

EnerChip™ CC Real-Time Clock Evaluation Kit

System Features and Overview

CBC-EVAL-06 is a demonstration kit featuring the Cymbet EnerChip CBC3112 backup power and battery management circuit coupled with the Micro Crystal low power RV-2123 real-time clock (RTC) with integrated crystal.

The kit demonstrates just how compact an RTC and backup power solution can be using the low profile surface mount devices from Cymbet and Micro Crystal. The combined board space of the two-chip solution including RTC, crystal oscillator, rechargeable backup power source, and power management circuits, is **only 0.65 cm²**.

CBC-EVAL-06 has the following elements:

- Solid state rechargeable energy storage in low profile surface mount package, for real-time clock backup power
- Integrated battery management that controls battery charging and discharge cutoff, ensuring maximum service life of on-board storage cells
- Integrated real-time clock and crystal oscillator in small ceramic surface mount package with SPI bus
- USB connector for easy demonstration on personal computer
- Input/output access to board for easy connection to external microcontroller



Figure 1: CBC-EVAL-06 Demo Kit.

Smallest RTC Power Backup Footprint

As shown above in Figure 1, the CBC-EVAL-06 demonstrates an extremely compact RTC power backup solution. The EnerChip CC CBC3112 is on the left and the Micro Crystal 2123 is on the right inside the white box. The block diagram of this simple two chip solution is shown in Figure 2.

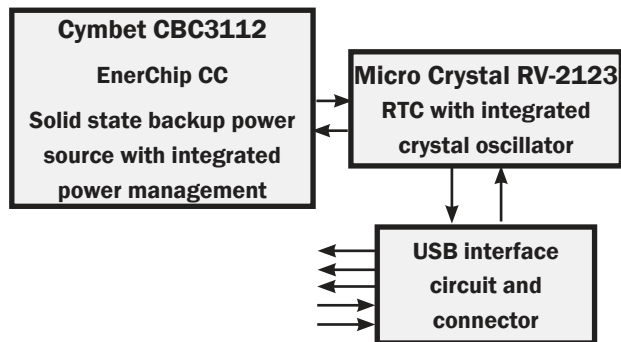
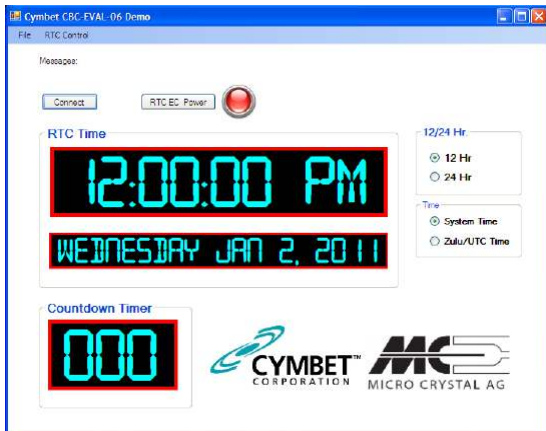


Figure 2: EnerChip CBC-EVAL-06 Demo Kit block diagram.

EVAL-06 Graphical User Interface

The CBC-EVAL-06 includes an easy to use PC based software application that communicates with the USB stick. Users can set the time of day, date and count-down timer values to experiment with RTC power-backup. The software works with Microsoft Windows XP and Windows 7 operating systems. Once the EVAL-06 USB stick is inserted into the PC, the Connect button is clicked in the GUI. This establishes communication over the USB port and the time, date and countdown selections are written to the RTC. The EVAL-06 can then be removed from the PC and the RTC will be powered by the EnerChip CC CBC3112.



CBC-EVAL-06 EnerChip CC RTC Evaluation Kit

CBC-EVAL-06 Module Connector, Jumpers, and Test Points

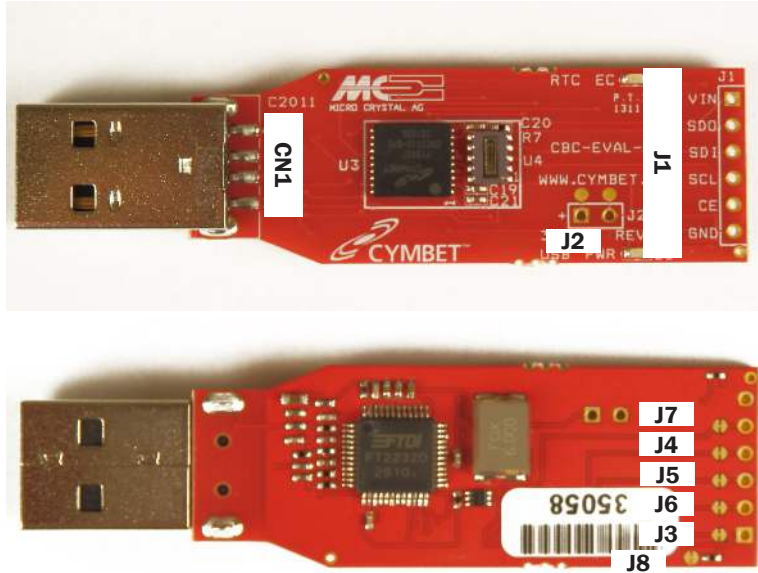


Figure 3: Locations of Connector and Jumpers.

| JUMPERS AND CONNECTORS | | |
|------------------------|------------|------------------------------|
| Jumper | Pin Number | Designation |
| J1 | 1 | VIN |
| | 2 | SDO |
| | 3 | SDI |
| | 4 | SCL |
| | 5 | CE |
| | 6 | GND |
| J2 | 1 | EXT ENERCHIP (+) |
| | 2 | EXT ENERCHIP (-) [GND] |
| J3 | Trace | RTC PWR |
| J4 | Trace | SCL |
| J5 | Trace | SDI |
| J6 | Trace | SDO |
| J7 | Trace | CE |
| J8 | Trace | RTCPWR LED (optional cut) |
| CN1 | 1 | VDD (indirect) |
| | 2 | USBDM (indirect) |
| | 3 | USBDP and RSTOUT# (indirect) |
| | 4 | GND |

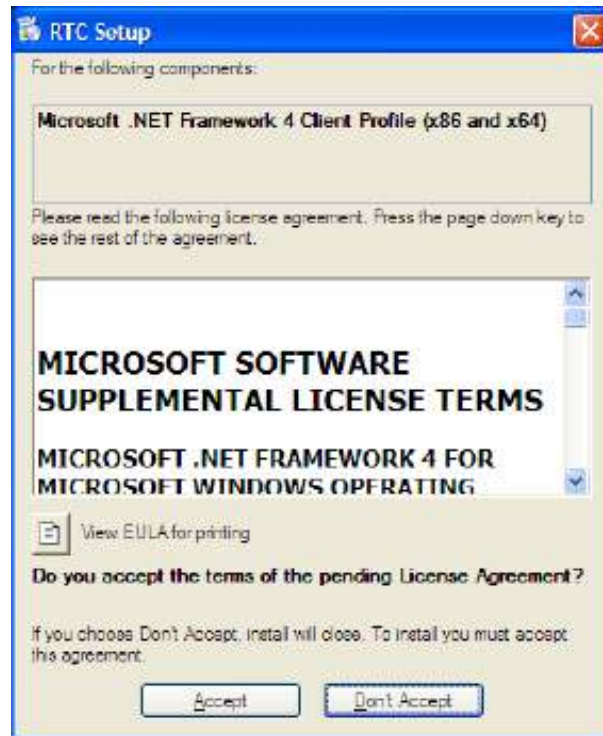
CBC-EVAL-06 EnerChip CC RTC Evaluation Kit

Getting Started

For first time users who have not installed the demonstration software, follow these steps:

Insert the EVAL-06 Kit CD-ROM into the CD drive.

If the Microsoft .NET Framework Client Profile has not been loaded, a window will appear as shown below. Click 'Accept.'



After Framework loads, click 'Yes', on Setup. This will reboot the computer.



When the 'Welcome to the RTC Setup Wizard' window appears, click 'Next.'

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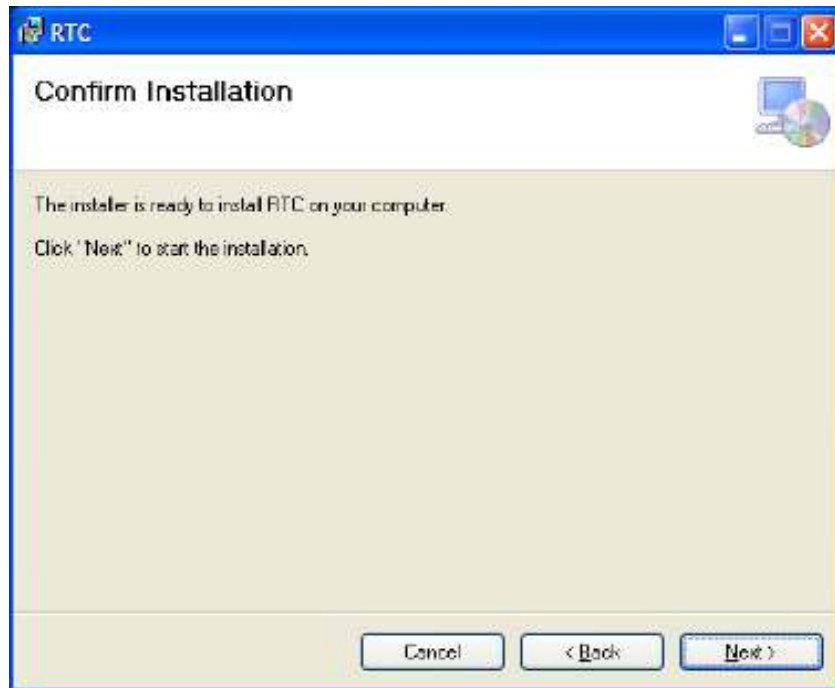
Click 'Next' on each of the next two windows that appear.

Installing RTC ...Installation complete, then click 'Close'

Insert EVAL-06 dongle into USB port. Both red LEDs will be lit



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When the 'Found New Hardware Wizard' window appears, click 'No, not this time.'



Click 'Next.'

Then, click 'Install from a list or specific location (Advanced)' and click 'Next.'

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At the next window, check 'Include this location in the search,' then browse to 'My Computer.'

Continue navigating computer folders to the location shown below, then click 'OK' in the 'Browse for Folder' window.



Click 'Next.'

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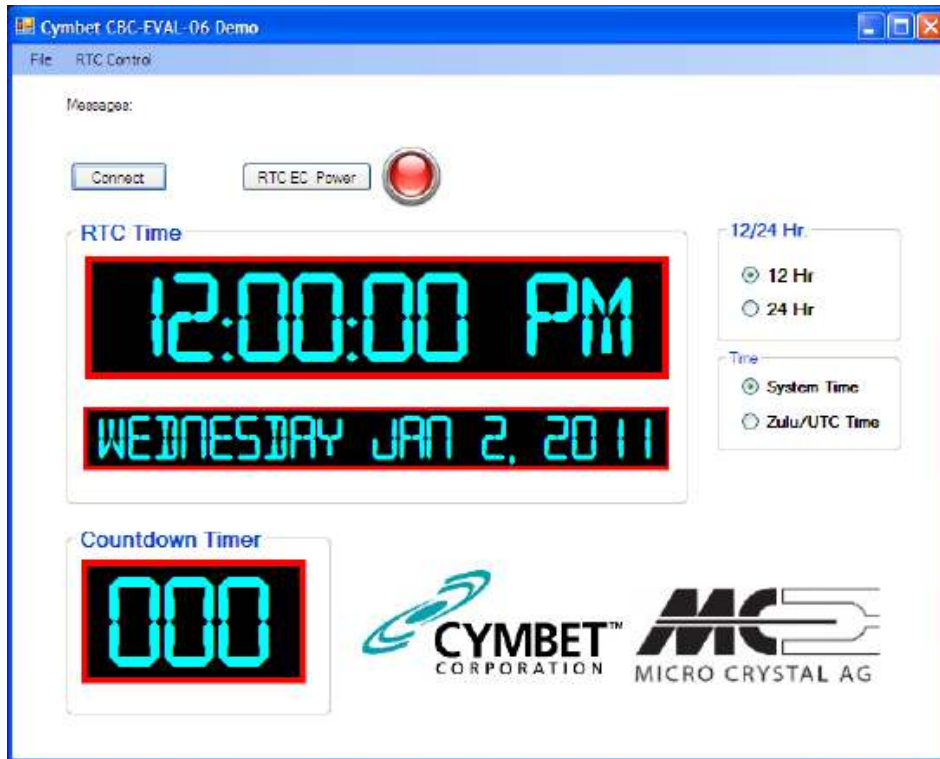
When the 'Found New Hardware Wizard' window appears, Click 'Finish.'



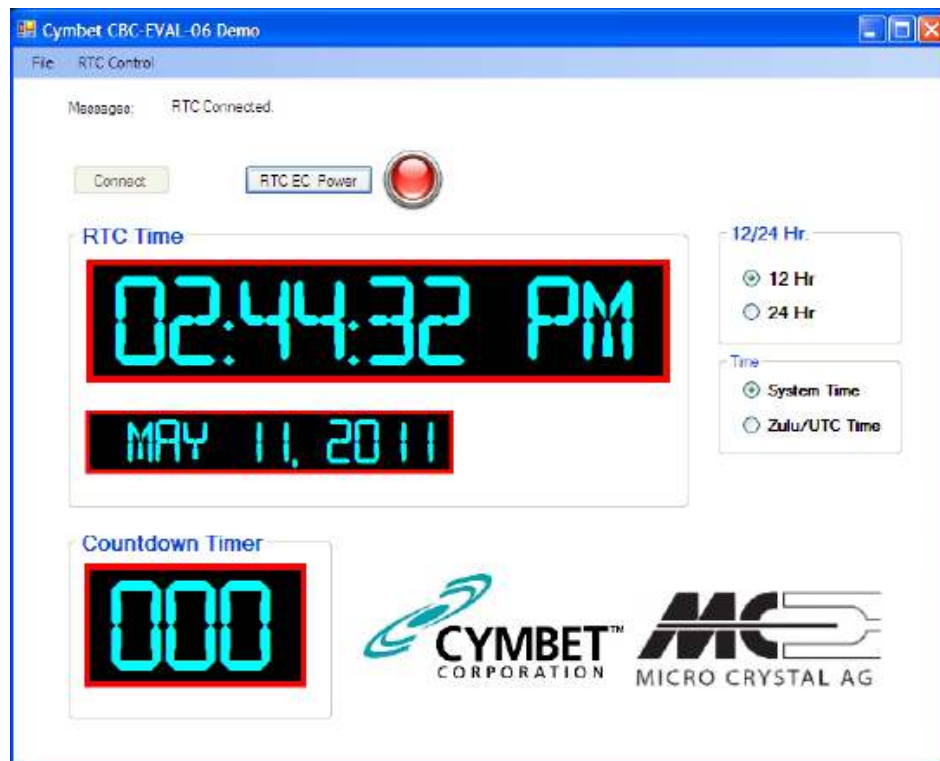
A 'Found New Hardware' balloon will appear on your screen, indicating a successful installation. The system is now ready to run the RTC demo.

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Double-click the 'Cymbet RTC Demo' icon on the desktop. The following window should appear.



Plug in the EVAL-06 USB stick into a PC USB Port. Click 'Connect' on the Graphical User Interface (GUI). The System time will appear.

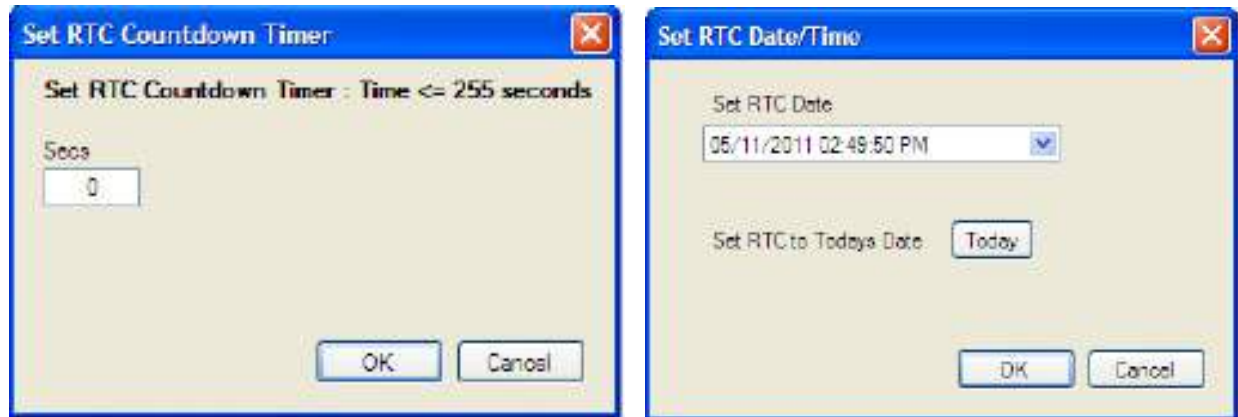


CBC-EVAL-06 EnerChip CC RTC Evaluation Kit

Click 'RTC EC Power' to disable power from the dongle. Power LED will turn off.

Click RTC EC Power to again apply power to the dongle.

To use Countdown Timer or clock settings, open 'RTC Control' menu.



Select either option.

RTC Countdown Timer option allows user to apply a value from 0 to 255 in 'Secs' field.

Alternatively, the 'Set RTC Date/Time' option allows the user to set a specific date and time. Enter any arbitrary date and time as the starting time.

Once countdown timer or date and time have been set, the CBC3112 EnerChip can be used to maintain the timer or time by either disabling power from the dongle by clicking the 'RTC EC Power' button or removing the dongle from the USB port. In the absence of USB power, the CBC3112 will provide power to the RV-2123 RTC for up to 100 hours. Simply re-insert the dongle or re-apply power to verify that the countdown timer or time and date were maintained while the dongle was not under USB power.

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CBC-EVAL-06 Circuit Schematic

The schematic of Figure 4 depicts the portion of the CBC-EVAL-06 including the EnerChip CC and the RTC module which is the top side of the USB stick. Note the presence of vias J1 for connecting the components to an external circuit for hardware development.

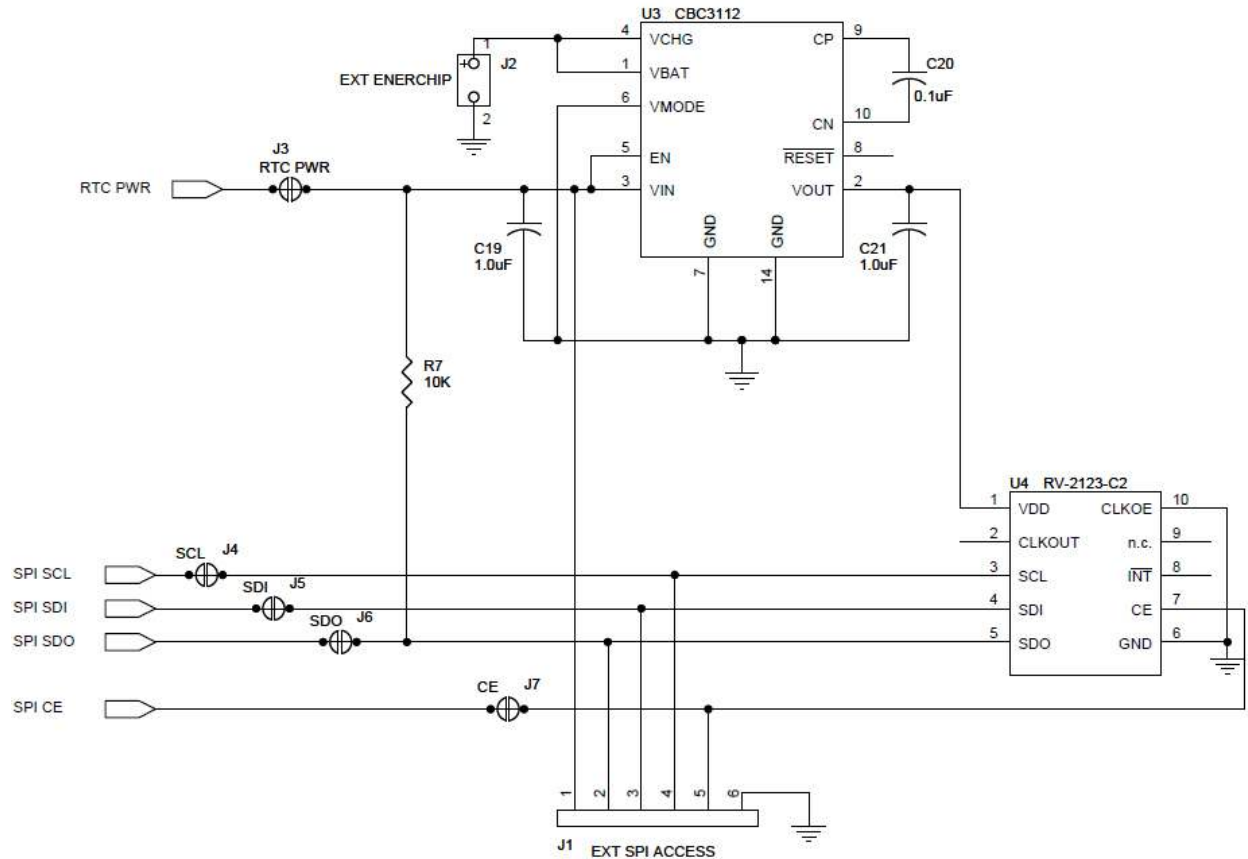


Figure 4: CBC-EVAL-06 Circuit Schematic (EnerChip CC and RTC Portion Only).

Table 1: CBC-EVAL-06 Bill of Materials.

| Quantity | Ref Des | Manufacturer | Manufacturer Part # | Description |
|----------|----------------------------|---|---------------------|----------------------------------|
| 1 | R8 | Panasonic - ECG | ERJ-2GE0R00X | RES 0.0 OHM 1/10W 0402 SMD |
| 2 | R2, R3 | Vishay/Dale | CRCW040227R0JNED | RES 27 OHM 1/16W 5% 0402 SMD |
| 1 | R1 | Panasonic - ECG | ERJ-2RKF4700X | RES 470 OHM 1/10W 1% 0402 SMD |
| 2 | R9, R10 | Yageo | RC0402JR-07680RL | RES 680 OHM 1/16W 5% 0402 SMD |
| 1 | R4 | Vishay/Dale | CRCW04021K50JNED | RES 1.5K OHM 1/16W 5% 0402 SMD |
| 3 | R5, R6, R7 | Vishay/Dale | CRCW040210K0FKED | RES 10.0K OHM 1/16W 1% 0402 SMD |
| 2 | C16, C17 | Murata Electronics North America | GRM1555C1H270JZ01D | CAP CER 27PF 50V 5% C0G 0402 |
| 2 | C6, C7 | Murata Electronics North America | GCM1555C1H470JZ13D | CAP CER 47PF 50V C0G 0402 |
| 2 | C1, C13 | Murata Electronics North America | GCM155R71H103KA55D | CAP CER 01UF 50V X7R 0402 |
| 2 | C5, C12 | Murata Electronics North America | GRM155R71A333KA01D | CAP CER 33000PF 10V 10% X7R 0402 |
| 6 | C2, C4, C11, C14, C15, C20 | Murata Electronics North America | GRM155R61A104KA01D | CAP 1UF 10V CERAMIC X5R 0402 |
| 2 | C19, C21 | Murata Electronics North America | GRM155R60J105KE19D | CAP CER 1.0UF 6.3V 10% X5R 0402 |
| 1 | C3 | TDK Corporation | C1508X5R0J106M | CAP CER 10UF 6.3V X5R 0603 |
| 2 | D3, D4 | Lumex Opto/Components Inc | SML-LX06031W-TR | LED 635NM RED DIFF 0603 SMD |
| 1 | U2 | FTDI, Future Technology Devices Int'l Ltd | FT2232D-REEL | IC USB FS DUAL UART/FIFO 48-LQFP |
| 1 | U3 | Cymbet | CBC3112 | EnerChip CC CBC3112 |
| 1 | U4 | Microcrystal | RV-2123-C2 | IC RTC MODULE |
| 1 | Q1 | Diodes Inc | DMP2004VK | MOSFET P-CH DUAL 530MA SOT-563 |
| 2 | FB1, FB2 | Murata Electronics North America | BLM156D182SN1D | FERRITE CHIP 1800 OHM 100MA 0402 |
| 1 | Y1 | Fox Electronics | FQ7050B-6 | CRYSTAL 6.0000 MHZ 20PF SMT |
| 1 | CN1 | Molex Inc | 480371000 | CONN PLUG USB 4POS RT ANG SMD |
| 1 | PCB1 | Cymbet | 310079 REV. A | PRINTED CIRCUIT BOARD |

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CBC-EVAL-06 Assembly Diagrams

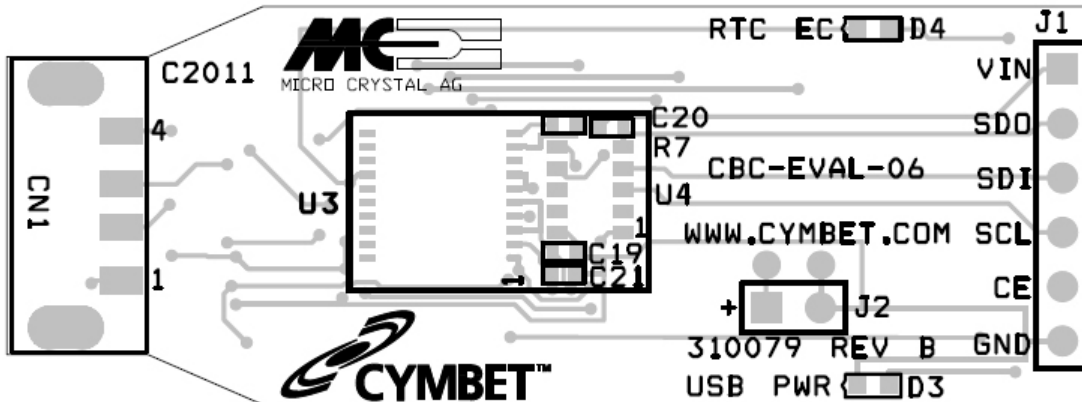


Figure 5: CBC-EVAL-06 Assembly Diagram (Top View).

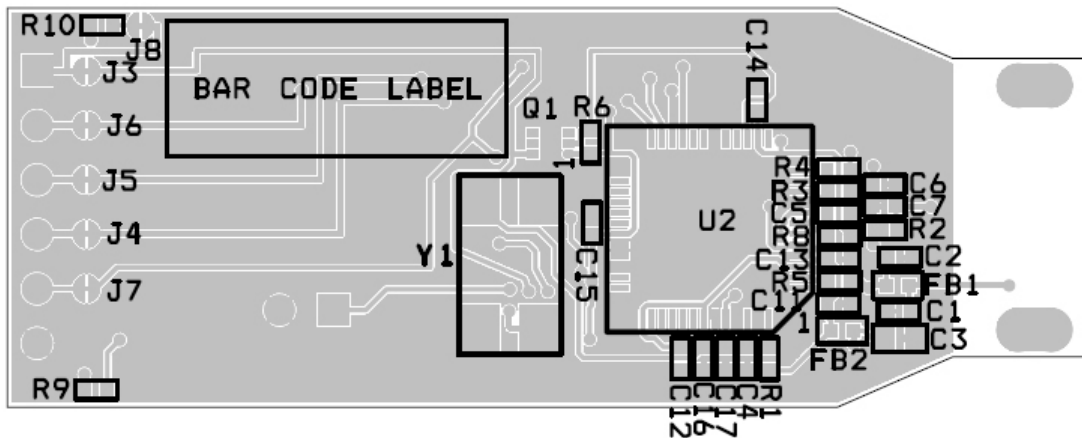


Figure 6: CBC-EVAL-06 Assembly Diagram (Bottom View).

Ordering Information

| EnerChip Part Number | Description | Notes |
|----------------------|--|--|
| CBC-EVAL-06 | EnerChip CC RTC Demo Kit | Contains USB Stick with EnerChip CC and RTC Module |
| CBC3112-D7C | EnerChip CC with Integrated Power Management | Packaged in Tape and Reel or Tubes |
| CBC012-D5C | EnerChip 12 μ Ah Solid State Battery | Packaged in Tape and Reel or Tubes |

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