

🍏 Apple Lisa Computer
Technical Information



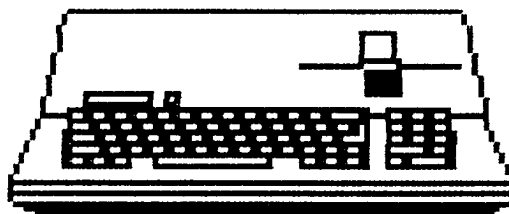
Apple Lisa Computer: ProFile HD Communications Protocol

Lisa Computer:
1983 - 1985

Apple Computer, Inc.
Service Engineering Department



Apple /// Computer Repair Document



Apple ///
Apple ///+

COMPONENT NAME

ProFile Hard Disk

DOCUMENT TITLE

*ProFile Sales Kit:
ProFile Technical Review*

Author: Apple

DAVID T. CRAIG
736 EDGEWATER, WICHITA, KANSAS 67230 [USA]

ProFile Sales Kit

Apple III

ProFile Technical Review

This section of the ProFile Sales Kit will give you an overview of the technical details of the ProFile Personal Mass Storage System for the Apple III. It is intended to be a summary only, and is not a detailed explanation of the engineering aspects of the ProFile. This information is presented to give you a better understanding of the quality, reliability, and performance that Apple has built into ProFile, and to prepare you to answer technical questions raised by your customers. Additional information regarding the ProFile can be found in "Section D" of this Sales Kit.

What is ProFile?

ProFile is a Winchester technology hard disk drive designed to operate with the Apple III personal computer. It has a formatted storage capacity of 5 Megabytes, which is essentially the same as 35 floppy disks (the Apple III disk drive uses floppies that have a capacity of 140K Bytes). The ProFile will, as you can see, enable you to store large amounts of data on a single device. You are also able to store files that are larger than the 140K floppies that you usually use. In addition, you are able to access your data much faster with the ProFile than with the Disk III.

The ProFile physically consists of three main assemblies. They are the ProFile drive, the Apple III interface card, and the interconnect cable. The ProFile has its own power supply, and as such does not rely on the Apple III for operating power. Functionally, the ProFile consists of five major modules:

1. The Controller Card
2. The Power Supply
3. The Analog Card
4. The Head Disk Assembly (HDA) with motor control board
5. The Interface Card

The following sections describe the function of these modules in detail.

The Contoller Card

Functionally, the controller provides communications with the Apple III, provides signals to read and write serial data on the disk, moves the heads to the proper track, and monitors error conditions. The controller consists of a Z8 microprocessor, 2K bytes of RAM, error detection logic, and read/write control logic.

1-8

The Z8 provides an intelligent interface to the Apple ///. High level commands, such as read, write, and status, are passed to the Z8 through the RAM. The Z8 executes the command and passes the result of the operation back to the Apple /// through the RAM.

The controller also interfaces to the analog card to pass head control information to it. In this way the controller determines when read/write operations will take place. The Z8 controls the stepper motor to move the heads from track to track (called "seeking"), selects one of four read/write heads, and writes sector marks on the disk during formatting.

Read /Write functions are performed by the read/write logic on command from the Z8. This logic in turn controls the parallel to serial data conversion when writing, and the serial to parallel data conversion when reading. To ensure the proper transfer of data, the controller does a CRC (cyclic redundancy check) of the serial data. If an error occurs, the Z8 will automatically perform an error recovery routine and try to relocate the data onto a different section of the disk. The sector causing problems will be removed from use to prevent future errors.

To prevent heat build-up in the drive, the Z8 removes power from the stepper motor if no commands have been received for 0.75 seconds. After 3 seconds, the head is moved to a non data area of the disk to prevent accidental damage to data if a failure (such as power loss) occurs. The READY light on the front of the ProFile is lit whenever the controller is idle (not busy).

Power Supply

The power supply provides the +5VDC, +12VDC, and -12VDC needed by the ProFile for operation. The supply also contains monitoring circuitry to detect a power failure. Once a failure is detected, the head current is shut off to prevent the accidental writing of false data that would otherwise occur if a write operation were in process when the power failed. The power supply is completely shielded to eliminate the effects of electro magnetic radiation.

Analog Card

The analog card serves as the interface between the controller and the Head Disk Assembly (HDA). It consists of a data encoder, a data decoder, write driver, head select logic, automatic gain control (AGC) preamplifier, read detector, phase lock loop (PLL), and sector detector.

The head select matrix selects one of the four heads for a read or write operation. The ProFile has two fixed disks in its HDA, and there are two heads for each disk (one for each side, since the disks are double sided). Thus you have a choice of four heads, depending on which section of the disk you are trying to access. It is not necessary for you to know which section of the disk you are trying to access; the controller

2-8

and the analog board take care of that for you.

During a write operation, the serial data is encoded using a technique known as MFM. It is not important that you know what this is, just that it allows the maximum data storage with low formatting overhead. In otherwords, it lets you get a lot of data in a small amount of space.

During a read operation, the AGC circuit amplifies the low level head signal (.6 to 2.0 mv) to a fixed signal level (1.0 volt). The read detector simply shapes the signal so that it appears in a standard fashion. The PLL and data decoder then convert this signal back into serial data, which is passed to the controller, which in turn converts it to parallel data and passes it to the Apple ///.

When the disk is initially formatted, the sector boundaries are written to the disk (this is done by removing all read signals from certain sections of the media). During the read operation, the sector detector looks for these areas of no read signal, and signals the controller that a sector boundary has been found.

Head Disk Assembly (HDA)

The ProFile HDA is a random access storage device with two non-removable 5 1/4 inch discs as storage media. Each disk surface employs one movable head to service 153 data tracks. The total formatted capacity of the four heads and surfaces is 5 Megabytes (16 sectors per track, 532 bytes per sector, 612 tracks).

High reliability is achieved through the use of a band actuator and open loop stepper head positioning mechanism. The read/write heads are mounted on a ball bearing supported carriage which is positioned by the band actuator connected to the stepper motor shaft. The inherent simplicity of the mechanical design and electronic control allows maintenance free operation for the life of the drive (designed for over 10,000 hours MTBF). All PCB's are mounted outside the HDA for easy serviceability.

Mechanical and contamination protection for the heads, actuator, and discs are provided by an impact resistant aluminum enclosure. A self contained recirculating system supplies clean air through a 0.3 micron filter. a special spindle pump assures adequate air flow and uniform temperature distribution throughout the head and disk area. Thermal isolation of the stepper and spindle motor assemblies from the disc enclosure provides significantly greater "off track" margin (temperature changes are less likely to cause read errors). Additionally, read and write operations can be performed immediately after power on without waiting for thermal stabilization.

A brushless DC drive motor rotates the spindle at 3600 RPM. The spindle is driven directly with no belt or pulley. The motor and spindle are dynamically balanced to insure a low vibration level. A brake is used to provide a fast stop to the spindle motor when power is removed.

3-8

The recording media consists of a lubricated thin magnetic oxide coating on a 130 mm diameter aluminum substrate. This coating formulation, together with the low load force, low mass Winchester type "flying heads", permits reliable contact start/stop operation.

Interface Card

The Apple /// interface card serves primarily to buffer the data and decoded control lines of the Apple /// for transmission to the ProFile controller card. The interface card may be plugged into any of the four Apple /// expansion slots. Eight bi-directional data lines and five control lines are connected to the ProFile controller card with a 25-conductor cable. Each signal is buffered by an RC network fo EMI/RFI suppression. Bytes may be transferred either one at a time or by DMA at 1 Megabyte per second.

4-8

Apple III

ProFile - The Reliability Story

With thousands of ProFiles already installed, we have been asked to explain what Apple has done to make the ProFile so reliable. This is how we do it:

Design Simplicity:

Experience shows that the fewer parts there are, the less that can go wrong. ProFile was designed to work in harmony with the personal computer, resulting in fewer electronic and mechanical parts than any comparable Winchester design. There are fewer things that can go wrong with ProFile.

ProFile is designed to prevent problems:

Throughout the design process, the question was asked: "What can go wrong?" The answers were taken into account as the design proceeded. For instance, ProFile moves the heads to a "parking position" off the data zone after three seconds of no activity. This prevents the loss of data if, for instance, the ProFile is dropped or jarred. ProFile constantly checks for errors during operation. After any change in tracks, ProFile verifies that the operation has been performed correctly. ProFile also checks that the heads are positioned accurately on a track before any read or write operation is performed. Unless the system requests that the ProFile do otherwise, data is always verified after a write operation. In all these cases, ProFile will correct the problem so that no errors occur.

Many types of systems are prone to failures when the power is turned on or off. The ProFile power supply is designed to sense a power failure well before the internal DC voltages drop. This allows the intelligent controller in ProFile to prevent any data loss if the power fails or is turned off accidentally. The system will not begin any operation until the power is on for at least one second.

Superior System Margins:

For the user, a system with greater operating margins results in superior reliability. ProFile will operate correctly and handle data correctly under adverse environmental and mechanical conditions. For example, the packaging of ProFile enables it to withstand a one inch (2.5 cm) drop while operating, or a three inch (7.6 cm) angled drop while not operating. The HDA (head disk assembly) can be operated from 10°C to 60°C. This wide operating range, combined with a 75% efficient switching power supply allows ProFile to operate from 10 to 40°C in still air without a fan!

High speed, low noise ECL (emitter coupled logic) provides wide margins for the analog electronics section of ProFile. Motor speed is kept accurate within 4%. Automatic gain control combined with a unique "gated detector" can compensate for off track operation up to 20%. Data can be read correctly with up to 50% signal degradation.

5-8

ProFile can Detect and Even Correct Problems:

The intelligent controller which is built into ProFile is continually checking the operation of the disk. In addition to the "problem prevention" functions already described, ProFile performs additional operations to assure that the user will never see a problem. These operations start the moment ProFile is turned on. After power-up, ProFile does a scan of the entire disk surface, and checks for any errors. Upon any data error, an extensive analysis of the error is performed to determine whether a media error exists. If that is the case, the data will be moved to a spare sector of the disk. That part of the disk with a media error will no longer be used. In most cases, the data recovery routines in ProFile will be able to extract the data even from a bad sector. The recovery operation includes more than 300 retries under various conditions. Maps of the bad sectors are redundantly recorded on ProFile so that an error in the map will not cause a problem in operation.

ProFile is Designed for Performance:

Data can be transferred from the ProFile to the system at up to one Mbyte per second DMA rate. Data is interleaved at a 5:1 ratio, which allows three 512 byte sectors to be transferred on each rotation. MFM encoding allows the maximum data storage capacity with low formatting overhead.

ProFile has been Exhaustively Tested in Design and Manufacturing.

During product development, over 200,000 hours of testing were logged. Over forty systems were customer tested for three months before volume production began. Each ProFile is tested for 184 hours prior to shipment, 60 of which are at 60°C. This commitment to quality ensures a 10,000 hour MTBF with typical performance of over 24000 hours MTBF. ProFile is truly the most reliable product of its type.

6-8

PROFILE:

APPLE'S 5 MEGABYTE PERSONAL MASS STORAGE SYSTEM for the APPLE ///

FEATURES:

1. ProFile has 5 Megabytes of storage capacity
2. Less than 44 cents per 1000 bytes
3. ProFile accesses data 10 times faster than the conventional floppy disk drive.
4. ProFile's intelligent controller automatically scans for error conditions and relocates marginal data blocks elsewhere on the disk, if necessary.
5. ProFile has a flexible backup scheme using the Backup /// Utility.
6. ProFile is fully supported by Apple ///'s Sophisticated Operating System.
7. Many different application programs can be stored on ProFile. Using Catalyst software from Quark Engineering, various software programs stored on ProFile, can be selected and then loaded from the hard disk without re-booting floppy diskettes when you want to go from one program to another.
8. ProFile is compact, lightweight, styled like the Apple /// and Monitor ///, simple to install, and extremely quiet.

BENEFITS:

1. Simplifies large data processing and programming tasks.
2. Provides cost-effective data storage.
3. Increases productivity.
4. Assures data integrity.
5. Assures data security.
6. Apple /// software utilizes ProFile without requiring any changes. Different types of programs can often use the same data base.
7. Saves time normally lost when booting up numerous floppies. Reduces media wear because programs are booted directly from the ProFile.
8. ProFile is usable in any work environment.

7-8

MARKETS AND APPLICATIONS

ProFile is an ideal tool for....

- * Financial Planners: who can make better decisions, because ProFile lets them draw on a greater data base in generating answers to questions about pricing, market share, profits, etc. In addition, all financial modeling files created with programs such as VisiCalc can be stored in one place allowing the planner to switch quickly from one file to another.
- * Software Developers: ProFile lets developers keep all successive versions of programs on the same disk, thus making development time less tedious and time-consuming.
- * Graphics Designers: Thanks to ProFile's fast access time, plots, charts, and finished graphics can be displayed many times faster than with conventional diskettes. ProFile also makes it possible to create highly sophisticated graphics programs that require large amounts of storage space.
- * Professionals: ProFile lets doctors, dentists, lawyers, consultants, and other professionals store large client record files all in one place.
- * Managers in small to medium size businesses: ProFile has the storage capacity to hold many letters, memos, reports, and other documents in a single place.

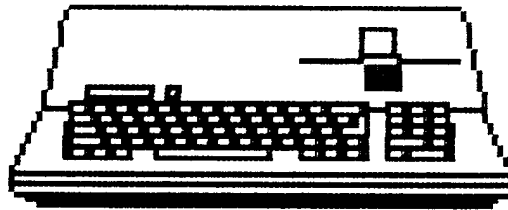
The End

8-8

Apple Computer, Inc.
Service Engineering Department



Apple /// Computer Repair Document



Apple ///
Apple ///+

COMPONENT NAME

ProFile Hard Disk

DOCUMENT TITLE

*Pro-File Level II Phase 1 Service
Manual (Preliminary)*

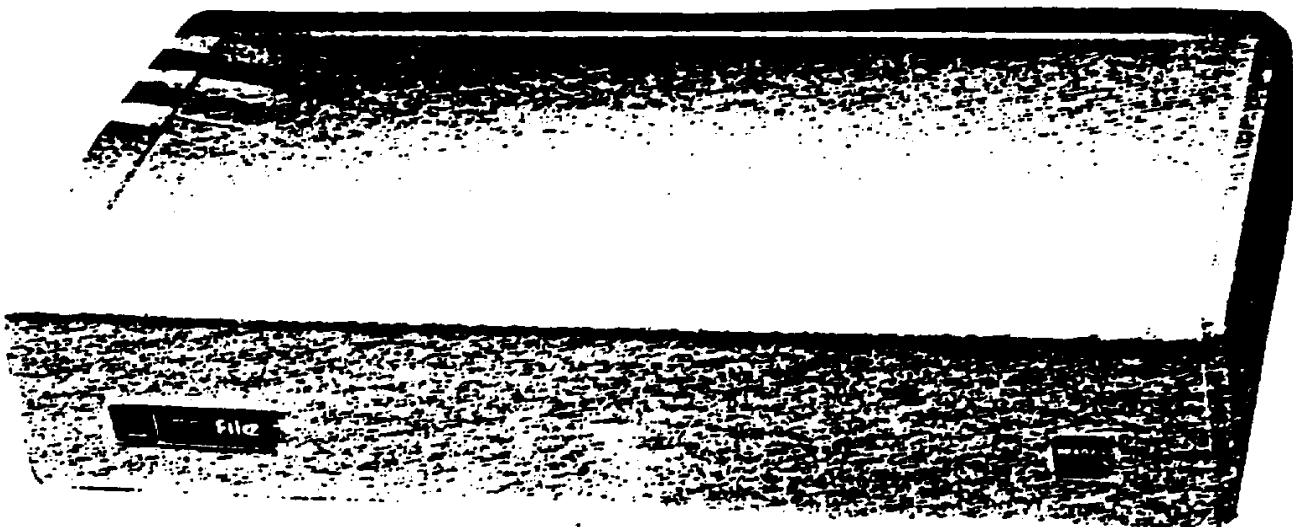
Author: Apple

DAVID T. CRAIG
736 EDGEWATER, WICHITA, KANSAS 67230 [USA]

Pages: 238

PRO-FILE LEVEL II PHASE 1 SERVICE MANUAL

PRELIMINARY



PRO-FILE PHASE 1 SERVICE MANUAL TABLE OF CONTENTS

Manual Introduction i

Section 1 Troubleshooting

Section 1 Introduction 1.3
Main Troubleshooting Flowchart 1.4
No Scan Troubleshooting Flowchart 1.14
Diagnostic Procedure Flowchart 1.18

Section 2 Service Procedures

How To Use This Section 2.1

Pro-File Module Removal/Replacement Procedures

Introduction 2.3
1. The Cover 2.5
2. The Ready LED 2.7
3. Controller PCB 2.9
4. Power Supply 2.11
5. HDA and Analog PCB 2.13
6. Motor Control PCB 2.17

PCB Upgrades

Controller PCB Upgrade 2.19
Analog PCB Upgrade 2.21

Checks and Adjustments

HDA Speed 2.23
HDA Index 2.24
HDA Brake 2.26
HDA Track 0 2.30

Software Operation Procedures

Format Program 2.33
Final System Test (FST) 2.36
FST Service Criteria 2.37
Quick Debugger (system Z8 installed)..... 2.38
Big Debugger (Debugger/Format Z8 installed) 2.40

PRO-FILE PHASE 1 SERVICE MANUAL TABLE OF CONTENTS

Section 3 Appendices

How to Use This Section 3.2

Overview of the Pro-File

General Information 3.3

1. Controller PCB 3.5

2. Analog PCB 3.6

3. Switcher Power Supply 3.7

4. Hard Disk Assembly (HDA) 3.8

Pro-File HDA Description

1. Physical Description 3.10

2. Pro-File HDA Format 3.11

3. Special Function Tracks 3.17

Firmware Routines

1. Scan Operation 3.20

2. Retry (Error/Data Recovery) 3.23

3. Diagnostic (Sector Media Check) 3.25

4. Normal Operation (Differences from Scan) 3.26

Circuit Descriptions

1. Controller PCB 3.27

2. Analog PCB 3.92

Schematic Diagrams

1. Controller PCB 3.124

2. Analog PCB 3.125

Controller PCB Circuit Descriptions

Read/Write Data MUX U6

The Read Data MUX is used to select one of two sources of data, either Serialized Data from the SER/DESER register, or NRZ Read Data from the Analog PCB. When reading, it gates NRZ Read Data through to the Serial/Deserial Shift Register U14. During a Write, it gates serial data from the Serial/Deserial Shift Register U14, to the CRC generator U35.

CRC Generator/Checker U35, U36

The CRC (Cyclic Redundancy Check) circuit is used to compute CRC check characters that are written at the end of each data block on disk during Write operations, to compute CRC for Read data, and to compare the result with the CRC characters that were read at the end of each data block

Deserialized Data Register U21

This 8-bit register temporarily holds the deserialized data from the disk so that the shift register can receive the next byte. When the logic is ready, it directs the register's contents to RAM through the Data In MUX.

Serial/Deserial Shift Register U14

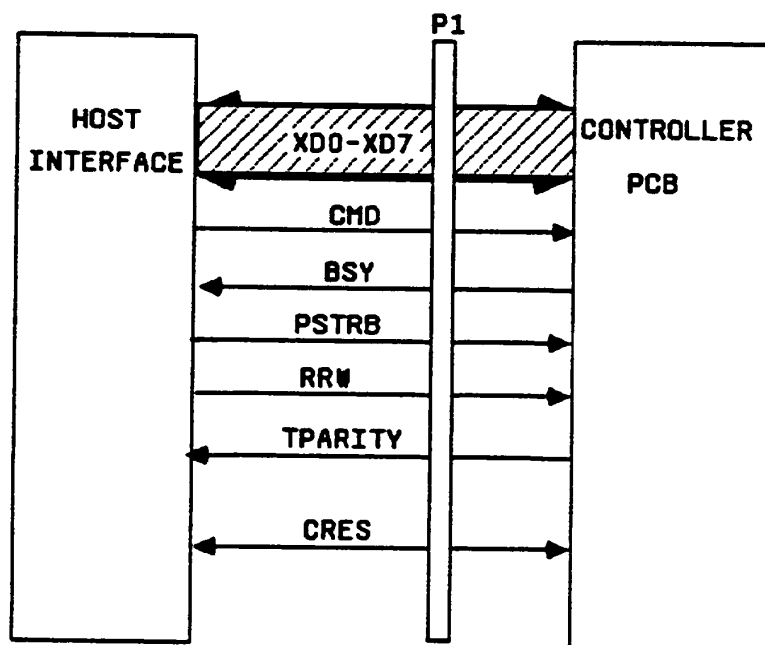
This register is used to take the parallel data from RAM and shift it out serially to the Analog PCB and to take the serial data from disk and shift it into a parallel format for transfer back into RAM.

Stepper Motor Drivers U7, U8

The 4 phases required for Stepper motor movement are generated by the Z8. The current for these signals is then boosted by the Stepper Motor Drivers U7, and U8.

Controller PCB Circuit Descriptions

PRO-FILE HOST INTERFACE



Controller PCB Circuit Descriptions

CONTROLLER PCB SIGNAL FLOW DESCRIPTION

To understand Controller PCB operation, you should first become familiar with data flow in the three stages of an operation; the Command Handshake, the Check Header function, and the operation itself. The following discussions describe each stage, first in general and then in detail.

The Z8 is used to condition the logic, but it is not actively involved with data transfers to/from the disk or Host; that is done by the Read/Write Control logic (RWCL which is just about everything else on the Controller PCB except the Z8, RAM, and Host interface circuitry).

(For information on the Pro-File format on composition of the sectors in the format, refer to the Pro-File HDA Description in the Appendices section.)

A. Command Handshake

Command Handshake General Explanation

Assume that the Pro-File is initially sitting idle with the BSY line high (not active), the disks spinning, and the heads over track 155 (Park position), waiting for the Host to tell it to do something. The Host communicates this message during the Command Handshake.

The Host asserts CMD (active low) to initiate communications with the Z8. Upon seeing CMD going low, the Z8 lowers its BSY line and waits for the Host to raise CMD.

When the Pro-File sees CMD go high it places a 01 response byte on the interface bus and raises BSY.

The Host sees the BSY line go high and interprets the 01 as an ACK, so it lowers the RRW signal. The low RRW signal enables the Pro-File to write the command bytes the Host will send into its RAM.

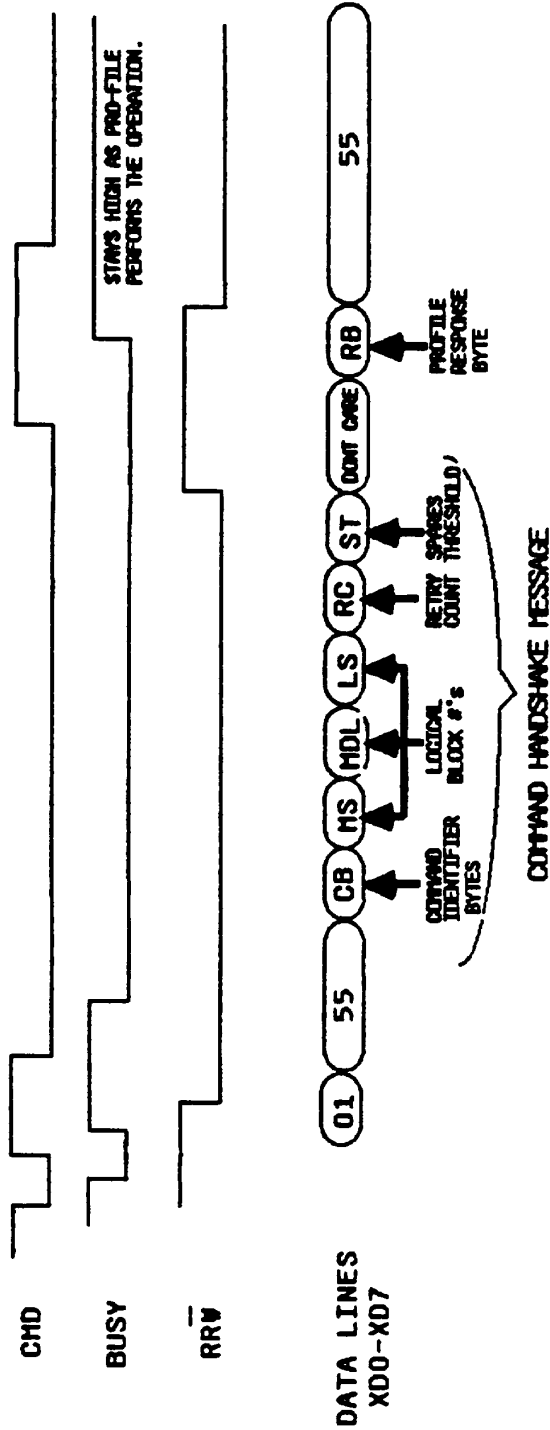
The Host must acknowledge the Pro-File's response with a 55, or the Z8 will abort the operation and go back to idle. The Host puts its 55 response byte on the bus and lowers the CMD line.

The low RRW and the response of 55 cause the Z8 to condition the bus to receive the command bytes, which are not immediately read by the Z8 but are stored in RAM for future reference.

After the Host puts each byte on the I/O bus, it generates PSTRB. The positive transition of the negative pulse PSTRB is used to clock the byte into the RAM.

Controller PCB Circuit Descriptions

COMMAND HANDSHAKE TIMING



Controller PCB Circuit Descriptions

When CMD goes low again, the Z8 interprets the command bytes and responds with the result of its command interpretation. For example, if the Host has said to read a block, the Z8 would respond with "02", which means "I'm going to read a block".

If it wants the operation to continue, the Host must confirm the response with a 55 on the bus again. If it disagrees or has changed its mind, the Host will send a byte other than a 55 causing the Pro-File to abort the operations.

Two handshakes are required to complete a Read operation. The first one is the Command Handshake, and the second is when the Pro-File sends the Read data, and the completion status of the operation back to the Host.

Three are required for both a Write and a Write/Verify operation. The first one is the Command Handshake, and the second is when the Host sends the block of write data to the Pro-File, and the third is when the Pro-File sends the completion status of the operation back to the Host.

The command identifier bytes for each of the three commands are as follows, 00 for Read, 01 for Write, and 02 for Write/Verify. A Command Handshake message is composed of the following elements.

<u>Command Identifier</u>	<u>Logical Block #</u>	<u>Retry Count</u>	<u>Sparing Threshold</u>
XX	Most, Middle, and Least Significant	Host Specific	Host Specific

The Pro-File interprets CMD high as a request from the Host to send a byte telling the Host what the Pro-File expects to do next. When the Pro-File is waiting for a command, it sends an '01' in response to CMD high. The Pro-File's other responses are shown in the table below.

<u>Host's command to Pro-File</u>	<u>Pro-File's Response</u>
Initiate handshake (lowers CMD)	01
Read a block	02
Receive Write data	03
Receive Write/Verify data	04
Do the Write or W/V on disk	06

Controller PCB Circuit Descriptions

Following a Read or a Write, the Z8 provides the Host with four status bytes, which are placed in the buffer immediately preceding the data just read or written. The significance of the individual bits is listed below:

STATUS 1

- 7 = 1 if Pro-File received 55 to its last response
- 6 = 1 if Write or Write/Verify was aborted because the number of data bytes sent exceeded the data block limits or because the Pro-File couldn't read its spares table
- 5 = 1 if the Host's data is no longer in RAM because the Pro-File updated its spares table.
- 4 = 1 if SEEK ERROR - caused by Pro-File being unable in three tries to read three consecutive headers on a track
- 3 = 1 if CRC error, may occur only during an actual Read or verify of Write/Verify, not while trying to read headers after seeking
- 2 = 1 if TIMEOUT ERROR (couldn't find target sector's header in nine revolutions - Not set while trying to read headers after seeking)
- 1 = N.C.
- 0 = 1 if operation is unsuccessful

STATUS 2

- 7 = 1 if SEEK ERROR - occurs if Pro-File is unable in one try to read three consecutive headers on a track.
- 6 = 1 if spares table overflow (More 32 sectors spared)
- 5 = N.C.
- 4 = 1 if bad block table overflow occurs (Less than 100 bad blocks in table)
- 3 = 1 if the Pro-File is unable to read its status sector.
- 2 = 1 if sparing occurs.
- 1 = 1 if Seek to wrong track occurs.
- 0 = Not used.

Controller PCB Circuit Descriptions

STATUS 3

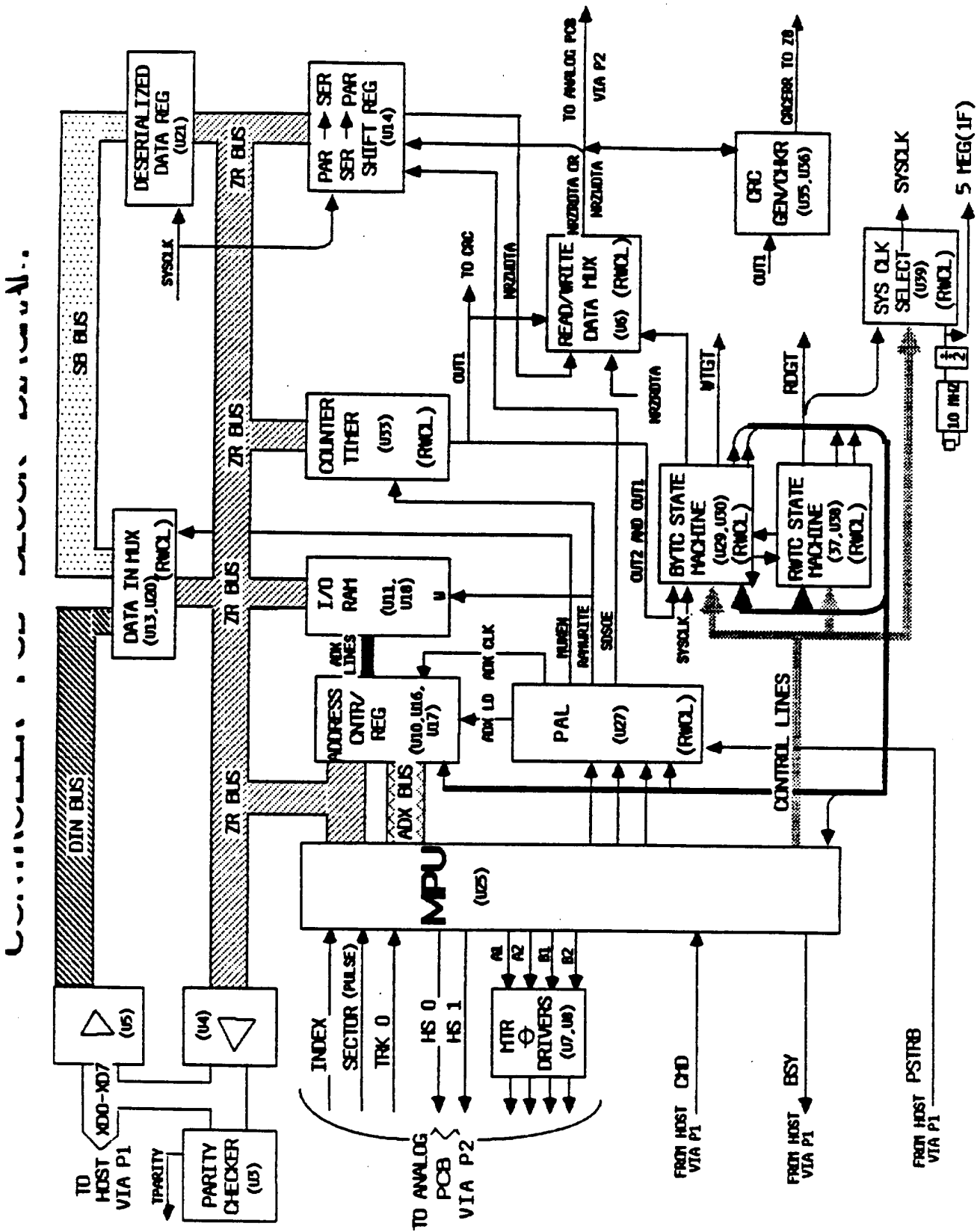
- 7 = 1 if the Pro-File has been reset
- 6 = 1 if block number is invalid
- * 5 = 1 if block I.D. at end of sector is mismatched
- 4 = N.C.
- 3 = N.C.
- * 2 = 1 if the Pro-File has been reset.
- * 1 = 1 if the Pro-File gave a bad response
- * 0 = 1 if CRC error occurs.
- * These bits are sent by the Host driver.

STATUS 4

- 7 - 0 = the number of errors encountered when rereading a block after any read error.

(Continued on the next page.)

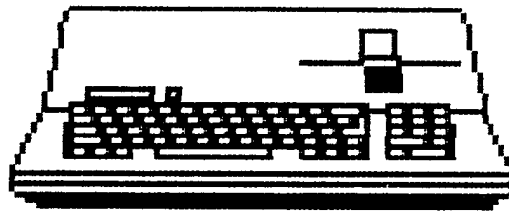
Controller PCB Circuit Descriptions



Apple Computer, Inc.
Service Engineering Department



Apple /// Computer Repair Document



Apple ///
Apple ///+

COMPONENT NAME

ProFile Hard Drive

DOCUMENT TITLE

*Pro-File Level II Phase 1
Service Manual (Very Preliminary)*

Author:

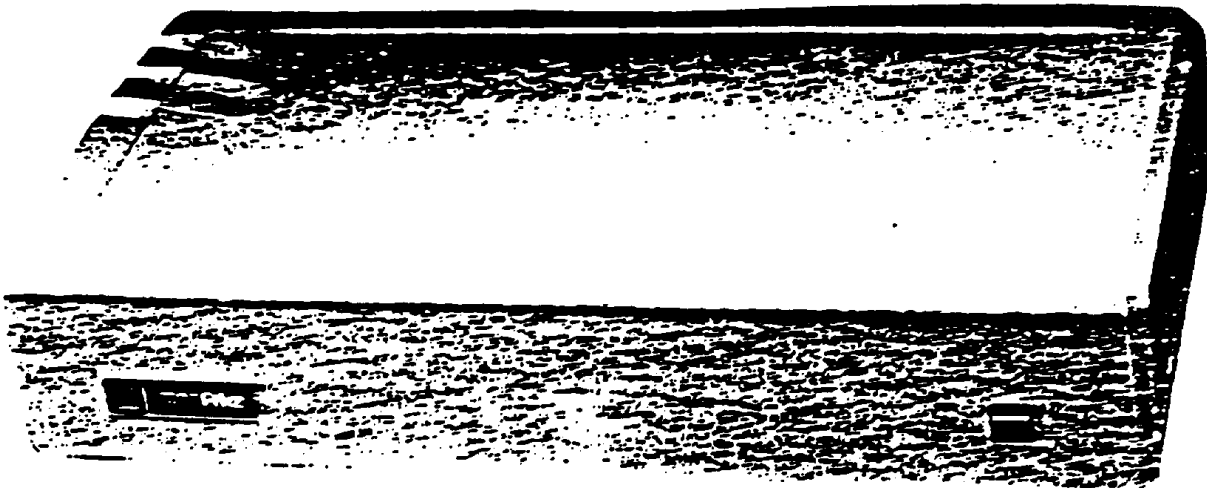
DAVID T. CRAIG

736 EDGEWATER, WICHITA, KANSAS 67230 [USA]

Pages: 101 (p. 1 not present)

PRO-FILE LEVEL II PHASE 1 SERVICE MANUAL

VERY PRELIMINARY





CONTROLLER DETAILED BLOCK DIAGRAMS

The first thing we need to do is to get familiar with where the data goes in each one of the various modes. Once we understand where it is supposed to go it is a lot easier to understand how the control logic gets the job done. By not bothering with the super detail at this point, or using the assumption that it does it as if it were a mystery of life. Trust us!

CONTROLLER/INTERFACE COMMAND HANDSHAKE

The MPU having done its previous command is sitting idle and is waiting for the Apple to tell it to do something. The interface raises CMD and the MPU starts its thing.

Upon seeing CMD going high the MPU raises its BSY line and places 01 on the interface bus. The apple must ack the Profiles response with a 55 when it lowers the CMD line or the profile will abort the operation and go back to idle. When the interface lowers CMD (and has acked the response with 55 the MPU conditions the bus to receive the command bytes.

The command bytes are not read by the MPU at this time but are stored in the RAM. When CMD goes high again the MPU interprets the command bytes and responds with the result of its command interpretation (For example: if the apple had said to read a block, the MPU will respond with "02" which means "I'm going to read a block"). The apple must confirm the response with a 55 on the bus again, if it disagrees or has changed its mind any other byte will cause the Profile to abort the operation.

It takes two command handshakes to complete a Read operation, and three handshakes for both a write, and a write/verify operatin.

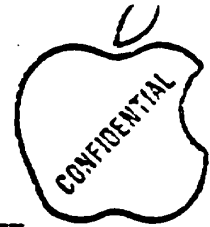
Let's now look at each operation's handshake routine:

Read Operation

1. The Apple raises CMD.
2. Profile places 01 on the bus and signals the apple by raising BSY.
3. The Apple places 55 on the bus and signals Profile by lowering CMD.
4. The apple then transfers the read command bytes to profile ram.
5. The apple the raises CMD again.
- 6 Profile looks at the command bytes and reponds with 02 and raises BSY.
7. Apple checks response, acks with 55 and lowers CMD.
8. Profile then goes and reads the desired block, keeping BSY high.
9. When finished reading block from disk to RAM, Profile lowers BSY.
- 10.Apple then transfers data from Profile Ram to its own.
- 11.Operation complete.

Write Operation

1. The Apple raises CMD.
2. Profile places 01 on the bus and signals the apple by raising BSY.
3. The Apple places 55 on the bus and signals Profile by lowering CMD.



4. The apple then transfers the write command bytes to profile ram.
5. The apple then raises CMD again.
6. Profile looks at the command bytes and responds with 03 and raises BSY.
7. Apple checks response, acks with 55 and lowers CMD.
8. Apple then transfers block to Profile RAM
9. When finished transferring block to RAM Apple raises CMD.
10. Profile places 06 on bus and raises BSY.
11. Apple checks response puts 55 on bus and lowers CMD.
12. Profile writes data on disk and updates status bytes in RAM.
13. When done writing Profile lowers BSY.
14. Apple transfers status bytes from Profile RAM and sees if OK.
15. Operation complete.

Write/Verify Operation

1. The Apple raises CMD.
2. Profile places 01 on the bus and signals the apple by raising BSY.
3. The Apple places 55 on the bus and signals Profile by lowering CMD.
4. The apple then transfers the write/verify command bytes to profile ram.
5. The apple then raises CMD again.
6. Profile looks at the command bytes and responds with 04 and raises BSY.
7. Apple checks response, acks with 55 and lowers CMD.
8. Apple then transfers block to Profile RAM
9. When finished transferring block to RAM Apple raises CMD.
10. Profile places 06 on bus and raises BSY.
11. Apple checks response puts 55 on bus and lowers CMD.
12. Profile writes and verifies data on disk and updates status bytes in RAM.
13. When done writing Profile lowers BSY.
14. Apple transfers status bytes from Profile RAM and sees if OK.
15. Operation complete.

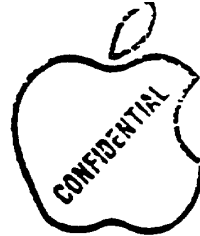
This simple handshaking protocol, seems a bit cumbersome but it allows very complete control and acknowledgement of every action before it is allowed to go ahead.

We have gone through system level data movement but what goes on inside Profile? Thought you'd never ask.

The simplest operation is the read.

First one very simple statement, the MPU is used to condition the logic but is not really actively involved with data transfers to/from disk or the Apple, that is done by the Read/Write Control logic. Now let's go.

The Read Operation Command Handshake is complete and the MPU has seen both command responses ack'd. It then conditions the logic to start a read. First it interprets the block number requested and selects the proper head, and alters the stepper phase control lines to match the proper track. It then places the head, track, sector information in RAM for comparison with information returning from the disks headers. After proper timeouts, if there was either a head and/or track change it starts the Read/Write control Logic (hereafter referred to as RWCL).



DISK FORMAT

The Profile has two disks, each having two sides. There is a read/write head for each surface. Each surface is divided into 152 concentric tracks. Each Track has 16 sectors. The user has access to 9,728 blocks (sectors). Each sector has 532 bytes of user data. This means that the formatted drive contains 5.17 million bytes of user data. (the equivalent of over 40 DISK II diskettes)

SECTOR FORMAT

Each sector is formatted into two fields, the header and the data block. There is a preamble of 22 bytes of zeros before each field.

The header contains 16 bytes; two start header bytes, three bytes for track, sector, and head ID's, and three bytes for a redundancy of the compliments of the track, sector head bytes. The rest of the field is filled with zeroes.

The data field contains two sync bytes, 532 data bytes, and ***bytes for the CRC characters. After the CRC characters the disk writes zeros until WTGT is lowered.

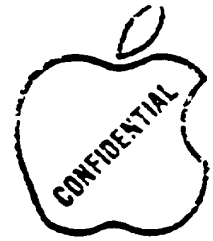
CHECK HEADER OPERATION

For each read or write operation, the specific sector must be located and checked. This is accomplished by the action of the MPU, RWCL and most all of the logic on the controller. It however is a relatively simple operation.

The MPU sets a complete replica of the desired header (exclusive of the first "01" start byte) into a specific area of RAM. Then it waits for the sector pulse. When it sees the sector pulse it starts the State Machines. The state machines in combination with the PAL move each successive byte of the header replica into the SERIALIZER which is then serialized and shifted out in sync with the incoming NRZDTA. It is compared and if there is even a single bit difference in comparison the STATE MACHINES abort the attempt and reset to wait for the next incoming sector then the process is repeated. This will go on until the header matches the image in RAM or there is a timeout error (inside the MPU...its waiting for the "sector done" from the state machine if it doesn't see it in a reasonable amount of time the MPU takes over and goes through an Error routine.)

If the desired operation was to read a block, the logic then accepts the data in from disk and moves it into RAM. If the operation was to write a block the logic is conditioned to move the data from RAM to the disk.

PROFILE COMMUNICATION PROTOCOL



This document describes the communication protocol between the Profile hard disk drive and a host computer. Profile is connected to the host by a data bus, a CMD (command) input and a CRES (controller reset) input, a BSY (busy) output, and several other signal lines which are described in the Profile Controller Hardware External Reference Specification and will not be covered in this document.

When Profile is turned on, its processor waits 18 seconds for the disk to come up to speed. It then sequentially reads each block on the disk, using the read and write/verify/sparing routines described below, with a retry count of 105 and a sparing threshold of 53, but without the CMD - BSY handshakes. During this disk scan the hardware blinks the ready light about twice per second. The scan usually takes about 55 seconds, but will take more time if errors are encountered. After the scan is done Profile's ready light stays on without blinking, indicating that Profile is ready for use.

Profile supports three commands. They are: read, write, and write/verify. The host computer initiates all command sequences by raising the CMD line. Whenever Profile's Z8 processor is idle, it stays in a loop waiting for CMD to go high. After 1 1/2 seconds in this loop (except between the second and third handshakes of a write or write/verify operation) the Z8 will move the head to the innermost position, off the data area of the disk, and turn off the stepper motor.

The command bytes for each of the three commands are shown below.

	Block #				Retry Count	Sparing Threshold
READ	00	MS		LS		

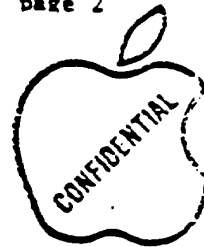
	Block #			
WRITE	01	MS		LS

	Block #			
WRITE/ VERIFY	02	MS		LS

APPLE COMPUTER
CONFIDENTIAL

PROFILE COMMUNICATION PROTOCOL

PAGE 2

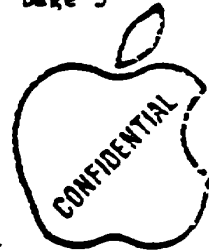


Profile interprets CMD high as a request from the host to send it a byte telling it (the host) what Profile expects to do next. When Profile is waiting for a command it sends an '01' in response to CMD high. Profile's other responses are shown in the table below.

PROFILE'S Next Action	PROFILE'S Response
get a command	01
read a block	02
receive write data	03
receive write/verify data	04
do actual write or write/verify on disk	06

Profile indicates that its response byte is on the data bus by raising BSY. It then waits (forever, if necessary, as there is no timeout) for CMD to go low. When that occurs, Profile reads the data bus. If the value read is a '55' (hex), Profile executes the next action, and lets the host know that it is done by lowering BSY. If the response from the host is not a '55', Profile sets the NAK received status bit, resets itself to the idle state and waits for CMD to go high again.

Profile uses only the number of bytes it needs for each command. Any extra bytes sent are ignored. Valid block numbers range from 000000 to 0025FF inclusive. A block number of FFFFFE will read or write Profile's RAM buffer, while a block number of FFFFFFF will read Profile's spare table from the disk. The retry count parameter of the read command tells Profile how many times to reread a block if it gets a CRC or timeout error (zero is a valid number). If a CRC or timeout error occurs, Profile saves the data the first time it reads the block successfully, but rereads the block the full number of times specified in the retry count. If Profile is not able to read a block during any of the retries, it will attempt to read the block an additional 90 times or until the read is successful, whichever comes first. Each timeout error during these 90 retries counts as 9 retries, since that is how many times the disk rotates before a timeout occurs. If Profile is not able to successfully read the block after all these retries, it enters the block number in its bad block table, sets the appropriate error bits (described in detail later), sets up the bus so the host can read the result of its latest read attempt, and lowers BSY to indicate that the operation is finished. If the bad block table is already full (100 entries), Profile will set that error bit instead of entering the block number in the table. If, during the initial retries (those specified by the retry count), the number of errors is less than the number specified in the sparing threshold, Profile sets the four status



bytes to their appropriate values, sets up the bus for the host, and lowers BSY. However, if the number of errors is equal to or greater than the number specified in the sparing threshold, Profile goes through its write/verify/sparing routine. The w/v/s routine first attempts to write the data on the disk. If the attempt is unsuccessful because there was a seek settle error or because Profile was unable to read its spare table (two conditions which disallow all writes to the disk), Profile will set the operation unsuccessful status bit, set up the data bus for the host, and lower BSY. If the attempt is unsuccessful because of a timeout error, or if the read after write is bad, Profile will retry the whole write/verify routine one more time. If it still is not able to do it, Profile will retry the write/verify/spare routine using a spare sector on the disk. When a write/verify operation is successful, Profile will delete the block number from the bad block table, if it was there, and enter it in the spare table if appropriate. The only difference between a write/verify operation (which uses the write/verify/spare routine described above), and a write operation is that a write operation does not retry on a timeout error, and does not read the block after writing it (and will never spare a block). However, Profile will automatically change a write operation to a write/verify operation if the block being written is in the bad block table.

Profile's 9,728 usable blocks are divided into 152 cylinders of 4 surfaces, with 16 blocks (sectors) per track. The blocks are allocated to sectors sequentially, starting with track 0, head 0, sector 0,1,2, ... 15; track 0, head 1, sector 0,1.. ;; track 152, head 3, sector 1,2,...14,15. No blocks are originally assigned to cylinder 77, as it is reserved for the 32 spare sectors and the spare table (which includes some device specific information and the bad block table). Profile's interleave is 5 to 1 for reads, 21 to 1 for writes, and 37 to 1 for write verifies. The latter 2 obviously miss the physical interleave when used with the Apple III. In addition to the wait between successive writes, there is a 30ms wait before the first write after any cylinder change. Profile's rotation speed is 3600 RPM.

When the host requests a read or a write from Profile, Profile first translates the block number into the correct track, head and sector values. It then checks to see if the desired block is in the spare table, and sets the track, head, and sector accordingly if so. If the current block and the last block read or written have the same track and head, the Z8 exits the seek routine. If the track is the same but the head is different, the Z8 waits 750us and then exits the routine. Otherwise, the Z8 waits 24ms for the stepper to settle, then tries up to 64 times to read any 3 consecutive sectors on the disk (actually alternate sectors on the disk, since that is the best the hardware can do). If during these reads it determines that it is on the wrong head or track it will set the appropriate error bit and go back to the beginning of the seek routine. If the Z8 is not able to read 3 consecutive sectors because of a timeout (no header found in 26ms) or CRC error, it will retry the entire seek routine up to twice more after moving the stepper off track first to the innermost track and back, and if not successful, then to the outermost track and back. If it is still not able to read 3 consecutive sectors the Z8 will set the seek



settle error bit, which as mentioned disables all writes to the disk.

Following a read or a write the Z8 provides the host with 4 status bytes. They are placed in the buffer immediately preceding the data just read or written. The significance of the individual bits is as follows:

STATUS 1

- 7 = 1 if Profile received \diamond 55 to its last response
- 6 = 1 if write or write/verify was aborted because >532 bytes of data were sent or because Profile couldn't read its spare table
- 5 = 1 if host's data is no longer in RAM because Profile updated its spare table
- 4 = 1 if SEEK ERROR - unable in 3 tries to read 3 consecutive headers on a track
- 3 = 1 if CRC error (only set during actual read or verify of write/verify, not while trying to read headers after seeking)
- 2 = 1 if TIMEOUT ERROR (couldn't find header in 9 revolutions - not set while trying to read headers after seeking)
- 1 = N.C.
- 0 = 1 if operation unsuccessful

STATUS 2

- 7 = 1 if SEEK ERROR - unable in 1 try to read 3 consecutive headers on a track
- 6 = 1 if spared sector table overflow (> 32 sectors spared)
- 5 = N.C.
- 4 = 1 if bad block table overflow (> 100 bad blocks in table)
- 3 = 1 if Profile unable to read its status sector
- 2 = 1 if sparing occurred
- 1 = 1 if seek to wrong track occurred
- 0 = N.C.

STATUS 3

- 7 = 1 if Profile has been reset
- 6 = 1 if block number invalid
- 5 = 1 if block I.D. at end of sector mismatch *
- 4 = N.C.
- 3 = N.C.
- 2 = 1 if Profile was reset *
- 1 = 1 if Profile gave a bad response *
- 0 = 1 if parity error *

STATUS 4

7 - 0 = the number of errors encountered when rereading a block after any read error

* These bits are set by the S.O.S. Profile driver.

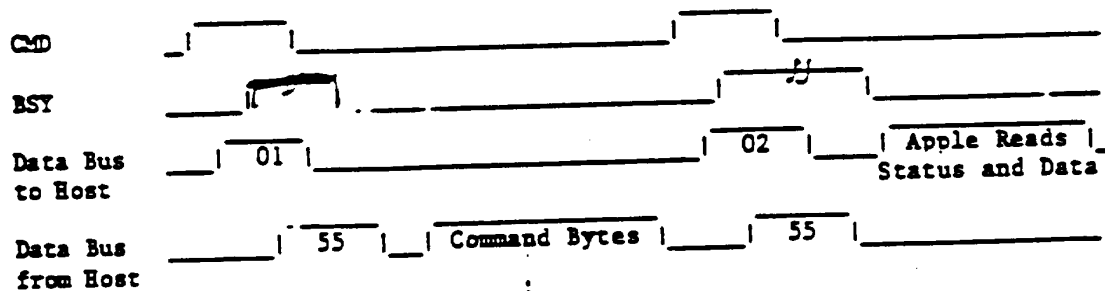
PROFILE COMMUNICATION PROTOCOL



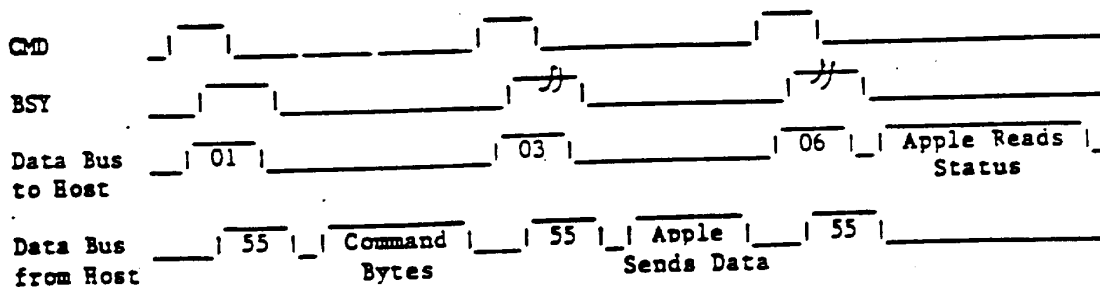
As mentioned previously, reading block FFFFFF gets Profile's spare table. The first 13 bytes are allocated for the device name, which is PROFILE followed by 6 blanks. The next 3 bytes are allocated for the device number, which is 00 00 00. The next 2 bytes are used for the program revision number, which currently is 03 90. The next 3 bytes tell how many blocks are available to the user, with the most significant first. These bytes should be 00 26 00. The next 2 bytes tell how many bytes are in each block. These bytes will be 02 14, which equals 532 decimal (however, Profile doesn't care how many bytes the host reads, nor how many bytes the host sends as long as it's not more than 532). The next byte contains the total number of spare sectors available, which is 20 hexadecimal or 32 decimal. This is followed by the number of spares currently allocated (once a spare is allocated it can never be deallocated, except by reformatting the disk), and then followed by the number of bad blocks currently in the bad block table. Finally the numbers of the spared blocks and the numbers of the bad blocks are listed (3 bytes per block number), with delimiters of FF FF FF between the spare and bad block lists and following the bad block list.

The diagrams below show how the handshaking works for each of the 3 operations supported by Profile.

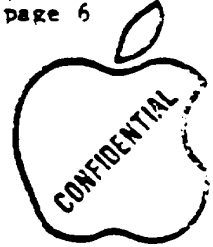
Read Operation



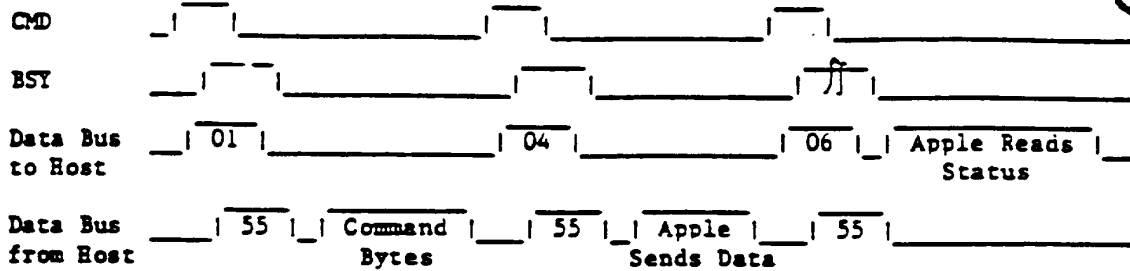
Write Operation



PROFILE COMMUNICATION PROTOCOL



Write/Verify Operation



Important: The host must raise CMD following the last operation requested, since changes in Profile's spare and bad block tables do not get rewritten onto the disk until this occurs. After BSY goes high, CMD can be lowered as long as anything but 55 (hexadecimal) is on the data bus.

PROFILE COMMUNICATION PROTOCOL

page 7

Addendum for Controller Versions 3.96 and 3.97

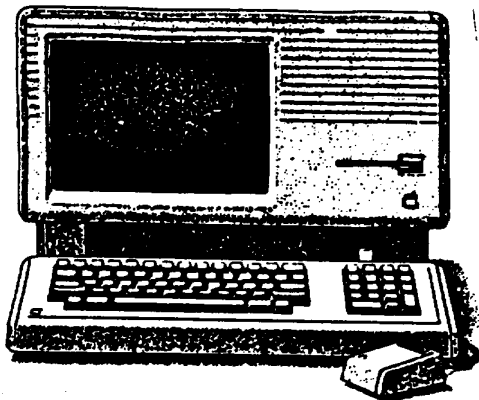


Revision 3.96 of the Profile controller program has several improvements over revisions 3.90 and 3.92 (3.90 and 3.92 are identical except that 3.92 moves the stepper at half the 1.5ms per track rate used by 3.90). Instead of the Z8 falling directly into the write/verify/sparing routine if the number of errors encountered reading a block is greater than the sparing threshold specified by the driver, it rewrites the block then rereads it 100 times. If the error rate is greater than 30%, the block is spared. This 30% sparing criteria is used anytime a write/verify fails to verify, when doing a write or write/verify of a block that is in the bad block table, and when verifying a write to a spare sector. Another change is that a block is spared if the seek was able to read 3 consecutive sectors OK but a timeout error (because of not being able to find the desired header) occurred while doing a write or write/verify. Because of these changes in the sparing algorithm, the sparing threshold during the initial disk scan is now 30% instead of 50%. The last change in revision 3.96 is that the fast seek algorithm is used if the jumper at P6 on the controller board is cut, and the slow seek algorithm is used if the jumper is intact. Revision 3.97 waits 3.28 seconds instead of 1.5 seconds before moving the head off the data area of the disk.

WILL BE FIRST MISTAKEN
VERSION

Document # 159

Apple Lisa Information



FILE NAME
Dissassembly: Profile Driver

DISK #

COMMENTS
DTC

David T. Craig
736 Edgewater, Wichita, Kansas 67230
(316) 733-0914



The Lisa Professional



Source Code Listing
for
Lisa System Driver

Lisa



System_CD_Profile

David T. Craig
736 Edgewater
Wichita, Kansas 67230

```

1
2 #####
3 #
4 # -----
5 #                               APPLE LISA COMPUTER DISASSEMBLY
6 # -----
7 #
8 # File      : System.CD_Profile
9 #
10 # Notes    : This document contains a disassembly of the Apple Lisa
11 #           system driver file for the ProFile hard disk device.
12 #
13 #           This disassembly is in Motorola 68000 assembly language
14 #           as produced by the Lisa WorkShop tool DumpObj.
15 #
16 # Disassembler : David T. Craig
17 #               736 Edgewater
18 #               Wichita, Kansas 67230
19 #               (316) 733-0914
20 #
21 ##### [ May 1991 ] #####
22
23 Dump of file system.cd_profile:
24
25 VersionCtrl: FileType:OldObjFile sysNum: 00010000 minSys: 00010000
26 maxSys: 00017F00 Reserv1: 00000000 Reserv2: 00000000 Reserv3: 00000000
27
28 Executable: JTLaddr: F80100 JTSIZE: 00001C DataSize: 000000
29 MainSize: 000000 JTSegDelta: 0100 StkSegDelta: 0100 DynStack: 002800
30 MaxStack: 020000 MinHeap: 001000 MaxHeap: 020000
31 Jump Table: Segments: 0001
32 Seg SegmentAddr Packed Unpacked MemLoc
33 0001 000088 0000 1534 220000
34 Procedure Descriptors: 0001
35 JT Loc JUMP.L AbsAddr
36 000010: 4EF9 220F0C
37 Trap Handler:
38 000016: 2258 2F08 4ED1          '"X/.N.'
39
40 ModuleName: MainProg SegmentName:      CSize: 000000
41
42 StartAddress: 000000 GSize: 000000
43
44 CodeBlock: Addr: 220000
45 ObjectCode:
46 000008: 4EFA 0C76      'N..v'      JMP      *+$0C78      ; 00000C80
47 00000C: 2078 0210      'x..'      MOVE.L  $0210,A0
48 000010: 4ED0          'N..'      JMP      (A0)
49 000012: 2078 0210      'x..'      MOVE.L  $0210,A0
50 000016: 4EE8 0006      'N...'     JMP      $0006(A0)
51 00001A: 2078 0210      'x..'      MOVE.L  $0210,A0
52 00001E: 4EE8 000C      'N...'     JMP      $000C(A0)
53 000022: 2078 0210      'x..'      MOVE.L  $0210,A0
54 000026: 4EE8 0012      'N...'     JMP      $0012(A0)
55 00002A: 2078 0210      'x..'      MOVE.L  $0210,A0
56 00002E: 4EE8 0018      'N...'     JMP      $0018(A0)
57 000032: 2078 0210      'x..'      MOVE.L  $0210,A0
58 000036: 4EE8 001E      'N...'     JMP      $001E(A0)
59 00003A: 2078 0210      'x..'      MOVE.L  $0210,A0
60 00003E: 4EE8 0024      'N..$'     JMP      $0024(A0)
61 000042: 2078 0210      'x..'      MOVE.L  $0210,A0
62 000046: 4EE8 002A      'N..*'     JMP      $002A(A0)
63 00004A: 2078 0210      'x..'      MOVE.L  $0210,A0
64 00004E: 4EE8 0030      'N..0'     JMP      $0030(A0)
65 000052: 2078 0210      'x..'      MOVE.L  $0210,A0
66 000056: 4EE8 0036      'N..6'     JMP      $0036(A0)
67 00005A: 2078 0210      'x..'      MOVE.L  $0210,A0
68 00005E: 4EE8 003C      'N..<'     JMP      $003C(A0)
69 000062: 2078 0210      'x..'      MOVE.L  $0210,A0
70 000066: 4EE8 0042      'N..B'     JMP      $0042(A0)
71 00006A: 2078 0210      'x..'      MOVE.L  $0210,A0
72 00006E: 4EE8 0048      'N..H'     JMP      $0048(A0)
73 000072: 2078 0210      'x..'      MOVE.L  $0210,A0
74 000076: 4EE8 004E      'N..N'     JMP      $004E(A0)
75 00007A: 2078 0210      'x..'      MOVE.L  $0210,A0
76 00007E: 4EE8 0054      'N..T'     JMP      $0054(A0)

```

```

77 000082: 2078 0210 'x..' MOVE.L $0210,A0
78 000086: 4EE8 005A 'N..Z' JMP $005A(A0)
79 00008A: 2078 0210 'x..' MOVE.L $0210,A0
80 00008E: 4EE8 0060 'N...' JMP $0060(A0)
81 000092: 2078 0210 'x..' MOVE.L $0210,A0
82 000096: 4EE8 0066 'N..f' JMP $0066(A0)
83 00009A: 2078 0210 'x..' MOVE.L $0210,A0
84 00009E: 4EE8 006C 'N..l' JMP $006C(A0)
85 0000A2: 2078 0210 'x..' MOVE.L $0210,A0
86 0000A6: 4EE8 0072 'N..r' JMP $0072(A0)
87 0000AA: 2078 0210 'x..' MOVE.L $0210,A0
88 0000AE: 4EE8 0078 'N..x' JMP $0078(A0)
89 0000B2: 2078 0210 'x..' MOVE.L $0210,A0
90 0000B6: 4EE8 007E 'N..~' JMP $007E(A0)
91 0000BA: 2078 0210 'x..' MOVE.L $0210,A0
92 0000BE: 4EE8 0084 'N...' JMP $0084(A0)
93 0000C2: 2078 0210 'x..' MOVE.L $0210,A0
94 0000C6: 4EE8 008A 'N...' JMP $008A(A0)
95 0000CA: 2078 0210 'x..' MOVE.L $0210,A0
96 0000CE: 4EE8 0090 'N...' JMP $0090(A0)
97 0000D2: 2078 0210 'x..' MOVE.L $0210,A0
98 0000D6: 4EE8 0096 'N...' JMP $0096(A0)
99 0000DA: 2078 0210 'x..' MOVE.L $0210,A0
100 0000DE: 4EE8 009C 'N...' JMP $009C(A0)
101 0000E2: 2078 0210 'x..' MOVE.L $0210,A0
102 0000E6: 4EE8 00A2 'N...' JMP $00A2(A0)
103 0000EA: 2078 0210 'x..' MOVE.L $0210,A0
104 0000EE: 4EE8 00A8 'N...' JMP $00A8(A0)
105 0000F2: 2078 0210 'x..' MOVE.L $0210,A0
106 0000F6: 4EE8 00AE 'N...' JMP $00AE(A0)
107 0000FA: 2078 0210 'x..' MOVE.L $0210,A0
108 0000FE: 4EE8 00B4 'N...' JMP $00B4(A0)
109 000102: 2078 0210 'x..' MOVE.L $0210,A0
110 000106: 4EE8 00BA 'N...' JMP $00BA(A0)
111 00010A: 2078 0210 'x..' MOVE.L $0210,A0
112 00010E: 4EE8 00C0 'N...' JMP $00C0(A0)
113 000112: 2F38 0210 '/8..' MOVE.L $0210,-(A7)
114 000116: 0697 0000 00C6 '.....' ADDI.L #$000000C6,(A7)
115 00011C: 4E75 'Nu' RTS
116 00011E: 2F38 0210 '/8..' MOVE.L $0210,-(A7)
117 000122: 0697 0000 00CC '.....' ADDI.L #$000000CC,(A7)
118 000128: 4E75 'Nu' RTS
119 00012A: 2F38 0210 '/8..' MOVE.L $0210,-(A7)
120 00012E: 0697 0000 00D2 '.....' ADDI.L #$000000D2,(A7)
121 000134: 4E75 'Nu' RTS
122 000136: 48E7 1838 'H..8' MOVEM.L D3/D4/A2-A4,-(A7)
123 00013A: 206F 0018 'o..' MOVE.L $0018(A7),A0
124 00013E: 2808 '(..' MOVE.L A0,D4
125 000140: 2468 0004 '$h..' MOVE.L $0004(A0),A2
126 000144: 266A 0004 '&j..' MOVE.L $0004(A2),A3
127 000148: 2852 '(R' MOVE.L (A2),A4
128 00014A: 426A 001A 'Bj..' CLR.W $001A(A2)
129 00014E: 302A 0014 '0*..' MOVE.W $0014(A2),D0
130 000152: 303B 0014 '0;..' MOVE.W **$0016(D0.W),D0 ; 00000168
131 000156: 4EBB 0010 'N...' JSR **$0012(D0.W) ; 00000168
132 00015A: 4A40 'J@' TST.W D0
133 00015C: 66F0 'f..' BNE.S *-$000E ; 0000014E
134 00015E: 4CDF 1C18 'L...' MOVEM.L (A7)+,D3/D4/A2-A4
135 000162: 205F '...' MOVE.L (A7)+,A0
136 000164: 584F 'X0' ADDQ.W #$4,A7
137 000166: 4ED0 'N..' JMP (A0)
138 000168: 008A 00A2 00F4 '.....' ORI.L #$00A200F4,A2
139 00016E: 01A4 '...' BCLR D0,-(A4)
140 000170: 00A8 0124 026A '...$.j' ORI.L #$0124026A,$0356(A0)
141 000176: 0356 'V'
142 000178: 00A8 042C 0468 '....,h' ORI.L #$042C0468,$00A8(A0)
143 00017E: 00A8 '...'
144 000180: 0124 '.$' BTST D0,-(A4)
145 000182: 026A 0614 00A2 '.j....' ANDI.W #$0614,$00A2(A2)
146 000188: 00F4 01A4 00A8 '.....' ORI.W #$01A4,$A8(A4,D0.W)
147 00018E: 0124 '.$' BTST D0,-(A4)
148 000190: 026A 0654 00A2 '.j.T...' ANDI.W #$0654,$00A2(A2)
149 000196: 00F4 0708 00A8 '.....' ORI.W #$0708,$A8(A4,D0.W)
150 00019C: 00F4 0724 0734 '...$.4' ORI.W #$0724,$34(A4,D0.W)
151 0001A2: 00A2 00F4 0778 '.....x' ORI.L #$00F40778,-(A2)
152 0001A8: 00A8 00F4 07CC '.....' ORI.L #$00F407CC,$00A2(A0)

```

```

153 0001AE: 00A2      '. .'
154 0001B0: 00F4 0886 00A8      '.....'
155 0001B6: 012A      '. $'
156 0001B8: 026A 0906 00A8      '.j.....'
157 0001BE: 00EE 09C2 04AE      '.....'
158 0001C4: 00A8 09D8 00A8      '.....'
159 0001CA: 00F4      '.....'
160 0001CC: 026A 00A2 00EE      '.j.....'
161 0001D2: 09C2      '.....'
162 0001D4: 0A46 00A8      '.F.. '
163 0001D8: 00F4 026A 0A76      '...j.v'
164 0001DE: 00A2 00F4 0AB6      '.....'
165 0001E4: 00A8 00F4 0AEE      '.....'
166 0001EA: 00A8      '.....'
167 0001EC: 012A      '. $'
168 0001EE: 026A 0B14 7001      '.j..p.'
169 0001F4: 0C2A 0002 0013      '.*.....'
170 0001FA: 6D08      'm.'
171 0001FC: 357C 0046 0014      '5|.F..'
172 000202: 4E75      'Nu'
173 000204: 546A 0014      'Tj..'
174 000208: 4E75      'Nu'
175 00020A: 157C 0001 0012      '.....'
176 000210: 546A 0014      'Tj..'
177 000214: 022C 00FE 0060      '.....'
178 00021A: 197C 0002 0068      '.....h'
179 000220: 0014 0008      '.....'
180 000224: 0214 00EF      '.....'
181 000228: 422C 0018      'B..'
182 00022C: 303C 0050      '0<.P'
183 000230: 082C 0001 0068      '.....h'
184 000236: 6614      'f.'
185 000238: 51C8 FFF6      'Q...'
186 00023C: 357C 0001 001A      '5|.....'
187 000242: 197C 00FF 0048      '.....H'
188 000248: 7000      'p.'
189 00024A: 4E75      'Nu'
190 00024C: 197C 0002 0068      '.....h'
191 000252: 7001      'p.'
192 000254: 4E75      'Nu'
193 000256: 143C 0069      '.....i'
194 00025A: 6004      '.....'
195 00025C: 143C 0055      '.....U'
196 000260: 6140      'a0'
197 000262: 303C 0050      '0<.P'
198 000266: 082C 0001 0068      '.....h'
199 00026C: 6614      'f.'
200 00026E: 51C8 FFF6      'Q...'
201 000272: 357C 0001 001A      '5|.....'
202 000278: 197C 00FF 0048      '.....H'
203 00027E: 7000      'p.'
204 000280: 4E75      'Nu'
205 000282: 197C 0002 0068      '.....h'
206 000288: 7001      'p.'
207 00028A: 4E75      'Nu'
208 00028C: 143C 0055      '.....U'
209 000290: 6110      'a.'
210 000292: 357C 0001 001A      '5|.....'
211 000298: 197C 00FF 0048      '.....H'
212 00029E: 7000      'p.'
213 0002A0: 4E75      'Nu'
214 0002A2: 002C 0001 0060      '.....'
215 0002A8: 122C 0078      '.....x'
216 0002AC: B22A 0012      '.....'
217 0002B0: 6706      'g.'
218 0002B2: 4A2A 0012      'J*..'
219 0002B6: 6A1E      'j.'
220 0002B8: 546A 0014      'Tj..'
221 0002BC: 0214 00E7      '.....'
222 0002C0: 197C 00FF 0018      '.....'
223 0002C6: 1942 0078      '.....B.x'
224 0002CA: 197C 0002 0068      '.....h'
225 0002D0: 0014 0010      '.....'
226 0002D4: 4E75      'Nu'
227 0002D6: 357C 0038 0014      '5|.8..'
228 0002DC: 4202      'B.'

```

229	0002DE: 0C2A 0002 0013	'.*....'	CMP I.B	#\$0002,\$0013 (A2)	
230	0002E4: 6DD6	'm.'	BLT.S	*-\$0028	; 000002BC
231	0002E6: 143C 0069	'<.i'	MOVE.B	#\$0069,D2	
232	0002EA: 60D0	'.'	BRA.S	*-\$002E	; 000002BC
233	0002EC: 0005 0A0F	'.....'	ORI.B	#\$0A0F,D5	
234	0002F0: 0409 0E03	'.....'	SUBI.B	#\$0E03,A1	
235	0002F4: 080D 0207	'.....'	BTST	#\$0207,A5	
236	0002F8: 0C01 060B	'.....'	CMP I.B	#\$060B,D1	
237	0002FC: 0005 0A0F	'.....'	ORI.B	#\$0A0F,D5	
238	000300: 0409 0E03	'.....'	SUBI.B	#\$0E03,A1	
239	000304: 080D 0207	'.....'	BTST	#\$0207,A5	
240	000308: 0C01 060B	'.....'	CMP I.B	#\$060B,D1	
241	00030C: 0213 00DF	'.....'	ANDI.B	#\$00DF,(A3)	
242	000310: 0013 0020	'.....'	ORI.B	#\$0020,(A3)	
243	000314: 197C 0008 0068	'h'	MOVE.B	#\$0008,\$0068 (A4)	
244	00031A: 43EA 000A	'C....'	LEA	\$000A (A2),A1	
245	00031E: 1959 0008	'Y....'	MOVE.B	(A1)+,\$0008 (A4)	
246	000322: 1959 0008	'Y....'	MOVE.B	(A1)+,\$0008 (A4)	
247	000326: 1959 0008	'Y....'	MOVE.B	(A1)+,\$0008 (A4)	
248	00032A: 1019	'.....'	MOVE.B	(A1)+,D0	
249	00032C: 4A2A 0008	'J*...'	TST.B	\$0008 (A2)	
250	000330: 6718	'g....'	BEQ.S	*+\$001A	; 0000034A
251	000332: 720F	'r....'	MOVEQ	#\$0F,D1	
252	000334: C240	'e....'	AND.W	D0,D1	
253	000336: 0200 00F0	'.....'	ANDI.B	#\$00F0,D0	
254	00033A: 4A2A 0013	'J*...'	TST.B	\$0013 (A2)	
255	00033E: 6606	'f....'	BNE.S	*+\$0008	; 00000346
256	000340: D03B 10AA	';. ...'	ADD.B	*-\$0054 (D1.W),D0	; 000002EC
257	000344: 6004	'.....'	BRA.S	*+\$0006	; 0000034A
258	000346: D03B 10B4	';. ...'	ADD.B	*-\$004A (D1.W),D0	; 000002FC
259	00034A: 1940 0008	'e....'	MOVE.B	D0,\$0008 (A4)	
260	00034E: 1959 0008	'Y....'	MOVE.B	(A1)+,\$0008 (A4)	
261	000352: 1959 0008	'Y....'	MOVE.B	(A1)+,\$0008 (A4)	
262	000356: 4A2A 000A	'J*...'	TST.B	\$000A (A2)	
263	00035A: 660E	'f....'	BNE.S	*+\$0010	; 0000036A
264	00035C: 546A 0014	'Tj...'	ADDQ.W	#\$2,\$0014 (A2)	
265	000360: 157C 0002 0012	''	MOVE.B	#\$0002,\$0012 (A2)	
266	000366: 6000 000E	'.....'	BRA	*+\$0010	; 00000376
267	00036A: 357C 0010 0014	'5'	MOVE.W	#\$0010,\$0014 (A2)	
268	000370: 157C 0003 0012	''	MOVE.B	#\$0003,\$0012 (A2)	
269	000376: 7001	'p....'	MOVEQ	#\$01,D0	
270	000378: 082C 0003 0068	'h'	BTST	#\$0003,\$0068 (A4)	
271	00037E: 6708	'g....'	BEQ.S	*+\$000A	; 00000388
272	000380: 357C 0296 001A	'5'	MOVE.W	#\$0296,\$001A (A2)	
273	000386: 7000	'p....'	MOVEQ	#\$00,D0	
274	000388: 0014 0018	'.....'	ORI.B	#\$0018,(A4)	
275	00038C: 422C 0018	'B....'	CLR.B	\$0018 (A4)	
276	000390: 4E75	'Nu'	RTS		
277	000392: 422C 0018	'B....'	CLR.B	\$0018 (A4)	
278	000396: 0014 0018	'.....'	ORI.B	#\$0018,(A4)	
279	00039A: 0213 00DF	'.....'	ANDI.B	#\$00DF,(A3)	
280	00039E: 0013 0020	'.....'	ORI.B	#\$0020,(A3)	
281	0003A2: 197C 0008 0068	'h'	MOVE.B	#\$0008,\$0068 (A4)	
282	0003A8: 43EA 0016	'C....'	LEA	\$0016 (A2),A1	
283	0003AC: 12AC 0008	'.....'	MOVE.B	\$0008 (A4),(A1)	
284	0003B0: 136C 0008 0001	' .l....'	MOVE.B	\$0008 (A4),\$0001 (A1)	
285	0003B6: 136C 0008 0002	' .l....'	MOVE.B	\$0008 (A4),\$0002 (A1)	
286	0003BC: 136C 0008 0003	' .l....'	MOVE.B	\$0008 (A4),\$0003 (A1)	
287	0003C2: 082C 0003 0068	'h'	BTST	#\$0003,\$0068 (A4)	
288	0003C8: 6604	'f....'	BNE.S	*+\$0006	; 000003CE
289	0003CA: 7000	'p....'	MOVEQ	#\$00,D0	
290	0003CC: 4E75	'Nu'	RTS		
291	0003CE: 7001	'p....'	MOVEQ	#\$01,D0	
292	0003D0: 4E75	'Nu'	RTS		
293	0003D2: 61BE	'a....'	BSR.S	*-\$0040	; 00000392
294	0003D4: 4A40	'J0'	TST.W	D0	
295	0003D6: 661A	'f....'	BNE.S	*+\$001C	; 000003F2
296	0003D8: 0C11 0009	'.....'	CMP I.B	#\$0009,(A1)	
297	0003DC: 671E	'g....'	BEQ.S	*+\$0020	; 000003FC
298	0003DE: 203C C140 C000	'<.0...'	MOVE.L	#\$C140C000,D0	
299	0003E4: C091	'.....'	AND.L	(A1),D0	
300	0003E6: 6714	'g....'	BEQ.S	*+\$0016	; 000003FC
301	0003E8: 357C 028E 001A	'5'	MOVE.W	#\$028E,\$001A (A2)	
302	0003EE: 7000	'p....'	MOVEQ	#\$00,D0	
303	0003F0: 4E75	'Nu'	RTS		
304	0003F2: 357C 0296 001A	'5'	MOVE.W	#\$0296,\$001A (A2)	


```

305 0003F8: 7000      'p.'      MOVEQ    #$00,D0
306 0003FA: 4E75      'Nu'      RTS
307 0003FC: 546A 0014      'Tj...'  ADDQ.W   #$2,$0014(A2)
308 000400: 7001      'p.'      MOVEQ    #$01,D0
309 000402: 4E75      'Nu'      RTS
310 000404: 2F08      '/'       MOVE.L   A0,-(A7)
311 000406: 7407      't.'      MOVEQ    #$07,D2
312 000408: 2049      'I'      MOVE.L   A1,A0
313 00040A: 6122      'a"'     BSR.S   **+$0024      ; 0000042E
314 00040C: 4218      'B.'     CLR.B   (A0)+
315 00040E: 7402      't.'      MOVEQ    #$02,D2
316 000410: 611C      'a.'     BSR.S   **+$001E     ; 0000042E
317 000412: 4218      'B.'     CLR.B   (A0)+
318 000414: 7402      't.'      MOVEQ    #$02,D2
319 000416: 6116      'a.'     BSR.S   **+$0018     ; 0000042E
320 000418: 7601      'v.'     MOVEQ    #$01,D3
321 00041A: 1012      '...'   MOVE.B   (A2),D0
322 00041C: B101      '...'   EOR.B   D0,D1
323 00041E: 4880      'H.'     EXT.W   D0
324 000420: 30C0      '0.'     MOVE.W   D0,(A0)+
325 000422: 7401      't.'     MOVEQ    #$01,D2
326 000424: 6108      'a.'     BSR.S   **+$000A     ; 0000042E
327 000426: 51CB FFF2      'Q...'  DBF      D3,*-$000C   ; 0000041A
328 00042A: 205F      '...'   MOVE.L   (A7)+,A0
329 00042C: 4E75      'Nu'     RTS
330 00042E: 1012      '...'   MOVE.B   (A2),D0
331 000430: B101      '...'   EOR.B   D0,D1
332 000432: 10C0      '...'   MOVE.B   D0,(A0)+
333 000434: 51CA FFF8      'Q...'  DBF      D2,*-$0006   ; 0000042E
334 000438: 4E75      'Nu'     RTS
335 00043A: 2049      'I'     MOVE.L   A1,A0
336 00043C: 1012      '...'   MOVE.B   (A2),D0
337 00043E: B101      '...'   EOR.B   D0,D1
338 000440: 1400      '...'   MOVE.B   D0,D2
339 000442: 0200 000F      '...'  ANDI.B   #$000F,D0
340 000444: 10C0      '...'   MOVE.B   D0,(A0)+
341 000448: 1012      '...'   MOVE.B   (A2),D0
342 00044A: B101      '...'   EOR.B   D0,D1
343 00044C: 10C0      '...'   MOVE.B   D0,(A0)+
344 00044E: 0202 00F0      '...'  ANDI.B   #$00F0,D2
345 000452: 10C2      '...'   MOVE.B   D2,(A0)+
346 000454: 4218      'B.'     CLR.B   (A0)+
347 000456: 7403      't.'     MOVEQ    #$03,D2
348 000458: 61D4      'a.'     BSR.S   *-$002A     ; 0000042E
349 00045A: 7601      'v.'     MOVEQ    #$01,D3
350 00045C: 4218      'B.'     CLR.B   (A0)+
351 00045E: 7402      't.'     MOVEQ    #$02,D2
352 000460: 61CC      'a.'     BSR.S   *-$0032     ; 0000042E
353 000462: 51CB FFF8      'Q...'  DBF      D3,*-$0006   ; 0000045C
354 000466: 7601      'v.'     MOVEQ    #$01,D3
355 000468: 1012      '...'   MOVE.B   (A2),D0
356 00046A: B101      '...'   EOR.B   D0,D1
357 00046C: 4880      'H.'     EXT.W   D0
358 00046E: 30C0      '0.'     MOVE.W   D0,(A0)+
359 000470: 7401      't.'     MOVEQ    #$01,D2
360 000472: 61BA      'a.'     BSR.S   *-$0044     ; 0000042E
361 000474: 51CB FFF2      'Q...'  DBF      D3,*-$000C   ; 00000468
362 000478: 1012      '...'   MOVE.B   (A2),D0
363 00047A: B101      '...'   EOR.B   D0,D1
364 00047C: 1340 0003      '0...'  MOVE.B   D0,$0003(A1)
365 000480: 1012      '...'   MOVE.B   (A2),D0
366 000482: B101      '...'   EOR.B   D0,D1
367 000484: 4E75      'Nu'     RTS
368 000486: 743F      't?'    MOVEQ    #$3F,D2
369 000488: 1012      '...'   MOVE.B   (A2),D0
370 00048A: B101      '...'   EOR.B   D0,D1
371 00048C: 10C0      '...'   MOVE.B   D0,(A0)+
372 00048E: 1012      '...'   MOVE.B   (A2),D0
373 000490: B101      '...'   EOR.B   D0,D1
374 000492: 10C0      '...'   MOVE.B   D0,(A0)+
375 000494: 1012      '...'   MOVE.B   (A2),D0
376 000496: B101      '...'   EOR.B   D0,D1
377 000498: 10C0      '...'   MOVE.B   D0,(A0)+
378 00049A: 1012      '...'   MOVE.B   (A2),D0
379 00049C: B101      '...'   EOR.B   D0,D1
380 00049E: 10C0      '...'   MOVE.B   D0,(A0)+
    
```

```

381 0004A0: 1012      '...'      MOVE.B   (A2),D0
382 0004A2: B101      '...'      EOR.B   D0,D1
383 0004A4: 10C0      '...'      MOVE.B   D0,(A0)+
384 0004A6: 1012      '...'      MOVE.B   (A2),D0
385 0004A8: B101      '...'      EOR.B   D0,D1
386 0004AA: 10C0      '...'      MOVE.B   D0,(A0)+
387 0004AC: 1012      '...'      MOVE.B   (A2),D0
388 0004AE: B101      '...'      EOR.B   D0,D1
389 0004B0: 10C0      '...'      MOVE.B   D0,(A0)+
390 0004B2: 1012      '...'      MOVE.B   (A2),D0
391 0004B4: B101      '...'      EOR.B   D0,D1
392 0004B6: 10C0      '...'      MOVE.B   D0,(A0)+
393 0004B8: 51CA FFCE  'Q...'    DBF     D2,*-$0030 ; 00000488
394 0004BC: 4E75      'Nu'      RTS
395 0004BE: 2244      '"D'      MOVE.L   D4,A1
396 0004C0: 2069 0008  'i...'    MOVE.L   $0008(A1),A0
397 0004C4: D1E9 0010  '...'    ADDA.L   $0010(A1),A0
398 0004C8: 2269 000C  '"i...'  MOVE.L   $000C(A1),A1
399 0004CC: 2F0A      '/'      MOVE.L   A2,-(A7)
400 0004CE: 45EC 0008  'E...'    LEA     $0008(A4),A2
401 0004D2: 7200      'r.'      MOVEQ    #$00,D1
402 0004D4: 6100 FF2E  'a...'    BSR     *-$00D0 ; 00000404
403 0004D8: 61AC      'a.'      BSR.S   *-$0052 ; 00000486
404 0004DA: 245F      '$_'      MOVE.L   (A7)+,A2
405 0004DC: 7000      'p.'      MOVEQ    #$00,D0
406 0004DE: 4A29 0006  'J)...'  TST.B   $0006(A1)
407 0004E2: 6C16      'l.'      BGE.S   *+$0018 ; 000004FA
408 0004E4: 4229 000D  'B)...'  CLR.B   $000D(A1)
409 0004E8: 0229 007F 0006  '.)....'  ANDI.B  #$007F,$0006(A1)
410 0004EE: 4A01      'J.'      TST.B   D1
411 0004F0: 6708      'g.'      BEQ.S   *+$000A ; 000004FA
412 0004F2: 357C FD69 001A  '5|i...'  MOVE.W  #$FD69,$001A(A2)
413 0004F8: 4E75      'Nu'      RTS
414 0004FA: 082C 0003 0068  '.....h'  BTST   #$0003,$0068(A4)
415 000500: 66F0      'f.'      BNE.S   *-$000E ; 000004F2
416 000502: 0C2A 0009 0016  '.*....'  CMPI.B  #$0009,$0016(A2)
417 000508: 67E8      'g.'      BEQ.S   *-$0016 ; 000004F2
418 00050A: 4267      'Bg'     CLR.W   -(A7)
419 00050C: 2F04      '/'      MOVE.L   D4,-(A7)
420 00050E: 4EBA FBF2  'N...'    JSR     *-$040C ; 00000102
421 000512: 355F 001A  '5...'    MOVE.W  (A7)+,$001A(A2)
422 000516: 6704      'g.'      BEQ.S   *+$0006 ; 0000051C
423 000518: 7000      'p.'      MOVEQ    #$00,D0
424 00051A: 4E75      'Nu'      RTS
425 00051C: 52AA 000A  'R...'    ADDQ.L  #$1,$000A(A2)
426 000520: 2044      'D'      MOVE.L   D4,A0
427 000522: 4A68 0014  'Jh...'  TST.W   $0014(A0)
428 000526: 670A      'g.'      BEQ.S   *+$000C ; 00000532
429 000528: 357C 0002 0014  '5|....'  MOVE.W  #$0002,$0014(A2)
430 00052E: 7001      'p.'      MOVEQ    #$01,D0
431 000530: 4E75      'Nu'      RTS
432 000532: 082A 0002 0017  '.*....'  BTST   #$0002,$0017(A2)
433 000538: 6604      'f.'      BNE.S   *+$0006 ; 0000053E
434 00053A: 7000      'p.'      MOVEQ    #$00,D0
435 00053C: 4E75      'Nu'      RTS
436 00053E: 357C 002C 0014  '5|,...'  MOVE.W  #$002C,$0014(A2)
437 000544: 7001      'p.'      MOVEQ    #$01,D0
438 000546: 4E75      'Nu'      RTS
439 000548: 2244      '"D'      MOVE.L   D4,A1
440 00054A: 2069 0008  'i...'    MOVE.L   $0008(A1),A0
441 00054E: D1E9 0010  '...'    ADDA.L   $0010(A1),A0
442 000552: 2269 000C  '"i...'  MOVE.L   $000C(A1),A1
443 000556: 2219      '".'      MOVE.L   (A1)+,D1
444 000558: 7404      't.'      MOVEQ    #$04,D2
445 00055A: 2019      'i.'      MOVE.L   (A1)+,D0
446 00055C: B181      '...'    EOR.L   D0,D1
447 00055E: 51CA FFFA  'Q...'    DBF     D2,*-$0004 ; 0000055A
448 000562: 747F      't.'      MOVEQ    #$7F,D2
449 000564: 3008      '0.'      MOVE.W   A0,D0
450 000566: 0240 0001  '0...'    ANDI.W  #$0001,D0
451 00056A: 6710      'g.'      BEQ.S   *+$0012 ; 0000057C
452 00056C: 1028 01FF  '(...'    MOVE.B  $01FF(A0),D0
453 000570: B101      '...'    EOR.B   D0,D1
454 000572: 1018      '...'    MOVE.B  (A0)+,D0
455 000574: B101      '...'    EOR.B   D0,D1
456 000576: 3018      '0.'      MOVE.W  (A0)+,D0
    
```

5/28/91 12:53 PM

HD:Lisa Device Drivers:SYSTEM.CD_PROFILE

```

457 000578: B141      '.A'      EOR.W     D0,D1
458 00057A: 5342      'SB'     SUBQ.W    #$1,D2
459 00057C: 2018      '.'      MOVE.L    (A0)+,D0
460 00057E: B181      '...'   EOR.L     D0,D1
461 000580: 51CA FFFA    'Q... '  DBF       D2,*-$0004 ; 0000057C
462 000584: 3001      '0.'    MOVE.W    D1,D0
463 000586: 4841      'HA'    SWAP      D1
464 000588: B141      '.A'    EOR.W     D0,D1
465 00058A: 3541 0010  '5A..'  MOVE.W    D1,$0010(A2)
466 00058E: B32A 0010  '.*..'  EOR.B     D1,$0010(A2)
467 000592: 4E75      'Nu'    RTS
468 000594: 143C 0055  '.<.U'  MOVE.B    #$0055,D2
469 000598: 6100 FD08  'a...'  BSR       *-$02F6 ; 000002A2
470 00059C: 0C02 0055  '...U'  CMPI.B    #$0055,D2
471 0005A0: 661A      'f.'    BNE.S     *+$001C ; 000005BC
472 0005A2: 61A4      'a.'    BSR.S     *-$005A ; 00000548
473 0005A4: 082C 0001 0068  '.,...h' BTST      #$0001,$0068(A4)
474 0005AA: 6710      'g.'    BEQ.S     *+$0012 ; 000005BC
475 0005AC: 157C 0001 0027  '.|... ' MOVE.B    #$0001,$0027(A2)
476 0005B2: 197C 0002 0068  '.|...h' MOVE.B    #$0002,$0068(A4)
477 0005B8: 7001      'p.'    MOVEQ     #$01,D0
478 0005BA: 4E75      'Nu'    RTS
479 0005BC: 422A 0027  'B*..'  CLR.B     $0027(A2)
480 0005C0: 357C 0001 001A  '5|.... ' MOVE.W    #$0001,$001A(A2)
481 0005C6: 197C 00FF 0048  '.|...H' MOVE.B    #$00FF,$0048(A4)
482 0005CC: 7000      'p.'    MOVEQ     #$00,D0
483 0005CE: 4E75      'Nu'    RTS
484 0005D0: 4A2A 0027  'J*..'  TST.B     $0027(A2)
485 0005D4: 6604      'f.'    BNE.S     *+$0006 ; 000005DA
486 0005D6: 6100 FF70  'a..p'  BSR       *-$008E ; 00000548
487 0005DA: 122A 0010  '.*..'  MOVE.B    $0010(A2),D1
488 0005DE: 2244      '"D'    MOVE.L    D4,A1
489 0005E0: 2069 0008  'i...'  MOVE.L    $0008(A1),A0
490 0005E4: D1E9 0010  '..... ' ADDA.L    $0010(A1),A0
491 0005E8: 2269 000C  '"i...' MOVE.L    $000C(A1),A1
492 0005EC: 0214 00F7  '..... ' ANDI.B    #$00F7,(A4)
493 0005F0: 197C 00FF 0018  '.|.... ' MOVE.B    #$00FF,$0018(A4)
494 0005F6: 0213 00DF  '..... ' ANDI.B    #$00DF,(A3)
495 0005FA: 0013 0020  '..... ' ORI.B     #$0020,(A3)
496 0005FE: 197C 0008 0068  '.|...h' MOVE.B    #$0008,$0068(A4)
497 000604: 2F0A      '/.'    MOVE.L    A2,-(A7)
498 000606: 45EC 0008  'E...'  LEA       $0008(A4),A2
499 00060A: 6100 00B2  'a...'  BSR       *+$00B4 ; 000006BE
500 00060E: 6176      'av'    BSR.S     *+$0078 ; 00000686
501 000610: 245F      '$'     MOVE.L    (A7)+,A2
502 000612: 6000 0036  '...6'  BRA       *+$0038 ; 0000064A
503 000616: 2244      '"D'    MOVE.L    D4,A1
504 000618: 2069 0008  'i...'  MOVE.L    $0008(A1),A0
505 00061C: D1E9 0010  '..... ' ADDA.L    $0010(A1),A0
506 000620: 2269 000C  '"i...' MOVE.L    $000C(A1),A1
507 000624: 0214 00F7  '..... ' ANDI.B    #$00F7,(A4)
508 000628: 197C 00FF 0018  '.|.... ' MOVE.B    #$00FF,$0018(A4)
509 00062E: 0213 00DF  '..... ' ANDI.B    #$00DF,(A3)
510 000632: 0013 0020  '..... ' ORI.B     #$0020,(A3)
511 000636: 197C 0008 0068  '.|...h' MOVE.B    #$0008,$0068(A4)
512 00063C: 2F0A      '/.'    MOVE.L    A2,-(A7)
513 00063E: 45EC 0008  'E...'  LEA       $0008(A4),A2
514 000642: 6158      'aX'    BSR.S     *+$005A ; 0000069C
515 000644: 6100 00D2  'a...'  BSR       *+$00D4 ; 00000718
516 000648: 245F      '$'     MOVE.L    (A7)+,A2
517 00064A: 082C 0003 0068  '.,...h' BTST      #$0003,$0068(A4)
518 000650: 6712      'g.'    BEQ.S     *+$0014 ; 00000664
519 000652: 422C 0018  'B,..'  CLR.B     $0018(A4)
520 000656: 0014 0008  '..... ' ORI.B     #$0008,(A4)
521 00065A: 357C 0296 001A  '5|.... ' MOVE.W    #$0296,$001A(A2)
522 000660: 7000      'p.'    MOVEQ     #$00,D0
523 000662: 4E75      'Nu'    RTS
524 000664: 422C 0018  'B,..'  CLR.B     $0018(A4)
525 000668: 0014 0008  '..... ' ORI.B     #$0008,(A4)
526 00066C: 4267      'Bg'    CLR.W     -(A7)
527 00066E: 2F04      '/.'    MOVE.L    D4,-(A7)
528 000670: 4EBA FA90  'N...'  JSR       *-$056E ; 00000102
529 000674: 355F 001A  '5...'  MOVE.W    (A7)+,$001A(A2)
530 000678: 157C 0006 0012  '.|.... ' MOVE.B    #$0006,$0012(A2)
531 00067E: 546A 0014  'Tj...' ADDQ.W    #$2,$0014(A2)
532 000682: 7001      'p.'    MOVEQ     #$01,D0
    
```

```

533 000684: 4E75      'Nu'      RTS
534 000686: 707F      'p.'      MOVEQ    #$7F,D0
535 000688: 1498      'Nq'      MOVE.B   (A0)+,(A2)
536 00068A: 4E71      'Nq'      NOP
537 00068C: 1498      'Nq'      MOVE.B   (A0)+,(A2)
538 00068E: 4E71      'Nq'      NOP
539 000690: 1498      'Nq'      MOVE.B   (A0)+,(A2)
540 000692: 4E71      'Nq'      NOP
541 000694: 1498      'Nq'      MOVE.B   (A0)+,(A2)
542 000696: 51C8 FFF0      'Q...'   DBF      D0,*-$000E ; 00000688
543 00069A: 4E75      'Nu'      RTS
544 00069C: 7200      'r.'      MOVEQ    #$00,D1
545 00069E: 707F      'p.'      MOVEQ    #$7F,D0
546 0006A0: 1418      'Nq'      MOVE.B   (A0)+,D2
547 0006A2: B501      'Nq'      EOR.B    D2,D1
548 0006A4: 1482      'Nq'      MOVE.B   D2,(A2)
549 0006A6: 1418      'Nq'      MOVE.B   (A0)+,D2
550 0006A8: B501      'Nq'      EOR.B    D2,D1
551 0006AA: 1482      'Nq'      MOVE.B   D2,(A2)
552 0006AC: 1418      'Nq'      MOVE.B   (A0)+,D2
553 0006AE: B501      'Nq'      EOR.B    D2,D1
554 0006B0: 1482      'Nq'      MOVE.B   D2,(A2)
555 0006B2: 1418      'Nq'      MOVE.B   (A0)+,D2
556 0006B4: B501      'Nq'      EOR.B    D2,D1
557 0006B6: 1482      'Nq'      MOVE.B   D2,(A2)
558 0006B8: 51C8 FFE6      'Q...'   DBF      D0,*-$0018 ; 000006A0
559 0006BC: 4E75      'Nu'      RTS
560 0006BE: 1429 0008      '.)...'  MOVE.B   $0008(A1),D2
561 0006C2: B501      'Nq'      EOR.B    D2,D1
562 0006C4: 1429 000C      '.)...'  MOVE.B   $000C(A1),D2
563 0006C8: B501      'Nq'      EOR.B    D2,D1
564 0006CA: 1429 0010      '.)...'  MOVE.B   $0010(A1),D2
565 0006CE: B501      'Nq'      EOR.B    D2,D1
566 0006D0: 1429 0014      '.)...'  MOVE.B   $0014(A1),D2
567 0006D4: B501      'Nq'      EOR.B    D2,D1
568 0006D6: 7405      't.'      MOVEQ    #$05,D2
569 0006D8: 1499      'Nq'      MOVE.B   (A1)+,(A2)
570 0006DA: 51CA FFFC      'Q...'   DBF      D2,*-$0002 ; 000006D8
571 0006DE: 1419      'Nq'      MOVE.B   (A1)+,D2
572 0006E0: 6D08      'm.'      BLT.S    *+$000A ; 000006EA
573 0006E2: 0A01 0080      'Nq'      EORI.B   #$0080,D1
574 0006E6: 0002 0080      'Nq'      ORI.B    #$0080,D2
575 0006EA: 1482      'Nq'      MOVE.B   D2,(A2)
576 0006EC: 4E71      'Nq'      NOP
577 0006EE: 4E71      'Nq'      NOP
578 0006F0: 1499      'Nq'      MOVE.B   (A1)+,(A2)
579 0006F2: 6116      'a.'      BSR.S    *+$0018 ; 0000070A
580 0006F4: 3419      '4.'      MOVE.W   (A1)+,D2
581 0006F6: B501      'Nq'      EOR.B    D2,D1
582 0006F8: 1481      'Nq'      MOVE.B   D1,(A2)
583 0006FA: 4E71      'Nq'      NOP
584 0006FC: 4E71      'Nq'      NOP
585 0006FE: 1499      'Nq'      MOVE.B   (A1)+,(A2)
586 000700: 4E71      'Nq'      NOP
587 000702: 1499      'Nq'      MOVE.B   (A1)+,(A2)
588 000704: 6104      'a.'      BSR.S    *+$0006 ; 0000070A
589 000706: 6102      'a.'      BSR.S    *+$0004 ; 0000070A
590 000708: 4E75      'Nu'      RTS
591 00070A: 5249      'RI'      ADDQ.W   #$1,A1
592 00070C: 1499      'Nq'      MOVE.B   (A1)+,(A2)
593 00070E: 4E71      'Nq'      NOP
594 000710: 1499      'Nq'      MOVE.B   (A1)+,(A2)
595 000712: 4E71      'Nq'      NOP
596 000714: 1499      'Nq'      MOVE.B   (A1)+,(A2)
597 000716: 4E75      'Nu'      RTS
598 000718: 1419      'Nq'      MOVE.B   (A1)+,D2
599 00071A: 0202 000F      'Nq'      ANDI.B   #$000F,D2
600 00071E: 1029 0001      '.)...'  MOVE.B   $0001(A1),D0
601 000722: 0200 00F0      'Nq'      ANDI.B   #$00F0,D0
602 000726: 8400      'Nq'      OR.B     D0,D2
603 000728: B501      'Nq'      EOR.B    D2,D1
604 00072A: 1482      'Nq'      MOVE.B   D2,(A2)
605 00072C: 1419      'Nq'      MOVE.B   (A1)+,D2
606 00072E: B501      'Nq'      EOR.B    D2,D1
607 000730: 1482      'Nq'      MOVE.B   D2,(A2)
608 000732: 1019      'Nq'      MOVE.B   (A1)+,D0

```

```

609 000734: 1019      '...'      MOVE.B    (A1)+,D0
610 000736: 1419      '...'      MOVE.B    (A1)+,D2
611 000738: B501      '...'      EOR.B     D2,D1
612 00073A: 1482      '...'      MOVE.B    D2,(A2)
613 00073C: 1419      '...'      MOVE.B    (A1)+,D2
614 00073E: B501      '...'      EOR.B     D2,D1
615 000740: 1482      '...'      MOVE.B    D2,(A2)
616 000742: 1419      '...'      MOVE.B    (A1)+,D2
617 000744: 0002 0080    '...'      ORI.B     #$0000,D2
618 000748: B501      '...'      EOR.B     D2,D1
619 00074A: 1482      '...'      MOVE.B    D2,(A2)
620 00074C: 1419      '...'      MOVE.B    (A1)+,D2
621 00074E: B501      '...'      EOR.B     D2,D1
622 000750: 1482      '...'      MOVE.B    D2,(A2)
623 000752: 6112      'a.'      BSR.S    **$0014      ; 00000766
624 000754: 6110      'a.'      BSR.S    **$0012      ; 00000766
625 000756: 610E      'a.'      BSR.S    **$0010      ; 00000766
626 000758: 610C      'a.'      BSR.S    **$000E      ; 00000766
627 00075A: B101      '...'      EOR.B     D0,D1
628 00075C: 1480      '...'      MOVE.B    D0,(A2)
629 00075E: 4E71      'Nq'     NOP
630 000760: 4E71      'Nq'     NOP
631 000762: 1481      '...'      MOVE.B    D1,(A2)
632 000764: 4E75      'Nu'     RTS
633 000766: 5249      'RI'     ADDQ.W   #$1,A1
634 000768: 1419      '...'      MOVE.B    (A1)+,D2
635 00076A: B501      '...'      EOR.B     D2,D1
636 00076C: 1482      '...'      MOVE.B    D2,(A2)
637 00076E: 1419      '...'      MOVE.B    (A1)+,D2
638 000770: B501      '...'      EOR.B     D2,D1
639 000772: 1482      '...'      MOVE.B    D2,(A2)
640 000774: 1419      '...'      MOVE.B    (A1)+,D2
641 000776: B501      '...'      EOR.B     D2,D1
642 000778: 1482      '...'      MOVE.B    D2,(A2)
643 00077A: 4E75      'Nu'     RTS
644 00077C: 2044      'D'      MOVE.L   D4,A0
645 00077E: 4A28 0016    'J(...'   TST.B    $0016(A0)
646 000782: 670C      'g.'     BEQ.S    **$000E      ; 00000790
647 000784: 546A 0014    'Tj...'   ADDQ.W   #$2,$0014(A2)
648 000788: 422A 000A    'B*...'   CLR.B    $000A(A2)
649 00078C: 7001      'p.'     MOVEQ    #$01,D0
650 00078E: 4E75      'Nu'     RTS
651 000790: 52AA 000A    'R...'   ADDQ.L   #$1,$000A(A2)
652 000794: 2044      'D'      MOVE.L   D4,A0
653 000796: 4A68 0014    'Jh...'   TST.W    $0014(A0)
654 00079A: 670A      'g.'     BEQ.S    **$000C      ; 000007A6
655 00079C: 357C 0002 0014  '5|.....' MOVE.W   #$0002,$0014(A2)
656 0007A2: 7001      'p.'     MOVEQ    #$01,D0
657 0007A4: 4E75      'Nu'     RTS
658 0007A6: 082A 0002 0017  '.*.....' BTST    #$0002,$0017(A2)
659 0007AC: 6604      'f.'     BNE.S    **$0006      ; 000007B2
660 0007AE: 7000      'p.'     MOVEQ    #$00,D0
661 0007B0: 4E75      'Nu'     RTS
662 0007B2: 357C 002C 0014  '5|,...'   MOVE.W   #$002C,$0014(A2)
663 0007B8: 7001      'p.'     MOVEQ    #$01,D0
664 0007BA: 4E75      'Nu'     RTS
665 0007BC: 41EC 0008    'A...'   LEA     $0008(A4),A0
666 0007C0: 7200      'r.'     MOVEQ    #$00,D1
667 0007C2: 0C2A 0002 0013  '.*.....' CMPI.B   #$0002,$0013(A2)
668 0007C8: 6710      'g.'     BEQ.S    **$0012      ; 000007DA
669 0007CA: 6170      'ap'    BSR.S    **$0072      ; 0000083C
670 0007CC: 343C 01FF    '4<...'   MOVE.W   #$01FF,D2
671 0007D0: 1010      '...'   MOVE.B    (A0),D0
672 0007D2: B101      '...'   EOR.B     D0,D1
673 0007D4: 51CA FFFA    'Q...'   DBF     D2,*-$0004      ; 000007D0
674 0007D8: 600E      '...'   BRA.S    **$0010      ; 000007E8
675 0007DA: 343C 01FF    '4<...'   MOVE.W   #$01FF,D2
676 0007DE: 1010      '...'   MOVE.B    (A0),D0
677 0007E0: B101      '...'   EOR.B     D0,D1
678 0007E2: 51CA FFFA    'Q...'   DBF     D2,*-$0004      ; 000007DE
679 0007E6: 616E      'an'    BSR.S    **$0070      ; 00000856
680 0007E8: 4A03      'J.'     TST.B    D3
681 0007EA: 6C0E      'l.'     BGE.S    **$0010      ; 000007FA
682 0007EC: 4A01      'J.'     TST.B    D1
683 0007EE: 670A      'g.'     BEQ.S    **$000C      ; 000007FA
684 0007F0: 357C FD69 001A  '5|.i...' MOVE.W   #$FD69,$001A(A2)
    
```

```

685 0007F6: 7000      'p.'          MOVEQ    #$00,D0
686 0007F8: 4E75      'Nu'         RTS
687 0007FA: 082C 0003 0068    '.,...h'     BTST     #$0003,$0068(A4)
688 000800: 66EE          'f.'         BNE.S   *-$0010 ; 000007F0
689 000802: 0C2A 0009 0016    '.*....'     CMPI.B  #$0009,$0016(A2)
690 000808: 67E6          'g.'         BEQ.S   *-$0018 ; 000007F0
691 00080A: 52AA 000A      'R....'     ADDQ.L  #$1,$000A(A2)
692 00080E: 2044          'D'         MOVE.L  D4,A0
693 000810: 4A68 0014      'Jh...'     TST.W   $0014(A0)
694 000814: 6710          'g.'         BEQ.S   **+$0012 ; 00000826
695 000816: 157C 0001 000A    'l.....'     MOVE.B  #$0001,$000A(A2)
696 00081C: 357C 0002 0014    '5|.....'     MOVE.W  #$0002,$0014(A2)
697 000822: 7001          'p.'         MOVEQ   #$01,D0
698 000824: 4E75          'Nu'         RTS
699 000826: 082A 0002 0017    '.*....'     BTST     #$0002,$0017(A2)
700 00082C: 6604          'f.'         BNE.S   **+$0006 ; 00000832
701 00082E: 7000          'p.'         MOVEQ   #$00,D0
702 000830: 4E75          'Nu'         RTS
703 000832: 357C 002C 0014    '5|,...'     MOVE.W  #$002C,$0014(A2)
704 000838: 7001          'p.'         MOVEQ   #$01,D0
705 00083A: 4E75          'Nu'         RTS
706 00083C: 7405          't.'         MOVEQ   #$05,D2
707 00083E: 1010          '...'       MOVE.B  (A0),D0
708 000840: B101          '...'       EOR.B   D0,D1
709 000842: 51CA FFFA      'Q....'     DBF     D2,*-$0004 ; 0000083E
710 000846: 1610          '...'       MOVE.B  (A0),D3
711 000848: B701          '...'       EOR.B   D3,D1
712 00084A: 740C          't.'         MOVEQ   #$0C,D2
713 00084C: 1010          '...'       MOVE.B  (A0),D0
714 00084E: B101          '...'       EOR.B   D0,D1
715 000850: 51CA FFFA      'Q....'     DBF     D2,*-$0004 ; 0000084C
716 000854: 4E75          'Nu'         RTS
717 000856: 7403          't.'         MOVEQ   #$03,D2
718 000858: 1010          '...'       MOVE.B  (A0),D0
719 00085A: B101          '...'       EOR.B   D0,D1
720 00085C: 51CA FFFA      'Q....'     DBF     D2,*-$0004 ; 00000858
721 000860: 1610          '...'       MOVE.B  (A0),D3
722 000862: B701          '...'       EOR.B   D3,D1
723 000864: 740E          't.'         MOVEQ   #$0E,D2
724 000866: 1010          '...'       MOVE.B  (A0),D0
725 000868: B101          '...'       EOR.B   D0,D1
726 00086A: 51CA FFFA      'Q....'     DBF     D2,*-$0004 ; 00000866
727 00086E: 4E75          'Nu'         RTS
728 000870: 197C 00FF 0008    'l.....'     MOVE.B  #$00FF,$0008(A4)
729 000876: 0014 0018      'B,..'     ORI.B   #$0018,(A4)
730 00087A: 422C 0018      'B,..'     CLR.B   $0018(A4)
731 00087E: 157C 00FF 0012    'l.....'     MOVE.B  #$00FF,$0012(A2)
732 000884: 546A 0014      'Tj...'     ADDQ.W  #$2,$0014(A2)
733 000888: 7001          'p.'         MOVEQ   #$01,D0
734 00088A: 4E75          'Nu'         RTS
735 00088C: 0014 0018      '.....'     ORI.B   #$0018,(A4)
736 000890: 422C 0018      'B,..'     CLR.B   $0018(A4)
737 000894: 7000          'p.'         MOVEQ   #$00,D0
738 000896: 4E75          'Nu'         RTS
739 000898: 7001          'p.'         MOVEQ   #$01,D0
740 00089A: 4E75          'Nu'         RTS
741 00089C: 0C2A 0002 0013    '.*....'     CMPI.B  #$0002,$0013(A2)
742 0008A2: 6D26          'm.'         BLT.S   **+$0028 ; 000008CA
743 0008A4: 4A2A 0028      'J*..'     TST.B   $0028(A2)
744 0008A8: 6620          'f.'         BNE.S   **+$0022 ; 000008CA
745 0008AA: 157C 0001 0028    'l.....('    MOVE.B  #$0001,$0028(A2)
746 0008B0: 203C 000C 0000    '<.....'     MOVE.L  #$00C0000,D0
747 0008B6: 0813 0001      '.....'     BTST    #$0001,(A3)
748 0008BA: 6606          'f.'         BNE.S   **+$0008 ; 000008C2
749 0008BC: 51C8 FFF8      'Q....'     DBF     D0,*-$0006 ; 000008B6
750 0008C0: 6008          '...'       BRA.S   **+$000A ; 000008CA
751 0008C2: 546A 0014      'Tj...'     ADDQ.W  #$2,$0014(A2)
752 0008C6: 7001          'p.'         MOVEQ   #$01,D0
753 0008C8: 4E75          'Nu'         RTS
754 0008CA: 422A 0028      'B*..'     CLR.B   $0028(A2)
755 0008CE: 357C 075A 001A    '5|.Z...'     MOVE.W  #$075A,$001A(A2)
756 0008D4: 422C 0018      'B,..'     CLR.B   $0018(A4)
757 0008D8: 0014 0018      '.....'     ORI.B   #$0018,(A4)
758 0008DC: 7000          'p.'         MOVEQ   #$00,D0
759 0008DE: 4E75          'Nu'         RTS
760 0008E0: 0213 00DF      '.....'     ANDI.B  #$00DF,(A3)
    
```

761	0008E4:	0013	0020	'...'	ORI.B	#\$0020, (A3)	
762	0008E8:	197C	0008	0068	'h'	MOVE.B	#\$0008, \$0068 (A4)
763	0008EE:	197C	0013	0008	''	MOVE.B	#\$0013, \$0008 (A4)
764	0008F4:	4E71		'Nq'	NOP		
765	0008F6:	197C	0001	0008	''	MOVE.B	#\$0001, \$0008 (A4)
766	0008FC:	4E71		'Nq'	NOP		
767	0008FE:	197C	0005	0008	''	MOVE.B	#\$0005, \$0008 (A4)
768	000904:	4E71		'Nq'	NOP		
769	000906:	197C	00E6	0008	''	MOVE.B	#\$00E6, \$0008 (A4)
770	00090C:	0014	0018		'.....'	ORI.B	#\$0018, (A4)
771	000910:	422C	0018		'B, ...'	CLR.B	\$0018 (A4)
772	000914:	082C	0003	0068	'f, ...h'	BTST	#\$0003, \$0068 (A4)
773	00091A:	660E			'f.'	BNE.S	+\$0010 ; 0000092A
774	00091C:	546A	0014		'Tj...'	ADDQ.W	#\$2, \$0014 (A2)
775	000920:	157C	0003	0012	''	MOVE.B	#\$0003, \$0012 (A2)
776	000926:	7001			'p.'	MOVEQ	#\$01, D0
777	000928:	4E75			'Nu'	RTS	
778	00092A:	357C	0296	001A	'5 '	MOVE.W	#\$0296, \$001A (A2)
779	000930:	7000			'p.'	MOVEQ	#\$00, D0
780	000932:	4E75			'Nu'	RTS	
781	000934:	422C	0018		'B, ...'	CLR.B	\$0018 (A4)
782	000938:	0014	0018		'.....'	ORI.B	#\$0018, (A4)
783	00093C:	43EA	0016		'C...'	LEA	\$0016 (A2), A1
784	000940:	7003			'p.'	MOVEQ	#\$03, D0
785	000942:	12EC	0008		'.....'	MOVE.B	\$0008 (A4), (A1) +
786	000946:	51C8	FFFA		'Q...'	DBF	D0, *-\$0004 ; 00000942
787	00094A:	202A	0016		'*...'	MOVE.L	\$0016 (A2), D0
788	00094E:	81AA	002A		'...*'	OR.L	D0, \$002A (A2)
789	000952:	021A	00F7		'.....'	ANDI.B	#\$00F7, (A4)
790	000956:	022C	007F	0580	'.....'	ANDI.B	#\$007F, \$0580 (A4)
791	00095C:	7027			'p.'	MOVEQ	#\$27, D0
792	00095E:	51C8	FFFE		'Q...'	DBF	D0, *+\$0000 ; 0000095E
793	000962:	002C	0080	0580	'.....'	ORI.B	#\$0080, \$0580 (A4)
794	000968:	707F			'p.'	MOVEQ	#\$7F, D0
795	00096A:	51C8	FFFE		'Q...'	DBF	D0, *+\$0000 ; 0000096A
796	00096E:	066A	0001	0036	'j...6'	ADDI.W	#\$0001, \$0036 (A2)
797	000974:	422A	0028		'B*.('	CLR.B	\$0028 (A2)
798	000978:	203C	0018	0000	'<...'	MOVE.L	#\$00180000, D0
799	00097E:	0814	0001		'.....'	BTST	#\$0001, (A4)
800	000982:	6604			'f.'	BNE.S	+\$0006 ; 00000988
801	000984:	5380			's.'	SUBQ.L	#\$1, D0
802	000986:	66F6			'f.'	BNE.S	*-\$0008 ; 0000097E
803	000988:	0C6A	0010	0036	'j...6'	CMPI.W	#\$0010, \$0036 (A2)
804	00098E:	6E0A			'n.'	BGT.S	*+\$000C ; 0000099A
805	000990:	357C	0046	0014	'5 .F...'	MOVE.W	#\$0046, \$0014 (A2)
806	000996:	7001			'p.'	MOVEQ	#\$01, D0
807	000998:	4E75			'Nu'	RTS	
808	00099A:	357C	075A	001A	'5 .Z...'	MOVE.W	#\$075A, \$001A (A2)
809	0009A0:	422C	0018		'B, ...'	CLR.B	\$0018 (A4)
810	0009A4:	0014	0018		'.....'	ORI.B	#\$0018, (A4)
811	0009A8:	7000			'p.'	MOVEQ	#\$00, D0
812	0009AA:	4E75			'Nu'	RTS	
813	0009AC:	0213	00DF		'.....'	ANDI.B	#\$00DF, (A3)
814	0009B0:	0013	0020		'...'	ORI.B	#\$0020, (A3)
815	0009B4:	197C	0008	0068	'h'	MOVE.B	#\$0008, \$0068 (A4)
816	0009BA:	41EA	002E		'A...'	LEA	\$002E (A2), A0
817	0009BE:	102A	002E		'*...'	MOVE.B	\$002E (A2), D0
818	0009C2:	4880			'H.'	EXT.W	D0
819	0009C4:	0240	000F		'e...'	ANDI.W	#\$000F, D0
820	0009C8:	5340			'S@'	SUBQ.W	#\$1, D0
821	0009CA:	7200			'r.'	MOVEQ	#\$00, D1
822	0009CC:	1950	0008		'P...'	MOVE.B	(A0), \$0008 (A4)
823	0009D0:	D218			'...'	ADD.B	(A0) +, D1
824	0009D2:	51C8	FFF8		'Q...'	DBF	D0, *-\$0006 ; 000009CC
825	0009D6:	0A01	00FF		'.....'	EORI.B	#\$00FF, D1
826	0009DA:	1941	0008		'A...'	MOVE.B	D1, \$0008 (A4)
827	0009DE:	082C	0003	0068	'f, ...h'	BTST	#\$0003, \$0068 (A4)
828	0009E4:	6604			'f.'	BNE.S	+\$0006 ; 000009EA
829	0009E6:	7000			'p.'	MOVEQ	#\$00, D0
830	0009E8:	4E75			'Nu'	RTS	
831	0009EA:	7001			'p.'	MOVEQ	#\$01, D0
832	0009EC:	4E75			'Nu'	RTS	
833	0009EE:	0C2A	0002	000A	'*.....'	CMPI.B	#\$0002, \$000A (A2)
834	0009F4:	6C00	006E		'l.n'	BGE	*+\$0070 ; 00000A64
835	0009F8:	2044			'D'	MOVE.L	D4, A0
836	0009FA:	3028	0014		'0(...'	MOVE.W	\$0014 (A0), D0

```

837 0009FE: 0C40 007F '.e...' CMP I.W #007F,D0
838 000A02: 6F02 'o.' BLE.S **$0004 ; 00000A06
839 000A04: 707F 'p.' MOVEQ #7F,D0
840 000A06: 1540 0026 '.e.&' MOVE.B D0,$0026(A2)
841 000A0A: 157C 0026 002E '.|. &...' MOVE.B #0026,$002E(A2)
842 000A10: 156A 000A 002F '.j.../' MOVE.B $000A(A2),$002F(A2)
843 000A16: 256A 000A 0030 '*j...0' MOVE.L $000A(A2),$0030(A2)
844 000A1C: 1540 0030 '.e.0' MOVE.B D0,$0030(A2)
845 000A20: 618A 'a.' BSR.S *-$0074 ; 000009AC
846 000A22: 4A40 'J0' TST.W D0
847 000A24: 662C 'f.' BNE.S **$002E ; 00000A52
848 000A26: 4A2A 000A 'J*...' TST.B $000A(A2)
849 000A2A: 6616 'f.' BNE.S **$0018 ; 00000A42
850 000A2C: 357C 004C 0014 '5|.L...' MOVE.W #004C,$0014(A2)
851 000A32: 157C 0022 0012 '.|. "...' MOVE.B #0022,$0012(A2)
852 000A38: 0014 0018 '...' ORI.B #0018,(A4)
853 000A3C: 422C 0018 'B,...' CLR.B $0018(A4)
854 000A40: 600C '...' BRA.S **$000E ; 00000A4E
855 000A42: 357C 005A 0014 '5|.2...' MOVE.W #005A,$0014(A2)
856 000A48: 157C 0023 0012 '.|. #...' MOVE.B #0023,$0012(A2)
857 000A4E: 7001 'p.' MOVEQ #01,D0
858 000A50: 4E75 'Nu' RTS
859 000A52: 357C 0296 001A '5|....' MOVE.W #0296,$001A(A2)
860 000A58: 0014 0018 '...' ORI.B #0018,(A4)
861 000A5C: 422C 0018 'B,...' CLR.B $0018(A4)
862 000A60: 7000 'p.' MOVEQ #00,D0
863 000A62: 4E75 'Nu' RTS
864 000A64: 357C 006C 0014 '5|.1...' MOVE.W #006C,$0014(A2)
865 000A6A: 7001 'p.' MOVEQ #01,D0
866 000A6C: 4E75 'Nu' RTS
867 000A6E: 2244 '"D' MOVE.L D4,A1
868 000A70: 2069 0008 'i...' MOVE.L $0008(A1),A0
869 000A74: D1E9 0010 '...' ADDA.L $0010(A1),A0
870 000A78: 2269 000C '"i...' MOVE.L $000C(A1),A1
871 000A7C: 2F0A '...' MOVE.L A2,-(A7)
872 000A7E: 45EC 0008 'E...' LEA $0008(A4),A2
873 000A82: 7200 'r.' MOVEQ #00,D1
874 000A84: 6100 FA00 'a...' BSR *-$05FE ; 00000486
875 000A88: 6100 F9B0 'a...' BSR *-$064E ; 0000043A
876 000A8C: 245F '$' MOVE.L (A7)+,A2
877 000A8E: 4A29 0006 'J)...' TST.B $0006(A1)
878 000A92: 6C0C 'l.' BGE.S **$000E ; 00000AA0
879 000A94: 0229 007F 0006 '.)....' ANDI.B #007F,$0006(A1)
880 000A9A: 4A01 'J...' TST.B D1
881 000A9C: 6600 006E 'f..n' BNE **$0070 ; 00000B0C
882 000AA0: 002C 0003 0068 '...h' BTST #0003,$0068(A4)
883 000AA6: 6600 0050 'f..P' BNE **$0052 ; 00000AF8
884 000AAA: 0C2A 0009 0016 '*....' CMP I.B #0009,$0016(A2)
885 000AB0: 6700 0050 'g..P' BEQ **$0052 ; 00000B02
886 000AB4: 4267 'Bg' CLR.W -(A7)
887 000AB6: 2F04 '...' MOVE.L D4,-(A7)
888 000AB8: 4EBA F648 'N..H' JSR *-$09B6 ; 00000102
889 000ABC: 355F 001A '5...' MOVE.W (A7)+,$001A(A2)
890 000AC0: 6600 0050 'f..P' BNE **$0052 ; 00000B12
891 000AC4: 7001 'p.' MOVEQ #01,D0
892 000AC6: 52AA 000A 'R...' ADDQ.L #1,$000A(A2)
893 000ACA: 532A 0026 'S*.&' SUBQ.B #1,$0026(A2)
894 000ACE: 6714 'g.' BEQ.S **$0016 ; 00000AE4
895 000AD0: 4AAA 0016 'J...' TST.L $0016(A2)
896 000AD4: 661A 'f.' BNE.S **$001C ; 00000AF0
897 000AD6: 357C 004C 0014 '5|.L...' MOVE.W #004C,$0014(A2)
898 000ADC: 157C 0022 0012 '.|. "...' MOVE.B #0022,$0012(A2)
899 000AE2: 4E75 'Nu' RTS
900 000AE4: 546A 0014 'Tj...' ADDQ.W #2,$0014(A2)
901 000AE8: 157C 0001 0012 'l....' MOVE.B #0001,$0012(A2)
902 000AEE: 4E75 'Nu' RTS
903 000AF0: 357C 0046 0014 '5|.F...' MOVE.W #0046,$0014(A2)
904 000AF6: 4E75 'Nu' RTS
905 000AF8: 357C 0296 001A '5|....' MOVE.W #0296,$001A(A2)
906 000AFE: 6000 0008 '...' BRA **$000A ; 00000B08
907 000B02: 357C FD69 001A '5|.i...' MOVE.W #FD69,$001A(A2)
908 000B08: 7000 'p.' MOVEQ #00,D0
909 000B0A: 4E75 'Nu' RTS
910 000B0C: 357C FD69 001A '5|.i...' MOVE.W #FD69,$001A(A2)
911 000B12: 422A 0026 'B*.&' CLR.B $0026(A2)
912 000B16: 2044 'D' MOVE.L D4,A0
    
```


913	000B18:	4268	0014	'Bh...'	CLR.W	\$0014 (A0)	
914	000B1C:	546A	0014	'Tj...'	ADDQ.W	#\$2, \$0014 (A2)	
915	000B20:	7001		'p.'	MOVEQ	#\$01, D0	
916	000B22:	157C	00FF 0012	'.'	MOVE.B	#\$00FF, \$0012 (A2)	
917	000B28:	4E75		'Nu'	RTS		
918	000B2A:	2044		'D'	MOVE.L	D4, A0	
919	000B2C:	4A68	0014	'Jh...'	TST.W	\$0014 (A0)	
920	000B30:	670A		'g.'	BEQ.S	+\$000C	; 00000B3C
921	000B32:	357C	0046 0014	'5 .F...'	MOVE.W	#\$0046, \$0014 (A2)	
922	000B38:	7001		'p.'	MOVEQ	#\$01, D0	
923	000B3A:	4E75		'Nu'	RTS		
924	000B3C:	7000		'p.'	MOVEQ	#\$00, D0	
925	000B3E:	4E75		'Nu'	RTS		
926	000B40:	122C	0078	'...x'	MOVE.B	\$0078 (A4), D1	
927	000B44:	0214	00E7	'....'	ANDI.B	#\$00E7, (A4)	
928	000B48:	197C	00FF 0018	'.'	MOVE.B	#\$00FF, \$0018 (A4)	
929	000B4E:	197C	0055 0078	' .U.x'	MOVE.B	#\$0055, \$0078 (A4)	
930	000B54:	002C	0001 0060	'....'	ORI.B	#\$0001, \$0060 (A4)	
931	000B5A:	197C	0002 0068	' .h'	MOVE.B	#\$0002, \$0068 (A4)	
932	000B60:	0014	0010	'....'	ORI.B	#\$0010, (A4)	
933	000B64:	0C01	0023	'...#'	CMPI.B	#\$0023, D1	
934	000B68:	662C		'f.'	BNE.S	+\$002E	; 00000B96
935	000B6A:	52AA	000A	'R...'	ADDQ.L	#\$1, \$000A (A2)	
936	000B6E:	532A	0026	'S*.&'	SUBQ.B	#\$1, \$0026 (A2)	
937	000B72:	6716		'g.'	BEQ.S	+\$0018	; 00000B8A
938	000B74:	357C	005A 0014	'5 .Z...'	MOVE.W	#\$005A, \$0014 (A2)	
939	000B7A:	357C	0001 001A	'5'	MOVE.W	#\$0001, \$001A (A2)	
940	000B80:	197C	00FF 0048	' .H'	MOVE.B	#\$00FF, \$0048 (A4)	
941	000B86:	7000		'p.'	MOVEQ	#\$00, D0	
942	000B88:	4E75		'Nu'	RTS		
943	000B8A:	157C	0027 0012	' . '...'	MOVE.B	#\$0027, \$0012 (A2)	
944	000B90:	546A	0014	'Tj...'	ADDQ.W	#\$2, \$0014 (A2)	
945	000B94:	60E4		' ...'	BRA.S	*-\$001A	; 00000B7A
946	000B96:	0C01	00A3	'....'	CMPI.B	#\$00A3, D1	
947	000B9A:	6608		'f.'	BNE.S	+\$000A	; 00000BA4
948	000B9C:	357C	0064 0014	'5 .d...'	MOVE.W	#\$0064, \$0014 (A2)	
949	000BA2:	60D6		' ...'	BRA.S	*-\$0028	; 00000B7A
950	000BA4:	357C	0038 0014	'5 .8...'	MOVE.W	#\$0038, \$0014 (A2)	
951	000BAA:	7001		'p.'	MOVEQ	#\$01, D0	
952	000BAC:	4E75		'Nu'	RTS		
953	000BAE:	357C	120D 002E	'5'	MOVE.W	#\$120D, \$002E (A2)	
954	000BB4:	6100	FDf6	'a...'	BSR	*-\$0208	; 000009AC
955	000BB8:	4A40		'J@'	TST.W	D0	
956	000BBA:	6600	0010	'f...'	BNE	+\$0012	; 00000BCC
957	000BBE:	157C	000F 0012	'.'	MOVE.B	#\$000F, \$0012 (A2)	
958	000BC4:	546A	0014	'Tj...'	ADDQ.W	#\$2, \$0014 (A2)	
959	000BC8:	7001		'p.'	MOVEQ	#\$01, D0	
960	000BCA:	4E75		'Nu'	RTS		
961	000BCC:	357C	0296 001A	'5'	MOVE.W	#\$0296, \$001A (A2)	
962	000BD2:	0014	0018	'....'	ORI.B	#\$0018, (A4)	
963	000BD6:	422C	0018	'B, ...'	CLR.B	\$0018 (A4)	
964	000BDA:	7000		'p.'	MOVEQ	#\$00, D0	
965	000BDC:	4E75		'Nu'	RTS		
966	000BDE:	262A	000A	'&*...'	MOVE.L	\$000A (A2), D3	
967	000BE2:	0283	00FF FFFF	'.....'	ANDI.L	#\$0FFFFFFF, D3	
968	000BE8:	2043		'C'	MOVE.L	D3, A0	
969	000BEA:	2F0A		'/'	MOVE.L	A2, -(A7)	
970	000BEC:	45EC	0008	'E...'	LEA	\$0008 (A4), A2	
971	000BF0:	6100	F894	'a...'	BSR	*-\$076A	; 00000486
972	000BF4:	245F		'\$'	MOVE.L	(A7)+, A2	
973	000BF6:	2043		'C'	MOVE.L	D3, A0	
974	000BF8:	0C28	0001 0009	'.(....'	CMPI.B	#\$0001, \$0009 (A0)	
975	000BFE:	660E		'f.'	BNE.S	+\$0010	; 00000C0E
976	000C00:	0CA8	000C 0511	'.....'	CMPI.L	#\$000C0511, \$01C6 (A0)	
977	000C06:	01C6		' ...'			
978	000C08:	6604		'f.'	BNE.S	+\$0006	; 00000C0E
979	000C0A:	7000		'p.'	MOVEQ	#\$00, D0	
980	000C0C:	4E75		'Nu'	RTS		
981	000C0E:	357C	026A 001A	'5 .j...'	MOVE.W	#\$026A, \$001A (A2)	
982	000C14:	60F4		' ...'	BRA.S	*-\$000A	; 00000C0A
983	000C16:	546A	0014	'Tj...'	ADDQ.W	#\$2, \$0014 (A2)	
984	000C1A:	7001		'p.'	MOVEQ	#\$01, D0	
985	000C1C:	4E75		'Nu'	RTS		
986	000C1E:	357C	160E 002E	'5'	MOVE.W	#\$160E, \$002E (A2)	
987	000C24:	257C	F078 3C1E	'% .x<.'	MOVE.L	#\$F0783C1E, \$0030 (A2)	
988	000C2A:	0030		' ...'			

989	000C2C:	6100	FD7E	'a...~'	BSR	*-\$0280	; 000009AC
990	000C30:	4A40		'J0'	TST.W	D0	
991	000C32:	6600	0010	'f...'	BNE	+\$0012	; 00000C44
992	000C36:	157C	0010 0012	''	MOVE.B	#\$0010,\$0012(A2)	
993	000C3C:	546A	0014	'Tj...'	ADDQ.W	#\$2,\$0014(A2)	
994	000C40:	7001		'p.'	MOVEQ	#\$01,D0	
995	000C42:	4E75		'Nu'	RTS		
996	000C44:	357C	0296 001A	'5 '	MOVE.W	#\$0296,\$001A(A2)	
997	000C4A:	0014	0018	'.....'	ORI.B	#\$0018,(A4)	
998	000C4E:	422C	0018	'B...'	CLR.B	\$0018(A4)	
999	000C52:	7000		'p.'	MOVEQ	#\$00,D0	
1000	000C54:	4E75		'Nu'	RTS		
1001	000C56:	202A	000A	'*...'	MOVE.L	\$000A(A2),D0	
1002	000C5A:	0280	00FF FFFF	'.....'	ANDI.L	#\$0FFFFFFF,D0	
1003	000C60:	2040		'e'	MOVE.L	D0,A0	
1004	000C62:	2F0A		'/. '	MOVE.L	A2,-(A7)	
1005	000C64:	45EC	0008	'E...'	LEA	\$0008(A4),A2	
1006	000C68:	6100	FA1C	'a...'	BSR	*-\$05E2	; 00000686
1007	000C6C:	245F		'\$'	MOVE.L	(A7)+,A2	
1008	000C6E:	157C	0006 0012	''	MOVE.B	#\$0006,\$0012(A2)	
1009	000C74:	546A	0014	'Tj...'	ADDQ.W	#\$2,\$0014(A2)	
1010	000C78:	7001		'p.'	MOVEQ	#\$01,D0	
1011	000C7A:	4E75		'Nu'	RTS		
1012	000C7C:	7000		'p.'	MOVEQ	#\$00,D0	
1013	000C7E:	4E75		'Nu'	RTS		
1014	000C80:	206F	0004	'o...'	MOVE.L	\$0004(A7),A0	
1015	000C84:	4A68	0004	'Jh...'	TST.W	\$0004(A0)	
1016	000C88:	665C		'f\.'	BNE.S	+\$005E	; 00000CE6
1017	000C8A:	2F0A		'/. '	MOVE.L	A2,-(A7)	
1018	000C8C:	2050		'P'	MOVE.L	(A0),A0	
1019	000C8E:	2468	0004	'\$h...'	MOVE.L	\$0004(A0),A2	
1020	000C92:	206A	0004	'j...'	MOVE.L	\$0004(A2),A0	
1021	000C96:	2250		'p'	MOVE.L	(A0),A1	
1022	000C98:	702A		'p*'	MOVEQ	#\$2A,D0	
1023	000C9A:	C029	0068	'.)h'	AND.B	\$0068(A1),D0	
1024	000C9E:	1340	0068	'e.h'	MOVE.B	D0,\$0068(A1)	
1025	000CA2:	7400		't.'	MOVEQ	#\$00,D2	
1026	000CA4:	0589	0046	'...F'	MOVEP.W	D2,\$0046(A1)	
1027	000CA8:	137C	0020 0068	' . .h'	MOVE.B	#\$0020,\$0068(A1)	
1028	000CAE:	0811	0000	'.....'	BTST	#\$0000,(A1)	
1029	000CB2:	6636		'f6'	BNE.S	+\$0038	; 00000CEA
1030	000CB4:	0200	0002	'.....'	ANDI.B	#\$0002,D0	
1031	000CB8:	6746		'gF'	BEQ.S	+\$0048	; 00000D00
1032	000CBA:	426F	000C	'Bo...'	CLR.W	\$000C(A7)	
1033	000CBE:	4A6A	0046	'Jj.F'	TST.W	\$0046(A2)	
1034	000CC2:	6752		'gR'	BEQ.S	+\$0054	; 00000D16
1035	000CC4:	2F0A		'/. '	MOVE.L	A2,-(A7)	
1036	000CC6:	4EBA	F46E	'N..n'	JSR	*-\$0B90	; 00000136
1037	000CCA:	206A	0004	'j...'	MOVE.L	\$0004(A2),A0	
1038	000CCE:	3028	001A	'0(...'	MOVE.W	\$001A(A0),D0	
1039	000CD2:	3F40	000C	'?e...'	MOVE.W	D0,\$000C(A7)	
1040	000CD6:	0C40	0001	'e...'	CMPI.W	#\$0001,D0	
1041	000CDA:	6608		'f.'	BNE.S	+\$000A	; 00000CE4
1042	000CDC:	317C	0064 0020	'l .d.'	MOVE.W	#\$0064,\$0020(A0)	
1043	000CE2:	6032		'2'	BRA.S	+\$0034	; 00000D16
1044	000CE4:	245F		'\$'	MOVE.L	(A7)+,A2	
1045	000CE6:	4EFA	041C	'N...'	JMP	+\$041E	; 00001104
1046	000CEA:	317C	0294 001A	''	MOVE.W	#\$0294,\$001A(A0)	
1047	000CF0:	1342	0018	'B...'	MOVE.B	D2,\$0018(A1)	
1048	000CF4:	0011	0018	'.....'	ORI.B	#\$0018,(A1)	
1049	000CF8:	4A6A	0046	'Jj.F'	TST.W	\$0046(A2)	
1050	000CFC:	66E6		'f.'	BNE.S	*-\$0018	; 00000CE4
1051	000CFE:	6016		'.'	BRA.S	+\$0018	; 00000D16
1052	000D00:	5368	0020	'sh.'	SUBQ.W	#\$1,\$0020(A0)	
1053	000D04:	6F08		'o.'	BLE.S	+\$000A	; 00000D0E
1054	000D06:	137C	00FF 0048	'H'	MOVE.B	#\$00FF,\$0048(A1)	
1055	000D0C:	6008		'.'	BRA.S	+\$000A	; 00000D16
1056	000D0E:	317C	075D 001A	' .]...'	MOVE.W	#\$075D,\$001A(A0)	
1057	000D14:	60DA		'.'	BRA.S	*-\$0024	; 00000CF0
1058	000D16:	245F		'\$'	MOVE.L	(A7)+,A2	
1059	000D18:	205F		'_'	MOVE.L	(A7)+,A0	
1060	000D1A:	DEFB	0004	'.....'	ADDA.W	#\$0004,A7	
1061	000D1E:	4ED0		'N.'	JMP	(A0)	
1062	000D20:	48E7	0038	'H..8'	MOVEM.L	A2-A4,-(A7)	
1063	000D24:	4CEF	1F00 000C	'L.....'	MOVEM.L	\$000C(A7),A0-A4	
1064	000D2A:	0011	00A0	'.....'	ORI.B	#\$00A0,(A1)	

1065	000D2E:	0012	00A0	'....'	ORI.B	#\$0A0, (A2)	
1066	000D32:	177C	003B 0070	'. .;.p'	MOVE.B	#\$03B,\$070 (A3)	
1067	000D38:	022B	00DC 0058	'+.X'	ANDI.B	#\$0DC,\$058 (A3)	
1068	000D3E:	022B	007B 0060	'+.{.'	ANDI.B	#\$07B,\$060 (A3)	
1069	000D44:	002B	006B 0060	'+.k.'	ORI.B	#\$06B,\$060 (A3)	
1070	000D4A:	7000		'p.'	MOVEQ	#\$00, D0	
1071	000D4C:	018B	0046	'...F'	MOVEQ.W	D0, \$0046 (A3)	
1072	000D50:	422B	0018	'B+.'	CLR.B	\$0018 (A3)	
1073	000D54:	022B	00FC 0010	'+....'	ANDI.B	#\$0FC,\$010 (A3)	
1074	000D5A:	002B	001C 0010	'+....'	ORI.B	#\$01C,\$010 (A3)	
1075	000D60:	0213	00FB	'....'	ANDI.B	#\$0FB, (A3)	
1076	000D64:	0013	0018	'....'	ORI.B	#\$018, (A3)	
1077	000D68:	0813	0000	'....'	BTST	#\$000, (A3)	
1078	000D6C:	6708		'g.'	BEQ.S	+\$000A ; 00000D76	
1079	000D6E:	303C	0294	'0<..'	MOVE.W	#\$294, D0	
1080	000D72:	6000	00E2	'....'	BRA	+\$00E4 ; 00000E56	
1081	000D76:	6100	00F6	'a...'	BSR	+\$00F8 ; 00000E6E	
1082	000D7A:	4A40		'J0'	TST.W	D0	
1083	000D7C:	6708		'g.'	BEQ.S	+\$000A ; 00000D86	
1084	000D7E:	303C	075D	'0<.]'	MOVE.W	#\$75D, D0	
1085	000D82:	6000	00CA	'....'	BRA	+\$00CC ; 00000E4E	
1086	000D86:	7401		't.'	MOVEQ	#\$01, D2	
1087	000D88:	6100	0110	'a...'	BSR	+\$0112 ; 00000E9A	
1088	000D8C:	4A40		'J0'	TST.W	D0	
1089	000D8E:	6600	00BE	'f...'	BNE	+\$00C0 ; 00000E4E	
1090	000D92:	0212	00DF	'....'	ANDI.B	#\$0DF, (A2)	
1091	000D96:	0012	0020	'....'	ORI.B	#\$020, (A2)	
1092	000D9A:	177C	0008 0068	' ...h'	MOVE.B	#\$008,\$068 (A3)	
1093	000DA0:	7000		'p.'	MOVEQ	#\$00, D0	
1094	000DA2:	1740	0008	'0...'	MOVE.B	D0, \$0008 (A3)	
1095	000DA6:	4E71		'Nq'	NOP		
1096	000DA8:	177C	00FF 0008	''	MOVE.B	#\$0FF,\$008 (A3)	
1097	000DAE:	177C	00FF 0008	''	MOVE.B	#\$0FF,\$008 (A3)	
1098	000DB4:	177C	00FF 0008	''	MOVE.B	#\$0FF,\$008 (A3)	
1099	000DBA:	177C	000A 0008	''	MOVE.B	#\$00A,\$008 (A3)	
1100	000DC0:	1740	0008	'0...'	MOVE.B	D0, \$0008 (A3)	
1101	000DC4:	082B	0003 0068	'+...h'	BTST	#\$003,\$068 (A3)	
1102	000DCA:	6700	000A	'g...'	BEQ	+\$000C ; 00000DD6	
1103	000DCE:	303C	0296	'0<..'	MOVE.W	#\$296, D0	
1104	000DD2:	6000	007A	'...z'	BRA	+\$007C ; 00000E4E	
1105	000DD6:	7402		't.'	MOVEQ	#\$02, D2	
1106	000DD8:	6100	00C0	'a...'	BSR	+\$00C2 ; 00000E9A	
1107	000DDC:	4A40		'J0'	TST.W	D0	
1108	000DDE:	6600	006E	'f.n'	BNE	+\$0070 ; 00000E4E	
1109	000DE2:	422B	0018	'B+.'	CLR.B	\$0018 (A3)	
1110	000DE6:	0013	0018	'....'	ORI.B	#\$018, (A3)	
1111	000DEA:	0212	00DF	'....'	ANDI.B	#\$0DF, (A2)	
1112	000DEE:	0012	0020	'....'	ORI.B	#\$020, (A2)	
1113	000DF2:	177C	0008 0068	' ...h'	MOVE.B	#\$008,\$068 (A3)	
1114	000DF8:	196B	0008 0016	'k....'	MOVE.B	\$0008 (A3), \$0016 (A4)	
1115	000DFE:	196B	0008 0017	'k....'	MOVE.B	\$0008 (A3), \$0017 (A4)	
1116	000E04:	196B	0008 0018	'k....'	MOVE.B	\$0008 (A3), \$0018 (A4)	
1117	000E0A:	196B	0008 0019	'k....'	MOVE.B	\$0008 (A3), \$0019 (A4)	
1118	000E10:	082B	0003 0068	'+...h'	BTST	#\$003,\$068 (A3)	
1119	000E16:	6700	0008	'g...'	BEQ	+\$000A ; 00000E20	
1120	000E1A:	303C	0296	'0<..'	MOVE.W	#\$296, D0	
1121	000E1E:	602E		'p.'	BRA.S	+\$0030 ; 00000E4E	
1122	000E20:	7000		'p.'	MOVEQ	#\$0D, D0	
1123	000E22:	122B	0008	'+...'	MOVE.B	\$0008 (A3), D1	
1124	000E26:	51C8	FFFA	'Q...'	DBF	D0, *-\$0004 ; 00000E22	
1125	000E2A:	196B	0008 0013	'k....'	MOVE.B	\$0008 (A3), \$0013 (A4)	
1126	000E30:	7002		'p.'	MOVEQ	#\$02, D0	
1127	000E32:	122B	0008	'+...'	MOVE.B	\$0008 (A3), D1	
1128	000E36:	51C8	FFFA	'Q...'	DBF	D0, *-\$0004 ; 00000E32	
1129	000E3A:	196B	0008 0023	'k...#'	MOVE.B	\$0008 (A3), \$0023 (A4)	
1130	000E40:	196B	0008 0024	'k...\$'	MOVE.B	\$0008 (A3), \$0024 (A4)	
1131	000E46:	196B	0008 0025	'k...#'	MOVE.B	\$0008 (A3), \$0025 (A4)	
1132	000E4C:	7000		'p.'	MOVEQ	#\$00, D0	
1133	000E4E:	422B	0018	'B+.'	CLR.B	\$0018 (A3)	
1134	000E52:	0013	0018	'....'	ORI.B	#\$018, (A3)	
1135	000E56:	177C	003B 0068	'. .;.h'	MOVE.B	#\$03B,\$068 (A3)	
1136	000E5C:	177C	00A2 0070	'. ...p'	MOVE.B	#\$0A2,\$070 (A3)	
1137	000E62:	4CDF	1C00	'L...'	MOVEM.L	(A7)+, A2-A4	
1138	000E66:	4FEF	0014	'O...'	LEA	\$0014 (A7), A7	
1139	000E6A:	3E80		'>...'	MOVE.W	D0, (A7)	
1140	000E6C:	4ED0		'N.'	JMP	(A0)	

```

1141 000E6E: 7000      'p.'      MOVEQ    #000,D0
1142 000E70: 223C 000C 0000  '"<....'  MOVE.L   #000C0000,D1
1143 000E76: 0813 0001      '....'   BTST     #0001,(A3)
1144 000E7A: 6606      'f.'      BNE.S    +$0008      ; 00000E82
1145 000E7C: 5381      's.'      SUBQ.L   #1,D1
1146 000E7E: 66F6      'f.'      BNE.S    +-$0008      ; 00000E76
1147 000E80: 7001      'p.'      MOVEQ    #01,D0
1148 000E82: 4E75      'Nu'     RTS
1149 000E84: 7000      'p.'      MOVEQ    #00,D0
1150 000E86: 223C 000C 0000  '"<....'  MOVE.L   #000C0000,D1
1151 000E8C: 0813 0001      '....'   BTST     #0001,(A3)
1152 000E90: 6706      'g.'     BEQ.S    +$0008      ; 00000E98
1153 000E92: 5381      's.'     SUBQ.L   #1,D1
1154 000E94: 66F6      'f.'     BNE.S    +-$0008      ; 00000E8C
1155 000E96: 7001      'p.'     MOVEQ    #01,D0
1156 000E98: 4E75      'Nu'     RTS
1157 000E9A: 177C 0002 0068  '.|...h'  MOVE.B   #0002,$0068(A3)
1158 000EA0: 0213 00EF      '....'   ANDI.B   #00EF,(A3)
1159 000EA4: 0013 0008      '....'   ORI.B    #0008,(A3)
1160 000EA8: 422B 0018      'B+...'  CLR.B    #018(A3)
1161 000EAC: 61D6      'a.'     BSR.S    *-$0028      ; 00000E84
1162 000EAE: 4A40      'J0'     TST.W    D0
1163 000EB0: 6706      'g.'     BEQ.S    +$0008      ; 00000EB8
1164 000EB2: 303C 075D      '0<.]'   MOVE.W   #075D,D0
1165 000EB6: 4E75      'Nu'     RTS
1166 000EB8: 122B 0078      '+.x'    MOVE.B   $0078(A3),D1
1167 000EBC: 0213 00E7      '....'   ANDI.B   #00E7,(A3)
1168 000EC0: 177C 00FF 0018  '.|....'  MOVE.B   #00FF,$0018(A3)
1169 000EC6: B202      '...'   CMP.B    D2,D1
1170 000EC8: 661C      'f.'     BNE.S    +$001E      ; 00000EE6
1171 000ECA: 177C 0055 0078  '.|.U.x'  MOVE.B   #0055,$0078(A3)
1172 000ED0: 0013 0010      '....'   ORI.B    #0010,(A3)
1173 000ED4: 6198      'a.'     BSR.S    *-$0066      ; 00000E6E
1174 000ED6: 4A40      'J0'     TST.W    D0
1175 000ED8: 6704      'g.'     BEQ.S    +$0006      ; 00000EDE
1176 000EDA: 303C 075D      '0<.]'   MOVE.W   #075D,D0
1177 000EDE: 177C 0002 0068  '.|...h'  MOVE.B   #0002,$0068(A3)
1178 000EE4: 4E75      'Nu'     RTS
1179 000EE6: 177C 00AA 0078  '.|...x'  MOVE.B   #00AA,$0078(A3)
1180 000EEC: 0013 0010      '....'   ORI.B    #0010,(A3)
1181 000EF0: 6100 FF7C      'a..|'   BSR      *-$0082      ; 00000E6E
1182 000EF4: 303C 075A      '0<.Z'   MOVE.W   #075A,D0
1183 000EF8: 177C 0002 0068  '.|...h'  MOVE.B   #0002,$0068(A3)
1184 000EFE: 4E75      'Nu'     RTS
1185 000F00: 205F      '...'   MOVE.L   (A7)+,A0
1186 000F02: 225F      'u-'    MOVE.L   (A7)+,A1
1187 000F04: 137C 003B 0070  '.|.;.p'  MOVE.B   #003B,$0070(A1)
1188 000F0A: 4ED0      'N.'     JMP      (A0)
1189 000F0C: 4EBA 061C      'N... '  JSR      +$061E      ; 0000152A
1190 000F10: 4E56 0000      'NV..'   LINK     A6,#0000
1191 000F14: 2C5F      '...'   MOVE.L   (A7)+,A6
1192 000F16: 4E55 0000      'NU..'   LINK     A5,#0000
1193 000F1A: 9FED 0010      '....'   SUBA.L   $0010(A5),A7
1194 000F1E: 4EBA 060E      'N... '  JSR      +$0610      ; 0000152E
1195 000F22: 4EBA FD5C      'N..\'   JSR      *-$02A2      ; 00000C80
1196 000F26: 4EBA 060C      'N... '  JSR      +$060E      ; 00001534
1197 000F2A: 4E5D      'N]'     UNLK     A5
1198 000F2C: 4EBA 05FE      'N... '  JSR      +$0600      ; 0000152C
1199 000F30: 4E75      'Nu'     RTS
1200 000F32: 4E5E      'N^'    UNLK     A6
1201 000F34: 4E75      'Nu'     RTS
1202 000F36: C452      '.R'    AND.W    (A2),D2
1203 000F38: 4956      'IV'    PEA      (A6)
1204 000F3A: 4552      'ER'    NEG.W    (A2)
1205 000F3C: 4D41 0000      'MA..'   MOVEM.L  D1
1206 000F40: 4E56 FFF4      'NV..'   LINK     A6,#FFF4
1207 000F44: 48E7 0318      'H... '  MOVEM.L  D6/D7/A3/A4,-(A7)
1208 000F48: 2E2E 0008      '....'   MOVE.L   $0008(A6),D7
1209 000F4C: 2C2E 000C      '....'   MOVE.L   $000C(A6),D6
1210 000F50: 2047      'G'     MOVE.L   D7,A0
1211 000F52: 2668 0004      '&h..'   MOVE.L   $0004(A0),A3
1212 000F56: 2047      'G'     MOVE.L   D7,A0
1213 000F58: 2868 003E      '(h.>'   MOVE.L   $003E(A0),A4
1214 000F5C: 197C 0001 0014  '.|....'  MOVE.B   #0001,$0014(A4)
1215 000F62: 2047      'G'     MOVE.L   D7,A0
1216 000F64: 216C 001E 003A  '!1...:'  MOVE.L   $001E(A4), $003A(A0)

```

```

1217 000F6A: 2047      ' G'      MOVE.L  D7,A0
1218 000F6C: 2028 003E  ' (.>'    MOVE.L  $003E(A0),D0
1219 000F70: 7228      ' r('     MOVEQ   #$28,D1
1220 000F72: D081      '...'    ADD.L   D1,D0
1221 000F74: 2740 000A      ' @...'   MOVE.L  D0,$000A(A3)
1222 000F78: 176C 0018 000A  ' l.....' MOVE.B  $0018(A4),$000A(A3)
1223 000F7E: 426B 0014      ' Bk...'  CLR.W   $0014(A3)
1224 000F82: 2F07      ' /.'     MOVE.L  D7,-(A7)
1225 000F84: 4EBA F1B0      ' N...'   JSR     *-$0E4E      ; 00000136
1226 000F88: 2046      ' -F'     MOVE.L  D6,A0
1227 000F8A: 30AB 001A      ' 0...'   MOVE.W  $001A(A3),(A0)
1228 000F8E: 2046      ' F'     MOVE.L  D6,A0
1229 000F90: 4A50      ' JP'     TST.W  (A0)
1230 000F92: 670E      ' g.'     BEQ.S  **+$0010      ; 00000FA2
1231 000F94: 2046      ' F'     MOVE.L  D6,A0
1232 000F96: 0C50 0001      ' P...'   CMPI.W  #$0001,(A0)
1233 000F9A: 6606      ' f.'     BNE.S  **+$0008      ; 00000FA2
1234 000F9C: 377C 0064 0020  ' |.d.'   MOVE.W  #$0064,$0020(A3)
1235 000FA2: 4CDF 18C0      ' L...'   MOVEM.L (A7)+,D6/D7/A3/A4
1236 000FA6: 4E5E      ' N^'     UNLK   A6
1237 000FA8: 205F      ' .'     MOVE.L  (A7)+,A0
1238 000FAA: 504F      ' PO'    ADDQ.W  $S8,A7
1239 000FAC: 4ED0      ' N.'     JMP     (A0)
1240 000FAE: D354      ' T'     ADD.W  D1,(A4)
1241 000FB0: 4152      ' AR'    NEGX.W (A2)
1242 000FB2: 545F      ' T'     ADDQ.W  $S2,(A7)+
1243 000FB4: 4E4F      ' NO'    TRAP   $SF
1244 000FB6: 0000 4E56      ' ..NV'   ORI.B  #$4E56,D0
1245 000FBA: FFE8      ' ..'    $$$
1246 000FBC: 48E7 0F18      ' H...'   MOVEM.L D4-D7/A3/A4,-(A7)
1247 000FC0: 206E 0008      ' n...'   MOVE.L  $0008(A6),A0
1248 000FC4: 2E28 0004      ' (...)' MOVE.L  $0004(A0),D7
1249 000FC8: 206E 000E      ' n...'   MOVE.L  $000E(A6),A0
1250 000FCC: 30BC 028D      ' 0...'   MOVE.W  #$028D,(A0)
1251 000FD0: 7A28      ' z('     MOVEQ   $S28,D5
1252 000FD2: 0C6E 0002 000C  ' n.....' CMPI.W  #$0002,$000C(A6)
1253 000FD8: 6604      ' f.'     BNE.S  **+$0006      ; 00000FDE
1254 000FDA: DA7C 0200      ' |...'   ADD.W  #$0200,D5
1255 000FDE: 2C3C 0000 0200  ' <.....' MOVE.L  $00000200,D6
1256 000FE4: 4267      ' Bg'    CLR.W  -(A7)
1257 000FE6: 3F05      ' ?.'    MOVE.W  D5,-(A7)
1258 000FE8: 2046      ' F'     MOVE.L  D6,A0
1259 000FEA: 2F10      ' /.'     MOVE.L  (A0),-(A7)
1260 000FEC: 486E FFF8      ' Hn...' PEA    $FFF8(A6)
1261 000FF0: 4EBA F038      ' N..8'   JSR     *-$0FC6      ; 0000002A
1262 000FF4: 101F      '...'   MOVE.B  (A7)+,D0
1263 000FF6: 6700 00F4      ' g...'   BEQ    **+$00F6      ; 000010EC
1264 000FFA: 206E 000E      ' n...'   MOVE.L  $000E(A6),A0
1265 000FFE: 4250      ' BP'    CLR.W  (A0)
1266 001000: 2D6E FFF8 FFF4  ' -n.....' MOVE.L  $FFF8(A6),$FFF4(A6)
1267 001006: 286E FFF4      ' (n...'   MOVE.L  $FFF4(A6),A4
1268 00100A: 296E 0008 001A  ' )n.....' MOVE.L  $0008(A6),$001A(A4)
1269 001010: 196E 000D 0018  ' .n.....' MOVE.B  $000D(A6),$0018(A4)
1270 001016: 42AC 001E      ' B...'   CLR.L  $001E(A4)
1271 00101A: 47EC 000A      ' G...'   LEA    $000A(A4),A3
1272 00101E: 2046      ' F'     MOVE.L  D6,A0
1273 001020: 200B      ' .'     MOVE.L  A3,D0
1274 001022: 9090      ' ..'    SUB.L  (A0),D0
1275 001024: 3680      ' 6.'    MOVE.W  D0,(A3)
1276 001026: 3753 0002      ' 7S...' MOVE.W  (A3),$0002(A3)
1277 00102A: 2F2E FFF4      ' /...'   MOVE.L  $FFF4(A6),-(A7)
1278 00102E: 4EBA F0BA      ' N...'   JSR     *-$0F44      ; 000000EA
1279 001032: 2047      ' G'     MOVE.L  D7,A0
1280 001034: 3F28 0038      ' ?(.8)' MOVE.W  $0038(A0),-(A7)
1281 001038: 486E FFF2      ' Hn...' PEA    $FFF2(A6)
1282 00103C: 4EBA F04C      ' N..L'   JSR     *-$0FB2      ; 0000008A
1283 001040: 2047      ' G'     MOVE.L  D7,A0
1284 001042: 2068 003E      ' h.>'    MOVE.L  $003E(A0),A0
1285 001046: 2968 0024 0024  ' )h.$.$' MOVE.L  $0024(A0),$0024(A4)
1286 00104C: 2047      ' G'     MOVE.L  D7,A0
1287 00104E: 2068 003E      ' h.>'    MOVE.L  $003E(A0),A0
1288 001052: 3028 0008      ' 0(...)' MOVE.W  $0008(A0),D0
1289 001056: 5D40      ' |@'    SUBQ.W  $S6,D0
1290 001058: 48C0      ' H.'    EXT.L  D0
1291 00105A: 2046      ' F'     MOVE.L  D6,A0
1292 00105C: 2210      ' ". '   MOVE.L  (A0),D1
    
```

1293	00105E:	D280	'..'	ADD.L	D0,D1	
1294	001060:	2801	'.'	MOVE.L	D1,D4	
1295	001062:	2047	'G'	MOVE.L	D7,A0	
1296	001064:	2247	'"G'	MOVE.L	D7,A1	
1297	001066:	2028 003E	'(.>'	MOVE.L	\$003E(A0),D0	
1298	00106A:	B0A9 0042	'...B'	CMP.L	\$0042(A1),D0	
1299	00106E:	6608	'f.'	BNE.S	+\$000A	; 00001078
1300	001070:	2047	'G'	MOVE.L	D7,A0	
1301	001072:	216E FFF4 003E	'!n...>'	MOVE.L	\$FFF4(A6), \$003E(A0)	
1302	001078:	2047	'G'	MOVE.L	D7,A0	
1303	00107A:	3028 0046	'0(.F'	MOVE.W	\$0046(A0),D0	
1304	00107E:	5240	'R0'	ADDQ.W	#\$1,D0	
1305	001080:	2047	'G'	MOVE.L	D7,A0	
1306	001082:	3140 0046	'10.F'	MOVE.W	D0,\$0046(A0)	
1307	001086:	486C 0006	'Hl...'	PEA	\$0006(A4)	
1308	00108A:	2044	'D'	MOVE.L	D4,A0	
1309	00108C:	4868 0006	'Hh...'	PEA	\$0006(A0)	
1310	001090:	2046	'F'	MOVE.L	D6,A0	
1311	001092:	2F10	'/'	MOVE.L	(A0),-(A7)	
1312	001094:	4EBA EF7C	'N... '	JSR	*-\$1082	; 00000012
1313	001098:	2047	'G'	MOVE.L	D7,A0	
1314	00109A:	0C68 0001 0046	'h...F'	CMP.L	#\$0001,\$0046(A0)	
1315	0010A0:	660A	'f.'	BNE.S	+\$000C	; 000010AC
1316	0010A2:	2F2E 000E	'/...'	MOVE.L	\$000E(A6),-(A7)	
1317	0010A6:	2F07	'/'	MOVE.L	D7,-(A7)	
1318	0010A8:	4EBA FE96	'N...'	JSR	*-\$0168	; 00000F40
1319	0010AC:	3F2E FFF2	'?...'	MOVE.W	\$FFF2(A6),-(A7)	
1320	0010B0:	4EBA EFE0	'N...'	JSR	*-\$101E	; 00000092
1321	0010B4:	206E 000E	'n...'	MOVE.L	\$000E(A6),A0	
1322	0010B8:	0C50 0001	'P...'	CMP.L	#\$0001,(A0)	
1323	0010BC:	6626	'f&'	BNE.S	+\$0028	; 000010E4
1324	0010BE:	2F2E FFF4	'/...'	MOVE.L	\$FFF4(A6),-(A7)	
1325	0010C2:	486E FFF4	'Hn...'	PEA	\$FFF4(A6)	
1326	0010C6:	4EBA EF6A	'N...'	JSR	*-\$1074	; 00000052
1327	0010CA:	206E FFF4	'n...'	MOVE.L	\$FFF4(A6),A0	
1328	0010CE:	1028 0015	'(. ...'	MOVE.B	\$0015(A0),D0	
1329	0010D2:	6708	'g.'	BEQ.S	+\$000A	; 000010DC
1330	0010D4:	206E 000E	'n...'	MOVE.L	\$000E(A6),A0	
1331	0010D8:	4250	'BP'	CLR.W	(A0)	
1332	0010DA:	6008	'..'	BRA.S	+\$000A	; 000010E4
1333	0010DC:	206E 000E	'n...'	MOVE.L	\$000E(A6),A0	
1334	0010E0:	30BC 028E	'0...'	MOVE.W	#\$028E,(A0)	
1335	0010E4:	2F2E FFF4	'/...'	MOVE.L	\$FFF4(A6),-(A7)	
1336	0010E8:	4EBA EF22	'N..."	JSR	*-\$10DC	; 0000000C
1337	0010EC:	4CDF 18F0	'L...'	MOVEM.L	(A7)+,D4-D7/A3/A4	
1338	0010F0:	4E5E	'N^'	UNLK	A6	
1339	0010F2:	205F	'.'	MOVE.L	(A7)+,A0	
1340	0010F4:	DEFB 000A	'-...'	ADDA.W	#\$000A,A7	
1341	0010F8:	4ED0	'N.'	JMP	(A0)	
1342	0010FA:	CE4F	'O'	AND.W	A7,D7	
1343	0010FC:	4E49	'NI'	TRAP	#\$9	
1344	0010FE:	4F5F	'O'	UNLK	A7	
1345	001100:	5245	'R0'	ADDQ.W	#\$1,D5	
1346	001102:	0000 4E56	'..NV'	ORI.B	#\$4E56,D0	
1347	001106:	FFCE	'...'	\$\$\$		
1348	001108:	48E7 0F18	'H...'	MOVEM.L	D4-D7/A3/A4, -(A7)	
1349	00110C:	2A2E 0008	'*...'	MOVE.L	\$0008(A6),D5	
1350	001110:	2045	'E'	MOVE.L	D5,A0	
1351	001112:	2050	'P'	MOVE.L	(A0),A0	
1352	001114:	2E28 0004	'(. ...'	MOVE.L	\$0004(A0),D7	
1353	001118:	2045	'E'	MOVE.L	D5,A0	
1354	00111A:	3028 0004	'0(...'	MOVE.W	\$0004(A0),D0	
1355	00111E:	6700 0298	'g...'	BEQ	+\$029A	; 000013B8
1356	001122:	5340	'S0'	SUBQ.W	#\$1,D0	
1357	001124:	6726	'g&'	BEQ.S	+\$0028	; 0000114C
1358	001126:	5540	'U0'	SUBQ.W	#\$2,D0	
1359	001128:	6700 02CA	'g...'	BEQ	+\$02CC	; 000013F4
1360	00112C:	5340	'S0'	SUBQ.W	#\$1,D0	
1361	00112E:	6700 039A	'g...'	BEQ	+\$039C	; 000014CA
1362	001132:	5740	'W0'	SUBQ.W	#\$3,D0	
1363	001134:	6700 02C8	'g...'	BEQ	+\$02CA	; 000013FE
1364	001138:	5D40	'j0'	SUBQ.W	#\$6,D0	
1365	00113A:	6730	'g0'	BEQ.S	+\$0032	; 0000116C
1366	00113C:	5340	'S0'	SUBQ.W	#\$1,D0	
1367	00113E:	6700 0200	'g...'	BEQ	+\$0202	; 00001340
1368	001142:	5940	'Y0'	SUBQ.W	#\$4,D0	

```

1369 001144: 6700 01CE 'g...' BEQ *+$01D0 ; 00001314
1370 001148: 6000 03B8 '...' BRA *+$03BA ; 00001502
1371 00114C: 2045 'E' MOVE.L D5,A0
1372 00114E: 2F10 '/' MOVE.L (A0),-(A7)
1373 001150: 4EBA EFA0 'N...' JSR *-$105E ; 000000F2
1374 001154: 486E FFE4 'Hn...' PEA $FFE4(A6)
1375 001158: 2045 'E' MOVE.L D5,A0
1376 00115A: 2F10 '/' MOVE.L (A0),-(A7)
1377 00115C: 2F05 '/' MOVE.L D5,-(A7)
1378 00115E: 4EBA EF9A 'N...' JSR *-$1064 ; 000000FA
1379 001162: 3D6E FFE4 000C 'n...' MOVE.W $FFE4(A6),$000C(A6)
1380 001168: 6000 03AC '...' BRA *+$03AE ; 00001516
1381 00116C: 3D7C 028D 000C 'l...' MOVE.W #$028D,$000C(A6)
1382 001172: 283C 0000 0200 '<...' MOVE.L #$00000200,D4
1383 001178: 4267 'Bg' CLR.W -(A7)
1384 00117A: 3F3C 0038 '?<.8' MOVE.W #$0038,-(A7)
1385 00117E: 2044 'D' MOVE.L D4,A0
1386 001180: 2F10 '/' MOVE.L (A0),-(A7)
1387 001182: 486E FFF0 'Hn...' PEA $FFF0(A6)
1388 001186: 4EBA EEA2 'N...' JSR *-$115C ; 0000002A
1389 00118A: 101F '...' MOVE.B (A7)+,D0
1390 00118C: 6700 0182 'g...' BEQ *+$0184 ; 00001310
1391 001190: 2C2E FFF0 '...' MOVE.L $FFF0(A6),D6
1392 001194: 2846 '(F' MOVE.L D6,A4
1393 001196: 2045 'E' MOVE.L D5,A0
1394 001198: 2650 '&P' MOVE.L (A0),A3
1395 00119A: 2047 'G' MOVE.L D7,A0
1396 00119C: 216E FFF0 0004 'n...' MOVE.L $FFF0(A6),$0004(A0)
1397 0011A2: 2D6B 0008 FFF8 '-k...' MOVE.L $0008(A3),$FFF8(A6)
1398 0011A8: 4A2B 0033 'J+.3' TST.B $0033(A3)
1399 0011AC: 6D4E 'mN' BLT.S *+$0050 ; 000011FC
1400 0011AE: 707E 'p~' MOVEQ #$7E,D0
1401 0011B0: 2F00 '/' MOVE.L D0,-(A7)
1402 0011B2: 2F3C 0002 0000 '<...' MOVE.L #$00020000,-(A7)
1403 0011B8: 4EBA EF58 'N.X' JSR *-$10A6 ; 00000112
1404 0011BC: 102B 0032 '+.2' MOVE.B $0032(A3),D0
1405 0011C0: 4880 'H.' EXT.W D0
1406 0011C2: 48C0 'H.' EXT.L D0
1407 0011C4: 2F3C 0000 4000 '<...@.' MOVE.L #$00004000,-(A7)
1408 0011CA: 2F00 '/' MOVE.L D0,-(A7)
1409 0011CC: 4EBA EF44 'N.D' JSR *-$10BA ; 00000112
1410 0011D0: 201F '...' MOVE.L (A7)+,D0
1411 0011D2: D09F '...' ADD.L (A7)+,D0
1412 0011D4: D0BC 0000 2001 '...' ADD.L #$00002001,D0
1413 0011DA: 122B 0033 '+.3' MOVE.B $0033(A3),D1
1414 0011DE: 4881 'H.' EXT.W D1
1415 0011E0: C3FC 0800 '...' MULS #$0800,D1
1416 0011E4: 48C1 'H.' EXT.L D1
1417 0011E6: D280 '...' ADD.L D0,D1
1418 0011E8: 2881 '(.' MOVE.L D1,(A4)
1419 0011EA: 2954 0004 ')T...' MOVE.L (A4),$0004(A4)
1420 0011EE: 202C 0004 '...' MOVE.L $0004(A4),D0
1421 0011F2: 7210 'r.' MOVEQ #$10,D1
1422 0011F4: D081 '...' ADD.L D1,D0
1423 0011F6: 2D40 FFFC '-@...' MOVE.L D0,$FFFC(A6)
1424 0011FA: 602E '...' BRA.S *+$0030 ; 0000122A
1425 0011FC: 707E 'p~' MOVEQ #$7E,D0
1426 0011FE: 2F00 '/' MOVE.L D0,-(A7)
1427 001200: 2F3C 0002 0000 '<...' MOVE.L #$00020000,-(A7)
1428 001206: 4EBA EF0A 'N...' JSR *-$10F4 ; 00000112
1429 00120A: 201F '...' MOVE.L (A7)+,D0
1430 00120C: D0BC 0000 D801 '...' ADD.L #$0000D801,D0
1431 001212: 2880 '(.' MOVE.L D0,(A4)
1432 001214: 2014 '...' MOVE.L (A4),D0
1433 001216: D0BC 0000 0400 '...' ADD.L #$00000400,D0
1434 00121C: 2940 0004 ')@...' MOVE.L D0,$0004(A4)
1435 001220: 202C 0004 '...' MOVE.L $0004(A4),D0
1436 001224: 5880 'X.' ADDQ.L #$4,D0
1437 001226: 2D40 FFFC '-@...' MOVE.L D0,$FFFC(A6)
1438 00122A: 422C 0028 'B.( ' CLR.B $0028(A4)
1439 00122E: 42AC 002A 'B.* ' CLR.L $002A(A4)
1440 001232: 426C 0036 'Bl.6' CLR.W $0036(A4)
1441 001236: 42AC 0022 'B.'" ' CLR.L $0022(A4)
1442 00123A: 206E FFF8 'n...' MOVE.L $FFF8(A6),A0
1443 00123E: 217C 0000 25F8 '!|...&.' MOVE.L #$000025F8,$0004(A0)
1444 001244: 0004 '...'

```

```

1445 001246: 206E FFF8      ' n..'      MOVE.L  $FFF8 (A6), A0
1446 00124A: 4228 0012      'B(..'      CLR.B   $0012 (A0)
1447 00124E: 42AC 001C      'B...'      CLR.L   $001C (A4)
1448 001252: 197C 000A 000E      '.|.....'  MOVE.B  #$000A, $000E (A4)
1449 001258: 197C 0003 000F      '.|.....'  MOVE.B  #$0003, $000F (A4)
1450 00125E: 197C 0001 0008      '.|.....'  MOVE.B  #$0001, $0008 (A4)
1451 001264: 4A2B 0033      'J+.3'     TST.B   $0033 (A3)
1452 001268: 6C08          'l.'       BGE.S   *+$000A          ; 00001272
1453 00126A: 1F3C 0001      '<..'      MOVE.B  #$0001, - (A7)
1454 00126E: 4EBA EE4A      'N..J'     JSR     *-$11B4          ; 000000BA
1455 001272: 4267          'Bg'       CLR.W   - (A7)
1456 001274: 2F06          '/.'       MOVE.L  D6, - (A7)
1457 001276: 2F14          '/.'       MOVE.L  (A4), - (A7)
1458 001278: 2F2C 0004      '/,..'    MOVE.L  $0004 (A4), - (A7)
1459 00127C: 2F2E FFFC      '/...'    MOVE.L  $FFFC (A6), - (A7)
1460 001280: 4EBA FA9E      'N...'    JSR     *-$0560          ; 00000D20
1461 001284: 3D5F FFD6      '=...'    MOVE.W  (A7)+, $FFD6 (A6)
1462 001288: 4A2B 0033      'J+.3'     TST.B   $0033 (A3)
1463 00128C: 6C06          'l.'       BGE.S   *+$0008          ; 00001294
1464 00128E: 4267          'Bg'       CLR.W   - (A7)
1465 001290: 4EBA EE28      'N..('     JSR     *-$11D6          ; 000000BA
1466 001294: 3D6E FFD6 000C      '-n.....'  MOVE.W  $FFD6 (A6), $000C (A6)
1467 00129A: 4A6E FFD6      'Jn...'    TST.W   $FFD6 (A6)
1468 00129E: 6F1C          'o.'       BLE.S   *+$001E          ; 000012BC
1469 0012A0: 2F14          '/.'       MOVE.L  (A4), - (A7)
1470 0012A2: 4EBA FC5C      'N..\'     JSR     *-$03A2          ; 00000F00
1471 0012A6: 2F2E FFF0      '/...'    MOVE.L  $FFF0 (A6), - (A7)
1472 0012AA: 2044          'D.'       MOVE.L  D4, A0
1473 0012AC: 2F10          '/.'       MOVE.L  (A0), - (A7)
1474 0012AE: 4EBA ED72      'N..r'     JSR     *-$128C          ; 00000022
1475 0012B2: 2047          'G.'       MOVE.L  D7, A0
1476 0012B4: 42A8 0004      'B...'    CLR.L   $0004 (A0)
1477 0012B8: 6000 025C      '\..'     BRA     *+$025E          ; 00001516
1478 0012BC: 0CAC 0000 2600      '...&..'  CMPI.L  #$00002600, $0022 (A4)
1479 0012C2: 0022          '...'     SLE     D0
1480 0012C4: 5FC0          '...'     CMPI.L  #$00007530, $0022 (A4)
1481 0012C6: 0CAC 0000 7530      '...u0'   SGT     D1
1482 0012CC: 0022          '...'     OR.B   D1, D0
1483 0012CE: 5EC1          '^..'     BEQ.S   *+$0008          ; 000012DA
1484 0012D0: 8001          '...'     CLR.B   $0013 (A4)
1485 0012D2: 6706          'g..'     BRA.S   *+$0038          ; 00001310
1486 0012D4: 422C 0013      'B...'    MOVE.L  $FFF8 (A6), A0
1487 0012D8: 6036          '6..'     MOVE.L  $0022 (A4), D0
1488 0012DA: 206E FFF8      ' n..'    SUB.L   $0008 (A0), D0
1489 0012DE: 202C 0022      '...'     MOVE.L  $FFF8 (A6), A0
1490 0012E2: 90A8 0008      '...'     MOVE.L  D0, $0004 (A0)
1491 0012E6: 206E FFF8      ' n..'    MOVE.L  $0013 (A4)
1492 0012EA: 2140 0004      '!@..'    TST.B   $0013 (A4)
1493 0012EE: 4A2C 0013      'J,..'    BEQ.S   *+$0018          ; 0000130A
1494 0012F2: 6716          'g..'     CLR.B   $0008 (A4)
1495 0012F4: 422C 0008      'B,..'    MOVE.B  #$0002, $0013 (A4)
1496 0012F8: 197C 0002 0013      '.|.....'  MOVE.L  $FFF8 (A6), A0
1497 0012FE: 206E FFF8      ' n..'    MOVE.B  #$0014, $0012 (A0)
1498 001302: 117C 0014 0012      '.|.....'  BRA.S   *+$0008          ; 00001310
1499 001308: 6006          '...'     MOVE.B  #$0001, $0013 (A4)
1500 00130A: 197C 0001 0013      '.|.....'  BRA     *+$0206          ; 00001516
1501 001310: 6000 0204      '...'     MOVE.L  D7, A4
1502 001314: 2847          '(G..'    MOVE.L  $0004 (A4), D6
1503 001316: 2C2C 0004      ',,..'    MOVE.L  D6, A0
1504 00131A: 2046          'F.'     MOVE.L  (A0), - (A7)
1505 00131C: 2F10          '/.'     JSR     *-$041E          ; 00000F00
1506 00131E: 4EBA FB00      'N...'    MOVE.L  #$00002000, D4
1507 001322: 283C 0000 0200      '<.....'  MOVE.L  $0004 (A4), - (A7)
1508 001328: 2F2C 0004      '/,..'    MOVE.L  D4, A0
1509 00132C: 2044          'D.'     MOVE.L  (A0), - (A7)
1510 00132E: 2F10          '/.'     JSR     *-$130E          ; 00000022
1511 001330: 4EBA ECF0      'N...'    CLR.L   $0004 (A4)
1512 001334: 42AC 0004      'B...'    CLR.W   $000C (A6)
1513 001338: 426E 000C      'Bn...'   BRA     *+$01DA          ; 00001516
1514 00133C: 6000 01D8      '\..'     MOVE.L  D7, A4
1515 001340: 2847          '(G..'    MOVE.L  $003E (A4), A0
1516 001342: 206C 003E      'l.>'     MOVE.B  $0018 (A0), D0
1517 001346: 1028 0018      '(...'    EXT.W   D0
1518 00134A: 4880          'H..'     MOVE.W  D0, $FFD2 (A6)
1519 00134C: 3D40 FFD2      '=@..'    CMPI.W  #$0002, $FFD2 (A6)
1520 001350: 0C6E 0002 FFD2      '.n.....'

```



```

1521 001356: 6612      'f.'      BNE.S    *+$0014      ; 0000136A
1522 001358: 486E FFE4  'Hn..'   PEA      $FFE4 (A6)
1523 00135C: 2F07      '/.'     MOVE.L   D7, -(A7)
1524 00135E: 4EBA FBE0  'N..'   JSR      *-$041E      ; 00000F40
1525 001362: 3D6E FFE4 000C  'n.....' MOVE.W   $FFE4 (A6), $000C (A6)
1526 001368: 604A      'J'     BRA.S    *+$004C      ; 000013B4
1527 00136A: 2C2C 0004  '....'  MOVE.L   $0004 (A4), D6
1528 00136E: 2646      '&F'    MOVE.L   D6, A3
1529 001370: 206C 003A  'l..'   MOVE.L   $003A (A4), A0
1530 001374: 2768 0012 000A  'h.....' MOVE.L   $0012 (A0), $000A (A3)
1531 00137A: 7001      'p.'   MOVEQ    #$01, D0
1532 00137C: 906E FFD2  'n..'   SUB.W   $FFD2 (A6), D0
1533 001380: 1740 000A  'e..'   MOVE.B   D0, $000A (A3)
1534 001384: 426B 0014  'Bk..'  CLR.W   $0014 (A3)
1535 001388: 2F07      '/.'     MOVE.L   D7, -(A7)
1536 00138A: 4EBA EDAA  'N..'   JSR      *-$1254      ; 00000136
1537 00138E: 3D6B 001A 000C  'k.....' MOVE.W   $001A (A3), $000C (A6)
1538 001394: 4A6B 001A  'Jk..'  TST.W   $001A (A3)
1539 001398: 671A      'g.'   BEQ.S    *+$001C      ; 000013B4
1540 00139A: 0C6B 0001 001A  'k.....' CMPI.W  #$0001, $001A (A3)
1541 0013A0: 6608      'f.'   BNE.S    *+$000A      ; 000013AA
1542 0013A2: 377C 0064 0020  '7|d.'  MOVE.W   #$0064, $0020 (A3)
1543 0013A8: 600A      '...'  BRA.S    *+$000C      ; 000013B4
1544 0013AA: 2F07      '/.'     MOVE.L   D7, -(A7)
1545 0013AC: 3F2B 001A  '?+..'  MOVE.W   $001A (A3), -(A7)
1546 0013B0: 4EBA ECA8  'N..'   JSR      *-$1356      ; 0000005A
1547 0013B4: 6000 0160  '...'  BRA      *+$0162      ; 00001516
1548 0013B8: 2847      '(G'   MOVE.L   D7, A4
1549 0013BA: 2C2C 0004  '....'  MOVE.L   $0004 (A4), D6
1550 0013BE: 2646      '&F'    MOVE.L   D6, A3
1551 0013C0: 3D6B 001A 000C  'k.....' MOVE.W   $001A (A3), $000C (A6)
1552 0013C6: 4AAB 0016  'J.....' TST.L   $0016 (A3)
1553 0013CA: 671A      'g.'   BEQ.S    *+$001C      ; 000013E6
1554 0013CC: 0C6B 028E 001A  'k.....' CMPI.W  #$028E, $001A (A3)
1555 0013D2: 57C0      'W.'   SEQ      D0
1556 0013D4: 0C6B FD69 001A  'k.i...' CMPI.W  #$FD69, $001A (A3)
1557 0013DA: 57C1      'W.'   SEQ      D1
1558 0013DC: 8001      '...'  OR.B    D1, D0
1559 0013DE: 6706      'g.'   BEQ.S    *+$0008      ; 000013E6
1560 0013E0: 276B 0016 001C  'k.....' MOVE.L   $0016 (A3), $001C (A3)
1561 0013E6: 2F07      '/.'     MOVE.L   D7, -(A7)
1562 0013E8: 3F2B 001A  '?+..'  MOVE.W   $001A (A3), -(A7)
1563 0013EC: 4EBA EC6C  'N..l'  JSR      *-$1392      ; 0000005A
1564 0013F0: 6000 0124  '...$'  BRA      *+$0126      ; 00001516
1565 0013F4: 3D7C 02AD 000C  '|.....' MOVE.W   #$02AD, $000C (A6)
1566 0013FA: 6000 011A  '...'  BRA      *+$011C      ; 00001516
1567 0013FE: 2045      'E'   MOVE.L   D5, A0
1568 001400: 2D68 0006 FFE8  'h.....' MOVE.L   $0006 (A0), $FFE8 (A6)
1569 001406: 2047      'G'   MOVE.L   D7, A0
1570 001408: 2C28 0004  ', (...' MOVE.L   $0004 (A0), D6
1571 00140C: 2847      '(G'   MOVE.L   D7, A4
1572 00140E: 266E FFE8  'n..'   MOVE.L   $FFE8 (A6), A3
1573 001412: 0C53 0002  'S..'   CMPI.W  #$0002, (A3)
1574 001416: 670A      'g.'   BEQ.S    *+$000C      ; 00001422
1575 001418: 3D7C 0291 000C  '|.....' MOVE.W   #$0291, $000C (A6)
1576 00141E: 6000 00A8  '...'  BRA      *+$00AA      ; 000014C8
1577 001422: 426E 000C  'Bn..'  CLR.W   $000C (A6)
1578 001426: 3F2C 0038  '?..8'  MOVE.W   $0038 (A4), -(A7)
1579 00142A: 486E FFE6  'Hn..'  PEA      $FFE6 (A6)
1580 00142E: 4EBA EC5A  'N..Z'  JSR      *-$13A4      ; 0000008A
1581 001432: 302B 0002  '0+...' MOVE.W   $0002 (A3), D0
1582 001436: 0440 000F  'e..'   SUBI.W  #$000F, D0
1583 00143A: 670A      'g.'   BEQ.S    *+$000C      ; 00001446
1584 00143C: 5B40      '[e'   SUBQ.W  #$5, D0
1585 00143E: 6716      'g.'   BEQ.S    *+$0018      ; 00001456
1586 001440: 5340      'S0'  SUBQ.W  #$1, D0
1587 001442: 6750      'gP'  BEQ.S    *+$0052      ; 00001494
1588 001444: 6074      't'   BRA.S    *+$0076      ; 000014BA
1589 001446: 2046      'F'   MOVE.L   D6, A0
1590 001448: 2768 001C 0004  'h.....' MOVE.L   $001C (A0), $0004 (A3)
1591 00144E: 276C 001C 0008  'l.....' MOVE.L   $001C (A4), $0008 (A3)
1592 001454: 606A      'j'   BRA.S    *+$006C      ; 000014C0
1593 001456: 7004      'p.'   MOVEQ    #$04, D0
1594 001458: 2740 0004  'e..'   MOVE.L   D0, $0004 (A3)
1595 00145C: 42AB 0008  'B...'  CLR.L   $0008 (A3)
1596 001460: 277C 0000 03E7  '|.....' MOVE.L   #$000003E7, $000C (A3)

```

```

1597 001466: 000C      '...'
1598 001468: 42AB 0010  'B...'      CLR.L    $0010 (A3)
1599 00146C: 7001      'p...'      MOVEQ   #$01, D0
1600 00146E: 2740 0014  '0...'      MOVE.L  D0, $0014 (A3)
1601 001472: 2046      'F'         MOVE.L  D6, A0
1602 001474: 0C28 000A 000F  '.(....'    CMPI.B  #$000A, $000F (A0)
1603 00147A: 5FC0      '...'      SLE     D0
1604 00147C: 4400      'D.'         NEG.B   D0
1605 00147E: 4880      'H.'         EXT.W   D0
1606 001480: 48C0      'H.'         EXT.L   D0
1607 001482: 2740 0018  '0...'      MOVE.L  D0, $0018 (A3)
1608 001486: 102C 0016  '...'      MOVE.B  $0016 (A4), D0
1609 00148A: 4880      'H.'         EXT.W   D0
1610 00148C: 48C0      'H.'         EXT.L   D0
1611 00148E: 2740 001C  '0...'      MOVE.L  D0, $001C (A3)
1612 001492: 602C      '...'      BRA.S   **+$002E      ; 000014C0
1613 001494: 4AAB 0008  'J...'      TST.L   $0008 (A3)
1614 001498: 660A      'f.'         BNE.S   **+$000C      ; 000014A4
1615 00149A: 2046      'F'         MOVE.L  D6, A0
1616 00149C: 117C 000B 000F  '.|....'    MOVE.B  #$000B, $000F (A0)
1617 0014A2: 6008      '...'      BRA.S   **+$000A      ; 000014AC
1618 0014A4: 2046      'F'         MOVE.L  D6, A0
1619 0014A6: 117C 0003 000F  '.|....'    MOVE.B  #$0003, $000F (A0)
1620 0014AC: 4AAB 000C  'J...'      TST.L   $000C (A3)
1621 0014B0: 56C0      'V.'         SNE     D0
1622 0014B2: 4400      'D.'         NEG.B   D0
1623 0014B4: 1940 0016  '0...'      MOVE.B  D0, $0016 (A4)
1624 0014B8: 6006      '...'      BRA.S   **+$0008      ; 000014C0
1625 0014BA: 3D7C 0291 000C  '=|....'    MOVE.W  #$0291, $000C (A6)
1626 0014C0: 3F2E FFE6  '?...'      MOVE.W  $FFE6 (A6), - (A7)
1627 0014C4: 4EBA EBCC  'N...'      JSR     *-$1432      ; 00000092
1628 0014C8: 604C      'L'         BRA.S   **+$004E      ; 00001516
1629 0014CA: 426E FFE4  'Bn...'    CLR.W   $FFE4 (A6)
1630 0014CE: 2047      'G'         MOVE.L  D7, A0
1631 0014D0: 2C28 0004  '...'      MOVE.L  $0004 (A0), D6
1632 0014D4: 2046      'F'         MOVE.L  D6, A0
1633 0014D6: 0C28 0002 0013  '.(....'    CMPI.B  #$0002, $0013 (A0)
1634 0014DC: 6610      'f.'         BNE.S   **+$0012      ; 000014EE
1635 0014DE: 486E FFE4  'Hn...'    PEA     $FFE4 (A6)
1636 0014E2: 3F3C 0002  '?<...'    MOVE.W  #$0002, - (A7)
1637 0014E6: 2045      'E'         MOVE.L  D5, A0
1638 0014E8: 2F10      '/.'         MOVE.L  (A0), - (A7)
1639 0014EA: 4EBA FACC  'N...'      JSR     *-$0532      ; 00000FB8
1640 0014EE: 4A6E FFE4  'Jn...'    TST.W   $FFE4 (A6)
1641 0014F2: 6E06      'n.'         BGT.S   **+$0008      ; 000014FA
1642 0014F4: 3D7C FD54 FFE4  '=|.T...'    MOVE.W  #$FD54, $FFE4 (A6)
1643 0014FA: 3D6E FFE4 000C  '=n....'    MOVE.W  $FFE4 (A6), $000C (A6)
1644 001500: 6014      '...'      BRA.S   **+$0016      ; 00001516
1645 001502: 486E FFE4  'Hn...'    PEA     $FFE4 (A6)
1646 001506: 2045      'E'         MOVE.L  D5, A0
1647 001508: 2F10      '/.'         MOVE.L  (A0), - (A7)
1648 00150A: 2F05      '/.'         MOVE.L  D5, - (A7)
1649 00150C: 4EBA EBEC  'N...'      JSR     *-$1412      ; 000000FA
1650 001510: 3D6E FFE4 000C  '=n....'    MOVE.W  $FFE4 (A6), $000C (A6)
1651 001516: 4CDF 18F0  'L...'      MOVEM.L (A7)+, D4-D7/A3/A4
1652 00151A: 4E5E      'N^'         UNLK   A6
1653 00151C: 2E9F      '...'      MOVE.L  (A7)+, (A7)
1654 00151E: 4E75      'Nu'        RTS
1655 001520: D052      '.R'        ADD.W   (A2), D0
1656 001522: 4F44      'OD'       TRAP   #$4
1657 001524: 5249      'RI'       ADDQ.W #$1, A1
1658 001526: 5645      'VE'       ADDQ.W #$3, D5
1659 001528: 0000 4E75  '..Nu'     ORI.B  #$4E75, D0
1660 00152C: 4E75      'Nu'        RTS
1661 00152E: 4A6F FF9C  'Jo...'    TST.W  $FF9C (A7)
1662 001532: 4E75      'Nu'        RTS
1663
1664 EndBlock: CSize: 00152C
1665
1666 EOF_Mark:
1667
1668 #####
1669 #
1670 #           F   I   N   I   S
1671 #
1672 #####

```