

Flying Pig Systems

Wholehog II timecode (SMPTE) input Hardware implementation & recommendations

Serial numbers affected: ALL CONSOLES UPTO 04170

It has been brought to my attention that some users have experienced timecode (SMPTE) reception problems on certain jobs. These problems range from intermittent reception & receive errors through to no reception and, in some severe cases, damage to console electronics (namely ICs 20 & 21 and MOSFET TR1). This document addresses the cause and the solution to these problems.

Timecode is an audio signal that is typically recorded on a separate channel alongside audio/visual data for equipment synchronisation. As it is an audio signal, the voltage levels are relatively small (1V @ 0dB) and thus prone to noise over cable runs. For this reason, the signal is generally distributed as a balanced signal using a high quality screened twisted-pair cable.

The Wholehog II is designed to accept a balanced timecode signal ranging from -20dB to 0dB in level and the input stage is given for reference in figure 1.

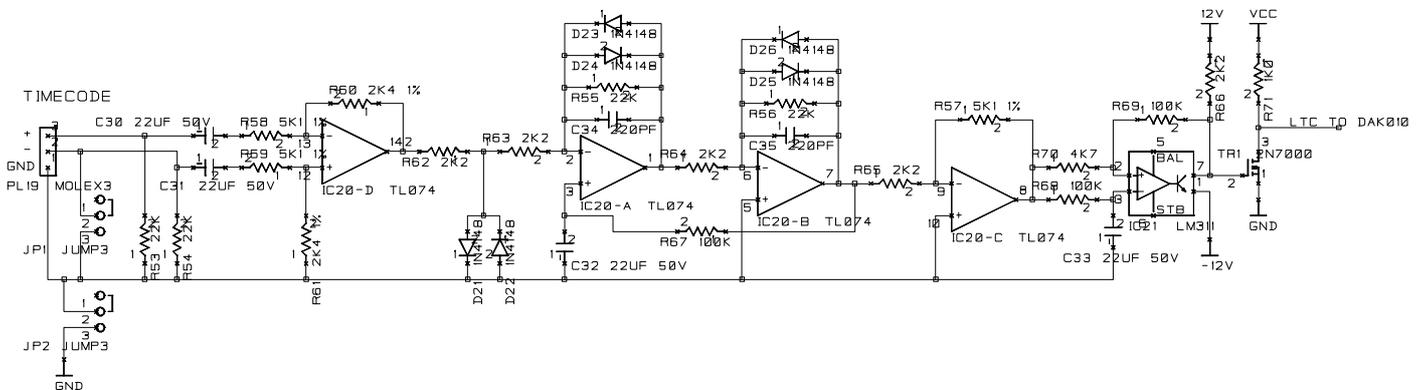


Figure 1

However, this design can only function correctly if the timecode source and this receiver assume the same reference voltage which is typically the ground voltage of each item. Unfortunately, dogma states that the ground connections of audio and lighting equipment must never be connected to avoid the possibility of noise entering the audio system amongst other more serious issues (see later).

As you can see from figure 1, my response to this was to incorporate a ground lift jumper (JP2) for which the default factory setting was lifted. This rather clumsy method of isolation is highly unsatisfactory as the ground voltages may now be allowed to vary enough to cause unreliable signal detection at the gate of TR1. Indeed, large potential differences may and do actually damage this and certain other components.

continued

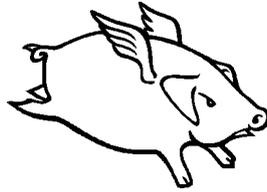
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Thus, to ensure that this circuit operates as intended, please move JP2 to the non default position and accept my apologies for a sloppy piece of engineering. JP1 should be left at the default setting as it is **NOT** recommended that unbalanced signals be used. Refer to figure 2 for jumper identification - the pcb screen indicates the default link.

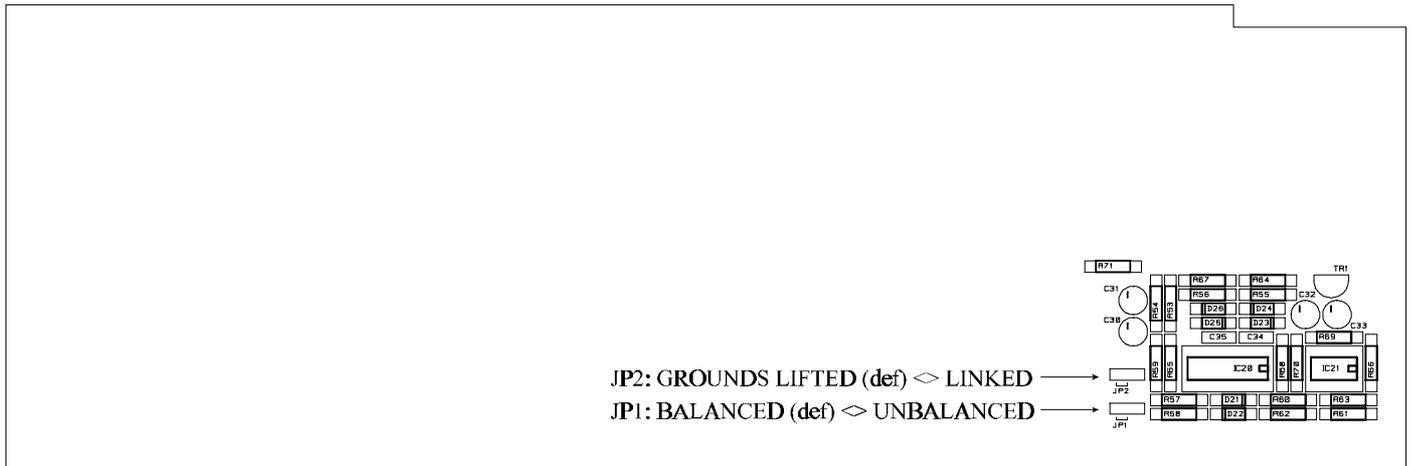


Figure 2

Consoles with serial numbers 04171 onwards have been factory set with JP2 correctly set.

However, whilst this will solve most Wholehog II timecode reception problems, it does nothing to address the real, underlying issue - mains supplies, equipment grounding and signal interconnection in general;

Large systems may employ separate generators at separate sites bearing different loads which will almost certainly guarantee ground potential differences between, for example, audio and lighting equipment. Under these circumstances, simply connecting the grounds together via signal cable screens is unsatisfactory and perhaps even hazardous. Other methods **MUST** be found to isolate such equipment and such equipment is commonly available for audio signals in much the same way as isolated repeater boxes are used to distribute the much more robust digital DMX512 data.

As a work around, **provided that the console employs such isolated repeaters to communicate with the lighting rig**, then simply powering (thus grounding) the console from the same mains supply as that which powers the timecode source will meet all the criteria (reliable timecode signal connection with complete isolation of audio equipment from motors, dimmer racks and the lighting rig in general). The Wholehog II will **NOT** interfere or induce noise onto the audio system.

This is a large subject which is clearly outside the scope of this document but I hope that this at least helps in sorting out the Wholehog II issues.

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16th March 1998

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