X3T9.2/90-68

CORPORATION
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TO: X-3T9.2 Committee Members (SCSI II)

FROM: Wills Xu

DATE: May 4, 1990

SUBJECT: External Cable Evaluations - Analog Near End & Far End Crosstalk

1. Equipment Used for subject test:

   A. HP 8753A Network Analyzer
   B. HP 85044A Transmission/Reflection Test Set
   C. Amp Champmate Female Connectors

2. Sample Prep and Fixture Assemblies

   A. All samples terminated per HP specification with AMP Champmate male connectors on both ends of the cable.

   B. The mating connector tied into the system is configured that pin 1 through 25 are tied together and then returned to the test equipment as a signal ground. (Per SCSI configuration)

3. Test Procedures:

   A. Select a pin to be excited with a sinusoidal signal directly out of the HP Network Analyzer test equipment.

   B. Select adjacent pin as a listener to measure the amount of crosstalk, both near end and far end.

   C. Unused pins and overall shield are floating.

   D. The measurement is taken from the magnitude of Vout/Vin voltage and converted to dB's. (Percent to dB conversion formula:

      $$dB = -20 \log (\%/100)$$

   D. The frequency range selected is 1 MHz to 11 MHz.

4. Measurements and Test Results:

EXCITED PIN	MEASUREMENT TAKEN (LISTENER)	MEASUREMENT NO.
P26	P27	1
P28	P29	2
P30	P31	3
P32	P33	4
P34	P35	5
P36	P37	6
P38	P39	7
P40	P41	8
P42	P43	9
P44	P45	10
P46	P47	11
P48	P49	12
P49	P50	13

Thirteen measurements were taken using the configuration listed above. Since all the samples received are terminated and tested without the knowledge of the pair location in reference to the pin location, we are unable to confirm all the tests are performed on adjacent pairs within the same cable.

There has been an unknown amount of crosstalk within the test fixtures as well as in the terminated connectors. These numbers would not be recommended to use as spec limits but as a relative comparison from one cable to the other.

Wills Xu
Product Development Manager

WX:cp:2336c:dict

Enc: Data

EXCITE PIN	LITSEN PIN		CABLE A: FURUKAWA DT-882814						CABLE B: MADISON 408		
			@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ
			NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB
P26	P27	1	40.0	37.0	23.0	19.0	26.0	18.5	32.0	32.0	27.0
P28	P29	2	38.0	49.0	25.0	30.0	27.0	33.0	39.0	29.0	33.0
P30	P31	3	47.0	50.0	41.0	32.5	38.0	36.0	32.0	33.0	28.0
P32	P33	4	42.0	39.0	24.0	19.5	24.0	19.0	40.0	41.0	37.0
P34	P35	5	50.0	50.0	38.0	33.0	33.0	33.5	29.0	48.5	23.0
P36	P37	6	44.0	47.0	27.0	30.0	32.0	32.0	29.0	48.0	23.0
P38	P39	7	50.0	50.0	34.0	30.0	40.0	31.5	39.0	41.0	33.0
P40	P41	8	50.0	50.0	38.0	34.0	36.0	35.0	38.0	40.0	33.0
P42	P43	9	49.0	50.0	35.0	45.0	40.0	50.0	39.0	41.0	34.0
P44	P45	10	29.0	33.0	35.0	24.0	28.0	26.0	42.0	43.0	37.0
P46	P47	11	31.0	32.0	28.0	24.0	29.5	25.0	28.0	38.5	23.0
P48	P49	12	35.0	37.0	34.0	29.0	28.5	29.0	43.0	47.0	38.0
P49	P50	13	37.0	38.0	33.0	30.0	29.5	33.0	44.0	37.0	42.0
	WORST CASE		29.0	32.0	23.0	19.0	24.0	18.5	28.0	29.0	23.0
	MEAN		41.7	43.2	31.9	29.2	31.7	30.9	36.5	39.9	31.6
	STD		7.1	7.0	5.6	6.5	5.2	7.8	5.5	5.8	6.0

EXCITE PIN	LITSEN PIN		CABLE A: FURUKAWA DT-882814						CABLE B: MADISON 408		
			@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ
			NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %
P26	P27	1	1.0	1.4	7.1	11.2	5.0	11.9	2.5	2.5	4.5
P28	P29	2	1.3	0.4	5.6	3.2	4.5	2.2	1.1	3.5	2.2
P30	P31	3	0.4	0.3	0.9	2.4	1.3	1.6	2.5	2.2	4.0
P32	P33	4	0.8	1.1	6.3	10.6	6.3	11.2	1.0	0.9	1.4
P34	P35	5	0.3	0.3	1.3	2.2	2.2	2.1	3.5	0.4	7.1
P36	P37	6	0.6	0.4	4.5	3.2	2.5	2.5	3.5	0.4	7.1
P38	P39	7	0.3	0.3	2.0	3.2	1.0	2.7	1.1	0.9	2.2
P40	P41	8	0.3	0.3	1.3	2.0	1.6	1.8	1.3	1.0	2.2
P42	P43	9	0.4	0.3	1.8	0.6	1.0	0.3	1.1	0.9	2.0
P44	P45	10	3.5	2.2	1.8	6.3	4.0	5.0	0.8	0.7	1.4
P46	P47	11	2.8	2.5	4.0	6.3	3.3	5.6	4.0	1.2	7.1
P48	P49	12	1.8	1.4	2.0	3.5	3.8	3.5	0.7	0.4	1.3
P49	P50	13	1.4	1.3	2.2	3.2	3.3	2.2	0.6	1.4	0.8
	WORST CASE		0.3	0.3	0.9	0.6	1.0	0.3	0.6	0.4	0.8
	MEAN		1.2	0.9	3.1	4.1	3.1	4.1	1.8	1.3	3.3
	STD		1.0	0.7	2.0	3.1	1.6	3.5	1.2	0.9	2.3

			CABLE E: MADISON 4099						CABLE F: BELDEN P1309			
	@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ	
FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB
22.5	29.0	24.0		30.0		17.5		17.5	50.0	50.0	36.0	31.0
19.0	37.0	18.5		30.0		19.0		19.0	39.0	50.0	34.0	31.5
23.0	28.0	23.0		49.0		37.0		42.0	40.0	39.0	22.0	18.0
32.0	32.0	35.0		30.0		18.0		18.0	50.0	50.0	45.0	37.0
39.0	27.0	50.0		47.0		37.0		41.0	50.0	50.0	33.0	38.0
38.0	27.0	41.0		30.0		22.0		17.0	50.0	50.0	36.0	29.0
31.0	36.0	31.5		30.0		18.0		18.0	48.5	49.0	34.0	29.0
30.0	35.0	31.5		36.0		32.0		32.0	42.0	49.0	31.0	34.0
31.0	32.0	32.0		49.0		38.0		45.0	50.0	50.0	41.0	32.0
33.5	33.0	38.0		30.0		18.0		17.0	39.0	50.0	22.0	31.0
18.5	31.0	18.5		29.0		22.0		26.0	39.0	39.0	23.0	19.0
37.0	33.0	50.0		31.0		19.0		18.5	50.0	50.0	37.0	30.0
33.0	32.0	38.5		37.0		30.0		23.0	38.0	49.0	22.0	18.5
18.5	27.0	18.5	ERR	29.0	ERR	17.5	ERR	17.0	38.0	39.0	22.0	18.0
29.8	31.7	33.2	ERR	35.2	ERR	25.2	ERR	25.7	45.0	48.1	32.0	29.1
6.7	3.1	10.0	ERR	7.6	ERR	8.0	ERR	10.2	5.2	3.9	7.3	6.4

			CABLE E: MADISON 4099						CABLE F: BELDEN P1309			
	@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ	
FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %
7.5	3.5	6.3		3.2		13.3		13.3	0.3	0.3	1.6	2.8
11.2	1.4	11.9		3.2		11.2		11.2	1.1	0.3	2.0	2.7
7.1	4.0	7.1		0.4		1.4		0.8	1.0	1.1	7.9	12.6
2.5	2.5	1.8		3.2		12.6		12.6	0.3	0.3	0.6	1.4
1.1	4.5	0.3		0.4		1.4		0.9	0.3	0.3	2.2	1.3
1.3	4.5	0.9		3.2		7.9		14.1	0.3	0.3	1.6	3.5
2.8	1.6	2.7		3.2		12.6		12.6	0.4	0.4	2.0	3.5
3.2	1.8	2.7		1.6		2.5		2.5	0.8	0.4	2.8	2.0
2.8	2.5	2.5		0.4		1.3		0.6	0.3	0.3	0.9	1.5
2.1	2.2	1.3		3.2		12.6		14.1	1.1	0.3	7.9	2.8
11.9	2.8	11.9		3.5		7.9		5.0	1.1	1.1	7.1	11.2
1.4	2.2	0.3		2.8		11.2		11.9	0.3	0.3	1.4	
2.2	2.5	1.2		1.4		3.2		7.1	.3	0.4	7.9	
1.1	1.4	0.3		0.4		1.3		0.6	.3	0.3	0.6	1.3
4.4	2.8	3.9		2.3		7.6		8.2	.7	0.4	3.5	4.7
3.6	1.0	3.9		1.2		4.8		5.3	0.4	0.3	2.9	4.0

	CABLE G: MONTROSE SCSI 2						CABLE H: C&M 62327			
@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ	
NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB
33.0	32.0	32.0	40.0	20.5	38.0	19.5	38.0	50.0	50.0	34.0	29.0
36.0	35.0	29.0	32.0	18.0	20.0	19.0	19.0	46.0	50.0	32.0	28.0
24.0	17.0	35.0	47.0	20.0	35.0	20.0	41.0	39.0	50.0	32.0	29.0
37.5	40.0	35.0	46.0	20.5	35.0	20.0	37.0	43.0	50.0	35.0	30.0
29.0	50.0	33.0	43.0	21.0	32.0	23.0	31.0	50.0	50.0	32.0	29.0
31.0	32.0	33.0	41.5	20.5	31.0	19.0	31.0	50.0	50.0	36.0	31.0
31.0	30.5	34.0	41.0	20.5	30.0	20.0	29.0	46.0	40.0	38.0	19.0
26.0	48.0	35.0	45.0	21.0	35.0	20.0	37.0	50.0	50.0	31.0	29.0
35.0	35.0	35.5	49.0	21.0	38.0	20.0	37.5	50.0	50.0	34.0	37.0
25.0	31.5	34.0	45.0	21.0	34.0	21.5	37.0	50.0	50.0	36.0	31.0
24.0	18.0	28.0	29.0	17.0	18.5	19.0	16.5	37.0	50.0	24.0	31.5
32.0	31.0	33.0	41.0	20.5	30.0	19.5	29.0	50.0	50.0	37.0	33.0
24.0	17.5	32.0	39.0	20.0	27.5	19.5	27.0	39.0	45.0	23.0	21.0
24.0	17.0	28.0	29.0	17.0	18.5	19.0	16.5	37.0	40.0	23.0	19.0
29.8	32.1	33.0	41.4	20.1	31.1	20.0	31.5	46.2	48.8	32.6	29.0
4.7	10.0	2.2	5.5	1.2	5.9	1.1	7.2	4.8	2.9	4.4	4.5

	CABLE G: MONTROSE SCSI 2						CABLE H: C&M 62327			
@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ	
NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %
2.2	2.5	2.5	1.0	9.4	1.3	10.6	1.3	0.3	0.3	2.0	3.5
1.6	1.8	3.5	2.5	12.6	10.0	11.2	11.2	0.5	0.3	2.5	4.0
6.3	14.1	1.8	0.4	10.0	1.8	10.0	0.9	1.1	0.3	2.5	3.5
1.3	1.0	1.8	0.5	9.4	1.8	10.0	1.4	0.7	0.3	1.8	3.2
3.5	0.3	2.2	0.7	8.9	2.5	7.1	2.8	0.3	0.3	2.5	3.5
2.8	2.5	2.2	0.8	9.4	2.8	11.2	2.8	0.3	0.3	1.6	2.8
2.8	3.0	2.0	0.9	9.4	3.2	10.0	3.5	0.5	1.0	1.3	11.2
5.0	0.4	1.8	0.6	8.9	1.8	10.0	1.4	0.3	0.3	2.8	3.5
1.8	1.8	1.7	0.4	8.9	1.3	10.0	1.3	0.3	0.3	2.0	1.4
3.6	2.7	2.0	0.6	8.9	2.0	8.4	1.4	0.3	0.3	1.6	2.8
6.3	12.6	4.0	3.5	14.1	11.9	11.2	15.0	1.4	0.3	6.3	2.7
2.5	2.8	2.2	0.9	9.4	3.2	10.6	3.5	0.3	0.3	1.4	2.2
.3	13.3	2.5	1.1	0.0	4.2	10.6	4.5	.1	0.3	7.1	.9
1.3	0.3	1.7	0.4	8.9	1.3	7.1	0.9	3	0.3	1.3	1.4
3.7	4.5	2.3	1.1	0.0	3.7	10.1	3.9	.6	0.3	2.7	4.1
1.9	4.9	0.7	0.9	1.5	3.2	1.1	4.1	0.4	0.2	1.8	2.7

	CABLE J: C&M NO P/N (62286)						CABLE K: C&M 62523				
@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10
NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB
32.0	29.0	45.0	40.0	24.0	19.5	33.0	38.0	42.0	42.0	22.0	18.0	23.0
37.0	28.0	50.0	50.0	36.0	34.0	35.0	45.0	50.0	50.0	38.0	36.0	29.0
38.0	32.0	50.0	50.0	40.0	37.5	46.0	50.0	50.0	50.0	33.0	29.0	35.0
39.0	31.0	45.0	50.0	42.0	37.0	50.0	41.0	43.0	43.0	24.0	21.0	26.0
38.0	28.0	41.0	50.0	33.0	36.0	27.0	30.0	40.0	50.0	24.0	31.0	26.0
35.0	30.0	44.0	50.0	35.0	30.0	22.0	31.0	50.0	50.0	33.0	30.0	35.0
28.5	35.0	49.0	42.0	31.0	28.0	39.0	36.0	50.0	50.0	34.0	31.5	50.0
41.0	28.0	50.0	50.0	34.0	30.0	33.0	30.0	50.0	50.0	31.0	28.0	31.0
29.0	41.0	50.0	50.0	36.0	32.0	32.0	29.0	50.0	50.0	38.0	30.5	35.0
33.0	31.0	40.0	40.0	21.0	18.0	32.0	15.0	50.0	50.0	35.0	31.0	36.0
38.0	31.5	50.0	46.0	34.0	28.0	32.0	31.0	40.0	40.0	21.0	18.5	32.0
35.5	36.0	40.0	40.0	21.0	18.0	33.0	16.5	50.0	50.0	36.0	32.0	36.0
26.0	18.0	50.0	49.0	32.0	28.0	35.0	29.0	50.0	50.0	36.0	31.0	38.0
26.0	18.0	40.0	40.0	21.0	18.0	22.0	15.0	40.0	40.0	21.0	18.0	23.0
34.6	30.7	46.5	46.7	32.2	28.9	34.5	32.4	47.3	48.1	31.2	28.3	33.1
4.4	5.1	4.0	4.3	6.3	6.5	7.0	9.5	4.1	3.6	5.9	5.3	6.5

	CABLE J: C&M NO P/N (62286)						CABLE K: C&M 62523				
@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10
NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %
2.5	3.5	0.6	1.0	6.3	10.6	2.2	1.3	0.8	0.8	7.9	12.6	7.1
1.4	4.0	0.3	0.3	1.6	2.0	1.8	0.6	0.3	0.3	1.3	1.6	3.5
1.3	2.5	0.3	0.3	1.0	1.3	0.5	0.3	0.3	0.3	2.2	3.5	1.8
1.1	2.8	0.6	0.3	0.8	1.4	0.3	0.9	0.7	0.7	6.3	8.9	5.0
1.3	4.0	0.9	0.3	2.2	1.6	4.5	3.2	1.0	0.3	6.3	2.8	5.0
1.8	3.2	0.6	0.3	1.8	3.2	7.9	2.8	0.3	0.3	2.2	3.2	1.8
3.8	1.8	0.4	0.8	2.8	4.0	1.1	1.6	0.3	0.3	2.0	2.7	0.3
0.9	4.0	0.3	0.3	2.0	3.2	2.2	3.2	0.3	0.3	2.8	4.0	2.8
3.5	0.9	0.3	0.3	1.6	2.5	2.5	3.5	0.3	0.3	1.3	3.0	1.8
2.2	2.8	1.0	1.0	8.9	12.6	2.5	17.8	0.3	0.3	1.8	2.8	1.6
1.3	2.7	0.3	0.5	2.0	4.0	2.5	2.8	1.0	1.0	8.9	11.9	2.5
1.7	1.6	1.0	1.0	8.9	12.6	2.2	15.0	0.3	0.3	1.6	2.5	[illegible]
7.0	12.6	0.3	0.4	2.5	4.0	1.8	3.5	.3	0.3	1.6	2.8	.6
0.9	.9	0.3	0.3	0.8	1.3	0.3	0.3	.3	0.3	1.3	1.6	.3
2.1	.6	0.5	0.5	3.3	4.8	2.5	4.3	.5	0.4	3.6	4.8	.8
1.2	2.8	0.3	0.3	2.7	4.0	1.9	5.3	0.3	0.2	2.6	3.6	1.8

	CABLE L: FURUKAWA DT-891C55						CABLE M: BERKTEK 270288				
	@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ
FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB
16.0		41.0		29.0		31.0	42.0	43.0	50.0	30.0	34.0
35.0		41.0		28.0		28.0	31.0	31.0	21.0	10.0	34.0
28.0		40.0		29.0		28.0	42.0	43.0	32.5	30.0	50.0
19.0		42.0		30.0		29.5	30.0	31.0	24.0	19.0	31.0
31.0		30.0		18.0		15.0	43.0	42.0	33.0	30.0	38.0
28.0		31.0		18.0		17.0	31.0	31.0	21.0	18.0	35.0
33.0		29.0		19.0		25.0	49.0	48.0	36.0	39.0	37.0
27.5		42.0		30.0		30.0	36.0	39.5	33.0	26.5	35.0
30.0		42.0		31.0		28.0	31.0	31.0	21.0	17.5	30.0
30.5		31.5		18.5		17.0	43.0	42.0	33.0	29.0	37.5
16.0		35.0		22.0		22.0	48.0	48.0	40.0	36.0	43.0
33.0		35.0		23.0		21.5	43.0	40.0	35.0	30.0	36.0
32.0		34.0		22.0		23.0	32.0	32.0	23.0	18.0	29.0
16.0	ERR	29.0	ERR	18.0	ERR	15.0	30.0	31.0	21.0	10.0	29.0
27.6	ERR	36.4	ERR	24.4	ERR	24.2	38.5	38.6	31.0	25.6	36.1
6.2	ERR	4.9	ERR	5.0	ERR	5.2	6.7	6.3	8.4	8.1	5.3

	CABLE L: FURUKAWA DT-891055						CABLE M: BERKTEK 270288				
	@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ
FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %
15.8		0.9		3.5		2.8	0.8	0.7	0.3	3.2	2.0
1.8		0.9		4.0		4.0	2.8	2.8	8.9	31.6	2.0
4.0		1.0		3.5		4.0	0.8	0.7	2.4	3.2	0.3
11.2		0.8		3.2		3.3	3.2	2.8	6.3	11.2	2.8
2.8		3.2		12.6		17.8	0.7	0.8	2.2	3.2	1.3
4.0		2.8		12.6		14.1	2.8	2.8	8.9	12.6	1.8
2.2		3.5		11.2		5.6	0.4	0.4	1.6	1.1	1.4
4.2		0.8		3.2		3.2	1.6	1.1	2.2	4.7	1.8
3.2		0.8		2.8		4.0	2.8	2.8	8.9	13.3	3.2
3.0		2.7		11.9		14.1	0.7	0.8	2.2	3.5	1.3
15.8		1.8		7.9		7.9	0.4	0.4	1.0	1.6	0.7
2.2		1.8		7.1		8.4	0.7	1.0	1.8	3.2	1.6
2.5		[illegible]		7.9		7.1	2.5	2.5	7.1	12.[illegible]	3.5
1.8		.8		2.8		2.8	0.	0.4	0.3	1.1	0.3
5.6		.8		7.0		7.4	1.[illegible]	1.5	4.1	8.1	1.8
4.9		1.0		3.8		4.7	1.1	1.0	3.2	8.1	0.9

	CABLE N: ASTRO						CABLE O: C&M 62659					
	@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ	
FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB
31.0	38.0	39.0	29.0	28.0	33.0	29.0	47.0	50.0	50.0	38.0	31.0	48.0
16.0	38.0	39.0	29.0	28.0	33.0	28.0	34.0	41.0	16.0	20.0	18.0	21.0
30.0	38.5	39.0	29.5	27.5	36.0	29.0	48.0	46.0	34.0	28.0	35.0	29.0
18.0	39.0	40.0	31.0	29.0	36.0	30.0	39.0	37.0	23.0	15.0	26.0	14.0
28.0	41.0	41.0	32.0	29.0	34.0	30.0	47.0	46.0	35.0	25.0	32.0	25.0
15.0	29.0	23.0	20.0	18.0	28.0	22.0	50.0	46.0	39.0	32.0	35.0	35.0
50.0	40.0	41.0	34.0	31.0	32.0	32.5	50.0	50.0	50.0	38.0	40.0	39.0
24.5	42.0	44.0	33.0	32.0	36.0	34.0	50.0	48.0	44.0	16.0	44.0	30.0
15.0	30.0	30.0	21.0	18.0	26.0	17.0	37.0	35.0	22.0	14.0	24.0	12.0
31.0	46.0	49.0	39.0	38.0	33.0	50.0	50.0	41.0	35.0	37.0	32.0	40.0
38.0	40.0	42.0	38.0	31.0	33.0	35.0	50.0	50.0	38.0	41.0	32.0	32.0
31.0	32.0	30.0	28.5	18.0	16.0	16.0	50.0	50.0	39.0	29.0	32.0	31.0
15.0	41.0	42.0	37.0	31.0	35.0	34.5	50.0	50.0	40.0	32.0	25.0	37.0
15.0	29.0	23.0	20.0	18.0	16.0	16.0	34.0	35.0	16.0	14.0	18.0	12.0
26.3	38.0	38.4	30.8	27.6	31.6	29.8	46.3	45.4	35.8	28.1	31.2	30.2
10.2	4.7	6.6	5.5	5.8	5.3	8.3	5.5	5.0	9.9	9.1	6.6	9.9

	CABLE N: ASTRO						CABLE O: C&M 62659					
	@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ	
FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %
2.8	1.3	1.1	3.5	4.0	2.2	3.5	0.4	0.3	0.3	1.3	2.8	0.4
15.8	1.3	1.1	3.5	4.0	2.2	4.0	2.0	0.9	15.8	10.0	12.6	8.9
3.2	1.2	1.1	3.3	4.2	1.6	3.5	0.4	0.5	2.0	4.0	1.8	3.5
12.6	1.1	1.0	2.8	3.5	1.6	3.2	1.1	1.4	7.1	17.8	5.0	20.0
4.0	0.9	0.9	2.5	3.5	2.0	3.2	0.4	0.5	1.8	5.6	2.5	5.6
17.8	3.5	7.1	10.0	12.6	4.0	7.9	0.3	0.5	1.1	2.5	1.8	1.8
0.3	1.0	0.9	2.0	2.8	2.5	2.4	0.3	0.3	0.3	1.3	1.0	1.1
6.0	0.8	0.6	2.2	2.5	1.6	2.0	0.3	0.4	0.6	15.8	0.6	3.2
17.8	3.2	3.2	8.9	12.6	5.0	14.1	1.4	1.8	7.9	20.0	6.3	25.1
2.8	0.5	0.4	1.1	1.3	2.2	0.3	0.3	0.9	1.8	1.4	2.5	1.0
1.3	1.0	0.8	1.3	2.8	2.2	1.8	0.3	0.3	1.3	0.9	2.5	2.5
2.8	2.5	3.2	3.8	12.6	15.8	15.8	0.3	0.3	1.1	3.5	2.5	
17.8	0.9	0.8	1.4	.8	1.8	1.9	0.3	0.3	1.(	2.5	5.6	
0.3	.5	0.4	1.1	.3	1.6	0.1	0.3	0.3	0.	0.9	0.6	.4
8.1	.5	1.7	3.6	.3	3.4	4.9	0.6	0.7	3.2	6.7	3.7	.0
6.8	0.9	1.8	2.7	4.0	3.7	4.6	0.5	0.5	4.3	6.6	3.1	7.5

CABLE P: HELIX 28 AWG						CABLE _: HITACHI 8212					
@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ	
NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB
40.0	40.5	37.0	32.0	32.0	35.0	28.0	31.0	17.0	18.5	18.0	17.0
31.0	31.0	28.0	22.0	28.0	24.0	32.0	39.5	20.0	28.0	20.5	30.0
33.0	35.0	31.0	26.0	30.0	27.0	37.0	41.0	21.0	29.0	23.0	29.0
39.0	40.0	37.0	31.0	31.0	33.0	33.0	42.0	20.0	30.0	20.5	31.0
36.0	38.0	33.0	28.0	29.0	29.0	28.0	31.0	18.0	19.0	18.0	17.0
33.0	35.0	30.0	27.0	32.0	29.0	28.0	28.0	18.0	18.0	20.5	32.0
44.0	48.0	42.0	41.0	33.0	50.0	35.0	50.0	22.5	41.0	22.0	42.0
49.0	26.0	41.0	17.5	33.0	18.0	35.0	50.0	22.0	41.0	21.0	34.0
27.0	26.0	21.0	17.0	26.0	17.5	33.0	39.0	22.0	28.0	21.0	28.0
27.0	25.0	21.0	37.0	26.0	38.0	33.0	40.0	22.0	28.0	21.0	28.0
26.0	27.0	21.0	18.0	25.0	18.0	28.0	30.0	18.0	17.0	19.0	15.0
26.0	27.0	23.0	18.0	25.0	18.0	35.0	43.0	22.0	32.0	23.0	46.0
37.0	37.0	35.0	28.0	28.0	30.0	32.0	41.0	15.0	29.5	15.0	31.0
26.0	25.0	21.0	17.0	25.0	17.5	28.0	28.0	15.0	17.0	15.0	15.0
34.5	33.5	30.8	26.3	29.1	28.2	32.1	38.9	19.8	27.6	20.2	29.2
7.0	6.9	7.3	7.4	2.9	9.2	3.0	6.8	2.3	7.6	2.1	8.7

CABLE P: HELIX 28 AWG						CABLE _: HITACHI 8212					
@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ	
NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %
1.0	0.9	1.4	2.5	2.5	1.8	4.0	2.8	14.1	11.9	12.6	14.1
2.8	2.8	4.0	7.9	4.0	6.3	2.5	1.1	10.0	4.0	9.4	3.2
2.2	1.8	2.8	5.0	3.2	4.5	1.4	0.9	8.9	3.5	7.1	3.5
1.1	1.0	1.4	2.8	2.8	2.2	2.2	0.8	10.0	3.2	9.4	2.8
1.6	1.3	2.2	4.0	3.5	3.5	4.0	2.8	12.6	11.2	12.6	14.1
2.2	1.8	3.2	4.5	2.5	3.5	4.0	4.0	12.6	12.6	9.4	2.5
0.6	0.4	0.8	0.9	2.2	0.3	1.8	0.3	7.5	0.9	7.9	0.8
0.4	5.0	0.9	13.3	2.2	12.6	1.8	0.3	7.9	0.9	8.9	2.0
4.5	5.0	8.9	14.1	5.0	13.3	2.2	1.1	7.9	4.0	8.9	4.0
4.5	5.6	8.9	1.4	5.0	1.3	2.2	1.0	7.9	4.0	8.9	4.0
5.0	4.5	8.9	12.6	5.6	12.6	4.0	3.2	12.6	14.1	11.2	17.8
5.0	4.5	7.1	12.6	5.6	12.6	1.8	0.7	7.9	2.5	7.1	0.5
1.1	1.4	1.8	4.0	4.0	3.2	2.5	0.9	17.8	3.3	17.8	2.8
0.4	0.4	0.8	0.9	2.2	0.3	1	0.3	7.5	0.9	7	0.5
2.5	2.8	4.0	6.6	3.7	6.0	2.	1.5	10.6	5.9	10.	5.5
1.6	1.8	3.1	4.7	1.2	4.8	0.9	1.2	3.0	4.5	2.8	5.5

CABLE _: HITACHI 8199						CABLE _: HITACHI IREFV-SD					
@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ	
NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB	NEXT DB	FEXT DB
28.5	29.5	23.0	18.0	23.0	17.0	31.0	35.0	19.0	23.0	20.0	23.0
29.0	30.0	23.0	18.0	24.0	17.0	30.0	33.0	18.0	23.0	20.0	21.0
38.0	40.0	32.0	29.0	29.0	31.0	33.0	42.0	20.0	31.0	20.0	32.0
29.0	30.0	23.0	18.0	23.0	17.5	29.0	41.0	23.0	29.0	24.0	28.0
36.0	38.0	31.0	28.0	27.0	29.0	28.0	30.0	17.0	18.5	19.0	17.0
42.0	50.0	37.5	36.0	28.0	40.0	35.0	42.0	20.0	31.5	20.0	34.0
38.0	40.0	32.0	29.0	29.0	28.0	32.0	40.0	20.0	28.5	20.0	28.5
30.0	30.0	23.0	19.0	23.0	17.0	33.0	42.0	20.0	30.0	20.5	28.0
42.0	34.0	35.0	29.5	31.0	39.0	32.0	40.0	19.5	29.0	20.5	29.5
29.0	29.5	20.0	16.0	24.0	15.0	33.0	42.0	20.0	31.0	20.0	32.0
29.5	30.0	22.0	18.0	26.0	16.5	32.0	40.0	19.5	29.0	20.0	29.5
29.0	30.0	21.0	17.0	24.0	15.5	33.0	42.0	20.0	31.0	19.0	33.0
39.0	42.0	30.0	32.0	27.0	38.0	33.0	42.0	20.0	31.0	20.0	33.0
28.5	29.5	20.0	16.0	23.0	15.0	28.0	30.0	17.0	18.5	19.0	17.0
33.8	34.8	27.1	23.7	26.0	24.7	31.8	39.3	19.7	28.1	20.2	28.3
5.2	6.3	5.7	6.7	2.6	9.4	1.8	3.9	1.3	3.9	1.2	4.9

CABLE _: HITACHI 8199						CABLE _: HITACHI IREFV-SD					
@1 MHZ		@5 MHZ		@10 NHZ		@1 MHZ		@5 MHZ		@10 NHZ	
NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %	NEXT %	FEXT %
3.8	3.3	7.1	12.6	7.1	14.1	2.8	1.8	11.2	7.1	10.0	7.1
3.5	3.2	7.1	12.6	6.3	14.1	3.2	2.2	12.6	7.1	10.0	8.9
1.3	1.0	2.5	3.5	3.5	2.8	2.2	0.8	10.0	2.8	10.0	2.5
3.5	3.2	7.1	12.6	7.1	13.3	3.5	0.9	7.1	3.5	6.3	4.0
1.6	1.3	2.8	4.0	4.5	3.5	4.0	3.2	14.1	11.9	11.2	14.1
0.8	0.3	1.3	1.6	4.0	1.0	1.8	0.8	10.0	2.7	10.0	2.0
1.3	1.0	2.5	3.5	3.5	4.0	2.5	1.0	10.0	3.8	10.0	3.8
3.2	3.2	7.1	11.2	7.1	14.1	2.2	0.8	10.0	3.2	9.4	4.0
0.8	2.0	1.8	3.3	2.8	1.1	2.5	1.0	10.6	3.5	9.4	3.3
3.5	3.3	10.0	15.8	6.3	17.8	2.2	0.8	10.0	2.8	10.0	2.5
3.3	3.2	7.9	12.6	5.0	15.0	2.5	1.0	10.6	3.5	10.0	3.3
3.5	3.2	8.9	14.1	6.3	16.8	2.2	0.8	10.0	2.8	11.2	2.2
1.1	0.8	3.2	2.5	4.5	1.3	2.2	0.8	10.0	2.8	10.0	2.2
0.6	0.3	1.3	1.6	2.8	1.0	1.8	0.8	1	2.7	6.3	2.0
2.6	2.2	5.3	8.5	5.2	9.2	2.6	1.2	1.5	4.4	9.8	4.6
1.2	1.1	2.9	5.1	1.5	6.5	0.6	0.7	1.6	2.6	1.1	3.4