AIRIO-MCU-02

GSM/GPRS Monitor/Controller
User Manual

Version 02

Legal notice:

Disclaimer:

The use of Alarm Monitoring and Control System AIRIO-MCU-02 is at sole discretion of the user. IoSelect, Inc. cannot be held responsible for any damages arising due to use of Alarm Monitoring and Control System AIRIO-MCU-02. Therefore, any liability claims would be discarded.

Content

1.   Attention

All wireless devices for data transferring are susceptible to interference, which could affect performance.

Only qualified personnel may install or repair this product.

The device is not water-resistant. Keep it dry.

Do not install or service device during a thunderstorm.

2.   Safety Instructions

This section will provide guidelines on how to use the AIRIO-MCU-02 safely. We suggest you adhere to the following recommendations to avoid any damage to person or property. Familiarize yourself with the safety requirements before using the device!

Only qualified personnel or a person who has enough knowledge about this device and safety requirements can perform installation and technical support of the device.

All the associated (interconnected) equipment, PC and power supply units (PSU) shall comply with requirements of standard IEC 60950-1.

To avoid mechanical damage of the device, transport the device packed in damage-proof packaging. While using the device, place it such that the LEDs are visible to the user. The LEDs provide information about the working modes and conditions of the device. Signal level of the AIRIO-MCU-02 depends on the environment in which it is working. If the device fails to work properly, only qualified personnel may repair this product. Disconnect the device, review the contents of this manual and ensure the SIM card is current. Contact ioSelect (www.ioselect.com) for support.

At the installation site, supply circuits must have protective devices (bipolar surge suppression device) which provide protection from short-circuit and incorrect ground installation.

Install the power supply near the AIRIO-MCU-02.

2.1.   Disconnecting From The Main Supply

Disconnect the device from the main supply in the following order: primarily peripheral devices are disconnected and lastly the device, for example:

- In the AC main supply, disconnect the relays circuit by short-circuit back-up protection device SF2, and then disconnect the device and all sensors by SF1.
- In the DC main supply, disconnect the relays circuit SF2, and then disconnect the device and all sensors by SF1.
- When PC is connected to the device, disconnect the computer and then SF1.

3.   Introduction

AIRIO-MCU-02 is a compact alarm monitoring, status reporting, and remote control device for electronic equipment with support of Short Messages (SMS – text messages), phone calls (Caller ID), and with a GPRS (General Packet Radio Service) enabled SIM e-mails. The device is configurable via an internal web server through an RS232 interface.

4.   Technical Specification

- Supply 12 Vdc ±10% ⎓ 200 mA
- Power consumption max 5 W
- Wireless modem:
  - Quad Band GSM (850/900/1800/1900MHz)
- Four digital inputs
  - Input resistance 10 kΩ
  - "0" (false) 0 – 3 Vdc
  - "1" (true) 3 – 26 Vdc
  - Connector: terminal blocks
- Two analog inputs.
  - Voltage mode
    - Input resistance 60 kΩ
    - Voltage range: 0 – 10 Vdc
  - Current mode
    - Input resistance 480 Ω +/-2%
    - Current range: 0-20 mA
  - Resolution 10bit A/D converter
  - Connectors: terminal blocks
- Four relay outputs
  - Rated load 240 V, 60 Hz ~7 A, 24 Vdc ⎓ 10 A
  - Total current 20 A
  - Connectors: terminal blocks
- Interfaces
  - RS232
    - Speed: 115200 bauds
    - Format: 8 bits
    - Parity: none
    - Stop bits: 1
    - Flow control: hardware
    - Connector RJ45
  - GSM GPRS

- Alarm message service via SMS, E-Mail
- Antenna MMCX connector
- Protocols HTTP and SMTP
- Possible configurations via internal web server interface
- Watchdog controller
- Operating temperature range from -20 °C to +55 °C
- Relative humidity: 5…95 % (non condensing)
- DIN Rail Mounting
- Safety
    - IEC 60950-1
    - EMC

5.   Mechanical Integration

5.1.   Package Contents

1. AIRIO-MCU-02;
2. Serial cable PORT1 (female DB-9 to RJ45);
3. GSM antenna (MMCX connector);
4. The CD with Software and User's Manual.

5.2.   Dimensions

The plastic case of AIRIO-MCU-02 is light and suitable for fitting with electronic equipment that can hook to the DIN EN 50022 (35 mm, symmetrical DIN rail).

When planning a location for AIRIO-MCU-02, consider the GSM antenna, supplied in your package, should NOT be placed in metal case. If you plan to mount AIRIO-MCU-02 into a metal case, please mount the antenna outside of the metal case. If cable length is not enough, contact ioSelect to order antennas with longer cables.
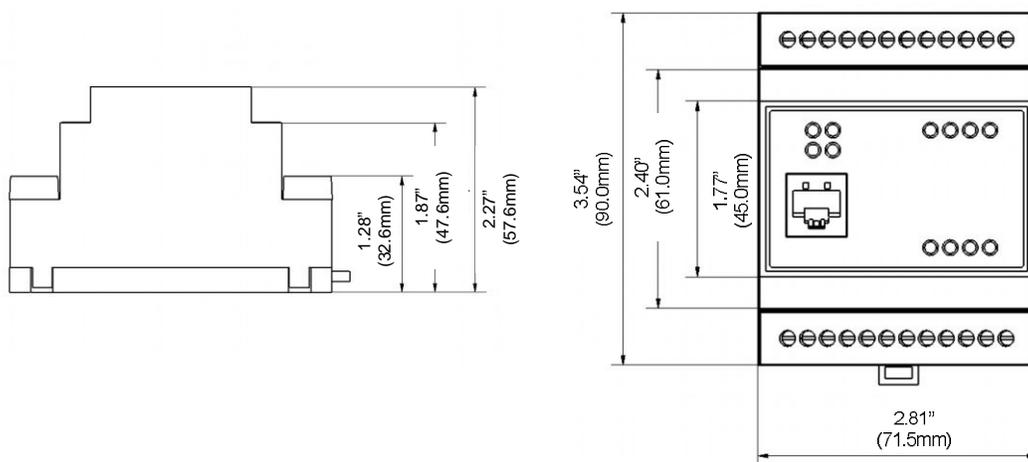
5.3.   Front Panel LEDs
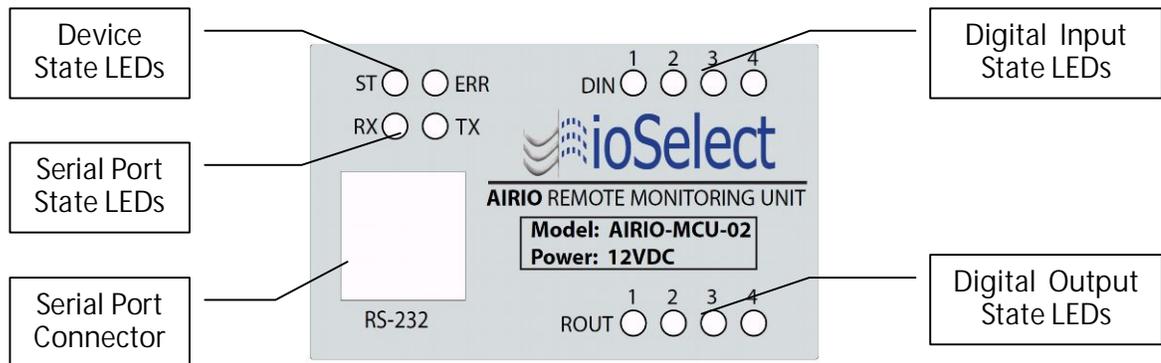
ST   Power LED turns on when power is applied to AIRIO-MCU-02. It also shows the device's working status:

- LED ON
- LED blinks slow (0.2s ON, 0.6s OFF) – The device has registered on the GSM network
- LED blinks fast (0.4s ON, 0.4s OFF) – The device is transmitting data via the GSM network

ERR   Error LED turns on when the device has detected an internal fault.

RX   Indicates receiving data from the device via serial port.

TX   Indicates sending data to the device via serial port.

DIN   Indicates the digital input's voltage at the ON level.

ROUT   Indicates the relay output state.

RS232 Standard serial communication port.

6.   Wiring Connections

6.1.   Top Connector

Pin name	Description
A IN 1 -	Analog input 1. Input voltage range: 0 to 10 Vdc (15 Vdc Max) or 0(4)-20 mA
A IN 1 +	(30 mA Max).
A IN 2 -	Analog input 2. Input voltage range: 0 to 10 Vdc (15 Vdc Max) or 0(4)-20 mA
A IN 2 +	(30 mA Max).
D IN 1	Digital input 1. This input is optically isolated from analog input and power: 0…3Vdc – false, 3…26Vdc – true.
D IN 2	Digital input 2. This input is optically isolated from analog input and power: 0…3Vdc – false, 3…26Vdc – true.
D IN 3	Digital input 3. This input is optically isolated from analog input and power: 0…3Vdc – false, 3…26Vdc – true.
D IN 4	Digital input 4. This input is optically isolated from analog input and power: 0…3Vdc – false, 3…26Vdc – true.
D IN -	Digital input ground. It is optically isolated from module ground (power supply, analog input).
12V +	Device supply. Voltage is 12 Vdc ±10% ⎓ 200 mA max. A switching power regulator is used inside, the smaller the voltage, the bigger the current and vice versa (power consumption remains about the same).
12V -	
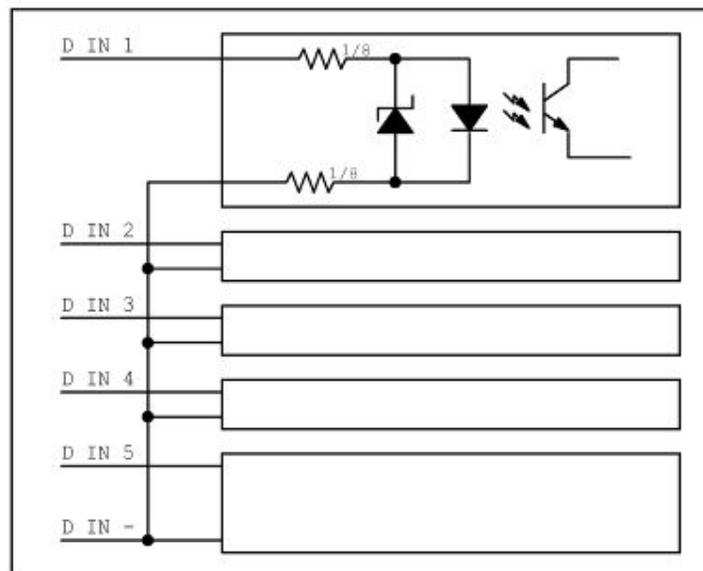
6.2.   Bottom Connector

Pin Name	Description	Specification
R1 NO	1st Relay normally open output.	Rated load 240 V, 60Hz ~7 A, 24 Vdc ⎓ 10 A
R1 CO	1st Relay common output.	
R1 NC	1st Relay normally closed output.	
R2 NO	2nd Relay normally open output.	Rated load 240 V, 60Hz ~7 A, 24 Vdc ⎓ 10 A
R2 CO	2nd Relay common output.	
R2 NC	2nd Relay normally closed output.	
R3 NO	3rd Relay normally open output.	Rated load 240 V, 60Hz ~7 A, 24 Vdc ⎓ 10 A
R3 CO	3rd Relay common output.	
R3 NC	3rd Relay normally closed output.	
R4 NO	4th Relay normally open output.	Rated load 240V, 60Hz ~7 A, 24 Vdc ⎓ 10 A
R4 CO	4th Relay common output.	
R4 NC	4th Relay normally closed output.	
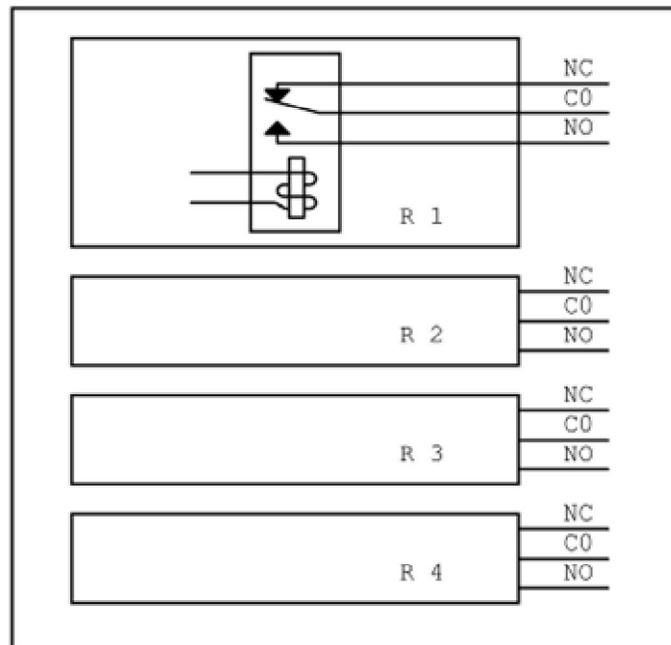
6.3.   Serial Port (RS232 Interface)

The serial port is used for communication with internal web server. The internal web server allows editing of configured data. The RS232 port is used only for the configuration of AIRIO-MCU-02 and is not able to communicate with external devices.

Serial port parameters:
- Interface format RS232C

- Logic levels (RS232C levels)
- Speed: 115200 bauds
- Format: 8 bits
- Parity: none
- Stop bits: 1
- Flow control: hardware

RS232 RJ45 connector

The communication connector is an eight-way RJ45 PLUG style connector.

RJ45 Pin number	Description	Direction
1	DSR	Output
2	DCD	Output
3	DTR	Input
4	GND	-
5	RXD	Input
6	TXD	Output
7	CTS	Output
8	RTS	Input

6.4.   Sample Electrical Connection

Connection to DC power supply: 24 Vdc @ 20.5 A max

For each external sensor:
24 Vdc @ 150 mA max
Total = 300 mA max

Short circuit backup protection recommended in installtion

- | + | - | + | 1 | 2 | 3 | 4 | - | + | -
A IN 1   A IN 2   D IN   24 Vdc @ 200 mA

RS232

AIRIO-MCU-01

R1   R2   R3   R4
NO CO NC   NO CO NC   NO CO NC   NO CO NC

For each R1 – R4:
240 Vac – 7 A max;
24 Vdc – 10 A max;
Total = 20 A max
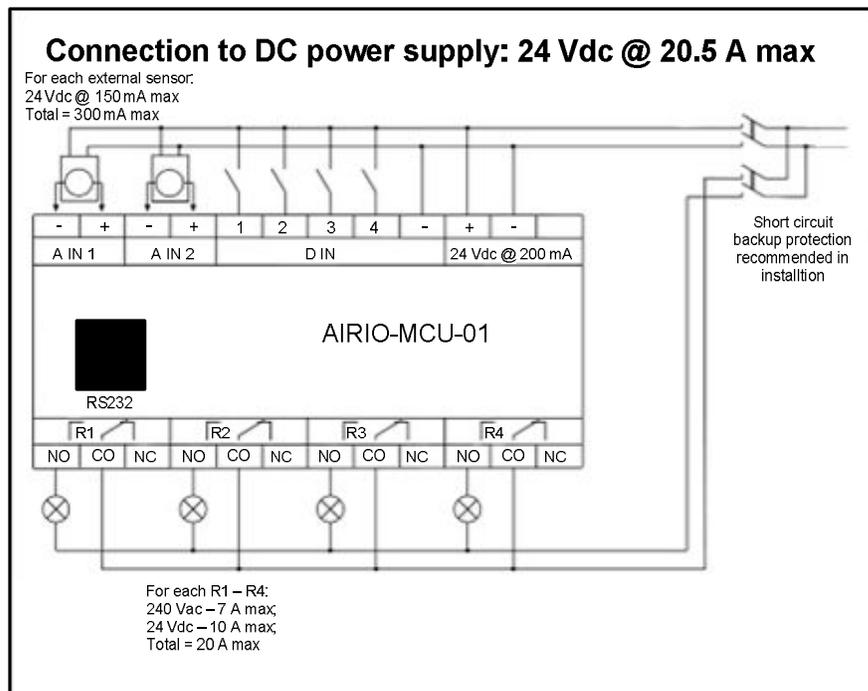
7.   Installation and Starting

7.1.   Installing / Removing a SIM Card
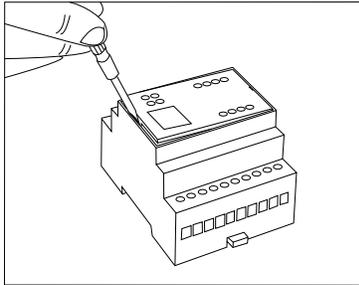
Figure 7.1.1

- Remove the cover with screwdriver (see the *Figure 7.1.1*).
- Slide the SIM card holder toward its hinge to unlock it (see the *Figure 7.1.2*).
- Lift the SIM card holder.
- Insert the SIM card into the holder so that the notches align (see the *Figure 7.1.3*). If you want to remove and already installed SIM you can remove it now.
- Close the SIM card holder.
- Slide the SIM card holder away from its hinges to lock it (see the *figure 7.1.4*).
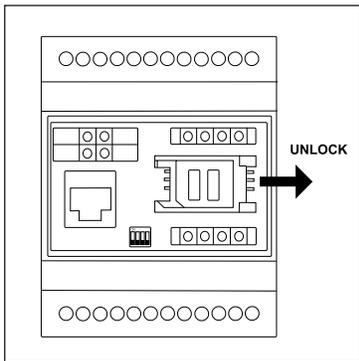
Figure 7.1.2
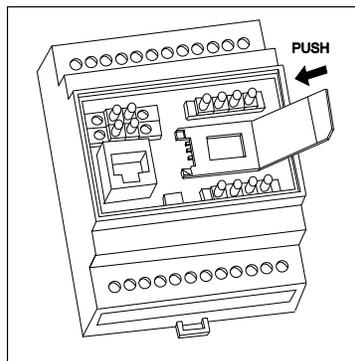
Figure 7.1.3
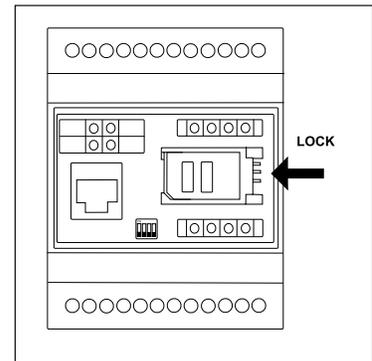
Figure 7.1.4

7.2.   DIP Switch Settings

DIP switch should be set according the *Figure 7.2.1* for the normal working conditions (*OFF*, *OFF*, *OFF*, *ON*).
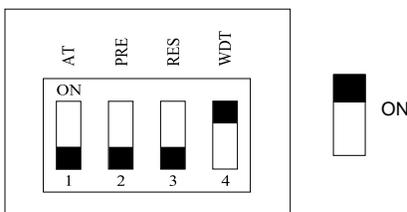
Figure 7.2.1

Switch number	OFF	ON
1	Serial port works in the normal mode	Serial port works in the "AT Command" mode
2	Normal working conditions	Preset factory parameters
3	Normal working conditions	Reset GSM module
4	"Watchdog" off	"Watchdog" on

Table 7.2.1

7.3. Connection To PC

An RS232 connection is used to connect a PC to the unit for configuration, and the "Server" program is run to allow the PC web browser to access teh unit.

7.3.1. RS232

1. Install AIRIO-MCU for windows. To perform the installation, run the following programs from your CD or download folder: AIRIO-MCU Server.msi. The program should autorun when the CD is put into your CD drive and the door closed. If the program does not auto run: Open My Computer, right-click on the CD drive icon and select "Explore"; Double click on "AIRIO-MCU Server.msi" and follow the on screen installation instructions.

PC connection via RS232

2. Connect PCs serial port to the AIRIO-MCU-0x RS232 serial port cable port.

3. After installation, run the program by clicking On Start, All Programs, then find MCU Server select Server.exe. To open the program, click the Once the icon appears on the taskbar the program may be opened by double-clicking on the icon.

4. Select serial port number to which AIRIO-MCU-0x is connected then click on Apply. If you are not certain which COM port is being used you can find the port to which the AIRIO-MCU-0x is connected by pressing the Autodetect button.

5. Click the link: *http://localhost:5000/settings* the default browser window will open.

6. If you have difficulty maintaining connection to the AIRIO-MCU-0x go to Device Manager and set your COM port settings to: 115,200 bits per second and under "Advanced…" turn off the FIFO.
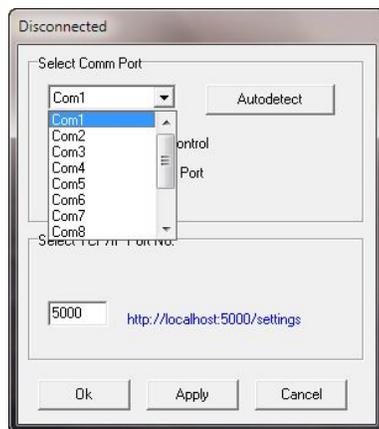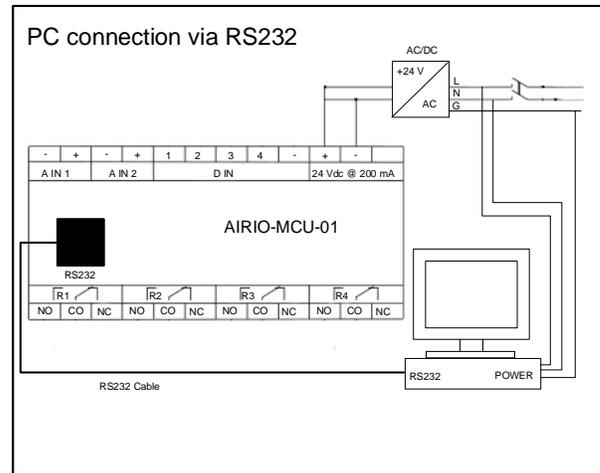
Select COM Port
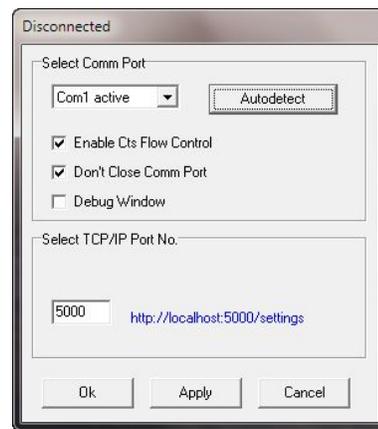
After Autodetect

Note: If Server.exe program is running, to reopen the program - please use the icon from the taskbar (). Do NOT run the SERVER.EXE software more than one time from Start/Programs/IoSelect/MCU. If the icon turns red (), close the program and reopen the Server program from the Start menu, and then click on the http://localhost:5000/settings *link to reconnect to the unit.*

Note: Leaving the unit connected via RS-232 to the PC while the PC is shutdown / restarted may put the unit in an undefined state. If this occurs, power cycle the unit for RS-232 communication to resume.

7.3.2. SEVER Program Settings

There are three check boxes and a text box on the SERVER program's main dialog:

Setting	Description
Enable CTS Flow Control	Default = ON It is suggested to leave this on for robust operation
Don't Close Comm Port	Default = ON By default the SERVER program opens the COMM port once on startup and keeps it open untill the SERVER program is closed. On most machines this results in more robust operation. By un-checking this box the SERVER program will open the COMM port for every transaction with the device, and close it once it is complete. On some computeres all this opening and closing of the COMM port causes problems (Red SERVER Icon) quite frequently.
Debug Window	Default = OFF Turning this on will cause the server program to display debug infomation in a window. This information may be usefull to ioSelect technical support staff. On some PC that presistantly have Red SERVER Icon issues running the program with teh Debug Windows displayed may reduce these errors.
TCP/IP Port Number	Default = 5000 The TCP/IP port of the unit. Leave this at the default for proper operation.

8. Application Configuration

Data configuration is executed by the internal web server application. You need to connect AIRIO-MCU-02 to PC and run the server program to access the configuration web pages.

8.1. General Overview

The unit can be configured in any order. For example Logics, Events, Actions, etc. can be configured in the unit even without a SIM installed. Once the SIM is installed to get the unit fully operational some settings changes may need to be done.

8.1.1. SMS Only

With an SMS Only SIM it is very likely that no additional configuration is necessary and the unit will just start working. This only setting that may need to be changes is the PIN setting (*Settings Menu → GSM/GPRS → PIN Code*). If needed this must be obtained from the SIM provider. The SIMs phone number should be noted if SMS messages or Calls are to be sent to the unit.

If you are only using SMS that it is strongly suggested that you *DISABLE* GPRS in the unit (Settings):

8.1.2.   GPRS

A SIM enabled for GPRS, assuming you want to use GPRS features like email and Time Synch, needs additional configuration. The following information needs to be obtained from the SIM provider:

- APN – Access Point Name – Usually a string of characters
- Username – For the above APN – Usually a string of characters
- Password – For the above APN – Usually a string of characters
- SMTP – For the above APN – Usually a string of characters or an IP address (www.xxx.yyy.zzz)

Enter these setting (*Settings Menu → GSM/GPRS*) and restart the unit. Check the System Log and look for errors if the unit is not communicating correctly (usually the problem is a number or letter was entered incorrectly).

8.2.   Application Logical Elements
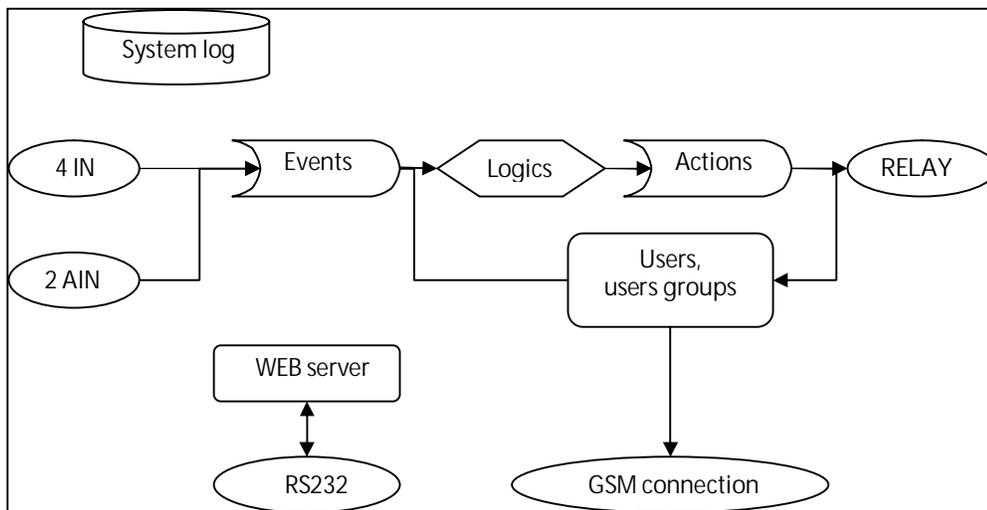
Simply put the unit takes various Events, does some Logic on them, and Triggers various Actions based on this.

Events	• Digital input state • Analog input above or below a threshold • An incoming phone call from a certain number • An incoming SMS from a certain number with a certain message • A certain amount of time has passed
Logics	• ANDing / ORing of Various Events
Actions	• Setting or Toggling a Relay Output • Sending an SMS with IO values to one or more Numbers • Sending and email with IO values to one or more Recipients
Users	• A way to name phone numbers and email entries as Individuals and Groups

This document will go through the various configuration menu options and detail the settings.

8.3.   Logics Menu

When displayed the Logics screen will give an overview of all the Logics currently defined (List of Logics). For example:

To create a New Logics, Press the New button. Here is where the user will define which Events will cause which Actions. Multiple Events can be selected (use the Ctrl key and click the Event entry) to trigger multiple Actions (same method as selecting multiple Events).

NAME:
This is the name of the logic (alphanumeric). This does not have any effect on operation of the logic it's just for easy identification.

FUNCTION:
OR: Action(s) are produced when *AT LEAST ONE* of the selected events is present
AND: Action(s) are produced when *ALL* the selected events are present

EVENTS:
Choose an existing event name. If you want to choose several events, click items together with the Ctrl key.
            Create new events in the Events menu.

ACTIONS:
Choose existing action name. If you want to choose several actions, click item together with the Ctrl key.
            Create new actions in the Actions menu.

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Logics
RESET will reload and display whatever is currently saved

8.3.1.   Events Menu

Events are based on the condition of the digital inputs (DIN), analog inputs (AIN), received messages, and time.

8.3.1.1.   Analog Event

Press the *NEW Analog Event* button, then you will see the new item "EventX". Click it and configure parameters.

Logics Events Actions Users Settings Status System Log

Tests

List of EVENTs

	State Column
	A shows that this item is currently Active
	T shows that this item is currently True
	F shows that this item is currently False

Name	Type	State
☐ noname	Timer	A F

DELETE | NEW Analog Event | NEW Digital Event | NEW Message Event | NEW Timer Event

If you want to delete any listed event, mark event's checkbox and press DELETE.

Logics Events Actions Users Settings Status System Log

Edit EVENT - AI1_UP

NAME

AI1_UP

TYPE

Analog UP

AIN

1

ACTIVATION SETUP TIME (seconds)

0.0

DEACTIVATION SETUP TIME (seconds)

0.0

THRESHOLD (V)

5.5

GAP

0.100

APPLY   SUBMIT   RESET

NAME:
This is the name of event (alphanumeric). This does not have any effect on operation of the event it's just for easy identification.

TYPE:
Select the analog type from the list:
Edge Triggered: *Analog UP, Analog DOWN,*
Level Triggered: *Analog HIGH, Analog LOW* (use with CAUTION)

AIN:
Choose analog input number of interest (1 or 2).

ACTIVATION SETUP TIME:
The time interval after which the event will be sent to the logic function if the event conditions still exist.). Min = 0.0 Sec, Max = 6553.5 Sec.

DEACTIVATION SETUP TIME:
The time interval the condition that caused this event has to be gone for this event to be possibly be triggered again. Essentially results in a MINIMUM time between the same events.). Min = 0.0 Sec, Max = 6553.5 Sec.

THRESHOLD:
Select the level of the trigger: 0 to 10 when configured for Volts or 0 to 20 when configured for mA.

GAP:
Hysteresis setting, The event will switch ON at (*Threshhold+GAP/2*) and switch OFF again when the value is (*Threshhold-GAP/2*).

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Events
RESET will reload and display whatever is currently saved

8.3.1.2.   Digital Event

Press the *NEW Digital Event* button, then you will see the new item "EventX". Click it and configure parameters.

Logics Events Actions Users Settings Status System Log

Tests

List of EVENTs

Name	Type	State
☐ **noname**	Digital UP	

```
State Column
A shows that this item is currently Active
T shows that this item is currently True
F shows that this item is currently False
```

[DELETE] [NEW Analog Event] [NEW Digital Event] [NEW Message Event] [NEW Timer Event]

Logics Events Actions Users Settings Status System Log

Edit EVENT - Event2

NAME

Event2

TYPE

Digital DOWN ▾

DIN

1 ▾

ACTIVATION SETUP TIME (seconds)

0.0

DEACTIVATION SETUP TIME (seconds)

0.0

[APPLY] [SUBMIT] [RESET]

NAME:
This is the name of event (alphanumeric). This does not have any effect on operation of the event it's just for easy identification.

TYPE:
Select the digital type from the list:
Edge Triggered: *Digital UP, Digital DOWN,*
Level Triggered: *Digital HIGH, Digital LOW* (use with CAUTION)

DIN:
Choose digital input number from 1 to 4.

ACTIVATION SETUP TIME:
The time interval after which the event will be sent to the logic function if the event conditions still exist.). Min = 0.0 Sec, Max = 6553.5 Sec.

DEACTIVATION SETUP TIME:
The time interval the condition that caused this event has to be gone for this event to be possibly be triggered again. Essentially results in a MINIMUM time between the same events.). Min = 0.0 Sec, Max = 6553.5 Sec.

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Events
RESET will reload and display whatever is currently saved

8.3.1.3.   Message Event

Press the *NEW Message Event* button, then you will see the new item "EventX". Click it and configure parameters.

Logics Events Actions Users Settings Status System Log

Tests

List of EVENTs

Name	Type	State
☐ **noname**	Short Message	

```
State Column
A shows that this item is currently Active
T shows that this item is currently True
F shows that this item is currently False
```

[DELETE] [NEW Analog Event] [NEW Digital Event] [NEW Message Event] [NEW Timer Event]

Logics Events Actions Users Settings Status System Log

Tests

Edit EVENT –

NAME

command

TYPE

SMS ▼
SMS
CALL

USER

Tom ▼

MESSAGE

make call

APPLY   SUBMIT   RESET

NAME:
This is the name of event (alphanumeric). This does not have any effect on operation of the event it's just for easy identification.

TYPE:
There you can choose the incoming message type:
SMS – An incoming SMS message (also called a Text)
CALL – An incoming Phone call (Caller ID Only). Some SIMs must be setup for phone call support (contact the SIM provider).

USER:
Choose the user or group of users who are allowed to SEND this message to the unit.
    Create new users and groups in the Users menu.

MESSAGE:
SMS ONLY – The text to be used to match against the incoming message. For this event to be TRUE this text much match the incoming SMS text *EXACTLY* (character to character, same case, etc.) and is from a selected user/group of users (phone number matches exactly).

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Events
RESET will reload and display whatever is currently saved

8.3.1.4.   Timer Event

Timer events are used to create periodic Events based on time. For example, the unit can send a message by SMS or e-mail every hour. Press *NEW Timer Event* button, then you will see the new item "EventX". Click it and configure parameters.

Logics Events Actions Users Settings Status System Log

Tests

List of EVENTs

Name	Type	State
☐ **noname**	Timer	A F

DELETE | NEW Analog Event | NEW Digital Event | NEW Message Event | NEW Timer Event

State Column
A shows that this item is currently Active
T shows that this item is currently True
F shows that this item is currently False

Logics Events Actions Users Settings Status System Log

Tests

Edit EVENT -

NAME

Event #1

START TIME

Year:	2008
Month:	July
Day:	14
Hour:	8
Minute:	20
Second:	0

For "Real" dates and times to work correctly GPRS needs to be setup and a NTP time server selected. Relative time intervals can be used with SMS only but they will drift somewhat.

NAME:
This is the name of event (alphanumeric). This does not have any effect on operation of the logic it's just for easy identification.

START TIME:
Set exact date, when the event should start.

END TIME

Year: 2008
Month: July
Day: 14
Hour: 9
Minute: 20
Second: 11

END TIME:
Set the end time of the event.

REPETITION PERIOD

Months: 0
Days: 0
Hours: 0
Minutes: 15
Seconds: 0

REPETITION PERIOD:
Here you can set repetition period. Event can be repeated after some seconds, minutes, hours, days, and/or months.

WEEKDAYS

Monday ☐ ☐ ☐ ☐ ☑ ☑ Sunday
APPLY SUBMIT RESET

WEEKDAYS:
Set the day (days) of the week, when the event should happen. De-selected days OVERRIDE the above settings and no message will be sent.

This will ONLY work accurately with GPRS setup and a NTP time server selected.

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Events
RESET will reload and display whatever is currently saved

8.4. Actions Menu

Actions define operations for the device to perform like turn on a relay, send an SMS, e-mail, or make a Call (Caller ID info ONLY).

8.5. ROUT

Press the *NEW ROUT Action* button, then you will see the new item "ActionX". Click it and configure parameters.

Logics Events Actions Users Settings Status System Log

Tests

List of ACTIONs

	Name	Type
☐	**noname**	ROUT TOOGLE

DELETE   NEW ROUT Action   NEW Message

Logics Events Actions Users Settings Status System Log

Tests

Edit ACTION –

NAME

ROUT1

TYPE

TOGGLE ▾

ROUT

1 ▾

HOLD TIME (seconds)

0.0

APPLY SUBMIT RESET

NAME:
This is the name of event (alphanumeric). This does not have any effect on operation of the action it's just for easy identification.

TYPE:
The resulting state when the action is performed:
ON – Turn the Relay ON
OFF – Turn the Relay OFF
TOGGLE – Change the current state of the Relay

ROUT:
Choose relay number from 1 to 4.

HOLD TIME:
The time output is held in the new state. If *0.0* is entered it means a permanent change in state). Min = 0.0 Sec, Max = 6553.5 Sec.

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Actions
RESET will reload and display whatever is currently saved

8.6.   Message

Press the *NEW Message* button, then you will see the new item "ActionX". Click it and configure parameters. Default type is *SMS*, but can be changed to *Call* or *E-Mail* during configuration.

Logics Events Actions Users Settings Status System Log

Tests

List of ACTIONs

Name	Type
☐ **noname**	Short Message

DELETE | NEW ROUT Action | NEW Message

Logics Events Actions Users Settings Status System Log

Edit ACTION - email1

NAME

email1

TYPE

EMAIL ▾

USER/GROUP

Phil-email ▾

MESSAGE

Test Message

The message above applies only to SMS and EMAIL action types.

In the above following keywords will be replaced by corresponding values:

- @D1, @D2, @D3, @D4 - digital inputs, possible values are 0 (low) and 1 (high)
- @A1, @A2 - analog inputs (V or mA), possible values are from 0.00 to 99.9
- @U1, @U2 - units of analog inputs, possible values are 'V ' and 'mA'
- @R1, @R2, @R3, @R4 - relay outputs, possible values are 0 (off) and 1 (on).
- @YY, @MM, @DD, @HH, @NN, @SS - message creation time - year, month, day, hours, minutes and seconds.
- @PW - mains power voltage, possible values are form 0.00 to 99.9
- @SF - device status, possible values are 'ok' and 'err'.

Maximal size of message is 120 symbols before and after replacement of keywords.
Please note that new line break takes 2 symbols.

APPLY | SUBMIT | RESET

NAME:
This is the name of event (alphanumeric). This does not have any effect on operation of the action it's just for easy identification.

TYPE:
Choose the outgoing message type to send the alarm:
SMS – Also called a "Text" up to 120 characters
CALL – A Phone call (Caller ID Only). Some SIMs must be setup for actual phone call support (contact your provider). The message box is *NOT* used for this type.
E-MAIL – Must have GPRS and SMTP server setup. Subject to same length restrictions as SMS message.

USER/GROUP:
Choose the users or groups of users who would receive the alarm.
        Create Users and Groups in the Users menu.

MESSAGE:
This text message will be sent to the selected User or Group. Please see the *Format Note* below for more information.

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Actions
RESET will reload and display whatever is currently saved

Format Note   Enter a text string of no more than 120 characters (after keyword replacement) for email and SMS. All characters are allowed except @ which is use to send internal unit values embedded in the message text string. The defined keywords are:

- @A1 - Analog Input 1. Result will be from 0.0 to 99.0 with decimal point
- @A2 - Analog input 2. Result will be from 0.0 to 99.0 with decimal point
- @U1 - Units of Analog Input 1 (V, mA)
- @U2 - Units of Analog Input 2 (V, mA)
- @D1 - Digital Input 1, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)
- @D2 - Digital Input 2, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)
- @D3 - Digital Input 3, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)
- @D4 - Digital Input 4, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)
- @R1 - Digital Relay Output 1, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)
- @R2 - Digital Relay Output 2, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)
- @R3 - Digital Relay Output 3, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)
- @R4 - Digital Relay Output 4, Result will be symbol 0 or 1 (0 – OFF, 1 - ON)

- @PW - Mains power voltage, 0.0 – 99.0 with decimal point
- @SF – Device fault status flag (OK – Device is OK, ERR – Device status fault)
- @YY – Year, SMS message creation year from 0000 to 9999
- @MM – Month, SMS message creation month from 00 to 99
- @DD – Day, SMS message creation day from 00 to 99
- @HH – Hour, SMS message creation hour from 00 to 99
- @NN – Minute, SMS message creation minute from 00 to 99
- @SS – Second, SMS message creation second from 00 to 99

Example (in unit SMS or email message text):
Values: @A1 @U, @R1, @D2, @R2, @PW V, Date: @MM/@DD/@YY

The resulting message being sent:
Values: 7.4 V, 1, 0, 0, 23.7 V, Date: 11/09/2009

Also, messages of the type email by default have an email subject of MCU message. This can be changed by making the first two lines of the email text as follows:

Subject: <Your Subject>
<Blank Line>

For example, an email message text formatted like this in the unit:

```
MESSAGE

Subject: MCU Status (@YY/@MM/@DD)

Time: @HH:@NN:@SS
DI(1, 2): @D1, @D2
AI(1, 2): @A1@U1, @A2@U2
End
```

Results in the following email message being received:

```
MCU Status (2009/12/08)
AirIO@ioselect.com
To:  undisclosed-recipients:
Time: 09:51:30
DI(1, 2): 1, 0
AI(1, 2): 0.01V , 0.19V
End
```

8.7.   Users Menu

A User is generally a phone number of someone or something getting messages from or sending messages to the unit. The User entry is made of user name, telephone number and email address. The user list can be edited by adding or deleting users. Press the *NEW Person* button to add a new user. Press the *NEW Group* button to create a new Group of Users. A group is useful for sending to or receiving messages from multiple Users. The Individual users MUST be created with *NEW Person* prior to being assigned to a Group.

Logics Events Actions Users Settings Status System Log

Tests

List of USERs

	Name	Type
☐	Robert	PERSON
☐	weekend	GROUP
☐	Tom	PERSON

[DELETE] [NEW Person] [NEW Group]

Whenever a User is deleted the user will be removed from all corresponding groups.

8.7.1.   Editing Users

Logics Events Actions Users Settings Status System Log

Edit USER/GROUP - User1

NAME

User1

PHONE

E-Mail

APPLY   SUBMIT   RESET

NAME:
This is the user name (alphanumeric). This does not have any effect on operation of the user it's just for easy identification.

PHONE NUMBER:
Phone number of this user. Please see the *Format Note* below for more information.

E-Mail:
The email address of this user (X@Y.Z).

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Users
RESET will reload and display whatever is currently saved

Format Note   The unit uses exact matching of incoming phone numbers versus the users defined. This can lead to some issues because different SIM providers can send the SMS or Call with different format of phone numbers. The most common are:

- 10 Digit Format: xxxyyyzzzz
- 11 Digit Format: 1xxxyyyzzzz
- +11 Digit Format: +1xxxyyyzzzz

SIM obtained directly from ioSelect typically use the +11 Digit Format, but there is usually no way to tell what format the phone numbers will be in with any give companies SIM. The best way to proceed is to enter the phone number in for a user in 10 Digit Format, and they do a test call to the device. If it works… Great! If not check the System Log webpage and there should be an error something like this:

Logics Events Actions Users Settings Status System Log

System LOG

2009.11.04 13:08:02 Sms process: not found user: +19092392824 msg: Off

DISABLE   ERASE   REFRESH

Note the format of the incoming number (in this case +11 Digit) and make changes to your users phone numbers accordingly. Any of the above formats will work when sending an SMS or Call to a user, this is only an issue for the unit receiving an SMS or a Call from a user.

8.7.2.   Editing User Groups

Logics Events Actions Users Settings Status System Log

Edit USER/GROUP - Group1

NAME

Group1

USERS

User1

APPLY   SUBMIT   RESET

NAME:
This is the user group name (alphanumeric). This does not have any effect on operation of the group it's just for easy identification.

USERS:
Choose and existing user(s) names. If you want to choose several users, click items together with the Ctrl key.

Create new users in the Users menu.

APPLY will save the values and stay here
SUBMIT will save the values and go back to the list of Users
RESET will reload and display whatever is currently saved

8.8.   Settings Menu

Logics Events Actions Users Settings Status System Log

Settings

Analog inputs

	Mode	Value	Calibrate
Analog Input 1	"VOLTAGE ▾	(13) 0.0 V	0V 10V
Analog Input 2	"VOLTAGE ▾	(49) 0.195 V	0V 10V

Apply changes

Fault Relay

ROUT 4   ▾ Apply changes

Date and Time

Date: 2004 1 1
Time: 1 :42 :3
Apply changes

Timezone and Daylight Saving

Timezone: "1 ▾
Daylight Saving rules: "none ▾
Apply changes

Time Synchronization Server

Hostname:
Mode: "none ▾
Timeout (hours):
Apply changes

GSM/GPRS

PIN code:
GPRS Off: ☐ (disable http server, email, time server, bridged connection)
APN: open.internet
Username: gprs
Password:
Authentication method "Auto ▾

Warning: if 'Authentication method' was changed TWCT20 must be restarted for changes to take effect

Apply changes   Restart

E-MAIL

SMTP Server:
Sender address:

Apply changes

Authorization

Username:
Password:

Apply changes

Analog Inputs:
Analog input has two modes:
VOLTAGE – 0 to 10VDC, *CURRENT* – 4 to 20 mA. The unit is *NOT* factory calibrated. Use the Calibrate buttons to change the calibration for 0V (minimum) or 10V (maximum). Apply the appropriate Voltage / Current to the desired input and press the appropriate button. After all changes are completed press *Apply changes*. These changes will be permanently saved to flash and will be retained through power cycles to the unit.

The current unit read value is located in the Value column. Refresh the webpage to see the latest.

Fault Relay:
Here you can set Fault Relay that will turn on when the unit detects an error (ERR LED is ON). ROUT is from 1 to 4. After all changes press *Apply changes*.

Date and Time:
Manual Time Set (YYYY.MM.DD) and time (HH:MM:SS). Will be overridden if at Time Synch Server is used. After all changes are completed press *Apply changes*.

Timezone and Daylight Saving:
Timezone and Daylight Saving setting. Timezone is the offset versus GMT. After all changes are completed press *Apply changes*.

In North America we suggest selecting NONE for Daylight Savings Time Rules.

Time Synchronization Server:
Enter a DNS name or IP address of a NTP/SNTP time server to use for time synch. In general, Mode should be set to Unicast and Timeout set to several hours (do not need to check very often). After all changes are completed press *Apply changes*.

GSM/GPRS:
GPRS Settings – This is specific to a particular SIM provider. Use the Authentication method of Auto unless specifically directed otherwise by your SIM provider. After all changes are completed press *Apply changes*.

Contact your SIM provider for APN, Username, Password, and PIN (if used).

E-Mail:
EMAIL Settings – This is specific to a particular SIM provider. The

Sender Address can be anything, this entry shows up in the "From" field in the sent email message (*See Format Note Below*). After all changes are completed press *Apply changes*.

Contact your SIM provider for their SMTP DNS name or IP Address.

Authorization:
This *Username* and *Password* in order to protect the Units settings from unauthorized people. After all changes are completed press *Apply changes*.

SMS Center Number

Center Number (default: +13123149810 . Leave empty to use default.): [   ]

[Apply changes]

SMS Center Number:
The default SMS Center Number comes on the SIM and is typically fine, but it can be overridden if needed. After all changes are completed press *Apply changes*.

Bridged Network connection

Allowed user [None ▼]
[Apply changes]

Bridged Network Connection:
Here you can set user to whom a Bridged Network connection is allowed. After all changes are completed press *Apply changes*.

Language selection

Language: [English ▼]
[Apply changes]

Language Selection:
Set the appropriate language for the unit. After all changes are completed press *Apply changes*.

Options

☐ Not Show Logic Info
[Apply changes]

Options:
Show detailed Logics summary screen or not. After all changes are completed press *Apply changes*.

Download configuration

Download Configuration:
Pressing this link will create a file on the PC's hard drive with the current configuration of the unit.

Upload configuration

[Browse..] [Submit]

Upload Configuration:
You can enter in a path on you hard drive (or Browse) to a file that contains a previously saved configuration of a unit and reload this configuration (Submit).

Saved configurations can ONLY be loaded into units with the SAME version of firmware.

Format Note   When using the Sender Address field care must be taken otherwise email sending can fail. If no sting is entered then the email messages will be sent with no "From" address. If only a partial email address string is given (For example: MCU01) the resulting "From" address will be MCU01@*<email of provider>* where *<email of provider>* depends on the SIM provider. If ioSelect is providing the SIM it will be k2.wyless.com, so in the example above the resulting "From" address will be MCU01@k2.wyless.com. If a complete email address string is provided then the "From" field will be this sting. For example if MCU01@MyPlace.Com is entered then the resulting "Form" address will be MCU01@MyPlace.Com (capitalized as entered).

Whatever is entered here MUST result in a valid string format for an email address (for example spaces are not allowed). If ANY invalid characters are entered all email sending will FAIL. The resulting string does not have to actually be a working email address, but the FORMAT of the resulting email address string MUST be valid.

8.9. Status Menu

The *Status Menu* shows a summary of the operational state of the unit from a comms perspective.

Logics Events Actions Users Settings Status System Log

Status

Date: 2004.01.01
Time: 1:24:04   ← Current date, time and Timezone settings.
Weekday: Thursday
Time zone: 1
Daylight Saving: inactive

Software Version: TWCT20.02.651 ← Here you can see the firmware version number in the unit.
Phone IMEI: 353976010183600   ← IMEI - International Mobile Equipment Identity – Unique number identifying this device (Not the SIM).

Connection   ← With a new SIM card it may need changed parameters in the settings
Not established   menu. This is *ALWAYS* true with GPRS, but with SMS it may be that no
SMS_ERR_SIM_CARD   changes are required. Some errors may be displayed here
                                   SMS_ERR_SIM_CARD means there in no or a corrupted SIM card is
Signal quality (0-5): 0   installed.
Service: False
GPRS network not available   ← With GPRS configured and a NTP/SNTP Time Synch Server selected in the
                                   Setting Menu, this will show the current Time Synch status. With SMS only
Time NOT synchronized   SIMs this will *ALWAYS* show NOT Synched.

8.10. System Log Menu

The Log shows the events that take place during startup and network registration. Also, it will list various errors that occur during operation. It can be useful when troubleshooting.

Logics Events Actions Users Settings Status System Log

System LOG

```
2004.01.01 00:00:11 DEVICE VER.: TWCT20.02.651 STARTED: CAUSE_DEFAULT
2004.01.01 00:00:11 FFS is available

2004.01.01 00:00:11 FFS free space: 0x0010 01be

2004.01.01 00:00:11 Current directory: \

2004.01.01 00:00:11 FILE: TWCT20syslog 203

2004.01.01 00:00:11 Failed to obtain next file: 0

2004.01.01 01:00:12 SMS_ERR_SIM_CARD
2004.01.01 00:00:02 DEVICE VER.: TWCT20.02.651 STARTED: CAUSE_DEFAULT
2004.01.01 00:00:02 FFS is available

2004.01.01 00:00:02 FFS free space: 0x0010 01be

2004.01.01 00:00:02 Current directory: \

2004.01.01 00:00:02 FILE: TWCT20syslog 540

2004.01.01 00:00:02 Failed to obtain next file: 0

2004.01.01 01:00:03 SMS_ERR_SIM_CARD
```

[DISABLE] [ERASE] [REFRESH]

To see the latest entries in the Log – press the *REFRESH* button. To clear the log press *ERASE*. The log overwrites with a first in, first out method. The *DISABLE* button terminates the logging ability (*not recommended*).

Except for startup information and time synch notifications, in general the log only shows errors of some kind.

8.11. Common Errors List

SMS_ERR_SIM_CARD   Message means that no or a corrupted SIM card is installed

SMS_ERR_NEED_PIN_CODE   Message means that a PIN code must be
                                 entered in *Settings Menu* for this SIM card.

SMS_ERR_CANT_REG_NETWORK   Message means that a there is a problem with
                                 the APN/Username/Password entered in
                                 Settings Menu for this SIM card.

8.12.   Tests Menu

This displays the current inputs and output of the unit, and gives the ability to manually change the ROUTs. Access tests menu: http://localhost:5000/test

Please use care when using this page. Many of these entries are only useful to ioSelect product support staff.

← Use check boxes to turn ON (Checked) or turn OFF (Unchecked) the ROUTS. Press the *Apply* button to activate.

← Shows the current values on AI1 and AI2

← Press the *Apply* button to activate the changes.

← Current Voltage to CPU
← Current Voltage to Unit

← Current DIP switch settings and Current Warnings

← Refresh this display
← Restart Silent – Restarts the GSM Modem
← Restart soft error – Restarts the entire unit

9.   Typical ioSelect SIM Settings

These are for ioSelect supplied SIMs only. For other SIM please contact your SIM provider:

9.1.   SMS Settings

Once the SIM is installed SMS communications should just work. Phone numbers on incoming SMS messages to the unit are in +11 Digit Format. Incoming Calls are in 11 Digit Format. Therefore, different users must be created for incoming SMS and incoming Calls (*User1-SMS* and *User1-Call*) because the number formats are different.

9.2. GPRS Settings

Use the following (Other time Synch Servers – NTP Servers – can be used, but this should work):

APN: telargo.t-mobile.com
Username: "" ← Nothing (blank)
Password: "" ← Nothing (blank)
SMTP: smtp.wyless.net
Time Synch Server: nist1.symmetricom.com   (Use unicast and a timeout of 2 hours or more)

10. Support

Before contacting us for support, make sure that you went through the above manual thoroughly. If you are still facing problems, feel free to contact our technical support team at support@ioSelect.com, we would be glad to help you.