Supplementary Figure 1. Standard deviation of the EPSP amplitude as a function of the mean EPSP amplitude. Data presented corresponds to 637 synapses used in Section IV. Black line is least square fit by a power law with exponent 0.38.
Supplementary Figure 2. Optimal input distributions may be discrete. The capacity-achieving input distribution for the AWGN channel with unit variance noise under the constraints that the input alphabet is restricted to the interval \([-1.5, 1.5]\) and that the variance of the input distribution is less than 1.125 consists of three delta functions (Smith, 1971). The capacity of the channel under these constraints is 0.37 nats. This input distribution corresponds to a filling fraction of 0.5.
Supplementary Figure 3. Discrete input distributions may be only slightly suboptimal. Information storage capacity of the AWGN channel with capacity-achieving (Gaussian) input distribution (blue) and binary ($\pm \langle A^2 \rangle^{1/2}$) input distribution (red). Note that at small SNR the difference in information storage capacity is negligible.
Supplementary Figure 4. Distribution of synaptic weights sorted into bins whose width is given by two standard deviations for the corresponding EPSP amplitude. Blue squares: fraction of neuron pairs belonging to a bin centered on that synaptic weight. Black line: stretched exponential fit (i.e. power law in the log domain) with exponent 0.49. Unconnected pairs of neurons as well as very weak connections (<0.1 mV) are pooled in the first bin, which corresponds to zero-weight synapses (absent and silent synapses). For this reason, the gap between the zero-weight synapses and the peak of the distribution does not appear in this graph (cf. Supplementary Figure 1 and Section VI; also see Figure 5 in Song et al., 2005).