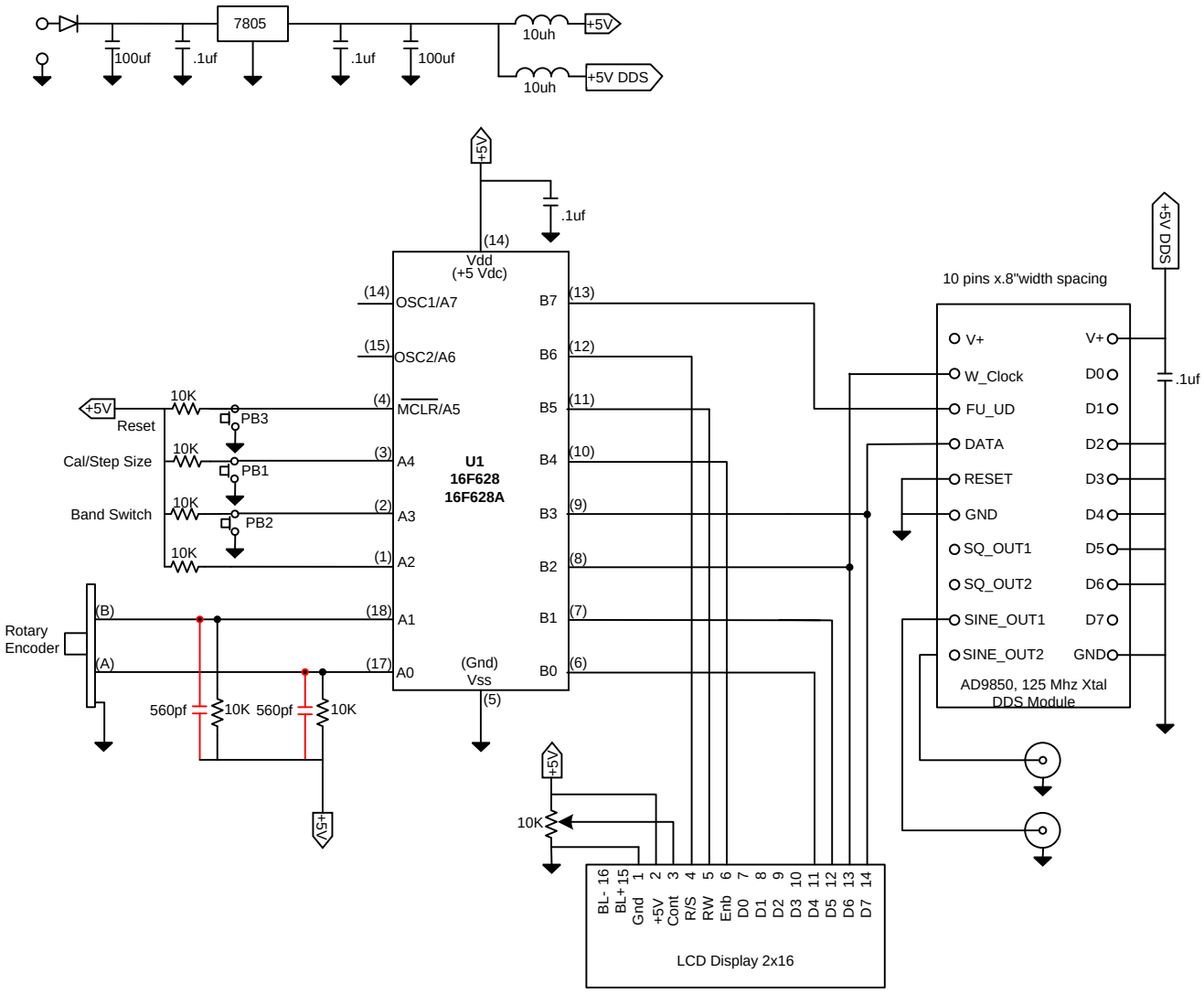


Date:	Revision/Addition/ Note	By:
May 19, 2017	Initial Drawing, DDS VFO by VK5TM (http://www.vk5tm.com) Redrawn from his page	GSC
May 20, 2017	Purchased and received a AD9850, 125 Mhz xtal DDS module (30mhz). Ordered mechanical rotary encoders, 2x16 LCD module	GSC
May 24, 2017	The LCD pinouts vary from MFG, to MFG. The NewHaven display I bought counts 16,15,1-14. With pin 15(+v)and pin 16(Gnd) being the LED backlight.	GSC
June 3, 2017	Used software PICELgen7.4-30.	GSC
June 5, 2017	First attempt on breadboard. Everything worked but the rotary encoder. Adjusting encoder caused device to reboot. LCD OK, DDS OK, PB switches OK. Encoder was a TT electronics 987-1398-ND from Digikey. The Bourns PEC11R-4020F-S0024 had no detent and caused to unit to quit. DO NOT use a no detent encoder.	GSC
June 5, 2017	Removed the two capacitors on the encoders (marked in red). This gave me adjustment and no reboot.	GSC
June 7, 2017	After talking with Terry VK5TM, and sending him my version of this drawing, he found he had listed wrong value for the capacitors on the encoder. He corrected on is webpage. Value should be .001uf to .0047uf. Have on order. Also going to try an optical encoder.	GSC
June 10, 2017	Replaced .1uf caps with .001uf caps. Still locked up. Removed.	GSC
July 7, 2017	If using an optical encoder, change the pull up resistors to recommended values. For the one I purchased that will be 2.2k to 4.7K from 10K shown.	GSC
July 9, 2017	Ordered (2)AD9851 30Mhz xtal DDS module. (70 Mhz max) Software PICELgen7.4-60.	GSC
July 23, 2017	Both modules worked on breadboard.	GSC
Sep 21, 2017	Put 560pf caps in for the encoder caps. This worked and helped the adjustment.	GSC

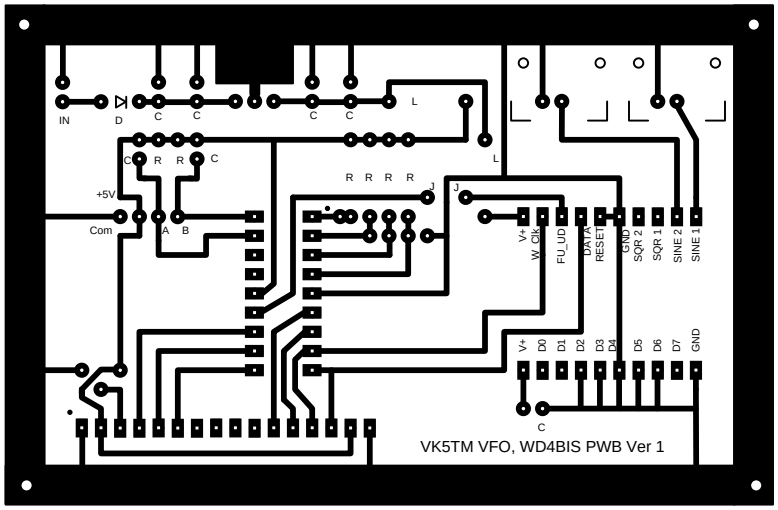
DDS Module notes:
This is just my opinion after using several modules purchased from China and Hong Kong. It is my belief that these are factory seconds where the chips are performance dropouts. You will have to check all the outputs to see which ones work. So far, none of the square wave outputs have worked, and on several modules only one of the sine wave outputs worked. But as long as one output works, Im golden. Regardless for the price of about $10-15 I cant build the module. Single unit AD9851 parts are running about $24-28 depending on distributor.

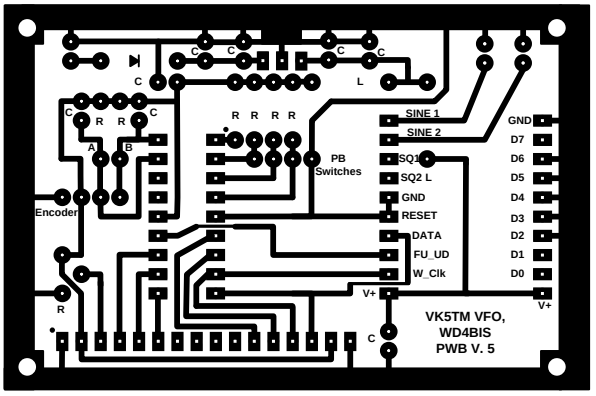
From AA0ZZ PEgen5.1.ASM file

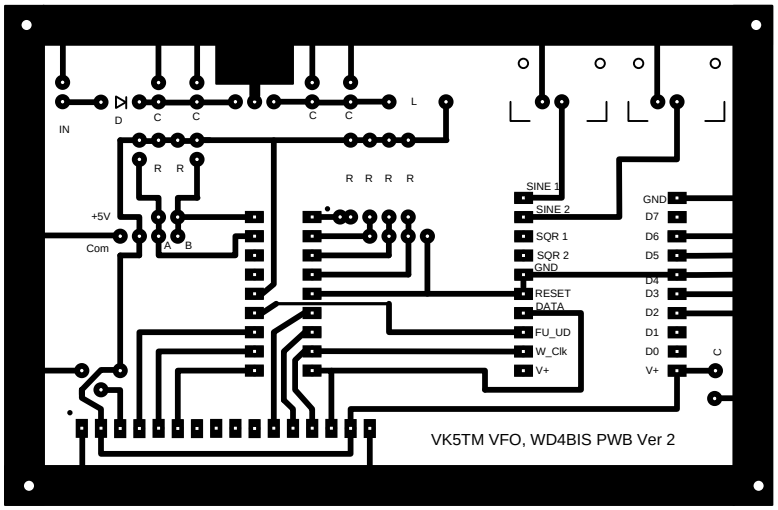
```
;
; CALIBRATE MODE is entered if a pushbutton switch (PIC-EL PB_1) is pressed
; during power-on. The display is set to 10 MHz and remains fixed,
; even as adjustments are being made. If pushbutton is held pressed, then
; turning the shaft encoder will increase or decrease the value "osc" used to
; calculate the DDS control word. The basic calibrate adjustment rate is very
; low (on the order of a few cycles per turn of the encoder).  A somewhat
; faster adjustment speed is available by pressing the encoder shaft down
; while turning.

; An external frequency counter on the DDS output is required to observe this
; adjustment. To exit calibrate mode, release the pushbutton and turn the
; shaft encoder one more time. The calibrated value of "osc" will then be
; stored in EEPROM memory.
```

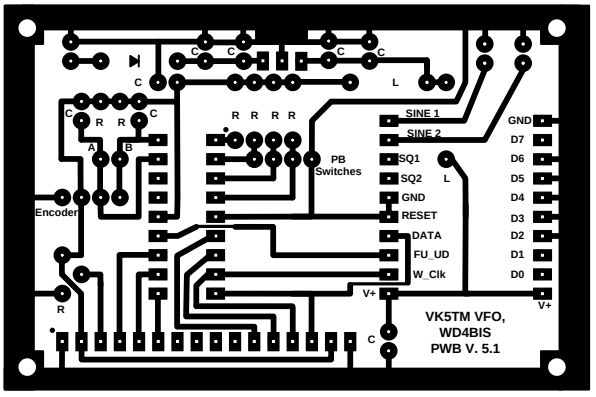
Print Check .5"x.5"

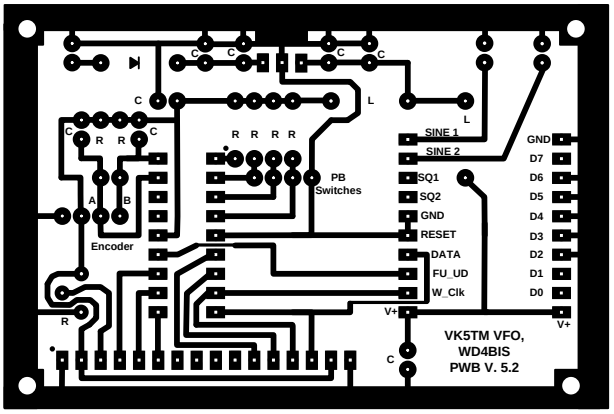
Drawn By:	Gerald Crenshaw WD4BIS	Date: May. 19, 2017	From the bench of: Amateur Radio Station WD4BIS	Page of	1 1
Designed By:	Gerald Crenshaw WD4BIS	Date: May. 19, 2017			
Checked By:	Janet Crenshaw WB9ZPH	Date: May. 19, 2017	Title: VK5TM DDS VFO	Scale:	

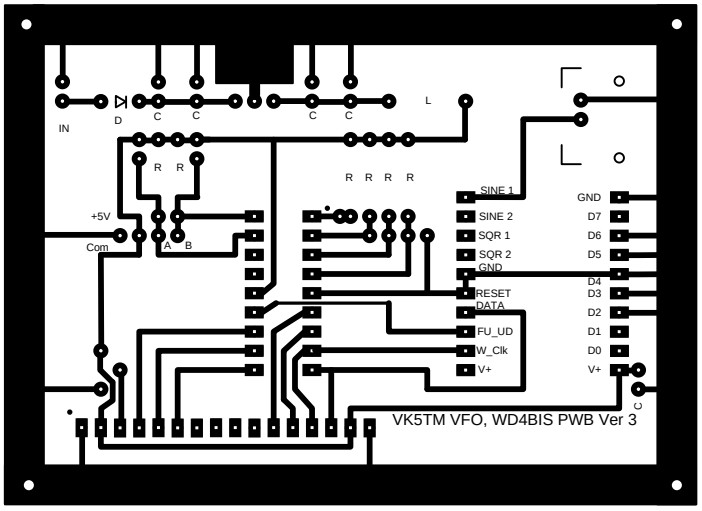


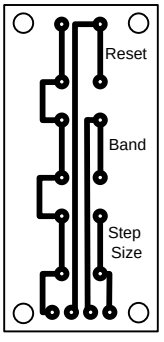


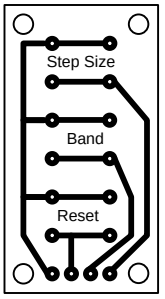






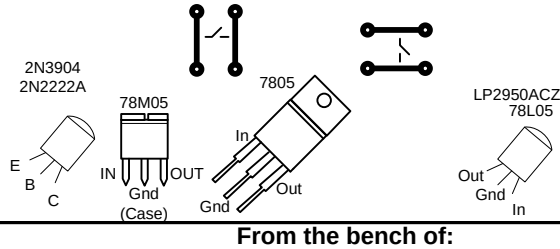






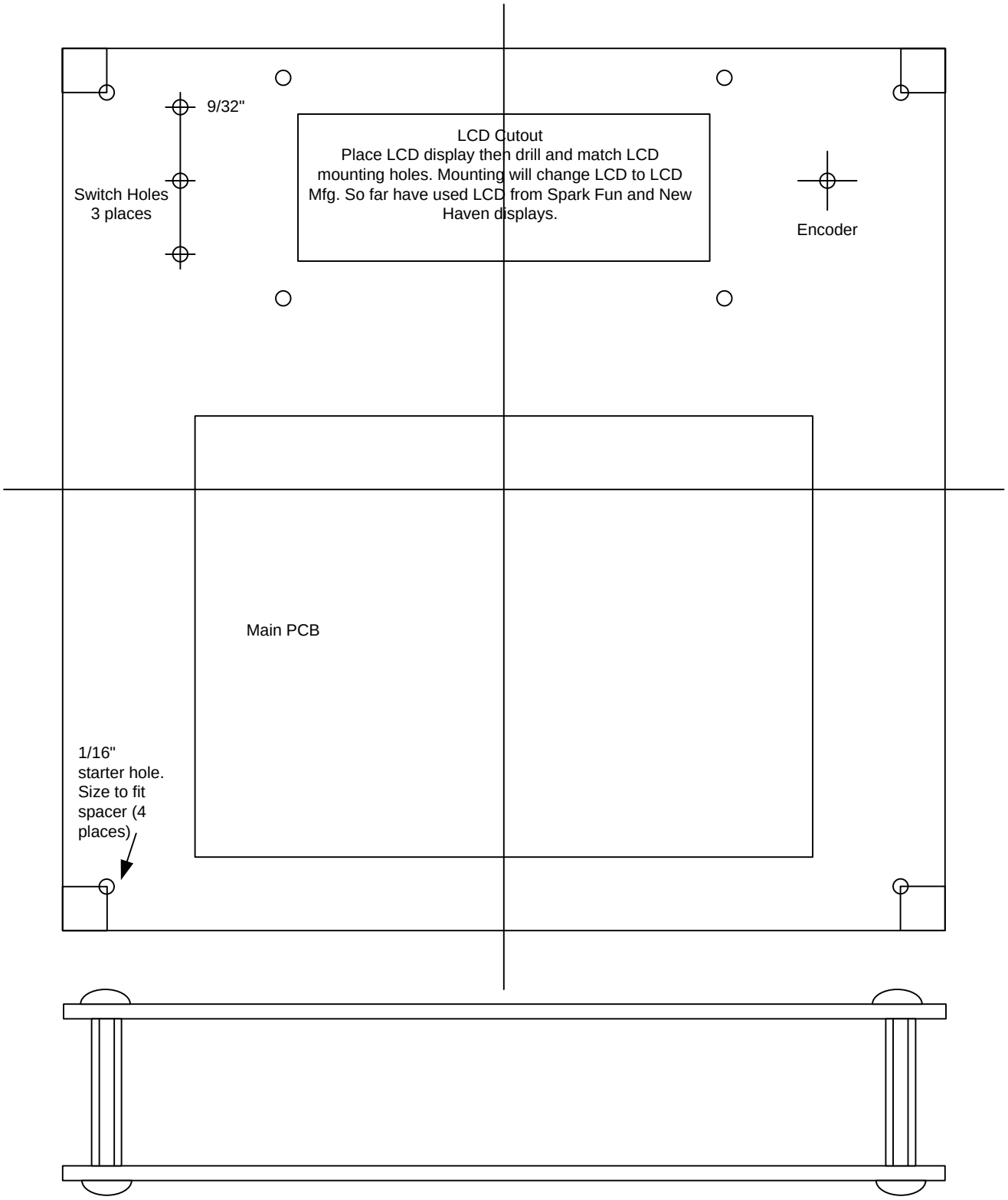
Date:	Revision/Addition/ Note	By:
May. 19, 2017	Initial Drawing, DDS VFO by VK5TM (http://www.vk5tm.com)	GSC
July 4, 2017	Flipped orientation of DDS module on Ver.2 PWB	GSC
July 4, 2017	Will work with both AD9850 and AD9851 DDS Module but will require a software change in PIC.	GSC
July 4, 2017	Added the option of an optical encoder by adding a 5Vpin on Ver-1, Ver-2. Requires software change for an optical encoder.	GSC
Sept 17, 2017	Added Ver-5, reduced size PWB. Artwork proved out.	GSC
Sept 22, 2017	Added Ver-5.1, moved L1,L2 to give little room for a different inductor I found surplus. 2.5 turns on a 6 hole ferrite bead, about 22uh@10Mhz.	GSC
Oct 10, 2017	Added Ver-5.2, New 10K pot has a different footprint. Expanded the board a little to reduce crowding. Moved DDS module .1" as it rubbed the LCD connector.	GSC

Package Outlines



Print Check .5"x.5"

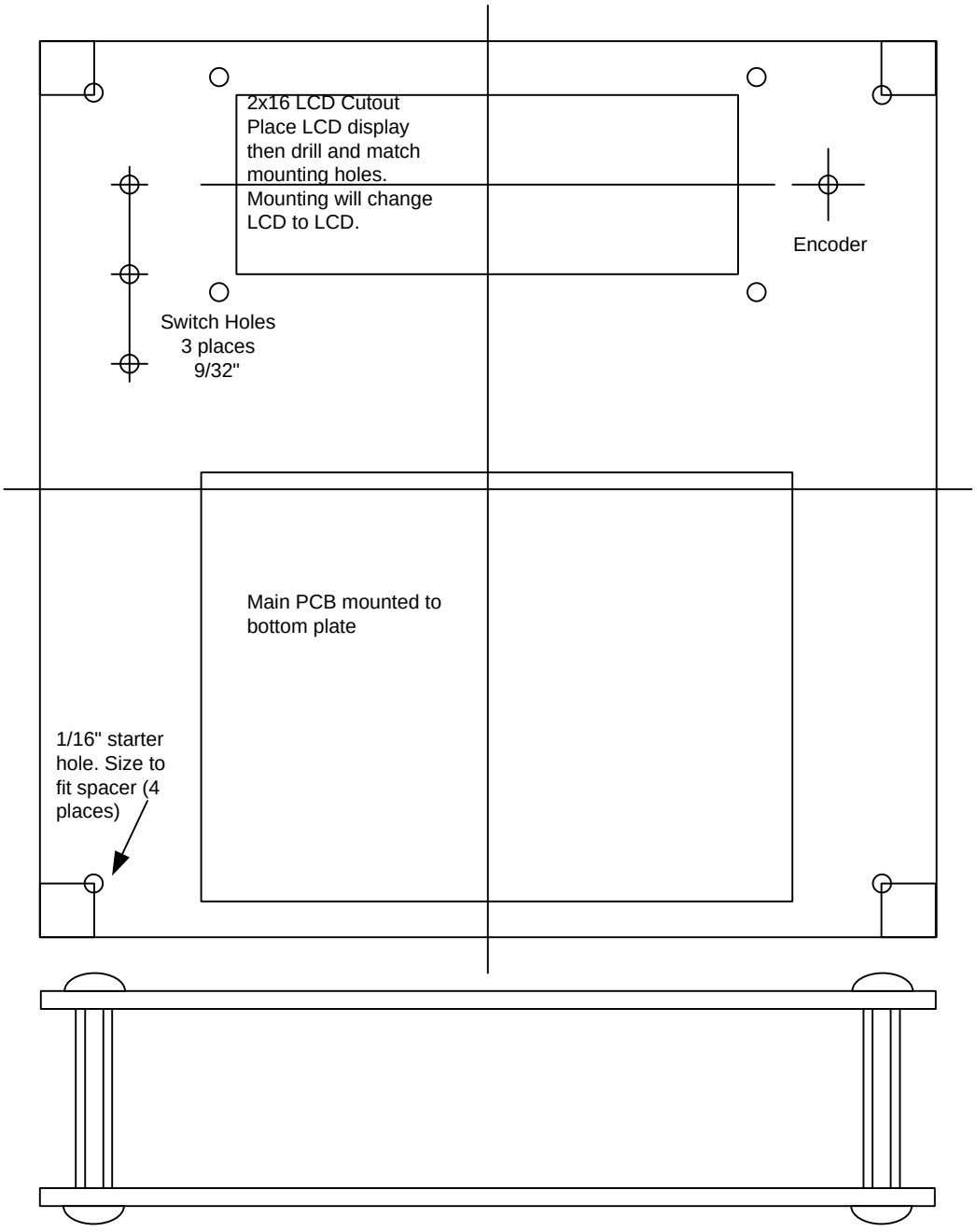
Drawn By:	Gerald Crenshaw WD4BIS	Date: May. 21, 2017	From the bench of: Amateur Radio Station WD4BIS
Designed By:	Gerald Crenshaw WD4BIS	Date: May. 21, 2017	Page 1 of 1
Checked By:	Janet Crenshaw WB9ZPH	Date: May. 21, 2017	Title: VK5TM DDS VFO WD4BIS PCB — Scale:



Date:	Revision/Addition/ Note	By:
June 17, 2017	Initial Drawing, Mounting plates, going to mount device between 2 6"x6" plates of plexiglass with 1" spacers,#8 threads.	GSC

Print Check .5"x.5"

Drawn By:	Gerald Crenshaw WD4BIS	Date: June 17, 2017	From the bench of: Amateur Radio Station WD4BIS	Page 1 of 1	
Designed By:	Gerald Crenshaw WD4BIS	Date: June 17, 2017			
Checked By:	Janet Crenshaw WB9ZPH	Date: June 17, 2017	Title: VK5TM DDS VFO Mounting plates	Scale:	

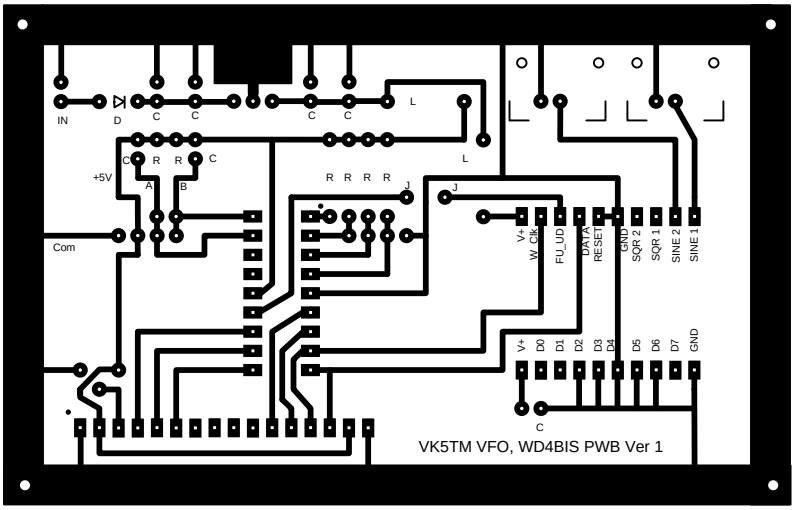


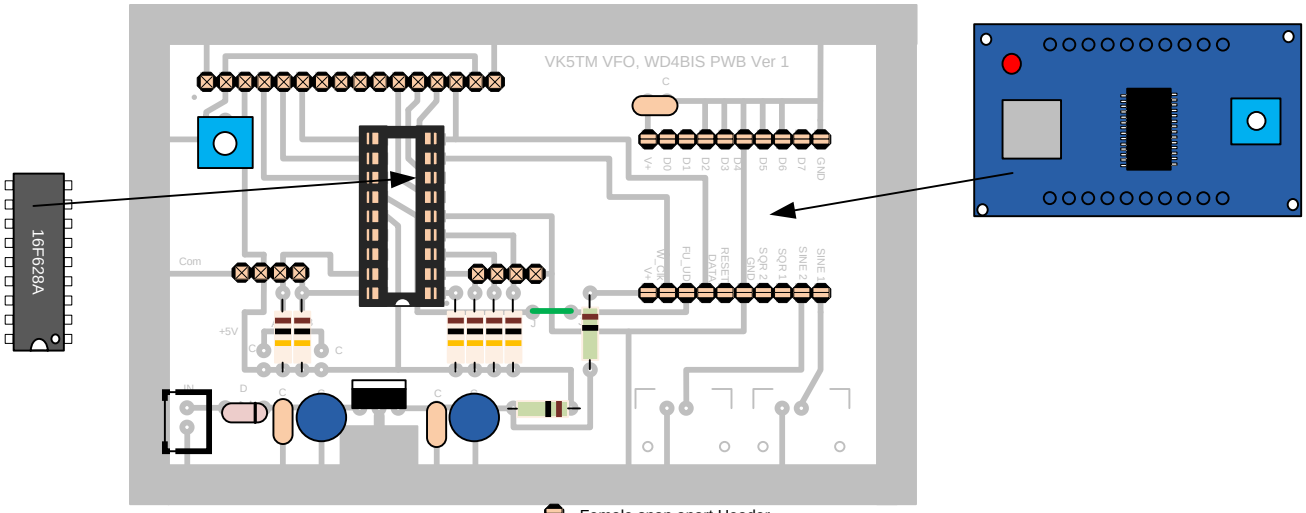
vk5tm@internode.on.net

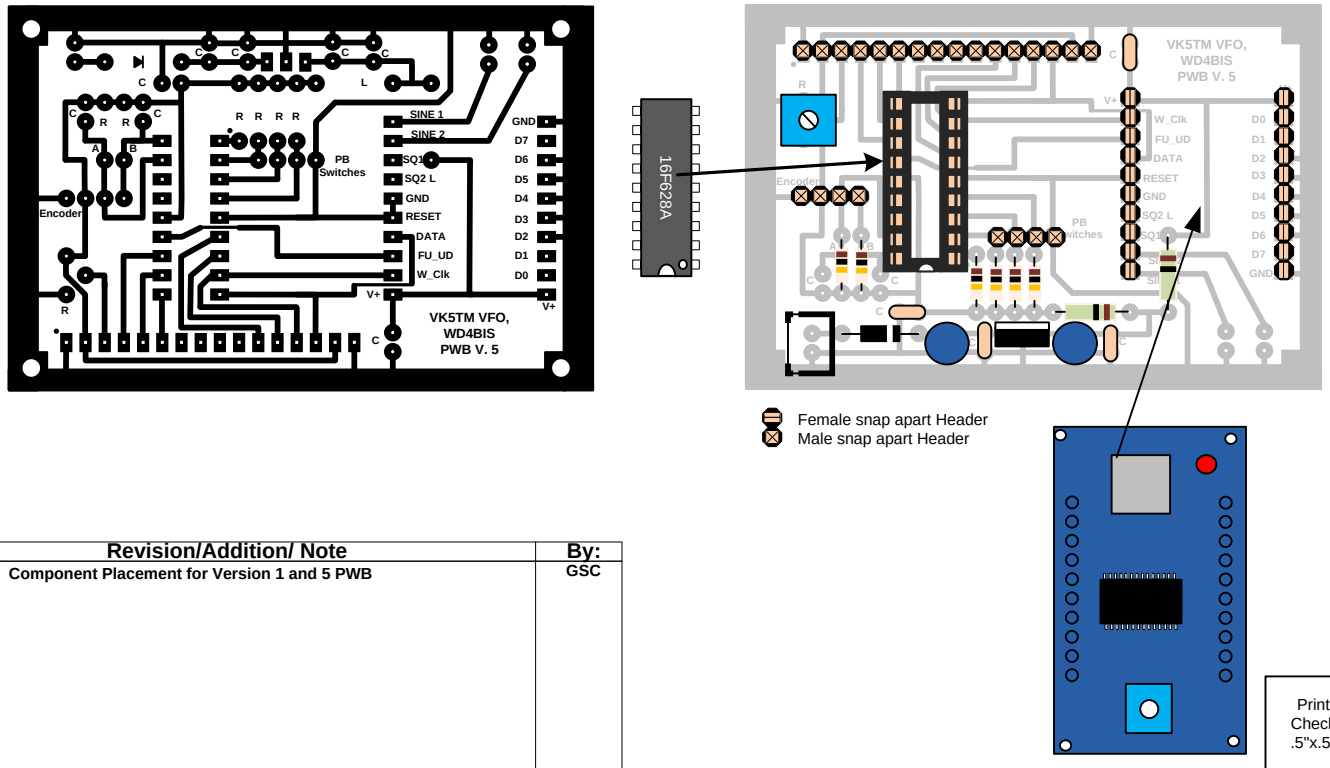
Date:	Revision/Addition/ Note	By:
July 27, 2017	Initial Drawing, Version 2. The second prototype breadboard was smaller and the LCD display was smaller.	GSC
July 27, 2017	Mounting plates, going to mount device between 2, 5"x5" plates of plexiglass with 1" spacers,#8 threads. #8 clearance hole, #16 drill .1770"	GSC
July 30, 2017	Had to move switch holes to clear the LCD Display PCB.	GSC
July 30, 2017	Positioned then mounted the main PCB to bottom plate with tape then drilled the mounting holes through board mounting holes into Plexiglass	GSC

Print Check .5"x.5"

Drawn By:	Gerald Crenshaw WD4BIS	Date: July 27, 2017	From the bench of: Amateur Radio Station WD4BIS	Page of	1 1
Designed By:	Gerald Crenshaw WD4BIS	Date: July 27, 2017			
Checked By:	Janet Crenshaw WB9ZPH	Date: July 27, 2017	Title: V2. VK5TM DDS VFO Mounting plates	Scale:	



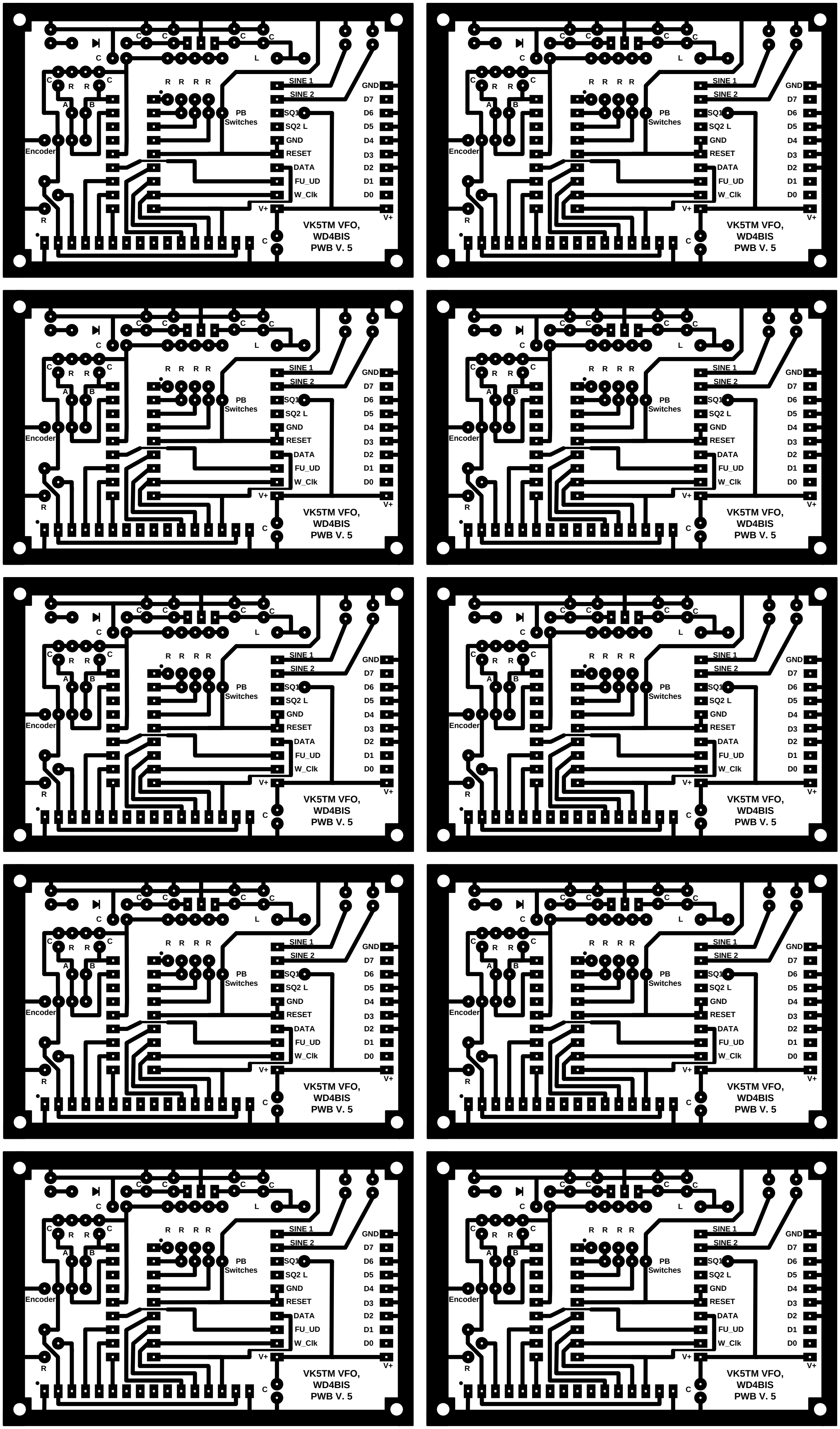




Date:	Revision/Addition/ Note	By:
Sept 19, 2017	Component Placement for Version 1 and 5 PWB	GSC

Print Check .5"x.5"

Drawn By:	Gerald Crenshaw WD4BIS	Date: Sept 19, 2017	From the bench of: Amateur Radio Station WD4BIS
Designed By:	Gerald Crenshaw WD4BIS	Date: Sept 19, 2017	Page 1 of 1
Checked By:	Janet Crenshaw WB9ZPH	Date: Sept 19, 2017	Title: PCB Component Placement VK5TM DDS VFO — Scale:



Print to HP Laserjet P3005,
Single sheet feed
Shiny side up, Staples basic photo stock paper.
Properties, Finishing, Mirror Image.
Paper/Quality Pro Res 1200 DPI

Heat press, 400 degrees for 240 seconds. (4 min.)