# 8:16 Service Guide Supplement

# for Attache 8:16 and Attache 8:16S Portable Computer Systems

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#### Introduction

The Attache 8:16 is an Attache portable computer system with an 8086 16-bit processor board installed. This board fits the option board slot at the rear of the computer and connects to the 8-bit Z80 main processor board.

This supplement describes tests and procedures for servicing the 8086 16-bit processor board in Attache 8:16 portable computer systems, including diagnostic programs for performance verification, instructions for removal and installation of the 8086 16-bit processor board, and troubleshooting service maps to isolate problems in the 8086 16-bit processor board.

Information in this supplement is in addition to the Attache Service Guide, which describes procedures for servicing all aspects of the Attache portable computer. Use this supplement in conjunction with the Attache Service Guide to run diagnostic tests, install or remove modules, and perform troubleshooting analysis procedures.

#### 8:16 Diagnostic Programs

Diagnostic programs for troubleshooting and performance verification on the Attache 8:16 are activated from monitor mode.

To activate monitor mode:

- 1. Power up the unit.
- 2. Open the Drive A door.
- 3. Press RESET and the right SHIFT key at the same time.
- 4. When the message Now in Terminal Mode is displayed, press CTRL and LINE FEED at the same time.
- 5. The @ prompt indicates that you are in monitor mode.

The Z80 main processor retains control of monitor functions. If the 8086 16-bit processor board is not installed, all tests except H return a lowercase "x".

Commands for running diagnostics on the 8:16 are:

- [ --- 8086 RAM Test
- ] SCC Test\*
- ( GPIB Listener/Talker Test\*
- ) GPIB Controller Test\*
- H Display RAM Test\*\*

\*Optional features

\*\*The H (Display RAM) Test does not return an "x" error if 8086 16-bit processor board is not present.

#### Notes on 8:16 Diagnostic Tests

- 1. You must be in monitor mode to run the diagnostic tests.
- The Serial Communications Controlled (SCC) Test and the two GPIB tests are for optional features. These tests return an "x" if the feature is not included on the unit being tested.

3. You may run a test in a continuous loop by activating the L (Loop) test before typing the command for the program you wish to run. For example, to run the 8086 RAM Test in a continuous loop, type L after the @ prompt, then type [on the following line. The test will run continuously until you press any key. See the description of the L Test in Section 2 of the Attache Service Guide.

#### [ - 8086 RAM Test

Format: [ (no parameters)

Function: Tests the 8086 16-bit processor board system RAM of 256K bytes.

Screen Shows: [M

**Run Time:** Less than 3 seconds.

Exit: Automatic at end of test.

**Reports:** Returns to the next line and displays an @ prompt if the test is successful.

Errors are reported in the format Unn, where nn is the U code of the bad RAM chip as follows:

Row 1: U34 – U41

Row 2: U44 --- U51

Row 3: U54 — U61

Row 4: U64 --- U71

#### Failures: Suspect (1) loose cable connections, (2) 8086 16bit processor board, (3) power supply module.

## ] - Serial Communications Controller (SCC) Test

Format: ] (no parameters)

Function: Performs a test of the Serial Communications Controller (SCC). A loopback connector is required for this test.

> To create a loopback connector, attach a wire from pin 2 to pin 3 of the 8086 16-bit processor board's communications port (the transmit/ receive lines). The communications port, if installed, is at the upper left of the option board plate.

Screen Shows: [S

Run Time: Less than 2 seconds.

Exit: Automatic at end of test.

- Reports: Returns and displays @ prompt if test is successful. An "x" indicates that the SCC option is not installed. A "?" indicates SCC failure.
- Failures: Suspect (1) loose cable connections, (2) SCC option failure.

#### ( — GPIB Listener/Talker Test

Format: ( (no parameters)

Function: Exercises all General Purpose Interface Bus (GPIB) lines. This test only works when the unit is connected to another Attache 8:16 running the GPIB Controller Test. This test must be started before the GPIB Controller Test.

Screen Shows: [L

Run Time: Less than 2 seconds if successful, or 45 seconds if GPIB option failure occurs.

Exit:	Automatic at end of test.		
Reports:	Returns and displays @ prompt if test is success- ful. An "x" indicates that GPIB option is not installed. A "?" indicates GPIB test failure.		
Failures:	Suspect (1) loose cable connections, (2) GPIB option is not installed on this machine, (3) Listener/Talker Test was not started before GPIB Controller Test, (4) GPIB option failure.		

#### ) — GPIB Controller Test

Format: ) (no parameters)

Function: Exercises all General Purpose Interface Bus (GPIB) lines. Must be connected to another Attache 8:16 which is running the GPIB Listener/ Talker Test. The GPIB Controller Test must be started after the GPIB Listener/Talker Test.

Screen Shows: [T

- Run Time: Less than 2 seconds if successful, or 45 seconds if GPIB option failure occurs.
- Exit: Automatic at end of test.

**Reports:** Returns and displays the @ prompt if test is successful. An "x" indicates that no GPIB option is installed. A "?" indicates GPIB test failure.

Failures: Suspect (1) loose cable connections, (2) GPIB option is not installed on this machine, (3) Controller Test was not started after Listener/Talker Test, (4) GPIB option failure.

#### H — Display RAM Test

Format: H (no parameters)

Function: This test is an extension of the H Display RAM Test described in Section 2 of the Service Guide.

> Tests all bits and locations of the alphanumeric, graphic, and attribute display memories. Automatically tests for 25 lines and increased graphics on the Z80 main processor board if the 8086 board is installed and functional, and tests if the extra memory is present.

Screen Shows: H

Run Time: Less than 10 seconds.

Exit: Automatic at end of test.

Reports: Returns and displays @ prompt if test is successful.

An error is reported in the following format:

llccddff — where llccdd is the line-character-bit position of the error, and ff is the frame code as described for the Display RAM Test in Section 2 of the Service Guide.

This error code is not reliable under certain conditions. If ff of the error code is C0 or E0, the error message is correct. If ff is 00, 20, 40, 80, or A0, the error is in the graphics RAM section of the Z80 main processor board, but you do not know which of the three RAMs it is.

Because this test is an extension of the Z80 main processor board Display RAM Test, an error will not show if the 8086 board is present and the graphics option is not installed. Instead, the regular Z80 Display RAM Test is run in the normal manner.

#### Failures:

Suspect (1) loose cable connections, (2) Z80 main processor board.

#### 8086 — 16-Bit Processor Board Installation

Procedures for removing and reinstalling the Attache 8:16 8086 16-bit processor board are described in the following pages. A Phillips screwdriver is the only tool required.

**Note:** This guide cannot be used for first-time installation of the 8086 16-bit processor board. Several modifications to the Z80 main processor board are required before an Attache can operate as an 8:16.

## WARNING — HIGH VOLTAGE

HIGH VOLTAGE IS PRESENT WHENEVER ATTACHE IS POWERED ON. ALWAYS UNPLUG THE UNIT PRIOR TO REMOVING THE CABINET.

### Attache 8086 16-Bit Processor Board Assembly Parts List

Qty Description		Otrona Part Number	
2	#6-32 x .500 Phillips Screws	29-000616	
2	#6 Split-lock Washers	29-110006	
1	8086 16-Bit Processor Board	depends on model	
10	#4-40 x .500 Phillips Screws	29-000416	
10	#4 Split-lock Washers	29-110004	

### 8086 16-Bit Processor Board Removal

- 1. Place the unit face-down on a level surface.
- 2. Remove the two #6-32 x .500 Phillips screws (B) and #6 split-lock washers (C) from the rear plate of the 8086 16-bit processor board (A).
- 3. Gently pull the 8086 16-bit processor board (A) out of the option slot. Some wiggling may be necessary. Do not force.
- 4. If the board does not readily pull from the option slot, remove the cabinet from the unit (see the Service Guide).
- 5. Set the unit on its back, Z80 main processor board (G) up.
- 6. Loosen 10 of the 12 #4-40 x .500 Phillips screws (D) and #4 split-lock washers (E) from the bottom of the Z80 processor board (G). DO NOT REMOVE the two screws (H) that attach the expansion connector (I) to the Z80 main processor board (G).
- 7. If the option board slot is a rectangular cut in the unit, follow steps 7A-7C below.

If the option board slot has been cut to form a u-shaped indent in the cabinet, go to Step 8.

- 7A. Remove several of the screws (D) from the Z80 main processor board (G) so that the outer edge of the Z80 processor board can be pulled a couple of inches away from the CRT module (F). DO NOT REMOVE THE Z80 MAIN PROCESSOR BOARD.
- 7B. Gently pull Z80 main processor board (G) away from unit and detach the 8086 16-bit processor board (A) from the connector (I) on the Z80 main processor board (G).
- 7C. Slide the 8086 16-bit processor board from the option board slot, being careful not to snag the board.
- If there is a u-shaped cut in the cabinet so that the option board slot is not separated from the Z80 main processor board, follow steps 8A and 8B below:
  - Completely remove the Z80 main processor board (G) and turn it chip-side up.
  - 8B. Detach the 8086 16-bit processor board (A) from the connector (I) on the Z80 main processor board (G).



# 8086 Board Removal

## 8086 16-Bit Processor Board Installation

#### If you did not remove the cabinet:

- 1A. With the Attache face-down, insert the 8086 16-bit processor board (A) into the option board slot chip-side up, being careful not to snag the board. Do not force.
- 1B. When the board is almost completely inserted, push the 8086 16-bit processor board onto the connector on the Z80 main processor board inside the machine.
- 1C. Check for proper seating of the 8086 board. The rear plate of the 8086 16-bit processor board should be flush with the back of the Attache cabinet. **Go to Step 5.**

#### If you removed the Z80 main processor board:

- 2A. Push the 8086 16-bit processor board (A) onto the connector (I) on the Z80 main processor board (G).
- 2B. When a solid connection has been made, place the Z80 main processor board (G) back in correct position. Go to Step 4.

#### If you only partially removed the Z80 main processor board:

- 3A. With the unit on its side (CRT-module side up), gently pull the Z80 main processor board (G) away from unit.
- 3B. Insert the 8086 16-bit processor board (A) into the option board slot at the rear of Attache and slide it along CRTmodule (F) until it lines up with the connector on the Z80 main processor board (G).
- 3C. Get your fingers behind the connector (I) on the Z80 main processor board and push the 8086 16-bit processor board onto the connector.
- 3D. When a solid connection has been made, gently push the Z80 main processor board (G) back to correct position. Go to Step 4.
  - 4. Replace and tighten #4-40 x .500 Phillips screws (D) and #4 split-lock washers (E) to secure Z80 main processor board (G) in correct position on unit.
  - 5. Attach rear plate of the 8086 16-bit processor board (A) to the rear of the Attache with two #6-32 x .500 Phillips screws and #6 split-lock washers.
  - 6. Reinstall the cabinet if removed (see Service Guide).



## **8086 Board Installation**

### 8:16 Troubleshooting Guide

This troubleshooting guide is designed to help you isolate problems in the 8086 16-bit processor board. These service maps are intended primarily for use by qualified dealer service personnel. Shaded areas in the service maps indicate steps for qualified dealer service personnel only.

Procedures that require swapping modules depend upon the availability of replacement modules. If you do not have access to another unit with which to swap modules while testing a problem, return the unit to your dealer for service. More complicated problems and troubleshooting should also be handled by qualified dealer service personnel.

After you have determined whether or not the problem concerns the 8086 16-bit processor board, you may go on to the troubleshooting maps contained in Section 4 of the Attache Service Guide.

Complete details on using the troubleshooting service maps are in Section 4 of the Attache Service Guide.

#### How to Use the Service Maps

The service maps consist of a series of numbered steps. The reference number (shown at the left of each step) identifies the step and is used to direct you through the maps.

The troubleshooting maps in this supplement are not intended to be used to diagnose every possible problem with an Attache. They are designed only to isolate problems in the 8086 16-bit processor board. In some cases, you may be referred to the troubleshooting service maps in Section 4 of the Service Guide to continue problem analysis.

For example, step 0002 asks you a question. If the answer is YES, you move on to step 0004, which asks you another question. If the answer is NO, you move next to step 0100 in the Service Guide Maps in Section 4. After you have completed up to step 0155 in the Service Guide, return to step 0004 in this map.

Note: Areas that are shaded in the service maps indicate steps that should be taken by qualified dealer service personnel only. Return the unit to your dealer for service rather than proceed into a shaded area.

Preliminary Problem Analysis			
REF#	DESCRIPTION		ACTION REQUIRED
0002	Is power up normal? Does the screen display "OTRONA ATTACHE" when the power is turned on?	Yes GOTO 0004	No GOTO 0100 in Service Guide to step 0155, then return to 0004.
0004	Do the 8086 diagnostic tests run successfully?	Yes GOTO 0006	No GOTO 1100
0006	Does MS-DOS boot?	Yes GOTO 0008	No GOTO 2100
0008	Problem appears to be unre- lated to 8086 processor board.	GOTO 0020 in Service Guide and continue with problem analysis for CP/M and Z80 main processor.	

Shaded areas indicate steps for qualified dealer service personnel only.

Diagnostic Test Failure and Probable Cause			
REF#	DESCRIPTION	ACTION REQUIRED	
1100	If [ 8086 RAM Test fails:	Suspect: (1) loose cable connections, (2) 8086 processor board, (3) power supply module GOTO 1125	
1105	If ] SCC Test fails:	Suspect: (1) loose cable connections, (2) SCC option failure GOTO 1125	
1110	If ( GPIB Listener/Talker Test fails:	Suspect: (1) loose cable connections, (2) GPIB option not installed on this machine, (3) Listener/Talker Test not started before Controller Test, (4) GPIB option failure GOTO 1125	

Shaded areas indicate steps for qualified dealer service personnel only.

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Diagnostic Test Failure and Probable Cause			
REF#	DESCRIPTION	ACTION REQUIRED	
1115	If ) GPIB Controller Test fails:	Suspect: (1) loo (2) GP (3) Co Tal (4) GP	se cable connections, IB option not installed on machine, ntroller Test not started after Listener/ ker Test, IB option failure
1120	If H Display RAM Test fails:	Suspect: (1) loose cable connections, (2) Z80 main processor board GOTO 1125	
1125	Do tests fail even after possible causes are checked?	Yes GOTO 3100	No GOTO 0006

Shaded areas indicate steps for qualified dealer service personnel only.

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MS-DOS Does Not Boot			
REF#	DESCRIPTION		ACTION REQUIRED
2100	Check diskette in Drive A. Does the diskette have a known good system on it?	Yes GOTO 2105	No Replace diskette with a known good disk and retry bootstrap operation.
2105	Run diagnostic tests. Do all diagnostics run without errors?	Yes GOTO 2110	No GOTO 1100
2110	Will MS-DOS boot after diagnostics have run without errors?	Yes GOTO 0008	No GOTO 3100

Shaded areas indicate steps for qualified dealer service personnel only.

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8086 Processor Board Replacement			
REF#	DESCRIPTION	ACTION REQUIRED	
3100	Replace 8086 processor board. Will diagnostics now run without errors?	Yes GOTO 3110	No GOTO 1100
3110	Will MS-DOS boot after diagnostics have run without errors?	Yes GOTO 3115	No GOTO 0008
3115	Problem resolved.	8086 board was faulty. Run all diagnostic tests again and check unit in operation to insure unit is functioning properly. Return faulty modules to your dealer. If you are a dealer, contact your customer service representative at Otrona for instructions on returning faulty boards to the factory.	

Shaded areas indicate steps for qualified dealer service personnel only.

Insert in back jacket of Attache Service Guide