

$$\begin{aligned} \text{CollisionAvoidance} &\triangleq \forall p, q \in \text{TaskSet} \cup \text{ProcSet}(\text{Proc}) : \\ &\quad \Box(\text{ENABLED} \ (Send(p) \wedge Send(q)) \Rightarrow (p = q)) \end{aligned}$$

$$\begin{aligned} \text{HardRingCorrectness} &\triangleq \\ &\quad \wedge \forall t \in \text{TaskSet} : \wedge \Box(\text{Len}(\text{TaskState}[taskId(t)].msg) \leq 3) \\ &\quad \wedge \Box \Diamond \text{ENABLED} \ SendElem(t) \end{aligned}$$

$$\begin{aligned} \text{ReservationSafety} &\triangleq \\ &\quad \Box \forall chip, j \in \text{Task} : \wedge \text{ENABLED} \ SendRese(T[j]) \\ &\quad \quad \wedge \text{Shared}.chipCount = chip \\ &\quad \Rightarrow \wedge \text{TaskState}[j].res[chip] = j \\ &\quad \quad \wedge \forall i \in \text{Task} \setminus \{j\} : \text{TaskState}[i].res[chip] \in \{j, -1\} \end{aligned}$$

$$\begin{aligned} \text{SoftRingFairness} &\triangleq \\ &\quad \wedge \forall i \in \text{Proc} : \Box(\text{IF } i \in \text{Shared}.proc \\ &\quad \quad \text{THEN } \text{ProcState}[i].list \neq \langle \rangle \Rightarrow \Diamond(i = \text{ProcState}[i].token) \\ &\quad \quad \text{ELSE TRUE}) \\ &\quad \wedge \Box \Diamond (\forall i \in \text{Proc} \setminus \text{Failed} : \text{IF } i \in \text{Shared}.proc \\ &\quad \quad \quad \text{THEN } \text{Len}(\text{ProcState}[i].list) = 0 \\ &\quad \quad \quad \text{ELSE TRUE}) \end{aligned}$$