

# ISO-MAX® PRO SERIES USER GUIDE

## SPEAKER-LEVEL to LINE-LEVEL Interfaces

### Models SC-2NR, SS-2NR and SP-2SX

Jensen ISO-MAX® Pro series audio interfaces are designed for use in the finest professional and audiophile sound systems. They use the same industry-benchmark Jensen transformers that are installed in tens of thousands of the world's best recording studios, broadcast facilities, and sound reinforcement venues because of their sonic transparency, ultra-wide bandwidth, an vanishingly low harmonic and phase distortion.



**Model SP-2SX**

Models SC-2NR and SS-2NR are two channel “speaker” level to unbalanced “consumer” level converters and ground isolators - the SS-2NR having an extended low-frequency response for extremely high-performance sub-woofers. The SP-2SX (shown above) is the functional equivalent with balanced “pro”level outputs. All are designed to accept, in four switch-selectable ranges, speaker drive voltages of 14 Vrms, 25 Vrms, 44 Vrms, or 77 Vrms. These voltages will be developed at full output of power amplifiers rated at 24 W, 75 W, 240 W, or 750 W respectively into 8  $\Omega$  loads or rated at 48 W, 150 W, 480 W, or 1,500 W respectively into 4  $\Omega$  loads. Input ranges also include 25 V and 70 V lines used in commercial sound systems covering large areas. Since the speaker inputs are ungrounded, they are especially useful with power amplifiers where both outputs are actively driven and cannot be grounded (these are often referred to as “bridge-mode” or “floating” outputs). The speaker inputs represent a trivial additional load for the driving power amplifiers - maximum input power is 0.08 W, 0.4 W, 1.5 W, and 5.4 W respectively in the four input ranges. In addition, all models provide inherent low-pass filtering to remove ultra-sonic switching artifacts from the outputs of “digital” or “class D” power amplifiers. These artifacts can cause subtle distortions in downstream amplifiers [Deane Jensen and Gary Sokolich, “Spectral Contamination Measurement,” AES 85<sup>th</sup> Convention Preprint 2725, 1988].

The standard versions have dual, or “stereo,” outputs that correspond independently to each of the speaker input signals. The SC-2NR and SS-2NR output signals will reach 1.75 Vrms (+5 dBV) at maximum rated input - sufficient to drive any known power amplifier with an unbalanced input to full output power. This level represents 15 dB of “headroom” in consumer audio systems where the nominal or “reference level” signal is standardized at -10 dBV or 0.316 Vrms. Likewise, the SP-2SX outputs will reach 6.9 Vrms (+19 dBu), a level that represents 15 dB of “headroom” in professional audio systems where the nominal or “reference level” signal is standardized at +4 dBu or 1.23 Vrms.

“Mono” output versions, denoted by a “-M” suffix in the model number, have a single output that represents the sum of the two speaker input signals. These would be used, for example, when the inputs are Left and Right channels and the output, L + R, drives a single sub-woofer.

These ISO-MAX units are entirely passive and require no power supply.

**FOR OPTIMUM PERFORMANCE, PLEASE REVIEW THE FOLLOWING PAGES!**

## General Application Guidelines

Load Impedance Range ( <i>input impedance</i> of device the unit drives) .....	10 kΩ or more
Maximum Output Cable Length, SC-2NR and SS-2NR. ....	60 feet (18 m) of typical cable at 50 pF/ft (160 pF/m) total capacitive load < 3,000 pF
SP-2SX.....	3 feet (1 m) of typical cable at 50 pF/ft (160 pF/m) total capacitive load < 200 pF
Maximum Input Cable (amplifier/speaker to ISO-MAX) Length. ....	unlimited

## System Hookup

In choosing a physical location for the ISO-MAX unit, shorter output cables are preferred over shorter input (speaker feed) cables. In general, the better location will be near the amplifier(s) to be driven. Inexpensive, small-gauge “zip cord” or “speaker wire” is recommended for the speaker inputs to the unit. Its gauge is technically unimportant but 18, 20, or 22 gauge are generally easiest to strip and handle. It should be emphasized that the quality of this wire has negligible effect on the quality of sound - normal technical concerns about speaker cables do not apply. The other ends of these input cables can be connected to either the main-channel power amplifier output terminals or the main-channel speaker terminals, whichever is closer or more convenient. For 25 V or 70 V distribution systems, make the “speaker” connections directly across the “constant voltage” distribution line. Again, be sure to observe polarity and tightly twist the strands of wire at each end to avoid strands that “stray” beyond the clamp area of either the screw terminals or amplifier/speaker terminals.

### For the SC-2NR or SS-2NR:

Observing polarity, securely attach the speaker input cables to screw terminals **1 (+)** and **2 (-)**, marked “**CH 1 IN,**” for one channel and screw terminals **8 (+)** and **9 (-)**, marked “**CH 2 IN,**” for the other channel. **DOUBLE CHECK TO BE SURE THE SPEAKER INPUT CABLES ARE CONNECTED TO THE CORRECT TERMINALS - OTHERWISE, THE UNIT MAY BE DAMAGED!** Finally, connect a standard, high-quality RCA male to RCA male cable between the ISO-MAX unit outputs and the inputs of the power amplifier(s) to be driven.

### For the SP-2SX:

Observing polarity, securely attach each speaker feed cable to terminals **1 (+)** and **2 (-)** of a Neutrik “Speakon” model NL2FC “2-pole” cable connector (not supplied). Please note that the mating Neutrik model NL2MP panel connector used on the ISO-MAX unit will not accept 4-pole cable connectors. Alternatively, the screw terminals may be used for speaker input as described below.

### The Screw Terminal Strip (all models):

If desired, all input and output connections can be made via the detachable 13-pole screw-terminal strip. These connections parallel the input and output connectors, if present. Note that terminal numbers descend in left-to-right order.

Terminal	Marking	Function
13	CH 2, OUT +	Channel 2, Line Output +
12	CH 2, OUT -	Channel 2, Line Output - (cable shield for unbalanced output models)
11	CH 2, OUT S	Channel 2, Output Shield (internally tied to unit housing/chassis)
10	CH 2, IN S	(no internal connection)
9	CH 2, IN -	<b>Channel 2, Speaker Input -</b>
8	CH 2, IN +	<b>Channel 2, Speaker Input +</b>
7	(CHASSIS)	Unit housing, internally tied to Output Shields (see “Grounding” discussion below)
6	CH 1, OUT +	Channel 1, Line Output +
5	CH 1, OUT -	Channel 1, Line Output - (cable shield for unbalanced output models)

4	CH 1, OUT S	Channel 1, Output Shield (internally tied to unit housing/chassis)
3	CH 1, IN S	(no internal connection)
2	CH 1, IN -	<b>Channel 1, Speaker Input -</b>
1	CH 1, IN +	<b>Channel 1, Speaker Input +</b>

## Grounding

Although these units completely electrically isolate inputs from outputs, there are situations where supplemental grounding may be necessary. This generally happens only when equipment has a 2-prong AC power connection (no third or grounding prong). **CAUTION:** *if any piece of equipment in your system uses a 3-to-2 prong "adapter" or other means (such as a clipped-off 3<sup>rd</sup> prong) to defeat safety grounding provided by its 3-prong power cord, we strongly urge you to remove it ... this is an extremely dangerous practice, promoted by the technically naive, that may result in fire, severe shock or electrocution.*

For balanced output models (SP-2SX), grounding to the **DESTINATION** (equipment driven by the unit's line outputs) normally occurs through the XLR output cable shield connections. However, for unbalanced output models (SC-2NR or SS-2NR), allowing ground current to flow in the output RCA cables would create hum or buzz. Therefore, an added equipment ground is recommended. This can be most effectively done by connecting an insulated wire (stranded #18 or #20 AWG, green, length as required) between **screw-strip terminal 7** and the chassis of the destination equipment. Sometimes there is a convenient "ground" terminal on the equipment for the purpose. If not, you can attach the wire under an existing screw somewhere on the equipment's metal chassis. Sometimes grounding can be done by simply mounting the destination equipment in a properly-grounded equipment rack (taking care to remove paint that might prevent electrical contact between equipment and rack rail). Another alternative is to have a reputable technician change the power cord on the destination equipment from 2-prong to 3-prong, attaching the green wire of the new cord to the equipment chassis.

If the **SOURCE** equipment (amplifiers that generate the speaker input) is ungrounded, turn on switches **S4** (Ch 1) and **S5** (Ch 2), as shown below, to eliminate hum or buzz that might occur.

## Setting the Switches

On the bottom of the unit, you'll find a group of switches that select the rated input, in terms of rated maximum amplifier power output that will produce the specified maximum output voltage (+5 dBV for the SC-2NR and SS-2NR or +19 dBu for the SP-2SX). Use the 75/150 W setting for 25 V distribution and the 750/1,500 W setting for 70 V distribution lines. Switches 1, 2, and 3 are for Channel 1 and switches 6, 7, and 8 are for Channel 2:



Switch Settings, Ch 1 / Ch 2			Amplifier Power Rating (W)	
S1 / S6	S2 / S7	S3 / S8	at 8 ohms	at 4 ohms
off	off	off	24	48
on	off	off	75	150
on	on	off	240	480
on	on	on	750	1,500

**S4 and S5 are normally off.** They are used to solve possible grounding issues (see "Grounding" above). While the unit can't be damaged by continuous input voltages up to 80 volts, regardless of switch settings, severe distortion may result from improper settings.

All Jensen products are proudly made in the United States of America. If you have problems or questions about these products, contact [techsupport@jensen-transformers.com](mailto:techsupport@jensen-transformers.com) or call us at (818) 374-5857, Monday through Thursday, 9 AM to 5 PM, Pacific time. For detailed specifications, please see the product data sheets at [www.jensen-transformers.com](http://www.jensen-transformers.com).

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