DUET 350

OWNER'S MANUAL

Serial Number_____

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INTRODUCTION…

Congratulations on choosing the Duet 350 Amplifier. Your unit has been individually handmade from the finest parts and materials. The Duet 350 utilizes proprietary Cello circuitry that represents true state-of-the-art in audio electronics and is designed to perform to "as-new" specifications for decades of musical enjoyment. We want your Duet 350 to provide you with complete satisfaction. Please read this manual carefully and care for your Duet 350 so that it will retain its value, beauty and performance. If you have any questions, contact your authorized Cello Designer or call the factory. It is our wish to assist you in every way, now and in the future.

Product Concept and Description

In 1986 Cello introduced the Performance Amplifier, a no-compromise four chassis set of two mono supplies and two mono amplifiers. The Performance Amplifier has become a legend in its time because of its extremely natural sound, lightning-fast response, almost unlimited power, and exceptional reliability. While the Performance Amplifier was designed as a reference standard without cost restrictions, the more affordable Duet 350 offers a similar combination of qualities in a single, stereo chassis. The principal difference between the Performance and the Duet 350 is that the Performance, with 40 output devices per channel, has greater output current for driving ultra-low impedance loads. For most 4 to 8 Ohms speakers, the Duet 350 is the natural mate. Its twelve output devices per channel, coupled with the most sophisticated circuitry, give it tremendous capabilities. In normal stereo mode, it has more than enough power to drive most speakers to their limits with the kind of open, clear, effortless sound coupled with high speed and powerful dynamics that are the hallmark of Cello. In bridged mode, accomplished with the flick of a toggle on the rear panel, the Duet 350 becomes a devastating 1.2 kiloWatt mono block power station for those who have the speakers to withstand it. In stereo or bridged mode the Duet 350 is the music lover's dream-come-true amplifier.

Packaging and Features

The Duet 350 chassis is an imposing 11 inches (28cm) high. The height is designed to accommodate a number of vertically large subassemblies including circuit boards, heatsinks, and power supply components. In particular, twelve large output devices per channel require substantial heatsinking. As an alternative to fan cooling, large, vertically-oriented passive heatsinks are provided for each channel.

Packaging and Features (Cont.)

To achieve a more affordable price, Cello engineers developed new circuitry which offers outstanding performance without dual choke power supplies. The Duet 350 will drive speakers of any impedance, but it is optimized for loads in the 4 to 8 Ohms range. Some speakers have a low impedance in part of their range. For example, electrostatic speakers may have a dip in the range between 10 to 20 kHz. The Duet 350 handles such anomalies with complete grace.

The Duet 350, like the Performance Amplifier, has electrically conductive heatsinks mounted inside the chassis. This approach has several advantages. First, it offers maximum thermal transfer from the power transistor case to the heatsink. This permits the maximum transistor power-handling capability to be obtained.

Second, there are no mica insulating wafers to short out and thereby causing amplifier failure. Most other power amps have the heatsinks on the outside where they cannot be electrically conductive. This requires the transistor to be electrically insulated from the metal, but thermally connected via mica wafers.

Third, the heatsink becomes an electrical asset conducting voltage to the transistors.

Fourth, money that would have been spent polishing and anodizing heatsinks to make them cosmetically perfect (heatsinks are manufactured as rough, industrial parts) can be spent where it offers some real value - on premium circuits and parts.

The inner chassis of the Duet 350 is heavy steel for structural strength. The sides, top and front panel are clear-anodized aluminum for long-lasting beauty. Custom-made Litz wire, first introduced to audio by Cello, Ltd., is used throughout the amplifier for signal paths, DC voltages and ground paths. Three-pin Swiss-made Fischer connectors are used for balanced line input connections of the highest quality. Heavy-duty speaker output connections are made via industrial-strength barrier strips with #8 screws. Because of its substantial weight (95 lbs/ 43Kg), front and rear handles are provided for safe lifting and moving of the unit. Protection circuitry is provided for the amplifier's use in unsafe conditions without compromising sonic quality. The power transformer is specially shock-mounted to minimize mechanical noise. Like other Cello products, only premium parts (seldom, if ever, used by other manufacturers) are used exclusively to ensure as-new Cello performance during many decades of listening pleasure.

The Rationale for High Power Amplification

Real music fills a room. Even a soft instrument such as flute, harpsichord, or guitar is much larger in life than most music systems can easily reproduce. Part of the problem, until now, has been the limitations in power amplifiers. Some amps sound sweet but have no power. Others play loud but lack natural sonic quality. At the same time many speaker systems are not very efficient and require fairly high voltage to reproduce musical peaks. Other speakers have low impedance curves which require substantial current to drive. Still other speakers have low efficiency and low impedance parameters which require high current and high voltage drive capability. For example, many kinds of live music can generate musical peaks of 115dB SPL at the listener's ears. If a speaker is rated at 85dB SPL 1W/1M, then it will require 1024 Watts to reproduce a peak of 115dB SPL! In bridged mode, the Duet 350 will handle even this tough demand with ease. How much power speakers actually require to produce a given sound pressure level is difficult to calculate because the impedance curves of different designs vary so much and because other important factors are involved.

Compatibility

The Duet 350 is virtually compatible with all high quality preamplifiers and loudspeakers from other manufacturers. In fact, Cello engineers designed the Duet 350 specifically to be compatible with a wide variety of available equipment. The input impedance (audio +) is 1 megOhms, so it does not load even the most sensitive vacuum tube preamp. Output impedance is low enough to ensure against interactions with speaker loads. Noise is low enough so that high efficiency speakers can be used without audible residual noise. Input sensitivity is reasonably high permitting the Duet 350 to be easily driven by any high quality preamplifier. For balanced line inputs, the industry standard connector is the XLR type. Cello does not use XLR connectors because they do not meet Cello's standards for contact quality and reliability. Instead, Cello uses the 3-pin Fischer connector series for all balanced line applications. Cello Strings cables are available through Cello authorized accounts with 3-pin Fischer on one end (male for Duet 350 input) and XLR or RCA on the other end for interfacing with non-Cello equipment. Use of Cello Strings cable is highly recommended because a number of "balanced" cables on the market do not actually provide the correct complement of conductors and shield.

Summary

The Duet 350 has achieved affordable excellence in sonic quality, power capability and reliability. For slightly more cost than conventional amplifiers (and less than some others), you can now own a Cello.

INSTRUCTIONS

Unpacking

The packing box for the Duet 350 Amplifier should arrive in good condition. Please inspect for damage to the carton, although this is most unlikely due to the strength of the carton construction. Open packing carefully and save all foam pieces and boxes for reuse in the event that the unit must be shipped in the future. Should the boxes become lost, please contact the factory for replacement cartons.

The carton should contain:

- Duet 350 Amplifier
- 1 heavy duty A.C. cable
- 1 3/32 Allen wrench
- 1 warranty card
- 1 owner's manual
- spare fuses

Installation

Be certain the amplifier is installed so that it has proper ventilation. Placing the unit in a small, close-fitting enclosure is not recommended. Room air temperature should not exceed 122 degrees F./50 degrees C.

Cable and Adapter Selection

The Duet 350 Amplifier has three-pin Fischer connectors for highest quality balanced line input capability. It is recommended that input connections be made using Cello Strings cable. Cello Strings are stocked in lengths of 1,1.5,2,3,5,8 and 10 meters. Terminations are available to suit the particular components of your system. Custom lengths are available on special order. If it is necessary to convert Fischer inputs to RCA, use the E3 adapters. The best way to convert to single ended operation is to use Cello Strings cable (which has three conductors and a shield) with Fischer male on one end and RCA connector on the other. This preserves the three-wire system from the amplifier to the source unit and provides better grounding and common-mode rejection. To interface with XLR systems, it is recommended that Cello Strings cable be used with Fischer male on one end and XLR female on the other end.

Custom Made Cables **(Non-Cello)**

Three-conductor shield cables should be used to keep audio(+), audio(-), audio ground and chassis earth separate. If single-ended adapters are made, pins one and three should be jumped and used as ground and pin two should be used as the audio(+).

Connecting audio ground and chassis ground may cause or solve grounding problems depending on the system as a whole.

Electrical Connections

1) Make sure the circuit breaker is "off'.
2) Verify that AC mains voltage is set correctly.
3) Connect the preamplifier or other driving equipment.
4) Connect speaker output cables.
5) Be sure that the electrical service in the building/house is up to the task, especially if using two bridged amplifiers. The recommended ideal situation is a dedicated line to each amplifier.
6) Install AC cable into IEC mains connector on rear of power amplifier.
7) Connect AC cables to AC mains.

The Duet 350 Amplifier can be used as part of a complete Cello System, or in conjunction with other speakers, electronics and cables.

Operation

The Duet 350 Amplifier is capable of producing extremely high voltage and current levels. Be sure to observe standard precautions when operating. The following steps are recommended.

1) Be sure all electrical connections are correct. Triple check them.
2) Do not run AC mains or audio cables under rugs or sharp objects.
3) Turn peripheral source electronics on first. Avoid switching these on or off while amplifiers are in use.
4) Set volume controls on preamplifier to minimum.
5) Turn amplifier switch on.
6) Bring the volume control up slowly to the desired level. Use the amplifier for musical enjoyment. Do not overdrive to create distortion. The Duet 350 Amplifier is capable of damaging loudspeakers if the volume is up too high.

When you are through, switch the amplifiers off first before turning off the peripheral equipment. Leaving the amplifiers on will not harm them, but be advised that each unit draws approximately 200 watts at idle.

If physical damage has occurred to the unit, or it is exposed to water or other liquids, do not use this device until proper repairs and/or unit integrity tests have been effected by authorized personnel.

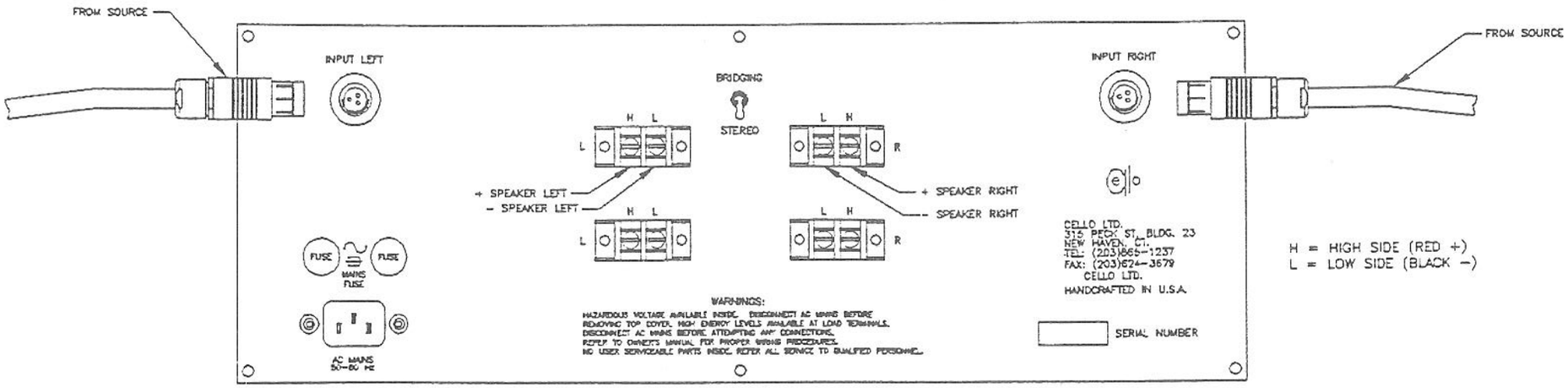
Bridged Operation

1) Use the right channel input.
2) Connect the high side of the speaker cable to the right channel high (H) on the amplifier. Connect the low side of the speaker cable to the left channel high (H) on the amplifier.
3) Set bridging/stereo switch to bridging position.

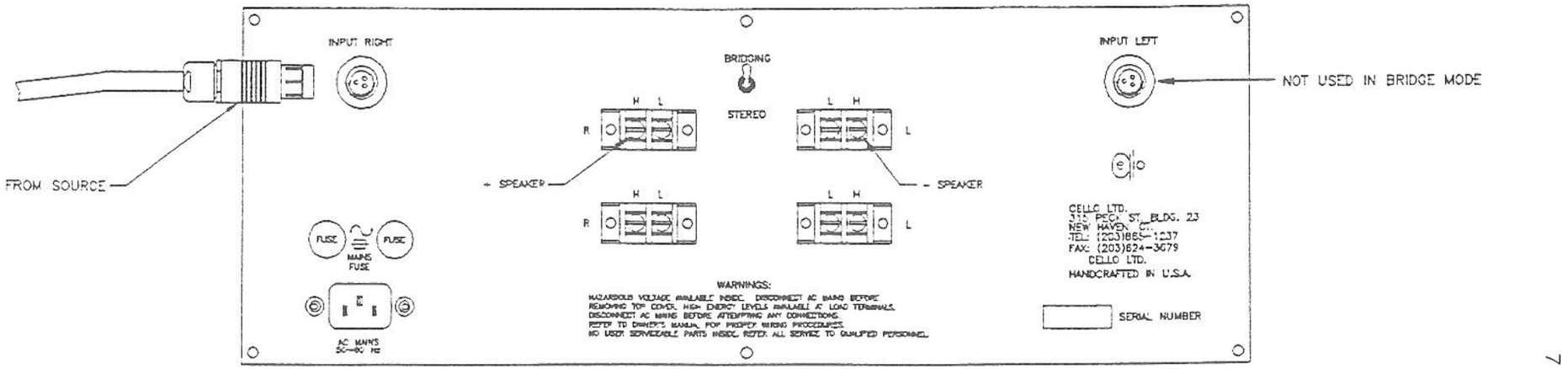
CAUTION:
Bridged operation should only be carried out with the recommendation of the speaker manufacturer:

CAUTION:
Make certain preamplifier volume is turned down before AC power of bridged amplifier is switched "ON".

NORMAL OPERATION



BRIDGED OPERATION



CELLO LIMITED WARRANTY

Parts

Cello warranties all mechanical parts for five years and electronic parts for life.

Labor

Labor is the responsibility of the distributor except for the following:

Any defective product during the first year shall be repaired by the distributor with labor paid by Cello according to factory rates for a given repair. At Cello's discretion, or if the distributor is unable to perform the repair, the unit may be returned to the factory for service using agreed-upon air freight. After repair, the unit will be returned by the same carrier or equivalent. During years 2-5, if the distributor is unable to perform the repair Cello will pay return air freight from the factory by agreed upon carrier provided the unit was shipped to the factory with air freight prepaid.

Cello will not pay freight if units are returned without a Return Authorization number (RA#). Cello will not pay freight if units are found to be in perfect working order.

Warranty of Repair Work Performed:

Any specific repairs or modifications effected by the factory or authorized service facility shall be guaranteed for 100% parts and labor for the remainder of the warranty period for the unit or one year (whichever is longer), except for electronic parts which carry a lifetime warranty.

Product Registration and Transferability:

Distributors shall fill out the form on the outside of the carton when the goods are delivered to the retailer. The form should be sent to Cello, Limited. Warranty cards inside the box shall be completed by the retailer and customer respectively and returned to Cello, Limited within thirty days from the date of the sale to the customer.

All products must be registered. When sold, new owners must be registered for the transfer of the warranty to be effected. All warranties are transferable to any succession of subsequent registered owners. Please contact you nearest authorized Cello supplier or the Customer Service Department at the factory for details of subsequent owner warranty registration.

Tampering/Abuse/Misuse:
Any unauthorized modifications, repairs or tampering, and/or any indications of obvious owner abuse, negligence or improper usage, as determined by Cello Limited shall be grounds to void the warranty.

Service

If you believe your Cello equipment is not functioning properly, please call the Customer Service department at the factory. If you need to return your component, you will be given an R/A (return authorization) number. This number must appear on the outside of the shipping boxes. Returns without R/A numbers will not be accepted. Returns received in original Cello packaging will be returned in original packing. Returns received in non-Cello packing will be returned in new Cello packaging at the owner's expense. If you need replacement packing materials, please contact the Customer Service Department at the factory.

Maintenance

The finish of the Duet 350 Amplifier is of brushed and anodized aluminum. Ammonia-based glass cleaner or alcohol and a soft cloth work well to restore the shine and remove finger prints. Be sure that the unit is off and unplugged before cleaning. Avoid getting excess cleaning fluid inside the amplifier. Take care when cleaning rear panel. Excessively aggressive rubbing may remove the silkscreen lettering.

ELECTRICAL **SPECIFICATIONS**

Duet 350 Amplifier

Power Output

	Rated Watts (AVG.)
8 Ohms	350
4 Ohms	600
8 Ohms bridged mono mode operation	1,200

IMD SMPTE

60Hz & 7kHz

8 Ohms 350W output ..... >0.1%

THD

20Hz-20kHz

8 Ohms 350W output ..... >0.3%

4 Ohms 600W output ..... >0.6%

Full Power Bandwidth ..... 20Hz to 20kHz

Dynamic Headroom 1.8dB

Signal to noise

20V output

10Hz - 22kHz ..... <-100dB

Input Impedance

Non-inverting 1megOhms

Inverting 5kOhms

Input Sensitivity

8 Ohms

350W 1.58V

Dimensions (WxHxD) ..... 24"x 12"x 18"

Shipping Weight ..... 108 lbs

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