

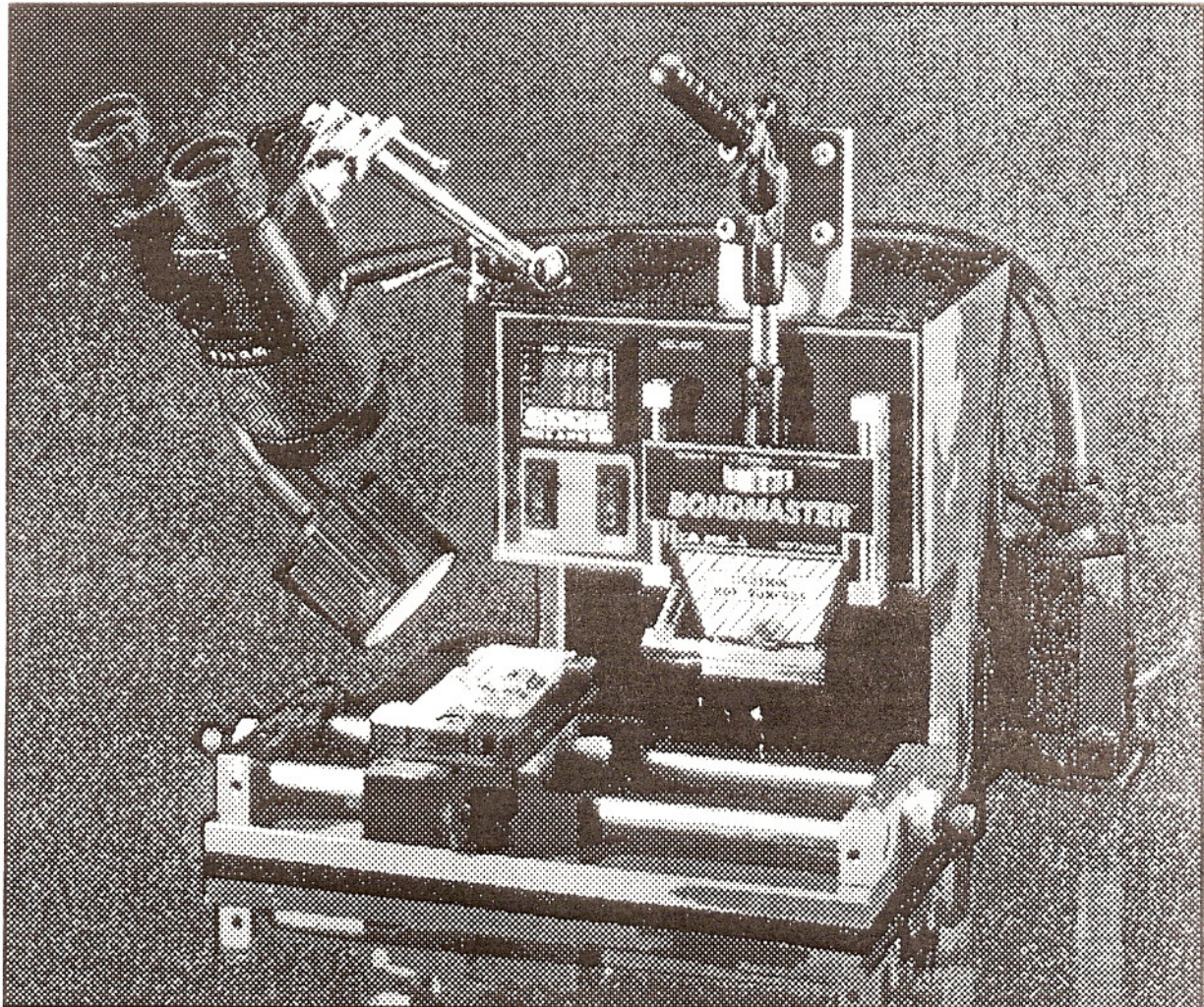
**BondMaster**

**R1346A**

**BondMaster HSC Rework System**

# **BondMaster Manual**

1. Unpacking the BondMaster
2. Installation
3. Universal Paging Bonding Fixture
4. Aligning the Pager
5. Bonding Process
6. BondMaster Technology
7. BondMaster Technology and Fixturing
8. BondMaster Fixturing and Specification



Manufactured exclusively for



**MOTOROLA**

*For service questions call:*  
**Automation Production Equipment**  
Phone: 305-451-4722  
Fax: 305-451-3374

**A.P.E. SOUTH**

48 Coral Way, MM105.2  
Key Largo, FL 33037, USA

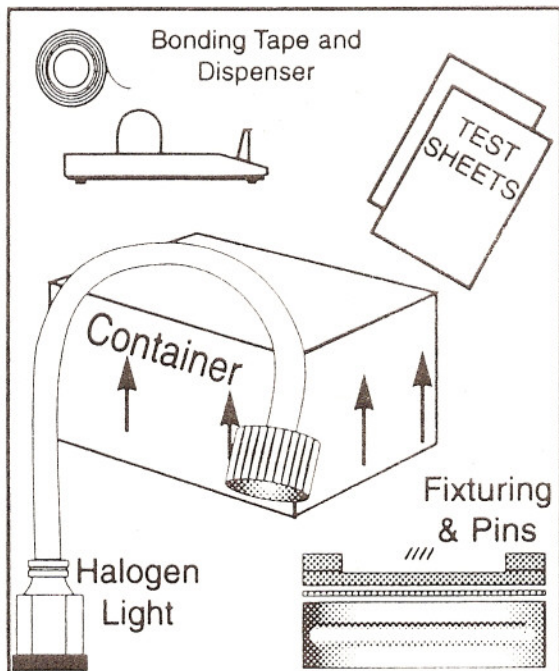


**R1346A BondMaster****Unpacking the BondMaster**

The HSC 9000 BondMaster has been securely packaged in a robust custom designed container with inserts separating and protecting each component.

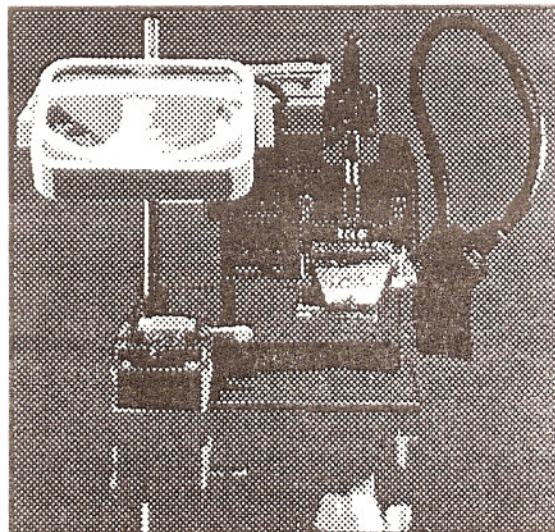
On the outside of the container will be registered the Model Number of the BondMaster and the Voltage. If you have ordered an accessory such as a Microscope or X-Y Table, this will also be registered. Follow these simple steps to guide you through unpacking your BondMaster safely:

1. Unseal the container, ensuring that the arrows on the side of the case point upwards.
2. Remove this manual and literature for reference.

**Component Parts**

For more information contact  
Motorola's America's Parts Division at:

Phone: 1-800-543-9191  
Fax: 1-847-538-8079

**BondMaster Basic System**

3. Remove top insert containing:
  - a) Halogen Light
  - b) ESD safe Bonding Tape and Dispenser
  - c) Manufacturing Test Sheet
4. Remove bottom insert containing:
  - a) BondMaster
  - b) Support Base Block (Gold)
  - c) Foot switch
  - d) Power cord

**Optional:**

- MasterLens
- Universal Pager Fixture Kit includes:
  - Universal Bonding Fixture (Black)
  - 1 pk set location Pins (Gold)
  - 1 pk set location Pins (Silver)
  - 1 pk set Memo support pins (Black)
  - Intermediate Spacer Fixture (Gold)

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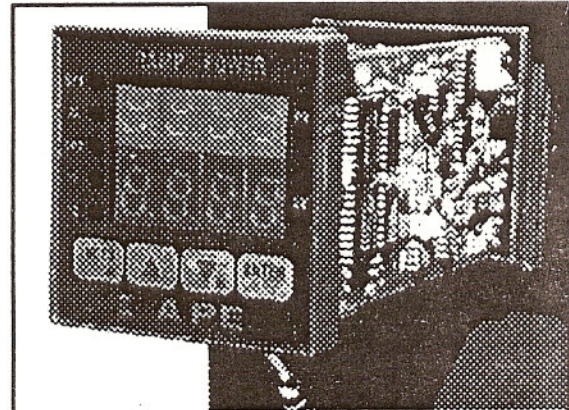
## R1346A BondMaster

### Installing the BondMaster

1. Check that the work bench is sturdy and level.
2. Ensure that a power supply is available (110VAC or 220VAC), and that the main power is off.
3. Connect the Foot Pedal and AC power cord to rear of the machine and connect the power cord to the AC supply.
4. Connect the halogen light and optional MasterLens to the sockets provided.
5. Check that the Foot Pedal/Continuous switch is in Foot Pedal mode.
6. Ensure that the Heating Element is in place within the Bond Head, the element is designed to carry the thermal load of the Bond Head and must be inserted to avoid failure or degradation.
7. Turn ON the main supply.
8. Turn ON the BondMaster main supply switch, the digital controller will conduct a Self Test and then display the ambient temperature of the Bond Head in RED and the Set Point bond temperature in GREEN.
9. Place the Foot Pedal/Continuous switch to the Continuous mode to test the Bond Head heating element and note the ambient temperature in the red display begin to ramp. Continue until the display reads 250°F 121°C, then switch back to Foot Pedal mode.
10. Press the Foot Pedal momentarily then release to test that the temperature cycle starts by noting when the ambient temperature begins to ramp.

#### PID Controller

*Three thermal/temperature profiles have been pre-loaded and are ready*



*Important: Do not switch off the BondMaster until the display registers under 110°F (43°C) as this will rapidly degrade heater life.*

#### Controller

*to go for Bravo and other pagers, with an additional profile allocated for future products. Do not change any field within the controller until you are familiar with it's operation.*

11. Pressing the "INDEX" key on the controller once will display the *Bond Time* as "t1", the pager bond time 1:45 minutes has been factory set as a default and is recommended for most applications, however it may be changed by using the "UP" and "DOWN" arrows, press "ENTER" to save a new time.

12. Press "INDEX" again to step to the *Bond Profile* "Prof", the default profile is #1, and may be changed from 1 thru 4 using the same procedure as changing time but we recommend that Profile #1 is used.

13. Press "INDEX" again to display the *Bond Temperature* ISPI which can be changed as above, the prefix in ISPI indicates the profile number, we recommend you use the factory set temperature.

14. Press "INDEX" to exit.

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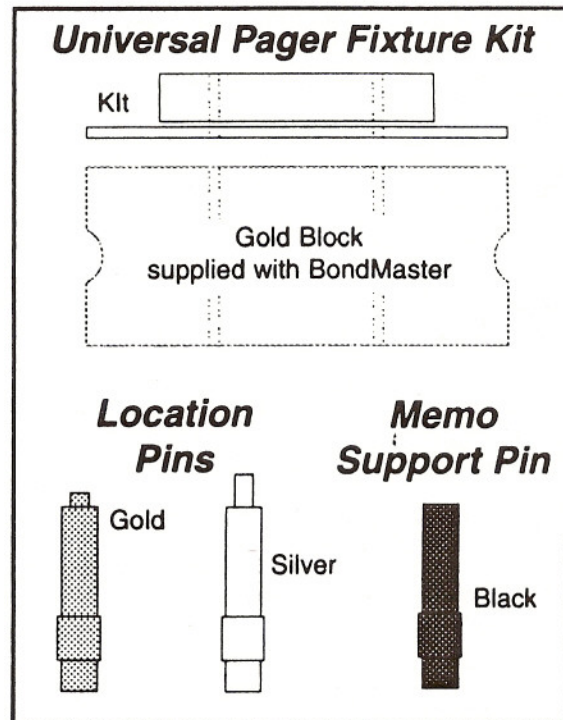
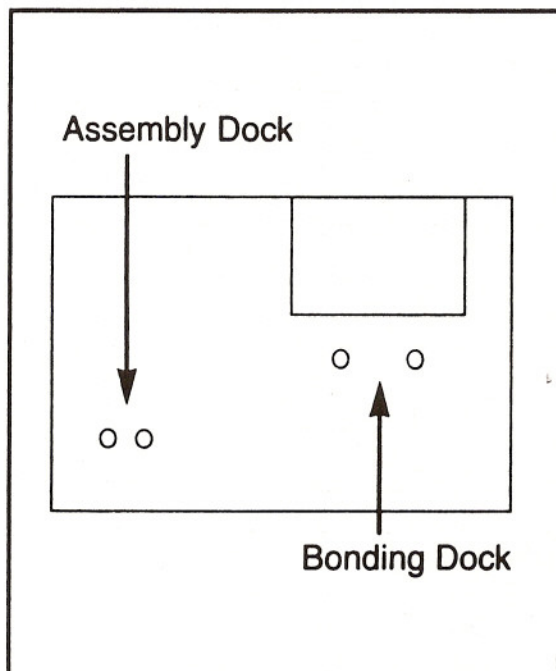
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**R1346A BondMaster****Universal Pager Bonding Fixture Kit**

The Basic BondMaster system does not include the optional Universal Pager Fixture Kit. The BondMaster will accommodate all Motorola pager fixtures, or the user may decide to fabricate a special assembly. The optional two piece Universal Pager Fixture Kit is supplied banded and assembled for Bravo type pagers (the band must be removed before use). The Base Block (gold) supplied with the BondMaster supports the kit, which includes an Intermediate Spacer (gold) and the top Universal Pager Fixture (black), orientated for Bravo pagers. Also included are two sets of location pins, silver and gold, which are color coded for use with different pager types. The Memo Support Pins are black.



With the BondMaster facing the user, note the *Assembly Dock* location holes on the left of the base plate, these will locate with the roll pins on the bottom of the gold Base Block. The Universal Pager Fixture Kit will retain the pager and display assembly once the HSC/LCD has been aligned using the correct location pins and the anti-static thermal bonding insulating tape supplied. See next page. Once the pager and display are securely taped, the Base Block can be moved to the *Bonding Dock* location under the Bonding Head. **Note: the Intermediate Spacer is not required when using Motorola standard tooling.**

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## R1346A BondMaster

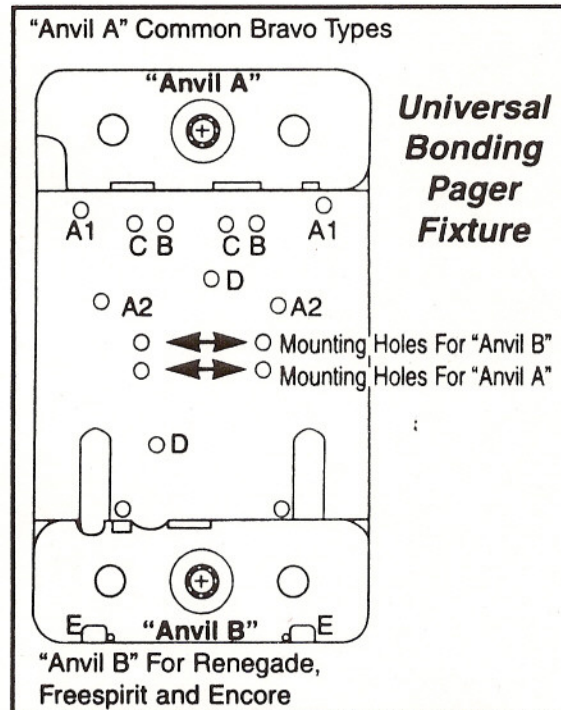
### Aligning the Pager

The following steps prepare for the bonding process, using the Universal Pager Bonding Fixture:

Mount the Universal Paging Fixture and Base Block at the *Assembly Dock* location (see previous page).

Select the correct Bonding Anvil for the pager. The fixture is supplied with "Anvil A" in position for Bravo pagers. When it is necessary to select "Anvil B" the fixture should be rotated 180 degrees on the Intermediate Spacer and the correct holes aligned to the Intermediate Spacer pins by the Location Arrows marked on the fixture. If the wrong pins are selected then the display will not register to the Bonding Head when in the *Bonding Dock* location.

Pager	Group	Color
Bravo	C	Silver
Bravo Classic	C	Silver
Bravo Numeric	C	Silver
Bravo Alpha	C	Silver
Lifestyle (New)	C	Silver
Bravo Express	A	Gold
Bravo Ultra Exp	A	Gold
Lifestyle	B	Silver
Lifestyle +	B	Silver
Bravo Encore	D	Gold
Pro Encore	D	Gold
Free Spirit	E	Silver
Renegade	E	Silver
Memo Express	A	Gold



The above illustration shows the positions of the Tooling Pins and which Anvil to use with which pager type.

The silver tooling pins are used for Bravo and the gold pins are for Bravo Express pager types. Locate the pager in the fixture using the appropriate pins, see illustration at left.

Lay the LCD on a clean flat surface with the side to be bonded to the connector facing down. The top surface, which will contact the Bonding Head, is facing up. Dispense and cut a 3 inch piece of Bonding Tape and lay the tape over the HSC material end, ensure there is sufficient tape to capture the pager and that there are no wrinkles before peeling the assembly from the surface. Carefully align the taped HSC traces of the LCD to the finger contacts of the pager supported in the fixture. **Press and secure, then add an additional layer of tape.**

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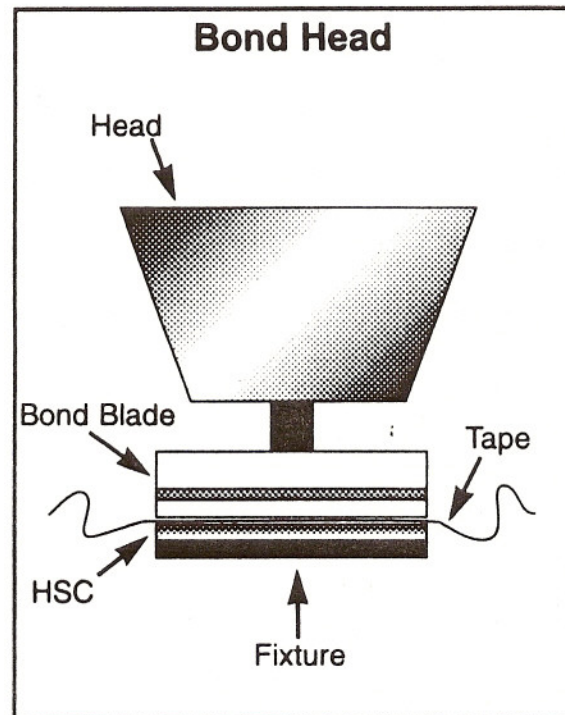
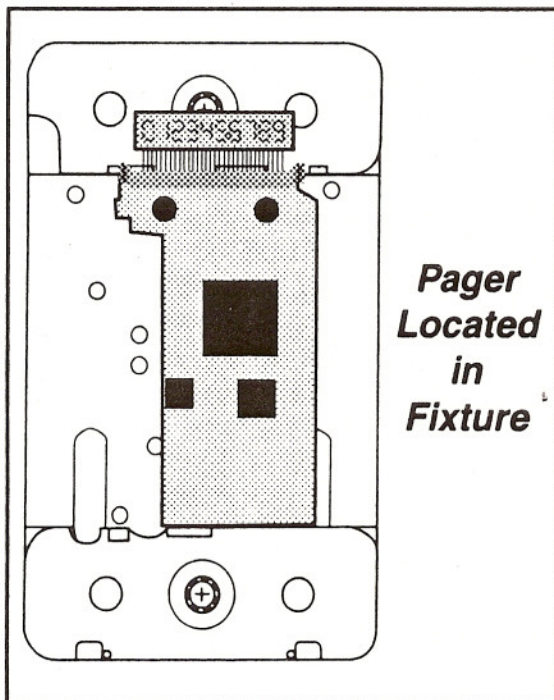
**R1346A BondMaster****Bonding Process**

The objective of the tape preparation and alignment procedure is not only to secure the aligned assembly, but to also prevent the Bonding Head sticking to the flexible circuit during the bond process and to insulate the circuit from the Bond Head. It also allows for a linear distribution of pressure throughout the flexible circuit as the conductive epoxy reaches reflow and changes shape to conform to the Bond Head.

Once aligned and secured, move the entire Universal Pager Fixture Kit, with the installed assembly, to the Bonding Dock under the Bonding Head. Secure the roll pins in the location holes.

The Pager is now ready for the bonding process.

The BondMaster is supplied with correct pressure tension adjustment for anisotropic and planar pagers. *The correct procedure for aligning and*



*adjusting pressure for Memo Express (monosotropic) is supplied with the fixture. Slowly move the Bonding Lever down until it contacts the anti-static tape and locks into position.*

Depress the foot pedal to activate the temperature cycle. The Set Point (green display) will convert to the digital timer and count down from the preset time to zero.

When the Timer reaches zero, disengage the foot pedal and immediately release the lever and allow the pager and display to cool before removing.

Carefully peel the anti-static bonding tape from the HSC connector and pager assembly.

**Caution – Hot radiating surface. DO NOT touch Bond Head.**



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## R1346A BondMaster

### BondMaster Technology

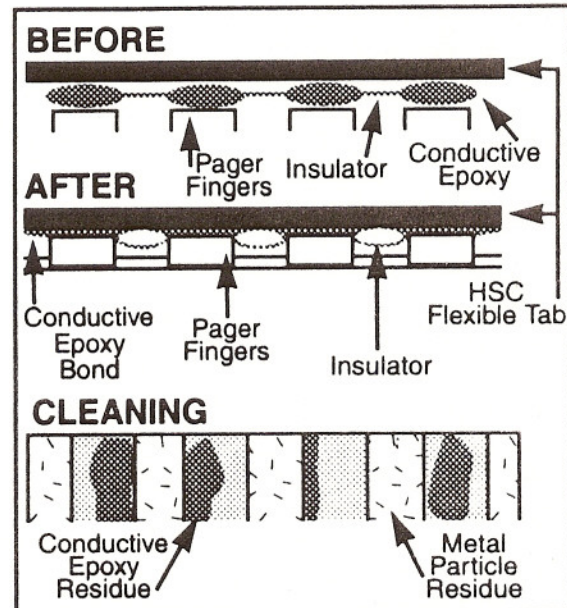
There are two types of flexible cable that will be found connected to pager LCD assemblies. The technologies vary but both require a similar preparation.

Mylar technology is recognized by the presence of solder.

The HSC (Heat Sealed Connector) are flexible circuits which have conductive traces filled with conductive epoxy. The technology was developed to provide a quick and effective process for connecting a LCD (Liquid Crystal Display) to printed circuit boards.

There are three variants of this technology, which offer different electrical, mechanical and performance characteristics.

**Monosotropic** – Is used for Fine Pitch projects of 0.22mm and above. The materials contain gold and nickel particles offering very low electrical resistance. Its typical yellow appearance derives from the titanium dioxide used in the thermoset adhesive coating process.



**Anisotropic** – A low cost material yielding reliable bond connections, filled with gold plated nickel particles and found on most pagers, replacing Planar in many instances. The material can also be used in Fine Pitch applications of 0.29mm and above. Indications are Green/White and Black/White markings.

Pager	Group	Color	Turns	Pressure	Temp.	Time
Bravo	C	Silver	10	75 PSI	302°F	1:45
Bravo Classic	C	Silver	10	75 PSI	302°F	1:45
Bravo Numeric	C	Silver	10	75 PSI	302°F	1:45
Bravo Alpha	C	Silver	10	75 PSI	302°F	1:45
Lifestyle (New)	C	Silver	10	75 PSI	302°F	1:45
Bravo Express	A	Gold	10	75 PSI	302°F	1:45
Bravo Ultra Exp	A	Gold	10	75 PSI	302°F	1:45
Lifestyle	B	Silver	10	75 PSI	302°F	1:45
Lifestyle +	B	Silver	10	75 PSI	302°F	1:45
Bravo Encore	D	Gold	10	75 PSI	302°F	1:45
Pro Encore	D	Gold	10	75 PSI	302°F	1:45
Free Spirit	E	Silver	10	75 PSI	302°F	1:45
Renegade	E	Silver	10	75 PSI	302°F	1:45
Memo Express	A	Gold	11	83 PSI	330°F	1:45

Note "Pressure Calibration" on page 9.

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**R1346A BondMaster****BondMaster Technology and Fixturing**

**Planar** – The original pager material, limited to 0.3mm or above pitch and is more costly than the new technologies. No metal particles are included and it is more often being replaced by Anisotropic materials.

Bonding all three of these materials requires temperature, pressure and time. The illustration at left shows the characteristics of each material. Note the operating envelope for each type.

**PAGER PREPARATION****Mylar Technology**

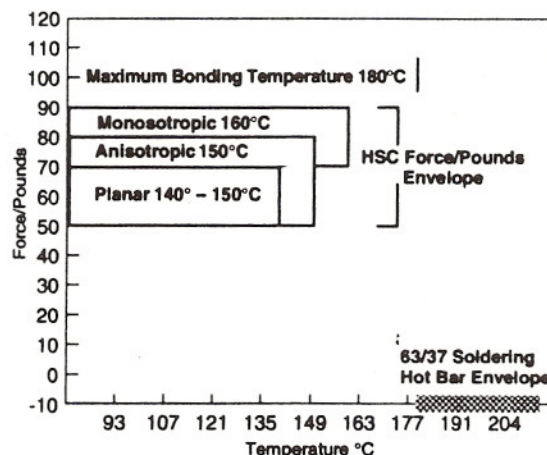
Mylar soldered flexible circuits are removed using a soldering iron, reflowing each connection as the circuit is gently peeled away from the board.

To prepare the new LCD circuit, simply apply a bead of no-clean solder paste reference 6680333E72 across the new connector pads, then reflow the paste with a temperature controlled soldering iron R1343A.

After reflow (tinning), add a bead of no-clean flux reference 6680333E71 across the pads. All necessary tools are found in the SMT Tool Kit reference 0180303E45.

**HSC Technology**

Remove the HSC circuit by grasping the LCD and gently peeling the flexible circuit from the pager board. A close inspection of the finger contacts on the board will reveal the residue of the old bonded epoxy, see illustration on page 7.

**Precise and Repeatable Bonding of HSC and Mylar Solder Materials**

**Caution** – The original pager material residue will contain conductive particles which can cause shorting. It is therefore very important that you clean thoroughly ensuring all the particles are removed. For this application use the SMT Tool Kit reference 0180303E45.

**Fixturing**

The Universal Pager Fixture is suitable for the following HSC Pagers:

- |                       |                   |
|-----------------------|-------------------|
| • Bravo Classic       | • Bravo LX-FLX    |
| • Bravo Numeric       | • Bravo Encore    |
| • Bravo Plus          | • Pro Encore      |
| • Bravo Alpha         | • Lifestyle       |
| • Bravo Express       | • Lifestyle Plus  |
| • Bravo Ultra Express | • Lifestyle (New) |
| • Pronto, Pronto Flex | • Free Spirit     |
| • Renegade            |                   |

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## R1346A BondMaster

### BondMaster Fixturing and Specification

**Memo Express LCD Positioning upgrade package includes:**

- Linear X-Y Micrometer Bearing Table
- Microscope with mounting hardware
- Universal Pager Bonding Fixture

**Portable Radio Products Fixture for the following:**

**Radio Products**

- MTX 838
- MTX 8000
- MTX 9000
- HT 1000
- HT 2000
- MTS 2000

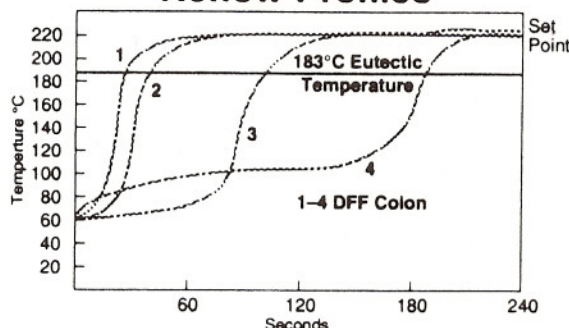
**Pager Products  
Hot Bar**

- Advisor
- Scriptor
- Advisor Gold
- Advisor Plus
- Tango

#### Technical Specification

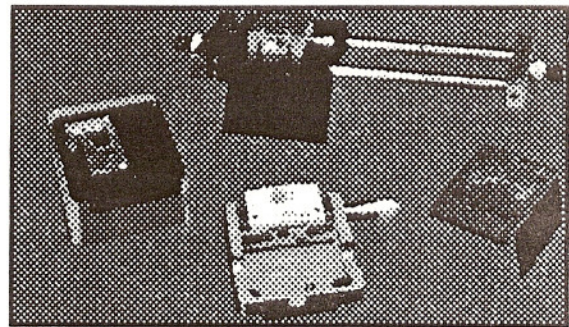
Electrical:	110V/220V 50/60Hz
Current:	5 Amps continuous
Power:	200 Watts continuous
Mechanical	Rugged Anodized Aluminum Plate
Dimensions:	15 in. x 12 in. x 12 in. (381 x 305 x 305mm)
Weight:	14 lbs (6.36 Kg)
Temperature Envelope:	Ambient to 550°F (288°C)
Pressure Envelope:	0-100 lbs (45.45 Kg)
Time:	Programmable 1 sec-3 minutes

#### Reflow Profiles



For more information contact  
Motorola's America's Parts Division at:

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#### Memo Express Package

#### Pressure Calibration Procedure:

Each BondMaster is calibrated before leaving the factory and the Pressure Wheel is set in place by a "Pressure Set Pin."

If it is necessary to calibrate the system, simply reset the location as follows:

Raise Pressure Wheel and Bond Head by turning wheel in direction of arrow in Figure A.

#### Pressure Wheel

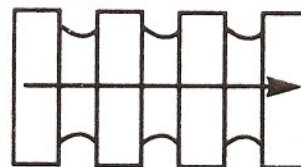


Figure A

Once the wheel is topped out, rotate wheel in reverse direction ten (10) full turns, as Figure B.

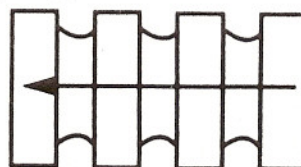


Figure B

This will apply 75 lbs. (7.5 lbs per rotation).  
*End of procedure.*

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