ISO 20794-7:2020 (E)

Road vehicles — Clock extension peripheral interface (CXPI) — Part 7: Data link and physical layer conformance test plan

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Symbols and abbreviated terms

4.1 Symbols
4.2 Abbreviated terms

5 Conventions

6 General test specification considerations

6.1 General
6.2 Test conditions
6.3 IUT requirements
6.4 CTC definition
6.5 Test system set-up
6.6 Configuration of test system and IUT
6.6.1 General
6.6.2 IUT-specific set-up parameters
6.6.3 Default configurations
6.6.4 L_ErrDet1 configurations
6.6.5 L_ErrDet2 configurations
6.6.6 L_Arbit configurations
6.6.7 L_Unknown configurations
6.7 SUT initialisation
6.8 Additional test system set-up capabilities
6.8.1 CXPI network data generator
6.8.2 TXD data generator
6.8.3 TXPWM data generator
6.8.4 RXPWM data generator
6.8.5 Other requirements

7 Data link layer conformance test plan

7.1 General
7.2 CTP – Timing parameters
7.2.1 2.CTC_1.1 – IBS length
7.2.2 2.CTC_1.2 – IFS length
7.2.3 2.CTC_1.3 – Frame reception starting condition 1 without the error bit
7.2.4 2.CTC_1.4 – Frame reception starting condition 1 with the error bit
7.2.5 2.CTC_1.5 – Frame reception starting condition 2 without the error bit
7.2.6 2.CTC_1.6 – Frame reception starting condition 2 with the error bit
7.2.7 2.CTC_1.7 – Frame reception starting condition 3
7.2.8 2.CTC_1.8 – Maximum length of the frame
7.3 CTP – Frame transmission/reception
7.3.1 2.CTC_2.1 – Response to L_PID field
7.3.2 2.CTC_2.2 – L_PID field transmission
7.3.3 2.CTC_2.3 – L_PTYPE field transmission

7.3.4 2.CTC_2.4 – L_PTYPE field response function
7.3.5 2.CTC_2.5 – L_FI_DLC ≠ 11112 and frame data verification 1
7.3.6 2.CTC_2.6 – L_FI_DLC ≠ 11112 and frame data verification 2 if DLC is 11012 or 11102 (Ftype = NormalCom)
7.3.7 2.CTC_2.7 – L_FI_DLC = 11112/L_FI_DLCext ≥ 0 and frame data verification
7.3.8 2.CTC_2.8 – Given CRC of frame with L_FI_DLC ≠ 11112
7.3.9 2.CTC_2.9 – Given CRC of frame with L_FI_DLC = 11112/L_FI_DLCext ≥ 0
7.3.10 2.CTC_2.10 – Frame transmission completion
7.3.11 2.CTC_2.11 – Frame reception completion
7.4 CTP – Network access
7.4.1 2.CTC_3.1 – Arbitration function 1 (arbitration by using carrier sense)
7.4.2 2.CTC_3.2 – Arbitration function 2 (IUT loses arbitration and transitions into receiving state)
7.5 CTP – Error detection
7.5.1 2.CTC_4.1 – Byte error
7.5.2 2.CTC_4.2 – CRC error
7.5.3 2.CTC_4.3 – Parity error of the L_PID field without the error bit
7.5.4 2.CTC_4.4 – Parity error of the L_PID field with the error bit
7.5.5 2.CTC_4.5 – Parity error of the L_PTYPE field without the error bit
7.5.6 2.CTC_4.6 – Parity error of the L_PTYPE field with the error bit
7.5.7 2.CTC_4.7 – Data length code error with L_FI_DLC ≠ 11112
7.5.8 2.CTC_4.8 – Data length error with L_FI_DLC = 11112/L_FI_DLCext ≥ 0
7.5.9 2.CTC_4.9 – Data length code error L_FI_DLC ≠ 11112 and if DLC is 11012 or 11102 (Ftype = DiagNodeCfg)
7.5.10 2.CTC_4.10 – Data length code error L_FI_DLC = 11112/L_FI_DLCext ≤ 12 (Ftype = DiagNodeCfg)
7.5.11 2.CTC_4.11 – Framing error in receiving node
7.5.12 2.CTC_4.12 – Framing error in transmitting node
7.5.13 2.CTC_4.13 – Ignore error (no support of L_FI_DLC = 11112)

8 Physical layer conformance test plan (PMA – PS separate type)

8.1 CTP – Operational conditions and calibration
8.1.1 Initial configuration
8.1.2 1.CTC_1.1 – Clock transmission 1
8.1.3 1.CTC_1.2 – Clock transmission 2
8.1.4 1.CTC_1.3 – Clock transmission 3
8.1.5 1.CTC_1.4 – Detection of clock existence
8.1.6 1.CTC_1.5 – Arbitration function (stop transmission by arbitration)
8.1.7 1.CTC_1.6 – Operating voltage range
8.1.8 1.CTC_1.7 – Bit synchronisation
8.2 CTP – Wake-up pulse
8.2.1 General
8.2.2 1.CTC_2.1 – Wake-up pulse reception 1, IUT as master node
8.2.3 1.CTC_2.2 – Wake-up pulse reception 2, IUT as slave node
8.2.4 1.CTC_2.3 – Wake-up pulse transmission
8.3 CTP – Voltage and duty cycle thresholds
8.3.1 General
8.3.2 Voltage threshold test set-up
8.3.3 1.CTC_3.1 – Voltage threshold test 1
8.3.4 1.CTC_3.2 – Voltage threshold (VDom_TS up) test 2
8.3.5 1.CTC_3.2 – Voltage threshold test 2
8.3.6 1.CTC_3.3 – Duty cycle threshold test 1
8.3.7 1.CTC_3.4 – Duty cycle threshold test 2
8.4 CTP – Network state current characteristics
8.4.1 1.CTC_4.1 – Drive current test
8.4.2 1.CTC_4.2 – Input leakage test
8.4.3 1.CTC_4.3 – Reverse leakage current test
8.5 CTP – Physical signal slope control
8.5.1 1.CTC_5.1 – Duty cycle measurement 1
8.5.2 1.CTC_5.2 – Duty cycle measurement 2
8.5.3 1.CTC_5.3 – Duty cycle measurement 3
8.5.4 1.CTC_5.4 – Propagation delay of the receiver test
8.5.5 1.CTC_5.5 – Propagation delay of the transmitter test
8.5.6 1.CTC_5.6 – Propagation delay of the transmitter test 2

8.5.7 1.CTC_5.7 – Loop back time test
8.6 CTP – GND/VBAT shift test
8.6.1 GND/VBAT shift test set-up
8.6.2 1.CTC_6.1 – GND shift test
8.6.3 1.CTC_6.2 – VBAT shift test
8.7 CTP – Loss of power supply
8.7.1 Loss of battery and Loss of GND test set-up
8.7.2 1.CTC_7.1 – Loss of battery test (VBAT)
8.7.3 1.CTC_7.2 – Loss of GND test
8.8 CTP – Internal static capacity
8.8.1 Internal static capacity test set-up
8.8.2 1.CTC_8.1 Internal static capacity
8.9 CTP – Internal resistance measurement during operation
8.9.1 Internal resistor measurement test set-up
8.9.2 1.CTC_9.1– Internal resistor measurement 1
8.9.3 1.CTC_9.2– Internal resistor measurement 2

9 Physical layer conformance test plan (PS –PMA non-separate type)

9.1 CTP – Operational conditions and calibration
9.1.1 1.CTC_10.1 – Clock transmission
9.1.2 1.CTC_10.2 – Detection of clock existence
9.1.3 1.CTC_10.3 – Arbitration function (stop transmission by arbitration)
9.1.4 1.CTC_10.4 – Operating voltage range
9.2 CTP – Wake-up pulse
9.2.1 General
9.2.2 1.CTC_11.1 – Wake-up pulse reception, IUT as master node
9.2.3 1.CTC_11.2 – Wake-up by clock detection
9.2.4 1.CTC_11.3 – Wake-up pulse transmission
9.3 CTP – Voltage and duty cycle thresholds
9.3.1 General
9.3.2 1.CTC_12.1 – Voltage threshold test 1
9.3.3 1.CTC_12.2 – Voltage threshold test 2
9.3.4 1.CTC_12.3 – Duty cycle threshold test 1
9.3.5 1.CTC_12.4 – Duty cycle threshold test 2
9.4 CTP – Network state current characteristics
9.4.1 1.CTC_13.1 – Drive current test
9.4.2 1.CTC_13.2 – Input leakage test
9.4.3 1.CTC_13.3 – Reverse leakage current test
9.5 CTP – Physical signal slope control
9.5.1 1.CTC_14.1 – Duty cycle measurement 1
9.5.2 1.CTC_14.2 – Duty cycle measurement 2
9.6 CTP – GND/VBAT shift test
9.6.1 GND/VBAT shift test set-up
9.6.2 1.CTC_15.1 – GND shift test
9.6.3 1.CTC_15.2 – VBAT shift test
9.7 CTP – Loss of power supply
9.7.1 General
9.7.2 Loss of battery (VBAT) and GND test set-up
9.7.3 1.CTC_16.1 – Loss of battery test (VBAT)
9.7.4 1.CTC_16.2 – Loss of GND test
9.8 CTP – Internal static capacity
9.8.1 Internal static capacity test set-up
9.8.2 1.CTC_17.1 Internal static capacity
9.9 CTP – Internal resistance measurement during operation
9.9.1 Internal resistor measurement test set-up
9.9.2 1.CTC_18.1– Internal resistor measurement 1
9.9.3 1.CTC_18.2– Internal resistor measurement 2

Page count: 132