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Understanding [Embedded - CPLDs \(Complex Programmable Logic Devices\)](#)

Embedded - CPLDs, or Complex Programmable Logic Devices, are highly versatile digital logic devices used in electronic systems. These programmable components are designed to perform complex logical operations and can be customized for specific applications. Unlike fixed-function ICs, CPLDs offer the flexibility to reprogram their configuration, making them an ideal choice for various embedded systems. They consist of a set of logic gates and programmable interconnects, allowing designers to implement complex logic circuits without needing custom hardware.

Applications of Embedded - CPLDs

Details	
Product Status	Not For New Designs
Programmable Type	In System Programmable
Delay Time tpd(1) Max	7.5 ns
Voltage Supply - Internal	4.5V ~ 5.5V
Number of Logic Elements/Blocks	-
Number of Macrocells	192
Number of Gates	-
Number of I/O	96
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	144-LQFP
Supplier Device Package	144-TQFP (20x20)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/m4a5-192-96-7vni

uCBF54x - EMM

➤ embedded media module



overview

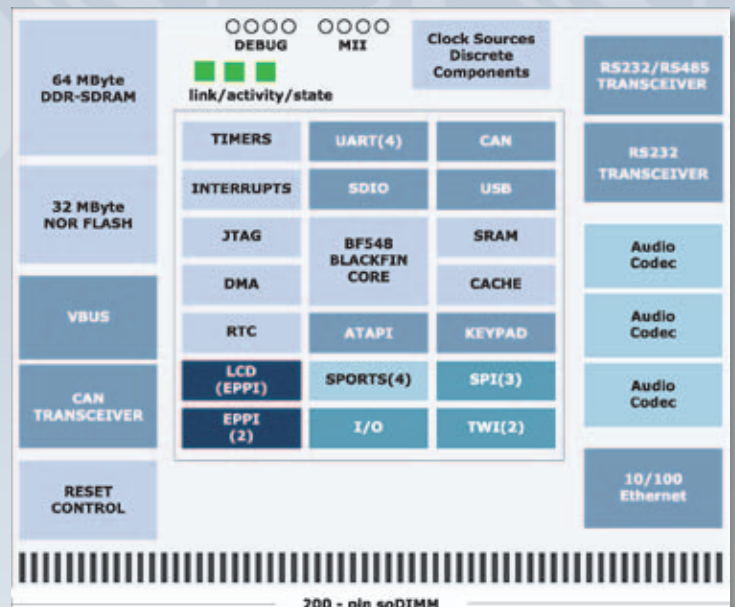
The uCBF54x embedded media module is a highly integrated system-level solution for the creation of a wide range of mixed two-way voice, broadcast audio, mini-PBX or video applications. The module combines the value of low-cost per channel IP audio with the scalability to support video, making it an ideal platform for digital IP media devices, transportation communications systems, access/security control, point of sale or medical monitoring.

The module is built around the powerful 533mHz Analog Devices® Blackfin® BF548 processor and includes all memory and subsystems to enable most applications with minimal external circuitry. The device supports analog audio, Ethernet, USB, serial, SDIO, ATAPI, SPI, TWI, as well as high speed synchronous serial and parallel interfaces. The system features three SSM2603 codecs that can support up to 6 duplex channels of audio or 3 headset connections.

The uCBF54x includes complete Voice and Management middleware and an open source uClinux BSP, eliminating the need to integrate multiple software components from various vendors. This hybrid combination of software gives developers complete voice support while retaining the ability to customize and recreate the system.

The development kit includes the uCBF54x module, host board, software and licenses for use. All software is integrated together to form a system-level solution with API's and tools. Out-of-the-box demo's are preloaded and example code helps reduce the learning curve.

The module integrates into end product with a simple 200pin soDIMM style edge connector and is available in various quantities. It is FCC/UL pre-qualified, RoHS compliant and suitable for harsh environments.



Multichannel Audio, Video, miniPBX



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➤ **empower embedded.**

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features

- 533MHz Analog Devices ADSP-BF548 Blackfin Microprocessor
- 32Mbyte NOR Flash
- 324Kbytes internal processor cache and SRAM
- 64Mbyte DDR-SDRAM
- USB Host/Device
- SDIO - Secure Digital Controller
- ATAPI - Parallel ATA Interface
- SPI - Serial Peripheral Interface
- TWI - compatible with I²C devices
- 4 - SPORTs (max) Synchronous Serial Interfaces
- 3 - EPPI (max) Parallel Interface
- 1 - LCD (EPPI0) Capable of Supporting Video
- 4 - Serial UARTS (max)
- RS232 Dedicated Serial Port
- RS232/RS485 Selectable Serial Port
- CAN - Controller Areas Network Bus
- RTC - Real Time Clock / Counter

- Timers / Counters
- Keypad Interface
- Configurable GPIO
- Lockbox® Code Security
- 3 - SSM2603 (max) - Audio Subsystem Codecs
- Single Headset or Dual Channel Mode Per Codec
- Up to 6 audio inputs and 6 outputs (max)
- Up to 3 headsets (max)
- SMSC 9217 10/100 BaseT MAC/PHY
- 10/100 Ethernet with Auto MDI/MDX
- Link, State and Activity Indicators
- Reset Controller
- Temperature range -40 to +85C
- RoHS Compliant

OS and Tools

- uClinux 2.6.x, uClibc, GNU Tools, JTAG support

middleware

Voice and Media Middleware

- Certified SIP Signalling Stack
- Feature Rich Telephony Application
- Run-time Configurable Signalling Abstraction Layer
- SIP, RTP, STUN, NTP
- Analog Audio Subsystem
- Digitmap and Config Files
- Demo Applications
- Integrated with Management Middleware
- Simple Interactive Voice Response (IVR)
- Play / Record Announcement Files

Telephony Features

- Push-to-call, Click-to-Call, Intercom, Dial, Play Announcement and Broadcast Modes
- Configurable voCoder Preferences
- Caller-ID, Call Waiting, Cancel Call Waiting
- Unattended/Attended Call Transfers
- Hotline, Speed dials
- Call Blocking Rules
- Auto Call Back on Busy
- Do Not Disturb
- MeetME Conferencing
- Anonymous Calling / Call Rejection
- Call Hold and Retrieve, Held Call Ringback
- IVR - Announce IP address / Call Return

API Module

- Simple Command Based Control
- Volume and Gain Controls
- Call Progress Messages
- Call ID messages
- Status Queries and Messages
- Reference Application for Easy Integration

Broadcast and Mass Notification Module

- Multicast One-to-Many RTP Support
- Up to 99 Configurable Broadcast Groups
- Configurable permissions per group
- Definable Command Packet port/address
- Definable Caller-ID and Caller Name
- Definable Broadcast Priorities
- Definable voCoder Payload

- Definable Answer Settings
- Configurable Alert Tone Generation
- Keep alive, Late Arrival and Termination
- Config file for Advanced Settings
- Coexistence with other SIP Elements

Voice Processing Subsystem

- G.711a, G.711u
- DTMF Detect and Generate
- Call Progress Tones

Management Middleware

- Core Middleware Engine
- Management Database System
- API, Tools and Software Modules Listed Below

Bootloader Module

- Flash Support, Partitioning, Wear Leveling
- Persistent Object and Database Support
- Firmware Failover Framework
- Definable Serial Port and Boot Parameters
- Command Shell
- TFTP Server
- Kernel API

WebUI Module

- SSL v2/v3 enabled webserver (https)
- Login Authentication
- Post-parsing CGI Support
- Auto Log Out on Idle
- Deny Simultaneous Users
- Auto Redirect to Secure Port
- Complete HTML Web Pages
- Wizards, Tools, Firmware Upload, Diagnostic Capture

Remote Provisioning Module

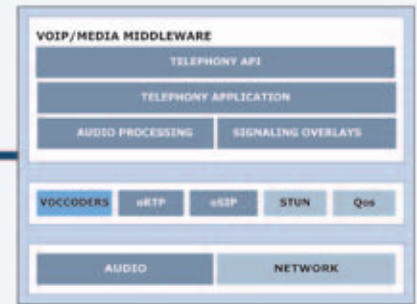
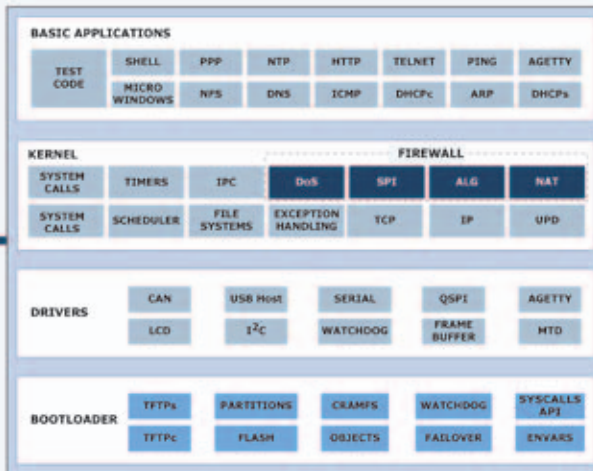
- End-point Initiated Remote Management
- Https Transport
- SSL v2/v3 Cryptography Support
- Host Webserver Authentication
- Simple Script Configuration File
- Automated with CRON Process
- Configurable with Unique Credentials
- Compatible with Dynamic Webservers

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➤ **uCBF54x - EMM**

- **MULTICHANNEL AUDIO, VIDEO, MINIPBX**
- **NO PROHIBITIVE LICENSING OR NRE**
- **BUNDLED, SYSTEM LEVEL SOLUTION**
- **MODULES AVAILABLE OFF-THE-SHELF**
- **OPEN SOURCE UCLINUX™ DISTRIBUTION**

software



development kits

Kit Includes:

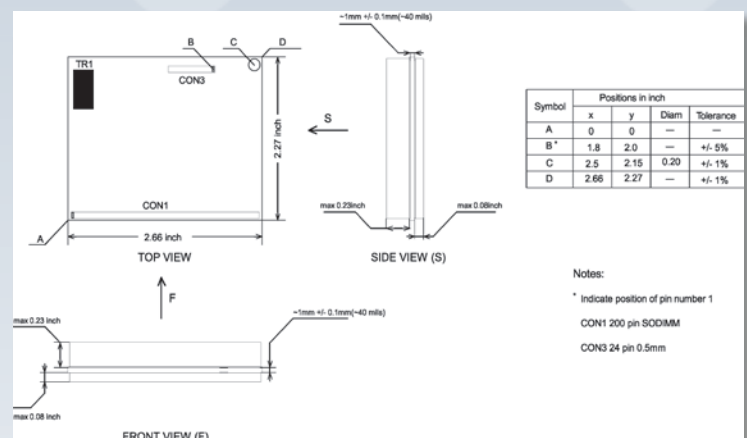
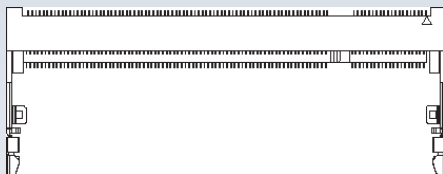
- uCBF548D200-32E64U3ACMDL533-XR Module
- Host Board, Cable kit, Power Supply, Headset
- Installation Support
- Access to Dedicated Online Support Site
 - Documentation, Schematics
 - Software, Demo's
 - How-To's, Forums, FAQ's
- License to use Middleware



physical

Edge / Mating Connector Options

- Tyco® Electronics Part Number 1981284-4
- Gas Tight / CAD Object Available



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bus description

PIN	SIGNAL	DESCRIPTION	PIN	SIGNAL	DESCRIPTION	PIN	SIGNAL	DESCRIPTION	PIN	SIGNAL	DESCRIPTION
1	N/C	NOT CONNECTED	51	GND	GROUND	101	RSM1	RS232/485 MODE SELECT	151	PJ_4	GPIO
2	T1_TP	ETHERNET	52	VDD_USB	+5V	102	PE_11	GPIO	152	PJ_3	GPIO
3	N/C	NOT CONNECTED	53	GND	GROUND	103	PE_12	GPIO	153	PJ_10	GPIO
4	T1_TN	ETHERNET	54	VDD_USB	+5V	104	PE_13	GPIO	154	PJ_7	GPIO
5	N/C	NOT CONNECTED	55	GND	GROUND	105	PH_3	GPIO	155	PJ_9	GPIO
6	T1_TC	ETHERNET	56	VDD_USB	+5V	106	CLKBUF	BUFFERED CLOCK OUTPUT	156	PG_3	GPIO
7	N/C	NOT CONNECTED	57	EXT_WAKE	EXT. WAKEUP OUTPUT	107	PA_13	GPIO	157	ATAPI_PD	ATAPI CONTROLLER
8	T1_RC	ETHERNET	58	USB_VBUS	USB VBUS	108	PA_9	GPIO	158	PG_2	GPIO
9	N/C	NOT CONNECTED	59	BM1	MODE SELECT 1	109	CLKOUT	CPU CLOCK OUT	159	PG_4	GPIO
10	T1_RP	ETHERNET	60	USB_VBUS	USB VBUS	110	SPI0MISO	SPI0 MASTER IN SLAVE OUT	160	PJ_5	GPIO
11	N/C	NOT CONNECTED	61	BM2	MODE SELECT 2	111	SPI0MOSI	SPI0 MASTER OUT SLAVE IN	161	PJ_6	GPIO
12	T1_RN	ETHERNET	62	USB_VBUS	USB VBUS	112	SPI0SCK	SPI0 CLOCK	162	PD_6	GPIO
13	KEEP-OUT	KEEP-OUT	63	#RESET	MASTER RESET	113	#SPI0SEL1	SPI0 SLAVE SELECT ENABLE 1	163	PD_7	GPIO
14	KEEP-OUT	KEEP-OUT	64	BATT	RTC BATT INPUT	114	#SPI0SEL2	SPI0 SLAVE SELECT ENABLE2	164	PD_4	GPIO
15	KEEP-OUT	KEEP-OUT	65	#RST_OUT	RESET OUT	115	#SPI0SEL3	SPI0 SLAVE SELECT ENABLE3	165	PD_5	GPIO
16	KEEP-OUT	KEEP-OUT	66	LED1	CHANNEL 0 - LED1	116	#SPI0SS	SPI0 SLAVE SELECT INPUT	166	PD_3	GPIO
17	GND	GROUND	67	LED2	CHANNEL 0 - LED2	117	SPI1MISO	SPI1 MASTER IN SLAVE OUT	167	PD_1	GPIO
18	GND	GROUND	68	LED3	CHANNEL 0 - LED3	118	SPI1MOSI	SPI1 MASTER OUT SLAVE IN	168	PD_2	GPIO
19	N/C	NOT CONNECTED	69	#NMI	NON MASKABLE INT.	119	SPI1SCK	SPI1 CLOCK	169	PD_0	GPIO
20	N/C	NOT CONNECTED	70	PG_15	GPIO	120	#SPI1SEL1	SPI1 SLAVE SELECT ENABLE 1	170	PBLRC3	DAC SAMPLE RATE, PLAYBACK
21	LLIN1	AUDIO INPUT LEFT	71	UART2_RXD	UART2 RECEIVE	121	#SPI1SEL2	SPI1 SLAVE SELECT ENABLE2	171	PA9	GPIO
22	LOUT1	AUDIO OUTPUT LEFT	72	UART2_TXD	UART2 TRANSMIT	122	#SPI1SEL3	SPI1 SLAVE SELECT ENABLE3	172	PBDAT3	DAC AUDIO DATA INPUT, PLAYBACK
23	RLIN1	AUDIO INPUT RIGHT	73	#UART3_CTS	UART3 CLEAR TO SEND	123	#SPI1SS	SPI1 SLAVE SELECT INPUT	173	BCLK3	DIGITAL AUDIO BIT CLOCK
24	ROUT1	AUDIO OUTPUT RIGHT	74	#UART3_RTS	UART3 REQUEST TO SEND	124	SPI2MISO	SPI2 MASTER IN SLAVE OUT	174	RECLRC3	ADC SAMPLE RATE, RECORD
25	MIN1	MICROPHONE INPUT	75	UART3_RX	UART3 RECEIVE	125	SPI2MOSI	SPI2 MASTER OUT SLAVE IN	175	PA_13	GPIO
26	N/C	NOT CONNECTED	76	UART3_TX	UART3 TRANSMIT	126	SPI2SCK	SPI2 CLOCK	176	RECDAT3	ADC AUDIO DATA OUTPUT, RECORD
27	LLIN2	AUDIO INPUT LEFT	77	SCL0	TWI0 CLOCK	127	#SPI2SEL1	SPI2 SLAVE SELECT ENABLE 1	177	PA_15	GPIO
28	LOUT2	AUDIO OUTPUT LEFT	78	SDA0	TWI0 DATA	128	#SPI2SEL2	SPI2 SLAVE SELECT ENABLE2	178	PC_3	GPIO
29	RLIN2	AUDIO INPUT RIGHT	79	SCL1	TWI1 CLOCK	129	#SPI2SEL3	SPI2 SLAVE SELECT ENABLE3	179	PC_0	GPIO
30	ROUT2	AUDIO OUTPUT RIGHT	80	SDA1	TWI1 DATA	130	#SPI2SS	SPI2 SLAVE SELECT INPUT	180	PC_5	GPIO
31	MIN2	MICROPHONE INPUT	81	SD_D2	SD DATA	131	PG_0	GPIO	181	PC_4	GPIO
32	N/C	NOT CONNECTED	82	SD_D3	SD DATA	132	PG_1	GPIO	182	PC_6	GPIO
33	LLIN3	AUDIO INPUT LEFT	83	SD_CMD	SD COMMAND	133	PH_2	GPIO	183	PC_2	GPIO
34	LOUT3	AUDIO OUTPUT LEFT	84	SD_CLK	SD CLOCK	134	PF_14	GPIO	184	PC_1	GPIO
35	RLIN3	AUDIO INPUT RIGHT	85	SD_D0	SD DATA	135	PF_13	GPIO	185	PC_7	GPIO
36	ROUT3	AUDIO OUTPUT RIGHT	86	SD_D1	SD DATA	136	PF_15	GPIO	186	R1_CTS	RS232 CLEAR TO SEND
37	MIN3	MICROPHONE INPUT	87	SD_WP	SD WRITE PROTECT	137	PF_11	GPIO	187	+1.2V	POWER
38	ANALOG GND	ANALOG GROUND	88	SD_CD	SD CARD DETECT	138	PF_9	GPIO	188	R1_RTS	RS232 REQUEST TO SEND
39	ANALOG GND	ANALOG GROUND	89	PD_14	GPIO	139	PF_12	GPIO	189	+2.5V	POWER
40	ANALOG GND	ANALOG GROUND	90	PD_13	GPIO	140	PF_10	GPIO	190	R1_RXD	RS232 RECEIVE
41	GND	GROUND	91	PD_15	GPIO	141	PF_8	GPIO	191	CANO_H	CANO HIGH BUS OUTPUT
42	VDD	POWER	92	PD_11	GPIO	142	PF_5	GPIO	192	R1_TXD	RS232 TRANSMIT
43	GND	GROUND	93	PD_12	GPIO	143	PF_6	GPIO	193	CANO_L	CANO LOW BUS OUTPUT
44	VDD	POWER	94	PD_9	GPIO	144	PF_4	GPIO	194	R2_RXD	RS232 RECEIVE
45	GND	GROUND	95	PD_10	GPIO	145	PF_7	GPIO	195	USB_DM	USB D-
46	VDD	POWER	96	PD_8	GPIO	146	PF_3	GPIO	196	R2_TXD	RS232 TRANSMIT
47	GND	GROUND	97	PH_4	GPIO	147	PF_0	GPIO	197	USB_DP	USB D+
48	VDD	POWER	98	PH_5	GPIO	148	PF_2	GPIO	198	R0_RXD	RS232 RECEIVE
49	GND	GROUND	99	PH_6	GPIO	149	PF_1	GPIO	199	USB_ID	USB ID
50	VDD	VDD	100	PH_7	GPIO	150	PJ_8	GPIO	200	R0_TXD	RS232 TRANSMIT

ratings & parts

Voltage	Module	Condition
3.3VDC	550mA	Normal Operation
3.3VDC	Not Yet Rated	Power Save Mode
3.3VDC	770mA	Theoretical Max.

Part Number	Description
uCBF54x-Dev Kit ¹	uCBF54x-EMM Development Kit w/ Daughter Cards
uCBF54x-Start Kit	uCBF54x-EVM Starter Kit w/out Daughter Cards
uCBF54x-Exp Pack ¹	Peripheral Daughter Cards
uCBF548D200 -32E64U3ACMDL533-XR	uCBF54x-EMM Module (superset)
uCBF542D200 -16E64UD400-CR ¹	uCBF54x-EVM Module (subset)

¹contact sales for availability

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