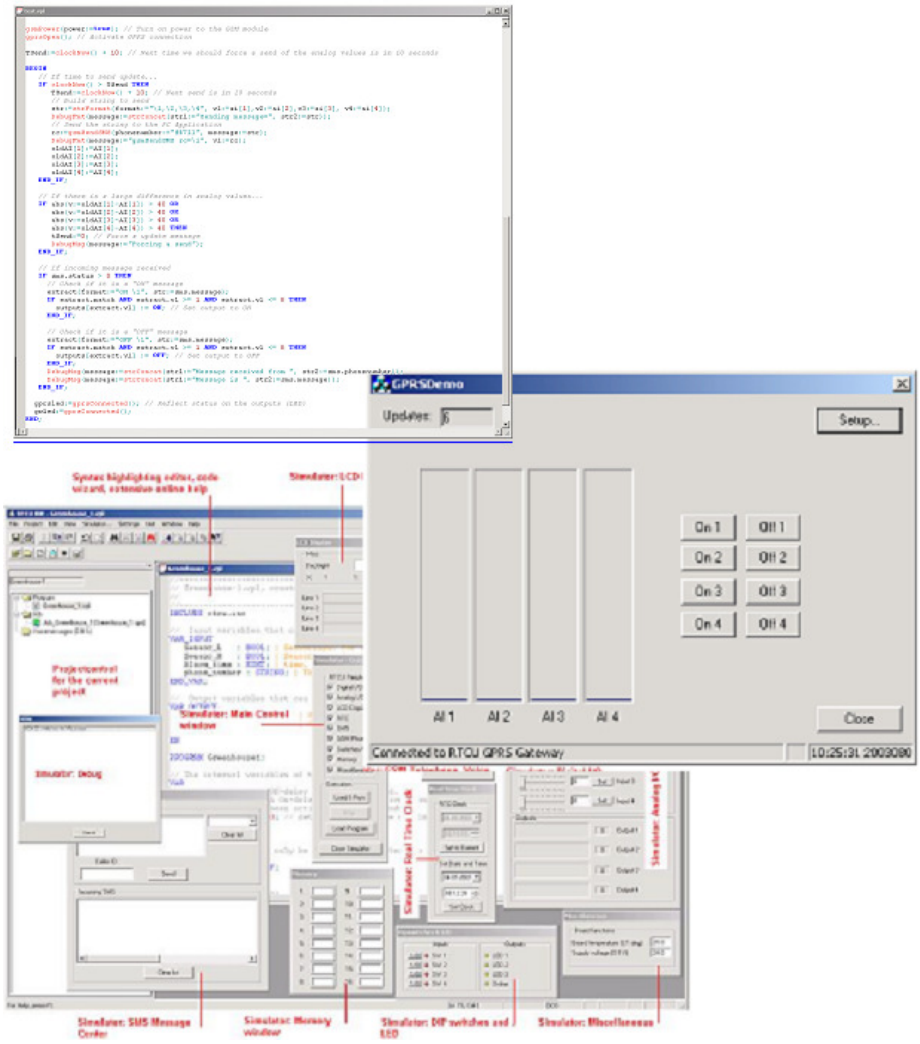
The Logic IO

RTCU Gateway Deployment Package

Version 2.01



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Introduction

This document describes the details of a practical RTCU Gateway application demonstrating communication between an RTCU unit (alternatively RTCU IDE Simulator) and a PC server-like application.

If you follow this document you will be able to install and test the demo application, and see for yourself, that the deployment of M2M technology is easy and straightforward when using Logic IO products!

This demo application transfers the value of the up to 4 analog inputs of the RTCU unit to a PC application every 10 seconds (or if one of the analog inputs changes significantly). The PC application can switch one of 4 digital outputs either on or off on the RTCU unit.

All the communication is transferred with the help of the RTCU Gateway, which simplifies the implementation dramatically. Messages between the PC application and the RTCU unit are transferred using VSMS (Virtual SMS) messages.

What's new in version 2.01:

- The VSMSGW library and the PC demo application are now built using Visual Studio 2010.
- Support for both 32 bit and 64 bit version of the library.

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Contents of package

The package this document is part of, contains the following:

"\RTCU Gateway Deployment Package.pdf"	This document
"\PC App\"	The complete PC application
"\RTCU App\"	The complete RTCU application
"\VSMSGW\"	The DLL containing library functions for the RTCU Gateway communication.
"\Library\"	The .H, .LIB and .DLL file for the VSMSGW library

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How to install and run the demo application

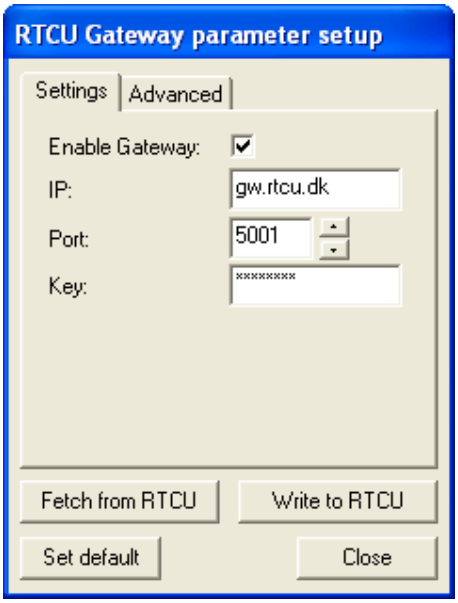
Below, you will find a step-by-step instruction how to install and make the demo application run:

1) Unpack the contents of the “RTCU Gateway Deployment Package.ZIP” file.

2) Start the RTCU-IDE program, and connect to the RTCU Unit. Alternatively the RTCU IDE simulator can be used.

3) Configure the TCP/IP settings for the RTCU Unit with the correct settings for the actual GPRS enabled SIM card you have installed in the unit. Alternatively an Ethernet or Wi-Fi connection may be configured.

4) Configure the Gateway settings for the RTCU Unit with the following parameters:



5) Using the above parameters the unit will connect to the test RTCU Gateway that is running at Logic IO. If you decide to install the RTCU Gateway in your own environment it can be downloaded for free from www.logicio.com.

6) Load the “RTCU App” project in the RTCU-IDE

7) Upload the project to the RTCU Unit

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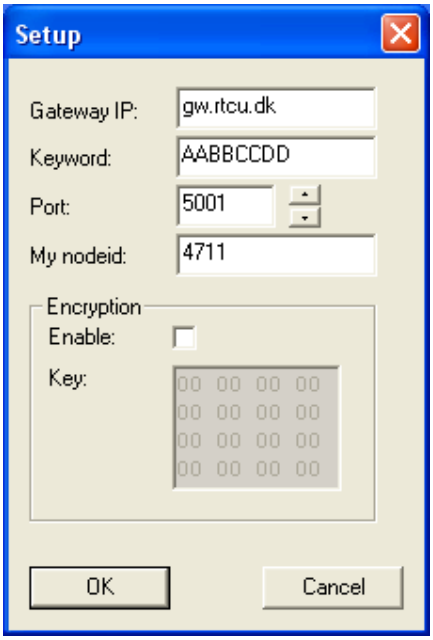
8) After some tenths of seconds, it should connect itself to the RTCU Gateway.

9) Then start the PC Application located in the “PC App\Release” directory.

10) The default settings in the “Setup” dialog should be sufficient for the program to connect to the test RTCU Gateway at Logic IO. Should you decide to install and run your own RTCU Gateway, you will have to change the parameters in the Setup dialog. Factory default for the parameters are:



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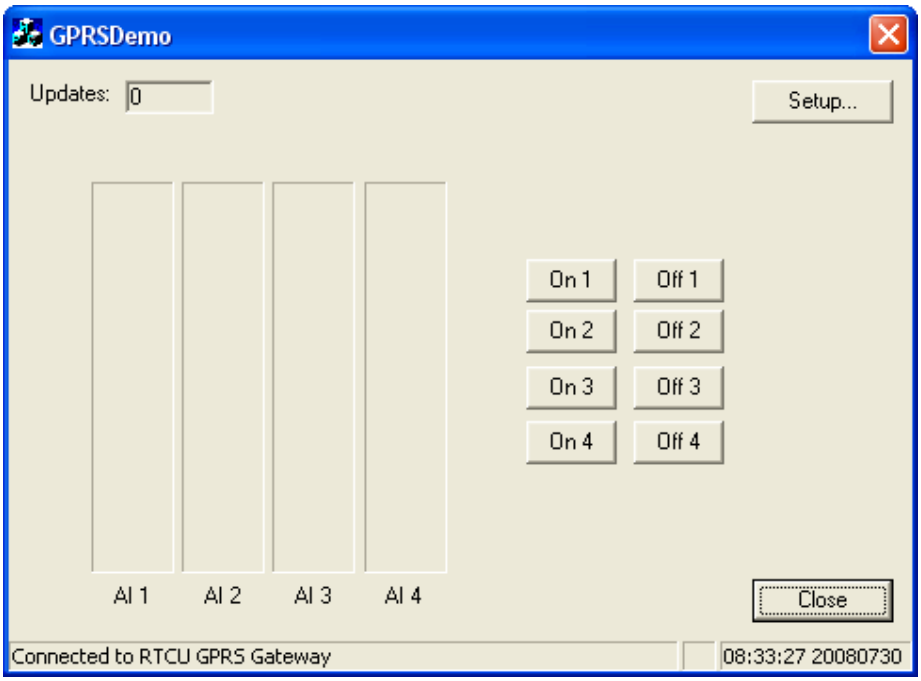
11) After some seconds, the PC application should look something like this:



The field “Updates” shows how many messages that has been sent from the Unit, and the 4 bar graphs shows graphically the values of the 4 analog inputs. By pressing one of the 8 buttons (On 1...4 and Off 1...4) it is possible to control the 4 digital outputs on the RTCU Unit.

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Short introduction to the Logic IO RTCU Gateway

The Logic IO RTCU Gateway is a software solution that allows easy communication and access to remote units connected using the revolutionary wireless technologies such as GPRS and Wi-Fi. The product is especially suited in cases where the GSM operator does not offer a fixed and/or global IP-address. With the Logic IO RTCU Gateway product the remote units can easily be accessed without any need for expensive IP-tunneling solutions provided by the specific GSM-operators.

The RTCU Gateway, acts as a kind of “switch-board”, each “client” can connect to the switchboard, and then send messages to other “participants”.

When seen from the RTCU Gateway, all connecting parties, either RTCU units or “PC” applications, are seen as “Clients”. The RTCU Gateway can see no difference between them; they are all “just clients of the switchboard”. It is a Client’s node id that makes it unique to the Gateway. A node id can be one of two things: if the Client is a RTCU unit, the node id of the unit is simply the serial number of the unit. If the Client is a “PC” application, the node id is a number the application selects (it can be “0”, in that case the Gateway assigns it a unique node id).

The GWPROT DLL forms the low-level protocol towards the RTCU Gateway. It handles all issues regarding connect/disconnect socket connection, monitoring of line status, and it is responsible for bringing the connection up again, should it be down etc. The VSMSGW Library, uses the GWPROT DLL for the RTCU Gateway connection, and essentially just encapsulates some of the functions of the GWPROT DLL, and makes sending and receiving VSMS messages more easy and straightforward.

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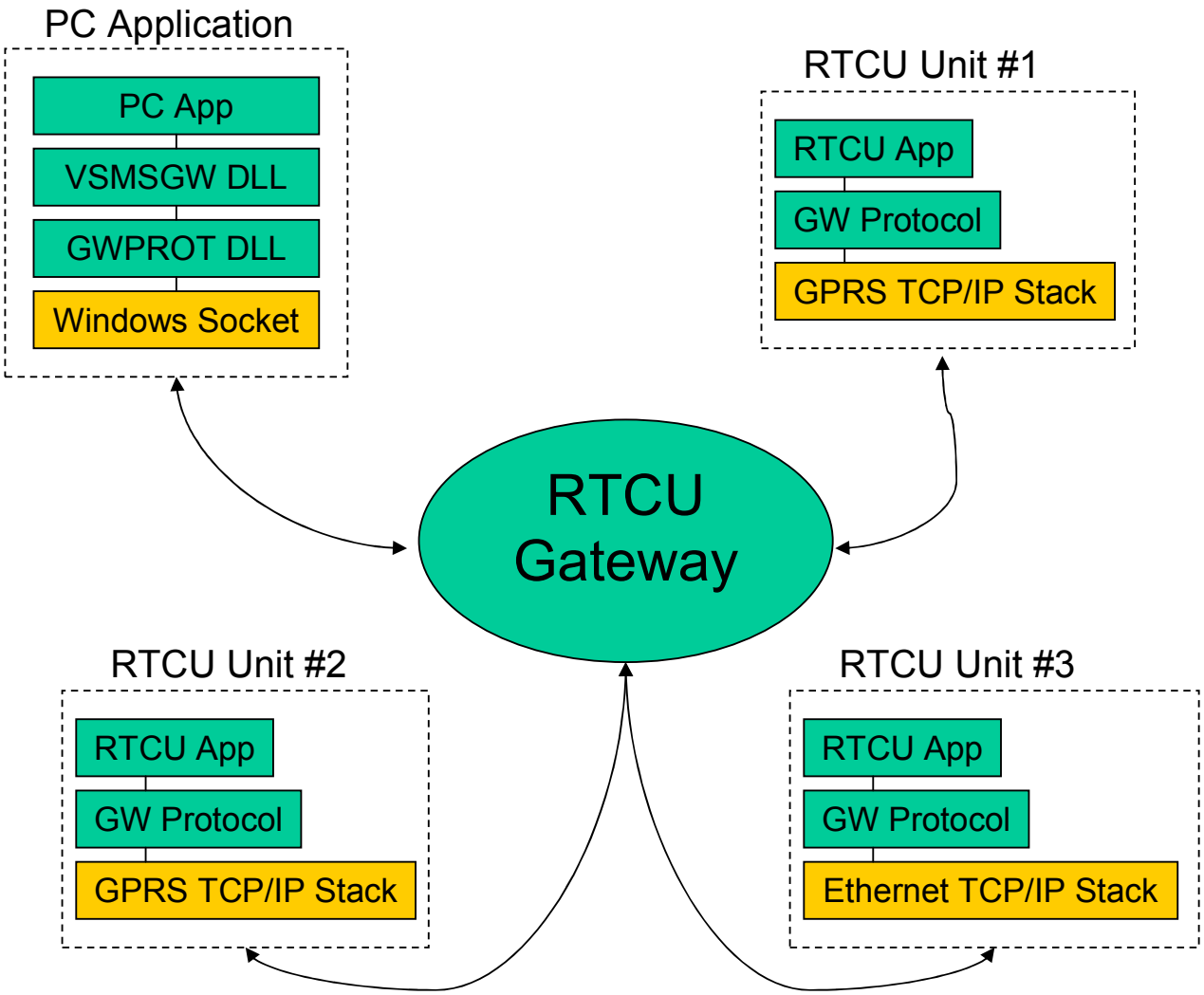
Schematic presentation of the architecture:



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Introduction to the Library

The VSMSGW library is a small library that encapsulates some of the transactions that is possible to make against a RTCU unit.
For a description of the complete Gateway protocol, please consult the appropriate document from Logic IO.
The VSMSGW library is written in Microsoft Visual Studio 2010, and was created using the wizard in Visual Studio for creation of a DLL. The VSMSGW project is part of the workspace for the PC Application.

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Functions in the VSMSGW Library

The Library is a collection of the following functions described in this section.

Return Codes:

Symbolic name	Value	Description
GWRC_OK	0	Operation successful
GWRC_ERROR	1	Unspecified error
GWRC_NOT_CON	2	Not connected
GWRC_TIMEOUT	3	A timeout occurred
GWRC_INV_LEN	5	Invalid length
GWRC_IS_OPEN	7	Is already open
GWRC_NOT_OPEN	8	Is not open
GWRC_INV_PARM	9	Invalid parameters
GWRC_DST_UNREACH	10	Destination node is unreachable

cbfuncText()

Synopsis
typedef int(_cdecl *cbfuncText)(int SenderNodeID, char str[161], void *arg);

Description
Definition of callback function for receiving Text SMS messages.

Input :

SenderNodeID	The nodeid of the sender (the serial number of the RTCU that sent the message)
str	The text string sent by the RTCU. Max size is 160 characters + a null-terminator.
arg	A user supplied 32 bit variable that was set when vsmsgwInit() was called

Output:

rc	This is the return code that should be returned to the RTCU Unit, 0 if OK, else error

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cbfuncPDU()

Synopsis
typedef int(_cdecl *cbfuncPDU)(int SenderNodeID, unsigned char data[140], int length, void *arg);

Description
Definition of callback function for receiving PDU SMS messages.

Input :

SenderNodeID	The nodeid of the sender (the serial number of the RTCU that sent the message)
data	The data sent by the RTCU. Max size is 140 bytes.
length	The length of data sent by the RTCU
arg	A user supplied 32 bit variable that was set when vsmsgwInit() was called

Output:

rc	This is the return code that should be returned to the RTCU Unit, 0 if OK, else error

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cbfuncPackage()

Synopsis
typedef int(_cdecl * cbfuncPackage)(int SenderNodeID, unsigned char data[480], int length, void *arg);

Description
Definition of callback function for receiving RTCU Gateway data packages.

Input :

SenderNodeID	The nodeid of the sender (the serial number of the RTCU that sent the message)
data	The data sent by the RTCU. Max size is 480 bytes.
length	The length of data sent by the RTCU
arg	A user supplied 32 bit variable that was set when vsmsgwSetDataPackageCB() was called

Output:

rc	This is the return code that should be returned to the RTCU Unit, 0 if OK, else error

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vsmsgwInit()

Synopsis

VSMSGW_API int _cdecl
vsmsgwInit(int MyNodeID, const char *GWIP, int GWPort, const char GWKey[9], cbfuncText SMSText, cbfuncPDU SMSPDU, void *arg);

Description

Initialize the connection to the RTCU Gateway

Input :

MyNodeID	The nodeid for the PC application. If set to 0, it will be assigned by the RTCU Gateway
GWIP	The IP address (or symbolic name) of the RTCU Gateway
GWPort	The portnumber the RTCU Gateway listens on
GWKey	The key value (an 8 character password) used to access the RTCU Gateway. Must be null terminated,
SMSText	A callback function that will be called whenever an Text SMS is received
SMSPDU	A callback function that will be called whenever an PDU SMS is received

Returns 0 if OK, else error (Look at the GWRC_xx codes)

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vsmsgwInitAdv()

Synopsis
VSMSGW_API int _cdecl
vsmsgwInitAdv(int MyNodeID, const char *GWIP, int GWPort, const char GWKey[9], unsigned char CryptKey[16]);

Description
Initialize the connection to the RTCU Gateway

Input :

MyNodeID	The nodeid for the PC application. If set to 0, it will be assigned by the RTCU Gateway
GWIP	The IP address (or symbolic name) of the RTCU Gateway
GWPort	The portnumber the RTCU Gateway listens on
GWKey	The key value (an 8 character password) used to access the RTCU Gateway. Must be null terminated,
CryptKey	The encryption key used to access the RTCU Gateway.

Returns 0 if OK, else error (Look at the GWRC_xx codes)

vsmsgwSetSMSTextCB()

Synopsis
VSMSGW_API void _cdecl
vsmsgwSetSMSTextCB(cbfuncText SMSText, void *arg);

Description
Set callback function that will be called whenever a Text SMS is received.

Input :

SMSText	A callback function that will be called whenever a Text SMS is received
arg	A user supplied 32 bit variable that will be supplied to the callback function when it gets called

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vsmsgwSetSMSPDUCB()

Synopsis
VSMSGW_API void _cdecl
vsmsgwSetSMSPDUCB(cbfuncPDU SMSPDU, void *arg);

Description
Set callback function that will be called whenever a PDU SMS is received.

Input :

SMSPDU	A callback function that will be called whenever a PDU SMS is received
arg	A user supplied 32 bit variable that will be supplied to the callback function when it gets called

vsmsgwSetDataPackageCB()

Synopsis
VSMSGW_API void _cdecl
vsmsgwSetDataPackageCB(cbfuncPackage PACKAGE, void *arg);

Description
Set callback function that will be called whenever a data package is received.

Input :

PACKAGE	A callback function that will be called whenever a data package is received
arg	A user supplied 32 bit variable that will be supplied to the callback function when it gets called

vsmsgwIsConnected()

Synopsis
VSMSGW_API bool _cdecl vsmsgwIsConnected(void);

Description
Returns true if connected to the RTCU Gateway

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vsmsgwGetMyNodeID()

Synopsis
VSMSGW_API int _cdecl **vsmsgwGetMyNodeID**(unsigned long* MyNodeID);

Description
This function will return this nodes nodeid. This function is used especially when a dynamic node-id is requested (by setting MyNodeID to 0 in the vsmsgwInit() function)

vsmsgwSendSMS()

Synopsis
VSMSGW_API int _cdecl vsmsgwSendSMS(unsigned int HisNodeID,
const char str[161], int *rc);

Description
Send a Text SMS message to the specified NodeID, the return code from the RTCU unit, will be contained in rc

Input :

HisNodeID	The node number (serial number) of the receiving RTCU unit
str	The string to send to the receiving RTCU unit. Maximum size is 160 characters + NULL terminator.

Output :

rc	The return code from the receiving RTCU unit, 0 if OK, else error

Returns 0 if OK, else error (Look at GWRC_xx codes)

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vsmsgwSendPDU()

Synopsis
VSMSGW_API int _cdecl vsmsgwSendPDU(unsigned int HisNodeID,
const unsigned char data[140], int length, int *rc);

Description
Send a PDU SMS message to the specified NodeID, the return code from the RTCU unit, will be contained in rc

Input :

DstNodeID	The node number (serial number) of the receiving RTCU unit
data	The data to send to the receiving RTCU unit Maximum size is 140 bytes.
length	The length of data to send

Output :

rc	The return code from the receiving RTCU unit, 0 if OK, else error

Returns 0 if OK, else error (Look at the GWRC_xx codes)

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vsmsgwSendDataPackage()

Synopsis

VSMSGW_API int _cdecl vsmsgwSendDataPackage(unsigned int HisNodeID,
const unsigned char data[480], int length, int *rc);

Description

Send a data package to the specified NodeID, the return code from the RTCU unit, will be contained in rc.

Input :

DstNodeID	The node number (serial number) of the receiving RTCU unit
data	The data to send to the receiving RTCU unit Maximum size is 480 bytes.
length	The length of data to send

Output :

rc	The return code from the receiving RTCU unit, 0 if OK, else error

Returns 0 if OK, else error (Look at the GWRC_xx codes)

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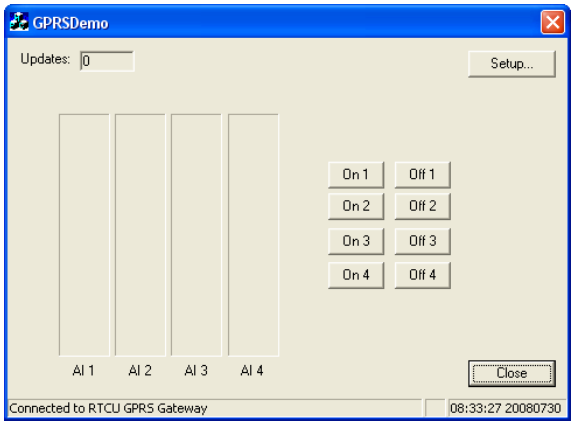
Description of the demo project



The demo project consists of a PC application and a RTCU application (see Appendix A). The RTCU application sends periodically the values of its 4 analog inputs to the PC application, and the PC application can send commands to the RTCU Unit that will command one of the four outputs on the RTCU Unit either on or off.

The PC application uses the VSMSGW Library for sending/receiving information from the RTCU Unit. When started, the application tries to connect to the RTCU Gateway, using information set in the “Setup” dialog. In the status bar of the program, you can see if the application is connected or not to the RTCU Gateway.

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