

2014

Product Guide

TopLine



**Lead Free
Dummy Components
Practice Kits**

KIT PART NUMBERING SYSTEM

WEBCODE XK1



926

025

SERIES	
900 = QFP Lead Template	945 = PCMCIA
901 = FC176 Flip Chip	946 = Universal BGA 1.27/1.5mm
902 = FC88 Flip Chip	947 = BGA256/272/292/352/388
903 = FC317 Flip Chip	948 = Monster 2 *
904 = FC220 Flip Chip	949 = 0201/0402 Chip
905 = CBGA Ceramic Substrates	950 = SMTA Saber
906 = FC96 Ceramic	951 = CBGA
907 = FC96 Lamanate	952 = B52 CRET Cleanliness
908 = FC48 Ceramic	953 = Visual BGA & Flip Chip
909 = FC48 Flip Chip	954 = HP Saber Alloy Test
910 = Beginner Throughhole	955 = DIE KIT *
911 = FC112 Flip Chip	956 = CLGA
912 = Recertification Mix Tech	957 = CBGA196/625 *
913 = Multilayer Throughhole	958 = LBGA1089/1225
914 = Mixed Technology 2	959 = 2D Matrix & Bar Codes
915 = Multipurpose Throughhole	960 = Machine Diagnostic *
916 = Multipurpose Throughhole	961 = Fiducial Comparator
917 = BGA121, 352, 400 (obsolete)	962 = 28mm QFP Assortment
918 = Unassigned *	963 = Universal BGA .5~.8mm
919 = Phillips Machine	964 = 0402/0603 Chip
920 = Challenger 1 (see 928) *	965 = Rework 1 Practice
921 = µBGA TV46	966 = BGA169/225 6L
922 = TV74 (obsolete)	967 = BGA169/225
923 = TV188 (obsolete) *	968 = 0805/1206 Chip
924 = Beginners SMD	969 = Mixed Technology 1
925 = SMD Introductory	970 = Display Boards
926 = Practical Mixed Technology	971 = Label for 970 *
927 = Unassigned	972 = Parts for Display
928 = Challenger 2	973 = CCGA1089/CCGA1274*
929 = Jumbo Chip Set *	974 = eBGA1600/eBGA1936
930 = Advanced w/o QFP256	975 = QFN Daisy Chain
931 = Advanced w/QFP256	976 = BGA256 1.0mm/SBGA560
932 = µBGA TV62	977 = Metcal *
933 = Custom *	978 = Rework 3 Practice
934 = µBGA TV208	979 = NASA Training
935 = Stencil Eval. w/TQFP168	980 = 01005 / 0201 Chip
936 = Stencil Evaluation	981 = Universal BGA 1.0/0.8mm
937 = Econo I - BGA	982 = QFP208 Lead Free
938 = Econo II - Mixed	983 = 0805/1206 Lead Free
939 = Econo III - Mixed	984 = 0402/0603 Lead Free
940 = Monster (see 948) *	985 = BGA Lead Free *
941 = Mydata *	986 = Lead Free Multicomponent
942 = Intertronic 2001	999 = Special/Custom *
943 = TQFP168 (obsolete)	9603 = TSOP32 *
944 = Rework 2 Practice	9613 = BQFP132 *

SPECIFICATIONS	
000 = Single Pack Kit (Hand Solder)	
001 = Standard PC Board	
002 = Lead Free Tin Plated Board	
003 = Populated PC Board	
004 = X, Y, Theta Parts Placement ASCII File	
005 = Gerber File For Solder Paste Stencil	
006 = Immersion Silver Board (Lead Free)	
007 = Polyimide Board	
008 = OSP Copper Board Entek (Lead Free)	
009 = Ni Au PC Board	
010 = Kit Of 10	
025 = Kit Of 25	
050 = Kit Of 50	
100 = Kit Of 100	

LEAD FREE (ROHS) PB-FREE KITS:

2XX = Tin (Sn) Board
6XX = Silver (Ag) Board
8XX = OSP (Cu) Board
9XX = Gold (Ni-Au ENIG) Board
XX = Quantity of Kits

9616 = QFP160 *
9618 = Rotational Test
9621 = QFP208
9625 = QFP256

* = Not Shown in Catalog
See www.topline.tv



GENERAL KIT INFORMATION



FR-4 (STANDARD)

Epoxy-glass FR-4 is standard for most kits. Most Boards are double sided. Tg = 140°C.

FR4 (HIGH TEMP)

High Temp (Tg = 170°C ~ 180°C) is used for Lead Free boards.

POLYIMIDE (OPTIONAL)

For high temperatures during assembly or burn-in. Polyimide Tg is 270°C.

BT (OPTIONAL)

Bismaleimide Triazine available special order.

COPPER THICKNESS

Usually 1.0 oz. of copper.

HOT AIR SOLDER LEVELING (Sn63)

Hot air solder leveling (HASL) during board fabrication gives boards a controlled plating flatness which assures coplanarity for fine pitch components.

LIQUID PHOTO IMAGEABLE SOLDER MASK

Liquid photoimageable (LPI) soldermask with Sanwa Chemical SPSR-950. Taiyo PSR4000 AUS5 is available special order.

X,Y THETA: (ACCESSORY)

Component placement data for pick and place machines. Free download.

GERBER DATA: (ACCESSORY)

For solder paste stencil. Free download.

LEAD-FREE (OPTIONAL)

Available in 4 finishes:

- Sn100 - Immersion (White) Tin
- Au (ENIG) Ni - Immersion Gold
- Ag - Immersion Silver
- OSP - ENTEK 106 Copper

GLOBAL FIDUCIALS

A minimum of two global fiducials are located diagonally opposed as far apart as possible.

LOCAL FIDUCIALS

Used to locate the position of an individual.

GENERAL

Kits are supplied with enough components for one side of the board only.

OSP (OPTIONAL)

Organic Solder Preservative over bare copper such as ENTEK106 is available special order.



RoHS Banned Substances

Substance	Maximum Limit (ppm)
Cadmium (Cd)	100
Lead (Pb)	1000
Mercury (Hg)	1000
Hexavalent Chromium (Cr 6+)	1000
Polybrominated Biphenyls (PBB)	1000
Polybrominated Diphenyl Ethers (PBDE)	1000

About RoHS:

The European Union has adopted Directive 2002/95/EC – the Restriction of Hazardous Substances (RoHS) in electrical and electronic equipment. This legislation bans the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) in electrical and electronic devices after July 1, 2006 with certain exemptions.



TopLine offers Lead Free boards with 4 popular finishes compatible with RoHS.

COMPARISON OF LEAD FREE FINISHES			
	Description	Advantages	Concerns
Sn	Immersion Tin (also known as White Tin)	<ul style="list-style-type: none"> • Low Cost • Widely Accepted • Re-workable • Good Flatness • Good Shelf Life 	<ul style="list-style-type: none"> • Potential Whisker • Microscopic Voids
Ag	Immersion Silver	<ul style="list-style-type: none"> • Low Cost • Widely Accepted • Re-workable • Excellent Flatness • Excellent Wetting 	<ul style="list-style-type: none"> • Shelf Life • Tarnishing
OSP Cu	Organic Solderability Preservative Entek CU106 or CU56	<ul style="list-style-type: none"> • Low Cost • Widely Accepted • Re-workable • Excellent Flatness 	<ul style="list-style-type: none"> • Shelf Life • Degrades with Temperature • Handling Sensitivity • Flex Sensitive
Ni-Au	Electroless Nickel Immersion Gold (Also known as ENIG)	<ul style="list-style-type: none"> • Widely Accepted • Excellent Flatness • Very Long Shelf Life 	<ul style="list-style-type: none"> • Added Cost • Difficulty with rework • More brittle solder joints

COMPARISON OF STANDARD FINISHES (WITH Pb)			
	Description	Advantages	Concerns
Sn/Pb	Hot Air Solder Level (also known as HASL)	<ul style="list-style-type: none"> • Low Cost • Widely Accepted • Re-workable • Good Shelf Life 	<ul style="list-style-type: none"> • Flatness (Coplanarity) • Paste Misprints • Not RoHS Compatible

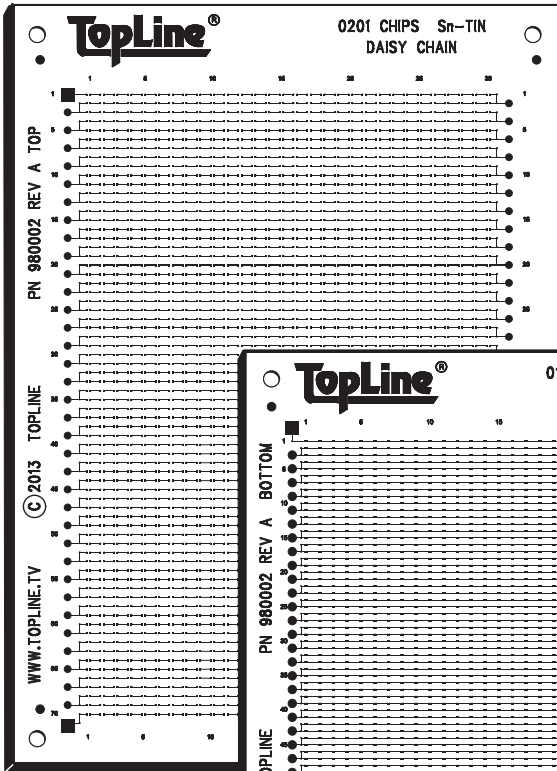
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CHIP SHOOTER KIT 01005 AND 0201 CHIPS WITH DAISY CHAIN

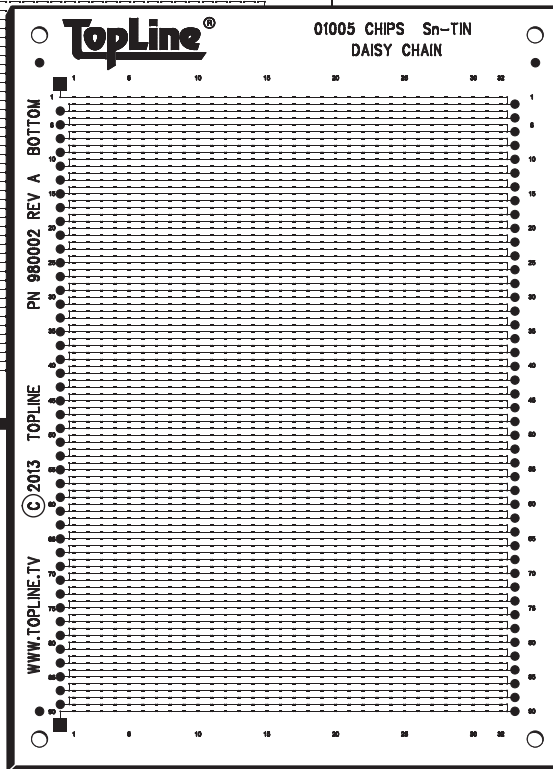


Top Side of Board

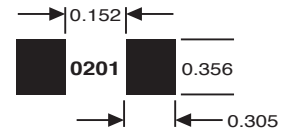
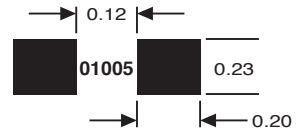


Put your machine to the test with TopLine's new 01005/0201 kits. Double sided board has 2000 pads for 0201 chips on the front side and 3000 pads for 01005 chips on the back side. Components are supplied on 2mm pitch tape. Kit can be used for placement, soldering or epoxy dispenser testing. Many test points for continuity testing.

Bottom Side of Board



Pad Dimensions (mm)



FEATURES

- LPI Solder Mask
- FR4 Board .062" thick
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



CHIP SHOOTER KIT 01005 AND 0201 CHIPS WITH DAISY CHAIN



KIT ORDERING INFORMATION

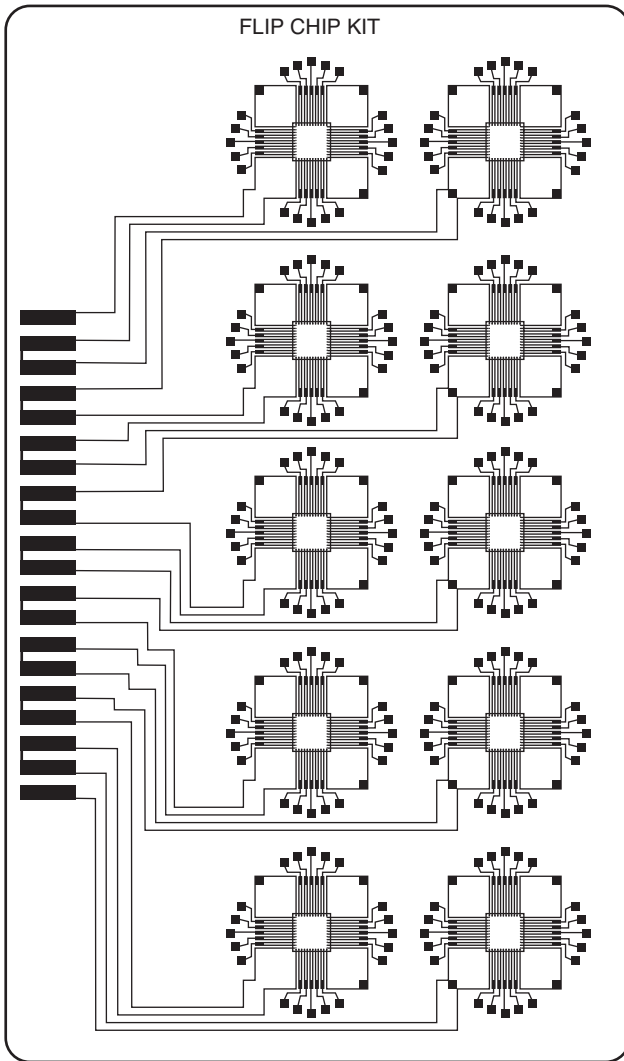
COMPONENT	TAPE PITCH	MACHINE RUN				
		ORDER NUMBER 980200 1 KIT	ORDER NUMBER 980203 3 KITS	ORDER NUMBER 980206 6 KITS	ORDER NUMBER 980210 10 KITS	ORDER NUMBER 980225 25 KITS
Board	-	1	3	6	10	25
01005 Chip	2mm	3,000	9,000	18,000	30,000	75,000
0201 Chip	2mm	2,000	3,000	12,000	20,000	50,000

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	3 Kits	6 Kits	10 Kits	25 Kits
Lead Free						
Sn - Tin	980002	980200	980203	980206	980210	980225
Au - Gold	980009	980900	980903	980906	980910	980925

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

NOTE: 50 and 100 KITS ALSO AVAILABLE



Actual Size: 3.25" x 5.5" (83 x 140mm)

Laminate FR4 board for placement and daisy chain continuity testing after assembly.

Each board has coupon sites for mounting 10 flip chips.

Laminate board features multifunctional high temperature FR4 board (Tg = 170°C)

Plating Options:
Ni-Au Standard
Cu-OSP Available

Board Thickness:
.031" - 0.78mm FC317
.062" - 1.57mm FC48-FC220

NOTE



Gerber Data is only available for laminate boards.



FLIP CHIP KITS



KIT ORDERING INFORMATION

CONTENTS	 MANUAL ASSEMBLY		AND	 MACHINE RUN	
	ORDER NUMBER 902000 1 KIT	ORDER NUMBER 903000 1 KIT		ORDER NUMBER 909000 1 KIT	ORDER NUMBER 911000 1 KIT
Laminate FR4 Board	1	1		1	1
FC48 457µm	0	0		25	0
FC88 204µm	36	0		0	0
FC112 152µm	0	0		0	36
FC317 254µm	0	36		0	0

Lead Free (Pb-Free) Option

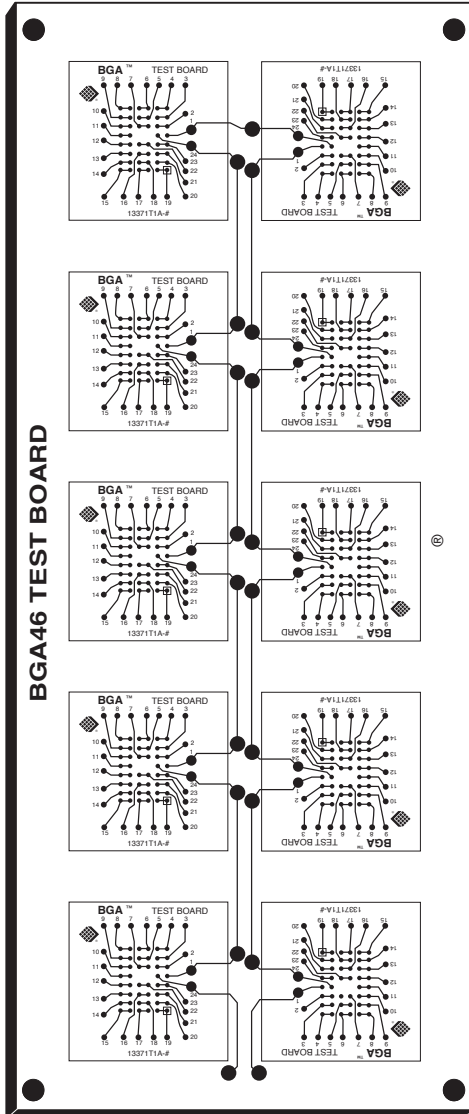
Description	FC48	FC88	FC317	FC112
Lead Free Kit Gold Board + SnAgCu Flip Chip	909900	902900	903900	911900
Spare Gold Board	909001	902001	903001	911001
Standard Kit Gold Board + SnPb Flip Chip	909000	902000	903000	911000

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

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BGA46 0.75MM TEST KIT



Actual Size 2.75" x 6.5" (70 x 165mm)

Test board for 0.75mm pitch BGA46 chip scale components. Each board has 10 coupons which allow continuity testing of individual components as well as series test of all 10 components.

Parts are supplied in trays.



Pad	Diameter
Bump Site	.012" (.3mm)
Fiducial	.040" (1.0mm)

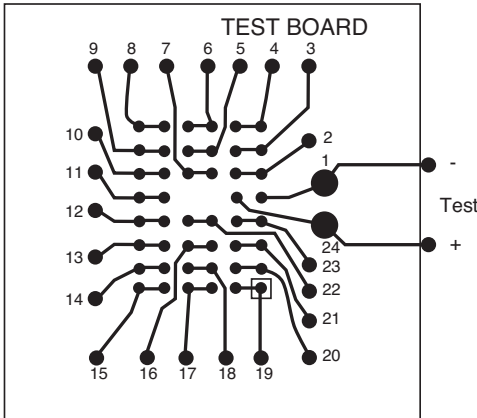
FEATURES

- Electroless Nickel Immersion Gold Plated
- LPI Solder Mask
- FR4 Board .03" (0.76mm)
- Single Sided, 1/2 oz. copper
- Fiducial Marks

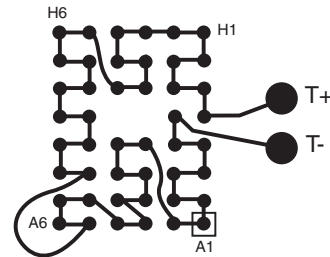


KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN		
		NUMBER 921000 1 KIT	ORDER NUMBER 921010 10 KITS	ORDER NUMBER 921025 25 KITS	ORDER NUMBER 921050 50 KITS
Board BGA46	0.75mm	1 10	10 100	25 250	50 500



SINGLE PCB TEST COUPON



AFTER MOUNTING TO TEST BOARD

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free Gold Board + SnAgCu BGA	921001	921900	921910	921925	921950	921999
Standard Gold Board + SnPb BGA	921001	921000	921010	921025	921050	921100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm



TopLine's Universal CSP Kits provide pads capable of mounting 0.5mm, 0.75mm and 0.8mm pitch without daisy chain. Includes fiducial marks for vision equipment.

Uses soldermask defined pads.

TopLine CSP Universal Placement

P = 0.5mm 8 x 8

P = 0.5mm 10 x 10

P = 0.5mm 12 x 12

P = 0.5mm 14 x 14

P = 0.75mm 6 x 8

P = 0.8mm 7 x 7

P = 0.8mm 8 x 8

P = 0.8mm 9 x 9

P = 0.8mm 10 x 10

P = 0.8mm 12 x 12

P = 0.8mm 14 x 14

PN963001 Rev A

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www.TopLineDummy.com

PAD GEOMETRY		
PAD DIA.	BALL DIA.	PITCH
0.26mm	0.3mm	0.5mm
0.26mm	0.3mm	0.75mm
0.38mm	0.46mm	0.8mm

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes

Actual Size 4" x 5.5" (100 x 140mm)



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UNIVERSAL CSP KIT 0.5~0.8mm PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN	
		ORDER NUMBER 963000 1 KIT	ORDER NUMBER 963010 10 KITS	ORDER NUMBER 963025 25 KITS
Board		1	10	25
CSP	0.5mm	4	40	100
CSP	0.75mm	4	40	100
CSP	0.8mm	4	40	100

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	963002	963200	963210	963225	963250	963299
Ag – Silver	963006	963600	963610	963625	963650	963699
Cu – OSP	963008	963800	963810	963825	963850	963899
Au – Gold	963009	963900	963910	963925	963950	963999
Standard						
SnPb – HASL	963001	963000	963010	963025	963050	963100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

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UNIVERSAL BGA KIT 0.8/1.0MM PITCH



TopLine's Universal BGA kits are convenient to use. Includes non-daisy chain BGA components for 1.0mm and 0.8mm pitch for placement and solder practice.

Soldermask defined pads with varying apertures from 16mil to 24mil diameter.

TopLine BGA Universal Placement

1.0mm pitch

Rev A

P/N 981001

Ø 19mil Ø 20mil Ø 21mil

© 1999 TopLine

Ø 22mil Ø 23mil Ø 24mil

www.TopLineDummy.com

0.8mm pitch

Ø 16mil Ø 17mil Ø 18mil

Actual Size 4" x 5.5" (100 x 140mm)

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes
- Fiducial Marks



TopLine®



UNIVERSAL BGA KIT 0.8/1.0MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN	
		ORDER NUMBER 981000 1 KIT	ORDER NUMBER 981010 10 KITS	ORDER NUMBER 981025 25 KITS
Board 981001	0.8/1.0mm	1	10	25
BGA	1.0mm	4	40	100
BGA	0.8mm	4	40	100

Lead Free (Pb-Free) Option

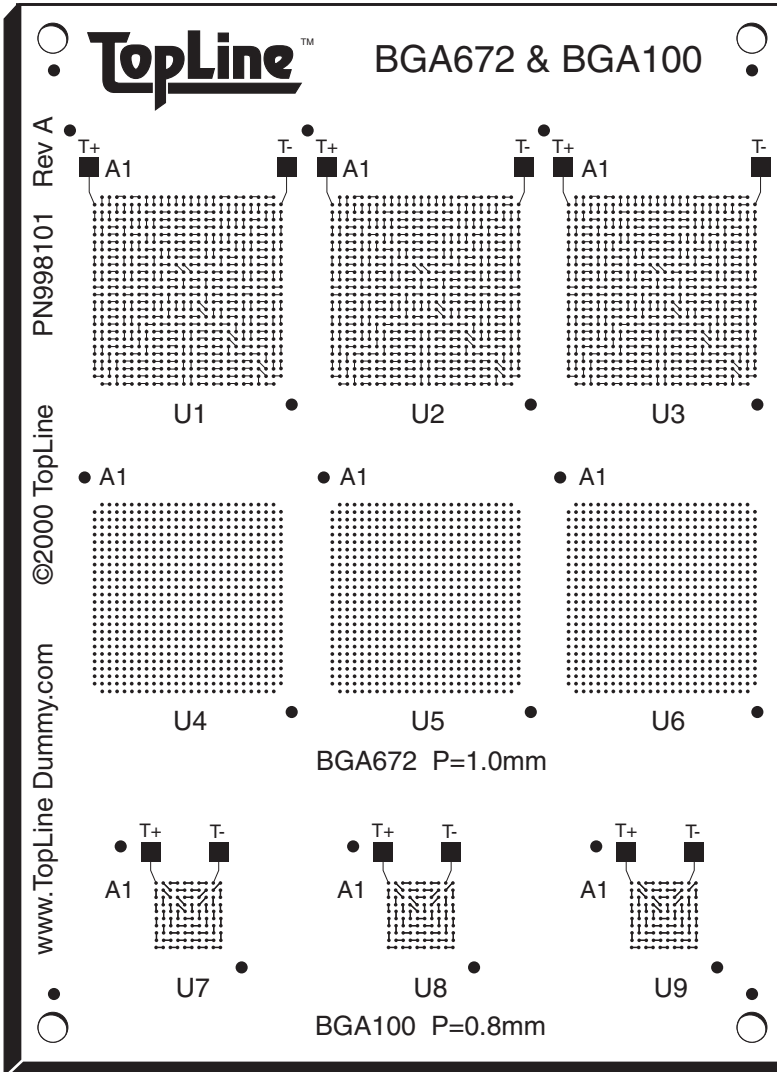
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	981002	981200	981210	981225	981250	981299
Ag – Silver	981006	981600	981610	981625	981650	981699
Cu – OSP	981008	981800	981810	981825	981850	981899
Au – Gold	981009	981900	981910	981925	981950	981999
Standard						
SnPb – HASL	981001	981000	981010	981025	981050	981100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

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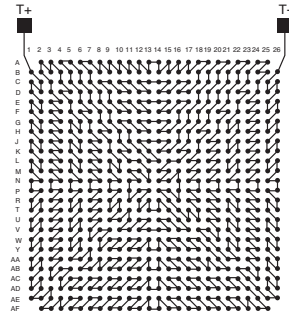


FINE PITCH BGA WITH DAISY CHAIN TEST 0.8MM - 1.0MM PITCH

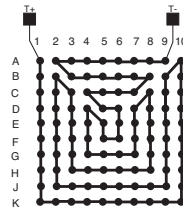


Actual Size 4" x 5.5 (100 x 140mm)

TopLine makes practicing with Fine Pitch Ball Grid Array technology accessible and affordable. Each board supports BGAs with 0.8mm and 1.0mm grid patterns and daisy chain test points to verify proper placement.



**BGA672
AFTER ASSEMBLY**



**BGA100
AFTER ASSEMBLY**

FEATURES



- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Tooling Holes .125"
- Fiducial Marks



FINE PITCH BGA WITH DAISY CHAIN TEST 0.8MM - 1.0MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 998102 1 KIT	ORDER NUMBER 998110 10 KITS	ORDER NUMBER 998125 25 KITS	ORDER NUMBER 998150 50 KITS	ORDER NUMBER 998100 100 KITS
Board		1	10	25	50	100
BGA100	0.8mm	2	20	50	100	200
BGA672	1.0mm	2	20	50	100	200

Kits are supplied with only 2 BGAs for each daisy chain portion of PC Board.

SOLDERMASK DEFINED PADS

Pitch	Pad Dia.	Ball Dia.
0.8mm	0.38mm	0.46mm
1.0mm	0.508mm	0.63mm

Lead Free (Pb-Free) Option

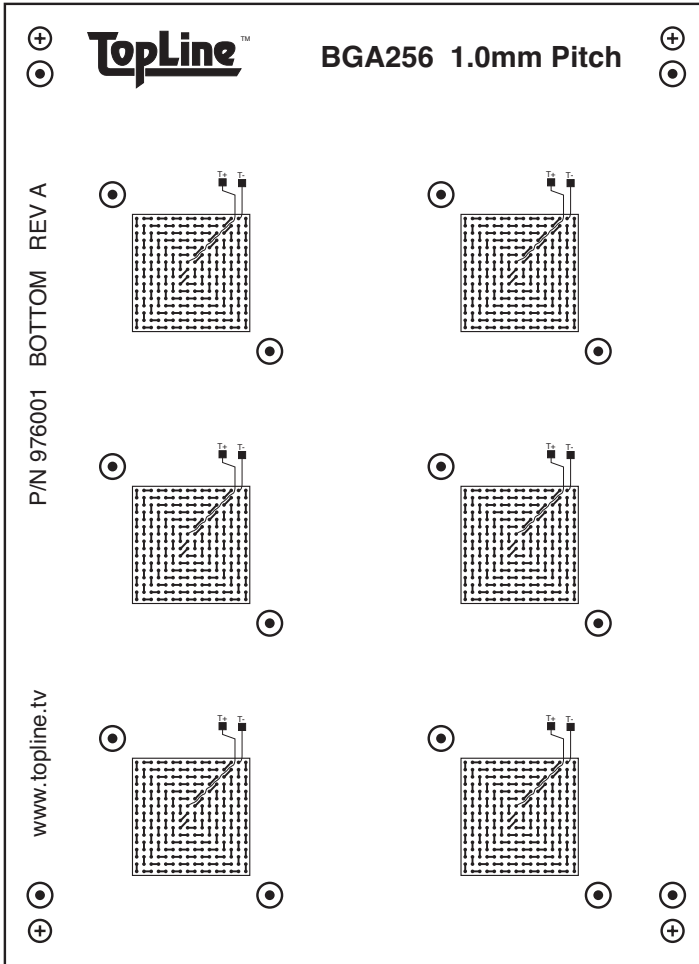
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	998107	998200	998210	998225	998250	998299
Ag - Silver	998106	998600	998610	998625	998650	998699
Cu - OSP	998108	998800	998810	998825	998850	998899
Au - Gold	998109	998900	998910	998925	998950	998999
Standard						
SnPb - HASL	998101	998102	998110	998125	998150	998100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

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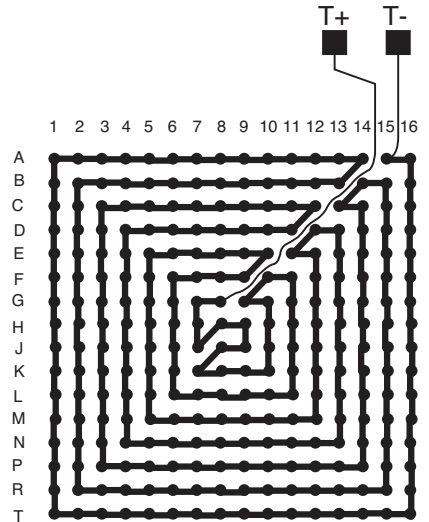


BGA256 DAISY CHAIN KIT 1.0MM PITCH



Test board for 1.0mm pitch BGA256
Full Array with daisy chain.

Bottom side of board is for SBGA560
(not shown).



BGA256T1.0-DC169A
AFTER MOUNTING

FEATURES

- LPI Solder Mask
- Single Sided
- Tooling Holes .125"
- Fiducial Marks



Actual Size: 4" x 5.5" (100 x 140mm)



BGA256 DAISY CHAIN KIT 1.0MM PITCH



KIT ORDERING INFORMATION

COMPONENT	BALL PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		976000 1 KIT	976010 10 KITS	976025 25 KITS	976050 50 KITS	976100 100 KITS
Board		1	10	25	50	100
BGA256	1.0mm	6	60	150	300	600

Kits are supplied with BGAs for one side of PC Board.

SOLDERMASK DEFINED PADS

Component	Pitch	Pad Dia.	Ball Dia.
BGA256	1.0mm	0.63mm	0.6mm

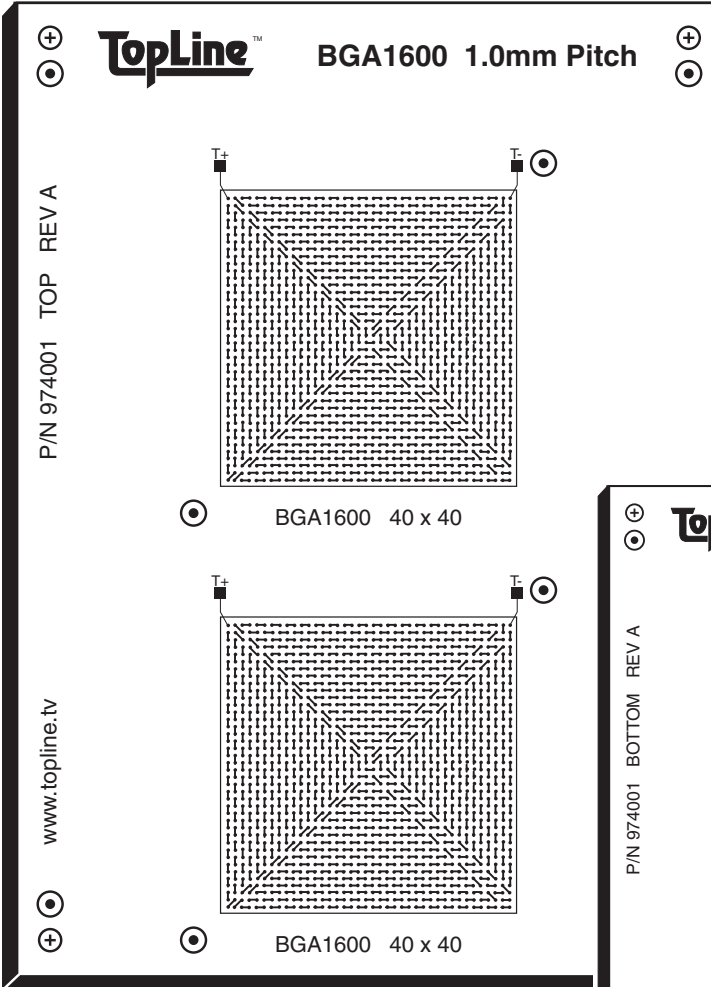
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	976002	976200	976210	976225	976250	976299
Ag – Silver	976006	976600	976610	976625	976650	976699
Cu – OSP	976008	976800	976810	976825	976850	976899
Au – Gold	976009	976900	976910	976925	976950	976999
Standard						
SnPb – HASL	976001	976002	976010	976025	976050	976100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

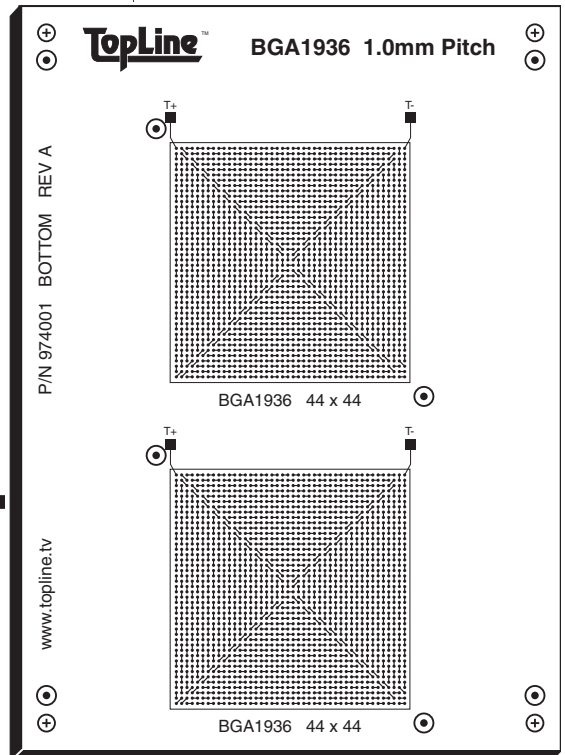


BGA1600/1936 DAISY CHAIN KIT 1.0MM PITCH



TOP SIDE
BOARD

**BOTTOM SIDE
BOARD**



Actual Size: 4" x 5.5" (100 x 140mm)



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BGA1600/1936 DAISY CHAIN KIT 1.0MM PITCH



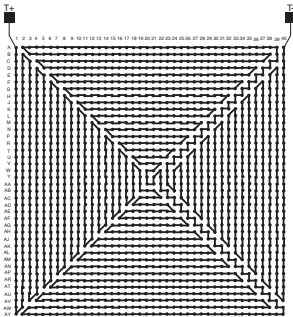
KIT ORDERING INFORMATION

CONTENTS	 MANUAL ASSEMBLY			OR	 MACHINE RUN		
	ORDER NUMBER 974000 1 KIT	ORDER NUMBER 974600 1 KIT	ORDER NUMBER 974900 1 KIT		ORDER NUMBER 974021 1 KIT	ORDER NUMBER 974621 1 KIT	ORDER NUMBER 974921 1 KIT
	Sn Pb BALLS				LEAD FREE SnAgCu BALLS		
BGA1600	2	2	0		2	2	0
BGA1936	2	0	2		2	0	2
Board Sn-Tin	1	1	1		1	1	1

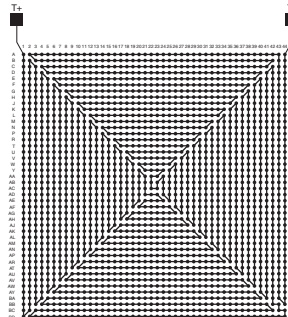
Select the kit that matches your requirements

SOLDERMASK DEFINED PADS

Component	Pitch	Pad Dia.	Ball Dia.
BGA1600/1936	1.0mm	0.635mm	0.6mm



BGA1600T1.0-DC409
After Mounting



BGA1936T1.0-DC449
After Mounting

OPTIONAL ACCESSORIES

PARTS PLACEMENT DATA	BOARD ORDER NUMBER
X, Y, THETA ASCII FILE	Sn - Tin 974002
ORDER NUMBER 974004	Ag - Silver 974006
SOLDER PASTE ARTWORK	Cu - OSP 974008
GERBER FILE	Au - Gold 974009
ORDER NUMBER 974005	

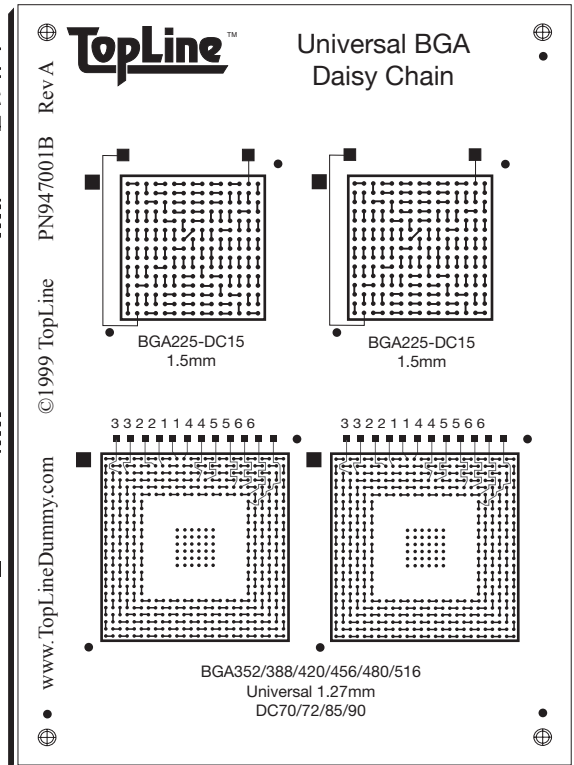
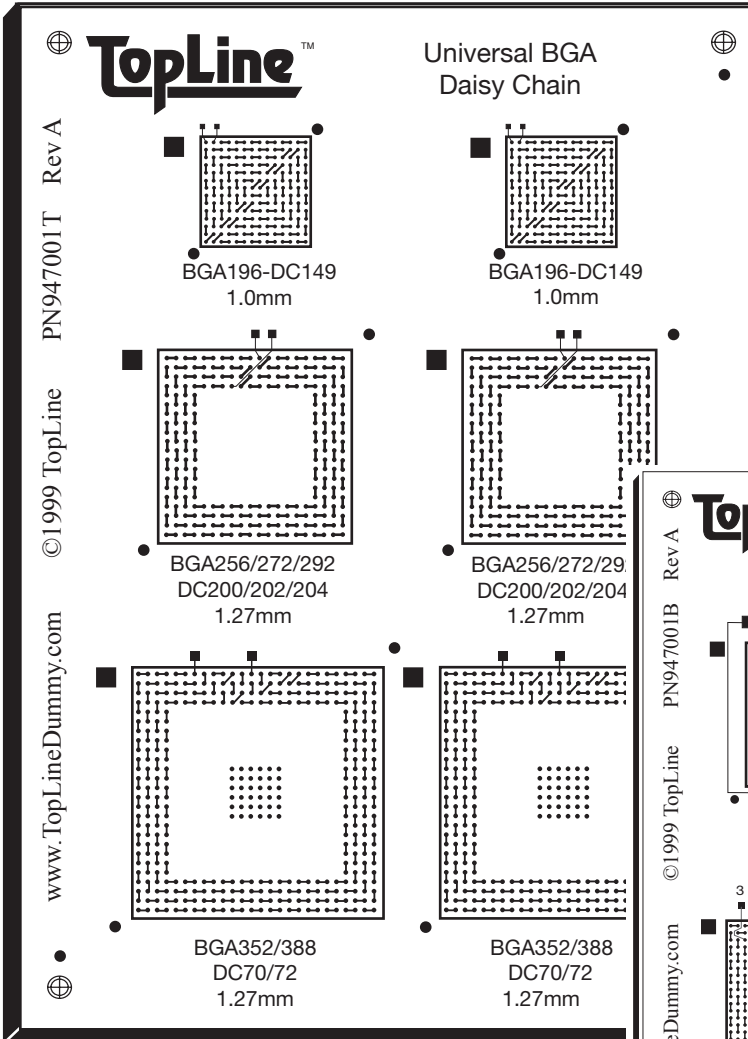


UNIVERSAL BGA DAISY CHAIN KIT 1.0/1.27MM PITCH



TOP SIDE
BOARD

BOTTOM SIDE
BOARD





Actual Size: 4" x 5.5" (100 x 140mm)



UNIVERSAL BGA DAISY CHAIN KIT 1.0/1.27MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 947000 1 KIT	ORDER NUMBER 947010 10 KITS	ORDER NUMBER 947025 25 KITS	ORDER NUMBER 947050 50 KITS	ORDER NUMBER 947100 100 KITS
Board		1	10	25	50	100
BGA196	1.0mm	2	20	50	100	200
BGA256	1.27mm	2	20	50	100	200
BGA352	1.27mm	2	20	50	100	200

Kits are supplied with BGAs for top side of PC Board.

SOLDERMASK DEFINED PADS

Component	Pitch	Pad Dia.	Ball Dia.
BGA196	1.0mm	0.508mm	0.63mm
others	1.27~1.5mm	0.61mm	0.75mm

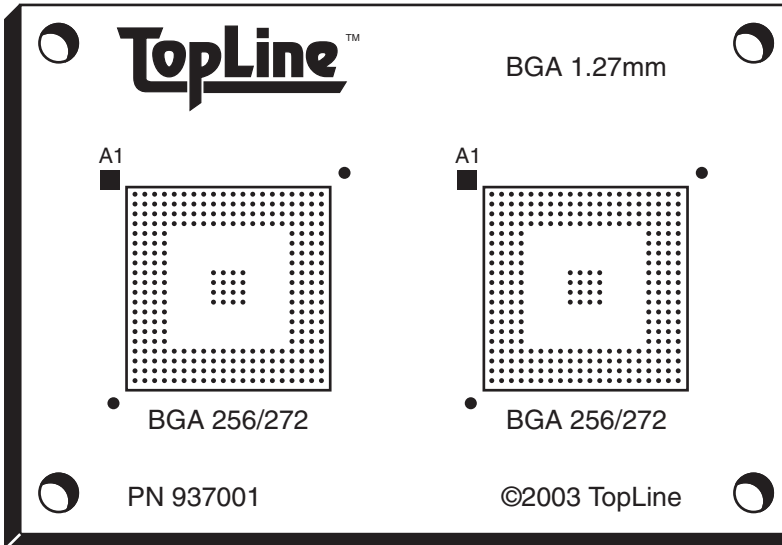
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	947002	947200	947210	947225	947250	947299
Ag – Silver	947006	947600	947610	947625	947650	947699
Cu – OSP	947008	947800	947810	947825	947850	947899
Au – Gold	947009	947900	947910	947925	947950	947999
Standard						
SnPb – HASL	947001	947000	947010	947025	947050	947100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

TopLine[®]

BGA256/BGA272 1.27MM PITCH



TopLine offers a low cost BGA kit for placement and rework practice. Popular BGA256/BGA272 without daisy chain. Use for hand solder or machine assembly

FEATURES

- FR4 Board
- Double Sided
- Tooling Holes
- Fiducial Marks
- LPI Soldermask
- Pad Site .030" dia.

Actual Size 2.75" x 4.0" (70 x 100mm)



TopLine®



BGA256/BGA272 1.27MM PITCH



KIT ORDERING INFORMATION

COMPONENT SELECTION	BALL PITCH	MANUAL ASSEMBLY OR					MACHINE RUN
							
		937000 ORDER NUMBER 1 KIT	937010 ORDER NUMBER 10 KITS	937020 ORDER NUMBER 20 KITS	937040 ORDER NUMBER 40 KITS	937080 ORDER NUMBER 80 KITS	
Board		1	10	20	40	80	
BGA256/BGA272	1.27mm	2	20	40	80	160	

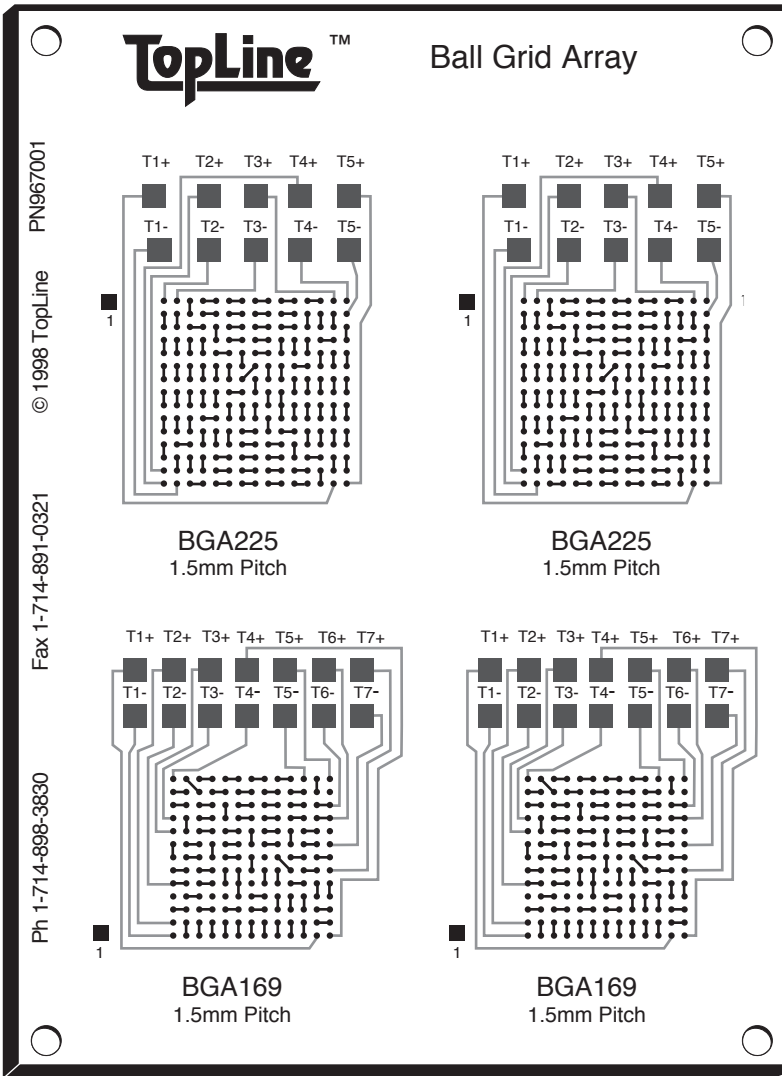
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	20 Kits	40 Kits	80 Kits
Lead Free						
Sn – Tin	937002	937200	937210	937220	937240	937280
Ag – Silver	937006	937600	937610	937620	937640	937680
Cu – OSP	937008	937800	937810	937820	937840	937880
Au – Gold	937009	937900	937910	937920	937940	937980
Standard						
SnPb – HASL	937001	937000	937010	937020	937040	937080

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

TopLine[®]

BGA169 & BGA225 WITH DAISY CHAIN TEST 1.5MM PITCH



TopLine makes practicing with Ball Grid Array technology accessible and affordable. Each board supports four BGAs with 1.5mm grid pattern and daisy chain test points to verify proper placement. Double sided board incorporates "two front side" design so only one solder paste stencil is needed.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks



Actual Size 4" x 5.5 (100 x 140mm)

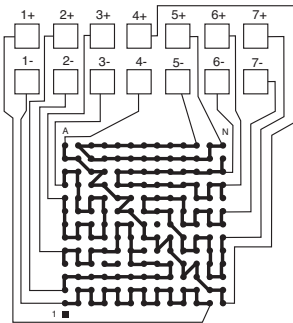


BGA169 & BGA225 WITH DAISY CHAIN TEST 1.5MM PITCH

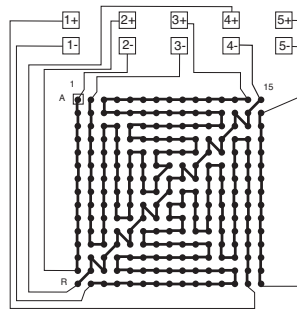


KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 967000 1 KIT	ORDER NUMBER 967012 12 KITS	ORDER NUMBER 967025 25 KITS	ORDER NUMBER 967050 50 KITS	ORDER NUMBER 967100 100 KITS
Board		1	12	25	50	100
BGA 169	1.5mm	2	25	50	100	200
BGA 225	1.5mm	2	25	50	100	200



BGA169
AFTER MOUNTING TO TEST BOARD



BGA225
AFTER MOUNTING TO TEST BOARD

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	12 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	967002	967200	967212	967225	967250	967299
Ag - Silver	967006	967600	967612	967625	967650	967699
Cu - OSP	967008	967800	967812	967825	967850	967899
Au - Gold	967009	967900	967912	967925	967950	967999
Standard						
SnPb - HASL	967001	967000	967012	967025	967050	967100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

TopLine®

UNIVERSAL BGA KIT 1.27MM & 1.5MM PITCH



TopLine's Universal BGA Kits are economical. Includes non-daisy-chain BGA components. Kit has 1.27mm and 1.5mm pitch for placement and solder practice.

TopLine™ BGA Universal Placement
Soldermask Defined Pads

1.27mm Pitch

1.5mm Pitch

Rev A
PN946001T
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www.TopLineDummy.com

Pad Geometries		
Pad	Ball	
Dia.	Dia.	Pitch
23mil	30mil	1.5 mm
23mil	30mil	1.27mm

Top Side-
Soldermask defined pads

Bottom Side-
Etched defined pads

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes

Actual Size: 4" x 5.5" (100 x 140mm)



TopLine®



UNIVERSAL BGA KIT 1.27MM & 1.5MM PITCH



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY	 MACHINE RUN	
		ORDER NUMBER 946000 1 KIT	ORDER NUMBER 946010 10 KITS	ORDER NUMBER 946025 25 KITS
COMPONENT	PITCH			
Board 946001	1.27/1.5mm	1	10	25
BGA169 or BGA225	1.5mm	4	40	100
BGA256 or BGA352	1.27mm	4	40	100

Lead Free (Pb-Free) Option

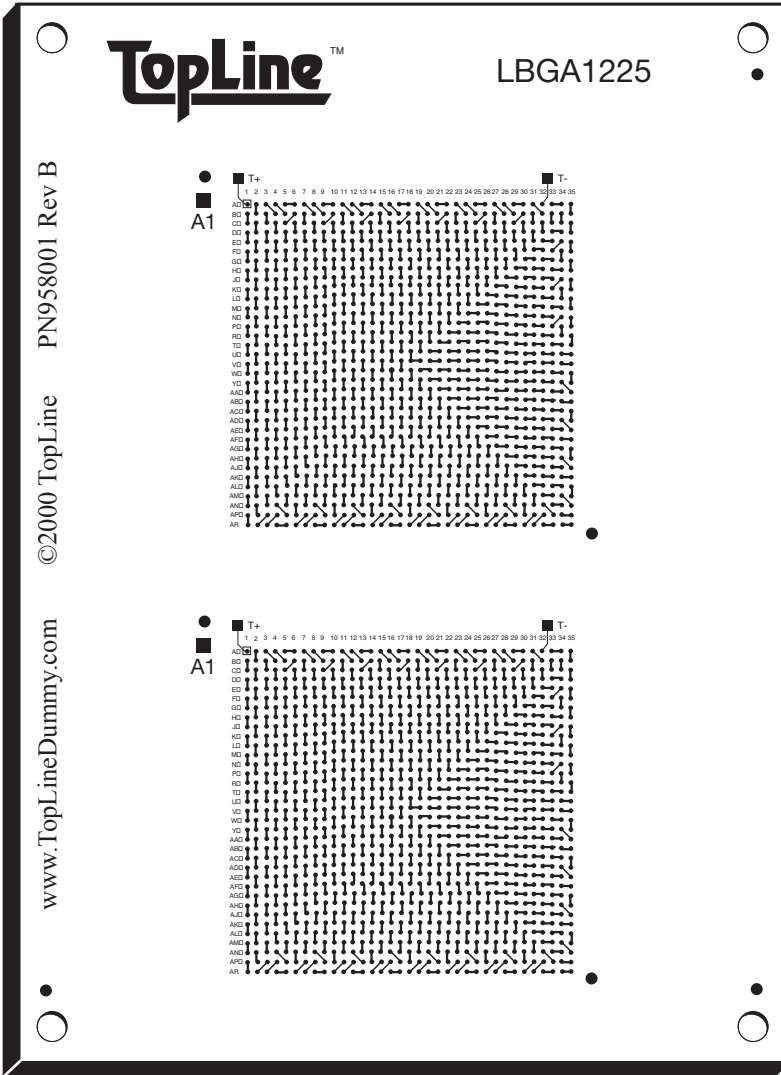
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	946002	946200	946210	946225	946250	946299
Ag – Silver	946006	946600	946610	946625	946650	946699
Cu – OSP	946008	946800	946810	946825	946850	946899
Au – Gold	946009	946900	946910	946925	946950	946999
Standard						
SnPb – HASL	946001	946000	946010	946025	946050	946100

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TopLine[®]



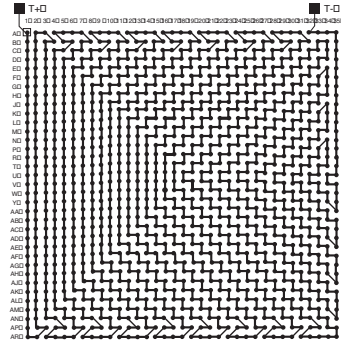
LBGA1225 DAISY CHAIN KIT 1.27MM PITCH



Experiment with large size Ball Grid Arrays. Kit comes consists of PC Board with daisy chain and matching 45mm square LBGA Component with 1225 solder balls.

Top Side:
35 x 35 matrix LPGA1225

Bottom Side: LPGA1089
33 x 33 matrix: Not Shown



Soldermask defined
pad diameter 0.6mm

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



TopLine®



LPGA1225 DAISY CHAIN KIT 1.27MM PITCH



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY	 MACHINE RUN	
		ORDER NUMBER 958000 1 KIT	ORDER NUMBER 958012 12 KITS	ORDER NUMBER 958024 24 KITS
COMPONENT	PITCH			
Board 958001 LPGA1225	1.27mm	1 2	12 24	24 48

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	958002	958200	958210	958225	958250	958299
Ag – Silver	958007	958600	958610	958625	958650	958699
Cu – OSP	958008	958800	958810	958825	958850	958899
Au – Gold	958009	958900	958910	958925	958950	958999
Standard						
SnPb – HASL	958001	958000	958010	958025	958050	958100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

TopLine[®]

CERAMIC CBGA KIT 1.27MM PITCH



TopLine[™] Ceramic CBGA

CBGA121

CBGA196

CBGA256

CBGA304

CBGA361

CBGA625

TopLine's Ceramic Ball Grid Array. Kit includes one PC board and 6-different CBGAs. New Rev "B" design is daisy chain, double sided with same land patterns on both sides of board.

- FEATURES**
- LPI Solder Mask
 - FR4 Board .062"
 - Double Sided
 - Tooling Holes .125"
 - Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)





CERAMIC CBGA KIT

1.27MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN	
		ORDER NUMBER 951000 1 KIT	ORDER NUMBER 951010 10 KITS	ORDER NUMBER 951012 12 KITS	ORDER NUMBER 951025 25 KITS
Board		1	10	12	25
CBGA121 11 x 11	1.27mm	1	10	12	25
CBGA196 14 x 14	1.27mm	1	10	12	25
CBGA256 16 x 16	1.27mm	1	10	12	25
CBGA304 21 x 25	1.27mm	1	10	12	25
CBGA361 19 x 19	1.27mm	1	10	12	25
CBGA625 25 x 25	1.27mm	1	10	12	25

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	12 Kits	25 Kits
Lead Free					
Sn – Tin	951002	951200	951210	951212	951225
Ag – Silver	951006	951600	951610	951612	951625
Cu – OSP	951008	951800	951810	951812	951825
Au – Gold	951009	951900	951910	951912	951925
Standard					
SnPb – HASL	951001	951000	951010	951012	951025

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm



Practice Lead free assembly using fine-pitch components.

BGA196-DC149
1.0mm

BGA256/272/292
DC200/202/204
1.27mm

0402

0603

0805

1206

BGA225
1.5mm

QFP208 .5mm

© 1999 TopLine PN986001 Rev A

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- PC BOARD FEATURES**
- LPI Solder Mask
 - FR4 Board .062"
 - Double Sided
 - Tooling Holes .125"
 - Fiducial Marks

- ASSEMBLY METHODS**
- Machine Run
 - Hand Solder
 - Rework



Actual Size 4" x 5.5 (100 x 140mm)



LEAD FREE KIT MULTICOMPONENTS



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		986000	986010	986024	986050	986100
		1 KIT	10 KITS	24 KITS	50 KITS	100 KITS
Board		1	10	24	50	100
BGA196	1.0mm	1	10	24	50	100
BGA225	1.5mm	1	10	24	50	100
BGA256	1.27mm	1	10	24	50	100
QFP208	0.5mm	1	10	24	50	100
0402		10	100	250	500	1000
0603		10	100	250	500	1000
0805		10	100	250	500	1000
1206		10	100	250	500	1000

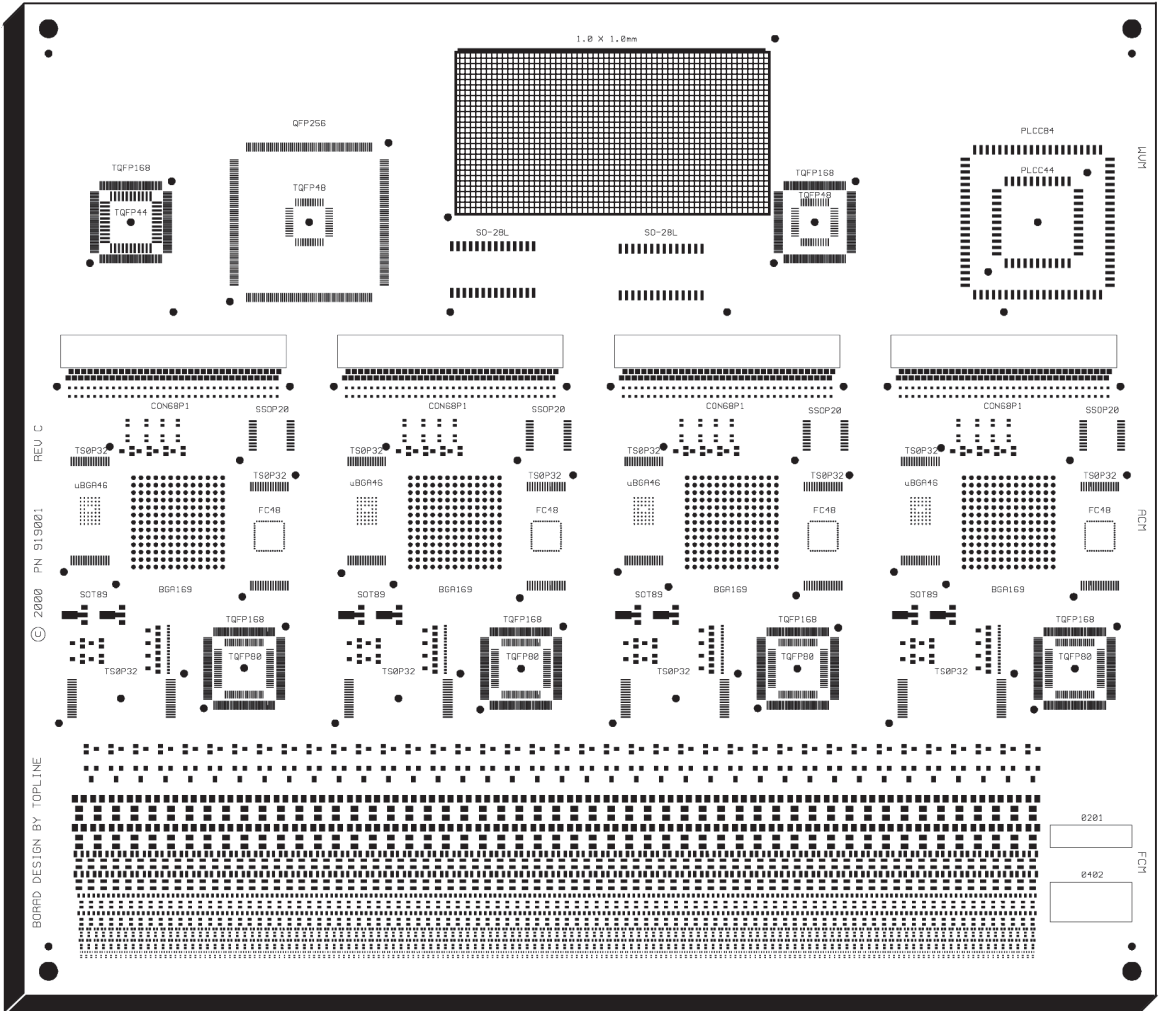
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	24 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	986002	986200	986210	986224	986250	986299
Ag - Silver	986006	986600	986610	986624	986650	986699
Cu - OSP	986008	986800	986810	986824	986850	986899
Au - Gold	986009	986900	986910	986924	986950	986999

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm



LARGE MACHINE RUN KIT



Actual Size: 9" x 7.875" (228.6mm x 200mm)

FEATURES

- Single Sided
- Black LPI Soldermask
- Very High Density
- 0201 Chips



KIT ORDERING INFORMATION

	PER BOARD	PITCH				
			ORDER NUMBER 919010 10 KIT	ORDER NUMBER 919025 25 KITS	ORDER NUMBER 919050 50 KITS	ORDER NUMBER 919100 100 KITS
COMPONENT						
Board			10	25	50	100
LQFP168	6	0.3mm	0	0	0	0
QFP256	1	0.4mm	10	24	48	96
TQFP48	2	0.5mm	25	50	100	200
TQFP44	1	0.8mm	10	25	50	100
LQFP80	4	0.4mm	40	100	200	400
TSOP32	12	0.5mm	120	300	600	1,200
FLIP CHIP 48	4	457µm	0	0	0	0
µBGA46	4	0.75mm	40	100	200	400
BGA169	4	1.5mm	40	100	180	360
PLCC44	1	1.27mm	10	25	50	100
PLCC84	1	1.27mm	10	25	50	100
SOL28	2	1.27mm	20	50	100	200
SSOP20	4	0.65mm	40	100	200	400
SOT323	87		3,000	3,000	3,000	6,000
SOT23	39		3,000	3,000	3,000	6,000
SOT89	8		100	200	400	800
0201	600		5,000	15,000	30,000	60,000
0402	700		10,000	20,000	40,000	80,000
0603	500		5,000	15,000	25,000	50,000
0805	300		5,000	10,000	15,000	30,000
1206	200		5,000	10,000	15,000	20,000

Lead Free (Pb-Free) Option

Description	Spare Board	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free					
Sn – Tin	919002	919210	919225	919250	919299
Ag – Silver	919006	919610	919625	919650	919699
Cu – OSP	919008	919810	919825	919850	919899
Au – Gold	919009	919910	919925	919950	919999
Standard					
SnPb – HASL	919001	919010	919025	919050	919100

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TopLine®



CHALLENGER 2 KIT INTERMEDIATE SMD



PN928001

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Fax 1-714-891-0321

Ph 1-714-898-3830

Challenger 2

QFP44 - .8mm

0805

1206

1210

Inductor

0603

5020 Crystal

MINI MELF

1812

0402

Tantalum

SO 14

SOM 16

PLCC 20

SOL 20

SOT 23

SOT 89

SOT323

MELF

AL CAP
6.3mm

AL CAP
4mm

1812

SOT
223

Pot.

D PAK

BGA169

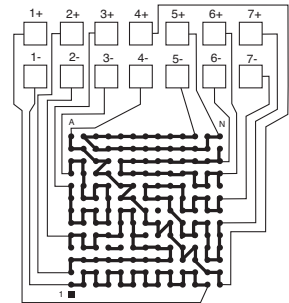
TSOP32-T1

PLCC 68

QFP100
.65mm

QFP208
.5mm

The new Challenger 2 Kit gives you a wide selection of 33 different SMD packages. Includes BGA with daisy chain continuity test, fine-pitch components and many discrete components. Double-sided board incorporates "two-front-side" design so only one solder paste stencil is needed. Put your machine to the test with the new Challenger 2 Kit.



BGA169 AFTER MOUNTING

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



KIT ORDERING INFORMATION

 COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		928000	928010	928025	928050	928100
		1 KIT	10 KITS	25 KITS	50 KITS	100 KITS
Board		1	10	25	50	100
TSOP32	0.5mm	1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
QFP44	0.8mm	1	10	25	50	100
PLCC20	1.27mm	1	10	25	50	100
PLCC68	1.27mm	1	10	25	50	100
SO14	1.27mm	1	10	25	50	100
SOM16	1.27mm	1	10	25	50	100
SOL20	1.27mm	1	10	25	50	100
BGA169	1.5mm	1	10	25	50	100
SOT23		3	30	75	150	400
SOT89		2	20	50	100	200
SOT223		1	10	25	50	100
SOT323		2	20	50	100	200
DPAK		1	10	25	100	100
Crystal		1	10	25	100	100
Tantalum A & B		1 ea.	10 ea.	25 ea.	50 ea.	100 ea.
Tantalum C & D		1 ea.	10 ea.	25 ea.	100 ea.	100 ea.
Aluminum Cap 4mm & 6.3mm		1 ea.	10 ea.	25 ea.	100 ea.	100 ea.
0402 & 0603 Chip		10 ea.	100 ea.	250 ea.	500 ea.	1000 ea.
0805 & 1206 Chip		10 ea.	100	150	500	1000
1206 mini MELF		6	60	150	500	500
1210 Chip		6	60	25	50	250
1210 Inductor		1	10	25	50	100
1812 Chip		1	10	25	50	100
1812 Inductor		1	10	25	50	100
Potentiometer		1	10	25	50	100
2308 MELF		2	20	50	100	200

Lead Free (Pb-Free) Option

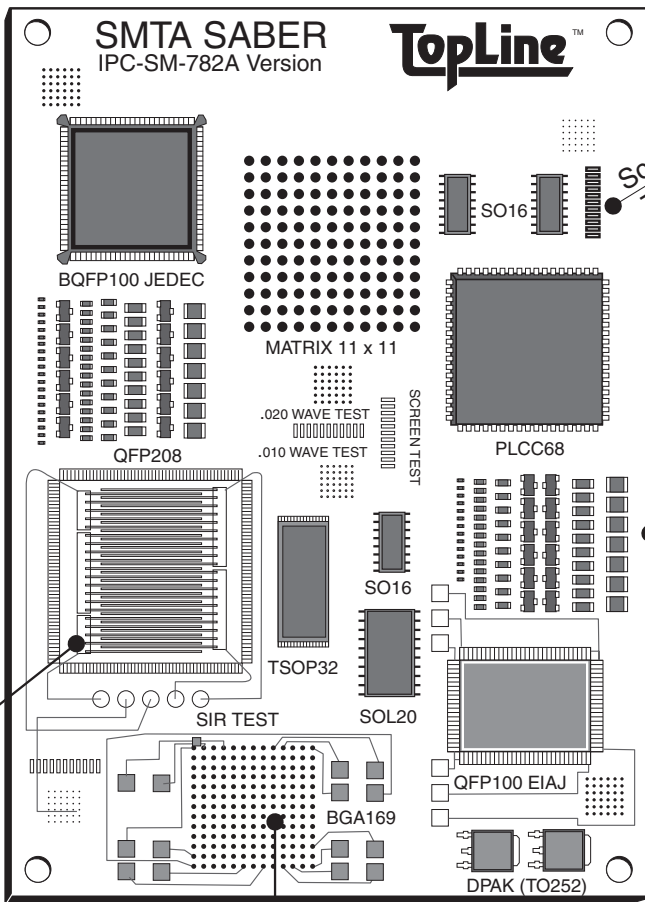
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	928002	928200	928210	928225	928250	928299
Ag – Silver	928006	928600	928610	928625	928650	928699
Cu – OSP	928008	928800	928810	928825	928850	928899
Au – Gold	928009	928900	928910	928925	928950	928999
Standard						
SnPb – HASL	928001	928000	928010	928025	928050	928100

TopLine[®]



SABER 4-BOARD ARRAY

ADVANCED MIXED TECHNOLOGY

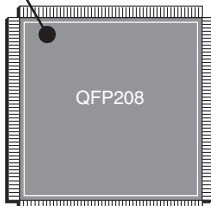


The SABER Board has helped many SMTA members to define and refine their surface mount assembly processes. The SABER Board is used by mainstream surface mount manufacturers throughout the industry to test capabilities such as component placement accuracy, cleanliness (SIR-surface insulation resistance), solder paste screening, solder joint integrity, wave soldering and component placement speed (chip shooting). The SABER Board is supplied as a snap-apart, four board panelized array.

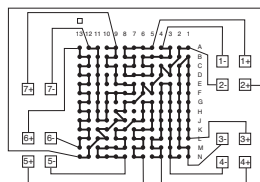
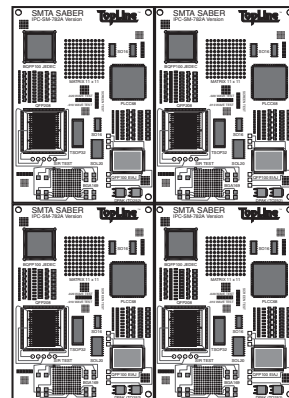
0402/1210
Chips & SOT's

ACTUAL PANEL SIZE:
8" x 11" (200 x 280mm)

SIR Test*



Daisy Chain



BGA AFTER MOUNTING (TOP SIDE)

- FEATURES**
- LPI Solder
 - FR4 Board .062"
 - Double Sided
 - Tooling Holes .125"
 - Fiducial Marks
 - 4-Board Routed Array





SABER 4-BOARD ARRAY

ADVANCED MIXED TECHNOLOGY



KIT ORDERING INFORMATION

*BQFP100 only in SnPb Kit

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 950000 4 KITS	ORDER NUMBER 950012 12 KITS	ORDER NUMBER 950024 24 KITS	ORDER NUMBER 950048 48 KITS	ORDER NUMBER 950096 96 KITS
SABER Array		1 Array	3 Arrays	6 Arrays	12 Arrays	24 Arrays
QFP208	0.5mm	4	12	25	50	100
TSOP32	0.5mm	4	12	25	50	100
QFP100	0.65mm	4	12	25	50	100
BQFP100*	25mil	4	12	25	50	100
BGA169	1.5mm	4	12	25	50	100
PLCC68	1.27mm	4	12	25	50	100
SO16	1.27mm	12	50	100	200	300
SOL20	1.27mm	4	12	50	50	100
DPAK	1.27mm	10	25	50	100	200
SOT23	1.27mm	100	300	500	1000	3000
0402/0603/0805/1206 Chip	-	100	500	1000	2000	5000
1210 Chip	-	100	200	500	1000	1000
DIP14 ~ 20	100mil	8	25	50	100	200

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10/12 Kits	24/25 Kits	48/50 Kits	96/100 Kits
4-Board Array						
Sn – Tin	950002	950200	950212	950224	950248	950296
Ag – Silver	950006	950600	950612	950624	950648	950696
Cu – OSP	950008	950800	950812	950824	950848	950896
Au – Gold	950009	950900	950912	950924	950948	950996
Standard						
SnPb – HASL	950001	950000	950012	950024	950048	950196
Single (1-up)						
Sn – Tin	950013	950201	950210	950225	950250	950299
Ag – Silver	950016	950601	950610	950625	950650	950699
Cu – OSP	950018	950801	950810	950825	950850	950899
Au – Gold	950007	950901	950910	950925	950950	950999
Standard						
SnPb – HASL	950003	950011	950010	950025	950050	950100



PN935001

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Fax 1-714-891-0321

Ph 1-714-898-3830

TopLine™ Stencil Evaluation Kit

DAISY CHAIN

T1+ T2+ T3+ T4+ T5+
T1- T2- T3- T4- T5-

QFP 256 .4mm

TSOP32 .5mm

BGA225 1.5mm Pitch

QFP 208 .5mm

MINI MELF

QFP100 .65mm

0402

0603

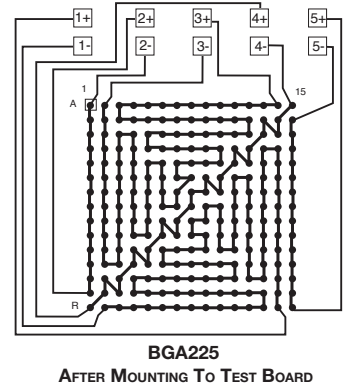
D PAK

SCREEN TEST PATTERN

SOL 20

PLCC 44

We supply the board and components. You provide the stencil. All kits include a ball grid array with daisy chain test and 0.4mm pitch QFP256.



- FEATURES**
- LPI Solder Mask
 - FR4 Board .062"
 - Double Sided
 - Tooling Holes .125"
 - Fiducial Marks



Actual Size: 4" x 5.5" (100 x 140mm)



STENCIL EVALUATION KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 936000 1 KIT	ORDER NUMBER 936010 10 KIT	ORDER NUMBER 936025 25 KITS	ORDER NUMBER 936050 50 KITS	ORDER NUMBER 936100 100 KITS
Board		1	10	25	50	100
LQFP168	0.3mm	0	0	0	0	0
QFP256	0.4mm	1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
TSOP32	0.5mm	1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
BGA225	1.5mm	1	10	25	50	100
PLCC44	50mil	1	10	25	50	100
SOL20	50mil	1	10	25	50	100
DPAK		1	10	25	50	100
0402 chip		10	100	250	500	1000
0603 chip		10	100	250	500	1000
mini Melf		6	60	150	300	600

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	935002	936200	936210	936225	936250	936299
Ag - Silver	935006	936600	936610	936625	936650	936699
Cu - OSP	935008	936800	936810	936825	936850	936899
Au - Gold	935009	936900	936910	936925	936950	936999
Standard						
SnPb - HASL	935001	936000	936010	936025	936050	936100

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REWORK 1 PRACTICE KIT



TopLine

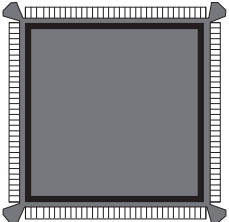
PN 965001

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Ph 1-714-898-3830


Rework Practice



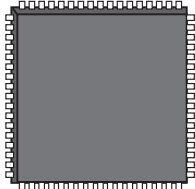
BQFP 132




SO 14




SO 14




PLCC 68



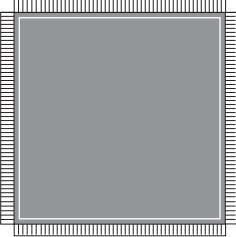
0805 (2012)



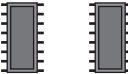
TSOP 32



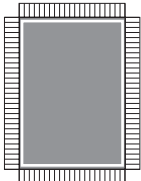
1206 (3216)



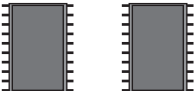
QFP 208




SOM 16



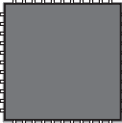
QFP100




SOL 20




SOT 23




PLCC 44



PLCC 44



PLCC 20



PLCC 20

This Rework Practice Kit is designed for all skill levels. Includes fine-pitch components often found in real world rework situations.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks



Actual Size: 4" x 5.5" (100 x 140mm)



REWORK 1 PRACTICE KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 965000 1 KIT	ORDER NUMBER 965010 10 KITS	ORDER NUMBER 965026 25 KITS	ORDER NUMBER 965050 50 KITS	ORDER NUMBER 965100 100 KITS
Board		1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
TSOP32	0.5mm	1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
BQFP132*	25mils	1	10	25	50	100
PLCC20	50mils	2	25	50	100	200
PLCC44	50 mils	2	25	50	100	200
PLCC68	50mils	1	10	25	50	100
SO14	50mils	2	25	50	100	200
SOM16	50mils	2	25	50	100	200
SOL20	50mils	2	25	50	100	200
SOT23		10	100	500	500	500
0805 Chip		10	100	500	500	1000
1206 Chip		10	100	250	500	1000

*BQFP132 only in SnPb Kits

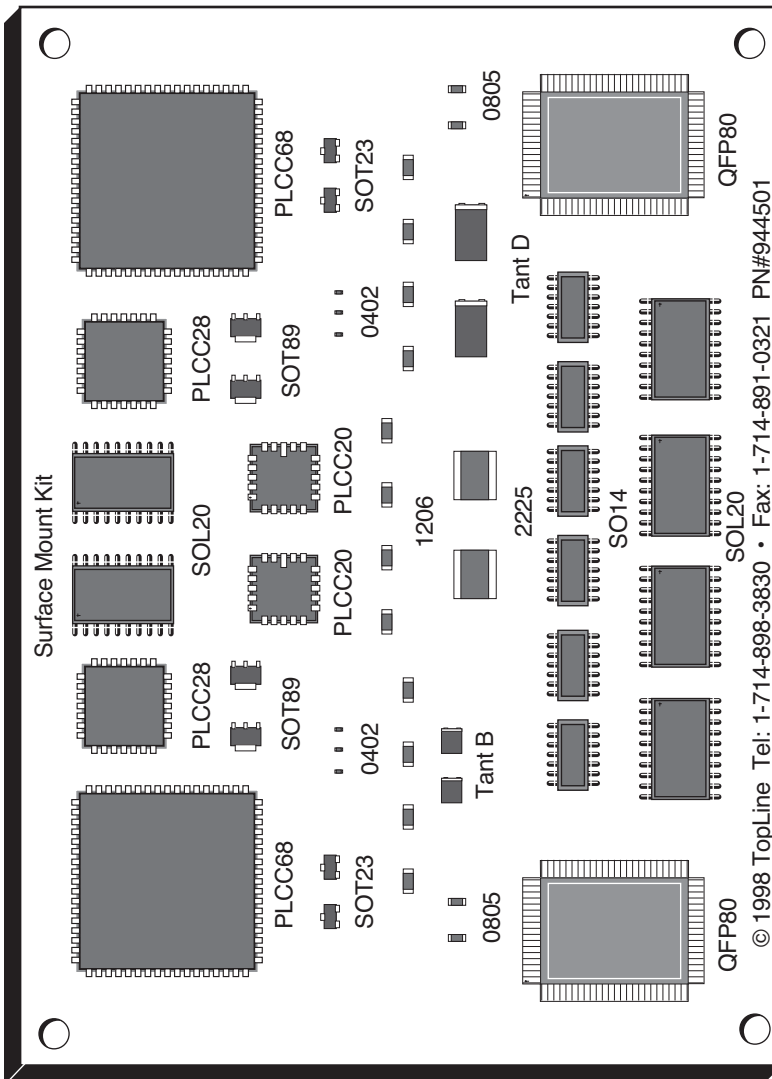
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	965002	965200	965210	965225	965250	965299
Ag - Silver	965006	965600	965610	965625	965650	965699
Cu - OSP	965008	965800	965810	965825	965850	965899
Au - Gold	965009	965900	965910	965925	965950	965999
Standard						
SnPb - HASL	965001	965000	965010	965025	965050	965100

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REWORK 2 PRACTICE KIT



Topline provides this kit for rework practice. Kit contains popular components including fine pitch Quad Flat Pack. For manual assembly only.

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FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



REWORK 2 PRACTICE KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	MANUAL ASSEMBLY		MACHINE RUN	
		ORDER NUMBER 944500 1 Kit	ORDER NUMBER 944510 10 Kits	ORDER NUMBER 944525 25 Kits	ORDER NUMBER 944550 50 Kits
Board		1	10	25	50
QFP80	0.8mm	2	20	50	100
PLCC20	1.27mm	2	20	50	100
PLCC28	1.27mm	2	20	50	100
PLCC68	1.27mm	2	20	50	100
SO14	1.27mm	6	60	150	300
SOL20	1.27mm	6	60	150	300
0402 Chips		6	60	150	300
0805 Chips		8	80	200	400
1206 Chips		12	120	300	600
2225 Cap		2	20	50	100
Tantalum 3528	B-Case	2	20	50	100
Tantalum 7343	D-Case	2	20	50	100
SOT23		4	40	100	400
SOT89		4	40	100	200

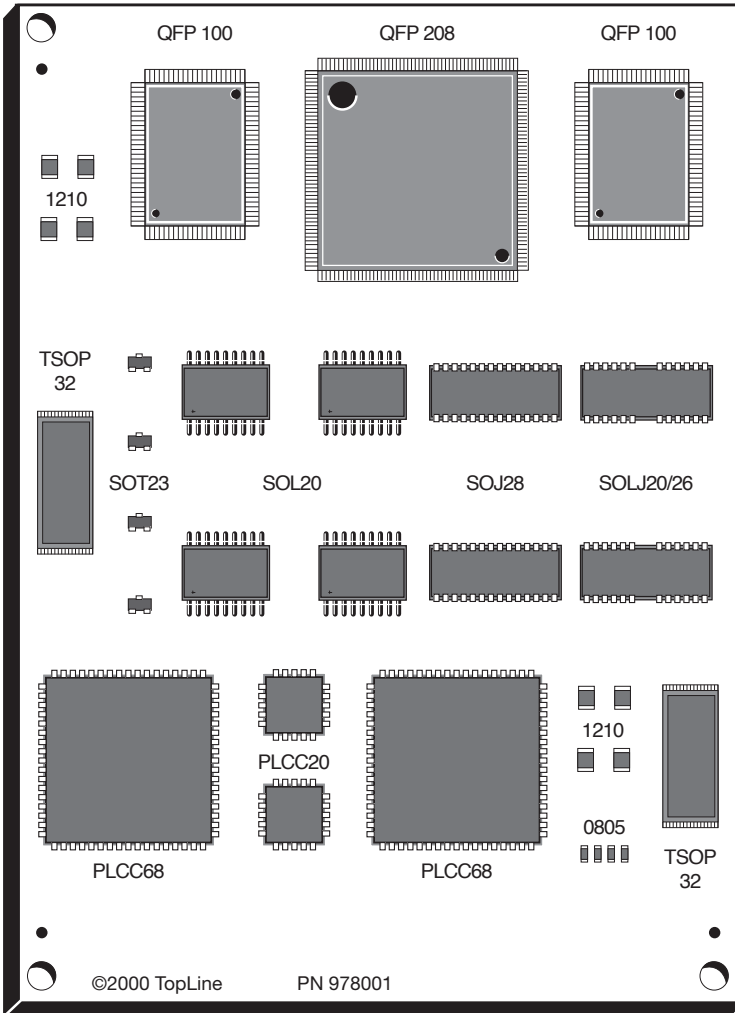
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	944502	944200	944210	944225	944250	944299
Ag – Silver	944506	944600	944610	944625	944650	944699
Cu – OSP	944508	944800	944810	944825	944850	944899
Au – Gold	944509	944900	944910	944925	944950	944999
Standard						
SnPb – HASL	944501	944500	944510	944525	944550	944599

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REWORK 3 PRACTICE KIT



This Rework Practice Kit is available populated and unassembled. Includes fine-pitch components often found in real work situations.

FEATURES

- LPI Soldermask
- FR4 Board .062"
- Single Sided
- Tooling Holes
- Fiducial Marks



Actual Size 4" x 5.5" (100 x 140mm)



REWORK 3 PRACTICE KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 978000 1 KIT	ORDER NUMBER 978010 10 KITS	ORDER NUMBER 978025 25 KITS	ORDER NUMBER 978050 50 KITS	ORDER NUMBER 978100 100 KITS
Board		1	10	25	50	100
QFP208	0.5mm	1	10	25	50	100
QFP100	0.65mm	2	20	50	100	200
TSOP32	0.5mm	2	20	50	100	200
PLCC20	50mil	2	20	50	100	200
PLCC68	50mil	2	20	50	100	200
SOL20	50mil	4	40	100	200	400
SOJ28	50mil	2	20	50	100	200
*SOJ20/26	50mil	2	20	50	100	200
SOT23		4	50	100	200	400
0805		4	50	100	200	400
1210		8	100	200	400	800

*SOJ20/26 only in SnPb Kits

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	978002	978200	978210	978225	978250	978299
Ag – Silver	978006	978600	978610	978625	978650	978699
Cu – OSP	978008	978800	978810	978825	978850	978899
Au – Gold	978009	978900	978910	978925	978950	978999
Standard						
SnPb – HASL	978001	978000	978010	978025	978050	978100

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TopLine® SMT INTRODUCTORY KIT SURFACE MOUNT TECHNOLOGY



The SMD Introductory Kit includes a wide range of popular easy-to-handle components.

PN 925001

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Fax 1-714-891-0321

Ph 1-714-898-3830

TopLine SMD Introductory Kit

PLCC 68

QFP100 .65mm

SOJ24

PLCC 20

A B C D
Tantalum

Pot.

SOL 20

MINI

MELF

MELF

SOM 16

SO 14

TRANSISTORS

SOT 23

SOT 89

SOT 143

SOT 223

D PAK

FLAT CHIPS

0805

1206

1210

1812

2225



- FEATURES**
- LPI Solder Mask
 - FR4 Board .062"
 - Double Sided
 - Tooling Holes .125"
 - Fiducial Marks

Actual Size: 4" x 5.5" (100mm x 140mm) Rev B

TopLine® SMT INTRODUCTORY KIT SURFACE MOUNT TECHNOLOGY



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		925000 1 Kit	925010 10 Kits	925025 25 Kits	925050 50 Kits	925100 100 Kits
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
SO14	50mils	1	10	25	50	100
SOM16	50mils	1	10	25	50	100
SOL20	50mils	1	10	25	50	100
PLCC20	50mils	1	10	25	50	100
PLCC68	50mils	1	10	25	50	100
SOT23		3	30	75	250	300
SOT89		2	20	50	100	200
SOT143		1	10	25	50	100
SOT223		1	10	25	50	100
DKPAK		1	10	25	50	100
Tantalum-A		1	10	25	50	100
Tantalum-B		1	10	25	50	100
Tantalum-C		1	10	25	50	100
Tantalum-D		1	10	25	50	100
MELF		2	20	50	100	200
mini-MELF		6	60	300	300	600
Potentiometer		1	10	25	50	100
0805 Chip		10	100	250	500	1000
1206 Chip		10	100	250	500	1000
1210 Chip		10	100	250	500	1000
1812 Chip		2	20	50	100	200
2225 Chip		1	10	25	50	100

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	925002	925200	925210	925225	925250	925299
Ag - Silver	925006	925600	925610	925625	925650	925699
Cu - OSP	925008	925800	925810	925825	925850	925899
Au - Gold	925009	925900	925910	925925	925950	925999
Standard						
SnPb - HASL	925001	925000	925010	925025	925050	925100

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TopLine[®]



PRACTICAL MIXED TECHNOLOGY KIT



P/N 926001

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Fax 1-714-891-0321

Ph 1-714-898-3830

TopLine[™]

Practical Kit

SOM16

PLCC20

QFP44 .8mm

QFP100 .65mm

QFP64 1.0mm

PLCC20

DIP

SOT23

PLCC68

1206 (3216)

0805 (2012)

PLCC44

PLCC44

PLCC68

A low-cost, mixed technology kit for rework and solder practice. Includes simple-to-handle components. Excellent for beginners. Can also be used for medium speed assembly.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks
- Plated Throughholes



Actual Size: 4" x 5.5" (100 x 140mm)



PRACTICAL MIXED TECHNOLOGY KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 926000 1 KIT	ORDER NUMBER 926010 10 KITS	ORDER NUMBER 926025 25 KITS	ORDER NUMBER 926050 50 KITS	ORDER NUMBER 926100 100 KITS
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
QFP44	0.80mm	1	10	25	50	100
QFP64	1.00mm	1	10	25	50	100
PLCC20	50mils	2	25	50	100	200
PLCC44	50mils	2	25	50	100	200
PLCC68	50mils	2	25	50	100	200
SOM16	50mils	2	25	50	100	200
DIP14~18	100mils	1	10	25	50	100
SOT23		10	50	500	500	500
0805 Chip		10	100	500	500	1000
1206 Chip		10	100	250	500	1000

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	926002	926200	926210	926225	926250	926299
Ag - Silver	926006	926600	926610	926625	926650	926699
Cu - OSP	926008	926800	926810	926825	926850	926899
Au - Gold	926009	926900	926910	926925	926950	926999
Standard						
SnPb - HASL	926001	926000	926010	926025	926050	925100

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PN 969601

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Ph 1-714-898-3830

TopLine Mixed Technology Kit

PLCC 68

QFP100 .65mm

SOL 20

A Tantalum

C Tantalum

Pot.

SOM 16

B Tantalum

D Tantalum

MELF

SO 14

PLCC 20

MINI MELF

SOT 23

SOT 89

SOT 143

SOT 223

D PAK

0805 (2012)

1206 (3216)

1210 (3225)

1812 (4532)

2225 (5664)

Plated Through holes

Experiment with mixed technology. Combines easy-to-handle SMD components plus plenty of through-hole components on 100mil grid.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks
- Plated Throughholes

Actual Size: 4" x 5.5" (100 x 140mm)



KIT ORDERING INFORMATION

		MANUAL ASSEMBLY		MACHINE RUN		
		ORDER NUMBER 969600 1 Kit	ORDER NUMBER 969610 10 Kits	ORDER NUMBER 969625 25 Kits	ORDER NUMBER 969650 50 Kits	ORDER NUMBER 969699 100 Kits
COMPONENT	PITCH					
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
SO14	50mils	1	10	25	50	100
SOM16	50mils	1	10	25	50	100
SOL20	50mils	1	10	25	50	100
PLCC20	50mils	1	10	25	50	100
PLCC68	50mils	1	10	25	50	100
DIP14~20	100mils	4	40	100	200	400
SOT23 & SOT89		3	30	75	150	300
SOT143		1	10	25	50	100
SOT223		1	10	25	50	100
DPAK		1	10	25	50	100
Tantalum-A		1	10	25	50	100
Tantalum-B		1	10	25	50	100
Tantalum-C		1	10	25	50	100
Tantalum-D		1	10	25	50	100
MELF		2	20	50	100	200
mini-MELF		6	60	150	300	600
Potentiometer		1	10	25	50	100
0805 Chip		10	100	250	500	1000
1206 Chip		10	100	250	500	1000
1210 Chip		10	100	250	500	1000
1812 Chip		2	20	100	100	200
2225 Chip		1	10	25	50	100

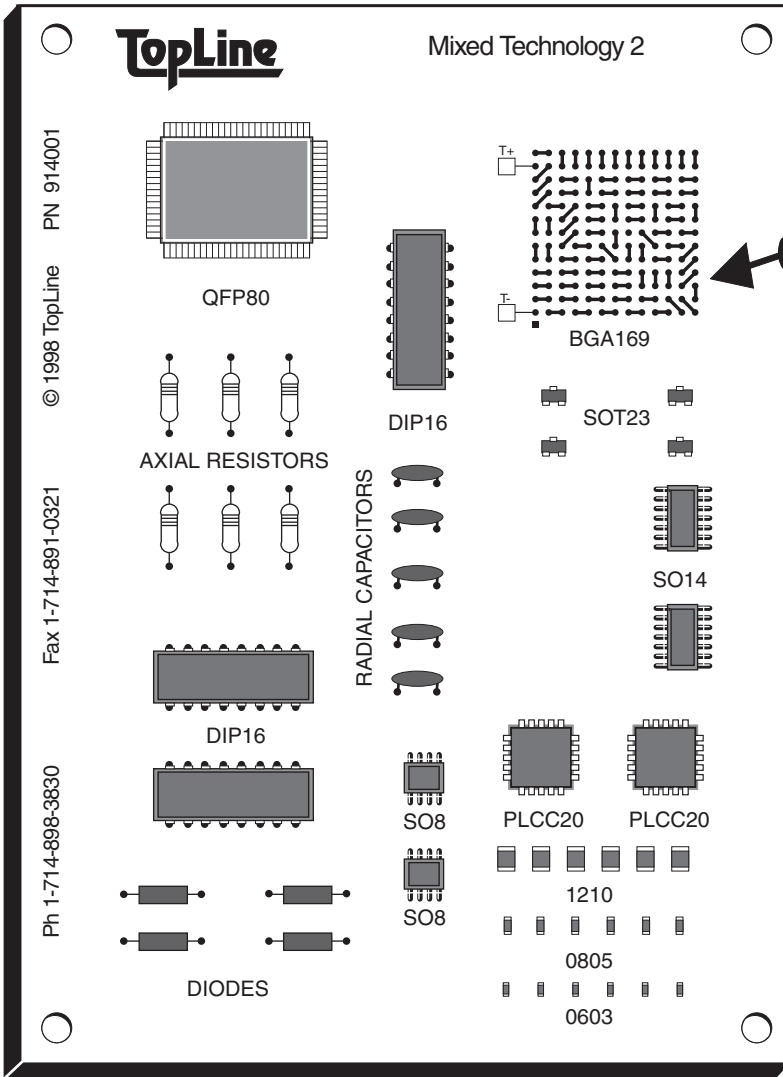
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	969602	969200	969210	969225	969250	969299
Ag - Silver	969606	969700	969710	969725	969750	969799
Cu - OSP	969608	969800	969810	969825	969850	969899
Au - Gold	969609	969900	969910	969925	969950	969999
Standard						
SnPb - HASL	969601	969600	969610	969625	969650	969699

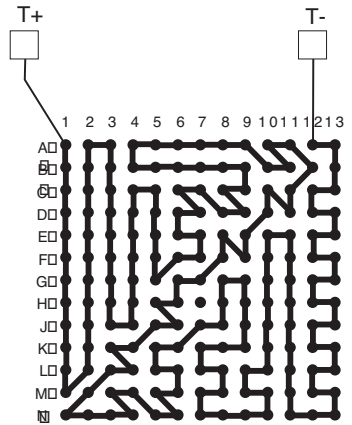
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TopLine®

MIXED TECHNOLOGY 2 KIT



The mixed technology 2 kit provides plenty of plated throughholes as well as BGA and an easy-to-solder QFP.



BGA169
AFTER MOUNTING

FEATURES

- LPI Solder Mask
- FR4 Board .062" (standard)
- Single Sided
- Tooling Holes .125"
- Fiducial Marks
- Plated Throughholes



Actual Size: 4" x 5.5" (100 x 140mm)



MIXED TECHNOLOGY 2 KIT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		914000 1 KIT	914010 10 KITS	914025 25 KITS	914050 50 KITS	914100 100 KITS
Board		1	10	25	50	100
QFP80	0.8mm	1	10	25	50	100
BGA169	1.5mm	1	10	25	50	100
SO8	1.27mm	2	25	50	100	200
SO14	1.27mm	2	25	50	100	200
PLCC20	50mil	2	25	50	100	200
SOT23		4	40	100	200	400
1210 Chip		6	60	150	300	600
0805 Chip		10	100	250	500	1000
0603 Chip		10	100	250	500	1000
THROUGH HOLE COMPONENTS						
DIP16	100mil	3	30	75	150	300
1/4W Resistor	.50"	6	60	150	300	600
DO35 Diodes	.50"	4	40	200	200	400
Ceramic Cap	.20"	5	50	250	250	500

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	914002	914200	914210	914225	914250	914299
Ag - Silver	914006	914600	914610	914625	914650	914699
Cu - OSP	914008	914800	914810	914825	914850	914899
Au - Gold	914009	914900	914910	914925	914950	914999
Standard						
SnPb - HASL	914001	914000	914010	914025	914050	914100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm



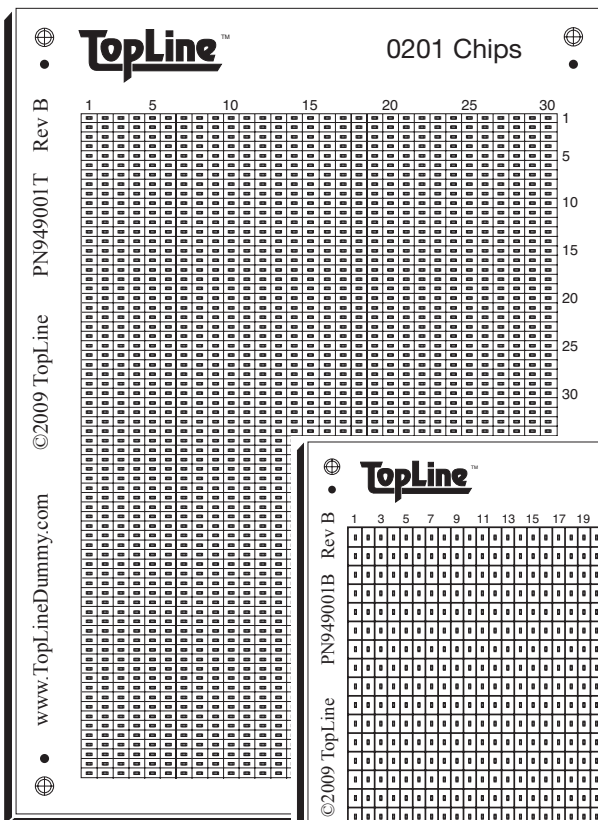
CHIP SHOOTER KIT

0201 AND 0402 CHIPS

REV B WITH DAISY CHAIN

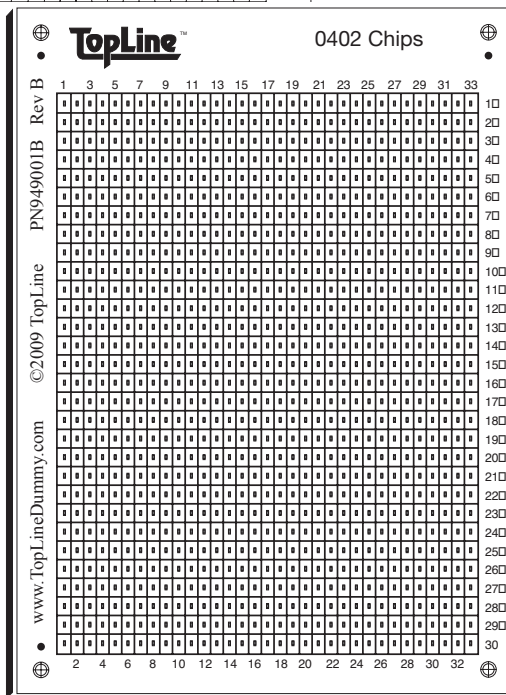


Top Side of Board

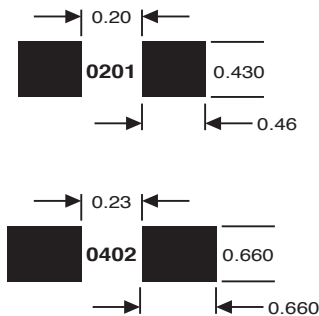


Put your machine to the test with TopLine's new 0201/0402 kits. Double sided board has 2000 pads for ultra-miniature 0201 chips on the front side and 1000 pads for 0402 chips on the back side. Components are supplied on 2mm pitch tape. Kit can be used for placement, soldering or epoxy dispenser testing. Rev B has test points for continuity testing.

Bottom Side of Board



Pad Dimensions (mm) Rev-B



FEATURES

- LPI Solder Mask
- FR4 Board .062" thick
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



CHIP SHOOTER KIT 0201 AND 0402 CHIPS ZERO OHM DAISY CHAIN



KIT ORDERING INFORMATION

COMPONENT	TAPE PITCH	MACHINE RUN				
		ORDER NUMBER 949000 1 KIT	ORDER NUMBER 949010 10 KITS	ORDER NUMBER 949025 25 KITS	ORDER NUMBER 949050 50 KITS	ORDER NUMBER 949100 100 KITS
Board	-	1	10	25	50	100
0201 Chip	2mm	2000	15,000	45,000	100,000	200,000
0402 Chip	2mm	1000	10,000	25,000	50,000	100,000

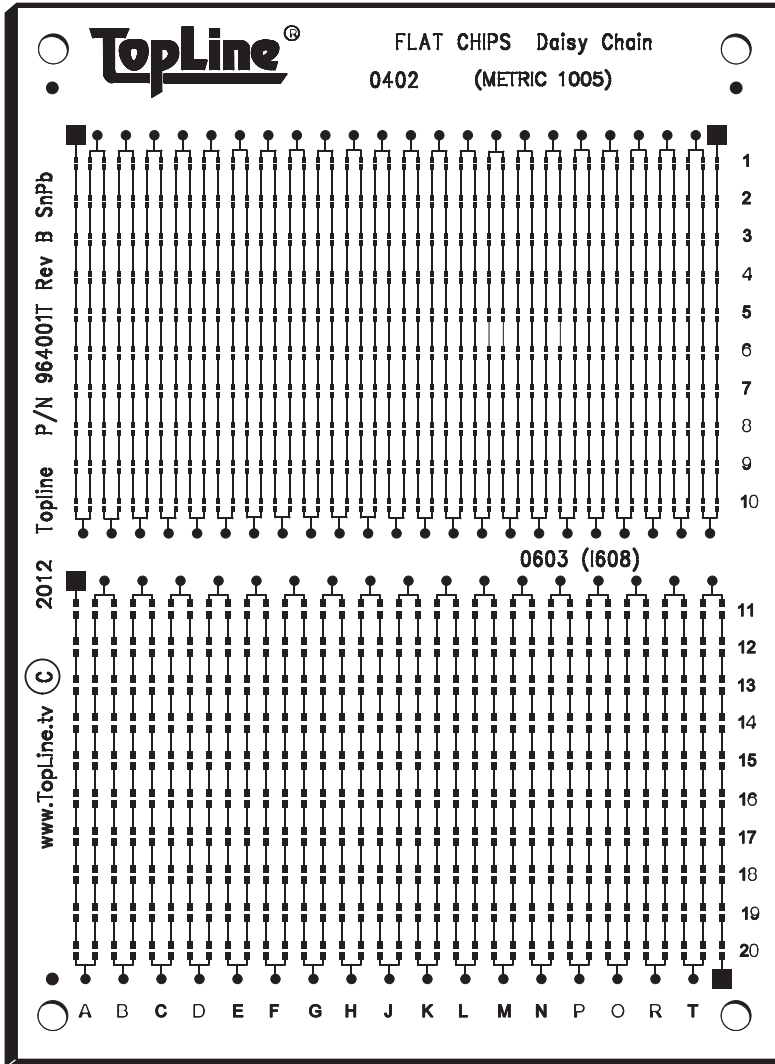
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	949002	949200	949210	949225	949250	949299
Ag – Silver	949006	949600	949610	949625	949650	949699
Cu – OSP	949008	949800	949810	949825	949850	949899
Au – Gold	949009	949900	949910	949925	949950	949999
Standard						
SnPb – HASL	949001	949000	949010	949025	949050	949100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

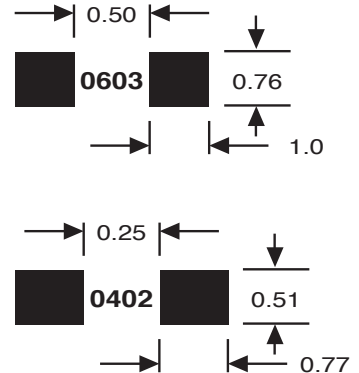
TopLine[®]

CHIP SHOOTER KIT 0402 AND 0603 CHIPS ZERO OHM DAISY CHAIN



TopLine has thousands of zer-ohm 0402 and 0603 resistors for your machine to place. 0402 chips are supplied on tape with 2mm pitch and the 0603 chips with 4mm pitch tape. Double sided board has 460 pads for 0402 chip and 350 pads for 0603 chip per side. 1600 pads total! This kit can be used for placement, soldering or epoxy dispenser testing.

Pad Dimensions (mm)
Rev-A



FEATURES

- LPI Solder MaskFR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks


Actual Size: 4" x 5.5" (100 x 140mm)



CHIP SHOOTER KIT 0402 AND 0603 CHIPS ZERO OHM DAISY CHAIN



KIT ORDERING INFORMATION

COMPONENT	 MACHINE RUN				
	ORDER NUMBER 964000 1 KIT	ORDER NUMBER 964010 10 KITS	ORDER NUMBER 964025 25 KITS	ORDER NUMBER 984050 50 KITS	ORDER NUMBER 964100 100 KITS
DAISY CHAIN KIT					
Board	1	10	25	50	100
0402 Chip Resistor	1000	10,000	20,000	40,000	80,000
0603 Chip Resistor	1000	10,000	15,000	30,000	60,000

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	964002	964200	964210	964225	964250	964299
Ag – Silver	964006	964600	964610	964625	964650	964699
Cu – OSP	964008	964800	964810	964825	964850	964899
Au – Gold	964009	964900	964910	964925	964950	964999
Standard						
SnPb – HASL	964001	964000	964010	964025	964050	964100

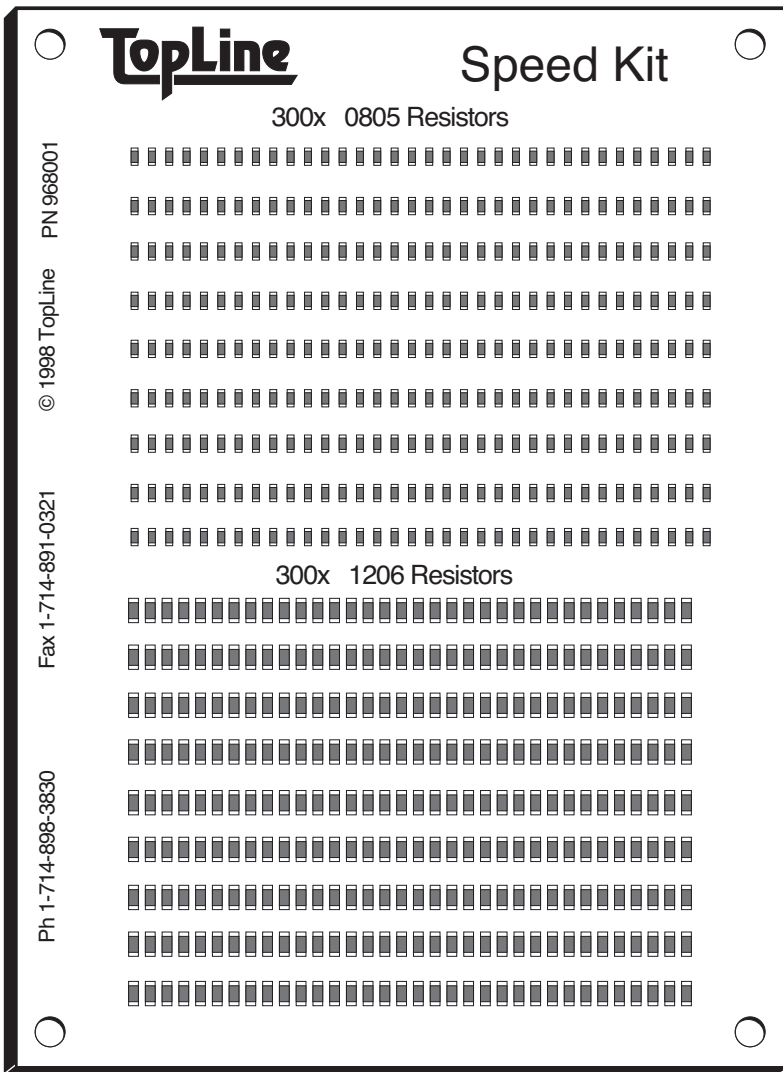
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Note: 984001 is now 964002

TopLine®



CHIP SHOOTER KIT 0805 AND 1206 CHIPS

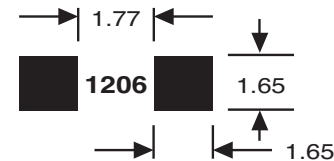
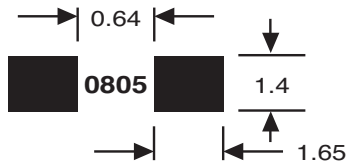


Put your machine to the test . This Kit is a low cost way for you to measure the component per hour (CPH) rating of pick & place machines. Use to benchmark and compare the performance of different machines.

Each side has land patterns for 300 each 0805 and 1206. Total of 1200 pads on the board.

This kit can be used for placement, soldering or epoxy dispenser testing.

Pad Dimensions (mm)
Rev-A



FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)



CHIP SHOOTER KIT 0805 AND 1206 CHIPS



KIT ORDERING INFORMATION



MACHINE RUN

COMPONENT	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
	968000	968010	968025	968050	968100
	1 KIT	10 KIT	25 KITS	50 KITS	100 KITS
KIT					
Board	1	10	25	50	100
0805 Chip Resistor	300	3,000	7,500	15,000	30,000
1206 Chip Resistor	300	3,000	7,500	15,000	30,000

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	968002	968200	968210	968225	968250	968299
Ag – Silver	968006	968600	968610	968625	968650	968699
Cu – OSP	968008	968800	968810	968825	968850	968899
Au – Gold	968009	968900	968910	968925	968950	968999
Standard						
SnPb – HASL	968001	968000	968010	968025	968050	968100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

Note: 983001 is now 968002

TopLine®

ADVANCED SMD KIT FOR THE EXPERT



TopLine

Advanced Kit

PN 930001

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Fax 1-714-891-0321

Ph 1-714-898-3830

QFP 256 .4mm

TSOP32
.5mm

QFP 120 .8mm

LQFP100 .5mm

QFP100 .65mm

QFP 208 .5mm

LQFP144 .5mm

QFP 160 .65mm

QFP64 1.0mm

BQFP100 25Mil

Put your machine through its paces with the Advanced SMD Kit. Includes a wide selection of fine-pitch parts from 0.4mm pitch. All components are packaged on tape and reel for machine run. Also available single packed for manual assembly.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks



Actual Size: 4" x 5.5 (100 x 140mm)



ADVANCED SMD KIT FOR THE EXPERT



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 931000 1 KIT	ORDER NUMBER 931010 10 KITS	ORDER NUMBER 931024 24 KITS	ORDER NUMBER 931048 48 KITS	ORDER NUMBER 931096 96 KITS
Board		1	10	24	48	96
QFP256	0.4mm	1	10	24	48	96
QFP208	0.5mm	1	10	24	48	96
LQFP144	0.5mm	1	10	24	48	96
LQFP100	0.5mm	1	10	24	48	96
TSOP32	0.5mm	1	10	24	48	96
QFP100	0.65mm	1	10	24	48	96
*BQFP100	25.0mil	1	10	24	48	96
QFP160	0.65mm	1	10	24	48	96
*QFP120	0.8mm	1	10	24	48	96
QFP64	1.0mm	1	10	24	48	96

*BQFP100 and QFP120 only in SnPb Kit

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	24 Kits	48 Kits	96 Kits
Lead Free						
Sn – Tin	930002	931200	931210	931224	931248	931296
Ag – Silver	930006	931600	931610	931624	931648	931696
Cu – OSP	930008	931800	931810	931824	931848	931896
Au – Gold	930009	931900	931910	931924	931948	931996
Standard						
SnPb – HASL	930001	931000	931010	931024	931048	931100

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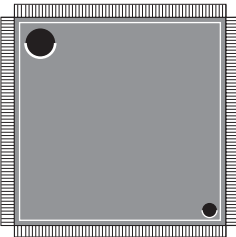


28MM QFP ASSORTMENT KIT 0.4MM TO 0.8MM PITCH

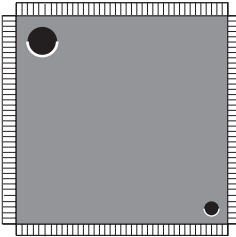


TopLine 28mm QFP Assortment

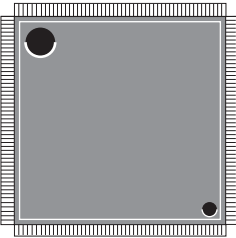
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Ph 1-714-898-3830



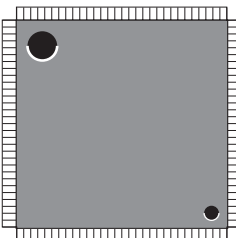
QFP 256 .4mm



QFP 160 .65mm



QFP 208 .5mm



QFP 120 .8mm

Try them all. We give you four different lead pitches: 0.4mm, 0.5mm, 0.65mm and 0.8mm. Experience the differences in levels as you progress to 0.4mm pitch.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks



Actual Size: 4" x 5.5" (100 x 140mm)



28MM QFP ASSORTMENT KIT 0.4MM TO 0.8MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY		 MACHINE RUN		
		ORDER NUMBER 962000 1 KIT	ORDER NUMBER 962012 12 KITS	ORDER NUMBER 962024 24 KITS	ORDER NUMBER 962048 48 KITS	ORDER NUMBER 962096 96 KITS
Board		1	12	24	48	96
QFP256	0.4mm	1	12	24	48	96
QFP208	0.5mm	1	12	24	48	96
QFP160	0.65mm	1	12	24	48	96
*QFP120	0.80mm	1	12	24	48	96

*QFP120 only in SnPb Kit

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	12 Kits	24 Kits	48 Kits	96 Kits
Lead Free						
Sn – Tin	962002	962200	962212	962224	962248	962296
Ag – Silver	962007	962600	962612	962624	962648	962696
Cu – OSP	962008	962800	962812	962824	962848	962896
Au – Gold	962009	962900	962912	962924	962948	962996
Standard						
SnPb – HASL	962001	962000	962012	962024	962048	962096

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TopLine[®]



QFP256 KIT 0.4MM PITCH



TopLine 4X QFP256
P= .4mm /15.7Mil

PN962501
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Fax 1-714-891-0321
Ph 1-714-898-3830

QFP 256 QFP 256
QFP 256 QFP 256

The image shows a rectangular kit board with four circular fiducial marks at the corners. In the center, there are four square QFP 256 components arranged in a 2x2 grid. Each component has a dense array of pins on all four sides. The board is labeled with the TopLine logo, product name, and pitch information at the top. On the left side, there is vertical text providing contact information and a part number.

Be on the cutting edge with 0.4mm (15.7Mil) pitch. It's guaranteed to push vision and soldering equipment to its limits.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)

TopLine®





QFP256 KIT

0.4MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 962500 1 KIT	ORDER NUMBER 962512 12 KITS	ORDER NUMBER 962524 24 KITS	ORDER NUMBER 962548 48 KITS	ORDER NUMBER 962596 96 KITS
Board QFP256	0.4mm	1 4	12 48	24 96	48 192	96 384

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	12 Kits	24 Kits	48 Kits	96 Kits
Lead Free						
Sn – Tin	962502	962520	962521	962522	962525	962529
Ag – Silver	962507	962560	962561	962562	962565	962569
Cu – OSP	962508	962580	962581	962582	962585	962589
Au – Gold	962509	962590	962591	962592	962595	962599
Standard						
SnPb – HASL	962501	962500	962512	962524	962548	962596

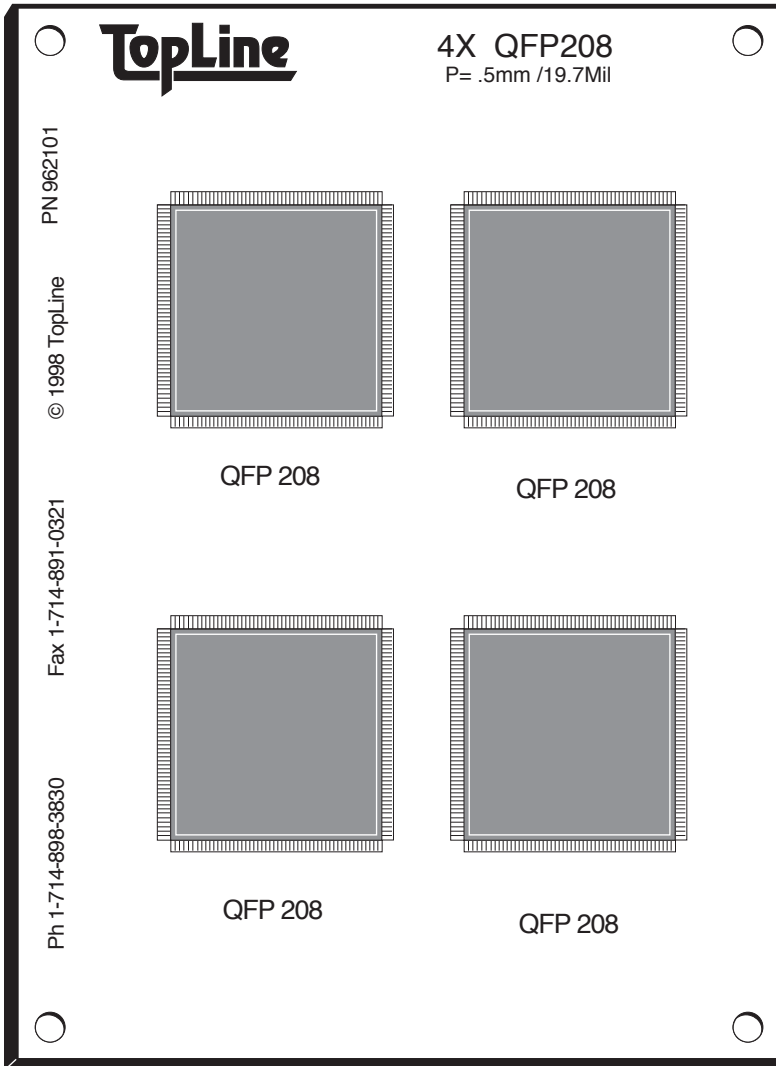
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TopLine[®]



QFP208 KIT

0.5MM PITCH



Practice assembling 0.5mm (19.7Mil) pitch. The QFP208 is a very popular package. Components are provided on tape and reel.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)

TopLine®





QFP208 KIT

0.5MM PITCH



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN			
		ORDER NUMBER 962100 1 KIT	ORDER NUMBER 962112 12 KITS	ORDER NUMBER 962124 24 KITS	ORDER NUMBER 962148 48 KITS	ORDER NUMBER 962196 96 KITS
Board QFP208	0.5mm	1 4	12 48	24 96	48 192	96 384

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	12 Kits	24 Kits	48 Kits	96 Kits
Lead Free						
Sn – Tin	962102	962120	962121	962122	962125	962129
Ag – Silver	962107	962160	962161	962162	962165	962169
Cu – OSP	962108	962180	962181	962182	962185	962189
Au – Gold	962109	962190	962191	962192	962195	962199
Standard						
SnPb – HASL	962101	962100	962112	962124	962148	962196

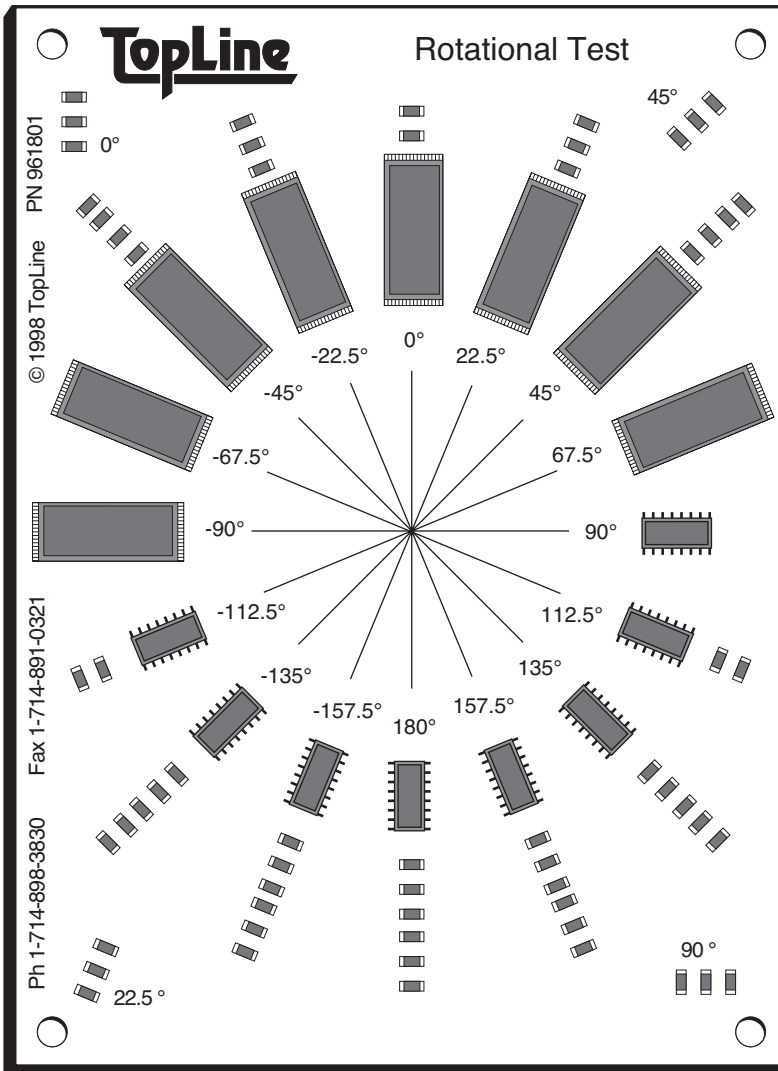
Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm

Note: 982001 is now 962102

TopLine®

ROTATIONAL PLACEMENT KIT

TESTS ACCURACY TO $\pm 0.5^\circ$



Be on target! Some problems do not become evident until you start rotating components. TopLine's Rotational Placement Kit is designed to test the rotational accuracy on your system to $\pm 0.5^\circ$.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)





ROTATIONAL PLACEMENT KIT

TESTS ACCURACY TO $\pm 0.5^\circ$



KIT ORDERING INFORMATION

COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN		
		ORDER NUMBER 961800 1 KIT	ORDER NUMBER 961806 6 KITS	ORDER NUMBER 961812 12 KITS	ORDER NUMBER 961825 25 KITS
Board		1	6	12	25
TSOP32	0.5mm	8	50	100	200
SO16	1.27mm	8	50	100	200
1206 Chips		60	300	750	1500

Lead Free (Pb-Free) Option

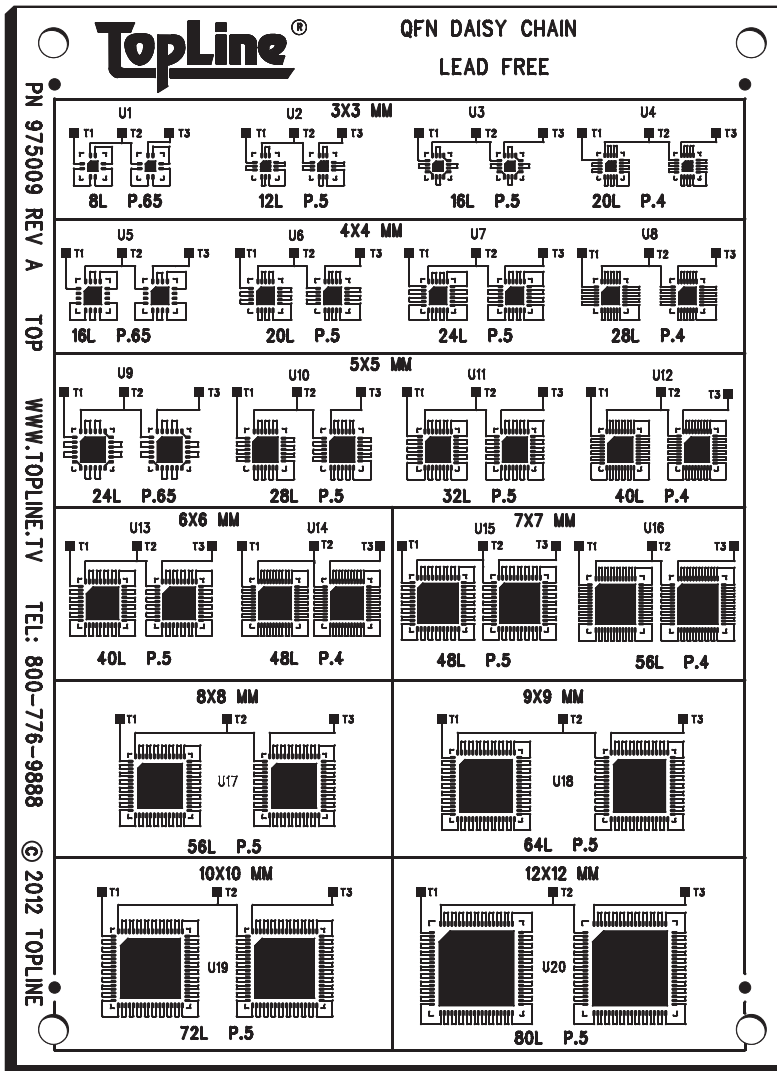
Description	Spare Board	1 Kit	12 Kits	25 Kits	50 Kits
Lead Free					
Sn – Tin	961802	-	961821	961822	961824
Ag – Silver	961807	-	961861	961862	961864
Cu – OSP	961808	-	961881	961882	961884
Au – Gold	961809	-	961891	961892	961894
Standard					
SnPb – HASL	961801	961800	961812	961825	961850

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

QFN DAISY CHAIN KIT

3 ~ 12MM

PITCH 0.4 ~ 0.65MM



This kit provides a wide variety of daisy chain bottom terminal QFN components 8 ~ 80pins for solder practice and continuity testing. Pitch 0.4mm to 0.65mm provides advanced and easy to handle combinations. Component size 3mm to 12mm covers the full range of package sizes. Large ground pads present a challenge for correct solder paste deposition and reflow. Test terminals T1-T2-T3 provide easy method to verify zero ohm continuity testing after assembly and reflow.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- Fiducial Marks

Actual Size: 4" x 5.5" (100 x 140mm)





QFN DAISY CHAIN KIT

3 ~ 12MM

PITCH 0.4 ~ 0.65MM



KIT ORDERING INFORMATION

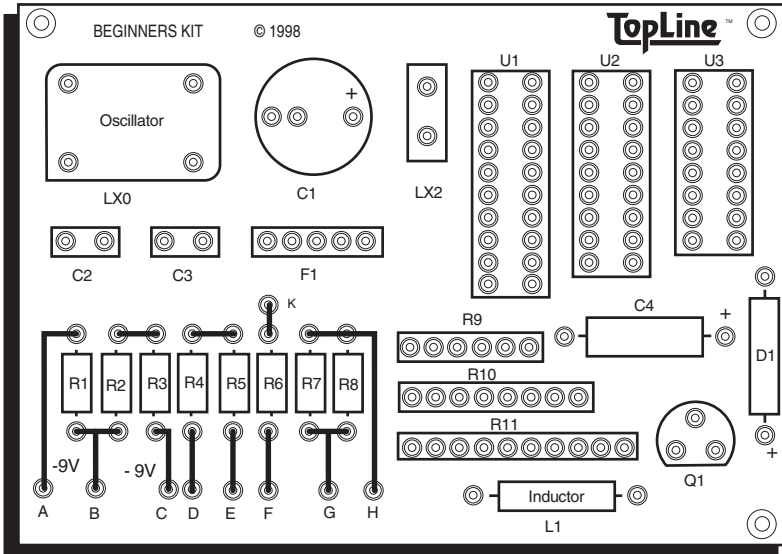
COMPONENT	PITCH	 MANUAL ASSEMBLY	 MACHINE RUN		
		NUMBER 975200 1 KIT	ORDER NUMBER 975205 5 KITS	ORDER NUMBER 975210 10 KITS	ORDER NUMBER 975225 25 KITS
Board		1	5	10	25
QFN 16L 3x3mm	0.5mm	2	10	20	50
QFN 16L 4x4mm	0.65mm	2	10	20	50
QFN 20L 4x4mm	0.5mm	2	10	20	50
QFN 24L 4x4mm	0.5mm	2	10	20	50
QFN 24L 5x5mm	0.65mm	2	10	20	50
QFN 28L 5x5mm	0.5mm	2	10	20	50
QFN 32L 5x5mm	0.5mm	2	10	20	50
QFN 40L 6x6mm	0.5mm	2	10	20	50
QFN 48L 7x7mm	0.5mm	2	10	20	50
QFN 56L 7x7mm	0.4mm	2	10	20	50
QFN 56L 8x8mm	0.5mm	2	10	20	50
QFN 64L 9x9mm	0.5mm	2	10	20	50
QFN 72L 10x10mm	0.5mm	2	10	20	50
QFN 80L 12x12mm	0.5mm	2	10	20	50

* Note: All QFN are Lead-Free (Pb-Free)

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	5 Kits	10 Kits	25 Kits
Lead Free					
Sn – Tin	975002	975200	975205	975210	975225
Ag – Silver	975006	-	-	-	975625
Cu – OSP	975008	-	-	-	975825
Au – Gold	975009	975900	975905	975910	975925
Standard					
SnPb – HASL	975001	975000	975005	975010	975025

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm



Actual Size: 2.75" x 4.0" (70 x 100mm)


The beginners Through-hole Kit is a low-cost, entry level kit for practicing with a wide range of components. Total of 24 easy-to-identify components are provided in kit.

FEATURES

- FR4 Board .062"
- Single Sided
- Tooling Holes .125"
- Plated Throughholes



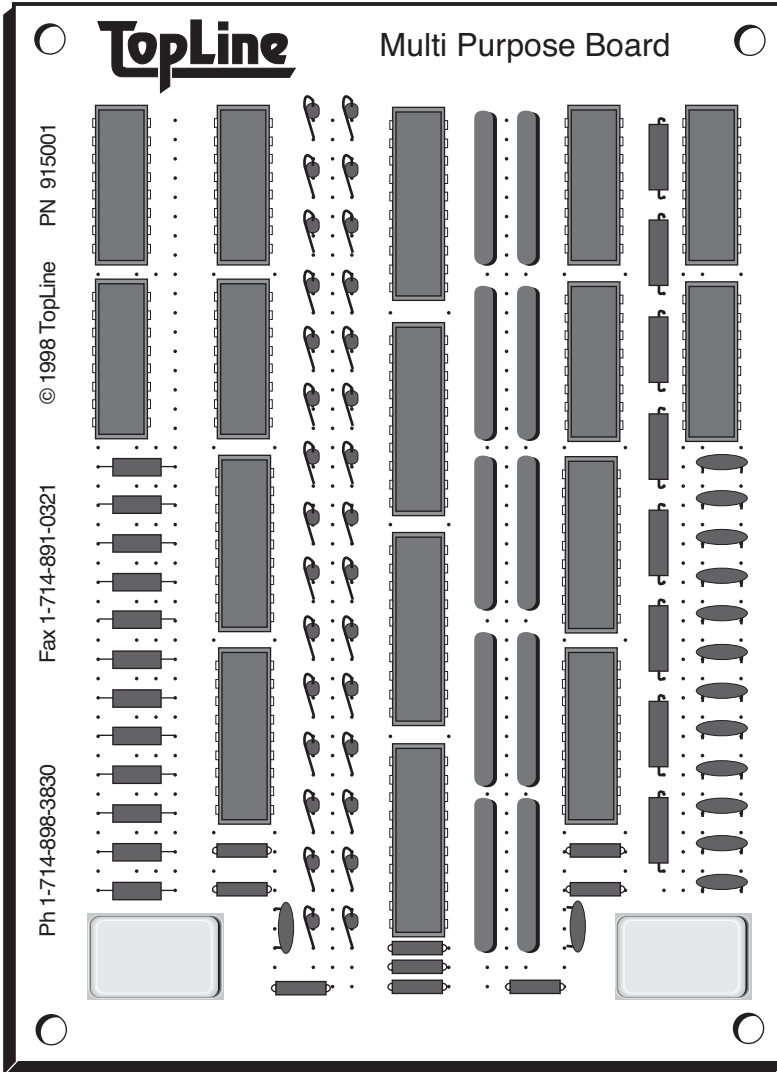
KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY				
COMPONENT	BOARD LOCATION	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		910000 1 KIT	910010 10 KITS	910025 25 KITS	910050 50 KITS	910100 100 KITS
Board		1	10	25	50	100
Oscillator	LX0	1	10	25	50	100
Crystal	LX2	1	10	25	50	100
Radial Aluminum Cap	C1	1	10	25	50	100
Ceramic Capacitor	C2	1	10	25	50	100
Film Capacitor	C3	1	10	25	50	100
Axial Aluminum Cap	C4	1	10	25	50	100
Axial Inductor	L1	1	10	25	50	100
Resistor Network SIP6	R9	1	10	25	50	100
Resistor Network SIP8	R10	1	10	25	50	100
Resistor Network SIP10	R11	1	10	25	50	100
SAW Filter SIP5	F1	1	10	25	50	100
Transistor TO92	Q1	1	10	25	50	100
Rectifier DO35/DO41	D1	1	10	25	50	100
Integrated Circuit DIP16	U1	1	10	25	50	100
Integrated Circuit DIP18	U2	1	10	25	50	100
Integrated Circuit DIP20	U3	1	10	25	50	100
Resistor 1/8 W	R1-4	4	40	100	200	400
Resistor 1/4 W	R5-8	4	40	100	200	400

Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	910003	910200	910210	910225	910250	910299
Ag – Silver	910006	910600	910610	910625	910650	910699
Cu – OSP	910008	910800	910810	910825	910850	910899
Au – Gold	910009	910900	910910	910925	910950	910999
Standard						
SnPb – HASL	910002	910000	910010	910025	910050	910100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm



We supply the board and a wide assortment of components. This board has room for at least 200 different components. You decide where to insert the components.

Kits are available for machine or manual insertion.



FEATURES

- FR4 Board .062"
- Double Sided
- Tooling Holes .125"
- 920 Plated Throughholes
- Hole Pitch 0.10-inch

Actual Size: 4" x 5.5" (100 x 140mm)



KIT ORDERING INFORMATION

COMPONENT	 MANUAL ASSEMBLY				 MACHINE RUN	
	ORDER NUMBER	NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
	916000	916025	916050	916100	915050	915100
	1 KIT	25 KITS	50 KITS	100 KITS	50 KITS	100 KITS
Board	1	25	50	100	50	100
8-PIN DIP	5	100	200	400	200	400
14-PIN DIP	5	100	200	400	200	400
16-PIN DIP	5	100	200	400	200	400
20-PIN DIP	5	50	100	200	100	200
SIP Resistor Network	10	100	200	400	200	400
Oscillator	2	40	100	200	100	200
Radial Capacitor	10	250	500	1000	500	1000
1/8 W Axial Resistor	50	1000	2500	5000	2500	5000
1/4 W Axial Resistor	50	1000	2500	5000	2500	5000
1/2 W Axial Resistor	20	1000	2000	4000	2000	4000

Lead Free (Pb-Free) Option

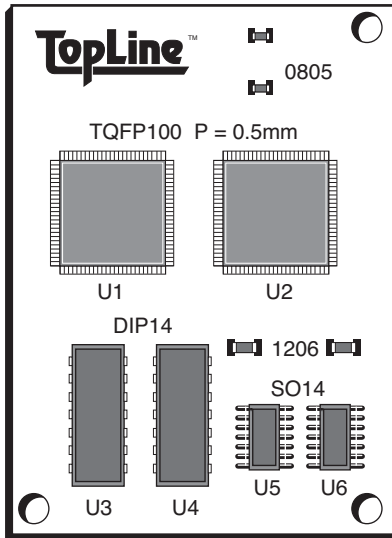
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	915002	916200	916210	916225	916250	916299
Ag – Silver	915006	916600	916610	916625	916650	916699
Cu – OSP	915008	916800	916810	916825	916850	916899
Au – Gold	915009	916900	916910	916925	916950	916999
Standard						
SnPb – HASL	915001	916000	916010	916025	916050	916100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm



ECONO KIT II

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



ACTUAL SIZE: 1.62" x 2.0" (41 x 51mm)

TopLine offers an economical, mixed technology kit with fine pitch. This kit is used by employment agencies for soldering certification.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Tooling Holes .125"
- Plated Throughholes




ECONO KIT II

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY				
COMPONENT	PITCH	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		938000 1 KIT	938010 10 KITS	938025 25 KITS	938050 50 KITS	938100 100 KITS
Board		1	10	25	50	100
LQFP100	0.5mm	2	20	50	100	200
SO14	50mil	2	20	50	100	200
DIP14	100mil	2	20	50	100	200
0805 Chip		2	20	50	100	250
1206 Chip		2	20	50	100	250

Note: Kits of 10, 25, 50 and 100 are bulk packed

Lead Free (Pb-Free) Option

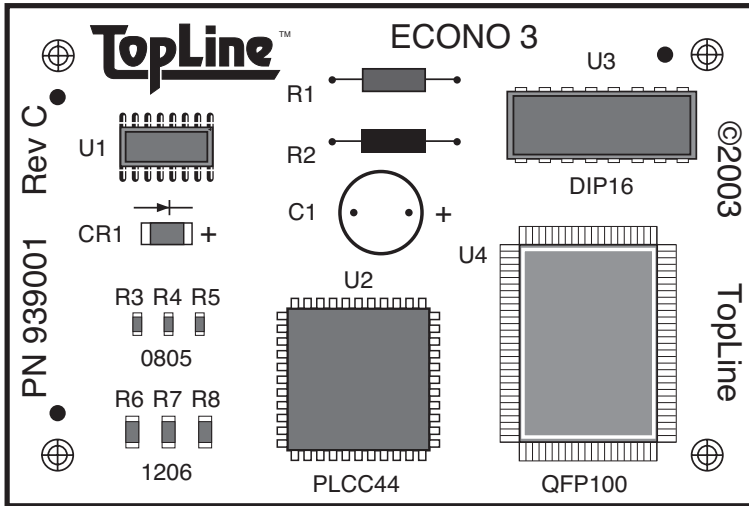
Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	938002	938200	938210	938225	938250	938299
Ag – Silver	938006	938600	938610	938625	938650	938699
Cu – OSP	938008	938800	938810	938825	938850	938899
Au – Gold	938009	938900	938910	938925	938950	938999
Standard						
SnPb – HASL	938001	938000	938010	938025	938050	938100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm



ECONO KIT III

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



ACTUAL SIZE: 2" x 3" (50mm x 76mm)

TopLine offers an economical, mixed technology kit with popular components including fine pitch. This kit is used by employment agencies for soldering certification of assemblers.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Plated Throughholes
- Fiducial Marks
- Tooling Holes




ECONO KIT III

MIXED TECHNOLOGY FOR SOLDERING CERTIFICATION



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY				
COMPONENT	PITCH	ORDER NUMBER 939000 1KIT	ORDER NUMBER 939010 10 KITS	ORDER NUMBER 939025 25 KITS	ORDER NUMBER 939050 50 KITS	ORDER NUMBER 939100 100 KITS
Board		1	10	25	50	100
QFP100	0.65mm	1	10	25	50	100
PLCC44	1.27mm	1	10	25	50	100
SO16	1.27mm	1	10	25	50	100
DIP16	2.54mm	1	10	25	50	100
0805 Chip		3	30	75	150	300
1206 Chip		3	30	75	150	300
MELF		1	10	25	50	100
1/4W resistor	.5 inch	2	20	50	100	200
AL CAP	.2 inch	1	10	25	50	100

Note: Kits of 10, 25, 50 and 100 are bulk packed

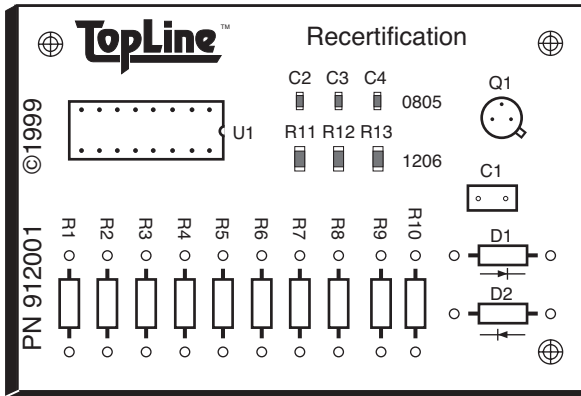
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn - Tin	939002	939200	939210	939225	939250	939299
Ag - Silver	939006	939600	939610	939625	939650	939699
Cu - OSP	939008	939800	939810	939825	939850	939899
Au - Gold	939009	939900	939910	939925	939950	939999
Standard						
SnPb - HASL	939001	939000	939010	939025	939050	939100

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbbersFree.cfm



ECONO IV MIXED TECHNOLOGY RECERTIFICATION KIT



ACTUAL SIZE: 2" x 3" (50 x 76mm)

The Econo IV Kit offers an economical mixed technology kit with simple components. This kit is used for soldering re-certification of assemblers.

FEATURES

- LPI Solder Mask
- FR4 Board .062"
- Single Sided
- Plated Throughholes
- Tooling Holes


TopLine[®]



ECONO IV MIXED TECHNOLOGY RECERTIFICATION KIT



KIT ORDERING INFORMATION

		 MANUAL ASSEMBLY				
COMPONENT	PITCH	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
		912000 1KIT	912010 10 KITS	912025 25 KITS	912050 50 KITS	912100 100 KITS
Board		1	10	25	50	100
DIP16/18	IC	1	10	25	50	100
TO-5	Transistor	1	10	25	50	100
CK05	Capacitor	1	10	25	50	100
DO-35	Diode	2	20	50	100	200
0805 Chip	SMD	3	30	75	150	300
1206 Chip	SMD	3	30	75	150	300
1/4 W Resistor	Axial Lead	10	100	250	500	1000

Note: Kits of 10, 25, 50 and 100 are bulk packed.

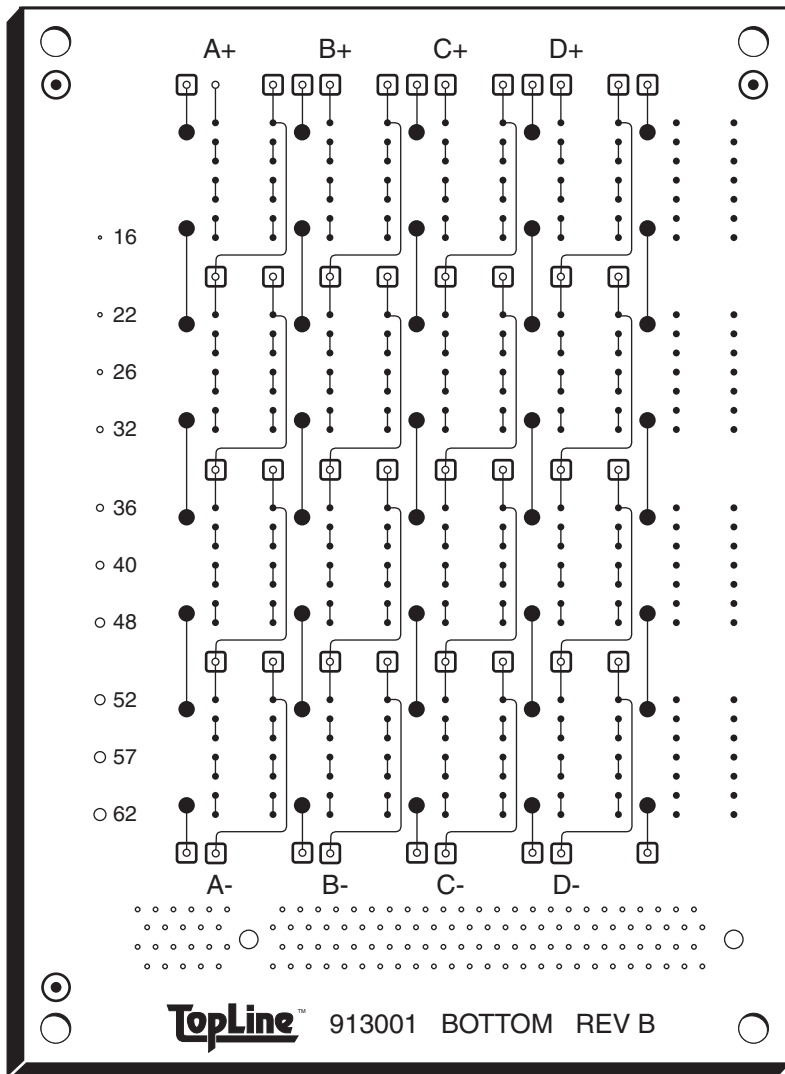
Lead Free (Pb-Free) Option

Description	Spare Board	1 Kit	10 Kits	25 Kits	50 Kits	100 Kits
Lead Free						
Sn – Tin	912002	912200	912210	912225	912250	912299
Ag – Silver	912006	912600	912610	912625	912650	912699
Cu – OSP	912008	912800	912810	912825	912850	912899
Au – Gold	912009	912900	912910	912925	912950	912999
Standard						
SnPb – HASL	912001	912000	912010	912025	912050	912100

TopLine[®]



12 LAYER LEAD FREE THROUGHHOLE KIT DAISY CHAIN



Actual Size: 4.0" x 5.5" (100 x 140mm) 0.10" (2.5mm) thick



12-layer board designed with heat dissipating (thermal relief) inner layers, makes this board a challenge to solder. Boards available in 4 Lead Free finishes.

BOARD PLATING (Pb Free):
 Sn100 – White Tin (Immersion Tin)
 Ag - Immersion Silver
 Cu - OSP (Entek 106)
 Au - Gold Ni-Au (ENIG)
 (Electroless Nickel, Immersion Gold)

DAISY CHAIN
 DIP14
 Zero Ohm 1/4 W Resistors
 Go, No-Go Test Points

PLATED HOLES
 Throughhole barrels with thermal relief are connected to all 10 inner layer copper ground planes for soldering capillary test.
 10 holes with graduating sizes:
 .016" - .062" (0.4mm ~1.6mm)

FEATURES
 LPI Solder Mask
 FR4 Board 0.10" (2.5mm) Thick
 Tg = 175°C 12 Layer
 Copper ground plane inner layers
 Tooling Holes
 Fiducials Marks
 450 Plated Holes

Thermal Relief Wagon Wheel




Inner Layer PTH



12 LAYER LEAD FREE THROUGHHOLE KIT DAISY CHAIN



KIT ORDERING INFORMATION

COMPONENT	NOTES	 MACHINE RUN				
		ORDER NUMBER 913216 16 KITS	ORDER NUMBER 913232 32 KITS	ORDER NUMBER 913248 48 KITS	ORDER NUMBER 913264 64 KITS	ORDER NUMBER 913296 96 KITS
*Board	Sn100	16	32	48	64	96
DIP14	Daisy Chain Test	256	512	768	1024	1536
DIP14	Non Daisy Chain	64	128	192	256	384
1/4 W Resistors	Zero Ohm	320	640	960	1280	1920
Connector AMP 1-5145154-2	120 Pin	16	32	48	64	96

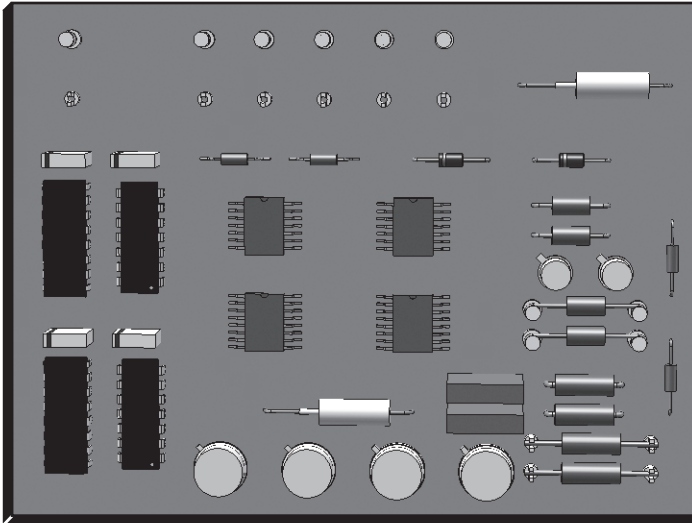
*Note: Contact TopLine for combination kits with assortment of finishes: Sn, Ag, OSP, Au

Lead Free (Pb-Free) Option

Description	Spare Board	16 Kits	32 Kits	48 Kits	64 Kits	96 Kits
Lead Free						
Sn - Tin	913002	913216	913232	913248	913264	913296
Ag - Silver	913007	913616	913632	913648	913664	913696
Cu - OSP	913008	913816	913832	913848	913864	913896
Au - Gold	913009	913916	913932	913948	913964	913996

Free Solder Paste Gerber + Parts Placement download www.topline.tv/GerbersFree.cfm

NASA SOLDER TRAINING THROUGH HOLE KIT



Actual Size: 4" x 5.5" (100 x 140mm)

The NASA kit includes a wide assortment of legacy throughhole and SMT components including flat packs and solder terminals.

FEATURES

- FR4 Board .062" SnPb HASL
- Double Sides
- Tooling Holes .125"
- Plated Throughholes
- Without Solder Mask

KIT CONTENTS

Item	Ref	Part Type or Description
1	U1, U2	DIP 14L (.3x.75)
2	U3, U4	DIP 16L (.3x.75)
3	U5, U6	FP 14L (Flat Pack)
4	U7, U8	FP 16L (Flat Pack)
5	U9, U10	TO-99
6	Q1, Q2	TO-5
7	Q3, Q4	TO-18
8	D1, D2	DO-35
9	C1, C2, C3, C4	CK05/CK06 (Molded Capacitor)
10	C5, C6	KK4 (Disc Capacitor)
11	C7, C8	CS2 (B-Case Tantalum)
12	R1, R2	RC05 1/8W Resistor (.015 wire)
13	R3, R4	RC05 1/8W Resistor (.015 wire)
14	R5, R6	RC07 1/4W Resistor (.025 wire)
15	R7, R8	RC07 1/4W Resistor
16	R9, R10	RC20 1/2W Resistor (.033 wire)
17	R11, R12	RC20 1/2W Resistor
18	E11-E16	Bifurcated Terminals .094 collar
19	E17-E22	Turret Terminals 0.125 collar

KIT ORDERING INFO

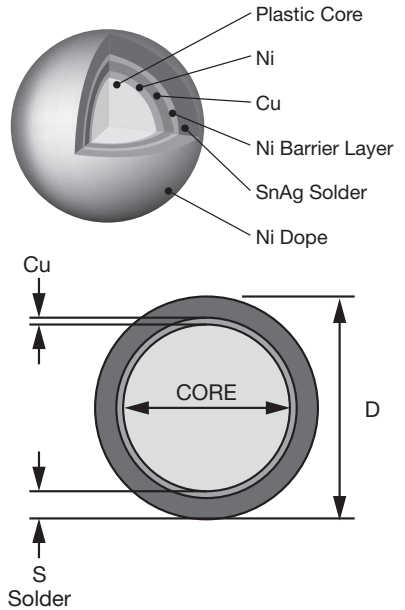
Tin-Lead PWB with components for customer to hand assemble	ORDER NUMBER	ORDER NUMBER	ORDER NUMBER
	979000	979010	979025
	1 Kit	10 Kits	25 Kits

Spare PWB

Order Number 979001

NON COLLAPSIBLE SOLDER BALL Sn96.5Ag3.5 WITH Cu & ELASTOMER CORE

DIA D	CORE	COPPER Cu	SOLDER S	PART NUMBER
80um	60um	3um	7um	NN2-SOL-80-3C7SA
110um	80um	5um	10um	NN2-SOL-110-5C10SA
200um	150um	5um	20um	NN2-SOL-200-5C20SA
200um	130um	5um	30um	NN2-SOL-200-5C30SA
250um	150um	10um	40um	NN2-SOL-250-10C40SA
262um	198um	7um	25um	NN2-SOL-262-7C25SA
310um	210um	10um	40um	NN2-SOL-310-10C40SA
311um	235um	8um	30um	NN2-SOL-311-8C30SA
350um	264um	10um	33um	NN2-SOL-350-10C33SA
500um	400um	15um	35um	NN2-SOL-500-15C35SA
650um	550um	20um	30um	NN2-SOL-650-20C30SA
910um	790um	20um	40um	NN2-SOL-910-20C40SA



APPLICATIONS:

DIMENSIONALLY STABLE. SOLDERABLE. DURABLE.
 USE TO SUPPORT & INTERCONNECT MODULES TO MOTHER BOARD.
 NON-COLLAPSIBLE TOP MOUNTED BGA/CSP (PoP) PACKAGE.
 SOLDERABLE SPACER/STANDOFF. FR4, GLASS, CERAMIC, BT

CCGA SOLDER COLUMNS

FIGURE	COLUMN DIAMETER	LENGTH	MATERIALS
1	0.020" 0.51mm	0.087" 2.21mm	Pb90/Sn10
2	0.020" 0.51mm	0.087" 2.21mm	Pb80/Sn20 Cu Wrap
	0.020" 0.51mm	0.100" 2.54mm	
	0.022" 0.56mm	0.087" 2.21mm	
	0.022" 0.56mm	0.100" 2.54mm	
3	0.020" 0.51mm	0.050" 1.27mm	Be Cu Micro-Coil Spring



FIG. 1
Pb90/Sn10
PLAIN



FIG. 2
Pb80/Sn20
Cu WRAP



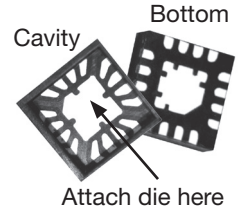
FIG. 3
BE CU
SPRING

* Licensed from NASA under U.S. Patent Application Serial No. 13/800,692



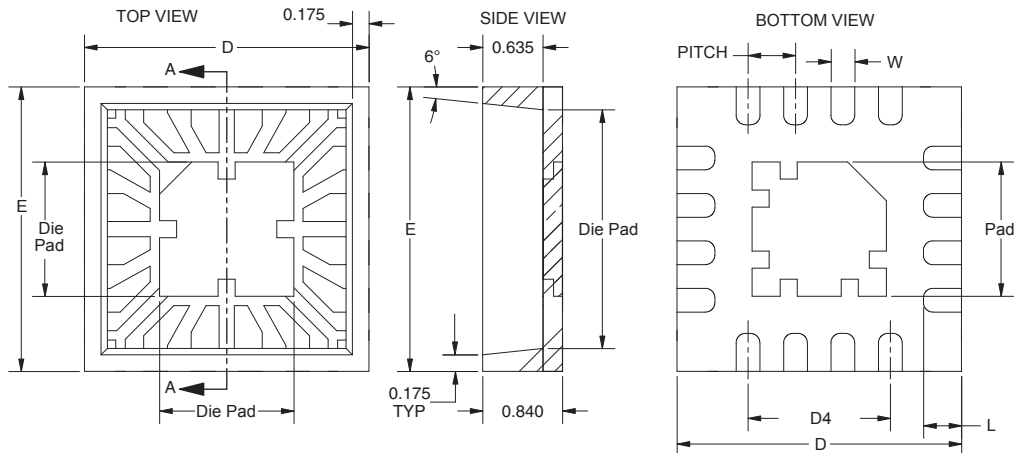
OPEN CAVITY M-QFN ATTACH YOUR DIE

Open Tool Packages



ORDERING INFORMATION

BODY D/E SIZE SQ	NBR LEAD		DIE PAD mm	CAVITY PACKAGE PART NUMBER	XH1	TRAY QTY
	LEADS	PITCH				
3mm	8	0.65mm	1.4 SQ	M-QFN8W.65		100
3mm	12	0.5mm	1.4 SQ	M-QFN12W.5		100
3mm	16	0.5mm	1.4 SQ	M-QFN16W.5		100
4mm	16	0.65mm	2.4 SQ	M-QFN16W.65		64
4mm	20	0.5mm	2.4 SQ	M-QFN20W.5		64
4mm	24	0.5mm	2.4 SQ	M-QFN24W.5		64
5mm	32	0.5mm	3.4 SQ	M-QFN32W.5		36
5mm	40	0.4mm	3.4 SQ	M-QFN40W.4		36
6mm	40	0.5mm	4.4 SQ	M-QFN40W.5		25
6mm	48	0.4mm	4.4 SQ	M-QFN48W.4		25
7mm	48	0.5mm	5.4 SQ	M-QFN48W.5		81
8mm	56	0.5mm	6.0 SQ	M-QFN56W.5		64
9mm	64	0.5mm	7.0 SQ	M-QFN64W.5		49
10mm	72	0.5mm	8.0 SQ	M-QFN72W.5		49
12mm	80	0.5mm	9.0 SQ	M-QFN80W.5		36



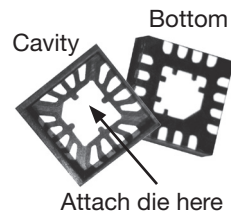
INFO

Open cavity. Attach and wire bond your own die.
Wire bondable. Applications: MEMS, RF Microwave. Fabless prototype, Socket probing
Visit www.MirrorSemi.com for drawings



OPEN CAVITY M-QFN ATTACH YOUR DIE

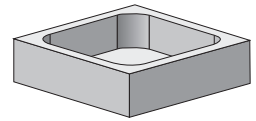
Road Map - check www.MirrorSemi.com



ORDERING INFORMATION

BODY D/E SIZE SQ	NBR LEAD		DIE PAD mm	CAVITY PACKAGE PART NUMBER	FLAT LID PART NBR (OPTIONAL)
	LEADS	PITCH			
3mm	20	0.4mm	1.4 SQ	M-QFN20W.4	T-LID3-BLACK
4mm	12	0.65mm	2.4 SQ	M-QFN12W.65	T-LID4-BLACK
4mm	12	0.8mm	2.4 SQ	M-QFN12W.8	T-LID4-BLACK
4mm	28	0.4mm	2.4 SQ	M-QFN28W.4	T-LID4-BLACK
5mm	16	0.8mm	3.4 SQ	M-QFN16W.8	T-LID5-BLACK
5mm	20	0.65mm	3.4 SQ	M-QFN20W.8	T-LID5-BLACK
5mm	20	0.8mm	3.4 SQ	M-QFN20W.8	T-LID5-BLACK
5mm	24	0.65mm	3.4 SQ	M-QFN24W.65	T-LID5-BLACK
5mm	28	0.5mm	3.4 SQ	M-QFN28W.5	T-LID5-BLACK
5mm	32	0.4mm	3.4 SQ	M-QFN32W.4	T-LID5-BLACK
5mm	36	0.4mm	3.4 SQ	M-QFN36W.4	T-LID5-BLACK
6mm	24	0.8mm	4.4 SQ	M-QFN24W.8	T-LID6-BLACK
6mm	28	0.65mm	4.4 SQ	M-QFN28W.65	T-LID6-BLACK
6mm	36	0.5mm	4.4 SQ	M-QFN36W.5	T-LID6-BLACK
7mm	28	0.8mm	5.4 SQ	M-QFN28W.8	T-LID7-BLACK
7mm	32	0.65mm	5.4 SQ	M-QFN32W.65	T-LID7-BLACK
7mm	44	0.5mm	5.4 SQ	M-QFN44W.65	T-LID7-BLACK
7mm	56	0.4mm	5.4 SQ	M-QFN56W.4	T-LID7-BLACK
7mm	64	0.4mm	5.4 SQ	M-QFN64W.4	T-LID7-BLACK
8mm	32	0.8mm	6.4 SQ	M-QFN32W.8	T-LID8-BLACK
8mm	40	0.65mm	6.4 SQ	M-QFN40W.65	T-LID8-BLACK
8mm	44	0.65mm	6.4 SQ	M-QFN44W.65	T-LID8-BLACK
8mm	52	0.5mm	6.4 SQ	M-QFN52W.5	T-LID8-BLACK
8mm	68	0.4mm	6.4 SQ	M-QFN68W.4	T-LID8-BLACK
9mm	72	0.4mm	7.0 SQ	M-QFN72W.4	T-LID9-BLACK
9mm	76	0.4mm	7.0 SQ	M-QFN76W.4	T-LID9-BLACK
10mm	68	0.5mm	8.2 SQ	M-QFN68W.5	T-LID10-BLACK
10mm	88	0.4mm	8.2 SQ	M-QFN88W.4	T-LID10-BLACK
12mm	100	0.4mm	10.2 SQ	M-QFN100W.4	T-LID12-BLACK

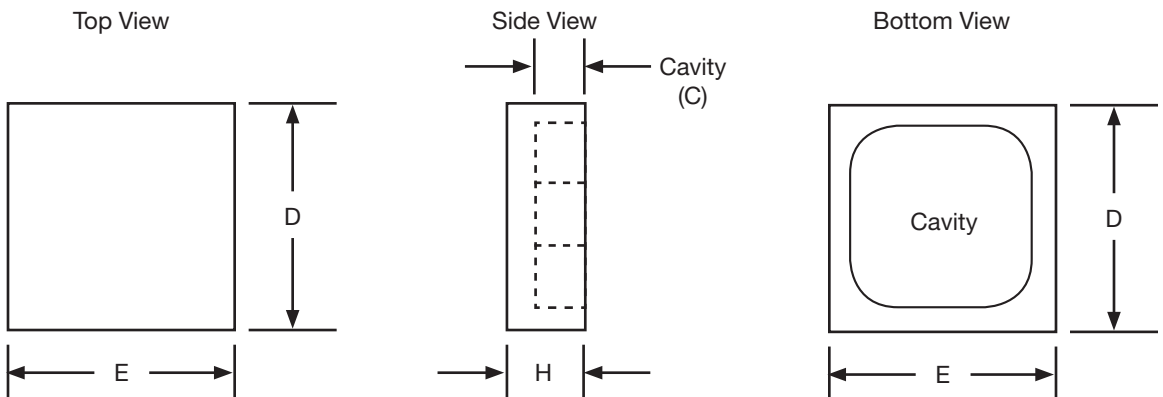
DOME LIDS FOR M-QFN COVERS FOR TALL DIE



ORDERING INFORMATION

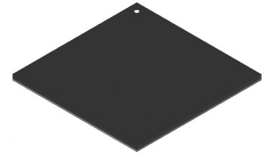
D / E BODY SIZE SQ	SHEILDED ALUMINUM	LCP BLACK	CERAMIC AL ₂ O ₃	GLASS CLEAR
3mm	Z-CAP3-ALUM	L-CAP3-BLACK	C-CAP3-WHITE	G-CAP3-GLASS
4mm	Z-CAP4-ALUM	L-CAP4-BLACK	C-CAP4-WHITE	G-CAP4-GLASS
5mm	Z-CAP5-ALUM	L-CAP5-BLACK	C-CAP5-WHITE	G-CAP5-GLASS
6mm	Z-CAP6-ALUM	L-CAP6-BLACK	C-CAP6-WHITE	G-CAP6-GLASS
7mm	Z-CAP7-ALUM	L-CAP7-BLACK	C-CAP7-WHITE	G-CAP7-GLASS
8mm	Z-CAP8-ALUM	L-CAP8-BLACK	C-CAP8-WHITE	G-CAP8-GLASS
9mm	Z-CAP9-ALUM	L-CAP9-BLACK	C-CAP9-WHITE	G-CAP9-GLASS
10mm	Z-CAP10-ALUM	L-CAP10-BLACK	C-CAP10-WHITE	G-CAP10-GLASS
12mm	Z-CAP12-ALUM	L-CAP12-BLACK	C-CAP12-WHITE	G-CAP12-GLASS

SERIES	(C) CAVITY	H
L-CAP	0.6~2.0mm	1.0~3.0mm
G-CAP	0.60mm	1.1mm
Z-CAP	1.0mm	1.6mm
C-CAP	0.6mm	1.0mm



O T Z -

Add a dome lid to cover an M-QFN to extend the head room over tall die. Available in a variety of materials. Custom sizes are readily available. Visit www.MirrorSemi.com for drawings



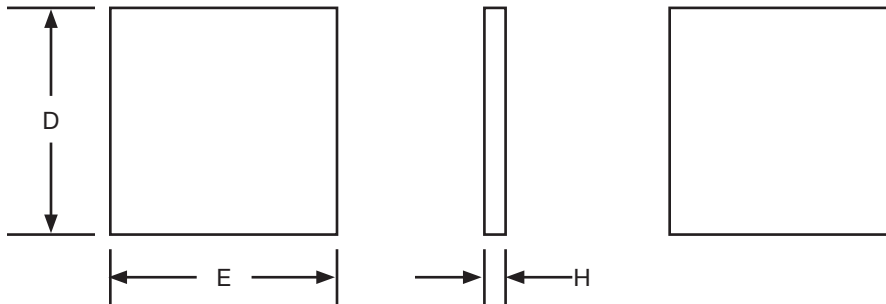
ORDERING INFORMATION

D / E Body Size SQ	PRE-FORM ADHESIVE BLACK	PRE-FORM ADHESIVE BLACK	NON-ADHESIVE GLASS	NON-ADHESIVE WHITE	NON-ADHESIVE BLACK
3mm	B-LID3-BLACK	C-LID3-BLACK	G-LID3-GLASS	T-LID3-WHITE	T-LID3-BLACK
4mm	B-LID4-BLACK	C-LID4-BLACK	G-LID4-GLASS	T-LID4-WHITE	T-LID4-BLACK
5mm	B-LID5-BLACK	C-LID5-BLACK	G-LID5-GLASS	T-LID5-WHITE	T-LID5-BLACK
6mm	B-LID6-BLACK	C-LID6-BLACK	G-LID6-GLASS	T-LID6-WHITE	T-LID6-BLACK
7mm	B-LID7-BLACK	C-LID7-BLACK	G-LID7-GLASS	T-LID7-WHITE	T-LID7-BLACK
8mm	B-LID8-BLACK	C-LID8-BLACK	G-LID8-GLASS	T-LID8-WHITE	T-LID8-BLACK
9mm	B-LID9-BLACK	C-LID9-BLACK	G-LID9-GLASS	T-LID9-WHITE	T-LID9-BLACK
10mm	B-LID10-BLACK	C-LID10-BLACK	G-LID10-GLASS	T-LID10-WHITE	T-LID10-BLACK
12mm	B-LID12-BLACK	C-LID12-BLACK	G-LID12-GLASS	T-LID12-WHITE	T-LID12-BLACK

Top View

Side View

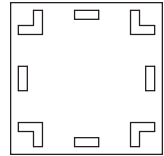
Bottom View



<u>MATERIAL</u>	<u>ADHESIVE PREFORM</u>	<u>LID SERIES</u>	<u>THICK H</u>
BT	None	T-LID BLACK	0.2mm
BT	Yes	B-LID BLACK	0.3mm
CERAMIC	Yes	C-LID-BLACK	0.35mm
RO-4003C	None	T-LID WHITE	0.2mm
GLASS	None	G-LID GLASS	0.63mm

Visit www.MirrorSemi.com

SILICON TEST DIE FOR BONDING PRACTICE DAISY CHAIN & ISOLATED



ORDERING INFORMATION

FIG.	CIRCUIT	DIE SIZE	PAD SIZE	NBR PADS	TRAY QTY	PART NUMBER
Fig. 1	Daisy Chain	1.0x1.0mm	60x160µm	8 Pair	100	TD8-1.0-DC
Fig. 2	Daisy Chain	2.5x2.5mm	60x160µm	16 Pair	100	TD16-2.5-DC
Fig. 3	Daisy Chain	4.0x4.0mm	60x360µm	24 Pair	64	TD24-4.0-DC
Fig. 4	Isolated	1.0x1.0mm	60µm SQ	16	100	TD16-1.0-ISO
Fig. 5	Isolated	2.5x2.5mm	60µm SQ	32	100	TD32-2.5-ISO
Fig. 6	Isolated	4.0x4.0mm	60µm SQ	48	64	TD48-4.0-ISO
Fig. 7	Differential Pair	1.0x1.0mm	60x160µm	2 + GND	100	TD2-1.0-DIF
Fig. 8	Differential Pair	2.5x2.5mm	60x160µm	2 + GND	100	TD2-2.5-DIF
Fig. 9	Differential Pair	4.0x4.0mm	60x160µm	2 + GND	64	TD2-4.0-DIF
Fig. 10	Fully Plated	1.0x1.0mm	900µm SQ	1	100	TD1-1.0-BUS
Fig. 11	Fully Plated	2.5x2.5mm	2400µm SQ	1	100	TD1-2.5-BUS
Fig. 12	Fully Plated	4.0x4.0mm	3900µm SQ	1	64	TD1-4.0-BUS

Not to Scale

Fig. 1
TD8-1.0DC

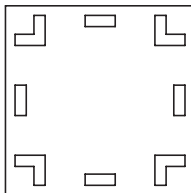


Fig. 2
TD16-2.5-DC

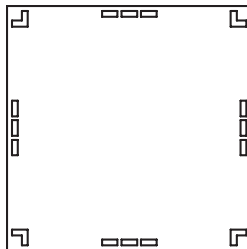
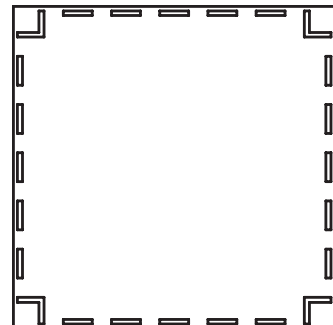


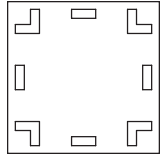
Fig. 3
TD24-4.0-DC



**I
N
F
O**

Die Material is Silicon (Si) 250µm (10mil) thick.
 Metallization 1.0µm Aluminum (Al) over 0.75µm SiO₂
 Wire bondable with Gold (Au) or Aluminum (Al) wire.
 Applications: Wire Bonding Practice or for RF / impedance characterization trials.

SILICON TEST DIE FOR BONDING PRACTICE OUTLINE DRAWINGS



ORDERING INFORMATION

Not to Scale

Fig. 4
TD16-1.0-ISO

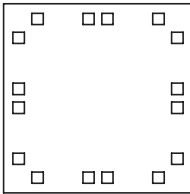


Fig. 5
TD32-2.5-ISO

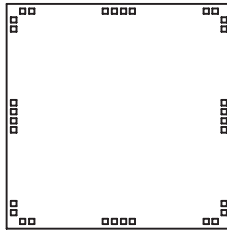


Fig. 6
TD48-4.0-ISO

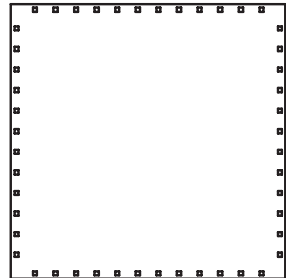


Fig. 7
TD2-1.0-DIF

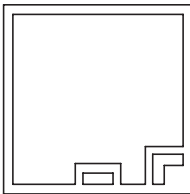


Fig. 8
TD2-2.5-DIF

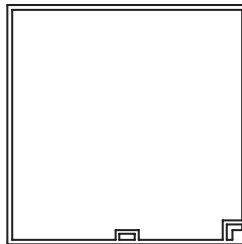


Fig. 9
TD2-4.0-DIF

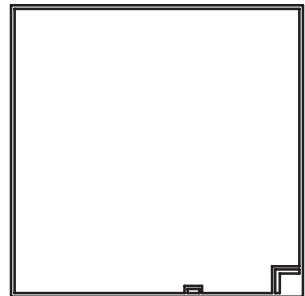


Fig. 10
TD1-1.0-SUS

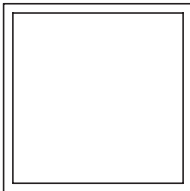


Fig. 11
TD1-2.5-BUS

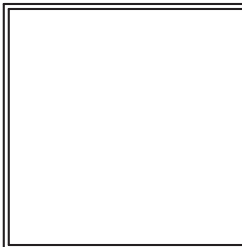
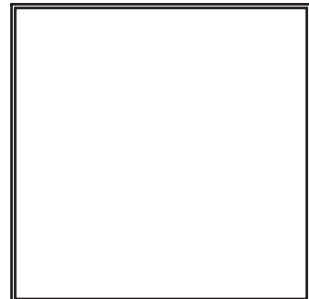


Fig. 12
TD1-4.0-BUS



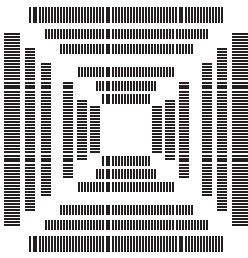


UNIVERSAL QFP LEAD STRAIGHTENER REWORK TOOL

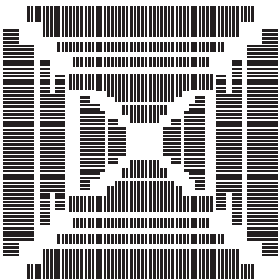


TopLine™

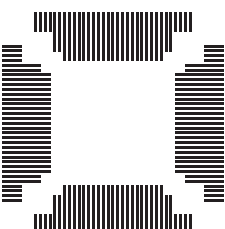
QFP Lead Straightener



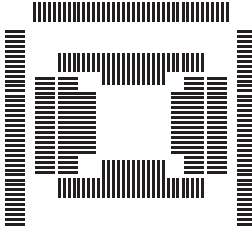
0.4mm Pitch



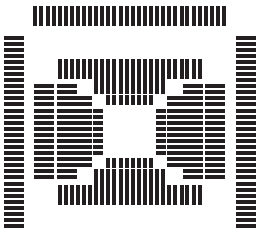
0.5mm Pitch



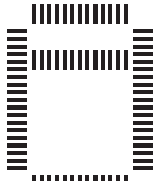
0.635mm Pitch



0.65mm Pitch



0.8mm Pitch



1.0mm Pitch

©2003 TopLine P/N 900000 REV A Design Patent D512,970

Low cost Universal QFP Lead Straightener handles all QFP, TQFP and LQFP with pitch of 0.4mm to 1.0mm.

Complete set includes all template patterns.

Use standard hand tools such as dental picks and tweezers to adjust leads of QFP to match recessed template slots.

Great for rework and recovery of expensive QFP, TQFP and LQFP. Also use for incoming inspection.

Conductive heavy duty stainless steel construction - precision coplanarity. For use on benchtop.

Lead Count and Pitch Includes:

0.4mm	0.5mm	0.65mm	0.8mm
64L	32L	52L	32L
80L	48L	80L	44L
120L	64L	100L	64L
128L	80L	144L	80L
176L	100L	160L	120L
216L	128L		128L
256L	144L	0.635mm	
	160L	84L	1.0mm
	176L	100L	44L
	184L	132L	52L
	208L		64L
	240L		

Order Number: 900000

Design Patent D512,970

Actual Size: 4" x 5.5" (100 x 140mm) .048" (1.2mm) thick