Novatech Systems

HBC-43
Hot Bonding Controller

Adhesive Maintenance Program

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Note:
Throughout this manual, several important keys have been referred to by an abbreviation.
ie. ¿ Refers to the Enter key
[ESC] Refers to the Escape key
↓, ↑, ← & → Refers to the Cursor keys

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1. Introduction

1.1 The need for this program

This program is intended to be used in conjunction with the Hot Bonding Controller program. It has been written to enable the user of the HBC-43 controller to introduce a new adhesive to the Hot Bonding Controller for automatic temperature/time adjustments.

The Novatech Systems Hot Bonding Controller is a sophisticated electronic control system for controlling the temperature of composite repairs. One of the features of the control system is to automatically control the time of the cure based on the temperature/time characteristics of the adhesive.

The program will request information about the time the that cure should be extended to if the temperature of the cure has been below the specified temperature. The information is typed into a table, and a graph is calculated to best fit the data points that were entered.

It is not expected that new adhesives will need to be added very often, and therefore has been designed to run from a machines other than the working HBC-43 notepad computers.

This program will allow a supervisor to add a new adhesive, view the current adhesives, and edit an current adhesive. New adhesives are saved on the program floppy disk, ready for transfer to the working HBC-43 computers directly from the floppy disk.

1.2 Using this program

Start the program by following the instructions in chapter 1. Use the function keys to add a new adhesive or edit an existing one, and then save the changes.

Transfer the new adhesive graphs to the HBC-43 working computer from the floppy disk.

Keep the floppy disk in a safe place.

1.3 Starting the Adhesive Maintenance Program

Insert the 3 ½inch floppy labeled –

Novatech Systems Adhesive Maintenance

into the A: drive on a personal computer.

Type:

```
A:
```

The response should be the normal computer prompt:

```
A:\>
```

Type:

ADHESIVE

Wait about 30 seconds (Running from a floppy disk takes longer).

The screen will appear :-

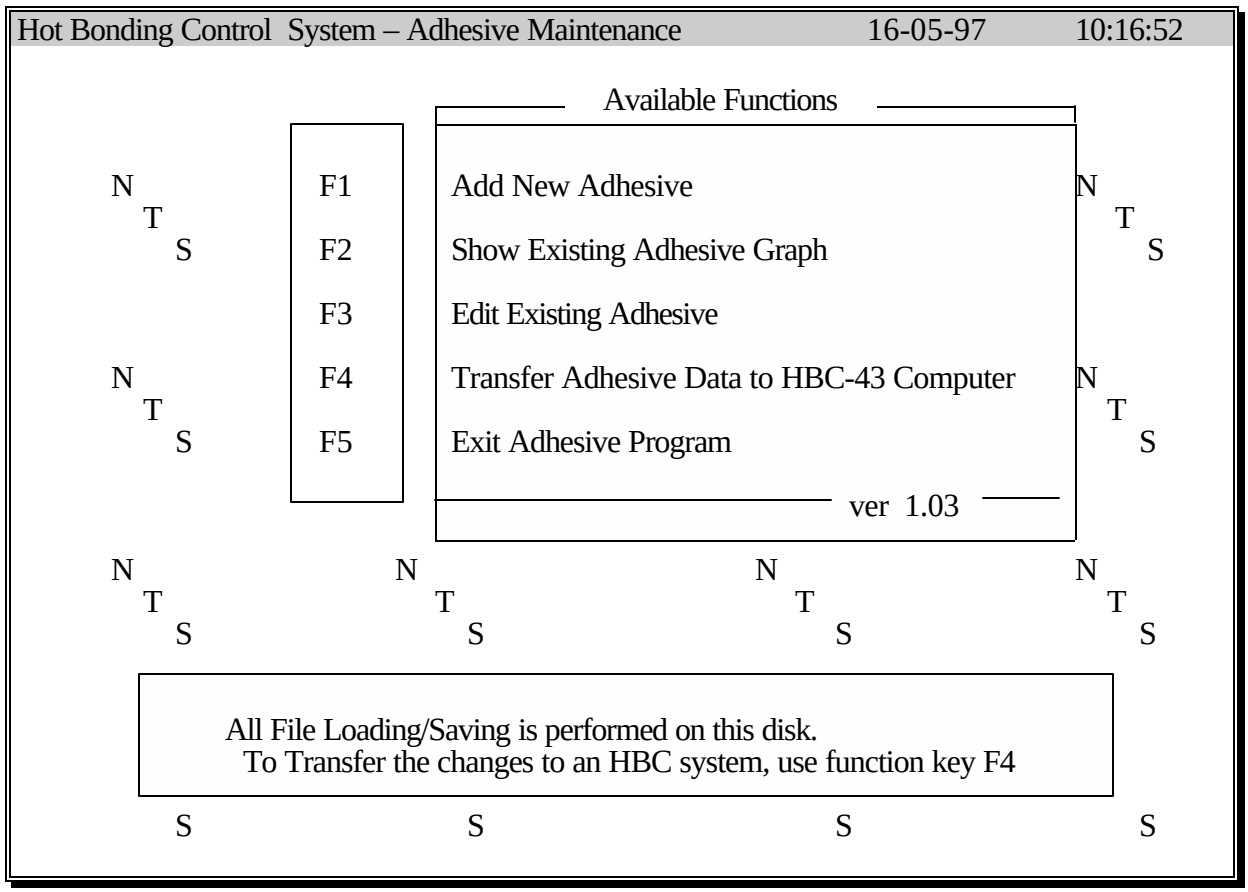

Fig. 1 Main menu screen

From this screen there are 5 options by pressing the function keys :-

Function key 1	Add a new adhesive to the existing list of adhesives
Function key 2	Show the temperature/time graph of the existing adhesives
Function key 3	Change an existing adhesive graph shape
Function key 4	Transfer the new list of adhesives to a working HBC-43 computer

Function key 5 Finish using the adhesive program, and return to DOS

For the details of these functions, see chapter 2.

2. Detailed Description of the Program Functions

2.1 Add new Adhesive

This function allows a new adhesive to be used by the Hot Bonding Controller.

From the MAIN MENU, press the F1 key.
The screen will appear :-

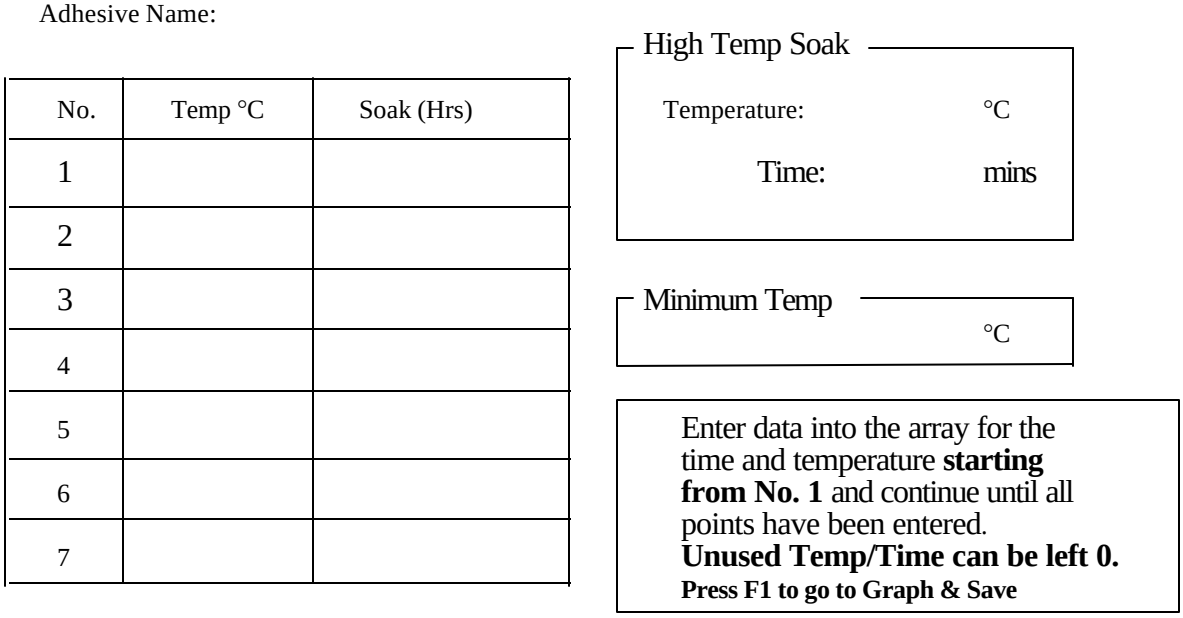

Fig. 2 Adhesive Entry Table

Adhesive Name
Enter the name for the new adhesive.

High Temp Soak
Enter the normal soak temperature and soak time.

Table
Enter the temperature and time characteristics of the adhesive in the table. Enter at least 3 pairs of numbers and up to 7 pairs.
The first pair of temperature/time numbers should normally be the same as the 'High Temp Soak' values for temperature and time.
Use the cursor keys (↓, ↑, ← & →) to move around the screen as prompted by the bottom line of the screen.

Minimum Temp
This temperature is the lowest temperature that the adhesive will cure. The Hot Bonding Controller will not extend the soak time any longer, even if the zone temperature is below this temperature.

Press the [ESC] key to go on to view the graph of the new adhesive.
(See in Fig. 3, Adhesive Graph Screen)

From the graph screen, either press the ‘S’ key to save the changes or press the [ESC] key to return to the main menu, discarding the changes.

2.2 Show Existing Adhesive Graph

This function allows an existing adhesive temperature/time cure graph to be checked.

From the MAIN MENU, press the F1 key.

FM-73
FM-300
AF-130

Select the adhesive to review by using the up and down cursor keys.
Press the ¿ key.

The screen will appear :-

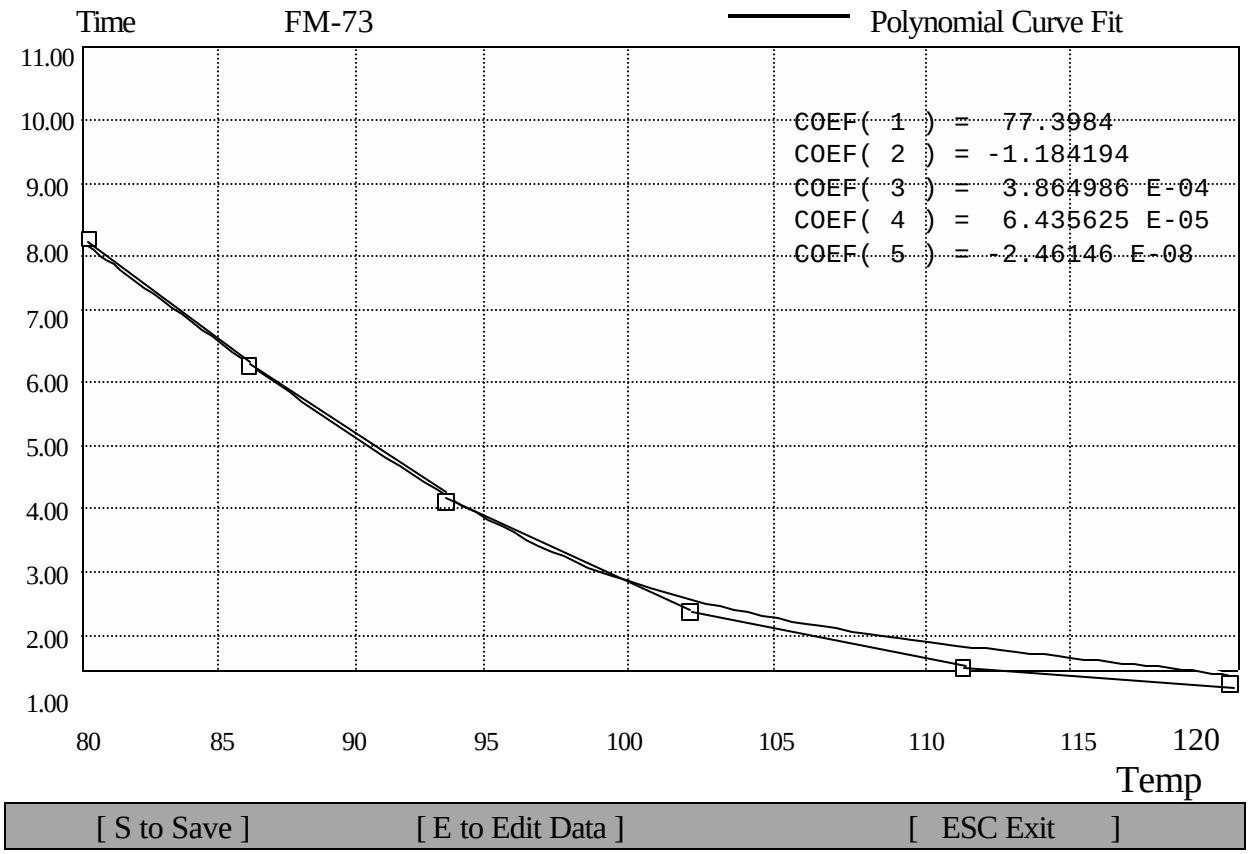

Fig. 3 Adhesive Graph Screen

The graph shows the data points that we entered to create the graph as small squares.
The lines that join the squares show the unsmoothed shape of the temperature/time graph.
The curve that approximates the data points has been fitted by a polynomial. This is the curve that will be used in the Hot Bonding Controller.

Press the 'S' key to save the changes to the adhesives
'E' key to return to the entry table to make further changes
[ESC] key to exit without saving the changes

If the message appears :-

Adhesive Names Don't Match In Coeffts and Raw Data Files

The file ADHESIVE.DAT has been damaged or removed from the floppy disk.

2.3 Edit Existing Adhesive Graph

This function allows an existing adhesive temperature/time cure graph to be edited.

From the MAIN MENU, press the F3 key.

FM-73
FM-300
AF-130

Select the adhesive to edit by using the up and down cursor keys.
Press the ¿ key.

The screen will appear :-

Adhesive Name: **FM-73**

No.	Temp °C	Soak (Hrs)
1	**80.0**	**8.00**
2	**90.0**	**4.75**
3	**100.0**	**2.50**
4	**110.0**	**1.50**
5	**120.0**	**1.00**
6	**0.00**	**0.00**
7	**0.00**	**0.00**

High Temp Soak

Temperature: **120** °C

Time: **60** mins

Minimum Temp

80 °C

Enter data into the array for the time and temperature **starting from No. 1** and continue until all points have been entered.
Unused Temp/Time can be left 0.
Press F1 to go to Graph & Save

Fig. 4 Adhesive Entry Table

Any of the data point can be changed by using the cursor keys to move the highlight to the correct position.

Press the [ESC] key to exit without saving the changes
F1 (function key 1) to go on to view the graph of the adhesive including saving any changes. (See in Fig. 3, Adhesive Graph Screen)

From the graph screen, press the
'S' key to save the changes to the adhesives

‘E’ key to return to the entry table to make further changes.
[ESC] key to exit without saving the changes

2.4 Transfer Adhesive Data to HBC-43 Computer

This function is used to transfer the calculated, smoothed graphs from the machine used to enter/edit the adhesive graph to the computer used to run the HBC-43 Hot Bonding Controller.

To use this function after an adhesive has been edited or created –

1. Close the program on the computer used to edit/create the adhesive graph. Make sure that you have saved the new adhesive file. (pressing the 'S' key from the graph screen)
2. Remove the floppy disk from the editing computer.
3. Go to the computer being used to control the HBC-43.
4. Turn the computer on. The computer should start running the Hot Bonding Controller as part of the start up procedure. Use the "Exit to DOS" function key to return to DOS.
5. Insert the disk into the floppy drive on the computer.
6. Type A:
7. The response will be A:\>
8. Type "ADHESIVE"
9. The program will show the main menu screen within 30 seconds.
10. Use the F4 key, "Transfer Adhesive Data to HBC-43 Computer" to copy the new adhesive the from the floppy disk to the HBC-43 computer.

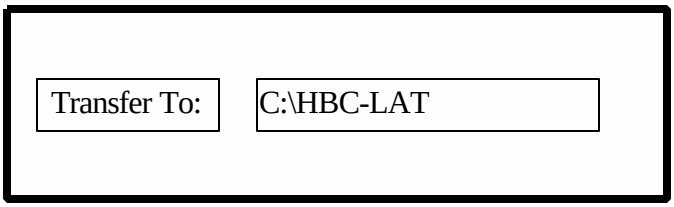

Fig. 5 Transfer prompt box

The transfer prompt box uses the default directory C:\HBC-LAT because all the HBC-43 computers use that directory for the latest copy of the HBC-43 program.
If the directory has been changed or it is required to copy the adhesive file to another directory simply type the new directory path.

11. Press the ¿ key. The adhesive file will be transferred to the HBC-43 computer.

If the directory is not found a box will appear -

Fig. 6 Transfer error box

Typing 'N' will take you back to the prompt box in figure 5.
Typing 'Y' in response will make the computer attempt to write the file to the nominated directory. If the directory is still not found, the file will not be copied, a warning box will appear and the main menu will be shown.

2.5 Exit Adhesive Program

WARNING:
Do not use the F5 "Exit Adhesive Program", if the new adhesive profile has been entered, or an existing one has been changed, unless the file has been saved, as in section 2.1 or 2.3.

Press the F5 "Exit Adhesive Program", when the session is finished. The program will be closed, and the floppy disk can be removed from the disk drive when the normal computer prompt is seen –

A:\>