1. Observations and Data Analysis

Observations were made on 2006 July 9–10 using the 10 antennas of the VLBA (Napier *et al.* 1994) of the National Radio Astronomy Observatory (NRAO)[1]. Eight IFs (frequency channels) were recorded, each eight MHz wide, at K–band (23.72, 23.73, 23.77, 23.85, 23.99, 24.10, 24.16, & 24.18 GHz) for a total bandwidth of 64 MHz. The multiplicity of channels allows for the determination of a precise group delay (Rogers 1970), Results of the precise astrometry afforded by these observations will be presented elsewhere. Observations in this mode also allow imaging, which is the focus of the work discussed here.

A total of 178 out of 193 sources had sufficient data for imaging. Observations of a source were made using short duration "snapshots" over a number of different hour angles in order to maximize the (u, v) -plane coverage. Of the 178 images produced, 15 were of sources not previously included in the K/Q-band RRFID.

The raw data bits were correlated with the VLBA correlator at the Array Operations Center in Socorro, New Mexico. The correlated data were calibrated and corrected for residual delay and delay rate using the NRAO Astronomical Image Processing System (AIPS). Initial amplitude calibration for each of the IFs in each frequency band was accomplished using system temperature measurements taken during the observations combined with NRAO supplied VLBA gain curves. Fringe–fitting was done in AIPS using solution intervals chosen to optimize the SNR of the solution and a point source model in all cases. After correction for residual delay and delay rate, the data were written to FITS disk files. All subsequent processing was carried out using the Caltech VLBI imaging software, primarily DIFMAP. After phase self–calibration with a point source model, the 3.9 second correlator records were coherently averaged to 8 seconds and then edited.

The visibility data for each frequency band were self–calibrated, Fourier inverted, and CLEANed using DIFMAP in an automatic mode (Shepherd, Pearson, & Taylor 1995). DIFMAP combines the visibilities for each IF of an observation in the (u, v) plane during gridding, taking into account frequency differences. However, DIFMAP makes no attempt to correct for spectral index effects. The spanned bandwidth of the eight IFs in each band are relatively small, so we assume that source structure and flux density variations across each of the two frequency bands are negligible. The data were self–calibrated following the hybrid–mapping technique (Pearson & Readhead 1984) to correct for residual amplitude and phase errors. The data were initially phase self–calibrated and mapped using uniform weighting in the (u, v) plane before switching to natural weighting after several iterations.

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