Dual

CS 606

Owner's manual

Semi-automatic single-play turntable
with electronically-regulated direct drive
and ULM (Ultra Low Mass) tonearm

Introduction

You now own one of the finest turntables made today, one which will make your records more enjoyable than ever before.

In addition to your turntable's superb performance, you will appreciate its ease and simplicity of operation and in time, its long-lasting reliability.

Before proceeding with the installation, please read through this manual carefully. This will help prevent any problems from incorrect installation or imprecise tonearm settings.

If you should have any questions about your Dual's operation or performance, please contact us. We would also appreciate your comments on the enclosed warranty card.

We appreciate your selection of Dual and hope you will have countless hours of musical enjoyment.

Contents

WARNING: To prevent fire or shock hazard, do not expose this product to rain or moisture.

Dual
CS 606

17   16   15   14

Fig. 1

Fig. 2

Fig. 3

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13   12   11

Dual 606   ELECTRONIC DIRECT DRIVE
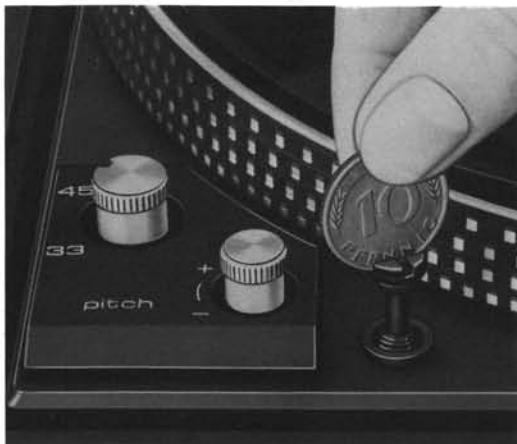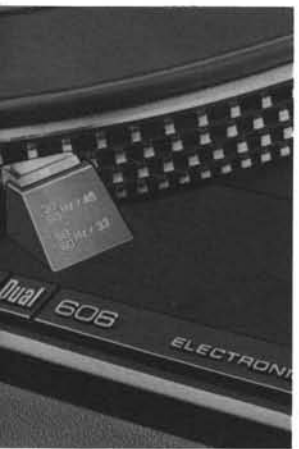
Fig. 4

anti-skating

Fig. 5

Features of the Dual CS 606

(1) Adjustment screw for tonearm height
(2) Tonearm counterbalance with tunable anti-resonator
(3) Locking screw for tonearm counterbalance
(4) Tracking force setting
(5) Alignment screw for tonearm set-down point
(6) Anti-skating setting
(7) Tonearm lock
(8) Tonearm post with tonearm rest
(9) Leed-in-groove sensor
(10) Cue control
(11) Illuminated stroboscope
(12) Tonearm lift/ULM stylus lock
(13) Cartridge attachment screw
(14) Record spindle (and motor shaft)
(15) Transport locking screw (one of three)
(16) Pitch control
(17) Speed selector

Installation

Unpacking and setting up

Unpack the CS 606 according to the separate descriptive sheet in the carton.

The chassis is secured to the base by three self-contained transit screws. To release the chassis from its transit position, turn each screw clockwise. At mid-position, each screw will disengage. Continue to turn clockwise until each screw is tightened in the chassis (B).
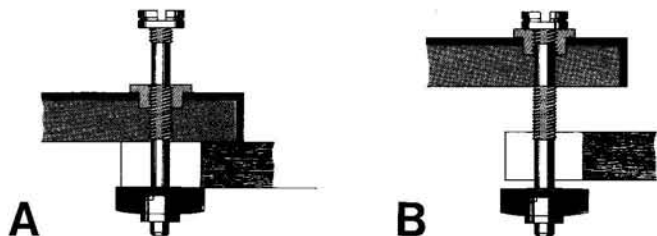
Now lower the platter over the top of the rotor so that the top of the motor shaft comes through the center hole of the platter.

Note: Reverse all these procedures whenever the Dual is to be moved for any distance. Be sure to lock the transit screws in their up-positions and remove the platter to prevent damage.

Attaching the dust cover

The base is provided with special spring-loaded hinges which allow the cover to remain open at any angle.

To install the dust cover, turn the base around so the hinges are readily accessible.

Parallel the rear panel of the cover to the receiving slots on the hinges (the angle is 60°) and press the bottom edge into the slots. The cover is removed in the same manner.

(The cover is kept in any desired open position by the spring tension of the hinges). To adjust the spring tension, turn both screws. In most cases a half turn will be sufficient.

Connections to power supply

You can plug the line voltage cord of your Dual either into the convenience outlet on the back of your amplifier or directly into a house outlet. The AC plug is polarized and requires a polarized outlet. If the amplifier AC outlet is switched, the amplifier's on/off switch will control the power to the Dual.

Connections to amplifier

1. The black phono cable is for the right channel, the white cable for the left channel.
2. Connect the ground wire of your Dual to the grounding screw on the rear of your amplifier.

Installing cartridges

Note: If you purchased your Dual turntable with a ULM cartridge, it has already been installed and mounted in the tonearm. The information in this section need be referred to only if your should ever wish to replace your ULM cartridge with another ULM cartridge or to install a standard cartridge with 1/2-inch mounting centers. (You will need a small screwdriver.)

Removing ULM cartridge

1. The ULM cartridge in its mounting plate is secured to the tonearm head by an attachment screw **(13)**. There may also be an additional small screw (Fig. 6/S) inserted in the tonearm head at the side of the attachment screw. If so, remove this first and set aside. (Its function is to prevent removal of the stylus assembly).
2. Turn the attachment screw counterclockwise while holding the cartridge which will be loosened and then detached from the tonearm head. (This screw is permanently attached to the tonearm head.)
3. To replace a ULM cartridge, reverse the above procedures. (ULM cartridges are provided already mounted to the ULM mounting plate.)

Installing 1/2-inch cartridges

1. Detach the tonearm leads from the ULM cartridge pin holder.
2. Use the mounting accessories provided with the turntable. These include: a mounting plate, screws, nuts, spacers and a gauge.
3. Attach the 1/2-inch cartridge to the mounting plate using either the hardware provided with the turntable or with the cartridge. Depending on the depth of the cartridge body you may need to use spacers between the mounting plate and the cartridge. The use of the gauge described below will indicate this. Do not tighten the mounting screws yet.
4. Use the gauge as shown in figure 9 to check the orientation of the cartridge in the mounting plate. Viewed from above, the stylus tip should be in the V-shaped recess of the gauge. Viewed from the side, the stylus should be in the rectangular gap. When the cartridge is correctly positioned, carefully tighten the mounting screws. Then check with the gauge once again to make sure the cartridge has not shifted when being tightened.
5. Connect the tonearm leads to the cartridge pins, following this color code:
Red   R   (right channel)
Green GR   (right channel ground)
Blue   GL   (left channel ground)
White   L   (left channel)
6. Place the mounted cartridge under the tonearm head so that the pins on the top surface of the mounting plate fit into the corresponding holes on the bottom surface of the tonearm head.
7. Secure the cartridge in place by turning the attachment screw clockwise **(13)**.

Tuning mechanical anti-resonance filter

The tuning anti-resonator enables optimum adaptation of the tonearm to the cartridge being used. Not only Dual ULM cartridges but also conventional 1/2" cartridges can be optimally adapted with this device. For the ULM cartridge or for the 1/2" cartridge you can find the value to be set in the following diagram.

Locate the total weight of the cartridge including mounting hardware on the horizontal scale. Move up to the point on the line corresponding to the compliance of your cartridge. Then look at the vertical scale at left and read off the optimum tuning value.
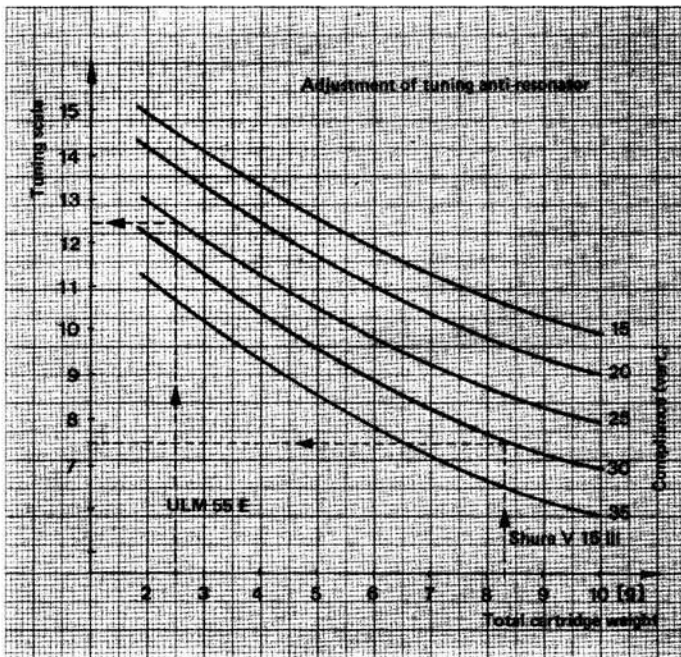
Net weight and compliance of cartridge can be found in its accompanying data sheet. Add to the net weight of the cartridge the weight of the mounting hardware (mounting plate, screws, spacers, and nuts). With Dual ULM cartridges, net weight and total weight are the same.

In order to set the tuning anti-resonator, turn the scale ring in clockwise direction until you see the determined scale value above the pointer.

It is recommended to carry out tuning setting before inserting the counterbalance in the tonearm. In this case, hold the stem with one hand and turn the scale ring with the other.

Note: If you turn the damping selector in the range of the wedge-shaped marking to stop position, the tuning anti-resonator is safe-guarded against transport damage.

Compliance of HiFi magnetic and dynamic cartridges

Cartridge		Compli-ance	Stylus pressure	Cartridge mass		
					Mounting	
Manufac-turer	Typ			Car-tridge	hard-ware	Total mass
			[mN]	[g]	[g]	[g]
Shure	V 15 III	30	10	6,5	1,8	8,3
	V 15 IV	30	10	6,3	1,8	8,1
	M 95 ED	30	12,5	6,5	1,8	8,3
Ortofon	SL 15 Mk II	20	20	7,0	1,5	8,5
	M 20 E	30	10	7,0	1,5	8,5
	M 20 FL-Sup.	20	15	5,5	1,2	6,7
	ULM 50 E	18	20	2,5	–	2,5
	ULM 55 E	25	15	2,5	–	2,5
Audio-Technica	TK 7 E	20	15	6,8	1,2	8,0
	TK 14 S	20	15	6,2	1,8	8,0
	AT 13 Ea	25	15	5,5	1,8	7,3
	AT 15 Sa	35	15	6,2	1,8	8,0
	AT 20 SLa	25	15	7,6	1,8	9,4

Balancing the tonearm

Note: 1/2-inch cartridges weighing 6.5 grams or more will requiere the addition of weights on the rear of the counterbalance in order for the tonearm to be properly balanced. Two such weights are provided in the accessory package. For cartridges weighing approximately 6.5 grams, screw the weight with the threaded screw (the smaller thread) into the rear of the coun-

terbalance. For cartridges weighing more than 6.5 grams, the second weight should be screwed onto the first.
1. With the tonearm locked and the stylus force and anti-skating dials set at 0, slip the shaft of the counterbalance onto the rear of the tonearm, guiding it on by the V-shaped track. Do not tighten the set-screw.
2. If your cartridge has a removable stylus protector, detach it before balancing the tonearm.
3. Unlock the tonearm and move it to the inside, past the switch-on position. Move the cue-control to the ☒ position. Then notice if the tonearm floats either up or down.
4. Slide the counterbalance back and forth until the tonearm is approximately balanced for the weight of the cartridge. Then tighten the set-screw.
5. For fine balance, turn the knurled ring of the counterbalance until the tonearm floats freely parallel to the platter.

Applying tracking force

Place the tonearm on the rest post and dial the tracking force recommended for your cartridge.

Tracking force can be set to any value from 0 to 3.0 grams. Between 0 and 1.5 grams, the dial is calibrated in increments of 0.1 gram; between 1.5 and 3.0 grams, in increments of 0.25 gram.

Note: The Dual tonearm can track at a force as low as 0.25 gram. However, you should not actually attempt to track at so low a force as this is below the optimum tracking force on any cartridge available today. In all cases, the tracking ability of the cartridge you select will determine the best stylus force to use.

It is usually wise to set tracking force toward the higher end of the range suggested by the manufacturer of your cartridge. If loud passages with a good record sound clean, you can reduce the force slightly, but listen for the harshness or fuzziness that occurs with insufficient tracking force.

Too light a tracking force produces distortion, and also produces groove skipping and excessive record wear.

Too heavy a tracking force restricts the abbility of the stylus to follow the contours of the groove and can also cause excessive record wear.

Applying anti-skating

Use the bottom scale (○) for conical styli, the top scale (○) for elliptical styli. Dial to the same number you have set for tracking force.

Operation

Operating instructions

After the initial installation and whenever the unit has been transported, do the following: Move the cue-control lever to position ▼, then move the tonearm toward the center of the record until the tonearm-return mechanism is activated. Release the tonearm and allow it to return to its rest. The turntable is now ready for operation.

1. Set the turntable speed selector switch for the record to be played.

2. If desired, switch the lead-in groove sensor **(9)** to position ∨. (You will then feel a slight resistance when the stylus is positioned over the 12" and 7" lead-in grooves.)

3. Lift the tonearm off its rest post and move it toward the record. (This will start the platter rotating.)

4. To lower the tonearm to the record, move the cue-control lever to position ▼. (A light touch will do.)

5. At the end of play, the tonearm will lift (the cue-control will be engaged), return to its rest post and the motor will shut off. Note: to interrupt play at any time, lift the tonearm from the record, either with the cue control or by hand, and return it to the rest post. (If you lift it by hand, we suggest you reset the cue control to ▼.)

Pitch-control and strobe

Each of the two speeds can be varied within a 10 % range. To set the speeds precisely at 33 1/3 or 45 rpm, play a record while viewing the illuminated strobe bars on the platter rim.

Each speed is exactly correct when no movement of the bars is observed. If the bars appear to move counterclockwise, motor speed is slow. Turn the pitch-control clockwise to advance speed. If the bars are moving clockwise, the speed can be slowed by turning the pitch-control counter-clockwise.

The pitch-control can also provide other than exact speed. For example, when you want to match the pitch of recorded music to a live musical instrument. Also, when making tape recordings, you may prefer that the tape sounds flatter or sharper than at "normal" speed. You can also "stretch" or "shrink" a recorded selection slightly to match a length of motion picture film.

Adjustment of tonearm indexing

When the lead-in-groove sensor is switched on (knob **(9)** in position ∨), the stylus automatically lowers itself into the run-in groove of the record. If, in the case of a subsequently fitted cartridge for example, the stylus sets down too far from the run-in groove, the setting down point of the diamond stylus can be corrected with the alignment screw **(5)**.

If the stylus sets down too far inside or outside the record, turn the alignment screw to the left or the right accordingly.

The setting is effective not only for 17 cm but also for 30 cm records.

Cue-control height adjustment

When the tonearm is lifted by the cue-control, the height of the stylus over the record can be varied by approximately 6 mm. To adjust height, turn the knurled adjustment which is located in the front left section of the gimbal.

Stylus care

In normal use, every stylus is subject to wear and tear. We recommend that yours be inspected periodically, and certainly after approximately 300 playing hours in the case of diamond styli. Worn or damaged (chipped) styli will grind the modulation out of the grooves and damage your records. For replacement, obtain only the stylus type recommended in the Technical Data for your cartridge. Imitations can cause noticeable loss in sound quality and rapid record wear.

Please keep in mind that the stylus and cantilever are necessarily quite delicate in order to provide quality performance. They are extremely sensitive to harsh handling, accidental blows, etc. Take the cartridge in the holder to your Dual dealer for inspection of the stylus. (Removal of cartridge holder is described above.)

Servicing

Your Dual has a limited warranty of two years from date of purchase against manufacturing defects or faulty parts.

Should your unit require service, please write to our service department (address on the back cover), describing your complaint.

During the warranty period, the Dual will be serviced without charge under the conditions stated on the warranty card. Note: Only factory-authorized service stations should service the Dual; any servicing by anyone else will void our warranty. After it has been serviced, your turntable will be shipped back to you.

Technical data

Current AC 50 to 60 Hz

Mains voltages 110 to 125 V and 220 to 240 V

Drive

Electronically-controlled direct-drive system Dual EDS 500

Power input	approximately 2 watts
Motor at playing operation	$<$ 50 mW

Power consumption

220 V 50 Hz:

at start 35 mA	at play 15 mA

110 V 60 Hz:

at start 65 mA	at play approximately 25 mA

Starting time

(Until the rated speed is attained) 2 — 2.5 s at 33 1/3 rpm

Platter   non-magnetic, removable, 1.4 kg, 304 mm diameter

Platter speed 33 1/3 and 45 rpm, electronically adjustable

Pitch control

Each speed adjustable by means of variable resistor, range: 10 %

Speed control (monitoring)

With illuminated stroboscope for platter speeds 33 1/3 and 45 rpm, 50 and 60 Hz.

Sensitivity of the illuminated strobe for 0.1 % speed deviation

6   division markings per minute at 50 Hz,

7.2 division markings per minute at 60 Hz.

Total wow and flutter	according to DIN 45 507
(German Industry Standard)	± 0.05 %
WRMS	± 0.03 %

Rumble

(according to DIN 45 500)

Unweighted:	50 dB
Weighted:	75 dB

Tonearm Distortion-free "ultra-low-mass", aluminum tubular tonearm in 4-point gimbal bearing. Tonearm counterbalance with tuning anti-resonator

Effective tonearm length 221 mm

Offset angle 24° 4'

Tangential tracking error 0.16°/cm

Tonearm bearing friction (referred to stylus tip)
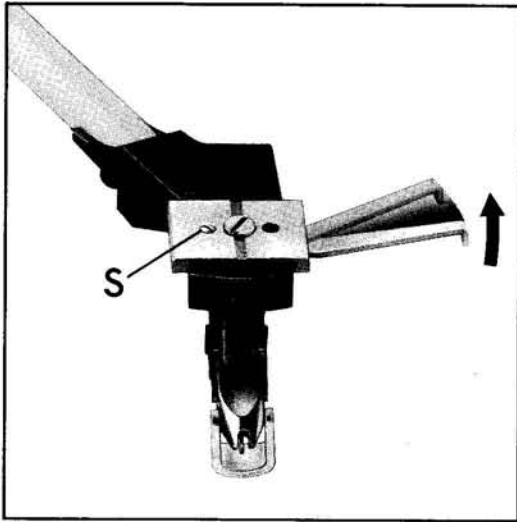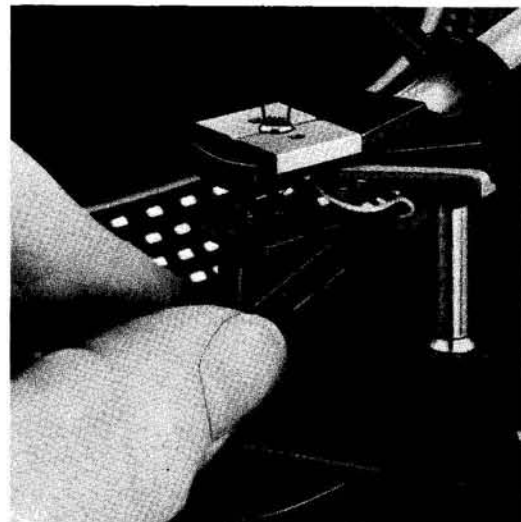0.07 mN (0.007 g)

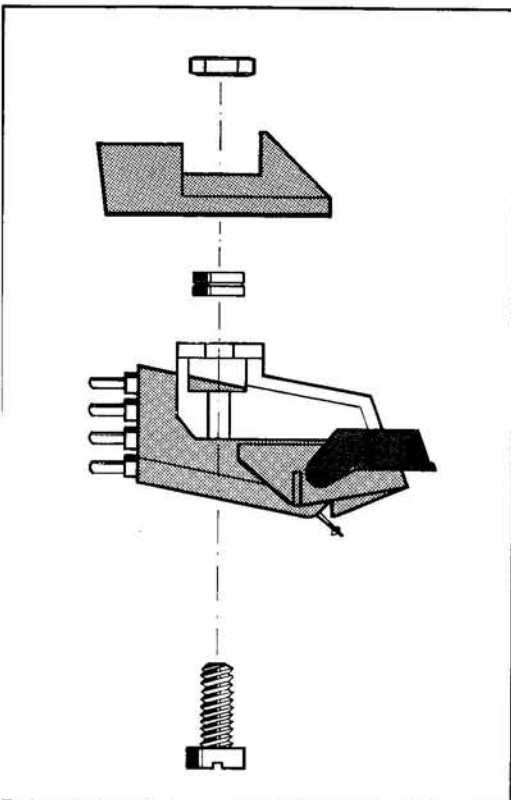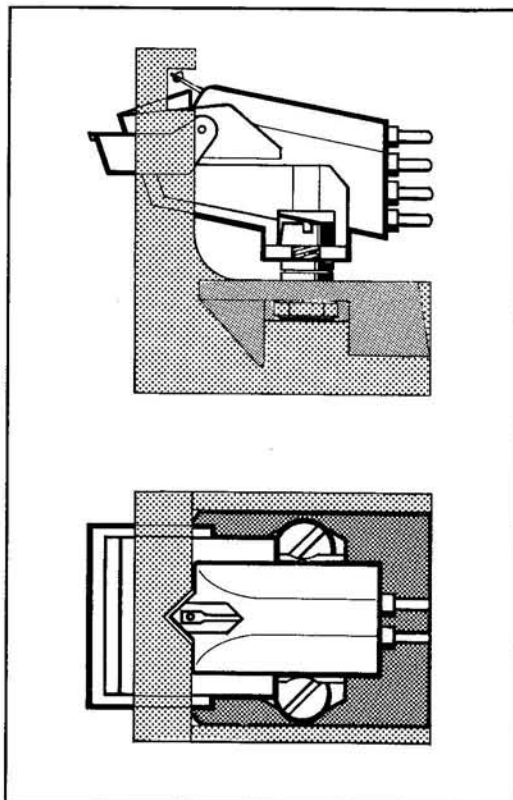**Adjustable Overhang** 5 mm

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Dual®