

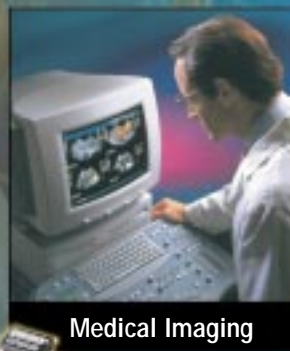
High Speed Solutions

Communications, Video & Imaging

revised
2000
winter



Broadband Communications



Medical Imaging



Digital Imaging



Communication Basestations



High Speed Solutions

This brochure provides an overview of Burr-Brown's high-speed product line. Additional product information in the form of data sheets or applications bulletins can be obtained from the Burr-Brown website (www.burr-brown.com).

High Speed

With Burr-Brown's ever expanding SpeedPLUS product line, you can find your complete high-speed signal processing solutions for communications, instrumentation, video and imaging applications.

The product line includes high performance analog-to-digital converters plus compatible low cost, high performance operational amplifiers. The current line of A/D converters offers

resolutions from 8- to 14-bit and sampling rates from

5 to 80MHz. The operational amplifiers offer the best

distortion performance in the industry. For DSL applications, Burr-Brown can provide both analog front ends as well as differential line drivers. For the growing imaging market, these SpeedPLUS product lines address the needs for video signal processing and feature single chip IC solutions for CCD imaging.



SpeedPLUS Solutions

Many of your analog and mixed-signal applications circuits will benefit from the flexibility of Burr-Brown's high speed products. The following circuits illustrate just a few of the diverse applications made possible with the expanding SpeedPLUS product line.

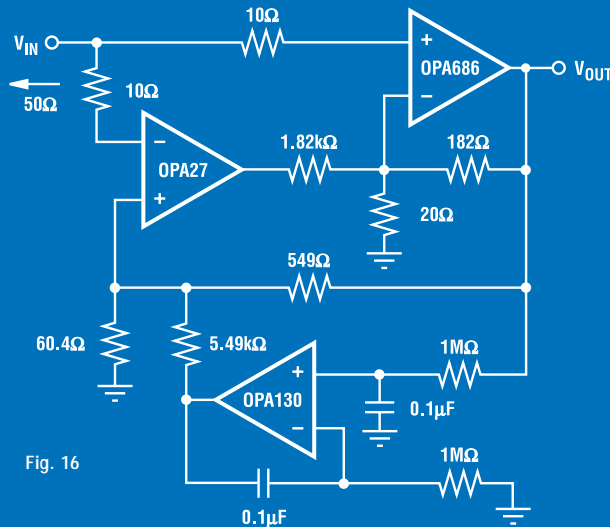


Fig. 16

Composite Amplifier

This circuit is for applications that require a high speed op amp, but need excellent DC precision. The OPA686 provides the high speed functionality, while the OPA27 gives excellent DC precision and low 1/f noise. The OPA130 is an optional integrator that blocks the DC input (below 0.2Hz), leaving <1mV output offset voltage. This circuit could be used as a LNA (Low Noise Amplifier), or as a driver for a diode mixer. See Figure 16.

Optic Receiver Amplifier

Burr-Brown offers you outstanding solutions for the transimpedance amplifier portion of a photodiode. The OPA655 is a FET-input op amp with 240MHz gain bandwidth product and very low input noise ($6nV/\sqrt{Hz}$). It also features very fast overdrive recovery (20ns). Applications limited by the op amp's voltage noise will benefit from the OPA686's voltage noise of $1.3nV/\sqrt{Hz}$. The OPA689 has a guaranteed overdrive recovery time of 2.8ns for those applications that require minimal signal drop-out time. See Figure 17.

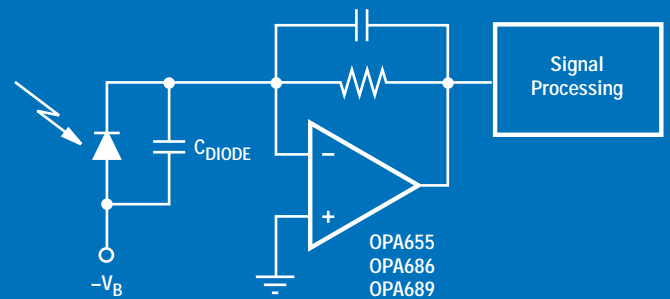


Fig. 17

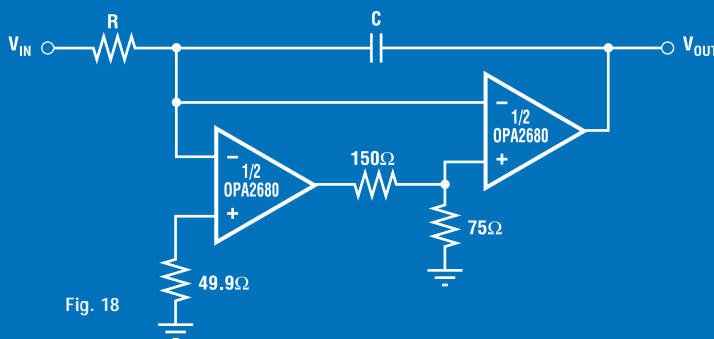


Fig. 18

Wideband Integrator

This circuit acts as an integrator that maintains better than 2° phase accuracy over ≥ 5 decades of frequency. This compares very favorably with the standard single op amp integrator using the OPA680, which is accurate over ≥ 1.5 decades of frequency. Also, this circuit maintains this accuracy at higher frequencies (0.5 decades higher). The voltage divider ratio set by the 150Ω and 75Ω resistors keeps the composite amplifier stable, and the phase errors low. See Figure 18.

Video/CCD Imaging Solutions

CCD Video Signal Processors

Burr-Brown offers a complete line of imaging signal processors for video and still cameras with line (row) rate clamps, and correlated double samplers for data and reference timed to the CCD signal. Each provides a 0 to +34dB remote gain amplifier, linear in dB, and black level controls for the CDS and inputs. All are complete solutions with internal references. See Figure 12.

VSP2000 – Internal A/D Converter • Analog Gain Control

VSP2080 – External A/D Converter • Analog Gain Control

VSP2101 – Internal A/D Converter • Digital Gain Control

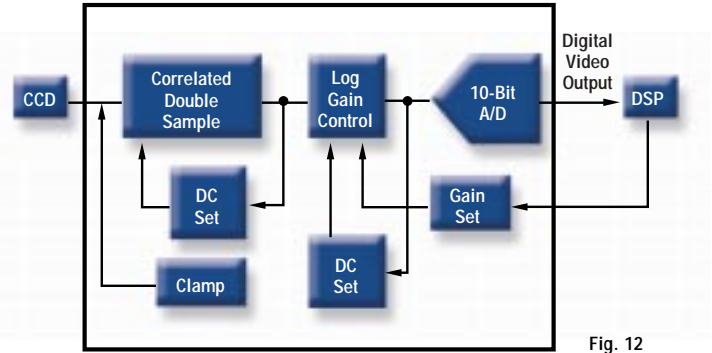


Fig. 12

CCD or CIS Scanners or Cameras

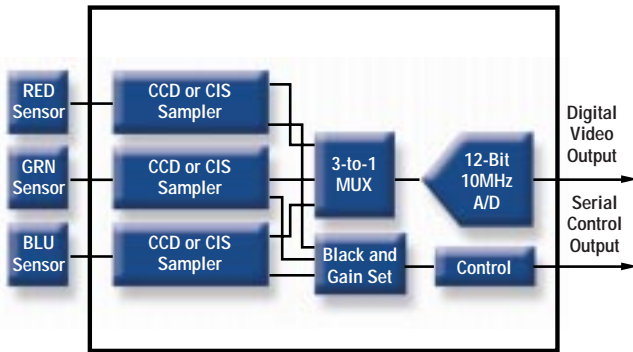


Fig. 13

3-Input CCD/CIS Signal Processor with A/D

VSP3000 provides a complete, three-input imaging signal for CCD or CIS sensors. In CCD mode, it provides line (row) input clamps and correlated double samplers for data and reference timed to the CCD signal. In CIS mode, an input reference and correlated single samplers sample data timed to the CIS signal. Gain range is 0 to 13dB, linear in dB. The A/D's high resolution allows black level and gain control from DSP. Reference can be internal or external. Programming can be parallel and/or serial. The single A/D design uses only 350mW (CDS mode) and comes in a small, 48-lead LQFP. See Figure 13.

Video Analog-to-Digital Conversion Systems

Burr-Brown offers a complete, A/D solution for video. These A/Ds operate on a single +5V supply at low power, come in SSOP packages, and the driver op amps are small and lowest in cost. These op amps provide low distortion and highest video signal to noise. See Figure 14.

Our A/D converters for video range from 8-bit, 30MHz to 14-bit, 65MHz. See *SpeedPLUS* A/D converters for selections. The SNR numbers in the selection table can be adjusted by 9dB for video applications. Burr-Brown also offers a wide variety of video drivers as shown in *SpeedPLUS* op amps.

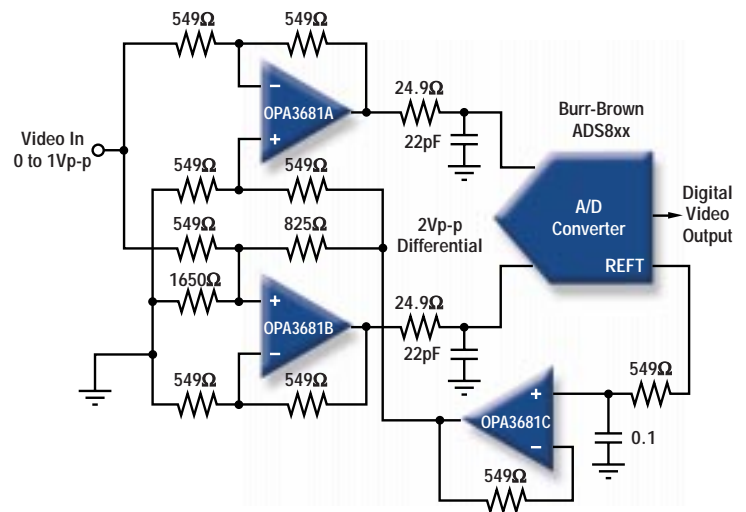


Fig. 14

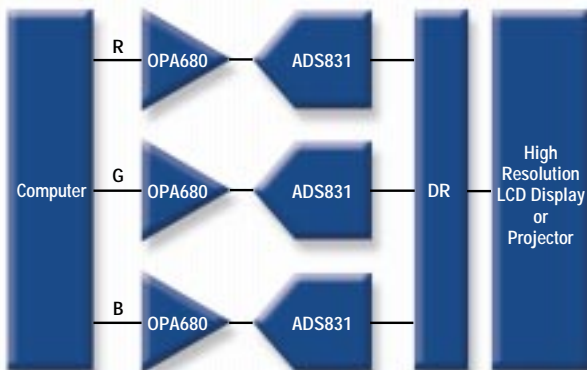


Fig. 15

LCD Displays and Projectors

The 8-bit 60MHz ADS830 and the 8-bit 80MHz ADS831 offer outstanding differential non-linearity performance with a typical error of only 0.2 LSBs and 7.9 effective bits, making them attractive for RGB to LCD conversion in both VGA and SVGA systems. Along with the triple channel OPA3681, these converters provide a winning combination. See Figure 15.

New Product Highlights

Available Soon!

High Speed Digital-to-Analog Converters

The new **DAC900** Family is a pin compatible digital-to-analog converter (DAC) family featuring 8-,10-,12-, or 14-bit resolution, with all four models supporting update rates of 165MSPS. The advanced segmentation architecture of the DAC900 Family is optimized to provide a high spurious free dynamic range (SFDR) for single-tone as well as multi-tone signals needed for the transmit path of communications systems. The differential outputs allow for both a differential or single-ended analog signal interface. Utilizing a small geometry CMOS process, the monolithic DAC900 Family can be operated on a single supply range of 2.7V to 5.5V, and can be interfaced with either +3V or +5V CMOS logic. Its low power consumption allows for use in portable and battery operated systems. The reference structure of the DAC900 Family permits additional flexibility by utilizing the on-chip reference, or applying an external reference. With only one external resistor, the full-scale output

current can be adjusted over a span of 2mA to 20mA while maintaining the specified dynamic performance. All models are available in both SO-28 and TSSOP-28 packages.

New!

Ultra-Wideband, Current-Feedback Op Amp with Disable

The **OPA685** is an ultra-high speed, current-feedback op amp featuring very wideband performance at higher gains with 4000V/ μ s slew rate. Specified at a gain of +8V/V, the OPA685 gives >400MHz bandwidth for either a plus or minus gain of 8. The quiescent current is trimmed at 12.9mA to reliably deliver the high slew rate, while an optional power-down disable is included for those power-sensitive applications. In addition to \pm 5V supply operation, the OPA685 will operate on a single supply from +5V to +12V. The OPA685 is available in both SO-8 and SOT23-6 packages.

SpeedPLUS A/D Converters

Product	Resolution Bits	f _s (MHz)	Power (mW)	V _s (V)	SNR (dB)	SFDR at f _{IN} (dBFS) (MHz)	FPBW (MHz)	Ref	Input	Package	Price** (1kpcs)
ADS852	14	65	650	+5	75	100 at 20	1000	Int/Ext	SE or Diff	LQFP-64	\$39.00
ADS851	14	40	400	+5	75	100 at 20	1000	Int/Ext	SE or Diff	LQFP-64	\$29.00
ADS810	12	100	600	+5	68	95 at 20	1000	Int/Ext	SE or Diff	TQFP-48	\$23.95
ADS807	12	53	324	+5	68	82 at 10	270	Int/Ext	SE or Diff	SSOP-28	\$17.95
ADS805	12	20	300	+5	67	77 at 8	270	Int/Ext	SE or Diff	SSOP-28, SO-28	\$15.35
ADS804	12	10	180	+5	69	80 at 4.8	270	Int/Ext	SE or Diff	SSOP-28, SO-28	\$9.95
ADS803	12	5	116	+5	69	82 at 2	270	Int/Ext	SE or Diff	SSOP-28, SO-28	\$6.95
ADS828	10	75	325	+5.0	58	70 at 10	300	Int/Ext	SE or DIFF	SSOP-28	\$9.75
ADS824	10	70	315	+5	58	68 at 20	300	Int/Ext	SE or Diff	SSOP-28	\$8.80
ADS823	10	60	265	+5	60	74 at 10	300	Int/Ext	SE or Diff	SSOP-28	\$8.45
ADS822	10	40	161	+5	60	66 at 10	300	Int/Ext	SE or Diff	SSOP-28	\$4.90
ADS902	10	30	140	+5	58	58 at 12	100	Ext	SE	SSOP-28	\$3.95
ADS820	10	20	195	+5	60	63 at 10	100	Int	Diff	SSOP-28, SO-28	\$6.36
ADS900	10	20	52	+2.7	50	53 at 10	100	Int	SE	SSOP-28	\$2.75
ADS901	10	20	48	+2.7	54	51 at 9	100	Ext	SE	SSOP-28	\$2.65
ADS831	8	80	265	+5	48	65 at 10	300	Int/Ext	SE or Diff	SSOP-20	\$4.95
ADS830	8	60	180	+5	49	65 at 10	300	Int/Ext	SE or Diff	SSOP-20	\$3.95
ADS931	8	30	63	+2.7 to +5	48	49 at 12	100	Ext	SE	SSOP-28	\$2.15
ADS930	8	30	66	+2.7 to +5	46	51 at 12	100	Int	SE	SSOP-28	\$2.25

SpeedPLUS D/A Converters

Product	Resolution (Bits)	Update Rate (MSPS)	Power Supply (V)	Settling Time I _{OUT} (ns)	I _{OUT} (mA)	Power (mW)	Package	Price** (1kpcs)
DAC904	14	165	+2.7 to +5.5	30 to 0.1%	20	170	SO-28, TSSOP-28	\$16.30
DAC902	12	165	+2.7 to +5.5	30 to 0.1%	20	170	SO-28, TSSOP-28	\$9.95
DAC900	10	165	+2.7 to +5.5	30 to 0.1%	20	170	SO-28, TSSOP-28	\$5.75
DAC908	8	165	+2.7 to +5.5	30 to 0.1%	20	170	SO-28, TSSOP-28	\$2.95

Bold indicates new products, **Bold Blue Italics** indicates preliminary information

**Recommended resale in USD; FOB USA.

Wireless Communication Solutions

Wideband IF Sampling

Burr-Brown provides a variety of compatible wideband operational amplifiers and ADCs with the necessary bandwidth and dynamic range for IF sampling. The **OPA687** gives in excess of 95dB SFDR at 20MHz and the **ADS852** gives in excess of 100dB SFDR. Using this

ADC for undersampling at the 1st IF stage is also achievable due to the wideband track/hold performance. For instance, the **ADS852** track/hold offers a 1GHz bandwidth and a low 0.25ps jitter.

See Figure 7.

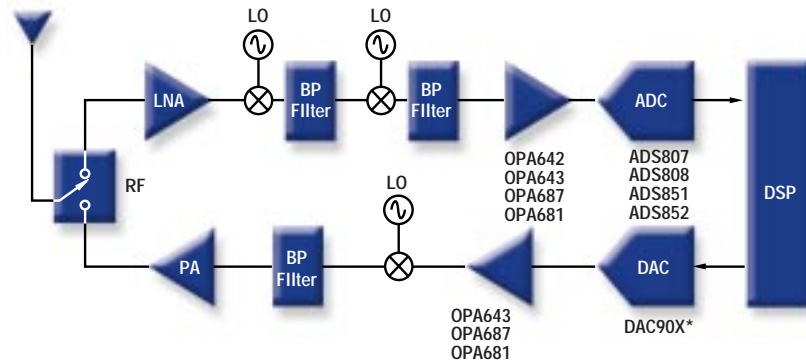


Fig. 7

Baseband Sampling

Burr-Brown offers several op amp and ADC combinations for baseband sampling. An example of these parts are the **ADS803** and the **OPA642**. The **ADS803** gives 80dB of SFDR at 1MHz

and the **OPA642** gives in excess of 90dB while having a low voltage noise of $2.2nV/\sqrt{Hz}$, making it compatible with the low noise of the **ADS803**. See Figure 8.

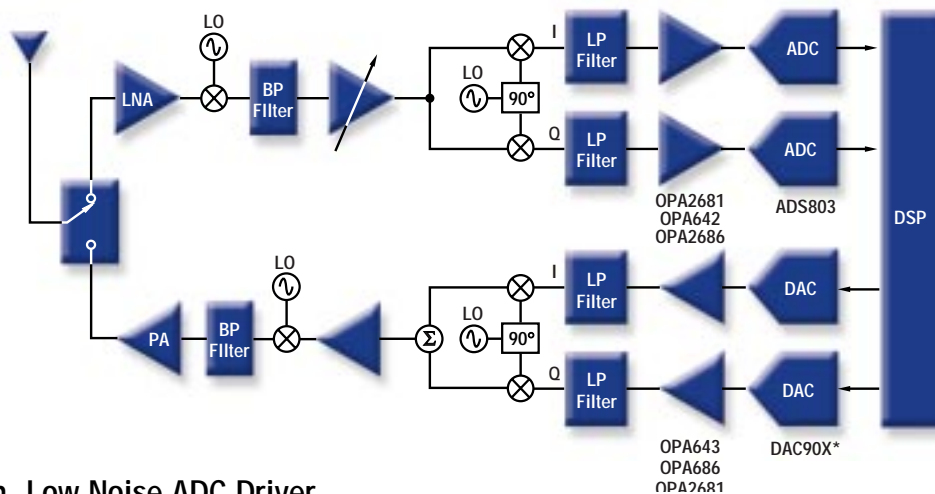


Fig. 8

Low Distortion, Low Noise ADC Driver

This **OPA687** application circuit delivers the ultimate in low distortion when sampling IF signals. With the differential amplifier delivering 95dB SFDR at 20MHz and the ADC capable of 100dB

SFDR, this circuit meets the stringent requirements for basestations without the need for dither. Also, the overall gain is 18.5dB with an amplifier noise figure < 6dB. See Figure 9.

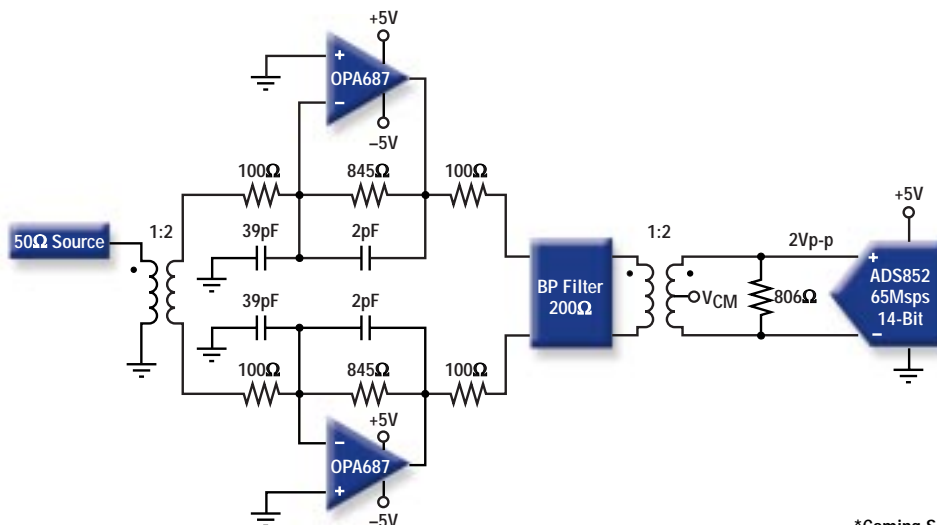


Fig. 9

SpeedPLUS Variable Gain Amplifier and Preamp

Product	BW (MHz)	Pre-Amp e_{n1} (nV/ $\sqrt{\text{Hz}}$)	VCA e_{n1} (nV/ $\sqrt{\text{Hz}}$)	Gain Control Range (dB)	Power Dissipation (mW)	Input	V_S (V)	Package	Price** (1kpcs)
VCA2612 (DUAL)	80	1.4	3.3	5 to 25	390 (dual)	DIFF/SE	+5	LQFP-48	\$11.75

SpeedPLUS Video Signal Processing Solutions

Product	Bits	Sample Rate (MHz)	Power (mW)	V_S (V)	SNR (dB)	Gain Range (dB)	CDS/CIS	Ref	Package	Price** (1kpcs)
VSP2000	10	18	160	+2.7	53	0 to 34	Yes/No	Int	LQFP-48	\$5.75
VSP2080	— ⁽¹⁾	—	130	+2.7	55	0 to 34	Yes/No	Int	SSOP-20	\$2.23
VSP2101	10	27	170	+2.7	53	0 to 13	Yes/Yes	Int	LQFP-48	\$5.75
VSP3000	12	6	350 ⁽²⁾	+5	—	0 to 13	Yes/Yes	Int	LQFP-48	\$5.75
VSP3010	12	12	350 ⁽²⁾	+5	—	0 to 13	Yes/Yes	Int	LQFP-48	\$5.75
VSP3100	14	10	500	+5	—	0 to ± 13	Yes/Yes	Int	LQFP-48	\$15.00

Note: (1) ADC not included. (2) Typ CDS Mode.

DSL Analog Front Ends

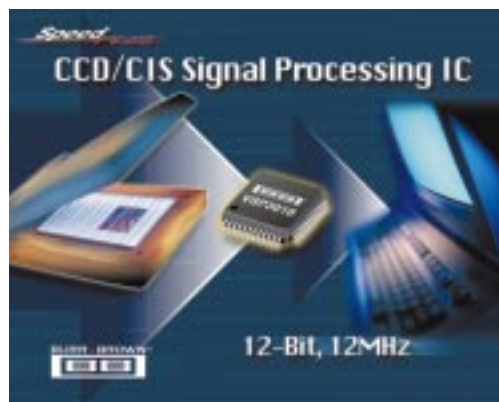
Product	Type	Design Speed (Kbits/s)	Minimum Speed (Kbits/s)	Scaleable Data Rate	Line Code	Power Dissipation (mW)	Power Supply (V)	VCXO	Package	Price** (1kpcs)
AFE1302	ADSL G.Lite	1100	—	—	DMT	500	+5	Yes	SSOP-40	\$11.00
AFE1230	HDSL2/SDSL	2320	64	445	PAM	650	+5	No	SSOP-36	\$18.00
AFE1137	DSL	1000	160	yes	QAM	300	+5	No	SSOP-56	\$14.40
AFE1144	HDSL	1168	64	yes	2B1Q	250	+5	No	SSOP-28	\$9.00
AFE1115	HDSL/SDSL	1168	192	yes	2B1Q	300	+5	Yes	SSOP-56	\$12.00
AFE1124	HDSL/SDSL	1168	64	yes	2B1Q	250	+5	No	SSOP-28	\$9.00
AFE1203	HDSL/SDSL	2320	160	yes	2B1Q	400	+5	No	SSOP-48	\$14.40
AFE1205	HDSL/SDSL	2320	160	yes	2B1Q	400	+5	No	SSOP-48	\$14.40
AFE1224	HDSL/SDSL	2320	64	yes	2B1Q	355	+5	No	SSOP-28	\$14.40
AFE2124	HDSL/SDSL	1168	64	yes	2B1Q	250 ⁽¹⁾	+5	No	SSOP-48	\$18.00
AFE2126	HDSL/SDSL	1168	64	465	2BIQ	280	+5	No	SSOP-48	\$18.00

Note: (1) Per channel; HDSL is high bit rate DSL; MDSL is medium speed DSL; SDSL is symmetrical DSL.

DSL Differential Line Drivers

Product	-3dB BW ⁽¹⁾ (MHz)	I_{OUT} (mA)	Diff. SR (V/ μs)	THD ⁽¹⁾ (dBc)	e_{n1} (nV/ $\sqrt{\text{Hz}}$)	Input V_{OS} (mV)	CMRR (dB)	PSRR (dB)	Gain Error (dB)	I_Q (mA)	V_S (V)	Package	Price** (1kpcs)
DRV1100	5	230	80	-65	30	5	62	76	± 0.25	11	+5	SO-8, PDIP-8	\$2.95
DRV1101	24	230	100	-71	15	3	46	76	± 0.25	25	+5	SO-8	\$2.95
OPA2607 ⁽²⁾	25	140	1200		1.6					17	± 12	SO-8, SO-14	\$2.39
OPA2677 ⁽²⁾	200	280	2200		1.7					18	+12	SO-8, SO-14	\$2.29

Note: (1) $R_L = 15\Omega$, $V_O = 6V_{p-p}$. (2) See Current Feedback Op Amps



SpeedPLUS Op Amps

Fixed Gain Buffer Amplifiers (G = +2, +1, -1)

Product	BW ⁽¹⁾ (MHz)	G _{NOM} ⁽²⁾	SR ⁽³⁾ (V/μs)	SFDR ⁽⁴⁾ (dB)	V _S ⁽⁵⁾ (V)	I _O ⁽⁶⁾ (mA/Chan)	V _{OR} ⁽⁷⁾ (V)	I _{OUT} ⁽⁸⁾ (mA)	e _{ni} ⁽⁹⁾ (nV/√Hz)	Package	Price** (1kpcs)
OPA682	240	2	2100	74	±5, 5	6.0	±3.8	135	2.2	SOT23-6, SO-8, PDIP-8	\$1.82
OPA2682	240	2	2100	74	±5, 5	6.0 (dual)	±3.8	135	2.2	SO-8, SO-14	\$2.92
OPA3682	240	2	2100	74	±5, 5	6.0 (triple)	±3.8	135	2.2	SSOP-16, SO-16	\$3.85

Current Feedback

Product	BW (MHz)	G _{NOM}	SR (V/μs)	SFDR (dB)	V _S (V)	I _O (mA/Chan)	V _{OR} (V)	I _{OUT} (mA)	e _{ni} (nV/√Hz)	Package	Price** (1kpcs)
OPA603	160	2	1000	59	±15, ±5	21	±10	150	4.2	SO-16, PDIP-8	\$4.65
OPA658	680	2	1700	68	±5	5.0	±2.7	60	3.2	SOT23-5, SO-8, PDIP-8	\$1.49
OPA2658	500	2	1700	68	±5	5.0 (dual)	±2.7	60	3.2	SO-8, PDIP-8	\$2.39
OPA4658	450	2	1700	66	±5	5.0 (quad)	±2.7	60	3.3	SO-14	\$4.99
OPA681	220	2	2100	74	±5, ±5	6.0	±3.8	135	2.5	SOT23-6, SO-8, PDIP-8	\$1.79
OPA2681	220	2	2100	74	±5, ±5	6.0 (dual)	±3.8	135	2.5	SO-8, SO-14	\$2.89
OPA3681	220	2	2100	74	±5, ±5	6.0 (triple)	±3.8	135	2.5	SO-16, SSOP-16	\$3.79
OPA685	900	2	4200	74	±5, ±5	12.9	±3.9	60	1.7	SO-8, SOT23-6	\$1.89
OPA2607	25	8	600	72	±12	8.5 (dual)	±11	140	1.6	SO-8, SO-14	\$2.39
OPA2677	200	4	1100	72	±6	9.0 (dual)	±5	280	1.7	SO-8, SO-14	\$2.29

Voltage Feedback (G_{MIN} = 1)

Product	BW (MHz)	G _{NOM}	SR (V/μs)	SFDR (dB)	V _S (V)	I _O (mA/Chan)	V _{OR} (V)	I _{OUT} (mA)	e _{ni} (nV/√Hz)	Package	Price** (1kpcs)
OPA620	300	1	250	—	+5	21	±3.0	50	2.3	SO-8, PDIP-8	\$7.20
OPA631	75	2	100	42	+10, +5, +3	6	0.06 to 4.80	25	6.0	SO-8, SOT23-5	\$1.29
OPA2631	75	2	100	42	+10, +5, +3	6 (dual)	0.06 to 4.80	25	6.0	SO-8	\$2.09
OPA632	75	2	100	42	+10, +5, +3	6	0.06 to 4.80	25	6.0	SO-8, SOT23-6	\$1.29
OPA634	150	2	250	63	+10, +5, +3	12	0.05 to 4.80	50	5.6	SO-8, SOT23-5	\$1.49
OPA2634	150	2	250	63	+10, +5, +3	12 (dual)	0.08 to 4.80	50	5.6	SO-8	\$2.49
OPA635	150	2	250	63	+10, +5, +3	12	0.05 to 4.80	50	5.6	SO-8, SOT23-6	\$1.49
OPA642	400	1	380	92	±5	20	±3.0	40	2.7	SOT23-5, SO-8, PDIP-8	\$3.75
OPA650	560	1	240	73	±5	5.1	±2.7	65	8.4	SOT23-5, SO-8, PDIP-8	\$1.29
OPA2650	360	1	240	72	±5	5.5 (dual)	±2.7	65	8.4	SO-8, PDIP-8	\$1.95
OPA2652	200	2	290	75	±5	5.5 (dual)	±3.0	80	8.0	SO-8	\$1.29
OPA4650	360	1	240	68	±5	5.8 (quad)	±2.7	65	8.4	SO-14, PDIP-14	\$4.99
OPA655***	400	1	210	90	±5	25	±3.0	35	6.0	SO-8, PDIP-8	\$9.13
OPA671***	33	1	107	—	±15, ±5	15	±10.5	50	10.0	PDIP-8	\$4.37
OPA680	220	2	1800	68	±5, ±5	6.4	±3.8	135	4.8	SOT23-6, SO-8, PDIP-8	\$1.79
OPA2680	220	2	1800	68	±5, ±5	6.4 (dual)	±3.8	135	4.8	SO-8, SO-14	\$2.89
OPA3680	220	2	1800	68	±5, ±5	6.4 (triple)	±3.8	135	4.8	SSOP-16, SO-16	\$3.79
OPA688 ^{VLA}	260	2	1000	66	±5, ±5	16	±3.9	70	6.3	SO-8, PDIP-8	\$2.65

Voltage Feedback (G_{MIN} > 1)

Product	BW (MHz)	G _{NOM}	SR (V/μs)	SFDR (dB)	V _S (V)	I _O (mA/Chan)	V _{OR} (V)	I _{OUT} (mA)	e _{ni} (nV/√Hz)	Package	Price** (1kpcs)
OPA621	500	2	500	—	±5	26	±2.7	60	2.3	SO-8	\$7.20
OPA643	200	5	1000	90	±5	20	±3.0	40	2.3	SOT23-5, SO-8, PDIP-8	\$3.75
OPA651	470	2	300	67	±5	5.1	±2.7	65	4.6	SO-8	\$1.95
OPA686	250	10	600	72	±5	12	±3.2	60	1.3	SOT23-5, SO-8	\$2.89
OPA2686	250	10	600	72	±5	12 (dual)	±3.2	60	1.4	SO-8	\$4.59
OPA687	290	20	900	90	±5	18	±3.3	60	0.9	SOT23-6, SO-8	\$3.49
OPA689 ^{VLA}	280	6	1600	61	±5, ±5	16	±3.9	70	4.6	SO-8, PDIP-8	\$2.95

Notes: (1) BW refers to small-signal bandwidth. (2) G_{NOM} is the nominal gain for the other specs. (3) SR refers to slew rate. (4) SFDR is the Spurious Free Dynamic Range at f = 5MHz and V_O = 2Vp-p. (5) V_S is the specified supply voltage(s). (6) I_O is the supply current per channel. (7) V_{OR} is the no load, voltage output range (guaranteed at 25°C). (8) I_{OUT} refers to the output current (guaranteed at 25°C). (9) e_{ni} is the input voltage noise density. *Voltage Limiting Amplifier. ***FET Input.

Bold indicates new products. **Bold Blue Italics** indicates preliminary information



**Recommended resale in USD; FOB USA.

Medical Imaging Solutions

Ultrasound

Burr-Brown continues to expand its portfolio of products for medical imaging. Along with a complete line of high-speed 8-, 10- and 12-Bit A/D converters plus driver op amps, a family of high-speed D/A converters (**DAC900 Family**) and a new dual variable gain amplifier with low noise pre-amp (**VCA2612**) has now been added. The A/Ds and op amps give simply the best dynamic range of any A/D in their class and power consumption category at a very attractive price. The new VCA2612 with its combination of gain and gain range programmability make it a versatile building block in the medical imaging signal chain. The new DAC900 Family is a pin compatible digital-to-analog converter (DAC) family featuring 8-, 10-, 12-, or 14-bit resolution, with all four models supporting update rates of 165MSPS. Whether your SNR requirement is 49dB for an 8-Bit system or 68dB 12-bit system, we have the right parts to meet your needs. *See Figure 10.*

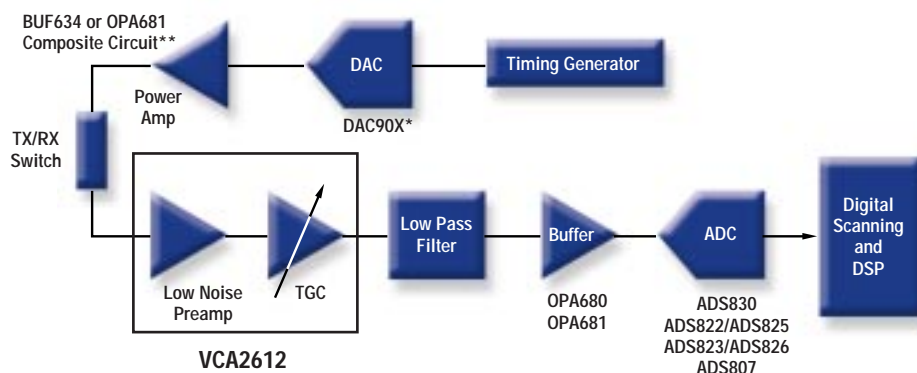


Fig. 10

Gamma Cameras

For gamma camera applications, Burr-Brown has a complete line of 10-bit A/Ds as well as operational amplifiers for signal conditioning, voltage gain control and current-to-voltage conversion. The

combination of high dynamic performance, low power and low cost make Burr-Brown products the best solution in many medical imaging applications. *See Figure 11.*

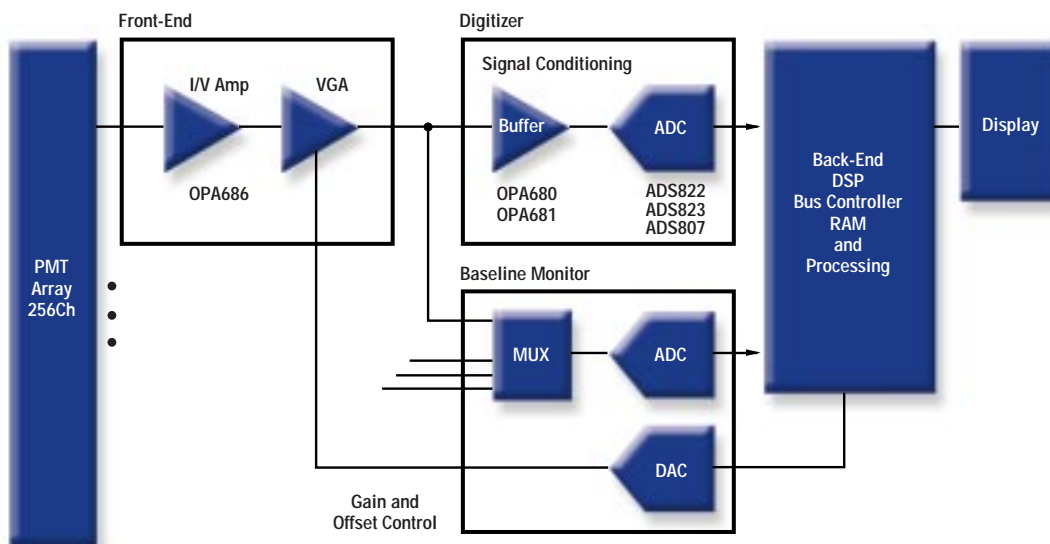


Fig. 11



*Coming Soon – Call factory for availability. **Contact Burr-Brown applications group for circuit details.

Wired Communication Solutions

Burr-Brown's ever expanding product line provides high performance solutions for many DSL and other wired communications systems.

DSL Analog Front End Products

Burr-Brown offers a number of analog front end (AFE) products for digital subscriber lines (DSL). Each of the analog front ends includes a transmit and a receive channel with all of the active analog circuitry needed to connect a digital signal processor chip to a telephone line transformer. These units also feature scaleable data rates in which all on-chip filters and converters automatically scale with input clock frequency.

In addition to the standard products shown below, Burr-Brown has the capability to design and produce new analog front end chips for your volume production requirements. Our "core cell" approach means that we can design new analog front end products using critical circuit blocks which already exist for fast turnaround time with relatively low risk.

See Figure 1.

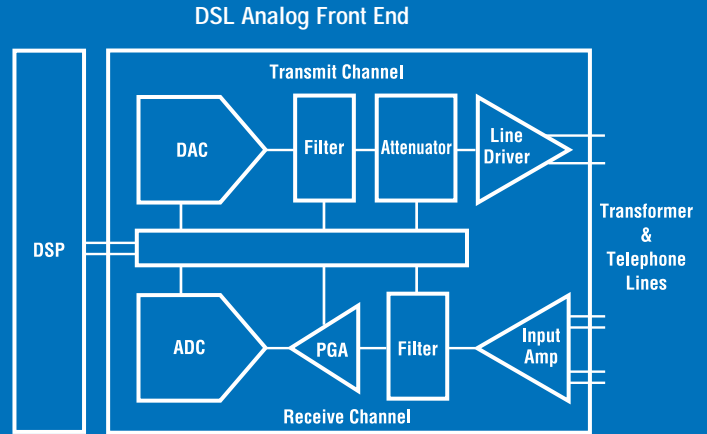


Fig. 1

AFE1124

The AFE1124 is an analog front end optimized for HDSL and MDSL applications. It features a serial interface with a very small package and very low power dissipation. It is designed for data rates up to 1.168Mbps. Priced at \$9.00 each in 1000s.

See Figure 2.

Features

- 250mW Power Dissipation
- Scaleable Data Rate
- 28-Pin SSOP

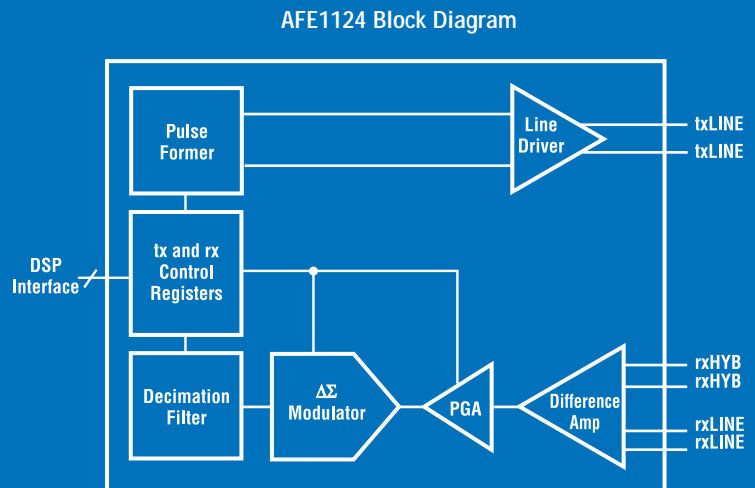


Fig. 2

AFE1115

The AFE1115 is an analog front end optimized for HDSL and MDSL applications. It includes DSL transmit and receive channels, additional on-board VCXO circuitry, and an 8-bit VCXO control DAC for clock recovery. It is designed for data rates up to 1.168Mbps. Priced at \$12.00 each in 1000s.

See Figure 3.

Features

- 300mW Power Dissipation
- Scaleable Data Rate
- 56-Pin SSOP

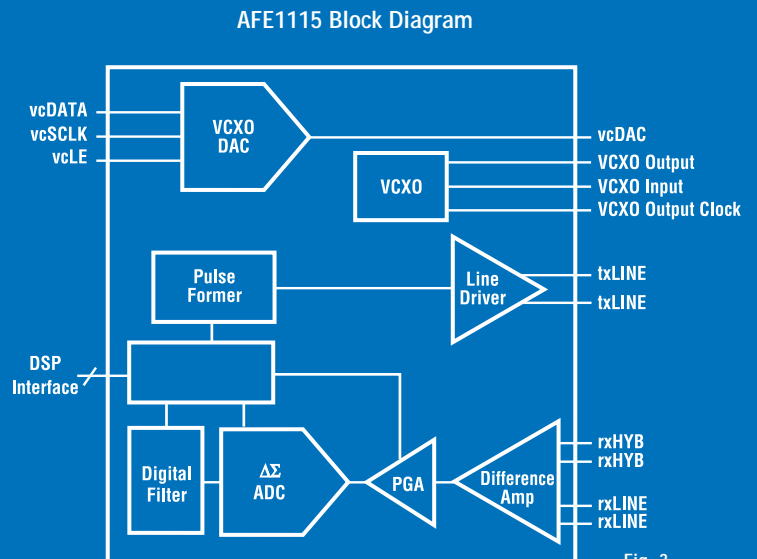
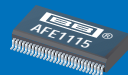


Fig. 3

AFE1203 & AFE1205

The **AFE1203** and **AFE1205** are analog front ends optimized for single pair 2B1Q HDSL and MDSL applications. They have a power control feature which allows the user to reduce power dissipation. Both include DSL transmit and receive channels, and are designed for data rates up to 2.3Mbps. See Figure 4.

Features

- 385mW Power Dissipation
- User Power Control
- Scaleable Data Rate
- 48-Pin SSOP

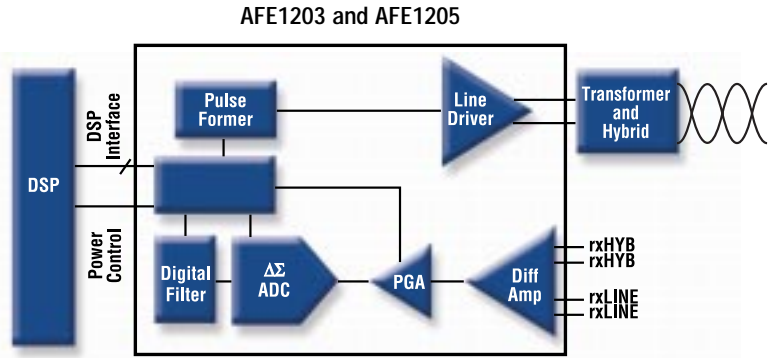


Fig. 4

DRV1100 & DRV1101—Line Drivers

The **DRV1100** is a low power, fixed gain differential line driver designed for very low harmonic distortion at the high power required of DSL line interface standards. The DRV1100 operates from a single +5V supply and can deliver 230mA peak output current and 9.5Vp-p differential output voltage swing.

The **DRV1101** is a fixed gain differential line driver designed for use as the upstream line driver for single +5V only ADSL G.Lite, and as both upstream and downstream line drivers in CAP ADSL systems. Operating on a single +5V supply, the DRV1101 can supply up to 230mA peak output current. The output voltage can swing up to 9.5Vp-p on a single +5V supply. In ADSL G.Lite applications, DRV1101 can supply up to 10dBm average line power with a crest factor of 5.3. Both are priced at \$2.95 each in 1000s. See Figure 5.

Features

- 5MHz Bandwidth: 6Vp-p into 15Ω (DRV1100)
- 10MHz Bandwidth: 6Vp-p into 15Ω (DRV1101)
- Fixed Differential Gain of 3V/V
- PDIP-8 and SO-8 (DRV1100)
- SO-8 Package (DRV1101)

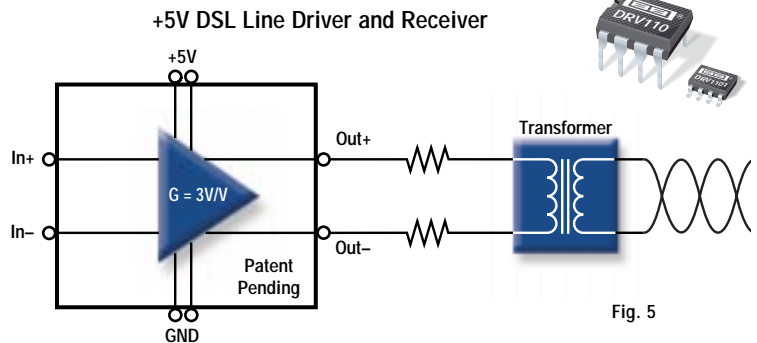


Fig. 5

DSL Line Driver/Receiver Application

This application circuit supports DSL applications at the CP (Customer Premises) requiring 10 to 13dBm (crest factor of 5.33 for DMT) on a single +12V supply. The **OPA2681** has the right combination of output swing, output current and slew rate at high gains to achieve low distortion at the required power levels. The **OPA2680** makes an excellent receiver amplifier because of its low noise, high bandwidth and slew rate performance margins. Where +12V or ±5V supplies are available, and/or lower turns ratios are desired, use the OPA2681/OPA2680. See Figure 6.

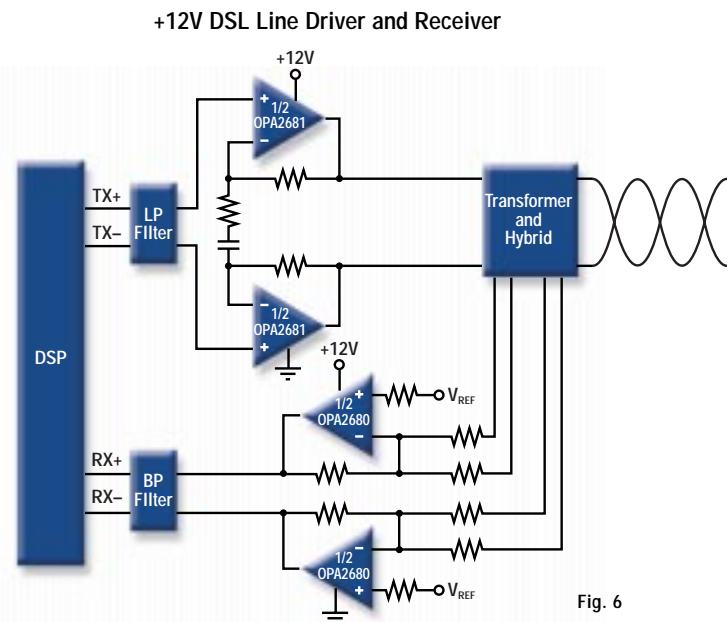


Fig. 6

Burr-Brown

Corporate Profile

Burr-Brown Corporation designs, manufactures, and markets a broad line of analog and mixed-signal integrated circuits used in the processing of real-world electronic signals. These products are used in a wide range of markets and applications, including industrial and process control, telecommunications, test and measurement, medical and scientific instrumentation, medical imaging, digital audio and video, personal computing, and multimedia.

Burr-Brown's product strategy is to design innovative, proprietary products which bring a very high level of functional value to our customers' applications. There are currently over 1200 products in our portfolio. We produce both standard products which are used in a broad range of applications, and specially developed products optimally suited for emerging, fast growth, target applications such as audio signal processing and broadband communications.

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