Management Module Board Testing Procedures

By: Emma Wallace

For each set of tests, the writer used Quartus to program a DE1-SoC FPGA board. While compiling the project, management_module_top.v was set as the top-level entity and the writer would uncomment the blocks made for each set of tests.

Operational States Testing Procedures and Results:

Step	Instruction	Expected Result	Actual Result	Comments
1	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS	Hex Display: POFFS	Operational State = POWER_OFF_STATE
2	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	Operational State = INITIALIZATION_STATE
3	Set SW[9:3] to 7'b1000101. Press KEY[1].	Hex Display: InItS LED[7] = ON	Hex Display: InItS LED[7] = ON	Operational State = INITIALIZATION_STATE Response Code = TPM_RC_INITIALIZE
4	Set SW[9:3] to 7'b1000100. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	Operational State = STARTUP_STATE
5	Press KEY[1].	Hex Display: StArt LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: StArt LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Operational State = STARTUP_STATE
6	Set SW[1] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON	Hex Display: OPErt LED[9] = ON	Operational State = OPERATIONAL_STATE Response Code = TPM_RC_SUCCESS
7	Set SW[9:3] to 7'b0100001. Set SW[2] to OFF. Press KEY[1].	Hex Display: OPErt LED[9] = ON LED[3] = OFF	Hex Display: OPErt LED[9] = ON LED[3] = OFF	Operational State = OPERATIONAL_STATE Response Code = TPM_RC_SUCCESS
8	Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[6] = ON LED[3] = OFF	Hex Display: OPErt LED[6] = ON LED[3] = OFF	Operational State = OPERATIONAL_STATE Response Code = TPM_RC_VALUE
9	Set SW[9:3] to 7'b1000011. Set SW[2] to OFF.	Hex Display: SELFt LED[9:5] = OFF	Hex Display: SELFt LED[9:5] = OFF	Operational State = SELF_TEST_STATE

	Set SW[0] to ON. Press KEY[1].			
10	Press KEY[1].	Hex Display: OPErt LED[9:5] = OFF	Hex Display: OPErt LED[9:5] = OFF	Operational State = OPERATIONAL_STATE
11	Set SW[9:3] to 7'b1000101. Set SW[2] to ON. Press KEY[1].	Hex Display: SHUtS LED[9:5] = OFF	Hex Display: SHUtS LED[9:5] = OFF	Operational State = SHUTDOWN_STATE
12	Press KEY[1].	Hex Display: OPErt LED[9:5] = OFF	Hex Display: OPErt LED[9:5] = OFF	Operational State = OPERATIONAL_STATE
13	Set SW[9:3] to 7'b1000010. Set SW[2] to OFF. Set SW[1] to OFF. Set SW[0] to OFF. Press KEY[1].	Hex Display: SELFt LED[9:5] = OFF	Hex Display: SELFt LED[9:5] = OFF	Operational State = SELF_TEST_STATE
14	Press KEY[1].	Hex Display: FAILS LED[8] = ON	Hex Display: FAILS LED[8] = ON	Operational State = FAILURE_MODE_STATE Response Code = TPM_RC_FAILURE
15	Set SW[9:3] to 7'b1000101. Set SW[2] to ON. Press KEY[1].	Hex Display: FAILS LED[8] = ON	Hex Display: FAILS LED[8] = ON	Operational State = FAILURE_MODE_STATE Response Code = TPM_RC_FAILURE
16	Press KEY[0].	Hex Display: POFFS	Hex Display: POFFS	Operational State = POWER_OFF_STATE

Startup Types Testing Procedures and Results:

Step	Instruction	Expected Result	Actual Result	Comments
1	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS	Hex Display: POFFS	Operational State = POWER_OFF_STATE
2	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	Operational State = INITIALIZATION_STATE
3	Set SW[9:3] to 7'b1000100. Set SW[2] to OFF. Set SW[0] to OFF. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	Operational State = STARTUP_STATE

4	Press KEY[1].	Hex Display: StArt LED[8] = ON	Hex Display: StArt LED[8] = ON	Operational State = STARTUP_STATE Startup Type = TPM_RESET
5	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS	Hex Display: POFFS	Operational State = POWER_OFF_STATE
6	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	Operational State = INITIALIZATION_STATE
7	Set SW[9:3] to 7'b1000100. Set SW[2] to OFF. Set SW[0] to ON. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	Operational State = STARTUP_STATE
8	Press KEY[1].	Hex Display: StArt LED[7] = ON	Hex Display: StArt LED[7] = ON	Operational State = STARTUP_STATE Startup Type = TPM_RESTART
9	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS	Hex Display: POFFS	Operational State = POWER_OFF_STATE
10	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	Operational State = INITIALIZATION_STATE
11	Set SW[9:3] to 7'b1000100. Set SW[2] to ON. Set SW[0] to ON. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	Operational State = STARTUP_STATE
12	Press KEY[1].	Hex Display: StArt LED[6] = ON	Hex Display: StArt LED[6] = ON	Operational State = STARTUP_STATE Startup Type = TPM_RESUME
13	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS	Hex Display: POFFS	Operational State = POWER_OFF_STATE
14	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	Operational State = INITIALIZATION_STATE
15	Set SW[9:3] to 7'b1000100. Set SW[2] to ON. Set SW[1] to OFF. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	Operational State = STARTUP_STATE
16	Press KEY[1].	Hex Display: StArt LED[5] = ON LED[4] = ON	Hex Display: StArt LED[5] = ON LED[4] = ON	Operational State = STARTUP_STATE Startup Type = TPM_TYPE

				Response Code = TPM_RC_VALUE
17	Press KEY[1].	Hex Display: InItS LED[5] = ON LED[4] = ON	Hex Display: InItS LED[5] = ON LED[4] = ON	Operational State = INITIALIZATION_STATE Startup Type = TPM_TYPE Response Code = TPM_RC_VALUE

Hierarchy Enables Testing Procedures and Results:

Step	Instruction	Expected Result	Actual Result	Comments
1	Reset SW[9:0] to 10'b0000000001. Program board. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
2	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	
3	Set SW[9] to ON. Set SW[8:6] to 3'b000. Set SW[3] to ON. Set SW[2] to ON. Set SW[0] to ON. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	
4	Press KEY[1] twice.	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = OFF LED[0] = ON	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = OFF LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b0 ehEnable = 1'b1
5	Reset SW[9:0] to 10'b0000000001. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
6	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	
7	Set SW[9] to ON. Set SW[8:6] to 3'b000. Set SW[3] to ON. Set SW[2] to OFF. Set SW[0] to ON.	Hex Display: StArt	Hex Display: StArt	

	Press KEY[1].			
8	Press KEY[1] twice.	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
9	Reset SW[9:0] to 10'b0000000001. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
10	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	
11	Set SW[9] to ON. Set SW[8:6] to 3'b000. Set SW[3] to OFF. Set SW[2] to OFF. Set SW[0] to ON. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	
12	Press KEY[1] twice.	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
13	Set SW[1] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
14	Set SW[9] to OFF. Set SW[8:6] to 3'b100. Set SW[2] to OFF. Set SW[5:4] to 2'b00. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
15	Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[6] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[6] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_VALUE phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1

16	Set SW[8:6] to 3'b101. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = OFF LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = OFF LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b1 ehEnable = 1'b1
17	Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
18	Set SW[8:6] to 3'b010. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = OFF LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = OFF LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b0 ehEnable = 1'b1
19	Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
20	Set SW[8:6] to 3'b011. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = OFF	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = OFF	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b0
21	Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
22	Reset SW[9:0] to 10'b0000000001. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
23	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	

24	Set SW[9] to ON. Set SW[8:6] to 3'b000. Set SW[3] to ON. Set SW[2] to OFF. Set SW[0] to ON. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	
25	Press KEY[1] twice.	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
26	Set SW[1] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
27	Set SW[9] to OFF. Set SW[8:6] to 3'b100. Set SW[5:4] to 2'b01. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
28	Set SW[9] to OFF. Set SW[8:6] to 3'b101. Set SW[5:4] to 2'b01. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
29	Set SW[9] to OFF. Set SW[8:6] to 3'b010. Set SW[5:4] to 2'b01. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = OFF LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = OFF LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b0 ehEnable = 1'b1
30	Set SW[9] to OFF. Set SW[8:6] to 3'b011. Set SW[5:4] to 2'b01. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = OFF LED[0] = ON	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = OFF LED[0] = ON	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b0 ehEnable = 1'b1

31	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
32	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	
33	Set SW[9] to ON. Set SW[8:6] to 3'b000. Set SW[3] to ON. Set SW[2] to ON. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	
34	Press KEY[1] twice.	Hex Display: StArt LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: StArt LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
35	Set SW[1] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	
36	Set SW[9] to OFF. Set SW[8:6] to 3'b100. Set SW[5:4] to 2'b00. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
37	Set SW[9] to OFF. Set SW[8:6] to 3'b100. Set SW[5:4] to 2'b01. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
38	Set SW[9] to OFF. Set SW[8:6] to 3'b101. Set SW[5:4] to 2'b01. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0

39	Set SW[9] to OFF. Set SW[8:6] to 3'b001. Set SW[5:4] to 2'b01. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
40	Set SW[9] to OFF. Set SW[8:6] to 3'b011. Set SW[5:4] to 2'b01. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
41	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
42	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	
43	Set SW[9] to ON. Set SW[8:6] to 3'b000. Set SW[3] to OFF. Set SW[2] to OFF. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	
44	Press KEY[1] twice.	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
45	Set SW[1] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	
46	Set SW[9] to OFF. Set SW[8:6] to 3'b100. Set SW[5:4] to 2'b10. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1

47	Set SW[9] to OFF. Set SW[8:6] to 3'b101. Set SW[5:4] to 2'b10. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
48	Set SW[9] to OFF. Set SW[8:6] to 3'b010. Set SW[5:4] to 2'b10. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[5] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
49	Set SW[9] to OFF. Set SW[8:6] to 3'b011. Set SW[5:4] to 2'b10. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = OFF	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = OFF	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b0
50	Reset SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
51	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	
52	Set SW[9] to ON. Set SW[8:6] to 3'b000. Set SW[3] to ON. Set SW[2] to ON. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	
53	Press KEY[1] twice.	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: StArt LED[9] = ON LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
54	Set SW[1] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = OFF LED[1] = OFF LED[0] = OFF	

55	Set SW[9] to OFF. Set SW[8:6] to 3'b100. Set SW[5:4] to 2'b00. Set SW[2] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
56	Set SW[9] to OFF. Set SW[8:6] to 3'b100. Set SW[5:4] to 2'b10. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
57	Set SW[9] to OFF. Set SW[8:6] to 3'b101. Set SW[5:4] to 2'b10. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
58	Set SW[9] to OFF. Set SW[8:6] to 3'b001. Set SW[5:4] to 2'b10. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0
59	Set SW[9] to OFF. Set SW[8:6] to 3'b011. Set SW[5:4] to 2'b10. Set SW[2] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0

Remaining Response Codes Testing Procedures and Results:

Step	Instruction	Expected Result	Actual Result	Comments
1	Set SW[9:0] to 10'b0000000000. Press KEY[0].	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Hex Display: POFFS LED[3] = OFF LED[2] = OFF LED[1] = OFF LED[0] = OFF	Reset Check: phEnable = 1'b0 phEnableNV = 1'b0 shEnable = 1'b0 ehEnable = 1'b0

2	Press KEY[1].	Hex Display: InItS	Hex Display: InItS	
3	Set SW[9:7] to 3'b001. Set SW[6:4] to 3'b000. Set SW[1] to ON. Set SW[0] to OFF. Press KEY[1].	Hex Display: StArt	Hex Display: StArt	
4	Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = ON LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b1 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
5	Set SW[9:7] to 3'b010. Set SW[6:4] to 3'b100. Set SW[3:2] to 2'b00. Set SW[0] to OFF. Press KEY[1] twice.	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[9] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_SUCCESS phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
6	Set SW[9:7] to 3'b010. Set SW[6:4] to 3'b010. Set SW[3:2] to 2'b01. Set SW[0] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[5] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = TPM_RC_AUTH_TYPE phEnable = 1'b0 phEnableNV = 1'b1 shEnable = 1'b1 ehEnable = 1'b1
7	Set SW[9:7] to 3'b010. Set SW[6:4] to 3'b010. Set SW[3:2] to 2'b11. Set SW[0] to ON. Press KEY[1] twice.	Hex Display: OPErt LED[4] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Hex Display: OPErt LED[4] = ON LED[3] = OFF LED[2] = ON LED[1] = ON LED[0] = ON	Response Code = executionEng_in
8	Set SW[9:7] to 3'b011. Press KEY[1] twice.	Hex Display: OPErt LED[4] = ON	Hex Display: OPErt LED[4] = ON	
9	Set SW[9:7] to 3'b100. Set SW[1] to OFF. Press KEY[1].	Hex Display: SELF	Hex Display: SELF	
10	Press KEY[1].	Hex Display: FAIL	Hex Display: FAIL	Response Code = TPM_RC_FAILURE

		LED[8] = ON	LED[8] = ON	
11	Set SW[9:7] to 3'b101. Press KEY[1].	Hex Display: FAIL LED[4] = ON	Hex Display: FAIL LED[4] = ON	Response Code = executionEng_in
12	Set SW[9:7] to 3'b100. Press KEY[1] .	Hex Display: FAIL LED[8] = ON	Hex Display: FAIL LED[8] = ON	Response Code = TPM_RC_FAILURE
13	Set SW[9:7] to 3'b110. Press KEY[1].	Hex Display: FAIL LED[4] = ON	Hex Display: FAIL LED[4] = ON	Response Code = executionEng_in