)<br>0.75inches (19 mm) |

## Software:

| Function | Parameter | Specification |
|---|---|---|
| **User Programs** | Language<br>Number concurrent<br>Stand alone mode | C<br>7<br>Yes |
| **Host Requirements** | OS<br>Interface | MS Windows™ 2000, MS Windows™ XP<br>USB 2.0 |
| **Interface Library** | Multi-Thread<br>Multi-Process<br>Multi-Board<br>MS Windows™ VC++<br>MS Windows™ VB<br>MS Windows™ C#<br>MS Windows™ .NET | Yes<br>Yes<br>Yes<br>Supported<br>Supported<br>Supported<br>Supported |

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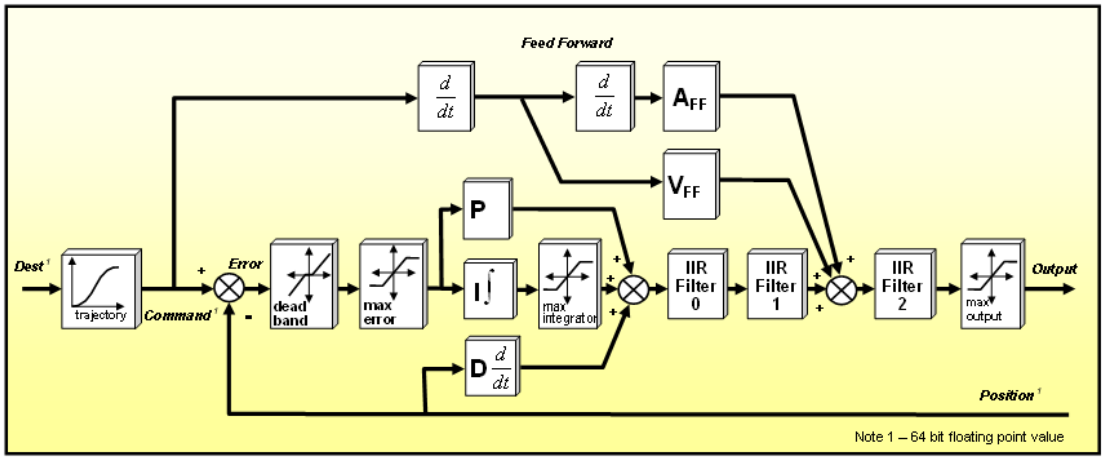
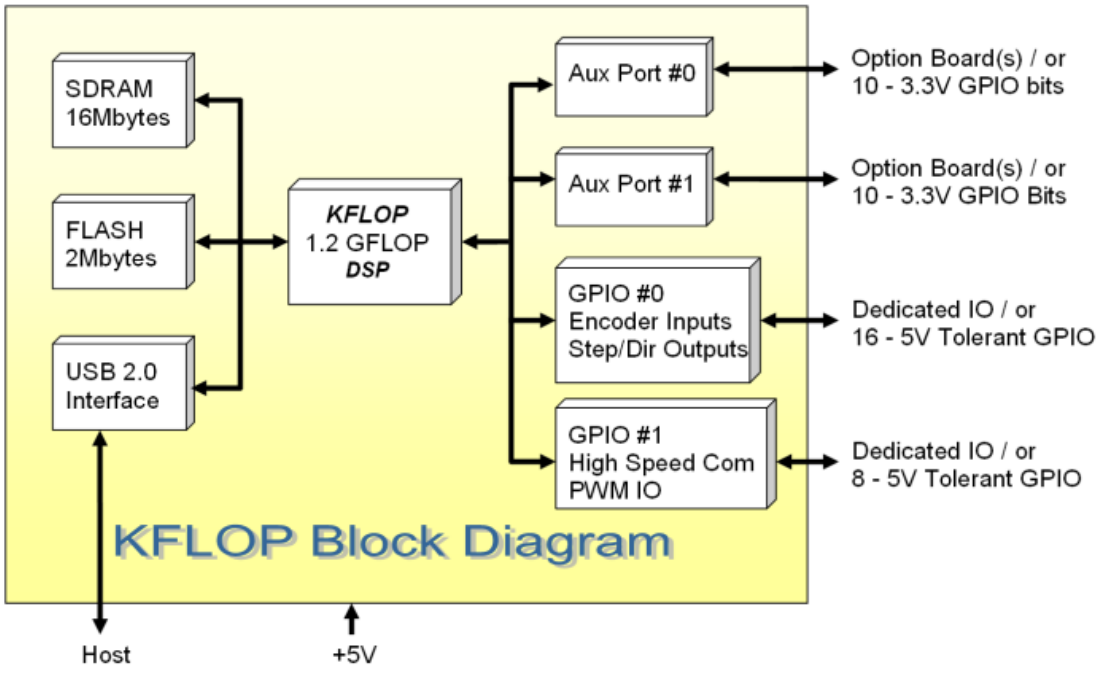
|---|---|---|
| **C Compiler** | TCC67 | Included |
| **G Code** | Interpreter | Included |
| **Script Language** | ASCII Commands | Included |
| **Trajectory Planner** | Coordinated Motion | 6 Axis |
| **Executive Application** | Configuration<br>Tuning<br>User Programs<br>G Code<br>Command Console<br>Status Display | Upload/Download/Save/Load Motor Config<br>Move/Step Response, Bode Plot, Calc Filters<br>Integrated IDE - Edit/Compile/Download/Exec Integrated<br>ASCII Command Entry - Log Console<br>Axis/Analog/Digital |




KMotion 2.2 Servo Flow Diagram




KFLOP Block Diagram

*Made in USA*

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