Embedded Systems - Lab 4

Task

Your goal is to program the DBGU module to send and receive characters via the RS232 port. Your program should work as follows:

1. It accepts a string typed by the user on the computer (minicom).
2. It displays the unaltered string on the minicom terminal.
3. The ARM processor converts capital leters into small ones and vice versa.
4. The result of the conversion operation is displayed on the PC screen.

Example minicom screen:

```
>Welcome message
>Test String 123          -> Your input
>tEST sTRING 123          -> ARM generated output
```

You should create your library DBGU.h and DBGU.c where you will define the following functions (but not limited to):

- `int DBGU_init(void)` - initialisation procedures, returns 0 if successful, -1 if failure.
- `int DBGU_SendData(unsigned char* data)` - sends a string specified by the pointer, returns the number of characters sent.
- `int DBGU_ReadData(unsigned char* data)` - captures an incomming string into the pointer, returns the number of characters received.

You may find the following information useful:

- The RS232 standard operates in full-duplex mode.
- Communications is of 8N1 type (8 data bits, no parity, 1 stop bit).
- The baudrate is 115200.
- Peripherals operate at 100 MHz.
- To display your input on the screen use the DBGU module in the automatic echo mode.

References

1. AT91SAM9263 Preliminary:
   - Chapter 30: Debug Unit
   - Chapter 31: Parallel Input/Output Controller
   - Chapter 28: Power Management Controller