

TUV Rheinland of North America, Inc.

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PRELIMINARY
TEST REPORT NO.

TBR2/30451940.001/04

Date: September 10, 2004

Total Number of Pages: 123

Equipment: **SP3508 Evaluation Board w/ SP3508CF Chipset**

Client: **Sipex Corporation**

Address: **233 South Hillview Drive
Milpitas, CA 95035**

European Technical Standards: **TBR1 / TBR2
NET1 / NET2**

Authorised Signature:

September 10, 2004

Rolf W. Bienert

Division Manager

A handwritten signature in blue ink that reads 'Rolf W. Bienert'.

Date

Name

Title

Signature

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1 IDENTIFICATION SUMMARY

1.1 Test Laboratory

TUV Rheinland of North America, Inc.
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*Accredited by the American Association for Laboratory
Accreditation under Certificate # 1972.01*

1.2 Limits and Reservations

This test report satisfies ISO 7025. The test results in this test report apply only to the particular System under Test (SUT) and component Implementations under Test (IUTs) declared in this test report.

1.3 Client Information

Name : **Sipex Corporation**
Street : **233 South Hillview Drive**
City : **Milpitas, CA 95035**
Country : **USA**
Phone : **(408) 934-7500**
Fax : **(408) 935-7600**
Contact Person : **Mark Boormeester**
Phone : **(978) 671-1991**
Fax : **(978) 671-4676**

1.4 Product

Supplier's name : **Sipex Corporation**
Street : **233 South Hillview Drive**
City : **Milpitas, CA 95035**
Country : **USA**
Phone : **(408) 934-7500**
Fax : **(408) 935-7600**

1.4.1 System under Test (SUT)

SUT Hardware Configuration for testing (PC, Bus System, Clock etc.)	SP3508CF Chipset mounted on SP3508 Evaluation Board.
Operating System	
Version No.	
Miscellaneous	

1.4.2 Type of Product

Transceiver Chipset for X.21, V.24, V.35 and V.36 type interfaces.

1.4.3 Description of Product

20Mbps, 8 Channel Multi-protocol Transceiver with programmable DCE/DTE and Termination Resistors.



1.4.4 15-pin DTE/DCE interface ISO 4903
 (CCITT Recommendation X.21/V.10/V.11 interface)

Name	SP3508 Evaluation Board		
Version/Model	SP3508CF component		
Serial No.	Prototype		
minimum speed (bit/s)	---		
maximum speed (bit/s)	20Mbps		
Interface board	Evaluation Board		
Chip set	V.11 Transmitter: SP3508	Receiver: SP3508	
Cable (name, P/N)	Note 1 (See Section 4)		
Cable Length	N/A		

Supported Circuits

supported

(X) V.11
 () V.10

Circuit

1	-----
103 TxD	T(A) (X)
105 RTS	C(A) (X)
104 RxD	R(A) (X)
106 CTS	I(A) (X)
115 RxC	S(A) (X)
113 TxCE	B(A) (X)
8	G ()
103 TxD	T(B) (X)
105 RTS	C(B) (X)
104 RxD	R(B) (X)
106 CTS	I(B) (X)
115 RxC	S(B) (X)
113 TxCE	B(B) (X)
15	Reserved for future international use
107 DSR	(A/B) (X)
108 DTR	(A/B) (X)
109 DCD	(A/B) (X)
114 TxC	(A/B) (X)

1.4.5 25-pin DTE/DCE interface ISO 2110

(CCITT Recommendation V.24/V.28 (RS232) interface)

Name	SP3508 Evaluation Board		
Version/Model	SP3508CF component		
Serial No.	Prototype		
minimum speed (bit/s)	---		
maximum speed (bit/s)	120 kbps		
Interface board	Evaluation Board		
Chip set	V.28 Transmitter: SP3508	V.28 Receivers: SP3508	
Cable (name, P/N)	Note 1 (See Section 4)		
Cable Length	N/A		

Supported Circuits

<u>CCITT circuit</u>		<u>supported</u>
102	7	() gnd
103	TxD	(X)
104	RxD	(X)
105	RTS	(X)
106	CTS	(X)
107	DSR	(X)
108	DTR	(X)
109	DCD	(X)
113	TxCE	(X)
114	TxC	(X)
115	RxC	(X)
125	RI	(X)
140	RL	(X)
141	LL	(X)
142	TM	(X)

1.4.6 34-pin DTE/DCE interface ISO 2593 (CCITT Recommendation V.35 interface)

Name	SP3508 Evaluation Board		
Version/Model	SP3508CF component		
Serial No.	Prototype		
minimum speed (bit/s)	---		
maximum speed (bit/s)	20Mbps (V.35) 120kbps (V.28)		
Interface board	Evaluation Board		
Chip set	V.35 Transmitter: SP3508 V.11 Transmitter: N/A V.28 Transmitter: SP3508	V.35 Receivers: SP3508 V.11 Receivers: N/A V.28 Receivers: SP3508	
Cable (name, P/N)	Note 1 (See Section 4)		
Cable Length	N/A		

Supported Circuits

<u>CCITT circuit</u>	<u>A-wire</u>	<u>B-wire</u>	<u>Electrical characteristics</u>		<u>supported</u>
102a	A				() gnd
102	B				() gnd
103 TxD	P	S	V.35 (X)	V.11 ()	(X)
104 RxD	R	T	V.35 (X)	V.11 ()	(X)
105 RTS	C		V.28 (X)	V.10 ()	(X)
106 CTS	D		V.28 (X)	V.10 ()	(X)
107 DSR	E		V.28 (X)	V.10 ()	(X)
108 DTR	H		V.28 (X)	V.10 ()	(X)
109 DCD	F		V.28 (X)	V.10 ()	(X)
113 TxCE	U	W	V.35 (X)	V.11 ()	(X)
114 TxC	Y	AA	V.35 (X)	V.11 ()	(X)
115 RxC	V	X	V.35 (X)	V.11 ()	(X)
125 RI	J		V.28 (X)	V.10 ()	(X)
140 RL	N		V.28 (X)	V.10 ()	(X)
141 LL	L		V.28 (X)	V.10 ()	(X)
142 TM	NN		V.28 (X)	V.10 ()	(X)

1.4.7 37-pin DTE/DCE interface ISO 4902 (CCITT Recommendation V.36 interface)

Name	SP3508 Evaluation Board		
Version/Model	SP3508CF component		
Serial No.	Prototype		
minimum speed (bit/s)	---		
maximum speed (bit/s)	20Mbps (V.11) 120Kbps (V.10)		
Interface board	Evaluation Board		
Chip set	V.11 Transmitter: SP3508 V.10 Transmitter: SP3508	V.11 Receivers: SP3508 V.10 Receivers: SP3508	
Cable (name, P/N)	Note 1 (See Section 4)		
Cable Length	N/A		

Supported Circuits

<u>CCITT circuit</u>	<u>A-wire</u>	<u>B-wire</u>	<u>Electrical characteristics</u>		<u>supported</u>
102	19				() gnd
102a	37				() gnd
102b	20				() gnd
103 TxD	4	22	V.11 (X)	V.10 ()	(X)
104 RxD	6	24	V.11 (X)	V.10 ()	(X)
105 RTS	7	25	V.11 (X)	V.10 ()	(X)
106 CTS	9	27	V.11 (X)	V.10 ()	(X)
107 DSR	11	29	V.11 (X)	V.10 ()	(X)
108 DTR	12	30	V.11 (X)	V.10 ()	(X)
109 DCD	13	31	V.11 (X)	V.10 ()	(X)
113 TxCE	17	35	V.11 (X)	V.10 ()	(X)
114 TxC	5	23	V.11 (X)	V.10 ()	(X)
115 RxC	8	26	V.11 (X)	V.10 ()	(X)
125 RI	15		V.10 (X)		(X)
140 RL	14		V.10 (X)		(X)
141 LL	10		V.10 (X)		(X)
142 TM	18		V.10 (X)		(X)

1.4.8 DTE/DCE interface (RS530 interface)

Name	SP3508 Evaluation Board		
Version/Model	SP3508CF component		
Serial No.	Prototype		
minimum speed (bit/s)	---		
maximum speed (bit/s)	20Mbps (V.11) 120Kbps (V.10)		
Interface board	Evaluation Board		
Chip set	V.11 Transmitter: SP3508 V.10 Transmitter: SP3508	V.11 Receivers: SP3508 V.10 Receivers: SP3508	
Cable (name, P/N)	Note 1 (See Section 4)		
Cable Length	N/A		

Supported Circuits

<u>CCITT circuit</u>	<u>Electrical characteristics</u>		<u>supported</u>
102			() gnd
102a			() gnd
102b			() gnd
103 TxD	V.11 (X)	V.10 ()	(X)
104 RxD	V.11 (X)	V.10 ()	(X)
105 RTS	V.11 (X)	V.10 ()	(X)
106 CTS	V.11 (X)	V.10 ()	(X)
107 DSR	V.11 (X)	V.10 ()	(X)
108 DTR	V.11 (X)	V.10 ()	(X)
109 DCD	V.11 (X)	V.10 ()	(X)
113 TxCE	V.11 (X)	V.10 ()	(X)
114 TxC	V.11 (X)	V.10 ()	(X)
115 RxC	V.11 (X)	V.10 ()	(X)
125 RI	V.10 (X)		(X)
140 RL	V.10 (X)		(X)
141 LL	V.10 (X)		(X)
142 TM	V.10 (X)		(X)

1.4.9 DTE/DCE interface
 (RS530A interface)

Name	SP3508 Evaluation Board		
Version/Model	SP3508 CF component		
Serial No.	Prototype		
minimum speed (bit/s)	---		
maximum speed (bit/s)	20Mbps (V.11) 120Kbps (V.10)		
Interface board	Evaluation Board		
Chip set	V.11 Transmitter: SP3508 V.10 Transmitter: SP3508	V.11 Receivers: SP3508 V.10 Receivers: SP3508	
Cable (name, P/N)	Note 1 (See Section 4)		
Cable Length	N/A		

Supported Circuits

<u>CCITT circuit</u>	<u>Electrical characteristics</u>		<u>supported</u>
102			() gnd
102a			() gnd
102b			() gnd
103 TxD	V.11 (X)	V.10 ()	(X)
104 RxD	V.11 (X)	V.10 ()	(X)
105 RTS	V.11 (X)	V.10 ()	(X)
106 CTS	V.11 (X)	V.10 ()	(X)
107 DSR	V.11 ()	V.10 (X)	(X)
108 DTR	V.11 ()	V.10 (X)	(X)
109 DCD	V.11 (X)	V.10 ()	(X)
113 TxCE	V.11 (X)	V.10 ()	(X)
114 TxC	V.11 (X)	V.10 ()	(X)
115 RxC	V.11 (X)	V.10 ()	(X)
125 RI	V.10 (X)		(X)
140 RL	V.10 (X)		(X)
141 L	V.10 (X)		(X)
142 TM	V.10 (X)		(X)

1.5 Nature of Conformance Testing

The purpose of Conformance Testing is to increase the probability that different implementations can interwork. However, the complexity of OSI protocols makes exhaustive testing impractical on both technical and economic grounds. Furthermore, there is no guarantee that an IUT which has passed all the relevant tests conforms to a specification. Neither is there any guarantee that such an IUT will interwork with other real open systems. Rather, the passing of the tests gives confidence that the IUT has the stated capabilities and that its behaviour conforms consistently in representative instances of communication.

2 Test Conditions

2.1 Environmental Conditions

Temperature	: In the range of 15°C to 35°C	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Relative humidity	: In the range of 5% to 75%	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

2.2 Power Supply Limitations

All tests were carried out within +/- 5% of the normal operating voltage of 3.3Vdc .

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3 System Report Summary

3.1 Test Report Summary

Protocol Standards: TBR 1 (01.97)
TBR 2 (01.97)
NET 1, second edition 1994
NET 2, second edition 1994

Protocol Conformance Test Report: See Section 6

Abstract Test Suite (ATS) Standard: TBR 1 (01.97)
TBR 2 (01.97)
NET 1, second edition 1994
NET 2, second edition 1994

Abstract Test Method: *Remote Single Layer Embedded (RSE)*

Real Test system:

Executable Test Suite (ETS) Identification:

	Serial-No.
Digital Multimeter HP 34401A	3146A25410
Digital Multimeter HP 34401A	3146A34621
Power Supply HP6235A	2450A08776
Oscilloscope HP 54520A	3415A00472
Frequency Generator HP 33120A	US34014718
Capacitance/Resistance Decade RCS-500	A0010

Conformance Status:

Static Conformance Errors : **No**
Dynamic Conformance Errors : **No**

Passed : ALL
Failed : 0

3.2 Parameterized Executable Test Suite (PETS) Layer 1

The selection of the tests is limited by the implemented capabilities.

3.1.1 Clause X.21/V.11

NET 1 Clause	Selected	Run	Verdict	Observation
8.1.1.2, CCITT V.11, 5.2	Yes	Yes	Pass	
8.1.1.2, CCITT V.11, 5.3	Yes	Yes	Pass	
8.1.1.2.2a	Yes	Yes	Pass	
8.1.1.2.2b	Yes	Yes	Pass	
8.1.1.2.2c	no			
8.1.2	no			Note 1
8.1.3	no			

Note 1: The SUT was an evaluation board. Measurements were taken at test points on the board.

3.1.2 Clause V.24/V.28

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.1.1	no			Note 1
8.2.1.2	no			
8.2.2.1, Annex A, Table A-1	no			Note 1
8.2.4.1, Annex B.1.1	yes	yes	pass	
8.2.4.1, Annex B.1.2	yes	yes	pass	
8.2.4.1, Annex B.1.3	yes	yes	pass	
8.2.4.1, Annex B.1.4	yes	yes	pass	
8.2.4.1, Annex B.1.5	yes	yes	pass	
8.2.4.1, Annex B.1.6	yes	yes	pass	
8.2.4.1, Annex B.2.1	yes	yes	pass	
8.2.4.1, Annex B.2.2	yes	yes	pass	
8.2.4.1, Annex B.2.3	yes	yes	pass	
8.2.4.1, Annex B.2.4	yes	yes	pass	
8.2.4.1, Annex B.3.1	yes	yes	pass	
8.2.4.1, Annex B.3.2	no			
8.2.4.1, Annex B.3.3	yes	yes	pass	
8.2.4.1, Annex B.3.4	yes	yes	pass	
8.2.4.1, Annex B.4	yes	yes	pass	
8.2.4.1, Annex B.5	yes	yes	pass	
8.2.4.1, Annex B.7	no			

Note 1: The SUT was an evaluation board. Measurements were taken at test points on the board.

3.1.3 Clause V.35

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.1.1	no			Note 1
8.2.1.2	no			
8.2.2.2, Annex A, Table A-2	no			Note 1
8.2.4.2, Annex C.1.1	yes	yes	pass	
8.2.4.2, Annex C.1.2	yes	yes	pass	
8.2.4.2, Annex C.1.3	yes	yes	pass	
8.2.4.2, Annex C.1.4	yes	yes	pass	
8.2.4.2, Annex C.2	no			Note 1
8.2.4.2, Annex C.3.1	yes	yes	pass	
8.2.4.2, Annex C.3.2	yes	yes	pass	
8.2.4.2, Annex C.4	yes	yes	pass	
8.2.4.1, Annex B.1.2	yes	yes	pass	
8.2.4.1, Annex B.1.3	yes	yes	pass	
8.2.4.1, Annex B.1.4	yes	yes	pass	
8.2.4.1, Annex B.1.5	yes	yes	pass	
8.2.4.1, Annex B.2.1	yes	yes	pass	
8.2.4.1, Annex B.2.2	yes	yes	pass	
8.2.4.1, Annex B.4	yes	yes	pass	
8.2.4.1, Annex B.5	yes	yes	pass	

Note 1: The SUT was an evaluation board. Measurements were taken at test points on the board.

3.1.4 Clause V.36/V.10

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.2.3, Annex A, Table A-3	no			Note 1
8.2.4.4, CCITT V.10, 5.2.1	yes	yes	pass	
8.2.4.4, CCITT V.10, 5.2.2	yes	yes	pass	
8.2.4.4, CCITT V.10, 5.2.3	yes	yes	pass	
NET 1 8.1.1.1.2	yes	yes	pass	

3.1.5 Clause V.36/V.11

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.1.1	no			Note 1
8.2.1.2	no			
8.2.2.3, Annex A, Table A-3	no			Note 1
8.2.4.5, CCITT V.11, 5.2	yes	yes	pass	
8.2.4.5, CCITT V.11, 5.3	yes	yes	pass	
NET 1 8.1.1.2.2a	yes	yes	pass	
NET 1 8.1.1.2.2b	yes	yes	pass	
NET 1 8.1.1.2.2c	no			

Note 1: The SUT was an evaluation board. Measurements were taken at test points on the board.



3.1.6 RS530 & RS530A

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.2.3, Annex A, Table A-3	no			Note 1
8.2.4.4, CCITT V.10, 5.2.1	yes	yes	pass	
8.2.4.4, CCITT V.10, 5.2.2	yes	yes	pass	
8.2.4.4, CCITT V.10, 5.2.3	yes	yes	pass	
NET 1 8.1.1.1.2	yes	yes	pass	

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.1.1	no			Note 1
8.2.1.2	no			
8.2.2.3, Annex A, Table A-3	no			Note 1
8.2.4.5, CCITT V.11, 5.2	yes	yes	pass	
8.2.4.5, CCITT V.11, 5.3	yes	yes	pass	
NET 1 8.1.1.2.2a	yes	yes	pass	
NET 1 8.1.1.2.2b	yes	yes	pass	
NET 1 8.1.1.2.2c	no			

Note 1: The SUT was an evaluation board. Measurements were taken at test points on the board.

4 Observations

Date: **September 10, 2004**

Note 1: The SUT was an evaluation board. Measurements were taken at test points on the board.

Measurements associated with different binary states of a circuit are noted with the inclusion of their polarity for the sake of clarity. Measurement limits for compliance are based on the absolute value of the measurements.

5 Summary of Compliance

Date: **September 10, 2004**

The test results in this test report apply only to the particular System under Test (SUT) and component Implementations under Test (IUTs) declared in this test report.

The SUT/IUT has not been shown by the conformance assessment to be non-conforming to the specified protocol standards. The test campaign did not reveal errors in the SUT/IUT.

Exclusion: the SUT/IUT did not include means of connection (cables) to DCE. See Note 1 (Section 4).

6 Protocol Conformance Test Report

6.1 Protocol Conformance Test Report Layer 1

6.1.1 Dates

Receipt of SUT/IUT: **September 1, 2004**
Date of Test: **September 3, 2004**

6.1.2 Operator

Timothy Langeslay



(Signature)

6.1.3 Test System

Digital Multimeter HP 34401A
Power Supply HP6235A
Oscilloscope HP 54520A
Frequency Generator HP 33120A
Protocol Tester HP Idacom PT 300
Capacitance/Resistance Decade RCS-500

6.1.4 Test Environment

Temperature : In the range of 15°C to 35°C Yes No
Relative humidity : In the range of 5% to 75% Yes No

All tests are carried out within +/- 5% of the normal operating voltage of 3.3Vdc.

6.2 Test Results

6.2.1 15-pin DTE/DCE interface ISO 4903

(CCITT Recommendation X.21/V.10/V.11 interface)

Test Case	Requirement	Result	Verdict	Comment
	TBR NET			
7.2.5.1	6.2.5.1 8.1.2	ISO 4903 (15-pole)	NT	Note 1
7.2.5.2	6.2.5.2 8.1.2	Pin out designations	NT	Note 1

CCITT V.11 Interchange Circuits

A - B terminated with 3.9 Kohm

Binary State 1

Circuit TxD 103

Test Case	Description	Limits TBR / NET	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	3.26 V	pass	
NET - 5.2.1	A - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	

Circuit RTS 105

	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	3.26 V	pass	
NET - 5.2.1	A - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	

Circuit DTR 108

	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	3.26 V	pass	
NET - 5.2.1	A - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	

Circuit TxCE 113

	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	3.26 V	pass	
NET - 5.2.1	A - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	

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Binary State 2

Circuit TxD 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	-3.26 V	pass	
	A - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	

Circuit RTS 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	-3.26 V	pass	
	A - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	

Circuit DTR 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	-3.26 V	pass	
	A - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	

Circuit TxCE 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$V_o \leq 12.0V / \leq 6.0V$	-3.26 V	pass	
	A - C	$V_o \leq 12.0V / \leq 6.0V$	0.01 V	pass	
	B - C	$V_o \leq 12.0V / \leq 6.0V$	3.28 V	pass	

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A - B terminated with 2 x 50 Ohm

Binary State 1

Circuit TxD 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.40 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

Circuit RTS 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.40 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit DTR 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.38 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

Circuit TxCE 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.39 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

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**Binary State 2**

Circuit TxD 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.41 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.62 V	pass	

Circuit RTS 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.43 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.62 V	pass	

Circuit DTR 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.40 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.61 V	pass	

Circuit TxCE 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.41 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.62 V	pass	

Short Circuit Measurement

Circuit TxD 103

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	26 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	< 0.1 mA	pass	

Circuit RTS 105

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	28 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	< 0.1 mA	pass	

Circuit DTR 108

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	49 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	< 0.1 mA	pass	

Circuit TxCE 113

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	26 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	< 0.1 mA	pass	

Power-off Measurement

Circuit TxD 103

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	

Circuit RTS 105

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	

Circuit DTR 108

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	

Circuit TxCE 113

Test Case	Limits	Results	Verdict	Observation
NET – 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 0.1 \mu\text{A}$	pass	

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Generator Output Risetime

Circuit TxD 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.70 ns pos	pass	
NET - 5.3		NET - $20ns \geq t$ or $t \leq 0.1tb$	4.12 ns neg	pass	

Circuit RTS 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	3.90 ns pos	pass	
NET - 5.3		NET - $20ns \geq t$ or $t \leq 0.1tb$	4.18 ns neg	pass	

Circuit DTR 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.21 ns pos	pass	
NET - 5.3		NET - $20ns \geq t$ or $t \leq 0.1tb$	3.80 ns neg	pass	

Circuit TxCE 113

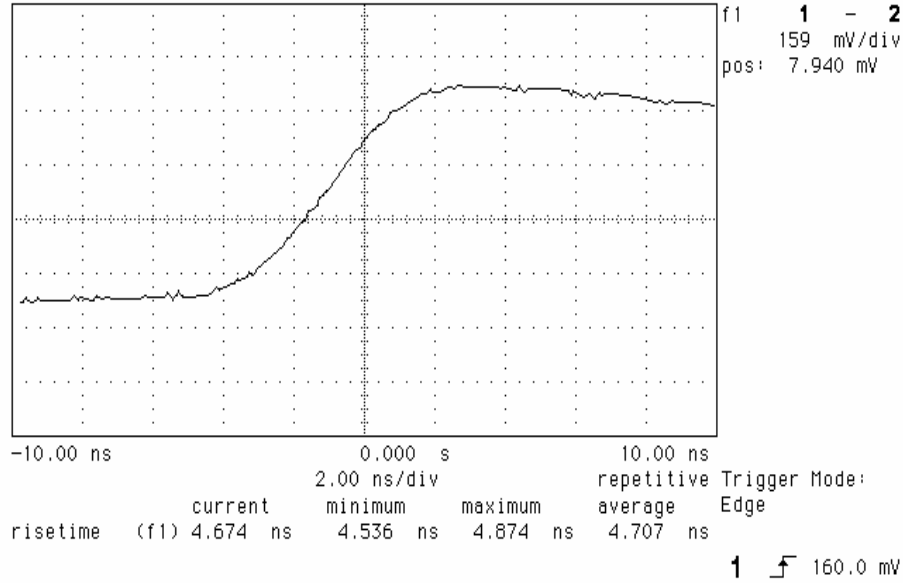
Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.19 ns pos	pass	
NET - 5.3		NET - $20ns \geq t$ or $t \leq 0.1tb$	4.13 ns neg	pass	

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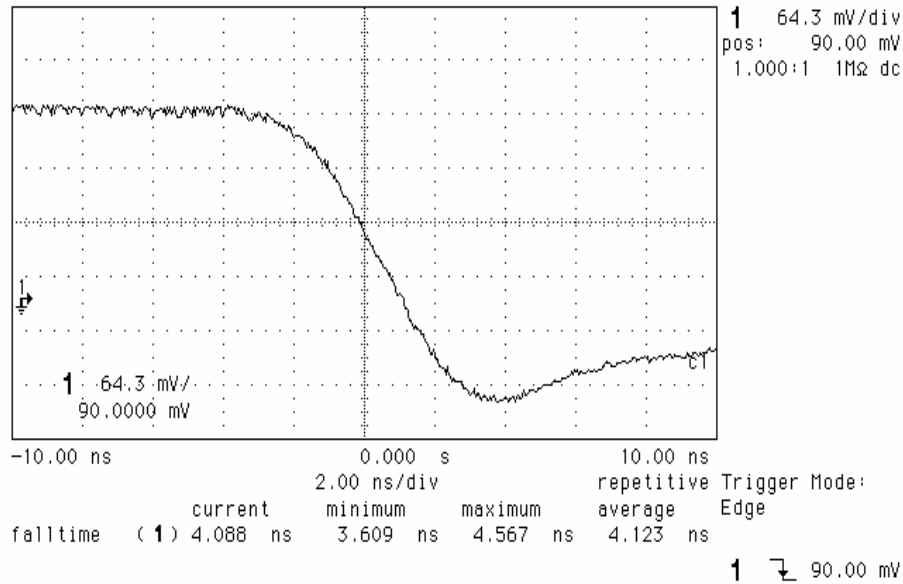
V11Rise01

hp stopped



V11Rise02

hp stopped

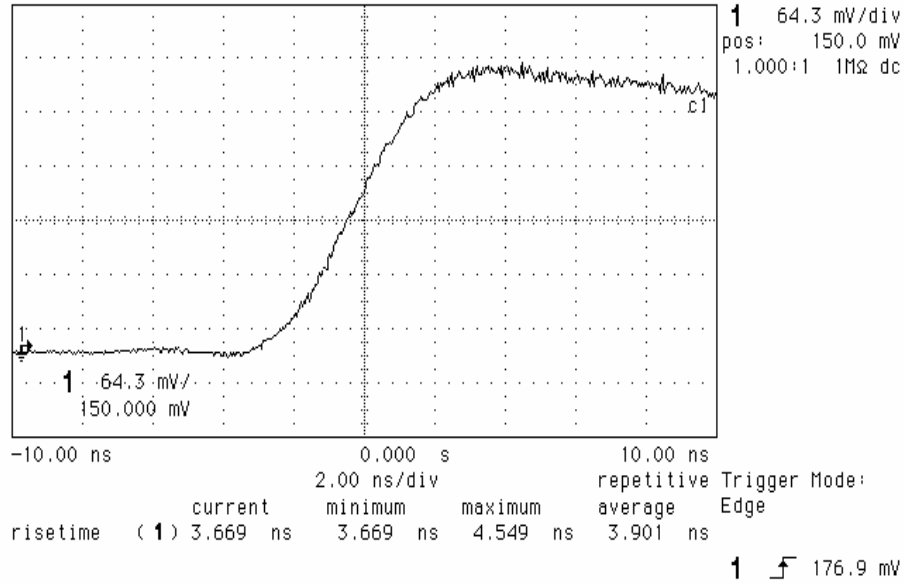


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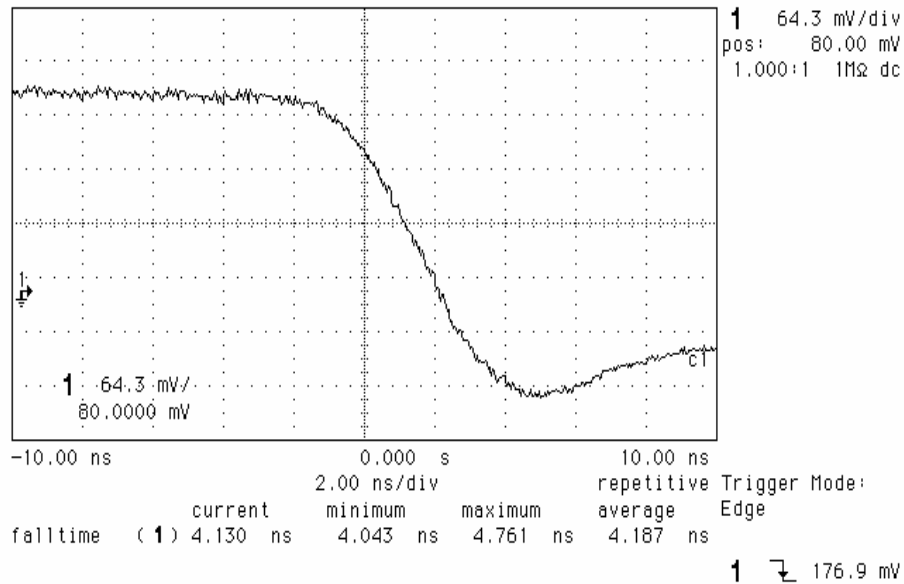
V11Rise03

hp stopped



V11Rise04

hp stopped

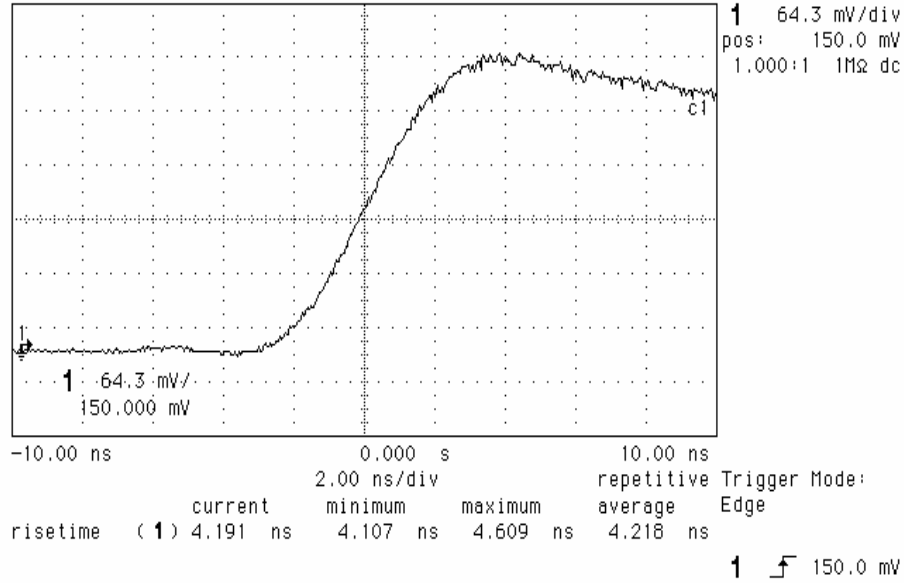


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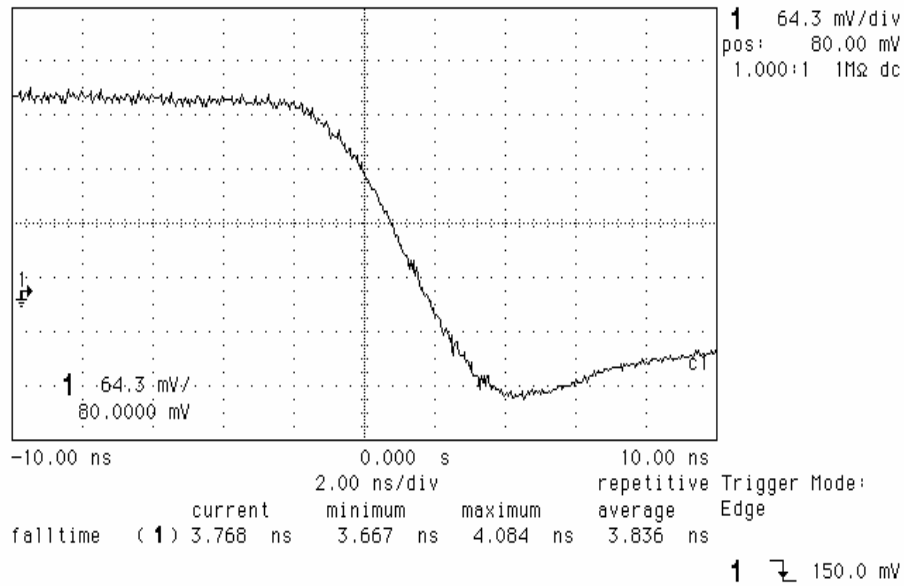
V11Rise05

hp stopped



V11Rise06

hp stopped

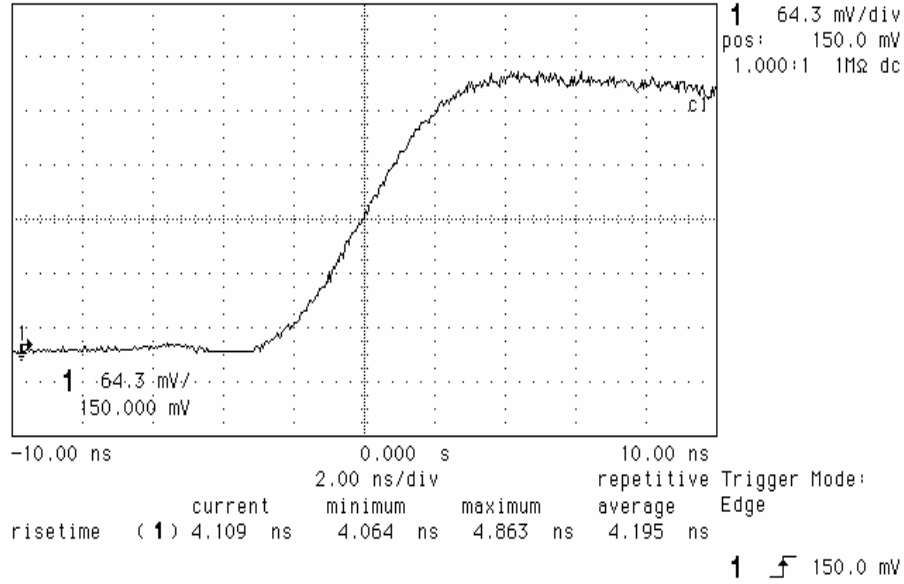


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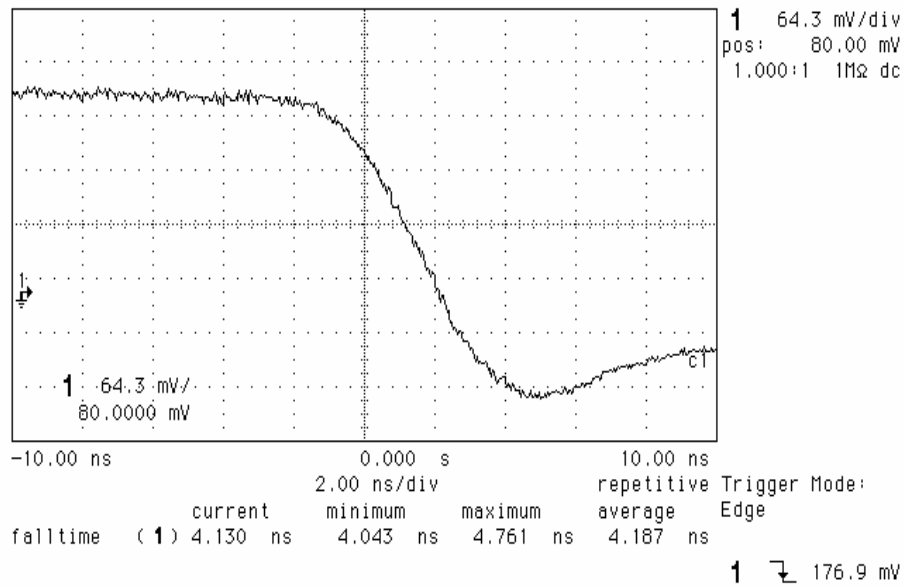
V11Rise07

hp stopped



V11Rise08

hp stopped



Receiver Characteristics NET - 6.1

Circuit RxD 104

The receiver is terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Test Case	Limits	Results	Verdict	Observation
NET 6.1				
Via = 6V	$I \leq 60.75 \text{ mA}$	48 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.6 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.6 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	48 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.6 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.6 mA	pass	

Circuit 106 CTS

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Test Case	Limits	Results	Verdict	Observation
NET 6.1				
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 107 DSR

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Test Case	Limits	Results	Verdict	Observation
NET 6.1				
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 109 DCD

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Test Case	Limits	Results	Verdict	Observation
NET 6.1				
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 114 TxC

The receiver *is* terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Test Case	Limits	Results	Verdict	Observation
NET 6.1				
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.4 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.4 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.4 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.4 mA	pass	

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Circuit 115 RxC

The receiver is terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Test Case	Limits	Results	Verdict	Observation
NET 6.1				
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.4 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.4 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	46 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	24 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.4 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.4 mA	pass	

6.2.2 25-pin DTE/DCE interface ISO 2110

(CCITT Recommendation V.24/V.28 (RS232) interface)

Test Case	Requirement	Result	Verdict	Comment
7.2.1.1	TBR - 6.2.1.1 NET - 8.2.2.1	ISO 2110 (25-pole)	NT	Note 1
7.2.1.2	TBR - 6.2.1.2 NET - 8.2.2.1	Table A.1 and A.2	NT	Note 1

Generator Characteristics

Protection against short circuit conditions (NET - Annex B.1.1)

Circuit	Limits	Results	Verdict	Observation
NET B.1.1				
103	no damage	no damage	pass	
105	no damage	no damage	pass	
108	no damage	no damage	pass	
113	no damage	no damage	pass	
140	no damage	no damage	pass	
141	no damage	no damage	pass	

Generator Output Current Limit (NET - Annex B.1.2)

Circuit	Limits	Results		Verdict	Observation
NET B.1.1		State 1	State 2		
103	$I \leq 0.5A$	37 mA	48 mA	pass	
105	$I \leq 0.5A$	38 mA	48 mA	pass	
108	$I \leq 0.5A$	37 mA	48 mA	pass	
113	$I \leq 0.5A$	37 mA	48 mA	pass	
140	$I \leq 0.5A$	37 mA	48 mA	pass	
141	$I \leq 0.5A$	37 mA	47 mA	pass	

CCITT V.28 Interchange Circuits

A - C unterminated

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.1 NET - B.1.3	103	$V \leq 25.0V$	5.56 V	pass	
	105	$V \leq 25.0V$	5.56 V	pass	
	108	$V \leq 25.0V$	5.56 V	pass	
	113	$V \leq 25.0V$	5.56 V	pass	
	140	$V \leq 25.0V$	5.56 V	pass	
	141	$V \leq 25.0V$	5.56 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.1 NET - B.1.3	103	$V \leq 25.0V$	-5.90 V	pass	
	105	$V \leq 25.0V$	-5.90 V	pass	
	108	$V \leq 25.0V$	-5.90 V	pass	
	113	$V \leq 25.0V$	-5.90 V	pass	
	140	$V \leq 25.0V$	-5.90 V	pass	
	141	$V \leq 25.0V$	-5.90 V	pass	

A - C terminated with 3 KOhm**Binary State 1**

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.2 NET - B.1.4	103	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	5.30 V	pass	
	105	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	5.30 V	pass	
	108	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	5.30 V	pass	
	113	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	5.30 V	pass	
	140	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	5.30 V	pass	
	141	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	5.30 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.2 NET - B.1.4	103	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	-5.68 V	pass	
	105	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	-5.68 V	pass	
	108	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	-5.68 V	pass	
	113	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	-5.68 V	pass	
	140	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	-5.68 V	pass	
	141	TBR - $\geq 3.0V$ NET - $\geq 5.0V$	-5.68 V	pass	

A - C terminated with 7 KOhm**Generator Output Voltage limit under minimum load (NET - Annex B.1.5)****Binary State 1**

Test Case	Circuit	Limits	Result	Verdict	Comment
NET - B.1.5	103	$\leq 15V$	5.43 V	pass	
	105	$\leq 15V$	5.43 V	pass	
	108	$\leq 15V$	5.43 V	pass	
	113	$\leq 15V$	5.43 V	pass	
	140	$\leq 15V$	5.43 V	pass	
	141	$\leq 15V$	5.43 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
NET - B.1.5	103	$\leq 15V$	-5.80 V	pass	
	105	$\leq 15V$	-5.80 V	pass	
	108	$\leq 15V$	-5.80 V	pass	
	113	$\leq 15V$	-5.80 V	pass	
	140	$\leq 15V$	-5.80 V	pass	
	141	$\leq 15V$	-5.80 V	pass	

Generator Output Risetime

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.3	103	$t \leq 0.03$ tb	538 ns pos	pass	
NET – B.3.2 & B.3.3	Pin 2	$t \leq 0.03$ tb	417 ns neg	pass	

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.3	105	$t \leq 0.03$ tb	536 ns pos	pass	
NET – B.3.2 & B.3.3	Pin 4	$t \leq 0.03$ tb	410 ns neg	pass	

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.3	108	$t \leq 0.03$ tb	545 ns pos	pass	
NET – B.3.2 & B.3.3	Pin 20	$t \leq 0.03$ tb	415 ns neg	pass	

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.3	113	$t \leq 0.03$ tb	542 ns pos	pass	
NET – B.3.2 & B.3.3	Pin 24	$t \leq 0.03$ tb	416 ns neg	pass	

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.3	140	$t \leq 0.03$ tb	543 ns pos	pass	
NET – B.3.2 & B.3.3	Pin 21	$t \leq 0.03$ tb	413 ns neg	pass	

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.3	141	$t \leq 0.03$ tb	538 ns pos	pass	
NET – B.3.2 & B.3.3	Pin 25	$t \leq 0.03$ tb	413 ns neg	pass	

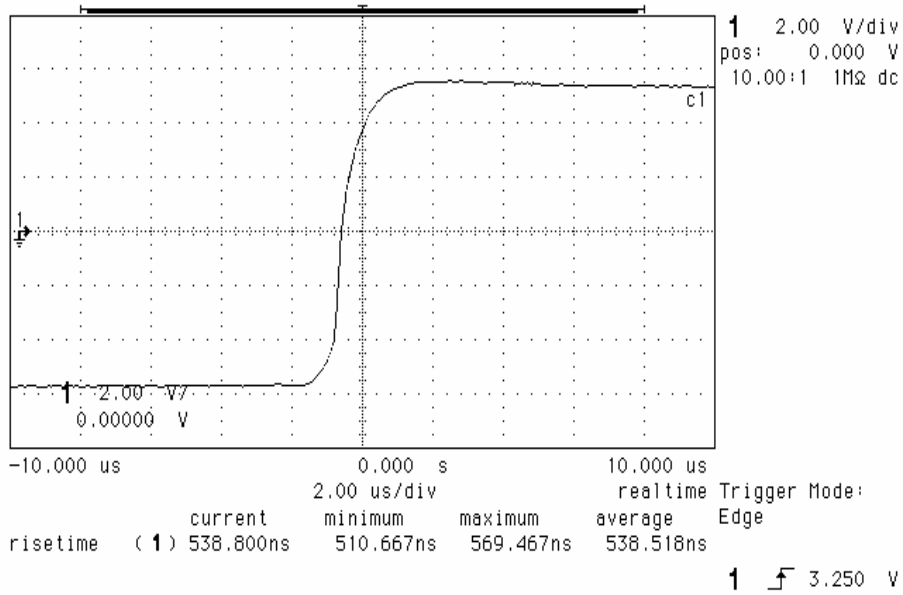
(X) B7 no : The generator was terminated with 3000 Ohms and 2500 pF.

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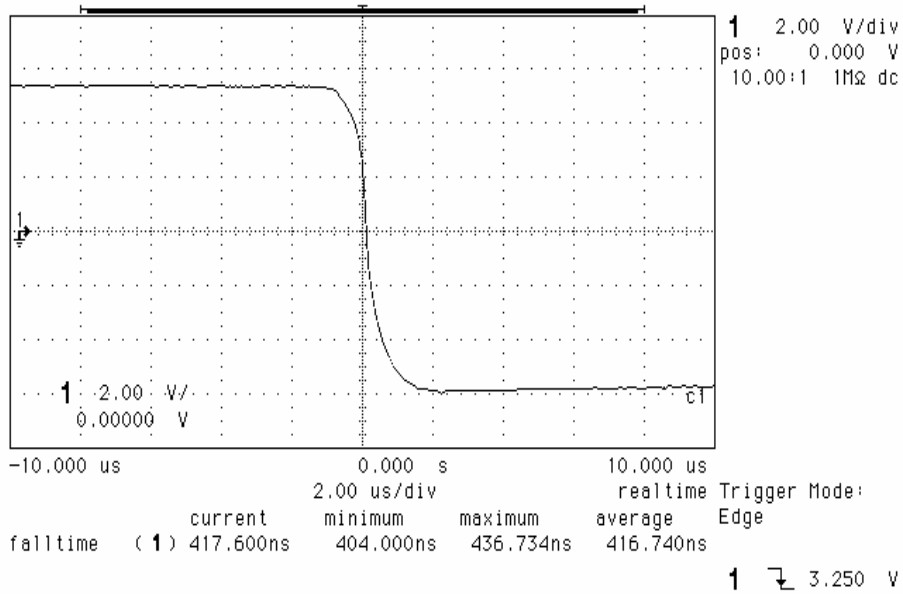
V24rise00

hp stopped



V24rise01

hp stopped

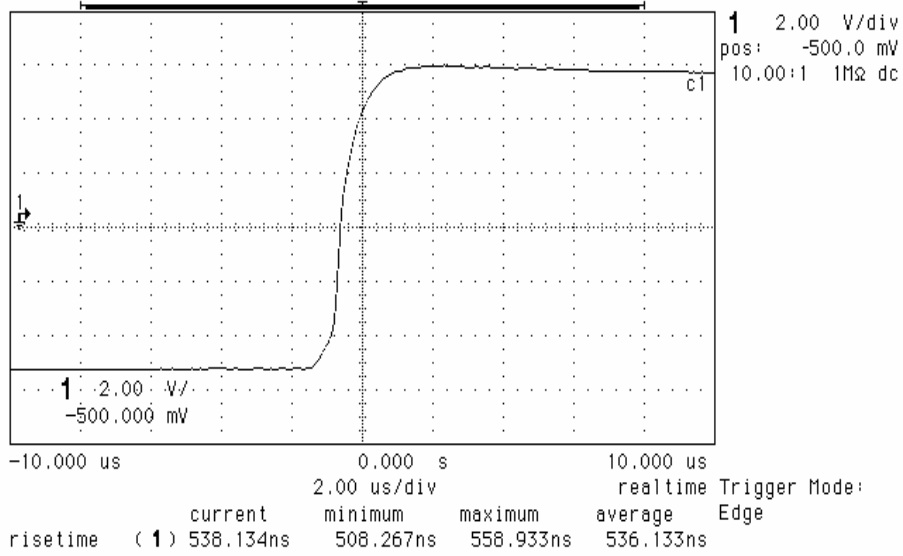


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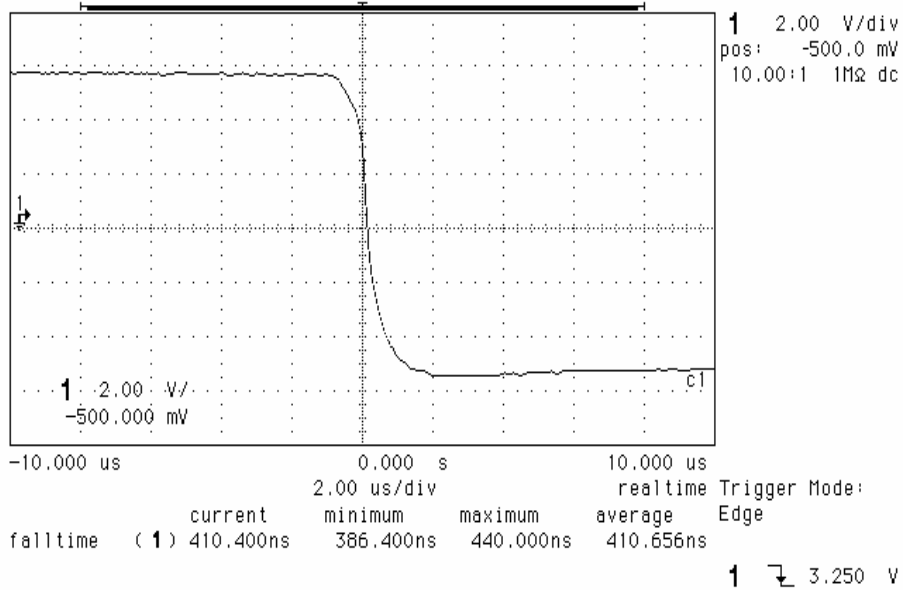
V24rise02

hp stopped



V24rise03

hp stopped

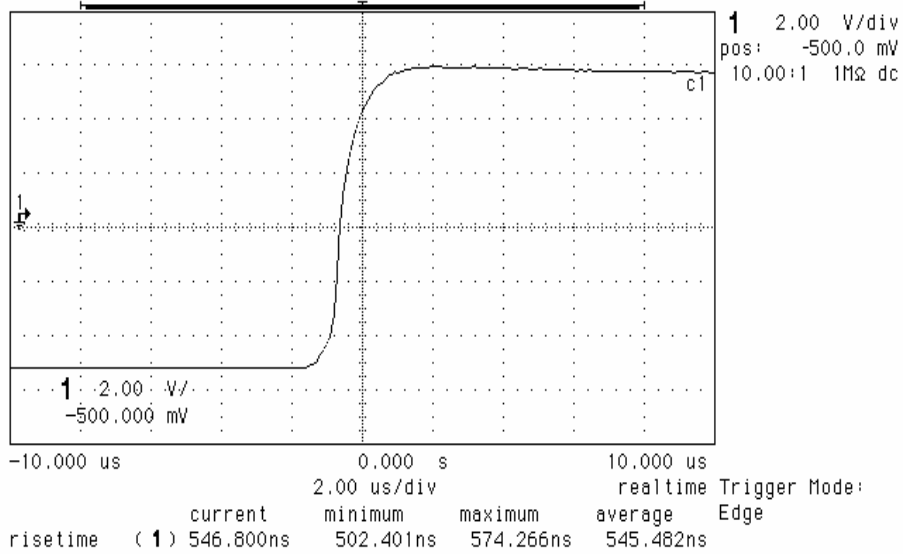


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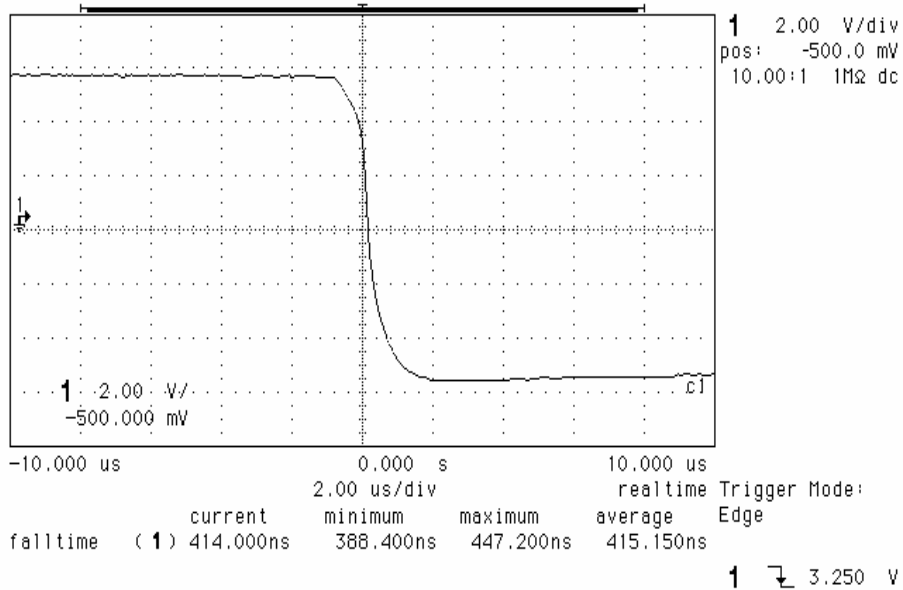
V24rise04

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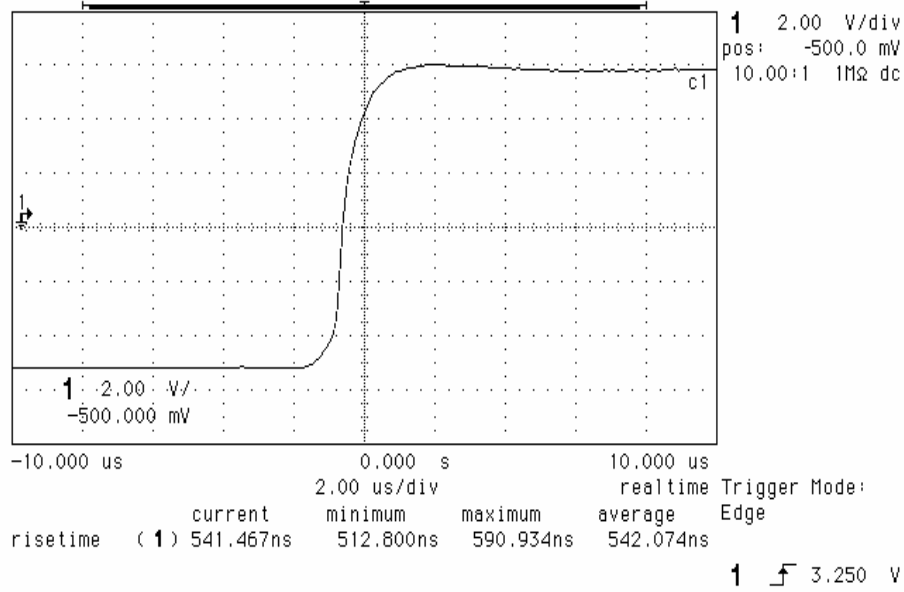
V24rise05

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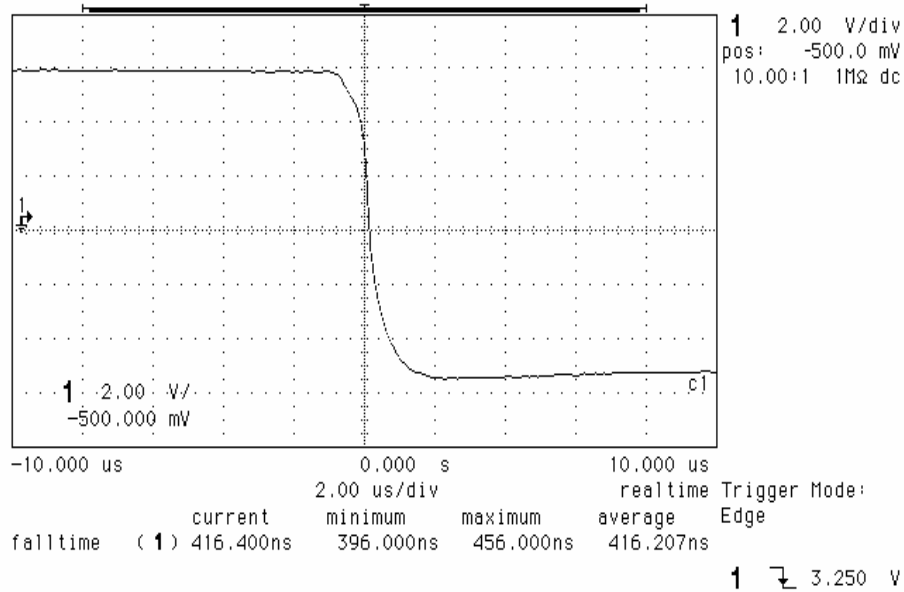
V24rise06

hp stopped



V24rise07

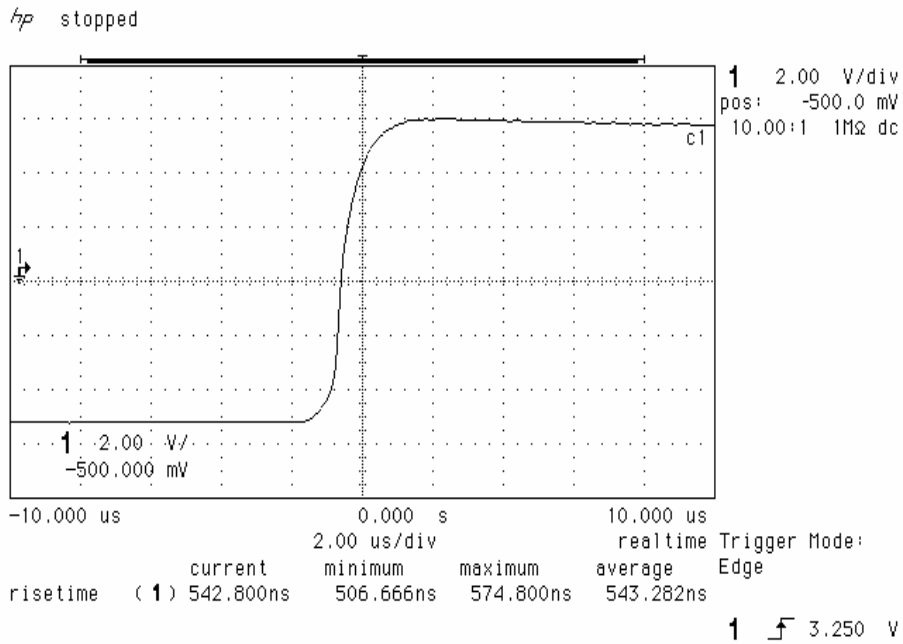
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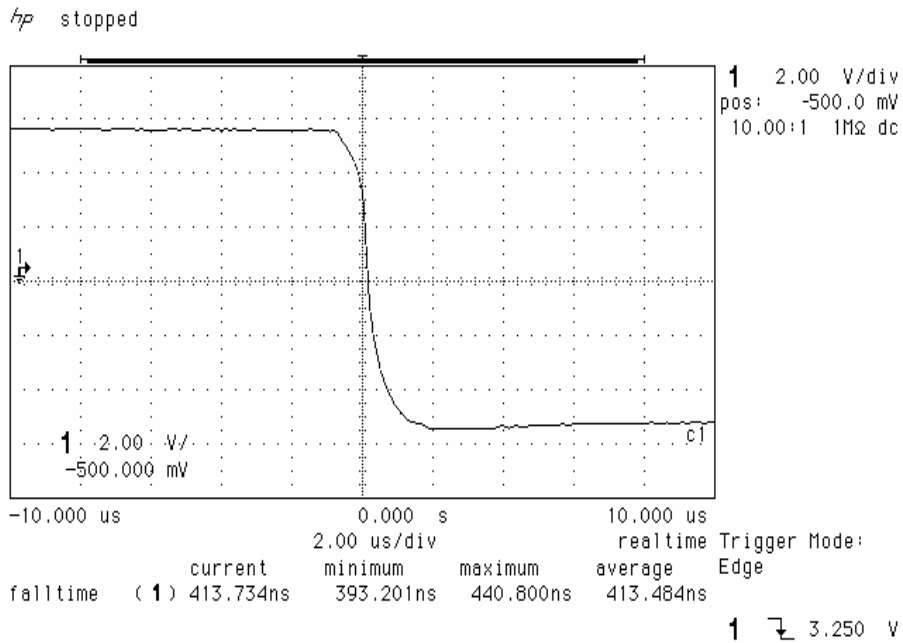
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V24rise08



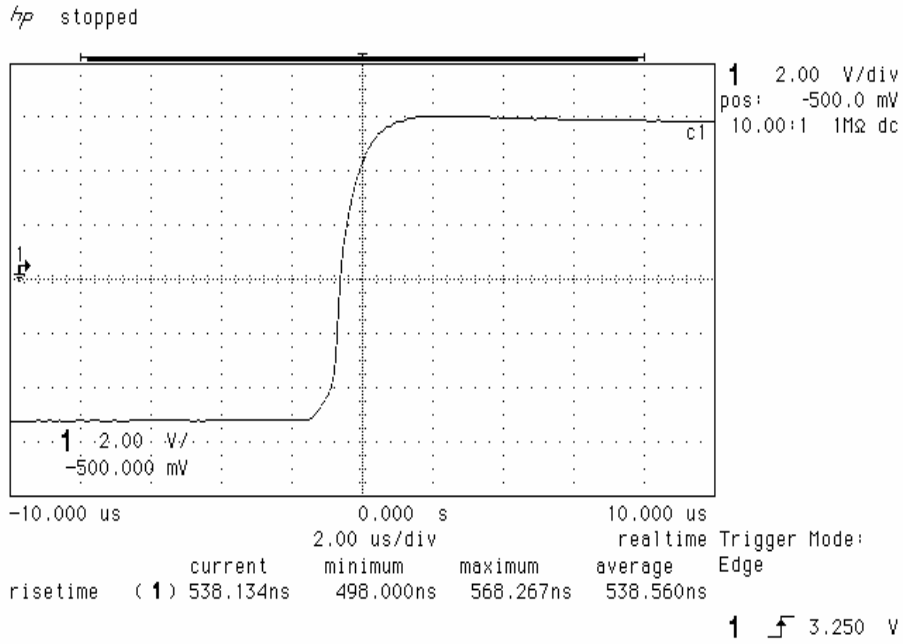
V24rise09



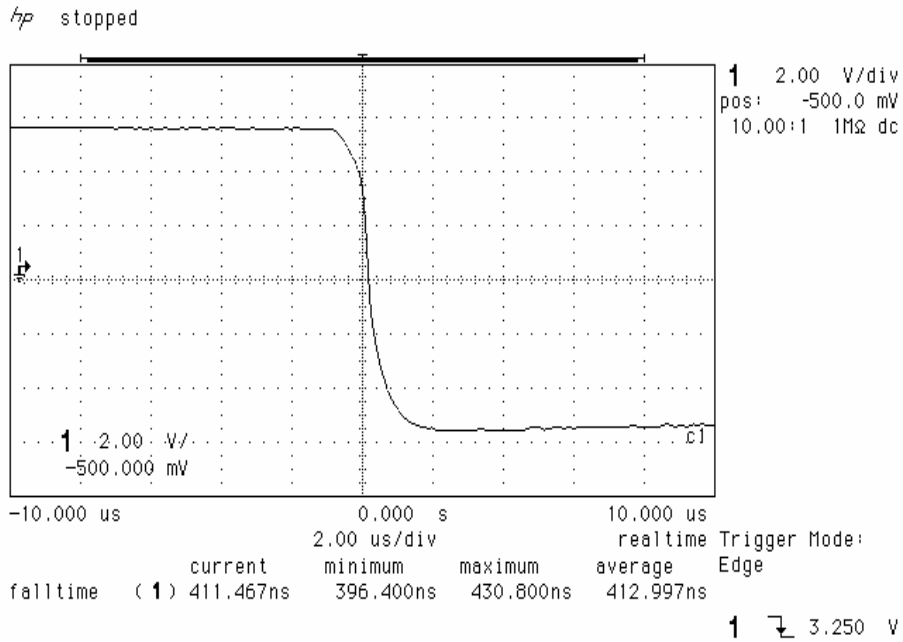
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V24rise10



V24rise11



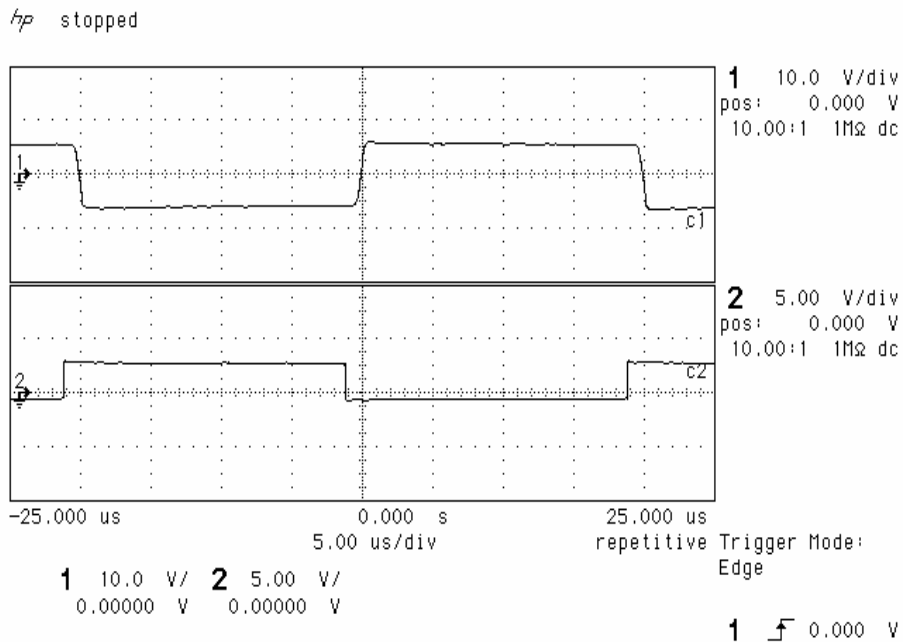


Generator Output Power (NET - Annex B.1.6)

(x) o.k. - see test NET - Annex B.3.1 b

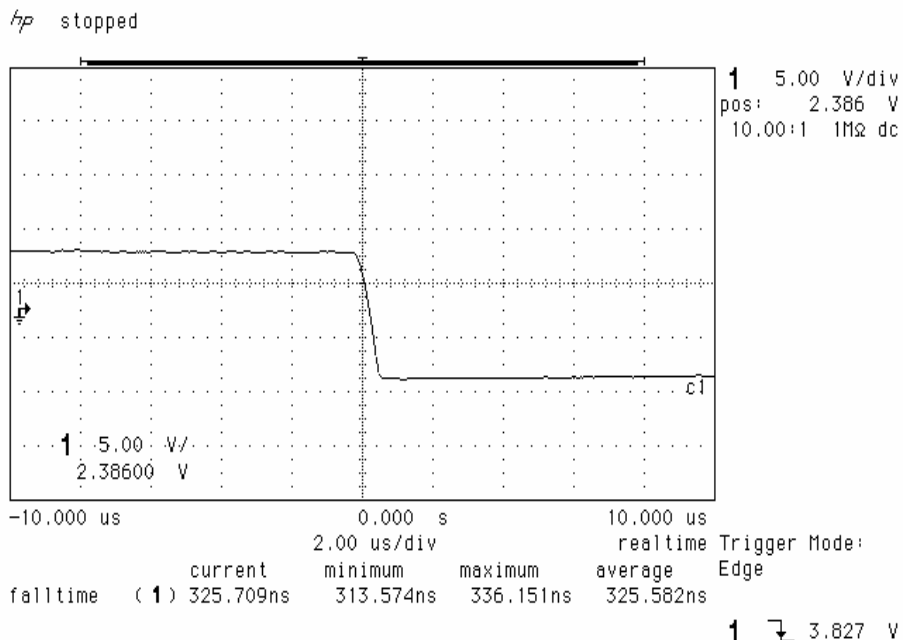
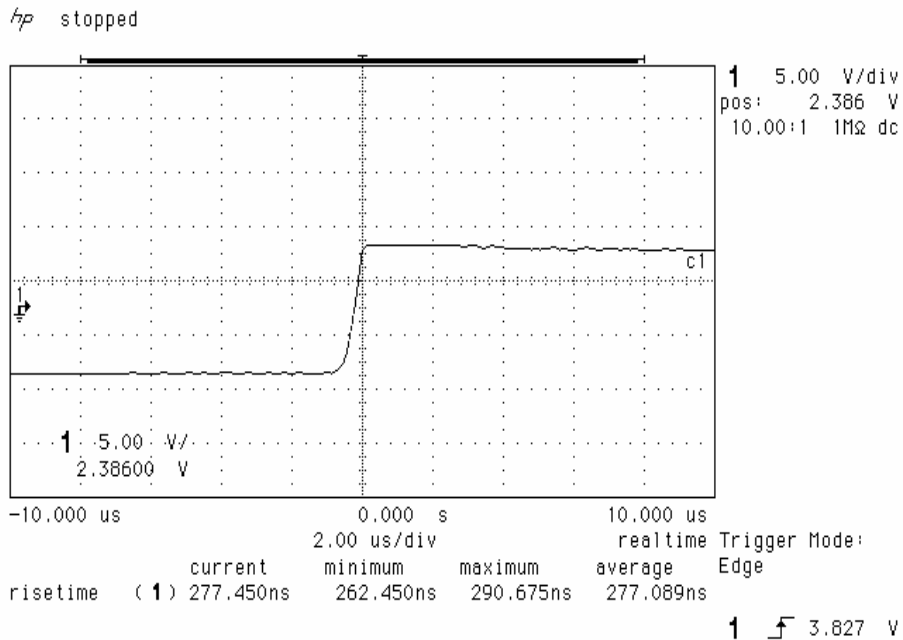
Wave Form (NET - Annex B.3.1)

Circuit	Limits	Results	Verdict	Observation
NET B.3.1				
103 slope positive	monotone, no negative components	monotone, no negative components	pass	
103 slope negative	monotone, no negative components	monotone, no negative components	pass	



Maximum Instantaneous Rate of Voltage Change (NET - Annex B.3.4)

Circuit	Limits	Results	Verdict	Observation
103	$t \geq 200\text{ns}$	277 ns	pass	
	$t \geq 200\text{ns}$	325 ns	pass	



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Receiver Shunt Capacitance

Test Case	Circuit	Limits	Result t3= 3.0 µsec	Verdict	Comment
TBR - 7.5.2.1 NET - B.2.3	104	t1 and t2 ≤ t3	t1= 78 nsec t2= 70 nsec	pass	
	106	t1 and t2 ≤ t3	t1= 48 nsec t2= 44 nsec	pass	
	107	t1 and t2 ≤ t3	t1= 48 nsec t2= 44 nsec	pass	
	109	t1 and t2 ≤ t3	t1= 44 nsec t2= 39 nsec	pass	
	114	t1 and t2 ≤ t3	t1= 63 nsec t2= 58 nsec	pass	
	115	t1 and t2 ≤ t3	t1= 72 nsec t2= 65 nsec	pass	
	125	t1 and t2 ≤ t3	t1= 36 nsec t2= 32 nsec	pass	
	142	t1 and t2 ≤ t3	t1= 47 nsec t2= 42 nsec	pass	

Load Impedance (NET - Annex B.2.4)

Circuit	Limits	Results	Verdict	Observation
104	capacitive	capacitive	pass	
106	capacitive	capacitive	pass	
107	capacitive	capacitive	pass	
109	capacitive	capacitive	pass	
114	capacitive	capacitive	pass	
115	capacitive	capacitive	pass	
125	capacitive	capacitive	pass	
142	capacitive	capacitive	pass	

Load Resistance Conditions (NET - Annex B.2.1)

Measurement with 3V applied

Circuit	Limits	Results	Verdict	Observation
104	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5825 Ω	pass	
106	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5825 Ω	pass	
107	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5825 Ω	pass	
109	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5825 Ω	pass	
114	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5836 Ω	pass	
115	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5836 Ω	pass	
125	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5813 Ω	pass	
142	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5825 Ω	pass	

Measurement with 15V applied

Circuit	Limits	Results	Verdict	Observation
104	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	4665 Ω	pass	
106	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5848 Ω	pass	
107	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5848 Ω	pass	
109	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5848 Ω	pass	
114	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	4889 Ω	pass	
115	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	3689 Ω	pass	
125	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5841 Ω	pass	
142	$3\text{ k}\Omega \leq R \leq 7\text{ k}\Omega$	5848 Ω	pass	

Maximum Load open circuit voltage (NET - Annex B.2.2)

Circuit	Limits	Results	Verdict	Observation
104	$U \leq 2\text{V}$	0.00 V	pass	
106	$U \leq 2\text{V}$	0.00 V	pass	
107	$U \leq 2\text{V}$	0.00 V	pass	
109	$U \leq 2\text{V}$	0.00 V	pass	
114	$U \leq 2\text{V}$	0.00 V	pass	
115	$U \leq 2\text{V}$	0.00 V	pass	
125	$U \leq 2\text{V}$	0.00 V	pass	
142	$U \leq 2\text{V}$	0.00 V	pass	

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Power off Measurement (NET - Annex B.4)

Circuit	Limits	Results	Verdict	Observation
103	$R \geq 300\Omega$	$> 10 M\Omega$	pass	
105	$R \geq 300\Omega$	$> 10 M\Omega$	pass	
108	$R \geq 300\Omega$	$> 10 M\Omega$	pass	
113	$R \geq 300\Omega$	$> 10 M\Omega$	pass	
140	$R \geq 300\Omega$	$> 10 M\Omega$	pass	
141	$R \geq 300\Omega$	$> 10 M\Omega$	pass	

Short Circuit Test (NET - Annex B.5)

A binary state 0

Connected to common return

Circuit	Limits	Results	Verdict	Observation
103	no damage	no damage	pass	
105	no damage	no damage	pass	
108	no damage	no damage	pass	
113	no damage	no damage	pass	
140	no damage	no damage	pass	
141	no damage	no damage	pass	

Connected to a load of 3000 Ohms where the open circuit voltage is -2V

Circuit	Limits	Results	Verdict	Observation
103	no damage	no damage	pass	
105	no damage	no damage	pass	
108	no damage	no damage	pass	
113	no damage	no damage	pass	
140	no damage	no damage	pass	
141	no damage	no damage	pass	

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B binary state 1

Connected to common return

Circuit	Limits	Results	Verdict	Observation
103	no damage	no damage	pass	
105	no damage	no damage	pass	
108	no damage	no damage	pass	
113	no damage	no damage	pass	
140	no damage	no damage	pass	
141	no damage	no damage	pass	

Connected to a load of 3000 Ohms where the open circuit voltage is +2V

Circuit	Limits	Results	Verdict	Observation
103	no damage	no damage	pass	
105	no damage	no damage	pass	
108	no damage	no damage	pass	
113	no damage	no damage	pass	
140	no damage	no damage	pass	
141	no damage	no damage	pass	

Allowance for Capacitance of Connections Leads (Annex B.7)

Circuit	Limits	Results	Verdict	Observation
All Leads	$C \leq 2500\text{pF}$	--	N/A	

6.2.3 34-pin DTE/DCE interface ISO 2593

(CCITT Recommendation V.35 interface)

Test Case	Requirement	Result	Verdict	Comment
7.2.4.1	TBR - 6.2.4.1 NET – 8.2.2.2	ISO 2593 (34-pole)	NT	Note 1
7.2.4.2	TBR - 6.2.4.2 NET – 8.2.2.2	Table A.17 and A.18	NT	Note 1

CCITT V.35 Interchange Circuits

A - B terminated with 3.9 KOhm

Circuit 103 (P/S)

Binary State 1

Test Case	Description	Limits	Result	Verdict	Comment
7.6.1.1	A - B	$V_o \leq 1.2 \text{ V}$	1.08 V	pass	
	A - C	$V_{oa} \leq 1.2 \text{ V}$	0.53 V	pass	
	B - C	$V_{ob} \leq 1.2 \text{ V}$	-0.56 V	pass	

Binary State 2

Test Case	Description	Limits	Result	Verdict	Comment
7.6.1.1	A - B	$V_o \leq 1.2 \text{ V}$	-1.08 V	pass	
	A - C	$V_{oa} \leq 1.2 \text{ V}$	-0.66 V	pass	
	B - C	$V_{ob} \leq 1.2 \text{ V}$	0.43 V	pass	

Circuit 113 (U/W)

Binary State 1

Test Case	Description	Limits	Result	Verdict	Comment
7.6.1.1	A - B	$V_o \leq 1.2 \text{ V}$	1.07 V	pass	
	A - C	$V_{oa} \leq 1.2 \text{ V}$	0.51 V	pass	
	B - C	$V_{ob} \leq 1.2 \text{ V}$	-0.56 V	pass	

Binary State 2

Test Case	Description	Limits	Result	Verdict	Comment
7.6.1.1	A - B	$V_o \leq 1.2 \text{ V}$	-1.07 V	pass	
	A - C	$V_{oa} \leq 1.2 \text{ V}$	-0.65 V	pass	
	B - C	$V_{ob} \leq 1.2 \text{ V}$	0.42 V	pass	

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Source Impedance (Annex C.1.1)

Circuit	Limits	Results	Verdict	Observation
103	$100 \pm 50 \Omega$	100.6 Ω	pass	
113	$100 \pm 50 \Omega$	100.2 Ω	pass	

4.2.2.2 Resistance A&B-C (Annex C.1.2)

Circuit	Limits	Results	Verdict	Observation
103 2V applied	$150 \pm 15 \Omega$	154.3 Ω	pass	
103 -2V applied	$150 \pm 15 \Omega$	158.7 Ω	pass	
113 2V applied	$150 \pm 15 \Omega$	147.8 Ω	pass	
113 -2V applied	$150 \pm 15 \Omega$	159.6 Ω	pass	

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**A - C terminated with 2 x 50 Ohm**

Circuit 103 (P/S)

Binary State 1

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.6.1.2	A - B	$0.44V \leq V_t \leq 0.66V$	0.57 V	pass	
NET - C.1.3	R1/R2 - C	$V_{os} \leq 0.6 V$	-0.038 V	pass	

Binary State 2

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.6.1.2	A - B	$0.44V \leq V_t \leq 0.66V$	-0.58 V	pass	
NET - C.1.3	R1/R2 - C	$V_{os} \leq 0.6 V$	-0.088 V	pass	

Circuit 113 (U/W)

Binary State 1

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.6.1.2	A - B	$0.44V \leq V_t \leq 0.66V$	0.57 V	pass	
NET - C.1.3	R1/R2 - C	$V_{os} \leq 0.6 V$	-0.046 V	pass	

Binary State 2

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.6.1.2	A - B	$0.44V \leq V_t \leq 0.66V$	-0.57 V	pass	
NET - C.1.3	R1/R2 - C	$V_{os} \leq 0.6 V$	-0.094 V	pass	

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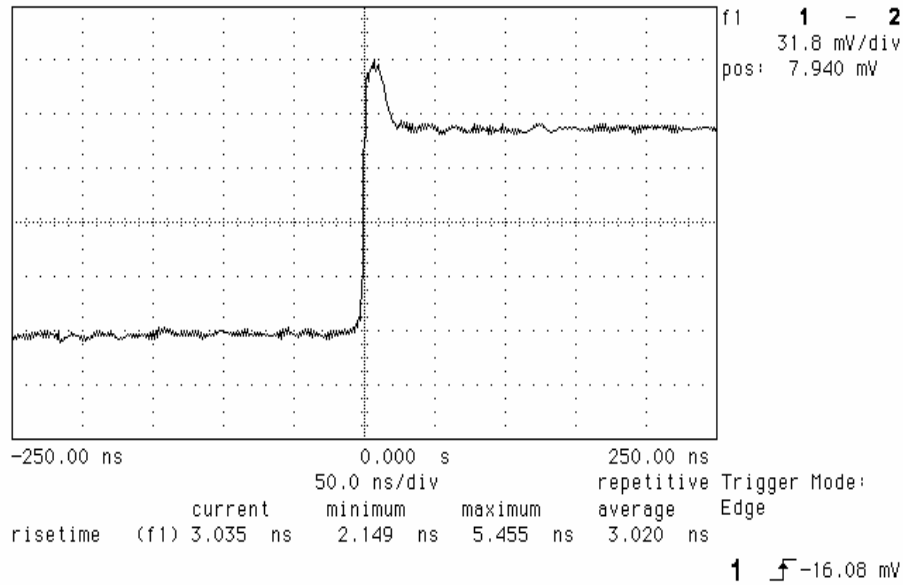


Generator Output Risetime

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.6.1.3 NET - C.1.4	103 (P/S)	$t \leq 0.1$ tb	3.0 ns pos	pass	
		$t \leq 0.1$ tb	2.8 ns neg	pass	
	113 (U/W)	$t \leq 0.1$ tb	2.5 ns pos	pass	
		$t \leq 0.1$ tb	2.6 ns neg	pass	

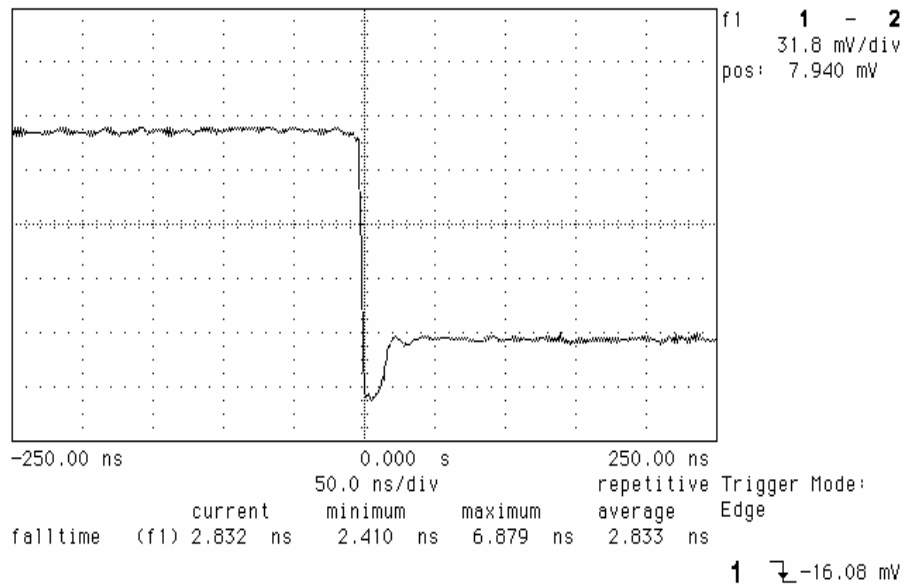
V35rise00

hp



V35rise01

hp stopped

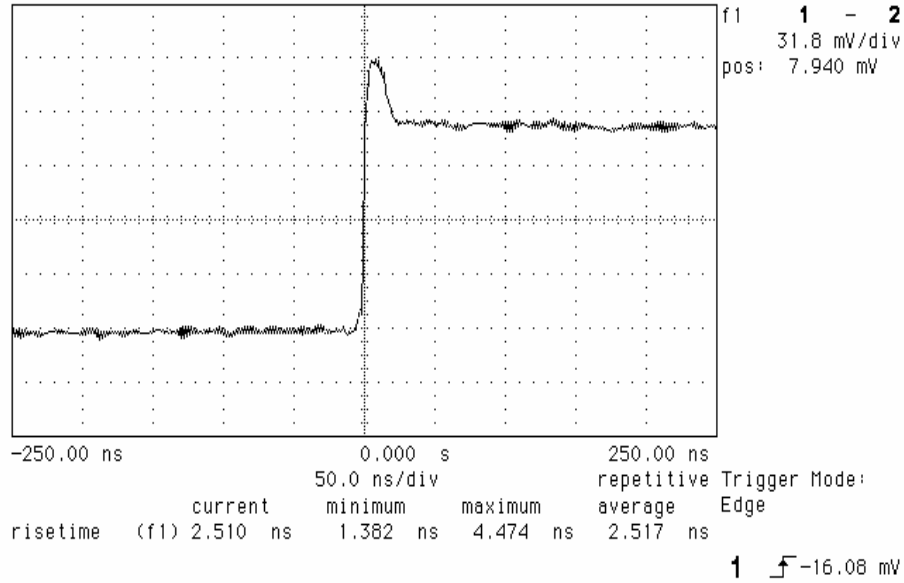


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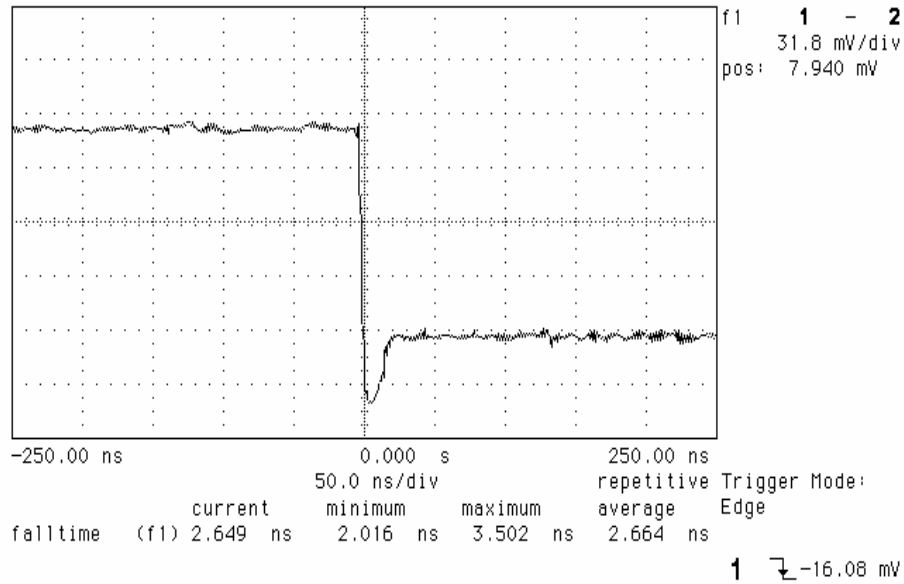
V35rise02

hp stopped



V35rise03

hp stopped



Impedance of Interconnecting Cable (NET - Annex C.2)

Circuit	Limits	Results	Verdict	Observation
P/S	100 ± 20 Ω	NA	--	Note 1

Load Characteristics

Impedance (NET - Annex C.3.1)

Circuit	Limits	Results	Verdict	Observation
104	100 ± 10 Ω	93.2 Ω	pass	
114	100 ± 10 Ω	96.8 Ω	pass	
115	100 ± 10 Ω	96.4 Ω	pass	

Resistance A&B-C (NET - Annex C.3.2)

Circuit	Limits	Results	Verdict	Observation
104 +2V applied	150 ± 15 Ω	152.2 Ω	pass	
104 -2V applied	150 ± 15 Ω	150.9 Ω	pass	
114 +2V applied	150 ± 15 Ω	152.1 Ω	pass	
114 -2V applied	150 ± 15 Ω	151.0 Ω	pass	
115 +2V applied	150 ± 15 Ω	153.0 Ω	pass	
115 -2V applied	150 ± 15 Ω	151.8 Ω	pass	

Generator/Load Protection (NET - Annex C.4)

Circuit	Limits	Results	Verdict	Observation
104	no damage	no damage	pass	
114	no damage	no damage	pass	
115	no damage	no damage	pass	

CCITT V.28 Interchange Circuits

A - C unterminated

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.1 NET - B.1.3	105	$V \leq 25.0V$	5.49 V	pass	
	108	$V \leq 25.0V$	5.49 V	pass	
	140	$V \leq 25.0V$	5.49 V	pass	
	141	$V \leq 25.0V$	5.49 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.1 NET - B.1.3	105	$V \leq 25.0V$	-5.84 V	pass	
	108	$V \leq 25.0V$	-5.84 V	pass	
	140	$V \leq 25.0V$	-5.84 V	pass	
	141	$V \leq 25.0V$	-5.84 V	pass	

A - C terminated with 3 KOhm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.2 NET - B.1.4	105	$V \geq 3.0V$	5.26 V	pass	
	108	$V \geq 3.0V$	5.26 V	pass	
	140	$V \geq 3.0V$	5.25 V	pass	
	141	$V \geq 3.0V$	5.25 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.2 NET - B.1.4	105	$V \geq 3.0V$	-5.65 V	pass	
	108	$V \geq 3.0V$	-5.654 V	pass	
	140	$V \geq 3.0V$	-5.654 V	pass	
	141	$V \geq 3.0V$	-5.654 V	pass	

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A - C terminated with 7 KOhm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
NET – B.1.5	105	$V \geq 3.0V$	5.38 V	pass	
	108	$V \geq 3.0V$	5.38 V	pass	
	140	$V \geq 3.0V$	5.38 V	pass	
	141	$V \geq 3.0V$	5.38 V	pass	

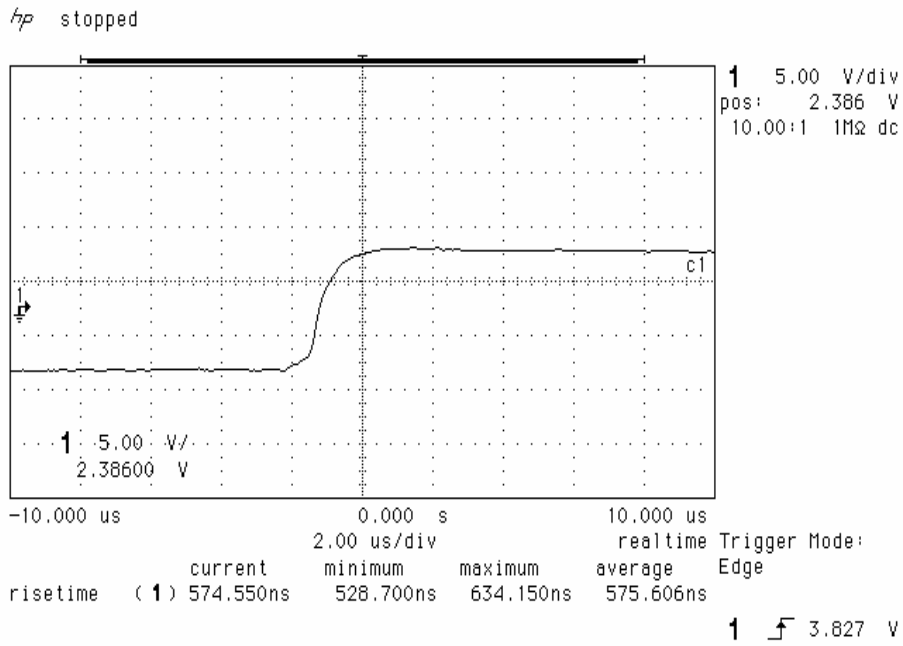
Generator Output Risetime

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.5.1.3	105	$t \leq 0.03$ tb	575 ns pos	pass	
		$t \leq 0.03$ tb	437 ns neg	pass	
	108	$t \leq 0.03$ tb	576 ns pos	pass	
		$t \leq 0.03$ tb	444 ns neg	pass	
	140	$t \leq 0.03$ tb	574 ns pos	pass	
		$t \leq 0.03$ tb	436 ns neg	pass	
	141	$t \leq 0.03$ tb	580 ns pos	pass	
		$t \leq 0.03$ tb	436 ns neg	pass	

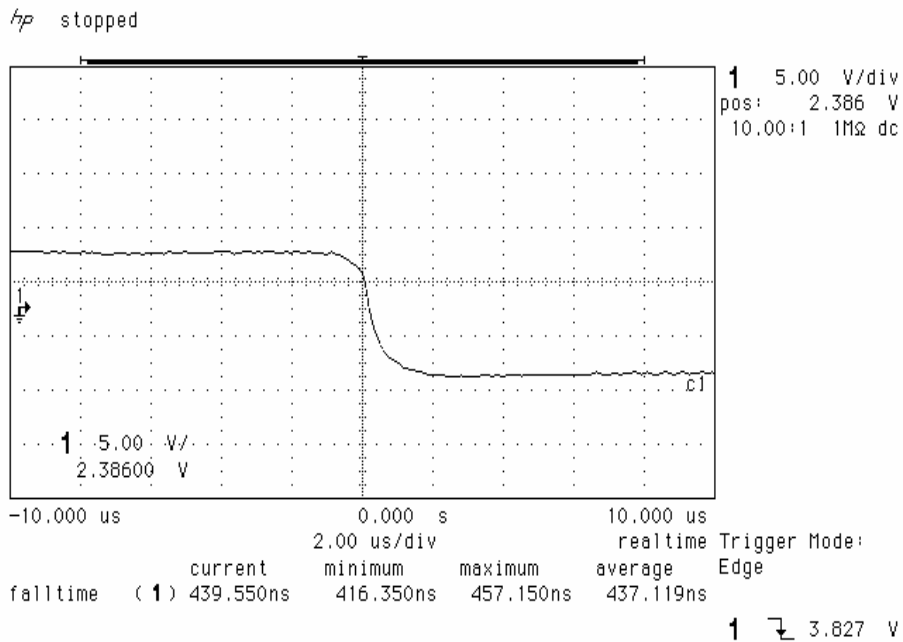
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V28rf300



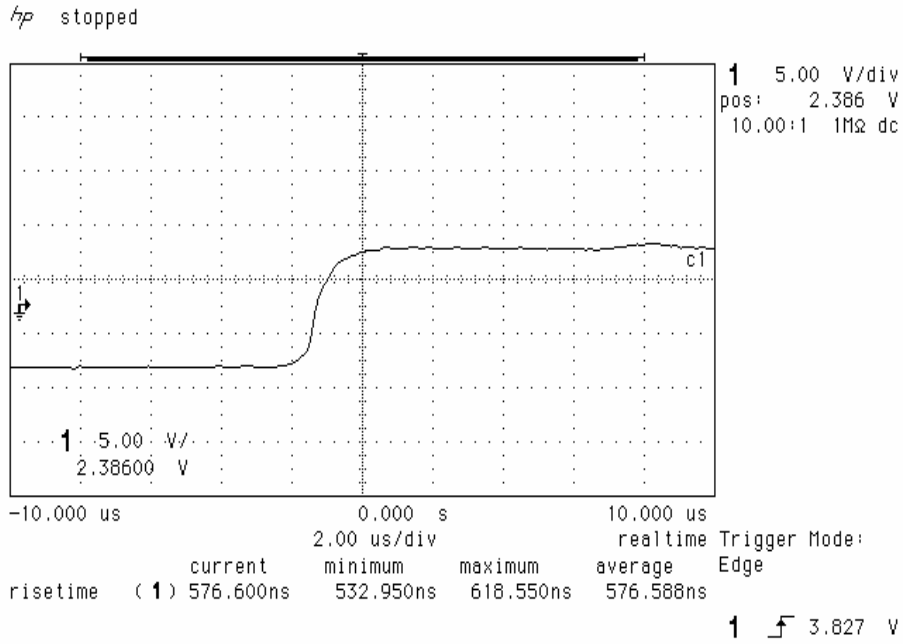
V28rf301



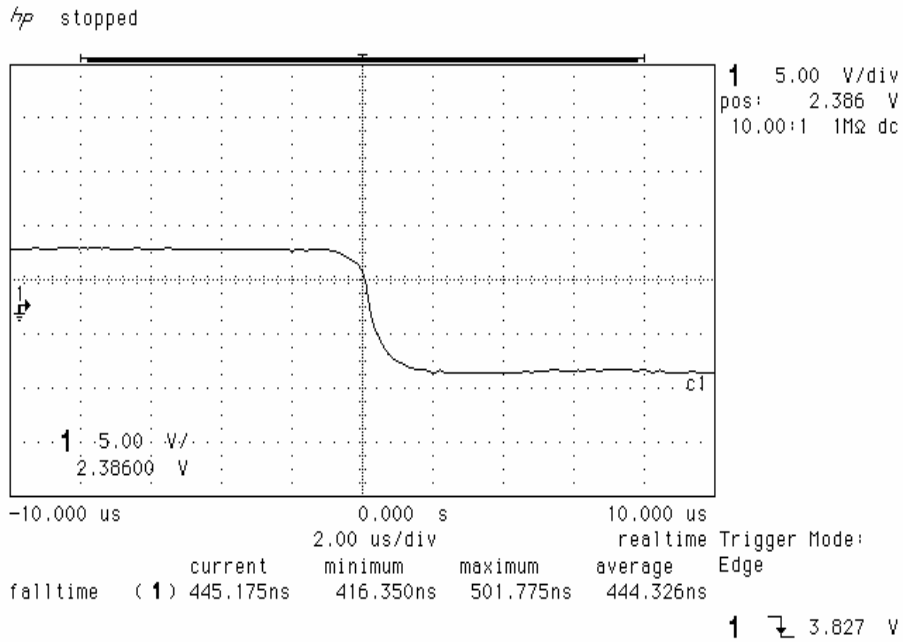
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V28rf302



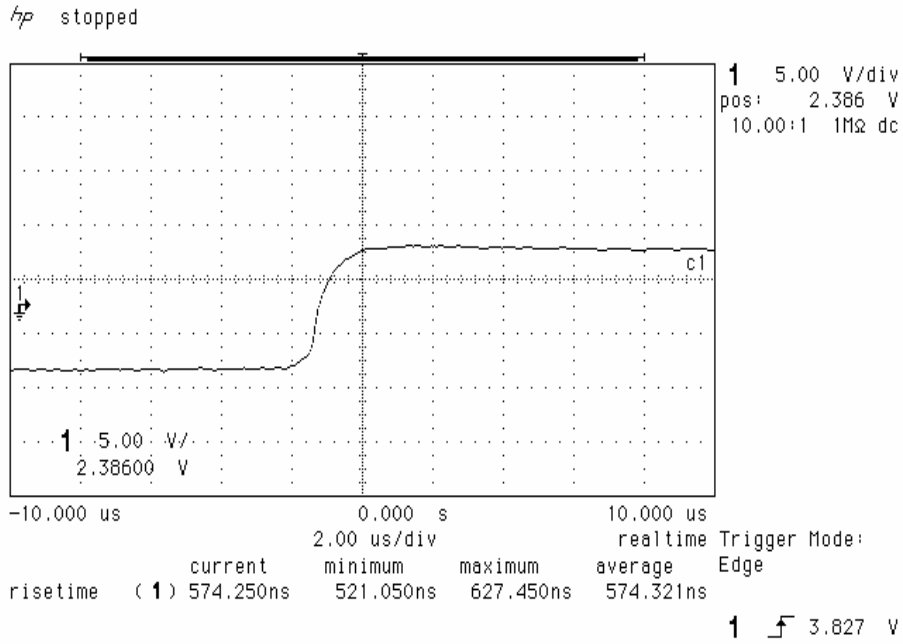
V28rf303



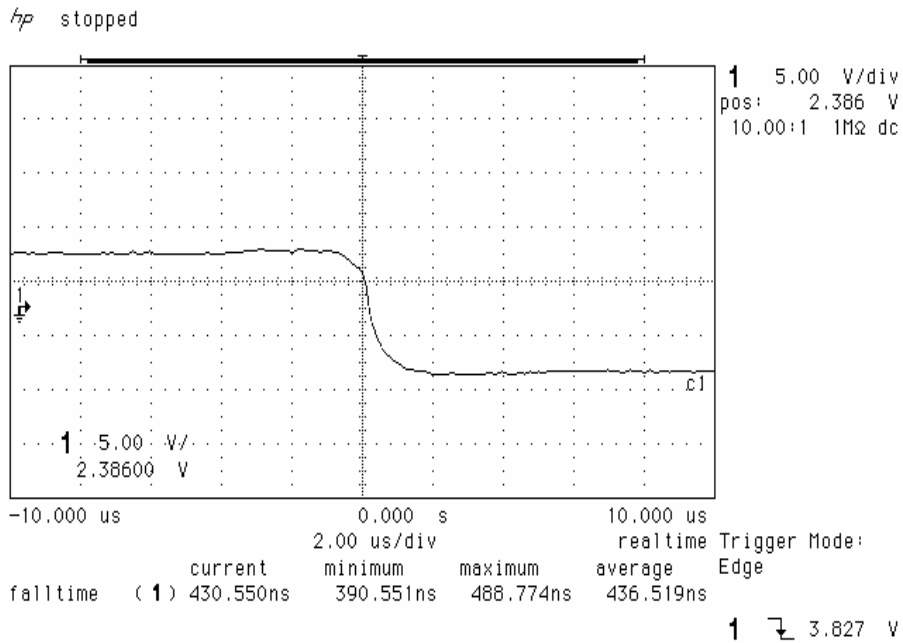
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V28rf304



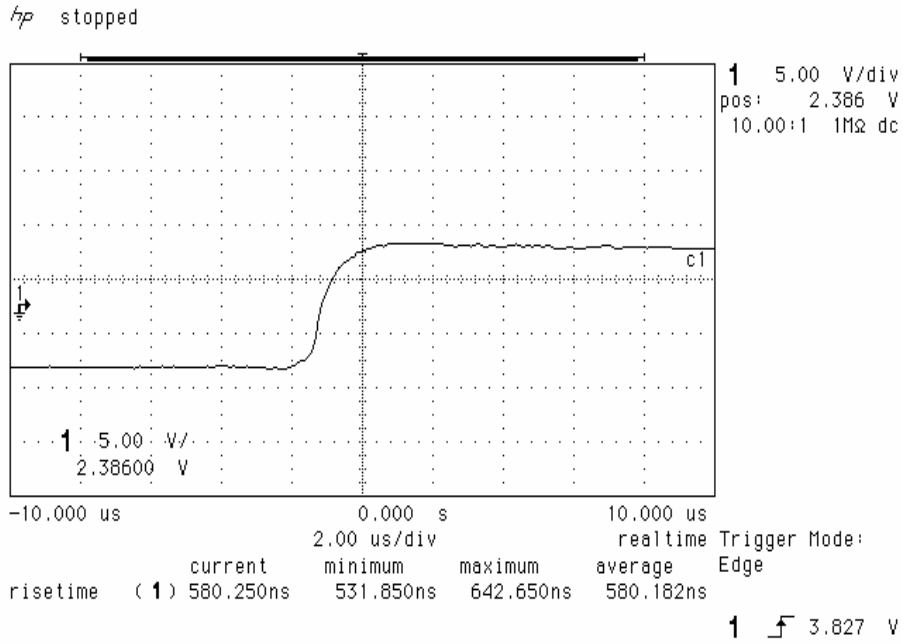
V28rf305



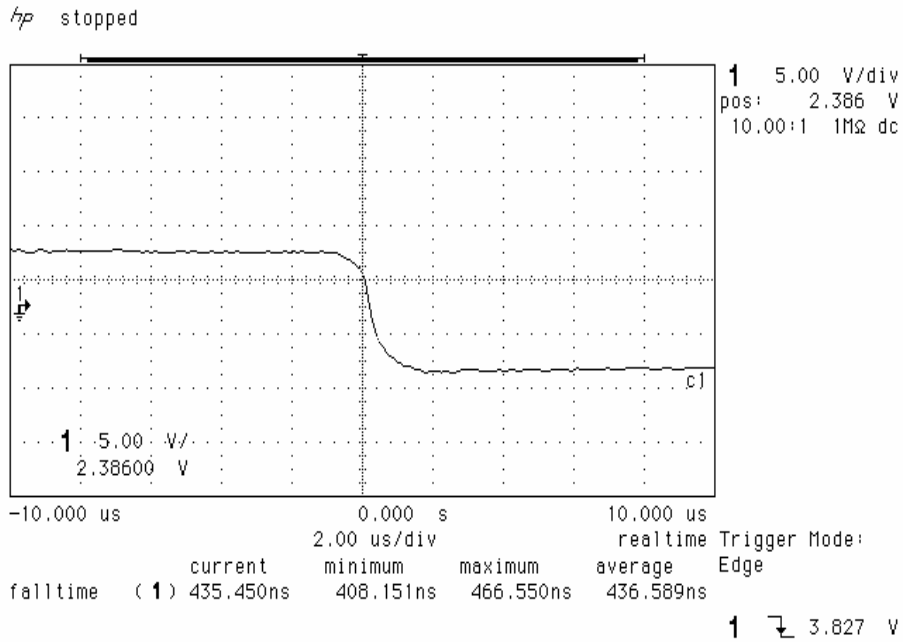
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V28rf306



V28rf307



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Generators

Circuit	Description	Limits	Results		Verdict	Observation
			State 1	State 2		
NET – Annex B.1.2			State 1	State 2		
C	Short Circuit	$I_k \leq 500\text{mA}$	-35.5 mA	44.8 mA	pass	
H	Short Circuit	$I_k \leq 500\text{mA}$	-36.5 mA	45.2 mA	pass	
N	Short Circuit	$I_k \leq 500\text{mA}$	-36.5 mA	46.0 mA	pass	
L	Short Circuit	$I_k \leq 500\text{mA}$	-36.2 mA	45.1 mA	pass	
NET – Annex B.4						
H 2volt	Resistance power off	$R \geq 300\Omega$	> 10 M Ω		pass	

Receiver Shunt Capacitance

Test Case	Circuit	Limits	Result t3= 3.0 μ S	Verdict	Comment
TBR 7.5.2.1	106	t1 and t2 \leq t3	t1= 54 nsec t2= 50 nsec	pass	
	107	t1 and t2 \leq t3	t1= 53 nsec t2= 50 nsec	pass	
	109	t1 and t2 \leq t3	t1= 50 nsec t2= 46 nsec	pass	
	125	t1 and t2 \leq t3	t1= 43 nsec t2= 42 nsec	pass	
	142	t1 and t2 \leq t3	t1= 50 nsec t2= 49 nsec	pass	

Receivers

Circuit	Description	Limits	Results	Verdict	Observation
NET – B.2.2					
D 106	Voltage without Terminator	EL \leq 2V	10.9 mV	pass	
E 107	Voltage without Terminator	EL \leq 2V	11.7 mV	pass	
F 109	Voltage without Terminator	EL \leq 2V	11.2 mV	pass	
NN 142	Voltage without Terminator	EL \leq 2V	11.0 mV	pass	
J 125	Voltage without Terminator	EL \leq 2V	11.9 mV	pass	
NET – B.2.1.a					
D	Rmin, 3V applied	7k Ω \geq R \geq 3k Ω	5870 Ω	pass	
E	Rmin, 3V applied	7k Ω \geq R \geq 3k Ω	5870 Ω	pass	
F	Rmin, 3V applied	7k Ω \geq R \geq 3k Ω	5870 Ω	pass	
NN	Rmin, 3V applied	7k Ω \geq R \geq 3k Ω	5870 Ω	pass	
J	Rmin, 3V applied	7k Ω \geq R \geq 3k Ω	5870 Ω	pass	
NET – B.2.1.b					
D	Rmax, 15V applied	7k Ω \geq R \geq 3k Ω	5886 Ω	pass	
E	Rmax, 15V applied	7k Ω \geq R \geq 3k Ω	5882 Ω	pass	
F	Rmax, 15V applied	7k Ω \geq R \geq 3k Ω	5882 Ω	pass	
NN	Rmax, 15V applied	7k Ω \geq R \geq 3k Ω	5877 Ω	pass	
J	Rmax, 15V applied	7k Ω \geq R \geq 3k Ω	5873 Ω	pass	

6.2.4 37-pin DTE/DCE interface ISO 4902 (CCITT Recommendation V.36 interface)

Test Case	Requirement	Result	Verdict	Comment
7.2.3.1	TBR - 6.2.3.1 NET - 8.2.2.3	ISO 4902 (37-pole)	NT	Note 1
7.2.3.2	TBR - 6.2.3.2 NET - 8.2.2.3	Table A.13 and A.14	NT	Note 1

CCITT V.10 Interchange Circuits

A - C terminated with 3.9 KOhm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.1	140	TBR - $V \leq 12.0V$	5.45 V	pass	
NET - 8.2.4.4	141	NET - $4V \leq V_o \leq 6V$	5.45 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.1	140	$V \leq 12.0V$	-5.81 V	pass	
NET - 8.2.4.4	141	NET - $4V \leq V_o \leq 6V$	-5.81 V	pass	

A - C terminated with 450 Ohm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.2	140	TBR - $V_o \geq 2.0V$	5.23 V	pass	
NET - 8.2.4.4	141	NET - $V_t \geq 0.9 * V_o$	5.24 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.2	140	TBR - $V_o \geq 2.0V$	-5.63 V	pass	
NET - 8.2.4.4	141	NET - $V_t \geq 0.9 * V_o$	-5.63 V	pass	

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Reference	Description	Limits	Results	Verdict	Observation
NET -					
V.10 140 5.2.3	Short Circuit	$I_s \leq 150\text{mA}$	86.3 mA	pass	
V.10 141 5.2.3	Short Circuit	$I_s \leq 150\text{mA}$	85.6 mA	pass	
V.10 140 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 141 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 140 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 141 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	

Generator Output Risetime

Circuit 140

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.3.1.3	A - C	$t \leq 0.3 \text{ tb}$	13.4 ns pos	pass	
NET - 8.2.4.4		$t \leq 0.3 \text{ tb}$	38.5 ns neg	pass	

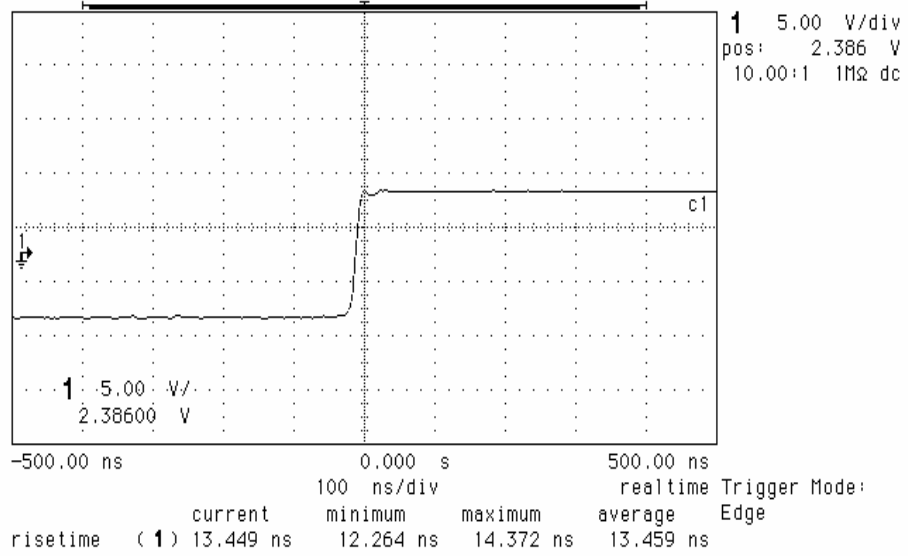
Circuit 141

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.3.1.3	A - C	$t \leq 0.3 \text{ tb}$	13.0 ns pos	pass	
NET - 8.2.4.4		$t \leq 0.3 \text{ tb}$	39.5 ns neg	pass	



V10D_10

hp stopped



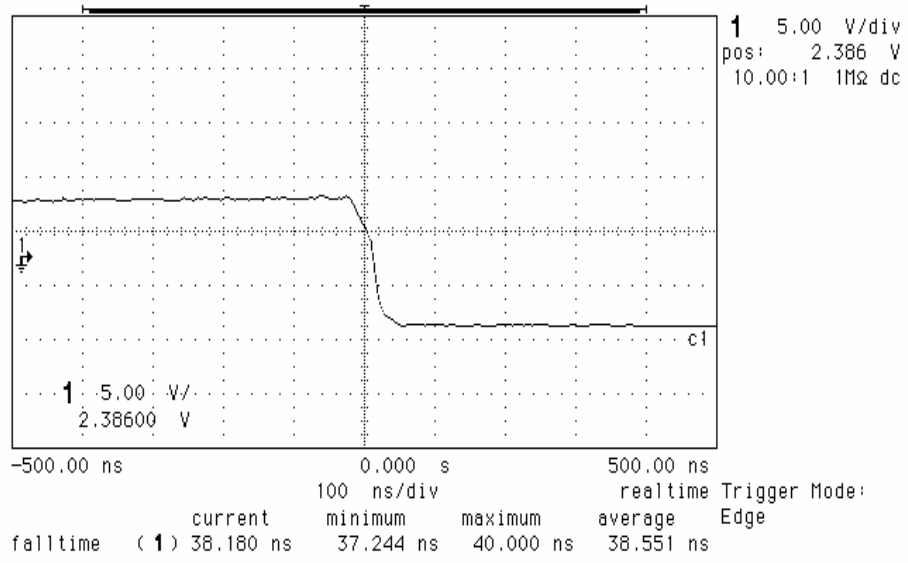
1 5.00 V/div
pos: 2.386 V
10.00:1 1MΩ dc

-500.00 ns 0.000 s 500.00 ns
100 ns/div realtime Trigger Mode:
Edge

1 3.827 V

V10D_11

hp stopped



1 5.00 V/div
pos: 2.386 V
10.00:1 1MΩ dc

-500.00 ns 0.000 s 500.00 ns
100 ns/div realtime Trigger Mode:
Edge

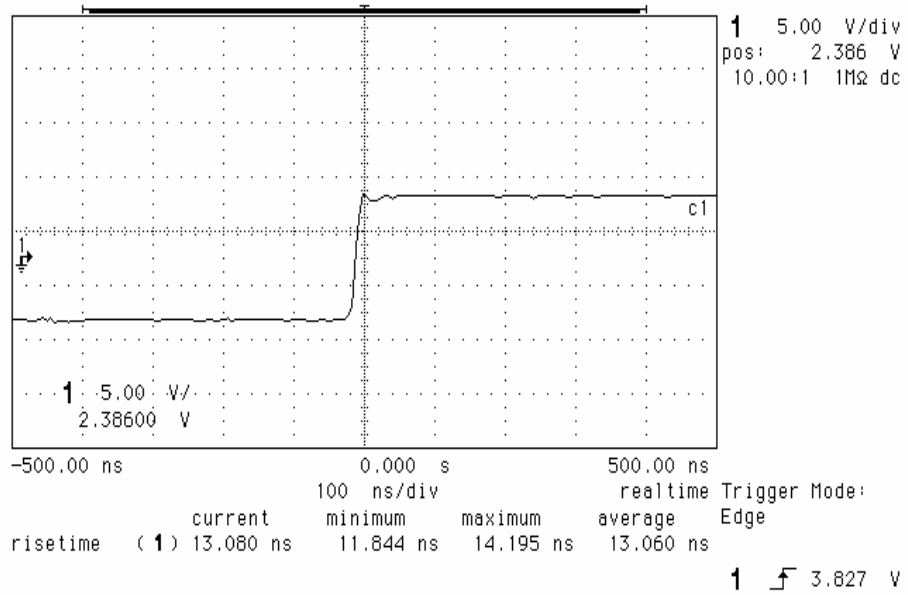
1 3.827 V

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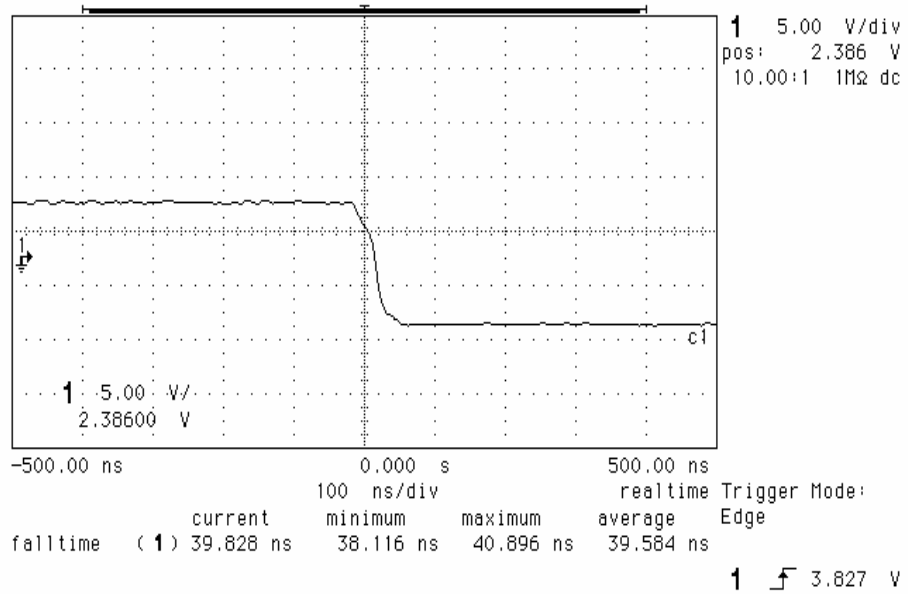
V10D_12

hp stopped



V10D_13

hp stopped



CCITT V.11 Interchange Circuits

A - B terminated with 3.9 Kohm

Binary State 1

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.27 V	pass	
NET - V11 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.29 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.27 V	pass	
NET - V11 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.29 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.25 V	pass	
NET - V11 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.27 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.21 V	pass	
NET - V11 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.27 V	pass	

Binary State 2

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1 NET - V11 5.2.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.27 V	pass	
	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.28 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1 NET - V11 5.2.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.27 V	pass	
	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.28 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1 NET - V11 5.2.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.25 V	pass	
	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.25 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1 NET - V11 5.2.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.28 V	pass	
	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.29 V	pass	

A - B terminated with 2 x 50 Ohm**Binary State 1**

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.40 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.41 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.65 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.39 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.40 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

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**Binary State 2**

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.42 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.44 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.41 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.62 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.42 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

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Generator Output Risetime

Circuit TxD 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.1 pos	pass	
NET - V11 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.1 neg	pass	

Circuit RTS 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	3.9 ns pos	pass	
NET - V11 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.0 ns neg	pass	

Circuit DTR 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.2 ns pos	pass	
NET - V11 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.1 ns neg	pass	

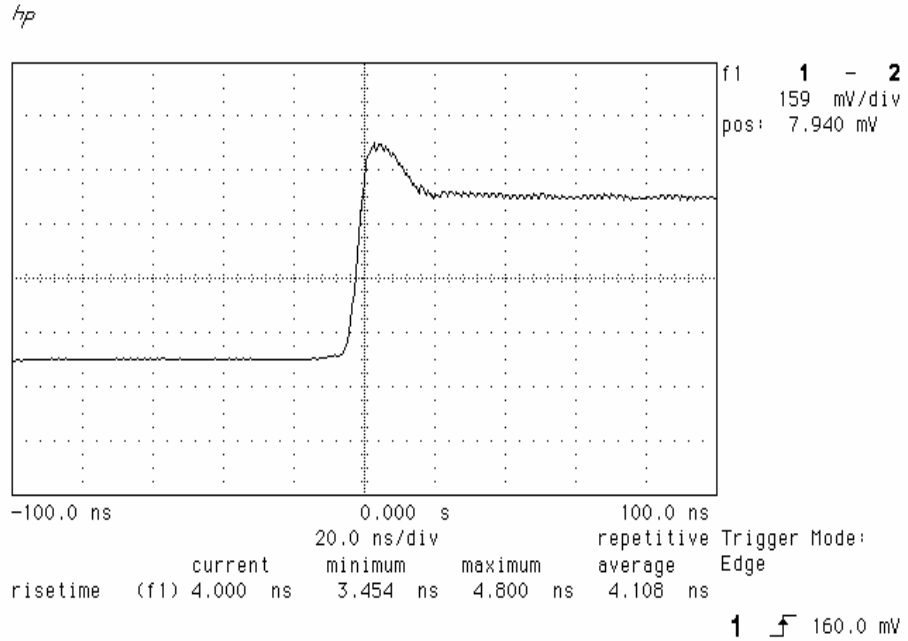
Circuit TxCE 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.0 ns pos	pass	
NET - V11 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.2 ns neg	pass	

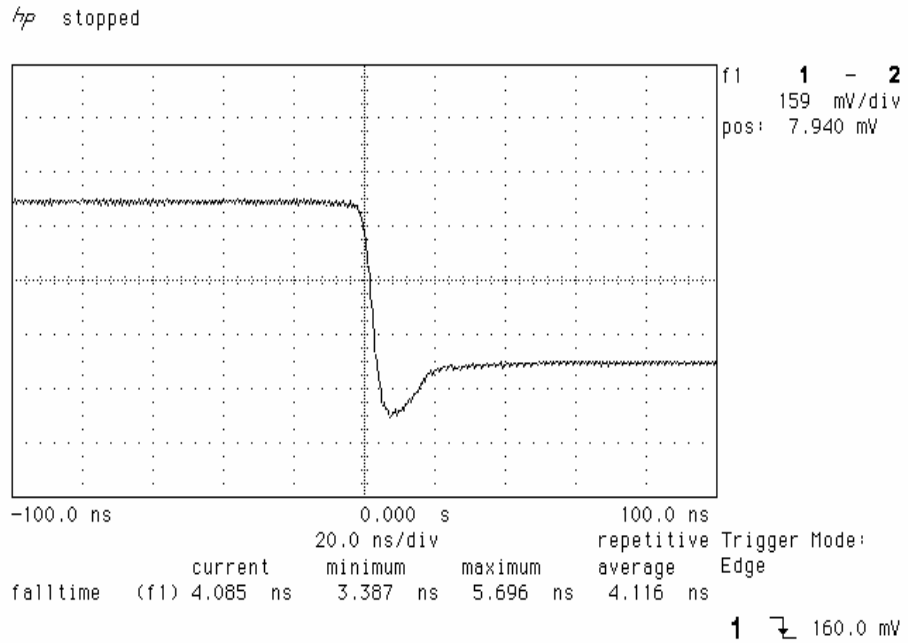
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V11Rise00



V11Rise03

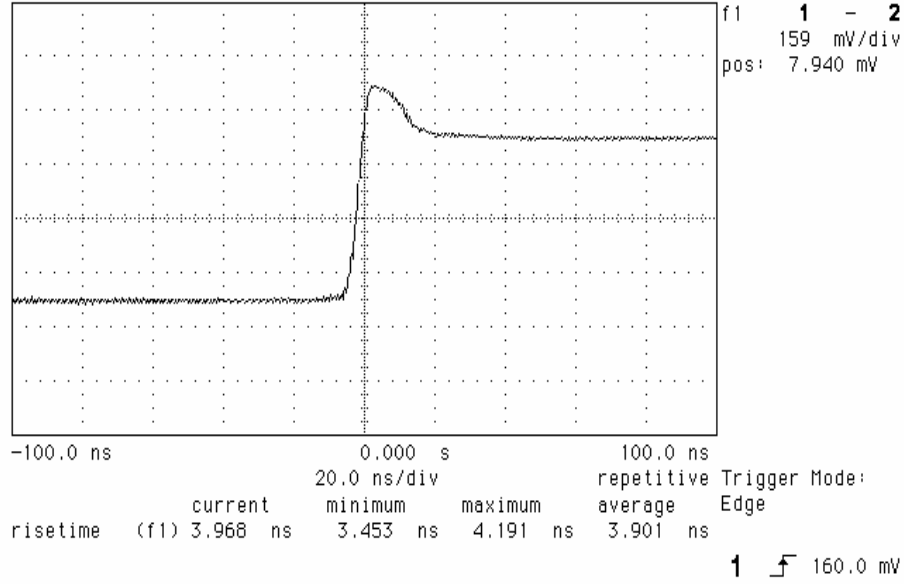


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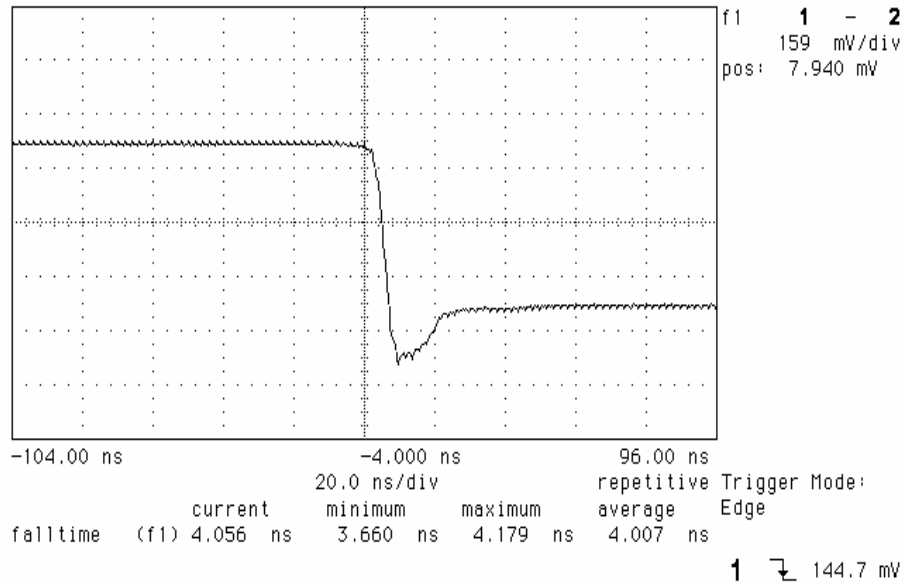
V11Rise06

hp stopped



V11Rise09

hp stopped

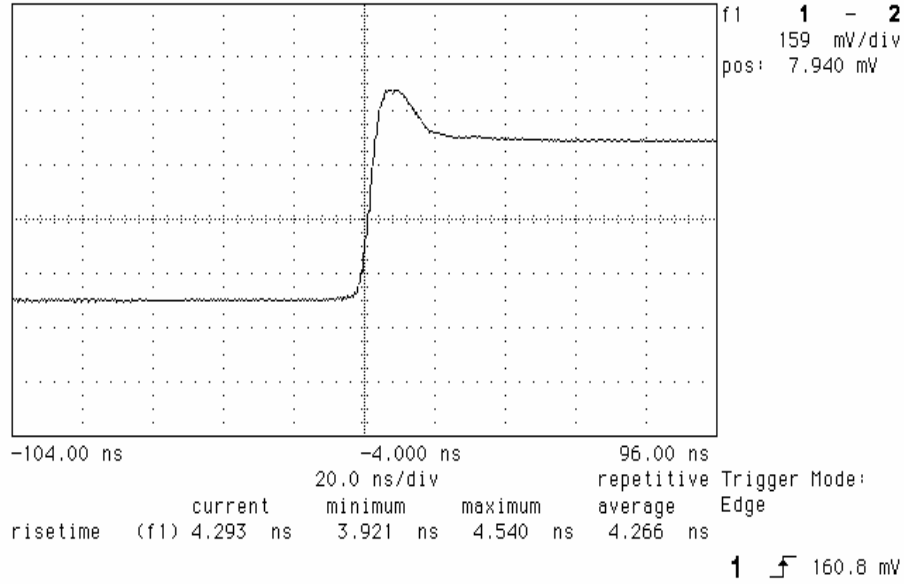


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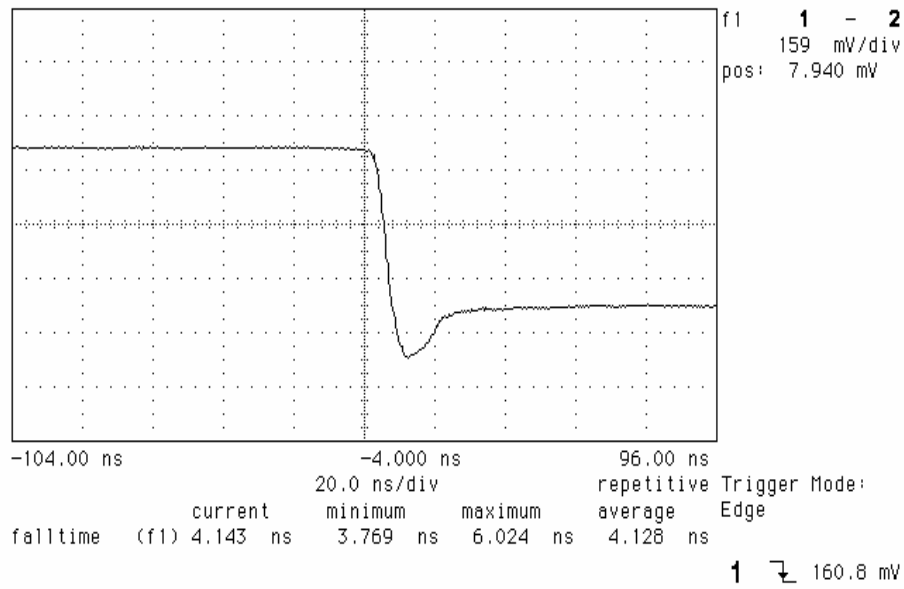
V11Rise12

hp stopped



V11Rise15

hp stopped

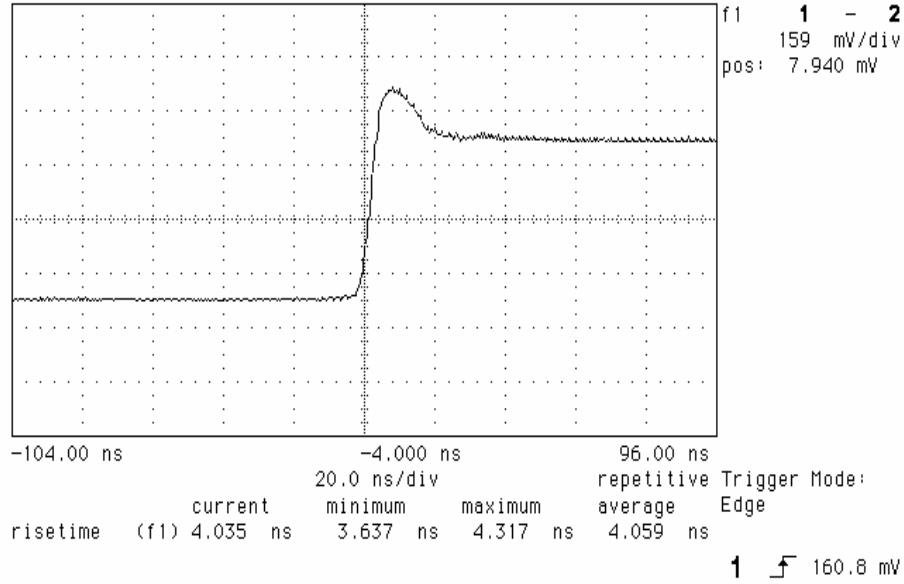


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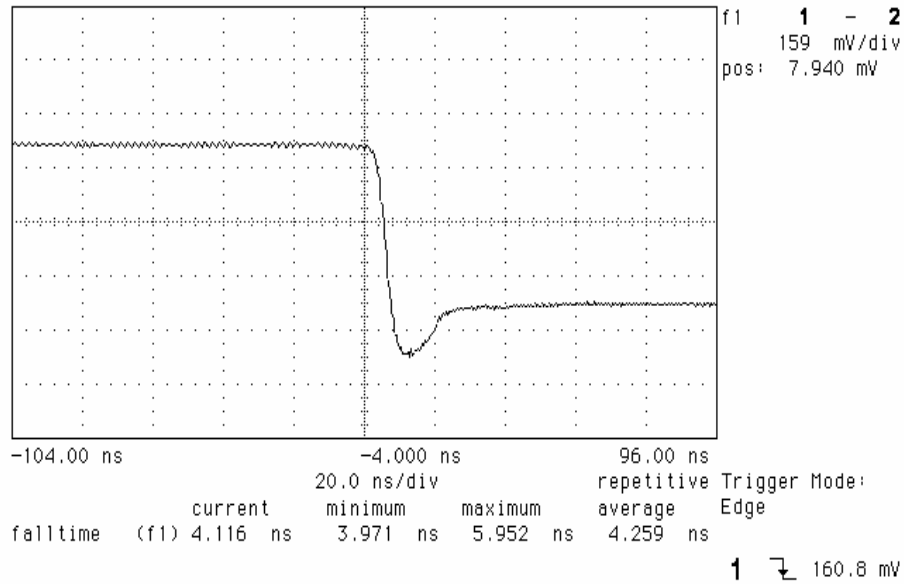
V11Rise18

hp stopped



V11Rise21

hp stopped



Short Circuit Measurement (NET - 5.2.3)

Circuit TxD 103

Description	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	Pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	25.4 mA	pass	

Circuit RTS 105

Description	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.1 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	27.6 mA	pass	

Circuit DTR 108

Description	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.1 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	49.6 mA	pass	

Circuit TxCE 113

Description	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.1 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	25.6 mA	pass	

Power-off Measurement (NET - 5.2.4)Power-off applied voltage $\pm 0.25V$

Circuit TxD 103

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit RTS 105

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit DTR 108

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit TxCE 113

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

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Receiver Characteristics NET - 6.1

Circuit RxD 104

The receiver *is* terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	49 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.7 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-51 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.7 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	48 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.7 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-51 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.7 mA	pass	

Circuit 106 CTS

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 107 DSR

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 109 DCD

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 114 TxC

The receiver *is* terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	

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Circuit 115 RxC

The receiver is terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.4 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.4 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	

6.2.5 DTE/DCE interface EIA 530

CCITT V.10 Interchange Circuits

A - C terminated with 3.9 KOhm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.1	140	TBR - $V \leq 12.0V$ NET - $4V \leq V_o \leq 6V$	5.45 V	pass	
NET - 8.2.4.4	141		5.45 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.1	140	$V \leq 12.0V$ NET - $4V \leq V_o \leq 6V$	-5.81 V	pass	
NET - 8.2.4.4	141		-5.81 V	pass	

A - C terminated with 450 Ohm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.2	140	TBR - $V_o \geq 2.0V$ NET - $V_t \geq 0.9 * V_o$	5.24 V	pass	
NET - 8.2.4.4	141		5.23 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.2	140	TBR - $V_o \geq 2.0V$ NET - $V_t \geq 0.9 * V_o$	-5.64 V	pass	
NET - 8.2.4.4	141		-5.64 V	pass	

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Reference	Description	Limits	Results	Verdict	Observation
NET -					
V.10 140 5.2.3	Short Circuit	$I_s \leq 150\text{mA}$	86.3 mA	pass	
V.10 141 5.2.3	Short Circuit	$I_s \leq 150\text{mA}$	85.1 mA	pass	
V.10 140 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 141 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 140 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 141 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	

Generator Output Risetime

Circuit 140

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.3.1.3	A - C	$t \leq 0.3 \text{ tb}$	13.1 ns pos	pass	
NET - 8.2.4.4		$t \leq 0.3 \text{ tb}$	38.4 ns neg	pass	

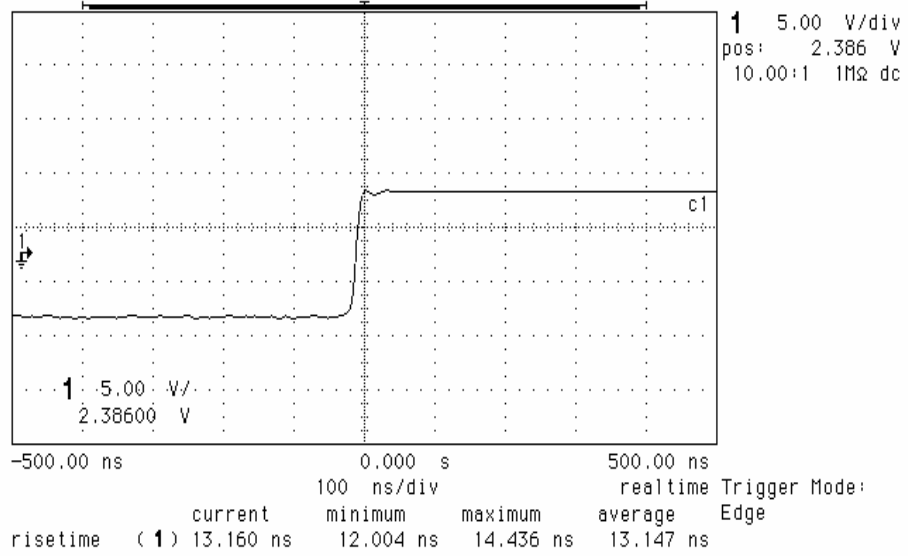
Circuit 141

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.3.1.3	A - C	$t \leq 0.3 \text{ tb}$	13.5 ns pos	pass	
NET - 8.2.4.4		$t \leq 0.3 \text{ tb}$	38.6 ns neg	pass	



V10rise06

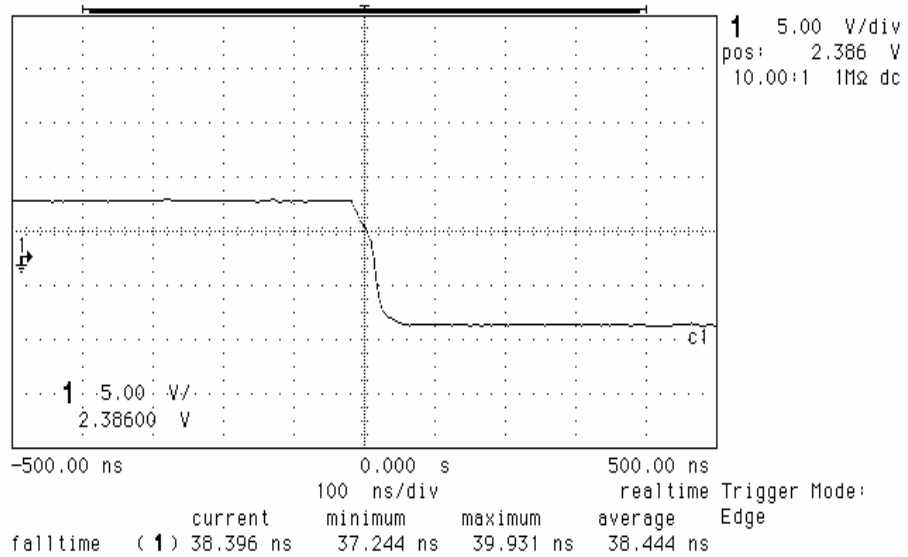
hp stopped



1 5.00 V/div
 pos: 2.386 V
 10.00:1 1MΩ dc
 1 3.827 V

V10rise07

hp stopped

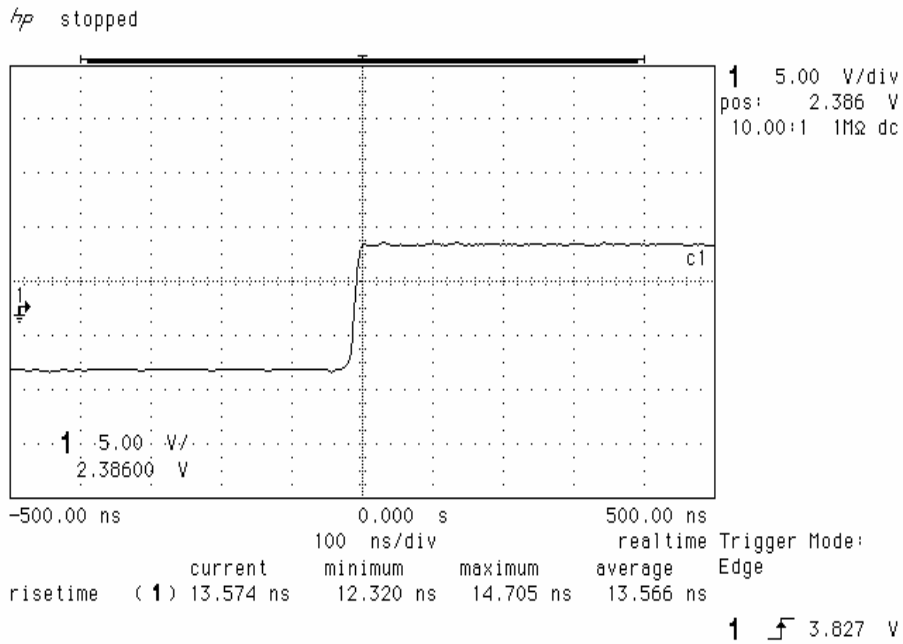


1 5.00 V/div
 pos: 2.386 V
 10.00:1 1MΩ dc
 1 3.827 V

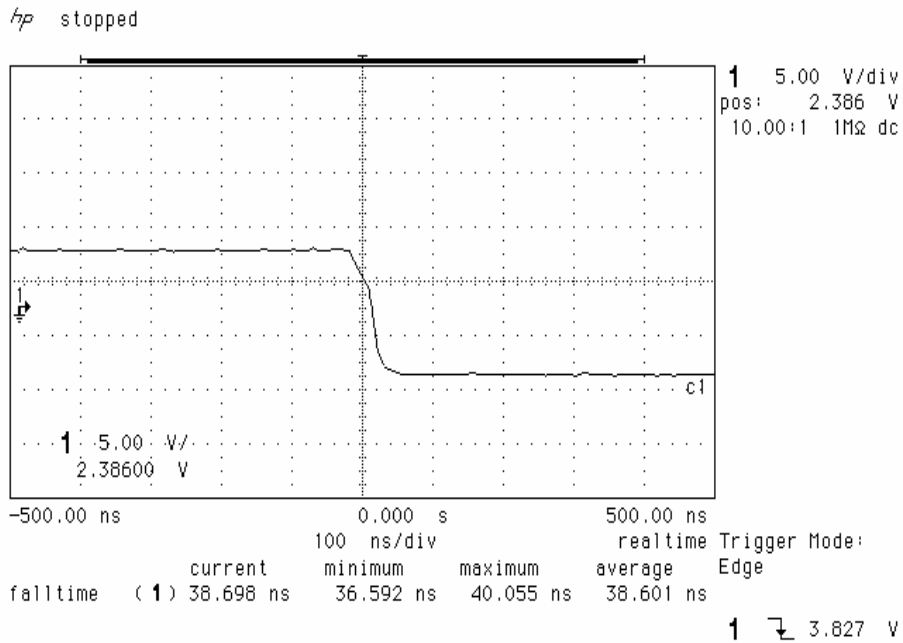
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V10rise08



V10rise09



CCITT V.11 Interchange Circuits

A - B terminated with 3.9 Kohm

Binary State 1

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.28 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.29 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.28 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.29 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.28 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.29 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.28 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.29 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Binary State 2

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.27 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.29 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.28 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.29 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.28 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.29 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.28 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.29 V	pass	

A - B terminated with 2 x 50 Ohm**Binary State 1**

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.41 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.41 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.65 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.39 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.40 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

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**Binary State 2**

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.42 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.44 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.42 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.62 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.42 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

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Generator Output Risetime

Circuit TxD 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.0 ns pos	pass	
NET - 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.2 ns neg	pass	

Circuit RTS 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.0 ns pos	pass	
NET - 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.0 ns neg	pass	

Circuit DTR 108

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.1 ns pos	pass	
NET - 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.2 ns neg	pass	

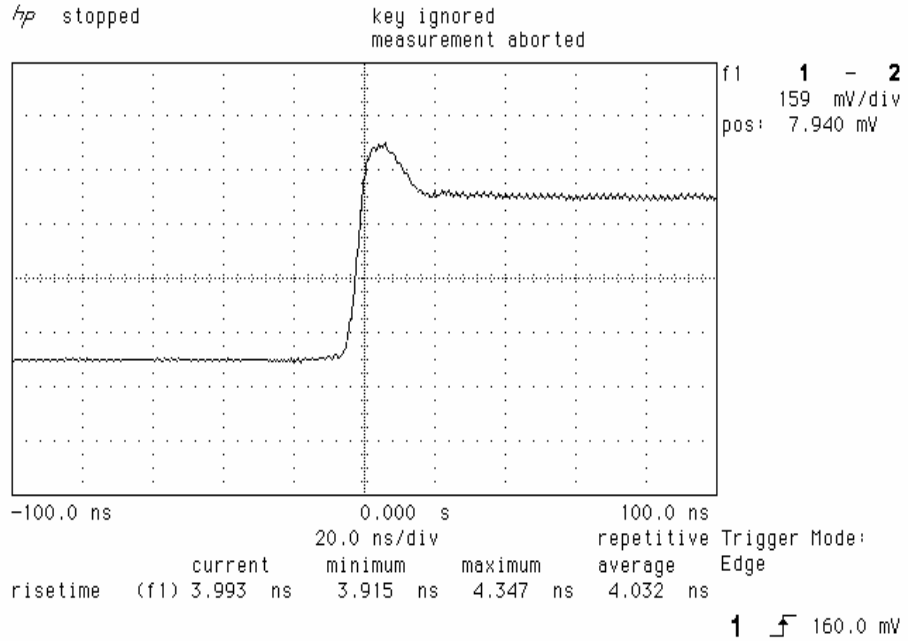
Circuit TxCE 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3$ tb	4.2 ns pos	pass	
NET - 5.3		NET - $20\text{ns} \geq t$ or $t \leq 0.1\text{tb}$	4.0 ns neg	pass	

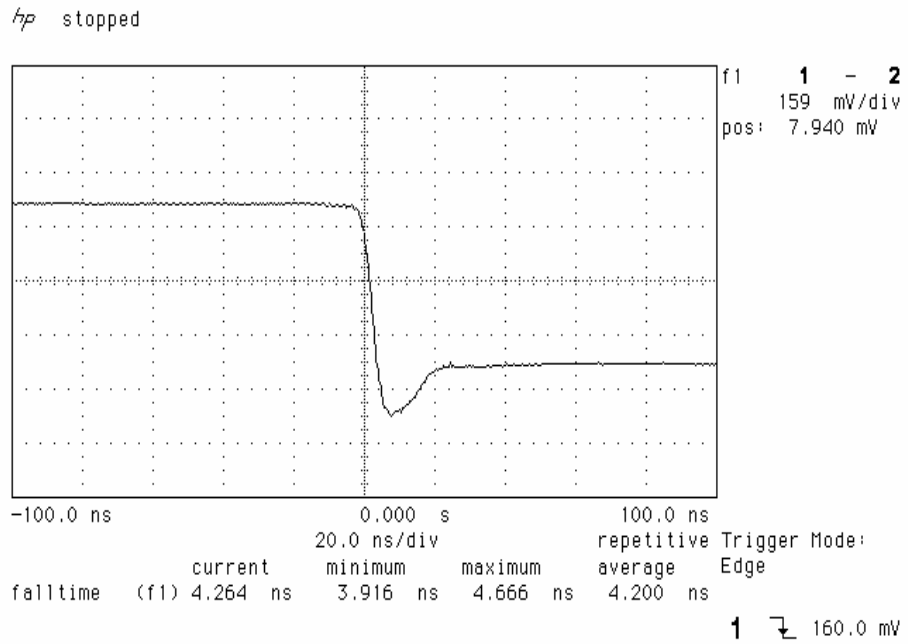
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V11Rise01



V11Rise04

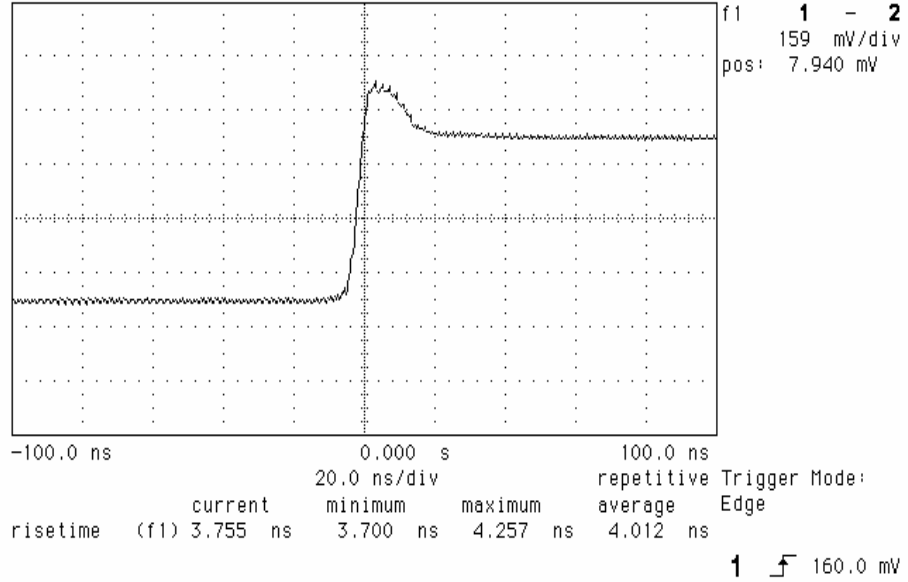


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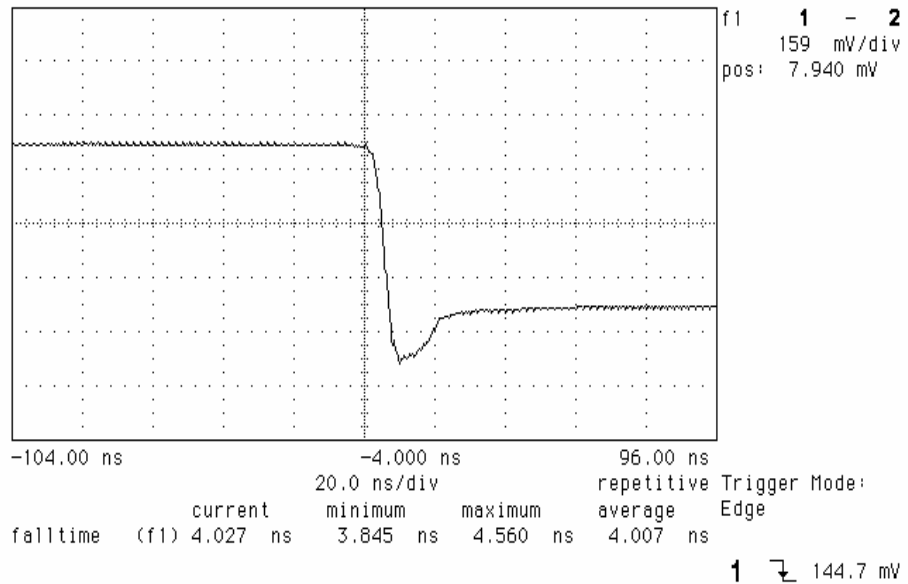
V11Rise07

hp stopped



V11Rise10

hp stopped

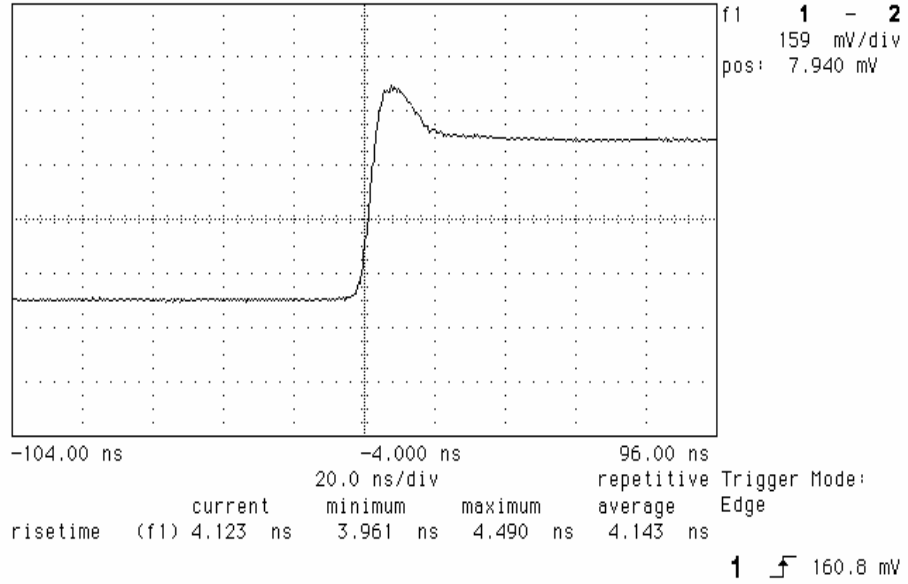


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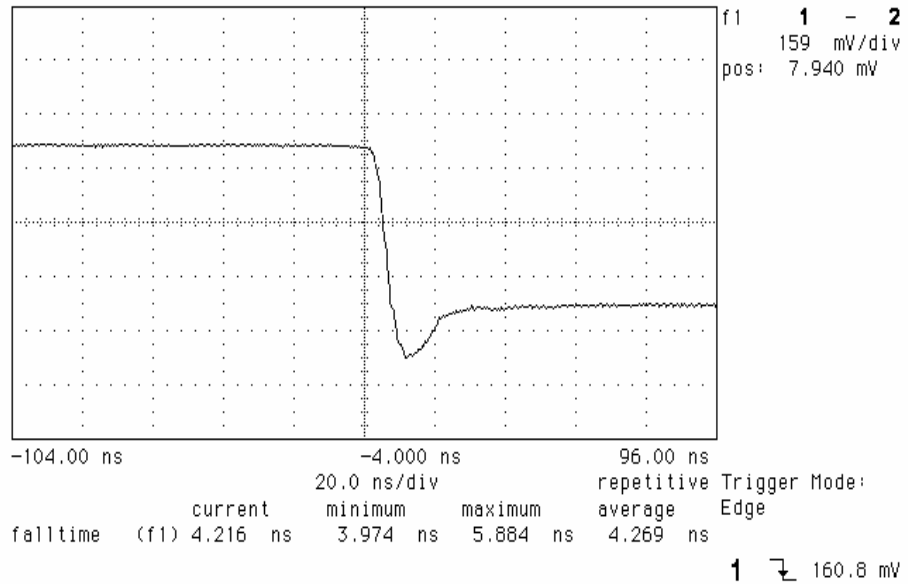
V11Rise13

hp stopped



V11Rise16

hp stopped

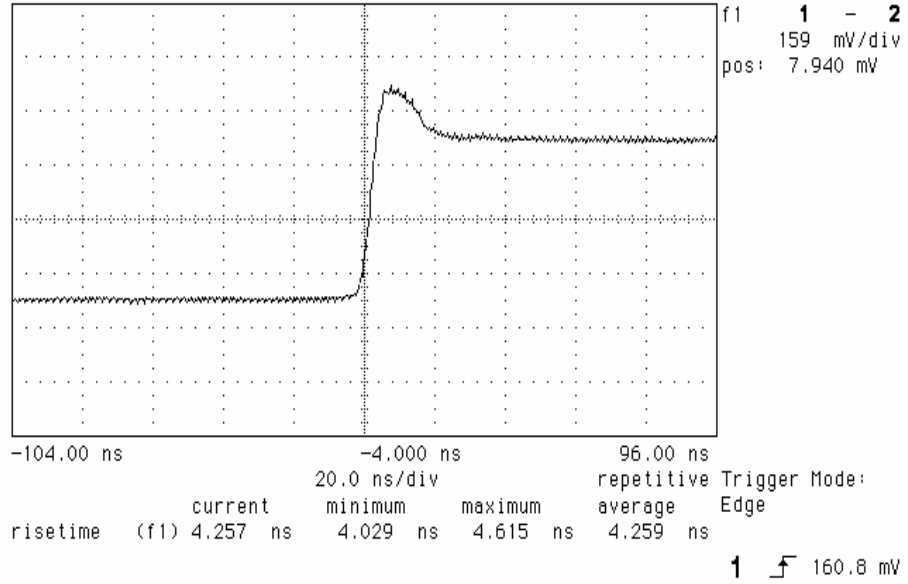


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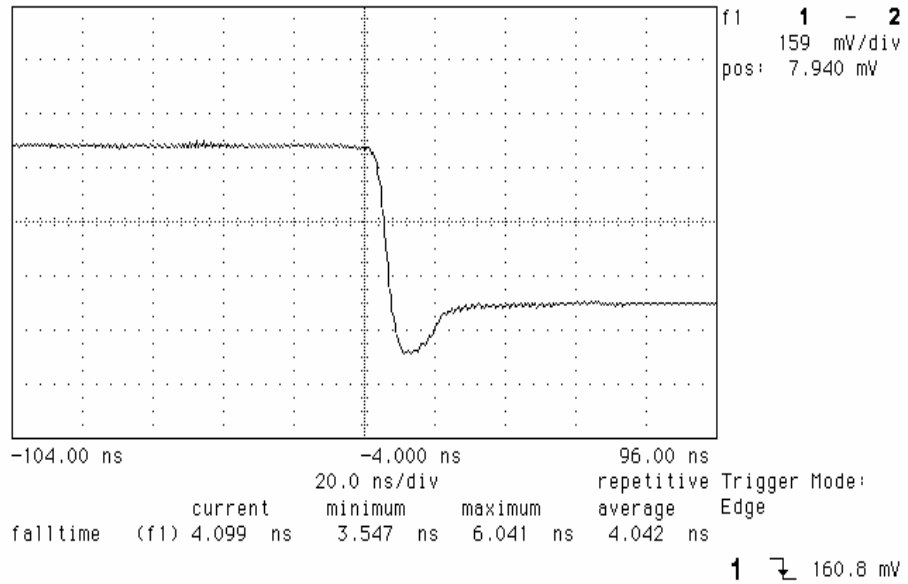
V11Rise19

hp stopped



V11Rise22

hp stopped



Short Circuit Measurement (NET - 5.2.3)

Circuit TxD 103

Description	Limits	Results	Verdict	Observation
NET - 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	25.6 mA	pass	

Circuit RTS 105

Description	Limits	Results	Verdict	Observation
NET - 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	27.6 mA	pass	

Circuit DTR 108

Description	Limits	Results	Verdict	Observation
NET - 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	49.7 mA	pass	

Circuit TxCE 113

Description	Limits	Results	Verdict	Observation
NET - 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	25.7 mA	pass	

Power-off Measurement (NET - 5.2.4)Power-off applied voltage $\pm 0.25V$

Circuit TxD 103

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit RTS 105

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit DTR 108

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit TxCE 113

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Receiver Characteristics NET - 6.1

Circuit RxD 104

The receiver is terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	49 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	26 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.7 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-51 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.7 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	48 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.7 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-51 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.7 mA	pass	

Circuit 106 CTS

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 107 DSR

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 109 DCD

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 114 TxC

The receiver *is* terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	

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Circuit 115 RxC

The receiver is terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	

6.2.6 DTE/DCE interface EIA 530A

CCITT V.10 Interchange Circuits

A - C terminated with 3.9 KOhm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.1	140	TBR - $V \leq 12.0V$ NET - $4V \leq V_o \leq 6V$	5.45 V	pass	
NET - 8.2.4.4	141		5.45 V	pass	
	108		5.44 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.1	140	$V \leq 12.0V$ NET - $4V \leq V_o \leq 6V$	-5.81 V	pass	
NET - 8.2.4.4	141		-5.80 V	pass	
	108		-5.80 V	pass	

A - C terminated with 450 Ohm

Binary State 1

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.2	140	TBR - $V_o \geq 2.0V$ NET - $V_t \geq 0.9 * V_o$	5.23 V	pass	
NET - 8.2.4.4	141		5.24 V	pass	
	108		5.22 V	pass	

Binary State 2

Test Case	Circuit	Limits	Result	Verdict	Comment
TBR - 7.3.1.2	140	TBR - $V_o \geq 2.0V$ NET - $V_t \geq 0.9 * V_o$	-5.63 V	pass	
NET - 8.2.4.4	141		-5.63 V	pass	
	108		-5.62 V	pass	

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Reference	Description	Limits	Results	Verdict	Observation
NET -					
V.10 140 5.2.3	Short Circuit	$I_s \leq 150\text{mA}$	86.3 mA	pass	
V.10 141 5.2.3	Short Circuit	$I_s \leq 150\text{mA}$	85.6 mA	pass	
V.10 108 5.2.3	Short Circuit	$I_s \leq 150\text{mA}$	85.6 mA	pass	
V.10 140 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 140 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 141 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 141 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 108 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	
V.10 108 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu\text{A}$	< 0.1 μA	pass	

Generator Output Risetime

Circuit 140

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.3.1.3	A - C	$t \leq 0.3 \text{ tb}$	13.5 ns pos	pass	
NET - 8.2.4.4		$t \leq 0.3 \text{ tb}$	41.5 ns neg	pass	

Circuit 141

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.3.1.3	A - C	$t \leq 0.3 \text{ tb}$	13.8 ns pos	pass	
NET - 8.2.4.4		$t \leq 0.3 \text{ tb}$	40.8 ns neg	pass	

Circuit 141

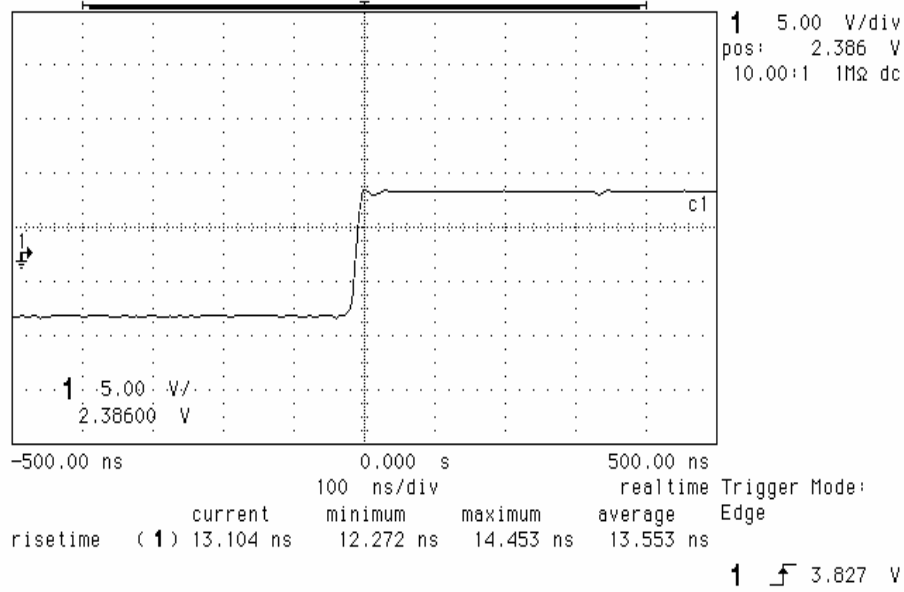
Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.3.1.3	A - C	$t \leq 0.3 \text{ tb}$	16.2 ns pos	pass	
NET - 8.2.4.4		$t \leq 0.3 \text{ tb}$	43.5 ns neg	pass	

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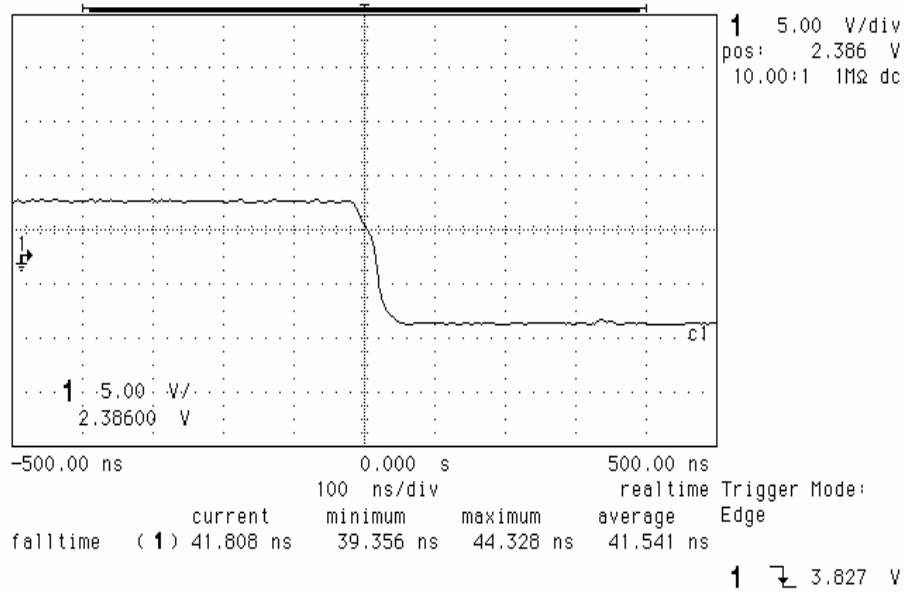
V10rise00

hp stopped



V10rise01

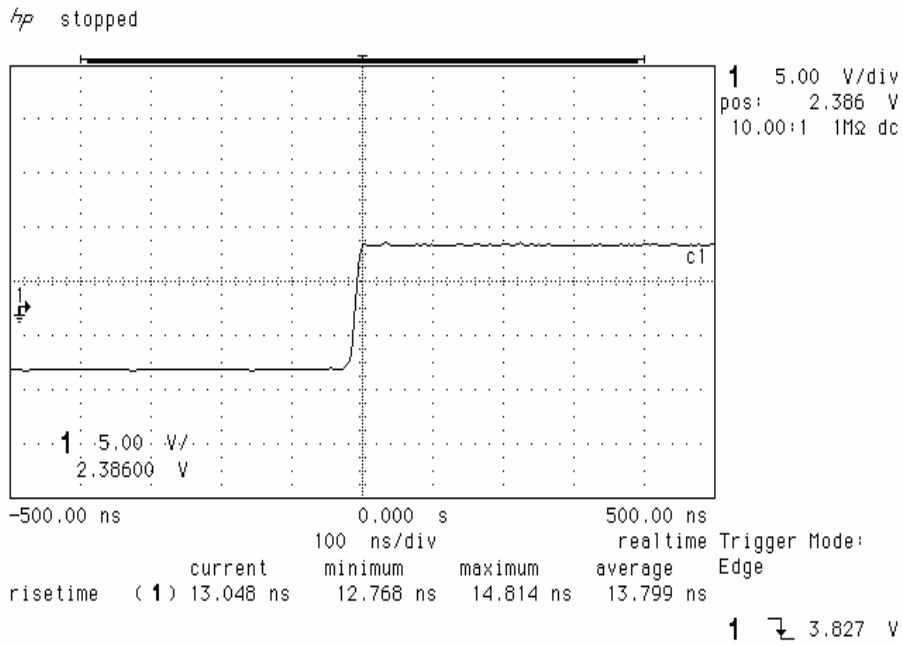
hp stopped



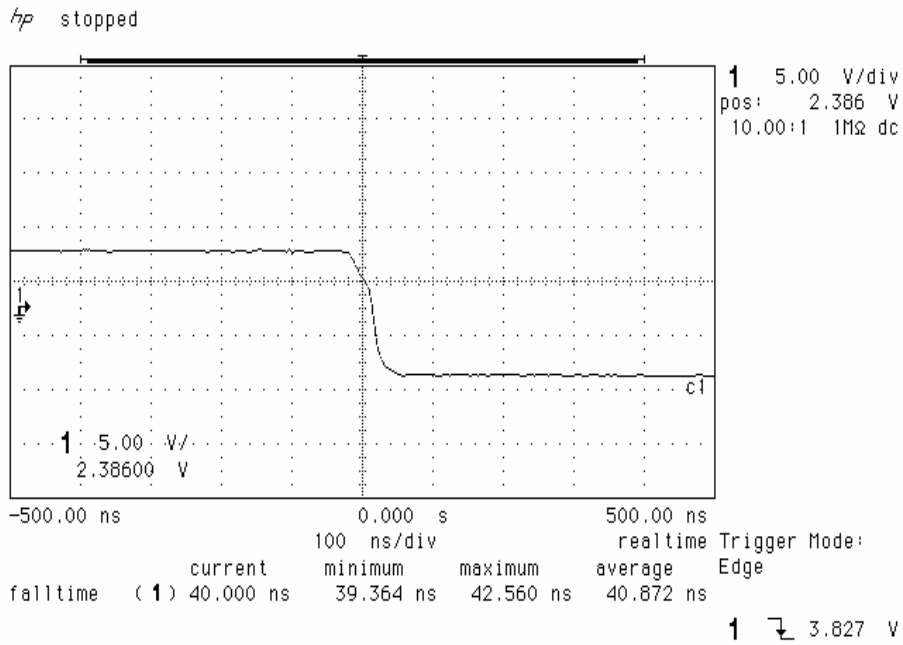
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V10rise02



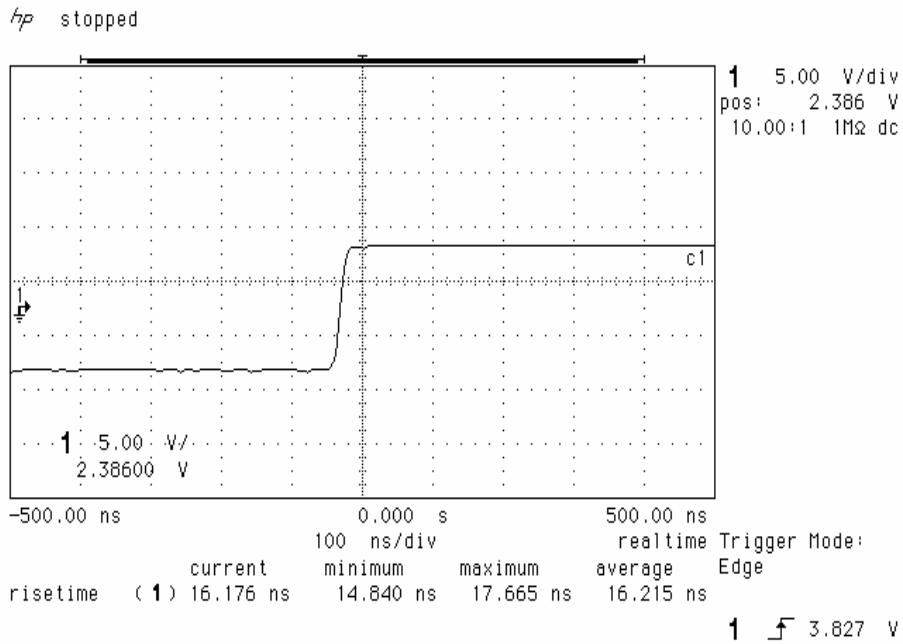
V10rise03



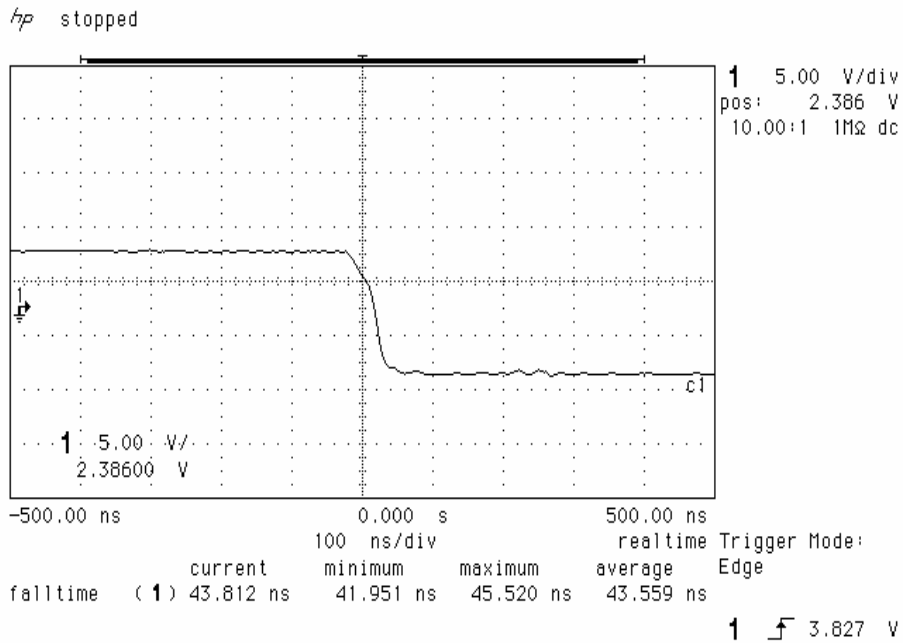
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V10ris04



V10ris05



CCITT V.11 Interchange Circuits

A - B terminated with 3.9 Kohm

Binary State 1

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.25 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.25 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.27 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.28 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.24 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	3.25 V	pass	
	B - C	$TBR \leq 12.0V$ $NET \leq 6.0V$	0.01 V	pass	

Binary State 2

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.24 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.29 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.25 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.27 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.1	A - B	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	-3.21 V	pass	
NET - 5.2.1	A - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	0.01 V	pass	
	B - C	$TBR \leq 12.0V \text{ NET} \leq 6.0V$	3.24 V	pass	

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A - B terminated with 2 x 50 Ohm

Binary State 1

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.41 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.41 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.65 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	2.41 V	pass	
NET - V11, 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

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Binary State 2

Circuit 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.42 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

Circuit 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.44 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.64 V	pass	

Circuit 113

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.2	A - B	$V_t \geq 2.0V$	-2.42 V	pass	
NET - 5.2.2	R1/R2 - C	$V_{os} \leq 3.0V$	1.63 V	pass	

Generator Output Risetime

Circuit TxD 103

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3 \text{ tb}$	4.0 ns pos	pass	
NET - 5.3		NET - $20\text{ns} \geq t \text{ or } t \leq 0.1\text{tb}$	4.2 ns neg	pass	

Circuit RTS 105

Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3 \text{ tb}$	4.0 ns pos	pass	
NET - 5.3		NET - $20\text{ns} \geq t \text{ or } t \leq 0.1\text{tb}$	3.9 ns neg	pass	

Circuit TxCE 113

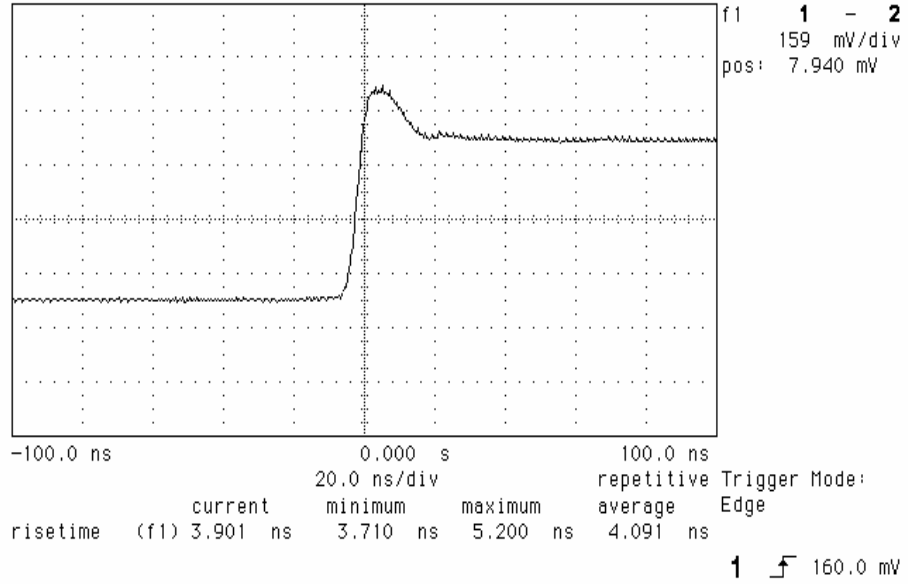
Test Case	Description	Limits	Result	Verdict	Comment
TBR - 7.4.1.3	A - B	TBR - $t \leq 0.3 \text{ tb}$	4.1 ns pos	pass	
NET - 5.3		NET - $20\text{ns} \geq t \text{ or } t \leq 0.1\text{tb}$	4.2 ns neg	pass	

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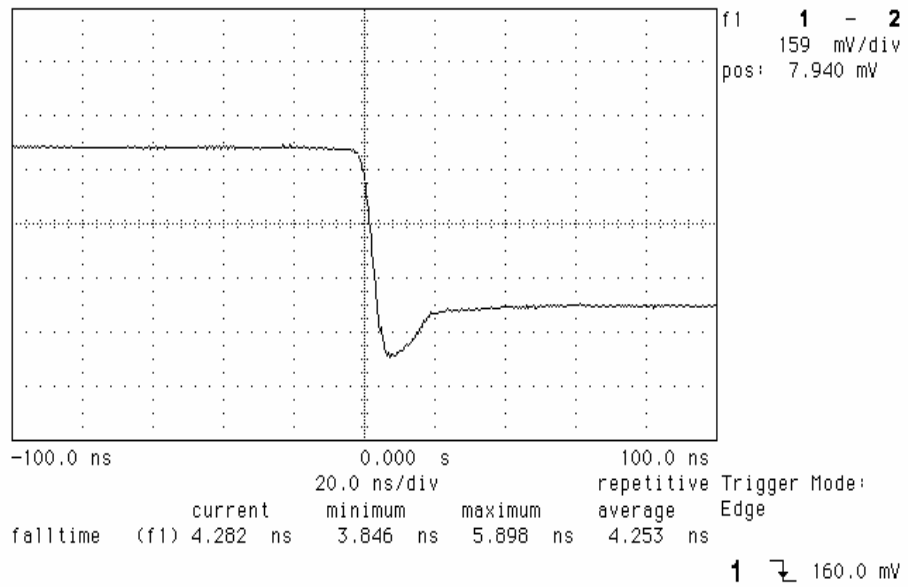
V11Rise02

hp stopped



V11Rise05

hp stopped

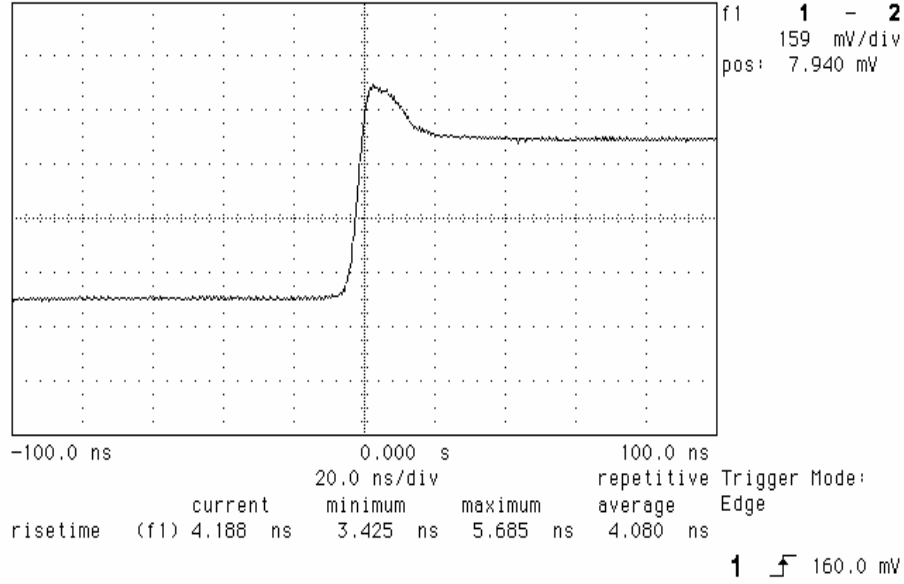


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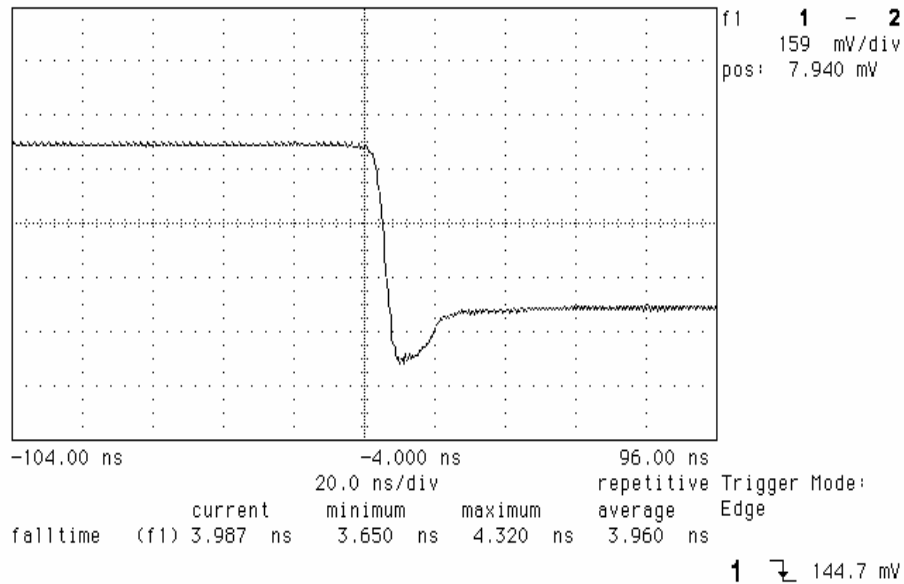
V11Rise08

hp stopped



V11Rise11

hp stopped

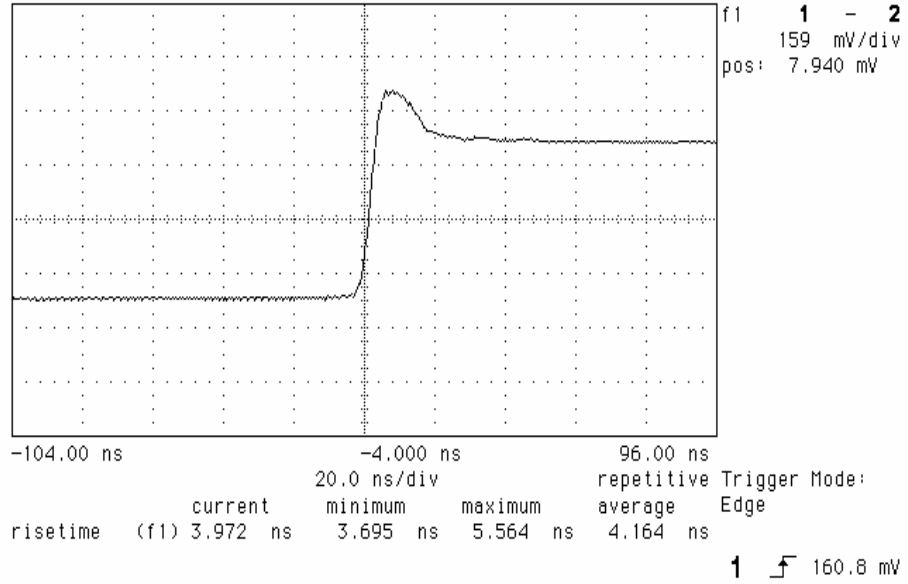


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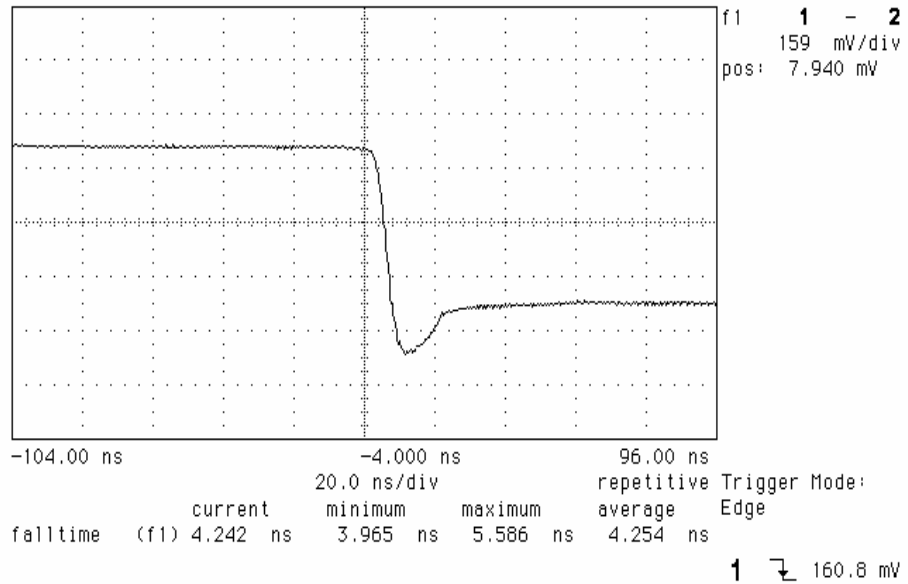
V11Rise20

hp stopped



V11Rise23

hp stopped





Short Circuit Measurement (NET - 5.2.3)

Circuit TxD 103

Description	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	25.6 mA	pass	

Circuit RTS 105

Description	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	27.7 mA	pass	

Circuit TxCE 113

Description	Limits	Results	Verdict	Observation
NET – 5.2.3				
A - C	$I_{sa} \leq 150 \text{ mA}$	< 0.01 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	25.7 mA	pass	

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Power-off Measurement (NET - 5.2.4)

Power-off applied voltage $\pm 0.25V$

Circuit TxD 103

Description	Limits	Results	Verdict	Observation
NET - 5.2.4				
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit RTS 105

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Circuit TxCE 113

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 0.1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 0.1 \mu A$	pass	

Receiver Characteristics NET - 6.1

Circuit RxD 104

The receiver is terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	49 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.7 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-51 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.8 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	48 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.7 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-51 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-26 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.8 mA	pass	

Circuit 106 CTS

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 107 DSR

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.10, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 109 DCD

The receiver *is not* terminated with an optional cable resistance.

Limits according to CCITT Recommendation V.11, Figure 6

Description	Limits	Results	Verdict	Observation
Via = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.70 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.21 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.70 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.21 mA	pass	

Circuit 114 TxC

The receiver *is* terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-50 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	

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Circuit 115 RxC

The receiver is terminated with an optional cable resistance.

Limits according to NET 1, Revision 1, Figure 1

Description	Limits	Results	Verdict	Observation
Via = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	47 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.5 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0.00 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-49 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-25 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-8.5 mA	pass	

7 Photographs

