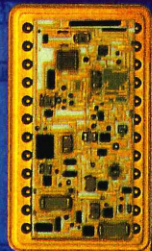
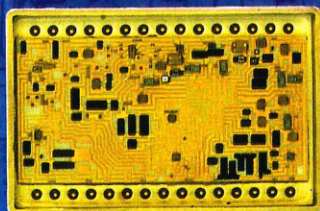
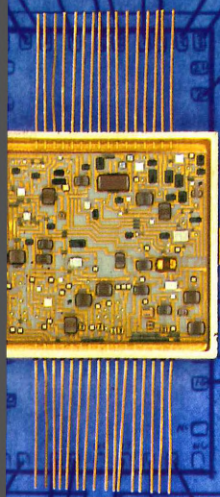




Better products by design.



 **TELEDYNE PHILBRICK**

MIL-STD-1772 Qualified

Better products by design.

Since 1946, Teledyne Philbrick has pioneered the design, development and manufacture of high-quality electronic circuits—inventing many of those analog techniques that have since become universal standards.

Today, we produce an even broader range of high-performance standard and custom circuits, both in hybrid and modular form, representing the state of the art in analog signal conditioning and data acquisition.

Our expertise in the design and production of hybrid circuits has earned

for Teledyne Philbrick Qualification to MIL-STD-1772.

The operational amplifiers produced by Teledyne Philbrick are at the forefront of linear technology for speed, accuracy, bandwidth and overall performance.

Our wide range of converters (including analog to digital, digital to analog, voltage to frequency and frequency-to-voltage) are unparalleled for speed, accuracy and linearity.

And our track and hold amplifiers, designed to interface with analog to digital converters when digitizing

high-speed analog signals, offer the highest performance in the industry.

Every product Teledyne Philbrick makes, in fact, is constantly reassessed for design improvement. As a result, they outperform standard spec requirements—often substantially.

So whatever your application—high-speed data acquisition, graphic CRT displays, audio, video, microwave transmission or medical instrumentation—look to Teledyne Philbrick.

Your products will be better by design because *our* products are better by design.

PRODUCT SELECTION GUIDE

Operational Amplifiers

 Indicates new product.

HYBRIDS

Part Number	Guaranteed Output Range (1)		Open Loop Gain (MIN) dB	Frequency Response		Time Response		Offset Voltage		Input Bias Current		Pkg.
	V (MIN)	mA (MIN)		GBW (MIN) MHz	Unity Gain (MIN) MHz	Settling Time (MAX) μ s-0.1%	Slew Rate (MIN) V/ μ s	Initial (MAX) mV	Drift (MAX) μ V/ $^{\circ}$ C	Initial (MAX) nA	Drift (MAX) nA/ $^{\circ}$ C	
0032*	± 10	± 10	80	—	80(t)	0.3(t)	± 350	± 5	± 25 (t)	± 0.1	(3)	A
1430*	± 10	± 50	106	80	60(t)	0.1(t)	± 500 (t)	± 2	± 75	± 0.5	(3)	D
1435*	± 5	± 10	90	700	150(t)	0.06	± 250	± 5	± 25	± 20 k	100	D
1437*	± 10	± 20	88	350(t)	60(t)	0.12	± 400 (t)	± 2	± 50	± 0.2 (t)	(3)	B
1438*	± 10	± 50	88	350(t)	60(t)	0.12	± 400 (t)	± 2	± 50	± 0.2 (t)	(3)	A
1443*	± 10.25	± 100	95	1200(t)	80(t)	0.08(t)	± 900	± 3	± 75	± 0.05	(3)	E
1446*	± 10.5	± 100	90	1000(t)	100(t)	0.1(t)	± 1 k (t)	± 2	± 50	± 0.05	(3)	E
1460*	± 30	± 150	80	1400(t)	—	0.8(t)	± 300 (t)	± 5	± 50	± 10 k	80(t)	E
1461*	± 27	± 600	95	1200(t)	30(t)	1	± 900	± 5	± 50	± 0.05 (t)	(3)	F
1463*	± 28	± 1000	95	—	17(t)	0.25(t)	± 165 (t)	± 5	± 20 (t)	± 0.2	(3)	E
1464*	± 30	(2)	95	(2)	(2)	(2)	(2)	± 5	± 20 (t)	± 0.2	(3)	E
1465*	± 28	± 600	110	1500	30(t)	1	± 800	± 5	± 50	± 0.05	(3)	E
1467*	± 5	± 10	90	700	150(t)	0.06	± 250	± 0.1	± 3	± 25 k	250	D
1468*	± 34	$\pm 10,000$	96	4(t)	—	2.0(t)	± 2.5	± 6	± 65	± 30	± 0.4 (t)	E
1480*	± 140	± 75	95	18(t)	5(t)	1.5	± 100 (t)	± 3	± 100	± 0.2	(3)	E
1481*	± 68	± 80	94	—	3	7.5(t)	± 25	± 3	± 50	± 0.1	(3)	E
1493*	± 10	± 20	88	350(t)	60(t)	0.12	± 400 (t)	± 2	± 50	± 0.2 (t)	(3)	D

*May be ordered with screening to MIL-STD-883, class B or S.

(t) denotes typical spec.

See notes on last page.

Operational Amplifiers

MONOLITHICS

Part Number	Guaranteed Output Range (1)		Open Loop Gain (MIN) dB	Frequency Response		Time Response		Offset Voltage		Input Bias Current		Pkg.
	V (MIN)	mA (MIN)		GBW (MIN) MHz	Unity Gain (MIN) MHz	Settling Time (MAX) μ s-0.1%	Slew Rate (MIN) V/ μ s	Initial (MAX) mV	Drift (MAX) μ V/ $^{\circ}$ C	Initial (MAX) nA	Drift (MAX) nA/ $^{\circ}$ C	
1321	± 10	± 10	98	100(t)	—	0.4(t)	± 20	± 5	± 30 (t)	± 25	± 0.8 (t)	B
1322*	± 10	± 10	76	20(t)	—	0.2(t)	± 80	± 10	± 30 (t)	± 250	± 0.5 (t)	B
1332	± 35	± 10	100	—	4	7(t)	± 5 (t)	± 6	± 20 (t)	± 30	± 0.4 (t)	B
1341	± 10	± 10	80	400(t)	—	0.25(t)	± 350	± 15	± 20 (t)	$\pm 20\mu$ A	—	C
1342	± 10	± 10	80	600(t)	—	0.35(t)	± 550	± 15	± 20 (t)	$\pm 20\mu$ A	—	C
1344	± 10	± 15	98	100(t)	20(t)	—	± 100	± 3	± 20 (t)	± 0.05	(3)	B
1345	± 10	± 15	88	100(t)	20(t)	—	± 50	± 15	± 35	± 0.065	(3)	B
1346	± 10	± 10	106	—	2(t)	2(t)	± 4	± 3	± 5 (t)	± 0.001	(3)	B
1424	± 10	± 5	86	—	1(t)	—	± 6 (t)	± 50	± 75	± 0.05	(3)	B

MODULES

Part Number	Guaranteed Output Range (1)		Open Loop Gain (MIN) dB	Frequency Response		Time Response		Offset Voltage		Input Bias Current		Pkg.
	V (MIN)	mA (MIN)		GBW (MIN) MHz	Unity Gain (MIN) MHz	Settling Time (MAX) μ s-0.1%	Slew Rate (MIN) V/ μ s	Initial (MAX) mV	Drift (MAX) μ V/ $^{\circ}$ C	Initial (MAX) nA	Drift (MAX) nA/ $^{\circ}$ C	
1009	± 10	± 5	94	—	1	—	± 5	—	± 75	± 0.03	(3)	G
1018	± 10	± 2.5	120	—	0.5	80(t)	± 0.3 (t)	± 1	± 1.5	2	± 0.1	G
1022	± 100	± 20	120	—	1	—	± 20	± 2	± 50	± 0.03	(3)	G8
1027	± 10	± 20	100	—	10	0.5(t)	± 60	± 15	± 50	± 0.05	(3)	G2
1032	± 110	± 10	100	—	1	25	± 6	± 5	± 50	± 0.01	(3)	G8
1035	± 10	± 5	100	—	0.3	30(t)	± 0.3 (t)	± 2	± 50	± 150 fA	(3)	G2
1701	± 12	± 5	112	—	1(t)	—	± 1.2	± 0.015	± 0.25	± 0.05	± 0.001	G4
1702	± 10	± 5	100	—	500Hz(t)	—	± 0.5 V/ms(t)	± 5	± 30	± 5 fA	± 2 fA	G4

Buffers

HYBRIDS

Part Number	Guaranteed Output Range (1)		Gain (1) (MIN)	Frequency Response	Time Response		Offset Voltage		Input Bias Current		Pkg.
	V (MIN)	mA (MIN)		-3dB Bandwidth (MIN) (V _{IN} = 1VRMS) MHz	Settling Time (MAX) μ s-0.1%	Slew Rate (MIN) V/ μ s	Initial (MAX) mV	Drift (MAX) μ V/ $^{\circ}$ C	Initial (MAX) nA	Drift (MAX) nA/ $^{\circ}$ C	
0033*	± 9	± 100 (t)	0.98V/V(t)	100(t)	0.025(t)	± 1000	± 10	± 50 (t)	± 2.5	(3)	A
1359	± 10	± 100	0.93V/V	250(t)	0.05(t)	± 1000	± 15	± 30 (t)	± 35 k	—	A
1490*	± 3	± 100	0.98V/V(t)	100(t)	—	± 500	± 20	± 500	± 0.1	—	E

Video Display Drivers

Part Number	Output Swing (V)	Rise Time (ns)	Linearity	-3dB Bandwidth (MHz)	Settling time 90% to 100% $\pm 2\%$ (ns)	Maximum Power Consumption (W)	Package
1900	50	2.4	$\pm 2\%$	200	6	7	S
1901*	50	2.4	$\pm 2\%$	200	6	7	T

Logarithmic Amplifiers

Part No.	Description	Dynamic Range (dB)		Log Conformity				Frequency Response (Hz)	Pkg.
		Current	Voltage	Input Current	% (Max)	Input Voltage	% (Typ)		
4357	Positive Input Logarithmic Operator	120	80	1nA to 10nA 10nA to 100μA 100μA to 1mA	±1 ±1 ±1	(12)	(12)	80 (13)	G1
4358	Negative Input Logarithmic Operator	120	80	1nA to 10nA 10nA to 100μA 100μA to 1mA	±1 ±1 ±1	(12)	(12)	80 (13)	G1
4362	Positive Input Logarithmic Amplifier	120	80	1nA to 10nA 10nA to 100μA 100μA to 1mA	±1 ±0.5 ±1	1mV to 1V 1V to 10V	±0.5 ±1	80k	G3
4363	Negative Input Logarithmic Amplifier	120	80	1nA to 10nA 10nA to 100μA 100μA to 1mA	±1 ±0.5 ±1	1mV to 1V 1V to 10V	±0.5 ±1	80k	G3

Instrumentation Amplifier

Part No.	Description	Output Range (V/mA)	Unity Gain Bandwidth (kHz)(t)	Settling to ±0.1% (μsec)	Offset Voltage (mV, Max)	Input Bias Current (3) (pA, Max)	Pkg.
4253	High Performance FET Input	±10/±5	75	5(t)	±1	±10	G7

Track-Hold Amplifiers

Part Number	Acquisition Time (10V Step to ±0.01%FS)	Sample-Hold Settling Time (to ±0.01%FS)	Maximum Droop Rate (μV/μsec)	Aperture Jitter (nsec)	Maximum Gain Error (4) (%)	Typical Input Impedance	Package
4853	1μsec(t)	300nsec(t)	±1(t)	±1(t)	±0.05	(5)	G5
4854	12μsec(t)	1.5μsec(t)	±0.05	±4 Max	±0.01	10 ⁹ Ω	G5
4855	300nsec Max	100nsec Max	±25	±0.2(t)	±0.02	10 ⁹ Ω//2pF	G5
4856*	5μsec(t)(6)	(6)	(6)	±7(t)	(4)	5MΩ	H
4860*	200nsec Max	100nsec(t)	±5(t)	±0.05(t)	±0.1(t)	1kΩ	J
4866	1μsec(t)	185nsec(t)	±0.08	±30(t)	±0.0005	5MΩ//3pF	J

Deglitchers

4902*	1μsec(t)	200nsec Max	±25	N/A	±0.05(t)	N/A	I
4903	1μsec Max	200nsec Max	±1000	N/A	±0.05(t)	N/A	I

Analog to Digital Converters

Resolution (Bits)	Part Number	Maximum Conversion Time	Input Voltage Ranges (V)	Integral Linearity Error (LSB's, Max)	Differential Linearity Error (LSB's, Max)	Maximum Power Consumption (mW)	Package
8	4130 Series	750nsec	-5, -10 ±5, ±10	±1/2	±1/4	3,275	G11
10	4131 Series	1μsec	-5, -10 ±5, ±10	±1	±1/2(t)	3,275	G11
12	4132-22	3.5μsec	-10, -20 ±5, ±10	±1	±1/2(t)	3,275	G11
12	4133-22	2.5μsec	-10, -20 ±5, ±10	±1	±1/2(t)	3,275	G11
8	4143	1.8msec	10μA (7)	±1/2	±1/2	25	K
10	4144	6msec	10μA (7)	±1/2	±1/2	25	K
12	4145*	24msec	10μA (7)	±1/2	±1/2	25	K
3 1/2 Digit (8)	4146*	12msec	10μA (7)	±1/2	±1/2	25	K
12	4188	25μsec	+10, +20 ±5, ±10	±1	(14)	720	U
12	4188-01	25μsec	+10, +20 ±5, ±10	±1/2	(15)	720	U
12	4192	500nsec	+10, +20, ±10	±1/2	±1/2(t)	1,800	L
12	4193	500nsec	0 to +5	±1	±1/2(t)	2,100	N
12	4195	500nsec	±2.5	±1	±1/2(t)	2,100	N

* May be ordered with screening to MIL-STD-883, class B or S.

(t) denotes typical spec.

See notes on last page.

Sampling Analog to Digital Converters

Resolution (Bits)	Part Number	Maximum Sample Rate (MSPS)	Input Voltage Ranges (V)	Integral Linearity Error (LSB's, Max)	Differential Linearity Error (LSB's Max)	Effective Bits	Maximum Power Consumption (W)	Pkg.
10	4194	30	±1, 0 to +2	±1	±1/2	8.8 at 4MHz	13	Q
8	4196	250	±0.270	±1/2	±1/2	6.8 at 125MHz	5	R

Digital to Analog Converters

Resolution (Bits)	Part Number	Output Ranges (Volts, mA)	Maximum Settling Time (Step size/Error Band/Time)	Integral Linearity Error (LSB's, Max)	Differential Linearity Error (LSB's, Max)	Maximum Power Consumption (mW)	Package
8	4020	Current: +2, ±1	2mA/ ±1/2LSB/300nsec	±1/2	±1/2	450	G7
8	4021	Voltage: -10, ±5	10V/ ±1/2LSB/25µsec	±1/2	±1/2	600	G7
10	4022	Current: +2, ±1	2mA/ ±1/2LSB/300nsec	±1/2	±1/2	450	G7
10	4023	Voltage: -10, ±5	10V/ ±1/2LSB/25µsec	±1/2	±1/2	600	G7
12	4024	Current: +2, ±1	2mA/ ±1/2LSB/300nsec	±1/2	±1/2	450	G7
12	4025	Voltage: -10, ±5	10V/ ±1/2LSB/5µsec	±1/2	±1/2	750	G7
3-digit	4026	Current: +1.25	—	±1/2	±1/2	450	G7
3-digit	4027	Voltage: -10	—	±1/2	±1/2	750	G7
12	4058*	Voltage: -5, -10 ±2.5, ±5, ±10 Current: +4, ±2	20V/ ±1/2LSB/2.5µs 4mA/ ±1/2LSB/ 200n sec	±1/2	±1/2	645	I
12	4065*	Current: +4, ±2	4mA/ ±1/2LSB/100ns	±1/2	±1/2	645	I
12	4068*	Current: -5, ±2.5	5mA/ ±1/2LSB/400ns	±1/2	±1/2	465(t)	J
12	4072	Multiplying (9)	20V/ ±1LSB/650ns	±1/2	±1/2	1500	G10
12	4080 Series*	Voltage: 4080: -5, -10 4081: ±2.5, ±5 4082: +5, +10	10V/ ±1LSB/250ns	±1/2	±1/2(t)	900	I
12	TP7541 Series	Multiplying (9)	20V/ ±1/2LSB/1µs	±1/2	±1/2	450	M
12	TPDAC80V	Voltage: +5, +10, ±2.5, ±5, ±10	10V/ ±1/2LSB/1.5µs(t)	±1/2	±1/2	1000	J
12	TPDAC80I	Current: -2, ±1	2mA/ ±1/2LSB/300nsec(t)	±1/2	±1/2	1000	J
16	4088	Current: -2, ±1	2mA/ ±2LSB/1µs(t)	±1/2	±1/2	1000	N

Voltage to Frequency Converters

GENERAL PURPOSE

Output Frequency Range	Part Number	Absolute Accuracy			Temperature Stability		Pkg.
		Nonlinearity (%FS, Max)	Zero Offset (%FS, Max)	Full Scale (%FS, Max)	Zero Offset (µV/°C. Max)	Full Scale (Max) (ppm of FS/°)	
10kHz	4701	±0.05	±0.1	±0.75(t)	±100	±100	G3
	4713	±0.1	±0.1	±0.75	±100	±150	G3
	4721	±0.2	±0.2	±1.0	±100	±300	G2
	4723	±0.015	±0.15	±0.50	±50	±100	G2
	4725	±0.015 plus ±0.015 (10)	±0.1	±0.75(t)	±100	±100	G3
100kHz	4703	±0.05	±0.1	±0.75	±100	±100	G3

PRECISION

Output Frequency Range	Part Number	Absolute Accuracy			Temperature Stability		Pkg.
		Nonlinearity (%FS, Max)	Zero Offset (%FS, Max)	Full Scale (%FS, Max)	Zero Offset (µV/°C. Max)	Full Scale (Max) (ppm of FS/°)	
10kHz	4715	±0.01 plus ±0.01 (10)	±0.03	±0.50	±20	±50	G7
	4715-01	±0.005 plus ±0.005 (10)	±0.03	±0.50	±20	±15	G7
	4731*	±0.005	±0.05	±0.50	±20	±20(t)	I
100kHz	4709	±0.005 plus ±0.02 (10)	±0.03	±0.50	±30	±44	G6
	4733*	±0.005	±0.05	±0.50	±20	±20(t)	I
1MHz	4705	±0.001 plus ±0.05 (10)	±0.1	±0.50	±50	±200	G6
	4735*	±0.015	±0.05	±0.50	±50	±50	I
5MHz	4707	±0.01 plus ±0.075 (10)	±0.1	±0.50	±100	±150	G9
	4739*	±0.05 plus ±0.001 (10)	±0.08	±0.5	±100(t)	±75(t)	I
10MHz	4743*	±0.05 plus ±0.05 (10)	±0.08	±0.50	±100	±200	I

*May be ordered with screening to MIL-STD-883, class B or S.

(t) denotes typical spec.

See notes on last page.

Frequency to Voltage Converters

GENERAL PURPOSE

Frequency Range	Part Number	Absolute Accuracy			Temperature Stability		Pkg.
		Nonlinearity (%FS, Max)	Zero Offset (%FS, Max)	Full Scale (%FS, Max)	Zero Offset ($\mu\text{V}/^{\circ}\text{C}$, Max)	Full Scale (Max) (ppm of FS/ $^{\circ}\text{C}$)	
10kHz	4702	± 0.03	± 0.1	$\pm 0.1(t)$	± 100	± 100	G3
	4714	± 0.08	± 0.1	$\pm 0.1(t)$	± 100	± 150	G3
	4722	± 0.03 plus $\pm 0.03(10)$	± 0.1	$\pm 0.1(t)$	± 50	± 300	G
100kHz	4704	± 0.05	± 0.1	$\pm 0.1(t)$	± 100	± 150	G3
	4780 (11)	± 0.05	± 0.5	$\pm 10(t)$	± 50	± 40	H
	4781 (11)	± 0.02	± 0.5	$\pm 10(t)$	± 50	± 40	H
1MHz	4706	± 0.01 plus $\pm 0.05(10)$	± 0.1	$\pm 0.5(t)$	± 100	± 150	G7

PRECISION

Frequency Range	Part Number	Absolute Accuracy			Temperature Stability		Pkg.
		Nonlinearity (%FS, Max)	Zero Offset (%FS, Max)	Full Scale (%FS, Max)	Zero Offset ($\mu\text{V}/^{\circ}\text{C}$, Max)	Full Scale (Max) (ppm of FS/ $^{\circ}\text{C}$)	
10kHz	4708	± 0.007 plus $\pm 0.013(10)$	± 0.05	$\pm 0.5(t)$	± 50	± 50	G3
	4732*	± 0.005	$\pm 0.05(t)$	$\pm .075$	± 25	± 25	I
10kHz	4710	± 0.007 plus $\pm 0.013(10)$	± 0.1	$\pm 0.5(t)$	± 50	± 50	G3
	4734*	± 0.005	$\pm 0.05(t)$	$\pm .075$	± 25	± 25	I
1MHz	4736*	± 0.008	$\pm 0.05(t)$	$\pm .075$	± 25	± 50	I

Semi-Custom SMPS Power Hybrids

These products are designed to construct a high efficiency (85%) DC to DC converter. They may be easily customized to a specific application. Operating temperature range is -55°C to $+125^{\circ}\text{C}$.

Part Number	Part Type	Features	Package
2491*	Regulating PWM	Regulation $\leq 1\%$ under all operating conditions Operation to 500kHz MOSFET compatible outputs Internally compensated for 5V/167kHz operation	O
2494*	Current Mode Regulating PWM	Pulse by pulse current limiting Automatic push-pull symmetry correction Regulation $\leq 1\%$ under all operating conditions Operation to 1MHz MOSFET compatible outputs Internally compensated for 5V/200kHz operation	O
2473*	Driver/Switcher	Two 30A DC MOSFET switches with drivers Low on resistance ($0.085\ \Omega$ max) Low thermal resistance ($1^{\circ}\text{C}/\text{W}$ max) 20 milliohm current sense resistor included	P
2478*	Half/Full Bridge Schottky Rectifier	70A peak forward current Low forward voltage (0.9V @ 20A) Fast recovery ($1000\text{V}/\mu\text{s}$ reverse dv/dt) Low thermal resistance ($1^{\circ}\text{C}/\text{W}$ max) $V_r \text{ max} = 90\text{V}$	P

*May be ordered with screening to MIL-STD-883, class B or S.

(t) denotes typical spec.

See notes on last page.

Modular Power Supplies

2200 SERIES { 50Hz to 400Hz, 115V $\pm$ 10V. For optional 230V $\pm$ 20V operation, add -21 to
2400 SERIES { model number. Models 2203, 2204 and 2206 operate from 115V or 230Vac.

		Part Number	Output		Regulation, Max.		Ripple and Noise	Limit Current mA (t)	Case Size
			Voltage	Current	Line	Load			
PC BOARD MOUNTED	+ 5 Volts	2213	+5V DC	+ 1000mA	$\pm$ 0.6%	+ 0.1%	1mVp-p	1750	G13
		2223	+5V DC	+ 2000mA	$\pm$ 0.02%	$\pm$ 0.05%	1mV(RMS)	2700	G15
	$\pm$ 15 Volts	2203	$\pm$ 15V DC	$\pm$ 100mA	$\pm$ 0.03%	$\pm$ 0.03%	1mV(RMS)	50	G12
		2204	$\pm$ 15V DC	$\pm$ 50mA	$\pm$ 0.03%	+ 0.015%	1mV(RMS)	25	G12
		2215	$\pm$ 15V DC	$\pm$ 200mA	$\pm$ 0.02%	$\pm$ 0.05%	1mV(RMS)	60	G13
		2218	$\pm$ 15V DC	$\pm$ 350mA	$\pm$ 0.02%	$\pm$ 0.02%	0.5mV(RMS)	800	G15
	High Voltage	2217	$\pm$ 120V DC $\pm$ 2%	$\pm$ 40mA	$\pm$ 0.1%	$\pm$ 0.1%	2mV(RMS)	60	G14
CHASSIS MOUNTED	Triple Output	2243	$\pm$ 15V	$\pm$ 100mA	$\pm$ 0.02%	$\pm$ 0.03%	1mV(RMS)	175	G16
			+ 5V	+ 500mA	$\pm$ 0.02%	$\pm$ 0.05%	1mV(RMS)	850	
	+ 5V	2413	+5V DC	+ 1000mA	$\pm$ 0.5%	$\pm$ 0.15%	2mV(RMS)	1750	G19
	$\pm$ 15 Volts	2415	$\pm$ 15V DC	$\pm$ 200mA	$\pm$ 0.05%	$\pm$ 0.05%	1mV(RMS)	350	G19
		2419	$\pm$ 15V DC	$\pm$ 500mA	$\pm$ 0.05%	$\pm$ 0.05%	1mV(RMS)	1100	G19

2300 SERIES DC TO DC CONVERTERS

PC BOARD MOUNTED	Part Number	Output		Input			Regulation, Max.		Limit Current mA (t)	Case Size
		Voltage	Current	Voltage	Current		Line	Load		
					No Load	Full Load				
	2301	± 15V DC	± 100mA	+ 5V DC	200mA	1000mA	± 0.07%	± 0.07%	150	G17
2302	± 15V DC	± 150mA	+ 5V DC	200mA	1380mA	± 0.07%	± 0.07%	225	G17	
2331	± 15V DC	± 165mA	+ 5V DC	500mA	3480mA	± 0.1%	± 0.1%	300	G18	
	+ 5V DC	+ 750mA				± 1.0%	± 1.0%	750		

NOTES:

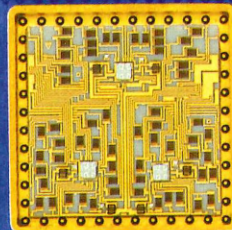
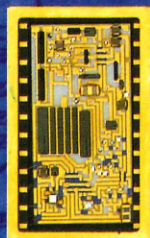
- At rated load
- Operational transconductance amplifier with user defined output stage.
- Doubles approximately every 10°C.
- All track-hold amplifiers listed have a gain of -1 except the 4854 (+1) and the 4856 (determined by a choice of external resistors).
- 2k Ω /(20pF in series with 2k Ω).
- Determined by size of external hold capacitor.
- These A/D's use an incremental charge balancing technique and require an input current. Any voltage, buffered by an external series resistor, may be applied.
- The 4146 has a 3½ digit binary coded decimal (BCD) output.
- The 4072 and the TP7541 are multiplying DACs. Their output voltages ($\pm$ 10V) will be equal to the product of their input voltages (-1V to +10V) and their digitally programmable scale factors (-1 to +1).
- Nonlinearity specification includes $\pm$ % FS plus $\pm$ % signal.
- 4780 and 4781 perform both voltage to frequency and frequency to voltage conversion in the same package.
- 4357/4358 require external operational amplifiers and passive components which will determine log conformity.
- Specified for 1nA input current. Frequency Response depends on external amplifiers for input currents from 1 μ A to 1mA.
- No missing codes for 11 bit resolution.
- No missing codes for 12 bit resolution.

PACKAGES:

- TO-8
- TO-99
- 14 pin DIP-ceramic
- 14 pin DIP-metal
- 8 pin TO-3
- 14 pin DIP-metal (with mounting flanges)
- Module (see below)
- 14 pin DIP-plastic
- 24 pin DIP-metal
- 24 pin DIP-ceramic
- 24 pin DIP-plastic
- 32 pin DIP-ceramic
- 18 pin DIP-ceramic
- 40 pin DIP-ceramic
- 30 pin flat pack (1" x 1")
- 10 pin power package (metal, 1" x 1.1" plus mounting flange)
- 5" x 7" P.C. Board
- 84 pin flat pack-ceramic
- 24 pin DIP-power tab
- 24 pin flat pack (1" x 1" including mounting flange)
- 28 pin DIP-metal

MODULE DIMENSIONS:

- 1.02" x 1.02" x 0.52"
- 1.14" x 1.14" x 0.42"
- 1.52" x 1.52" x 0.42"
- 1.52" x 1.52" x 0.62"
- 1.80" x 2.02" x 0.41"
- 2.00" x 2.00" x 0.40"
- 2.02" x 2.02" x 0.41"
- 2.42" x 1.82" x 0.62"
- 3.00" x 2.00" x 0.40"
- 3.02" x 2.52" x 0.40"
- 4.02" x 2.02" x 0.42"
- 3.55" x 2.5" x 1.05"
- 3.55" x 2.55" x 1.25"
- 3.55" x 2.55" x 2.00"
- 3.55" x 2.55" x 1.62"
- 3.55" x 2.55" x 1.88"
- 2" x 2" x 0.39"
- 3" x 2.5" x 0.75"
- 4.05" x 2.75" x 1.50"



TELEDYNE PHILBRICK Offices

Headquarters

40 Allied Drive,
Dedham, MA 02026-9103
Tel 617-329-1600
Tlx 212711 Fax 617-326-6313

U.K.:

The Harlequin Centre
Southall Lane
Southall Middlesex, UB2, 5NH, U.K.
Tel 571-9596
Tlx 935008 Fax 1-571-9442

West:

30423 Canwood Street
Suite #212
Agoura Hills, CA 91301
Tel 818-889-3827
Fax 818-889-8215

Japan:

4th Floor
Taiko No. 3 Bldg
2-10-7 Shibuya-Ku
Tokyo, 542, Japan
Tel 797-5251
Tlx 781-24335 Fax 7975255

