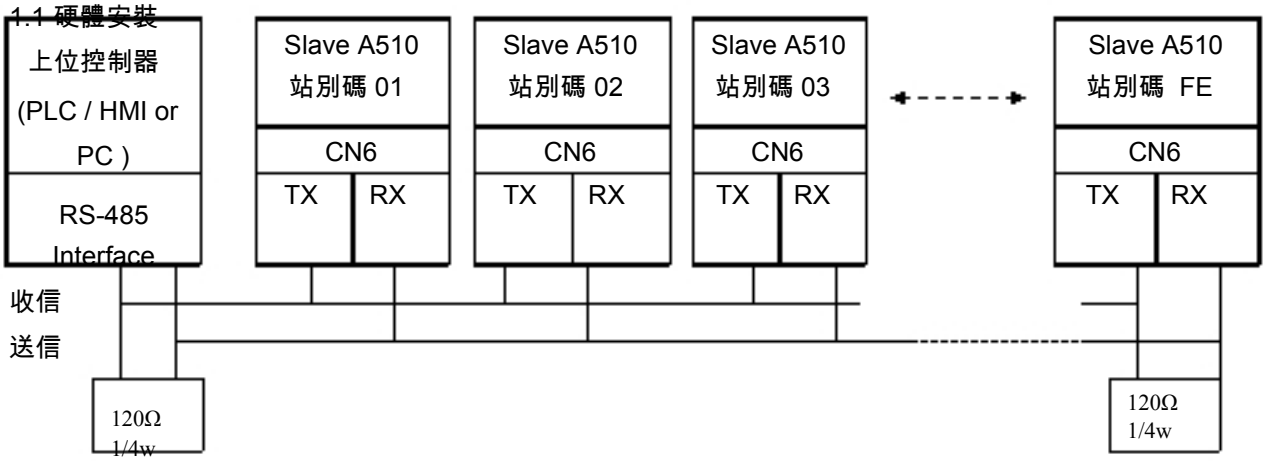
1.通信資料結構

A510 系列機種接受電腦或其他上位控制器,經由 RS485 or RS232 做通訊控制,使ش Modbus RTU Mode & Modbus ASCII Mode 作為通信協定

frame length maximum 80 bytes

1.1 硬體安裝



於通信 線之啟始點與最終點請ก上 120Ω,1/4w 之終端阻抗

1.2 資料格式框 FOR ASCII MODE

STX(3AH)	起始字元 = 3AH
Address Hi Address Lo	通信位置(站別): 由 2 個 ASCII 碼組合
Function Hi Function Lo	ɔ能碼(command): 由 2 個 ASCII 碼組合
Command Start Address Command Start Address Command Start Address Command Start Address	命令起始位元: 由 4 個 ASCII 碼組合
Data length Data length Data length Data length	命令起始到結束的長度: 由 4 個 ASCII 碼組合
LRC Check Hi LRC Check Lo	LRC 檢查碼: 由 2 個 ASCII 碼組合
END Hi END Lo	結束字元: END Hi = CR(0DH) END Li = LF(0AH)

資料格式框 FOR RTU MODE

MASTER(PLC 等)相對於 SLAVE 指令, SLAVE 應答。收受信的構成如右所示, 依指令(機能)的內容, DATA 部的長度不一。

**指令信號與應答信號間必須維持 10mS 之間隔

1.3 通信位址(Address)

00H : 對所有驅動器廣播(Broadcast)

01H : 對第 01 位址驅動器

0FH : 對第 15 位址驅動器

10H : 對第 16 位址驅動器

以ฺ類推.... , 最大可到 254(FEH)

1.4 ɒ能碼(Function)

03H : 讀出暫存器內容

06H : 寫入一個 WORD 至暫存器(暫存器寫入)

08H : 迴路測試

10H : 寫入多筆資料至暫存器(複數暫存器寫入)

2.CMS (Checksum and time-out definition)

2.1 LRC

ex. ADDRESS 01H

FUNCTION 03H

COMMAND 01H

00H

DATA LENGTH 0AH

0FH----------取二補數

Checksum = F1H

CS(H) = 46H (ASCII)

CS(L) = 31H (ASCII)

2.2 CRC CHECK : CRC 檢查碼是由 Slave 位址到 DATA 結束,請以下述方式算出。

(1).取一個 16 bit 之暫存器設定值= FFFFH (ꜜ部為 1),作為 CRC 暫存器。

(2).將指令信號第一個位元組與 16-bit CRC 暫存器的低位元組做 Exclusive OR 運算後，將其結果再存入ن CRC 暫存器內。

(3).將ن CRC 暫存器之值ﺑ右移出一位,並將 0 填入高位元處之最左一位。檢查ن CRC 暫存器之值。

(4).如果是 0 時,將步驟(3)的新值存入 CRC 暫存器內,

如不為 0,將ن CRC 暫存器與 A001h(1010 0000 0000 0001)值再 Exclusive OR ,將結果存入 CRC 暫存器內。

(5). 重複步驟(3)與(4),將 8-bit ﻛ部運算完成。

(6). 重複步驟(2)到(5),取下一個 8-bit 的訊息指令,ﷺ到所有訊息指令運算完成,最後得到的 CRC 暫存器的值,即為 CRC 檢查碼,ن CRC 檢查碼於 出時必須將 Low-order byte ﺭ 輸,再 輸 High-order byte.例如 CRC 檢查碼值為 1241hex 時, CRC-16 上位必須設定 41hex, CRC-16 下位必須設定 12hex

- CRC 計算應ش程式

```
UWORD ch_sum ( UBYTE long , UBYTE *rxdbuff ) {
        BYTE i = 0;
        UWORD wkg = 0xFFFF;
        while ( long-- ) {
        wkg ^= rxdbuff++;
        for ( i = 0 ; i < 8; i++ ) {
              if ( wkg & 0x0001 ) {
                 wkg = ( wkg >> 1 ) ^ 0xa001;
              }
              else {
                 wkg = wkg >> 1;
              }
         }
      }
     return( wkg );
}
```

3.Error code

ASCII Mode

STX	' :'
Address	'0'

RTU Mode

SLAVE address	02H
Function	83H

	'1'
Function	'8'
	'6'
Exception code	'5'
	'1'
LRC Check	'2'
	'8'
END	'CR'
	'LF'

Exception code		52H
CRC-16	upper	C0H
	the next bit	CDH

When the communication connection, if an error is generated, drive will respond to the error code and the function code 80H respond to the master system.

Error codes	Description
01	Function code error
02	A scratchpad position error
03	The number of more than 32
04	Data setting error

4 - Inverter control

4. 1 instruction data (read & write)

Accounting for the location of the register	Bit	Content
2500H	Reserved	
2501H	No letter for operation 0	operation command 1 : operate 0 : stop

		1	¯transfer command 1 : turn 0 : political turn
		2	External error 1 : error
		3	Error reversion 1 : revert
		4	retention
		5	retention
		6	Multi function terminal S1 1 :,ON˙
		7	Multi function terminal S2 1 :,ON˙
		8	Multi function terminal S3 1 :,ON˙
		9	Multi function terminal S4 1 :,ON˙
		A	Multi function terminal S5 1 :,ON˙
		B	Multi function terminal S6 1 :,ON˙
		C	Multi function terminal S7 1 :,ON˙
		D	Multi function terminal S8 1 :,ON˙
		E	Controller mode 1 : ,ON˙
		F	retention
2502H			Frequency command
2503H			Retention
2504H			Retention
2505H			AO1
2506H			AO2
2507H			DO
2508H			Retention
2509H			Retention
250AH			Retention
250BH			Retention
250CH			Retention
250DH			Retention
250EH			retention
250FH			retention
2510H			G12-00 H-WORD
2511H			G12-00 L-WORD

Note : Write in zero for Not used BIT, do not write in data for the reserved register.

4. 2 Monitoring data (readout only)

Register No.		Bit	Content
2520H	Status signals	0	Operating status 1 : operate 0 : stop
		1	Direction of state 1 : turn 0 : forward
		2	Inverter operation ready state 1 : ready to complete 0 : not yet ready

		3	error	1 : Abnormal	
		4	warning	1 :,ON'	
		5	zero	1 :,ON'	
		6	440 models	1 :,ON'	
		7	Frequency reaches	1 :,ON'	
		8	Arbitrary frequency reaches	1 :,ON'	
		9	Frequency detected a	1 :,ON'	
		A	Frequency detected in two	1 :,ON'	
		B	Low voltage	1 :,ON'	
		C	The drive is not output	1 :,ON'	
		D	Freq non basis for communication	1 :,ON'	
		E	Seq Not From Comm	1 :,ON'	
		F	Over torque	1 :,ON'	
2521H	Description of the error	0		31	Under Torque 1
		1	UV	32	Under Torque 2
		2	OC	33	CF02
		3	OV	34	CF03
		4	OH1	35	CF04
		5	OL1	36	CF05
		6	OL2	37	CF06
		7	OH4	38	CF07
		8	OH5	39	CF08
		9	SC	40	CF09
		10	Ground OC	41	CF10
		11	Fuse broken	42	CF11
		12	Input Phase Loss	43	CF12
		13	Output Phase Loss	44	CF13
		14	PG Over speed	45	CF14
		15	PG Open	46	CF15
		16	PG Speed Deviation	47	CF16
		17	External Fault 01	48	CF17
		18	External Fault 02	49	Feedback Fault
		19	External Fault 03	50	Keypad Removed
		20	External Fault 04	51	OH
		21	External Fault 05	52	OH3
		22	External Fault 06	53	Modbus External Fault
		23	External Fault 07	54	Braking Transistor Fault
		24	External Fault 08	55	Braking Resistor Overheat
		25	External Fault 09	56	CE
		26	External Fault 10	57	
		27	External Fault 11	58	

			28	External Fault 12		59			
			29	Over Torque 1		60			
			30	Over Torque 2		61			
2522H		DI status		Multi function terminal S1					
			1	Multi function terminal S2					
			2	Multi function terminal S3					
			3	Multi function terminal S4					
			4	Multi function terminal S5					
			5	Multi function terminal S6					
			6	Multi function terminal S7					
			7	Multi function terminal S8					
			8	retention					
			9	retention					
			A	retention					
			B	retention					
			C	retention					
			D	retention					
			E	retention					
			F	retention					
2523H			Frequency command						
2524H			Output frequency						
2525H			retention						
2526H			DC voltage command						
2527H			Output current						
2528H		Warning description	0	No alarm	18	EF2	36	SE03	54	BB6
			1	OV	19	EF3	37	SE04	55	BB7
			2	UV	20	EF4	38	SE05	56	BB8
			3	OL2	21	EF5	39	HP ERR	57	retention
			4	OH2	22	EF6	40	EF	58	retention
			5	retention	23	EF7	41	CTRLE	59	retention
			6	OT	24	EF8	42	SUME	60	retention
			7	retention	25	CLA	43	RDP	61	RETRY
			8	retention	26	CLB	44	retention	62	SE07
			9	UT	27	ADL	45	OL1	63	SE08
			10	OS	28	retention	46	SE09		
			11	PGO	29	USP	47	retention		
			12	DEV	30	RDE	48	retention		
			13	CE	31	WRE	49	BB1		
			14	retention	32	FB	50	BB2		
			15	retention	33	VRYE	51	BB3		

			16	EF0	34	SE01	52	BB4		
			17	EF1	35	SE02	53	BB5		
2529H			DO status							
252AH			retention							
252BH			retention							
252CH			AI 1 input							
252DH			AI 2 input							
252EH			retention							
252FH			A510/L510/E510 Check							

Note : Do not write in data for the reserved register.

4. 3 read out to keep the content of the register [03H]

Starting from the specified designation, Specified number of continuous maintain the contents of the register is read out.

(Example) from the SLAVE1 of A510 inverter will read out the frequency command.

ASCII Mode

Command signal

3AH	STX

Response signal(normal)

3AH	STX

Response signal(abnormal)

3AH	STX

30H	SLAVE address
31H	
30H	Function code
33H	
30H	Numbere d starting
31H	
32H	
33H	
30H	A number
30H	
30H	
31H	
?	LRC CHECK
?	
0DH	END
0AH	

30H	SLAVE address
31H	
30H	Function code
33H	
30H	DATA number
32H	
31H	Initial save register
37H	
37H	
30H	
?	LRC CHECK
?	
0DH	END
0AH	

30H	SLAVE address
32H	
38H	Function code
33H	
35H	Exception code
32H	
0DH	END
0AH	

+

RTU Mode

Command signal

signal		01 H
SLAVE address		03H
Function code	upper	01H
	the next bit	23H
Numbered starting A number	upper	00H
	next bit	01H
CRC-16	upper	74H
	next bit	3CH

Response signal(normal)

SLAVE address		01H
Function code		03H
DATA number		02H
initial preservation upper register		17H
	Next bit	70H
CRC-16	upper	AFH
	next bit	82H

Response signal(abnormal)

SLAVE address		02H
Function code		83H
Exception code		52H
CRC-16	upper	C0H
	next bit	CDH

4. 4 LOOP BACK test [08H]

Instruction message as a reply message to return.Between MASTER & SLAVE to check the signal sent to the test code data can be set to any value.

ASCII Mode

Command signal

3AH	STX
30H	SLAVE adress

Respond signal(normal)

3AH	STX
30H	SLAVE address

Respond signal(abnormal)

3AH	STX
30H	SLAVE address

31H	
30H	Function code
38H	
30H	Test code
30H	
30H	
30H	
41H	DATA
35H	
33H	
37H	
?	LRC CHECK
?	
0DH	END
0AH	

31H	
30H	Function code
38H	
30H	Test code
30H	
30H	
30H	
41H	DATA
35H	
33H	
37H	
?	LRC CHECK
?	
0DH	END
0AH	

31H	
38H	Function code
38H	
32H	Exception code
30H	
?	LRC CHEC
?	
0DH	END
0AH	

RTU Mode

Command signal

SLAVE address		01 H
Function code		08H
Test code	upper	00H
	next bit	00H
DATA	upper	A5H
	next bit	37H
CRC-16	upper	DAH
	next bit	8DH

Response signal(normal)

SLAVE address		01H
Function code		08H
Test code	upper	00H
	next bit	00H
DATA	upper	A5H
	next bit	37H
CRC-16	upper	DAH
	next bit	8DH

Response signal(abnormal)

SLAVE address		01H
Function code		88H
Exception code		20H
CRC-16	upper	47H
	next bit	D8H

4. 5 maintain a register write [06H]

Will maintain the register to write to the specified data from the specified number.
(for example)A510 inverter set frequency command from plc SLAVE1 to 60HZ.

ASCII Mode

Command signal

Response signal(normal)

Response signal(abnormal)

3AH	STX
30H	SLAVE address
31H	
30H	Function code
36H	
30H	Numbered starting
31H	
30H	
32H	
31H	DATA
37H	
37H	
30H	
?	LRC CHECK
?	
0DH	END
0AH	

3AH	STX
30H	SLAVE address
31H	
30H	Function code
36H	
30H	Numbered starting
31H	
30H	
32H	
31H	DATA
37H	
37H	
30H	
?	LRC CHECK
?	
0DH	END
0AH	

3AH	STX
30H	SLAVE address
31H	
38H	Function code
36H	
35H	Exception code
32H	
?	LRC CHECK
?	
0DH	END
0AH	

RTU Mode

Command signal

SLAVE address		01 H
Function code		06H
Numbered starting	upper	01H
	next bit	02H
A number	upper	17H
	next bit	70H
CRC-16	upper	27H
	next bit	E2H

Response signal(normal)

SLAVE address		01H
Function code		06H
Numbered starting	upper	01H
	next bit	02H
A number	upper	17H
	next bit	70H
CRC-16	upper	27H
	next bit	E2H

Response signal(abnormal)

SLAVE address		01H
Function code		86H
Exception code		52H
CRC-16	upper	C3H
	next bit	9DH

4. 6 plural maintain registers write [10H]

Start from a specified number, will maintain the registers of the specified number of ت، do not write to the specified

(example)from the PLC to the slave 1 of A510 inverter set freq. command 60HZ FWD.

ASCII Mode

Command signal	Response signal(normal)	Response signal(abnormal)

3AH	STX
30H	SLAVE address
31H	
31H	Function code
30H	
30H	Numbered starting
31H	
30H	
31H	
30H	number
30H	
32H	
30H	DATA number*
34H	
30H	initial DATA
30H	
30H	
31H	
31H	secondly DATA
37H	
37H	
30H	
?	LRC CHECK
?	
0DH	END
0AH	

3AH	STX
30H	SLAVE address
31H	
31H	Function code
30H	
30H	Numbered starting
31H	
30H	
31H	
30H	number
30H	
32H	
?	LRC CHECK
?	
0DH	END
0AH	

3AH	STX
30H	SLAVE address
31H	
39H	Function code
30H	
35H	Exception code
32H	
?	LRC CHECK
?	
0DH	END
0AH	

* DATA number to the number of multiply 2

RTU Mode

Command signal

SLAVE address	01 H
Function code	10H
Start disignation upper	01H
Start disignation next bit	01H

Response signal(normal)

SLAVE address	01H
Function code	10H
Start disignation upper	01H
Start disignation next bit	01H

Response signal(abnormal)

SLAVE address	01H
Function code	90H
Exception code	52H
CRC-16 upper	CDH

A	upper	00H
	next bit	02H
number DATA number*		04H
initial DATA	upper	00H
	next bit	01H
secondly DATA	upper	17H
	next bit	70H
CRC-16	upper	60H
	next bit	27H

* DATA number to the number of multiply 2

A	upper	00H
	next bit	02H
number	upper	11H
CRC-16	next bit	F4H

	Next bit	FDH

Parameter Data(Readable and Writable)

Function	Register No	Function	Register No	Function	Register No
Group 0		Group 1		Group 2	
0 - 00	0000H	1 - 00	0100H	2 - 00	0200H
0 - 01	0001H	1 - 01	0101H	2 - 01	0201H
0 - 02	0002H	1 - 02	0102H	2 - 02	0202H

0 - 03	0003H	1 - 03	0103H	2 - 03	0203H
0 - 04	0004H	1 - 04	0104H	2 - 04	0204H
0 - 05	0005H	1 - 05	0105H	2 - 05	0205H
0 - 06	0006H	1 - 06	0106H	2 - 06	0206H
0 - 07	0007H	1 - 07	0107H	2 - 07	0207H
0 - 08	0008H	1 - 08	0108H	2 - 08	0208H
0 - 09	0009H	1 - 09	0109H	2 - 09	0209H
0 - 10	000AH	1 - 10	010AH	2 - 10	020AH
0 - 11	000BH	1 - 11	010BH	2 - 11	020BH
0 - 12	000CH	1 - 12	010CH	2 - 12	020CH
0 - 13	000DH	1 - 13	010DH	2 - 13	020DH
0 - 14	000EH	1 - 14	010EH	2 - 14	020EH
0 - 15	000FH	1 - 15	010FH	2 - 15	020FH
0 - 16	0010H	1 - 16	0110H	2 - 16	0210H
0 - 17	0011H	1 - 17	0111H	2 - 17	0211H
0 - 18	0012H	1 - 18	0112H	2 - 18	0212H
0 - 19	0013H	1 - 19	0113H	2 - 19	0213H
0 - 20	0014H	1 - 20	0114H	2 - 20	0214H
0 - 21	0015H	1 - 21	0115H	2 - 21	0215H
0 - 22	0016H	1 - 22	0116H	2 - 22	0216H
0 - 23	0017H	1 - 23	0117H	2 - 23	0217H
0 - 24	0018H	1 - 24	0118H	2 - 24	0218H
0 - 25	0019H	1 - 25	0119H	2 - 25	0219H
0 - 26	001AH			2 - 26	021AH
0 - 27	001BH			2 - 27	021BH
0 - 28	001CH			2 - 28	021CH
0 - 29	001DH			2 - 29	021DH
0 - 30	001EH			2 - 30	021EH
0 - 31	001FH			2 - 31	021FH
0 - 32	0020H			2 - 32	0220H

Function	Register No	Function	Register No	Function	Register No
Group 2		Group 3		Group 3	
2 - 33	0221H	3 - 00	0300H	3 - 33	0321H
2 - 34	0222H	3 - 01	0301H	3 - 34	0322H
2 - 35	0223H	3 - 02	0302H	3 - 35	0323H
2 - 36	0224H	3 - 03	0303H	3 - 36	0324H
		3 - 04	0304H	3 - 37	0325H

		3 - 05	0305H	3 - 38	0326H
		3 - 06	0306H		
		3 - 07	0307H		
		3 - 08	0308H		
		3 - 09	0309H		
		3 - 10	030AH		
		3 - 11	030BH		
		3 - 12	030CH		
		3 - 13	030DH		
		3 - 14	030EH		
		3 - 15	030FH		
		3 - 16	0310H		
		3 - 17	0311H		
		3 - 18	0312H		
		3 - 19	0313H		
		3 - 20	0314H		
		3 - 21	0315H		
		3 - 22	0316H		
		3 - 23	0317H		
		3 - 24	0318H		
		3 - 25	0319H		
		3 - 26	031AH		
		3 - 27	031BH		
		3 - 28	031CH		
		3 - 29	031DH		
		3 - 30	031EH		
		3 - 31	031FH		
		3 - 32	0320H		

Function	Register No	Function	Register No	Function	Register No
Group 4		Group 5		Group 5	
4- 00	0400H	5 - 00	0500H	5 - 33	0521H
4 - 01	0401H	5 - 01	0501H	5 - 34	0522H
4 - 02	0402H	5 - 02	0502H	5 - 35	0523H
4 - 03	0403H	5 - 03	0503H	5 - 36	0524H
4 - 04	0404H	5 - 04	0504H	5 - 37	0525H

4 - 05	0405H	5 - 05	0505H	5 - 38	0526H
4 - 06	0406H	5 - 06	0506H	5 - 39	0527H
4 - 07	0407H	5 - 07	0507H	5 - 40	0528H
4 - 08	0408H	5 - 08	0508H	5 - 41	0529H
4 - 09	0409H	5 - 09	0509H	5 - 42	052AH
4 - 10	040AH	5 - 10	050AH	5 - 43	052BH
4 - 11	040BH	5 - 11	050BH	5 - 44	052CH
4 - 12	040CH	5 - 12	050CH	5 - 45	052DH
4 - 13	040DH	5 - 13	050DH	5 - 46	052EH
4 - 14	040EH	5 - 14	050EH	5 - 47	052FH
4 - 15	040FH	5 - 15	050FH	5 - 48	0530H
4 - 16	0410H	5 - 16	0510H		
4 - 17	0411H	5 - 17	0511H		
4 - 18	0400H	5 - 18	0512H		
		5 - 19	0513H		
		5 - 20	0514H		
		5 - 21	0515H		
		5 - 22	0516H		
		5 - 23	0517H		
		5 - 24	0518H		
		5 - 25	0519H		
		5 - 26	051AH		
		5 - 27	051BH		
		5 - 28	051CH		
		5 - 29	051DH		
		5 - 30	051EH		
		5 - 31	051FH		
		5 - 32	0520H		

Function	Register No	Function	Register No	Function	Register No
Group 6		Group 6		Group 7	
6- 00	0600H	6 - 33	0621H	7- 00	0700H
6 - 01	0601H	6 - 34	0622H	7 - 01	0701H
6 - 02	0602H	6 - 35	0623H	7 - 02	0702H
6 - 03	0603H	6 - 36	0624H	7 - 03	0703H
6 - 04	0604H	6 - 37	0625H	7 - 04	0704H

6 - 05	0605H	6 - 38	0626H	7 - 05	0705H
6 - 06	0606H	6 - 39	0627H	7 - 06	0706H
6 - 07	0607H	6 - 40	0628H	7 - 07	0707H
6 - 08	0608H	6 - 41	0629H	7 - 08	0708H
6 - 09	0609H	6 - 42	062AH	7 - 09	0709H
6 - 10	060AH	6 - 43	062BH	7 - 10	070AH
6 - 11	060BH	6 - 44	062CH	7 - 11	070BH
6 - 12	060CH	6 - 45	062DH	7 - 12	070CH
6 - 13	060DH	6 - 46	062EH	7 - 13	070DH
6 - 14	060EH	6 - 47	062FH	7 - 14	070EH
6 - 15	060FH			7 - 15	070FH
6 - 16	0610H			7 - 16	0710H
6 - 17	0611H			7 - 17	0711H
6 - 18	0612H			7 - 18	0712H
6 - 19	0613H			7 - 19	0713H
6 - 20	0614H			7 - 20	0714H
6 - 21	0615H			7 - 21	0715H
6 - 22	0616H			7 - 22	0716H
6 - 23	0617H			7 - 23	0717H
6 - 24	0618H			7 - 24	0718H
6 - 25	0619H			7 - 25	0719H
6 - 26	061AH			7 - 26	071AH
6 - 27	061BH			7 - 27	071BH
6 - 28	061CH				
6 - 29	061DH				
6 - 30	061EH				
6 - 31	061FH				
6 - 32	0620H				

Function	Register No	Function	Register No	Function	Register No
Group 8		Group 9		Group 10	
8- 00	0800H	9- 00	0900H	10- 00	0A00H
8 - 01	0801H	9 - 01	0901H	10 - 01	0A01H
8 - 02	0802H	9 - 02	0902H	10 - 02	0A02H
8 - 03	0803H	9 - 03	0903H	10 - 03	0A03H
8 - 04	0804H	9 - 04	0904H	10 - 04	0A04H

8 - 05	0805H	9 - 05	0905H	10 - 05	0A05H
8 - 06	0806H	9 - 06	0906H	10 - 06	0A06H
8 - 07	0807H	9 - 07	0907H	10 - 07	0A07H
8 - 08	0808H	9 - 08	0908H	10 - 08	0A08H
8 - 09	0809H	9 - 09	0909H	10 - 09	0A09H
8 - 10	080AH			10 - 10	0A0AH
8 - 11	080BH			10 - 11	0A0BH
8 - 12	080CH			10 - 12	0A0CH
8 - 13	080DH			10 - 13	0A0DH
8 - 14	080EH			10 - 14	0A0EH
8 - 15	080FH			10 - 15	0A0FH
8 - 16	0810H			10 - 16	0A10H
8 - 17	0811H			10 - 17	0A11H
8 - 18	0812H			10 - 18	0A12H
8 - 19	0813H			10 - 19	0A13H
8 - 20	0814H			10 - 20	0A14H
8 - 21	0815H			10 - 21	0A15H
8 - 22	0816H			10 - 22	0A16H
8 - 23	0817H			10 - 23	0A17H
8 - 24	0818H			10 - 24	0A18H
8 - 25	0819H			10 - 25	0A19H
8 - 26	081AH			10 - 26	0A1AH
8 - 27	081BH			10 - 27	0A1BH
8 - 28	081CH			10 - 28	0A1CH
8 - 29	081DH			10 - 29	0A1DH
8 - 30	081EH				

Function	Register No	Function	Register No	Function	Register No
Group 11		Group 11		Group 12	
11- 00	0B00H	11- 33	0B21H	12- 00	0C00H
11 - 01	0B01H	11 - 34	0B22H	12 - 01	0C01H
11 - 02	0B02H	11 - 35	0B23H	12 - 02	0C02H
11 - 03	0B03H	11- 36	0B24H	12 - 03	0C03H
11 - 04	0B04H	11 - 37	0B25H	12 - 04	0C04H

11 - 05	0B05H	11 - 38	0B26H	12 - 05	0C05H
11 - 06	0B06H	11- 39	0B27H	12 - 06	0C06H
11 - 07	0B07H	11 - 40	0B28H	12 - 07	0C07H
11 - 08	0B08H	11 - 41	0B29H	12 - 08	0C08H
11 - 09	0B09H	11- 42	0B2AH	12 - 09	0C09H
11 - 10	0B0AH	11 - 43	0B2BH	12 - 10	0C0AH
11 - 11	0B0BH	11 - 44	0B2CH	12 - 11	0C0BH
11 - 12	0B0CH	11- 45	0B2DH	12 - 12	0C0CH
11 - 13	0B0DH	11 - 46	0B2EH	12 - 13	0C0DH
11 - 14	0B0EH	11 - 47	0B2FH	12 - 14	0C0EH
11 - 15	0B0FH	11 - 48	0B30H	12 - 15	0C0FH
11 - 16	0B10H	11 - 49	0B31H	12 - 16	0C10H
11 - 17	0B11H	11 - 50	0B32H	12 - 17	0C11H
11 - 18	0B12H	11 - 51	0B33H	12 - 18	0C12H
11 - 19	0B13H	11 - 52	0B34H	12 - 19	0C13H
11 - 20	0B14H	11 - 53	0B35H	12 - 20	0C14H
11 - 21	0B15H	11 - 54	0B36H	12 - 21	0C15H
11 - 22	0B16H	11 - 55	0B37H	12 - 22	0C16H
11 - 23	0B17H	11 - 56	0B38H	12 - 23	0C17H
11 - 24	0B18H	11 - 57	0B39H	12 - 24	0C18H
11 - 25	0B19H	11 - 58	0B3AH	12 - 25	0C19H
11 - 26	0B1AH			12 - 26	0C1AH
11 - 27	0B1BH			12 - 27	0C1BH
11 - 28	0B1CH			12 - 28	0C1CH
11 - 29	0B1DH			12 - 29	0C1DH
11 - 30	0B1EH			12 - 30	0C1EH
11 - 31	0B1FH			12 - 31	0C1FH
11 - 32	0B20H			12 - 32	0C20H

Function	Register No	Function	Register No	Function	Register No
Group 12		Group 13		Group 14	
12- 33	0C21H	13- 00	0D00H	14- 00	0E00H
12 - 34	0C22H	13 - 01	0D01H	14 - 01	0E01H
12 - 35	0C23H	13 - 02	0D02H	14 - 02	0E02H
12- 36	0C24H	13 - 03	0D03H	14 - 03	0E03H
12 - 37	0C25H	13 - 04	0D04H	14 - 04	0E04H

12 - 38	0C26H	13 - 05	0D05H	14 - 05	0E05H
12- 39	0C27H	13 - 06	0D06H	14 - 06	0E06H
12 - 40	0C28H	13 - 07	0D07H	14 - 07	0E07H
12 - 41	0C29H	13 - 08	0D08H	14 - 08	0E08H
12- 42	0C2AH	13 - 09	0D09H	14 - 09	0E09H
12 - 43	0C2BH	13 - 10	0D0AH	14 - 10	0E0AH
12 - 44	0C2CH			14 - 11	0E0BH
12- 45	0C2DH			14 - 12	0E0CH
12 - 46	0C2EH			14 - 13	0E0DH
12 - 47	0C2FH			14 - 14	0E0EH
12 - 48	0C30H			14 - 15	0E0FH
12 - 49	0C31H			14 - 16	0E10H
12 - 50	0C32H			14 - 17	0E11H
12 - 51	0C33H			14 - 18	0E12H
12 - 52	0C34H			14 - 19	0E13H
12 - 53	0C35H			14 - 20	0E14H
12 - 54	0C36H			14 - 21	0E15H
12 - 55	0C37H			14 - 22	0E16H
12 - 56	0C38H			14 - 23	0E17H
12 - 57	0C39H			14 - 24	0E18H
12 - 58	0C3AH			14 - 25	0E19H
12 - 59	0C3BH			14 - 26	0E1AH
12 - 60	0C3CH			14 - 27	0E1BH
12 - 61	0C3DH			14 - 28	0E1CH
12 - 62	0C3EH			14 - 29	0E1DH
12 - 63	0C3FH			14 - 30	0E1EH
12 - 64	0C40H			14 - 31	0E1FH
12 - 65	0C41H			14 - 32	0E20H
12 - 66	0C42H			14 - 33	0E21H

Function	Register No	Function	Register No	Function	Register No
Group 14		Group 15		Group 16	
14 - 34	0E22H	15- 00	0F00H	16- 00	1000H
14 - 35	0E23H	15 - 01	0F01H	16 - 01	1001H
14 - 36	0E24H	15 - 02	0F02H	16 - 02	1002H
14 - 37	0E25H	15 - 03	0F03H	16 - 03	1003H
14 - 38	0E26H	15 - 04	0F04H	16 - 04	1004H

14 - 39	0E27H	15 - 05	0F05H	16 - 05	1005H
14 - 40	0E28H	15 - 06	0F06H	16 - 06	1006H
14 - 41	0E29H	15 - 07	0F07H	16- 07	1007H
14 - 42	0E2AH	15 - 08	0F08H	16 - 08	1008H
14 - 43	0E2BH	15 - 09	0F09H	16 - 09	1009H
14 - 44	0E2CH	15 - 10	0F0AH		
14 - 45	0E2DH	15 - 11	0F0BH		
14 - 46	0E2EH	15 - 12	0F0CH		
14 - 47	0E2FH	15 - 13	0F0DH		
		15 - 14	0F0EH		
		15 - 15	0F0FH		
		15 - 16	0F10H		
		15 - 17	0F11H		
		15 - 18	0F12H		
		15 - 19	0F13H		
		15 - 20	0F14H		
		15 - 21	0F15H		
		15 - 22	0F16H		
		15 - 23	0F17H		
		15 - 24	0F18H		
		15 - 25	0F19H		
		15 - 26	0F1AH		
		15 - 27	0F1BH		
		15 - 28	0F1CH		
		15 - 29	0F1DH		
		15 - 30	0F1EH		
		15 - 31	0F1FH		
		15 - 32	0F20H		

Function	Register No	Function	Register No	Function	Register No
Group 17		Group 18		Group 19	
17- 00	1100H	18- 00	1200H	19- 00	1300H
17 - 01	1101H	18 - 01	1201H	19 - 01	1301H
17 - 02	1102H	18 - 02	1202H	19 - 02	1302H
17 - 03	1103H	18 - 03	1203H	19 - 03	1303H
17 - 04	1104H	18 - 04	1204H	19 - 04	1304H

17 - 05	1105H	18 - 05	1205H	19 - 05	1305H
17 - 06	1106H	18 - 06	1206H	19 - 06	1306H
17 - 07	1107H			19- 07	1307H
17 - 08	1108H				
17- 09	1109H				
17 - 10	110AH				
17 - 11	110BH				

Function	Register No	Function	Register No	Function	Register No
Group 20		Group 21		Group 21	
20- 00	1400H	21- 00	1500H	21-33	1521H
20 - 01	1401H	21 - 01	1501H	21 - 34	1522H
20 - 02	1402H	21 - 02	1502H	21 - 35	1523H
20 - 03	1403H	21 - 03	1503H	21 - 36	1524H
20 - 04	1404H	21 - 04	1504H	21 - 37	1525H

20 - 05	1405H	21 - 05	1505H	21 - 38	1526H
20 - 06	1406H	21 - 06	1506H	21 - 39	1527H
20 - 07	1407H	21 - 07	1507H	21 - 40	1528H
20 - 08	1408H	21 - 08	1508H	21 - 41	1529H
20 - 09	1409H	21 - 09	1509H		
20 - 10	140AH	21 - 10	150AH		
20 - 11	140BH	21 - 11	150BH		
20 - 12	140CH	21 - 12	150CH		
20 - 13	140DH	21 - 13	150DH		
20 - 14	140EH	21 - 14	150EH		
20 - 15	140FH	21 - 15	150FH		
20 - 16	1410H	21 - 16	1510H		
20 - 17	1411H	21 - 17	1511H		
20 - 18	1412H	21 - 18	1512H		
20 - 19	1413H	21 - 19	1513H		
20 - 20	1414H	21 - 20	1514H		
20 - 21	1415H	21 - 21	1515H		
20 - 22	1416H	21 - 22	1516H		
20 - 23	1417H	21 - 23	1517H		
20 - 24	1418H	21 - 24	1518H		
20 - 25	1419H	21 - 25	1519H		
20 - 26	141AH	21 - 26	151AH		
20 - 27	141BH	21 - 27	151BH		
20 - 28	141CH	21 - 28	151CH		
20 - 29	141DH	21 - 29	151DH		
20 - 30	141EH	21 - 30	151EH		
20 - 31	141FH	21 - 31	151FH		
		21 - 32	1520H		

Function	Register No	Function	Register No	Function	Register No
Group 22					
22 - 00	1600H				
22 - 01	1601H				
22 - 02	1602H				
22 - 03	1603H				
22 - 04	1604H				

22 - 05	1605H				
22 - 06	1606H				
22 - 07	1607H				
22 - 08	1608H				
22 - 09	1609H				
22 - 10	160AH				
22 - 11	160BH				
22 - 12	160CH				
22 - 13	160DH				
22 - 14	160EH				
22 - 15	160FH				
22 - 16	1610H				
22 - 17	1611H				
22 - 18	1612H				