Customer:

ALPS ELECTRIC EUROPA GMBH

No. M970041 (1 /17)

Date: Mar. 31, 1997

Attention:

Your ref. No.:

Your Part No.: MDLP3W104A

401598

SPECIFICATIONS

ALPS' :

MODEL : MDLP3W104A

Spec. No. :

Sample No.:

RECEIPT STATUS
RECEIVED
By. Date
Signature
Name
Title

ALPS ELECTRIC CO., LTD.

DSG'D H. Nakamura

APP'D S. Aokawa

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RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

This specification covers UHF output PLL modulator, booster and mixer, which conform to the television standard transmission system (NTSC-M,PAL-G/I/K,SECAM-L).

Model Applied: The specification conforms to the following model:

Cust Part No.	ALPS Model Name	Channel	Remarks
MDLP3W104A	MDLP3W104A	CH.21 to CH.69	

Customer name : ALPS ELECTRIC EUROPA GMBH

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	DESCRIPTION	MEASUREMENT METHOD
1	General Specification	
1.1	Test Condition	
1.1.1	Standard Test Condition	Standard test shall be conducted at a temperature of 25℃±3℃ and a relative humidity of 65%±5%. However, test may be performed within a temperature range of 5℃ to 30℃ and relative humidity range of 45% to 85%, provided test results are not affected.
1.1.2	Video Carrier Frequency	The video carrier frequency shall conform to the specified value unless other specified by the customer.
1.1.3	Modulation Input signal Condition	a) Video Stair-Step signal : 1Vp-p · V/S=7/3 · APL=50% b) Audio Sine wave 1kHz, −5dBs(1.23Vp-p)
1.1.4	Temperature Stability	Within the humidity range 45%RH to 85%RH, the test shall be performed under the following conditions, unless otherwise specified: 0℃-2Hr, 10℃-1Hr, 25℃-1Hr 45℃-1Hr, 60℃-2Hr Initial value measure at a temperature 25℃, gradually increase temperature to 60℃ after cool down temperature 0℃.
1.1.5	Rule Safty and Radiation of Local Oscillation	Should be certificate rule of CENELEC.
1.2	Specify Performance	This specification is the spec. at the state expressed in 1.4 PLL CONTROL BITS (2)STATE (page 5), the performance at the other state is not guaranteed.

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	DESCRIPTION	MEASUREMENT METHOD
1.3	Remark	If there are any doubts regarding the Specification or the Products, it will be settled by consultation between ALPS and the Purchaser.
1.3.1	Booster & Mixer Pass Band	FULL BAND (47MHz to 862MHz)
1.3.2	Modulator Transmission System	NTSC-M, PAL-G/I/K, SECAM-L system

SYMB	DATE	APPD	CHKD.	DSGD.				
								104A
					APPD.	CHKD.	DSGD.	TITLE: MDLP3W SPECIFICATION
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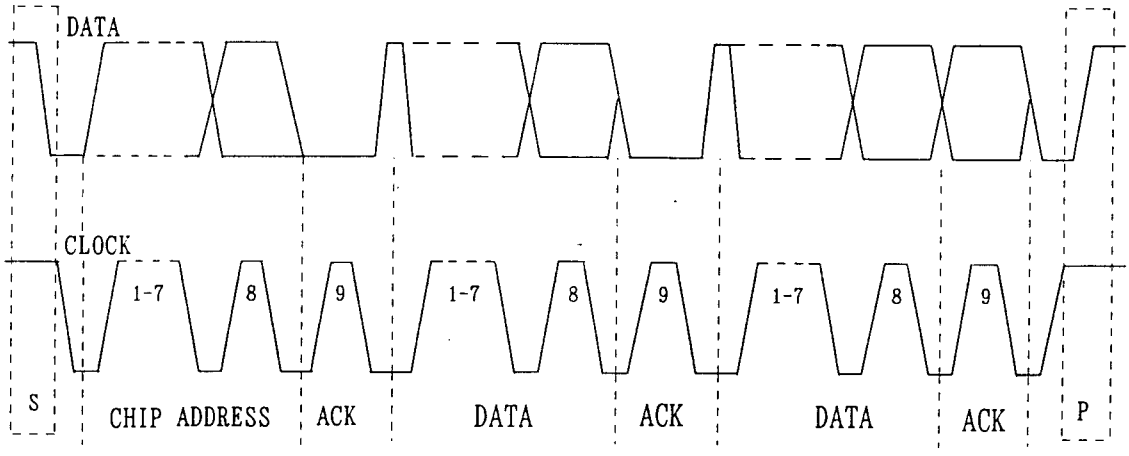
					ALPS ELECTRIC CO., LTD.			

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	METHOD
1.4	PLL Control Bits

(1) BUS FORMAT(I2C)



	Bit7							Bit0	
CA (CHIP ADDRESS)	1	1	0	0	1	0	1	0	A
C1	1	AMD2	AMD1	AMD0	PS2	PS1	PS0	SYSLEN	A
CO	VMD2	VMD1	VMD0	FA1	FA0	1	0	0	A
FM	0	TPSGEN	N13	N12	N11	N10	N9	N8	A
FL	N7	N6	N5	N4	N3	N2	0	0	A

NOTES;

ORDER OF BYTES: CA C1 CO or
CA FM FL or
CA C1 CO FM FL or
CA FM FL C1 CO

A =ACKNOWLEDGE BIT
AMDx =AUDIO MODULATION DEPTH
PSx =SOUND TO PICTURE CARRIER RATIO
SYSLEN =SYSTEM L ENABLE(+ve MOD.&A.M.SOUND ; 1=SYSTEM L,0=OTHER)
VMDx =VIDEO MODULATION DEPTH
FAx =SOUND CARRIER FREQUENCY
TPSGEN =TPSG ENABLE(1=TPSG EN.)
Nx =PROGRAMMABLE DIVIDER CONTROL

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	METHOD

(2) STATE

AMDx bits :

SYSTEM	AMD2	AMD1	AMD0
M	1	0	1
G/I/K	1	1	0
L	0	1	0

PSx bits :

SYSTEM	PS2	PS1	PS0
M	1	0	1
G/I/K	1	0	1
L	1	1	0

VMDx bits :

SYSTEM	VMD2	VMD1	VMD0
M	0	1	1
G/I/K	0	1	1
L	1	0	1

FAx bits :

SOUND CARRIER FREQUENCY (MHz)	FA1	FA0
4.5	0	0
5.5	0	1
6.0	1	0
6.5	1	1

Nx bits ; (N2···N13) UHF frequency programming bits, in step of 250kHz.

(3) BUS CHARACTERISTIC (CLOCK,DATA)

- HIGH-LEVEL INPUT VOLTAGE : 3.0 V MIN. 5.5 V MAX.
- LOW-LEVEL INPUT VOLTAGE : 0 V MIN. 1.0 V MAX.
- BUS CLOCK FREQUENCY : 500 kHz MAX.

(4) REMARK

If the RF Modulator is powerd off, the memory data in IC are put out. Therefore, when the RF Modulator is powered on again, the bus data have to be sent at the same time.

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.	Electrical Specification		
2.1	Video Characteristics		
2.1.1	Input Impedance	1kΩ ± 30 % (Unbalance)	Measured from 0MHz to 5.0MHz
2.1.2	Input Signal Level	1Vp-p of Negative Sync.	82Ω loaded.
2.1.3	Video Modulation	M/G/I/K : 80 ± 10 % L : 90 ± 10 %	82Ω loaded.
2.1.4	White Clip (M/G/I/K)	99 % Max.	Input Voltage 1.2 Vp-p
2.1.5	V/S Ratio	M/G/I/K : 7 ± 0.3 / 3 ∓ 0.3 L : 7 ± 0.4 / 3 ∓ 0.4	Input signal : Stair-Step signal, 1Vp-p Negative Sync, (V/S=7/3)
2.1.6	Amplitude Frequency Characteristics	within ± 2 dB (0.5MHz to 5.0MHz)	Based on fv+1MHz. Apply sweep signal into video input terminal, then measure at RF-OUTPUT. Test Instrument : Spectrum Analyzer(300kHz)
2.1.7	Modulation varies by change of APL	within ± 3 %	Based on 50% APL. The variance is measured between 10% and 90% of APL and final comparison is made.
2.1.8	Differential Gain	within 10 %	Measure at 10% to 90%.
2.1.9	Video S/N	45 dB Min.	Measure by Video Noise Meter at the output of standard De-Modulator Video Band Width M : 100kHz to 4.0MHz G/I/K/L : 100kHz to 5.0MHz Chroma Trap and Weight : ON 50% White signal input.
2.1.10	TPSG	Fit for practical use.	(TPSG H.sync Cycle 64±1μsec.)

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.2	Audio Characteristics		
2.2.1	Input Impedance	10 kΩ Min.	Measured between 0.1kHz and 10kHz.
2.2.2	Input Signal Level	−5 dBs (1.23Vp-p)	
2.2.3	Amplitude Frequency Characteristics	± 3 dB (Except NTSC-M)	Based on 1kHz wthin the range from 0.1kHz to 10kHz, and measured theoretical value of pre-emphasis (The following notes) characteristics, the level difference is measured. 50μSec.
2.2.4	Modulation	M : 80 ± 15 % G/I/K : 90 ± 15 % L : 60 ± 15 %	M : 100%=±25kHz Dev. G/I/K : 100%=±50kHz Dev.
2.2.5	Distortion	M/G/I/K : 3 % Max. L : 4 % Max.	Standard Modulation
2.2.6	Audio S/N	M/G/I/K : 40 dB Min. L : 38 dB Min.	Video input signal : Color bar 1Vp-p. Measured by HP 339A (Equivalent) & LPF (15kHz) at used demodulator (M/G/I/K : Sony Tektronix 1450-, L : NIHON TSUSHINKI 5210)
2.2.7	TPSG	Through external Audio signal input and Audio signal at TPSG output.	

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ALPS ELECTRIC CO., LTD.

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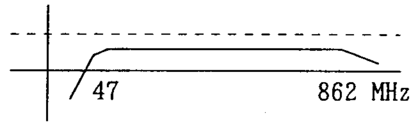
RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

No.	ITEM	STANDARD VALUE	MEASUREMENT METHOD
2.3	Output Characteristics		
2.3.1	Video Carrier Frequency	CH.21 to CH.69 ± 100 kHz	
2.3.2	Audio Carrier Frequency	M : within 4500 ± 3 kHz G : within 5500 ± 3 kHz I : within 6000 ± 3 kHz K : within 6500 ± 3 kHz L : within 6500 ± 3 kHz	
2.3.3	Video Output Level	M/G/I/K : 71 ± 4 dBμV L : 70 ± 4 dBμV	75Ω term. Peak value level at Standard Modulation.
2.3.4	Audio Output Level	16 ± 4 dB	Measure the level difference between the Video at standard modulation the Audio.
2.3.5	Out-Band Spurious	−40 dB Max. Against fv' level.	Signal: Stair-Step signal. Use the Spectrum Analyzer to measure the Out-Band Spurious less than fv−3MHz and more than fa+3MHz except the 2fv and the lower sideband fsc and fa.
2.3.6	In-Band Spurious	−60 dB Max. Against fv' level.	Measure between fv' and fv'+fa'.
2.3.7	Chromabeat	M/G/I/K : −62 dB Max. L : −60 dB Max. Against fv' level.	Based on modulated fv' VIDEO IN : 4.43MHz(SC)0.4Vp-p
2.3.8	Video Carrier Harmonic Level	46 dBμV Max. (75Ω Terminate)	Measured at 950MHz to 1750MHz. This applies to all the variable frequency ranges and standard modulation.

RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

No.	ITEM	STANDARD VALUE	MEASUREMENT METHOD
2.4	Characteristics of Booster & Mixer		
2.4.1	Power Gain	3^{+4}_{-3} dB	ANT IN → ANT OUT (47MHz to 862MHz) 
2.4.2	Noise Figure	9 dB Max.	ANT IN → ANT OUT (47MHz to 862MHz)
2.4.3	VSWR of each Terminal	ANT IN : 3.5 Max. ANT OUT : 3 Max.	(47MHz to 862MHz)
2.4.4	Voltage Leakage AERIAL IN Terminal	40 dBμV Max.	75Ω terminate. Unused terminal shall be terminated at 75Ω. This applies to all the variable frequency ranges.
2.4.5	Intermodulation ANT IN → ANT OUT		

f1 MHz	f2 MHz	f(IM) MHz	INPUT LEVEL (75Ω) dBμV	Inter Modulation Level dB
500	700	200	85	50 Min.
200	210	220	85	55 Min.
175	230	55	85	50 Min.
60	55	50	85	50 Min.
600	650	700	85	55 Min.

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

No.	ITEM	STANDARD VALUE	MEASUREMENT METHOD
2.5	Power Supply		
2.5.1	Input Voltage	MD +B= 5.0±0.3 V TUN +B= 30 ± 3 V BST +B= 5.0±0.3 V	Allowable Ripple Voltage : 10 mVp-p Max.
2.5.2	Current Consumption	MD section: 90 mA Max. TUN section: 3 mA Max. BST section: 45 mA Max.	Typical : 75 mA Typical : 0.1mA Typical : 35 mA
2.6	Temperature Characteristics		
2.6.1	Thermal Stability of Video Modulation	M/G/I/K : 80 ± 20 % L : 90 + 10 % − 20	Temperature ranging from 0°C to 60°C.
2.6.2	Thermal Stability of Video Carrier Frequency	within ± 100 kHz	Measure the deviated value according to the temperature measurement order from 0°C to 60°C.
2.6.3	Thermal Stability of Audio Carrier Frequency	within ± 3 kHz	Measure the deviated value according to the temperature measurement order from 0°C to 60°C.
2.6.4	Thermal Stability of Video Output Level	M/G/I/K : 71 + 5 dBμV − 6 L : 70 ± 6 dBμV	Temperature ranging from 0°C to 60°C.
2.6.5	Thermal Stability of Synchronous Level	M/G/I/K : 7 ± 0.4 / 3 ∓ 0.4 L : 7 ± 0.6 / 3 ∓ 0.6	Measure the deviated Video Sync. level according to the temperature measurement order from 0°C to 60°C. (V/S=7/3)
2.6.6	Thermal Stability of Audio Output Level	16 ± 6 dB	Temperature ranging from 0°C to 60°C.

SYMB	DATE OR NO	APPD.	CHKD.	DSGD.

APPD.	CHKD.	DSGD.	TITLE	104A
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			DOCUMENT NO. (10/)	

ALPS ELECTRIC CO., LTD.

(規格・仕様書用紙)

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.6.7	Thermal Stability of Audio Modulation	within ± 20 %	Measure the deviated value according to the temperature measurement order from 0°C to 60°C.
2.6.8	Thermal Stability of Differential Gain	within ± 15 %	Measure the deviated value according to the temperature measurement order from 0°C to 60°C. (APL 10% to 90%)
2.7	Total Video and Audio Quality	Fit for practical use.	The limit sample should be prepared because this item is relative test.
2.8	Environmental Test Condition		
2.8.1	Temperature and Humidity Test Conditions	1. Temperature Range 0°C to 60°C 2. Humidity Range 10%RH to 80%RH	
2.8.2	Storage Conditions	1. Temperature Range −10°C to 70°C 2. Humidity Range 45°C 95%RH or less.	
3.	Mechanical Specification		
3.1	Appearance		
3.1.1	Process	Normal condition applies.	
3.1.2	Stain or Damage	Neither stain non damage shall be permitted.	
3.1.3	Electrical Contact	Neither stain non damage shall be permitted.	
3.1.4	Weight	60 g Max.	Typical : 41 g

SYMB	DATE OR NO	APPD	CHKD.	DSGD.

104A

APPD.	CHKD.	DSGD.	TITLE
			MDLP3W SPECIFICATION

DOCUMENT NO. (11/)

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(電格・住様専用紙)

RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
3.2	Structure & Dimensions	According to the assembly drawing.	
3.3	Operation Performance		
3.3.1	Total Pulout force for Coaxial Connector	(1) Initial : between 9.8N and 49N (1kg to 5kg). (2) After 100 times, 7.84N(0.8kg) Min.	
3.3.2	Connector	Neither bend nor play shall be permitted.	
4.	Other Test		
4.1	Vibration Test	The rated performance shall be satisfied.	The Unit is set to the fixture and then vibrated with total amplitude of 2mm. frequency range 7Hz to 30Hz, once per minute consecutively for 10 minutes, in each of three directions (X,Y,Z).
4.2	Tapping Test	The rated performance shall be satisfied.	Tapped the Modulator except input/output terminal and covers. by Teflon rod.(Length:200mm, Diameter:8mm)
4.3	Impact Test	The appearance and performance shall not have deteriorated.	Before measurement, the un-packed modulator is dropped from a height of 0.5m on each of 3 Modulator surfaces. Acceptable surfaces are : connectors, terminals and covers.

SYMB	DATE OR NO.	APPD.	CHKD.	DSGD.	APPD.	CHKD.	DSGD.	TITLE	104A
								MDLP3W SPECIFICATION	
								DOCUMENT NO. (12/)	
					ALPS ELECTRIC CO., LTD.				

RF BOOSTER/MODULATOR PRODUCT
SPECIFICATION

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
4.4	Static Proof Test	± 15 kV / 200 pF After impressing voltage 5 times in each connector, no abnormality should occur.	ANT IN, ANT OUT Terminal Electrical discharge resistance : 150Ω
4.5	Life Test		
4.5.1	Heat Test	(Against initial value.)	a).Environmental conditions Temperature : 70℃±3℃ Humidity : 40%RH to 45%RH b).Power Supply : OFF c).Measuring Time 0Hrs,100Hrs,250Hrs,500Hrs d).After using the above conditions, the tested modulator is left for one and a half hours at normal room temp.
	1.Video Modulation	± 10 %	
	2.Audio Modulation	± 25 %	
	3.Video Carrier Frequency	± 200kHz	
	4.Audio Carrier Frequency	± 10 kHz	
	5.Video Output Level	± 4 dB	
	6.Audio Output Level (fv-fa)	± 4 dB	
4.5.2	Humidity Test	Same as in item 4.5.1	a).Environmental conditions Temperature : 60℃±3℃ Humidity : 90%RH to 95%RH Same as b),c),d)in item 4.5.1
4.5.3	Cold Test	Same as in item 4.5.1	a).Environmental conditions Temperature : −20℃±3℃ Same as b),c),d)in item 4.5.1
4.5.4	Heat Shock Test	Same as in item 4.5.1	a).Environmental conditions 80℃±3℃ ··· 1 H −20℃±3℃ ··· 1 H b).Power Supply : OFF c).Measurement : After 100 cycles. Same as d) in item 4.5.1

SYMB	DATE OR NO	APPD	CHKD.	DSGD.

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			MDLP3W SPECIFICATION	
			DOCUMENT NO.	(13/13)

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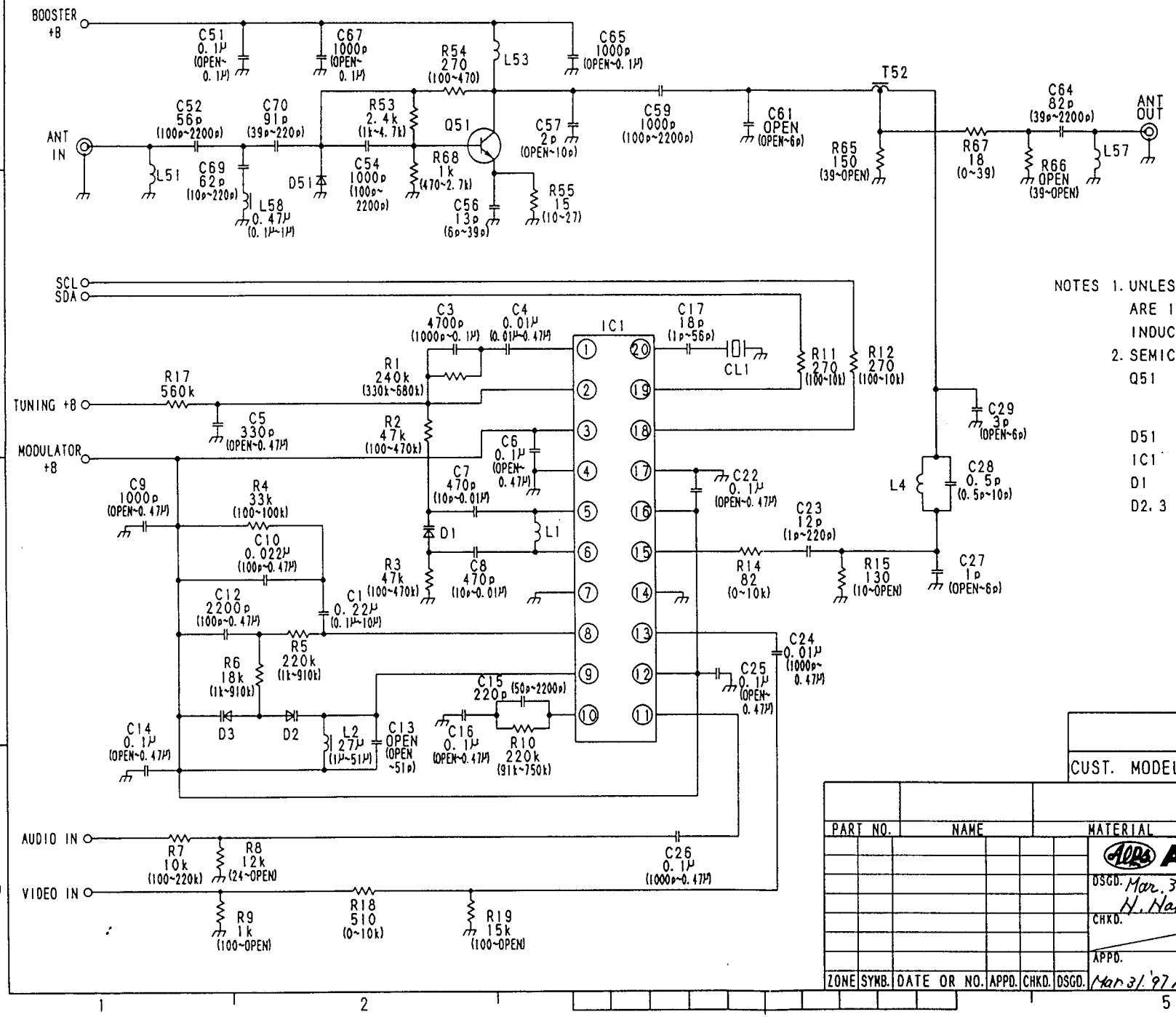
(規格・仕様書用紙)



NOTES 1. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHM, CAPACITORS ARE IN FARAD, INDUCTORS ARE IN HENRY.

2. SEMICONDUCTORS ARE AS FOLLOWS.

Q51	: 2SC2570, 2SC3355, MPS571, MPS911, 2SC3512, 2SC3779, 2SC4874, 2SC4875. (EQUIVALENT)
D51	: 1SS133, 1SS83, (EQUIVALENT)
IC1	: MC44353, MC44354, MC44355, (EQUIVALENT)
D1	: HVU202, (EQUIVALENT)
D2, 3	: HVU300, HVU306, (EQUIVALENT)

CUST. MODEL NO.	CUST. PART NO.	ALPS MODEL NO.
	MDLP3W104A	MDLP3W104A

PART NO.	NAME	MATERIAL	SPEC.	FINISH

ALPS ELECTRIC CO., LTD.

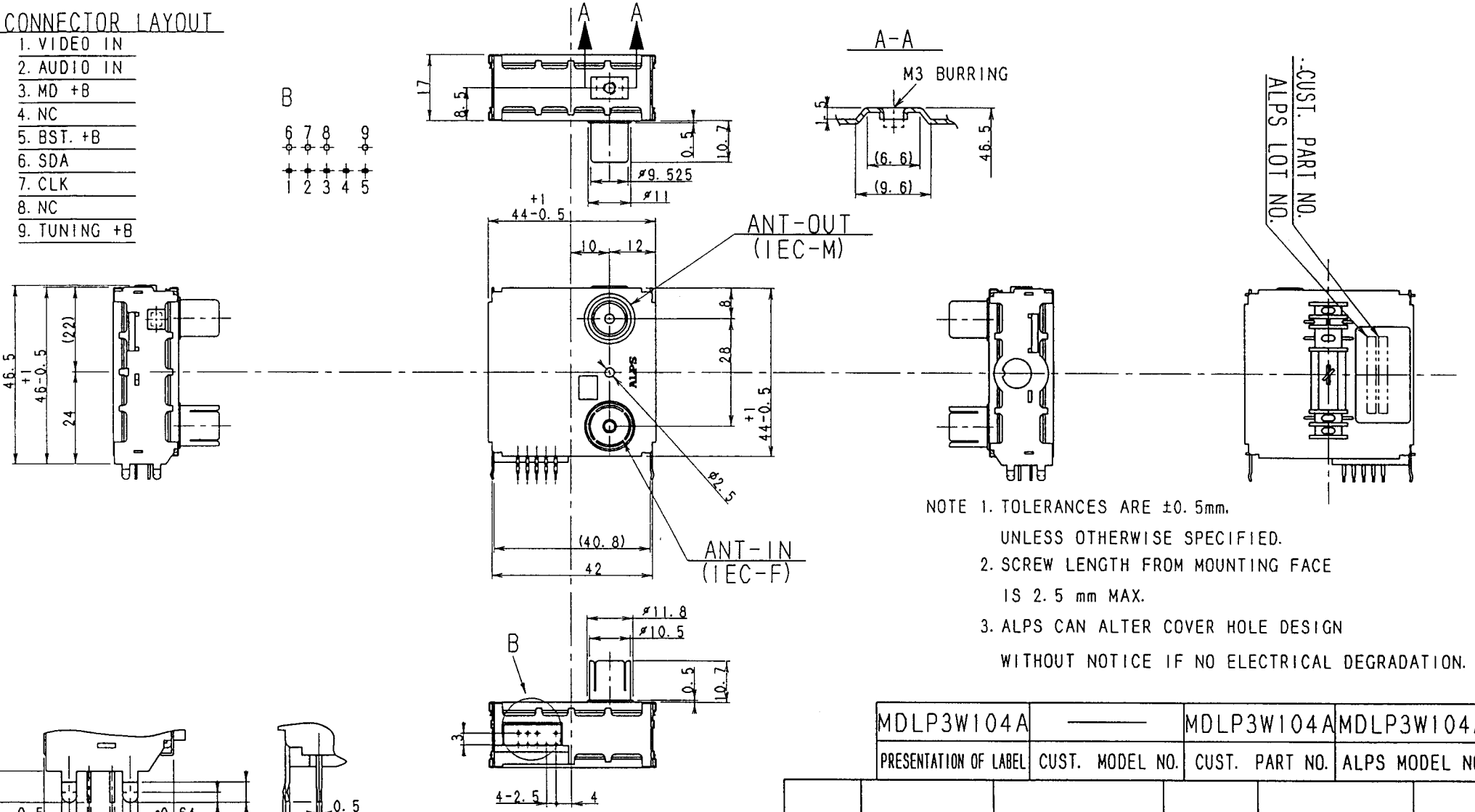
ZONE	SYMB.	DATE OR NO.	APPD.	CHKD.	DSGD.
			Mar. 31 '97 S. Akiba		

DSGD. Mar. 31, '97 H. Nakamura
CHKD.
APPD.
SCALE :
UNIT mm
KEY NO.
TITLE MDLP3 CIRCUIT DIAGRAM
DOCUMENT NO.

97/03/31 08:25

CONNECTOR LAYOUT

1. VIDEO IN
2. AUDIO IN
3. MD +B
4. NC
5. BST. +B
6. SDA
7. CLK
8. NC
9. TUNING +B



NOTE 1. TOLERANCES ARE ±0.5mm.
UNLESS OTHERWISE SPECIFIED.
2. SCREW LENGTH FROM MOUNTING FACE
IS 2.5 mm MAX.
3. ALPS CAN ALTER COVER HOLE DESIGN
WITHOUT NOTICE IF NO ELECTRICAL DEGRADATION.

MDLP3W104A	——	MDLP3W104A	MDLP3W104A
PRESENTATION OF LABEL	CUST. MODEL NO.	CUST. PART NO.	ALPS MODEL NO.

PART NO.	NAME	MATERIAL	SPEC.	FINISH

ALPS ELECTRIC CO., LTD.

ZONE	SYMB.	DATE OR NO.	APPD.	CHKD.	DSGD.

DSGD. Mar.31.'97 K.Harada
CHKD.
APPD. Mar.31.'97 M.Nakasato

SCALE 1:1
UNIT mm
KEY NO.

TITLE
MDLP3 ASSEMBLY DRAWING
DOCUMENT NO.

6 (A3V回面用紙)

RECORD OF REVISIONS

MDLP3W104□

DATE	PRESENT CONTENTS	NEW CONTENTS / REASON	DSGN BY
Mar.31,'97 (M970041)	N E W		N.NAKAMURA

JAPAN	ALPS ELECTRIC CO.,LTD.
MANUFACTURER	