ALU 150
Central Processing Unit
Module Description

DOK-248802.23-0699 [1)]

The ALU 150 is the processor and must be inserted in the A350 and A500 primary subracks.

1) No Ordering code. This module description is only available as a part of the user manual.

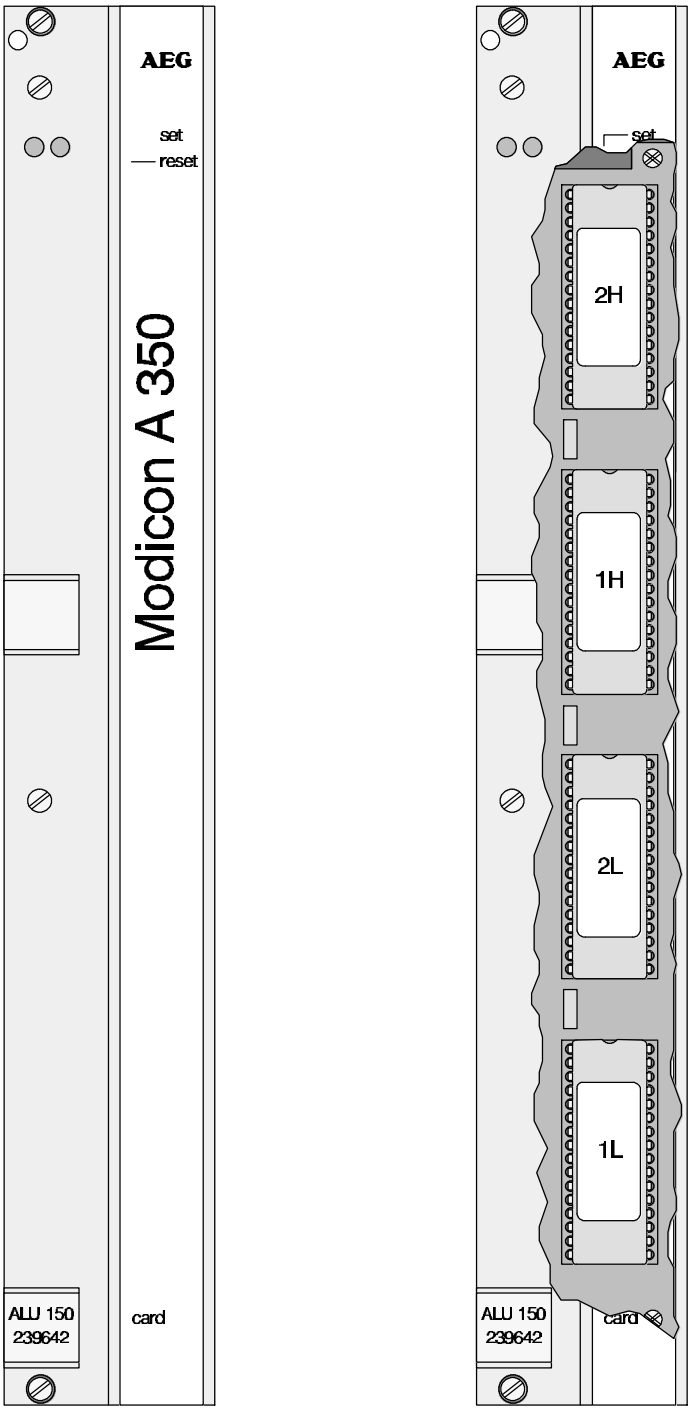
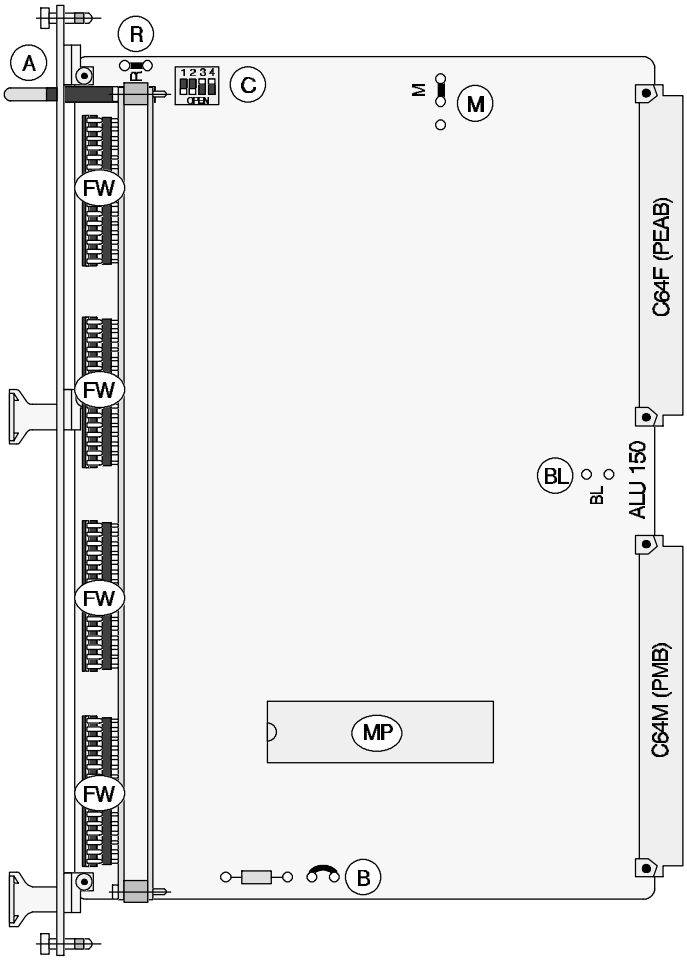


Figure 1 Front view of ALU 150



A: Contact Sockets set/reset (see 2)
B: Wire Jumper separated when MAT 827 is inserted
BL: Battery Charging Connection, (see 3.3)
C: DIP Switch for Baudrate (see 3.2)
FW: EPROMs with Basic Software (see 3.1)
M: Jumper for Determining the Starting Behavior (Automatic Start ↔ Manual Start)
MP: Microprocessor
R: Reset jumper for program break (see 2)

The jumpers shown are as delivered. All further jumpers, soldering points and contact combs not shown are necessary for inspection adjustments in the factory; therefore no change may be made to these.

Figure 2 Survey of Configuration Elements ALU 150

1 General

The ALU 150 is the processor and must be inserted in the A350 and A500 primary sub-racks. Its plug location is fixed and details are give in the description of the respective module carrier.

1.1 Physical Characteristics

The module has double European format with 8T width and PMB and PEAB contact. Its essential component parts are:

- Microprocessor 8086, expansion capability for the arithmetic processor MAT 827
- 512 Kbyte memory (EPROM) for basic software, inserted in a DIP socket
- 32 Kbyte memory (CMOS-RAM) for signal and program memory
- Jumpers, contact sockets and DIP switches for start behavior, baudrate etc. ...

In addition it contains the adaptive control for the parallel I/O bus (PEAB), the memory bus control as well as a RS 232C-interface whose signals are brought out via the SCU.

1.2 Mode of Function

The processor fulfills the following tasks:

- Production of the internal processing pulse
- Organization of the internal data transfer on the PEAB between all units
- Organization of the internal data transfer on the PMB between the memory modules
- Reading the process input signals into the signal memory
- Executing the user program
- Storing the occurring intermediate results (markers) in the signal memory
- Output of the process output signals from the memory
- Operating the serial interface for program transmissions
- Storing and evaluating the monitoring signals for temperature, supply, control loop, program circulation and memory contents (parity error).

2 Operation and Display

The module contains 2 contact sockets for the following functions:

- Socket ”set” — Bit 0 of the status word, serves to define the starting behavior after a voltage failure, providing the M jumper of an automatic start is enabled. The status word is queried with a read command.
  - Inserted: Initial start, i.e. start at the program beginning
  - Not inserted: Restart, i.e. continuation of the program at the interrupt point
- Socket ”reset” — Reset socket for program break (if the contact pin is inserted and the internal jumper R is closed).

Warning The program break attainable using the reset socket (by plugging in) does not guarantee that the program will stop as commanded with data being saved as in the program interrupt after an undervoltage warning. This facility may not be used in regular system operation (therefore the jumper R should be open in normal operation).

3 Configuration

The following are to be configured for the module:

- Battery charging connection
- Baudrate (status word)
- Type of program start
- Operation without/with additional processor MAT 827
- Relaying for desired functions (A3 formula)
- Reset permitted/not permitted

3.1 Basic Software

The basic software of the A350/A500 is distributed on four EPROMs in the ALU 150 (see item FW in Figure 2), which are accessible from the front after unscrewing the front plate (4 screws to be loosened, 2 of which are covered by the handles). The name plate with the version number of the basic software used is fixed to the lower handle of the module.

Caution When taken over completed A500 programs care must be taken that the distribution of the memory address space for the ALU 150 does not deviate from that valid for the ALU 821 diagram. Detailed data on this can be found in the user manual in the chapter ”Adressing the Memory” resp. ”Memory Allocation”.

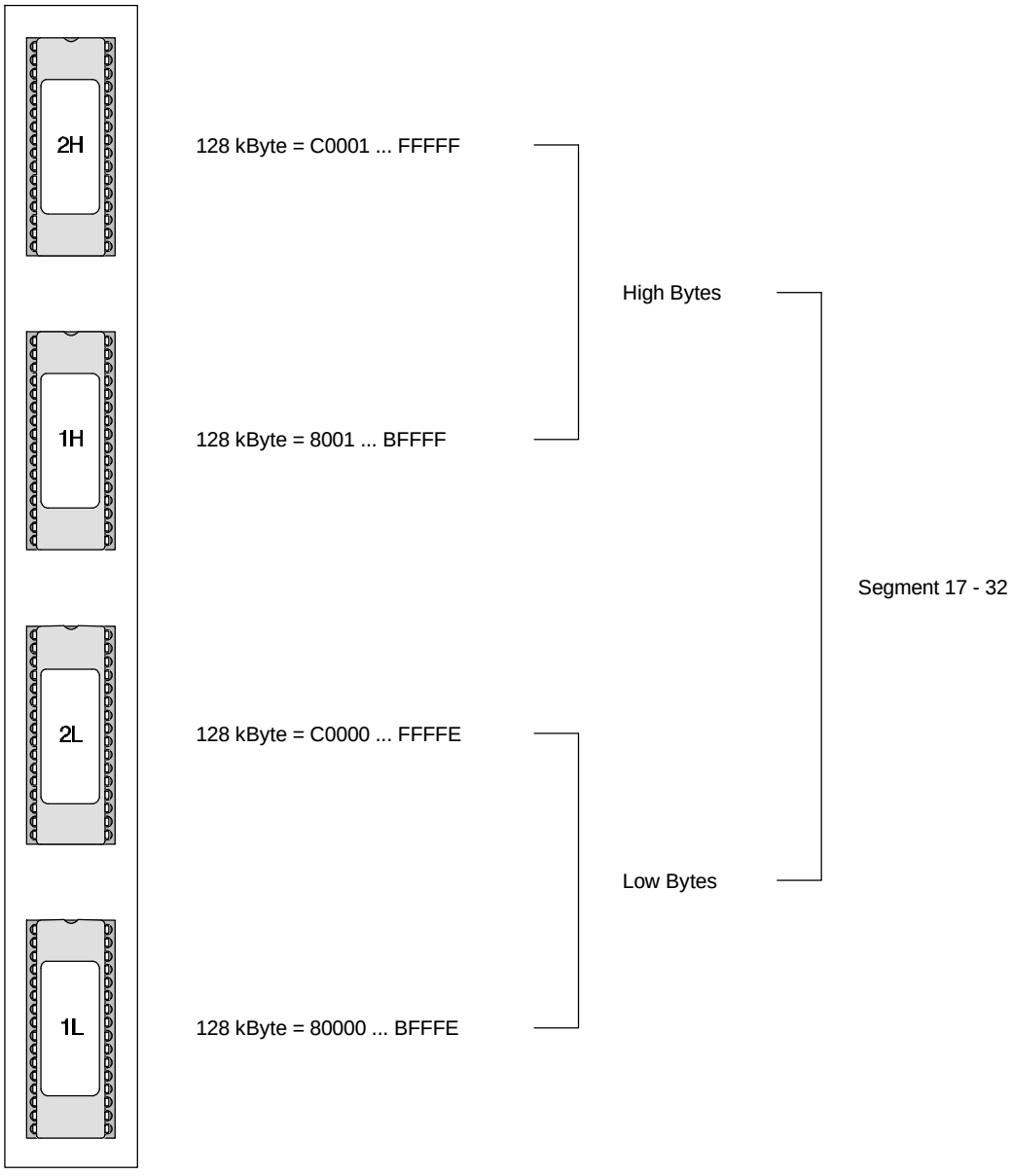


Figure 3 Arrangement of the EPROMs on the ALU 150 (Front View after Removing the Front Panel)

3.2 Baudrate

With the DIP switches 1-3 (pos. C in Figure 2) the baudrate is given, however, it is only then evaluated when the SCU 150 or UKA 024 is defective or if no baudrate is set. The switch coding is drawn from the following table.

Table 1 DIP-Switch Coding

Baudrate	DIP Switch 1	2	3	4
110	0	0	0	x
300	1	0	0	x
1 200	0	1	0	x
2 400	1	1	0	x
9 600	0	0	1	x
19 200	1	0	1	x

”0” = Switch Position OFF
”1” = Switch Position ON
”x” = Switch Position OFF,
Switch Position ON,
No other codings are permitted.

Warning When using front connection modules the switch position of the DIP switch 4 (x) must accord with the position of the DIP switch B1 on the SCU 150 or the jumper B1 on the UKA 024. Otherwise the function of the jumper B1 is not guaranteed.

3.3 Battery Charging Connection and Monitoring

The jumper BL is only necessary, when the ALU 150 is used in the A500. It enables a charging current which is designed for one 3-cell NiCd battery 1.8 Ah.

- When using the A350, the jumper ”BL” has always to be open
- When using the A500, the jumper ”BL” is necessary, if a NiCd battery integrated in the primary subrack is to be charged.

BL ○ ○ The battery charging current is interrupted.
○▬○ The battery charging current is enabled. The battery integrated in the primary subrack of the A500 is charged.

A battery low voltage warning (when operating in the A350 battery low voltage warning) is distributed with valency 1 in the marker 23 and/or 33.

3.4 Starting Behavior of the Controller

With the aid of the jumper M, contact pin ”set” and in combination with the UKA 024 or SCU 150 the starting behavior of the controller may be defined after a voltage failure. For more information on configuration see chapter ”Startup Characteristics” in the user manual.

3.5 Documentation

An A3 form sheet with explanations is available for the system documentation, showing which type and E-No. is set for the software used as well as the operating conditions of jumpers and switches. These form sheets are:

- part of the form pad intended for conventional processing (see ordering details)
- part of the Ruplan processing database (under development) and intended for Ruplan processing (technical sales office version)

4 Specifications

4.1 Allocation

Devices	A350, A500
Structure	Designated slot in the primary subrack (see module description of the subrack)

4.2 Supply Interface

Internal		
UB 5	+5 V/1.4 A typical	(2.5 A max)
UB 12	+12 V/0.1 A typical	(0.15 A max)
UB -12	-12 V/10 mA typical	(15 mA max)
Reference Potential	0 V	

4.3 Data Interface

PEAB	Parallel in-/output bus
PMB	Parallel microprocessor bus, driver design for max. 12 PMB subscribers
RS 232C / V.28	Serial interface according to DIN 66 020, non-isolated connection via SCU 150 on A350 or UKA 024 on A500

4.4 Processor Type

8086	Microporcessor (16 bit) for logic and arithmetic
8087	Expansion of the module by adaptation of the additional board MAT 827 for processing numerical-mathematical problems

4.5 Memory Capacity

RAM	Signal RAM and system RAM, 32 Kbyte (16 x 16K / 1 bit, type 6167), of which 2 Kbytes can be addressed bit by bit,
EPROM	4 x 128K x 8 bit (INTEL 27C1000) = 512 Kbytes, occupied by system basic software (console functions, I/O routines, operating functions, Dolog B blocks etc.) can be fitted in parts in 2 x 128 Kbyte

4.6 Physical Characteristics

Module	Double European format
Format	6/8T
Mass (weight)	520 g

4.7 Type of Connection

PEAB, PMB	2 x plug-in connectors C64M according to DIN 41 612

4.8 Environmental Conditions

System Data	see chapter 4 in user manual A350 resp. A500
Stray Power Dissipation	$\underline{<}$8 Watt typical

4.9 Ordering Details

Module ALU 150	424 239 642 (with German basic software)
Module ALU 150 EN	424 239 667 (with English basic software)
Module MAT 827	424 203 633
A3 form pad A350	A91M.12-234 785
A3 form pad A500	A91M.12-234 720

Specifications subject to change without notice.

Schneider Automation GmbH
Steinheimer Str. 117
D - 63500 Seligenstadt
Tel.: (49) 61 82 81-0
Fax: (49) 61 82 81-33 06

Schneider Automation, Inc.
One High Street
North Andover, MA 01845, USA
Tel.: (1) 978 794 0800
Fax: (1) 978 975 9010

Schneider Automation S. A.
245, route des Lucioles - BP 147
F-06903 Sophia-Antipolis
Tel.: (33) 4 92 96 20 00
Fax: (33) 4 93 65 37 15