

“Black Onyx” Turntable Design and Specifications Paper

TTWeights Audio Presents the “Black Onyx Turntable



LJT Manufacturing

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ONYX Turntable Design and Specifications

Drive System and Bearing

- Direct internal rim drive
- Plinth mounted rigid decoupled motor
- Bearing is no contact oil bath bearing design
- Carbide bearing shaft .5000 inch (12.7mm) x 2.5 inch (6.35mm) length
- polished.1870 inch (4.749 mm) carbide thrust bearing
- Proprietary two piece brass and OilLite
- The bearing is housed in massive 3.50 inch (8.89 mm) diameter brass housing
- Brass housing provides an oil well
- OilLite bearing oil impregnated submersed in oil well
- Shrink fit assembled, micro bored to +/- .0001 inches (+/- .00254 mm)
- Oiling measuring kit and oil included
- Cryogenically installed
- .0003 inch (.0076 mm) run-out from bearing
- .0015 inch (.0381 mm) maximum run out from centerline to outer diameter of the platter
- Center OilLite bearing is installed and machined once it is in the natural state of rest
- Maintains perfect accuracy bore diametrical tolerance +/- .0001, (+/- .00254 mm) roundness >.0001(> .00254 mm) parallelism

July 2010, Product is subject to change without notice due to continuous Research and Development.

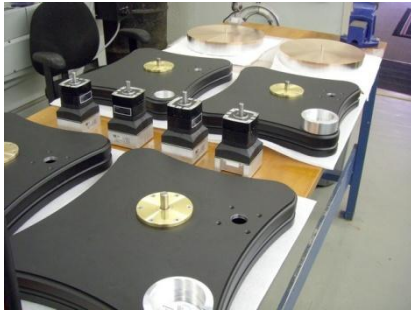
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Rim Drive

- Drive wheel is driven directly from the servo motor
- .625 inch (15.875 mm) diameter brass drive wheel
- Profile machined groove with full radius to match o ring
- Platter driven on inner machined groove
- Single point of contact
- Simple maintenance / 2 additional drive rings included
- direct transfer of torque to the platter
- Maximum torque 75 oz (2.13 Kg's) of direct power
- Speed +/- .001 rpm

Motor Mounting



- The DC motor (a stout weight of 3.5 lbs/1.6 Kg's) is secured to the CNC machined 6061 plinth through solid aluminum
- 4 stainless steel bolts 60 degree countersunk mount motor to plinth
- Decoupling from motor to plinth by the use of carbon fibre
- External motor housing to quiet motor sound and absorb vibration
- Two layer sound dampening external motor and internal on the housing
- Elastomeric butyl and aluminum constrained-layer vibration damper

- Vibration energy is converted to heat rather than sound
- Laminated to plinth/decoupled

Motor



- DC Brushless – no brush maintenance – no maintenance
- No oiling required
- Start to 33.333 rpm in 3.0 – 3.8 seconds, 45 RPM 4 – 5 seconds, 78 RPM
- DC brushless
- High torque 3 phase
- Brushless servo motor
- Non cogging 24 volt
- Rated at a full 1/8 horsepower 6 amp
- Micro processor controlled motor has built in encoder
- PPM digital signal is processed 1000/pulses per platter revolution
- Torque applied if weight is added
- XLR Connector – 7 Pin 4 FT controller cable (plugs in back of controller)

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External Controller



- Custom built by LJT Manufacturing
- External motor controller
- XLR Connectors
- Cryogenically treated silver internal wiring
- 7.5 wide x 4.5 deep x 2.5 height inches (19 x 11.5 x 6.4 cm.)
- Aluminum face and rear plates
- Aluminum housing with black finish
- 1/8 inch copper isolation plates top and bottom

Control Panel Front left to Right



- Speed selector 33.333/45/78 RPM
- Platter ON/OFF aircraft grade power switch(s)
- Separate speed control (10x Fine pots) for 33.333 RPM
- Separate speed control (10x Fine pots) for 45 RPM
- Separate speed control (10x Fine pots) for 78 RPM

Back Panel



- Female XLR connector 24 volt power

- Main power switch ON/OFF aircraft grade power switch
- Overload resettable switch (no fuses)
- Female XLR connector for turntable controller



Power Supply



- 110 to 240 AC voltages/European available
- 6.5 AMP, 24 Volt
- Built in AC line filters
- Extremely low noise
- XLR connector
- Standard HD grounded power cord 4ft
- Optional low noise power cord available impact AC power line 3 ft

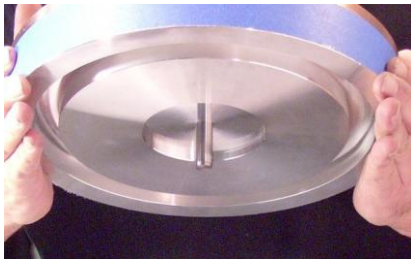
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Platter Design for Black Onyx



- Extreme accuracy and cutting edge design
- CAD modelled and designed
- Platter has Five (5) layers of decoupling
- High technology use of material
- Each component is CNC machined
- Laminated to one another providing non mechanical coupling
- Absolute concentricity
- Spindle, stainless steel

Lower Platter Section All Onyx Models



- Lower aluminum platter – main drive coupling
- 1.5 inches thick x 11.46 diameter (11 lbs/5 KG's)
- 6061 platter base which houses the internal drive wheel coupling

Platter Specifications by Model – Platter Thickness

Platter Weights and Dimensions	Aluminum Base Height In.	Copper layers	Copper Top (in. thick/3m
ONYX Silver Edition	1.5	1	0.125
ONYX Gold Edition	1.5	3	0.375
ONYX Platinum Edition	1.5	4	0.5

Upper Platter Section ONYX Silver Edition

- 1.75 thick platter/with mat included
- 1 copper laminated/mechanically decoupled Layers
- Copper layer is .125 thick x 11.46 diameter
- 4 lbs, CNC machined

Upper Platter Section ONYX Gold Edition

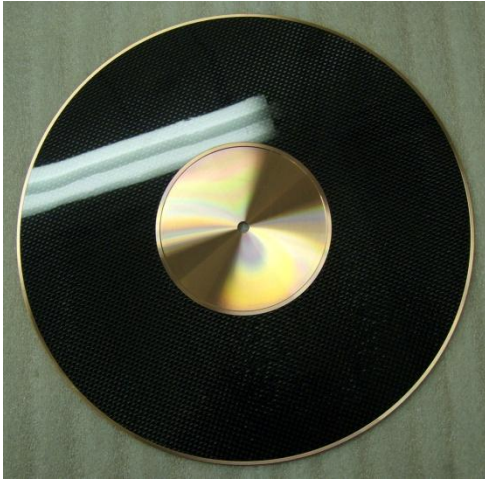
- 2.00 thick platter/with mat included
- 3 copper laminated/mechanically decoupled Layers
- Each copper layer is .125 thick x 11.46 diameter
- Each copper Layer is 4 lbs, CNC machined

Upper Platter Section ONYX Platinum

- 2.2 inch thick platter/with mat included
- 6 layer platter (plus mat)
- Enhanced platter dampening
- Additional carbon layer on top of platter .080 thick
- 4 copper laminated/mechanically decoupled Layers
- Each copper layer is .125 thick x 11.46 diameter
- Each copper Layer is 4 lbs, CNC machined
- Lower platter section is drilled in alternating sizes and shapes
- Filled with Elastomeric butyl constrained-layer vibration damper

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Mat on all ONYX Models



- Two layer construction
- Copper disk CNC machined locates to turntable platter
- Carbon fibre Insert .025 thick
- Dimensions: 11.45 inches diameter x .125 thick.
- Weight: 1.570 KG/3.5 lbs

Mass Dampened Plinth

- CNC machined plinth from billet 6061-T6511
- Compact design 14 x 16 inch footprint
- Internally housed drive systems and motor
- Machined from solid 6061 billet
- No castings CNC machined on all surface with curved features
- Resonance tuned shape (dog bone) radius on all corners
- Entire surface is shot peened to improve surface tensile strength
- Black powder coating



Isolation Piers (feet)

- 4 leg design from solid 6061 Aluminum
- ½ inch height adjustment:
- Mass dampening feet with height and levelling adjustability
- 4 piece design provides superb decoupling from the stand and the environment
- Ball bearing points
- Plinth taper lock
- Not mechanically coupled to plinth
- Taper locating for accurate plinth location
 - O ring damper between pier and plinth

Maintenance

- 2 spare drive rings provided
- Replace annually
- 15 minute procedure
- No motor maintenance, no lubrication, no brushes



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Summary Specifications

- DC Motor/Rim Drive
- 87 lbs to 127 lbs (40 to 57.6 kg's)
- Remote Arm Board 11 lbs (5 Kg's) each, up to 3, plus 1 on board, 4 total
- 42 lb (19Kg's) 6061 Aluminum Plinth and Motor Assembly
- High mass 25 to 35 lb Platter (11.5 to 15.5 Kg's)
- Constrained layer platter design employing Aluminum, copper and carbon fibre
- Separate AC/DC Power Supply 120-240 volts in / 24 Volts DC out
- Separate Controller Unit: 7.5 wide x 4.5 deep x 2.5 height inches (19 x 11.5 x 6.4 cm.)
- 33.333/45/78 each with independent adjustable 10x speed pots
- Height without Center Weight: 7.5 inches (19 cm)
- With Center Weight 9 inches (22.8 cm.)
- Width: 16 inches (40.6 cm.)
- Depth: 14 inches (35.6 cm.)
- Depth with Remote Arm Pods add 4 inches (10 cm.) to rear/side of table
- All materials are NAFTA certified billet material, no castings or moulds
- All components are CNC machined to extreme tolerances
- All turntables are hand assembled and tested
- 4 year Parts and Labour and 10 years parts Some limitations apply – see Onyx Turntable Set Up and Warranty Manual

ONYX Weight Specifications

Platter Weights and Dimensions	Aluminum Base Height In.	Copper layers	Copper Top (.125 in. thick/3mm)	Ultimat (.125 in.Thick/3mm)	Platter Height Inches	Platter Height MM's	Platter Weights Lbs	Platter Weight Kg's
ONYX Silver Edition	1.5	1	0.125	0.125	1.75	44.45	19	8.64
ONYX Gold Edition	1.5	3	0.375	0.125	2	50.8	27	12.27
ONYX Platinum Edition	1.5	4	0.5	0.125	2.125	53.975	31.2	14.18

Quantity	Description	Unit Weight	Total Weight lbs	Total Weight kg's
4	Onyx levelling Isolation Piers	3.3	13.2	5.99
4	Carbon Fibre Discs – Table Protectors	0.1	0.4	0.18
1	ONYX Plinth/Motor Assembly with 4 ft Cable Assembly	42	42	19.07
1	ONYX Platter and Carbide Bearing Assembly	19	19	8.63
1	Quick Change 9.0 inch Tone Arm Mount	2	2	0.91
1	Power Supply and Cable Assembly and Power Cord	1.75	1.75	0.79
1	ONYX DC Speed Controller Box	4.3	4.3	1.95
1	TTSuperRing Carbon Ultimat	3.5	3.5	1.59
1	Weight Classic/Built in Level	1	1	0.45
	Onyx Silver edition		87.15	39.57
	Onyx Gold Edition		95.15	43.20
	Onyx Platinum Edition		99.35	45.10
	Please add remote arm pod weight if optioned			
	Minimum table weight		87.15	39.57
	Maximum (Platinum with 3 remote arm pods)		132.35	60.09
	Optional:			
	Remote Tone Arm Mount Maximum of 3 (plus 11 lbs each)	11	33	2.20
	TTSuperRing Periphery Ring	1	2.5	1.14
	TTSuperWeight Upgrade (add)	0.8	0.8	0.37

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Maintenance Information

Check Speed Periodically and adjust for each speed level 33/45/78. The drive ring may need to be replaced after time, if the speed is not 100% consistent then change the drive o rings, 2 are included with the turntable. Please call 905-953-7923 for technical support when changing o rings.

After at least one year of use, the platter should be removed, and checked for lubrication, you may want to add .5 to 1 ML of oil, using syringe provided a 30 weight oil is required, PLEASE KEEP THE ORIGINAL SYRINGE.

TTWeights / LJT Manufacturing and Consulting Limited Warranty

TTWeights / LJT Manufacturing and Consulting (TTW) warrants this unit against defects in materials and/or workmanship for four (4) years from the date of purchase by the original retail purchaser. TTW’s sole obligation under this warranty is limited to the repair or replacement, at TTW’s option, of any part(s) found to be defective. TTW’s obligation to repair or replace defective parts is the purchaser’s sole and exclusive remedy, and TTW’s shall not be

liable for any injury and/or property damage direct or indirect arising out of the use of the product or defect in or failure of the product. This warranty does not extend to any product/turntable whose serial number has been defaced or altered. Any product that TTW determines causes a defect or malfunction due to incorrect installation, modification, misuse, or servicing by the purchaser, or service technician not authorized by TTW to perform such service will not be warranted. This warranty does not cover trivial or cosmetic defects that do not impair the unit’s normal function, the warranty does cover our plinth coatings and plating for peeling and finish degradation. TTW reserves the right to make engineering changes to this product without assuming any obligation to install such change in any product previously manufactured. This warranty to repair or replace defective parts is in lieu of all other express or implied warranties of merchantability or fitness for a particular purpose. There are not warranties that extend beyond the description herein.