



BANKNOTE SECURITY

**Bringing National Symbols to Life with
Nano-Optic Banknote Security**

BRINGING NATIONAL SYMBOLS TO LIFE WITH NANO OPTIC BANKNOTE SECURITY

Banknote security features have long walked the line between science and art. As banknote designers and security technologists, we aim not just to protect, but to captivate by creating features that communicate trust, deter counterfeiting, and elevate the user experience. With the latest evolution of QUANTUM stripe™ from the Authentix Nano Optics platform, we are proud to unveil a powerful new capability that deepens that blend with full animation.

ANIMATING SECURITY: THE NEXT EVOLUTION OF QUANTUM stripe™

QUANTUM stripe now enables full frame by frame animation, bringing smooth, dynamic movement to overt security features. Bringing national symbols to life with nano optics is possible, within a secure, nano-scale overt feature with numerous frames per sequence, unlocking a new visual vocabulary for authentication. This innovation expands the creative possibilities for banknote design and security, introducing effects never before seen in this context - multicolored national symbols with sequence movement, depth, pulsing, image transitions, smooth disappearance and reappearance, and rotational imagery. Elements of national pride can now come alive – think of flames flickering, cogs turning in a watch, an hourglass slowly filling. A sun can rise and set, locks can open, stars can swivel, currency symbols can smoothly switch to denominations all on a banknote!

These animations aren't just decorative; they serve a core authentication purpose. By blending art and authentication, this breakthrough allows banknote designers to integrate visual storytelling and temporal effects - like pulsing, switching, and rotation - into secure features, enhancing both user interaction and authentication.



THE ARTISTRY OF ANIMATION IN BANKNOTE DESIGN

In the world of overt security features, animation has largely remained elusive - confined to low-frame optical tricks or coarse lenticular effects with limited flexibility. Our ability to create numerous frame animations opens the door to detailed motion effects at an entirely new scale. The result is smooth, fluid movement that mirrors the richness of traditional animation, but rendered with nanoscale precision.

Why Smooth Animation is Important for Human Senses:



Mimics natural movements and enhances visual perception: By giving end users something intuitive and unmistakable to experience, authentication becomes an inherent, easier, and faster, while providing an ultimate barrier to illicit replication.



There is an evolutionary basis for this heightened sensitivity to natural movement: Humans have long relied on natural movement to detect subtle environmental adjustments. Early humans even depended on movement recognition to survive.



Capitalizes on the brain's natural tendency to react to realistic movement: Animations appeal to viewers' visual and verbal memory processes, increasing the probability of recalling important information like being able to intuitively recognize genuine banknotes.



Fluid movement captivates us on an innate level: Unique animated effects elicit different kinds of emotions. Neuroscience and psychology research suggests that our brains link certain motion patterns with particular emotions. Fast-paced pulsing animations can make the public excited, slower rotation movement can make viewers calm or happy. Smooth and flowing animations like growing, shrinking and image switching can promote feelings of ease and trust.



Figure 1: Example of multi frame animation



Figure 2: Traditional low frame animation



DESIGNING WITH FLOW FOR OPTIMAL BANKNOTE SECURITY

Each animated effect is designed to create an intuitive, memorable interaction. A user can tilt the note and watch symbols shift in fluid harmony, reinforcing the ideas of movement, trust, and precision. Dynamic features open up additional layers of functionality. We can create effects that appear only when tilted in a specific direction, or that reveal different content depending on viewing angle - enabling more complex authentication cues for the end user.

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Figure 3: Example of animation effects



NANO OPTIC ANIMATION RAISES THE BAR FOR COUNTERFEIT DETERRENCE

The strength of certain security features are based on, among other things, the difficulty of replicating them. Animation adds a new dimension to greatly increasing the challenge of illicit replication. The technical complexity required to produce animated features, especially with smooth, direction-sensitive transitions makes duplication significantly more difficult. Where traditional overt elements can be mimicked with static approximations or even digital print tricks, dynamic sequences demand exactitude not just in shape and color, but in frame order, consistency of movement, and directional responsiveness.

Attempting to counterfeit a feature with multiple frame animation introduces an entirely new and greater challenge...Every frame must align. Every transition must be seamless. Every optical pathway must support the intended viewing experience. This is no trivial feat. And critically, the visual payoff - when executed correctly - is unmistakable. This next chapter cements the Authentix QUANTUM stripe technology position at the pinnacle of innovation in securing banknotes in the industry.

The very nature of Nano Optics allows for greater customization, where animations are tailored to central banks, individual issuers, drawing on cultural and national themes to create deeper resonance. Plasmonic colors and effects breathe life into national symbols. Combined with Authentix proven scalability and **manufacturing readiness**, QUANTUM stripe is not just a technology breakthrough, but a practical, deployable, and elegant solution for central banks worldwide.





Figure 4: Dynamic design becomes a new language for authentication

This leap into animation represents more than a technological milestone. It marks a shift in how we think about design: recognizing that movement carries meaning, that artistry can amplify security, and that the best features don't just protect...they inspire. Where every shift in light and angle tells a story, and where the timeless principles of trust, creativity, and innovation continue to lead us forward.

Contact Authentix today to request a design workshop, get a sneak peek of our upcoming animated housenote, or learn more about incorporating QUANTUM stripe™ into your next banknote series.



North America | Europe | Middle East | Africa | Asia

The Most **Reliable** Banknote **Security** in the Industry

