

HIGH SPEED

Instrumentation and Data Acquisition

- Fast DAC Amplifiers
- Signal Processing
- RF Amplification
- RADAR
- Fiber-Optic Systems
- Copiers/Laser Printers

Color, B/W Video and Multimedia

- Frame Grabbers
- Video Cable Drivers
- Video MUXs
- Cable Tappers
- Video Gain Blocks
- Building Security
- Image Recognition
- Video Keyer/Fader

Lowest Offsets,
Lowest Bias Current

Fastest Slew Rate,
Fastest Settling

Dual Supplies,
Largest Bandwidth

±5V, or Single 5V
Supplies, Lowest Cost

Single Supply, DC Precision

- Low V_{OS} with High Bandwidth/Slew Rate (150 μ V Max, A-Grades)
- Single Supply 3.3V, 5V or Dual \pm 15V Operation
- Low Power (1.3mA/Amp): LT[®]1211/12
- Fast Settling to 0.01%, 250ns, 2V Step: LT1215/16
- SO-8 (Duals) and 0.150" SO-16 (Quads)

	GBW (Typ) MHz	SR (Typ) V/ μ s	V_{OS} (Max) μ V
LT1211 (D)	14	7	150/275
LT1212 (Q)	14	7	275
LT1213 (D)	28	12	150/275
LT1214 (Q)	28	12	275
LT1215 (D)	23	50	300/450
LT1216 (Q)	23	50	450

NEW AMPLIFIER ARCHITECTURE!

Voltage Feedback Op Amps with Current Feedback Speed

- Low Supply Current/Amplifier (250 μ A): LT1351/2/3
- Very High Slew Rate (1000V/ μ s): LT1363
- Low V_{OS} (0.6mV Maximum): LT1351/2/3/7/8/9
- Low Power (6mA/Amplifier for 1000V/ μ s Slew Rate): LT1363/4/5
- Fast Settling (80ns to 0.01%, 50ns to 0.1%, 10V Step)
- C-Load[™]: Drives Unlimited Capacitive Loads

Single	Dual	Quad	GBW MHz	SR V/ μ s	I_S /Amp (mA)
LT1351	LT1352	LT1353	3	200	0.25
LT1354	LT1355	LT1356	12	400	1
LT1357	LT1358	LT1359	25	600	2
LT1360	LT1361	LT1362	50	800	4
LT1363	LT1364	LT1365	70	1000	6

Voltage Feedback Op Amps

- 12-Bit Accurate: LT1220/21/22
- 10-Bit Accurate: LT1224/25/26
- C-Load: Drives Unlimited Capacitive Loads

	A_V (Min) V/V	GBW (Typ) MHz	0.1% Settling Time ns	SR (Typ) V/ μ s	V_{OS} (Max) mV
LT1220	1	45	75	250	1.0
LT1221	4	150	65	250	0.6
LT1222	10	500	75	200	0.3
LT1224	1	45	90	400	2.0
LT1225	5	150	90	400	1.0
LT1226	25	1000	100	400	1.0

Current Feedback Amps

- Bandwidth Independent of Gain
- "Shutdown" Feature: LT1217, LT1223, LT1227
- 12-Bit Accurate: LT1223
- Low Power ($I_S = 1$ mA): LT1217
- Lowest Cost: LT1252/3/4
- Operates on \pm 2V to \pm 15V Supplies*

* LT1223 & LT1217 Min Supply Voltage = \pm 5V

	BW (Typ) MHz	SR (Typ) V/ μ s	V_{OS} (Max) mV	I_{OUT} (Min) mA
LT1227	140	1100	10	30
LT1259 (D)	130	1600	10	30
LT1260 (T)	130	1600	10	30
LT1223	100	1300	3	50
LT1229 (D)	100	1000	10	30
LT1230 (Q)	100	1000	10	30
LT1252	100	250	15	30
LT1253 (D)	90	250	15	30
LT1254 (Q)	90	250	15	30
LT1206	60	900	10	250
LT1207 (D)	60	900	10	250
LT1210	35	900	15	1100
LT1217	10	500	3	50
LT1497 (D)	50	900	10	125

Low Cost Video Op Amps

- Specified Operation with \pm 5V and Single 5V Supplies
- Color Video Performance
- "Shutdown" Feature: LT1190/1/2/5
- Directly Drives Cables: 50mA I_{OUT}
- 450V/ μ s Slew Rate
- Low Power: LT1195

	GBW (Typ) MHz	SR (Typ) V/ μ s	A_V (Min) V/V
LT1190	50	450	1
LT1191	90	450	1
LT1192	350	450	5
LT1195	50	165	1

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C-Load is a trademark of Linear Technology Corporation.

(D) = Dual, (T) Triple, (Q) = Quad

Rev K 1097

Video Products

In addition to high speed amplifiers, LTC® offers the following products tailored to video, multimedia and computer graphics applications.

Low Cost Dual/Triple 130MHz CFAs with Shutdown

- LT1260: Triple CFA for RGB Video
- LT1259: Dual CFA with Shutdown
- 90MHz Bandwidth on $\pm 5V$
- 0.1dB Gain Flatness, 30MHz: Good for HDTV
- 1600V/ μs Slew Rate
- $\pm 2V$ to $\pm 15V$ Supply Range
- 100ns/40ns Turn On/Off Times
- Makes 2 or 3 Input MUX Amp
- Low Supply Current (5mA/Amp)
- Narrow SO Packages

Video Distribution Amplifier

- LT1206, Single; LT1207, Dual: 250mA Minimum Output Current
- 60MHz, 900V/ μs Current Feedback Amplifier
- Drives Ten 150 Ω Video Cables
- Drives Low Impedances & High Capacitances
- Color Video Performance
- Low Current "Shutdown" Mode Available

4:1 Video Multiplexer

- LT1204: 4:1 MUX w/ Current Feedback Amp
- 0.1dB Gain Flatness to >30MHz: for HDTV
- 1000V/ μs Slew Rate
- 75MHz, -3dB Bandwidth ($A_V = 2$)
- 90dB Channel Separation
- Expandable
- 16-Pin PDIP and SW Packages

$\pm 5V$ Video Difference Amps

- 50dB CMRR @ 10MHz
- Input Voltage Range: (-2.5V to 3.5V)
- $\pm 4V$ Output Voltage Swing
- Color Video Performance
- "Shutdown" Feature
- Can Directly Drive Cables
- 500V/ μs Slew Rate: LT1193/LT1194
- Low Power: LT1187/LT1189

	Gain	A_V (Min) V/V	BW (Typ) MHz
LT1187	Adj.	2	50
LT1189	Adj.	10	35
LT1193	Adj.	2	80
LT1194	Fixed	10	35

2:1 and 4:1 Video Multiplexers Very Fast for Pixel Switching

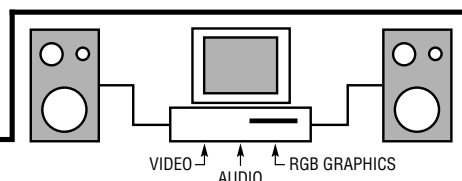
- LT1203 (2:1), LT1205 (2 \times 2:1 or 4:1)
- 150MHz, -3dB Bandwidth
- 90dB Channel Separation
- 30MHz, 0.1dB Gain Flatness (HDTV)
- 25ns Channel Switching Time
- 50mV Switching Transient
- 10M Ω Disabled Output Impedance
- Expandable
- 8- and 16-Pin Narrow SO Packages

Current Feedback Amp with DC Gain Control

- LT1228: 75MHz Transconductance Amp with 100MHz Current Feedback Amplifier
- Color Video Performance
- Differential Input
- Operates on $\pm 2V$ to $\pm 15V$ Supplies
- For Auto-Gain, Tunable Filters and Specialized Video Circuits

Video Fader/Gain-Controlled Amplifier

- LT1251: 40MHz Video Fader
- LT1256: 40MHz Gain-Controlled Amplifier
- Accurate 1% Linear Gain Control
- Low Differential Gain/Phase, 0.1%/0.1°
- 14-Pin PDIP and Narrow SO Packages



Multimedia

Multimedia systems combine **audio**, **composite video** (broadcast quality TV) and **high resolution computer graphics**.

Typical requirements are:

Video: NTSC or PAL need minimum 50MHz, -3dB bandwidth

HDTV needs 0.1dB flatness to 30MHz

Suggested Products (Refer to above and reverse side):

General Purpose Gain Blocks/Video A/D Buffers LT1360/61/62/63/64/65: Single/Dual/Quad Voltage Feedback Op Amps with Current Feedback Speed
LT1227/29/60/30: Single/Dual/Triple/Quad Current Feedback Amplifiers
LT1252/3/4: Low Cost Current Feedback Amplifiers

Multiplexer LT1204: 4:1 Video MUX with CFA

Video Distribution LT1206: 250mA Output Current CFA
LT1207: Dual 250mA Output Current CFA
LT1497: Dual 125mA Output Current CFA

DC Restoration LT1228: CFA with Gain Control

Gain Control LT1228: CFA with Gain Control, LT1256: 40MHz Amplifier with DC Gain Control

COAX Loopthrough/Twisted-Pair Receiver LT1187/89/93/94: Video Difference Amplifiers

Video Fader LT1251: 40MHz Fader

Graphics: VGA needs >50MHz, 19" monitors need >100MHz

RGB, YUV, YC, Amps LT1259/60: Dual/Triple, 130MHz, 1800V/ μs Current Feedback Amplifiers with Shutdown

Pixel Switching LT1203/05: 2:1 and 4:1 Video Multiplexers

Audio: For 8 \times Oversampling, 200kHz Bandwidth is Required

Gain Blocks LT1115: Low Noise Preamplifier

LT1124/26: Dual Low Noise Preamplifier

LT1211/12: High Slew Rate, Single Supply Dual/Quad Op Amps

LT1122: Ultralow Distortion FET-Input Op Amp with Symmetric Slew Rates

LT1354/55/56: Ultrahigh Slew Rate, Low Supply Current Op Amps