

Surface Mount Programming Adapter Manufacturers

As the market for nonvolatile memory parts in surface mount packages increases, so does the interest in simple, low cost programming socket adapters. These adapters allow users of standard programming equipment to program any package type including SOIC (gull-wing), PLCC (J-Lead), TSOP, CBGA, and TSSOP. The adapter plugs into the programmer in place of a 600 mil or 300 mil DIP package of the same part.

The two major disadvantages of building a socket adapter are:

Little or no support from programmer manufacturers.

Use of socket adapters (which are larger in width than the pins on a DIP I.C.) is not recommended. This will cause spring tension loss damage of the programmer's zero insertion force sockets, which may degrade the reliability of the programmer when the adapter is not used.

The advantages are more obvious. Some manufacturers charge up to \$500 for an adapter which slides or plugs into the programmer compared to about \$100 for the hardware described here.

Assembly of a custom programming adapter is very simple. Table 1 describes the typical piece-parts needed. Table 2 lists sockets and piece-part sources for different package configurations. The finished adapter is about 2 inches square and 1.5 inches high.

Table 1. Piece-Part Descriptions (see Figure 1)

Item No.	Qty.	Description
(1)	1	Zero insertion force socket.
(2)	2	Wire wrap strips with 100 mils pin centers and about 500 mils long on the end which will plug into the programmer's socket and 200 mils long on the opposite end to attach to (5) below.
(3)	2	Wire wrap strips similar to (2) above except only 100 mils and 200 mils long to connect (4) and (5) below.
(4)	1	PC board to accept the socket (1) and run traces to the edge of the card connecting to (3).
(5)	1	PC board to run traces from the card edge (3) to the two strips (2) (usually separated by 600 mils).
(6)	20"	#16-18 insulated stranded copper wire.
(7)	1-2	0.1 μ F ceramic high-frequency decoupling capacitors.
(8)	1	(Recommended) Pin socket board to fit between (1) and (4) to allow easy replacement of the socket (1). (8) is soldered to (4) and (1) plugs into (8). Zero insertion force sockets wear out quickly so replaceability is a good feature to have.



EPROM

Application Note

Rev. 0561B-06/98



As listed in Table 2, Emulation Technology, Inc., (408) 982-0660, can supply the adapter sockets preassembled, but we recommend you order the parts as an UNSOLDERED KIT to facilitate attaching the decoupling capacitors. The additional wire shunts (not required if a -LN kit is ordered from ET) and capacitors are essential to reduce inductive noise effects during programming and to maintain adequate programming yield. It is necessary to "beef-up" all the power (V_{CC} , V_{PP}) and ground (Gnd) connections by adding short jumpers of wire (6) running from the socket (1),

around the edge of the module and finally to the pins of item (2) on the bottom of the module. Bypass capacitors (7) must be soldered between Gnd and V_{CC} or V_{PP} (if applicable). The leads on the capacitors must be trimmed as short as possible and soldered as close to the socket (1) as possible (on the wide traces on the -LN board (4)). The other end of each capacitor will be connected to short stranded wires (6) running from the top, around the edge of the adapter, and finally soldered to the ground pin of item (2).

Table 2. Vendors / Part Numbers by Package Type

Package Type	Pin Count	Emulation Technology ⁽¹⁾	Socket Manufacturer	Part No.
PLCC	32	AS-32-28-01P-P6-LN	Yamaichi	IC51-0324-453
	44	AS-44-40-08-P6-LN	Textool	244-5292
SOIC	28	AS-28-28-015-6-GANG	Enplas	FB-28-1-27-07
	32	AS-32-32-01S	Yamaichi	IC51-0322-667
	44	AS-44-44-01S	Yamaichi	IC51-0442-1208
TSOP	28	AS-28-28-01TS-S	Yamaichi	IC51-0282-673-1
	32	AS-32-32-01TS-S	Enplas	OTS-32-0.5-02
	40	AS-40-40-01TS-S	Yamaichi	IC191-0402-002N
	48	AS-48-48-01TS-S	Yamaichi	IC191-0482-004

Notes: 1. ET can also supply finished adapter sockets built per this application note or other customer requirements.

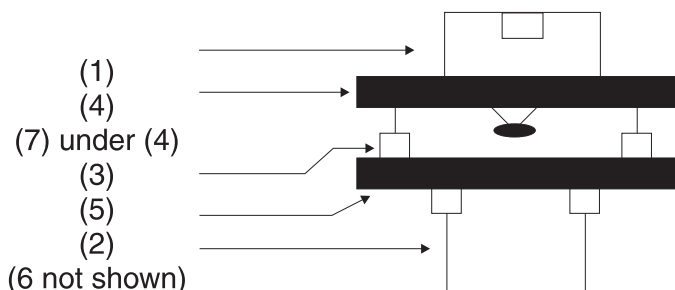
2. Made by 3M. Check with your local distributor.

Assembly proceeds as follows (see Figure 1 and note that jumper wires (6) are not required if a -LN kit is used):

- Trim the leads on the jumper wires (6) to about 3.0 inches. Solder capacitors (7) with shrink-wrap insulation on the cap leads, and jumper wires (6) under the socket (1) (or under (8) if socket replaceability is needed) in such a way that they do not interfere with attaching the socket (or (8)) to the board (4). (If a -LN kit is used, just solder the capacitors on the wide traces provided on board (4).)
- Solder the socket (or item (8)) to the PC board (4) and trim the pins on the socket flush to the board (4).
- Solder the shorter pin strips (3) to the outside of board (4) with the spacers on the side away from the socket (1).
- Solder the longer pin strips (2) into the other PC board (5) such that the spacers stick out of the bottom of the adapter. These longer pins will be used to plug directly into the programmer socket. Trim the shorter leads of (2) flush with the board (5) after soldering.
- Solder the PC board (5) to the short pins protruding below PC board (4).

- (Omit this step if a -LN kit is used.) Connect all the V_{CC} , V_{PP} (if applicable) and Gnd wires which were connected in step (1) to their appropriate pins on item (2) on the underside of the assembly close to the protruding spacer in such a way that they will not interfere with plugging the completed module into the programmer DIP socket. Trim these shunt wires as short as possible to minimize inductance effects.

Figure 1.



This application note has described how to build a simple and cheap programming adapter socket to support a wide variety of nonvolatile memory product packages available from Atmel.



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