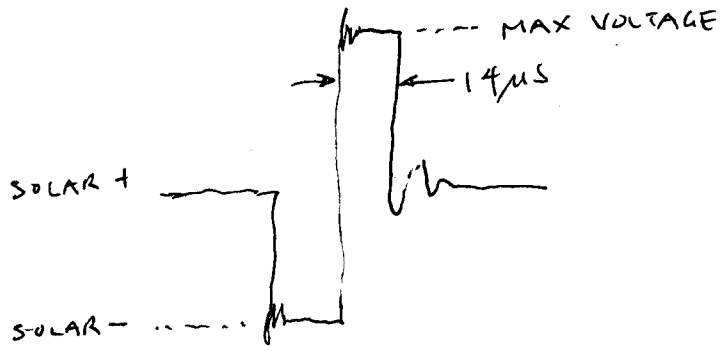
09MAR2015;
Roderick.

PREPARING TO WIND T300A-26 TOROID. WRAPPED #26 WIRE 12T AROUND IT. LENGTH WAS 43" - WILL GO 48" WITH #10, AND TRIM.

PUT A PAPER BAND AROUND TOROID. OUTER CIRCUMFERENCE SEEMS TO BE 243-244mm. ~~PRINTER~~ TRIED PRINTING A BAND 244mm ~~LONG~~. LONG. EITHER MY RULER WAS OFF, OR THE PRINTER WAS. WILL TRY AGAIN WITH 242mm. NO, 243 SEEMS RIGHT, NOW. AS HARD TO WIND AS PREVIOUS TOROID. MADE COMPONENT IN DESIGNSPARK WROTE SMALL C PROGRAM TO CALCULATE COORDINATES OF 13 EQUALLY SPACED HOLES ON 243mm CIRCLE.

19MAR2015. TRIED IT IN CIRCUIT - WORKS WELL. POSSIBLY DUE TO LOWER INDUCTANCE, CHARGE TIME IS FASTER THAN HURRICANE INDUCTOR. ALSO, ON SCOPE OBSERVED MINIMUM PULSE WIDTH OF CHARGING IS 14μS, NOT 12μS AS BEFORE.



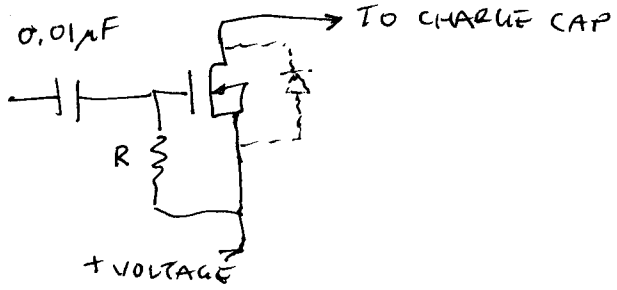
RINGING AFTER CHARGE ENDS IS SLOW - 210 KHZ. DON'T WANT TO LOSE ENERGY SNUBBING IT. HOWEVER, WITH SNUBBING HIGHER FREQ RING AT START OF PUMP + CHARGE - IT THREATENS GATE OF MOSFET.

WILL HOOK UP GATE OF SYNCHRONOUS RECTIFIER. PULSE LIMIT IS TUNED FOR 12μS PULSE RIGHT NOW, BUT WILL JUST LEAVE IT. TOO SHORT DOES NO HARM FUNCTIONALLY, JUST IMPACTS EFFICIENCY. OUTPUT STAYS AT BASICALLY Ø. FOUND NEW TOROID WIRED BACKWARDS. MADE NO DIFFERENCE FOR NON-SYNC CASE. FIXED.

MISTAKE #2, GATE WINDING WOUND IN WRONG DIRECTION. CORRECTED.
W/O SYNC RECTIFY, COUNT TO 1007 = 271
WITH " " , " " " = 264 HELPS A LITTLE.
CAN TUNE LATER

21 MAR 2015;
Roderick.

TUNED PULSE LIMITER R TO 1.5KΩ



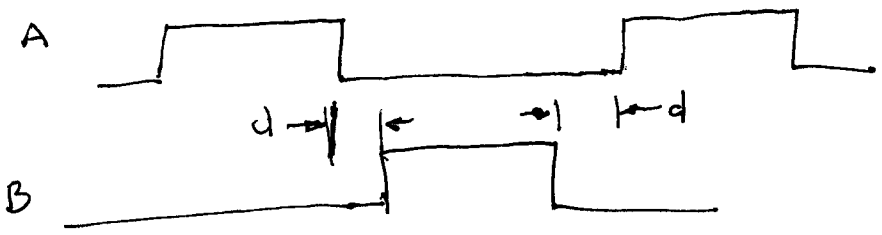
~~COUNT~~ TAKES 264 20μS PULSES TO CHARGE CAP TO MAX VOLTAGE. NO IMPROVEMENT. NEEDED SEVERAL TRIALS TO MAGNETIZE CORE UNTIL COUNT WAS STABLE. TRY AGAIN WITH R = 2.51K TOOK 313. SEEMED TO BE STRUGGLING ~~AT~~ NEAR TOP. TRY AGAIN. SCOPE SHOWS MOSFET NOT TURNING OFF IN TIME. TRY 2K. STILL TROUBLE AT OUTPUT VOLT = 25 OR SO. TRY 1.7K - RING @ 930 COUNT.

TRY 1.51K - RING @ 954. TRY 1.3K - OK. COMPLETES @ 265.

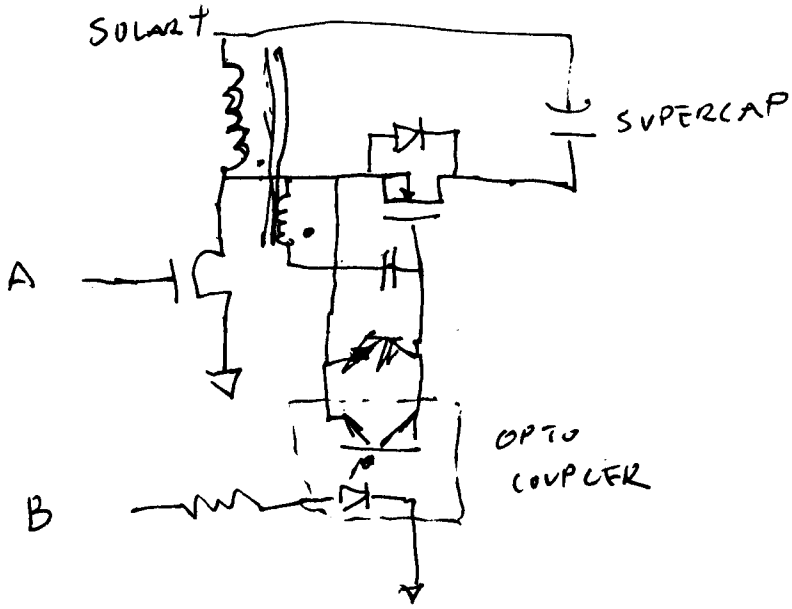
TRY 1.2K - 264 TRY 1.0K - 261 TRY 700Ω - 264

02APR 15; Roderick.

ALTERNATE WAY OF TURNING OFF SYNCHRONOUS RECTIFIER IF SNUBBER FAILS



d = dead time



A AND B USING HALF BRIDGE OF HWPWM OF 14M2+

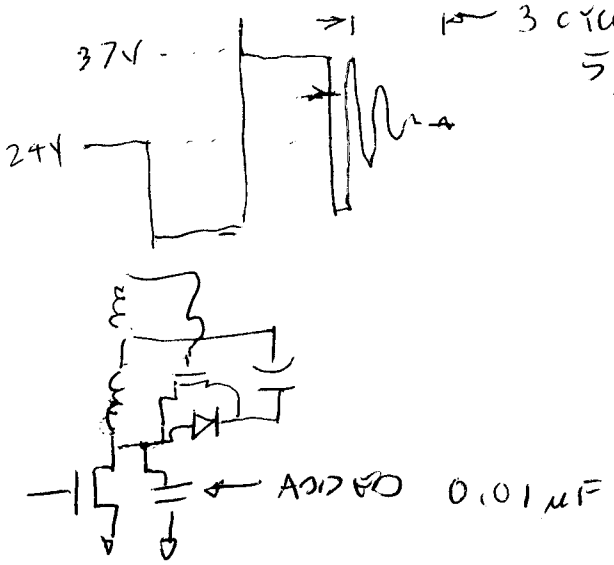
01 MAY 2015
RUBRICK.

GOING TO TRY SNUBBER TO ADDRESS RINGING ON SYNC RECTIFIER.
NOT GETTING MUCH BENEFIT, W/ PRESENT PULSE-LIMITING SCHEME,
ALTHOUGH GETTING SOME.

RE-WOUND GATE WINDING OF TOROID TO 6 TURNS.

PICAXE 08M2 NOT RESPONDING. CAN'T EVEN CHECK FIRMWARE REV
W/ AXEPAD OPTION MENU. TRIED REDOING MODPROBE, NO HELP.
CHANGED PART, THEN COULD READ FIRMWARE. NOTICED ORIGINAL
PART SEEMED A LITTLE LOOSE. PUTTING ORIGINAL BACK IN
BREADBOARD. NOPE, BURNED OUT. CAN'T TELL WHAT DID IT. WAS
WORKING FINE A FEW DAYS AGO. MAYBE JUST REACHED END OF
PROGRAMMABILITY? WILL NEED TO BRING SPARE PICAXES IF GO
IN FIELD. — POSSIBLE THAT RINGING TRANSIENT GOT
THROUGH & BURNED OUT A/D.

03MAY15. AT ABOUT COUNT 270, RINGING ISSUE STARTS AGAIN.



ADDED 0.01 µF, FREQ OF
RINGING NOW 10 µS / 3 CYCLES
→ 300 kHz
VOLTAGE ONLY GOES TO 250 A/D
COUNTS INSTEAD OF 280 STEADY STATE.

05 MAY 15
Roderick.

$$w = 2\pi f = \frac{1}{\sqrt{LC_0}} = 600\,kHz \cdot 2\pi$$

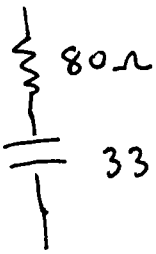
$$\frac{1}{\sqrt{L(C_0+C_1)}} = 300\,kHz \cdot 2\pi$$

$C_1 = 0.01\,\mu F = 10{,}000\,pF$

$C_0 = 3300\,pF$, APPROX.

$$Z_{C_0} = \frac{1}{w\,C_0} = \frac{1}{2\pi f C_0} = \frac{1}{2\pi \cdot \frac{6}{2} \times 10^5 \cdot \frac{1}{3} \cdot .01 \times 10^{-6}}$$

$$= \frac{1}{4\pi \cdot 10^{-3}} = 80\,\Omega$$



IDEALLY GOES ACROSS SYNC RECTIFER DRAIN - SOURCE.

BUT DOES NOT CURE ISSUE OF SYNC RECTIFIER NOT TURNING OFF.