rec.radio.amateur.homebrew

Metcal RF generator

(too old to reply)

Chuck Olson 15 years ago

My Metcal RFG-30 soldering system power supply quit on me a week or so ago, so yesterday I decided to look into
the problem. After removing 8 screws holding two bottom covers I was able to slide out the front and back dress panels for very limited access to fasteners. I couldn't find any way to unfasten the top cover which would allow separating the two halves of the case, but that turned out to be unnecessary. The single power transistor, an IRF130 TO-3 case FET was mounted with nuts on studs that came up through the mounting holes. One end had a Nylon shoulder washer under the nut but the other end made electrical contact with the case and was found to be barely finger tight. Since that had to be the drain connection to the device, I gently firmed up that fastener and reattached the cables to test the unit - - back in operation.
I was particularly impressed with the toroidal power transformer in the base - - that had to cost the manufacturer some serious cash. If anyone knows how to remove the plastic top panel, that knowledge will help improve the serviceability of this excellent product.

Chuck W6PKP

Pete KE9OA 15 years ago

I know, with the PS2A series, you have to remove the plastic overlay on the top panel to remove it, but I am not sure about the newer units. Actually, it is a pretty cool design, using a PWM scheme to control the power output. I've got a couple of the units.....I keep one at work (the small 400kHz unit) and the other one at home (the 13.58MHz unit). These units do have short circuit and open circuit protection.

Pete

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maxfoo 15 years ago

> *Post by Pete KE9OA*
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> Pete

I get 13MHz spurs in my RF synthesizer data if I don't turn off the Metcal on my bench. took me nearly a week to figure out where those spurs were coming from. those spurs are 40dbc...

Remove "HeadFromButt", before replying by email.

Leon Heller 15 years ago

> *Post by Chuck Olson*
> My Metcal RFG-30 soldering system power supply quit on me a week or so ago,
> so yesterday I decided to look into
> the problem.

[deleted]

I've got a couple of the later PS2V units. They have four screws securing the top cover. Just out of curiosity I removed it on one of the units and the Al panel beneath it carrying the On/Off switch and the LEDs. Everything inside seems fairly accessible for servicing, including the output device - a VN0106, I think, in a TO220 package.

Perhaps I could put one of them on 14 MHz by changing the crystal. 8-)

73, Leon

Chuck Olson 15 years ago

Permalink

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Thanks, Leon and Pete. This oldest of the 13.56 MHz power units has no fasteners visible on the top surface, so I figure it has to be fastened from the inside. I tried to look up through the bottom, but too many components were in the way. It usually shows up on Ebay at a pretty low price, presently there's one at $14.99 with no bid. I kinda like them because there are no funky RF switches to go bad. Some of the RFG-30 units have LED indicators, but out of 4 units, 3 of mine have incandescent lamps behind the front Metcal logo that no longer light up. Yes, that would really be a buzz, "rig here is a 30 watt Metcal RF Generator"! ! ! Might not be too hard to do.

These things must be exceptionally reliable since there's almost no information available (or needed, apparently) on how to repair them - - they must not be failing.

73, Chuck

Chuck Olson 15 years ago

...

Well the RFG-30 quit on me again, so this time I had to get into the package to find out what was the matter. Pete, KE9OA, said something about removing an overlay, which at the time went by me without even pausing at my brain. But faced now with this puzzle, I looked and looked, and eventually I could see where sheetmetal screws came down through the aluminum top panel, but there were no screw heads visible above them. They had to be covered up with something, so I started tapping on the flat surface around the on/off switch, and sure enough in places it sounded thin and hollow. So I got a sharp little screwdriver and found a corner that looked like there was space around a thin covering and started to pry up on the corner of that covering, and what do you know - - it was a thin "overlay" (now I know what an overlay is) that was glued down to the plastic top panel with rubber cement, and it came up fairly easily, exposing the four Philips-head sheetmetal screws that needed to be removed to get down to the aluminum top panel holding the on/off switch.

So there you have it. Now the halves of the case can be separated and re-arranged to service the innards of the machine. One thing surprised me, though. I found a whole lot of stored energy in the 1000 uf 50 volt filter capacitor, and it stayed charged up to around 40 volts between the times the unit was turned on. Now 40 volts is something to be a little concerned about. I remember being zapped by a 45 volt "B" battery when I was a kid, so this thing is not so different. If shorted, the sound of that arc is sure to attract some attention from people nearby. Okay, it's not deadly,

but a little bleeder resistor across that 40 volt supply wouldn't hurt.

I found help servicing this unit from the 1986 Metcal patent 4,626,767 which contains a pretty accurate circuit diagram of the RF and power supply sections of the RFG-30, missing only the use of the SG3526. You can view and print out this patent by using http://www.pat2pdf.com/ which will turn the document into a PDF file you can download. I wasn't able to find out much from their other patents about the use of the SG3526 where they (oddly to me) ground the A and B outputs of the chip, but the OnSemi data sheet from http://www.newrock.com.cn/pdf/igbtgo/SG3526.pdf shows an application in figure 21 that looks like it's probably how they're using it. If anyone knows of a source of more recent schematics on the RFG-30, the PS2 or MX-500 power supplies, this is a good place to let all the people that are interested see them. I found a 1N4001 diode that passes rectified pulses to the 470 uf 25 v filter capacitor on the 16 volt supply, I think it was D7, bad, and replaced it, restoring operation.

Chuck W6PKP