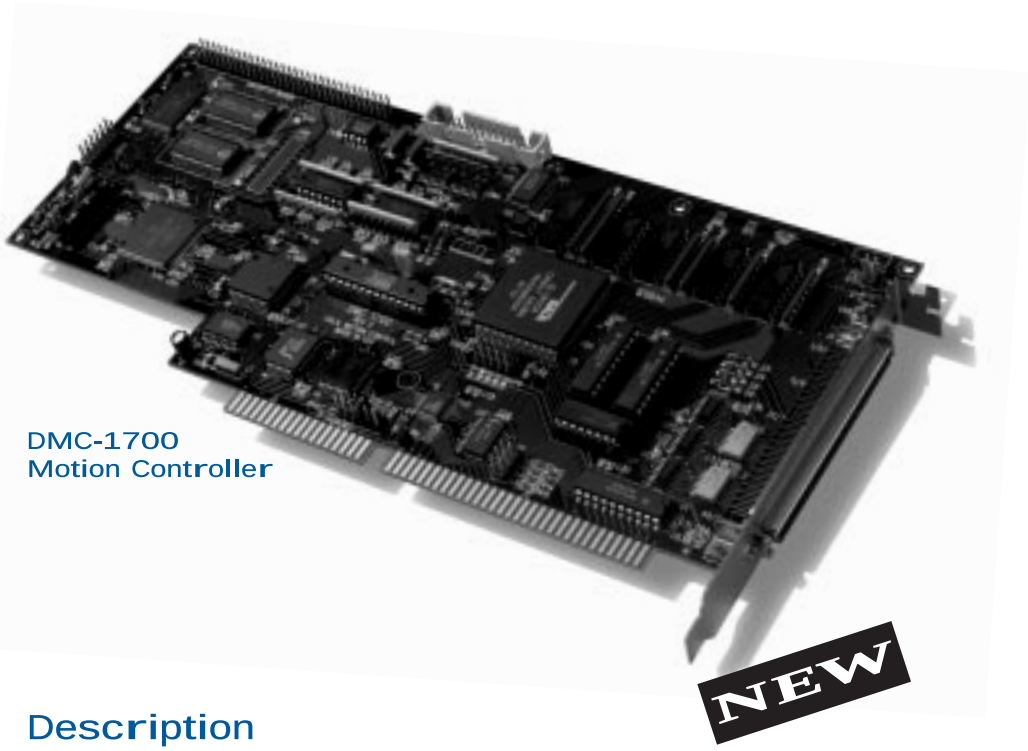
ISA BUS
DMC-1700

FEATURES

- Up to 8 axes of motion control
- Dual communication channels including DMA and FIFO
- 62.5 µsec per axis servo update rate
- Binary or ASCII modes
- Controls servo motors, step motors, and hydraulics
- 16-bit motor output DAC
- 12,000,000 counts/sec encoder feedback for servos
- 3,000,000 steps/sec for steppers
- Auxiliary encoder inputs for each axis
- Non-volatile program memory, array and variable storage
- Multitasking of four independent programs
- Automatic program execution upon power-up
- Jogging, point-to point positioning, linear and circular interpolation, electronic gearing and cam, and contouring
- Optoisolated inputs for home, abort, limits
- 8 uncommitted, optoisolated inputs (5-28 VDC) and 8 programmable outputs
- 8 analog inputs with 12-bit ADC (16-bit optional)
- High-speed position capture
- High-speed encoder compare output
- Programmable event triggers, symbolic variables and arrays
- I/O functions and timers for executing PLC tasks
- Flash EEPROM for firmware updates, program, parameter and array storage
- 100-pin high density environmental connector minimizes EMI
- Software tools available for servo tuning, interface to Visual Basic, and DOS, Windows 3.1, 95 and NT
- Plug and Play for Windows 95



DMC-1700
Motion Controller

NEW

Description

The DMC-1700 Series are Galil's newest motion control cards that install directly into a PC. The series offers many enhanced features including high speed communications, non-volatile program memory, faster encoder speeds, and improved cabling for EMI reduction.

The DMC-1700 provides two communication channels: a high speed FIFO for sending and receiving commands and a DMA channel which places a record directly into PC memory. This channel gives instant access to status and parameters.

The latest generation in ISA bus motion control allows for high speed servo control up to 12 million encoder counts/sec and step motor control up to 3 million steps per second. Sample rates as low as 62.5 µsec per axis are available.

A 2M Flash EEPROM provides enough non-volatile memory for storing application programs, parameters, arrays and firmware. New firmware revisions are easily upgraded in the field without removing the controller from the PC.

The DMC-1700 is available with up to 8 axes per card. The DMC-1700 can be used with step motors, servo motors, and hydraulics, on any combination of axes. Each axis is configurable by the user for optimum flexibility.

The DMC-1700 achieves superior precision through use of a 16-bit motor command output DAC and a sophisticated PID filter that features Kp, Ki, Kd, velocity and acceleration feedforward, and integration limits.

Designed to solve complex motion problems, the DMC-1700 can

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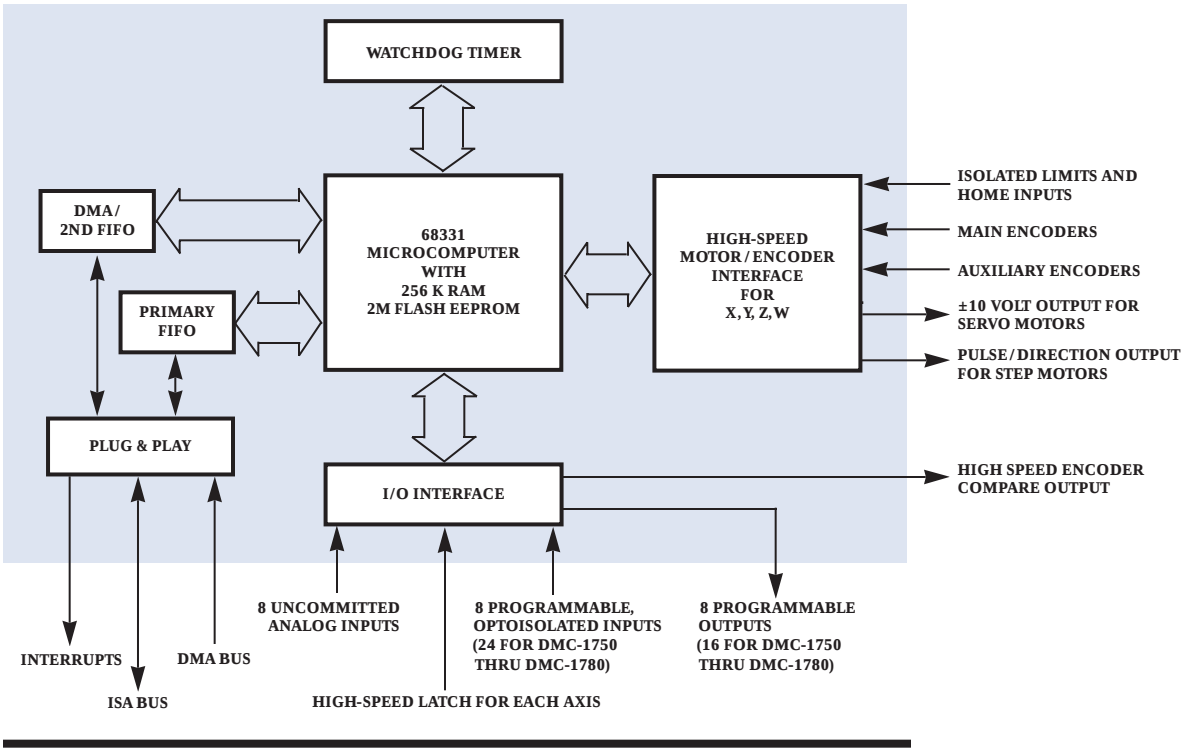
DMC-1700

be used for applications involving jogging, point-to-point positioning, vector positioning, electronic gearing, multiple move sequences, and contouring. The controller eliminates jerk by programmable acceleration and deceleration with profile smoothing. For smooth following of complex contours, the DMC-1700 provides continuous vector feed of an infinite number of linear and arc segments. The electronic gearing mode allows for multiple masters.

For synchronization with outside events, the DMC-1700 provides uncommitted I/O, including 8 opto-isolated digital inputs, 8 digital outputs, and 8 analog inputs for interface to joysticks, sensors, and pressure transducers. Dedicated optoisolated inputs are provided for forward and reverse limits, abort, and home.

The DMC-1700 is Plug and Play for Windows 95 making it easy to set-up. Commands can be sent in either Binary or ASCII. Additional software is available to autotune, view trajectories on a PC screen, translate AutoCAD files into motion, and create powerful, application-specific operator interfaces with Visual Basic. Drivers for Dos, Windows 3.1, 95 and NT are available.

DMC-1700 Functional Elements



Modes of Motion

Independent Axis Positioning: In this mode, each axis follows its own prescribed profile. The user specifies the desired absolute position (PA) or relative position (PR), along with the acceleration rate (AC), deceleration rate (DC), and slew speed (SP). Position can be interrogated at any time using the tell position (TP) command.

Jogging: The jog mode allows the user to command each motor to run at a prescribed jog speed. The user specifies the jog speed (JG), the acceleration rate (AC), and the deceleration rate (DC). On begin (BG), the motor accelerates up to the jog speed and continues at that speed until a new speed or stop command (ST) is issued. The direction of motion is specified by the sign of the JG parameter. The JG, AC, and DC parameters can be changed at any time during motion. Average speed can be interrogated at any time using the tell velocity (TV) command.

Linear Interpolation: The DMC-1700 provides a linear interpolation mode for any combination of up to 8 axes. Here, motion between the axes is coordinated to maintain the prescribed vector speed (VS), acceleration rate (VA), and deceleration rate (VD) along the specified path. The path is described by incremental distances (LI) for each axis. Several LI segments can be given prior to and during motion allowing infinite paths to be followed without stopping. There is no limit to the total move length.

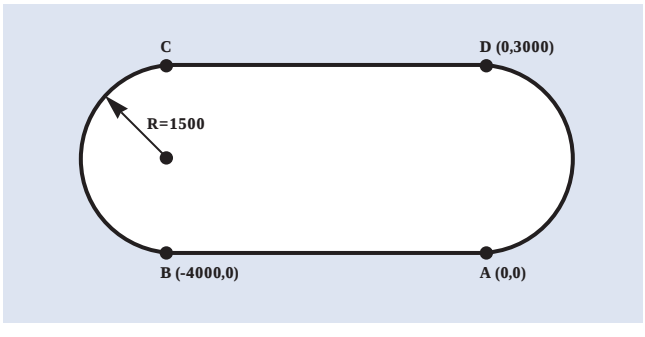
2-D Coordinated Motion—Linear and Circular Interpolation: The DMC-1700's coordinated motion mode (VM) makes it easy to follow a two-dimensional path consisting of multiple straight-line and arc segments. Here, the user programs linear moves (VP) and circular moves (CR), in addition to the feed-rate (VS), vector acceleration (VA), and deceleration (VD). There is no limit to the number of segments that can be specified allowing long motion paths to be followed without stopping. The coordinated motion mode is useful when a constant vector speed must be maintained along a two-dimensional path, such as in engraving or adhesive applications. The vector speed can be changed at any time during motion, which is ideal for slowing down around sharp corners. The user can also command a third axis to remain tangent to the coordinated path, which is ideal for cutting tools.

2-D path at constant vector speed.
Example:

VM XY	XY motion plane
VS 10000	Vector speed
VP -4000,0	Segment AB
CR 1500,270,-180	Segment BC
VP 0,3000	Segment CD
CR 1500,90,-180	Segment DA
VE	End of sequence
BGS	Begin sequence

Motion Smoothing: To eliminate the jerk of mechanical systems, the DMC-1700 provides profile smoothing. The acceleration profile is filtered with the IT command for inde-

2-D Circular Path



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pendent moves and the VT command for coordinated moves.

Contouring: The contouring mode allows the user to bypass the DMC-1700 motion profiler and prescribe any arbitrary position trajectory. Position increments (CD) over a time interval (DT) are specified for each axis. The contouring mode is useful when complex and computer-generated trajectories must be followed. An automatic data recording feature allows the DMC-1700 to "learn" a path and then follow it in the contour mode.

Electronic Gearing: This mode allows up to 8 axes to be electronically geared to up to 8 masters. The master axis (GA) may rotate in both directions and the geared axes will follow at the specified ratios (GR). The gear ratio can be changed during motion. An axis can be geared and do an independent or vector move simultaneously. This is useful for the precise synchronization required in flying-shear applications. The electronic gearing mode eliminates mechanical gears and is also useful for gantry applications where a special command (GM) tightly couples the two axes.

Electronic gearing. Example:

GAY	Y is master
GR 5,,-2.5	X ratio=5, Z ratio=-2.5
PR,10000	Specify Y distance
SP,10000	Specify Y speed
AC,25000	Specify Y acceleration
DC,25000	Specify Y deceleration
BG Y	Begin motion

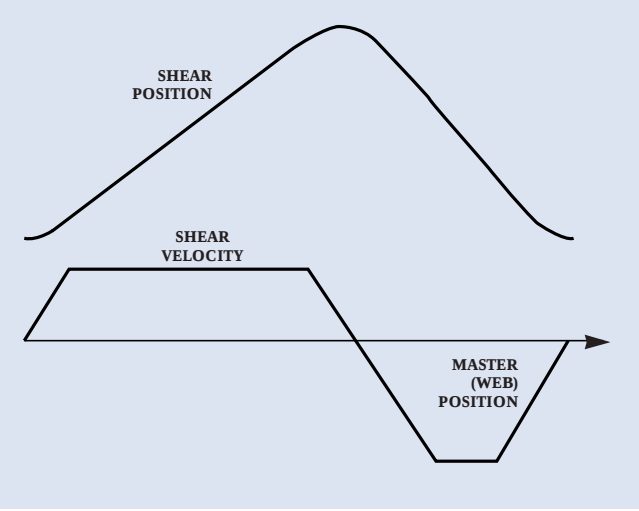
Electronic Cam: This mode allows synchronizing up to seven axes with a master axis according to any function. The cam functions, which are specified by a table, define the required position of the followers point by point along the motion cycle. The master axis may be a driven axis or just a master encoder. It may rotate in either direction.

The position of the master axis and the follower axes may be expressed in modulo form, limiting the value to one cycle. This simplifies the description of points and events along the cycle.

Any follower axis may be engaged or disengaged independently at specific points along a cycle. This allows selecting the engagement and disengagement points as those where the speed change of the follower is most gradual.

The electronic cam is an ideal mode for periodic operation, especially those requiring varying gear ratio along the motion cycle. Such applications include flying shears, rotating knives and packaging systems.

Electronic Cam



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The diagram on the previous page shows the cam table for a typical flying shear application. It also shows the expected shear velocity when the master speed is constant.

Dual Loop: The dual-loop encoder feature enables the DMC-1700 to compensate for backlash. There are two compensation methods. The continuous dual loop, which performs the correction along the move, and the sampled dual loop, which performs the correction at the final point.

In both cases two encoders are used for each axis. One encoder is mounted on the motor and one is mounted on the load. The continuous dual loop, which is activated with the instruction DV1, closes the position loop with the load encoder and derives the damping terms from the motor encoder. This method provides backlash compensation along the motion path. The sampled dual loop performs the correction at the end of the move.

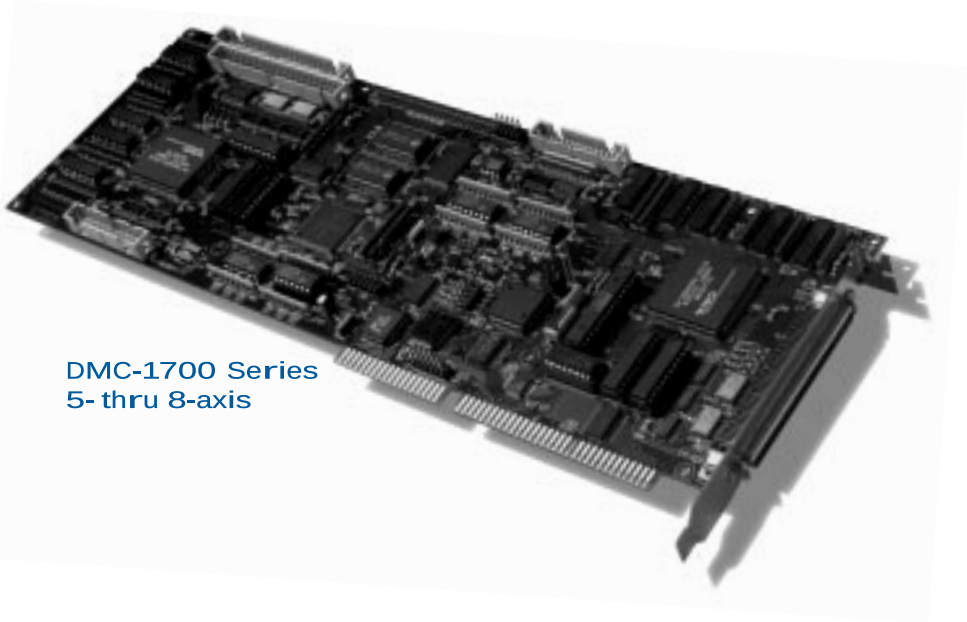
Homing: The home (HM) command can be used to home each motor to an external mechanical reference and an encoder index signal. The home speed (SP) is programmable and the polarity of the home switch is selectable using the (CN) command. Alternative homing sequences can be created with the FE and FI commands.

Sinusoidal Commutation: The DMC-1700 is available with the sinusoidal commutation option. In this mode, the controller performs a sinusoidal commutation of brushless motors and outputs the sinusoidal signals necessary to drive the motor phases. This method allows the use of low-cost amplifiers, thereby reducing the system cost.

The initialization procedure can be customized for the users, according to the available sensors such as incremental encoders, hall sensors, absolute encoders, or resolvers.

High Speed Latch: For precisely sychronizing the position to an external input, the high-speed latch captures exact main or auxiliary encoder position on the occurance of an input. RL reports the latched position.

High Speed Encoder Compare: The OC command waits for an encoder to reach a specified starting position and then produces a pulse every time the encoder passes a second specified distance. This feature is useful for triggering external events to exact positions within .5 microseconds.



DMC-1700 Series
5- thru 8-axis

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Command Summary

MOTION

AB	Abort motion
AC	Acceleration
BG	Begin motion
CD	Contour data
CM	Contour mode
CR	Circle
CS	Clear motion sequence
DC	Deceleration
DT	Contour time interval
ES	Ellipse scaling
EA	Select Master cam axis
EB	Enable cam mode
EG	Start cam motion
EM	Modulus for cam
EP	Master counts per table entry
EQ	Stop cam motion
ET	Cam table entry
FE	Find edge
FI	Find index
GA	Master axis for gearing
GM	Gantry mode
GR	Gear ratio
HM	Home
IP	Increment position
IT	Smoothing time constant–independent
JG	Jog mode
KS	Stepper smoothing
LE	Linear interpolation end
LI	Linear interpolation distance
LM	Linear interpolation mode
OC	Circular encoder compare
PA	Position absolute
PR	Position relative
SP	Speed
ST	Stop
TN	Tangent
VA	Vector acceleration
VD	Vector deceleration
VE	Vector sequence end
VM	Coordinated motion mode
VP	Vector position
VS	Vector speed
VT	Smoothing time constant–vector

PROGRAM FLOW

AD	After distance
AI	After input
AM	After motion complete
AP	After absolute position
AR	After relative distance
AS	At speed
AT	After time
AV	After vector distance
HX	Halt task
IN	Input variable
II	Input interrupt
JP	Jump to program location
JS	Jump to subroutine
MG	Message

PROGRAM FLOW (cont.)

MC	After “In Position”
MF	Forward motion past position
MR	Reverse motion past position
NO	No operation
RE	Return from error subroutine
RI	Return from interrupt
WC	Wait for contour data
WT	Wait
XQ	Execute program
ZS	Zero subroutine stack
TW	Timeout for “In Position”

CONFIGURATION

AF	Analog feedback
AL	Arm latch
BN	Burn
BP	Burn program
BV	Burn variable
CB	Clear bit
CE	Configure encoder type
CN	Configure switches and stepper
CO	Configure outputs
CW	Data adjustment
EN	End program
DA	Deallocate arrays
DE	Define dual encoder position
DL	Download
DM	Dimension arrays
DP	Define position
DR	DMA/status FIFO
ED	Edit mode
EI	Enable interrupts
EO	Echo off
LS	List
LZ	Leading zeros
MO	Motor off
MT	Motor type
OB	Define output bit
OC	Output compare
OP	Output port
PF	Position format
QD	Download array
QU	Upload array
QZ	DMA record structure
RA	Record array
RC	Record
RD	Record data
RS	Reset
SB	Set bit
UI	User interrupt
UL	Upload
VF	Variable format

CONTROL FILTER SETTINGS

DV	Damping for dual loop
FA	Acceleration feedforward
FV	Velocity feedforward
GN	Gain
IL	Integrator limit
KD	Derivative constant
KI	Integrator constant
KP	Proportional constant
OF	Offset
PL	Pole
SH	Servo here
TL	Torque limit
TM	Sample time
ZR	Zero

STATUS

RP	Report command position
RL	Report latch
SC	Stop code
TB	Tell status
TC	Tell error code
TD	Tell dual encoder
TE	Tell error
TI	Tell input
TP	Tell position
TR	Trace
TS	Tell switches
TT	Tell torque
TV	Tell velocity

ERROR AND LIMITS

BL	Reverse software limit
ER	Error limit
FL	Forward software limit
OE	Off on error

EDITOR

ED	Edit mode
<return>	Save line
<cntrl>P	Previous line
<cntrl>I	Insert line
<cntrl>D	Delete line
<cntrl>Q	Quit editor

ARITHMETIC FUNCTIONS

@SIN	Sine
@COS	Cosine
@ABS	Absolute value
@FRAC	Fraction portion
@INT	Integer portion
@RND	Round
@SQR	Square root
@IN	Return digital input
@AN	Return analog input
+	Add
-	Subtract
*	Multiply
/	Divide
&	And
|	Or
( )	Parentheses

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Connectors

J1 DMC-1740 (A–D AXES) MAIN; 100-PIN HIGH DENSITY:

1	nc	51	nc
2	Ground	52	Ground
3	+5V	53	+5V
4	Error Output	54	Limit common
5	Reset	55	Home W
6	Encoder-Compare Output	56	Reverse limit W
7	Ground	57	Forward limit W
8	Ground	58	Home Z
9	Motor command W	59	Reverse limit Z
10	Sign W / Dir W	60	Forward limit Z
11	PWM W / Step W	61	Home Y
12	Motor command Z	62	Reverse limit Y
13	Sign Z / Dir Z	63	Forward limit Y
14	PWM Z / Step Z	64	Home X
15	Motor command Y	65	Reverse limit X
16	Sign Y/ Dir Y	66	Forward limit X
17	PWM Y/ Step Y	67	Ground
18	Motor command X	68	+5V
19	Sign X/ Dir X	69	Input common
20	PWM X / Step X	70	Latch X
21	Amp enable W	71	Latch Y
22	Amp enable Z	72	Latch Z
23	Amp enable Y	73	Latch W
24	Amp enable X	74	Input 5
25	A+ X	75	Input 6
26	A- X	76	Input 7
27	B+ X	77	Input 8
28	B- X	78	Abort
29	I+ X	79	Output 1
30	I- X	80	Output 2
31	A+ Y	81	Output 3
32	A- Y	82	Output 4
33	B+ Y	83	Output 5
34	B- Y	84	Output 6
35	I+ Y	85	Output 7
36	I- Y	86	Output 8
37	A+ Z	87	+5V
38	A- Z	88	Ground
39	B+ Z	89	Ground
40	B- Z	90	Ground
41	I+ Z	91	Analog In 1
42	I- Z	92	Analog In 2
43	A+ W	93	Analog In 3
44	A- W	94	Analog In 4
45	B+ W	95	Analog In 5
46	B- W	96	Analog In 6
47	I+ W	97	Analog In 7
48	I- W	98	Analog In 8
49	+12V	99	-12V
50	+12V	100	-12V

J5 DMC-1740 (A–D AXES) AUXILIARY ENCODERS; 26-PIN IDC:

1	+5V	2	Ground
3	A+ Aux X	4	A- Aux X
5	B+ Aux X	6	B- Aux X
7	A+ Aux Y	8	A- Aux Y
9	B+ Aux Y	10	B- Aux Y
11	+5V	12	Ground
13	A+ Aux Z	14	A- Aux Z
15	B+ Aux Z	16	B- Aux Z
17	A+ Aux W	18	A- Aux W
19	B+ Aux W	20	B- Aux W
21	Sample Clock	22	NC
23	NC	24	NC
25	NC	26	NC

Note: X, Y, Z, W are interchangeable designations for A, B, C, D axes.

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Connectors (continued)

J8 DMC-1780 (E–H AXES) MAIN; 50 PIN IDC:

1 nc
2 Ground
3 +5V
4 Error Output
5 Reset
6 Encoder-Compare Output
7 Ground
8 Ground
9 Motor command H
10 Sign H / Dir H
11 PWM H / Step H
12 Motor command G
13 Sign G / Dir G
14 PWM G / Step G
15 Motor command F
16 Sign F/ Dir F
17 PWM F/ Step F
18 Motor command E
19 Sign E/ Dir E
20 PWM E / Step E
21 Amp enable H
22 Amp enable G
23 Amp enable F
24 Amp enable E
25 A+ E
26 A- E
27 B+ E
28 B- E
29 I+ E
30 I- E
31 A+ F
32 A- F
33 B+ F
34 B- F
35 I+ F
36 I- F
37 A+ G
38 A- G
39 B+ G
40 B- G
41 I+ G
42 I- G
43 A+ H
44 A- H
45 B+ H
46 B- H
47 I+ H
48 I- H
49 +12V
50 +12V

J6 DMC-1780 (E–H AXES) MAIN; 50-PIN IDC:

51 nc
52 Ground
53 +5V
54 Limit common
55 Home H
56 Reverse limit H
57 Forward limit H
58 Home G
59 Reverse limit G
60 Forward limit G
61 Home F
62 Reverse limit F
63 Forward limit F
64 Home E
65 Reverse limit E
66 Forward limit E
67 Ground
68 +5V
69 Input common
70 Latch E
71 Latch F
72 Latch G
73 Latch H
74 Input 13
75 Input 14
76 Input 15
77 Input 16
78 Reserved
79 Output 1
80 Output 2
81 Output 3
82 Output 4
83 Output 5
84 Output 6
85 Output 7
86 Output 8
87 +5V
88 Ground
89 Ground
90 Ground
91 Input 17
92 Input 18
93 Input 19
94 Input 20
95 Input 21
96 Input 22
97 Input 23
98 Input 24
99 -12V
100 -12V

J7 DMC-1780 (E–H AXES) AUXILIARY ENCODER; 26-PIN IDC :

1 +5V
2 Ground
3 A+ Aux E
4 A- Aux E
5 B+ Aux E
6 B- Aux E
7 A+ Aux F
8 A- Aux F
9 B+ Aux F
10 B- Aux F
11 +5V
12 Ground
13 A+ Aux G
14 A- Aux G
15 B+ Aux G
16 B- Aux G
17 A+ Aux H
18 A- Aux H
19 B+ Aux H
20 B- Aux H
21 Sample Clock
22 NC
23 NC
24 NC
25 NC
26 NC

Note: The A, B, C, D axes and other I/O are located on the main DMC-1740 card.

CB50–100 Connector Board
The CB50–100 converts the two 50-pin ribbon cables from the DMC-1780 into a single 100-pin high density connector which brings the cable out of the back of the PC.

ISA BUS
DMC-1700

Specifications

PERFORMANCE

Servo loop cycle time:
DMC-1710: 125 µsec
DMC-1720: 125 µsec
DMC-1730: 250 µsec
DMC-1740: 250 µsec
DMC-1750: 375 µsec
DMC-1760: 375 µsec
DMC-1770: 500 µsec
DMC-1780: 500 µsec

Block execution time: In contour mode, up to 500 blocks (moves)/sec with full trajectory calculation.

Position accuracy: ±1 quadrature count.

Velocity accuracy:
Long-term: phase-locked, better than .003%.
Short-term: system dependent.

Synchronization: All axes in the same card are perfectly synchronized and share the same servo cycle. All cards sharing synchronization signal are perfectly synchronized in the same servo cycle.

Position capture accuracy: 40 µsec with optoisolation; .1 µsec if by-pass optoisolation.

PARAMETER RANGES

Position range: ±2,147,483,647 counts/move; automatic rollover; no limit in jog or vector modes.

Velocity range: Up to 12,000,000 counts/sec in servo mode.

Acceleration/deceleration: 1,024 to 67,107, 840 c/sec^2.

Error limit: 32,767 counts

Gear ratio: 127.9999

Filter constants:
Kp: 0 to 1023.875
Kd: 0 to 4095.875
Ki: 0 to 2047.875
Pl: 0 to .9999

Motor command resolution: 16 bits or .0003 V

Step motor control mode: Full, half or microstep

Step pulse frequency: 3,000,000 pulses/sec

Number of variables: 254

Array size: 8000 elements in up to 30 arrays

Memory size: 1000 lines × 80 characters

INPUTS/OUTPUTS

Feedback: Two channels of A/B quadrature per axis with third channel for index. In servo mode, includes auxiliary encoder inputs for each axis. Single-ended or differential. Can be configured for quadrature or pulse and direction. Option for analog feedback or absolute encoders.

General purpose inputs:
DMC-1710 thru 1740: 8 optoisolated inputs–active high or low
DMC-1750 thru 1780: 24 total inputs (16 optoisolated, 8 TTL)

General purpose outputs:
DMC-1710 thru 1740: 8 TTL outputs
DMC-1750 thru 1780: 16 TTL outputs

General purpose analog inputs: 8 inputs; ± 10 V; 12-bit resolution. 16-bit optional.

Dedicated outputs per axis: Analog motor command, pulse and direction, amplifier enable, encoder output compare (one total).

Axes: Up to 8 axes per card.

POWER REQUIREMENTS

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

OPERATING TEMPERATURE

0° to 70° C

PHYSICAL

10.25" × 4.8"
(DMC-1710 thru DMC-1740)
13.25" × 4.8"
(DMC-1750 thru DMC-1780)

COMMUNICATION INTERFACE

Primary Communications Channel. Bi-directional high speed FIFO used for sending commands and receiving responses from commands and application programs.

Secondary Communications Channel.
Can be used in two modes:
1. DMA—places a record in memory of PC at a fixed rate.
2. Polling—provides record on demand.

In both modes the record is in binary format and contains information on position, position error, torque, velocity, switches, inputs, outputs, and status.

SOFTWARE INTERFACE

Plug and Play for Windows 95. Utilities for DOS, Windows 3.1, 95 and NT. Configurable for non-Plug and Play mode.

Continued on the next page.

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Specifications (continued)

I/O DESCRIPTION

Inputs:

Encoder, A+, B+: Position feedback from incremental encoder with two channels in quadrature. The encoder can be analog (±12 V) or TTL. NOTE: Encoders that produce outputs in the format of pulses and direction can also be used.

Encoder index, I+: Once-per-revolution encoder pulse; used in Homing sequence or Find Index command. Minimum index pulse width is 120 µsec.

Encoder, A-, B-, I-: Optional differential inputs from encoder; used for enhanced noise immunity.

Auxiliary encoder: Inputs for additional encoder; used when encoders on both the motor and the load are required. Available on servo axes only.

Abort#: Stops commanded motion instantly and also aborts application program.

Reset:* System reset.

Forward and reverse limit switch#: When active, inhibits motion in forward or reverse direction and also causes the limit switch subroutine #LIMSWI to execute.

Home switch#: Input for Homing (HM) and Find Edge (FE) instructions.

Input 1–Input 8#: Uncommitted inputs; can be defined by the user to trigger events or interrupt program. Inputs 9–24 available with DMC-1750 thru DMC-1780.

Latch#: High-speed position latch to capture axis position within 40 µsec (bypass optoisolation for .1 µsec capture). AL command arms latch. Input 1, 2, 3, 4 latches X, Y, Z, W respectively or the auxiliary encoder of X, Y, Z and W. Inputs 9, 10, 11, 12 latches E, F, G, H axes respectively for DMC-1780.

Analog 1–Analog 8: Analog inputs that can be connected to external analog signals such as force or pressure transducers. 12-bit resolution ADC for ±10 V input used for position feedback. 16-bit ADC optional.

Outputs:

Analog motor command: ±10 V range signal for driving servo amplifiers has 16-bit resolution or .0003 Volts.

Amp enable:* Signal to disable and enable an amplifier. Amp enable goes low when a motor-off condition occurs.

Step Out: Pulses for input to a step motor driver. The pulses can be either active low or high. Upon Reset, the output will be low if the SM jumper is on, Tristate if off. The STEP OUT pin also provides the PWM signal for servo motors.

Direction: Used with the Step Out signal to give direction to step motors or servo motors in the sign magnitude mode.

Error:* The signal goes low when the position error on any axis exceeds the limit specified by the error command, ER.

Output 1–Output 8: These 8 TTL outputs are uncommitted and can be designated by the user to toggle relays and trigger external events. The output lines are toggled by Set Bit (SB), Clear Bit (CB), Define Bit (OB), and OP instructions. Outputs 9–16 available with DMC-1750 thru DMC-1780.

Active high or low. Optoisolated 2.2 KΩ in series; requires at least 2 mA of sinking current to activate.

* Active low

ISA BUS
DMC-1700

ICM-1900/AMP-19X0 INTERCONNECT MODULE

The ICM-1900 interconnect module provides easy connections between the DMC-1700 series controllers and other system elements, such as amplifiers, encoders, and external switches. The ICM-1900 accepts the 100-pin main cable and 25-pin auxiliary cable and breaks them into screw-type terminals. Each screw terminal is labeled for quick connection of system elements.

An ICM-1900 is required for each set of 4 axes on the DMC-1740 and DMC-1780. The ICM-1900 is contained in a metal enclosure. A version of the ICM-1900 is also available with servo amplifiers, the AMP-19X0.

The AMP-1910 contains 1 amplifier; the AMP-1920, 2 amplifiers; the AMP-1930, 3 amplifiers; and the AMP-1940, 4 amplifiers. Each amplifier is rated for 7 amps continuous, 10 amps peak at up to 80 V. The gain of the AMP-19X0 is 1 amp/V and requires an external DC supply.

FEATURES

- **Breaks out DMC-1700 cables into individual screw-type terminals**
- **Clearly identifies all terminals**
- **Provides jumper for connecting limit and input supplies to 5 V supply from PC**
- **Can be configured for AEN high or low**
- **Available with optoisolated output as an option**

PHYSICAL

- 13.5" × 2.675" × 6.88"
- Keyholes – 1/4 ∅

ELECTRICAL (AMP-19X0)

- 7 amps continuous, 10 amps peak; 20 to 80 V
- Minimum motor inductance: 1 mH
- PWM frequency: 30 Khz
- Ambient operating temperature: 0° to 70° C
- Gain: 1 amp/V

SAVE $100

STARTER KIT

Complete system for quick prototyping, including:

- **DMC-1700 controller**
- **ICM-1900 interconnect**
- **100-pin cable**
- **WSDK servo tuning software**
- **Utilities**
- **Programming manual**