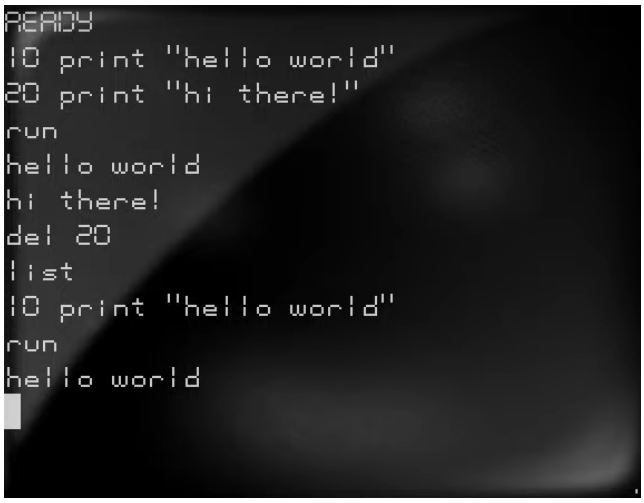
Controller Datasheet

Thank you for purchasing our versatile 8051 controller with built-in BestDeviceBus™!

This datasheet contains some information about the controller and its uBASIC programming interface.

```
                  CPU: 8051 compatible
         External RAM: 64KB
                BASIC: uBASIC (http://dunkels.com/adam/ubasic/) + custom line editor
      Internal Devices: serial
                        BestDeviceBus™ router
                        8-bit register (write-only)
                        8-bit port I/O extender (write-only)
BestDeviceBus™ Devices: 8-bit register
                        8-bit adder
                        8-port I/O extender
                        256 byte FlagROM
```

BASIC



Our controller comes with a built-in lowercase BASIC editor and execution environment.

Line editor's commands:

<LINE> <TEXT>
Place text at a given LINE number.
EXAMPLE: 110 print "asdf"

del <LINE>
Remove the line of the given number.
EXAMPLE: del 110

list
List the whole program.
EXAMPLE: list

list <LINE>
List just one line.
EXAMPLE: list 110

list <LINE>-
List from this line onward.
EXAMPLE: list 110-

list <LINE>-<LINE>
List line range (inclusive).
EXAMPLE: list 110-200

run
Start the program from the first line.
EXAMPLE: run

run <LINE>
Start the program from a given line.
EXAMPLE: run 110

Please note that:
- all variables must have single letter names,
- all variables and constants are 8-bit unsigned integers,
- **poke** and **peek** functions are mapped to the first 256 bytes of XRAM for convenient use of MMIO.

For details about uBASIC please see http://dunkels.com/adam/ubasic/.

Devices

The uBASIC interface allows access to some devices either:
- directly using the MMIO interfaces mapped at the first 256 bytes of XRAM
- or indirectly using BestDeviceBus™ router device.

BestDeviceBus™ router

XRAM_MMIO_ROUTER_**SRC_DEV** = 80
XRAM_MMIO_ROUTER_**SRC_REG** = 81
XRAM_MMIO_ROUTER_**DST_DEV** = 82
XRAM_MMIO_ROUTER_**DST_REG** = 83
XRAM_MMIO_ROUTER_**CTRL** = 84

The BestDeviceBus™ router is a simple copy-byte-from-to device which will allow you to copy bytes between various devices connected to this bus.
To execute a copy:
- set the source device id and source device register numbers in SRC_DEV and SRC_REG MMIO registers,
- write 1 to the CTRL register.

The execution will be halted until the byte transfer is completed.

Reading from the CTRL register will always yield 0.
The behavior when attempting to copy from or two a non-existent device or non-existent device register is undefined.

8-bit register

XRAM_MMIO_**REG** = 7 (write-only)

BUS_DEV_**REG** = 22

BUS_REG_**REG_VALUE** = 0

The 8-bit register is accessible both directly via MMIO on address 7 (write-only; reading will always yield a value of 0) and via the BestDeviceBus™ (read/write) on address 22. It has only one 8-bit register at register index REG_VALUE.

This device can be used to send data from a uBASIC program to a BestDeviceBus™ device or as an 8-bit read/write accumulator for BestDeviceBus™ devices.

8-bit port I/O extender

XRAM_MMIO_**IO** = 23 (write-only)

BUS_DEV_**IO** = 15

BUS_REG_**IO_STATE** = 0

The 8-bit port I/O extender allows the user to interact with any external devices. Each bit of the 8-bit state register corresponds to 1 external device (if connected). For example, this can be used for simple switching on and off external devices.

This I/O port is available both directly via MMIO on address 23 (write-only; behavior when reading is undefined) and via the BestDeviceBus™ (read/write) on address 15 (only register 0 is available).

8-bit adder

BUS_DEV_**ADDER** = 37

BUS_REG_**ADDER_A** = 0

BUS_REG_**ADDER_B** = 1

BUS_REG_**ADDER_RES** = 2

The 8-bit adder performs a simple 8-bit addition operation.
Registers A (index 0) and B (index 1) hold the operands.
Register RES (index 2) holds the 8-bit result of the A+B operation.

This device is only accessible via the BestDeviceBus™.

256 byte FlagRom

BUS_DEV_**FLAGROM** = 88 (read-only)

The FlagROM is a 256-byte ROM with a predefined hardcoded value of absolutely no importance. The BestDeviceBus™ register number is used as a byte-index into the ROM.

This device is read-only and only available via the BestDeviceBus™.

serial

SFR_SERIAL_**OUT_DATA** = 0xf2
SFR_SERIAL_**OUT_READY** = 0xf3

The serial device is not directly available to uBASIC, however the **print** statement can be used to send data through serial to the console.