Patterned illumination can be used to improve lateral resolution, provide optical sectioning, and to reduce illumination dose. For example, in Structured Illumination Microscopy (SIM), spatially periodic illumination patterns are used to double the resolution [1]. The use of a Spatial Light Modulator (SLM), such as a Digital Micro-mirror Device (DMD), gives full control over the illumination pattern and makes the microscope a versatile Programmable Array Microscope (PAM) [2]. Controlling the illumination through the DMD pixel by pixel, a 5-times reduction in photobleaching rates can be achieved [3]. There are essentially two ways in which the SLM can be introduced in the light path. In a single-pass architecture the SLM is used only in the illumination branch of the light path and the demodulation and image processing to obtain the final image is done in-silico on the set of acquired images. In a double-pass architecture this is partly accomplished by modulating the imaging branch with the SLM as well and capturing both the conjugate and non-conjugate image. The high switching speed of the DMD can be used to illuminate the sample with a series of patterns within the camera frame time. In this way, a double-pass architecture can provide advantages in terms of image acquisition speed, sensitivity to readout noise, and an optically sectioned image that is extracted from only two captured images rather than from a whole series. We discuss an optical architecture for a double-pass PAM using two DMDs and two cameras for capturing the conjugate and non-conjugate images. This design simplifies the optics of previous architectures using only one SLM and one camera. Several design issues are discussed, such as the autofluorescence of optics in the shared illumination-imaging branch, Scheimpflug relay optics, and diffraction effects of the DMD, both in the illumination and in the imaging branch.