



**Pro Intercom LLC**

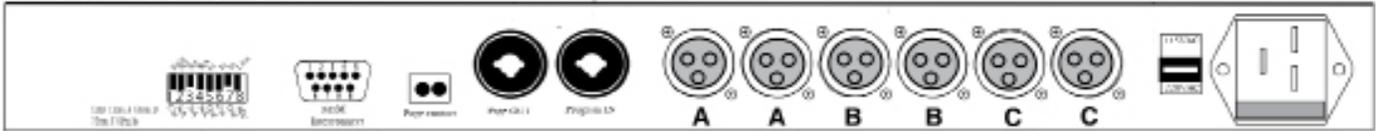
Intercom for Sound, Lighting and Production Professionals



## Instructions

**MS301**  
3-Circuit  
Intercom & IFB  
Master Station

### A. Connections:



#### 1. AC:

Before attaching the IED power cable, check that the voltage setting is correct for your area and that the fuse is the right value. (110/120V- 2A @250V; 220/240V - 1A@250V). Assure that the front panel power switch is in the *Off* position. Connect the IED cable to the MS301 and the power source. Switch the unit *On* at the Front panel. The top LED in the Status column on the front should light - green. The three lower LEDs will also remain green unless there is a problem on that circuit, in which case the LED will turn red.

There is room for a spare fuse in the IED inlet.

#### 2. Comms circuits:

Your groups of stations should now be connected to the appropriate XLR jack, A, B or C. If you have more cable runs than the number of XLR jacks for a particular circuit, you can easily increase the available jacks with an SB1 Adaptor or with Y-cables. It is essential that you check all your station interconnect cables for correct phasing. If Pin 1 is grounded anywhere other than in the MS301 it will create a serious problem. The same is true with Pin 1/3 reversals which can easily happen when switching genders. Some mis-wiring will still allow a cable to work with a microphone, but will render an intercom system useless.

#### 3. Program Input:

The connector provided will accommodate either a 3-pin male XLR or a 1/4in. T/R/S phone plug. The input is unbalanced. The connection is via pins 1&2 of the XLR or the Tip and Sleeve of the 1/4in. phone plug. If your source is balanced you will have to unbalance it externally before connecting it to the MS301. Devices to do this are commonly available on-line or even at consumer electronic stores.

#### 3. Paging Output:

Once again, the jack will accept either a 3-pin male XLR or a 1/4in. T/R/S phone plug. The output is balanced at 600Ω. A signal only appears here when the front panel 'Page' button is pressed *and held* and consists only of the output from the front panel microphone, whether it is part of a headset, handset or gooseneck microphone. The balanced signal is on pins 2 & 3 of the XLR or the tip and ring of the 1/4in. phone plug with pin 1 of the XLR and the sleeve of the 1/4in. phone plug being grounded.

#### 4. Paging Activation:

When the front panel 'Page' button is pressed, the pins of this jack are shorted, allowing the activation of a paging amplifier that has this feature.

**Pro Intercom LLC**  
PO Box 7035 Algonquin Illinois 60102-7035  
Phone: +1 (815) 680-5205 Orders and Tech support: (888) 320-5928 Fax: +1 (815) 526-8689  
support@prointercomllc.com Skype: intercom4pros

## MSM301 Connection:

The MS301 can be augmented by the MSM301 which adds 3 more active circuits. The 9-pin d-Sub connector is used for this connection. The appropriate cable with connectors installed is supplied with the MSM301.

## Setting the DIP switches:

There are 8 switches in the DIP group. In the MS301 only 5 are active

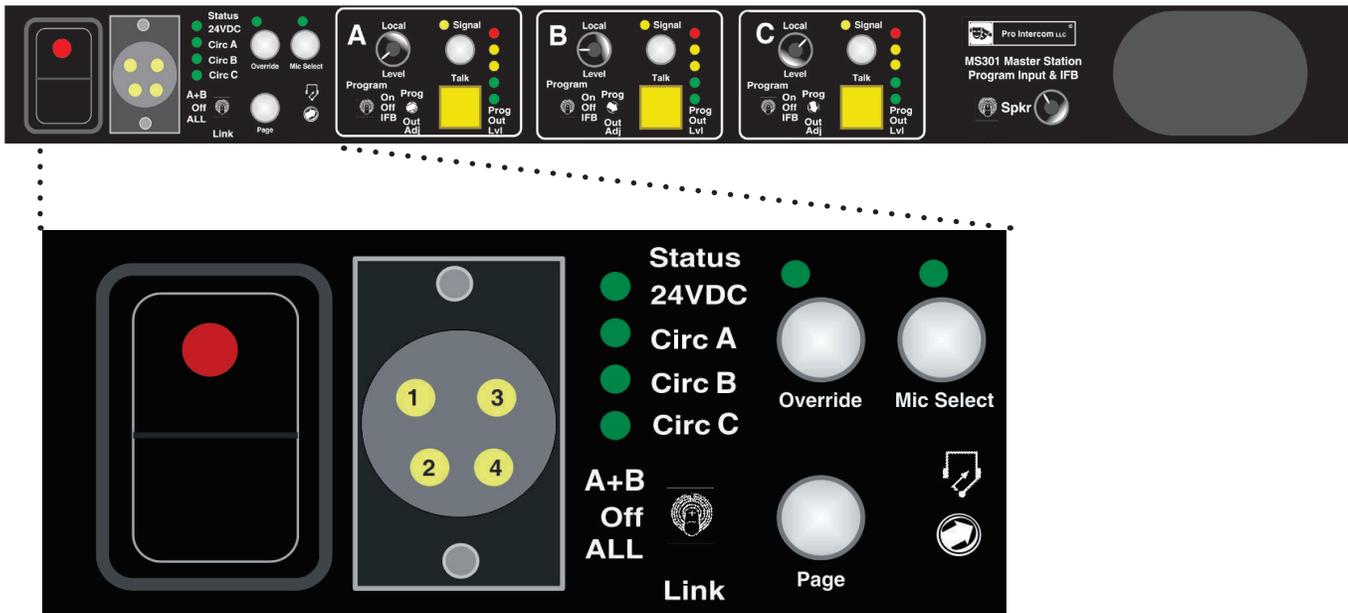
No 1. When IFB mode is being used, this switch changes the way in which program audio is interrupted when the operator activates the Talk function. In the down position program audio will be instantly cut; in the up position program audio will be smoothly faded.

No's 2. thru 4. These switches are reserved for future functions.

No's 5. thru 7. Lifts the 200Ω termination circuit from circuits A, B and C. The standard position for this switch is Down, with the termination circuit connected. The most common of the *rare* times that the termination circuit would be lifted is when a circuit is being connected to another intercom system which already has a termination circuit.

No 8. Sets program audio input circuit to line or mic compatibility. DOWN is Line level (+4dB) while UP is Mic level (-20dB). In both positions, the input is unbalanced. If you wish to connect a device with balanced output, you will need to unbalance it externally first. Devices for doing this are commonly available on-line and at retail electronics stores. You will want the unbalanced end to terminate in either a T/R/S ¼in. phone plug or a 3-pin *male* XLR. Either will work with the MS301. Pins 1&2 and the Tip & Sleeve are the active contacts.

## B. Operation



The left section of the front panel contains controls which affect all circuits.

The 'mains' switch connects or completely disconnects the MS301 from the AC source.

The 4-pin male XLR is used to connect a headset, a handset or a gooseneck microphone. Pins 1 & 2 are the input, with pin 1 being ground. Pins 3 & 4 are the output with pin 3 being 'low'. When a gooseneck microphone is being used, the speaker and controls on the

right side of the chassis are used to listen. Communication is duplex, simultaneous talk/listen no matter what device is connected. If a handset is used and it has a push-to talk bar, the bar should be locked *On* or internally wired for constant *On*. If a gooseneck microphone is used, particular attention should be paid to instructions regarding *Sidetone*, below.

The Status Bar of LEDs contains four green LEDs. The top LED indicates that the power supply section of the MS301 is delivering 24VDC to the operating section. The green LEDs below it are bi-color and turn red if there are any problems on Circuits A, B or C. The most likely problems are a short circuit between the power pin (2) and ground in one of the interconnecting cables, or a pin 1/3 reversal in the wiring which often happens when attaching different gender connectors to opposite ends of a cable. The fact that a microphone cable works with a microphone does NOT assure that it will work in an intercom system. An out-of-phase microphone will still work, if poorly. An out-of-phase intercom system will not work at all and may damage components. If the problem on the circuit is serious enough to damage the MS301, *the circuit will shut down until the problem is removed*. The other circuits will not be affected.

Below the status bar is a switch which allows you to link the circuits, either *A+B* or *ALL*. This will put all the stations on the linked circuits on a common circuit as may be desirable during a sound check or rehearsal. The normal position is *Off*.

Above and to the right of the Link switch is a button marked *Override*. Pro Intercom Loudspeaker stations have a built-in circuit which restores its front panel controls to preset functions, regardless of how they may have been adjusted locally. Units turned *Off* are turned *On*, volume is restored to an audible level, etc., all determined by internally set jumpers. The *Override* button activates that circuit. For example, a Loudspeaker station that has been turned down locally could have its volume restored and an important message heard.

LS3 Talkback Loudspeaker Station



Override Active Indicator

Back on the MS301, below the *Override* button is one marked '*Page*'. When this button is pressed the output of the internal microphone preamplifier is balanced at 600Ω, raised to line level and delivered to the output jack on the rear panel marked '*Page Out*'. At the same time a pair of contacts connected to the *Page Active* jack on the rear panel are closed. These contacts are intended to be used to activate a remote paging amplifier which has this feature. A remote paging amplifier at a considerable distance from the MS301 can now make announcements in a lobby, dressing room, green room, etc. These announcements will also be heard on any communications circuit which has its *TALK* button latched *On*.

The next control in this segment is marked with a symbol:  '*Sidetone*'. You experience Sidetone every day when you use the telephone. It overcomes the brain's conviction that if you can't hear yourself, nobody else can either. It is a small amount of the audio from your own microphone fed back into your earspeaker. You need just enough Sidetone and no more. The amount varies from person to person.

Sidetone is used in two ways with an MS301:

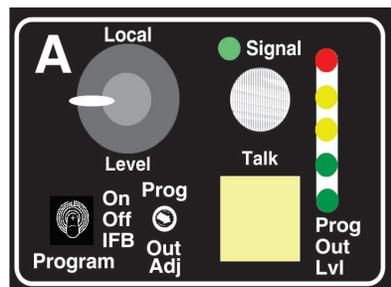
First, if you are using a headset, tiny adjustments of the little recessed control can make your listening more comfortable. Remember, Sidetone only affects what you hear, it does not change the level that others on the circuit hear. The second, and most dramatic use of Sidetone is to permit the MS301 to be used with a noise-canceling gooseneck microphone and the built-in loudspeaker in a full simultaneous talk/listen mode (duplex) hands-free. Reducing Sidetone also reduces the level of your own voice coming out of the loudspeaker, thus delaying the onset of feedback. This allows you to raise the level of the audio coming from those with whom you are communicating.

Using a noise-canceling gooseneck microphone cuts back on the amount of audio coming from the loudspeaker and the environment which is getting back into the audio path via the microphone. The result is that the MS301 can be used in a fairly quiet environment to talk and listen to other stations without a headset and without pressing buttons. The *Sidetone* control requires very tiny adjustments to find that perfect spot where speech is loud enough, and feedback does not occur. The default position of the control is 12 o'clock which is usually acceptable for most headsets

The last control in this segment is a button marked Mic Type.

This control sets the circuitry to accommodate either a dynamic or an electret microphone, whether it is part of a headset/handset or is a gooseneck microphone. An LED indicates which setting is active. It is essential that you use a professional communications headset, handset or microphone with the MS301. The earspeakers in the headset should be between 200 and 400 $\Omega$ , and the microphone should be either a dynamic from 150 to 250 $\Omega$ , or an electret between 1.2 and 1.8 k $\Omega$ . Inexpensive headsets commonly sold for connecting to computer sound cards are not acceptable for this purpose.

## Individual Circuit Controls



Each circuit has a control section on the front panel like the one illustrated above. Unless the Link Switch (see previous section) is in use, each circuit operates completely independently of the others.

The rotary control marked *Local Level* controls the volume of the audio on that circuit as heard in the MS301 user's headset. It does not affect the level that anyone else on that circuit hears. Each remote station controls its own level.

The toggle switch affects program only. Program can be turned *ON*, meaning that it is being fed to the stations on that circuit. It can be turned *OFF* so that stations on that circuit hear no program audio at all. It can be put in the *IFB* position, so that stations (*IFB Talent Receivers*) hear the program, but when the MS301 operator activates the *Talk* function, the program audio is either muted or ducked depending on the selection made via the rear panel DIP switch. (See previous section)

The recessed screwdriver adjust control marked *Prog Out Adj* controls the loudness of the program audio sent to the stations on that circuit.

The 5-segment LED meter displays the level of program audio being sent to the stations on that circuit. It is possible to adjust the level so that it is a true VU meter, but most will find it more useful as an indicator of the level relative to the other circuits and set by agreement between the operator and the station users.

The Signal button lights the signal lamps on all stations connected to that circuit. Those stations can also signal the MS301 operator. In both cases the bright yellow LED next to the button is lit. The exception is IFB talent receivers which have no signal LED.

The Talk button functions momentarily by simply pressing and releasing it. Tapping it quickly will lock it ON while another tap turns it OFF.

## About IFB

IFB (Interrupt & Fold Back) is industry jargon for the gear that is used by the producer or director of a performance to talk to the 'Talent' discreetly during the performance. It is the reason that you see the tiny earpiece with the thin coil cord running into the ear of the announcer on a newscast or the members of a discussion panel on television. The producer is feeding them information about upcoming commercial breaks, correcting some mis-statement they have made, advising them to speed up their delivery, etc., etc.

The equipment used for IFB is very similar to intercom except that the 'Talent' cannot respond - they don't have a communications microphone. The backpack they use is therefore much simpler and is usually referred to as a Talent Receiver. Pro Intercom's Talent receiver is the TR1 and looks like this:



Any make of Talent Receiver can be used with the MS301 as long as it operates on the same 200Ω unbalanced principle. Conversely, the TR1 can be adjusted for use on virtually any wired IFB system ever sold.

Pro Intercom staff will be happy to direct you to sources for the tiny earpieces used with the TR1.

On the MS301 you can choose which circuits you want to use for IFB with the click of front panel switch. Reducing the level of Program audio heard by the 'Talent' when the director presses his Talk button is automatically activated.

## Adding Extra Circuits

Especially because you can operate both intercom circuits and IFB circuits from the same MS301, you may find that 3 circuits are insufficient. The MSM301 is an accessory which adds 3 additional circuits to a MS301.



The MSM301 needs to be located close to the MS301 and connects to it via a single multi-pin cable, which is provided.

Once connected, you treat circuits D, E & F in exactly the same way as A, B & C.

The MSM301 does not have its own power supply, but simply allows you to apportion the current provided by the MS301 over 6 circuits instead of 3. Since the MS301 provides 2.4A @ 24VDC (roughly the equivalent of 80 backpacks) current should be sufficient for a very large system.

# Power Distribution

The MS301 contains a powerful and sophisticated power supply. The upper limit of its ability to supply current is determined by the toroidal transformer that is at its heart, and its associated rectifier. The transformer is able to supply (after rectification to DC) 2.4 Amps @24VDC. This is roughly enough current to drive 80 belt packs with their signal lamps constantly lit.

Each of the three circuits has its own regulator and is regulated at 1.0A. This means that if all 3 circuits were loaded to draw their full output. The total would exceed the transformer's capability by 0.6A. In this event the circuitry would simply begin to reduce the voltage available from 24VDC down towards 18VDC. The system would not fail and 18VDC is sufficient to provide beltpack performance close to normal.

However, common sense suggests that any one circuit should be limited to 0.8A. (2.4/3) This represents about 27 beltpacks or 8 LS3 loudspeaker stations. In the very unlikely circumstance that a greater load than this is required, the stations could be spread across 2 circuits and the link switch used to put them in communications with one another.

The fact that each circuit has its own regulator means that each circuit can be monitored separately and that a fault in one circuit will not affect the others.

When an MSM301 Accessory is added to create 3 more circuits, the maximum average current draw per circuit is reduced to 0.4A.

The Power Supply components are mounted on a massive heat sink and a temperature sensitive cooling fan starts up if the power supply section gets warm.

**In conclusion:** A huge intercom system can be built around an MS301 without fear of failure.



Intercom for Sound, Lighting and Production Professionals