HYCON 紘康科技



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1. Overview

1.1. Product introduction

HY16F198B Starter Kit (internal pre-burning Bootloader function program, takes about 4KB size) before it can be used with HY16F ISP (In System Programming) Bootloader software, through the USB Port directly to the chip program updates, so that beginners can quickly get started HY16F198B each IP functions and applications.

1.2. Starter Kit Features

- HY16F ISP Bootloader function (chip program updates)
- Support Mini Link for software development debug
- MCU power consumption test function
- MCU power supply options
 - -> External power supply: USB or battery-powered
 - -> EDM power supply: powered by Mini Link
 - Through the Charge Pump to VDD3V power supply
- Can demo all of the MCU's hardware IP function



2. Package Contents



No.		Model No.	Description	Quantity
	1.	HY16F19x-IM04	HY16F198B-L100 EV Board	1
	2.	HY16F19x-AM01	HY16F198B AP Board	1
	3.	HY10000-AM01	LCD Board	1
	4.	Cable line	USB Type A to Mini B Cable	1



3. Safety Precautions

- Do not place heavy objects on the display panel, in order to avoid damage caused by stress.
- Place the application display boards at steady place, so as to avoid falling damage.
- Do not use this product with the input voltage which is not meeting the electrical specifications, , in order to avoid working abnormally or damage
- Avoid application display boards being touched by liquid, dirt and avoid being exposed to moisture during operation. This application should be kept in a dry environment, so as not to affect the function and performance
- Remove the power supply when not using it.
- When following status occurred, please remove the power supply immediately, and contact our engineer.
 - Power Supply line is worn or damaged.
 - Power source (battery) connected but no any light on while operating.
 - Component off.



4. Software Installation Requirements

4.1. HY16F ISP Bootloader Installation Requirements

- PC/NB hardware requirement:
 IBM PC compatible X86 system CPU
 4GB Memory
 8GB Hard disk
- (2) Product number support: HY16F184, HY16F187, HY16F188, HY16F196B, HY16F197B, HY16F198B
- (3) Hardware model support: HY16F19x-DS01 (HY16F19x Starter Kit)
- (4) Software version support: HY16F ISP Bootloader V1.1
- (5) Operating system support: Windows XP, Windows Vista, Windows 7, Windows 8, Windows 10
- (6) Apply the following interface modes: USB Port



5. Description of the Starter Kit hardware

5.1. EV Board



5.1.1. Description of the EV Board

No.	Name	Description
1	External Power	Powered by battery or power supply
		(Voltage input range 5V ~ 9V)
2	EDM Port	Connection Mini Link executable Debug Mode
2		(See HY16F19x series IDE hardware manual)
2	External Dower LED	When External Power Switch selects EPW, D5 Red
5		LED continues to light.
		MCU power supply source selection:
		 When EPW is selected, the power supply can
4	External Power Switch	be powered by USB Port or External Power.
		 When EDM is selected, it is powered by Mini
		Link.
5		When External Power Switch selects EDM. D3
5		Green LED continues to light.



No.	Name	Description
6	Boot Switch	 Bootloader Mode selection Select ON to enable Bootloader mode Select OFF to disable Bootloader mode (Bootloader mode detailed entry method, please refer to Section 5.4)
7	Boot LED	When Boot Switch select ON to enable, D4 Yellow LED continues to light.
8	UART Port	Use UART Port and PC connection.
9	External Power Input	Provide power (3V) input test standby power consumption
10	Current meter	Test the standby power consumption, Series current meter
11	Boot Pin Switch	When ON is selected (3 switches must be synchronized) - Bootloader Pin connection MCU
12	Current Jumper	Current measurement option settings (Detailed current measurement method please refer to section 5.5) Current Measurement OFF J1 Current Measurement ON J1
13	C.pump Jumper	Charge Pump function options settings Charge Pump ON $J_2 \stackrel{1}{\bullet} \underbrace{\bullet}_{3}$ Charge Pump OFF $J_2 \stackrel{1}{\bullet} \underbrace{\bullet}_{3}$ Charge Pump OFF $J_3 \stackrel{1}{\bullet} \underbrace{\bullet}_{3}$
14	MCU Pin	Including PT1.0~PT1.7&PT2.0~PT2.7, and AIO0~AIO8.
15	Crystal 32768Hz	External low frequency crystal to provide the use of



No.	Name	Description
		RTC
16	HY16F198B-L100	HY16F198B LQFP100 MCU
17	COM/SEG Pin	Provide COM0~COM3 & SEG0~SEG35
10	USB to UART	Provide USB Port with the MCU function uses
10	Bridge IC	Bootloader
10		Regulate the external power supply (USB powered &
19		battery powered) to 3.3V for MCU use.
20	LISP Dort	ISP bootloader function or provide external power
20		supply
21	Reset Pin Switch	Provide chip reset



5.2. AP Board



5.2.1. Description of the AP Board

No.	Name	Description
1	LED*3 (LD1~LD3)	PT1.4 ~ PT1.6 total of three GPIO control LD1 ~ LD3
		Control the VDD power supply of the U5 (HY3106)
		(Power is not supplied to HY3106)
2	128 VDD Jumper	J28
2		(Power supply to HY3106)
		J28
3	SPI Connector	SPI Interface
4	I ² C Connector	I ² C Interface
5	PWM Port	PT2.6 & PT2.7 PWM Port
6	24C02 EEPROM	With 2K EEPROM for I ² C interface
		Set PT2.2 pull high resistor
		PT2.2 disable pull high resistor
7	127 VDD lumper	J27 🌑 🌑
		PT2.2 enable pull high resistor
		J27



No.	Name	Description
8	Tack Switch*3 (K1~K3)	PT1.1 ~ PT1.3 total of three GPIO control K1 ~ K3
		AIO3 settings
		AIO3 OPEN AVSS
0	AIO3 lumper	J18
9		AIO3 Short AVSS
		J18
		AIO2 settings
		AIO2 Short VDDA
10	AIO2 Jumper	J17 • •
		AIO2 Short AVSS
		J17 🗨 🕒
11	VSS	MCU VSS Pin
12	DAC	MCU DAO Pin
13	OPA	MCU OPO Pin
14	ADC VR1	Adjust the ADC's variable resistor
		External bridge circuit settings
		(Please refer to section 5.6 for detailed ADC
		measurement method)
		Enable the external bridge circuit J15 VDDA •
15	ADC Jumper	
		Disable the external bridge circuit
		VDDA •
		AIO0 • •
		AI01 • •
		AVSS •
16	Bridge Sensor	ADC Input Pin A0 & A1



No.	Name	Description
	Connector	
17	CMP VR2	Adjust the CMP's variable resistor
18	COM/SEG Pin	4COM*36SEG LCD Port



5.3. LCD Board

5.3.1. 4 COM*17 SEG LCD Board



Name	C1	C3	S1	S3	S5	S 7	S9	S11	S13	S15			-	-	-	-	-	-	-	-
Pin	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
No.	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
Name	CO	C2	S0	S2	S4	S6	S8	S10	S12	S14	S16	-	-	-	-	-	-	-	-	-

Note: - \rightarrow unused

5.3.2. LCD Panel specification

- (1) Operating Voltage: 3.0V
- (2) Visible Angle: 60 degree
- (3) Operating Frequency: 60Hz
- (4) Bias: 1/3 bias
- (5) Waveform: 1/4 duty
- (6) Pin: 90 degree

S1 S2 S3 S4	A								
							58 m	S14 A	S18
	// _F //						S9	S15	S19
	// //B						ĸ	516	
S5		$U_{}U$	UU	$U_{-}U$	<u> </u>	$U_{}U$	M	V	
									S20
S6	//						• S11	S17	
TARE /	/ ^L // ^C						S 1	2 g	S21
S7 /	/ D // Н			11 11			S1	3	
ZERO 🖓				~ o					-
	1	2	3	4	5	6			

	SEG0	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8	SEG9	SEG10	SEG11	SEG12	SEG13	SEG14	SEG15	SEG16
COMO	1F	1A	2F	2A	3F	3A	4F	4A	5F	5A	6F	6A	S1	S5	S10	S9	S18
COM1	1G	1B	2G	2B	3G	3B	4G	4B	5G	5B	6G	6B	S2	S6	S11	S14	S19
COM2	1E	1C	2E	2C	3E	3C	4E	4C	5E	5C	6E	6C	S3	S7	S12	S15	S20
COM3	1D	1H	2D	2H	3D	3H	4D	4H	5D	5H	6D	S17	S4	S8	S13	S16	S21



5.4. Enter ISP Bootloader operation steps



ISP Bootloader Mode Enter the following steps:

- Step1. Switch S1 (External Power Switch) to EPW
- Step2. Switch S2 (Boot Switch) to ON
- Step3. Switch S3 (Boot Pin Switch) all open to ON
- Step4. Connect USB Cable to USB Port
- Step5. Open ISP Bootloader AP



5.5. Measure the MCU power consumption steps



Measure MCU power consumption as follows:



- Step1. J1 Pin2 & Pin3 short
- Step2. Provide 3V power supply in J9 (+), J10 (-)
- Step3. Connect current meter to J8 (+), J7 (-)



5.6. Explanation of ADC measurement steps of AP Board



The AP board Bridge Circuit ADC display method is as follows:



Step1. Enable the external bridge circuit

Step2. AIO2 Short VDDA



Step3. AIO3 Short AVSS

Step4. Adjust the ADC's variable resistor



6. Hardware Circuit Diagram

6.1. EV Board Circuit Diagram





6.2. AP Board Circuit Diagram





6.3. LCD Board Circuit Diagram

	J1
COMO	1
COM1	$\frac{1}{2}$
COM2	2
COM3	3
SEG0	
SEG1	- 6
SEG2	7
SEG3	8
SEG4	9
SEG5	10
SEG6	- 11
SEG7	- 12
SEG8	13
SEG9	14
SEG10	15
SEG11	16
SEG12	17
SEG13	18
SEG14	19
SEG15	20
SEG16	21

	J2		
COMO	1	C	COM1
COM2		2 4	COM3
SEG0	5	4	SEG1
SEG2		0	SEG3
SEG4		0	SEG5
SEG6	11	10	SEG7
SEG8	11	12	SEG9
SEG10	15	14	SEG11
SEG12	17	10	SEG13
SEG14	10	$\frac{10}{20}$	SEG15
SEG16	21	20	SEG17
SEG18	$\begin{array}{c} 21\\ 22\end{array}$	24	SEG19
SEG20	25	24 26	SEG21
SEG22	23	20	SEG23
SEG24	$\frac{27}{20}$	20	SEG25
SEG26	29	20	SEG27
SEG28	22	32 24	SEG29
SEG30	25	26	SEG31
SEG32	33	38	SEG33
SEG34	20	30 40	SEG35
	39	40	

LCD Panel

LCD Panel



7. Description of the Hardware Connection

PC and Starter Kit connection diagram



• Normal connection status, see the Silicon Labs CP210x USB to UART Bridge (As the red area below)

·····	-	×
檔案(F) 動作(A) 檢視(V) 說明(H)		
V 🗄 DESKTOP-FIMOLTS		
>		
> 📹 IDE ATA/ATAPI 控制器		
> 🙀 人性化介面裝置		
> 💼 列印佇列		
> 🊂 存放控制器		
> 🏣 系統裝置		
> щ 音效、視訊及遊戲控制器		
> 🗖 處理器		
> 🖣 通用序列匯流排控制器		
✓ 員 連接埠 (COM 和 LPT)		
Silicon Labs CP210x USB to UART Bridge (COM4)		
■ 通訊連接埠 (COM1)		
> 🛄 監視器		
> 🔜 磁碟機		
> 🚽 網路介面卡		
> 🔄 顯示卡		



8. Revisions

The following describes the major changes made to the document, excluding the punctuation and font changes.

VersionPageSummary of ChangesV01ALLFirst version