System Conformance Testing

8

Test Suite Supplement I

I

Testing of Run State Machines

Summary:

This document contains test specifications for Testing of implemented Run State Machines.

Version 01.01.01 is a KNX Approved Standard.

This document is part of the KNX Specifications v2.1.

Document Updates

Version	Date	Modifications
0.1	2008.03	Draft Proposal
0.2	2008.05	Revised Draft Proposal
0.3	2008.06	Readying the document for Release for voting
0.4	2008.11	Readying the document for Final voting – step 1 KonCert
0.5	2009.04	Readying the document for Final voting – step 2 KSG
1.0	2009-06	Resolution of comments from final voting cycle - Readying document for publication in V2.0 of KNX specifications
01.01.01	2013.10.24	Editorial updates for the publication of KNX Specifications 2.1.

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Contents

1 General

1.1 Introduction

This test suite supplement contains test specifications for the testing the correct implementation of Run State Machines in accordance with Volume 3/5/2.

Note: the underneath test specifications do not contain tests for testing the reaction of the run state machine when the initial state of the BDUT is ‘starting’ and ‘shutting down’, as current implementations do not support these states. If an implementation, in which these states are supported, is submitted to certification, the test specifications have to be updated accordingly.

1.2 Test Set-up

For all tests, the same setup can be used. As PC interface an RS232 or USB interface can be used.

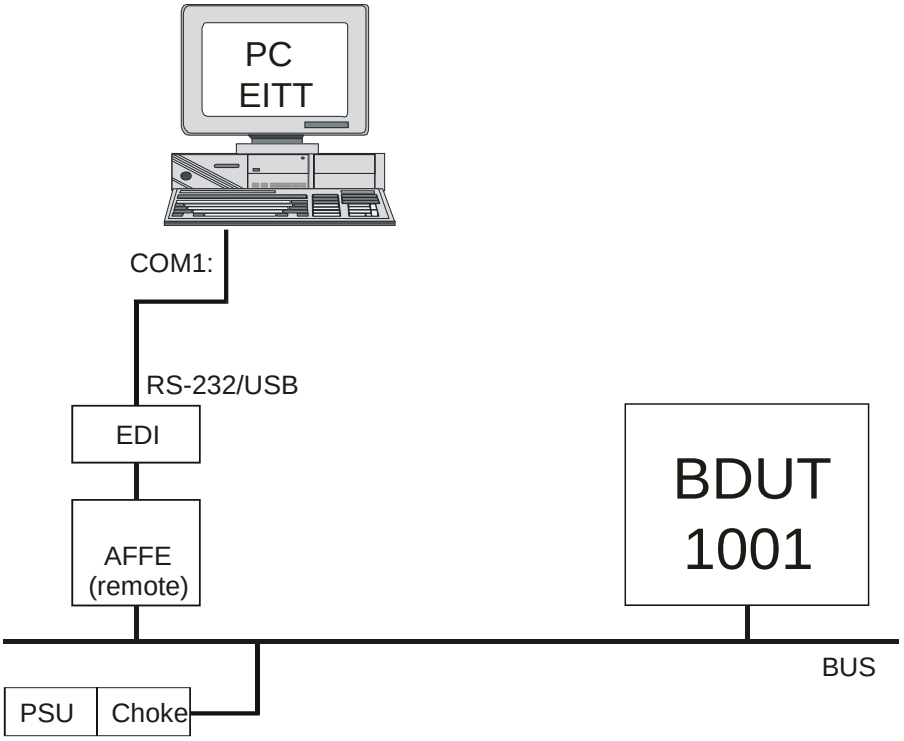

Fig. 8-TSS-I-1: Set-up for testing run state machines

1.3 State-transition table

The State transition table is given in Volume 3/5/2.

2 Testing of Run State Machines

2.1 Test Preparation

Assumed Memory Model:

Address 0x4000 to 0xBFFF:

2.2 Tests with initial state RUNSTATE_HALTED

Preparation: Load application object (executable part)

2.2.1 Event: Invalid RUNCONTROL and RUNCONTROL_NO_OPERATION

Preparation: Unload test object (Application)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Read run state

BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 47 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

First check if BDUT ignores invalid Run state event

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 6F 4B D7 03 06 10 01 FF 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=FF 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Now send to run state object a RUNCONTROL_NO_OPERATION

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 6F 4F D7 03 06 10 01 00 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=00 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.2.2 Event: RUNCONTROL_RESTART and executable part loaded

Note: Only applicable for devices complying with System 2/BCU2 profiles or mask versions 0300h and 2300h. For all other system profiles, this test does not apply as the initial state can not be provoked.

Set device to state 'halted'with executable part loaded as done in clause 2.3.5.

Send to run state object a RUNCONTROL_RESTART

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

IN BC 1041 1001 6F 43 D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.2.3 Event: RUNCONTROL_RESTART and executable part unloaded

Preparation: Unload test object (Application)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_RESTART

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 6F 47 D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.2.4 Event: RUNCONTROL_STOP

Preparation: Unload test object (Application)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_STOP

---> **Acceptance**: BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 47 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.2.5 Event: Unload to corresponding load state

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to run state object a RUNCONTROL_RESTART

BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 6F 43 D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Read run state

BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 47 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 4B D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 4F D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.2.6 Event: Device restart and executable part loaded (Power Up)

Not applicable as device is in run state „halted“, which is for a loaded application not possible.

2.2.7 Event: Device restart and executable part not loaded (Power Up)

Preparation: Unload test object (Application)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send a reset to BDUT

IN BC AFFE 1001 61 47 80 :Restart()

Connection breaks down, run state is RUNSTATE_HALTED

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.3 Tests with initial state RUNSTATE_RUNNING

2.3.1 Preparation

Note: the underneath test preparation is specific to a certain system profile and might have to be adapted for other system profiles to ensure that at the end of the preparation the load state machine is in state "loaded" and the run state machine is in the state 'running'.

Load application object (executable part)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to application program object a LOAD_EVENT_START

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 47 D7 03 05 10 01 01 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4B D7 03 05 10 01 03 00 07 00 00 F8 F1 02 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 07 00 00 F8 F1 02 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4F D7 03 05 10 01 03 00 40 A4 01 5C F1 03 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 40 A4 01 5C F1 03 00 00)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 53 D7 03 05 10 01 03 00 42 00 01 00 22 03 80 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 42 00 01 00 22 03 80 00)

OUT B0 1001 AFFE 60 D2 :T-Ack(Seq=4)

OUT BC 1001 AFFE 66 53 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D2 :T-Ack(Seq=4)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 57 D7 03 05 10 01 03 00 43 00 01 00 33 03 80 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 43 00 01 00 33 03 80 00)

OUT B0 1001 AFFE 60 D6 :T-Ack(Seq=5)

OUT BC 1001 AFFE 66 57 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D6 :T-Ack(Seq=5)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5B D7 03 05 10 01 03 00 44 00 72 00 FF 03 80 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 44 00 72 00 FF 03 80 00)

OUT B0 1001 AFFE 60 DA :T-Ack(Seq=6)

OUT BC 1001 AFFE 66 5B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DA :T-Ack(Seq=6)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5F D7 03 05 10 01 03 02 41 34 00 00 C5 FF 12 11
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 02 41 34 00 00 C5 FF 12 11)

OUT B0 1001 AFFE 60 DE :T-Ack(Seq=7)

OUT BC 1001 AFFE 66 5F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DE :T-Ack(Seq=7)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 63 D7 03 05 10 01 03 04 40 B7 03 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 04 40 B7 03 00 00 00 00 00)

OUT B0 1001 AFFE 60 E2 :T-Ack(Seq=8)

OUT BC 1001 AFFE 66 63 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 E2 :T-Ack(Seq=8)

Send to application program object a LOAD_EVENT_COMPLETE

BDUT returns load state LOAD_STATE_LOADED

IN BC AFFE 1001 6F 67 D7 03 05 10 01 02 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 E6 :T-Ack(Seq=9)

OUT BC 1001 AFFE 66 67 D6 03 05 10 01 01 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 E6 :T-Ack(Seq=9)

Send to run state object a RUNCONTROL_RESTART

BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 6F 6B D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 EA :T-Ack(Seq=A)

OUT BC 1001 AFFE 66 6B D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 EA :T-Ack(Seq=A)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.3.2 Event: Invalid RUNCONTROL and RUNCONTROL_NO_OPERATION

Precondition: The executable part is already loaded (see clause 2.3.1)

Preparation: Set run state to RUNSTATE_RUNNING

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

First check if BDUT ignores invalid Run State event

---> **Acceptance**: BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 6F 47 D7 03 06 10 01 FF 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=FF 00 00 00 00 00 00 00 00 00)

IN B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

IN BC 1001 AFFE 66 47 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Now send to run state object a RUNCONTROL_NO_OPERATION

---> **Acceptance**: BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 6F 4B D7 03 06 10 01 00 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=00 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.3.3 Event: RUNCONTROL_RESTART (executable part loaded)

Precondition: The executable part is already loaded (see clause 2.3.1)

Preparation: Set run state to RUNSTATE_RUNNING

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_RESTART

---> **Acceptance**: BDUT returns run state RUNSTATE_RUNNING. It may intermediately return RUNSTATE_READY (this is marked in italics and is thus optional).

IN BC 1041 1001 6F 47 D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

In case of an intermediate RUNSTATE_Ready, observe waiting period to ensure that application has started.

Read run state

IN BC 1041 1001 65 47 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.3.4 Event: RUNCONTROL_RESTART and executable part unloaded

Not applicable, the runstate „running“ is not possible for an unloaded application.

2.3.5 Event: RUNCONTROL_STOP

Precondition: The executable part is already loaded (see clause 2.3.1)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_STOP

---> **Acceptance**: BDUT returns run state RUNSTATE_TERMINATED, optional HALTED

IN BC 1041 1001 6F 47 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

(optional OUT BC 1001 AFFE 66 47 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.3.6 Event: Unload corresponding load state

Precondition: The executable part is already loaded (done in 2.)

Preparation: Set run state to RUNSTATE_RUNNING

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to run state object a RUNCONTROL_RESTART

BDUT returns run state RUNSTATE_RUNNING (it may optionally return the intermediate state ‘ready’).

IN BC 1041 1001 6F 43 D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Read run state

BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 47 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 4B D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED, alternatively the intermediate step 'Shutting Down (05h)'

IN BC 1041 1001 65 4F D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.3.7 Event: Device restart and executable part loaded (Power Up)

Preparation: Load application object (executable part)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to application program object a LOAD_EVENT_START

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 47 D7 03 05 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Note: the underneath test preparation until the next dotted line is specific to a certain system profile and might have to be adapted for other system profiles to ensure that at the end of the preparation the load state machine is in state “loaded” and the run state machine is in the state “running”.

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4B D7 03 05 10 01 03 00 07 00 00 F8 F1 02 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 07 00 00 F8 F1 02 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4F D7 03 05 10 01 03 00 40 A4 01 5C F1 03 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 40 A4 01 5C F1 03 00 00)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 53 D7 03 05 10 01 03 00 42 00 01 00 22 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 42 00 01 00 22 03 80 00)

OUT B0 1001 AFFE 60 D2 :T-Ack(Seq=4)

OUT BC 1001 AFFE 66 53 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D2 :T-Ack(Seq=4)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 57 D7 03 05 10 01 03 00 43 00 01 00 33 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 43 00 01 00 33 03 80 00)

OUT B0 1001 AFFE 60 D6 :T-Ack(Seq=5)

OUT BC 1001 AFFE 66 57 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D6 :T-Ack(Seq=5)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5B D7 03 05 10 01 03 00 44 00 72 00 FF 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 44 00 72 00 FF 03 80 00)

OUT B0 1001 AFFE 60 DA :T-Ack(Seq=6)

OUT BC 1001 AFFE 66 5B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DA :T-Ack(Seq=6)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5F D7 03 05 10 01 03 02 41 34 00 00 C5 FF 12 11
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 02 41 34 00 00 C5 FF 12 11)

OUT B0 1001 AFFE 60 DE :T-Ack(Seq=7)

OUT BC 1001 AFFE 66 5F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DE :T-Ack(Seq=7)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 63 D7 03 05 10 01 03 04 40 B7 03 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 04 40 B7 03 00 00 00 00 00)

OUT B0 1001 AFFE 60 E2 :T-Ack(Seq=8)

OUT BC 1001 AFFE 66 63 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 E2 :T-Ack(Seq=8)

Send to application program object a LOAD_EVENT_COMPLETE

BDUT returns load state LOAD_STATE_LOADED

IN BC AFFE 1001 6F 67 D7 03 05 10 01 02 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 E6 :T-Ack(Seq=9)

OUT BC 1001 AFFE 66 67 D6 03 05 10 01 01 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 E6 :T-Ack(Seq=9)

Send to application program object a RUNSTATE_RESTART

IN BC 1041 1001 6F 6B D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

IN B0 1001 AFFE 60 EA :T-Ack(Seq=A)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

Actual start of test

Preparation: Do reset of device

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send a reset to BDUT

IN BC AFFE 1001 61 43 80 :Restart()

---> **Acceptance**: Connection breaks down, run state *may* intermediately return RUNSTATE_HALTED or RUNSTATE_READY or may immediately return the run state RUNSTATE_RUNNING. The test sequence in italics is thus optional.

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT may return the intermediate run state RUNSTATE_HALTED and/or RUNSTATE_READY

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

And/or

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

In case of an intermediate RUNSTATE_HALTED and/or RUNSTATE_READY, observe waiting period to ensure that application has started.

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 47 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.3.8 Event: Device restart and executable part unloaded (Power Up)

Not applicable, marked as such in AN080.

2.4 Tests with initial state RUNSTATE_READY

2.4.1 General

If run-conditions are immediately fulfilled and the executable part is started automatically, it may be possible that the BDUT never returns the intermediate run state ‘ready’. In that case the underneath tests can be skipped.

2.4.2 Event: Invalid RUNCONTROL and RUNCONTROL_NO_OPERATION

Precondition: The executable part is already loaded

Preparation: Set run state to RUNSTATE_READY

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send a reset to BDUT

IN BC AFFE 1001 61 43 80 :Restart()

---> **Acceptance**: Connection breaks down, run state is RUNSTATE_READY

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=01.00.001)

Read run state

BDUT returns run state RUNSTATE_READY (intermediate state)

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

First check if BDUT ignores invalid run state event

---> **Acceptance**: BDUT returns run state RUNSTATE_READY

IN BC 1041 1001 6F 47 D7 03 06 10 01 FF 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=FF 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Now send to run state object a RUNCONTROL_NO_OPERATION

---> **Acceptance**: BDUT returns run state RUNSTATE_READY

IN BC 1041 1001 6F 4B D7 03 06 10 01 00 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=00 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.4.3 Event: Restart and executable part loaded

Precondition: The executable part is already loaded (done in 2.)

Preparation: Set run state to RUNSTATE_READY

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send a reset to BDUT

IN BC AFFE 1001 61 43 80 :Restart()

---> **Acceptance**: Connection breaks down, run state is RUNSTATE_READY

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_READY (intermediate state)

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_RESTART

BDUT returns run state RUNSTATE_READY (intermediate state)

IN BC 1041 1001 6F 47 D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Here we wait a few seconds to be sure that the application has started.

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 4B D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.4.4 Event: Restart and executable part unloaded

Not applicable (if application is unloaded and a restart is sent to the BDUT, the BDUT can acc. AN 080 never be set to the ready state. The case where the initial state is ready for an unloaded application can never occur).

2.4.5 Event: Stop run state machine

Preparation: Set run state to RUNSTATE_READY

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send a reset to BDUT

IN BC AFFE 1001 61 43 80 :Restart()

---> **Acceptance**: Connection breaks down, run state is RUNSTATE_READY

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_READY (intermediate state)

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_STOP

---> **Acceptance**: BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 47 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.4.6 Event: Unload to corresponding load state

Preparation: Set run state to RUNSTATE_READY

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send a reset to BDUT

IN BC AFFE 1001 61 43 80 :Restart()

---> **Acceptance**: Connection breaks down, run state is RUNSTATE_READY

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_READY (intermediate state)

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 47 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 4B D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.4.7 Event: Device restart and executable part loaded (Power Up)

Precondition: The executable part is already loaded

Preparation: Load application object (executable part)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to application program object a LOAD_EVENT_START

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 47 D7 03 05 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4B D7 03 05 10 01 03 00 07 00 00 F8 F1 02 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 07 00 00 F8 F1 02 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4F D7 03 05 10 01 03 00 40 A4 01 5C F1 03 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 40 A4 01 5C F1 03 00 00)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 53 D7 03 05 10 01 03 00 42 00 01 00 22 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 42 00 01 00 22 03 80 00)

OUT B0 1001 AFFE 60 D2 :T-Ack(Seq=4)

OUT BC 1001 AFFE 66 53 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D2 :T-Ack(Seq=4)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 57 D7 03 05 10 01 03 00 43 00 01 00 33 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 43 00 01 00 33 03 80 00)

OUT B0 1001 AFFE 60 D6 :T-Ack(Seq=5)

OUT BC 1001 AFFE 66 57 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D6 :T-Ack(Seq=5)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5B D7 03 05 10 01 03 00 44 00 72 00 FF 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 44 00 72 00 FF 03 80 00)

OUT B0 1001 AFFE 60 DA :T-Ack(Seq=6)

OUT BC 1001 AFFE 66 5B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DA :T-Ack(Seq=6)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5F D7 03 05 10 01 03 02 41 34 00 00 C5 FF 12 11 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 02 41 34 00 00 C5 FF 12 11)

OUT B0 1001 AFFE 60 DE :T-Ack(Seq=7)

OUT BC 1001 AFFE 66 5F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DE :T-Ack(Seq=7)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 63 D7 03 05 10 01 03 04 40 B7 03 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 04 40 B7 03 00 00 00 00 00)

OUT B0 1001 AFFE 60 E2 :T-Ack(Seq=8)

OUT BC 1001 AFFE 66 63 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 E2 :T-Ack(Seq=8)

Send to application program object a LOAD_EVENT_COMPLETE

BDUT returns load state LOAD_STATE_LOADED

IN BC AFFE 1001 6F 67 D7 03 05 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 E6 :T-Ack(Seq=9)

OUT BC 1001 AFFE 66 67 D6 03 05 10 01 01 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 E6 :T-Ack(Seq=9)

Send to application program object a RUNSTATE_RESTART

IN BC 1041 1001 6F 6B D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

IN B0 1001 AFFE 60 EA :T-Ack(Seq=A)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

Start of actual test: Set run state to RUNSTATE_READY

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send a reset to BDUT

IN BC AFFE 1001 61 43 80 :Restart()

---> **Acceptance**: Connection breaks down, run state is RUNSTATE_READY

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_READY

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send a reset to BDUT

IN BC AFFE 1001 61 47 80 :Restart()

---> **Acceptance**: Connection breaks down, run state is RUNSTATE_READY

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_READY (intermediate state)

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Observe a short wait time to ensure that the application has started.

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 47 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.4.8 Event: Device restart and executable part unloaded (Power Up)

Not applicable, marked as such in AN080.

2.5 Tests with initial state RUNSTATE_TERMINATED

Preparation: Load application object (executable part)

2.5.1 Event: Invalid RUNCONTROL and RUNCONTROL_NO_OPERATION

Precondition: The executable part is already loaded

Preparation: Set run state to RUNSTATE_TERMINATED

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to run state object a RUNCONTROL_STOP

BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 43 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

First check if BDUT ignores invalid run state event

---> **Acceptance**: BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 47 D7 03 06 10 01 FF 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=FF 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Now send to run state object a RUNCONTROL_NO_OPERATION

---> **Acceptance**: BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 4B D7 03 06 10 01 00 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=00 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.5.2 Event: RUNCONTROL_RESTART (executable part loaded)

Precondition: The executable part is already loaded (done)

Preparation: Set run state to RUNSTATE_TERMINATED

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to run state object a RUNCONTROL_STOP

BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 43 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_RESTART

---> **Acceptance**: BDUT returns run state RUNSTATE_RUNNING (it may return the intermediate state 'ready').

IN BC 1041 1001 6F 47 D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.5.3 Event: RUNCONTROL_RESTART (executable part unloaded)

Preparation: Set run state to RUNSTATE_TERMINATED

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_STOP

BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 47 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Send to run state object a RUNCONTROL_RESTART

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 6F 4B D7 03 06 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.5.4 Event: RUNCONTROL_STOP

Preparation: Set run state to RUNSTATE_TERMINATED

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to run state object a RUNCONTROL_STOP

BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 43 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_STOP

---> **Acceptance**: BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 47 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.5.5 Event: Unload to corresponding load state

Preparation: Set run state to RUNSTATE_TERMINATED

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to run state object a RUNCONTROL_STOP

BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 43 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 47 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Read run state

---> **Acceptance**: BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 4B D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.5.6 Event: Device restart and executable part loaded (Power Up)

Preparation: Load application object (executable part)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to application program object a LOAD_EVENT_START

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 47 D7 03 05 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Note: the underneath test preparation until the next dotted line is specific to a certain system profile and might have to be adapted for other system profiles to ensure that at the end of the preparation the load state machine is in state “loaded” and the run state machine is in the state “loaded”.

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4B D7 03 05 10 01 03 00 07 00 00 F8 F1 02 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 07 00 00 F8 F1 02 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4F D7 03 05 10 01 03 00 40 A4 01 5C F1 03 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 40 A4 01 5C F1 03 00 00)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 53 D7 03 05 10 01 03 00 42 00 01 00 22 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 42 00 01 00 22 03 80 00)

OUT B0 1001 AFFE 60 D2 :T-Ack(Seq=4)

OUT BC 1001 AFFE 66 53 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D2 :T-Ack(Seq=4)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 57 D7 03 05 10 01 03 00 43 00 01 00 33 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 43 00 01 00 33 03 80 00)

OUT B0 1001 AFFE 60 D6 :T-Ack(Seq=5)

OUT BC 1001 AFFE 66 57 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D6 :T-Ack(Seq=5)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5B D7 03 05 10 01 03 00 44 00 72 00 FF 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 44 00 72 00 FF 03 80 00)

OUT B0 1001 AFFE 60 DA :T-Ack(Seq=6)

OUT BC 1001 AFFE 66 5B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DA :T-Ack(Seq=6)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5F D7 03 05 10 01 03 02 41 34 00 00 C5 FF 12 11 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 02 41 34 00 00 C5 FF 12 11)

OUT B0 1001 AFFE 60 DE :T-Ack(Seq=7)

OUT BC 1001 AFFE 66 5F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DE :T-Ack(Seq=7)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 63 D7 03 05 10 01 03 04 40 B7 03 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 04 40 B7 03 00 00 00 00 00)

OUT B0 1001 AFFE 60 E2 :T-Ack(Seq=8)

OUT BC 1001 AFFE 66 63 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 E2 :T-Ack(Seq=8)

Send to application program object a LOAD_EVENT_COMPLETE

BDUT returns load state LOAD_STATE_LOADED

IN BC AFFE 1001 6F 67 D7 03 05 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 E6 :T-Ack(Seq=9)

OUT BC 1001 AFFE 66 67 D6 03 05 10 01 01 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 E6 :T-Ack(Seq=9)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

Start of actual test

Precondition: The executable part is already loaded

Preparation: Set run state to RUNSTATE_TERMINATED

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to run state object a RUNCONTROL_STOP

BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 43 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send a reset to BDUT

IN BC AFFE 1001 61 47 80 :Restart()

---> **Acceptance:** Connection breaks down, run state may intermediately return RUNSTATE_HALTED and/or RUNSTATE_READY or may immediately return the run state RUNSTATE_RUNNING. The test sequence in italics is thus optional.

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

BDUT returns run state RUNSTATE_HALTED and/or RUNSTATE_READY (intermediate state)

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

And/or

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 02 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

In case of an intermediate RUNSTATE_HALTED and/or RUNSTATE_Ready, observe a wait time to ensure that the application has started.

Read run state

---> **Acceptance:** BDUT returns run state RUNSTATE_RUNNING

IN BC 1041 1001 65 47 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 01 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

2.5.7 Event: Device restart and executable part not loaded (Power Up)

Preparation: Unload test object (Application)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to run state object a RUNCONTROL_STOP

BDUT returns run state RUNSTATE_TERMINATED

IN BC 1041 1001 6F 47 D7 03 06 10 01 02 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=06, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 06 10 01 03 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=03)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Send a reset to BDUT

IN BC AFFE 1001 61 4B 80 :Restart()

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

T-ACK is optional. It is depending on the device architecture.

---> **Acceptance:** Connection breaks down, load state remains UNLOADED

Reconnect to BDUT

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Read run state

---> **Acceptance:** BDUT returns run state RUNSTATE_HALTED

IN BC 1041 1001 65 43 D5 03 06 10 01 :PropertyValueRead(Obj=03, Prop=06, Count=1, Start=001)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 06 10 01 00 :PropertyValueResponse(Obj=03, Prop=06, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect

Restore device (Load application object)

IN B0 AFFE 1001 60 80 :T-Connect(Addr=1001)

Send to application program object a LOAD_EVENT_UNLOAD

BDUT returns load state LOAD_STATE_UNLOADED

IN BC AFFE 1001 6F 43 D7 03 05 10 01 04 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=04 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C2 :T-Ack(Seq=0)

OUT BC 1001 AFFE 66 43 D6 03 05 10 01 00 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=00)

IN B0 AFFE 1001 60 C2 :T-Ack(Seq=0)

Send to application program object a LOAD_EVENT_START

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 47 D7 03 05 10 01 01 00 00 00 00 00 00 00 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=01 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 C6 :T-Ack(Seq=1)

OUT BC 1001 AFFE 66 47 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 C6 :T-Ack(Seq=1)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4B D7 03 05 10 01 03 00 07 00 00 F8 F1 02 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 07 00 00 F8 F1 02 00 00)

OUT B0 1001 AFFE 60 CA :T-Ack(Seq=2)

OUT BC 1001 AFFE 66 4B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CA :T-Ack(Seq=2)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 4F D7 03 05 10 01 03 00 40 A4 01 5C F1 03 00 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 40 A4 01 5C F1 03 00 00)

OUT B0 1001 AFFE 60 CE :T-Ack(Seq=3)

OUT BC 1001 AFFE 66 4F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 CE :T-Ack(Seq=3)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 53 D7 03 05 10 01 03 00 42 00 01 00 22 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 42 00 01 00 22 03 80 00)

OUT B0 1001 AFFE 60 D2 :T-Ack(Seq=4)

OUT BC 1001 AFFE 66 53 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D2 :T-Ack(Seq=4)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 57 D7 03 05 10 01 03 00 43 00 01 00 33 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 43 00 01 00 33 03 80 00)

OUT B0 1001 AFFE 60 D6 :T-Ack(Seq=5)

OUT BC 1001 AFFE 66 57 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 D6 :T-Ack(Seq=5)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5B D7 03 05 10 01 03 00 44 00 72 00 FF 03 80 00 :PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 00 44 00 72 00 FF 03 80 00)

OUT B0 1001 AFFE 60 DA :T-Ack(Seq=6)

OUT BC 1001 AFFE 66 5B D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DA :T-Ack(Seq=6)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 5F D7 03 05 10 01 03 02 41 34 00 00 C5 FF 12 11
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 02 41 34 00 00 C5 FF 12 11)

OUT B0 1001 AFFE 60 DE :T-Ack(Seq=7)

OUT BC 1001 AFFE 66 5F D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 DE :T-Ack(Seq=7)

Send to application program object a LOAD_EVENT_SEGMENT

BDUT returns load state LOAD_STATE_LOADING

IN BC AFFE 1001 6F 63 D7 03 05 10 01 03 04 40 B7 03 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=03 04 40 B7 03 00 00 00 00 00)

OUT B0 1001 AFFE 60 E2 :T-Ack(Seq=8)

OUT BC 1001 AFFE 66 63 D6 03 05 10 01 02 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=02)

IN B0 AFFE 1001 60 E2 :T-Ack(Seq=8)

Send to application program object a LOAD_EVENT_COMPLETE

BDUT returns load state LOAD_STATE_LOADED

IN BC AFFE 1001 6F 67 D7 03 05 10 01 02 00 00 00 00 00 00 00 00 00
:PropertyValueWrite(Obj=03, Prop=05, Count=1, Start=001, Data=02 00 00 00 00 00 00 00 00 00)

OUT B0 1001 AFFE 60 E6 :T-Ack(Seq=9)

OUT BC 1001 AFFE 66 67 D6 03 05 10 01 01 :PropertyValueResponse(Obj=03, Prop=05, Count=1, Start=001, Data=01)

IN B0 AFFE 1001 60 E6 :T-Ack(Seq=9)

Close connection with BDUT

IN B0 AFFE 1001 60 81 :T-Disconnect