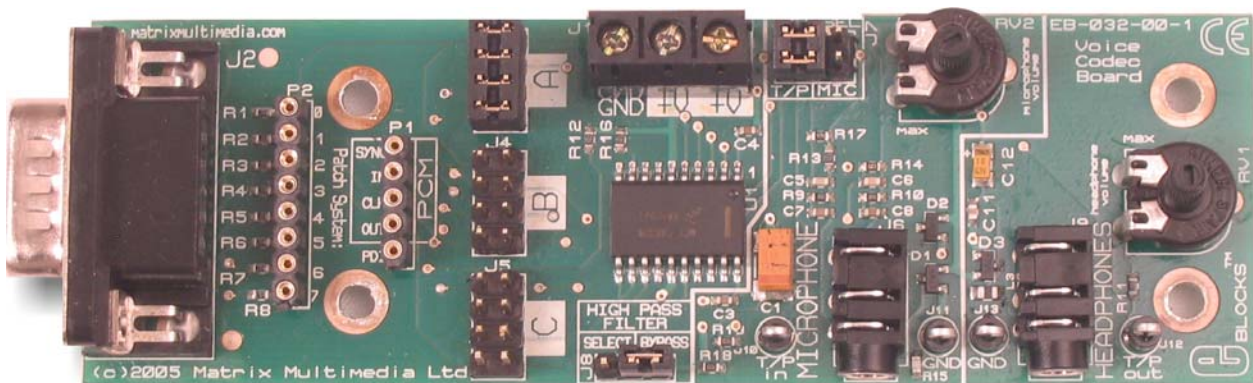


Codec board datasheet

EB032-00-1



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Appendix 1 Circuit diagram

1. **About this document**

This document concerns the Matrix Multimedia Audio Codec Board code EB-032-00-1

1. Trademarks and Copyright

PIC and PICmicro are registered trademarks of Arizona Microchip Inc.

E-blocks is a trademark of Matrix Multimedia Limited.

EB-032 and associates software and documentation are Copyright ©2008 Matrix Multimedia Limited.

2. Other Sources of Information

There are various other documents and sources that you may find useful:

Getting Started with E-Blocks.pdf

This describes the E-blocks system and how it can be used to develop complete systems for learning electronics and for PICmicro programming.

PPP Help File

This describes the PPP software and its functionality. PPP software is used for transferring hex code to a PICmicro microcontroller.

3. Disclaimer

The information in this document is correct at the time of going to press. Matrix Multimedia reserves the right to change specifications from time to time.

4. Technical Support

If you have any problems operating this product then please refer to the troubleshooting section of this document first. You will find the latest software updates, FAQs and other information on our web site: www.matrixmultimedia.co.uk. If you still have problems please email us at: support@matrixmultimedia.co.uk. When emailing please state the operating system, the hardware and the version of PPP you are using.

2. General information

1. Description

The EB032-00-1 is designed to incorporate Codec technology, and is capable of compressing and decompressing data. From the circuit diagram in Appendix 1 it can be seen that the onboard chip is a MC145483. The MC145483 is a 13 bit linear PCM Codec filter with 2's compliment data format. The device performs the voice digitization and reconstruction as well as the band limiting and smoothing required for the voice coding in digital communication systems.

Further information on E-blocks is available in a separate document entitled Introduction to E-blocks.doc.

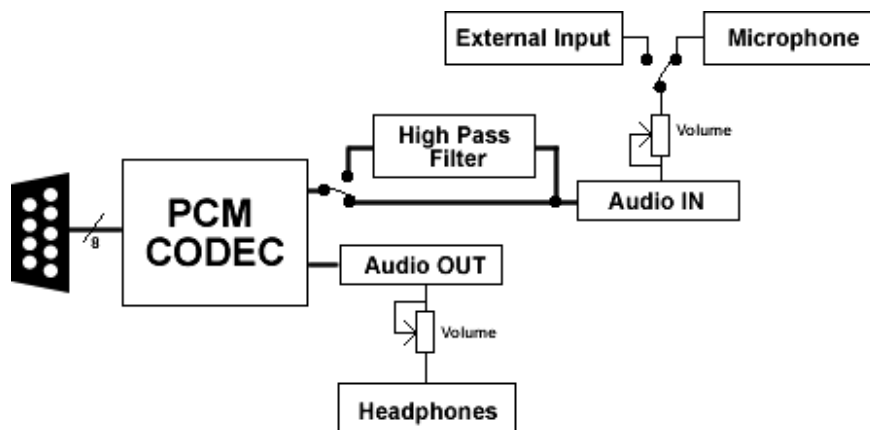
2. Features

- Works with the Bluetooth E-Block
- Sockets for audio in and out
- Volume control for both channels
- Built in high pass audio filter
- E-blocks compatible
- 3.3V compatible

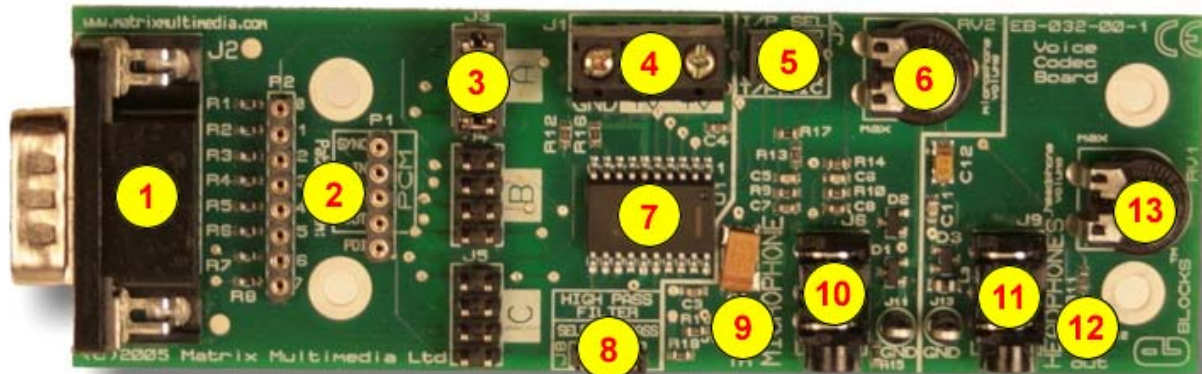
Description

This is an add-on board to allow for audio to be sent and received via the Bluetooth E-Block.

3. Block schematic



3. Board layout



EB032-74-1.jpg

1. Downstream 9 way D type connector
2. Patch system
3. Jumper settings
4. Screw Terminals +V - 3.3V
5. Jumper selection. Test pin or Microphone
6. Microphone volume control
7. MC145483 chip
8. Jumper selection. Filter or no filter
9. Audio In test pin
10. Microphone input
11. Headphone input
12. Audio Out test pin
13. Headphone volume control

4. Testing This Product

System Setup

EB006 Options	Setting
Power supply	External, 14V
PICmicro device	16F877a
SW1 (Fast/Slow)	Don't care
SW2 (RC/Xtal)	Xtal
Xtal frequency	19.6608MHz
Port A	EB007 Switch board
Port B	EB005 LCD board
Port C	EB024 Bluetooth board
Port D	
Port E	
Test program	BT_MASTER.HEX

EB007 Options	Setting
Power supply	External, 5V

EB005 Options	Setting
Power supply	External, 5V
Jumper settings	Default

EB024 Options	Setting
Power supply	External, 5V
J7	No link block
J8	5V
J13 / J9	J9 Horizontal
J14 / J10	J10 Horizontal
J15 / J11	J11 Horizontal
J16 / J12	J12 Horizontal

EB032 Options	Setting
Power supply	External, 3.3V (from Bluetooth board)
J3	A
High Pass Filter	Bypass
IP/SEL (J7)	T/P
RV1	Max (counter clockwise)
RV2	Max (clockwise)

- Slave system requirements are as above except:
 - 16F877a is programmed with VOICE_CODEC_SLAVE.HEX
 - IDC cable
 - EB032 Voice Codec E-block is the system under test.
- PSU Connected to Master System - Slave system can be powered by connecting between “GND” and “+14V” screw terminals of EB-006’s.
- Signal generator set to a sine wave at approximately 500Hz, 1V pk-pk, 1.6V DC offset. Use the 50 ohm output if available. (2 signal generators would be preferable, but this is not essential – the instructions below assume only 1 is being used).

- Dual channel oscilloscope with time base at 0.2 ms per div and both inputs at .1V per div. (Again, 2 separate oscilloscopes might be preferable – the instructions below assume that 1 dual scope is being used). Use AC coupling and be careful with the trigger settings (obviously this is scope-dependant).
- Pair of headsets for performing additional QA procedure.

4.5 Setup Procedure

1. Before the test unit has been connected, connect both systems as described and apply the power to the Master EB-006 E-Block and press “RESET” – “init..done” will be displayed on the Master LCD.
2. A series of dots on the Master LCD will show the progress of the Master System boot procedure. The message “setup” will indicate a successful boot, and then the screen will go blank. Then the Master LCD will display “PAIR 0 xxx”, “RING xxx” and “CONNECT xxx” messages (where “xxx” is a 12-digit number), and finally “^^^”.
3. At the same time, the Slave System LCD will display “rx.done.”, then the screen will go blank and a series of dots will indicate progress. This will end with “connected”, and then the message will be replaced by “audio” followed by another stream of dots ending with “on”. The second line will then display “press A0 to exit” – but don’t press it unless something goes wrong! This whole boot-up sequence should take approximately 15 seconds.
4. At this stage, both the Master and Slave Bluetooth modules will have D2 lit and an audio signal will exist between the Bluetooth systems.
5. Connect channel 1 of the oscilloscope to the “T/P OUT” test-point of the Master System.

4.6 Test procedure

6. Connect the signal generator to the “T/P IN” test-point of the MASTER System
7. Power the test unit with 3.3V from the Bluetooth board in the Slave System and plug it into the “CODEC” end using the supplied IDC cable.
8. Connect channel 2 of the scope to the “T/P OUT” test-point of the Slave System. A clean sine wave at the appropriate frequency should be present on this channel (of approximately 0.3V amplitude).
9. Disconnect the signal generator from the Master System and connect it instead to the Slave System “T/P IN” test-point. Now, a clean sine wave should be present on channel 1 of the scope.
10. Disconnect the test subject from all test equipment and the Slave System.
11. Repeat steps 6 to 10 for the remaining Voice Codec E-Blocks.

4.7 Possible Problems

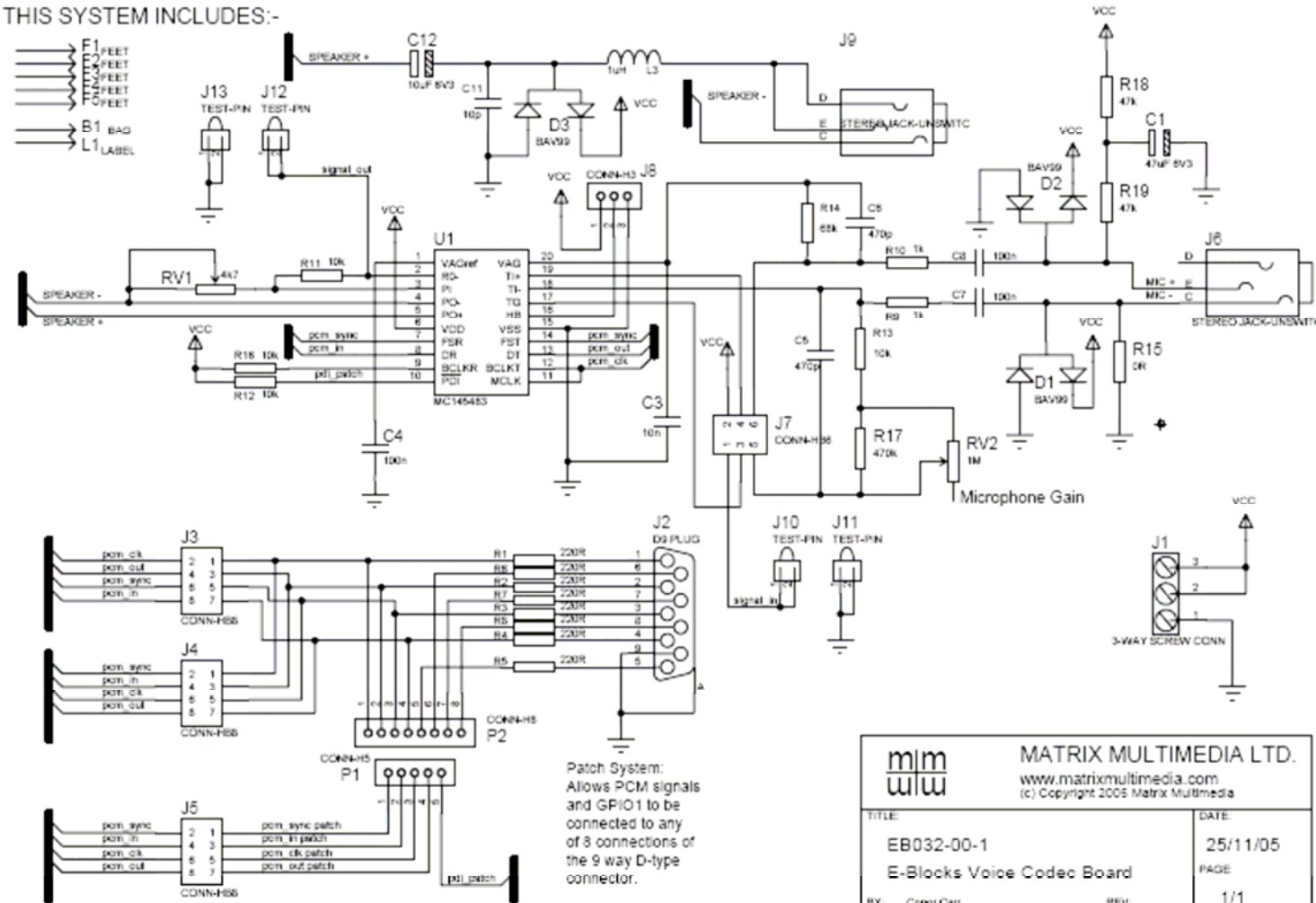
- If the Slave Bluetooth module does not have power (or is not working for any reason), the Slave LCD will display “rx.done.f0” at step 4.
- If the Master System boot fails, the LCD will display “init.done” and the screen will go blank. The progress dots will not appear.
- If the Slave module fails to “discover” the Master module, the Slave display will stall at 4 dots and finally a message “error 6” will be displayed. Possible causes are that the Master Bluetooth module...
 - ...is no longer powered
 - ...has not completed boot-up successfully
 - ...is not the one with address “00809094BA05”
 - ...remains connected to another Bluetooth module (the D2 LED will be on)

Reset the Master System and wait for a successful boot-up to recover.

- If the oscilloscope reading is a flat line, it could be:
 - ...a failure with either Voice Codec boards – check their connections
 - ...one of the Codec boards has the wrong settings
 - ...the signal generator and/or scope are set incorrectly

Appendix 1 – Circuit Diagram

THIS SYSTEM INCLUDES:-



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TITLE: EB032-00-1 E-Blocks Voice Codec Board BY: Conner Carr	DATE: 25/11/05 PAGE: 1/1

