Diagnostic Rev. 586220 Harness - User Port

**Module Description**

The User Port module is the central part of the Diagnostic Rev. 586220 harness. It provides the required feedback connections for testing the C64’s CIA U2, which is connected to the user port. It also holds the analog switches, which are required to test the Control Ports and the feedback connections for testing the cassette port.

The MOTOR output signal of the cassette port has approximately a 6V level. To use it as a control signal for operating logic devices, a voltage divider consisting out of a 150Ω resistor and a 320Ω (316Ω works here, 330Ω should work as well) resistor is required, which has a ratio of about 0.7.

This way, the MOTOR signal is fed back to the WRITE pin and is also used for switching the analog switches between the joystick signals of both control ports.

# Pin Outs

## User Port

J1- Edge Connector (2x12, 3.96mm pitch)

|  |  |  |  |
| --- | --- | --- | --- |
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | GND | A | GND |
| 2 | +5V | B | /FLAG2 |
| 3 | /RESET | C | PB0 |
| 4 | CNT1 | D | PB1 |
| 5 | SP1 | E | PB2 |
| 6 | CNT2 | F | PB3 |
| 7 | SP2 | H | PB4 |
| 8 | /PC2 | J | PB5 |
| 9 | ATN | K | PB6 |
| 10 | 9VAC(1) | L | PB7 |
| 11 | 9VAC(2) | M | PA2 |
| 12 | GND | N | GND |

## Cassette Port

J2 – 2x3 pin header for a ribbon cable connected to the cassette port PCB (project number 114).

|  |  |  |  |
| --- | --- | --- | --- |
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | GND | 2 | n.c. |
| 3 | MOTOR | 4 | READ |
| 5 | WRITE | 6 | SENSE |

## Control Port #1

J3 – 2x5 pin header for a ribbon cable which connects via a D-SUB 9 (female) to the control port.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pin** | D-SUB | **Signal** | **Pin** | D-SUB | **Signal** |
| 1 | 1 | JOYA0 (up) | 2 | 6 | FIREA |
| 3 | 2 | JOYA1 (down) | 4 | 7 | +5VCTR1 |
| 5 | 3 | JOYA2 (left) | 6 | 8 | n.c. (GND) |
| 7 | 4 | JOYA3 (right) | 8 | 9 | POTXA |
| 9 | 5 | POTYA | 10 | - | n.c. |

## Control Port #2

J4 – 2x5 pin header for a ribbon cable which connects via a D-SUB 9 (female) to the control port.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pin** | D-SUB | **Signal** | **Pin** | D-SUB | **Signal** |
| 1 | 1 | JOYB0 (up) | 2 | 6 | FIREB |
| 3 | 2 | JOYB1 (down) | 4 | 7 | +5VCTR2 |
| 5 | 3 | JOYB2 (left) | 6 | 8 | n.c. (GND) |
| 7 | 4 | JOYB3 (right) | 8 | 9 | POTXB |
| 9 | 5 | POTYB | 10 | - | n.c. |

# Interconnects

## User Port

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pin** | **Signal** |  | **Signal** | **Pin** |
| 4 | CNT1 | ↔ | CNT2 | 6 |
| 5 | SP1 | ↔ | SP2 | 7 |
| 8 | /PC2 | ↔ | /FLAG2 | B |
| 9 | ATN | ↔ | PA2 | M |
| C | PB0 | ↔ | PB4 | H |
| D | PB1 | ↔ | PB5 | J |
| E | PB2 | ↔ | PB6 | K |
| F | PB3 | ↔ | PB7 | L |

## Cassette Port

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pin** | **Signal** |  | **Signal** | **Pin** |
| 3 | MOTOR | Volt.div. | WRITE | 5 |
| 4 | READ | ↔ | SENSE | 6 |

## Control Ports

|  |  |  |
| --- | --- | --- |
| **Signal** |  | **Signal** |
| FIREA | switched by MOTOR | FIREB |
| JOYA0 | switched by MOTOR | JOYB0 |
| JOYA1 | switched by MOTOR | JOYB1 |
| JOYA2 | switched by MOTOR | JOYB2 |
| JOYA3 | switched by MOTOR | JOYB3 |
| POTXA | via 120kΩ (R1) | +5V (CTR 1) |
| POTYA | via 120kΩ (R2) | +5V (CTR 1) |
| POTXB | via 120kΩ (R5) | +5V (CTR 2) |
| POTYB | via 120kΩ (R6) | +5V (CTR 2) |

The digital signals of the control ports are connected by an analog switch. A HIGH level of the MOTOR signal will switch on.

The POT (paddle) signals are tested with a fix resistor of 120k, that is connected to the +5V provided by the respective control port.

# Cables

## User Port/Cassette Port Cable

One cable as shown in Doc.-No. 113-3-01-00 is required. It connects to J2.

## User Port/Control Cables

Two cables as shown in Doc.-Nr. 113-3-02-00 are required. They connect to J3 and J4.

## The IEC-Dongle

The IEC-Dongle is not attached to the PCB, it is an extra built.

6p. DIN plug, connect according to Doc.-No. 113-3-03-00

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pin** | **Signal** |  | **Signal** | **Pin** |
| 1 | SRQ | ↔ | DATA | 5 |
| 3 | ATN | ↔ | CLK | 4 |