CP-1027

SERIAL NO. 3112

ONKYO® SERVICE MANUAL

DIRECT DRIVE FULLY AUTOMATIC TURNTABLE MODEL CP-1027F

TABLE OF CONTENTS

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

Type:	Direct drive fully automatic turntable with auto lead-in and return, reject, repeat and cue button function; two-motor micro-computer design.
Turntable Platter:	310 mm (12-1/4") aluminum die-cast
Motor:	Electronic servo direct drive brushless DC motor
Speeds:	33-1/3, 45 rpm, adjustable ±3%
Wow & Flutter:	less than 0.028% (WRMS)
Signal-to-Noise Ratio:	better than 70 dB (DIN B)
Tonearm:	Statically balanced straight type
Effective Arm Length:	224 mm (8-7/8")
Overhang:	13 mm (1/2")
Offset Angle:	21 degrees
Maximum Tracking Error:	+3 degrees, −1 degree
Suitable Cartridge Weight:	Min. 5, Max. 9 grams
Tracking Force:	0 – 3.0 grams
Other Features:	Tracking force direct readout scale Removable headshell Anti-skating device
Cartridge (Except 120V model):	Moving magnet type
Type:	OC-51M
Frequency Response:	20 – 20,000 Hz
Recommended Load Impedance:	47 kohms
Recommended Tracking Force:	2 grams
Compliance:	8×10^{-6} cm/dyne
Output Voltage:	3.5 mV
Stylus Tip:	0.5 mil diamond
Replacement Stylus:	DN-51ST
Power Supply:	AC 120 V, 60 Hz AC 220 V, 50 Hz AC 240 V, 50 Hz AC 110-120/220-240V, 50/60 Hz
Dimensions (WxDxH):	418 x 380 x 135 mm (16-1/2" x 15" x 5-3/8")
Weight:	5.0 kg (11 lbs.)
Accessories:	Headshell, counterweight, adapter, instruction manual
Optional Recommended Headshell:	SH-21F

Specificaitions are subject to change for further product improvements.

CIRCUIT DESCRIPTION

1. Explanation of Operations

1-1. Automatic Operation Section

This turntable features fully automatic operation which is performed by IC201 (TMP4310AP4411) microcomputer.
Operation commands are transmitted to the micro-computer from the switches.

*Operations of each part

Arm motor:	A pulse motor in which one pulse is 18° rotates by the 2-phase excitation method to create the power for fully automatic operations.
Plunger:	Works as a clutch to switch the movement of the pulse motor between moving the tonearm laterally and moving the lifter up and down.
Leaf switch: (SW205)	This switch determines whether the tonearm is up or down. (off when up, on at all other times)
Microswitch: (SW206)	Functions as the tonearm location sensor. The lead-in count for automatic operation is performed by counting the number of pulses of the pulse motor from this point. Also functions as the arm switch for manual operations.
Cam gear:	This causes the leaf switch (SW205) to operate and also has the slope for the elevation shaft that moves the tonearm up and down.
Pulley assembly:	The tonearm moves when the outer rubber ring comes in contact with the idler shaft on the gear side. SW205 is turned on and off by the rotation of the pulley assembly which also turns the return sensor on and off.

1-2. Order of Fully Automatic Operations

*Play

1. When the PLAY/REJECT button is pressed, IC201 terminal 18 becomes L, the pulse motor control terminal 11 goes from L to H and the pulse motor begins to rotate counter-clockwise.
2. In the same manner, the DD motor control terminal 15 goes from H to L and Q208 turns on to start the DD motor rotating. The speed indicator LED also illuminates.
3. The rotation of the pulse motor causes the cam gear to turn and the elevation shaft to rise.
4. As the elevation shaft rises, the leaf switch (SW205) turns off and the pulse motor stops for an instant (about 0.2 seconds).
5. Next, the terminal changes from L to H, Q204 turns on and the plunger goes to on.
6. The plunger causes the pulse motor rotations to be transmitted via the pulley by the idler to start moving the tonearm.

7. The pulses of the pulse motor are counted from the point where the rest switch (SW206) changes from off to on and moves the tonearm to the 30cm or 17cm lead-in point (according to the command of the size switch – SW204: 30cm when terminal 2 is H and 17cm when it is L). Note that the number of pulses is adjusted by adjusting the lead-in adjustment jumper wire.

8. Terminal 12 goes from H to L and the plunger goes to the off position to stop the tonearm movement. Then the pulse motor begins to rotate clockwise.
9. The cam gear starts to rotate in the opposite direction mentioned above and the leaf switch (SW205) immediately turns on. From that point, the pulses are counted and the tonearm stops at the down position to begin record play.

*Reject
1. Same as number 1 of the play section.
2. Same as number 3 of the play section.
3. Same as number 4 of the play section.
4. Same as number 5 of the play section.
5. The pulse motor starts to rotate clockwise and the plunger moves so the rotations are transmitted by the pulley to start moving the tonearm toward the arm rest.
6. The rest switch (SW206) switches from off to on to start counting the number of pulses to the arm rest. Terminal 15 of IC201 goes from L to H, Q208 turns off and the DD motor stops.
7. When the number of pulses to the arm rest has been counted, terminal 12 goes from H to L, the plunger goes to the off position, the tonearm stops moving and the revolutions of the pulse motor are transmitted to the cam gear.
8. The cam gear begins to rotate (clockwise) and the leaf switch (SW205) switches on. From that point on, the number of pulses is counted and the tonearm stops in the down position in the arm rest.

*Cueing (UP)
1. When the CUEING button is pressed, IC201 terminal 1 goes from H to L, the pulse motor rotates clockwise and turns the cam gear in the counterclockwise direction (toward the rear).
2. When the tonearm is up and the leaf switch (SW205) is off, the pulse motor stops.

*Cueing (DOWN)
1. When the tonearm is up (SW205 is off) and the CUEING button is pressed, the pulse motor rotates counterclockwise and turns the cam gear in the clockwise direction.
2. The leaf switch (SW205) goes from off to on and the pulses are counted from that point until the tonearm stops in the down position.

*Auto-Return
1. When the return circuit (circuit no. 700, circuit no. 300) operates, IC201 terminal 19 goes from H to L.
2. From this point on, operation is the same as reject.

*Repeat
1. Same as number 1 of the auto-return section.
2. Same as number 1 of the reject section.
3. Same as number 2 of the reject section.
4. Same as number 3 of the reject section.
5. Same as number 4 of the reject section.
6. Same as number 5 of the reject section.
7. When the rest switch (SW206) goes from off to on, the number of pulses to the arm rest is counted. When the count is completed, the pulse motor rotations change to the counteer-clockwise direction and the tonearm moves in the play direction again.
8. Same as number 7 of the play section.
9. Same as number 8 of the play section.
10. Same as number 9 of the play section.

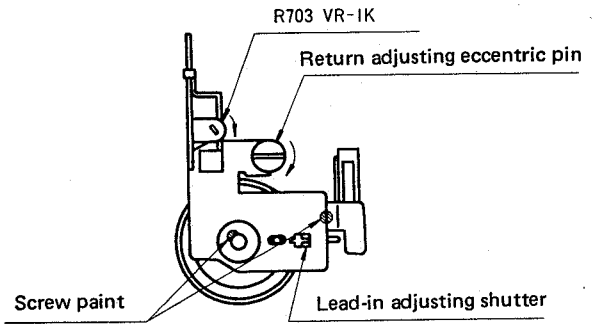
ADJUSTMENT PROCEDURES

1. Lead-in Adjustment

Roughly adjust the pulley shutter so the stylus lowers approximately into the lead-in grooves of a record. Next, adjust the jumper circuit (J220 – J225) on the printed circuit board (NADG-1046).

Press the record size selector to 30cm position and confirm the lead-in position. When outside the lead-in position, connect or cut the jumper wires by referring to the below table.

	Cut	Connect
J225	inner	outside
J220	0.3 mm	
J221	0.6 mm	
J222	1.2 mm	
J223	2.4 mm	
J224	4.8 mm	



2. Auto-Return Adjustment

2-1. Sensitivity Adjustment

*Remove the DD motor and arm motor connectors and connect a millivoltmeter between the GND and "IN" of the terminal of DG-AS (NADG-1046).

*Move the tonearm to the innermost part of the the record and, in a position such that the pulley and deflection pin do not cover the end sensor (D701, D702), turn R703 counterclockwise as far as it will go and read the value on the millivoltmeter. (should be about 100mV)

*Next, turn R703 clockwise to the point where the millivoltmeter value has changed 2 – 3mV and set R703 at that point.

Notes: 1. Do not cover the light of the outdoor during adjustments.
2. If parts on the printed circuit board of RET-AS are replaced, perform the sensitivity adjustment procedure described above. No adjustments are necessary when other parts are replaced.

2-2. Auto-return position

Adjust the return position by the eccentric pin attached by the tonearm base. To adjust the return position for faster, turn the eccentric pin clockwise. To adjust the return position for later, turn the eccentric pin counter-clockwise.

3. Tonearm Height Adjustment

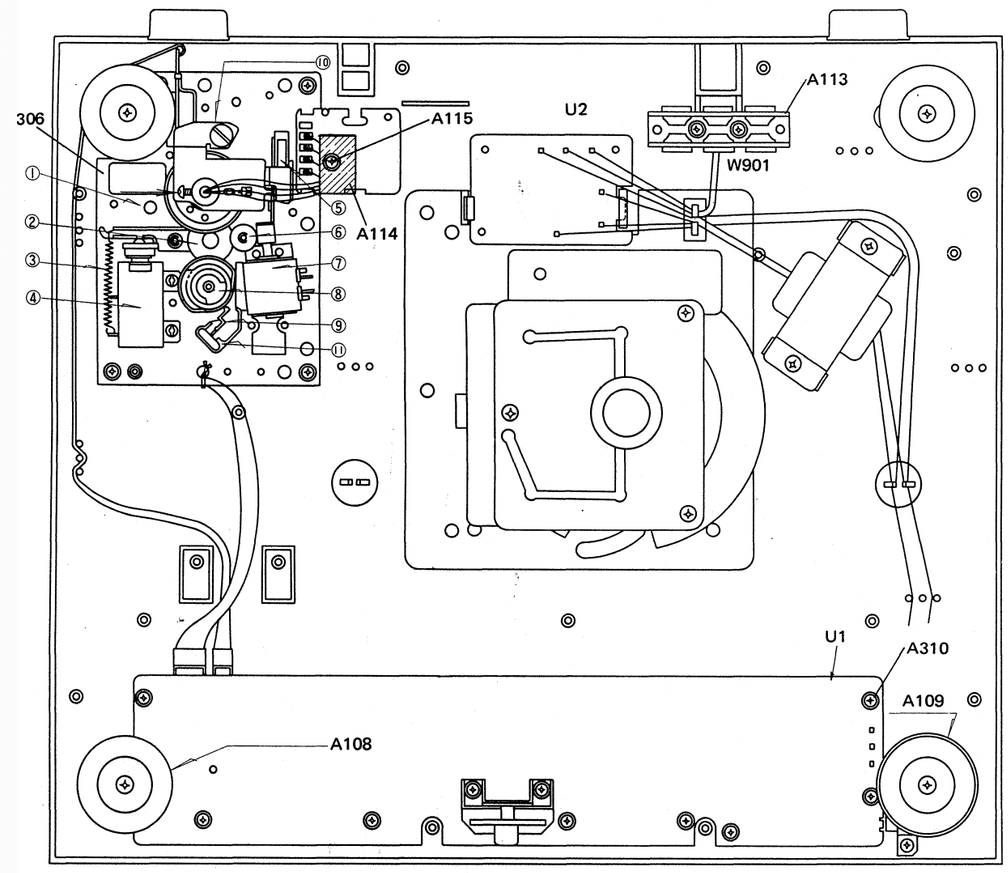
Turn the adjustment screw on top of the elevation section clockwise to lower and counterclockwise to raise the height of the tonearm during fully automatic operations.

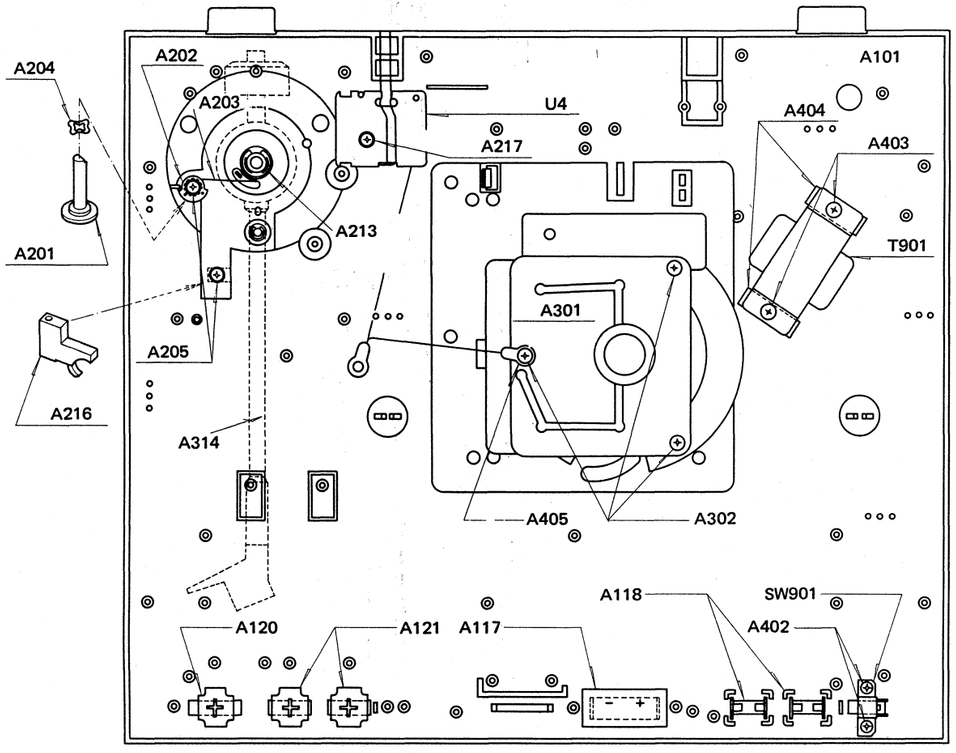
specification 13 ~ 15mm

4. Speed Adjustment

Set the speed control VR of the operation section to about its mechanical center and, after confirming that the green LED in the speed indicator window is illuminated, adjust VR-45 and VR-33 on the main motor so that a 3kHz test record is 3,000Hz at 45 rpm and 3,000Hz at 33 rpm.

COMPONENT LOCATION



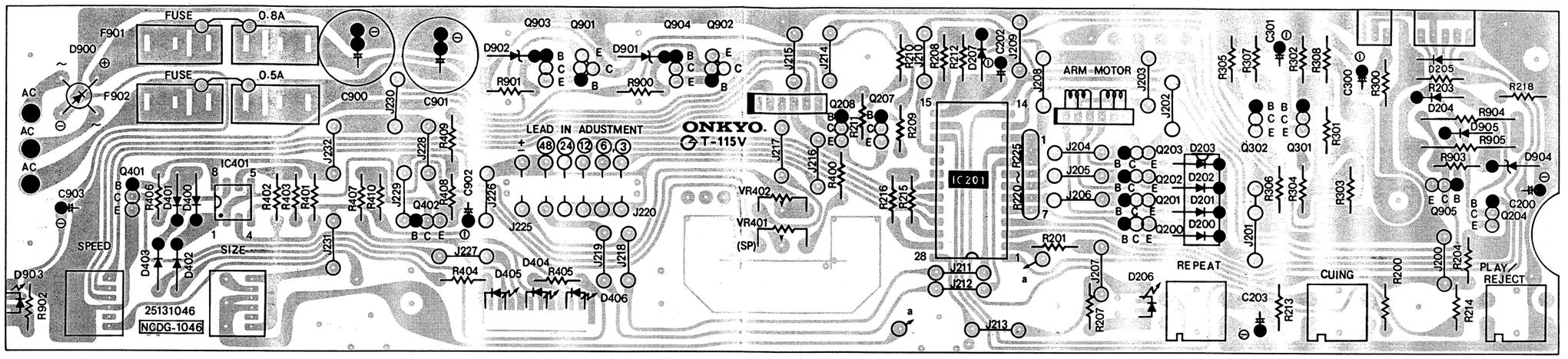


PARTS LIST

SYMBOL NO.	PARTS NO.	DESCRIPTION
A101	28110210	Cabinet ass'y
A103	27262086	Plate, switch
A104	27170086Z	Bottom board
A105	831130100	3TTW+10P, Tapping screw for bottom board
A106	24509215	Dust cover ass'y
A107	28180062	Hinge
A108	24509232	Insulator
A109	27270058	Spacer
A110	833140120	4TTP+12P, Tapping screw
A111	833140200	4TTP+20P, Tapping screw
A112	27140449	Bracket, volume
A113	28400010	Holder, power supply cord
A114	27150133	Shielded plate
A115	831130100	3TTW+10P, Tapping screw
A117	28191070	Clear plate
A118	28320446	Knob S
A119	28320489	Knob M, Power
A120	28320517	Knob LT
A121	28320518	Knob MT
A201	28320490	Knob, IFC
A202	28400012A	Cam, IFC
A203	27180071	Spring, IFC
A204	870071	Wave washer
A205	831130100	3TTW+10P, Tapping screw
A208	24501363	Lifter plate
A209	27260054	Lifter shaft
A210	24506533	Screw
A211	27180067	Spring
A212	27180068	Spring
A213	8930305	Circlip
A216	28400013	Tonearm rest
A301	24502123	Motor
A302	833140120	4TTP+12P, Tapping screw
A304	24502120	Turntable platter
A306	24506534	Fulley automatic mechanism ass'y
1		Mechanism ass'y
2	24504310	Lever
3	24503100	Spring
4	24506474	Solenoid
5	24503108	Microswitch
6	24503097	Wheel
7	24502125	Motor
8	24503098	Cam wheel
9	24503102	Leafswitch
10	24506536	Pulley ass'y
11	24506463	Cover
A307	27140411	Bracket L
A308	834130082	3STS+8BQ, Tapping screw
A310	831130100	3TTW+10P, Tapping screw
A314	24501383	Tonearm ass'y
	24501321A	Screw, headshell
	24501385	Counter weight
	24501354	Headshell
	24501330	Cartridge mounting part ass'y (D)
	24501346	OC-51M, Cartridge (G/Q/U)
	24501308	DN-51ST, Stylus (G/Q/U)
	24501283	Stylus cover (G/Q/U)
	24501287	Screw (G/Q/U)
	24501123	Nut (G/Q/U)
	24500079	Washer (G/Q/U)
A318	28140340	Cushion
A319	870073	W10x18x1, Washer
A320	890010	E-8, Circlip
A401	831130100	3TTW+10P, Tapping screw
A402	833130100	3TTP+10P, Tapping screw
A403	833140120	4TTP+12P, Tapping screw (D)
	833140200	4TTP+20P, Tapping screw (G/Q/U)
A404	270520	Support (D)
	27265035	Ring (G/Q/U)
	87614012	W4x12F Washer (G/Q/U)
A405	251073	Terminal
D701, D702	225049 or 225050	SEL1121R (B) or SEL1121R (C), L.E.D.
SW901	25035267	NPS-111-L231P, Power switch
T901	230518	NPT-735D, Power transformer (D)
	230515	NPT-746G, Power transformer (G)
	230522	NPT-746AG, Power transformer (U)
	230527	NPT-746Q, Power transformer (Q)
U1	16644546A	NADG-1046a, Digital and power supply pc board ass'y (D/G/Q)
U1	16640546B	NADG-1046b, Digital and power supply pc board ass'y (J)
U2	16639547A	NAPS-1047a, Power supply pc board ass'y (D)
	16644547B	NAPS-1047b, Power supply pc board ass'y (G)
	16640547C	NAPS-1047c, Power supply pc board ass'y (U)
	16643510D	NAPS-1047d, Power supply pc baord ass'y (Q)
U3	16626517A	NARET-917a, Return circuit pc board ass'y
U4	16627510	NAPI-1010, Output terminal pc board
W901	253099A	AS-UC-3, Power supply cable (D)
	253083	AS-CEE, Power supply cable (G/U)
	253077	Power supply cable (Q)

Note:
(D): Only 120V model
(G): Only 220V model
(Q): Only 240V model
(U): Only universal model

PRINTED CIRCUIT BOARD VIEW FROM COMPONENT SIDE



PRINTED CIRCUIT BOARD — PARTS LIST

DIGITAL AND POWER SUPPLY CIRCUIT PC BOARD (NADG-1046a/b) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
IC201	222622	TMP4310AP, Micro computer
IC401	222465	NJM4558D, Operation amplifier
	Transistors	
Q200–Q203	2211544	2SC1959 (Y)
Q204	2201291, 2201292 or 2201293	2SD985 (K), 2SD985 (L) or 2SD985 (M)
Q207, Q208	2211254 or	2SC1815 (Y) or
Q301, Q302	2211255	2SC1815 (GR)
Q401, Q903		
Q402	2211454	2SA1015 (Y)
Q901, Q902	2201074	2SD880 (Y)
Q905	2211611	2SD471 (K) (D/G/Q)
Q905	2201074	2SD880 (Y) (U)
	Diodes	
D200–D205	223105 or	1S1555 or
D207, D905	223133	DS442X
D400–D403		
D900	223869	W01
D901	224096	GZA5.6U
D902	224120	GZA18U
D904	224113	GZA13L
	L.E.Ds	
D404	225051 or 225052	SEL1321G (B) or SEL1321G (C)
D405, D406	225049 or 225050	SEL1121R (B) or SEL1121R (C)
	Capacitors, elect.	
C200	352780339	3.3μF, 50V
C202, C203	352780109	1μF, 50V
C300	352734709	47μF, 10V
C301	352733309	33μF, 10V
C900	352761029	1,000μF, 35V
C901	352751029	1,000μF, 25V
C902	352763309	33μF, 35V
C903	352744709	47μF, 16V

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Resistors	
R205	441521024	1kΩ, 1/2W, Metal oxide film
R220–R223	49121152504	1.5kΩx4, 1/8W, Network
VR401, VR402	5148051	N16RG2KB15, Speed control variable
R904, R905	441722004	20Ω, 2W, Metal oxide film (D/G/Q)
R904, R905	441723304	33Ω, 2W, Metal oxide film (U)
	Sockets	
P204	25050085	NSAS-6p-061, DD motor
P205	25050084	NSAS-6p-060, Tonearm control motor
	Plugs	
P209	25055039	NPLG-3p-30
P210	25055041	NPLG-5p-31
	Switches	
SW201–SW203	25035089	NPS-111-S54, Play, reject, repeat, cueing
SW204, SW401	25035215	NPS-122-L179, Size, speed
	Back plate	
A118	28133037	
	Knob	
A123	24506402-1	Speed
	Radiator	
	27160029	
	Screws	
	82113006	3P+6FN, Pan head

RETURN DETECTOR PC BOARD (NARET-917a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Transistor	
Q701	2211255 or 2211254	2SC1815 (GR) or 2SC1815 (Y)
	L.E.D.	
D701	225053 or 225054	SEL111OR (B) or SEL111OR (C)

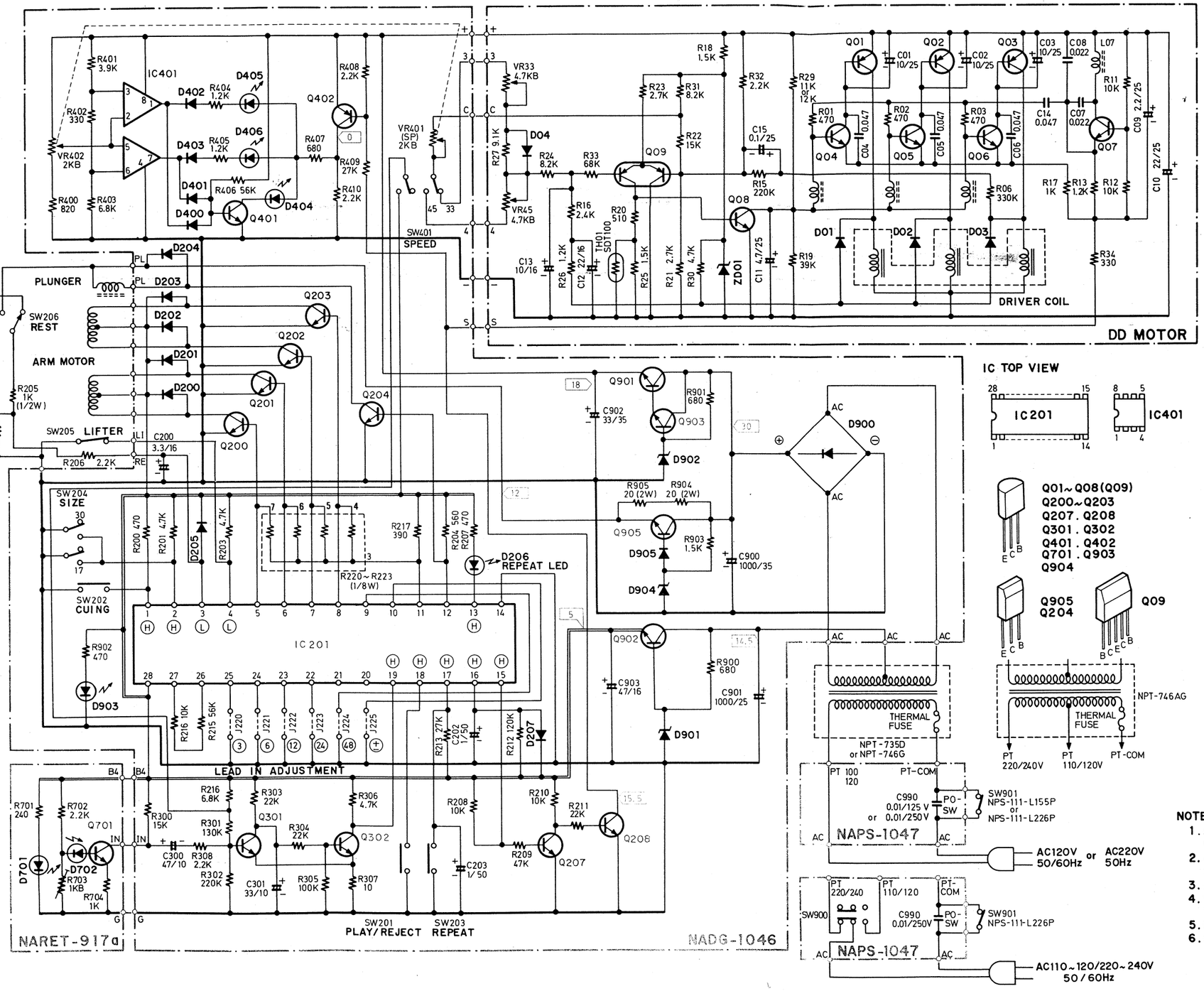
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Photo diode ass'y	
D702	225055	SP-254SHO
	Semi-fixed resistor	
R703	5215051	N08HR1KBF, Return sense adjustment
	Socket	
	25050083	NSAS-3p-059

POWER SUPPLY PC BOARD (NAPS-1047) – PARTS LIST

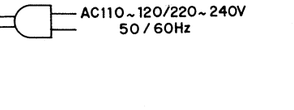
CIRCUIT NO.	PARTS NO.	DESCRIPTION
C100	3500060	0.01μF, 125V, CS (D)
C100	3500058	PME265MB510, IS (G), (U)
C100	3500065	DE7150FZ103PAC400V, IS (Q)
S900	25065109	NSS-2255P, Voltage selector (U)

Note:
(D): Only 120V model
(G): Only 220V model
(U): Only Universal model
(Q): Only 240V model

SCHEMATIC DIAGRAM



IC TOP VIEW



Q01~Q08(Q09)
Q200~Q203
Q207. Q208
Q301. Q302
Q401. Q402
Q701. Q903
Q904

Q905
Q204

Q09

Q901. Q902

D206. D405
D404. D406
D903

D701

D702

IC201	TMP4310AP(4411)
IC401	NJM4558D
Q01~Q03	2SA952 2SB561 2SA509 2SB605
Q04~Q08	2SC945 2SC2320 2SC372 2SC458 LC945 2SC536 2SC828 JA1350 2SC1815 2SC733 2SC2021
Q09	2SA798 2SA733 x2 2SA999 x2 2SA608 x2 2SA640 x2 LA733 x2 2SA933 x2 2SA1015 x2 2SA564 x2
Q200~Q203	2SC1959
Q204	2SD985
Q207. Q208 Q301. Q302 Q401. Q903 Q904. Q701	2SC1815 2SC945
Q905	2SD471 (2SD880)—UU
Q901. Q902	2SD880
Q401	2SA1015
D01~D03 D04	1S953
ZD01	RD5.1E H25C
D200~D205 D207. D905 D400~D403	DS442X 1S1555
D206. D405 D406. D903	SEL1121R
D404	SEL1321G
D900	W01
D901	GZA5.6U
D902	GZA18U
D904	GZA13L
D701	SEL1110R
D702	SP29S SP254S

R220~R223 RESISTOR NETWORK
RM 1/8GK-1.5K x 4

NOTE

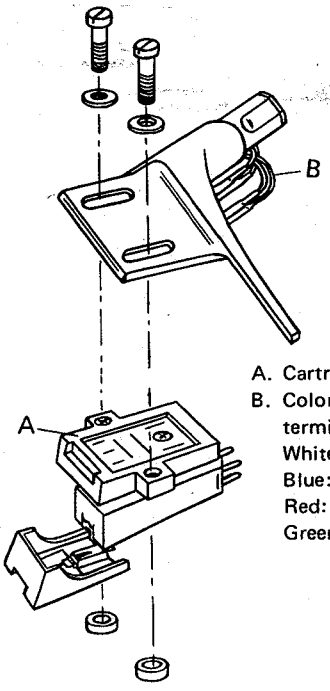
1. ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS ARE IN μF, 50WV UNLESS OTHERWISE NOTED.
3. ELECTROLYTIC CAPACITORS (⊣⊢) ARE IN μF/WV.
4. VOLTAGE IS MEASURED WITH V.T.V.M. WHEN TONEARM IS IN REST POSITION. (▭)
5. Ⓛ,Ⓗ SYMBOLS SHOW WITH THE POSITIVE LOGIC.
6. CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

ONKYO CORPORATION

SERVICE GUIDE

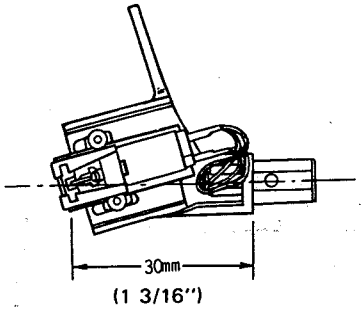
1. Attaching the cartridge

Attach the cartridge as shown below, connecting each of the color coded lead wires to the proper terminal. If a mistake is made, no sound will be heard or stereo reproduction will be lost. Also, to prevent damage to the stylus during installation operations, leave its cover on or remove the stylus completely.

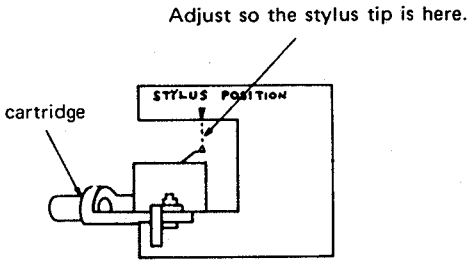


A. Cartridge
B. Colors of the headshell lead wires and cartridge terminals:
White: left channel signal (L)
Blue: left channel ground (LE or LG)
Red: right channel signal (R)
Green: right channel ground (RE or RG)

Adjust so the distance between the stylus tip and the base of the headshell is 30 mm (1 3/16") and tighten the screws. This assures the effective length and overhang of the tonearm are correct.



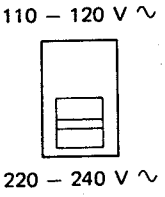
Use the included overhang gauge as shown below, placing the cartridge in the gauge and setting the location of the stylus tip as indicated.



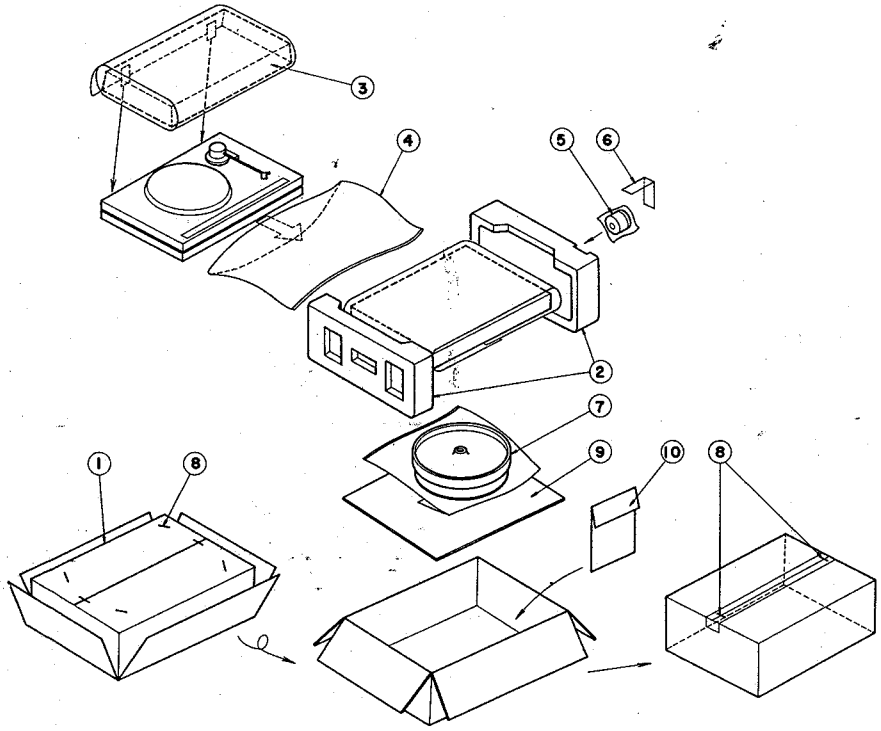
After attaching a different cartridge, always balance the tonearm again and set the appropriate tracking force.

2. Voltage selector (Universal model)

The voltage selector is located on bottom of the cabinet. If a voltage change is necessary, change the voltage selector switch to the proper voltage.



PACKING PROCEDURES



REF. NO.	PARTS NO.	DESCRIPTION
1	29050460	Master carton box
2	29090568	Pad
3	29100050	Protection bag
4	29100049	460x620mm, Poly bag
5	29100002	80x150mm, Poly bag
	24501385	Counter weight
6	260013	Tape
7	29100046	370x470mm, Poly bag
	24509111-1	T.T mat
	24502120	Turntable platter
8	282301	Sealing hook
9	29090566	Pad sheet
10		Accessary bag ass'y
	29340519	Instruction manual (D)
	29340520	Instruction manual (G/Q/U)
	24509197	Overhang gauge
	292049A	45 r.p.m. adaptor
	29365006	Warranty card (N)
	29365005-3	Warranty card (V)
	29358002	Service station list (N)
	24501330	Cartridge mounting parts ass'y (D)
	25055018	CV-K-1, Conversion plug
11	260012	Damplon tape

Note:
(N): Only U.S.A. model
(U): Only West Germany model
(G): Only 220V model
(D): Only 120V model
(Q): Only 240V model
(U): Only Universal model

ONKYO CORPORATION
International Division: No. 24 Mori Bldg., 23-5, 3-chome, Nishi-Shinbashi, Minato-ku, Tokyo, Japan
Telex: 2423551 ONKYO J. Phone: 03-432-6981

ONKYO U.S.A. CORPORATION
Eastern Office
42-07 20th Avenue, Long Island City, New York 11105, U.S.A. Phone: (212) 728-4639
Midwest Office
935 Sivert Drive, Wooddale, Illinois 60191, U.S.A. Phone: (312) 595-2970
C/O Damark Industries, Inc.
20520 Nordhoff Chatsworth, Cal. 91311, U.S.A. Phone: (213) 998-6501

ONKYO DEUTSCHLAND GMBH, ELECTRONICS
8034 München-Germering, Industriestrasse 18, West Germany. Telex: 521726 Telefon: (089)-84-3071

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