IBM Maintenance Library

MAPs	MAPs	MAPs	PLAN INDEX LGND GLOSS START FCD LOC ESDR SENSE	SCGEN OPER INST REMOV CARR REF IR
0001 2100	2105 4220	4230 7900		
VOL 1	VOL 2	VOL 3	VOL 4	VOL 5

8809

Magnetic Tape Unit Maintenance Information (4300 Processors)

8809

AA0001 Seq 1 of 2	2699163 Part Number	846318 15 Mar 79	846481 15 Dec 79	847308 1 Aug 81	847314 1 Apr 82			

PREFACE

How to use the MIM

The MIM can be used in three ways:

1. As a problem solving aid:
   a. The CE can enter the MIM in the START section.
   b. The CE can follow the instructions in the START section to progress to other sections.
   c. In the START section and other MIM sections, references are made to other sections for support information.
2. As a recall aid:
   a. The cover of each volume shows the contents of the entire MIM, highlighting the contents of particular volume.
   b. The CE can enter a section on page 1 (the table of contents) if he knows the section contains the needed information.
   c. The CE can refer to the INDEX section to locate desired information.
3. As an education tool:
   a. The student completes reading assignments in the MIM required by the FE education course.
   b. The student uses pages in the MIM as reference material.

How to Update the MIM

This manual is under normal Logic Engineering Change controls. File pages by sequence number and side 1 EC level. EC level and date are given in the EC history strip 2.

Related Publications

For 8100 system attachment:

- Introduction to the IBM 8100 Information System, Order No. GA27-2875.
- IBM 8100 Information System Configurator, Order No. GA27-2876.

For 4331 system attachment:

- IBM 4331 Computing System Summary, Input/Output and Data Communications Configurator, Order No. GA33-1523.
- IBM Input/Output Device Summary, Order No. GA32-0039.
- IBM Input/Output Equipment Installation Manual - Physical Planning, Order No. GC22-7064.

For 8100 and 4331 system attachment:

- Reference Manual for IBM 8809 Tape Unit, Order No. GA26-1659.
- IBM 8809 Tape Unit Operator's Guide, Order No. 232-0005.
- Tape Specifications for IBM One-Half Inch Tape Units at: 5556, 800, 1600, and 6250 BPI, Order No. GA32-0006.

This manual was prepared by the IBM General Products Division, Department 61E, Tucson, Arizona 85744.

8809 1 2

AA0001 Seq 2 of 2	2699163 Part Number	846318 15 Mar 79	846481 15 Dec 79	847308 1 Aug 81	847314 1 Apr 82			

SAFETY

Safety Guidelines

If you are aware of the guidelines for working with electrical and mechanical equipment and practice these guidelines, you can work safely with this equipment.

You need not fear electricity, but you must respect it.

You should take every safety precaution possible and observe the following safety practices while maintaining IBM equipment:

1. You should not work alone under hazardous conditions or around equipment with dangerous voltage. Always advise your manager if this is a potential problem.
2. Remove all power before removing or assembling major components, working in the immediate area of power supplies, performing mechanical inspection of power supplies, or installing changes in machine circuitry.
3. Power supplies, pumps, blowers, motor generators, and other units with voltages which exceed 30V ac or 42.4V dc must not be serviced with power on when the unit is removed from its normal installed position within the machine, unless maintenance documentation clearly states otherwise. (This is done to ensure that proper grounding is maintained.)
4. Unplug the power supply cord whenever possible before working on the machine. The wall box switch when turned off should be locked in the off position or tagged with a DO NOT OPERATE tag (form Z229-0237). Be aware that a non-IBM attachment to an IBM machine may be powered from another source and be controlled by a different disconnect or circuit breaker.
5. When it is absolutely necessary to work on equipment having exposed live electrical circuitry, observe the following precautions:
   a. Another person familiar with power off controls must be in immediate vicinity. (Someone must be there to turn off power if it should become necessary.)
   b. Do not wear any jewelry, chains, metallic frame eyeglasses, or metal cuff links. (In the event of contact, there will be more current flowing because of the greater contact area afforded by the metal.)
   c. Use only insulated pliers, screwdrivers, and appropriate probe tips/extenders. (Remember, worn or cracked insulation is unsafe.)
   d. Use only one hand when working on energized equipment. Keep the other hand in your pocket or behind your back. (Remember, there must be a complete circuit for electrical shock. This procedure helps eliminate a path that could complete a circuit through you.)
   e. When using test equipment, be certain that controls are set correctly and that insulated probes of proper capacity are used.
   f. Avoid contacting ground potential (Metal floor strips, machine frames, etc.), use suitable rubber mats purchased locally if necessary.
6. Follow special safety instructions when working with extremely high voltages. These instructions are outlined in CEMs and the safety portion of maintenance documentation. Use extreme care when checking high voltage.
7. Avoid use of tools and test equipment that have not been approved by IBM. (Electrical hand tools [wire wrap guns, drills, etc.] should be inspected periodically.)
8. Replace worn or broken tools and test equipment.
9. After maintenance, restore all safety devices, such as guards, shields, signs, and ground leads. Replace any safety device that is worn or defective. (These safety devices are there to protect you from a hazard. Don't defeat their purpose by not replacing them at the completion of the service call.)
10. Safety glasses must be worn when:
    - Using a hammer to drive pins, etc.
    - Power hand drilling
    - Using spring hooks, attaching springs
    - Soldering, wire cutting, removing steel bands
    - Parts cleaning, using solvents, chemicals, and cleaners
    - All other conditions which might be hazardous to your eyes
11. Never assume that a circuit is deenergized. (Check it first.)
12. Always be alert to potential hazards in your working environment (i.e., damp floors, nongrounded extension cords, power surges, missing safety grounds, etc.).
13. Do not touch live electrical circuits with the surface of the plastic dental mirrors. The surface of the dental mirror is conductive and can result in machine damage and personal injury.
14. Four steps that should be taken in the event of an electrical accident:
    a. USE CAUTION--DON'T BE A VICTIM YOURSELF
    b. TURN POWER OFF
    c. HAVE SOMEONE ELSE GET MEDICAL HELP
    d. ADMINISTER RESCUE BREATHING IF VICTIM IS NOT BREATHING
15. Do not use solvents, cleaners, or oils that have not been approved by IBM.
16. Lift by standing or pushing up with stronger leg muscles. This takes strain off back muscles. Do not lift any equipment or parts which you feel uncomfortable with.
17. Each customer engineer is responsible to be certain that no action on his/her part renders the product unsafe or exposes hazards to customer personnel.
18. Place removed machine covers in a safe out-of-the-way location while servicing the machine. These covers must be in place on the machine before the machine is returned to the customer.
19. Always place CE tool kit away from walk areas where no one can trip over it (i.e., under desk or table).
20. Avoid wearing loose clothing that may be caught in machinery. Shirt sleeves must be left buttoned or rolled up above the elbow. Long hair and scarves must be secured.
21. Ties must be tucked in shirt or have a tie clasp (preferably non-conductive) approximately three inches from the end when servicing a machine.
22. Before starting equipment, make sure that fellow CEs and customer personnel are not in a hazardous position.
23. Maintain good housekeeping in the area of the machines while performing and after completing maintenance.
24. Avoid touching moving mechanical parts when lubricating, checking for play, etc.

Prevention is the key to electrical safety. You should always be conscious of electrical safety and practice *good habits* such as:

- Making certain that the customer's power receptacle meets IBM equipment requirements.
- Inspect line cords and plugs. Check for loose, damaged or worn parts.
- Before removing a component which can retain a charge from the machine, review the procedure in the maintenance documentation. CAREFULLY discharge the necessary components exactly as directed by the service procedure.
- Do not use an ordinary lamp as an extension trouble light.

Never *assume* anything about a machine or circuit. No machine is completely safe *all* the time. The exact condition of a machine may be unknown. Here are some of the reasons why:

- The power receptacle could be incorrectly wired.
- Safety devices or features could be missing or defective.
- The maintenance and/or modification history may be uncertain or unclear.
- A possible design deficiency could exist.
- The machine may have suffered transportation damage.
- The machine might have an unsafe alteration or attachment.
- An EC or sales change may have been improperly installed.
- The machine may have deteriorated due to age or environmental extremes.
- A component could be defective, creating a hazard.
- Some component of the machine may have been incorrectly assembled.

Relating to safety, these are some of the ways the condition of the machine can be affected. *Before you begin a service call or procedure, exercise good judgment and proceed with caution.*

Safety Guidelines (Continued)

Electrical Accidents

Administering First Aid

In implementing rescue procedures in an electrical accident, one must:

- *Use Caution*. If the victim is still in contact with the electrical current source, it may be necessary to use the room EPO (Emergency Power Off) or disconnect switch to remove the electrical current. If the EPO or disconnect switch cannot be located, use a dry stick or another nonconducting object to pull or push the victim away from contact with the electrical equipment.
- *Act Quickly*. If the victim is unconscious, he/she may need rescue breathing and possibly external cardiac compression if the heart is not beating.
- *Call Fire Rescue* (Rescue Squad, Emergency, Ambulance, Hospital, etc.). Have someone summon medical aid.

Determine if the victim needs rescue breathing.

1. Make certain that the victim's airway is open and that it is not obstructed. Check the mouth for objects that may be blocking the airway such as gum, food, dentures or even the tongue. Position the victim on his back and place one hand beneath the victim's neck and the other hand on his forehead. Then lift the neck with one hand and tilt the head backward with pressure on the forehead from the other hand as shown in Figure 1.
2. Now you must *look, listen, and feel* to determine if the victim is breathing freely. Place your cheek close to the victim's mouth and nose to listen and feel for the exhaling of air.

Figure 1.

At the same time, look at the chest and upper abdomen to see if they rise and fall. If the victim is not breathing properly, you should:

a. With the head in a backward tilt as shown in Figure 1, continue to exert pressure on the victim's forehead with your hand while rotating this same hand so that you can pinch the victim's nostrils together with the thumb and index finger (See Figure 2).

CAUTION
Use extreme care when administering rescue breathing to a victim that may have breathed in toxic fumes. DO NOT INHALE AIR EXHAUSTED BY THE VICTIM.

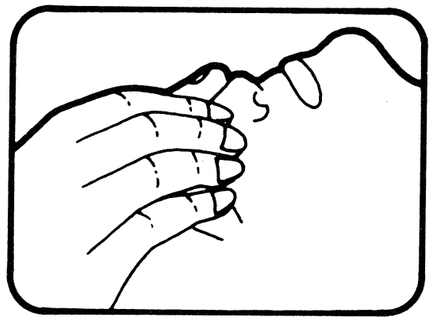

Figure 2.

b. Open your mouth wide and take a deep breath. Make a tight seal with your mouth around the victim's mouth and blow into the victim's mouth (See Figure 3).

Figure 3.

c. Remove your mouth and allow the victim to exhale while watching for the victim's chest to fall (See Figure 4).

Figure 4.

d. Repeat this cycle once every five seconds until the victim breathes for himself or medical help arrives.

Reporting Accidents

It is a CE's responsibility to report all electrical accidents, potential electrical hazards, and "near miss" accidents to your *field manager*. Remember, a near miss accident might be the result of a design deficiency and prompt reporting will ensure that the situation will be resolved quickly.

It's important to report even a minor shock since the conditions which caused it need only be varied slightly to cause serious injury.

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Mach Type/Mod	Serial Number	Storage Control/CPU	MIM Page ID	MIM Page EC No.
8809				
Symptom/Error Code			If no error or symptom code, check here ☐	

Describe the trouble as it was reported to you, or as it appeared to you (machine problem).

Describe problem you encountered with documentation.

Want an acknowledgement?

Fill in your name and Branch Office Number:

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CONTENTS

Organization and Retrieval Aids . . . . . PLAN 10

Documentation Plan . . . . . PLAN 20
Volume 1 . . . . . PLAN 20
Volumes 2 and 3 . . . . . PLAN 20
Volume 4 . . . . . PLAN 20
Volume 5 . . . . . PLAN 20

8809 Maintenance Philosophy . . . . . PLAN 30
Introduction . . . . . PLAN 30
- Directed Maintenance Mode . . . . . PLAN 30
- Maintenance Information Manual (MIM) . . . . . PLAN 30
- Error Logging by the Host System . . . . . PLAN 30
- Symptom Code (SC) . . . . . PLAN 30
- Isolation Code (IC) . . . . . PLAN 30
- Visual Indications . . . . . PLAN 30
- Operator Panel CE Functions . . . . . PLAN 30
- Diagnostic Routines
- Test Pattern Tape . . . . . PLAN 30
- Intermittent Strategy . . . . . PLAN 30

Basic Maintenance Approach . . . . . PLAN 30
Maintenance Information Manual . . . . . PLAN 30
- Entry . . . . . PLAN 30
- Maintenance Analysis Procedures (MAPs) . . . . . PLAN 30

Test Descriptions . . . . . PLAN 31
- Diagnostic Linked Series Inline Programs . . . . . PLAN 31
- Special Requirement Diagnostic Programs . . . . . PLAN 31

Reference Material . . . . . PLAN 31
Functional Level Diagrams . . . . . PLAN 31

How to Use the MIM . . . . . PLAN 50
- Start . . . . . PLAN 50
- Follow Directions . . . . . PLAN 50
- Analyze . . . . . PLAN 50
- Repair . . . . . PLAN 50

Intermittent Strategy . . . . . PLAN 60
Special Isolation Procedures . . . . . PLAN 60

NOTES:

Notes PLAN 5

ORGANIZATION AND RETRIEVAL AIDS

ORGANIZATION

How information is arranged:

The **Documentation Plan (PLAN 20)** defines major sections of the manual. Where practical, documentation is arranged in sections corresponding to natural sequence of machine elements (SENSE, OPER, LOC, etc.).

The **Contents Page (page 1 of each section)** indicates the contents of that section.

The **Maintenance Information Manual (MIM)** charts START pages present the high level trouble shooting approach. References from the START section may be to a specific MAP where a detailed trouble shooting procedure is located.

The **Fault Code Dictionary** section contains the Field Replaceable Unit (FRU) Exchange History table, the Support Center Fact Sheets, Symptom Code tables, and the Isolation Code tables.

The **Reference** section contains added reference and support material that is called out by MAPs.

AE0200 Seq 1 of 2	**2699170** Part Number	**846318** 15 Mar 79	**846481** 15 Dec 79	**847308** 1 Aug 81				

RETRIEVAL AIDS

How to find information:

The **Documentation Plan** provides a method of determining the contents of major sections of the documentation.

The **Contents** page is the first page of each section, and shows the organization of the information within each section. Some CONTENTS pages may contain references to areas of similar interest in other sections.

The **Divider Tabs** aid in fast location of major sections. The TABS also contain a description of how to use the CE probe, and a detailed logic board location chart.

The **Page Numbers** in "thumbing" position may be readily scanned by flipping pages. Page titles provide a quick reference to contents of the page. FCD page titles contain a Symptom Code or Isolation Code for reference.

The **Index** pages contain an alphabetical listing giving page and section locations of specific subjects.

The **Glossary** provides the meaning of abbreviations and terms used in the 8809 MIM.

DOCUMENTATION PLAN

VOLUME 1

MAP 0001 presents a high level, troubleshooting approach. Volume 1 contains MAPs 0001 through 2100.

VOLUMES 2 AND 3

MAPs give detailed, troubleshooting procedures for specific functional areas of the 8809. Volume 2 contains MAPs 2105 through 4220; volume 3 contains MAPs 4230 through 7900

VOLUME 4

PLAN describes the organization of the MIM and the contents of major MIM sections.

INDEX is an alphabetic subject index of the MIM contents.

LGND contains descriptions of symbols and conventions used in the MIM.

GLOSS defines technical terms and abbreviations used in the MIM.

START is the initial entry point for 8809 maintenance activity.

FCD contains the FRU Exchange History table, the Support Center Fact Sheet, and the Fault Code Dictionary tables.

LOC shows FRU and component locations in the 8809.

ESDR describes the output data from the programs that edit and print error and statistical data.

SENSE describes the sense data information supplied by the 8809 to the host system.

VOLUME 5

SCGEN gives a method of using sense data to manually generate a symptom code.

OPER gives a high-level description of tape concepts and 8809 operation.

INST contains step-by-step instructions for installing the 8809, and verifying correct 8809 operation before turning it over to a customer.

REMOV contains step by step instructions for removing or relocating an 8809, and preparing it for shipment.

CARR contains checks, adjustments, removal and replacement procedures for FRUs in the 8809.

REF gives specific reference material needed to complete MAP procedures.

IR gives the customer engineer direct access to FE IR codes.

8809

AE0200 Seq 2 of 2	**2699170** Part Number	**846318** 15 Mar 79	**846481** 15 Dec 79	**847308** 1 Aug 81				

8809 MAINTENANCE PHILOSOPHY

INTRODUCTION

The 8809 maintenance philosophy has been designed around the following:

Directed Maintenance Mode

The CE is kept in directed maintenance mode at all times. This means the CE must follow the step-by-step maintenance analysis procedures (MAPs). The CE is never instructed to operate in a free-lance mode.

Maintenance Information Manual (MIM)

The MIM contains all the information necessary to guide the CE during maintenance. It includes the Fault Code Dictionary (FCD) and other necessary information.

Error Logging by the Host System

When an error occurs, sense bytes are logged in the host system for later analysis by the CE. The sense bytes are also used to develop the symptom code (SC). The symptom code guides the CE to the Fault Code Dictionary, which then points the CE to the detailed MAP for analysis of the machine failure. The host system also logs statistical data when needed.

Symptom Code (SC)

The SC is generated from sense bits and system detected errors collected at the time of failure. The first character of the 4 digits is always a letter. (A, B, C, D, E or F).

Isolation Code (IC)

The IC is generated from sense bits and diagnostic detected errors collected at the time of failure. The first two characters of the code identify the diagnostic routine.

Visual Indications

The MAPs instruct the CE to inspect the operator panel and power supply indicators. The CE is also told to check for obvious tape motion malfunctions, such as loss of tape tension, loose wraps, creases, and so on.

Operator Panel CE Functions

Special functions are built into the Operator Panel to permit the CE to:

- Start and stop tape
- Reverse tape direction
- Change tape speed

Diagnostic Routines

These diagnostic routines are designed to re-create customer failures and to help isolate failing FRUs. They are also used for repair verification.

Test Pattern Tape

The 8809 diagnostic routines 5A and 5B use a prewritten test pattern tape to aid in read/write failure isolation.

Intermittent Strategy

A strategy has been developed to aid in repairing intermittent 8809 failures. The strategy is based on error log reports and summary data analysis, and the recording of FRU usage in the FRU Exchange History table as instructed by the MAPs.

BASIC MAINTENANCE APPROACH

8809 maintenance is based on finding machine failures quickly and on sense data collection. Error data is collected, analyzed, and a symptom code is generated with the purpose of identifying the failing area of the 8809. The START section of the 8809 MIM asks the CE to examine the Symptom Code, run diagnostic linked series inlines and examine the failure symptoms. The CE uses the symptom code to enter the Fault Code Dictionary (FCD). The FCD contains a list of probable failing field replaceable units (FRUs), and points to a MAP that supplies more detailed instructions. When the MAPs call for diagnostic routines to be run and a failure occurs, an isolation code (IC) is generated. The IC then points to the FCD that contains the FRU list and MAP references.

The FRU Exchange History table, and the Support Center Fact Sheet are used when the CE is performing maintenance for intermittent errors. When the CE works on an intermittent failure, he may exchange a "probable-failing FRU". This FRU exchange is noted in the FRU Exchange History table. If the intermittent failure occurs again, this record of FRU exchange will help determine what repair action the CE should follow.

The 8809 maintenance philosophy and the Maintenance Information Manual (MIM) are designed to help the customer engineer repair hardware malfunctions. The MIM emphasizes "how to repair" rather than "how it works".

The maintenance philosophy is designed for the product-trained CE. It can also be used by more proficient product-trained and product-support CEs. Functional Level Diagrams (FLDs), which show point to point wiring and detailed logic, are available for support level CEs. This strategy allows each CE to continue with maintenance until all resources have been exhausted, or until existing policies dictate that he request assistance.

The normal card-isolation technique is to exchange or swap specific cards within a maintenance procedure until the failing card is identified. At the CE's discretion, and depending on customer needs, cards may be swapped between 8809s in a series to speed the isolation process. In many cases, it is not possible or practical to exchange or swap components to isolate failures; therefore, information is given so a failing FRU can be identified.

Scoping procedures are given where necessary. Keep in mind that swapping or exchanging is the primary card isolation technique.

MAINTENANCE INFORMATION MANUAL

The MIM contains the information necessary to guide the CE during maintenance. It includes MAPs, reference information, Fault Code Dictionary, and other information necessary to perform repair actions. The MIM is made up of the following basic interacting parts.

Entry

Problem-analysis entry to the MIM is made on system MAPs. The MIM uses symptoms from customer information, sense data from error-recording programs, console messages, or visual indications to point to the specific MAP to isolate the failure.

Maintenance Analysis Procedures (MAPs)

The MAPs contain detailed step-by-step procedures for problem analysis. The MAPs include the following features.

Possible Causes

Some MAPs list probable failing FRUs. The FRUs are listed in the most probable order of failure or in an order for ease of checking.

The FRUs are listed so that:

- The CE can order the suspected failing parts.
- The CE can use the list as a reference or starting point for intermittent failures.
- The CE can swap or exchange parts to make a repair before continuing with the error analysis.

Isolation

MAPs attempt to give detailed instructions for every cause of a malfunction. For cable failures, the bad condition of the line is identified. A Functional Level Diagram of the failing line may be supplied, and the CE's abilities may be called upon to identify the specific failing unit. For example, the MAP isolates the cause of an 8809 problem to the failure of a certain relay to pick. The relay is picked by a series of switches and cables through a number of connectors. The MAP instructs the CE to swap or exchange each FRU, except for the cables. If the failure is not found, the problem may be in the cable. In some instances, the FLDs are referenced, and the CE will trace the circuit to identify a specific failure.

Interaction with Other MIM Sections

The MAP is the focal point of the maintenance strategy. Because the other MIM sections are integral parts of the strategy, they are all associated with the MAP in some way, either directly or by reference.

8809 MAINTENANCE PHILOSOPHY (Continued)

Diagrams

Diagrams are supplied to analyze difficult problems. These diagrams give more detail, such as connections between cards, and show specific test points. They may include physical locations and FLD references if more specific information is necessary. Where necessary, detailed descriptions and scoping procedures are also given.

TEST DESCRIPTIONS

Diagnostic Linked Series Inline Programs

The Diagnostic Link Series (DLS) Inlines are the CE's primary tool in duplicating a customer problem, and in isolating a failing FRU. The programs begin with the basic routines and build on each other so that as one area of the machine is tested, a more complex area follows. A failure while running the DLS programs generates an Isolation Code (IC) for entry to the FCD section of the MIM.

Special Requirement Diagnostic Inline Programs

The Special Requirement Diagnostic programs permit the CE to check timings, and read/write functions. They are used with the DLS programs to thoroughly test certain 8809 functions. They cannot be run concurrently with customer programs. See REF 20 section of MIM for run procedures.

REFERENCE MATERIAL

Reference material provided in the MIM gives the CE a basic "big picture" of 8809 operation. This reference material shows locations of FRUs, samples of error reports, circuit diagrams, sense data, and so on. Because the maintenance strategy is "how to repair," only the material that is needed for maintenance is given.

FUNCTIONAL LEVEL DIAGRAMS

The Functional Level Diagrams (FLDs) are supplied for difficult and intermittent 8809 failures. The FLDs show connections between cards, point to point wiring, and logic and voltage levels. In most cases, the FLDs are not used for failure analysis.

HOW TO USE THE MIM

Start

Start by gathering all available information about the failure, and consulting the START pages in the MIM.

Follow Directions

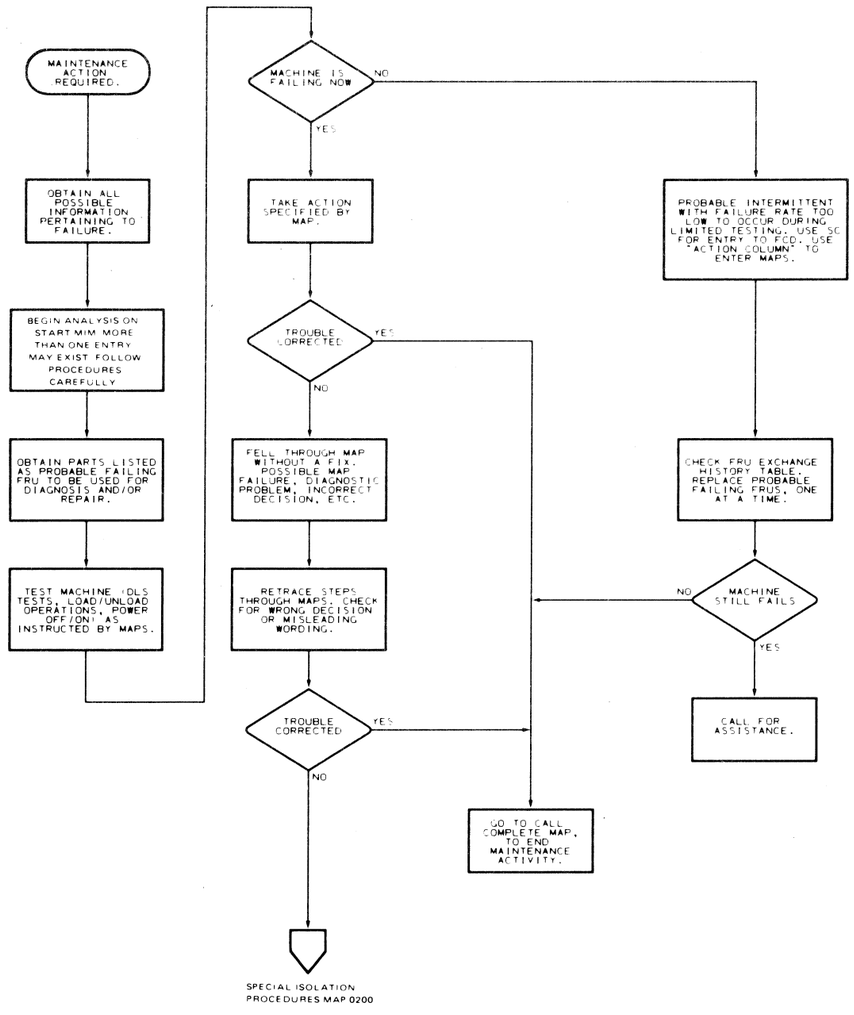
Perform each sequential step without skipping any steps or pages. **Read all instructions and notes.**

Analyze

Analyze available failure information with the aid of the maintenance information manual (MIM). These procedures begin in the START section. Follow the procedure to isolate the failing area.

Repair

Follow the MAP to determine the repair action. Use other material referenced by the MAPs to assist in analyzing failures. MAPs may attempt to recreate failures by having you run diagnostic programs. Return to the MAP to analyze results. If the program detects a failure, reference is made to the Fault Code Dictionary (FCD).



SPECIAL ISOLATION PROCEDURES

If the type of 8809 failure is not obvious, use system manuals, attachment manuals, programming manuals, etc., to determine how to obtain logged information (sense byte and symptom code, for example) from the specific system/programming configuration to which the 8809 is attached.

Obtain any available console error messages. Use operator manuals, system message manuals, etc., for specific formats, layouts, descriptions, and corrective actions. Also, refer to the ESDR section of the 8809 MIM. Determine from the logged information if the failure is isolated to one tape unit, two tape units, or all tape units in the series (indicating a possible attachment failure). Determine what is failing and what is not failing. Log summaries are most effective for this.

See 8809 MIM, START 20, Figures 3 and 4 for setting error log mode to record temporary errors for analysis.

A few soft (correctable) errors, especially Data Checks or Write Checks, should not be cause for concern. Any significant increase in these type of errors should be investigated.

Review the IR history and the FRU Exchange History table. It is possible that the trouble could have been transferred to the machine while card swapping to isolate a problem in another machine.

Refer to the Special Isolation Procedures (SIP) MAP when directed to do so by the MAP. The SIP MAP may also request that you call the Support Center at the appropriate time.

Obtain help whenever you experience difficulty in making a rapid repair. The SIP MAP and local procedures dictate how and when to do this.

INDEX

A

abbreviations (see GLOSSary section)
ac power distribution
  50 Hz Models 1 and 3 . . . REF 200
  60 Hz Models 1 and 3 . . . REF 100
addressing . . . INST 60, REMOV 10
adjustments
  alternate skew . . . CARR 51
  mechanical skew . . . CARR 50
after installation . . . INST 80
alternate skew adjustment . . . CARR 51
analysis procedure, EREP . . . ESDR 80
attachment to 4331 Processor . . . REF 50

B

Backspace Block command . . . OPER 90
Backspace File . . . OPER 90
beginning-of-tape mark . . . OPER 30
BOT (see beginning-of-tape mark)
BOT/EOT sensor removal and replacement . . . CARR 60

C

cables
  fan . . . INST 40
  installation . . . INST 70
  multi-model . . . INST 30
  power . . . INST 40
  removal . . . REMOV 10
  tailgate . . . INST 70, 80
  to host system . . . INST 70
cards, stack assembly . . . LOC 70
CE switch . . . OPER 81
Check Reset command . . . OPER 90
checks
  diagnostic . . . INST 80
  grounding . . . INST 45
  initial . . . INST 65
  power . . . INST 45
    general . . . INST 45
    Model 1A, 1B . . . INST 45
    Model 2 . . . INST 55
    system . . . INST 55
  rectifier . . . CARR 10
  ripple . . . CARR 20
  skew . . . INST 65
  voltage . . . CARR 20
checklist, installation . . . INST 5
cleaner block removal and replacement . . . CARR 130
cleaning procedures . . . OPER 60
commands
  Backspace Block . . . OPER 90
  Backspace File . . . OPER 90
  Control No Op . . . OPER 90
  Data Security Erase . . . OPER 90
  Erase Gap . . . OPER 90
  Forward Space Block . . . OPER 90
  Forward Space File . . . OPER 90
  Loop Write to Read . . . OPER 90
  Read . . . OPER 90
  Read and Reset Buffered Log . . . OPER 90
  Rewind . . . OPER 90
  Rewind Unload . . . OPER 90
  Sense . . . OPER 90
  Sense I/O . . . OPER 90
  Set Diagnose . . . OPER 90
  Set High Speed . . . OPER 90
  Set High Speed and Long Gap . . . OPER 90
  Set High Speed and Normal Gap . . . OPER 90
  Set Long Gap . . . OPER 90
  Set Low Speed . . . OPER 90
  Set Low Speed and Long Gap . . . OPER 90
  Set Low Speed and Normal Gap . . . OPER 90
  Set Normal Gap . . . OPER 90
  Write . . . OPER 90
  Write Tape Mark . . . OPER 90
connectors
  drive control . . . REF 70
  power amplifier circuits . . . REF 80
  power supply . . . REF 10
  stack assembly . . . LOC 70
  tape deck . . . LOC 60
  transducer circuits . . . REF 60
control line tag summary . . . OPER 160
control lines
  inbound . . . OPER 140
  outbound . . . OPER 140
Control No Op command . . . OPER 90
cross crease . . . OPER 40
CUA Statistics . . . ESDR 20

D

Data Security Erase command . . . OPER 90
dc distribution . . . CARR 20
deck brake removal and replacement . . . CARR 240
deck raise gear box removal and replacement . . . CARR 230
definition of terms (see GLOSSary section)
device characteristics . . . OPER 10
device commands . . . OPER 90
Diagnostic Link Series (see DLS operating instructions)
diagnostics . . . INST 80
disassemble . . . REMOV 10
disposition of shipping material . . . INST 80
DLS operating instructions . . . REF 20, PLAN 31
documentation plan . . . PLAN 20
drive control . . . OPER 130
drive control circuits and connectors . . . REF 70

E

edge crease . . . OPER 40
end-of-tape mark . . . OPER 30
environmental problems
  contamination . . . OPER 50
  handling . . . OPER 50
  humidity . . . OPER 50
  storage . . . OPER 50
  tape handling . . . OPER 50
  temperature . . . OPER 50
EOT (see end-of-tape mark)
Erase Gap command . . . OPER 90
erase head removal and replacement . . . CARR 130
EREP
  analysis procedure . . . ESDR 80
  CUA Statistics Report . . . ESDR 20
  MDR Edit Report . . . ESDR 70
  OBR Edit Report . . . ESDR 60
  Permanent Error Summary Report . . . ESDR 30
  Summary of Reports . . . ESDR 10
  Volume Statistics Report . . . ESDR 50
extended operation . . . OPER 150

F

fan cables . . . INST 40
fan removal and replacement . . . CARR 220
field packing . . . REMOV 10
File Protect indicator . . . OPER 80
file reel latch interlock switch . . . CARR 180
file reel latch removal and replacement . . . CARR 80
file reel motor and motor brush, removal and replacement . . . CARR 90
Format 1
  description . . . SENSE 11
  summary . . . SENSE 10
Format 6
  description . . . SENSE 51
  summary . . . SENSE 50
Forward Space Block command . . . OPER 90
Forward Space File . . . OPER 90
FRU exchange history . . . FCD 02
functional level diagrams (FLD) . . . PLAN 31
functional overview of tape unit . . . OPER 100

G

graphic symbols (see LGND section)
grounding checks . . . INST 45

H

handling problems . . . OPER 40
head card assembly removal and replacement . . . CARR 70
host system to 8809 cables . . . INST 70
how to use the MIM . . . PLAN 50

I

immediate operation . . . OPER 150
inbound lines
  Bus In . . . OPER 140
  Check End . . . OPER 141
  Normal End . . . OPER 141
  Select Active . . . OPER 140
  Selected Alert . . . OPER 141
  Sync In . . . OPER 140
indicators
  File Protect . . . OPER 80
  Power Off . . . OPER 80
  Power On . . . OPER 80
  Ready . . . OPER 80
  Select . . . OPER 80
initial checkout . . . INST 80
inlines (see DLS operating instructions)
installation
  addressing . . . INST 60
  cables . . . INST 70
  checklist . . . INST 5
  diagnostics . . . INST 80
  disposition of shipping materials . . . INST 80
  introduction . . . INST 10
  power checks
    general . . . INST 45
    grounding . . . INST 45
    Model 1A, 1B . . . INST 45
    Model 2 . . . INST 55
    system . . . INST 55
  pre-installation check . . . INST 10
  preparation . . . INST 10
  programming . . . INST 10
  records . . . INST 80
  skew check . . . INST 65
  terminators . . . INST 65, INST 80
  time . . . INST 10
  tools and test equipment . . . INST 10
  unpack/locate . . . INST 10
interlock switches removal and replacement . . . CARR 180
intermittent strategy . . . PLAN 60

L

Load Rewind switch . . . OPER 81
locations
  major assemblies . . . LOC 10
  motors . . . LOC 20
  power supply . . . LOC 40, LOC 50
  sensors . . . LOC 20
  stack assembly . . . LOC 30
  tape deck . . . LOC 20
logic board removal and replacement . . . CARR 210
logic card removal and replacement . . . CARR 190
Loop Write to Read command . . . OPER 90
loose wrap load . . . OPER 80

M

machine reel motor removal and replacement . . . CARR 150
machine reel removal and replacement . . . CARR 120
magnetic tape
  environmental problems . . . OPER 50
  general information . . . OPER 30
  handling problems . . . OPER 40
maintenance philosophy . . . PLAN 30
  basic approach . . . PLAN 30
  diagnostic linked series (DLS) . . . PLAN 31
  functional level diagrams (FLD) . . . PLAN 31
  how to use the MIM . . . PLAN 50
  intermittent strategy . . . PLAN 60
  maintenance information manual . . . PLAN 31
  special requirement diagnostics (SRD) . . . PLAN 31
major assembly location . . . LOC 10
MDR Edit Report . . . ESDR 70
motor brush removal and replacement . . . CARR 90
motor location . . . LOC 20
multi-model cables . . . INST 30
multiple unit configurations . . . OPER 20

N

normal load . . . OPER 81

O

OBR Edit Report . . . ESDR 60
operator panel . . . OPER 80
  connections . . . REF 70
  removal and replacement . . . CARR 160
organization of MIM . . . PLAN 10
outbound lines
  Bus Out . . . OPER 140
  Recycle . . . OPER 140
  Response . . . OPER 140
  Select Hold . . . OPER 140
  Sync Out . . . OPER 140
  Tag Bus Out . . . OPER 140
  Tag Gate . . . OPER 140

8809

AG0100	2699174	846318	846481	847323	847308			
Seq 1 of 2	Part Number	15 Mar 79	15 Dec 79	1 Oct 80	1 Aug 81			

P

packing for shipment . . . REMOV 10
PEID (see phase encode identification)
Permanent Error Summary . . . ESDR 30
phase encode identification . . . OPER 30
physical characteristics . . . OPER 10
pleat crease . . . OPER 40
postamble . . . OPER 30
power amplifier board removal and replacement . . . CARR 200
power amplifier circuits and connectors . . . REF 80
power cables . . . INST 40
power checks
  Model 1A, 1B, or Model 3 . . . INST 45
  Model 2 . . . INST 55
  system . . . INST 55
power control card Models 1 and 3 . . . REF 400
Power Off indicator . . . OPER 80
Power Off switch . . . OPER 81
Power On indicator . . . OPER 80
Power On switch . . . OPER 81
power supply
  connector pins and voltages . . . REF 10
  Model 2 . . . LOC 50
  Models 1 and 3 . . . LOC 40
  power control card removals and replacements . . . CARR 30
  ripple checks . . . CARR 20
  voltage checks . . . CARR 20
preamble . . . OPER 30
pre-installation check . . . INST 10
preparation . . . INST 10
primary power distribution Model 2 . . . REF 400
programming . . . INST 10
pushbutton
  CE . . . OPER 81
  Load Rewind . . . OPER 81
  Power Off . . . OPER 81
  Power On . . . OPER 81
  Reset . . . OPER 81
  Unload Rewind . . . OPER 81

R

Raising the deck . . . INST 20
Read and Reset Buffered command . . . OPER 90
Read command . . . OPER 90
read/write data path . . . OPER 120
Ready indicator . . . OPER 80
records updating . . . INST 80, REMOV 20
rectifier
  removal and replacement . . . CARR 10
  test . . . CARR 10
reel size sensor removal and replacement . . . CARR 100
relocation procedures . . . REMOV 10
removal and replacement
  BOT/EOT sensor . . . CARR 60
  cleaner block . . . CARR 130
  erase head . . . CARR 130
  fan . . . CARR 220
  file reel latch . . . CARR 80
  file reel latch interlock switch . . . CARR 180
  file reel motor . . . CARR 90
  head card . . . CARR 70
  interlock switches . . . CARR 180
  logic board . . . CARR 210
  logic card . . . CARR 190
  machine reel . . . CARR 120
  machine reel motor . . . CARR 150
  motor brush . . . CARR 90
  operator panel . . . CARR 160
  power amplifier board . . . CARR 200
  power supply . . . CARR 30
  rectifier . . . CARR 10
  reel size sensor . . . CARR 100
  sense idler assembly . . . CARR 110
  tape guide . . . CARR 60
  tape idler . . . CARR 110
  tape present sensor and idler . . . CARR 110
  tape tachometer . . . CARR 140
  top cover interlock switch . . . CARR 180
  write enable sensor . . . CARR 170
removal procedures . . . REMOV 10
Reports
  CUA Statistics . . . ESDR 20
  Detailed
    Error . . . ESDR 60
    Statistical . . . ESDR 70
  MDR Volume Statistics . . . ESDR 50
  OBR Volume Statistics . . . ESDR 50
  Permanent Error Summary . . . ESDR 30
  Subsystem Temporary Error Summary . . . ESDR 40
  Summary of . . . ESDR 10
  Volume Statistics . . . ESDR 50
Reset Long Gap . . . OPER 90
Reset switch . . . OPER 81
retrieval aids . . . PLAN 10
Rewind command . . . OPER 90
Rewind Unload . . . OPER 90
ripple checks . . . CARR 20

S

Select indicator . . . OPER 80
selection operation . . . OPER 150
Sense command . . . OPER 90
sense data
  description Format 1 . . . SENSE 11
  description Format 6 . . . SENSE 51
  summary Format 1 . . . SENSE 10
  summary Format 6 . . . SENSE 50
sense idler assembly removal and replacement . . . CARR 110
Sense I/O command . . . OPER 90
sensor location . . . LOC 20
Set Diagnose . . . OPER 90
Set High Speed and Long Gap command . . . OPER 90
Set High Speed and Normal Gap command . . . OPER 90
Set High Speed command . . . OPER 90
Set Long Gap command . . . OPER 90
Set Low Speed and Long Gap command . . . OPER 90
Set Low Speed and Normal Gap command . . . OPER 90
Set Normal Gap command . . . OPER 90
ship group items . . . REMOV 20
skew adjustment . . . CARR 50
skew check . . . INST 65
special requirement diagnostics . . . REF 40, PLAN 31
special tools . . . REF 30
SRD (see special requirements diagnostics)
stack assembly . . . LOC 30
  cards . . . LOC 70
  connectors . . . LOC 70
start of call . . . START 10
Subsystem Temporary Error Summary . . . ESDR 40
support center fact sheet . . . FCD 08
symbols (see LGND section)
symptom code
  flowcharts . . . SCGEN 11
  generation . . . SCGEN 10
system power check . . . INST 55
sytem terminator (8100) . . . INST 80

T

tag sequence operations . . . OPER 150
tag summary . . . OPER 160
tailgate cables . . . INST 70, 80
tape
  contamination . . . OPER 50
  damage . . . OPER 40
  handling . . . OPER 50
  humidity . . . OPER 50
  storage . . . OPER 50
tape deck
  connectors . . . LOC 60
  location . . . LOC 20
  motors . . . LOC 20
  sensors . . . LOC 20
tape guide removal and replacement . . . CARR 60
tape idler removal and replacement . . . CARR 110
tape present sensor removal and replacement . . . CARR 110
tape tachometer removal and replacement . . . CARR 140
tape unit
  cleaning procedures . . . OPER 60
  commands . . . OPER 90
  configurations . . . OPER 20
  control lines . . . OPER 140
  drive control . . . OPER 130
  functional overview . . . OPER 100
  operator panel . . . OPER 80
  read/write data path . . . OPER 120
  tag sequence . . . OPER 150
termination . . . INST 65, 80, REMOV 10
terminology (see GLOSSary section)
tools and test equipment . . . INST 10
top cover damper removal and replacement . . . CARR 55
top cover interlock switch . . . CARR 180
transducer circuits and connectors . . . REF 60

U

Unload Rewind switch . . . OPER 81
unpack/locate tape units . . . INST 10
unit emergency power off switch (UEPO) . . . OPER 80, INST 1

V

voltage checks . . . CARR 20
volume statistics
  MDR volume statistics . . . ESDR 50
  OBR volume statistics . . . ESDR 50

W

Write command . . . OPER 90
write enable sensor removal and replacement . . . CARR 170
write path . . . OPER 120
Write Tape Mark command . . . OPER 90

8809
  attachment to 4331 Processor . . . REF 50
  cables to host system . . . INST 70
  device characteristics . . . OPER 10
  device commands . . . OPER 90
  maintenance philosophy . . . PLAN 30
  physical characteristics . . . OPER 10

8809

AG0100	2699174	846318	846481	847323	847308			
Seq 2 of 2	Part Number	15 Mar 79	15 Dec 79	1 Oct 80	1 Aug 81			

CONTENTS

Graphic Symbols . . . . . LGND 10

Contents LGND 1

NOTES:

Notes: **LGND 5**

LEGEND—GRAPHIC SYMBOLS

GRAPHIC SYMBOLS AND LINES

The legend contains descriptions of symbols and conventions used in this MIM.

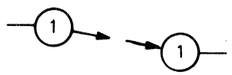
Keys

Primary Key: reverse number in a black square. Used in text and illustrations.

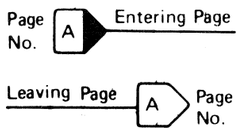
Secondary Key: reverse letter in a black circle. Used in text when keying to a test point symbol in a diagram.

Test Point Key: used on diagrams to indicate test point or circuit part.

Connectors

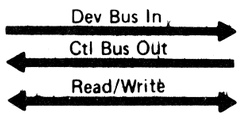


Onpage Connector: connection between parts of the same diagram. Line-of-sight arrows assist in locating other connector(s) and indicate flow direction of the line.



Offpage Connector: connection between diagrams on separate pages. Letter keys are used to identify corresponding points.

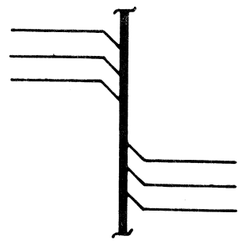
Bus and Control Lines



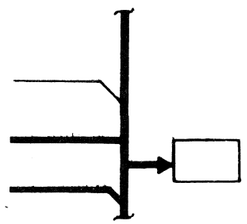
Bus Lines (Data Flow)

Control Lines: not connected.

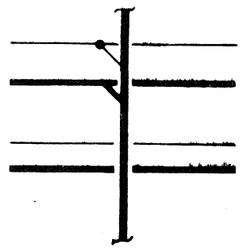
Control Lines: connected.



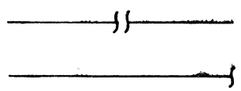
Bus or cable with multiple control lines entering and exiting.



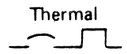
Bus and control lines that connect to a bus.

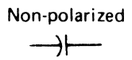


Bus and control lines that do not connect to a bus.



The standard line break is used when a line break is required.





ELECTRICAL SYMBOLS

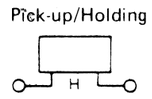
Circuit Breakers

Note: *Auxiliary contacts associated with the circuit breaker (CB) are shown in their normal positions with the CB in its On position.*

Capacitors

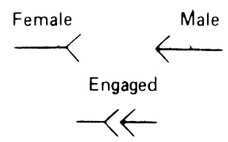
When required for safety or circuit operation, the use of the curved line represents the following:

- The outside electrode in fixed paper dielectric, certain ceramic dielectric, plastic dielectric, and similar capacitors
- The moving element in variable capacitors
- The low potential element in feed-through capacitors

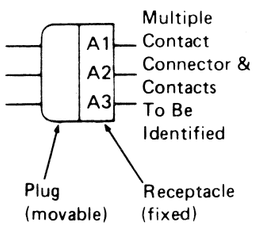


Coils, Relay and Solenoid Relay

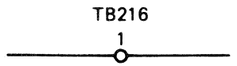
Connectors



Manual Disconnect



Plug and Receptacle



Terminal: may be added to each symbol.

8809

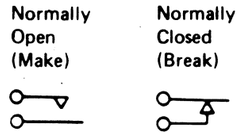
AJ0200 Seq 1 of 2	2699178 Part Number	846318 15 Mar 79						

LEGEND—GRAPHIC SYMBOLS (Continued)

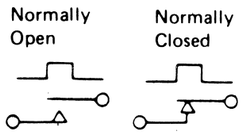
ELECTRICAL SYMBOLS (Continued)

Contacts

Relay

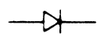


Thermal



Diode, Rectifier (solid state)

Note: *Arrow shows direction of conventional current flow.*



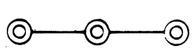
General

Light Emitting Diode (LED)

Ground

Earth: earth potential or a structure acting as a ground

Frame on Chassis: frame on chassis may be at other than earth potential



Hubs

Inductor-Reactor

General

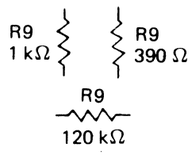
Lamp

Filament Type

Motor

Armatures, Motor

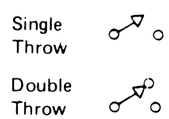
Receptacle



Resistors

Fixed: all resistance values will be specified as follows:

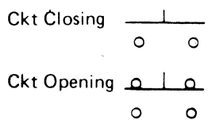
Ω= ohm
kΩ= kilohm
MΩ= megohm



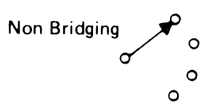
Switches

Toggle Switches

Ganged



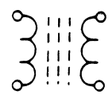
Pushbutton



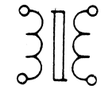
Selectors

Transformers

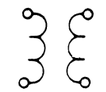
Laminated Iron Core



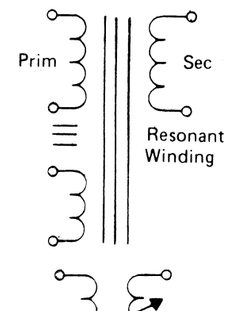
Powdered Iron Core



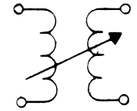
Core of Square of Loop Material



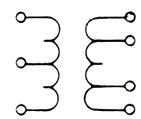
Air Core



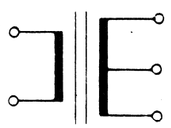
Transformer, Voltage Regulating: (Ferro-Resonant Transformer)



Adjustable

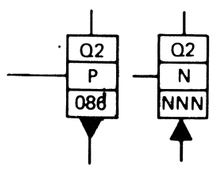


Tapped



Low Frequence Transformer

Transistor



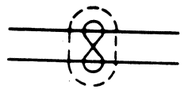
Q2 identifies the transistor on the circuit drawing.

P or N identifies the channel material.

NNN identifies the IBM type

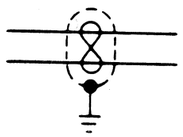
LEGEND—GRAPHIC SYMBOLS (Continued)

ELECTRICAL SYMBOLS (Continued)

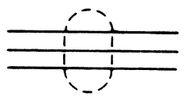


Wiring

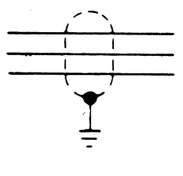
Twisted Pair: shielded and Ungrounded



Twisted Pair: shielded and Grounded

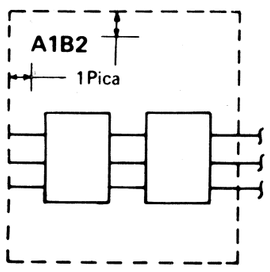


Multiple Wires: shielded and Ungrounded



Multiple Wires: shielded and Grounded

ENCLOSURE



Enclosure (Dashed Line)

The enclosure can be used to indicate a field replaceable unit (FRU).

NOTES:

Notes: LGND 31

GLOSSARY OF TERMS AND ABBREVIATIONS

This glossary is a vocabulary reference source for definitions that are unique to the 8809 magnetic tape unit. Included are some common data processing abbreviations and terms that have been defined for specific use in this maintenance information manual (MIM). If you do not find the term you are looking for, refer to the INDEX section of this MIM, or the IBM Data Processing Glossary, Order No. GC20-1699.

ACKNOWLEDGEMENT TO THE AMERICAN NATIONAL STANDARDS INSTITUTE

This glossary includes definitions developed by the American National Standards Institute (ANSI). This material is reproduced from the American National Dictionary for Information Processing, copyright 1977 by the Computer and Business Equipment Manufacturers Association, copies of which may be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018. ANSI definitions and terms are identified with an asterisk (*).

SI METRIC SYMBOLS

Systeme International d'Unites (SI) metric system symbols used in this MIM are listed in the glossary.

SYMBOLS

* Used to show a footnote in the MIM.

% Percent.

/ Per; and/or, to indicate either or both.

' ' Prime. Used to enclose numbers in hexidecimal notation.

μ Micro.

Ω Ohm.

°C Degree Celsius.

°F Degree Fahrenheit.

A

A: Ampere(s), AND function (logic block symbol).

A*OR: AND*OR function (logic block symbol).

ac: Alternating current.

amp(s): Ampere(s).

ampl: Amplifier. See power amplifier.

AND: AND circuit (logic block symbol).

AR: Amplifier function (logic block symbol).

B

B/M: See bill of material.

background error: An unexpected error occurring while running diagnostic tests. The error occurred in circuitry other than that being tested at the time of failure.

backward creep: During repeated backspace commands, the tape moves close to or overlaps the preceding record.

***beginning of tape mark (BOT)**: The reflective strip that identifies the beginning of the recording area on tape. This term is used synonymously with load point.

bill of material(s) B/M: A list of parts. See also Field bill of material.

blinks: As pertains to the general logic probe lamps. Both lamps are alternately on and off, and the duration of either lamp may vary.

BOB: Beginning of block.

BOPAR: Bus out parity.

BOR: Beginning of record.

BOT mark: See beginning of tape mark (BOT).

bpi: Bits per inch.

BPI: Bytes per inch.

BSB: Backspace Block (command).

BSF: Backspace File (command).

Bus: A common electrical connector.

Bus In: Pertaining to incoming signals or power on a bus.

Bus Out: Pertaining to outgoing signals or power on a bus.

byte: A sequence of eight adjacent bits plus a parity bit.

C

°C: Degree Celsius.

C: Capacitor.

Call Complete MAP: A MAP used at the end of each service call to ensure that the machine is functioning properly for the customer, and that all data concerning the call is properly recorded.

Caution (notice): A word to call attention to possible damage to a program, device, or system. Contrast with Danger.

CB: Circuit breaker.

CE: Customer Engineer.

CE multimeter: The standard multimeter (PN 1749231) issued with the CE tool kit.

centimeter (cm): One hundredth part of a meter. See also meter and millimeter.

cm: See centimeter.

Continuity: A state of having zero or near zero resistance from point to point in an electrical circuit.

CP: Circuit protector.

Ctl No-op: Control No Operation (command).

D

DA: Device address.

Danger (notice): A word to call attention to possible harm to people. Contrast with Caution.

dc: Direct current.

DE: Device end.

defective: Used to describe a part that has failed.

degauss: To demagnetize an object.

Diag Bkwd: Diagnostic Backward (command).

Diag Fwd: Diagnostic Forward (command).

Diag Stp: Diagnostic Stop (command).

dictionary: See FCD.

disconnect: To break a connection, either physically or electrically.

DLS: Diagnostic linked series inline program. A group of 8809 diagnostic routines that execute in a predetermined sequence. A machine failure while running these routines causes an isolation code (IC) to be developed.

drop: To deenergize a relay.

DSE: Data Security Erase (command).

DT: Dead track.

DTR: Dead track register.

E

EC: Edge connector; engineering change.

End of Block code (EOB): A code that marks the end of a block of data.

End of File mark (EOF): A code which signals that the last record of a file has been read.

***End of Tape mark (EOT)**: The reflective strip that marks the end of the recording area on tape.

EOB: See End of block.

EOF: See End of file.

EOJ: End of job.

EOR: End of record; end of reel.

EOT mark: See End of Tape Mark.

EOV: End of volume.

EREP: Environmental recording, editing, and printing (program).

ERG: Erase Gap (command).

ERP: Error recovery procedures.

exchange: To remove a thing and install another, generally of an identical nature.

F

°F: Degree Fahrenheit.

F: Fuse; farad.

Fault Code Dictionary (FCD): A section of the MIM containing the FRU Exchange History Table, Support Center Fact Sheets, diagnostic routine and program descriptions, and all symptom codes and isolation codes.

FBM: See Field bill of material.

FCD: See Fault Code Dictionary.

fci: Flux changes per inch.

FF: Flip-flop (logic block symbol).

Field bill of material (FBM): A document that provides the parts and instructions to install an engineering change in the field.

file protect (FP): Pertaining to a tape reel with the write enable ring removed.

file reel: The tape reel containing customer data. Contrast with machine reel.

FL: Flip-latch (logic block symbol).

FLD: Functional Level Diagrams

flashing: See blinks.

FP: See file protect.

FRU: Field replaceable unit.

FSB: Forward Space Block (command).

FSF: Forward Space File (command).

G

g: Gram.

GLOSSARY OF TERMS AND ABBREVIATIONS (Continued)

general logic probe: A CE tool used for testing logic line levels. Preparation and use of the tool is briefly explained on all section tabs in this MIM.

gnd: ground, electrical earthing.

H

Hertz (Hz): Unit of frequency.

hex: Hexadecimal, pertaining to a number system with a base of 16. See also ' ' symbol.

HS: High speed.

HV: High voltage.

Hz: See Hertz.

I

I: Current; inverter (logic block symbol).

I/O: Input/output.

IBG: See Interblock Gap.

IC: See Isolation Code.

Interblock Gap (IBG): Space between two consecutive blocks of data.

ips: Inches per second.

IR: Incident report.

***ISO:** International Organization for Standardization

Isolation Code (IC): A code generated when a failure occurs while running the diagnostic linked series inline (DLS) programs. The code is used for entry into the Fault Code Dictionary.

iwr: Write current (logic block symbol).

J

J: Connection, receptacle (logic block symbol).

jumper: A wire connecting two pins of a card or board.

K

k: See kilo.

ka: Kiloamperes.

kb: Kilobyte.

kg: Kilogram.

kHz: Kilohertz.

kilo: A prefix meaning one thousand times. When referring to storage capacity, means exactly 1,024 bytes of storage.

L

L: Liter; inductor (electrical symbol).

LB: Laminar bus.

LED: Light emitting diode.

LIM: Limiter (logic block symbol).

load point: See beginning of tape mark.

load tape: To install and wind magnetic tape on the tape unit.

LOGREC: Log record for the operating system.

loop on error: A diagnostic monitor operating mode used with 8809 diagnostics. A sensed error causes the diagnostic program to loop on the instruction sequence that failed, rather than continue to run the remaining tests and routines.

loose wrap load: An operation that tightens the tape on the file reel.

LR: Line receiver (logic block symbol).

LSI: Large scale integration technology.

LT: Line terminator (logic block symbol).

LWR: Loop Write-to-Read (command).

M

m: See meter. See also milli.

M: See mega.

M/T: Multiple track.

mA: Milliampere.

machine reel: The reel that is on the machine at all times. Contrast with file reel.

MAP: Maintenance analysis procedure.

mark: See Beginning of Tape Markand End of Tape Mark.

master skew tape: A magnetic tape (PN 4322641) used with the skew adjustment card to ensure that the Read/Write head is at right angles (electrically) to the magnetic tape.

Mb: Megabyte.

MD: Maintenance device.

mega (m): One million times. When referring to storage capacity, means exactly 1,048,576 in decimal notation.

meter: 1.0936 yards.

MHz: Megahertz.

micro: One millionth of.

milli: One thousandth part of.

millimeter (mm): One thousandth part of a meter. See also meter and centimeter.

MIM: Maintenance information manual. The manual containing documentation used by CEs to keep a product in, or restore it to, good working order.

MLC: Machine level control.

mm: See millimeter.

ms: Millisecond.

MST: Monolithic system technology.

mV: Millivolt.

N

n: See nano.

N: Inverter (logic block symbol); also No, as used in MAPs.

N OR: Inverter OR (logic block symbol).

N/C: Normally closed.

N/O: Normally open.

nano (n): One billionth part of.

NPF: No problem found.

ns: Nanosecond.

O

O: OR circuit (logic block symbol).

OBR: Outboard recorder.

OE: Exclusive OR circuit (logic block symbol).

OK: Results are as they should be.

open circuit: Infinite or near infinite resistance from point to point in a circuit.

option: A specification in the diagnostic programs that may influence the execution of the program.

OR: OR circuit (logic block symbol).

OR*FL: OR flip latch circuit (logic block symbol).

OV: Overvoltage.

P

p-p: Peak to peak.

P bit: Parity bit.

PN: Part number.

***parameter:** A variable that is given a constant value for a specified application and that may denote the application.

PC: Parity check.

PC board: Printed circuit board.

PE: Phase encoded.

PH: Polarity hold (logic block symbol).

phototransistor: A transistor that is sensitive to infrared light.

pick: To energize a relay.

PNF: Problem not found (MAP). The PNF MAP suggests some additional troubleshooting hints to try before the CE dials for help.

power amplifier: Detects the digital pulses from the A1H2 Drive Control card, and changes the pulses to the varying dc levels used to operate the reel motors.

press: To operate a key or a pushbutton.

PS: Power supply.

pulsing: See blinks.

pushbutton: A button that is pressed to operate a switch or latch.

Q

Q: Transistor (logic block symbol).

R

R: Resistor (logic block symbol).

R/C: Resistor/capacitor (logic block symbol).

R/W: Read/Write.

RCVR: Receiver (logic block symbol).

Rd: Read (command).

RDB: Read Backward (command).

RDF: Read Forward (command).

reconnect: Physically or electrically put back together.

reinstall: Put the original part back that was removed.

remove: Take a part off the machine.

reseat: Remove from the socket and then reinstall in the socket.

REW: Rewind (command).

ring: See write enable ring.

rpm: Revolutions per minute.

RUN: Rewind Unload (command).

S

s: second(s) of time.

SC: Symptom Code. This code is generated by analyzing sense byte information generated after a machine failure. The code is then used for entry into the FCD.

SCR: Silicon controlled rectifier (logic block symbol).

scratch tape: An unlabeled tape that can be used for test purposes.

SDR: Statistical data recorder.

SEL: Selector (logic block).

short circuit: A low resistance between two circuits.

SHS: Set High Speed (command).

SHSLG: Set High Speed and Long Gap (command).

SHSNG: Set High Speed and Normal Gap (command).

GLOSSARY OF TERMS AND ABBREVIATIONS (Continued)

SI: Universal abbreviation for Systeme International d'Unites, the international System of Units.

SIO: Start Input/Output (command).

Skew adjustment: A mechanical adjustment that aligns the Read/Write head at right angles electrically to the magnetic tape.

skew adjustment card: The skew adjustment card (PN 8492415) is used with the master skew tape (PN 432641). The card permits the CE to properly set or adjust the Read/Write head alignment to the magnetic tape without the use of an oscilloscope.

SLG: Set Long Gap (command).

SLS: Set Low Speed (command).

SLSLG: Set Low Speed and Long Gap (command).

SLSNG: Set Low Speed and Normal Gap (command).

SLT: Solid logic technology.

SNG: Set Normal Gap (command).

SNS: Sense (command).

SRD: Special requirements diagnostic programs. These diagnostic tests are used to test the 8809 during installation and troubleshooting. Some SRDs are time-dependent or require a special tape to be installed. In most cases, a dedicated system is required while running these diagnostic programs.

SS: Single shot (logic block).

stop on error: A diagnostic monitor operating mode used with 8809 diagnostics programs. A sensed error causes the diagnostic program to stop at the point where the error was sensed. Further diagnosis may then be made by the CE while the machine holds the error conditions.

Support Center Fact Sheet: A detailed form that the CE fills out prior to calling the support center for help. It will contain all known information about the machine at the time of failure.

swap: Exchange two identical parts within the machine for test purposes.

sync: Synchronize; synchronous.

T

T: Transformer or terminal.

tach: See *Tachometer.*

tachometer: A device that emits pulses that are used to measure speed or distance.

TB: Terminal board or test bit.

TC: Tape control.

test: As it pertains to a meter or probe, to perform a procedure to ensure the tool or device works correctly.

test pattern tape: The test pattern tape (PN 4297736) is a prewritten tape containing 12 groups of special bit patterns and records. It is used in conjunction with the special requirements diagnostics programs.

TI: Tape indicate.

TIE: Track in error.

TP: Test point.

***track:** The portion of a moving storage medium (tape) accessible to a given reading head.

TU: Tape unit.

TUBI: Tape unit bus in.

TUBO: Tape unit bus out.

U

undervoltage lamp: A lamp that, when lighted, indicates that the power supply voltage is below limits.

unload: A part of the unload rewind operation that causes the magnetic tape to be completely rewound onto the file reel.

UV: Undervoltage. See *undervoltage lamp.*

V

V: Volt.

Vac: Volts alternating current.

Vdc: Volts direct current.

VES: Volume error statistics.

VOLID: Volume identification.

W

W: Watt(s).

Write: Write (command).

write enable ring: A device that is installed in a tape reel to permit writing on tape. A reel with the ring removed is file protected, and writing cannot take place.

WTM: Write Tape Mark (command).

Y

y: Yes, as used in MAPs.

Z

Z: Impedance; impedance network (logic block symbol).

NOTES:

Notes: **GLOSS 31**

IMPORTANT

This section is designed for the CE who is familiar with the 8809 maintenance philosophy. If you are not familiar with the maintenance philosophy, read the PLAN section of this Maintenance Information manual before proceeding. The answer to each question in the following entry point charts should be "no" if you do not know or are not sure of a specific problem.

Entry Point A

Entry point for all tape unit problems.

Did the operator report that the tape drive damaged tape?
YES ■■■▶ Go to MAP 4070, entry point A.
NO

Do you have a tape drive problem such as loading, unloading, rewinding, ready failure, power failure, or BOT/EOT failure?
YES ■■■▶ Go to START 40, entry point D.
NO

Is there a symptom code (SC) in the operator message or in an EREP printout? See Notes 1 through 3 and 6.
YES ■■■▶ Go to START 20, entry point B.
NO

Go to entry point A1 on this page.

Entry Point A1

Run the Diagnostic Linked Series (DLS) Inlines routines. See REF 20 for the procedure to run DLS routines.

Did DLS stop with an error and display an isolation code (IC)? See Notes 4 and 5.
YES ■■■▶ Go to START 30, entry point F.
NO

You are here because:
- You do not have tape damage
- You do not have a visual symptom
- You do not have a customer SC
- You do not have an IC

Is this the first time at this point for this call?
YES Go to START 40, entry point D.
NO

Call your next level of support.

Notes:

1. *An SC is not a Reference Code (4331 error codes).*
2. *See START 50, Figure 1 for an example of an SC in an operator error message.*
3. *See START 50, Figure 2 for an example of an SC in an EREP printout.*
4. *If the DLS inlines routines fail, an E1 error message is displayed on line 23. See START 20, Figure 3.*
5. *See Figure 3 on START 20 for an example of an IC in a diagnostic error message.*
6. *See PLAN 30 for definitions of the SC and IC codes.*

START (CONTINUED)

Entry Point B

Is the first character of the symptom code B, C, D, E, or F?

YES ■■■▶ Go to entry point C on this page.

NO

Has the 4331 FTA2 diagnostic been run error-free?

YES ■■■▶ Go to entry point C on this page.

NO

Go to the 4331 and run the FTA2 diagnostic. See 4431 Volume 13 for FTA2 operating instructions.

Does the FTA2 diagnostic run error-free?

YES ■■■▶ Go to entry point C on this page.

NO

The problem is in the 4331.
Go to the 4331 MAPs to fix this problem.

Entry Point C

Run the Diagnostic Linked Series (DLS) Inlines routines.

Does DLS stop with an error and display an isolation code (IC)?

YES ■■■▶ Go to START 30, entry point F.

NO

Go to the FCD page for the SC and perform the **action** described in the **Action** column.

```
                        DLS INLINE DIAGNOSTICS
LV:80016210
DISK/TAPE INLINE RUN/CONTROL OPTIONS
     RUN OPTIONS                              CONTROL OPTIONS
                                               00 = START/STOP DIAGN EXEC
*01 = NO LOOP, LINK, BYP ERR STOP             *10 = START DIAGN PARAM ENTRY
*02 = LOOP + LINK RTN, STOP ON ERR            *20 = ADV ERROR/PARAM DISPL
*03 = LOOP + LINK RTN, BYP ERR STOP           *2X = SEL BYTE X OF ERROR/PARAM DISPL
*04 = NO LOOP, NO LINK, STOP ON ERR            30 = TERMINATE INLINE MODE
*05 = NO LOOP, NO LINK, BYP ERR STOP           31 = I/O ADDRESS ENTRY (0C UU)
*06 = LOOP SINGLE RTN, STOP ON ERR             33 = CONCURRENT RUN RATE SEL
*07 = LOOP SINGLE RTN, BYP ERR STOP            35 = RESET ERROR LOG MODE
 08 = NO LOOP, LINK, STOP ON ERR               36 = SET ERROR LOG MODE
 08 = DEFAULT RUN OPTION                      *37 = START DIAGN PARAM DISPL
*XX = INVALID FOR 3370                         3C = DISPL ILT MNTR REL LVL
                                              40..FF = RTN ID SELECTION

DIAGN 1  2  3  4  5  6  7  8  9  A B C D E F SEL RUN OPT: 08 CUU = 300
ERROR F6 00 00 00 00                            RTN ID =  56 OVY NR = 33
                                                TST NR =  01 OVY ID = 57
SELECTION:  20
             TEST     4MB VSE TIMER: ON        DATA: 0000   ADDR: 000000
                          TOD: SEC
                                          8809 E1 ERROR   D856F68100000000
EFFF
                                          8809 ISOLATION CODE
```

Note: *The asterisks have no significance regarding the 8809.*

Figure 3

Temporary Errors - Customer Operation

Caution: Error Log Mode can be set for customer operation, however, it must be set as specified below. Also be sure that the unit being addressed will not be used by the customer until after Error Log Mode has been set or reset.

1. Press and hold the ALT and press DIAG to display diagnostic screen.
2. Key 88XXX40 and press Enter. (XXX = tape unit address, 300, 301, and so forth.)
3. The customer screen will display. Press CHG DISP.
4. Key 36 and press Enter.
5. Key 03 and press Enter.
6. Key 0X and press Enter. (X = last digit of tape unit address, 0, 1, and so forth.)
7. Ensure that the tape unit is ready and the tape is at load point.
8. Press Enter twice.
9. Key 30 and press Enter.
10. Error Log Mode is now set up for the unit address specified by the Inline Diagnostics.

Figure 4

Notes:

1. *Error Log Mode can be reset by setting Control Option 35, powering down the 4331, or reloading the control diskette. To reset Error Log Mode, repeat steps 1 through 9 (in step 4, key 35 instead of 36).*
2. *There will not be a visual indication on the screen that Control Option 36 has been set.*
3. *If further information is desired, see 4331 MI VOL 13, Section DIA, "Set Control Options", for set and reset of Error Log Mode.*

Entry Point E

Go to the FCD pages and compare the SC and IC FRUs for the two error codes.

Are all or any of the FRUs the same?

YES → Go to the FCD page for the IC and perform the **action** described in the **Action** column.

NO

It seems you have two unrelated problems.
You may have a defective scratch tape, a dirty read/write head, or you are running the DLS routines wrong.
Try a different scratch tape, clean the read/write head, and verify your operating procedures.

Do the DLS tests run error-free now?

YES → Go to the FCD page for the SC and perform the **action** described in the **Action** column.

NO

Do you have two related error codes now?

YES → Go to the FCD page for the IC and perform the **action** described in the **Action** column.

NO

It seems you have two problems. Go to the FCD page for the SC and perform the **action** described in the **Action** column.

Entry Point F

Is the isolation code 4023?

YES → Go to entry point G on this page.

NO

Do you have an SC for this problem?

YES → Go to entry point E on this page.

NO

Go to the FCD page for the IC and perform the **action** described in the **Action** column.

Entry Point G

Is the Power On indicator on?

YES → Go to entry point H on this page.

NO

Go to MAP 6000, entry point A.

Entry Point H

Raise the deck (see INST 20) and observe the under-voltage lamp.

Is the under-voltage lamp on?

YES → Go to MAP 6000, entry point A.

NO

Go to entry point E on this page.

8809

AM0200 Seq 1 of 2	4449808 Part Number	847308 1 Aug 81	847314 1 Apr 82					

Entry Point D

For this failure, select the most appropriate symptom from the following:

Symptoms	Explanation	Action
Power Failure	Power on lamp off, UV lamp on, CP/CP tripped, or fuse blown. See LOC 40 for the location of the UV lamp, and INST 20 for how to raise the deck.	Go to MAP 6000, entry point A.
Tape Load Failure	The reels do not turn when the Load/Rewind pushbutton is pressed after mounting a tape.	Go to MAP 4560, entry point A.
Load/Rewind	The reels do not turn correctly or the tape fails to rewind.	Go to MAP 4010, entry point A.
Rewind/ Unload	The tape fails to rewind on a rewind/unload operation.	Go to MAP 4020, entry point A.
Loud Noises	The tape unit makes loud chattering noises when loading tape.	Go to MAP 4010, entry point A.
BOT Failure	Tape stops before or after BOT marker passes BOT LED.	Go to MAP 4530, entry point A.
High Speed Rewind	Tape unit fails to go into High Speed rewind operation.	Go to MAP 4540, entry point A.
Select Failure	Select lamp will not come on when running tape job or diagnostic.	Go to MAP 4550, entry point A.
No Ready Indication	Tape loads, but Ready iamp does not come on.	Go to START 10, entry point A1.
Drops Ready	When the tape is moving, the Ready lamp goes off and stays off.	Go to MAP 4030, entry point A.
Reel Size Problem	Mini-reel fails to load. Tape goes forward then backwards and then drops tension, or operator reports a reel size problem.	Go to MAP 4050, entry point A.
Repositioning Problem	Repositioning can occur at 100 ips when the next command does not arrive in time or when a data check occurs at 12.5 ips.	Go to MAP 4600, entry point A.
Sense Idler Problem	The idler should not move back and forth more than 5 mm in each direction during tape movement.	Go to MAP 4610, entry point A.
File Protect Problem	The File Protect lamp comes on when a write enable ring is installed, or does not come on when the write enable ring is removed.	Go to MAP 4090, entry point A.
Loose Wrap Load	The reel fails to move forward for approximately one-half the length of the tape during a loose-wrap load operation.	Go to MAP 4010, entry point E2.
Excessive Data Checks (Media)	Customer complains of excessive errors on one tape media.	Go to MAP 3000, entry point A.
EOT Failure	The EOT lamp does not come on when the EOT marker passes the LED, or the lamp comes on before the EOT marker passes the LED.	Go to MAP 4040, entry point A.
Reset Pushbutton Failure	The Ready lamp does not go off when the Reset pushbutton is pressed.	Go to MAP 4100, entry point A.
CE Pushbutton Failure	Fails to operate during a troubleshooting procedure.	Go to MAP 4570, entry point A.
If the symptoms are not described in the foregoing table, go to START 50, entry point J.		

Entry Point J

Have you run the DLS routines for this call?

YES → Diagnostics ran error-free, but you do not have a symptom code or a visual symptom. Record all available sense data on the Support Center Fact Sheet (FCD 8) and go to SCGEN 10.

NO ↓

Run the DLS routines.

Do the DLS routines run error-free?

YES → Diagnostics ran error-free, but you do not have a symptom code or a visual symptom. Record all available sense data on the Support Center Fact Sheet (FCD 8) and go to SCGEN 10.

NO ↓

Go to the FCD page for the IC and perform the **action** described in the **Action** column.

DOS VS OPERATING SYSTEM

```
=) BG
AR 015 IS01D INVALID STATEMENT
=) 0 // EXEC DITTO
BG 000 ENTER XXX TO LIST FUNCTIONS
BG 000 DITTO FUNCTION?
BG-000                                    address of failing drive
=) 0 TT,30150,30050,2
BG 014 0P10I C EQUIP CHK SYS098=300
     CCSW=01100389580E00051 CCB=038020
     SSN=1000000308000010000000000000000000000000000
         000000000004A232
BG 000 0P73I JOB NO/NAME CANCELLED DUE TO I/O ERROR
  8809 symptom code
```

Figure 1. Printout for DOS VSE Rel 3.0

DOS EREP Printout

```
                                   DOS EREP PRINTOUT
                                --- I/O DEVICE EDITING ---

                 TASK IDENTITY   DOS/370                          DAY  YEAR         HH MM SS
RECORD TYPE - UNIT CHECK                                    DATE - 104   81     TIME - 08 09 09
CPU MODEL 4331          SERIAL 012732   Address of failing drive
            DOS REL.   02
FAILING CHANNEL/UNIT ADDRESS 0300            DEVICE TYPE 8809
                  CC   DA     FL    CT                             K   CA     US CS  CT
FAILING CCW       01  03326C  20  00 0051                   CSW    10 033650  02  00 0000

              --- UNIT STATUS ---                                 --- CHANNEL STATUS ---
ATTENTION          0     CHANNEL END      0     PRGM-CTLD IRPT     0     CHAN DATA CHECK  0
STATUS MODIFIER    0     DEVICE END       0     INCORRECT LENGTH   0     CHAN CTL CHECK   0
CONTROL UNIT END   0     UNIT CHECK       1     PROGRAM CHECK      0     I.F CTL CHECK    0
BUSY               0     UNIT EXCEPTION   0     PROTECTION CHECK   0     CHAINING CHECK   0

DEVICE DEPENDENT DATA

VOLUME SERIAL
BLOCK LENGTH   00051

SENSE BYTE DATA

                                                1   1   1   1   1   1
 0   1   2   3   4   5   6   7   8   9   0   1   2   3   4   5
10  00  00  03  08  00  00  10  00  00  00  00  00  00  00  00

 1   1   1   1   2   2   2   2   2   2   2   2   2   2   3   3
 6   7   8   9   0   1   2   3   4   5   6   7   8   9   0   1
00  00  00  00  00  00  00  00  00  00  00  00  00  00  A1  00

SYMPTOM CODE  A100 <---- 8809 symptom code

  HEX DUMP OF RECORD
  HEADER    302A0000   00001100   0081104F   08090950   00012732   43310000

      0018  C4D6E261   F3F7F040   0103326C   20000051   10033650   02000000   01000300   5A638006
      0038  00000300   00000020   40404040   40400051   10000003   08000010   00000000   00000000
      0058  00000000   00000000   00000000   0000A100
```

Figure 2

NOTES:

Notes START 60

FAULT CODE DICTIONARY

FCD - FRU Exchange History . . . . . FCD 6
FCD - Support Center Fact Sheet . . . . . FCD 8
Fault Code Dictionary – Symptom Code . . . . . FCD 10-40
Fault Code Dictionary – Isolation Code . . . . . FCD 50-480

8809

AN0100 Seq 1 of 2	**2699184** Part Number	**846318** 15 Mar 79	**847314** 1 Apr 82					

NOTES:

FCD - FRU EXCHANGE HISTORY

Use this FRU exchange history to make a record of field replaceable units (FRUs) as directed by a MAP. Write down the symptom code and/or isolation code that started the call, or was generated during the analysis of the problem.

Write down the FRU or FRUs used, the date, your name, and any other information that would be useful if this problem occurs again.

Symptom Code/ Isolation Code	FRU Used	Mach. Serial Number	Date	CE Name	Additional Information

Symptom Code/ Isolation Code	FRU Used	Mach. Serial Number	Date	CE Name	Additional Information

8809

AN0200 Seq 1 of 4	2699185 Part Number	846318 15 Mar 79						

FCD - FRU EXCHANGE HISTORY

Use this FRU exchange history to make a record of field replaceable units (FRUs) as directed by a MAP. Write down the symptom code and/or isolation code that started the call, or was generated during the analysis of the problem.

Write down the FRU or FRUs used, the date, your name, and any other information that would be useful if this problem occurs again.

Symptom Code/ Isolation Code	FRU Used	Mach. Serial Number	Date	CE Name	Additional Information

Symptom Code/ Isolation Code	FRU Used	Mach. Serial Number	Date	CE Name	Additional Information

8809

AN0200 Seq 2 of 4	2699185 Part Number	846318 15 Mar 79						

FCD - FRU EXCHANGE HISTORY

Use this FRU exchange history to make a record of field replaceable units (FRUs) as directed by a MAP. Write down the symptom code and/or isolation code that started the call, or was generated during the analysis of the problem.

Write down the FRU or FRUs used, the date, your name, and any other information that would be useful if this problem occurs again.

Symptom Code/ Isolation Code	FRU Used	Mach. Serial Number	Date	CE Name	Additional Information

Symptom Code/ Isolation Code	FRU Used	Mach. Serial Number	Date	CE Name	Additional Information

8809

AN0200 Seq 3 of 4	2699185 Part Number	846318 15 Mar 79						

FCD - FRU EXCHANGE HISTORY

Use this FRU exchange history to make a record of field replaceable units (FRUs) as directed by a MAP. Write down the symptom code and/or isolation code that started the call, or was generated during the analysis of the problem.

Write down the FRU or FRUs used, the date, your name, and any other information that would be useful if this problem occurs again.

Symptom Code/ Isolation Code	FRU Used	Mach. Serial Number	Date	CE Name	Additional Information

FCD - SUPPORT CENTER FACT SHEET

Use this fact sheet when the MAPs have failed to fix a problem and assistance is required from a support center.

Before placing a call, write in all of the requested information. This information is needed by the support center to analyze the problem.

The completed form will provide a history of problems, and will be helpful should the same problem occur again.

System type: _____

Unit serial number: _____

Customer name: _____

Machine EC level: _____

MIM EC level: _____

4300

EREP printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

8100

ELDA SYSLERR, SYSSTLD printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

System error message: _____

Adapter return code: _____

Translated adapter return code: _____

Write a short description of the problem:

_____

_____

_____

_____

_____

Name/Location of FRUs called for by MAP:

_____

_____

_____

_____

_____

_____

Name/Location of FRUs replaced during troubleshooting procedure:

_____

_____

_____

_____

_____

_____

Record the sense bytes obtained during customer operation with symptom code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Record the sense bytes obtained while running the diagnostic linked series with isolation code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

8809

AN0300 Seq 1 of 6	2699186 Part Number	846318 15 Mar 79	847323 1 Oct 80					

FCD - SUPPORT CENTER FACT SHEET

Use this fact sheet when the MAPs have failed to fix a problem and assistance is required from a support center.

Before placing a call, write in all of the requested information. This information is needed by the support center to analyze the problem.

The completed form will provide a history of problems, and will be helpful should the same problem occur again.

System type: _____

Unit serial number: _____

Customer name: _____

Machine EC level: _____

MIM EC level: _____

4300

EREP printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

8100

ELDA SYSLERR, SYSSTLD printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

System error message: _____

Adapter return code: _____

Translated adapter return code: _____

Record the sense bytes obtained during customer operation with symptom code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Record the sense bytes obtained while running the diagnostic linked series with isolation code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Write a short description of the problem:

_____

_____

_____

_____

_____

_____

Name/Location of FRUs called for by MAP:

_____

_____

_____

_____

_____

_____

Name/Location of FRUs replaced during troubleshooting procedure:

_____

_____

_____

_____

_____

_____

8809

AN0300 Seq 2 of 6	2699186 Part Number	846318 15 Mar 79	847323 1 Oct 80					

FCD - SUPPORT CENTER FACT SHEET

Use this fact sheet when the MAPs have failed to fix a problem and assistance is required from a support center.

Before placing a call, write in all of the requested information. This information is needed by the support center to analyze the problem.

The completed form will provide a history of problems, and will be helpful should the same problem occur again.

System type: _____

Unit serial number: _____

Customer name: _____

Machine EC level: _____

MIM EC level: _____

4300

EREP printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

8100

ELDA SYSLERR, SYSSTLD printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

System error message: _____

Adapter return code: _____

Translated adapter return code: _____

Write a short description of the problem:

Record the sense bytes obtained during customer operation with symptom code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Record the sense bytes obtained while running the diagnostic linked series with isolation code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Name/Location of FRUs called for by MAP:

Name/Location of FRUs replaced during troubleshooting procedure:

8809

AN0300 Seq 3 of 6	2699186 Part Number	846318 15 Mar 79	847323 1 Oct 80					

FCD - SUPPORT CENTER FACT SHEET

Use this fact sheet when the MAPs have failed to fix a problem and assistance is required from a support center.

Before placing a call, write in all of the requested information. This information is needed by the support center to analyze the problem.

The completed form will provide a history of problems, and will be helpful should the same problem occur again.

System type: _____

Unit serial number: _____

Customer name: _____

Machine EC level: _____

MIM EC level: _____

4300

EREP printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

8100

ELDA SYSLERR, SYSSTLD printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

System error message: _____

Adapter return code: _____

Translated adapter return code: _____

Write a short description of the problem:

_____

_____

_____

_____

_____

_____

Record the sense bytes obtained during customer operation with symptom code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Record the sense bytes obtained while running the diagnostic linked series with isolation code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Name/Location of FRUs called for by MAP:

_____

_____

_____

_____

_____

_____

Name/Location of FRUs replaced during troubleshooting procedure:

_____

_____

_____

_____

_____

_____

8809

AN0300 Seq 4 of 6	2699186 Part Number	846318 15 Mar 79	847323 1 Oct 80					

FCD - SUPPORT CENTER FACT SHEET

Use this fact sheet when the MAPs have failed to fix a problem and assistance is required from a support center.

Before placing a call, write in all of the requested information. This information is needed by the support center to analyze the problem.

The completed form will provide a history of problems, and will be helpful should the same problem occur again.

System type: _____

Unit serial number: _____

Customer name: _____

Machine EC level: _____

MIM EC level: _____

4300

EREP printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

8100

ELDA SYSLERR, SYSSTLD printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

System error message: _____

Adapter return code: _____

Translated adapter return code: _____

Write a short description of the problem:

_____

_____

_____

_____

_____

_____

Record the sense bytes obtained during customer operation with symptom code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Record the sense bytes obtained while running the diagnostic linked series with isolation code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Name/Location of FRUs called for by MAP:

_____

_____

_____

_____

_____

_____

Name/Location of FRUs replaced during troubleshooting procedure:

_____

_____

_____

_____

_____

_____

8809

AN0300 Seq 5 of 6	2699186 Part Number	846318 15 Mar 79	847323 1 Oct 80					

FCD - SUPPORT CENTER FACT SHEET

Use this fact sheet when the MAPs have failed to fix a problem and assistance is required from a support center.

Before placing a call, write in all of the requested information. This information is needed by the support center to analyze the problem.

The completed form will provide a history of problems, and will be helpful should the same problem occur again.

System type: _____

Unit serial number: _____

Customer name: _____

Machine EC level: _____

MIM EC level: _____

4300

EREP printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

8100

ELDA SYSLERR, SYSSTLD printout of failure on hand: Yes □ No □

Symptom code of failure: _____

Isolation code of failure: _____

Support center: _____

System error message: _____

Adapter return code: _____

Translated adapter return code: _____

Record the sense bytes obtained during customer operation with symptom code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Record the sense bytes obtained while running the diagnostic linked series with isolation code number: _____

Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte	Byte	Sense Byte
0		8		16		24	
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	

Write a short description of the problem:

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Name/Location of FRUs called for by MAP:

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Name/Location of FRUs replaced during troubleshooting procedure:

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8809

AN0300 Seq 6 of 6	2699186 Part Number	846318 15 Mar 79	847323 1 Oct 80					

SYMPTOM CODE

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
A100	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	DCI bus in parity error equals 1.
A110	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card Control Cable	CARR 190 CARR 190 REF 50	An active control line (any bit equal to 1) has been detected at selection time.
A220	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	A timeout occurred waiting for Tag Valid control line to equal 1 during the Select Device operation.
A221	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	A timeout occurred waiting for Tag Valid control line to equal 1 during any operation except a Select Device operation.
A230	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190 CARR 190	A timeout occurred waiting for Normal End, Check End, Selected Alert, or Sync In control lines to equal 1 during an Execute (tag '01') operation.
A232	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Sync In control line equaled 1 more often than Sync Out control line equaled 1.
A240	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A timeout occurred during a Poll Controller (tag '02') operation.
A250	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	A timeout occurred during a Read Control (tag '0A') command.
A310	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Normal End control line not equal to 1 after a Select Device (tag '83'), Poll Controller (tag '02'), or a Immediate Disconnected or Immediate Non-Disconnected Execute (tag '01') command.
A320	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Select Active control line equals 1 when not expected.
A321	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card Control Cable	CARR 190 CARR 190 REF 50	Select Active is not equal to 1 after selection.
A330	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Normal End control line equals 1 early on a Write operation.
A340	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Select Active control line equaled 0 before Select Hold (control line) equaled 0.
A400	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	During the Select Device (tag '83') operation the address returned is different from the selected address.

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
B001	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Sync Out Check (sense byte 11 bit 3) equals 1.
B002	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	DCI Sequence Check (sense byte 9 bit 4) equals 1. This is caused by an error in the control line sequence.
B004	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Tag Bus Parity Check (sense byte 9 bit 2) equals 1.
B008	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	Bus Out Parity Check (sense byte 9 bit 1) equals 1.
B010	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Formatter Read Fail (sense byte 9 bit 7) equals 1 and Read Back Fail (sense byte 14 bit 5) equals 0.
B020	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Formatter Write or Interface Fail (sense byte 9 bit 3) equals 1.
B040	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 23 bit 6) equals 1.
B080	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Clock Parity Error (sense byte 17 bit 3) equals 1.
B140	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Bus Out Reg Parity Check (sense byte 11 bit 1) equals 1.
B180	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Command Reg Parity Check (sense byte 9 bit 5) equals 1.

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
C008	Go to MAP 0140, entry point A.	Power Amplifier Flat Cable - unseated A1H2 Drive Control Card Power Amplifier Board circuit: A1H2U05 to Power Amplifier Board J6D13	LOC 70 CARR 190 CARR 200 REF 80	Power Ampl Cable Unseated (sense byte 23 bit 3) equals 1.
C010	Go to MAP 0140, entry point A.	Reel Size Sensor Transducer Card A1H2 Drive Control Card	CARR 100 LOC 20 CARR 190	Reel Size LED Fail (sense byte 22 bit 2) equals 1. This indicates a failure of the Reel Size Sensor.
C020	Go to MAP 0140, entry point A.	Tape Present Sensor Transducer Card A1H2 Drive Control Card	CARR 110 LOC 20 CARR 190	Tape Present LED Fail (sense byte 22 bit 1) equals I. This indicates a failure of the Tape Present Sensor or related circuits.
C040	Go to MAP 0140, entry point A.	BOT/EOT Sensor Transducer Card A1H2 Drive Control Card	CARR 60 LOC 20 CARR 190	BOT/EOT LED Fail (sense byte 22 bit 0) equals 1.
C080	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Cover/Reel Latch Interrupt (sense byte 18 bit 2) equals 1 and the Cover/Reel Latch Status (sense byte 19 bit 5) equals 0.

8809

AN0400 Seq 1 of 2	2699187 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 80	847314 1 Apr 82		

SYMPTOM CODE

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
C081	Go to MAP 0140, Entry point A.	A1H2 Drive Control Card Cover Interlock Switch Latch Interlock Switch	CARR 190 LOC 20 CARR 180	Cover/Reel Latch Interrupt (sense byte 18 bit 2) equals 1 and the Cover/Reel Latch Status (sense byte 19 bit 5) equals 1.
C110	Go to MAP 0140, entry point A.	Tape Tachometer Transducer Card A1H2 Drive Control Card	CARR 140 LOC 20 CARR 190	Tape Tach Rotation Check (sense byte 21 bit 3) equals 1.
C120	Go to MAP 0140, entry point A.	File Reel Motor Transducer Card A1H2 Drive Control Card Tape Tach Power Amp Card Possible Loose Wrap Problem	CARR 90 LOC 20 CARR 190 CARR 120 CARR 200 OPER 45	File Tach Fail (sense byte 21 bit 2) equals 1.
C140	Go to MAP 0140, entry point A.	Machine Reel Motor Transducer Card A1H2 Drive Control Card	CARR 150 LOC 20 CARR 190	Machine Tach Fail (sense byte 21 bit 1) equals 1.
C180	Go to MAP 0140, entry point A.	Tape Tachometer Transducer Card A1H2 Drive Control Card	CARR 140 LOC 20 CARR 190	Tape Tach Fail (sense byte 21 bit 0) equals 1.
C208	Go to MAP 0140, entry point A.	File Reel Motor Power Amplifier Board A1H2 Drive Control Card Machine Reel Motor circuit: A1H2B03 - shorted to ground	CARR 90 CARR 200 CARR 190 CARR 150 REF 80	Mach Ampl Saturation (sense byte 23 bit 1) equals 1. Excessive current at the brushes of the machine reel motor is detected by the power amplifier circuit.
C210	Go to MAP 0140, entry point A.	File Reel Motor Power Amplifier Board Sense Idler A1H2 Drive Control Card File Reel Motor circuit: A1H2B10 - shorted to ground Tape Tachometer Possible Loose Wrap Problem	CARR 90 CARR 200 CARR 110 CARR 190 CARR 90 REF 80 CARR 140 OPER 45	File Ampl Saturation (sense byte 23 bit 0) equals 1. Excessive current at the brushes of the file reel motor is detected by the power amplifier circuit.
C220	Go to MAP 0140, entry point A.	Power Amplifier Board A1H2 Drive Control Card File Reel Motor	CARR 200 CARR 190 CARR 90	Servo Analog Fail (sense byte 20 bit 1) equals 1.
C240	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Servo Logic Fail (sense byte 20 bit 0) equals 1.
C280	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Drive Control Fail (sense byte 22 bit 3) equals 1.
C380	Go to MAP 0140, entry point A.	Tape Present Sensor Transducer Card A1H2 Drive Control Card Power Amplifier Board File Reel Motor Possible Loose Wrap Problem	CARR 110 LOC 20 CARR 190 CARR 200 CARR 90 OPER 45	Sequence Error (sense byte 16 bit 5) equals 1 and Load Check (sense byte 18 bit 0) equals 1.
C381	Go to MAP 4170, entry point A.	A1H2 Drive Control Card Power Amplifier Board Machine Reel Motor File Reel Motor Tape Present Sensor Transducer Card Reel Size Sensor	CARR 190 CARR 200 CARR 150 CARR 90 CARR 110 LOC 20 CARR 100	Sequence Error (sense byte 16 bit 5) equals 1 and Tension Check (sense byte 18 bit 1) equals 1.
C382	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Sequence Error (sense byte 16 bit 5) equals 1 without Load Check (sense byte 18 bit 0) or Tension Check (sense byte 18 bit 1) being equal to 1.
C420	Go to MAP 4120, entry point A.	A1H2 Drive Control Card Power Amplifier Board Machine Reel Motor File Reel Motor Tape Tachometer	CARR 190 CARR 200 CARR 150 CARR 90 CARR 140	PEID Velocity Check (sense byte 17 bit 2) equals 1.
C440	Go to MAP 4120, entry point A.	A1H2 Drive Control Card Power Amplifier Board Machine Reel Motor File Reel Motor Tape Tachometer	CARR 190 CARR 200 CARR 150 CARR 90 CARR 140	End Velocity Check (sense byte 17 bit 1) equals 1.
C480	Go to MAP 4120, entry point A.	A1H2 Drive Control Card Power Amplifier Board Machine Reel Motor File Reel Motor Tape Tachometer	CARR 190 CARR 200 CARR 150 CARR 90 CARR 140	Start Velocity Check (sense byte 17 bit 0) equals 1.
C520	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Gap Control Check (sense byte 11 bit 2) equals 1.
C540	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card circuits: A1H2W07 to A1G2W07* A1H2Y32 to A1G2Y32* A1H2W09 to A1G2W09* A1H2Y03 to A1G2Y03* A1H2W28 to A1G2W28* *Open or shorted to ground	CARR 190 CARR 190 REF 70	Drive Control Parity Check (sense byte 9 bit 6) equals 1.
C580	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card circuits: A1H2X33 to A1G2X33* A1H2G04 to A1G2G04* A1H2X28 to A1G2X28* *Open or shorted to ground	CARR 190 CARR 190 REF 70	Drive Response Check (sense byte 11 bit 4) equals 1.
C640	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Operator Panel	CARR 190 CARR 160	Not Ready Due To Reset (sense byte 18 bit 4) equals 1. Ready (sense byte 8 bit 0) equals 0. This symptom code can be caused if the Reset pushbutton on the tape drive is pressed when the tape is not at the load point.
C641	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Not Ready Due To Reset (sense byte 18 bit 4) equals 1. Ready (sense byte 8 bit 0) equals 1.
C680	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Load Check (sense byte 18 bit 0) equals 1 but Sequence Error (sense byte 16 bit 5) is not equal to 1.

8809

AN0400 Seq 2 of 2	2699187 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82		

SYMPTOM CODE

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
D010	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Read Back Fail (sense byte 14 bit 5) equals 1 and Formatter Read Fail (sense byte 9 bit 7) equals 1.
D020	Go to MAP 2300, entry point A.	A1G2 Formatter Card Head Card Assembly Write Flat Cable	CARR 190 CARR 70 CARR 71	Write Bus Parity Check (sense byte 11 bit 0) equals 1.
D040	Go to MAP 2300, entry point B.	A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 70 CARR 71	Write Current Fail (sense byte 20 bit 2) equals 1.
D080	Go to MAP 2300, entry point B.	A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 70 CARR 71	Erase Current Fail (sense byte 20 bit 3) equals 1.
D180	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read Bus Parity Check (sense byte 12 bit 1) equals 1.
D220	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Selected Alert control line equals 1. BOT (sense byte 10 bit 3) equals 1 and no error condition is on. A backward operation into load point could cause this condition.
D240	Go to MAP 4090, entry point A.	A1H2 Drive Control Card Transducer Card Write Enable Sensor	CARR 190 LOC 20 CARR 170	Write Enable Error (sense byte 11 bit 7) equals 1.
D280	Go to MAP 0140, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Not Capable Space File (sense byte 11 bit 5) equals 1.

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
E001	Go to MAP 4040, entry point A.	A1H2 Drive Control Card Transducer Card BOT/EOT Sensor	CARR 190 LOC 20 CARR 60	EOT (sense byte 10 bit 4) equals 1 after a write operation. This symptom code indicates that the EOT mark was detected. This is not an error condition if the EOT mark was actually read.
E020	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Tape Mark Detected (sense byte 10 bit 5) equals 1.
E040	Go to MAP 0140, entry point A.	A1F2 Read Detect Skew/ Buffer Card A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Not Capable (sense byte 10 bit 6) equals 1.
E080	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Data Overrun (sense byte 10 bit 0) equals 1.
E202	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Not Capable (sense byte 10 bit 6) equals 1 after a write operation. Write Status (sense byte 23 bit 2) equals 1.
E204	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	PEID Check (sense byte 14 bit 1) equals 1 after a write operation. Write Command (sense byte 14 bit 0) equals 1.

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
E208	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Write Tape Mark Error (sense byte 14 bit 7) equals 1 afte a write operation. Write Command (sense byte 14 bit 0) equals 1.
E210	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Multitrack Error (sense byte 14 bit 2) equals 1 after a write operation. Write Command (sense byte 14 bit 0) equals 1.
E220	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Envelope Check (sense byte 14 bit 6) equals 1 after a write operation. Write Command (sense byte 14 bit 0) equals 1.
E240	Go to MAP 2300, entry point A.	A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 70	Start Read Check (sense byte 14 bit 4) equals 1 after a write operation. Write Command (sense byte 14 bit 0) equals 1.
E280	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 70	End Data Check (sense byte 14 bit 3) equals 1 after a write operation. Write Command (sense byte 14 bit 0) equals 1.
E302	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Not Capable (sense byte 10 bit 6) equals 1 after a non-write operation. Non-Write Command (sense byte 14 bit 4) equals 0. Write Status (sense byte 23 bit 2) equals 0.
E304	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Crease (sense byte 14 bit 5) equals 1 after a non-write operation. Non-Write Command (sense byte 14 bit 0) equals 0.
E308	Go to MAP 2300, entry point A	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	No Track Pointer (sense byte 14 bit 1) equals 1 after a non-write operation. Non-Write Command (sense byte 14 bit 0) equals 0.
E310	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Multitrack Error (sense byte 14 bit 2) equals 1 after a non-write operation. Non-Write Command (sense byte 14 bit 0) equals 0.
E320	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Skew Error (sense byte 14 bit 7) equals 1 after a non-write operation. Non-Write Command (sense byte 14 bit 0) equals 0.
E340	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Start Read Check (sense byte 14 bit 4) equals 1 after a non-write operation. Non-Write Command (sense byte 14 bit 0) equals 0.
E380	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	End Data Check (sense byte 14 bit 3) equals 1 after a non-write operation. Non-Write Command (sense byte 14 bit 0) equals 0.
E404	Go to MAP 2015, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 190 CARR 70	PEID Check (sense byte 14 bit 1) equals 1 on a Loop Write-to-Read operation. Write Command (sense byte 14 bit 0) equals 1.
E408	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Write Tape Mark Error (sense byte 14 bit 7) equals 1 after a Loop Write-to-Read operation.
E410	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Multitrack Error (sense byte 14 bit 2) equals 1 after a Loop Write-to-Read operation.

8809

AN0600	2699188	846318	847323	847308	847314			
Seq 1 of 2	Part Number	15 Mar 79	1 Oct 80	1 Aug 81	1 Apr 82			

SYMPTOM CODE

Symptom Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
E420	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Envelope Check (sense byte 14 bit 6) equals 1 after a
E440	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Start Read Check (sense byte 14 bit 4) equals 1 after a Loop Write-to-Read operation.
E480	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	End Data Check (sense byte 14 bit 3) equals 1 after a Loop Write-to-Read operation.
FFF1	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Selected Alert control line equals 1 but the sense data does not define the cause.
FFF2	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 and Data Check (sense byte 10 bit 1) equals 1 after a write operation but the sense data does not define the cause. Write Command (sense byte 14 bit 0) equals 1.
FFF3	Go to MAP 2300, entry point B.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 and Data Check (sense byte 10 bit 1) equals 1 after a Loop Write-to-Read operation but the sense data does not define the cause.
FFF4	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190	Check End control line equals 1 but Data Check (sense byte 10 bit 1) equals 0.
FFF5	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line equals 1 and Data Check (sense byte 10 bit 1) equals 1 but the sense data does not define the cause.
FFF6	Go to MAP 0140, entry point A.	Terminator Cards A1C2 Secondary Driver/Receiver Card	INST 30 CARR 190	An error condition has been signaled, but both Selected Alert control line and Check End control line equal 0.
FFFF	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	An FTA hardware timeout occurred waiting for Tag Valid control line to equal 1. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 40

Name: Control Line Diagnostic Routine

Description:

This test is used to test basic selection, the proper sequence of the control lines, and the Read Control command.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4011	Go to MAP 0506, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Select Active control line equals 1 but the outbound control lines equal 0.
4012	Go to MAP 0506, Entry Point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Normal End control line equals 1 but the outbound control lines equal 0.
4013	Go to MAP 0502, Entry Point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Tag Valid control line equals 1 but the outbound control lines equal 0.
4014	Go to MAP 0506, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Selected Alert control line equals 1 but the outbound control lines equal 0.
4015	Go to MAP 0505, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card Terminator Cards	CARR 190 CARR 190 CARR 190 INST 30	Sync In (control line) equals 1 but the outbound control lines equal 0.
4016	Go to MAP 0506, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Check End control line equals 1 but the outbound control lines equal 0.
4017	Go to MAP 0502, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	A 100-microsecond timeout occurred waiting for Normal End control line to equal 1 after the Select Device operation.
4018	Go to MAP 0502, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	A 100-microsecond timeout occurred waiting for Tag Valid control line to equal l line to equal 1 after the Select operation.
4019	Go to MAP 0503, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Bus In parity error equals 1 after Tag Gate control line equals 0.
401A	Go to MAP 0503, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Bus In does not have the correct value during the Select Device operation. Message displayed is the expected and received Bus In values.
401B	Go to MAP 0502, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Select Active control line not equal to 1 when the drive is selected.
401C	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 100-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after the Tag Gate control line equals 0.
401D	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	A 100-microsecond timeout occurred waiting for Normal End control line to equal 0 after Tag Gate control line equals 0.
401E	Go to MAP 0502, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	A 100-microsecond timeout occurred waiting for Select Active control line to equal 0 after Select Hold control line equals 0.
401F	Go to MAP 0502, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	A 100-microsecond timeout occurred waiting for Tag Valid control line to equal 1 on a Read Control operation.
4020	Go to MAP 0503, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	Bus In is incorrect on a Read Control operation. Bus In should be X'80'.
4021	Go to MAP 0502, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Loose Cables in B Row	CARR 190 CARR 190 CARR 190 CARR 190 REF 70	Bus In did not equal 1 as expected.
4022	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	Bus In did not equal 0 as expected.
4023	Go to MAP 0502, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card Possible Power Problem	CARR 190 CARR 190 START 5	A 100-microsecond timeout ocurred waiting for Normal End control line after issuing a Diagnostic Bus In command.
4024	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A 100-microsecond timeout ocurred waiting for Tag Valid control line after issuing a Diagnostic Bus In command.
40F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
40F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
40F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
40F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
40F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
40F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
40F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
40FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

DIAGNOSTIC ROUTINE IDENTIFIER: 42

Name: Check Byte Diagnostic Routine

Description:

This routine issues a Check Reset command to the tape unit. Sense bytes 8 through 23 are then read and checked for the expected value.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4210	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End Sense (sense byte 9 bit 0) equals 1. Message byte displayed is sense byte 9.
4211	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Bus Out Parity Check (sense byte 9 bit 1) equals 1. Message byte displayed is sense byte 9.
4212	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Tag Bus Parity Check (sense byte 9 bit 2) equals 1. Message byte displayed is sense byte 9.
4213	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Formatter Write or Interface Fail (sense byte 9 bit 3) is not equal to 0. Message byte displayed is sense byte 9.
4214	Go to MAP 0505, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	DCI Sequence Check (sense byte 9 bit 4) is not equal to 0. Message byte displayed is sense byte 9.
4215	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Command Reg Parity Check (sense byte 9 bit 5) is not equal to 0. Message byte displayed is sense byte 9.
4216	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Drive Control Parity Check (sense byte 9 bit 6) is not equal to 0. Message byte displayed is sense byte 9.
4217	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Formatter Read Fail (sense byte 9 bit 7) equals 1. Message byte displayed is sense byte 9.
4218	Go to MAP 0140, entry point A.	Tape drive not ready when diagnostic was started. Top Cover Interlock Switch Reel Latch Interlock Switch Power Amplifier Board A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card	 CARR 180 CARR 180 CARR 200 CARR 190 CARR 190 CARR 190	The tape unit is not ready. Ready (sense byte 8 bit 0) equals 0. Message byte displayed is sense byte 8.
4219	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Busy (sense byte 8 bit 1) equals 1. Message byte displayed is sense byte 8.
421A	Go to MAP 0140, entry point A.	Write Enable Ring Missing A1G2 Formatter Card A1H2 Drive Control Card Transducer Card Write Enable Sensor A1H2G08 open or shorted to ground	 CARR 190 CARR 190 LOC 20 CARR 170 REF 60	Write Enable (sense byte 8 bit 2) is not equal to 1. Message byte displayed is sense byte 8.
421B	Go to MAP 0140, entry point A.	Tape not at load point when diagnostic was started. A1G2 Formatter Card A1H2 Drive Control Card A1H2P04 open or shorted to ground	 CARR 190 CARR 190 REF 60	BOT (sense byte 8 bit 3) is not equal to 1. Message byte displayed is sense byte 8.
421C	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Transducer Card BOT/EOT Sensor	CARR 190 CARR 190 LOC 20 CARR 60	EOT (sense byte 8 bit 4) equals 1. Message byte displayed is sense byte 8.
421D	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	OP Complete (sense byte 8 bit 5) equals 1. Message byte displayed is sense byte 8.
421F	Go to MAP 0140,A. entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Positioning (sense byte 8 bit 7) equals 1. Message byte displayed is sense byte 8.
4220	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Data Overrun (sense byte 10 bit 0) equals 1. Message byte displayed is sense byte 10.
4221	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data Check (sense byte 10 bit 1) equals 1. Message byte displayed is sense byte 10.
4222	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Unused Sense Bit (sense byte 10 bit 2) equals 1. Message byte displayed is sense byte 10.
4223	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	BOT (sense byte 10 bit 3) is not equal to 1. Message byte displayed is sense byte 10.
4224	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	EOT (sense byte 10 bit 4) is not equal to 0. Message byte displayed is sense byte 10.
4225	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Tape Mark Detected (sense byte 10 bit 5) is not equal to 0. Message byte displayed is sense byte 10.
4226	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable (sense byte 10 bit 6) is not equal to 0. Message byte displayed is sense byte 10.
4228	Go to MAP 0502, entry point A.	X Top Card Connector Plugged 1 Pin Too High A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card A1G2 Formatter Card	 CARR 190 CARR 190 CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a Check Reset operation.
4229	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	Bus In parity check after a Check Reset operation.
422A	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line while reading sense byte 8.
422B	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	Bus In parity check after reading sense byte 8.
422C	Go to MAP 0140, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line while reading sense byte 9.
422D	Go to MAP 0503, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Bus In parity check after sense byte 9.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
422E	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line while reading sense byte 10.
422F	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 10.
4230	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Write Bus Parity Check (sense byte 11 bit 0) is not equal to 0. Message byte displayed is sense byte 11.
4231	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Bus Out Reg Parity Check (sense byte 11 bit 1) is not equal to 0. Message byte displayed is sense byte 11.
4232	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Gap Control Check (sense byte 11 bit 2) is not equal to 0. Message byte displayed is sense byte 11.
4233	Go to MAP 0505, entry point A.	A1G2 Formatter Card Terminator Cards	CARR 190 INST 30	Sync Out Check (sense byte 11 bit 3) is not equal to 0. Message byte displayed is sense byte 11.
4234	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Drive Response Check (sense byte 11 bit 4) is not equal to 0. Message byte displayed is sense byte 11.
4235	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable Space File (sense byte 11 bit 5) is not equal to 0. Message byte displayed is sense byte 11.
4237	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Write Enable Error (sense byte 11 bit 7) is not equal to 0. Message byte displayed is sense byte 11.
4238	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line after reading sense byte 11.
4239	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 11.
4240	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Write Bus Parity Check (sense byte 12 bit 0) is not equal to 0. Message byte displayed is sense byte 12.
4241	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Read Bus Parity Check (sense byte 12 bit 1) is not equal to 0. Message byte displayed is sense byte 12.
4242	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Gap Control Check (sense byte 12 bit 2) is not equal to 0. Message byte displayed is sense byte 12.
4243	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Sync Out Check (sense byte 12 bit 3) not equal to 0 Message byte displayed is sense byte 12.
4245	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Unused sense bit (sense byte 12 bit 5) is not equal to 0. Message byte displayed is sense byte 12.
4247	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Write Enable Error (sense byte 12 bit 7) is not equal to 0. Message byte displayed is sense byte 12.
4248	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line after sense byte 12.
4249	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 12.
4258	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line while reading sense byte 13.
4259	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 13.
4268	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line while reading sense byte 14.
4269	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 14.
4278	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line while reading sense byte 15.
4279	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 15.
4280	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Transport State Bit 0 (sense byte 16 bit 0) is not equal to 0. Message byte displayed is sense byte 16.
4281	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Transport State Bit 1 (sense byte 16 bit 1) is not equal to 0. Message byte displayed is sense byte 16.
4282	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Transport State Bit 2 (sense byte 16 bit 2) is not equal to 0. Message byte displayed is sense byte 16.
4283	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Transport State Bit 3 (sense byte 16 bit 3) is not equal to 0. Message byte displayed is sense byte 16.
4284	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Transport State Bit 4 (sense byte 16 bit 4) is not equal to 0. Message byte displayed is sense byte 16.
4285	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sequence Error (sense byte 16 bit 5) is not equal to 0. Message byte displayed is sense byte 16.
4286	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 16 bit 6) is not equal to 0. Message byte displayed is sense byte 16.
4287	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Unused Sense Bit (sense byte 16 bit 7) is not equal to 0. Message byte displayed is sense byte 16.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4288	Go to MAP 0502, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card A1H2 Drive Control Card	CARR 190 CARR 190 CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line while reading sense byte 16.
4289	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 16.
4290	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Start Velocity Check (sense byte 17 bit 0) is not equal to 0. Message byte displayed is sense byte 17.
4291	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	End Velocity Check (sense byte 17 bit 1) is not equal to 0. Message byte displayed is sense byte 17.
4292	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	PEID Velocity Check (sense byte 17 bit 2) is not equal to 0. Message byte displayed is sense byte 17.
4293	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Clock Parity Error (sense byte 17 bit 3) is not equal to 0. Message byte displayed is sense byte 17.
4294	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Servo State 0 (sense byte 17 bit 4) is not equal to 0. Message byte displayed is sense byte 17.
4295	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Servo State 1 (sense byte 17 bit 5) is not equal to 0. Message byte displayed is sense byte 17.
4296	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 17 bit 6) is not equal to 0. Message byte displayed is sense byte 17.
4299	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 17.
42A0	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Load Check (sense byte 18 bit 0) is not equal to 0. Message byte displayed is sense byte 18.
42A1	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Tension Check (sense byte 18 bit 1) is not equal to 0. Message byte displayed is sense byte 18.
42A2	Go to MAP 0140,A. entry point A.	Cover Interlock Switch A1H2 Drive Control Card Transducer Card	LOC 20 CARR 190 LOC 20	Cover/Reel Latch Interrupt (sense byte 18 bit 2) is not equal to 0. Message byte displayed is sense byte 18.
42A3	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Tension Status (sense byte 18, bit 3) is not equal to 1. Message byte displayed is sense byte 18.
42A4	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Operator Panel	CARR 190 CARR 160	Not Ready Due to Reset (sense byte 18 bit 4) is not equal to 0. Message byte displayed is sense byte 18.
42A6	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 18 bit 6) is not equal to 0. Message byte displayed is sense byte 18.
42A9	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 18.
42B5	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Cover/Reel Latch Status (sense byte 19 bit 5) is not equal to 0. Message byte displayed is sense byte 19.
42B6	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 19 bit 6) is not equal to 0. Message byte displayed is sense byte 19.
42B9	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 19.
42C0	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Transducer Card	CARR 190 LOC 20	Servo Logic Fail (sense byte 20 bit 0) is not equal to 0. Message byte displayed is sense byte 20.
42C1	Go to MAP 0140, entry point A.	Power Amplifier Board A1H2 Drive Control Card A1H2D12 Shorted to ground.	CARR 200 CARR 190 REF 80	Servo Analog Fail (sense byte 20 bit 1) is not equal to 0. Message byte displayed is sense byte 20.
42C2	Go to MAP 2300, entry point B.	Head Card Assembly A1H2 Drive Control Card A1K3 Write Flat Cable	CARR 70 CARR 190 REF 70	Write Current Fail (sense byte 20 bit 2) is not equal to 0. Message byte displayed is sense byte 20.
42C3	Go to MAP 2300, entry point B.	Erase Head A1H2 Drive Control Card Head Card Assembly A1K3 Write Flat Cable	CARR 120 CARR 190 CARR 70 REF 70	Erase Current Fail (sense byte 20 bit 3) is not equal to 0. Message byte displayed is sense byte 20.
42C4	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formmatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Present Servo State 0 (sense byte 20 bit 4) is not equal to 0. Message byte displayed is sense byte 20.
42C5	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Present Servo State 1 (sense byte 20 bit 5) is not equal to 1 (Stoplock). Message byte displayed is sense byte 20.
42C6	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 20 bit 6) is not equal to 0. Message byte displayed is sense byte 20.
42C9	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 20.
42D0	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Idler Tach Fail (sense byte 21 bit 0) equals 1. Message byte displayed is sense byte 21.
42D1	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Machine Tach Fail (sense byte 21 bit 1) equals 1. Message byte displayed is sense byte 21.
42D2	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	File Tach Fail (sense byte 21 bit 2) equals 1. Message byte displayed is sense byte 21.
42D3	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Idler Tach Rotation Check (sense byte 21 bit 3) equals 1. Message byte displayed is sense byte 21.

8809

AN0800 Seq 2 of 2	2699190 Part Number	846318 15 Mar 79	846481 15 Dec 79	847308 1 Aug 81	847314 1 Apr 82			

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
42D6	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 21 bit 6) equals 1. Message byte displayed is sense byte 21.
42D9	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 21.
42DA	Go to MAP 0503, entry point A.	A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 22.
42DB	Go to MAP 0503, entry point A.	EOT/BOT Sensor A1C2 Secondary Driver/Receiver Card	CARR 190	Bus In parity check after reading sense byte 23.
42E0	Go to MAP 4260, entry point A.	A1H2 Drive Control Card Transducer Card A1H2G03 open or shorted to ground	CARR 190 LOC 20 REF 60	BOT/EOT LED Fail (sense byte 22 bit 0) equals 1. Message byte displayed is sense byte 21.
42E1	Go to MAP 4270, entry point A.	Tape Present Sensor Transducer Card A1H2 Drive Control Card A1H2G02 open or shorted to ground	CARR 110 LOC 20 CARR 190 REF 60	Tape Present LED Fail (sense byte 22 bit 1) equals 1. Message byte displayed is sense byte 22.
42E2	Go to MAP 4280, entry point A.	Reel Size Sensor Transducer Card A1H2 Drive Control Card A1H2D04 or A1H2B04 open or shorted to ground	CARR 100 LOC 20 CARR 190 REF 60	Reel Size LED Fail (sense byte 22 bit 2) equals 1. Message byte displayed is sense byte 22.
42E3	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Drive Control Fail (sense byte 22 bit 3) equals 1. Message byte displayed is sense byte 22.
42E6	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 22 bit 6) is not equal to 0. Message byte displayed is sense byte 22.
42E8	Go to MAP 0140, entry point A.	Power Amplifier Board A1H2 Drive Control Card	CARR 200 CARR 190	File Ampl Saturation (sense byte 23 bit 0) is not equal to 0. Message byte displayed is sense byte 23.
42E9	Go to MAP 0140, entry point A.	Power Amplifier Board A1H2 Drive Control Card	CARR 200 CARR 190	Machine Ampl Saturation (sense byte 23 bit 1) is not equal to 0. Message byte displayed is sense byte 23.
42EB	Go to MAP 0140, entry point A.	Power Amp Flat Cable A1H2 Drive Control Card Power Amplifier Board	LOC 70 CARR 190 CARR 200	Power Ampl Cable Unseated (sense byte 23 bit 3) is not equal to 0. Message byte displayed is sense byte 23.
42EE	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Sense Bus Parity Check (sense byte 23 bit 6) is not equal to 0. Message byte displayed is sense byte 23.
42F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
42F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
42F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
42F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
42F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
42F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
42F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
42FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

NOTES:

Notes FCD 86

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 43

Name: Loop Write-To-Read Diagnostic Routine

Description:

This routine tests the data path through the magnetic tape unit. Several data patterns and record sizes are used in this test. The records and data patterns are constructed from the following hexadecimal patterns:

1. FF FF FF FF FF FF FF FF
2. 88 44 22 11 88 44 22 11
3. BB 77 EE DD BB 77 EE DD
4. BC FF 43 00 34 FF BC 00
5. 08 08 08 08 08 08 08 08

Data patterns within a record are the same.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4311	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 55 microsecond timeout occurred waiting for the Tag Valid control line during a Loop Write to Read command.
4313	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Write Command (sense byte 14 bit 0) did not equal 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 14.
4314	Go to MAP 2015, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Start Read Check (sense byte 14 bit 4) equals 1 during a Loop Write-To-Read operation. Message byte displayed is sense byte 14.
4315	Go to MAP 2015, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card A1H2 Drive Control Card A1C2 Secondary Driver/Receiver Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 190 CARR 70	PEID Check (sense byte 14 bit 1), End Data Check (sense byte l4 bit 3), Envelope Check (sense byte l4 bit 6), or Write Tape Mark Error (sense byte 14 bit 7) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 14.
4316	Go to MAP 2015, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Check End Sense control line equals 1 and the MTE bit in sense byte 14 equals 1. Message bytes displayed are sense bytes 12, 13, and 14.
4317	Go to MAP 2300, entry point B.	A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card A1G2 Formatter Card Head Card Assembly Flat Cable Between units	CARR 190 CARR 190 CARR 190 CARR 70	Loop Write-to-Read operation fails with varying data patterns. Message bytes displayed are sense bytes 13 and 14.
4318	Go to MAP 0140, entry point A.	Transducer Card A1H2 Drive Control Card	LOC 20 CARR 190	Write Enable (sense byte 8 bit 2) is not equal to 1 for a Loop Write-to-Read operation. Message byte displayed is sense byte 8.
4319	Go to MAP 0140, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Pointer information is incorrect after a complete record was read-back checked during a Loop Write-to-Read operation. Message bytes displayed are sense bytes 11, 12, and 13.
431A	Go to MAP 0505, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card Terminator Cards	CARR 190 CARR 190 CARR 190 INST 30	Normal End control line not equal to 0 after Response control line was set equal to 1 by the system. Message byte displayed is sense byte 9.
431B	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card Loose Read Flat Cable from Read/Write FRU Connector	CARR 190 CARR 190 CARR 190 CARR 190 CARR 71	A 0.5 second timeout occurred waiting for Nomal End, Check End, or Selected Alert control lines to equal 1. Message byte displayed is sense byte 8.
431C	Go to MAP 2022, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Data Overrun (sense byte 10 bit 0) equals 1 during a Loop Write-to-Read operation. Message bytes displayed are sense bytes 9, 10, and 11.
431D	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.
43A1	Go to MAP 2030, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	Bus Out Parity Check (sense byte 9 bit 1) equals 1 during a Loop Write-to-Read operation.
43A2	Go to MAP 2300, entry point B.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 190 CARR 70 CARR 71	Formatter Write or Interface fail (sense byte 9 bit 3) or Bus Out Reg Parity Check (sense byte 11 bit 1) are equal to 1 during a Loop Write-to-Read operation. Message bytes displayed are sense bytes 9 and 11.
43A3	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	DCI Sequence Check (sense byte 9 bit 4) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 9.
43A4	Go to MAP 2300, entry point B.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 70 CARR 71	Write Bus Parity Check (sense byte 11 bit 0) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 11.
43A5	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Gap Control Check (sense byte 11 bit 2) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 11.
43A6	Go to MAP 2030, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Sync Out Check (sense byte 11 bit 3) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 11.
43A7	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Drive Response Check (sense byte 11 bit 4) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 11.
43A8	Go to MAP 2300, entry point B.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 190 CARR 70 CARR 71	Read Back Fail (sense byte 14 bit 5) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 14.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
43A9	Go to MAP 2300, entry point B.	A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 70 CARR 71	Write Current Fail (sense byte 20 bit 2) or Erase Current Fail (sense byte 20 bit 3) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 20.
43AA	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Selected Alert control line equals 1 without any bits that are associated with read or write hardware being equal to 1. Message byte displayed is sense byte 17.
43AB	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Clock Parity Error (sense byte 17 bit 3) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 17.
43AC	Go to MAP 4090, entry point A.	A1H2 Drive Control Card Transducer Card Write Enable Sensor	CARR 190 LOC 20 CARR 170	Write Enable Error (sense byte 11 bit 7) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 11.
43AD	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Formatter Read Fail (sense byte 9 bit 7) equals 1 during a Loop Write-to-Read operation. Message byte displayed is sense byte 9.
43F0	Go to MAP 0520, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Selected Alert control line equals 1. This is a background error.
43F1	Go to MAP 0520, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1. This is a background error.
43F2	Go to MAP 0520, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Bus In parity error equals 1. This is a background error.
43F3	Go to MAP 0520, entry point A.	Y Top Card Connector Plugged 1 Pin Too Low A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
43F4	Go to MAP 0520, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	A timeout occurred waiting for Sync In control line. This is a background error.
43F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
43F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
43FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 44

Name: Poll Test Routine

Description:

In this routine, the tape unit is selected, reset, and deselected. A Poll Controller command is issued and no response is expected. Then the unit is selected, rewound, deselected, and polled again. The responses to the Poll Controller, Op Complete (sense byte 8 bit 5) and Busy (sense byte 8 bit 1) are checked. A reset is then issued and Op Complete checked again. The unit is then selected, rewound, and a Poll Controller command is issued with Bus Out equal to X'10', which suppresses the poll response. The unit is then selected, reset, and deselected again.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4411	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	The Bus In bit for the device under test is not equal to 0 on a Poll Controller command. A response to the Poll Controller command is not expected.
4412	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	The Bus In bit for the device under test is not equal to 1 on a Poll Controller command after a rewind.
4413	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Op Complete (sense byte 8 bit 5) is not equal to 1 after a Rewind operation.
4414	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Op Complete (sense byte 8 bit 5) is not equal to 0 after a Check Reset.
4415	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	The Bus In bit for the device under test is not equal to 0 after a Poll Controller command.
4416	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	The Bus In bit for the device under test is not equal to 0 on a Poll Controller command with Bus Out equal to X'10'. The Poll response should have been suppressed.
4420	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line on a Poll Controller command.
4421	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Selected Alert control line equals 1 after issuing a Poll Controller command.
4422	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line on a Rewind command.
4423	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Selected Alert control line equals 1 during a Rewind operation.
4424	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Ready (sense byte 8 bit 0) is not equal to 1 after completion of a Rewind operation. Message byte displayed is sense byte 8.
4425	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Busy (sense byte 8 bit 1) equals 1 after Op Complete (sense byte 8 bit 5) equals 1 after a Rewind operation.
44F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
44F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
44F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
44F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
44F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line. This is a background error.
44F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
44F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
44FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

NOTES:

Notes FCD 115

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 46

Name: Low Speed Routine

Description:

This routine tests forward and backward motion of the tape in low-speed mode. The tape unit is issued a Select Device command, a Check Reset command, and then a Set Low Speed command. The Erase Gap command is issued 37 times, which results in the movement of approximately 155 inches of tape across the head. A Rewind command is then issued.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4614	Go to MAP 0520, entry point D.			Bus In parity error received after issuing a Set Low Speed command. This is a background error.
4615	Go to MAP 0520, entry point D.			Bus In parity error received after issuing an Erase Gap command. This is a background error.
4616	Go to MAP 4040, entry point BB.	A1H2 Drive Control Card Transducer Card BOT/EOT Sensor	CARR 190	EOT (sense byte 8 bit 4) equals 1 after issuing an Erase Gap command at BOT. Message byte displayed is sense byte 8.
4617	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line after issuing a Set Low Speed command.
4618	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 2-second timeout occurred while waiting for Op Complete (sense byte 8 bit 5) after issuing a Set Low Speed command. Message byte displayed is sense byte 8.
4619	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Busy (sense byte 8 bit 1) is still on after Op Complete (sense byte 8 bit 5) was received from a Set Low Speed command. Message byte displayed is sense byte 8.
461F	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Present Transport State (sense byte 19, bits 0-4) are not equal to 01100 (Low Speed/Load Point) after executing a Rewind command. Message byte displayed is sense byte 19.
4620	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Op Complete (sense byte 8 bit 5) from a Set Low Speed command equals 1 after a Check Reset command. Message byte displayed is sense byte 8.
4621	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Servo State (sense byte 20 bits 4-5) are not equal to 01 (Stoplock) after the completion of a Rewind command. Message byte displayed is sense byte 20.
4622	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line to equal 1 after issuing an Erase Gap command.
4623	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	A 3-second timeout occurred while waiting for Normal End, or Check End control lines to equal 1 after issuing an Erase Gap command.
4627	Go to MAP 4530, entry point A.	BOT/EOT Sensor Transducer Card A1H2 Drive Control Card A1G2 Formatter Card	CARR 60 LOC 20 CARR 190 CARR 190	BOT (sense byte 8 bit 3) equals 1 after executing an Erase Gap command. Message byte displayed is sense byte 8.
4628	Go to MAP 2300. entry point B.	A1H2 Drive Control Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Present Transport State (sense byte 19 bits 0-4) are not equal to 11100 (Low Speed Wait) after executing an Erase Gap command. Message byte displayed is sense byte 19.
4629	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Servo State (sense byte 20 bits 4-5) are not equal to 01 (Stoplock) after executing an Erase Gap command. Message byte displayed is sense byte 20.
4631	Go to MAP 0140, entry point A.	A1G2 Formatter card A1H2 Drive Control Card	CARR 190 CARR 190	A 3-second timeout occurred while waiting for Normal End, or Check End control lines to equal 1 after issuing an Erase Gap command.
4632	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	A 15-second timeout occurred while waiting for an Op Complete (sense byte 8 bit 5) after issuing a Rewind command. Message byte displayed is sense byte 8.
4633	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Busy (sense byte 8 bit 1) equals 1 after receiving Op Complete from a Rewind command. Message byte displayed is sense byte 8.
4634	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	BOT (sense byte 8 bit 3) is not equal to 1 after a Rewind command. Message byte displayed is sense byte 8.
4635	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are not equal to 01100 (Low Speed Load Point) after issuing a Rewind command. Message byte displayed is sense byte 19.
4636	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Servo State (sense byte 20 bits 4-5) are not equal to 01 (Stoplock) after executing a Rewind command. Message byte displayed is sense byte 20.
4637	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Cover Interlock Switch Latch Interlock Switch Transducer Card	CARR 190 LOC 20 CARR 180 LOC 20	Cover/Reel Latch Interrupt (sense byte 18 bit 2) equals 1. Message byte displayed is sense byte 18.
4638	Go to MAP 4260, entry point A.	BOT/EOT Sensor Transducer Card A1H2 Drive Control Card	CARR 60 LOC 20 CARR 190	BOT/EOT LED Fail (sense byte 22 bit 0) equals 1. Message byte displayed is sense byte 22.
4639	Go to MAP 4270, entry point A.	Tape Present Sensor Transducer Card A1H2 Drive Control Card	CARR 110 LOC 20 CARR 190	Tape Present LED Fail (sense byte 22 bit 1) equals 1. Message byte displayed is sense byte 22.
463A	Go to MAP 4280, entry point A.	Reel Size Sensor Transducer Card A1H2 Drive Control Card	CARR 100 LOC 20 CARR 190	Reel Size LED Fail (sense byte 22 bit 2) equals 1. Message byte displayed is sense byte 22.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
463B	Go to MAP 0140, entry point A.	Power Amplifier Flat Cable A1H2 Drive Control Card Power Amplifier Board circuits: A1H2U05 to Power Amplifier Board J6D13 - open	LOC 70 CARR 190 CARR 200 REF 80	Power Ampl Cable Unseated (sense byte 23 bit 3) equals 1. Message byte displayed is sense byte 23.
463C	Go to MAP 4220, entry point A.	Tape Tachometer Transducer Card A1H2 Drive Control Card	CARR 140 LOC 20 CARR 190	Idler Tach Fail (sense byte 21 bit 0) equals 1. Message byte displayed is sense byte 21.
463D	Go to MAP 4230, entry point A.	Machine Reel Motor Transducer Card A1H2 Drive Control Card	CARR 150 LOC 20 CARR 190	Machine Tach Fail (sense byte 21 bit 1) equals 1. Message byte displayed is sense byte 21.
463E	Go to MAP 4240, entry point A.	File Reel Motor Transducer Card A1H2 Drive Control Card	CARR 90 LOC 20 CARR 190	File Tach Fail (sense byte 21 bit 2) equals 1. Message byte displayed is sense byte 22.
463F	Go to MAP 0140, entry point A.	Tape Tachometer Transducer Card A1H2 Drive Control Card	CARR 140 LOC 20 CARR 190	Idler Tach Rotation Check (sense byte 21 bit 3) equals 1. Message byte displayed is sense byte 22.
4641	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Drive Control Fail (sense byte 22 bit 3) equals 1. Message byte displayed is sense byte 22.
4642	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Servo Logic Fail (sense byte 20 bit 0) equals 1. Message byte displayed is sense byte 20.
4643	Go to MAP 0140, entry point A.	Tape Tachometer File Reel Motor Power Amplifier Board A1H2 Drive Control Card A1H2D12 Shorted to ground.	CARR 140 CARR 90 CARR 200 CARR 190 REF 80	Servo Analog Fail (sense byte 20 bit 1) equals 1. Message byte displayed is sense byte 20.
4644	Go to MAP 0140, entry point A.	File Reel Motor Power Amplifier Board A1H2 Drive Control Card circuit: A1H2B10 shorted to ground	CARR 90 CARR 200 CARR 190 REF 80	File Ampl Saturation (sense byte 23 bit 0) equals 1. Message byte displayed is sense byte 23.
4645	Go to MAP 0140, entry point A.	Machine Reel Motor Power Amplifier Board A1H2 Drive Control Card circuit: A1H2B03 shorted to ground	CARR 150 CARR 200 CARR 190 REF 80	Mach Ampl Saturation (sense byte 23 bit 1) equals 1. Message byte displayed is sense byte 23.
4646	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Load Check (sense byte 18 bit 0) equals 1, and Sequence Error (sense byte 16 bit 5) is not equal to 1. Message bytes displayed are sense bytes 16 and 18.
4647	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Operator Panel	CARR 190 CARR 160	Not Ready Due to Reset (sense byte 18 bit 4) equals 1. Message byte displayed is sense byte 18.
464B	Go to MAP 4170, entry point A.	A1H2 Drive Control Card Power Amplifier Board Machine Reel Motor File Reel Motor Tape Present Sensor Transducer Card Reel Size Sensor	CARR 190 CARR 200 CARR 150 CARR 90 CARR 110 LOC 20 CARR 100	Tension Check (sense byte 18 bit 1) equals 1 and Sequence Error (sense byte 16 bit 5) equals 1. Message bytes displayed are sense bytes 16 and 18.
464C	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Load Check (sense byte 18 bit 0) equals 1, and Sequence Error (sense byte 16 bit 5) equals 1. Message bytes displayed are sense bytes 16 and 18.
464D	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Sequence Error (sense byte 16 bit 5) equals 1 without Tension Check (sense byte 18 bit 1) or Load Check (sense byte 18 bit 0) equal to 1. This indicates a false error. Message bytes displayed are sense bytes 16 and 18.
4651	Go to MAP 4120, entry point A.	A1H2 Drive Control Card Machine Reel Motor Tape Tachometer Power Amplifier Board File Reel Motor Transducer Card	CARR 190 CARR 150 CARR 140 CARR 200 CARR 90 LOC 20	Start Velocity Check (sense byte 17 bit 0) equals 1. Message byte displayed is sense byte 17.
4652	Go to MAP 4120, entry point A.	A1H2 Drive Control Card Machine Reel Motor Tape Tachometer Power Amplifier Board File Reel Motor Transducer Card	CARR 190 CARR 150 CARR 140 CARR 200 CARR 90 LOC 20	End Velocity Check (sense byte 17 bit 1) equals 1. Message byte displayed is sense byte 17.
4653	Go to MAP 4120, entry point A.	A1H2 Drive Control Card Machine Reel Motor Tape Tachometer Power Amplifier Board File Reel Motor Transducer Card	CARR 190 CARR 150 CARR 140 CARR 200 CARR 90 LOC 20	PEID Velocity Check (sense byte 17 bit 2) equals 1. Message byte displayed is sense byte 17.
4654	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card circuits: A1H2X33 to A1G2X33* A1H2G04 to A1G2G04* A1H2X28 to A1G2X28* *Open or shorted to ground	CARR 190 CARR 190 REF 70	Drive Response Check (sense byte 11 bit 4) equals 1. Message byte displayed is sense byte 11.
4655	Go to MAP 0140, entry point A.	A1G2 Formatter card A1H2 Drive Control Card circuits: A1H2W07 to A1G2W07* A1H2Y32 to A1G2Y32* A1H2W09 to A1G2W09* A1H2Y03 to A1G2Y03 * A1H2W28 to A1G2W28 * *Open or shorted to ground	CARR 190 CARR 190 REF 70	Drive Control Parity Check (sense byte 9 bit 6) equals 1. Message byte displayed is sense byte 9.

8809

AN1100 Seq 2 of 2	2699193 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82		

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4656	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Gap Control Check (sense byte 11 bit 2) equals 1. Message byte displayed is sense byte 11.
4657	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 and a motion error is not indicated in the sense bits. The sense bits that are checked are described (in order) in isolation codes 4637 through 4656. This is a background error.
46F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
46F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
46F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
46F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
46F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
46F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
46FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

8809

AN1125 Seq 1 of 2	2699224 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82		

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 47

Name: Write/Read PEID Routine

Description:

A tape with no PEID burst is read and the sense data is then checked for correct error indications. Correct writing of the PEID burst is also checked.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4711	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a Data Security Erase (DSE) operation.
4712	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a Diagnostic Set Ready operation.
4713	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a Forward Space Block operation.
4714	Go to MAP 2015, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 190 CARR 70	Check End control line did not equal 1 after a Forward Space Block operation from BOT with no PEID burst on the tape. Message bytes displayed are sense bytes 9, 11, and 20.
4715	Go to MAP 2300, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable (sense byte 10 bit 6) did not equal 1 after a Forward Space Block operation from BOT with no PEID burst on the tape. Message bytes displayed are 11 and 14.
4716	Go to MAP 2300, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable Space File (sense byte 11 bit 5) is set equal to 1 by a Forward Space Block operation from BOT without a PEID burst on the tape. Message bytes are 11 and 14.
4717	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable (sense byte 10 bit 6) is not equal to 0 after a Check Reset operation. Message byte displayed is sense byte 10.
4718	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a Forward Space File operation.
4719	Go to MAP 2055, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Selected Alert control line equals 0 after a Forward Space File operation from BOT without a PEID burst. Message bytes displayed are sense bytes 10, 13, and 14.
471A	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable (sense byte 10 bit 6) is not equal to 1 after a Forward Space File operation from BOT without a PEID burst. Message bytes displayed are sense bytes 10 and 11.
471B	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable Space File (sense byte 11 bit 5) is not equal to 1 after a Forward Space File operation from BOT without a PEID burst. Message byte displayed is sense byte 11.
471C	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Not Capable Space File (sense byte 11 bit 5) is not equal to 0 after a Check Reset operation. Message byte displayed is sense byte 11.
471D	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	PEID Check (sense byte 14 bit 1) equals 1 during an Erase Gap operation. Message byte displayed is sense byte 14.
471E	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Write Command (sense byte 14 bit 0) is not equal to 1 during an Erase Gap operation. Message byte displayed is sense byte 14.
471F	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line equals 1 after an Erase Gap operation. Message bytes displayed are sense bytes 13 and 14.
4721	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Write Status (sense byte 23 bit 2) is not equal to 0. A Data Security Erase operation was terminated by Check Reset. Message byte displayed is sense byte 23.
4722	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Write Status (sense byte 23 bit 2) equals 1 during a Forward Space Block operation. Message byte displayed is sense byte 23.
4723	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Busy (sense byte 8 bit 1) is not equal to 1 during a Data Security Erase operation. Message byte displayed is sense byte 8.
4724	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Busy (sense byte 8 bit 1) equals 1 after a Data Security Erase operation was stopped early by a Check Reset command. Message byte displayed is sense byte 8.
4725	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card Flat Cables in C Row	CARR 190 CARR 190 CARR 190 REF 70	Selected Alert control line not equal to 1 after a Backspace Block command at beginning of tape (BOT). Message byte displayed is sense byte 8.
4726	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A timeout occurred waiting for Tag Valid control line to equal 1 after a Backspace Block command. Message byte displayed is sense byte 8.
4727	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.
47A1	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 190 CARR 70 CARR 71	Selected Alert control line equals 1 after an Erase Gap operation. Message bytes displayed are sense bytes 9, 11, and 20.
47A2	Go to MAP 2300, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 70 CARR 71	Selected Alert control line equals 1 after a Forward Space Block operation from load point with no PEID burst on the tape. Message bytes displayed are 9, 11, and 17.
47A3	Go to MAP 2300, entry point B.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 70 CARR 71	Selected Alert control line equals 1 because a Write Current Fail (sense byte 20 bit 2) or an Erase Current Fail (sense byte 20 bit 3) equals 1. Message byte displayed is sense byte 20.
47F0	Go to MAP 0520, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Selected Alert control line equals 1. This is a background error.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
47F1	Go to MAP 0520, entry point A.	A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 70	Check End control line equals 1. This is a background error.
47F2	Go to MAP 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	Bus In parity error equals 1. This is a background error.
47F3	Go to MAP 0520, entry point A.	A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 70	A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
47F4	Go to MAP 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Sync In control line. This is a background error.
47F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
47F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
47FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

Fault Code Dictionary — Isolation Code **FCD 150**

DIAGNOSTIC ROUTINE IDENTIFIER: 48

Name: 12.5 IPS Write/Read Diagnostic Routine

Description:

Five records are written and read back. The data patterns used are:

1. X'FFFFFFFFFFFFFFFF'
2. X'8844221188442211'
3. X'BB77EEDDBB77EEDD'
4. X'BCFF430034FFBC00'
5. X'0808080808080808'

Writing and reading is continuous and no repositioning is expected. If this is not the case, the isolation code generated may be incorrect.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4811	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a write operation.
4813	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Normal End, or Selected Alert control lines did not equal 1 after a Backspace Block operation. Message bytes displayed are sense bytes 9, 13, and 14.
4814	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	A 0.5 second timeout occurred waiting for Normal End control line to equal 1 after a write operation. Data pattern 2 was used.
4816	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	A 0.5 second timeout occurred waiting for Normal End control line to equal 1 after a write operation. Data pattern 3 was used.
4818	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	A 0.5 second timeout occurred waiting for Normal End control line to equal 1 after a write operation. Data pattern 4 was used.
481A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	A 0.5 second timeout occurred waiting for Normal End control line to equal 1 after a write operation. Data pattern 5 was used.
481B	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a read operation.
481C	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line equals 1 after a read operation and Write Command (sense byte 14 bit 0) equals 1. Message bytes displayed are sense bytes 9 and 14.
481D	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Check End control line equals 1 after a read operation and Data Check (sense byte 10 bit 1) is not equal to 1. Message bytes displayed are sense bytes 9, 10, 14, and 20.
481E	Go to MAP 2080, entry point A.	A1G2 Formatter Card A1F2 Read Detect Skew/Buffer Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Check End control line equals 1 after a read operation and Data Check (sense byte 10 bit 1) equals 1. Message bytes displayed are sense bytes 9, 13, and 14.
481F	Go to MAP 2080, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	A 0.5 second timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1 after a read command.
4820	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line equals 1 after a write operation and Write Command (sense byte 14 bit 0) is not equal to 1. Message bytes displayed are sense bytes 9 and 14.
4821	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 after a write operation and PEID Check (sense byte 14 bit 1) equals 1. Message byte displayed is sense byte 14.
4822	Go to MAP 2300, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Check End control line equals 1 after a write operation and Env Check (sense byte 14 bit 6) equals 1. Message byte displayed is sense byte 14.
4823	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 after a write operation and Multitrack Error, End Data Check, or Start Read Check (sense byte 14 bits 2-4) equals 1. Message byte displayed is sense byte 14.
4824	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 after a write operation but Multitrack Error, End Data Check, or Start Read Check (sense byte 14 bits 2-4) are not equal to 1. Message byte displayed is sense byte 14.
4826	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.
482E	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	A 0.5 second timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1 after a write operation. Data pattern 1 was used.
48A1	Go to MAP 2300, entry point B.	A1H2 Drive Control Card Erase Head Head Card Assembly Write Flat Cable	CARR 190 CARR 120 CARR 70 CARR 71	Selected Alert control line equals 1 after a commmand to write pattern 1. Write Current Fail (sense byte 20 bit 2) and/or Erase Current Fail (sense byte 20 bit 3) are equal to 1. Message bytes displayed are sense bytes 9, 11, and 20.
48A2	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 70 CARR 71	Selected Alert control line equals 1 after a Backspace Block operation. Message bytes displayed are sense bytes 9, 11, and 20.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
48A6	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Selected Alert control line equals 1 after a Read operation. Read Back Fail (sense byte 14 bit 5) equals 1. Message bytes displayed are sense bytes 9, 11, and 20.
48A7	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Selected Alert control line equals 1 on the first write operation. Gap Control Check (sense byte 11 bit 2) equals 1. Message byte displayed is sense byte 11.
48A8	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 after the first write operation. Read Back Fail (sense byte 14 bit 5) equals 1. Message byte displayed is sense byte 14.
48A9	Go to MAP 2079, entry point A.	A1G2 Formatter Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190	Selected Alert control line equals 1 without any bits that are associated with read or write hardware being equal to 1.
48AF	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read Back Fail (sense byte 14 bit 5) equals 1 following a read operation. Message bytes displayed are sense bytes 9, 11, and 20.
48F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
48F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
48F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
48F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
48F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
48F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
48F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
48FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 49

Name: Dual Gap Diagnostic Routine

Description:

This test verifies that short gaps of 15.24 mm (0.6 in.) and long gaps of 30.48 mm (1.2 in.) can be written and long-gap mode can be reset.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4912	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line to equal 1 during a Long Gap operation.
4913	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Selected Alert control line equals 1 after issuing a Reset Long Gap command.
4915	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Long Gap Mode (sense byte 18 bit 5) equals 1. Message byte displayed is sense byte 18.
4916	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Low Speed (sense byte 8 bit 6) is not equal to 1. Message byte displayed is sense byte 8.
491B	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Selected Alert control line equals 1 after issuing a Set Long Gap command.
491C	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line to equal 1 during a Set Long Gap operation.
4921	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Long Gap Mode (sense byte 18 bit 5) is not equal to 1. Message byte displayed is sense byte 18.
492C	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after a Read Block command. This is a background error.
492D	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	A 2-second timeout occurred while waiting for ending status from a Read Block command.
4931	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after a Read Block command. This is a background error.
4933	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after a Read Block command to read the X'22' data record.
4934	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	A 3-second timeout occurred waiting for Normal End, Check End or Selected Alert control lines to equal 1 after a Read Block command.
4935	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Tape Tachometer A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 140 CARR 190 CARR 190	After reading 13 records, the tape was not in position to read the X'22' data record.
4936	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Long Gap Mode (sense byte 18 bit 5) does not equal 0 after a Reset Long Gap command. Message byte displayed is sense byte 18.
4937	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after a Read Block command. This is a background error.
4938	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after a Read Block command. This is a background error.
4939	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Check End control line equals 1 after a Read Block command was issued to read the X'33' test records.
493A	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	After reading 10 records, the tape was not in position to read a record of X'33'. Long Gap Mode (sense byte 18 bit 5) failed to reset and is not equal to 0.
493B	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	A 2-second timeout occurred while waiting for ending status from a Read Block command.
49F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
49F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
49F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
49F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
49F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
49F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
49F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
49FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 4A

Name: Backward Creep Diagnostic Routine

Description:

This routine determines if a Backspace Block/Write Block command sequence destroys data in the record preceding the one being written. Backward creep occurs if, during repetitive Backspace Block commands, the tape moves close to or overlaps the preceding record.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4A11	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Low Speed (sense byte 8 bit 6) is not equal to 1. Message byte displayed is sense byte 8.
4A12	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Long Gap Mode (sense byte 18 bit 5) equals 1. Message byte displayed is sense byte 18.
4A16	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Tape Tachometer	CARR 190 CARR 140	Backspace into BOT causes a Selected Alert control line to equal 1. The drive should backspace over record 3 and stop in the IBG after record 2. Message byte displayed is sense byte 8.
4A17	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after issuing a Backspace Block command. (Backspacing into BOT is not the cause of this error.) This is a background error.
4A19	Go to MAP 0520, entry point E.			Check End control line equals 1 after issuing a Backspace Block command. This is a background error.
4A23	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after a Read Block command is issued to read record 1. This is a background error.
4A27	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Tape Tachometer A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 140 CARR 190	Check End control line equals 1 after reading record 1. Backward creep, while backspacing and rewriting record 3, caused the data in record 1 to change.
4A2B	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after a Read Block command is issued to read record 2. This is a background error.
4A2D	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Tape Tachometer A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 140 CARR 190	Check End control line equals 1 after a Read Block operation to read record 2. Backward creep, while backspacing and rewriting record 3, caused the data in record 2 to change.
4A33	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Tape Tachometer	CARR 190 CARR 140	Data-compare error. The data in record 2 is written as eight bytes of X'22'. When record 2 is read back and compared, the last five bytes are not equal to X'22'. Backward creep, while backspacing and rewriting record 3, caused the data in record 2 to change.
4A35	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after a Read Block command to read record 3. This is a background error.
4A37	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Tape Tachometer A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 140 CARR 190	Check End control line equals 1 after a Read Block operation to read record 3. Backward creep, while backspacing and rewriting record 3, caused the IBG to be written so short that record 3 cannot be read after reading record 2.
4A39	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Tape Tachometer	CARR 190 CARR 140	Data-compare error. The data in record 3 is written as eight bytes of X'33'. When record 3 is read back and compared, the last five bytes are not equal to X'33'. Backward creep, while backspacing and rewriting record 3, caused the IBG to be written so short that record 3 is spaced over as part of the IBG after reading record 2.
4AF0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
4AF1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
4AF2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
4AF3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
4AF4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
4AF5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
4AF6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
4AFF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 4C

Name: High Speed Diagnostic Routine

Description:

This routine determines if the tape unit can be set to high-speed mode and then reset to low-speed mode.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4C11	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line to equal 1 after a Set High Speed command.
4C12	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Selected Alert control line equals 1 after a Set High Speed command.
4C13	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A 1.0-second timeout occurred while waiting for Op Complete (sense byte 8 bit 5) to equal 1 after issuing a Set High Speed command. Message byte displayed is sense byte 8.
4C14	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Busy (sense byte 8 bit 1) equals 1 after Op Complete (sense byte 8 bit 5) equals 1 following a Set High Speed operation. Message byte displayed is sense byte 8.
4C15	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Low Speed (sense byte 8 bit 6) equals 1 after executing a Set High Speed command. Message byte displayed is sense byte 8.
4C16	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	Positioning (sense byte 8 bit 7) equals 1 after Op Complete (sense byte 8 bit 5) equals 1 after executing a Set High Speed command. Message byte displayed is sense byte 8.
4C17	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are not equal to 00100 (High Speed/Load Point) after executing a Set High Speed command. Message byte displayed is sense byte 19.
4C18	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Servo State (sense byte 20 bits 4-5) are not equal to 01 (Stoplock) after executing a Set High Speed command. Message byte displayed is sense byte 20.
4C19	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Op Complete (sense byte 8 bit 5) equals 1 after a Set High Speed operation but did not equal 0 after a Check Reset operation. Message byte displayed is sense byte 8.
4C1A	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Selected Alert control line equals 1 after issuing an Erase Gap command while in high-speed mode.
4C1B	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	A 2.5-second timeout occurred waiting for Normal End or Check End control lines to equal 1 after an Erase Gap command.
4C1C	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are not equal to 10100 (High Speed/Wait) after an Erase Gap operation to move tape away from BOT. Message byte displayed is sense byte 19.
4C1D	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Servo State (sense byte 20 bits 4-5) equal 01 after executing an Erase Gap command. Message byte displayed is sense byte 20.
4C1E	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are not equal to 00100 (High Speed/Load Point) after executing a Rewind command while in high-speed mode. Message byte displayed is sense byte 19.
4C1F	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Low Speed (sense byte 8 bit 6) is not equal to 1 after executing a Set Low Speed command. Message byte displayed is sense byte 8.
4C21	Go to MAP 0140, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Bus In parity error equals 1 after issuing a Set High Speed command.
4CF0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
4CF1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
4CF2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
4CF3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
4CF4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
4CF5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
4CF6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
4CFF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 4D

Name: Reposition Diagnostic Routine

Description:

This routine determines if the tape is being positioned correctly during write commands when system delays cause repositioning.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4D11	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 after issuing the first Write Block command in high-speed mode. The write data pattern is an eight byte block of X'11'. This is a background error.
4D12	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 after issuing the first Write Block command in high-speed mode. The write data pattern is an eight-byte block of X'11'.
4D13	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 during a Read Block operation in high-speed mode. The record being read is record 1.
4D14	Go to MAP 2300, entry point A.	A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 during a Read Block operation of record 1 in high-speed mode.
4D15	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 1 does not equal X'11'.
4D16	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 2. This is a background error.
4D17	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 2.
4D18	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 2 does not equal X'22'.
4D19	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 3. This is a background error.
4D1A	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 3.
4D1B	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 3 does not equal X'33'.
4D1C	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 4. This is a background error.
4D1D	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 4.
4D1E	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 4 does not equal X'77'.
4D1F	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 5. This is a background error.
4D20	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 5.
4D21	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 5 does not equal X'88'.
4D22	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 6. This is a background error.
4D23	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 6.
4D24	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 6 does not equal X'11'.
4D25	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 7. This is a background error.
4D26	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 7.
4D27	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 7 does not equal X'22'.
4D28	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 8. This is a background error
4D29	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 8.
4D2A	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 8 does not equal X'33'.
4D2B	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 while reading record 9. This is a background error.
4D2C	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	Check End control line equals 1 after reading record 9.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4D2D	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 9 does not equal X'77'.
4D2E	Go to MAP 0520, entry point F.			The Selected Alert control line equaled 1 while reading record 10. This is a background error.
4D30	Go to MAP 0140, entry point A.	A1H2 Drive Control Card	CARR 190	The data in record 10 does not equal X'88'.
4DF0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
4DF1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
4DF2	Go to MAP 0520, entry point A.			A Bus In parity error is detected. This is a background error.
4DF3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
4DF4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
4DF6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
4DFF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 4E

Name: Write Tape Mark Diagnostic Routine

Description:

In this routine, tape is rewound and a tape mark (TM) is written. The tape is then moved back and forth, and correct TM detection and sense indication is verified.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4E11	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after issuing a Write Tape Mark (WTM) command.
4E12	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 0.5-second timeout occurred waiting for Normal End control line to equal 1 after a Write Tape Mark (WTM) command. Message bytes displayed are sense bytes 16 and 20.
4E13	Go to MAP 2100, entry point A.	A1G2 Formatter Card	CARR 190	PEID Check (sense byte 14 bit 1) equals 1 after a Write Tape Mark operation. Message byte displayed is sense byte 14.
4E14	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Check End control line equals 1 after a Write Tape Mark (WTM) operation. Write Tape Mark Error (sense byte 14 bit 7) equals 1. Message byte displayed is sense byte 14.
4E15	Go to MAP 2100, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line equals 1 after the first Write Tape Mark operation. Write Command (sense byte 14 bit 0) equals 0. Message byte displayed is sense byte 14.
4E16	Go to MAP 2300, entry point A.	A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 70	Check End control line equals 1 after the first Write Tape Mark operation. Write Command (sense byte 14 bit 0) equals 1. Message bytes displayed are sense bytes 12, 13, and 14.
4E18	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card	CARR 190 CARR 190	A Backspace Block operation over a tape mark (TM) record fails to cause Check End control line to equal 1. Message bytes displayed are sense bytes 10, 11, and 14.
4E19	Go to MAP 2100, entry point A.	A1G2 Formatter Card	CARR 190	Tape Mark Detected bit (Bus In bit 5) is not equal to 1. Message bytes displayed are sense bytes 10 and 14.
4E1A	Go to MAP 2100, entry point A.	A1G2 Formatter Card	CARR 190	Check End Sense (sense byte 9 bit 0) is not equal to 1 after a Backspace Block operation over a tape mark. Message bytes displayed are sense bytes 9, 10, and 14.
4E1B	Go to MAP 2100, entry point A.	A1G2 Formatter Card	CARR 190	Tape Mark Detected (sense byte 10 bit 5) is not equal to 1 after a Backspace Block operation over a tape mark. Message bytes displayed are sense bytes 9, 10, and 14.
4E1C	Go to MAP 2100, entry point A.	A1G2 Formatter Card	CARR 190	Tape Mark Detected (sense byte 10 bit 5) is not equal to 0 after a Check Reset operation. Message byte displayed is sense byte 10.
4E1D	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred waiting for Tag Valid control line to equal 1 after a Backspace File command was issued. Message byte displayed is sense byte 8.
4E1F	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Op Complete (sense byte 8 bit 5) does not equal 1 after a Backspace File command was issued. Message byte displayed is sense byte 8.
4E21	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Busy (sense byte 8 bit 1) equals 1 with Op Complete (sense byte 8 bit 5) equal to 1 after a Backspace File operation.
4E22	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Op Complete (sense byte 8 bit 5) is not equal to 0 after a Check Reset operation. Message byte displayed is sense byte 8.
4E23	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.
4EA1	Go to MAP 2100, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 after issuing a Write Tape Mark (WTM) command. Message bytes displayed are sense bytes 9, 11, and 20.
4EF0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
4EF1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
4EF2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
4EF3	Go to MAP 0520, entry point A.			A Timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
4EF4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
4EF5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
4EF6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
4EFF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 4F

Name: High Speed Write Routine

Description:

In this routine, stress data patterns are written on tape and then read-back checked at 100 ips. The data patterns are:

1. X'FFFFFFFFFFFFFFFF'
2. X'8844221188442211'
3. X'BB77EEDDBB77EEDD'
4. X'BCFF430034FFBC00'
5. X'0808080808080808'

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
4F11	Go to MAP 2300, entry point A.	A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Check End control line equals 1 after writing a record of X'FF' in high-speed mode. Message byte displayed is sense byte 14.
4F12	Go to MAP 2115, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line equals 1 and Data Check (sense byte 10 bit 1) equals 0 on the first highspeed Write operation. Message bytes displayed are sense bytes 9 and 10.
4F13	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after writing a record of X'8844221188442211'. Message bytes displayed are sense bytes 9, 13, and 14.
4F14	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after writing a record of X'BB77EEDDBB77EEDD'. Message bytes displayed are sense bytes 9, 13, and 14.
4F15	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after writing a record of X'BCFF430034FFBC00'. Message bytes displayed are sense bytes 9, 13, and 14.
4F16	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after writing a record of X'08'. Message bytes displayed are sense bytes 9, 13, and 14.
4FA1	Go to MAP 2115, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 during the first write operation in high-speed mode. Message bytes displayed are sense bytes 9, 11, and 20.
4FF0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
4FF1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
4FF2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
4FF3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
4FF4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
4FF5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
4FF6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
4FFF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 52

Name: Erase Gap Diagnostic Routine

Description:

In this routine, a file containing a tape mark and six 4K-byte (4096) data records is written. The tape is positioned at the beginning of the file and five Erase Gap (ERG) commands are issued. A Backspace Block, followed by a Read Block command is then issued to verify that the operation was successful and properly sensed.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5211	Go to MAP 2100, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Write operation continues to fail after five retries. Message bytes displayed are sense bytes 9, 13, and 14.
5212	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Check End control line equals 0 after a Backspace Block Operation over a tape mark. Message bytes displayed are 9, 11, and 20.
5213	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Check End control line equals 1. Tape Mark Detected (sense byte 10 bit 5) equals 0 after the Backspace Block operation. Message bytes displayed are sense bytes 9, 13, and 14.
5214	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Check End control line is not equal to 1 after the read operation in an Erase Gap command area of the tape. Message bytes displayed are sense bytes 9, 11, and 20.
5215	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190 CARR 190	Tape Mark Detected (sense byte 10 bit 5) is not equal to 1 following a read operation in the erased gap area of the tape. Message bytes displayed are 9, 13, and 14.
5216	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.
52A1	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 during the write operation. Message bytes displayed are sense bytes 9, 11, and 20. This is a background error.
52F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
52F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
52F2	Go to MAP 0520, entry point A.			A Bus In parity error equals 1. This is a background error.
52F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
52F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
52F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
52F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
52FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 53

Name: Write High Speed/Read Low Speed Diagnostic Routine

Description:

In this routine, stress data patterns are written at 100 ips and read at 12.5 ips. The data read is compared to the data expected to verify the data handling capabilities of the tape unit. The data patterns are:

1. X'FFFFFFFFFFFFFFFF'
2. X'8844221188442211'
3. X'BB77EEDDBB77EEDD'
4. X'BCFF430034FFBC00'
5. X'0808080808080808'

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5311	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Write operation continues to fail with pattern 1 after five retries. Message bytes displayed are sense bytes 9, 13, and 14.
5312	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Write operation continues to fail with pattern 2 after five retries. Message bytes displayed are sense bytes 9, 13, and, 14.
5313	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Write operation continues to fail with pattern 3 after fives retries. Message bytes displayed are sense bytes 9, 13, and 14.
5314	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Write operation continues to fail with pattern 4 after five retries. Message bytes displayed are sense bytes 9, 13, and 14.
5315	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Write operation continues to fail with pattern 5 after five retries. Message bytes displayed are sense bytes 9, 13, and 14.
5316	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 1. Message bytes displayed are sense bytes 9, 13, and 14.
5317	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 70 CARR 190	Data read is not equal to X'FFFFFFFFFFFFFFFF'. Message bytes displayed are sense bytes 9, 13, and 14.
5318	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 2. Message bytes displayed are sense bytes 9, 13, and 14.
5319	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data read is not equal to X'8844221188442211'. Message bytes displayed are sense bytes 9, 13, and 14.
531A	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 3. Message bytes displayed are sense bytes 9, 13, and 14.
531B	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Data read is not equal to X'BB77EEDDBB77EEDD'. Message bytes displayed are sense bytes 9, 13, and 14.
531C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 4. Message bytes displayed are sense bytes 9, 13, and 14.
531D	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Data read is not equal to X'BCFF430034FFBC00'. Message bytes displayed are sense bytes 9, 13, and 14.
531E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 5. Message bytes displayed are sense bytes 9, 13, and 14.
531F	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Data read is not equal to X'0808080808080808'. Message bytes displayed are sense bytes 9, 13, and 14.
53A1	Go to MAP 2100, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 while trying to read data pattern 1. Message bytes displayed are sense bytes 9, 11, and 20.
53F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
53F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
53F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
53F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
53F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
53F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
53F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
53FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 54

Name: Read High Speed Diagnostic Routine

Description:

In this routine, the stress data patterns written by routine 53 are read in both directions at 100 ips. The data is compared to the expected data to verify the data handling capability of the tape unit. The data patterns are:

1. X'FFFFFFFFFFFFFFFF'
2. X'8844221188442211'
3. X'BB77EEDDBB77EEDD'
4. X'BCFF430034FFBC00'
5. X'0808080808080808'

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5416	Go to MAP 2300, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 1. Message bytes displayed are sense bytes 9, 13, and 14.
5417	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read data is not equal to X'FFFFFFFFFFFFFFFF'. Message bytes displayed are sense bytes 9, 13, and 14.
5418	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 2. Message bytes displayed are sense bytes 9, 13, and 14.
5419	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read data is not equal to X'8844221188442211'. Message bytes displayed are sense bytes 9, 13, and 14.
541A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 3. Message bytes displayed are sense bytes 9, 13, and 14.
541B	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read data is not equal to X'BB77EEDDBB77EEDD'. Message bytes displayed are sense bytes 9, 13, and 14.
541C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 4. Message bytes displayed are sense bytes 9, 13, and 14.
541D	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read data is not equal to X'BCFF430034FFBC00'. Message bytes displayed are sense bytes 9, 13, and 14.
541E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line is not equal to 1 after reading data pattern 5. Message bytes displayed are sense bytes 9, 13, and 14.
541F	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read data is not equal to X'0808080808080808'. Message bytes displayed are sense bytes 9, 13, and 14.
5420	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	A 55-microsecond timeout occurred while waiting for Tag Valid control line after a Read Backward command is issued.
5422	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Read Data is not equal to X'0808080808080808' after a Read Backward operation. Message bytes displayed are sense bytes 9, 13, and 14.
5423	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read Data is not equal to X'00CBFF430034FFCB' after a Read Backward operation. Message bytes displayed are sense bytes 9, 13, and 14.
5424	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read Data is not equal to X'DDEE77BBDDEE77BB' after a Read Backward operation. Message bytes displayed are sense bytes 9, 13, and 14.
5425	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read Data is not equal to X'1122448811224488' after a Read Backward operation. Message bytes displayed are sense bytes 9, 13, and 14.
5426	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Raed data is not equal to X'FFFFFFFFFFFFFFFF' after a Read Backward operation. Message bytes displayed are sense byts 9, 13, and 14.
54A1	Go to MAP 2100, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 while trying to read data pattern 1. Message bytes displayed are sense bytes 9, 13, and 14.
54F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
54F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
54F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
54F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
54F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
54F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
54F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
54FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 55

Name: Magnetized Head Diagnostic Routine

Description:

This routine checks for the possible magnetization of the read/write head and the cleaner block. If the cleaner block or the read/write head is magnetized, the test will end without a Normal End control line.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5511	Go to MAP 2100, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 190 CARR 70	Write operation continues to fail after five retries. Message bytes displayed are sense bytes 9, 13, and 14.
5512	Go to MAP 2300, entry point A.	Cleaner Block Head Card Assembly	CARR 130 CARR 70	Normal End control line does not equal 1 after a read operation. Cause is a read error or runaway tape.
5513	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Read data compare failed. Data is not equal to X'FF'.
55A1	Go to MAP 2100, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 during a write operation. Message bytes displayed are sense bytes 9, 11, and 20.
55F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
55F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
55F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
55F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
55F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
55F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
55F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
55FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 56

Name: Data Security Erase Diagnostic Routine

Description:

This routine verifies that the Data Security Erase command erases tape properly.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5613	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card BOT/EOT Assembly Head Card Assembly	CARR 190 CARR 190 CARR 60 CARR 190	A Forward Space Block command found a data record that should have been erased. Message bytes displayed are sense bytes 10, 16, and 19.
5614	Go to MAP 2300, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Tape Mark Detected (Bus In bit 5) is not equal to 1. Message bytes displayed are sense bytes 9, 13, and 14.
56A3	Go to MAP 2100, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 or a tape runaway occurs after a Forward Space Block command is issued. Message bytes displayed are sense bytes 9, 11, and 20.
56A4	Go to MAP 2100, entry point A.	A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Selected Alert control line equals 1 during a write operation. Message bytes displayed are sense bytes 9, 11, and 20.
56F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
56F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
56F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
56F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
56F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
56F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
56F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
56FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 5A

Name: Read Test Pattern Tape (Part 1)

Description:

This routine tests several recognition and correction functions of the tape unit. Included are:

Tape Mark (TM) Recognition: tests TM recognition with two different TM patterns.

Beginning of Record (BOR) Detection/Recognition: tests BOR detection logic for non-BOR data patterns and for valid BOR data patterns.

Interblock Gap (IBG) Recognition: tests the IBG decode logic for tracks equal-to-1 and for correct decode operation.

Crease Detection: tests for correct operation of the crease logic and correct operation of a positioning to the IBG.

Multi-track error (MTE): tests logic for track in error (TIE) identification and MTE signaling.

Forced End Data Check: checks end data check P code with false end of data pattern.

Skew correction: checks the skew buffer with records containing data skewed from one bit period to five periods.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5A11	Go to MAP 2135, entry point A.	None		Ready (sense byte 8 bit 0) is not equal to 1, or BOT (sense byte 8 bit 3) is not equal to 1, or Write Enable (sense byte 8 bit 2) is not equal to 0. Message bytes displayed are sense bytes 8, 16, and 20.
5A12	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Check End control line is not equal to 1 after a Forward Space Block operation over a tape mark. Message bytes displayed are sense bytes 8, 16, 18, and 20.
5A13	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Check End control line equals 1 but Tape Mark Detected (sense byte 10 bit 5) equals 0 after a Forward Space Block operation over a TM. Message bytes displayed are sense bytes 13 and 14.
5A14	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End Sense (sense byte 9 bit 0) did not reset to 0. Message byte displayed is sense byte 9.
5A15	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Normal End control line not equal to 1 after a Forward Space Block operation.
5A16	Go to MAP 2125, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.
5A21	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Tape mark not read by the Forward Space Block operation. A data record was read. Message bytes displayed are sense bytes 8, 9, and 10.
5A22	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Tape mark not read by Backspace Block operation. Tape may be positioned incorrectly. Message bytes displayed are sense bytes 8, 9, and 10.
5A23	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Tape mark not read by Forward Space Block operation. Tape may be positioned incorrectly. Message bytes displayed are sense bytes 8, 9, and 10.
5A24	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line is not equal to 1 after a read operation over a 15-byte BOR test record. Message bytes displayed are sense bytes 8, 16, and 20.
5A25	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line equals 1 but Start Read Check (sense byte 14 bit 4) is not equal to 1 after reading the BOR test record. Message byte displayed is sense byte 14.
5A26	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Data Check (sense byte 10 bit 1) is not equal to 1. Message byte displayed is sense byte 16.
5A27	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Start Read Check (sense byte 10 bit 1) did not reset to 0. Message bytes displayed are sense bytes 10 and 14.
5A28	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Normal End control line is not equal to 1 after a Forward Space Block operation.
5A29	Go to MAP 2150, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Normal End control line is not equal to 1 after a Backspace Block operation.
5A2A	Go to MAP 2150, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Normal End, or Check End control lines are not equal to 1 after a Backspace Block operation, or TM is not read during a Backspace Block operation.

8809

AN1500 Seq 2 of 2	2699201 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82		

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5A2B	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Normal End control line is not equal to 1 after a Forward Space Block operation.
5A2C	Go to MAP 2150, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Normal End control line is not equal to 1 after a Forward Space Block operation.
5A31	Go to MAP 2137, entry point A.	None		Tape mark not read by the Forward Space Block operation. Tape may be positioned incorrectly. Message bytes displayed are sense bytes 8, 9, and 10.
5A32	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card A1H2 Drive Control Card Head Card Assembly Write Flat Cable	CARR 190 CARR 190 CARR 190 CARR 70 CARR 71	Track in Error (sense byte 12 bit 6 and sense byte 13 bits 0-7) equal 1 for a test record failure. A track in error is indicated by the bit that equals 1. Message bytes displayed are sense bytes 12 and 13.
5A33	Go to MAP 2100, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 and no Multitrack Error (MTE) pointers equal 1. Message bytes displayed are sense bytes 9 and 14.
5A41	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Interblock gap is read incorrectly on the Forward Space Block operation over a tape mark-postamble combination. Message bytes displayed are sense bytes 8, 10, and 16.
5A42	Go to MAP 0140, entry point A.	A1F2 Read Detect/Skew Buffer Card	CARR 190	Interblock gap is read incorrectly on the Backspace Block operation over a tape mark-preamble combination. Message bytes displayed are sense bytes 8, 10, and 14.
5A43	Go to MAP 2137, entry point A.	None		Normal End control line not equal to 1 after a Forward Space Block operation.
5A44	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Multitrack Error (sense byte 14 bit 2) and Crease (sense byte 14 bit 5) are not equal to 1 after a Check Reset operation. Message byte displayed is sense byte 14.
5A51	Go to MAP 2137, entry point A.	None		Check End control line is not equal to 1 after a Forward Space Block operation over a tape mark. Message bytes displayed are sense bytes 8, 16, 18, and 20.
5A52	Go to MAP 2137, entry point A.	None		Tape Mark Detected (Bus In bit 5) is not equal to 1 after a Forward Space Block operation over a tape mark. Message bytes displayed are sense bytes 13 and 14.
5A53	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Check End control line is not equal to 1 after a Read Block operation over a simulated crease record. Message bytes displayed are sense bytes 9, 13, and 14.
5A54	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Multitrack Error (sense byte 14 bit 2) is not equal to 1 after a Read Block operation over a simulated crease record. Message bytes displayed are sense bytes 13 and 14.
5A55	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Crease (sense byte 14 bit 5) is not equal to 1 after a Read Block operation over a simulated crease record. Message bytes displayed are sense bytes 13 and 14.
5A56	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	A Read operation over a simulated crease record is completed, but tape may be positioned incorrectly.
5A57	Go to MAP 2137, entry point A.	None		TM (Bus In bit 5) is not equal to 1 after a Read Block operation over a simulated crease record. Message bytes displayed are sense bytes 13 and 14.
5A58	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	TM (Bus In bit 5) is not equal to 1 after a Backspace Block operation over a simulated crease record. Message bytes displayed are sense bytes 9, 10, and 20.
5A59	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	TM (Bus In bit 5) is not equal to 1 after a Forward Space Block operation over a simulated crease record. Message bytes displayed are sense bytes 9, 10, and 20.
5A5B	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Start Read Check (sense byte 14 bit 4) did not reset to 0. Message bytes displayed are sense bytes 10 and 14.
5A5C	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Write Command (sense byte 14 bit 0) equals 1 after a read operation. Message byte displayed is sense byte 14.
5A5E	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.
5A71	Go to MAP 2137, entry point A.	None		Tape mark not read by a Forward Space Block operation. Tape may be positioned incorrectly. Message bytes displayed are sense bytes 8, 10, 14, and 16.
5A72	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Check End control line is not equal to 1 after a read operation over a record with two bad tracks. Message bytes displayed are sense bytes 8, 10, 19, and 20.
5A73	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card Head Card Assembly	CARR 190 CARR 190 CARR 70	Check End control line equals 1 but Multitrack Error (sense byte 14 bit 2) does not equal 1 after a read operation over a record with two bad tracks. Message bytes displayed are sense bytes 12 and 13.
5A81	Go to MAP 2137, entry point A.	None		Tape mark not read by a Forward Space Block operation. Tape may be positioned incorrectly. Message bytes displayed are sense bytes 8, 10, 14, and 19.
5A82	Go to MAP 2137. entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Check End control line is not equal to 1 after a Read operation over a 101-byte test record. Message bytes displayed are sense bytes 8, 9, 19, and 20.
5A83	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190	End Data Check (sense byte 14 bit 3) is not equal to 1 after a Read operation over a 101-byte test record.
5A84	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to be valid.

8809

AN1550 Seq 1 of 2	2699202 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82		

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5AA1	Go to MAP 2137, entry point A.	None		Check End control line is not equal to 1 after a Forward Space Block operation over a tape mark. Message bytes displayed are sense bytes 8, 16, 18, and 20.
5AA2	Go to MAP 2137, entry point A.	None		Tape Mark Detected (Bus In bit 5) is not equal to 1 after a Forward Space Block operation over a tape mark. Message bytes displayed are sense bytes 13 and 14.
5AA3	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Selected Alert control line equals 1 after reading a record with only one bit period of skew.
5AA4	Go to MAP 2137, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Check End control line equals 1 after reading a record with only one bit period of skew, but Skew Error (sense byte 14 bit 7) equals 0. Message bytes displayed are sense bytes 13 and 14.
5AA5	Go to MAP 2150, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter Card	CARR 190 CARR 190	Check End control line equals 1 after reading a record with only a one-bit period of skew, and Skew Error (sense byte 14 bit 7) equals 1. Message bytes displayed are sense bytes 13 and 14.
5AA6	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to valid.
5AA7	Go to MAP 0140, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card A1C2 Secondary Driver/Receiver Card	CARR 190 CARR 190 CARR 190	Check Byte 6 is invalid. Check Byte 1 bit 0 and Check Byte 2 bit 1 must be equal to 1 for Check Byte 6 to valid.
5AA8	Go to MAP 2150, entry point A.	A1F2 Read Detect/Skew Buffer Card A1G2 Formatter	CARR 190 CARR 190	Check End control line is not equal to 1 after reading a record containing three or more bit periods of skew. Message bytes displayed are sense bytes 8, 16, 18, and 20.
5AA9	Go to MAP 2150, entry point A.	A1F2 Read Detect/Skew Buffer Card	CARR 190	Skew Error (sense byte 14 bit 7) is not equal to 1 after reading a record with three or more bit periods of skew. Message bytes displayed are sense bytes 13 and 14.
5AAA	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Skew Error (sense byte 14 bit 7) equals 1 after a reset. Message bytes displayed are sense bytes 13 and 14.
5AF0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
5AF1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
5AF2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
5AF3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
5AF4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
5AF5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
5AF6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
5AFF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

8809

AN1550 Seq 2 of 2	2699202 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82		

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 5B

Name: Read Test Pattern Tape (Part 2)

Description:

This routine tests the ability of the tape unit to read records of varying size and complexity. The data patterns are:

1. X'FF'
2. X'88442211'
3. X'BB77EEDD'
4. X'BCFF430034FFBC00'
5. X'08'
6. X'00000000000000FF'
7. X'FFFFFFFFFFFFFF00'
8. X'FFFFFF---(256 bytes total)'.
9. X'88442211-(256 bytes total)'.
10. X'BB77EEDD-(256 bytes total)'.
11. X'BCFF430034FFBC00--(256 bytes total)'.
12. X'08---(256 bytes total)'.
13. X'00000000000000FF---(256 bytes total)'.
14. X'FFFFFFFFFFFFFF00---(256 bytes total)'.

Performing Read Block operations over the three tape marks, written on the tape after the test patterns, should cause Check End control line and Tape Mark Detected (sense byte 10 bit 5) to equal one for each read operation.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5B11	Go to MAP 2137, entry point A.	None		Tape mark before the first data pattern was not read by the Forward Space Block operation. Tape may be positioned incorrectly. Message bytes displayed are sense bytes 8, 10, 19 and 20.
5B12	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Error reading data pattern 1. Message bytes displayed are sense bytes 8, 9, and 14.
5B13	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 1. Data did not equal X'FF'.
5B14	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 2. Message bytes displayed are sense bytes 8, 9, and 14.
5B15	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 2. Data did not equal X'88442211'.
5B16	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 3. Message bytes displayed are sense bytes 8, 9, and 14.
5B17	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 3. Data did not equal X'BB77EEDD'.
5B18	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 4. Message bytes displayed are sense bytes 8, 9, and 14.
5B19	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 4. Data did not equal X'BCFF430034FFBC00'.
5B1B	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 5. Data did not equal X'08'.
5B1C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Error reading data pattern 6. Message bytes displayed are sense bytes 8, 9, and 14.
5B1D	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 6. Data did not equal X'00000000000000FF'.
5B1E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 7. Message bytes displayed are sense bytes 8, 9, and 14.
5B1F	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 7. Data did not equal X'FFFFFFFFFFFFFF00'.
5B21	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 8. Message bytes displayed are sense bytes 8, 9, and 14.
5B22	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 8. Data did not equal X'FF'.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
5B23	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 9. Message bytes displayed are sense bytes 8, 9, and 14.
5B24	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 9. Data did not equal X'88442211'.
5B25	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 10. Message bytes displayed are sense bytes 8, 9, and 14.
5B26	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 10. Data did not equal X'BB77EEDD'.
5B27	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 11. Message bytes displayed are sense bytes 8, 9, and 14.
5B28	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 11. Data did not equal X'BCFF430034FFBC00'.
5B29	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 12. Message bytes displayed are sense bytes 8, 9, and 14.
5B2A	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 12. Data did not equal X'08'.
5B2B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 13. Message bytes displayed are sense bytes 8, 9, and 14.
5B2C	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 13. Data did not equal X'00000000000000FF'.
5B2D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Error reading data pattern 14. Message bytes displayed are sense bytes 8, 9, and 14.
5B2E	Go to MAP 2137, entry point A.	A1G2 Formatter Card A1F2 Read Detect/Skew Buffer Card	CARR 190 CARR 190	Data compare error on pattern 14. Data did not equal X'FFFFFFFFFFFFFF00'
5B31	Go to MAP 2137, entry point A.	None		Tape mark not read by a Forward Space Block operation. Message bytes displayed are sense bytes 8, 9, and 14.
5B32	Go to MAP 2137, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Selected Alert control line is not equal to 1 after a write operation on a file protected tape. Message bytes displayed are sense bytes 9 and 14.
5B34	Go to MAP 0140, entry point A.	A1G2 Formatter Card	CARR 190	Write Enable Error (sense byte 11 bit 7 and sense byte 12 bit 7) equal 1 after a Check Reset operation. Message bytes displayed are sense bytes 11 and 12.
5B35	Go to MAP 4040, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred and Check End control line and EOT (sense byte 8 bit 4) equal 0. Message bytes displayed are sense bytes 8 and 18.
5B36	Go to MAP 4020, entry point A.	A1H2 Drive Control Card	CARR 190	A timeout occurred during a Rewind Unload operation waiting for Tag Valid control line to equal 1.
5B37	Go to MAP 4500, entry point A.	A1H2 Drive Control Card	CARR 190	The time allowed for a Rewind Unload operation has gone by but Tension Status (sense byte 18 bit 3) equals 0. Message bytes displayed are sense bytes 8, 16, and 17.
5B38	Go to MAP 4040, entry point A.	A1H2 Drive Control Card	CARR 190	EOT (sense byte 8 bit 4) is not equal to 0 before sensing the EOT mark.
5B39	Go to MAP 4040, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	EOT (sense byte 8 bit 4) is not equal to 0 after a Backspace Block operation over the EOT mark. Message byte displayed is sense byte 8.
5B3A	Go to MAP 2137, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Busy (sense byte 8 bit 0) is not equal to 1 during a Rewind Unload operation. Message byte displayed is sense byte 8.
5B3C	Go to MAP 2137, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Op Complete (sense byte 8 bit 5) equals 1 but Busy (sense byte 8 bit 1) equals 1 after a Rewind Unload operation.
5B3D	Go to MAP 2137, entry point A.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Op Complete (sense byte 8 bit 5) equals 1 after a Check Reset operation following a Rewind Unload operation. Message byte displayed is sense byte 8.
5BF0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
5BF1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
5BF2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
5BF3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
5BF4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
5BF5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
5BF6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
5BFF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 60

Name: Write Reliability Diagnostic Routine

Description:

This routine writes a series of 14 records at both low and high speeds. A check for Normal End is made after each write operation.

1. X'FFFFFFFFFFFFFFFF'.
2. X'00...(62 bytes of FF)...00' Pattern repeats, 4032 bytes total
3. X'FF...(62 bytes of 00)...FF' Pattern repeats, 4032 bytes total
4. X'11...(62 bytes of 00)...11' Pattern repeats, 4032 bytes total
5. X'22...(62 bytes of 00)...22' Pattern repeats, 4032 bytes total
6. X'44...(62 bytes of 00)...44' Pattern repeats, 4032 bytes total
7. X'88...(62 bytes of 00)...88' Pattern repeats, 4032 bytes total
8. X'11FF(...27 bytes of 00FF...) FF00FF00FF00FF11'
9. X'22FF(...27 bytes of 00FF...) FF00FF00FF00FF22'
10. X'44FF(...27 bytes of 00FF...) FF00FF00FF00FF44'
11. X'88FF(...27 bytes of 00FF...) FF00FF00FF00FF88'
12. X'88442211' Pattern repeats, 4000 bytes total
13. X'BB77EEDD' Pattern repeats, 4000 bytes total
14. X'BCFF430034FFBC00' Pattern repeats, 4000 bytes total

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6011	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 1 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6012	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 2 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6013	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 3 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6014	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 4 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6015	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 5 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6016	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 6 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6017	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 7 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6018	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 8 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6019	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 9 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
601A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 10 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
601B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 11 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
601C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 12 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
601D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 13 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
601E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 14 at low speed. Message bytes displayed are sense bytes 10, 13, and 14.
6021	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 1 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
6022	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 2 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6023	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 3 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
6024	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 4 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
6025	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 5 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
6026	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 6 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
6027	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 7 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
6028	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 8 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
6029	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 9 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
602A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 10 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
602B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 11 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
602C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 12 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
602D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 13 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
602E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 190	Normal End control line not equal to 1 after writing pattern 14 at high speed. Message bytes displayed are sense bytes 10, 13, and 14.
60F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
60F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
60F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
60F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
60F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
60F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
60F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
60FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 61

Name: Read Reliability Diagnostic Routine

Description:

This routine reads the 28 records that were written by Write Reliability diagnostic routine 60. The records are read in forward and backward directions. The data is compared with the expected patterns to make sure the data was read correctly.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6111	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 1. Message bytes displayed are sense bytes 9, 13, and 14.
6112	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 2. Message bytes displayed are sense bytes 9, 13, and 14.
6113	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 3. Message bytes displayed are sense bytes 9, 13, and 14.
6114	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 4. Message bytes displayed are sense bytes 9, 13, and 14.
6115	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 5. Message bytes displayed are sense bytes 9, 13, and 14.
6116	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 6. Message bytes displayed are sense bytes 9, 13, and 14.
6117	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 7. Message bytes displayed are sense bytes 9, 13, and 14.
6118	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 8. Message bytes displayed are sense bytes 9, 13, and 14.
6119	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 9. Message bytes displayed are sense bytes 9, 13, and 14.
611A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 10. Message bytes displayed are sense bytes 9, 13, and 14.
611B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 11. Message bytes displayed are sense bytes 9, 13, and 14.
611C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 12. Message bytes displayed are sense bytes 9, 13, and 14.
611D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 13. Message bytes displayed are sense bytes 9, 13, and 14.
611E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 14. Message bytes displayed are sense bytes 9, 13, and 14.
6121	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 15. Message bytes displayed are sense bytes 9, 13, and 14.
6122	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 16. Message bytes displayed are sense bytes 9, 13, and 14.
6123	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 17. Message bytes displayed are sense bytes 9, 13, and 14.
6124	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 18. Message bytes displayed are sense bytes 9, 13, and 14.
6125	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 19. Message bytes displayed are sense bytes 9, 13, and 14.
6126	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 20. Message bytes displayed are sense bytes 9, 13, and 14.
6127	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 21. Message bytes displayed are sense bytes 9, 13, and 14.
6128	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 22. Message bytes displayed are sense bytes 9, 13, and 14.
6129	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 23. Message bytes displayed are sense bytes 9, 13, and 14.
612A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record number 24. Message bytes displayed are sense bytes 9, 13, and 14.
612B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 25. Message bytes displayed are sense bytes 9, 13, and 14.
612C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 26. Message bytes displayed are sense bytes 9, 13, and 14.
612D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 27. Message bytes displayed are sense bytes 9, 13, and 14.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
612E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after reading record 28. Message bytes displayed are sense bytes 9, 13, and 14.
6131	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 1. Message bytes displayed are sense bytes 9, 13, and 14.
6132	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 2. Message bytes displayed are sense bytes 9, 13, and 14.
6133	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 3. Message bytes displayed are sense bytes 9, 13, and 14.
6134	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 4. Message bytes displayed are sense bytes 9, 13, and 14.
6135	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 5. Message bytes displayed are sense bytes 9, 13, and 14.
6136	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 6. Message bytes displayed are sense bytes 9, 13, and 14.
6137	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 7. Message bytes displayed are sense bytes 9, 13, and 14.
6138	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 8. Message bytes displayed are sense bytes 9, 13, and 14.
6139	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 9. Message bytes displayed are sense bytes 9, 13, and 14.
613A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 10. Message bytes displayed are sense bytes 9, 13, and 14.
613B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 11. Message bytes displayed are sense bytes 9, 13, and 14.
613C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 12. Message bytes displayed are sense bytes 9, 13, and 14.
613D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 13. Message bytes displayed are sense bytes 9, 13, and 14.
613E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 14. Message bytes displayed are sense bytes 9, 13, and 14.
6141	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 15. Message bytes displayed are sense bytes 9, 13, and 14.
6142	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 16. Message bytes displayed are sense bytes 9, 13, and 14.
6143	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 17. Message bytes displayed are sense bytes 9, 13, and 14.
6144	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 18. Message bytes displayed are sense bytes 9, 13, and 14.
6145	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 19. Message bytes displayed are sense bytes 9, 13, and 14.
6146	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 20. Message bytes displayed are sense bytes 9, 13, and 14.
6147	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 21. Message bytes displayed are sense bytes 9, 13, and 14.
6148	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 22. Message bytes displayed are sense bytes 9, 13, and 14.
6149	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 23. Message bytes displayed are sense bytes 9, 13, and 14.
614A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 24. Message bytes displayed are sense bytes 9, 13, and 14.
614B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 25. Message bytes displayed are sense bytes 9, 13, and 14.
614C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 26. Message bytes displayed are sense bytes 9, 13, and 14.
614D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 27. Message bytes displayed are sense bytes 9, 13, and 14.
614E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Normal End control line not equal to 1 after a Read Backward operation of record 28. Message bytes displayed are sense bytes 9, 13, and 14.
6151	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is 1 byte of X'FF'.
6152	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 2, for data pattern.
6153	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 3, for data pattern.
6154	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 4, for data pattern.

8809

AN1700 Seq 2 of 2	2699205 Part Number	846318 15 Mar 79	846481 15 Dec 79	847308 1 Aug 81	847314 1 Apr 82			

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6155	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 5, for data pattern.
6156	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 6, for data pattern.
6157	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 7, for data pattern.
6158	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 8, for data pattern.
6159	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 9, for data pattern.
615A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 10, for data pattern.
615B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 11, for data pattern.
615C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is X'88442211'.
615D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is X'BB77EEDD'.
615E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is X'BCFF430034FFBC00'.
6161	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is X'FF'.
6162	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 2, for data pattern.
6163	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 3, for data pattern.
6164	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 4, for data pattern.
6165	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 5, for data pattern.
6166	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 6, for data pattern.
6167	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 7, for data pattern.
6168	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 8, for data pattern.
6169	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 9, for data pattern.
616A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 10, for data pattern.
616B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. See FCD 350, Record 11, for data pattern.
616C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is X'88442211'.
616D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is X'BB77EEDD'.
616E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Block command is not equal to the expected pattern. The data pattern is X'BCFF430034FFBC00'.
6171	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'FF'.
6172	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 2, for data pattern.
6173	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 3, for data pattern.
6174	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 4, for data pattern.
6175	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 5, for data pattern.
6176	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 6, for data pattern.
6177	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 7, for data pattern.
6178	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 8, for data pattern.

8809

AN1750 Seq 1 of 2	2699206 Part Number	846318 15 Mar 79	846481 15 Dec 79	847308 1 Aug 81	847314 1 Apr 82			

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6179	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 9, for data pattern.
617A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 10, for data pattern.
617B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 11, for data pattern.
617C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'11224488'.
617D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'DDEE77BB'.
617E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'00CBFF430034FFCB'.
6181	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'FF'.
6182	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 2, for data pattern.
6183	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 3, for data pattern.
6184	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected patten. See FCD 350, Record 4, for data pattern.
6185	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 5, for data pattern.
6186	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 6, for data pattern.
6187	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 7, for data pattern.
6188	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 8, for data pattern.
6189	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 9, for data pattern.
618A	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 10, for data pattern.
618B	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. See FCD 350, Record 11, for data pattern.
618C	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'11224488'.
618D	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'DDEE77BB'.
618E	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Data received with a Read Backward command is not equal to the expected pattern. The data pattern is X'00CBFF430034FFCB'.
6191	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Tape Mark Detected (sense byte 10 bit 5) is not equal to 1 after a Forward Space Block operation over a tape mark. Message bytes displayed are sense bytes 9 and 15.
6192	Go to MAP 2300, entry point A.	A1F2 Read Detect/Skew Buffer Card Head Card Assembly	CARR 190 CARR 70	Tape Mark Detected (sense byte 10 bit 5) is not equal to 1 after a Backspace Block operation over a tape mark. Message bytes displayed are sense bytes 9 and 15.
61F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
61F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
61F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
61F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
61F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
61F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
61F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
61FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 62

Name: Control Line Exerciser Diagnostic Routine

Description:

In this routine, a series of instructions are issued to check the control lines. A timeout is expected after each instruction. The routine then tests the next control line. Bus In parity, addresses, or Selected Alert conditions are not checked. System "waits" for expected control sequences are not allowed. An unconditional error exit is made at the end of the routine to allow the routine to loop.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6211				The diagnostic routine has ended. This exit does not necessarily indicate error-free operation.
62F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
62F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
62F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
62F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
62F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
62F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
62F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
62FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 63

Name: Load, Rewind, Ready Analysis Routine

Description:

This routine analyzes load, rewind, and ready problems on the tape unit. With the tape unit in a failing condition, the sense data is analyzed to determine the failure. This diagnostic routine must be used with MAP 4010.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6313	Go to MAP 4360, entry point A.	Cover Interlock Switch Latch Interlock Switch Transducer Card A1H2 Drive Control Card	LOC 20 CARR 180 LOC 20 CARR 190	Cover/Reel Latch Status (sense byte 19 bit 5) equals 1. This bit indicates the Cover Interlock Switch or the Latch Interlock Switch is not closed. Message byte displayed is sense byte 19.
6314	Go to MAP 4560, entry point A.	A1H2 Drive Control Card Operator Panel A1G2 Formatter Card Power Amplifier Board	CARR 190 CARR 160 CARR 190 CARR 200	Present Transport State (sense byte 19 bits 0-4) are equal to 00000 (Idle). Message byte displayed is sense byte 19.
6316	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00011 (Sample Radius). Message byte displayed is sense byte 19.
6317	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00010. Message byte displayed is sense byte 19.
6318	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00110 (Rewind Forward Space). Message byte displayed is sense byte 19.
6319	Go to MAP 4010, entry point L.	A1H2 Drive Control Card Power Amplifier Board	CARR 190 CARR 200	Present Transport State (sense byte 19 bits 0-4) are equal to 00111 (Rewind). Message byte displayed is sense byte 19.
631A	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00101. Message byte displayed is sense byte 19.
631B	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and Low Speed (sense byte 8 bit 6) equals 1. Message byte displayed is sense byte 19.
631C	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01000 (High Speed Load Point) and Low Speed (sense byte 8 bit 6) equals 1. Message byte displayed is sense byte 19.
631D	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are not equal to 01100 (Low Speed Load Point). The tape unit is in low speed mode. All Load/Rewind Transport States have been tested and none of them is on. Message byte displayed is sense byte 19.
631E	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point) and Busy (sense byte 8 bit 1) equals 1. Message byte displayed is sense byte 8.
631F	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point) and BOT (sense byte 8 bit 3) is not equal to 1. Message byte displayed is sense byte 8.
6321	Go to MAP 4040, entry point BB.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point). Message byte displayed is sense byte 8.
6322	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point) and Op Complete (sense byte 8 bit 5) is not equal to 1. This error will occur if the tape unit was reset after pressing the Load Rewind pushbutton, or if the Load Rewind pushbutton is not pressed each time this routine is run. Message byte displayed is sense byte 8.
6323	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point) and Positioning (sense byte 8 bit 7) equals 1.
6324	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point) and Present Servo State (sense byte 20 bits 4-5) are not equal to 01 (Stoplock). Message byte displayed is sense byte 20.
6325	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point) and Ready (sense byte 8 bit 0) is not equal to 1.
6326	Go to MAP 4010, entry point J.	A1H2 Drive Control Card Operator Panel	CARR 190 CARR 160	Present Transport State (sense byte 19 bits 0-4) are equal to 01100 (Low Speed Load Point). Message byte displayed is sense byte 8.
6328	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are not equal to 00100 (High Speed Load Point). The tape unit is in high-speed mode. All Load Rewind Transport States bits have been tested and none of them is on. Message byte displayed is sense bytes 19.
6329	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and Busy (sense byte 8 bit 1) equals 1. Message byte displayed is sense byte 8.
632A	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and BOT (sense byte 8 bit 3) is not equal to 1. Message byte displayed is sense byte 8.
632B	Go to MAP 4040, entry point BB.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and EOT (sense byte 8 bit 4) equals 1. Message byte displayed is sense byte 8.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
632C	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and Op Complete (sense byte 8 bit 5) is not equal to 1. This error will occur if the tape unit is reset after pressing the Load Rewind pushbutton, or if the Load Rewind pushbutton is not pressed each time this routine is run. Message byte displayed is sense byte 8.
632D	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and Positioning (sense byte 8 bit 7) equals 1. Message byte displayed is sense byte 8.
632E	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and Present Servo State (sense byte 20 bits 4-5) are not equal to 01 (Stoplock). Message byte displayed is sense byte 20.
632F	Go to MAP 4010, entry point L.	A1H2 Drive Control Card A1G2 Formatter Card	CARR 190 CARR 190	Present Transport State (sense byte 19 bits 0-4) are equal to 00100 (High Speed Load Point) and Ready (sense byte 8 bit 0) is not equal to 1.
6331	Go to MAP 4010, entry point J1.	A1H2 Drive Control Card	CARR 190	Present Transport State (sense byte 19 bit 0-4) are equal to 00100 (High Speed Load Point). Message byte displayed is sense byte 8.
6334	Go to MAP 4010, entry point L.	A1H2 Drive Control Card Cover Interlock Switch Latch Interlock Switch	CARR 190 LOC 20 CARR 180	Cover/Reel Latch Interrupt (sense byte 18 bit 2) is equal to 1. Message byte displayed is sense byte 18.
6335	Go to MAP 4260, entry point A.	BOT/EOT Sensor Transducer Card A1H2 Drive Control Card	CARR 60 LOC 20 CARR 190	BOT/EOT LED Fail (sense byte 22 bit 0) equals 1. Message byte displayed is sense byte 22.
6336	Go to MAP 4270, entry point A.	Tape Present Sensor Transducer Card A1H2 Drive Control Card	CARR 110 LOC 20 CARR 190	Tape Present LED Fail (sense byte 22 bit 1) equals 1. Message byte displayed is sense byte 22.
6337	Go to MAP 4280, entry point A.	Reel Size Sensor Transducer Card A1H2 Drive Control Card	CARR 100 LOC 20 CARR 190	Reel Size LED Fail (sense byte 22 bit 2) equals 1. Message byte displayed is sense byte 22.
6338	Go to MAP 4010, entry point L.	A1H2 Drive Control Card Power Amplifier Flat Cable	CARR 190 LOC 70	Power Ampl Cable Unseated (sense byte 23 bit 3) equals 1. Message byte displayed is sense byte 23.
6339	Go to MAP 4220, entry point A.	Tape Tachometer Transducer Card A1H2 Drive Control Card	CARR 140 LOC 20 CARR 190	Tape Tach Fail (sense byte 21 bit 0) equals 1. Message byte displayed is sense byte 21.
633A	Go to MAP 4230, entry point A.	Machine Reel Motor Transducer Card A1H2 Drive Control Card	CARR 150 LOC 20 CARR 190	Mach Tach Fail (sense byte 21 bit 1) equals 1. Message byte displayed is sense byte 21.
633B	Go to MAP 4240, entry point A.	File Reel Motor Transducer Card A1H2 Drive Control card	CARR 90 LOC 20 CARR 190	File Tach Fail (sense byte 21 bit 2) equals 1. Message byte displayed is sense byte 21.
633C	Go to MAP 4010, entry point L.	Tape Tachometer Transducer Card A1H2 Drive Control Card	CARR 140 LOC 20 CARR 190	Tape Tach Rotation Check (sense byte 21 bit 3) equals 1. Message byte displayed is sense byte 21.
6341	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Drive Control Fail (sense byte 22 bit 3) equals 1. Message byte displayed is sense byte 22.
6342	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Servo Logic Fail (sense byte 20 bit 0) equals 1. Message byte displayed is sense byte 20.
6343	Go to MAP 4010, entry point L.	Power Amplifier Board A1H2 Drive Control Card File Reel Motor A1H2D12 Shorted to ground.	CARR 200 CARR 190 CARR 90 REF 80	Servo Analog Fail (sense byte 20 bit 1) equals 1. Message byte displayed is sense byte 20.
6344	Go to MAP 4010, entry point L.	File Reel Motor Power Amplifier Board A1H2 Drive Control Card File Reel Motor circuit: A1H2B10 shorted to ground	CARR 90 CARR 200 CARR 190 CARR 90 REF 80	File Amplitude Saturation (sense byte 23 bit 0) equals 1. Message byte displayed is sense byte 23.
6345	Go to MAP 4010, entry point L.	Machine Reel Motor Power Amplifier Board A1H2 Drive Control Card circuit: A1H2B03 shorted to ground	CARR 150 CARR 200 CARR 190 REF 80	Mach Amplitude Saturation (sense byte 23 bit 1) equals 1. Message byte displayed is sense byte 23.
6346	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Load Check (sense byte 18 bit 0) equals 1 and Sequence Error (sense byte 16 bit 5) is not equal to 1. Message byte displayed is sense byte 18.
6347	Go to MAP 4010, entry point L.	A1H2 Drive Control Card Operator Panel	CARR 190 CARR 160	Not Ready Due To Reset (sense byte 18 bit 4) equals 1. Message byte displayed is sense byte 18.
6348	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 but no errors are indicated in sense bytes 16-23 (motion sense bytes). This is a background error.
634B	Go to MAP 0140, entry point A.	A1H2 Drive Control Card Power Amplifier Board File Reel Motor	CARR 190 CARR 200 CARR 90	Tension Check (sense byte 18 bit 1) and Sequence Error (sense byte 16 bit 5) equal 1 and Present Transport State (sense byte 19 bits 0-4) equal 00111 (Rewind). Message bytes displayed are sense bytes 16 and 18.
634C	Go to MAP 4500, entry point A.	Sense Idler Tape Present Sensor Transducer Card A1H2 Drive Control card	CARR 110 CARR 110 LOC 20 CARR 190	Load Check (sense byte 18 bit 0) and Sequence Error (sense byte 16 bit 5) equal 1. Message bytes displayed are sense bytes 16 and 18.
634D	Go to MAP 4010, entry point L.	A1H2 Drive Control Card	CARR 190	Sequence Error (sense byte 16 bit 5) equals 1 but Tension Check (sense byte 16 bit 1) or Load Check (sense byte 16 bit 0) is not equal to 0. This indicates a false error. Message bytes displayed are sense bytes 16 and 18.
634E	Go to MAP 4010, entry point K.	A1H2 Drive Control Card Power Amplifier Board Machine Reel Motor File Reel Motor Tape Present Sensor Transducer Card Reel Size Sensor	CARR 190 CARR 200 CARR 150 CARR 90 CARR 110 LOC 20 CARR 100	Tension Check (sense byte 18 bit 1) and Sequence Error (sense byte 16 bit 5) equal 1 and Present Transport State (sense byte 16 bits 0-4) is not equal to 00111 (Rewind). Message bytes displayed are sense bytes 16 and 18.

ISOLATION CODE

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6351	Go to MAP 4010, entry point L.	A1G2 Formatter Card A1H2 Drive Control Card circuits: A1H2W07 to A1G2W07* A1H2Y32 to A1G2Y32* A1H2W09 to A1G2W09* A1H2Y03 to A1G2Y03* A1H2W28 to A1G2W28* *Open or shorted to ground	CARR 190 CARR 190 REF 70	Drive Control Parity Check (sense byte 9 bit 6) equals 1. Message byte displayed is sense byte 9.
6352	Go to MAP 4010, entry point L.	A1G2 Formatter Card A1H2 Drive Control Card circuits: A1H2X33 to A1G2X33* A1H2G04 to A1G2G04* A1H2X28 to A1G2X28* *Open or shorted to ground	CARR 190 CARR 190 REF 70	Drive Response Check (sense byte 11 bit 4) equals 1. Message byte displayed is sense byte 9.
63F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
63F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
63F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
63F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
63F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
63F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
63F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
63FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 64

Name: Command Reinstruct Timing Routine (Short Gap)

Description:

This routine requires the dedicated use of the system. If the system interrupts this routine, the results are incorrect. This routine checks the command reinstruct functions in the tape unit in the high speed and short gap modes. The tape unit writes continuously at high speed. If repositioning occurs, it indicates that the system is not issuing commands fast enough or the tape unit is not accepting commands fast enough to keep the tape unit in motion.

This routine runs until the EOT mark unless manually interrupted. To stop the prior to EOT, enter option X'00', then reset the tape unit under test. This causes a normal routine stop.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6411	Go to MAP 0520 entry point F.			Selected Alert control line equals 1 during a Write Block operation. This is a background error.
6412	Go to MAP 0520, entry point E.			Check End control line equals 1 after a Write Block operation. This is a background error.
64F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
64F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
64F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
64F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
64F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
64F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
64FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 65

Name: Command Reinstruct Timing Routine (Long Gap)

Description:

The routine requires the dedicated use of the system. If the system interrupts this routine, the results are incorrect. This routine checks the tape unit command reinstruct functions in the high speed and long gap modes. The tape unit should write continuously at high speed. If repositioning occurs, it indicates that the system is not issuing commands fast enough or the tape unit is not accepting commands fast enough to keep the tape unit in motion. This routine runs until EOT unless manually interrupted. To stop the routine prior to EOT, enter '00' and then reset the tape unit under test. This causes a normal routine stop.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6511	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 during a Write Block operation. This is a background error.
6512	Go to MAP 0520, entry point E.			Check End control line equals 1 after a Write Block operation. This is a background error.
65F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
65F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
65F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
65F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
65F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
65F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
65F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
65FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 66

Name: Read Continuous Routine (High Speed)

Description:

In this routine, the tape unit reads continuously at high speed. If repositioning occurs, it indicates that the system is not issuing commands fast enough or the tape unit is not accepting commands fast enough to keep the tape unit in motion. This routine runs until EOT unless manually interrupted. To stop the routine prior to EOT, enter '00' and then reset the tape unit under test. This causes a normal stop.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6611	Go to MAP 0520, entry point F.			Selected Alert control line equals 1 during a Read Block operation. This is a background error.
6612	Go to MAP 0520, entry point E.			Check End control line equals 1 after a Read Block operation. This is a background error.
66F0	Go to MAP 0520, entry point A.			Selected Alert control line equals 1. This is a background error.
66F1	Go to MAP 0520, entry point A.			Check End control line equals 1. This is a background error.
66F2	Go to MAP 0520, entry point A.			Bus In parity error equals 1. This is a background error.
66F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
66F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
66F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
66F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
66FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

ISOLATION CODE

DIAGNOSTIC ROUTINE IDENTIFIER: 67

Name: IBG Measurement Diagnostic Routine

Description:

This routine verifies proper length of the interblock gap (IBG). The routine operates in short gap mode only. This routine requires the dedicated use of the system. If the system interrupts this routine, the results are incorrect.

Isolation Code	Action	Probable Failing FRU or Circuit	MIM References	Error Description
6711	Go to MAP 4580, entry point A.	A1H2 Drive Control Card	CARR 190	Positioning (sense byte 8 bit 7) did not equal 1 within 15 milliseconds after Normal End control line equals 1 after a Read Block command is issued. Message byte displayed is sense byte 8.
6712	Go to MAP 4580, entry point A.	A1H2 Drive Control Card	CARR 190	An IBG of 13.9 mm (0.549 inch) or less was detected in one or more of the last 15 records read. Message byte displayed is sense byte 8.
6713	Go to MAP 4580, entry point A.	A1H2 Drive Control Card	CARR 190	An IBG of 16.8 mm (0.651 inch) or greater was detected in one or more of the last 15 records read. Message byte displayed is sense byte 8.
6714	Go to MAP 0520, entry point F.			Normal End control line was not received from a Read Block command. This is a background error.
67F0	Go to MAP 0520, entry point A.			A Selected Alert control line equals 1. This is a background error.
67F1	Go to MAP 0520, entry point A.			A Check End control line equals 1. This is a background error.
67F2	Go to MAP 0520, entry point A.			A Bus In parity error equals 1. This is a background error.
67F3	Go to MAP 0520, entry point A.			A timeout occurred waiting for Normal End, Check End, or Selected Alert control lines to equal 1. This is a background error.
67F4	Go to MAP 0520, entry point A.			A timeout occurred waiting for Sync In control line to equal 1. This is a background error.
67F5	Go to Map 0520, entry point A.	A1C2 Secondary Driver/Receiver Card A1G2 Formatter Card	CARR 190 CARR 190	A timeout occurred waiting for Bus In bit 0 (Pre-Sync-In) during a read/write operation. This is a background error.
67F6	Go to MAP 0520, entry point A.			The last disconnect command executed for this diagnostic routine caused Selected Alert control line to equal 1. This is a background error.
67FF	Go to Map 0520, entry point A.			A timeout occurred waiting for Tag Valid. from any device command. This is a background error.

CONTENTS

Locations, Major Assemblies . . . . . LOC 10
Physical Description

Tape Deck, Motors, and Sensors . . . . . LOC 20
Physical Description

Stack Assembly and Power Amplifier Board . . . . . LOC 30
Physical Description

Power Supply Models 1 and 3 and Power Control Card . . . . . LOC 40
Physical Description

Power Supply Model 2 . . . . . LOC 50
Physical Description

Tape Deck Connectors . . . . . LOC 60

Stack Assembly, Connectors and Logic Cards . . . . . LOC 70

Read/Write Head Card Assembly . . . . . LOC 71

8809

AP0100 Seq 1 of 2	2699227 Part Number	846318 15 Mar 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82			

NOTES:

Notes LOC 5

LOCATIONS, MAJOR ASSEMBLIES

GENERAL

This section identifies the 8809 component groups and their position relative to each other.

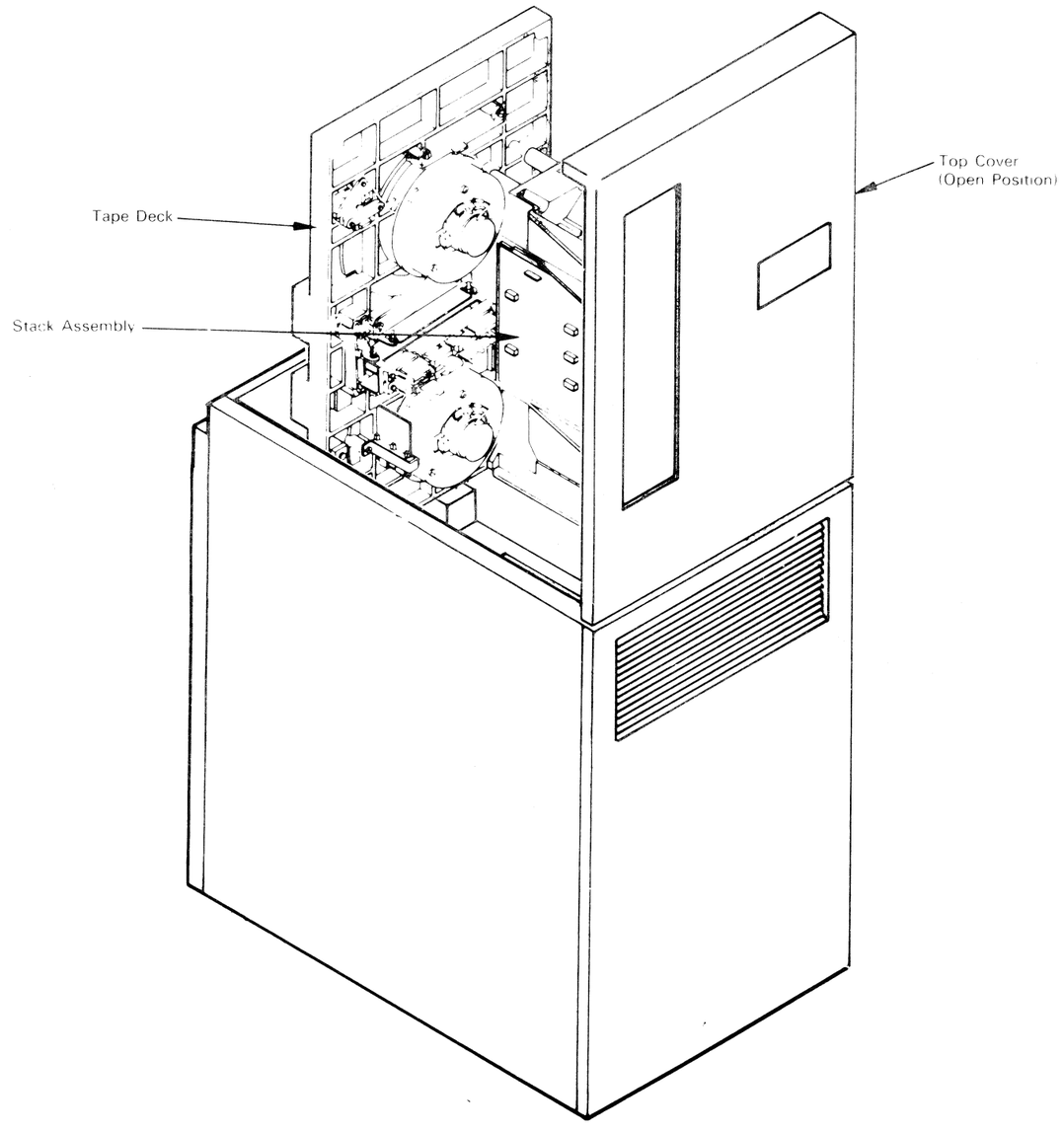
Details of the field replaceable units (FRUs) contained on the machine group shown are on: LOC 20, 30, 40, and 50.

PHYSICAL DESCRIPTION

The tape deck is a hinged casting on which the tape movement mechanisms are mounted when assembled in the machine. (See LOC 20.)

The stack assembly is used to mount the air movement equipment, logic cards, and power amplifier cards. (See LOC 30.)

The power supply contains all the power components such as transformers, capacitors, and resistors. (See LOC 40 and 50.)



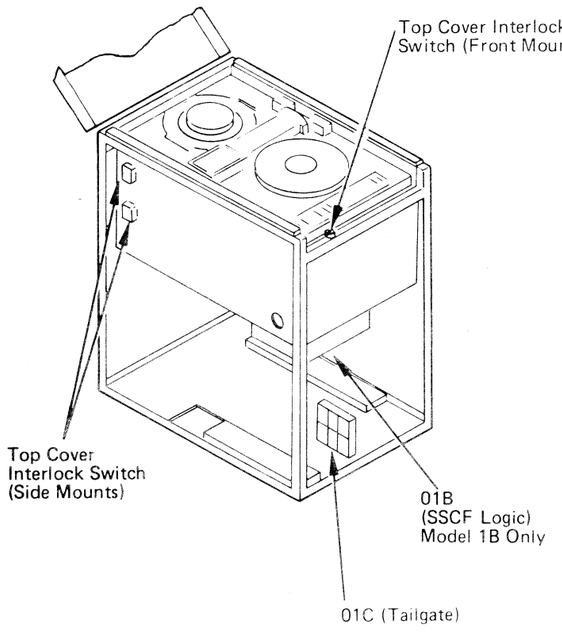
TAPE DECK, MOTORS AND SENSORS

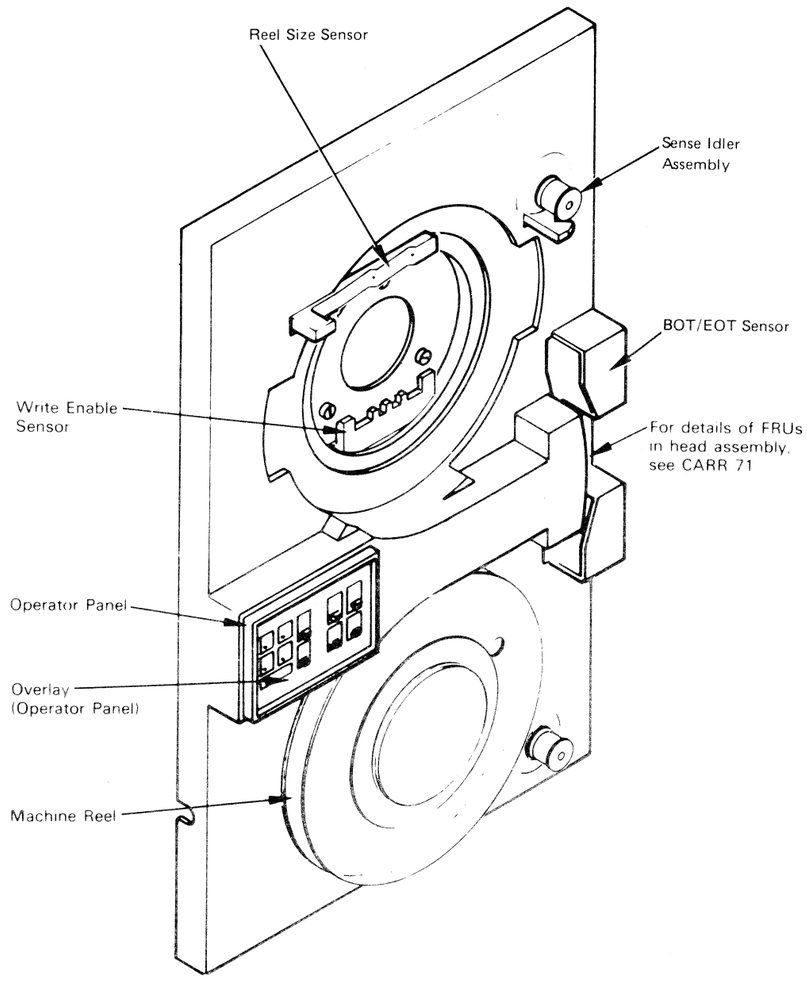
GENERAL

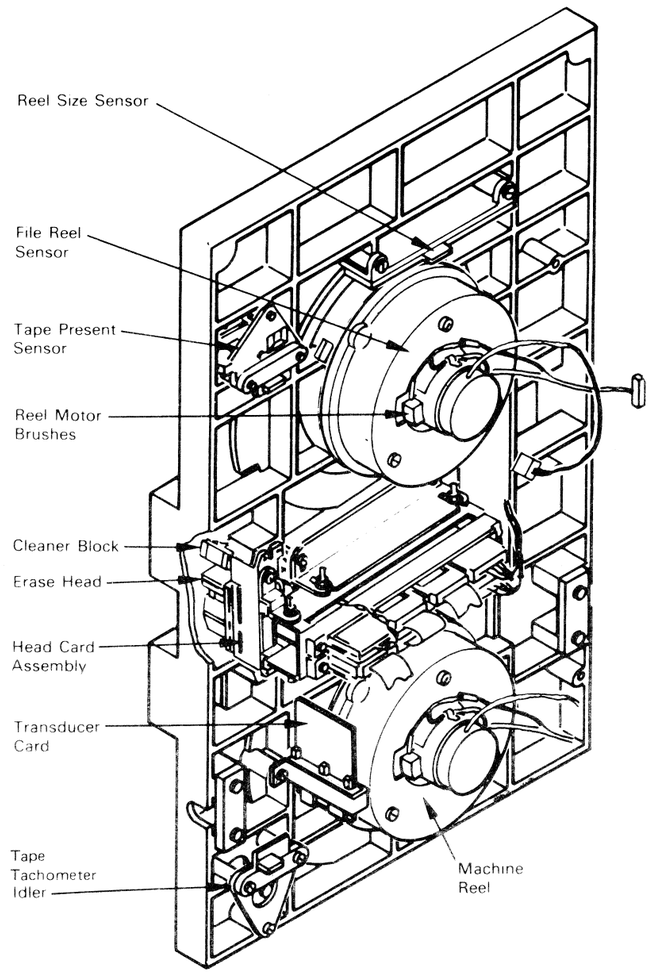
This page shows the locations of the field replaceable units (FRUs) attached to the tape deck.

PHYSICAL DESCRIPTION

After locating the FRU to be installed, use the *Illustrated Parts Catalog,* Order Number S132-0009 to find the part number. Order the part through normal procedures.







Note: *The top cover interlock switch on the machine may be in* **one** *of the three locations shown. To override the cover interlock switch, raise the plunger to the override position. For side-mounted switch, remove rear cover for access to switch.*

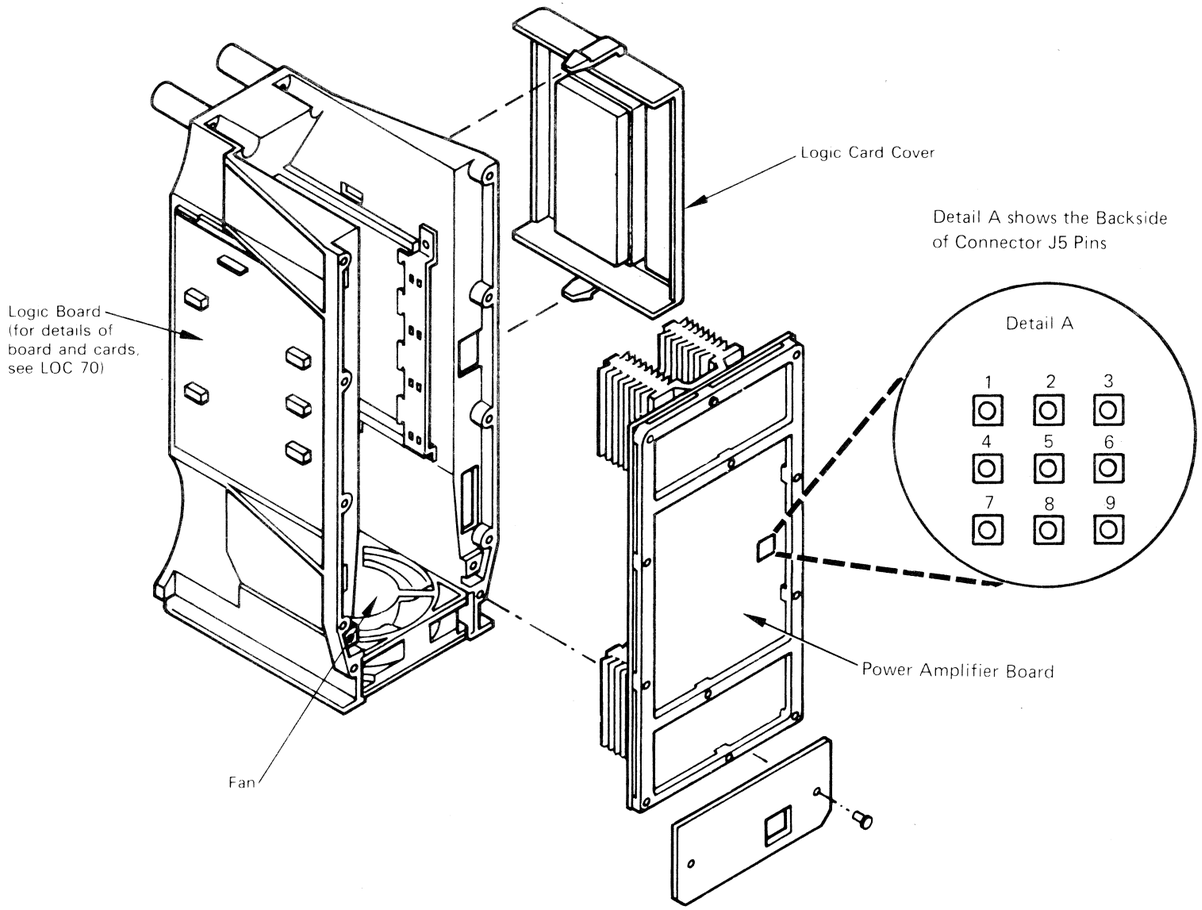
STACK ASSEMBLY AND POWER AMPLIFIER BOARD

GENERAL

This page shows the locations of the field replaceable units (FRUs) contained in the stack assembly.

PHYSICAL DESCRIPTION

After locating the FRU to be installed, use the *Illustrated Parts Catalog,* Order Number S132-0009 to find the part number. Order the part through normal procedures.



J5 Pins	Voltage
1	+24Vdc
2	+15Vdc
3	−15Vdc
4	−5Vdc
5	Pwr On Reset (Logic Level)
6	+5Vdc
7	−24Vdc
8	Gnd
9	Gnd

8809

AP0300 Seq 1 of 2	2699229 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847308 1 Aug 81	847314 1 Apr 82		

POWER SUPPLY MODELS 1 AND 3 AND POWER CONTROL CARD

GENERAL

This page contains the locations of the field replaceable units (FRUs) contained in the power supply for 8809 Model 1 or 3. (See LOC 50 for the power supply locations of a Model 2.) CARR 50 shows physical location of power supply in models 1 and 3.

The power supply shown here is viewed from the top with the top cover and baseplate (tape deck) removed.

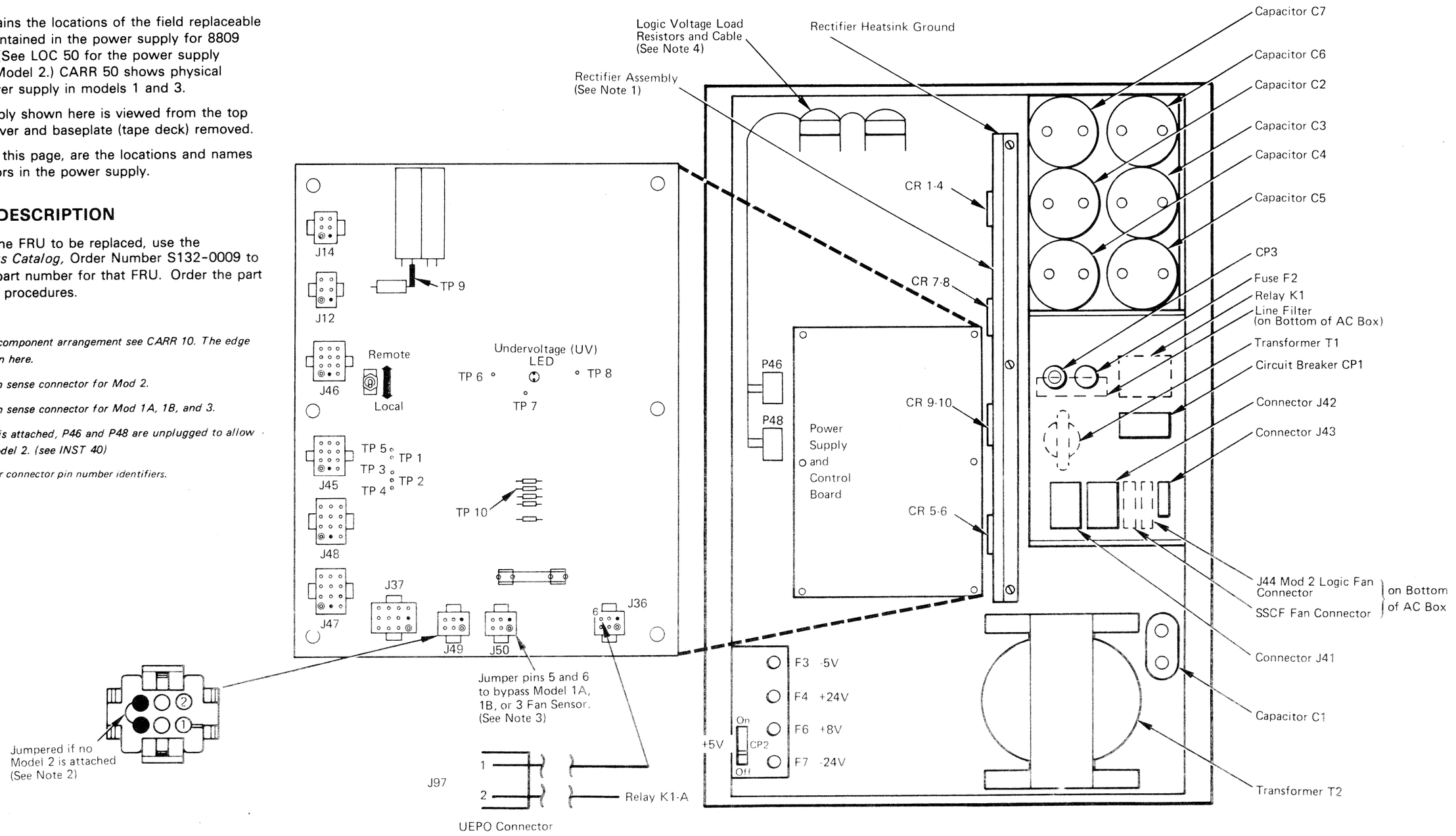
Also shown on this page, are the locations and names of the connectors in the power supply.

PHYSICAL DESCRIPTION

After locating the FRU to be replaced, use the *Illustrated Parts Catalog,* Order Number S132-0009 to determine the part number for that FRU. Order the part through normal procedures.

Notes:

1. *For detailed component arrangement see CARR 10. The edge view is shown here.*
2. *J49 is the fan sense connector for Mod 2.*
3. *J50 is the fan sense connector for Mod 1A, 1B, and 3.*
4. *If a model 2 is attached, P46 and P48 are unplugged to allow cabling to model 2. (see INST 40)*
5. *See REF 40 for connector pin number identifiers.*



8809

AP0300	2699229	846318	846481	847323	847308	847314		
Seq 2 of 2	Part Number	15 Mar 79	15 Dec 79	1 Oct 80	1 Aug 81	1 Apr 82		

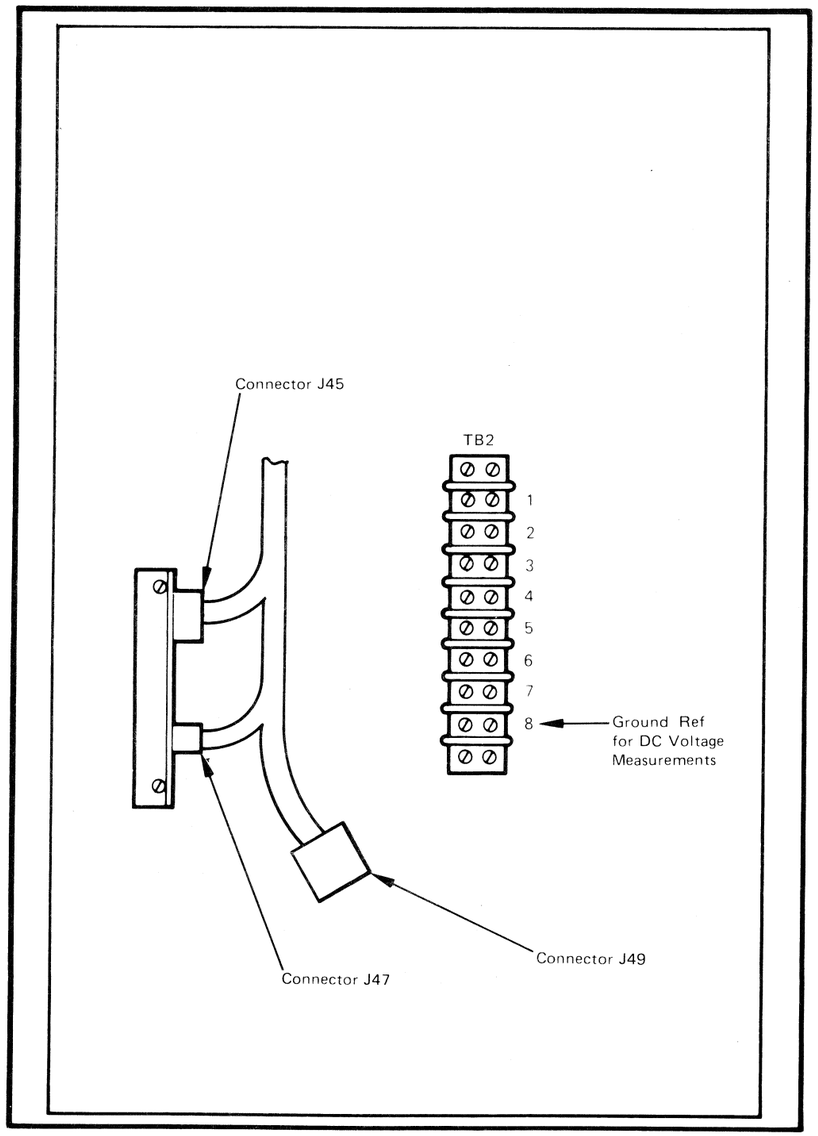
POWER SUPPLY MODEL 2

GENERAL

This page shows the locations of the field replaceable units (FRUs) in a 8809 Model 2. (See LOC 40 for the power supply locations of Models 1 and 3.

PHYSICAL DESCRIPTION

A Model 2 receives power from a Model 1 or 3. The power is supplied through a cable connected from J46 and J48 in the Model 1 or 3, to J45 and J47 in the Model 2.



Note: *Connector J49 is fan sensor to Model 1A, 1B, or 3 power control board.*

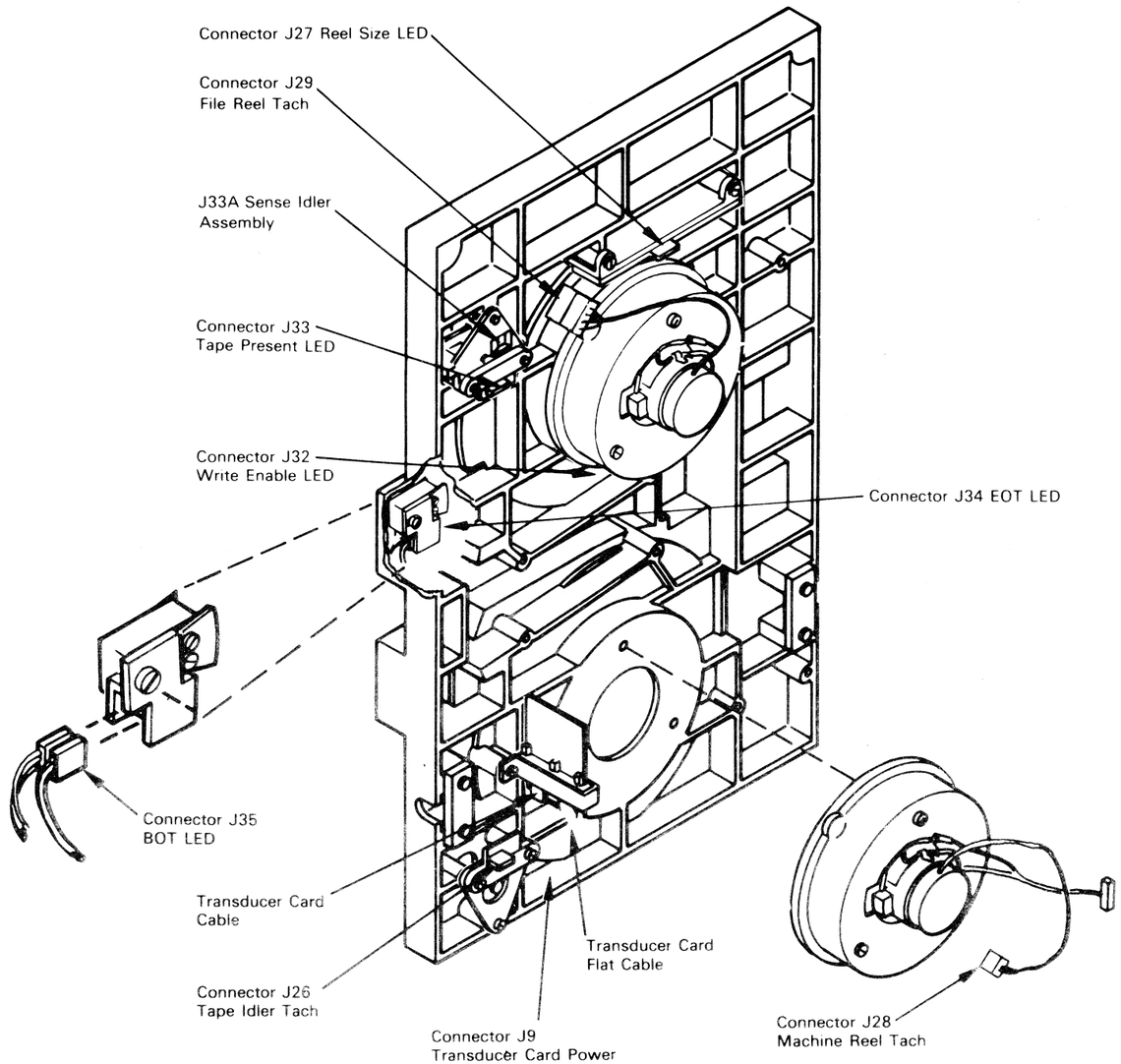
TAPE DECK CONNECTORS

GENERAL

This page shows the locations and names of the connectors on the tape deck.

Each connector has a key inserted in one position for reference when counting connector positions. The following chart lists the key position for each connector.

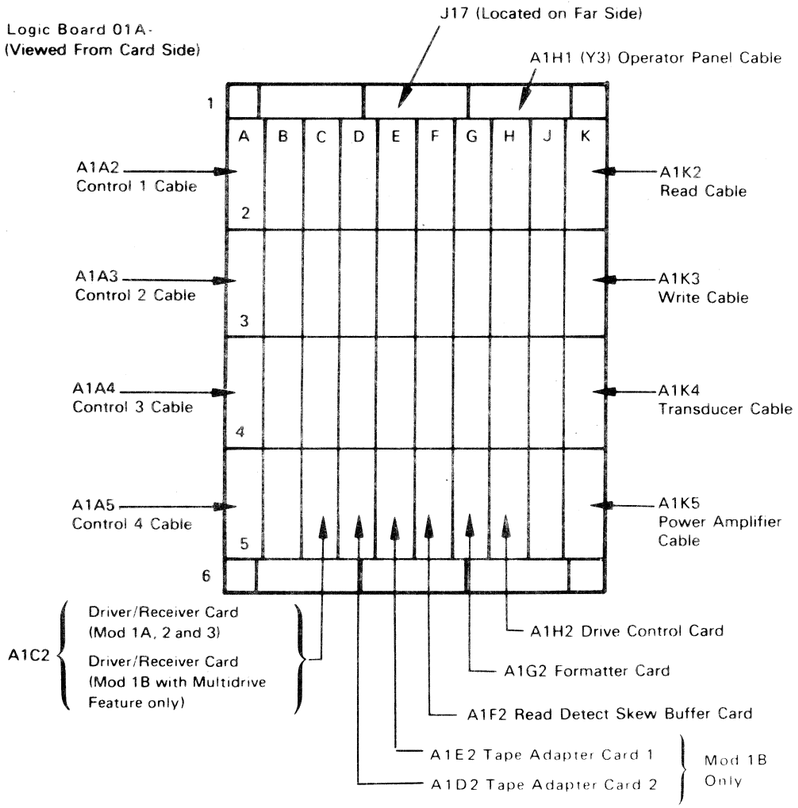
Connector Chart		
Connector Number	**Number of Positions**	**Key Location**
J26	10	2
J27	9	2
J28	5	2
J29	5	2
J32	5	2
J33	5	2
J34	7	7
J35	7	7

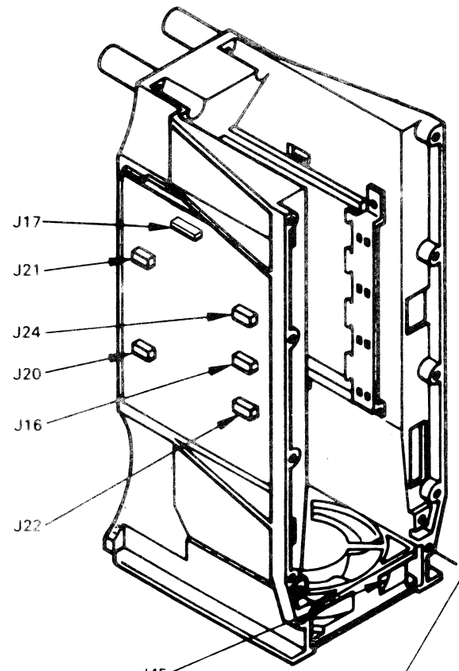


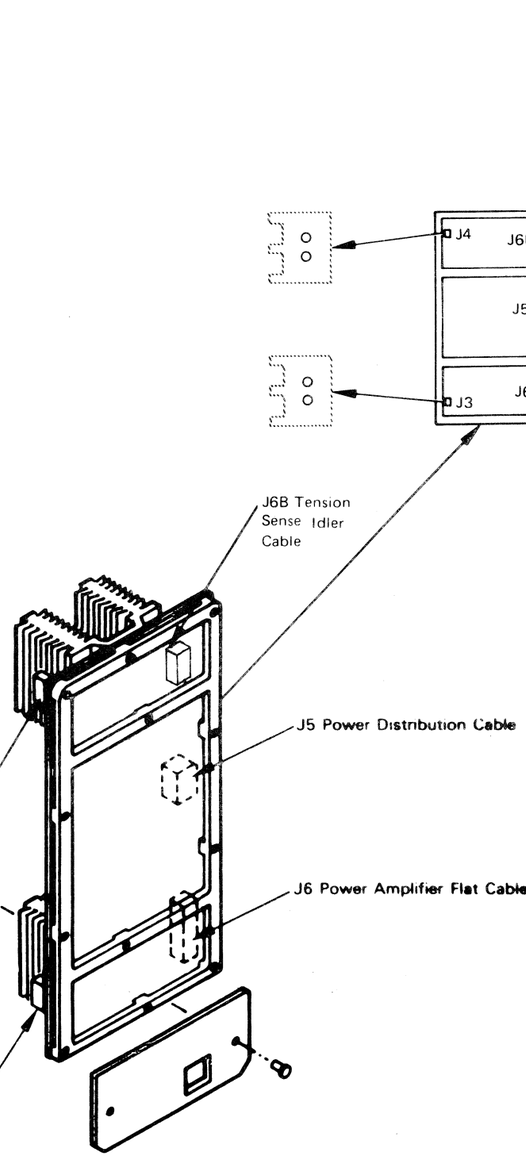
STACK ASSEMBLY CONNECTORS AND LOGIC CARDS

GENERAL

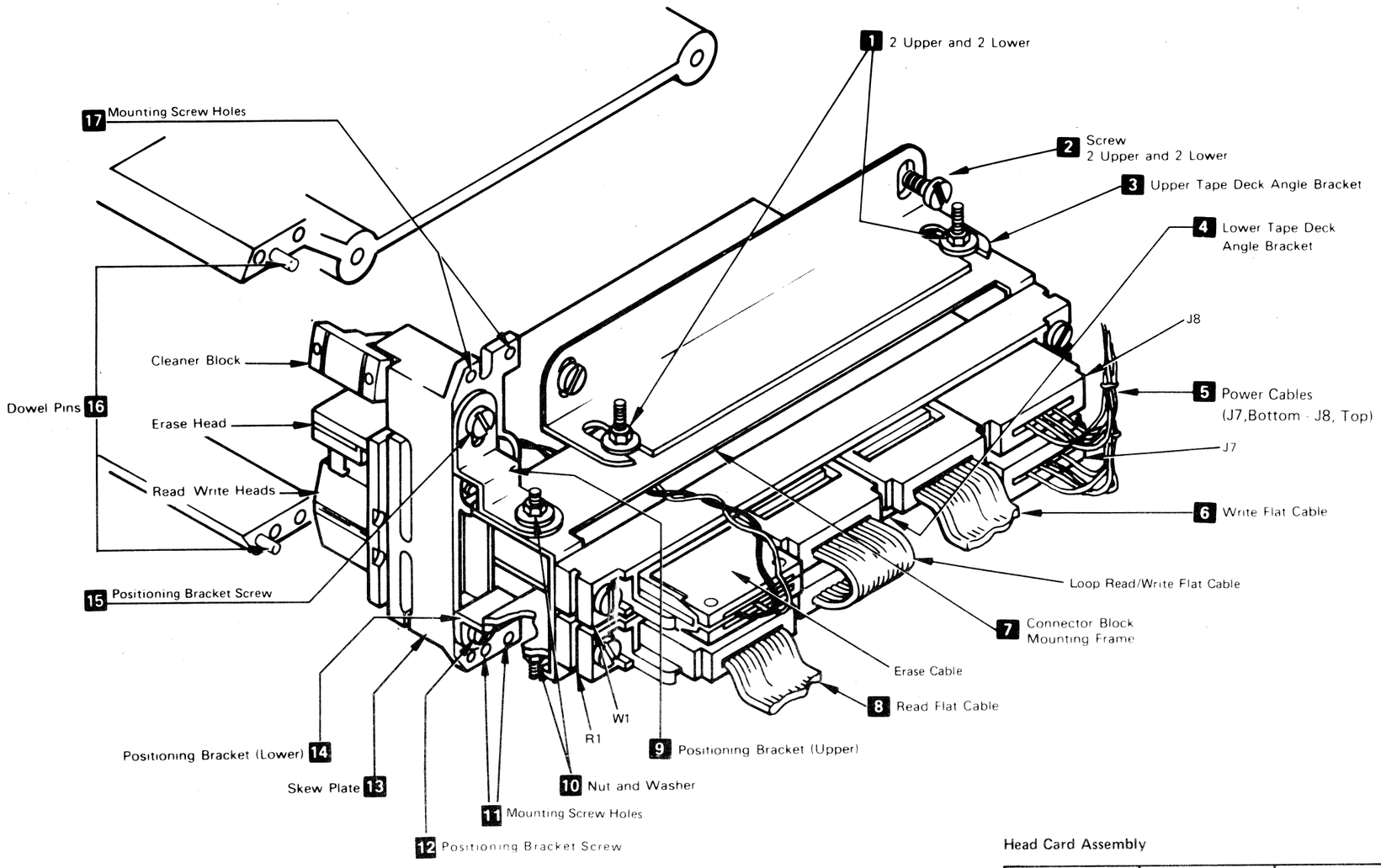
This page contains the locations and names of the connectors on the Stack Assembly.







READ/WRITE HEAD CARD ASSEMBLY



Head Card Assembly

W1	B02 ••••••••••••• B13 D02 •••••••••••••	G02 J02	M02 P02	S02 U02
R1	B02 ••••••••••••• D02 •••••••••••••	G02 J02	M02 P02	S02 U02

Viewed from Cable Side

8809

AP0500 Seq 2 of 2	**2699231** Part Number	**846318** 15 Mar 79	**846481** 15 Dec 79	**847323** 1 Oct 80	**847308** 1 Aug 81			

CONTENTS

EREP—Summary of Reports . . . . . ESDR 10

CUA Statistics Report . . . . . ESDR 20

Permanent Error Summary . . . . . ESDR 30

Subsystem Temporary Error Summary . . . . . ESDR 40

Volume Statistics . . . . . ESDR 50
OBR Volume Statistics Report
MDR Volume Statistics Report

Detailed Error Report . . . . . ESDR 60
OBR Edit Report

Detailed Statistical Report . . . . . ESDR 70
MDR Edit Report

EREP Analysis Procedure . . . . . ESDR 80

8809

AR0100 Seq 1 of 2	2699233 Part Number	846318 15 Mar 79	847314 1 Apr 82					

NOTES:

EREP—SUMMARY OF REPORTS

The OS/VS, DOS/VS, VM/370 Environmental Recording Editing and Printing (EREP) program provides six types of reports for the 8809 Magnetic Tape Unit. They are:

CUA Statistics
Permanent Error Summary
Subsystem Temporary Error Summary
Volume Statistics
Detailed Error Reports
Detailed Statistical Reports

The first four reports are presented in the EREP Threshold Summary report for the 8809 tape unit.

The Detailed Error Reports are presented in the EREP Outboard Recorder (OBR) Edit format, and the Detailed Statistical Reports are presented in the EREP Miscellaneous Data Record (MDR) Edit format.

Detailed information about specific fields in these reports are given on the following pages.

- **See ESDR 80 for EREP Analysis Procedures.**

CUA STATISTICS REPORT

The CUA Statistics report contains a one line entry for each MDR record that exceeds either the read or write error threshold. MDR log records contain a standard header, device-dependent and device-independent data, and Format 6 sense data. When the information in the report is taken from Format 6 sense data, those references are included in the description of the field. The following fields appear in the CUA Statistics report.

```
XXXX SUBSYSTEM SUMMARY
PRIMARY CUA XXXX
CUA STATISTICS - CUAS EXCEEDING XXX TEMPORARY READS OR XXX TEMPORARY WRITES
 1      2      3          4          5    6     7     8       9    10   11   12   13   14   15   16    17
      DATE   VOLUME      TIME          TEMP      SIO COUNT
CUA  DAY YR  SERIAL  HH MM SS TH   RDS  WRTS  RDS   WRTS    MTE  EDC  SRC  RBF  ENV  NOP  CRE  SKEW  VEL
XXXX XXX XX  XXXXX   XX XX XX XX  XXXX XXXX  XXXXX XXXXX   XX   XX   XX   XX   XX   XX   XX    XX   XX
XXXX XXX XX  XXXXX   XX XX XX XX  XXXX XXXX  XXXXX XXXXX   XX   XX   XX   XX   XX   XX   XX    XX   XX
XXXX XXX XX  XXXXX   XX XX XX XX  XXXX XXXX  XXXXX XXXXX   XX   XX   XX   XX   XX   XX   XX    XX   XX
```

1 CUA
Control Unit Address

2 DATE

3 VOLUME SERIAL

4 TIME

5 TEMP RDS
Temporary Read Errors. Format 6 sense byte 20.

6 TEMP WRTS
Temporary Write Errors. See Format 6 sense byte 21.

7 SIO COUNT RDS
Start I/O Count of Read operations. See Format 6 sense bytes 22 and 23.

8 SIO COUNT WRTS
Start I/O count of Write operations. See Format 6 sense bytes 24 and 25.

9 MTE
Multi-Track Errors. See Format 6 sense byte 8.

10 EDC
End Data Check. See Format 6 sense byte 9.

11 SRC
Start Read Check. See Format 6 sense byte 10.

12 RBF
Read Back Fail. See Format 6 sense byte 11.

13 ENV
Envelope Check. See Format 6 sense byte 12.

14 NOP
No Pointer Error. See Format 6 sense byte 13.

15 CRE
Crease Error. See Format 6 sense byte 14.

16 SKEW
Skew Error. See Format 6 sense byte 15.

17 VEL
Velocity Check. See Format 6 sense byte 19.

- **See SENSE 45 for description of format 6 sense data.**

8809

AR0200 Seq 2 of 2	2699234 Part Number	846318 15 Mar 79	847308 1 Aug 81					

PERMANENT ERROR SUMMARY

The Permanent Error Summary report contains a one line entry for each OBR record on the host system. OBR log records contain a standard header, device-dependent and device-independent data, and Format 1 sense data. This report presents data by device address, by date, and by time. When information in the report is taken from Format 1 sense data, those references are included in the description of the field. The following fields appear in the Permanent Error Summary report.

```
PERMANENT ERROR SUMMARY
1      2    3            4                5          6            7          8     9    10
                                                   DATE          TIME       100        SYMP
DEV   ERR  VOL.ID     LAST CCW         CSW 44-47  DAY  YR    HH MM YY TH    IPS   LGM  CODE
XXXX  XX   XXXXX  XXXXXXXXXXXXXXXX    XXXXXXXX   XXX  XX    XX XX XX XX     X     X   XXXX
XXXX  XX   XXXXX  XXXXXXXXXXXXXXXX    XXXXXXXX   XXX  XX    XX XX XX XX     X     X   XXXX
XXXX  XX   XXXXX  XXXXXXXXXXXXXXXX    XXXXXXXX   XXX  XX    XX XX XX XX     X     X   XXXX

PW = PERMANENT WRITE      PR = PERMANENT READ
EC = EQUIPMENT CHECK      WC = WRITE CURRENT CHECK        PE = CAUSE UNKNOWN
```

1 DEV
Device Address

2 ERR
A two character field describing the following conditions:

WC
Write Current Check. See Format 1 sense byte 20 bits 2 and 3 equal to 1.

EC
Equipment Check

PW
Permanent Write Error

PR
Permanent Read Error

PE
All other conditions

3 VOL ID
Volume Identification

4 LAST CCW
The failing CCW as logged in the OBR record.

5 CSW
Channel Status Word

6 DATE

7 TIME

8 IPS
100 Inches Per Second. See Format 1 sense byte 8 bit 6 equals 0.

9 LGM
Long Gap Mode. See Format 1 sense byte 18 bit 5 equals 1.

10 SYMP CODE
Symptom Code. See Format 1 sense byte 30 and 31.

- **See SENSE 25 for description of format 1 sense data.**
- **See SENSE 15 for sense data summary table.**

SUBSYSTEM TEMPORARY ERROR SUMMARY

The Subsystem Temporary Error Summary report summarizes all MDR records, including records that have not exceeded the threshold levels, and is listed by control unit address. When information in the report is taken from Format 6 sense data, those references are included in the description of the field. The following fields appear in the Subsystem Temporary Error Summary Report.

```
XXXX SUBSYSTEM TEMPORARY ERROR SUMMARY
1         2     3         4          5      6       7        8          9         10         11         12    13
       ERRORS/100K                                              READ                   WRITE
          SIOS          DATE        TOTAL SIOS    TOTAL        STATISTICS            STATISTICS          OVER  VEL
CUA    READ  WRITE    FROM    TO    READ   WRITE  MOUNTS    ERRORS   RETRIES    ERRORS     ERS GAP     RUN   CHK

XXX    XX.XX XX.XX   XXXXX XXXXX   XXXXX  XXXXX    XX       XXXXX    XXXXX      XXXXX      XXXXX       XX    XX
XXX    XX.XX XX.XX   XXXXX XXXXX   XXXXX  XXXXX    XX       XXXXX    XXXXX      XXXXX      XXXXX       XX    XX
XXX    XX.XX XX.XX   XXXXX XXXXX   XXXXX  XXXXX    XX       XXXXX    XXXXX      XXXXX      XXXXX       XX    XX

TOTALS
    XX.XX XX.XX        XXXXX XXXXX  XXX  XXXXX  XXXXX
```

1 CUA
Control Unit Address

2 ERRORS/100K SIOS READ
Errors per 100,000 Read Start I/O operations. The number is obtained by dividing the number of temporary read errors (see Format 6 sense byte 20) by the number of read Start I/Os (see Format 6 sense bytes 22 and 23) and adjusting for rates of 100,000.

3 ERRORS/100K SIOS WRITE
Errors per 100,000 Write Start I/O operations. The number is obtained by dividing the number of temporary write errors (see Format 6 sense byte 21) by the number of Write Start I/Os (see Format 6 sense bytes 24 and 25) and adjusting for rates of 100,000.

4 DATE FROM TO
This field contains the reporting dates for this set of data.

5 TOTAL SIOS READ
The total Read Start I/O count is obtained from format 6 sense bytes 22 and 23.

6 TOTAL SIOS WRITE
The total Write Start I/O count is obtained from Format 6 sense bytes 24 and 25.

7 TOTAL MOUNTS
The total number of volume dismounts for this device is shown.

8 READ STATISTICS ERRORS
See Format 6 sense byte 20.

9 READ STATISTICS RETRIES
The number of retries is determined by adding the contents of Format 6 sense bytes 30 and 31.

10 WRITE STATISTICS ERRORS
See Format 6 sense byte 21.

11 WRITE STATISTICS ERS GAP
The number of Write errors is determined by adding Format 6 sense bytes 28 and 29.

12 OVERRUN
See Format 6 sense byte 27.

13 VEL CHK
See Format 6 sense byte 19.

- See SENSE 45 for description of format 6 sense data.
- See SENSE 15 for sense data summary table.
- See SENSE 25 for description of format 1 sense data.

8809

AR0300 Seq 2 of 2	2699235 Part Number	846318 15 Mar 79	847308 1 Aug 81					

VOLUME STATISTICS

The Volume Statistics report contains a one line entry for each 8809 tape unit OBR record and a one line entry for each MDR record. The report is organized by volume serial number, by date, and by time. When information is taken from sense data those references are included in the description of the field.

The following fields appear in both the OBR and MDR Volume Statistics Report.

- **See SENSE 25 for description of format 1 sense data.**
- **See SENSE 15 for sense data summary.**
- **See SENSE 45 for description of format 6 sense data.**

VOLUME STATISTICS - VOLUMES EXCEEDING XXX TEMPORARY READS OR XXX TEMPORARY WRITES OR PERMANENT ERRORS

1	2	3		4	5	6	7	8	9	10	11	12	13	14	15	
VOLUME	DATE	TIME			PERM		TEMP		READ	ERASE	SIO COUNT		BLOCK	PROGRAM	CPU	
SERIAL	DAY YR	HH	MM SS TH	CUA	RD	WRT	RDS	WRTS	RETRY	GAPS	RDS	WRTS	LENGTH	ID	ID	SERIAL
XXXXXX	XXX XX	XX	XX XX XX	XXXX	X	X	XXX	XXX	XXXX	XXXX	XXXXX	XXXXX	XXXXX	XXXXXXXXXX	XXXXX	XXXXX
XXXXXX	XXX XX	XX	XX XX XX	XXXX	X	X	XXX	XXX	XXXX	XXXX	XXXXX	XXXXX	XXXXX	XXXXXXXXXX	XXXXX	XXXXX
XXXXXX	XXX XX	XX	XX XX XX	XXXX	X	X	XXX	XXX	XXXX	XXXX	XXXXX	XXXXX	XXXXX	XXXXXXXXXX	XXXXX	XXXXX

OBR Volume Statistics Report

The OBR Volume Statistics report contains a one line entry for each permanent 8809 tape unit error.

1 VOLUME SERIAL

2 DATE

3 TIME

4 CUA
Control Unit Address

5 PERM RD
Permanent Read Errors. This field contains a 1 if Format 1 sense byte 14 bit 0 equals 0.

6 PERM WRT
Permanent Write Errors. This field contains a 1 if Format 1 sense byte 14 bit 0 equals 1.

7 TEMP RDS
Blank for OBR volume records.

8 TEMP WRTS
Blank for OBR volume records.

9 READ RETRY
Blank for OBR volume records.

10 ERASE GAPS
Blank for OBR volume records.

11 SIO COUNT RDS
Blank for OBR volume records.

12 SIO COUNT WRTS
Blank for OBR volume records.

13 BLOCK LENGTH
Data obtained from OBR record.

14 PROGRAM ID
Data obtained from OBR record.

15 CPU ID SERIAL
Data obtained from OBR record.

MDR Volume Statistics Report

The MDR Volume Statistics report contains a one line entry for each Volume Dismount log record, each End-of-data record, and each SDR Counter Overflow record obtained from the 8809 tape unit.

1 VOLUME SERIAL

2 DATE

3 TIME

4 CUA
Control Unit Address

5 PERM RD
Blank for MDR volume records.

6 PERM WRT
Blank for MDR volume records.

7 TEMP RDS
Temporary Read Errors. See Format 6 sense byte 20.

8 TEMP WRTS
Temporary Write Errors. See Format 6 sense byte 21.

9 READ RETRY
See Format 6 sense byte 30-31.

10 ERASE GAPS
See Format 6 sense bytes 28 and 29.

11 SIO COUNTS RDS
See Format 6 sense bytes 22 and 23.

12 SIO COUNTS WRTS
See Format 6 sense bytes 24 and 25.

13 BLOCK LENGTH
Data from MDR record.

14 PROGRAM ID
Blank for MDR volume records.

15 CPU ID SERIAL
Data from MDR volume record.

DETAILED ERROR REPORT

OBR EDIT REPORT

The Detailed Error Reports are presented in the OBR Edit Format for any OBR/ Unit Check log record or group of OBR/Unit Check log records. The report contains two sections. The first section contains a standard EREP header. The second section contains device dependent information as shown below.

```
                    TASK  IDENTITY = XXXXXXXXXX        DAY YEAR        HH MM SS
RECORD TYPE - UNIT CHECK                           DATE-XXX  XX    TIME-XX XX XX
CPU MODEL XXXX          SERIAL XXXXXX

DOS RELEASE LEVEL XX

FAILING CHANNEL/UNIT ADDRESS XXXX     DEVICE TYPE XXXX

            CC    CA     FL       CI              K     CA     VS  CS   CT

FAILING CCW XX  XXXXXXX  XX  XX  XXXX         CSW XX  XXXXXXX  XX  XX  XXXX

          UNIT STATUS                              CHANNEL STATUS

ATTENTION          X      CHANNEL END      X        PRGM-CTLD IRPT    X       CHAN DATA CHECK    X
STATUS MODIFIER    X      DEVICE END       X        INCORRECT LENGTH  X       CHAN CTL CHECK     X
CONTROL UNIT END   X      UNIT CHECK       X        PROGRAM CHECK     X       IF/CTL CHECK       X
BUSY               X      UNIT EXCEPTION   X        PROTECTION CHECK  X       CHAINING CHECK     X

DEVICE DEPENDENT DATA:

VOLUME SERIAL   XXXXXX
BLOCK LENGTH    XXXXX
SENSE BYTE DATA:

                                                  1  1  1  1  1  1
0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX

1  1  1  1  2  2  2  2  2  2  2  2  2  2  3  3
6  7  8  9  0  1  2  3  4  5  6  7  8  9  0  1
XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX

SYMPTOM CODE  XXXX
```

SENSE BYTE DATA
Thirty-two bytes of sense data from the 8809 tape unit are printed. See Format 1 sense bytes 0 through 31.

SYMPTOM CODE
The symptom code for this error. See Format 1 sense bytes 30 and 31.

For intermittent temporary errors set error log mode on to log temporary errors as permanent errors. (See START 20 figures 3 and 4.)

- **See SENSE 25** for format 1 sense byte descriptions.
- **See SENSE 15** for sense data summary.

8809

AR0400 Seq 2 of 2	**2699236** Part Number	**846318** 15 Mar 79	**847308** 1 Aug 81					

DETAILED STATISTICAL REPORT

MDR EDIT REPORT

The Detailed Statistical Reports are presented in the MDR Edit format for any MDR log record or group of MDR log records. The report contains two sections. The first section contains a standard EREP header and the second contains device dependent information as shown below.

```
RECORD TYPE  XXXXXXXXXXXXXXXXXXXXXX                    DAY  YEAR
 HH  MM  SS
CPU MODEL  XXXX     SERIAL   XXXXXX                  DATE-XXX   XX      TIME-XX  XX  XX
DOS RELEASE LEVEL  XX
NORMALIZED CHANNEL/UNIT ADDRESS  XXXX     DEVICE TYPE   XXXX

DEVICE DEPENDENT DATA:
VOLUME SERIAL  XXXXXX
BLOCK LENGTH   XXXXX
STATISTICAL COUNTERS:
 1    2       3       4       5       6       7
  TEMP        OPERATIONS     OVER    ERASE    READ
RDS  WRTS     RD      WRT     RUNS    GAPS    RETRIES
XXX  XXX    XXXXX   XXXXX    XXX     XXXXX    XXX

SENSE BYTE COUNTERS:
 8    9   10   11   12   13   14    15    16    17    18    19
MTE  EDC  SRC  RBF  ENV  NOP  CRE  SKEW  TRK 4  TRK 5  TRK P  VEL
XXX  XXX  XXX  XXX  XXX  XXX  XXX   XXX   XXX    XXX    XXX   XXX
```

- See SENSE 45 for format 6 sense byte descriptions.

1 TEMP RDS
Temporary Read Errors. See Format 6 sense byte 20.

2 TEMP WRTS
Temporary Write Errors. See Format 6 sense byte 21.

3 OPERATIONS RD
Read Operations. See Format 6 sense bytes 22 and 23.

4 OPERATIONS WRT
Write Operations. See Format 6 sense bytes 24 and 25.

5 OVERRUNS
See Format 6 sense byte 27.

6 ERASE GAPS
See Format 6 sense bytes 28 and 29.

7 READ RETRIES
See Format 6 sense bytes 30 and 31.

8 MTE
Multi-Track Errors. See Format 6 sense byte 8.

9 EDC
End Data Check. See Format 6 sense byte 9.

10 SRC
Start Read Check. See Format 6 sense byte 10.

11 RBF
Read Back Fail. See Format 6 sense byte 11.

12 ENV
Envelope Check. See Format 6 sense byte 12.

13 NOP
No Pointer Error. See Format 6 sense byte 13.

14 CRE
Crease Error. See Format 6 sense byte 14.

15 SKEW
Skew Error. See Format 6 sense byte 15.

16 TRK 4
Track 4 Error. See Format 6 sense byte 16.

17 TRK 5
Track 5 Error. See Format 6 sense byte 17.

18 TRK P
Track P Error. See Format 6 sense byte 18.

19 VEL
Velocity Check. See Format 6 sense byte 19.

8809

AR0500 Seq 1 of 2	2699237 Part Number	846318 15 Mar 79	847323 1 Oct 80	847308 1 Aug 81				

EREP ANALYSIS PROCEDURE

This procedure is to assist you in analyzing EREP reports to determine if the cause of reported failures is magnetic tape or the tape unit. It is assumed that all diagnostic tests run error free including Special Requirement Diagnostics (SRD) 5A and 5B.

Obtain the reports to be used by executing the EREP program. See System 370 FE EREP reference guide S229-3224 for further information.

The values for the THRESHOLD parameter can be adjusted up or down based on general tape library condition, use, and other factors. It is necessary to summarize only those errors that represent unusual error counts.

The reports generated for the 8809 are:

Permanent Error Summary which contains a one-line entry for each permanent error that has occurred.

Temporary Error Summary which contains a one-line entry for each control unit address (CUA) with the summary of the temporary errors on that device.

Volume Statistics which contains a one-line entry for each outboard record (OBR) or miscellaneous data record (MDR) that exceeds the threshold for temporary errors.

CUA Statistics which contain a one-line entry for each MDR that exceeds the threshold for temporary errors.

Check the permanent error summary first.

- Check for WC-type errors.

  This error type is an erase or write current failure and can cause loss of the customer data. Unless there is only one isolated error of this type, go to the FCD using the most frequent symptom code and take the action specified.

- Check for EC or PE type errors.

  If any errors are found, determine if there is more than one tape unit involved. If so, check for any Axxx symptom codes. These codes are control line problems that can affect more than one tape unit. Go to the FCD and take the action specified.

  If only one tape unit has this type of error, use the most frequent symptom code or the most recent one. Go to the FCD and take the action specified.

- Check for PW-type errors.

  Take note of the volume identification whenever this error occurs. If the same volume was in use every time the error occurred, check the tape volume for damage. Damage could be caused by mishandling the tape reel or by a tape unit failure that caused the stretching or creasing of tape

  Notify the customer of the problem. The solution may require cutting off the damaged tape or replacing the tape.

  If the same volume was not in use when the error occurred, use the most frequent symptom code. Go to the FCD and take the action specified.

- Check for PR-type errors.

  This type of error can be caused by:

  Damage to the tape after the record was written.

  Failure of the tape unit which is reading the tape.

  Failure of the tape unit when the record was written.

  Take the following actions:

  Determine the physical location of the permanent error on tape. The tape may need to be replaced.

  Clean the tape unit and retry the failing job.

  Determine if other tape units can read the tape.

  Answer the following questions.

  1. Is only one tape unit failing on read operations? If so, consider changing the Head Card Assembly. Go to MAP 2300 before changing the Head Card Assembly.
  2. Is only one tape unit writing records which later cause permanent read errors? If so, consider changing the Head Card Assembly on the tape unit that wrote the record.
  3. Is only one tape volume causing permanent read errors? Bring the volume to the attention of the customer for cutting off the first 10 meters of tape, or posssible replacement.

- Check the Subsystem Temporary Error Summary report.

  Note whether one tape unit has a significantly higher error rate than others, or if the error rate is significantly higher than it was when the report was last run.

  If one tape unit has a high error rate, check the volume statistics report to make sure that the high error rate is not due to a particular tape volume on that tape unit.

  If one volume is causing the high error rate, notify the customer. The tape may need to have the first 10 meters cut off to get rid of the damage. There may be edge damage and it may need to be replaced.

  If no volumes are causing the high error rate, clean the tape unit thoroughly. Adjust skew using the procedure in the CARR section of this MIM. Run the DLS and read/write reliability tests.

  If an error occurs, use the isolation code to enter the FCD and take the action specified.

  If no error occurs, return the tape unit to the customer. However, if the high error rate continues, consider changing the Head Card Assembly.

- If the EREP analysis shows no unusual error rates but the customer is still having problems, go to Special Isolation MAP 0200, entry point A.

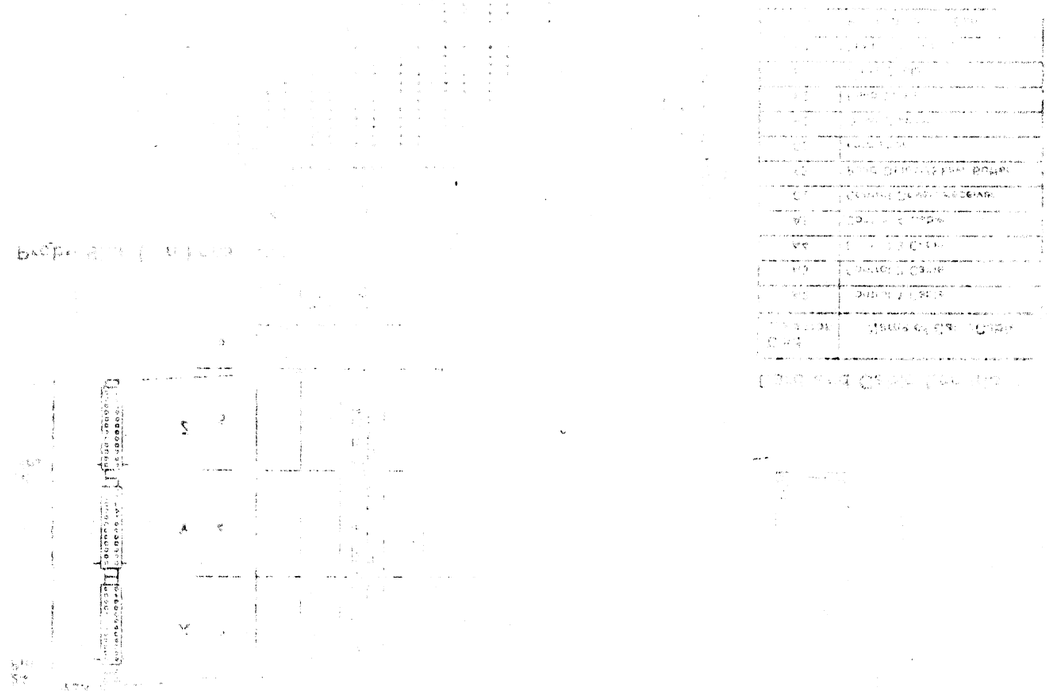
CONTENTS

Status Information and Sense Data . . . . . SENSE 10
Introduction . . . . . SENSE 10
Unit Status Byte . . . . . SENSE 10
Channel Status Byte . . . . . SENSE 10
Sense Data . . . . . SENSE 10

Sense Data Summary . . . . . SENSE 15

Sense Byte Descriptions . . . . . SENSE 20, 30, 40

Error, Usage, Overrun, and Retry Counters . . . . . SENSE 50
Updating the Counters . . . . . SENSE 50



8809

AT0100 Seq 1 of 2	2699239 Part Number	846318 15 Mar 79	846481 15 Dec 79	847323 1 Oct 80	847314 1 Apr 82			

NOTES:

STATUS INFORMATION AND SENSE DATA

INTRODUCTION

Error conditions sensed by the 8809 activate either the Selected Alert or Check End line. Activating Selected Alert or Check End causes a host-system interruption. The host system can then collect and analyze status and sense information to determine what type of recovery action to attempt.

The unit status and channel status bytes indicate 8809 or channel errors; in most cases, the thirty-two sense bytes are analyzed to determine the exact cause of failure.

Conditions sensed by the host system, without Selected Alert or Check End, indicate a probable problem in the procedures or operations, rather than in the equipment.

The unit status and channel status bytes each contain eight bits of status information about the selected tape unit. Status information is updated at the beginning of each tape operation, except a test I/O, to indicate initial status. It is also updated during a tape operation to supply status information when the I/O operation ends. These two bytes of status information are kept by the channel until they are entered into the channel status word (CSW) by an I/O interruption or, under some circumstances, by a Start I/O, Test I/O, or Halt I/O instruction. Bits 32 through 39 of the CSW, which indicate tape unit status, and bits 40 through 47 of the CSW, which indicate channel status, are described in this section.

The following statements describe channel-end and device-end status indications for the 8809 I/O operations.

- Usually, only one channel-end status indication and device-end status indication is generated for each I/O operation; however, when an attempt is made to select a device while it is rewinding, a second device-end status indication is generated when the tape completes rewinding to the load point.
- Channel-end and device-end status indications are not generated when programming errors or equipment malfunctions are found during the start of an operation before the tape unit returns its status.
- When command chaining takes place, only the channel-end status and device-end status indications of the last operation are available to the host I/O program.
- The channel may or may not present the channel-end status indication to the operating system even though the channel-end status indication was present when a tape unit caused a premature end of a chain of commands, or when a tape-unit error occurred during the start of a chained command operation.
- If an unusual condition is found during the start of a chained-command operation, the chain is ended without the device-end status indication.

Unit Status Byte

As a result of an instruction such as Test I/O or Start I/O, or when a command operation is completed, the unit status byte is available in bits 32 through 39 of the channel status word (CSW), shown in Figure 1 as bits 0 through 7.

The following descriptions refer to the bit numbering used in Figure 1.

Bit 0, attention, is not used in normal operation. However, this bit and bit 6, unit check, are set to 1 when an error is sensed while the tape unit is idle.

Bit 1, status modifier, is not used.

Bit 2, control unit end, is not used.

Bit 3, busy, is set to 1 when the selected tape unit is executing an operation that started earlier or when a secondary status (device-end status indication) is pending because a Start I/O instruction was sent. A pending device-end status indication causes only the selected tape unit to be busy; the other tape units in the subsystem remain available.

Bit 4, channel end, is set to 1 when a command is started or when an operation has been completed. This bit and bit 5, device end, are set at the same time.

Bit 5, device end, is set to 1 alone only when the state of the tape unit is changed from not ready to ready (the operator pressed the Load Rewind pushbutton at the Operator Panel on the tape unit). This bit is set together with bit 4 when a command is started or when an operation has been completed.

Bit 6, unit check, is set to 1 when an error or unusual situation occurs during an operation or at the start of an operation. The sense information related to this bit is saved until the next Start I/O instruction is sent with a command other than No Op. Usually, a Sense command is sent to determine why this bit has been set.

Bit 6 is set when any of the following occur:

- Bit 0, attention, is set.
- Any bit in sense byte 0 is set.
- Bit 0 in sense byte 1, noise, is set.
- A backspace-block or backspace-file operation is started into or at the beginning-of-tape mark.
- Bit 6 in sense byte 1, file protected, is set during a write operation.
- Bit 7 in sense byte 1, not capable, is set.

The description for sense byte 3 shows the error recovery procedure (ERP) characters that are valid for each unit-check status condition.

Bit 7, unit exception, is set to 1 when a specific command cannot be completed for a logical reason; for example, when a Write command causes the tape to run until the end-of-tape mark is reached, or when a Forward Space Block or Backspace Block command encounters a tape mark.

Channel Status Byte

The channel status byte is available in bits 40 through 47 of the CSW, shown on SENSE 15 in Figure 1 as bits 0 through 7.

The following descriptions refer to the bit numbering used in Figure 1, SENSE 15.

Bit 0, program controlled interruption, is set to 1 when an interruption is requested because the channel command word (CCW) to which the status applies has the program-controlled interruption (PCI) flag set. The I/O operation continues processing.

Bit 1, incorrect length, is set for a read operation when the tape has reached the next interblock gap before the count in the CCW has been reduced to zero, or if there is more data available after the CCW count has reached zero. It is set to 1 for a write operation when the tape runs off the reel. This bit also can be set when data-transfer operations are stopped by a Halt I/O or Halt Device instruction. Bit 1 can be suppressed by the host program by a suppress-incorrect-length-indicator (SILI) flag in the CCW. Bit 1 is not used for Backspace Block, Backspace File, Data Security Erase, Erase Gap, Forward Space Block, Forward Space File, Rewind, Rewind Unload, and Write Tape Mark.

Bit 2, program check, is set to 1 when any of the following errors is sensed:

- Invalid CCW address specification
- Invalid CCW address
- Invalid command code (sensed by the channel)
- Invalid count
- Invalid data address
- Invalid key
- Invalid channel-address-word format
- Invalid sequence

Note: *The channel checks only the four low-order bits of the command code for the standard patterns for the Read, Write, Control, and Sense commands. Although the pattern may be valid for the channel, it may not be valid for the tape unit.*

Bit 3, protection check, is set to 1 when the key in the channel address word does not match the key in storage for the location referenced by the command, or when an attempt is made to access a channel command word or data from a tape unit that is disconnected.

Bit 4, channel data check, is not used.

Bit 5, channel control check, is set to 1 when a machine malfunction is found that affects the channel controls. For example, a hardware check is found in the control line and is signaled to the processor.

Bit 6, interface control check, is not used.

Bit 7, chaining check, is not used.

Sense Data

Sense data gives detailed information about the selected tape unit and about the last I/O operation performed. Information transferred by the Sense command is more detailed than that supplied by the status bytes, and can be used to determine why bit 6 in the unit status byte is set to 1.

The sense data is made up of the 8809 status byte (sense byte 8), 8809 check bytes (sense bytes 9 through 23), and bytes that contain conditions sensed by the host system.

Figure 1, SENSE 15 summarizes the sense and status information.

SENSE DATA SUMMARY

Unit Status and Channel Status Bytes								
Byte	**Bit 0**	**Bit 1**	**Bit 2**	**Bit 3**	**Bit 4**	**Bit 5**	**Bit 6**	**Bit 7**
Unit Status	Attention	Status Modifier (Not Used)	Control Unit End (Not Used)	Busy	Channel End	Device End	Unit Check	Unit Exception
Channel Status	Program Controlled Interruption	Incorrect Length	Program Check	Protection Check	Channel Data Check	Channel Control Check	Interface Control Check (Not Used)	Chaining Check (Not Used)
Format 1: Sense Bytes								
0	Command Reject	Intervention Required	Reserved: contains a zero	Equipment Check	Data Check	Overrun	Reserved: contains a zero	Reserved: contains a zero
1	Noise	Tape Unit Status A	Tape Unit Status B	Reserved: contains a zero	Load Point	Write Status	File Protected	Not Capable
2	Track-in-error pointers.							
3	Two ERP hexadecimal characters that define error-recovery procedures done by the host operating program.							
4	Reserved: contains a zero	Reserved: contains a zero	Tape Indicate	Permanent Error	Host Detected Error	Loop Write-to-Read Error	Reserved: contains a zero	Reserved: contains a zero
5	Reserved: contains a zero	Reserved: contains a zero	Reserved: contains a zero	PEID Burst Check	Reserved: contains a zero	Reserved: contains a zero	Reserved: contains a zero	Reserved: contains a zero
6	This byte contains all zeros.							
7	Format Code '10' = Format 1				Data Security Erase	Reserved: contains a zero	Reserved: contains a zero	Reserved: contains a zero
8	Ready	Busy	Write Enable	Beginning of Tape	End of Tape	Operation Complete	Low Speed	Positioning
9	Check End Sense	Bus Out Parity Check	Tag Bus Parity Check	Formatter Failure	Control Lines Sequence Check	Command Register Parity Check	Drive Control Parity Check	Formatter Read Failure
10	Data Overrun	Data Check	Reserved: contains a zero	Beginning of Tape	End of Tape	Tape Mark Detected	Not Capable	Reserved: contains a zero
11	Write Bus Parity Check	Bus Out Register Parity Check	Gap Control Check	Sync Out Check	Drive Response Check	Not Capable Space File	Track In Error P	Write Enable Error
12	Write Bus Parity Check	Read Bus Parity Check	Gap Control Check	Sync Out Check	Reserved: contains a zero	Reserved: contains a zero	Track In Error P	Write Enable Error
13	Track in Error 0	Track in Error 1	Track in Error 2	Track in Error 3	Track in Error 4	Track in Error 5	Track in Error 6	Track in Error 7

Format 1: Sense Bytes								
Byte	**Bit 0**	**Bit 1**	**Bit 2**	**Bit 3**	**Bit 4**	**Bit 5**	**Bit 6**	**Bit 7**
14 Bit 0=0	Nonwrite-type Command	No Track Pointer	Multitrack Error	End Data Check	Start Read Check	Crease	Reserved: contains a zero	Skew Error
Bit 0=1	Write Command	PEID Check				Read Back Failure	Envelope Check	Write Tape Mark Error
15	This byte contains all zeros.							
16	Transport State					Sequence Error	Sense Bus Parity Check	Reserved: contains a zero
17	Start Velocity Check	End Velocity Check	PEID Velocity Check	Clock Parity Error	Servo State		Sense Bus Parity Check	Reserved: contains a zero
18	Load Check	Tension Check	Cover/ Reel Latch Interrupt	Tension Status	Not Ready Due to Reset	Long Gap Mode	Sense Bus Parity Check	Reserved: contains a zero
19	Present Transport State					Cover/ Reel Latch Status	Sense Bus Parity Check	Reserved: contains a zero
20	Servo Logic Failure	Servo Analog Failure	Write Current Failure	Erase Current Failure	Present Servo State		Sense Bus Parity Check	Reserved: contains a zero
21	Tape Tachometer Failure	Machine Tachometer Failure	File Tachometer Failure	Tape Tachometer Rotation Check	Reserved: contains a zero	Reserved: contains a zero	Sense Bus Parity Check	Reserved: contains a zero
22	BOT/EOT LED Failure	Tape Present LED Failure	Reel Size LED Failure	Drive Control Failure	Reserved: contains a zero	Reserved: contains a zero	Sense Bus Parity Check	Reserved: contains a zero
23	File Amplifier Saturation	Machine Amplifier Saturation	Write Status	Power Amplifier Cable Unseated	Reserved: contains a zero	Reserved: contains a zero	Sense Bus Parity Check	Reserved: contains a zero
24	This byte contains all zeros.							
25	This byte contains all zeros.							
26	Device Address							
	Address 4	Address 2	Address 1	0	0	Not Address 4	Not Address 2	Not Address 1
27	This byte contains all zeros.							
28	This byte contains the contents of the control line-tag bus at the time of error.							
29	This byte contains the contents of the control line-bus out at the time of error.							
30	This byte contains the high-order fault-symptom code.							
31	This byte contains the low-order fault-symptom code.							
Format 6: Sense Bytes								
Sense bytes 0, 1, 2, 4, 5, and 6 are set to zeros; sense byte 3 contains the fixed ERP hexadecimal characters 01; and sense byte 7 contains the format code X'60'. Sense bytes 8 through 31 contain the counters.								

Figure 1. Status and Sense Byte Summary for the IBM 8809 Attached to an IBM 4331 Processor

8809

AT0200 Seq 2 of 2	2699240 Part Number	846318 15 Mar 79	846481 15 Dec 79	847308 1 Aug 81	847314 1 Apr 82			

SENSE BYTE DESCRIPTION

INTRODUCTION

The following text describes the sense bytes, as summarized on Figure 1. The sense bits that activate the 8809 Selected Alert line are indicated in text. You should examine bit 6 in sense bytes 16 to 23 (sense bus parity check) to ensure that the sense data is valid.

Sense Byte 0

Any of the bits in sense byte 0, when set to 1, will also set bit 6 in the unit status byte.

Bit 0, command reject, is set to 1 when:

- The tape unit receives an unassigned command.
- A Data Security Erase, Erase Gap, Loop Write-to-Read, Write, or Write Tape Mark command is sent to a file-protected tape.
- A command is received in the wrong sequence; that is, a Data Security Erase command is not command-chained from a preceding Erase Gap command, or a Read command or Forward Space command follows a Write command without an intervening backspace command.

Bit 1, intervention required, is set to 1 when the selected tape unit is not ready, when it is inline testing, or when it is nonexistent.

Bit 2 is reserved and contains a zero.

Bit 3, equipment check, is set to 1 when:

- Internal hardware malfunctions are found, such as failure of the light-emitting diodes that sense the beginning or end of tape.
- Velocity errors occur, for example, a tape mark cannot be written error-free, tape tension is incorrect, or other tape unit problems are encountered.

Bit 4, data check, is set to 1 when:

- Uncorrectable parity errors are sensed.
- Two or more tracks have low amplitude or a phase error.
- Excessive skew is sensed.
- One track is in error during a write operation.
- Two tracks are in error during a read operation.

Bit 5, overrun, is set to 1 when storage does not send or accept data during a data-transfer operation. An attempt to chain data within a record causes overrun, and data transfer ends. This bit is set when bit 0 in sense byte 10 is active.

Bits 6 and 7 are reserved and contain zeros.

Sense Byte 1

Bit 0, noise, is set to 1 when bit 4 in sense byte 0, data check, is set to 1 during a read operation. This bit also sets bit 6 in the unit status byte.

Bit 1, tape unit status A, is set to 1 when the tape unit is selected and ready.

Bit 2, tape unit status B, is set to 1 when the tape unit is not ready or is busy executing the commands or functions described for bit 1 in sense byte 8. Together, bits 1 and 2 supply the following indications:

Bits 1 2	State
0 0	Nonexistent tape units
0 1	Not ready
1 0	Ready and not busy
1 1	Ready and busy

Bit 3 is reserved and contains a zero.

Bit 4, load point, is set to 1 when the selected tape unit is loaded, ready, and the tape is at the beginning-of-tape (BOT) mark. This bit also sets bit 6 in the unit status byte.

Bit 5, write status, is set to 1 when the selected tape unit has completed a Write command. When this bit equals 0, the tape unit is in read status.

Bit 6, file protected, is set to 1 when the tape reel on the selected tape unit does not have a write-enable ring installed and the tape unit is ready. This bit also sets bit 6 in the unit status byte if a write operation is attempted when the ring is not installed.

Bit 7, not capable, is set to 1 when the tape unit cannot read the tape because the 1600-bpi identification burst is not recorded correctly on the tape. This might be caused by a new or erased tape, or when the tape is not written in phase-encoded mode. This bit also sets bit 6 in the unit status byte.

Sense Byte 2

Each bit in sense byte 2 represents one track. A bit set to 1 in this byte indicates a failing track. Any one of the bits set to 1 in this byte sets bit 6 in the unit status byte and bit 4 in sense byte 0.

Sense Byte 3

Sense byte 3 contains two error recovery procedure (ERP) hexadecimal characters that define the recovery actions to be done by the 4300 I/O program.

ERP Hex Characters	Recovery Action
01	Post statistical record and send the operation command again.
02	Enter the error record and send the operation command again.
03	Give equipment-check message, enter the error record into processor storage, and end the recovery action.
04	Give equipment-check and warning messages, enter the error record into processor storage, and end the recovery action.
05	Give intervention-required message, enter the error record into processor storage, and end the recovery action.
06	Give intervention-required message and end the recovery action.
07	Give write-data-check message, enter the error record into processor storage, and end the recovery action.
08	Give write-data-check and hardware failure messages, and end the recovery action.
09	Give read-data-check message, enter the error record into processor storage, and end the recovery action.
0A	Give not-capable message, enter the error record into processor storage, and end the recovery action.
0B	Give file-protected message and end the recovery action.
0C	Give command-rejected message and end the recovery action.
0D	Give backspaced-into-load-point message and end the recovery action.
0E	Give data-security-erase-failure message, enter the error record into processor storage, and end the recovery action.
0F	Give PEID-check message, enter the error record into processor storage, and end the recovery action.
10	Give overrun message and end the recovery action.

Sense Byte 4

Bits 0 and 1 are reserved and contain zeros.

Bit 2, tape indicate, is set to 1 whenever the end-of-tape (EOT) mark is sensed during a forward tape operation. If this bit is set during a write, write-tape-mark, or erase-gap operation, it also sets bit 7 in the unit status byte.

Bit 3, permanent error, is set to 1 when an error is sensed and all automatic recovery attempts have failed. This bit also sets bit 6 in the unit status byte.

Bit 4, host detected error, is set to 1 when a condition of the processor has not been met. This bit also sets bit 6 in the unit status byte.

Bit 5, loop write-to-read error, is set to 1 when an error is sensed during a loop write-to-read operation. This bit also sets bit 6 in the unit status byte.

Bits 6 and 7 are reserved and contain zeros.

Sense Byte 5

Bit 3 is the only significant bit in sense byte 5. Bit 3, PEID burst check, is set to 1 when the PE identification burst written during a Write, Write Tape Mark, or Erase Gap command is not correct. This bit also sets bit 6 in the unit status byte.

Sense Byte 6

Sense byte 6 contains all zeros.

Sense Byte 7

Bits 0-3, format code, define the contents of sense bytes 8 through 31. Two formats are defined: format 1 (X'10') when the sense bytes contain sense data; format 6 (X'60') when the sense bytes contain statistical data.

Bit 4, data security erase, is set to 1 when the data-security-erase operation senses signals in the erased area or does not complete for some other reason. This bit also sets bit 6 in the unit status byte.

Bits 5, 6, and 7 are reserved and contain zeros.

Sense Byte 8 (Format 1)

Bit 0, ready, is set to 1 when the tape unit is loaded and the tape is positioned at the BOT mark, or when the diagnostic set-ready operation is started. This bit is set to 0 when tape tension is lost or when the top cover of the tape unit is opened.

It is also set to 0 when the Operator panel's Reset pushbutton is pressed. The 8809 must be ready before it can perform any operation other than check reset, read 8809 status, or any of the read-sense-byte or speed set operations.

Bit 1, busy, is set to 1 when the following operations are performed:

Backspace File
Data Security Erase
Forward Space File
Rewind
Rewind Unload
Set High Speed
Set Low Speed

Bit 1 is also set to 1 when the tape unit is executing the Operator Panel functions of load rewind or unload rewind.

Bit 2, write enable, is set to 1 when the tape reel is not file-protected (a write-enable ring has been installed), permitting write operations to take place.

Bit 3, beginning of tape, is set to 1 when the tape is stopped and positioned behind the BOT mark, and the 8809 is ready to read the PE identification burst. It is reset to 0 when the tape moves.

Bit 4, end of tape, is set to 1 when the end-of-tape mark is sensed and the tape is moving in the forward direction. It is reset to 0 when the end-of-tape mark is sensed and the tape is moving in the backward direction.

All 8809 operations can be sent to the selected tape unit when the end-of-tape bit is on; however, the system may recognize the EOT bit as an exceptional condition. A data-security-erase operation sent to the tape unit when the end-of-tape bit is on will erase the tape approximately one meter (40 inches) from where the tape is and set bit 5, operation complete.

Bit 5, operation complete, is set to 1 at the completion of the commands and functions that cause bit 1 in sense byte 8, busy, to be set to 1.

Bit 6, low speed, is set to 1 when the tape unit is set to operate at a speed of 0.318 meter per second (12.5 inches per second). When the bit is set to 0, the tape unit is set to operate at 2.54 meters per second (100 inches per second).

Bit 7, positioning, is set during the time the tape unit is in a positioning operation.

Sense Byte 9 (Format 1)

Bit 0, check end sense, does not activate the Selected Alert line. When it is set to 1, the data in sense byte 10 is valid and describes the cause of the check end bit.

Bit 1, Bus Out parity check, is set to 1 when even parity is sensed on command or data transfer from the 4331 processor. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, Tag Bus parity check, is set to 1 when even parity is sensed on a command transfer from the 4331 processor. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 3, formatter failure, is set to 1 when there is an internal failure of the Formatter Card. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 4, control lines sequence check, and is set to 1 when an incorrect sequence occurs on control lines from the 4331 processor. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 5, command register parity check, is set to 1 when odd parity is found on the Command Register bus from the Formatter Card to the Drive Control Card. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 6, drive control parity check, is set to 1 when odd parity is found on the Control bus from the Drive Control Card. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 7, formatter read failure, is set to 1 when:

- An internal failure of the Formatter Card occurred, or
- Data was not read back when expected during a write-block, loop write-to-read, or write-tape-mark operation.

This bit, when set to 1, also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Sense Byte 10 (Format 1)

Sense byte 10 is the check end byte and is only valid when bit 0 in sense byte 9, check and sense, is set to 1.

Bit 0, data overrun, is set to 1 when a data transfer to or from the 4331 processor has not occurred within the time specified for the 8809.

Bit 1, data check, is set to 1 when one or more of the conditions exist as described in sense byte 14.

Bit 2 is reserved and contains a zero.

Bit 3, beginning of tape, is set to 1 when the beginning-of-tape mark is sensed. Bit 3 in sense byte 8 is also set to 1.

Bit 4, end of tape, is set to 1 when the end-of-tape mark is sensed following a write-block, write-tape-mark, or erase-gap operation. Bit 4 in sense byte 8 is also set to 1.

Bit 5, tape mark detected, is set to 1 when a tape mark is sensed during a Forward Space Block or Backspace Block command or a read operation.

Bit 6, not capable, is set to 1 when:

- A PEID identification burst is not sensed while reading or spacing the tape forward from the beginning-of-tape mark.
- A PEID identification burst is not correctly recorded while writing from the beginning-of-tape mark.

Bit 7 is reserved and contains a zero.

None of the bits in byte 10 activate the Selected Alert line.

Sense Byte 11 (Format 1)

Bit 0, write bus parity check, is set to 1 when even parity is sensed across the 10-bit bus to the write card on the head card assembly. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 1, Bus Out register parity check, is set to 1 when even parity is sensed on the internal Formatter bus from the Bus Out register. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, gap control check, is set to 1 when the Gap Control line is deactivated before a complete record is written. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 3, sync out check (for a write-type operation only), is set to 1 when:

- More than one sync-out pulse is received from the magnetic tape attachment feature in response to a single sync-in pulse, or
- The sync-out pulse did not reset in the specified time.

It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 4, drive response check, is set to 1 when motion logic responds too early or late to the formatter operation. It also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 5, not capable space file, is set to 1 when the PEID identification burst is not sensed while executing a space-file command from the BOT mark. This bit also sets bit 6 in sense byte 10, not capable, and bit 0 in sense byte 9, check end sense.

SENSE BYTE DESCRIPTION (Cont'd)

Bit 6, track in error P, is set to 1 when the error-correction pointer for track P is on at the end of the last operation during which a data check occurred.

Bit 7, write enable error, is set to 1 when a write operation is attempted and the tape is mounted without a write-enable ring.

Sense Byte 12 (Format 1)

The conditions that set bits 0, 1, 2, 3, 6, and 7 are identical to those that set bits 0, 1 ,2, 3, 6, and 7 in sense byte 11. Bits 4 and 5 are reserved and contain zeros.

Sense Byte 13 (Format 1)

Bit 0 through 7, track in error pointers. These bits do not activate the Selected Alert line; they indicate the tracks for which pointers were on at the end of the last operation during which a data check occurred. The bits are reset on the next Read Block and Write Block command or space-file operation.

Sense Byte 14 (Format 1)

The description of sense byte 14 depends on the operation in progress at the time the sense bytes are set to 1. Bit 0 indicates whether the operation is of a nonwrite-type command or caused by a write command.

Nonwrite-type Commands

When bit 0 is set to 0, none of the other bits activate the Selected Alert line. Bits 1, 2, 3, 4, 5, and 7 set bit 1 in the control lines Bus In (control line data check) and bit 1 in sense byte 10 (data check) when the Check End line is activated. They also set bit 0 in sense byte 9, check end sense.

Bit 0, nonwrite-type command, is set to 0 for all commands other than Erase Gap, Write Block, or Write Tape Mark.

Bit 1, no track pointer, is set to 1 when a parity error is sensed with no accompanying track pointer. This bit also sets bit 4 in sense byte 0, data check.

Bit 2, multitrack error, is set to 1 when a multiple track error (more than one pointer) is sensed and the data is not correctable. This bit also sets bit 4 in sense byte 0, data check.

Bit 3, end data check, is set to 1 when an interblock gap (IBG) is sensed earlier or later than expected. This bit also sets bit 4 in sense byte 0, data check.

Bit 4, start read check, is set to 1 when a partially recorded data block is sensed. This bit also sets bit 4 in sense byte 0, data check.

Bit 5, crease, is set to 1 when a temporary loss of data is sensed in all tracks of a data block. This bit also sets bit 4 in sense byte 0, data check.

Bit 6 is reserved and contains a zero.

Bit 7, skew error, is set to 1 when the skew buffer exceeds its capacity. This bit also sets bit 4 in sense byte 0, data check.

Write Command

When bit 0 is set to 1, only bit 5 activates the Selected Alert line. Bits 2, 3, 4, 6, and 7 set bit 1 in the control lines Bus In (control line data check) and bit 1 in sense byte 10 (data check) when the Check End line is activated. They also set bit 0 in sense byte 9, check end sense.

Bit 0, write command, is set to 1 for an Erase Gap, Write Block, or Write Tape Mark command.

Bit 1, PEID Check, is set to 1 when a PEID identification burst is not correctly recorded from the beginning-of-tape mark during a write operation. This bit also sets bit 4 in sense byte 0, data check. When bit 0 in sense byte 9, check end sense, is set to 1, this bit also sets bit 6 in sense byte 10, not capable.

Bit 2, multitrack error, is set to 1 when a multiple track error (more than one pointer) is sensed in a readback check. This bit also sets bit 4 in sense byte 0, data check.

Bit 3, end data check, is set to 1 when an interblock gap (IBG) is sensed earlier or later than expected in a readback check. This bit also sets bit 4 in sense byte 0, data check.

Bit 4, start read check, is set to 1 when a partially recorded data block is sensed in a readback check. This bit also sets bit 4 in sense byte 0, data check.

Bit 5, read back failure, is set to 1 when either of the following conditions exists:

- Data was not read back when expected during a write-block or write-tape-mark operation. The Selected Alert line is activated, and bit 7 in sense byte 1, formatter read failure, and bit 3 in sense byte 0, equipment check, are set to 1, but bit 0 in sense byte 1, check end sense, and bit 1 in sense byte 2 are not set to 1.
- A crease was sensed during the readback of a write-block or write-tape-mark operation. Bit 0 in sense byte 1, check end sense, and bit 1 in sense byte 2, data check, are also set to 1, but the Selected Alert line is not activated and bit 7 in sense byte 1, formatter read failure, is not set to 1.

Bit 6, envelope check, is set to 1 when a skew buffer parity error or any phase error is sensed during a readback check. This bit also sets bit 4 in sense byte 0, data check.

Bit 7, write tape mark error, is set to 1 if less than 40 bytes of a tape mark were written correctly during a Write Tape Mark command. This bit also sets bit 4 in sense byte 0, data check.

Sense Byte 15 (Format 1)

Sense byte 15 contains all zeros.

8809

AT0400 Seq 1 of 2	2699211 Part Number	846481 15 Dec 79	847323 1 Oct 80					

Sense Byte 16

Sense byte 16 contains the state of the 8809 at the time an 8809 sequence error occurs that shuts down the servo. Bits 0 through 4 indicate the transport state sequences, and bit 5 indicates a sequence error. The transport state at the time of the error is held in bits 0 through 4 for testing to determine the cause of the sequence error. This byte usually contains zeros when a sense operation is performed, unless a sequence error is present. Bits 0 through 4 are indicators and do not activate the Selected Alert line. The table below shows the different sequences:

Bits 0 1 2 3 4	Transport State
0 0 0 0 0	Idle
0 0 0 0 1	Take Up Slack
0 0 0 1 0	Enable Servo
0 0 0 1 1	Sample Radius
0 0 1 0 0	High Speed Load Point
0 0 1 0 1	Rewind Stop
0 0 1 1 0	Rewind Forward Space
0 0 1 1 1	Rewind
0 1 0 0 0	Space to Low Speed Load
0 1 0 0 1	Unload Leader
0 1 1 0 0	Low Speed Load Point
0 1 1 0 1	Move to BOT
0 1 1 1 0	Write ID Burst
0 1 1 1 1	Space Over BOT
1 0 0 0 0	Data Transfer
1 0 0 0 1	Go Hold Over
1 0 0 1 0	Reversal
1 0 0 1 1	Overrun Same Direction
1 0 1 0 0	High Speed Wait
1 0 1 0 1	Overrun, Alternate Direction
1 0 1 1 0	Degauss Area
1 0 1 1 1	Move From Hold
1 1 0 0 0	Data Security Erase
1 1 0 0 1	Set Erase Gate, Alternate Direction
1 1 0 1 0	Prepare Gap Control, Alternate Direction
1 1 0 1 1	Low Speed Degauss
1 1 1 0 0	Low Speed Wait
1 1 1 0 1	Set Erase Gate, Previous Direction
1 1 1 1 0	Prepare Gap Control, Previous Direction
1 1 1 1 1	Write Backward Hitch

Bit 5, sequence error, is set to 1 when there is a loss of tension while the servo is active (tension check), or during loading (load check). This bit also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 6, sense bus parity check, is set to 1 when even parity is sensed on the internal sense bus from the Drive Control Card to the Formatter Card. The first sense bus parity check can occur in any of sense bytes 16 through 23; then, bit 6 will be set in the bytes that follow through byte 23. Therefore, validity of the sense bus data for bytes 16 through 23 can be tested by examining bit 6 in sense byte 23. This parity check activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 7 is reserved and contains a zero.

Sense Byte 17 (Format 1)

Bit 0, start velocity check, is set to 1 when a velocity problem occurs before a write data transfer. This bit indicates that the 8809 did not move the tape. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 1, end velocity check, is set to 1 when a velocity problem occurs during a write data transfer. The tape must be positioned before the data is written again. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, PEID velocity check, is set to 1 when a velocity problem occurs during an attempt to write a 1600-bpi phase-encoded identification burst (PEID). This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 3, clock parity error, is set to 1 when an internal parity error is sensed in the clock generation module, and activates the Selected Alert line.

Bits 4 and 5, servo state, indicate the state of the servo at the time of an 8809 sequence error. These bits are indicators and do not activate the Selected Alert line.

The 8809 servo states are:

Bits 4 5	Servo State	Description
0 0	Idle	Tape position is not being controlled by the servo, and tape reels can be freely turned by hand.
0 1	Stoplock	The 8809 is in a stopped state and tape position is being controlled by the servo; if reels are turned by hand, the tape will be positioned back to the original stoplock position.
1 1	Plug/Start	Tape is being accelerated or decelerated by the servo in response to an 8809 operation or Operator panel function.
1 0	Run	Tape has been accelerated to operating speed and the 8809 is performing an operation.

Bit 6, sense bus parity check: see description for bit 6 of sense byte 16.

Bit 7 is reserved and contains a zero.

Sense Byte 18 (Format 1)

Bit 0, load check, is set to 1 when a load-rewind operation that started from the Operator panel did not complete. This also activates Selected Alert line, which sets bit 3 in sense byte 0, equipment check. This bit is set to 0 by either a check-reset operation or by pressing the Operator panel's Reset pushbutton.

Bit 1, tension check, is set to 1 when a tension failure causes a sequence error. This also activates Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, cover/reel latch interrupt, is set to 1 when the cover is opened after the tape is loaded and the tape tension is established. This bit resets the ready bit, makes the tape unit not ready, activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 3, tension status, is set to 1 when the tape is correctly loaded in the tape path (the tape-present sensor is sensing tape in the transducer channel).

Bit 4, not ready due to reset, is set to 1 when a command is sent to the 8809 and it is not ready. It is also set when the Operator panel's Reset pushbutton is pressed and the tape is not at the beginning-of-tape mark. This also activates the Selected Alert line, which sets bit 1 in sense byte 0, intervention required.

Bit 5, long gap mode, is set to 1 when the 8809 is in long gap mode.

Bit 6, sense bus parity check: see description for bit 6 of sense byte 16.

Bit 7 is reserved and contains a zero.

SENSE BYTE DESCRIPTION (Cont'd)

Sense Byte 19 (Format 1)

Bits 0 through 4, present transport state, contain the state of the 8809 when a sense operation is performed. See the description for sense byte 16 for a definition of the transport states. Note that bits 0 through 4 of this byte are not necessarily associated with a sequence error. These bits are indicators and do not activate the Selected Alert line.

Bit 5, cover/reel latch interlock status, indicates that either the transport or the cover interlock switch is open. This bit does not activate the Selected Alert line.

Bit 6, sense bus parity check: see description for bit 6 of sense byte 16.

Bit 7 is reserved and contains a zero.

Sense Byte 20 (Format 1)

Bit 0, servo logic failure, is set to 1 when a failure is sensed on the Drive Control Card associated with the servo. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 1, servo analog failure, is set to 1 when a failure is sensed on the Power Amplifier Board. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, write current failure, is set to 1 when either of the following conditions exists:

- No write current was found after the Write Status line was activated, or
- Incorrect current was found in the write head that could destroy data.

This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 3, erase current failure, is set to 1 when either of the following conditions exists:

- No erase current was found after the Erase Status line was activated, or
- Incorrect erase current was found that could destroy data.

This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bits 4 and 5, present servo state, indicate the state of the servo at the time the Read Sense Byte 20 operation is executed. These bits are indicators and do not activate the Selected Alert line.

Bits 4 5	Servo State	Description
0 0	Idle	Tape position is not being controlled by the servo, and tape reels can be freely turned by hand.
0 1	Stoplock	The 8809 is in a stopped condition and tape position is being controlled by the servo; if reels are turned by hand, the tape will be positioned back to the original stoplock position.
1 1	Plug/Start	Tape is being accelerated or decelerated by the servo in response to an 8809 operation or Operator panel function.
1 0	Run	Tape has been accelerated to operating speed and the 8809 is performing an operation.

Bit 6, sense bus parity check: see description for bit 6 of sense byte 16.

Bit 7 is reserved and contains a zero.

Sense Byte 21 (Format 1)

Bit 0, tape tachometer failure, is set to 1 when there is a failure in the idler tachometer while bits 4 and 5 in sense byte 17 equal 10 (run state). This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 1, machine tachometer failure, is set to 1 when there is a failure in the machine reel-motor tachometer. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, file tachometer failure, is set to 1 when there is a failure in the file reel-motor tachometer. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 3, tape tachometer rotation check, is set to 1 when the idler tachometer frequency is below a permissible level during a normal start/stop operation (bits 4 and 5 in sense byte 17 equal 11, plug/start state). This condition can indicate a tension failure, a tape-stick problem at the read/write head, or an idler tachometer failure. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bits 4 and 5 are reserved and contain zeros.

Bit 6, sense bus parity check: see description for bit 6 of sense byte 16.

Bit 7 is reserved and contains a zero.

Sense Byte 22 (Format 1)

Bit 0, BOT/EOT LED Failure, is set to 1 when no current is found in the BOT or EOT sensor LEDs. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 1, tape present LED failure, is set to 1 when no current is found in the tape sensor LED. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, reel size failure, is set to 1 when one of the following conditions exists:

- No current is found in one of the reel-size sensor LEDs.
- The measured radius of the tape exceeds the reel size.
- An invalid reel size has been found.

This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 3, drive control failure, is set to 1 when there is a failure in the drive control PLA. This also activates Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bits 4 and 5 are reserved and contain zeros.

Bit 6, sense bus parity check: see description for bit 6 of sense byte 16.

Bit 7 is reserved and contains a zero.

SENSE BYTE DESCRIPTION (Cont'd)

Sense Byte 23 (Format 1)

Bit 0, file amplifier saturation, is set to 1 when the file reel-motor amplifier finds a voltage-saturation condition. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 1, machine amplifier saturation, is set to 1 when the machine reel-motor amplifier finds a voltage-saturation condition. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bit 2, write status, is set to 1 when the 8809 completes a write, write-tape-mark, erase-gap, or data-security-erase operation. This bit does not activate the Selected Alert line.

Bit 3, power amplifier cable unseated, is set to 1 when the cable between the logic gate and the power amplifier board is not correctly seated at either or both connectors. This also activates the Selected Alert line, which sets bit 3 in sense byte 0, equipment check.

Bits 4 and 5 are reserved and contain zeros.

Bit 6, sense bus parity check: see description for bit 6 of sense byte 16.

Bit 7 is reserved and contains a zero.

Sense Bytes 24 and 25 (Format 1)

Sense bytes 24 and 25 contain all zeros.

Sense Byte 26 (Format 1)

Bits 0 through 2 contain the address of the tape unit. Bits 3 and 4 are not used and contain zeros. Bits 5 through 7 usually contain zeros; however, when an addressing error is sensed, they contain the complement of bits 0 through 2.

Sense Byte 27 (Format 1)

Sense byte 27 contains all zeros.

Sense Byte 28 (Format 1)

Sense byte 28 contains the last command sent to the 8809 over the Tag Bus control lines before a failure.

Sense Byte 29 (Format 1)

Sense byte 29 contains the last command sent to the 8809 over the Bus Out control lines before a failure.

Sense Byte 30 (Format 1)

Sense byte 30 contains the high-order fault symptom code for entry into the maintenance analysis procedures (MAPs).

Sense Byte 31 (Format 1)

Sense byte 31 contains the low-order fault symptom code for entry into the maintenance analysis procedures (MAPs).

Sense Bytes in Format 6

In format 6, sense bytes 0, 1, 2, 4, 5, and 6 are set to zero; sense byte 3 contains the fixed ERP hexadecimal characters 01; and sense byte 7 contains the format code X'60'. Sense bytes 8 through 31 contain the counters described under "Error, Usage, Overrun, and Retry Counters," which follows.

ERROR, USAGE, OVERRUN, AND RETRY COUNTERS

Each tape unit owns a specific control block in a reserved storage area of the 4331 processor. This control block contains statistical information that includes error, usage, overrun, and retry counters.

The functional and error-handling microcode of the magnetic tape attachment updates the counters. When one of the counters overflows, the counter-overflow flag is set for the respective tape unit. The next Start I/O instruction that addresses the tape unit having the counter-overflow flag set causes bit 6 in the unit status byte, unit check, to be set to 1.

The unit-check status condition causes the operating system to send a Sense command to the selected tape unit, causing the Format 6 sense bytes to be displayed or printed and the counters set to zeros. A Read and Reset Buffered Log command also causes the Format 6 sense bytes to be displayed or printed and the counters to be set to zeros.

The counters are assigned as follows:

Sense Byte	Error Counters
8	Multitrack Errors
9	End Data Checks
10	Start Read Checks
11	Readback Failures
12	Envelope Checks
13	No Pointer Errors
14	Crease Errors
15	Skew Errors
16	Track 4 Errors
17	Track 5 Errors
18	Track P Errors
19	Velocity Checks
20	Temporary Read Errors*
21	Temporary Write Errors*
Usage Counters	
22 and 23	Read Operations
24 and 25	Write Operations
Overrun Counter	
27	Data Overruns
Retry Counters	
28 and 29	Erase Gap (write retry operation)**
30 and 31	Read Retry

*The counters also count as permanent errors.
**The erase-gap counter shows both usage and write retry operations because erase gap is a standard operation during a write retry operation.

Updating the Counters

The error counters are increased by one each time an error occurs during the execution of a command. They are not updated during retry attempts. Only the appropriate counter for each tape unit is updated.

The usage counters are updated for every operation that takes place, except retry attempts.

The data-overrun counter is updated each time a data overrun occurs.

The retry counters are updated only when a retry operation is attempted.

NOTES:

8809

AT0600 Seq 2 of 2	2699213 Part Number	846481 15 Dec 79						