

KOLLMORGEN

SERVOSTAR *mc*

KOLLMORGEN

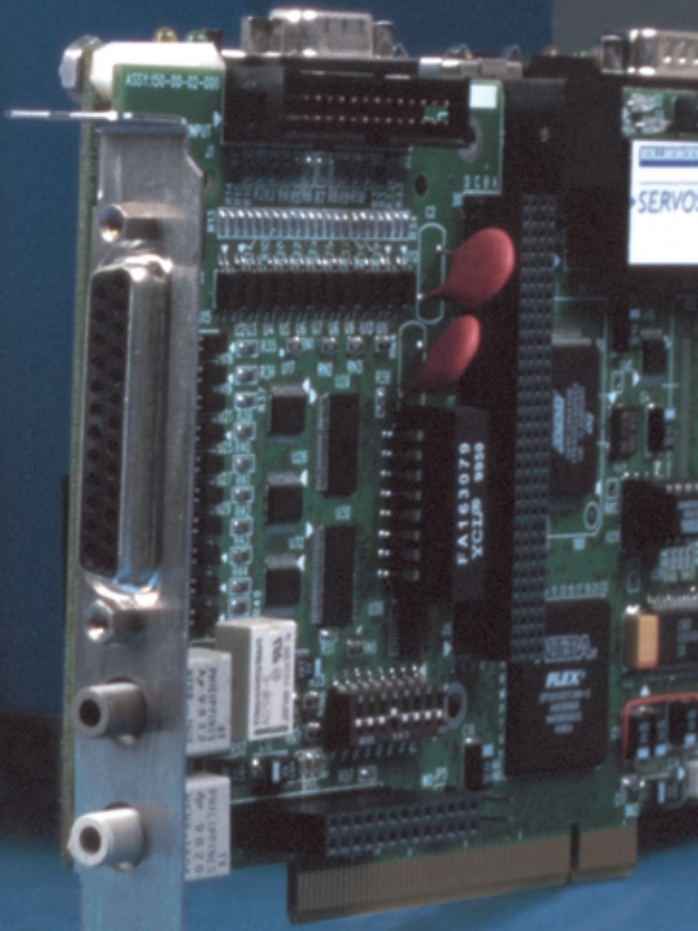
SERVOSTAR *mc*

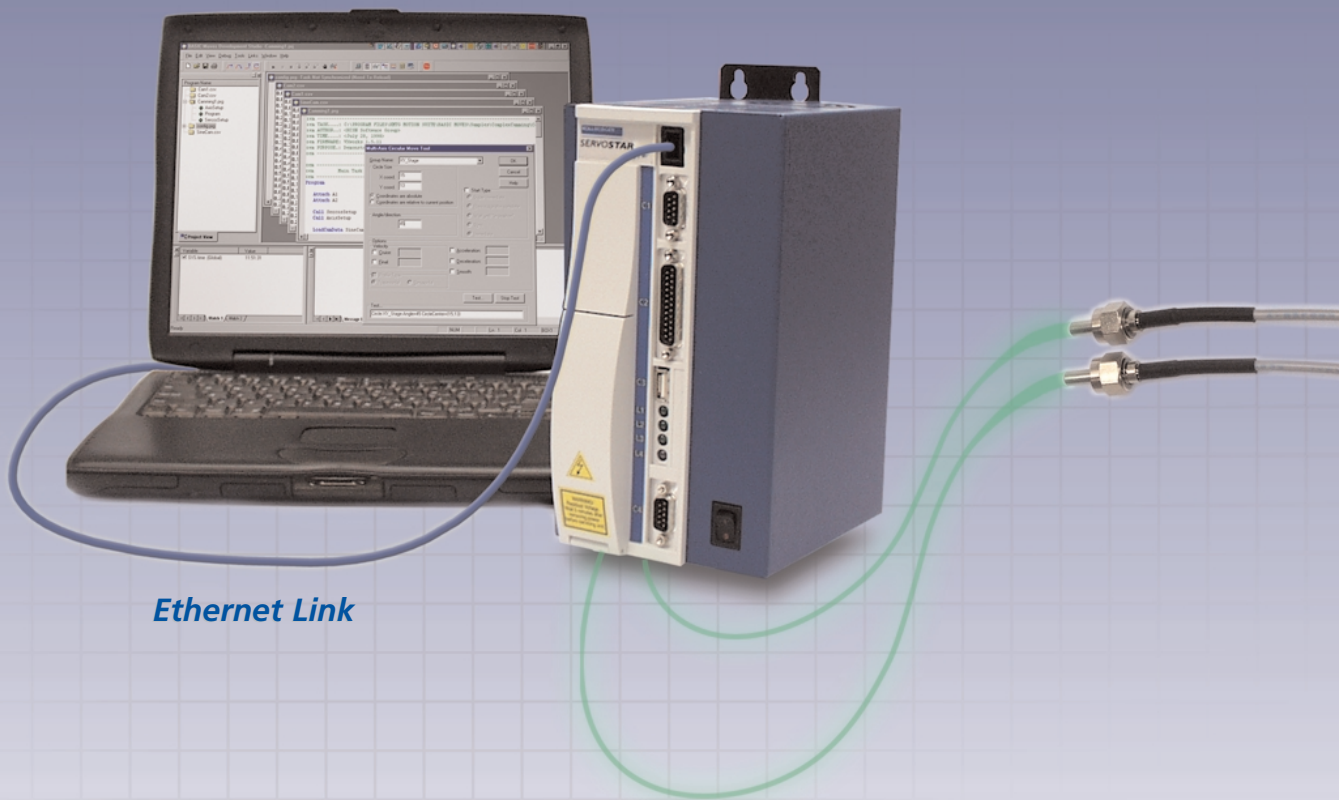


WARNING!
Residual Voltage.
Wait 5 minutes after
removing power
before servicing unit.

C1
C2
C3
C4

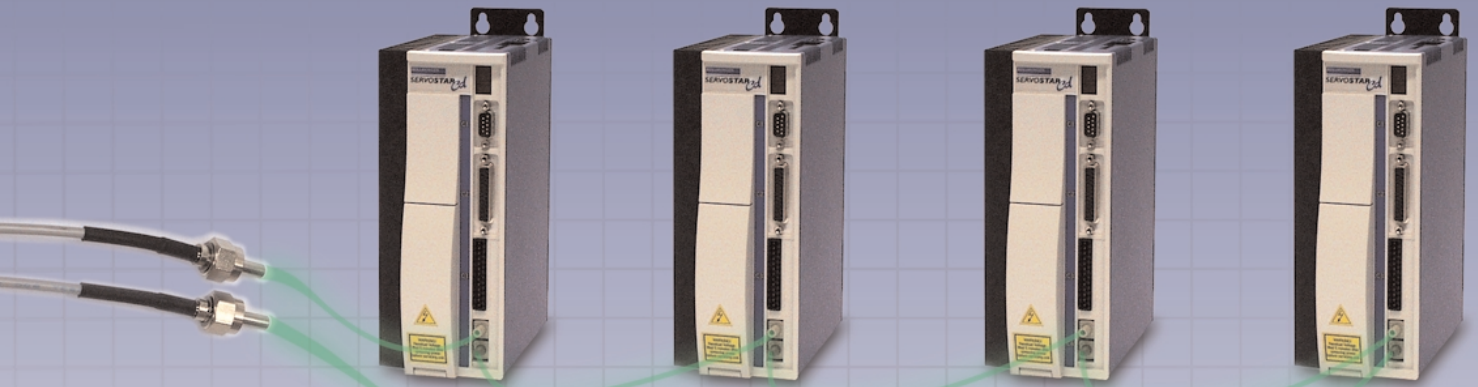
100% RELIABILITY
SERVO DRIVE
SERVO MOTOR





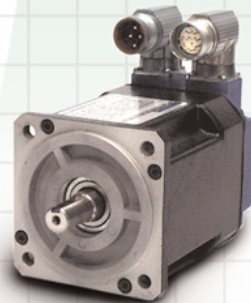
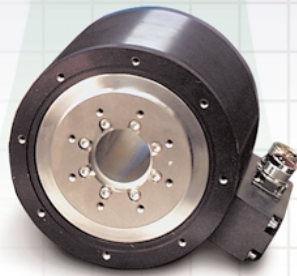
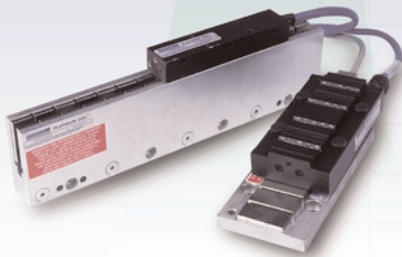
Ethernet Link

Meet Kollmorgen's complete line of **SERVOSTAR® *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 **SERVOSTAR *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.



SERCOS interface™

Fiber Optic Ring



KOLLMORGEN

SERVOSTAR®
VAC

Introduction

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

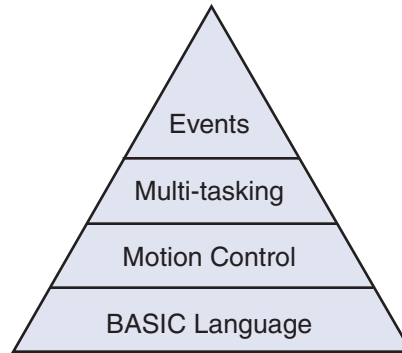
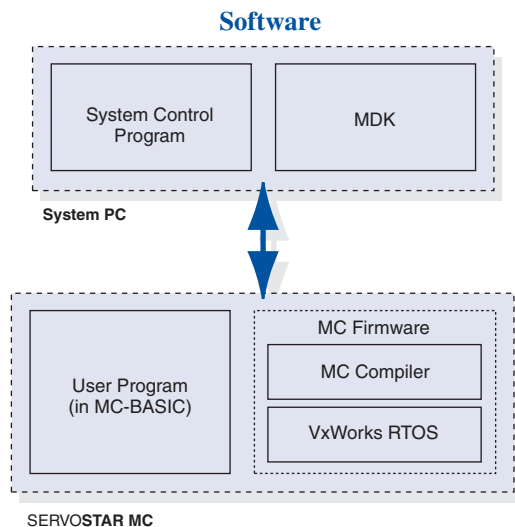
The firmware is Kollmorgen dedicated software running on the MC. The user program is the software you write on the MC in MC-BASIC. Finally, the Motion Developer's Kit (MDK) is Windows-based software that includes the development tools and communications routines that let your PC talk to the MC. Let's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

SERVOSTAR 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 SERVOSTAR MC stands ready to respond to today's challenges.

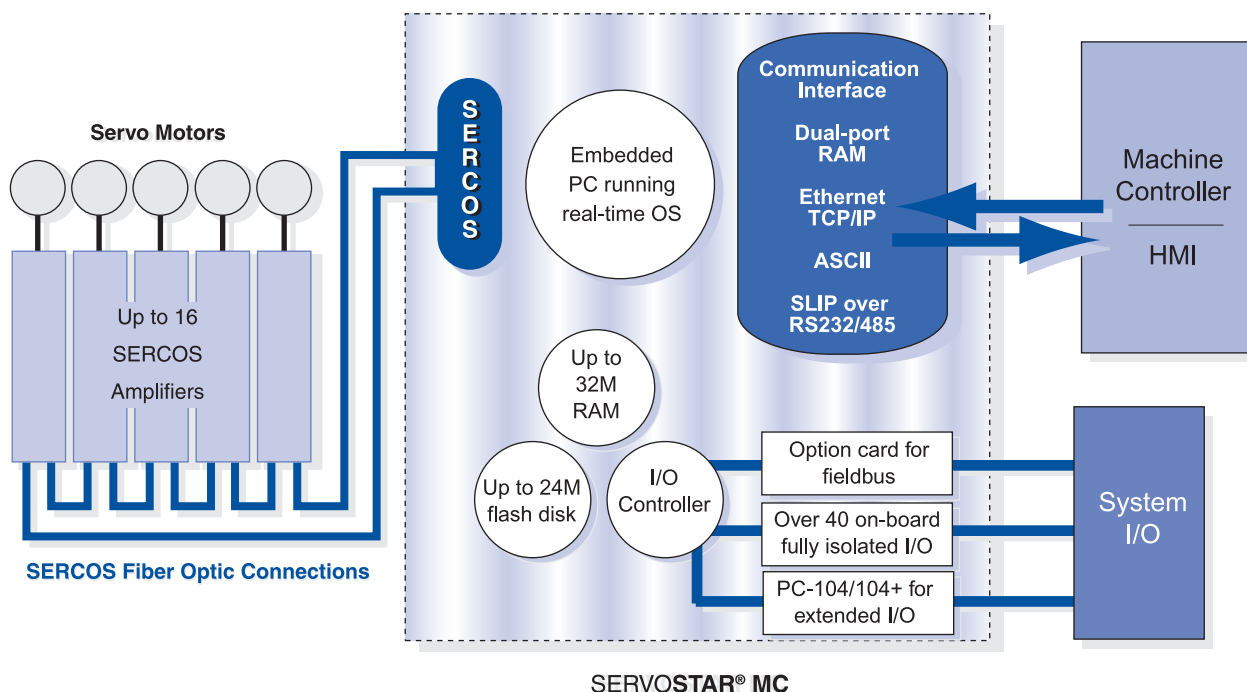
The design process started with a careful review of problems encountered by motion control engineers everywhere. It was found that the analog connection between the controller and the drive was creating problems. Ground loops. electrical noise. Shielding deficiencies. Intermittent connections. And just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

A fully digital means of communication was needed. That is why the SERVOSTAR 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.

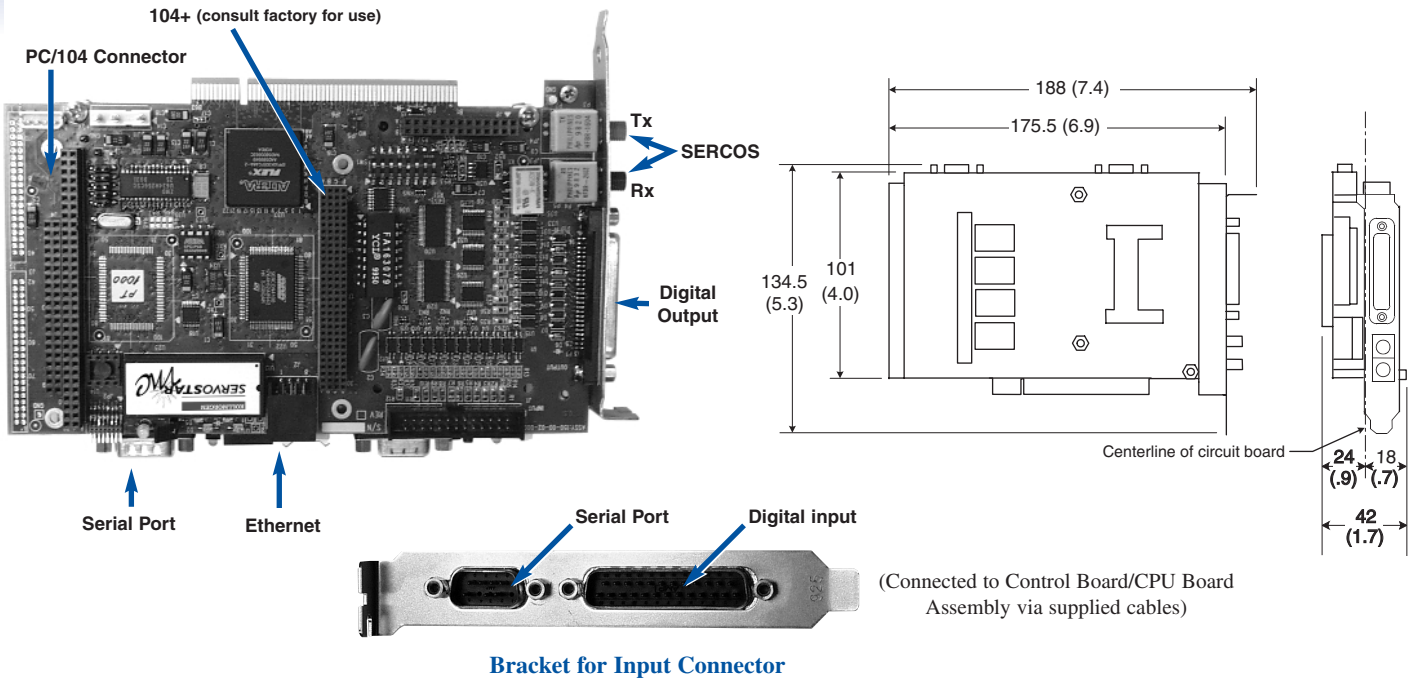
Finally, the SERVOSTAR MC controller provides the Input/Output flexibility that is needed. There are over forty on-board optically-isolated I/Os. Each axis has additional I/O points that can be easily connected into the system. Even more, the SERVOSTAR MC has its own internal PC-104+ bus so that a wide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

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

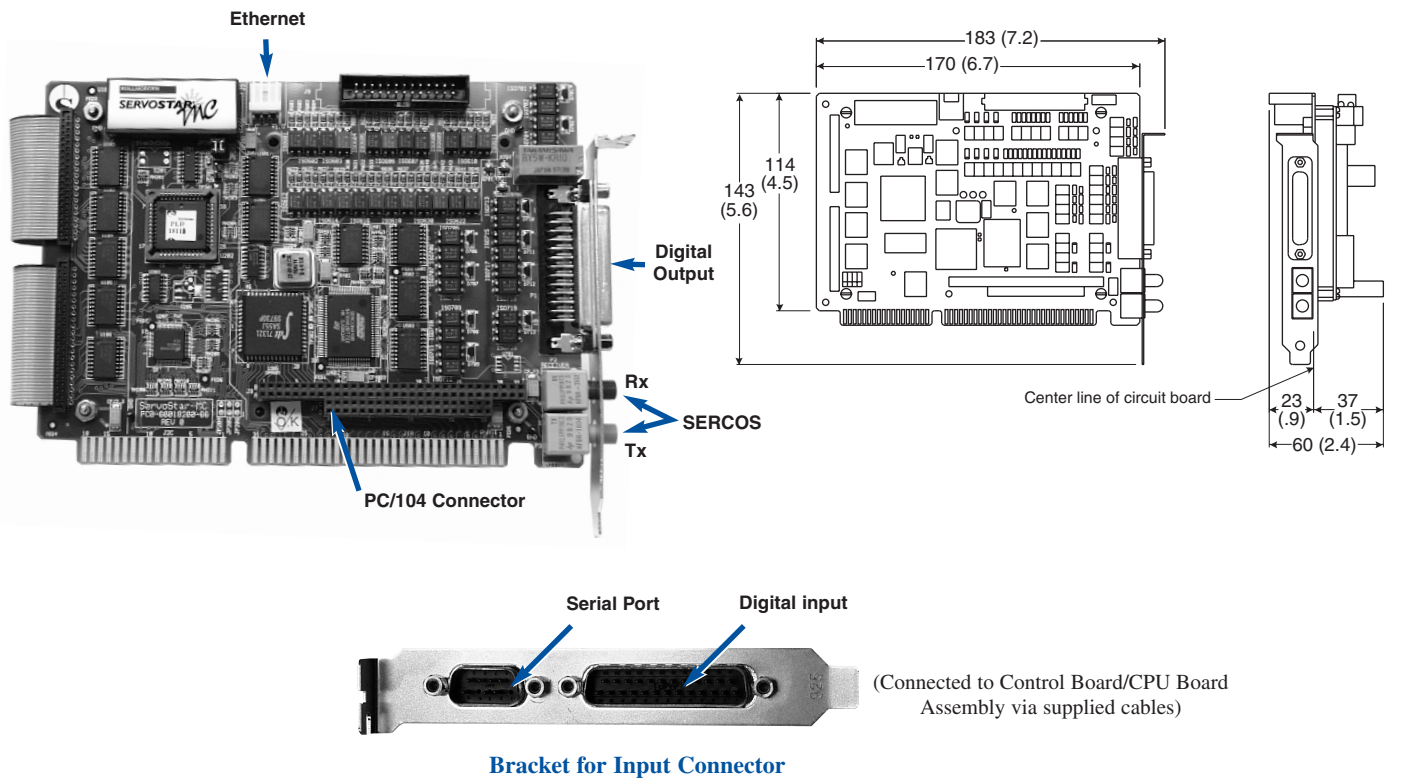


Key Connectors And Dimensions For PCI And ISA Cards

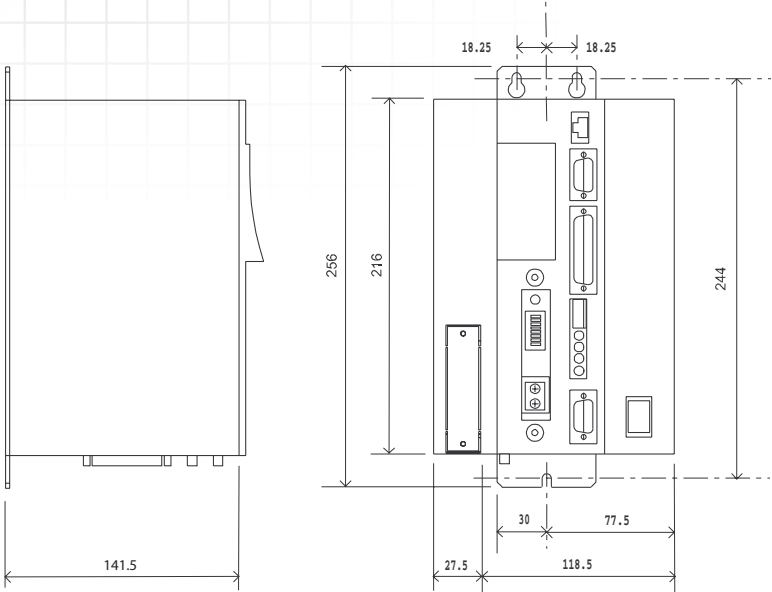
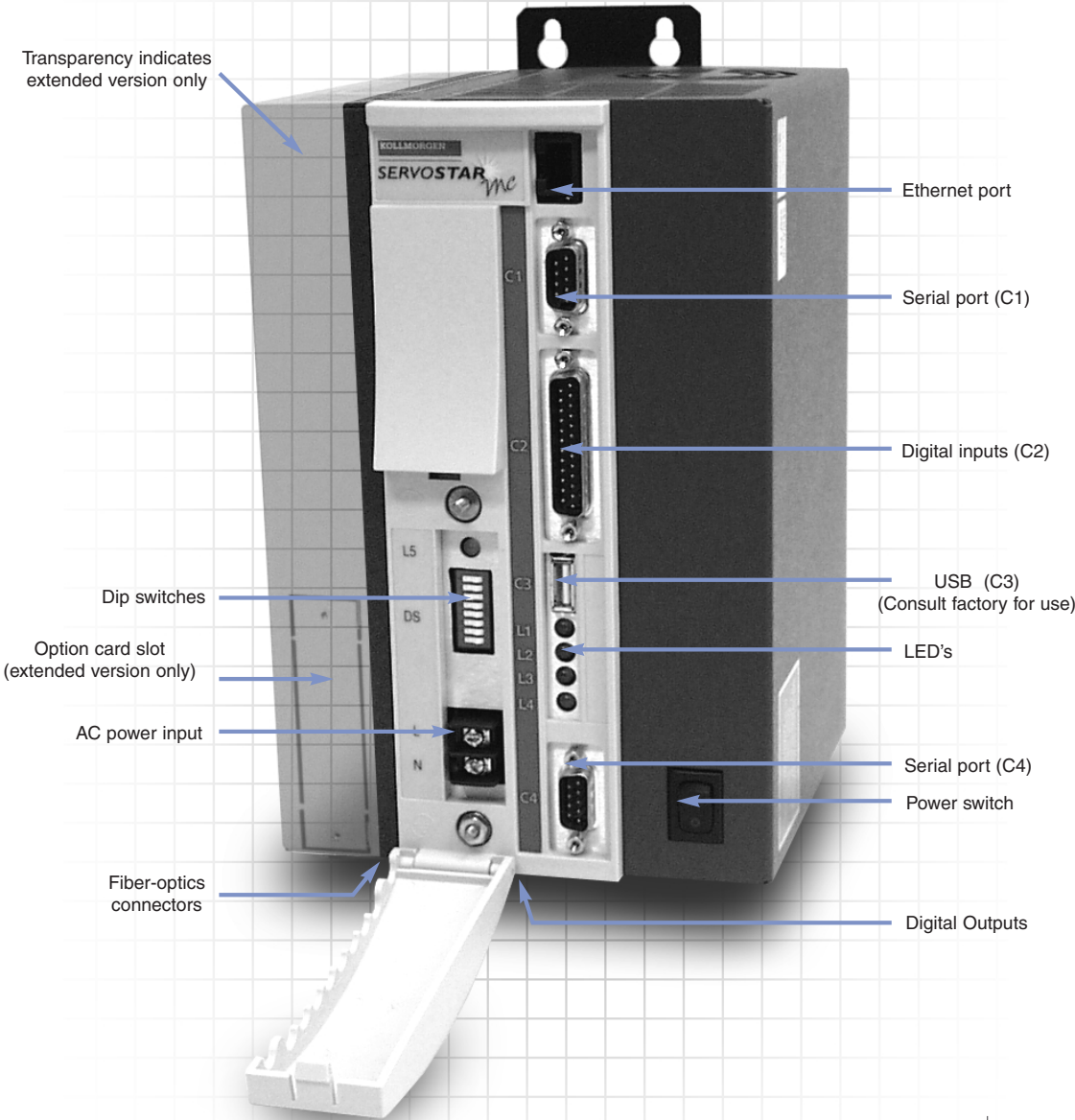
PCI Card



ISA Card



Key Connectors And Dimensions For Stand-Alone



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

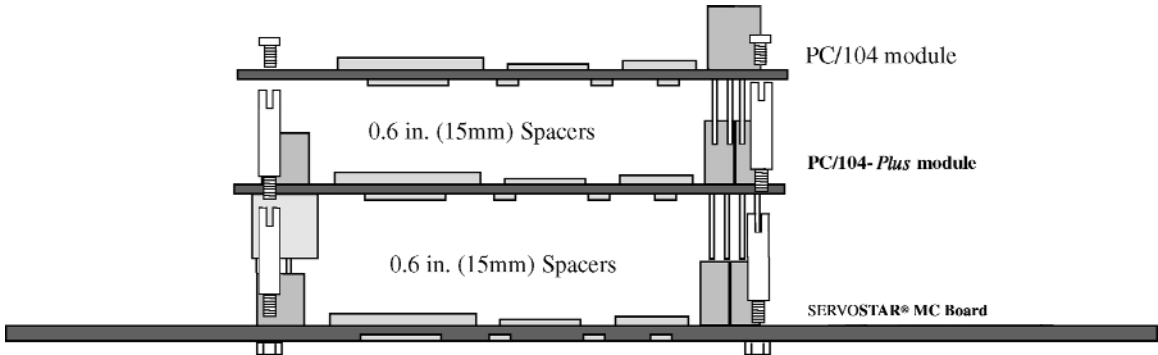
- Small footprint
- Reasonably priced
- Wide assortment of I/O
- Full connection to MC memory and I/O space
- Available from many vendors
- Industrial designs

PC-104+

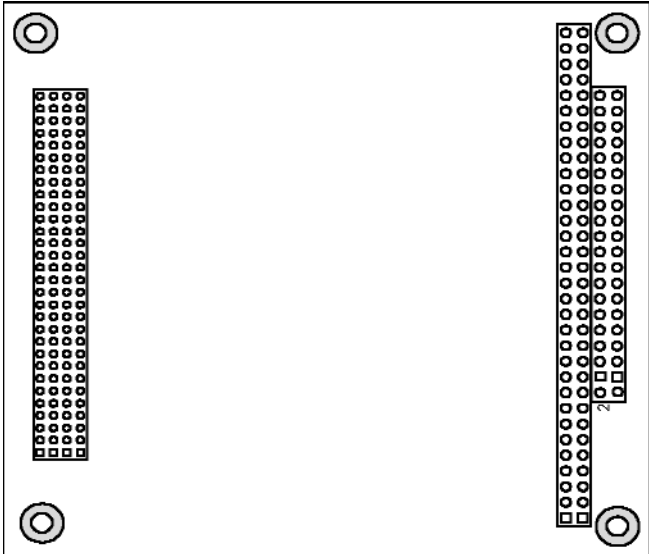
PC/104-plus is basically a PCI (Peripheral Component Interface) bus addition to the PC/104 standard. PCI gives peripheral devices more direct access to the CPU which can greatly improve system performance.

*Not available for the ISA version.

PC-104 I/O Cards



Basic Mechanical Dimensions (16 bit version)



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\$ RTrim\$, Ltrim\$, Asc, Instr, Left\$, Right\$, Mid\$	Formatting functions 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

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
PositionErrorMax	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

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	
FirstCam	Set up global cam 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

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}
```

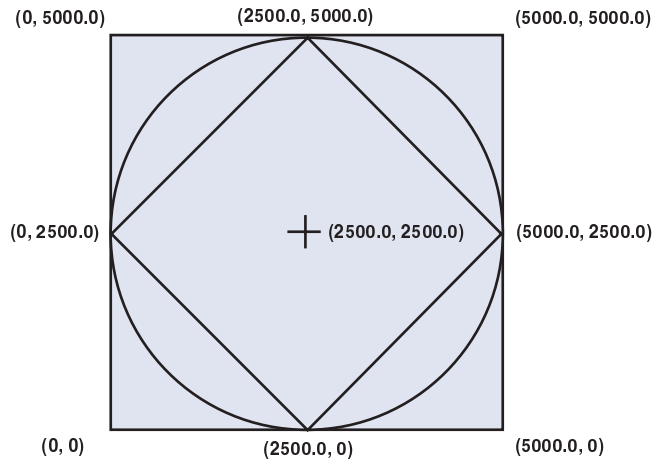
```
Sleep 500
'Delay 500msec.
```

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
```

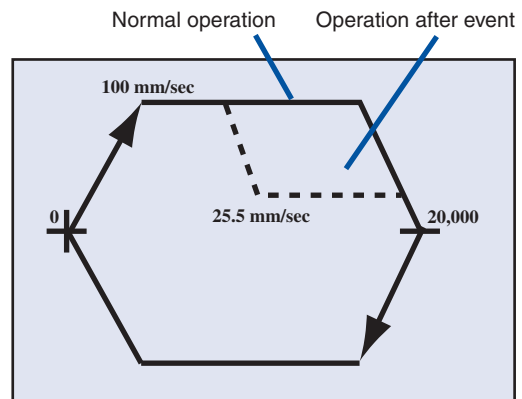
```
While True 'Loop Forever
EventOn RespondToInput 'Enable event in one direction
Move Axis1 20000 VCruise = 10 Absolute = True
While Axis1.IsSettled = 0
Sleep 10
```

```
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



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
    GearedAxis.MasterSource = AuxAxis.PositionFeedback
    GearedAxis.GearRatio = 2.5
    GearedAxis.Slave = Gear

    EventOn PLSEvent
        Jog AuxAxis 3.0
        While True
            Sleep 100
        End While
        EventOff PLSEvent

    Detach AuxAxis
    Detach GearedAxis
    Detach SealerAxis

    End Program
    
```

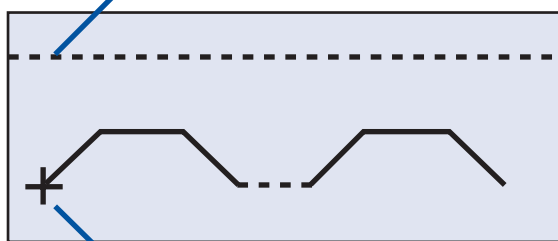
SealerAxis.Absolute = False 'Use incremental moves on sealer axis

GearedAxis.MasterSource = AuxAxis.PositionFeedback

GearedAxis.GearRatio = 2.5

GearedAxis.Slave = Gear 'Put Axis in GearMode

Gear Axis - Continuously geared to external input



Sealer Axis - Point to point move every 2000 counts of axis 1

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
    Cam2.Next = Cam1
    Cam2.Previous = Cam1
    Cam2.Cycle = 2

    MainAxis.Slave = Cam
    MainAxis.Enable = 1
    ConveyorAxis.Enable = 1

    Jog ConveyorAxis 3.0

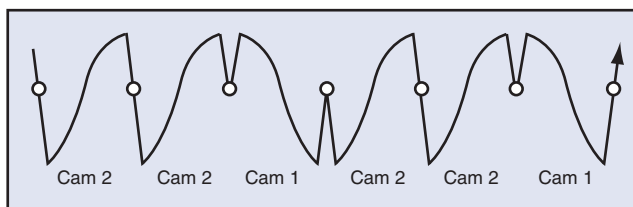
    While True
        Sleep 100
    End While

    Detach MainAxis
    Detach ConveyorAxis

    End Program
    
```

'Run Cam1 Once before going to NextCam

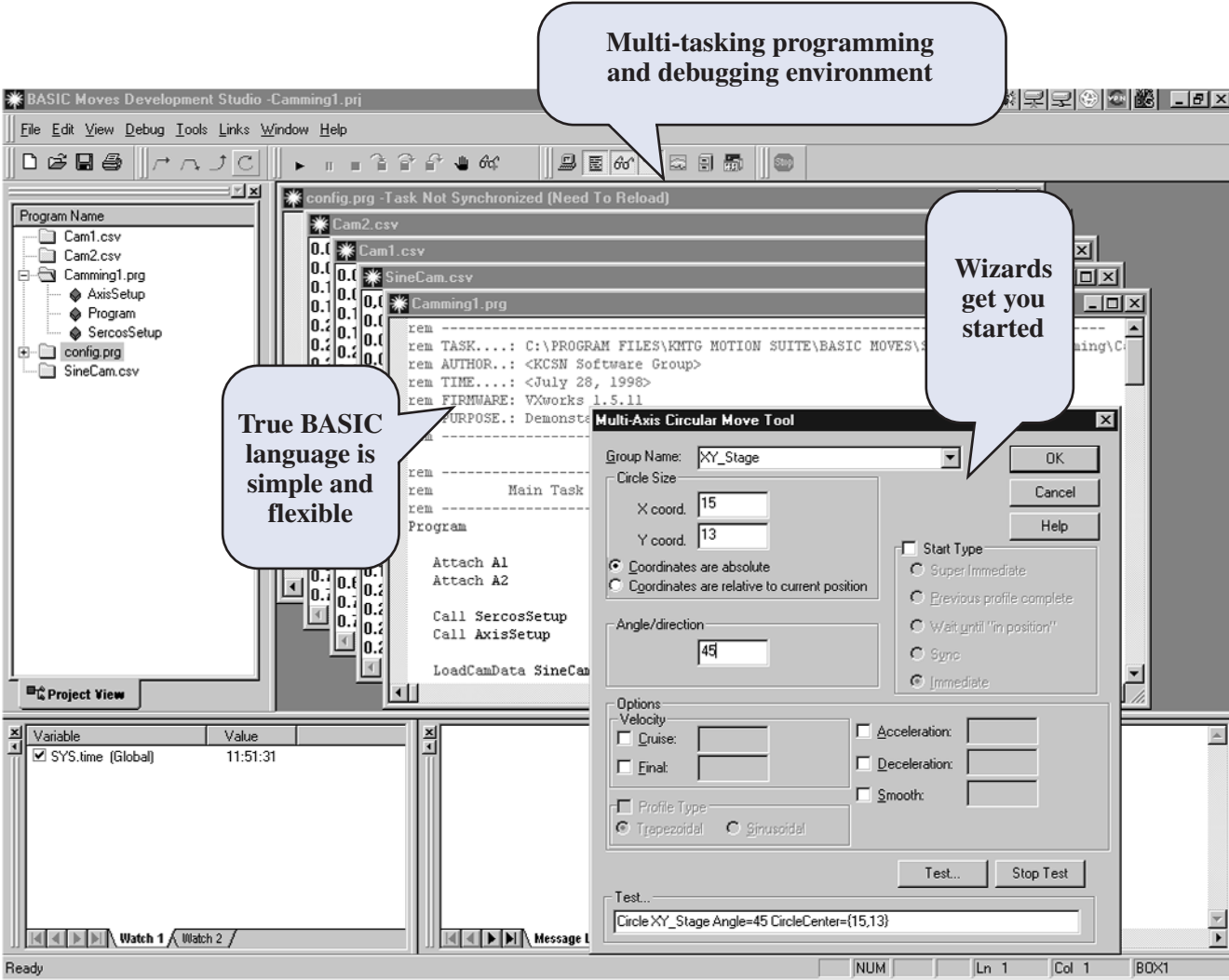
'Run Cam2 Twice before going to NextCam



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.

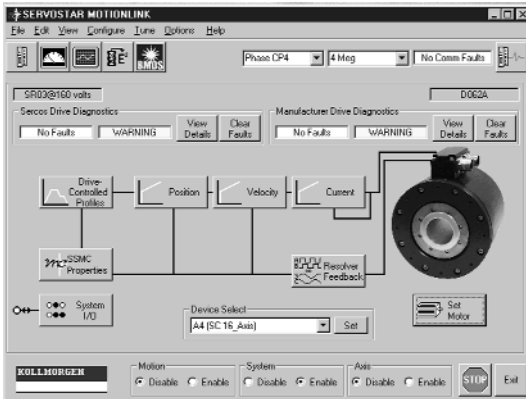


Key Features of BASIC Moves:

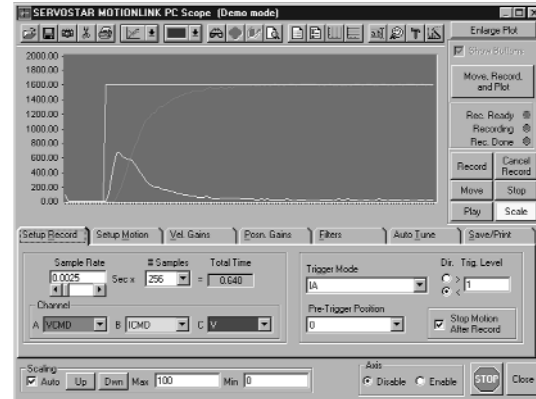
- Easy multi-tasking
- Simple debugging
- Project control

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.



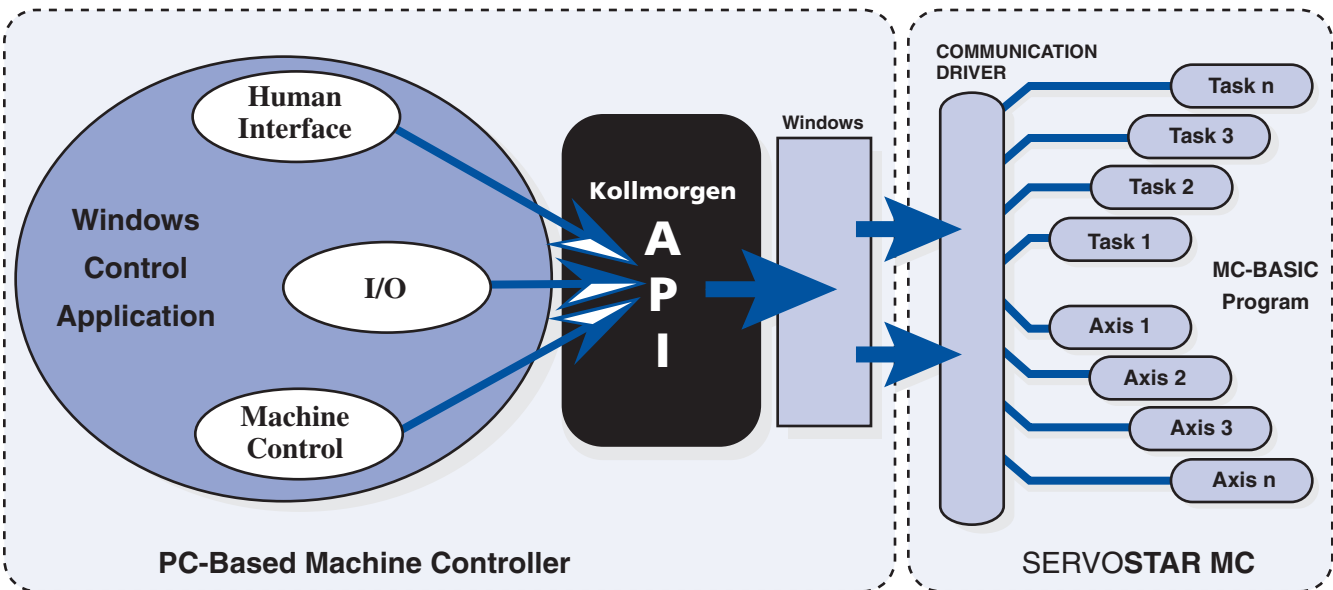
PC Oscilloscope:

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

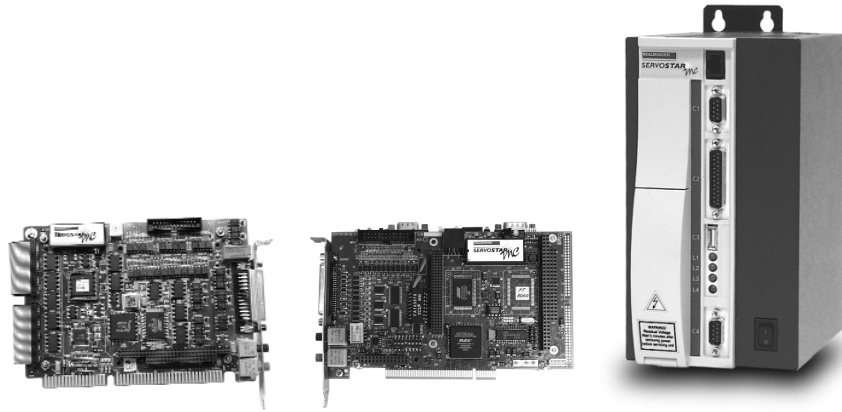
The Kollmorgen Application Programming Interface (API) is the simple way to connect your Windows control application to the SERVOSTAR MC. With the API, simple subroutine calls let you connect your multi-layered PC-based machine control system to the MC's multi-tasking motion

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.



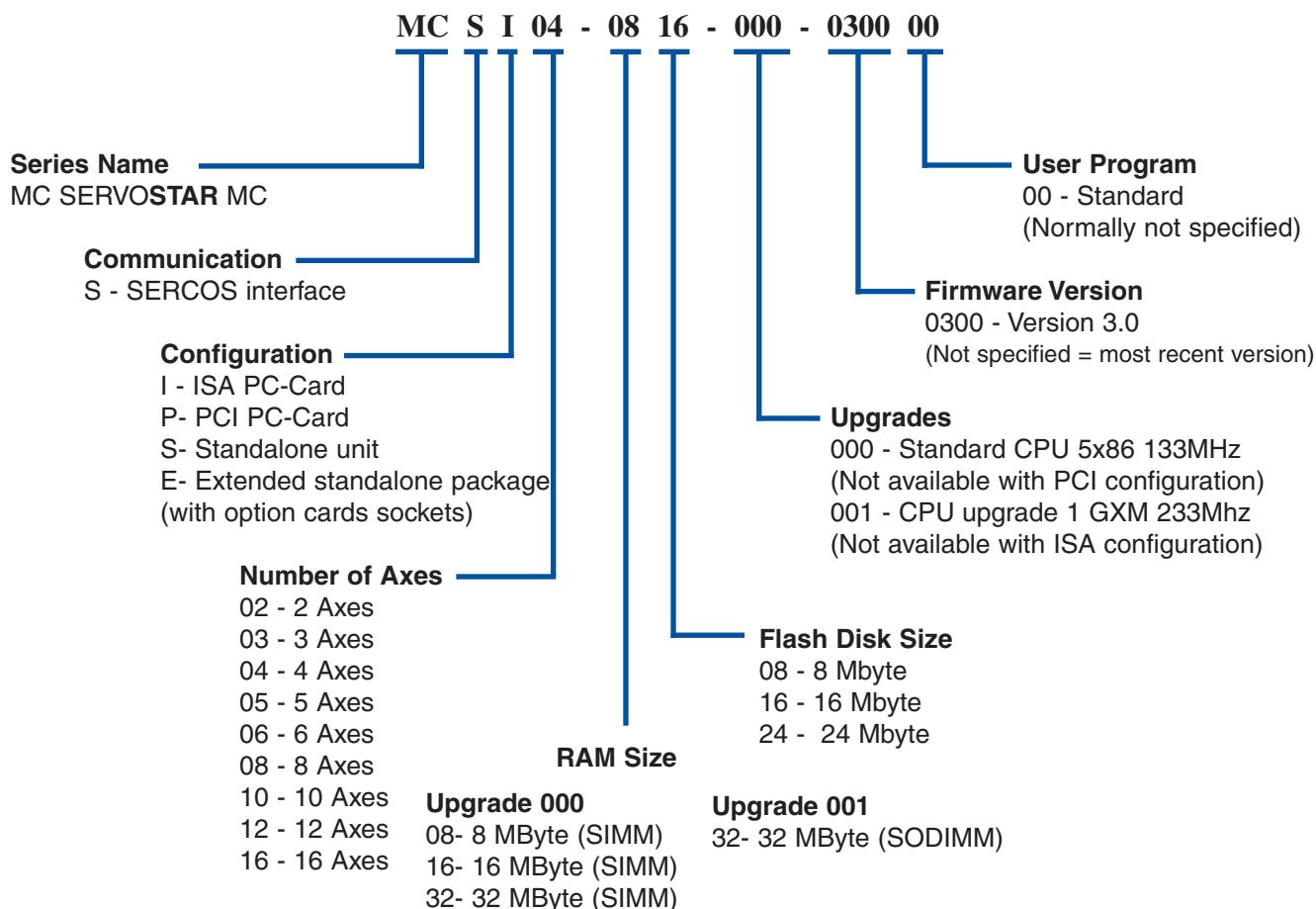
The API ties the machine controller to the motion controller

Hardware Configurations

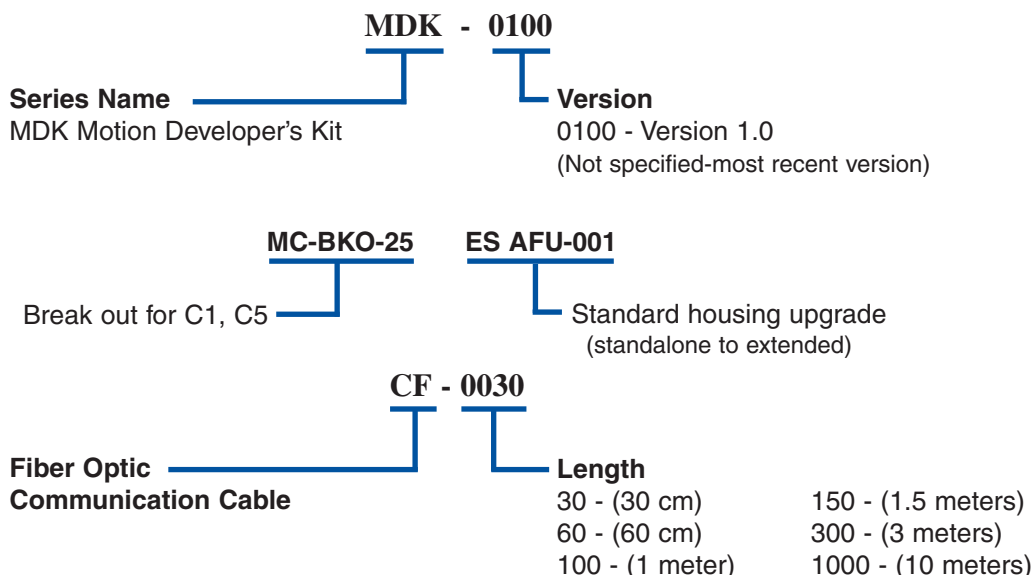


	ISA	PCI	Standalone
Mechanical configuration	Half size ISA Bus PC Card	Half size PCI Bus PC Card	Self contained standalone package
Onboard IOs	<ul style="list-style-type: none"> • 23 isolated inputs • 20 isolated outputs 	<ul style="list-style-type: none"> • 23 isolated inputs • 20 isolated outputs • 8 dip-switches 	<ul style="list-style-type: none"> • 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

MODEL NUMBERS & ACCESSORIES

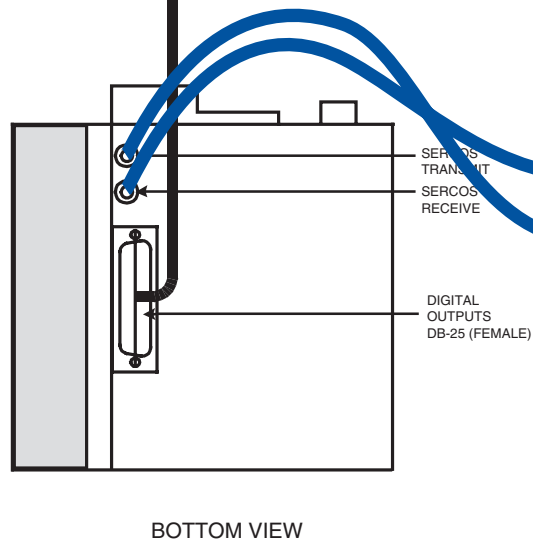
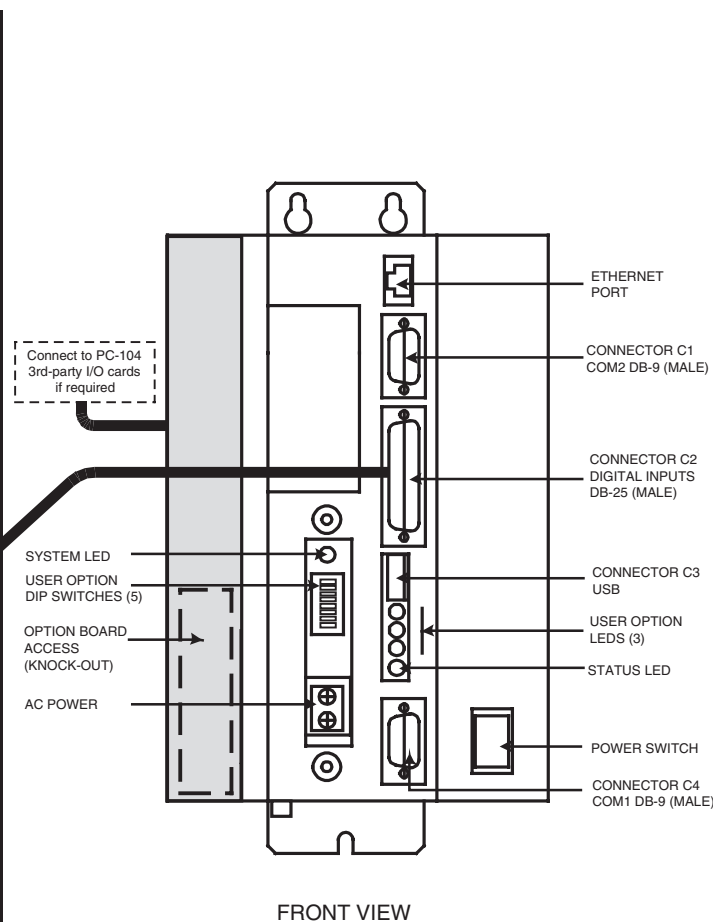
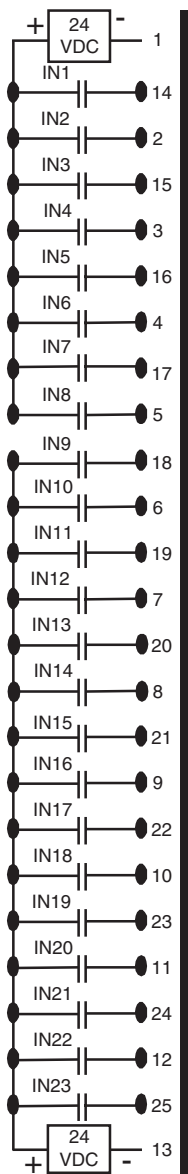
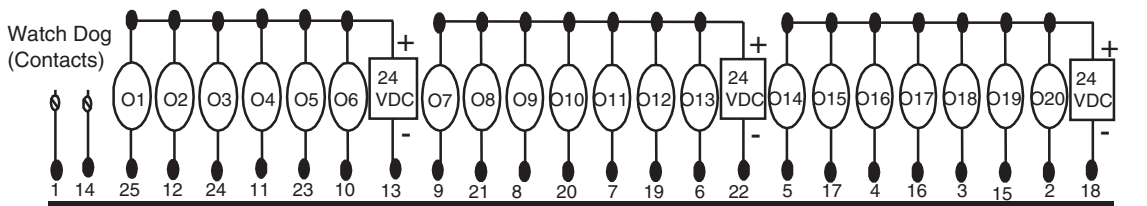


Accessories



SERVOSTAR® MC Wiring Diagram

(Stand-alone version)



Available Product Versions

PC Card

The PC Card version of the SERVOSTAR 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.

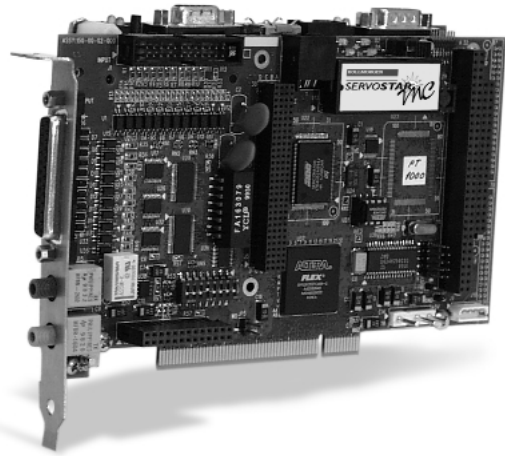
Stand-alone Version

The Stand-alone version of the SERVOSTAR 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 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

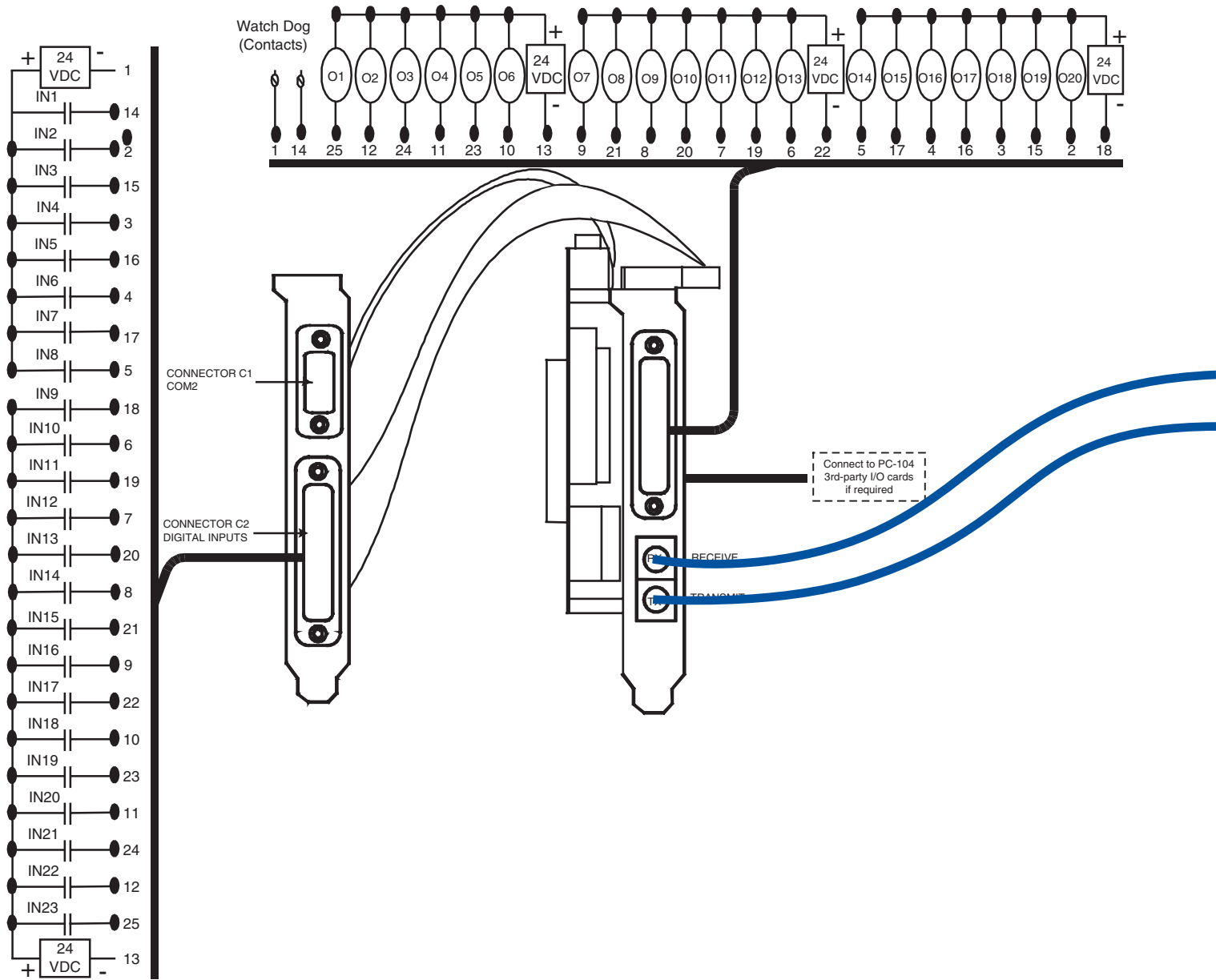


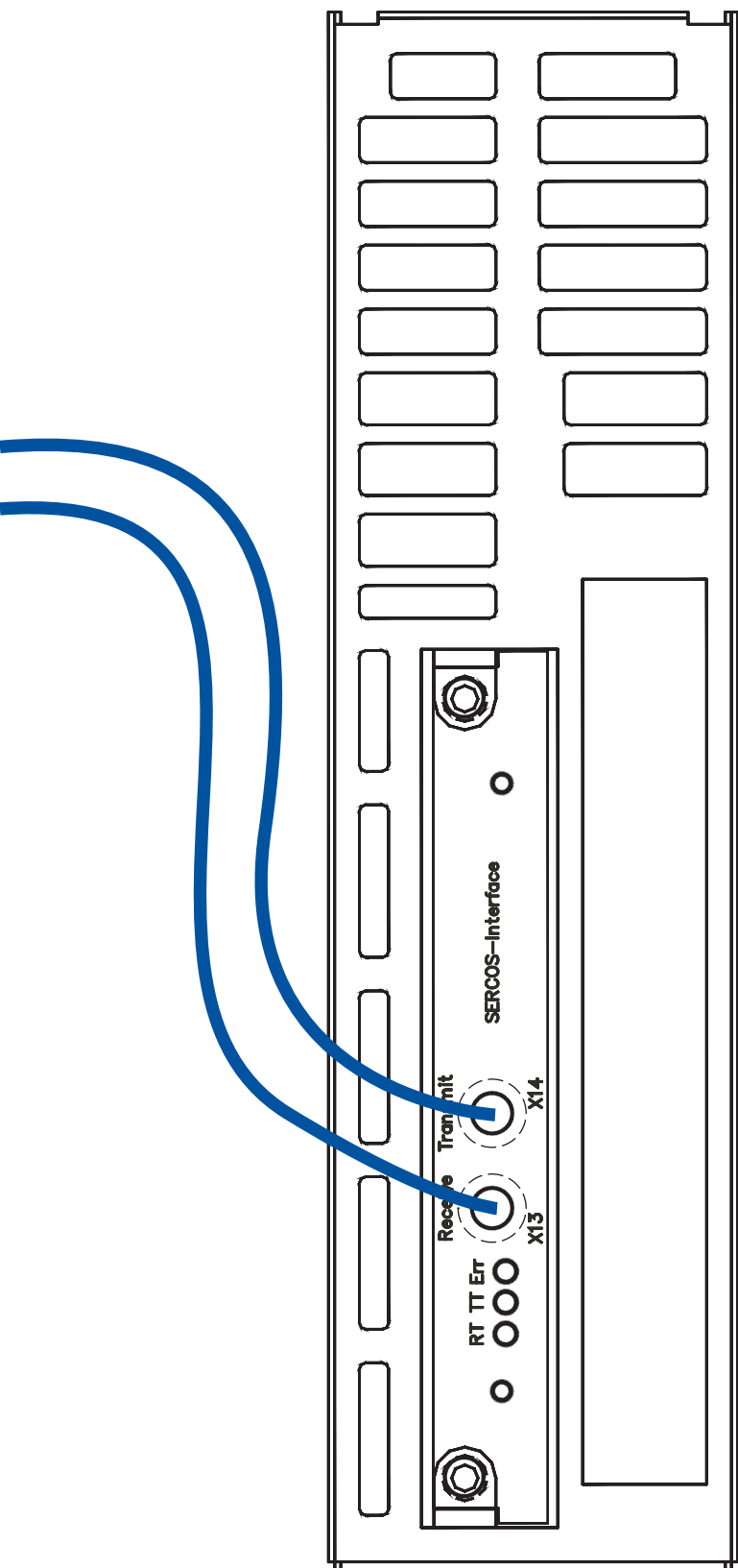
Advantages of Stand-alone version

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

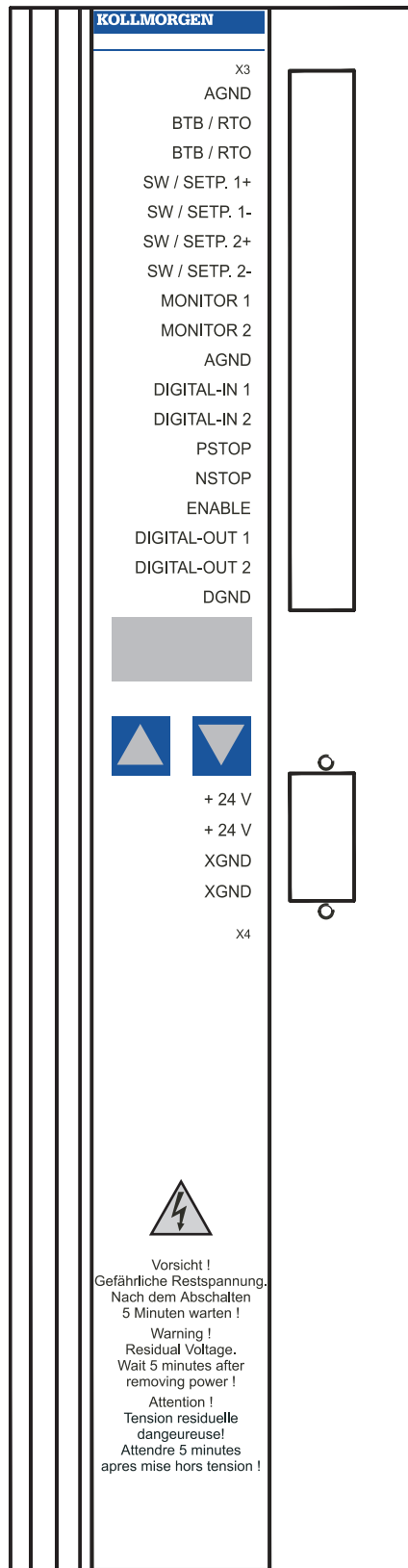
SERVOSTAR® MC Wiring Diagram

(PCI Card version)





TOP VIEW

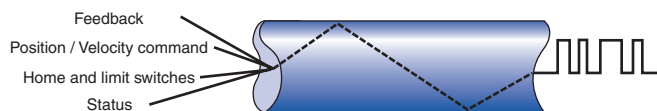


FRONT VIEW



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.



SERVOSTAR® drives with SERCOS option

SERVOSTAR® amplifiers are high-performance, full featured brushless motor controllers. **SERVOSTAR** 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, **SERVOSTAR** amplifiers have the accuracy and flexibility to work in just about every high-performance motion system.

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

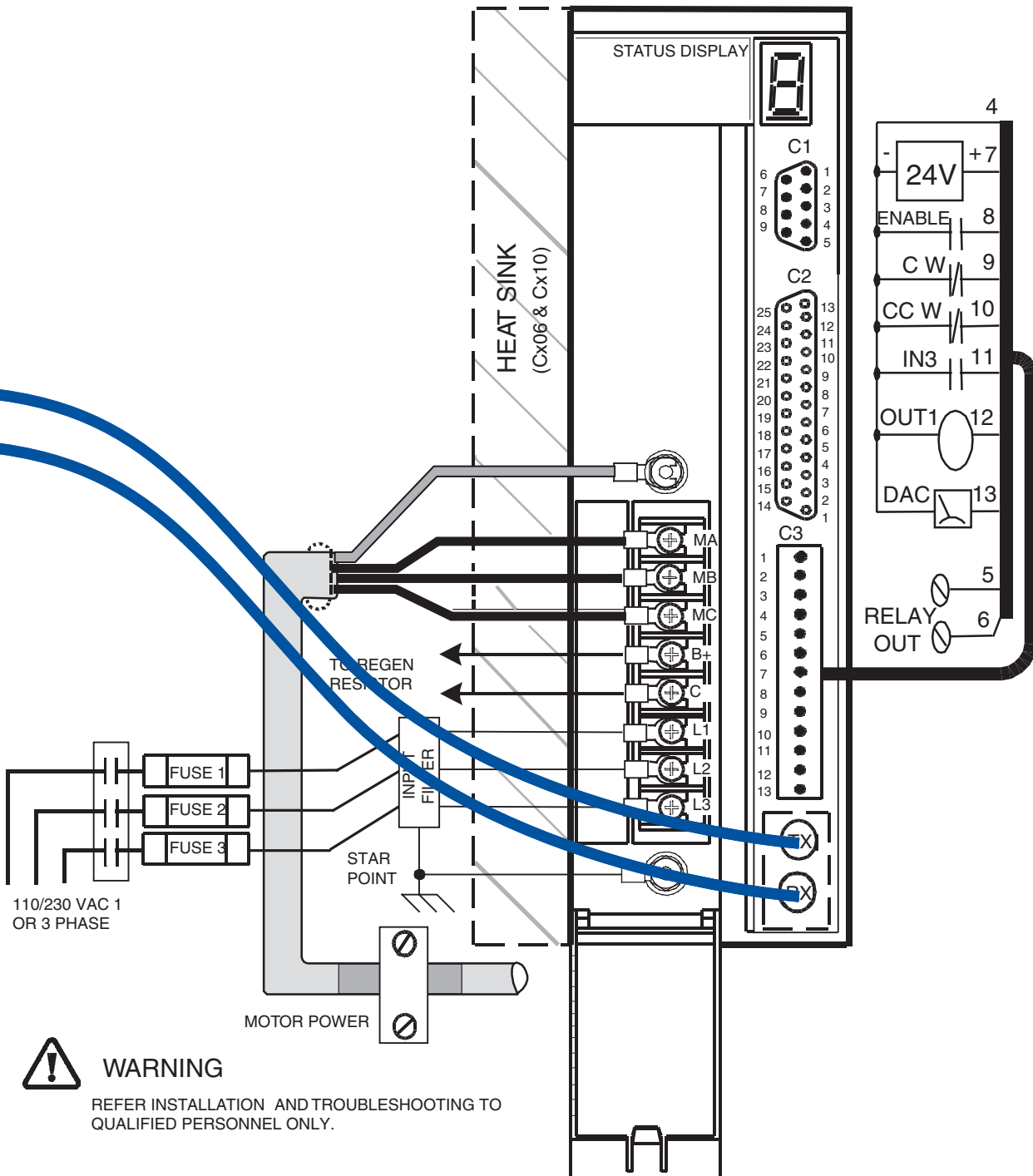
SERVOSTAR amplifier start up is very straight forward. Hook up power, motor, and feedback. Add optional drive I/O like limit switches. Hook up two fiber optic cables and you're ready to go.

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.

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

The **SERVOSTAR** MC works best when it's teamed with **SERVOSTAR** amplifiers to make a complete system. Since the **SERVOSTAR** MC was designed from the start to work with the **SERVOSTAR** 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.

SERVOSTAR® CD Wiring Diagram



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