PCS Electronics
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RDS MAX V1.0

RDS MAX v1.0 is a high quality and cost effective way to add RDS capability to your transmitter. It has been designed especially to complement the PCI MAX and other FM transmitters from PCS Electronics. Our main guideline was to have an option of transmitting MP3 IDtag with the radio text. This unit will allow for dynamic PS, TA, AF, RT, DI, PTY, TP, PI and possibly CT (still evaluated). Simple assembling procedure, high quality components and printed circuit board assure 24/7 operation for years.

Features:

MPX input: 6K
MPX output: 75 ohms
Supply voltage: 12V-16V/100mA DC
Input connector: RCA
Output connector: RCA
Output level:
RDS pilot: 57KHz, PLL locked to stereo pilot
RDS groups supported: 0A, 2A
Functions: PS, AF, RT, TA, DI, PTY, TP, PI
Galvanic separation with the PC, eliminates ground loops (brum)
PC data connection: RS232
Automatic switch from internal pilot to stereo synchronized pilot

Fig. 1; RDS MAX v1.0 without the enclosure

THANK YOU FOR PURCHASING RDS MAX V1.0!

We hope you will enjoy it as much as we do and remember to tell your friends about it. If you discovered a bug and perhaps even found a solution or have an idea for improvement of this product, please don't hesitate to contact us.
Please feel free to send us your comments to feedback@pcs-electronics.com. For tech support please send email to support@pcs-electronics.com

From all of us we wish you happy broadcasting! Now go get that soldering iron :-)

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BEFORE YOU START

Here is what you need to use RDS MAX V1.0

-**Soldering iron;** 25-35 watt soldering iron. Weller and ERSA make excellent soldering tools. Radio Shack stuff is horrible, but will do if that's your only option. This may not be needed with some configurations (enclosed).
-**FM exciter (a transmitter);** You will need a transmitter that will transmit the RDS signal. It has been designed specifically for the MAX family of transmitters, but can be used with any FM exciter.

Finally, if you know nothing or little about electronics, I selected a few books that I find extremely useful and often read. The links to them are on our homepage. I suggest you start with ARRL HANDBOOK, the holy bible of amateur radio and electronics in general. It is an extremely valuable resource for every broadcaster.

USING THE RDS MAX v1.0

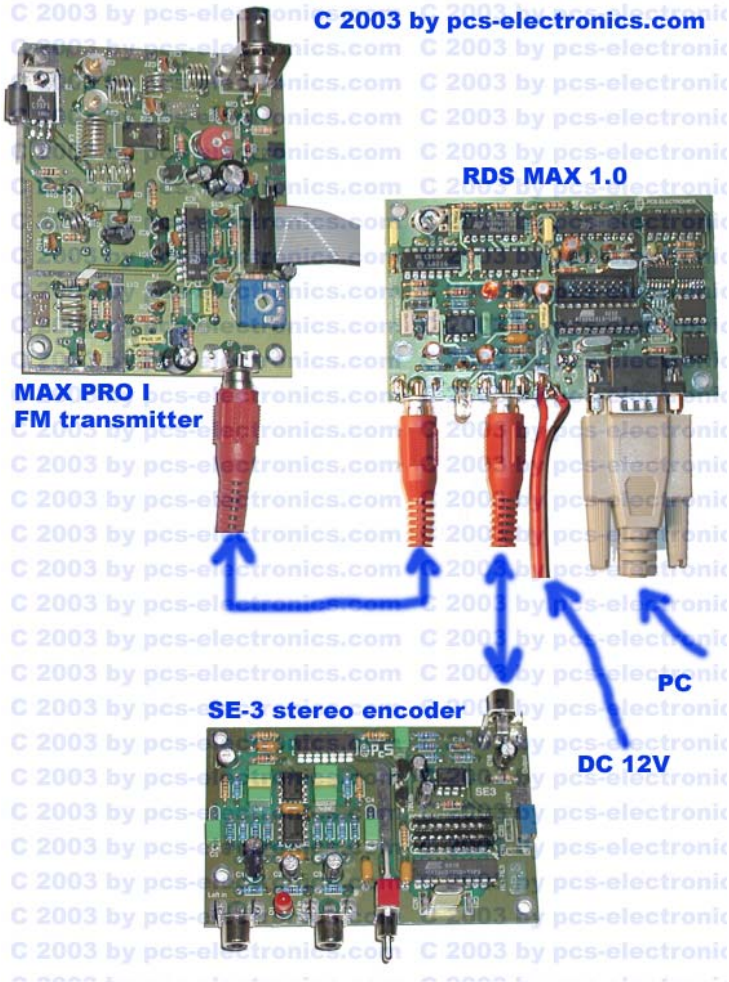
Step 1: Unwrapping the package

Clean-up that desk and carefully unwrap the package. Depending on the configuration of the purchased RDS encoder you will either find just the PCB with the CD or the encoder mounted into an enclosure with encoder and cable. Sometimes we don't send the CD since some countries have strict regulations pertaining to import of CDs (Mexico is a good example of this). If this is the case, you are advised to download your driver from our website.
Quickly check the PCB for any defects inflicted by the shipping. If all checks out fine, proceed to the next step.

Step 2: Connecting to the transmitter, PC and stereo encoder

This is the most difficult part of the job. Still, with little patience, good instructions and steady hand it should be a breeze with most users. If you're stuck at some point, don't hesitate to contact us with your questions. Note that we have a Forum on our website; you can post your questions there also. Let's look at the typical scenarios with RDS MAX v1.0.

SCENARIO 1: MAX PRO I, SE3 and RDS MAX v1.0 (simple)



The advantage of this setup is its obvious simplicity. You don't even have to solder; the only exception is the positive supply voltage of 12V, which is really simple. If you are doing this with the enclosed version of RDS MAX, you don't even have to solder anything since there is a connector for the power supply.

While this setup generally works very well it does have one small disadvantage. Depending on the audio content there could be a bit of jitter on the RDS data carrier.

We'd like to point out here that you should keep the wires short and mount this setup in enclosure or separate enclosures.

Install a jumper on J5, place it to the right away from the edge of the PCB.

Advantages:
-Simple
-Pilot is extracted automatically
-No alignment necessary (when used with PCS transmitters)

Disadvantages:
-Audio can cause a bit of RDS pilot jitter

SCENARIO 2: MAX PRO I, SE3 and RDS MAX v1.0 (advanced)

If you know how to install an extra cable for the pilot, this is definitely worth doing. The above connections from scenario 1 stay in place with scenario 2. The only difference is in a way in which we extract stereo pilot and send it over to the RDS encoder. This is now done via a dedicated cable. The reason for this is the above mentioned jitter on the pilot. Here's what you have to do to set this up:

-Connect all cables as shown above
-Connect a short coaxial audio cable from C23 on SE3 (stereo encoder pilot) to the J4 on RDS MAX V1.0.
-Install a jumper on J5, place it to the left towards the edge of the PCB

Advantages:
-No alignment necessary (when used with PCS transmitters)
-Better signal quality

Disadvantages:
-A bit more complex

SCENARIO 3: PCI MAX ULTRA and RDS MAX v1.0

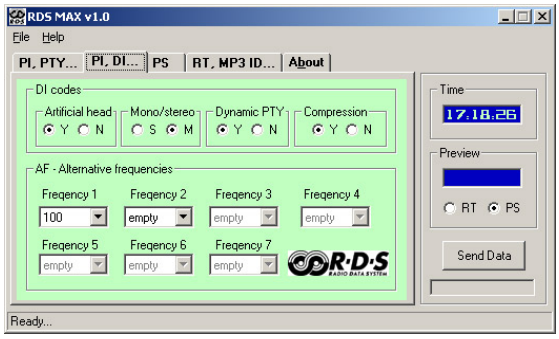
For all those who have been wondering; yes, it can be done! There are two things we need to do here.

First, get the stereo pilot to the RDS MAX board so it can phase lock its RDS data pilot and second, get the RDS data signal back to the PCI MAX board. The picture on the left illustrates this really well. This is how we pick up pilot from PCI MAX and send it over to the RDS encoder. Remember, this must be done with a shielded coaxial audio cable (microphone cable) and this cable should be kept short. The other end goes to jumper J4 on the RDS MAX board. Install a jumper on J5, place it to the left towards the edge of the PCB.

Next, we must inject RDS data into the PCI MAX card. We will need another shielded coaxial cable to do that. This cable will go from MPX out RCA jack on the RDS MAX board to the point on the PCI MAX ULTRA board. Also replace the 75 ohms resistor close to the MPX OUT connector with a 10K resistor. You can also place this resistor between the output (MPX OUT) and the coaxial cable (inline). The next picture below shows where the RDS signal from the RDS MAX 1.0 goes on the PCI MAX ULTRA board.

Step 3: Software

Install the RDS MAX program from the provided CD or download the latest version from our website. Set the used COM port in the Setup dialog. Please send us any bug reports or suggestions for improvement. We will take your comments into consideration.



Step 4: Power up and use

If you're running stereo signal and D2 isn't lit, adjust P1 until it is. That's pretty much all there is to it. If you're using another FM transmitter and stereo encoder, you may need to increase/decrease the level of RDS data signal. This can be done with changing the 15K resistor (R7) on the RDS MAX board.

Troubleshooting

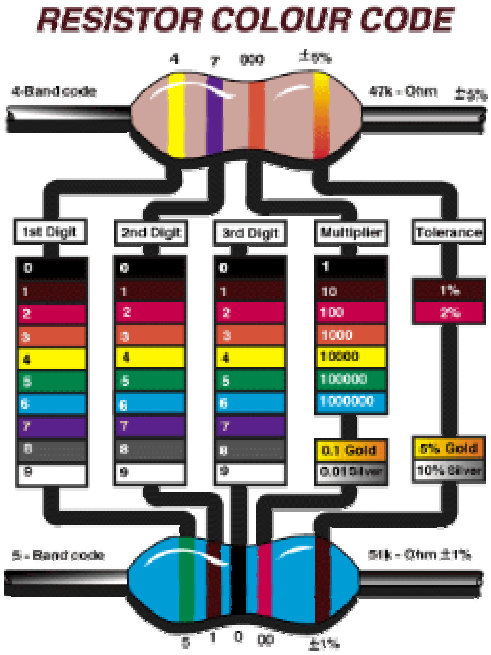
We hope you'll never get to this step. We all know bad things happen. But do not despair! If you have problems that you cannot solve yourself, please contact us directly **support@www.pcs-electronics.com.** Feel free to post questions to our forum and discuss matters with other users.

Newsletter

You may want to sign up for out newsletter so you can receive the latest news and special deals. Also check our forum and discuss tips and tricks with other users, you never know you just may learn something. You can sign up at www.pcs-electronics.com

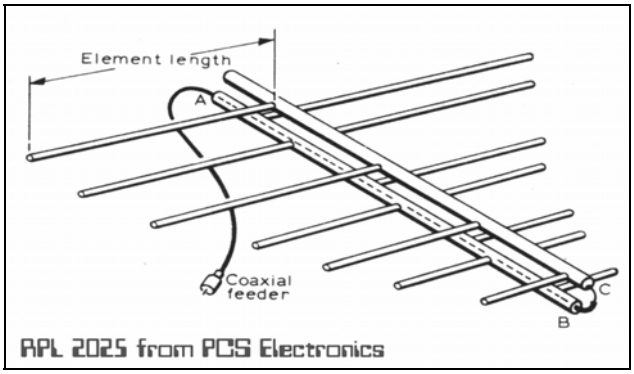
Appendix A: The resistor color codes

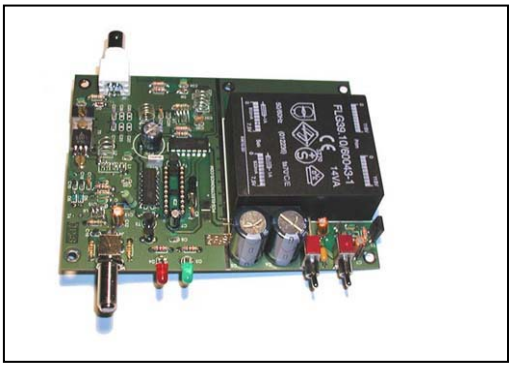
The easiest method is to get radio Shack part number 271-1210 for $1.19; it is a pocket sized card with spin dials. Just spin the dials to show the correct colored bands and read the resistance off the card. Sort of a resistor slide rule. And as you've probably guessed, it's also on our site.



0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Grey
9	White

Also available from PCS Electronics





Directional antennas, 5W boosters, stand-alone FM transmitters and much much more...

Check www.pcs-electronics.com!

Bill of Materials **RDS MAX V1.0**

Qty	Value	Reference	Checklist (√)
1	NE5532P	IC1	
1	MC1310P	IC2	
1	4017	IC3	
1	4046	IC4	
1	TDA7330D	IC5	
1	4066	IC6	
1	4030 SMD	IC7	
1	4013 SMD	IC8	
1	90S2313 - 10	IC9	
1	24C64 (24C32) ATMEL	IC10	
1	78L05	IC11	
1	78L09 or 78L10	IC12	
1	CNY17	IC13	
2	RCA connector for PCB	J1, J2	
1	DB9F connector, PCB, 90 degrees	J3	
1	Pilot input, optional	J4	
1	Auto/manual pilot input selection, optional	J5	
1	4.332 MHz	Q1	
1	9.8304 MHz	Q2	
1	LED Green (+681 resistor under the pcb)	D1	
1	LED RED – Pilot lock to stereo encoder	D2	
1	Wire bridge	D3	
1	75 Metal	R1	
4	6K8 Metal	R2, R3, R6, R9	
6	10K	R4, R5, R13, R16, R19, R20	
1	15K Metal	R7	
2	33	R8, R12	
5	1K	R10, R11, R15, R22, R23	
2	1K SMD under the 24C64		
1	330K	R14	
1	330	R17	
1	2M2	R18	
1	1K, special placement	R21	
1	10K trimmer	P1	
1	15pF	C1	
6	68-150nF	C2, C4, C5, C9, C11, C15	
4	10uF	C3, C6, C7, C20	
2	680pF	C12, C32	
1	1nF	C19	
1	1uF (yellow)	C16	
9	47-100nF	C8, C13, C14, C17, C18, C21, C22, C26, C31	
4	22pF	C23, C24, C28, C29	
2	10nF	C10, C25	
1	DIL 20 socket for IC9		
1	DIL8 socket for IC10		
1	PCB		

Limitation of liability

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LEGAL INFO

It may be illegal to operate this device in your county. Please consult local authorities before using RDS MAX V1.0!

WARNING

Please note that there is high voltage present inside the RDS encoder (the version in enclosure with mains power supply). Do not touch any of the exposed circuits or parts once the unit has been connected to the mains voltage. Failure to follow this might result in serious injury or even death. Always unplug the mains cable before opening this unit and tampering inside the unit!