SBL2e CHIP and BOB

Processor and Break Out Board

236 Version with 80-pin LQFP | BOB Version with 10-pin header

NetBurner

DATASHEET

Key Points

- Serial to Ethernet server
- TTL serial device support
- Up to 10 LVTTL digital I/O
- Two 4-Channel 12-bit A/D inputs
- Works out of the box - no programming is required
- Chip level product and Break Out Board
- Customize with development kit

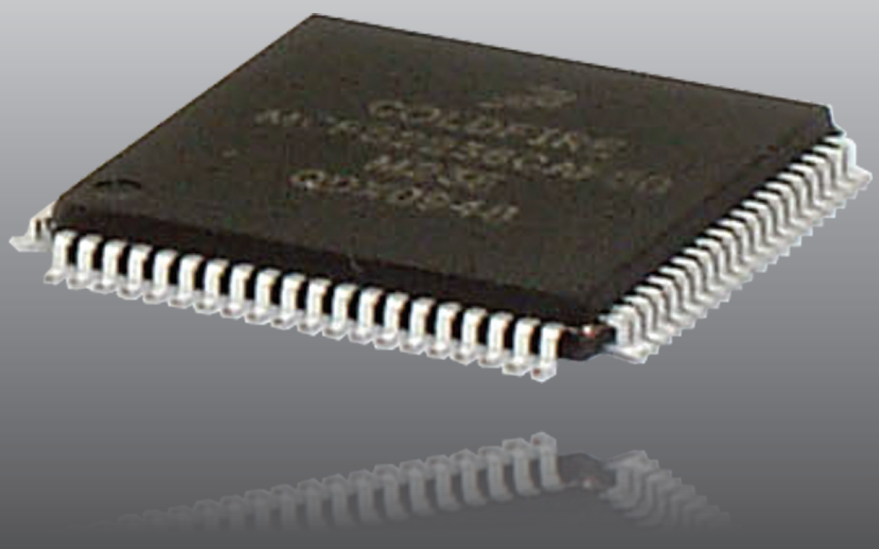
Features

- 10/100Mbps Ethernet
- TCP/UDP/Telnet modes
- DHCP/Static IP modes
- Web or AT command based configuration
- 32-bit performance
- Industrial Temperature Range (-40°C to 85°C)
- Standard and custom baud rates with factory application
- Custom serial packetization options
- RS-232 and RS-422/485 ready (require external
- level shifter)

Optional

The following features are available with the optional development kit:

- Customize any aspect of operation including web pages, data filtering, or custom network applications
- I^2C, SPI, and CAN support
- External timer inputs
- 4-Channel DMA
- 4-Channel 8-bit Pulse Width Modulator (PWM)



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Factory Application Specifications

Serial Port Baud Rate
Factory application supports up to 115,200 bps. Supports custom baud rates.

Serial Protocols Supported
2 TTL

Serial Configurations
The UARTs can be configured in the following way:

- Up to 2 TTL ports
- Add external level shifter for RS-232
- Add external level shifter for RS-422/485 (up to one port)

Note: UART 0 also provides RTS/CTS hardware handshaking signals.

Analog to Digital Converter
Four 12-Bit

Digital I/O
Up to 10

Hardware Specifications

Processor
32-bit Freescale ColdFire 52236 running at 50MHz

Network Interface
10/100 BaseT (CHIP Version)
10-pin header (BOB Version)

Data I/O Interface (80-Pin LQFP)

- Three UARTs
- Up to 10 digital I/O
- Two 4-Channel 12-bit A/D inputs
- I^2C peripheal interface

Physical Characteristics
Dimensions (inches): .63” x .63” (CHIP)
Dimensions (inches): 2.05” x 1.54 (BOB)

Power
DC Input Voltage: - 3.3V @ 82mA (with Ethernet on) @ 260mA (with Ethernet off)

Environmental Operating Temperature
-40° to 85° C

RoHS Compliance
The Restriction of Hazardous Substances guidelines ensure that electronics are manufactured with fewer environment harming materials.

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Multi-function I/O Connector (80-Pin LQFP)

The SBL2e chip has one 80-pin LQFP, which enables you to quickly and easily connect to a board you create on your own. Table 1 provides a description of pin function for the 80-pin LQFP.

Table 1: **Multi-function I/O Connector (80-Pin LQFP) Pinout and Signal Descriptions**

CPU Pin	BOB Header/Pin	Function	GPIO
1	JP6 - 3	PSTCLK	
2	JP2 - 1	$\overline{\text{BKPT}}$[1]	
3	VCC3V	$\overline{\text{EZPCS}}$[1]	
4	JP2 - 3	DSI	
5	JP2 - 9	DSO	
6	JP2 - 7	DSCLK	
7	JP2 - 5	ALLPST	
8	JP6 - 6	Timer Input 0 (T0IN)	Yes
9	JP6 - 8	Timer Input 1 (T1IN)	Yes
10	VCC3V	VDDX	
11	GND	VSSX	
12	GND	JTAG_EN	
13	JP5 - 8	Timer Input 2 (T2IN)	Yes
14	JP5 - 11	Timer Input 3 (T3IN)	Yes
15	JP5 - 3	$\overline{\text{UART 1 Request to Send (UART1_RTS)}}$[1,2]	Yes
16	JP5 - 1	$\overline{\text{UART 1 Clear to Send (UART1_CTS)}}$[1,2]	Yes
17	JP1 - 3	$\overline{\text{UART 0 Request to Send (UART0_RTS)}}$[1,2]	Yes
18	JP1 - 4	$\overline{\text{UART 0 Clear to Send (UART0_CTS)}}$[1,2]	Yes
19	JP6 - 1	External Timer Clock Input B (SYNCB)	Yes
20	JP6 - 2	External Timer Clock Input A ($\overline{\text{SYNCA}}$)	Yes

CPU Pin	BOB Header/Pin	Function	GPIO
21	JP1 - 2	UART 0 Receive (UART0_RX)[2]	Yes
22	JP1 - 1	UART 0 Transmit (UART0_TX)[2]	Yes
23	JP1 - 12	UART 1 Receive (UART1_RX)[2]	Yes
24	JP1 - 13	UART 1 Transmit (UART1_TX)[2]	Yes
25	JP5 - 2	SPI Data In (SPI_DIN)	Yes
26	JP5 - 5	SPI Data Out (SPI_DOUT)	Yes
27	JP5 - 6	SPI Clock (SPI_CLK)	Yes
28	JP5 - 4	SPI Chip Select 0 (SPI_CS0)	Yes
29	JP5 - 7	$\overline{\text{Interrupt Request 4 (IRQ4)}}$[1]	Yes
30	GND	VSSX	
31	VCC3V	VDDX	
32	JP2 - 8	$\overline{\text{RESET}}$[1]	
33	GND via capacitator	VDDPLL	
34	JP5 - 10	$\overline{\text{RSTO}}$[1]	
35	GND	VSSPLL	
36	Y1 clock crystal	EXTAL	
37	Y1 clock crystal	XTAL	
38	GND	TEST	
39	JP5 - 9	$\overline{\text{Interrupt Request 1 (IRQ1)}}$[1]	Yes
40	JP5 - 15	$\overline{\text{Interrupt Request 7 (IRQ7)}}$[1]	Yes

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SBL2e CHIP and BOB

CPU Pin	BOB Header/Pin	Function	GPIO
41	JP5 - 12	$\overline{\text{Interrupt Request 11 (IRQ11)}}$[1]	Yes
42	JP5 - 14	Ethernet Collision LED (COLLED)	Yes
43	JP5 - 13	Ethernet Duplex LED (DUPLED)	Yes
44	GND	VSS	
45	GND via capacitor	VDD	
46	Pulled to GND	PHY_RBIAS	
47	GND	PHY_VSSA	
48	GND via capacitor	PHY_VDDA	
49	GND via capacitor	PHY_VDDTX	
50	JP3 - 1	PHY_TXP (Ethernet Transmit +)	
51	JP3 - 2	PHY_TXN (Ethernet Transmit -)	
52	GND	PHY_VSSTX	
53	JP3 - 3	PHY_RXP (Ethernet Receive +)	
54	JP3 - 6	PHY_RXN (Ethernet Receive -)	
55	GND via capacitor	PHY_VDDRX	
56	GND	PHY_VSSRX	
57	JP3 - 9	Ethernet Speed LED (SPDLED)	
58	VCC3V	VDDR	
59	JP3 - 10	Ethernet Link LED (LNKLED)	
60	JP6 - 14	Ethernet Activity LED (ACTLED)	Yes

CPU Pin	BOB Header/Pin	Function	GPIO
61	JP6 - 13	A2D Input Channel 4 (AN4)	Yes
62	JP6 - 12	A2D Input Channel 5 (AN5)	Yes
63	JP6 - 11	A2D Input Channel 6 (AN6)	Yes
64	JP6 - 10	A2D Input Channel 7 (AN7)	Yes
65	JP1 - 10	A2D Input Channel 3 (AN3)	Yes
66	JP1 - 9	A2D Input Channel 2 (AN2)	Yes
67	JP1 - 8	A2D Input Channel 1 (AN1)	Yes
68	JP1 - 7	A2D Input Channel 0 (AN0)	Yes
69	VCC3V + GND	VDDA	
70	Referance Voltage	VRH	
71	GND	VRL	
72	GND	VSSA	
73	GND	VSS	
74	GND via capacitor	VDD	
75	JP6 - 9	General Purpose Timer 3 (GPT3)	Yes
76	JP6 - 7	General Purpose Timer 2 (GPT2)	Yes
77	JP6 - 5	General Purpose Timer 1 (GPT1)	Yes
78	JP6 - 4	General Purpose Timer 0 (GPT0)	Yes
79	JP1 - 14	I2C Serial Clock (I2C_SCL)[3]	Yes
80	JP1 - 15	I2C Serial Data (I2C_SDA)[3]	Yes

Note:

1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar
2. All UART signals are TTL Level, external level shifters may be added for RS-232 or RS-422/485 operation
3. If using I^2C, pull-up resistors must be added to open drain SDA/SCL signals.

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Connector Interface Pinout and Signal Description

The SBL2e Break Out Board (BOB) has several headers, which enable you to quickly and easily connect to one of our standard NetBurner Adapter Boards, or a board you create on your own. Tables 1 through 5 provide a description of pin function for headers JP1 to JP3 and JP5 to JP6.

Table 1: **I/O Connector (JP1) Pinout and Signal Descriptions**

Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
1	22	UART0_TX		FEC_CRS	Yes	UART 0 Transmit[2] or Ethernet Carrier Sense	3.3VDC
2	21	UART0_RX		FEC0_RX	Yes	UART 0 Receive[2] or Ethernet 0 Receive	3.3VDC
3	17	$\overline{\text{UART0_RTS}}$	CAN_TX	FEC_RXDV	Yes	UART 0 Request To Send[1,2] or CAN Transmit or Ethernet RX Data Valid	3.3VDC
4	18	$\overline{\text{UART0_CTS}}$	CAN_RX	FEC_RXCLK	Yes	UART 0 Clear To Send[1,2] or CAN Receive or Ethernet RX Clock	3.3VDC
5		VCC3V				Input Voltage 3.3VDC	3.3VDC
6		GND				Ground	-
7	68	ADC_IN0			Yes	Analog to Digital Converter Input 0	3.3VDC
8	67	ADC_IN1			Yes	Analog to Digital Converter Input 1	3.3VDC
9	66	ADC_IN2			Yes	Analog to Digital Converter Input 2	3.3VDC
10	65	ADC_IN3			Yes	Analog to Digital Converter Input 3	3.3VDC
11		GND			Yes	Ground	-
12	23	UART1_RX		FEX0_TX	Yes	UART 1 Receive[2] or Ethernet 0 Transmit	3.3VDC
13	24	UART1_TX		FEC_COL	Yes	UART 1 Transmit[2] or Ethernet Collision	3.3VDC
14	79	I2C_SCL	CAN_TX	UART2_TX	Yes	I^2C Serial Clock[3] or CAN Transmit or UART 2 Transmit[2]	3.3VDC
15	80	I2C_SDA	CAN_RX	UART2_RX	Yes	I^2C Serial Data[3] or CAN Receive or UART 2 Receive[2]	3.3VDC
16	32	$\overline{\text{RESET}}$				Processor Reset Input[1]	3.3VDC

Note:
1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar
2. All UART signals are TTL Level, external level shifters may be added for RS-232 or RS-422/485 operation
3. If using I^2C, pull-up resistors must be added to open drain SDA/SCL signals.

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Table 2: **I/O Connector (JP2) Pinout and Signal Descriptions**

Pin	CPU Pin	Function 1	Function 2	General Purpose I/O	Description	Max Voltage
1	2	$\overline{\text{BKPT}}$			Breakpoint[1]	3.3VDC
2		VCC3V			Input Voltage 3.3VDC	3.3VDC
3	4	DSI			Development Serial Input	3.3VDC
4						3.3VDC
5	7	ALLPST			All Processor Status Output	3.3VDC
6						3.3VDC
7	6	DSCLK			Development Serial Clock	3.3VDC
8	32	$\overline{\text{RESET}}$			Processor Reset Input[1]	3.3VDC
9	5	DSO			Development Serial Output	3.3VDC
10		GND			Ground	-

Note:

1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar

Table 3: **I/O Connector (JP3) Pinout and Signal Descriptions**

Pin	CPU Pin	Function 1	Function 2	General Purpose I/O	Description	Max Voltage
1	50	ETX+			Ethernet Transmit +	3.3VDC
2	51	ETX-			Ethernet Transmit -	3.3VDC
3	53	ERX+			Ethernet Receive +	3.3VDC
4						3.3VDC
5		VCC3V			Input Voltage 3.3VDC	3.3VDC
6	54	ERX-			Ethernet Receive -	3.3VDC
7		VCC3V			Input Voltage 3.3VDC	3.3VDC
8		GND			Ground	-
9	57	SPDLED			Ethernet Speed LED	3.3VDC
10	59	LNKLED			Ethernet Link LED	3.3VDC

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Table 4: **I/O Connector (JP5) Pinout and Signal Descriptions**

Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
1	16	$\overline{\text{UART1_CTS}}$	SYNCA	UART2_TX	Yes	UART 1 Clear to Send[1,2] or External Timer Clock Input A or UART 2 Transmit[2]	3.3VDC
2	25	SPI_DIN	CAN_RX	UART1_RX	Yes	SPI Data In or CAN Receive or UART 1 Receive[2]	3.3VDC
3	15	$\overline{\text{UART1_RTS}}$	SYNCB	UART2_TX	Yes	UART 1 Request To Send[1,2] or External Timer Clock Input B or UART 2 Transmit[2]	3.3VDC
4	28	SPI_CS0	I2C_SDA	UART1_CTS	Yes	SPI Chip Select 0 or I²C Serial Data[3] or UART 1 Clear to Send[2]	3.3VDC
5	26	SPI_DOUT	CAN_TX	UART1_TX	Yes	SPI Data Out or CAN Transmit or UART 1 Transmit[2]	3.3VDC
6	27	SPI_CLK	I2C_SCL	UART1_RTS	Yes	SPI Clock or I²C Serial Clock[3] or UART 1 Request to Send[2]	3.3VDC
7	29	$\overline{\text{IRQ4}}$			Yes	External Interrupt 4[1]	3.3VDC
8	13	T2IN	T2OUT	PWM_4	Yes	Timer Input 2 or Timer Output 2 or PWM 4 Output Signal/Input Capture	3.3VDC
9	39	$\overline{\text{IRQ1}}$	SYNCA	PWM_1	Yes	External Interrupt 1[1] or External Timer Clock Input A or PWM 1 Output Signal/ Input Capture	3.3VDC
10	34	$\overline{\text{RSTOUT}}$				Processor Reset Output[1]	3.3VDC
11	14	T3IN	T3OUT	PWM_6	Yes	Timer Input 3 or Timer Output 3 or PWM 6 Output Signal/Input Capture	3.3VDC
12	41	$\overline{\text{IRQ11}}$			Yes	External Interrupt 11[1]	3.3VDC
13	43	DUPLED			Yes	Ethernet Duplex LED	3.3VDC
14	42	COLLED			Yes	Ethernet Collision LED	3.3VDC
15	40	$\overline{\text{IRQ7}}$			Yes	External Interrupt 7[1]	3.3VDC
16		GND				Ground	-

Note:

1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar
2. All UART signals are TTL Level, external level shifters may be added for RS-232 or RS-422/485 operation
3. If using I²C, pull-up resistors must be added to open drain SDA/SCL signals.

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Table 5: **Multi-function I/O Connector (JP6) Pinout and Signal Descriptions**

Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
1	19	SYNCB	CAN_RX	FEC_MDC	Yes	External Timer Clock Input B or CAN Receive or Ethernet Mgmt Data Clock	3.3VDC
2	20	SYNCA	CAN_TX	FEC_MDIO	Yes	External Timer Clock Input A or CAN Transmit or Ethernet Mgmt Data I/O	3.3VDC
3	1	PSTCLK				Processor Status Clock	3.3VDC
4	78	GPT0	FEC_TXER	PWM_1	Yes	General Purpose Timer 0 or Ethernet Transmit Error or PWM 1 Output Signal/Input Capture	3.3VDC
5	77	GPT1	FEC1_TX	PWM_2	Yes	General Purpose Timer 1 or Ethernet 1 Transmit or PWM 2 Output Signal/ Input Capture	3.3VDC
6	8	T0IN	T0OUT	PWM_0	Yes	Timer Input 0 or Timer Output 0 or PWM 0 Output Signal/Input Capture	3.3VDC
7	76	GPT2	FEC2_TX	PWM_5	Yes	General Purpose Timer 2 or Ethernet 2 Transmit or PWM 5 Output Signal/ Input Capture	3.3VDC
8	9	T1IN	T1OUT	PWM_2	Yes	Timer Input 1 or Timer Output 1 or PWM 2 Output Signal/Input Capture	3.3VDC
9	75	GPT3	FEC3_TX	PWM_7	Yes	General Purpose Timer 3 or Ethernet 3 Transmit or PWM 7 Output Signal/ Input Capture	3.3VDC
10	64	ADC_IN7			Yes	Analog to Digital Converter Input 7	3.3VDC
11	63	ADC_IN6			Yes	Analog to Digital Converter Input 6	3.3VDC
12	62	ADC_IN5			Yes	Analog to Digital Converter Input 5	3.3VDC
13	61	ADC_IN4			Yes	Analog to Digital Converter Input 4	3.3VDC
14	60	ACTLED			Yes	Ethernet Activity LED	3.3VDC
15		GND				Ground	-
16		GND				Ground	-

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Part Numbers

SBL2e Processor
Part Number: SBL2eCHIP-236IR

SBL2e Break Out Board
Part Number: SBL2E-BOB-200IR

SBL2e Break Out Board Development Kit
Part Number: NNDK-SBL2EBOB-KIT
Kit includes all the hardware and software you need to customize the included platform hardware.

Ordering Information

E-mail: sales@netburner.com
Online Store: www.Netburner.com
Telephone: 1-800-695-6828

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