

6

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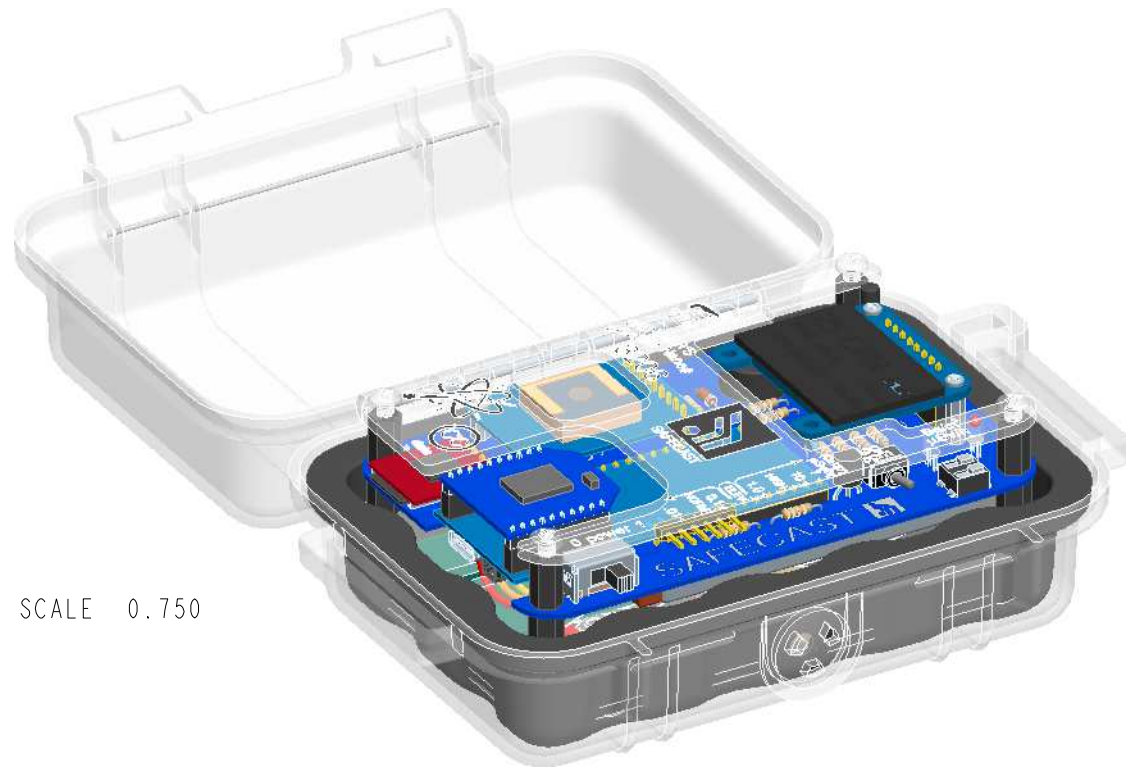
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D

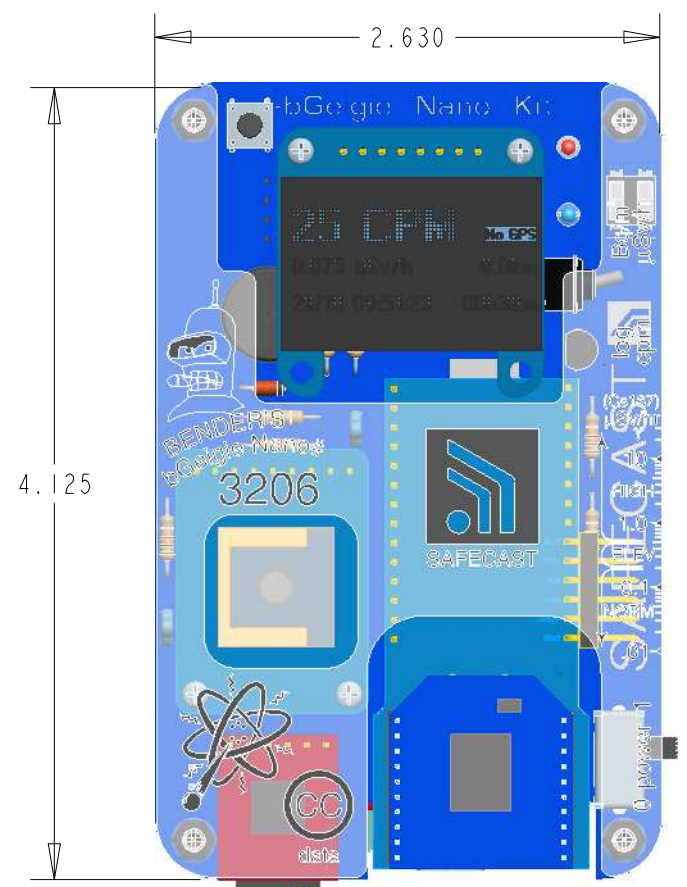
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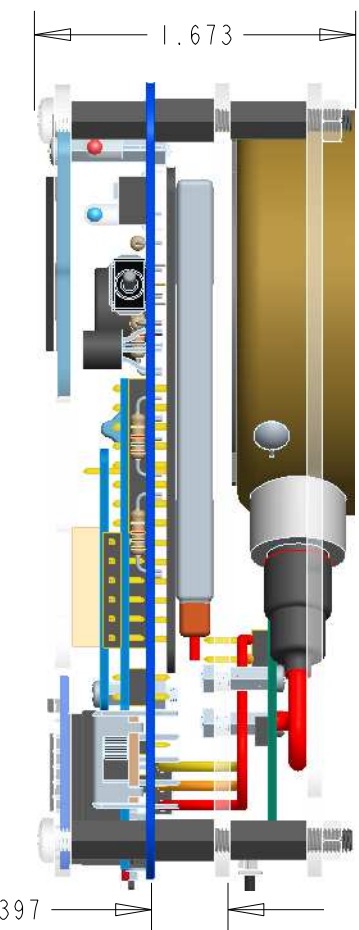
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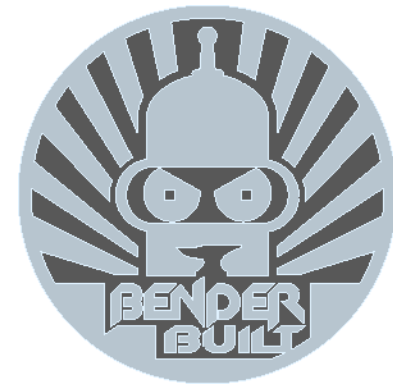
SCALE 0.750



SCALE 1.000



DATE	2021-09-05	ISSUE	02
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INITIAL APPLICATION
 MAPPING

TITLE
 SAFECAST
 BGEIGIE NANO
 RADIATION LOGGING DETECTOR

DRAWING NUMBER	BNE02	SCALE	NTS
DARYL BENDER		SIZE	B
		SHEET	1 OF 12

(PRO0501 1)

6

5

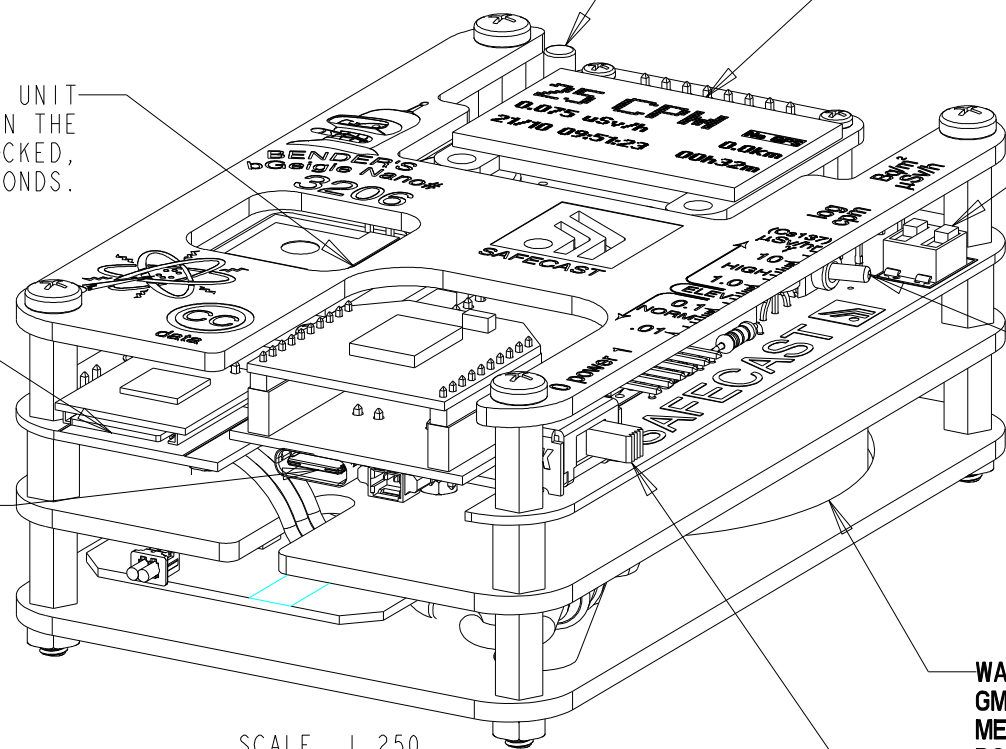
4

3

2

(PRO0501 1)

bGeigie OPERATIONAL INTERFACES AND MEASURING DETAILS



THE RED LED ON THE GPS UNIT BLINKS EVERY 1 SECOND WHEN THE GPS IS NOT LOCKED. ONCE LOCKED, IT BLINKS EVERY 10 SECONDS.

MICRO SD CARD (GOLD FINGERS UP) SEE SHEET 5

MINI B USB (FOR CHARGING) 1200mAh Li-ION BATTERY HAS APPROX 12.5hr RUN-TIME SEE SHEET 5

NEVER CHARGE THE BGEIGIE WHILE THE UNIT IS ON. THE POWER MUST BE TURNED OFF BEFORE CHARGING TO AVOID PERMANENT DAMAGE TO THE CHARGE CIRCUIT.

SCALE 1.250

SWITCH NOT USED/FUNCTIONAL

ON POWER-UP THE SAFECAST LOGO WILL APPEAR ON THE DISPLAY FOR APPROXIMATELY ONE SECOND. THE NEXT START-UP SCREEN DISPLAYS THE NAME OF MODEL (BGEIGIENANO), THE FIRMWARE VERSION NUMBER, BATTERY CHARGE LEVEL, BASIC SETTINGS, AND THE USER'S NAME (OR OTHER CUSTOMIZABLE INFORMATION). THENANO'S MAXIMUM OPERATING RANGE IS ABOUT 350,000CPM, OR 1mSv/h (1 MILLISIEVERT PER HOUR DOSE RATE OR 1000uSv/h (MICROSIEVERTS PER HOUR).

ALARM SETTING SWITCH
A SPEAKER "CLICKS" AND A SMALL BLUE LED "COUNT" BLINKS WITH EACH PULSE FROM THE GEIGER TUBE. IT CAN BE DIMMED BY SETTING DIP SWITCH #1 TO "OFF". A SMALL RED LED "LOG/ALARM" FLICKERS ON PULSE, AND REMAINS LIT ON ALARM. IT WILL ONLY GLOW IF THE GPS IS LOCKED, THE SD CARD IS PRESENT, THE BATTERY HAS MORE THAN 10% CHARGE LEFT, THE UNIT HAS BEEN ON FOR ONE MINUTE, AND THE GEIGER TUBE IS PROVIDING A PULSE. IT CAN BE DIMMED BY SETTING DIP SWITCH #2 TO "OFF".

DISPLAY/RECORD SWITCH
THE "UP" POSITION (TO THE RIGHT) SWITCHES THE UNIT INTO DISPLAY MODE (IN WHICH THERE IS NO DATA LOGGING). THE FIELDS ON THE OLED INDICATE uSv/h DOSE-RATE (CS137), MAX DOSE-RATE, DOSIMETER, Bq/m2 DISPLAY (CS137), TIME STAMP, AND ALARM. THE "DOWN" POSITION PUTS THE NANO INTO RECORDING MODE. THE OLED SHOWS INDICATORS FOR CPM AND uSv/h, THE NUMBER OF SATELLITES LOCKED, ALTITUDE (METERS), DISTANCE TRAVERSED (km), TOTAL DURATION OF MEASUREMENT (h:m), AND TIME STAMP (dd:hh:mm:ss). WHEN THE NANO IS IN RECORDING MODE, THE OLED SHOWS WHETHER A MICRO-SD MEMORY CARD IS CURRENTLY INSERTED.

WARNING
GM TUBE CONTAINS A PARTIAL VACUUM AND ITS MEMBRANE IS THIN BRITTLE MICA. MECHANICAL SHOCKS, POKING IT OR SUDDEN PRESSURE CHANGES (SLAMMING A CAR DOOR) CAN CAUSE IT TO RUPTURE. NEVER TOUCH THE MEMBRANE!

POWER ON/OFF SWITCH
THE SAFECAST LOGO WILL APPEAR ON THE DISPLAY FOR APPROXIMATELY ONE SECOND. THE NEXT START-UP SCREEN DISPLAYS THE NAME OF MODEL (BGEIGIENANO), THE FIRMWARE VERSION NUMBER, BATTERY CHARGE LEVEL, BASIC SETTINGS, AND THE USER'S NAME (OR OTHER CUSTOMIZABLE INFORMATION).

WHILE IN uSv /Bq MODE, THE DISPLAY ALSO SHOWS THE PEAK DOSE RATE (IN uSv /h), TOTAL ACCUMULATED DOSE (IN uSv), AND CPM.

THE MODE SWITCH SETS THE BGEIGIE NANO INTO "LOGMODE" (SWITCH DOWN "LOG CPM"). IN LOG MODE, THE LARGEST AREA OF THE DISPLAY ("THE BIG NUMBERS") SHOWS THE COUNT RATE IN CPM, AND DATA WILL BE WRITTEN TO THE SD CARD. IN "SURVEY MODE" (SWITCH UP "Bq/m2 uSv /h"), THE MAIN PART OF THE DISPLAY WILL SHOW THE DOSE RATE IN MICROSIEVERTS PER HOUR.

- TO MEASURE THE uSv DOSE RATE ACCURATELY, PUT THE NANO IN THE CASE, HOLD IT 1m ABOVE THE GROUND TILT IT AROUND 45 DEGREES, AND THEN WAIT FOR APPROXIMATELY ONE MINUTE FOR A STABLE READING.
- TO MEASURE Bq ACCURATELY, TAKE THE NANO OUT OF THE CASE, KEEP IT WITHIN 5CM TO 1CM FROM THE SURFACE, AND WAIT APPROXIMATELY ONE MINUTE FOR A STABLE READING. THEN, READ THE VALUE ON THE SECOND LINE IN Bq/m2. THE NANO WILL EMIT A SPEAKER SOUND TO AID IN FINDING HOT SPOTS.
- THE DOSE RATE IS BASED ON THE ASSUMPTIONS THAT THE NANO IS IN ITS CASE; IT IS ABOUT 1 METER (3FT) AWAY FROM ANY OBJECT OR SURFACE; ANY GAMMA RAYS ARE OF MODERATE ENERGY (600~700KeV); AND THE UNIT HAS MET THE PREVIOUS CONDITIONS FOR AT LEAST ONE MINUTE.
- ALSO IN SURVEY MODE, THE SECOND LINE ON THE DISPLAY ("THE SMALL NUMBERS") WILL ROTATE THROUGH SEVERAL OTHER VALUES. ONE OF THOSE WILL BE Bq/m2. THAT IS ONLY A LOCALLY DISPLAYED INTERPRETATION OF THE DATA, AND REQUIRES VERY DIFFERENT CONDITIONS TO BE CORRECT: THE NANO IS OUT OF ITS CASE AND HELD 1cm (~HALF INCH) FROM A SURFACE CONTAMINATED WITH RADIO CESIUM. THIS USAGE PROBABLY ONLY WORKS IN FUKUSHIMA AND CHERNOBYL.

WHEN AVERAGING READINGS FROM TWO DIFFERENT NANOS, YOU SHOULD ONLY COMPARE LONG-TERM COUNTING (E.G. NUMBER OF COUNTS FOR 10 MINUTES).

TYPE	DESCRIPTION	MEASURE
ALPHA RADIATION	ALPHA PARTICLES ARE CHARGED PARTICLES THAT HAVE A LARGE MASS AND CHARGE. AS A RESULT, THEY DON'T PENETRATE MATERIALS AS EASILY AS OTHER TYPES OF IONIZING RADIATION. THEY ALSO DON'T TRAVEL VERY FAR. THEY ARE THE MOST DANGEROUS INTERNALLY IF INGESTED OR INHALED.	OUT OF CASE
BETA RADIATION	BETA PARTICLES ARE SIMILAR TO ELECTRONS. THEY ARE LIGHTER THAN ALPHA PARTICLES AND TRAVEL FARTHER, UP TO FEW FEET THROUGH AIR.	OUT OF CASE
GAMMA RADIATION	GAMMA PARTICLES ARE THE MOST POWERFUL FORM OF IONIZING RADIATION. THEY TRAVEL VERY FAR AT THE SPEED OF LIGHT AND EASILY PENETRATE MOST MATERIALS. THICK LAYERS OF CONCRETE, LEAD STEEL, OR SIMILAR MATERIALS REQUIRED TO STOP GAMMA PARTICLES.	IN OR OUT OF CASE

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DRAWING NUMBER		ISSUE
BNE02		02
DARYL BENDER	SIZE	SHEET
	B	2

DATA LOG FILES RECORDED & STORED ON THE MICRO SD CARD

THE DATA LOG FILE NAME

THE DATA LOG FILE NAME IS COMPRISED OF THREE PARTS: THE DID NUMBER, THE MONTH THE LOG WAS INITIATED, AND THE DAY THE LOG WAS INITIATED. FOR EXAMPLE, "21080716.LOG" IS THE DATA LOG FOR UNIT 2108 FROM 16 JULY. DUE TO SPACE CONSTRAINTS, THE FILE DATE PROPERTY IS MM-DD. HOWEVER, EVERY LINE HAS UTC TIME DATE STAMP READING YYYY-MM-DD. THE LOG FILE NAME MAY APPEAR TO BE A DAY OFF DUE TO TIME ZONE DIFFERENCES.

THE DATA LOG

A DATA LOG OR SECTION BEGINS WITH SEVERAL COMMENT LINES, WHICH BEGIN WITH HASH SIGNS (#). EXAMPLE:

```
# NEW LOG
# format=1.4.1Nnano
# deadtime=ON
$BNRDD,2108,2013-12-06T13:03:58Z,22,2,115,A,3145.7607,N,03510.1975,E,734.90,V,3,908*64
```

ONE OF THE COMMENT LINES CONTAINS THE DEADTIME. DEADTIME IS "THE TIME AFTER EACH EVENT DURING WHICH THE SYSTEM IS NOT ABLE TO RECORD ANOTHER EVENT". YOU CAN FIND THE ENABLE_LND_DEADTIME COMPENSATION FORMULA IN THE bGeigieNano.ino MASTER REPOSITORY.

SAMPLE LOG FILE "32060904.log"

```
# NEW LOG
# format=1.4.1nano
# deadtime=on
$BNRDD,3206,2000-00-00T16:45:11Z,34,3,41,A,4603.1351,N,07600.3862,W,154.50,A,8,98*60
$BNRDD,3206,2021-09-04T16:45:16Z,36,4,45,A,4603.1351,N,07600.3862,W,154.50,A,8,102*54
$BNRDD,3206,2021-09-04T16:45:21Z,36,3,48,A,4603.1351,N,07600.3862,W,154.50,A,8,102*5A
$BNRDD,3206,2021-09-04T16:45:26Z,38,4,52,A,4603.1351,N,07600.3862,W,154.50,A,7,108*5A
$BNRDD,3206,2021-09-04T16:45:31Z,35,3,55,A,4603.1352,N,07600.3862,W,154.50,A,6,149*56
...
```

FIELD	DESCRIPTION	EXAMPLE
HEADER	THE DEVICE MODEL HEADER	Mini=BMRDD, Nano=BNRDD, NX=BNXRDD.BNRDD
DEVICE ID	THE DEVICE SERIAL NUMBER	3206
DATE	THE DATE, FORMATTED ACCORDING TO THE ISO-8601 STANDARD; USUALLY USES GMT	2012-12-16T17:58:31Z
RADIATION 1 MINUTE	THE NUMBER OF PULSES GIVEN BY THEGEIGER TUBE IN THE LAST MINUTE	30
RADIATION 5 SECONDS	THE NUMBER OF PULSES GIVEN BY THEGEIGER TUBE IN THE LAST 5 SECONDS	1
RADIATION TOTAL COUNT	THE TOTAL NUMBER OF PULSES RECORDED SINCE STARTUP	116
RADIATION COUNT VALIDITY FLAG	"A" INDICATES THE COUNTER HAS BEEN RUNNING FOR MORE THAN ONE MINUTE, AND THE ONE-MINUTE COUNT IS NOT ZERO. OTHERWISE, THE FLAG IS "V" (VOID)	A
LATITUDE	AS GIVEN BYGPS; THE FORMAT IS DDMM.MMMM, WHERE DD IS DEGREES AND MM.MMMM IS DECIMAL MINUTES	4632.8174
HEMISPHERE	'N' (NORTH), OR 'S' (SOUTH)	N
LONGITUDE	AS GIVEN BYGPS; THE FORMAT IS DDMM.MMMM, WHERE DD IS DEGREES (WITH LEADING ZEROS IF REQ'D) AND MM.MMMM IS DECIMAL MINUTES	07528.7752
EAST/WEST	'E' (EAST), OR 'W' (WEST)	W
ALTITUDE	THE DISTANCE ABOVE SEA LEVEL, AS GIVEN BY THE GPS IN METERS	236.40,
GPS VALIDITY	'A' OK, 'V' INVALID	A
NUMBER OF SATELLITES	THE NUMBER OF SATELLITES USED BY THE GPS	10
HDOP	THE HORIZONTAL DILUTION OF PRECISION (HDOP), OR RELATIVE ACCURACY OF THE HORIZONTAL POSITION	80
CHECKSUM		*5B

THE DATA LOG IN RECORDING MODE

THE DATA LOG FILE WRITES TO THE MICRO-SD CARD. A KEY TO THE FIELDS IN THE DATA LOG IS AVAILABLE IN THE bGeigie library README.md BY FAKUFAKU. THE DATA IS FORMETTED SIMILARLY TO THE NMEA SENTENCES THAT GPS USES. IT BEGINS WITH A DOLLAR SIGN (\$) AND ENDS WITH AN ASTERISK (*). A CHECKSUM FOLLOWS THE STAR. SEE SAMPLE ABOVE RIGHT.

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DRAWING NUMBER		ISSUE
BNE02		02
DARYL BENDER	SIZE	SHEET
	B	3

EXPLODED VIEW

SCALE 0.375

FOR DRIVE MONITORING, UNIT IS PLACED AGAINST VEHICLE WINDOW (TOP) WITH SENSOR OUTWARDS. WINDOW IS ROLLED UP WITH STRAPS ROUTED INSIDE VEHICLE. STRAPS ARE LOOPED THROUGH VEHICLE GRAB HANDLE AND LATCHED. IF WINDOW IS INADVERTENTLY ROLLED DOWN DURING DRIVE, UNIT WILL SWING SAFELY INTO THE VEHICLE.

FAIRWIN TACTICAL BELT (MEDIUM)

PELICAN 1010 CASE

VHB 5908 TAPE

10mm M3 MF STANDOFF

M2 HEX NUTS

10MM M2 MF STAND-OFFS

OLED MODULE

5MM M2 MF STAND-OFFS

M2 PHMS

D

C

B

A

D

C

B

A

BOTTOM ACRYLIC PLATE

M3 HEX NUTS ACRYLIC

GM TUBE SCREEN

LND 7317 GM TUBE

VHB 5952 TAPE

HEATSHRINK (ON HV LEAD)

HIGH VOLTAGE PCBA

5MM M2 MF STAND-OFFS

MIDDLE ACRYLIC PLATE

1200MAH L1-10N BATTERY WITH VHB TAPE

8mm M3 MF STANDOFF

GK40 FORMEX INSULATOR

MAIN PCBA VI. IR5A

OPEN LOG BOARD

MICRO-SD CARD

FIO BOARD

10mm M3 MF STANDOFF

GPS MODULE

BLUETOOTH MODULE

FRONT PLATE

M3 PHMS ACRYLIC

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DRAWING NUMBER		ISSUE	
BNE02		02	
DARYL BENDER		SIZE	SHEET
		B	4

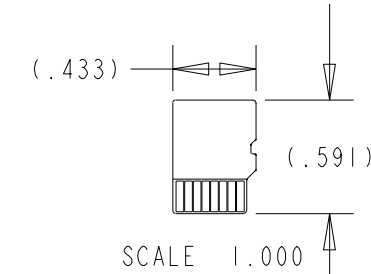
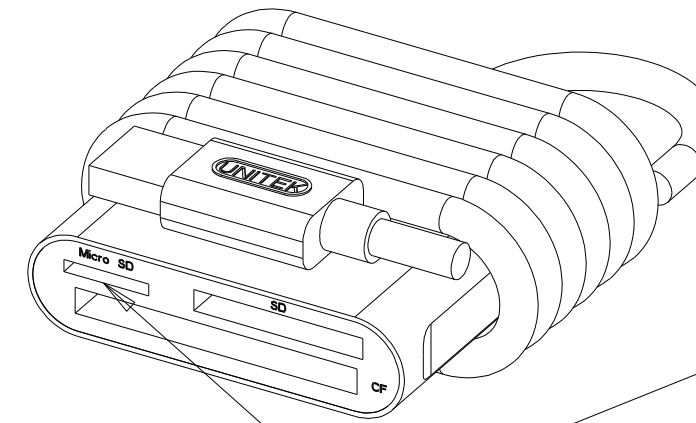
NON-STANDARD MOD:
INSULATOR CHANGED TO GK40 BLACK FORMEX
VHB CHANGED TO 5908 (1/2"x.010" THICK)
BATTERY TAPED TO MIDDLE PLATE WITH FORMEX TOWARD PCB (SEE SHEET 9)

COSTS ARE APPROXIMATE AS OF 2021. SOME ARE LISTED AS MIN QUANTITY COSTS (I.E. SCREWS ETC).
IN KIT FORM TARIFF CODE IS 8542.90.00.00

bGeigie Nano Product Structure

LINE	QTY	ITEM	SOURCE	US\$	CDN\$
1	1	BGEIGIE_NANO_PCBA_1.1R5A			
2	1	BGEIGIE_NANO_PCB_1.1R5A	OSHPARK bGeigie Nano 1.1r5a	\$54.15	
3	3	CAP_100NF_TDK_FG18X7RIH104KNT06	DIGI-KEY TDK FG18X7RIH104KNT06		\$0.34
4	1	DIODE_IN4148	DIGI-KEY ONSEMI IN4148		\$0.14
5	1	LED_T1-3/4_RED	DIGI-KEY KINGBRIGHT WP7113SEC/J3		\$1.00
6	1	LED_T1-3/4_BLUE	DIGI-KEY KINGBRIGHT WP7113QBC/D		\$0.68
7	1	RESISTOR_47_OHM_250W_FILM	DIGI-KEY 13-MFR-25FTF52-47RCT-ND		\$0.14
8	4	RESISTOR_1K_OHM_250W_FILM	DIGI-KEY 13-MFR-25FTF52-1KCT-ND		\$0.14
9	2	RESISTOR_4.7K_OHM_250W_FILM	DIGI-KEY 13-MFR-25FTF52-4K7CT-ND		\$0.14
10	1	RESISTOR_9.1K_OHM_250W_FILM	DIGI-KEY 13-MFR-25FTF52-9K1CT-ND		\$0.14
11	2	RESISTOR_47K_OHM_250W_FILM	DIGI-KEY 13-MFR-25FTF52-47KCT-ND		\$0.13
12	1	RESISTOR_100K_OHM_250W_FILM	DIGI-KEY 13-MFR-25FTF52-100KCT-ND		\$0.18
13	1	TRANSISTOR_2SC1815	DIGI-KEY 2SC1815		\$1.32
14	1	SWITCH_DIP_C&K_SDA02HIBD	DIGI-KEY C&K SDA02HIBD		\$1.54
15	1	SWITCH_TOGGLE_NKK_G12AH	DIGI-KEY NKK G12AH		\$5.95
16	1	SWITCH_PUSH_MOMENTARY_TACTILE	ALIEXPRESS 6X6X12_MOMENTARY SWITCH		\$0.01
17	1	SWITCH_SLIDE_C-K_OS102011MAIQNI	DIGI-KEY OS102011MAIQNI		\$0.65
18	1	HEADER_SAMTEC_FEMALE_8-PIN	DIGI-KEY SSQ-108-01-S-S		\$2.06
19	1	HEADER_SAMTEC_MALE_9-PIN	DIGI-KEY TSW-109-23-F-S		\$1.39
20	1	HEADER_SAMTEC_MALE_6-PIN	DIGI-KEY TSW-106-07-F-S		\$1.62
21	4	HEADER_SAMTEC_MALE_2-PIN	DIGI-KEY TSW-102-06-F-S		\$0.36
22	1	HEADER_SAMTEC_MALE_RA_3-PIN	DIGI-KEY TSW-103-08-F-S-RA		\$0.59
23	1	PIEZO_PKM13EPYH4000-A0	DIGI-KEY PKM13EPYH4000-A0		\$0.46
24	1	OPEN_LOG_PCBA	SPARKFUN DEV-13712	\$15.50	
25	1	ARDUINO_FIO_PCBA	SPARKFUN DEV-10116	\$28.50	
26	1	HEADER_SAMTEC_MALE_14-PIN	DIGI-KEY TSW-114-14-F-S		\$2.03
27	1	HEADER_SAMTEC_MALE_8-PIN	DIGI-KEY TSW-108-23-S-S		\$1.39
28	1	HEADER_SAMTEC_MALE_RA_6-PIN	DIGI-KEY TSW-106-08-F-S-RA		\$1.03
29	2	STANDOFF_M-F_M2X5MM	ALIEXPRESS M2X5mm_10PCS		\$5.87
30	2	STANDOFF_M-F_M2X10MM	ALIEXPRESS M2X10mm_10PCS		\$6.66
31	4	NUT_HEX_M2	MCMMASTER CARR 91828A111	\$5.23	
32	1	FRONT_PLATE_FINAL			
33	1	BOTTOM_PLATE_FINAL			
34	1	MIDDLE_PLATE_FINAL	FAMILIAR FACES ENGRAVING		\$41.81
35	1	MIDDLE_PLATE_FINAL			
36	2	STANDOFF_M-F_M2X5MM	ALIEXPRESS M2X5mm_10PCS		REPEAT
37	2	NUT_HEX_M2	MCMMASTER CARR 91828A111		REPEAT
38	1	OLED_PCBA	ADAFRUIT 938	\$19.95	
39	1	HEADER_SAMTEC_MALE_8-PIN	DIGI-KEY TSW-108-23-S-S		\$1.39
40	1	GPS_PCBA	ADAFRUIT 746	\$39.95	
41	1	BLEBee_PCBA	SEED STUDIO BLEBee v2.0.0	\$34.50	
42	1	MEDCOM_IM1_iROVER_HV_PCBA	IM1 1-707-823-0336	\$90.00	
43	1	LND_7317_GM_TUBE WITH GRILL	LND 1-516-678-6141	\$110.00	
44	1	BATTERY_LI_ION_1200MAH_ASSY			
45	1	BATTERY_LI_ION_1200MAH	ELMWOOD ELECTRONICS		\$17.99
46	8	VHB5908_500X469X10	DIGI-KEY 3MI55900-ND		\$17.74
47	1	GK40_FORMEX_INSULATOR_1750X2625	EBAY GK40 (OR GK30) FORMEX	\$25/f+2	
48	2	VHB_5952_375X600X40	DIGI-KEY 3MI56594-ND		\$38.07
49	2	VHB_5952_375X1462X40			
50	2"	HEATSHRINK, 3/8", 2:1	MCMMASTER CARR 7496K87	\$5.86	
51	6	SCREW_PHMS_M2X3	MCMMASTER CARR 92000A010	\$12.40	
52	4	SCREW_PHMS_POLYCARBONATE_M3X6	MCMMASTER CARR 93140A154	\$7.00	
53	4	STANDOFF_M-F_M3X8MM	MCMMASTER CARR 93665A095	\$3.72	
54	8	STANDOFF_M-F_M3X10MM	MCMMASTER CARR 93655A097	\$3.87	
55	4	NUT_HEX_POLYCARBONATE_M3	MCMMASTER CARR 94905A113	\$10.71	
56	1	PELICAN 1010 MICRO-CASE	PELICAN / AMAZON	\$16.50	
57	1	FAIRWIN_TACTICAL_BELT	AMAZON		\$22.69
58	1	SANDISK EXTREME MICRO SDHC 32GB	AMAZON	\$13.22	
59	1	AUKEY 12W 2-PORT USB CHARGER	STAPLES		\$19.99
60	1	UNITEK USB CARD READER 3-SLOT	AMAZON	\$14.99	

UNITEK USB CARD READER



SANDISK MICRO SDHC (32Gb)

SCALE 3.000

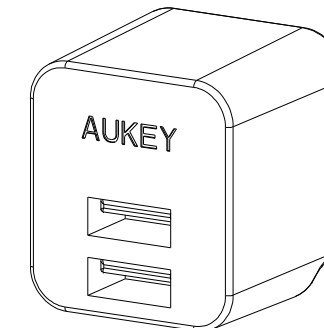
USED IN OPEN-LOG PCBA ON BGEIGIE (WITH PINS FACING UP) AND READ IN THIS CARDREADER SLOT (PINS TOWARD CENTER)

NOTE: SHOULD BE FORMATTED TO "FAT32" AND CONTAIN TWO ROOT FILES "CONFIG.TXT" & "SAFECAST.TXT". SEE SHEET 6.

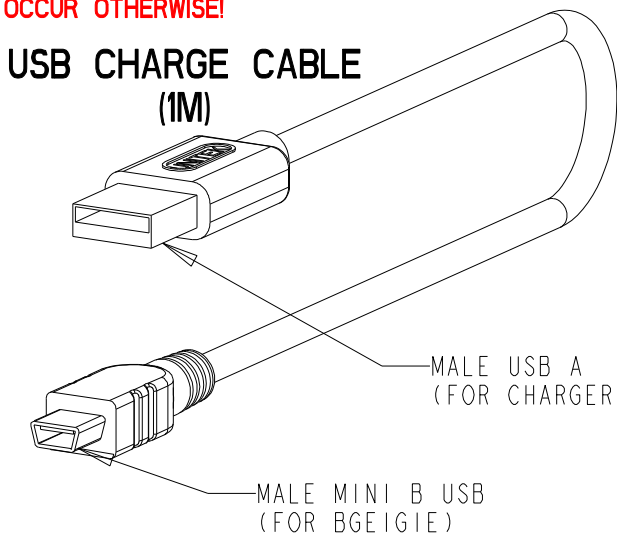
NOTE: ONLY ~70KB OF MEMORY IS USED IN RECORDING DATA EACH HOUR (OR ~2Mb/DAY)

BGEIGIE POWER SWITCH MUST BE OFF AT ALL TIMES WHEN CHARGING BATTERY. (I.E. NEVER EVEN PLUG INTO A BGEIGIE WITH IT'S SWITCH ON) INRUSH DAMAGE WILL OCCUR OTHERWISE!

AUKEY USB CHARGER



USB CHARGE CABLE (1M)



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BNE02		02
DARYL BENDER	SIZE	SHEET
	B	5

SET-UP FOR FIRMWARE PROGRAMMING

LATEST FIRMWARE (V1.4.4) CAN BE FOUND AT <https://github.com/Safecast/bGeigieNanoKit>
 FIRMWARE FOR BGEIGIENANO WITH BGEIGIECAST CAN BE FOUND AT https://github.com/Safecast/bGeigieNanoKit/tree/ASCII_new

NOTE: THIS IS ONLY INCLUDED FOR REFERENCE. UNIT SHOULD NOT REQUIRE PROGRAMMING.
 IF REQUIRED SEE;
<https://github-wiki-see.page/m/Safecast/bGeigieNanoKit/wiki/How-to-Update-the-Firmware>
 FOR DETAILS ON PROGRAMMING FIRMWARE, TEXT FILES REQUIRED ON SD CARD ETC.

NOTE: THIS BLEBee CARD MUST BE REMOVED TO AVOID CONFLICT WITH TX/RX SIGNALS WHICH ARE SHARED.

ADAFRUIT FTDI PROGRAMMER PLUGGED INTO 90° 6 PIN HEADER ON ARDUINO FIO SEE ALSO DIAGRAM BELOW

NOTE: USB CONNECTOR ON FTDI FACES DOWN

NOTE: POWER SWITCH SHOULD BE OFF. UNIT WILL BE POWERED THROUGH PROGRAMMER

TWO ROOT TEXT FILES TO BE WRITTEN ON MICRO SD CARD

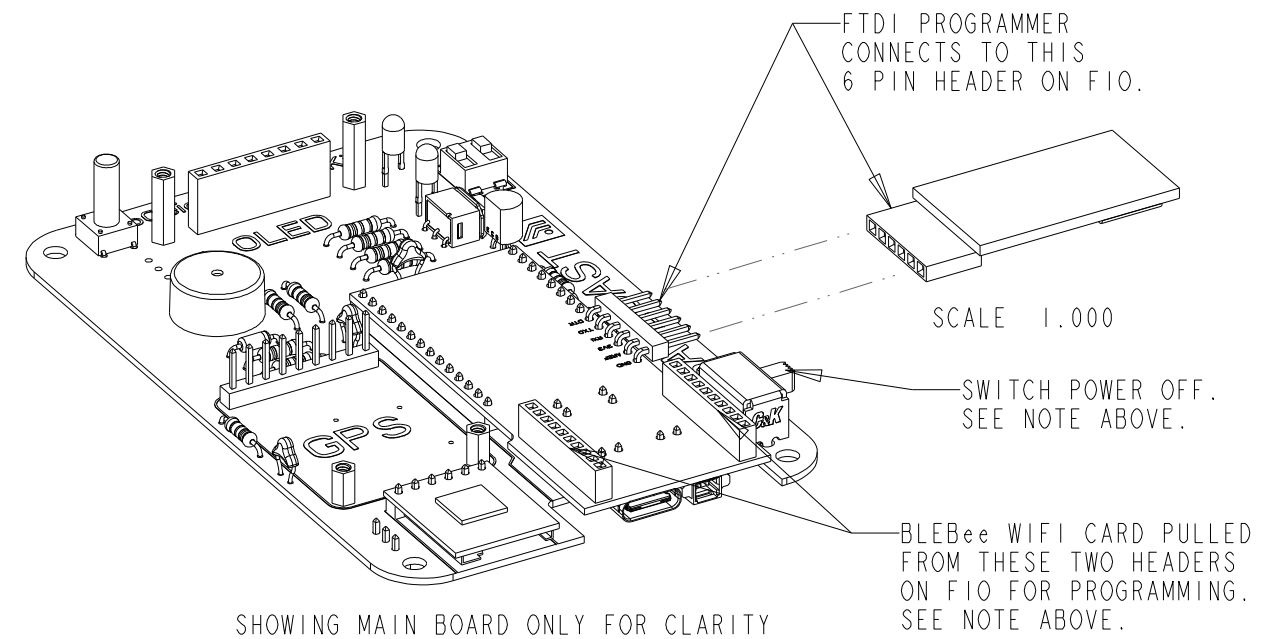
SCALE 1.000

CONFIG.TXT

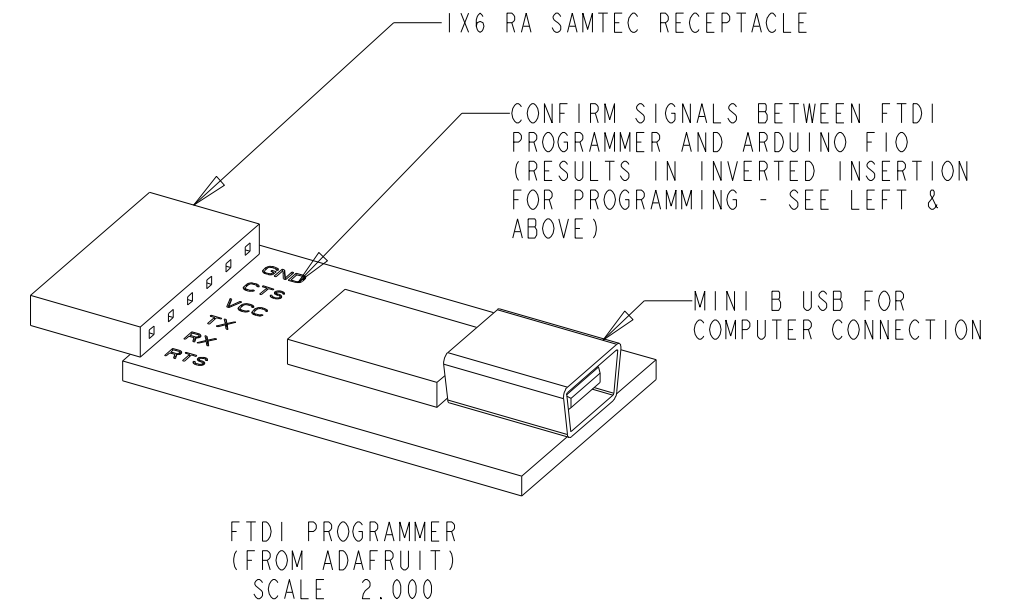
```
9600,26,3,2,1,1,0
baud,escape,esc#,mode,verb,echo,ignoreRX
```

SAFECAST.TXT (Do not enter comments)

nm=Daryl Bender	User's name or handle. This is displayed on the startup screen.
did=3206	Unique Serial No. This is the most important! It should be the same as the number on the unit.
gt=0	Geiger type - Last I remember this isn't used anywhere.
gm=0	Geiger mode - Also not used if I recall correctly.
cpmf=334	Dose rate conversion factor - Used to calculate the dose rate for the OLED display.
cpmn=Cs137	Calibration isotope - not implemented but it's what the dose rate is based on.
bqmf=37	Surface contamination conversion factor - used to get Becquerels per area for display.
bqmn=Cs137	Surface calibration isotope - not implemented but here for reference.
al=150	Alarm Level - above this many CPM, "alarm mode" kicks in, flashing the status LED.
tz=-5	Time zone offset from GMT - not implemented. The intention was to display local time.
cn=CA	Alpha-2 Country code - not implemented. Intended for UI localization.
st=0	Sensor type - not implemented. The Nano is always an LND 7317.
ss=0	Sensor shield - not implemented. In case we developed an energy compensation adapter.
sh=100	Sensor height - not implemented. In cm, but we decided to use only the API metadata.
sm=0	Sensor mode - not implemented. I can't recall what this was supposed to do.
cw=60	I have no memory of this parameter! I doubt it's used in the code.



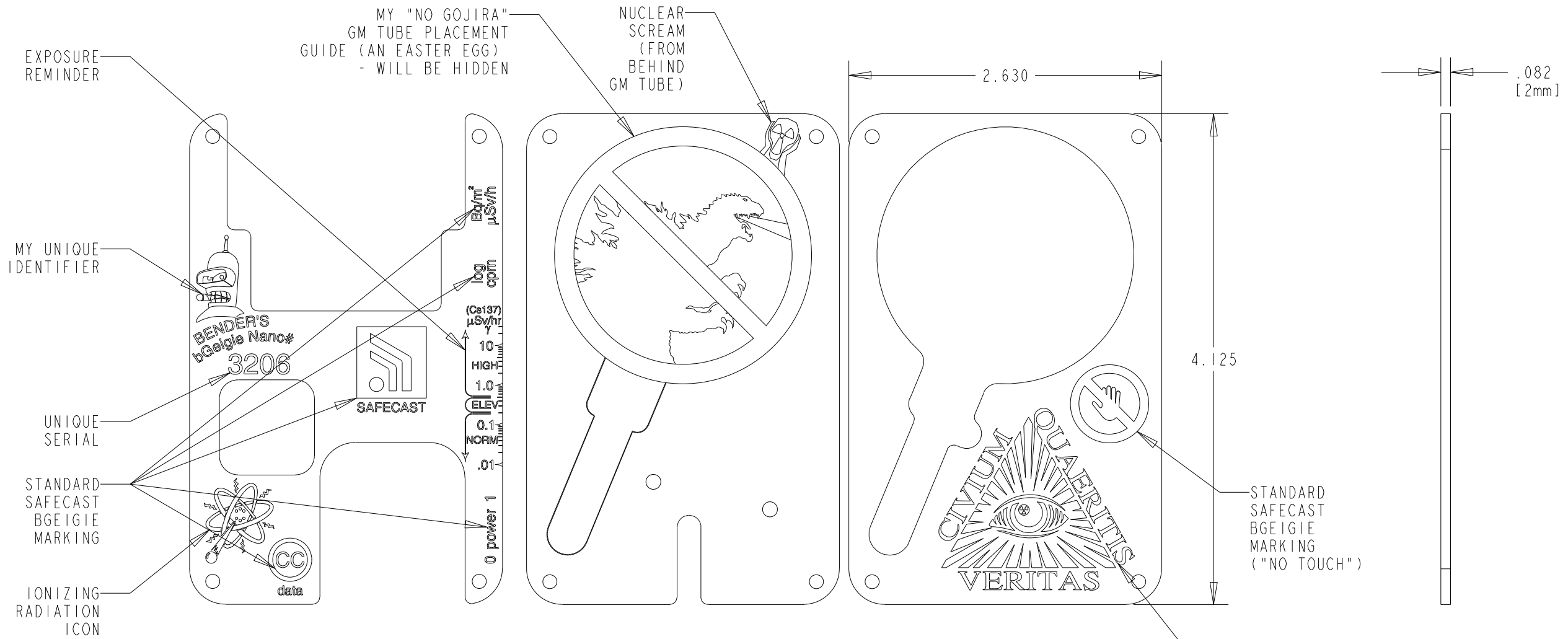
USB CHARGING CABLE CAN BE USED FOR PROGRAMMING
 - USB A CONNECTOR TO COMPUTER
 - MINI B CONNECTOR TO FTDI



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BNE02		02
DARYL BENDER	SIZE	SHEET
	B	6

Custom Artwork for bGeigie 3206 by Daryl Bender ©2019



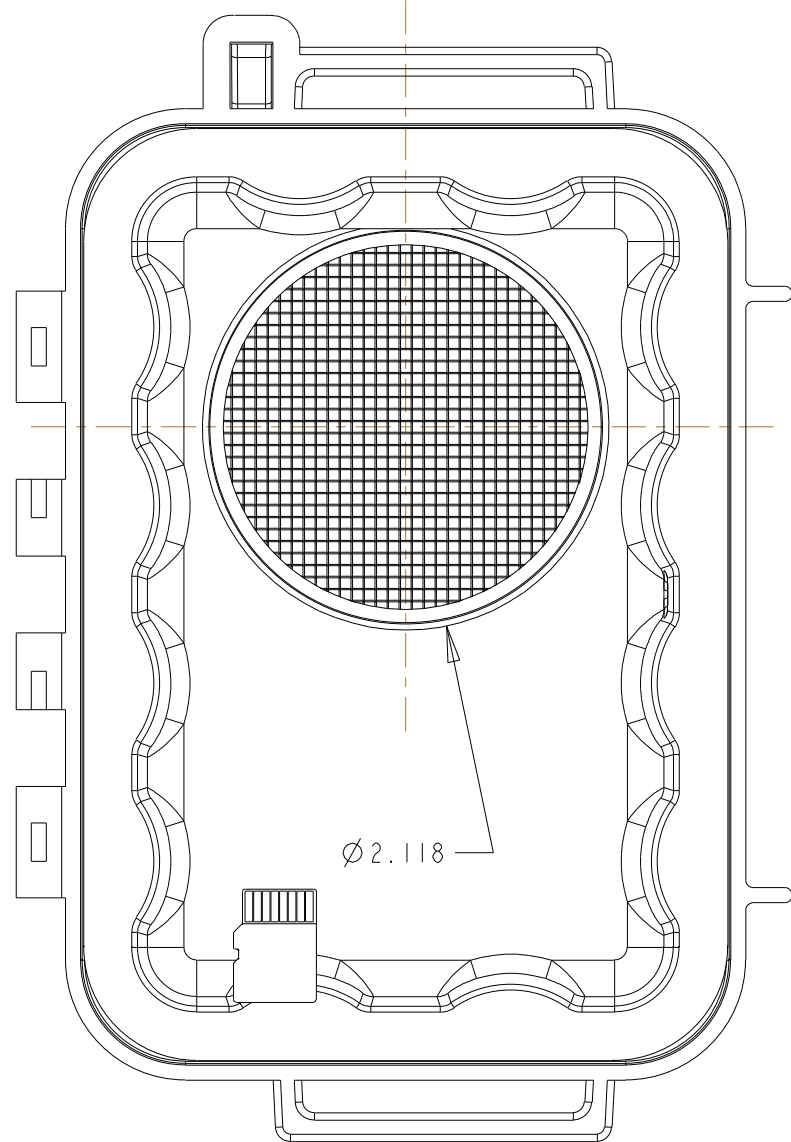
SCALE 1.000

USE "bGeigie_Plates.svg" or "bGeigie_Plates.ai"
RGB ARTWORK FOR LASER CUTTING/ETCHING PLATES
USE 2mm CAST (NOT EXTRUDED) ACRYLIC SHEET.

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DARYL BENDER	SIZE	SHEET
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PELICAN CASE HOLE POSITION

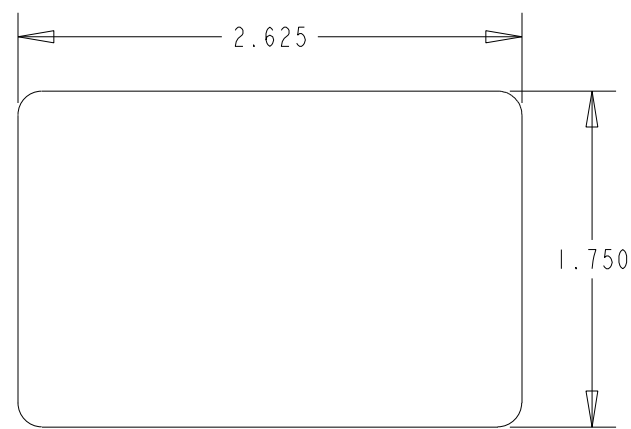
(SEE SHEET 10)



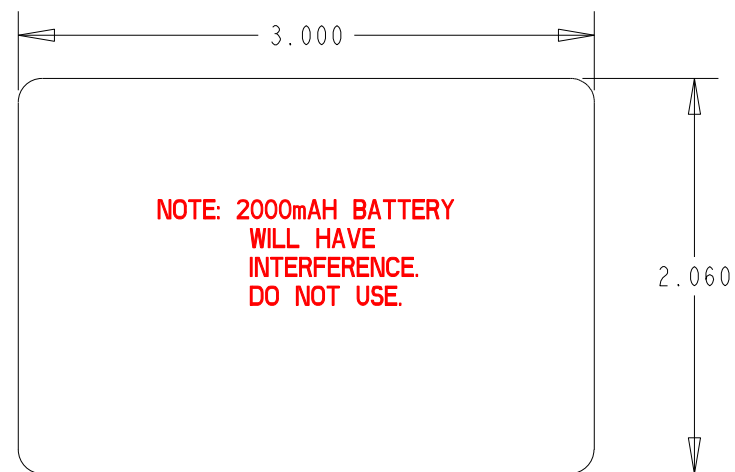
SCALE 1.000

LI-ION BATTERY FORMEX INSULATORS (1200mAh & 2000mAh)

(SEE SHEET 7)



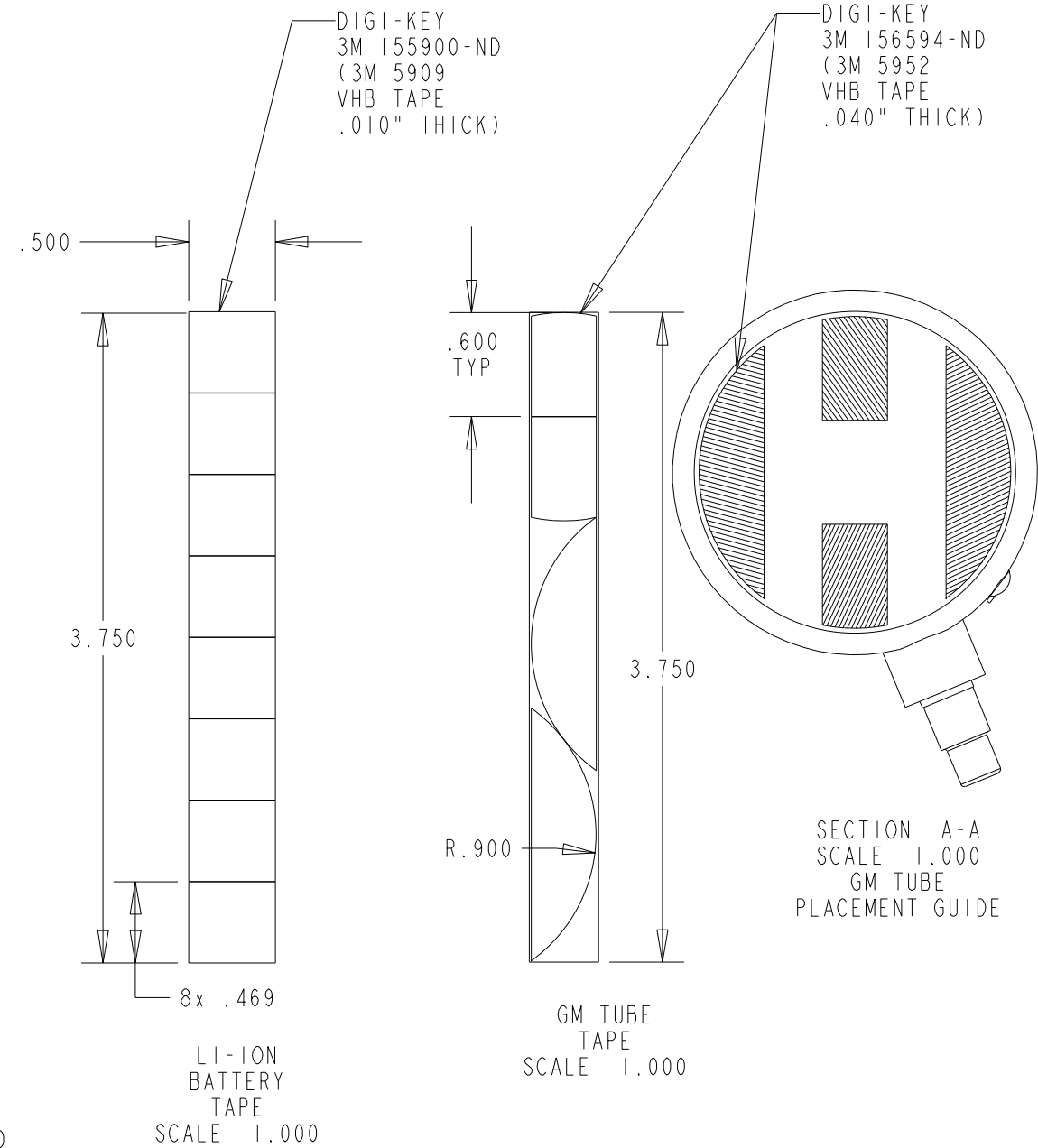
SCALE 1.000



**NOTE: 2000mAh BATTERY
WILL HAVE
INTERFERENCE.
DO NOT USE.**

SCALE 1.000

DOUBLE-SIDED VHB TAPE



GM TUBE
TAPE
SCALE 1.000

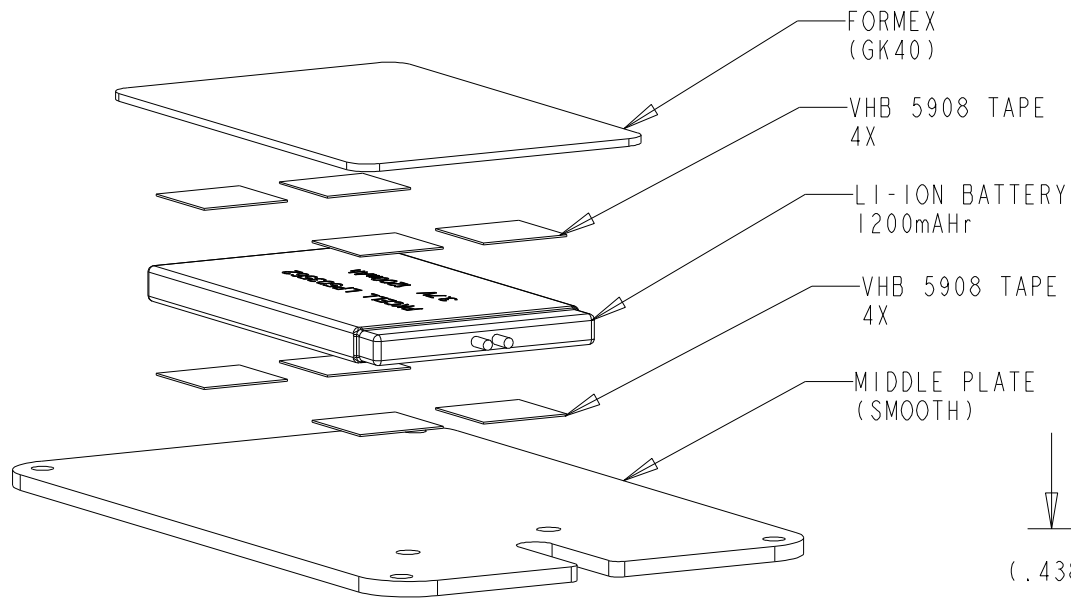
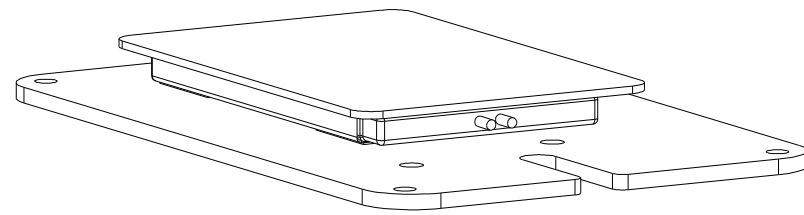
SECTION A-A
SCALE 1.000
GM TUBE
PLACEMENT GUIDE

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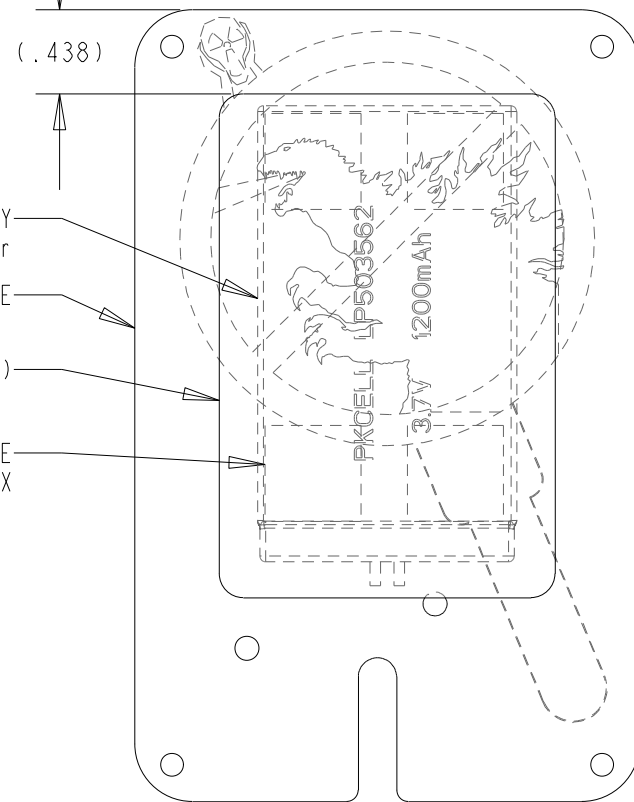
BATTERY INSULATOR DETAILS, STACK-UP, CLEARANCE CHECKS & BATTERY PLACEMENT GUIDES

SEE SHEET 8 FOR FORMEX & VHB DIMENSIONS

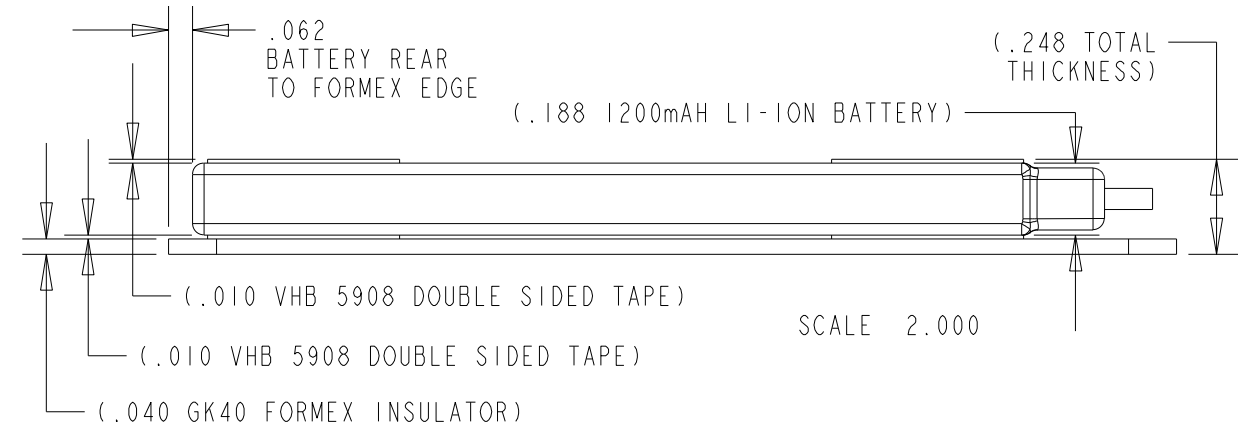


OUT OF CAUTION THE LI-ION BATTERY WAS VHB BONDED TO THE SMOOTH MIDDLE PLATE WITH THE RIGID GK40 FORMEX FACING, AND PROTECTING AGAINST, THE PROTRUDING PCB TAILS.

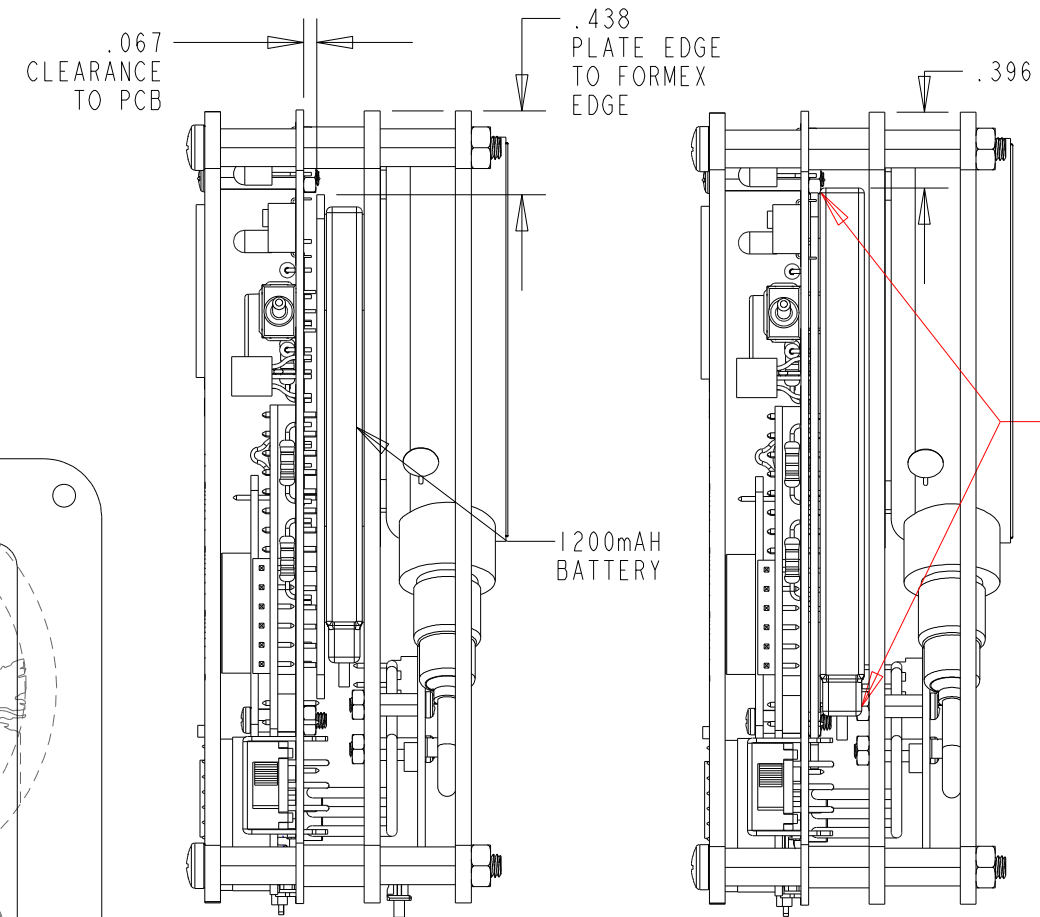
- LI-ION BATTERY 1200mAh
- MIDDLE PLATE
- FORMEX (GK40)
- VHB 5908 TAPE 8X



SCALE 1.000



SCALE 2.000

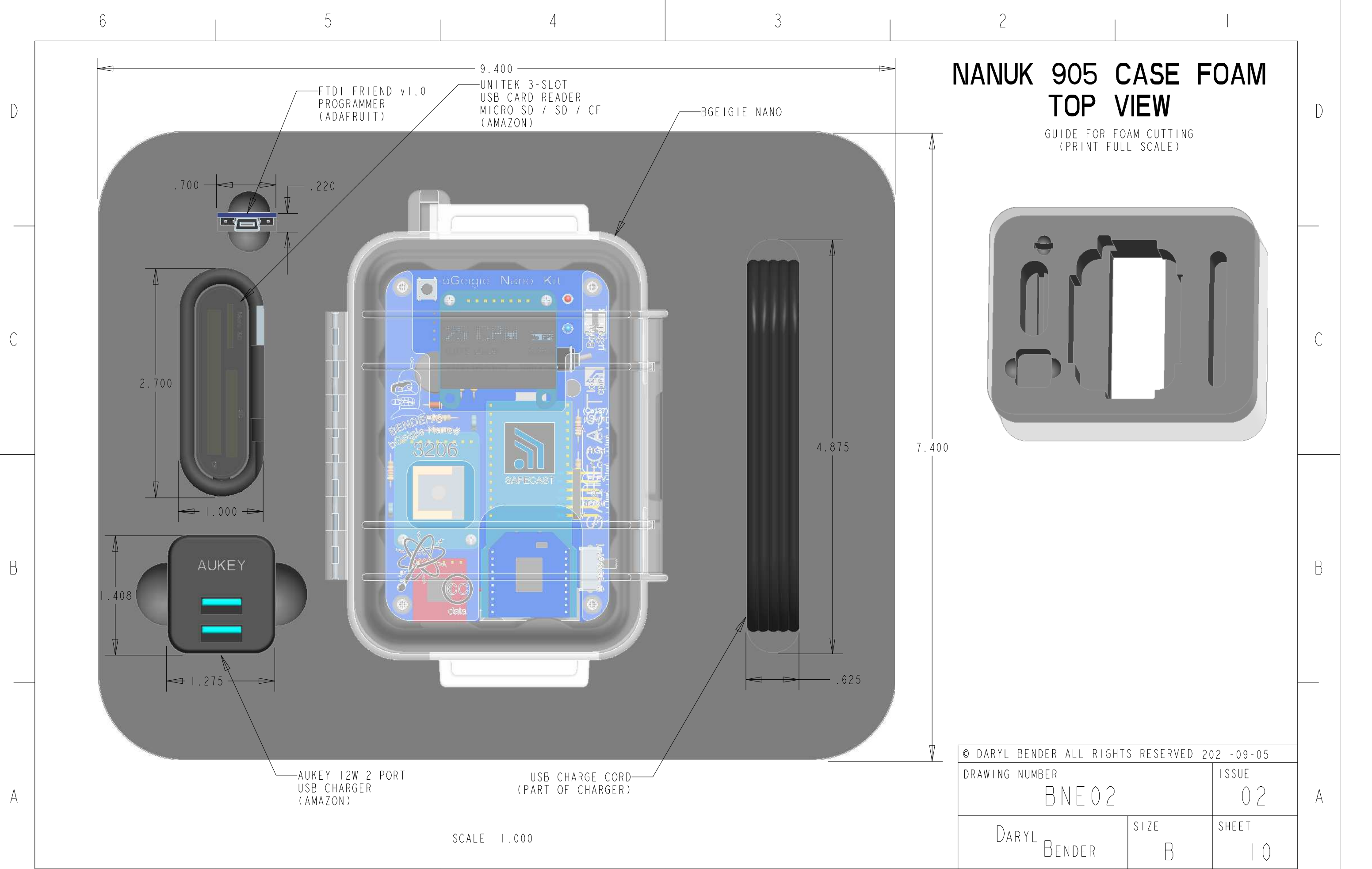


1200mAh BATTERY SCALE 1.000

2000mAh BATTERY SCALE 1.000

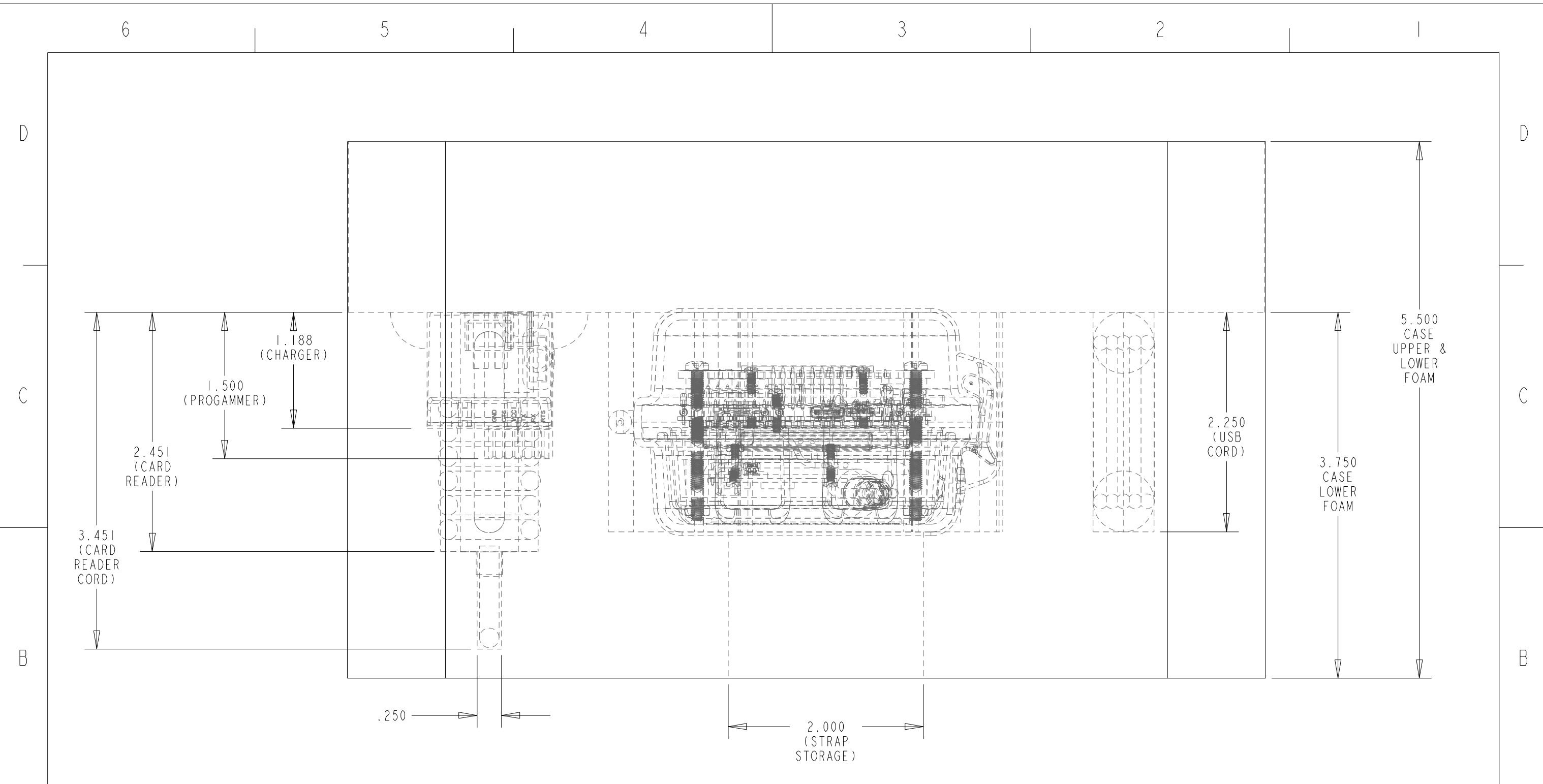
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SCALE 1.000

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	B	10



NANUK 905 CASE FOAM FRONT VIEW

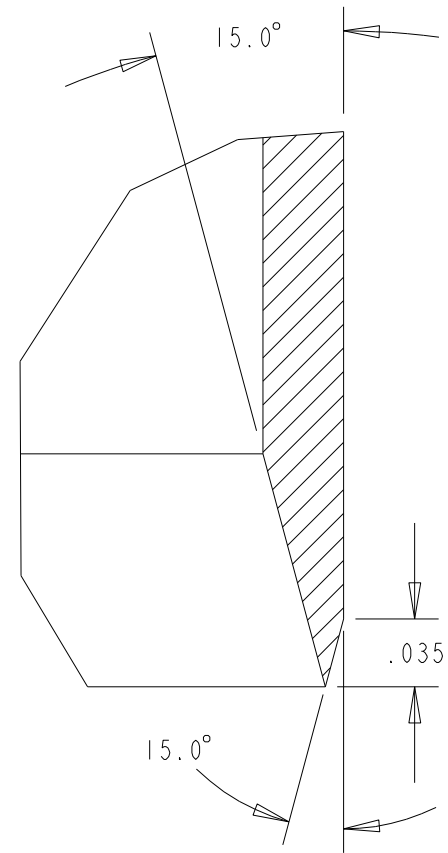
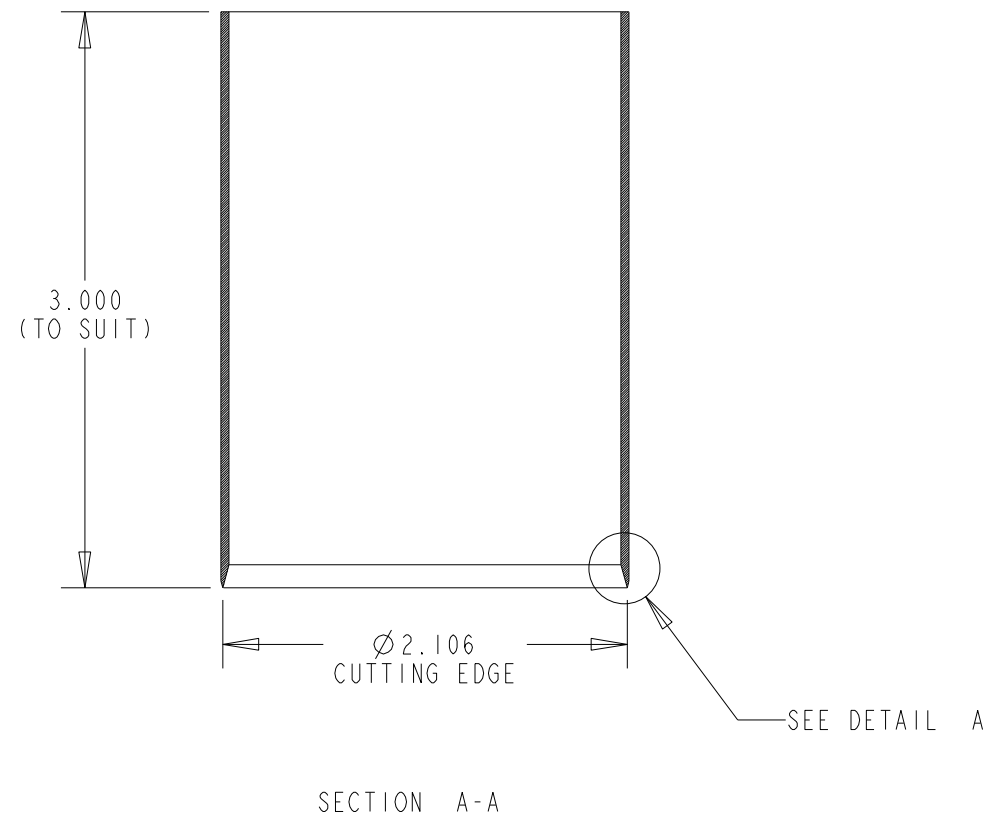
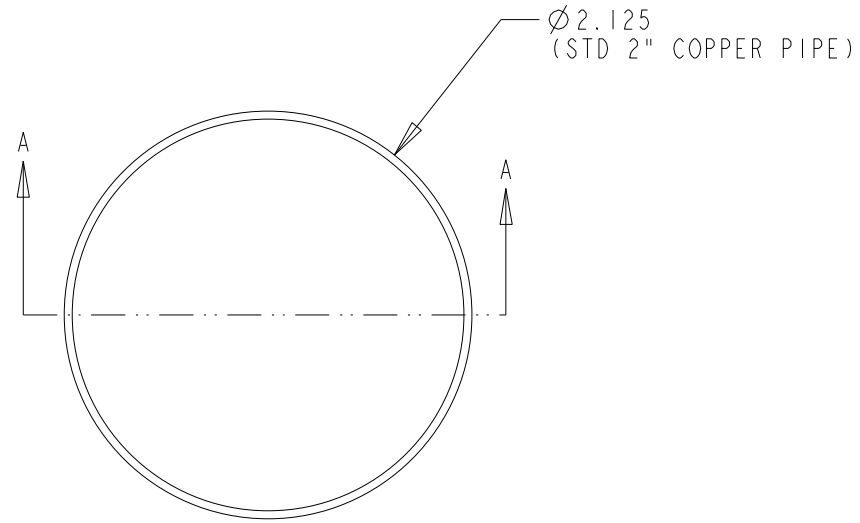
SHOWING DEPTH OF FOAM CUTS

SCALE 1.000

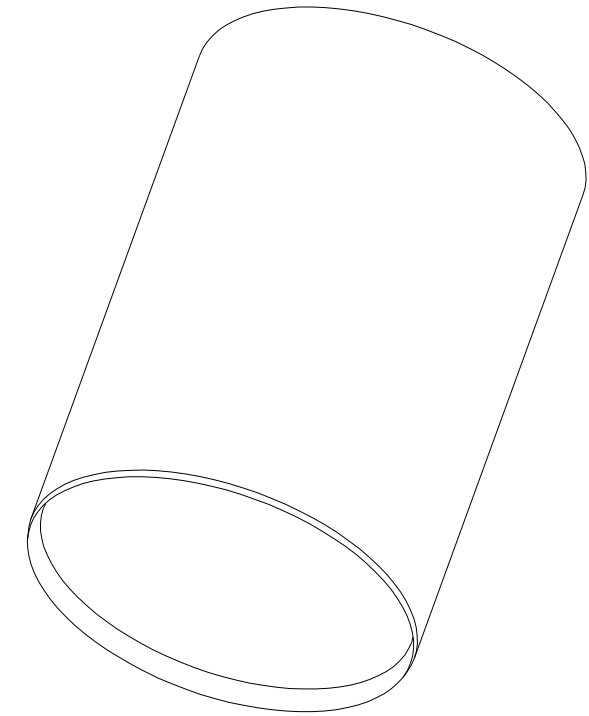
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THE 'COPPER CHOPPER' TOOL

USE BOTTOM PLATE IN PELICAN CASE FOAM AS A CUTTING GUIDE. PRESS & TWIST TO CUT HOLE IN FOAM.



DETAIL A
SCALE 10.000
CUT INSIDE AT 15°
THEN CUT OUTSIDE
AT 15° FOR .035"



CAN BE MADE IN A FEW MINUTES ON A LATHE. THIS IS BASED ON JOE'S "CAN CUTTER HACK" COULDN'T FIND RIGHT SIZE CAN BUT FOUND 2" COPPER PIPE IS NEAR EXACT AND CAN TAKE A LOT OF DOWNWARD FORCE IF NEEDED. GIVEN LOW USE REVERTING TO "BRONZE AGE TOOLING" WAS DEEMED ACCEPTABLE.

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DRAWING NUMBER BNE02		ISSUE 02
DARYL BENDER	SIZE B	SHEET 12