



ADL Vantage 35 Repeater Notes

(Version 5.02 Firmware and higher)

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Thesis

Best Practices for ADL Repeater operation.

Repeater programming (initial setup) is different in Version 5 ADL radio firmware. Information in the printed iG8 and X91+, X900+ User Manual is obsolete if your radio is upgraded to the new firmware. However, the new firmware version appears to have a more reliable listen mode, which makes the repeat function more reliable than previous radio firmware versions. So we recommend updating existing radios.

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Important Notes (for all firmware versions)

The #1 Repeater Problem

If your repeater used to work and now it does not, the NUMBER ONE cause is a bad or failing battery. This is the issue 95% of the time when customers call us.

The battery that you use for the repeater MUST be relatively new with low internal resistance. When the repeater broadcasts a correction the current (AMPS) draw is nearly 20 amps. If the terminal voltage of the battery drops below 10.5 volts during this draw, the repeater will not work.

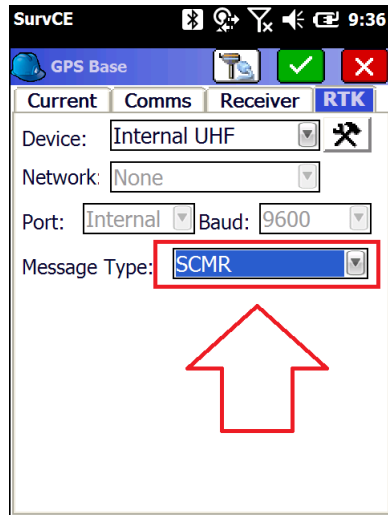
If you set the power to 2 Watts and the repeater 'sounds good' and the LED's flash repeatedly, but when you turn the output power to 35 Watts and the repeater gets screwy: you need to replace the battery.

Unlike previous high-powered radio versions, the ADL Vantage Pro / ADL 35 really do have the capability of broadcasting 35 watts. The ADL Pro and 35 will not tolerate marginal power supplies at output powers higher than 2-watts.

Correction setting when used with a repeater

Watch this video on YouTube: <https://youtu.be/rTSfXAzt2Zc>

When configuring a Base in SurvCE for use with a repeater, set the correction protocol to 'sCMR' on the RTK tab of the GPS Base configuration:



Background, why?

For a base receiver tracking and broadcasting corrections with 25 or more satellites:

- RTCM3.2 MSM ~631 bytes per second
- sCMR (sCMRx) ~315 bytes per second
- CMR+ (CMR Plus) ~361 bytes per second

Note that 'sCMRx' is equivalent to 'sCMR'. These two terms are used interchangeably in Trimble and Carlson products. The correct term is 'sCMRx' however 'sCMR' is used to indicate the same setting.

The carrying capacity (raw data rate) of 9600 baud in Satel 9600 no FEC no Scrambling mode is approximately 800 bytes per second, at 4800 baud the carrying capacity is approximately 384 bytes per second

When used with a repeater, each correction stream must be transmitted twice plus a 20 millisecond repeater delay.

Thus there is not sufficient time at 9600 baud to transmit RTCM3.2 MSM corrections with very high satellite counts. It is possible to raise the elevation mask on the base which greatly reduces the tracked satellite count if you must use RTCM3 protocol for compatibility with other brands of rovers.

What is the disadvantage of CMR+? Only GPS + GLONASS are encoded in CMR+. Corrections for L5, L2C, GLONASS L3 and Galileo may not be available.

What is the disadvantage of sCMRx? Only Trimble OEM receivers have a decoder sCMRx. True Trimble receivers (like the R8, R10, R12) are purposely prevented from using sCMRx and instead rely on the CMRx protocol.

What is the disadvantage of RTCM3.2 MSM? RTCM3.2 cannot be used with a repeater if the satellite count is high. If you need to use RTCM3.2, set the elevation mask on the base to 15 degrees. It may

also be possible to use a duplex frequency setting (receive on one frequency, transmit on another) however this usually results in the rover only receiving every other correction packet.

ADL radios hang sometimes when front panel is used

Sometimes the ADL radios may need to be rebooted (power off, wait 5 seconds, power on) after making channel selections from the front panel or after clicking the Program button from the programming tool. This happens most often when changing the protocol from the front panel, for example when changing from TT450S to Satel.

This is a bug, and the behavior has existed forever. If you make changes from the front panel and it seems like they have not been implemented or the interface hangs, cycle the power. This is not a big deal because the radios don't really have many changes made to them from the front panel.



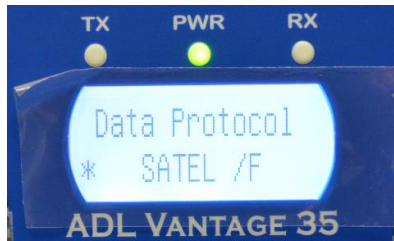
ADL front panel turns off after timeout, incomplete messages

If the radio has been on for a few minutes, the display will go blank. Most of the time pressing the power button for 2 seconds will turn the display back on.

When using the front panel buttons to move through the settings, the display sometimes does not fully load a message. This is a bug, it is in all devices don't let it drive you crazy. You can usually re-write the display by clicking down then up.

Changes in display with new firmware

With version 5 radio firmware when you have selected the correct 'Data Protocol', the radio display will show 'SATEL /F':



And the 'Radio Link Rate' will be 9600:



This is important, if the 'Radio Link Rate' is 19,200 you have set the bandwidth to 25 KHz and it will not work.

Programming as Satel Mode Repeater

Getting the latest firmware and configuration tool version

You can download the latest programming tool and firmware version from the Pacific Crest website:

<http://pacificcrest.com/support.php?page=updates>

Firmware and Software Upgrades for ADL Radio Modems

Filename	Description	Revision
ADL_FW.zip	Firmware for ADL radios and modules	5.02.0004
ADLCONF_Setup.zip	ADLCONF configuration software for all ADL radios	4.20.0002

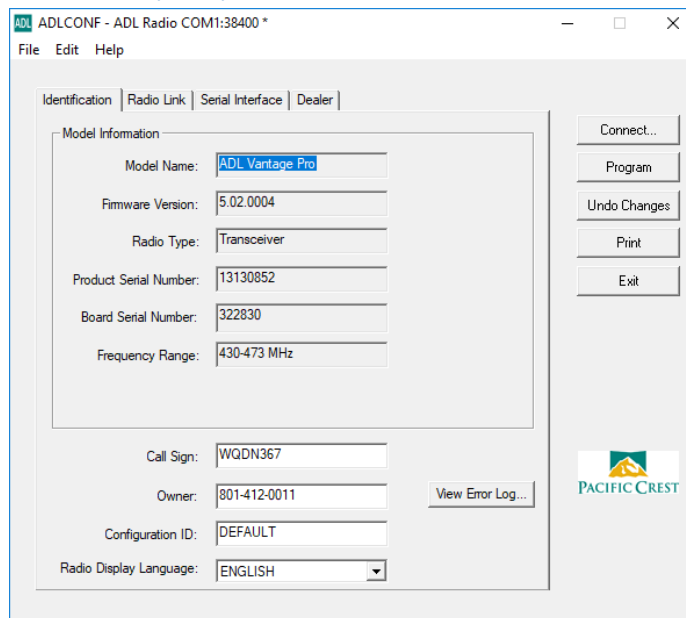
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You will need a power connector with a serial port cable. If you need to change the bandwidth or frequencies you will need a dealer programming dongle. (iGage can supply these tools.)

Programming Notes

Connect by serial port. Attach an antenna before connecting power. The default baud rate is 38400 for the cable connection. You can change this from the front panel of the device. Press 'Connect'.

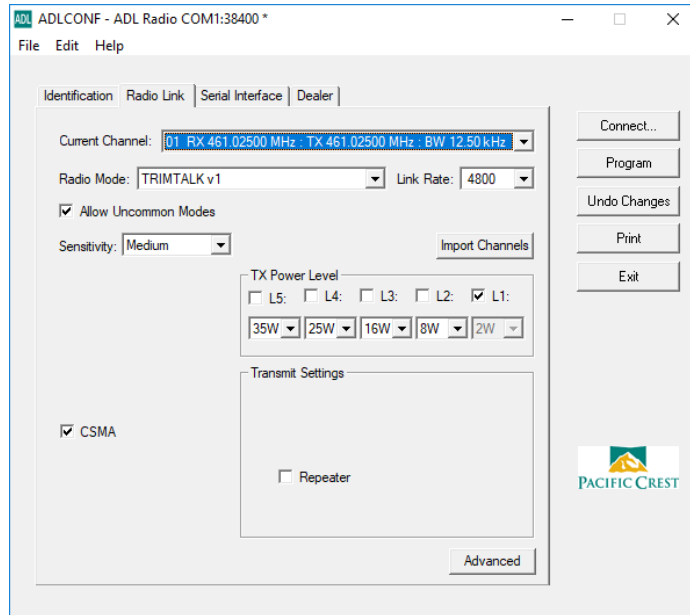
Identification (tab)



We put the owner's phone number in the Owner box. You must have a FCC license to broadcast, and the FCC call sign must be transmitted every 10 minutes. So put your call sign in the appropriate box.

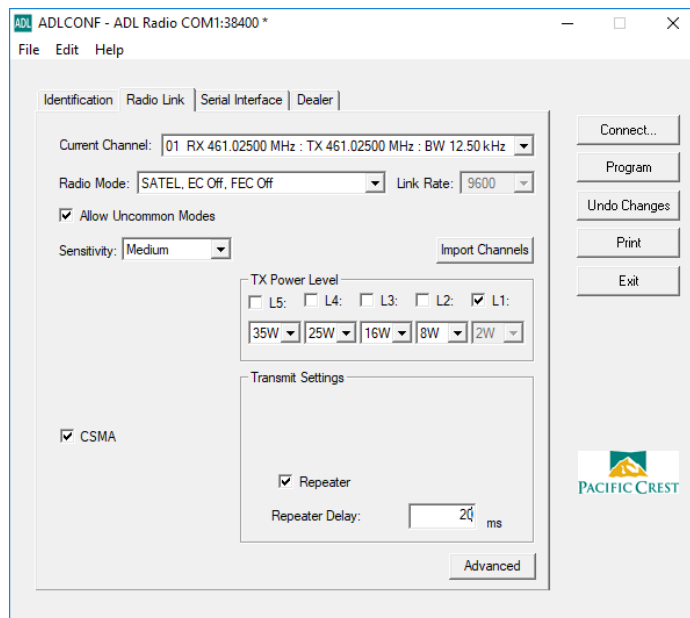
Radio Link (tab)

Initially 'Allow Uncommon Modes' will not be checked. Once you check it you must program the radio (by clicking Program) and then re-connect (by clicking Connect) and re-read the radio configuration.



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Check the 'Allow Uncommon Modes' box. Then click Program to store the changes. After the upload is complete, click the 'Connect' button to reload the radio configuration.

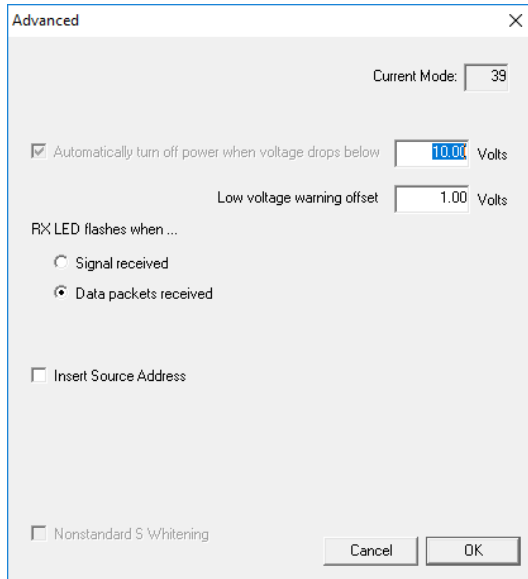


Now you will be able to select 'SATEL, EC Off, FEC Off' which is the default Satel / 3AS mode that we use for iGage iG receivers. CSMA should be checked for legal operation in the USA unless you have a

dedicated, unshared channel. Set the Sensitivity to Medium to keep low power noise from throttling the repeater's output.

Check the 'Repeater' check box. I like to set the repeater delay to 20 ms.

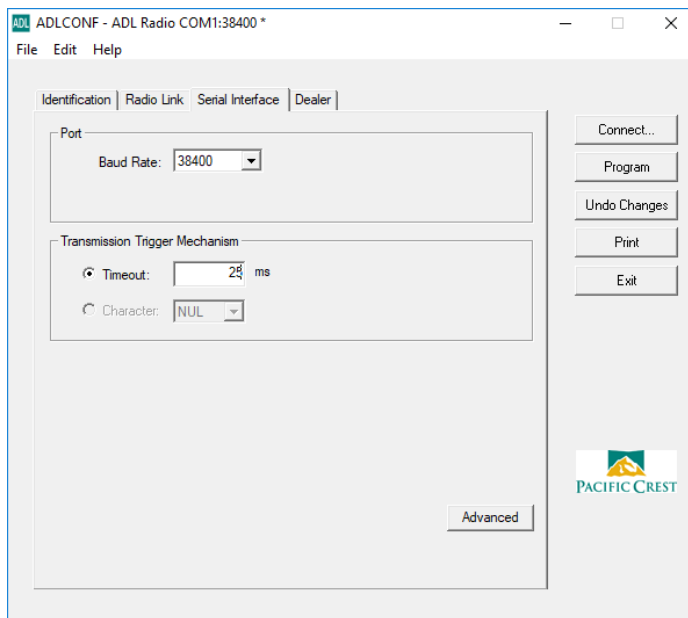
Clicking Advanced:



Leave the default values unchanged.

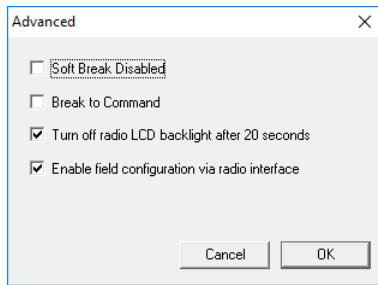
Serial Interface (tab)

On the 'Serial Interface' tab:



Leave everything unchanged.

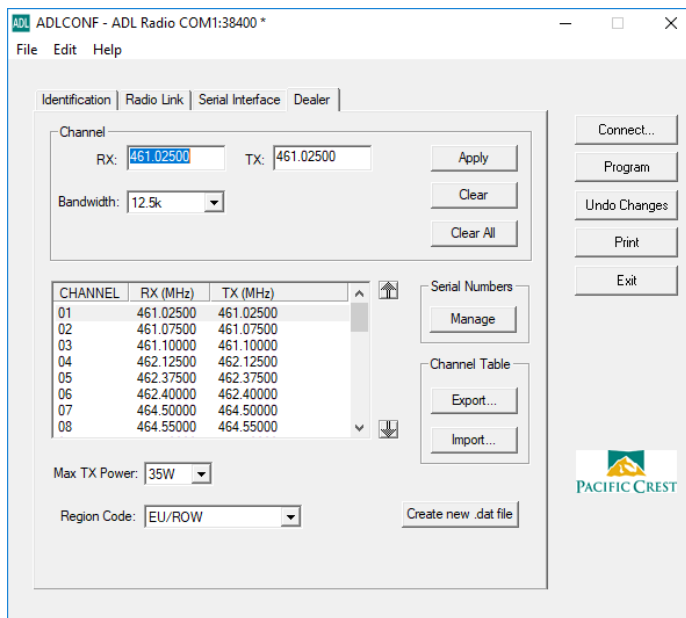
Clicking the Advanced button:



Leave everything unchanged.

Dealer (tab)

You won't be able to modify the dealer tab if you don't have a programming dongle. On the 'Dealer' tab:



The Bandwidth must be set to 12.5 KHZ for operation in the USA. You may need to make this change and then return to the 'Radio Link' tab to get the baud rate to register correctly.

It is illegal to program a radio with unlicensed frequencies. It is illegal to program a radio to 25 KHz unless your FCC license allows 25 KHz operation.

In addition to simplex channels (the Rx and Tx frequencies are the same) you may want to program some cross channel pairs like Rx 461.025 Tx 464.700.

Once all settings are correct, click the Program button and subsequent buttons as appropriate to store the settings.



Cycling the radio power, then reconnecting to **double-check all settings** is highly recommended.