MODULE *SendModbus*

EXTENDS *Sequences*,
Naturals,
Modbus,
TLC

LOCAL INSTANCE *Hex*
WITH $natValue \leftarrow 0$, $hexValue \leftarrow \langle 0 \rangle$

$MessagesFromCryptoCell \triangleq$
{⟨":", "J", "G", "P", "9", "4", "3", "2", "J", "3", "9", "J", "G", "W", "I", "R", "W"⟩,
⟨":", "1", "1", "0", "3", "0", "0", "6", "B", "0", "0", "0", "3", "7", "E", "C", "R", "L", "F"⟩,
⟨":", "J", "G", "P", "9", "4", "3", "2", "J", "3", "9", "J", "G", "W", ":", "1", "1", "0", "3", "0", "0", "6
⟨⟩}

This algorithm didn't translate correctly. If I have time I'll break it down and post a bug report
BEGIN TRANSLATION
VARIABLES tx, $txBuf$, $txBufIndex$, pc, $txReg$, $message$

$vars \triangleq \langle tx, txBuf, txBufIndex, pc, txReg, message \rangle$

$Init \triangleq$ Global variables
$\land\ tx \in$ BOOLEAN
$\land\ message \in MessagesFromCryptoCell$
$\land\ txBuf = \langle\rangle$
$\land\ txReg =$ ""
$\land\ txBufIndex = 1$
$\land\ pc =$ "idle"

$idle \triangleq \land\ pc =$ "idle"
$\land\ txBuf' = message$
$\land$ IF $tx =$ TRUE
THEN $\land\ pc' =$ "transmit"
ELSE $\land\ pc' =$ "Done"
$\land$ UNCHANGED $\langle tx, txBufIndex, txReg, message \rangle$

$transmit \triangleq \land\ pc =$ "transmit"
$\land$ IF $IsModbus(txBuf)$
THEN $\land\ pc' =$ "send"
ELSE $\land\ pc' =$ "t1"
$\land$ UNCHANGED $\langle tx, txBuf, txReg, txBufIndex, message \rangle$

$send \triangleq \land\ pc =$ "send"
$\land$ IF $Len(txBuf) > 1$
THEN $\land\ pc' =$ "a"
$\land\ txReg' = txReg$
ELSE $\land\ pc' =$ "t1"

$$\land\ txReg' = Head(txBuf)$$
$$\land\ \text{UNCHANGED}\ \langle tx,\ txBuf,\ txBufIndex,\ message\rangle$$

$a \triangleq$
$$\land\ pc = \text{“a”}$$
$$\land\ txReg' = Head(txBuf)$$
$$\land\ txBuf' = Tail(txBuf)$$
$$\land\ pc' = \text{“b”}$$
$$\land\ \text{UNCHANGED}\ \langle tx,\ txBufIndex,\ message\rangle$$

$b \triangleq$
$$\land\ pc = \text{“b”}$$
$$\land\ txBufIndex' = txBufIndex + 1$$
$$\land\ pc' = \text{“send”}$$
$$\land\ \text{UNCHANGED}\ \langle tx,\ txBuf,\ txReg,\ message\rangle$$

$t1 \triangleq$
$$\land\ pc = \text{“t1”}$$
$$\land\ txReg' = \text{“”}$$
$$\land\ tx' = \text{FALSE}$$
$$\land\ pc' = \text{“Done”}$$
$$\land\ \text{UNCHANGED}\ \langle txBuf,\ txBufIndex,\ message\rangle$$

$Next \triangleq\ idle \lor transmit \lor send \lor a \lor b \lor t1$
$$\lor\ \text{Disjunct to prevent deadlock on termination}$$
$$(pc = \text{“Done”} \land \text{UNCHANGED}\ vars)$$

$Spec \triangleq\ Init \land \Box[Next]_{vars} \land \text{WF}_{vars}(Next)$

$Termination \triangleq\ \Diamond(pc = \text{“Done”})$

$LIVELINESS \triangleq$

check that if valid modbus is in the buffer it gets sent
$$\land\ (tx = \text{TRUE} \land IsModbus(txBuf)) \leadsto Len(txBuf) = 1$$
If there is something to send then it is alway sent
$$\land\ (tx = \text{TRUE} \land IsModbus(txBuf)) \leadsto (txReg \neq \text{“”})$$
If there is something to send, the flag is eventually reset
$$\land\ (tx = \text{TRUE}) \leadsto (tx = \text{FALSE})$$

$SAFETYCHECK \triangleq$

Only valid modbus triggers the sending
$$\land\ txReg \neq \text{“”} \Rightarrow IsModbus(message)$$
Only valid modbus characters are sent
$$\land\ (txReg \in ModbusChar)$$

END TRANSLATION

* Modification History
* Last modified Sun May 06 22:05:46 *EDT* 2018 by *SabraouM*
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