

# Performance upgrade for the Icen1 70cm transverter

## Purpose of document

This document describes how to upgrade an existing (pre August 2018) Icen1 with the new mixer. An upgrade 'kit' is available from the author.

## Introduction

The existing (pre August 2018) Icen1 kits included the ADE13 mixer. This is now replaced with the ADE751MH high level mixer.

The ADE13 can be replaced by the ADE751MH on version 1.0 PCBs by means of a simple cut and strap, described in this document. No changes are required to the 404MHz LO as this should already be +13dBm +/-1dB.

## Procedure

Before starting, if you can, check the receive P1db level of the Icen1. This should be approximately -13dBm. Better still, check the IIP3, noise figure and insertion gain if you have access to the correct equipment. These should be as the original specification on my web page (that is,

make sure you read it!). This will ascertain that the Icen1 is working correctly before commencing the modification.

1. Remove the ADE13. Use a hot air gun so that the PCB tracks are not damaged.
2. Cut the tracks at point 'X' to pin 3 and 4 to isolate the RF and IF from the mixer, as shown below in fig 1

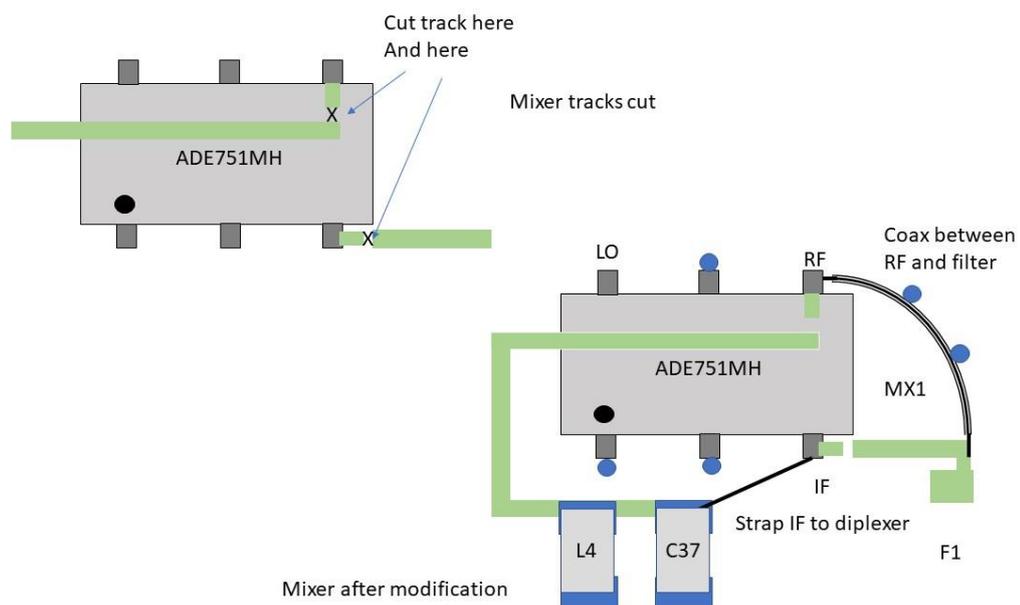


Figure 1 Mixer track cutting.

3. Solder the ADE751MH in place of the removed ADE13. The orientation should be the same.
4. Solder a short strap from the mixer IF pin to the top of C37, as shown in fig 1
5. Prepare a short length of 50Ω PTFE coaxial cable as shown in fig 2



Short length of 50Ω PTFE coax

Figure 2 Preparing the coax link

- a) Cut around the jacket of the coax, 20mm from one end and slide the jacket off the coax to expose the braid.
- b) Tin the braid for the full 20mm
- c) At one end score around the tinned braid 2mm from the end and carefully break it away and slide it off the PTFE insulation
- d) 1mm from the end CAREFULLY cut the insulation and slide off to expose the inner
- e) Tin the inner
- f) Cut the whole 20mm from the rest of the coax and repeat c), d) and e) so that the coax appears as in fig2
- g) Carefully bend the coax around a 10mm round former so that the ends are 90° to each other.
- h) Solder one end to the RF pin of the mixer
- i) Solder the other end to the filter, F1, input
- j) Solder the coax braid to at least two plated through vias, as shown by the blue dots in fig 1

That is the modification completed.

Check that the transverter still works and that the receive P1dB has improved (typically -7dBm). If you can, check noise figure and insertion gain. On transmit, check that the saturated output is around +23dBm. This will need around +6dBm IF input. The transmit gain remains at +17dB.

Filter F1 may need a very slight adjustment to peak the tuning. This is best done using test equipment to check that you are obtaining the best performance.

### What's in the upgrade kit?

An ADE751MH mixer and short length of PTFE coax cable. The cost is on my Prices web page.

73 de Sam, G4DDK

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