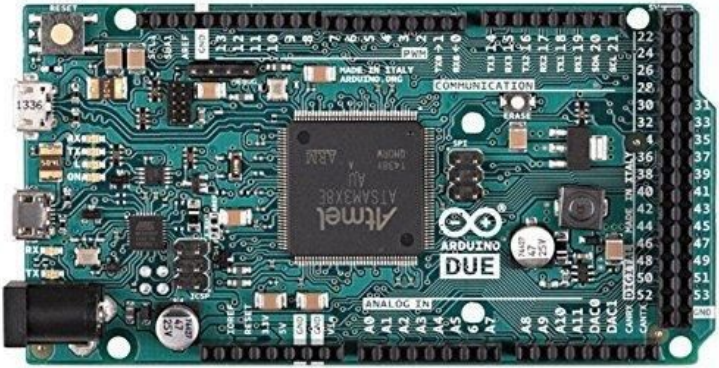



Caveatron Bill of Materials – Main Body

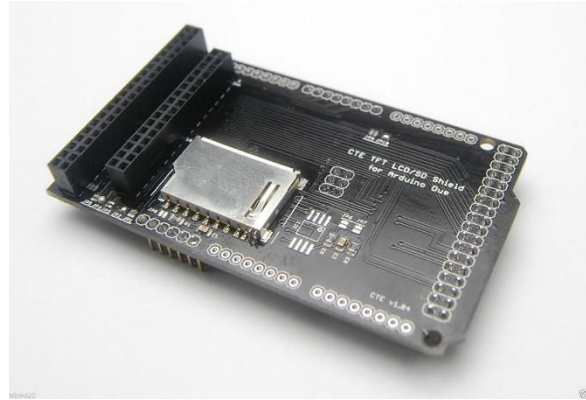
Hardware Revision: A

Date: 2017-09-10

Red = No longer available – replaced in Hardware Rev. B Yellow = Limited availability (no longer manufactured). Replaced in Hardware Rev. B

Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
Main Processor	1	Arduino	Due	Arduino Due	Amazon	
Notes: The main system processor. Available from many vendors. Third party clones are available at lower cost but may require modification of the reset circuit by adding a capacitor and/or resistor as per this link: https://forum.arduino.cc/index.php?topic=256771.0						
Touchscreen LCD	1	Coldtears Electronics	N/A	3.5 inch TFT LCD module w/Font IC 480x320 full angle Arduino DUE MEGA 3.2 4.3	N/A	

Notes: *The display and user interface.* The component used in Hardware revision A is no longer available. A revised component was released by the manufacturer with a new font IC and different display driver that requires revised code Caveatron firmware that is currently under development. The 4 inch 480x320 module produced by this manufacturer appears to use the previous font IC and driver so may work with original firmware, but has not been tested.


Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
Due LCD Interface Shield	1	Coldtears Electronics	N/A	TFT/SD Shield for Arduino DUE TFT LCD Module SD Card Adapter 2.8 3.2 inch Mega	Ebay	

Notes: *Providea electrical interface from Arduino to the Touchscreen LCD.*

Laser Rangefinder	1	Uni-T	UT390B	Laser Distance Meter	Ebay, Amazon, or other sources. Availability changes frequently.	
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Notes: *Used for station distance measurements.* This item appears to be discontinued but can still be found online from various sources. Do not confuse this with the UT390B+, which is widely available but does not have an accessible serial port, so is not useable. The UT390B+ has a bubble level in the upper left which the UT390B does not. The UT390B must be disassembled and the LCD removed to access the electronics board. The Caveatron hardware rev. B uses a new rangefinder that has assembly advantages, but operational disadvantages over this model.

[illegible]




Real-Time Clock and	1	N/A	N/A	DS3231 AT24C32 Real time clock module memory module	Ebay or other sources. Ebay sellers change frequently	
Notes: Provides date/time and used to store calibration and system parameters. This board contains a Maxim DS3231 real-time clock and an Atmel AT24C32 EEPROM memory IC. Requires a CR2032 battery to keep clock active. Available from many vendors and Ebay sellers						

Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
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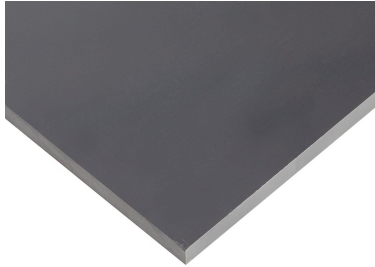
[illegible]


Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
Piezoelectric Buzzer	1	Pololu	1260	30mm Piezo Buzzer: 1-30V	Pololu	
Notes: Indicator buzzer. Item has been discontinued. A new part needs to be identified for hardware rev. B.						
Power Switch & Charging LED	1	Adafruit	916	Rugged Metal On/Off Switch with Red LED Ring - 16mm Red On/Off	Adafruit	
Notes: On/Off power switch and charge indicating ring LED. Several colors of the LED are available.						
USB Jack	1	GT Contact	GT114200-10	Mini USB-B C2 size Plastic Panel Mount	USBFirewire.com	
Notes: Mini-USB jack for data download, battery charging, and loading of software and calibration parameters.						
USB Cap	1	GT Contact	GT1C5221-22	Seal Cap	USBFirewire.com	

Notes: *Waterproof cap for USB jack.*


Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
LIDAR Interface Jack	1	Conxall/ Switchcraft	17982-6S G-300	Micro-Con-X 6 Position Circular Connector Receptacle, Female Sockets Solder Cup Gold	Digikey	
Notes: <i>Jack for LIDAR interface cable.</i> Available from multiple vendors.						
LIDAR Interface Cap	1	Conxall/ Switchcraft	16295	Micro-Con-X Receptacle Dust Cap	Digikey	
Notes: <i>Cap for LIDAR interface jack.</i> Available from multiple vendors.						
LCD Connector Cable	1	N/A	N/A	40 pin IDE Connector Cable, 6"	Ebay or Amazon	

Notes: Cable to interface Due LCD Interface Shield and LCD Touchscreen. 6" is the preferred length. Longer would take up too much space in the enclosure. 4" can work as well, but is a bit of a stretch. Available from multiple vendors.

Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
Main Body Enclosure	1	Bud Industries	PN-1324-DG	NEMA ABS NEMA 4x Enclosure, Dark Gray	Amazon	
Notes: Enclosure box for main body. Requires machining of base to add cutouts for USB jack and front window and machining of the cover to add screw holes for the LIDAR Mounting Rail, LCD Touchscreen, Strap Attachment Hardware, and cutouts for the Touchscreen LCD, and LIDAR Interface Jack. Available from many vendors.						
LIDAR Mounting Rail	1	Weaver	TO-9M	Tip-Off Aluminum Base	Amazon	
Notes: Rail for mounting LIDAR module. Weaver TO-9 rail is identical but with a shiny finish. Available from multiple vendors						
Plastic Base Material	1	Small Parts	STPVC-0093-F	PVC Sheet, Opaque Gray, 0.093" Thickness, 12" Width, 24" Length	Amazon	

Screen Protector	1	iCarez	N/A	iPhone 5 Ultra Clear Screen Protector 6-pack	Amazon	
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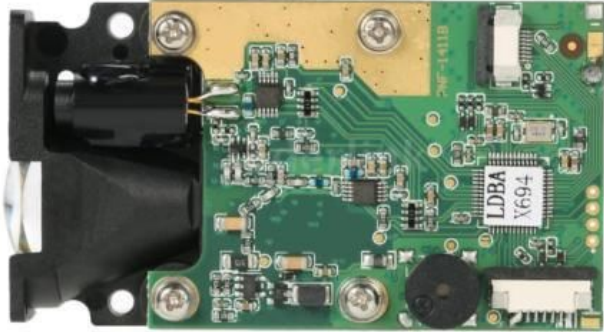
Notes: *Protection film for touchscreen.* Also comes in a 3 pack. Needs to be cut to length. Most any screen protector film for iPhone 4, 4S, 5, 5s, or SE should work as they have the same screen width as the 3.5" LCD. Available from multiple vendors.

Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
Strap Attachment Hardware	1	122317	Hillman Group	D-Ring Hangers	Lowes	

Notes: *Small D-rings for attaching neck strap.* Available from multiple

New Components for Hardware Revision: B

Date: 2017-09-10

Item	Qty	Manufacturer	Mfr. P/N	Description	Suggested Vendor Link	Photo
Touchscreen LCD	1	Coldtears Electronics	N/A	3.5 inch TFT LCD module w/Font IC 480x320 full angle Arduino DUE MEGA 3.2 4.3	Ebay	
Notes: <i>The display and user interface.</i> This replaces the Touchscreen LCD for hardware Rev A. This component uses a different Font IC so requires a different interface library and changes to the Caveatron GUI library. The display driver also appears to be slightly different and requires a small change to the display library code to work properly.						
Laser Rangefinder	1	Unknown	Unknown	100m Laser Distance Sensor Module	Ebay Availability changes frequently.	
Notes: <i>Used for station distance measurements.</i> This new rangefinder module is very similar in size to the one in hardware rev. A, is easier to mount due to the presence of mounting holes, is easier to attach wiring, has a simpler command and data structure, and has similar sensitivity. However, it's method of operation is less well suited to the Caveatron since it can take up to 3 sec to timeout with failed readings vs 1 sec on the old one, which does not work as well in Passage mode.						

Date: 2017-09-11

Date: 2017-09-11

[illegible]