Integrating Motion and Depth via Parallel Pathways
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Figure S1. Re-warming data

(a) Mean normalized firing activity (±s.e.m., n = 45) at the onset and termination of cooling. On average, the cooling firing rate stabilized within five minutes of cooling onset across all sites, as described in the text. At the onset of rewarming, most cells showed an initial recovery phase that was very fast, on par with the rate of inactivation. However, not all cells reached their pre-cooling firing levels immediately, as reflected by the lower average firing response (this was true of single- and multi-units). (b) Population change in mean firing rate (±s.e.m.) during and after cooling. Each point shows the mean response of a single recording site during (blue) and after cooling (green), n = 51. Inset: blocking index distributions. The mean and median blocking indices for the cooling distribution were 0.21 and 0.20, while the mean and median values for the rewarming distribution were 0.0 and 0.02. (c) Direction discrimination index values from monkey M as a function of recording session. To rule out the possibility that the multiple cooling cycles might also cause cumulative damage, we plotted our measured pre-cooling discrimination indices over time (sequential order of recording sessions, direction discrimination index values from monkey M). We found no significant changes in the magnitude of the discrimination indices over time for either monkey or visual modality as determined by a simple linear regression. For monkey M, regression coefficients $r^2 = 0.007, P = 0.58$ (direction), $r^2 = 0.06, P = 0.09$ (disparity). For monkey K, regression coefficients $r^2 = 0.005, P = 0.68$ (direction), $r^2 = 0.05, P = 0.22$ (disparity).
Figure S2 Stability of vergence during fixation while V2/V3 were inactivated

Disparity tuning curves could be flattened by variability in vergence state, which we summarized as 1) instability within trials, 2) instability across trials, or 3) through the reduction of the visual disparity through vergence responses (if the animals were unable to “hold” their vergence state). (a) Distribution of intratrial vergence values before and during cooling (from both monkeys used in physiology experiments). Median values were 0.0011 deg² (pre-cooling) and 0.0009 deg² (cooling) and while both medians were statistically distinct (P < 0.001, Wilcoxon rank sum test), but this observed reduction in vergence instability during cooling would favor the reliable measurement of disparity tuning curves, not destroy them. (b) Distribution of intertrial vergence values before and during cooling (both monkeys). Median values were 0.0676 deg² and 0.0687 deg² and statistically equivalent, (P > 0.05, Wilcoxon rank sum test). Finally, to test whether monkeys were unable to hold vergence state during cooling, we looked for statistical differences in the mean vergence position as a function of stimulus disparity (using a one-way ANOVA) in every disparity tuning experiment (n = 84, 42 pre-cooling and 42 cooling experiments). We found significant differences in mean vergence values in 8/84 disparity tuning experiments (four pre-cooling and four cooling experiments). Of these, only one experiment showed the expected vergence pattern predicted by the stimuli (increased/decreased convergence in response to crossed/uncrossed disparities). All vergence values were measured over a time window of 450 ms starting at stimulus motion (trial length was 500 ms).
**Figure S3** Regression fits to discrimination index data.

Discrimination indices before and during cooling for direction (left) or disparity (right), (±s.e.m., \( n = 41 \), open symbols = multi-unit sites, closed symbols = single-unit recordings). Long black dotted lines show the line of equality. Solid lines show the Model-2 maximum likelihood regression lines for single units only (\( n = 23 \)); dashed lines show the regression for the entire population (\( n = 41 \)).