BU400, BU400B, UB400B, UB400B, & BI400

IHF-PRO INTERFACE AMPLIFIER

OPERATING AND MAINTENANCE MANUAL

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GENERAL

Consumer audio equipment can offer unique features, good performance and attractive pricing making it very desirable for professional use. Unfortunately, RF pickup, ground coupled cross talk, high frequency roll off, hum loops and distortion are often the results of the direct connection of low level unbalanced IHF outputs into the 600 ohm balanced systems used in studio or broadcast environments. Consumer and semi-professional equipment can be identified by their use of RCA type connectors, typical of home hi-fi equipment, for their IHF inputs and outputs. Professional systems typically use XLR type connectors or hard-wired connections.

The **BI100, BU400** and **UB400** are interface amplifiers designed to interconnect consumer grade and semi-professional equipment into professional, balanced, low impedance audio systems.

The **BI100** is a **bi - directional stereo** interface, which bridges a stereo pair of professional 600 ohm balanced or unbalanced +4dBm lines and converts those signals to a nominal .25volt IHF level (-10dBu). The IHF output can feed, for example, the record inputs of a consumer grade cassette or DAT recorder. Simultaneously the BI100 also converts the unbalanced, high impedance, stereo, .25-volt IHF playback outputs from the tape deck to a +4dBm output capable of driving balanced or unbalanced lines of 600 ohms or greater line impedance.

The **UB400** is a uni - directional four-channel interface that converts four IHF **level** signals **into four balanced professional** outputs. The UB400 is particularly useful in protecting the four, eight or sixteen main or monitoring IHF outputs of low cost mixers and tape decks. The UB400 is also a very low cost way to interconnect two CD players into a balanced system.

The **BU400** is also a uni - directional four channel interface but it **converts four balanced professional** signals **into IHF** levels suitable for feeding the line inputs of a multi-channel tape deck, DAT machine or mixer.

Several of these can comfortably share a single external WA100, 24VDC / 400mA. wall-mount AC/DC power supply. Battery packs for remote or back-up use are planned for this product line. Check your dealer or a current price list for availability. Up to three of these products will mount side-by-side in only one rack unit using the available rack mounting kits. They may also be neatly stacked or mounted side-by-side on your desk with the available angled desk mounting kits.

The BI100, UB400 and BU400 use rugged XLR type connectors for the balanced inputs and outputs. Gold plated RCA type jacks mate to the IHF world.

CIRCUIT DESCRIPTION

INPUT STAGES

The balanced input stages of the BU400 and BI100 utilize a FET input LF347 quad op-amp in a clean, quiet inverting instrumentation amplifier configuration. Input levels up to +24dBm will be handled without clipping, excess levels cause only clean clipping without hang-up or phase reversal. Equal gains from both HI and LO inputs allow unbalanced sources to be easily accommodated. Bridging impedance is a high 40Kohms with good CMR.

LEVEL CONTROLS

Each IHF and balanced output is controlled by its' own front panel potentiometer. These controls are factory set for standard IHF level of -10dBu (.25V) and Pro level of +4dBm.

LINE OUTPUT

Balanced output stages of the BI100 and UB400 utilize a unique active balanced output driver IC, the SSM2142, which senses whether the connected load is balanced and floating or is unbalanced due to either side being grounded. A balanced output load will be driven with equal and antiphase levels on the HI and LO output lines. An unbalanced (one side grounded) load will cause the driver IC to shut off the signal output to the grounded side of the load and double the output level applied to the other side, thus maintaining equal output to either type of load. The output stage will drive loads of 600 ohms and higher. Nominal output is +4dBm with clipping at +22dBm into balanced loads. Maximum output *at clipping* is reduced by 6dB when driving an unbalanced load, since the full output swing of only one driver is available.

POWER SUPPLY

Requires 22 to 30VDC and are designed to share a common external 24VDC "Wall Wart" type power supply. A pair of loop-thru DC connectors on the rear of each module permits several units to be daisy-chained with P/N20602-1 DC power cables to a single WA100-1 power supply. The WA100 is a 400mA supply. The BI100 and the UB400 each draw 70mA and the BU400 draws 40mA. Any combination, which adds up to less than 400mA, can be powered by a single supply. They incorporate an "artificial ground" power supply splitting circuit to track the DC input voltage and provide a center point voltage reference for the audio stages.

INSTALLATION

UNPACKING

Inspect the equipment. If there is any visible damage to the unit or to the box it came in, contact the factory but do not return anything to ATI without prior authorization and shipping instructions. It may be necessary to have the shipping company inspect the unit and the box at your location. Count the pieces! Don't throw out the boxes and packing material until you are sure you have everything that is coming to you. They need either their own separately ordered WA100 power supply or a DC cable, P/N20602-1 to share the supply of another.

Rack and desk mounting hardware may be packed in with the unit even though ordered separately. Wall mount power supplies must be ordered separately but may either be included with the unit or shipped in their own box.

MOUNTING

Single desk mounting kits consist of a pair of angled base plates that mount under the lower front and rear cover screws of a single unit, to raise and to tilt it for easy use. In addition, one or more sets of vertical stacking plates, mounting to the upper front and rear cover screws of the bottom unit, allow multiple units to be stacked. Several units can be desk mounted side-by-side and even stacked side-by-side using horizontal joiner kits together with mounting base and stacker kits. P/N20617-501 is the angled base kit. P/N20617-502 is the base plus one stacker kit (two high). P/N20617-503 is the base plus two stackers (three high). P/N20617-504 is the stacker kit by itself and P/N20604-504 is a horizontal joiner kit. Rack mount system 21075-501 mounts three units in one rack.

Their interfaces are light enough that they can also be attached directly to the equipment they are interfacing using either Velcro or duct tape.

WIRING

AUDIO CONNECTIONS

XLR type inputs and outputs are wired per figure 1 with pin 2 as HI and pin 3 as LOW. Pin 1 is the cable shield and ground connection. Pin 1 is grounded as shipped but may be floated to interrupt a hum producing ground loop by opening the unit and clipping out the GND LIFT jumpers.

Active balanced outputs and inputs require a reference ground connection to the source or receiving device for proper operation. The rack frame or a studio buss connection can provide this ground if the output cable shield does not carry it through.

GROUNDING

Operation in high RF broadcast environments requires special attention to grounding and shielding. The chassis must be grounded directly to a good, low impedance studio ground system. Input and output connections must be properly shielded and free of ground loops. It may even be necessary to add shielding to the DC input leads to avoid RF pickup.

POWER DISTRIBUTION

Sharing a single wall-wart power supply should be looped through each other using the DC interconnect cables P/N20602-1. Noise performance of the units can be degraded by poor DC ground connections between units sharing a common supply, use of the recommended rack and desk mounting kits will assure a good ground connection between units by firmly strapping their chassis together. CAUTION! The outer shell of the DC interconnect cables is positive relative to the chassis. Do not allow a DC cable plugged into a powered unit to hang loose where it might short against the chassis or rack frame.

OPTIONS

230VAC
Contact factory or your local distributor regarding availability of power modules for operation in areas outside of the U.S.A.
Battery Operation
Battery pack power modules are planned for future inclusion in this product line. Check a current price list, contact the factory or ask your dealer for availability.

MAINTENANCE

There is no routine maintenance required for this product. If you have a problem, check panel LED indicators to assure that the units have DC power, eliminate by substitution input and output cables, connectors, downstream devices, DC interconnect cables and Wall Wart power supplies. If you are still experiencing a problem, call us and ask for technical support.

POWER SUPPLY LEVELS

The recommended loaded DC input voltage range is 22VDC minimum to 32VDC maximum over the full range of AC line voltage tolerances. The audio circuits continue to work with reduced headroom below 22VDC. Momentary surges up to 36VDC will cause some increased internal heating, but above 36VDC, IC's man fail.

OPERATING POINTS

An internal reference voltage equal to 1/2 the supply voltage is generated. All audio stage IC inputs and outputs should show a DC level equal to this voltage when measured with a high impedance meter. Audio inputs and outputs are capacitor coupled and ground referenced.

PERFORMANCE SPECIFICATIONS:

BALANCED TO UNBALANCED AND UNBALANCED TO BALANCED

Gain:	-14db nominal, -8db maximum. +14db nominal, +22db maximum. User adjustable for -10dBu (.25V) User adjustable to 0, +4 or +8dBm output with 0, +4 or +8dBm inputs 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
Noise 20kHz B.W.:	-90dBu maximum output -80dBm maximum output
Harmonic Dist.:	.02% Max at Peak Level .02% max. at Peak Level 20Hz to 20kHz .005% max. at Nominal Level .005% max. at Nominal Level
Frequency Resp.:	+.25dB, 20 to 20,000Hz +.25dB, 20 to 20,000 Hz
Crosstalk:	70dB minimum at 10kHz 70db minimum at 10kHz
Input Impedance:	Balanced, 20kohm bridging Unbalanced 10,000 ohms
Output Impedance:	Unbalanced, 1500 ohms max. Zs. Balanced, 40 ohms maximum
Dimensions:	1.5"H by 5.5"W by 5.75"D; Weight: 1.5 Lbs. Net
Connectors:	XLR (balanced input/outputs) & RCA phono jacks (unbalanced input/outputs)
Power:	24VDC @ .07A - BI100 & UB400, 24VDC @ .04A - BU400, Connector sleeve is positive.
Models Available:	**BI100** - Bi-Directional Stereo IHF to PRO **UB400** - Uni-Directional Quad IHF to Balanced **BU400** - Uni-Directional Quad Balanced to IHF

Power Supplies:	All units require 24VDC power supply, which is ordered separately. They can share a single supply-using loop thru DC cable (P/N 20602-1). Do not exceed rated supply current.
WA100-1	Wall mount power supply (UL), 24VDC @ .4 amp, 115 VAC/60 Hz.
WA100-2	Tabletop power supply, 24VDC @ .4 amp, 230 VAC/50-60 Hz with IEC 320 male 3 pin AC input connector. User supplies matching AC line cord for local power system.
BBU100-1	Battery Pack unit houses four 9V alkaline batteries (batteries not included). Normal 4 hour life.
DC100-1	DC to DC converter powers several units from 12VDC mobile and belt pack batteries. Supplies 24VDC @ .2amp maximum.
20602-1	DC power cable assembly for looping the DC power
Desk Mount Kits:	**20617-501** Angled Desk Mount Base **20617-502** Angled Desk Mount Base and One Stacker (2 units high). **20617-503** Angled Desk Mount Base and Two Stackers (3 units high). **20617-504** Stacker (2 units high). **20604-504** Horizontal Joiner (2 units side-by-side). Rev B 9/94
Rack Mount System:	**21075-501** Mounts three units in one rack.