

Morse Decode

A source of sound has been detected on the planet's surface. The source appears to be transmitting a message in Morse code¹ format – long and short tone pulses.

Your task is to design and construct receiving equipment to be fitted to the Rover and using the equipment and the processing power on the Rover receive and identify the message encoded in the Morse transmission.

Using the schematic below calculate values for the unspecified components, layout and fabricate a stand-alone (5VDC power will be provided) printed circuit board which will receive and analyse the alien signal, producing a digital stream, probably UART, which can be received by the Rover's on-board processor and thereby relayed to the Earth Station GUI indicating the content of the message.

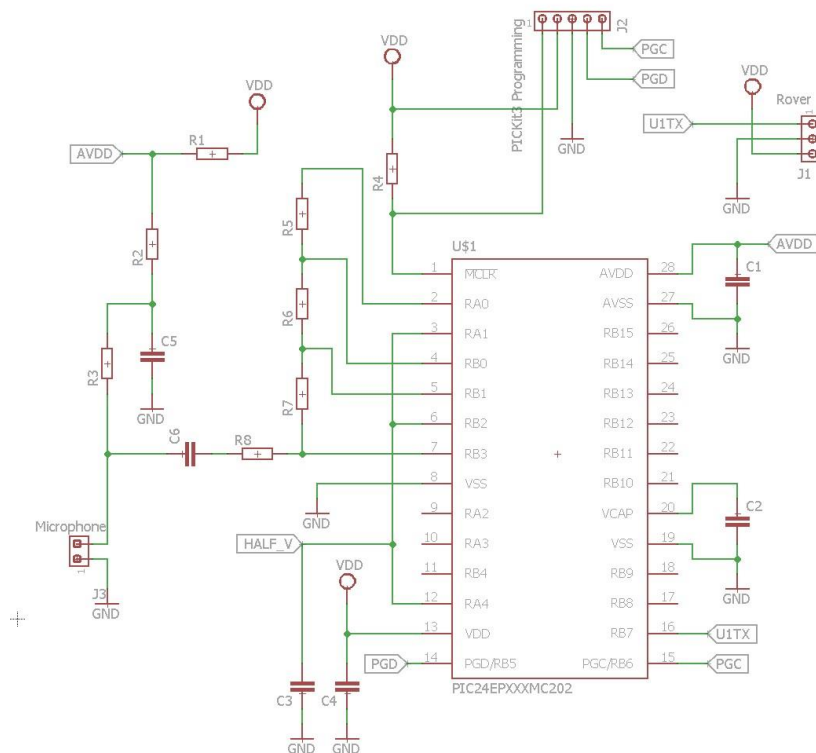


Figure 1: Outline Schematic for Sonic Signal Decode

¹ ["International Morse code Recommendation ITU-R M.1677-1"](http://www.itu.int). [itu.int](http://www.itu.int). International Telecommunication Union. October 2009. Retrieved 28th September 2015.

Demonstration Procedure

1. Stage 1: Stand-alone operation (prior to launch): Connect your equipment to the provided 5VDC power supply and the UART output to the PC using a USB-to-UART converter, request that the Mission Director enables the simulation of the signal being received on the planet's surface and demonstrate that the received message can be decoded by your equipment and displayed on the PC.
2. Stage 2: Challenge Day (after launch): As you trundle along the course to attempt the other tasks, you are going to have to keep your receiver primed and ready.
3. The Morse code message is detectable somewhere along the course of the mission.
4. Attempt to receive and decode the Morse message, send the message for display on the Earth Station GUI. Mark with an X where you believe the message emanates from.
5. Do not start your next task until you have confirmed that the Mission Director has recorded your team's score for this task.

Scoring:

Achievement	Score
Production of stand-alone reception equipment whose output may be displayed on a Windows PC using standard terminal emulation ²	+3
Identify where along the route you found the source of this sound	+1
Decode Morse message and display message on the Earth Station	+1

² May be demonstrated before launch, prior to Challenge Day