The protocol of M/VB-Series PLC

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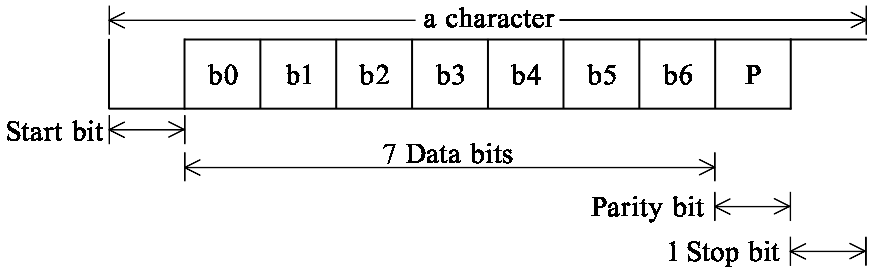
- Communication Type：Asynchronous, half duplex serial communication
- The setting of UART or ACIA：
  - Baud rate：19200 bps
  - Data Bit ：7 data bits ASCII code
  - Parity ：Even parity
  - Stop bit ：1 stop bit



- For each character only following can be:

STX	02H
ETX	03H
ACK	06H
'0'～'9'	30H～39H
'A'～'F'	41H～46H

• For each protocol, it can be partition to 3 kinds of field. They are
  one char field
  two char field
  four char field

• For one char field, only STX,ETX and ACK can be
  STX : It is the first char for all protocol which are sent to PLC
  ETX : It is always before the last field (check sum)
  ACK : It is the first char for all protocol which are sent from PLC

• For 2 char field :
  Station Number : specify the station number of the PLC which want to communicate
  Command : Specify the command which want the PLC to do
  Status code : Indicate the status which is sent by PLC
  Length : Specify the quantities in bytes which will write to or read from the PLC
  Byte Data : the content which will write to or read from the PLC
  Check Sum : the add on data for communication error detection. It must be the last field of a protocol

Decimal	Hexdecimal	String	ASCII code	
0	00	'00'	30H	30H
1	01	'01'	30H	31H
2	02	'02'	30H	32H
⋮	⋮	⋮	⋮	⋮
9	09	'09'	30H	39H
10	0A	'0A'	30H	41H
⋮	⋮	⋮	⋮	⋮
15	0F	'0F'	30H	46H
16	10	'10'	31H	30H
17	11	'11'	31H	31H
⋮	⋮	⋮	⋮	⋮
255	FF	'FF'	46H	46H

• For 4 char field :
  Start ByteAddress : Specify the start address of continue data Access
  Bit Address : Specity the Bit address which want to force the bit component ON or OFF

Decimal	Hexdecimal	String	ASCII code			
0	0000	'0000'	30H	30H	30H	30H
1	0001	'0001'	30H	30H	30H	31H
2	0002	'0002'	30H	30H	30H	32H
⋮	⋮	⋮	⋮	⋮	⋮	⋮
9	0009	'0009'	30H	30H	30H	39H
10	000A	'000A'	30H	30H	30H	41H
⋮	⋮	⋮	⋮	⋮	⋮	⋮
15	000F	'000F'	30H	30H	30H	46H
16	0010	'0010'	30H	30H	31H	30H
17	0011	'0011'	30H	30H	31H	31H
⋮	⋮	⋮	⋮	⋮	⋮	⋮
23551	5BFF	'5BFF'	35H	42H	46H	46H

Command List

COMMAND	COMMAND CODE	DEVICE
Read continue data	'51'	X,Y,M,S,T,C,D
Write continue data	'61'	X,Y,M,S,T,C,D
Force contact ON	'70'	X,Y,M,S
Force contact OFF	'71'	X,Y,M,S

Status Code List

'00'	OK
'10'	ASCII code error
'11'	Check Sum error
'12'	Command Undefine
'14'	Stop, parity error, frame error, overrun
'28'	Address out of range

Read continue data (command code'51', ⟶ 35H,31H)

TO PLC

STX	Station Number		Command		Start ByteAddress				Length (Bytes)		ETX	Check Sum	
	16^1	16^0	16^1	16^0	16^3	16^2	16^1	16^0	16^1	16^0		16^1	16^0

※The start ByteAddress please refer to appendix

From PLC

ACK	Station Number		Command		Status Code		1st Byte		2nd Byte			Last Byte		ETX	Check Sum	
	16^1	16^0	16^1	16^0	16^1	16^0	16^1	16^0	16^1	16^0		16^1	16^0		16^1	16^0

For example：To read the value of M8～M15 (if M15 ON，M14 ON，M13 OFF，M12 ON，M11 OFF，M10 OFF，M9 OFF，M8 ON)。

TO PLC

STX	Station Number		Command		Start ByteAddress				Length (Bytes)		ETX	Check Sum	
02	30	30	35	31	30	30	38	31	30	31	03	46	33

From PLC

ACK	Station Number		Command		Status Code		DATA		ETX	Check Sum	
06	30	30	35	31	30	30	44	31	03	39	45

Write continue data (command code '61', ⟶36H,31H)

TO PLC

STX	Station Number		Command		Start ByteAddress				Length (Bytes)		1st Byte		2nd Byte			
	16^1	16^0	16^1	16^0	16^3	16^2	16^1	16^0	16^1	16^0	16^1	16^0	16^1	16^0		

→

→

Last Byte		ETX	Check Sum	
16^1	16^0		16^1	16^0

※The start ByteAddress please refer to appendix C and D

From PLC

ACK	Station Number		Command		Status Code		ETX	Check Sum	
	16^1	16^0	16^1	16^0	16^1	16^0		16^1	16^0

For example：To set Y30=ON, Y31=OFF, Y32=OFF, Y33=OFF, Y34=ON, Y35=ON, Y36=OFF, Y37=ON

TO PLC

STX	Station Number		Command		Start ByteAddress				Length (Bytes)		1st Byte		ETX	Check Sum	
02	30	30	36	31	30	30	34	33	30	31	42	31	03	36	35

For example：To write the content of D1 to A325H

TO PLC

STX	Station Number		Command		Start ByteAddress				Length (Bytes)		1st Byte		2nd Byte		ETX	Check Sum	
02	30	30	36	31	31	43	30	32	30	32	32	35	41	33	03	44	44

Force contact ON (command code '70', ⟶ 37H,30H)
OFF(command code '71', ⟶ 37H,31H)

TO PLC

STX	Station Number		Command		BitAddress				ETX	Check Sum	
	16^1	16^0	16^1	16^0	16^3	16^2	16^1	16^0		16^1	16^0

※The calculation of BitAddress please refer to appendix B

From PLC

ACK	Station Number		Command		Status Code		ETX	Check Sum	
	16^1	16^0	16^1	16^0	16^1	16^0		16^1	16^0

For example：force M10 ON

TO PLC

STX	Station Number		Command		BitAddress				ETX	Check Sum	
02	30	30	37	30	30	34	30	41	03	39	46

For example：force M100 OFF

TO PLC

STX	Station Number		Command		BitAddress				ETX	Check Sum	
02	30	30	37	31	30	34	36	34	03	39	39

Appendix

A.

- **How to calculate the value of the checksum of a protocol ?**

1. Add the ASCII code of each character from 'Station Number' to ETX
2. Get the LSB byte of the value
3. Translate the LSB byte into 2 char ASCII

For example:

STX	Station Number		Command		BitAddress				ETX	Check Sum	
02	30	30	37	30	30	34	31	34	03	39	33

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

30H+30H+37H+30H+30H+34H+31H+34H+03H=0193H

0193H Get the LSB Byte will be 93H
and the Byte 93H translate to 2 ASCII code will be 39H and 33H

B.

- **How to calculate the bit Address？**

❶According to the component type, get the Base Address.

CompType	BaseAddress
X	0000
Y	0040
M	0080
S	0300
T	0380
C	03A0
Special M	03E0
Coil T	0780
Coil C	07A0

❷divide the component Number by 8 to get ByteOffset

❸Mod the component Number by 8 to get the remainder:BitOffset

❹The BitAddress will be:(BaseAddress+ByteOffset)×8+BitOffset

C. The address map of bit component

Component Tupe	Component Number					Mapping address
	b7	b6	~	b1	b0	
Input Relay X*	X7		~		X0	0000
			⟆			⟆
	X777		~		X770	003F
Output Relay Y*	Y7		~		Y0	0040
			⟆			⟆
	Y777		~		Y770	007F
Aux Relay M	M7		~		M0	0080
			⟆			⟆
	M5119		~		M5112	02FF
Step Relay S	S7		~		S0	0300
			⟆			⟆
	S999		~		S992	037C
Timer Contact	T7		~		T0	0380
			⟆			⟆
	T255		~		T248	039F
Counter Contact	C7		~		C0	03A0
			⟆			⟆
	C255		~		C248	03BF
Special Relay M9000 M9255	M9007		~		M9000	03E0
			⟆			⟆
	M9255		~		M9248	03FF
Timer Coil	T7		~		T0	0780
			⟆			⟆
	T255		~		T248	079F
Counter Coil	C7		~		C0	07A0
			⟆			⟆
	C255		~		C248	07BF

＊Note : The numbric system of component of X and Y are Octal(8), and the others are decimal(10).

D. The address map of Register component