RM03, RM05

TECHNICAL INFORMATION

FOR INTERNAL USE ONLY

EP-0RM03-TI-P
1 OF 1 JAN 1987

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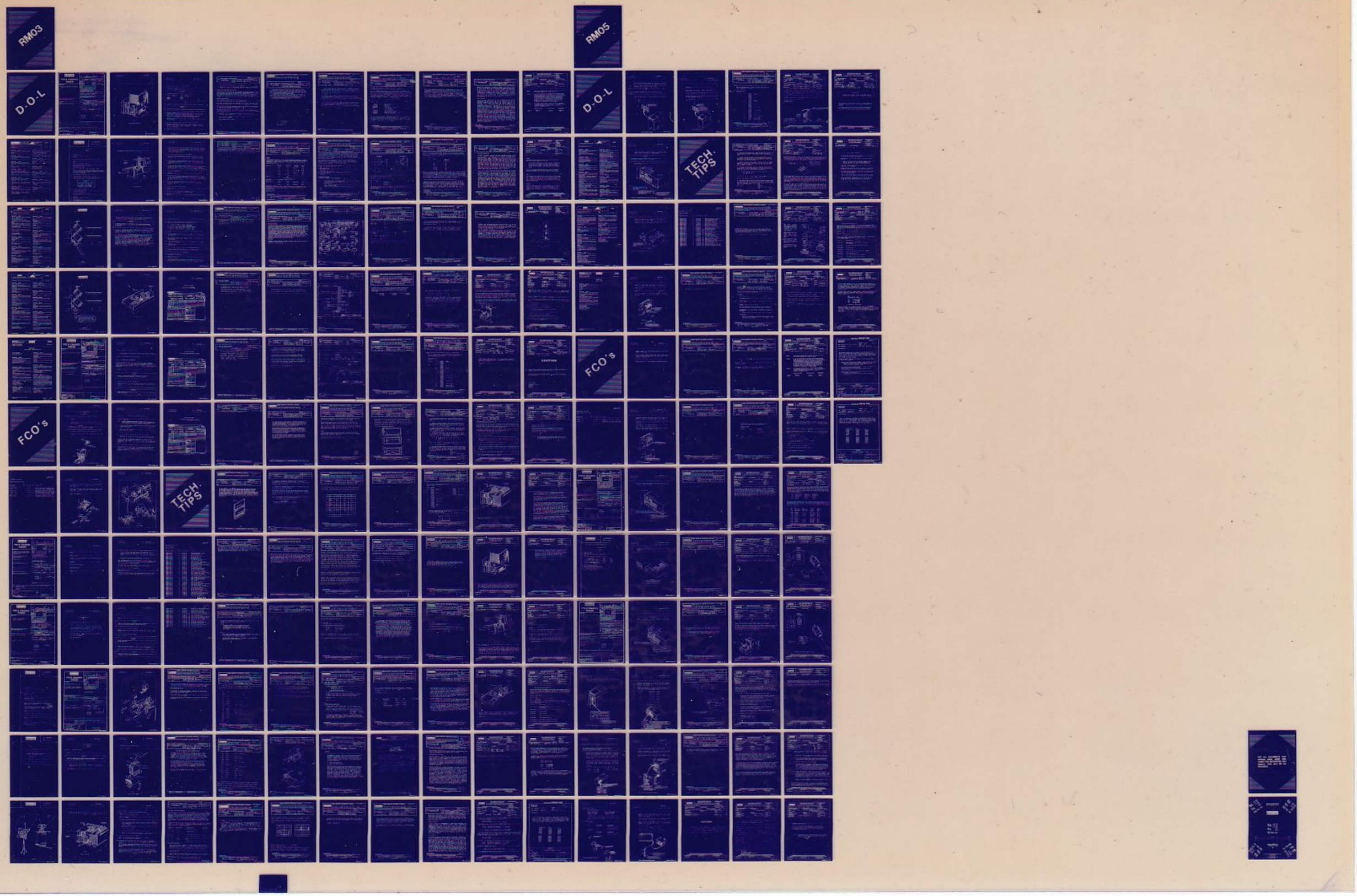
MADE IN USA



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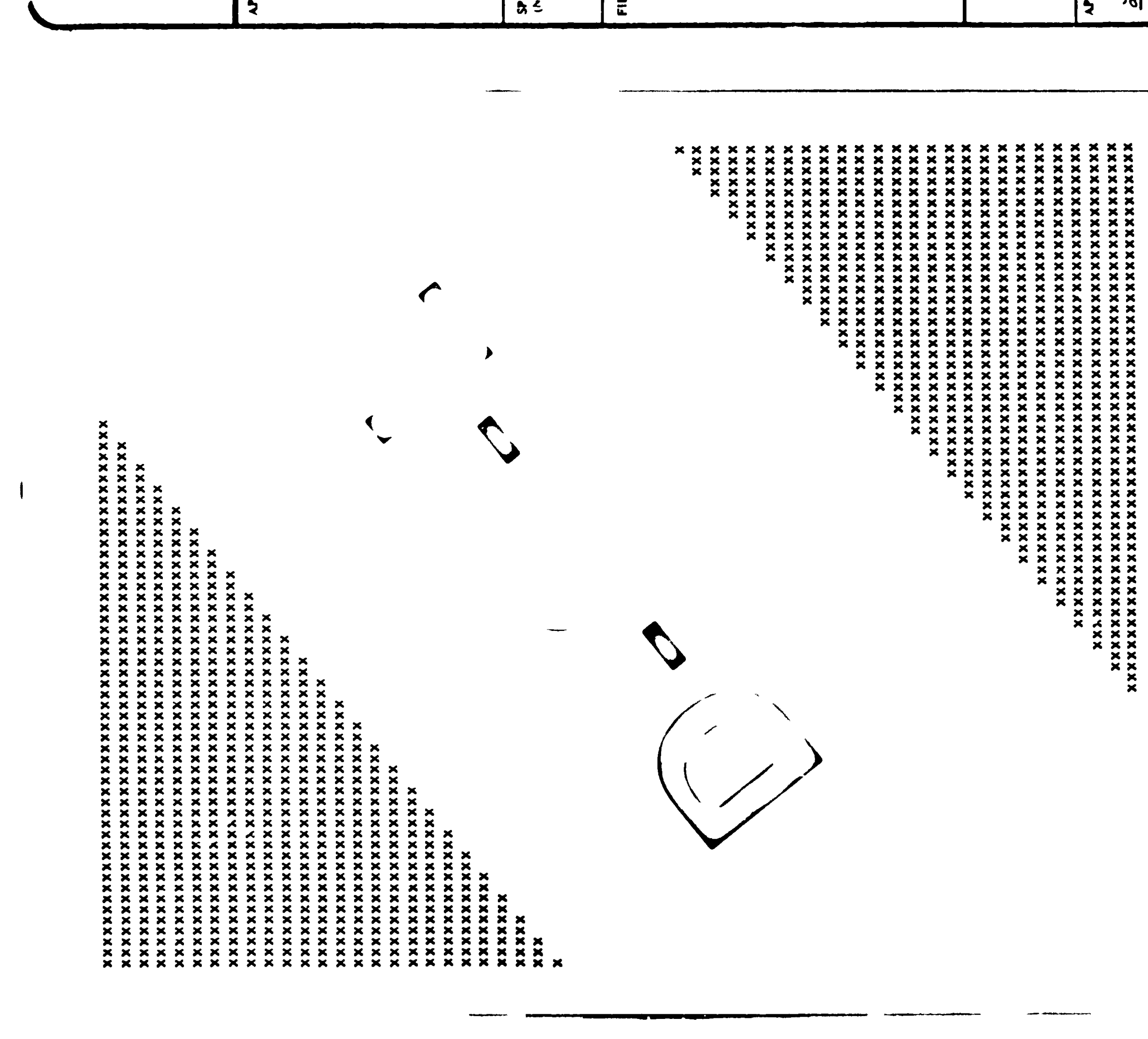


EQUIPMENT CORPORATION
MAYNARD MASSACHUSETTS

Engineering Change Order Log
DEC-O-LOG

1779

RM03

DISK DRIVE

PROCESSOR TYPE 10 , 11 , VAX

RM03-00001 CODE D DD A
OCT 77 CORRECTION 1 Change model numbers and change sheet metal finish on drawing B DD RM03 0
IN-PLANT EFFECTIVITY Documentation change only

RM03-00002 CODE. D
OCT 77 - CORRECTION 1 Add new shipping bracket and make charges to model numbers on drawing D UA-RM03-0-0
IN PLANT EFFECTIVITY Documentation change only

RM03-00003 CODE. D
NOV 77 PROBLEM 1 No deck support in drive
CORRECTION 1 Incorporate self contained deck support on all manufacturing drives Retain and install UL label
IN PLANT EFFECTIVITY This ECO must be installed by December 15, 1977

RM03-00004 CODE: D DD B
DEC 77 CORRECTION 1 Add supports to drive and cabinet to meet drop test requirements
CORRECTION 2 Update drawing B-DD-RM03-0-0 to include new 100 volt/50 Hz and Business Systems models
IN-PLANT EFFECTIVITY Marlboro Colorado Springs, Westminster and Salem N H Retrofit immediately

RM03-00005 CODE: D
DEC 77 PROBLEM 1 Lid may be opened while spindle is spinning when no pack is mounted
CORRECTION 1 replace 6SGV' logic card with new ASGV card
IN PLANT EFFECTIVITY Presently being incorporated in Colorado Springs and in Westminster FA and T areas

RM03-00006 CODE D
JAN 78 PROBLEM 1 Front door does not meet 1978 CSA standards
CORRECTION 1 Replace door stop with new bracket which allows door to be closed by a mechanical fastener
IN PLANT EFFECTIVITY Phase in by February 21 1978 ECO H969 00003 must be implemented in conjunction with this ECO

RM03-00007 CODE. D
MAR 78 PROBLEM 1 Canadian safety standards require labels indicating device electrical requirements to be located on external surface of cabinet
CORRECTION 1 Add ID label with appropriate information and CSA label to rear cover
IN PLANT EFFECTIVITY External labels are required on all units shipped into Canada after June 30, 1978

RM03-00008 CODE: D
MAR 78 - PROBLEM 1 Deck support bracket is secure when used in upright position
CORRECTION 1 Add thumb screw to provide more stability
IN PLANT EFFECTIVITY Implemented by CDC prior to shipment

RM03-00009 CODE: D
MAR 78 - CORRECTION 1 Invert clock data to improve READ CLOCK margin
IN PLANT EFFECTIVITY Implemented by CDC prior to shipment

RM03-00010 CODE. D DD. C
JUN 78 CORRECTION 1 Update documentation to agree with Colorado manufacturing
CORRECTION 2 Add a label to distinguish RM02 from RM03
IN PLANT EFFECTIVITY Colorado Springs Phase-in to assembly by June 26 1978

RM03-00011 CODE. D
JUN 78 PROBLEM 1 Units may draw in excess of 6 amps
CORRECTION 1 Change 6 amps fuses to 8 amp type Change 5V Regulator board from ASHV to BSHV in A1 3 location
IN PLANT EFFECTIVITY Documentation change only

RM03-00012 CODE D
JUN 78 PROBLEM 1 Deck support bracket requires warning labels
CORRECTION 1 Add warning labels to deck support bracket
IN PLANT EFFECTIVITY Implemented by CDC

DIGITAL EQUIPMENT CORPORATION

Engineering Change Order Log

RM03

Disk Drive

PROCESSOR TYPE: PDP-11, DEC 10/20, VAX

RM03-S0013 CODE: F
NOV 78 - PROBLEM 1 HFSV head alignment card with AZPV card which will accept 2,400 RPM and 3,600 RPM drives
IN-PLANT EFFECTIVITY (June 1978)
COMPATIBILITY: AZPV (2,400/3,600 RPM) head alignment board may be used on RM02 and RM03.
FIELD EFFECTIVITY: Exchange JFSV (2,400 RPM) and HFSV (3,600 RPM) head alignment boards with AZPV (2,400/3,600 RPM) universal head alignment board.
QUICK CHECK. Presence of AZPV board in FTU.

The DEC on-site labor charge will be the time required to install and test the FCO at the then-current hourly rate.

FCO KIT ORDERING:
EQ-00900-00. FCO, PARTS
FA-04064-00: FCO only

RM03-00014 CODE: D
JUL 78 - PROBLEM. Specifications missing from drawing directory
CORRECTION· Add specifications to drawing directory.
IN-PLANT EFFECTIVITY Documentation change only.
FIELD EFFECTIVITY None
QUICK CHECK None

RM03-00015 CODE: D
JUL 78 - PROBLEM Interference between fit of Chassis Slides and Vertical Supports of Frame Assembly
CORRECTION Change mounting of Chassis Slides from inside Vertical Supports to outside
IN-PLANT EFFECTIVITY. Immediately
FIELD EFFECTIVITY· None
QUICK CHECK. None

RM03-00016 CODE: D
SEP 78 - PROBLEM. Dust accumulation in shroud area.
CORRECTION: Add foam tape to front bezel
IN-PLANT EFFECTIVITY Phase-In to Galway by 22 August 1978 Immediately in Colorado
FIELD EFFECTIVITY. None.
QUICK CHECK. None.

RM03-00017 CODE: D
SEP 78 - PROBLEM 1· Flow and timing diagrams do not reflect latest revisions made to M7684 module.
CORRECTION 1 Update drawings and add to drawing directory
PROBLEM 2: Wrong variation of Bottom Pan called out on parts list
CORRECTION 2: Call out correct Bottom Pan variation
IN-PLANT EFFECTIVITY: Documentation change only
FIELD EFFECTIVITY· None.
QUICK CHECK None

RM03-00018 CODE: D
DEC 78 - PROBLEM 1. Serial number information not called out
CORRECTION 1 Add note to unit assembly drawing referencing method of serialization
PROBLEM 2 Tie wraps must be cut to remove flat cable in service loop
CORRECTION 2 Revise method of dressing flat cable
PROBLEM 3 Cable clamp not large enough to contain power cord and ground strap
CORRECTION 3 Change to large cable clamp.
IN-PLANT EFFECTIVITY Phase-In to Colorado by 1 June 1979
FIELD EFFECTIVITY None.
QUICK CHECK None

RM03-00019 CODE: D
JUN 79 - PROBLEM Incorrect part number for Terminator Assembly listed on drawing directory
CORRECTION Change part number on drawing directory
IN PLANT EFFECTIVITY Documentation change only
FIELD EFFECTIVITY None
QUICK CHECK None

RM03-00020 CODE: D
JUN 79 - PROBLEM Serial number labels must be hand typed.
CORRECTION Use pin feed decals for automated printing
IN-PLANT EFFECTIVITY Phase-In to Colorado by 1 June 1979
FIELD EFFECTIVITY None
QUICK CHECK: None.

RM03-00021 CODE: D
AUG 79 - PROBLEM 1 Side panel assembly re design needs to be documented
CORRECTION 1 Update Unit Assembly drawing
PROBLEM 2: Document additions and corrections needed.
CORRECTION 2: Update and add drawings
IN-PLANT EFFECTIVITY Phase-In to Colorado by 1 May 1979.
FIELD EFFECTIVITY: None.
QUICK CHECK None.

RM03-00022 CODE: D
FEB 80 - PROBLEM 1 Present dual port switch not accessible from outside disk drive cabinet
CORRECTION 1: Add dual port switches near front door of drive.
PROBLEM 2 Various part numbers called out incorrectly on parts list
CORRECTION 2 Update drawings to reflect correct parts.
IN-PLANT EFFECTIVITY Phase-In to Colorado by 1 October 1980 Immediately in Galway
FIELD EFFECTIVITY: None
QUICK CHECK None.

RM03-S0023 CODE: F
SEP 81 - PROBLEM SYMPTOM. Intermittent data checks (DCK)
PROBLEM Ungrounded brake assembly is source of intermittent read errors.
CORRECTION Add grounding to brake assembly.
IN-PLANT EFFECTIVITY (February, 1981) Immediately into drives with serial number 45,300 or above.
FIELD EFFECTIVITY Retrofit all RM03 drives, series 29 and 36, when problem symptom is evident.
QUICK CHECK. Presence of ground jumper wire from brake assembly to drive motor mounting plate

The DEC on-site labor charge will be the time required to install and test the FCO at the then-current hourly rate.

FCO KIT ORDERING
EQ-01097-00 FCO, PRINTS, PARTS
FA-04323-00 FCO only

RM03-00024 CODE: D
MAY 81 - PROBLEM ECC algorithm occasionally gives false correction to data
CORRECTION. Modify recommended recovery procedure.
IN-PLANT EFFECTIVITY: Documentation change only.

RM03-00025 CODE: D
DEC 81 - PROBLEM: Spindle Stop Time exceeds specification.
CORRECTION: Replace or rework ASGV Modules.
IN-PLANT EFFECTIVITY: Immediately by Vendor.

RM03-00026 CODE: D
DEC 81 - PROBLEM: Excessive Data Checks.
CORRECTION: Replace Cap on Voice Coil Assembly.
IN-PLANT EFFECTIVITY: Immediately by Vendor.

RM03-00027 CODE: D
JAN 82 - PROBLEM: Part number 7419781-00 is obsolete.
CORRECTION: Correct parts list drawing K-PL-RM03-0-DBP to reflect current part number 7419781-15.
IN-PLANT EFFECTIVITY: Documentation change only

RM03-S0028 CODE: F
JAN 83 - PROBLEM SYMPTOM: Excessive data check or header CRC errors.
PROBLEM: Arcing contacts on A1K2 emergency retract relay
CORRECTION. Rework Power Supply Board 5VQN per vendor ECO, CDC NEC J296.
IN-PLANT EFFECTIVITY: (April, 1982) Immediately
FIELD EFFECTIVITY. Retrofit all RM03 drives series code 43 and below when problem symptoms are evident..
QUICK CHECK. Presence of 5.0 MFD capacitor mounted on underside of Mother Board. (Use flashlight and inspection mirror to determine presence of capacitor.)

The DEC on-site labor charge will be the time required to install and test the FCO at the then-current hourly rate.

LIBRARY TYPE

PDP8, PDP11, DEC 10/20, VAX

FCO KIT ORDERING:
EQ-01170-00: FCO, PARTS
FA-04414-00: FCO only

RM03-00029 CODE: D
JUN 82 - PROBLEM: Update the specification to include MBA MTBF page 4, sec 4 0 and correct the soft error rate page 6, sec., 6 0
CORRECTION. Add the new MBA MTBF and soft error correction per this ECO.
IN-PLANT EFFECTIVITY. Documentation change only.

RM03-S0030 CODE: F
MAY 84 - PROBLEM Possible start relay failure due to the peak inverse voltages in the excess of the device rating.
CORRECTION. Replace the 600 volt start relay (A3K5) with the 800 volt start relay per CDC NEC #J255
IN-PLANT EFFECTIVITY· Aug 82
FIELD EFFECTIVITY: Retrofit all RM03 drives, series 42 and below when the Problem/Symptom is evident.
QUICK CHECK. CDC P/N 94378603 is stamped on the relay at location A3K5 in the RM03 drive.

The DEC on-site labor charge will be the time required to install and test the FCO at the then current hourly rate.
FCO KIT ORDERING.
EQ-01253-01: FCO, PARTS
FA-04425-01. FCO only

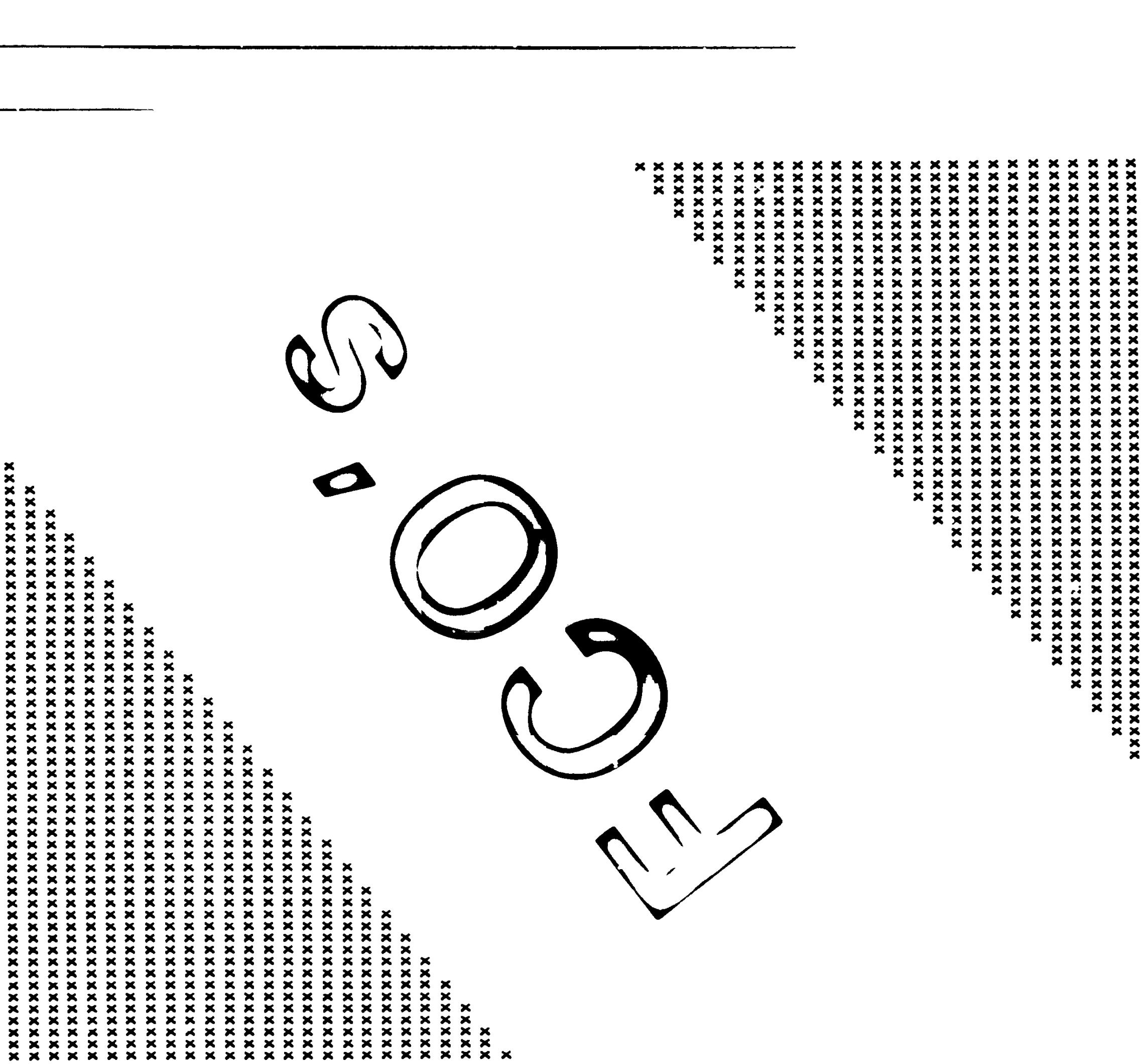
RM03-00031 CODE: D
SEP 85 - PROBLEM BC06S rework (74-19781-15) is being replaced.
CORRECTION· Replace with cable, MASS BUS (BC06S-15)
IN-PLANT EFFECTIVITY· Documentation change only.

RM03-00032 CODE: D
NOV 82 - PROBLEM: 1. Jumpers have been used in the RM03 Drive, but have not been properly documented.
CORRECTION: 1. Document jumpers in the RM03 assy and parts list.
PROBLEM: 2. Documentation updates are required.
CORRECTION: 2. Make a documentation change on UA-PL.
IN-PLANT EFFECTIVITY: Documentation change only.

RM03-00033 CODE: D
JUL 83 - PROBLEM: Transformer A1T1 can potentially short to deck plate due to insufficient adjustment travel in the mounting strap on the 50hz units.
CORRECTION: Incorporate Transformer with a new mounting strap on the failed units (50 hz only) per CDC NEC #J388
IN-PLANT EFFECTIVITY: JUL 83

RM03-M0034 CODE: F
AUG 85 - IN-PLANT EFFECTIVITY MAY 85
PROBLEM: Transformer (A1T1) may come in contact with the upper deck plate assembly (when raised or lowered); resulting in damage to the transformer winding insulation and/or shorting of the transformer windings to the chassis.
FIELD EFFECTIVITY: Inspect and retrofit (if necessary) all RM03 50 Hertz Drives. All 29-22908 50 Hertz Replacement Transformers require incorporation of this FCO when they are installed.
QUICK CHECK. Drive Revision is "T" or standoffs on Power Amplifier Assembly.

The DEC on-site labor charge will be the time required to install and test the FCO at the then current hourly rate.
FCO KIT ORDERING.
EQ-01334-01: FCO, PARTS
FA-04615-01· FCO only



5-Nov-1986
RM03-INDEX.A
REV A

MICROMEDIA PUBLISHING

Field Change Order Index

FCO Number	FA REV	Rel. Date	SB#	Problem
-RM03---S013	A	2-Nov-78		Present HFSV head alignment card can only be used on 3600 RPM drive
-RM03---S023	A	23-Sep-81	199	Data checks (DCK)-ungrounded brake assembly is source of read errors
-RM03---S028	A	28-Jan-83	266	Data check/header CRC error-arcing contacts on A1K2 emerg retr relay
-RM03---S030	A	11-May-84	330	Start failure due to peak inverse voltages in excess of device ratin
-RM03---M034	A	15-Aug-85	396	Transformer (A1T1) may come in contact w/ upper deck plate assemb

digital

FIELD CHANGE ORDER

FCO RM03 S 0013 PAGE 1 of 1

Level of Urgency (LOU)

APPLICABILITY

EXCHANGE JFSV (2,400 RPM) AND HFSV (3,600 RPM) HEAD ALIGNMENT BOARDS WITH AZPV (2,400/3,600) UNIVERSAL HEAD ALIGNMENT BOARD.

RETURN HFSV AND/OR JFSV TO S/R 126 BY 28 FEBRUARY 1979 USE PART NUMBER EQ-00900-00.

TO RECEIVE CREDIT: USE RAC # 8037.

SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES
(Not included in the Field Retrofit Kit)

FIELD INSTALLATION and TEST PROCEDURE

PROBLEM FROM ECO RM03-00013:

PRESENT HFSV HEAD ALIGNMENT CARD CAN ONLY BE USED ON 3600 RPM DRIVE.

FCO EXPENSE RESPONSIBILITY

STATUS LOU	WARRANTY	CONTRACT	PER CALL
Mandatory	DIGITA		CUST
Required			CUST
Specification			CUST
Improvement			
Hardware Option	PURCHASEABLE OPTION		
Cosmetic	CUST	CUST	CUST

On site FCO installation, by DEC will be in accordance with both APPLICABILITY and the above FCO EXPENSE RESPONSIBILITY matrix

ESTIMATED TIME TO INSTALL and TEST
(on-site)
(Travel time not included)

0.3

DECIMAL HOURS

RM02
RJM02
RWM02

QUICK CHECK (To determine if FCO has been installed)

PRESENCE OF AZPV BOARD IN FTU.

LAST PREVIOUS FCO s NONE

RELATED OR PREREQUISITE FCO s / MCO s

NONE

FCO KIT CHARGES (United States and Canada only)

KIT ITEM	DOCUMENTATION	PARTS	OTHER
	☒ FCO ☐ PRINTS $5.00	::	

Parts charges are as of FCO release date and are subject to change

PARTS AVAILABILITY DATE DECEMBER 1978

LOGISTICS CODING (174) (174) (200)

LOGISTICS REVIEW Lynn S. Morse 1 Nov 78

QTY	PART NUMBER	DESCRIPTION
1	29-23202	CDC FCO KIT, 89053483

ORDER BY THIS NUMBER	KIT INCLUDES FCO	PRINTS	PARTS
EQ-0900-00	X		X
FA-04064-00	X		

:: PARTS PRICE UNDETERMINED AT DATE OF FCO RELEASE

NOTES: COMPATIBILITY NOTE: AZPV (2,400/3,600 RPM) HEAD ALIGNMENT BOARD MAY BE USED ON RM02 AND RM03.

AFFECTED PM PROCEDURE: RM03 HEAD ALIGNMENT PROCEDURE AND RM02 HEAD ALIGNMENT PROCEDURE

APPROVED - Field Service Product Support

GREG EKHOLM

Greg Ekholm

DISTRIBUTION CODING

LIST 11,10

LAQ 200

FCO RELEASE DATE

NOVEMBER 2, 1978

DEC 12 (861) 1006A R178

RM02 FCO-1A

digital

FIELD CHANGE ORDER

FCO RM03 S 0023 PAGE 1 of 4

Level of Urgency (LOU)

APPLICABILITY

RETROFIT ALL RM03 DRIVES, SERIES 29 AND 36, WHEN PROBLEM SYMPTOM IS EVIDENT.

FCO EXPENSE RESPONSIBILITY

STATUS LOU	WARRANTY	K	PER CALL
Mandatory	DIGITAL		CUST
Required			CUST
Specification			CUST
Improvement			CUST
Hardware Option	PURCHASEABLE OPTION		
Common	CUST	CUST	CUST

On-site FCO installation, by DEC, will be in accordance with both APPLICABILITY and the above FCO EXPENSE RESPONSIBILITY matrix.

ESTIMATED TIME TO INSTALL and TEST (on-site) (Travel time not included)

1.0 DECIMAL HOURS

QUICK CHECK (To determine if FCO has been installed)

PRESENCE OF GROUND JUMPER WIRE FROM BRAKE ASSEMBLY TO DRIVE MOTOR MOUNTING PLATE.

LAST PREVIOUS FCO #: RM03-S0013

RELATED OR PREREQUISITE FCO #s / MCO #s

NONE

SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES (Not included in the Field Retrofit Kit)

NONE

FIELD INSTALLATION and TEST PROCEDURE

SEE PAGES 2 THROUGH 4 OF THIS FCO.

FCO KIT CHARGES (United States and Canada only)

KIT ITEM	DOCUMENTATION	PARTS	OTHER
	☒ FCO ☐ PRINTS NONE $10.00	::	

Parts charges are as of FCO release date and are subject to change.

PARTS AVAILABILITY DATE SEPTEMBER, 1981

LOGISTICS CODING 5K 500 1K

LOGISTICS REVIEW E.M. Duffy 7/16/81

QTY	PART NUMBER	DESCRIPTION
1	29-11997	CDC FCO KIT PE 60378

ORDER BY THIS NUMBER	KIT CONTAINS FCO	PRINTS	PARTS
EO-01097-00	X		Y
FA-04323-00	X		

::PARTS PRICE UNDETERMINED AT DATE OF FCO RELEASE.

PROBLEM SYMPTOM: INTERMITTENT DATA CHECKS (DCK)

APPROVED Field Service Product Support

Greg Ekholm

GREG EKHOLM

LIBRARIES: ALL

RM03-FCO-1 DM-

FCO RELEASE DATE

23 SEPTEMBER 1981

REWORK PROCEDURE

FOR

RM03-S0023

1- POWER DOWN DRIVE.

2- REMOVE DISC PACK AND STORE IN PROPER AREA.

3- TURN OFF CIRCUIT BREAKERS AT REAR OF DRIVE.

4- REMOVE REAR COVER.

5- INSTALL REAR HOLD DOWN BRACKET.

6- REMOVE TWO (2) SCREWS IN PACK WELL AND RAISE TOP DECK TO MAINTENANCE POSITION.

7- LOCK MAINTENANCE BRACKET IN PLACE WITH THUMB SCREW .

8- INSTALL ONE END OF GROUND JUMPER (CDC 77579946) ON DRIVE MOTOR MOUNTING PLATE USING EXISTING SCREW AND WASHER INT. #8 (CDC 10126104). (FIGURE 1)

9- INSTALL OTHER END OF GROUND JUMPER ASSEMBLY ON BRAKE ASSEMBLY STANDOFF USING WASHER INT. #10 (CDC 10126105), STANDOFF (CDC 73078800), AND SCREW PAN HD. (CDC 10127361). (FIGURE 1)

10- UNLOCK THE MAINTENANCE BRACKET AND LOWER TOP DECK TO NORMAL POSITION.

11- RE-INSTALL TWO SCREWS IN WELL AREA AND CLOSE ACCESS COVER.

12- REMOVE REAR HOLD DOWN BRACKET AND RETURN TO STORAGE POSITION.

13- UPDATE FCO LOG TABLE ON SIDE OF LOGIC CARD CAGE TO NEC J115 CDC FCO PE60378.

14- INSTALL REAR COVER.

15- POWER UP DRIVE BY TURNING ON CIRCUIT BREAKERS.

16- PURGE DRIVE WITHOUT A PACK AND ALL CIRCUIT BREAKERS ON FOR TEN (10) TO FIFTEEN (15) MINUTES.

17- UPDATE SITE MANAGEMENT GUIDE TO REFLECT THIS FCO.

18- INSTALL A SCRATCH DISK PACK.

19- RUN APPROPRIATE DIAGNOSTIC FOR A MINIMUM OF TEN (10) MINUTES TO ENSURE PROPER OPERATION:

PDP11: CZRMUA0 OR LATER, RM02, 03, 05 PERFORMANCE EXERCISER

VAX: ESRAA 7.0 OR LATER, RP0X/RK0X/RM0X RELIABILITY TEST.

20'S: MD-10-DDRPI-A OR LATER RELIABILITY TEST.

20- RETURN DISK DRIVE TO PROPER CUSTOMER CONFIGURATION.

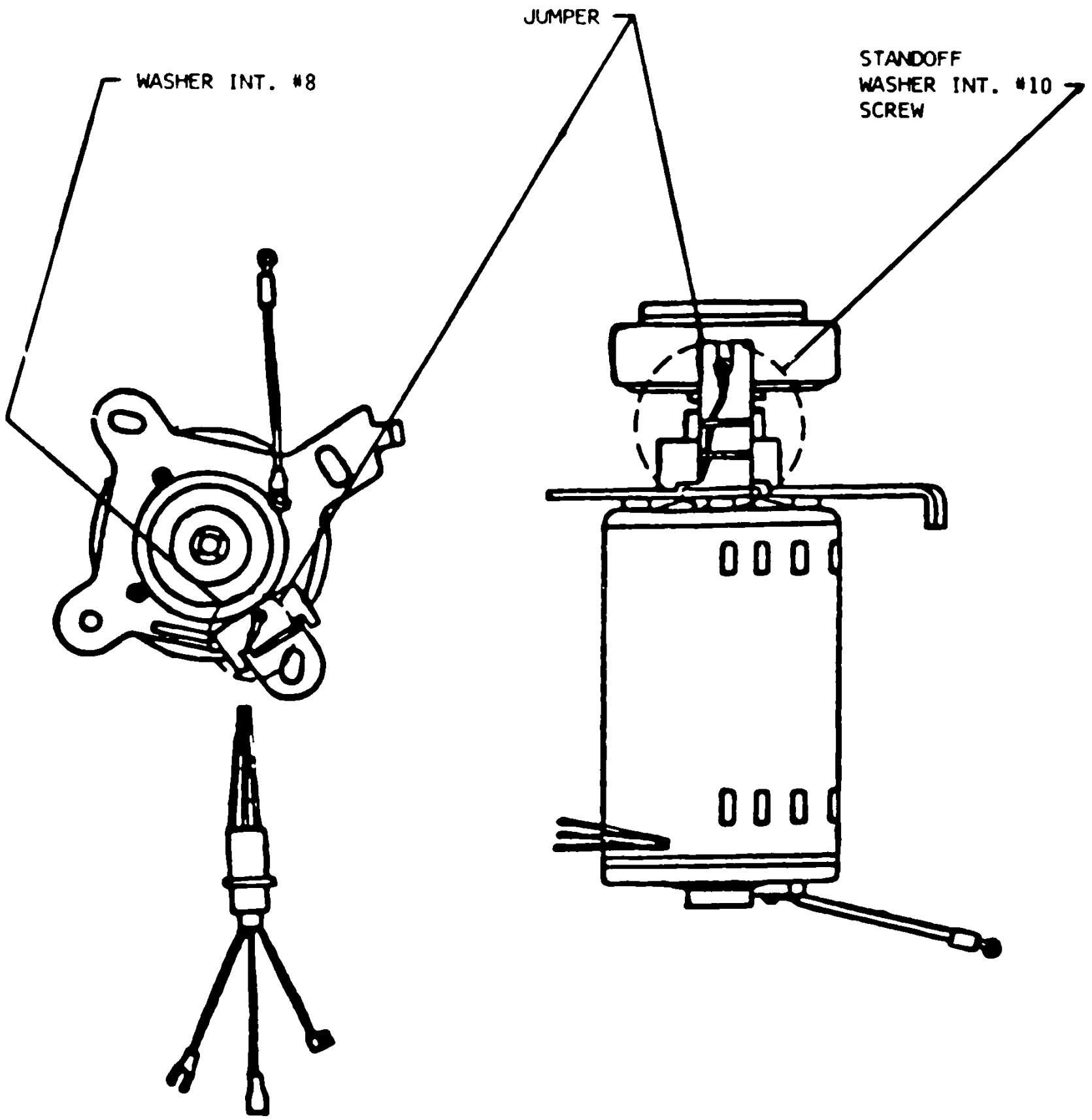


FIGURE 1

digital

FIELD CHANGE ORDER

FA-04414-00

FCO RM03 S 0028

Level of Urgency (LOU)

STATUS / LOU	FCO EXPENSE RESPONSIBILITY: WARRANTY	K	PER CALL
Mandatory	DIGITAL		
Required			CUST
Specification			CUST
Improvement			CUST
Hardware Option	PURCHASEABLE OPTION		
Cosmetic	CUST	CUST	CUST

On-site FCO installation, by DEC, will be in accordance with both APPLICABILITY and the above FCO EXPENSE RESPONSIBILITY matrix.

ESTIMATED TIME TO INSTALL and TEST (on-site) (Travel time not included)

1.0 DECIMAL HOURS

APPLICABILITY

RETROFIT ALL RM03 DRIVES SERIES CODE 43 AND BELOW WHEN PROBLEM SYMPTOMS ARE EVIDENT.

QUICK CHECK (To determine if FCO has been installed)

PRESENCE OF 5.0 MFD CAPACITOR MOUNTED ON UNDERSIDE OF MOTHER BOARD. (SEE NOTE)

LAST PREVIOUS FCO's: RM03-S0023, S0013

RELATED OR PREREQUISITE FCO's / MCO's

SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES (Not included in the Field Retrofit Kit)

STANDARD TOOL KIT, 3/16" DRILLBIT, AND DRILL

FIELD INSTALLATION and TEST PROCEDURE

SEE PAGES 2 THROUGH 4 OF THIS FCO.

FCO KIT CHARGES (United States and Canada only)

KIT ITEM	DOCUMENTATION	PARTS	OTHER
	☒ FCO ☐ PRINTS NONE $10.00	::	

Parts charges are as of FCO release date and are subject to change

PARTS AVAILABILITY DATE MARCH, 1983

LOGISTICS CODING 6K 1.4K 2K

LOGISTICS REVIEW Ruth Fuss 1/14/83

QTY	PART NUMBER	DESCRIPTION
1	29-12318-00	CDC FCO KIT 89053939

ORDER BY THIS NUMBER	KIT CONTAINS FCO	PRINTS	PARTS
EQ-01170-00	X		X
FA-04414-00	X		

::PARTS PRICE UNDETERMINED AT DATE OF FCO RELEASE.

PROBLEM SYMPTOM: EXCESSIVE DATA CHECKS OR HEADER CRC ERRORS.

NOTE: USE FLASHLIGHT AND INSPECTION MIRROR TO DETERMINE PRESENCE OF CAPACITOR.

APPROVED Field Service Product Support

Loyd G. Buchanan

LOYD G. BUCHANAN

LIBRARIES: 10
11
VAX

DM

RM03-FCO-6

FCO RELEASE DATE

28 JANUARY 1983

REWORK PROCEDURE

FOR

FCO RM03-S0028

1- POWER DOWN DRIVE.

2- DISCONNECT AC POWER CORD AT SOURCE.

3- RAISE DECK.

NOTE: ENSURE REAR SHOCK MOUNT HAS SHIPPING BOLT IN PLACE.

4- DISCONNECT CONNECTORS P1B, P1A, AND P100 FROM POWER SUPPLY BOARD 5VQN.

5- REMOVE THREE POWER SUPPLY CARDS.

6- REMOVE AND RETAIN SEVEN 6-32 BY 5/6 PHILLIPS HEAD SCREWS SECURING POWER SUPPLY BOARD 5VQN TO STANDOFFS.

7- REMOVE POWER SUPPLY BOARD.

8- DRILL A 3/16 (.187)" HOLE IN POWER SUPPLY BOARD. (FIGURE 1)

9- INSTALL A 5 MFD CAPACITOR, EITHER A CDC ZD2A505K OR A CDC X663F 5.0-10-200 WITH INSULATION (CDC 92261120) OVER EACH LEAD, BETWEEN NEWLY DRILLED HOLE AND EDGE OF POWER SUPPLY BOARD, AND FLUSH WITH EDGE OF BOARD. (FIGURE 2)

10- SOLDER ONE LEAD OF CAPACITOR TO PIN 8 OF RELAY K2.

11- SOLDER OTHER LEAD OF CAPACITOR TO PIN 6 OF PLUG J1.

12- ENSURE CAPACITOR IS FLUSH WITH EDGE OF POWER SUPPLY BOARD AND USE TIE WRAP (CDC 94277401) TO SECURE CAPACITOR TO BOARD.

CAUTION

WHEN SECURING CAPACITOR TO POWER SUPPLY BOARD, USE MINIMAL FORCE ON TIE WRAP. CAPACITOR MUST BE HELD FIRMLY IN PLACE WITHOUT DEFORMING OR DAMAGING OUTSIDE CASE.

13- RE-INSTALL POWER SUPPLY BOARD.

14- RE-INSTALL SEVEN 6-32 BY 5/16 PHILLIPS HEAD SCREWS SECURING POWER SUPPLY BOARD TO STANDOFFS.

15- RE-INSTALL THREE POWER SUPPLY CARDS

16- RE-CONNECT CONNECTORS P1B, P1A, AND P100 TO POWER SUPPLY BOARD.

17- CLOSE DECK.

18- RE-CONNECT AC POWER CORD TO SOURCE.

19- POWER UP DRIVE.

20- RUN PERFORMANCE EXERCISOR TO ENSURE CHANGE WAS DONE CORRECTLY.

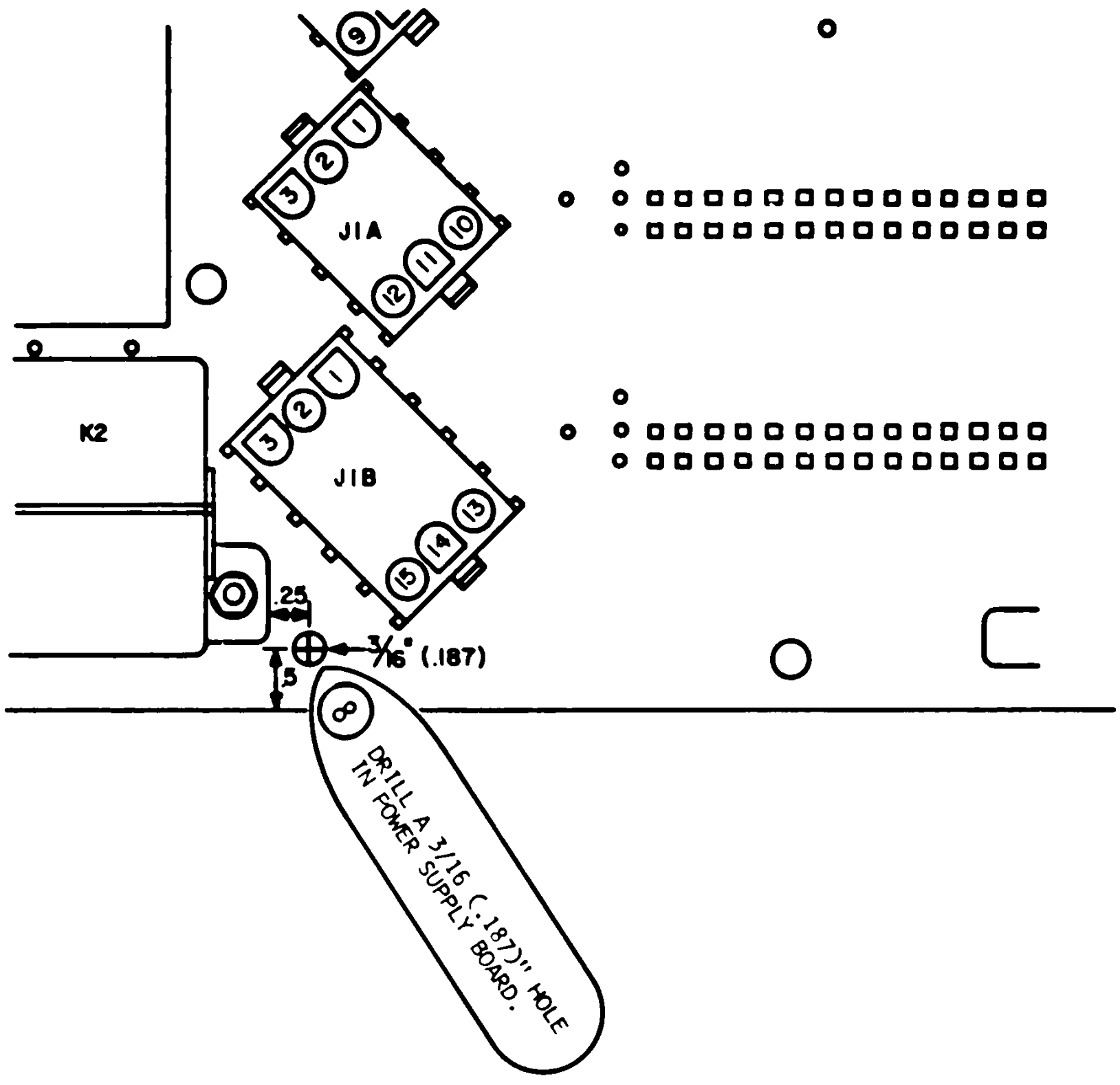


FIGURE 1

POWER SUPPLY BOARD 5VQN

RM 03 FCO-8

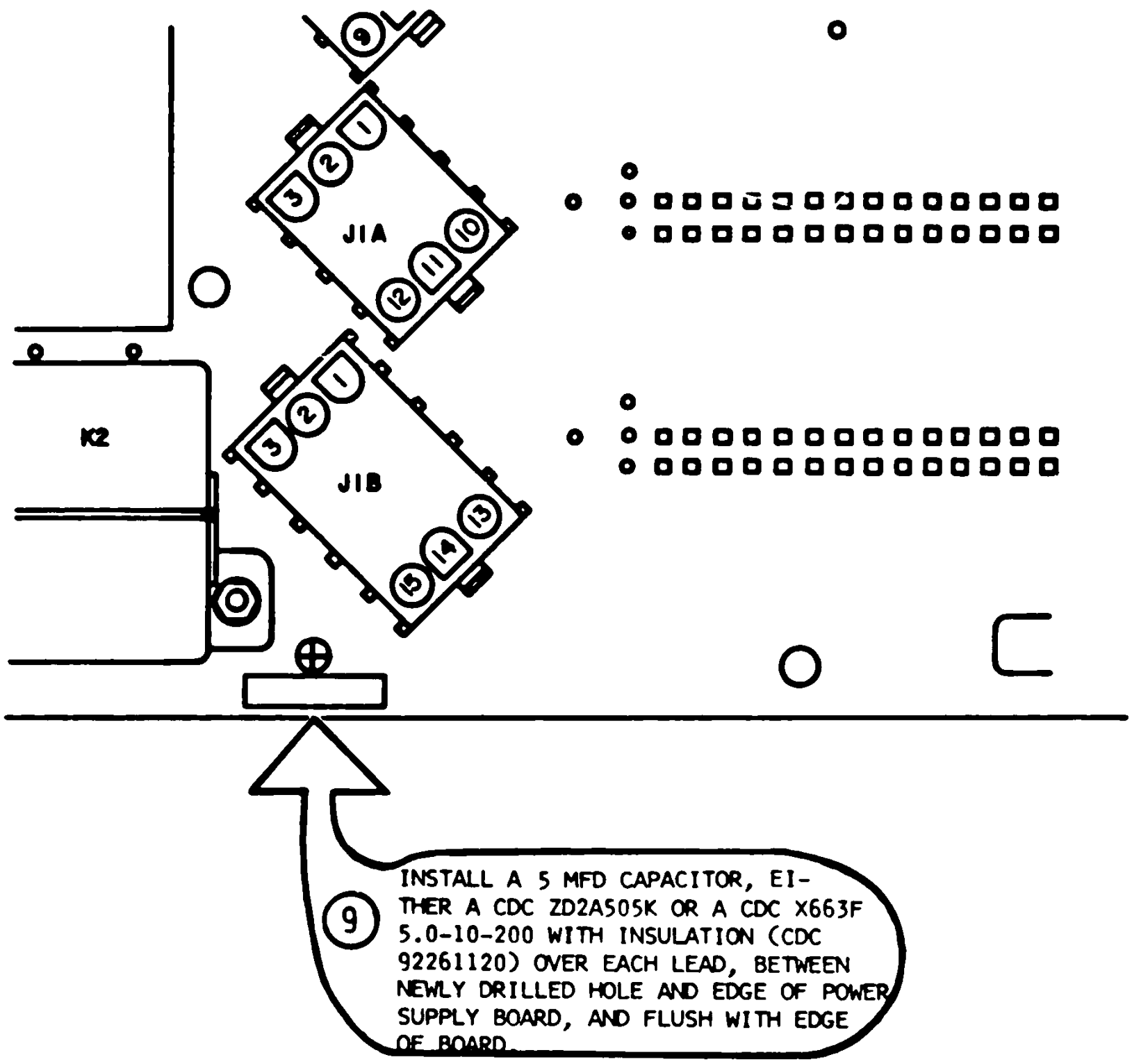


FIGURE 2

POWER SUPPLY BOARD 5VQN

digital

FIELD CHANGE ORDER

FA-04425-01

FCO RM03 S 0030 PAGE 1 of 5

Level of Urgency (LOU)

STATUS CODE	FCO EXPENSE RESPONSIBILITY: WARRANTY	E	PER CALL
Mandatory	DIGITAL		
Required			CUST
Specification			CUST
Improvement			CUST
Hardware Option	PURCHASEABLE OPTION		
Cosmetic	CUST	CUST	CUST

On-site FCO installation, by DEC, will be in accordance with both APPLICABILITY and the above FCO EXPENSE RESPONSIBILITY matrix.

ESTIMATED TIME TO INSTALL and TEST (on-site) (Travel time not included)

1 hour

DECIMAL HOURS

APPLICABILITY

Retrofit all RM03 drives, series 42 and below when Problem/Symptom is evident.

QUICK CHECK (To determine if FCO has been installed)

CDC P/N 94378603 stamped on relay at location A3K5 in RM03 drive.

LAST PREVIOUS FCO: RM03-S0023

RELATED OR PREREQUISITE FCO's / MCO's

SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES (Not included in the Field Retrofit Kit)

Standard Tool Kit
Thermal Grease (90-08268)

FCO KIT CHARGES (United States and Canada only)

KIT ITEM	DOCUMENTATION	PARTS	OTHER
	☐ FCO ☐ PRINTS		

Parts charges are as of FCO release date and are subject to change.

PARTS AVAILABILITY DATE June 1984

FIELD INSTALLATION and TEST PROCEDURE

See attached. FCO predominantly effects 50 HZ, 220/240 volt units.

*******NOTE*******
This FCO implements ECO # RM03-CX030

LOGISTICS CODING 1800 - 200 - 500

LOGISTICS REVIEW E M Dullen 5-9-84

QTY	PART NUMBER	DESCRIPTION
1	each	80 volt relay CDC P/N 94376503 (29-22929)

Order by This Number	Kit Contains FCO	Prints	Parts
EQ-01253-01	X		X
FA-04425-01	X		

Failure/Symptoms: Possible start relay failure due to peak inverse voltages in excess of device rating.

APPROVED–Field Service Product Support
Mark Holmes

APPROVED–Field Service Product Safety
Bob Barnard 4-18-84
Bob Barnard

Libraries: 11
Mini
LCG

FCO RELEASE DATE
11 May 1984

Annex-FCO-1C

REWORK PROCDEDURE
FOR
FCO RM03-S0030

This FCO replaces the existing 600 volt A3K5 Start Triac (CDC P/N 94376501) with an 800 volt Start Triac (CDC P/N 94376503)

1. Raise the pack access cover with power applied to the Drive.

2. Remove the Drive power with the pack access cover in the open position.

CAUTION
The RM02 AC Power Cord "plug" must be removed from the AC power source receptacle before proceeding.

3. Loosen the locking screws that hold the Drive top cover in place and slide it backwards off the Drive.

4. Install the heads actuator locking pin into the "shipping lock" hole to prevent the actuator from moving.

5. Install the rear deck hold-down spacer. (See Figure 1)

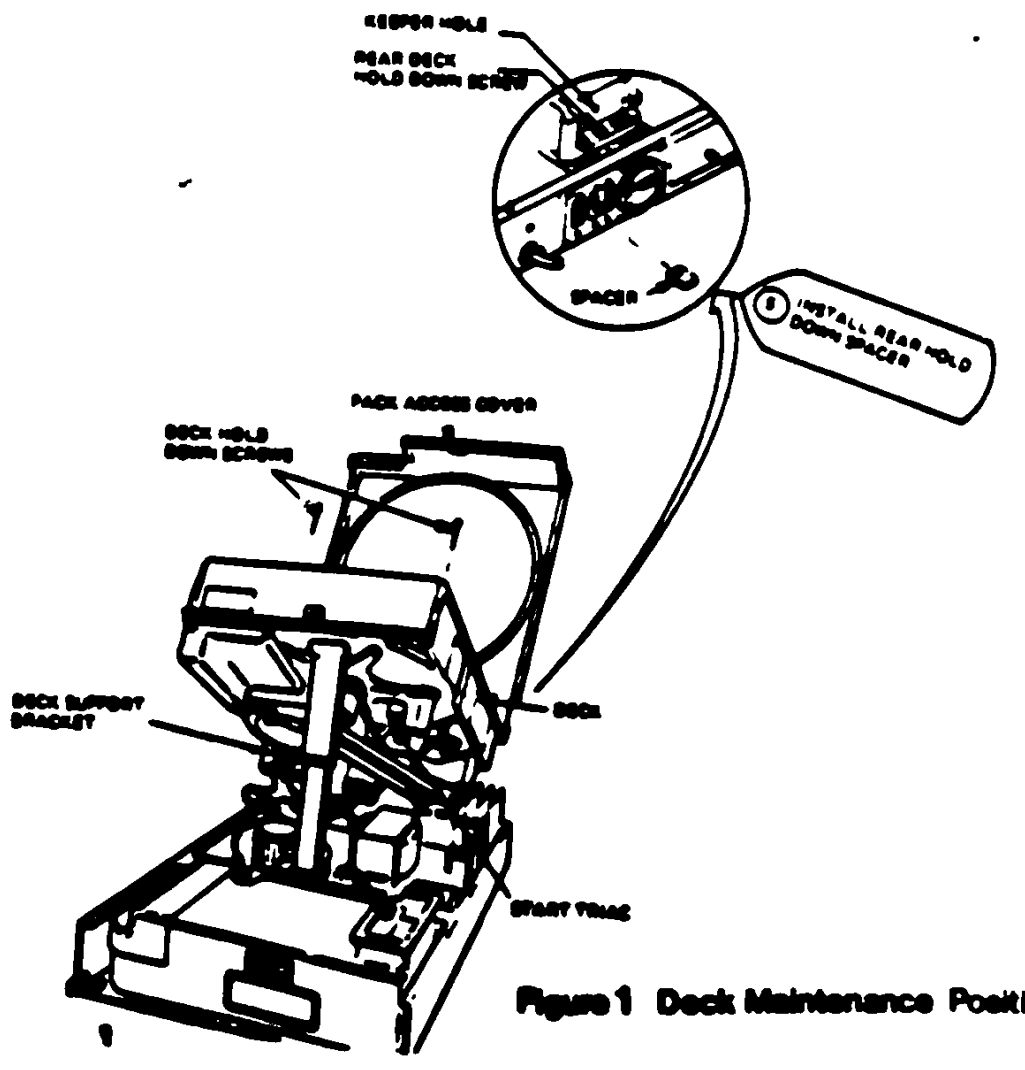


Figure 1 Deck Maintenance Position

6. Remove the two (2) deck hold-down screws from inside the pack shroud area.

7. Raise the deck upward until its support bracket locks into place. Secure the support bracket locking the thumb screw and strap it into the lower hole of the support arm assembly.

8. Locate and remove all connectors from the start triac A3K5. (See Figure 2)

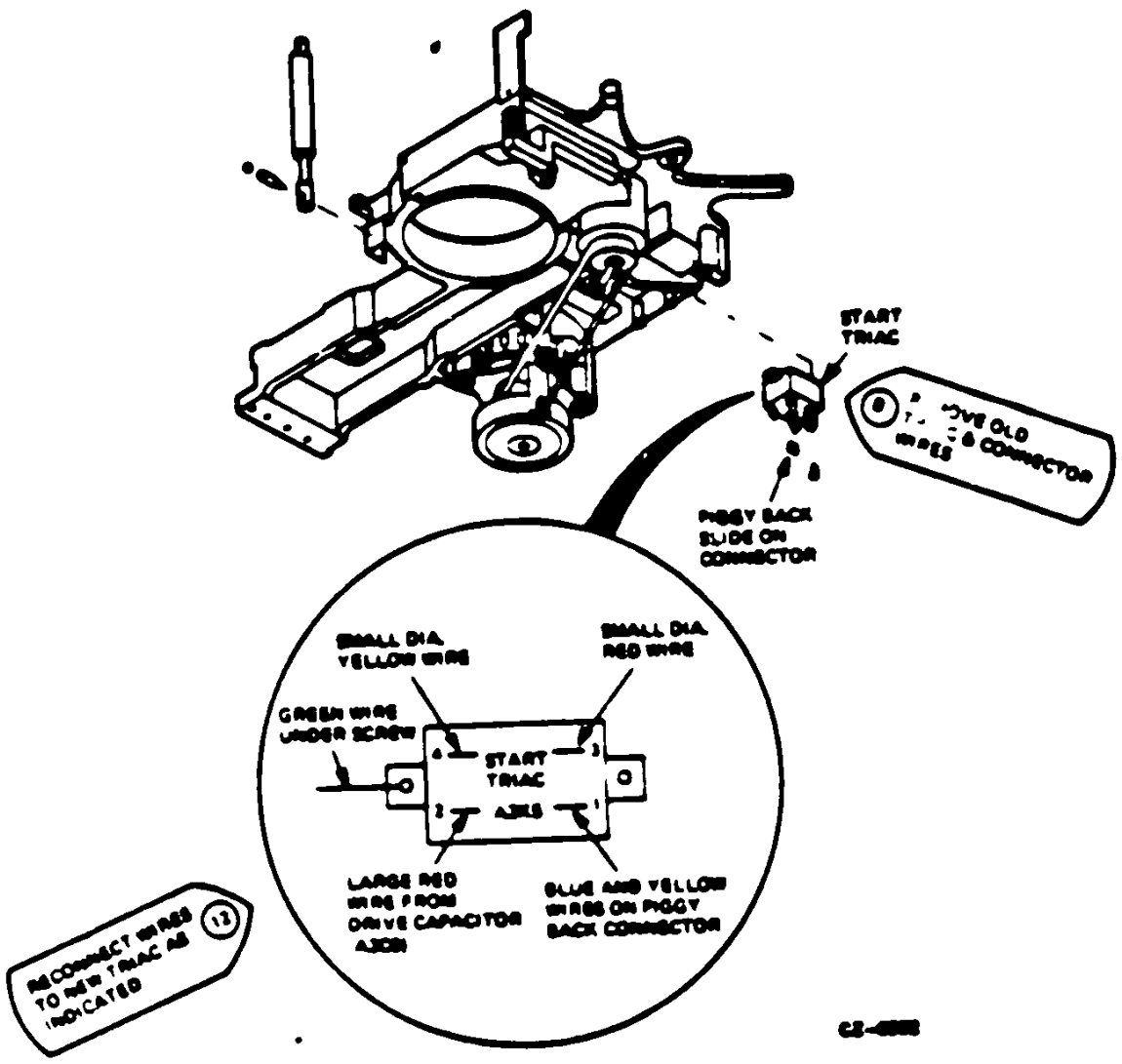


Figure 2 Start Triac A3K5

9. Remove the two (2) screws that secure the triac in place.

10. Apply a light coat of dielectric grease to the base of the new triac.

11. Mount the new triac using the two (2) screws previously removed. Be sure to attach the green grounding wire to one of these screws.

12. Reconnect all wires to the triac terminals according to Figure 2.

13. Release the deck support bracket and lower the deck into the operating position.

14. Re-install the two (2) deck hold-down screws inside the pack shroud area.

15. Remove the rear hold-down spacer and install it in the keeper hole.

16. Restore the head actuator holding pin to its "storage" hole.

17. Replace the top cover onto the Drive.

digital	FCO RM03-S0030
	PAGE 5 OF 5

VERIFICATION TEST
FOR
RM03-S0030

1. Connect the Drive to the MBA and the processor.

2. Apply the power to the Drive.

3. Install a scratch pack and close the pack access cover.

4. Press the START switch on the Drive's operator panel and verify that the Drive goes READY in approximately 30-40 seconds and that no FAULT condition exists.

5. Spin the drive down and repeat step 4.

6. Load and execute any of the available diagnostics on site that perform read/write functions to verify the final Drive operation.

7. Log the installation of this FCO into the Digital Site Management Guide.

FIELD CHANGE ORDER

FA-04615-01

FCO RMO3 M 0034 PAGE 1 of 21

Level of Change (LOC)

STATUS LOG

	FCO EXPENSE RESPONSIBILITY		
	WARRANTY	CONTRACT	PER CALL
Mandatory	DIGITAL		CUST
Required			CUST
Specification			CUST
Improvement			CUST
Hardware Option	PURCHASEABLE OPTION		
Cosmetic	CUST	CUST	CUST

On the FCO installation by DEC will be in accordance with both APPLICABILITY and the above FCO EXPENSE RESPONSIBILITY matrix

ESTIMATED TIME TO INSTALL and TEST (on site) (Travel time not included)

1.0

DECIMAL HOURS

APPLICABILITY

Inspect and retrofit (if necessary) all RM03 50 Hertz Drives.

All 29-22908 50 Hertz Replacement Transformers require incorporation of this FCO when they are installed.

QUICK CHECK (To determine if FCO has been installed)

Drive Revision is "T" or standoffs on Power Amplifier Assembly.

SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES
(Not included in the Field Retrofit Kit)

Offset Phillips Screwdriver, Flashlight, 2mm (.08 inches) Feeler Gauge or small ruler

LAST PREVIOUS FCO: RM03-S-030

RELATED OR PREREQUISITE FCO: MCO:
RM02-M0026

FIELD INSTALLATION and TEST PROCEDURE

NOTE

This FCO incorporates ECO number RM03-CXC33 and RM03-CXC34.

PARTS AVAILABILITY DATE: October 1985

LOGISTICS CODING: 1000-100-500

LOGISTICS REVIEW:

QTY	PART NUMBER	DESCRIPTION
4	90-00001-32	Standoffs
4	90-08007-01	10-32 X ¼ Screws
1	29-22908-00	XFMR & MTG Strap

Order by This Number	Kit Contains FCO	Prints	Parts
EQ-01334-01	X		X
FA-04615-01	X		

Problem/Symptoms: Transformer (A1T1) may come in contact with the upper deck plate assembly (when raised or lowered); resulting in damage to the transformer winding insulation and/or shorting of the transformer windings to the chassis.

APPROVED: Field Service Product Support

Rick Swanson

John Freudenberg

Libraries:
IAG
PDP 11
MINI
KS10

FCO RELEASE DATE
15 August 1985

RM03-FCO-

REWORK PROCEDURE
FOR
FCO RM03-M0034

SECTION I - INSPECTION PROCESS

1. Remove any existing disk pack from the drive and power-down the Unit.

****
* DANGER *
* *
* REMOVE AC POWER FROM THE RM02 DISK DRIVE BY REMOVING THE AC POWER *
* PLUG FROM THE BRANCH RECEPTACLE BEFORE PROCEEDING. *
****

2. Remove the drive top cover assembly.

   A. Loosen the two locking screws on the back of the top cover.
   B. Slide the drive top cover back and then lift it off the rear of the drive.

3. Loosen the logic chassis clamp screws from the rear of the drive (See FIGURE 1).

4. Carefully slide the logic chassis (on its hinges) towards the rear of the drive and then up and to the left (counter clockwise) into the maintenance position (ARROWS 1 & 2 in FIGURE 1).

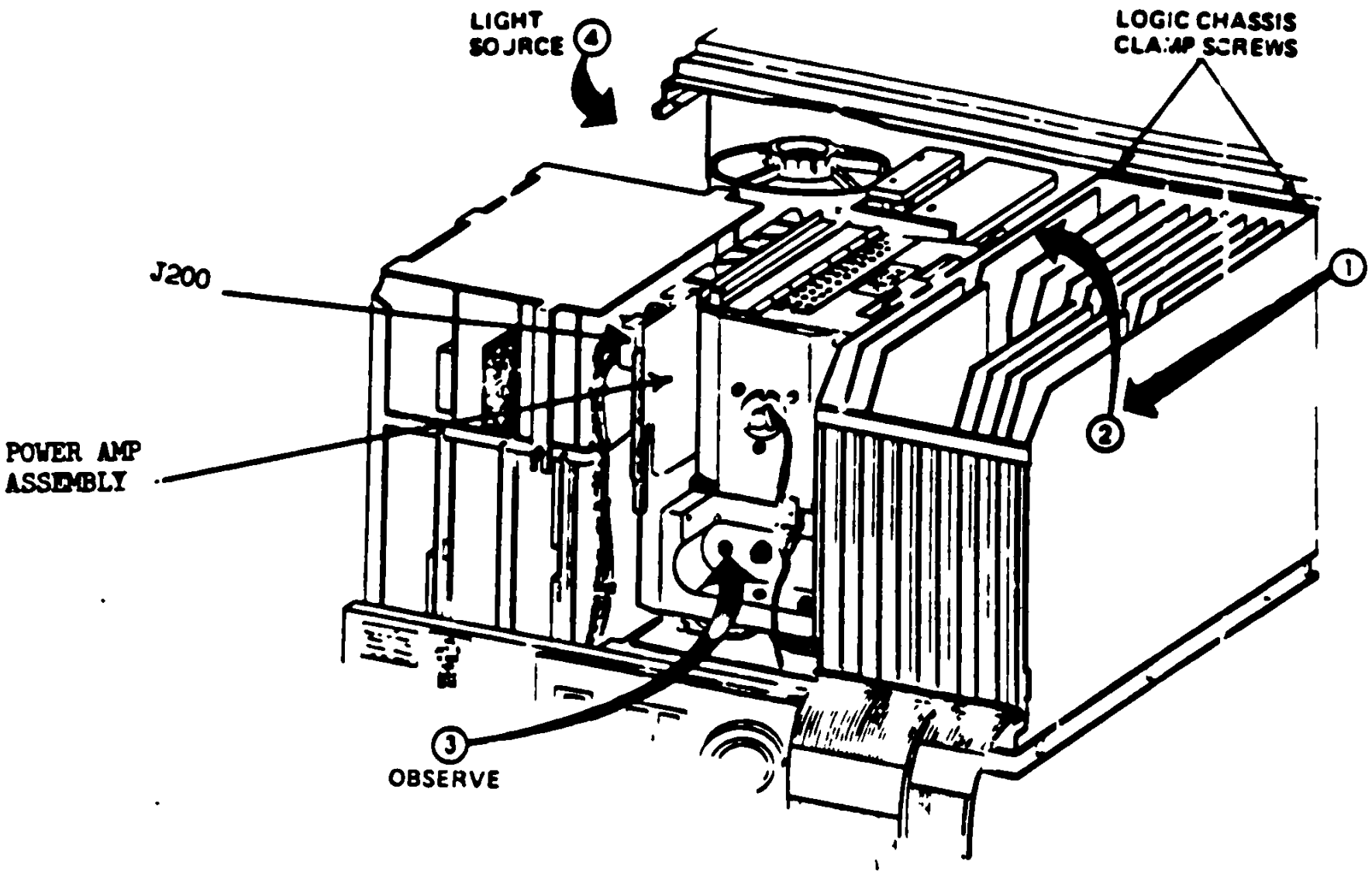


FIGURE 1

RM02-3 REAR VIEW

5. Locate the main (50HZ) Transformer (A1T1) as shown in FIGURE 2.

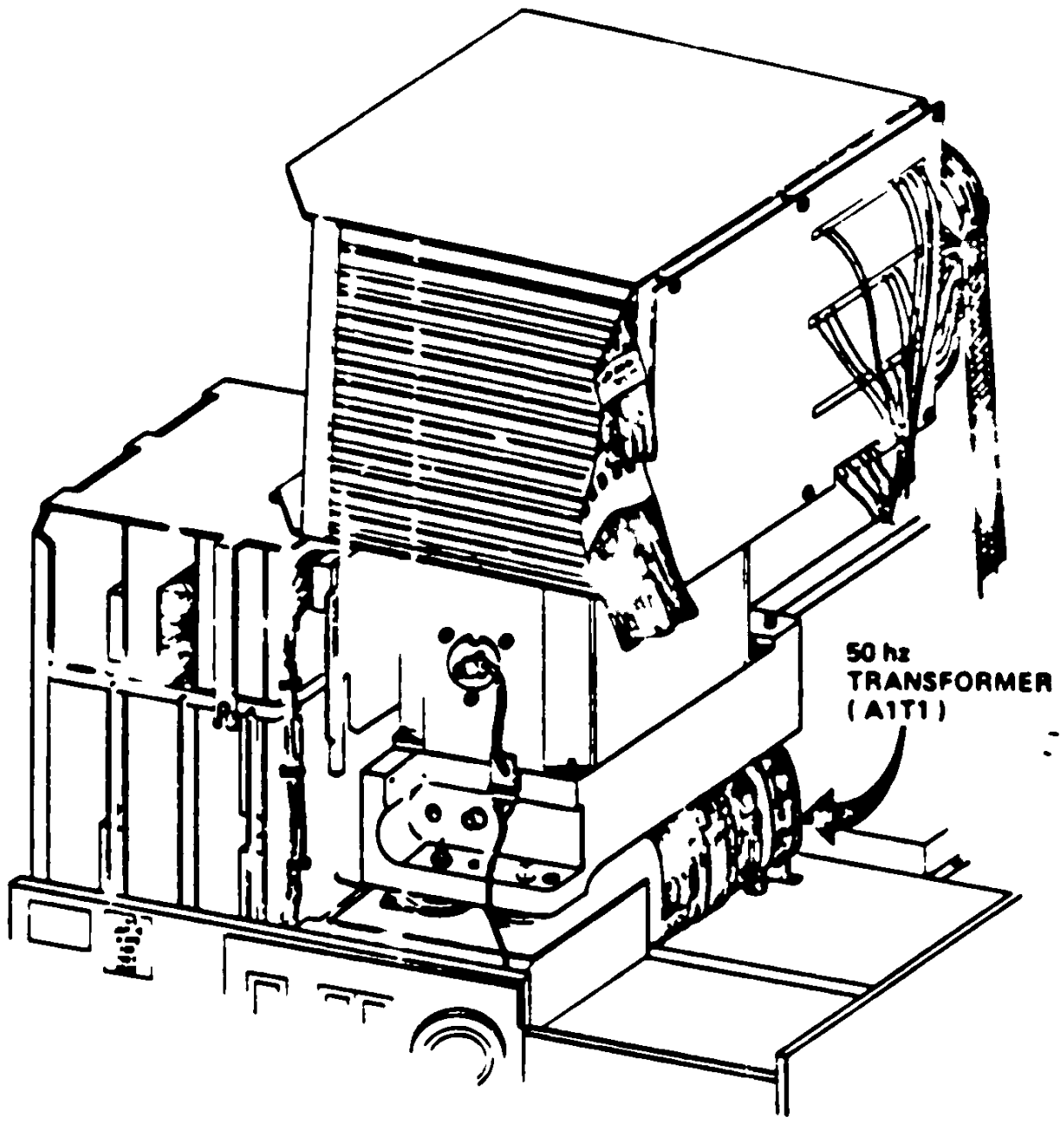


FIGURE 2

RM02-3 Drive Logic chassis in
the maintenance position

6. The upper deck plate assembly may have to be raised into its maintenance position to view all areas of the transformer, (a closer view of the transformer is shown in FIGURE 3).

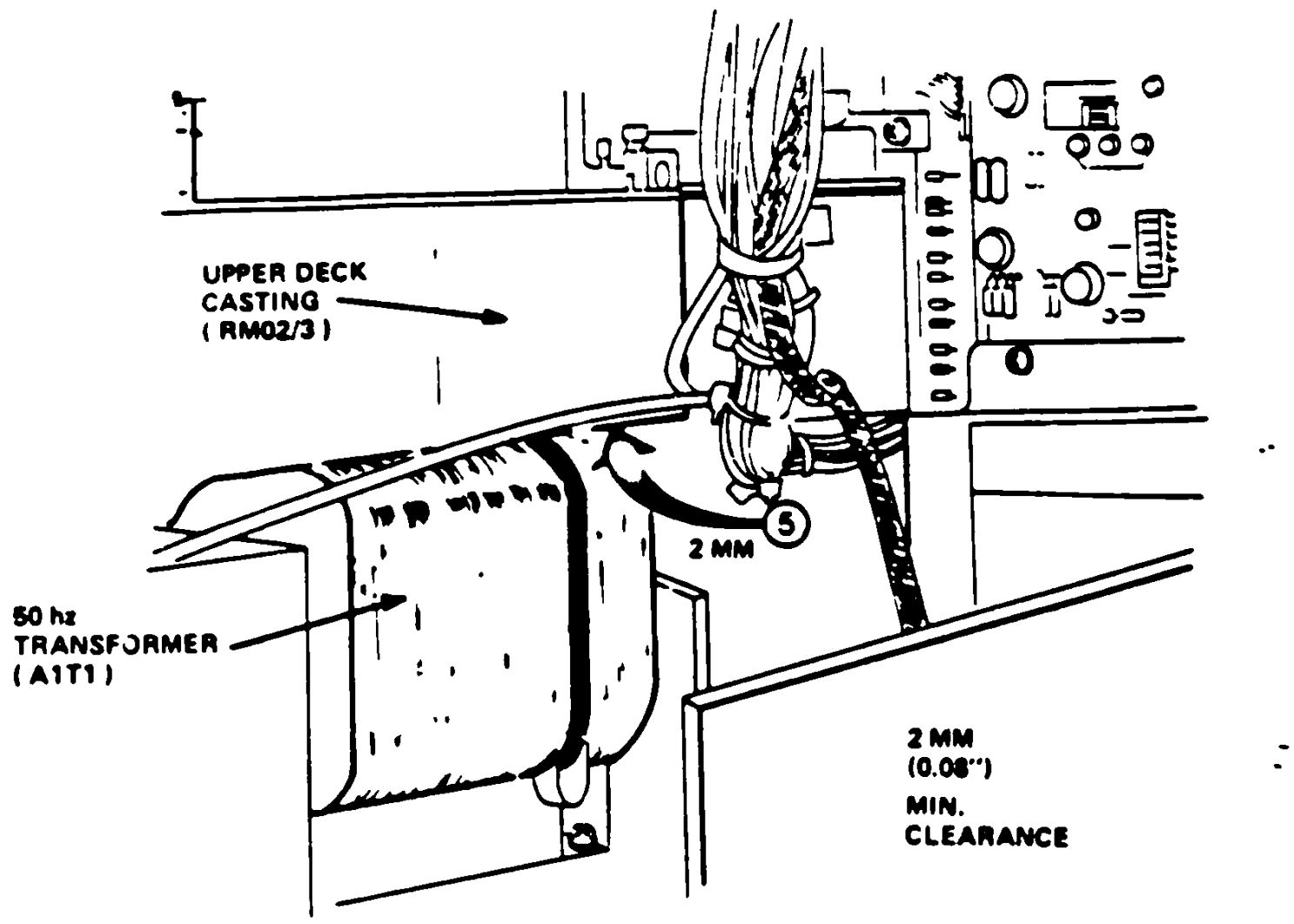


FIGURE 3

RM02-3 50 Hz Transformer
(Close-up View)

7. Carefully examine the insulation on both sides of the transformer (transformer windings insulation) for any signs of physical damage (ie: punctures, tears, scratches, indentations, etc.).

WARNING

IF PHYSICAL DAMAGE HAS OCCURRED THIS WILL REQUIRE REPLACEMENT OF THE TRANSFORMER. GO TO SECTION 2 FOR TRANSFORMER REPLACEMENT PROCEDURES.

8. If there is no physical damage to the AC power transformer winding insulation, check to ensure that the required clearance between the AC power transformer winding insulation and the upper deck plate assembly is 2mm (.08 inches).

9. With the deck in its lowered position, check to be sure that there is a minimum clearance of 2mm (.08 inches), between both the left and right side of the AC power transformer winding insulation and any part of the upper deck plate assembly. The critical areas of clearance are noted by the arrows labeled with no. 5 in FIGURE 3. A flashlight and feeler gauge may be required. The side of the transformer closest to the power supply assembly, see FIGURE 4, can be observed by looking through the hole in the rear of the positioner (ARROW 3, FIGURE 1) and applying sufficient light (with a flashlight) as shown by ARROW 4 in FIGURE 1. Assure that there are no pinched wire harnesses and no chance of damage due to contact between the transformer assembly and the upper deck chassis or other surrounding components.

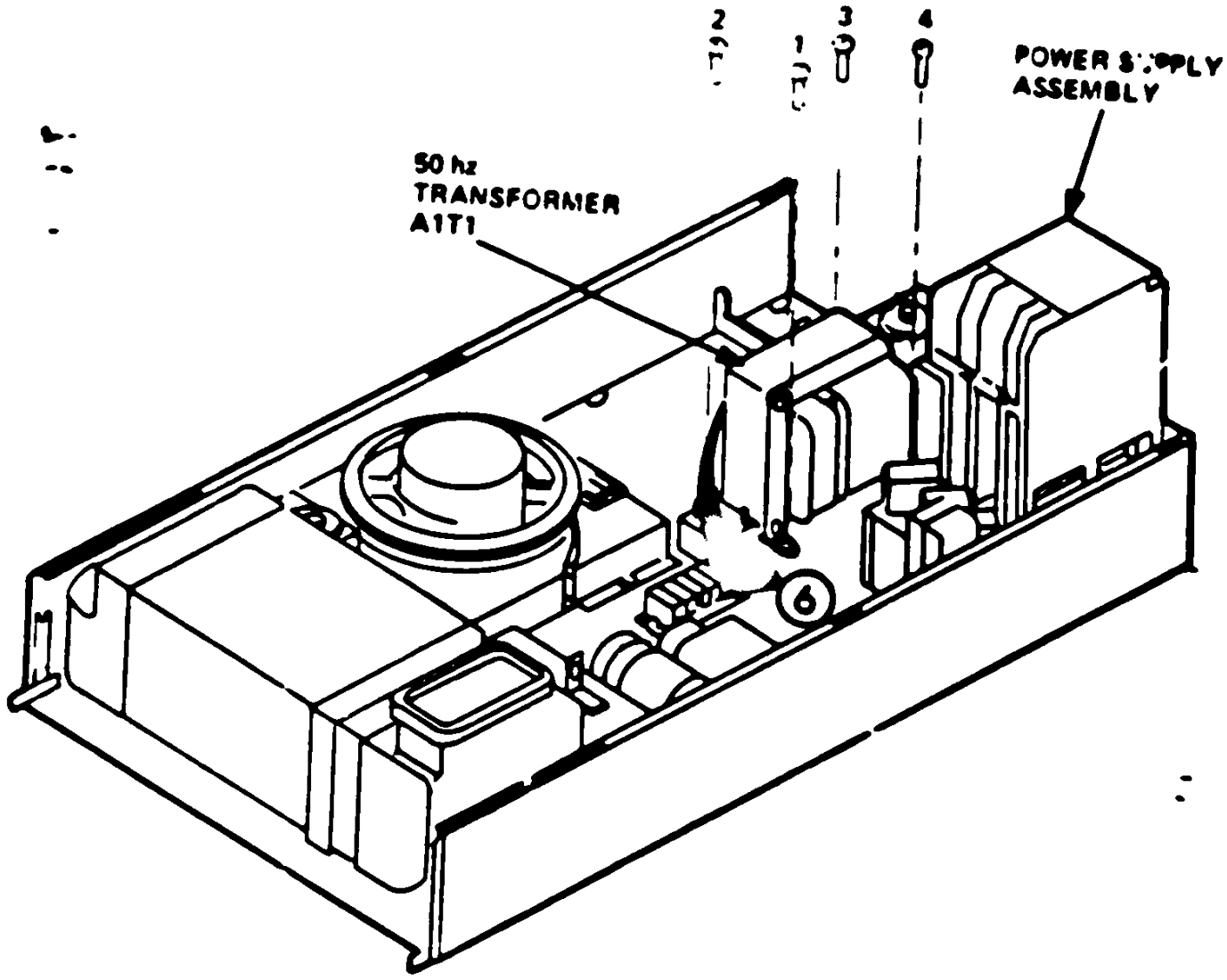


FIGURE 4

RM02-3 Lower Chassis Assembly

SECTION I - INSPECTION PROCESS (CON'T)

10. If the clearance on the left or the right side of the transformer is not sufficient, go to Section 2 for Transformer Rework Procedures.

SECTION 2 - TRANSFORMER REWORK PROCEDURES

PART 1 - ADJUSTING THE TRANSFORMER

It may be possible to get the required 2mm (.08 inches) clearance between both the left and right sides of the AC power transformer winding insulation and the upper deck plate assembly by adjusting the transformer from left to right. However, if physical damage has occurred then proceed directly to Section 2, Part 2 - Transformer Replacement Procedure.

1. Remove any existing disk pack from the drive and power-down the Unit.

****
*
* DANGER
*
* REMOVE AC POWER FROM THE RM02 DISK DRIVE BY REMOVING THE AC POWER
* PLUG FROM THE BRANCH RECEPTACLE BEFORE PROCEEDING.
*
****

2. Remove the drive top cover assembly.

3. Remove the two (2) top deck hold down screws (from inside the pack shroud area) that secure the upper deck chassis to the lower deck chassis.

4. Raise the deck to its maintenance position and lock the maintenance.

****
*
* WARNING
*
* ENSURE THAT THE MAINTENANCE BRACKET IS LOCKED WITH THE THUMB SCREW
* BEFORE PROCEEDING.
*
****

SECTION 2, PART 1 - ADJUSTING THE TRANSFORMER (CONT'D)

5. Slightly loosen the transformer mounting screws #1, #2, #3, and #4 (shown in FIGURE 4).

   NOTE: ACCESS TO TRANSFORMER MOUNTING SCREW #4 MAY BE OBTAINED BY FIRST REMOVING THE POWER AMP ASSEMBLY MODULE LOCATED ON THE SIDE OF THE HEADS ACTUATOR ASSEMBLY, (SEE FIGURE 1).

   A. Remove the quick connect terminal (yellow leadwire) from Faston on the upper left hand corner of the power amp assembly A3A04 (ITEM 35 on FIGURE 5).

   B. Remove the screw that secures the upper left hand corner of the power amplifier assembly.

   C. Remove connector J200.

   D. Cut the tie wrap from the bottom right hand corner.

   E. Remove the two screws that secure the power amplifier to the deck casting. An offset phillips screwdriver will be needed.

6. Carefully move the transformer to the left or right to obtain the required clearance of 2mm (.08 inches), on both sides of the transformer. This would be in a direction from left-to-right when viewing the transformer from the front of the drive (See ARROW 6 in FIGURE 4).

7. Check clearance as indicated in Section 1 - Inspection, Step 9.

8. If the required clearance cannot be obtained on both sides of the transformer(with the upper deck in its lowered position and both screws in the pack well assembly secured) using this adjustment procedure, then go to part 2 and perform the Transformer Replacement Procedure. Otherwise, continue with step 9.

9. Tighten the four (4) transformer mounting screws.

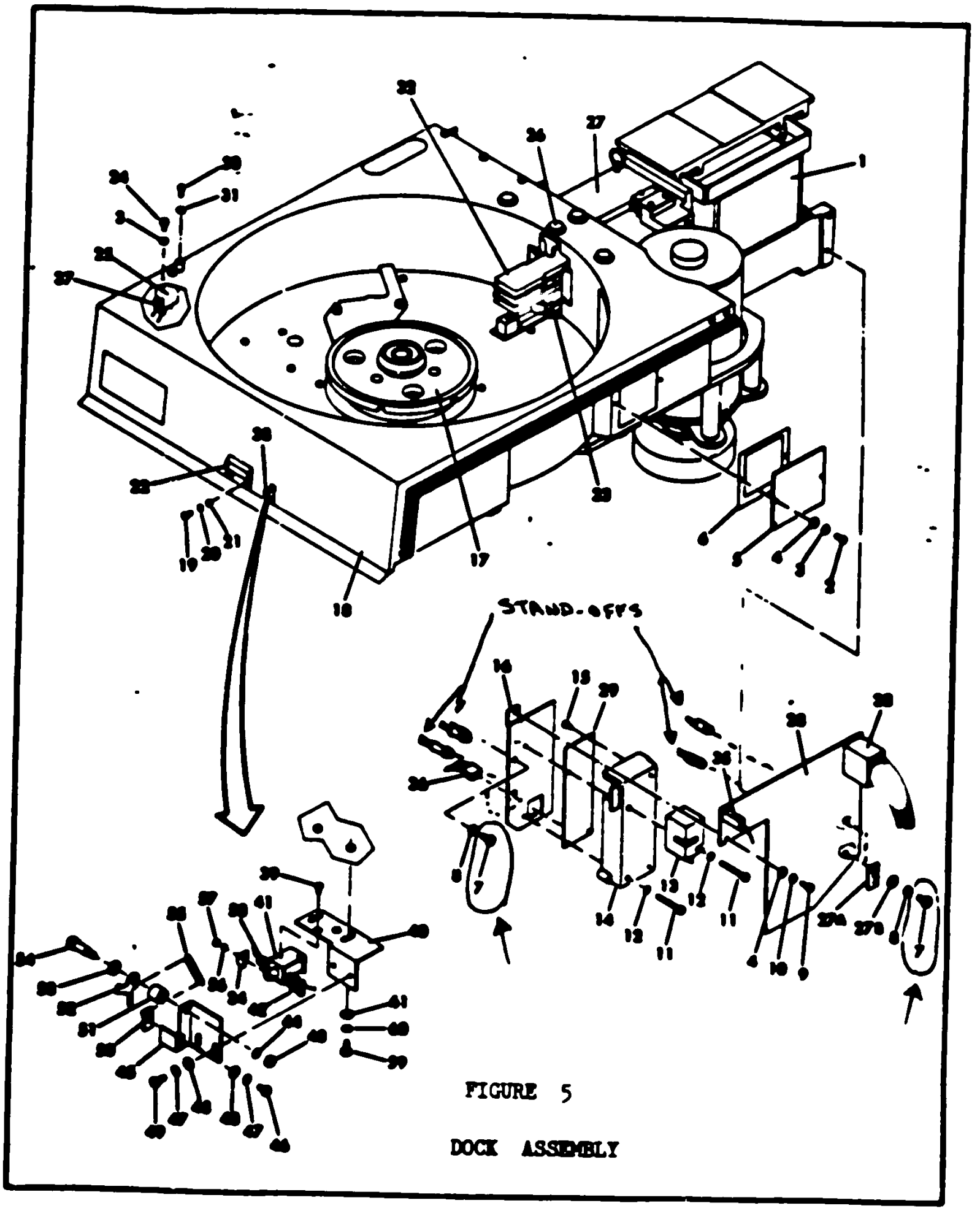


FIGURE 5

DOCK ASSEMBLY

10. To replace the servo power amplifier assembly, perform the following:

    A. Secure the servo power amp in place by installing the two (2) screws that mount the power amp to the baseplate. Do not tighten. Install and secure the screw in the upper left hand corner of the power amp assembly. Tighten the two remaining screws.

    B. Connect J200 to the power amp assembly. Connect yellow faston connector to the tab in the upper left hand corner.

11. With the upper deck in its lowered position and both screws in the pack well assembly secure, check again for required clearance on the both sides of the transformer, especially if the transformer has been re-adjusted in steps 1 through 8.

12. Carefully return the logic chassis to its normal operating position and tighten the logic chassis clamp screws per FIGURE 1.

13. Install the drive top cover assembly.

14. Power up the drive and verify drive operation using the available diagnostics on site.

15. Change the revision of the drive to revision "T", fill out LARS form as shown on attached example (see pages 19 thru 21) and log the performed FCO activity into the Digital Site Management Guide.

SECTION 2, PART 2 - REPLACING THE TRANSFORMER

1. Remove any existing disk pack from the drive and power-down the Unit.

DANGER

REMOVE AC POWER FROM THE RM02 DISK DRIVE BY REMOVING THE AC POWER PLUG FROM THE BRANCH RECEPTACLE BEFORE PROCEEDING.

2. Remove the drive Top Cover Assembly.

3. Remove the two (2) top deck hold down screws (from inside the pack shroud area) that secure the upper deck chassis to the lower deck assembly.

4. Install the rear hold-down spacer.

5. Raise the deck to its maintenance position and lock the maintenance.

WARNING

ENSURE THAT THE MAINTENANCE BRACKET IS LOCKED WITH THE THUMB SCREW BEFORE PROCEEDING.

6. Locate the terminal strip TB1 in front of the 50HZ transformer on the lower deck chassis assembly. Refer to item 2 on FIGURE 6.

7. Remove the plastic insulators from Terminals 1 through 6 on TB1.

NOTE

RECORD THE COLORS OF THE TRANSFORMER WIRES ATTACHED TO TERMINALS 1 THROUGH 6 ON TB1, BEFORE PROCEEDING.

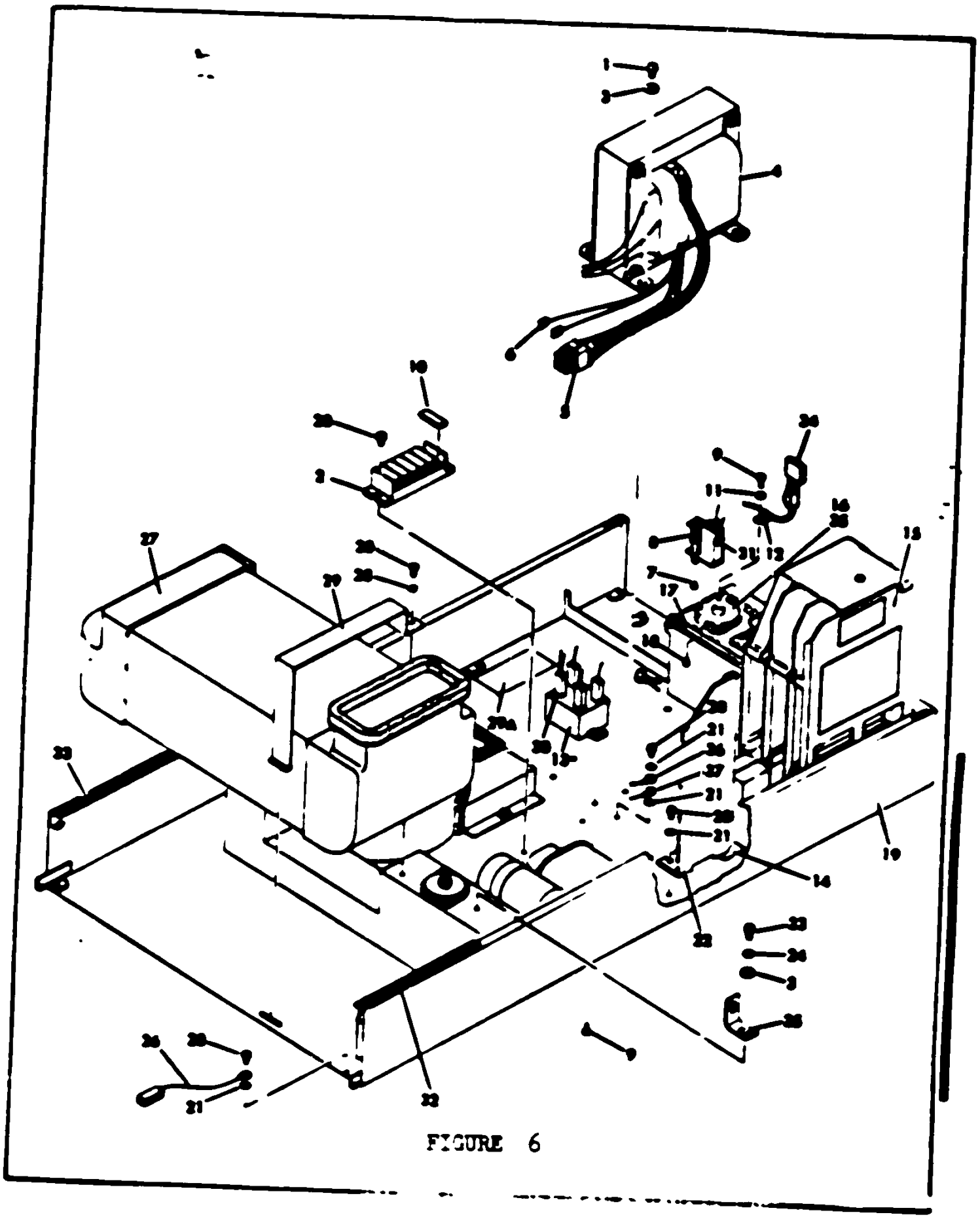


FIGURE 6

BASE ASSEMBLY

8. Loosen the terminal screws and remove the transformer wires attached to Terminals 1 through 6 on TB1.

9. Disconnect Transformer connector P100 from the power supply assembly, refer to FIGURE 7.

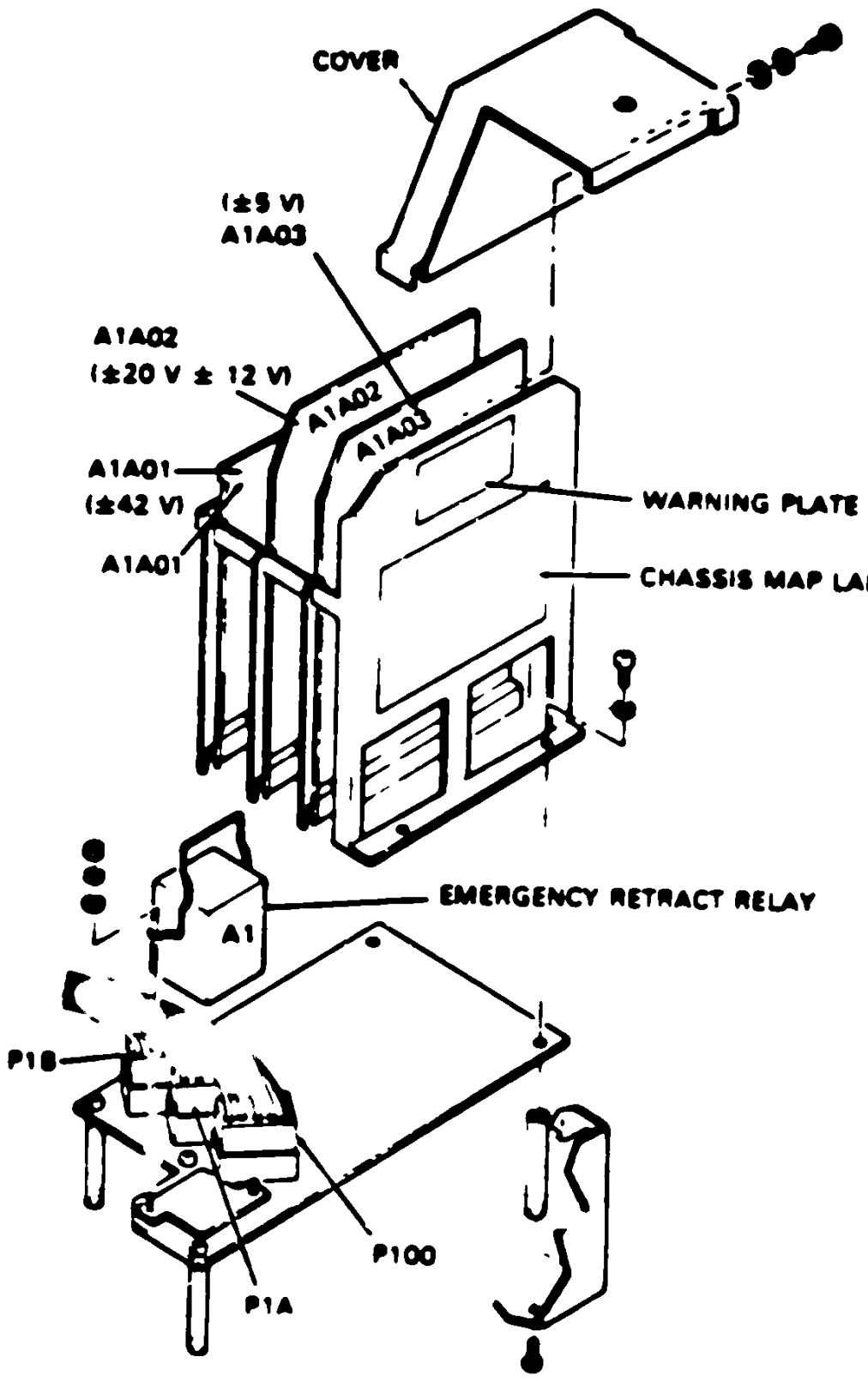


FIGURE 7

POWER SUPPLY ASSEMBLY

SECTION 2, PART 2 - REPLACING THE TRANSFORMER (CON'T)

10. Remove the two (2) orange transformer wires connected to the tuning capacitor C8 (Item 38 Figure 6).

11. Remove the three (3) transformer mounting screws #1, #2, and #3 as shown in FIGURE 4.

12. TO remove the power amplifier assembly to gain access to transformer screw #4, perform the following:

    A. Remove the quick connect terminal (yellow leadwire) from faston on the upper left hand corner of the power amplifier assembly. (Item 35 FIGURE 5).

    B. Remove the screw that secures the upper left hand corner of the power amplifier assembly.

    C. Remove connector J200.

    D. Cut the tie wrap from the bottom right hand corner.

    E. Remove the two (2) screws that secure the power amp to the deck casting. An offset phillips screwdriver will be needed.

13. Remove transformer screw #4 (FIGURE 4).

14. Remove the transformer (A1T1) and dispose of properly.
    Note: cut the tie wraps if necessary.

15. Install the new FCO replacement transformer (CDC P/N 76846800) with new transformer mounting strap (CDC P/N 95656840) incorporated (supplied in the FCO parts kit using the hardware removed in steps 11 and 12).
    NOTE: The new replacement transformer supplied with EQ-01334-01 has a new transformer elbow mounting bracket with slightly longer mounting holes to allow more tolerance in transformer adjustment. Refer to FIGURE 6.

16. Connect the two (2) transformer orange wires to the tuning capacitor (C8) as previously removed in step 10, polarity is not important. These two orange wires are identified as having spade lugs attached at their ends and both enter the tran-former windings at a location different from a 3rd orange wire containing no spade lug.

17. Route the wires away from movable parts.

18. Connect the transformer wires to terminal strip TB1 by color code as previously noted in steps 7 and 8.

CAUTION

TERMINAL CONFIGURATION FOR 220 VOLT, 50HZ OPERATION IS:

COLOR	TERMINAL NO.	COLOR	TERMINAL NO.
BLACK	1	YELLOW	4
ORANGE	2	GREY	5
BROWN	3	WHITE	6

19. Tighten all terminal strip screws and replace plastic insulators.

WARNING

ENSURE THAT ALL PLASTIC INSULATORS ARE REPLACED BEFORE PROCEEDING.

20. Steps 21 through 33 will move the power amplifier assembly (A3A04) and servo pre-amplifier assembly (A3A05) further away from the Transformer to allow more room for adjustment.
NOTE: The power amplifier assembly and the servo pre-amplifier assembly are attached to the side of the magnet assembly.

21. Remove the two screws (10-32 x 3/8, Item 7 FIGURE 5) that secure the power amplifier to the deck casting. An offset phillips screwdriver will be needed.

22. Carefully remove the power amplifier assembly out of the Unit.

23. Remove the uppermost left hand screw (Item 11 FIGURE 5) on the preamp housing shield (Item 13) and save it. Carefully slide back the servo preamp shield (Item 13 FIGURE 5) enough to get access to the servo head plug.

24. Unplug the servo head from the preamp board and slide the preamp shield off the servo head plug.

25. Remove the two most left-hand screws (10-32 x 3/8 Item 7 FIGURE 5) that secure the servo preamp housing to the baseplate and discard them. Carefully lift the servo preamp housing up approximately 2 inches. Disconnect connector J-8 (Item 36 FIGURE 5) from the bottom of the servo preamp housing.

26. Lift servo preamp housing out of the drive.

27. Install the four new standoffs supplied in the FCO kit to the baseplate in mounting holes for the servo preamp housing and the mounting holes for the power amp assembly, as shown in FIGURE 5.

28. Attach the servo preamp housing by first connecting J8 to the bottom of the servo preamp housing. Mount and secure the servo preamp housing to the new standoffs with the new screws (10-32 x 1/4) supplied in the FCO kit.

29. Install the servo preamp shield by sliding the servo head connector through slot in the servo preamp shield. Connect servo head connector to servo preamp. This connector is keyed. Make sure servo head cable is installed in cable clamp mounted on the baseplate.

30. Secure servo preamp shield into place with screw previously removed, see Item 11 Figure 5.

31. Replace tie wraps previously removed when the transformer was replaced.

32. Secure the power amp into place by installing the two new screws (10-32 x 1/4), supplied in the FCO kit, that mount the power amp to the new standoffs, but do not tighten. Install and secure screw in the upper left hand corner of the power amp assembly. Now tighten the two 10-32 x 1/4 inch screws.

33. Perform the transformer adjustment and inspection procedures outlined in sections 2, part 1. If the required clearance is obtained, continue with step 35 to verify proper operation of the drive.

34. Connect J200 to power amp assembly.

35. Connect the yellow faston connector to the tab in the upper left hand corner.

36. Restore the upper deck chassis assembly to its lowered position. Secure the two (2) top deck hold down screws.

37. Raise the logic card cage to its service position by sliding it back and lifting it up and over on its side. Refer to arrows 1 and 2 on FIGURE 1.

38. Connect tne main AC power cord to the site power source and apply power to the drive.

39. Using a Digital volt-ohmmeter, the following DC voltages can be measured on the bottom of the card cage (FIGURE 8.).

    A. +/- 5V (+/- 0.05V) on faston connectors.
    B. +/- 20V (+/- 1.0V) on faston connectors.
    C. +42V (+/- 2.0V) at Pin 32B on connector BAPA09.
    D. -42V (+/- 2.0V) at Pin 3B on connector BAPA09.
    E. +12V (+/- 0.3V) at Pin 8B on connector PA80.
    F. -12V (+/- 0.3V) at Pin 8A on connector PA80.

40. Command the drive to perform repetitive seeks between cylinders 0 and 32.

41. The +5V output should read +5.0 V (+/- 0.05V). If not, adjust the +5 V potentiometer on card A1A03 (FIGURE 7) until it is within specification.

42. The -5V output should read -5.0V (+/- 0.05V). If not adjust the -5V potentiometer on card A1A03 (FIGURE 7) until it is within specification.

43. If any adjustment was necessary in the preceeding two (2) steps, recheck both outputs.

44. Disconnect the Digital volt/ohmeter from the logic chassis and power down the drive.

45. Remove the main AC power cord from the site power source.

46. Carefully return the logic chassis to its normal operating position and tighten the logic chassis clamp screws per FIGURE 1.

47. Install the drive top cover assembly.

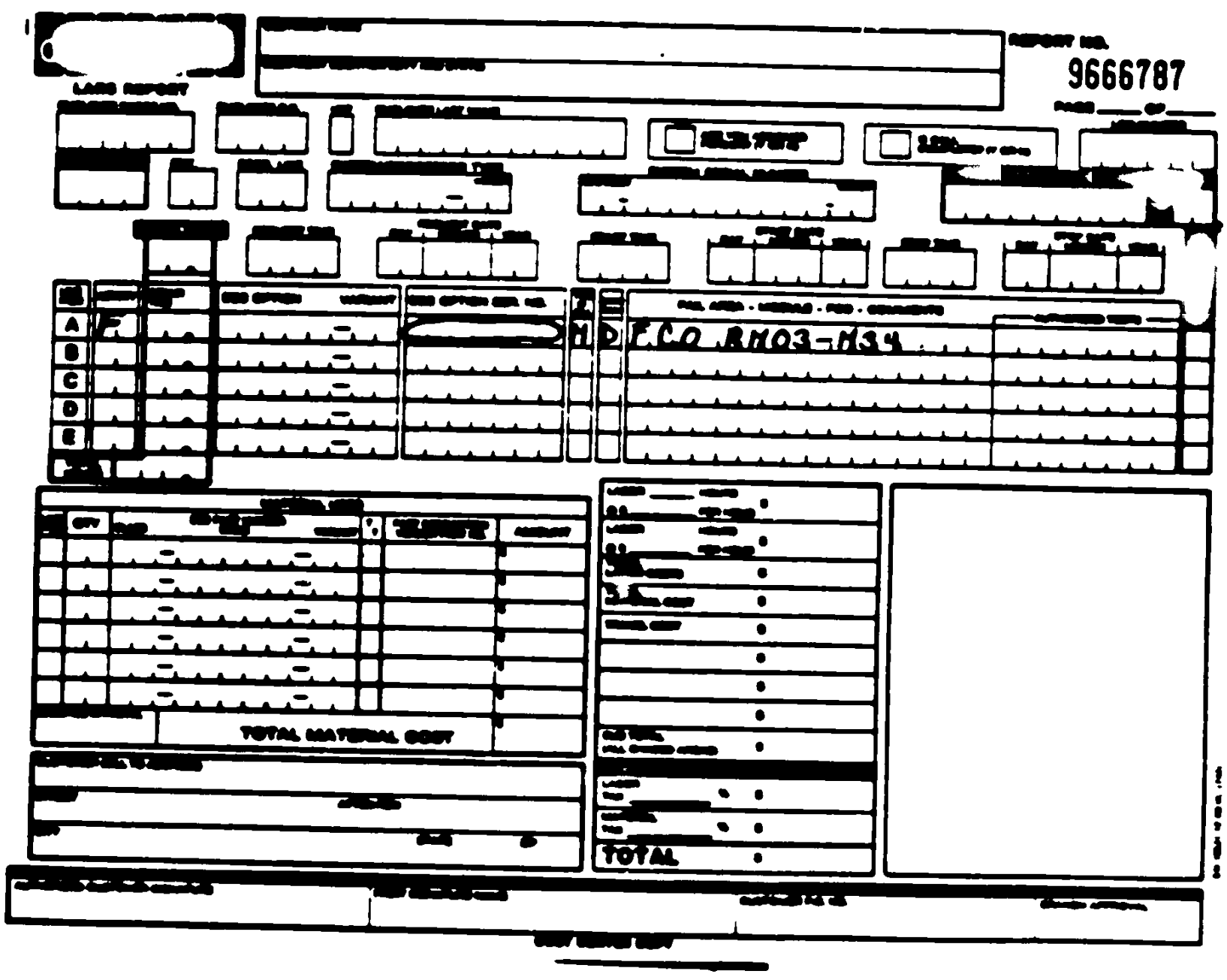
48. Connect the drive main AC power cord to the site power source and apply power to the drive.

49. Power-up the drive and verify drive operation using the available diagnostics on site.

50. Change the revision of the drive to revision "T", fill out Lars Form as shown on attached example (see pages 19 thru 21) and log the performed FCO activity into the Digital Site Management Guide.

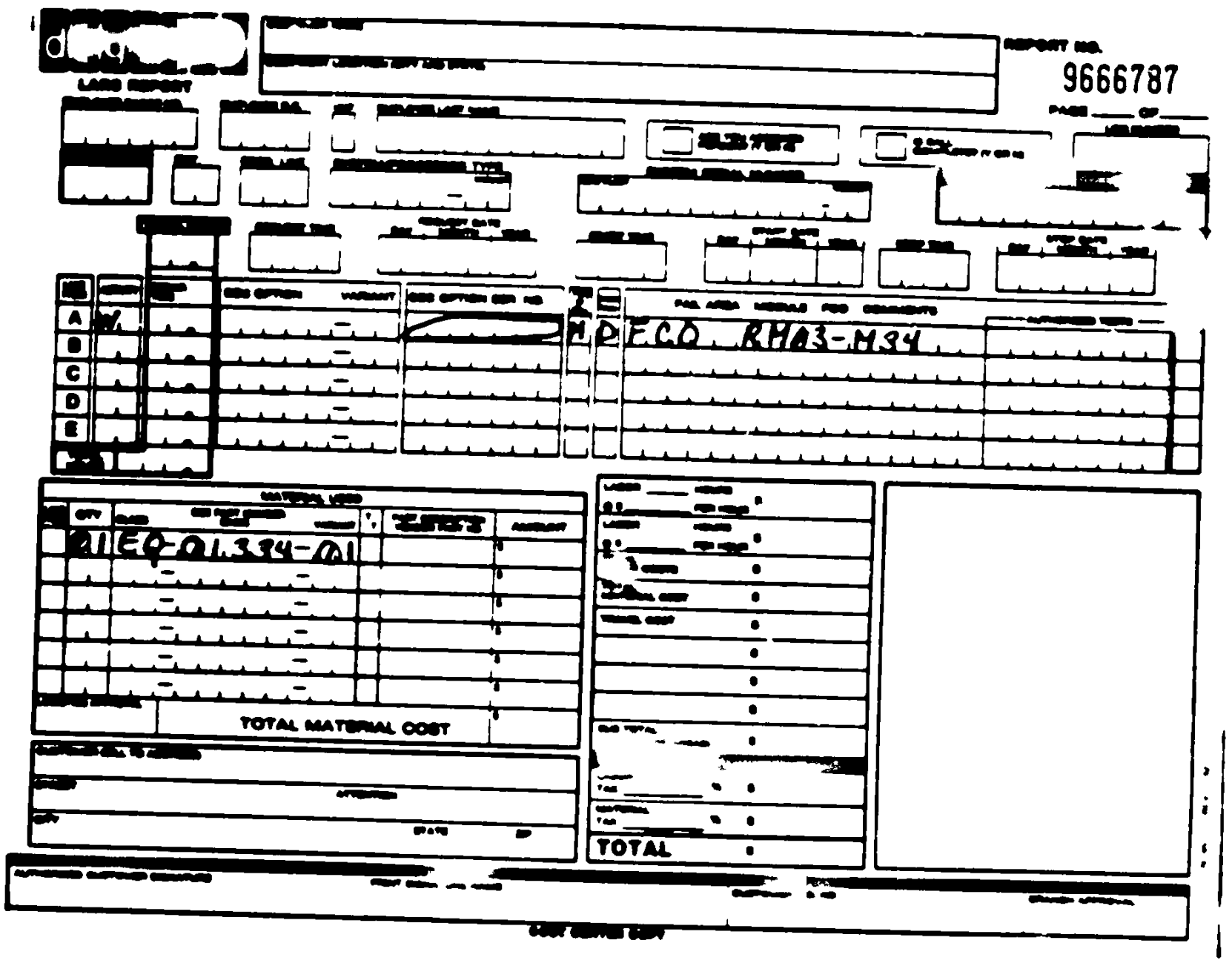
SAMPLE LARS FORM

FOR PER CALL CUSTOMERS
*** U.S., G.I.A. AND EUROPE ***



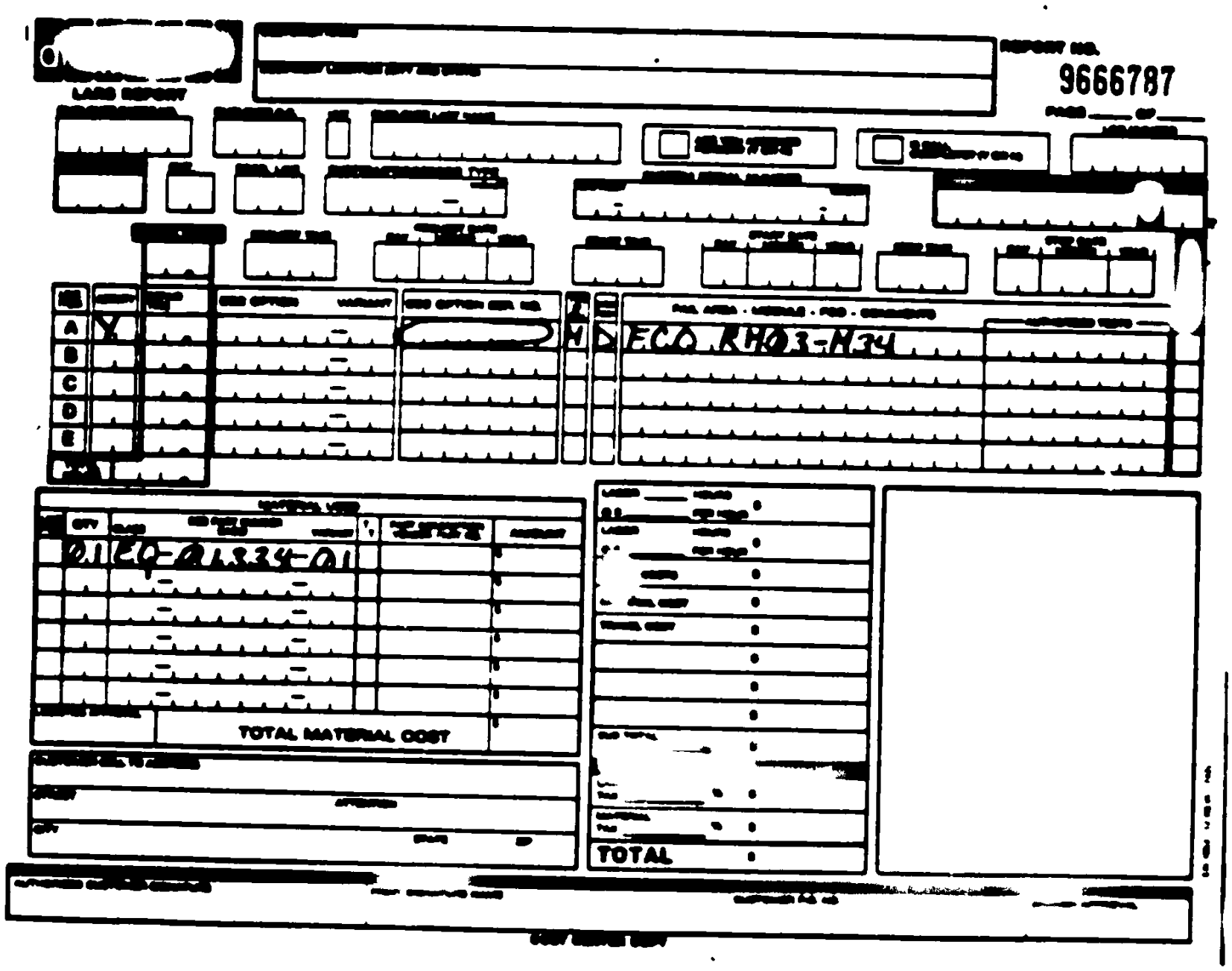
SAMPLE LARS FORM

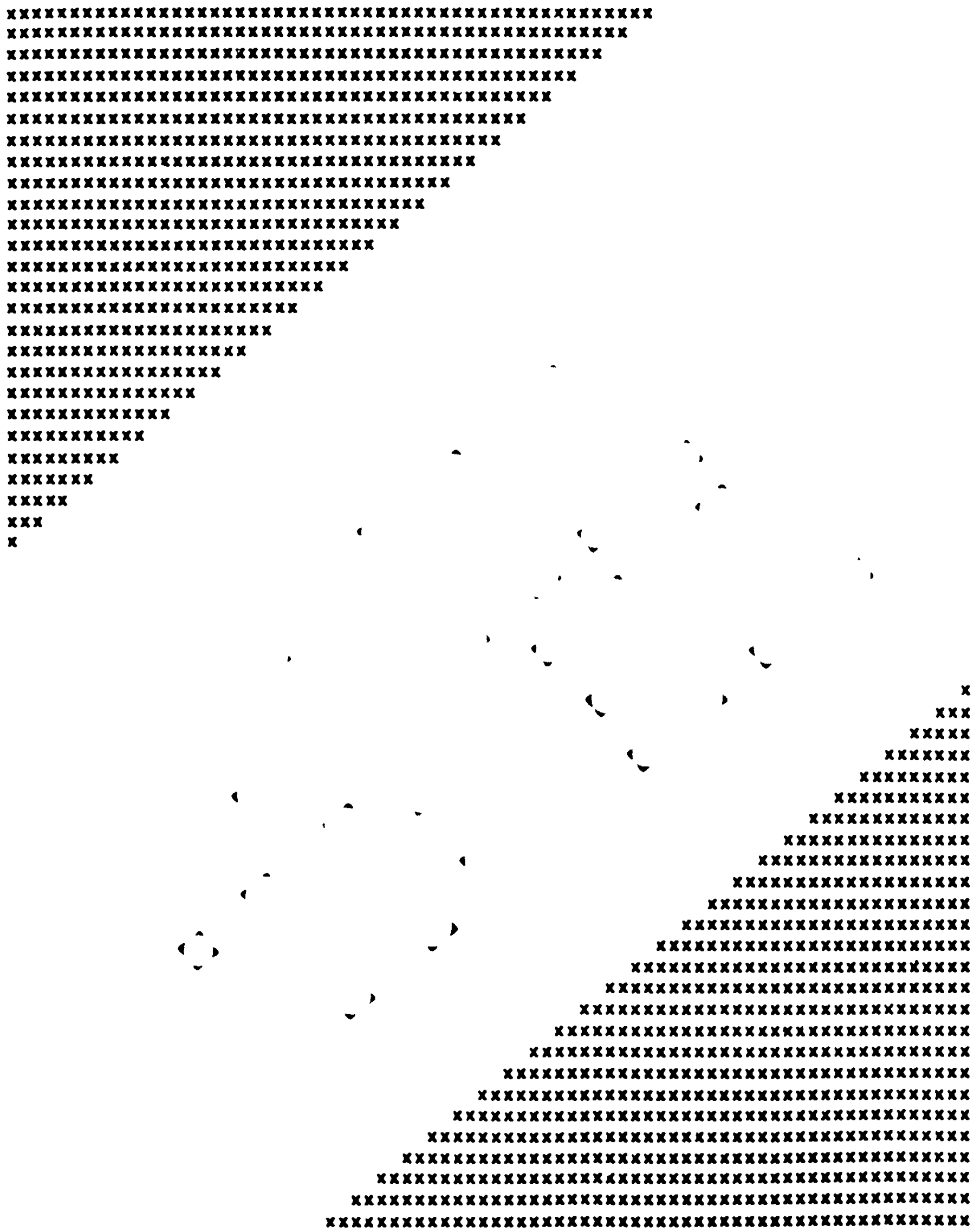
FOR CONTRACT AND WARRANTY CUSTOMERS
***** U.S AND G.I.A. ONLY *****



SAMPLE LARS FORM

FOR CONTRACT AND WARRANTY CUSTOMERS
***** EUROPE ONLY *****





7-Nov-1986
RM03-INDEX.A
REV A

MICROMEDIA PUBLISHING

Tech Tip Index

Tech Tip Number	REV	Rel. Date	SB#	Title
-RM03--TT-01	0	16-May-78		Diag Failure/RP04/5/6,RM02/3
-RM03--TT-02	B	9-Jun-78		Troubleshooting
-RM03--TT-03	0	11-Jan-79		XXDP Diagnostic Media
-RM03--TT-04	0	1-Feb-79		Maintenence Print Errors
-RM03--TT-05	0	31-Jan-79		Module Pin Marking
-RM03--TT-06	0	31-Jan-79		Heat Problem
-RM03--TT-07	0	31-Jan-79		Alignment Problems
-RM03--TT-08	0	26-Mar-79		RL11/RM03 Configured on 1170
-RM03--TT-09	0	9-Mar-79		Side Panel Fastening
-RM03--TT-10	0	25-Apr-79		Head Alignment Locking Pin
-RM03--TT-11	A	7-May-79		Jumper for LCG 2020 Compatability
-RM03--TT-12	0	6-Jun-79		5.1 Volt Adjustment
-RM03--TT-13	A	10-Dec-79		Power Regulator Board Blows Fuse
-RM03--TT-14	0	12-Jul-79		Offline Tester Head Algnmt Problem
-RM03--TT-15	0	6-Aug-79		Upgrade Restriction
-RM03--TT-16	0	20-Jul-79		HCE's DTE's Errors
-RM03--TT-17	0	20-Oct-79		Premature Bearing Failure
-RM03--TT-18	0	7-Nov-79		Air Circulation Problem
-RM03--TT-19	0	18-Sep-79		Premature Bearing Failure
-RM03--TT-20	0	28-Jan-80		RM02/3 Will Not Run DEC/X11
-RM03--TT-21	0	1-Feb-80		Write Check Error w/o Data Check
-RM03--TT-22	0	20-Feb-80		Seek Incomplete & Misposition Prob
-RM03--TT-23	A	12-Aug-80		Velocity Gain Adjustment
-RM03--TT-24	0	5-Dec-79		Head Alignment Tool Problem
-RM03--TT-25	0	30-Apr-80		Fault Latch Guard
-RM03--TT-26	A	13-May-81		Power Supply-Vib Sensitivity/DCK's
-RM03--TT-27	0	28-Jul-80		RM02/3/5/80 Module Compatibility
-RM03--TT-28	0	28-Jul-80		ASGV vs 6SGV Speed Detect
-RM03--TT-29	0	28-Jul-80		RM02/3/5/80 MBA Backplane
-RM03--TT-30	0	11-Jul-80		Head Crashes
-RM03--TT-31	0	12-Aug-80		Dual Port Logic Test Part 2
-RM03--TT-32	0	1-Dec-80		RM02/3/5/80 Dual Port
-RM03--TT-33	0	9-DEC-80		240 to 220v 50 HZ Power Conversion
-RM03--TT-34	0	16-Jan-81		Head Identification
-RM03--TT-35	0	19-Mar-81		Head Refurbishment Guideline
-RM03--TT-36	0	16-Mar-81		Poor Massbus Cable ZIF Connectors
-RM03--TT-37	0	19-Mar-81		ARL Module Guidelines
-RM03--TT-38	0	2-Apr-81		NRZ to MFM Part No Confusion
-RM03--TT-39	0	9-Jul-81		Noise Suspectibility
-RM03--TT-40	0	14-Jul-81		New Part No for CDC Drive ECO
-RM03--TT-41	0	22-Jul-81		DECX11 Module RMDA0
-RM03--TT-42	0	14-Aug-81		Intermittant Positioning Errors
-RM03--TT-43	0	14-Aug-81		Read-Write Servo Intermittents
-RM03--TT-44	A	9-Feb-82		RH11 Setup for RM02/3 on 11/44
-RM03--TT-45	A	9-Feb-82		Emergency Retract Relay
-RM03--TT-46	A	10-Mar-82		+12V Power Supply Too Low

-RM03--TT-47	A	22-Feb-82		RM02/2/5 Alt Head Alignment Proc
-RM03--TT-48	A	22-Apr-82		Velocity Gain Adjustment w/o FTU
-RM03--TT-49	A	18-Apr-82		Exclusive or Gate Error
-RM03--TT-50	A	18-Apr-82		Testing Carrage Bearings
-RM03--TT-51	A	15-Apr-82		Brake Assy Causing Intermtnt Fail
-RM03--TT-52	A	28-Apr-82	231	Disk Pack Cleaning/Inspection
-RM03--TT-53	A	17-May-82	235	Pack Seal Adj/Hold Down Bolts
-RM03--TT-54	A	15-Apr-83	277	Header Compare Error
-RM03--TT-55	A	18-May-83	281	50 HZ Power Transformer Shorting
-RM03--TT-56	A	6-Jun-83	285	New Line Filter/Series 34 and up
-RM03--TT-57	A	26-Oct-83	305	Brake Noise and Grounding FCO's
-RM03--TT-58	A	3-Jan-84	314	Data Errors Due to Runout
-RM03--TT-59	A	3-Jan-84	314	Problem Using Rail Alignment Tool
-RM03--TT-60	A	24-Mar-84	325	EVRDA Rev 4.1 Problem
-RM03--TT-61	A	25-Jun-84	342	RM Massbus Adapter Caution
-RM03--TT-62	A	3-Jan-85	363	RM Adapter Power Supply Caution
-RM03--TT-63	A	6-Mar-85	372	Speed Sensor Problem
-RM03--TT-64	A	7-Oct-85	402	FCO: RM02-S0020 Documentation
-RM03--TT-65	A	2-OCT-85	402	CPX Head Inspection Tool Kit
-RM03--TT-66	A	10-Nov-86	456	Diagnostic CZRMPB0.BIC Failure

FIELD SERVICE TECHNICAL MANUAL

Queen or Designator: RM02/3

12 Bit ☐ | 16 Bit ☒ | 18 Bit ☒ | 32 Bit ☐ | 36 Bit ☒

Title: DIAGNOSTIC FAILURES ON RP04, RP05/6, RM02/3			Tech Tip Number: RM02/3-TT-1
Author: Bill Davis/John Kwolek	F.S. Office: Nagog Woods	Date: 6.5.78	Revision: 0
Processor Applicability: All 11/40	Mgr/Sup.: Harry Dugas	Date: 5/14/78	Cross Reference
	Approval: Harry Dugas	Date:	

1. There is a chance of diagnostic failures on disks capable of formatting in 16 bit and 18 bit modes when connected to an 11/40. Typically, failures will occur in 18 bit mode due to an internal CPU jumper.

2. When testing the 18 bit data field function, the diagnostics use the PA and PB unibus lines.

3. On PDP-11/40's without Parity Memory, jumper W5 on the M7234 CPU timing board is inserted, grounding the PA line, and thus disabling bit 17 of the 18 bit data field.

4. If failures occur in the 18 bit mode, check to see if W5 on the M7234 is in. If so, cut the jumper.

5. On KL10's with the 11/40 as a front end, this jumper should always be removed, regardless of the memory configuration (i.e., parity or non-parity).

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RM02/3

Title	RM03/RM02 TROUBLESHOOTING			Tech Tip Number	RM02/3-TT-2
Author	D.MCELVANEY/L.BUCHANAN	F S Office	MAYNARD Date 6/9/78	Revision	B
Processor Applicability		Mgr /Sup	LARRY GOELZ Date 6/9/78	Cross Reference	
All	11	Approval	Larry Goelz Date 6/9/78		

READ THIS BEFORE YOU START TROUBLESHOOTING

THIS TECH TIP IS TO EMPHASIZE THE IMPORTANCE OF THE ± 5 VOLT ADJUSTMENT ON RM03/02 DISK DRIVES. THE SPECIFICATIONS FOR THIS ADJUSTMENT ARE 5.1 ± .05 VOLTS POSITIVE AND NEGATIVE. A DVM ACCURATE TO .01 VOLTS MUST BE USED TO MADE THE ADJUSTMENT, NOT A SCOPE. ALSO, THE VOLTAGE MUST BE MEASURED ON THE LOGIC CHASSIS WHILE PERFORMING REPETITIVE SEEKS FROM CYLINDER 0 TO 32. ANOTHER METHOD THAT HAS BEEN FOUND EFFECTIVE IS TO SET THE VOLTAGE AT 5.12 TO 5.15 VDC WITHOUT PERFORMING THE SEEKS.

THIS ADJUSTMENT MAY DRIFT AND SHOULD BE CHECKED FREQUENTLY, PARTICULAPLY IF THE UNIT IS CLOSE TO AN AIR CONDITIONING VENT OR THE SITE TEMPERATURE VARIES APPRECIABLY. ALWAYS CHECK THIS ADJUSTMENT BEFORE AND AFTER ANY C.M. ON THE DRIVE, AS A VERY SMALL ERROR IN THIS ADJUSTMENT CAN APPEAR AS RANDOM ERRORS OF ANY TYPE. PERFORMING THE 5 VOLT ADJUSTMENT AS A REGULAR PART OF PM WILL SIGNIFICANTLY REDUCE INTERMITTENTS ON THIS (OR ANY) C.D.C. DRIVE.

THE PLUS FIVE VOLT REGULATOR FOR THE MBA, RH70, CACHE, AND MEMORY MANAGEMENT SHOULD BE SET FOR 5.05 TO 5.10.

Title	RM02/3 XXDP DIAGNOSTIC MEDIA			Tech Tip Number	RM02/3-TT-3
Author	BOB BRASSARD	FS Office	MERRIMACK Date 11 JAN 79	Revision	0
Processor Applicability		Mgr /Sup	IRV PATON Date 11 JAN 79	Cross Reference	
All		Approval	Date		

RM03 XXDP SUPPORTING PROGRAMS

AS OF JANUARY 79, THE RM02/3 DISK DRIVE SUBSYSTEM WILL HAVE XXDP DIAGNOSTIC STORAGE, LOADING, MEDIA COPYING, AND DEC/X GENERATION CAPABILITIES THROUGH DECO'S (DIAGNOSTIC ENGINEERING CHANGE ORDER) TO THE XXDP SOFTWARE PACKAGE. PREVIOUSLY, THE RM03 HAD NOT BEEN SUPPORTED BY DIAGNOSTIC OR RELEASE ENGINEERING AS AN XXDP DIAGNOSTIC LOAD DEVICE. THE DECO'S WERE ORIGINALLY PUBLISHED TO THE FIELD ON MICROFICHE MINI LIBRARY SPEED BULLETIN #62 (NOVEMBER 27, 1978). THE UPDATED SOFTWARE UTILITIES AND DOCUMENTATION AND THE NEW RM02/3 XXDP BOOT/LOAD MONITOR RRDP WILL BE AVAILABLE IN THE DELAYED JANUARY 1979 SDC XXDP RELEASE, ORIGINALLY SCHEDULED FOR DECEMBER 1978.

STANDARD XXDP MEDIA CREATION PROCEDURES AS FOUND IN THE XXDP USER'S MANUAL (CZQXA??) SHOULD BE FOLLOWED TO CREATE AND TRANSFER DIAGNOSTICS TO THE "RRDP" MEDIA. BELOW IS A LIST OF XXDP SOFTWARE PRODUCTS AND THEIR MINIMUM REVISION LEVELS WHICH SUPPORT THE RM02/3.

MAINDEC #	REV/ECO TALLY	MAINDEC TITLE	DECO DATE
MD-11-CZQUR	L0/05	CZQURL0 XXDP UPD3R	15 OCT 78
MD-11-CZQUS	E0/04	CZQUSE0 XXDP HLP FLE (HELP FILE)	15 OCT 78
MD-11-CZQU1	C0/02	CZQU1C0 XXDP UPD3 PROG	15 OCT 78
MD-11-CZQU2	C0/02	CZQ72C0 XXDP COPY 2 PROG	15 OCT 78
MD-11-CZQU6	A0/00 (NEW!!)	CZQU6A0 RRDP XXDP RM02/3 MON	15 OCT 78
MD-11-CZQUX	H0/07	CZQUXH0 DEC/X11 CONFI LKR	20 SEP 78

RM03 XXDP DISCLAIMERS

1. ONLY THE "TOP LEVEL" (LARGEST) UTILITIES - UPD3, UPD3R, COPY2, DEC/X CONFIGURATOR LINKER (CZQUX-H0) - HAVE BEEN MODIFIED FOR THE RM02/3 BECAUSE THE RM03 IS GENERALLY NOT FOUND ON SYSTEMS REQUIRING THE SMALLER UTILITIES (WHICH WILL NOT BE UPGRADED FOR THE RM03): UPD1, UPD1A, UPD2, COPY1, DEC/X SMALL SYSTEM CONFIGURATOR LINKER (CZQUY E0).

2. THE "XTECO" XXDP TEXT EDITOR (CZQUG-G0) HAS NOT BEEN MODIFIED FOR USE WITH THE RM02/3.

3. ONLY THE NEW DEC/X CONFIGURATOR LINKER (CZQUX-H0), WHICH IS INCOMPATIBLE WITH THE "OLD" DEC/X "LIBRARIES AND MODULES", WILL SUPPORT THE

Title	RM02/3 XXDP DIAGNOSTIC MEDIA			Tech Tip Number	RM02/3-TT-3
Author	BOB BRASSARD	F S Office	MERRIMACK	Date 11 JAN 79	Revision 0
Processor Applicability: All		Mgr /Sup.	IRV PATON	Date 11 JAN 79	Cross Reference
		Approval		Date	

RM02/3 FOR RUN-TIME-EXERCISER (RTE) GENERATION.

4. DIAGNOSTICS: THE 11/70 INSTRUCTION EXERCISER (EQKC??) AND RH70 CONTROLLER TEST (ERHA??) HAVE NOT BEEN MODIFIED TO WORK WITH THE RM02/3.

RM02/3 XXDP DIAGNOSTIC MEDIA POLICY

THE RM02/3-P DISK PACK WILL NOT BE AVAILABLE FROM SDC-NR, NOR WILL IT BE USED BY F.A.&T. (NI, WM) AS AN XXDP DIAGNOSTIC DISTRIBUTION MEDIA. F.A.&T. WILL CONSIDER EXCEPTIONS TO THIS POLICY ON A CASE-BY-CASE BASIS, JUST AS WITH OTHER LARGE DISK PRODUCTS (RP02-6), FOR SYSTEMS WITH THE RM02/3 AS THE SOLE XXDP LOAD DEVICE IF FIELD SALES REQUESTS AND THE PRODUCT LINE FUNDS F.A.&T. TO TRANSFER THE XXDP DIAGNOSTIC PACKAGE TO AN RM02/3-P.

ORDERING INFORMATION

XXDP DIAGNOSTIC PACKAGES AND THE RM03 SUPPORTING UTILITIES ARE AVAILABLE ON THE FOLLOWING STANDARD MEDIA AND XXDP PACKAGE NAMES:

RX01/RXDP, RX02/RYDP, RL01/RLDP, RK05/RKDP, RK06-7/RMDP, TU60/TADP, TU56/TCDP (PENDING OBSOLESCENCE), TU10-16/TMDP-THDP, TR79/TRDP, AND PAPERTAPE.

NOTE THAT F.S. OFFICES AUTOMATICALLY RECEIVE PAPERTAPES AND DOCUMENTATION FOR UPGRADED AND NEW PDP11 DIAGNOSTIC SOFTWARE THROUGH THE "PDP11 DIAGNOSTIC PAPERTAPE AND DOCUMENT F.S. LIBRARY".

TO ORDER ANY OF THE ABOVE XXDP DISTRIBUTION MEDIA AND/OR DOCUMENTATION, CONSULT THE FOLLOWING FOR THE CORRECT PROCEDURES AND UNC (UNIFIED NUMBERING CODE) COMPONENT PART #'S:

1. ADMIN-TT-3: "F.S. PROCEDURES FOR ORDERING SOFTWARE AND PRINTS".
   MINIFICHE TECH INFO SECTION: "TT-MISC". (MISC. TECH TIPS)

2. PDP11 DIAGNOSTIC SOFTWARE COMPONENTS CATALOGUE: ORDER #:
   AV-8021F-TC (NO CHARGE)

3. PDP11 MAINDEC INDEX CZQAF??: MINIFICHE DIAGNOSTIC SECTION: "11 INDEX",
   DOCUMENT ORDER # AC-9024Q-MC.

Title	RM03 MAINTENANCE PRINT ERRORS			Tech Tip Number	RM02/3-TT-4
Author	M.J. DONESKI	F S Office	Date 1/31/79	Revision	0
Processor Applicability		Mgr /Sup.	Date	Cross Reference	
All X		Approval	Date 2/1/79		

IN THE RM03 DISK DRIVE MAINTENANCE PRINT SET, THERE IS A FLIP/FLOP LABELED "FINE F/F" ON PAGE 1-82, SHEET #2, CROSS REFERENCE #192. THIS F/F IS LABELED INCORRECTLY. THE OUTPUTS OF THIS F/F READS (-COARSE OUTPUT PIN 16B) SET-SIDE, AND (-FINE OUTPUT PIN 16A) CLEAR-SIDE. THEY SHOULD READ (-FINE OUTPUT PIN 16A) SET-SIDE AND (-COARSE OUTPUT PIN 16B) CLEAR-SIDE.

RM03 TT 7

Title	RM#3 MODULE PIN MARKING		Tech Tip Number RM02/3-TT-5
Processor Applicability: All X	Author DONESKI, M.J.	Rev 0	Cross Reference
	Approval [signature]	Date 11/31/79	

A problem exists on the RM#3 modules and extenders. The pins are labeled 1 to 17 (A&B) then 21 to 34 (A&B). Be very careful when shooting the backplane. Pins 18, 19, and 20 were omitted by C.D.C.

Title RMØ3 HEAT PROBLEM			Tech Tip Number RM02/3-TT-6
Processor Applicability: All X	Author DONESKI, M.J. Rev Ø		Cross Reference
	Approval [signature] Date 1/31/79		

In the RMØ3 disk drive, the card cage is cooled by directed air flow. When the card cage is in the maintenance position, for trouble shooting, it is no longer cooled by a directed air flow, and the modules start heating up fairly fast. Caution should be taken when trouble shooting in this area.

Title: RMØ3 ALIGNMENT PROBLEMS			Tech Tip Number RM02/3-TT-7
Processor Applicability: All [X]	Author DONESKI, M.J.	Rev Ø	Cross Reference
	Approval [signature]	Date 11/21/79	

The air pressure inside the RMØ3 shroud area is critical to head alignment, when the drive is up and running. Therefore, any disturbance to the drive cover can and will cause momentary, and prolonged, alignment problems. Nothing (pack, pack covers, coffee cups, elbows, or dead bodies) is to be placed on top of the RMØ3.

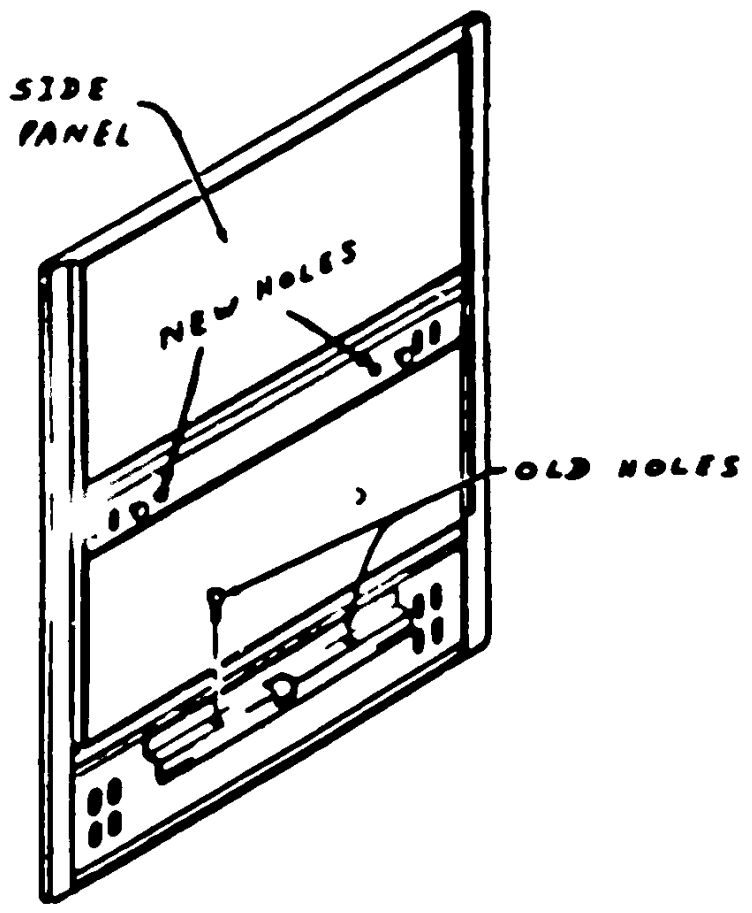
Title	RL11 AND RM03 CONFIGURED ON 11/70		Tech Tip Number	RM02/3-TT-8
Author	CLAY MORSE	F.S. Office CZ	Date 3-26-79	Revision 0
Processor Applicability All		Mgr./Sup. B. NICKERSON Date		Cross Reference
		Approval Date		RL11-TT-4

THIS TECH TIP IS FOR CROSS REFERENCE ONLY.

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RM02/3

Title RM02/RM03 SIDE PANEL FASTENING			Tech Tip Number RM02/3 - TT-9
Author GREG EKHOLM	F.S. Office MAYNARD	Date 3/9/79	Revision 0
Processor Applicability: All	Mgr./Supv. B NICKERSON	Date	Cross Reference
	Approved	Date	

A RECENT ECO # TO THE RM02/03 CABINET WILL NOW REQUIRE FASTENING THE DEC SIDE PANELS ON TO THE MODIFIED H9691 CABINET AT THE TOP OF THE H9691 INSTEAD OF THE BOTTOM AS WAS THE PREVIOUS METHOD. THE OLD HOLES WILL NOT BE REMOVED SO THERE SHOULD BE NO PROBLEM WITH DOWNWARDS COMPATABILITY. ON THE NEW STYLE UNITS IN ORDER TO REMOVE THE SIDE PANELS YOU WILL HAVE TO REMOVE THE TWO SCREWS AND WASHERS ON EACH SIDE PANEL FROM THE MBA AREA OF THE DRIVE. THE SCREWS WILL BE TOWARDS THE TOP OF THE CABINET CLOSE TO THE RETAINING LUGS FROM THE SIDE PANEL.



Title	RM03 HEAD ALIGNMENT LOCKING PIN			Tech Tip Number	RM02/3-TT-10
Author	Larry McGee	F.S. Office	Memphis, Tn. Date 2-26-79	Revision	0
Processor Applicability		Mgr./Supv.	Date	Cross References	
All		Approval:	Date 4-25-79		

WHEN REMOVING THE COVER FOR ACCESS TO THE HEAD ASSEMBLY, DRIVE LOGIC, AND POWER SUPPLY, THE "HEAD ALIGNMENT LOCKING PIN" HAS A TENDENCY TO GET PULLED OUT OF ITS STORAGE HOLE AND MAY DROP IN THE DRIVE. THE RING IN THE LOCKING PIN GETS MAGNETIZED FROM THE STRONG MAGNETIC FIELD OF THE EMA ASSEMBLY AND MAGNETICALLY ADHERES TO THE DRIVE COVER. TO PREVENT THIS FROM HAPPENING, USE TAPE TO HOLD THE LOCKING PIN IN PLACE

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RM02/3

Title RM02/03 Jumper for LCG 2020 Compatibility			Tech Tip Number RM02/02-TT-11
Author J.Gannelli/M. Ronayne	F S Office PROD SUPPORT MNFG. ENG.	Date 4/13/79	Revision A
Processor Applicability All babbaluke luk78b	Mgr /Sup A.O'Donnell	Date 4/19/79	Cross Reference
	Approval [signature]	Date 5/7/79	

FOR LCG 2020 SOFTWARE COMPATIBILITY INSTALL JUMPER FROM E6E1 to E6C2 (GROUND) ON THE DEC MBA CONTROLLER BACKPLANE.

REASON:

REFERENCE (RM02/03) DISK SYBSYSTEM USERS GUIDE #EK-RM023-UG-001 PAGE 4-55 TABLE 4-22. PRINT REFERENCE RM03 FIELD MAINTENANCE PRINT SET, PRINT DS6 - SHEET 6 OF 15 COORDINATES C3 SIGNAL NAME BP144 ENBH.

NOTE:

1. THIS JUMPER INHIBITS BAD SECTOR ERROR FROM COMING UP AS A RESULT OF MF OR UF BITS BEING TRUE IN FIRSTHEADER WORD. LCG 2020 DO NOT USE THESE BITS TO FLAG BAD SECTORS.

2. FOR ONLY 2020 SYSTEMS (NOT 8 & 11 SYSTEMS). IF YOU ARE HAVING TROUBLE WITH A PDP11 SYSTEM GETTING MF OR UF BITS, CHECK TO MAKE SURE THIS JUMPER IS NOT IN.

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/3
	12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☐	

Title 5.1 VOLT ADJUSTMENT			Tech Tip Number RM02/3-TT-12
Author Larry Wakeman	FS Office San Francisco	Date 7-MAY-79	Revision -0-
Processor Applicability: All	Mgr/Sup [signature]	Date 6-7-79	Cross Reference
	Approved [signature]	Date 6-6-79	

When adjusting the 5.1 Volt supply in the RM03, it is best to have the drive perfoming oscillating seeks between cylinders 0 and 32 ('Normal Load'). The following program will perform the requisite seeks.

```
LOC.    CONT.
1000     12737          MOV     #DRV,@#RMCS2
1002         0                                      : DRIVE #
1004    176710
1006     12737          MOV     #DRVCLR,@#RMCS1
1010        11
1012    176700
1014    105737          TSTB    @#RMCS1
1016    176700
1020    100375          BPL     .-2
1022     12737          MOV     #PACACK,@#RMCS1
1024        23
1026    176700
1030    105737          TSTB    @#RMCS1
1032    176700
1034    100375          BPL     .-2
1036     13737  LOOP:   MOV     @#SWR,@#RMDC
1040    177570
1042    176734
1044     12737          MOV     #SEEK,@#RMCS1
1046         5
1050    176700
```


RM03 TT 12

```
LOC.   CONT.
1052   105737      TSTB   @#RMCS1
1054   176700
1056   100375      BPL    .-2
1060   105737      TSTB   @#RMDS
1062   176712
1064   100375      BPL    .-2
1066    12737      MOV    #0,@#RMDC
1070        0
1072   176734
1074    12737      MOV    #SEEK,@#RMCS1
1076        5
1100   176700
1102   105737      TSTB   @#RMCS1
1104   176700
1106   100375      BPL    .-2
1110   105737      TSTB   @#RMDS
1112   176712
1114   100375      BPL    .-2
1116      747      BR     LOOP
```

To adjust the 5.1 volt supply, bring drive to ready, Load Address 1000, place 40 in the switch recister and Start. Adjust for 5.1 volts at the fastons on the bottom of the logic cage. This adjustment is very important as even a slight varition can cause problems with the drive.

If you wish to use a drive other then 0, just load the drive number in location 1002 and restart.

Title RM02-03 power regulator board fuse blowing			Tech Tip Number RM02/3-TT-13
Author Tom Tobiassen	F S Office Colo Springs	Date 10 May 79	Revision A
Processor Applicability: All 11 | 10 | 20 | VAX	Mgr /Sup Rollie Neff	Date 10 may 79	Cross Reference
	Approval GREG EKHOLM	Date 10 DEC79	

SUBJECT F2 SHV POWER REGULATOR BOARD

ON SOME RM02-03'S THE 6 AMP FUSE (F2) ON THE SHV REGULATOR BOARD, MAY BLOW INTERMITTANTLY ON DRIVE POWER UP. THIS BOARD DEVELOPS PLUS AND MINUS 5 VOLTS . REPLACE THE 6 AMP FUSE WITH AN 8 AMP FUSE PER ECO RM03-00011. THE OLD REGULATOR IS ASHV AND HAS 6 AMP FUSES. THE NEW REGULATOR IS BSHV AND HAS 8 AMP FUSES. OTHER THAN THE FUSE THERE IN NO DIFFERENCE BETWEEN THE TWO BOARDS.
CDC HAS ALSO CHANGED THE PLUS AND MINUS 42 VOLT REGULATOR BOARD. THE OLD ONE IS A 5 SJV AND HAS A 6 AMP FUSE ON IT. THE NEW ONE IS A ASJV AND HAS BOTH 8 AMP AND A BLEEDER RESISTER ON IT. AT THE PRESENT TIME IT IS NOT RECOMMENDED TO CHANGE THESE 6 AMP FUSES ON THE 5 SJV TO 8 AMP FUSES.

PRINTED IN U.S.A.

EK-1189C-12-R377 (79V)

RM02-TT-17

Title: RM03 OFFLINE TESTER HEAD ALIGNMENT PROBLEM			Tech Tip Number: RM02/3-TT-14
Author: JOHN R. STRAUSS	F.S Office: COLUMBUS OH. Date: 2-JUL-79		Revision: 0
Processor Applicability: All	Mgr /Sup.: JACK DONAHUE Date: 2-JUL-79		Cross Reference
	Approval: Greg Ehlsh Date: 7/12/79		

WHEN USING THE OFFLINE TESTER FOR HEAD ALIGNMENT, THERE IS A POSSIBILITY OF GETTING A FALSE INDICATION WHILE ALIGNING THE HEADS DUE TO EMI BEING INDUCED IN THE CABLES USED FOR THE TESTERS METER. THESE CABLES RUN FROM THE TEST CARD WHICH PLUGS INTO SLOT A2 ON THE RM03 TO THE TESTER'S METER INPUT.

I FOUND THAT TO GET A CORRECT INDICATION ON THE METER, YOU SHOULD TRY TO KEEP THE METER TEST LEADS SEPARATED. I ALSO FOUND THAT IF THESE LEADS ARE LYING ACROSS THE REGULATORS ON THE BACK OF THE DRIVE THIS CAN ALSO GIVE YOU A FALSE INDICATION.

TO RESOLVE THIS PROBLEM, IT MAY BE A GOOD IDEA TO USE SHIELDED CABLES FOR THESE TEST LEADS.

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/3
	12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☒	

Title RM#2 TO RM#3 UPGRADE RESTRICTION			Tech Tip Number RM#2/3 - TT - 15
Author BOB BRASSARD	F S Office MK1-2/G15	Date 6 AUG 79	Revision #
Processor Applicability: All 10 | 11 | V | A | X	Mgr /Sup IRV PATON	Date 6 AUG 79	Cross Reference
	Approval GREG EKHOLM	Date	

PROBLEM

FIELD UPGRADES OF THE RM#2 TO THE RM#3 IS NOT RECOMMENDED OR SUPPORTED BY THE PRODUCT MANAGER OR F.S. PRODUCT SUPPORT. ALTHOUGH THE ONLY FUNCTIONAL DIFFERENCE BETWEEN THE TWO PRODUCTS IS PACK SPIN RATE (RM#2 = 2400 RPM; RM#3 = 3600RPM) AND DATA TRANSFER RATE (16 BIT FORMAT: RM#2 = 806 KB/SEC; RM#3 = 1212 KB/SEC), THE FOLLOWING PARTS ARE DIFFERENT BETWEEN THEM:

	RM#3 DESIG.	RM#2 DESIG.	FUNCTION	LOCATION
LOGIC MODULES (7):	HFRV	JFRV	FINE SERVO	A2A#3
	HLRV	LLRV	DATA LATCH	A2A#5
	CLSV	BLSV	WRITE PLO	A2A#1
	ELTV	NLTV	ACC. CONT.	A2B#8
	BLZV	CLZV	READ PLO	A2A#6
	NZJN	SZJN	MD SEL. AMP	A3A#2
	EZKN	DZKN	WR DRIVER	A3A#3
POWER SUPPLIES:	ASHV	BSHV	±5 V. - REG.	A1A#3
	(FUSE CHANGE ONLY)			
R/W HEADS:	ALL 5 R/W HEADS AND 1 SERVO HEAD DIFFERENT.			
SPINDLE ASSY.	3600 R.P.M.	2400 R.P.M.		
SPINDLE MOTOR:	——	——	DRIVE MOTOR	A3DM1
	(292 MFD.)	(193 MFD.)	STARTING CAP.	A3C6
	——	——	DRIVE BELT	(A3DM1)

ADDITIONALLY, THERE ARE NO WRITTEN "UPGRADE" PROCEDURES, NO DISK ENGINEERING SUPPORT, NO MANUFACTURING TESTS AND NO FIELD EXPERIENCE TO GUARANTEE SUCCESS WITH THE UPGRADE. THIS RESTRICTION HAS NOT BEEN MENTIONED IN ANY OF THE RM#2/3 DOCUMENTATION OR MAINTENANCE PLAN.

SOLUTION/BACKGROUND - (CONTINUED ON NEXT PAGE.)

FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/3
12 Bit ☐	16 Bit ☐	18 Bit ☐	36 Bit ☐	

Title RMØ2 TO RMØ3 UPGRADE RESTRICTION			Tech Tip Number RMØ2/3 - TT- 15
Author BOB BRASSARD	F S Office MK1-2/G15	Date 6 AUG 79	Revision Ø
Processor Applicability: All 10'S 11'S V A X	Mgr./Sup. IRV PATON	Date 6 AUG 79	Cross Reference
	Approval GREG EKHOLM	Date	

SOLUTION/BACKGROUND

THE NEED TO UPGRADE THE RMØ2 MAY ARISE WHEN PLANNING A MOVE OR RE-INSTALLING AN RMØ2 FROM A UNIBUS - BASED SYSTEM (11/34 - 11/60) TO A HIGHER PERFORMANCE CPU (11/70, VAX, 10,20,ETC.). THE FACT IS THAT THE RMØ2 TRANSFER RATE IS ONLY 33% SLOWER THAN THE RMØ3 - THIS WAS INTENDED TO PREVENT "SWAMPING" / OVERLOADING OF UNIBUS SYSTEMS - AND IS TOTALLY COMPATIBLE WITH LARGER SYSTEMS AND RMØ3'S: MASSBUS, DIAGNOSTICS, RMØ2/3 MIXES. THAT PERFORMANCE DIFFERENCE IS FURTHER REDUCED WHEN CONSIDERING THAT NO DATA IS TRANSFERRED DURING HEAD REPOSITIONING ("SEEKS") WHICH TAKES A SIGNIFICANT AMOUNT OF THE DRIVE'S TIME. (THE SEEK PERFORMANCE BETWEEN THE RMØ2 AND RMØ3 IS IDENTICAL, ALTHOUGH AVERAGE ROTATIONAL LATENCY INCREASES FROM 8.3 TO 12.5 MILLISECONDS - THE DIFFERENCE REPRESENTING ONLY 14% OF THE 30MS. AVERAGE SEEK TIME.) UNLESS CONTINUOUS MASSBUS DATA TRANSFERS CAN BE MAINTAINED ON AN RMØ2/3 SUBSYSTEM THROUGH THE USE OF "OVERLAPPED - SEEK" SOFTWARE DEVICE DRIVERS AND MULTIPLE "SPINDLES," THE NET THROUGHPUT DIFFERENCE BETWEEN THE RMØ2 AND RMØ3 SHOULD BE INSIGNIFICANT. (NOTE: DISK MEDIA AND FORMATS ARE IDENTICAL AND INTERCHANGEABLE.)

CONCLUSION

THEREFORE, BECAUSE OF THE SMALL THROUGHPUT DIFFERENCE, THERE IS VERY LITTLE PRACTICAL ADVANTAGE TO UPGRADING FROM RMØ2 TO RMØ3 - THROUGH EITHER MODIFICATION OR DRIVE REPLACEMENT - IN THESE SITUATIONS.

Title	RM03 HCE's DTE's ERRORS		Tech Tip Number	R'102/3-TT-16
Author	Jimmie Ray McKenzie	F S Office SWD Support/PX Date 7/20/79	Revision	0
Processor Applicability: All		Mgr /Sup Gary Kline Date 7/20/79	Cross Reference	
		Approval /Greg Ekholm GREG EKHOLM		

The shield that covers the servo head lead on the servo pre-amp has to be reinstalled whenever a servo head or preamplifier is replaced. Failure to do this will result in DTE's and HCE errors, particularly on the upper cylinders.

Title	PREMATURE BEARING FAILURE			Tech Tip Number	RM02/3-TT-17
Author	A. GROVER	F.S. Office UK	Date 18 SEP 7	Revision	0
Processor Applicability: All		Mgr./Sup. I. YOUNG	Date	Cross References	
		Approval: GREG EKHOLM	Date 20.OCT.7		

It is becoming increasingly apparent that a number of sites are suffering from bearing failure on RM03's. The first indications of this are Seek incomplete and HCE's (header compare errors), if no attention is paid to these symptoms a head crash is almost certain to follow.

It is possible to prevent this by carefully monitoring the state of the rails and carriage bearings at P.M. time paying particular attention to the adjustable bearing.

Under normal conditions the rail should show signs of even wear over the whole width of the bearing - if the bearing is beginning to fail the wear is over a very narrow portion - at the same time there will be signs of over heating on the bearing - i.e. change of colour.

When these signs are detected the carriage/rail should be changed at the earliest opportunity.

Title	RM03 AIR CIRCULATION PROBLEM		Tech Tip Number	RM03-TT-18
Author	JOHN STRAUSS	F.S Office COLUMBUS, OH Date 23 AUG 79	Revision	0
Processor Applicability: All		Mgr. Rev. [signature] Date 27 Oct 79	Cross Reference	
		Approval [signature] Date 7 Nov 79		

WHILE TROUBLESHOOTING AN RM03 PROBLEM WE IN COLUMBUS ENCOUNTERED AN AIR FLOW PROBLEM THAT WE WERE NOT AWARE OF ON RM03's UNTIL WE CALLED DON SMITH IN CHICAGO (REGIONAL SUPPORT). WE IN FACT FOUND THE ORIGINAL CALL OUT PROBLEM WHICH WAS A BAD HEAD #4. AFTER REPLACING THE BAD HEAD WE LEFT THE COVERS OFF WHILE RUNNING DIAGNOSTICS TO CONFIRM THE FIX.

SOON AFTERWARDS WE STARTED GETTING DATA CHECK ERRORS ON HEAD ONE SO I SWAPPED HEAD ONE'S CABLE WITH HEAD TWO'S CABLE AND THE PROBLEM MOVED TO HEAD TWO, SO I SWAPPED OUT HEAD ONE. THE PROBLEM STAYED IN THE DRIVE SO I CALLED DON SMITH IN REGION AND HE ADVISED ME OF THE AIR CIRCULATION PROBLEM AND SAID THAT YOU SHOULDN'T RUN THESE DRIVES FOR MORE THAN AN HOUR AND A HALF WITHOUT THE COVERS.

I PUT THE COVERS BACK ON THE DRIVE AND AFTER A FEW MINUTES OF SETTLE DOWN TIME THE PROBLEM WENT AWAY. REMEMBER THIS WHILE TROUBLESHOOTING THESE DRIVES. IF NECESSARY STOP AND PUT THE COVERS BACK ON THE DRIVE FOR AWHILE TO ENSURE THAT YOU ARE GETTING THE CORRECT INDICATIONS WHILE PURSUING PROBLEMS.

Title PREMATURE BEARING FAILURE		Tech Tip Number RM02/3-TT-19
Author A. GROVER	FS Office READING (RB) Date 18 SEP 79	Revision 0
Processor Applicability	Mgr/Sup. I. YOUNG Date 18 SEP 79	Cross Reference
All	Approval G. EKHOLM Date	

IT IS BECOMING INCREASINGLY APPEARENT THAT A NUMBER OF SITES ARE SUFFERING FROM BEARING FAILURE ON RM03'S. THE FIRST INDICATIONS OF THIS ARE SEEK INCOMPLETE AND HCE'S (HEADER COMPARE ERRORS), IF NO ATTENTION IS PAID TO THESE SYMPTOMS A HEAD CRASH IS ALMOST CERTAIN TO FOLLOW.

IT IS POSSIBLE TO PREVENT THIS BY CAREFULLY MONITORING THE STATE OF THE RAILS AND CARRIAGE BEARINGS AT P.M. TIME PAYING PARTICULAR ATTENTION TO THE ADJUSTABLE BEARING.

UNDER NORMAL CONDITIONS THE RAIL SHOULD SHOW SIGNS OF EVEN WEAR OVER THE WHOLE WIDTH OF THE BEARING - IF THE BEARING IS BEGINNING TO FAIL THE WEAR IS OVER A VERY NARROW PORTION. AT THE SAME TIME, THERE WILL BE SIGNS OF OVERHEATING ON THE BEARING. I.E.: CHANGE OF COLOR.

NOTE: WHEN THESE SIGNS ARE DETECTED THE CARRIAGE/RAIL SHOULD BE CHANGED AT THE EARLIEST OPPORTUNITY.

PART NUMBERS

CARRIAGE AND COIL ASSY----------29-22910
CARRIAGE AND RAIL UPPER---------29-23029
CARRIAGE AND RAIL LOWER---------29-23028

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RM02/3

Title RM02/3 will not run Dec/X11			Tech Tip Number RM02/3-TT- 20
Author Frank C. Owens	F S Office Indianapolis	Date 7-Jan-80	Revision 0
Processor Applicability All	Engr /Supr	Date	Cross Reference
	Approval	Date	

When running Decx11 with Rm02/3'S and you get the error 'To many type que errors', then decx11 aborts,your problem may not be hardware. Check to to see if you have more than 32 total bad spots on all drives. This can be done by examining the user bad spot file on each pack,by using the RM02/3 formatter program (zrma). If the total number of bad spots,on the packs used to run Decx11,exceed 32 you have to change one or more of the packs with packs that have less bad spots to get that total less than 32. This does not mean the packs are bad. The problem is that the decx11 module CXRMAD0 does not allow more than 32 total bad spots on all drives being run on system.

Title Write Check ErrorW/O Data Check On Vav			Tech Tip Number RM02/3-TT-31
Author Tom Crow	F S Office Mar R.S.	Date Jan/80	Revision 0
Processor Applicability All	Mgr /Sup L. Terma	Date Jan 6 80	Cross Reference Rp05/6-TT-36
	Approval Greg Ekholm	Date Feb/80	

This Tech Tip is for Cross Referance only.

RM03-TT-26

FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/3
12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title	RM03 Seek Incomplete and Misposition Problems			Tech Tip Number	RM02/3-TT-22
Author	John R. Strauss	F S Office	Columbus, Ohio	Date 17 JAN 80	Revision 0
Processor Applicability: All / 11 / VAX / 20/20		Mgr /Sup	Carl Swigart	Date 17 JAN 80	Cross Reference
		Approval		Date	

On a recent problem which involved a RM03 with seek incomplete and misposition errors I found the two screws which hold the flex lead assembly to the rail bracket assembly had been loose. While the drive was seeking and shaking it would break the ground path and thus cause an error.

To resolve this problem make certain that there are lock washers under each one of the screws and that they are firmly secured to the rail bracket assembly.

Also, it is a good idea to check the flex leads going to the carriage coil assembly and make certain that they are not being twisted in any way when the drive is doing a seek. This may cause the flex leads to crack.

Title	RM03 SEEK INCOMPLETE AND MISPOSITION PROBLEMS		Tech Trp Number RM02/3-TT-22
Author JOHN STRAUSS	FS Office OHIO	Date 17/1/80	Revision 0
Processor Applicability: All	Mgr /Sup CARL SWIGART	Date	Cross Reference
	Approval GREG EKHOLM	Date 2/20/80	

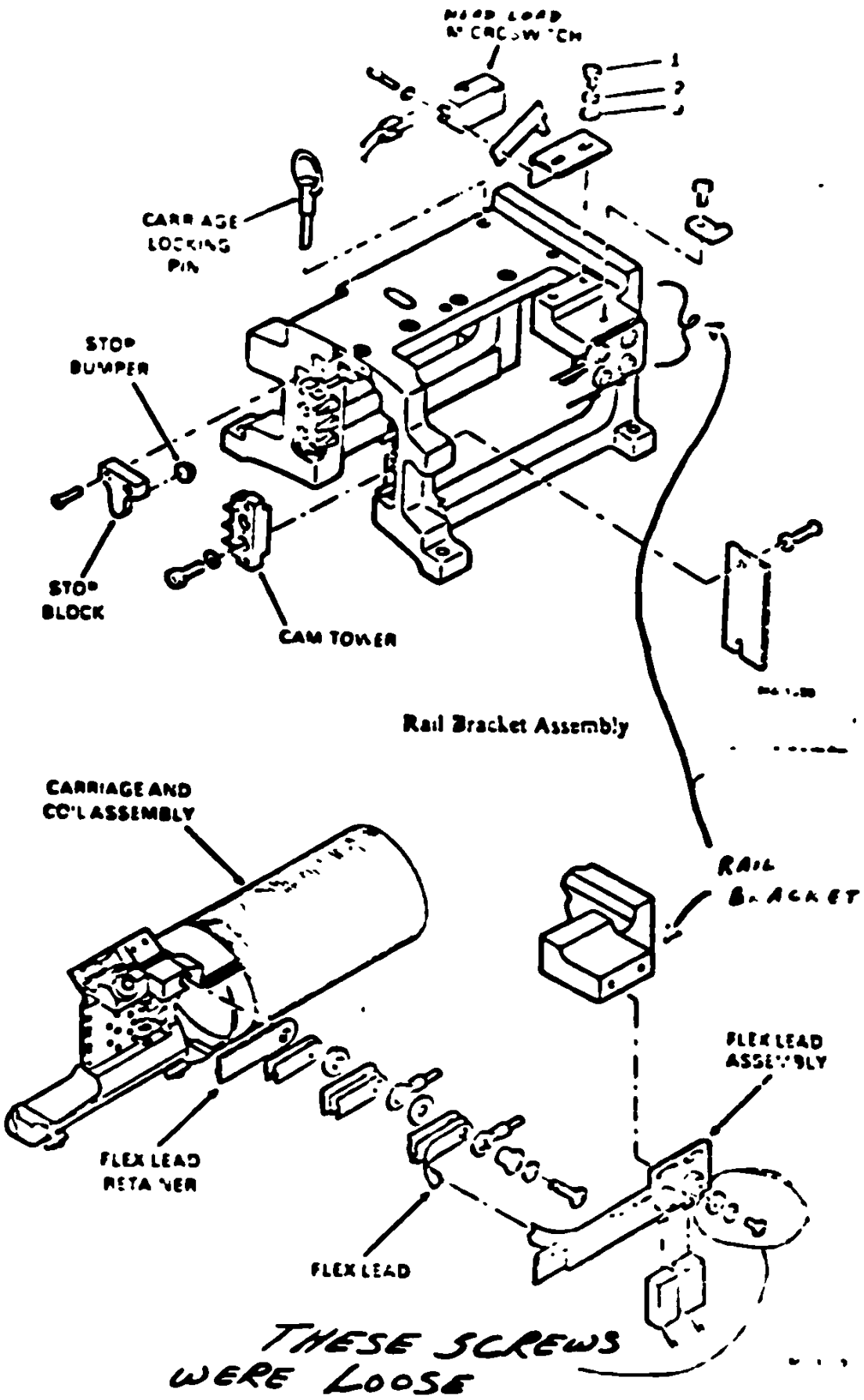
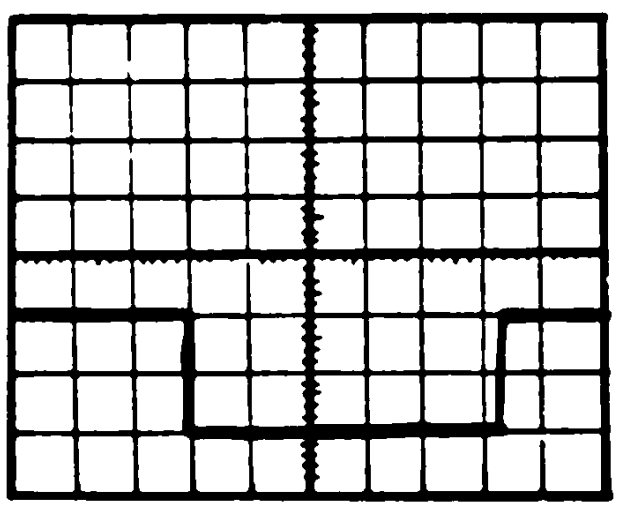


Figure Carriage and Coil Assembly

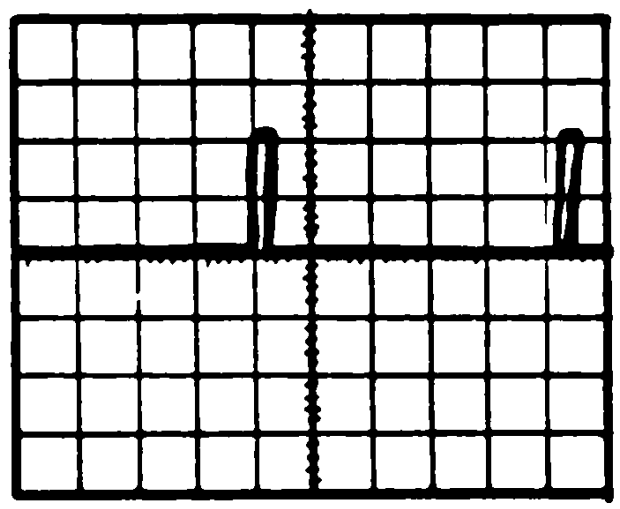
FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/03
12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	ROTATING MEMORIES

Title VELOCITY GAIN ADJUSTMENT			Tech Tip Number RM02/03-TT-23
Author GREG EKHOLM	F S Office COLO SPGS	Date 4/29/80	Revision A
Processor Applicability: All ☐ 11 ☐ VAX ☐ 20 ☐	Mgr /Sup.	Date	Cross Reference
	Approval Greg Ekholm	Date 5/12/80	

THE PICTURE SHOWN IN CHAPTER 4 OF THE RM02/03 DISK SUBSYSTEM SERVICE MANJAL (EK-RM023-SV-001) FOR THE VELOCITY GAIN ADJUSTMENT IS CORRECT. THE PROCEDURE IS CORRECT; HOWEVER, THE OSCILLOSCOPE DISPLAY COULD LOOK LIKE THE ONE BELOW IF YOU LOOKED AT TEST POINT B02-3A INSTEAD OF B09-3A.



A2B02-03A



A2B09-03A

A2B09-03A CROSS REF PAGE 193 IS "+ ON CYLINDER"
A2B02-03A CROSS REF PAGE 123 is "+ (BUS) BI" 2^9"
YOU COULD ADJUST THE VELOCITY GAIN USING THIS SECOND TEST POINT BECAUSE THE BUS BIT IS RELATED TO "ON CYLINDER". HOWEVER, IT IS RECOMMENDED THAT YOU USE THE CORRECT PIN B09-03A TO PERFORM THIS ADJUSTMENT.

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RM02-TT-29

digital

FIELD SERVICE TECHNICAL MANUAL

Option or Designator RM02/3

12 Bit ☐ 16 Bit ☒ 18 Bit ☒ 36 Bit ☒

Title: RM03 Head Alignment Tool Problem			Tech Tip Number: RM02/3-TT-24
Author: John R Strauss	F.S. Office: Columbus, Ohio	Date: 5 DEC 79	Revision: 0
Processor Applicability: All / 11 / Vax / 20	Mgr./Sup.: Carl Swigart	Date: 5 DEC 79	Cross Reference
	Approval: [signature]	Date:	

During a head alignment on a RM03 disk drive it is sometimes very hard to insert and remove the head cranking tool into or out of the carriage alignment holes for each of the respective heads. I have seen many cases wherein the tool may not always be in far enough and results in a rounded out head which can no longer be used. This is due to the fact that the head's body is made of aluminum and the tool is made of hardened steel.

This causes a small amount of Aluminum to build up on the Head Tool This can be removed by polishing the tool with very fine crocus cloth purchased at your local Hardware store. If you do not have any crocus cloth a piece of Bonded paper can also be used to polish off the aluminum and dirt.

It is also advisable to stay at 6 pounds of torque on the head retaining screws when doing this procedure due to the differences in the metals mentioned above. When you get the head aligned then torque it down to the 12 pounds of final torque as mentioned in the procedure. Many people try to bump the heads when they are at final torque as you can do with other types of drives and thus ruin the heads.

EN 11908 12 R277 (79Y)

RM03-TT 30

Title FAULT LATCH CARD			Tech Tip Number RM02/03-TT-25
Author GREG EKHOLM	F.S Office CX	Date 2/1/80	Revision 0
Processor Applicability: All / 11 / VAX / 20	Mgr./Sup	Date	Cross Reference
	Approval: Greg Ekholm	Date 4/30/80	

IF AN INTERMITTENT DRIVE FAULT OCCURS, THE OPERATING SYSTEM ISSUES A "DRIVE CLEAR" COMMAND WHICH CLEARS THE FAULT "LEDS" ON THE 9762 DISK DRIVE A2A04 CARD. THIS RESULTS IN "VV" VOLUME VALID BEING RESET AND NO OTHER ERROR CODES PRESENT. THE DRIVE IS NOW UNACCESSIBLE AND NO FAULT"LED'S" LITE. THE OPERATOR MUST NOW ISSUE A "MOUNT" COMMAND BEFORE DRIVE OPERATIONS CAN BEGIN.

THE CORRECTIVE ACTION REQUIRED TO LATCH UP THESE "LEDS" INVOLVES REMOVING INITIALIZE (MASTER FAULT CLEAR) FROM THE A2A04 CARDS RESET SIDE OF THE LED F/F'S AND RE-ROUTING IT SO THAT INITIALIZATION ONLY CLEARS THE FAULT SUMMARY F/F ON THE A2A04 CARD.

BECAUSE THIS INVOLVES MODIFYING A VENDOR CARD YOU CAN NOT LEGALLY RETURN THIS CARD FOR REPAIR OR CREDIT.

REWORK INSTRUCTIONS

. CUT ETCH SIDE 1 BETWEEN TWO FEED THRU HOLES LOCATED BETWEEN B2R2 AND 1CR1.
2. REMOVE AND SAVE CHIP C-3.
3. CUT ETCH SIDE ONE RUNNING BETWEEN C3 PIN 3 AND C3 PIN 13.
4. RE-INSTALL CHIP C3.
5. ADD WIRE FROM C3 PIN 3 AND LEFT HAND FEED THRU LOCATED BETWEEN B2R2 AND 1CR1.

DOCUMENTATON REWORK

1. MARK UP CR PAGE 42 AS PER ENCLOSED.
2. MARK UP CR PAGE 44 AS PER ENCLOSED.

NOTE:
1. FRONT PANEL FAULT CLEAR (MANUAL FAULT CLEAR) MUST NOW BE USED TO CLEAR THE FAULT F/F DURING MAINT.
2. SYSTEM "DRIVE CLEAR" NOW LEAVES FAULT LEDS ON AND ONLY CLEARS THE FAULT F/F.
3. FAULT LEDS ARE CLEARED BY CLEAR SWITCH ON A2A04 CARD OR BY POWER UP MASTER CLEAR.
4. CHIP C3 IS A LOGIC ELEMENT 141 AND IS THE SAME AS A 7410 CHIP. DEC'S PART NUMBER FOR THIS 7410 CHIP IS 19-05576-00.

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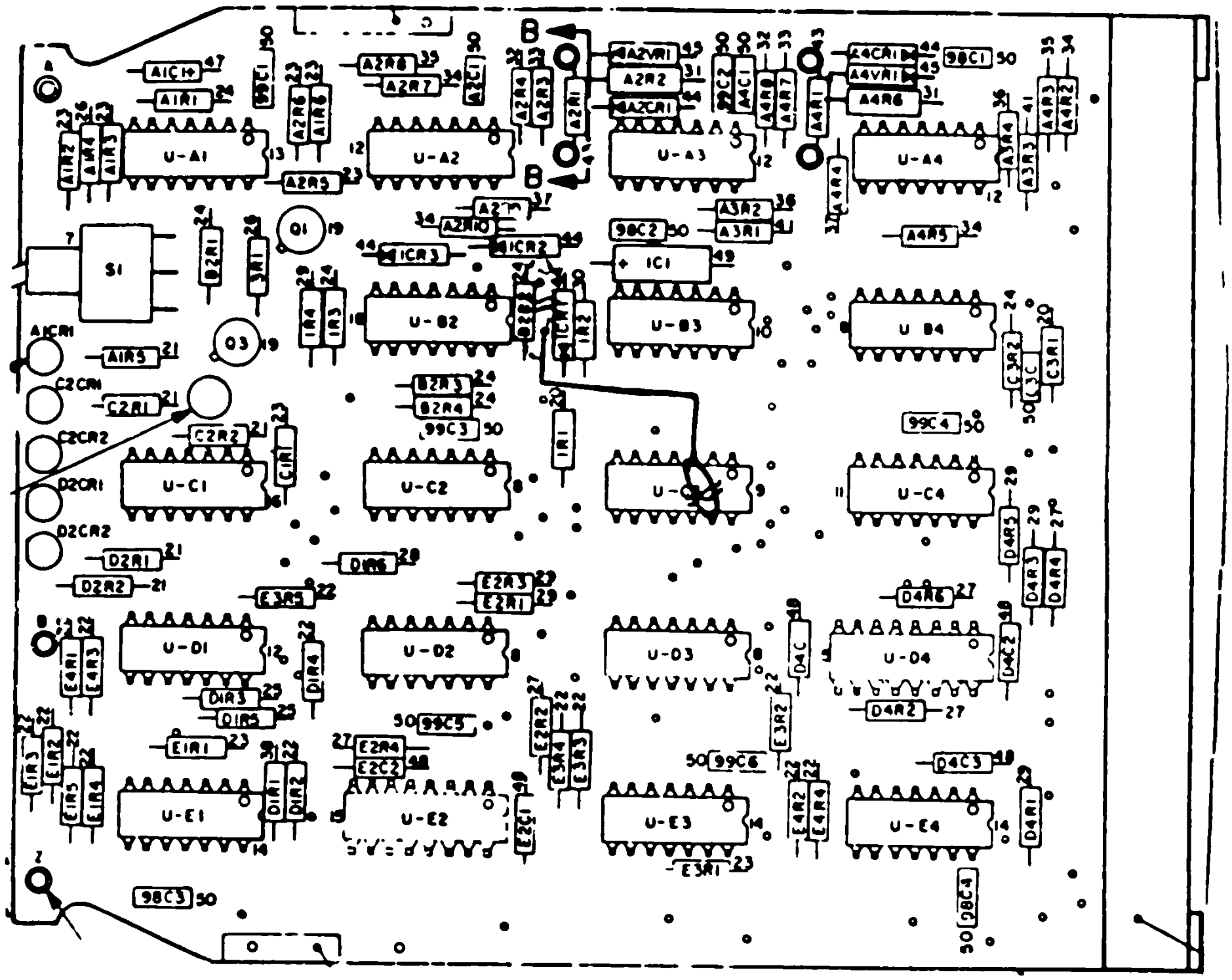
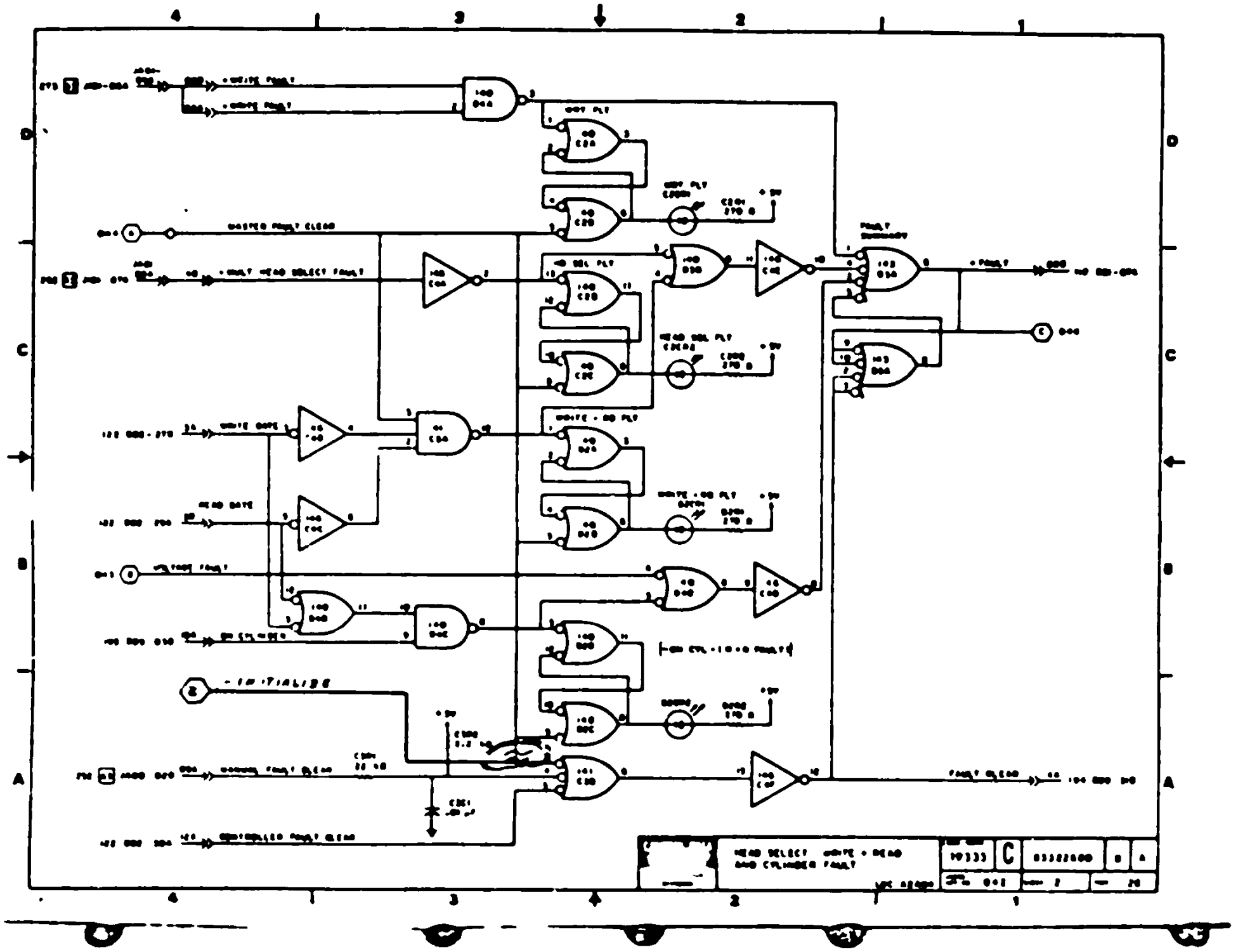
EN-1189C 12 R277 (79Y)

Title	FAULT LATCH CARD			Tech Tip Number	RM02/3-TT-25
Author	GREG EKHOLM	F S Office	CX	Date	Revision 0
Processor Applicability		Mgr /Sup		Date	Cross Reference
All		Approval		Date	



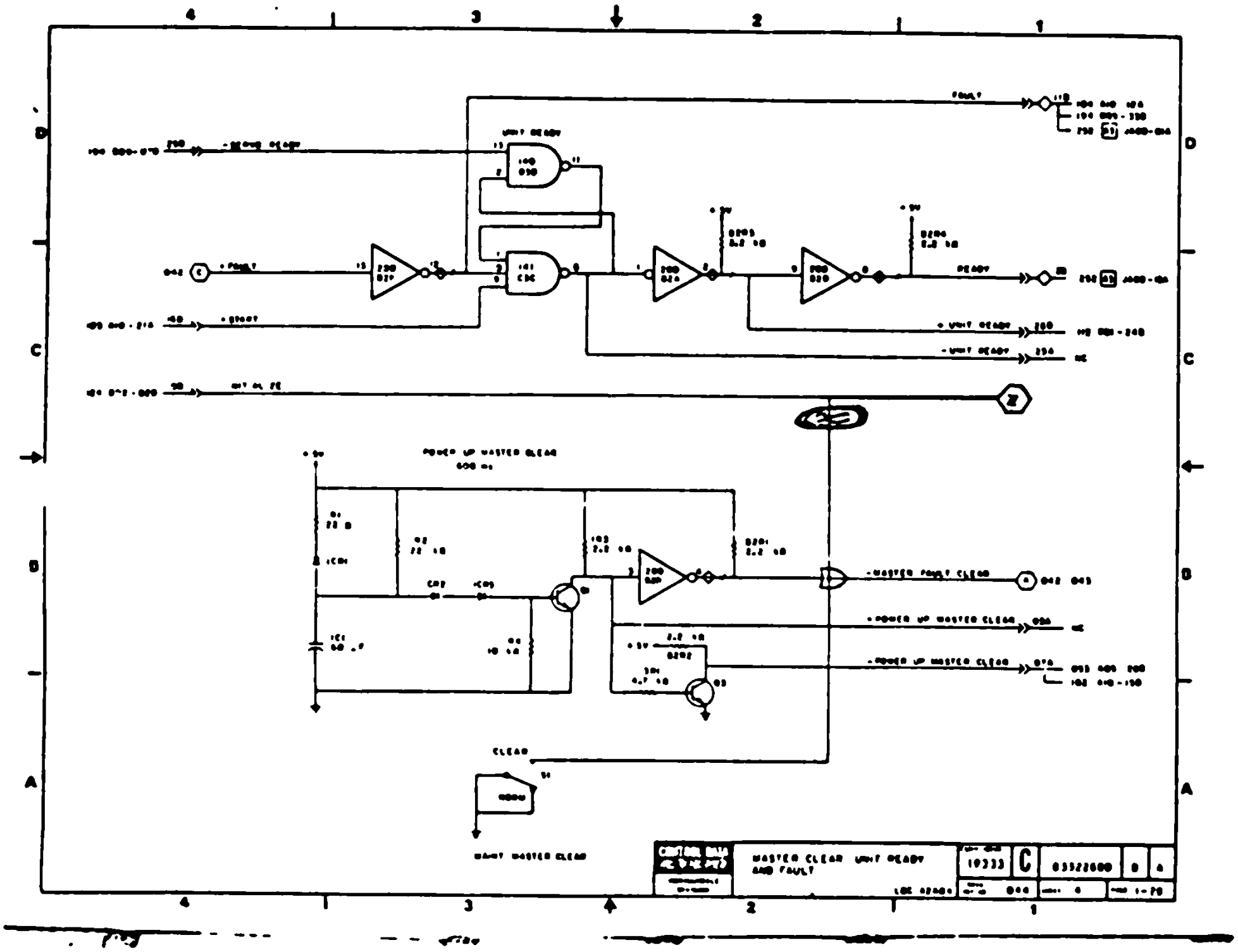
EN 11988 12 R277 (79V)

Title	FAULT LATCH CARD			Tech Trp Number RM02/3-TT-25
Author GREG EKHOLM		F S. Office CX	Date	Revision 0
Processor Applicability all		Mgr /Sup	Date	Cross Reference
		Approval	Date	



EN 11908 12 R277 (78Y)

Title		Tech Tip Number RM02/3mTT-25
Author Greg Ekholm	F S Office CX / Date	Revision 0
Processor Applicability All	Mgr /Sup. / Date	Cross Reference
	Approval / Date	



Some RM02/03 drives appear to have vibration sensative power supplies. Problem report CC00330 detailed occurances of data checks, header not found, and write checks occuring because of this problem.

The Quick fix appears to be to install foam and possibly part of a memory shield under the power supply mother board. The RFI filter sits under the mother board and this is the area you install the foam.

Region and District Support personnel report good results by adding the foam. Some have observed the dibits deteriorating when they tapped the regulators and others have seen spikes on the + 5 volt supplies. Consult AIDS Problem Report CC00330 for full background.

UPDATE

A fix from CDC has been received which adds a ground wire from the dynamic brake to the drive motor mounting plate. Soon to be released DEC FCO's RM02-S-CX015 and RM03-S-CX023 will update all drives between series code 29 and 36 with the fix.

Other areas to check are the spindle ground (DEC # 29-23934) and the emergency retract relay (DEC #29-23377).

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RM02-TT-35

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☐	18 Bit ☐	36 Bit ☐	RM02/03

Title RM02/03/05/80 Module Compatibility			Tech Tip Number RM02/03-TT-27
Author Greg Ekholm	F S Office Colo. Spgs.	Date 7/15/80	Revision B
Processor Applicability: All ☐ 11 ☐ VAX ☐ 20 ☐	Mgr /Sup	Date	Cross Reference: RM05, RM80
	Approval Greg Ekholm	Date 7/31/80	

WITH THE INTRODUCTION OF THE RM05 AND THE RM80, SEVERAL MBA MODULES HAVE CHANGED. THE TABLE BELOW LISTS THE REV LEVEL THE MODULES MUST BE AT TO BE COMPATIBLE, OR IF THEY ARE UNUSABLE ARE NOTED BY A "NO".

MODULE	RM02/03	RM80	RM05
M7684	CS = R	yes	yes
M7685 M7685-YA M8685	CS = C yes yes	no no yes	no CS = D CS = B
M7686 ** M7686-YA	CS = J yes	yes yes	no yes
M7687	CS = C	yes	yes
M5922	CS = E	yes	yes
M5923	CS = E	yes	yes
70-13398 Back Plane	WL = C WT = D	WL = D WT = E	WL = D WT = E

** If DUAL PORT Switches are located in the slot on the front door M7686-YA must be used.

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Title ASGV VERSUS 6SGV SPEED DETECT			Tech Tip Number RM02/03-TT-28
Author GREG EHKOLM	FS Office COLO SPGS	Date 7/15/80	Revision J
Processor Applicability: All / 11 / VA / X / 20/20	Mgr /Sup	Date	Cross Reference
	Approval	Date 7/28/80	

BECAUSE OF A PART NUMBER MIX UP, WE HAVE RECEIVED APPROX. 500 OF THE OLD 6SGV SPEED DETECT MODULES FOR SPARES. THE ASGV IS A DEC ONLY MODULE AND HAS AN ADDITIONAL CIRCUIT ON IT. THIS CKT PREVENTS THE PACK COVER FROM BEING OPENED FOR APPROX. 10-15 SECONDS AFTER A PACK SPIN DOWN. THIS ADDITIONAL TIME WAS ADDED FOR THE SITUATION OF A CUSTOMER STARTING THE DRIVE WITHOUT A PACK INSTALLED. AFTER THE DRIVE IS STARTED, THE SPEED DETECT CARD LOOKS FOR SPEED PULSES FROM THE SPEED XDUCER. WITHOUT A PACK INSTALLED NO PULSES WILL BE PRESENT AND THE DRIVE WILL FORCE A SPIN DOWN. THE PACK COVER INTERLOCK LOOKS FOR SPEED PULSES TO DETERMINE WHEN THE PACK HAS STOPPED AND WHEN TO NLOCK THE PACK. WITH NO PACK INSTALLED THE COVER UNLOCKED IMMEDIATELY WITH THE 6SGV AND THE SPINDLE COULD STILL BE SPINNING DOWN (APPROX. 6 - 8 SECONDS).

BECAUSE THE SEQUENCE OF EVENTS REQUIRES AN OPERATOR TO IMMEDIATELY OPEN THE PACK COVER AND TRY AND MOUNT A PACK ON THE SPINNING SPINDLE, THE LIKELIHOOD OF THIS HAPPENING IS CONSIDERED SMALL.

PRODUCT SAFETY HAS REVIEWED THE SITUATION AND DETERMINED A MANDATORY RETROFIT IS NOT REQUIRED. THE 6SGV HAS BEEN REMOVED FROM THE LOGISTICS ARL AND THE PART OBSELETED AND CROSS REFERENCED TO THE ASGV, YOU MAY CONTINUE TO USE THE 6SGV'S IN THE PRESENT DRIVES (ALL ORIGINAL RM02'S AND RM03'S HAVE ASGV MODULES IN THEM) UNTIL THEY FAIL. ALL SPARES AND FUTURE ORDERS SHOULD BE FOR THE ASGV MODULE.

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EN 1188C 12 R277 (78V)

RMC: 17 37

FIELD SERVICE TECHNICAL MANUAL				Option or Designator
12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RM02/03

Title RM02/03/05/80 MBA Backplane			Tech Tip Number RM02/03-TT-29
Author Greg Ekholm	FS Office Colo. Spgs.	Date 7/15/80	Revision 0
Processor Applicability: All / 11 / VAX / 20/20	Mgr /Sup	Date	Cross Reference RM05 -2 RM80 -2
	Approval [signature]	Date 7/21/80	

THE FOLLOWING CHANGES HAVE BEEN MADE TO THE RM02/03 BACKPLANE TO MAKE IT RM02/03 AND RM05/RM80 COMPATIBLE.

FOR THE RM05:

    ADD BP3600 RPM L - A16K2 to B15P2

FOR THE RM80 THE FOLLOWING HAVE BEEN ADDED:

    ADD NEW TRK READ L - A16 H1 to A19 R1
        RMOF L -   B15H2 TO A16 H2
        RMER2 H -   B15F2 to A16F2
        SSE -   E15U2 to E16 L1

WITH ALL 5 WIRES ADDED, THE "WL" IS AT A REV "D" AND THE "WT" IS AT A REV "E". THIS MAKES THE 70-13398 BACKPLANE RM02/03/05/80 COMPATIBLE.

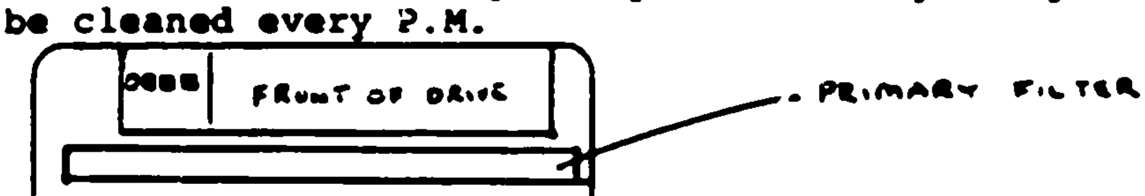
NOTE: REMEMBER THESE WIRE ROUTES ARE FOR KANATA AND SLOT 1 = KA WIRE WRAP SLOT 11, SLOT 9 = KA WIRE WRAP SLOT 19.

	FIELD SERVICE TECHNICAL MANUAL	Option or Designator RM02/
	12 Bit ☐ 16 Bit ☒ 18 Bit ☒ 36 Bit ☐	

Title RM03 HEAD CRASHES		Tech Tip Number RM02/03-TT-30
Author Robby Robertson	F S Office Charlotte Dist Date 5/30/80	Revision 0
Processor Applicability All 11 VAX /20	Mgr/Sup Date	Cross Reference
	Approval Date 7/11/80	

PREVENTION OF HEAD CRASHES

1) Airflow is critical - the primary filter clogs very easily and must be cleaned every P.M.



See RM02/03 Subsystem Service Manual Page 3-15

2) Do Not clean the heads while they are in the drive. It is easy to change the way they fly, causing errors and possibly head crashes. Always remove head cleaning solution residue.

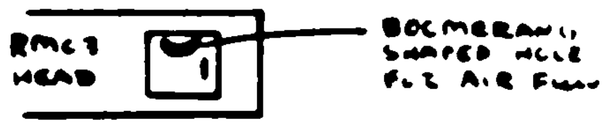
3) Check the bearings for rough spots. See Speed Bulletins #108 and #114.

4) Regularly clean the shroud area.

PROCEDURE AFTER A HEAD CRASH

1) Identify All bad packs and tag them. It is not uncommon for a customer to "HIDE" a valuable pack, tactfully cover this angle.

2) Remove all heads and inspect them. RM03 heads are oxide colored making it difficult to evaluate them. Pay special attention to the boomerang shaped hole on the head.



The boomerang shaped hole is famous for collecting debris and lint from "LINT FREE" cloths. Failure to examine this area has claimed a number of alignment packs and caused repeat head crashes. Again it is easy to change the way the head flies when attempting to clean debris out of the hole.

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☐	18 Bit ☐	36 Bit ☐	RM02/03

Title RM03 Head Crashes		Tech Tip Number RM02/03-TT-30
Author Robby Robertson	F S Office Charlotte Dist Date 5/30/80	Revision 0
Processor Applicability All | 11 | VAX | 20/36 |	Mgr /Sup. Date	Cross Reference
	Approval [signature] Date 7/11/80	

CAUTION!

This next step should only be done by someone trained on the drive.

3) The magnet will collect debris from a bad head crash and must be removed and examined. This can be done without changing or affecting the adjustable bearing on the carriage and coil assembly. Remember when removing the magnet to hold the EMA coil so it does not follow the magnet. By preventing the EMA coil from coming off the rail you will not have to recheck the bearing adjustment.

4) A. Clean the shroud area.
   B. Check the primary filter.
   C. Change the absolute filter.

After the respective heads have been changed and the drive is ready for head alignment, power the drive down and disconnect the E1 plug on the servo power amp (yellow wire on the servo power amp). Use the same procedure as when manually loading the heads. Power the drive up. Place a scratch pack in the drive, cycle it up. The heads will not load. Let the drive purge for a period of time (20 minutes). Then manually load the heads (7 inches per second or faster). Run the heads across the pack and listen closely for any head to disk interference. If everything is ok, unload the heads, cycle the drive down, remove power and reconnect the servo power amp plug. You may now follow the normal head alignment procedure. Remember to let the alignment pack reach ambient temperature.

Title: Dual Port Logic Test Part 2			Tech Tip Number: RM02/03-TT-31
Author: John Kopitz	F S Office: Corp. Field Sup.	Date: 5 AUG 80	Revision
Processor Applicability: All	Mgr /Sup: [signature]	Date: 8-5-80	Cross Reference
	Approved: [signature]	Date: 8/12/80	

In running the dual port logic test part 2, the placement of the special test cable out of Port A into Port B is very important. If not cabled correctly, near the end of the test, it will hang waiting for MOL on the wrong drive.

A reminder. Massbus from RH in on Port A, special test, cable (70-10507-02) out of Port A into Port B.

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EN 1180C 12 R277 (78V)

RM08-TT-41

Title	RM02/03/05/80 DUAL PORT			Tech Tip Number	RM02/03-TT-32
Author	Greg Ekholm	F.S. Office Colorado Spgs.	Date 11/16/80	Revision	
Processor Applicability: All ☐ 11 ☐ 10 ☐ 20 ☐ VAX ☐		Mgr./Sup. BOB DAVISON	Date 12/12/80	Cross Reference	RM80 RM05
		Approval: Greg Ekholm	Date 12/1/80		

ECOs RM03-CX-022 and RM02-CX-012 relocated the dual port switches to the front door. RM05s have always had the slots for the dual port switches on the front door.

The original RM02/RM03 ECOs were marked FCO required however, this upgrade will be a sales item, listed in the MLP (Maynard List Price) book, and no FCO will be issued. The MLP will carry the upgrade kit as RM02-C/RM03-C for use in new drives with the slot cut out of the front door. The RM03-CA should be ordered for old single ported drives where the customer wants access to the switches as this includes a dark grey front door with a slot for the dual port switch in the kit. A new kit with a blue door instead of a grey door is presently being worked on. Upgrade kits for the RM05 and RM80 are listed under RM05-C and RM80-C in the MLP (or Standard Price) Book.

Listed below is the ship list for the present RM03-C and RM03-CA.

Item	Part Number	Description	Quantity C	Quantity CA
1	M5923-00	MASS BUS TRANSCEIVER, Port B	2	2
2	7419781-00	BC06S Rework	1	1
3	7418607-00	Clamp Cable	6	6
4	9005041-01	Screw, Pan, Phil 8-32X 3/4 SS	2	2
5	9006418-01	Screw, Tapping, Type TT,Pan, Phil,	4	4
6		Disk Drive, RM03	REF	REF
7	7016549-00	Dual Port Switch ASSY	1	1
8	7012830-02	Front Door ASSY (Dark Grey)	-	1
9	1214434-02	Header .100 2POS RT Angle - -(J11,J12)	-	2
10	1209350-03	Mate-N-LOK 3POS HSG,SKT - -(J10)	-	1
11	1209456-01	Mate-N-LOK SKT 20-18ASW LOOSE PC -(J10)	-	3

The original ECOs also upgraded the MBA Backplane to a WT Rev "D". This removed the Dual Port Switch and LEDs from the backplane and added plugs in their place. Some of the original backplanes WT Rev "D" had the 3 connector plug inserted wrong. This will cause the led to light in the locked on port switch but the drive will actually be locked to the opposite port. (i.e., locked on "A" switch pushed in "B" out, locked on "A" LED lites but drive actually locked on "B".)

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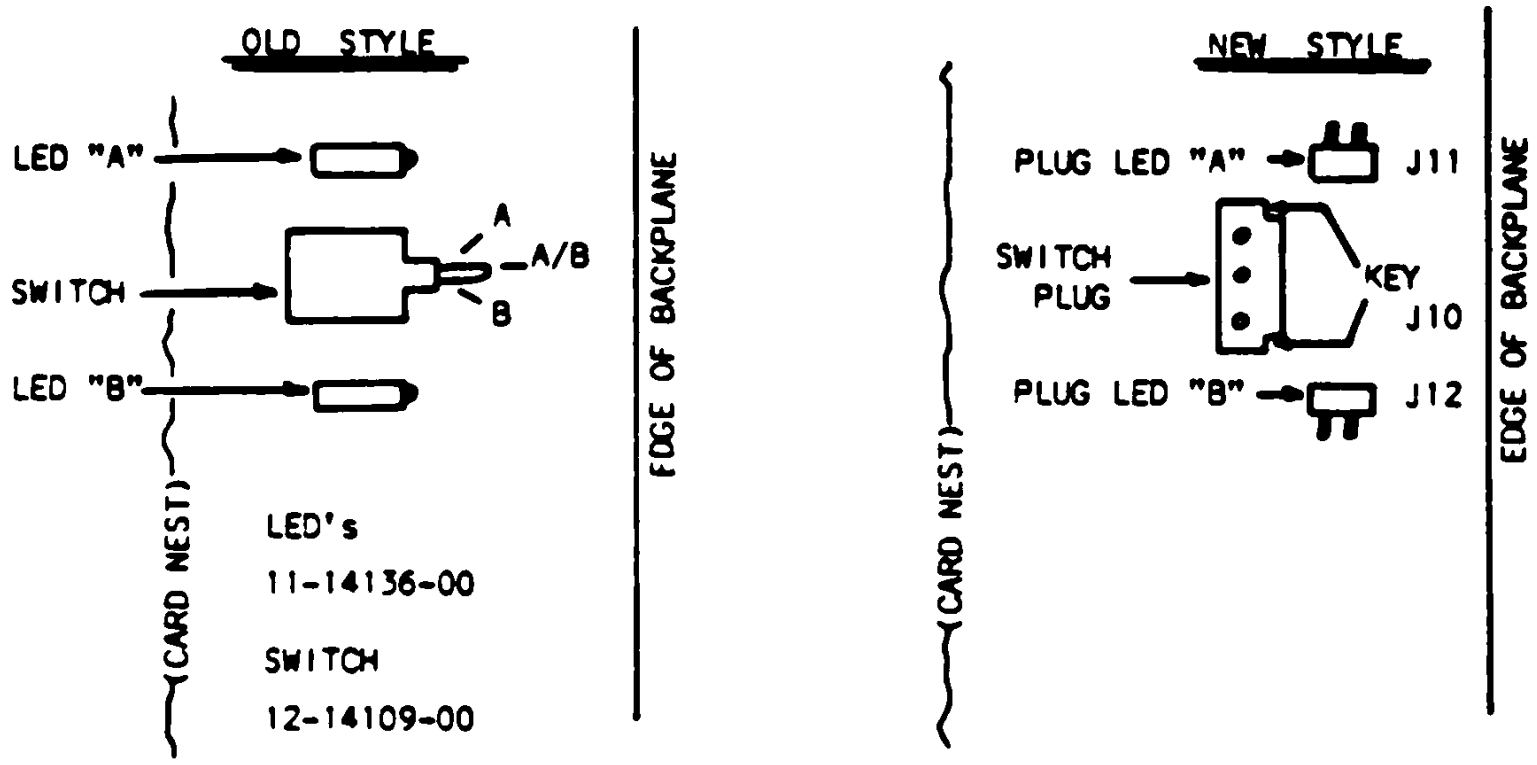
EN 1189C 12 R277 (79Y)

RM03-TT-42

Title RM02/3/5/80 DUAL PORT		Tech Tip Number RM02/3-TT- 32
Author GREG EKHOLM	F S. Office COLORADO SPRGS. Date12/1/80	Revision
Processor Applicability: All	Mgr /Sup. BOB DAVISON Date12/12/80	Cross Reference DM80 RM05
	Approval Greg Ekholm Date 12/11/80	

Ensure that the center plug has the keyed side towards the edge of the backplane, away from the card nest as shown below.



If the keyed part of the switch plug is facing the wrong way (towards the card nest) unsolder the plug and reorientate it correctly.

The new switch assembly is used as follows:

Port select switch

"A"	"B"		
OUT	OUT	-	Programable
IN	OUT	-	Locked on "A"
OUT	IN	-	Locked on "B"
IN	IN	-	Programable

When the dual port select switches are located on the front door the Control Interface (M7686) Board must be a M7686-YA. The "YA" version has R57 and R58 as 15K pull up resistors (M7686 IF 6 in print set) on "Lock Port A or B-L". Other than that the two boards are identical.

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EN 1188C 12 R277 (79V)

RM02-TT-43

Title 240 to 220 v 50 Hz Power Conversion | Tech Tip Number RM02/03 - TT-33

Author Greg Ekholm | F.S. Office Colo. Springs | Date 12/9/80 | Revision

Processor Applicability: All | 11 | | 10 | | 20 | | VAX

Mgr /Sup. | Date | Cross Reference

Approval: Greg Ekholm | Date 12/9/80

Because of the European voltage variation and the RM02/03 only being sold in 240 v 50 Hz versions, the following voltage conversion procedure may be used if you need the 220 v model.

RM02 - AD/BD RM03 - AD/BD	240 v 50 Hz -27 v +16 v	Range 213 - 257
Not offered	220 v 50 Hz -25 v +15 v	Range 195 - 235

Reference RM02/or/RM03 Print Set

ER - 0RM02 - MP	Cross reference page	302
ER - 0RM03 - MP		302

240 v Point 1 to Tap 1 on Transformer
Point 2 to Tap 6 on "

220 v Point 1 to Tap 1 on Transformer
Point 2 to Tap 5 on "

To convert 240 v to 220 v move wire from transformer Tap 6 to transformer Tap 5.

RM02/03 Disk Engineering in Colorado Springs has endorsed and varified this Tech Tip.

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L-RM08-TT-44

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☐	18 Bit ☐	36 Bit ☐	RM02/03

Title	RM02/03 Head Identification			Tech Tip Number	RM02/03-TT-34
Author	Alan King	F.S. Office	Indianapolis	Date 12/17/80	Revision 0
Processor Applicability		Mgr./Sup.	Steve Graves	Date 12/17/80	Cross Reference
All XX		Approval		Date	

A problem exists in inadvertently substituting RM02 and RM03 heads between the two drives. To tell an RM02 head, look at the pigtail. There should be a red or maroon strip on it. For an RM03, the pigtail will be colored with a blue strip. Always double check part numbers.

RM03	R/W Lower	CDC# 75010102	RM02 CDC#	75010302
	R/W Upper	75010103		75010303
	R/W Servo	75010105		75010305

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/03
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title Head Refurbishment Guideline			Tech Tip Number RM02/03-TT-35
Author Greg Ekholm	F.S. Office Colorado Springs	Date 3-16-81	Revision 0
Processor Applicability: All ☐ 11s ☐ VAX ☐ 20 ☐	Mgr./Sup.	Date	Cross Reference
	Approval	Date 3/17/81	RP05/06-TT-53

This tech tip for cross reference only.

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RM03 TT 40

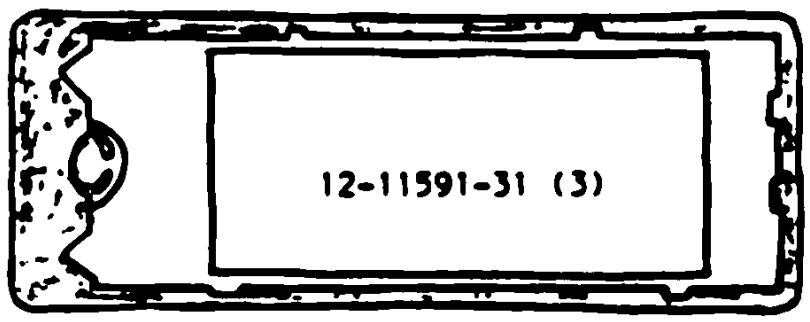
	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/03
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title POOR MASSBUS CABLE ZIF CONNECTORS			Tech Tip Number RM02/03-TT-36
Author Greg Ekholm	F S Office Colorado Springs	Date 3/10/81	Revision 0
Processor Applicability: All ☐ 11s ☐ VAX ☐ 20s ☐ 10s	Mgr /Sup.	Date	Cross Reference RP05/06-TT-52 RM80-TT-8
	Approval	Date 3/16/81	

RM80-TT-8

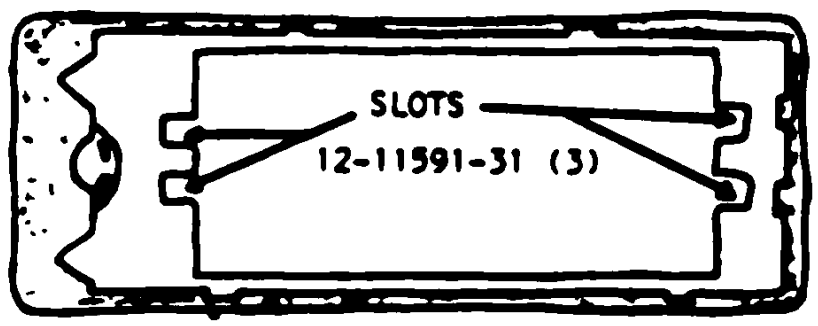
Some incorrect "Amp" connectors may have made it to theField on the ends of MASSBUS cables. If you have the incorrect ZIF connectors the MASSBUS cable end may fall off the connector bulkhead during normal operation. The cables were built between October 1980 and February 1981. Below are the three (3) styles of connectors as viewed from the pin end of the plug. If you are having this problem please check your ZIF connectors.

GOOD



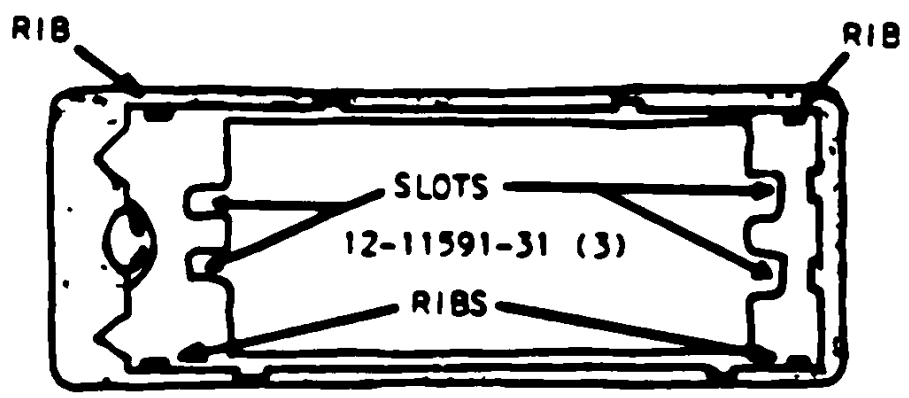
No Slots

BAD



Slots
NO RIBS

GOOD



Slots
&
RIBS

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RM80-TT-47

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/03
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title ARL Module Guidelines		Tech Tip Number RM02/03-TT 37
Author Greg Ekholm	F S Office Colorado Springs Date 3/16/81	Revision 0
Processor Applicability: AM 11s VAX 20	Mgr /Sup Date Approval Date 3/19/81	Cross Reference: RP05/06-TT-54

This tech tip for cross reference only.

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EN 1189C 12 R277 78V1

RM02 TT 48

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/03
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title NRZ TO MFM PART NUMBER CONFUSION			Tech Tip Number RM02/03-TT-38
Author Alan King	F S Office IN	Date 3/30/81	Revision 0
Processor Applicability: All, 11s, VAXs, 20s	Mgr /Sup	Date	Cross Reference
	Approval [signature]	Date 4/2/81	

A discrepancy exists between the CDC vendor manuals and the RM02/03 Disk Drives. The RM02 vendor manual recommended spares list calls for the same NRZ to MFM converter as the RM03. This is incorrect and is in the process of being changed.

For the RM03 order DEC #29-22891 vendor #54-278505 (ELXV)

For the RM02 order DEC #29-23115 vendor # 54-278509. (GLXV)

The GLXV module schematic cross reference, page 172, also is in error. "+ High Freq clock (12.88 MHZ)" comes in on Pin 09A and only goes to chip B3A Pins 1, 2 and 13. This manual is also being corrected.

Intermittent data check errors may be caused by gas operated forklift trucks. At two sites in the Charlotte district this problem was observed. In both cases getting the customer to install resistor spark plugs and a condenser between the ignition coil and battery ground eliminated these errors. The best way to show the problem is to run the performance exerciser(ZRMB) and do sequential reads. This may be done by doing a control 'C' and under commands, type a R space drive number. Inhibit printouts and bell on error. The diagnostic stops to print out errors, therefore if you do not inhibit printouts you will not see the true frequency of errors. Have the forklift trucks evacuate the area and then have them drive one by one as close to the system as possible. In both cases the forklift trucks accounted for about 80% of the data checks. Phase imbalances, grounding, carriage bearings and spindle grounds accounted for the other 20%. Using a 7L/2 spectrum analyzer with the LA7Ø antenna, we observed noise spikes from 100 to 400 MHZ at -65 to -38 DBM. Adding the suppressor kits reduced the number of noise spikes by about one half but did not affect the amplitude appreciably.

FIELD SERVICE TECHNICAL MANUAL			Option or Designator: RM02 / RM03
12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☐

Title: NEW PART # FOR CDC DRIVE ECO TO IMPROVE HINGES		Tech Tip Number: RM02/02-TT-40
Author: MARK H HALGAS	F S Office: NORFOLK (NF) Date: 5-21-81	Revision: 0
Processor Applicability: All	Mgr Sup: [signature] Date: 5/21/81	Cross Reference
	Approval: Date:	

CDC has improved the hinges on the pack access cover. The parts for this ECO will not work on the old style drives S/C-32 and below. So if you need to replace any parts, order all 5 items to improve the cover.

If you have the new type drive S/C-33 and above just order the parts you need.

Item	Description	CDC#	DEC	Quanity Needed
1	Retainer Bar	73063600	29-23633	1
2	Bushing	76429600	29-23634	2
3	Washer	75174202	29-23635	2
4	Right Hand Hinge	75070002	29-23636	1
5	Left Hand Hinge	75070003	29-23637	1

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Applicable Countries: UK X E N S D F

12 bit | 16 bit X | 8 bit | 36 bit | PL

Title
DECX11 MODULE RMDAØ

Tech Pub Number RMO2 03-TT-41

Processor Applicability
ALL

Originator GARY ROBERTS ... 727
Author GARY ROBERTS
Reg Approval
Issue Date 22nd July 81 Rev

Cross Reference
-

Beware of DECX11 module RMDAØ. There is a mistake in the code for deciding the load device, if it is an RMØ2/Ø3: no problem if it is an RPØ4/Ø5/Ø6. The result is that, the drive will not be dropped, even if location 40 has not been cleared.

You will, either overwrite your diagnostic pack, or, if you are lucky, get multiple write lock errors, depending on the state of the write lock switch, which can be confusing as you are not expecting to be testing that particular drive.

The answer at present, is to deselect the load device if you do not want it tested by a MOD RMDAØ 14 and clearing the bit for the appropriate drive.

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/3
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title	INTERMITTANT POSITIONING ERRORS			Tech Tip Number	RM 02/03-TT-42
Author	FRED SAAS	F S Office	Columbus. OH	Date 7/23/81	Revision 0
Processor Applicability	All ☐ 11's ☐ VAX's ☐ 20's ☐	Mgr /Sup	Norm Stanski	Date 7/23/81	Cross Reference
		Approval		Date 9/4-81	

I have noticed on a couple of RM03 calls that I was able to induce positioning errors by flexing/vibrating the A3A04 Power Amplifier while the Drive was running performance exerciser. The cause of the problem was discovered to be due to the sockets that the Power Transistors are mounted in. In both cases I resolved the problem by removing the Transistors, removing the socket "pins" and soldering the Power Transistor Leads directly to the Circuit Board.

This problem may show up as a vib sensitive problem or as a heat related problem, but in either case, may be responsible for many intermittant positioning related errors.

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digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM02/03
	12 Bit ☐	16 Bit ☐	18 Bit ☐	36 Bit ☐	

Title READ/WRITE - SERVO INTERMITTENTS			Tech Tip Number RM 02/3-TT-43
Author Randy Hitch	F.S. Office Miami, Fla.	Date 7/8/81	Revision 0
Processor Applicability: All 11's VAX	Mgr./Sup.	Date	Cross Reference
	Approval: K. P. T...	Date 8-14-81	

There is a CDC recognized problem with the ± 12V ZENER diodes, VR1 and VR2, on the ± 20V regulator board (-5KV), that may cause intermittent Rd/Wrt or Servo problems. These ZENERS provide ± 12 volts for two 6.2 regulators for the Servo preamp. The preamp is used for amplification of the dibits, which provide ALL timing for the drive. If the 6.2 volt regulators are marginal, a difference between plus and minus 12 volts of as little as .5 volts may cause these intermittent failures. If these failures occur, and all attempts to resolve the problem prove unsuccessful, it is recommended that the ZENERS be checked, and if the difference between plus and minus 12 volts exceeds .5 volts, change either the regulator board or replace the diodes with those of the same type, which may be purchased locally.

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator: RM03
	12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☐	

Title: RH11 Setup for RM02/3 on 11/44			Tech Tip Number: RM03-TT-44
Author: Roger Head	F.S Office: Perth	Date: 5/29/81	Revision: A
Processor Applicability — All X 11's	PSG: Fran Linnehan	Date: 2/1/82	Cross Reference: RH11-TT-8
	CSSE: Lyd D Buchanan	Date: 2/9/82	PDP11/44-TT-11

The RM02/3 DISK SUBSYSTEM SERVICE MANUAL (EP-RM02/3-SV-002) has an error in paragraph 2.4.3.1. It states that RM02 subsystems have 22 registers, and that the jumpers in E3 should be set up to select 20. In fact the number of registers is 20 and the jumpering in E3 should be for 20, but is shown for 22.

Table 2-3 should read:

SLOT	JUMPER	JUMPER IN/ JUMPER OUT
E3	1-16	OUT
	2-15	OUT
	3-14	IN
	4-13	IN
	5-12 (2)	IN
	6-11 (4)	OUT
	7-10 (8)	IN
	8-9 (16)	OUT

Note that the selection scheme is somewhat confusing because the two significant jumpers that are removed (6-11 and 8-9) have binary weightings that imply a value of 20 and yet the RH11 signal BCTA LEGAL REG H will only be true for imput values to the comparator E12 of 18 (because the output A>B is used). The trick is that address bit A01 is not looked at by the comparator and can therefore contribute an extra count of 2. The net result of this is that the binary weighting attached to the jumpers in E3 should be used to select the the exact number of registers that you wish the subsystem to respond to.

I believe the RM02 User Manual also gives the wrong jumpering for E3.

I imagine that this error will not be apparent, nor will it cause any problems when generating a system such as RSTS or RSX on an 'ordinary' Unibus PDP11. However when generating RSX11M-PLUS on an 11/44, part of the dialogue involves telling it that you have a 22 bit addressing machine. The software goes out and checks for the existence of the RMBAE register. This is the 21st register in the subsystem, and if it responds the software assumes that is is running on an 11/70, hence, doesn't worry about setting up the Unibus Map, and your system dies the first time it tries to use the disk.

Craig Prosser (Perth Software Support) is writing an article for the Small Buffer concerning this.

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM03
	12 Bit [X]	16 Bit [X]	18 Bit [X]	36 Bit [X]	

Title RM02/03 EMERGENCY RETRACT RELAY		Tech Tip Number RM03-TT-45	
Author GARY ROBERTS	F.S. Office NER (EUROPE) Date 6/10/81	Revision A	
Processor Applicability All X	PSG [signature] Date 2/1/82	Cross Reference	
	CSSE [signature] Date 2/4/82	RM02-TT-45	

IF YOU ARE EXPERIENCING INTERMITTENT DATA CHECK PROBLEMS IT MAY BE WORTH CHANGING THE EMERGENCY RETRACT RELAY (A1K2) MOUNTED ON THE POWER REGULATOR BOARD.

IT IS CERTAINLY WORTH CHECKING THIS RELAY AND ITS BASE FOR SIGNS OF OVERHEATING, AS THEPE HAS BEEN AT LEAST ONE INSTANCE OF A BASE MELTING, RESULTING IN THE HEADS NOT RETRACTING FROM THE PACK AREA.

The ± 12/20 Volt Power Supply in the RM02/3 (A1A02) feeds the following boards from the +12 V side:

1. Head Select and Read Amplifier A3A02

2. Track Servo Preamp A3A05

On occasions the +12 V Power Supply, which is non-adjustable, drops its voltage below 11.6 Volts. If this occurs, changing the three associated boards A1A02, A3A02, and A3A05 may not get the voltage above 11.6 volts. If this occurs, a temporary fix can be to insert a 200 OHM, 10 Watt resistor in parallel with the 51 OHM 10 Watt output resistor for the +12 V output, R1.

This is to be done on an emergency basis after all else has been done.

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EN-011000-12-R1270(79V)

RM03-TT-57

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RMØ3
	12 Bit ☐	18 Bit ☒	32 BIT ☒	36 Bit ☐	SYSTEMS

Title	RMØ2/Ø3/Ø5 ALTERNATE HEAD ALIGNMENT PROCEDURE		Tech Tip Number RMØ3-TT-47
Author TOM TOBIASSEN	F.S. Office COLO.SPRINGS	Date 17 FEB 82	Revision A
Processor Applicability: All ☐ Y ☒ X 11's	CSSE LOYD BUCHANAN	Date 18-MAR-82	Cross Reference RMØ2-TT- 47, RMØ5-TT- 9
	PSG FRAN LINNEHAN	Date 22 FEB 82	

Subject Alternate head alignment procedure for RMØ2/Ø3/Ø5's

This can be done with or without the HFSV (head align card). With the HFSV card the results will equal alignment done with a field test unit (FTU).

Enter into memory starting at

Location			
	200	000005	Reset
		012737	Select unit 0
		000000	
		176710	
	210	012737	Set VV
		000021	
		176700	
	216	000005	Reset
	220	012737	Set WC
		177400	
		176702	
	226	012737	Set BA
		002000	
		176704	
	234	013737	Select Head
		177570	
		176706	
	242	012737	Set DCA=365_8
		000365	
		176734	
	250	012737	Do Read Data
		000071	
		176700	
	256	105737	TSTB for Ready
		176700	
	262	100375	BPL to TSTB
	264	000137	Jump to 216 and
		000216	do it again

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EN-011808-12-R1276(79V)

..-TT-58

Title	RMØ2/Ø3/Ø5 ALTERNATE HEAD ALIGNMENT PROCEDURE		Tech Tip Number RMØ3-TT-47
Author TOM TOBIASSEN	F.S. Office COLO.SPRINGS	Date 17 FEB 82	Revision A
Processor Applicability All X 11 s	CSSE LOYD BUCHANAN	Date 18 MAR 82	Cross Reference RMØ2-TT-47
	PSG FRAN LINNEHAN	Date 22 FEB 82	RMØ5-TT- 9

Instructions:

1. With the drive powered off, place the HFSV card in the drive logic chassis at location AØ2 on RM02/03 and A16 on RM05's. Insert LAP Ø into drive. If you are not using the HFSV card goto step 5.

2. Install the head alignment cable between the drive logic chassis and the jack on the card in the read/write chassis as specified in the appropriate disk subsystem user's guide. Use your DVM in place of the FTU meter.

3. Power up the drive and install a CE Pack. Enter the toggle program at location 200, load address 200 and press start with SWR = Ø. Heads will seek to cyl 245_{10} and you are ready for head alignment on head #Ø.

4. To select another head, raise the switches on the console to correspond to the desired head. On 1170 with RDC console, press ctrl P to get in console mode. 1W writes a 1 into the SWR, change the value 1 to ? for another head selection.

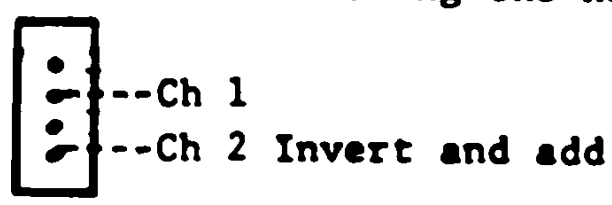
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
*	*	*	HD	HD	HD	HD	HD	*	*	*	*	*	*	*	*
			16	08	04	02	01								
			x	x											

First line = Switch Second line = value calculated by adding values in line 3.

Note: x - not used by RM02/03

5. For head alignment without the HFSV card place scope probes as shown below. J104 on the read amp card A3A03. Align the head for equal simitry of the dibit pattern shown in the user guides. This is an emergency procedure and should be done using the HFSV card as soon as possible.

Goto step 3.



Page 47	Page Revision A	Publication Date APRIL 1982

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EN-011886-12-81278(78V)

M03-TT-59

FIELD SERVICE TECHNICAL MANUAL				Option or Designator: RMØ3
12 Bit ☐	16 Bit ☒	32 BIT ☒	36 Bit ☐	SYSTEMS

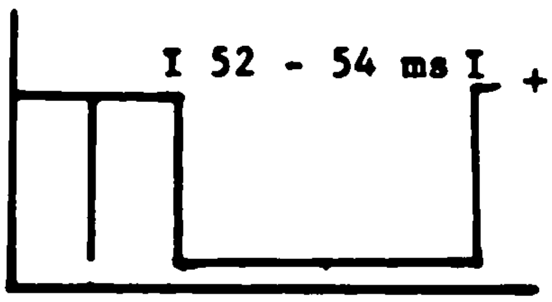
Title: VELOCITY GAIN ADJUSTMENT WITHOUT FTU FOR RMØ2/Ø3		Tech Tip Number: RMØ3-TT-48
Author: TOM TOBIASSEN	F.S Office: COLO.SPRINGS Date: 17 FEB 82	Revision: A
Processor Applicability: All X, 11	CSSE: LOYD BUCHANAN Date: 18 MAR 82	Cross Reference: RMØ2-TT-48
	PSG: FRAN LINNEHAN Date: 22 FEB 82	

The following is a procedure for adjusting velocity gain on RM02/03 using a toggle-in program on PDP-11's.

Toggle program

```
200     000005    Reset
202     012737    Sel Unit 0
        000000
        176710
210     012737    Set VV
        000021
        176700
216     012737    Set DC = 1466(8)
        001466
        176734
224     012737    Seek Command
        000005
        176700
232     105737    TSTB for Ready
        176700
        100375
240     000005    Reset
242     012737    Set DC = Ø
        000000
        176734
250     012737    Seek Command
        000005
        176700
256     105737    TSTB for Ready
        176700
        100375
264     000137    Jump to the
        000200    beginning
```

1. Connect a scope to pin on the bottom of the logic rack A2 BØ9 Ø3A.
2. Start the drive with unit select plug #0
3. Load address 200 and start.
4. Adjust pot E2R6 on the A2A07 card for 52 - 54 MSec. See figure.



RM03-TT 60

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM03
	12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☒	SYSTEMS

Title	EXCLUSIVE OR GATE ERROR			Tech Tip Number	RM03-TT- 49
Author	LOYD BUCHANAN	F.S. Office	COLORADO	Date 23 FEB 81	Revision A
Processor Applicability		CSSE	GREG EKHOLM	Date 14 JUL 81	Cross Reference RM02-TT- 49
AH X		PSG	FRAN LINNEHAN	Date 18 JUL 81	RM05-TT- 10

The RM02, RM03, and RM05 prints are in error on drawing exculsive OR gates. Referring to cross references 164 and 165 in the RM02 and RM03 prints, C.D.C. has shown the 149H gates as exclusive NOR gates. The manufacturer's data sheet lists the 7486 and the 3021 gates as exclusive OR's. Erasing the inversion bubbles on the outputs does make the logic work properly.

This logic appears on cross references 124 and 125 of the RM05 prints.

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EN-011888-12-R1278(78V)

RM03 TT 49

When testing the RM02/03 carriage bearings, it is better to manually load the heads with no pack in the drive.

When done with reasonable care, this practice does not damage the heads.

If the bearings are tested with a spinning pack, the carriage can "float" on the air-bearing; and give a <u>false</u> indication that the bearings are good.

These principles would also apply to the RM05.

EN 1180C 12 8277 (78V)

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	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM03
	32 Bit [X]	16 Bit [X]	18 Bit [X]	36 Bit [X]	SYSTEMS

Title BRAKE ASSEMBLY CAUSING INTERMITTENT FAILURE			Tech Tip Number RM03-TT-51
Author FRAN LINNEHAN	F S Office MAYNARD	Date 15 FEB 82	Revision A
Processor Applicability: All X	CSSE SKIP DALTON SD	Date 10 MAR 82	Cross Reference RM02-TT-51
	PSG. ED MALONE EM	Date 15 FEB 82	

There has been an increase of intermittent failures caused by the brake assembly in RM02/03 disk drives. This does not mean that if you have an intermittent failure that you automatically go and change the brake assembly, and/or related modules. You may have one of these intermittent failures, and the problem may be in another area of the drive. However, the brake assembly is one area that should be checked. These intermittent failures may show up as data checks, write checks, seek incomplete, format errors, header compares, header CRC, or drive timing errors. These errors may show up under the operating system only.

To check whether this is your problem, just remove the brake assembly from the spindle motor for testing. Do not leave the drive in this condition because this would cause a safety problem. The pack may still be spinning, and you will be able to open the cover.

If you find that the brake assembly is the problem, you should also be aware that the driver for the brake, transistor Q10 on the A10 card may have been weakened. To verify this, touch the motor or brake. Neither of these should feel hot to the touch. If so, replace card A10. You should also compare the temperature of the motors and brake assembly on a working drive so you can feel what a normal temperature should be before you replace the A10 card. When Q10 is weakened, it will put a constant drag on the brake/drive motor, thus creating excessive heat.

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EN 1180C 12 A277 (78V)

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM03
	32 BIT [X]	16 Bit [ ]	18 Bit [ ]	36 Bit [ ]	SYSTEMS

Title DISK PACK CLEANING/INSPECTION		Tech Tip Number RM03-TT-52
Author GREG EKHOLM	F S Office COLORADO Date 8 APR 82	Revision A
Processor Applicability: All X	CSSE DENNIS SHAW Date 5-4-82	Cross Reference RM02-TT-52
	PSG ED MALONE Date 4 28 82	

COMPANY CONFIDENTIAL Tech Tip on MEDIA MAINTENANCE of DISK PACKS

The following statements are to be included in DEC Manuals, TECH TIPS, Policies and Procedures manuals and as a general corporation stand on the subject of "to clean or not to clean".

PACK HANDLING AND STORAGE

Careful handling of disk packs is a must. This includes assuring that the pack is never hit against another object or dropped. Every force on a disk assembly can potentially result in the repositioning of the many parts that make up the unit and possibly effect the construction tolerances and data reliability. This is true during the insertion and extraction of the media from the drive as well as general transportation and storage. Packs should be stored in a computer room environment with temperature held between 60 to 80 degrees F (15 TO 27 c) with relative humidity of from 40 to 55 percent.

Careful handling in a clean environment, utilizing the media's protective dust covers should be taught at all times. Always store the top and bottom of the protective dust cover together when not on the disk pack. Always keep the bottom cover afixed to the pack when the pack is in the top protective cover. Storing the media in a controlled clean environment is the first order of preventative maintenance. The likelihood of contamination is decreased if the media is operated and stored in a clean, controlled environment. If the media is stored in a different room than where the disk drive is located then care should be exercised to insure temperature stabilization before the disk pack is mounted in the disk drive. A disk pack's stacking tolerances can be directly effected by temperature. The rate of change of this temperature is also important to insure that condensation and media separation does not occur. Packs stored at a temperature different than the disk drive it is to be mounted in, should be allowed to stabilize to the room temperature of the disk drive for a period not less than one hour and preferably two hours.

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EN 1188C 12 R277 (79V)

Title DISK PACK CLEANING/INSPECTION		Tech Tip Number RM03-TT-52
Author GREG EKHOLM	F S Office COLORADO Date 8 APR 82	Revision A
Processor Applicabil ty: All X	CSSE DENNIS SHAW Date 5-4-82	Cross Reference
	PSG ED MALONE Date 4-26-82	RM02-TT-52

Never store a disk pack in direct sunlight or a dirty environment. Never allow a disk pack to come in the area of any strong magnetic field. Store the disk packs on a flat surface, never on the edge. If possible avoid stacking packs and if not, only stack two high, never more. Only stack packs of the same type, never inter-mix packs of different design.

IMPACT DETECTORS

A device known as a "SHOCKWATCH" is commercially available from several companies. The "SHOCKWATCH" impact detector gives you an immediate, visual alert when a disk has been shocked beyond manufacturer's specs; the normally clear indicator in the "SHOCKWATCH" changes to brilliant red, indicating probable damage. "SHOCKWATCH" can be easily attached to any standard disk cartridge or disk pack, and will not interfere with drive operation. If a "SHOCKWATCH" has been activated (the "SHOCKWATCH" is now red) that media should not be mounted on any disk drive. The media should be put to one side until it can be inspected using proper media inspection equipment.

PACK TRACKING

A reliable method of tracking media is strongly recommended to insure the performance of not only the media but, also the disk drive(s). Each pack should be labeled to allow tracking. The label should be placed either on the inside of the disk pack hub (do not place labels on the top of the disk pack), in the appropriate label area of the pack if so equipped, or on the top of the protective disk pack cover(never place labels on the side of the disk pack's protective cover). Place labels on the inside of the disk pack hub only if the pack is designed with a deep center hub ie: RP04, RP05, RP06 not RM02 or RM03 packs. Do not apply a large number of labels to the inside hub as this can cause the pack to be out of balance thus resulting in data reliability problems. Do not use grease pencils or other marking equipment that could flake off or introduce contamination to the pack or disk drive. Do not use lead pencil to mark packs. Write the label before it is applied to the disk pack or the disk cover. Never erase the

Page 53	Page Revision A	Publication Date APRIL 1982

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EN 1180C 12 R277 (78V)

RM03 TT-65

labels, if a correction is required, apply a new label instead. Each time the disk pack is mounted, the pack identification should be noted and the disk drive it is mounted in should be identified, by serial number rather than logical unit number. The performance of the disk drive and pack should be logged and kept as a site record. As an increase in data checks will frequently accompany contamination, a running log of errors attributable to the pack can indicate when the pack is in need of maintenance. The total log of errors can indicate when the disk drive is in need of maintenance. Both will contribute to the data reliability of the disk sub-system and prove to be cost effective in the long run.

PACK CLEANING

DIGITAL EQUIPMENT CORPORATION does not recommend the preventative cleaning of any disk packs. This policy supersedes any and all previous statements and is based on the latest technical data available. Packs should be logged and tracked and when the performance of a particular disk pack has degraded to an established control point (this should be set on a customer by customer basis taking into consideration the individual customers tolerance to data errors) then that disk pack should be removed from service until it can be cleaned by an approved cleaning method administered by an approved cleaning source. If this preferred method can not be implemented, then preventative cleaning should be used. DIGITAL EQUIPMENT CORPORATION does recommend the use of automated cleaning equipment using specially formulated "wet" cleaning solutions. The use of this automated cleaning equipment is believed to be very repeatable and consistent from cleaning to cleaning providing the equipment is maintained per the manufactures recommendations. It should be noted that cleaning will not solve all problems. Scratched media and dirty read/write heads require technical consideration. Media that has been damaged by improper handling should be immediately removed from service and so marked. A method to determine the condition of the actual disk surfaces is known as disk inspection and will be covered next.

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EN 1189C 12 R277 (79V)

RM0[illegible]-TT-66

Title	DISK PACK CLEANING/INSPECTION	Tech Tip Number	RM83-TT-52
Author	GREG EKHOLM	FS Office COLORADO Date 8 APR 82	Revision A
Processor Applicability All X	CSSE DENNIS SHAW Date 5-4-82		Cross Reference
	PSG ED MALONE Date 4-28-82		RM82-TT-52

DISK PACK INSPECTION

A method of visually inspecting the disk surfaces is known as disk or pack inspection. Several tests are usually performed during pack inspection. The inspectors are designed to accommodate a variety of pack types, including 1316, 2316, 3336 mod I or II. Other units are available to inspect disk cartridges both single and dual platter styles. The most common test is to insure that the disk platters that make up the disk pack are at the proper stacking tolerances. This is done with what is commonly known as a comb gauge. The disk pack is mounted on a special tester and the dust cover removed. The comb gauge is mounted on the tester and positioned to allow the disk platters to pass through the comb gauge. The pack is rotated and if any of the surfaces touch the comb gauge the pack is rejected. With properly designed comb gauges, run-out can also be checked, however the less than 10 RPMs spec is used rather than the dynamic runout tolerance.

Another test usually performed during pack inspection is a visual inspection of each of the disk surfaces. This is done by mounting a light source and a set of mirrors on the tester. The mirrors allow the operator to visually scan each disk surface for surface defects. The light source provides a high intensity light to illuminate the disk surfaces. The disk pack and drive is designed in such a manner to allow a disk read/write head to touch down momentary on the disk surface during a head load without causing a catastrophic head crash. The area of the pack known as the head load zone is reserved for this possible miniature head crash or head stabilization period. This area does not contain any data and therefore is not able to be checked except by the pack inspector. Small minor surface defects are allowed in this area. The inspector will look for defects in the surface of each platter and inspect the head load zone for defects larger than normal. Scratches, dings, dirt, etc. will be inspected for and depending upon the location of the defects a judgment can be made of the physical condition of the disk pack.

RM[illegible]-TT-67

Title	DISK PACK CLEANING/INSPECTION		Tech Tip Number RM#3-TT-52
Author	GREG EKHOLM	FS Office COLORADO Date 8 APR 82	Revision A
Processor Applicability All X		CSSE DENNIS SHAW Date 5-4-82	Cross Reference RM#2-TT-52
		PSG ED MALONE Date 4-28-82	

A further test sometimes performed on the disk pack is a test for run-out. This is accomplished by mounting a dial gauge on the tester and positioning the ball of the gauge on the outer rim of the disk platter. When the disk is rotated the gauge will show any variation in the roundness of the disk platter.

DIGITAL EQUIPMENT CORPORATION does endorse the use of the disk pack inspectors by qualified personnel. Because most of the defects are inspected for by visual methods the judgement of the inspector is of prime importance and therefore only qualified, experienced personnel should perform this inspection. Also, because the protective cover is removed from the disk pack during this inspection, care must be used to prevent contamination from reaching the surfaces of the disk pack. A clean environment should be used for the disk packs when they are being inspected.

EN-1188C 12 R277 (79V)
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RM03-TT-68

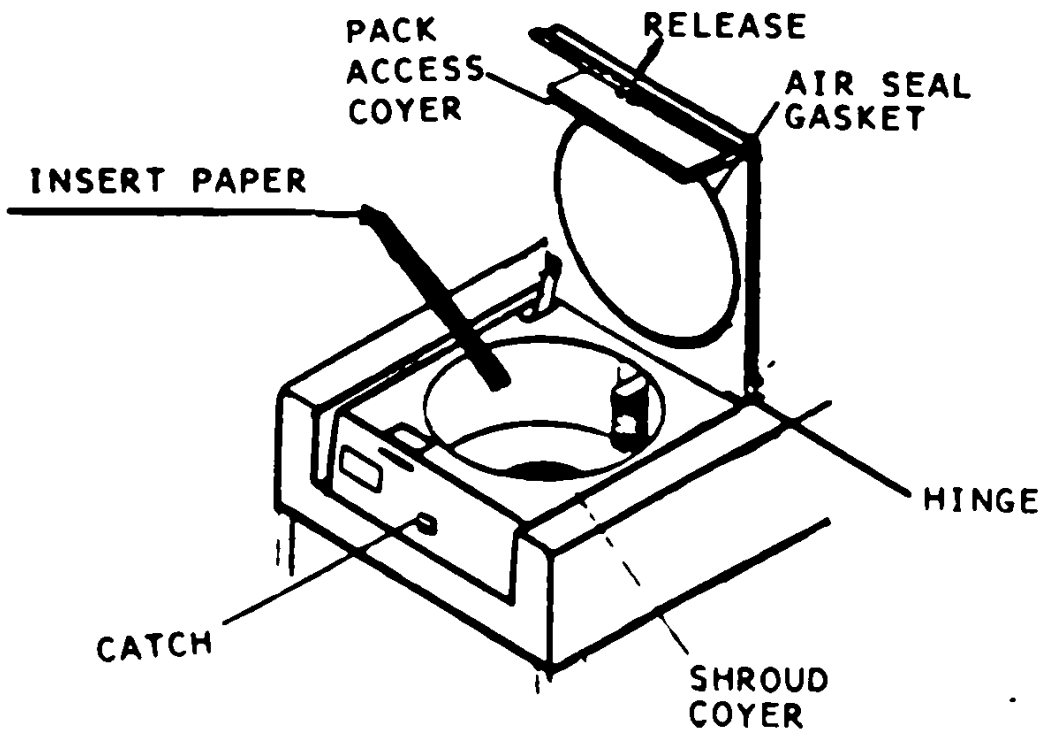
[redacted]	**FIELD SERVICE TECH TIP**					Option Designator RM03
	☒ 12 BIT	☒ 16 BIT	☐ 18 BIT	☐ 32 BIT	☐ 36 BIT	Category SYSTEMS
Title: PACK SEAL ADJUSTMENT / HOLD DOWN BOLTS						Tech Tip No. RM03-TT-53
Processor Applicability: ALL		Cross Reference: N/A				Tech Tip Rev: A / Page: 1 of 1
Author: Ron Hruby			Mgr./Supv. Approval: N/A			
Location: Parker Street		Mail Stop: PK3-2/K11				Date: 5-12-82
CSSE Approval: Dennis Shaw						Date: 5-21-82
PSG Approval						Date

It has been found that a lot of head crashes can be attributed to air seal leaks. The following procedure should rectify this problem.

This can be checked by noting the drag on a sheet of paper as it is pulled out from between the closed pack access cover, and the shroud assembly. The amount of drag should be even around the seal. Adjust if necessary, by moving the front catch on the shroud up or down until the pack access cover latches tightly enough to provide an air tight seal. This adjusts the sides and front of the pack access cover..

If you have a rear seal leak do the following: Loosen hinge screws, and while applying slight pressure on closed pack access cover tighten screws. Also, shroud cover hold down bolts must be in and tightened down, while in customer operation.

NOTE: Because of the use of paper to check seal, you must purge pack for at lease 15 minutes.



	FIELD SERVICE TECH TIP					Option Designator RM#3
	☐ 12 Bit	☒ 16 Bit	☐ 18 Bit	☒ 32 Bit	☒ 36 Bit	Category SYSTEMS
Title RM#2/RM#3 HEADER COMPARE ERROR						Tech Tip No. RM#3-TT-54
Processor Applicability 11 | VAX | 10 | 20 |		Cross Reference RM#2-TT-53				Tech Tip Rev A / Page 1 of 1
Author ANDREW WYNN			Mgr./Supv. Approval ORVILLE BERESKA			
Location VANCOUVER, CANADA		Mail Stop VAO				Date 3 NOV 82
CSSE Approval DENNIS SHAW						Date 31MAR83
PSG Approval DAVE GURSKY						Date 15 APR 83

A FAULTY DOOR CLOSE SWITCH WAS FOUND TO HAVE CAUSED INTERMITTENT HEADER COMPARE ERROR UNDER RSTS. THE PROBLEM WAS ISOLATED BY TAPPING THE SWITCH WHILE RUNNING PERFORMANCE EXERCISER (DIAGNOSTIC GIVES H.C.E. SKI ETC.)

PROBLEM WAS SOLVED BY REPLACING THE SWITCH (DEC PART NUMBER 29-22919).

	FIELD SERVICE TECH TIP					Option Designator RM03
	☐ 12 BH	☒ 16 BH	☒ 18 BH	☒ 32 BH	☒ 36 BH	Category SYSTEMS
Title: 50 Hz Power Transformer Shorting						Tech Tip No. RM03-TT-55
Processor Applicability: A L L		Cross Reference: RM02-TT-54				Tech Tip Rev: A; Page: 1 of 5
Author: Mark Himes			Mgr /Supv. Approval: Dennis Shaw			
Location: CX CSSE		Mail Stop: CXO1-1/N27				Date: 17-May-83
CSSE Approval: Dennis Shaw						Date: 17 MAY 83
PSG Approval: DAVE GURSKY						Date: 18 MAY 83

CFSPS: ROBERT BARNARD

The following material is intended as interim information until a CDC ECO and subsequent DEC ECO/FCO's are generated and released.

A few instances have been reported where the main 50hz power transformer (A1T1, physically larger than the 60Hz unit) have shorted to the upper deck casting in 50hz RM02/3 drive units. This has resulted in physical damage and insulation breakdown to the transformer insulation material and subsequent safety concerns.

On the next PM or service call, check your RM02/3 for proper clearance between the transformer and the upper deck chassis. This clearance must be checked with the deck in its LOWERED position. This check should be performed as follows:

1) Power down the drive and disconnect the AC power source.

2) Remove the top cover assembly.

3) From the rear of the drive, loosen the logic chassis clamp screws (see figure 1).

4) CAREFULLY slide the logic chassis (on its hinges) towards the rear of the drive and then up and to the left (counterclockwise) into the maintenance position (arrows 1 & 2, figure 1).

5) Locate the main 50hz transformer (A1T1) as shown in figure 2.

6) A closer view of the transformer is shown in figure 3.

7) The critical area of clearance is noted by arrow 5, figure 3. Check to be sure that there is sufficient clearance between the transformer and the upper deck chassis. A minimum of 2mm (.08") clearance is required. A flashlight and feeler gauge set may be required.

   If the clearance is sufficient, then skip to step 13. Otherwise proceed with the next step(s) for proper transformer re-adjustment.

   NOTE: If the transformer windings or winding insulation appear punctured or damaged, the transformer should immediately be replaced.

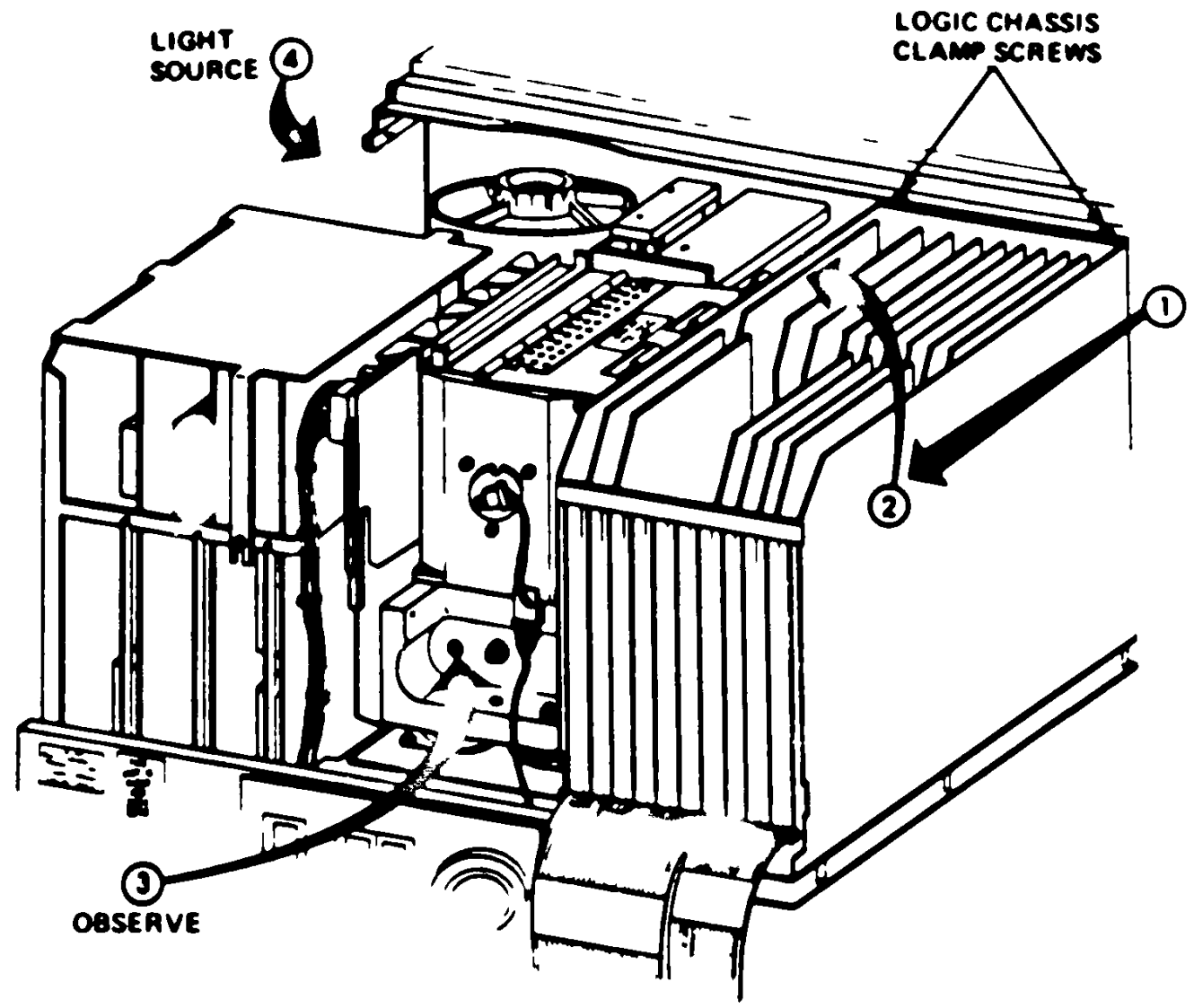


Fig 1

8) Loosen the transformer mounting screws (#1, #2, and #3 in figure 4). Screw #4 is unaccessable at this time.

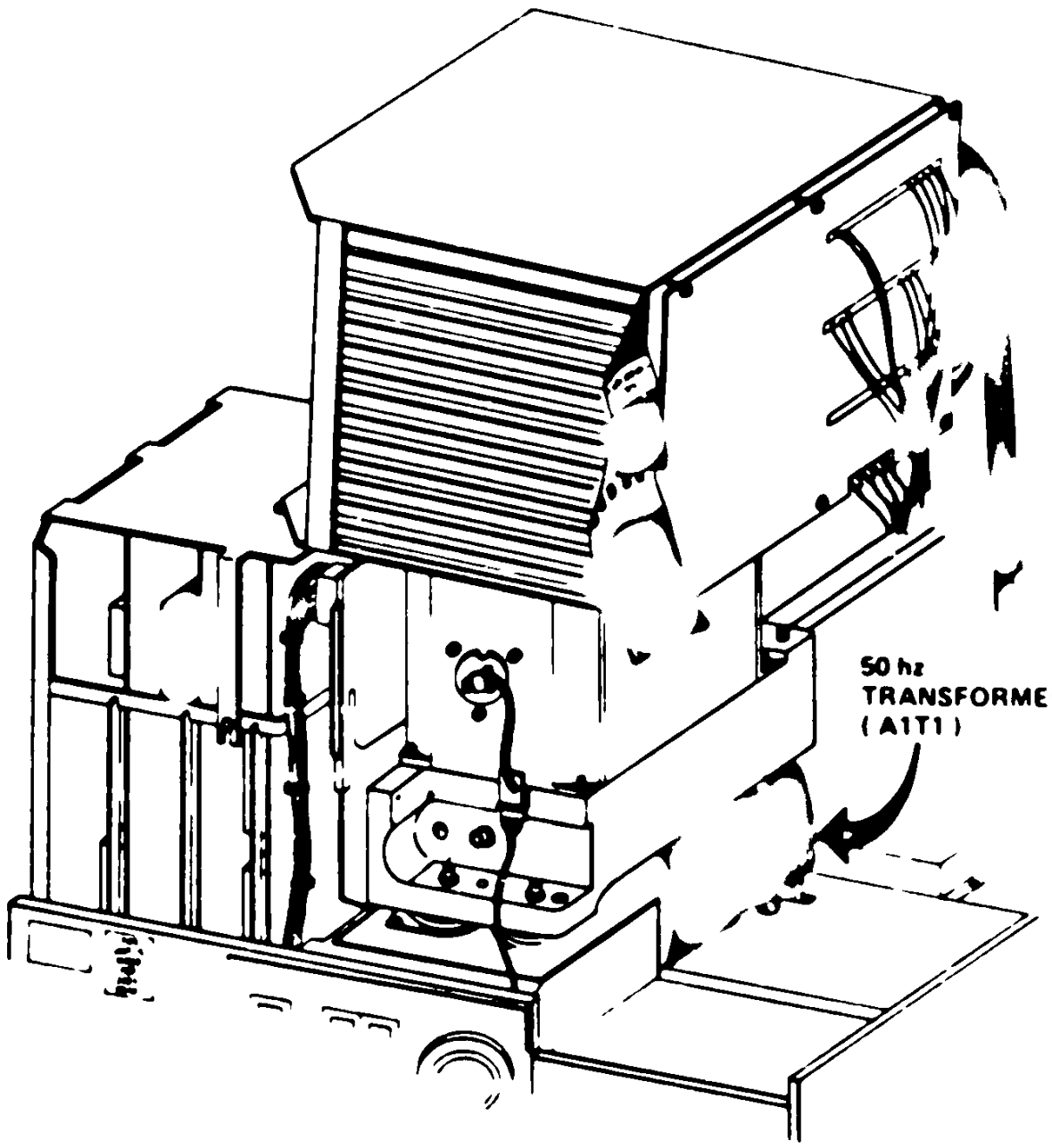


Fig 2

9) Rotate the transformer (using screw 4 as the pivot point) in the direction noted by arrow 6 in figure 4 until the required clearance is obtained. Since screw #4 is still tightened, the transformer may have to be lightly "tapped" to perform this step. If the transformer will not move, the 4th screw will have to be loosened. This screw is accessable by first removing the power supply assembly (figure 4).

RM(. TT-7

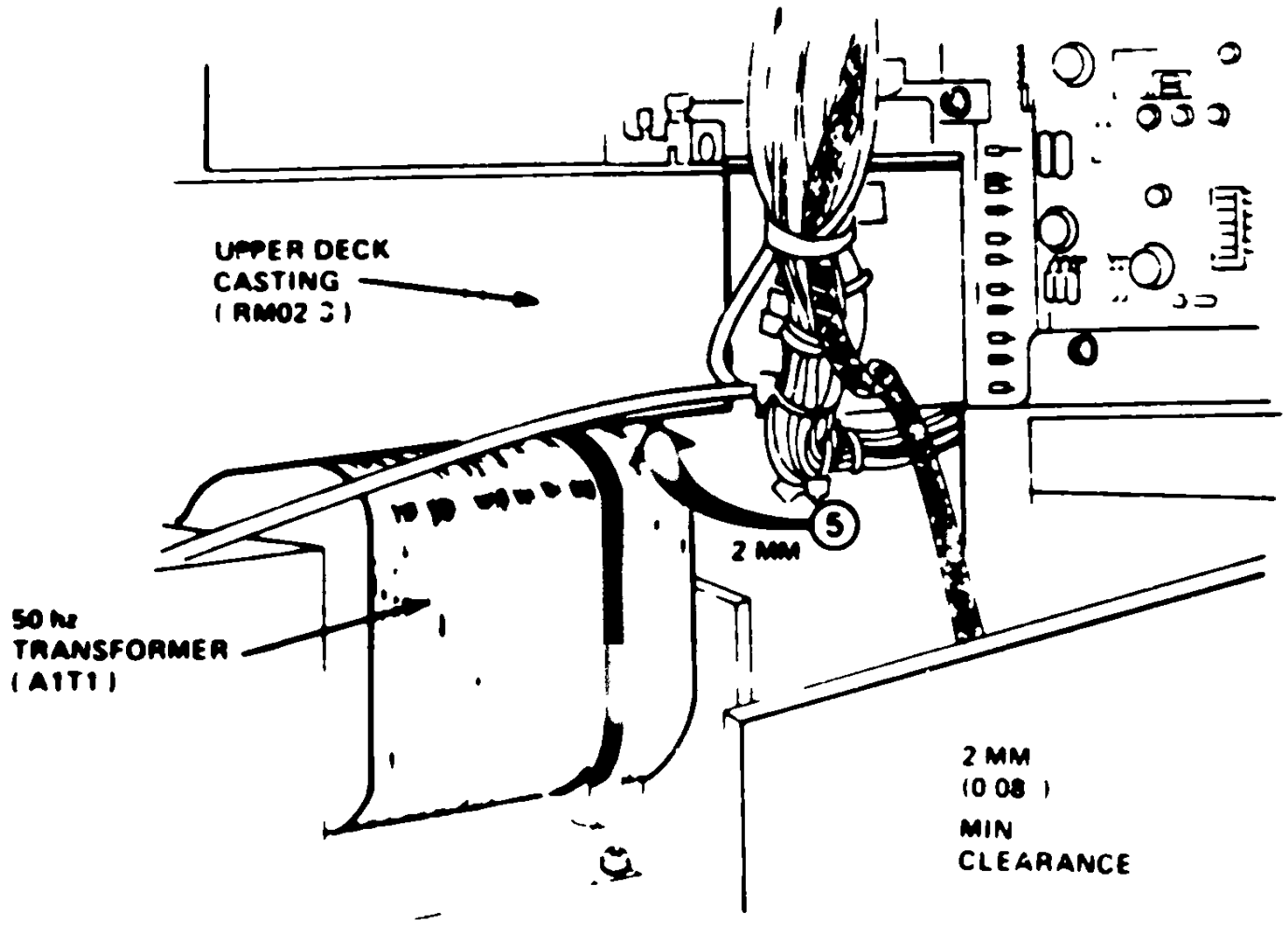


Fig 3

10) After readjusting the transformer, retighten the transformer mounting screws (1,2,3,4 in figure 4).

11) With the upper deck in its LOWERED POSITION, check for adequate clearance on the "other" side of the transformer. This will be the side of the transformer closest to the power supply. This area may be observed by looking through the hole in the rear of the positioner (arrow 3, figure 1) and applying sufficient light (with a flashlight) as shown by arrow 4 in figure 1. Assure there are no pinched wire harnesses and no chance of damage due to contact between the transformer or transformer winding assembly and other surrounding components or chassis.

RM1 - TT-74

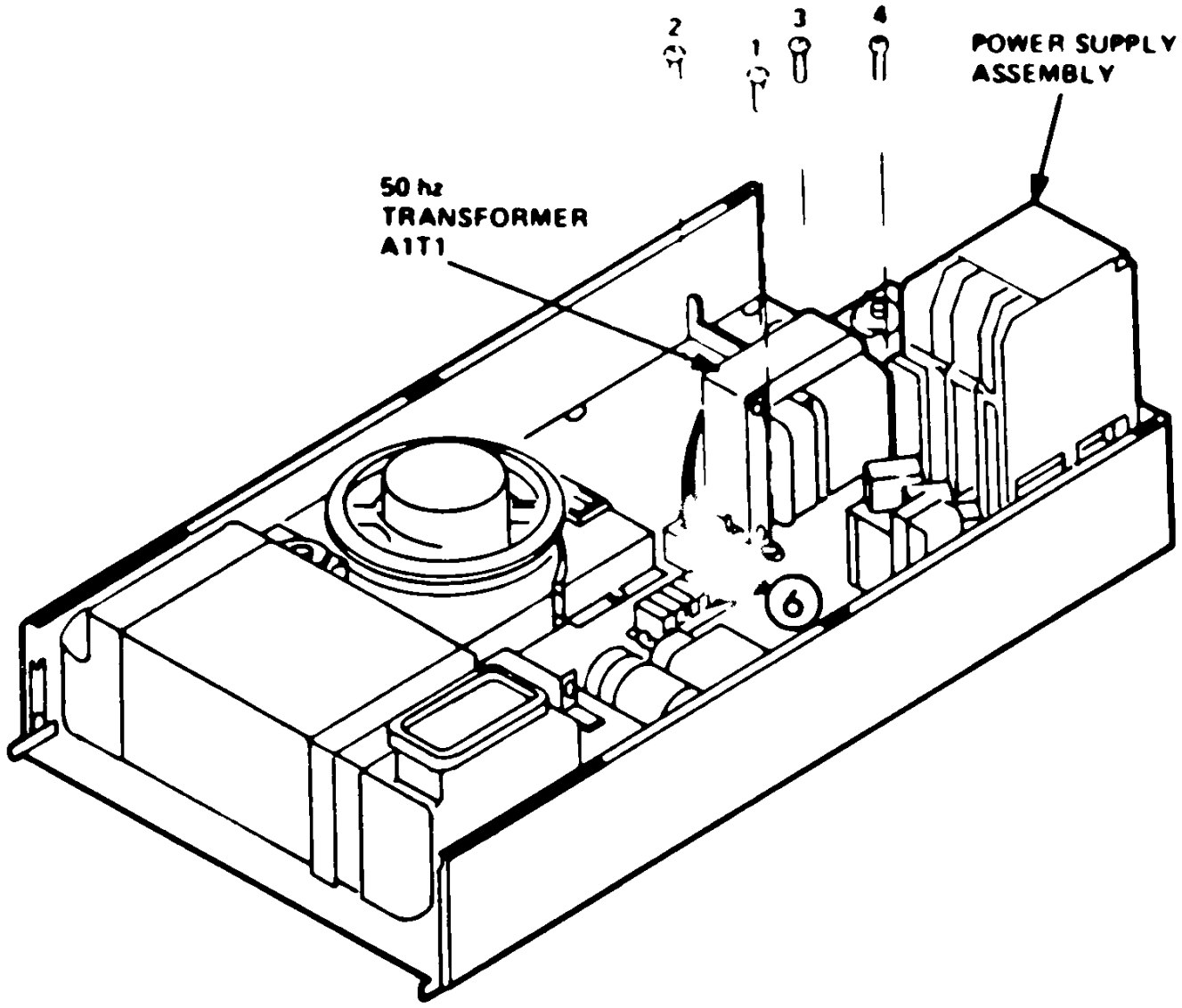


Fig. 4

12) If the transformer cannot be sufficiently adjusted to provide the required clearance, contact your nearest Digital Area F.S. support representative and have them notify CSSE in Colorado Springs. Otherwise, continue with the next step.

13) Carefully return the logic chassis to its operating position and retighten the clamp screws (figure 1).

14) Verify drive operation using the available diagnostics on site.

[redacted]	FIELD SERVICE TECH TIP					Option Designator RM03
	☐ 12 Bit	☐ 16 Bit	☐ 18 Bit	☐ 32 Bit	☐ 36 Bit	Category SYSTEMS
Title NEW LINE FILTER IN SERIES 34 AND ABOVE						Tech Tip No. RM03-TT56
Processor Applicability		Cross Reference RM02-TT-55				Tech Tip Rev A / Page 1 of 1
Author STEVE SCHWEIN			Mgr./Supv. Approval			
Location ST. LOUIS, MO.		Mail Stop				Date 4 APR 83
CSSE Approval DENNIS SHAW						Date 1 June 83
PSG Approval DAVE GURSKY						Date 6 June 83

CDC is using a new line filter on later model RM02/03 Drives. The filter does not have a DEC part number but can be ordered via the vendor number 92 009801.

The new filter is smaller than the old one and has a male receptacle mounted at the back.

digital	FIELD SERVICE TECH TIP					Option Designator RM03
	☐ 12 Bit	☐ 16 Bit XX	☐ 18 Bit XX	☐ 32 Bit XX	☐ 36 Bit XX	Category SYSTEMS
Title: BRAKE noise and Grounding FCO's						Tech Tip No. RM03-TT-57
Processor Applicability: | | A | L | L | | | |		Cross Reference: RM02-TT-56				Tech Tip Rev A / Page 1 of 1
Author: Mark Himes				Mgr./Supv. Approval: Dennis Shaw		
Location: CX CSSE		Mail Stop: CXO2-1/K97				Date: 26-Oct-83
CSSE Approval: Dennis Shaw						Date: 26oct83
						Date

The vendor (CDC) originally created the following ECO/FCO's to resolve a problem with the ungrounded brake assembly as a source of noise into the drive.

Vendor ECO # PE60337
Vendor FCO # PE60378 (FCO kit, vendor p/n 89053893)

This particular vendor FCO kit included a ground "wire" and other various hardware items. This FCO kit was incorporated into the following DEC FCO kits:

EQ-01096 (RM02-S0015 FCO documentation + 1 ea. 29-11997)
EQ-01097 (RM03-S0023 FCO documentation + 1 ea. 29-11997)

Note: DEC p/n 29-11997 contained vendor part number 89053893 which in turn contained the CDC kit for FCO PE63078.

It was later determined that the original FCO was not adequate in many situations. The vendor created another ECO/FCO to supercede the previous ECO/FCO. The new ECO/FCO replaced the ground "wire" with a ground "BRAID" to reduce and/or eliminate brake generated noise. The new vendor ECO/FCO is:

Vendor ECO # DJ00200
Vendor FCO # DJ00200 (FCO kit vendor p/n 89053931)

The NEW PARTS + DOCUMENTATION ARE NOW AVAILABLE under the ORIGINAL DEC part numbers:

EQ-01096 (RM02-S0015 FCO documentation + 1 ea. 29-11997)
EQ-01097 (RM03-S0023 FCO documentation + 1 ea. 29-11997)
29-11997 (vendor kit p/n 89053931 for FCO DJ00200)

The vendor kit (supplied with the DEC FCO kit) includes new instructions and hardware for both of the possible situations:

1) Install the new brake assembly ground BRAID.
2) Replace any existing brake assembly ground "wire" with the BRAID.

It is recommended that the NEW revised FCO kit be installed at the next PM or service call if brake generated noise problems are suspected.

digital

FIELD SERVICE TECH TIP

☐ 12 Bit ☒ 16 Bit ☐ 18 Bit ☒ 32 Bit ☑ 36 Bit

Option Designator: RM03

Category: SYSTEMS

Title: DATA ERRORS DUE TO RUNOUT

Tech Tip No.: RM03-TT- 58

Processor Applicability: 11's 20's VAX

Cross Reference: RM02-TT-57 RM05-TT-22

Tech Tip Rev: A

Page: 1 of 1

Author: MARK LICATA

Mgr/Supv. Approval: Randal C Olson

Location: CHICAGO PRODUCT SUPPORT

Mail Stop: RLO ROLLING MEADOWS, IL

Date: 10 AUG 1983

CSSE Approval: for Nelson

Date: 3 JAN 1984

PROBLEM

EXCESSIVE DATA PROBLEMS DUE TO INABILITY OF CARRIAGE TO FOLLOW OUT OF ROUND SPINDLE OR PACK DURING FINE MODE.

SYMPTOMS

IF YOU ARE EXPERIENCING OFF CYLINDER FAULTS OR EXCESSIVE DATA ERRORS THE CAUSE COULD BE EXCESS RUNOUT OF THE PACK OR SPINDLE. THE RM POSITIONER HAS TO DRIFT OFF CYLINDER IN FINE MODE FOR MORE THAN 800 MICROSECONDS TO ACTUALLY FLAG AN OFF CYLINDER FAULT. IF THE POSITIONER DRIFTS BECAUSE OF PACK OR SPINDLE OUT OF ROUNDNESS FOR LESS THAN 800 MICROSECONDS, NO POSITIONER ERROR OR FAULT IS DETECTED. AT 3600 RPM'S A SECTOR IS ONLY 520 MICROSECONDS, SO A WHOLE SECTOR COULD BE READ OR WRITTEN OFF CYLINDER WITH NO INDICATION OF A RUNOUT PROBLEM.

SOLUTION

LOAD HEADS AND SCOPE RUNOUT AT GIVEN TEST POINT TO DETERMINE IF SPINDLE AND PACK ARE WITHIN GUIDELINES. WHEN TAKING READINGS ROTATE PACK 90 DEGREES 4 SEPARATE TIMES, THEN LOOK AT ALL READINGS TO DETERMINE STATUS.

	RUNOUT TEST POINT	MAX SPEC P-PEEK	INDEXTRIGGER
RM02/03	A2A08 TPF	1.0 VP-P	A2B08 TPC
RM05	A2A19 TPC	400 MVP-P	A2A06 TPC

[_____]	**FIELD SERVICE TECH TIP**					Option Designator RM03
	☐ 12 Bit	☒ 16 Bit	☐ 18 Bit	☐ 32 Bit	☐ 36 Bit	Category SYSTEMS
Title PROBLEMS USING RM02/03 RAIL ALIGNMENT TOOL						Tech Tip No. RM03-TT-59
Processor Applicability		Cross Reference RM02-TT-58				Tech Tip Rev A / Page 1 of 2
Author JOHN LOCKRIDGE			Mgr./Supv. Approval			
Location LYNCHBURG, VA		Mail Stop LBO				Date 11/4/83
CSSE Approval						Date 1/3/84
						Date

PROBLEM

ANYONE WHO HAS REPLACED RAILS ON AN RM02/03 HAS PROBABLY EXPERIENCED DIFFICULTY WITH THE ALIGNMENT TOOL AS FOLLOWS:

> AFTER FOLLOWING INSTRUCTIONS AND SECURING THE TOOL TO THE BOTTOM RAIL WITH THE TWO THUMB-SCREWS, THE TOOL "WOBBLES" OR "ROCKS" BACK AND FORTH AND IS NOT STABLE. THIS CAUSES INCONSISTANT RESULTS. THE TOP RAIL MAY BE PARALLEL TO THE BOTTOM, BUT IS NOT NECESSARILY ALIGNED. IT MAY BE RIGHT OR LEFT OF THE BOTTOM RAIL BY VARYING DEGREES.

IF LEFT IN THE CONDITION DESCRIBED ABOVE, THE RM02/03 MAY EXPERIENCE EXCESSIVE RAIL/BEARING WEAR AND/OR HEAD CRASHES BECAUSE THE ENTIRE CARRIAGE/HEAD ASSEMBLY WILL BE TILTED WITH RESPECT TO THE DISK SPINDLE.

CAUSE

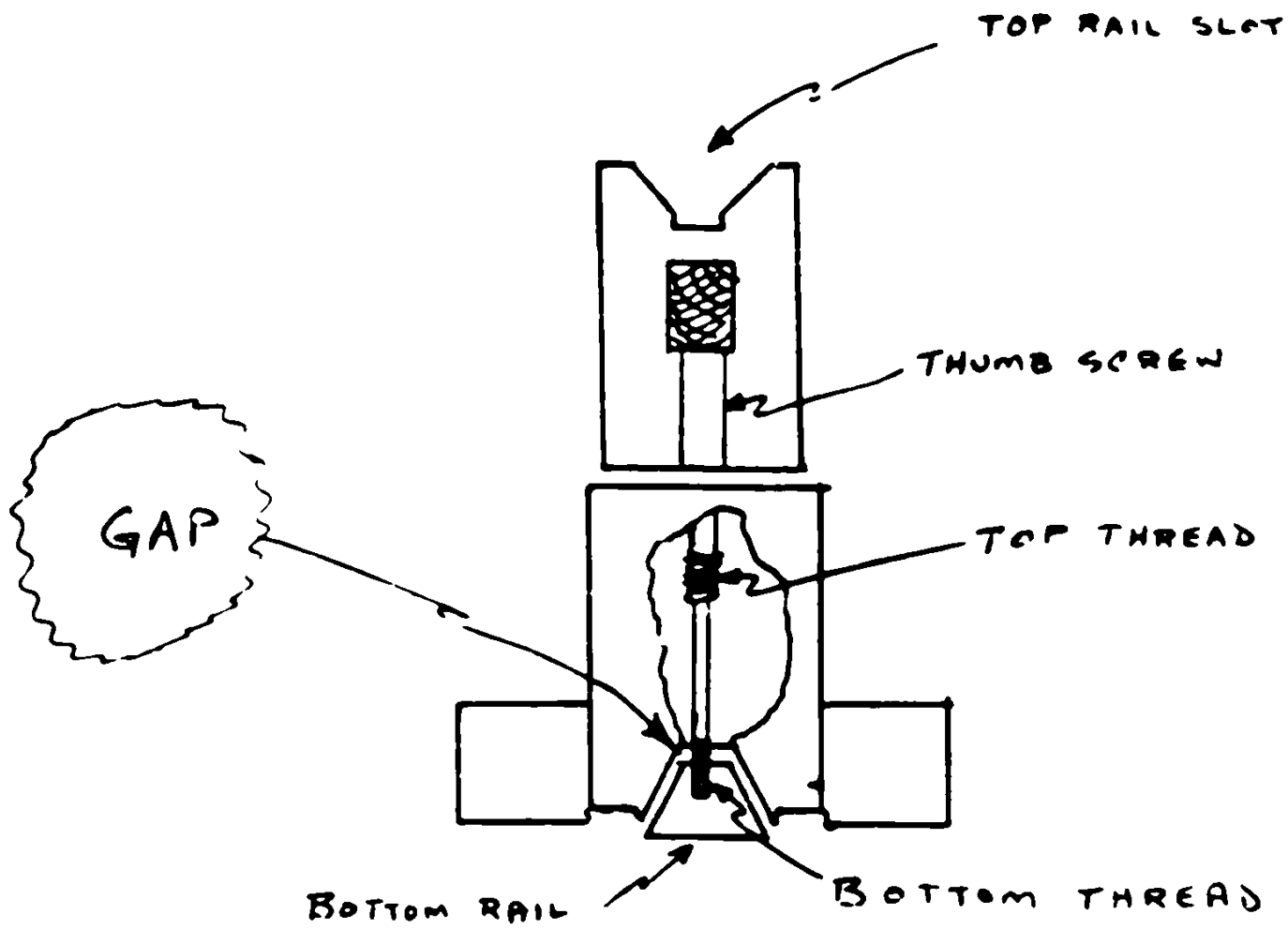
THE THUMB-SCREWS WHICH SECURE THE TOOL TO THE BOTTOM RAIL EACH HAVE TWO SETS OF THREADS; ONE SCREWS INTO THE TOOL AND THE OTHER INTO THE BOTTOM RAIL. ON SOME DRIVES, THIS WILL ACT AS A "JACK SCREW" AND ACTUALLY LIFT THE TOOL OFF THE BOTTOM RAIL. IN THIS "SUSPENDED" CONDITION, THE TOOL IS UNSTABLE AND DOES NOT PROVIDE A RELIABLE REFERENCE FOR THE "RAIL BRACKET" OR THE TOP RAIL.

SOLUTION

REMOVE THE THUMB-SCREWS AND USE A LOCALLY PURCHASED SIZE 6-32 SCREW CUT TO EXACTLY 1.4". REMEMBER THAT YOU ARE ONLY CATCHING TWO OR THREE THREADS, SO DON'T OVERTIGHTEN. BY FOLLOWING THIS PROCEDURE, YOU WILL FIND THAT THE TOP & BOTTOM RAILS LINE UP JUST AS THE BOOK SAYS THEY SHOULD.

RM1 - TT.79

[ ]	**FIELD SERVICE TECH TIP**	Option Designator RM03	
	Continuation Sheet	Category SYSTEMS	
Title PROBLEMS USING RM02/03 RAIL ALIGNMENT TOOL		Tech Tip No. RM03-TT-59	
Processor Applicability	Cross Reference RM02-TT-58	Tech Tip Rev A	Page 2 of 2



RAIL ALIGNMENT TOOL

FRONT END VIEW

RMUG-TT-59

	FIELD SERVICE TECH TIP					Option Designator RM03
	☐ 12 Bit	☐ 16 Bit	☐ 18 Bit	☒ 32 Bit	☐ 36 Bit	Category Diagnostics
Title EVRDA Rev 4.1 Problem						Tech Tip No. RM03-TT-60
Processor Applicability Vax		Cross Reference RM02-TT-59, RM05-TT-23, RM80-TT-21				Tech Tip Rev A / Page 1 of 1
Author Koller			Mgr./Supv. Approval			
Location CXO		Mail Stop CXO 2-1/K97				Date 3-23-84
CSSE Approval Ron Milano						Date 3.24.84
FSPSG Approval Al Snyder						Date 3.24.84

PROBLEM:

EVRDA Rev 4.1 fails Test 73, Subtest 0 (Error 3), when run on a VAX11-780 with the new extended silo module for the RH780 (module M8274). Since the new module has a deeper silo, the diagnostic's timer times out before the silo empties.

FIX:

The fix consists of a patch to be made to the program after it is loaded in memory via the Diagnostic Supervisor.

Since it appears that there may be two versions of the diagnostic both identifying themselves as Rev 4.1, the patch that follows covers both cases:

1. Load program EVRDA

2. SET BASE 9BFC [old Rev 4.1]

3. EXAM E9 contents should be D0530200

   A. IF this is correct, then DEP/L E9 D0530700
   B. Done. Run the program.

4. If the contents were not correct, SET BASE 9D66

5. EXAM F6 contents should be D0530200

   A. IF this is correct, then DEP/L F6 D0530700
   B. Done. Run the program [new Rev 4.1]

A new revision of the program will be released on the very next VAX Diagnostic release cycle.

RM03-TT-60

[ ]	FIELD SERVICE TECH TIP					Option Designator RM03
	☐ 12 BH	☒ 16 BH	☐ 18 BH	☒ 32 BH	☒ 36 BH	Category Safety
Title RM Mass Buss Adapter Caution						Tech Tip No. RM03-TT-61
Processor Applicability 10 | 11 | 20 | VAX		Cross Reference SEE BELOW				Tech Tip Rev A / Page 1 of 1
Author Louis Carpenito		Mgr/Supv Approval Bob Barnard				
Location OGO		Mail Stop 1-1/F17				Date 19-JUN-84
CSSE Approval Dennis Shaw RWM						Date 23 Jul 84
FSPG Approval Bob Barnard Bob Barnard						Date 6-25-84

CAUTION

Extreme care must be used when working in or around the RM Mass Buss Adapter chassis slides. The flat bearings inside the channel of the slide may be sharp enough to inflict a minor cut to your fingers and/or hands.

Also extreme care must be taken when fastening the ground cables to the ground stud on the side of the unit, because your wrist may be close to the sharp edges of the chassis slide.

CROSS REFERENCE:

RM MASS BUSS ADAPTER-TT-01
RM02-TT-60
RM80-TT-22
SAFETY-TT-18

	FIELD SERVICE TECH TIP					Option Designator RM03
	☐ 12 Bit	☒ 16 Bit	☐ 18 Bit	☒ 32 Bit	☒ 36 Bit	Category DISK
Title RM ADAPTER POWER SUPPLY (70-13826) CAUTION						Tech Tip No. RM03-TT-62
Processor Applicability [11/'d] [VAX] [LCG]		Cross Reference RM02-TT-61, RM05-TT-26, RM80-TT-23				Tech Tip Rev . A / Page 1 of 1
Author RICK SWANSON			Mgr /Supv Approval RON MILANO			CX/CSSE
Location COLORADO SPRINGS		Mail Stop CXO/[illegible]				Date 3-JANUARY-1985
CSSE Approval RON MILANO CX/CSSE						Date 3-JANUARY-1985
FSPSG Approval						Date

Extreme caution must be used when working in or around the RM Adapter Power Supply.

When the Power Supply is disassembled to allow service access, there are exposed uninsulated parts with primary AC voltage present on them. The possibility of coming in contact with such voltage is very likely when servicing the RM Adapter Power Supply.

WARNING: WHEN SERVICING THE RM ADAPTER POWER SUPPLY, LOCATED IN THE RM ADAPTER, ALWAYS MAKE SURE THAT THE RM ADAPTER MAIN AC POWER CORD CONNECTOR IS REMOVED FROM THE SITE POWER SOURCE.

	FIELD SERVICE TECH TIP					Option Designator RM03
	☐ 12 BIT	☒ 16 BIT	18 BIT	☒ 32 BIT	☒ 36 BIT	Category DISK
Title SPEED SENSOR PROBLEM						Tech Tip No. RM03-TT- 63
Processor Applicability 11/3 VAX LCG		Cross Reference RM02-TT- 62				Tech Tip Rev A / Page 1 of 2
Author Ricky C. Swanson			Mgr /Supv Approval Ron Milano			
Location Colorado Springs		Mail Stop CXO1-1/P14				Date 6-MARCH-1985
CSSE Approval Ron Milano CX/CSSE						Date 6-MARCH-1985
FSPSG Approval						Date

PROBLEM: When checking or adjusting the speed sensor assembly on the RM02/RM03 disk drive , always make sure that the metallic transducer pickup is properly secured inside the plastic threaded housing of the speed sensor assembly.

During some occasions the adhesive securing the transducer pickup inside the threaded stud has broken down. When this occurs the transducer pickup will usually slip down inside the threaded stud instead of protruding from the top of the stud housing.

When adjusting the speed sensor assembly a GO/NOGO tool is used to get the transducer pickup to a maximum height without interfering with the rotating disk pack. This is done by resting the tool on the spindle face plate and observing that the tool "GO SIDE" will pass over the top of the transducer pickup while the tool "NOGO" side will not clear the top of the transducer pickup. When the adhesive breaks down it lets the transducer pickup recess itself inside the threaded stud. When the speed transducer adjustment is attempted with the transducer pickup in its lowered position,the height of the threaded stud must now be increased to the height of the tool. This is because the clearance is normally measured from the bottom of the GO/NOGO tool to the top of the metallic transducer pickup.

With the transducer pickup recessed the plastic housing must be elevated to satisfy the proper clearance with the GO/NOGO tool. The result is, the top of the sensor gets chipped away by the speed sensing magnets embedded in the bottom of the pack. These plastic particles can be the contributing cause that eventually results in a head crash.

[ ]	FIELD SERVICE TECH TIP Continuation Sheet	Option Designator RM03
		Category DISK
Title SPEED SENSOR PROBLEM		Tech Tip No RM03-TT- 63
Processor Applicability 11's | VAX | | LCG | |	Cross Reference RM02-TT- 62	Tech Tip Rev A
		Page 2 of 2

SOLUTION: When adjusting or checking the speed transducer for the proper clearance, carefully inspect the adhesive that secures the transducer pickup inside the plastic threaded housing. If there is evidence of the adhesive breaking down you will either notice tiny cracks in the adhesive or else the transducer pickup will not be securely mounted in the center of the plastic threaded stud. In either case , replacement of the speed sensor assembly is required.

SPEED SENSOR ASSEMBLY -- PART NUMBER -- 29-22909 --

[_ _]	FIELD SERVICE TECH TIP					Option Designator RM03
	[12 BH	X 16 BH	18 BH	X 32 BH	X 36 BH	Category Disk
Title FCO: RM02-S0020 Documentation						Tech Tip No. RM03-TT-64
Processor Applicability |VAX| |11'4 |LCG| |		Cross Reference RM02-TT-63				Tech Tip Rev A / Page 1 of 1
Author Ken Davis			Mgr./Supv Approval Terry Howard			
Location Winnipeg		Mail Stop WNO				Date 28-August-1985
CSSE Approval Ron Milano CX/CSSE						Date 07-October-1985
FSPSG Approval						Date

PROBLEM:

FCO DOCUMENTATION ERRORS AND OMISSION.

SOLUTION:

1) PAGE 1 OF 4: QUICK CHECK BLOCK STATES "PRESENCE OF 5.0 MFD CAPACITOR...".
IT SHOULD STATE "PRESENCE OF 8.0 MFD CAPACITOR...".

2) PAGE 2 OF 4: STEP 9 STATES "INSTALL A 5 MFD CAPACITOR,...". IT SHOULD READ "INSTALL AN 8 MFD CAPACITOR,..."

3) PAGE 2 OF 4: STEP 11 STATES "SOLDER OTHER LEAD OF CAPACITOR TO PIN 6 OF J1."
IT SHOULD READ "SOLDER OTHER LEAD OF CAPACITOR TO PIN 6 OF J1B".
SOLDERING THE CAPACITOR TO J1A WILL CAUSE THE EMA COIL TO EMIT A VERY LOUD, HIGH-PITCHED TONE.

	FIELD SERVICE TECH TIP	Option Designator RM03
	12 BH / X 16 BH / 18 BH / X 32 BH / X 36 BH	Category Disk

Title: CPX Head Inspection Tool Kit	RM02-TT-64	Tech Tip No.: RM03-TT-65
Processor Applicability: VAX / 11's / LCG	Cross Reference: RM05-TT-28, RP05-TT-64, RP06-TT-71	Tech Tip Rev: A / Page: 1 of 2
Author: Gene Ridge CX/CSSE	Mgr/Supv Approval: Ron Milano	
Location: Colorado Springs	Mail Stop: CX01-1/P14	Date: 02-October-1985
CSSE Approval: Ron Milano CX/CSSE		Date: 02-October-1985
FSPSG Approval		Date

CPX HEAD INSPECTION TOOL KIT

VESE and CPX Company are pleased to announce the availability and special price to Digital branches for the CPX Head Inspection Tool Kit. This tool kit has been evaluated and approved by the Colorado Springs CSSE Maintainability Engineering Group for use on the following disk drives.

DIGITAL - RP05, RP06, RM02, RM03, RM05

MEMOREX - 677

CDC - 9762, 9766

The kit part number from CPX is HIMKK2531N, which is a combination of two standard CPX Head Inspection Kits. Included in this kit are the following items.

CPX P/N	DESCRIPTION	QTY
HIMKG1125N	MDG25 Base Unit with Optics offset at 105 degrees	1
HIACC1006N	Optical tube, 10x power magnification	1
HIACC1005N	Optical Brush	1
HICA51002N	Aluminum Case	1
HITRA1062N	Power Transformer 24 VAC, 16 amp output	1
HIACC1003N	E230 Removeable Rails	1
HIBKT1001N	E124 RM05 Carriage Limit Bracket	1
HIBKT1002N	E123 RM03 Carriage Limit Bracket	1

	FIELD SERVICE TECH TIP	Option Designator RM03	
[redacted]	Continuation Sheet	Category Disk	
Title CPX Head Inspection Tool Kit	RP05-TT-64	Tech Tip No RM03-TT-65	
Processor Applicability |VAX| |11's| |LCG| |	Cross Reference RM02-TT-64 RP06-TT-71 RM05-TT-28	Tech Tip Rev A	Page 2 of 2

With this Head Inspection Tool Kit, an engineer will be able to closely inspect R/W Heads on the above disk drives without removing the heads themselves. This will save valuable labor time for the F.S. Engineer and will help decrease the amount of down time for the customer. The head inspection tool may be used during PM's to help the engineer diagnose a dirty head before a major failure occurs.

To fascilitate orders in a timely manner, Field Service Branches and Regional Logistics offices may order through the local CPX Sales Office or place the order with the CPX home office by sending a Purchase Order to:

CPX
21900 Plummer Street
Chatsworth, CA 91311

Tel: (818)709-4003
Telex: 371-9692
TWX: 310-371-9692
FAX: 818-882-7799

ATTENTION: Jenny Rippel

The Digital price for the Head Inspection Tool Kit (HIMKK2531N) is $745.00. Digital's Field Service Logistics Organization will not stock this item in Woburn (SR #17) unless sufficient demand for this tool kit is present. If there are any questions regarding the ordering of this Head Inspection Tool, you may contact Fran Linnehan at Mailstop OG01-1/H11.

Field Service TECH TIP

digital™

Title: Diagnostic CZRMPBO.BIC Failure

Category: Disks Rev: A

Option: RM03

Cross Reference: RM02-TT-65, RM05-TT-30

TECH TIP No: RM03-TT-66

Problem/Solution

Test 72 of Diagnostic CZRMPBO.BIC (RM02/03/05 Diskless Test 1) fails on a PDP 11/60 with Cache, the indication is that the AOE bit did not set. The problem is due to the speed of the cache memory on an 11/60 system. The following patch has been written by Diagnostic Engineering and will be available on the next release of XXDP in the January '87' time frame.

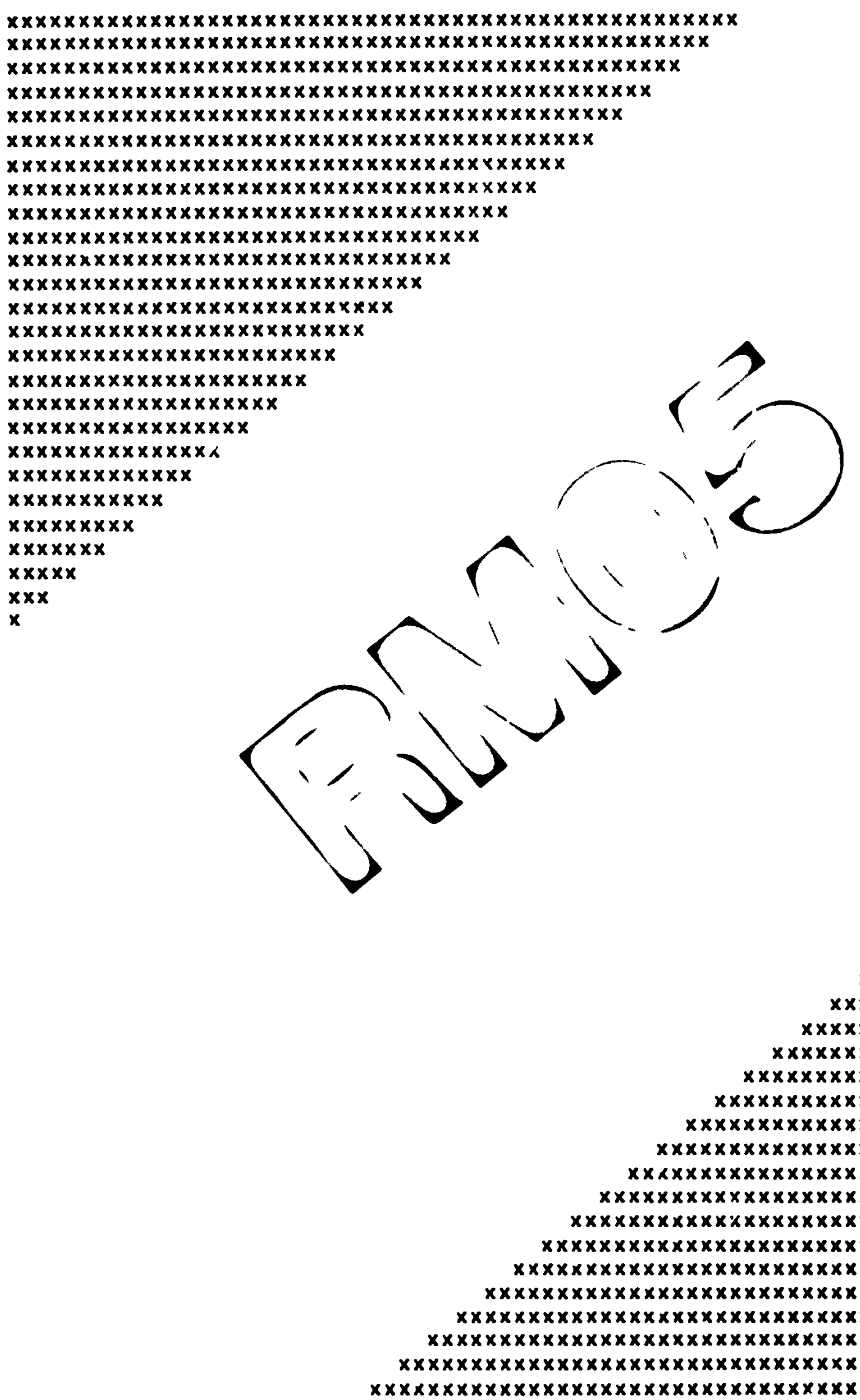
Change loc.	From	To
034400	012760	012702
034402	061001	000020
034404	000024	004737
034406	012760	000630
034410	041001	005302
034412	000024	001376
000630	000632	012760
000632	000000	061001
000634	000636	000024
000636	000000	012760
000640	000642	041001
000642	000000	000024
000644	000646	000207

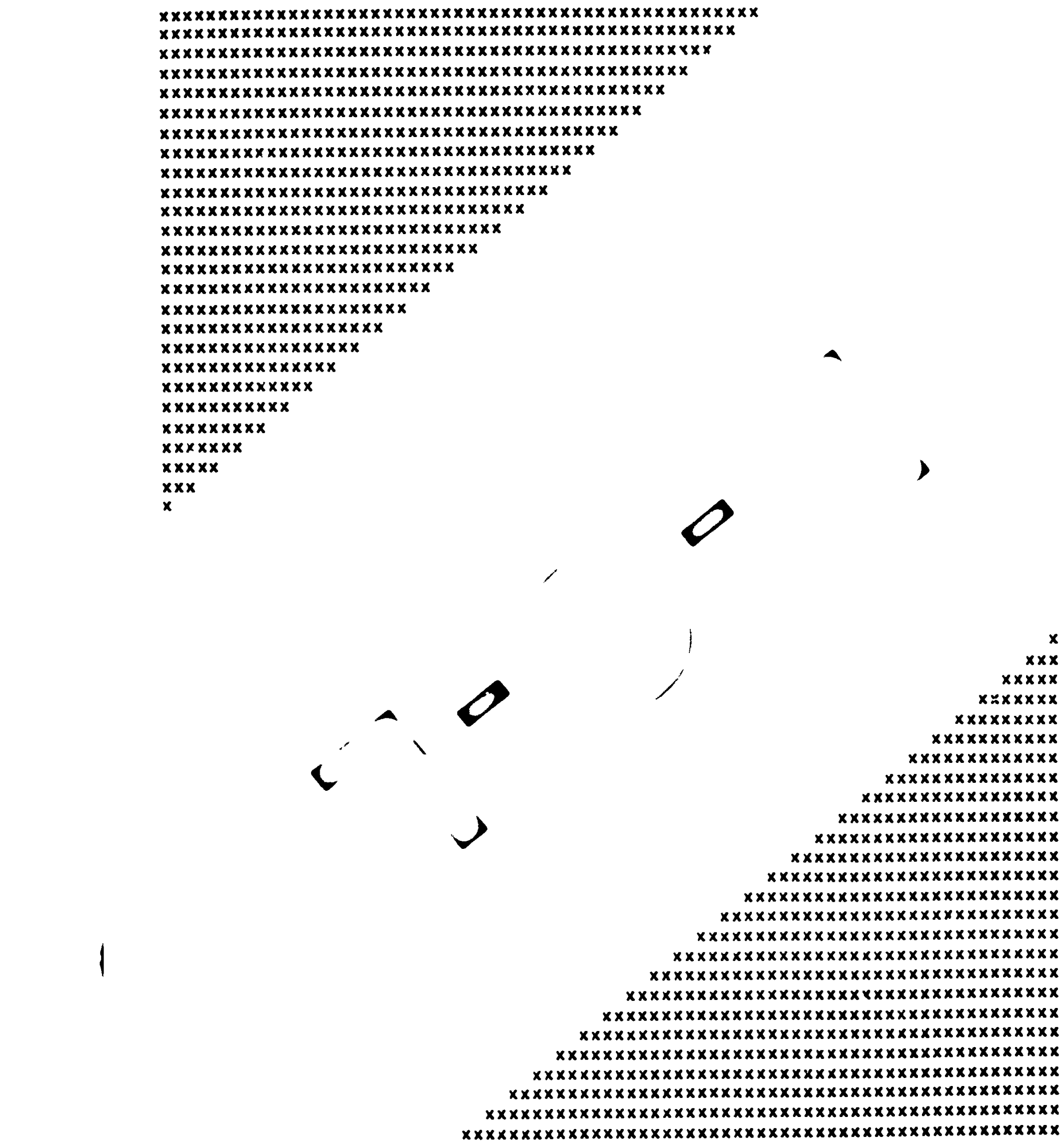
Approvals

Author	ESD&P TECH TIP Coordinator	CSSE
Gary Cable	Bruce J. Conley	Gary Cable
Author's Manager: Mike Mayfield		Field Service Product Safety
Release Date: 5 November 1986		Revision: A

EK-[illegible]-[illegible]-548

RM03 TT-89





DIGITAL EQUIPMENT CORPORATION

Engineering Change Order Log

RM05

Disk Drive

PROCESSOR TYPE: PDP-11, VAX

RM05-00001 CODE: D
MAR 80 - PROBLEM Minor documentation changes needed to bring documentation in conformity to DEC Std 140
CORRECTION Correct documentation
IN-PLANT EFFECTIVITY Documentation change only

RM05-00002 CODE: D
APR 80 - PROBLEM Present Dual Port configuration design is not adequate.
CORRECTION Redesign necessary hardware for revised Dual Port configuration
IN-PLANT EFFECTIVITY. Phase-In to Colorado by 26 April 1980

RM05-00003 CODE: D
APR 80 - PROBLEM Present Dual Port configuration design is not adequate
CORRECTION Redesign necessary hardware for revised Dual Port configuration
IN-PLANT EFFECTIVITY Phase-In to Colorado by 15 June 1980

RM05-00004 CODE: D
JUL 80 - PROBLEM 1 Present documentation structure does not allow manufacturing of inhouse Dual Port MBA s
CORRECTION 1 Restructure documentation allowing Colorado to build Dual Port MBA s
PROBLEM 2 Latch to lock MBA in home position not documented
CORRECTION 2 Include latch callout for Cabinet Assembly 7017612
PROBLEM 3 Access Hole Cover never implemented
CORRECTION 3 Add Access Hole Cover (7424313-00) to Cabinet Assembly.
PROBLEM 4 Cable Clamps compensate for unused new Round I/O Cable
CORRECTION 4 Add Cable Clamps, 7424324-00, to Cabinet Assembly.
PROBLEM 5 Backplane Shield should be used.
CORRECTION 5 Add Backplane Shield 7424464-00 to Single Port MBA Chassis Assembly 7017606
IN-PLANT EFFECTIVITY: Documentation change only, CORRECTIONS 1 and 2 Phase-In to Colorado by 10 September 1980, CORRECTIONS 3, 4, and 5

RM05-00005 CODE: D
NOV 80 - PROBLEM 1 Terminators should not be used on this assembly level
CORRECTION 1 Remove terminators from Unit Assembly Drawing D-UA-RM05-0-0
PROBLEM 2 Ground strap not needed from MBA Backplane Logic to Drive Logic
CORRECTION 2 Remove Logic Ground from Unit Assembly Drawing D-UA-RM05-0-0
PROBLEM 3 Method of grounding I/O Cable never documented
CORRECTION 3 Show method and hardware for grounding I/O Cable
PROBLEM 4 MBA Single Port Assembly should be secondary level assembly drawing
CORRECTION 4 Revise Parts List Drawing K-PL-7017606-0-DBP and Assembly Drawing D-AD-7017606-00 to reflect second level assembly Replace third level assembly drawing with Assembly Drawing D-AD-7018322-0-0
PROBLEM 5 MBA Chassis Assembly does not reflect actual build
CORRECTION 5 Update MBA Chassis Assembly 7018322-00 to show Module Holder Clip 1209856-02 Kep Nut 9006565-00, and Lock Washer 9006635-00
IN-PLANT EFFECTIVITY Immediately Co-requisite ECO 7017344-00002.

RM05-00006 CODE: D
JUL 81 - PROBLEM Current production models not documented
CORRECTION Correct Table of Contents Drawing B-TC-RM05-0-1 and Specifications Drawing B-SP-RM05-0-BK7B
IN-PLANT EFFECTIVITY Documentation change only

RM05-00007 CODE: D
AUG 82 - PROBLEM This ECO was changed to ECO RM05-00008

RM05-00008 CODE: D
SEP 82 - PROBLEM 1 Cable is difficult to manufacture and to assemble
CORRECTION 1 Use new cable 7019688-15
PROBLEM 2 RM05-00007 has incorrect Colorado Control Number
CORRECTION 2 Change RM05-00007 to RM05-00008.

PROBLEM 3 Documentation changes not documented
CORRECTION 3 Revise Unit Assembly Drawing D-UA-RM05-0-0 Parts List Drawing K-PL-RM05-0-DBP, Assembly Drawing D-AD-7018322-0-0, Parts List Drawing K-PL-7018322-0-DBP, Assembly Drawing D-AD-7017612-0-0, and Parts List Drawing K-PL-7017612-0-DBP
IN-PLANT EFFECTIVITY Phase-In to Colorado by 13 August 1982 and phase-in to Kaufbeuren by 30 September 1982

RM05-00009 CODE: D
OCT 82 - PROBLEM Improved Bridge Rectifier needed
CORRECTION Change wiring at TBG in Power Supply See CDC NEC 2433
IN-PLANT EFFECTIVITY Phase-In to all units by 1 February 1981

RM05-00010 CODE: D
OCT 82 - PROBLEM 1 Inadequate air flow on 50Hz units
CORRECTION 1 Change to single wheel style blower See CDC NEC H206
PROBLEM 2 VDE modification not incorporated in 60Hz units
CORRECTION 2 Modify Parts List Drawing K-PL-RM05-0-DBP and incorporate changes See CDC NEC H140B
PROBLEM 3 Improved servo cable retainer needed
CORRECTION 3 Modify servo cable retainer See CDC NEC H243
IN-PLANT EFFECTIVITY Phase-In CORRECTION 1 in all 50Hz units by 14 January 1982 and phase-in CORRECTIONS 2 and 3 in all units by 14 January 1982.

RM05-00011 CODE: D
OCT 82 - PROBLEM 1: Inadequate air flow on 60Hz units
CORRECTION 1: Change to single wheel style blower See CDC NEC H206
PROBLEM 2 Crimping of cable to motor and power supply assembly.
CORRECTION 2. Re-position motor relay box 180°. See CDC NEC H201.
PROBLEM 3 Shorter length levelers needed
CORRECTION 3 Modify thread length of levelers to 2.25 in. See CDC NEC H202A.
PROBLEM 4 Insufficient overcurrent protection
CORRECTION 4 Add fuses and circuit breakers to secondary circuits of Ferro Transformers See CDC NEC H193A
IN-PLANT EFFECTIVITY Phase-In CORRECTION 1 in all 60Hz units by 12 April 1982 and phase-in CORRECTIONS 2 3, and 4 by 12 April 1982

RM05-S0012 CODE: F
APR 83 - PROBLEM SYMPTOM Carriage slam on loss of ±20V DC
PROBLEM Loss of ±20V causes carriage slamming
CORRECTION Replace FQPV card with HQPV card in Location A2A08 and change 4 backplane wires See CDC NEC H241
IN-PLANT EFFECTIVITY (October, 1982) Phase-In to all Units by 1 March 1982
FIELD EFFECTIVITY Retrofit all RM05 drives series code 18 through 29
QUICK CHECK Presence of HQPV card in location A2A08

The DEC on-site labor charge will be the time required to install and test the FCO at the then-current hourly rate
FCO KIT ORDERING
EQ-01182-00 FCO, PARTS
FA-04431-00 FCO only

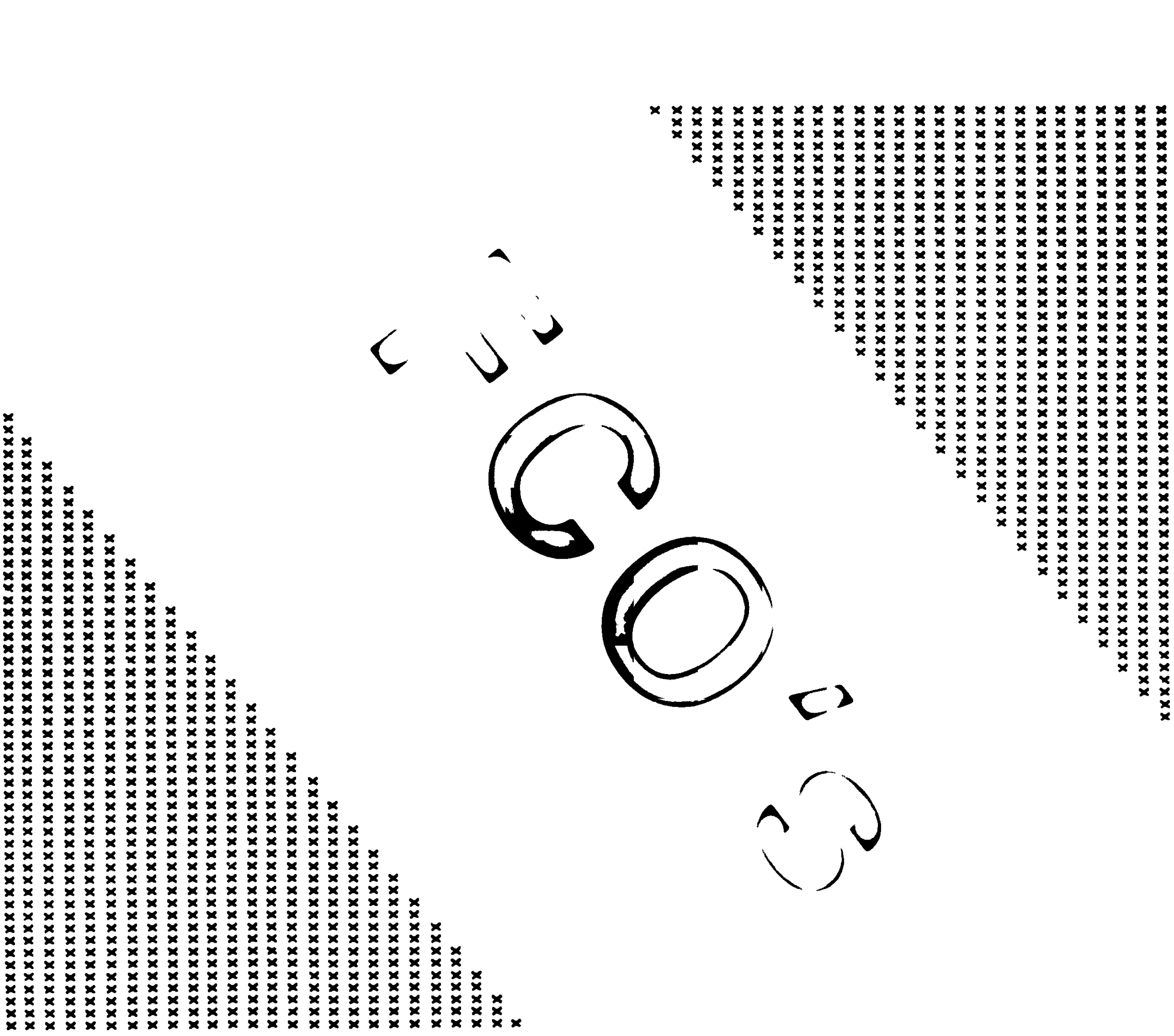
LIBRARY TYPE

PDP 11, VAX

RM05-00013 CODE: D
OCT 82 - PROBLEM Pack Access interlocking is not VDE compliant
CORRECTION Add interlock switch A359 and two wires.
IN-PLANT EFFECTIVITY Phase in all units by SEP 82

RM05-R0014 CODE: F
OCT 84 -PROBLEM· 1. Intermittent Carriage Slam 2 Frequent power supply related problems 3 Intermittent head unloading. spin down, or drive off line errors
IN-PLANT EFFECTIVITY NOV 82
FIELD EFFECTIVITY Retrofit all VDE RM05 drives, series code 35 and below, when the problem symptoms are evident
QUICK CHECK Verify presence of VDE power supply, vendor part number 73133111 or higher in 50HZ drives or 73133112 or higher 50HZ drives

The DEC on-site labor charge will be the time required to install and test the FCO at the then current hourly rate
FCO KIT ORDERING
EQ-01254-01· FCO, PARTS
EQ-01254-02: FCO, PARTS
FA-04426-01: FCO only



30-Oct-1986
RM05-INDEX.A
REV A

MICROMEDIA PUBLISHING

Field Change Order Index

FCO Number	FA REV	Rel. Date	SB#	Problem
-RM05---S012	A	7-Apr-83	276	Loss of +/-20V causes carriage slamming
-RM05---R014	A	12-Oct-84	352	Intermittent carriage slam, power supply, head unloading, spin down

digital

FIELD CHANGE ORDER

FA-04431-00

PCO RM05 S 0012 PAGE 1 of 2

Level of Urgency (LOU)

STATUS BOX

	PCO EXPENSE RESPONSIBILITY		
	WARRANTY	E	PER CALL
Mandatory	DIGITAL		CUST
Required			CUST
Specification			CUST
Improvement			
Hardware Option	PURCHASEABLE OPTION		
Cosmetic	CUST	CUST	CUST

On-site PCO installation, by DEC, will be in accordance with both APPLICABILITY and the above PCO EXPENSE RESPONSIBILITY matrix.

ESTIMATED TIME TO INSTALL and TEST (on-site) (Travel time not included)

1.0 DECIMAL HOURS

APPLICABILITY

RETROFIT ALL RM05 DRIVES SERIES CODES 18 THROUGH 29.

QUICK CHECK (To determine if PCO has been installed)

PRESENCE OF HQPV CARD IN LOCATION A2A08.

LAST PREVIOUS PCO #: NONE

RELATED OR PREREQUISITE PCO #s / MCO #s

NONE

SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES (Not included in the Field Retrofit Kit)

NONE

FIELD INSTALLATION and TEST PROCEDURE

SEE PAGE 2 OF THIS FCO.

COMPATABILITY: HQPV MODULE WILL NOT FUNCTION WITHOUT BACKPLANE WIRING CHANGES.

PCO KIT CHARGES (United States and Canada only)

KIT ITEM	DOCUMENTATION	PARTS	OTHER
	☒ PCO ☐ PRINTS NONE $10.00	::	

Parts charges are as of PCO release date and are subject to change.

PARTS AVAILABILITY DATE MAY, 1983

LOGISTICS CODING 4K 3K 4K

LOGISTICS REVIEW EM Dyer 3/14/83

QTY	PART NUMBER	DESCRIPTION
1	29-23557-00	CDC FCO KIT 85010002

ORDER BY THIS NUMBER	KIT CONTAINS FCO	PRINTS	PARTS
EQ-01182-00	X		X
FA-04431-00	X		

::PARTS PRICE UNDETERMINED AT DATE OF FCO RELEASE.

PROBLEM SYMPTOM: CARRIAGE SLAM ON LOSS OF ± 20V DC.

APPROVED-Field Service Product Support
LOYD G. BUCHANAN Loyd G. Buchanan

APPROVED-Field Service Product Safety
LOUIS CARPENITO Louis Carpenito

LIBRARIES: 11
VAX

FCO RELEASE DATE
7 APRIL 1983

RMCP FCO 1A

FCO RM05-S0012

TO BE INSTALLED ONLY BY RM05 TRAINED PERSONNEL

REWORK PROCEDURE

FOR

FCO RM05-S0012

1- POWER DOWN DRIVE.

2- REMOVE FQPV MODULE FROM DRIVE. INSTALL NEW HQPV MODULE IN SAME LOCATION.

3- INSTALL WIRE ADDITIONS TO BACKPLANE AS FOLLOWS:

SIGNAL NAME	FROM	TO
- (SPEED FAULT+VOLTAGE FAULT)	A1914A	A0808A
+ TIE HIGH	A1322B	A0203B
+ [(~UP TO SPEED)+VOLTAGE FAULT]	A1715B	A1915A
+ [(~UP TO SPEED)+VOLTAGE FAULT]	A1715B	A1914B

4- INSTALL A SCRATCH DISK PACK.

5- POWER UP DRIVE AND ALLOW HEADS TO LOAD.

6- TO ENSURE PROPER OPERATION, MANUALLY DROP ± 20V CIRCUIT BREAKER AND OBSERVE EMERGENCY RETRACT. MAKE SURE HEADS DO NOT SLAM TOWARDS SPINDLE.

FIELD CHANGE ORDER

FA-04426-01

FCO RM05 R 0014 PAGE 1 of 17

Level of Urgency (LOU)

APPLICABILITY

Retrofit all VDE RM05 drives, series code 35 and below, when problem symptoms are evident.

See NOTE 1 under "Notes for FCO RM05-R0014" (page 2 of 17)

Status	FCO EXPENSE RESPONSIBILITY: WARRANTY	K	PER CALL
Mandatory	DIGITAL		
Required	DIGITAL		CUST
Specification	DIGITAL		CUST
Improvement	DIGITAL		CUST
Hardware Option	PURCHASEABLE OPTION		
Comments	CUST	CUST	CUST

On-site FCO installation, by DEC, will be in accordance with both APPLICABILITY and the above FCO EXPENSE RESPONSIBILITY matrix.

ESTIMATED TIME TO INSTALL and TEST (on-site) (Travel time not included)

1.0 DECIMAL HOURS

QUICK CHECK (To determine if FCO has been installed)

Verify presence of VDE power supply, vendor part number 73133111 or higher in 60 hz drives or 73133112 or higher 50 hz drives.

LAST PREVIOUS FCO #: RM05-S0012

RELATED OR PREREQUISITE FCO #s / MCO #s

None

FCO KIT CHARGES (United States and Canada only)

KIT ITEM	DOCUMENTATION	PARTS	OTHER
	☐ FCO ☐ PRINTS		

Parts charges are as of FCO release date and are subject to change.

PARTS AVAILABILITY DATE November 1984

LOGISTICS CODING 6,000 - 190/90 - 500

LOGISTICS REVIEW Ed Dugan 10/1/84

QTY PART NUMBER DESCRIPTION

See NOTE 3 under "Notes for FCO RM05-R0014" (Page 4 of 17)

Order by This Number	Kit Contains FCO	Prints	Parts
EQ-01254-01	X		X
EQ-01254-02	X		X
FA-04426-01	X		

SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES (Not included in the Field Retrofit Kit)

Standard Field Service Tool Kit DVM (Digital Voltmeter)

FIELD INSTALLATION and TEST PROCEDURE

See attached REWORK PROCEDURES

This FCO Incorporates the following ECOs:

*RM05-CX014 (Problem/Correction #1)
*RM05-CX015
*RM05-CX019

Problem/Symptoms:
1. Intermittent Carriage Slam.
2. Frequent power supply related problems.
3. Intermittent head unloading, spin down, or drive off line errors.

Compatability: See Note 2 under "NOTES for FCO RM05-R0014" (page 4 of 17)

APPROVED-Field Service Product Support

Mark Himes

APPROVED-Field Service Product Safety

Bob Barnard 4-18-84
Bob Barnard

Libraries: 11 Mini

FCO RELEASE DATE

12 October 1984

APPLICABILITY - NOTE 1

Retrofit all VDF PM05 drives, series code 35 and below, when the problem symptoms are evident. The series code is stamped on the vendor equipment identification tag located on the front of the drive behind the front door of the drive cabinet. (See Figure 1)

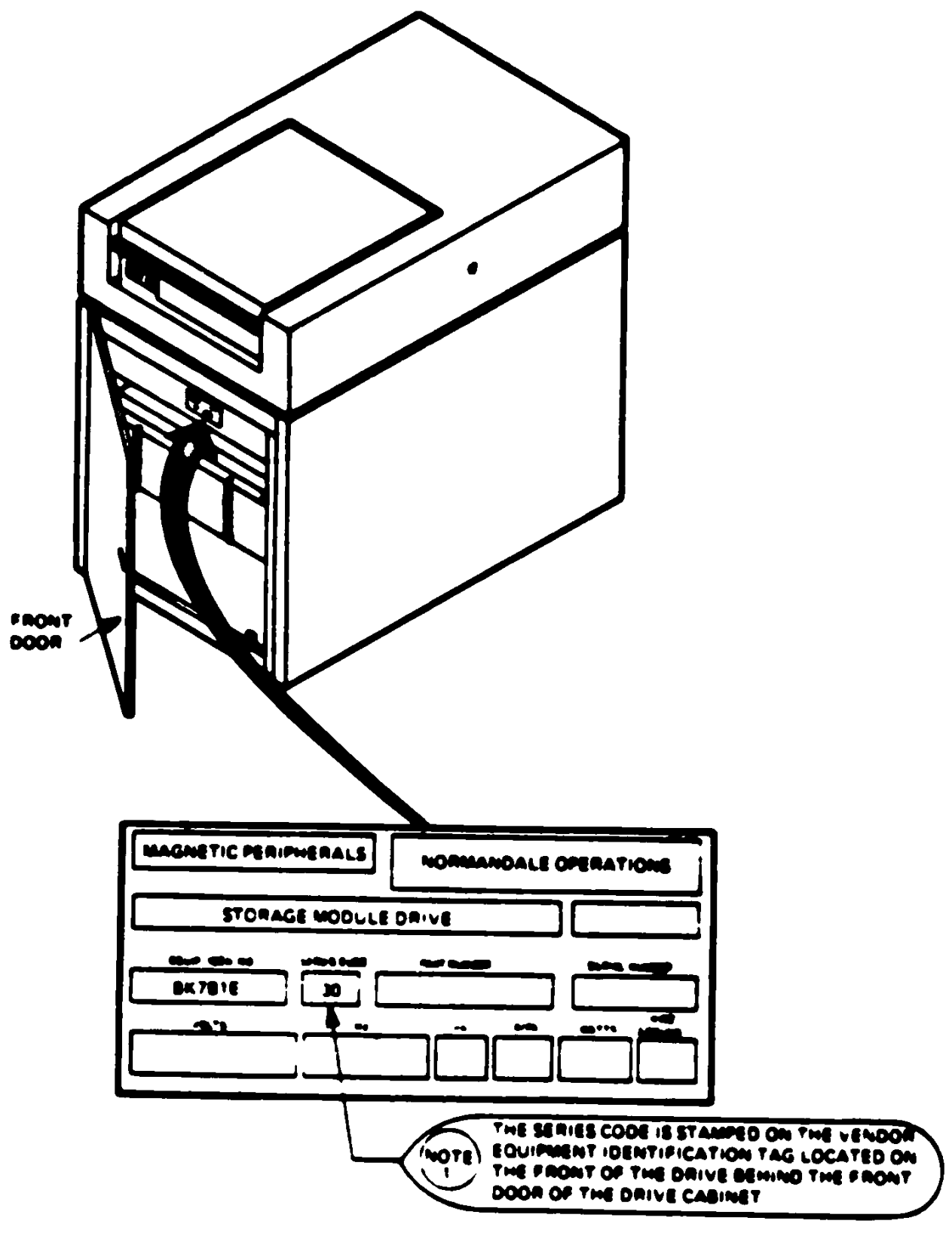


FIGURE 1 VENDOR EQUIPMENT IDENTIFICATION TAG (RM05)

NOTE

The VDE power supplies contained in the VDE drives are NOT INTERCHANGEABLE with the NON-VDE power supplies contained in the NON-VDE drives.

The VDE power supplies are stamped with a vendor Part Number of 731331XX (XX = any two digits). NON-VDE power-supplies are stamped with a vendor P/N of 472936XX (XX = any two digits). The vendor P/N is stamped on a tag on the front of the power supply located at the bottom of the drive behind the rear door of the cabinet. (See Figure 2)

If the 50 HZ VDE RM05 contains any of the 50 HZ VDE power supplies listed below AND the problem symptoms are evident, then install the EQ kit _____ . If the 60 HZ VDE RM05S power supplies listed below AND problem symptoms are evident, then order and install the EQ kit _____ .

VENDOR PART NUMBERS OF AFFECTED VDE POWER SUPPLIES

73133110	(50 HZ VDE)	73133105	(60 HZ VDE)
73133102	(50 HZ VDE)	73133109	(60 HZ VDE)
73133104	(50 HZ VDE)		
73133108	(50 HZ VDE)		

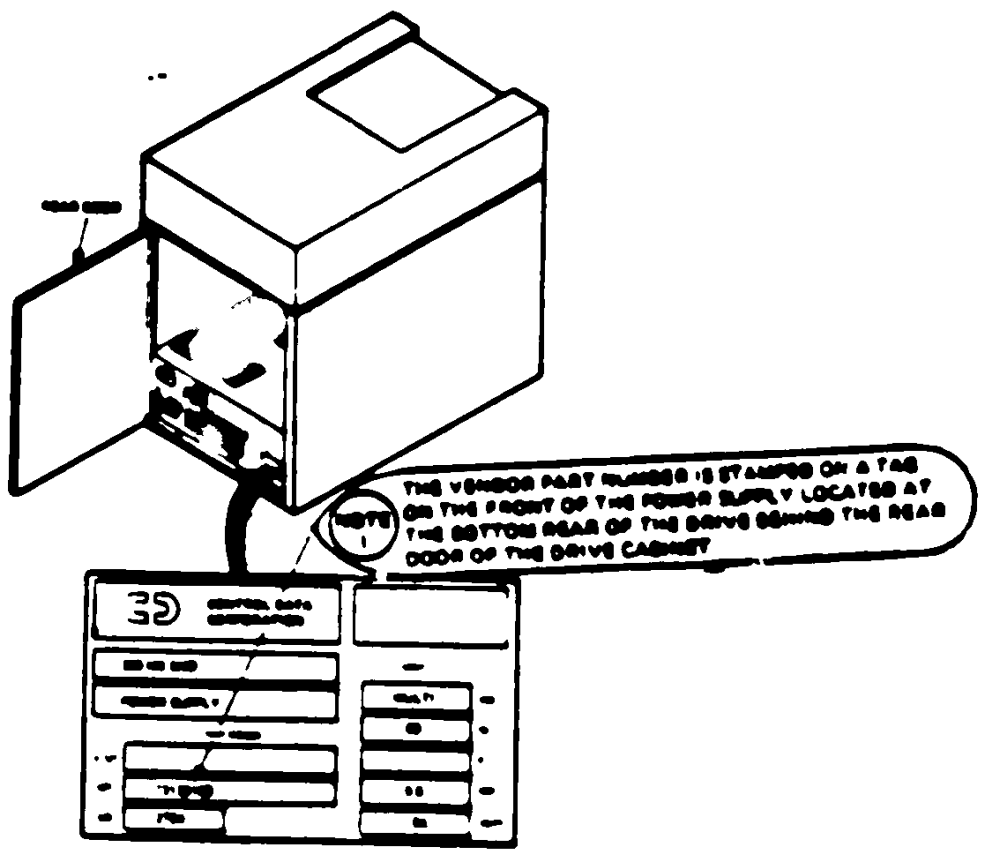


FIGURE 2 VENDOR POWER SUPPLY PART NUMBER TAG (VDE)

COMPATIBILITY - NOTE 2

This FCO implements a new keyed AC power cable assembly for the power supply.

OLD AC POWER CABLE Vendor Part Number	NEW AC POWER CABLE (keyed) Vendor Part Number
70734120 (50 Hz)	70734122 (50 Hz)
70734121 (60 Hz)	70734123 (60 Hz)

The new AC power cables may be used with any of the VDF power supplies, but the old AC power cables will not fit into the new VDF power supplies with the vendor part numbers 73133108 and the above. An example of the new "keyed" cable is shown in Figure 3.

PARTS NEEDED - NOTE 3

FC-01254-01 is used only on the affected 50Hz VDF PM05 Drives.

QTY	PART NUMBER	DESCRIPTION
1	29-23889	50 Hz VDF P.S. assy. (CDC P/N 73133112)
1	29-24773	50 Hz AC power cable (CDC P/N 70734122)

FC-01254-02 is used only on affected 60 Hz VDF PM05 Drives.

QTY	PART NUMBER	DESCRIPTION
1	29-23838	60 Hz VDF P.S. assy. (CDC P/N 73133111)
1	29-24773	60 Hz AC power cable (CDC P/N 70734123)

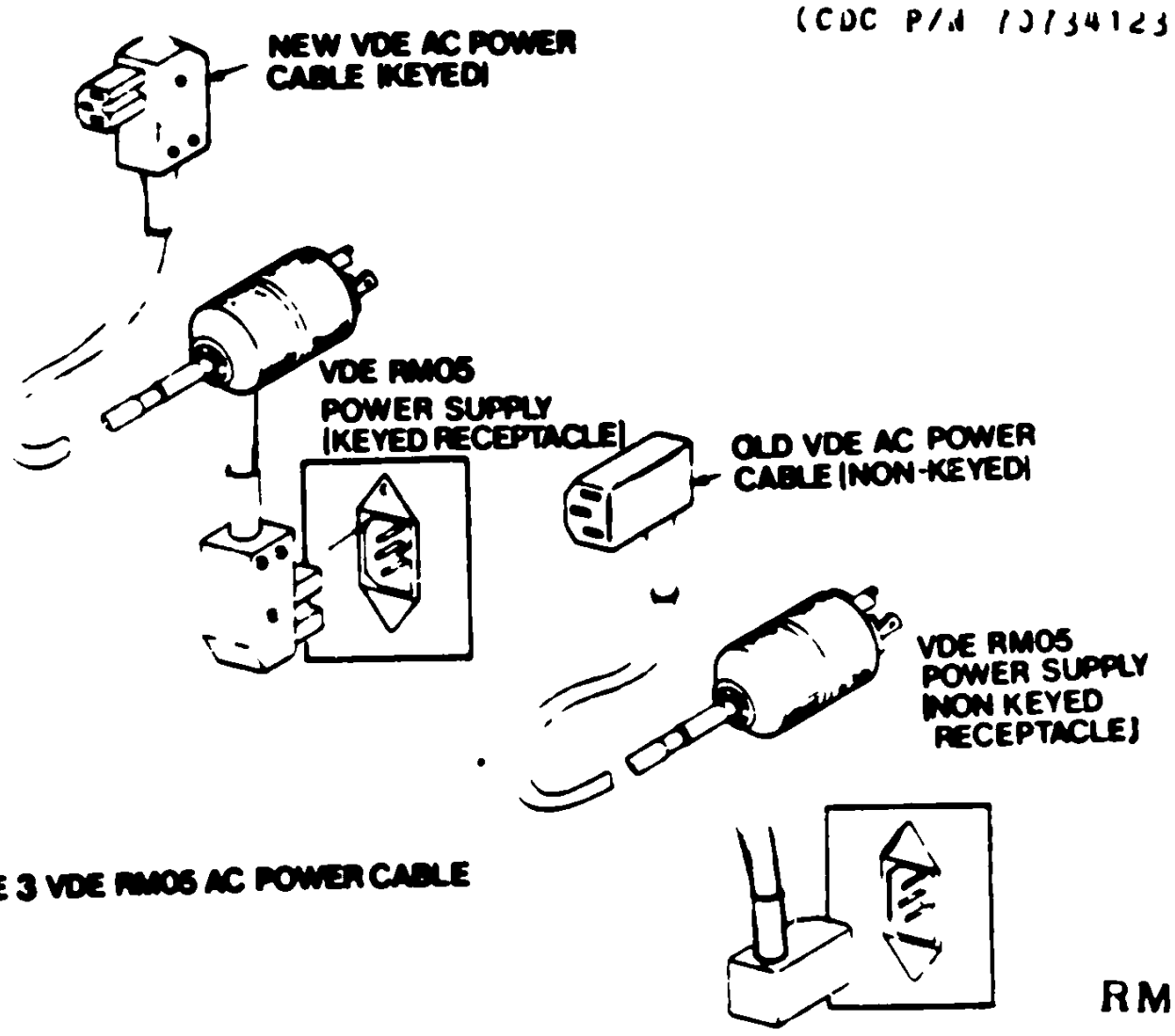


FIGURE 3 VDE RM05 AC POWER CABLE

This FCO describes the removal and replacement procedure to install the new RM05 VDE power supply (50 Hz or 60 Hz). It also describes the new keyed AC power cable replaceing any of tne previous revision power supply assemblies and non-keyed AC power cables.

NOTE

It is strongly recommended that the installation of this FCO be performed by RM05 trained Field Service Engineers only.

1. Press the START switch on the operators front panel to stop the drive motor and unload tne heads. (See Figure 4)

2. Remove tne disk pack.

3. Open the rear door of the RM05 drive cabinet.

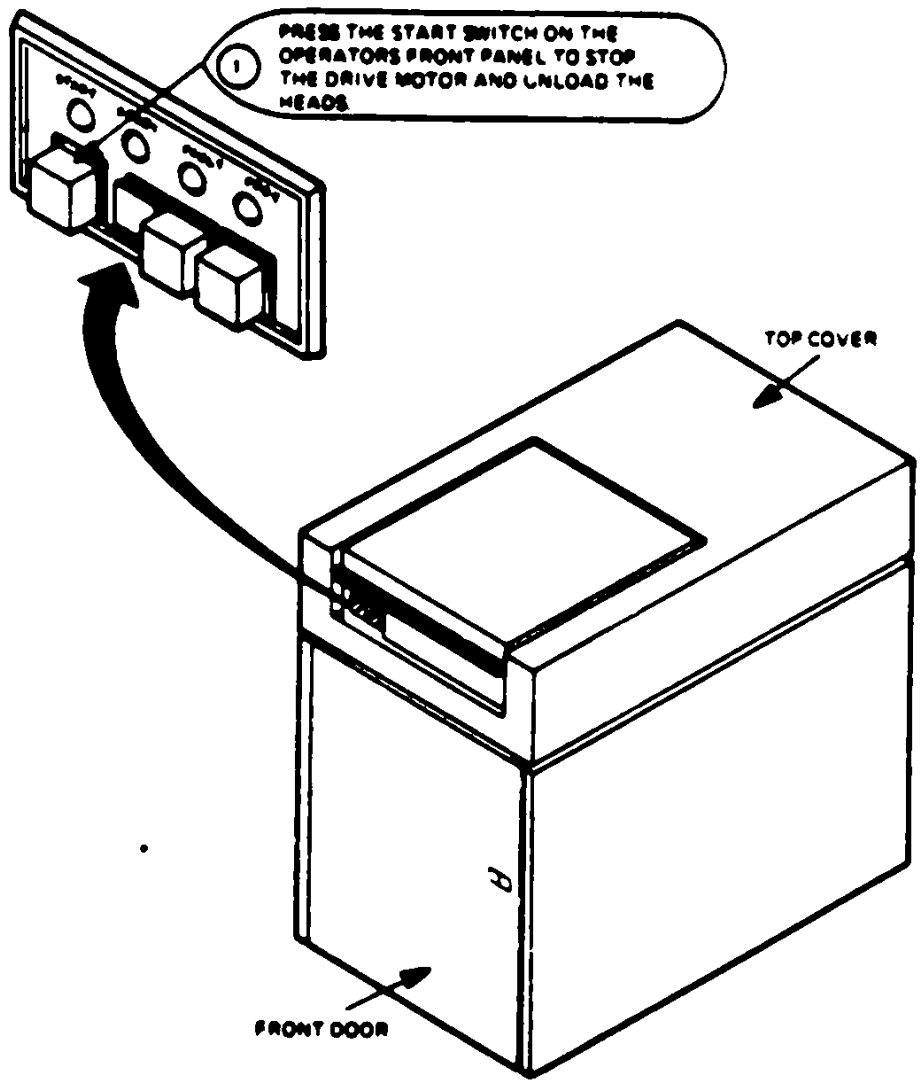


FIGURE 4 RM05 OPERATORS PANEL

4. Locate the "MAIN AC" circuit breaker on the power supply control panel and press rhe circuit breaker down to the "OFF" position (labeled "0"). (See Figure 5)

CAUTION

Disconnect the RM05 AC Power Cord "plug" from the AC Power Source Receptacle before proceeding.

5. Disconnect tne RM05 Main AC Power Cable from the site power source.

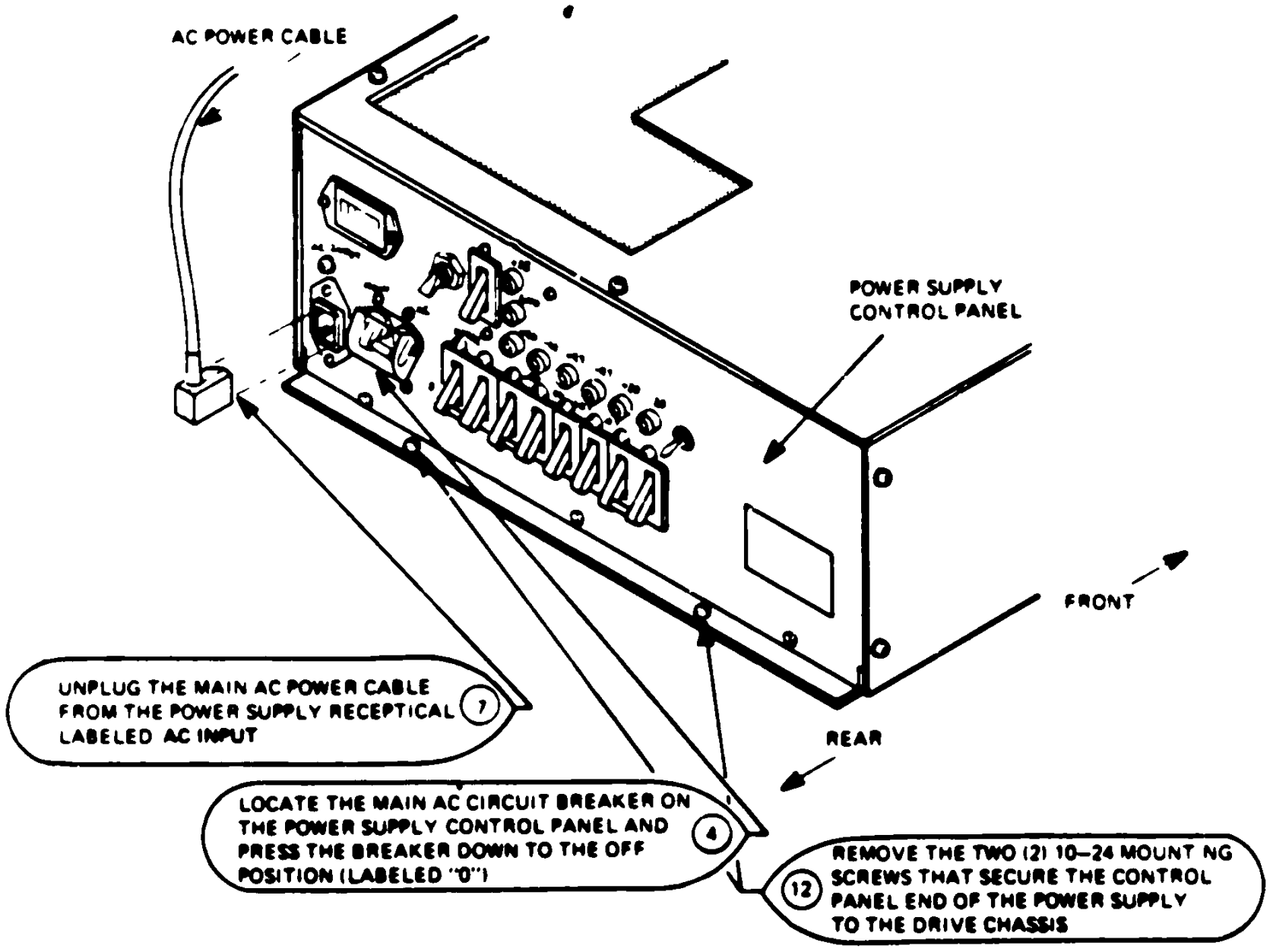


FIGURE 5 VDE RM05 POWER SUPPLY CONTROL PANEL

6. Carefully disconnect the blower hose from the rear of panel of the power supply assembly. (See Figure 6)

7. Unplug the main AC power cable from the power supply receptacle labeled as AC INPUT. (See Figure 5)

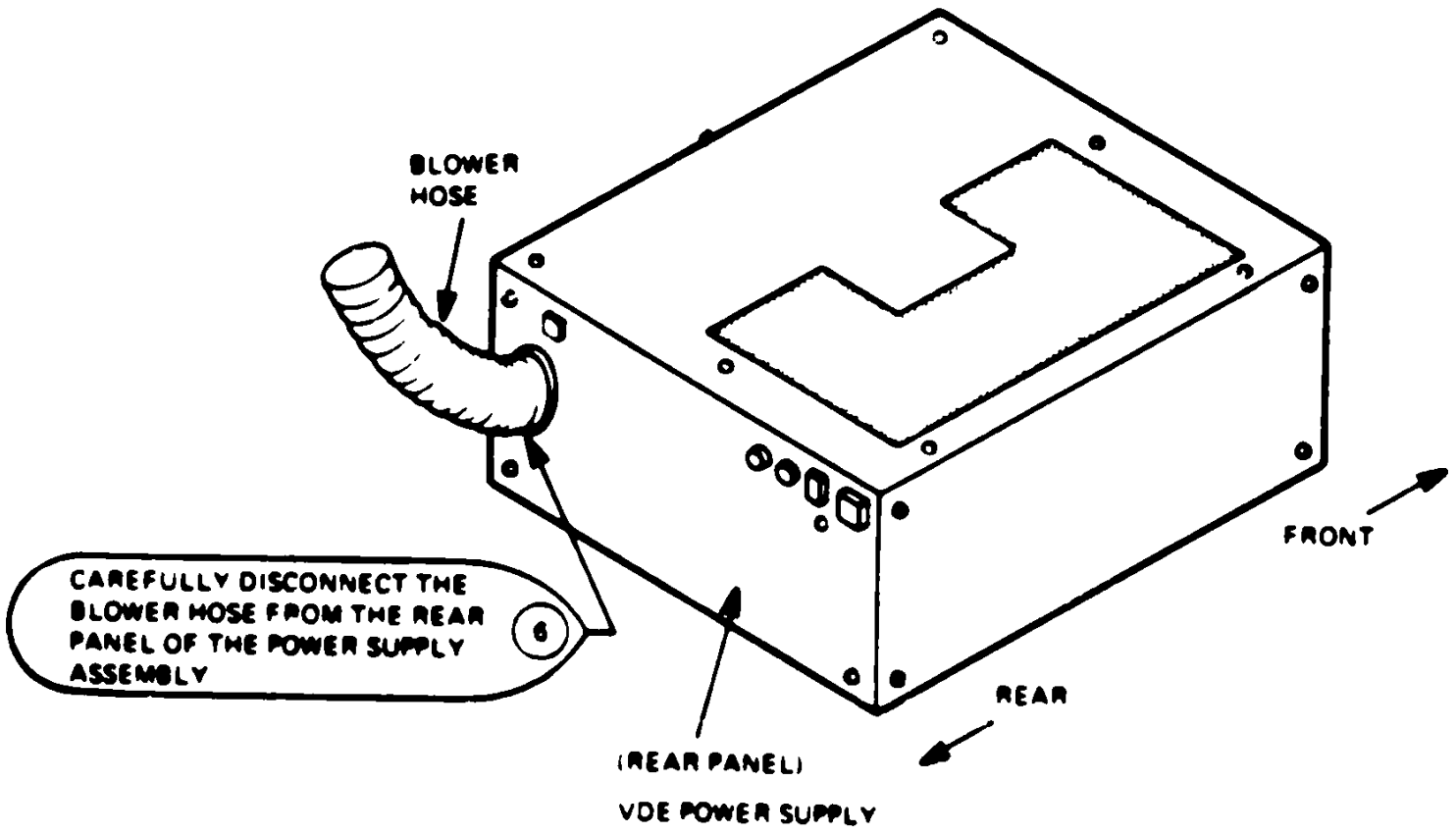


FIGURE 6 RM05 VDE POWER SUPPLY (REAR VIEW)

8. Remove the cable lamp that secures the main AC power cable to the top of the power supply. (See Figure 7)

9. Remove the main AC power cable from the power supply. (See Figure 7)

10. Remove the main AC power cable from the drive and put it aside.

11. Note the location of all external cables connected to the power supply and then disconnect all of these cables.

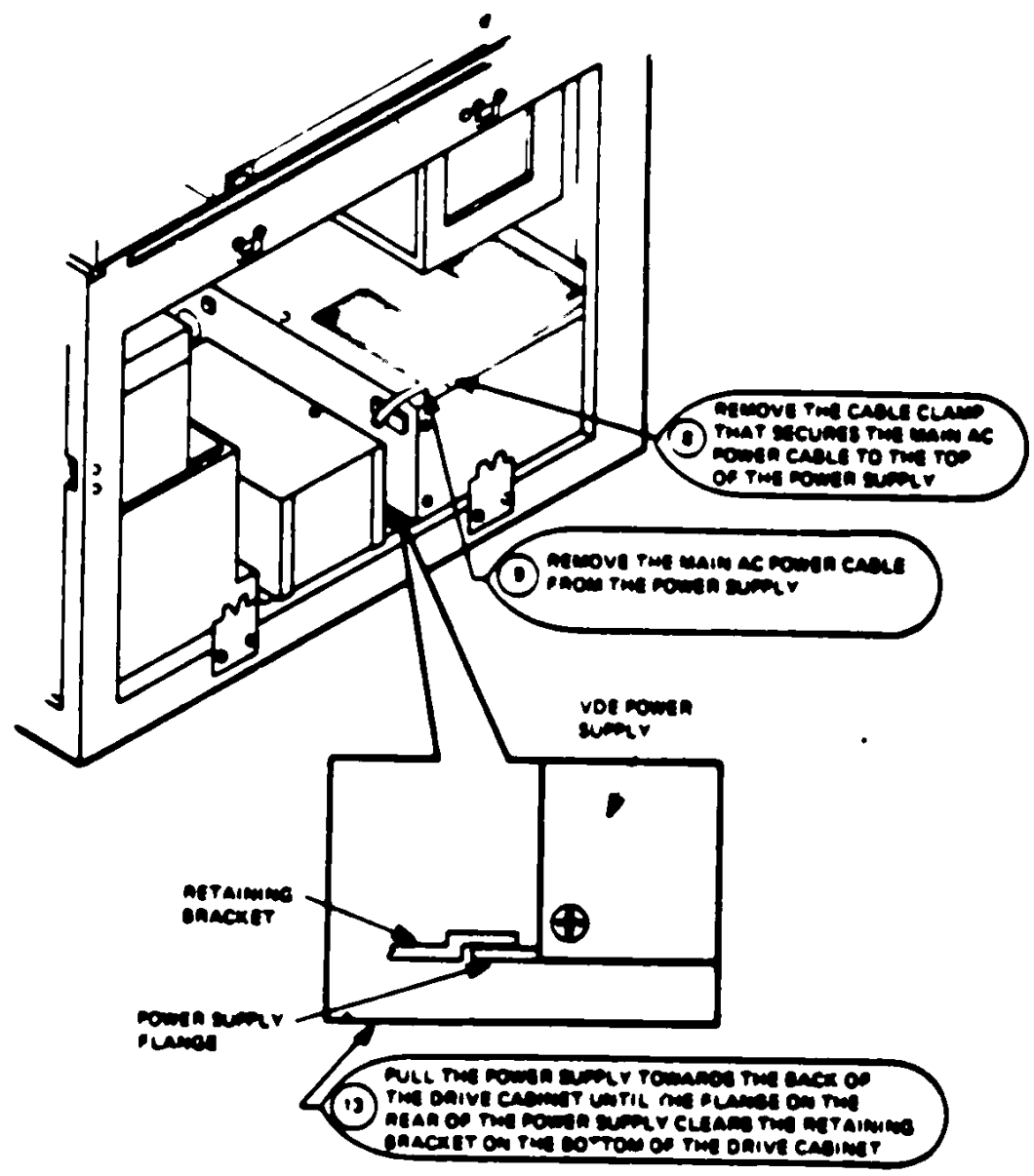


FIGURE 7 RM05 WITH VDE POWER SUPPLY

12. Remove the two (2) 10-24 mounting screws that secure the control panel end of the power supply to the drive chassis. (See Figure 5)

13. Pull the power supply towards the back of the drive cabinet until the flange on the rear of the power supply clears the retaining bracket on the bottom of the drive cabinet. (See Figure 7)

14. Remove the power supply from the drive cabinet.

15. Mount the new power supply assembly (supplied with EQ- for 50Hz or EQ- for 60Hz) into the drive cabinet.

16. Slide the new power supply back into the drive until the flange on the rear of the supply slips under the retaining bracket on the bottom of the drive cabinet.

17. Re-install the two (2) 10-24 mounting screws and secure the control panel end of the power supply to the drive cabinet.

18. Re-attach all the external connectors to the power supply assembly (as noted in step 11).

19. Using the cable clamp removed in step 8, attach the NEW keyed AC power cable (supplied in the FCO kit) to the top of the power supply. (See Figure 8)

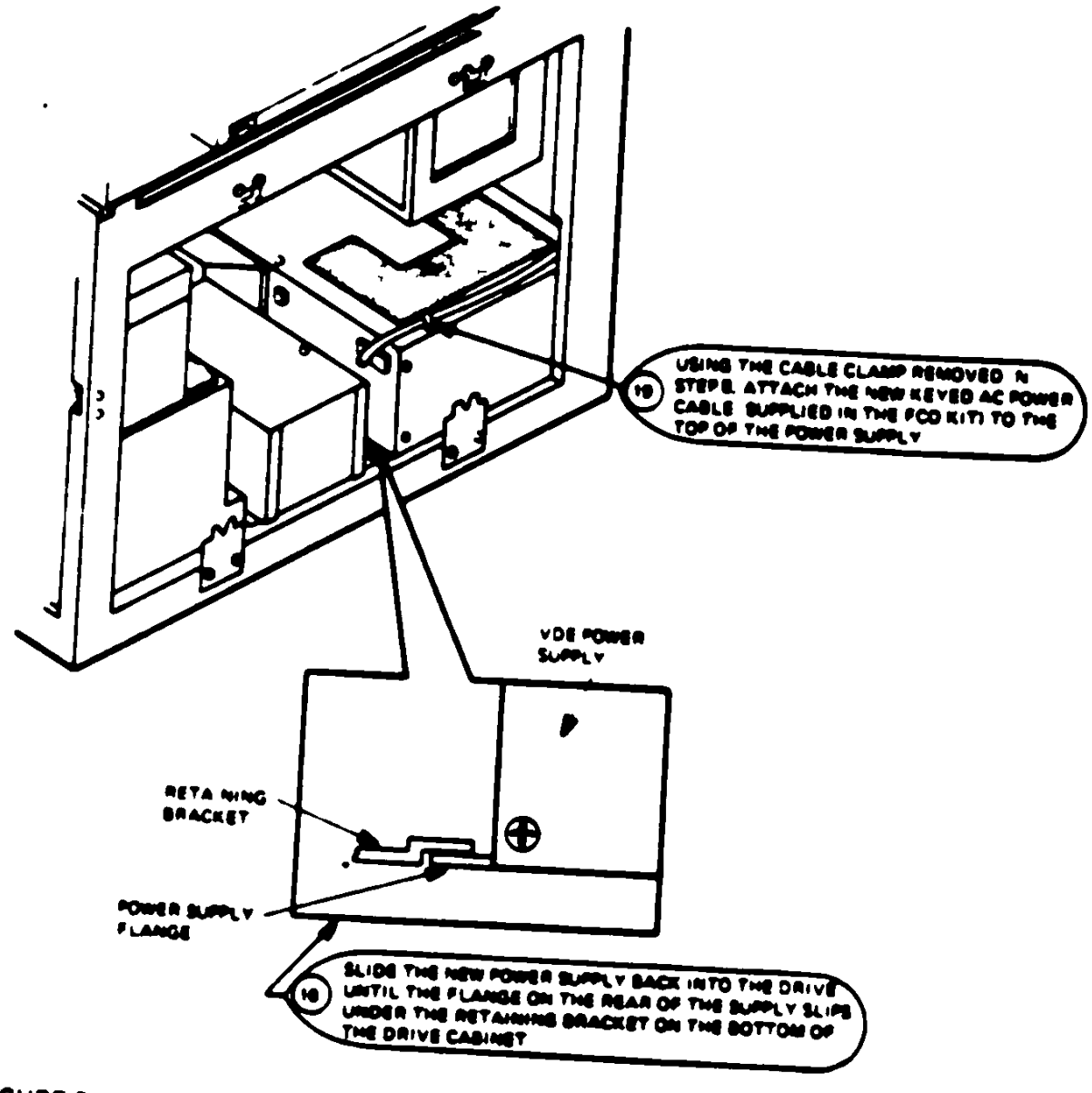


FIGURE 8 RM05 WITH VDE POWER SUPPLY

20. Insert the keyed plug of the new AC power cable into the receptacle labeled AC INPUT on the control panel of the new power supply. (See Figure 9)

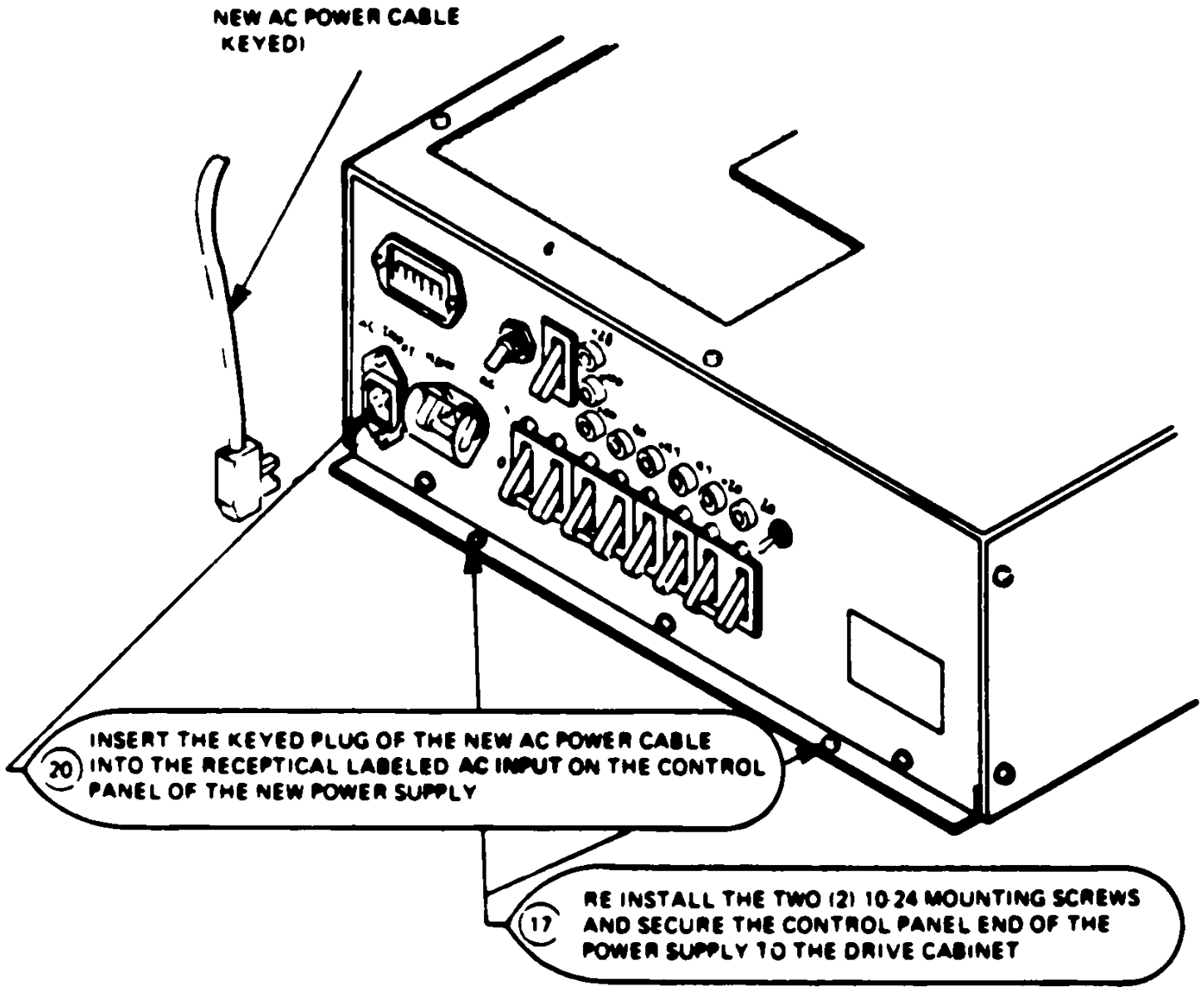


FIGURE 9 VDE RM05 POWER SUPPLY CONTROL PANEL

21. Re-connect the blower hose to the "new air plenum" located on the rear panel of the new power supply. (See Figure 10)

22. Re-connect the new main AC power cable to the site power source.

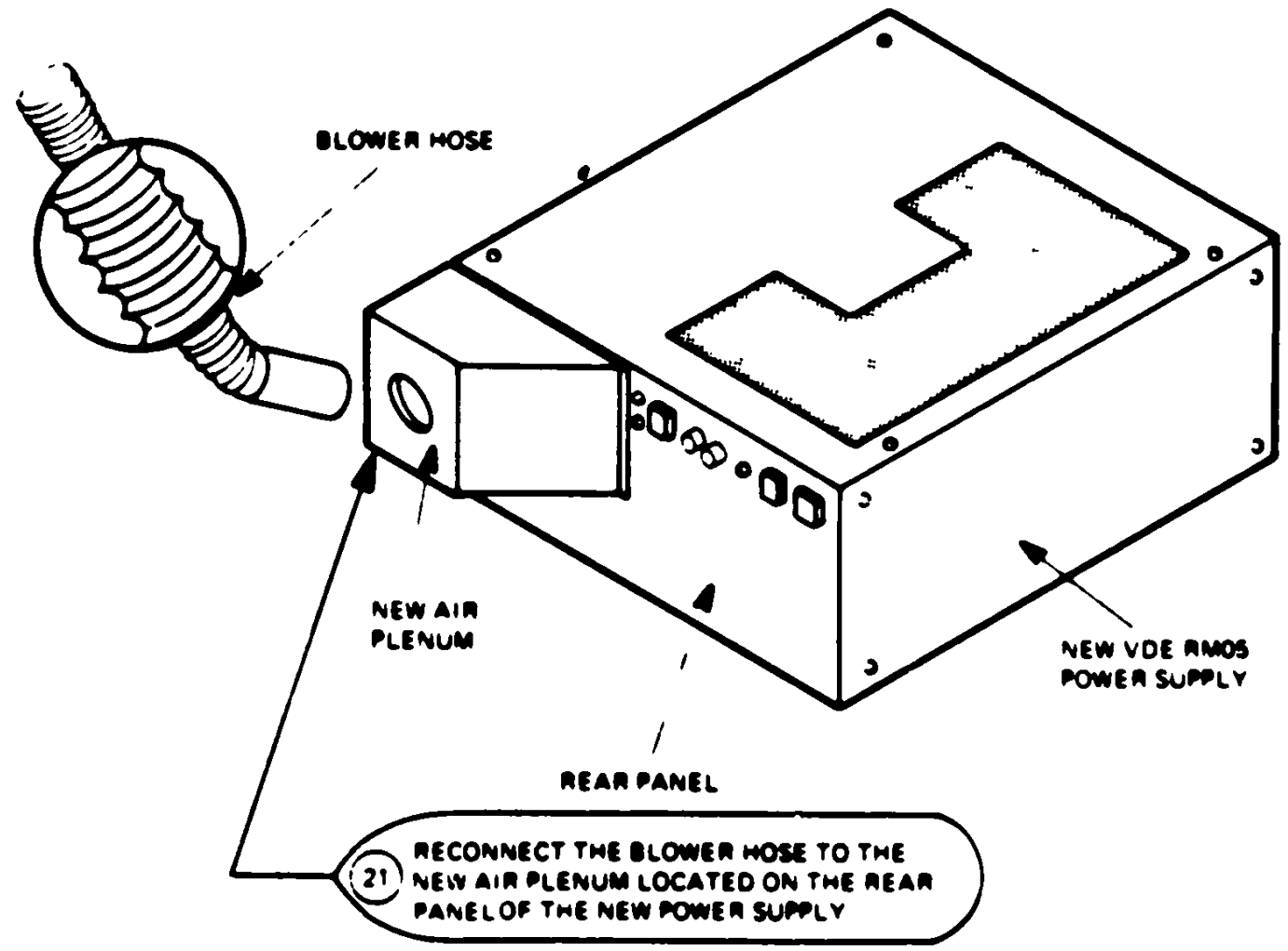


FIGURE 10 VDE RM05 POWER SUPPLY (REAR VIEW)

23. Raise all of the indicated switches and circuit breakers to their UP position. (See Figure 11)

24. Locate the "MAIN AC" circuit breaker on the power supply control panel and lift the breaker up to the "ON" position (labeled "1"). (See Figure 11)

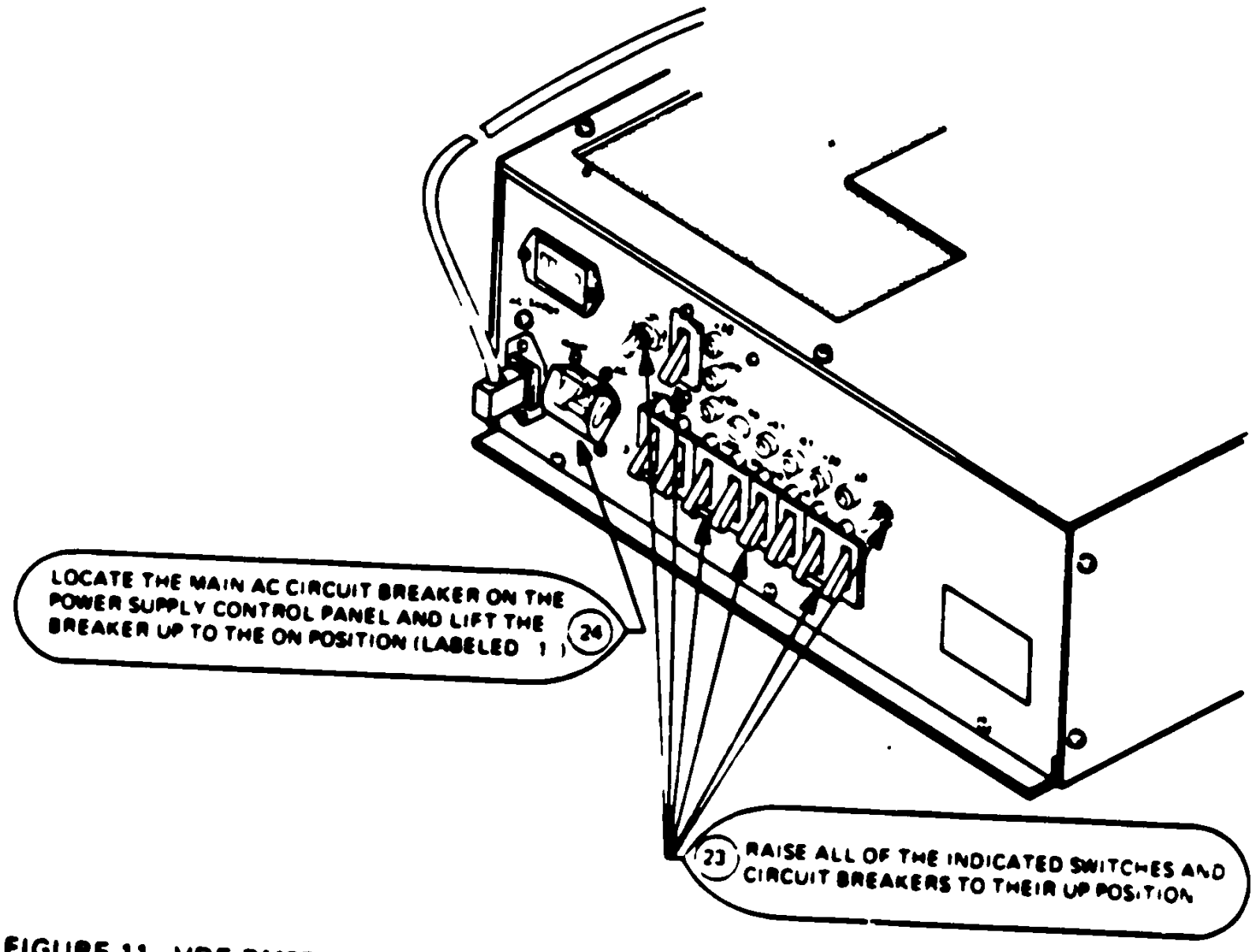


FIGURE 11 VDE RM05 POWER SUPPLY CONTROL PANEL

25. Connect the negative (-) lead of a DVM (Digital Voltmeter) to the GND (ground) test jack on the power supply control panel and verfiy the following DC voltages. (See Figure 12)

26. Connect the positive (+) lead of the DVM to each of the voltage test jacks on the power supply control panel and verfiy the following DC voltages. (See Figure 12)

TEST JACK	MEASURED DC VOLTS
+46	+44 to +51 Volts
-46	-44 to -51 Volts
+20	+18 to +22 Volts
-2J	-18 to -22 Volts
+28	+26 to +30 Volts
+9.7	+8.7 to +10.7 Volts
-9.7	-8.7 to -10.7 Volts

27. Disconnect the DVM from the power supply.

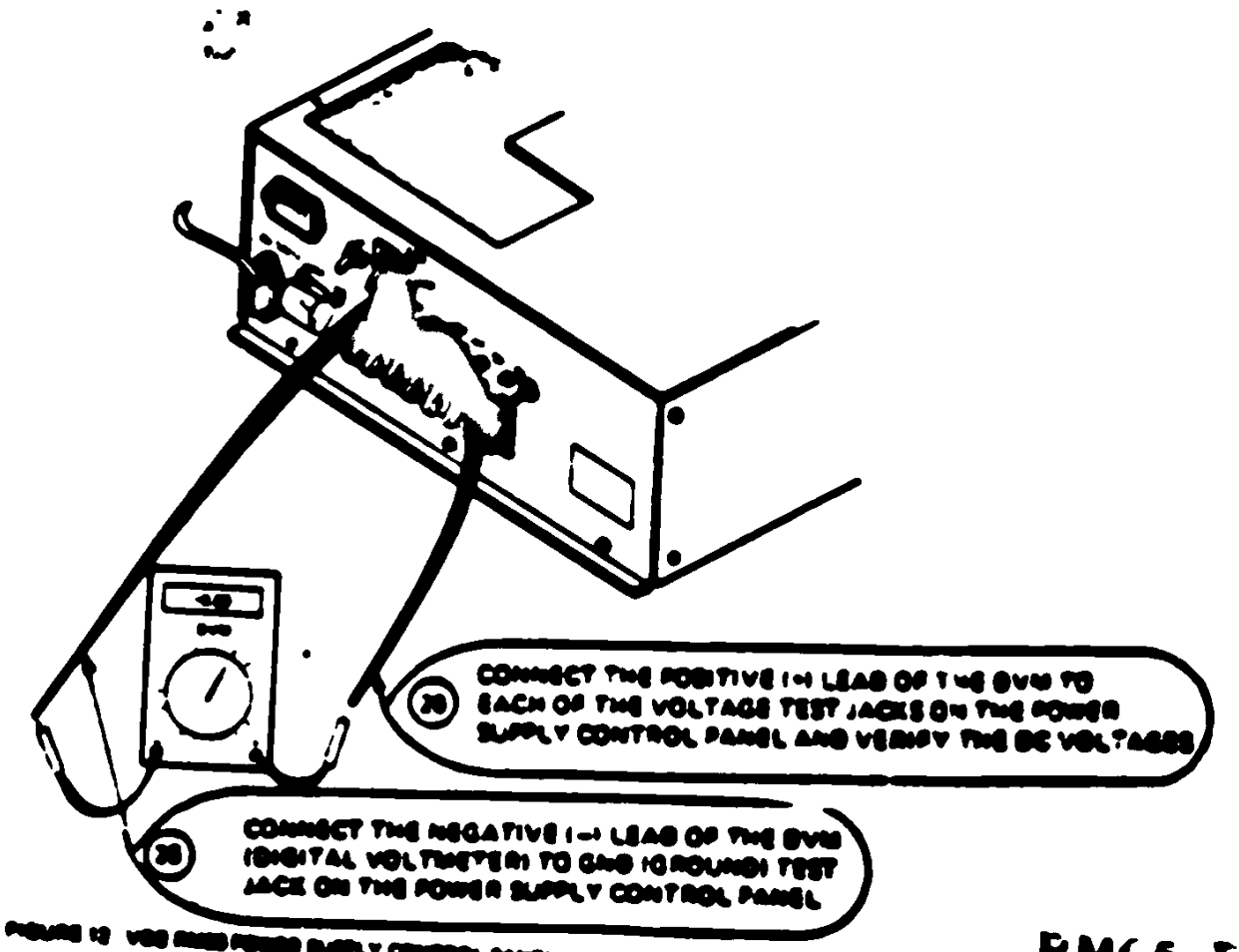


FIGURE 12 VDB RM05 POWER SUPPLY CONTROL PANEL

28. Locate the wire-wrapped side of the main logic chassis directly above the power supply. (See Figure 13)

29. Connect the negative (-) DVM lead to one of the GND (ground) tabs on the left edge of the wire-wrapped side of the main logic chassis. (See Figure 13)

30. Connect the positive (+) DVM lead to Pin A2JD94-04A on the wire wrapped side of the main logic chassis . (See Figure 13)

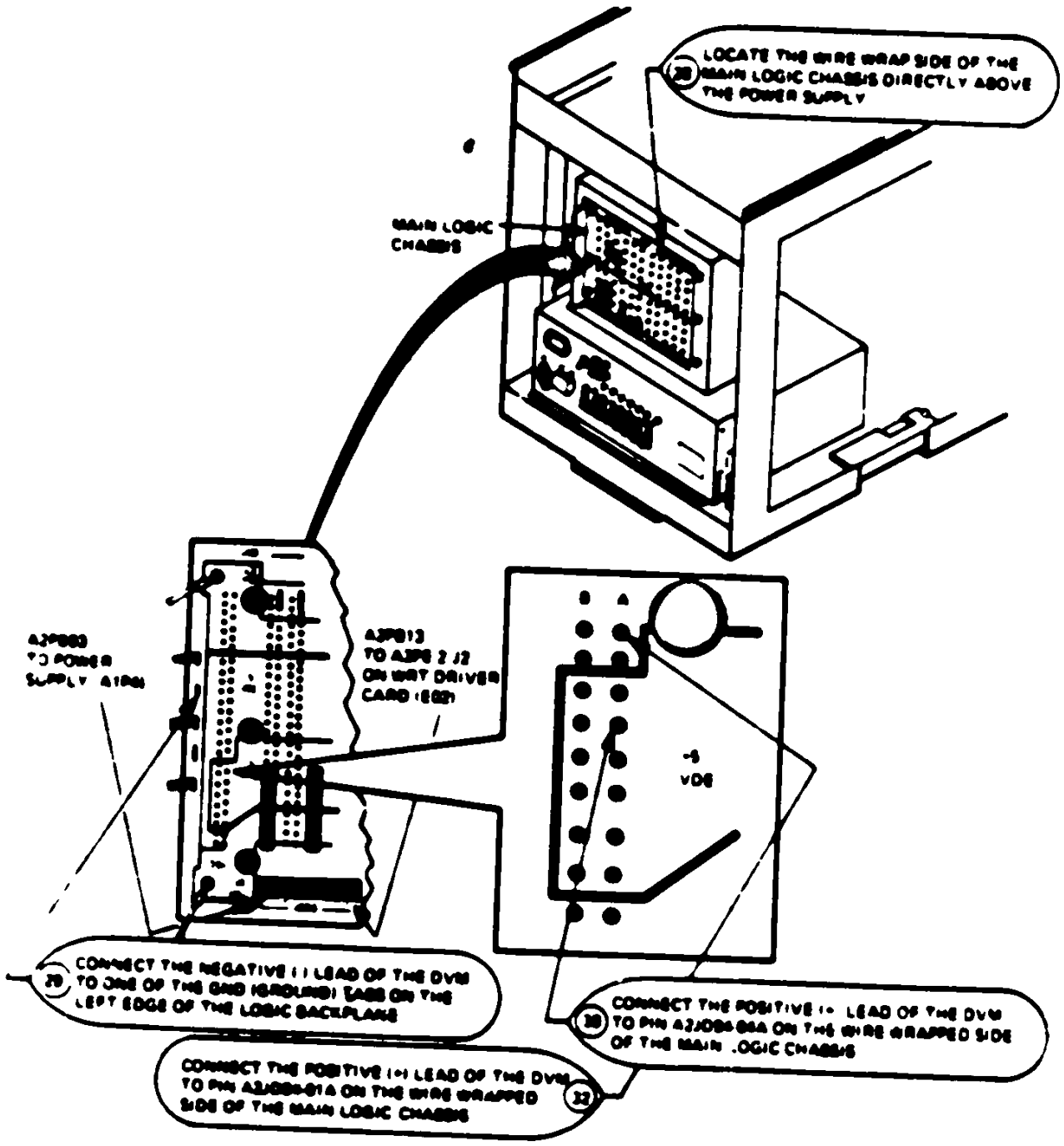


FIGURE 13 RM05 MAIN LOGIC CHASSIS (WIRE WRAPPED SIDE)

31. Adjust the bottom potentiometer of the +/- 5 volt DC regulator card on the card side of the main logic chassis until the DVM reads between +5.05 and -5.15 volts DC. (see Figure 14)

32. Connect the positive DVM lead to Pin A2JD94-01A on the wire wrapped side of the logic chassis. (See Figure 13)

33. Adjust the top potentiometer of the +/ - 5 volt DC regulator card on the card side of the main logic chassis until the DVM reads between -5.05 and -5.15 volts DC. (See Figure 14)

34. Disconnect the DVM from the main logic chassis.

35. Close the rear door of the drive cabinet.

36. Prepare the drive for return to Online operation.

37. Install a scratch pack and close the pack access cover.

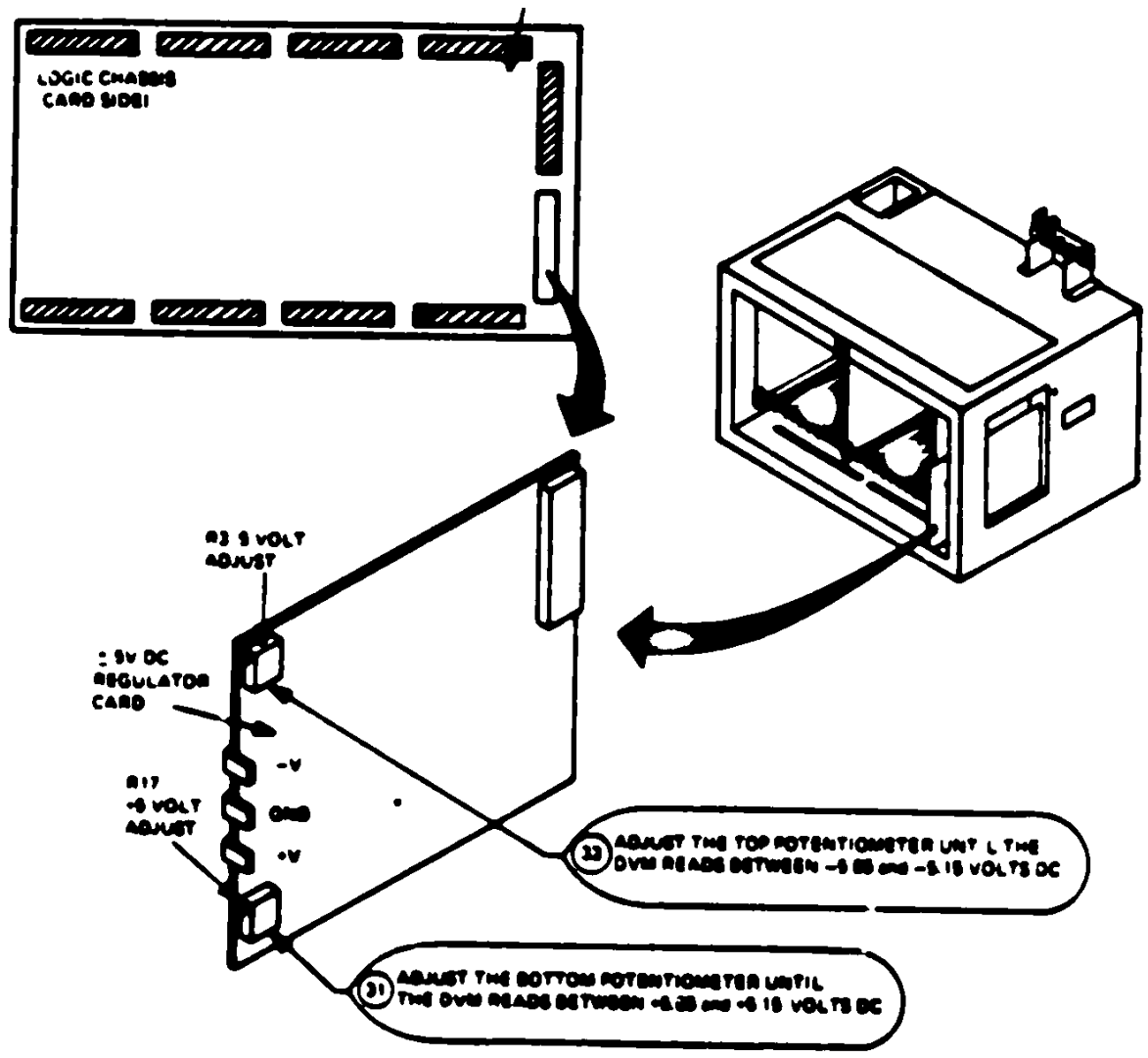


FIGURE 14 RM05 MAIN LOGIC CHASSIS (CARD SIDE)

38. Press the start button on the drive operator panel. (See Figure 15)

39. Verify that the drive "READY" lamp illuminates in approximately 20-30 seconds. (See Figure 15)

40. Verify that the FAULT lamp does not illuminate and that no FAULT condition exists. (Figure 15)

41. Verify that the drive operation using any of the available diagnostics on the site. Thirty (30) minutes run time should be sufficent.

42. Log installation of this FCO into the Digital Site Management Guide.

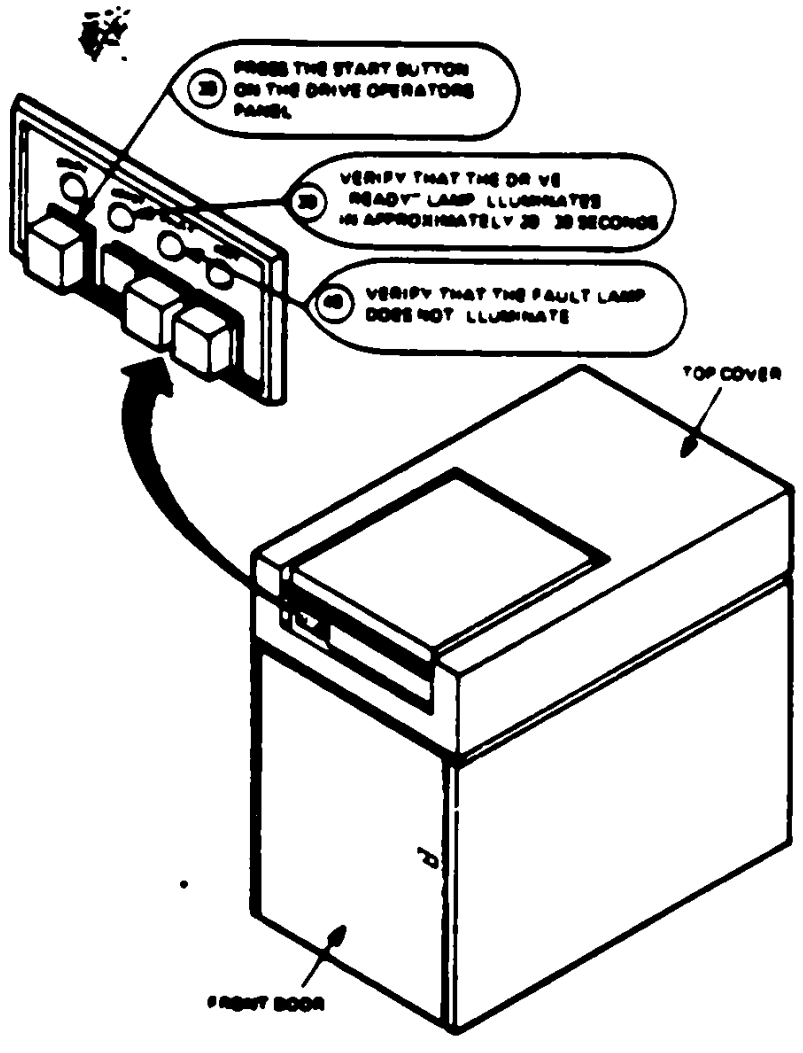


FIGURE 16 RM05 OPERATORS PANEL

10-Nov-1986
RM05-INDEX.A
REV A

MICROMEDIA PUBLISHING

Tech Tip Index

Tech Tip Number	REV	Rel. Date	SB#	Title
-RM05--TT-01	0	28-Jul-80		RM02/3/5/80 Model Compatibility
-RM05--TT-02	0	28-Jul-80		RM02/3/5/80 MBA Backplane
-RM05--TT-03	0	2-Dec-80		RM02/3/5/80 Dual Port
-RM05--TT-04	0	19-Mar-81		Poor MASSBUS Cable ZIF Connection
-RM05--TT-05	0	19-Mar-81		ARL Module Guidelines
-RM05--TT-06	0	1-Jun-81		Speed Sensor Assy Adjustment Hazd
-RM05--TT-07	A	8-Feb-82		RM05 Vibration Problem
-RM05--TT-08	A	23-Mar-82	223	Handling Information
-RM05--TT-09	A	22-Feb-82		RM02/3/5 Alt Head Alignment Proc
-RM05--TT-10	A	18-Jul-81		Exclusive or Gate Error
-RM05--TT-11	A	11-Feb-82		Leaky Spindle Motor Capacitor
-RM05--TT-12	A	29-Apr-82	229	Pack/Head Cleaning
-RM05--TT-13	A	29-Apr-82	230	CE Pack Orientation
-RM05--TT-14	A	17-May-82	233	Power Problems
-RM05--TT-15	A	17-May-82	233	Velocity Transcender Replacement
-RM05--TT-16	A	17-May-82	233	Pack Seal Adjustment
-RM05--TT-17	A	17-May-82	233	Head Crashes
-RM05--TT-18	A	12-Oct-82	253	RM Adapter Cabling Problem
-RM05--TT-19	A	30-Oct-82		A/B Cable Shorting
-RM05--TT-20	A	29-Mar-83	275	Pack Trim Shield Labels
-RM05--TT-21	A	11-Apr-83	276	Velocity Transducer Servicing
-RM05--TT-22	A	3-Jan-84	314	Data Errors Due To Runout
-RM05--TT-23	A	24-Mar-84	325	EVRDA Rev 4.1 Problem
-RM05--TT-24	A	16-Apr-84	329	AC Power Cables for VDE Power Sup
-RM05--TT-25	A	15-May-84	332	Power Supply Failures
-RM05--TT-26	A	3-Jan-85	363	RM Adapter Power Supply Caution
-RM05--TT-27	A	8-Aug-85	394	RM05 Re-Skidding
-RM05--TT-28	A	2-Oct-85	402	CPX Head Inspection Tool Kit
-RM05--TT-29	A	6-Jun-86	434	Absolute Air Filter Springs
-RM05--TT-30	A	10-Nov-86	456	Diagnostic CZRMPB0.BIC Failure

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RM05

Title RM02/03/05/80 Module Compatibility			Tech Tip Number RM05-TT-1
Author Greg Ekholm	F S Office Colo Spgs.	Date 7/15/80	Revision 0
Processer Applicability: All ☐ 11 ☐ VAX ☒ 20 ☐	Mgr /Sup	Date	Cross Reference
	Approval Greg Ekholm	Date 7/21/80	RM02/03-TT-27

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EN 1189C 12 R277 (79Y)

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RM05

Title RM02/03/05/80 MBA Backplane			Tech Tip Number RM05-TT-2
Author Greg Ekholm	F S Office Colo. Spgs.	Date 7/15/80	Revision 0
Processor Applicability: All ☐ 11 ☐ VAX ☐ 20 ☐	Mgr /Sup	Date	Cross Reference: RM02/03-TT-29
	Approval Greg Ekholm	Date 7/28/80	

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EN 1180C 12 R277 (79Y)

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	RMØ5

Title RMØ2/Ø3/Ø5/8Ø Cual Port			Tech Tip Number RMØ5-TT - 3
Author Greg Ekholm	F S. Office Colorado Springs	Date 12/2/8Ø	Revision
Processor Applicability: All ☐ 11 ☐ 10 ☐ 20 ☐ VAX	Mgr /Sup BOB DAVISON	Date 12/12/80	Cross Reference
	Approval Greg Ekholm	Date 12/2/80	RMØ2/Ø3-TT- 32

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RMO5-TT 4

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM05
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title Poor MASSBUS Cable Zif Connecting		Tech Tip Number RM05-TT-4
Author Greg Ekholm	F S Office Colorado Springs Date 3/16/81	Revision 0
Processor Applicability: All ☐ 11s ☐ VAXs ☐ ☐ ☐ ☐	Mgr /Sup Date Approval Date 7/1/81	Cross Reference RM02/03-TT-3636

This tech tip for cross reference only.

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	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RM05
	12 Bit ☐	16 Bit ☒	18 Bit ☒	36 Bit ☒	

Title ARL Module Guidelines		Tech Tip Number RM05-TT-5
Author Greg Ekholm	F S Office Colorado Springs Date 3/16/81	Revision 0
Processor Applicability: All ☐ 11 ☐ VAX ☐	Mgr /Sup Date	Cross Reference RP05/06 - TT -54
	Approval Greg Ekholm Date 3/16/81	

This tech tip for cross reference only.

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EN 1188C 12 R277 1781

Title: Speed Sensor Assembly Adjustment Hazard

Tech Tip Number: RM05-TT-6

Author: Kathy McGuire

F S Office: CX Date: 06-01-81

Revision:

Processor Applicability: All 11/70 | 11/750 | 11/780

Mgr 'Sup: [signature] Date: 7/31/81

Approval: [signature] Date: 06-01-81

Cross Reference:

This technical tip is to inform all field engineers of a possible hazard which may be encountered while doing a speed sensor assembly adjustment / replacement.

On the bottom of the spindle pulley is mounted a steel pin which passes over the speed sensor pickup. NEVER place a screwdriver, your finger, or any other object in this area while the spindle is turning. Doing so may cause damage to the spindle pin, speed sensor, or yourself.

See Figure 1 (attached).

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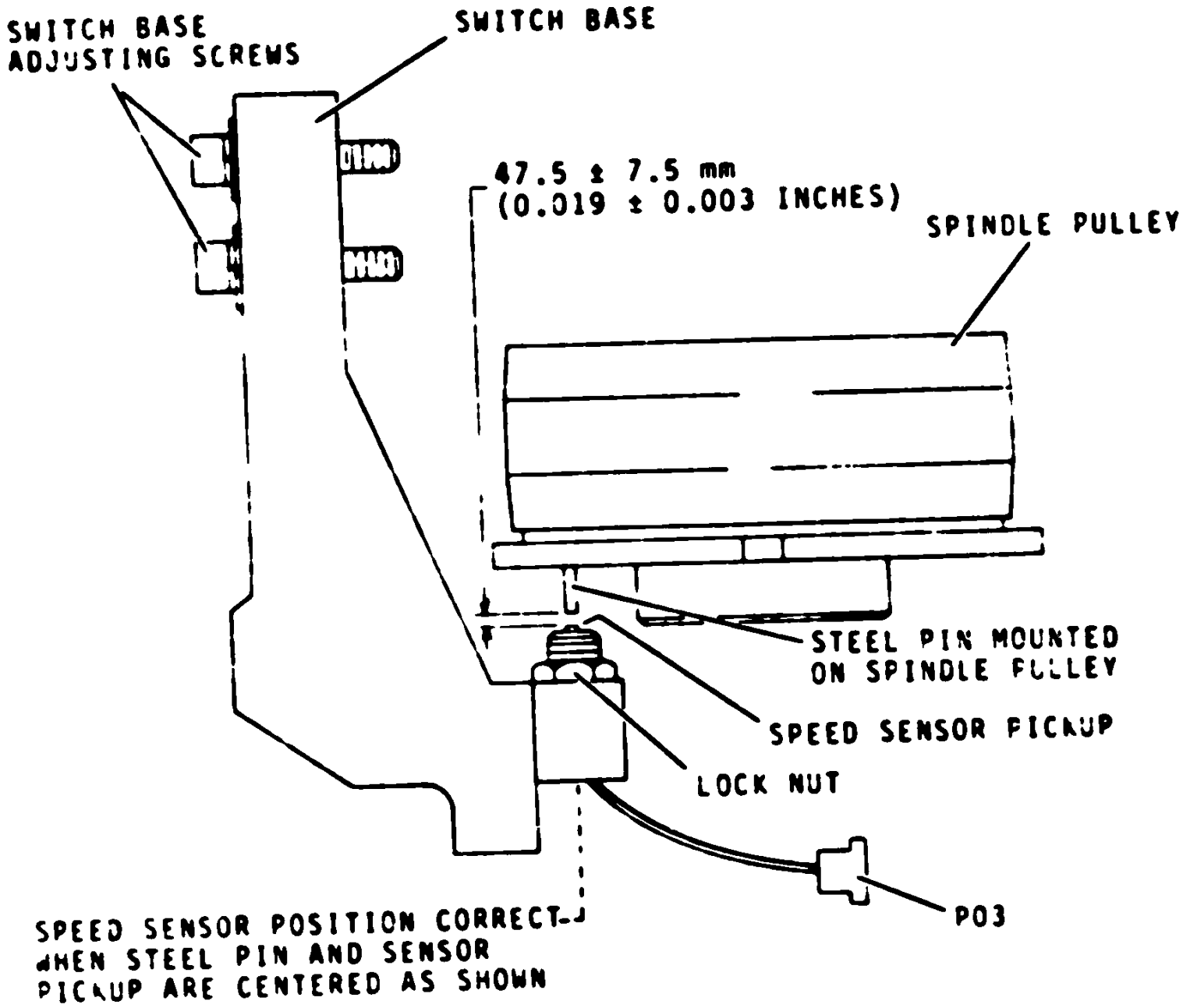
EN 1180C 12 R277 (79V)

digital	FIELD SERVICE TECHNICAL MANUAL				Option or Des gnator RM05
	12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☐	

Title Speed Sensor Assembly Adjustment Hazard			Tech Tip Number RM05-TT-6
Author Kathy McGuire	F S Office CX	Date 06-01-81	Revision
Processor Appl cability	Mgr Sup J Siciemsky	Date 07-30-81	Cross Reference
AH	Approval Kathy McGuire	Date 06-01-81	



FIRGURE 1 SENSOR ASSEMBLY ADJUSTMENT

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EN 1188C 12 R277 (78V1)

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RMØ5
	12 Bit [X]	16 Bit [X]	18 Bit [X]	36 Bit [X]	

Title RMØ5 Vibration Problem		Tech Tip Number RMØ5-TT-7
Author D.C. Waterman	FS Office Kansas City Date 5/14/81	Revision A
Processor Applicability: All X | VAX	PSG Date 2/1/82 CSSE Date 2/8/82	Cross Reference

The RM05's are presently being shipped with metal feet. The drive has a tendency to walk and the resultant vibration causes modules to shake loose. This cause many intermittent problems.

Placing rubber cups under the metal feet will cure this problem.

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EN-011888 12 R1278(79V)

RM05

digital	FIELD SERVICE TECH TIP					Option Designator RMØ5
	☐ 12 Bit	☒ 16 Bit	☐ 18 Bit	☒ 32 Bit	☒ 36 Bit	Category SYSTEMS
Title RMØ5 HANDLING INFORMATION						Tech Tip No RMØ5-TT-
Processor Applicability ALL		Cross Reference				Tech Tip Rev A / Page 1 of 1
Author FIELD SERVICE PRODUCT SAFETY			Mgr./Supv. Approval LOUIS CARPENITO			
Location PK3-2		Mail Stop S39				Date 13 MAR 82
CSSE Approval SKIP DALTON						Date 23 MAR 82
PSG Approval ED MALONE						Date 23 MAR 82

CAUTION!!

DURING SHIPMENT THE RMØ5 IS BANDED ONLY AND NOT BOLTED TO THE SKID. ONCE THE SHIPPING BANDS ARE REMOVED THE RMØ5 SHOULD NOT BE TRANSPORTED AROUND ON ITS SKID. IF IT IS NECESSARY TO TRANSPORT THE RMØ5 AROUND IT MUST EITHER BE REMOVED FROM THE SKID OR REBANDED TO THE SKID.

Subject Alternate head alignment procedure for RMØ2/Ø3/Ø5's

This can be done with or without the HFSV (head align card). With the HFSV card the results will equal alignment done with a field test unit (FTU).

Enter into memory starting at

Location			
	200	000005	Reset
		012737	Select unit 0
		000000	
		176710	
	210	012737	Set VV
		000021	
		176700	
	216	000005	Reset
	220	012737	Set WC
		177400	
		176702	
	226	012737	Set BA
		002000	
		176704	
	234	013737	Select Head
		177570	
		176706	
	242	012737	Set DCA=365_8
		000365	
		176734	
	250	012737	Do Read Data
		000071	
		176700	
	256	105737	TSTB for Ready
		176700	
	262	100375	BPL to TSTB
	264	000137	Jump to 216 and
		000216	do it again

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EN-011888 12 R1278(79V)

RMCE TT-11

Title	RM02/03/05 ALTERNATE HEAD ALIGNEMENT PROCEDURE		Tech Tip Number RM05-TT-9
Author TOM TOBIASSEN	F S Office COLO.SPRINGS	Date 17 FEB 82	Revision A
Processor Applicability: All x 11's	CSSE LOYD BUCHANAN	Date 18 MAR 82	Cross Reference RM03-TT-47
	PSG FRAN LINNEHAN	Date 22 FEB 82	RM02-TT-47

Instructions:

1. With the drive powered off, place the HFSV card in the drive logic chassis at location A02 on RM02/03 and A16 on RM05's. Insert LAP 0 into drive. If you are not using the HFSV card goto step 5.

2. Install the head alignment cable between the drive logic chassis and the jack on the card in the read/write chassis as specified in the appropriate disk subsystem user's guide. Use your DVM in place of the FTU meter.

3. Power up the drive and install a CE Pack. Enter the toggle program at location 200, load address 200 and press start with SWR = 0. Heads will seek to cyl 245_{10} and you are ready for head alignment on head #0.

4. To select another head, raise the switches on the console to correspond to the desired head. On 1170 with RDC console, press ctrl P to get in console mode. 1W writes a 1 into the SWR, change the value 1 to ? for another head selection.

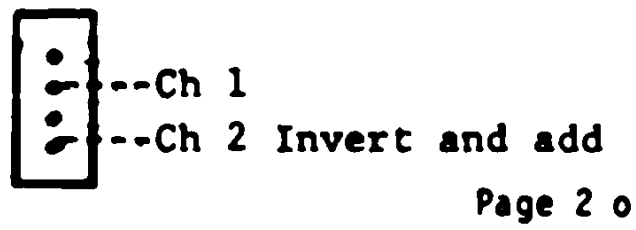
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
*	*	*	HD	HD	HD	HD	HD	*	*	*	*	*	*	*	*
			16	08	04	02	01								
			x	x											

First line = Switch Second line = value calculated by adding values in line 3.

Note: x - not used by RM02/03

5. For head alignment without the HFSV card place scope probes as shown below. J104 on the read amp card A3A03. Align the head for equal simitry of the dibit pattern shown in the user guides. This is an emergency procedure and should be done using the HFSV card as soon as possible.

Goto step 3.



Page 11	Page Revision A	Publication Date APRIL 1982

PRINTED IN U.S.A.

EN-011888-12-R127(79Y)

RM05-TT-12

	FIELD SERVICE TECHNICAL MANUAL				Option or Designator RMØ5
	12 Bit ☐	16 Bit ☒	18 Bit ☐	36 Bit ☐	SYSTEMS

Title EXCLUSIVE OR GATE ERROR			Tech Tip Number RMØ5-TT- 10
Author LOYD BUCHANAN	F S Office COLORADO	Date 23 FEB 81	Revision A
Processor Applicability All X	CSSE GREG EKHOLM	Date 24 FEB 81	Cross Reference RMØ2-TT- 49 RMØ3-TT- 49
	PSG FRAN LINNEHAN	Date 18 JUL 81	

The RMØ2, RMØ3, and RMØ5 prints are in error on drawing exculsive OR gates. Referring to cross references 164 and 165 in the RMØ2 and RMØ3 prints, C.D.C. has shown the 149H gates as exclusive NOR gates. The manufacturer's data sheet lists the 7486 and the 3Ø21 gates as exclusive OR's. Erasing the inversion bubbles on the outputs does make the logic work properly.

This logic appears on cross references 124 and 125 of the RMØ5 prints.

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EN-011888-12-R1278(79Y)

RMCE-TT- 13

Title	LEAKY SPINDLE MOTOR CAPACITOR			Tech Tip Number	RM05-TT-11
Author	FRAN LINNEHAN	F.S Office	MAYNARD	Date 11 FEB 82	Revision A
Processor Applicability: All X		CSSE	SKIP DALTON	Date 2 MAR 82	Cross Reference
		PSG	ED MALONE	Date 11 FEB 82	

On DEC 9766 50Hz drives, if the drive motor has a date code of F813, G813, or H813 and with the run capacitor ground wire soldered to the capacitor, the capacitor and wire should be replaced. this effects BK7B1F and BK7B1F drives only (RM05).

Listed is the suggested procedure for checking the run capacitor on the DEC version 9766 drive motors.

Procedure:

1. Power down drive.

2. Gain access to drive motor from the left side of the drive (as facing drive).

3. Locate capacitor cover opposite from motor power wires and remove cover.

   Caution: Capacitor May be charged.

4. Check to determine whether the ground wire is soldered to the capacitor case or is attached via quick connector.

5. If the ground is a quick connect attachment, no rework is necessary.

   5.1 Replace cover on drive motor and return to customer.

6. If soldered:

   6.] Contact Fran Linnehan, Corporate Product Support Group, PK3-2/K11, DTN: 223-8855 or (6]7) 493-8855 for parts and rework instructions

PRINTED IN U.S.A.

EN 1188C 12 R277 (78V)

RM06 TT-14

digital	FIELD SERVICE TECHNICAL MANUAL			Option or Designator RMØ5
	12 Bit ☐	16 Bit ☒	32 BIT ☒	36 Bit ☐	SYSTEMS

Title RMØ5 PACK/HEAD CLEANING		Tech Tip Number RMØ5-TT- 12
Author A. GROVER	F S Office / Date 3 JUN 81	Revision A
Processor Applicability: All | 11 | VAX |	CSSE DENNIS SHAW 4-16-82	Cross Reference
	PSG ED MALONE Date	

THE FOLLOWING IS A RECOMMENDATION FROM DISK ENGINEERING/MAINTAINABILITY -

"BECAUSE OF THE LOW FLYING HEIGHT OF RMØ5 HEADS NEITHER HEADS NOR PACKS SHOULD BE CLEANED".

A PROCEDURE TO DETERMINE IF A HEAD NEEDS REPLACING IS TO BE FOUND IN THE "RMØ5 DISK SUBSYSTEM MAINTENANCE MANUAL" PARA. 4.7.

Title	RMØ5 CE PACK ORIENTATION		Tech Tip Number RMØ5-TT-13
Author	J. WHITFIELD	F S Office UK REGION Date 20 OCT 81	Revision A
Processor Applicability: All / VAX / 11		CSSE DENNIS SHAW Date 4-16-82	Cross Reference
		PSG ED MAIONE Date 4 29-82	

THE FOLLOWING IS A LIST OF THE VARIOUS ALIGNMENT TRACKS ON THE RMØ5 CE PACK AND THEIR USES.

CYLINDER ADDRESS

DECIMAL	OCTAL	USED FOR
491	753	HEAD ALIGNMENT
5	5	SERVO OFFSET
4	4	" "
ØØØ	ØØØ	" "

NOTE: THEY ARE NOT THE SAME AS THE RMØ2/Ø3

PRINTED IN U.S.A.

EN-011ØØ 12 R127(79V)

RMØ5-TT-16

	FIELD SERVICE TECH TIP					Option Designator RMØ5
	☐ 12 Bit	☒ 16 Bit	☒ 18 Bit	32 Bit	☐ 36 Bit	Category SYSTEMS
Title RM05 Power Problems						Tech Tip No RMØ5-TT- 14
Processor Applicability J J V A X		Cross Reference N/A				Tech Tip Rev A / Page 1 of 1
Author W. L. Robertson			Mgr /Supv Approval N/A			
Location Charlotte		Mail Stop CE				Date 3-17-82
CSSE Approval Dennis Shaw						Date 5-21-82
PSG Approval						Date

The rectifier and capacitor board (YEN) may fail in such a manner that regulator chips on both the E01 card (read/write control) 10.5V regulator (VR14) and the E03 card (read amp) 6V regulator (VR22) may be damaged. When replacing the YEN card, if the voltage checks in the service manual are o.k. and the drive is getting DTEs (drive timing errors) or the tester is getting address errors check the output of these regulators. 6V reg VR22 (E03) is located on drawing cross ref. 632. 10.5V reg VR14 (E01) is located on drawing cross ref. 612. The above voltages are not monitored and will not cause a voltage fault.

	FIELD SERVICE TECH TIP					Option Designator RM05
	_ 12 Bit	x 16 Bit	_ 18 Bit	x 32 Bit	36 Bit	Category SYSTEMS
Title VELOCITY TRANSDUCER REPLACEMENT						Tech Tip No. RM05-TT-15
Processor Applicability [ ] 11/780 11/750 [ ]		Cross Reference N/A				Tech Tip Rev A / Page 1 of 1
Author Dan Edgell			Mgr /Supv Approval N/A			
Location CINCINNATI		Mail Stop CY				Date N/A
CSSE Approval Dennis Shaw						Date 5-21-82
PSG Approval						Date

When removing and/or replacing a velocity transducer assembly in a RM05, follow the procedure exactly as described in the "RM05 Service Manual" (EK-ORM05-SV-002 Page 4-81).

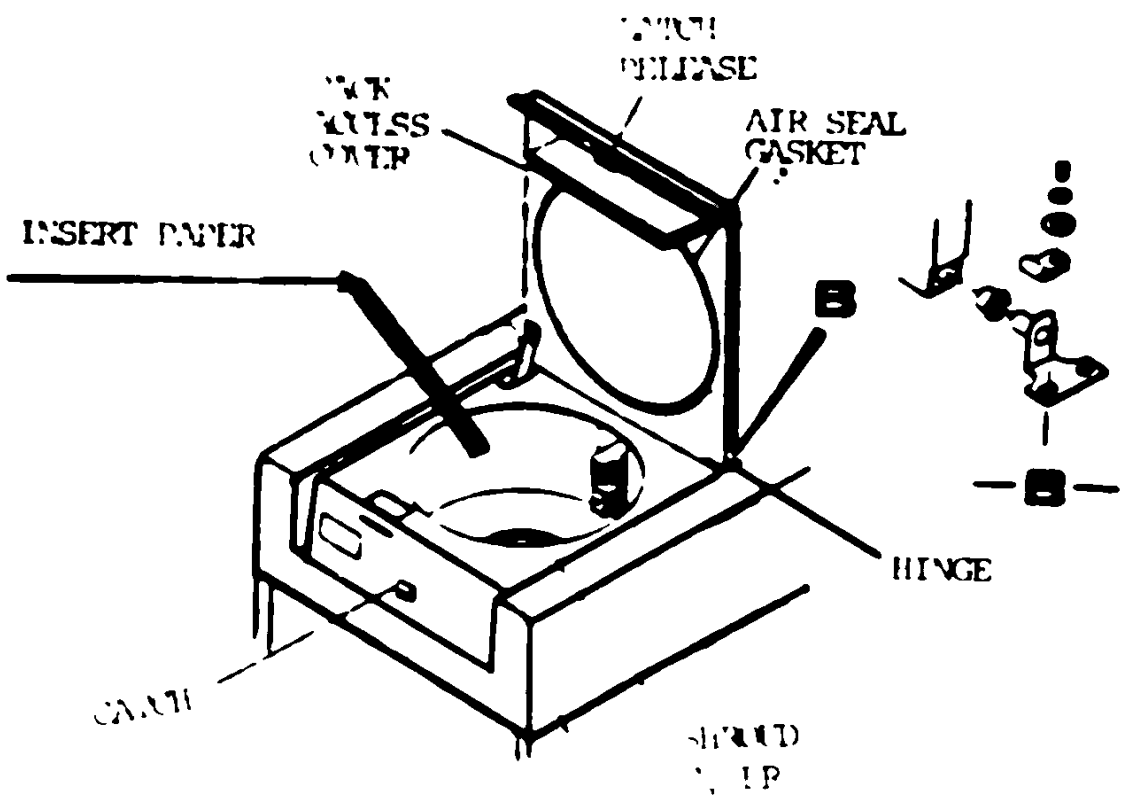
In the instances when the transducer was replaced or handled improperly, the problem symptom was that the RM05 was unable to perform seeks above cylinder 1200 (octal).

	FIELD SERVICE TECH TIP					Option Designator RM05
	X 12 BIT	X 16 BIT	X 18 BIT	X 32 BIT	X 36 BIT	Category SYSTEMS
Title: Pack Seal Adjustment						Tech Tip No: RM05-TT-16
Processor Applicability: ALL		Cross Reference: N/A				Tech Tip Rev: A / Page: 1 of 1
Author: Ron Hruby			Mgr Supv Approval: N/A			
Location: Parker Street		Mail Stop: PK3-2/K11				Date: 4-29-82
CSSE Approval: Dennis Shaw						Date: 5-21-82
PSG Approval						Date

It has been found that a lot of head crashes can be attributed to air seal leaks. The following procedure should rectify this problem.

This can be checked by noting the drag on a sheet of paper as it is pulled out from between the closed pack access cover, and the shroud assembly. The amount of drag should be even around the seal. Adjust if necessary, by moving the front catch on the shroud up or down until the pack access cover latches tightly enough to provide an air tight seal. This adjusts the sides and front of the pack access cover.

NOTE: Because of the use of paper to check seal, you must purge pack for at least 15 minutes.



	FIELD SERVICE TECH TIP					Option Designator RM05
	X 12 Bit	X 16 Bit	X 18 Bit	32 Bit	X 36 Bit	Category SYSTEMS
Title RM05 HEAD CRASHES						Tech Tip No RM05-TT-17
Processor Applicability A L L		Cross Reference N/A				Tech Tip Rev A / Page 1 of 3
Author Ron Hruby			Mgr Supv Approval N/A			
Location Parker Street		Mail Stop ~~PK3-2~~/K11				Date 5-14-82
CSSE Approval Dennis Shaw						Date 5-21-82
PSG Approval						Date

Due to the very low flying height of the heads and the critical characteristics of the RM05 packs, it is recommended that if a head crash is experienced, you should replace all the heads in the drive. There is no way you can determine with the unaided eye whether or not the remaining heads are good or not. This requires a microscope and a thorough knowledge of head construction.

In the event of a crash, the following steps should be taken:

1. Because the RM05 uses a perforated shroud assembly, you must disassemble the shroud and clean the deck area very thoroughly. Some repeat crashes have been attributed to contamination left in the drive from the original crash.

2. Take no chances. Replace every head when reassembling the drive. Visually inspect each head for signs of improper assembly or contamination before installing.

3. Inspect the positioner and magnet for metal particles. BE THOROUGH IN EVERY RESPECT.

4. When drive is reassembled, allow the drive to purge for a minimum of 30 minutes. Visually inspect the shroud area before installing a new scratch pack.

5. When the pack has spun up for a few minutes and things look stable, you can then proceed with the head alignment procedures.

6. Complete the attached form and forward it to:

   Ron Hruby
   SSG Product Support Group
   129 Parker Street PK3-2/K11
   Maynard, MA 01754

	FIELD SERVICE TECH TIP					Option Designator RM05
	x 12 BH	x 16 BH	x 18 BH	x 32 BH	x 36 BH	Category SYSTEMS
Title RM05 HEAD CRASHES (continued)						Tech Tip No RM05-TT-17
Processor Applicability ALL		Cross Reference N/A				Tech Tip Rev A / Page 2 of 3
Author Ron Hruby			Mgr Supv Approval N/A			
Location Parker Street		Mail Stop PK3-2/K11				Date 5-14-82
CSSE Approval Dennis Shaw						Date 5-21-82
PSG Approval						Date

Due to the "Burnished media" technology used on these packs, the normal pack cleaning procedures tend to leave a residue on the platter surfaces. The media requires a special power wash cycle to insure that all the residue is removed. Again, only a keen eye trained to recognize a media defect can spot a problem by inspecting a pack. CDC recommends a program of media inspection at certain intervals but will not recommend any cleaning. Therefore, a clean environment and proper storage of media to prevent pack contamination is strongly suggested.

The maintainability group for the RM05 needs to have more complete reporting of RM05 head crashes. It has been found that some RM05 calls, especially if they are repeat crashes, have been reported on LARS against systems. This makes accurate performance statistics difficult at best. The last page of this Tech-Tip is a reporting format which should be used in every instance of a RM05 head crash until further notice. Send the completed form to: Ron Hruby; SSG Product Support Group, PK3-2/K11. We will appreciate your assistance in this very much.

Until the head crash problem has been resolved, we recommend that all branches have their RM05 CE and scratch packs inspected at least once a month by a trained field engineer. This is necessary to eliminate the possibility that our test packs may be a source of contamination.

	FIELD SERVICE TECH TIP					Option Designator RM05
	X 12 Bit	X 16 Bit	X 18 Bit	X 32 Bit	X 36 Bit	Category SYSTEMS
Title RM05 HEAD CRASHES (Continued)						Tech Tip No RM05-TT-17
Processor Applicability ALL	Cross Reference N/A					Tech Tip Rev A / Page 3 of 3
Author Ron Hruby	Mgr Supv Approval N/A					
Location Parker Street	Mail Stop PK3-2/K11					Date 5-14-82
CSSE Approval Dennis Shaw						Date 5-21-82
PSG Approval						Date

PLEASE USE THIS FORM TO DOCUMENT RM05 HEAD CRASHES FOR MAINTAINABILITY ENGINEERING IN COLORADO.

****

Branch Office _____ Cost Center _____

Customer Name _____ LARS Log # _____

RM05 Serial # _____ Pack Serial # _____

Date of failure _____ Date of installation _____

Hour Meter reading _____ Head #s (loc) that actually crashed

_____ _____

Site Environment _____

Suspected Cause _____

Name of Engineer _____ Telephone # _____

Additional comments: _____

_____

_____

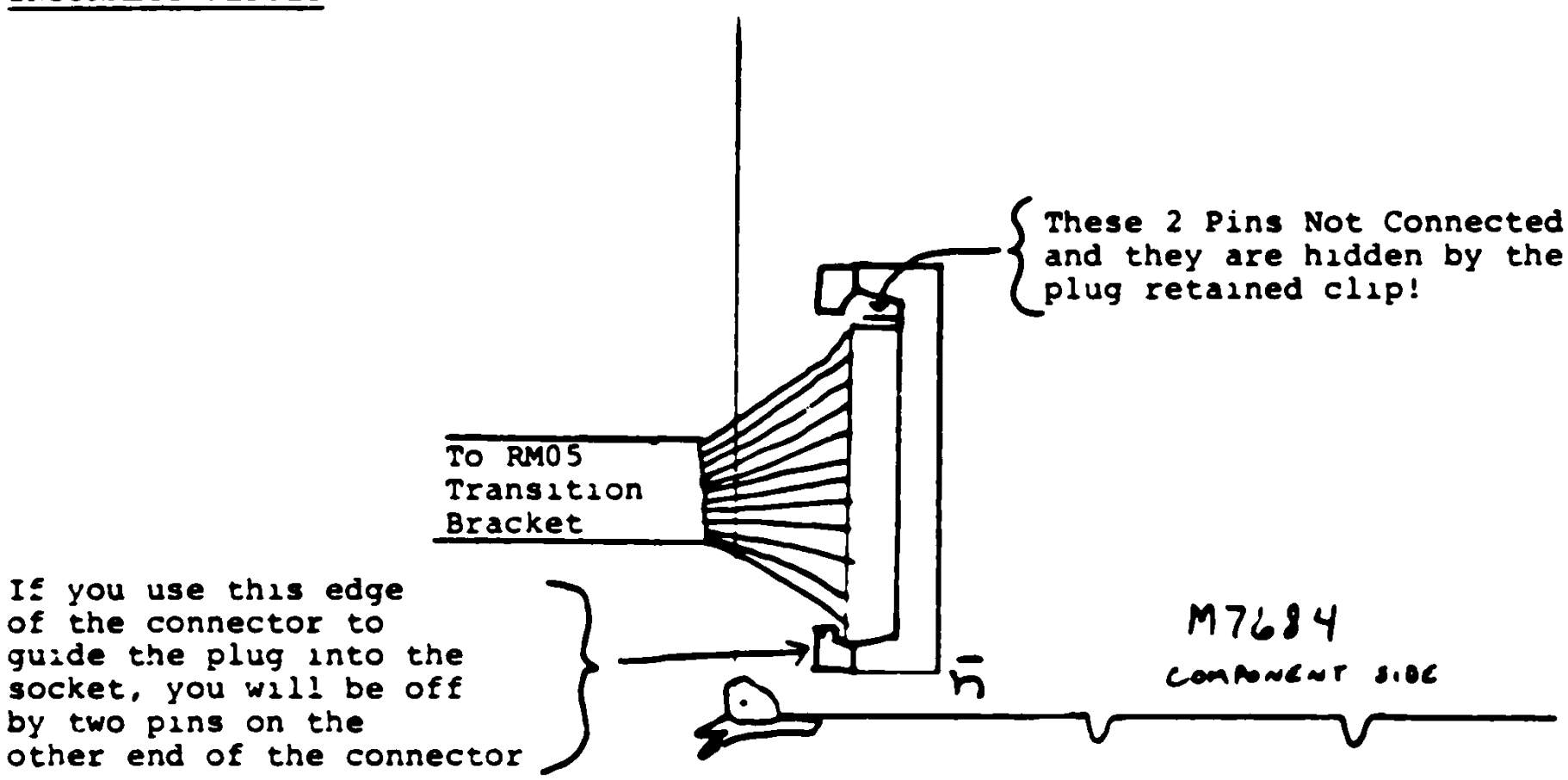
_____

Send to: Ron Hruby
SSG Product Support
129 Parker Street, PK3-2/K11
Maynard, MA 01754

DIGITAL	FIELD SERVICE TECH TIP					Option Designator RM#5	
	☐ 12 BIT	☒ 16 BIT	☐ 18 BIT	☒ 32 BIT	☐ 36 BIT	Category SYSTEMS	
Title RM ADAPTER CABLING PROBLEM						Tech Tip No RM#5-TT-18	
Processor Applicability 11 VAX			Cross Reference N/A			Tech Tip Rev A	Page 1 of 1
Author Richard Mautz			Mgr/Supv. Approval Ronald J. Mullin				
Location Santa Monica, CA		Mail Stop LX0				Date 9/8/82	
CSSE Approval DENNIS SHAW						Date 10-4-82	
PSG Approval DON DAVIS						Date 10/12/82	

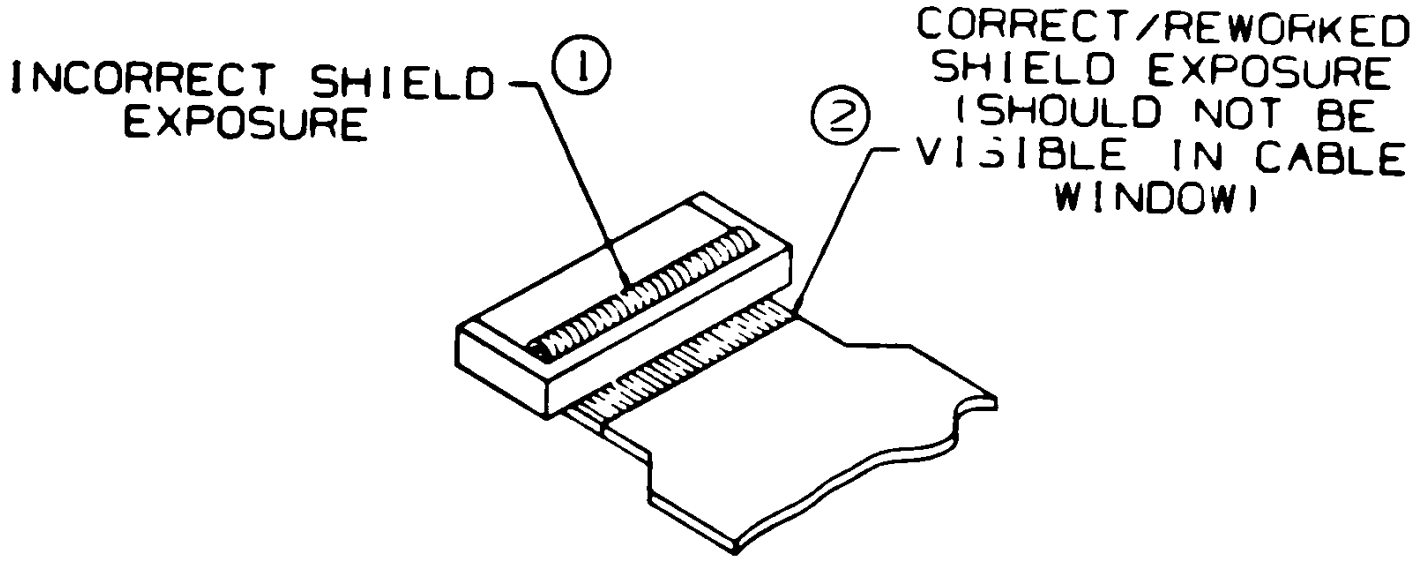
A problem exists between the AMP connector on the M7684 (J1) of the RM adapter, and its corresponding cable from the RM05 transition bracket. The problem is that the cable connector plug is narrower than the mating AMP socket on the M7684 (J1) board. This can result in the cable being plugged in two pins off. The proper connection of the cable is with all pins of J1 mated with the cable plug.

INCORRECT RESULT:



[redacted]	FIELD SERVICE TECH TIP					Option Designator RM#5
	☐ 12 BM	☒ 16 BM	☐ 18 BM	☐ 32 BM	☐ 36 BM	Category Systems
Title RM#5 A/B Cable Shorting						Tech Tip No. RM#5-TT-19
Processor Applicability ALL		Cross Reference N/A				Tech Tip Rev A / Page 1 of 1
Author Mark Himes			Mgr./Supv. Approval N/A			
Location CXO1-1		Mail Stop N27				Date 30-DEC-82
CSSE Approval Dennis Shaw						Date 30-DEC-82
PSG Approval DON DAVIS						Date 30 Dec 82

The new FCC shielded A/B cable (p/n 70-19688-15) may cause shorting to the RM#5 MBA. Specifically, the end of the 26-pin "B" cable that plugs into J1 of the M7687 module in the MBA, may have "exposed" shielded braid within the cable "window" of the berg connector as shown by area # 1 below.



Cables with exposed shield in this area (#1) can cause shorting of etches on the M7687 when installed. These cables should NOT be reworked in the Field as cable damage could result. Covering the exposed area with tape is also NOT acceptable since you will only be prolonging the problem. You may tape the exposed braid on an existing cable ONLY AS AN INTERIM TO REPLACEMENT. The best solution is replacement of the cable with a reworked Rev "A" cable.

The new FCC approved A/B cables that are now being manufactured or "reworked" to Rev "A" will have moved the exposed portion to either area #2 of the cable (shown above) or completely concealed within the berg housing itself, either condition of which is acceptable. New shipments of MBA assemblies will have a round red sticker on the back of the MBA chassis denoting that the A/B cable has been checked or re-worked to revision "A" for this condition.

[redacted]	**FIELD SERVICE TECH TIP**					Option Designator RM05
	☐ 12 Bit	☒ 16 Bit	☒ 18 Bit	☒ 32 Bit	☒ 36 Bit	Category SYSTEMS
Title: RM05 Pack Trim Shield Labels						Tech Tip No. RM05-TT-25
Processor Applicability: A L L		Cross Reference: N/A				Tech Tip Rev: A / Page: 1 of 1
Author: Mark Himes			Mgr Supv Approval: Dennis Shaw			
Location: CX CSSE		Mail Stop: CX01-1/N27				Date: 18-Mar-83
CSSE Approval: Dennis Shaw						Date: 18 MAR 83
PSG Approval: FRAN LINNEHAN						Date: 29-Mar-83

RM05 packs frequently contain a white mylar blank label (item A in Fig 1). It is provided as a customer convenience item by pack vendors and serves no other useful purpose.

These labels are prone to release from the trim shield during spin-up cycles and could seriously damage the drive and/or heads.

CSSE and Engineering advise these labels be removed from all existing and new packs prior to installation into a drive.

An ECO is being written to have these plastic labels excluded from all future packs.

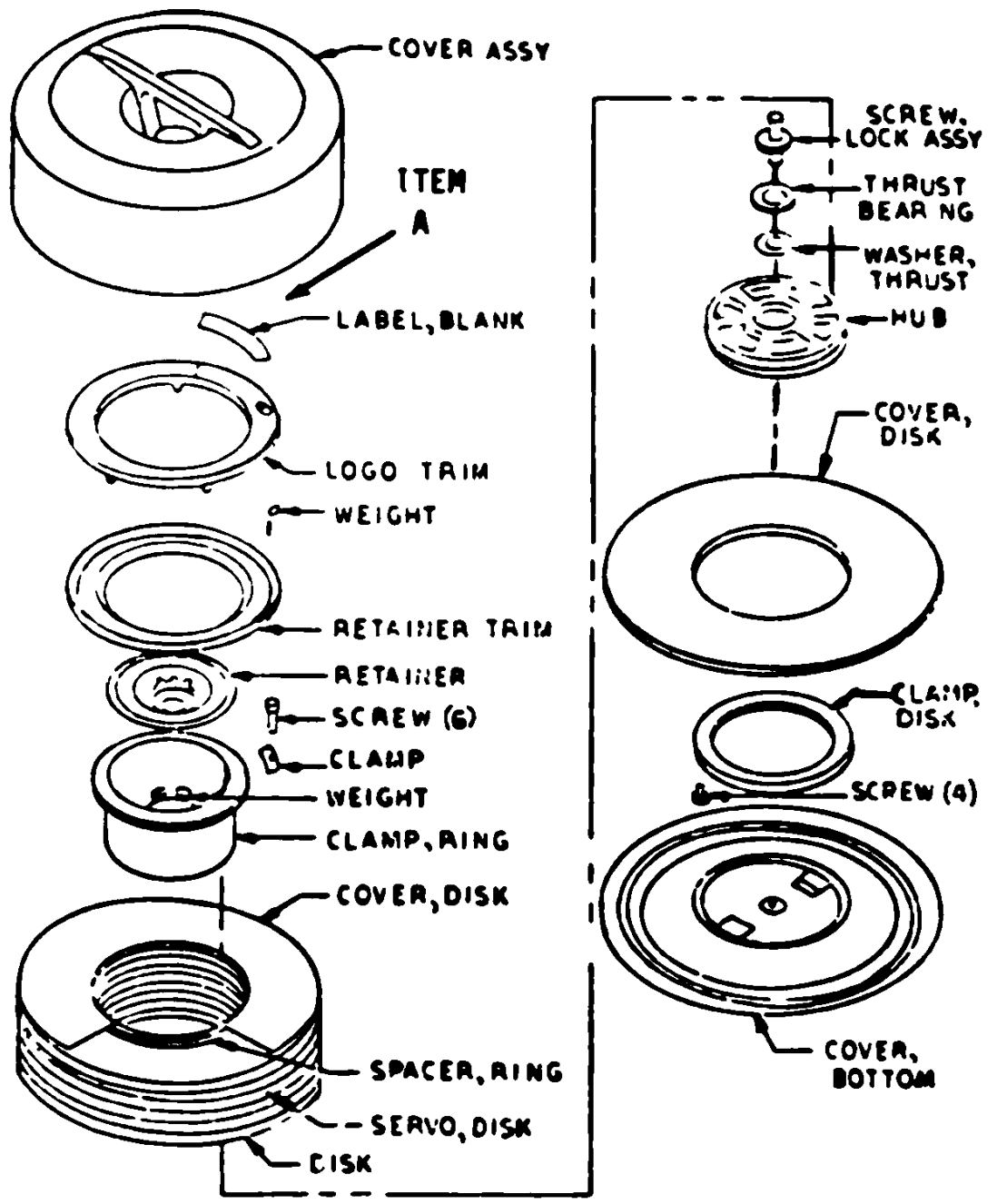


FIG 1, DISK PACK COMPONENTS

	FIELD SERVICE TECH TIP					Option Designator RM05
	☐ 12 Bit	☒ 16 Bit	☐ 18 Bit	☒ 32 Bit	☒ 36 Bit	Category SYSTEMS
Title RM05 VELOCITY TRANSDUCER SERVICING						Tech Tip No. RM05-TT-21
Processor Applicability 11 | 10 VAX		Cross Reference N/A				Tech Tip Rev A / Page 1 of 1
Author TOM TOBIASSEN			Mgr./Supv. Approval N/A			
Location COLORADO SPRINGS		Mail Stop CXO1-1/N27				Date 18 FEB 83
CSSE Approval DENNIS SHAW						Date 31 MAR 83
PSG Approval FRAN LINNEHAN						Date 11-APR-83

While servicing the velocity transducer in the RM05, care should be used NOT to remove the transducer core from the transducer coil housing.

If you remove the core from the housing, you may electrically damage the transducer cuasing SKI's, HCE's, etc. and requiring it's replacement.

Both parts should always be removed, installed and handled with the core inside the coil.

This is not clear in the RM05 Service Manual, paragraph 4.33, and should be noted.

[redacted]	**FIELD SERVICE TECH TIP**					Option Designator RM05
	☐ 12 BIT	☑ 16 BIT	☐ 18 BIT	☑ 32 BIT	☑ 36 BIT	Category SYSTEMS
Title DATA ERRORS DUE TO RUNOUT						Tech Tip No. RM05-TT-22
Processor Applicability 11's & 20's MAX		Cross Reference RM02-TT-57 RM03-TT-58				Tech Tip Rev A / Page 1 of 1
Author MARK LICATA			Mgr/Supv. Approval [signature]			
Location CHICAGO PRODUCT SUPPORT		Mail Stop RLO ROLLING MEADOWS, IL				Date 10 AUG 1983
CSSE Approval [signature]						Date 3 JAN 1984

PROBLEM EXCESSIVE DATA PROBLEMS DUE TO INABILITY OF CARRIAGE TO FOLLOW OUT OF ROUND SPINDLE OR PACK DURING FINE MODE.

SYMPTOMS IF YOU ARE EXPERIENCING OFF CYLINDER FAULTS OR EXCESSIVE DATA ERRORS THE CAUSE COULD BE EXCESS RUNOUT OF THE PACK OR SPINDLE. THE RM POSITIONER HAS TO DRIFT OFF CYLINDER IN FINE MODE FOR MORE THAN 800 MICROSECONDS TO ACTUALLY FLAG AN OFF CYLINDER FAULT. IF THE POSITIONER DRIFTS BECAUSE OF PACK OR SPINDLE OUT OF ROUNDNESS FOR LESS THAN 800 MICROSECONDS, NO POSITIONER ERROR OR FAULT IS DETECTED. AT 3600 RPM'S A SECTOR IS ONLY 520 MICROSECONDS, SO A WHOLE SECTOR COULD BE READ OR WRITTEN OFF CYLINDER WITH NO INDICATION OF A RUNOUT PROBLEM.

SOLUTION LOAD HEADS AND SCOPE RUNOUT AT GREEN TEST POINT TO DETERMINE IF SPINDLE AND PACK ARE WITHIN GUIDELINES. WHEN TAKING READINGS ROTATE PACK 90 DEGREES 4 SEPARATE TIMES, THEN LOOK AT ALL READINGS TO DETERMINE STATUS.

	RUNOUT TEST POINT	MAX SPEC P-PEEK	INDEXTRIGGER
RM02/03	A2A08 TPF	1.0 VP-P	A2B08 TPC
RM05	A2A19 TPC	400 MVP-P	A2A06 TPC

	FIELD SERVICE TECH TIP					Option Designator RM05
	☐ 12 Bit	☐ 16 Bit	☐ 18 Bit	☒ 32 Bit	☐ 36 Bit	Category Diagnostics
Title EVRDA Rev 4.1 Problem						Tech Tip No. RM05-TT-23
Processor Applicability Vax		Cross Reference RM02-TT-59, RM03-TT-60, RM80-TT-21				Tech Tip Rev A / Page 1 of 1
Author Koller			Mgr./Supv. Approval			
Location CXO		Mail Stop CXO 2-1/K97				Date 3-23-84
CSSE Approval Ron Milano						Date 3.24.84
FSPSG Approval Al Snyder						Date 3.24.84

PROBLEM:

EVRDA Rev 4.1 fails Test 73, Subtest 0 (Error 3), when run on a VAX11-780 with the new extended silo module for the RH780 (module M8274). Since the new module has a deeper silo, the diagnostic's timer times out before the silo empties.

FIX:

The fix consists of a patch to be made to the program after it is loaded in memory via the Diagnostic Supervisor.

Since it appears that there may be two versions of the diagnostic both identifying themselves as Rev 4.1, the patch that follows covers both cases:

1. Load program EVRDA

2. SET BASE 9BFC [old Rev 4.1]

3. EXAM E9 contents should be D0530200

   A. IF this is correct, then DEP/L E9 D0530700
   B. Done. Run the program.

4. If the contents were not correct, SET BASE 9D66

5. EXAM F6 contents should be D0530200

   A. IF this is correct, then DEP/L F6 D0530700
   B. Done. Run the program [new Rev 4.1]

A new revision of the program will be released on the very next VAX Diagnostic release cycle.

	FIELD SERVICE TECH TIP					Option Designator RM05
	☐ 12 BW	☒ 16 BW	☒ 18 BW	☒ 32 BW	☒ 36 BW	Category OPTION
Title: New AC Power Cables for VDE Power Supplies						Tech Tip No. RM05-TT-24
Processor Applicability: A			Cross Reference: N/A			Tech Tip Rev A / Page 1 of 4
Author: Mark Himes				Mgr/Supv Approval: Ron Milano		
Location: CX CSSE		Mail Stop: CX02-1/K97				Date: 26-Oct-83
CSSE Approval: Ron Milano						Date: 16 Apr 84
FSPSG APPROVAL						Date

RM05 drives have started shipping with higher revision VDE power supplies using new "keyed" AC power cords to further meet VDE requirements. The new keyed power cords are compatable with ALL VDE power supplies. However, drives previously installed in the field may contain an earlier non-keyed AC power cords which WILL NOT FIT INTO the new VDE power supplies. Figure 1 and Figure 2 illustrate the physical differences between the keyed and non-keyed cables.

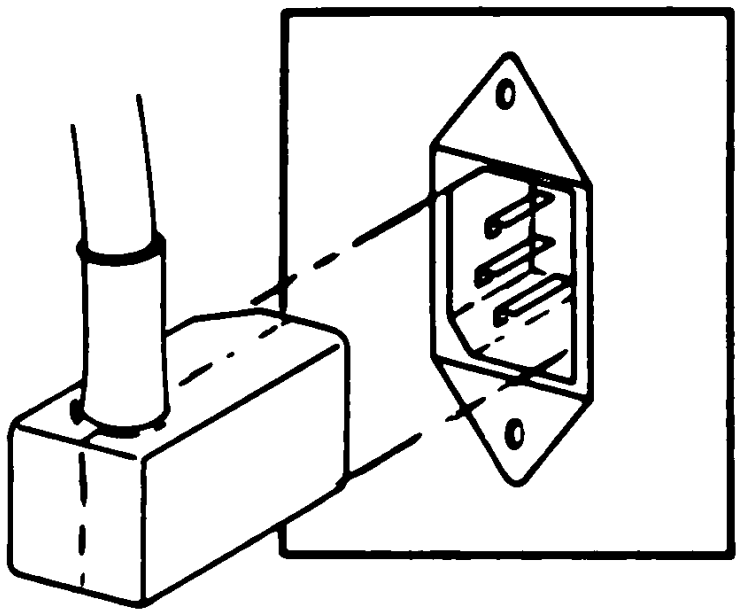
VDE RM05 Drive	OLD (non-keyed) AC Power Cord Vendor p/n	NEW (keyed) AC Power Cord Vendor p/n	NEW (keyed) AC Power Cord DEC p/n
50 Hz	70734120	70734122	29-24778
60 Hz	70734121	70734123	29-24779

The following table represents all of the different VDE RM05 power supplies that we have been exposed to at the present. A previously installed RM05 may contain any of these VDE power supplies. The table also represents the compatabilities that exist between the different power supplies and the OLD (non-keyed) AC power cord versus the NEW (keyed) AC power cord.

VDE RM05 Drive	VDE Power Supply Vendor p/n	VDE Power Supply DEC p/n	AC Power Cord Required	VDE Power Supply Level
50 Hz	73133100	-------	New or Old	VDE I
50 Hz	73133102	-------	New or Old	VDE I
50 Hz	73133104	29-23889	New or Old	VDE I
50 Hz	73133108	-------	ONLY NEW	VDE II
50 Hz	73133112	-------	ONLY NEW	VDE II
60 Hz	73133101	-------	New or Old	VDE I
60 Hz	73133103	-------	New or Old	VDE I
60 Hz	73133105	29-23888	New or Old	VDE I
60 Hz	73133109	-------	ONLY NEW	VDE II
60 Hz	73133111	-------	ONLY NEW	VDE II

	FIELD SERVICE TECH TIP	Option Designator RM05
	Continuation Sheet	Category OPTION
Title: New AC Power Cables for VDE Power Supplies		Tech Tip No. RM05-TT-24
Processor Applicability	Cross Reference N/A	Tech Tip Rev A / Page 2 of 4

VDE RM05
POWER SUPPLY
(NON-KEYED
RECEPTACLE)



No KEYED slot
in power supply
plug

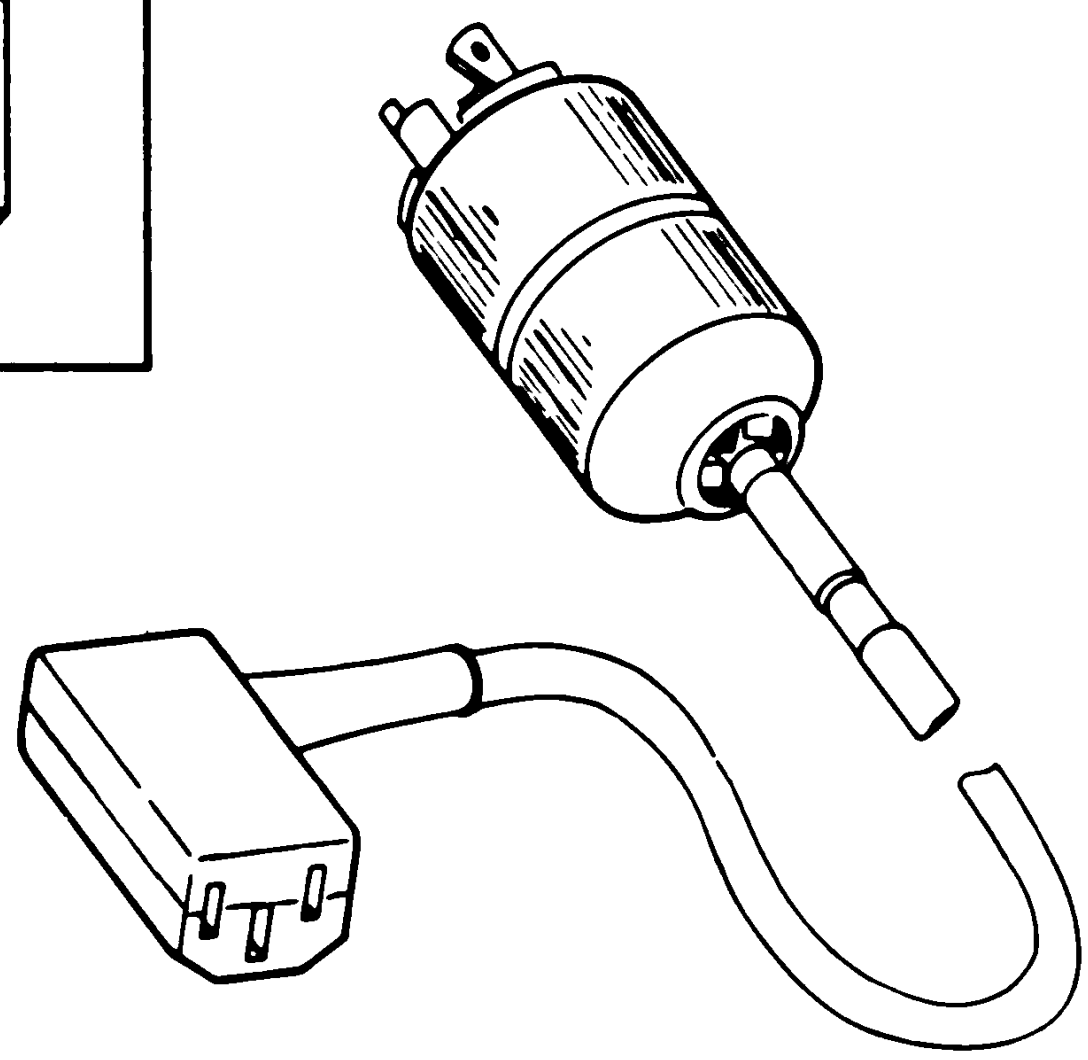


Figure 1. OLD Non-keyed AC Power Cord (VDE)

	FIELD SERVICE TECH TIP	Option Designator RM05	
	Continuation Sheet	Category OPTION	
Title New AC Power Cables for VDE Power Supplies		Tech Tip No RM05-TT-24	
Processor/Applicability	Cross Reference N/A	Tech Tip Rev A	Page 3 of 4

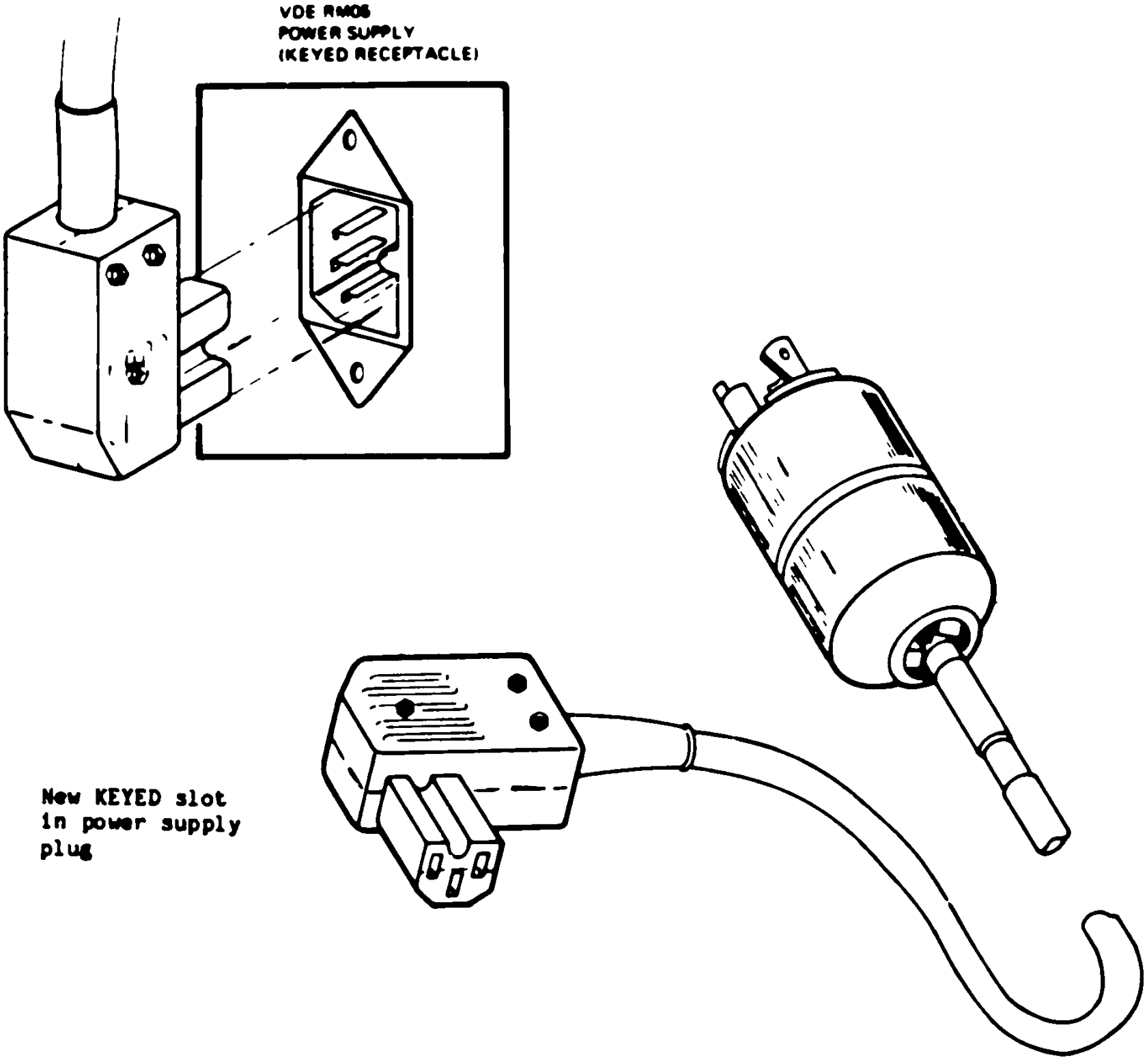


Figure 2. NEW KEYED AC Power Cord (VDE)

[ ]	FIELD SERVICE TECH TIP	Option Designator RM05
	Continuation Sheet	Category OPTION
Title: New AC Power Cables for VDE Power Supplies		Tech Tip No: RM05-TT-24
Processor Applicability: | | A | | | | | |	Cross Reference: N/A	Tech Tip Rev: A / Page: 4 of 4

An FCO has been generated (RM05-R0014) and will soon be released. This will implement the latest VDE power supplies with new cables. The FCO should ONLY be installed if the problem symptoms are present as described in the FCO documentation.

The Digital part numbers 29-23888 and 29-23889 will be updated in the near future to also reflect the latest VDE power supplies 73133111 and 73133112. Until such time, they can only be obtained by ordering the Vendor Part Number or the FCO kit (when released).

	FIELD SERVICE TECH TIP					Option Designator RM05
[ ]	☐ 12 Bit	☒ 16 Bit	☐ 18 Bit	☒ 32 Bit	☐ 36 Bit	Category DISK DRIVE
Title: POWER SUPPLY FAILURES						Tech Tip No. RM05-TT-25
Processor Applicability: ALL, VAX		Cross Reference: N/A				Tech Tip Rev: A / Page: 1 of 1
Author: MARK LICATA			Mgr./Supv. Approval: RON MILANO			
Location: CHICAGO PRODUCT SUPPORT		Mail Stop: ROLLING MEADOWS, ILL (RL)				Date: 1 MAY 1984
CSSE Approval: RON MILANO						Date: 15 MAY 1984
PSPSG APPROVAL						Date

PROBLEM - RM05 (CDC 9766) OLD STYLE NON-VDE POWER SUPPLY FAILS MORE OFTEN THAN SHOULD. COMMONLY CAPACITOR-RECTIFIER ASSEMBLY PN:29-23541.

SYMPTOMS - 1) WRITE FAULT APPEARS IMMEDIATELY AFTER POWER UP AND WILL NOT CLEAR. ALL VOLTAGES ARE WITHIN PUBLISHED TOLERANCES.

2) START LAMP ON CONTROL PANEL GLOWS DIMLY EVEN WHEN DRIVE IS SPUN DOWN OR READY LAMP DOES NOT BLINK ON SPIN UP, STAYS ON SOLID. NUMEROUS SPIN UP AND SPIN DOWN PROBLEMS.

3) CARRIAGE OSCILLATES AFTER HEAD LOAD.

SOLUTIONS - 1) ALTHOUGH +28 VOLT TOLERANCE IS LISTED TO BE ±2 VOLTS, I HAVE FOUND THE + TOLERANCE TO BE INCORRECT ON THE NON-VDE SUPPLY. ON THREE OCCASIONS I HAVE SEEN +28 AT +26.9 AND +27.1, AND THE CAUSE WAS CAPACITOR C2 ON THE SYEN CAP-REC PCB. THE WRITE DRIVER CHECKS AND GENERATES WRITE FAULT (4 CAUSES) BASED ON WHETHER +22 VOLTS IS GREATER THAN +22.0. THE +22 VOLTS IS DERIVED FROM +28 VOLTS.

2) REMOVE POWER SUPPLY COVER TO SCOPE AND METER THE +20Y VOLTAGE AT A1TB2 PIN 11 ON THE SYEN CAP-REC ASSEMBLY. THIS VOLTAGE IS USED TO PICK AND HOLD ALL CONTROL RELAYS IN THE NON-VDE SUPPLY. NEEDLESS TO SAY, THE TOLERANT NOISE LEVEL IS HIGHER THAN A DC SUPPLY FOR A LOGIC RACK BUT NOT AS IMPORTANT TO THE PROPER FUNCTION OF A MECHANICAL DISK DRIVE. IF BAD SCOPE WILL TELL.

3) SCOPE ± 46 WHILE CARRIAGE IS OSILLATING, IF NOISY PROBLEM COULD BE C7 OR C8 AGAIN ON THE CAP-REC ASSEMBLY.

NOTE: WHEN REMOVING SYEN MAKE A CHART TO INDICATE WHAT WIRE GOES WHERE BEFORE YOU REMOVE THE ASSEMBLY, THERE ARE 31 CONNECTORS IN ALL. ALSO IF YOU NEED THE CAPS FOR PROBLEMS 1 OR 2 THEY ARE USED ON THE ±20 VOLT SUPPLY USED IN THE RM03.

	FIELD SERVICE TECH TIP					Option Designator RM05	
	☐ 12 BIT	☒ 16 BIT	18 BIT	☒ 32 BIT	☒ 36 BIT	Category DISK	
Title RM ADAPTER POWER SUPPLY (70-13826) CAUTION						Tech Tip No RM05-TT- 26	
Processor Applicability |11'S| |VAX| |LCG| |		Cross Reference RM02-TT- 61 RM80-TT-23 , RM03-TT- 62				Tech Tip Rev A	Page 1 of 1
Author RICK SWANSON			Mgr /Supv Approval RON MILANO CX/CSSE				
Location COLORADO SPRINGS		MailStop CX02-1/K97				Date 3-JANUARY-1985	
CSSE Approval RON MILANO CX/CSSE						Date 3-JANUARY-1985	
FSPSG Approval						Date	

Fxtreme caution must be used when working in or around the RM Adapter Power Supply.

When the Power Supply is disassembled to allow service access, there are exposed uninsulated parts with primary AC voltage present on them. The possibility of coming in contact with such voltage is very likely when servicing the RM Adapter Power Supply.

WARNING: WHEN SERVICING THE RM ADAPTER POWER SUPPLY, LOCATED IN THE RM ADAPTER, ALWAYS MAKE SURE THAT THE RM ADAPTER MAIN AC POWER CORD CONNECTOR IS REMOVED FROM THE SITE POWER SOURCE.

FIELD SERVICE TECH TIP

☐ 12 Bit	☒ 16 Bit	☐ 18 Bit	☒ 32 Bit	☒ 36 Bit

Option Designator	RM05
Category	DISK
Title	RM05 RE-SKIDDING
Tech Tip No.	RM05-TT- 27
Processor Applicability	VAX | 11's | LCG | | |
Cross Reference	N/A
Tech Tip Rev	A
Page	1 of 2
Author	Thomas M. Wrenn
Mgr./Supv. Approval	
Location	Stow, Mass.
Mail Stop	OGO1-1/J17
Date	26-July-85
CSSE Approval	[signature]
Date	08-August-85
FSPSG Approval	John M Freudenberg CX/CSSE
Date	26-July-85

****WARNING****

IMPROPER RM05 SKIDDING OR USE OF THE WRONG SKID MAY CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO MATERIAL.

WHEN RETURNING AN RM05 FROM THE FIELD TO A REPAIR CENTER OR STOCKROOM, PROPER RE-SKIDDING AND PACKAGING PROCEDURES MUST BE USED.

THE CORRECT PACKAGING AND SKIDDING PROCESS SHOWN BELOW IS FULLY DOCUMENTED IN DIGITAL'S PACKAGING PROCESS DOCUMENT # PG-3700573-00-WO REV B UNDER THE HEADING "RE-SKIDDING".

RE-SKIDDING PROCEDURE

1. PLACE THE NON CUSHIONED SKID (99-07387-01) INTO POSITION AT THE END OF THE RAMP (99-07387-02).

2. PUSH THE RM05 (70-17618-00) DRIVE UP THE RAMP AND ONTO THE SKID.

NOTE: FRONT OF THE DRIVE MUST BE ORIENTED TOWARD THE END OF THE SKID (99-07387-01) WITH LAG BOLT RUNNER. USE LOCATING LINES ON THE SKID TO POSITION THE UNIT.

3. PLACE THE PLYWOOD RAMP (99-07387-02) ON THE SKID DECK BETWEEN THE 2 x 4 BLOCKS.

4. SECURE THE RM05 DRIVE TO THE SKID USING TWO (2) SHIPPING BRACKETS (74-31322-01) AND (4) LAG SCREWS (90-00048-14).

5. PLACE ONE SHIPPING BRACKET IN THE FRONT OF THE UNIT UNDER THE FRAME ON THE LEFT HAND SIDE. THE LIP OF THE BRACKET WILL FIT OVER THE FRAME.

6. USING A 9/16" SOCKET WRENCH, SCREW EACH OF THE LAG SCREWS INTO THE PREDRILLED HOLES UNTIL TIGHT AGAINST THE BRACKET.

7. PLACE ONE BRACKET DIAGONALLY FROM THE FRONT TO THE REAR OF THE UNIT. NOTE: THE BRACKET WILL FIT IN THE SPACE BETWEEN THE FILTER FRAME AND THE SIDE OF THE UNIT.

8. COVER THE UNIT WITH THE POLY BAG (P/N 99-06104-44).

	FIELD SERVICE TECH TIP					Option Designator RM05	
	☐ 12 BIT	☒ 16 BIT	☐ 18 BIT	☒ 32 BIT	☒ 36 BIT	Category Disk	
Title CPX Head Inspection Tool Kit			Cross Reference RP05-TT-64	RM02-TT-64 RM03-TT-65 RP06-TT-71		Tech Tip No RM05-TT-28	
Processor Applicability |VAX| |11's| |LCG| |						Tech Tip Rev A	Page 1 of 2
Author Gene Ridge CX/CSSE				Mgr./Supv Approval Ron Milano			
Location Colorado Springs			Mail Stop CX01-1/P14			Date 02-October-1985	
CSSE Approval Ron Milano CX/CSSE						Date 02-October-1985	
FSPSG Approval						Date	

CPX HEAD INSPECTION TOOL KIT

VESE and CPX Company are pleased to announce the availability and special price to Digital branches for the CPX Head Inspection Tool Kit. This tool kit has been evaluated and approved by the Colorado Springs CSSE Maintainability Engineering Group for use on the following disk drives.

DIGITAL - RP05, RP06, RM02, RM03, RM05

MEMOREX - 677

CDC - 9762, 9766

The kit part number from CPX is HIMKK2531N, which is a combination of two standard CPX Head Inspection Kits. Included in this kit are the following items.

CPX P/N	DESCRIPTION	QTY
HIMKG1125N	MDG25 Base Unit with Optics offset at 105 degrees	1
HIACC1006N	Optical tube, 10x power magnification	1
HIACC1005N	Optical Brush	1
HICAS1002N	Aluminum Case	1
HITRA1062N	Power Transformer 24 VAC, 16 amp output	1
HIACC1003N	E230 Removeable Rails	1
HIBKT1001N	E124 RM05 Carriage Limit Bracket	1
HIBKT1002N	E123 RM03 Carriage Limit Bracket	1

	FIELD SERVICE TECH TIP	Option Designator RM05	
	Continuation Sheet	Category Disk	
Title CPX Head Inspection Tool Kit		Tech Tip No. RM05-TT-28	
Processor Applicability |VAX| |11's| |LCG| |	Cross Reference RM03-TT-65 RP06-TT-71 RP05-TT-64 RM02-TT-64	Tech Tip Rev A	Page 2 of 2

With this Head Inspection Tool Kit, an engineer will be able to closely inspect R/W Heads on the above disk drives without removing the heads themselves. This will save valuable labor time for the F.S. Engineer and will help decrease the amount of down time for the customer. The head inspection tool may be used during PM's to help the engineer diagnose a dirty head before a major failure occurs.

To facilitate orders in a timely manner, Field Service Branches and Regional Logistics offices may order through the local CPX Sales Office or place the order with the CPX home office by sending a Purchase Order to:

CPX
21900 Plummer Street
Chatsworth, CA 91311

Tel: (818)709-4003
Telex: 371-9692
TWX: 310-371-9692
FAX: 818-882-7799

ATTENTION: Jenny Rippel

The Digital price for the Head Inspection Tool Kit (HIMKK2531N) is $745.00. Digital's Field Service Logistics Organization will not stock this item in Woburn (SR #17) unless sufficient demand for this tool kit is present. If there are any questions regarding the ordering of this Head Inspection Tool, you may contact Fran Linnehan at Mailstop OG01-1/H11.

Field Service TECH TIP

digital™

Category Safety Rev A

Title Absolute Air Filter Springs

Option RM05

Cross Reference N/A

TECH TIP No. RM05-TT-29

Problem/Solution

The springs holding down the plenum of the RM05 absolute air filter are extremely strong and unless proper precautions are taken can slip and injure a service person trying to work on the blower motor or absolute filter assembly. The RM05 service manual and the RM05 Preventive Maintenance manual are not clear as to the strength of these springs.

PROPER CAUTIONARY MEASURES FOR WORKING ON RM05 ABSOLUTE FILTER OR BLOWER MOTOR ASSEMBLY.

A - Replacing the blower motor assembly or the absolute air filter requires removing the entire blower assembly from the drive.
(there is insufficient room in the cabinet for safe maneuverability or access to parts)

B - Use a spring hook or spring pliers to remove and replace the four (4) plenum hold-down springs.
these springs are very strong and may cause injury if removed by hand.

C - When removing the air filter plenum, place one hand on top of the plenum to stabilize it.
the springs are strong enough that they can cause the plenum to tip.

Approvals

Author	ESD&P TECH TIP Coordinator	CSSE
S.W. Caccia	Bruce J. Conley	N. Fisette
Author's Manager		Field Service Product Safety
S. Hoyt		S.W. Caccia
Release Date		Revision
06 June 1986		A

Field Service **TECH TIP**

digital™

Title: Diagnostic CZRMPBO.BIC Failure

Category: Disks

Rev: A

Option: RM05

Cross Reference: RM02-TT-65, RM03-TT-66

TECH TIP No.: RM05-TT-30

Problem/Solution

Test 72 of Diagnostic CZRMPBO.BIC (RM02/03/05 Diskless Test 1) fails on a PDP 11/60 with Cache, the indication is that the AOE bit did not set. The problem is due to the speed of the cache memory on an 11/60 system. The following patch has been written by Diagnostic Engineering and will be available on the next release of XXDP in the January '87' time frame.

Change loc.	From	To
034400	012760	012702
034402	061001	000020
034404	000024	004737
034406	012760	000630
034410	041001	005302
034412	000024	001376
000630	000632	012760
000632	000000	061001
000634	000636	000024
000636	000000	012760
000640	000642	041001
000642	000000	000024
000644	000646	000207

Approvals

Author: Gary Cable	ESD&P TECH TIP Coordinator: Bruce J. Conley	CSSE: Gary Cable
Author's Manager: Mike Mayfield		Field Service Product Safety
Release Date: 5 November 1986		Revision: A

RM05 - TT-30