



16 Axis PCI SERCOS interface Card

(Catalog Number 1784-PM16SE)

This document provides the instructions for installing the 16 Axis PCI SERCOS interface™ card (1784-PM16SE) in a PC computer using the Windows™ 2000/NT/XP operating system.

Before you install your card you need a PC computer with an open 32 bit local PCI Bus slot. PCI Bus configuration:

Personal Computer Expansion Bus	
Bus Type	One Primary PCI
Bus Speed	PCI- 33MHz
Bus Signaling	5 VDC or 3.3 VDC Universal
Expansion Size	32-bit Slot 4.2 in (10.67 cm) High 6.95 inches (17.65 cm) long

The PC should meet the following recommended configuration:

Category	Requirement
Personal computer	Pentium™ II 300MHz or Celeron 300A processor Pentium™ III 600 MHz recommended ¹
Operating System	Microsoft Windows NT version 4.0 with Service Pack 6A or Microsoft Windows 2000 with Service Pack 2 or Microsoft Windows XP.
RAM	128 Mbytes of RAM minimum
Hard Disk Space	50 Mbytes of free hard disk space
Video Requirements	256 - color, 800 X 600 video resolution minimum

¹The SoftLogix 5800 controller has only been tested and qualified on genuine Intel processors.

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Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including all applicable laws, regulation codes, and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

The illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, and recognize the consequences of a potential hazard.

WARNING

Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Rockwell Automation Support

Allen-Bradley offers support services worldwide, with over 75 Sales/Support Offices, 512 authorized Distributors and 260 authorized Systems

Integrators located throughout the United States alone, plus Allen-Bradley representatives in every major country in the world.

Technical Product Assistance

If you need to contact Rockwell Automation for technical assistance, please review the information in this manual first. Then call your local Rockwell Automation representative. For the quickest possible response, we recommend that you have the catalog numbers of your products available when you call. See the *Related Documentation* section of this chapter for the publication numbers of other manuals that can help with this product.

The Rockwell Automation Technical Support number is:

1-440-646-5800

On the Web

For additional information, visit the following World Wide Web site:

<http://www.ab.com/>

Related Documentation

The following documents contain information concerning related Allen-Bradley products. To obtain a copy, contact your local Rockwell Automation office or distributor.

For:	Read This Document:	Publication Number
ControlLogix™ motion commands	<i>Motion Instruction Set Reference Manual</i>	1756-RM007
Information on setup and configuration	<i>SoftLogix Motion Module Setup and Configuration Manual</i>	1784-UM003
Information on the SoftLogix™ System	<i>SoftLogix5800 System Manual</i>	1789-UM002
Information on installing the SoftLogix5800 controller	<i>SoftLogix5800 Controller Installation Instructions</i>	1789-IN001
Information on installation, wiring, and setup for the 1394C-SJTxx-D	<i>1394 SERCOS interface Multi Axis Motion Control System</i>	1394C-5.20
Information on integrating the 1394C drive with SERCOS	<i>1394 SERCOS Integration Manual</i>	1394-IN024
Information on Ultra3000™ installation	<i>Ultra3000 Hardware Installation Manual</i>	2098-IN003
Information on Kinetix 6000™ installation	<i>Kinetix 6000 Installation Manual</i>	2094-IN001
Information on integrating the Kinetix 6000 with SERCOS	<i>Kinetix 6000 Integration Manual</i>	2094-IN002
Information on integrating the Ultra3000 with the 1784-PM16SE	<i>Ultra3000 SERCOS Integration Manual</i>	2098-IN005
Information on use of the 8720MC High Performance Drive	<i>8720MC High Performance Drive User Manual</i>	8720MC-UM001

Overview

The 16 Axis PCI SERCOS interface card (1784-PM16SE) serves as a link between the SoftLogix platform and intelligent SERCOS drives. The communication link between the card and the drive(s) is via IEC 61491 SERCOS using fiber optical medium. Fiber optics assures reliable high speed data transmission with excellent noise immunity, improved performance, and elimination of interconnect wiring.

The 16 axis PCI SERCOS interface card connects to one SoftLogix Controller using an industry standard Peripheral Component Interconnect (PCI) bus. The card generates periodic interrupts to trigger execution of motion in the SoftLogix Controller. The card is a PCI bus master for exchange of real-time data with the SoftLogix Controller.

The SERCOS network is a digital synchronous optical LAN that is configured in a master and slave ring topology. The PCI SERCOS interface card is capable of supporting up to 16 axes. It can send cyclic position commands at periods down to 0.5 milliseconds.

Environment and Enclosure

The PCI SERCOS interface card is intended for use in a heavy industrial environment and is not to be used in a domestic or office environment. The card must be installed in a suitable computer.

ATTENTION**Environment and Enclosure**

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as “open type” equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are not required to comply with certain product safety certifications.

NOTE: See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 (Industrial Automation Wiring and Grounding Guidelines), for additional installation requirements pertaining to this equipment.

Preventing Electrostatic Discharge

ATTENTION



This equipment is sensitive to electrostatic discharge (ESD), which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
 - Wear an approved grounding wrist strap.
 - Do not touch the connectors or pins on component boards.
 - Do not touch circuit components inside the equipment.
 - If available, use a static-safe workstation.
 - When not in use, store the equipment in appropriate static-safe packaging.
-

Power Source

All power for the SERCOS interface card (1784-PM16SE) is taken from the host PC via the PCI connector. No user provided field electric power source is needed. The PC chassis supplies all power for internal operation and fiber optic energy.

Identifying Card Components

The following diagrams provide two views of the 1784-PM16SE card. The first diagram is a side view which shows the orientation of the card, the connection to the PCI Bus, and the product label. The second diagram is a front view which shows the position of the cable connections, the LEDs, and the Card Identification Switch.

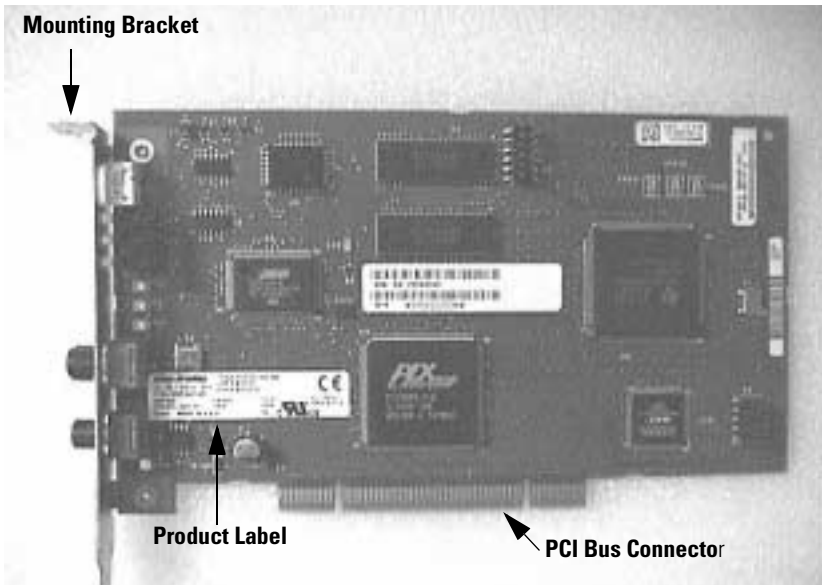


Figure 1 Side view of 1784-PM16SE

Mounting Bracket

The card mounting bracket secures the card to the computer.

PCI Bus Connector

The PCI Bus Connector fits into the PCI Bus slot of the computer.

Product Label

The product label provides pertinent information about the card. This should be checked prior to installation to verify that you have the proper card for your application.

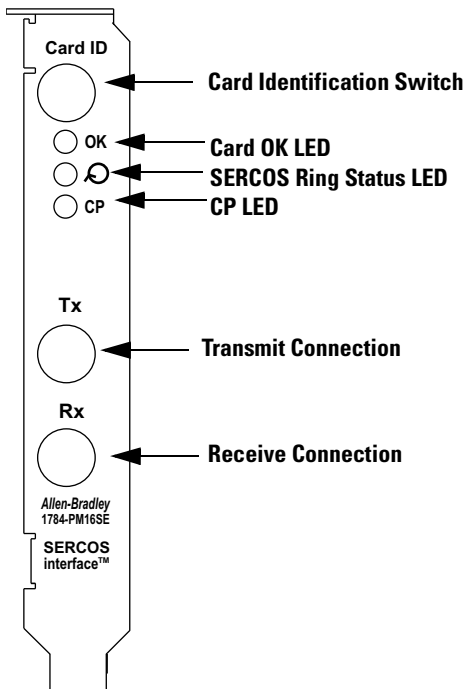
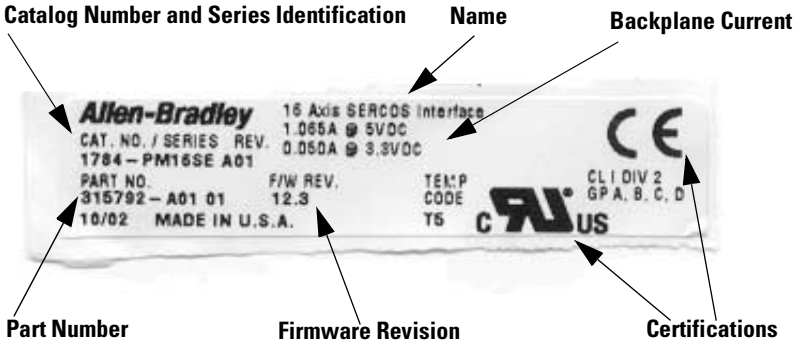


Figure 2 Front view of 1784-PM16SE

Card Identification Switch

The Card Identification Switch is a slotted rotary switch with 16 positions (0-9 and A-F). When each card is installed in your computer, this switch must be set to a unique setting to identify the individual 1784-PM16SE card from the other 1784-PM16SE cards installed in the computer. (A 1784-PM16SE can have the same switch setting as a 1784-PM02AE card without creating a problem.) Use a small slotted screwdriver to select a setting.

LEDs

The three LEDs report on the status of the system. See the section entitled *Checking the LED Indicators* later in this document for more information about the function of the individual LEDs.

Card OK LED – Indicates the present health of the card.

SERCOS Ring Status LED – Displays the status of the SERCOS network.

CP LED – Displays the current Communication Phase.

Fiber Optic Cable Connections

Fiber optic cables are used to send and receive signals between the card and the controller.

Transmit Connection – Fiber optic cable connects to Transmit connector of card and to Receive connection of Controller.

Receive Connection – Fiber optic cable connects to Receive Connection of Card and to Transmit connection of Controller.

Hazardous Location Information

The following information applies when operating this equipment in hazardous locations:

Products marked “CL I, DIV 2, GP A, B, C, D” are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest “T” number) may be used to help determine the overall temperature

code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

WARNING



EXPLOSION HAZARD –

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
 - Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
 - Substitution of components may impair suitability for Class I, Division 2.
 - If this product contains batteries, they must only be changed in an area known to be nonhazardous.
-

Informations sur l'utilisation de cet équipement en environnements dangereux:

Les produits marqués «CL I, DIV 2, GP A, B, C, D» ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

AVERTISSEMENT**RISQUE D'EXPLOSION –**

- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.
- La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe 1, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Installing the Card

Before you install the card, be certain you know how to install hardware in your computer.

Consult your computer's documentation for specific information on how to install hardware. The steps needed to install hardware can vary from machine to machine. Make sure you understand the 1784-PM16SE requirements and follow your specific computer's documentation to install it.

ATTENTION

Failure to follow card handling instructions and your computer's documentation to add hardware can result in equipment damage, personal injury, or agency violations.

To install the card, you need access to the computer's expansion slots. See the table at the beginning of this document for specific slot requirements.

Access the Computer's PCI Local Bus Expansion Slots

To install the card, you must access the computer's PCI local bus expansion slots. Refer to your computer's user guide for instructions on how to:

1. Perform an orderly computer shutdown using the operating system menu.
2. Turn off the power to the host computer and all attached devices.
3. Disconnect the computer from its AC power sources. Disconnect all other devices in the computer from their power sources. Disconnect cables such as telephone lines. Doing so reduces the potential for personal injury and equipment damage.
4. Remove/Open the computer's cover.
5. Select a vacant PCI local bus expansion slot. Make sure the vacant slot is on the primary PCI Bus. The slot must not be on a bridged or extended PCI bus.
6. Remove the slot's expansion cover. Remove the screw on the back (rear bracket) of the computer.

Insert the Card

To insert the card inside the computer:

1. Follow the card handling instructions under Preventing Electronic Discharge section earlier in this manual.
2. Push the card's PCI connection into the PCI Bus.
3. Set the Card Identification Switch to a unique setting using a small slotted screwdriver.
4. Replace and tighten the expansion slot screw.

If you have additional cards to install, repeat steps 1, 2, 3, and 4 for each card.

5. Replace the computer's cover.
6. Turn on the computer to make sure it comes up correctly.

If the computer	then:
powers up	go to step 5.
hangs up	<ul style="list-style-type: none"> • The card is not installed correctly. • You should remove all other cards and try again. <p>If you continue to experience difficulty, call Technical Support.</p>

7. Install the PC Driver. See the *SoftLogix5800 Controller Installation Instructions*, publication 1789-IN001, for information on installing the WIndows 2000 and Windows XP drivers. The Windows NT drivers are already installed.
8. Configure the Virtual backplane as explained in the *SoftLogix5800 System Manual*, publication 1789-UM002.
9. Refer to the *SoftLogix Motion Card Setup and Configuration Manual*, publication number 1784-UM003, for information on how to add and configure the 1784-PM16SE card, configure axes, select drives, and hookup and tune you motion system.

Installing Multiple Cards

You can install up to four (4) 1784-PM16SE cards in your computer. The physical installation procedures are the same as explained previously in this document. It is imperative that the Card Identification Switch for each 1784-PM16SE card is set to a unique number or letter. (See section on card components for more information about the Card Identification Switch.) When you have multiple 1784-PM16SE cards installed they must each be associated with an individual SoftLogix Controller.

IMPORTANT

Each additional SoftLogix controller requires additional computer hardware resources that can impact performance. Additional computer processor capabilities or an increase in the motion Coarse Update Periods may be required. See publication 1789-UM002 *Using Multiple SoftLogix Controllers* for more information.

IMPORTANT

Producing and consuming motion data between SoftLogix Controllers is not recommended. This is due to the asynchronous relationship of a 1784-PM16SE card with other motion cards in your computer. For applications that require tight coordination among multiple motion cards, physically couple the feedback from one common axis to each card.

Fiber Optic Transmission

The fiber optic transmitter for the SERCOS interface 16 Axis PCI card uses a 650nm wavelength. This produces a visible light from the port and is a determinant in factoring maximum cable lengths. The high light output lets you use both plastic optical fiber (POF) and hard clad silica (HCS) cables.

The fiber optics used with the 1784-PM16SE card is rated Class 1 for IEC Laser (LED) Safety Classification. Be aware that under certain conditions, viewing the optical port may expose the eye to hazard. Under most viewing conditions, there is no eye hazard.

ATTENTION



When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommended in ANSI Z136.2, 1997.

Fiber Optic Cables

The 1784-PM16SE card is connected to the drive(s) via a fiber optic cable. These cables can be either made of plastic or glass.

Plastic Fiber Optic Cables

The card is connected to the drive(s) via a 1000 μm plastic simplex fiber optical cable. Plastic fiber optic cables have a transmission range of 1 meter to 32 meters. The maximum bend radius is 2.5 cm. Both the transmitter and receiver connections are made using a F-SMA standard plug that conforms to the F-SMA screw type connector.

Premade plastic fiber optic cable assemblies are available from Allen-Bradley. Plastic fiber optic cables come in a variety of jackets depending on application environments. The cable is available without a jacket (Chlorinated Polyethylene) for use inside an electrical cabinet, a standard jacket (Polyvinyl Chloride) for use outside of electrical cabinets, and a nylon jacket for use in harsh environments.

The following table shows the catalog numbers and available lengths for plastic fiber optic cables that are not jacketed (Chlorinated Polyethylene) and should be used only within an electrical cabinet.

Allen-Bradley Catalog Number	Length in meters (feet)
2090-SCEP1-0	1 m (3.28 ft)
2090-SCEP3-0	3 m (9.84 ft)
2090-SCEP5-0	5 m (16.26 ft)
2090-SCEP8-0	8 m (26.25 ft)
2090-SCEP10-0	10 m (32.81 ft)
2090-SCEP15-0	15 m (49.22 ft)
2090-SCEP20-0	20 m (65.62 ft)
2090-SCEP25-0	25 m (82.03 ft)
2090-SCEP32-0	32 m (104.99 ft)

The plastic fiber optic cables listed in the following table have a standard jacket (Polyvinyl Chloride) for use in normal environments outside of an electrical cabinet.

Allen-Bradley Catalog Number	Length in meters (feet)
2090-SCVP1-0	1 m (3.28 ft)
2090-SCVP3-0	3 m (9.84 ft)
2090-SCVP5-0	5 m (16.26 ft)
2090-SCVP8-0	8 m (26.25 ft)
2090-SCVP10-0	10 m (32.81 ft)
2090-SCVP15-0	15 m (49.22 ft)
2090-SCVP20-0	20 m (65.62 ft)
2090-SCVP25-0	25 m (82.03 ft)
2090-SCVP32-0	32 m (104.99 ft)

If your cables are going to run through a harsh environment, the cable should be appropriately jacketed. The following table contains the catalog numbers and lengths for nylon jacketed cables for use in harsh environments.

Allen-Bradley Catalog Number	Length in meters (feet)
2090-SCNP1-0	1 m (3.28 ft)
2090-SCNP3-0	3 m (9.84 ft)
2090-SCNP5-0	5 m (16.26 ft)
2090-SCNP8-0	8 m (26.25 ft)
2090-SCNP10-0	10 m (32.81 ft)
2090-SCNP15-0	15 m (49.22 ft)
2090-SCNP20-0	20 m (65.62 ft)
2090-SCNP25-0	25 m (82.03 ft)
2090-SCNP32-0	32 m (104.99 ft)

Glass Fiber Optic Cables

Fiber Optic cables made from glass are a better conduit for the light to pass through thus increasing the length of cable that may be used and still supply a strong enough signal for use with the 1784-PM16SE card.

The card is connected to the drive(s) via a 200 μm glass fiber optical cable. Glass fiber optic cables have a transmission range of 1 meter to 200 meters. The maximum bend radius is 2.5 cm. Both the transmitter and receiver connections are made using a F-SMA standard plug that conforms to the F-SMA screw type connector.

Premade glass fiber optic cable assemblies are available from Allen-Bradley. Glass fiber optic cables come with a standard jacket (Polyvinyl Chloride) for use in normal environments.

The following table shows the catalog numbers and lengths available for premade glass fiber optic cables. These cables have a standard jacket (Polyvinyl Chloride) for use in normal environments.

Allen-Bradley Catalog Number	Length in meters (feet)
2090-SCVG1-0	1 m (3.28 ft)
2090-SCVG3-0	3 m (9.84 ft)
2090-SCVG5-0	5 m (16.26 ft)
2090-SCVG8-0	8 m (26.25 ft)
2090-SCVG10-0	10 m (32.81 ft)
2090-SCVG15-0	15 m (49.22 ft)
2090-SCVG20-0	20 m (65.62 ft)
2090-SCVG25-0	25 m (82.03 ft)
2090-SCVG32-0	32 m (104.99 ft)
2090-SCVG50-0	50m (164.05 ft)
2090-SCVG100-0	100m (328.1 ft)
2090-SCVG150-0	150m (492.15 ft)
2090-SCVG200-0	200m (656.2 ft)

Cable Connector Handling and Maintenance

When cables are not in use, keep the ends covered with the dust covers that came with the cables. This helps to keep dust and small particles from blocking the optic path. Good system performance is dependent on clean port optics and cable ferrules to avoid obstructing the optical path. Clean compressed air is often sufficient to remove particles of dirt. You can also use methanol on a cotton swab. Recommended cleaners include:

Alcohols

methyl
isopropyl
isobutyl

Aliphatics

hexane
heptane

Other

soap solution
naphtha

ATTENTION



The small junction size inherent in the design of these components increases the components' susceptibility to damage from electrostatic discharge (ESD). It is advised that normal static precautions be taken in handling and assembly of these components to prevent damage and/or degradation which can be induced by ESD.

Supported Drives

The following Allen-Bradley drives are supported by the SERCOS interface motion card.

Catalog Number	Description
1394C-SJT05-D	1394C 5KW SERCOS interface 460V drive
1394C-SJT10-D	1394C 10KW SERCOS interface 460V drive
1394C-SJT22-D	1394C 22KW SERCOS interface 460V drive
2094-AC05-M01	Kinetix 6000 3KW Power Supply/9A Drive, 230VAC
2094-AC09-M02	Kinetix 6000 6KW Power Supply/15A Drive, 230VAC
2094-AM01	Kinetix 6000 9A Drive, 230VAC

Catalog Number	Description
2094-AM02	Kinetix 6000 15A Drive, 230VAC
2094-BC01-M01	Kinetix 6000 6KW Power Supply/9A Drive, 460VAC
2094-BC02-M02	Kinetix 6000 15KW Power Supply/15A Drive, 460VAC
2094-BM01	Kinetix 6000 9A Drive, 460VAC
2094-BM02	Kinetix 6000 15A Drive, 460VAC
2098-DSD-005-SE	Ultra3000 0.5KW SERCOS interface 230VDrive
2098-DSD-010-SE	Ultra30001KW SERCOS interface 230VDrive
2098-DSD-020-SE	Ultra3000 2KW SERCOS interface 230VDrive
2098-DSD-030-SE	Ultra3000 3KW SERCOS interface 230VDrive
2098-DSD-075-SE	Ultra3000 7.5KW SERCOS interface 230VDrive
2098-DSD-150-SE	Ultra3000 15KW SERCOS interface 230VDrive
2098-DSD-HV030-SE	Ultra3000 3KW, 460VAC SERCOS interface 460V drive
2098-DSD-HV050-SE	Ultra3000 5KW, 460VAC SERCOS interface 460V drive
2098-DSD-HV100-SE	Ultra3000 10KW, 460VAC SERCOS interface 460V drive
2098-DSD-HV150-SE	Ultra3000 15KW, 460VAC SERCOS interface 460V drive
2098-DSD-HV220-SE	Ultra3000 22KW, 460VAC SERCOS interface 460V drive
8720MC	8720MC High Performance Drive

Ring Topology

The SERCOS network consists of a Master (1784-PM16SE card) and several slaves (drives) connected in a ring topology. The fiber optical ring starts and ends with the master.

The following diagram gives an example of a possible network connected in a ring topology.

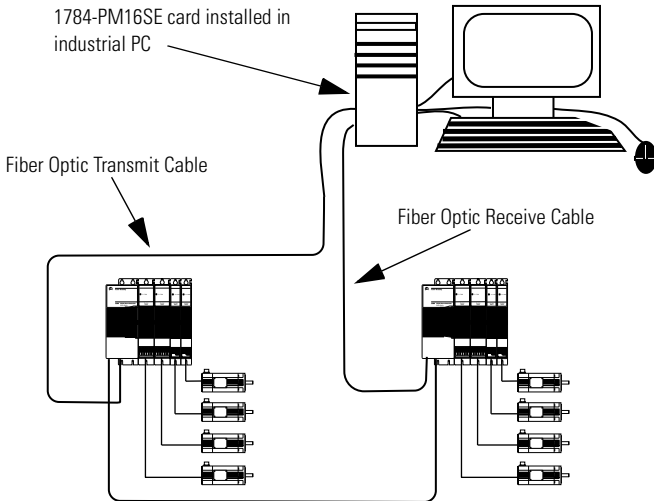


Figure 3 Ring topology - 1784-PM16SE card in PC with 1394C-SJTxx-D

Any break in the fiber optical ring disables the SERCOS network and creates a warning in the ring LED.

Checking the LED Indicators

The card provides three bi-color LED indicators to show the state of the system. The LEDs are located on the mounting bracket of the 1784-PM16SE card. The LED on the top, marked by OK, indicates the present health of the card. Just below the OK LED is the SERCOS Ring Status LED. This is marked with a ring icon and displays the status of the SERCOS network. Below the SERCOS Ring Status LED is the CP LED. The CP LED shows the communication phase.

The OK LED

During power up, the card completes an indicator test. The OK indicator is solid red at startup and then turns to flashing green if the card passes all of its self tests.

Card Status Using the OK Indicator

If the OK LED displays:	Then the card status is:	Take this action:
Off	The card is not operating.	<ul style="list-style-type: none"> • Apply power. • Verify the card is completely inserted into the PCI slot.
Flashing green light	The card has passed internal diagnostics, but has not established active communications.	<ul style="list-style-type: none"> • None, if you have not configured the card.
Solid green light	<ul style="list-style-type: none"> • Data is being exchanged. • The card is in the normal operating state. 	None. The card is ready for action.
Flashing red light	<ul style="list-style-type: none"> • A major recoverable failure has occurred. • An NVS update is in progress. 	<p>If an NVS update is in progress, complete the NVS update.</p> <p>If an NVS update is not in progress: Reboot</p>
Solid red light	A potential nonrecoverable fault has occurred.	<ul style="list-style-type: none"> • Reboot the card. • If the solid red persists, replace the card.

The SERCOS Ring Status LED

The SERCOS Ring Status LED shows the status of the SERCOS ring.

SERCOS Ring Status

If SERCOS Ring Status LED displays:	Then the ring status is:	Take this action:
Solid green light	The ring, drive, and axes are configured and are actively communicating through to the nodes on the ring.	None.
Flashing red light	The card has detected a setup or configuration fault with the ring.	Check your system setup and configuration as follows: <ul style="list-style-type: none"> • Ensure drive and axes addresses are correct. • Remove excess axes from ring. • Make sure application program has selected the proper Ring Cycle Period and Baud Rate.
Solid red light	The card has detected a hardware or installation fault with the ring.	Check your system hardware and installation as follows: <ul style="list-style-type: none"> • Make sure all cables are properly installed. • Make sure cable is of the correct type and length. • Make sure application program has configured the card's ring transmit level to High when using specified cables. • Make sure the drive's transmit levels are set appropriately. • Inspect cables for degradation. • Inspect drives for any faults and correct them.
Off	The card has detected no ring data on its receiver or has not successfully completed phase 2.	Check your system and installation as follows: <ul style="list-style-type: none"> • Make sure all cables are properly installed • Inspect cable for degradation and breakage. • Inspect drives for faults.
Flashing green light	The ring, drive, or axes are not configured but, at least one has been identified.	Not a problem if the system has not been configured. If you are having trouble configuring the ring, drive, and axes: Make sure that the application program is setup properly for the equipment in use.

The Communication Phase LED



The Communication Phase (CP) LED provides information as to what phase the SERCOS link is in.

SERCOS Communication Phase Status Using the CP Indicator

If the CP LED displays:	Then the card status is:
Solid Orange	In Phase -1: Autobaud detection in progress.
Off	In Phase 0: looking for a closed ring.
Flashing Red	In Phase 1: looking for active nodes.
Alternating Red/Green	In Phase 2: configuring nodes for communication.
Flashing Green	In Phase 3: configuring device specific parameters
Solid Green	In Phase 4: configured and active.

1784-PM16SE Card Specifications

Number of Nodes	16 axes maximum
Card location	32 bit 33MHz primary PCI Bus slot
Card keying	3.3 / 5 VDC universal
Power Dissipation	7.5 W maximum
Backplane Current	5 VDC @ 1.065 A and 3.3 VDC @ 0.050 A ¹
Environmental Specifications Slot Temperature Storage temperature Relative Humidity	0-60° C (32-140° F) -40 to 85°C (-40 to 185°F) 30 to 95% non condensing IEC 68-2-30
Shock Operating Non-operating	30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width
Vibration	2g @ 10-150Hz per IEC 68-2-6

<p>Plastic Fiber Optic Specifications</p> <p>Transmission Range</p> <p>Core Diameter</p> <p>Cladding Diameter</p> <p>Cable Attenuation</p> <p>Operating Temperature</p> <p>Connector</p> <p>Bend Radius</p>	<p>1-32 meters</p> <p>980μm \pm 60μm</p> <p>1000μm \pm 60μm</p> <p>140 dB/km @ 650nm</p> <p>-55 to 85° C (-67 to 185°F)</p> <p>F-SMA standard screw-type connector</p> <p>2.5 cm</p>
<p>Glass Fiber Optic Specifications</p> <p>Transmission Range</p> <p>Core Diameter</p> <p>Cladding Diameter</p> <p>Cable Attenuation</p> <p>Operating Temperature</p> <p>Connector</p> <p>Bend Radius</p>	<p>1-200 meters</p> <p>200μm \pm 4μm</p> <p>230μm +0/-10μm</p> <p>6.0 dB/km @ 820nm</p> <p>-20 to 85° C</p> <p>F-SMA standard screw-type connector</p> <p>2.5 cm</p>
<p>SERCOS</p> <p>SERCOS Class</p> <p>Data Rate</p> <p>Operating cycle</p> <p>1784-PM16SE @ 4 Mbaud</p> <p>1784-PM16SE @ 8 Mbaud</p>	<p>Class B (Position or Velocity)</p> <p>4 Mbits or 8 Mbits per second</p> <p>0.5 ms for up to 2 axes</p> <p>1 ms for up to 4 axes</p> <p>2 ms for up to 8 axes</p> <p>No support for 9 to 16 axes</p> <p>0.5 ms for up to 4 axes</p> <p>1 ms for up to 8 axes</p> <p>2 ms for up to 16 axes</p>
<p>Agency certification (when product or packaging is marked)</p>	<p> UL Recognized Component Industrial Control Equipment for Class I, Division 2, Groups A, B, C, D Hazardous Locations, certified for US and Canada</p> <p> EN50081-2; Industrial Emissions EN61000-6-2; Industrial Immunity</p>

¹ Must be supplied from UL Listed Information Technology Equipment or UL Listed Industrial Control Equipment.

Notes:

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