Identification of primary and secondary chop pixels in the SPIRE photometer arrays

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Change Notice

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Updated for real platescale from Kjetil Dohlen – 31 August 2001 – no further comments so issued with minor changes and note number 15 November 2001

0 Introduction

This short technical note identifies the pairs of pixels within the SPIRE BDAs that will be used for point source photometer chopped observations. A primary and a secondary pair are identified within each array. It is desirable that the primary pair and the secondary pair are read out through separate harness; JFET and LIA chains. It is also necessary that the specification on the total throw of the BSM in the chop direction is changed to allow the use of the secondary pair of pixels.

1 Pixel Identification

The note "Arrangement of detector arrays in SPIRE" laid out how the chop and jiggle tracks of the BSM are arranged on the final focal planes and, hence, how the detector arrays must be orientated with respect to their interface. The BDA interfaces have a dowel and a slot associated with their mechanical mounting in order to locate them with respect to the interface to the structure. This defines a handedness for the BDAs as indicated in figure 1. Using this handedness we can identify uniquely the overlapping pixels on each array that will be used for point source chopped observations.

The primary pair consists of the pixels in the centre row of each array at ?5 mm from the centre line along the long axis of the array. The f/number at the centre of the image is 4.9 so this equates to ?64 arcsec on the sky. The BSM has a capability of chopping ~?120 arcsec on the sky, this prevents the use of the next co-aligned pixels out along the centre line being used. Instead a pair of pixels at the edge of the FOV can be used. There are four possible pairs of pixels using six individual pixels. The edge of the array that is imaged at the telescope focal plane in the +Z direction is close to the edge of the FPU box and may suffer from increased straylight if the FPU is warmer than predicted. The beams from the –Z edge on the other hand may pass close to warm parts of the cryostat or telescope! In figure 1 I have indicated that the –Z edge pixels should be designated as the secondary chop pair – two out of the three using the central pixels as one of the pair – but either edge could be used in principle. As a goal the primary pixels and each set of three edge pixels should be read out through independent harness; JFET and LIA combinations.

The platescale varies from top to bottom and left to right of the image by a few percent, the maximum distance to the outer of these pixels is 129.5 arcsec if the arrays are well aligned. The maximum displacement of the arrays could be up to 2 arcsecs, therefore to use these pixels for point source chopping the BSM should have the capability chop to at least 132 arcsec.

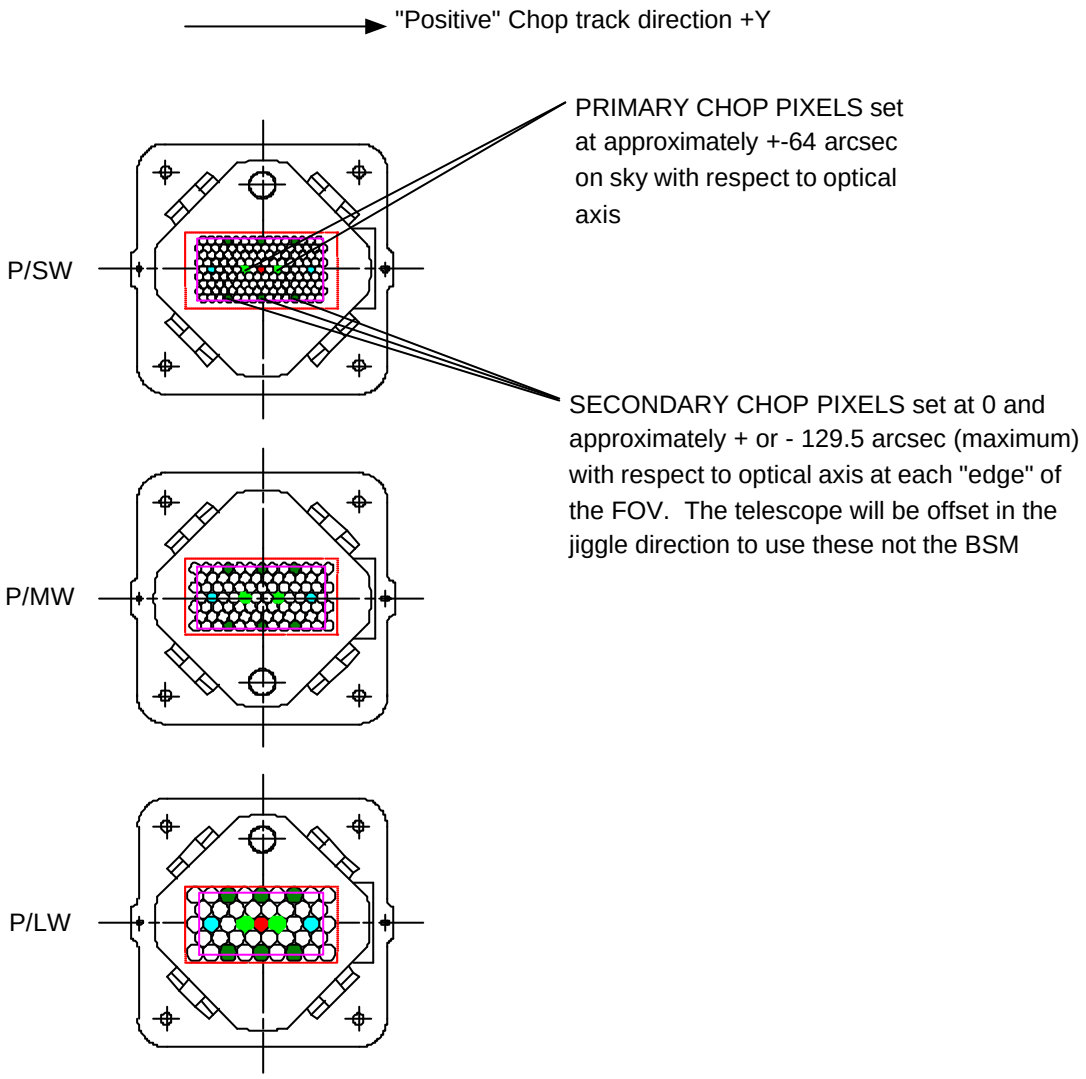

Figure 2: Indicative orientation of chop track on the BDAs and identification of primary and secondary chop pixels. The detectors are viewed from the front and the location of the dowel slotted hole is to the left.