

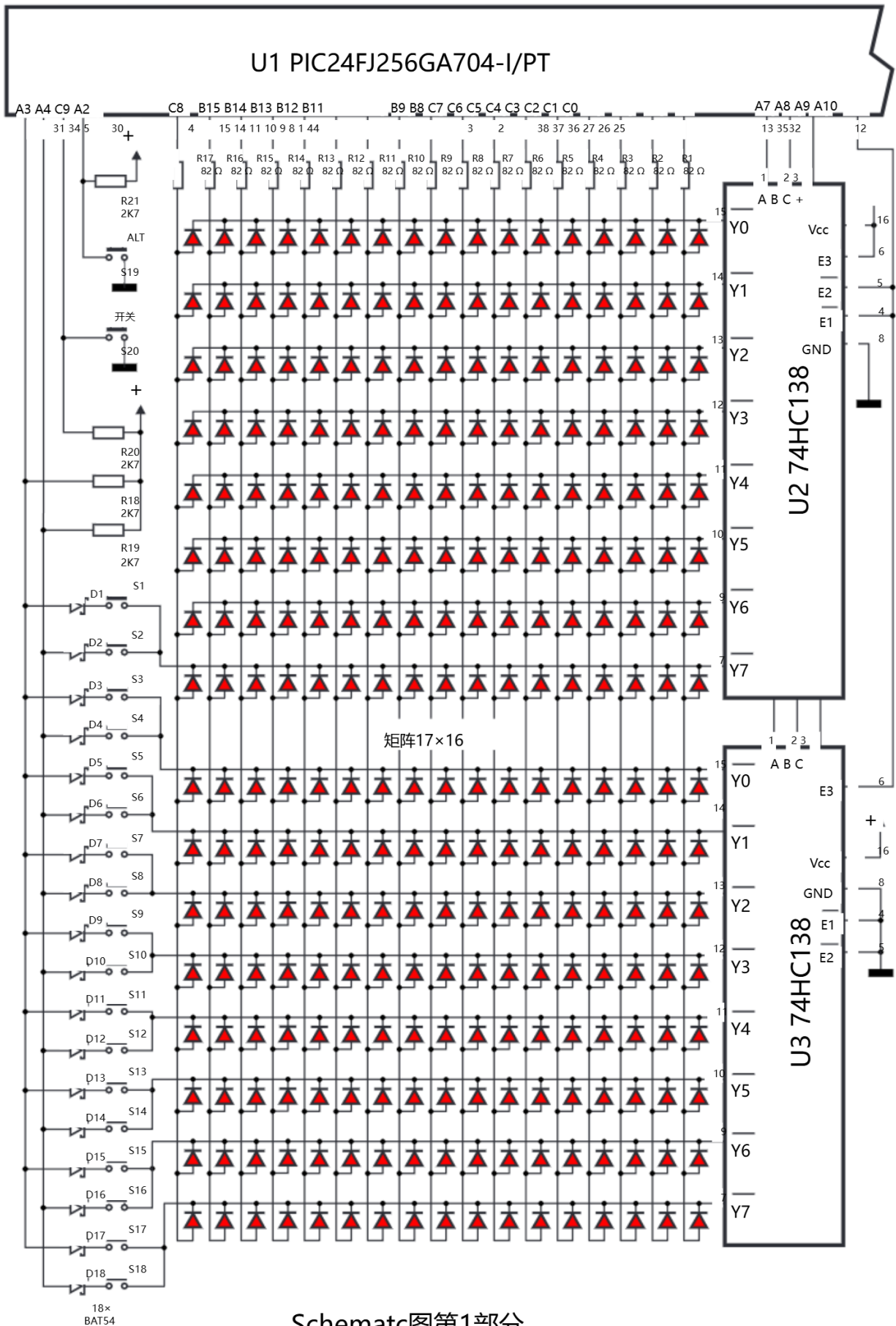
# **HARDWARE**

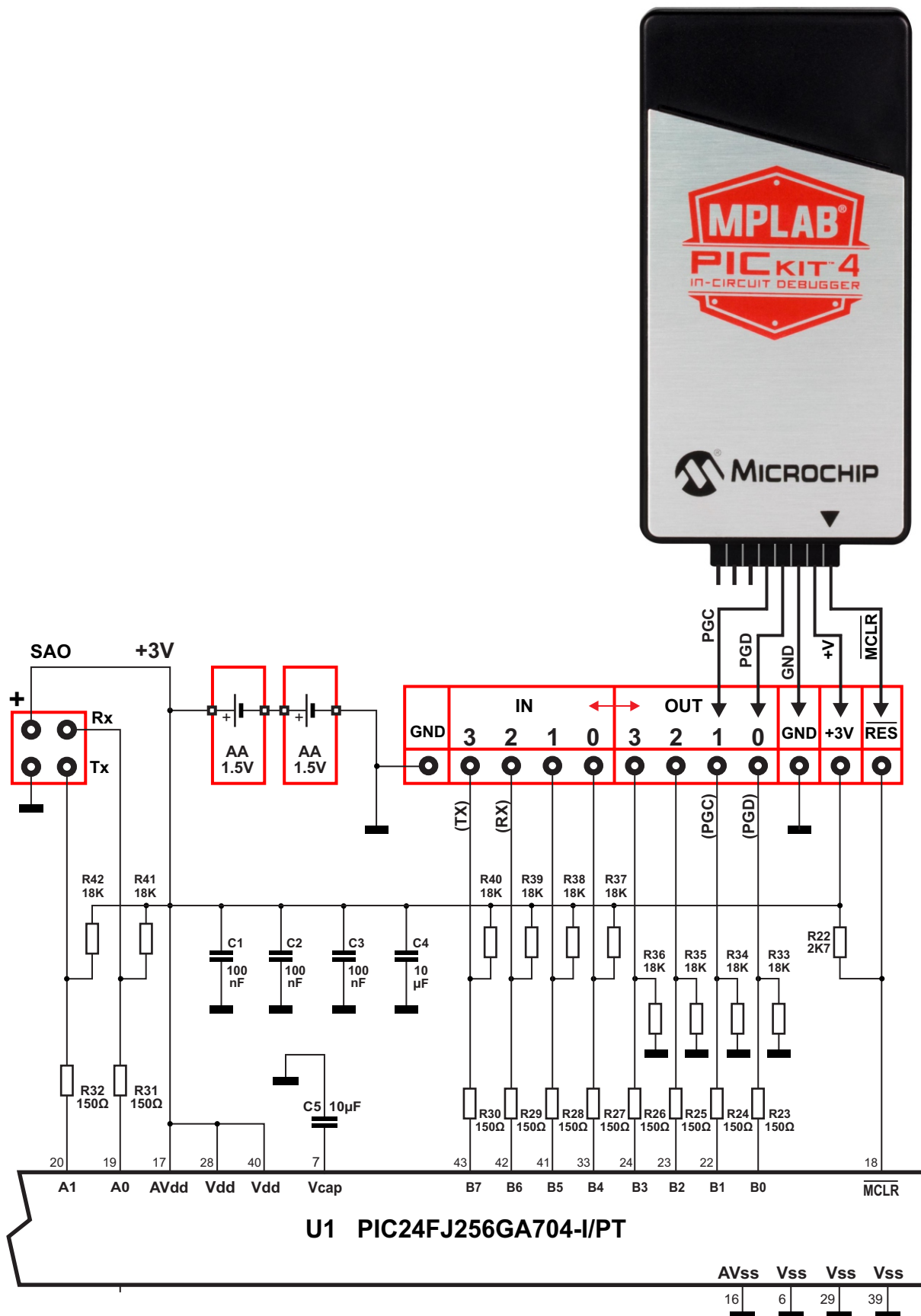
**Revision 4a**  
Nov-03-2022

# 硬件

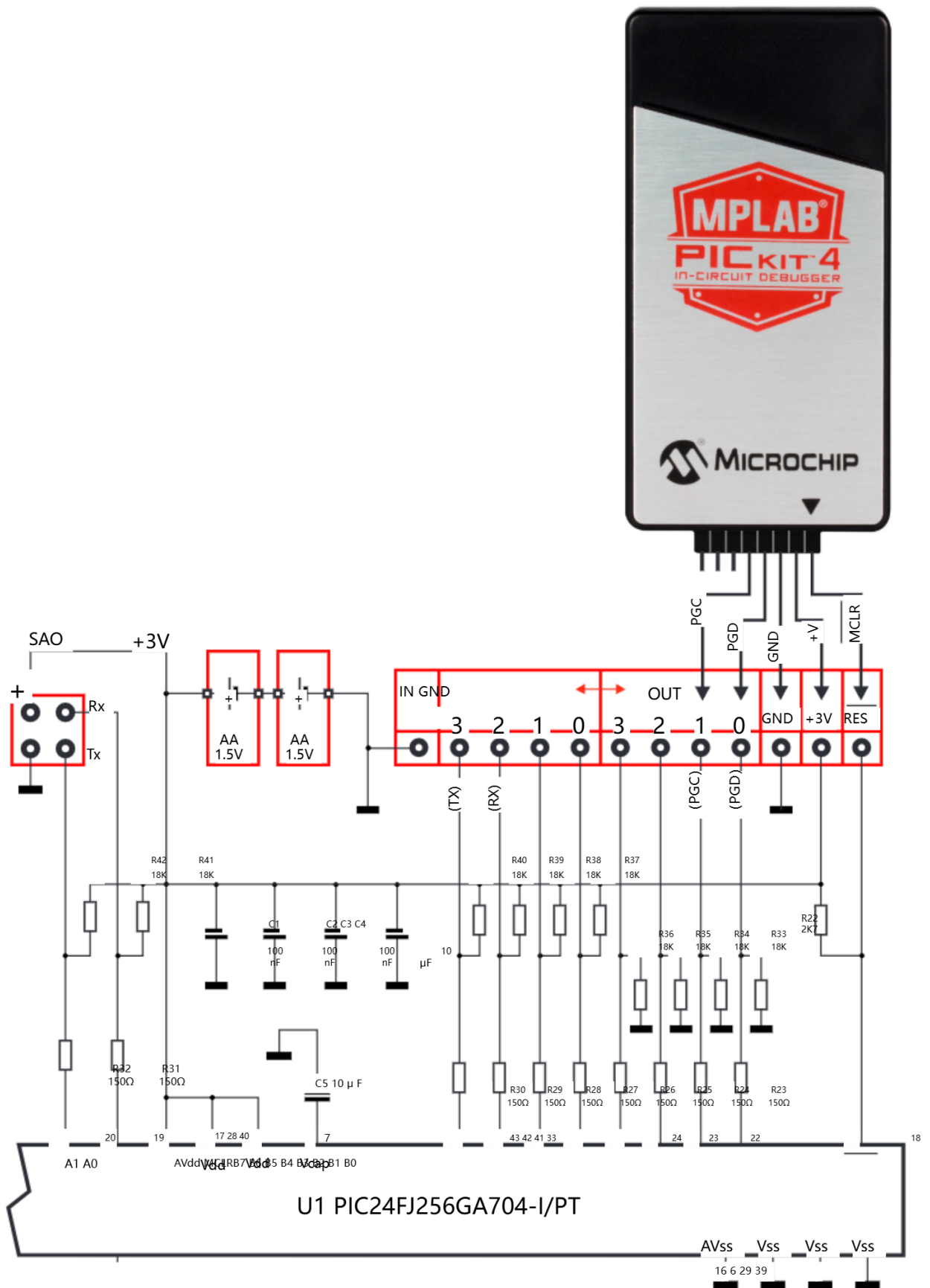
修订版4a  
2022年11月3日



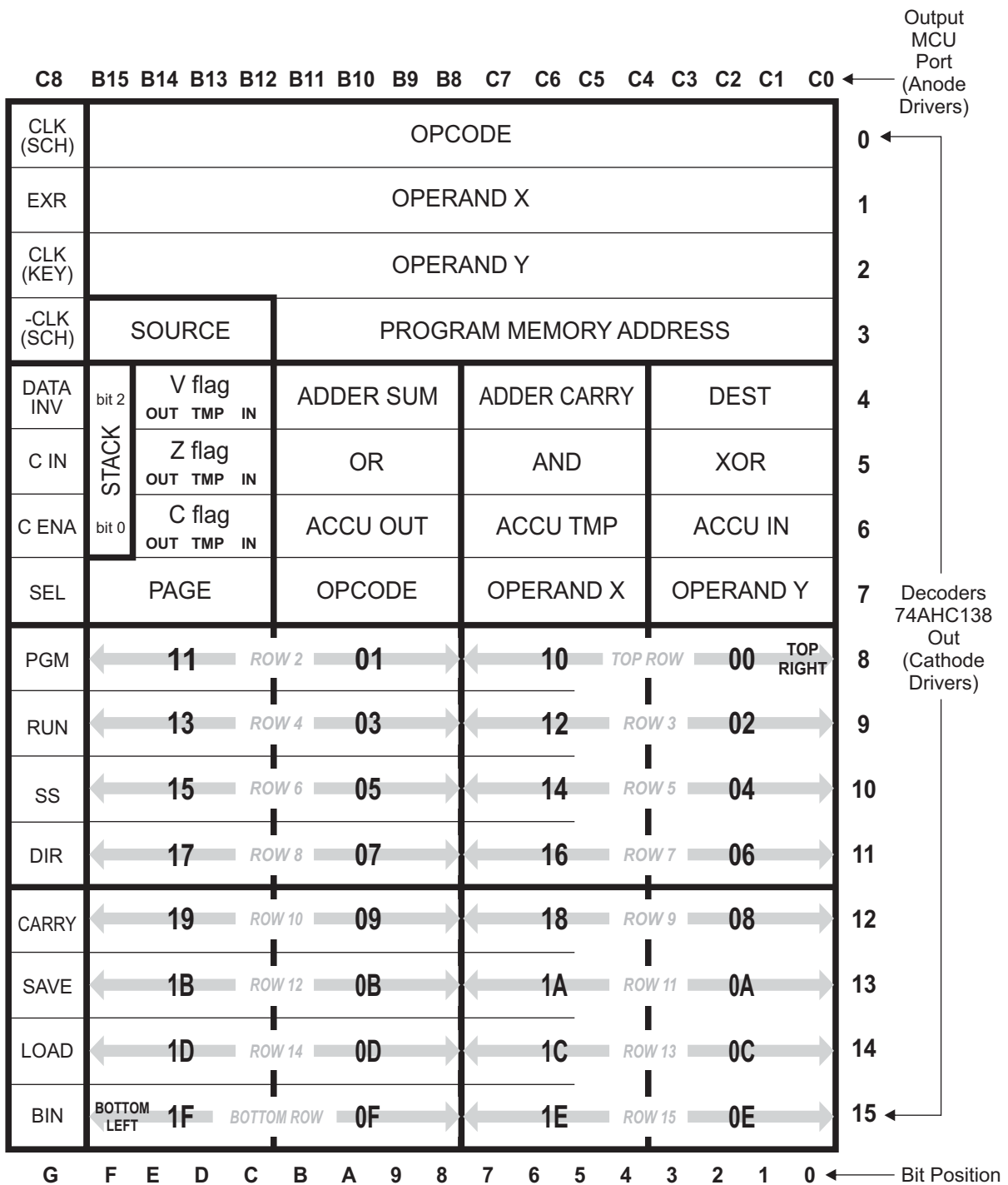




Schematc diagram part 2



示意图第2部分



Full LED matrix 16×17  
Total 172 LEDs 0603  
182 Red LEDs  
90 Yellow LEDs

## LED Matrix wiring map



全LED矩阵16×17共172个  
LED 0603 182个红色LED  
90个黄色LED

LED矩阵布线图



## ALKALINE AA BATTERY (2000 mAh) POWER SUPPLY

Parameter	Conditions		Min	Typical	Max	Alkaline Battery life AA, 2 Ah (Calculated)
Supply Voltage	MCU User Manual data		2 V	3 V	3.6 V	
<b>Operating Current @ 25°C (77°F) and calculated battery life</b>	3V, Sleep Mode (OFF)			5.5µA		42 Years (**)
	3V Dim = MAX	Number of LEDs "ON"	10	14 mA		143 h (6 days)
			40	27 mA		74 h (3 days)
			60(*)	37 mA		54 h (2 days)
			100	57 mA		35 h (1.5 days)
			150	81 mA		24 h (1 day)

(\*) Average value in normal applications.

(\*\*) This is the theoretical (calculated) battery life. The shelf life of alkaline battery is about 10 years, so it will be drained much before the calculated period.

Note: In practical tests with fresh alkaline batteries, the badge achieved operating times that were much longer than calculated. This was due to the battery voltage drop, causing the LED current to drop even more, decreasing the power consumption. The whole system worked fine down to 1.82V, but the light intensity was low.

## TIMINGS

Parameter	Conditions		Min	Typical	Default	Max
IPS (Instructions Per Second) (*)	Parameters adjustable at runtime		0.5		250,000	250,000
Sync (*)			1 Hz		400 Hz	1000 Hz
Baud Rate (*)			1200		2400	115,200
Dimmer Duty Cycle (*)			6%		100%	100%
AutoOff Period (*)		After Reset or Switch ON		20 minutes		
		After any key pressed (except ON/OFF or ALT)		2.5 hours		
Timing Tolerance	0°C < T <sub>AMB</sub> < +85°C 32°F < T <sub>AMB</sub> < +185°F		-1.5%	0.15%		+1.5%
Flash Data Retention	V <sub>MAX</sub> or T <sub>MAX</sub> not violated		20 Years			

(\*) These parameters are adjustable at runtime.

碱性AA电池（2000 mAh）电源插座

参数	条件		最小	典型	最大	碱性电池寿命AA, 2 Ah (计算值)
电源电压	MCU用户手册数据		2 V	3 V	3.6 V	
工作电流 在25°C (77°F) 时 和计算 电池寿命	3V, 睡眠模式 (关闭)			5.5μA		42岁 (**)
	3V 尺寸=最大	LED "ON" 的数量	10	14 mA		143小时 (6天) 54小时 (2天)
			40	27毫安		74小时 (3天)
			60 (*)	37 mA		
			100	57毫安		35小时 (1.5天) 默认
			150	81毫安		24小时 (1天)

(\*) 正常应用中的平均值

(\*\*) 这是理论 (计算) 电池寿命。碱性电池的保质期约为10年，因此它会在计算期之前耗尽。

注：在使用新碱性电池的实际测试中，徽章的工作时间比计算的时间长得多。这是由于电池电压下降，导致LED电流下降更多，降低了功耗。整个系统在低至1.82V时工作良好，但光强较低。

定时

参数	条件		最小典型值			Max
IPS (说明 每秒) (*)	运行时参数可调		0.5		250,000	250,000
同步 (*)			1 Hz		400 Hz	1000 Hz
波特率 (*)			1200		2400	115,200
调光器占空比 (*)			6%		100% 100%	
自动关闭周期 (*)		复位或打开后		20分钟2.5小时		
		按下任何键后 (ON/OFF或ALT除外)				
定时容差	0°C < T < +85°CAMB 32°F < T < +185°FAMB		-1.5%	0.15%		+1.5%
闪存存储器数据保留	V或T未违反MAX		20年			

(\*) 这些参数可在运行时调整。