Components for building the Coldsnap

Short list of components is at the end; this is the illustrated version..... These are suggestions and do not imply an endorsement of these specific vendors.

Nice small prototype perfboards that fit in an Altoids tin, hold the Pro-Mini and other components:  
http://www.ebay.com/itm/391039602767?_trksid=p2057872.m2749.l2649&ssPageName=STRK%3AMEBIDX%3AIT  
(5 for $2.13, free shipping)

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Properly sanctioned authentic Arduino Pro Mini 328P
($9.95 ea, + shipping) from Sparkfun (the original designer, and damn nice guys...)  
https://www.sparkfun.com/products/11113

“Pro Mini Compatible” ($2.58 each, free shipping)  
(Note this is an older design, copied from the Sparkfun design, even bears the Sparkfun logo silkscreen, several I have used/tested work very well and are very well made - even has gold plated holes.....)
http://www.ebay.com/itm/New-ATMEGA328-5V-16Mhz-Replace-ATmega168-For-Arduino-Pro-Mini-Compatible-Nano-/191117208428?pt=LH_DefaultDomain_0&hash=item2c7f792b6c
The more mundane components....
available from Digikey Corp., these are Digikey part numbers...
Pricing is for reference, check at ordering time!

D1  1N4003 diode; this is for polarity protection and also drops the input voltage about 0.5V  
    1N4003DICT-ND  0.14 ea

R1 and R2    10k ohm NTC thermistor chips (SMD 0402, tiny!) for the temperature sensors...
    490-4801-1-ND  50 for $3.96  (you may drop a few making the probes!)

R3 and R4    20k ohm (0.1% precision, +/-5ppm/°C tempco) resistors for sensing circuits, Vishay-Dale;  
    leads/through-hole  
    PTF20KDCT-ND  1.35ea  11.94/10  (2 required per ColdSnap)  
    (I have used the above resistors with excellent results.... )

ALTERNATIVE, SMD resistors (these are almost as tiny as the thermistor chips!):  
20k ohm (0.1% precision, ±25ppm/°C tempco) for sensing circuit  
SMD 0603    P20KDBCT-ND  0.63 ea  12.47/50  
These have a bit more temperature sensitivity, but are still very good; this is max 0.5 ohm/C change in  
controller board temperature, whereas the thermistors used for ROOM and FINS sensors are changing  
about 575 ohms/degree C (at 15C). The controller board sits (typically) in the controlled temperature so  
it normally changes very little in temperature anyway.

R5    100 ohm 3W power resistor - “Heater” for the AirConditioner sensor probe  
    23J100E-ND  1.58ea
Note: the heater is driven by PWM at 50% (default); it may be possible to use a 200 ohm power resistor  
instead, and drive with no PWM, but it may not warm the AC sensor adequately at cooled room  
temperatures. With the 100 ohm you have the flexibility to adjust the effective power as needed.

R6     1k ohm resistor for transistor base drive  
    1.00KXSBK-ND  0.10ea  1.45/25  3.22/100

R7     200 ohm  
    200QBK-ND  0.01 ea  - qty discounts....

VR1    20k ohm potentiometer for the variable temperature setting  
    CT6EP203-ND  0.79ea  7.11/10

Q1     2N4401 transistor for heater drive  
    2N4401-ND  0.22ea  2.01/10  3.62/25

12V power supply – 300mA*, can be unregulated, but must not exceed 16V!  
*Needs to be 500mA or more if you include a “dew-chaser” heater resistor on the prototype board!  
12V wall adapter, regulated, 600mA capacity  $5.95  [https://www.sparkfun.com/products/9442](https://www.sparkfun.com/products/9442)
NOTE! The circuit design was changed from the originally posted schematic to include a 200 ohm  
resistor between the +12V power and the RAW terminal of the Pro Mini; the Pro Mini in the circuit as  
shown uses about 17.5mA, so there is about 3.5V dropped across the 200 ohm resistor (heater off;  
about 7V dropped with heater drive ON), leaving about 6.4V at the RAW pin and the ProMini's  
MIC5205 low dropout regulator needs less than 100mV headroom to provide a regulated 5V output, so
this is very good and works well. If the circuit is changed, adding additional output drive, then this
ballast resistor may need to be changed.

Of course there are miscellaneous things like wire, most available from Mouser, Digikey, or Sparkfun
Electronics.....

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