PC/104, cPCI, ISA, PCI Optima 1–8 axes

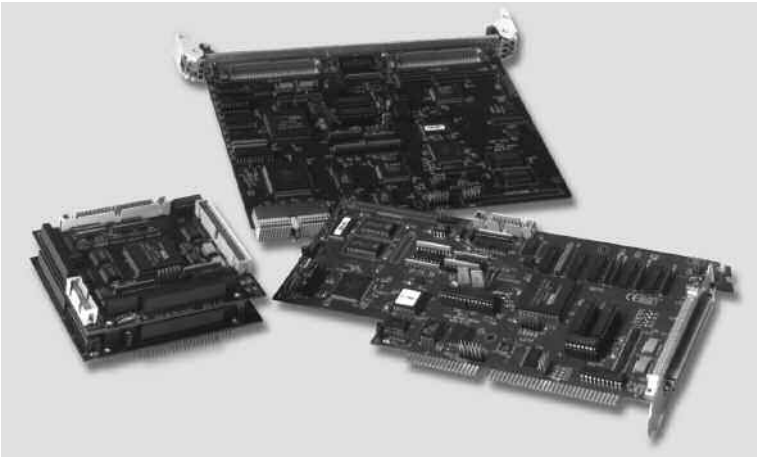
DMC-12x0, DMC-16x0, DMC-17x0, DMC-18x0 Series

Product Description

The DMC-12x0, 16x0, 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-16x0 for cPCI, DMC-17x0 for ISA bus and DMC-18x0 for PCI. For single axis applications, Galil's Econo DMC-1410 (ISA), DMC-1411 (PC/104), DMC-1412 (RS232), or DMC-1417 (PCI) controllers should be considered.

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

Left to right:
DMC-12x0 PC/104
DMC-16x0 CompactPCI
DMC-17x0 ISA



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-16x0: cPCI x=1,2,3,4 axes plus 64 extended I/O
  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 ellipse 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*
- *DMC-16x0 includes 64 configurable I/O. 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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Specifications

System Processor

- Motorola 32-bit microcomputer

Communications Interface

- DMC-12x0: PC/104 with bi-directional, high speed FIFO
- DMC-16x0: CompactPCI with bi-directional FIFO plus auxiliary 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 (±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^2

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-1610 thru -1640	8	8	64
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 ±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- (±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

	-FAST†
1–2 axes: 250 µsec	125 µsec
3–4 axes: 375 µsec	250 µsec
5–6 axes: 500 µsec	375 µsec
7–8 axes: 625 µsec	500 µsec

Maximum Encoder Feedback Rate

- 12 MHz

Maximum Stepper Rate

- 3 MHz (Full, half or microstep)

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

† Reduced feature set for -FAST.

DMC-12x0, DMC-16x0, 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-16x0
  1–4 axes: 6U
- 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

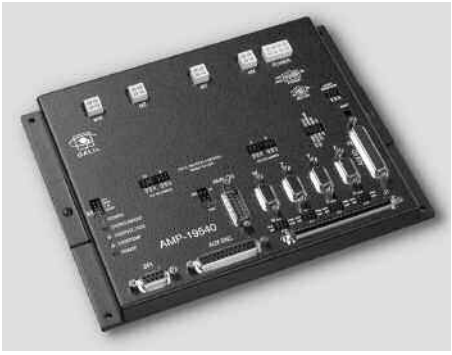
The ICM-1900 Interconnect Module breaks-out the 100-pin main cable and 25-pin auxiliary encoder cable into screw-type terminals for quick connection of system hardware. An ICM-1900 is required for each set of four axes. The ICM-1900 is contained in a metal enclosure with dimensions of 13.5" × 3.0" × 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.

PC/104, cPCI, ISA, PCI Optima 1–8 axes

DMC-12x0, DMC-16x0, DMC-17x0, DMC-18x0 Series

Ordering Information

PART NUMBER	DESCRIPTION	QUANTITY 1	QUANTITY 100
DMC-1210, -1710, -1810	1-axis PC/104 or ISA or PCI	$1095	$ 795
DMC-1220, -1720, -1820	2-axis PC/104 or ISA or PCI	$1495	$ 875
DMC-1230, -1730, -1830	3-axis PC/104 or ISA or PCI	$1895	$ 935
DMC-1240, -1740, -1840	4-axis PC/104 or ISA or PCI	$2195	$ 995
DMC-1250, -1750, -1850	5-axis PC/104 or ISA or PCI	$2595	$1345
DMC-1260, -1760, -1860	6-axis PC/104 or ISA or PCI	$2795	$1425
DMC-1270, -1770, -1870	7-axis PC/104 or ISA or PCI	$2995	$1525
DMC-1280, -1780, -1880	8-axis PC/104 or ISA or PCI	$3195	$1595
CB-50-100-1200	50-pin to 100-pin converter board which includes two 50-pin cables	$ 75	$ 50
CABLE-20-25	20-pin IDC to 25-pin D type for dual encoders	$ 15	$ 15
CABLE-100-1M	100-pin high-density cable in 1-meter length	$ 125	$ 95
CABLE-100-2M	100-pin high-density cable in 2-meter length	$ 135	$ 100
CABLE-100-4M	100-pin high-density cable in 4-meter length	$ 150	$ 105
CABLESET-1200	(2) 50-pin ribbon, (1) 20-pin ribbon	$ 35	$ 30
ICM-1900	Interconnect module (use 1 for every 4 axes). Specify -HAEN for high amp enable or -LAEN for low amp enable	$ 345	$ 245
ICM-1900-OPTO	ICM with optoisolated outputs	$ 395	$ 295
DB-12064	Attachment board for 64 additional I/O (use DB-14064 for -17x0 or -18x0)	$ 395	$ 245
DMC-1610	1-axis CompactPCI	$1395	$ 945
DMC-1620	2-axis CompactPCI	$1795	$1025
DMC-1630	3-axis CompactPCI	$2195	$1085
DMC-1640	4-axis CompactPCI	$2495	$1145
CABLE-36-1M	36-pin high-density cable in 1 meter length	$ 90	$ 75
CABLE-36-3M	36-pin high-density cable in 3 meter length	$ 110	$ 90
CABLE-100-1M	100-pin high-density cable in 1 meter length	$ 125	$ 95
CABLE-100-2M	100-pin high-density cable in 2-meter length	$ 135	$ 100
CABLE-100-4M	100-pin high-density cable in 4 meter length	$ 150	$ 105
AMP-19520	2-axis amplifier for 500 W servos	$ 595	$ 395
AMP-19540	4-axis amplifier for 500 W servos	$ 795	$ 495
-SR	Shunt regulator option for AMP-195x0	$ 50	$ 25

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