

# PC/104, ISA, PCI Optima 1–8 axes

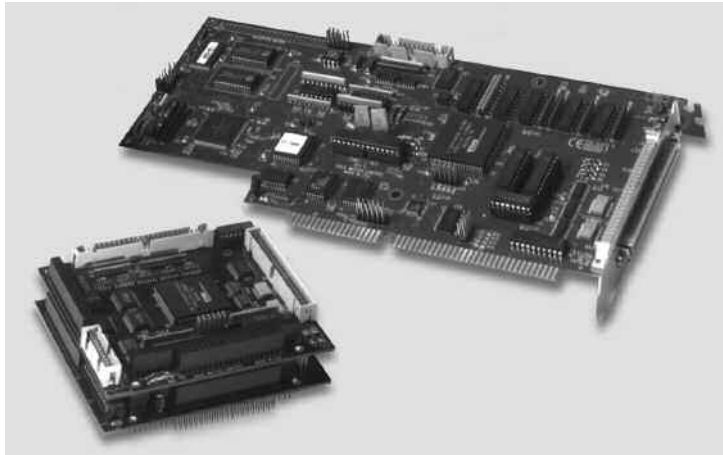
## DMC-12x0, DMC-17x0, DMC-18x0 Series

### Product Description

The DMC-12x0, DMC-17x0 and DMC-18x0 are Optima motion controllers which are prior generation. The controllers differ only in their communication interface: DMC-12x0 is for PC/104; DMC-17x0 for ISA bus and DMC-18x0 for PCI. For single axis applications, Galil's Econo, DMC-1411 (PC/104), DMC-1412 (RS232), or DMC-1417 (PCI) controllers should be considered.

The motor controllers incorporate a 32-bit microcomputer and provide such advanced features as PID compensation with velocity and acceleration feedforward,

Top to bottom:  
DMC-17x0 ISA  
DMC-12x0 PC/104



programmable notch, program memory with multitasking for simultaneously running up to eight applications programs, and uncommitted I/O for synchronizing motion with external events. They handle various modes of motion including point-to-point positioning, jogging, linear and circular interpolation, contouring, electronic gearing and ECAM. Additionally, the controllers are user-configurable for stepper or servo motor control on any combination of axes.

Like all Galil controllers, the controllers use a simple, English-like command language which makes them very easy to program. Galil's WSDK servo design software further simplifies system set-up with "one-button" servo tuning and real-time display of position and velocity information. Communication drivers are available for DOS, Linux and all current Windows operating systems.

### Features

- Available in various communication and axes formats:  
DMC-12x0: PC/104 x=1,2,3,4,5,6,7,8 axes  
DMC-17x0: ISA x=1,2,3,4,5,6,7,8 axes  
DMC-18x0: PCI x=1,2,3,4,5,6,7,8 axes
- User-configurable for stepper or servo motors on any combination of axes. Optional firmware for piezo-ceramic motors. Sinusoidal commutation for brushless servo motors
- 12 MHz encoder frequencies for servos, 3 MHz for steppers
- PID compensation with velocity and acceleration feedforward, integration limits, notch filter and low-pass filter
- Modes of motion include jogging, point-to-point positioning, contouring, linear and circular interpolation, electronic gearing and ECAM. Features elliptical scaling, slow-down around corners, infinite segment feed and feedrate override
- Over 200 English-like commands including conditional statements and event triggers
- Non-volatile memory for programs, variables and arrays. Concurrent execution of up to eight application programs
- Isolated home and forward and reverse limits accepted for every axis. Isolation not available on the DMC-12x0
- 8 isolated uncommitted inputs and 8 outputs for 1- through 4-axes models, 24 in/16 out for 5- through 8-axis models. Optical isolation not available on the DMC-12x0
- High speed position latch for each axis and output compare
- 8 uncommitted analog inputs
- Dual encoder inputs for each axis
- Additional 64 I/O may be added on DMC-12x0 and DMC-17x0 using the DB-12064 or DB-14064 daughter board
- 100-pin SCSI connectors for each set of 4 axes. Galil's ICM-1900 interconnect module breaks-out the 100-pin cable into screw terminals
- Communication drivers for all current versions of Windows, DOS, and Linux
- CE certified — DMC-17x0 and DMC-18x0
- Custom hardware and firmware options available

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## DMC-12x0, DMC-17x0, DMC-18x0 Series

### Specifications

#### System Processor

- Motorola 32-bit microcomputer

#### Communications Interface

- DMC-12x0: PC/104 with bi-directional, high speed FIFO
- DMC-17xx: ISA with bi-directional FIFO plus auxiliary FIFO
- DMC-18x0: PCI with bi-directional FIFO plus auxiliary FIFO, and DPRAM

Commands are sent in ASCII. A binary communication mode is also available as a standard feature

#### Modes of Motion:

- Point-to-point positioning
- Position Tracking
- Jogging
- 2D Linear and Circular Interpolation with feedrate override
- Linear Interpolation for up to 8 axes
- Tangential Following
- Helical
- Electronic Gearing with multiple masters
- Gantry Mode
- Electronic Cam
- Contouring
- Teach and playback

#### Memory

- Program memory size — 1000 lines × 80 characters
- 254 variables
- 8000 array elements in up to 30 arrays

#### Filter

- PID (proportional-integral-derivative) with velocity and acceleration feedforward
- Notch filter and low-pass filter
- Dual-loop control for backlash compensation
- Velocity smoothing to minimize jerk
- Integration limits
- Torque limits
- Offset adjustments
- Option for piezo-ceramic motors

#### Kinematic Ranges

- Position: 32 bit ( $\pm 2.15$  billion counts per move; automatic rollover; no limit in jog or vector modes)
- Velocity: Up to 12 million counts/sec for servo motors
- Acceleration: Up to 67 million counts/sec<sup>2</sup>

#### Uncommitted Digital I/O

	DIGITAL INPUTS	DIGITAL OUTPUTS	CONFIGURABLE I/O
DMC-1210 thru -1240*	8	8	64 w/ DB-12064
DMC-1250 thru -1280*	16	16	64 w/ DB-12064
DMC-1710 thru -1740	8	8	64 w/ DB-14064
DMC-1750 thru -1780	24	16	64 w/ DB-14064
DMC-1810 thru -1840	8	8	64 w/ DB-14064
DMC-1850 thru -1880	24	16	64 w/ DB-14064

#### Uncommitted Analog Inputs

- 8 individual  $\pm 10$  V analog inputs with 12-bit resolution (16-bit available as an option)

#### High Speed Position Latch

- Uncommitted inputs 1–4 latch X, Y, Z, W and 9–12 latch E, F, G, H axes (latches within 0.1 microseconds without optoisolation and within 40 microseconds with optoisolation)

#### Dedicated Inputs (per axis)

- Main encoder inputs — Channel A, A-, B, B-, I, I- ( $\pm 12$  V or TTL)
- Dual encoder (for axes configured as servo) — Channel A, A-, B, B-
- Forward and reverse limit inputs — optoisolated\*
- Home input — optoisolated\*
- Selectable high-speed position latch input — optoisolated\*
- Selectable abort input — optoisolated\*

#### Dedicated Outputs (per axis)

- Analog motor command output with 16-bit DAC resolution
- Pulse and direction output for step motors
- PWM output for servo amplifiers
- Amplifier enable output
- Error output (per card)
- High-speed position compare output (per card)

#### Minimum Servo Loop Update Time

	STANDARD	-FAST <sup>†</sup>
■ 1–2 axes: 250 $\mu$ sec		125 $\mu$ sec
■ 3–4 axes: 375 $\mu$ sec		250 $\mu$ sec
■ 5–6 axes: 500 $\mu$ sec		375 $\mu$ sec
■ 7–8 axes: 625 $\mu$ sec		500 $\mu$ sec

#### Maximum Encoder Feedback Rate

- 12 MHz

#### Maximum Stepper Rate

- 3 MHz (Full, half or microstep)

\*DMC-1200 has TTL limits, home, and general inputs.

<sup>†</sup>Reduced feature set for -FAST.

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# PC/104, ISA, PCI Optima 1–8 axes

## DMC-12x0, DMC-17x0, DMC-18x0 Series

### Specifications – continued

#### Power Requirements

- +5V 750 mA
- 12V 40 mA
- +12V 40 mA

#### Environmental

- Operating temperature: 0–70° C
- Humidity: 20–95% RH, non-condensing

#### Mechanical

- DMC-12x0
  - 1–4 axes: 4.4" × 4.15" (2 stacked cards)
  - 5–8 axes: 4.4" × 4.15" (3 stacked cards)
- DMC-17x0
  - 1–4 axes: 10.25" × 4.8"
  - 5–8 axes: 13.25" × 4.8"
- DMC-18x0
  - 1–4 axes: 8.175" × 4.2"
  - 5–8 axes: 12.28" × 4.2"

### Hardware Accessories

#### ICM-1900 Interconnect Module

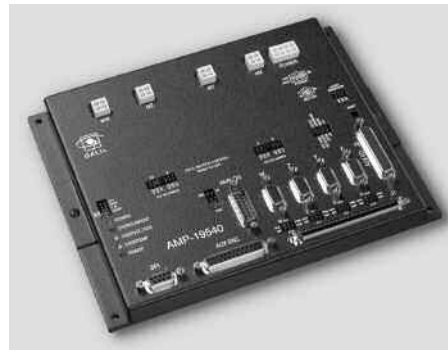
The ICM-1900 Interconnect Module breaks-out the 100-pin main cable and 25-pin auxiliary encoder cable into screw-type terminals for quick connection of system hardware. An ICM-1900 is required for each set of four axes. The ICM-1900 is contained in a metal enclosure with dimensions of 13.5" × 3.0" × 7.0" and 1/4" diameter keyholes for mounting. The ICM is default configured for high amp enable (-HAEN). For low amp enable, order ICM-1900-LAEN. Specify -OPTO for optoisolated outputs.

#### DB-14064 I/O Expansion

The DB-14064 is an optional board which provides 64 additional I/O for the DMC-17x0, and DMC-18x0 controllers (for the DMC-12x0 use the DB-12064). This board mounts directly onto the back of the controller and provides 64 I/O points configurable by the user as inputs or outputs. The I/O is accessible through two 50-pin IDC headers.

#### AMP-19540 Interconnect with Four 500 Watt Servo Drives

Galil's AMP-19540 is a 4-axis amplifier for driving brush or brushless motors up to 500 Watts. By interfacing directly to Galil's Optima controllers, it provides a cost-effective controller/drive solution for multi-axis applications. The AMP-19540 contains four transconductance, PWM amplifiers for driving brush or brushless motors. Each amplifier operates at 18 V to 80 V dc, up to 7 Amps continuous, 10 Amps peak. The AMP-19540 gain setting is easily configured with jumpers. The PWM switching frequency is 60 kHz. The AMP-19540 enclosure has dimensions of 6.8" × 8.75" × 1". It interfaces to the Optima controller with a single, 100-pin high density SCSI cable. Signals for each axis are brought out through D-type connectors located on



the AMP-19540. For applications with less than three axes, the AMP-19520 two-axis model is available. A shunt regulator option is also available.

AMP-19540

#### ICM-2900 Interconnect Module

The ICM-2900 breaks-out the 100-pin SCSI cable into removable screw-type terminals. One ICM-2900 is required for each set of four axes. The ICM-2900-FL has flanges which allow standard screw-type mounting. Specify -OPTO for optoisolated outputs. Specify -HAEN for high amp enable or -LAEN for low amp enable.

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# PC/104, ISA, PCI Optima 1–8 axes

## DMC-12x0, DMC-17x0, DMC-18x0 Series

### Ordering Information

PART NUMBER	DESCRIPTION	QUANTITY 1	QUANTITY 100
<b>DMC-1210, -1710, -1810</b>	1-axis PC/104 or ISA or PCI	\$1095	\$ 795
<b>DMC-1220, -1720, -1820</b>	2-axis PC/104 or ISA or PCI	\$1495	\$ 875
<b>DMC-1230, -1730, -1830</b>	3-axis PC/104 or ISA or PCI	\$1895	\$ 935
<b>DMC-1240, -1740, -1840</b>	4-axis PC/104 or ISA or PCI	\$2195	\$ 995
<b>DMC-1250, -1750, -1850</b>	5-axis PC/104 or ISA or PCI	\$2595	\$1345
<b>DMC-1260, -1760, -1860</b>	6-axis PC/104 or ISA or PCI	\$2795	\$1425
<b>DMC-1270, -1770, -1870</b>	7-axis PC/104 or ISA or PCI	\$2995	\$1525
<b>DMC-1280, -1780, -1880</b>	8-axis PC/104 or ISA or PCI	\$3195	\$1595
<b>CB-50-100-1200</b>	50-pin to 100-pin converter board which includes two 50-pin cables	\$ 75	\$ 50
<b>CABLE-20-25</b>	20-pin IDC to 25-pin D type for dual encoders	\$ 15	\$ 15
<b>CABLE-100-1M</b>	100-pin HD cable in 1 meter length	\$ 165	\$ 125
<b>CABLE-100-2M</b>	100-pin HD cable in 2-meter length	\$ 180	\$ 135
<b>CABLE-100-4M</b>	100-pin HD cable in 4 meter length	\$ 195	\$ 145
<b>CABLESET-1200</b>	(2) 50-pin ribbon, (1) 20-pin ribbon	\$ 35	\$ 30
<b>ICM-1900</b>	Interconnect module (use 1 for every 4 axes). Specify -HAEN for high amp enable or -LAEN for low amp enable	\$ 345	\$ 245
<b>ICM-1900-OPTO</b>	ICM with optoisolated outputs	\$ 395	\$ 295
<b>DB-12064</b>	Attachment board for 64 additional I/O (use DB-14064 for -17x0 or -18x0)	\$ 395	\$ 245
<b>AMP-19520</b>	2-axis amplifier for 500 W servos	\$ 595	\$ 395
<b>AMP-19540</b>	4-axis amplifier for 500 W servos	\$ 795	\$ 495
<b>-SR</b>	Shunt regulator option for AMP-195x0	\$ 50	\$ 25

*Galil offers additional quantity discounts for purchases between 1 and 100. Consult Galil for a quotation.*

OTHER

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