Chapter 2 Functional Description

2.1 General Controller Utilities

2.1.1 CPU

The processor module PM511V contains the total amount of RAM (Random Access Memory), which is an 8 or 16 Mbyte dynamic RAM with error correction code. This memory holds the system program which is in use as well as the controller system configuration and application program, that is, all memory executed in run time. The processor module is built-up around a microprocessor, Motorola 68040, running at 25 MHz.

The module front contains the following functions:

- Indicators and a character display for high level system diagnostics.
- The main operable equipment is a four-position rotary switch for start and working mode selection and a restart push button.
- The module front also includes a program card interface and a connection for S100 I/O bus communication.
- You can connect a configuration and maintenance tool on the module front.

Redundant CPU

Optional Advant Controller 450 features redundant processor modules, each containing CPU, memory and switch over function. While the active unit is running the process control functions, the backup unit is on “hot stand-by” and continuously updated by an automatic check pointing procedure. A manually initiated switch-over can be accomplished. No special arrangements are required in the application programs. If a failure is detected in the active unit, it is halted, and the backup unit takes over totally bumpless. Status information is shown on the module front and also sent to AdvaCommand as system alarm.

2.1.2 Memory and Backup

System Program Backup

The system program is backed up in flash PROM and loaded to the RAM in connection to system start. Physically, the standard system program is stored in one program card (PCMCIA). The basic system program card must always be located in the CPU. Normally the program card should be in place during operation. The program card must be in place in order to start-up the backup CPU of a redundant pair. Additional program cards are located in program card interface MB510.

Application Program Backup

The controller system configuration and the application program is normally created in an off-line or sometimes an on-line configuration session supported by an engineering station. The work is basically backed up in the engineering station environment (hard disc, flexible disc or likely).

To restore a RAM which has been cleared by an accident or a fatal error some measures have to be taken, automatically and manually. In addition to the automatic loading of the system program, described above under the heading System Program Backup, somebody has to manually load the application program backup (including the controller system configuration) using an engineering station.

As an alternative, the Advant Controller 450 can be equipped with an optional flash card of similar type as the one used for the system program. The flash card is contained with a DUmp of Application Programs (DUAP) preferably taken while the controller is in the operation mode. At need, the controller system configuration and the application program is likewise automatically loaded from its flash card into the controller RAM. No manual intervention is needed to get into operation after the interruption.

Flash cards are available in different memory-sizes (2, 4 or 10 Mbytes). Select a type that takes the actual application program.

The system program backup and the application program backup can not be mixed in one single program card.

Memory Backup Power Supply

The RAM is secured against loss of power for a minimum of four hours (two hours when redundant processor modules are used) by a backup power supply and battery. This is important for the configured application program, which is basically not otherwise backed up.
If a longer backup time is desirable, you can use:

- Additional backup power supply unit SB510 and battery package (doubled backup time)
- Alternative backup power supply unit SB511 connected to a 24 V or 48 V external battery system
- An application program backup (see heading above).

2.1.3 System Clock, External Clock Synchronization

The processor module PM511V is provided with a calendar clock which is backed up by the same battery used for memory backup. You can set the date and time from the programming unit or from a local operator station, for example, MasterView 320. A slow, smaller adjustment in the interval ±100 s can also be performed with the programming unit. With Advant Controller 450 connected to MasterNet, as a part in a distributed control system, the synchronization occurs automatically with other stations via a network with an accuracy faster than 3 ms.

If extreme synchronization accuracy is required between controllers (in the order of 2 ms) and synchronization to an external clock, an external minute pulse signal can be connected to all systems concerned. The supervision module TC520 has a special input for external synchronization of the calendar clock.

Chapter 4 Hardware Components

4.1 Processor Module

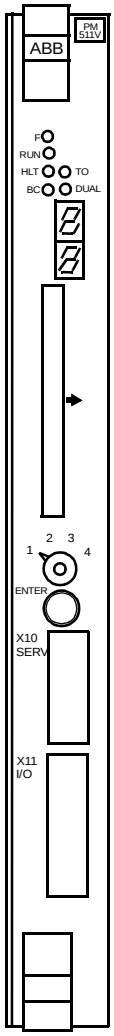


Figure 4-1. Front View of the Processor Module PM511V

The processor module, PM511V, has the following characteristics:

- It contains a Motorola MC68040 processor with dynamic read/write memory (RAM) with ECC (Error Correction Circuit). The memory houses the system software as well as the user built application and is not expandable.
- One port dedicated to connection of Advant Station 140.
- One port dedicated to connection of the S100 I/O bus extension.
- One dedicated slot for the program card.
- Two PM511V can be used in a redundant, hot stand-by, configuration. The redundant processor modules communicate via a built-in redundant control link.
- Two PM511V can be used for controlling a redundant S100 I/O bus extension.

The processor module exists in two versions which have the same type designation on the front, PM511V, and can be separated by the label on the component side of the module.

- PM511V08 with 8 Mbyte read/write memory (RAM)
- PM511V16 with 16 Mbyte read/write memory (RAM).

PM511V08 is upgradable to PM511V16 with a special kit containing 16 Mbyte RAM.

Redundant Processor Modules

If a failure is detected in the active unit, it is halted, and the backup unit takes over in less than 25 ms, totally bumpless. The two processor modules in a redundant configuration must have the same RAM-size.

4.2 Program Card

The controller system software is stored on a flash memory card of type PCMCIA.
This card is located in a slot on the CPU PM511V. It is accessed during start-up of the controller and supervised in run-time.

4.3 Submodule Carriers

The purpose of the submodule carrier is to carry communication interfaces and other submodules. There are two different submodule carriers available for Advant Controller 450. The submodule carriers fit into the subrack of Advant Controller 450. The submodule carriers have the following characteristics.

SC510 has two slots for submodules and no built-in processor. It can house all kinds of submodules.

SC520 has two slots for submodules and a built-in processor. It is primarily dedicated for CS513 when used for MasterBus 300 or MasterBus 300E. Empty slots, not used for CS513 can be used for other submodules.

8.6.1 General Requirements

Table 8-1. General and Normative Requirements

Description	Consists of	Article No.
CE-marking, Cabinet Mounted Delivery.	- EC Declaration of Conformity - CE mark - Mains Filter	3BSE019968R1
CE-marking, Loose Part Delivery.	- Conditional EC Declaration of Conformity	3BSE019969R1
Assembly and test of subracks		3BSE016033R1

8.6.2 System Units

Table 8-2. System Units

Description	Consists of	Article No.
System unit to fit in RM500 cabinet with single 5 V regulator, and basic program QC07-BAS41, version 4.0 (no license included).	RF533 SR511 TC520 RC527 RA102 QC07-BAS41	3BSE020007R1

Table 8-3. Redundant Central Unit

Description	Consists of	Article No.
Processor module with 8 Mbyte RAM	PM511V08	3BSE011180R1
Processor module with 16 Mbyte RAM	PM511V16	3BSE011181R1

Table 8-4. Redundant 5V Regulator

Description	Consists of	Article No.
Regulator 24 V/5 V, 35 A	SR511	3BSE000863R1