

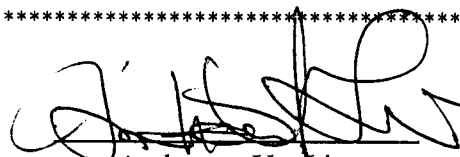
ETC

ELECTRONICS TESTING CENTER, TAIWAN

Universal Serial Bus Cable & Connector Testing Report

Ind. Ser. No. : ET89T-12-076-E00

Dept. Manager :


Andrew Y Lin



TEST REPORT

Ind. Ser. No.ET89T-12-076-E00

Applicant Information

Ind. Ser. No. : ET89T-12-076-E00

Applicant : BAFO/Quality Computer Accessories

USB-IF Member Number : 1398

Applicant Address : 4f., No.36-1, Huang His Street Shihlin Dis.
Taipei, Taiwan, R. O. C.

Telephone : +886-2-2837-8121

Facsimile : +886-2-2837-8198

Commodity : USB V2.0 Cable Assembly

Quantity : 8 sets/each type and 5pcs cable assembly

Date of Receipt : Dec. 20, 2000

Date of Testing : Dec. 20, 2000 ~ Apr. 16, 2001

Measure Environment : Temp. : 25 \pm 10°C, 60 \pm 15% R.H.



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Manufacturer Information

1. Wire Manufacturer

Manufacturer's Name : BAFO/Quality Computer Accessories
 USB-IF Member Number : 1398
 Model : 25AWG*2C Signal + 28~24AWG*2C Power
 UL ID Number : E200534
 UL ID Certification Date : Feb. 10, 1999
 USB-IF TID Number : 60000288
 USB-IF TID Certification Date : Apr. 15, 2001

2.Connector Manufacturer

Manufacturer's Name : ADVANCED CONNECTEK INC
 USB-IF Member Number : 1314
 Model : (1)UAW34-4W5200
 (2)UBW32-4W5200
 USB-IF TID Number : (1)A Type : 60000062
 (2)B Type : 60000063
 USB-IF TID Certification Date : Oct. 25, 2000



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Product Description

Commodity : USB V2.0 Cable Assembly
Model : BA-A0646
USB-IF TID Number : 60000289
USB-IF TID Certification Date : Apr. 15, 2001
Cable Assembly Length : 5m
Twisted signal pair wire Gauge : See the attached file.
Power pair wire Gauge : See the attached file.
Connector type : R/A Thru Hole

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DATA SUMMARY

<u>TEST</u>	<u>REQUIREMENTS</u>	<u>RESULTS</u>
Group 1		
Examination	No damage	PASS
Mating	Mating : 35 N max	PASS
LLCR	30 milliohms max initial	PASS
Durability	No Damage	PASS
Random Vibration	No Chatter > 1 microsecond	PASS
Mechanical Shock	No Chatter > 1 microsecond	PASS
LLCR	ΔR 10 milliohms max final	PASS
Unmating Forces	Unmating : 10 N min	PASS
Cable Pullout	No Damage or loss of cont.	PASS
Examination	No damage	PASS
Group 6		
Examination	No Damage	PASS
Impedance	Differential : 76.5 to 103.5 Ω Common : 39 to 21 Ω	PASS
Attenuation	3.2 dB and 5.8 db max between 200 and 400 Mhz	PASS
Propagation Delay	5.2 nS/m max.	PASS
Propagation Delay Skew	100 pS max.	PASS
Examination	No Damage	PASS
Group 9		
Examination	No Damage	PASS
Cable flex	Discontinuity less than 1 μ s and Physical damage	PASS
IR	1000 Megohms min	PASS
DWV	No flashover or breakdown	PASS
Examination	No Damage	PASS



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SAMPLE CODING

Test Group	"A" plug / receptacle	"B" plug / receptacle	"A" to "B" Cable Assembly
Group 1	1-1	1-1	
	1-2	1-2	
	1-3	1-3	
	1-4	1-4	
	1-5	1-5	
	1-6	1-6	
	1-7	1-7	
	1-8	1-8	
Group 6			6-1
			6-2
			6-3
			6-4
			6-5
Group 9	9-1	9-1	
	9-2	9-2	
	9-3	9-3	
	9-4	9-4	
	9-5	9-5	
	9-6	9-6	
	9-7	9-7	
	9-8	9-8	

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Testing Conditions

According to USB Ver.2.0 specifications and EIA-364 standard.

Group 1

1. Examination

Visual and functional inspection will be performed in accordance with the USB quality inspection plans.

2. Mating Forces

Speed : 2.5 mm/min.

3. Low Level Contact Resistance

Sample Condition : Mating

Full Scale Voltage : 20 mV

Current : 100m A

4. Durability

Cycle Time : 1500 cycles

Rate : 500 cycles/hr.

5. Random Vibration

Requirement : Discontinuous time < 1.0 μ s

Frequency : 50 ~ 2000 Hz

PSD : 0.02g / sec² (100~1000)

Slope : -6dB (50 ~ 100Hz), 6dB (1000 ~ 2000Hz)

Direction : X, Y, Z

Duration : 15 min. / axis

Discontinuity : <1 μ s

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6. Mechanical Shock

Sample Condition : Mating
Wave form : Half sine wave
Accelerate : 30 g
Duration : 11 ms
Direction : $\pm X$, $\pm Y$, $\pm Z$
Shock time : 3 times/axis
Discontinuity : $<1\mu s$

7. Low Level Contact Resistance

Sample Condition : Mating
Full Scale Voltage : 20 mV
Current : 100m A

8. Unmating Forces

Speed : 12.5 mm/min.

9. Cable Pullout

Load : 40N
Duration : 1min

10. Examination

Visual and functional inspection will be performed in accordance with the USB quality inspection plans.



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Group6

1. Examination

Visual and functional inspection will be performed in accordance with the USB quality inspection plans.

2. Signal Pairs Impedance Test

- Rise time : 200 ps
- Testing Point : Max. and Min.
- Testing Point : twisted pair

3. Signal Pairs Propagation Delay Test

- Rise time : 200 ps
- Testing Point : twisted pair

4. Signal Pairs Delay Skew Test

- Rise time : 200 ps
- Testing Point : twisted pair

5. Signal Pairs Attenuation Test

- Testing Point : twisted pair
- Freq. Range : 64 kHz ~ 400 MHz
- Testing point : 64 kHz、256 kHz、512 kHz、772 kHz、1 MHz、4 MHz、
8 MHz、12MHz、24MHz、48MHz、96MHz、
200MHz、400 MHz

6. Examination

Visual and functional inspection will be performed in accordance with the USB quality inspection plans.

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Group 9

1. Examination

Visual and functional inspection will be performed in accordance with the USB quality inspection plans.

2. Cable Flex

Speed : 12-14 cycles / min.

Angle : $\pm 90^\circ$ / one cycle

Times : 100 cycles

Discontinuity : $< 1\mu s$

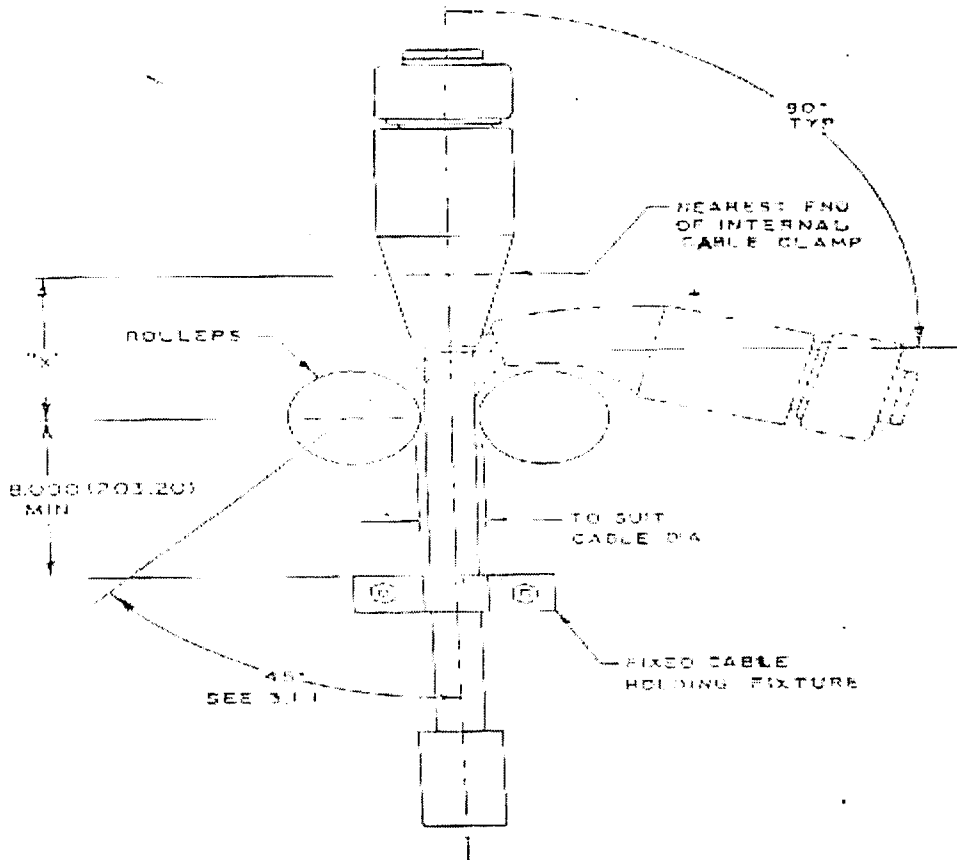


FIGURE 1. Circular cable flexing test setup.

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3. Insulation Resistance

Sample condition : Unmating

Testing voltage : 500Vdc

Duration : 2 min.

4. Withstanding Voltage

Sample condition : Unmating

Testing voltage : 500 V_{ac}

Cut off current : 0.5 mA

Duration : 1 min.

5. Examination

Visual and functional inspection will be performed in accordance with the USB quality inspection plans.



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Testing Equipment

Name	Model
TERMINAL STRENGTH TESTER	ALGOL SV-200LD & MAX-0001
DIGITAL MICRO-OHMMETER	VALHALLA SCIENTIFIC 4300B
VIBRATION TEST SYSTEM	IMV VS-3203 , IMV RC-1110
SYNCHROSCOPE	IWATSU SS-5702
SHOCK PULSE MEMORY	BOKUSUL BROWN BB-1B
SHOCK TESTER	AVCO SM-110-MP
MEGOHMMETER	HP-4339B
BREAKDOWN TESTER	GPD-515AD (001)
DISCONTINUITY TESTER	PW-TS712
DIGITAL THERMOLMETER	TES-1310
BARNSTEAD THERMOLYNE	CIMAREC SP46925
Network Spectrum Analyzer	HP 8753D
FLEXING TESTER	CS-7062A
TDR Digital Sample Oscilloscope	TEKTRONIX 11801C



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Testing Result

Group 1

1. Examination

All examined samples met the requirements as USB2.0 specified.

2. Mating Force

Item	Mating Force (NT)	
	35N max	
Requirement	A Type	B Type
NO		
1	10.19	12.60
2	9.87	13.05
3	9.08	11.15
4	8.65	21.37
5	10.08	12.26
6	9.65	15.89
7	10.78	10.59
8	10.13	12.84
Average	9.80	13.72

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3. Low Level Contact Resistance

NO	Item	Contact Resistance			
	Requirement	A Type (m Ω) 30m Ω max			
Test point	P	D+	D-	G	
1	16.82	18.31	17.20	17.38	
2	16.50	17.20	16.02	16.15	
3	16.83	17.41	16.46	16.69	
4	16.31	16.91	16.79	17.11	
5	15.62	16.60	16.72	15.27	
6	17.22	17.34	17.51	16.58	
7	16.38	16.92	14.94	16.08	
8	16.83	17.20	15.81	17.37	
Average	16.56	17.24	16.43	16.58	



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Item NO	Contact Resistance B Type (mΩ)			
	Requirement 30mΩ max			
Test point	P	D+	D-	G
1	18.32	16.68	17.42	23.16
2	16.28	16.99	15.80	14.37
3	16.30	14.28	16.09	15.27
4	15.90	14.98	15.75	14.07
5	16.80	15.67	17.10	13.76
6	18.98	15.60	16.72	17.22
7	18.80	22.21	19.25	15.56
8	16.12	14.99	17.30	13.86
Average	17.19	16.43	16.93	15.91

4. Durability

There was no evidence of physical damage to the test samples as tested.

5. Random Vibration

1. There was no evidence of physical damage to the test samples as tested.
2. There was no electrical discontinuity greater than 1.0 μs.

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6. Mechanical Shock

1. There was no evidence of physical damage to the test samples as tested.
2. There was no electrical discontinuity greater than $1.0 \mu s$.

7. Low Level Contact Resistance

NO	Item	Contact Resistance A Type ($m\Omega$)			
	Requirement	$\Delta R 10m\Omega \text{ max}$			
Test point	P	D+	D-	G	
1	0.02	0.88	0.46	0.18	
2	0.56	0.34	2.09	0.34	
3	0.02	1.08	0.12	0.20	
4	0.11	0.19	0.92	1.01	
5	1.26	0.81	0.55	1.63	
6	0.60	1.55	0.45	0.43	
7	0.36	0.48	1.19	0.28	
8	2.36	1.02	0.47	0.73	
Average	0.66	0.79	0.78	0.60	

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NO	Item	Contact Resistance B Type (mΩ)			
	Requirement	$\Delta R 10m\Omega \text{ max}$			
Test point	P	D+	D-	G	
1	1.96	0.83	0.67	5.64	
2	1.24	1.51	1.07	1.13	
3	0.98	0.56	1.62	0.99	
4	0.40	0.51	0.20	0.02	
5	0.67	1.80	1.75	0.93	
6	1.55	0.75	0.01	4.04	
7	2.48	6.11	4.73	1.05	
8	0.74	0.78	2.93	0.36	
Average	1.25	1.61	1.62	1.77	

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8. Unmating Forces

Item	Unmating Force (NT)	
Requirement	10N min	
NO	A Type	B Type
1	12.17	12.67
2	10.05	14.59
3	16.46	22.36
4	12.70	16.30
5	13.83	14.65
6	10.28	17.96
7	11.25	15.38
8	10.02	20.00
Average	12.10	16.74

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9. Cable Pullout

1. There was no evidence of physical damage to the test samples as tested.
2. There was no electrical discontinuity greater than $1.0 \mu\text{s}$.

10.Examination

All examined samples met the requirements as USB2.0 specified.

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1. Examination

All examined samples met the requirements as USB2.0 specified.

2. Signal Pairs Impedance Test

NO	Item	Differential mode Impedance (Ω)		Common mode Impedance (Ω)	
		Max	Min	Max	Min
	Requirement	103.5	76.5	39	21
1		99.20	83.82	37.50	30.56
2		94.93	84.50	37.04	32.08
3		92.31	81.82	35.39	28.77
4		97.63	83.82	37.66	31.69
5		95.69	80.18	37.04	29.35
	Average	95.95	82.83	36.93	30.49

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3. Signal Pairs Attenuation Test

Item NO	Attenuation (dB)					
	Requirement	1	2	3	4	5
64k	0.08	0.0361	0.0430	0.0625	0.0421	0.0466
256k	0.11	0.0642	0.0708	0.0956	0.0666	0.0695
512k	0.13	0.0847	0.0964	0.1189	0.0927	0.0949
772k	0.15	0.1104	0.1201	0.1467	0.1158	0.1184
1M	0.2	0.1187	0.1303	0.1563	0.1313	0.1547
4M	0.39	0.2502	0.2560	0.3018	0.2472	0.2907
8M	0.57	0.4068	0.4173	0.4898	0.3787	0.4736
12M	0.67	0.5465	0.5615	0.6314	0.5137	0.6332
24M	0.95	0.6456	0.6430	0.6860	0.6252	0.7113
48M	1.35	0.9363	0.9242	1.0359	0.8974	0.9880
96M	1.9	1.5072	1.4372	1.5609	1.4709	1.5070
200M	3.2	2.2715	1.9388	2.1760	1.9387	2.2116
400M	5.8	3.1663	2.9874	3.4616	3.5257	3.0611

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4. Signal Pairs Propagation Delay Test

NO	Item	Propagation Delay (ns)		
		Requirement	26ns/Cable	5.2ns/m
1			24.054	4.811
2			23.983	4.797
3			24.090	4.818
4			23.779	4.756
5			23.982	4.796
	Average		23.978	4.796

5. Signal Pairs Delay Skew Test

NO	Item	Skew (ps)
		Requirement
		100ps/Cable
1.00		22.53
2.00		52.85
3.00		39.10
4.00		5.68
5.00		2.96
	Average	24.62

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6. Examination

All examined samples met the requirements as USB2.0 specified.

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Group 9

1. Examination

All examined samples met the requirements as USB2.0 specified.

2. Cable Flex

There was no evidence of physical damage to the test samples as tested.

3. Insulation Resistance

The insulation resistance exceeded 1000M Ω .

4. Withstanding Voltage

1. There was no electrical discontinuity greater than 1.0 μ s.
2. The sample was no leakage and breakdown.

5. Examination

All examined samples met the requirements as USB2.0 specified and no physical damage.

Tester : Dennis Chang
Dennis Chang
(Group1)

Sophia C. Liu
Sophia C. Liu
(Group6)

Wen Tien Tso
Wen Tien Tso
(Group9)