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Find the *ACS Motion Control DDM3U-2-320V-10A* at our website: *Click HERE*

MC4U

Multi-axis Motion & Machine Controllers

SPiiPlus-3U HP / LT 4, 6, 8 Axes



The SPiiPlus powerful controller is at the heart of every MC4U system.
The SPiiPlus 3U controllers are designed to address the control requirements of the most demanding applications, such as semiconductors manufacturing, wafer inspection and Flat Panel Display assembly and testing. The SPiiPlus 3U provides outstanding smooth motion, programmability, ease of use, sub-nanometer resolution and high speed without compromising accuracy and throughput.
In addition to the controller's centralized eight axes and IO, the SPiiPlus can also manage a CANOpen network. The MC4U capabilities can be significantly extended using CANOpen compatible servo drives, intelligent servo and step motors and IOs. The network includes up to 64 nodes of axes and IOs.
The SPiiPlus controller can be programmed using IEC61131-3 PLC language and ACSPL+ powerful motion language. The two languages complement each other and enhance both motion and machine control capabilities.

Two versions are available:

1. SPiiPlus 3U-LT – Economical controller
2. SPiiPlus 3U-HP– High performance controller

Choose the SPiiPlus 3U-HP if you need one of the following features:

- SIN-COS analog encoders
- Using linear drives
- Special (Gantry or other) control algorithm
- Input Shaping for reducing move and settling time

Specifications

The table below highlights the differences in resources of available controllers

Product	Axes with ±10V Drive Command/s	G.P. Digital I/O	Axes with PEG Pulse Output	Position Registration MARK Inputs*	SPiiPlus-3U-HP General Purpose Analog Inputs**	SPiiPlus-3U-HP Sin-Cos Encoders (optional)****	SPiiPlus-3U-HP Analog Outputs***	SPiiPlus-3U-LT Analog Outputs	HSSI Channels
SPiiPlus 3U_4...	4	8/8	2 (XY)	2 per X,Y	0	4	0	2	2
SPiiPlus 3U_6...	6	8/8	3 (XYT)	2 per X,Y,Z	2	6	2	3	3
SPiiPlus 3U_8...	8	8/8	4 (XYTZ)	2 per X,Y,Z,T	4	8	4	4	3

Comments:
* Type: RS422 or single ended isolated
** General purpose only ±10V analog inputs, available when axes C and/or D Sin-Cos encoders are not used. Additional 1V peak to peak analog inputs are available by utilizing SinCos encoder inputs For LT no Analog Inputs are available
*** Additional ±10V analog outputs are available from unutilized drive commands.
**** The number of 2.5MHz Sin-Cos encoders is up to four. SPiiPlus-3U-LT doesn't support Sin-Cos encoders.

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Profile Generation

Trajectory Calculation Rate: programmable 0.5, 1 or 2 kHz (default).
SPiiPlus-LT: 1kHz.

Control

All controllers: Position (P) loop + velocity loop (PI, 2'nd order low-pass and Notch filters), SPiiPlus-3U-HP only: BiQuad filter, Disturbance Rejection Algorithm, Gantry Control Algorithm.
Sampling Rate: 20 kHz.
Dual Loop: Supports up to 4 axes. For more info refer to MC4U user guide.
Note: each dual loop consumes another axis, unless an HSSI-ED2 is used for interfacing with one of the feedbacks.

Feedback

Feedback types: incremental digital encoders, Sin-Cos encoders (optional), analog inputs and 3 hall inputs for initiating commutation.
SPiiPlus-3U-LT does not support SIN-COS encoders and analog inputs.

Incremental Digital Encoder:
One per axis, A&B,I; UP/DN,I; CLK/DIR,I. Type: RS-422.
Max. rate: 30 million encoder counts/sec.

Sin-Cos Encoder (for SPiiPlus-3U-HP only, optional): see table on previous page. Programmable multiplication factor: x4 – x65,536. Sin-Cos offset compensation: progammable, ±50mV, 16 bit resolution. Rate: up to $250*10^3$ or $5*10^6$ sine periods/sec (see How To Order section). Maximum acceleration with Sin-Cos encoder: 10^8 sine periods/second^2.

Hall inputs:
Quantity: three. Type: single-ended, 5V, source, opto-isolated
Input circuit current: <7mA.

Drive Interface

Analog commands: One (torque command) or two (commutation commands) per axis. SPiiPlus-3U-LT supports only torque command.
Type: see Analog Outputs, drive commands section. Offset compensation: programmable, 0.3mV resolution.

PWM Drive Commands: 3 per axis. PWM Switching Method, Advanced unipolar space vector modulation.
PWM Switching frequency: 40kHz on the motor. Current loop sampling rate: 20kHz
Control algorithm: Field Oriented control with PI filters.
Current resolution: 14 bit

Drive enable output:
Type: single ended, opto-isolated, sink only. Up to 24V/7mA, active low.

Drive Fault Input:
Type: single-ended, opto-isolated, sink only. Input circuit current: <7mA.

Digital I/O

Note: It is recommended to use a dedicated supply for digital IO. See Power Supplies section.

Safety Inputs:

Emergency stop input:
Type: two-terminal, sink or source, opto-isolated.

Left and right limit inputs:
Quantity: pair per axis.
Type: single-ended, sink (default) or source, configurable by jumper, opto-isolated.
Safety inputs voltage: single-ended, 5V or 24V. Input circuit current: <15mA.

Digital Inputs:

General purpose inputs:
Quantity: eight. Type: single-ended, 5V or 24V, sink (default) or source, opto-isolated.
Input circuit current: <15mA.

Mark (position capture) inputs:
Quantity: see table on previous page. Type: RS-422. Propagation delay: <0.1 µsec.

Digital Outputs:

General purpose outputs:
Quantity: eight. Type: single-ended, 5V or 24V, sink (default) or source, opto-isolated, 50mA per output.

Mechanical Brake Outputs:
Quantity: one per axis. Type: single-ended, 5V, source only, opto-isolated, 7mA per output. By default, configured to dynamic brake.

PEG (Position Event Generator) pulse outputs:
Quantity: see table on previous page.
Type: RS-422. Propagation delay: <0.1µsec.
PEG pulse width: 25nsec to 1.6msec.
PEG position accuracy: ±1 count at up to 5,000,000 counts/sec.

PEG states outputs (not available for LT): Quantity: three per X axis. Type: RS-422. Propagation delay: <0.1µsec.

HSSI Expansion Channels: see table on previous page. Each channel provides 64 input bits and 64 output bits per channel, sampled and updated at very 50µS .
Type: RS-422. Up to additional 64/63 I/Os via each HSSI using HSSI-IO16 modules.

Analog I/O

Analog Inputs:
Unused Sin-Cos encoder inputs can be used as general purpose analog inputs
Type: 1Vptp, differential, 14-bit resolution. S/N>72db.

General purpose ±10V analog inputs: When axes C and/or D Sin-Cos encoders are not used, these inputs can be used for general purpose.
Quantity: see table on previous page. Type: ±10V, differential, 14-bit resolution. SPiiPlus-3U-LT: No analog inputs.

Analog Outputs:
Drive commands or general purpose ±10V analog outputs: Quantity: see table on previous page. SPiiPlus-3U-HP: ±10V, differential, 16 bit DAC resolution.
SPiiPlus-3U-LT: ±10V, single ended, 11.5 bit PWM filtered.

Communication Channels

Serial: two RS-232. Up to 115,200bps.
Ethernet: TCP/IP, 10/100 Mbits/sec.
Simultaneous communication through all channels is fully supported. Modbus protocol as master or slave is supported via all channels.

MPU

User Memory: RAM: 128Mb.
Flash: 128Mb.
Powerup Time: 25sec.

Power Supplies

Power Supply Voltage/Current: +5Vdc +5Vdc (±10%)/2.5A, -5Vdc (±10%)/0.1A, ±12Vdc (±5%)/0.4A.
I/O Supply Voltage/Current: +5Vdc (±10%)/1A, or 24Vdc (±10%)/1A.
Safety Supply Voltage/Current: +5Vdc (±10%)/1A, or 24Vdc (±10%)/1A.
Six LEDs on the front panel indicate the status of all above power supplies.

Standards & Environment

Operating Temperature: 0°C to 55°C.
Storage Temperature: - 40°C to 70°C.
Humidity: 90%RH, non-condensing.
The controllers are CE (EMC) certified and RoHS compliant.

How To Order

SPiiPLUS 3U Controller and Software

• SPiiPLUS 3U Controller

Example: SPiiPlus 3U - HP - 8 - E - M6 - F4 - I - C

Controller type: [HP] - High Performance controller [LT] - Economical controller

Number of axes: [4] - Four axes controller [6] - Six axes controller [8] - Eight axes controller

Communication channels:
[E] - two RS_232 and one Ethernet 10/100 Mbits/sec.

Number of total Sin-Cos encoder multipliers:
[M0] - no multipliers, [M1] ... [M8] - up to a total of eight multipliers

Optional field - Number of fast 2.5MHz Sin-Cos encoder multipliers (out of the total):
[F1] - One, [F2] - Two, [F3] - Three, [F4] - Four

Optional field - Special algorithm to reduce vibration and settling time:
[I] - Special algorithm enabled

Optional field – CANopen network
[C] – PLC enabled

Warranty

The warranty of this product is according to the Terms and Conditions of Sale and is effective for one year from date of shipment from ACS Motion control. For further warranty information, please see the hardware guide.

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