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How to update the Galaxy Radios  
For using IRF520 MOSFET's.

Single final AM/FM Chassis Only

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# Draft Ver 1.0

Updated By Rick Jackson (Euro Radio Co)

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**NOTE: There may be more information in this package than you need depending on your experience. When you click the print icon you can select print all the pages, range of pages or any current page you have displayed.**

## 1.0 INTRODUCTION:

Soon all Mitsubishi 2SC1969, 2SC2166 transistors will disappear or become too expensive to buy. This is how to correctly update the Galaxy Radios for using IRF520 MOSFET's.

This project is not for novices or anyone who does not have the proper equipment for aligning RF circuitry, or anyone faint at heart.

Leave the installation and alignment to a proven technician.

### NOTE:

Update sheet is written on the assumption that you know the basics.

Exercise a great deal of care with this mod!

Due to the placement, size, and close proximity of the surrounding traces.

If done wrong you could destroy the PCB.

If you have even the slightest doubts or the proper equipment, it would be wise to have someone else you trust perform the mod for you.

## SO TAKE YOUR TIME AND DOUBLE CHECK YOUR WORK!!!!

### 1.1 TOOLS NEEDED

You will need a Soldering Iron, and solder.

Long nose pliers.

Cutting pliers (What you are looking for are "flush cutting" pliers rather than the traditional "dikes" or "diagonal cutting pliers.")

Digital Multimeter.

Magnifier for examining circuit board traces and solder connections.

Preferably some experience soldering and de-soldering components.

### 1.2 BEFORE YOU START NOTES:

If you properly replace the 2SC2166 driver and 2SC1969 final with the IRF520 mosfets, you will gain slightly more power when done correctly. The radio will also have less than 10% distortion at full-modulated power. Pushing the mosfets harder will naturally give higher wattage but this comes with problems like harmonics, distortion and high temp plus they will become very unstable.

So be weary of those that post numbers of 25 watts per mosfet when in reality the safe numbers are closer to 8 -12 watts each. Mosfets are not as forgiving as bipolar's so failure rates for mosfet radios will be very high when tweekers and peakers start casting their magic spells on them.

One other thing to be weary of are the folks out there that's going to jump on the kit bandwagon. Ask questions about their kit of components.

#### For Example:

1. Does the kit come with all of the components needed?
2. If doing a single to dual final update. Does the kit come with the Heatsink, and transistor mounting hardware?
3. Do they offer any support if you have problems?

**Be REAL careful with the bunch on eBay.**

#### Preparing the Radio for the Mod.

1. Fully check out the radio and make sure everything is in full working order before starting this conversion!
2. Carefully remove the top and bottom radio covers. When removing the bottom cover, disconnect the speaker connector from the main board.
3. Put the Radio back to stock i.e.
  - a. If AMC has been defeated, return AMC back to operation.
  - b. Remove any of the so-called swing Mods.

**2.0 MODELS COVERED:**

Radios with the following Main Chassis (**Single final AM/FM Only**)

EPT360011B, EPT360014B, EPT360014C.

DX33HML, DX44V, DX55V, DX66V, DX73V

**3.0 WHERE TO GET THE PARTS NEEDED:**

All Galaxy DX Radio parts and IRF520's,  
purchased directly from the following distributors

**RF PARTS CO.**

435 S. Pacific St.

San Marcos CA 92069

TEL: (800) 737-2787 strictly orders only!

(760) 744-0700 all other questions

FAX: (760) 744-1943

Web Site: <http://www.rfparts.com/>

**MAYCOM COMMUNICATIONS PRODUCTS**

1134 W. JOHN BEERS ROAD

STEVENSVILLE (DERBY), MICHIGAN 49127

1-269-429-8522

1-269-429-8541

Fax: 1-269-429-2137

Web Site: <http://maycomcomm.com/>

All Galaxy DX Radio parts and IRF520's  
Wholesale Only Distributors

**J T I Distributors**

PO Box 300

Welcome NC 27374-0300

Toll Free: 1-800-626-3059 strictly orders only!

Local: 336-731-8177

Fax: 336-731-2805

Web Site: <http://www.jtronix.com/>

Mouser has the IRF520's also

**MOUSER ELECTRONICS**

1000 N. Main St.

Mansfield TX 76063

TEL: (800) 346-6873, (817) 483-4422

(800) 992-9943 to get a catalog only

FAX: (817) 483-0931

Web Site: <http://www.mouser.com/>

**NOTE: The IRF520's are not expensive do your research and check prices.**

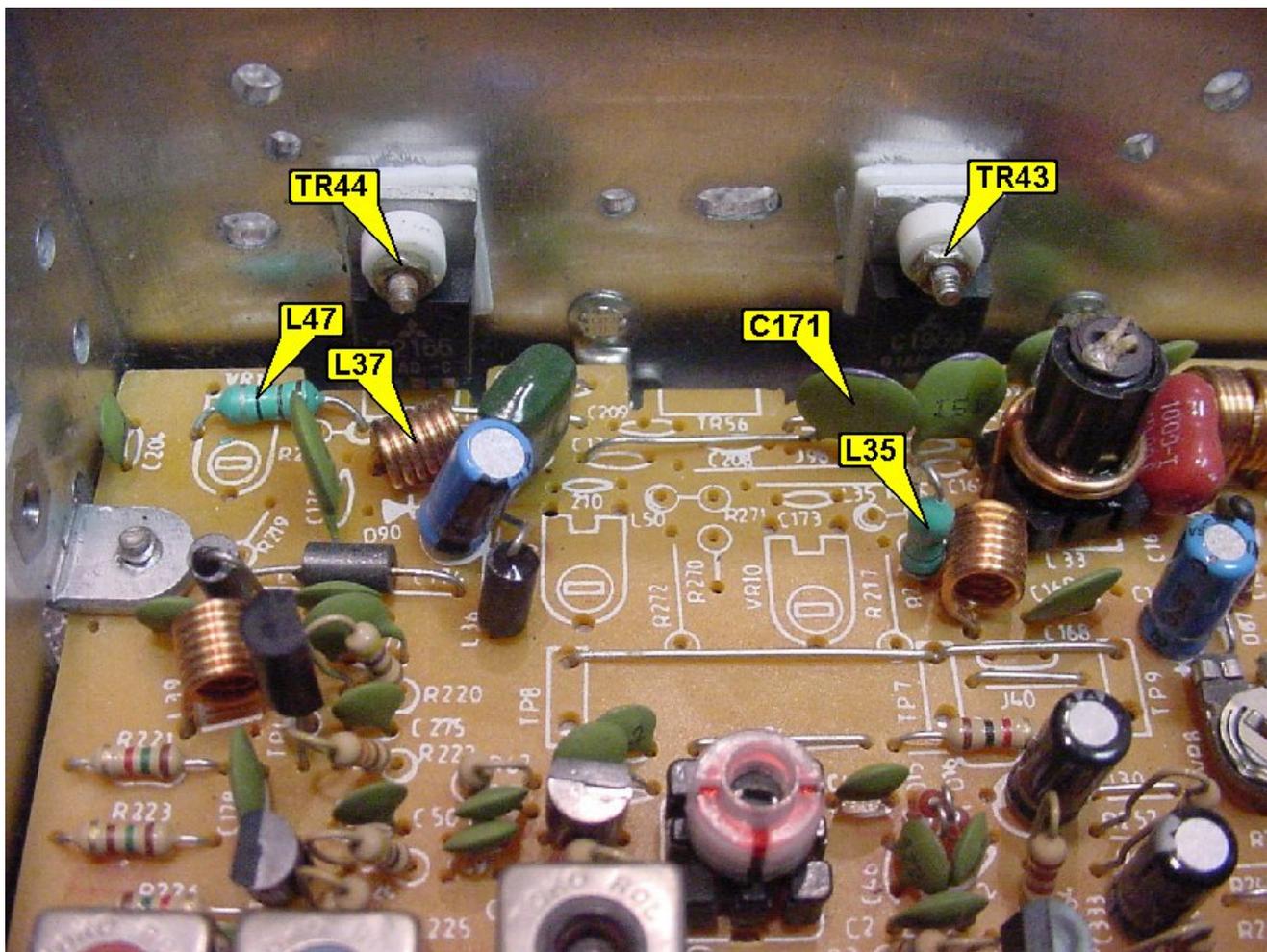
**4.0 PARTS LIST:**

Single Final Models		
2	IRF520 MOSFET	TR43, TR44
2	5.6 Volt 400mWatt Zener	D88, D89, D112
1	12K 1/4 Watt	L47-R218
1	1K 1/4 Watt	L35-R216
1	390pF/UL	C175
1	152 /M (1500pF)	C171
2	100KB (Galaxy Part # RE10400020)	VR10, VR11
1	47K 1/4 Watt	R219
1	100K 1/4 Watt	R215
1	47K 1 Watt	R217
1	150pF /UJ	C167
1	103 (0.01uF) Mylar	C168
1	104 (0.1uF) Disc Ceramic	C173
1	Wire for jumpers	J98
1	Heatsink (Galaxy Part # MM7878041B)	

**5.0 OVERVIEW OF STEPS FOR A SINGLE FINAL MODEL:****Single Final Models**

1. Change TR44 to IRF520 MOSFET
2. Change TR43 to IRF520 MOSFET
3. Change L37 from 7 turn to 4 turns
4. Remove L47 / R218 and install a 12K 1/4 Watt in L47-R218
5. Remove L35 / R216 and install a 1K 1/4 Watt in L35-R216
6. Remove C170 (This is not fitted to all chassis).
7. Add D89 to 5.6 Volt Zener (Install reversed, see attached PCB layout 2)
8. Add D88 to 5.6 Volt Zener (Install reversed, see attached PCB layout 2)
9. Change C175 to 390pF /UL
10. Change C171 to 152 /M
11. Add VR11 100KB
12. Add VR10 100KB
13. Add R219 47K 1/4 Watt
14. Add R215 100K 1/4 Watt
15. Add R217 47K 1 Watt
16. Add C167 to 150pF /UJ
17. Add C173 104 (0.1uF) Disc Ceramic
17. Add jumper J98
18. Add C168 103 (0.01uF) Mylar (This cap is all ready fitted to some chassis).
19. Add rear Heatsink (Galaxy Part # MM7878041B).

6.0 3600xxx SINGLE FINAL CHASSIS PICTURES BEFORE CONVERSION COMPONENT SIDE VIEW:

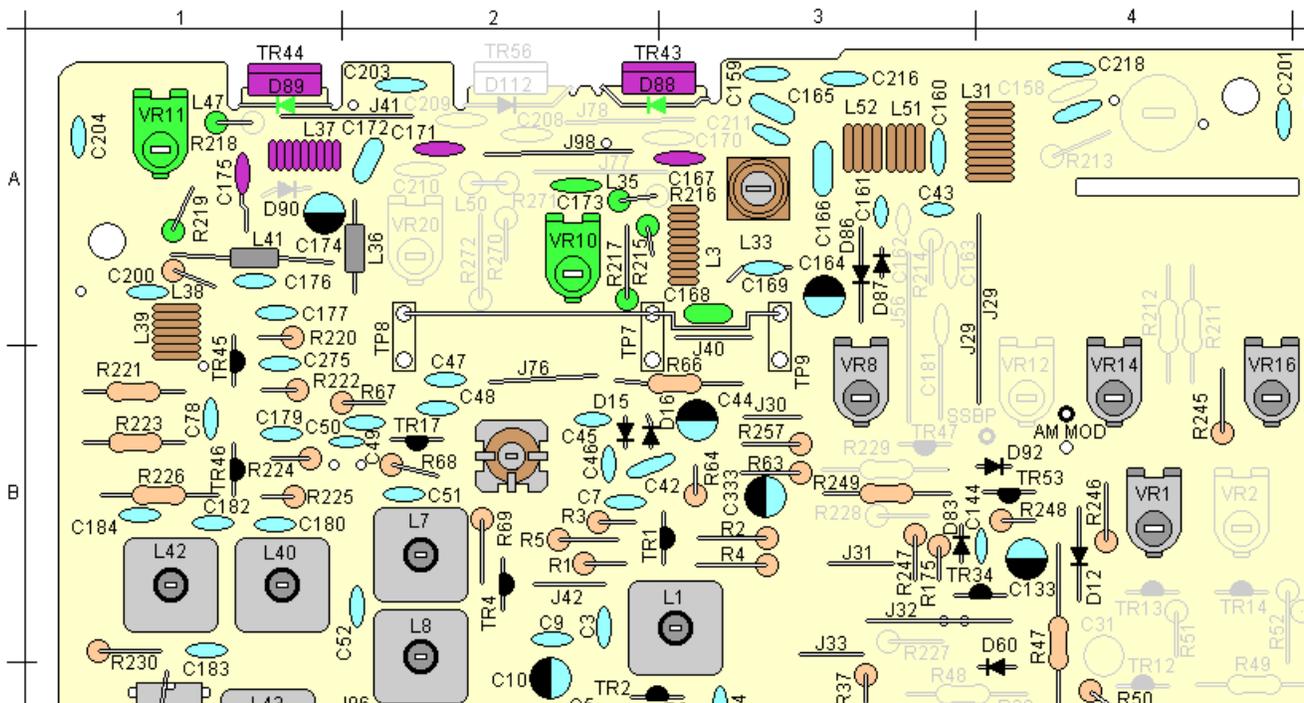
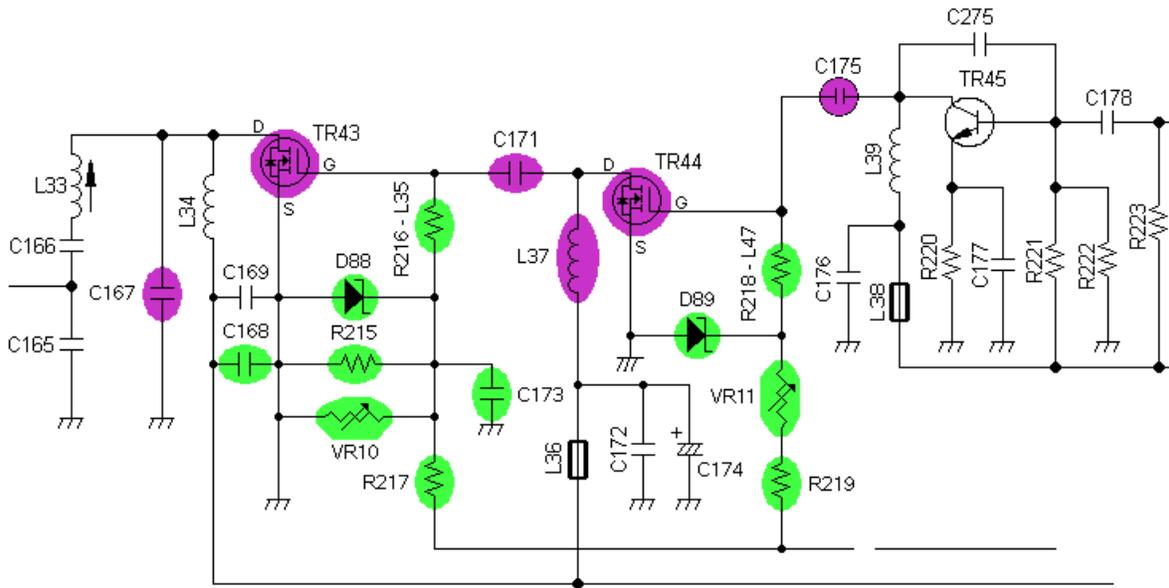




**6.2 3600xxx SINGLE FINAL CHASSIS SCHEMATIC AND PCB LAYOUT AFTER CONVERSION:**

Single Final Chassis AM/FM  
None SSB Chassis

	CHANGE PART
	ADD PART



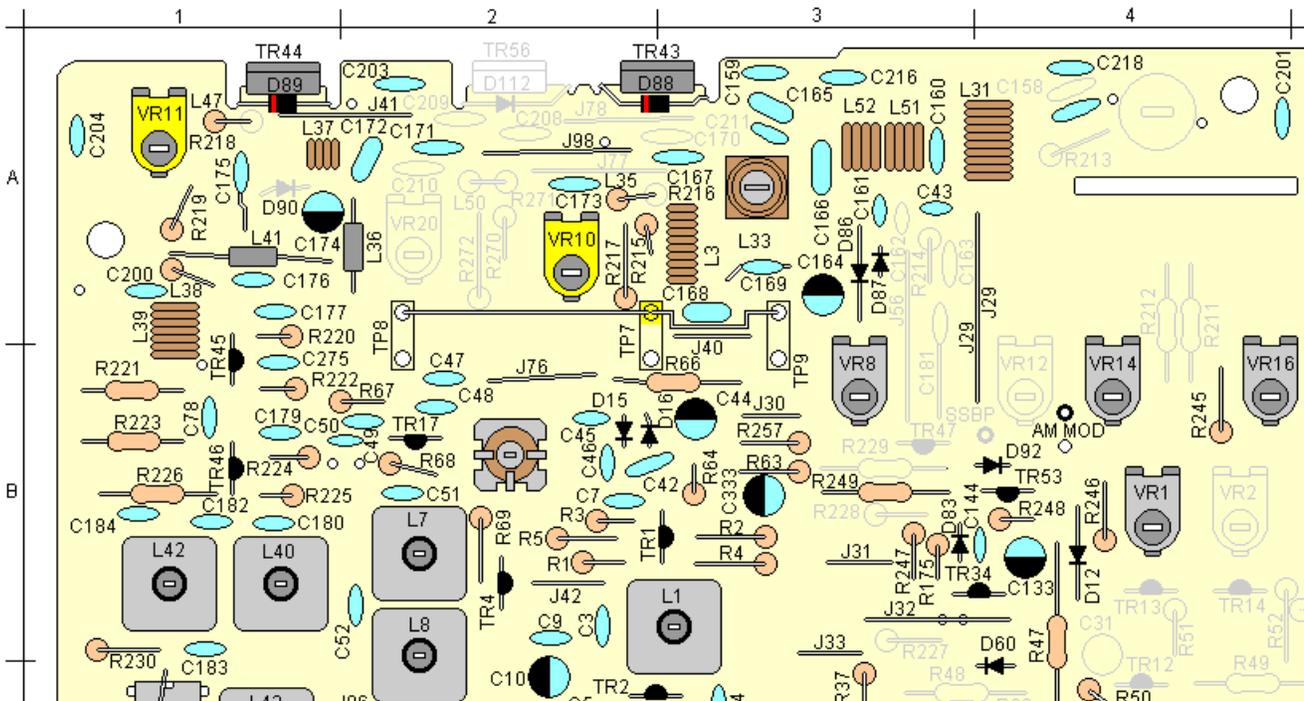
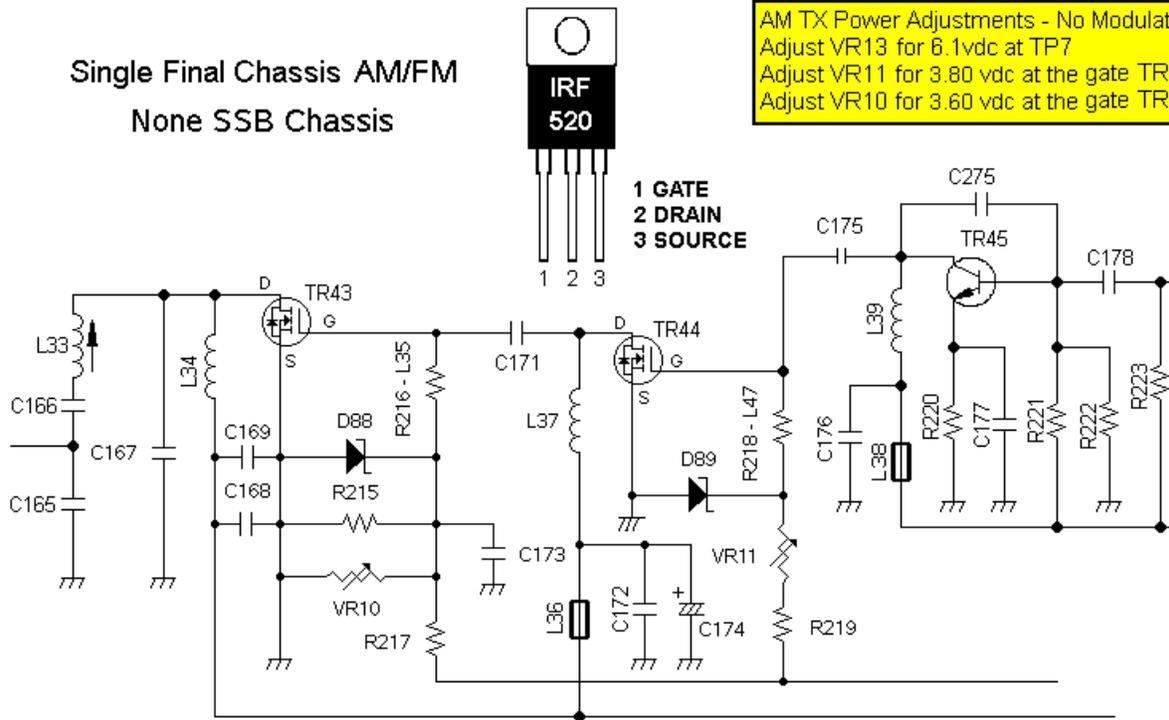
Single Final Chassis (After Conversion)  
Schematic And PCB Layout (2)

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**7.0 ADJUSTMENT:**

Single Final Chassis AM/FM  
None SSB Chassis

AM TX Power Adjustments - No Modulation  
Adjust VR13 for 6.1vdc at TP7  
Adjust VR11 for 3.80 vdc at the gate TR44  
Adjust VR10 for 3.60 vdc at the gate TR43



Single Final Chassis (After Conversion)  
Schematic And PCB Layout (3)

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**8.0 TRANSISTOR DATASHEET:**

The IRF520 was developed by International Rectifier, thus the IRF part prefix.

Several other manufacturers have been licensed manufacture the part also.

ST (Thompson)

Fairchild

Intersil

Supertex

And others

If you need to look at the IRF datasheet it is on-line at CBTricks.com website.

**8.1 FINAL NOTES:**

We have made every effort to make sure this project easy to follow and has been tested it before it was uploaded to the site.

**OLDER RADIOS:**

One of the test radios was an older EPT3600xxx and after the mod and the radio tested the harmonic was too high. It was found there was a bad cap in the final section C165.

Also the AM regulator may need to be stepped up in some of the oldest chassis. The 2SB754 (60 watt) has been discontinued and replaced with 2SB827 (60 watt).

Also a good replacement would be a 2SB688 (80 watt) or 2SB817 (100 watt).

Some 3600xxx L33 is adjustable, if your is like this do not remove L33 slug (required to balance power on upper and lower bands.)

**REFERENCE:**

Here is a good read, <http://www.aoc.nrao.edu/~pharden/hobby/ClassDEF1.pdf>

You don't need to understand it all just the simple basics where he is explaining the differences between bipolar and mosfets in the same application. Most everything we need to learn here is on pages 1& 2. The rest is just different classifications.

**Post your findings, questions and ideals of improvement of the mod or mod sheet at the following.**

CBTricks Forum.

<http://www.cbtricks.com/forums/>

Radio Modification/Conversion and Repair/Troubleshooting Discussions

Credits

Rick Jackson (Euro Radio Co)

Enjoy

Bennie

<http://www.cbtricks.com/>

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