



Embedded Computer Systems

Bitsy Compact Flash Connector Board User's Manual

ADS document # 110111-80011



PRELIMINARY

Applied Data Systems

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Revision History

ADS document # 110110-9001A.

REV	DESCRIPTION	DATE	BY
1	Initial release	06/21/01	HW

About the Cover Photo

The cover photo shows a Bitsy Connector board populated with optional Compact Flash.

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1 Introduction

1.1 Overview

The Bitsy Connector board is an optional unit intended to be used in conjunction with the Bitsy single board computer using the SA-1110 StrongARM RISC microprocessor. The Bitsy is designed to meet the needs of embedded and graphical systems developers.

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1.2 Organization of this Manual

The manual organizes information in three key sections:

Introduction	Provides an overview of the functionality and organization of the Bitsy Connector board.
Hardware Reference	Describes the configuration settings and connector pinouts for all systems of the Bitsy Connector board.
System Integration	Provides key information about power management, tips for system integration and electrical and mechanical interface specifications.

To locate the information you need, try the following:

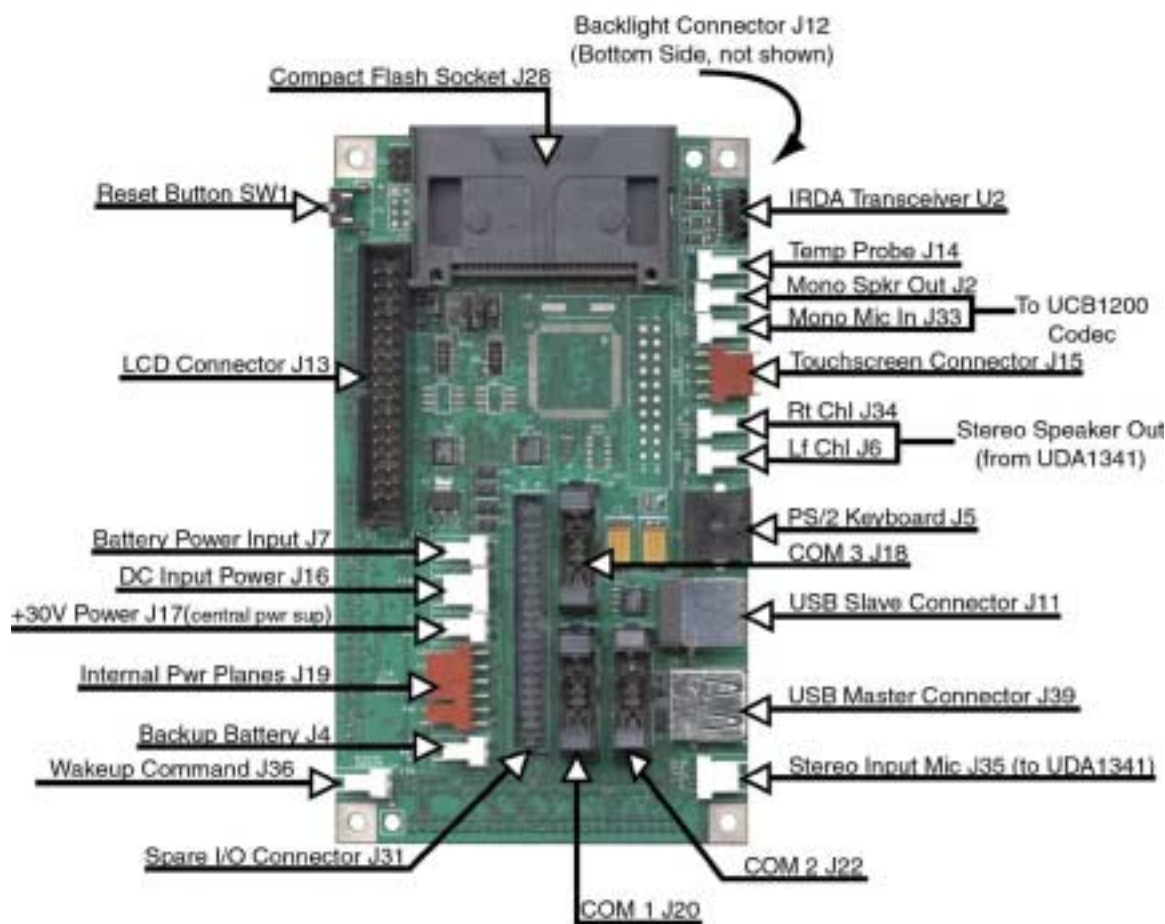
1. Browse the *Table of Contents*. Section titles include connector designators and their function.
2. Follow cross-references between sections.
3. View and search this manual in PDF format

1.3 For Further Information...

ADS maintains a web site exclusively for its developers. The site includes downloads, troubleshooting guides, operating system updates and the "ADS Knowledge Base", a comprehensive document with dozens of questions answered about developing applications for ADS products. Instructions on how to access the site are shipped with every evaluation system.

2 Hardware Reference

This section gives an overview of the hardware features of the Bitsy Connector board. This overview includes a description of the switches, jumper settings, connector and connector pinouts.



2.1 Locating "Pin 1"

Many connectors and headers have a visible number on the board that indicates pin 1. If that pin is not clearly marked, look at the underside of the board. The square pad is pin 1.

2.2 Switches

2.2.1 SW1: Reset Switch

SW1 is the reset switch for the Bitsy. This switch issues a hardware reset to the SA-1110. Press this button to restart the Bitsy without cycling power. This operation will reset the real-time clock. Most operating systems clear the contents of DRAM upon hardware reset.

You can hold the Bitsy Connector Board in reset by pressing and holding this button.

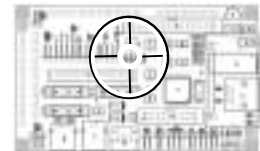
2.3 Jumper Settings

Jumpers on the Bitsy Connector board select a variety of operational options. All use 2mm shorting blocks (shunts) to select settings. Make sure power is turned off to the Bitsy Connector board when changing the position of a shunt.

2.3.1 JP2 and JP3: COM3 signaling

Type: 2-post headers, 2mm

JP2 setting	JP3 setting	Connect
1-2	1-2	DCD DSR and DTR shorted together
1-2	None	DCD shorted to DTR
None	1-2	DSR shorted to DTR
None	None	No connection on DCD and DSR

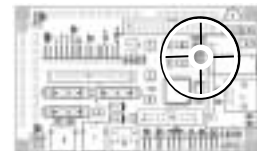


2.3.2 JP4, JP5, JP6 and JP7 : COM2, IrDA connection

Type: 3-post headers, 2mm

There are three modes of operations for COM2 signals from the StrongARM CPU. They are IrDA (an IR transceiver is populated on the board), RS-232 or TTL level output serial port. For each one of these operating modes, the following configuration has to be used:

JP4	JP5	JP6	JP7	COM2 configuration
1-2	1-2	2-3	2-3	COM2 at RS232 level
2-3	JP5.3 – JP6.2	2-3		COM2 at TTL level
None	None	1-2	1-2	IrDA active (J22 not used)
None	None	None	None	COM2 not used at all

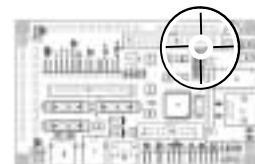


2.3.3 J29: Chemistry and cells number selection

Type: 3-post header, 2mm

This connector board supports the charging capabilities of three different battery configurations. They can be selected through three jumper headers as shown in the table below:

J29	Function
1-2	Li Ion 2 cells battery
2-3	NiCd/NiMH 5 cells battery
none	NiCd/NiMH 6 cells battery



2.3.4 J30 and J32: Battery maximum voltage settings adjustment

Type: 2-post header, 2mm for J30 and J32

This connector board supports the charging capabilities of three different battery configurations. They can be selected through three jumper headers as shown in the table below:

J30	J32	Function
1-2	None	Maximum voltage set about 5% higher
none	1-2	Maximum voltage set about 5% lower
none	None	Maximum voltage set on standardl values
1-2	1-2	Not Allowed. It is possible to damage the system by using this configuration.



2.3.5 J37, J38: USB Connection

Type: 2-post headers, 2mm

It is possible, with this board, to use the Master USB wires and route them oto the slave connector. This was done to provide support for the Bitsy board Rev. A. The selection is made according the following table:

J37	J38	Connection
1-2	1-2	USB Slave uses same line of USB master
none	none	USB slave uses its own line



2.4 Connector Pinouts

The following tables describe connector pinouts and the type of connector. At least one pin of every connector is labeled on the Bitsy Connector board. Double-row headers on the board are all numbered as shown in the figure to the right.

2	4	6	8...
1	3	5	7...

For information about the location of the connectors on the Bitsy Connector board, refer to section **Error! Reference source not found., Error! Reference source not found.:**

Legend: n/c Not connected
 GND Bitsy Connector board ground plane

2.4.1 J2 Speaker Mono

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

A speaker may be connected across the speaker outputs (bridge-tied load). Minimum speaker impedance is eight ohms. Voltages on the speaker outputs are 0-3.3V. If you connect one side of the speaker to ground, you must use a blocking capacitor; in this case, output power will be reduced to one quarter and power consumption will be cut in half from that of the bridge-tied load. Consult the UCB1200 specifications for further details.

Pin	Signal name	Description
1	SPK -	Speaker connection (-)
2	SPK +	Speaker connection (+)

2.4.2 J4: Backup Battery Input

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

Pin	Signal name	Description
1	<i>VBATNEG</i>	
2	<i>BATPOS</i>	

2.4.3 J5: PS/2 Keyboard Input

Type: Mini DIN-6 socket housing, MDI-004-6PC

Recommended mating connector: PS/2 keyboard

Pin	Signal name	Description
1	<i>TPSIG</i>	<i>PS/2 trackpad/keyboard data</i>
2	<i>N/C</i>	<i>not connected</i>
3	<i>GND</i>	<i>Ground</i>
4	<i>VCC</i>	<i>+ 5 Volts, fused at 350 mA</i>
5	<i>TPCLK</i>	<i>PS/2 trackpad/keyboard clock</i>
6	<i>N/C</i>	<i>not connected</i>

2.4.4 J6: Speaker Left Stereo

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

A speaker may be connected across the speaker outputs (bridge-tied load). Minimum speaker impedance is eight ohms. Voltages on the speaker outputs are 0-3.3V. If you connect one side of the speaker to ground, you must use a blocking capacitor; in this case, output power will be reduced to one quarter and power consumption will be cut in half from that of the bridge-tied load. Consult the UCB1200 specifications for further details.

Pin	Signal name	Description
1	<i>SPKI -</i>	<i>Speaker connection (-)</i>
2	<i>SPKI +</i>	<i>Speaker connection (+)</i>

2.4.5 J7: Battery Power Input

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

This connector allows you to connect an external battery to back up power on the Bitsy. If no other power source is available, the system will draw its sleep mode current from this connection. There is a steady-state 1M Ω load across these terminals. For reliable operation of the Bitsy, place a 0.100" shunt across the pins of this connector.

Pin	Signal name	Description
1	<i>BATNEG</i>	<i>Bitsy ground</i>
2	<i>BATPOS</i>	<i>3 Volt battery, positive terminal</i>

2.4.6 J11: USB Slave

Type: Single height right angle USB Type B

Pin	Signal name	Description
1	VCC_OUT	USB Slave
2	USB_UDC-	
3	USB_UDC+	
4	USB_GND	

2.4.7 J12: Backlight Inverter

Type: 7-pin header, 1.25mm, keyed, Molex #53261-0790

Recommended mating connector: Molex 51021-0700 or Quadrangle Products kit #RT51021-0700-18

This connector will supply power to a Xentek LS520 backlight inverter and compatible devices with a one-to-one cable. The onboard Bitsy Connector board PWM driver can electronically control the brightness of the inverter.

Pin	Signal name	Description
1	+12V	0-12 volts from J5.4
2		
3	GND	Ground
4		
5	BACKLIGHTON	Open-collector output with 12V pullup to control backlight (shorted to GND when "off")
6	BACKLIGHTPWM	PWM brightness control (SA-1111) (3.3V CMOS, 1.2k Ω series, 1 μ F filter)
7	GND	Ground

2.4.8 J13: LCD Panel (IDC 34)

Type: 34-pin IDC header, 2x17 0.100-inch spacing, shrouded, keyed

Recommended mating connector: IDC connector AMP #1-746288-8

This connector houses the signals to drive an 18-bit flat panel. Electrical specifications for panel signals are listed in section **Error! Reference source not found.**

<i>Pin</i>	<i>Signal name</i>	<i>Description</i>
1	<i>PNL_VEE</i>	<i>VEE (contrast); see VR1, J19 and JP12</i>
2	<i>PNL_GND</i>	<i>Ground</i>
3	<i>PNL_PIXCLK</i>	<i>Pixel Clock</i>
4	<i>PNL_HSYNC</i>	<i>Horizontal Sync.</i>
5	<i>PNL_VSYNC</i>	<i>Vertical Sync.</i>
6	<i>PNL_GND</i>	<i>Ground</i>
7	<i>PNL_RED0</i>	<i>Red Bit 0 (same as RED5)</i>
8	<i>PNL_RED1</i>	<i>Red Bit 1</i>
9	<i>PNL_RED2</i>	<i>Red Bit 2</i>
10	<i>PNL_RED3</i>	<i>Red Bit 3</i>
11	<i>PNL_RED4</i>	<i>Red Bit 4</i>
12	<i>PNL_RED5</i>	<i>Red Bit 5</i>
13	<i>PNL_GND</i>	<i>Ground</i>
14	<i>PNL_GREEN0</i>	<i>Green Bit 0</i>
15	<i>PNL_GREEN1</i>	<i>Green Bit 1</i>
16	<i>PNL_GREEN2</i>	<i>Green Bit 2</i>
17	<i>PNL_GREEN3</i>	<i>Green Bit 3</i>
18	<i>PNL_GREEN4</i>	<i>Green Bit 4</i>
19	<i>PNL_GREEN5</i>	<i>Green Bit 5</i>
20	<i>PNL_GND</i>	<i>Ground</i>
21	<i>PNL_BLUE0</i>	<i>Blue Bit 0 (same as BLUE5)</i>
22	<i>PNL_BLUE1</i>	<i>Blue Bit 1</i>
23	<i>PNL_BLUE2</i>	<i>Blue Bit 2</i>
24	<i>PNL_BLUE3</i>	<i>Blue Bit 3</i>
25	<i>PNL_BLUE4</i>	<i>Blue Bit 4</i>
26	<i>PNL_BLUE5</i>	<i>Blue Bit 5</i>
27	<i>PNL_GND</i>	<i>Ground</i>
28	<i>PNL_LBIAS</i>	<i>Enable</i>
29	<i>PNL_PWR</i>	<i>Vcc(5V) or 3.3 V, depending on JP1 position</i>
30		
31	<i>PNL_RL</i>	<i>Horizontal Mode Select (set by JP2)</i>
32	<i>PNL_UD</i>	<i>Vertical Mode Select (set by JP3)</i>
33	<i>PNL_ENA</i>	<i>Panel enable signal (StrongARM GPIO24)</i>
34	<i>VCON</i>	<i>Adjustable voltage for passive panels; set with VR2 or fixed voltage divider</i>

2.4.9 J14: Temperature Probe

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

Pin	Signal name	Description
1	<i>SENSOR -</i>	
2	<i>SENSOR+</i>	

2.4.10 J15: Touch Panel

Type: 4-pin header, 0.100-in spacing, friction lock, Molex 22-23-2041

Recommended mating connector: Molex 22-01-3047

The mapping shown of signal to edge of touch panel is an ADS convention. Interface cables are constructed to match this order. Some operating systems can tolerate swapping of positive (P) and negative (M) connections, and even swapping of X and Y pairs.

Pin	Signal name	Description
1	TSMX	Left edge of panel
2	TSPX	Right
3	TSPY	Bottom
4	TPMY	Top

2.4.11 J16: DC Power Input

Type: 3-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

Pin	Signal name	Description
1	+12V_IN	
2	DCIN_POS	
3	DCIN_NEG	

2.4.12 J17: +30V Power Input

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

Pin	Signal name	Description
1	Ground	
2	+30V	

2.4.13 J18: Serial Port 3

Type: 2x5 header, 0.100" IDC, keyed

Recommended mating connector: 2x5 IDC

Pin	Signal name	Description
1	"DCD3"	DCD from external device
2	"DSR3"	DSR from external device
3	RXD3	SA-1110 Serial Port 3, RS-232
4	RTS3	
5	TXD3	
6	CTS3	
7	"DTR3"	DTR from external device
8	n/c	not connected
9	GNDFILT3	filtered connection to ground
10	n/c	not connected

Note: The SA-1110 does not have hardware handshaking on its serial lines. The Bitsy Connector board is wired to use SA-1110 GPIO lines to perform CTS/RTS handshaking.

2.4.14 J19: Internal Power Planes Connector

Type: Mini DIN-6 socket housing, MDI-004-6PC

Recommended mating connector: PS/2 keyboard

Pin	Signal name	Description
1	VCC	+5V
2	GROUND	GND
3	+3.3V	+3.3V Digital IO plane
4	+12V_IN	For Backlight inverter
5	+1.75V	For SA-1110 core logic
6	PWR_EN	POWERENABLE signal generated by the SA-1110

2.4.15 J20: Serial Port 1

Type: 2x5 header, 0.100" IDC, keyed

Recommended mating connector: 2x5 IDC

Pin	Signal name	Description
1	"DCDI"	DCD from external device
2	"DSR1"	DSR from external device
3	RXD1	SA-1110 Serial Port 1, RS-232
4	RTS1	
5	TXD1	
6	CTS1	
7	"DTR1"	DTR from external device
8	RIB1	
9	GNDFILT1	filtered connection to ground
10	n/c	not connected

Note: The SA-1110 does not have hardware handshaking on its serial lines. The Bitsy Connector board is wired to use SA-1110 GPIO lines to perform CTS/RTS handshaking. J22: Serial Port 2

2.4.16 J22: Serial Port 2

Type: 2x5 header, 0.100" IDC, keyed

Recommended mating connector: 2x5 IDC

Pin	Signal name	Description
1	n/c	not connected
2	n/c	not connected
3	RXD2	SA-1110 Serial Port 2, TTL
4	n/c	
5	TXD2	
6	n/c	
7	n/c	not connected
8	n/c	not connected
9	GNDFILT2	filtered connection to ground
10	n/c	not connected

Note: The SA-1110 does not have hardware handshaking on its serial lines. The Bitsy Connector board is wired to use SA-1110 GPIO lines to perform CTS/RTS handshaking.

2.4.17 J28: Compact Flash

The 50-pin compact flash socket conforms to the compact flash standard for 3.3V and 5V Type II cards. It will supply up to 500 mA of 5V current. The socket is normally de-energized; the operating system is responsible for turning on the socket when a card is inserted and turning it off when the card is removed. The socket includes an integral card ejector.

2.4.18 J31: Spare UCB1200 and ADSmart IO™

Type: Mini DIN-40 socket housing,

Pin	Signal name	Description
1	UCB_IO0	General purpose IO available through the UCB1200
2	EXT_IRQ1	Available external Interrupt
3	UCB_IO1	General purpose IO available through the UCB1200
4	EXT_IRQ2	Available external Interrupt
5	UCB_IO2	General purpose IO available through the UCB1200
6	SMTIO0	General purpose IO available through the AVR
7	UCB_IO3	General purpose IO available through the UCB1200
8	SMTIO1	General purpose IO available through the AVR
9	UCB_IO4	General purpose IO available through the UCB1200
10	SMTIO2	General purpose IO available through the AVR
11	UCB_IO5	General purpose IO available through the UCB1200
12	SMTIO3	General purpose IO available through the AVR
13	UCB_IO6	General purpose IO available through the UCB1200
14	ANIN0	Analog Input connected to the AVR
15	UCB_IO7	General purpose IO available through the UCB1200
16	ANIN1	Analog Input connected to the AVR
17	UCB_IO8	General purpose IO available through the UCB1200
18	ANIN2	Analog Input connected to the AVR
19	UCB_IO9	General purpose IO available through the UCB1200
20	ANIN3	Analog Input connected to the AVR
21	AGSTAT	AGC Status signal from UDA1341
22	VREF	Available VREF signal from UDA1341
23	CODEC_OFI	Overflow signal from the UDA1341
24	SHON_RS232	
25	AMP_SDWN	Shutdown signal fro the Audio codec UDA1341
26	SW2	Connection to Bitsy S1 switch 2
27	QMUTE	Quick Mute option for the UDA1341
28	SW3	Connection to Bitsy S1 switch 3
29	GPIO27_CLK	
30	ROW0	ROW0 keypad signal
31	COL0	COL0 keypad signal
32	ROW1	ROW1 keypad signal
33	COL1	COL1 keypad signal
34	ROW2	ROW2 keypad signal
35	COL2	COL2 keypad signal
36	ROW3	ROW3 keypad signal
37	COL3	COL3 keypad signal
38	ROW4	ROW4 keypad signal
39	N/Cc	Not connected
40	GROUND	GND

2.4.19 J33: Microphone Mono

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

Input impedance of the microphone connection is 25 k Ω . Specifications for the UCB1200 call for 1k Ω or electret microphones. Microphones with other impedance may be used. Microphones connected should use a DC blocking capacitor between the microphone and MIC+ input.

Pin	Signal name	Description
1	MIC GND	Microphone (-)
2	MIC +	Microphone (+)

2.4.20 J34: Speaker Right Stereo

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

A speaker may be connected across the speaker outputs (bridge-tied load). Minimum speaker impedance is eight ohms. Voltages on the speaker outputs are 0-3.3V. If you connect one side of the speaker to ground, you must use a blocking capacitor; in this case, output power will be reduced to one quarter and power consumption will be cut in half from that of the bridge-tied load. Consult the UCB1200 specifications for further details.

Pin	Signal name	Description
1	SPK2 -	Speaker connection (-)
2	SPK2 +	Speaker connection (+)

2.4.21 J35: Microphone Stereo

Type: 3-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

Input impedance of the microphone connection is 25 k Ω . Specifications for the UCB1200 call for 1k Ω or electret microphones. Microphones with other impedance may be used. Microphones connected should use a DC blocking capacitor between the microphone and MIC+ input.

Pin	Signal name	Description
1	MIC 1_IN_LF	Left Microphone
2	GROUND	Ground
3	MIC2_IN_RT	Right Microphone

2.4.22 J36: Wake Up

Type: 2-pin header, 0.100-in spacing, friction lock, Molex 22-23-2021

Recommended mating connector: Molex 22-01-3027

Pin	Signal name	Description
1	GROUND	Common GND
2	RQONOFF	Wake up interrupt signal to the SA-1110

2.4.23 J39: USB Master

Type: Single USB socket

Recommended mating connector: USB cable

Pin	Signal name	Description
1	VCC_OUT	USB Master
2	USB-	
3	USB+	
4	USB_GND	

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3 Board Revision History

3.1.1 Identifying the board revision

The product revision number of the Bitsy Connector board is etched on the underside of the printed circuit board. That number is 170111-8000x, where "x" is the board revision.

3.1.2 Revision History

The following are the most significant changes that have occurred.

Rev. 1:

Initial release of the board

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