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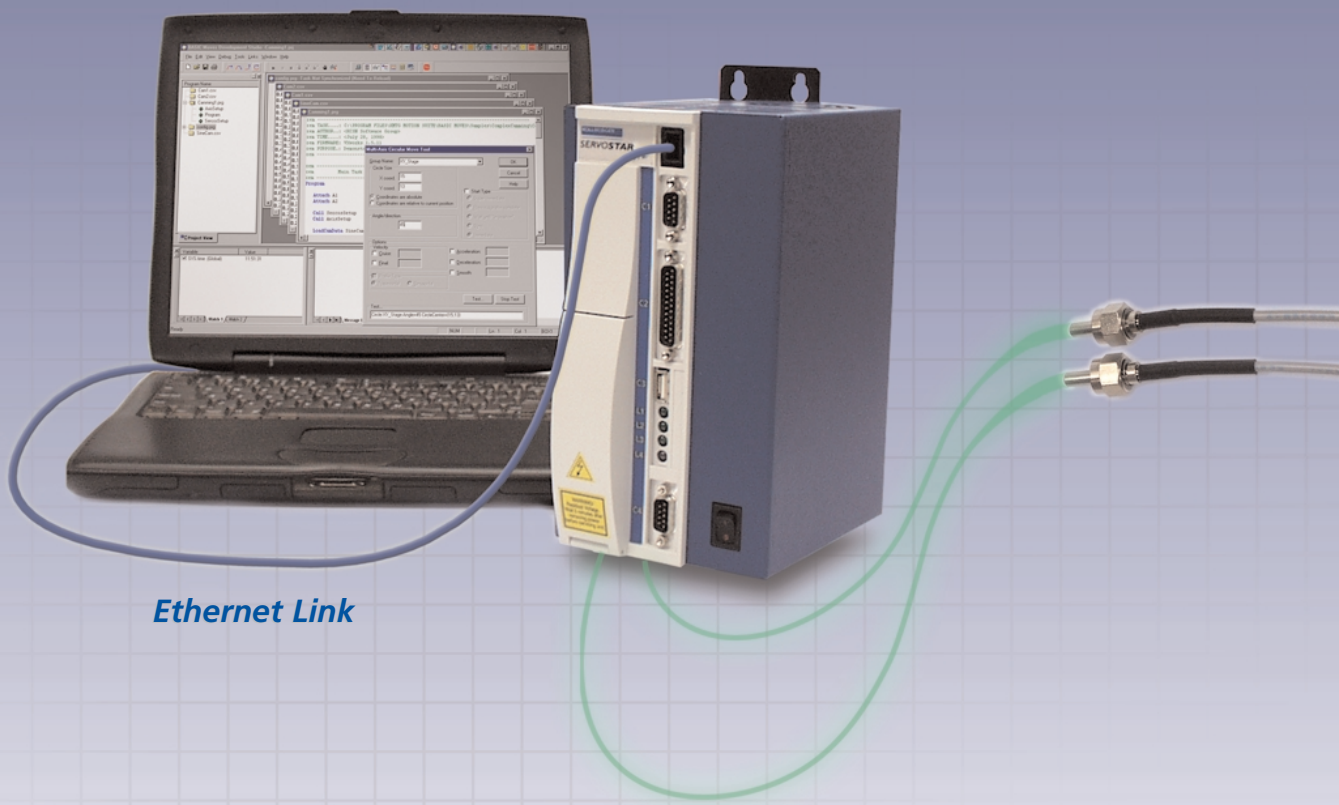
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Find the *Danaher Motion / Kollmorgen MC SE02-0808-000-0300* at our website: ***Click HERE***

Electronics Data Publication

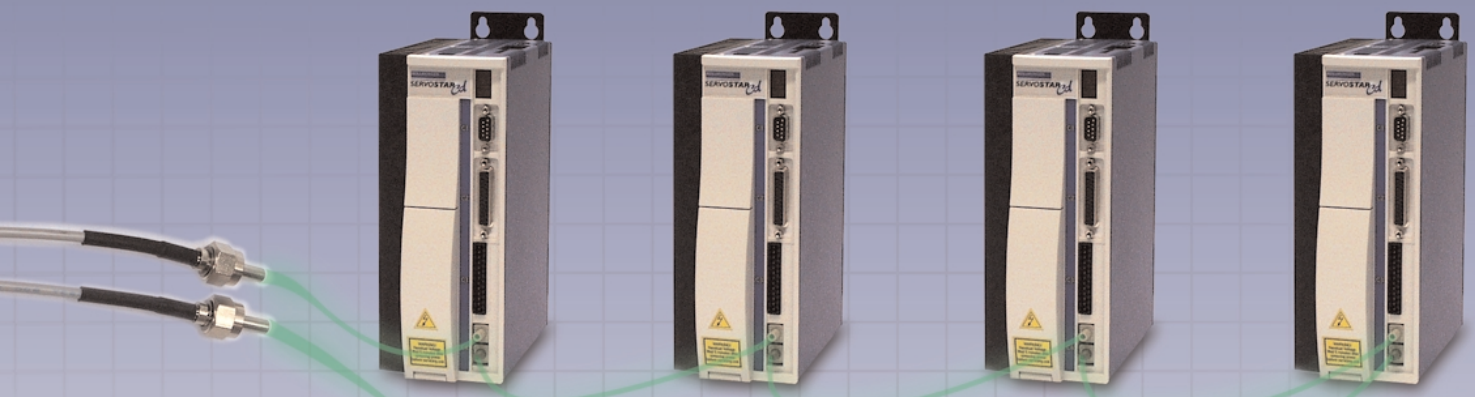


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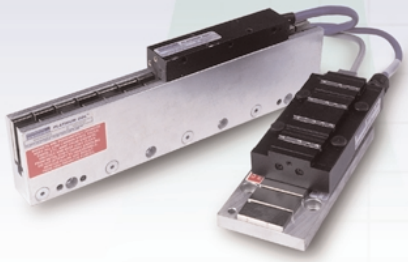
Meet Kollmorgen's complete line of SERVO**STAR**® *MC* motion controllers, based on the digital communication standard **SERCOS Interface™**, to provide the flexibility and accuracy needed by today's motion control systems. The SERVO**STAR** *MC* is offered in either ISA Bus Card or PCI Bus Card form for use in industrial computers, or as a standalone controller in a standard width or expanded width (for additional option cards) enclosure.

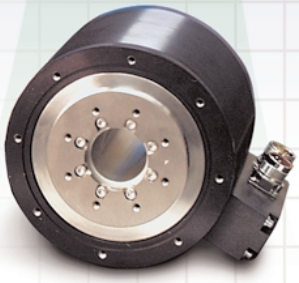
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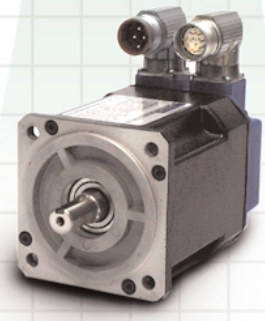


SERCOS interface™

Fiber Optic Ring









KOLLMORGEN

SERVOSTAR® 300

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Introduction

The MC software system has three major components: Firmware, User program and Microsoft Windows™ software.

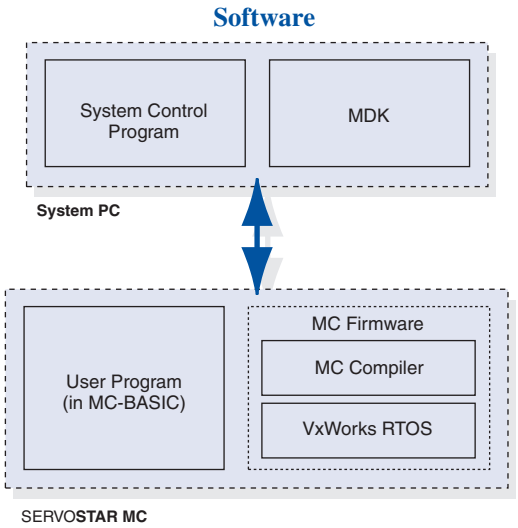
The firmware is Kollmorgen dedicated software running on the MC. The user program is the software you write on the MC in MC-BASIC. Finally, the Motion Developer's Kit (MDK) is Windows-based software that includes the development tools and communications routines that let your PC talk to the MC. Let's start with the firmware.

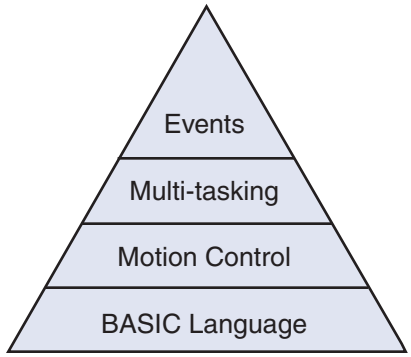
Real-Time Operating System (RTOS)

The foundation of system software is the operating system. Motion systems need rock-solid timing - something that ordinary operating systems like DOS and Windows just can't provide. We needed a "real-time operating system" or RTOS. Most companies write their own, proprietary RTOS. Kollmorgen sought out the best solution and found it available in the off-the-shelf RTOS industry. We chose VxWorks™ by Wind River Systems because they are the leaders in the RTOS industry. That gives our software higher in reliability and performance, and an upgrade path for the future.

MC-BASIC

What's MC BASIC? It's BASIC extended to support motion programming. Notice we didn't say "BASIC-like". It's true BASIC. With commands like "PRINT" and "GOTO". With FOR/NEXT loops and WHILE blocks. With MC-BASIC, you'll feel right at home the first time you write a program. And MC BASIC is fast. Because its compiled, not just interpreted, the user program can run in tens of microseconds per line.





MC BASIC

But BASIC is just the start. We added motion. We started with point-to-point moves. We added circular interpolation. We made all of our moves dynamically changeable with end points and target speeds that can be adjusted in real-time. We added gearing and the most powerful camming in the industry.

MC BASIC is multi-tasking. Tens of tasks can run independently. Tasks can control other tasks. They can start, stop, or pause other tasks. And all the tasks run in a well-defined, flexible priority structure where you decide how resources are allocated.

MC BASIC is event driven. What's an event? Just about anything that happens in the course of machine operation, like a switch opening or a motor crossing a position threshold. Events are monitored continuously and when one occurs, user "event code" is loaded and executed quickly.

BASIC MOVES Development Studio (BMDS)

BMDS is a fully featured editor and debugger designed to support the MC. BMDS makes developing motion programs simple. BMDS uses true BASIC language programming, a multi-tasking environment and easy to use wizards to get you started.

Motion Developer's Kit (MDK)

The final part of our software system is the MDK. The MDK includes the Application Programming Interface (API), a library of routines that simplify communication between the PC and the MC. It all goes together to let you quickly build your motion system, and with confidence for the future.

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Introduction

SERVO**STAR** MC is designed with the requirements of modern motion control systems in mind. Kollmorgen assembled a worldwide team of engineers with decades of design experience, and listened to the needs of the people that use these products everyday. Linking research and design discipline, the end result is a new innovative controller that answers the difficult questions posed by complex and varied applications. Bringing it all together - hardware, firmware and software - the SERVO**STAR** MC stands ready to respond to today's challenges.

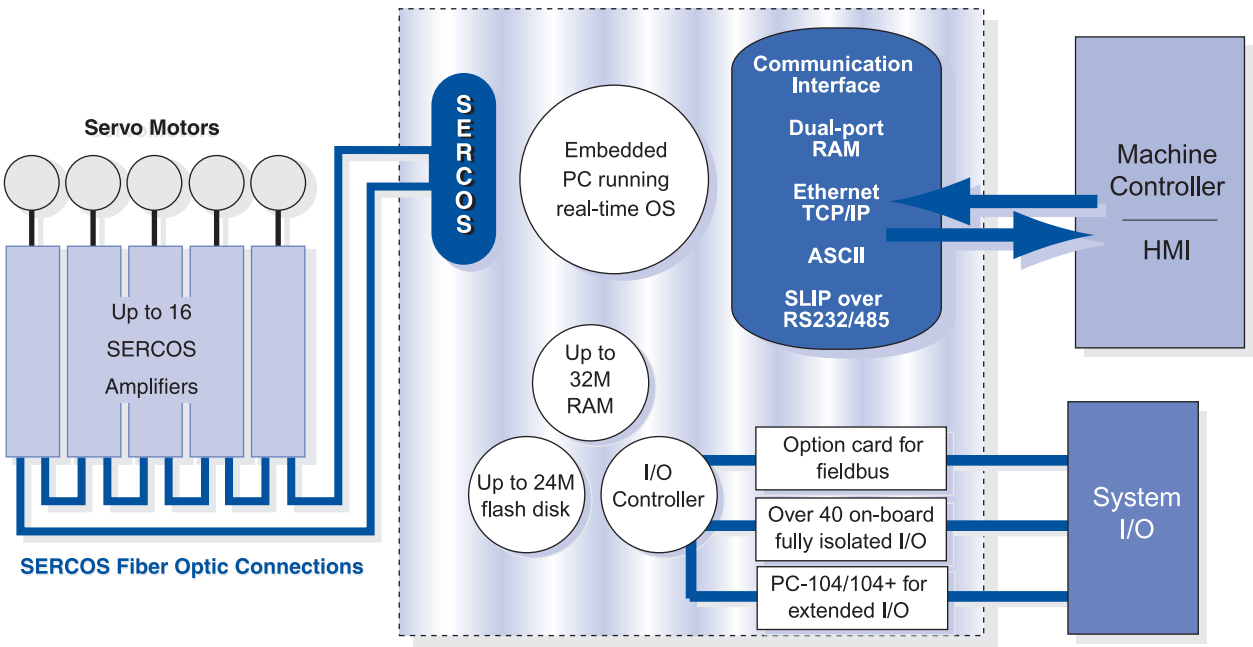
The design process started with a careful review of problems encountered by motion control engineers everywhere. It was found that the analog connection between the controller and the drive was creating problems. Ground loops. electrical noise. Shielding deficiencies. Intermittent connections. And just too many connections were required.

A fully digital means of communication was needed. That is why the SERVO**STAR** MC relies on SERCOS interface™ to connect the controller to its drives. This digital communications technology eliminates noise and ground concerns and reduced the fifty or more connections to just two fiber optic cables.

The MC hardware is powerful. That is because at its heart is a PC – either a dedicated 586 PC or a GXM PC (model dependent) – on a card. It has the processing power to run programs fast. It has a fully functional flash disk on-board to provide permanent memory storage measured in megabytes, not kilobytes. The same is true for RAM; the MC starts at 8MB and grows to fit your needs.

Finally, the SERVO**STAR** MC controller provides the Input/Output flexibility that is needed. There are over forty on-board optically-isolated I/Os. Each axis has additional I/O points that can be easily connected into the system. Even more, the SERVO**STAR** MC has its own internal PC-104+ bus so that a wide variety of I/O can be added, depending on the requirements.

With the Kollmorgen SERVO**STAR** MC, motion controllers have taken a leap forward in providing power, performance, reliability and flexibility to the motion control engineer.

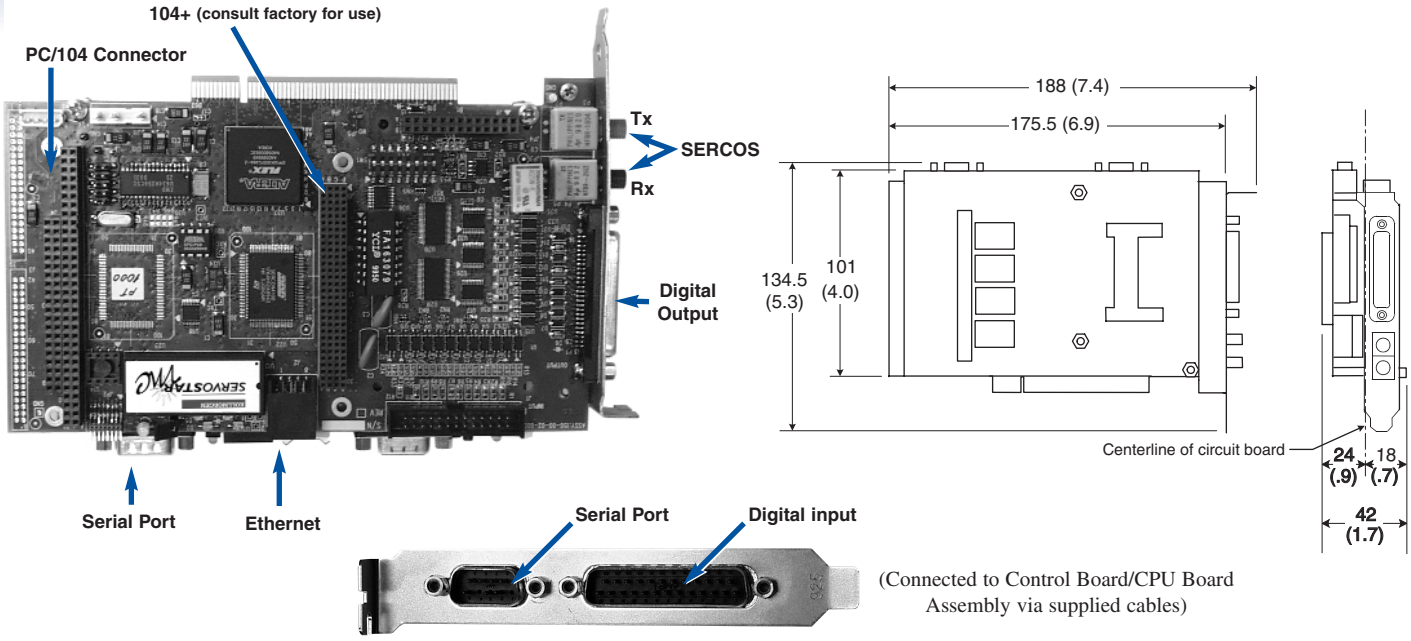


SERVO**STAR**® MC

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Key Connectors And Dimensions For PCI And ISA Cards

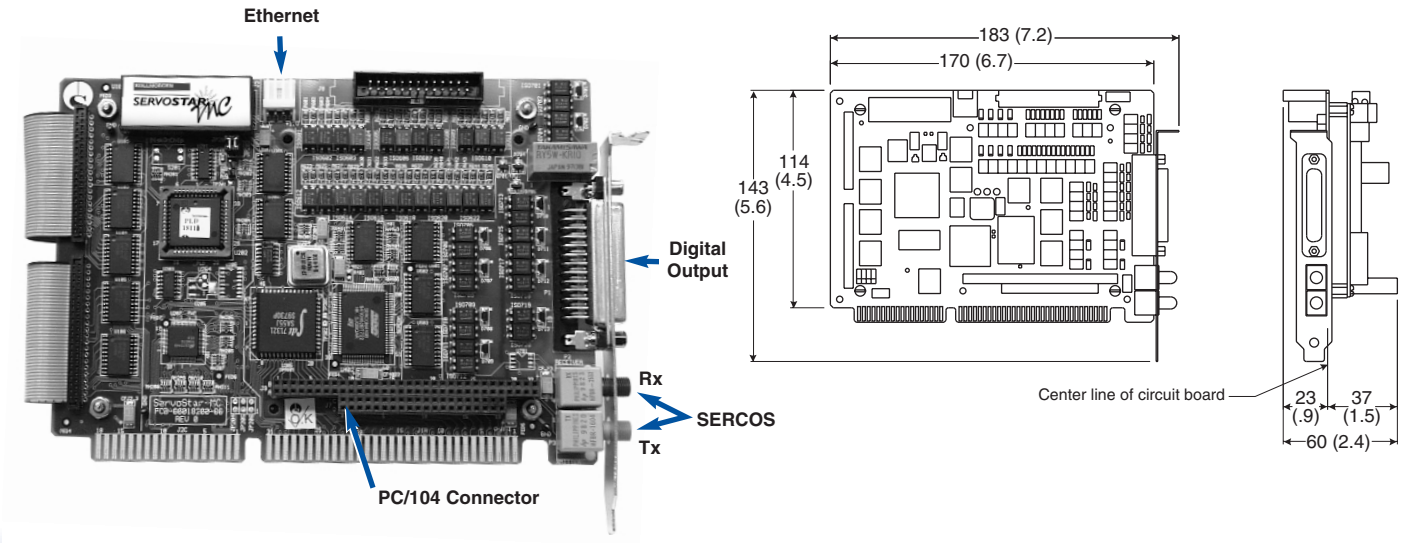
PCI Card



(Connected to Control Board/CPU Board Assembly via supplied cables)

Bracket for Input Connector

ISA Card

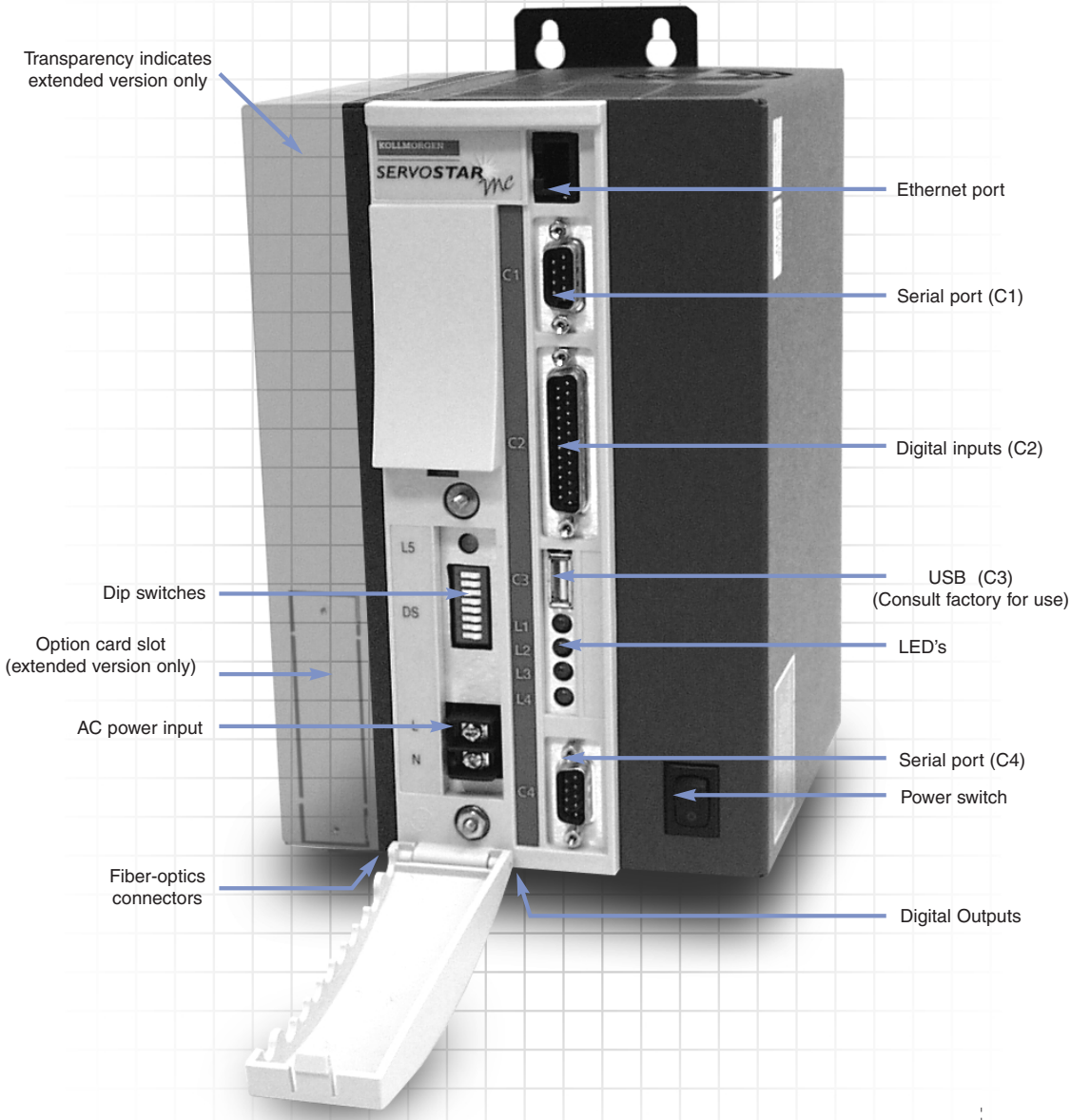


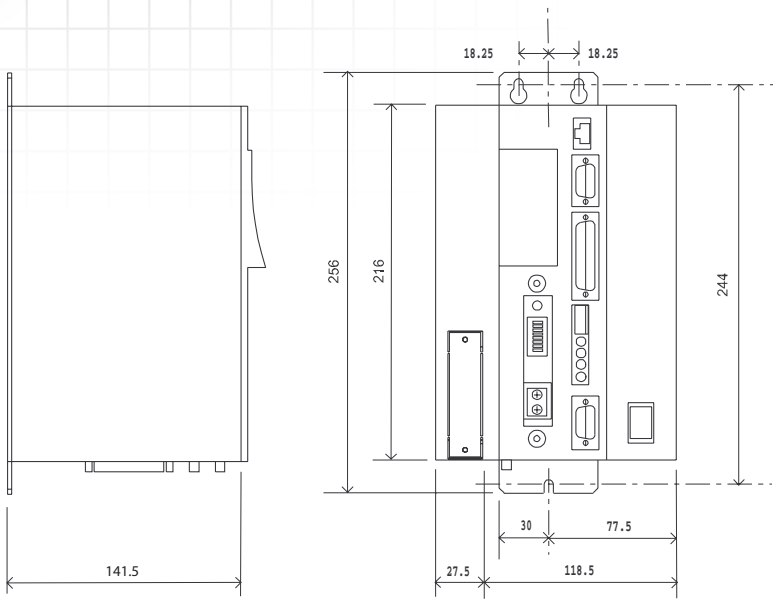
(Connected to Control Board/CPU Board Assembly via supplied cables)

Bracket for Input Connector

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Key Connectors And Dimensions For Stand-Alone





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Expansion Cards

PC-104 (104+)

PC-104 is a high-speed parallel computer bus. It's electrically the same as the ISA bus used in most PC's, but smaller and more rigid, it is mechanically suited for industry.

PC-104 is a standard supported by independent manufacturers that make everything from I/O cards to complete computers. So, if you need I/O that isn't standard on the MC, like A/D conversion, D/A conversion, RTD sensors, you can look to PC-104 vendors to provide a wider range of I/O than any single manufacturer can. In fact, you can even use PAMUX® OPTO-22's parallel I/O bus which lets you connect to as many as 512 I/O points of analog and digital I/O.

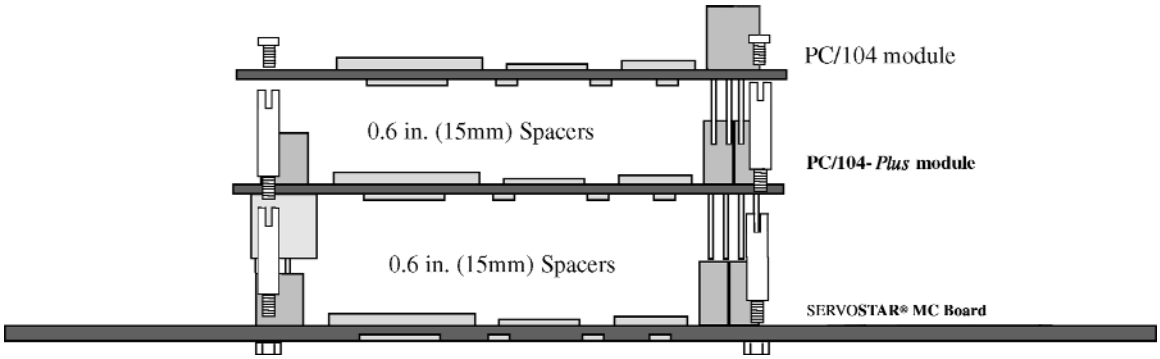
So, how do you use MC-BASIC to talk to PC-104 I/O? Most PC-104 cards require direct read/writes to either memory (PEEK/POKE) or I/O space (INP/OUT).
MC-BASIC supports both types of commands in byte and word format.

Advantages of PC-104
- Small footprint
- Reasonably priced
- Wide assortment of I/O
- Full connection to MC memory and I/O space
- Available from many vendors
- Industrial designs

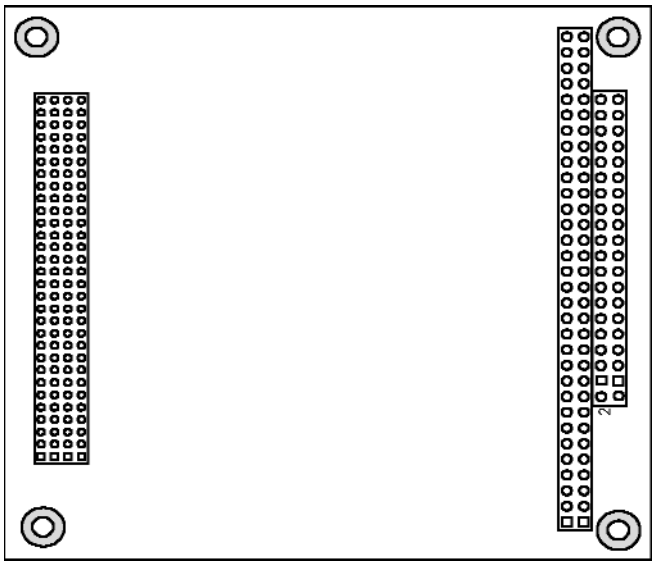
PC-104+
PC/104-plus is basically a PCI (Peripheral Component Interface) bus addition to the PC/104 standard. PCI gives peripheral devices more direct access to the CPU which can greatly improve system performance.

*Not available for the ISA version.

PC-104 I/O Cards



Basic Mechanical Dimensions (16 bit version)



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MC Basic Partial Command Set

BASIC

Operators

^, *, /, +, -	Math Operators
>, >=, <, <=, <>, =	Comparison operators
AND, OR, XOR, NOT	Logic operators
BAND,BOR, BNOT	Bitwise operators

Flow Control

IF…THEN...ELSE	
SELECT…CASE	
FOR…NEXT	
WHILE…DO	
DO…LOOP	
GOTO	
CALL	Subroutine call

Math (all functions double precision)

ABS	Absolute Value
ROUND	Round to nearest int
ATN	Arc Tangent
COS	Cosine
SIN	Sine
ASIN	Arcsine
ACOS	Arcosine
ATAN2	Arc Tangent 2
EXP	Exponential
LOG	Natural Logarithm
SGN	Sign Function
SQRT	Square Root
TAN	Tangent

Data Types

DOUBLE	Double-precision float
LONG	32-bit integer
STRING	ASCII string

Constant values

PI	π value
On, Off, True, False, Negative, Positive	
MaxLong, MinLong, MaxDouble, MinDouble	Data range

Printing

Print, ?	Unformatted print
PrintUsing	Formatted print

String manipulation functions

Chr$, Str$	Conversion functions
Space$, String$, LCase$, UCase$	Formatting functions
RTrim$, Ltrim$,Asc, Instr, Left$, Right$, Mid$	Sub-string manipulation

MEMORY, MULTI-TASKING & I/O

Memory and I/O Access

Inpb	Byte I/O read
Inpw	Word I/O read
Outb	Byte I/O write
Outw	Word I/O write
Peekb	Byte memory read
Peekw	Word memory read
Pokeb	Byte memory poke
Pokew	Word memory poke

Non Volatile RAM

NVRAMFormat, LNVRAMSize, DNVRAMSize	Formatting.
LNVRAM[x], DNVRAM[x]	Data access.

I/O

System.Din	Onboard isolated input
System.Dout	Onboard isolated output
System.Vin	Virtual input (Shared memory interface registers)
System.Vout	Virtual output

Multi-Tasking

Send	Send a file to the MC
Load	Load a task to RAM
StartTask	Start a task immediately
KillTask	End a task permanently
IdleTask	Pause a task
ContinueTask	Restart a paused task
Sleep	Delay for fixed time
State	Current state of a task

Debugging

Record	Set up data record
RecordOn	Enable recording
RecordOff	Stop recording
Axislist	List all axes names
GrorupList	List all groups
CamList	List all declared cams
VarList	List all declared variables
TaskList	Look at all tasks running
EventList	Look at all events running
PLSList	List all declared PLS

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MC Basic Partial Command Set

System

Clock	High resolution clock
Time	Current time
Date	Current date
Version	Get current MC firmware version
SerialNumber	Get controller serial number
NumberAxes	Get number of axes
Information	Get HW configuration & Status
ALoad	Get average system load
Pload	Get peak system load

MOTION

Properties (for group and axes)

Simulated	Simulated or real axis
Absolute	Absolute or incremental target position
Pfac, Vfac, Afac, JFac	Conversion factors to user units
VelocityCruise	Point-to-point speed
VelocityFinal	Commanded speed at target position
Acc, Dec, Smooth	Point-to-point parameters
TimeAcceleration,	Time to reach cruise velocity
TimeDeceleration	Time to reach Vfinal
SmoothFactor	The amount of smoothing applied to the s-curve profile
AMax, DMax, VMax	Profile generator limits
PostionErrorMax	Max following error
VelocityOverspeed	Overspeed Limit
PositionErrorSettle	Max Error allowed and still be considered settled
TimeSettle	Time to settle
TimeToSettleMax	Settling failure Timeout
Pfinal	Get target position
PtoGo	Get remaining distance to target position
IsMoving	Get motion generator status.
IsSettled	Get settling status
StartType	Start mode for axes/groups
StopType	Stop mode for axes/groups
ProceedType	Proceed mode for axes/groups
COMMON…GROUP	Setup Group

Enabling Motion

Enable	Enable/Disable amplifiers
Motion	Allow/Disallow motion

Motion commands

Attach	Take ownership of axis or group
Detach	Release axis
Move	Point-to-point interpolated motion
Circle	Circular Interpolation
SyncStart	Trigger synchronized start of moves
Jog	Single axis jog
Stop	On-path or immediate stop
Proceed	Restart the motion
VelocityOverride	Change speed of some or all axes

Error handling

Try…Finally	Local error handling
OnError	Task Error handling
OnSystemError	System error handling
ErrorNum	Get number of last error
Error	Details of last error
ErrorHistory	Review recent error messages
ErrorHistoryClear	Clear Error History buffer

Programmable Limit Switch (PLS)

Common Shared…as PLS, Create PLS Data	Define a PLS
PLSEnable, PLSHysteresis , PLSOutput, PLSPolarity, PLSPosition ,PLSRepeat,	PLS parameters

Events

OnEvent	Define Event
EventOn	Enable event evaluation
EventOff	Disable event evaluation

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MC Basic Partial Command Set

Gearing and CAMMING

MasterSource	Source of gear input
Slave	Engage gearing or camming
GearRatio	Double float gear ratio
MasterSync	Slave is synchronized to the master
SlaveLag	Accumulated position error
COMMON...AS CAM	Set up global cam
FirstCam	First cam accessed for an axis
CamOffset	Starting point in cam table
Next	Next cam table in sequence
Previous	Next cam table in reverse
Cycle	Number of times to run cam
CamCycle	Number of times cam table has executed

Homing

Home	Execute homing sequence
HomeAcceleration, HomeDirection, HomeDistance, HomeDistanceMax, HomeVelocity, HomeOffset, HomePolarity, HomeReturn, HomeType	Homing parameters
HomeStatus	Get status of homing procedure

Sercos

BaudRate, CycleTime, Power, Phase, Scan	Sercos setup parameters
WriteIdnValue, IdnValue, WriteIdnString, IdnString,	Sercos data access

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Application Examples

Application One: Circle-Square-Diamond

Using a two axis table, draw a diamond inside a circle inside a square.

Program

```
Attach xyTable
xyTable.Absolute = True
xyTable.StartType = InPosition

Rem Goto Start Position
Move xyTable {0.0,2500.0}

Sleep 500                          'Delay 500msec.

Rem Do diamond
Move xyTable {2500.0,5000.0}       'move up-right
Move xyTable {5000.0,2500.0}       'move down-right
Move xyTable {2500.0,0}            'move down-left
Move xyTable {0,2500.0}            'move up-left

Sleep 500                          'Delay 500msec.

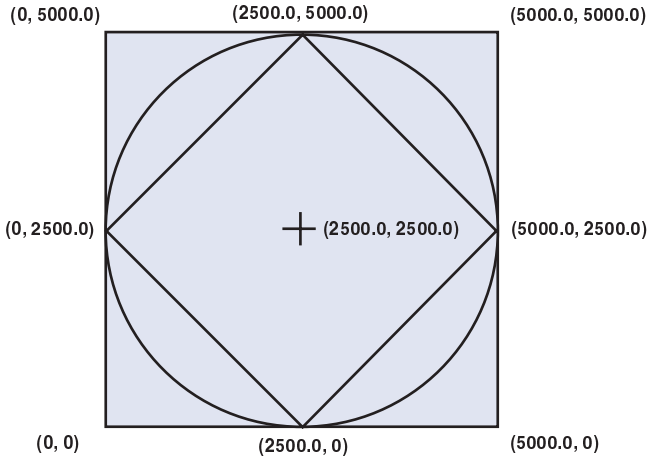
Rem Do Circle
Circle xyTable Angle = 360  CircleCenter = {2500.0,2500.0}

Sleep 500
'Delay 500msec.

Rem Do Square
Move xyTable {0, 5000}             'move to upper left-hand corner
Move xyTable {5000.0,5000.0}       'move right
Move xyTable {5000.0, 0}           'move down
Move xyTable {0,0}                 'move left
Move xyTable {0, 2500}             'move back to start position

Detach xyTable

End Program
```



Application Two: Dynamic Changes and Events

Use an external event to change speed of an existing move. The program reduces the axis speed from 100 mm/sec to 25.5 mm/sec when the event fires. If the axis is retracting, the event is ignored and the move continues at full speed.

Program

```
OnEvent RespondToInput System.Din.1 = 1
  Move Axis1 Axis1.PFinal VCruise = 2.55 StartType = Immediate
  While Axis1.IsSettled = 0
    Sleep 10
  End While
End OnEvent

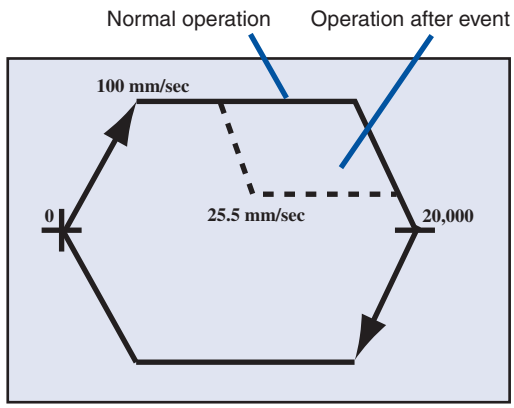
Attach Axis1
Axis1.StartType = InPosition

While True                         'Loop Forever
  EventOn RespondToInput           'Enable event in one direction
  Move Axis1 20000 VCruise = 10  Absolute = True
  While Axis1.IsSettled = 0
    Sleep 10
  End While
  EventOff RespondToInput          'Disable event in the other direction
  Move Axis1 0 VCruise = 10  Absolute = True
  While Axis1.IsSettled = 0
    Sleep 10
  End While

End While

Detach Axis1

End Program
```



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Application Three: Gearing, Event, PLS and Point-to-Point Moves

The first axis is geared and a second executes incremental moves based on the position of the first. A programmable limit switch (PLS) monitors the position of the geared axis and fires an event to begin the incremental motion on the second axis. The event fires when the geared axis hits 1000 counts, and then every 2000 counts thereafter.

```
'GearAxisPLS is a previously declared in the config. program

Program

OnEvent PLSEvent Sys.Dout.1 = On
  Move SealerAxis 4000 StartType = Immediate
End OnEvent

Attach AuxAxis
Attach GearedAxis
Attach SealerAxis

CreatePlsData 1 GearAxisPLS
GearAxisPLS.PLSPosition[1] = 1000
GearAxisPLS.PLSRepeat = 2000
GearAxisPLS.PLSEnable = ON

SealerAxis.Absolute = False          'Use incremental moves on sealer axis

GearedAxis.MasterSource = AuxAxis.PositionFeedback
GearedAxis.GearRatio = 2.5
GearedAxis.Slave = Gear              'Put Axis in GearMode

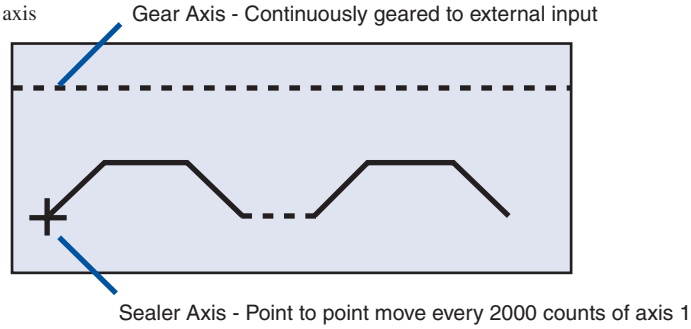
EventOn PLSEvent

Jog AuxAxis 3.0

While True                           'Loop Forever
  Sleep 100
End While
EventOff PLSEvent

Detach AuxAxis
Detach GearedAxis
Detach SealerAxis

End Program
```



Application Four: Camming

Using NextCam and PrevCam, connect two cams together so they run as follows:

Cam1, Cam2, Cam2, Cam1, Cam2, Cam2...

```
Program

LoadCamData Cam1.cam  Cam1
LoadCamData Cam2.Cam  Cam2

Attach MainAxis
Attach ConveyorAxis

MainAxis.MasterSource = ConveyorAxis.PositionFeedback
MainAxis.FirstCam = Cam1
MainAxis.CamOffset = 0
MainAxis.GearRation = 1

Cam1.Next = Cam2
Cam1.Previous = Cam2
Cam1.Cycle = 1              'Run Cam1 Once before going to NextCam

Cam2.Next = Cam1
Cam2.Previous = Cam1
Cam2.Cycle = 2              'Run Cam2 Twice before going to NextCam

MainAxis.Slave = Cam        'Enter Cam Mode

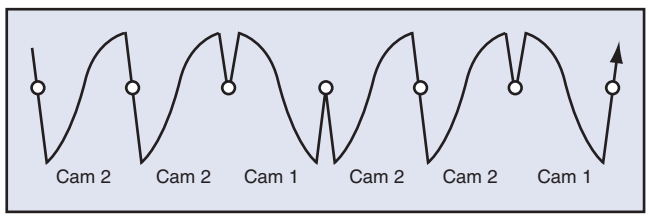
MainAxis.Enable = 1
ConveyorAxis.Enable = 1

Jog ConveyorAxis 3.0

While True
  Sleep 100                 'Loop Forever
End While

Detach MainAxis
Detach ConveyorAxis

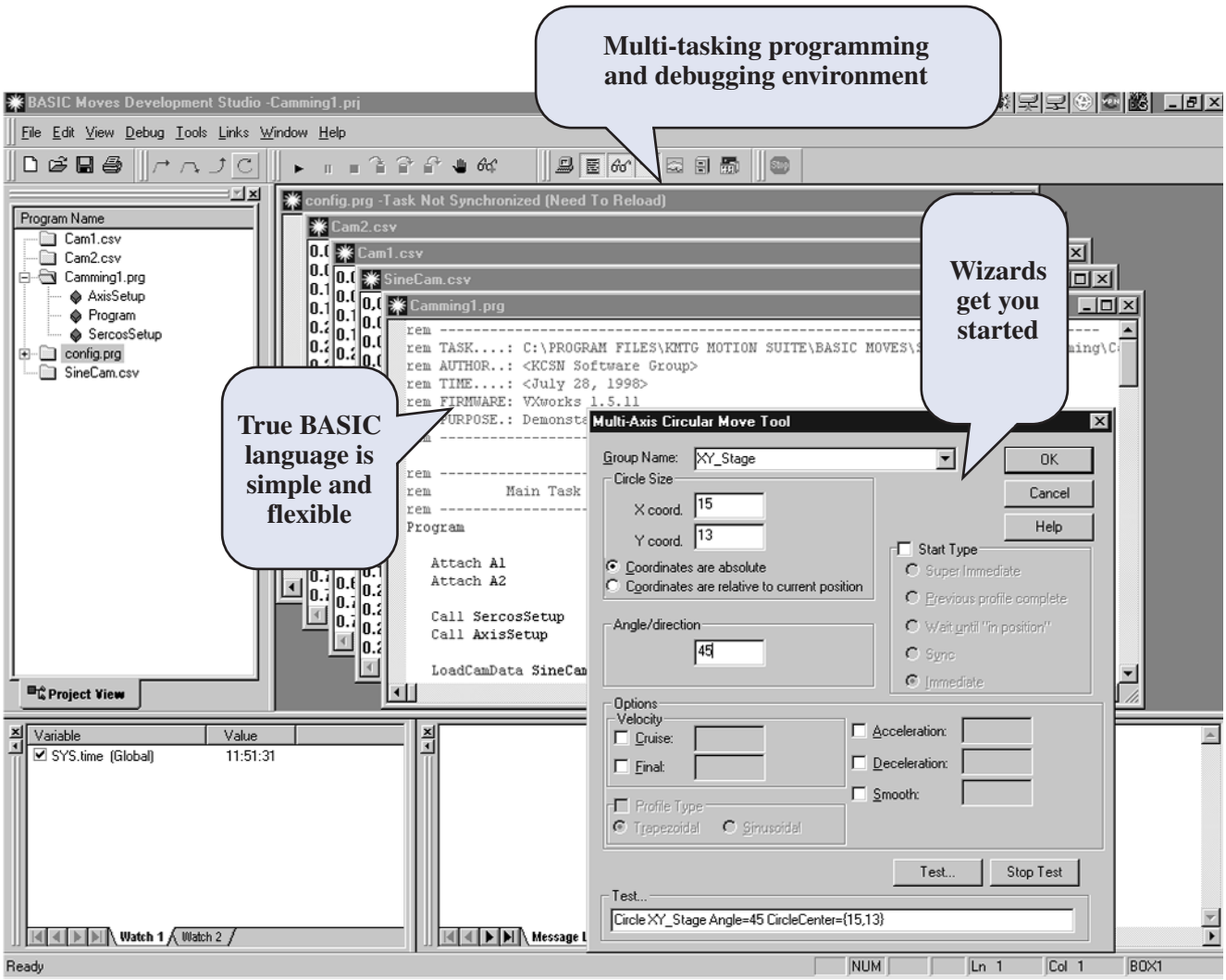
End Program
```



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Development Environment

BASIC Moves Development Studio is the ideal development environment for multi-tasking, multi-axis motion control. BASIC Moves Development Studio lets you write your programs as independent tasks. It makes the process easier by providing wizards where you need only fill in the blanks to run your motion program. When you're ready, BASIC Moves Development Studio bundles up your project and transports it to the MC. Now BASIC Moves Development Studio turns into a debugger, setting breakpoints visually. It marks the line in one task with the breakpoint, but continues to monitor the other tasks. Single step, step in, step over, step out.



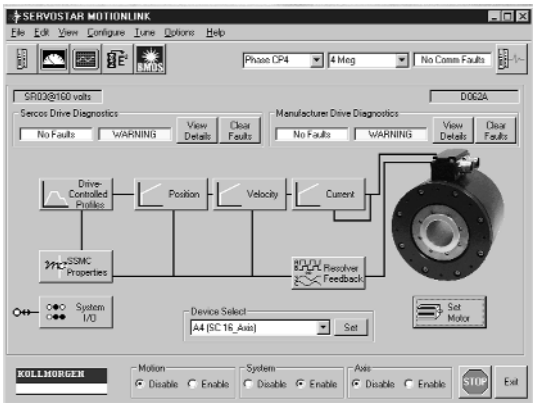
Key Features of BASIC Moves:

- Easy multi-tasking
- Simple debugging
- Project control

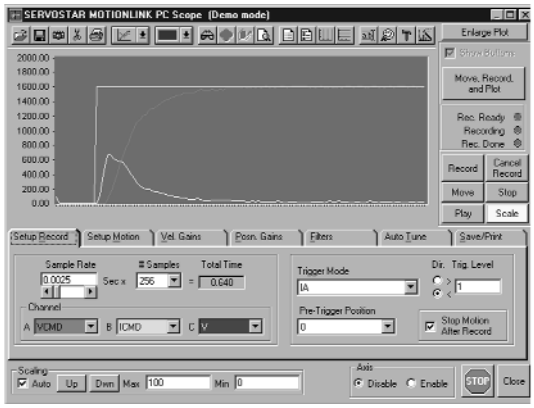
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Kollmorgen MOTIONLINK Tool Kit for the PC

MOTIONLINK for Windows takes the fear out of setting up a servo system. Designed for the novice as well as the advanced user, MOTIONLINK lets users quickly set-up and fine tune system performance.



MOTIONLINK includes features that allow you to fine tune or monitor the performance of the system.

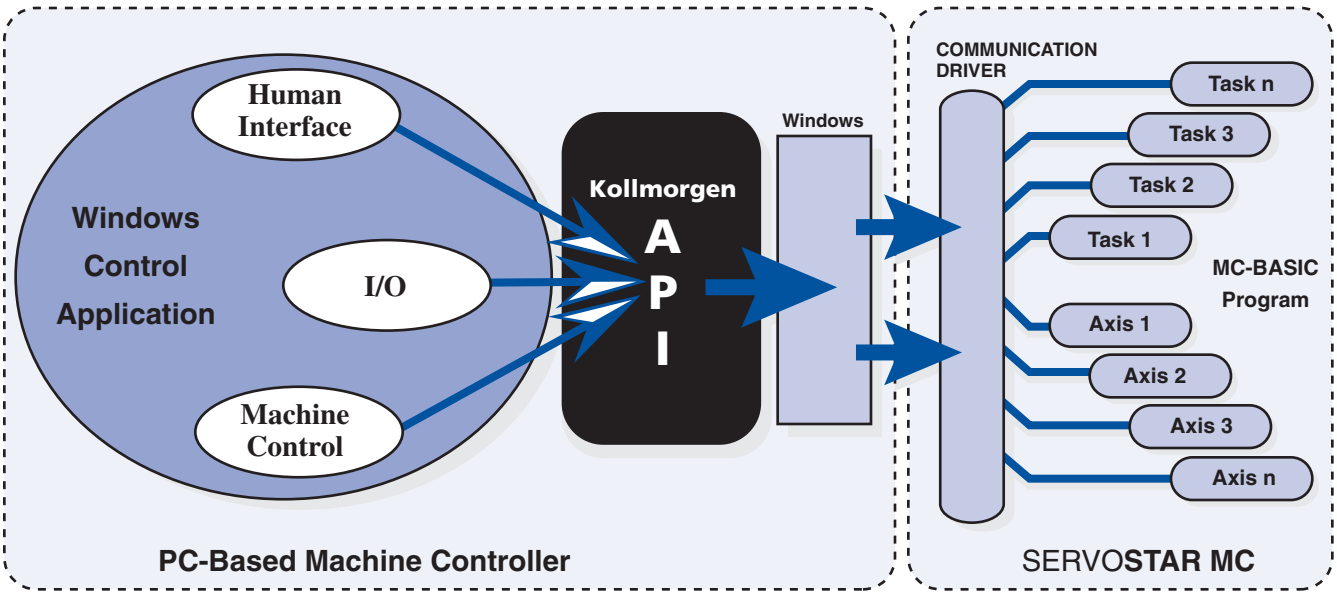


PC Oscilloscope:

For closely evaluating system performance, MOTIONLINK includes the functionality of an oscilloscope. You can very easily move the load, then review the performance, graphically on a computer screen.

API

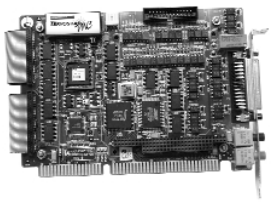
The Kollmorgen Application Programming Interface (API) is the simple way to connect your Windows control application to the SERVO**STAR** MC. With the API, simple subroutine calls let you connect your multi-layered PC-based machine control system to the MC's multi-tasking motion control system. So you can connect Visual BASIC to your MC-BASIC program with just a few lines of code. In fact, you can use the API to develop your own human interface package.

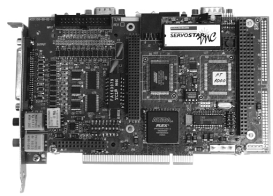


The API ties the machine controller to the motion controller

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Hardware Configurations







	ISA	PCI	Standalone
Mechanical configuration	Half size ISA Bus PC Card	Half size PCI Bus PC Card	Self contained standalone package
Onboard IOs	• 23 isolated inputs • 20 isolated outputs	• 23 isolated inputs • 20 isolated outputs • 8 dip-switches	• 23 isolated inputs • 20 isolated outputs • 8 dip-switches • 5 LEDs
Option cards support	PC-104 connector (stackable) for connection of up to 2 expansion cards.	PC-104 / PC-104+ connector (stackable) for connection of up to 2 expansion cards.	1. PC-104 / PC-104+ connector (stackable) for connection of up to 2 expansion cards. 2. SST compatible fieldbus support. *extended version only
NvRAM - for rapid storage of user data.	No	30 KB	30 KB
Flash Disk	8, 12 or 24 MB	8, 12 or 24 MB	8, 12 or 24 MB
RAM	8 ,16 or 32MB	32MB	8 ,16 or 32MB
CPU	5x86 133MHz	GXM 233Mhz	5x86 133MHz or GXM 233Mhz

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Ordering Information

MODEL NUMBERS & ACCESSORIES

MC S I 04 - 08 16 - 000 - 0300 00

Series Name
MC SERVO**STAR** MC

Communication
S - SERCOS interface

Configuration
I - ISA PC-Card
P- PCI PC-Card
S- Standalone unit
E- Extended standalone package
(with option cards sockets)

Number of Axes
02 - 2 Axes
03 - 3 Axes
04 - 4 Axes
05 - 5 Axes
06 - 6 Axes
08 - 8 Axes
10 - 10 Axes
12 - 12 Axes
16 - 16 Axes

RAM Size

Upgrade 000
08- 8 MByte (SIMM)
16- 16 MByte (SIMM)
32- 32 MByte (SIMM)

Upgrade 001
32- 32 MByte (SODIMM)

Flash Disk Size
08 - 8 Mbyte
16 - 16 Mbyte
24 - 24 Mbyte

Upgrades
000 - Standard CPU 5x86 133MHz
(Not available with PCI configuration)
001 - CPU upgrade 1 GXM 233Mhz
(Not available with ISA configuration)

Firmware Version
0300 - Version 3.0
(Not specified = most recent version)

User Program
00 - Standard
(Normally not specified)

Accessories

MDK - 0100

Series Name
MDK Motion Developer's Kit

Version
0100 - Version 1.0
(Not specified-most recent version)

MC-BKO-25
Break out for C1, C5

ES AFU-001
Standard housing upgrade
(standalone to extended)

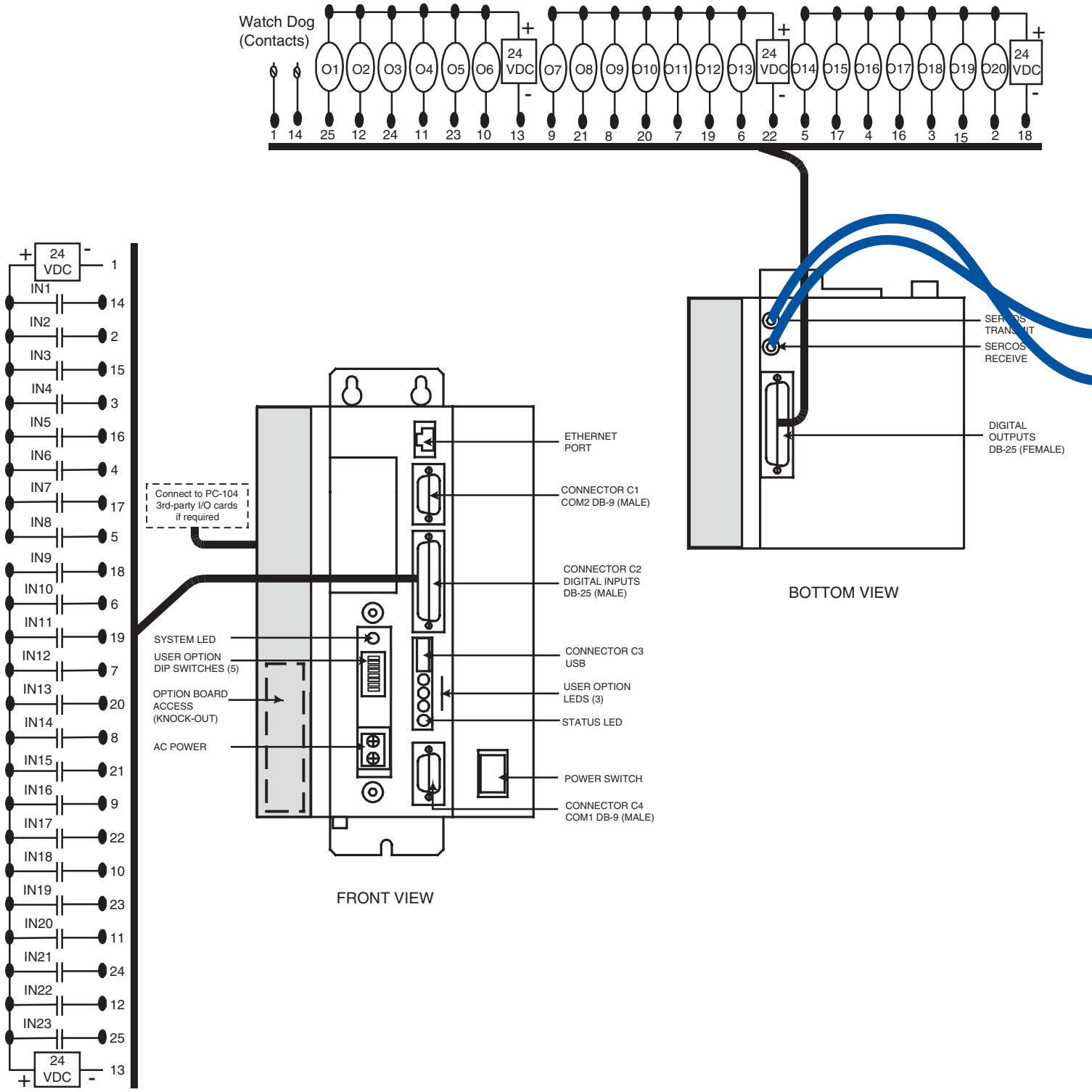
CF - 0030

Fiber Optic Communication Cable

Length
30 - (30 cm)
60 - (60 cm)
100 - (1 meter)
150 - (1.5 meters)
300 - (3 meters)
1000 - (10 meters)

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SERVOSTAR® MC Wiring Diagram
(Stand-alone version)



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Available Product Versions

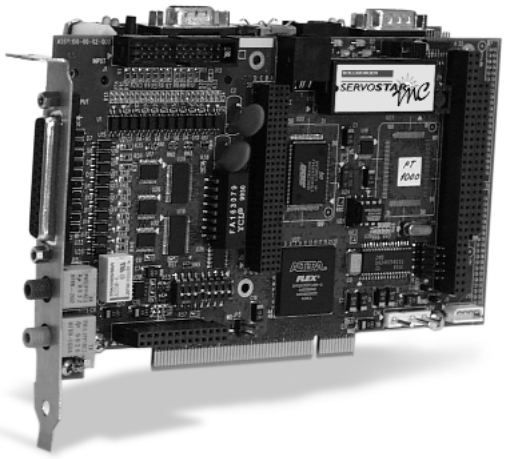
PC Card

The PC Card version of the SERVO**STAR** MC is the fastest way to get your PC-based control system moving. Just plug the card in and our Plug-and-Play® tools configure your Windows NT system automatically. Now you're ready to get moving.

You have options: you can send commands down from your computer to the MC one at a time, program your system to run without any host intervention, or anything in between. The MC's multi-tasking structure lets you launch tasks – program segments large or small – from the system controller. The MC's fast I/O block in dual-port RAM enables rapid communication between system components. For example, you can connect your soft Programmable Logic Controller (PLC) to the fast I/O and start and stop tasks by writing to memory.

Worried about electrical noise from amplifiers making a mess of your computer? SERCOS communications virtually eliminates transmission of electrical noise from amplifiers. Are you concerned about running 50 or 100 wires for amplifier I/O and feedback devices to the back of an industrial PC? SERCOS cuts that cable down to two fiber optic strands.

The PC Card version brings you all the I/O options. You can even add cards to the MC's PC-104 bus so you can get all the I/O you need connected right into your motion system.



Advantages of PC Card version:

- Control your system from Windows. Easiest way to integrate motion control into a Visual BASIC/Visual C® program
- Currently works with Windows NT 2000 including Plug-and-Play
- Dual-port RAM for fast communication
- Most cost effective if using a PC in control system
- Add I/O though your PC's bus or through PC-104

Stand-alone Version

The Stand-alone version of the SERVO**STAR** MC is the key to a complete motion control system. Just bolt on the box and connect the SERCOS fiber optic link. Connect single phase AC power - 90V to 260V - and you're ready.

The Stand-alone MC has all the connections readily available, like over 40 isolated I/O, ethernet port and two serial ports. Need more I/O, 16 bit DAC, RTD, PAMUX® parallel I/O bus for over 500 I/O points? It's all available in PC-104. Or choose from a wide array of ethernet based I/O solutions.

Since you'll be relying on MC-BASIC for your system, you should know this language has everything you will need. It has all the decision making capability of BASIC, including the math, the operators, and all the flow control. We also don't take short cuts like trying to push floating point math into integers - most calculations are IEEE double precision floating points. The MC has the memory to store even the largest motion program.

So, consider the Stand-alone MC. It's got the flexibility and power to run your application, and fits in just right.

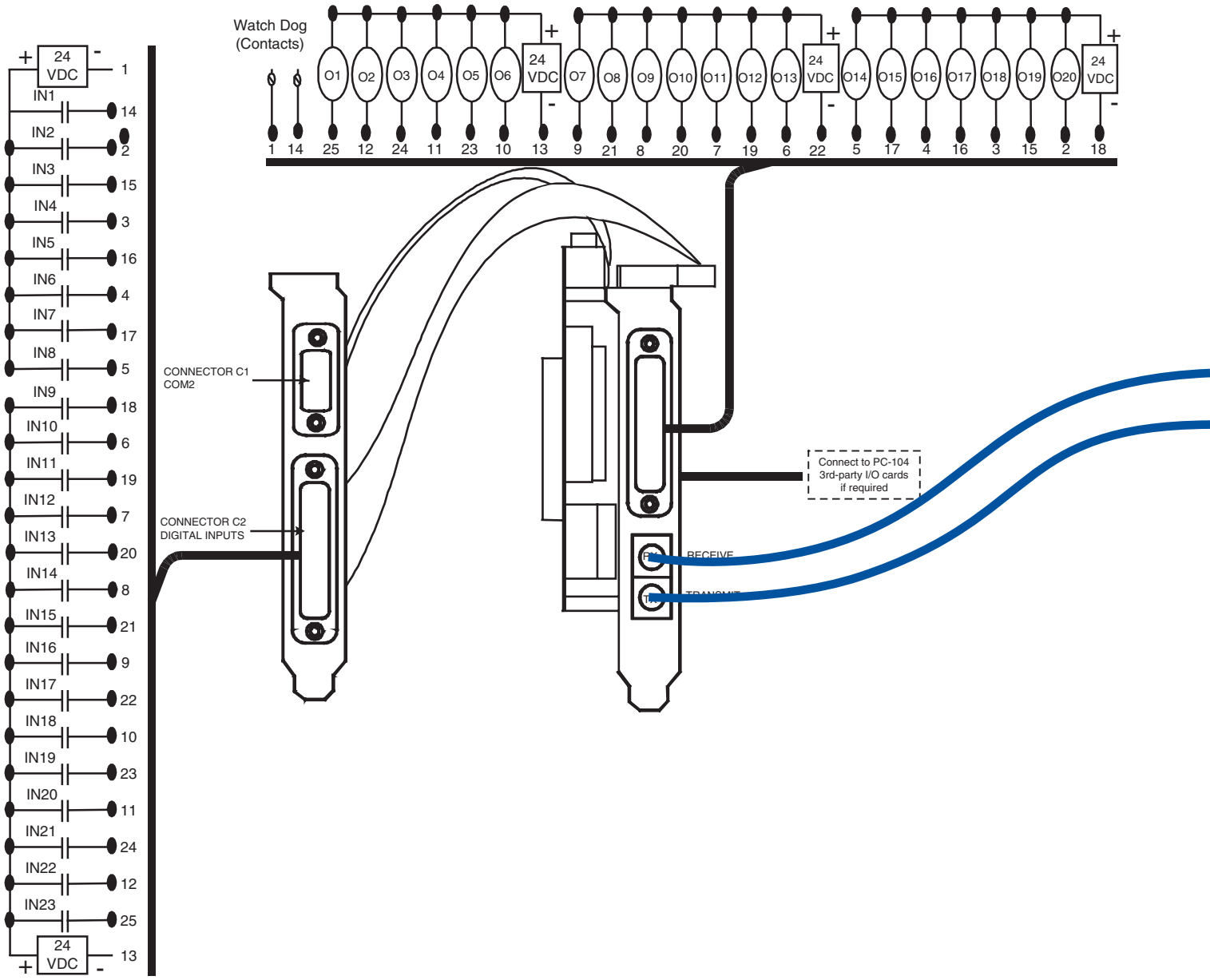


Advantages of Stand-alone version

- Most cost effective if not using a PC in your control system
- Racks up with SERVO**STAR** series amplifiers
- Requires only single-phase 115VAC/230VAC
- Add I/O though through PC-104+ or fieldbus

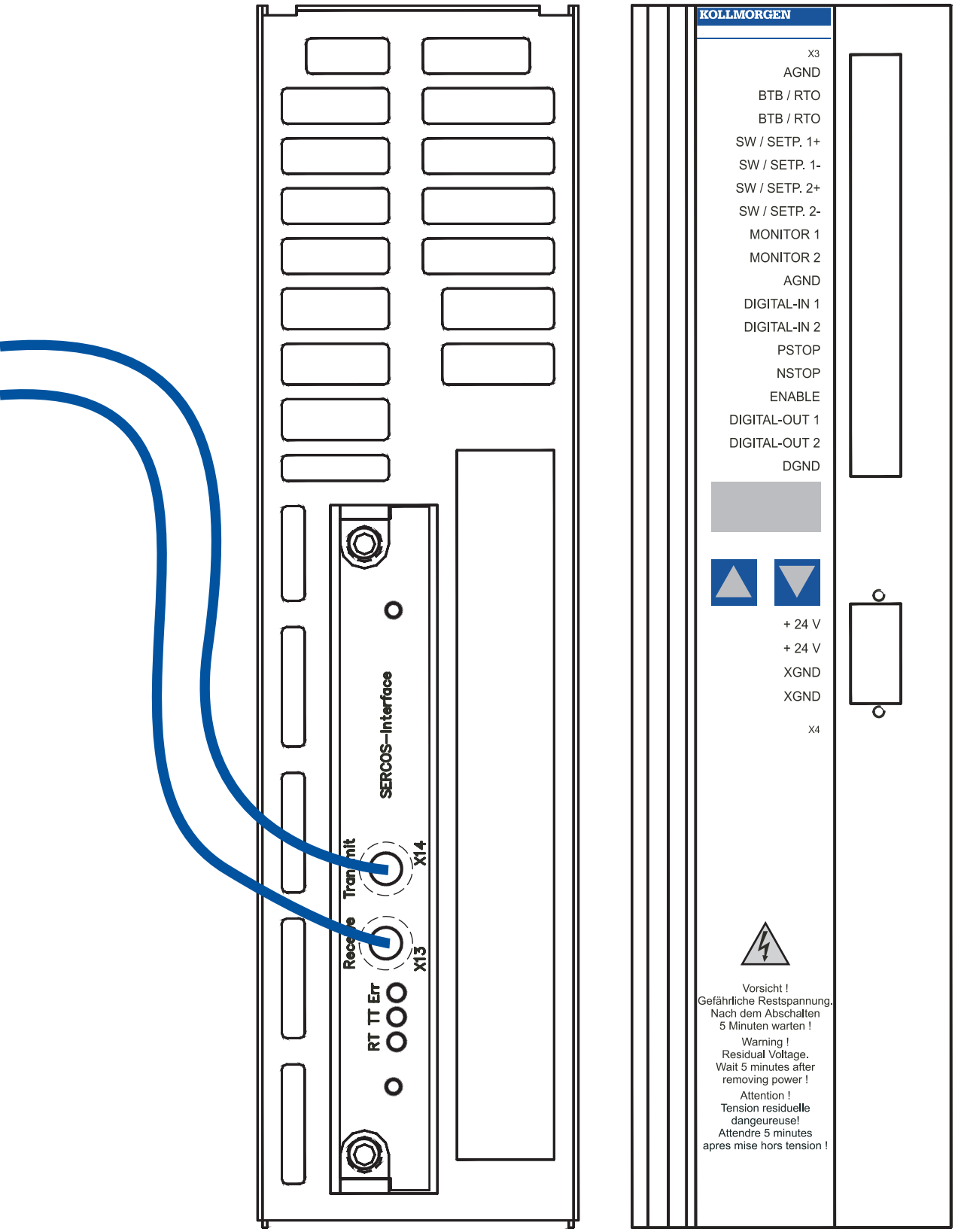
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SERVOSTAR® MC Wiring Diagram
(PCI Card version)



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SERVOSTAR® 600 Wiring Diagram



TOP VIEW

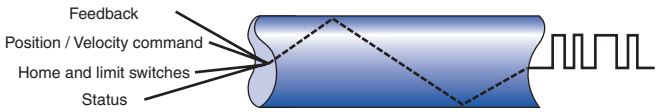
FRONT VIEW

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Sercos interface™

SERCOS sets the standard for full digital controller/amplifier communications. SERCOS, also known as IEC 1491, is the only field bus on the market with the determinism required for motion control and broad multi-vendor support. It was designed by the motion control industry for motion control systems. Unlike popular I/O based field-buses, SERCOS provides precise synchronization no matter how many axes are connected and no matter how much bus activity exists.

SERCOS uses fiber optics to virtually eliminate electrical noise being transmitted from high-power switching amplifiers to the system controller. No more ground loops or no more shielding problems. Intermittent connections are a lot less likely.



SERCOS reduces wiring. Take a typical 4-axis system. Between analog commands, shielding, enable, drive OK, and quadrature position feedback, there can be 50 connections between controller and amplifier set. With SERCOS, there are just two fiber optic connections between the controller and the amplifiers, whether you have 2 or 16 axes of motion.

SERCOS is flexible. Adding axes to a machine for special configurations takes a lot less rewiring. You can diagnose the system because SERCOS provides for full reporting of drive status. Replacement of drives is easy: just a few connections and all the parameters are loaded into the drive on power-up.



SERVO**STAR®** drives with SERCOS option

SERVO**STAR®** amplifiers are high-performance, full featured brushless motor controllers. SERVO**STAR** amplifiers have what it takes for today's tough motion control applications. The DSP engine has the computational power you need. Because the system is fully digital from the position command to the current loops for maximally smooth sine wave commutation, SERVO**STAR** amplifiers have the accuracy and flexibility to work in just about every high-performance motion system.

SERVO**STAR** amplifiers control the widest range of Kollmorgen motors from Kollmorgen **GOLD**LINE® standard rotary motors to PLATINUM® DDL (direct drive linear) and Kollmorgen **GOLD**LINE® DDR (direct drive rotary) motors. These amplifiers output 3-85A RMS/phase from 115 or 230VAC power.

SERVO**STAR** amplifier start up is very straight forward. Hook up power, motor, and feedback. Add optional drive I/O like limit switches. Hook up two fiber optic cables and you're ready to go.

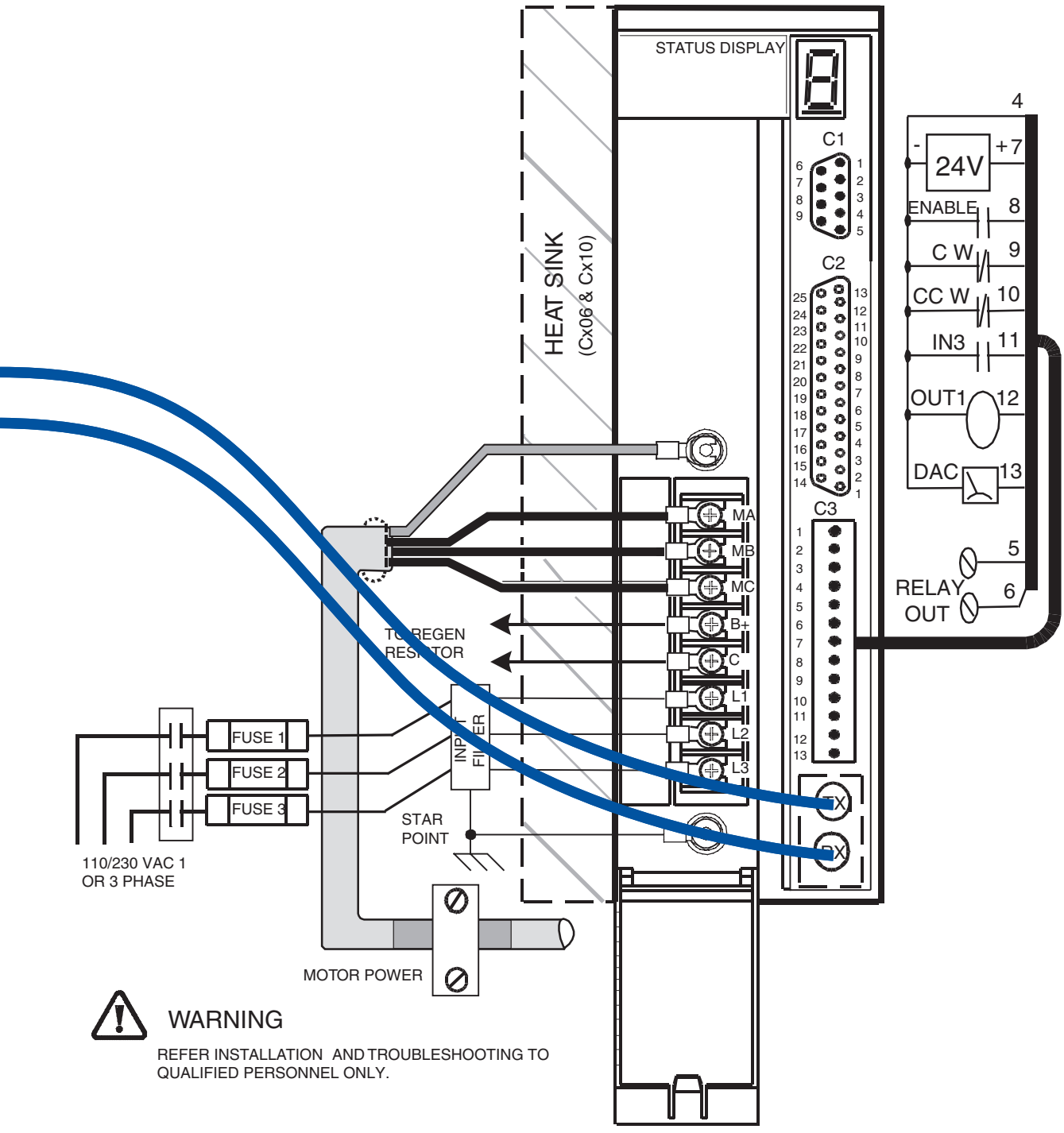
You can mix and match different size amplifiers in one application because they all work with the common feedback devices: encoders, scales, or resolvers for feedback.

SERVO**STAR** amplifiers contain patented torque angle control technology that actually increases normal motor speed and torque capability translating into higher performance for your machine.

The SERVO**STAR** MC works best when it's teamed with SERVO**STAR** amplifiers to make a complete system. Since the SERVO**STAR** MC was designed from the start to work with the SERVO**STAR** amplifier families, there are fewer surprises during system integration. With one manufacturer supporting all the components, those problems that do occur are easier to find and fix.

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SERVOSTAR® CD Wiring Diagram



WARNING

REFER INSTALLATION AND TROUBLESHOOTING TO QUALIFIED PERSONNEL ONLY.

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