



GAME KING

Game King 75704400
Enhanced Controller Board
With Classic Legacy Board And
Enhanced Deluxe Memory Board

This Document Covers Phase I and Phase II Submissions

From: CS Field Engineering
Revision: C
Date: 12/15/04

- Phase I covers 044 Enhanced Controller Board with Classic Legacy Board
- Phase II covers Enhanced Deluxe Memory Board

Table of Contents

Game King Enhanced Controller Board

Overview.....	1
Overview Continued.....	2
Features.....	3
Compatibility.....	3
Processor.....	3
Memory Board Mezzanine.....	3
System Memory.....	3
I/O Option.....	4
Game Memory.....	4
Audio.....	4
Communications.....	4
Security.....	4
Telltale.....	4
Power Supply.....	4
Key Chip Configuration.....	5
Key Chip Continued.....	6
Key Chip Continued.....	7
Key Chip Continued.....	8
Hardware Configuration 044 Enhanced Controller Board.....	9
Hardware Configuration Continued.....	10
Hardware Configuration Classic Memory Adapter Board.....	11
Hardware Configuration Continued.....	12
Hardware Configuration Enhanced Deluxe Memory Adapter Board.....	13
Hardware Configuration Continued.....	14
Hardware Configuration Motherboard.....	15
Conversion Guide.....	16
Troubleshooting Guide.....	17
Troubleshooting Guide Continued.....	18
Individual & Kit Part Numbers.....	19

Overview

This document covers both Phase I and II submissions for August and October of 2004 that will include the 044 Controller PCB, which is the center of the Game King enhanced board set and is a replacement for the 390X legacy video controller board. In addition, a new deluxe motherboard 91422600 is also required to provide a connection from the controller board to its peripheral devices and power to the 044-controller board. A classic legacy memory adapter board (1) will provide backward compatibility that supports existing 3900 G/K, I Game Plus software libraries. Phase II of this submission deals with new themes for the 7570440X board and new enhanced deluxe memory adapter board. The 76827400 (128MB) and the 76828600 (256MB) enhanced deluxe memory adapter boards (2) provide updated and new 044 game themes via a flash memory card that is not backward compatible with existing 3900 game software. These new board sets implement functions in current technology to reduce component obsolescence, and offer performance and features upgrade paths for the i960 product family. There will be 5 new 044 themes to start with that are to go with the enhanced deluxe memory adapter boards. These new 044 themes will only be available with the enhanced deluxe memory adapter boards with additional themes to be released quarterly.

The 5 new 044 themes are as follows:

1. Twin Win – Has 5 reels, 15 paylines, and MD3 O/S (Operating System).
 - Media Size – Game requires a 256MB enhanced deluxe memory board.
 - Game Program – GK000160.
 - Boot PROM – GKB00006.
 - This version contains ten paytables.
2. Texas Tina – Has 5 reels, 20 paylines, and MD3 O/S.
 - Media Size – Game requires a 128MB enhanced deluxe memory board.
 - Game Program – GK000144.
 - Boot PROM – GKB00006.
 - This version contains ten paytables.

3. True Romance – Has 5 reels, 20 paylines, and MD3 O/S.
 - Media Size – Game requires a 128MB enhanced deluxe memory board.
 - Game Program – GK000124.
 - Boot PROM – GKB00006.
 - This version contains ten paytables.
 4. Shake Your Booty – Has 5 reels, 15 paylines, and MD3 O/S.
 - Media Size – Game requires a 256MB enhanced deluxe memory board.
 - Game Program – GK000170.
 - Boot PROM – GKB00006.
 - This version contains ten paytables.
 5. Easel Money – Has 5 reels, 15 paylines, and MD3 O/S.
 - Media Size – Game requires a 256MB enhanced deluxe memory board.
 - Game Program – GK000162.
 - Boot PROM – GKB00006.
 - This version contains ten paytables.
- The enhanced deluxe memory adapter board must be flashed with one of the five new 044 themes before delivery to the customer.
 - If the customer orders a 044-theme conversion, the new programs must be flashed onto new enhanced deluxe memory boards before shipping.
 - The customer can return a used enhanced deluxe memory board for each conversion purchased to the PDC within 30 days for credit against the original conversion invoice.

Features

- A. **Compatibility:** The 044 controller board maintains software compatibility with all current game titles. Additionally, it supports all existing Game King slot peripherals and their associated cabling and interfaces. The Game King enhanced board set fits the Game King processor tray envelope, and may be field retrofitted into existing Game King slot chassis. The only sheet metal that changes in this conversion is the processor tray. The only exception to this is there are currently no motherboards that will work with the 044 Controller Board in a flat top bar machine. A new motherboard has been created for the flat top bar, expected release date is late October.

- B. **Processor:** The 044 controller board utilizes the Intel i960KA processor (U87), which is software compatible with the i960SA processor used in previous versions of IGT slot machine controllers, while offering increased processor speed, and a 32-bit bus interface. In the controller board implementation, the i960KA operates in one of two modes dependent upon the system memory board type.
 - Classic Mode: Phase 1*
Supports legacy CPU clock (12MHz) and memory bandwidth for software compatibility.
 - Overdrive Mode: Phase 2*
2X CPU clock (24MHz), and 4X memory bandwidth offers enhanced performance for new game development.

- C. **Memory Board Mezzanine:** You will see mezzanine terminology used frequently throughout this document. A simple definition of mezzanine is: structurally the stacking of boards i.e. daughter board.

- D. **System Memory:** The 044 controller board supports a memory board mezzanine (i.e. daughter or adapter board), which provides the game related non-volatile storage. This supports all of the programmed memory devices required by legacy games i.e. 7570390X processor boards and has four times the memory capacity. Three of the board choices required for operation is.
 - Classic Legacy Memory (Adapter) Card Option (91409900):*
Supports all current SIMMs and DIP EPROM's required for configuring a currently available 390X legacy theme.
 - Overdrive Memory (Adapter) Card Option (76827400 & 76828600):*
All memory devices are soldered directly to PCB to improve speed, reliability, and to eliminate configuration errors. This card can be "recycled" with new game software using a memory programmer.
 - Memory capacity options:
 - 128MB Main Memory, 16MB Audio, 16MB CG (76827400)
 - 256MB Main Memory, 64MB Audio, 64MB CG (76828600)

- E. **Game Memory:** The 044 controller board supports 4MB of battery backed SRAM (U20, U21, U43, U44) and 64MB of PC133 speed grade video SDRAM. A 32KB serial EEPROM (U25) is used by the enhanced deluxe memory board for boot signature storage.
- F. **Audio:** A 32-pin DSPL0003 Boot PROM must be present on the legacy memory adapter board in order to have sound. The DSP Boot code and game wave table files are stored directly onto the (enhanced) memory adapter boards.
- G. **Communications:** Still maintains SENET and Netplex communications. Four SENET channels are provided; the first two channels provide backward compatibility with other IGT i960 based platforms; the additional two channels are available for SENET bandwidth expansion.
- H. **Security:** Slot machine door security circuits that operate during normal machine operation and (Tell Tale) optionally during machine power down are provided. Additionally, the 044-controller board monitors system power and halts machine operation if power supplies fall out of tolerance. A watchdog timer circuit monitors the system for a software runaway, and halts system operation. Non-volatile memory (EEPROM and battery backed SRAM) store copies of system events and status for detecting and reporting system malfunction.
- I. **Tell Tale Door Switch Monitor:** The device and associated devices on the 044 are powered by TT_3V, which is either an optional rechargeable 3V battery during main power off conditions, or the 3.3V logic supply when system power is on. The level of the door out signal is 3V from the battery during power down operation or 5V during power on to provide better immunity from electrical noise that occurs during the slot machines operation.
- J. **Power Supply Monitoring:** The main power supply circuits are monitored on the 044-controller board. When 13V falls below 10V, the circuit asserts the V13_LOW interrupt to the i960 so that software can begin a soft crash of the system before the main supply voltages fail. The primary supply voltage is 3.3V and is used by the Controller Board and the various mezzanine boards. When either the 3.3V or 5V supply fall 5% the 044-controller board is held in reset.
- The 044 Controller Board generates a variety of power supplies for the various circuits. The IGT slot machine supplies 13V and 25V for the various devices within the system. The 044 Controller Board does not use the 25V supply. The board uses the 13V supply for some of the communications drivers, and also regulates it down to the other required voltages.

Key Chip Configuration

- The Phase I submissions will require a clear and key chip update in order to work with the new 044-board. The new key and clear chips are backward compatible and will work with both new and old legacy themes. The programs listed below are conditional pending jurisdictional approval.
 - KEY00017 is replaced by KEY00037 (non WAP keychip)
 - KEY00018 is replaced by KEY00038 (WAP keychip)
 - KEY00021 is replaced by KEY00039 (MD3 WAP keychip & memory clear)
 - KEY00022 is replaced by KEY00040 (MD3 non WAP keychip & memory clear)
 - KEY00023 is replaced by KEY00041 (MD3 exclusive MGM/Mirage)
 - KEY00025 is replaced by KEY00042 (MD3 WAP keychip New Jersey)
 - KEY00026 is replaced by KEY00043 (MD3 non WAP keychip New Jersey)
 - CSV00082 is replaced by CSV00083 (RAM and E2 clear chip New Jersey)
 - CSV00055 is replaced by CSV00086 (RAM only clear chip)
 - CSV00056 is replaced by CSV00087 (RAM and E2 clear chip)
- Phase II submissions will require an all in one clear and key chip (except for New Jersey) to work with the new 044-board. This new key and clear chip is not backward compatible and will only work with the new 044 enhanced memory themes. The programs listed below are conditional pending jurisdictional approval.
 - KEY00028 (MD3 non-WAP keychip & memory clear)
 - KEY00029 (MD3 WAP keychip & memory clear)
 - KEY00030 (NJ MD3 non-WAP keychip only)
 - KEY00033 (NJ MD3 WAP keychip only)
 - CSV00084 (NJ MD3 WAP & non-WAP clear chip only)
- How to use the KEY00028 program:
 1. Replace boot PROM with KEY00028 and power up machine.
 2. Initial menu for selections are shown for RAM OPERATIONS, EEPROM OPERATIONS, and KEYCHIP (see Figure A). **Note:** This keychip uses the touchscreen in place of the attendant key and test switch.
 3. The user can expand or collapse the selections that have a "+" on the left side of the menu item (see Figure B) by touching the menu item.
 4. If "CLEAR ALL RAM" is selected, the user is prompted with a yes/no window to confirm the selection (see Figure C).
 5. If "CLEAR MOTHERBOARD E2" is selected, the user is prompted with a yes/no window to confirm the selection (see Figure D).
 6. If "KEYCHIP" is selected, the user is prompted with a yes/no window to confirm the selection (see Figure E).

Note: It is important to understand that the options in KEY00028 are processed when they are confirmed. Keychips with the "REBOOT MACHINE" option will apply the selected items in the correct order. If KEY00028 is used, clearing of RAM and E2 should be done before setting the keychip flag.

Key Chip Configuration Continued

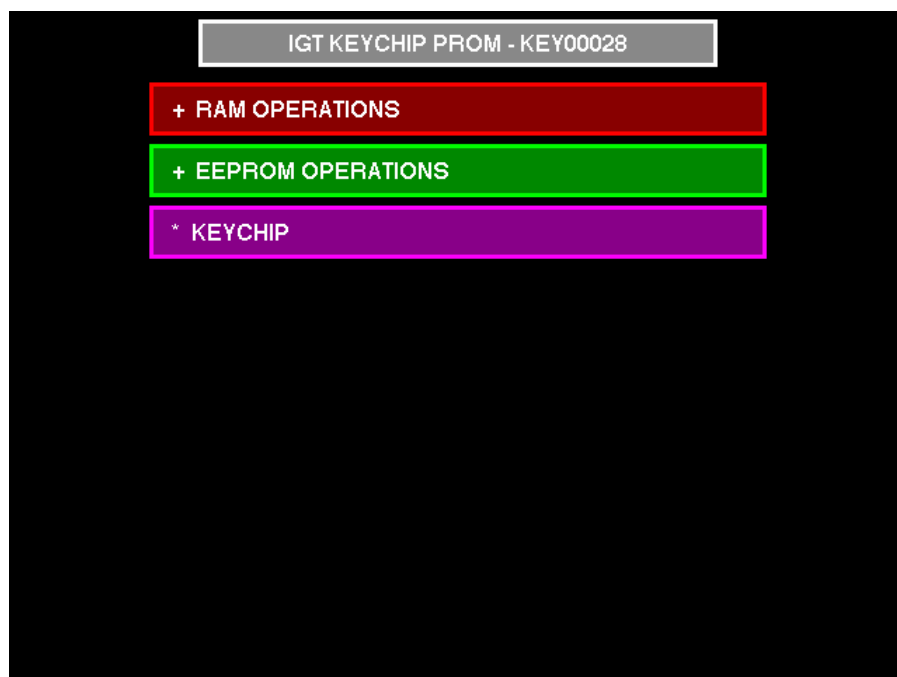


Figure A

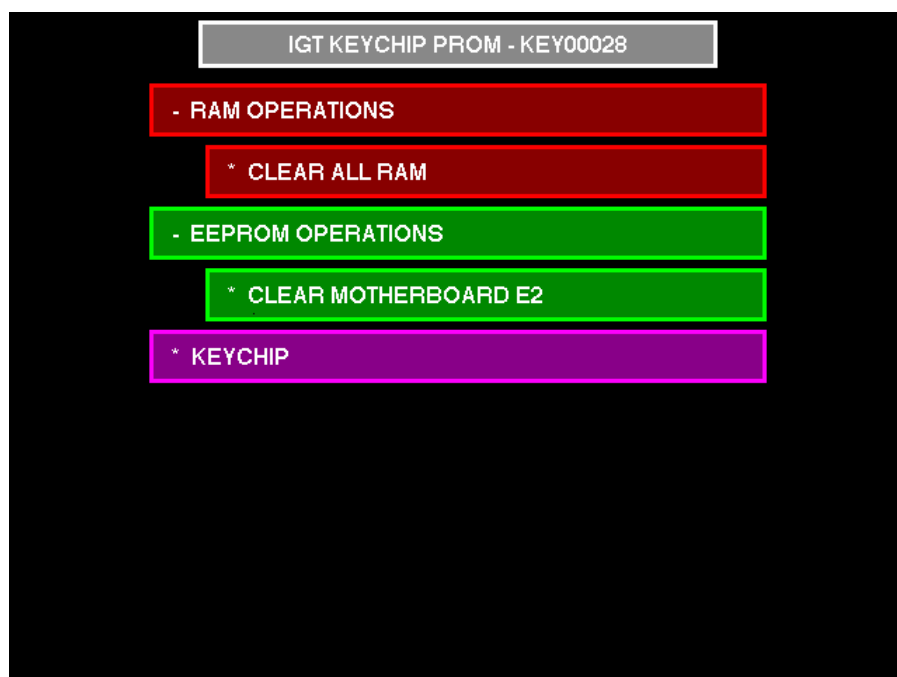


Figure B

Key Chip Configuration Continued

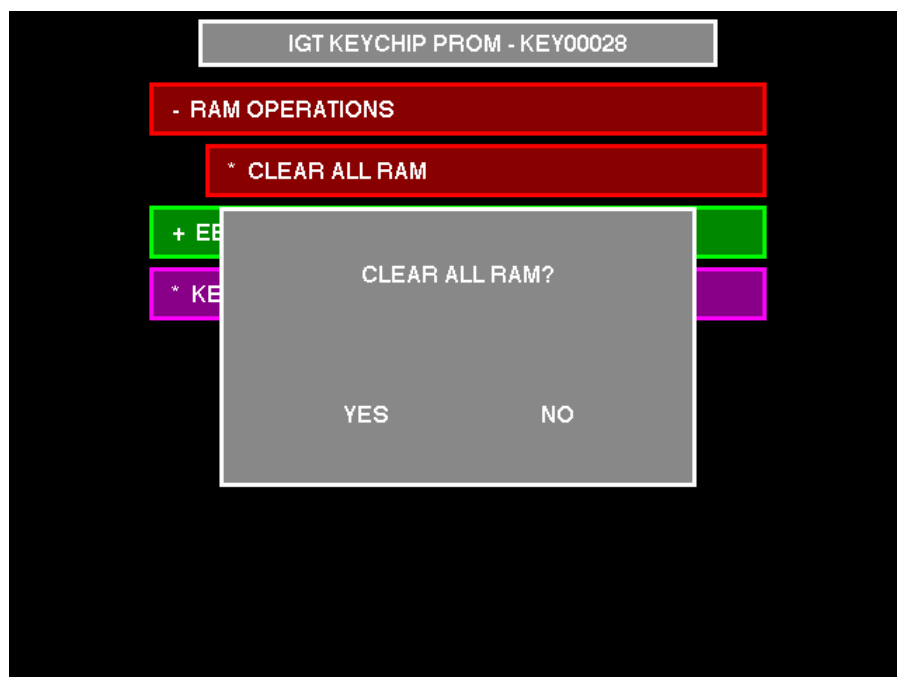


Figure C

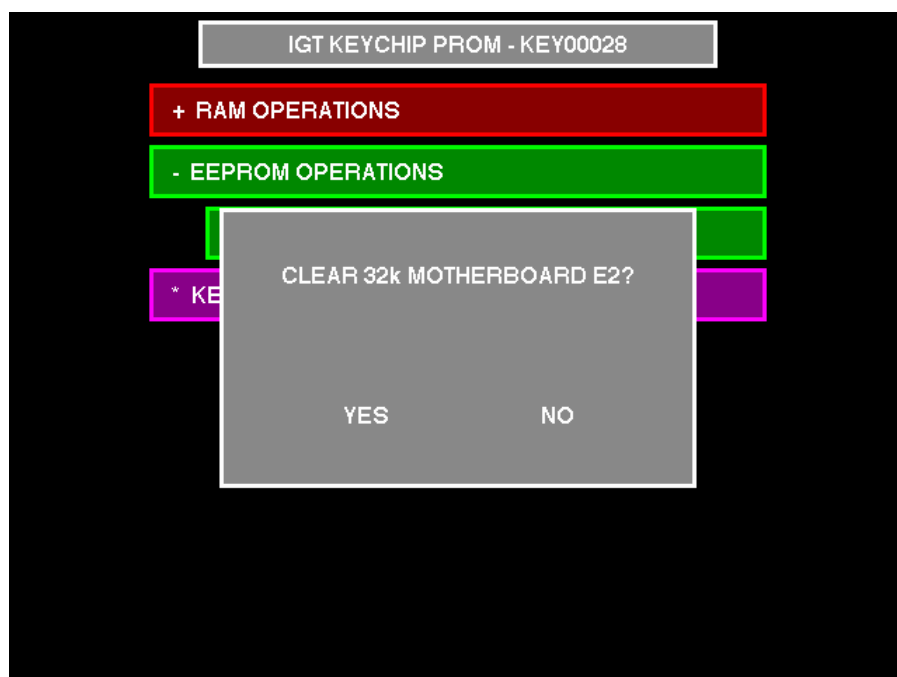


Figure D

Key Chip Configuration Continued

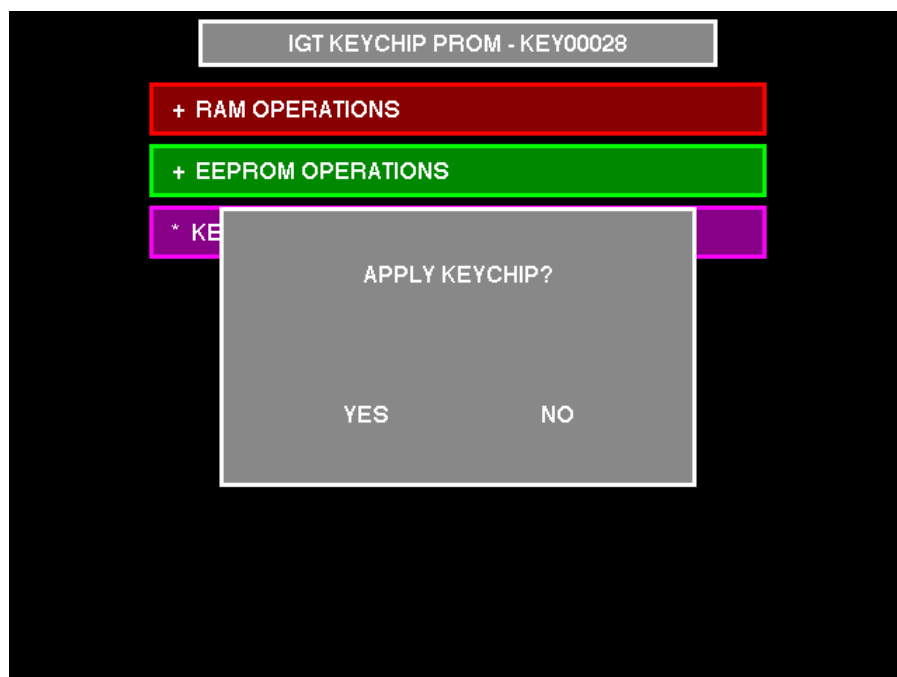
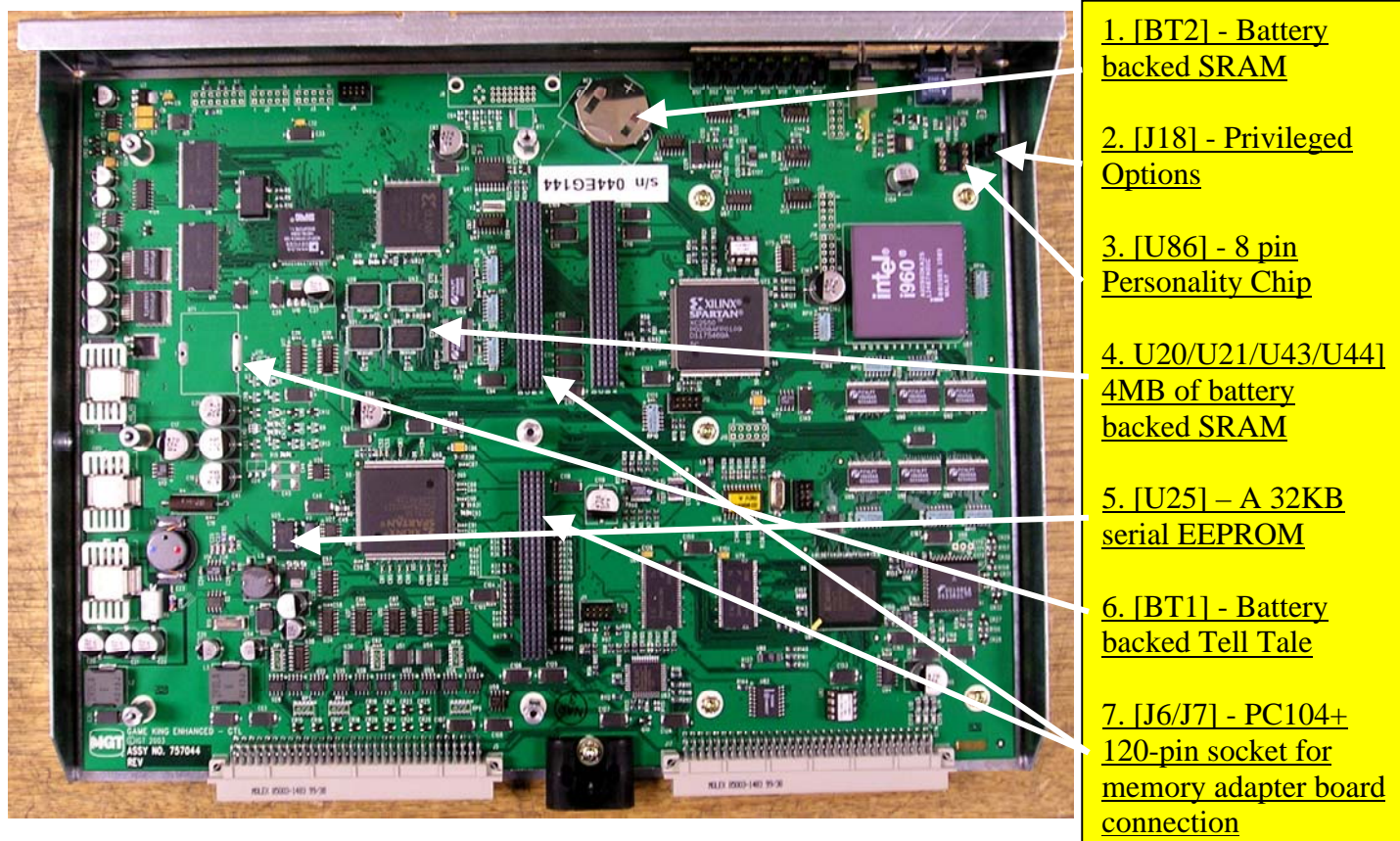


Figure E

Hardware Configuration – 044 Enhanced Controller Board

The picture below is of a 75704401-processor board without Tell Tale, as you can see there are no DIP sockets to support G/K, I-Game Plus chip sets. This board acts more like a controller to the mezzanine boards that are to be piggy backed onto it. *Items to be aware of are pointed out below.*



1. BT2 – Battery backed SRAM is the Static RAM on the 044-board that is power protected by a Lithium 23mm coin size CR2345, 3V battery P/N 40403490. When clearing use the appropriate CSV or Key clear chip listed on page 5.
2. J18 – Privileged Options is the connection to hook up the key switch and harness needed for privileged options. Currently privileged options are only being used in Canada.
3. The 044 controller board supports 4MB of battery backed SRAM (U20, U21, U43, U44).

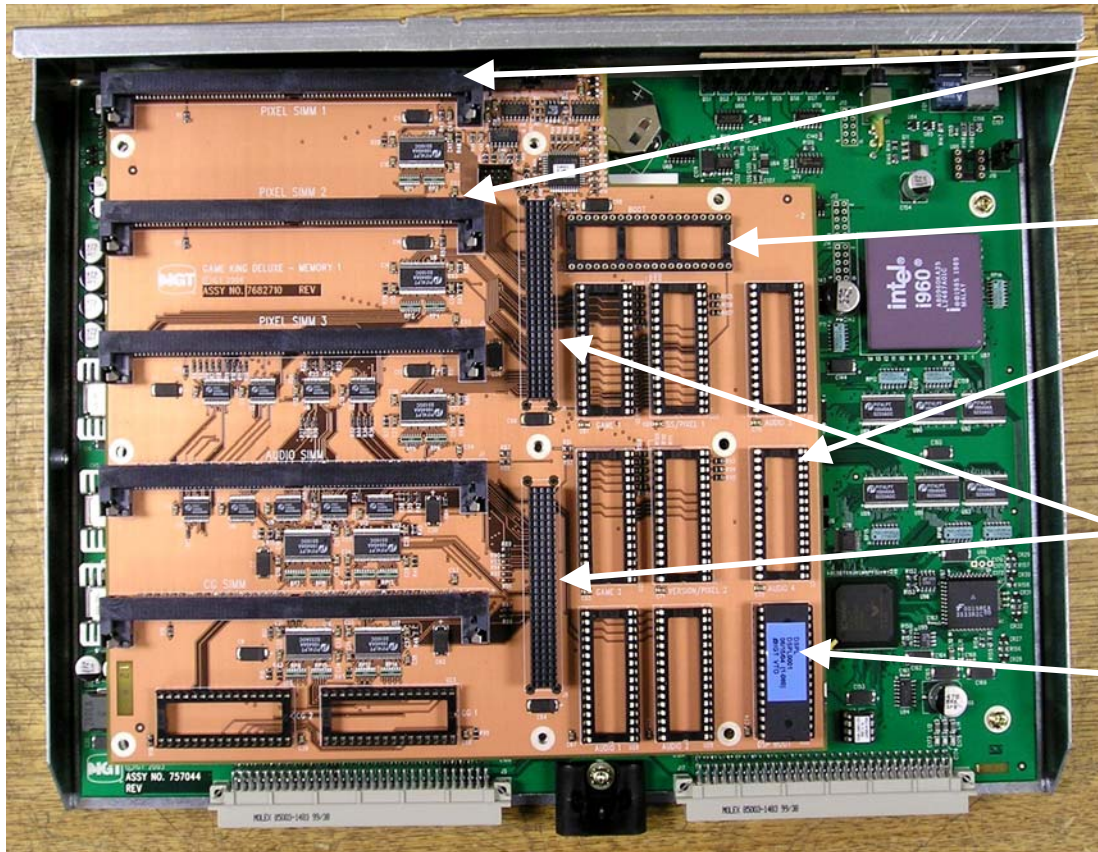
Hardware Configuration – 044 Controller Board Continued

4. U25 – A 32KB serial EEPROM is used by the enhanced deluxe memory board for storage of the boot signature. When you update or change enhanced deluxe memory board the EEPROM will be updated with the new boot signature.
5. BT1 – Battery backed telltale utilizes a rechargeable 160mA/H 3.6V NiMH battery P/N 40402290. Tell Tale operation; under battery power (while the unit is powered down), the circuit monitors the state of the slot machine doors for at least 30 days. The circuit remembers door violations and reports them when power is restored.
6. J6/J7 – Two 120-pin sockets to connect both classic legacy and enhanced memory adapter boards onto the 044-board to provide backward compatibility with current I-Game and new 044 software libraries.

Note: When using the 044-controller board with battery backed telltale and the classic legacy memory adapter board; a 31018200 insulator and 43201690 (X9) washer, must be installed in order to raise the legacy board and prevent the connector pins of the legacy board from shorting against the telltale battery on the controller board.

Hardware Configuration – Classic Legacy Memory Adapter Board

- The picture shown below is of the 91409900 classic legacy memory adaptor board; this board provides backward compatibility for the Game King enhanced controller (7570440X). This is a mezzanine board that contains a variety of SIMM sockets and DIP sockets that provide an interface for the legacy game firmware used by Game King II (7570390X) series. When the memory board is inserted in a Game King enhanced controller (7570440X), the controller board senses the memory type and runs in compatibility (Classic) mode. This board supports read only devices; no memory parts may be programmed on this board. *Items to be aware of are pointed out below.*



1. J1, J2, J5, J7, J8 – 72 pin SIMM sockets

2. U22 – 40-pin DIP socket for Base Game Chip

3. U15, U23 Through U31 – Are all 32-pin DIP sockets

4. J6/J9 - PC104+ 120-pin socket for I/O adaptor board connection

5. U32 – 32-pin DSP Boot Chip for sound

- The classic legacy memory board shown piggy backed onto the 044-board in the picture above has its SIMMs and DIP sockets clearly marked to assist you with installing legacy program chips. This board is approximately 8" x 9" in size and requires 9 standoffs and 9 standard M3X8 screws to be properly mounted onto the 044-board.

1. There are five 72-pin SIMM sockets (J1, J2, J5, J7, J8), which can support 8M x 16 SIMM cards. Each socket is clearly marked Pixel SIMM 1, 2, and 3, Audio SIMM and CG SIMM. The Pixel SIMM sockets parallel each other so placement of a Pixel SIMM card doesn't matter, the CG and Audio SIMM sockets are dedicated and must follow there markings.

Hardware Configuration – Legacy Memory Board Continued

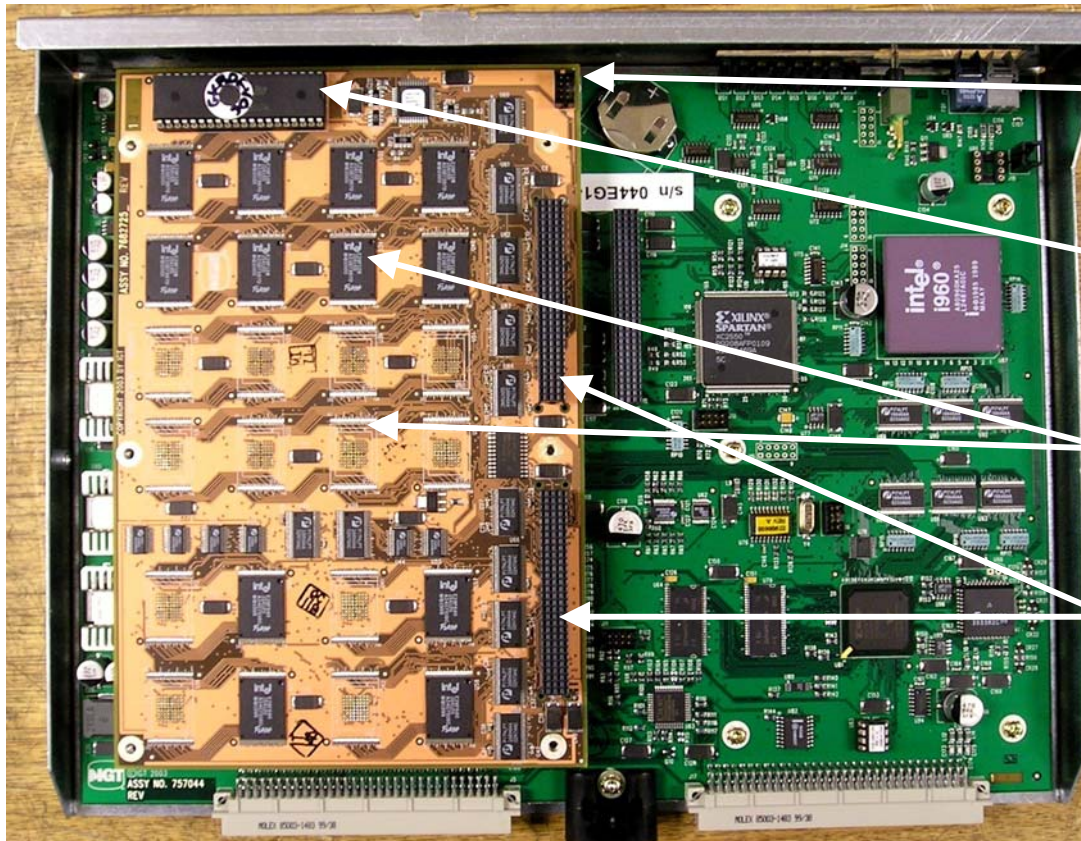
2. The Boot Memory (U22) socket supports a 1M x 16 EPROM in a 40-pin DIP socket. Although this socket is clearly marked (Boot) it is the correct location to install the Games Base program chip.
3. The Game (GME) Memory sockets (U24, U26) support two 1M x 8 EPROMs in 32-pin DIP sockets.
 - The Pixel, and CG Memory can be supported in one of two options: four 32-pin DIP sockets (U15, U23, U25, & U27) which accept 1M x 8 EPROMs, or four 72 pin SIMM sockets which can support 8M x16 SIMM cards.
 - The dual port Audio Memory is supported by one of two options: up to four 32 pin DIP sockets (U28-U31) may be populated with 1M x 8 EPROM (DSS) devices, or a 72 pin SIMM socket (J7) may be populated by a single (DSS) 8M x 16 SIMM card.

Note: Some of the very early SIMM cards installed into IGT 80960 product may not be compatible with the 044 classic legacy board. We are talking about the cards that were used, primarily, in 1999 and early 2000. This should be an extremely rare occurrence, but it could happen on the 76800830 and 76800831 SIMM boards. If this does come up, a free exchange for an updated SIMM card will be required. This is cover under CN: 3940.

4. The DSP Boot Memory socket (U32) is a 32 pin DIP socket that supports a 1M x 8 EPROM device. This socket will already be populated with a DSPL0003 Boot Chip with every board coming out of stock. The DSP Boot Memory is a part of the Audio Memory block, in terms of its bus connection and the game will provide no sound unless it's in place.

Hardware Configuration – Enhanced Deluxe Memory Adapter Board

- The picture shown below is of a 128MB enhanced deluxe memory adapter board P/N 76827400, also available but not shown is a 256MB board P/N 76828600. The enhanced deluxe memory adapter board is a memory mezzanine that plugs into the 044 enhanced controller board and holds all of the software (Base, Game, Character & Sound) required to run game, including the boot code. When the memory board is inserted in a Game King enhanced controller (7570440X), the controller board senses the memory type and runs in compatibility (enhanced or classic) mode. *Items to be aware of are pointed out below.*



1. J1 – JTAG connector

2. U30 – 40-pin DIP socket for the Boot PROM

3. Main Flash Memory Array

4. J2/J3 - PC104+ 120-pin socket for I/O adapter board connection

- The enhanced deluxe memory adaptor board shown piggy backed onto the 044-board in the picture above has a main memory array totaling 64MB, 128MB or 256MB divided into four banks. This board is approximately 8.25" x 5.5" in size and requires 6 standoffs and 6 standard M3 screws to be properly mounted onto the 044-board.

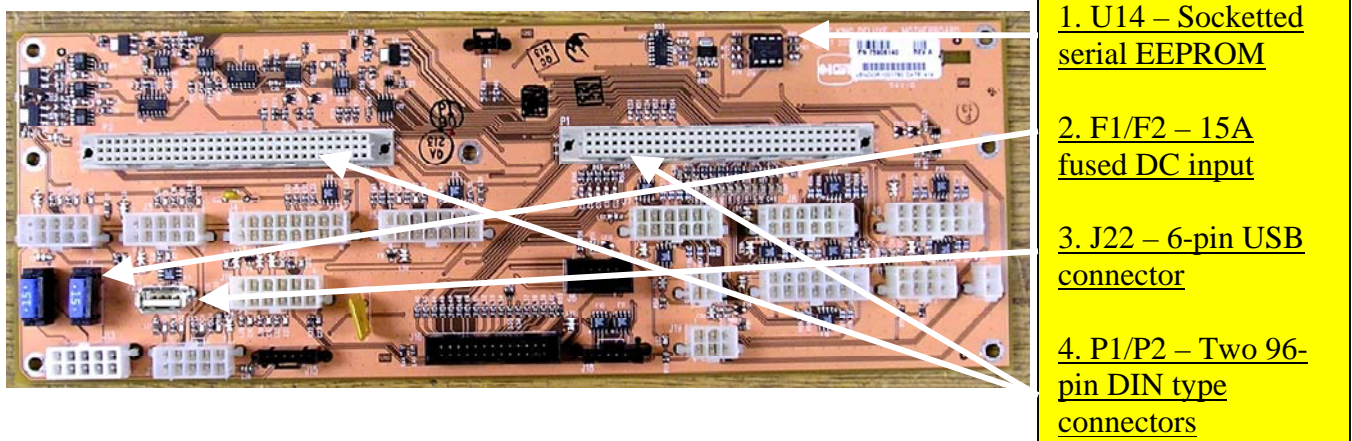
1. A socketed 256K x 16 EPROM (U30) in a 40-pin DIP socket contains the Boot code for the game. This device may be removed for verification, or may be replaced with Diagnostic EPROM's. The Boot PROM must be in residence to access and run game firmware data (GK bin. files) flashed within the memory array on the enhanced deluxe memory adapter board.

Hardware Configuration – Enhanced Deluxe Memory Board Continued

2. Main Flash Memory Array stores GK program files to run the game. The GKxxxxxx is the actual game kit image that gets loaded into the enhanced deluxe memory adapter board and also identifies what theme type the game is flashed with. The GKxxxxxx.bin contains the game components Ixxxxxxx, Gxxxxxxx, Cxxxxxxx, and DSSxxxxx. The GK images will be submitted on CD, but will be downloaded into the enhanced deluxe memory adapter board. The enhanced deluxe memory adaptor board will be clearly marked as to what GK program has been flashed into it. This will be done with the same type of tag already used to identify IGT EPROM's and placed in the lower right hand corner opposite end of the boot PROM.

Hardware Configuration - Motherboard

- The final picture is of the 91422600-motherboard. The 8800 motherboard fits both upright and slant top games; it is also compatible with both the 4100 and 440X boards. The primary function of the motherboard is to provide a connection from the controller board to the peripheral devices both inside and outside the game cabinet, and also provide power from the cabinet power supply to the processor board. *New items to be aware of are pointed out below.*



1. (U14) serial EEPROM is provided on the motherboard to store non-volatile data. This 8-pin socketted chip (P/N 70817590) is a 24FC256 I/P2CA EEPROM organized as an I2C 32K x 8 device.
2. 15A fused (F2) 13V and (F1) 25V DC input from the power supply.
3. (J22) is a 6-pin USB connector that provides USB communication path between the motherboard and the 044-controller board via P2. **This connector is currently not used.**
4. This new motherboard has two 96-pin DIN type connectors (P1, P2) that are provided to mate with the new 044-controller board. Because of the different style of DIN connectors this motherboard is not backward compatible with older Game King processor boards.

Conversion Guide

- Converting themes using the 7570440X controller board with classic legacy memory adapter board should be approached no differently then previous versions.
- Converting a 7570440X controller board with an enhanced deluxe memory adapter board.
 - Converting from a legacy themed game (using a classic legacy memory board) to a 044 themed game (using an enhanced deluxe memory board).
 1. Power off game and remove classic legacy memory board 91409900.
 2. Install enhanced deluxe memory board 76827400 (128MB) or 76828600 (256MB) already loaded with the appropriate 044-theme GK image.
 3. Remove GKB boot PROM and insert appropriate keychip.
 4. Power on game and follow on screen instructions to clear all memory (RAM & E2), also apply keychip option before removing it.
 5. Power off game and remove keychip.
 6. Re-insert GKB boot PROM and power on game.
 7. Follow on screen instructions to clear tilt and enter keychip mode.
 8. **Note:** The following message should appear on screen if memory was successfully cleared “Boot PROM Signature Mismatch” and “GK Signature Mismatch”. Both signatures are stored in E2 so if neither message appears on screen you may need to perform this function again.
 - Converting from an existing 044 themed game (using an enhanced deluxe memory board) to a new 044 themed game.
 1. Power off game and remove enhanced deluxe memory board.
 2. Install enhanced deluxe memory board 76827400 (128MB) or 76828600 (256MB) already loaded with the new 044-theme GK image.
 3. Remove GKB boot PROM and insert appropriate keychip.
 4. Power on game and follow on screen instructions to clear all memory (RAM & E2), also apply keychip option before removing it.
 5. Power off game and remove keychip.
 6. Re-insert GKB boot PROM and power on game.
 7. Follow on screen instructions to clear tilt and enter keychip mode.
 8. **Note:** The following message should appear on screen if memory was successfully cleared “Boot PROM Signature Mismatch” and “GK Signature Mismatch”. Both signatures are stored in E2 so if neither message appears on screen you may need to perform this function again.

Troubleshooting Guide

- Troubleshooting the 7570440X controller board with a classic legacy memory adapter board should be approached no differently then previous versions.
 - The tilt codes have not changed.
 - Netplex and SENET operation have not changed.
 - Game still utilizes 13V and 25V. If you loose either voltages check fuses on motherboard.
 - If there is no sound make sure the DSPL Boot Chip is inserted into U32 of the Classic Memory Adapter Board.
- How to troubleshoot a 7570440X controller board with an enhanced deluxe memory adapter board, is outlined below:

A. No Picture When Starting Up

Possible Cause: Motherboard connectors not connected or connected to improper slots.

Solution: Verify that each of the machine cable connectors is connected to where they were designed to go. Each connector should have a label on it marked P#. Match the corresponding P# to the J # with the same number. Should a cable be missing a P# label, verify that cable connectors are attached to: J3, J5, J7, J8, J9, J10, J11, J13, J14, and J19. If the machine is an upright or an older slant top, make sure the fan is plugged into J12. If the machine is a slant top, do not plug in any connector into J12 with green and white wires.

Possible Cause: No boot PROM installed or boot PROM installed incorrectly.

Solution: Verify that a boot PROM is properly installed onto the 044's memory card.

B. Corrupt Picture When Starting Up

Possible Cause: Motherboard connectors not connected or connected to improper slots

Solution: Verify that each of the machine cable connectors is connected to where they were designed to go. Each connector should have a label on it marked P#. Match the corresponding P# to the J # with the same number. Should a cable be missing a P# label, verify that cable connectors are attached to: J3, J5, J7, J8, J9, J10, J11, J13, J14, and J19. If the machine is an upright, make sure the fan is plugged into J12. Slant-top machines should have the wires for the fan traced from the fan to J12. On newer machines there is a connector that fits J12 (green and white wires), which will cause severe damage to the processor board if it is plugged into J12.

C. Slant-Top Board Smokes When Powered Up

Possible Cause: Sound driver board cable plugged into J12 on motherboard.

Solution: Slant-top machines should have the wires for the fan traced from the fan to J12. On newer machines there is a connector that fits J12 (green and white wires), which will cause severe damage to the processor board if it is plugged into J12.

D. EEPROM Fails Despite Being Set Or Game Fails To Work With WAP

Possible Cause: Outdated motherboard

Solution: Check the model number on the motherboard.

75906700 is an 041 motherboard and should be upgraded to an 044 motherboard

75908100 is an 044 non-WAP motherboard and should be upgraded to 91422600

91422600 is an 044 WAP or non-WAP motherboard and the correct motherboard you should be using with the 044-board

E. Boot PROM Signature Mismatch Error

This happens after cleared/corrupted EEPROM or a boot PROM change. The boot PROM signature is written to EEPROM. If the signature does not match, this error will occur. Turning the attendant key will write the proper value. However, if you restart the machine and the error reoccurs, there is a problem with either the motherboard or processor board EEPROM. Look at *EEPROM fails after being set* in the *Motherboard Problems* section (D) above. If this fails, try replacing the 17S150APC flash DIPs on the motherboard, if this doesn't work than try replacing the processor board and return it for repair.

F. GK Signature Mismatch Error

This happens after cleared/corrupted EEPROM or a GK image change. The GK signature is written to EEPROM. If the signature does not match, this error will occur. Turning the attendant key will write the proper value. However, if you restart the machine and the error reoccurs, there is a problem with either the motherboard or processor board EEPROM. Look at *EEPROM fails after being set* in the *Motherboard Problems* section (D) above. If this fails, try replacing the 17S150APC flash DIPs on the motherboard, if this doesn't work than try replacing the processor board and return it for repair.

G. DSA/SHA Check Failure

Possible Cause: Zero filling not enabled when flash was programmed.

Solution: Have the memory card reprogrammed with zero filling enabled (all memory cards should be programmed this way by default). The DSA/SHA algorithm expects the unused portion of flash to be set to zero, and if this is not the case, it will fault.

Possible Cause: Image downloaded improperly.

Solution: Have the flash reprogrammed. Have the programmer verify the image is valid.

H. Zero Check Failure

Possible Cause: Zero fill option not set when flash was programmed.

Solution: Have the flash reprogrammed. Have the programmer verify the image is valid and the programmer is functioning correctly.

I. Processor Board E2 Failure

Follow on-screen instructions to clear the processor board E2. If problem persists, then the processor board E2 may be bad.

Individual Part Numbers

- All part numbers listed below come as individual parts, so if any additional boards is needed it will have to be ordered separate.

044-Board Tray Assembly	044 Board Version	Description
91498600	75704400	PROC TRAY, 1LK, No Privileged Options, With Tell Tale BAT
91498601	75704400	PROC TRAY, 1LK, With Privileged Options, With Tell Tale BAT
91498602	75704400	PROC TRAY, 2LK, No Privileged Options, With Tell Tale BAT
91498603	75704400	PROC TRAY, 2LK, With Privileged Options, With Tell Tale BAT
91498604	75704401	PROC TRAY, 1LK, No Privileged Options, No Tell Tale BAT
91498605	75704401	PROC TRAY, 1LK, With Privileged Options, No Tell Tale BAT
91498606	75704401	PROC TRAY, 2LK, No Privileged Options, No Tell Tale BAT
91498607	75704401	PROC TRAY, 2LK, With Privileged Options, No Tell Tale BAT

Additional Boards:

91409900	Classic Legacy Memory Adapter Board with DSPL Boot included
31018200	Insulator PCB Classic Legacy Memory Adapter Board w/tell tale
43201690	Washer to be installed when using Classic Legacy Memory Adapter Board w/tell tale
41901891	M3X8 screws for P/N 31212790 processor board standoffs
76827400	Enhanced Deluxe Memory Adapter Board (128MB)
76828600	Enhanced Deluxe Memory Adapter Board (256MB)
91422600	Motherboard for both upright and slant top machines (Compatible with both 041 and 044 boards)
52009990	Motherboard Fuse Mini F/A 15A

Note: Processor boards with privileged options will not come with the harness and key switch unless it is requested.

Conversion Kit Part Numbers

- All parts listed below are available as a kit; the kit comes with a complete tray assembly 9149860X, and motherboard 91422600, the classic legacy memory adapter board with DSPL boot chip P/N 91409900 is sold separately.
- Kits with tell tale will require a PCB insulator 31018200 and washer 43201690 (X9) to be installed between the classic legacy and 044-board.

044-Board For Upright/Slant	Description
91897900	PROC TRAY, 1LK, No Privileged Options, With Tell Tale BAT
91898000	PROC TRAY, 1LK, With Privileged Options, With Tell Tale BAT
91898100	PROC TRAY, 2LK, No Privileged Options, With Tell Tale BAT
91898200	PROC TRAY, 2LK, With Privileged Options, With Tell Tale BAT
91898300	PROC TRAY, 1LK, No Privileged Options, No Tell Tale BAT
91898400	PROC TRAY, 1LK, With Privileged Options, No Tell Tale BAT
91898500	PROC TRAY, 2LK, No Privileged Options, No Tell Tale BAT
91898600	PROC TRAY, 2LK, With Privileged Options, No Tell Tale BAT