



# Memorandum

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**To:** File

**From:** Francoise Johnson  
John Effland

**Date:** 2005-03-24

**Revisions:** 2005-03-24           jee     Initial

**Subject:** Mechanical Inspection of Mixer Blocks 101 to 120

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## 1. Summary

Mixer blocks with serial numbers from 101 to 120 were manufactured by J&E Precision Tools. Incoming inspection of these mixers was performed by Francoise Johnson as described below. Nine mixer blocks were found to not meet specifications and were returned to J&E for rework. The reworked blocks were found to be acceptable, except for block SN 101, which was rejected a second time. J&E's latest rework corrected the problem with that block.

## 2. Measurement Procedure

A mixer integrated with both preamps is shown in Figure 1. The mixer block contains two mixer chips as identified in the drawing along with pole pieces for generating a magnetic field across the mixer junctions. The RF signal enters the mixer through waveguide orthogonal to the picture and located in the cover (not shown). This RF signal enters the top waveguide shown in the picture and is coupled through a 90° hybrid coupler to each mixer chip. The local oscillator (LO) signal enters the mixer through the waveguide orthogonal to the plane of the picture and shown in cross section in the lower quarter of the mixer block. The LO is split and then coupled to the mixers through two additional 90° hybrid couplers. Loads for the waveguide are installed in the cover and are not visible from this photo.

The mixer dimensions subject to incoming inspection are diagrammed in Figure 2. Both chips for each mixer block are mounted on a shelf as shown in the diagram. The measured dimensions are preceded with "L-" or "R-" to depict the right and left sides of the block.

After assembly of the chips, the mixer cover is fastened to the body and the upper and lower halves of the waveguide are, in the ideal case, centered with respect to each other. Practical machining tolerances impose limitations on how well the waveguide is centered, and dimensions "A" and "B" depict the accuracy of the centering.

## 3. Results

Figure 3 shows the inspection dimensions after all rework by J&E. Note that, except for Mixer 101, only R-A, R-B, L-A, and L-B were measured for the reworked mixer blocks. Figure 4 shows the inspection dimensions for all mixer blocks as originally received, prior to rework.

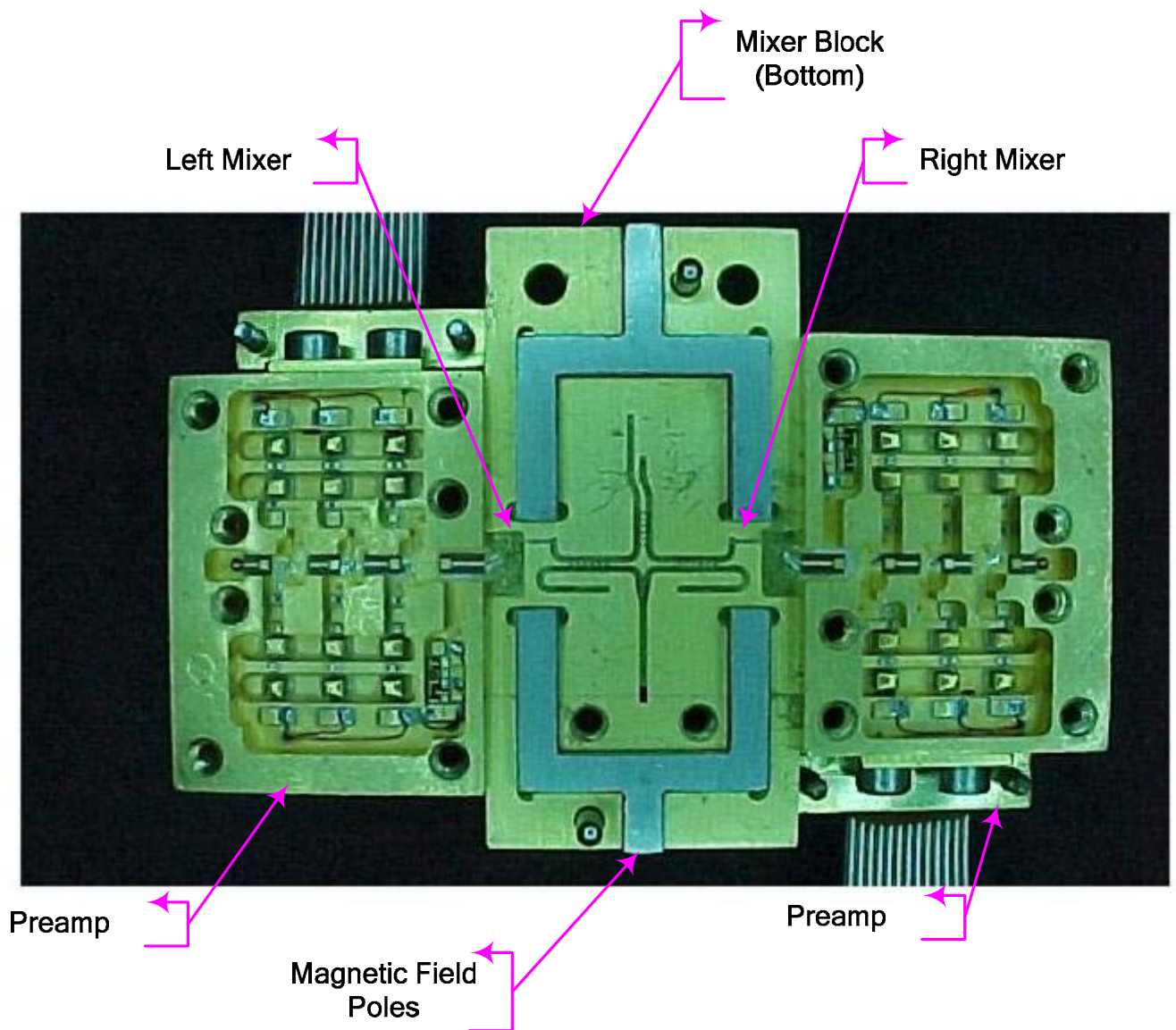


Figure 1: Band 6 SIS Mixer-Preamp

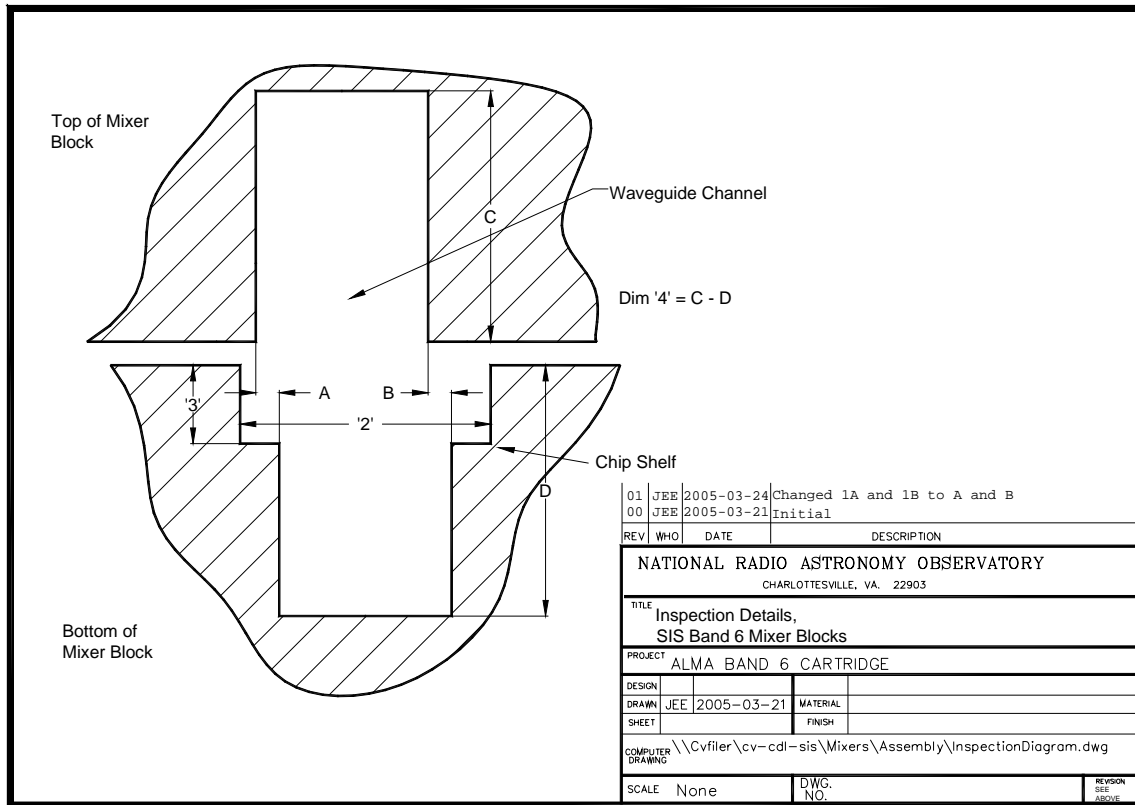
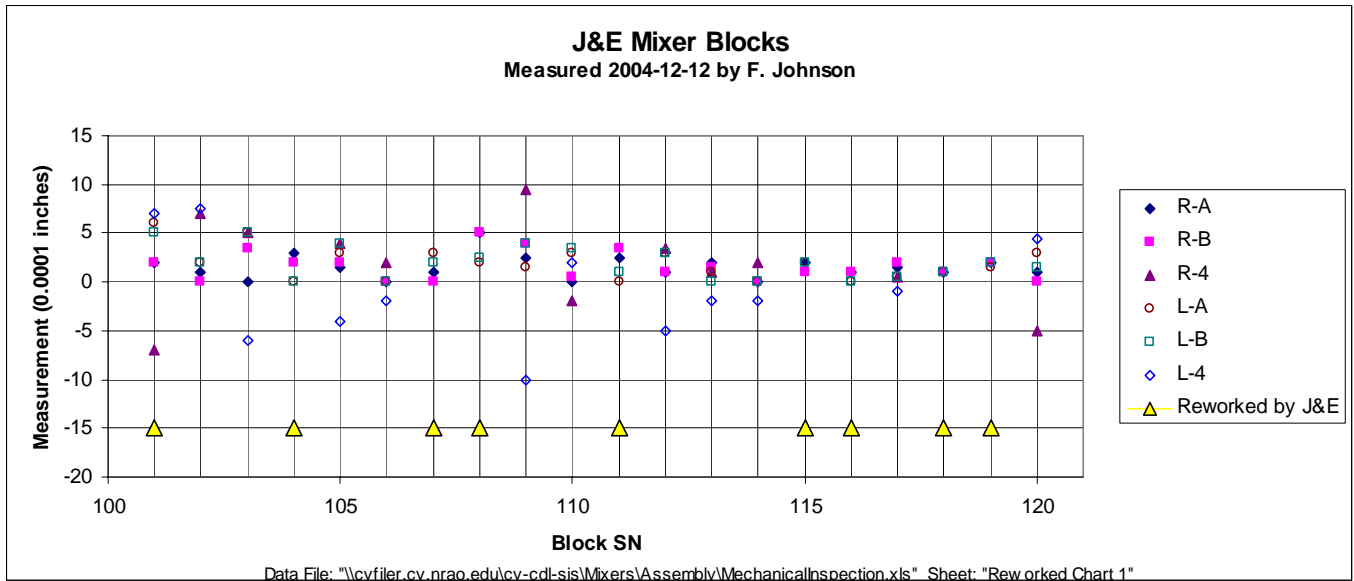


Figure 2: Dimensions Inspected



**Figure 3: Inspection Dimensions of Mixer Blocks after all Rework**

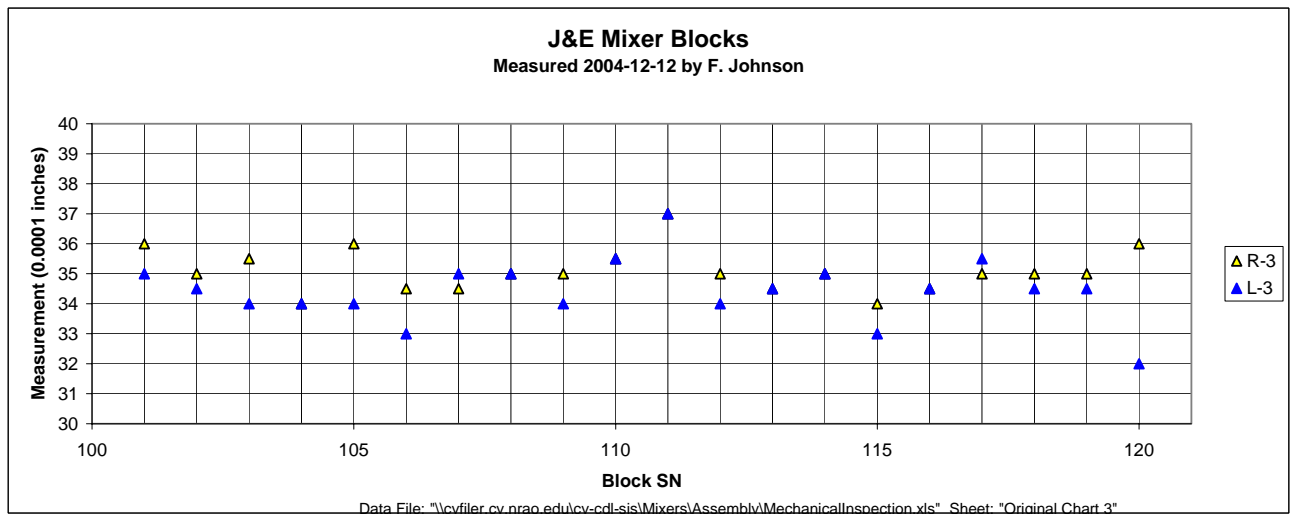
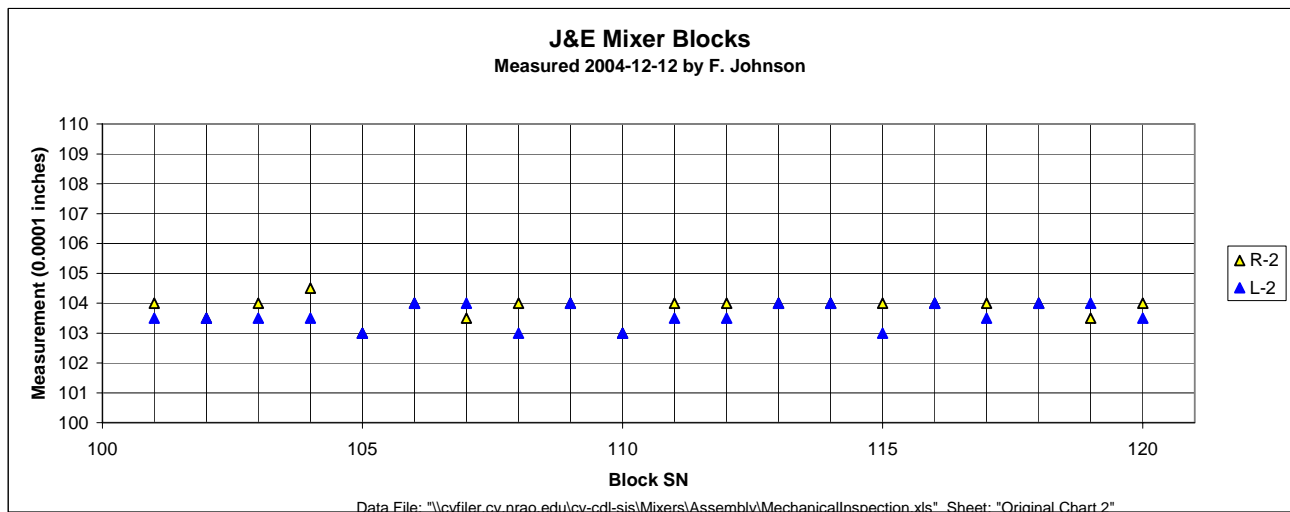
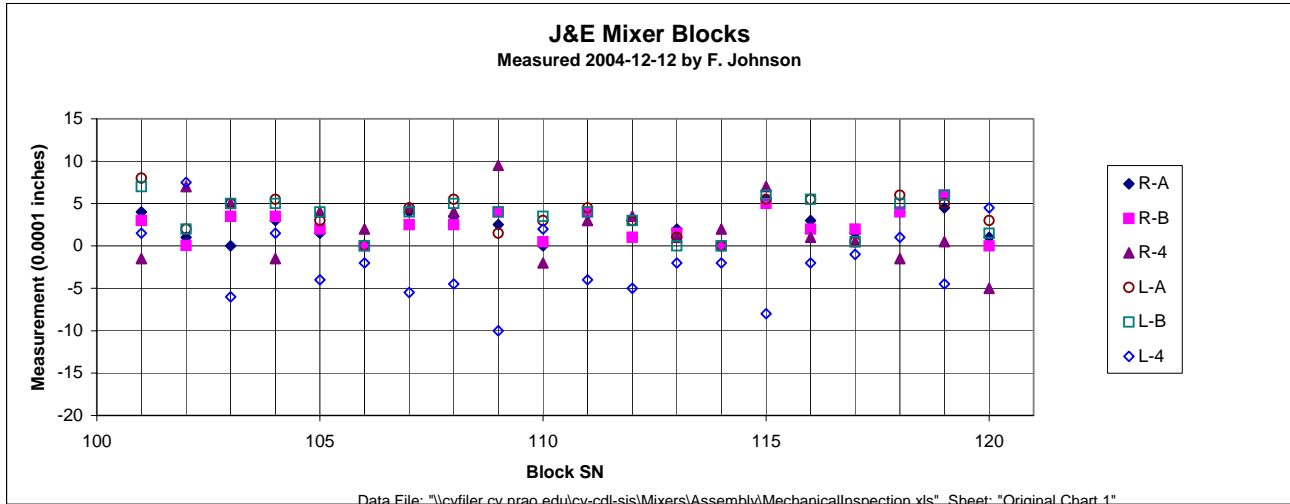


Figure 4: Inspection Dimensions Prior to Rework