



**TV
Studio
Communications**

Applications Notes

• General •

A Production Intercom system for use in a studio where there is no communications system built into the cameras and camera control unit (CCU) differs from a theatrical system only in the use of binaural headset stations (BP-2B Belt Packs) with a separate program being fed to each ear of a dual-muff headset. The balance of this section will deal with various combinations of existing camera/CCU facilities and Production Intercom systems.

Combining a Production Intercom system with existing communications facilities in the cameras and/or CCU varies with the type of circuits provided at the cameras and at the CCU.

2-wire v.s. 4-wire

Most camera intercom circuits are 2-wire. Both talk and listen occur simultaneously on a single pair of conductors. Although this is essentially the same principle upon which Production Intercom systems operate, the two are not compatible as the table below indicates:

System	Audio Line Impedance	DC Line Impedance	Operating Level
Camera Intercom	Approx. 600Ω	600Ω	0dBm
Production Intercom	200Ω 1%	5KΩ	-20dBm

The audio line impedance in these 2-wire camera systems is highly variable, as the camera circuits usually load the line with a low loading impedance. Thus, each camera added to the line, usually in parallel, reduces the line impedance. The system is then totally dependent upon the number of headsets in use, as well as the volume control settings at each individual camera. It is not possible to successfully integrate a Production Intercom system with these 2-wire systems.

A few of the better CCU's provide circuitry, switching and termination points to provide 4-wire connection to their 2-wire head-to-CCU systems. Audio quality may vary from poor to good, but these CCU's can be readily interfaced to a Production Intercom system.

Some newer and more sophisticated cameras and CCU's are equipped with a true 4-wire communications system. Talk and listen each have a separate pair of conductors. Audio quality is likely to be superior and a successful interface to a Production Intercom system is probable if access is provided at the CCU.

Camera Types

Group 1:

These cameras have the simplest of intercoms with a very basic headset circuit in the camera head. In general the performance is so poor that the best solution is a completely independent communications system, with a headset station (belt pack) and headset, connected via a discreet cable to the intercom system.



Group 2:

The intercoms provided in these are generally better than the most basic ones, but are still 2-wire, and incompatible as noted above. Therefore the use of a separate headset station (belt pack) and headset is still the ideal solution. Cameras of this type frequently have a 3-pin XLR connector for a microphone. The output end of this connector appears at the CCU.

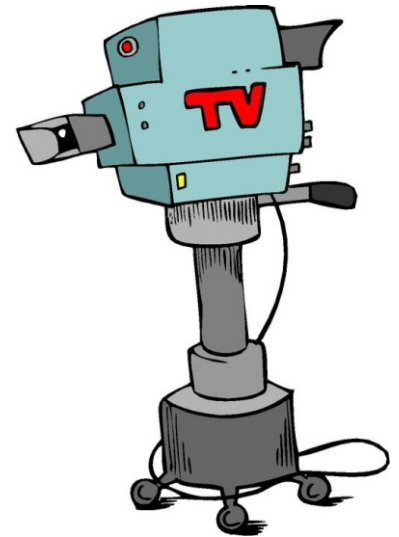
Since Production Intercom systems interconnect with microphone cable, this line within the camera cable may be used to connect the headset station back to the CCU. Many cameras have a microphone preamplifier at the head end to raise the microphone signal above the video cable 'noise'. If this connection is used for the headset station, this preamplifier must be bypassed. Check with your camera supplier for details.



Group 3:

These better cameras, if not equipped with a CCU, can be used as Group 2 types above. However, if a CCU is in use, and the built-in head-to-CCU communications system is of adequate quality, it makes sense to make use of it. The head-to-CCU intercom is most probably 2-wire, but many better CCU's have an intercom output termination which is switchable to a 4-wire format. These CCU's can be connected directly to a Production Intercom system via an AD903 adaptor. Follow the directions for your CCU and the connection and grounding instructions which come with your AD903 carefully. When successfully interfaced, the CCU/camera system will appear on the Production Intercom system just as if it were another headset station.

If the head-to-CCU communications system is true 4-wire, connection via an AD903 is easily accomplished, and performance likely to be the best of any combination. If 2-to-4 wire facilities are not provided on the CCU, it *may* still be possible to connect the CCU to the Production Intercom system via an AD903 adaptor, using the CCU's headset jack. These 1/4 in. headset jacks are 3-wire (talk signal/listen signal/common). Performance degradation in the Production Intercom system will probably occur when this three-wire jack is used as a source. Sidetone stability will deteriorate, and overall system gain may be reduced. Details for connecting to 3-wire systems are given in the AD903 instructions. Pay special attention to the sidetone adjustment instructions.



Adjusting a Hybrid System

Where a communications system is a hybrid consisting of a head-to-CCU system and a Production Intercom system, some simple points should be noted for optimizing performance.

Rule #1: One step at a time.

Rule #2: Re-read rule #1.

1. Check that each system is operating correctly and at normal levels, independently of each other. Do not adjust these levels again until all the steps below are completed.
2. If there is an auxiliary program feed to the Production Intercom system, connect this to the appropriate input and adjust the level. Be sure that the program material is at normal operating levels and is of the usual content, e.g: speech, music. Usually the program will be at lower level than the communications volume, so that users can speak over the top of the program. Do not adjust this level again until all the steps below are completed.
3. Connections between the Production Intercom system and the external systems are likely to be via the AD903 adaptor. If you are connecting more than one of these, do so one-at-a-time.
4. If possible connect only the 'send' side of the AD903 to the input side of external system. Adjust the 'send' control of the AD903 until the level of the Production Intercom system heard in the external system matches the level between headsets in the external system. Do not adjust the levels set in steps one and two above!
5. Now connect the receive side of the AD903 to the output terminals of the external system and adjust the 'receive' control of the AD903 until the level of the external system as heard in the Production Intercom system matches the level between headset stations in the Production Intercom system.
6. Simultaneously with adjusting the 'receive' level of the AD903, adjust the sidetone 'null' control on the AD903 for maximum performance. See the 'Sidetone' section of this binder for details.
7. If more than one AD903 is connected to one Production Intercom system, some level 'tweaking' may be required as each is added.