

BRAIN INVADERS MULTIPLAYER

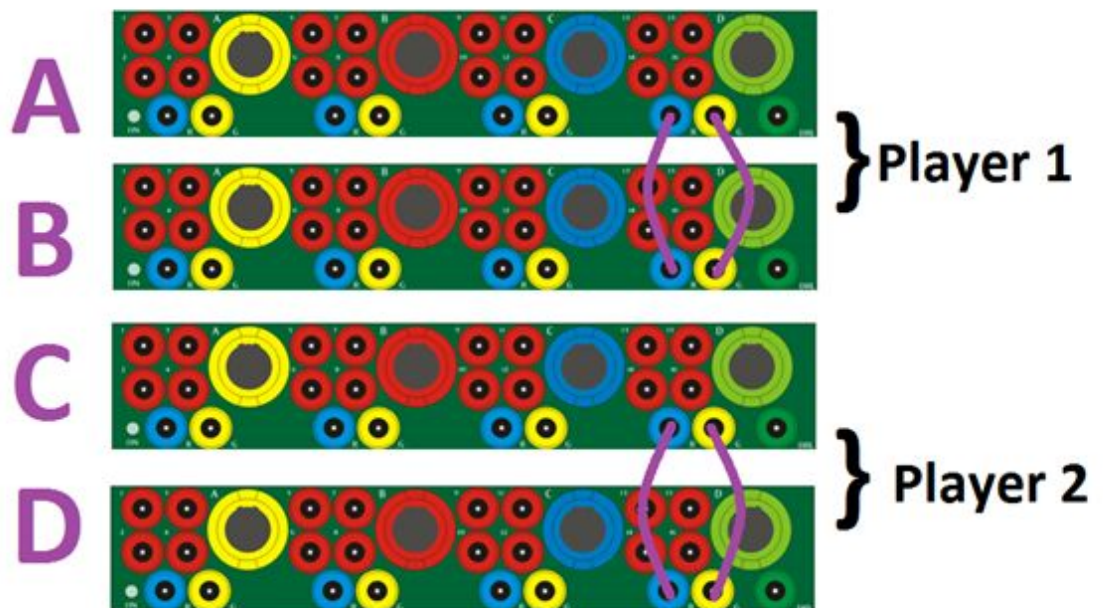
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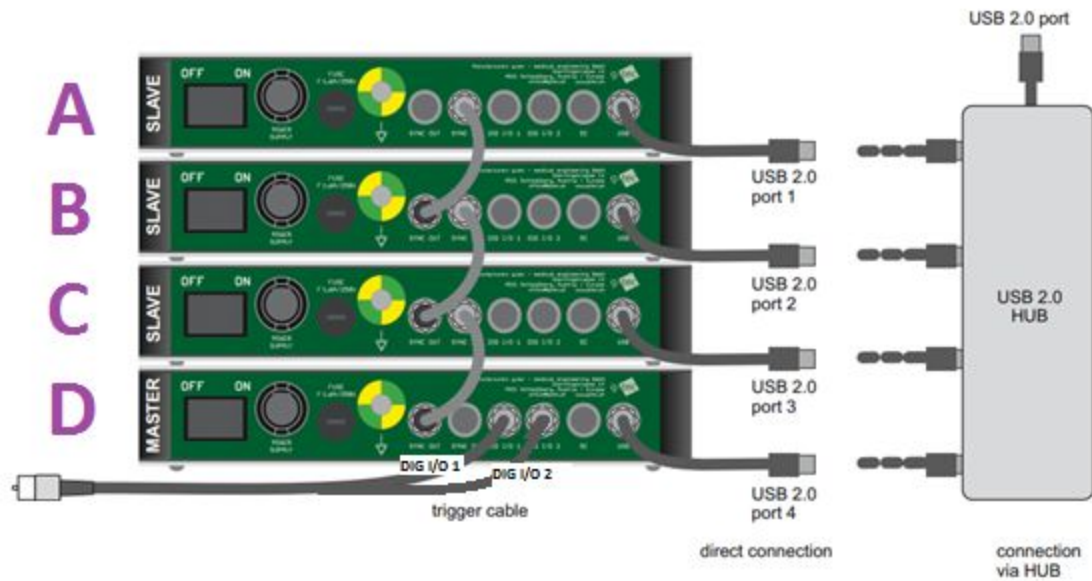
Equipment setup: 32 electrodes per subject, 2 subjects, 4 amplifiers:

- Equipment needed:
 - 4 amplifiers + power cables
 - 2 x 32 wet electrode EEG caps + accompanying preamplifiers
 - 4 x preamplifiers to ampli cables
 - triggerbox
 - 4 x purple ground/reference connector cables
 - 3 x sync cables
 - 4 x USB - ampli cables
 - 4 x Extension cables for pre-amplifiers
- Setup



Stack the 4 amplifiers on top of each other according to picture. Label them (top to bottom) A, B, C, D (in current experiment the order of amplifiers is .20, .34, .35 & .36). Amplifier A & B (Player 1) should be connected with 2 small purple connector cables at the front correspond to Player 1 and C & D to Player 2 (See picture 1). Label the pre-amplifiers and extension cables A to D, preamplifiers with ground and reference electrodes should be A and C. Connect the preamplifiers to the corresponding amplifiers, use extension cables if desired.

At the backside, connect each amplifier to power. Connect each amplifier to a USB-hub (or directly to the computer) by a USB-cable. Amplifier D is the master and should receive the trigger input. Connect the two cables from the triggerbox to DIG I/O 1 and DIG I/O 2 of amplifier D. Use sync-cables to connect the slave-amplifiers, from sync OUT (D) to sync IN (C) and so on (according to picture 2).

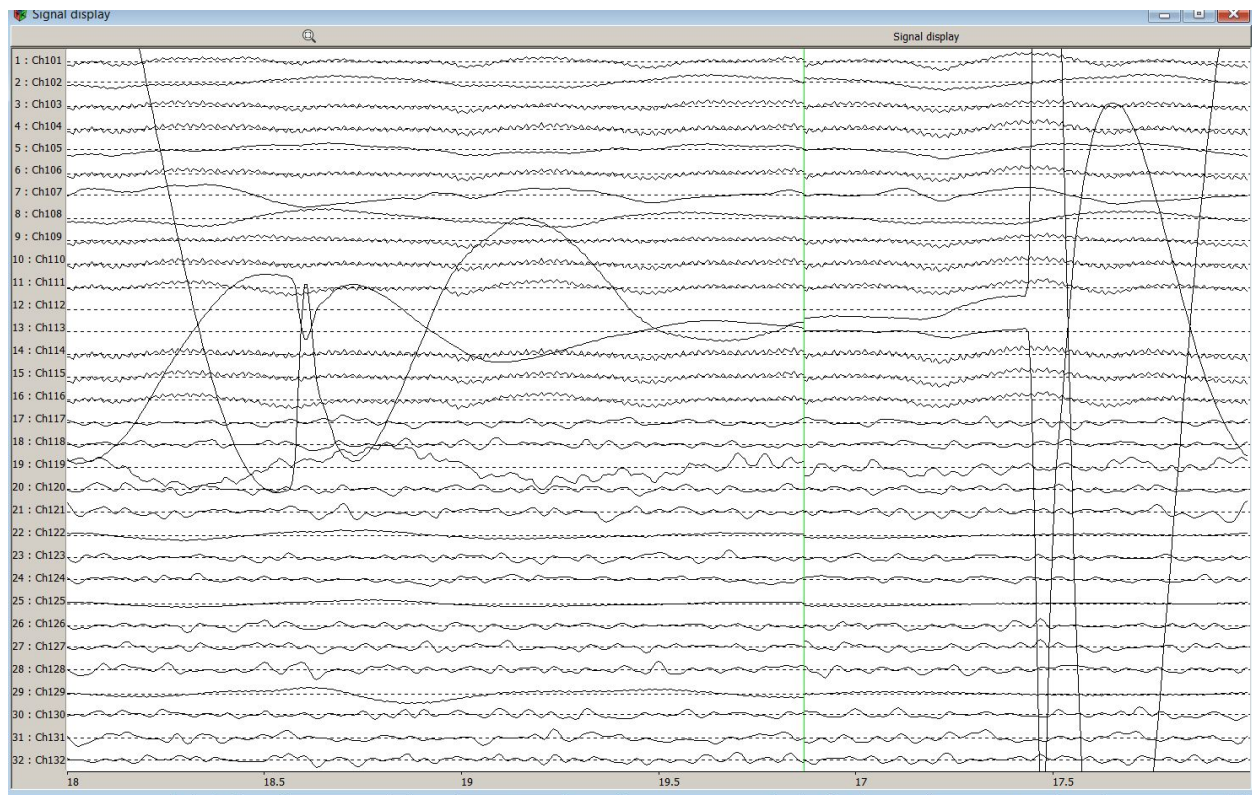


- Use
Switch on amplifiers from **top to bottom** (A-B-C-D). Switch on pre-amplifiers, the boxes with ground and reference first (A and C). Launch acquisition server, set amplifier D as master (currently: .36) and enable event channel (default). Install the caps and check the signal with OpenVibe Designer (Signal Monitoring). When the signals are good, use Launcher to start the game.

Even in 32 electrodes configuration BrainInvaders uses 16 electrodes per subject for classification in this specific order: Fp1, Fp2, F3, AFz, F4, T7, Cz, T8, P7, P3, Pz, P4, P8, O1, Oz, O2

Equipment setup: 16 electrodes per subject, 2 subjects, 2 amplifiers:

- Start the amplifiers top to bottom. This should put the channels of the first player on top of the second one in the OV Signal Display
- First player is the top amplifier. Second is the bottom.
- Bottom amplifier is the Master and the one connected to the trigger box
- The two amplifiers require a connection with a single sync cable
- Player 1 must be on the left in front of the screen. Player 2 on the right. This is because the win/lose screen in the game is configured like that.
- Player 1 must focus on the circled red skull alien. Player 2 on the squared red skull alien.



First 16 channels must be Player 1, second 16 Player 2

This configuration has been tested with dry electrodes.

Software setup:

- Gipsa-lab OpenVibe Extensions version 2.6 for OpenVibe 0.18 or Gipsa-lab OpenVibe Extensions 2.7 for OpenVibe 2.7 are the two known versions that provide the Multiplayer functionality.

- Choose scenario 8 from launcher (Brain Invaders P300 using MDM Adaptive - Full Multiplayer - hardware tagging)
- Select the right electrode setup: 32 or 16 (there are two scenarios for that). The Launcher will start a default one which is a copy of the 16 electrode per subject configuration.
- Select 1,2,3 or 4 on the keyboard in BI to select the multiplayer mode

Modifications of the single version for Brain Invaders Multiplayer:

- 5 levels using the Train Level
- score is calculated differently
- alien explosion is changed, target alien size is changed
- 4 modes to play are available:
 1. Cooperative 1 target
 2. Cooperative 2 targets
 3. Competitive 1 target
 4. Competitive 2 targets
- added different screens with bitmaps for the different modes
- the repetition per life (in single mode 1) and lives (in single mode 8) were modified to 3 and 1. This change is reflected in brain-invaders.conf.