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# VMU-M EM

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## COMMUNICATION PROTOCOL **DEVELOPERS**

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## Description of the VMU-M EM

Product Name	R&D Project Name	Firmware Code	Gavazzi's Code	Last Firmware Version	Last Firmware Release
VMUM4AS1T2EM	VMU-M EM	5110323	Value=88d (58h)	A3	A3

### 1.1 Short description of the modules

Maximum total number of modules: 5 (with master module).  
Sub-address of the module: depend by the position from 0 to 4.

Possible configurations are following:

#### 1.1.1 VMU-M EM

Product Name	R&D Project Name	Short Description	Sub-address	Modules present	Module code
VMUM4AS1T2EM	VMU-M EM	Master module	always in position 0	Only 1	21h
VMUP2TIWXSEM	VMU-P (120mV)	Process signal module	in any position - starting from 1	Only 1	23h
VMUP2TCWXSEM	VMU-P (20mA)	Process signal module	in any position - starting from 1	Only 1	28h
VMUOXI2R2EM	VMU-O (I2R2)	I/O module	in any position - starting from 1	maximum 3	24h

### 1.2 Table of instantaneous variables

VMU-M EM is a concentrator equipment that can read information from maximum 4 sub-slave devices. The device that is connected on the VMU-M EM local bus uses a sub-address that depends by its position. The device closed to VMU-M EM has sub-address 1. VMU-M EM has always sub-address 0.

The instantaneous variables are organized in 5 areas of 8 words each. Each area corresponds to a module. The first word of the area indicates the type of module, the others words have different structure in function of the module (see Table 1.2-2).

Table 1.2-1- Instantaneous variables: read only mode with functions code 03 and 04

	Description	Modicom address	Physical address	Length (words)	Firmware
Module sub-address=0 (it is always the VMU-M)	Module code	30769	0300h	1	A0
	Module status	30770	0301h	1	A0
	Word 1	30771	0302h	1	A0
	Word 2	30772	0303h	1	A0
	Word 3	30773	0304h	1	A0
	Word 4	30774	0305h	1	A0
	Word 5	30775	0306h	1	A0
Module sub-address=1	Module code	30777	0308h	1	A0
	Module status	30778	0309h	1	A0
	Word 1	30779	030Ah	1	A0
	Word 2	30780	030Bh	1	A0
	Word 3	30781	030Ch	1	A0
	Word 4	30782	030Dh	1	A0
	Word 5	30783	030Eh	1	A0
Module sub-address=2	Module code	30785	0310h	1	A0
	Module status	30786	0311h	1	A0
	Word 1	30787	0312h	1	A0
	Word 2	30788	0313h	1	A0
	Word 3	30789	0314h	1	A0
	Word 4	30790	0315h	1	A0
	Word 5	30791	0316h	1	A0
Module sub-address=3	Module code	30793	0318h	1	A0
	Module status	30794	0319h	1	A0
	Word 1	30795	031Ah	1	A0
	Word 2	30796	031Bh	1	A0
	Word 3	30797	031Ch	1	A0

	Word 4	30798	031Dh	1	A0
	Word 5	30799	031Eh	1	A0
	Word 6	30800	031Fh	1	A0
	Module code	<b>30801</b>	<b>0320h</b>	1	A0
	Module status	30802	0321h	1	A0
	Word 1	30803	0322h	1	A0
Module sub-address=4	Word 2	30804	0323h	1	A0
	Word 3	30805	0324h	1	A0
	Word 4	30806	0325h	1	A0
	Word 5	30807	0326h	1	A0
	Word 6	30808	0327h	1	A0

Table 1.2-2 - Organisation of the instantaneous variable vs. module type

Module Type	Description	Address	Length (words)	Data Format	Notes	Firmware
VMU-M	Module code	Base+0h	1	UINT16	(*)21h=VMU-M	A0
	Module VMU-M status	Base+1h	1	UINT16	See table 1.2-3	A0
	Temperature channel 1	Base+2h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Temperature channel 2	Base+3h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Not used	Base+4h	1	INT16		A0
	Digital input ch.1	Base+5h	1	INT16	1(OFF)=ch1 open, 0(ON)=ch1 close	A0
	AC energy value	Base+6h	2	INT32	(***)0.0 to 99999.9 kWh	A0
VMU-P	Module code	Base+0h	1	UINT16	(*)23h=VMU-P (mV) or 28h=VMU-P (mA)	A0
	Module VMU-P status	Base+1h	1	UINT16	See table 1.2-3	A0
	Temperature channel 1	Base+2h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Temperature channel 2	Base+3h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Analogue input	Base+4h	1	INT16	(**)0.0 to 9.999 kW/m <sup>2</sup> or kW/ft <sup>2</sup>	A0
	Pulse rate input	Base+5h	1	INT16	(**)0.0 to 299.9 m/s or f/s	A0
VMU-O (I2R2)	Module code	Base+0h	1	UINT16	(*)24h=VMU-O	A0
	Module VMU-O status	Base+1h	1	UINT16	See table 1.2-3	A0
	Input status: "IN1"	Base+2h	1	UINT16	1(OFF)=open, 0(ON)=close	A0
	Input status: "IN2"	Base+3h	1	UINT16	1(OFF)=open, 0(ON)=close	A0
	Output status: "OUT1"	Base+4h	1	UINT16	0(OFF)=deactivate, 1(ON)=activate	A0
	Output status: "OUT2"	Base+5h	1	UINT16	0(OFF)=deactivate, 1(ON)=activate	A0

(\*) If the value is 0, the module is not present.

(\*\*) If the value is equal to 7FFFh (32767), the measurement is not enabled (not present).

(\*\*) If the value is equal to 7FFEh (32766), the measurement is in over-range condition.

(\*\*) If the value is equal to 7FDh (32765), the measurement is in under-range condition.

(\*\*\*) If the value is equal to 7FFF7FFFh (2147450879), the measurement is not enabled (not present).

Table 1.2-3 - Module status representation

Module Type	Module status word	Description	Flags group physical alarm	Notes	Firmware
VMU-M	Bit0	Error status: local bus is not ok	M1	Bit=0 no error, Bit=1 error	A0
	Bit1	Error status: module configuration is changed	M1	Bit=0 no error, Bit=1 error	A0
	Bit2	Programming parameters are incoherent	M1	Bit=0 par. ok; Bit=1 par. error	A0
	Bit3	Error status: short circuit on probe channel 1	M2	Bit=0 not short, Bit=1 short	A0
	Bit4	Error status: open circuit on probe channel 1	M2	Bit=0 not open, Bit=1 open	A0
	Bit5	Error status: short circuit on probe channel 2	M2	Bit=0 not short, Bit=1 short	A0
	Bit6	Error status: open circuit on probe channel 2	M2	Bit=0 not open, Bit=1 open	A0
	Bit7	Alarm status: temperature channel 1		Bit=0 no alarm, Bit=1 alarm	A0
	Bit8	Alarm status: temperature channel 2		Bit=0 no alarm, Bit=1 alarm	A0
	Bit9	Not used			A0
	Bit10	Error status: there are 2 or more module VMU-P connected	M1	Bit=0 no error, Bit=1 error	A0
	Bit11	Error status: there are 1 or more incompatible modules	M1	Bit=0 no error, Bit=1 error	A0
	Bit12	Not used			A0
VMU-P	Bit0	Programming parameters are incoherent	P1	Bit=0 par. ok; Bit=1 par. error	A0
	Bit1	Error status: short circuit on probe channel 1	P2	Bit=0 not short, Bit=1 short	A0
	Bit2	Error status: open circuit on probe channel 1	P2	Bit=0 not open, Bit=1 open	A0
	Bit3	Error status: short circuit on probe channel 2	P2	Bit=0 not short, Bit=1 short	A0
	Bit4	Error status: open circuit on probe channel 2	P2	Bit=0 not open, Bit=1 open	A0
	Bit5	Error status: high temperature inside module		Bit=0 normal, Bit=1 high temperature	A0
	Bit6	Alarm status: temperature channel 1		Bit=0 no alarm, Bit=1 alarm	A0
	Bit7	Alarm status: temperature channel 2		Bit=0 no alarm, Bit=1 alarm	A0
	Bit8	Alarm status: analogue input		Bit=0 no alarm, Bit=1 alarm	A0
	Bit9	Alarm status: pulse rate input		Bit=0 no alarm, Bit=1 alarm	A0
Bit10	Virtual		Bit=0 real module, Bit=1 virtual module (*)	A0	
VMU-O (I2R2)	Bit0	Programming parameters are incoherent	01	Bit=0 par. ok; Bit=1 par. error	A0
	Bit1	Error status: high temperature inside module		Bit=0 normal, Bit=1 high temperature	A0
	Bit2	Virtual		Bit=0 real module, Bit=1 virtual module (*)	A0

(\*)If the module is available in the system, it is called “Real Module”. If the module is programmed but unavailable, it is called “Virtual Module”.

## 1.3 Table of programming parameters

Table 1.3-1 – Programming parameter: read and write mode organisation for VMU-M module

Modicon address	HEX Physical address	Description	Data Format	Notes	Firmware
30081	0050h	Password	UINT16	0 ... 9999	A0
30082	0051h	Digital Input Type (valid for ch1 and ch2)	UINT16	0=Digital; 1=Temperature Ch1 + Ch2 2=Temperature Ch1 + none 3= none + Temperature Ch2 4=none + none	A0
30083	0052h	Digital Input 2 prescaler	INT16	1 ... 10000 Wh/pulse	A0
30084	0053h	Temperature Engineering unit	UINT16	0=Celsius; 1=Fahrenheit	A0
30085	0054h	Temperature Probe	UINT16	0=Pt100 3W; 1= Pt100 2W; 2=Pt1000 3W; 3=Pt1000 2W	A0
30096	005Fh	Data base enabling	UINT16	NO=0; YES =1	A0
30097	0060h	Data logger Time interval	UINT16	0=1min; 1=5min; 2=10min; 3=15min; 4=30min; 5=60 min	A0
30098	0061h	Data Event logger Enabling	UINT16	NO=0; YES =1	A0
30099	0062h	(**) RS485 Address	UINT16	1 ... 247	A0
30100	0063h	(**) RS485 BaudRate	UINT16	0=9600; 1=19200; 2=38400; 3=115200	A0
30101	0064h	(**) RS485 Parity	UINT16	0=none; 1=odd; 2=even	A0
30102	0065h	Clock Time format	UINT16	0=24h/12h ; 1=AM-PM	A0
30103	0066h	Clock Daylight-saving:	UINT16	NO=0; YES =1	A0
30104	0067h	(*) Clock Calendar: Year	UINT16	2008 ... 2050	A0
30105	0068h	(*) Clock Calendar: Month	UINT16	1 ... 12	A0
30106	0069h	(*) Clock Calendar: Day	UINT16	1 ... 31	A0
30107	006Ah	(*) Clock Time: hour	UINT16	0 ...23	A0
30108	006Bh	(*) Clock Time: minutes	UINT16	0 ...59	A0
30109	006Ch	(*) Clock Time: seconds	UINT16	0 ... 59	A0
30110	006Dh	Temperature channel 1: Alarm link	UINT16	See “Alarm link codes” , Table 1.3-4	A0
30111	006Eh	Temperature channel 1: Set point 1	INT16	-60.0 ... 400.0 °C or °F	A0
30112	006Fh	Temperature channel 1: Set point 2	INT16	-60.0 ... 400.0 °C or °F	A0
30113	0070h	Temperature channel 1: Delay	UINT16	0 ... 3600 sec	A0
30114	0071h	Temperature channel 2: Alarm link	UINT16	See “Alarm link codes” , Table 1.3-4	A0
30115	0072h	Temperature channel 2: Set point 1	INT16	-60.0 ... 400.0 °C or °F	A0
30116	0073h	Temperature channel 2: Set point 2	INT16	-60.0 ... 400.0 °C or °F	A0
30117	0074h	Temperature channel 2: Delay	UINT16	0 ... 3600 sec	A0
30122	0079h	Daylight Saving Month to increase hour (+1H)	UINT16	1 ... 12 month	A0
30123	007Ah	Daylight Saving Number of Sunday to increase hour (+1H)	UINT16	0 ... 4 (if 0 is last Sunday on month)	A0
30124	007Bh	Daylight Saving Hour to increase hour (+1H)	UINT16	0 ... 23 (only in 24h format)	A0
30125	007Ch	Daylight Saving Month to decrease hour (-1H)	UINT16	1 ... 12 month	A0
30126	007Dh	Daylight Saving Number of Sunday to decrease hour (-1H)	UINT16	0 ... 4 (if 0 is last Sunday on month)	A0
30127	007Eh	Daylight Saving Hour to decrease hour (-1H)	UINT16	0 ... 23 (only in 24h format)	A0
30131	0082h	M1(LSB) and M2 (MSB) flags group physical alarm	UINT16	See “Alarm link codes” , Table 1.3-4	A0
30134	0085h	(**) 1 <sup>st</sup> Reserved word	UINT16	TBD	A0
30135	0086h	(**) 2 <sup>nd</sup> Reserved word	UINT16	TBD	A0
30136	0087h	(**) 3 <sup>rd</sup> Reserved word	UINT16	TBD	A0
30137	0088h	(**) 4 <sup>th</sup> Reserved word	UINT16	TBD	A0
From 30257 to 30273	From 0100h to 011Fh	Programming parameter area for module with sub-address=1			A0
From 30289 to 30320	From 0120h to 013Fh	Programming parameter area for module with sub-address=2			A0
From 30321 to 30352	From 0140h to 015Fh	Programming parameter area for module with sub-address=3			A0
From 30353 to 30192	From 0160h to 00BFh	Programming parameter area for module with sub-address=4			A0

(\*) Values are update only when the command “update clock” is sent.

(\*\*) Values are update only when the command “update serial communication setting” is sent or switch off and on the instrument.

(\*\*\*) These parameters are used only by software management tool. VMU only stores the values

Table 1.3-2 - Programming parameter: organisation for VMU-P module (mV & mA versions)

Modicon address	HEX Physical address	Description	Data Format	Notes	Firmware
Base + 0	Base + 0h	Type of module	UINT16	23h=VMU-P(mV) or 28h=VMU-P(mA)	A0
Base + 1	Base + 1h	Temperature Engineering unit: °C/°F	UINT16	0=Celsius; 1=Fahrenheit	A0
Base + 2	Base + 2h	Temperature Probe P	UINT16	0=Pt100 3W; 1= Pt100 2W; 2=Pt1000 3W; 3=Pt1000 2W	A0
Base + 4	Base + 4h	Analogue input: Electrical scale LOW	INT16	0.0 ... 999.9 mV / 0.0 ... 99.99 mA	A0
Base + 5	Base + 5h	Analogue input: Electrical scale HIGH	INT16	0.0 ... 999.9 mV / 0.0 ... 99.99 mA	A0
Base + 6	Base + 6h	Analogue input: input Display scale LOW	INT16	0.000 ... 9.999	A0
Base + 7	Base + 7h	Analogue input: input Display scale HIGH	INT16	0.000 ... 9.999	A0
Base + 8	Base + 8h	Pulse rate signal input	INT16	0.0 ... 999.9 Hz	A0
Base + 9	Base + 9h	Pulse rate scale input	INT16	0.1 ... 299.9	A0
Base + 10	Base + Ah	Temperature channel 1: Alarm link	UINT16	See "Alarm link codes", Table 1.3-4	A0
Base + 11	Base + Bh	Temperature channel 1: Set point 1	INT16	-60.0 ... 400.0 °C or °F	A0
Base + 12	Base + Ch	Temperature channel 1: Set point 2	INT16	-60.0 ... 400.0 °C or °F	A0
Base + 13	Base + Dh	Temperature channel 1: Delay	UINT16	0 ... 3600 sec	A0
Base + 14	Base + Eh	Temperature channel 2: Alarm link	INT16	See "Alarm link codes", Table 1.3-4	A0
Base + 15	Base + Fh	Temperature channel 2: Set point 1	INT16	-60.0 ... 400.0 °C or °F	A0
Base + 16	Base + 10h	Temperature channel 2: Set point 2	INT16	-60.0 ... 400.0 °C or °F	A0
Base + 17	Base + 11h	Temperature channel 2: Delay	UINT16	0 ... 3600 sec	A0
Base + 18	Base + 12h	Analogue input: Alarm link	UINT16	See "Alarm link codes", Table 1.3-4	A0
Base + 19	Base + 13h	Analogue input: Set point 1	INT16	0.0 to 9.999	A0
Base + 20	Base + 14h	Analogue input: Set point 2	INT16	0.0 to 9.999	A0
Base + 21	Base + 15h	Analogue input: Delay	UINT16	0 ... 3600 sec	A0
Base + 22	Base + 16h	Pulse rate: Alarm link	UINT16	See "Alarm link codes", Table 1.3-4	A0
Base + 23	Base + 17h	Pulse rate: Set point 1	INT16	0.0 ... 299.9	A0
Base + 24	Base + 18h	Pulse rate: Set point 2	INT16	0.0 ... 299.9	A0
Base + 25	Base + 19h	Pulse rate: Delay	UINT16	0 ... 3600 sec	A0
Base + 26	Base + 1Ah	P1 (LSB) and P2 (MSB) flags group physical alarm	UINT16	See "Alarm link codes", Table 1.3-4	A0
Base + 27	Base + 1Bh	Number of Probes	UINT16	0= none + none 1= Temperature Ch1 + none 2=none + Temperature Ch2 3=Temperature Ch1 + Ch2	A0

Table 1.3-3 - Programming parameter: organisation for VMU-O (I2R2) module

Modicon address	HEX Physical address	Description	Data Format	Notes	Firmware
Base + 0	Base + 0h	Type of module	UINT16	24h=VMU-O	A0
Base + 1	Base + 1h	Digital output channel 1: Enabling	UINT16	0=Remote; 1=Alarm; 2=Clock	A0
Base + 2	Base + 2h	Digital output channel 1: Output status	UINT16	0=NO; 1=NC (only if selected "Alarm" type)	A0
Base + 3	Base + 3h	Digital output channel 1: Time activation hour (LSB=range 1 and MSB = range 2)	UINT16	0 ... 5911	A0
Base + 4	Base + 4h	Digital output channel 1: Time activation minutes (LSB=range 1 and MSB = range 2)	UINT16	0 ... 15163	A0
Base + 5	Base + 5h	Digital output channel 1: Time deactivation hour (LSB= range 1 and MSB = range 2)	UINT16	0 ... 5911	A0
Base + 6	Base + 6h	Digital output channel 1: Time deactivation minutes (LSB = range 1 and MSB = range 2)	UINT16	0 ... 15163	A0
Base + 7	Base + 7h	Digital output channel 2: Enabling	UINT16	0=Remote; 1=Alarm; 2=Clock	A0
Base + 8	Base + 8h	Digital output channel 2: Output status	UINT16	0=NO; 1=NC (only if selected "Alarm" type)	A0
Base + 9	Base + 9h	Digital output channel 2: Time activation hour (LSB=range 1 and MSB = range 2)	UINT16	0 ... 5911	A0
Base + 10	Base + Ah	Digital output channel 2: Time activation: minutes (LSB = range 1 and MSB = range 2)	UINT16	0 ... 15163	A0
Base + 11	Base + Bh	Digital output channel 2: Time deactivation: hour (LSB = range 1 and MSB = range 2)	UINT16	0 ... 5911	A0
Base + 12	Base + Ch	Digital output channel 2: Time deactivation: minutes (LSB = range 1 and MSB = range 2)	UINT16	0 ... 15163	A0
Base + 13	Base + Dh	O1 flags group physical alarm	UINT16	See "Alarm link codes" ", Table 1.3-4	A0

Table 1.3-4 - Programming parameter: Alarm link codes

Word value	Link	Word value	Link	Word value	Link
0	No alarm	4	Module 2, ch.1	8	Module 4, ch.1
1	Virtual alarm	5	Module 2, ch.2	9	Module 4, ch.2
2	Module 1, ch.1	6	Module 3, ch.1		
3	Module 1, ch.2	7	Module 3, ch.2		

Note: Only for "flags group physical alarm" programming with "Virtual alarm" has no effect.



## 1.3.1 Application Note: How to program modules

If module is connected to the system, is called **Real Module**. If module is programmed but doesn't connect, is called **Virtual Module**.

If **Real Module** is connected, for protection, it's impossible change "Type of module" parameter at address *Base + 0h*. It's allowed re-write with the same type for maintain Modbus compatibility.

If there is **Virtual Module** connected or is **Empty Module**, it's possible change the "Type of module" but it's mandatory write module sub code (at address *Base + 0h*) before other parameters because when module change, the system re-init it.

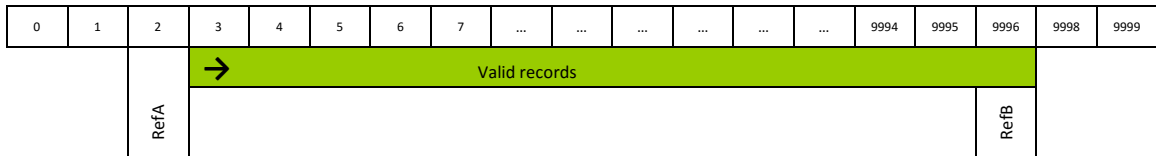
The system uses only **Real Module** in all calculation algorithm (such as energy, string control... and more).

If there is one or more **Virtual Module** the system generates "Error status: module configuration is changed" a flag which disables the database system (if it's active). It is possible to temporarily clear the former flag with the 3000h command.

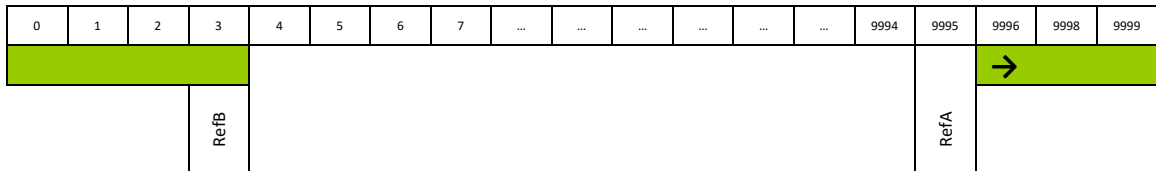
## 1.4 Table of "Data base" file

The "Data base" (also known as "DB") is a file with 10000 records (from index 0000 to 9999). The record is organised in 116 words as illustrated in table 1.4-2. The "data base" file is readable with Modbus function code 14h using file number 0. The "data base" has a circular management system and uses two reference record numbers to identify the first record available (RefA) and the last record stored (RefB). If RefB > RefA, the records valid are from RefA+1 to RefB, if RefA > RefB, the records valid are from RefA+1 to 9999 and from 0 to RefB.

RefB > RefA



Ref B < RefA



To read the "data base" file it is necessary to execute the following actions:

- 1) Read the reference of the first record available (RefA) and the reference of the last record stored (RefB) using Modbus function code 04h or 03h.
- 2) Read the valid records using Modbus function code 14h and sub-function code 06h. The identification file number for the data base is 0.
- 3) When all records are read, write the reference number RefA with the value of RefB (Modbus function code 06h). This action executes an equivalent reset function.

Table 1.4-1 - "Data base" file: reference record numbers

Modicon address	HEX Physical address	tDescription	Data Format	Notes	Firmware
30737	02E0h	"Data base" file: First record available (RefA)	INT16	0 ... 9999 (it is possible the write and read mode access)	A0
30738	02E1h	"Data base" file: Last record stored (RefB)	INT16	0 ... 9999 (it is possible only the read mode access)	A0

Table 1.4-2 - "Data base" file: record organisation

HEX Physical address	Description	Data Format	Notes	Firmware
Base+0h	Record index	INT16	0 ... 9999	A0
Base+1h	Date: Year and Month	INT16	Lsb=Month (1...12); MSB=Year (08...50)	A0
Base+2h	Date: Day and Hour	INT16	Lsb=Hour (0 ... 23); MSB=Day (01 ... 31)	A0



Base+3h	Date: Minute and Second	INT16	Lsb=Second (0 ... 59); Msb=Minute (0 ...59)	A0
From Base+004h to Base+00Ah	Record fields module with sub-address 0 (VMU-M)	7 word	See "organisation of the record field", table 1.4-3	A0
From Base+00Bh to Base+011h	Record fields module with sub-address 1	7 word		A0
From Base+012h to Base+018h	Record fields module with sub-address 2	7 word		A0
From Base+019h to Base+01Fh	Record fields module with sub-address 3	7 word		A0
From Base+020h to Base+026h	Record fields module with sub-address 4	7 word		A0

Table 1.4-3 – "Data base" file: organisation of the record field vs. module type

Module Type	Description	Address	Length (words)	Data Format	Notes	Firmware
VMU-M	Module code	Base+0h	1	UINT16	(*)21=VMU-M	A0
	Temperature channel 1	Base+1h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Temperature channel 2	Base+2h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Not used	Base+3h	1	INT16		A0
	AC energy value	Base+5h	2	INT32	(**)0.0 to 99999.9 kWh	A0
VMU-P	Module code	Base+0h	1	UINT16	(*)23h=VMU-P(mV) or 28h=VMU-P(mA)	A0
	Temperature channel 1	Base+1h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Temperature channel 2	Base+2h	1	INT16	(**)-60.0 to 400.0 (°C or °F)	A0
	Analogue input	Base+3h	1	INT16	(**)0.0 to 9.999	A0
	Pulse Rate input	Base+4h	1	INT16	(**)0.0 to 299.9	A0

(\*) If the value is 0, the module is not present.

(\*\*) If the value is equal to 7FFFh (32767), the measurement is not enabled (not present).

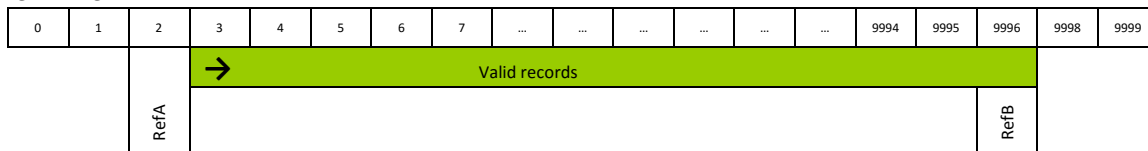
(\*\*) If the value is equal to 7FFEh (32766), the measurement is in over-range condition.

(\*\*) If the value is equal to 7FFDh (32765), the measurement is in under-range condition.

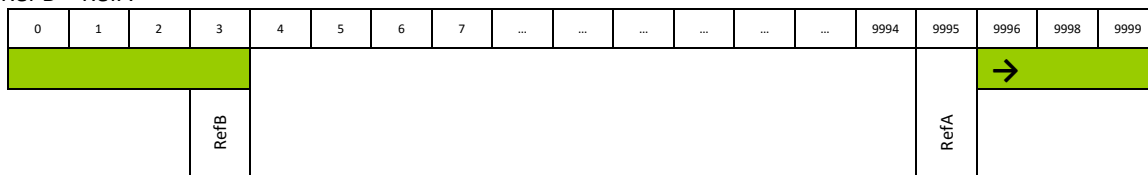
## Table of "Data event" file

The "Data event" (also known as "DE") is a file with 10000 records (from index 0000 to 9999). The record is organised in 11 words as illustrated in table 1.4-5. The "data event" file is readable with Modbus function code 14h using file number 1. The "data event" has a FIFO management system and uses two reference record numbers to identify the first record available (RefA) and the last record stored (RefB). If RefB > RefA, the records valid are from RefA+1 to RefB, if RefA > RefB, the records valid are from RefA+1 to 9999 and from 0 to RefB.

RefB > RefA



Ref B < RefA



To read the "data event" file it is necessary to execute the following actions:

- 4) Read the reference of the first record available (RefA) and the reference of the last record stored (RefB) using Modbus function code 04h or 03h.
- 5) Read the valid records using Modbus function code 14h and sub-function code 06h. The identification file number for the data base is 1.
- 6) When all records are read, write the reference number RefA with the value of RefB (Modbus function code 06h). This action executes an equivalent reset function.



Table 1.4-4 - "Data event" file: reference record numbers

Modicon address	HEX Physical address	Description	Data Format	Notes	Firmware
30739	02E2h	"Data event" file: First record available (RefA)	INT16	0 ... 9999 (it is possible the write and read mode access)	A0
30740	02E3h	"Data event" file: Last record stored (RefB)	INT16	0 ... 9999 (it is possible only the read mode access)	A0

Table 1.4-5 - "Data event" file: record organisation

HEX Physical address	Description	Data Format	Notes	Firmware
Base+0h	Record index	INT16	0 ... 9999	A0
Base+1h	Date: Year and Month	INT16	Lsb=Month (1...12); MSB=Year (08...50)	A0
Base+2h	Date: Day and Hour	INT16	Lsb=Hour (0 ... 23); MSB=Day (01 ... 31)	A0
Base+3h	Date: Minute and Second	INT16	Lsb=Second (0 ... 59); MSB=Minute (0 ...59)	A0
From Base+004h to Base+00Ah	Record fields	7 word	See "Data event record field", table 1.4-6	A0

Table 1.4-6 - "Data event" file: organisation of the record field vs. event type

Event Type	Description	Address	Length (words)	Data Format	Notes	Firmware
0=Alarm	Type of event	Base+4h	1	UINT16	See "Event type" on this table	A0
	Module sub-address code	Base+5h	1	UINT16	0 ...15	A0
	Type of variable	Base+6h	1	UINT16	See Table "Variable code", table 1.4-7	A0
	Variable value	Base+7h	1	INT16	Depend by the type of variable	A0
	Set point 1 value	Base+8h	1	INT16	Depend by the type of variable	A0
	Set point 2 value	Base+9h	1	INT16	Depend by the type of variable	A0
1=Digital input	Alarm link code	Base+Ah	1	UINT16	See "Alarm link codes" Table 1.3-4	A0
	Type of event	Base+4h	1	UINT16	See "Event type" on this table	A0
	Module sub-address code	Base+5h	1	UINT16	0 ...15	A0
	Number of channel input	Base+6h	1	UINT16	0=channel 1; 1=Channel 2;	A0
	Number of channel input	Base+6h	1	UINT16	0=channel 1; 1=Channel 2; 2 channel 3	A0
2=Digital output	New status	Base+7h	1	UINT16	1(OFF)=open, 0(ON)=close	A0
	Type of event	Base+4h	1	UINT16	See "Event type" on this table"	A0
	Module sub-address code	Base+5h	1	UINT16	0 ...15	A0
	Number of channel output	Base+6h	1	UINT16	0=channel 1; 1=Channel 2	A0
	Type of output	Base+7h	1	UINT16	0=Remote; 1=Alarm; 2=Clock	A0
3=Command	New status	Base+8h	1	UINT16	0(OFF)=deactivate, 1(ON) =activate	A0
	Type of event	Base+4h	1	UINT16	See "Event type" on this table"	A0
	Module sub-address code	Base+5h	1	UINT16	0 ...15	A0
	Type of command	Base+6h	1	UINT16	The value is the "physical address" of the command frame	A0
4=Error	Type of event	Base+4h	1	UINT16	See "Event type" on this table"	A0
	Module sub-address code	Base+5h	1	UINT16	0 ...15	A0
	Type of error	Base+6h	1	UINT16	See "Error type" on Table 1.4-8	A0
	New status	Base+7h	1	UINT16	0=activate; 1=deactivate	A0

Table 1.4-7- "Data event" file: variable code

Word value	Link	Firmware
0	VMU-M Temperature ch. 1	A0
1	VMU-M Temperature ch. 2	A0
7	VMU-P Temperature ch. 1	A0
8	VMU-P Temperature ch. 2	A0
9	VMU-P Analogue input	A0
10	VMU-P Pulse rate input	A0

Table 1.4-8 - "Data event" file: error type

Word value	Link	Firmware
0	Local bus in not ok	A0
1	Module configuration is changed	A0
2	Programming parameters are incoherent	A0
5	High temperature inside module	A0
6	Short circuit on probe channel 1	A0
7	Open circuit on probe channel 1	A0
8	Short circuit on probe channel 2	A0
9	Open circuit on probe channel 2	A0
10	Local access to programming mode	A0
11	Power off	A0

12	Power on	A0
13	There are 2 or more module VMU-P connected	A0
14	Module M parameters was stored	A0
15	One of Module's Parameters was stored	A0
16	There are 1 or more incompatible modules	A0

## 1.5 Table of commands

Table 1.5-1 - write only mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware
42289	3000h	1	Reset error "module configuration changed"	UINT 16	Value=1: command is executed; other values: no effect	A0
42290	3001h	1	Reset AC energy value	UINT 16		A0
42307	3012h	1	Reset Database	UINT 16		A0
42308	3013h	1	Reset Dataevent	UINT 16		A0
42369	3050h	1	Get clock values	UINT 16		A0
42370	3051h	1	Set clock values	UINT 16		A0
42371	3052h	1	(* Serial communication configuration updating	UINT 16		A0
42373	3054h	1	START AUTO UPDATED	UINT 16		A0
42417	3080h	1	Set clock values with hour and minute Without generate any events	UINT 16		A0
46385	4000h	1	Reset all Remote outputs	UINT 16	Value=1: command is executed; other values: no effect	A0
46386	4001h	1	Remote output command on VMU-O with sub-address=1	UINT 16	For VMU-O: Bit0: channel 1 (0= Output is open; 1= Output is close) Bit1: channel 2 (0= Output is open; 1= Output is close) Bit2: Command enable for Bit0 Bit3: Command enable for Bit1	A0
46387	4002h	1	Remote output command on VMU-O with sub-address=2	UINT 16		A0
46388	4003h	1	Remote output command on VMU-O with sub-address=3	UINT 16		A0
46389	4004h	1	Remote output command on VMU-O with sub-address=4	UINT 16		A0
46401	4010h	1	Set all Remote outputs	UINT 16	Value=1: command is executed; other values: no effect	A0

(\*) Wait at least 6 seconds before communicate with the new parameters

## 1.6 Table of firmware version and revision

Table 1.6-1 - MODBUS: read only mode with functions code 03 and 04

Module Sub-address	Modicom address	Physical address	Length (words)	Data Format	Notes	Firmware
0 (VMU-M)	31025	0400h	1	INT16	Byte msb: ASCII code for Version letter Byte lsb : numeric number for Revision If the value is FFFFh the module it is not present.	A0
1	31026	0401h	1	INT16		A0
2	31027	0402h	1	INT16		A0
3	31028	0403h	1	INT16		A0
4	31029	0404h	1	INT16		A0

## 1.7 Table of Carlo Gavazzi Controls identification code

Table 1.7-1 – Carlo Gavazzi identification code (read only mode)

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware
30012	000Bh	1	UINT 16	UINT16	Value=88d (58h) VMUM4AS1T2EM	A0

## 1.8 Table of labels and references

The VMU-M has an flash memory area where it is possible to store the label of the solar string and the inverter reference number for each module. The user can manage this memory area for other purpose, this information it is not used by the VMU-M. By default this memory area is filled with all 0FFFFh.

Table 1.8-1- Label and references Memory Area 1: read mode with functions code 03h or 04h, write mode with function 06h or 10h

	Description	Modicom address	Physical address	Length (words)	Byte msb (ASCII)	Byte lsb (ASCII)	Firmware
Module sub-address=0 (it is always the VMU-M)	Word0	301281	0500h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301282	0501h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301283	0502h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301284	0503h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301285	0504h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301286	0505h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301287	0506h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301288	0507h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=1	Word0	301289	0508h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301290	0509h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301291	050Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301292	050Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301293	050Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301294	050Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301295	050Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301296	050Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=2	Word0	301297	0510h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301298	0511h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301299	0512h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301300	0513h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301301	0514h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301302	0515h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301303	0516h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301304	0517h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=3	Word0	301305	0518h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301306	0519h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301307	051Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301308	051Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301309	051Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301310	051Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301311	051Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301312	051Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=4	Word0	301313	0520h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301314	0521h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301315	0522h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301316	0523h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301317	0524h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301318	0525h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301319	0526h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301320	0527h	1	Char16 (ASCII)	Char15 (ASCII)	A0

Table 1.8-2 - Label and references Memory Area 2: read mode with functions code 03h or 04h, write mode with function 06h or 10h

	Description	Modicom address	Physical address	Length (words)	Byte msb (ASCII)	Byte lsb (ASCII)	Firmware
Module sub-address=0 (it is always the VMU-M)	Word0	301281	0580h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301282	0581h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301283	0582h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301284	0583h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301285	0584h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301286	0585h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301287	0586h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301288	0587h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=1	Word0	301289	0588h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301290	0589h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301291	058Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301292	058Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301293	058Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301294	058Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301295	058Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301296	058Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=2	Word0	301297	0590h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301298	0591h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301299	0592h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301300	0593h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301301	0594h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301302	0595h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301303	0596h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301304	0597h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=3	Word0	301305	0598h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301306	0599h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301307	059Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301308	059Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301309	059Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301310	059Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301311	059Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301312	059Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=4	Word0	301313	05A0h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301314	05A1h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301315	05A2h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301316	05A3h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301317	05A4h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301318	05A5h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301319	05A6h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301320	05A7h	1	Char16 (ASCII)	Char15 (ASCII)	A0

Table 1.8-3 - Label and references Memory Area 3: read mode with functions code 03h or 04h, write mode with function 06h or 10h

	Description	Modicom address	Physical address	Length (words)	Byte msb (ASCII)	Byte lsb (ASCII)	Firmware
Module sub-address=0 (it is always the VMU-M)	Word0	301281	0700h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301282	0701h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301283	0702h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301284	0703h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301285	0704h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301286	0705h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301287	0706h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301288	0707h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=1	Word0	301289	0708h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301290	0709h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301291	070Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301292	070Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301293	070Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301294	070Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301295	070Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301296	070Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=2	Word0	301297	0710h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301298	0711h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301299	0712h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301300	0713h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301301	0714h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301302	0715h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301303	0716h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301304	0717h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=3	Word0	301305	0718h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301306	0719h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301307	071Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301308	071Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301309	071Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301310	071Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301311	071Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301312	071Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=4	Word0	301313	0720h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301314	0721h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301315	0722h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301316	0723h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301317	0724h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301318	0725h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301319	0726h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301320	0727h	1	Char16 (ASCII)	Char15 (ASCII)	A0

Table 1.8-4 - Label and references Memory Area 4: read mode with functions code 03h or 04h, write mode with function 06h or 10h

	Description	Modicom address	Physical address	Length (words)	Byte msb (ASCII)	Byte lsb (ASCII)	Firmware
Module sub-address=0 (it is always the VMU-M)	Word0	301281	0780h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301282	0781h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301283	0782h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301284	0783h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301285	0784h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301286	0785h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301287	0786h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301288	0787h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=1	Word0	301289	0788h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301290	0789h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301291	078Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301292	078Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301293	078Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301294	078Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301295	078Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301296	078Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=2	Word0	301297	0790h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301298	0791h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301299	0792h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301300	0793h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301301	0794h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301302	0795h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301303	0796h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301304	0797h	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=3	Word0	301305	0798h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301306	0799h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301307	079Ah	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301308	079Bh	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301309	079Ch	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301310	079Dh	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301311	079Eh	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301312	079Fh	1	Char16 (ASCII)	Char15 (ASCII)	A0
Module sub-address=4	Word0	301313	07A0h	1	Char2 (ASCII)	Char1 (ASCII)	A0
	Word1	301314	07A1h	1	Char4 (ASCII)	Char3 (ASCII)	A0
	Word2	301315	07A2h	1	Char6 (ASCII)	Char5 (ASCII)	A0
	Word3	301316	07A3h	1	Char8 (ASCII)	Char7 (ASCII)	A0
	Word4	301317	07A4h	1	Char10 (ASCII)	Char9 (ASCII)	A0
	Word5	301318	07A5h	1	Char12 (ASCII)	Char11 (ASCII)	A0
	Word6	301319	07A6h	1	Char14 (ASCII)	Char13 (ASCII)	A0
	Word7	301320	07A7h	1	Char16 (ASCII)	Char15 (ASCII)	A0