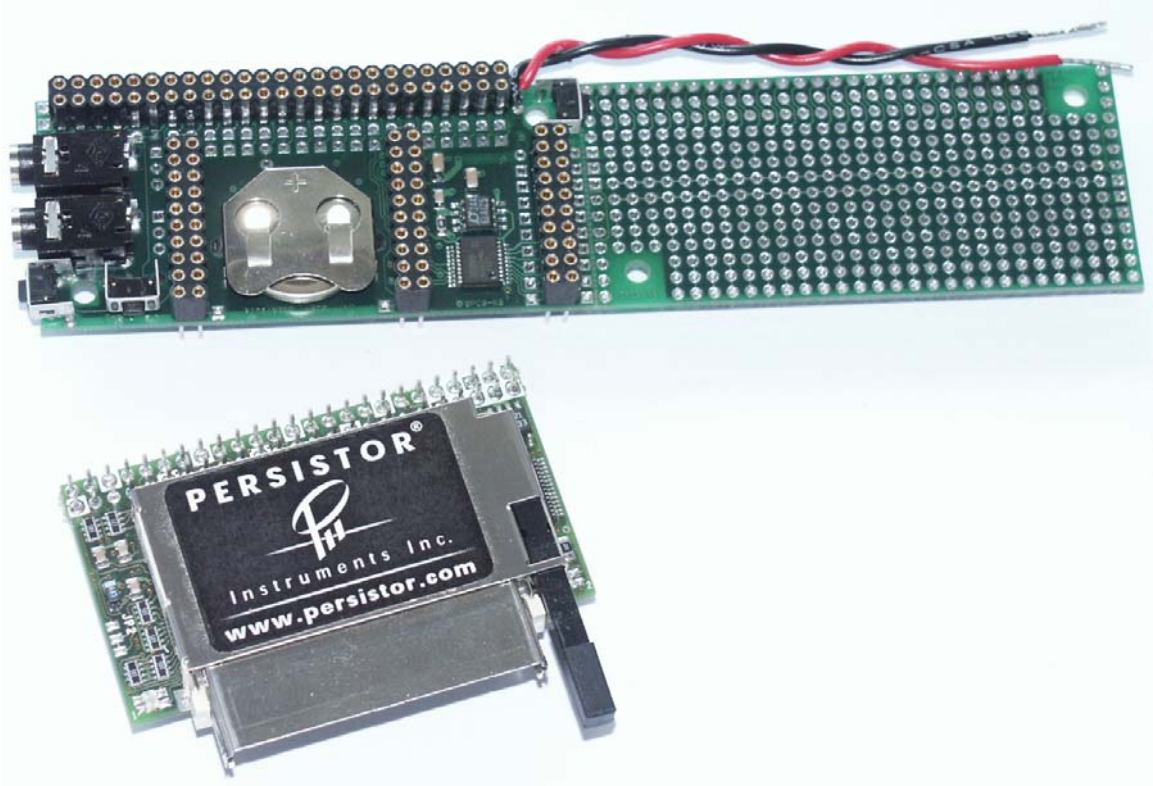
PERSISTOR INSTRUMENTS
Datasheet For The
MRCP
(Micro RecipeCard)



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Introduction and Warnings

Thank you for your purchase of the MRCP. This product is optimized for deploying the CF2 in as narrow a space as possible. Some customer convenience was traded for space reduction. Please read the following warnings.

Prying against the CF2 components voids the warranty. Broken or dislodged CF2 or MRCP components will not be replaced under the warranty. It is nearly impossible to remove the CF2 from an MRCP without damaging components. DO NOT insert the CF2 directly into the MRCP sockets without making provisions to remove it later. The MRCP socket strips are low profile and have a high retention force. For development, we recommend the CF2 be mounted with an extra set of long pinned sockets (included in MRCP development kits) between it and the MRCP. For deployment, we suggest 2 loops of strong nylon fishing line be placed between the MRCP and the CF2 so the loops can be used to pull out the CF2 if necessary.

Bent or broken pins will not be covered under the warranty. The pins protruding from the bottom of the MRCP are softer then standard bronze pins and are easily bent or broken. Please be careful to protect the pins from bending. The MRCP is packaged to protect the pins during shipping.

Damage from misapplied or unlimited voltage is not covered under the warranty. There is no power jack provided. MRCPs in development kits will have red and black tinned wires for power connection. However, the user should be careful to prevent the positive supply from shorting to the CF2 and MRCP. Please observe the current limit and voltage recommendations in the CF2 Getting Started Guide.

The + notation on the MRCP battery input pads is incorrect. The ground pad is incorrectly marked with +. The outer pad is VBAT and the inner pad is GND.

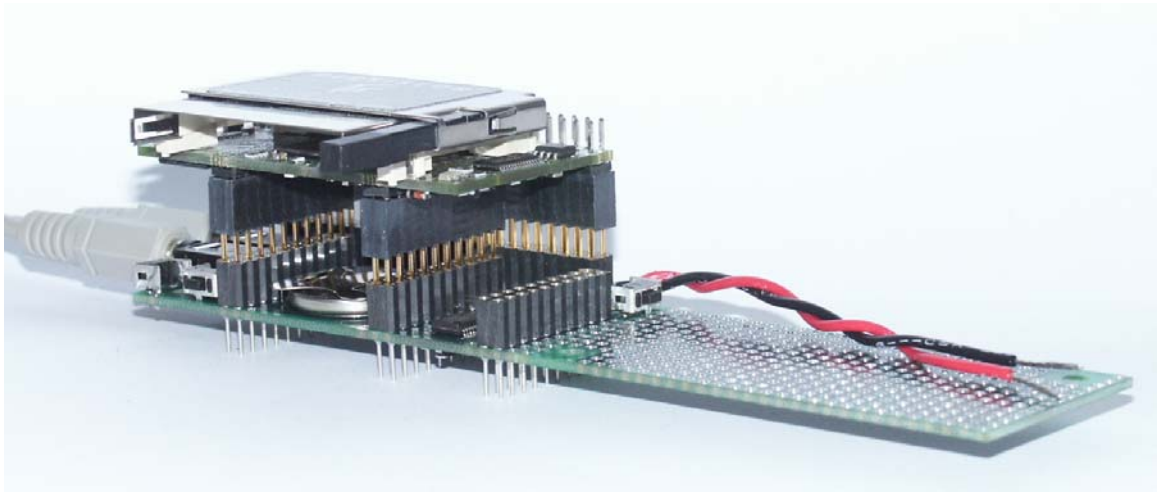
Features

Narrow 1.4” wide dimension allows CF2 deployment in narrow spaces.
Low profile stacking sockets for mating Persistor CF2
8 channel, 16 bit A/D converter
3.5mm jacks for SCI and TPU UARTs
Backup Battery
Buttons for Reset, Wake, and PBM
Prototype section can be separated and mated to the other half

The MRCP is a standard stock item from Persistor Instruments. Variations using the same circuit board can be manufactured in reasonable quantities. Please contact us with your needs for a quote.

The MRCP starter kit

The MRCP starter kit contains an extra set of long pinned socket strips for 0.025 square pins. These are provided to place between the MRCP and the CF2 during development to make it easier to remove the CF2 from the MRCP. The following photograph illustrates the CF2 elevated off the MRCP by the connectors.



The starter kit also contains an extra set of low profile socket strips. The extra low profile are provide for your connections to another board, or the MRCP’s other half.

Finally, the starter kit contains two cables for the communication ports, and the Persistor PicoDEV CD for software development. You will also need Metrowerks CodeWarrior. Contact Persistor Instruments for information on the currently supported version.

Removing the CF2 CompactFlash shroud and Ejector

For the smallest configuration, the CF2 CompactFlash ejector and shroud can be removed. If you intend to use a CompactFlash card, there is no point in removing the shroud, but removing the ejector will lessen the dimensions some what. The ejector button can also be sawed off.

The ejector snaps onto the header. Two metal holes snap over plastic nubs on the left side of the ejector as you read the Persistor label. Using a very small screw driver, or knife, pry these two metal tabs over the plastic nubs; the ejector should lift off.

Next lift the shroud straight up out of the slits in the plastic header. Rock it gently if it doesn't lift easily. The photograph shows the CF2 with the ejector and shroud removed.

Breaking the MRCP

The MRCP can be cut in half (carefully) and the prototyping half's pads and mounting holes will line up with the connectors and mounting holes of the CF2 side. The spare connectors provided in the starter kit can be used to mate the two halves. The pads that line up with the CF2 C connector are divided out to make convenient connections to the functions on the second half. However, the pads that line up with the Address, Data, and A/D connectors are not so conveniently brought out. Be sure to check for shorted pads if you mate to these connectors.

While perforations are provided for breaking the two halves, we recommend using a hack saw to avoid breaking the surface mount components or bending the fragile connector pins.

The MRCP stacking connectors

These connectors are custom made for Persistor. They allow minimum distance between the two boards. The round pins will mate to 0.025” square sockets, and the machine screw sockets will receive 0.025” square pins. If your application does not require all, or some, of the pins on the bottom, simply cut them off.

More connectors can be obtained from Persistor if needed.

NOTE Prying against the CF2 components voids the warranty. Broken or damaged components will not be replaced under the warranty. Bent or broken pins will not be covered under the warranty. It is nearly impossible to remove the CF2 from an MRCP without damaging components. Do not insert the CF2 directly into the MRCP sockets without making provisions to remove it later. The MRCP socket strips are low profile and have a high retention force. For development, we recommend the CF2 be mounted with an extra set of long pinned sockets (included in MRCP development kits) between it and the MRCP. For deployment, we suggest 2 loops of strong nylon fishing line be placed between the MRCP and the CF2 so the loops can be used to remove the CF2 if necessary.

CF2 Pin Names and Identification

Please refer to the CF2 getting started guide for CF2 pin descriptions. All are brought to pads on the MRCP.

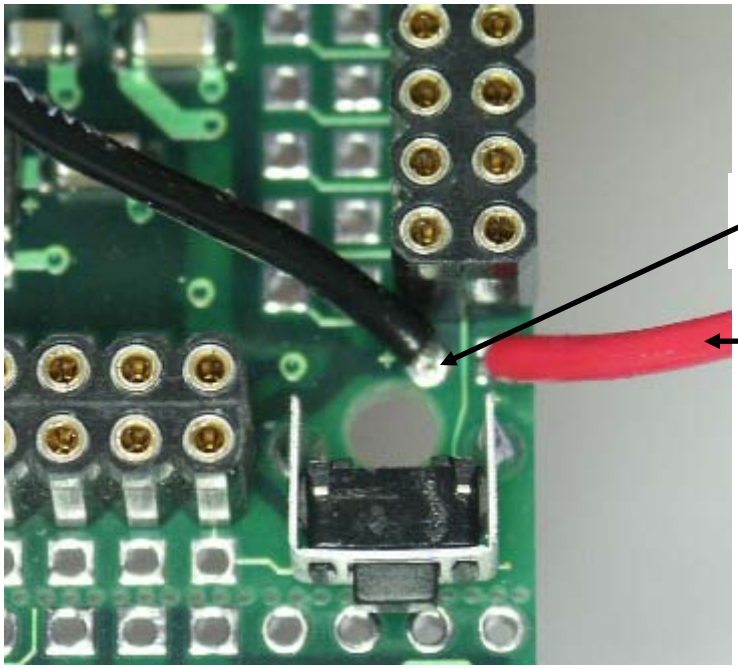
Power Connection

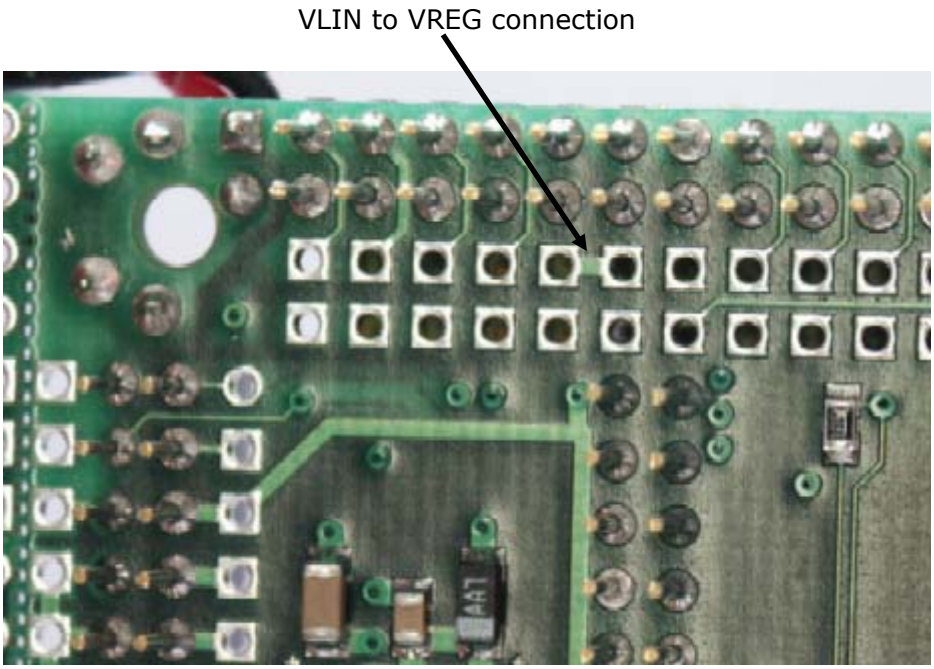
The MRCP does not have a power jack. If your MRCP came from an MRCP starter kit, there are short red and black wires soldered into pads for power connection. These wires are connected to pads next to the pin 1 / pin 2 end of the CF2 connector C.

NOTE the MRCP does not protect against over voltage or reverse voltage. Please review the warnings and precautions in the CF2 Getting Started Guide.

WARNING The + notation on the MRCP battery input pads is wrong. Ground is incorrectly marked with +. The outer pad is VBAT and the inner pad is GND. The illustration on the next page shows the correct VBAT and GND connection points.

The CF2 has an on board regulator to provide 3.3 volts. The output is called VLIN. Normally, VLIN is brought off the CF2 and then fed back in to VREG; the positive input to the CF2 components. The MRCP makes this connection on the back of the MRCP between the solder pads for their connection at CF2 connector C. The connection is illustrated on the next page.


BAT GROUND
(mis-labeled +)
VBAT


VLIN to VREG connection

Communication Connectors and Cable

The MRCP has two 3.5 mm jacks for communication cables (Persistor part number CAB-COM2-RCP). The jacks are at the end of the MRCP to allow cables to be connected when deployed in a tube. The jack adjacent to the button is the main SCI UART. The second jack is connected to TPU 12 and 13 as illustrated in the CF2 Getting Started Guide on page 26. Please see the PicoDEV CD for the programming examples showing the use of the TPU UARTs.

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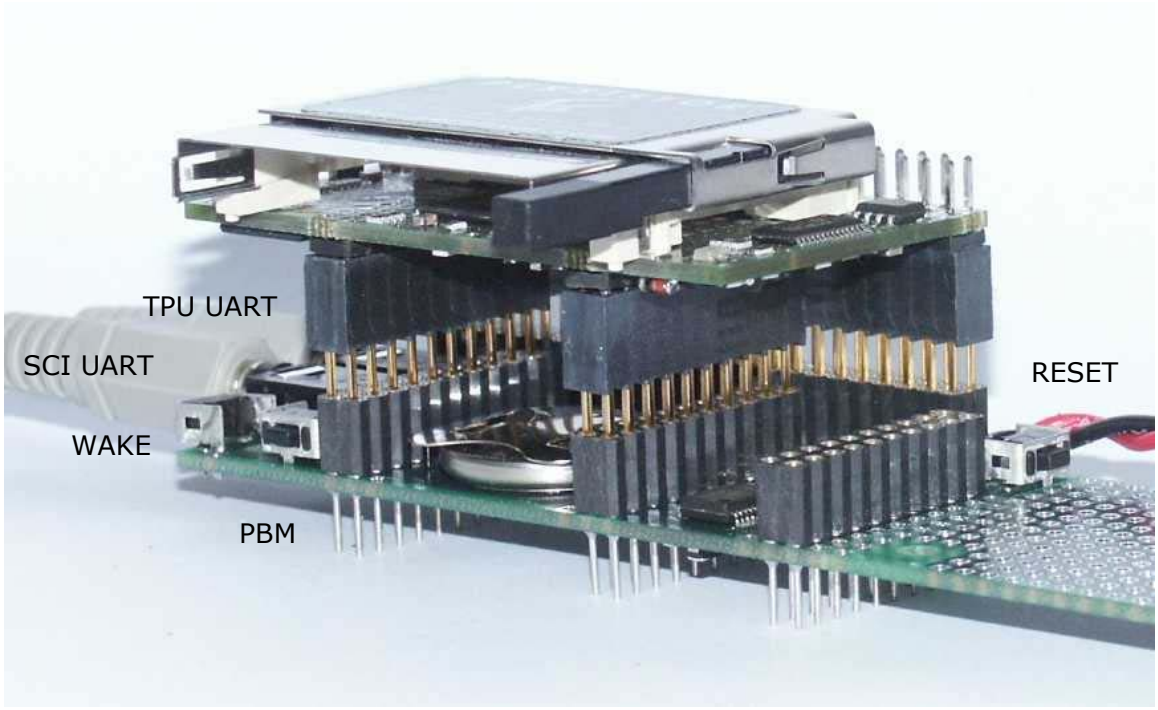

RESET, PBM and WAKE Buttons

Three right angled buttons are presented at various edges of the RecipeCard.

RESET is located near the pin 1 - 2 end of the CF2 connector C (near the power wires, if installed. This button, when momentarily depressed, will cause a full hardware reset.

PBM is located at the "side" of the MRCP. The PBM (IRQ5) button is used to pull a CF2 back to the PicoDOS monitor, instead of running an installed program, when power is applied. See your CF2 documentation for more information about using the PBM function.

WAKE is located next to the main SCI communication connector. This button can be used programmatically to wake the CF2 from certain low power modes. See your CF2 documentation for more information about using the /WAKE capability.

16 bit A/D

The MRCP is built with a Burr Brown ADS8344 16 bit, 8 channel A/D converter with a 2.5 volt Linear Technology LT1461 voltage reference. The datasheet for the A/D converter is available on your PicoDEV CD as well as various programming examples from Persistor. Persistor programming examples can often be compiled for a variety of A/D types, so be sure to compile for the ADS8344.

The layout for the converter is optimized to minimize conversion noise.

Condition	Noise*
10 Ω resistor divider powered from VREF	+/- 3 l.s.b
1K Ω resistor divider w/ 0.1uF caps on each channel	+/- 3.5 l.s.b.
Input of Nickel Metal Hydride battery (1.3 volts)	+/- 3 l.s.b.

* Results from sets of three 500 sample tests, taken at 1KHz. Values given for resistor divider tests are the worst observed noise on any channel over the three tests. For the Nickel Metal Hydride battery tests, channel zero was observed and the worst observed noise is reported.

A/D (and other) connections

The analog (and a few other) connections are available at a 20 pin low profile stacking connector. Pins 19 and 20 are at the edge of the board. The pin numbering below is given looking down at the sockets from the CF2 side of the MRCP.

Signal	Pin	Pin	Signal
PBM	1	2	RES
VBBK	3	4	WAKE
VLIN	5	6	VBAT
VREG	7	8	DGND
VANA	9	10	AGND
VREF	11	12	COM
AD7	13	14	AD6
AD5	15	16	AD4
AD3	17	18	AD2
AD1	19	20	AD0

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edge of board / edge of board / edge of board / edge of board

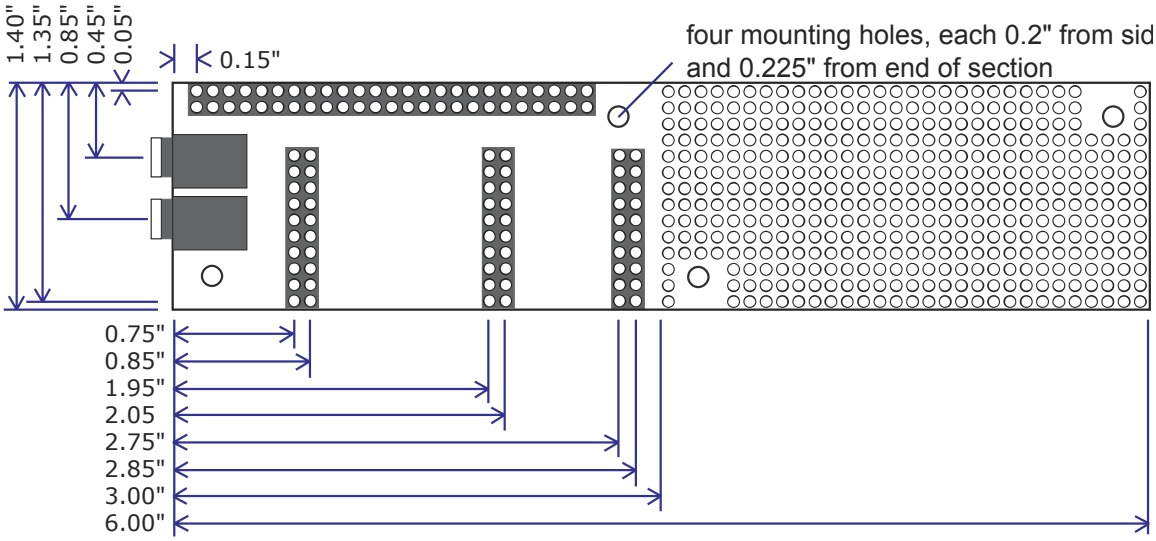
See the CF2 Getting Started Guide for descriptions of PBM, RES, VBBK, WAKE, VLIN, VBAT, VREG and DGND. VANA is the analog VDD and LT1461 input. See the ADS8344 datasheet for details on VREF, AGND and COM.

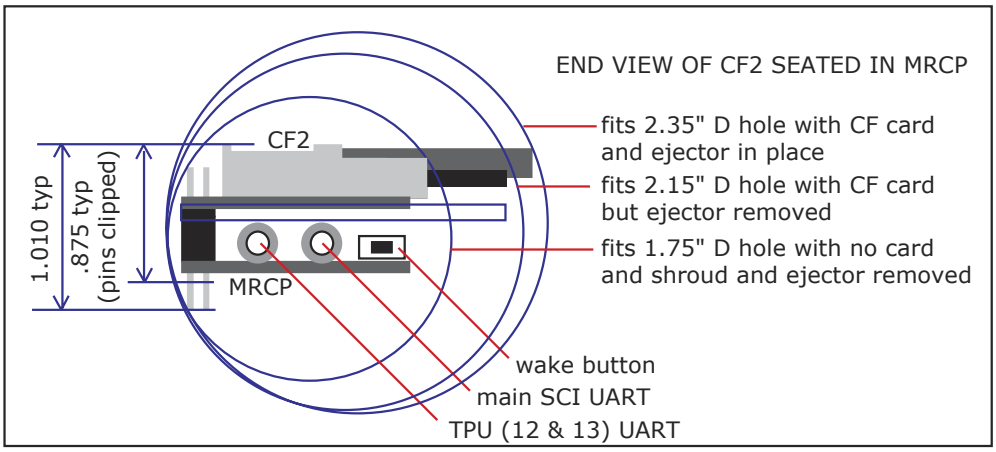
Backup Battery

A CR2032 lithium backup battery can be installed on the MRCP. It is readily available in retail stores. When replacing the battery, be sure to install it with the + sign up; that is NOT facing the printed circuit board.

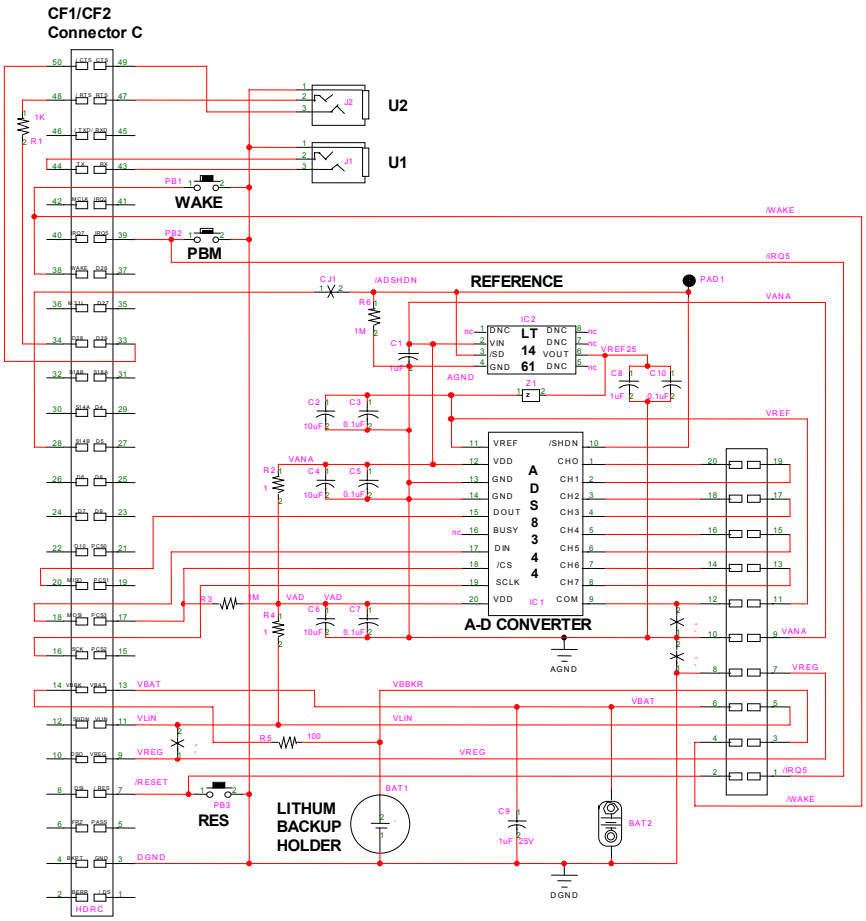
The CF2 does not require a backup battery to operate. However, if you intend to use the low power suspend modes of the CF2 or if you will use dynamic CompactFlash card changes (CCC from PicoDOS) then you WILL need a backup battery.

Dimensional Drawing





Schematic


CF1/CF2
Connector C
HDRC
U2
U1
WAKE
PBM
RES
REFERENCE
A-D CONVERTER
ADS8344
LT1461
LITHUM
BACKUP
HOLDER
/WAKE
/IRQ5
VANA
VREF
VREG
VBAT
VLIN
VBBKR
/RESET
/ADSHDN
AGND
DGND
VREF25
PAD1
BAT1
BAT2

Part List

Customers who use Persistor Instruments PERCF2 products are welcome to use any part of the MRCP circuit in their own add on boards. Following is a list of components that are used on the MRCP. Small quantities of these can be purchased from Persistor Instruments. Many of these items are also readily available at www.DigiKey.com.

Low Profile Stacking Sockets for the CF2's three pin strips:		
Socket, 2 pins by 10 pins	Persistor	0CON-STR-1-LPMSS-2X10
Socket, 2 pins by 25 pins	Persistor	0CON-STR-1-LPMSS-2X25
Sockets for cables		
(2) 3.5mm stereo jacks	Shogyo	SJ-0537-3RT JACK
Mating cables		
Mating cables	Persistor	CAB-COM2-RCP
Other standard items on MRCP		
Backup battery holder	DigiKey	3003K-ND
Backup battery	Sanyo	CR2032
RES, WAKE, PBM Switches	C&K	PTS635VL39
16 bit, 8 channel A/D circuit		
A/D converter	Texas Inst	ADS8344NB
Voltage Reference	Linear Tech	LT1461AIS8-2.5