Tarjeta microcontroladora basada en LPC4078FBD80

Diseño Basado en Microprocesadores

Dpto. de Automática, Electrónica, Arquitectura y Redes de Computadores

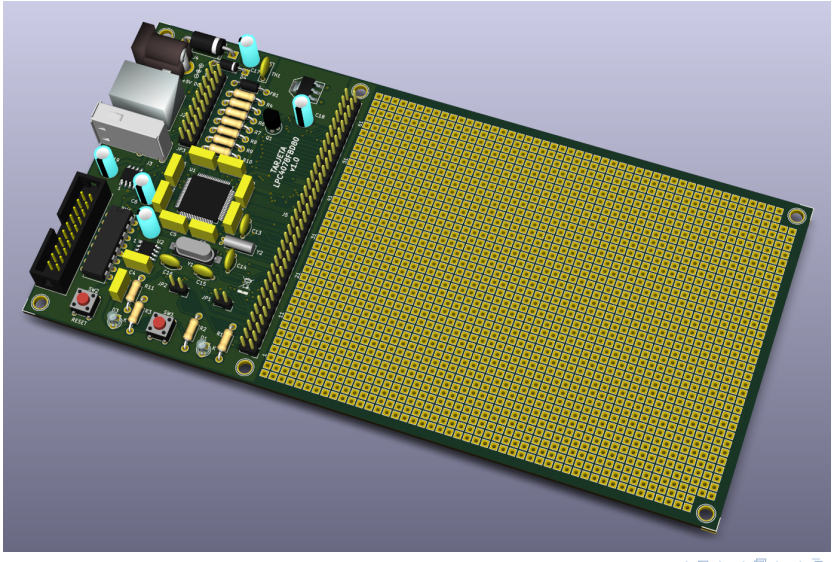
2017

Contenido

Características de la tarjeta

- Sólo elementos básicos (barata):
  - Microcontrolador LPC4078FBD80.
  - Regulador de tensión de $+3.3$ V.
  - Referencia de tensión de precisión para el ADC y DAC del μC.
  - LED indicador encendido.
  - LED y pulsador de propósito general.
  - Pulsador de reset.
  - Conector JTAG para programación y depuración.
  - Conectores USB device y USB host.
  - Conector de expansión.
  - Zona de prototipaje.
  - PCB de dos capas.
  - Dimensiones: 200 mm $\times$ 100 mm.

Imagen 3D de la tarjeta

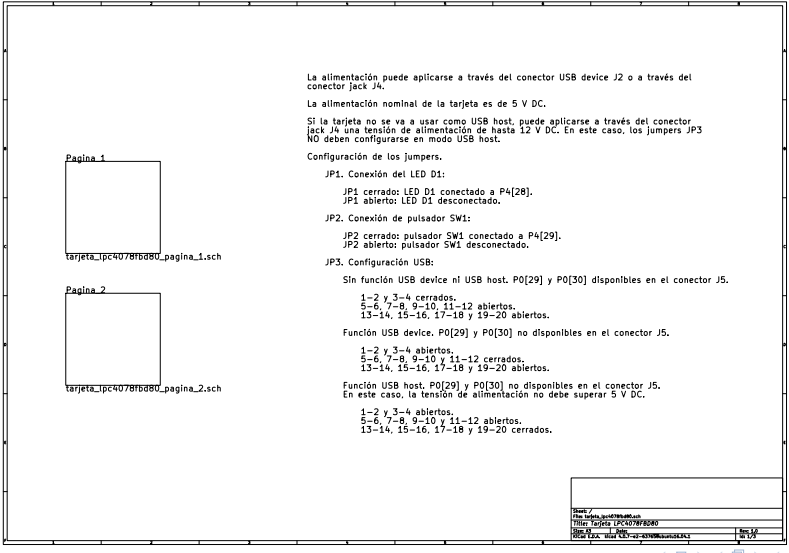


Diferencias entre el LPC4078FBD80 y el LPC4088FET208

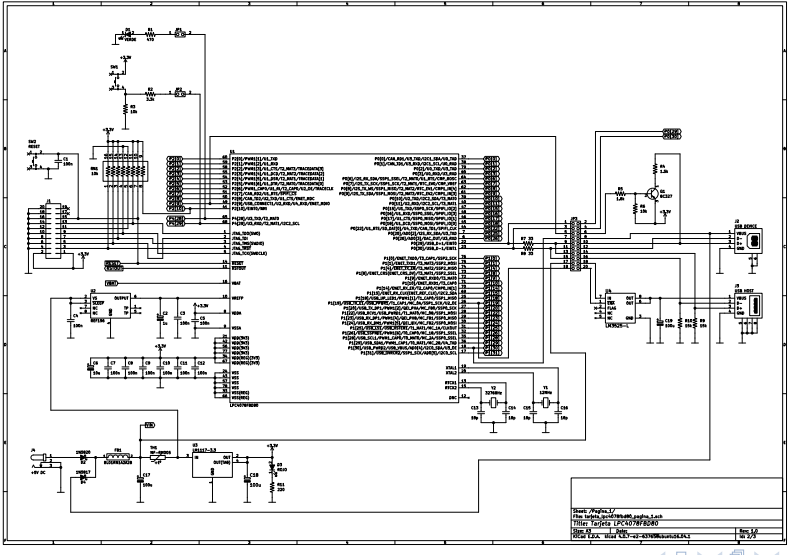
Table 2. Ordering options

Type number	Flash (kB)	SRAM (kB)	EEPROM (B)	EMC bus width (bit)	LCD	Ethernet	USB	CAN	UART	QEI	SD/MMC	Comparator	FPU	Package
LPC4088														
LPC4088FBD208	512	96	4032	32	yes	yes	H/O/D	2	5	yes	yes	yes	yes	LQFP208
LPC4088FET208	512	96	4032	32	yes	yes	H/O/D	2	5	yes	yes	yes	yes	TFBGA208
LPC4088FET180	512	96	4032	16	yes	yes	H/O/D	2	5	yes	yes	yes	yes	TFBGA180
LPC4088FBD144	512	96	4032	8	yes	yes	H/O/D	2	5	yes	yes	yes	yes	LQFP144
LPC4078														
LPC4078FBD208	512	96	4032	32	no	yes	H/O/D	2	5	yes	yes	yes	yes	LQFP208
LPC4078FET208	512	96	4032	32	no	yes	H/O/D	2	5	yes	yes	yes	yes	TFBGA208
LPC4078FET180	512	96	4032	16	no	yes	H/O/D	2	5	yes	yes	yes	yes	TFBGA180
LPC4078FBD144	512	96	4032	8	no	yes	H/O/D	2	5	yes	yes	yes	yes	LQFP144
LPC4078FBD100	512	96	4032	-	no	yes	H/O/D	2	5	yes	yes	yes	yes	LQFP100
LPC4078FBD80	512	96	4032	-	no	yes	H/O/D	2	5	yes	no	yes	yes	LQFP80
LPC4076														
LPC4076FET180	256	80	2048	16	no	yes	H/O/D	2	5	yes	yes	yes	yes	TFBGA180
LPC4076FBD144	256	80	2048	8	no	yes	H/O/D	2	5	yes	yes	yes	yes	LQFP144
LPC4074														
LPC4074FBD144	128	40	2048	-	no	no	D	2	4	no	no	no	no	LQFP144
LPC4074FBD80	128	40	2048	-	no	no	D	2	4	no	no	no	no	LQFP80
LPC4072														
LPC4072FET80	64	24	2048	-	no	no	D	2	4	no	no	no	no	TFBGA80
LPC4072FBD80	64	24	2048	-	no	no	D	2	4	no	no	no	no	LQFP80

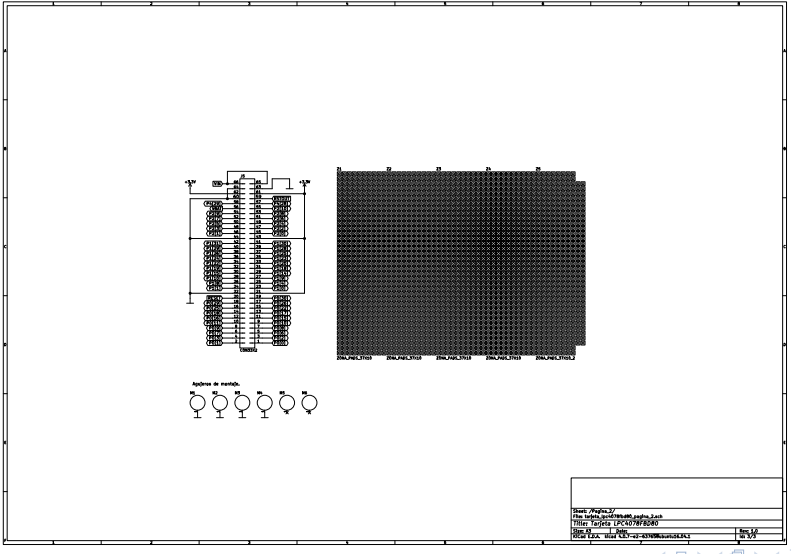
Esquemáticos (1/3)



Esquemáticos (2/3)

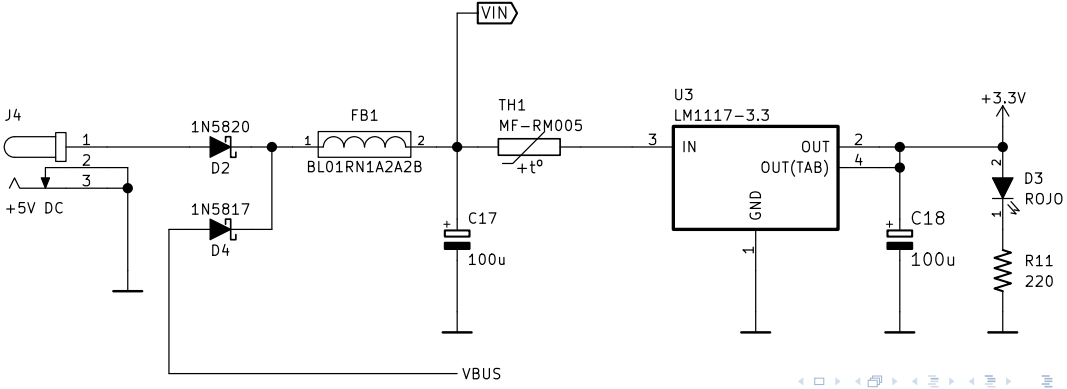


Esquemáticos (3/3)

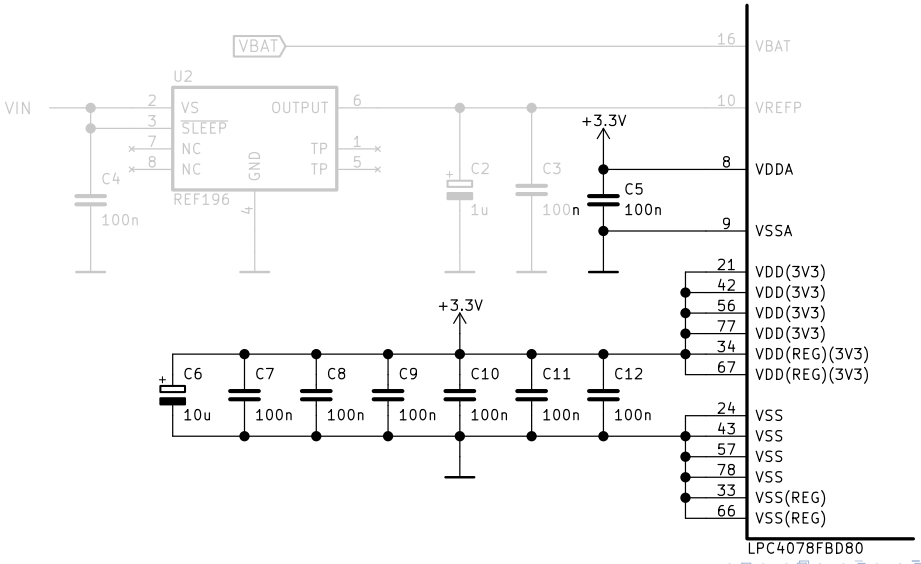


Alimentación

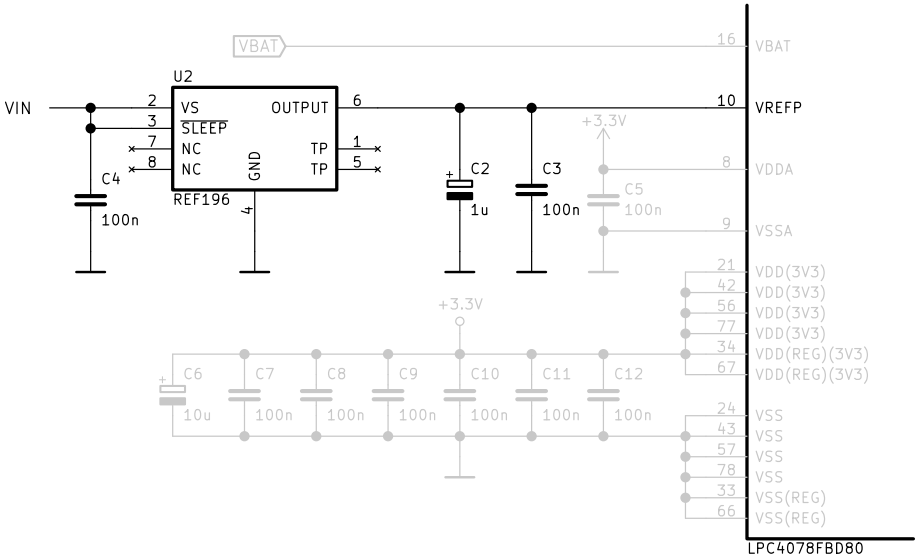
- La tarjeta puede alimentarse a través del conector jack J4 o del conector USB device J2 (tensión VBUS).
- Si la tarjeta no se usa como USB host (ver jumpers JP3) la alimentación aplicada a J4 puede ser de hasta 12 V DC.



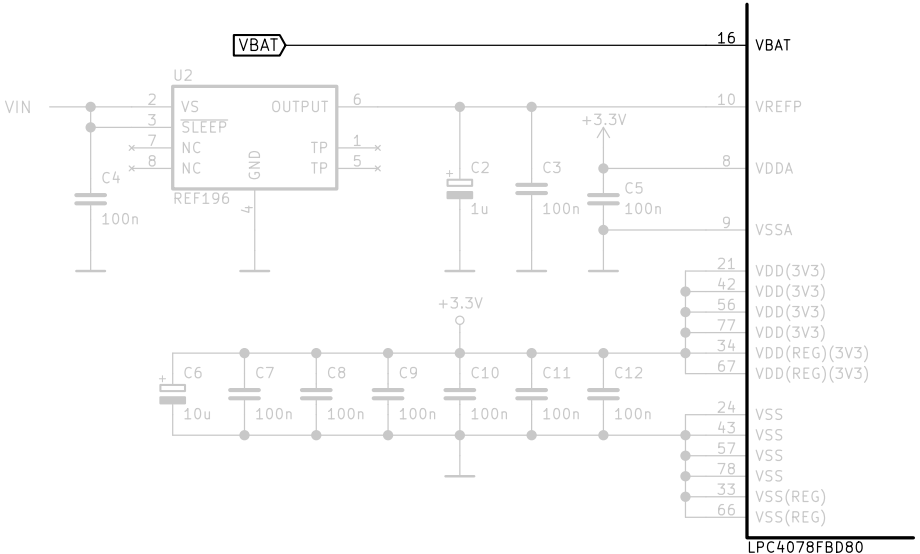
Condensadores de desacoplo de alimentación



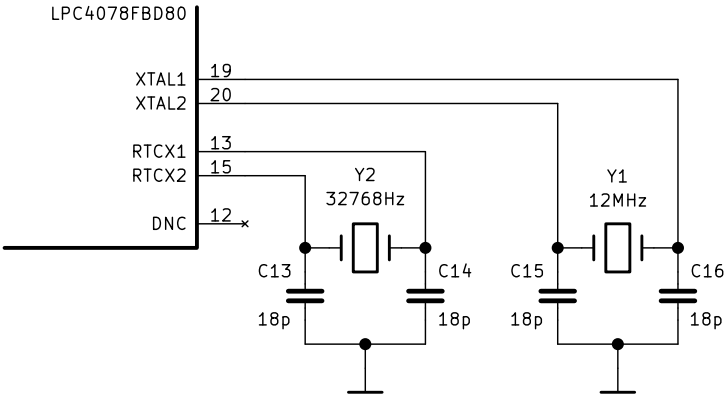
Referencia de precisión para ADC y DAC



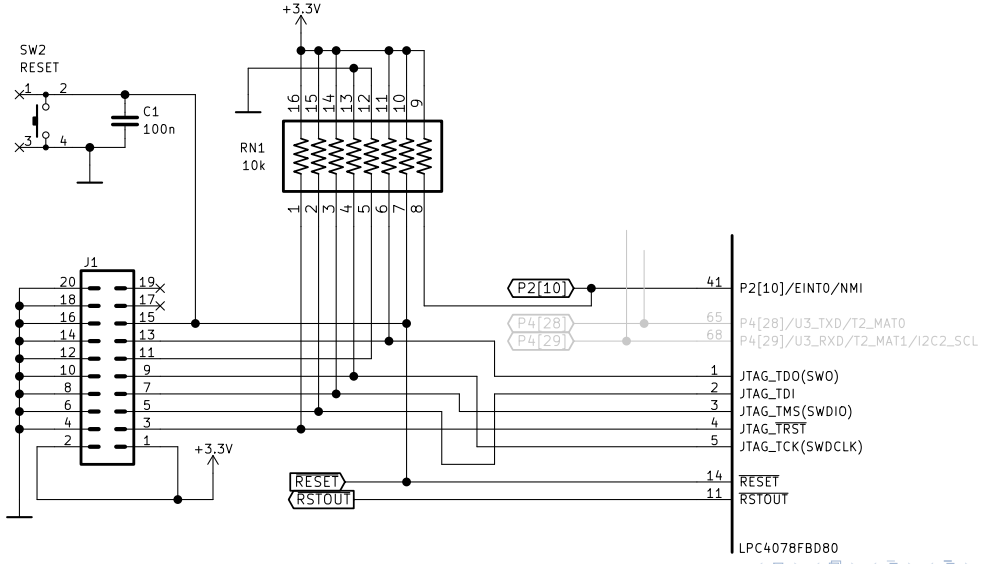
Tensión de batería para el RTC



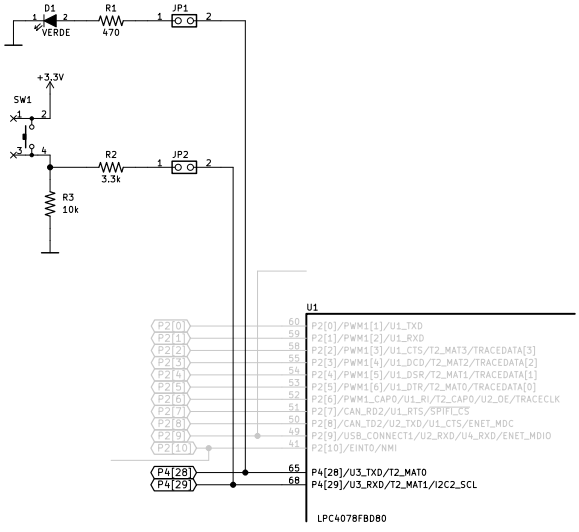
Cristales de cuarzo



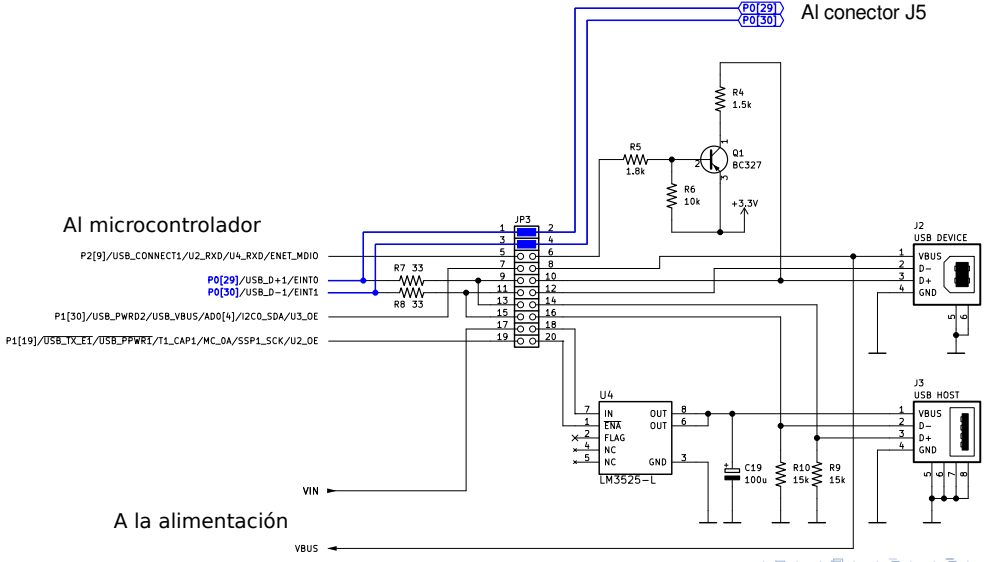
JTAG, RESET e ISP



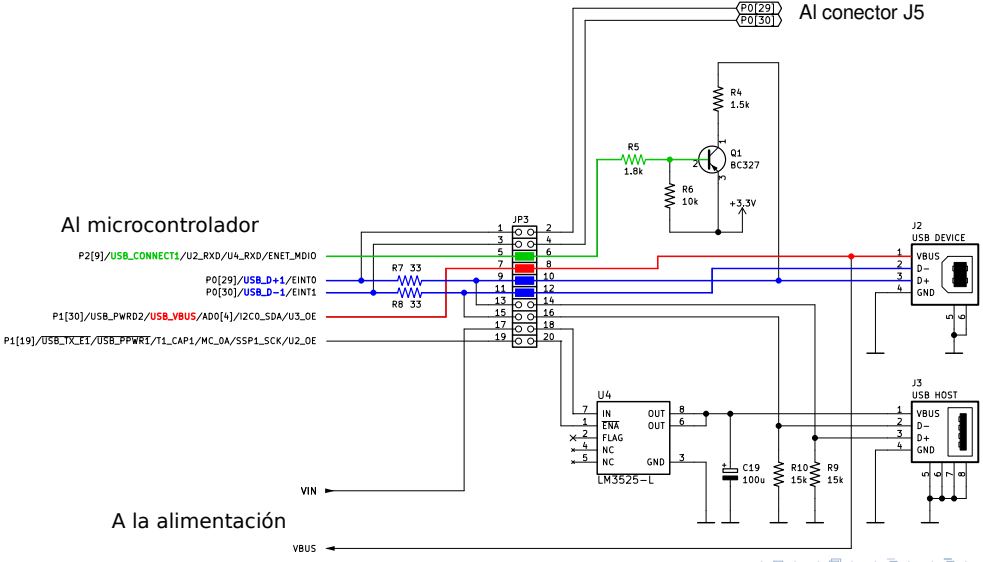
LED y pulsador de propósito general



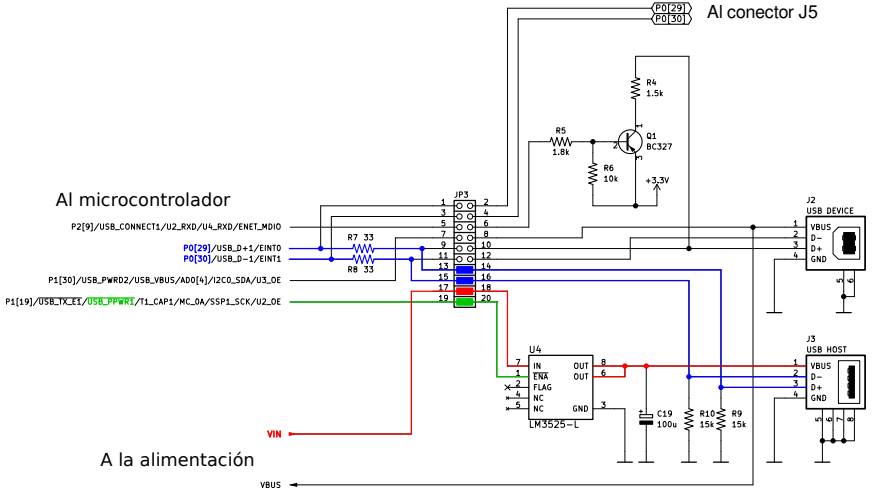
Jumpers JP3: sin USB, P0[29] y P0[30] disponibles en J5



JP3: USB device, P0[29] y P0[30] no disponibles en J5

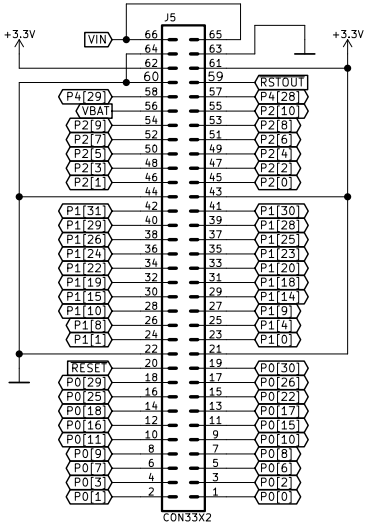


JP3: USB host, P0[29] y P0[30] no disponibles en J5



- En este modo, la alimentación de la tarjeta debe ser 5 V DC.

Conector de expansión J5



Señales en el conector de expansión J5

Visto con la tarjeta colocada en sentido horizontal y con la zona de prototipaje en el lado derecho

VIN	66	65	VIN
GND	64	63	GND
+3.3V	62	61	+3.3V
GND	60	59	RSTOUT
P4[29]/U3_RXD/T2_MAT1/I2C2_SCL	58	57	P4[28]/U3_TXD/T2_MAT0
VBAT	56	55	P2[10]/EINT0/NMI
P2[9]/USB_CONNECT1/U2_RXD/U4_RXD/ENET_MDIO	54	53	P2[8]/CAN_TD2/U2_TXD/U1_CTS/ENET_MDC
P2[7]/CAN_RD2/U1_RTS/SPIFI_CS	52	51	P2[6]/PWM1_CAP0/U1_RI/T2_CAP0/U2_OE/TRACECLK
P2[5]/PWM1[6]/U1_DTR/T2_MAT0/TRACEDATA[0]	50	49	P2[4]/PWM1[5]/U1_DSR/T2_MAT1/TRACEDATA[1]
P2[3]/PWM1[4]/U1_DCD/T2_MAT2/TRACEDATA[2]	48	47	P2[2]/PWM1[3]/U1_CTS/T2_MAT3/TRACEDATA[3]
P2[1]/PWM1[2]/U1_RXD	46	45	P2[0]/PWM1[1]/U1_TXD
GND	44	43	+3.3V
P1[31]/USB_OVRCR2/SSP1_SCK/AD0[5]/I2C0_SCL	42	41	P1[30]/USB_PWRD2/USB_VBUS/AD0[4]/I2C0_SDA/U3_OE
P1[29]/USB_SDA1/PWM1_CAP1/T0_MAT1/MC_2B/U4_TXD	40	39	P1[28]/USB_SCL1/PWM1_CAP0/T0_MAT0/MC_2A/SSP0_SSEL
P1[26]/USB_SSPND1/PWM1[6]/T0_CAP0/MC_1B/SSP1_SSEL	38	37	P1[25]/USB_LS1/USB_HSTEN1/T1_MAT1/MC_1A/CLKOUT
P1[24]/USB_RX_DM1/PWM1[5]/QEI_IDX/MC_FB2/SSP0_MOSI	36	35	P1[23]/USB_RX_DP1/PWM1[4]/QEI_PHB/MC_FB1/SSP0_MISO
P1[22]/USB_RCV1/USB_PWRD1/T1_MAT0/MC_0B/SSP1_MOSI	34	33	P1[20]/USB_TX_DP1/PWM1[2]/QEI_PHA/MC_FB0/SSP0_SCK
P1[19]/USB_TX_E1/USB_PPWR1/T1_CAP1/MC_0A/SSP1_SCK/U2_OE	32	31	P1[18]/USB_UP_LED1/PWM1[1]/T1_CAP0/SSP1_MISO
P1[15]/ENET_RX_CLK(ENET_REF_CLK)/I2C2_SDA	30	29	P1[14]/ENET_RX_ER/T2_CAP0/CMP0_IN[1]
P1[10]/ENET_RXD1/T3_CAP0	28	27	P1[9]/ENET_RXD0/T3_MAT0
P1[8]/ENET_CRS(ENET_CRS_DV)/T3_MAT1/SSP2_SSEL	26	25	P1[4]/ENET_TX_EN/T3_MAT2/SSP2_MISO
P1[1]/ENET_TXD1/T3_MAT3/SSP2_MOSI	24	23	P1[0]/ENET_TXD0/T3_CAP1/SSP2_SCK
GND	22	21	+3.3V
RESET	20	19	P0[30]/USB_D-1/EINT1
P0[29]/USB_D+1/EINT0	18	17	P0[26]/AD0[3]/DAC_OUT/U3_RXD
P0[25]/AD0[2]/I2S_RX_SDA/U3_TXD	16	15	P0[22]/U1_RTS/SD_DAT[0]/U4_TXD/CAN_TD1/SPIFI_CLK
P0[18]/U1_DCD/SSP0_MOSI/SPIFI_IO[0]	14	13	P0[17]/U1_CTS/SSP0_MISO/SPIFI_IO[1]
P0[16]/U1_RXD/SSP0_SSEL/SPIFI_IO[3]	12	11	P0[15]/U1_TXD/SSP0_SCK/SPIFI_IO[2]
P0[11]/U2_RXD/I2C2_SCL/T3_MAT1	10	9	P0[10]/U2_TXD/I2C2_SDA/T3_MAT0
P0[9]/I2S_TX_SDA/SSP1_MOSI/T2_MAT3/RTC_EV2/CMP1_IN[3]	8	7	P0[8]/I2S_TX_WS/SSP1_MISO/T2_MAT2/RTC_EV1/CMP1_IN[4]
P0[7]/I2S_TX_SCK/SSP1_SCK/T2_MAT1/RTC_EV0/CMP_VREF	6	5	P0[6]/I2S_RX_SDA/SSP1_SSEL/T2_MAT0/U1_RTS/CMP_ROSC
P0[3]/U0_RXD/U3_RXD	4	3	P0[2]/U0_TXD/U3_TXD
P0[1]/CAN_TD1/U3_RXD/I2C1_SCL/U0_RXD	2	1	P0[0]/CAN_RD1/U3_TXD/I2C1_SDA/U0_TXD