MCPP TEST PROCEDURE

OBJECTIVE:

The primary objective of the Macrovision Certification Partnership Program (MCPP) Test Procedure is to allow Macrovision licensees the ability to submit computer product for certification with confidence that it will pass. The MCPP Test Procedure together with the Macrovision Training Video will provide all the information required to perform verification testing for Macrovision compliance.

EQUIPMENT REQUIRED:

- Variable Video Distribution Amplifier (VDA)
- Sony Cross Pulse Monitor (Model PVM-14M4U or equivalent)
- Tektronix Waveform/Vector Scope (Model 1745 or equivalent)
- Macrovision Test Disc
- Macrovision Training Video
- MCPP Test Procedure (Revision 7.1.D1)
- DVD Player (used as a source of ACP during Security testing)
- Assorted and Appropriate Computer System Cables (S-video and Composite RCA type)

PROCEDURE OUTLINE:

I. NTSC Interlaced Waveform Measurements

H-Sync Amplitude Normalization Procedure
Table 1 – Pseudo Sync Pulse Measurements (NTSC)
Table 2 – AGC Pulse Measurements (NTSC)
Table 3 – End of Field Back Porch Pulse Measurements (NTSC)
Table 4 – 2 Line Colorstripe Position Measurements
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II. NTSC Progressive Scan Waveform Measurements

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III. PAL Interlaced Waveform Measurements

Table 8 - Pseudo Sync Pulse Measurements (PAL)
Table 9 - AGC Pulse Measurements (PAL)
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IV. SECURITY TESTING

Standard and System BIOS Security Tests (PC-DVD)
Capture Video-In Testing – Pass Through Video and Record Capability Tests

I. NTSC Interlaced Waveform Measurements

H-Sync Amplitude Normalization Procedure:

- ❑ Using the Macrovision Test Disc select colorbars with no ACP; loop the video signal through the VDA, through the Waveform monitor CH-A, then into the Sony cross pulse monitor CH-A, and terminate using 75 ohms. You should now be viewing the colorbars on the Waveform monitor and Sony cross pulse monitor Channel A.
- ❑ Using the variable Gain adjustment on the VDA, normalize the H-sync pulse amplitude of the NTSC colorbars signal for 40IRE; verify that the peak white amplitude is 100IRE. *Note: If after the H-sync pulse is normalized to 40IRE the peak white is not 100IRE, then use the H-sync pulse only and verify 40IRE amplitude level.*

Table 1

Pseudo Sync Pulse Measurements (NTSC)

Description	Expected Field 1	Measured Field 1	Expected Field 2	Measured Field2	Tolerance	Cfg. Bits	Range
Pulses Per Line	4		4		None	N13	**4**
Line Numbers	10-17		10-17		None	N11	**10-17**
H-Sync to First	8.89µS		8.89µS		±0.25µS	N9	**8.64-9.14**
Pulse Spacing	8.89µS		8.89µS		±0.25µS	N10	**“ “**
Pulse Width	2.22µS		2.22µS		±0.05µS	N8	**2.17-2.27**
Pulse Amplitude	40 IRE Note A		40 IRE Note A		±2 IRE Note B	NTSC	**38.0-42.0**

Note A: Measure from VBI blanking level.

Table 2

AGC Pulse Measurements (NTSC)

Description	Expected Field 1	Measured Field 1	Expected Field 2	Measured Field 2	Tolerance	Cfg. Bits	Range
Pulses Per Line	4		4		None	N13	**4**
Pulse Width	3.05µS		3.05µS		+/- 0.15		**2.90-3.20**
Amplitude	114IRE Note A		114IRE Note A		+/-3 IRE	N0	**111.0-117.0**
Cycling-Peak Time	12.0 S		12.0 S		+2/-0.5 S	N0	**11.50-14.0**
Peak to blanking	2.5 S		2.5 S		±0.5 S	N0	**2.0-3.0**
Blanking to peak	2.5 S		2.5 S		±0.5 S	N0	**2.0-3.0**
Cycle Blanking Time	3.0 S		3.0 S		±0.5 S	N0	**2.50-3.50**

Note A: Measure from VBI blanking level.

Table 3

End Of Field Back Porch Pulse Measurements (NTSC)

Description	Expected Field 1	Measured Field 1	Expected Field 2	Measured Field 2	Tolerance	Cfg. Bits	Range
Number of Pulses	6		6		None	N15	**6**
Line Numbers	1,2,3,261, 262,263		264,265,266, 523,524,525		None	N15	_____
Pulse Width	2.0µS		2.0µS		±0.15µS		**1.85-2.15**
Amplitude EOF	100 IRE		100 IRE		±3 IRE		**97.0-103.0**
	Note A		Note A				

Note A: Measure from VBI blanking level.

Table 4

2 Line Colorstripe Position Measurements (NTSC)

Description	Expected Field 1	Measured Field 1	Expected Field 2	Measured Field 2	Tolerance	Cfg. Bits	Range
1st Stripe	30-31		38-39		None	N1,N3	------
2nd Stripe	47-48		55-56		None	N2,N4	------
3rd Stripe	64-65		72-73		None	N5	------
Spacing	17		17		None	N5	------
Stripes per Field	13		13		None	N6	------
Lines per Stripe	2		2		None	N7	------

Table 5

4 Line Colorstripe Position Measurements (NTSC)

Description	Expected Measured Field 1	Field 1	Expected Measured Field 2	Field 2	Tolerance	Cfg. Bits	Range
1st Stripe	24-27		34-37		None	N1,N3	------
2nd Stripe	45-48		55-58		None	N2,N4	------
3rd Stripe	66-69		76-79		None	N5	------
Spacing	21		21		None	N5	------
Stripes per Field	11		11		None	N6	------
Lines per Stripe	4		4		None	N7	------

Table 6

Colorstripe Phase Measurements (NTSC)

Description	Expected Measured Field 1	Expected Measured Field 1	Expected Field 2	Measured Field2	Tolerance	Cfg. Bits	Range
Phase	180.0º		180.0º		±0.5º	N20	**179.5-80.5**
Inverted Phase	0.0º		0.0º		±0.5º	N21	**359.5-0.5**
Normal Color Burst							
Start Note B	5.5µS		5.5µS		0.15µS±	N16	**5.35-5.65**
End	7.84µS		7.84µS		0.15uS±	N19	**7.69-7.99**
Amplitude	40 IRE		40 IRE		±2.0 IRE	NTSC	**38.0-42.0**
Modified Color Burst							
Start Note B	4.96µS		4.96µS		±0.15µS	N16	**4.81-5.11**
Switch	1.54µS		1.54µS		±0.07µS	N17	**1.47-1.61**
End	1.54µS		1.54µS		±0.15µS	N19	**1.39-1.69**
Inverted Cycles	5.5		5.5		±0.25	N21	**5.25-5.75**
Normal Cycles	5.5		5.5		±0.25	N20	**“ “**
Invert Amplitude	40 IRE		40 IRE		±2.0 IRE	NTSC	**38.0-42.0**
Normal Amplitude	40 IRE		40 IRE		±2.0 IRE	NTSC	**“ “**

Note B: Measure from leading edge of H-sync.

Colorstripe Advanced Cycles Measurements (NTSC)

1. Measure the number of cycles in Normal Burst. Lines =____; _____uS (9 cycles, ± 1.0).
   (2.51µS, ± 0.28µS).

2. Measure the number of cycles advanced from normal =____; _____uS (2 cycles, ± 0.25).
   (0.56µS, ± 0.07µS).

3. Measure the number cycles normal start, to sw point =____; _____ uS (3.5 cycles, ± 0.5).
   (0.98µS, ±0.14µS).

4. Measure the number of cycles switch point, to end c/s =____; _____uS (5.5 cycles, ± 0.5).
   (1.54µS,± 0.15µS).

5. Measure total number of cycles in advanced burst lines =____; _____uS(11cycles, ±1.25).
   (3.07µS, ± 0.37µS).

II. NTSC Progressive Scan Waveform Measurements

Table 6

525p-AGC Copy Protection Waveform Verification Test

Parameter Description	Required Result	Measured Result	Unit	Diag.
Picture Video Amplitude, blanking level to peak white.	700 (714) (Amplitude reference)		MV	--
Sync pulse amplitude, blanking level to sync tip.	300 (286) ±5%		MV	--
Pseudo sync pulse amplitude, blanking level to pulse tip.	= Sync ampl. ± 2%		MV	2
AGC pulse amplitude at max. amplitude, blanking level to pulse tip.	= Peak White (min) = 820mV (max)		MV	2
Period during which ACP is still at maximum amplitude.	13 ±2		Sec	3
Period during which ACP is still in amplitude ramp-down mode.	2.5 ±0.5		Sec	3
Period during which ACP is still at minimum amplitude (blanking level).	3.0 ±0.5		Sec	3
Period during which ACP is still in amplitude ramp-up mode.	2.5 ±0.5		Sec	3
AGC pulse amplitude ramp-up and ramp-down are smooth and do not include discontinuities?		Yes No (Circle one)		3
H-sync leading edge to first Pseudo-sync leading edge, measured at 50% amplitude	4.44 ±0.1		µS	2
Pseudo-sync spacing (leading edge to leading edge), measured at 50% amplitude	3.26 ±0.1		µS	2
Pseudo-sync duration, measured at 50% amplitude	1.11 ±0.03		µS	2
Last Pseudo-sync pulse trailing edge location	<15.4		µS	2
AGC pulse duration, measured at 50% amplitude	1.48 ±0.1		µS	2
First line number with Pseudo sync/AGC pulse pairs	13		Line No.	1
Last line number with Pseudo sync/AGC pulse pairs	20		Line No.	1
Program source. e.g., Disc Title, Test Signal source, etc.				
Measurement Equipment (Manufacturer, Model)	Manuf. Model			
Subjective picture quality comparison with 525p Process On/Off (Same/Better/Worse)				
Display device used to assess subjective picture quality (Manufacturer, Model).	Manuf. Model			
Please attach to this sheet any Range, problems encountered during testing, etc. Is information attached?	Yes No (Circle one)			

III. PAL Interlaced Waveform Measurements

Table 8

Pseudo Sync Pulse Measurements (PAL)

Description	Format A Expected	Format A Measured	Format B Expected	Format B Measured	Tolerance	Cfg. Bits	Range
Pulses Per Line	7		6		None	N12	**7 - 6**
Line Numbers	8,10,12, 14,16	320,322, 324,326, 328	9,11,13, 15	321,323, 325,327	None	N11	---------
H-Sync to First	16.59µS		16.59µS		±0.05µS	N9	**16.35-16.85**
Pulse Spacing	5.33µS		6.52µS		±0.25µS	N10	
Pulse Width	1.63µS		1.78µS		±0.05µS	N8	
Pulse Amplitude	300mV Note A		300mV Note A		±15mV Note B	PAL	**285-315**

Table 9

AGC Pulse Measurements (PAL)

Description	State A Expected	State A Measured	State B Expected	State B Measured	Tolerance	Cfg. Bits	Range
Pulses Per Line	7		6		None	N13	**7 - 6**
Pulse Width	2.75uS		2.75µS		+/- 0.15µS	N13	**2.60-2.90**
Static High Amplitude Pulsating	790mV 450mV L8-13,	 100mV L320-325	790mV 100mV L14-16	 0mV L326-328	+/-20 mV +/-15mV +/- 5mV	N0	**770-810** **435-465** **95-105**
Cycling-Peak Time	12.0 S		12.0 S		+2/-0.5 S	N0	**11.50-14.0**
Peak to blanking	2.5 S		2.5 S		±0.5 S	N0	**2.0-3.0**
Blanking to peak	2.5 S		2.5 S		±0.5 S	N0	**2.0-3.0**
Pulsation Mode	12.0 S		12.0 S		±1.0 S	N0	**11.0-13.0**

Table 10

End Of Field Back Porch Pulse Measurements (PAL)

Description	Expected	Measured	Expected	Measured	Tolerance	Cfg. Bits	Range
Number of Pulses	6		6		None	N15	**6**
Line Numbers	307-312		620-625		None	N15	-------
Pulse Width	2.0µS		2.0µS		±0.15µS		**1.85-2.15**
Amplitude EOF	700mV		700mV		±20mV		**6.80-7.20**

IV. Security Testing

Standard System BIOS Security Tests:

- With a copy protected DVD title playing, disable TV-out using the Display Properties menu and select LCD. Then enable TV-out and verify that Macrovision ACP is still present on the output. Repeat this step for VGA mode (switch form TV-out to VGA, then back).
- Install a Type 0 (no copy protection) DVD title; disable TV-out using Display Properties. Install a copy protected DVD title and play. During DVD playback enable TV-out using the Display Properties menu, and verify Macrovision ACP is still present on the TV-out.
- With the copy protected DVD title playing, use the Display Properties to disable TV-out but, do not except change, and therefore allowing for the 15 second time out to occur and the system to switch back to TV-out automatically. Verify that ACP is still present on the TV-out port.
- With the copy protected DVD title playing, enable sleep mode with a 2 minute "Screen Saver" setting, and a 3 minute "Turn Monitor OFF" setting. Allow system to go into sleep mode and turn off monitor, then wake up the system and verify that ACP is still present on the TV-out port. *Note: Most commonly the screen savers will be shut off when the DVD Navigator is launched; this is the safest method to insure security.*
- Install Type 0 (no copy protection) DVD title, play title until movie studio Logo appears, hit pulse, then eject, install a copy protected title, play. Verify AGC pulse present on TV-out.
- With TV-out enabled and with ACP present on the analog output, use the "Fn Fx" Hot Keys to switch between LCD, VGA, then back to TV-out. Verify ACP is still present on the TV-out. *Note: The Hot Keys used for this option are different on most model Notebooks: i.e. Fn-F6, Fn- F7, or Fn-F5 etc…*
- Using a copy protected disc and with TV-out enabled, verify that when the Eject button is enabled, the ACP on the output is removed. *Note: The standard rule is that when copy protected material is present on the output, then ACP should be present: inversely when non-copy protected video is present on the output, then NO ACP should be present on the output.*
- Install system into Docking Station and verify that when playing a copy protected title, ACP is present on the analog video outputs (if applicable).
- Go into Display Properties and select PAL video standard. Using the Macrovision Test Disc, verify that when ACP Types 1, 2, or 3 are selected, the ACP type on the output is Type 1. Note: This verifies that the APS trigger bits are being interpreted correctly for PAL mode: since there is no Colorstripe for PAL mode ACP Types 2 and 3 are interpreted as Type 1.

Capture Video-In Testing:

Pass Through Mode: *This mode refers to the setup that allows you to view material present on the video input, on the video output port; full screen or otherwise.*

- ❑ Enable the video output port, launch the capture software to be shipped with this platform, connect the output of the DVD player to the video input on the platform; play a ACP Type 0 (non-copy protected) DVD title and verify that there is no ACP present on the video output.
- ❑ Install an ACP Type 1 copy protected DVD title into the source DVD player, and verify that the video output has copy protection present. *Note: If the detect IC is capable of detecting 2-line and 4-line colorstripe as well as pseudo sync pulses, then the output ACP should follow the input (i.e. T-1 in = T-1 out, T-2 in = T-2 etc…). Otherwise, when copy protection is detected on the input, ACP Type 2 should present on the video output.*
- ❑ Repeat the steps above using ACP Type 2 and Type 3 copy protected DVD material and verify the video output has the appropriate copy protection present for that detect circuitry (IC). *See Notes above*.
- ❑ Remove the copy-protected video from the input and verify that the ACP on the output is removed. *Note: The rule is that with non-copy protect material on the video input there should be no ACP copy protection on the output*.

Capture Mode: *The following tests are performed for display resolutions 480 X 320 or greater; capture of resolutions less than or equal to 480 X 320 are non-applicable*.

- ❑ Install and play a non-copy protected DVD disc in the source DVD player. After the Studio logo is displayed, enable capture for 1 minute and save this file as "Type 0." Repeat this step for DVD discs with ACP types 1, 2, and 3 saving these files with the appropriate file names.
- ❑ With the video output enabled, playback the file "Type 0" and verify that if the system did capture this video, there is no ACP is present on the output when played back for this non-copy protected material. Repeat this step for the remaining three copy protected files and verify that if they system captured these files, then the appropriate ACP type is on the video output during playback. *Note: The Standard DVD License Agreement section for "Capture Devices" gives the following three options when capturing copy protect material: A) Shut down record when copy protection is present; B) Pass the copy protection signal through the Product transparently; C) Detect and apply the trigger bits to a device that activates ACP on the analog output.*

_____ _____ _____

PRINT NAME SIGNATURE TEST DATE

Company Name: _____ Model Name: _____