



MOTOROLA

DL158/D
REV 0

Multimedia

Device Data






Multimedia

Device Data

Motorola offers a broad range of semiconductor multimedia products for a wide variety of applications. The *Motorola Multimedia Device Data Book* is a new book that contains specifications on these parts as well as information on Evaluation Kits, a selection of Application Notes, Handling and Design Guidelines, and Reliability and Quality information. Functional and Technical Selection Guides are also included to help you select the appropriate part for your application.

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DATA CLASSIFICATION

Product Preview

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Fully Released

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Technical Summary

The Technical Summary is an abridged version of the complete device data sheet that contains the key technical information required to determine the correct device for a specific application. Complete device data sheets for these more complex devices are available from your Motorola Semiconductor Sales Office or authorized distributor.

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MCD214	Video Decoder and System Controller (VDSC)	2-207
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CHAPTER 3 — EVALUATION KITS

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SALES OFFICES

Selection Guides

1

FUNCTIONAL SELECTION GUIDE

1

This selection guide includes all Motorola devices characterized in this book. Other devices also used in multimedia applications, but associated with other product families, appear in the following documents.

Document No.	Title
DL111/D	Bipolar Power Transistor Data
DL128/D	Linear and Interface ICs Data
SG73/D	Master Selection Guide
SG169/D	MOS Digital–Analog IC Quarterly Update
CA ...	Data Sheets
MC ...	Data Sheets
TDA ...	Data Sheets

A/D AND D/A CONVERTERS

Device #	Function	Page #
MC10319	Single Channel A/D	MC10319/D
MC10321	Single Channel A/D	MC10321/D
MC10322	Single Channel 8–Bit Video DAC	MC10322/D
MC10324	Single Channel 8–Bit Video DAC	MC10324/D
MC44200	Triple 8–Bit Video DAC	2–44
MC44250	Triple 8–Bit Video ADC	2–60
MC44251	Triple 8–Bit Video ADC Three–State Outputs	2–76
MC145073	Stereo Audio Sigma–Delta ADC	2–160
MC145074	Stereo Audio Sigma–Delta DAC	2–174
MC145076	Stereo Audio FIR Smoothing Filter	2–187

CD–I

Device #	Function	Page #
MCD212	Video Decoder and System Controller (JTAG)	2–194
MCD214	Video Decoder and System Controller (VDSC)	2–207
MCD221	CD–Interface and Audio Processor (CIAP)	2–218
MCD251	MPEG Full Motion Video Decoder (FMV)	2–226
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CHROMA DELAY LINES

Device #	Function	Page #
MC44140	Chroma Delay Line	2–23

COMB FILTERS

Device #	Function	Page #
MC141620	Enhanced Comb Filter	2–91
MC141621A	Advanced Comb Filter (ACF)	2–99
MC141622	Advanced Comb Filter – II (ACF – II)	2–116
MC141624	Advanced Comb Filter – I (ACF – I)	2–130

DEFLECTION

Device #	Function	Page #
MC1388	Waveform Generator for Monitors	MC1388/D
MC1391P	Horizontal Processor	MC1391P/D
MC44614	Line Deflection Transistor Driver	MC44614/D
MC44615A	Waveform Generator for Projection TV Convergence Function	MC44165A/D

ENCODERS/MODULATORS

Device #	Function	Page #
MC1373	Color TV Video Modulator	MC1373/D
MC1374	TV Modulator (High Quality)	MC1374/D
MC1377	Video RGB to PAL/NTSC Encoder	MC1377/D
MC1378	Video Overlay Synchronizer	MC1378/D
MC13077	Advanced Video RGB To QAL/NTSC Encoder	MC13077/D
MC44701	Multistandard Digital Video Encoder	2-76
MC44702	Multistandard Digital Video Encoder	2-77

SOUND

Device #	Function	Page #
MC1357	Sound IF Detector	MC1357/D
TDA3190P	Sound IF, Low Pass Filter, FM Detector, DC Volume Control, Preamplifier	TDA3190P/D

TRANSISTOR ARRAYS

Device #	Function	Page #
CA3054	Dual Independent Differential Amplifiers with Associated Constant Current Transistors .	CA3054/D
CA3146	General Purpose H/V Array	CA3146/D
MC3346P	One Differentially Connected Pair and Three Isolated Transistors	MC3346P/D

VIDEO AND AUDIO AMPLIFIERS

Device #	Function	Page #
MC13060	Mini Watt SOIC Audio Amplifier	MC13060/D
MC14576C	Dual Video Amplifier	2-3
MC14577C	Dual Video Amplifier	2-3
MC34119	Low Power Audio Amplifier	MC34119/D

VIDEO PROCESSORS/DEMODULATORS

Device #	Function	Page #
MC44000	Chroma 4 Multistandard Decoder	MC44000/D
MC44010	Digital Multistandard Video Processor	MC44010/D
TDA3301B	Color Processor	TDA3301B/D

OTHER FUNCTIONS

Device #	Function	Page #
MC3340	Electronic Attenuator	MC3340/D
MC44130	Stereoton	MC44130/D
MC44131	Improved Stereoton	2-11
MC44144	Subcarrier Reference Generator	MC44144/D
MC44145	Sync Separator/Pixel Clock PLL	MC44145/D
MC44802A	PLL Tuning Circuits	MC44802/D
MC44807	PLL Tuning Circuits	MC44807/D
MC44810	PLL Tuning Circuits	MC44810/D
MC44817	PLL Tuning Circuits	MC44817/D
MC44818	PLL Tuning Circuits	MC44818/D
MC44824	PLL Tuning Circuits	MC44824/D
MC144143	Closed Caption Decoder	2-142
MC144144	Enhanced Closed Caption Decoder	2-159

DISCONTINUED/NOT RECOMMENDED FOR NEW DESIGN

MC141625A	Advanced NTSC/PAL Comb Filter To be replaced by MC141626
MCD210	Video Decoder and System Controller Replaced by MCD212
MCD211	Video Decoder and System Controller Replaced by MCD212
MCD220	CD-Interface and Audio Processor Replaced by MCD221

TECHNICAL SELECTION GUIDE

1

A/D AND D/A CONVERTERS

Device	Function	Features	Suffix/ Package	Page #
MC44200	Triple 8-Bit Video D/A Converter	TTL inputs, 75 Ω drive outputs.	FU/824	2-34
MC44250	Triple 8-Bit Video A/D Converter	Video clamps for RGB/YUV, 15 MHz, TTL outputs.	FN/777	2-44
MC44251	Triple 8-Bit Video A/D Converter with 3-State Outputs	Video clamps for RGB/YUV, 18 MHz, High Z TTL outputs.	FN/777	2-60
MC145073	Stereo Audio Sigma-Delta ADC	Single + 5 V operation; 128x OSR, 0 to 20 kHz passband; on-chip filtering; max. ripple ± 0.1 dB.	DW/751E	2-160
MC145074	Stereo Audio Sigma-Delta DAC	Single + 5 V operation; supports 128x 192x, 256x and 384x OSR rates; accepts 16-, 18- or 20-bit data; companion to MC145076 Stereo Audio FIR Smoothing Filter.	D/751B	2-174
MC145076	Stereo Audio FIR Smoothing Filter	Single + 5 V operation; 18.5 MHz input data rate; > 40 dB of alias filtering; companion to MC145074 Stereo Audio Sigma-Delta DAC.	D/751B	2-187

CD-i

Device	Function	Features	Suffix/ Package	Page #
MCD212	Video Decoder and System Controller (JTAG)	Up to 768 x 560 resolution. Built-in memory management unit. 4 planes of graphics. Synch with external video.	FU/1007	2-194
MCD214	Video Decoder and System Controller (VDSC)	CCIR601 compatible. Built-in memory management unit. 4 planes of graphics. Synch with external video.	FU/1007	2-207
MCD221	CD-Interface and Audio Processor (CIAP)	i ² S or SONY format. 2x drives supported. 68000 or serial host interface.	FU/841B	2-218
MCD251	MPEG Full Motion Video Decoder (FMV)	Handles MPEG1 data up to 5 MBits/s. Direct Drive of up to 4 MBits of DRAM. Special effects such as fast forward, rewind, still, etc.	FU/1007	2-226
MCD270	IMPEG Integrated Video and Audio Decoder	Handles MPEG1 data up to 5 MBits/s. Direct Drive of up to 4 MBits of DRAM. Special effects such as fast forward, rewind, still, etc. 24-bit RGB or YUV output. i ² S or SONY audio output.	FU/1007	2-239

CHROMA DELAY LINES

Device	Function	Features	Suffix/ Package	Page #
MC44140	PAL Digital Delay Line	For PAL applications of the MC44011 and MC44001.	P/648 D/751G	2-23

COMB FILTERS

Device	Function	Features	Suffix/ Package	Page #
MC141620	Enhanced Comb Filter	Fast 8-Bit A/D Converter, Two 8-Bit D/A Converters, Two Line-Delay Memories, utilizes NTSC Subcarrier Frequency clock, CMOS Technology.	FU/898	2-91
MC141621A	Advanced Comb Filter (ACF)	Composite Video input; YC outputs in digital and analog form; all digital internal filters.	FU/898	2-99
MC141622	Advanced Comb Filter - II (ACF-II)	Composite Video input; YC outputs in digital and analog form; all digital internal filters; vertical enhancer circuit.	P/898	2-116
MC141624	Advanced Comb Filter - I (ACF-I)	Low cost 1h filter.	FU/873 SP/TBD	2-130

ENCODERS/MODULATORS

Device	Function	Features	Suffix/ Package	Page #
MC44701	Multistandard Digital Video Encoder	CCIR601 compatible (8-bit YCrCb) inputs. Master/slave modes. PAL/NTSC compatible. Closed-caption encoding. MACROVISION copy protection. JTAG.	FU/824A	2-76
MC44702	Multistandard Digital Video Encoder	CCIR601 compatible (8-bit YCrCb) inputs. Master/slave modes. PAL/NTSC compatible. Closed-caption encoding. MACROVISION copy protection. RGB and YCrCb outputs. JTAG.	FU/848B	2-77

VIDEO AND AUDIO AMPLIFIERS

Device	Function	Features	Suffix/ Package	Page #
MC14576C	Dual Video Amplifier — "C" Version	Gain @ 4.43 MHz = 6 dB +/- 1 dB, fixed gain, internally compensated, CMOS Technology.	P/626 F/904	2-3
MC14577C	Dual Video Amplifier — "C" Version	Gain @ 5 MHz = 10 dB max, 10 MHz = 6 dB max, adjustable gain, internally compensated, CMOS Technology.	P/626 F/904	2-3

OTHER FUNCTIONS

Device	Function	Features	Suffix/ Package	Page #
MC44131	Improved Stereoton	European TV audio decoder.	P/710	2-11
MC144143	Closed Caption Decoder	8 line text mode.	P/707	2-142
MC144144	Enhanced Closed Caption Decoder	OSD, 15 line text, XDS.	P/707	2-159

Data Sheets

2

Advance Information

Dual Video Amplifiers

CMOS

Each of these devices contains two amplifiers realized in CMOS. Each amp also employs two lateral NPN bipolar transistors.

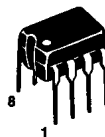
The MC14576 contains two internally-compensated operational amplifiers. On-chip gain-setting resistors result in a noninverting voltage gain of $6.0 \text{ dB} \pm 1.0 \text{ dB}$ at 4.43 MHz for each amp. Each noninverting input of the MC14576 appears as a mostly-capacitive load of about 10 pF.

The MC14577 also contains two internally-compensated operational amplifiers. However, the gain for each amp is adjustable with external components. (The value of the closed-loop voltage gain with a 150Ω load should not exceed 10 dB at 5 MHz and 6 dB at 10 MHz.) All inputs of the MC14577 appear as mostly-capacitive loads of about 10 pF.

The MC14576C and MC14577C are drop-in replacements for the MC14576B and MC14577B, respectively.

- Direct Drive of 150Ω Loads
- Maximum Supply Current: 40 mA per Package
- Operating Voltage Range — P Suffix: 5.0 to 12 V Relative to V_{SS}
F Suffix: 5.0 to 10 V Relative to V_{SS}
- May Be Used with Single or Dual Supplies
- Operating Temperature Range — P Suffix: -20 to 70°C
F Suffix: -20 to 50°C
- Excellent Differential Gain: 3% Maximum @ 4.43 MHz
- Excellent Differential Phase: 3° Maximum @ 4.43 MHz
- Guaranteed Bandwidth: 10 MHz
- Minimal External Components Required

MC14576C MC14577C



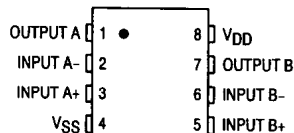
P SUFFIX
PLASTIC DIP
CASE 626-05

F SUFFIX
SOG PACKAGE
CASE 904-01

ORDERING INFORMATION

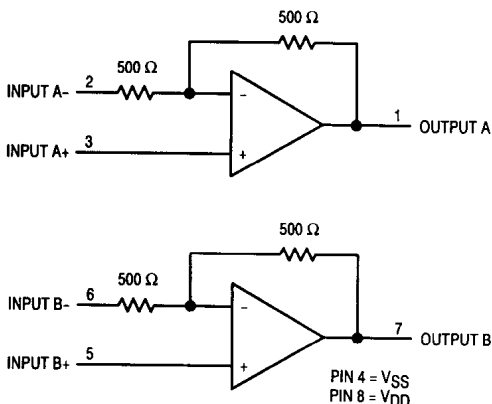
MC14576CP, MC14577CP	Plastic DIP
MC14576CF, MC14577CF	SOG Package

PIN ASSIGNMENT

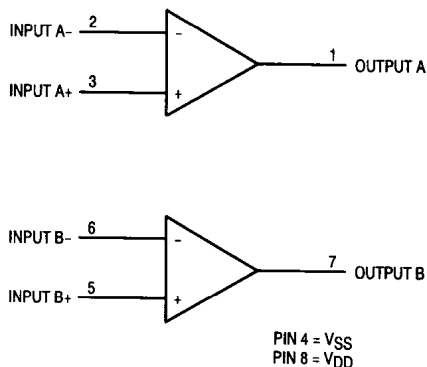


SYMBOLIC REPRESENTATIONS

MC14576



MC14577



NOTE: Resistors are shown above with nominal values.

This document contains information on a new product. Specifications and information herein are subject to change without notice.

MAXIMUM RATINGS (See Note)

Symbol	Parameter	Value	Unit
V_{DD}	DC Supply Voltage (Referenced to V_{SS})	- 0.5 to + 14	V
V_{in}	DC Input Voltage	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
V_{out}	DC Output Voltage	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
T_{stg}	Storage Temperature	- 65 to + 150	°C
T_L	Lead Temperature (10-Second Soldering)	260	°C

NOTE: Maximum Ratings are those values beyond which damage to the device may occur.

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{in} and V_{out} should be constrained to the range $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$.

Unused inputs must always be tied to an appropriate voltage level (e.g., either V_{SS} or V_{DD}). Unused outputs must be left open.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, Reference Figures 1 and 2, $R_L = 150\ \Omega$ Unless Otherwise Indicated)

Symbol	Parameter	Test Condition	V_{DD} V	V_{SS} V	Guaranteed Limit	Unit
V_{DD}	Power Supply Voltage Range (Referenced to V_{SS})	P Suffix F Suffix	— —	— —	5.0 to 12 5.0 to 10	V
I_{DD}	Maximum Power Supply Current (Per Package)	$V_{in} = 0\text{ V}$, $R_L = \infty$ (open)	+ 5.0	- 5.0	40	mA
N	Maximum Output Noise	$V_{in} = 0\text{ V}$, BW = 30 Hz to 25 MHz	+ 5.0	- 5.0	250	$\mu\text{V RMS}$
A_V	Closed-Loop Voltage Gain	$V_{in} = 2.0\text{ V p-p}$, $f = 4.43\text{ MHz}$	+ 5.0	- 5.0	5.0 to 7.0	dB
BW	Bandwidth	$V_{in} = 2.0\text{ V p-p}$, A_V within $\pm 3.0\text{ dB}$ of the gain at 4.43 MHz	+ 5.0	- 5.0	10	MHz
V_{out}	Minimum Output Voltage Swing	$V_{in} = 4.0\text{ V p-p}$, $f = 10\text{ MHz}$	+ 5.0	- 5.0	3.5	V p-p
		$V_{in} = 1.5\text{ V p-p}$, $f = 5.0\text{ MHz}$	+ 2.5	- 2.5	2.0	
—	Maximum Differential Gain	$V_{in} = 300\text{ mV p-p}$ biased from - 0.5 to + 0.5 V, $f = 4.43\text{ MHz}$	+ 5.0	- 5.0	3.0	%
—	Maximum Differential Phase	$V_{in} = 300\text{ mV p-p}$ biased from - 0.5 to + 0.5 V, $f = 4.43\text{ MHz}$	+ 5.0	- 5.0	3.0	Degrees
PSRR	Minimum Power Supply Rejection Ratio, V_{DD} or V_{SS} pins	$V_{in} = 0\text{ V}$, ΔV_{DD} or $\Delta V_{SS} = 400\text{ mV p-p}$ @ 100 kHz	+ 5.0	- 5.0	43	dB
—	Minimum Channel Separation	$V_{in} = 1.0\text{ V p-p}$, $f = 4.43\text{ MHz}$	+ 5.0	- 5.0	40	dB
C_{in}	Maximum Input Capacitance	$V_{in} = 1.0\text{ V p-p}$, $f = 4.43\text{ MHz}$	+ 5.0	- 5.0	10**	pF
R_{in}	Minimum Input Resistance, all Inputs except Input A- and Input B- of the MC14576		+ 5.0	- 5.0	109**	Ω

** Typical value only; not guaranteed.

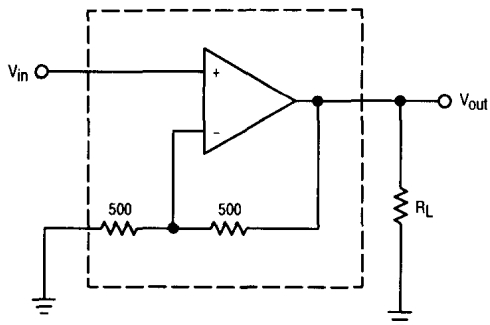


Figure 1. MC14576 Test Circuit

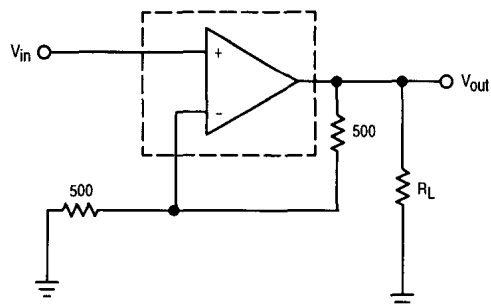


Figure 2. MC14577 Test Circuit

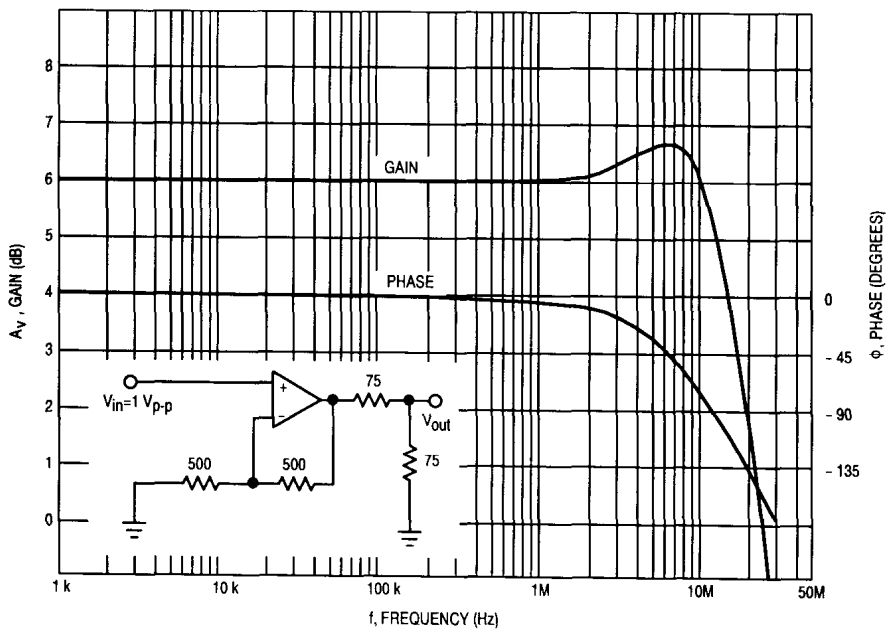


Figure 3. Typical Gain/Phase-Frequency Response (Not Guaranteed)