

December 23, 2008

The RB02 setup jumper – What it does...

Background

Over the past week there has been a lot of discussion on the list about the “setup” jumper on the RB02 and several reports that cutting this jumper can improve the performance of the radio on some layouts. I have had some discussions with NCE over the past couple of days and I want to pass along some information about the setup jumper and what it does.

First I need to discuss a little bit about how the radio handles messages to the cabs. Each time the radio base station (RB01 or RB02) sends a data message to a cab it expects to get an answer back from the cab that acknowledges the receipt of the message. If the base station doesn't hear back from the cab then it will try to resend the message up to 8 times for a RB01, or 16 times for a RB02.

If the radio environment is good then the cab should acknowledge back right away and the number of retries will be minimal. In a poor radio environment caused by weak signals, interference, or pre V1.5 cabs, the base station will spend a larger amount of time trying to resend messages to the cabs.

What causes the slowdown over time?

If the radio environment is poor there is a higher likelihood that the base station will timeout on some of the messages sent to the cabs. This occurs when the base station has tried to send the message 8 times for a RB01, or 16 times for a RB02. When a timeout occurs the message gets trapped in a buffer in the RB02 and that associated buffer space becomes unusable. The RB02 has a finite amount of buffer space and each trapped message reduces the usable buffer space.

In normal radio environments very few messages time out so this has very little affect on performance. If your system is in a less than ideal radio environment (weak reception, interference, pre. V1.5 cabs) you are likely to have more message timeouts. Each timeout reduces the usable buffer space and over time the shrinking buffer space can cause the radio performance and response time to slow down. This is a reason why the radio performance may appear to slow down over long operating sessions.

The solution

NCE recognized this shrinking buffer as a potential issue and changed the RB02 firmware in August 2005 to purge the buffer when a message time outs. This purging recovers the buffer space so that it is available for other messages.

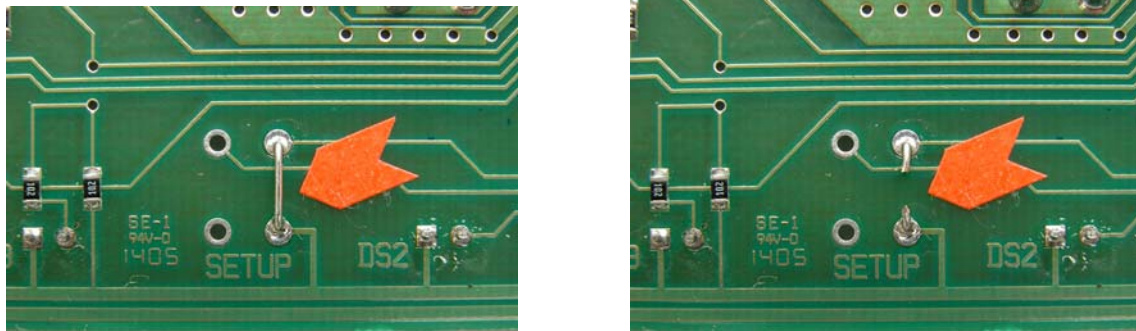
When this buffer purging change was made it was implemented with an on / off switch so that it could be thoroughly tested prior to its general release. This on / off switch is the setup jumper. If the jumper is installed then the buffer purging feature is off, if the setup jumper is cut then the purging feature is on.

Some layouts have been using this feature for upwards of 3 years now with no reports of any issues so at this point the change has been thoroughly tested.

Cutting the jumper

Enabling the buffer purging feature by cutting the setup jumper may improve your radio experience, especially if you run with a lot of cabs and, or have long operating sessions. If you are having any issues with the radio then you should also try and cut the setup jumper as there have been numerous reports of improved performance with the buffer purging code enabled.

Here is a picture of the setup jumper on the RB02 before and after cutting.



This only applies to RB02's that were produced after August 2005, RB02's made prior to that date will not have the setup jumper installed nor will they have the buffer purging feature. RB01's also do not have the setup jumper or the purging code. If you experience a slowdown with the RB01, cycle the DC power to the RB01 to reset everything.

This change does not affect any repeaters that you might have; there is no setup jumper in them as the RB02 is the brains of the base station and controlling the repeaters.

Conclusion

Cutting the setup jumper in the RB02 may improve your overall radio experience. If you have had any issues with selecting locomotives or slower response times you may be in a less than ideal radio environment. Under these conditions there have been numerous reports that cutting the setup jumper improves the radio performance.