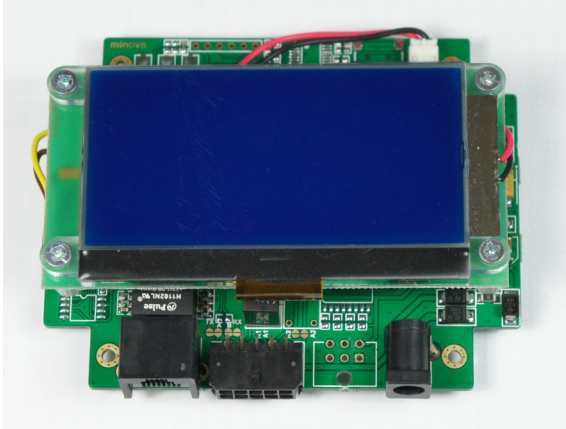
# MCR02/05

**Ethernet Based Contactless Card R/W Terminals**

## Features

- ISO14443 & Mifare Support
- Ethernet 10BaseT Full Duplex
- Integrated TCP/IP Stack
- TCP/IP Client-Server Connection Support
- Integrated DNS Client
- DHCP or Static Operation
- UDP, TCP,ARP,ICMP(ping) Support
- TCP/IP Server or Client Mode Operation
- Easy Configuration over a Network ( LAN )
- RS232/ RS485 / USB Communication Options
- -40 °C … +70 °C Industrial Operation
- Globally Unique MAC
- 2xRelay Output
- 4xDigital Input for peripherals i.e gates, turnstiles etc.
- Offline Operation Mode*
- TFTP & FTP Support*
- RTC with Battery Backup & NTP Server Support*
- Remote Firmware Update over Network*

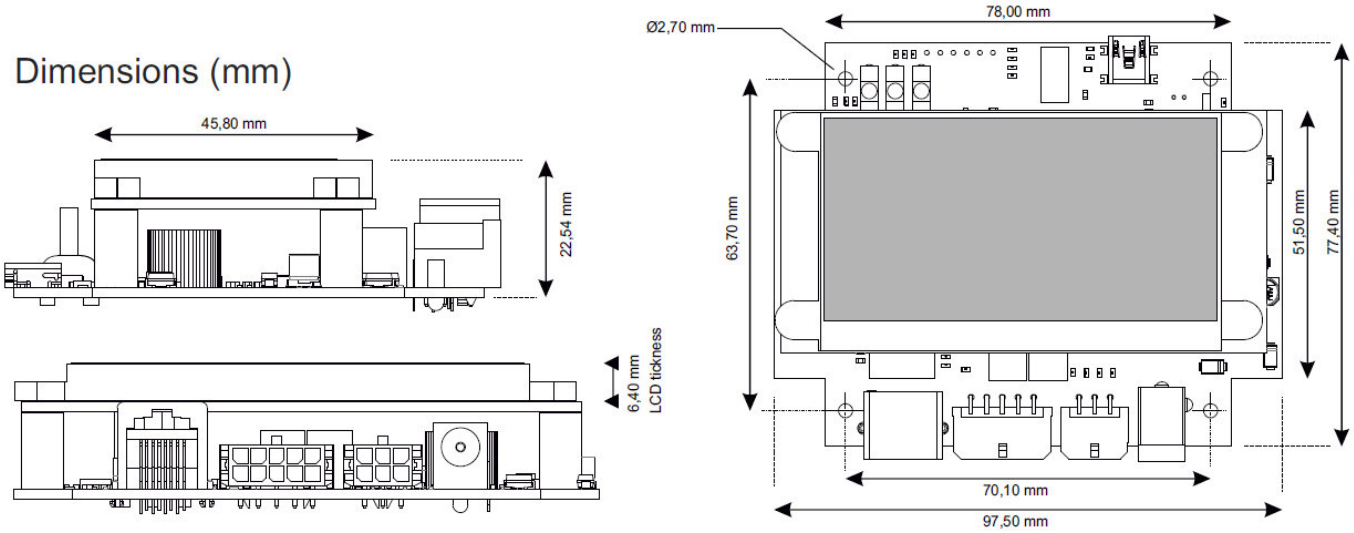


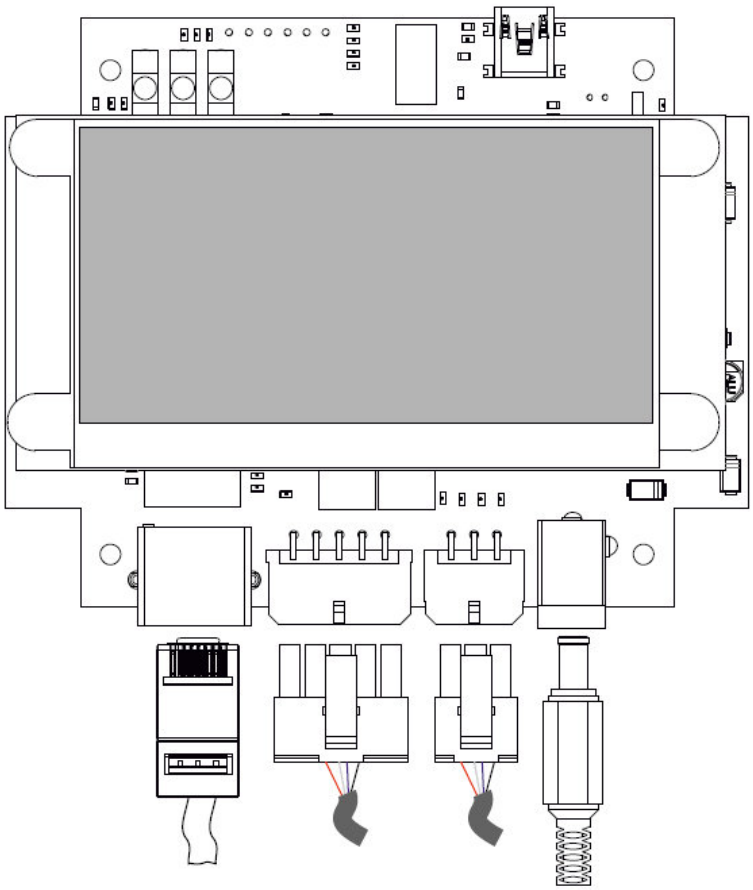
*Selected Models Only

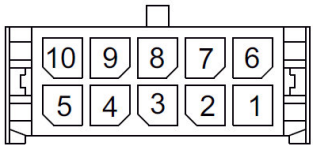
### Electrical Specifications

| Parameter | Min. | Nominal | Max. |
|---|---|---|---|
| **Operation Voltage** | 7.5 V | 12 V | 35 V |
| **Power Consumption** | 1.6 W | 2.4 W | 3 W |
| **Operation Temp.** | -20 C° | ~ | +85 C° |
| **CPU** | ARM Cortex CPU | | |
| **External Memory** | 128 Byte EEPROM & 1Mbyte Flash Memory* | | |
| **CPU RAM** | 8 KB SRAM | | |
| **Led Indicators** | 2xLED Onboard | | |
| **Global Unique MAC ID** | Yes | | |
| **Ethernet** | 10BaseT, IP, PING, DHCP, UDP, TCP, ARP | | |
| **IO / Relays** | 2xRelay; 4xInput | | |
| **RS485** | Yes* (RS232) | | |
| **RS232 / USB** | Yes | | |
| **RTC with Backup Battery** | Yes | | |

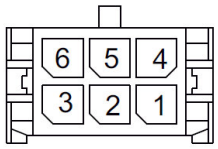
***Mechanical View & Dimensions***






1 DC IN
2 GND
3 ROLE 1 NO
4 GND
5 RS232 TX or RS485 A
6 ROLE 2 NO or NC (Preset)
7 ROLE 2 COM
8 ROLE 1 NC
9 ROLE1 COM
10 RS232 RX or RS485 B




1 GND
2 INPUT X3
3 INPUT X1
4 5V Out
5 INPUT X2
6 INPUT X0

## *Operating Modes & Setup*

### *Server & Client Protocols*

MCR02 Ethernet Terminals can be used in either Client or Server. In client mode the terminal connect to a remote server that it listening a TCP/UDP port. Server may accept multiple connections.
MCR02 Terminals can be used as Server. The terminal listens own port and can accept a connection request from outside. In this case terminal's IP number is to be static.
It depends on the application whether the terminal is in Client or Server mode.

***TCP/IP Client Mode Operation***

When the terminal is set to operate in client mode it tries to connect a remote server ip & port set in configuration.

***TCP/IP Server Mode Operation***

When the terminal is set to operate in server mode it listens own TCP port to accept outcoming request from other clients.

### *Terminal Setup & Settings*

The terminal can be configured on a network ( LAN ). To start setup terminal must be in a network that supports DHCP. The terminal needs to acquire an ip from a DHCP server on your network.
Configuration is made through and UDP protocol so it advisable to use a firewall free network. Most of the firewalls filter UDP.

For the first time setup you can use miFinder software. miFinder can discover all terminals on your network. After MCR02 is up i.e ( after gained an IP from your network ) you can use miFinder. It is also advisable to turn off any firewall & antivirus software before running miFinder. As stated before, firewalls on PC may prevent to discover the network.

### *miFinder Configuration Software*

Using miFinder you can set various parameters related to terminals. Some parameters are specific to each terminal and some parameters are global to all terminals. After all setup, your device is listed or discovered as given below.
If your terminal is not discovered, press Discover button again.

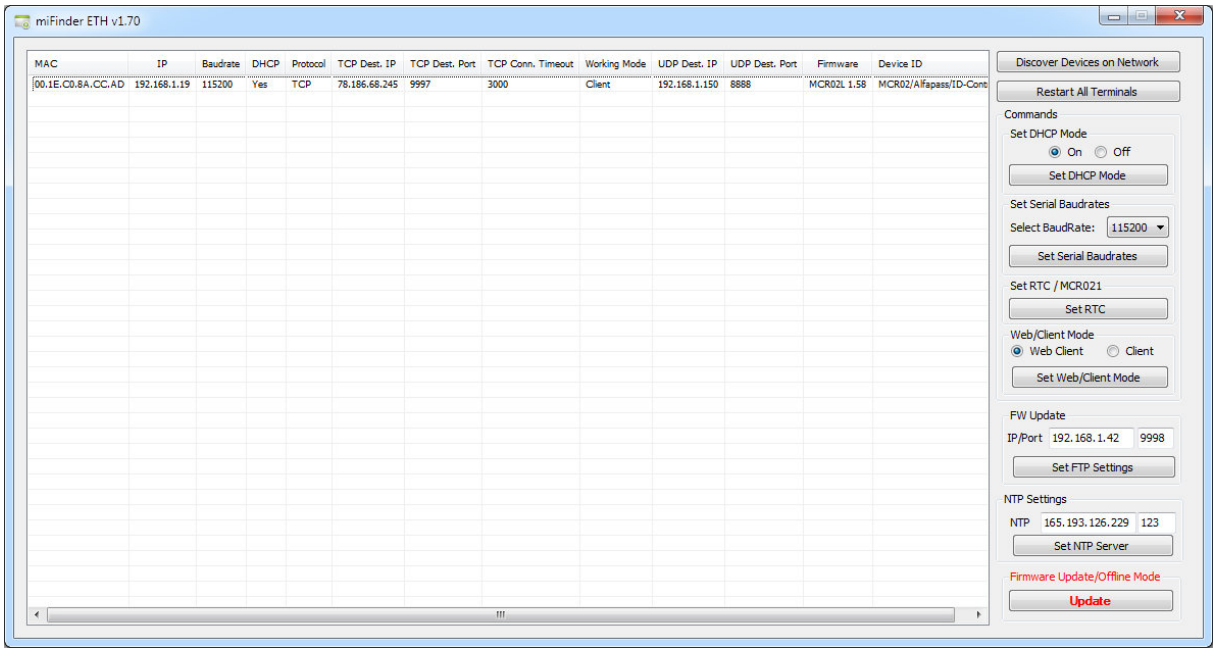



**Figure 2 - miFinder Main Screen**

In main window of miFinder you can the following parameters (see Figure-2 & Figure-3)

- Restart or Reset all terminals connected to network.
- Setting DHCP parameter of all terminals connected to network.

- Setting the baudrate of RS232 / RS485 / USB port.
- Setting the Real Time Clock of all terminals connected to network.
- Setting the Client mode type: Web or Normal Socket Client of all terminals connected to network.
- Setting the remote parameters or firmware update of all terminals connected to network.
- Setting the remote NTP server parameters of all terminals connected to network. NTP server can be used to set automatically if the device can access internet (www).
- Enter to update mode to check firmware update of all terminals connected to network.

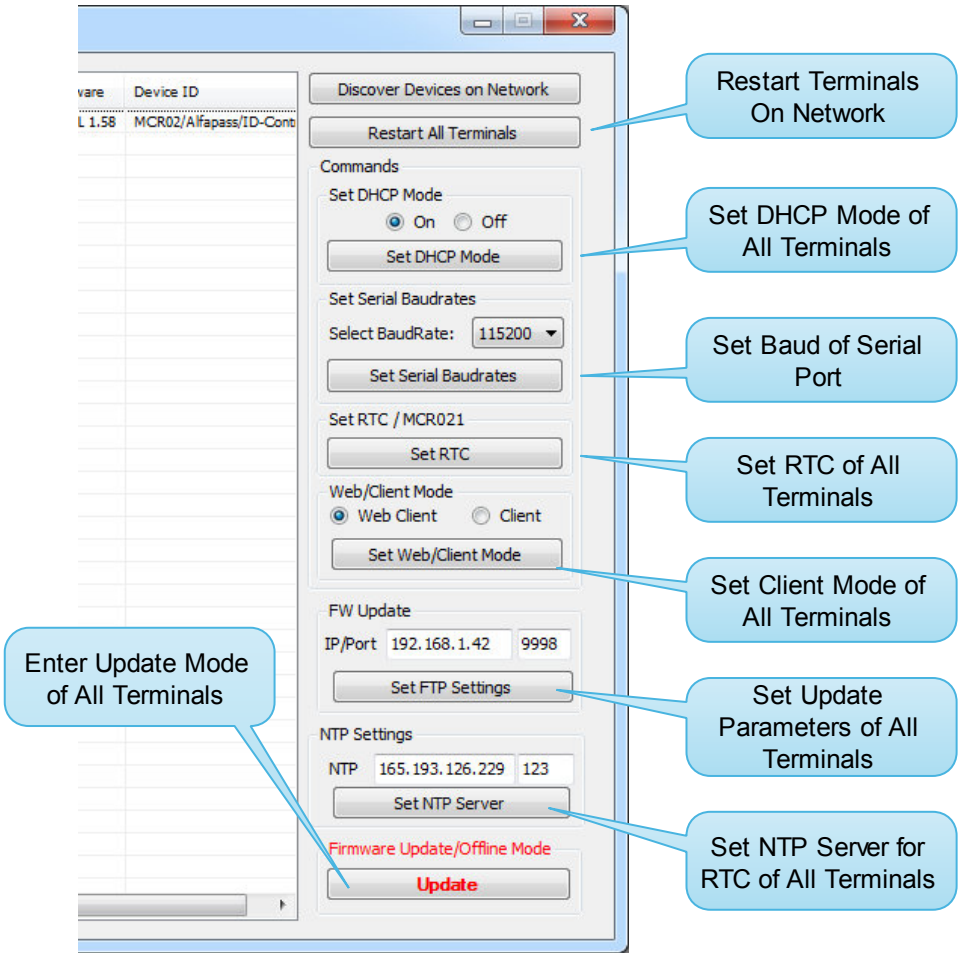



**Figure-3 miFinder main window view**

To enter a detailed setup of a particular terminal select a device from the list and double click to see a particular terminal setting window in miFinder. This window gives you a detailed setup of each terminal. Please note that these settings are specific to each terminal. Below given a snapshot of detailed settings window of miFinder.

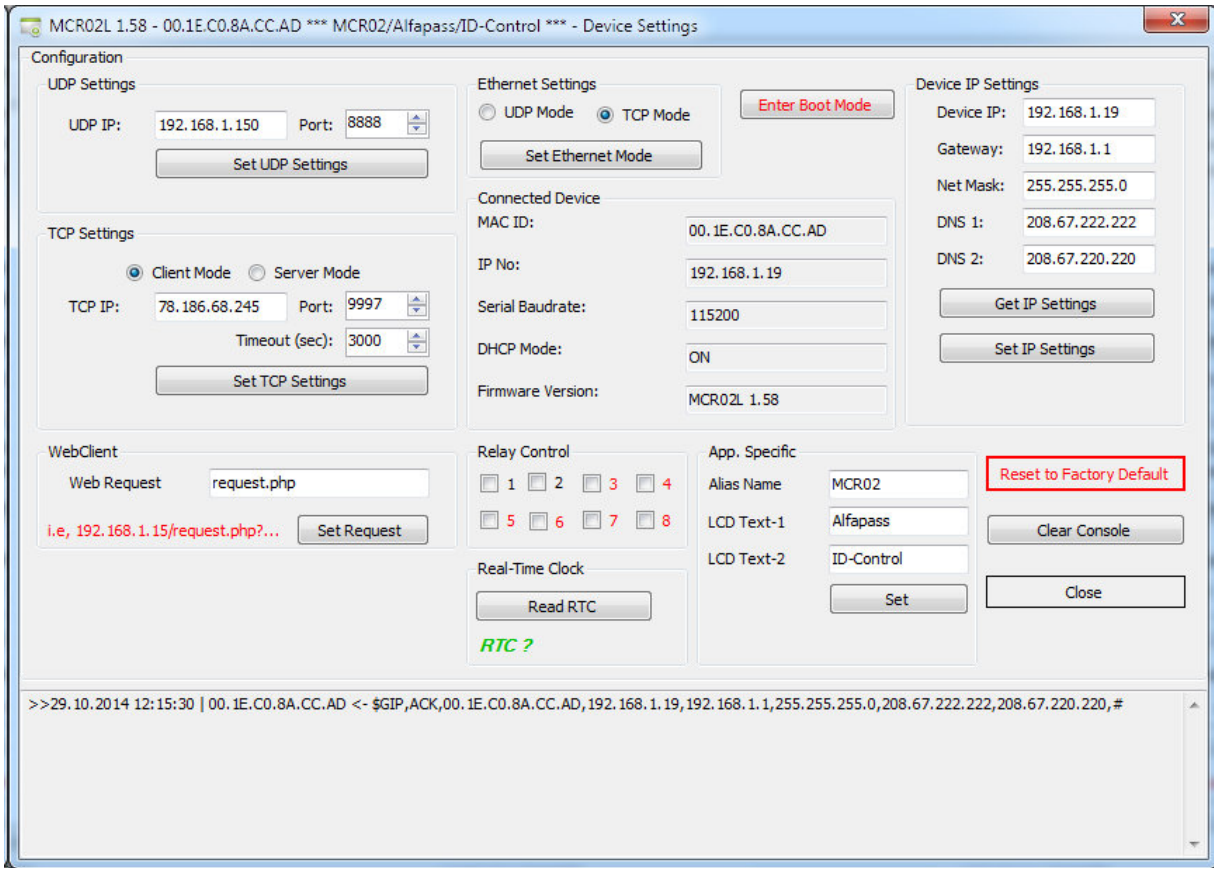



**Figure-4 miFinder Terminal Setting Window**

This setting window gives you to:

- Set the terminal IP static or dynamic
- Set protocol type of operation of the terminal: UDP or TCP
- Set UDP remote ip & port
- Set TCP operation mode: Client or Server
- Set TCP remote ip and server port
- Set remote request file with GET in Webclient mode
- Set / Clear Relays to test
- Give a alias name to terminal ( i.e MCR_Gate1 etc. )
- Set & View LCD Screen Texts ( App. Specific section )
- Set RTC syncronized with PC clock.
- Reset to factory default configuration of selected terminal.
- View Firmware version of the terminal.
- To enter boot mode. Please do not use unless required, otherwise the device erases its memory and enters bootloader mode.

***Automatic IP (DHCP) Mode***

In miFinder's main screen, in Set DHCP Mode section, select ON and press Set DHCP Mode button. Then all terminals restart and try to access a DHCP server to get an IP address from your network. Please note that your network must have a DHCP enabled management device.

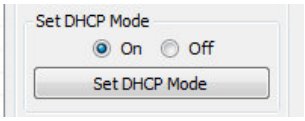



**Figure-5 DHCP Mode Setting**

***Constant / Static IP Mode***

The terminal is set up with the following IP parameters for static operation at factory.

| Parameter | Value |
|---|---|
| IP Address | 192.168.1.100 |
| Gateway Address | 192.168.1.1 |
| Net Mask | 255.255.255.0 |
| Primary DNS | 192.168.1.1 |
| Secondary DNS | 192.168.1.1 |

However, most of the terminals manufactured are set to operate in DHCP mode. Static IP mode is not preferred for mass productions. The default setting for all terminals is DHCP.

To set a terminal to be run in static IP mode, in miFinder's main window enter the desired terminal's settings screen. Then enter your desired IP, GW, Mask and DNS values in Device IP Settings section.


**Figure-6** IP Parameters Settings Section

Note that, after opening settings screen, this section gives your terminal's current IP parameters. After entering the values as above figure, then press Set IP Settings button. Then the terminal restarts again.

The last step is to set DHCP mode to OFF in main window of miFinder as given in Figure-5. The terminal restarts again in Static IP mode. Please note that you can skip this step if your terminal is already operating in static IP mode.

***Client and Web Client Modes of Operation***

Any MCR02/05 terminal can connect to web server or server as client. The terminal's client mode of operation can be altered in main screen of miFinder as in Figure-7.

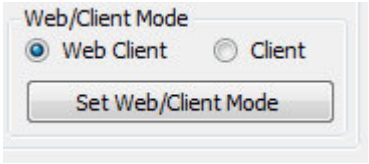



**Figure-7** Web Client or Normal Client Mode Setting

When a contactless card is detected by the terminal, it tries to send card's UID to server as follows:

| Operation Type | Example Terminal Request |
|---|---|
| Web Client | ***GET /request.php?devID=MCR02-ABC0&uid=396359221*** |
| Client ( Socket ) | ***MCR02-ABC0,UID=396359221*** |

It is seen that the terminal tries to send data to a webserver by requesting a PHP file. You can also change this request in miFinder's setting window.

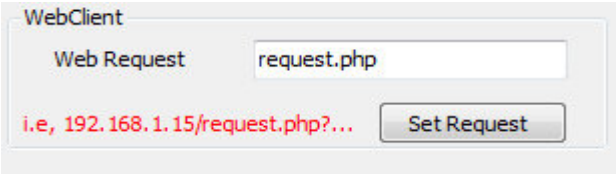



**Figure-8** Http request file name for WebClient Mode

**Message Formats from Server to Terminal**

The message format from server to terminal is given by the following syntax.

**<Device ID>,<CMD1;parameter1;…;parameterN>,<CMD2;parameter1;…;parameterN>,…**

This packet can be sent by a specific TCP server via socket_send API's or simple echo statements defined in a web server protocols.

| Command | To | Description | Parameter |
|---|---|---|---|
| **LCDCLR* | *Terminal* | *Clears LCD* | *None* |
| **LCDSET* | *Terminal* | *Write Text to LCD* | *Left;Top;Font_Type;Text*<br>*Example:*<br>*LCDSET;0;0;0;Hello World* |
| **LCDLOCK* | *Terminal* | *Locks the display* | *None* |
| **LCDUNLOCK* | *Terminal* | *Releases the display* | *None* |
| *BUZZER* | *Terminal* | *Execute Buzzer* | *DelayMs,beepTimes*<br>*Example: (300 msec. period with 1 time Beep)*<br>*BUZZER;300;1* |
| *ALIVE*<br>*( In Web Mode )* | *Server* | *Alive message is sent by the Terminal periodically* | *If desired the server can send commands as reply.* |
| **ROLE1=xx* | *Terminal* | *Energize Relay-1 by Delay in Ms.* | *XX Delay in Milliseconds.*<br>*The Relay is ON with XX Delay.* |
| **ROLE2=xx* | *Terminal* | *Energize Relay-2 by Delay in Ms.* | *XX Delay in Milliseconds.*<br>*The Relay is ON with XX Delay.* |
| **ROLE1=ON*<br>**ROLE1=OFF* | *Terminal* | *Relay-1 ON or OFF all the time.* | *ON / OFF* |
| **ROLE2=ON*<br>**ROLE2=OFF* | *Terminal* | *Relay-2 ON or OFF all the time.* | *ON / OFF* |
| **TSYNC=UNIX_TIME* | *Terminal* | *Set Terminal's RTC from server.* | *UNIX_TIME*<br>*This is a unix time stamp value.*<br>*Ex: TSYNC=256984235* |

***Example Operation***

***The Terminal sends the following to Server:***

*MCR02-2A18A7,UID=ABFF1234*

***The Server may send the following to Terminal:***

*MCR02-2A18A7, BUZZER;500;1,LCDCLR,LCDSET;0;0;0;Test1,LCDCLR,LCDSET;0;10;0;Hello World!*

*MCR02-2A18A7, BUZZER;500;1,LCDCLR,LCDSET;0;0;0;Test1,LCDCLR,LCDSET;0;10;0;Hello World!,ROLE1=500*

***ALIVE* Message from Server:**

***GET /devID=MCR02-ABCD&cmd=ALIVE\r\n\r\n (Web client)***

***Offline Mode of Operation***

All MCR0X family of readers can operate in offline mode. Offline modes of operations are usually specific to application. Please contact with your vendor about your application requirements. Below it is given some application examples for offline systems.

- White List support
- Black List support

- Mifare Read/Write support
- Offline record and log support