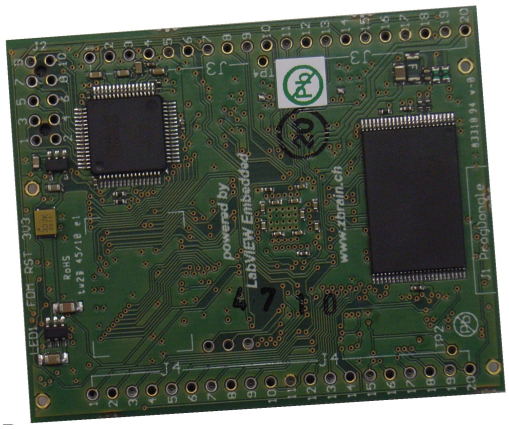
Preliminary

Z24-C1
Z27-C1



Mixed Signal Coremodules

Hardware Manual

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1 Imprint

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Warning*: ESD (electrostatic discharge) sensitive device. Proper ESD handling required.*

2 Introduction

Z24-C1 and Z27-C1 are members of the *Zbrain-System product family*, powered by LabVIEW Embedded.

Z24-27-C1 are a mixed signal core modules, based on the powerfull ADSP-BF527/524 processor.

They feature 4 low range signal analog inputs and up to 8 analog inputs with industrial input range, high input impedance and over voltage protection, which allows for direct connection to real world signals without the need for external circuitry.

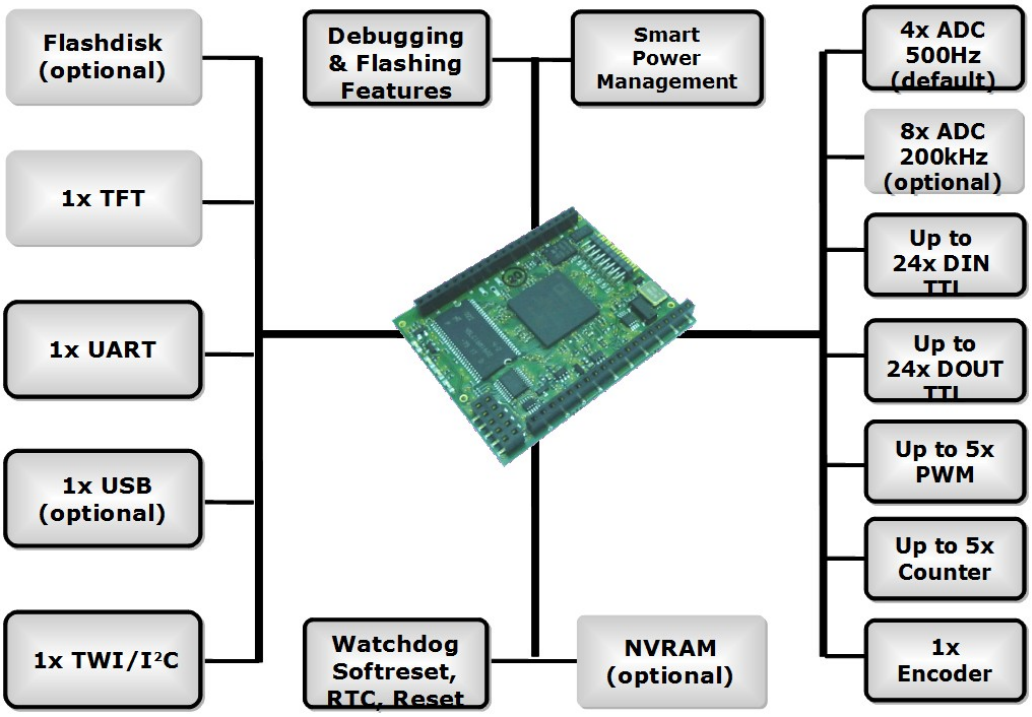
All *digital IO* signals are 3.3V TTL level and need to be driven on the base board.

Integration is very easy thanks to reliable 2.54mm pitch standard connectors, single 3.3V supply, and on board in programming interface.

3 Key Features

- Powered by LabVIEW Embedded (LabVIEW for Microprocessor)
- 400MHz ADSP-BF524/527 processor
- 256MByte on board flash disk (optional)
- 4x 0..3V analog inputs, 500Hz
- 8x +-5/+-10V industrial range analog inputs, protected and filtered (optional)
- up to 24 DIO (multiplexed with other functions)
- up to 5 Timer inputs / PWM outputs
- 1x rotary encoder interface
- 1x UART serial interface (e.g. for RS232, RS485, RS422)
- 1x TWI
- USB (optional)
- 16Bit LCD TFT interface (multiplexed with other functions)
- dynamic power management
- on board test points for analog and digital io

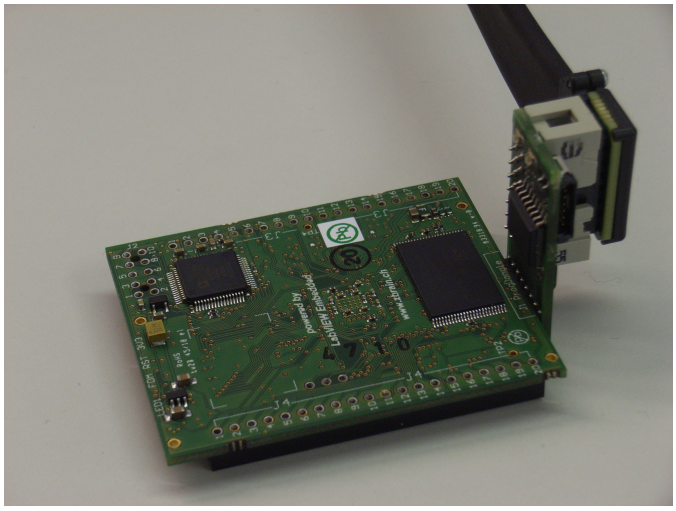
4 Block Diagram



5 Programming Interface (Prog-Dongle)

At delivery the fast Debug Mode (FDM) interpreter is pre flashed and indicates its activity by toggeling the FDM-LED. If the LED isn't toggeling, the FDM interpreter can be downloaded through the Emulator.

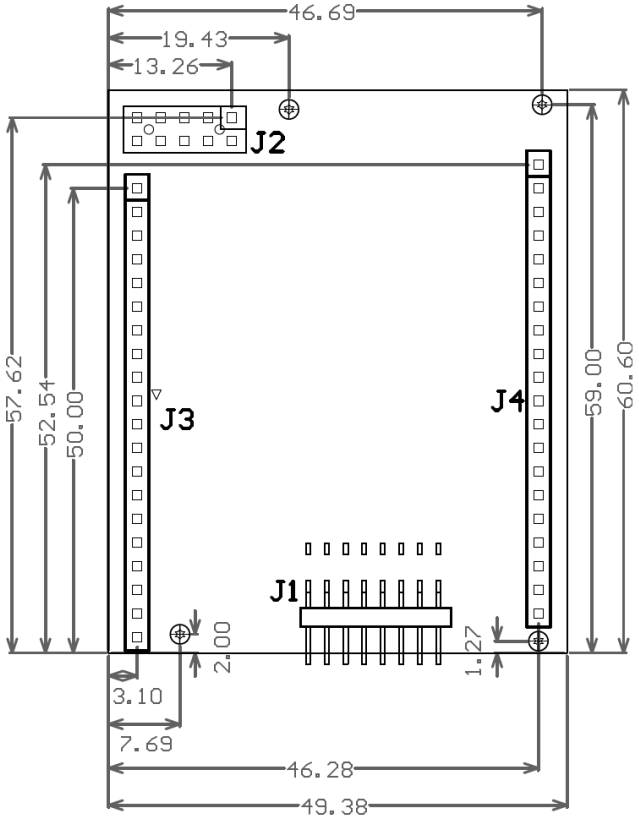
Z24-27-C1 feature a universal programming dongle (Prog-Dongle) for FDM programming, emulator connection, series production and field updates. This eliminates the need for any additional programming connectors on the base board.



note: *reserve enough space on the baseboard to be able to plug the ProgDongle in and out.*

6 Dimensions

TOP VIEW:

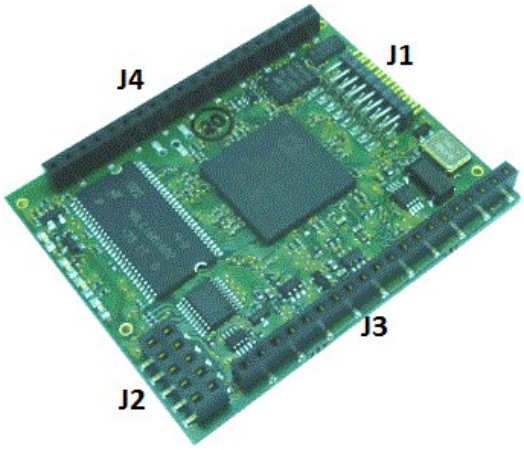


Notes:

- ***TOP VIEW***
- *All connector positions are within a **2.54mm grid**, which allows for easy setups on vero boards*
- *instead of mounting holes the board provides 4 pads to solder the board onto the baseboard*
- *dimensions indicate connectors pin 1*

7 Connector Overview

BOTTOM - VIEW



J1 : Programming connector (ProgDongle)
J2 : Analog In [10pol]
J3 : Analog & Digital IO [20pol]
J4 : Digital IO [20pol]

J[2..4] are standard 2.54mm sockets with reliable two point contacts.

Recommended mating parts for baseboard connectors are any standard 2.54mm headers with gold plating, e.g. Multicomp MC34739 (farnell 1593423)

8 Connector pin assignment

8.1 Legend

[I] = Input
[O] = Output
[IO] = Bidirctional

pu = internal pull up
pd = internal pull down

AIN = Analog Input
TMR = Timer Input or PWM output
TWI = Two wire interface
USB = USB interface
MR = Manual reset input

DIO = Digital IO
ENC = Encoder input
UART = Serial inteface
VRTC = RTC backup input

Notes:

- ***All pins are TTL 3.3V level, unless noted otherwise***
  (Imax = 2mA, NOT short circuit protected, take special care when configuring pins as outputs, Uoh>2.7V, Uol<0.4V)
- ***All pins except AINB and USB unprotected processor pins***
- ***All inputs can be left open***

All programmable IO pins are high impedance during power up and reset. They remain high impedance until defined otherwise by software.

8.2 Connector J3

Pin	1. Function	2. Function	3. Function	notes
J3-1	AINA-CH0 [I]			0..3V, up to 500Hz
J3-2	AINA-CH1 [I]			0..3V, up to 500Hz
J3-3	AINA-CH2 [I]			0..3V, up to 500Hz
J3-4	AINA-CH3 [I]			0..3V, up to 500Hz
J3-5	GND			
J3-6	TWI SCL [O]			pu 2k (only external pullup only to 3.3V allowed)
J3-7	TWI SDA [IO]			pu 2k (only external pullup only to 3.3V allowed)
J3-8	DIO16 [IO]	TMR A [IO]		
J3-9	DIO17 [IO]	TMR B [IO]		
J3-10	DIO18 [IO]	TMR C [IO]		
J3-11	DIO19 [IO]			
J3-12	DIO20 [IO]			
J3-13	DIO21 [IO]			
J3-14	MR [I]			pu 10k
J3-15	VRTC [I]			2.7..3.6V
J3-16	VCC (3.3V)			
J3-17	GND			
J3-18	USB VBUS			optional
J3-19	USB D-			optional
J3-20	USB D+			optional

8.3 Connector J4

Pin	1. Function	2. Function	3. Function	Notes
J4-1			LCD CLK	
J4-2	DIO23 [IO]	TMR E [IO]	LCD FS1	
J4-3	DIO22 [IO]	TMR F [IO]	LCD FS2	
J4-4	DIO0 [IO]		LCD R0 [O]	
J4-5	DIO1 [IO]		LCD R1 [O]	
J4-6	DIO2 [IO]		LCD R2 [O]	
J4-7	DIO3 [IO]		LCD R3 [O]	
J4-8	DIO4 [IO]		LCD R4 [O]	
J4-9	DIO5 [IO]		LCD G0 [O]	
J4-10	DIO6 [IO]		LCD G1 [O]	
J4-11	GND			
J4-12	DIO7 [IO]		LCD G2 [O]	
J4-13	DIO8 [IO]		LCD G3 [O]	
J4-14	DIO9 [IO]	UART1 TXEN [O]	LCD G4 [O]	
J4-15	DIO10 [IO]	UART1 /RXEN [O]	LCD G5 [O]	
J4-16	DIO11 [IO]	ENC CZM	LCD B0 [O]	
J4-17	DIO12 [IO]	ENC CDG	LCD B1 [O]	
J4-18	DIO13 [IO]	ENC CUD	LCD B2 [O]	
J4-19	DIO14 [IO]	UART1 TX [O]	LCD B3 [O]	
J4-20	DIO15 [IO]	UART1 RX [I]	LCD B4 [O]	

8.4 Connector J2 (AINB, optional)

Pin	Function/Name	notes
J2-1	AINBGND [I]	Analog Reference Potential, must be connected to GND or AGND
J2-2	AINBGND [I]	Analog Reference Potential, must be connected to GND or AGND
J2-3	AINB-CH7 [I]	+-5V / +-10V Analog Input
J2-4	AINB-CH6 [I]	+-5V / +-10V Analog Input
J2-5	AINB-CH5 [I]	+-5V / +-10V Analog Input
J2-6	AINB-CH4 [I]	+-5V / +-10V Analog Input
J2-7	AINB-CH3 [I]	+-5V / +-10V Analog Input
J2-8	AINB-CH2 [I]	+-5V / +-10V Analog Input
J2-9	AINB-CH1 [I]	+-5V / +-10V Analog Input
J2-10	AINB-CH0 [I]	+-5V / +-10V Analog Input

9 Port & Signal Descriptions

Note: All pins are TTL 3.3V level, unless specified otherwise
(Imax = 2mA, NOT short circuit protected, direct processor pins)

Description	Specifications
AINA[0..3] Analog In Group A Analog Inputs for low performance applications Samplerate < 500Hz This inputs are referenced to GND please note that the sample rate is influenced by devices connected to the TWI bus.	0..3V 10 Bit, 500Hz NOT OVP protected Input impedance typ 1M Ohm temperature stability +- typ 40 ppm/°C
AINB[0..7] Analog In Group B (optional) Analog Inputs with a software selectable +-5V / +-10V input range Simultanous Sampling of all 8 channels. Built in 2nd order analog anti aliasing filter (22kHz@-3dB) Software selectable ditigal filter options (down to 1.5kHz) Samplerate up to 200kHz (DMA) **NOTE : AINBGND** is the reference potential for the analog inputs AINB[0..7]. ***AINBGND must be connected to GND or AGND on the baseboard.*** It must have a potential similar to GND	+-5V, +-10V 16 Bit, simultaneous Input imp typ 1M Ohm OVP -15..+15V temperature stability +- 7ppm/°C No missing codes
DIO[0..23] Digital IO standard digital IO pins, direction software controlled	3.3V TTL
TMR[A..E] Timer Inputs and Outputs (direction software controlled) PWM output, Measurement input and Counter capability	TBD
Encoder Interface Connects to a quadrature A/B signal encoders, optional with zero marker (ENC CMZ)	
TWI Two Wire Interface (I2C-interface) Standard TWI interface for easy IO extensions → ***both signals need external pull up resistors (2k)***	typ 100kbps
UART standard asynchronous serial interface supports e.g. RS232, RS485, RS422 or serial USB via FTDI -> use RXEN/TXEN for RS485/422 driver control -> NO RTS/CTS signals available	up to 3Mbaud
USB Interface (optional) slave only onboard protection circuits, connects directly to USB connectors on baseboard	USB 1.0

Description	Specifications
MR Manual Reset active low external reset input. (optionaly) integrated debouncer circuit → simply connect an reset button to GND if needed	40ms debounced
VRTC backup battery input Backup voltage for internal real time clock. (VRTC keeps the internal RTC running, even if VCC is not present) can be connected to a 3.6V LiIon battery	2.7..3.6V 20uA typ
VCC power supply input 3.3V use a regulated 3.3V supply	3.3V / TBDA, +-5% max 100mV p-to-p 0-20Mhz
GND → please connect all GND pins to a GND plane on the base board	

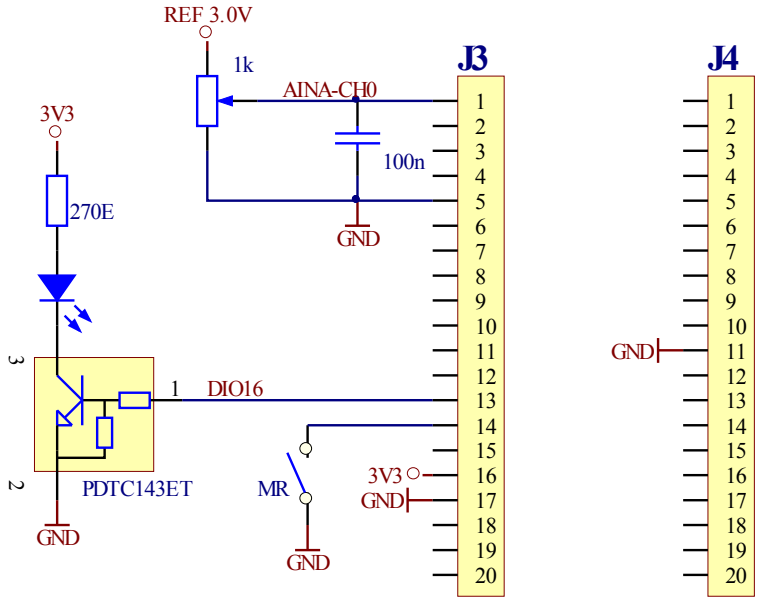
10 Basic Application Example

Integration into a custom baseboard is very easy. Just connect VCC (3.3V) to the board and the system is running and ready to go.

Add additional circuitry according to your needs.

In this basic example the Z48-C1 reads a potentiometer and controls an LED.

The MR pushbutton allows to reset the board manually.



11 Technical Data

Dimensions	60.6 x 49.4mm
Weight	
Power Supply	3.3V, Typ. 0.5..2W (TBD)
Processor	ADSP-BF52x
Memory	8MByte SPI Bootflash, 32MB SDRAM 100Mhz, 2k FRAM
Temperature Range Ambient	-20..75°C
Humidity	10..90%, non condensing
ROHS	Compliant
Warranty	2 years product warranty

12 Ordering Information

Z2x-C1z

[x = Processor Type]
4 : ADSP-BF524 processor, 400MHz
7 : ADSP-BF527 processor, 500Mhz

[z = Assembly Option]
A : full functionality
B : single sided, cost optimized

Valid Ordering Codes:

Ordering Code	Processor	AINA	AINB	Flash disk	USB	Availability
Z27-C1A	BF527	4x10Bit 500Hz	8x14Bit, 200kHz	256MB	yes	Q1 2011
Z27-C1B	BF527	4x10Bit 500Hz	-	-	no	-
Z24-C1A	BF524	4x10Bit 500Hz	8x14Bit, 200kHz	256MB	yes	-
Z24-C1B	BF524	4x10Bit 500Hz	-	-	no	-

13 Accessories

Picture	Ordering Code	Description	Availability
	DEV-Z2X-C1	Development Baseboard for Z24/27-C1	Q1 2011
	ProgDongle_STD	Programming Dongle	y
	RS232 DSUB adapter cable	RS232 DSUB adapter cable	y

14 Product Anomalies

Version	Anomalies
V0.0	ADCB supply inccorrect, TWI tolerates only 3.3V

15 Product Changes

Version	Changes
V0.1	

16 Document Revision History

Date	Vis.	Revision
30.12.09	**ab**	Preliminary release
15.02.11	**ab**	Product Revision and Anomalies added

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