



*Enabling an Intelligent Planet*

*MIOe DESIGN REFERENCE*

# **RS-232/422/485 MIO-E Design Reference**

**Revision 1.0**



**Reference Documents**

Document	Location
SCH3106 Datasheet	
SP339 Datasheet	

## Introduction

- This document is the design reference for designing a MIOe module with RS-232/422/485 feature to work with Advantech MIO single board.
  
- Contents:
  - Function Selection Table
  - PCB Layout Considerations
  - Reference Schematic
  - Component List

This document is only for MIOe design reference purpose only. Although the information is intended to be accurate, Advantech makes no claims, promises, or guarantees about the quality or reliability of a MIOe board that designed by any user who is outside of Advantech Corp.

## FUNCTION SELECTION TABLE

### **SYSOPT0, SYSOPT1 (Pin U3.68, U3.70):**

Configuration	Base I/O address
1. Pull-up SYSOPT0 with a 10 K $\Omega$ resistor to 3.3V power rail. 2. Pull-up SYSOPT1 with a 10 K $\Omega$ resistor to 3.3V power rail.	0x04E

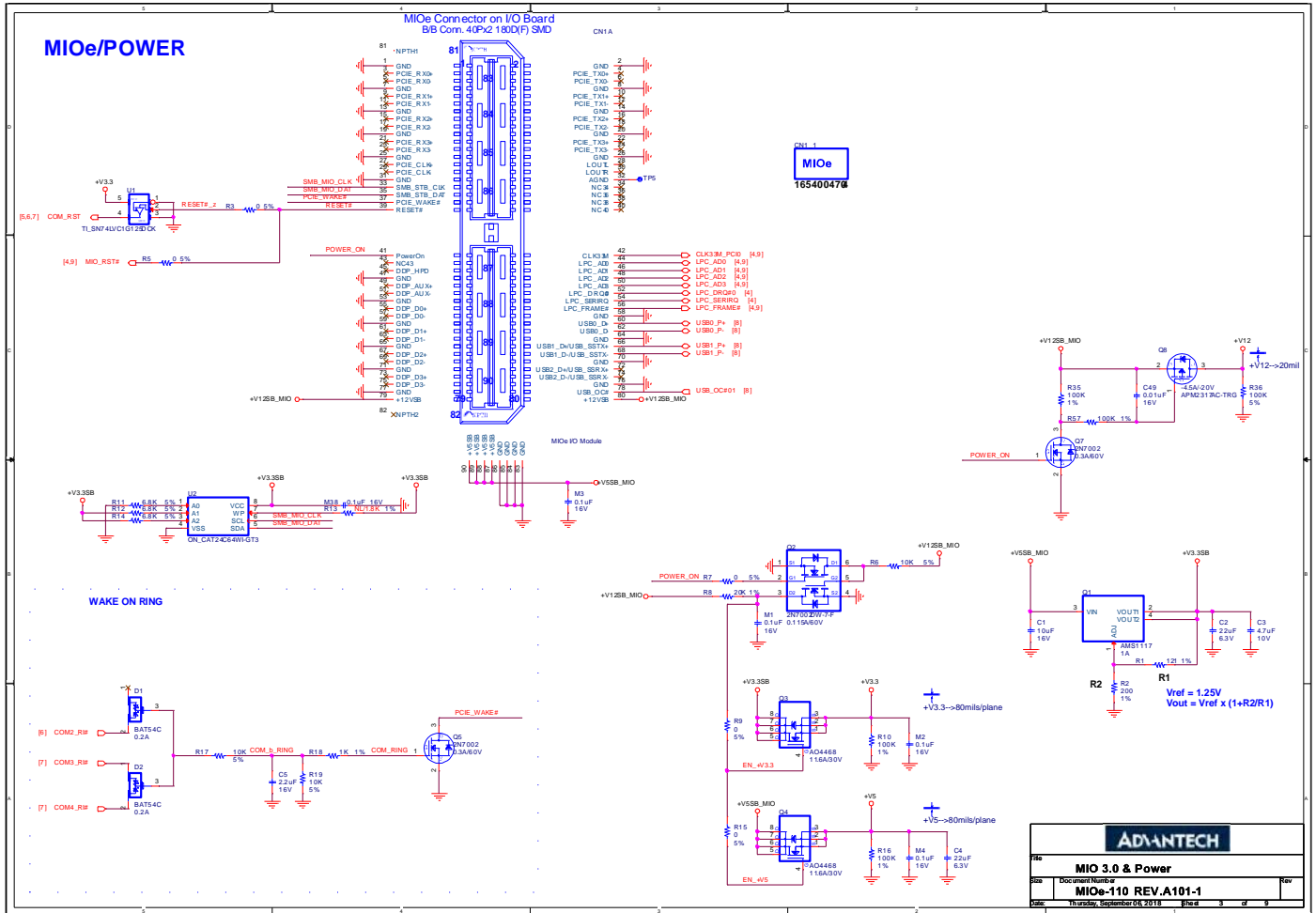
### **MODE0, MODE 1 (Pin U11.14, U11.15):**

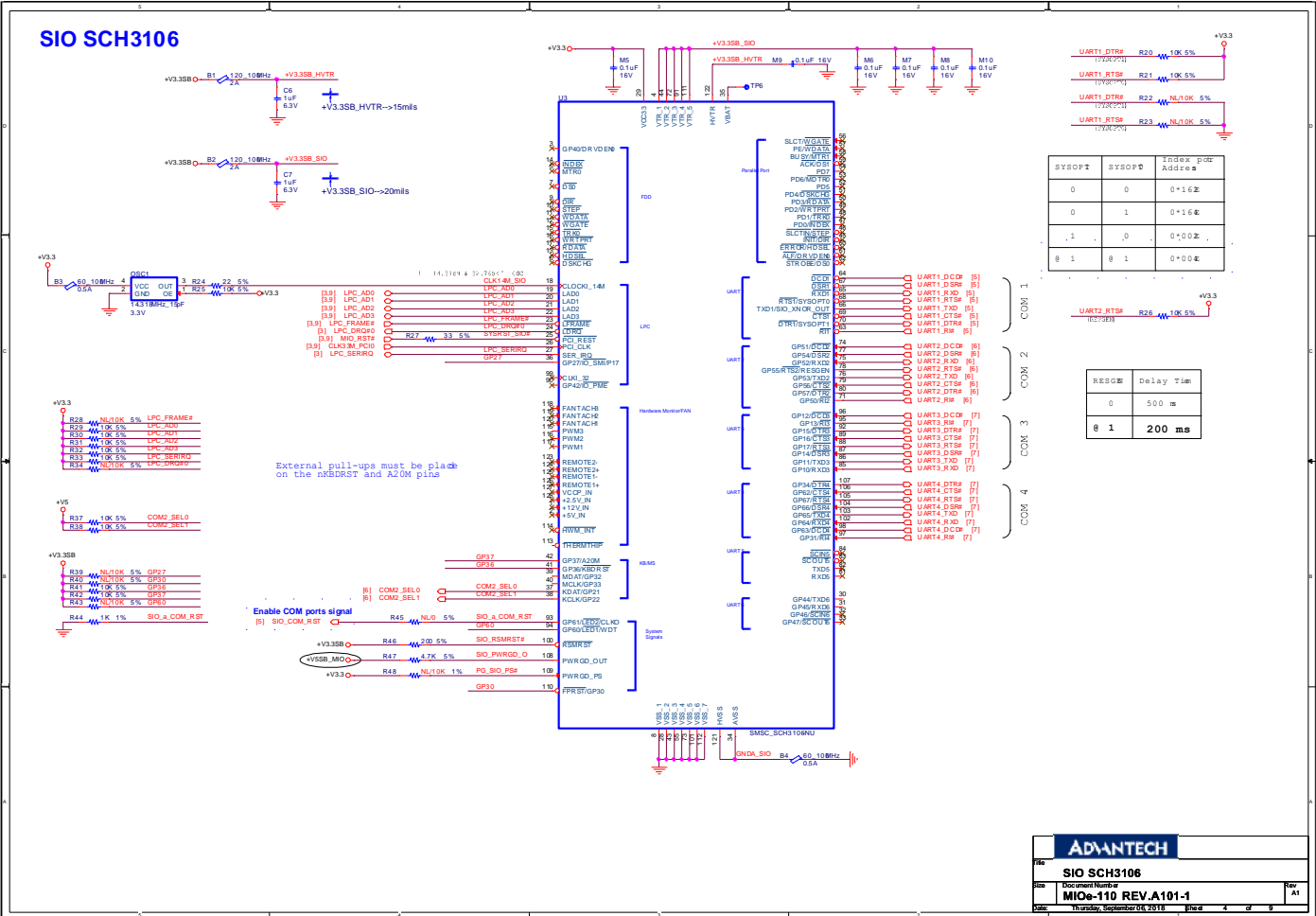
Configuration	Function
MODE0 = Logic High & MODE1 = Logic Low	RS-232
MODE0 = Logic Low & MODE1 = Logic High	RS-485
MODE0 = Logic High & MODE1 = Logic High	RS-422

## PCB Layout Considerations

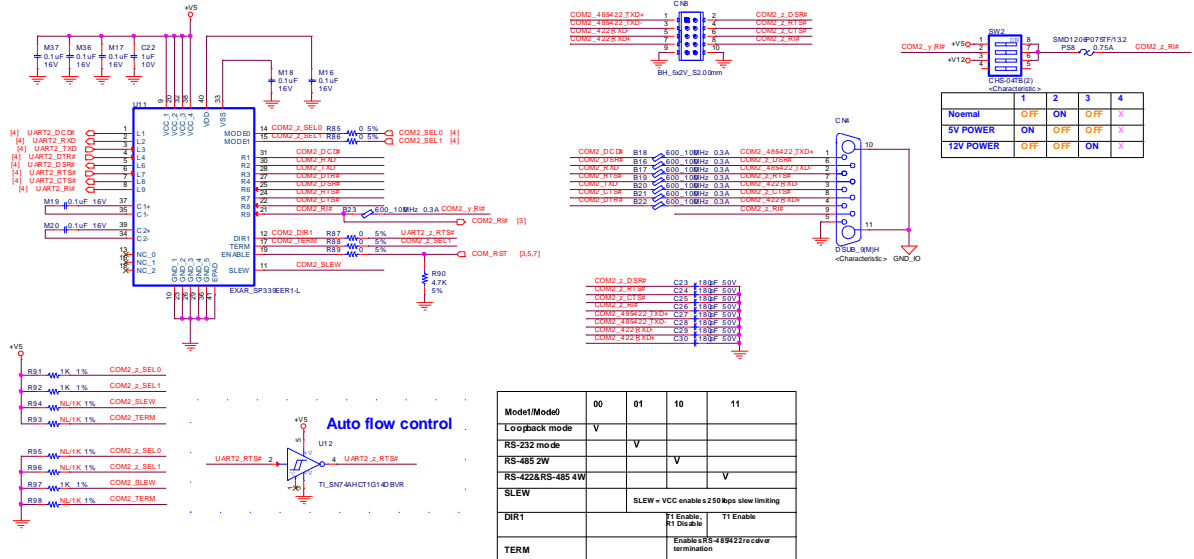
Please notice that PCB Layout will be vary depends on design. For layout considerations, please refer to SCH3106 and SP339 datasheet.

### Reference Schematic





### COM2



Model/Mod0	00	01	10	11
Loopback mode	V			
RS-232 mode		V		
RS-485 2W			V	
RS-422&RS-485 4W				V
SLEW	SLEW = VCC enable ±250kps slew limiting			
DIR1		F1 Enable		T1 Enable
TERM	Enable ±1K ±1% 48V422 receiver termination			

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Rev: COM2

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Date: Tuesday, September 04, 2018 Time: 8:45:53 AM Page: 5 of 8



## Component List

QTY	Description	Reference	Manufacture Part Number	Manufacture
1	CR 20K 1% 1/16W SMD 0402	R8	0402WGF2002TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
1	CR 1.8K 1% 1/16W SMD 0402	R13	0402WGF1801TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
1	MLCC X5R 1uF ±10% 10V SMD 0402	C22	0402X105K100CT	台灣東電化股份有限公司 (TDK Taiwan Corporation)
2	MLCC X5R 22uF 20% 6.3V SMD 0805	C2	0805X226M6R3CT-T	台灣村田股份有限公司 (Taiwan Murata Electronics Co., Ltd.)
		C4		
18	MLCC X7R 0.1uF 10% 16V SMD 0402	M1	0402B104K160CT	國巨股份有限公司 (Yageo Co.,Ltd.)
		M2		
		M3		
		M4		
		M5		
		M6		
		M7		
		M8		
		M9		
		M10		
		M16		
		M17		
		M18		
		M19		
		M20		
2	MLCC X5R 1uF 10% 6.3V SMD 0402	C6	0402X105K6R3CT	台灣東電化股份有限公司 (TDK Taiwan Corporation)
		C7		
1	MLCC X7R 0.01uF 10% 16V SMD 0402	C49	0402B103K160CT	國巨股份有限公司 (Yageo Co.,Ltd.)

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8	MLCC X7R 180pF 10% 50V SMD 0402	C23	CC0402KRX7R9 BB181	國巨股份有限公司 (Yageo Co.,Ltd.)
		C24		
		C25		
		C26		
		C27		
		C28		
		C29		
		C30		
1	MLCC X7R 2.2uF 10% 16V SMD 0805	C5	0805B225K160CT	台灣東電化股份有限公司 (TDK Taiwan Corporation)
1	MLCC X7R 10uF 10% 16V SMD 1206	C1	C1206X106K016T	台灣東電化股份有限公司 (TDK Taiwan Corporation)
1	MLCC Y5V 4.7uF +80%-20% 10V SMD 0805	C3	C0805Y475Z010T	台灣太陽誘電(股)公司 (Taiwan Taiyo Yuden Co., Ltd.)
2	Bead 120ohm 25% 2A SMD 0603 BLM18PG121SN1 WO/Pb	B1	BLM18PG121SN1	台灣村田股份有限公司 (Taiwan Murata Electronics Co., Ltd.)
		B2		
2	Bead 60ohm 500mA SMD 0603 BLM18PG600SN1D WO/Pb	B3	BLM18PG600SN1D	台灣村田股份有限公司 (Taiwan Murata Electronics Co., Ltd.)
		B4		
8	Bead 600ohm 25% 300mA SMD 0402 BLM15AG601SN1D	B16	BLM15AG601SN1D	台灣村田股份有限公司 (Taiwan Murata Electronics Co., Ltd.)
		B17		
		B18		
		B19		
		B20		
		B21		
		B22		
		B23		
1	OSC 14.318MHZ 50ppm 3.3V 15pF SMD 4P 7x5mm	OSC1	7W14300014	台灣晶技股份有限公司 (Txc Corporation)
1	Polyswitch SMD 0.75A WO/Pb SMD1206P075TF/13.2	PS8	SMD1206P075TF /13.2	聚鼎科技股份有限公司 (Polytronics Technology Corporation)
2	Schottky BAT54C 0.2A 30V SMD SOT-23	D1	BAT54C	恩智浦半導體 (NXP Semiconductors)
		D2		
2	MOSFET N-CH AO4468 11.6A 30V SMD SOIC8 8P	Q3	AO4468	香港商萬國半導體股份有限公司 (Alpha & Omega Semiconductor Ltd.)
		Q4		
2	MOSFET N-CH 2N7002 0.3A 60V SMD SOT-23 3P	Q5	2N7002	恩智浦半導體 (NXP Semiconductors)
		Q7		

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1	MOSFET P-CH APM2317AC-TRG -20V -4.5A SMD SOT-23	Q8	APM2317AC-TRG	大中積體電路股份有限公司 (Sinopower Semiconductor Inc.)
1	MOSFET N-CH 2N7002DW-7-F 0.115A 60V SMT SOT-363	Q2	2N7002DW-7-F	Diodes Inc.
1	CR 10K 1% 1/16W SMD 0402	R48	0402WGF1002TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
10	CR 1K 1% 1/16W SMD 0402	R18	0402WGF1001TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
		R44		
		R91		
		R92		
		R93		
		R94		
		R95		
		R96		
		R97		
4	CR 100K 1% 1/16W SMD 0402	R10	0402WGF1003TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
		R16		
		R35		
		R57		
1	CR 121 1% 1/10W SMD 0603	R1	0603WAF1210T5E	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
1	CR 200 1% 1/10W SMD 0603	R2	0603WAF2000T5E	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
11	CR 0 5% 1/16W SMD 0402	R3	0402WGJ0000TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
		R5		
		R7		
		R9		
		R15		
		R45		
		R85		
		R86		
		R87		
		R88		
R89				

23	CR 10K 5% 1/16W SMD 0402	R6	0402WGJ0103TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
		R17		
		R19		
		R20		
		R21		
		R22		
		R23		
		R25		
		R26		
		R28		
		R29		
		R30		
		R31		
		R32		
		R33		
		R34		
R37				
R38				
R39				
R40				
R41				
R42				
R43				
1	CR 100K 5% 1/16W SMD 0402	R36	0402WGJ0104TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
1	CR 200 5% 1/16W SMD 0402	R46	0402WGJ0201TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
1	CR 22 5% 1/16W SMD 0402	R24	0402WGJ0220TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
1	CR 33 5% 1/16W SMD 0402	R27	0402WGJ0330TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
2	CR 4.7K 5% 1/16W SMD 0402	R47	0402WGJ0472TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
		R90		
3	CR 6.8K 5% 1/16W SMD 0402	R11	0402WGJ0682TCE	厚聲電子工業有限公司 (Uniroyal Electronics Industry Co.,Ltd.)
		R12		
		R14		

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1	REG LDO AMS1117 SMD SOT-223 3P 1A ADJ AMS	Q1	AMS1117	Advanced Monolithic System Inc.
1	IC SN74AHCT1G14DBVR Logic Gate TTL SMD SOT-23 5P	U12	SN74AHCT1G14 DBVR	德州儀器工業股份有限公司 (Texas Instruments Incorporated)
1	IC SN74LVC1G125DCKR SMD SC-70 5P	U1	SN74LVC1G125 DCKJ	德州儀器工業股份有限公司 (Texas Instruments Incorporated)
1	IC SCH3106-NU SMD VTQFP 128P	U3	SCH3106-NU	美商史恩希股份有限公司 (Standard Microsystems Corporation)
1	IC CAT24C64WI-GT3 EEPROM SMD SOIC 8P	U2	CAT24C64WI-GT3	安森美半導體 (On Semiconductor)
1	IC SP339EER1-L Transceiver SMD TQFN 40P	U11	SP339EER1-L/TR	美商艾科嘉公司 (Exar Corporation)
1	DIP SW SMD 8P SPST P=1.27mm W=5.4mm KHS42E	SW2	CHS-04TB(29)	中國電子器材深圳有限公司
1	BOX HEADER 5x2P 2.00mm 180D(M) SMD 23N685B-10M10	CN8	23N685B-10M10B -01G-7.6-C	致威電子公司 (Jih Vei Electronics Co., Ltd.)
1	MIOE Connector	CN1	QTE-040-05-L-D-A	Samtec U.S.A.
1	D-SUB Conn. 9P 5mm 90D(M)	CN4	070205MR009 S202BA	實盈股份有限公司 (Suyin Corporation)

## Other Remarks

This document provides a reference on hardware design only. For other support or resource such as Firmware or other utilities, please contact your local agent.