In his new exhibition at the Whitechapel gallery in east London, Christopher Williams breaks all the rules. For a start, some of the walls have been flown in from his recent show in Germany - and the captions on the works are from the Whitechapel’s previous show, Adventures of the Black Square. The confusion these now-random captions cause for the viewer are as integral to the exhibition as the hanging of the prints, which tend to be well below the average eyeline. It’s all emblematic of Williams’ somewhat dogged conceptual thrust, and the attendant, seemingly wilful, elusiveness of his work.

Born in Los Angeles in 1955, Williams came of age as a student at CalArts in the 1970s, where he was taught by playful conceptualist John Baldessari. If it seems that Baldessari’s mischievous spirit informs the work of many younger photographers these days, Williams has long since condensed that spirit into a formal exploration of the medium and, in particular, its deployment in advertising. He uses photography to draw our attention to photography: what it is, what it does and what it means at a time when it is ubiquitous and seductive.

His subversion continues with a catalogue that contains very few images, and none of the works on display. Its bright green cover is echoed throughout the show, in the bright washes of green that make the gallery look oddly like a colour-coded idea store. It is, in fact, the exact colour of Fuji film. When the show visited Chicago, the dominant colour was yellow, the brand colour of Kodak; at MoMA in New York it was red, the colour of Agfa. It pays to pay attention to every aspect of a Christopher Williams show.

As well as curatorial essays, the catalogue includes reproduced posters for previous exhibitions by Williams, photographs by other artists as diverse as Thomas Struth and Edward Weston, an illustration from Guy Debord’s situationist classic The Society of the Spectacle, and film stills by the likes of Jean-Luc Godard. Avoid the various art manifestos and architectural drawings are the inner notes from Scritti Politti’s 1978 debut single, Skank Bloc Bologna. Scritti Politti are a clue to one strand of Williams’ methodology. They were postpunk, leftwing deconstructionists - their name a punning nod to the writings of Italian Marxist theorist Antonio Gramsci. Their sleeve notes drew attention to the means of production of the pop single by itemising the various costs of making it - recording: £98, mastering: £40, and so on.

Similarly, Williams’ images often draw attention to both the process of photography (one image shows a cross-section of a camera’s internal workings) and the ideology of the image: a model with a striking fake smile, a bright yellow dish half-submerged in water, shiny clusters of red apples that appear somehow cuddier and more real than any actual apple. Williams is no Marxist, though. There are politics here – a dark photograph of an upturned Renault car references with an almost contradictory coolness the riots in Paris in 1968 - but to fully appreciate the layers of meaning at play, one must be as fit with the postmodern art theory from which they emerge.

Williams photographs cameras a lot, and they often appear as if culled from old catalogues. The relative simplicity of his still lifes - a pristine Michelin tyre, a chrome dish washer holding a row of bright red plastic plates, a hand pulling a red sock over a well-turned ankle - echoes the functionality of catalogue shots, but invests them with the unreal sheen of advertising.

Something always seems slightly untoward in his photographs, and occasionally that is made manifest, as in the Kodak Three Point Reflection Guide that he leaves in the portrait.
of the model in a bright yellow towel. Often marooned against grey-white or jet-black backgrounds, cut loose from their commercial moorings, these objects - and people as objects - appear both ordinary and heightened.

Exhibition protocol is punctured again as one moves in reverse chronological order: downstairs is devoted to recent works, and the first floor to older series. Upstairs, things are obtuse and referential, but in a different way. A portrait of two women, Young Hee Kim and Gyung-Hwa Han (1992), hangs on one wall. You need to look very closely to realise that one has removed a contact lens to reveal one naturally brown eye, subverting their twin blue-eyed gazes. This small disruption of the unreal beauty is an echo of the barely noticeable bruising on one of the shiny red apples seen on the floor below.

On another wall, an older series, Angola to Vietnam, comprises 27 black-and-white still lifes of glass flowers, each pertaining to the national flower of a country Amnesty International has identified as engaging in political disappearances. Nearby, four photographs in a series called SOURCE ... (1981) show President John F Kennedy striding away from the camera or standing with his back to it. They were all taken on a single day in 1963, just months before Kennedy was assassinated. Here the unreality is ominous rather than glamorous.

The uses of photography and its deathliness - rendering still a moment in a life - echo more loudly through this floor; in one room is another single image, this time of a bouquet of bright flowers. It is titled Bouquet for Bas Jan Ader and Christopher D'Arcangelo (1991), and refers to the untimely deaths of two young artists in the 1970s. According to the Whitechapel gallery's website, it is “a still life photograph of a bouquet of flowers, referencing a work by Bas Jan Ader ... installed on a wall made to the artist’s specifications, which is based on a work by Christopher D’Arcangelo that involved the construction of a wall for the purpose of displaying other artworks.” Which says it all, really.

Referential, encoded and, at times, almost impenetrable, Christopher Williams’ art is a journey into the mind of a quietly insistent conceptualist. How much pleasure you take from The Production Line of Happiness may depend on how much prior knowledge of his work - and of art theory and of conceptual strategies in general - you bring to it. Either way, a peculiar environment awaits you: one in which almost nothing can be taken for granted.

The Production Line of Happiness is at the Whitechapel Gallery, London E1, until 21 June. Details: whitechapelgallery.org