# The BEACON

**West Mountain RADIO**

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## PWRcrimp

# RIGblaster DXpro: FSK Radioteletype with FLdigi
*By Sholto Fisher, K7TMG*

In this first of a series of articles about our newest member of the RIGblaster family, the DXpro, we will take a look at some of the advanced features which make this interface stand out from the crowd.

One of the questions I am often asked is whether it is possible to use your radio's RTTY mode with FLdigi. This is especially true for Linux and Mac OS users where programs like MMTTY and Ham Radio Deluxe are not available as a native build.

Within FLdigi is a clever method of generating what is termed "pseudo FSK". This is an on/off 1000Hz audio tone ("toneburst") that is generated on the right-channel audio output of the sound card which corresponds to the RTTY bit pattern. On its own this isn't enough to drive the FSK shift input of a radio but the FLdigi manual helpfully offers a schematic diagram of a full-wave voltage doubler circuit which can turn this signal into a switching signal ready to be connected to your radio.

When we designed the DXpro we decided to implement our own version of this circuit which makes it possible to use this very useful feature of FLdigi. In addition to RTTY FSK the circuit can be used for real-keyed CW too.

**What You Will Need**
Not all radios have a RTTY mode so check your owner's manual to see if your radio supports it. If it does, the chances are we have a ready-made cable for you. Use our Cable Finder page on our web site to find the correct cable http://www.westmountainradio.com/cableFinder.php

**Configuration**
The RIGblaster DXpro configuration utility should be used to program the unit for RTTY FSK operation:
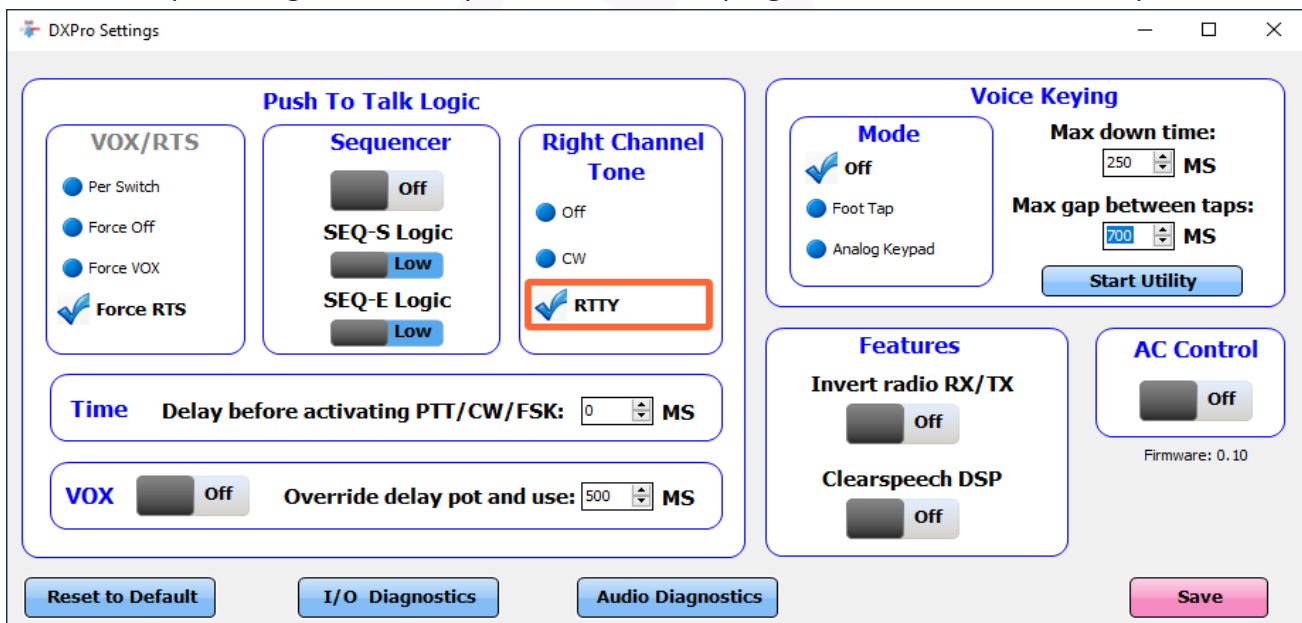


Remember to click on the Save button after you select the RTTY option!

You will notice that "Force RTS" is also selected automatically when this option is chosen. RTTY FSK operation requires a normal PTT signal and this will be supplied by the DXpro (via the microphone cable) even if you have not specifically set up rig control in FLdigi.
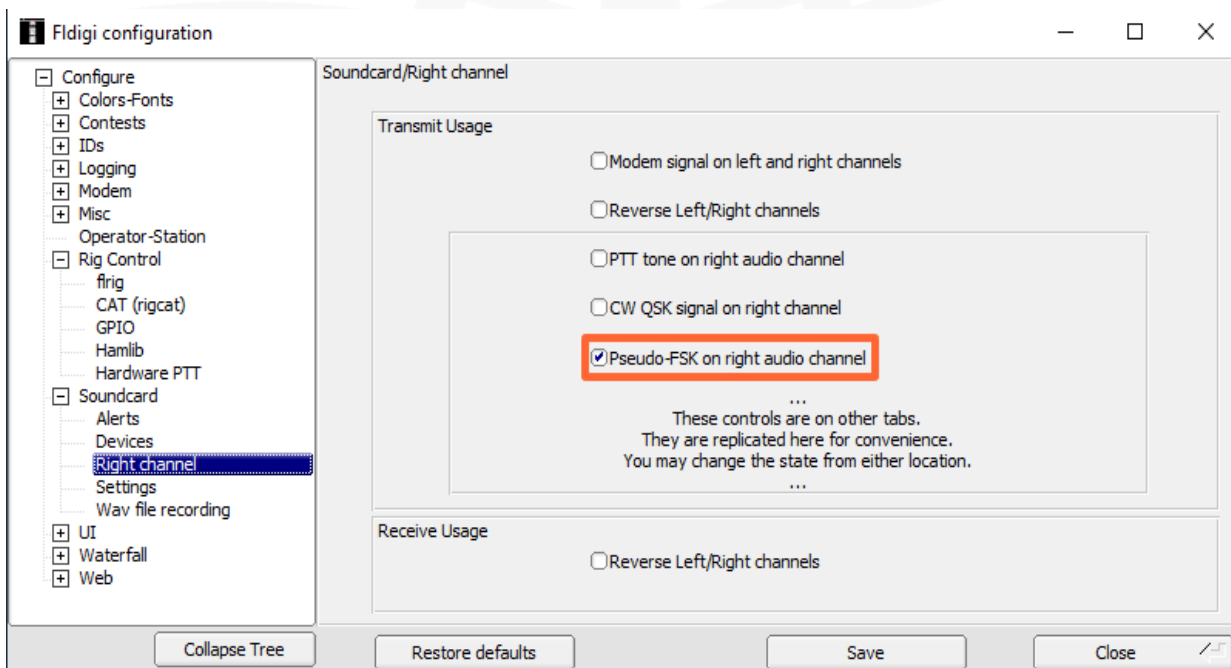
2

**FLdigi**

Next we will configure FLdigi to produce pseudo-FSK. Start by ensuring FLdigi is configured to use the RIGblaster DXPro main sound card:
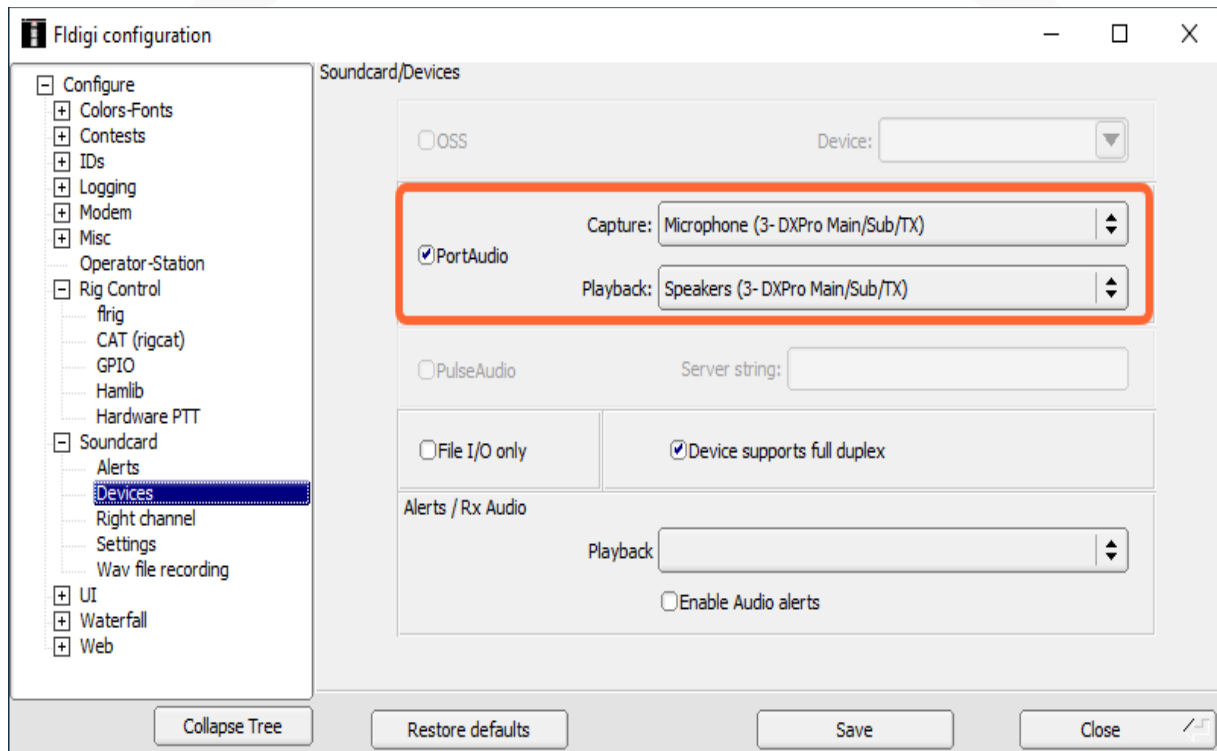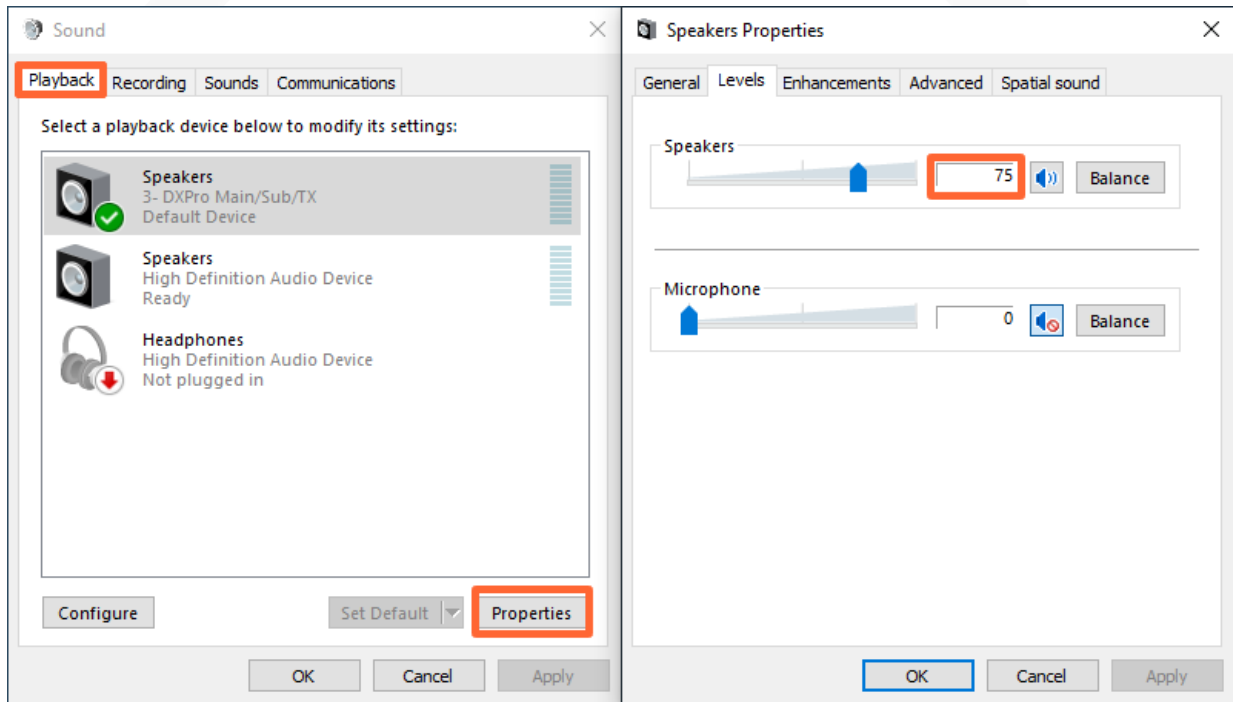


Then select the pseudo FSK option within FLdigi:

It is important that the sound card is producing a high enough amplitude "toneburst" for the pseudo FSK circuit to operate so ensure the playback channel of the DXpro main codec is set higher than approximately 65%. In Windows you can do this from the Sound Control Panel:



## Testing

Connect your FSK cable and the microphone cable supplied with the DXpro to your radio and select RTTY mode. Ensure your radio's FSK menu options are set for the correct Mark/Space width (170Hz for normal RTTY) and the Mark frequency you expect (e.g. 2125 Hz).

Switch to RTTY 45 baud in FLdigi and try a test transmission. You should observe all three of the right-hand side LEDs on the DXpro illuminate. The red (ptt) LED will be solid, the yellow (FSK) LED should flash in sympathy to the generated RTTY signal, and of course the green LED will blink to indicate that the unit is in use.
On the radio you should observe power output and if available, turning on the TX monitor on your radio will let you hear the RTTY signal.

Remember that RTTY is sideband dependent and the polarity of the RTTY signal is usually determined by a menu option within your radio. Probably the best method of determining correct polarity, is to arrange a sked with a friend!

Also remember that you will need to tune your radio's VFO to place received RTTY signals at the correct Mark/Space frequencies on the waterfall (e.g. 2125/2295Hz). Unlike AFSK you cannot change your audio frequency offset by clicking elsewhere on the waterfall.

# RIGblaster DXpro: Voice Contest Keying
## By Sholto Fisher, K7TMG

In the second of a series of articles about our newest member of the RIGblaster family, the DXpro, we will continue to take a look at some of the advanced features which make this interface stand out from the crowd.



The original RIGblaster Pro had the ability to record from an attached microphone (usually your transceiver's microphone). This was intended to be used to create voice keying wave-files and worked very well with computers which had a *fully implemented* sound card i.e., two recording channels (MIC-IN and LINE-IN) and two playback channels (SPEAKER-OUT and LINE-OUT). Inevitably things have changed over the years and you are lucky if your computer has two jacks these days. In fact many modern laptops may have a single combined jack with only a single recording channel and a single playback channel.

When we designed the DXpro we thought about this and decided to add a second recording channel and do the audio routing inside the unit itself (controlled by the front panel audio switches). It would also be nice to have some external method of triggering a signal so that suitable software could intercept this and play back a corresponding wave-file. This we realized with the footswitch input jack.

A traditional footswitch only has two states, open & closed. When closed (*and held-down*) the *RIGblaster-attached* microphone can be used for normal phone operation. It was important not to lose this feature so we devised a scheme where a number of 'taps' on the footswitch would cause a signal to be generated in the unit and passed to one of the virtual COM ports, while keeping the traditional *close-and-hold* nature of the footswitch jack. We went a little further with this idea and made the footswitch input able to accept an analog voltage (derived by resistors from the pull-up voltage). This allows the use of a simple analog keypad instead of a footswitch and this was developed into an accessory product called the "DXkey Remote" SKU #58142-1819.

We decided not to include any native wave-file recording or playback inside the DXpro itself, as this is best handled by host software running on the PC. Users may want to do some post-processing using their favorite audio editor, so having the actual file stored on the PC rather than the DXpro makes sense.

## Configuring the Footswitch Mode
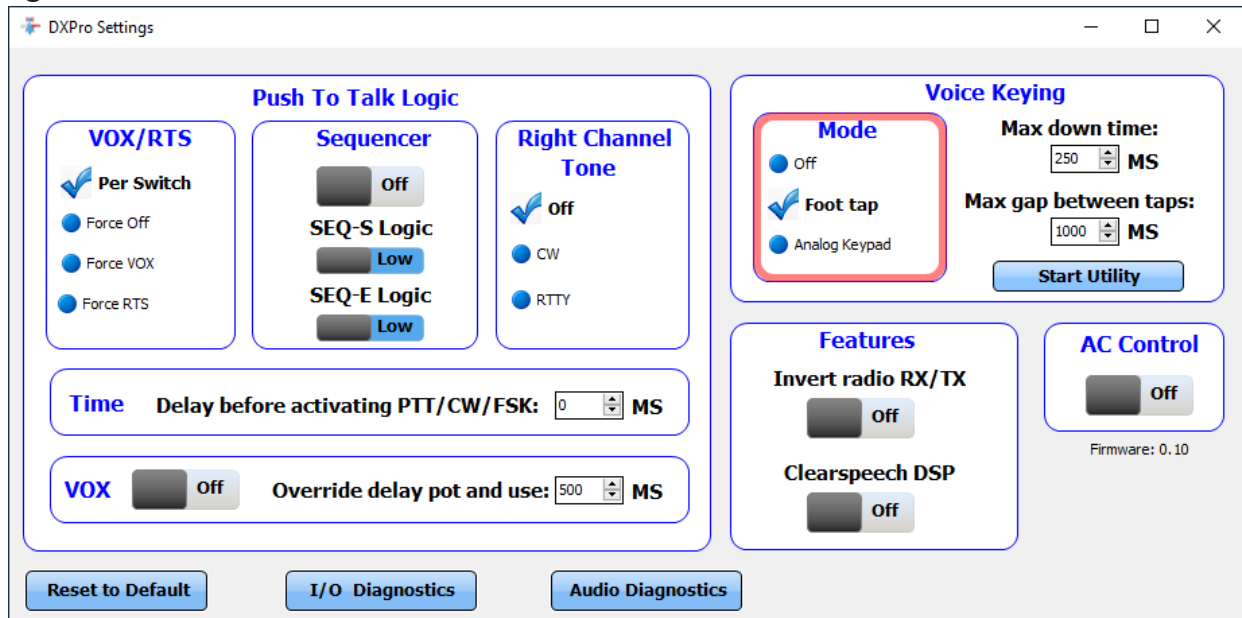


When bringing up the DXpro Settings software, users can configure the type of advanced footswitch behavior they want. The 'off' setting means normal footswitch operation, 'Foot tap' will make the RIGblaster trigger various serial signals on its virtual serial port corresponding to the number of taps (see below), and 'Analog Keypad' is for use with the DXkey Remote product.

There are also timing parameters which can be adjusted to suit the users individual rhythm of tapping. A bit of experimentation may be required.

When tapping, it helps if the user knows the Morse Code letters E, I, and S. If the user is thinking about sending these letters using a footswitch they will get the hang of it quite quickly.

| Taps | Active Serial Port Signal | Footswitch LED Color | DXpro Automatic Behavior |
|---|---|---|---|
| "Close-and-hold" | None | Flashing **RED** | Allows microphone audio to pass for as long as the footswitch is closed. |
| Single tap (Morse 'E') | DSR | Solid **GREEN** | None – signal would be intercepted by host program |
| Double tap (Morse 'I') | CTS | Solid **YELLOW** | None – signal would be intercepted by host program |
| Triple tap (Morse 'S') | RI | Solid **RED** | None – signal would be intercepted by host program |

At this time I do not know of any third party software which can play back a wave-file depending on the signal seen on a serial port. For this reason, we developed a small utility which can do this. We would love for programmers to incorporate this idea into their logging software however!

When clicking on the "Start Utility" button (shown above) the DXpro Voice Keying application will appear on the screen:
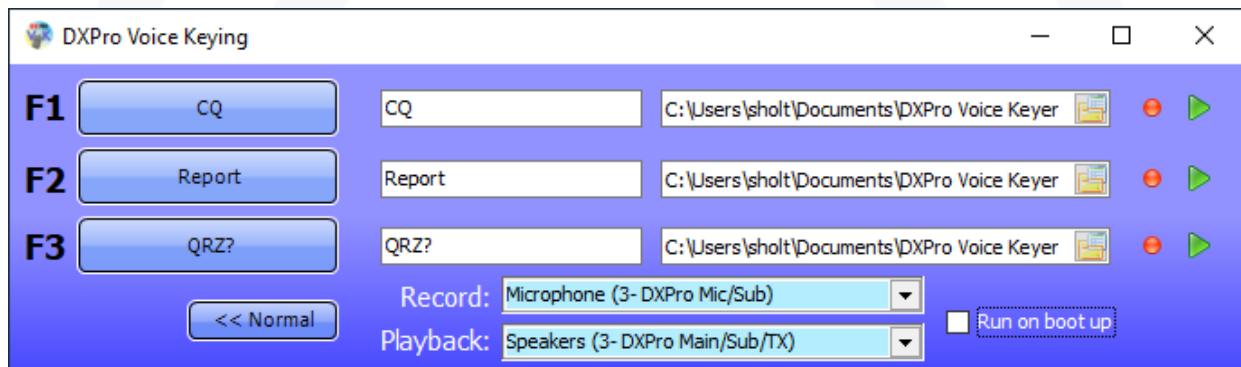


This utility can record the users voice wave-files directly from the DXpro and can play back up to three different wave-files depending on the footswitch taps (button clicks, or keyboard function keys F1-F3).
The following image should help explain how the application's controls are used:
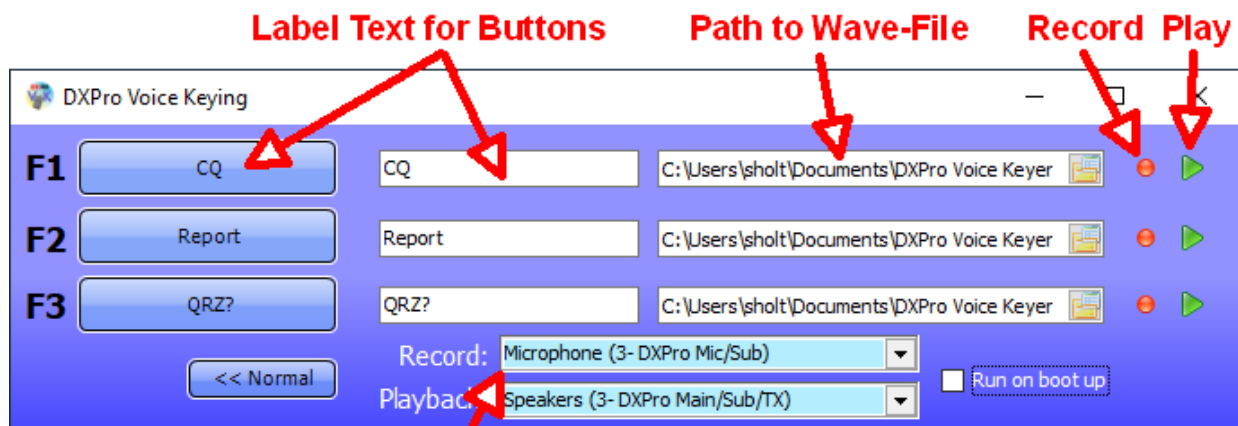


The Play buttons (green triangles) are simply there to play the wave file back without triggering PTT on the DXpro. The main buttons, function keys, and foot taps will trigger PTT.

To Record a wave-file, remember to first place the DXpro front-panel Audio Switch SW1 in the up position (MIC) then click the corresponding record button (red circle) and speak into the microphone.  A STOP button will appear, then click this when they finished speaking.

# PWRguard Plus Bench Tests with Icom IC-7300 Transient Suppression Components
*Craig Dominski, KC9VFA*

We received an inquiry regarding the use of the West Mountain Radio PWRguard Plus SKU #58402-1045, with the popular Icom IC-7300 HF/50MHz Transceiver. The IC-7300 may include a TPSMD15A (or similar) transient suppressor that is apparently part of a factory modification. If the IC-7300 is subjected to an over-voltage event, this transient suppressor can fail in a shorted condition. The transient suppressor is connected to the "load side" of a 5A fuse that is inside of the radio. My understanding is that the transient suppressor is not particularly easy for a user to replace.

The West Mountain Radio PWRguard Plus is an electronic under-voltage / over-voltage disconnect device for 12V applications. It is essentially a solid state switch that is only enabled when the supply voltage is in a safe range. The unit can help avoid damage to a rechargeable battery by preventing over-discharge. It can also prevent damage to your radio equipment due to excessive supply voltage. This can occur if the voltage regulator fails in a power supply. When using the PWRguard Plus, the default over-voltage trip point is 15V. If the input voltage is over 15V when power is first applied, the PWRguard Plus wont enable its output at all. You will not have a dangerously high supply voltage to your radio equipment; not even for a short time. If the supply voltage is initially in the safe range of 11V to 15V, but then increases to an unsafe voltage, there is a brief delay before the PWRguard Plus will shut off its output. This is to prevent the device from triggering on noise. The question was whether or not the PWRguard Plus would disconnect power quickly enough to prevent the transient suppression components from failing in the Icom IC-7300.

I assembled some circuitry to test this. The diagram shows the configuration. I used an 18V zener diode (similar to D201 in the Icom IC-7300), a 5A automotive fuse and fuse holder (similar to F201 and F202 in the Icom C-7300), and a TPSMD15A transient suppressor. On the input to the PWRguard Plus, I used a 2-input diode OR gate, a 12V power supply, and a 24V power supply. The power supplies could be damaged if the outputs are connected together directly. The OR gate allows the power to come from two different sources, but without the danger of connecting the power supply outputs together directly. The 12V supply was connected and powered on. This enabled the output on the PWRguard Plus. Then the live 24V supply was connected to the other input of the diode OR gate. This triggered the PWRguard Plus to shut off its output. The 24V supply was connected / disconnected ten times to provide ten over-voltage events. At the end of the test, there was normal current draw from the 12V supply and the 5A fuse had not blown. The 18V Zener diode and the TPSMD15A transient suppressor had not failed. Based on the results of this test, the PWRguard Plus would prevent the transient suppression components from failing in the Icom IC-7300.
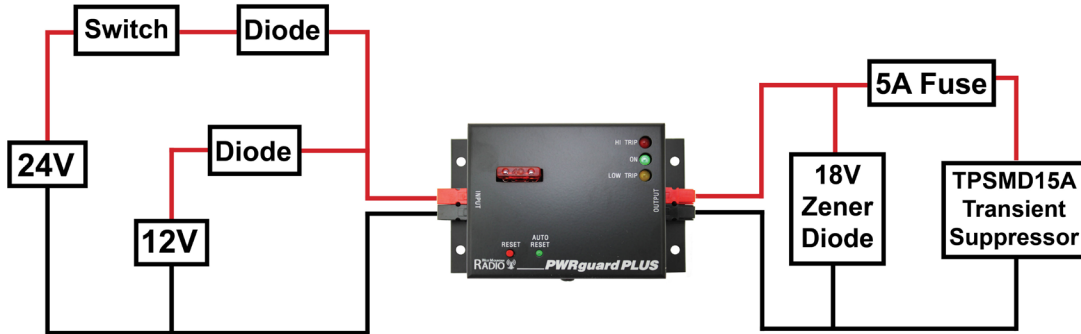
Protect your valuable radio equipment with a PWRguard Plus! In the event of a power supply failure that causes an unsafe voltage condition, you wont regret your decision to use this West Mountain Radio product. You will find more information on the PWRguard Plus here:

http://www.westmountainradio.com/product_info.php?products_id=pwr_guard

# PWRguard Plus

- **Momentary voltage dips below 11.0 volts are ignored to prevent false tripping while transmitting**

- **Rated for 40 amps maximum while transmitting, 30 amps continuous duty**

- **Indicator LEDs and audible alarm notify user when safety switch turns power off**
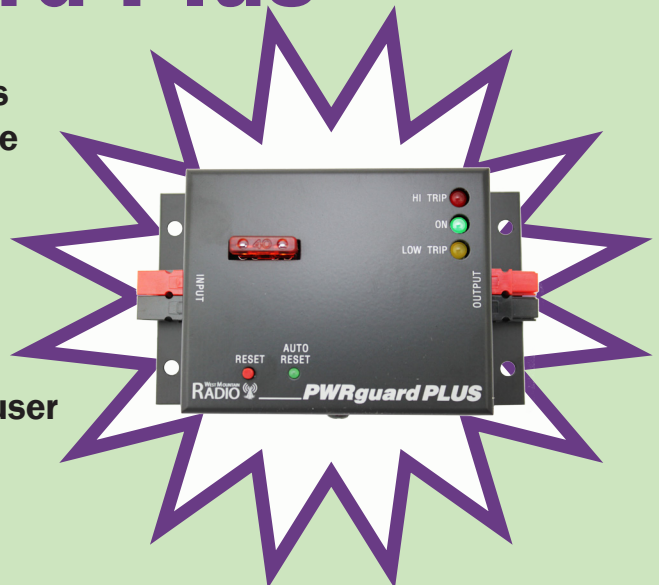
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marketing@westmountainradio.com

# Bulletin Board

**Visit Our Booth!**

**QSO Today Virtual Ham Expo March 12-14**

**EAA July 26- August 1**

Due to COVID-19, production has been delayed. West Mountain Radio encourages all the hams to keep communication going through these hard times over radio! Stay healthy!

## Epic PWRgate

**DC Power Management Device 12V Backup Power System**

### Features:

- USB Port Access to Monitor system
- Program for specific battery types
- Supports either Lead Acid or Li-Ion Battery Charging
- Optional direct solar panel input for MPPT battery charging

**Horizonal Version Available**

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