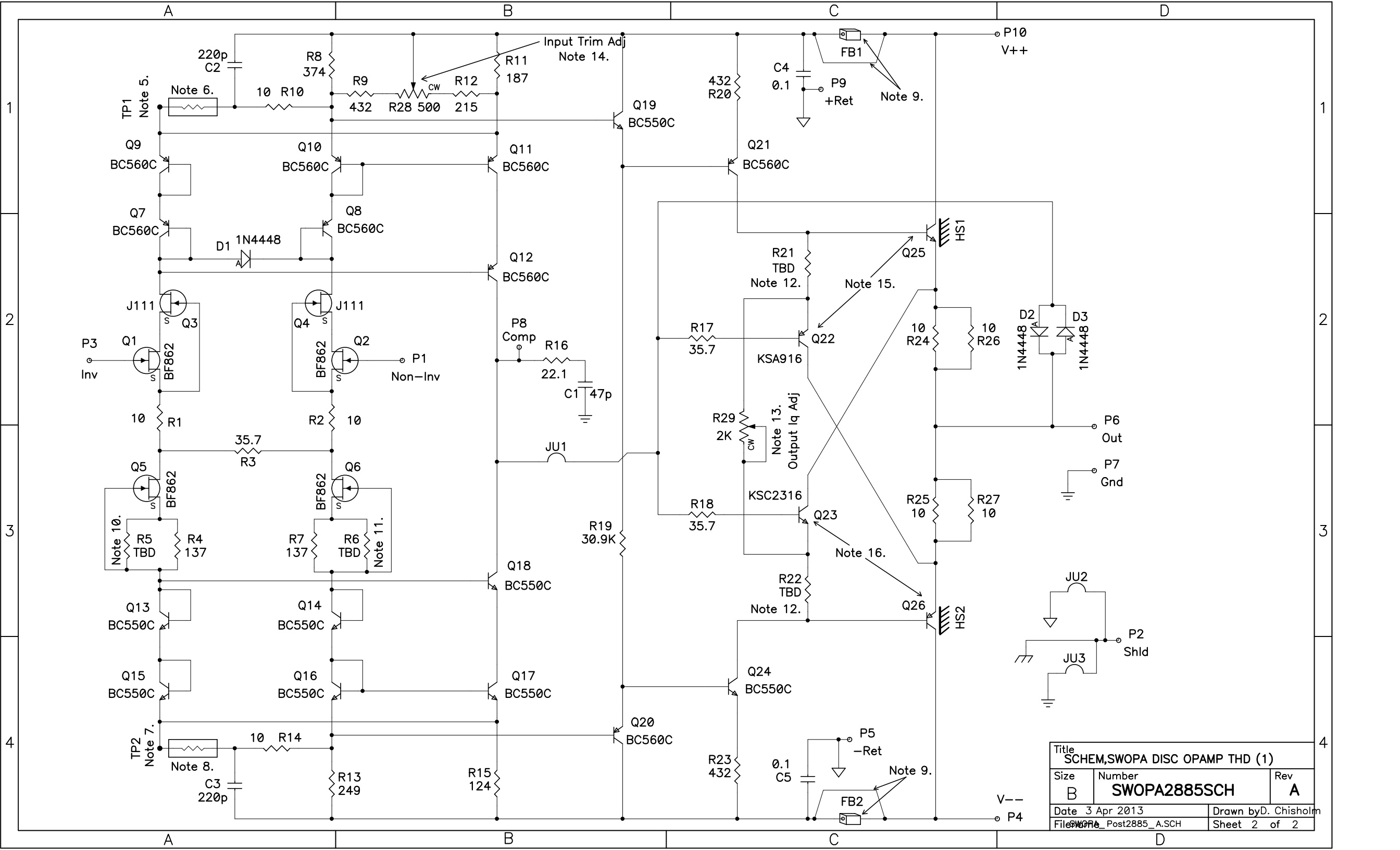


A		B		C		D	
1	Notes (Unless Otherwise Indicated):						1
	16 Provide thermal coupling between Q23 and Q26 by joining Q23 to Q26 with suitable adhesive or spring coupling device.						
	15 Provide thermal coupling between Q22 and Q25 by joining Q22 to Q25 with suitable adhesive or spring coupling device.						
	14 Input Balance Adjustment. Adjust to minimize input offset or overall THD as required by application.						
	13 Adjust for desired output stage bias current, or desired total module current. Typical adjustment values:						
	VARIANT: Ic Q25/Q26 Iq (Total)						
	-0 6.2 mA 25.0 mA						
	-1 27.8 mA 47.5 mA						
	12 Value sets range of output stage bias adjust. See Parts List.						
	11 Selected value.						
2	Selection criteria: 5 mA idle current through R13						
	Nominal value 162 ohms. Expected range 20 ohms to 4320 ohms.						
	10 Selected value.						
	Selection criteria: 10 mA idle current through R15						
	Nominal value 162 ohms. Expected range 20 ohms to 4320 ohms.						
	Select after selecting R7						
	9 Cut trace or remove jumper if indicated component is installed.						
	8 For alternative compensation method install R14 in this location rather than location shown.						
	7 Locate TP2 adjacent to R14 so that R14 may be installed either as shown, or in the alternate position between TP2 and C3.						
	6 For alternative compensation method install R10 in this location rather than location shown.						
3	5 Locate TP1 adjacent to R10 so that R10 may be installed either as shown, or in the alternate position between TP1 and C2.						
	4 Last Reference Designator used:						
	C5, D3, FB2, HS2, JU3, P10, Q26, R29						
	Reference Designator not used: None						
	3 Fixed resistors thin film or metal film, 250 mW min, 1% or better tol, except as noted.						
	Polarized capacitors aluminum electrolytic, rating as shown, tol +/-20% unless otherwise noted.						
	Non-polarized capacitors see parts list for construction & rating						
	2 Component values shown for reference only. Refer to parts list associated with specific variant and revision level.						
	1 VARIANTS:						
	SWOPA2885-0 T092 Output Devices						
SWOPA2885-1 T0126 Output Devices (High Bias)							
Revision Notes							
A. Preliminary development version of this dwg # and title. Not released. Circulated for comments. Circuit based on Post #2593 and #2643 in "Discrete Opamp Open Design" thread on "diyaudio.com". Available online at < http://www.diyaudio.com/forums/analog-line-level/218373-discrete-opa-p-open-design-260.html#post3324000 > and < http://www.diyaudio.com/forums/analog-line-level/218373-discrete-opa-p-open-design-265.html#post3344901 >.							
Title SCHEM,SWOPA DISC OPAMP THD (1)							
Size B		Number SWOPA2885SCH			Rev A		
Date 3 Apr 2013		Drawn byD. Chisholm					
Filename SWOPA_Post2885_A.SCH		Sheet 1 of 2					
A		B		C		D	



Title SCHEM,SWOPA DISC OPAMP THD (1)		
Size B	Number SWOPA2885SCH	Rev A
Date 3 Apr 2013		Drawn by D. Chisholm
File Name Post2885_A.SCH		Sheet 2 of 2

Assy Dwg # SWOPA2885ASY
Dwg Title PCB ASSY,SW-OPA DISC OPAMP THD (1)
Rev A
Schem Dwg # SWOPA2885SCH
Schem Title SCHEM,SWOPA DISC OPAMP THD (1)
Rev A

Orig Date 16-Apr-13
Assy Short Name SWOPA Disc Opamp THD1
Rev Date 16-Apr-13
Orig Date 16-Apr-13

Rev Date 16-Apr-13
Engineer Dale Chisholm

ITEM	REF	DES	DESCRIPTION	Unit of Meas	VARIANT USAGE:		ORIGINAL COMPONENT MANUFACTURER						ALTERNATIVE COMPONENT MANUFACTURER									
							Original Part Manufacturer (Pref)		Mfrgr. Typical Source		LINE COST PER VARIANT:		Original Part Manufacturer (Alternative)		Alternative Manufacturer Typical Source		LINE COST PER VARIANT:					
					-0	-1	MFRGR	MFRGR P/N	Unit Cost	Purch Qty	Vendor	Vendor P/N	-0	-1	MFRGR	MFRGR P/N	Unit Cost	Purch Qty	Vendor	Vendor P/N	-0	-1
1	<none>		SW-OPA DISC OPAMP THD(1) PWB	Ea	X	X	Pending	SWOPA2885PWB1			TBD	TBD	.0000	.0000	Pending	SWOPA2885PWB1			TBD	TBD	.0000	.0000
2	C1		Cap,Film PP 47pF	Ea	X	X	WIMA	FKP2O100471D00KSSD	.1900	10	Mouser	505-FKP247/1000/10	.1900	.1900	WIMA	FKP2O100471D00JSSD	.2886	25	TAW Electronics	FKP2O100471D00JSSD	.2886	.2886
3	C2		Cap,Film PP 220pF 100V 5mm	Ea	X	X	WIMA	FKP2O102201D00JSSD	.2400	10	Mouser	505-FKP2220/1000/5	.2400	.2400	WIMA	FKP2O102201D00JSSD	.2821	25	TAW Electronics	FKP2O102201D00JSSD	.2821	.2821
4	C3		Cap,Film PP 220pF 100V 5mm	Ea	X	X	WIMA	FKP2O102201D00JSSD	.2400	10	Mouser	505-FKP2220/1000/5	.2400	.2400	WIMA	FKP2O102201D00JSSD	.2821	25	TAW Electronics	FKP2O102201D00JSSD	.2821	.2821
5	C4		Cap,Film 0.10uF 63V 5mm	Ea	X	X	WIMA	MKS2-.1/63/5	.2000	10	Mouser	505-MKS2.1/63/5	.2000	.2000	Kemet	R82DC3100AA50J	.1510	10	Digi-Key	399-5863-ND	.1510	.1510
6	C5		Cap,Film 0.10uF 63V 5mm	Ea	X	X	WIMA	MKS2-.1/63/5	.2000	10	Mouser	505-MKS2.1/63/5	.2000	.2000	Kemet	R82DC3100AA50J	.1510	10	Digi-Key	399-5863-ND	.1510	.1510
7	D1		Diode,Si Switch 100V 200mA 4nSec 1N4448	Ea	X	X	NXP Semiconductors	1N4448,113	.0920	1	Digi-Key	568-1361-1-ND	.0920	.0920	Vishay	1N4448TR	.0460	10	Mouser	78-1N4448	.0460	.0460
8	D2		Diode,Si Switch 100V 200mA 4nSec 1N4448	Ea	X	X	NXP Semiconductors	1N4448,113	.0920	1	Digi-Key	568-1361-1-ND	.0920	.0920	Vishay	1N4448TR	.0460	10	Mouser	78-1N4448	.0460	.0460
9	D3		Diode,Si Switch 100V 200mA 4nSec 1N4448	Ea	X	X	NXP Semiconductors	1N4448,113	.0920	1	Digi-Key	568-1361-1-ND	.0920	.0920	Vishay	1N4448TR	.0460	10	Mouser	78-1N4448	.0460	.0460
10	FB1		Bead,Ferrite Interference Supp 96 Ohms/25 MHz, 0.5A	Ea	X	X	Fair-Rite	2743007112	.1200	1	Mouser	623-2743007112	.1200	.1200	Panasonic	EXCELSA39	.1400	1	Digi-Key	P9818NK-ND	.1400	.1400
11	FB2		Bead,Ferrite Interference Supp 96 Ohms/25 MHz, 0.5A	Ea	X	X	Fair-Rite	2743007112	.1200	1	Mouser	623-2743007112	.1200	.1200	Panasonic	EXCELSA39	.1400	1	Digi-Key	P9818NK-ND	.1400	.1400
12	HS1		Heatsink,TO126 Clip On	Ea		X	Aavid Thermalloy	577500B00000G	.4000	1	Digi-Key	HS216_ND		.4000	Assmann WSW	V2110B	.4300	1	Digi-Key	A10750-ND		.4300
13	HS1		Heatsink,TO126 Clip On	Ea		X	Aavid Thermalloy	577500B00000G	.4000	1	Digi-Key	HS216_ND		.4000	Assmann WSW	V2110B	.4300	1	Digi-Key	A10750-ND		.4300
14	P1		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
15	P2		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
16	P3		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
17	P4		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
18	P5		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
19	P6		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
20	P7		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
21	P8		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
22	P9		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
23	P10		Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	X	X	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-3125200000000	.2200	.2200	Cambion	460-2627-2					.0000	.0000
24	Q1		XSTR,BF862 N-JFET Hi-Gm RF SOT23	Ea	X	X	NXP Semiconductors	BF862,215	.2700	1	Mouser	771-BF862-T/R	.2700	.2700	NXP Semiconductors	BF862,215	.3790	10	Digi-Key	568-1968-1-ND	.3790	.3790
25	Q2		XSTR,BF862 N-JFET Hi-Gm RF SOT23	Ea	X	X	NXP Semiconductors	BF862,215	.2700	1	Mouser	771-BF862-T/R	.2700	.2700	NXP Semiconductors	BF862,215	.3790	10	Digi-Key	568-1968-1-ND	.3790	.3790
26	Q3		XSTR,N-JFET J111 Hi-Vp Switch TO-92	Ea	X	X	Fairchild	J111	.1600	1	Mouser	512-J111	.1600	.1600	Fairchild	J111	.4900	1	Digi-Key	J111FS-ND	.4900	.4900
27	Q4		XSTR,N-JFET J111 Hi-Vp Switch TO-92	Ea	X	X	Fairchild	J111	.1600	1	Mouser	512-J111	.1600	.1600	Fairchild	J111	.4900	1	Digi-Key	J111FS-ND	.4900	.4900
28	Q5		XSTR,BF862 N-JFET Hi-Gm RF SOT23	Ea	X	X	NXP Semiconductors	BF862,215	.2700	1	Mouser	771-BF862-T/R	.2700	.2700	NXP Semiconductors	BF862,215	.3790	10	Digi-Key	568-1968-1-ND	.3790	.3790
29	Q6		XSTR,BF862 N-JFET Hi-Gm RF SOT23	Ea	X	X	NXP Semiconductors	BF862,215	.2700	1	Mouser	771-BF862-T/R	.2700	.2700	NXP Semiconductors	BF862,215	.3790	10	Digi-Key	568-1968-1-ND	.3790	.3790
30	Q7		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000
31	Q8		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000
32	Q9		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000
33	Q10		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000
34	Q11		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000
35	Q12		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000
36	Q13		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	.1712	.1712
37	Q14		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	.1712	.1712
38	Q15		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	.1712	.1712
39	Q16		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	.1712	.1712
40	Q17		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	.1712	.1712
41	Q18		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	.1712	.1712
42	Q19		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	.1712	.1712
43	Q20		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000
44	Q21		XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.1100	.1100	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.1000	.1000

ITEM	REF	DES	DESCRIPTION	Unit of Meas	VARIANT USAGE:		Original Part Manufacturer (Pref)		Mfgr. Typical Source				LINE COST PER VARIANT:				Original Part Manufacturer (Alternative)		Alternative Manufacturer Typical Source				LINE COST PER VARIANT:			
					-0	-1	MFG#	P/N	Unit Cost	Purch Qty	Vendor	Vendor P/N	-0	-1	MFG#	P/N	Unit Cost	Purch Qty	Vendor	Vendor P/N	-0	-1				
45	Q22		XSTR,KSA916 PNP 120V 800 mA Driver TO-92L ECB Pinout	Ea	X	X	Fairchild	KSA916YTA	.1600	1	Mouser	512-KSA916YTA	.1600	.1600	Fairchild	KSA916YTA	.5600	1	Digi-Key	KSA916YTA	ND	.5600	.5600			
46	Q23		XSTR,KSC2316 NPN 120V 800 mA Driver TO-92L ECB Pinout	Ea	X	X	Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA	.0573	.0573	Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA		.0573	.0573			
47	Q24		XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	X	X	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.0500	.0500	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CG	OS	.1712	.1712			
48	Q25		XSTR,KSC2316 NPN 120V 800 mA Driver TO-92L ECB Pinout	Ea	X		Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA	.0573		Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA		.0573				
49	Q25		XSTR,KSC2690A NPN 160V 1.2 A Med Pwr TO-126	Ea		X	Fairchild	KSC2690AYS	.3800	1	Mouser	512-KSC2690AYS		.3800	Fairchild	KSC2690AYS	.5400	1	Digi-Key	KSC2690AYS	SFS-ND		.5400			
50	Q26		XSTR,KSA916 PNP 120V 800 mA Driver TO-92L ECB Pinout	Ea	X		Fairchild	KSA916YTA	.1600	1	Mouser	512-KSA916YTA	.1600		Fairchild	KSA916YTA	.5600	1	Digi-Key	KSA916YTA	ND	.5600				
51	Q26		XSTR,KSA1220A PNP 160V 1.2 A Med Pwr TO-126	Ea		X	Fairchild	KSA1220AYS	.3700	1	Mouser	512-KSA1220AYS		.3700	Fairchild	KSA1220AYS	.4300	1	Digi-Key	KSA1220AYS	SFS-ND		.4300			
52	R1		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
53	R2		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
54	R3		Res,Metal Film 1/4W 1% RN60 35.7 ohm	Ea	X	X	Vishay/Dale	RN60D35R7FB14	.1100	1	Mouser	71-RN60D35R7F	.1100	.1100	Vishay/Dale	CMF5535R700FHEB	.5890	10	Digi-Key	CMF35.7HFCT-ND		.5890	.5890			
55	R4		Res,Metal Film 1/4W 1% RN60 137 ohm	Ea	X	X	Vishay/Dale	RN60D1370FB14	.1100	1	Mouser	71-RN60D-F-137	.1100	.1100	Vishay/Dale	CMF55137R00FHEB	.5890	10	Digi-Key	CMF137HFCT-ND		.5890	.5890			
56	R5		Res,Metal Film 1/4W 1% RN60 Selected Value	Ea	X	X	Vishay/Dale	RN60D****FB14	.3300	1	Mouser	TBD	.3300	.3300	Vishay/Dale	CMF55*****0FHEB	.5890	10	Digi-Key	TBD		.5890	.5890			
57	R6		Res,Metal Film 1/4W 1% RN60 Selected Value	Ea	X	X	Vishay/Dale	RN60D****FB14	.3300	1	Mouser	TBD	.3300	.3300	Vishay/Dale	CMF55*****0FHEB	.5890	10	Digi-Key	TBD		.5890	.5890			
58	R7		Res,Metal Film 1/4W 1% RN60 137 ohm	Ea	X	X	Vishay/Dale	RN60D1370FB14	.1100	1	Mouser	71-RN60D-F-137	.1100	.1100	Vishay/Dale	CMF55137R00FHEB	.5890	10	Digi-Key	CMF137HFCT-ND		.5890	.5890			
59	R8		Res,Metal Film 1/4W 1% RN60 374 ohm	Ea	X	X	Vishay/Dale	RN60D3740FB14	.1100	1	Mouser	71-RN60D3740F	.1100	.1100	Vishay/Dale	CMF55374R00FHEB	.5890	10	Digi-Key	CMF374HFCT-ND		.5890	.5890			
60	R9		Res,Metal Film 1/4W 1% RN60 432 ohm	Ea	X	X	Vishay/Dale	RN60D4320FB14	.1100	1	Mouser	71-RN60D-F-432	.1100	.1100	Vishay/Dale	CMF55432R00FHEB	.5890	10	Digi-Key	CMF432HFCT-ND		.5890	.5890			
61	R10		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
62	R11		Res,Metal Film 1/4W 1% RN60 187 ohm	Ea	X	X	Vishay/Dale	RN60D1870FB14	.2000	1	Mouser	71-RN60D1870F	.2000	.2000	Vishay/Dale	CMF55187R00FHEB	.5890	10	Digi-Key	CMF187HFCT-ND		.5890	.5890			
63	R12		Res,Metal Film 1/4W 1% RN60 215 ohm	Ea	X	X	Vishay/Dale	RN60D2150FB14	.1100	1	Mouser	71-RN60D-F-215	.1100	.1100	Vishay/Dale	CMF55215R00FHEB	.5890	10	Digi-Key	CMF215HFCT-ND		.5890	.5890			
64	R13		Res,Metal Film 1/4W 1% RN60 249 ohm	Ea	X	X	Vishay/Dale	RN60D2490FB14	.1100	1	Mouser	71-RN60D-F-249	.1100	.1100	Vishay/Dale	RN60D2490FB14	.2723	100	Digi-Key	1135-1590-MIL		.2723	.2723			
65	R14		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
66	R15		Res,Metal Film 1/4W 1% RN60 124 ohm	Ea	X	X	Vishay/Dale	RN60D1240FB14	.1100	1	Mouser	71-RN60D-F-124	.1100	.1100	Vishay/Dale	CMF55124R00FHEB	.5890	10	Digi-Key	CMF124HFCT-ND		.5890	.5890			
67	R16		Res,Metal Film 1/4W 1% RN60 22.1 ohm	Ea	X	X	Vishay/Dale	RN60D22R1FB14	.1100	1	Mouser	71-RN60D-F-22.1	.1100	.1100	Vishay/Dale	CMF5522R100FKEB	.4660	10	Digi-Key	CMF22.1HGCT-ND		.4660	.4660			
68	R17		Res,Metal Film 1/4W 1% RN60 35.7 ohm	Ea	X	X	Vishay/Dale	RN60D35R7FB14	.1100	1	Mouser	71-RN60D35R7F	.1100	.1100	Vishay/Dale	CMF5535R700FHEB	.5890	10	Digi-Key	CMF35.7HFCT-ND		.5890	.5890			
69	R18		Res,Metal Film 1/4W 1% RN60 35.7 ohm	Ea	X	X	Vishay/Dale	RN60D35R7FB14	.1100	1	Mouser	71-RN60D35R7F	.1100	.1100	Vishay/Dale	CMF5535R700FHEB	.5890	10	Digi-Key	CMF35.7HFCT-ND		.5890	.5890			
70	R19		Res,Metal Film 1/4W 1% RN60 30.9K ohm	Ea	X	X	Vishay/Dale	RN60D3092FB14	.2000	1	Mouser	71-RN60D-F-30.9K	.2000	.2000	Vishay/Dale	CMF5530K900FHEB	.5890	10	Digi-Key	CMF30.9KHCT-ND		.5890	.5890			
71	R20		Res,Metal Film 1/4W 1% RN60 432 ohm	Ea	X	X	Vishay/Dale	RN60D4320FB14	.1100	1	Mouser	71-RN60D-F-432	.1100	.1100	Vishay/Dale	CMF55432R00FHEB	.5890	10	Digi-Key	CMF432HFCT-ND		.5890	.5890			
72	R21		Res,Metal Film 1/4W 1% RN60 27.4 ohm	Ea	X		Vishay/Dale	RN60D27R4FB14	.1100	1	Mouser	71-RN60D-F-27.4	.1100		Vishay/Dale	CMF5527R400FHEB	.5890	10	Digi-Key	CMF27.4HFCT-ND		.5890				
73	R21		Res,Metal Film 1/4W 1% RN60 90.9 ohm	Ea		X	Vishay/Dale	RN60D90R9FB14	.1100	1	Mouser	71-RN60D-F-90.9		.1100	Vishay/Dale	CMF5590R900FHEB	.5890	10	Digi-Key	CMF90.9HFCT-ND			.5890			
74	R22		Res,Metal Film 1/4W 1% RN60 27.4 ohm	Ea	X		Vishay/Dale	RN60D27R4FB14	.1100	1	Mouser	71-RN60D-F-27.4	.1100		Vishay/Dale	CMF5527R400FHEB	.5890	10	Digi-Key	CMF27.4HFCT-ND		.5890				
75	R22		Res,Metal Film 1/4W 1% RN60 90.9 ohm	Ea		X	Vishay/Dale	RN60D90R9FB14	.1100	1	Mouser	71-RN60D-F-90.9		.1100	Vishay/Dale	CMF5590R900FHEB	.5890	10	Digi-Key	CMF90.9HFCT-ND			.5890			
76	R23		Res,Metal Film 1/4W 1% RN60 432 ohm	Ea	X	X	Vishay/Dale	RN60D4320FB14	.1100	1	Mouser	71-RN60D-F-432	.1100	.1100	Vishay/Dale	CMF55432R00FHEB	.5890	10	Digi-Key	CMF432HFCT-ND		.5890	.5890			
77	R24		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
78	R25		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
79	R26		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
80	R27		Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	X	X	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.1100	.1100	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL		.2723	.2723			
81	R28		Trimpot,Multiturn, Top Adj, 3/8" Thru Hole 500 ohms	Ea	X	X	Vishay/Sfernice	T93YB501KT20	1.4400	1	Mouser	72-T93YB-500	1.4400	1.4400	BI Technologies	67YR500LF	1.4000	1	Digi-Key	987-1618-ND		1.4000	1.4000			
82	R29		Trimpot,Multiturn, Top Adj, 3/8" Thru Hole 2000 ohms	Ea	X	X	Vishay/Sfernice	T93YB202KT20	1.5800	1	Mouser	72-T93YB-2K	1.5800	1.5800	BI Technologies	67YR2KLF	1.4000	1	Digi-Key	987-1506-ND		1.4000	1.4000			
83	TB1		PWB Design Feature Only. No Physical Part.	Ea	X	X	N/A	N/A	N/A	N/A	N/A	N/A	.0000	.0000	N/A	N/A	N/A	N/A	N/A	N/A	.0000	.0000	.0000	.0000		
84	TB2		PWB Design Feature Only. No Physical Part.	Ea	X	X	N/A	N/A	N/A	N/A	N/A	N/A	.0000	.0000	N/A	N/A	N/A	N/A	N/A	N/A	.0000	.0000	.0000	.0000		
85																										
86																										
87																										
88																										
89																										
90																										

Assy Dwg #
Dwg Title
Rev
Schem Dwg #
Schem Title
Rev

SWOPA2885ASY
PCB ASSY,SW-OPA DISC OPAMP THD (1)
A
SWOPA2885SCH
SCHEM,SWOPA DISC OPAMP THD (1)
A

Orig Date
Assy Short Name
Rev Date
Orig Date

Rev Date
Engineer

16-Apr-13
SWOPA Disc Opamp THD1
16-Apr-13
16-Apr-13

16-Apr-13
Dale Chisholm

ITEM	REF DES	DESCRIPTION	Unit of Meas	QTY PER VER:		PREFERRED MANUFACTURER				LINE COST PER VERSION:		ALTERNATE MANUFACTURER				LINE COST PER VERSION:					
				-0	-1	Original Part Manufacturer (Pref) MFRGR	Manufacturer (Pref) MFRGR P/N	Unit Cost	Purch Qty	Pref. Mfgr. Typical Source Vendor	Vendor P/N	-0	-1	Original Part Manufacturer (Alt) MFRGR	Manufacturer (Alt) MFRGR P/N	Unit Cost	Purch Qty	Alternate ManufacturerTypical Source Vendor	Vendor P/N	-0	-1
1	<none>	SW-OPA DISC OPAMP THD(1) PWB	Ea	1	1	Pending	SWOPA2885PWB1			TBD	TBD			Pending	SWOPA2885PWB1			TBD	TBD	.0000	.0000
2	C1	Cap,Film PP 47pF	Ea	1	1	WIMA	FKP2O100471D00KSSD	.1900	10	Mouser	505-FKP247/1000/10	.1900	.1900	WIMA	FKP2O100471D00JSSD	.2886	25	TAW Electronics	FKP2O100471D00JSSD	.2886	.2886
3	C2, C3	Cap,Film PP 220pF 100V 5mm	Ea	2	2	WIMA	FKP2O102201D00JSSD	.2400	10	Mouser	505-FKP2220/1000/5	.4800	.4800	WIMA	FKP2O102201D00JSSD	.2821	25	TAW Electronics	FKP2O102201D00JSSD	.5642	.5642
4	C4, C5	Cap,Film 0.10uF 63V 5mm	Ea	2	2	WIMA	MKS2-.1/63/5	.2000	10	Mouser	505-MKS2.1/63/5	.4000	.4000	Kemet	R82DC3100AA50J	.1510	10	Digi-Key	399-5863-ND	.3020	.3020
5	D1, D2, D3	Diode,Si Switch 100V 200mA 4nSec 1N4448	Ea	3	3	NXP Semiconductors	1N4448,113	.0920	1	Digi-Key	568-1361-1-ND	.2760	.2760	Vishay	1N4448TR	.0460	10	Mouser	78-1N4448	.1380	.1380
6	FB1, FB2	Bead,Ferrite Interference Supp 96 Ohms/25 MHz, 0.5A	Ea	2	2	Fair-Rite	2743007112	.1200	1	Mouser	623-2743007112	.2400	.2400	Panasonic	EXCELSA39	.1400	1	Digi-Key	P9818NK-ND	.2800	.2800
7	HS1, HS2	Heatsink,TO126 Clip On	Ea	0	2	Aavid Thermalloy	577500B00000G	.4000	1	Digi-Key	HS216_ND	.0000	.8000	Assmann WSW	V2110B	.4300	1	Digi-Key	A10750-ND	.0000	.8600
8	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10	Pin,0.040" Contact, Staked, 0.043" Mtg Hole, 0.170" Standoff, 0.062" PWB	Ea	10	10	Mill-Max	3125-2-00-00-00-00-08-0	.2200	10	Mouser	575-31252000000000	2.2000	2.2000	Cambion	460-2627-2					.0000	.0000
9	Q1, Q2, Q5, Q6	XSTR,BF862 N-JFET Hi-Gm RF SOT23	Ea	4	4	NXP Semiconductors	BF862,215	.2700	1	Mouser	771-BF862-T/R	1.0800	1.0800	NXP Semiconductors	BF862,215	.3790	10	Digi-Key	568-1968-1-ND	1.5160	1.5160
10	Q3, Q4	XSTR,N-JFET J111 Hi-Vp Switch TO-92	Ea	2	2	Fairchild	J111	.1600	1	Mouser	512-J111	.3200	.3200	Fairchild	J111	.4900	1	Digi-Key	J111FS-ND	.9800	.9800
11	Q7, Q8, Q9, Q10, Q11, Q12, Q20, Q21	XSTR,BC560 PNP 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	8	8	Fairchild	BC560CTA	.1100	1	Mouser	512-BC560CTA	.8800	.8800	ON Semiconductor	BC560CG	.1000	1	Mouser	863-BC560CG	.8000	.8000
12	Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q24	XSTR,BC550 NPN 45V 100 mA Hi-HFE Lo-Noise TO-92	Ea	8	8	Fairchild	BC550CBU	.0500	1	Mouser	512-BC550CBU	.4000	.4000	ON Semiconductor	BC550CG	.1712	25	Digi-Key	BC550CGOS-ND	1.3696	1.3696
13	Q22	XSTR,KSA916 PNP 120V 800 mA Driver TO-92L ECB Pinout	Ea	1	1	Fairchild	KSA916YTA	.1600	1	Mouser	512-KSA916YTA	.1600	.1600	Fairchild	KSA916YTA	.5600	1	Digi-Key	KSA916YTACT-ND	.5600	.5600
14	Q23	XSTR,KSC2316 NPN 120V 800 mA Driver TO-92L ECB Pinout	Ea	1	1	Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA	.0573	.0573	Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA	.0573	.0573
15	Q25	XSTR,KSC2316 NPN 120V 800 mA Driver TO-92L ECB Pinout	Ea	1	0	Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA	.0573	.0000	Fairchild	KSC2316YTA	.0573	1	Arrow	KSC2316YTA	.0573	.0000
16	Q25	XSTR,KSC2690A NPN 160V 1.2 A Med Pwr TO-126	Ea	0	1	Fairchild	KSC2690AYS	.3800	1	Mouser	512-KSC2690AYS	.0000	.3800	Fairchild	KSC2690AYS	.5400	1	Digi-Key	KSC2690AYSFS-ND	.0000	.5400
17	Q26	XSTR,KSA916 PNP 120V 800 mA Driver TO-92L ECB Pinout	Ea	1	0	Fairchild	KSA916YTA	.1600	1	Mouser	512-KSA916YTA	.1600	.0000	Fairchild	KSA916YTA	.5600	1	Digi-Key	KSA916YTACT-ND	.5600	.0000
18	Q26	XSTR,KSA1220A PNP 160V 1.2 A Med Pwr TO-126	Ea	0	1	Fairchild	KSA1220AYS	.3700	1	Mouser	512-KSA1220AYS	.0000	.3700	Fairchild	KSA1220AYS	.4300	1	Digi-Key	KSA1220AYSFS-ND	.0000	.4300
19	R1, R2, R10, R14, R24, R25, R26, R27	Res,Metal Film 1/4W 1% RN60 10.0 ohm	Ea	8	8	Vishay/Dale	RN60D10R0FRE6	.1100	1	Mouser	71-RN60D-F-10/R	.8800	.8800	Vishay/Dale	RN60D10R0FB14	.2723	100	Digi-Key	1135-1563-MIL	2.1784	2.1784
20	R3, R17, R18	Res,Metal Film 1/4W 1% RN60 35.7 ohm	Ea	3	3	Vishay/Dale	RN60D35R7FB14	.1100	1	Mouser	71-RN60D35R7F	.3300	.3300	Vishay/Dale	CMF5535R700FHFB	.5890	10	Digi-Key	CMF35.7HFCT-ND	1.7670	1.7670
21	R4, R7	Res,Metal Film 1/4W 1% RN60 137 ohm	Ea	2	2	Vishay/Dale	RN60D1370FB14	.1100	1	Mouser	71-RN60D-F-137	.2200	.2200	Vishay/Dale	CMF55137R00FHFB	.5890	10	Digi-Key	CMF137HFCT-ND	1.1780	1.1780
22	R5	Res,Metal Film 1/4W 1% RN60 Selected Value	Ea	1	1	Vishay/Dale	RN60D****FB14	.3300	1	Mouser	TBD	.3300	.3300	Vishay/Dale	CMF55*****0FHFB	.5890	10	Digi-Key	TBD	.5890	.5890
23	R6	Res,Metal Film 1/4W 1% RN60 Selected Value	Ea	1	1	Vishay/Dale	RN60D****FB14	.3300	1	Mouser	TBD	.3300	.3300	Vishay/Dale	CMF55*****0FHFB	.5890	10	Digi-Key	TBD	.5890	.5890
24	R8	Res,Metal Film 1/4W 1% RN60 374 ohm	Ea	1	1	Vishay/Dale	RN60D3740FB14	.1100	1	Mouser	71-RN60D3740F	.1100	.1100	Vishay/Dale	CMF55374R00FHFB	.5890	10	Digi-Key	CMF374HFCT-ND	.5890	.5890
25	R9, R20, R23	Res,Metal Film 1/4W 1% RN60 432 ohm	Ea	3	3	Vishay/Dale	RN60D4320FB14	.1100	1	Mouser	71-RN60D-F-432	.3300	.3300	Vishay/Dale	CMF55432R00FHFB	.5890	10	Digi-Key	CMF432HFCT-ND	1.7670	1.7670

ITEM	REF DES	DESCRIPTION	Unit of Meas	QTY PER VER:		Original Part Manufacturer (Pref)		Pref. Mfgr. Typical Source			LINE COST PER VERSION:		Original Part Manufacturer (Alt)		Alternate ManufacturerTypical Source			LINE COST PER VERSION:									
				-0	-1	MFR	P/N	Unit Cost	Purch Qty	Vendor	Vendor P/N	-0	-1	MFR	P/N	Unit Cost	Purch Qty	Vendor	Vendor P/N	-0	-1						
26	R11	Res,Metal Film 1/4W 1% RN60 187 ohm	Ea	1	1	Vishay/Dale	RN60D1870FB14	.2000	1	Mouse	71-RN60D1870F	.2000	.2000	Vishay/Dale	CMF55187R00FHCB	.5890	10	Digi-Key	CMF187HFCT-ND	.5890	.5890						
27	R12	Res,Metal Film 1/4W 1% RN60 215 ohm	Ea	1	1	Vishay/Dale	RN60D2150FB14	.1100	1	Mouse	71-RN60D-F-215	.1100	.1100	Vishay/Dale	CMF55215R00FHCB	.5890	10	Digi-Key	CMF215HFCT-ND	.5890	.5890						
28	R13	Res,Metal Film 1/4W 1% RN60 249 ohm	Ea	1	1	Vishay/Dale	RN60D2490FB14	.1100	1	Mouse	71-RN60D-F-249	.1100	.1100	Vishay/Dale	RN60D2490FB14	.2723	100	Digi-Key	1135-1590-MIL	.2723	.2723						
29	R15	Res,Metal Film 1/4W 1% RN60 124 ohm	Ea	1	1	Vishay/Dale	RN60D1240FB14	.1100	1	Mouse	71-RN60D-F-124	.1100	.1100	Vishay/Dale	CMF55124R00FHCB	.5890	10	Digi-Key	CMF124HFCT-ND	.5890	.5890						
30	R16	Res,Metal Film 1/4W 1% RN60 22.1 ohm	Ea	1	1	Vishay/Dale	RN60D22R1FB14	.1100	1	Mouse	71-RN60D-F-22.1	.1100	.1100	Vishay/Dale	CMF5522R100FKCB	.4660	10	Digi-Key	CMF22.1HGCT-ND	.4660	.4660						
31	R19	Res,Metal Film 1/4W 1% RN60 30.9K ohm	Ea	1	1	Vishay/Dale	RN60D3092FB14	.2000	1	Mouse	71-RN60D-F-30.9K	.2000	.2000	Vishay/Dale	CMF5530K900FHCB	.5890	10	Digi-Key	CMF30.9KHFBCT-ND	.5890	.5890						
32	R21, R22	Res,Metal Film 1/4W 1% RN60 27.4 ohm	Ea	2	0	Vishay/Dale	RN60D27R4FB14	.1100	1	Mouse	71-RN60D-F-27.4	.2200	.0000	Vishay/Dale	CMF5527R400FHCB	.5890	10	Digi-Key	CMF27.4HFCT-ND	1.1780	.0000						
33	R21, R22	Res,Metal Film 1/4W 1% RN60 90.9 ohm	Ea	0	2	Vishay/Dale	RN60D90R9FB14	.1100	1	Mouse	71-RN60D-F-90.9	.0000	.2200	Vishay/Dale	CMF5590R900FHCB	.5890	10	Digi-Key	CMF90.9HFCT-ND	.0000	1.1780						
34	R28	Trimpot,Multiturn, Top Adj, 3/8" Thru Hole 500 ohms	Ea	1	1	Vishay/Sfernice	T93YB501KT20	1.4400	1	Mouse	72-T93YB-500	1.4400	1.4400	BI Technologies	67YR500LF	1.4000	1	Digi-Key	987-1618-ND	1.4000	1.4000						
35	R29	Trimpot,Multiturn, Top Adj, 3/8" Thru Hole 2000 ohms	Ea	1	1	Vishay/Sfernice	T93YB202KT20	1.5800	1	Mouse	72-T93YB-2K	1.5800	1.5800	BI Technologies	67YR2KLF	1.4000	1	Digi-Key	987-1506-ND	1.4000	1.4000						
36	TB1	PWB Design Feature Only. No Physical Part.	Ea	1	1	N/A	N/A	.0000	1	N/A	N/A	.0000	.0000	N/A	N/A	.0000	1	N/A	N/A	.0000	.0000						
37	TB2	PWB Design Feature Only. No Physical Part.	Ea	1	1	N/A	N/A	.0000	1	N/A	N/A	.0000	.0000	N/A	N/A	.0000	1	N/A	N/A	.0000	.0000						
38																											
				Component Parts Cost:										\$13.511	\$14.843	\$0.000	\$0.000	Component Parts Cost:						\$23.203	\$24.415	\$0.000	\$0.000