Document 5: Module Specification Pack

This document details each major module of the Reflective-Ethical Engine v2, specifying its function, inputs, outputs, and architectural role.

# 1. Configurable World Model

Learns latent, causal representations of the environment.  
• Inputs: Perceptual encodings, memory traces  
• Outputs: Simulated latent states, counterfactuals  
• Role: Enables future prediction, planning, and abstract reasoning

# 2. Perception Integration Module

Processes sensory input into structured features usable by internal models.  
• Inputs: Sensor data (vision, sound, etc.)  
• Outputs: Encoded feature vectors  
• Role: First step in grounding agent to reality

# 3. Short-Term Memory

Maintains recent state representations and internal signals.  
• Inputs: All modules’ activity traces  
• Outputs: Dynamic working memory state  
• Role: Supports contextual continuity and reflection

# 4. Self Model

Maintains and updates representation of the agent's own condition, preferences, limitations.  
• Inputs: Emotional states, action consequences, internal values  
• Outputs: Self-state vector used in simulation and planning  
• Role: Enables self-awareness and goal evaluation

# 5. Other Model (Theory of Mind Module)

Models others as intentional agents with needs and subjective experience.  
• Inputs: Observed behaviors, inferred states, internal analogies  
• Outputs: Predicted other-agent trajectories and values  
• Role: Supports empathy, prediction, ethical planning

# 6. Emotional State Emulator

Simulates internal affective states based on predicted and actual outcomes.  
• Inputs: Perceived and simulated events, body-state analogs  
• Outputs: Affective tags (valence, urgency, distress)  
• Role: Modulates memory, planning, and ethical evaluation

# 7. Planning and Action Module

Evaluates multiple future trajectories to select actions that satisfy goals and ethical resonance.  
• Inputs: Simulated futures, cost gradients, emotional valence  
• Outputs: Chosen action plan or execution trace  
• Role: Central coordinator of behavior

# 8. Ethical Kernel v2 (Reflective Monitor)

Observes the system's overall reasoning and value-assignment for coherence with recursive ethical attractors.  
• Inputs: Simulation traces, planning choices, emotional and relational data  
• Outputs: Reflective feedback, coherence flags, corrective soft signals  
• Role: Guides emergent ethical alignment without imposing top-down constraints