MM100 AND DP100

HIGH DEFINITION MATCHMAKER™

OPERATING AND MAINTENANCE MANUAL

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DESCRIPTION

Channels LL and RR of both the DP100 and the MM100 convert unbalanced IHF inputs via RCA phono jacks J1 and J2 into transformer balanced 600 ohm XLR outputs at J3 and J4. The RCA inputs are RF bypassed and diode protected from excessive level. Panel gain controls R9 and R10 allow a reference +4dBm output to be set for inputs ranging from less than .1V to over 1.0V and will allow many playback devices having front panel output level controls to be simply preset to their maximum. The input stages A1-3 and A1-4 provide a stage gain adjustable from +8 to -24dB. Output stages A2-1 and A2-2 provide 14dB additional gain and the total isolation, faraday shielding, superior balance, improved RF immunity and ease of application of a true transformer coupled balanced output. A unique feedback technique totally avoids the transformers characteristic limitations of high distortion, poor response and hum pickup. Typical output distortion measurements made at both peak (+22dBm) and nominal (+4dBm) levels barely exceed generator residuals at .004% from 20Hz to 20,000Hz. Hum pickup from the power supply is non-existent and flat response is greatly extended. The output is protected from short circuits but will drive over a half mile of shielded cable with less than 1dB of signal rolloff at 20,000sHz.

The MM100 bi-directional interface additionally incorporates a pair of differential amplifier channels, A1-1 and A1-2 (L and R) which bridge balanced (or unbalanced) XLR input, 600-ohm lines at J5 and J6 and convert their signals to IHF level (.25 Volt, -10dBu) at phono jack outputs J7 and J8. Heavy common mode bypassing of the inputs gives excellent RF protection and internal CMR trimmers R35 and R36 allow 80dB hum nulls to be set and maintained. Output level controls R39 and R40 accommodate 0 to +8dBm nominal inputs or allow presetting of connected IHF recorder input controls. The IHF outputs may be paralleled for mono.

Your ATI interface operates from an internal, double filtered bipolar 16VDC supply, which uses a couple of unique regulating devices called zener diodes. In contrast to fancy IC regulators, zener diodes will live through most power line transients and simultaneously protect your expensive circuitry. The supply is designed for minimum susceptibility to power line conducted RF with bypassed ferrite beads, RC primary side bypassing and a non-concentric wound, semi-toroidal power transformer.

APPLICATION

Consumer audio equipment can offer unique features, good performance and attractive pricing making it very desirable for professional use. Unfortunately, RF pick-up, crosstalk, high frequency roll off, hum loops and distortion are often the results of direct connection of low level unbalanced IHF outputs into the 600 ohm systems used in studio or broadcast environments.

The DP100 and MM100 are level and impedance matching interfaces for semi-pro, industrial and consumer audio equipment operating into professional balanced 600-ohm systems.

The DP100 is a uni-directional stereo interface for Playback Only applications. It is designed specifically to convert the unbalanced RCA outputs of Digital Compact Disc Players to transformer balanced and isolated XLR 600-ohm line levels with no compromise or degradation of the superb performance available from the digital audio source. The DP100 is equally at home on a newsroom desk to interconnect field ENG cassette recorders into broadcast systems for dubbing.

The MM100 is a bi-directional interface which bridges a stereo pair of 600 ohm balanced or unbalanced, +4dBm lines and converts those signals to a nominal .25 Volt (-10dBu) level to feed, for example, the record inputs of a consumer cassette or reel-to-reel tape recorder. Simultaneously the MM100 also converts the unbalanced, stereo, .25 Volt playback outputs from tape deck to a transformer balanced, floating +4dBm, 600-ohm professional line level. The MM100 RCA connectors may also be jumpered for use as a two channel 600 ohm Line Amplifier, a two output Distribution Amplifier or a Mono Summing Amplifier.

The MM100 and DP100 are identically packaged in a rugged, compact steel enclosure. All controls and connectors are recessed for protection and their identification markings are printed on the protected reverse side of a heavy-duty polycarbonate overlay. All power supply components are internal and are well shielded by the steel wrap-around. Keyhole slot mounting angles are supplied with the unit to assure secure mounting to shelves and desks. An accessory rack panel mounts one or two units side-by-side in a single 1-3/4 inch rack space.

INSTALLATION

MOUNTING

Your ATI interface can also be rack mounted either singly or in pairs in only 1-3/4 inches by using Accessory Front Panel Kit, P/N 20273-501. Each interface mounts to panel with precisely three #8 x 3/16" screws. Why precisely three screws? We calculated that two screws would really be enough to hold firmly and three screws would survive a major earthquake, therefore using four screws would definitely be gross over design and not justified. (Actually, the fourth screw was right in line to spear an output transformer.)

GROUNDING

We have taken heroic measures to keep RF out of your Interface. This heroism includes output transformers, split and bypassed input and output resistor networks, beaded, bypassed and isolated power inputs, non-concentric wound power transformers, double ground plane PC boards and a well shielded enclosure which will also keep rain and

snow off the circuit boards. However, in a difficult broadcast application, high RF levels may require a better ground path for the RF bypass networks than can be provided by the third wire AC power line ground and a separate low inductance studio ground bus may be necessary.

There are three wire grounded plugs. The power line ground could cause a loop with a separate studio ground. If you are sure your studio ground will provide adequate protection to personnel in case of an AC line short to chassis, a 3 to 2 AC adapter can be used to isolate the power line ground. We recommend that the adapter be removed and the power line ground reconnected prior to any service work requiring removal of the studio ground from the chassis.

The four inch, silver bearing, low inductance copper strap which you are, of course, using for your studio ground is not going to fit around the chassis ground screw on the amplifier. Run the strap to within a few inches of the chassis and jump to the chassis ground screw with shield braid. Any RF shielding and suppression system is going to be no better than the ground system into which it is trying to dump the unwanted RF. If you have a decent ground system and still have RF problems, give us a call.

INPUT AND OUTPUT CONNECTIONS

XLR audio inputs and outputs are all wired with Pin 2-Hi, Pin 3-Lo and Pin 1-Shield. All Hi inputs and outputs are in phase.

The transformer coupled line outputs at J3 and J4 will drive either 600-ohm terminating loads or high impedance bridging loads equally well. It is not necessary to resistively terminate lines which feed bridging inputs, however, terminating a bridging line at the load end with a 620 ohm resistor will sometimes help reduce RF pick-up between the load point and the Interface.

A phono plug Y adapter (available at your nearest Radio Shack) can be used to turn your MM100 bi-directional Interface into a Mono Summing Amplifier (Jumper L and R outputs into LL) or a two output Splitter/Distribution Amplifier (L into LL and RR). Simply jumping L into LL and R into RR makes a two channel Line/Buffer Amplifier with up to 14dB gain.

MAINTENANCE

There is no routine maintenance required by your DP100 and MM100. If you have a problem while using these Interfaces, eliminate by substitution source equipments, cables, connectors and load as a possible cause before attacking the Interface. Once you are positive that you have a problem inside the box, (A) call us for free in-warranty factory service or (B) as a last resort, begin the disassembly process below.

DISASSEMBLY

1. Remove AC power.
2. Remove nine (9 - Count'em) pan head screws using a Phillips head screwdriver.
3. Remove the screws, two (2) per XLR connector using a Phillips head screwdriver. Save the screws.
4. With your thumbs on the end XLR connector inserts and your fingertips on the sides of the cover, gently slide the cover forward about an inch until the connector shells clear the inserts. Lift the cover clear and pull the line cord grommet free of the cover. A dot of silicone grease or spray will help the grommet slide smoothly over line cord.
5. Re-assembly is the reverse of the above.

ADJUSTMENTS

Avoid the temptation to diddle the internal trimpots R21, R22, R35 and R36 just to see what effect they cause. All are sharp null type settings, which are greatly degraded by even slight maladjustment. Replacement of either A1 (National LF347N) or A2 (Signetics or Exar NE5533) will not require pot readjustment.

COMMON MODE REJECTION

Replacement of any resistors R23 through R34 will require readjustment of either R35 or R36 to maintain maximum common mode rejection (CMR). Apply 10Vrms at 120Hz between ground (Pin 1) and Pins 2 and 3 (tied together) of XLR input J5, measure at J7 and adjust R35 for the best null. Repeat for J6, J8 and R36 if necessary. An 80dB CMR (less than 200uV output) is attainable but may be difficult to measure without a tuned voltmeter.

DISTORTION

Replacement of any resistor R13 through R20, T2 or T3 will require readjustment of either R21 or R22 for minimum distortion. Apply sufficient 20Hz input signal at J1 or J2 to drive a loaded output measured at J3 or J4 (pins 2 to 3) to +20dBm. Measure Total Harmonic Distortion (THD) and adjust R21 or R22 for best null. If you cannot detect a good null, your Audio generator may well have far more 20Hz distortion than even the un-nulled contribution of the Interface, which is typically less than .1%. As an alternate adjustment means, turn the pots full CCW and adjust the generator for +19dBm output level, rotate the trim pot CW until the output increases just 1dB to +20dBm. Turning the pot farther CW can cause instability. When nulled using superior test gear such as the AMBER 3501, THD measurements of .004% at 20Hz and +22dBm output are to be expected.

GENERAL

Power Supply voltages are + and - 16VDC nominal. IC output DC Voltages under no signal; shorted input conditions should remain within .1 Volt of ground. Greater offsets are an indication of IC or circuit problems.

MODIFICATIONS

230 VAC OPERATIONS

Your interface is wired for 115VAC, 50/60Hz operation unless otherwise requested at time of ordering. It can be modified for 230VAC operation by removing primary jumpers W1 and W3 and inserting a jumper wire in W2.

Different types of attachment plugs or line cords may be required for connection to alternate supply voltages.

SPECIFICATIONS

	MM100	DP100
	Balanced to Unbalanced	Unbalanced to Balanced
GAIN	-14db nominal, -8db maximum. User adjustable for –10dBu (.25V) output with 0, +4 or +8dBm inputs	+14db nominal, +22db maximum. User adjustable to 0, +4 or +8dBm output with –10dBu (.25V) input.
NOMINAL LEVELS	+4dBm input, -10dBu (.25V) out	-10dBu (.25V) in, +4dBm out
PEAK LEVELS	+22dBm in, +8dBu (2.0V) out	+8dBu (2.0V) in, +22dBm out
MAXIMUM LEVELS	+28dBm in, +20.5dBu out	+24dBu in, +23dBm out
NOISE OUTPUT 20-20KHZ Meas. Band.	105dBu maximum	90dBm maximum
HUM OUTPUT 60, 120, AND 180 Hz.	-96dBu maximum	-96dBm maximum
DYNAMIC RANGE Peak levels to Noise	120dB	120dB
HARMONIC DISTORTION 20HZ TO 20,000Hz	.005% max. at Nominal Level	.005% max. at Nominal Level
INTERMOD. DISTORTION SMPTE, 7K/60Hz, 4:1	.005% max. at Peak and Nominal Level	.005% max. at Peak and Nominal Level
FREQUENCY RESPONSE	+0, -.25db, 20 to 20,000Hz. –3db at .5Hz and 150Hz	+0, -.25db, 20 to 20,000Hz. –3db at .5Hz and 150Hz

CROSSTALK	70 db minimum at 10kHz in all modes	70 db minimum at 10kHz in all modes
INPUT HUM REJECTION	60db minimum, internal trimmer	N.A.
INPUT IMPEDANCE	Balanced, 20kohm bridging Split and RF Bypassed	Unbalanced, 10,000 ohms Split and RF Bypassed
OUTPUT IMPEDANCE	Unbalanced, 1500ohms max Zs. Outputs may be paralleled for mono.	Transformer Balanced, 40 ohms maximum source impedance. 600/150 ohms load impedance.
SLEW RATE	13V/uSec	13V/uSec
RISE TIME	2 uSec.	2 uSec.
OVERSHOOT	None	2% maximum
PHASE SHIFT 20 TO 20,000Hz	Less than 1 degree input to output and between channels.	10 degrees max. input to output. Less than 2 degrees between channels.
POWER	115/230 VAC +/-10%, 47 to 63 Hz, 6VA.	115/230 VAC +/-10%, 47 to 63 Hz, 6VA.

DIMENSIONS	1.5”H (3.8cm) x 8.5”W (21.6 cm) x 4.65”D (11.8cm), 3 lbs. net, 5 lbs. Shipping wgt.	1.5”H (3.8cm) x 8.5”W (21.6 cm) x 4.65”D (11.8cm), 3 lbs. net, 5 lbs. Shipping wgt.
ENCLOSURE	Steel wrap-around with reverse printed graphics overlay	Steel wrap-around with reverse printed graphics overlay
MOUNTING	Accessory Rack Panel P/N 20273-501 mounts 1 or 2 units in 1 ¾ x 19-inch space.	
CONNECTIONS	Unbalanced IHF lines-RCA type Phono Jacks 600 ohm Inputs-XLR type, three terminal female 600-ohm Outputs-XLR type, three terminal male.	