JVC DATA DRIVE TROUBLESHOOTING GUIDE

To supply basic information needed to troubleshoot the 302B data drives.

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(JVC)   DATA DRIVE ASSEMBLY INFORMATION BOOKLET

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I. Source voltages and signals

   A. Eight (8) pin connector J1 which has eight color coded wires starting with <u>Black</u> and stopping at <u>Violet</u>.

      Pin #1 (Black) GND wire connecting to R/W board @ J11-9

      Pin #2 (Brown) write enable (WRENA) connecting R/W @ J11-7

      Pin #3 (Red) +12VL connecting to R/W board @ J11-6

      Pin #4 (Orange) data output connected to R/W @ J11-5

      Pin #5 (Yellow) +5V connected to R/W @ J11-4

      Pin #6 (Green) ground connected to R/W @ J11-3

      Pin #7 (Blue) track A/B select input connected to R/W @ J11-2

      Pin #8 (Violet) data input connected to R/W @ J11-1

   B. Nine (9) pin connector J2 which also connects to Read/Write J10

      1. Connectors has nine (9) color coded wire starting with <u>black</u> and ending with <u>gray</u>.

         Pin #1 (Black) C.I.P. signal @ J10-9

         Pin #2 (Brown) +12I signal @J10-8

         Pin #3 (Red) motion sense @ J10-7

         Pin #4 (Orange) GND @ J10-6

         Pin #5 (Yellow) speed select @ J10-5

         Pin #6 (Green) stop @ J10-4

         Pin #7 (Blue) go forward @ J10-3

         Pin #8 (Violet) go reverse @ J10-2

         Pin #9 (Gray) brake @ J10-1

      2. See figures 1, 2 for location, 3,4 for schematic.

   C. The ribbon connector connects the Read/Write to servo.

E3 is D +5V source	E9 is stop
E4 is voltage reference	E10 is speed select
E5 is tackout	E11 is GND
E6 is brake	E12 is motion sense
E7 is go reverse	E13 is 12VI
E8 is go forward	E14 is C.I.P.
	E15 is 12 VL

D. Connectors CN2, CN6, and CN7.

Connector CN2.

1 - orange

2 - gray

3 - blue

4 - brown

Connector CN6

1 - forward motor wire - black.

2 - forward motor wire - red and Reverse motor wire - black.

Connector CN7

1 - forward motor wire - red and reverse motor wire - black

2 - Reverse motor wire - red.

E. Read/Write board has CN1 connecting the head wires to the board.

CN1-5 (black) shield of wire GND   Yellow

CN1-4 (blue)   Blue]   Track A

CN1-7 (orange)   Green]

CN1-6 (brown)

CN1-8 (red)

CN1-3 (green)   Red   ]

CN1-2 (yellow)   Brown]   Track B

              Orange]

II. Test and trouble shoot data drive

A. Test data drive using the polish box

1. Make sure power switch is in "OFF" position.

2. Plug data drive into J1 & J2 of polish box.

3. Check J1 & J2 color code to make sure the wiring is correct.

4. Set switches to the following positions:

Stop @ on (LED lit)

Go forward @ off (LED lit)

Go reverse @ off (LED lit)

Speed select @ off (LED not lit)

Brake @ off (LED not lit)

TRK A/B @ B (LED lit)

Write enable/read @ read (LED lit)

Data in @ on (LED lit)

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(NOTE). C.I.P. motors do not work unless stop is in the "ON" position. Make
sure write enable is in read position when not writing.

5. Turn power switch to "ON" position. No motors should be running and
all LED's should be lit, except brake, speed select, C.I.P. and motion.

B. Check C.I.P.

1. Push C.I.P. switch in (located in front of data drive). Should get C.I.P.
light lit, and forward/reverse slow motors running. If not, you have C.I.P.
problem.

C. Check Motion

1. Spin encoder wheel. Motion LED should light. If not, you have motion
problems.

D. Check Forward and Reverse Motors

1. Put forward switch to "ON" position and STOP switch to "OFF" position.

2. Forward motor should be running hard fast, not able to stop. Reverse
motor should be running slow and able to stop with your finger. The Re-
verse motor doesn't have to be running, but will run when encoder wheel
is spun.

3. Turn stop switch to "ON" position and forward switch to "OFF" position.
(LED lit).

NOTE: Forward motor located on right side of data drive just above the en-
coder wheel.

4. Turn reverse switch to "ON" position and then STOP switch to "OFF"
position. Reverse motor (left side of data drive) should be running
hard fast (hard to stop). Forward motor should be slow easy to stop.
The Forward motor doesn't have to be running, but when encoder wheel
is spun the motor should turn until encoder wheel has stopped.

5. Turn stop switch to "ON" position and reverse switch to "OFF" position.

E. Check Speed Select

1. Insert any known good blank tape into data drive (C.I.P. light should
be lit).

2. Using either forward or reverse, put switch in the "ON" position. Turn
STOP switch to "OFF" position. Motion LED should light and tape should
be moving slowly in direction of switch being used.

3. Put speed select switch to the "ON" position. Speed of the tape should
pick up making it go faster.

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4. Turn speed select to "OFF" position.

5. Turn stop switch to "ON" position.

6. Turn either forward or reverse switch to "OFF" position.

7. Both forward and reverse switches should be in the "OFF" position.

F. Check read and write

1. Connect data out of polish box using BNC connector and RG/59 Cable to an oscilloscope.

2. Set oscilloscope switches as follows:
   sec/div @ 20us
   volts/div. @ 1 volt
   AC/GND/DC @ DC

3. Set data in switch of polish box to the "ON" position. (LED lit).

4. Write enable to write position (LED not lit).

5. TRK A/B switch to A position and 8KHZ/16 switch to 8 KHZ position.

6. Insert blank tape. C.I.P. LED should light.

7. Put either forward or reverse switch to the "ON" position.

8. Set STOP switch to "OFF" position. Motion light should be ON and tape moving in direction selected by forward or reverse switch.

9. Oscilloscope will have a 8KHZ square wave appearing on the screen.

10. Flipping data in switch ON, then OFF for reference pattern to look for when trying to read.

11. Set STOP switch to ON position.

12. Motion light should be out and tape should stop.

13. Set either forward or reverse switch that is in "ON" position to "OFF" position and turn the one that is in "OFF" position to the "ON" position.

14. Set write enable switch to read position (LED lit).

15. Turn STOP switch to "OFF" position.

16. C.I.P. and motion LED should be lit and tape should be moving in opposite direction from III A. #7.

17. Oscilloscope should be showing 8KHZ signal that was written earlier with pattern set by data in switch.

18. For writing/or reading on track B, set TRK A/B switch to B position and 8KHZ/16KZ switch to 16KHZ position and complete steps III A. #6 thru #17.

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RELIABILITY ENGINEERING

JVC DATA DRIVE TROUBLE SHOOTING GUIDE

I.   Some data drive problems are assembly problems.   Examples:

1.   Solder shorts

2.   Wiring assembled wrong

3.   Components missing or wrong value

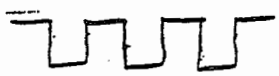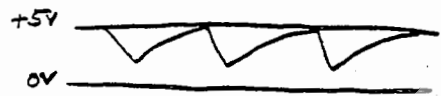4.   Shield shorting to ground or to components

II. C.I.P.   *Cassette in Place*

Check the C.I.P. motors by turning stop switch to the "ON" position and
pushing the C.I.P. button in.   The Forward motor should be turning "CCW"
in slow motor condition and Reverse motor should be turning CW direction.
If C.I.P. doesn't work, check for the following:

1.   Stop switch in the "OFF" position (LED not lit)

2.   Correct wiring at J1 (9 pin connector)

3.   C.I.P. switch bad.

4.   +5 volts at E9 (stop) missing.

5.   Q10 emitter for 3.6 VDC

6.   Q13 collector for 2.4 VDC

7.   Q13 collector should go low while pushing in on C.I.P. switch.

8.   Q13 collector should be +12 volts when the stop switch is in the "OFF"
     position.

9.   Q13 collector +12 volts stays at +12 volts when either Forward or Reverse
     switches are in the "ON" position (LED not lit).   With Forward switch "ON",
     Forward motor should be on hard fast.   With Reverse at the "ON" position,
     Reverse motor should be hard fast.

III. Motion

1.   Information from encoder wheel goes thru 4 wires that connect to Read/
     Write board at CN2.   The four wires are:

     a.   Orange - sinusoidal   wave that goes from zero (0) to twelve (12)
          volts while the encoder wheel is spun.

     b.   Gray = 1.2 VDC.

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       c. Blue - 0 VDC

       d. Brown - 12.2 VDC

2. Check for the signals from encoder at U5.

      Pin 4 -@.5 VDC   spin encoder for

      Pin 5 -@.5 VDC   spin encoder for

      Pin 2 -@.5 VDC   spin encoder for

3. Check for the signals from encoder at U10 while spinning encoder wheel.

      Pin 4   +5 volts amplitude

      Pin 5   +5 volts amplitude (inverted)

      Pin 6   +5 volts amplitude

      Pin 7   +5 volts amplitude (inverted)

      Pin 1   0 VDC

              +5v

      Pin 2   0v

      Pin 10 goes from 0 to +5 volts

4. Common problems found for no motion:

      *Wiring wrong.

      *Broken wires.

      *U10 bad @ pin 10

      *Encoder bad (photo sensor)

      *No voltages to encoder

IV. Motors

1. Set the polish box at the following positions:

       a. Stop - ON - Light lit

       b. Go Forward - OFF - light lit

       c. Go reverse - OFF - light lit

       d. Speed select - OFF - light not lit

       e. Brake - OFF - light not lit

2. With the stop switch at the "ON" position, check for the following voltages:

	Component	Base	Collector	Emitter
	Q2	2.7 volts	11.9 volts	2.1 volts
	Q3	12 volts	2.6 volts	12.2 volts
Fast fwd	Q4	0 volts	2.5 volts	0 volts
Slow Rev.	Q7	0 volts	2.5 volts	0 volts
Slow fwd	Q5	0 volts	2.5 volts	0 volts
Fast Rev.	Q6	- volts	2.5 volts	0 volts

3. With the stop switch at the "OFF" position, check for the following voltages:

	Component	Base	Collector	Emitter
	Q2	11.2 volts	11.8 volts	10.3 volts
	Q3	12.0 volts	12.4 volts	12.4 volts
Fast fwd	Q4	0 volts	12.3 volts	0 volts
Slow rev.	Q7	0 volts	12.3 volts	0 volts
Slow fwd.	Q5	0 volts	12.3 volts	0 volts
Fast rev.	Q6	0 volts	12.3 volts	0 volts

4. Check the voltage reference at U1 (servo board).
   Input +12 volts
   Output +5 volts

5. The square wave coming from the output U10 pin 7 goes thru R126, Q15, R114 to U9 producing a DC voltage for control of the motor speed.

6. With stop switch in the "ON" position, check for the following voltages at U9:

   Pin 12 = .2 volts   Pin 2 = 2.5 VDC
   Pin 13 = 1.2 volts   Pin 3 = 1.2 VDC
   Pin 14 = .1 volts   Pin 1 = .1 VDC

7. With the stop switch in the "OFF" position, check for the following voltages at U9.

   Pin 12 = 1.2 volts   Pin 1 = 6.8 volts
   Pin 13 = 0 volts   Pin 2 = 10.4 volts
   Pin 14 = 11 volts   Pin 3 = 11.3 volts

8. Go Forward

    a. <u>Fast</u> - the Go Forward (+5 volts) goes to U8 pin 9 out U2 pin 3 to Q8 turning Q8 ON. Q8 turns Q4 ON making the Fwd motor run hard fast.

    b. <u>Slow</u> - the Go Forward (+5 volts) also goes to U9 pin 6. The output at U9 pin 7 is a small voltage (1-2 volts) that runs the Reverse motor for tape take up. Q7 slow motor.

9. Go Reverse

    a. <u>Fast</u> - the Go Reverse (+5 volts) goes to U8 pin 1 which is inverted for a low output (0 volts). The output from U8 pin 2 biases Q9 which turns on (biases) Q6 for a hard fast Reverse motor.

    b. <u>Slow</u> - the Go Reverse (+5 volts) also goes to U9 pin 9 which put out a small voltage at pin 8 to turn on (bias) Q5 for slow Forward motor. (take up motor).

10. Common problems with motors:

    a. Motor (only one (1) stays ON slow.
       Cause: Q4 for Fwd, Q6 for Reverse.

    b. Both motors stay on hard fast Q3 bad.

V. <u>Read/Write</u>

  A. <u>Information on Inputs and Outputs</u>

    1. E18 input selects either track A or B using U2, U1, and Q1 for track B, Q2 for track A.

    2. E23 (wrena) (+5 volts) goes to U2, U1, which supplies signal to U3 for writing mode.

    3. Data input - is data supplied to the drive to be written on the tape at E17 which goes to U1 along with write enable for two inputs at U1.

    4. Data Output (E21) comes from U2 only if stop is at "OFF" position.

  B. <u>Check Points</u>

    1. With track select switch set at B for 16 KHZ, set the 8 KHZ/16 KHZ switch to 16 KHZ and the write enable switch to the write position.

	TRACK A	TRACK B
8 KHZ U3 pin 4		
8 KHZ pin 11		
16 KHZ pin 15		
16 KHZ pin 2		

50 mv

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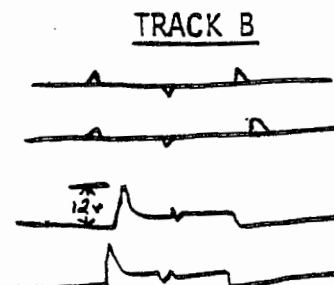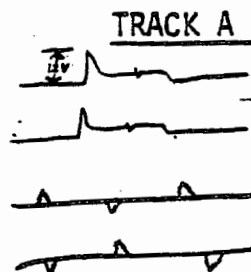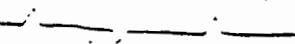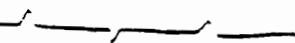
2. U3 pin 13 & 3 = 6 VDC
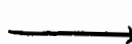
3. U4 pins 12, 13, 9, 10, = 6 VDC
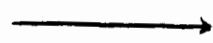
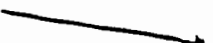   U4 pins 2 &3   Scope set @ .5/cm
                              10us/cm

   ⌐⌐⌐⌐⌐ 8 KHz

   ⌐⌐⌐⌐⌐ 16 KHz

4. U4 pin 1 amplified to 5 VDC. ⟶

5. U4 pin 6 - 6 DC level. ⟶

   U4 pin 7 - 3 VDC level. ⟶

6. U5 pin 7 - 6 VDC level. ⟶

   Pin 6 - 6 VDC level.(Same as U4 pin 7)

   Pin 1 - 11.5 pp ⟶

   U5 pin 13 stop at on ⟶

7. U2 pin 1   ⌐32us⌐   35us

   pin 2   ⌐35us⌐   32us

8. U2 pin 3   ⌐35us⌐   32us

9. U2 at track A

   Pin 5 = 0 V

   Pin 6 = 5 V

5 VDC level

At track B

Pin 5 = 4 VDC

Pin 6 = 0 VDC

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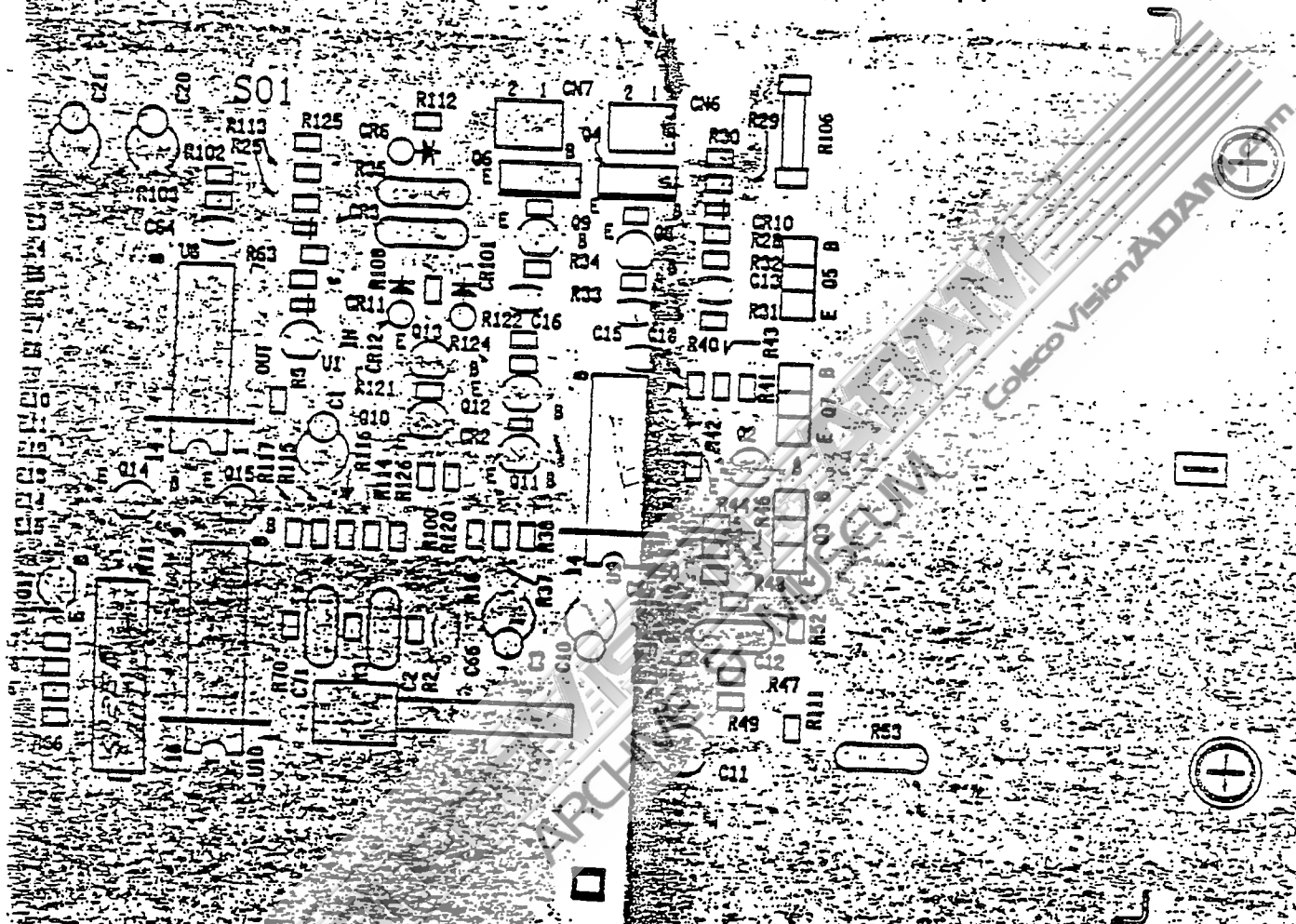
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FIGURE #1

FIGURE #2

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| NAME | P.W.BOARD (サービス図 |

SCHEMATIC DIAGRAM (READ/WRITE)

S41445-