BAY SYSTEMS Radio Microphone link specification.

The radio link is designed to connect microphones, though it may be used to connect accelerometers, over distances of 50 to 600+ metres. This product contains a transmitter that conforms to all the essential requirements of the Radio Directive 1999/5/EC

EN 300 422 V1.1.1 (2000-08)
EN 301 489-9 V1.2.1 (2001-07)
EN 60065:1998, EN60950:2000

The conformity assessment procedure referred to in article 10(5) and detailed in annex 1V of directive 1999/5/EC has been followed with the involvement of the following body(ies)

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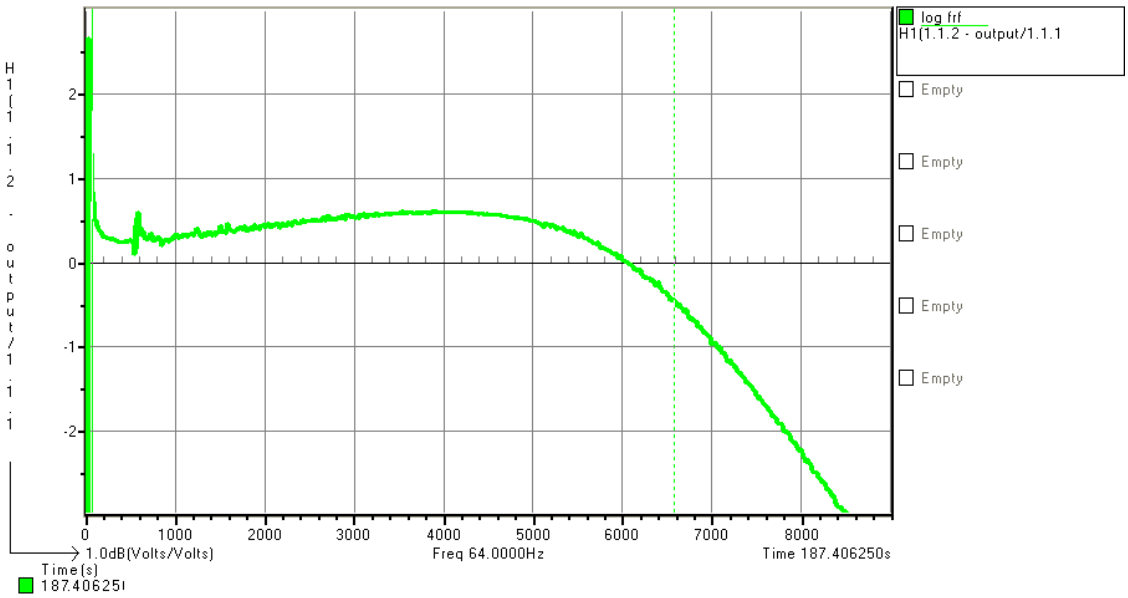
The worst case specification for the Bay Radio System is that the frequency response is flat from 50Hz to 15kHz +/- 3.5dB.
The actual typical response of the system is shown in figure 1. The typical frequency response is flat to +/- 0.5dB from 50Hz to 6.5kHz after 6.5kHz the response rolls off smoothly and can therefore be used, with an appropriate correction, to 15kHz.

Figure 1. A typical; frequency response of the radio link; input swept sine.



The measurement shown in figure 1 was made using a swept sine wave input feeding the input of the transmitter and measuring the receiver output signal. The frequency response function (H1) was computer over 2000 averages with 4096 FFT lines.

Power consumption and choice of battery

To reduce complexity and to enable the user to easily purchase replacement batteries it was decided to use commonly available 9 volt PP3 type batteries throughout the system. The maximum power drain for the transmitter and receiver circuits was 30 mAmps per channel. The microphone pre-amplifier also uses 30mAmp per channel making a transmit side consumption of 60mAmps and 30mAmps at the receiver. The power available per PP3 cell at normal temperatures is approximately 400mAmp hours and at a temperature of 65 degrees is around 200mAmps hours. An approximate loss of 1% capacity per degree C above 20 degrees C. This means that for each transmitter channel installed a standard PP3 cell will last at least 6 hours at raised temperatures and for approximately 12 hours at 20 degrees C. The microphone pre-amplifier requires at least 15volts to give reasonable head room and so requires two PP3 cells in series; the lifetime to be expected from the battery is therefore identical to the battery life of the radio module.

High power PP3 type batteries are available that have a stated capacity of 880mAmp hours which would result in a life of at least 12 hours at raised temperatures and approximately 24 hours at room temperature. Rechargeable batteries have slightly lower voltages and also significantly smaller capacities; these can be as low as 140mAmp hours. If rechargeable batteries are used in the systems then care must be taken to monitor their condition regularly.

Installed battery configuration.

Transmitter.

Figure 3. Twin Channel Transmitter Module.

The battery compartment for the microphone pre-amplifiers are shown. The microphone pre-amps are switched independently of the radio transmitters. Each double drawer powers one microphone. No appreciable change in sensitivity occurs as the battery discharges from 17.5Volts to 15volts.

The battery compartment for the radio section of the system is again divided so that each transmitter has its own battery. The radio link will work as long as there is 5Volts available.

Receiver.

Figure 4. Twin Channel Receiver Module.

Each channel has its own battery, the two cells are arranged in parallel, resulting in double the expected battery life i.e. with 880mAmap hour batteries 48 hours of operation. A diode prevents one battery discharging through the other. Once the power switch is set to on, red showing in lens, then the battery health button can be pressed. The led must light for the stated voltage to be present, the brighter the led the higher the voltage is above the minimum. The cct uses a zenner diode to hold off part of the battery voltage.

System operation.

The system is set up to cope with 124dB maximum sound pressure level at the GLM 100 microphone. The input range of the radio transmitter, the pre-amplifier gain setting and 100dB dynamic range of the radio link together impose a practical limit. A higher sound pressure level of 148dB may be requested as a special order.

The system is designed to use only one type of battery (PP3) use of multiple types of battery, although technically attractive would certainly lead to problems when replacement batteries were required in the field.

The transmit module can be used as a simple two channel microphone pre-amplifier with the output from the microphones being taken from the two monitor BNC sockets.

The radio channels allocated to each instrument are marked, the matching receive module must be used. The possibility exists to tune the system over any of the 15 available channels.

System Range.

Essentially the system is **line of sight** and because the power transmitted is controlled to a very low level <5 mWatts per channel the range is not “as far you can see”.
With the standard transmit and receive aerials fitted, see figures 3 and 6, the range will be 200+ meters provided the transmitter and receiver modules are at least a metre above the ground and in “line of sight”. If the high gain receiver antenna is used see figure 5. the range is at least 600 metres. The high gain antenna is connected by simply unscrewing the normal short antenna and attaching the coaxial cable.

Figure 5 High gain receive antenna.

An appreciation of the range achievable is obtained from figure 6. The transmitter is under the 400kV pylon and the high gain antenna is in a room on the 1st floor.
Using the standard Ariel the signal was good out to past the large tree.

Figure 6 Transmit range.

Bay Systems Ltd.
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