Key

1	**LEDs**	System (SYS) and Communications (COM) indicators
2	**Service Port**	RS232, 9-pin male, D-shell connector. Used for module firmware upgrades.
3	**PROFIBUS Port**	9-pin female D-shell connector. Used for connecting to a PROFIBUS network.
4	**Label (not shown, on side of module)**	Contains catalog number, description, standard conformance, and serial number information

IC693PBM200 PROFIBUS
Master Module

Figure 1-1. PROFIBUS Master Module

Specifications

Catalog Number	IC693PBM200
Description	Series 90-30 Master module for PROFIBUS DP networks
Configuration Software Requirement	Proficy™ Machine Edition Logic Developer version 2.6 or later
CPU Version Requirement	CPU firmware version 8.00 or later
Mounting Location	Any Series 90-30 baseplate (CPU, expansion, or remote) slot except slot 1 of a modular CPU baseplate
Environment	Storage temperature = -40°C to 85°C
	Operating temperature = 0°C to 60°C
Backplane Current Consumption	450mA @ 5VDC (typical)
Data rates	Supports all standard data rates (9.6K, 19.2K, 93.75K, 187.5K, 500K, 1.5M, 3M, 6M and 12M Baud)
Status Information Available	Slave Status Bit Array
	Slave Diagnostics/Firmware ID array
	Network diagnostic counters
	DP master diagnostic counters
	Firmware module revision
	Slave Diagnostic Address

PROFIBUS Basics

PROFIBUS Network Overview

- PROFIBUS is an open, vendor independent FieldBus standard for a wide range of applications in industrial automation, including motion control.

- PROFIBUS is a dynamic technology that grows functionally while complying with the European FieldBus Standard EN 50 170.

- PROFIBUS Guidelines and Profiles provide the means for further technical development based on the ever-changing communication requirements of the networks, systems, and devices used in today's industrial automation applications.

PROFIBUS specifications reference three different protocols to cover a range of industrial requirements:

- *PROFIBUS-DP* High speed data communication. DP stands for *Decentralized Periphery*. In practice, the majority of slave applications are DP applications.

- *PROFIBUS-FMS* Object oriented general-purpose data communication. FMS stands for *FieldBus Message Specification*. FMS protocol devices may exchange data on the same bus used for DP devices.

- *PROFIBUS-PA* Meets requirements for intrinsic safety and non-intrinsic safety areas and includes bus powered field devices.

Note: The PROFIBUS logo is a registered trademark of the PROFIBUS International Organization. Membership in the organization is open to all individuals, companies and organizations. More information about the organization and the protocol is available at http://www.profibus.com

Bus Communication

The PROFIBUS specification defines the technical characteristics of a serial field bus system that links distributed digital controllers on the network, from field level to cell level. PROFIBUS is a multi-master system that allows the joint operation of several automation, engineering or visualization systems with their distributed peripherals on one bus. PROFIBUS distinguishes between the following types of devices:

- **Master devices** determine the data communication on the bus. A master can send messages without an external request when it holds the bus access rights (the token). Masters are also called active stations.

- **Slave devices** include motion controllers, drives, I/O devices, valves, and transducers. Slaves do not have bus access rights and can only acknowledge received messages or send messages to the master when requested to do so. Slave devices are passive stations and require only small portions of the bus protocol.

The majority of PROFIBUS-DP applications are located at the field level. The field level typically includes slave devices such as the S2K motion controller station and host devices like PLC or PC control systems for the PROFIBUS-DP master station. Operator interfaces and DCS type systems usually operate at the cell level.

Data bandwidth Demands on PROFIBUS Communications Systems

	Amount of Data	Transmission Duration	Transmission Frequency
Management level	Mbytes	Hours/Minutes	Day/Shift
Cell level	Kbytes	Seconds	Hours/Minutes
Field Level	Bytes	Several 100 microseconds to 100 milliseconds	10 to 100 milliseconds
Actuator sensor level	Bits	Microseconds to milliseconds	Milliseconds

Network Topology

A PROFIBUS-DP network may have up to 127 stations (address 0-126), however address 126 is reserved for commissioning purposes. The bus system must be sub-divided into individual segments to handle this many participants. These segments are linked by repeaters. The function of a repeater is to condition the serial signal to allow connection of segments. In practice, both regenerating and non-regenerating repeaters may be used. Regenerating repeaters actually condition the signal to allow increased range of the bus. *Up to 32 stations are allowed per segment and the repeater counts as a station address.*

A specialized "link" segment consisting only of optical fiber modem repeaters may be used to span long distances. Plastic fiber optic segments are typically 50 meters or less while glass fiber, optic segments may extend several kilometers.

The user assigns a unique PROFIBUS station address to identify each master, slave, or repeater in the entire network. Each participant on the bus must have a unique station address.
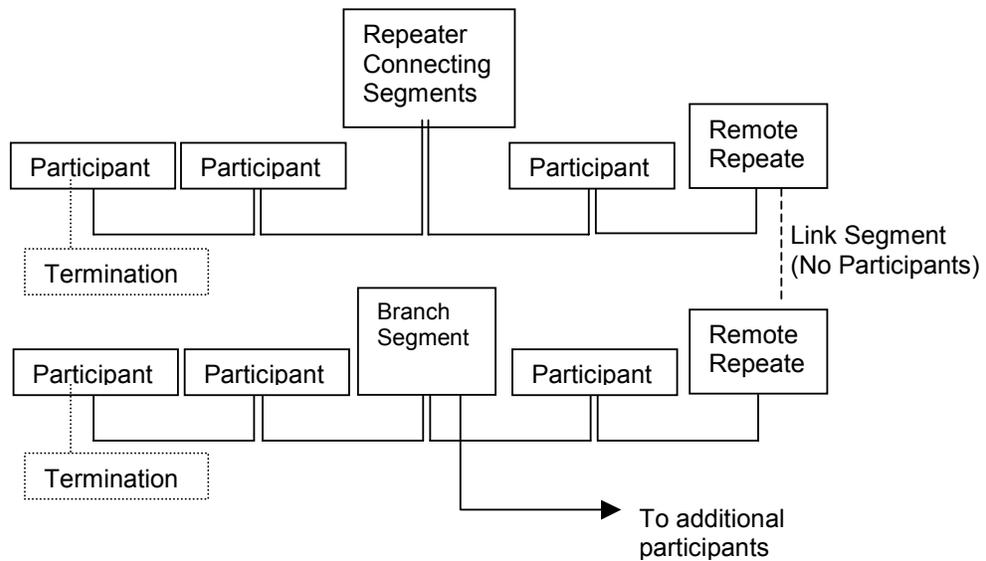
Figure 1-2. Repeaters and Bus Termination

Network Connectors

PROFIBUS connections are typically created with a 9-pin sub-D connector. Other connectors are used for IP67 devices. A minimum connection consists of a shielded twisted-pair cable (shield to pin 1 and twisted-pair wires to pins 3 and 8) with terminating connections in the appropriate bus plugs. The pin-to-signal conventions for a 9-pin sub-D connector are described below.

Pin-out Listing for the PROFIBUS Bus Plug Connector

Pin No.	Signal	Designation
1	Shield	Shield / Protective Ground
2	M24	Ground / Common of the 24V output voltage
3	RxD/TxD-P	Receive data / transmission data plus
4	CNTR-P	Control signal for repeaters (direction control)
5	DGND	Data transmission potential (ground to 5V)
6	VP	Supply voltage of the terminating resistance (+ 5V)
7	P24	Output voltage (+ 24V)
8	RxD/TxD-N	Receive data / transmission data negative
9	CNTR-N	Control signal for repeaters (direction control)

Note: For information on network segment length, network connectors and network termination, and network baud rate, refer to Chapter 2, "Installation."