Table S6. Post-translational interactions in the covalent modification and physical interaction models. These reactions are combined with those from Table S4 to create uncoupled, transcriptionally coupled, and translationally coupled model forms. $g^?$ denotes a promoter wildcard that can be on (g^*) or off (g).

Covalent modification model			
Reaction number	Reaction	Propensity	Parameter values
1	$A + B \rightleftharpoons A.B$	$k_b A \cdot B,\ k_d A.B$	0.5 $\Omega/(\#\times s)$, 0.5 s^{-1}
2	$A.B \rightarrow A^* + B$	$k_p A.B$	10^{-8}; 0.0001; 1 s$^{-1\dagger}$
3	$A.B \rightarrow \emptyset$	$k_{deg} A.B$	0.0002 s^{-1}
4	$A^* \rightarrow \emptyset$	$k_{deg} A^*$	0.0002 s^{-1}
Physical interaction model			
Reaction number	Reaction	Propensity	Parameter values
1	$A + B \rightleftharpoons A.B$	$k_b A \cdot B,\ k_d A.B$	0.0001; 0.038; 10 $\Omega/(\#\times s)^{\dagger}$, 1 s^{-1}
2	$A.B \rightarrow \emptyset$	$k_{deg} A.B$	0.0002 s^{-1}
Multiple gene regulator model			
Reaction number	Reaction	Propensity	Parameter values
1	$\rightarrow mRNA_p$	$k_{mp} g^*_p.A$	0.05 s^{-1}
2	$\rightarrow mRNA_p$	$k_{mp} g^*_p.B$	0.05 s^{-1}
3	$\rightarrow mRNA_p$	$k_{mp} g^*_p.A.B$	0.05 s^{-1}
4	$mRNA_p \rightarrow \emptyset$	$k_{mdeg} mRNA_p$	0.05 s^{-1}
5	$\rightarrow P$	$k_{tsn} mRNA_p$	0.05 s^{-1}
6	$P \rightarrow \emptyset$	$k_{deg} P$	0.05 s^{-1}
7	$g_p \rightleftharpoons g^*_p$	$k_{gon} g_p, k_{goff} g^*_p$	0.00045, 0.0028 s$^{-1\ddagger}$
8	$g^?_p + A \rightleftharpoons g^?_p A$	$k_b g^?_p \cdot A, k_d g^?_p A$	
9	$g^?_p + B \rightleftharpoons g^?_p B$	$k_b g^?_p \cdot B, k_d g^?_p B$	
10	$g^?_p A + B \rightleftharpoons g^?_p A.B$	$k_b g^?_p A \cdot B, k_d g^?_p A.B$	$k_b = 1\ \Omega/(\#\times s)$, $k_d = 1$; 55; 100 s$^{-1\dagger}$
11	$g^?_p B + A \rightleftharpoons g^?_p A.B$	$k_b g^?_p B \cdot A, k_d g^?_p A.B$	
12	$g_p A \rightleftharpoons g^*_p A$	$k_{gon} g_p A, k_{goff} g^*_p A$	0.00045, 0.0028 s$^{-1\ddagger}$
13	$g_p B \rightleftharpoons g^*_p B$	$k_{gon} g_p B, k_{goff} g^*_p B$	0.00045, 0.0028 s$^{-1\ddagger}$
14	$g_p A.B \rightleftharpoons g^*_p A.B$	$k_{gon} g_p A.B, k_{goff} g^*_p A.B$	0.00045, 0.0028 s$^{-1\ddagger}$

[†]Multiple entries denote scan values for Figure S1. Main text example used 0.0001 for the covalent modification model, 10 for the physical interaction model, and 55 for the multiple gene regulator model.
[‡]$k_{goff} = 0$ for fast promoter kinetics.