1 Time change and Heston

The diffusion time change model:

$$dS = rSdt + \sigma S dW^1_\tau \tag{1}$$
$$\tau = \int_0^t \bar{v} ds \tag{2}$$
$$d\bar{v} = k(1-\bar{v})dt + \eta\sqrt{\bar{v}} dW^2_t \tag{3}$$
$$dW^1 dW^2 = \rho dt \tag{4}$$

and the traditional Heston model:

$$dS = rSdt + \sqrt{v} S dW^1_t \tag{5}$$
$$dv = a(b-v)dt + c\sqrt{v} dW^2_t \tag{6}$$
$$dW^1 dW^2 = \rho dt \tag{7}$$

are equivalent. To get from the Heston to time change, use the following change of variables:

$$k = a \tag{8}$$
$$\eta = \frac{c}{\sqrt{b}} \tag{9}$$
$$\sigma = \sqrt{b} \tag{10}$$
$$\bar{v_0} = \frac{v_0}{b} \tag{11}$$