



DETECON Inc.

Type Approval Division  
1775 Old Highway 8  
St. Paul, MN USA 55112  
Tel. +1 612 639-0775  
Fax. +1 612 639-0873

THE ATTACHED

TEST REPORT NO.

NET2/110401/97

Registered under: L004D002

for *Linear Technology Corporation, LTC1343 / LTC1344 Chipset*

consists of

Cover Sheet	1 page
NET Test Report (NTR)	56 pages
Annex A Diagram	1 pages
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Total	58 pages

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The results of all measurements stated in this test report only relate to the product tested.



NET TEST REPORT  
for  
equipment tested against the requirements  
specified in  
EUROPEAN TELECOMMUNICATION STANDARDS  
NET 1 (Layer 1), NET 2 (Layer 1)

**NTR Number:  
NET2/110401/97**



## Table of contents

- 1 Identification Summary
  - 1.1 NET Test Report
  - 1.2 Test Laboratory
  - 1.3 Limits and Reservations
  - 1.4 Client Information
  - 1.5 Dates
  - 1.6 Description of System Under Test
  - 1.7 Nature of Conformance Testing
  - 1.8 Implemented physical capabilities
  
- 2 Test Conditions
  - 2.1 Environmental Conditions
  - 2.2 Power Supply Limitations
  - 2.3 Abstract Test Suites (ATS)
  - 2.4 Test equipment
  
- 3 System Conformance Test Report Summary
  - 3.1 Parameterized Executable Test Suite (PETS) Layer 1
  - 3.2 Protocol Conformance Test Report (PCTR)
  
- 4 Test Report Physical Layer
  - 4.1 Test Report X.21/V.11
  - 4.2 Test Report V.24/V.28
  - 4.3 Test Report V.35
  - 4.4 Test Report V.36
- 5 Test Report Frame Layer
- 6 Test Report Packet Layer
  
- 7 Photos



NTR Number: NET2/110401/97  
Page 3 of 56  
Date: November 5, 1997

## 1 IDENTIFICATION SUMMARY

### 1.1 NET TEST REPORT (NTR)

NTR Number : NET2/110401/97  
NTR Date : November 5, 1997

#### Laboratory Manager:

November 5, 1997    NET2  
Date                      Section

Troy Ihle  
Name

  
Signature

### 1.2 Test Laboratory

DETECON Inc, T.A.D.  
1775 Old Highway 8, Suite 107  
St. Paul, MN USA 55112  
Tel. +1 612 639-0775  
Fax. +1 612 639-0873

### 1.3 Limits and Reservations

This test report satisfies European Standard EN 45001. The test results in this test report apply only to the particular System Under Test (SUT) and component Items Under Test (IUTs) declared in this test report.

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NTR Number: NET2/110401/97  
Page 4 of 56  
Date: November 5, 1997

#### 1.4 Client Information

Name : **Linear Technology Corporation**  
Street : **1630 McCarthy Blvd.**  
City : **Milpitas, CA 95035**  
Country : **USA**  
Phone : **+1 (408) 954-8400**  
Fax : **+1 (408) 428-9413**

Contact Person : **David Soo**  
Phone : **+1 (408) 954-8400 ext. 3867**  
Fax : **+1 (408) 428-9413**

#### 1.5 Dates

Date of receipt of SUT : **October 30, 1997**  
Date of Test : **November 4, 1997**

#### 1.6 Description of System under Test (SUT)

Name of Supplier : **Linear Technology Corporation**  
Street : **1630 McCarthy Blvd.**  
City : **Milpitas, CA 95035**  
Country : **USA**  
Phone : **+1 (408) 954-8400**  
Fax : **+1 (408) 428-9413**

#### Description of SUT:

The LTC 1343 / LTC 1344 Chipset will support X.21, V.35, V.24, and V.36 interfaces.



### 1.6.1 IUT (Item Under Test) Identification

Name	LTC 1343 / LTC 1344 Chipset
Version/Model	--
Part No.	--
Serial No.	--
Hardware Configuration for testing (PC, Bus System, Clock etc.)	Circuit Board with DTE or DCE Pin name identifiers
Operating System	--
Version No.	--
Communication Software	--
Version No.	--
Software handling layer 2 and 3	--
Version No.	--

### 1.7 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 there is 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.



NTR Number: NET2/110401/97  
 Page 6 of 56  
 Date: November 5, 1997

## 1.8 Implemented physical capabilities

### 1.8.1 CCITT Recommendation X.21/X.27 Interface

Implemented            Yes (X)            No ( )

Tested                 Yes (X)            No ( )

Interface board	LTC 1343, LTC 1344		
minimum speed (bit/s)	--		
maximum speed (bit/s)	8 Mbit/s		
V.11 Transmitter	LTC 1343		
V.11 Receivers	LTC 1343		
Connector type	--		
Cable, name or part No.	--		
Length	--	shielded	unshielded

supported  
 X.27 (V.11)

- T(A) (X)
- C(A) (X)
- R(A) (X)
- I(A) (X)
- S(A) (X)
- B(A) (X)
- G (X)
- T(B) (X)
- C(B) (X)
- R(B) (X)
- I(B) (X)
- S(B) (X)
- B(B) (X)



NTR Number: NET2/110401/97  
 Page 7 of 56  
 Date: November 5, 1997

### 1.8.2 CCITT Recommendation V.24/V.28 (RS232) Interface

Implemented            Yes (X)            No ( )

Tested                    Yes (X)            No ( )

Interface board	LTC 1343, LTC 1344		
minimum speed (bit/s)	--		
maximum speed (bit/s)	19.2 kbit/s		
V.28 Transmitter	LTC 1343		
V.28 Receivers	LTC 1343		
Connector type	--		
Cable, name or part No.	--		
Length	--	shielded	unshielded

CCITT circuit No.	supported
102	(X)
103	(X)
104	(X)
105	(X)
106	(X)
107	(X)
108	(X)
109	(X)
111	( )
112	( )
113	(X)
114	(X)
115	(X)
125	( )
140	(X)
141	(X)
142	(X)





### 1.8.3 CCITT Recommendation V.35 Interface

Implemented            Yes (X)            No ( )  
 Tested                Yes (X)            No ( )

Interface board	LTC 1343, LTC 1344		
minimum speed (bit/s)	--		
maximum speed (bit/s)	640 kbit/s		
V.35 Transmitter	LTC 1343		
V.35 Receivers	LTC 1343		
V.11 Transmitter	--		
V.11 Receivers	--		
V.28 Transmitter	LTC 1344		
V.28 Receivers	LTC 1344		
Connector type	--		
Cable, name or part No.	--		
Length	--	shielded	unshielded

CCITT circuit No.	Electrical characteristics		supported
102a			( )
102			(X)
103	V.35 (X)	V.11 ( )	(X)
104	V.35 (X)	V.11 ( )	(X)
105	V.28 (X)	V.10 ( )	(X)
106	V.28 (X)	V.10 ( )	(X)
107	V.28 (X)	V.10 ( )	(X)
108	V.28 (X)	V.10 ( )	(X)
109	V.28 (X)	V.10 ( )	(X)
113	V.35 (X)	V.11 ( )	(X)
114	V.35 (X)	V.11 ( )	(X)
115	V.35 (X)	V.11 ( )	(X)
125	V.28 ( )	V.10 ( )	( )
140	V.28 (X)	V.10 ( )	(X)
141	V.28 (X)	V.10 ( )	(X)
142	V.28 (X)	V.10 ( )	(X)



### 1.8.4 CCITT Recommendation V.36 (RS449) Interface

Implemented            Yes (X)            No ( )  
 Tested                Yes (X)            No ( )

Interface board	LTC 1343, LTC 1344		
minimum speed (bit/s)	--		
maximum speed (bit/s)	8 Mbit/s		
V.11 Transmitter	LTC 1343		
V.11 Receivers	LTC 1343		
V.10 Transmitter	LTC 1343		
V.10 Receivers	LTC 1343		
Connector type	--		
Cable, name or part No.	--		
Length	--	shielded	unshielded

CCITT circuit No.	Electrical characteristics	supported
102		(X)
102a		( )
102b		( )
103	V.11 (X)	(X)
104	V.11 (X)	(X)
105	V.11 (X)            V.10 ( )	(X)
106	V.11 (X)	(X)
107	V.11 (X)	(X)
108	V.11 (X)            V.10 ( )	(X)
109	V.11 (X)	(X)
113	V.11 (X)	(X)
114	V.11 (X)	(X)
115	V.11 (X)	(X)
125	V.10 ( )	( )
140	V.10 (X)	(X)
141	V.10 (X)	(X)
142	V.10 (X)	(X)



## 2 Test Conditions

### 2.1 Environmental Conditions

Temperature	: In the range of 15° to 35°	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Relative humidity	: In the range of 25% to 75%	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Air pressure	: In the range of 86 to 106 kPa	<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

### 2.3 Abstract Test Suites (ATS)

NET 1, second edition 1994  
 NET 2, second edition 1994

### 2.4 Test Equipment

Equipment used for measurements of layer 1, NET 1 and NET 2

	Serial-No.	Last Calibration
- Schnittstellen-Messbox VX	V0009	March '97
- Digital Multimeter HP 34401A	3146A25410	Jan '97
- Digital Multimeter HP 34401A	3146A34621	Jan '97
- Power Supply HP6235A	2450A08776	Jan '97
- Oscilloscope HP 54520A	3415A00472	Jan '97
- Frequency Generator HP 33120A	US34014718	Jan '97

The DETECON test equipment is in the tolerance of the requirements of NET 1, 5.4.3 and NET 2, 7.2.3. Compliance is regularly checked by DETECON.



### 3 System Conformance Test Report Summary

This IUT has not been shown by conformance assessment to be non-conforming to the specified standard.

The tables in this section indicate for each test both the test case selection that was performed by the test laboratory and the results of testing. The tables are set up as followed below. Notes on the information that the test laboratory shall complete in the columns are profited below, and referenced as *n*).

ATS-Reference	Selected	Run	Verdict	Observation
a)	b)	c)	d)	e)

- a) Reference to the abstract test case of the ATS standard.
- b) Indicates whether or not the test was selected according to the PICS and PIXIT.
- c) Indicates whether or not the test did run to completion.
- d) Indicates the verdicts as assigned during the test campaign.

Possible verdicts:

- PASS : The test purpose according to the ATS is achieved, test did run as defined in ETS to completion.
- INCONCLUSIVE : The test purpose according to the ATS is not achieved, test did run not as defined in ETS to completion.
- FAIL : The test purpose according to the ATS is not achieved
- e) Indicates a reference to any observations made in section 8 of this test report.



### 3.1 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			
8.1.3	no			

#### 3.1.2 Clause V.24/V.28

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.1.1	no			
8.2.1.2	no			
8.2.2.1, Annex A, Table A-1	no			
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	

NTR Number: NET2/110401/97  
 Page 13 of 56  
 Date: November 5, 1997



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			

### 3.1.3 Clause V.35

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.1.1	no			
8.2.1.2	no			
8.2.2.2, Annex A, Table A-2	no			
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			
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	

NTR Number: NET2/110401/97  
 Page 14 of 56  
 Date: November 5, 1997



**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			
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			
8.2.1.2	no			
8.2.2.3, Annex A, Table A-3	no			
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			



### 3.2 Protocol Conformance Test Report (PCTR)

The selection of test cases is limited by the implemented Capabilities

#### 3.2.1 Parameterized Executable Test Suite (PETS) Layer 2

NET 2 Clause	Selected	Run	Verdict	Observation
9.1.1.1	no			
9.1.1.2	no			
9.1.2.1	no			
9.1.2.2	no			
9.1.3.1	no			
9.1.3.2	no			
9.1.4.1	no			
9.1.4.2	no			
9.2.1	no			
9.2.2	no			
9.2.3	no			
9.2.4	no			
9.3.1	no			
9.3.2	no			
9.4.1	no			
9.5.1	no			
9.5.2	no			
9.5.3	no			
9.5.4	no			
9.6.1	no			
9.6.2	no			
9.7.1	no			
9.7.2	no			
9.7.3	no			
9.8.1	no			
9.8.2	no			
9.8.3	no			
9.9.1	no			
9.9.2	no			



NTR Number: NET2/110401/97  
 Page 16 of 56  
 Date: November 5, 1997



9.10.1	no			
9.10.2	no			
9.10.3	no			
9.11.1	no			
9.11.2	no			
9.11.3	no			

### 3.2.2 Parameterized Executable Test Suite (PETS) Layer 3

NET 2 Clause	SVC	Selected	Run	Verdict	Observation
10.1.1		no			
10.1.2		no			
10.1.3		no			
10.2.1		no			
10.2.2		no			
10.2.3		no			
10.2.4		no			
10.2.5		no			
10.2.6		no			
10.3.1		no			
10.3.2		no			
10.4.1		no			
10.4.2		no			
10.4.3		no			
10.4.4		no			
10.5.1		no			
10.5.2		no			
10.5.3		no			
10.5.4		no			
10.6.1		no			
10.6.2		no			
10.6.3		no			
10.6.4		no			
10.6.5		no			
10.6.6		no			

NTR Number: NET2/110401/97  
 Page 17 of 56  
 Date: November 5, 1997



10.6.7	no			
10.6.8	no			
10.7.1	no			
10.7.2	no			
10.7.3	no			
10.7.4	no			
10.7.5	no			
10.8.1	no			
10.8.2	no			
10.8.3	no			
10.8.4	no			

NET 2 Clause	PVC	Selected	Run	Verdict	Observation
10.1.1		no			
10.1.2		no			
10.1.3		no			
10.2.1		no			
10.2.2		no			
10.2.3		no			
10.2.4		no			
10.2.5		no			
10.2.6		no			
10.3.1		no			
10.3.2		no			
F2.2.1		no			



NTR Number: NET2/110401/97  
 Page 18 of 56  
 Date: November 5, 1997

## 4 Test Report Physical Layer

### 4.1 Test Report X.21/V.11

The following tests are performed at the DCE end of the DTE-DCE cable supplied by the applicant.

#### 4.1.1 Basic Interconnection Test

NET 1 Clause	Selected	Run	Verdict	Observation
8.1.2	no			

#### 4.1.2 Generator Characteristics

##### 4.1.2.1 Open Circuit Measurement (V.11, 5.2.1)

A - B terminated with 3.9 kOhms

##### 4.1.2.1.1 Circuit T (pin 2 and 9)

Description	Limits	Results	Verdict	Observation
A - B	$V_o \leq 6.0V$	-4.80 V	pass	
A - C	$V_{oa} \leq 6.0V$	-0.02 V	pass	
B - C	$V_{ob} \leq 6.0V$	4.78 V	pass	

##### 4.1.2.1.2 Circuit C (pin 3 and 10)

Description	Limits	Results	Verdict	Observation
A - B	$V_o \leq 6.0V$	-4.80 V	pass	
A - C	$V_{oa} \leq 6.0V$	-0.02 V	pass	
B - C	$V_{ob} \leq 6.0V$	4.78 V	pass	

##### 4.1.2.2 Test Termination Measurement (V.11, 5.2.2)

Generator terminated with 2 x 50 Ohms



**4.1.2.2.1 Circuit C (pin 3 and 10)**

A binary state 1

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.88 V	pass	
	$V_{os} \leq 3.0V$	2.30 V	pass	

**4.1.2.2.2 Circuit T (pin 2 and 9)**

A binary state 1

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.87 V	pass	
	$V_{os} \leq 3.0V$	2.31 V	pass	

B binary state 2

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.88 V	pass	
	$V_{t1} - V_{t2} \leq 0.4V$	0.01 V	pass	
	$V_{os} \leq 3.0V$	2.29 V	pass	
	$V_{os1} - V_{os2} \leq 0.4V$	0.02 V	pass	

**4.1.2.3 Short Circuit Measurement (V.11, 5.2.3)**

**4.1.2.3.1 Circuit T (pin 2 and 9)**

Description	Limits	Results	Verdict	Observation
A - C	$I_{sa} \leq 150 \text{ mA}$	-2.47 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	99.1 mA	pass	

**4.1.2.3.2 Circuit C (pin 3 and 10)**

Description	Limits	Results	Verdict	Observation
A - C	$I_{sa} \leq 150 \text{ mA}$	-2.57 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	94.8 mA	pass	



4.1.2.4 Power-off Measurement (V.11, 5.2.4)

Power-off applied voltage  $\pm 0.25V$

4.1.2.4.1 Circuit T (pin 2 and 9)

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 1 \mu A$	pass	

4.1.2.4.2 Circuit C (pin 3 and 10)

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 1 \mu A$	pass	



**4.1.3 Receiver Characteristics (V.11, 6.1)**

**4.1.3.1 Circuit B (pin 7 and 14)**

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	$I \leq 60.75 \text{ mA}$	54.1 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	27.2 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.1 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-53.6 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-27.2 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.1 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	53.9 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	27.2 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.1 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-54.0 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-27.2 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.1 mA	pass	



**4.1.3.2 Circuit R (pin 4 and 11)**

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	$I \leq 60.75 \text{ mA}$	53.5 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25.0 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.0 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-52.6 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-26.6 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.0 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	53.1 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	25.5 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.0 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-53.3 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-27.0 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.0 mA	pass	



#### 4.1.3.3 Circuit I (pin 5 and 12)

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	$I \leq 3.25 \text{ mA}$	0.34 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.34 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.34 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.34 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	

#### 4.1.3.4 Circuit S (pin 6 and 13)

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	$I \leq 60.75 \text{ mA}$	53.6 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	25.6 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.1 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-53.1 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-27.2 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.1 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	54.2 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	27.3 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.2 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-53.0 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-27.0 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.1 mA	pass	







## 4.2 Test Report V.24/V.28

The following tests are performed at the DCE end of the DTE-DCE cable supplied by the applicant.

### 4.2.1 Basic Interconnection Test

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.2.1	no			

### 4.2.2 Generator Characteristics

#### 4.2.2.1 Protection against short circuit conditions (Annex B.1.1)

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	
141	no damage	no damage	pass	

#### 4.2.2.2 Generator Output Current Limit (Annex B.1.2)

Circuit	Limits	Results	Verdict	Observation
103	$I \leq 0.5A$	29.5 mA	pass	
105	$I \leq 0.5A$	30.0 mA	pass	
108	$I \leq 0.5A$	30.0 mA	pass	
113	$I \leq 0.5A$	29.7 mA	pass	
140	$I \leq 0.5A$	69.7 mA	pass	
141	$I \leq 0.5A$	69.5 mA	pass	



**4.2.2.3 Generator Output Voltage open circuit (Annex B.1.3)**

Circuit	Limits	Results	Verdict	Observation
103	$U \leq 25V$	9.1 V	pass	
105	$U \leq 25V$	9.3 V	pass	
108	$U \leq 25V$	9.3 V	pass	
113	$U \leq 25V$	9.1 V	pass	
140	$U \leq 25V$	9.5 V	pass	
141	$U \leq 25V$	9.2 V	pass	

**4.2.2.4 Generator Output Voltage limit under maximum load (Annex B.1.4)**

Circuit	Limits	Results	Verdict	Observation
103	$U \geq 5V$	8.2 V	pass	
105	$U \geq 5V$	8.4 V	pass	
108	$U \geq 5V$	8.4 V	pass	
113	$U \geq 5V$	8.3 V	pass	
140	$U \geq 5V$	8.7 V	pass	
141	$U \geq 5V$	8.6 V	pass	

**4.2.2.5 Generator Output Voltage limit under minimum load (Annex B.1.5)**

Circuit	Limits	Results	Verdict	Observation
103	$U \leq 15V$	8.6 V	pass	
105	$U \leq 15V$	8.8 V	pass	
108	$U \leq 15V$	8.8 V	pass	
113	$U \leq 15V$	8.7 V	pass	
140	$U \leq 15V$	8.9 V	pass	
141	$U \leq 15V$	8.8 V	pass	

**4.2.2.6 Generator Output Power (Annex B.1.6)**

plus an additional capacitance of 2500pF (Annex B.1.7)

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



### 4.2.3 Load Characteristics

#### 4.2.3.1 Load Resistance Conditions (Annex B.2.1)

Measurement with 3V applied

Circuit	Limits	Results	Verdict	Observation
104	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5455 $\Omega$	pass	
106	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5455 $\Omega$	pass	
107	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5455 $\Omega$	pass	
109	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5455 $\Omega$	pass	
114	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5436 $\Omega$	pass	
115	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5455 $\Omega$	pass	
142	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5455 $\Omega$	pass	

Measurement with 15V applied

Circuit	Limits	Results	Verdict	Observation
104	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5415 $\Omega$	pass	
106	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5357 $\Omega$	pass	
107	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5357 $\Omega$	pass	
109	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5338 $\Omega$	pass	
114	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5392 $\Omega$	pass	
115	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5435 $\Omega$	pass	
142	$3 \text{ k}\Omega \leq R \leq 7 \text{ k}\Omega$	5396 $\Omega$	pass	

#### 4.2.3.2 Maximum Load open circuit voltage (Annex B.2.2)

Circuit	Limits	Results	Verdict	Observation
104	$U \leq 2\text{V}$	0 V	pass	
106	$U \leq 2\text{V}$	0 V	pass	
107	$U \leq 2\text{V}$	0 V	pass	
109	$U \leq 2\text{V}$	0 V	pass	
114	$U \leq 2\text{V}$	0.01 V	pass	
115	$U \leq 2\text{V}$	0 V	pass	
142	$U \leq 2\text{V}$	0 V	pass	



**4.2.3.3 Maximum Load Shunt Capacitance (Annex B.2.3)**

Circuit	Limits	Results	Verdict	Observation
104	$C \leq 2500\text{pF}$	0 pF	pass	
114	$C \leq 2500\text{pF}$	0 pF	pass	
115	$C \leq 2500\text{pF}$	0 pF	pass	

**4.2.3.4 Load Impedance (Annex B.2.4)**

Circuit	Limits	Results	Verdict	Observation
104	capacitive	capacitive	pass	
114	capacitive	capacitive	pass	
115	capacitive	capacitive	pass	

**4.2.4 Transition between significant signal states**

**4.2.4.1 Wave Form (Annex B.3.1)**

Circuit	Limits	Results	Verdict	Observation
103 slope positive	monotone, no negative components	monotone, no negative components	pass	see figure O-2
103 slope negative	monotone, no negative components	monotone, no negative components	pass	see figure O-2



NTR Number: NET2/110401/97  
Page 30 of 56  
Date: November 5, 1997

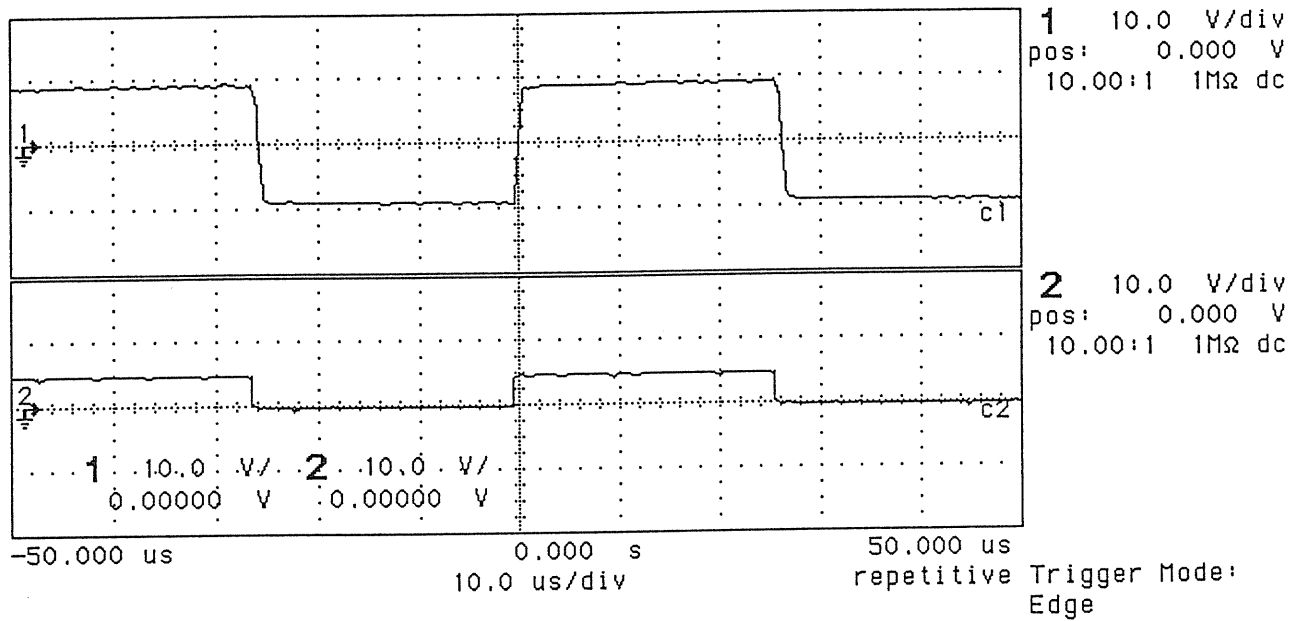
**Figure O-2**

**Reference V.28 Wave Form**

Ch1 = Circuit 103

Ch2 = Circuit 114

*hp* stopped



1 0.000 V

NTR Number: NET2/110401/97  
 Page 29 of 56  
 Date: November 5, 1997



**4.2.4.2 Maximum Transition Time on Control Interchange Circuits (Annex B.3.2)**

Circuit	Limits	Results	Verdict	Observation
105		no test		
108		no test		

**4.2.4.3 Maximum Transition Time on Data and Timing Interchange Circuits (Annex B.3.3)**

Transmission speed: 19.2 kbit/s (3% Tb: 19.2 kbit/s = 1,56µs)

Test under consideration of NET 2, Annex B7

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

Circuit	Limits	Results	Verdict	Observation
103	$t \leq 3\% T_b$	727 ns	pass	see figure O-3, O-4

**4.2.4.4 Maximum Instantaneous Rate of Voltage Change (Annex B.3.4)**

Circuit	Limits	Results	Verdict	Observation
103	$t \geq 200ns$	297 ns	pass	see figure O-5, O-6

NTR Number: NET2/110401/97  
Page 31 of 56  
Date: November 5, 1997



**Figure O-3**

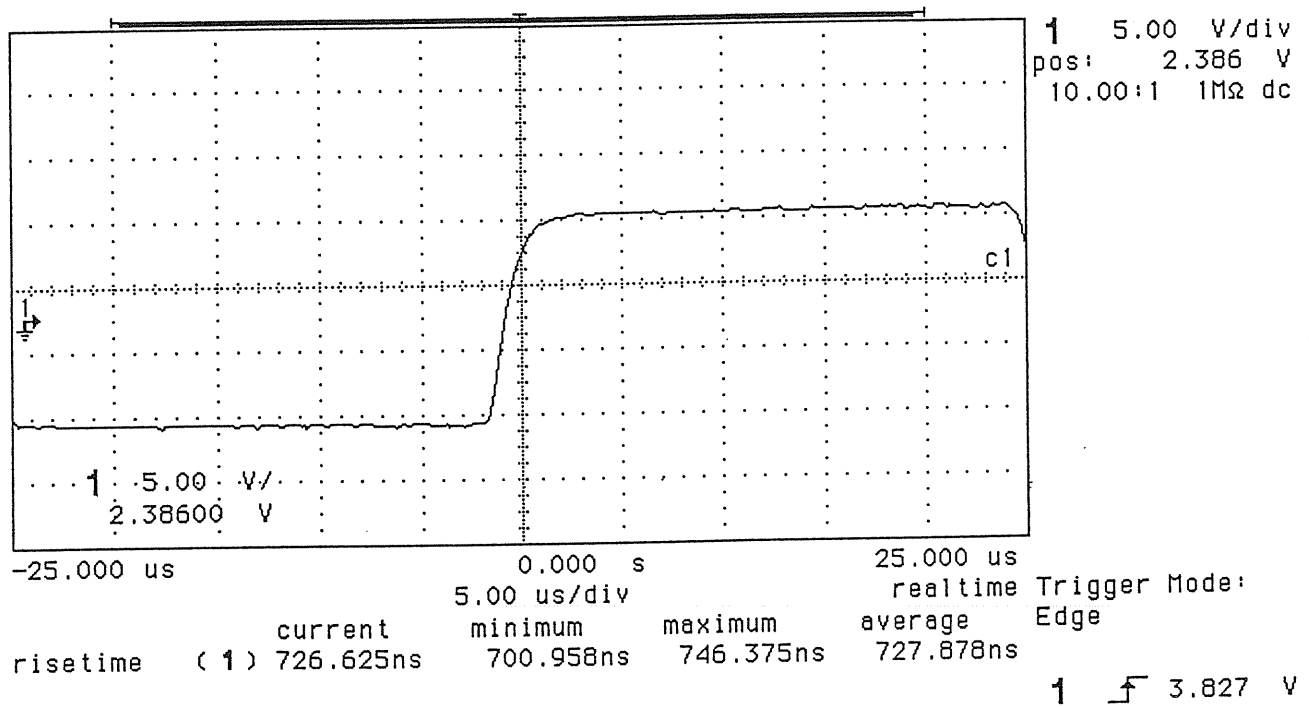
**Transition between significant signal states**

Circuit = CCITT 103, Send Data  
Load = see paragraph 4.4.3.3

SLOPE POSITIVE

Transition time shall be  $\leq 3\%$  of the nominal period

*hp* stopped







NTR Number: NET2/110401/97  
Page 32 of 56  
Date: November 5, 1997

**Figure O-4**

**Transition between significant signal states**

Circuit = CCITT 103, Send Data  
Load = see paragraph 4.4.3.3

SLOPE NEGATIVE

Transition time shall be  $\leq 3\%$  of the nominal period

*hp* stopped

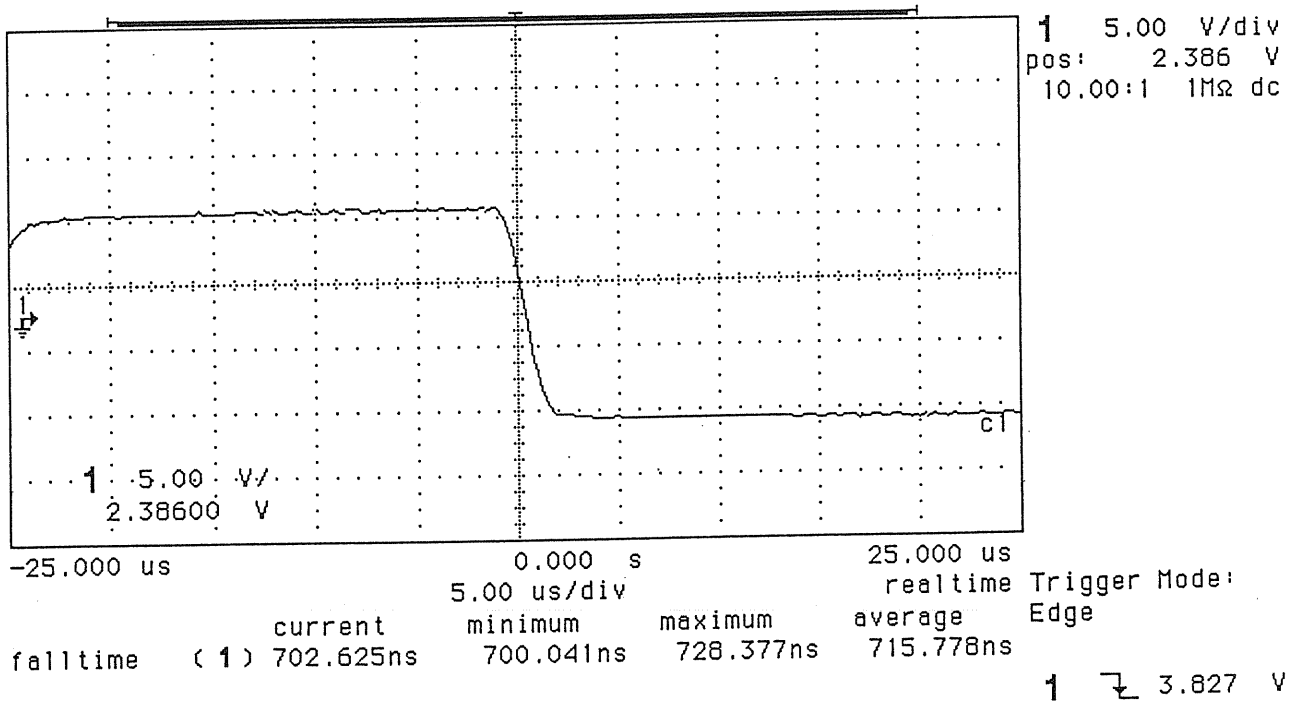




Figure O-5

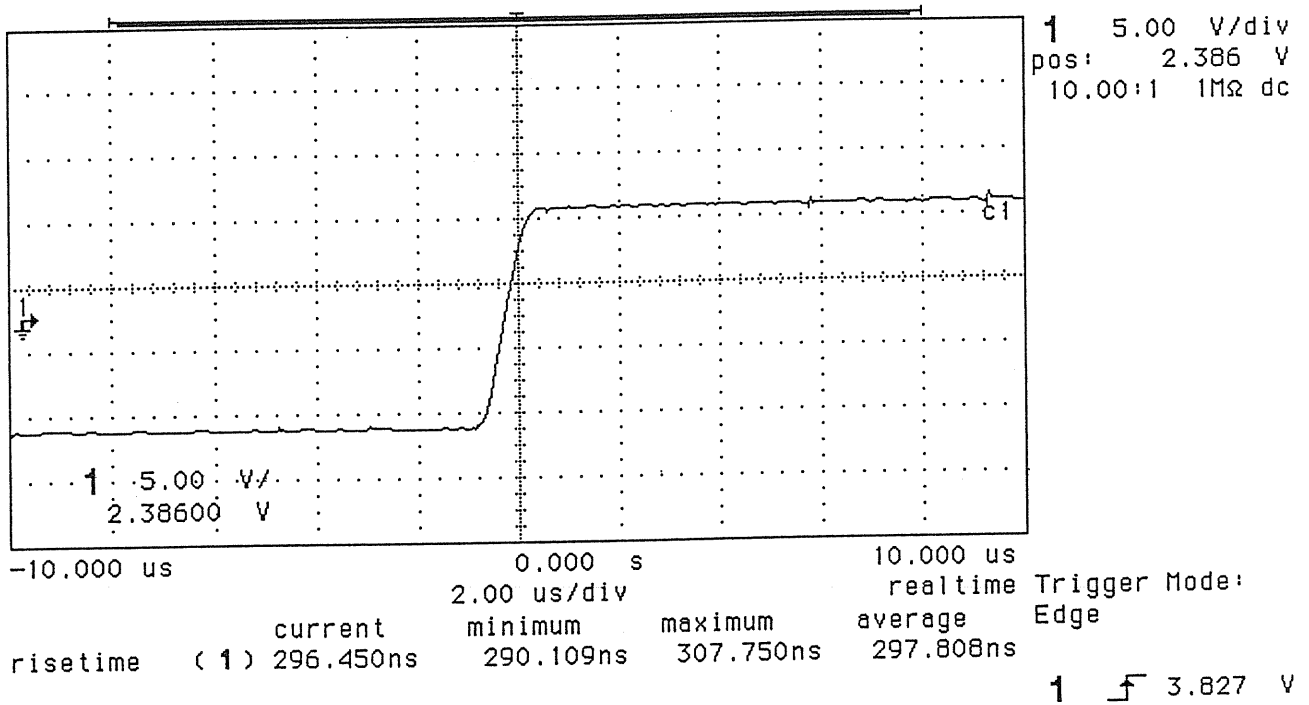
Maximum Instantaneous Rate of Voltage Change

Circuit = CCITT 103, Send Data  
Load = 7000 Ohms (purely resistive)

SLOPE POSITIVE

Rate of Voltage Change shall be  $\geq 200\text{ns}$  ( $30\text{V per } \mu\text{s} = 6\text{V per } 200\text{ns}$ )

hp





NTR Number: NET2/110401/97  
Page 34 of 56  
Date: November 5, 1997

Figure O-6

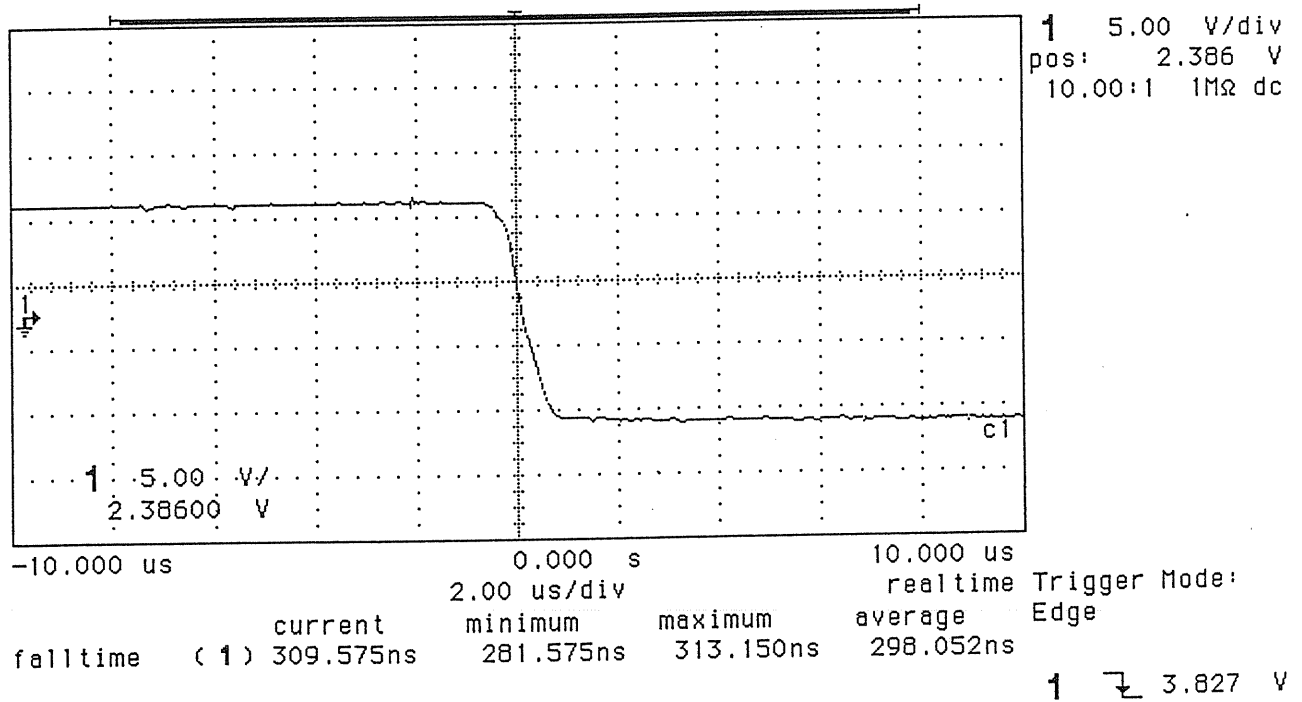
Maximum Instantaneous Rate of Voltage Change

Circuit = CCITT 103, Send Data  
Load = 7000 Ohms (purely resistive)

SLOPE NEGATIVE

Rate of Voltage Change shall be  $\geq 200\text{ns}$  ( $30\text{V per } \mu\text{s} = 6\text{V per } 200\text{ns}$ )

hp stopped





**4.2.5 Power off Measurement (Annex B.4)**

Circuit	Limits	Results	Verdict	Observation
105	$R \geq 300\Omega$	$\infty \Omega$	pass	
107	$R \geq 300\Omega$	27 K $\Omega$	pass	
108	$R \geq 300\Omega$	$\infty \Omega$	pass	

**4.2.6 Short Circuit Test (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	

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	

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	



NTR Number: NET2/110401/97  
 Page 36 of 56  
 Date: November 5, 1997

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	

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

Circuit	Limits	Results	Verdict	Observation
All Leads	$C \leq 2500\text{pF}$	No Test	NA	



### 4.3 Test Report V.35

The following tests are performed at the DCE end of the DTE-DCE cable supplied by the applicant.

#### 4.3.1 Basic Interconnection Test

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.2.2	no			

#### 4.3.2 Generator Characteristics

##### 4.3.2.1 Source Impedance (Annex C.1.1)

Circuit	Limits	Results	Verdict	Observation
103	100 ± 50 Ω	103 Ω	pass	
113	100 ± 50 Ω	105 Ω	pass	

##### 4.3.2.2 Resistance A&B-C (Annex C.1.2)

Circuit	Limits	Results	Verdict	Observation
103 2V applied	150 ± 15 Ω	144 Ω	pass	
103 -2V applied	150 ± 15 Ω	148 Ω	pass	
113 2V applied	150 ± 15 Ω	147 Ω	pass	
113 -2V applied	150 ± 15 Ω	148 Ω	pass	

##### 4.3.2.3 Test Termination Measurement (Annex C.1.3)

Circuit	Limits	Results	Verdict	Observation
103 P/S	0.55 ± 0.11V	0.53 V	pass	
113 U/W	0.55 ± 0.11V	0.54 V	pass	

##### 4.3.2.4 Measurement Rise/Fall Time (Annex C.1.4)

Circuit	Limits	Results	Verdict	Observation
103	0.01 tb	12.3 ns	pass	see figure O-7



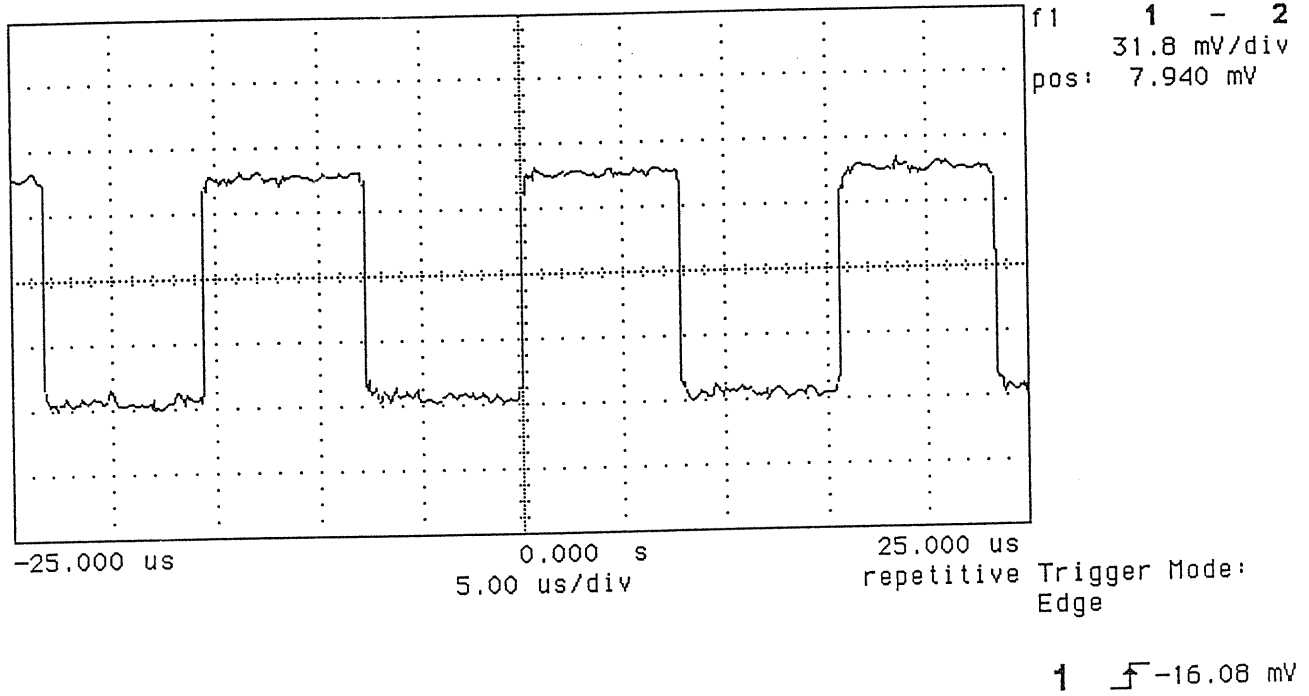


NTR Number: NET2/110401/97  
Page 39 of 56  
Date: November 5, 1997

**Figure O-8**

**Reference V.35 Wave Form**

*hp* stopped







**4.3.3 Load Characteristics (Annex C.3)**

**4.3.3.1 Impedance (Annex C.3.1)**

Circuit	Limits	Results	Verdict	Observation
104	100 ± 10 Ω	106 Ω	pass	
114	100 ± 10 Ω	104 Ω	pass	
115	100 ± 10 Ω	105 Ω	pass	

**4.3.3.2 Resistance A&B-C (Annex C.3.2)**

Circuit	Limits	Results	Verdict	Observation
104 +2V applied	150 ± 15 Ω	148 Ω	pass	
104 -2V applied	150 ± 15 Ω	149 Ω	pass	
114 +2V applied	150 ± 15 Ω	147 Ω	pass	
114 -2V applied	150 ± 15 Ω	148 Ω	pass	
115 +2V applied	150 ± 15 Ω	148 Ω	pass	
115 -2V applied	150 ± 15 Ω	148 Ω	pass	

**4.3.4 Generator/Load Protection (Annex C.4)**

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



### 4.3.5 Unbalanced Circuits

#### 4.3.5.1a Generators

Circuit	Description	Limits	Results	Verdict	Observation
C	Max. Voltage	$U_o \leq 25V$	9.3 V	pass	
H	Max. Voltage	$U_o \leq 25V$	9.4 V	pass	
N	Max. Voltage	$U_o \leq 25V$	9.5 V	pass	
L	Max. Voltage	$U_o \leq 25V$	7.4 V	pass	
C	Max. Load 3 kohm	$U_I \geq 5V$	8.4 V	pass	
H	Max. Load	$U_I \geq 5V$	8.4 V	pass	
N	Max. Load	$U_I \geq 5V$	8.6 V	pass	
L	Max. Load	$U_I \geq 5V$	6.9 V	pass	
C	Min. Load 7 kohm	$U_I \leq 15V$	8.8 V	pass	
H	Min. Load	$U_I \leq 15V$	8.8 V	pass	
N	Min. Load	$U_I \leq 15V$	8.8 V	pass	
L	Min. Load	$U_I \leq 15V$	7.0 V	pass	
C	Short Circuit	$I_k \leq 500mA$	29.7 mA	pass	
H	Short Circuit	$I_k \leq 500mA$	29.5 mA	pass	
N	Short Circuit	$I_k \leq 500mA$	68.9 mA	pass	
L	Short Circuit	$I_k \leq 500mA$	51.8 mA	pass	

NTR Number: NET2/110401/97  
 Page 42 of 56  
 Date: November 5, 1997



4.3.5.1b Generators

C	<i>Short Circuit State 0</i> Common Return 3 Kohm / -2 V	no damage	no damage	pass	
		no damage	no damage	pass	
H	<i>Short Circuit State 0</i> Common Return 3 Kohm / -2 V	no damage	no damage	pass	
		no damage	no damage	pass	
N	<i>Short Circuit State 0</i> Common Return 3 Kohm / -2 V	no damage	no damage	pass	
		no damage	no damage	pass	
L	<i>Short Circuit State 0</i> Common Return 3 Kohm / -2 V	no damage	no damage	pass	
		no damage	no damage	pass	
C	<i>Short Circuit State 1</i> Common Return 3 Kohm / +2 V	no damage	no damage	pass	
		no damage	no damage	pass	
H	<i>Short Circuit State 1</i> Common Return 3 Kohm / +2 V	no damage	no damage	pass	
		no damage	no damage	pass	
N	<i>Short Circuit State 1</i> Common Return 3 Kohm / +2 V	no damage	no damage	pass	
		no damage	no damage	pass	
L	<i>Short Circuit State 1</i> Common Return 3 Kohm / +2 V	no damage	no damage	pass	
		no damage	no damage	pass	
H	Resistance power off	$R \geq 300\Omega$	$\infty \Omega$	pass	

NTR Number: NET2/110401/97  
 Page 43 of 56  
 Date: November 5, 1997



4.3.5.2 Receivers

Circuit	Description	Limits	Results	Verdict	Observation
D	Voltage without Terminator	$EL \leq 2V$	0 V	pass	
E	Voltage without Terminator	$EL \leq 2V$	0 V	pass	
F	Voltage without Terminator	$EL \leq 2V$	0 V	pass	
NN	Voltage without Terminator	$EL \leq 2V$	0 V	pass	
D	Rmin, 3V applied	$7k\Omega \geq R \geq 3k\Omega$	5357 $\Omega$	pass	
E	Rmin, 3V applied	$7k\Omega \geq R \geq 3k\Omega$	5455 $\Omega$	pass	
F	Rmin, 3V applied	$7k\Omega \geq R \geq 3k\Omega$	5455 $\Omega$	pass	
NN	Rmin, 3V applied	$7k\Omega \geq R \geq 3k\Omega$	5455 $\Omega$	pass	
D	Rmax, 15V applied	$7k\Omega \geq R \geq 3k\Omega$	5357 $\Omega$	pass	
E	Rmax, 15V applied	$7k\Omega \geq R \geq 3k\Omega$	5357 $\Omega$	pass	
F	Rmax, 15V applied	$7k\Omega \geq R \geq 3k\Omega$	5338 $\Omega$	pass	
NN	Rmax, 15V applied	$7k\Omega \geq R \geq 3k\Omega$	5435 $\Omega$	pass	



#### 4.4 Test Report V.36

The following tests are performed at the DCE end of the DTE-DCE cable supplied by the applicant.

##### 4.4.1 Basic Interconnection Test

NET 2 Clause	Selected	Run	Verdict	Observation
8.2.2.3	no			

##### 4.4.2 Generator Characteristics

##### 4.4.2.1 Open Circuit Measurement (V.11, 5.2.1)

A - B terminated with 3.9 kOhms

##### 4.4.2.1.1 Circuit 103 (pin 4 and 22)

Description	Limits	Results	Verdict	Observation
A - B	$V_o \leq 6.0V$	-4.80 V	pass	
A - C	$V_{oa} \leq 6.0V$	-0.02 V	pass	
B - C	$V_{ob} \leq 6.0V$	4.78 V	pass	

##### 4.4.2.1.2 Circuit 105 (pin 7 and 25)

Description	Limits	Results	Verdict	Observation
A - B	$V_o \leq 6.0V$	-4.80 V	pass	
A - C	$V_{oa} \leq 6.0V$	-0.02 V	pass	
B - C	$V_{ob} \leq 6.0V$	4.78 V	pass	

##### 4.4.2.1.3 Circuit 113 (pin 17 and 35)

Description	Limits	Results	Verdict	Observation
A - B	$V_o \leq 6.0V$	-4.81 V	pass	
A - C	$V_{oa} \leq 6.0V$	-0.02 V	pass	
B - C	$V_{ob} \leq 6.0V$	4.79 V	pass	



4.4.2.1.4 Circuit 108 (pin 12 and 30)

Description	Limits	Results	Verdict	Observation
A - B	$V_o \leq 6.0V$	-4.81 V	pass	
A - C	$V_{oa} \leq 6.0V$	-0.02 V	pass	
B - C	$V_{ob} \leq 6.0V$	4.78 V	pass	

4.4.2.2 Test Termination Measurement (V.11, 5.2.2)

Generator terminated with 2 x 50 Ohms

4.4.2.2.1 Circuit 103 (pin 4 and 22)

A binary state 1

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.90 V	pass	
	$V_{os} \leq 3.0V$	2.30 V	pass	

B binary state 2

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.89 V	pass	
	$V_{t1} - V_{t2} \leq 0.4V$	0.01 V	pass	
	$V_{os} \leq 3.0V$	2.31 V	pass	
	$V_{os1} - V_{os2} \leq 0.4V$	0.01 V	pass	

4.4.2.2.2 Circuit 105 (pin 7 and 25)

A binary state 1

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.89 V	pass	
MP - Gnd	$V_{os} \leq 3.0V$	2.30 V	pass	



#### 4.4.2.2.3 Circuit 113 (pin 17 and 35)

A binary state 1

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.88 V	pass	
MP - Gnd	$V_{os} \leq 3.0V$	2.32 V	pass	

#### 4.4.2.2.4 Circuit 108 (pin 12 and 30)

A binary state 1

Description	Limits	Results	Verdict	Observation
A - B	$2V \leq V_t \leq 0.5V_o$	2.88 V	pass	
MP - Gnd	$V_{os} \leq 3.0V$	2.31 V	pass	

#### 4.4.2.3 Short Circuit Measurement (V.11, 5.2.3)

##### 4.4.2.3.1 Circuit 103 (pin 4 and 22)

Description	Limits	Results	Verdict	Observation
A - C	$I_{sa} \leq 150 \text{ mA}$	95.0 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	-2.47 mA	pass	

##### 4.4.2.3.2 Circuit 105 (pin 7 and 25)

Description	Limits	Results	Verdict	Observation
A - C	$I_{sa} \leq 150 \text{ mA}$	-2.40 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	96.0 mA	pass	

##### 4.4.2.3.3 Circuit 113 (pin 17 and 35)

Description	Limits	Results	Verdict	Observation
A - C	$I_{sa} \leq 150 \text{ mA}$	-2.71 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	96.7 mA	pass	



#### 4.4.2.3.4 Circuit 108 (pin 12 and 30)

Description	Limits	Results	Verdict	Observation
A - C	$I_{sa} \leq 150 \text{ mA}$	-2.35 mA	pass	
B - C	$I_{sb} \leq 150 \text{ mA}$	97.8 mA	pass	

#### 4.4.2.4 Power-off Measurement (V.11, 5.2.4)

Power-off applied voltage  $\pm 0.25\text{V}$

##### 4.4.2.4.1 Circuit 103 (pin 4 and 22)

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	

##### 4.4.2.4.2 Circuit 105 (pin 7 and 25)

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	

##### 4.4.2.4.3 Circuit 113 (pin 17 and 35)

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu\text{A}$	$< 1 \mu\text{A}$	pass	





**4.4.2.4.4 Circuit 108 (pin 12 and 30)**

Description	Limits	Results	Verdict	Observation
+0.25V applied	$I_{xa} \leq 100 \mu A$	$< 1 \mu A$	pass	
+0.25V applied	$I_{xb} \leq 100 \mu A$	$< 1 \mu A$	pass	
-0.25V applied	$I_{xa} \leq 100 \mu A$	$< 1 \mu A$	pass	
-0.25V applied	$I_{xb} \leq 100 \mu A$	$< 1 \mu A$	pass	

**4.4.3 Receiver Characteristics (V.11,V.10, 6.1)**

**4.4.3.1 Circuit 104 (pin 6 and 24)**

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	$I \leq 60.75 \text{ mA}$	53.7 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	26.9 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.0 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-53.3 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-26.9 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.0 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	53.7 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	26.9 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.0 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-53.3 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-26.9 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.0 mA	pass	



#### 4.4.3.2 Circuit 106 (pin 9 and 27)

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	$I \leq 3.25 \text{ mA}$	0.33 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.34 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.33 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.33 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	

#### 4.4.3.3 Circuit 109 (pin 13 and 31)

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	$I \leq 3.25 \text{ mA}$	0.34 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.34 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.34 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.34 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	



#### 4.4.3.4 Circuit 114 (pin 5 and 23)

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	$I \leq 60.75 \text{ mA}$	54.5 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	27.1 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.0 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-54.0 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-26.7 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.1 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	54.4 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	27.1 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.1 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-53.6 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-27.1 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.0 mA	pass	

NTR Number: NET2/110401/97  
 Page 51 of 56  
 Date: November 5, 1997



**4.4.3.5 Circuit 115 (pin 8 and 26)**

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	$I \leq 60.75 \text{ mA}$	53.8 mA	pass	
Via = 3V	$I \leq 30.75 \text{ mA}$	27.2 mA	pass	
Via = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	9.1 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -6V	$I \leq 60.75 \text{ mA}$	-54.1 mA	pass	
Via = -3V	$I \leq 30.75 \text{ mA}$	-27.1 mA	pass	
Via = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.1 mA	pass	
Vib = 6V	$I \leq 60.75 \text{ mA}$	54.2 mA	pass	
Vib = 3V	$I \leq 30.75 \text{ mA}$	27.2 mA	pass	
Vib = 1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	8.9 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -6V	$I \leq 60.75 \text{ mA}$	-53.9 mA	pass	
Vib = -3V	$I \leq 30.75 \text{ mA}$	-27.1 mA	pass	
Vib = -1V	$-0.5 \leq I \leq 10.75 \text{ mA}$	-9.1 mA	pass	



#### 4.4.3.6 Circuit 107 (pin 11 and 29)

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	$I \leq 3.25 \text{ mA}$	0.33 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.34 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	
Vib = 10V	$I \leq 3.25 \text{ mA}$	0.33 mA	pass	
Vib = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Vib = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Vib = -10V	$I \leq 3.25 \text{ mA}$	-0.33 mA	pass	
Vib = -3V	$I \leq 1.5 \text{ mA}$	-0.10mA	pass	

#### 4.4.3.7 Circuit 142 (pin 18)

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	$I \leq 3.25 \text{ mA}$	0.33 mA	pass	
Via = 3V	$I \leq 1.5 \text{ mA}$	0.10 mA	pass	
Via = 0V	$-0.75 \leq I \leq 0.75 \text{ mA}$	0 mA	pass	
Via = -10V	$I \leq 3.25 \text{ mA}$	-0.33 mA	pass	
Via = -3V	$I \leq 1.5 \text{ mA}$	-0.10 mA	pass	

NTR Number: NET2/110401/97  
 Page 53 of 56  
 Date: November 5, 1997



#### 4.4.4.1 V.10 Measurements on circuit CCITT 141 (pin 10)

Reference	Description	Limits	Results	Verdict	Observation
V.10 5.2.1	A - C, terminated with 3.9 kOhms	$4V \leq V_o \leq 6V$	5.72 V	pass	
V.10 5.2.2	A - C, terminated with 450 Ohms	$V_t \geq 0.9 * V_o$	5.31 V	pass	
V.10 5.2.3	Short Circuit	$I_s \leq 150mA$	54.1 mA	pass	
V.10 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu A$	< 1 $\mu A$	pass	
V.10 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu A$	< 1 $\mu A$	pass	

#### 4.4.4.2 V.10 Measurements on circuit CCITT 140 (pin 14)

Reference	Description	Limits	Results	Verdict	Observation
V.10 5.2.1	A - C, terminated with 3.9 kOhms	$4V \leq V_o \leq 6V$	5.71 V	pass	
V.10 5.2.2	A - C, terminated with 450 Ohms	$V_t \geq 0.9 * V_o$	5.30 V	pass	
V.10 5.2.3	Short Circuit	$I_s \leq 150mA$	55.2 mA	pass	
V.10 5.2.4	Power off 0.25 V applied	$I_x \leq 100\mu A$	< 1 $\mu A$	pass	
V.10 5.2.4	Power off -0.25 V applied	$I_x \leq 100\mu A$	< 1 $\mu A$	pass	



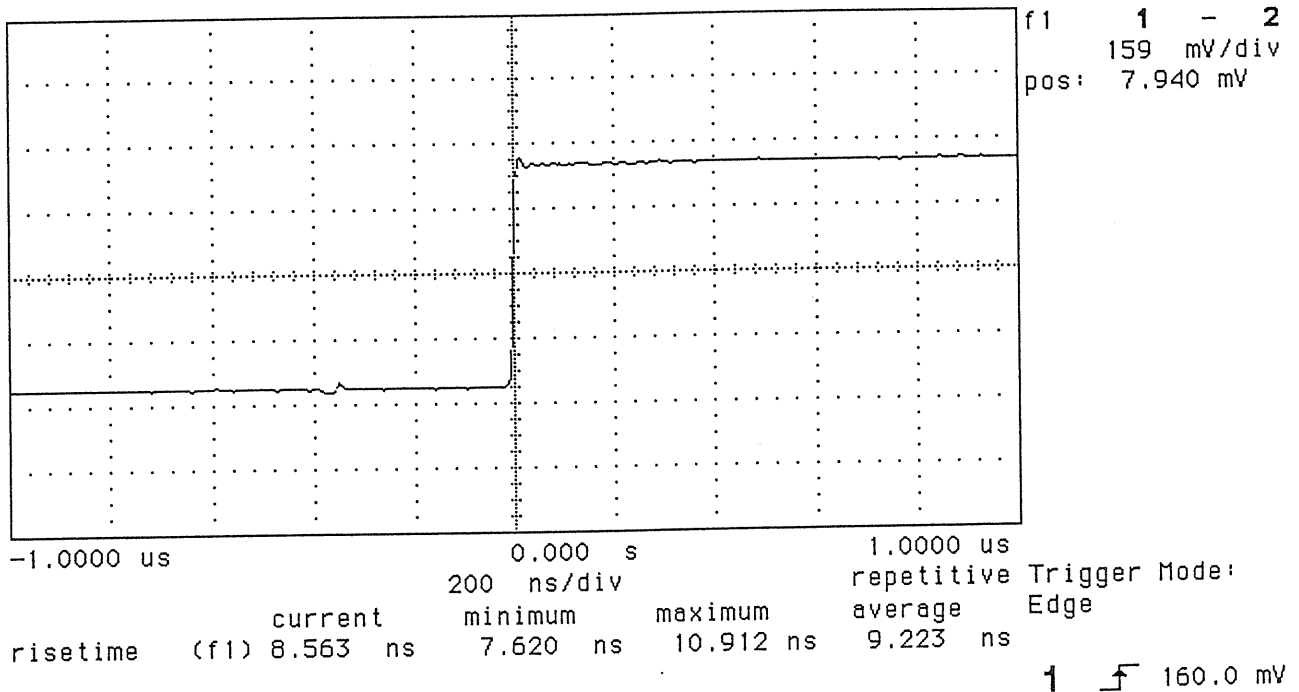
NTR Number: NET2/110401/97  
Page 54 of 56  
Date: November 5, 1997

#### 4.4.5 Dynamic Rise Time Measurement (V.11, 5.3)

Figure O-9

Circuit 103 (pin 4 and 22)

hp stopped



$20\text{ns} \geq t$  or  $t \leq 0.1\text{tb}$

**Verdict : Pass**



## 5 Test Report Frame Layer

### Test Result:

The tested implementation has not been shown by conformance assessment to be non-conforming to NET 2, Clause 9 (CCITT X.25, Layer 2, Frame Layer).

### Test Carried out:

**Not Applicable**

## 6 Test Report Packet Layer

### Test Result:

The tested implementation has not been shown by conformance assessment to be non-conforming to NET 2, Clause 10 (CCITT X.25, Layer 3, Packet Layer).

- ( ) Switched Virtual Channel (SVC) supported and tested
- ( ) Permanent Virtual Channel (PVC) supported and tested

### Test Carried out:

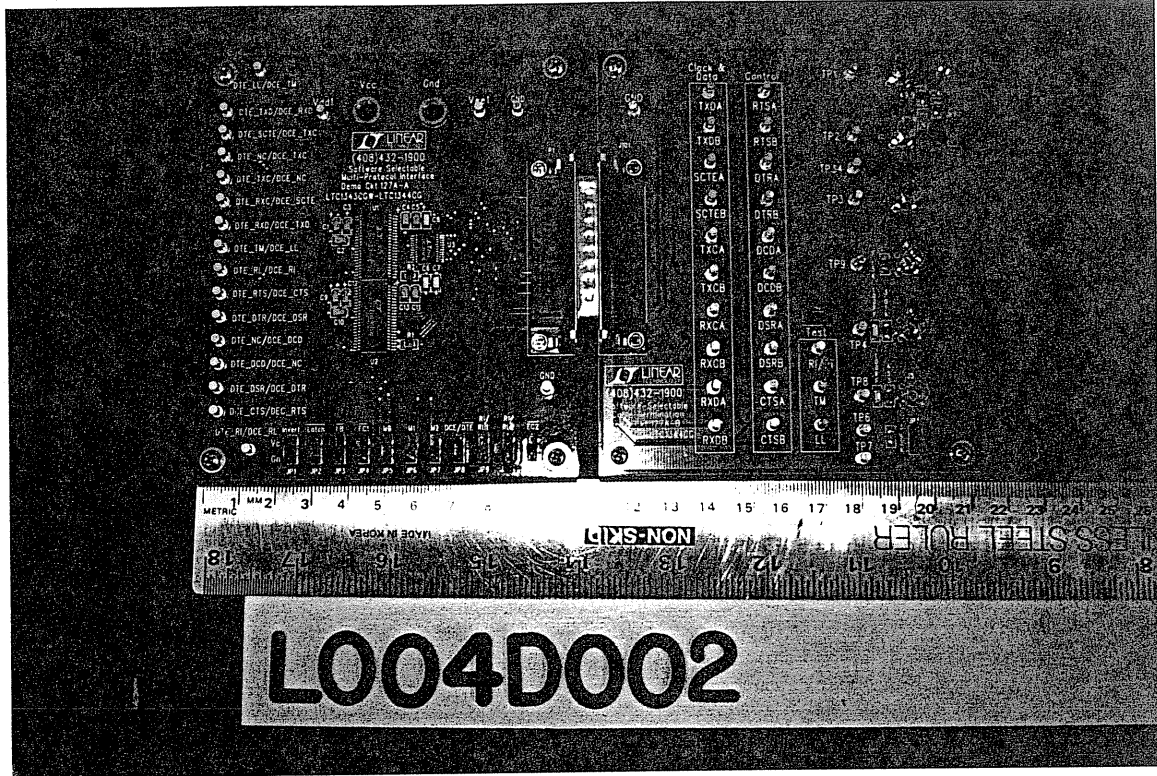
**Not Applicable**



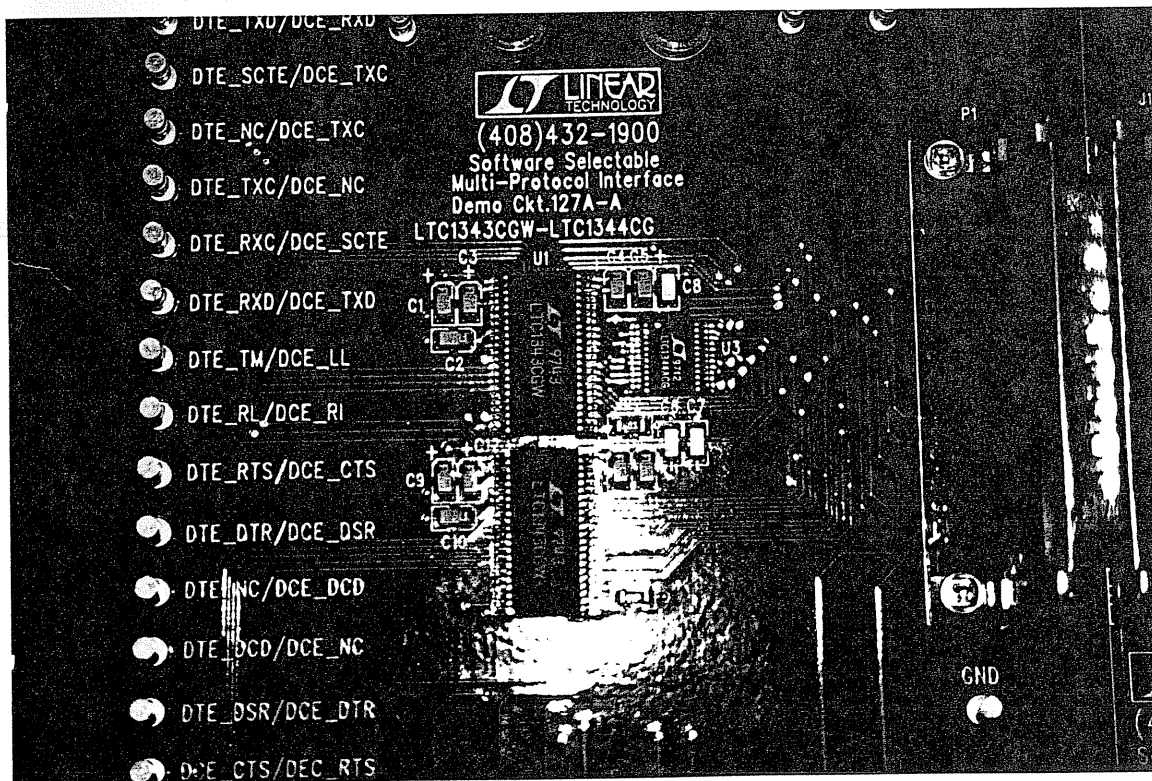


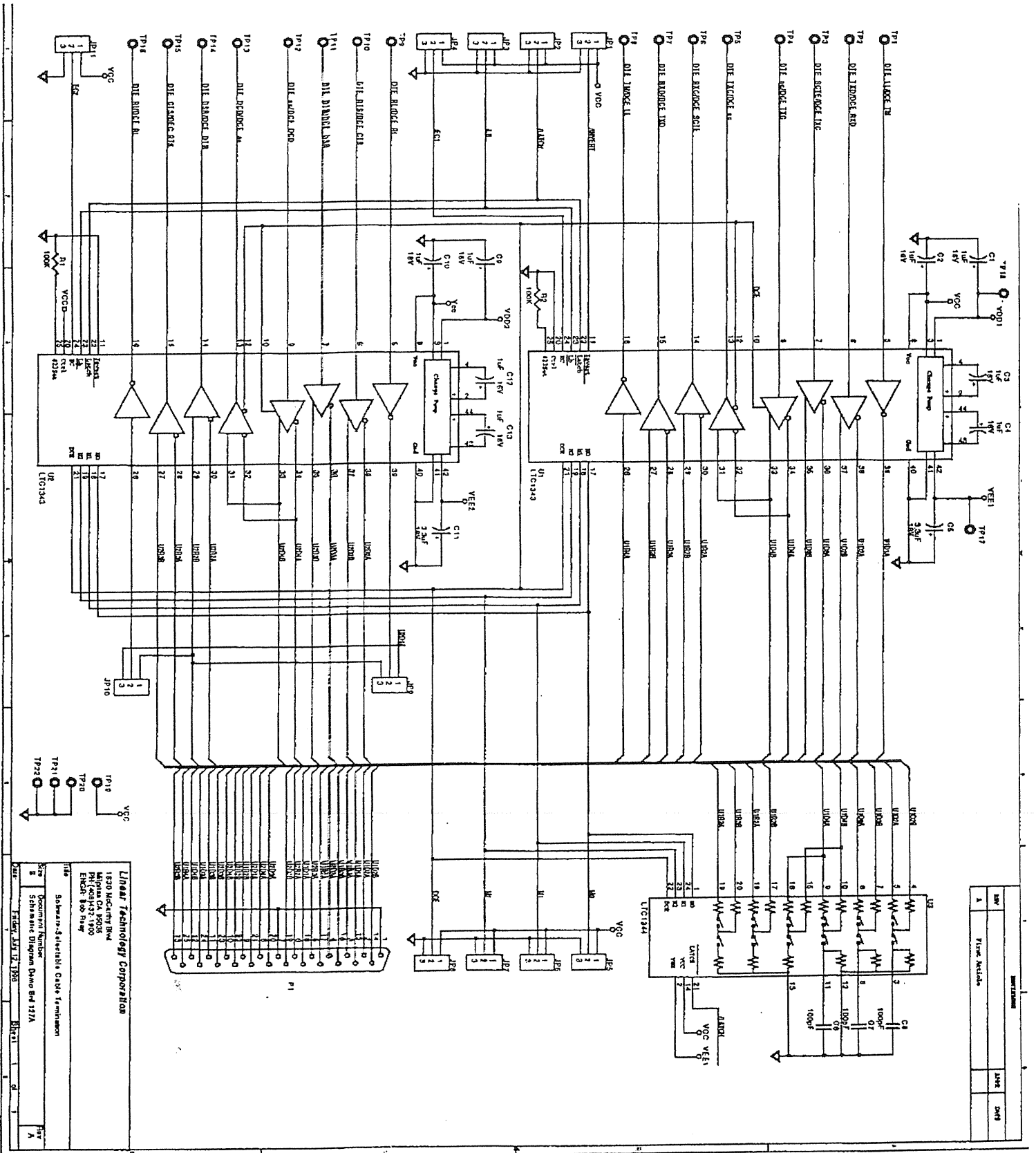
NTR Number: NET2/110401/97  
Page 56 of 56  
Date: November 5, 1997

# 7 Photos



**L004D002**





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 Fremont, CA 94538  
 ENCL: Rev. 1/97

Doc No.	110
Doc Name	Schematic Diagram Data Terminal
Doc Rev	1
Doc Date	11/12/95
Doc Author	BR/11
Doc Checker	
Doc Engineer	
Doc Designer	
Doc Verifier	
Doc Approver	