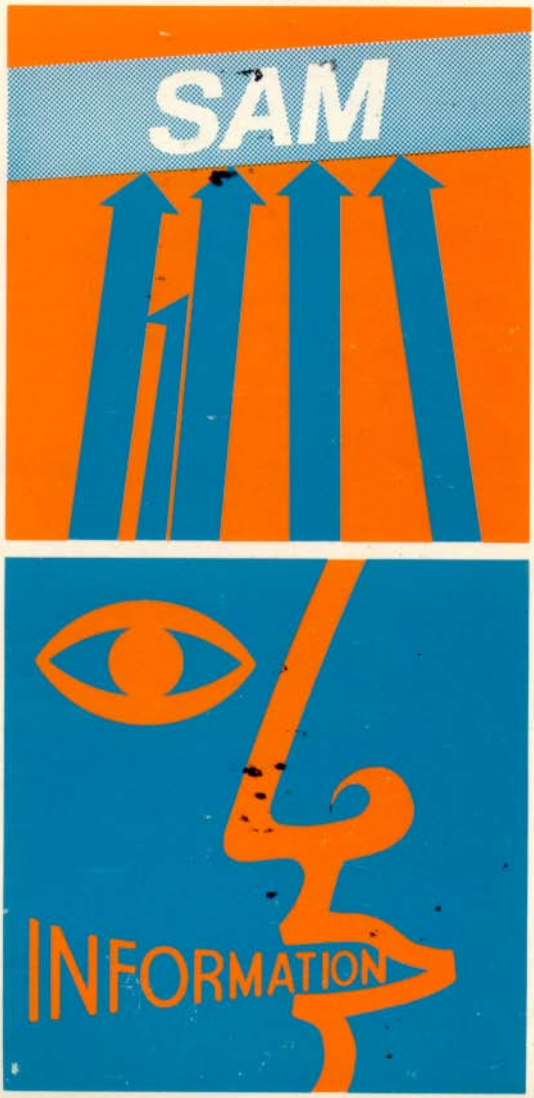
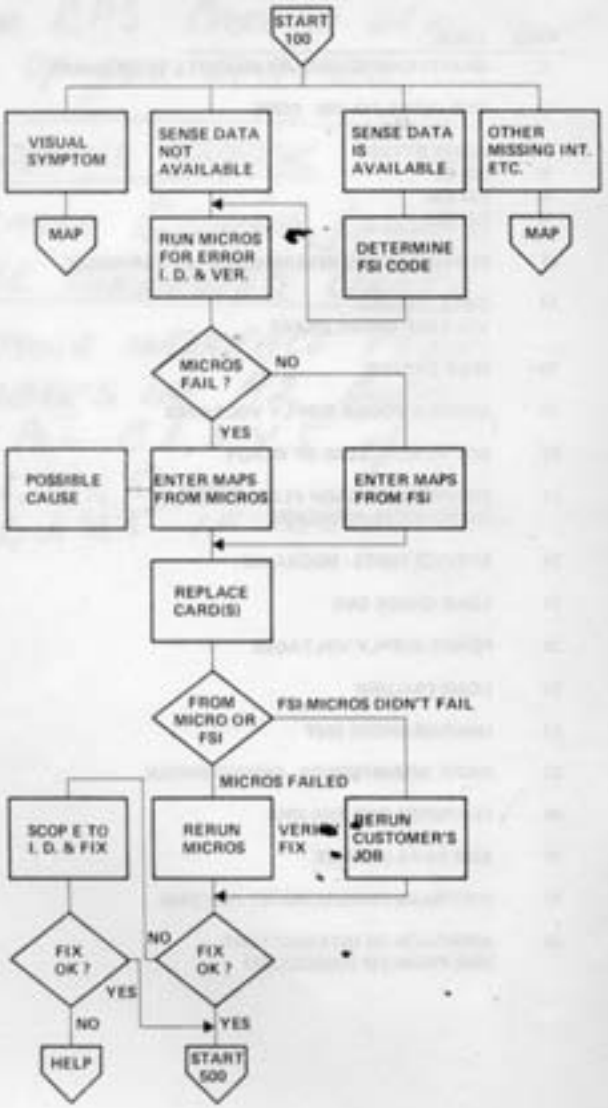
IBM 3340
Service Aid Manual



CETO Mainz 1975

CONTENT

MAINTENANCE LIBRARY MANUELL FLOW CHART



3340 QUICK FIX

F. S. I.	ERROR DESCRIPTION	POSSIBLE CAUSES
10XX	DEVICE INTERFACE CHECK	CABLES/CONN, A1C2, A2F2
11XX	DM SEQ CHECK	A1M2 (L2), A1T4 (S4) CABLES & SWITCHES
12XX	ACCESS TIMEOUT	A1P2 (N2)
1301	SECTOR COMPARE CHECK	A1G2 (RPS ONLY)
1310	DRIVE CHECK (FALSE)	A1P2 (N2)
14XX	READ/WRITE SAFETY	RD/WR MATRIX A1H2, A1J2
15XX	OVERSHOOT CHECK	SERVO GAIN (MICROA7) SERVO CARDS HOME PHOTO SENSOR, A1P2 (N2)
160E	SERVO OFF TRACK	SERVO CARDS BOBBIN BINDING A SIDE A1R2, A1R4, A1T2, POW. AMP, B SIDE Q2, Q4, S2, POW. AMP,
16XX	SERVO OFF TRACK	A1P2 (N2)
1910	ERROR ALERT (NOT FURTHER DEF)	A2L2, A2F2, A2Q2
1911	TRANSMIT TARGET ERROR	A1G2 (RPS ONLY), A1C2
1913	TRANSMIT FIXED HEAD ERROR	A1F2 (E2), A1C2
1914	SYNC OUT TIMING ERROR	BUS TERM, A2F2 (A1A3)
1916	TRANSMIT CAR ERROR	A1J4 (ST SW ONLY), A1C2
1917-18	TRANSMIT HEAD DIFF ERROR	A1F2 (E2), A1C2
49XX	DATA CHECK-NO SYNC BYTE FOUND	RD WR MATRIX, A1J2, A2S2 (MAY BE BOTH MATRIX) A2T2, A2R4
9001	NO TAG VALID RD/WT OP	A2T2
9004	TIME OUT FOR INDEX	A1H2, A1F2 (E2)
9005	ECC HARDWARE CHECK	A2R4

SERVO CARDS – A SIDE A1R2, A1R4, A1T2, PWR AMP
– B SIDE A1Q2, A1Q4, A1S2, PWR AMP

VOICE COIL MOTOR P/N 2 745 700

9009	BUSY MISSING AFTER SK START	A1P2 (N2)
900A	PHYS ADDRESS CHECK	DRIVE ADDRESS JUMPER, A1D2 SEE MLM INST 3
900F	ATTENTION CHECK	A1P2 (N2)
9104	I WRITE FAIL	A1H2, RD/WR MATRIX A2P2
91X8	CTL - I DEV - I BUS IN PARITY CHECK	A2F2, A1D2, CABLES & CONN
9110	DEV - I BUS IN PARITY CHECK	A1D2, CABLES & CONN
9120	ONE OF EIGHT CHECK	A1D2 + 6V - 4V NOISY
9180	CTL - I TAG BUS PARITY CH	A2K2 + 6V - 4V NOISY
91FC	CTL - I BUS IN ASSEMBLY FAILURE	A2K2
9200	CTL ERROR (FALSE)	A2K2, A2L2, A2F2
9202	ECC HARDWARE ERROR	A2R4
9204	MONITOR CHECK	A2L2, A2P2
9206	MONITOR-ECC HARDWARE ERROR	A2P2
9208-C	WRITE DATA-MONITOR CHECK	A2S2, A2P2, A2G2
921X	GAP COUNTER	A2P2 NOISY
922X	SHIFT REG	A2S2
9240	NO PLO	PLO CABLE, A1H2, A2T2
928X	PLO ERROR	A2T2

B3 MESSAGE DISPLAY – PASS 2

PROGRAM CONTROL DISPLAY HEX VALUE	MESSAGE B3 BYTE	DATA DISPLAY	0	1	2	3	4	5	6	7	DETAILED DESCRIPTION
E1	1	Physical Drive Identification	A	B	C	D	E	F	G	H	SENSE 106 Byte 4
E2	2	Sense HAR	Basic: Dir In = 1 / Not used; FHFE	Basic: Diff 256 / Fixed Heads = 1; FHFE	Basic: Not used / 32; FHFE	16	8	4	2	1	
E3	3	Sense Difference Counter	128	64	32	16	8	4	2	1	
E4	4	Drive Status		Device ** Interface Check	Drive ** Check	Read/Write** Check	Online *	Data Module Attention (70 F)	Busy	Seek/Sector Complete	SENSE 106, 107 Byte 8
E5	5	Checks/ Status	Data Module ** Loaded/ Switch Latched	Sector ** Compare Check	Motor at ** Speed Latched	Air/Belt ** Switch Latched	Write Enable	Data Module Size 4 bit	Data Module Size 2 Bit (70 Mbl	Data Module Size 1 Bit (35 Mbl	SENSE 107 Byte 9
E6	6	Data Module Sequence Control	Data Module ** Size Check	Data Module * Latch 4	Data Module * Latch 2	Data Module Latch 1	Check ** Latch	Data Module ** Sequence Check Latched	Bias Disable Switch	Odd Track	SENSE 107 Byte 10
E7	7	Load Switch Status	Drive Start * Switch	Data Module * Present Switch	Cover Locked * Switch	Data Module Unloaded Switch	Data Module * Loaded Switch	Air/Belt * Switch	Carriage Home	Motor at * Speed Switch	SENSE 107 Byte 11
E8	8	R/W Safety	Multiple ** Head Select Check	Capable/ ** Enable Check	Write ** Overrun	Index ** Check	R/W ** Interlock Check	Control ** Check	Transition ** Check	Write ** Current Check	SENSE 107 Byte 12
E9	9	Access Status	Access ** Timeout Check	Overshoot ** Check	Servo Off ** Track Check	Track * Crossing	Servo * Latch	Linear * Mode Latch	Control * Latch	Wait Latch	SENSE 108 Byte 16
EA	10	Controller Checks	PLO ** Check	No PLO ** Input	SERDES ** Check	Gap ** Counter Check	Write ** Data Check	Monitor ** Check	ECC ** Check	ECC * Zeros Detected	SENSE 108 Byte 17
EB	11	Control Interface Checks	Control Interface Tag Bus Parity Check **	Control Interface Bus Out Parity Check **	Device ** Selection Check	Device Bus In Parity Check **	Control Interface Bus In Parity Check **	) Write ** Fail			SENSE 108 Byte 20, Bits 0–5
EC	12	Device Interface Checks							Device Bus Out Parity Check **	Device Tag Parity Check **	SENSE 108 Byte 20, Bits 6, 7
ED	13	Target Address Register (RPS Feature)	(Bit 0 = 1 if RPS Installed)	64	32	16	8	4	2	1	
EE	14	Sense Cylinder Address Register (Switch Feature)	256	128	64	32	16	8	4	2	
EF	*** 15	Status (FHFE Only)	Direction Bit 1 = IN		Difference 256			Low Gain Error**		Fixed Head Feature Installed	SENSE 108 Byte 19
CE		Routine Number	1	0	1	1	0	0	1	1	MICRO 30

* *Indicators which are normally on with no error condition, Ready lamp on, and DM sequence at State 6.*

** *Error or check condition.*

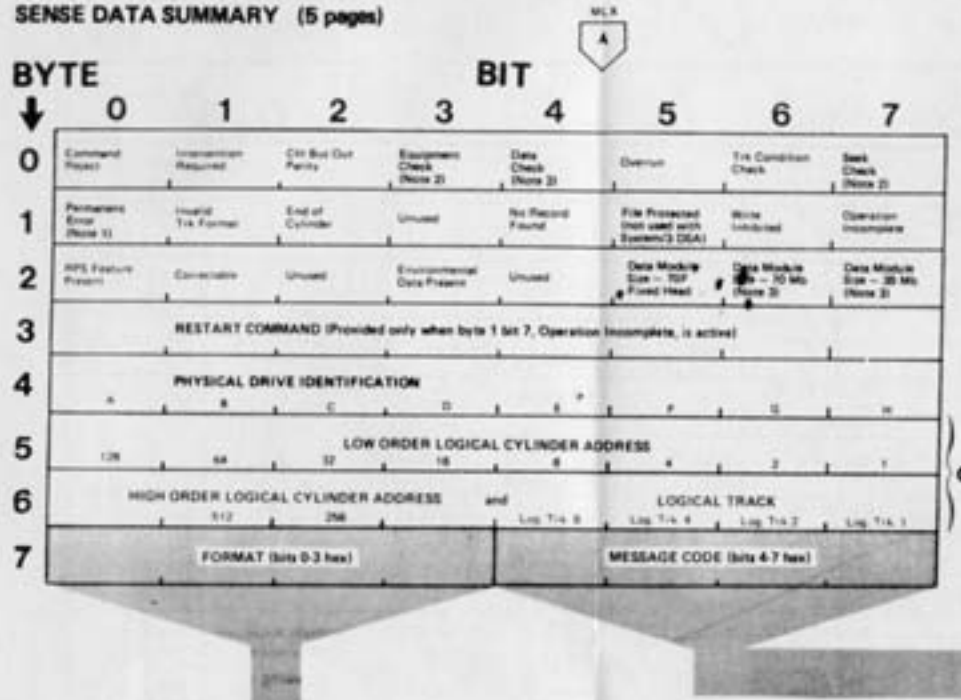
*** *This byte for FHFE only*

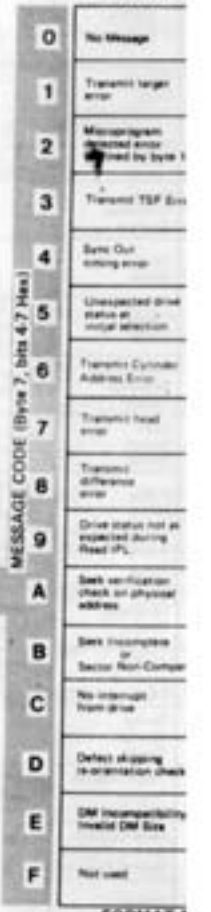
3340

AP0065	2747340
Dwg. 1 of 2	Part No. 1 1

See EC History	440218 5 Aug 75	440223 14 Mar 75				

SENSE DATA SUMMARY (5 pages)





Note: See Storage Control MLM for sense data and/or messages for Formats 0, 2, and 3. If the storage control is a System/3–3340 DSA, refer to the 3340 DSA T-MD manual for Formats 0 and 2.

3340
0
Storage Control MLX CHART

Notes:
1. *Set by ERPs.*
2. *Usually indicates a 3340 malfunction if byte 7, bits 0-3 equal '1', '4', or '5'.*
3. *If the storage control is a System/3–3340 DSA and a 12 MB CE data module is installed, both bits 6 and 7 are zero.*

SENSE BYTES 8-23 — MESSAGES

To formats 1, 4, 5, 6

3340

AV0001 Seq. 2 of 2	2741347 Part No.	440200 25 Jun 73	440203 2 Nov 73	440213 13 May 74	440218 5 Aug 74	440223 14 Mar 75

SENSE DATA SUMMARY

SENSE 100

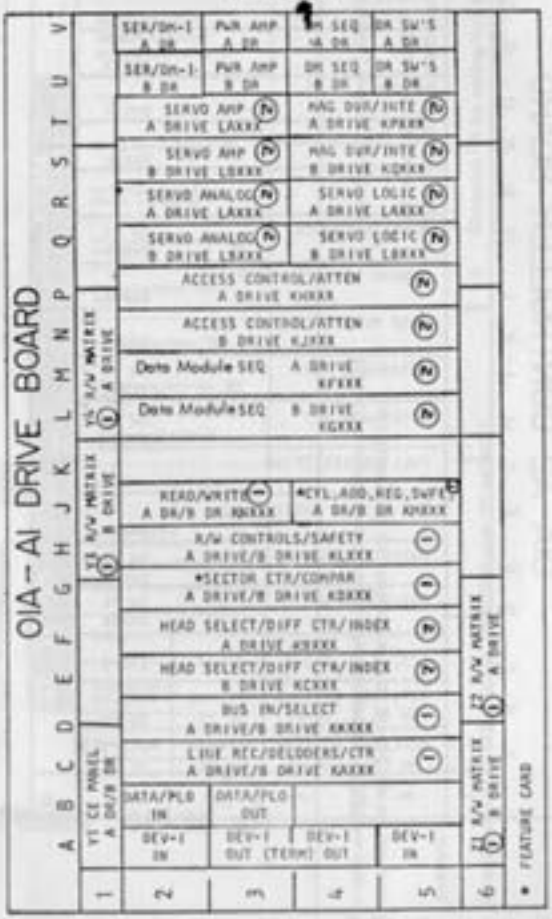
MESSAGES, determined by format and message code (byte 7)

MESSAGE CODE (byte 7, bits 4-7 Hex)	FORMAT 1	FORMAT 4	FORMAT 5
0	No Message	HA field data check	Not used
1	Transmit target error	Count field data check	Not used
2	Microprogram detected error (defined by byte 19)	Key field data check	Not used
3	Transmit TSF Error	Data field uncorrectable data check *	Data field correctable data check *
4	Sync Out timing error	HA field no sync byte found	Not used
5	Unexpected drive status at initial selection	Count field no sync byte found	Not used
6	Transmit Cylinder Address Error	Key field no sync byte found	Not used
7	Transmit head error	Data field no sync byte found	Not used
8	Transmit difference error	Not used	Not used
9	Drive status not as expected during Read IPL	Not used	Not used
A	Seek verification check on physical address	Not used	Not used
B	Seek incomplete or Sector Non-Compare	Not used	Not used
C	No interrupt from drive	Not used	Not used
D	Defect skipping re-orientation check	Not used	Not used
E	DM Incompatibility/ Invalid DM Size	Not used	Not used
F	Not used	Not used	Not used
	FORMAT 1	FORMAT 4	FORMAT 5

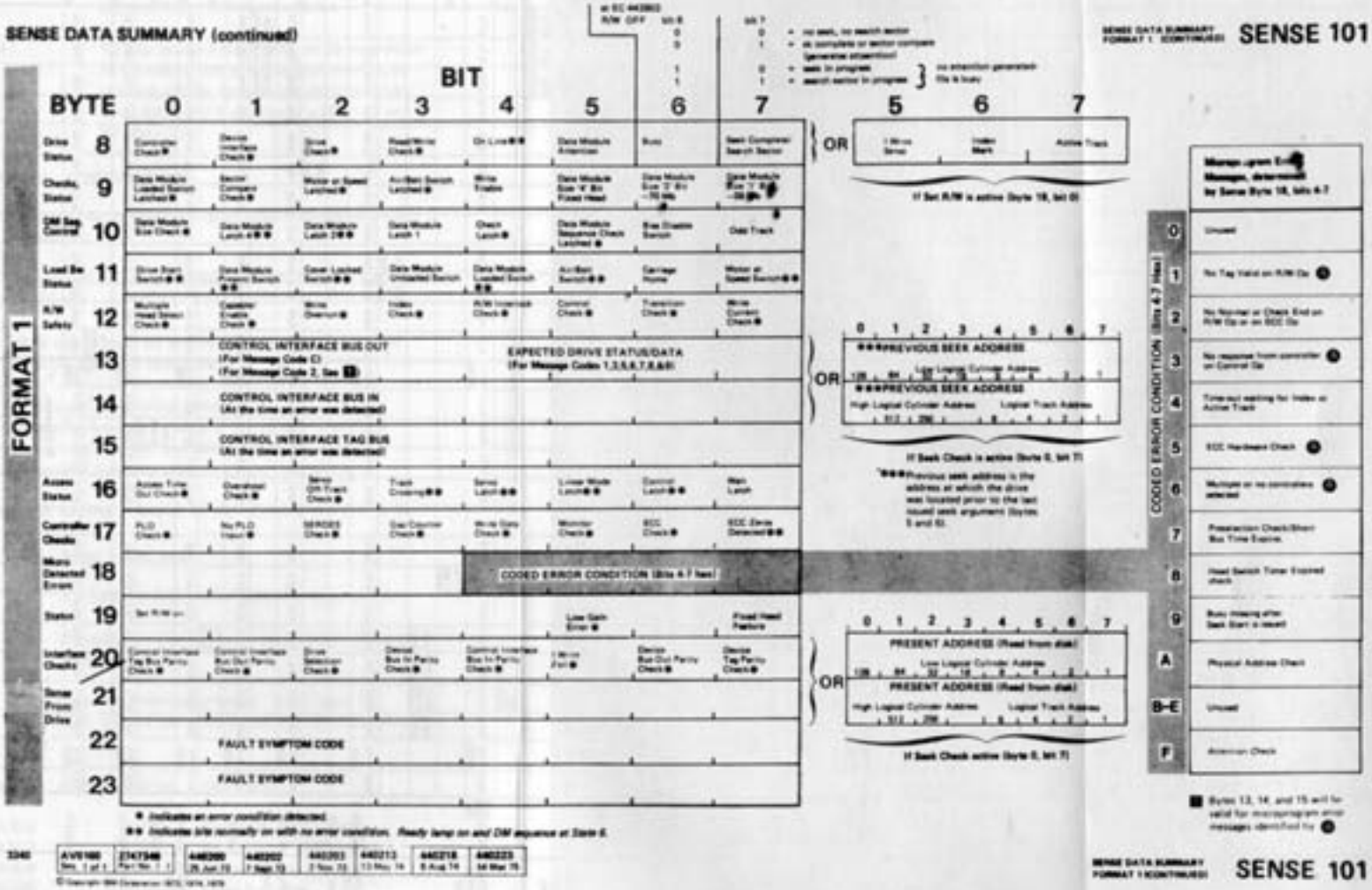
SENSE DATA SUMMARY SENSE 100

To add or remove cards it is recommended that power be/need off. If this is unpractical, add or remove cards via the following key:

1. For cards C2, D2, G2, H2, J2, and R/W Matrix - must always turn power off.
   Very both drives off line.
   Turn off CP 210/(CP 401). NOTE: If A2 box this drops power on the entire string.
   If B1/B2 box - power is only removed from the 3340 being serviced.
2. For cards F2 (E2), M2 (L2), P2 (N2), T2 (S2), T4 (S4), O4(R4), and power amp.
   One or both spindles - perform the following steps:
   A . . . Unload the data module (for customer data integrity).
   B . . . Place the drive in the CE mode (to prevent generating errors or interrupts).
   C . . . Turn the +24v, switch off at the CE panel.
   Turn the -36v, CB off. A drive = CP 408 (to prevent circuit damage).
   B drive = CP 407



STRINGS SWITCH-SWITCHES
01A-A2 CONTROLLER BOARD
A B C D E F G H J K L M N P Q R S T U V
1 2 3 4 5 6
DATA/PLO IN
DEV. INT IN
DEV. INT IN
CE PNL OUT
CE PNL IN
PLO/VFO BJXXX
SERDES BCXXX
ECC BBXXX
MACROS BHXXX
GAP CTR/CONTROLS BGXXX
*SWITCH COMMON SW FE BAXXX
BUS/OP CTRLS/CE DISP BDXXX
ASSM BUS/RESPONSE BEXXX
*STATUS B INT SW FE BQXXX
*STATUS A INT SW FE BPXXX
POLLING/SELECTION BFXXX
BUS IN/BUS OUT/BI ASSM BAXXX
*SELECT B INT SW FE BNXXX
*SELECT A INT SW FE BMXXX
CTL-I
*CTL-IB SW FE
*CTL-IA SW FE
* FEATURE



The table on page 10 provides you with the EC development of the 3340 Electronics, the appropriate Card Partnumbers and 3340 MLM Level.

Example:

What PN should be in Pos. A1J4 on a 3340 with EC 442900?

1. Find vertical column = 3340 MACH. EC''
2. Follow horizontal „442900" now ontill you cross column „CAR J4". On that point you find 5899
3. Complete PN by adding first 3 figures
   Complete 823 PN to 5899 and get 823 5899

3340 SERVICE AID TO INTERCHANGE A+B SPINDLES

ABSTRACT: On a single drive failure - swap electronics between drive for failure isolation.

TEXT: To help isolate a Read/Write or Servo problem to the electronics, cables and connectors, or physical spindle, interchange electronics between the A and B spindles of a 3340 A2 or B2 box.

Before this procedure is used:

1. The 3340 MLM maintenance procedure should have been exhausted.
2. The data module should have been eliminated as a source of problem.
3. R/W matrix cards on both A and B drive replaced - not interchanged with each other.
4. Positive error definition, that is:
   Microdiagnostic error stops or forced error with CCW string (use FRIEND and obtain sense data) or a repeatabel customer program – error indication.

After Each test step # below, do the following item= (A, B, C)

A. Rerun Failing test.

B. If trouble moves to other spindle, skip to step 7.

C. If trouble remains with same physical spindle, go to next step.

1. With Power-off, interchange cables: (See Figure 1)
   CAUTION: Be sure cables are seated and no loose connectors exist.

B Drive – with –	A Drive	Description
A1U2	A1V2	Servo Pre AMP signal
A1U3	A1V3	Servo Power AMP drive
A1U4	A1V4	DM sequence
A1U5	A1V5	Drive Switches
A1Y3	A1Y4	Upper R/W matrix - A2
A1Z1	A1Z2	Lower R/W matrix - A3

This effectively interchanges all electronics between A and B drives at the A1 board. Note that CE switch - B must be on to run physical spindle - A and vice versa. Also customers logical addresses have been reversed. Check servo is within tolerance - Run A7 micro (cards A1R2, 02)

2. If trouble moves to other physical spindle: Problem is in MST cards or A1 board - try replacing board if all cards have been swapped. (Skip to step 7 to complete analysis when trouble moves).

   If trouble remains with same physical spindle: Eliminate the power AMP and power AMP drive Cables by:

   A. Interchanging A1U3 with A1V3 (back to original positions) and

   B. Interchange large lead on top of VCM coil from A to B spindle.

3. If trouble remains with same physical spindle: Eliminate R/W matrix flat cables by interchanging:

   A. A1Y3 with A1Y4 (back to original positions)

   B A1Z1 with A1Z2 (back to original positions)

   C. R/W matrix connecting blocks and pair of cables

4. If trouble remains with same physical spindle; Eliminate servo pre-AMP signal cable by interchanging:

   A. Cables R/W matrix connector - drive connector plug see MLM R/W 350 A to B drive

   B. Cables A1U2 with A1V2

5. If trouble remains with same physical spindle, interchange (VCM) voice coil motor or bobbin ASM.

6. If trouble remains with same physical spindle,

   Suspect:

   A. DM Sequence cable A1U4/A1V4
   B. Drive switches cable A1U5/A1V5
   C. Drive mechanical problem
   D. Environmental problem ESD/Noise

7. Diagnosis is complete. Return all cables to original positions and verify proper operation of non failing drive. Take corrective action on failing drive. Verify its proper operation.

3340 DATA CHECK ANALYSIS PROCEDURE (OUTLINE)

A What type of data checks?

1. Sense byte 7 = 53 — Data field ECC correctable data checks
2. Sense byte 7 = 4X — ECC uncorrectable data checks

Symptom Code	Micro B 1 Err	Description
1. 4940	B1F0	ECC Data Check HA Field
2. 4941	B1F1	ECC Data Check Count Field
3. 4942	B1F2	ECC Data Check Key Field
4. 4943	B1F3	ECC Data Check Data Field
5. 4944 *	B1F4 *	No Sync Byte Found HA Field
6. 4945	B1F5	No Sync Byte Found Count Field
7. 4946	B1F6	No Sync Byte Found Key Field
8. 4947	B1F7	No Sync Byte Found Data Field

*

This is the error that will occur if unable to read at all.

B What is failing ?
(Data Module ? Drive ? Drive Module ? Controller ?)

1. Check all available sense information for
   a) Symptom Code 494X or Byte 7 = 4X — SENSE 100
   b) Physical Drive ID -- Byte 4 = 0--7 — MSG 30 - 42
   c) Environmental Data from Logout to determine Data Module ID (s) — MSG 32 - 40

2. Try to recreate the failure and gather more information by doing one or more of the following:

   a) Run OLTS 3340 PSA and 3340 PS8 — OLT 22 - 24
   b) Run Micro B1 in default mode — MICRO 34
      A Read operation will be tested on all physical heads.
   c) Run Micro B1 on a failing customer track to dertermine if failure can be recreated with Micro B1. — MICRO 34
   d) Run B2, insure you do not have write problem. — MICRO 35
   e) Run AF loop failing test. — MICRO 32

3. Swap data modules around and perform step 2 on different drives until satisfied that the problem has been isolated to the data module, drive, drive module or controller.
If the controller is the only module in the subsystem and both drives are failing, assume that the drive module is failing for Map Entry purposes. If one data module is failing on one drive. If one data module is failing, first assume that the Data Module is failing. Then asume that the drive is failing. R/W 300.

Note: Data Module

The absolute minimum amplitude should be no less than 40 millivolts on the innermost cylinders. Good data modules should normally show 50 millivolts and above, nominal 150 mv.
To ensure that low amplitude is being caused by the media, scope the envelope amplitude on:
a) different heads on inner and outer cylinders,
b) different data modules on failing drive,
c) failing data module on different drives.

C Which map ?

1.	Data module	(R/W 340)
2.	Drive	(R/W 302)
3.	Data module and drive	(R/W 340)
4.	Drive module (3340 box)	(R/W 304)
5.	Controller	(R/W 306)
6.	Drive module or controller (A02 only installed)	(R/W 304)

D Which Scoping Procedure ?

If card replacement does not fix the problem or scoping is required to further isolate the problem, check servo stability: Do track following scope + positon signal (A-drive: A1T2 D09, B-drive: A1S2 D09, max. 1Vpp).
Appropriate scope procedure for:

1. Data module	(R/W 347)
2. Drive	(R/W 303, R/W 309)
3. Drive module (3340 box)	(R/W 308)
4. Controller	(R/W 320 - 326 MICFL 1193 - 1196)

E Last Chance

If card replacement and scoping are not applicable, go to the last resort map for additional suggestions and references. (R/W 312).

Further Service Hints

- Check AC-ripple on DC-voltages. If exceeds specification limit take corrective actions (see PWR 290).
- Check for capacitor between TB101-16 and AC ground. If not installed, contact ASG.
- Check for BM 2347381, EC 445047, being installed (clips on power board connectors).
  If not yet installed or shipped, place emergency order (see TIP 3340 wt 044).
- Check VFO adjustment (TIP 3340 wt 039)
- Check spindle and baseplate ground
- Check if last drive module in the string has new DEV. - INTERF. - CABLING (see TIP 3340 wt 046).
  Unplug the 3 outbound cables at A1A3, A1A4 and A1B2 if necessary.
- Pre Filter dirty (DC - BOX)
- Photo cell - cable pinched by black appearence panel
- Voice coil motor
- PWR Amp / VCM cabling noisy. Fix is EC 442828
- Check R/W, Pio cables

A quick check of the R/W and PLO cables can be made with an ohmmeter (see R/W 306).

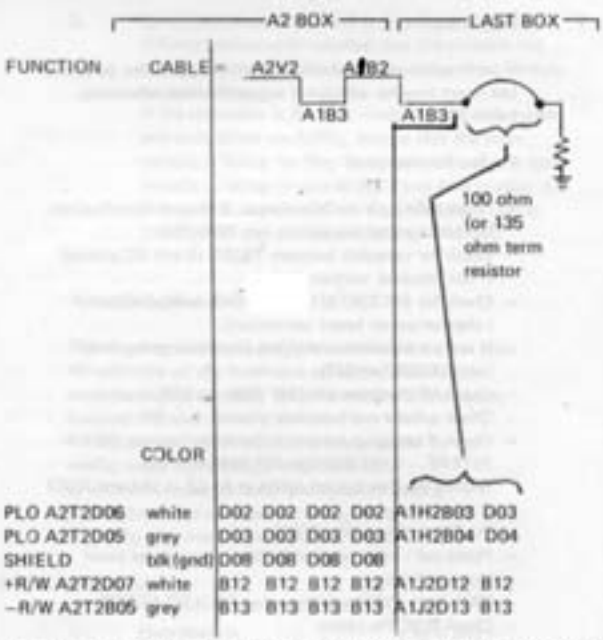
1. Turn power OFF and remove card A2T2

2. Measure each signal lines' ability to reflect the 100 OHM termination resistor at the other end of the line (jumpered on last 3340 in string during installation). Using an ohmmeter measure the the resistance of A2V2 pins D2, D3 B12, B13 to ground: a quick check of the resistance ofeach pin should be identical. For multiple attached 3340's see Chart Page 16.

3. Meter the resistance at A2V2 between each pair of signal lines D2 to D3 then B12 to B13, to insure they are not shorted.

4. If noise is suspected, check the integrity of the ground shield. Pull each cable end starting at A2V2 (shown in chart). Meter cable pin D08 to board ground pin D08 for 0 ohm. Replace cables and repeat steps 2 and 3 above.

5. Replace card A2T2.



SIGNAL TO GROUND RESISTANCE CHECK (nominal value, with 100 ohm terminator)

# 3340's INSTALLED	NO TERMINATOR	WITH TERMINATOR
1st 3340	220	68
2nd 3340	110	52
3rd 3340	73	42
4th 3340	55	35

OHMS ← NOMINAL RESISTANCE

TRANSFORMER PRIMARY INPUT TAP WIRING CHART (Mod 802)

	Voltage	TB 311 (YB 030)
Delta	200 V	Lead #1 to TB 311–3 Lead #2 to TB 311–7
	220 V	Lead #1 to TB 311–2 Lead #2 to TB 311–6
	235 V	Lead #1 to TB 311–1 Lead #2 to TB 311–5
Wye	380 V	Lead #1 to TB 311–2 Lead #2 to TB 311–6
	406 V	Lead #1 to TB 311–1 Lead #2 to TB 311–5

VOLTAGE CHECK CHART

DC Supply	Test Point	Tolerance (Volts)	Adjustment	Logic Page	Maximum AC Ripple	Diagram	MAP Entry
+24 V Local	+24 V A Switch Comm Term	+21.6 to +26.80	None*	YB060	0.350 V p/p	PWR 211	PWR 215–A
–24 V	A1L2003	–24.0 to –26.8	None*	YB090	0.08 V p/p	PWR 251	PWR 250–A
+12 V	A1R2005	+12.0 to +14.4	None*	KV010 YB080	0.10 V p/p	PWR 241	PWR 245–A
–12 V	A1M2006	–12.0 to –14.4	None*	KV010 YB080	0.10 V p/p	PWR 241	PWR 240–A
–4 V	A1P2008	– 3.72 to – 4.4	None*	KV010 YB080	0.10 V p/p	PWR 258	PWR 255–A
+5 V Reg	A1J2011	+ 5.76 to + 6.24 Adjust to +5.0	++	KV020 YB080	0.08 V p/p	PWR 261	PWR 265–A
–36 V	TB101-3 (Logic Gate)	–36.0 to –43.2	None*	YB080	0.14 V p/p	PWR 261	PWR 260–A
–20 V	A1T2910	–19.6 to –20.4	None*		0.07 V p/p		ACC 720–A
–20 V	A1E2910	–19.6 to –20.4	None*		0.07 V p/p		ACC 725–A

* Check transformer primary taps, change to match available voltage
** To increase the voltage, turn the adjustment screw clockwise (CW)

TRANSFORMER PRIMARY INPUT TAP WIRING CHART (Mod A02)

	Voltage	TB206 (YA810)	TB211 (YA820)
Delta	200 V	Lead #1 to TB206-2	Lead #1 to TB211-3 Lead #2 to TB211-7
Delta	220 V	Lead #1 to TB206-3	Lead #1 to TB211-2 Lead #2 to TB211-8
Delta	235 V	Lead #1 to TB206-4	Lead #1 to TB211-1 Lead #2 to TB211-9
Wye	380 V	Lead #1 to TB206-3	Lead #1 to TB211-2 Lead #2 to TB211-6
Wye	400 V	Lead #1 to TB206-4	Lead #1 to TB211-1 Lead #2 to TB211-5

VOLTAGE CHECK CHART

DC Supply	Test Point	Tolerance (Volts)	Adjustment	Logic Page	Maximum AC Ripple	Diagram	MAP-Entry
+24 V Seq	TP507 (DC Seq. Bd.)	+19.2 to +30.7	None*	YA060	0.6 V p/p	PWR 31	PWR 30-A/B/C
+24 V Local	+24 V Switch A Center Term	+21.6 to +26.40	None*	YA060	0.360 V p/p	PWR 71	PWR 70-A
-24 V	A1L2G03	-24.0 to -28.8	None*	KV010 YA090	0.08 V p/p	PWR 51	PWR 50-A
+12 V	A1R2G06	+12.0 to +14.4	None*	KV010 YA090	0.10 V p/p	PWR 41	PWR 45-A
-12 V	A1M2G06	-12.0 to -14.4	None*	KV010 YA090	0.10 V p/p	PWR 41	PWR [illegible]-A
-4 V Reg	A1 Board P2B08	-3.84 to -4.16 Adjust to -4.0	**	KV010 YA090	0.04 V p/p	PWR 56	PWR 55-A
-4 V Reg	A2 Board K2B08	-3.84 to -4.16	**	YA090 BV100	0.04 V p/p	PWR 56	PWR 55-A
+6 V Reg	A1 Board J2B11	+5.76 to +6.24 Adjust to +6.0	**	KV020 YA090	0.08 V p/p	PWR 61	PWR 60-A
+6 V Reg	A2 Board K2B11	+5.76 to 6.24	**	YA090 BV100	0.08 V p/p	PWR 61	PWR 60-A
-36 V	TS101-2 (Logic Gate)	-36.0 to -43.2	None*	YA090	0.14 V p/p	PWR 81	PWR 80-A
-20 V	A1T2B10	-19.6 to -20.4	None*		0.07 V p/p		ACC 720-A
-20 V	A1S2B10	-19.6 to -20.4	None*		0.07 V p/p		ACC 720-A

* Check transformer primary input taps, change to match available voltage, see chart above.

** -4 V and +6 V should be adjusted to -4.0 V and +6.0 V using the test point on the A1 board. Do not use test point on A2 board to adjust voltages. To increase the voltage, turn the adjustment screw clockwise (CW).

SEEK CHECKS

Failure not found by MAPs or duplicated by MICROs.

Possible Causes

1. Power Supply specifications. – Refer to Chart A. (Page 28).
2. Velocity Gain Adjustment. – Refer to ACC 800 Entry B.
3. Data Module. – Swap if available.
4. A1T2 (A1S2) Servo Amp (see Note). – Refer to ACC 440 for card verification procedure.
5. A1R2 (A1Q2) Servo Analog (see Note). – Refer to ACC 450 and ACC 640 for card verification procedures.
6. A1R4 (A1Q4) Servo Logic (see Note). – Refer to ACC 460 and ACC 650 for card verification procedures.
7. P410 (P411) Power Amplifier (see Note). – Refer to ACC 470 and ACC 660 for card verification procedures.
8. A1P2 (A1N2) Access Control.
9. A1F2 (A1E2) Head Select.
10. A1C2 Receiver and Controls.
11. A1D2 in Bus and Select.
12. Cable from data module to A1V2 (A1U2). – Refer to ACC 430 for configuration. (Check for proper shield ground and Servo Input isolation).
13. Cable from P410 (P411) to A1V3 (A1U3). – Refer to ACC 430 for configuration.(Check for prpper shield ground.
14. Check card and cable plugging for location and secure installation.
15. Check Voltage jumpers for location and secure installation.
16. Verify drive grounding network according to the procedure and diagram on ACC xxx.
17. Verify track following servo operation according to the procedure and diagram on ACC 701.
18. Inspect Voltage TB's and edge connectors for loose connections of fraying wires.
19. Inspect DM Load area for loose hardware or foreign matter.
20. Scan Microfiche for Service Aids or Engineering Changes which might correct the problem.
21. Replace Home Detector photo cell.
22. MAKE SURE THAT NO VCM CAUSE PROBLEM
    - Bobbin; loose coilclamping screws/washers secure screws with loctite. (SEE DM 845).
    - Bobbin height adj. nut loose, secure with loctite and readj. (SEE DM 770)
    - Crash stop broken (SEE DM 845)
    - VCM is located against pin (on left front side of motor).
23. Check if Carriage Latch Actuator Adj is too high DM 756

Trouble Corrected?

No → Refer to rezero Operation, Theory (ACC 400) or Seek Operation Theory (ACC 600)

Yes → B ACC 800

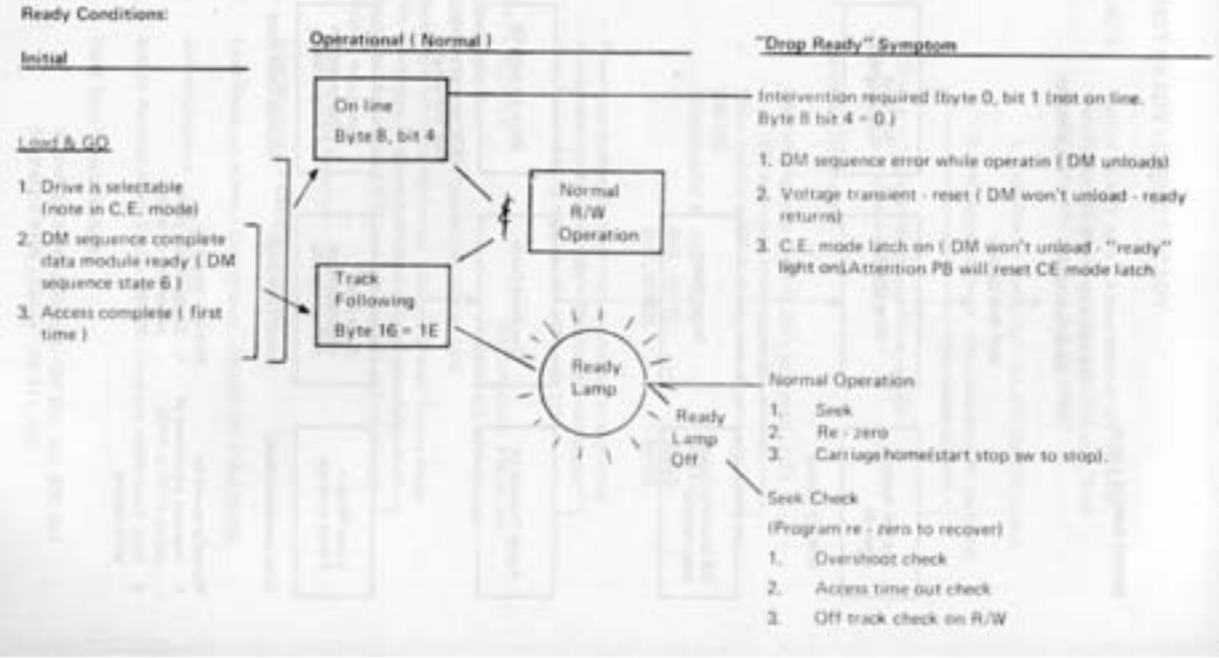
* Note on page 20

CHART A – POWER SUPPLY VOLTAGES

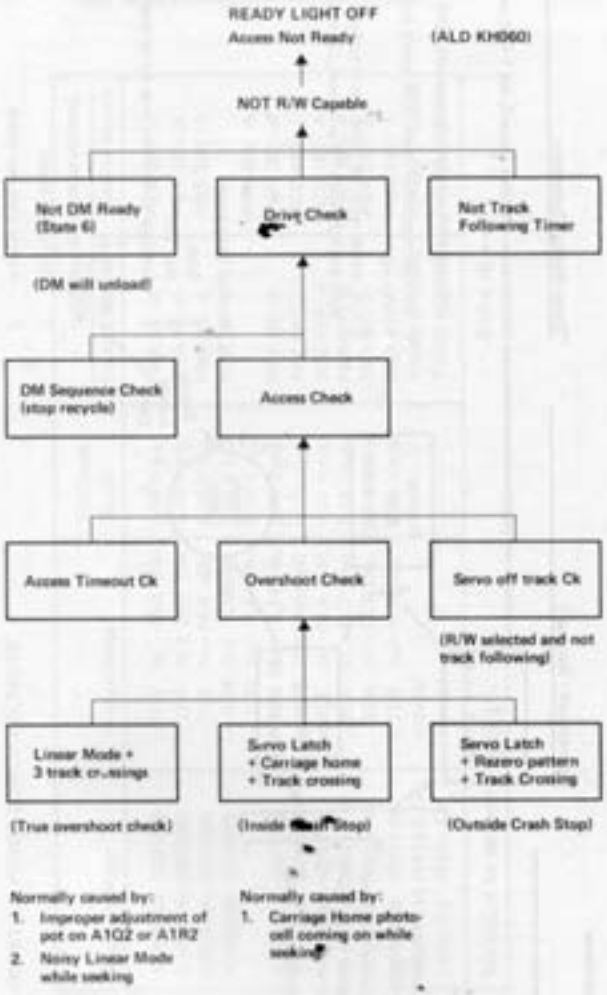
Measuring Point	Voltage Range	Maximum Ripple	Map Exit	
			Control Module	Satellite Module
A1R2D03 (Q2D03)	−24,0 to −28,8 Vdc	0,08 V p-p	PWR 50 - A	PWR 250 - A
A1R2D05 (Q2D05)	+12,0 to + 14,4 Vdc	0,10 V p-p	PWR 45 - A	PWR 245 - A
A1R2D06 (Q2D06)	−12,0 to −14,4 Vdc	0,10 V p-p	PWR 40 - A	PWR 240 - A
A1R2G06 (Q2G06)	− 3,84 to − 4,16Vdc	0,04 V p-p	PWR 55 - A	
	− 3,72 to − 4,4 Vdc	0,16 V p-p		PWR 255 - A
A1R2G11 (Q2G11)	+ 5,76 to + 6,24Vdc	0,08 V p-p	PWR 60 - A	PWR 260 - A
A1T2B08 (S2B08)	− 1,28 Vdc (nominal)	--------	ACC 441	ACC 441
A1T2B10 (S2B10)	−19,6 to −20,4 Vdc	0,07 V p-p	ACC 720 - A	ACC 720 - A
P410–7,8 (P411-7,8)	−36,0 to −43,2 Vdc	0,14 Vp-p	PWR 80 - A	PWR 280 - A
P410–14 (P411-14)	−12,0 to −14,4 Vdc	0,10 V p-p	PWR 40 - A	PWR 240 - A
P410–16 (P411-16)	+ 12,0 to + 14,4 Vdc	0,10 V p-p	PWR 45 - A	PWR 245 - A
P410–9,10 (P411-9,10)	Ground	--------	YA060 (YB060)	YA060 (YB060)
P410–13 (P411-13)	Ground	--------	YA060 (YB060)	YA060 (YB060)

See LOC 4 for location of P410/411.

Note: Card replacement should be followed by Velocity Gain calibration before retesting drive operation. Refer to the procedure on ACC 800 Entry B.



SERVO ERROR LOGIC:



NOT READY - LOSS OF READY

NOTE: Loss of READY light is a by-product of the real error. Identify the real problem on your I.R.; not just ,'Drop Ready'. Identify the cause, not the effect:

1. Seek Check - Ready light out with the DM loaded.
   or
2. DM Sequence Check - DM unloaded with the Start/Stop switch still ON.

1. If Drive is in failing condition run Inline routine B3 see Micro to determine cause

2. No trouble found check:

   - DM - serialnumber, Internal DM's with serial # 73 . . . . 0 – . . . . . 290 may cause intermittend loss of ready
   - DM – Loaded switch is at very end of cam-ramp. Readj see DM 730

   effected serial #: A02 10200 – 10900
   B02 30120 – 30650
   B01 50030 – 50150

- Poweramp cooling ribs must not have contact to each other
- Access- velocity should be 20V ± 2%. Readj if neccessary
- Drive Motor thermal tripped. (CP 217 or CP 218)

DATA MODULE MECHANICAL PROBLEM
LOAD/UNLOAD SERVICE APPROACH
USE OF MLM FOR MECHANICAL PROBLEMS

Review the following Mechanical Load and Unload Theory Mags. This is necessary to obtain a complete detailed knowledge of all the mechanical actions which occur during the Load and Unload cycles.

1. Data Module Functions – DM 610–611

2. Load Mechanics – DM 620–621–622

3. Load Checkout Without Data Module - DM400-401-410-420-430

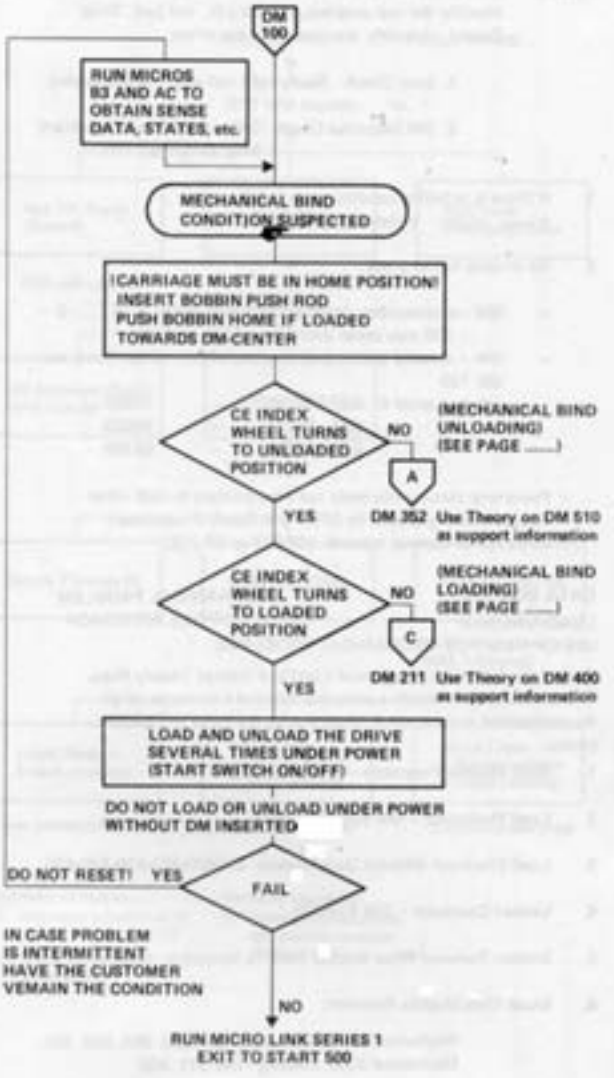
4. Unload Checkout – DM 510-520

5. Bobbin Removal When Bobbin Fails To Uncouple - DM847

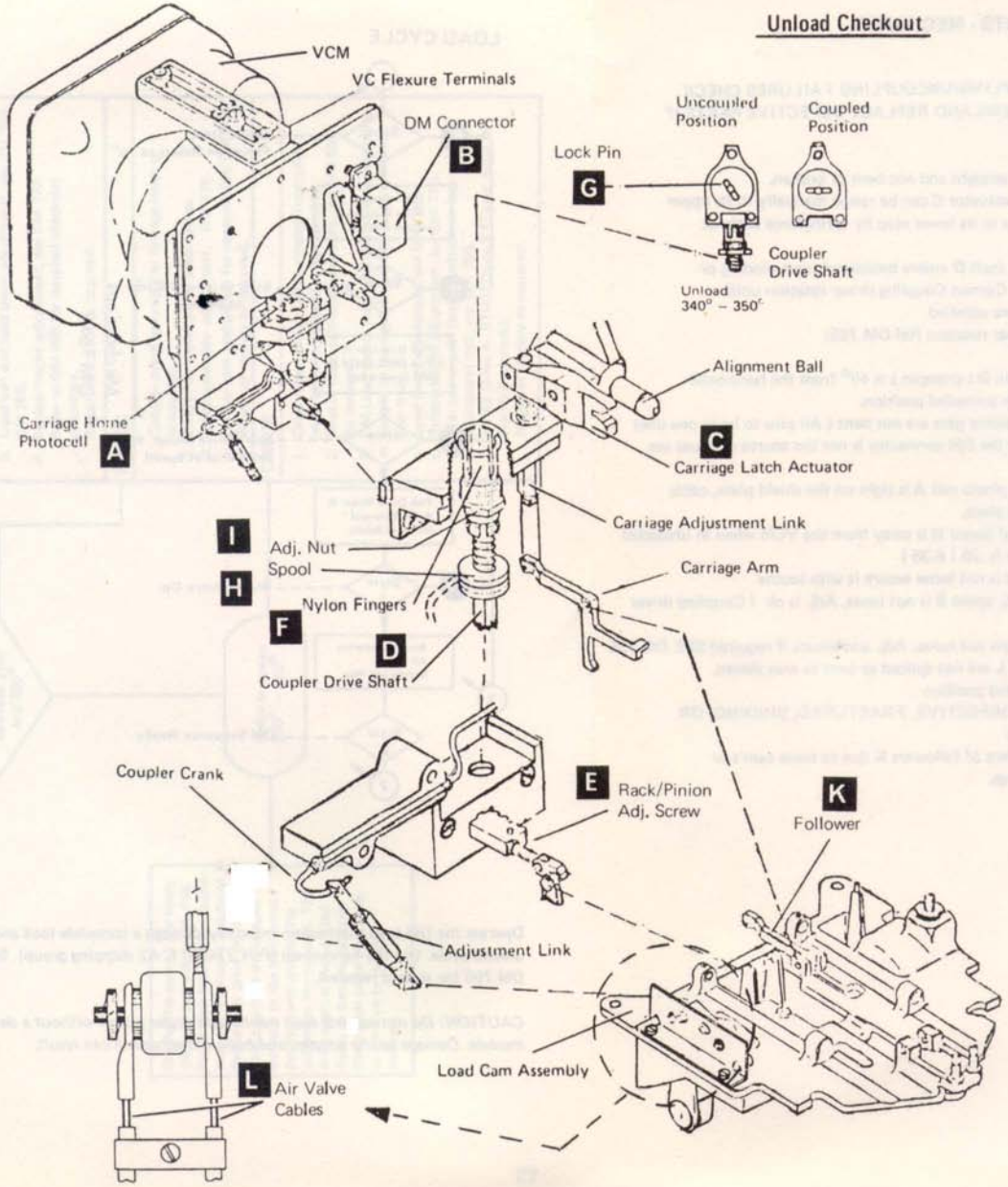
6. Stuck Data Module Removal:

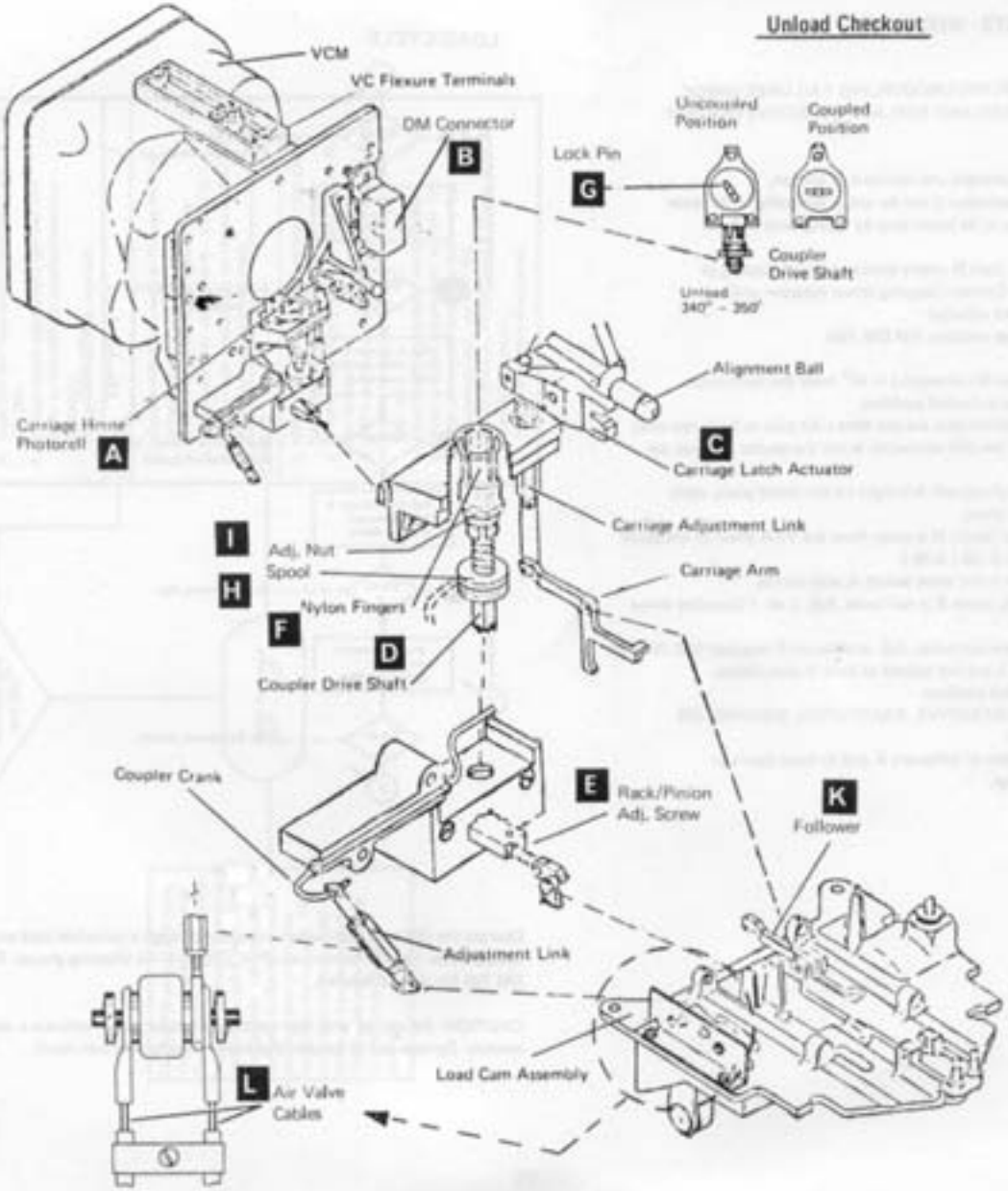
   Mechanical Bind, Unloading - DM 352, 353, 500, 501
   Mechanical Bind, Loading - DM 211, 400

MECHANICAL PROBLEMS -- SERVICE APPROACH FLOW CHART



Unload Checkout




VCM
VC Flexure Terminals
DM Connector
B
Lock Pin
G
Uncoupled Position
Coupled Position
Coupler Drive Shaft
Unload 340° – 350°
Alignment Ball
Carriage Home Photocell
A
C
Carriage Latch Actuator
Carriage Adjustment Link
I
Adj. Nut
Spool
H
Carriage Arm
Nylon Fingers
F
D
Coupler Drive Shaft
Coupler Crank
E
Rack/Pinion Adj. Screw
K
Follower
Adjustment Link
Load Cam Assembly
L
Air Valve Cables

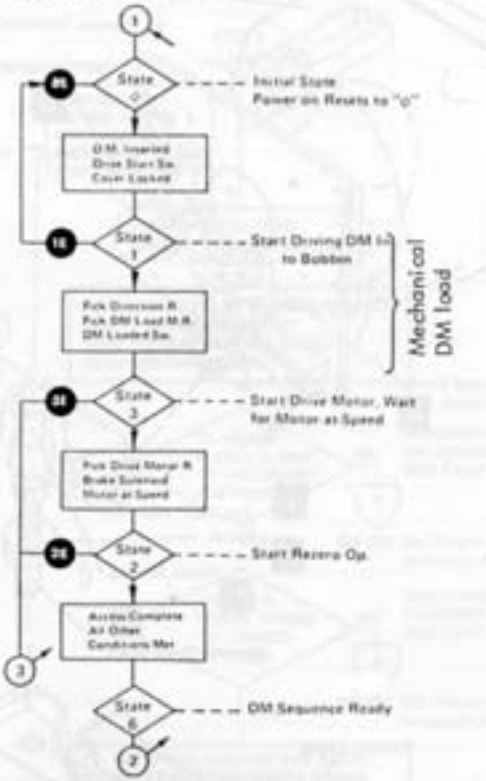
SERVICE HINTS - MECHANIC

TO AVOID COUPLING/UNCOUPLING FAILURES CHECK FOLLOWING ITEMS AND REPLACE DEFECTIVE PARTS IF NECCESSARY

- Nylonfinger **F** straight and not bent or broken.
- Carriage latch actuator **C** can be raised manually to its upper stop and moves to its lower stop by springforce without binding
- Coupler driver shaft **D** enters bobbin without binding or lifting bobbin. Correct Coupling driver rotation until requirements are satisfied
  (Coupling driver rotation Ref DM 765)

- Coupling lock pin **G** (crosspin) is 45° from the horizontal when drive is in unloaded position.
- Interface Connector pins are not bent (All pins to be in one line) Make sure that the DM connector is not the source of cause see DM 870
- Carriage home photo cell **A** is tight on the shield plate, cable connector is in place.
- Deep portion of Spool **H** is away from the VCM when in unloaded position, depth is .25 (6.35)
- Adjusting nut **I** is not loose secure it with loctite
- Pack./Pinion adj. screw **E** is not loose, Adj. is ok (Coupling driver rotation).
- Load beam screw not loose. Adj. and secure if required SEE DM 785
- airvalve cables **L** are not spliced or bent in area shown. Check on Loaded position
  CHECK FOR DEFECTIVE, FRACTURED, BINDING, OR WORN PARTS
- Accessive clearens of followers **K** due to loose cam's or follower bearings.

LOAD CYCLE



Operate the DM load mechanism manually through a complete load and unload cycle. Use the handwheel (P/N 2745011, A2 shipping group). See DM 705 for shroud removal.

CAUTION: Do not operate load mechanism under power without a data module. Damage to the coupler and bobbin mechanism can result.

Load – Checkout:

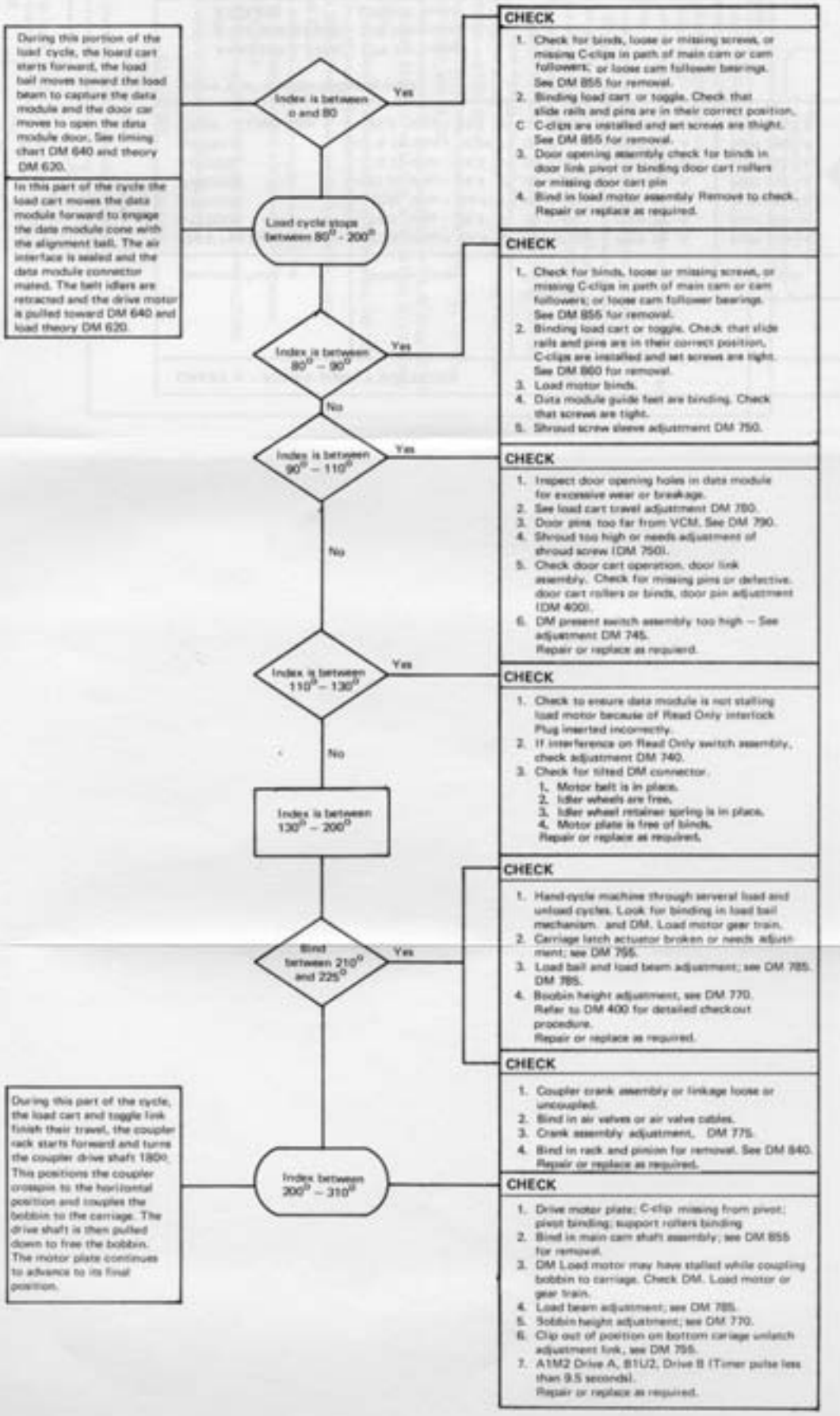


CHART A – POWER SUPPLY VOLTAGES

Measuring Point	Voltage Range	Maximum Ripple	MAP Exit	
			CTRL Module	Sat Module
+24 V Pwr Sw, Ctr, Term	+ 21.6 V to + 26.4 V	.375 V p/p	PWR 70 - A	PWR 270 - A
A1L2D03	– 24.0 V to – 28.8 V	.08 V p/p	PWR 50 - A	PWR 250 - A
A1R2D05	+ 12.0 V to + 14.4 V	.08 V p/p	PWR 45 - A	PWR 245 - A
A1M2D06	– 12.0 V to – 14.4 V	.08 V p/p	PWR 40 - A	PWR 240 - A
A1P2B06	– 3.72 V to – 4.4 V	.04 V p/p	PWR 55 - A	PWR 255 - A
A1J2B11	+ 5.76 V to + 6.24 V	.04 V p/p	PWR 60 - A	PWR 260 - A
TB101 - 3 Logic Gate	– 36.0 V to – 43.2 V	.12 V p/p	PWR 80 - A	PWR 280 - A

Ensure V ref is on the following cards

A1M2 B08 (L2 B08) - 1.28 Vdc (nom);
A1T2 B08 (S4 B08) - 1.28 Vdc (nom);
A1C2 B08 - 1.28 Vdc (nom).

LOAD FAILURE

A — DM Common Entry

Failure not found by MAPs or duplicated by MICROs

Possible Causes

1. Power supply specifications; refer to Chart A.
2. Data module; swap if available.
3. Verify all circuit protectors are on.
4. +24 V switch good.
5. Verify correct voltage to drive motor and DM load motor, and direction of rotation.
6. Verify drive motor is running within specification DM 160, Entry C.
7. Verify C601 good, start capacitor for DM load motor.
8. Relays are seated properly, relay contacts are in good working condition and make good contact; K252 (K253), K254 (K255)–60HZ, K254A (K254B)–50HZ, and K256(K257).
9. Verify connector A1T5805 (A155805) is on A1T4G05 (S4G05).
10. Check for frayed wires in base plate area.
11. Inspect plugs for secure installation; P207, P208, P209, P401, P404, P201 (P203), and P202 (P204).
12. Inspect voltage TBs for loose connections or frayed wires; TB 101, TB 201 (TB202), and TB 205.
13. Inspect edge connectors for secure installation or frayed wires; EC101 EC301, EC601, EC602, A1V4 (A1U4), A1V5 (A1U5), A1V2 (A1U2), and EC603.
14. Verify cover solenoid is adjusted and working properly; DM 710.
15. Verify shroud properly installed; DM 705.
16. Inspect DM load area for loose hardware or foreign matter. Ref. DM 400,510.
17. Ensure bobbin is captured in coupler drive; DM 705.
18. Verify home photocell is good and connector P601 secure; DM 170, Entry B.
19. Check PWR on reset line (+MST at A1C2U07 and A1C2U06) ref KA 040.
20. Reseat, swap, or replace the following Cards

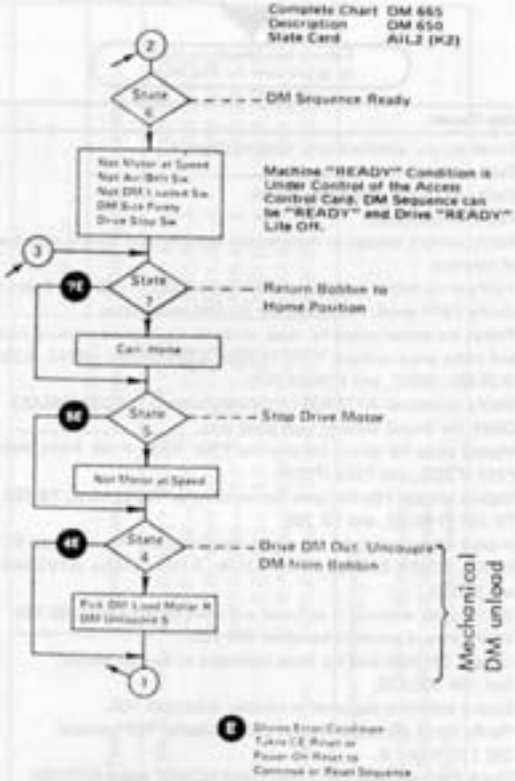
A1M2 (A1L2)	Cart Sequence
A1T4 (A1S4)	Mag DRV
A1C2	Controls
A1P2 (A1N2)	Access CTRL/Atten

21. Verify Start/Stop switch is working properly.

Trouble Corrected — NO → Go again to Load check out and then to Page 48

Trouble Corrected — YES

UNLOAD CYCLE

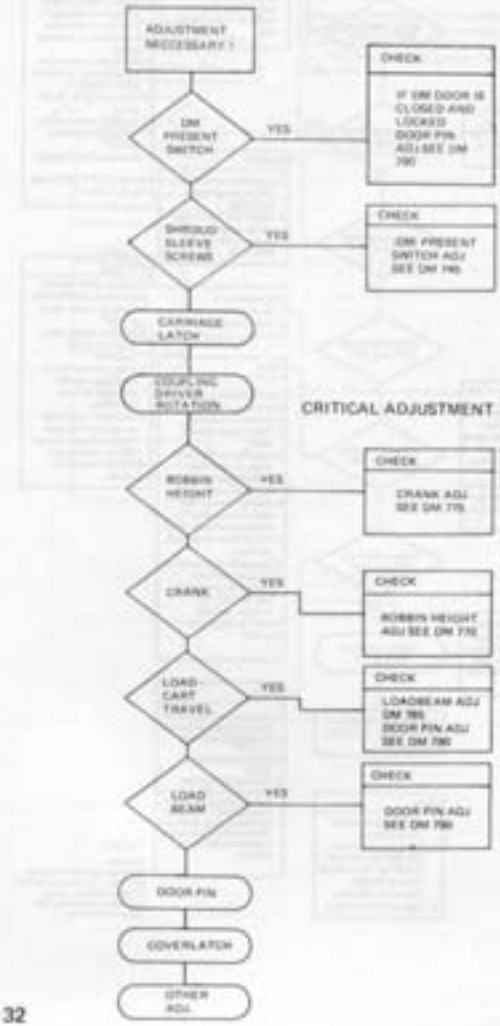


UNLOAD - CHECKOUT

ADJUSTMENTS:

Readjustments not due to parts replacement are seldom necessary and should be carefully analyzed;

- Recheck carefully before decision is made that adjustment is needed.
- Check for defective, fractured, binding, or worn parts. The adjustments may change in affective area due to one of the preceding conditions.



FEATURES FOR THE 3340

3340 OPTIONAL FEATURES

ROTATIONAL POSITION SENSING – RPS

	Features #	Factory B/M #	Field B/M #	Man hrs/Mach	hrs/Sys hrs
A02/B02	= 6202	2745302	2745350	1.0	0.2	0.5
B01	= 6201	2745302	2745350			

Provides A 1G2 card
(Do not plug card with out feature – Legal exposure)

STRING SWITCH – SSW (See NOTE 1)

Requires 9841 on attachment for program switching;
requires 959X on 3340 (See chart).

	Feature #	Factory B/M #	Field B/M #	Man hrs/Mach	hrs/Sys hrs
A02	= 8150	2745303	2745352	4.5	3.5	0.8
B02/B01	= 9670	2745304	2745354	1.0	0.2	0.8

Provides A1J4 card in each drive and D2, E2, H2, J2, M2 in the Controller
Note: This B/M is required on each B01 and B02 in the same string when the A02 has String Switch Feature 8150.

REMOTE SWITCH ATTACHMENT

Pre requisite Feature 8150 – SSW

	Feature #	Factory B/M #	Field B/M #	Man hrs/Mach	hrs/Sys hrs
A02 ONLY	= 6148	2745305	2745356	3.5	2.5	0.8

INTERMIX 3330/3340

No features required on 3340 - Functional micro code
3340 minimum hardware level EC 442903.
FIXED HEAD FEATURE – FHF (See NOTE 2)
Any or all 3340's may have FHF.

	Feature #	Factory B/M #	Field B/M #	Man hrs/Mach	hrs/Sys hrs
A02/B02	= 4301	2757990	2757980	4.5	3.7	0.6
B01	= 4302	2757985	2757975	3.5	2.7	0.6

(Pre req E/C 442905 and up)

NOTE 1 – 8150 is not required on 3340, even though storage control has String Switch micro code. If 3340 has 8150 String Switch attachment, all storage control units attached must have 9841. SSW microcode to support.

NOTE 2 – 4301 is not required on 3340, even though storage controll has Fixed Head micro code. If any 3340 has 4301 (FHFE), the storage unit must have 9190 Fixed Head micro code. 3830, ISC with 9190 – 2 Channel Switch only No 4 channel switch micro code.

3348 DATA MODULE

The CE's responsibility toward 3348 data modules is:

1. Problem determination:
   - isolation of the failing unit to be within the 3348 data module
   - determination of physical damage to covers etc.

2. Repair

   Field repair of data modules is limited to the replacement of:

   - electrical connector (standard, P/N 2746096; FHF P/N 2745960)
   - read only flipper (P/N 2746061)

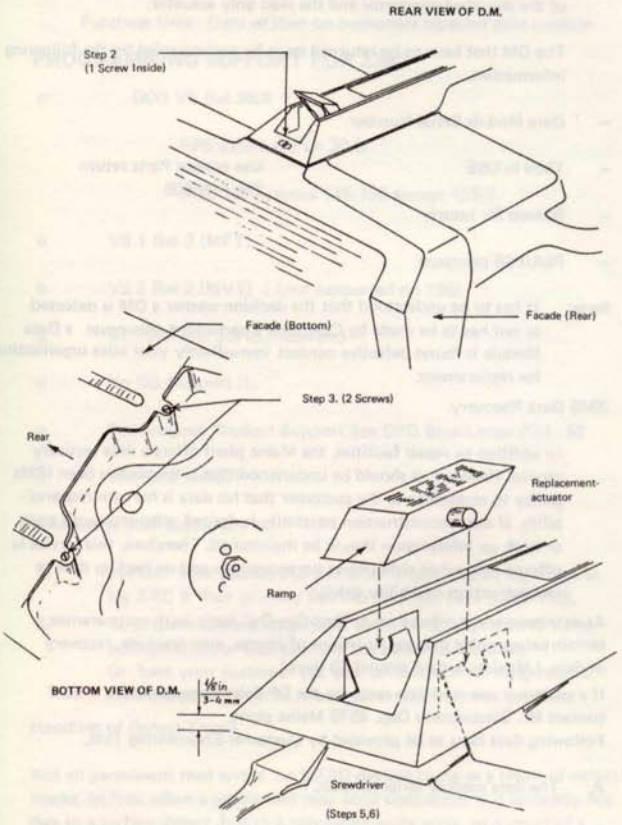
REPLACEMENT OF 3348 READ ONLY ACTUATOR

P/N 2 746 061 (Picture page 37)

1. Remove broken actuator.
2. Remove screw located in actuator recess.
3. Remove screws (2) holding facade on bottom of DM.
4. Remove facade.
5. Raise front edge of handle from top cover approx. 1/8 inch (3-4 mm) using a screwdriver to ply between handle and top cover above the door opening.

   Note: A loud cracking may be heard wich comes from tearing off part of the bonding between handle and the cover. No detrimental effect will occur the DM.

6. Twist replacement actuator to engage slots in handle. Insure ramp faces door ("Read only" is upside down visible).
7. Replace facade removed in steps 4.
8. Replace screws removed in steps 2and 3



Return of Damaged 3348 Modules

Data modules which can not be repaired in the field are be returned to the plant. Field repair of data modules is limited to the replacement of the electrical connector and the read only actuator.

The DM that have to be returned must be accompanied by the following information.

- Data Module Serial Number
- Time in USE — Use normal Parts return Tag F/N 508
- Reason for return
- PSA/PSB printouts

Note: It has to be understood that the decision wether a DM is defected or not has to be made by Customer Engeneering. Whenever a Data Module is found defective contact immediately your sales organisation for replacement.

3348 Data Recovery

In addition to repair facilities, the Mainz plant offers a data recovery service. However, it should be understood that it has always been IBMs policy to emphasize to the customer that his data is his own responsibility. If data reconstruction capability is desired, adequate audit trails or back up information should be maintained. Therefore, this service is offered only when data proves unrecoverable and no backup data or reconstruction capability exists.

As data recovery is offered on a "Best-Can-Do" basis, with no guarantee, certain catastrophic damage situations of course, may preclude, recovery of data. (Maximum turn around 10 days).

If a customer required data recorery the DP Sales Representative should contact Mr. Diestelmann Dep. 4578 Mainz plant.

Following data have to be provided by Customer Engeneering first.

A. The data module serial number.

B. The nature of the defect which caused the data to be unrecoverable in the field.

C. 370 System Model (3125, 3135, etc.)

D. Operating system type and level.

E. Type of 3340 attachment (DDA, IFA, ISC, 3830-2).

Recovered Data will be returned to the customer as follows:

Rental Unit - Data written on mechanical replacement data module.

Purchase Unit - Data written on customers repaired data module.

PROGRAMMING SUPPORT FOR 3340

- DOS VS Rel 29.0

  RPS supported on 30.0

  DOS for systems 115-158 except 155-1
- VS 1 Rel 3 (MFT)
- VS 2 Rel 2 (MVT)) (not supported on 135)
- OLTSFP Rel 5.0 (6.0 current)
- No OS Support !!
- For Program Product Support See DPD Blue Letter P73 - 52
- VM/ 370 Rel 2.1

Encourage your customers to:

1. Sys Gen their backup Sys Res with RES=YES to log errors in log XRC if their primary Sys Res does not have RMS=YES.
2. To prepare address assignment decks for changing 3340 device addresses. (Your S.E. can help the customer do this).
   Or have your customer sys.gen. generic address assignments. This will permit him to re-address drives from the console.

Handling of Defect Tracks

Not all permanent read errros on DASD devices come as a result of defect tracks. In fact, when a permanent read error does occur it is normally not due to a surface defect, but to a temporary write error, as a result of a transient condition. Nevertheless, a permanent read error has occurred and the user must determine whether or not the surface is usable. If he cannot write data on the track and read it back properly, that is a good indication the surface is defective. If the condition of the surface is marginal, however, the user may well be able to write data and read it back, wheras he would flag that track if all the facts were known to him. Therefore, the desirable procedure to follow in the event of a hard read error would be to first attempt to write and read back from known information on that track. If the data cannot be correctly read back, then obvioulsy the track should be flagged. If it can be read back

correctly several times, then the track should be left unflagged and used. However, the fact that the error did occur should be noted. If over a period of time a particular track on a particular pack shows a history of failures, then probably the track itself is marginal and should be flagged. If, on the other hand, no history of errors develops, this indicates that a track is in all probability perfectly good, and a transitional write error occurred.
Some things to note:

1. The nature of ECC is such that errors may occur when processing large blocks that cannot be duplicated when processing smaller blocks, since ECC can handle one 3 bit error burst per record and smaller blocks may tend to separate two error bursts into separate records.
2. There is no surface analysis support for 3330 for 3340 in IBM software simply because it is not within the capability of the drives to perform more than cursory surface analysis which could be misleading in light of the previous discussion. Keeping a history of failures by track is the only sound approach if one desires to minimize alternate track assignment. There is, however, an undocumented capability in the VS utilities LEHDASDR and IBCDASDI which will analyze 3340 tracks which have been flagged defective.

These programs will do a cursory surface analysis on tracks flagged defective and unflag the track if possible.

ALTERNATE TRACK ASSIGNMENT

NOTE: The following information is for your information only. It is the customers responsibility to use utility programs to format his data modules, and to assign alternate tracks.

DEFINITIONS

Alternate Track

An alternate track is an extra track that can be used in place of a defective track. The 35 Mb data module has 12 alternate tracks, and the 70 Mb data module has 24. These alternate tracks are designated at the plant and are logically addressed as follows:

35 Mb – Cyl 348, Hd 00-11 (Decimal)
70 Mb – Cyl 696-697, Hd 00-11 (Decimal)

Unassigned alternate tracks contain their own logical track address in the CCHH bytes of the HA and RO count field. In addition, bit 7 of the Flag byte in the HA field is set to identify the track as an available alternate.

Defective Track

A defective track is a track with one or more surface defects which cause Read Data checks. When the track is assigned as defective, bit 6 in the Flag byte of the HA field is set, and the RO count field is written with an address pointing to an alternate track.

ASSIGNMENT OF AN ALTERNATE TRACK

1. Bit 6 of the Flag byte in the Flag field on the defective track is set.
2. RO count field on the defective track is written with the CCHH bytes equal to the address of the assigned alternate track.
3. The count field of RO on the alternate track to be assigned is written with the CCHH bytes equal to the address of the defective track. (That is, it points back to the defective track).

OS/VS UTILITIES (Reference OS/VS Utilities, GC35-0005)

General utility programs are available with OS/VS operating systems to aid in alternate track assignment and data module initialization. Because alternate track assignment is a customer responsibility, the following is for information only.

IBC DASDI (Component J741 - SC1 - I1)

An independent or standalone utility used for initializing a disk pack or data module:

- Flag track defective (Save SD)
- Assigns alternate tracks for all tracks flagged defective.
- Write volume label on track 0, record 3.
- Constructs and writes a volume table of contents (VTOC), on cylinder 0 track 0.
- Write an IPL record on track 0.
- Allows tracks flagged defective to be analyzed and reclaimed if they are good.(Release 7.7? and above)
- Allows alternate track assignment for any track, whether it is defective or not. (Tracks with defects in HA or RO are included.)

LEH DASDR (OSVS1 - R3)

An OS/VS system utility used to initialize a data module:

- Performs the same functions as IBC DASDI, except it runs under OS/VS.
- Can be used to dump or restore the contents or a portion of the contents of a 3340 data module. (GETALT).

IEH ATLAS

A system utility used to assign and write an alternate track when defective tracks are indicated:

- Attempts to rewrite defective record (s) with data supplied by user.
- Flags a track defective if it cannot be rewritten successfully.
- Locates and assigns an alternate track.
- Retrieves and transfers usable data records from the defective track to the alternate track.
- Replaces bad record (s) with data supplied by the user.

UTILITIES OS – IEHDASDR

3340 Data Module Initialization Procedure

The following is recommended for 3340 data module initialization in an O/S account.

For a new pack or an unlabeled pack:

1. Vary offline, run IEHDASDR ANALYZE function with passes =0.
2. Vary online, run IEHDASDR FORMAT function.

For a pack with a label and VTOC:

1. Vary online, run IEHDASDR FORMAT (or analyze) function.

To assign an alternate to a defective track:

1. Vary online, run IEHDASDR GETALT function.

IEHDASDR ANALYZE will write a volume label, IPL bootstrap records, IPL test (optional) and construct the VTOC.

IEHDASDR FORMAT will perform the same functions ANALYZE and also write a standard record zero (and erase the remainder of the track) one each track on all cylinders. All defective tracks are listed and alternates assigned for defective tracks. Prior to running FORMAT, the pack must have a valiid label and VTOC. Therefore, on new or u unlabeled packs, ANALYZE must be run before FORMAT.

IEHDASDR GETALT will flag a selected track as defective and assign an alternate.

NOTE: There is a cursory single track surface analysis program for 3340 data modules. Once IEHDASDR GETALT has been used to flag a track, IEHDASDR or IBCDASDI (stand alone) at Release 7.77and above, analyze function will examine the flagged track to determine if it is possible to unflag the primary track. This will prevent using up all the alternates unnecessarily. The following control card parameters may be used to recover flagged tracks.

```
JOB       RECOVER
MSG       TODEV=XXXX, TOADDUR=CUU
DEDEF     TODEV=XXXX, TOADDUR=CUU, VOLID=XXXXX,
          PASSES=1, BYPASS=NO
VLD       NEWVOL=XXXXXX
VTOCD     STRTADR=NNNN, EXTENT=NN
END
```

WARNING: The Surface analysis capability of this program is limited. It cannot effectively isolate marginal tracks. Therefore, a log should be maintained to dertermine tracks causing intermittent Data Checks. These intermittent tracks should also be re-flagged as defective.

OTHER OS/VS UTILITIES AVAILABLE FOR DIRECT ACCESS DEVICES

IBC DMPRS, an independent utility used to dump and restore data on a direct access volume.

IRB COPY, a data set utility used to copy or merge data sets.

IEB UPDTE, a data set utility used to modify an existing partioned or sequential data set. Logical records can be replaced, deleted, renumbered, or added to the member or data set or to try to re-write data record.

IEB ISAM, a data set utility used to copy an indexed sequential data set.

OS/VS SERVICE AIDS - - Reference OS/VS Service Aids, GC28-0633.

SPZAP, a service aid program that operates as a problem program. Can be used to replace, modify, or reconstruct direct access data records that have been destroyed by an I/O error.

DOS/VS UTILITIES – (Reference DOS/VS System Utilities, GC33-5381)

General utility programs are available with DOS/VS operating systems to aid in alternate track assignment and data module initialization. Because alternate track assignment is a CUSTOMER RESPONSIBILTY, the following is for information only.

Initialize Disk (INTDK)

A system utility used to initialize a data module:

- Reads and verifies HA and RO fields.
- (IQ) Write volume label on track 0, record 3. (After reading all HA and RO OK)
- (IS) Contructs and write a volume table of contents (VTOC) on cylinder 0, track 0.

NOTE: Alternate tracks are not assigned for tracks flagged defective. It is assumed that any track that is flagged defective has previously had an alternate assigned. To assign an alternate track, use ALTDK or standalone DASDI. Has no track analyze function.

Assign Alternate Track Disk

Assign Alternate Track Disk (ALTDK)

A system utility used to assign and write an alternate track:

- Flags defective track. (Save SD)
- Locates and assigns alternate track.
- Retrieves and transfers usable data records from the defective track to the alternate track.
- Replaces bad record (s) with data supplied by the user.
- The condition of the defective track is not analyzed.

NOTE: Alternate tracks cannot be assigned for defects in Home Address or R0 count fields (use standalone DASDI 7.77 or above); cannot move HA (float) down the track.

Tracks flagged defective cannot be reclaimed with DOS (use standalone IBC DASDI 7.77 or above). No track analyze function.

OTHER DOS/VS UTILITIES AVAILABLE FOR DIRECT ACCESS DEVICES

Clear Disk -

- To establish preformated tracks (clear) on one (one track) or more extents on a 3348 disk
- Create a file label in the VTOC

Copy and Restore Disk -

Copy volume or file to disk tape or card

Fast Copy Disk Volume – (present version requires 12 PTFs, all are available).

To copy entire contents of a 3348 volume to another 3348 or tape. (multi files)

DOS/Ditto –

A general purpose utility program can copy files from disk to disk or tape or print.

UTILITY PROGRAMMING PROBLEMS

IBCDASDI

Problem: Hangs in Test I/O loop if Data Check occurs in HA.

Status: Pre-assigned APAR # 55821.

Problem: Tracks with no defects, but flagged defective, cannot be reclaimed.

Status: Pre-assigned APAR # 55821

Problem: Documentation (OS/VS Utilities, GC 35-0005) does not contain contain information on reclaiming defective tracks.

Status: Pre-assigned APAR # 55822

Problem: No adequate means exist to ship a standalone version of DASDI to the field.

Status: Will be released on P0531.

INITIALIZE DISK (INTDK DOS/VS REL 29)

Problem: Will not write Vol. ID on DM that has Data Check in any HA or RO field.

Status: DOS System House asked to re-asses this function.

Problem: Program turns on Security Bit with VTOC option, DASD OLTS will not run.

Status: APAR # DY 04293.

ASSIGN ALTERNATE TRACK DISK

Problem: Alternate track cannot be assigned for a track with a defect in the HA or RO field.

Status: APAR # DY04292 - Duplicate or APAR # DY00097.

Problem: Alternate tracks cannot be assigned on volumes without a Volume ID.

Status: DOS System House asked to re-asses this function.

SOFTWARE FIXES FOR 3340 HARDWARE SYMPTOMS

SYMPTOM	SYSTEM	APAR
INTKD turns on security bit in 3340 VTOC DASD OLTS will not run	DOS	DY04293
Can't assign alternate tracks if error in HA or RO	DOS	DY04292
Partial track flagging in 3340, SD bytes set to 0	DOS	DY00097
Job canceled due to not testing device busy condition	DOS	E00164
Loop on CUEND/CUBUSY when running ILTS on 3115	DOS	E02152
Invalid seek address generated when running sort in virtual mode	VS	P22430
Command reject on seek command due to incorrect test for device type		701534
MSG 0P711 issued if extnets allocated larger than necessary	DOS	D01179
Command reject on IPL	DOS	E02159

ERP don't log INT. REQ.	DOS	E03237
STAT MOD and busy from SIO	DOS	DY03238
INLT disk writes wrong F4 label	DOS	DY01288
IFA channel checks not edited for 3340	DOS	E01325
Data checks not printed intermittent	DOS	E03131
Fast copy cancels with MSG 8F28A	DOS	E02888
No record found on compiler	VS	P21366
MSG 8F28A during fast copy	DOS	DY02157
Chan PGM check on skip displacement	DOS	E02753
invalid statistical data in EREP	DOS	E00079
Soft overruns being recorded (only permanent overruns should be logged)	DOS	E00082
Volume statistics summary not printed	DOS	E00080
Invalid data in EREP	DOS	E00060
Wrong length record logged in EREP	DOS	E00062
Write inhibit record logged	DOS	E00081

APPROACH TO INTERMITTENT 3340 PROBLEM (CHECKLIST)

BE METHODICAL

1. Get it resolved so it does not come back to plague you! (Look for trouble).

2. Take an action! Take some corrective action, eliminate a logical part.

3. Card swapping - keep a log on a tab card - attach to machine.

4. Loop a microprogram test likely to fail (use with step 5).

5. Moderate vibration in suspected trouble area or to SLT gate may be effective. Rake cards and pins with folded tab cards.

6. Voltage - Check AC ripple on DC voltages. If exceeds specification take corrective action. See PWR 90.

   Nominal + 6.0V TP = 01AA1J2B11
   +/-5% = +6.30V to 5.77V

   Nominal - 4.0V TP = 01AA1J2B06
   (Not adjustable in B1/B2 boxes)
   +/-5% = -4.20V 60-3.77V

7. VCM temperature should not exceed 79 degrees C. Check fans and filters - location and blockage. See MLM page DM 630.

   1. Main intake filter behind MST gate, under machine at DC box. Keep cables, paper, and cards away. Check the filter on every call, and clean at least every 6 months.

   2. Heat exchanger - insure that air duct is in place and good air flow exists across the heat exchanger, to cool the VCM with recycled air through the absolute filter. Check that air is blowing out top of gate. (DC compartment and A1 A2 boards covered). The operating temperature of the MST cards may be raised by removing the cover from the DC compartment. (Do not leave DC compartment cover off permanently). Exhaust air from the MST logic gate must not exceed 49 degrees C.

NOTE:
The AC box is NOT air cooled and may run above 43 degrees C.

8. Loose screw/wire crimp audit - power off
   AC box
   DC bulk box
   DC regulation box
   Gate terminal blocks

9. Look for shorts/ground - cold flow, tight wire wraps, bent pins or stray lengths of stripped wire. Check base plate grounding.

10. Visual check of cables for chafing, grounding, strain

11. Gather information - core dumps, sense info, log rec, console printouts, OLTs and ST370 errors.

12. Keep a log of failures: FSI, micro, drive, data module S/N.

13. Try to simulate the failure, - any MST 1 line (except Servo Analog signals) may be tied to ground, to force a +MST 1 level.

14. Scope theorized trouble spot - use a systematic investigation. Know what you expect to see.

15. Pulse check signal lines in suspected area.

16. Use baby-sitting devices: probe, latch card, scope DIGITEK.

17. Use all documentation - CEM, RETAIN,MM, MLM, System TMM, SRL. Call your district or FSG and search the hardware and soft - ware data bank.

18. Get away from it all - cup of coffee.

19. Look for noise - scope AC voltage input for noise scope or voltage lines for ripple and noise when customer running scope sensitive circuits. For example: PLO, R/W Data.

20. DC voltages can only be set with digital voltmeter -- critical DC voltages + 6.V and - 4.0V (leave digital voltmeter on voltage to monitor during failure).

21. Don't overlook environment static, electrical noise generators, radar, power line dips and/or transients, and etc.

22. Interchangeability - change entire sections of cards.
    Example: SERVO is contained on 4 cards and Power Amp.

23. Swapping - circuit swapping on higher level - interchange A1 board between drives.

24. Interchange VCMs

25. Unnecessary parts replacement - reinstall original part ASAP when trouble fixed (use card kit).

26. Use phone-call for assistance from district /FSG. Open a RETAIN incident so that the ASG and the PLANT can assist you.

27. Customer relations - keep customer informed of your progress during the problem definition and analyses period.

28. Lower temperature of MST 1 cards with FREON (thermal shock).

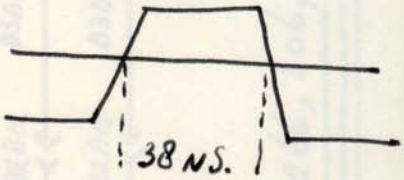
3340-GATE TB 101

1	} GATE THERMAL IN "B" - PWR 214
2	
3	-36V PWR 81+281
4	-24V PWR 51+251+281
5	+6V. PWR 61
6	-12V. PWR 41
7	+12V. PWR 41
8	+12V RETURN PWR 41
9	+6V. " PWR 17+61
10	-4V. " PWR 17.
11	PWR 56.
12	} -4V { PWR 17
13	} { PWR 56
14	36V RETURN PWR 81
15	
16	24V RETURN PWR 51+251
17	n.c OF +6V. PWR 61.
18	n.c.
~~19~~	

NOTES

PLO VFO CARD AT - A2T2
PART Nº # 8238240.
CHANN. 1 to A2T2 J0#5
" 2 to A2T2 B08

VREF. CHAN 2
VFO SS CHAN 1
TRACES AT THE SAME GROUND LEVEL.



THERE MUST NOT BE RUNNING ANY JOB DURING ADJUSTM.
3340 W.T. TIP 039.

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