

Sentinel Home

Srikanthan Parameshwaran

University Of Auckland

October 2007

1	Abstract.....	3
2	Introduction	4
3	Sentinel System	6
3.1	Problem With Earlier Sentinel System Design	6
3.2	Problem With Embedded Devices.....	7
3.3	Problem With Static IP Address	7
3.4	Solution To The Problems	8
4	Sentinel Client	9
4.1	Presentation Layer.....	10
4.1.1	<i>Different Forms</i>	10
4.1.2	Reason For The Dynamic User Interface	14
4.1.3	<i>Problem With One Big XML File</i>	15
4.1.4	<i>How SC Is Created And Installed</i>	16
4.1.5	<i>Warning Form</i>	17
4.1.6	<i>Different Ways To Send Security Alert To The Client</i>	17
4.2	Security Layer	18
4.2.1	<i>Security Threads</i>	18
4.2.2	<i>Types of Cryptography</i>	19
4.2.3	<i>Advanced Encryption Standard</i>	19
4.3	Communication Layer	20
5	Sentinel Management Server	21
5.1	Layers Of SMS	21
6	Sentinel Server	22
6.1	Tiny Internet Interface (TINI).....	22
6.2	I-Wire.....	22
6.3	Comfort System	23
6.4	Security.....	23
6.5	Layers In Sentinel Server.....	24
7	How Is Everything Connected	25
8	Mobile Platforms	25
8.1	Mobile Development Platforms	25
8.2	Comparison between .NET CF and J2ME (CDC and CLDC)	26
8.3	Comparison between Flash Lite and J2ME.....	27
8.4	Comparison between WAP and J2ME	27
8.5	Why did I choose J2ME?.....	28
9	Mobile Control Solutions (MCS Ltd)	29
10	Conclusion	30
11	Reference.....	31
12	Appendix	32
12.1	Appendix A (an example of user interface XML file).....	32
12.2	Appendix B (Sentinel Client Class Diagram)	36
12.3	Appendix C (an example of CS configuration file)	40
12.3	Appendix D (Sentinel Management Server Class Diagrams)	92
12.5	Appendix E (Sentinel Server Class Diagrams).....	94

1 Abstract

This project involves in researching and developing a home automation system that can be controlled using a low-end java capable phone. There are products like LinkTx by Compulogic [10] and TCS form DPS Promatic [11] which provide home automation using sms text message but the aim of this project is to go even one step further by providing a good graphical user interface that looks good and also efficient (low data transition). The problem with using sms text messaging for home automation is that the user has to remember and type the command and also the sms text messaging is not reliable. The other problem with sms text messaging based home automation system is that it doesn't provide instance feedback to the user. My aim of this project to not only provide a good graphical user interface but also make the communication between the mobile phone and the home automation system as secure and reliable as possible and also provide instant feedback to the user. This project is unique and first of it kind as there is no product in the market that actually does this.

2 Introduction

The aim of this project is to develop a home automation system that can be controlled via a standard Java capable MIDP2.0 mobile phones. This system has two distinctive parts, the first part is the software part where I build the user interface and the second part is the hardware part of how to connect each appliances. For the software part, I have decided to use Java and for the hardware part, I decided to use a system called Comfort developed by Cytech. This Comfort system provides the network for connecting the appliance as well as an alarm system to monitor the home. This system (Sentinel system) is built by extending the Comfort system.

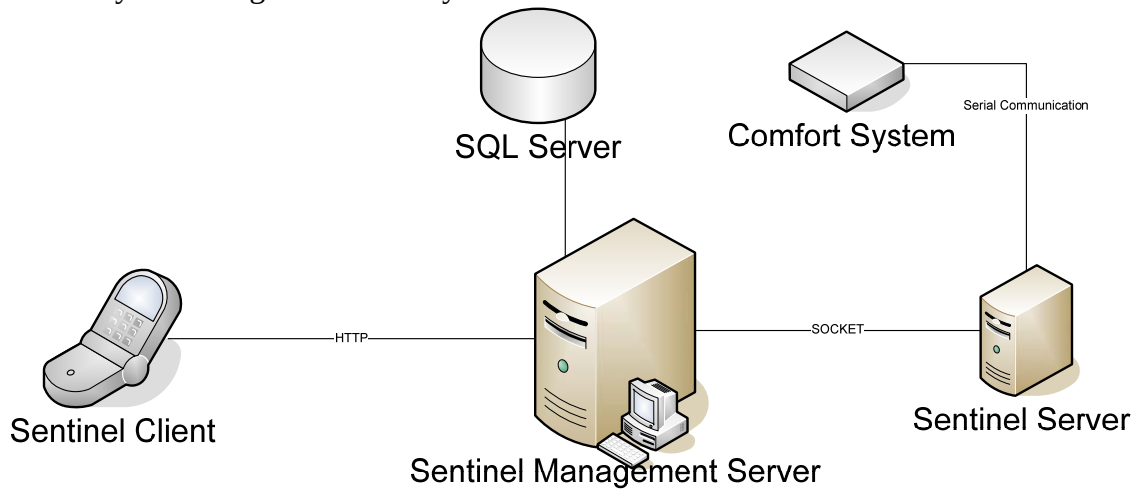


Figure 1: Single SC and SS communicating through SMS.

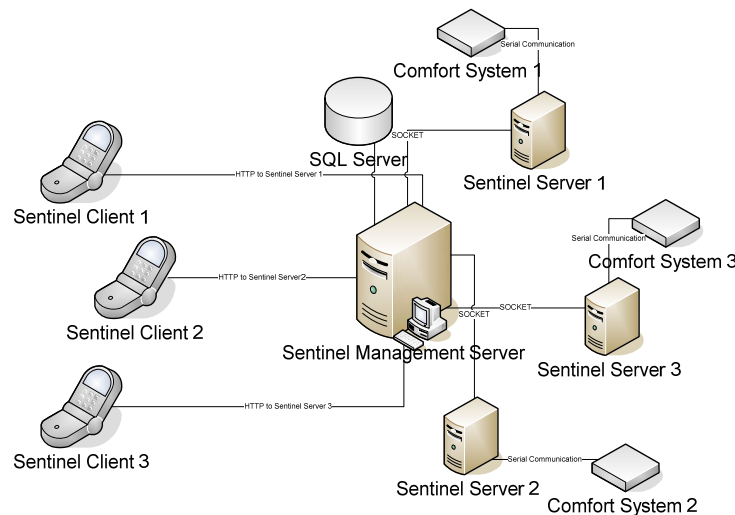


Figure 2: Multiple SC and SS communicating through SMS.

As you can see from figure 1, there are four different components. The first component is the Sentinel Client (SC) which is the user interface developed for Java capable phones. The second component is the Sentinel Management Server (SMS); it is responsible for connecting both the SC and SS by forwarding the request and the response between them. It is also responsible for authenticating both the SC and the SS. The third component is the Sentinel Server (SS); it is responsible for monitoring the comfort System (CS) and alerting the user when someone brakes into the house as well as sending commands to the comfort system to turn on/off the appliances. The fourth component is the comfort System; it is responsible for sending the actual electrical signal to turn on/off the appliances.

Figure 1 shows single sentinel client (SC) communicating with a sentinel server (SS) through sentinel management server (SMS) where figure 2 shows how multiple sentinel clients communicate with multiple sentinel servers. Each house will contain a sentinel server and a comfort system and these two components will work together to guard the house. When the sentinel server is started, it makes a socket connection with sentinel management server and keeps it open so the sentinel management server can forward the sentinel client requests. Sentinel management server accepts connections from many different sentinel servers on port 8080 and keeps the connection open. When a sentinel client sends a request, sentinel management server examines the request and based on the request, the request is forward to appropriate sentinel server and the response form the sentinel server is send back to the requested sentinel client. Multiple sentinel clients will send request to the sentinel server through the SMS but each SC belongs to only one SS. The reason for this is that each SC is uniquely created for each home based on the comfort system (CS) configuration (appendix C).

The aim of having this Sentinel System is to give the users the feeling that their home/office is secure, safe, energy efficient and cost effective. The sentinel system also provides the convenience of able to control any aspect of you home whether it is from the room next door or half way around the world. The users have the feeling that their home/office is secure because the sentinel system monitors and alert the user when there is brake-in or something similar. Its energy efficient and cost effective because the users are able to turn-on/turn-off their appliances from anywhere in the world. The sentinel system can be controlled form anywhere in the world because it uses the mobile technology.

3 Sentinel System

3.1 Problem With Earlier Sentinel System Design

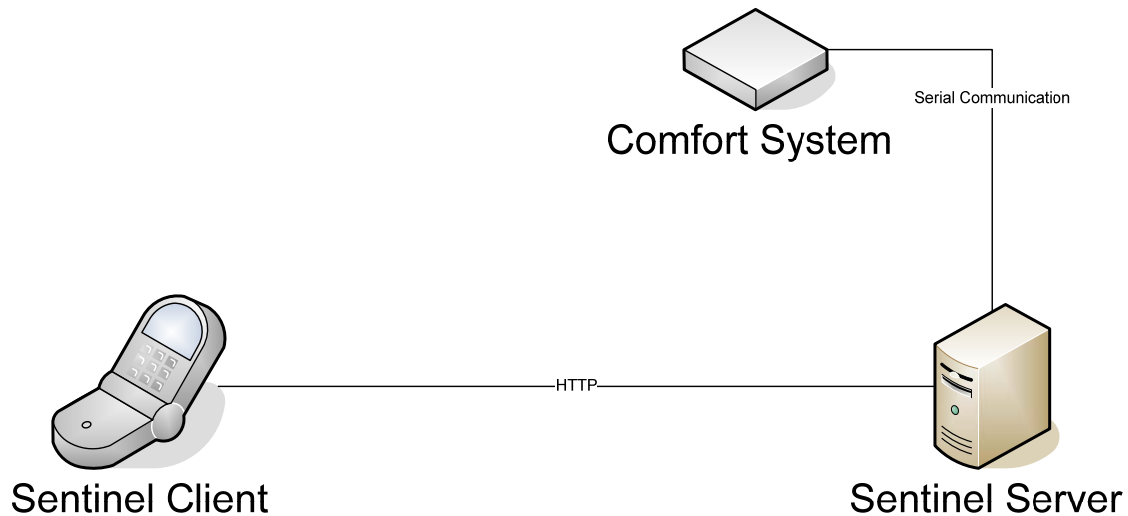


Figure 3: Bird's-eye view of the old Sentinel System

Figure 3 shows an earlier design of the sentinel system. If you compare this with figure 1, you will see that this design is missing the sentinel management server (SMS). The reason for that is when I was design this model, I was only thinking about the system from the programmer's point of view to make it simple but never thought about the memory and the processor capability of the sentinel server (SS). As you can see about, this design is simple and easy to develop. There is nothing complicated in the design, you have a server that waits for http requests and upon receiving the request it generates a response. For this design, I made lots of assumptions that the sentinel server will have a public static IP address and also able to handle multiple http requests at the same time as well as able to handle authentication/encryption for multiple clients.

Half way through the implementation it came clear that one of the assumptions did not hold and started to get out-of-memory exceptions from the sentinel server. The reason is that the sentinel server is an embedded device and only has 64kB [3] RAM which is good enough to response to one user at a time but can't handle multiple users. As there is only 64kB of RAM, the authentication/encryption information's cannot be store in the memory as well. To solve this out-of-memory exception I had two options, the first one is to get a better embedded device with more memory or reduce the load on the current device by limiting the concurrent user request and performing the user authentication somewhere else. By upgrading the current embedded device with a new device will only solve the out-of-memory exception as well as an attractive choice from my point of view as I don't have to rewrite the code again.

3.2 Problem With Embedded Devices

Each embedded devices (TINI [3], Rabbit [4], JStamp [5], ...) have their own advantage and disadvantages between them but the common problem with all these embedded devices is that they lack in memory space and the processing power compare with a real server (Apache, IIS). The other problem with these embedded devices is that it's difficult to write/deploy/run code for/on them. Example of this is that the embedded device I am currently using is called TINI and it has Java 1.1. The problem with java 1.1 is that it only provides basic functionalities even for a basic class like the string class. Writing code is hard but running the code is even harder as the embedded devices don't have any emulators. To actually run the code, the code has to be compiled and then need to be ftp in to the embedded device and then use the telnet to run the code. By choosing a different embedded device I can solve the out-of-memory exception for now but I still have lots of other problems that are not solved. To solve most if not all, I have redesigned the sentinel system as shown in figure 1.

3.3 Problem With Static IP Address

The other problem with the design on figure 3 is that the requirement of static IP address for the sentinel server because for a client to talk to a server, the client needs to know the IP address of the server. If the IP address of the server is always changing (e.g. if the ISP change the IP address every hour/day), then there is no way the client can keep track of the servers IP address. One option to solve this problem is to get a static IP address form the ISP but the problem with this is that the static IP address are expensive. To get a Static IP address in NZ, it cost around \$20 per month [2] but in countries like Singapore it cost around \$50 per month [1]. Normal households are not going to pay \$20 per month to just to get a static IP address, so getting a static IP address for the sentinel server is not an option. To solve the problem, I came up with a possible solution as shown in figure 4 below.

As you can see in figure 4, there are 3 components, the sentinel client, sentinel server and the discovery server. The main job of the discovery server is to keep record of the current IP address of all the sentinel servers. The discovery server has a static IP address and is maintained by the company that sells sentinel client/server system. Whenever sentinel server's IP address is changed, it sends a message to discovery server with its ID and the new IP address and the discovery server updates its record about the sentinel server specified by the ID. When the sentinel client wants to talk to a sentinel server, it sends a message to the discovery server with the ID of the sentinel server and asks for the new IP address. Upon receiving the new IP address from discovery server, it uses the new IP address to communicate with the sentinel server. This option will solve the requirement of static IP but not the common problem with embedded device.

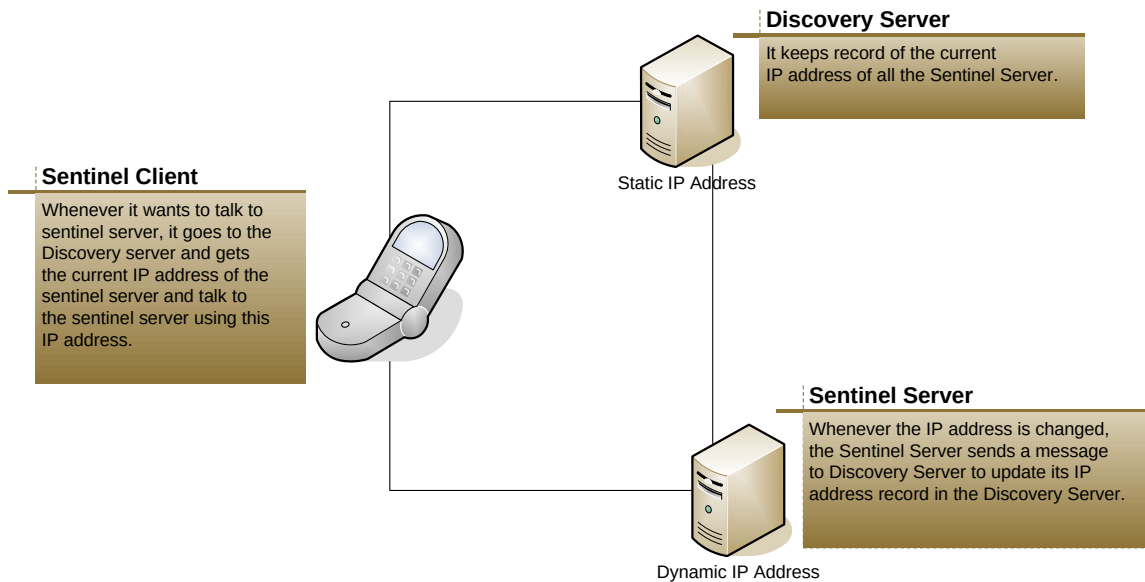


Figure 4: Getting the dynamic IP address of a server.

3.4 Solution To The Problems

The different between the figure 1 and figure 3 is that figure 1 one has an extra component call the sentinel management server, the main purpose of this management server is to reduce the load on sentinel server. Rather than replacing the current embedded device I decided to move all the complicated tasks form the embedded device into the management server, by doing this I made the embedded device as another client rather than a server. By making the embedded device as another client, it reduces the load on the embedded device but also solves the requirement of static IP address because only servers need static IP address so that client can reach them. Both sentinel client and the sentinel server connects to the sentinel management server to communicate with each other. The process of how sentinel server/client connect to each other is shown in figure 5.

Every SC and SS know the static IP address of the SMS and the communication between each SC and SS goes through the SMS as you can see in the figure 5. When the SMS is started, it listens on port 8080 for any connection from SS and on port 80 for SC. When it receives a socket connection on port 8080, it knows that it's coming form SS and waits for SS to send the login info. When SS sends login information, SMS check the login information and generates a session key and send it back to the SS and any future communication between SMS and SS is encrypted using this session key. After sending back the session key, it keeps the socket connection so that whenever a request from SC comes, it can be forward to SS. A similar thing happens with the SC.

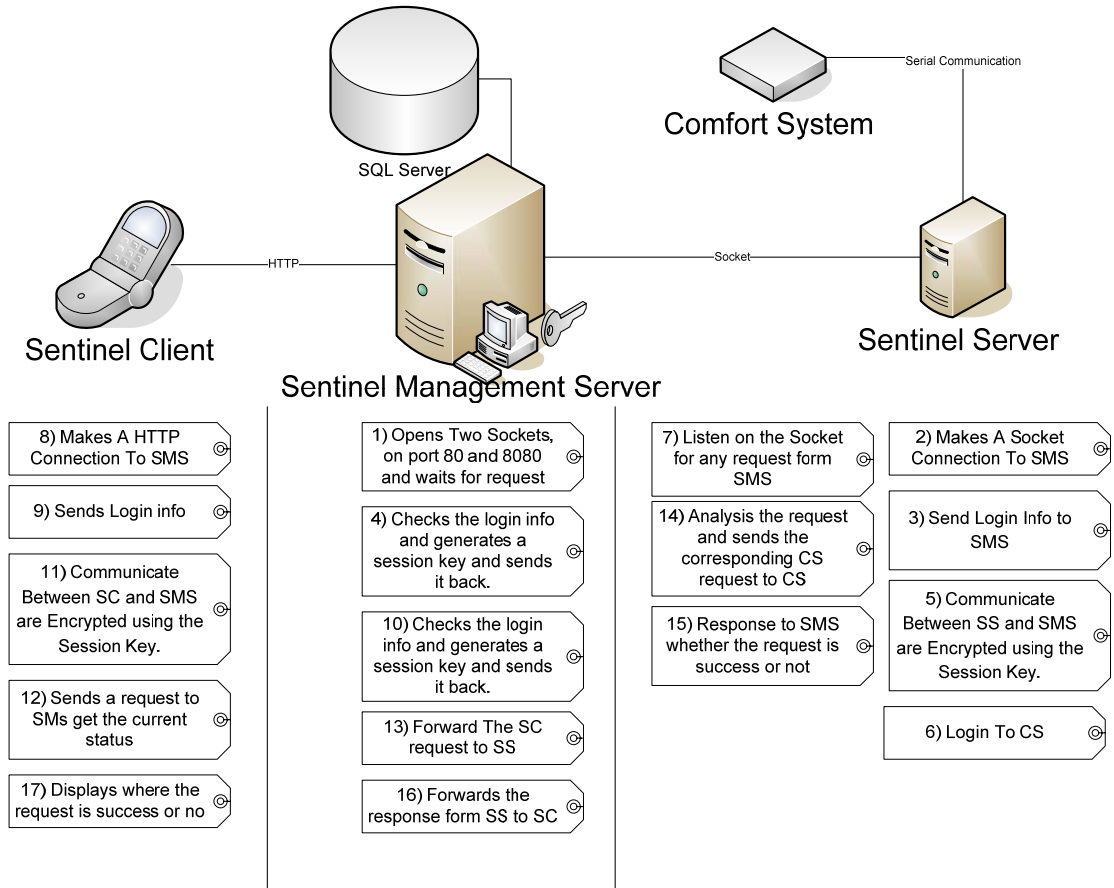


Figure 5: Connecting SC, SMS, SS and CS

4 Sentinel Client

Sentinel client is a graphical user interface for mobile phones that supports java (MIDP 2.0 and CLDC 1.1). SC is divided into four layers as shown in figure 6. Each of these layers is independent of each other and can be replaced with no or very little modification to the other layers. The reason to do this is to make the system easy to develop, understand and to maintain. Example of this could be that when I am working on the presentation layer, I never think about the security or how to send the data, I only think about what data need to be send. Appendix B shows the reversed engineered class diagrams of each layer. As you can see from the class diagrams, each layer is complicated and has too many classes. This separation of layers guarantees that I will not break any of the code on any other layers while I am updating one layer. This separation

made it simple as I only have to worry about one layer at a time. Without separating each layer, I don't know if I could have finished the project.

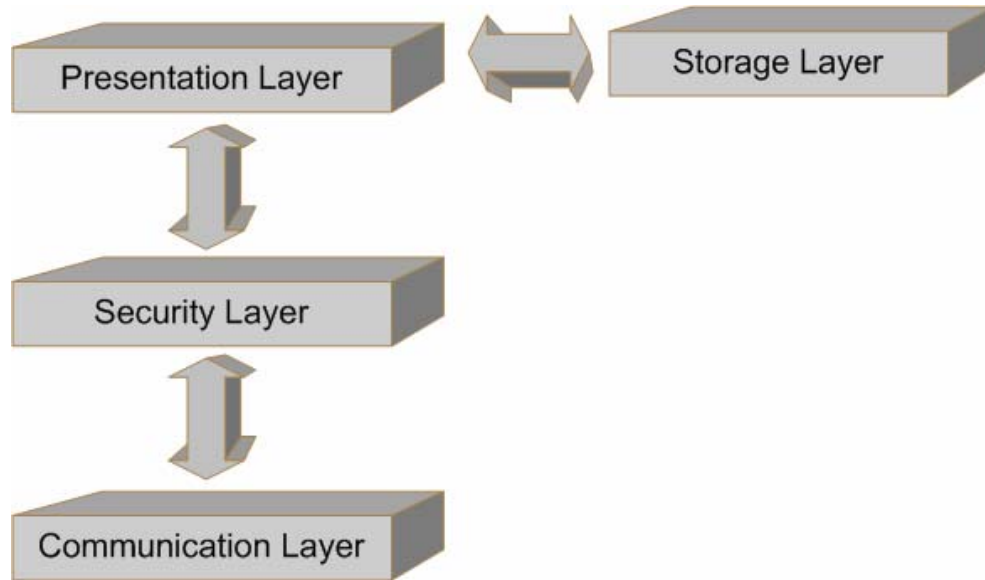


Figure 6: Different Layer in SC

4.1 Presentation Layer

4.1.1 Different Forms

This graphical interface has several forms, some of these forms are static and some are dynamically created based on the XML file (appendix a). Figure 7 -13 shows the different forms. Figure 7, 8, 9 and 10 are static forums but figure 11, 12 and 13 are dynamically generated. Figure 7 shows the welcome form, whenever the application is started, this form will be displayed first for 5 seconds and then the current status form will be displayed automatically. The reason to have this form is to promote the company; there is no other reason behind it.

Figure 8 shows the current status form, the aim of this form is to give the user a quick look at the alarm status of their home and who was responsible for this status. The current alarm status could be security off or away mode or night mode or day mode or vacation mode. The last action tells who was responsible for this status. Figure 9 shows the security form and this form is used to change the status of the security system. When the user wants to change the status of the security, they select the new security status and press the submit button. When the submit button is pressed, the presentation layer will create the appropriate message and sends this message to the security layer and waits for

the response. When the response comes, it examines the response and shows a message to the user where the update was success or not. Figure 10 shows the setting window. This is used to change the static IP address of the SMS as well as the ID of the SS.



Figure 7: Welcome Form



Figure 8: Current Status Form

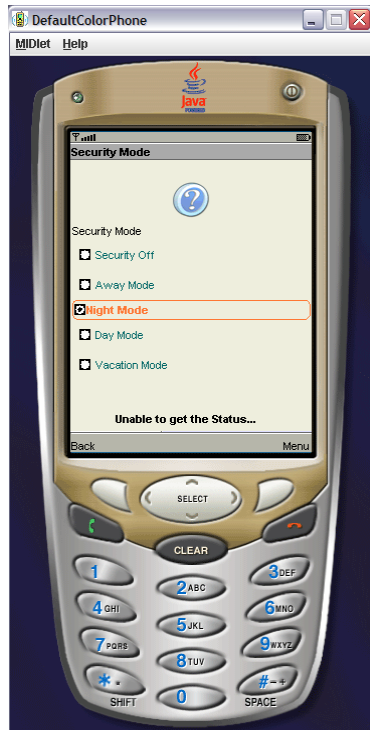


Figure 9: Security Form



Figure 11: Group of Appliance Form

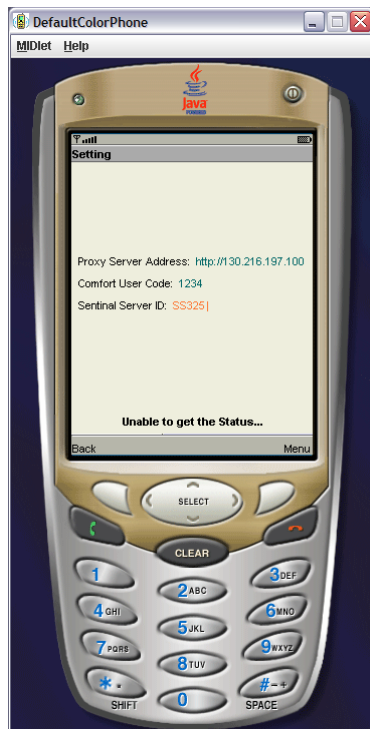


Figure 10: Setting Form



Figure 12: Different Lights Form



Figure 13: All Lights Form

Figure 11 shows the group of appliances that are connected to the comfort system. Figure 11 shows 5 groups of appliances but the number of groups depends on the xml file as this is dynamically generated based on the xml file. Part of the xml file that will generate the output in figure 11 is shown below.

```
<comfort>
  <controlgroup ControlGroup="0" Phrase="Lights">
  </controlgroup>
  <controlgroup ControlGroup="1" Phrase="Airconditioner">
  </controlgroup>
  <controlgroup ControlGroup="2" Phrase="Gate">
  </controlgroup>
  <controlgroup ControlGroup="3" Phrase="Vergola">
  </controlgroup>
  <controlgroup ControlGroup="4" Phrase="Heater">
  </controlgroup>
</comfort>
```

Comfort is the root element and it has zero, one or more sub-elements called controlgroup. As the name status, controlgroup contains group of controls like group of lights or group of heaters. Each group element contains sub-element call menu. Below is an example of the sub-element menu under the controlgroup lights. This sub-element menu is used to generate part of what is shown in figure 12.

```

<comfort>
  <controlgroup ControlGroup="0" Phrase="Lights">
    <menu Menu="0" Phrase="All Lights" FeedbackType="None">
      <key Key="0" Phrase="Off" Response="AllLightsOff" />
      <key Key="1" Phrase="On" Response="AllLightsOn" />
    </menu>
    <menu Menu="1" Phrase="Gate Front Light" FeedbackType="Zone"
Feedback="GateFrontLight">
      <key Key="0" Phrase="Off" Response="GateLgtOff" />
      <key Key="1" Phrase="On" Response="GateLgtOn" />
    </menu>
    <menu Menu="2" Phrase="Carporch Light" FeedbackType="Zone"
Feedback="PorchLight">
      <key Key="0" Phrase="Off" Response="CarLgt1Off" />
      <key Key="1" Phrase="On" Response="CarLgt1On" />
    </menu>
    <menu Menu="3" Phrase="Garage Light" FeedbackType="Zone"
Feedback="GarageLight">
      <key Key="0" Phrase="Off" Response="CarLgt2Off" />
      <key Key="1" Phrase="On" Response="CarLgt2On" />
    </menu>
  </controlgroup>
</comfort>

```

Each menu element has one or more sub-elements call the key; this key element describes a particular status of an application. And example of the key element is shown below and it has two statuses, the first status is off and the second status is on. If you look at figure 13, it's generated on the xml file shown below. If you look at the key element below, it has an attribute called the Response, this is what gets send to the sentinel server when the user selects a key and the sentinel server will convert this Response string to comfort system code and send to comfort system.

```

<comfort>
  <controlgroup ControlGroup="0" Phrase="Lights">
    <menu Menu="0" Phrase="All Lights" FeedbackType="None">
      <key Key="0" Phrase="Off" Response="AllLightsOff" />
      <key Key="1" Phrase="On" Response="AllLightsOn" />
    </menu>
  </controlgroup>
</comfort>

```

4.1.2 Reason For The Dynamic User Interface

Each home is going to have a different set of appliances. This means having the same user interface for every house will not work. What is the exact set of application in the home is configured in the CS configuration file for that house. So what I did was, I wrote an application to read the CS configuration and generate an xml file and use this

xml file to generate the CC interface. This way, the CC interface reflects the actual appliances and lights in a particular home.

4.1.3 Problem With One Big XML File

Appendix A shows the full xml file that is used to generate figure 11, 12 and 13. If you look at the xml file you will see that its quiet large and it takes ~3 seconds to load and generate the interface in a mobile phone. Around one second delay to view the interface is acceptable in a mobile phones but three seconds is not acceptable. To solve this problem, I divided the xml files into smaller files with ~20 lines per file. This reduces the loading time of the xml file as the file is smaller and also reduces the interface creation time as well. Example of the smaller file structure is shown below. The first file is called the MenuGroup.xml and it contains the different appliance groups. If you look at the controlgroup element in MenuGroup.xml you will see there is a new attribute called onSelectGoTo, this attribute tells which xml file to load when this controlgroup is selected by the user. This approach reduces the amount of data need to be load because you only load the data you need not all the data. This is the approach I was using early in the implementation but towards the end of the implementation, I put all data into one xml file as shown in appendix a. The reason for that is that this approach makes lots of small xml files for each interface and it hard to fallow the files. The other reason to use just one xml file is that I am showing a welcome form (figure 7) for five seconds whenever the application is started and while I am showing this I am also create the dynamic part of the interface. This solves to problem of user delay as well as the problem of having lots of xml files.

MenuGroup.xml File:

```
<?xml version="1.0" encoding="utf-8" ?>
< comfort Phrase ="Control Group">
  <controlgroup Phrase ="Lights" onSelectGoTo="Lights.xml" />
  <controlgroup Phrase="Airconditioner" onSelectGoTo="
Airconditioner.xml"/>
  <controlgroup Phrase="Gate" onSelectGoTo="Gate.xml" />
  <controlgroup Phrase="Vergola" onSelectGoTo=" Vergola.xml" />
  <controlgroup Phrase="Heater" onSelectGoTo=" Heater.xml" />
</ comfort >
```

Lights.xml File:

```
<?xml version="1.0" encoding="utf-8" ?>
<controlgroup Phrase ="Lights">
  < menu Phrase ="All Lights" onSelectGoTo="All_Lights.xml" />
  ..
  ..
  ..
</ controlgroup >
```

All_Lights.xml File:

```
<?xml version="1.0" encoding="utf-8" ?>
< menu Phrase = " All Lights " >
  <key Key="0" Phrase="Off" Response="AllLightsOff" />
  <key Key="1" Phrase="On" Response="AllLightsOn" />
</ menu >
```

4.1.4 How SC Is Created And Installed

The XML file (appendix a) that is used to create the user interface is automatically generated by going over the CS configuration file (appendix c). For this I have made an ASP.NET application that takes a CS configuration file and based on this configuration file it generates a XML file and uses the generated XML file to generate a SC jar file to be use by mobile phone. Figure 14 shows the basic steps of how an SC application is created and installed in a phone. Sentinel Interface Server (SIS) is a web based interface where a user can upload a CS configuration file and SIS will give a new URL where the corresponding jar file for that configuration file can be downloaded. Now the user can enter this URL into their phone and download the application directly or just downloaded to a PC and use Bluetooth to transfer into the phone. The design that is shown in figure 14 is just a design; I didn't implement the full functionalities (done 1, 2 and 3) as I didn't have the time. My aim is to use JSP and integrate this with SMS but didn't have time.

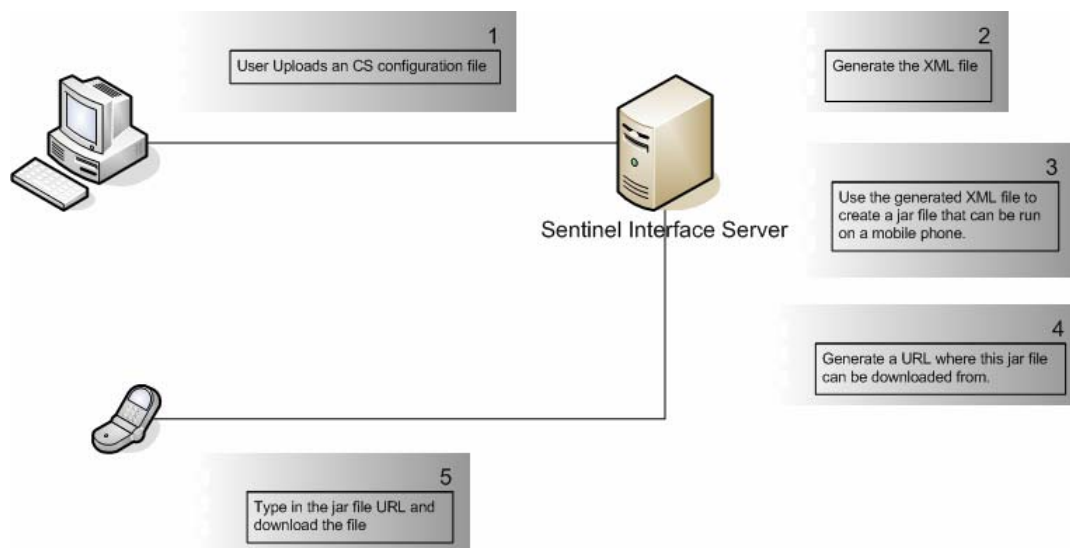


Figure 14: Creating a SC application based on the CS configuration file

4.1.5 *Warning Form*



Figure 15: Warning Form

When there is an intruder or fire in the house, the SS will send a message to SMS and SMS will send a sms (short message service) push message on port 5000 to the client phone. When the client phone receives the sms push, it will launch the SC application and will show a similar interface to what is shown in figure 15. While showing the interface, SC will also play a warning sound and the phone lights will flash and the phone will vibrate. This is to make sure the user can hear and see the warning message.

4.1.6 *Different Ways To Send Security Alert To The Client*

A mobile phone can connect to the outside world using many different protocols (sms, voice, http ...) but to connect into a phone from outside world, we have three options. The first is voice, the second is WAP push (sending sms using WAP push) and the third is sms. The best option for sending warning message is voice as its live and reliable but the problem with voice is that there is no way to launch the SC application using voice. I can call the client phone and play a recorded message form SMS but there is no way I can launch the SC application based on the incoming phone number. The other problem with voice is that its expensive compare to other options. WAP push and sms push are almost the same with the exception WAP push needs a Push Proxy Gateway where sms push doesn't need it. The problem with these two (sms and wap) options is

that they are not reliable; a message could arrive at the destination in 20 seconds or could take up to 20 minutes. Because of this, it's not a good option for sending warning messages to SC. The other problem with sms and WAP push is that some brands of phones doesn't allow an application to be pushed unless they are digitally signed and verified. Sony Ericsson phones allow an application to be pushed even if it's not digitally signed but NOKIA doesn't. This is not a big problem as it could be solved easily; the biggest problem is the reliability. The good think about WAP and sms push is that they are cheaper than the voice option. The reason to choose sms push over WAP push is that WAP push need PPG where sms doesn't. The reason to choose sms push over voice is that I couldn't able to find a way to launch the SC application based on the incoming voice call.

4.2 *Security Layer*

Security is an important part of this project because almost every single appliances, lights and alarm is accessible by a mobile phone. If the system is not secured properly then this will lead to the safety issue. By not securing the system properly, we are not only putting the assets of the house in danger but also the people who live in it.

4.2.1 *Security Threads*

There are lots of different security threads but to make the communication between SC and SMS secure, I have to worry about three security threads. The first one is information leakage, the second is message tampering and the last is the replay attack.

Eavesdropping is an example of information leakage. In my project, an unauthorized party could be listening on the communication line between the SC and SMS and when private information like user name and password is being send, they can record this information and, in a later time the unauthorized parties can use this information to login into the SMS. To prevent this system form information leakage, I never send the password over the network and any communication between the SC and SMS server is encrypted using a session key. The protocol I am using to transfer the session to the client is similar to how is done in the Kerberos protocol.

Man-in-the-middle attack is an example of message tampering; this is where an unauthorized party sits in the middle of the communication between the client and the server and can view and modify all the transaction between them. Even if an attacker manage to place themselves between the SC and SMS and able to view the encrypted message being pass between the SC and SMS, they will not be able to understand the message as its encrypted using the session key. Even though the attacker is not able to understand the encrypted message, he/she can still modify the message by removing some random bytes in the encrypted message and replacing with some new random bytes.

This will lead to SC or SMS unable to decrypt the encrypted message, which means they will discard the encrypted message. This prevents the system from message tempering security threat. To make it even more secure, I can get the digester of the message being send and send it with the message and the receiver can check if the digester he/she computed match the received digester. This will certainly make it even more secure but the problem with this is that mobile phone doesn't have the processing power to do this. Encryption/decryption itself takes a lot of time and if I add this digester to it, it will certainly add to the latency (~2 seconds more) the user faces. The other problem is the internet charge is depended on the amount of data transmitted and putting the digester; I will certainly increase the charge.

Replay attack is where an attacker obtains a copy of the message transmitted between the client and the server and sends this message later in the future to redo the same action. This will be effective even if the message is encrypted. To prevent the system from replay attack I am using timestamp. Every message send between SC and SMS will have a timestamp and if the received timestamp is not what the SC or SMS is expecting, then they will ignore the message. This prevents the system from replay attack.

4.2.2 Types of Cryptography

There are two type of cryptography that can be used to encrypt/decrypt the data being send between the client and the server. The first one is the symmetric cryptography and the second is the asymmetric cryptography. Symmetric cryptography is where the same key is used to encrypt and decrypt. Two communicating parties will have a secret key between them and any communicate between them will be encrypted using this key. As the key is secret, no other party can decrypt the message and this makes the communication private. Asymmetric cryptography uses different keys to encrypt and decrypt. Each communication parties have their own public and private key and when one party need to send a message, they encrypt the message using the receivers public key and the receiver decrypts the message using his/her private key. The disadvantage of asymmetric key algorithms compare to symmetric key algorithms is that asymmetric key algorithms are relatively computationally costly in comparison with many symmetric key algorithms. For this reason I have decided to use the symmetric key encryption.

4.2.3 Advanced Encryption Standard

Advanced Encryption Standard (AES), also know as Rijndael is the symmetric key encryption which is used to secure the communication between the SC and SMS. Appendix b shows the class diagram of the implementation. Some of the classes in the class diagram are from a third-party library call the Bouncy Castle and some are written by me to provide more functionality. The reason for using the third-party cryptography

library is the J2ME connected limited device configuration (CLDC) does not provide any support for this. J2ME Connected Device Configuration (CDC) does provide some build in Java cryptography support but the problem with J2ME CDC is that they cannot be run on low-end devices like J2ME CLDC can be.

4.3 Communication Layer

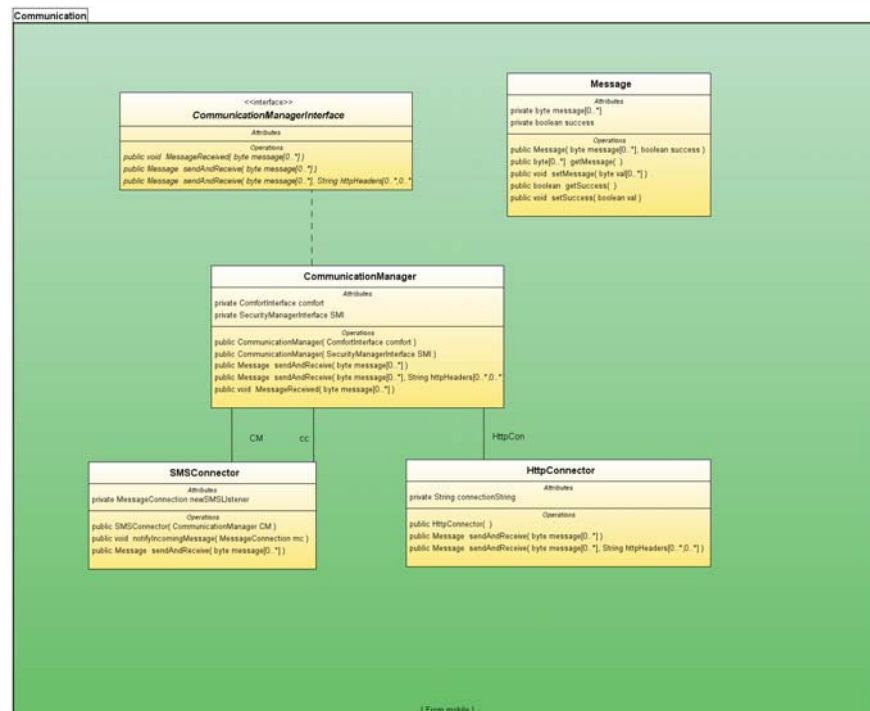


Figure 16: Communication Layer Class Diagram

Figure 16 above shows the communication layer class diagram. As you can see from the class diagram, there are two protocols that are support currently, the first is the HTTP protocol and the second is the sms protocol. Http is the main protocol that is used for the communication between SC and SMS and sms protocol is only used for receiving intruder alert. The one thing that is missing in the communication layer is the Bluetooth connector class. My aim was to put a Bluetooth connector class which can be used to communicate with the SS server when the user is inside the house. As the Bluetooth communication is free and class 1 Bluetooth can be used as long as the user in within ~100 meters [8], this make it a real good option but I didn't have the hardware to do it at the early stage of the project and in the later stage I didn't have the time. The reason I didn't have time is that at the moment all the communication between SC and SS is going through SMS and if I am using Bluetooth, SC and SS will communicate with each other directly which means I have to think about security. Even though the Bluetooth provides some authentication and encryption using the SAFER+ block cipher algorithm, I have to

worry about how the Bluetooth pin is entered and stored in SS. So I decided to leave it for a later time.

5 Sentinel Management Server

The main purpose of this Sentinel Management Server is to solve the requirement of static IP address by the SS, reduce the load on SS by performing authentication and also send sms push to sentinel client. This server has a static IP address and any communication between the SC and SS will go through this. Sentinel management server stores all the user names and the corresponding password of each sentinel client and the sentinel server in a database. When SMS receives a socket connection form the SS, it authenticate the SS and then keeps the socket connection opened. When it receives a connection form SC, based on the user name of the requested SC, the request will be passed to the corresponding SS. When the sentinel server response, the response will be send back to the SC. The SMS also waits for any connection on port 8081, this port is used by the SS to send intruder alert. When it receives a connection, it reads the input headers and body of the request and using the headers to decrypt the body and send this body as a sms to the SC. To send the sms, am using a GSM modem by wavecom.

5.1 Layers Of SMS

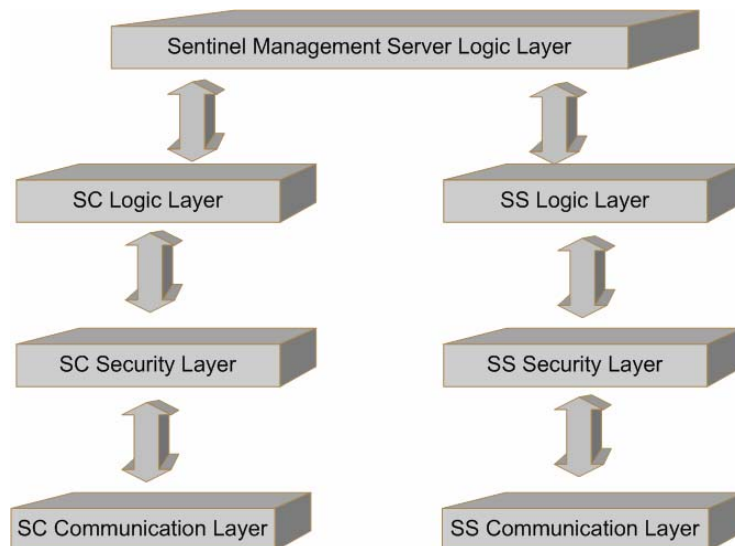


Figure 17: Layers of SMS

The figure above shows different layers of the SMS and how the message is sent between them. SC Logic/Security/Communication Layer is responsible for handling all the communication between SC and SMS and SS Logic/Security/Communication is responsible for handling all the communication between SS and SMS.

6 Sentinel Server

Sentinel Server (SS) is an embedded device called TINI that is installed in a house and connected to the SMS server through the internet. The main purpose of this server is to listen on the socket connection with SMS and upon receiving any request, analyze the request and convert this request to a format that CS can understand and send this converted message to CS. After sending the converted request to CS, examine where the request is executed successfully or not and then generate and send a response back to the SMS where the request is successful or not.

6.1 *Tiny Internet Interface (TINI)*

It is an embedded device developed by Dallas Semiconductor that has a Java virtual machine (version 1.1). It has lots of key features like 10/100 Base-T Ethernet Port, Two Serial Port (one Male and one Female), Dual 1-Wire Network Ports and CAN2.0B Port. It implements UDP, TCP, ARP and ICMP and also it supports both IPv4 and IPv6. For my project, I am using the Ethernet port to connect TINI to the internet and the Serial Port to connect the CS.

6.2 *1-Wire*

1-Wire is an alternative technology to a computer system; it is designed and developed by Dallas Semiconductors that allow us to connect multiple devices in a single wire. The 1-Wire uses only two cables, one for both power and communication and the other cable for ground. If you look at the picture below, you can see how appliances are connected in 1-Wire. Each of the appliances in the picture will have a unique 64-bit Factory-Lasered ID. This ID can be used to identify each 1-Wire device in the 1-Wire network. The first 8-bit of the ID also says the type of application it is.



Figure 18: Appliances on 1-wire

At the early stage of the project, I was thinking about using 1-Wire instead of CS to control the appliances, lights and the alarm. The problem with this is that if I use the 1-wire, I have to write lots of code at the low level in TINi and this will take about ~2 times the time it took to do this project. This is why I went and choose CS.

6.3 Comfort System

Comfort system is a home automation system developed by Cytech. It allows you to control and monitor your home security, home appliances and lighting using the keypad that comes with the system. The good thing about this comfort system is that it allows anyone to extend its functionality; example of this is adding a mobile interface. To extend and control the comfort system, you have to use a Universal Communications Model (UCM) which allows you to communicate with the comfort system. What this means is that you can't directly talk to a comfort system, to talk to a comfort system; you have to go through UCM. Comfort system has from 8-64 inputs and outputs depending on the type of system. Each of these inputs and outputs are configured when the system is installed in a home so the system know what's connected to each input and output. Example of input configuration could be that input one is configured to front door and example of output configuration could be that output one is configured to front light and output two is configured to the master heater. Example of this configuration file is shown in appendix c.

6.4 Security

To authenticate SS to SMS, I am currently sending the user name and base 64 encoded passwords from SS to SMS and SMS authenticate the SS using this. The reason why I didn't encrypt the communication between the SS and SMS is that I am unable to find any cryptography library for SS (TINI). To solve this problem I am currently changing the cryptography library I used in SC (java version 1.3) so it can be run in SS (java version 1.1). The problem is that I only manage to convert ~30% of the code to java version 1.1 but the rest is still to do. When the cryptography library is fully converted to version 1.1, the communication between the SS and SMS will be secured properly and all the three security threads will be solved.

6.5 Layers In Sentinel Server

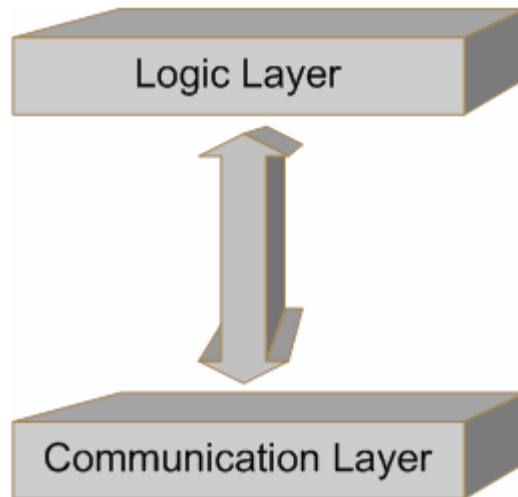


Figure 19: Sentinel Server Layers

Appendix E shows the reserved engineered class diagram of sentinel server. Figure above shows the two different layers that are in the Sentinel Server. The first layer is the logic layer and the second layer is the communication layer. There will be a third layer call the security layer between the logic and the communication layer once I completely convert the cryptography library to java version 1.1. The responsibility of the logic layer is to process the request it receives and generate a response for the request. First the request comes to the communication layer and the communication layer forwards this request to the logic layer and logic layer examines the request, sends the appropriate CS code to CS by calling the UCMCommunicator class and then it examines if the execution on CS is success. If the execution is not success, it tries to execute the code again. After that it generates a response stating where the request is executed successfully or not and return this response. Communication layer then forwards this response back to the SMS. UCMListener class in the logic layer is responsible for listening for all the events that happens in CS and when there is an intruder event, it alerts the SentinelServer class which sends a message to the SMS and SMS then sends a sms push message to SC. The communication layer is responsible for sending and receiving data between SS and SMS. When it receives a request form SMS, it pass the request to the upper layer and gets the response form the upper layer and pass it back to SMS.

7 How Is Everything Connected

When a user buys a Cytech comfort system, they are given an option to have a mobile interface to control their Cytech comfort system. If the user doesn't want the mobile interface, the Cytech technician just installs the comfort system without our mobile interface system which extends the comfort system. If the user wants the mobile user interface, the comfort system is installed and tested as if the user doesn't want the mobile interface. After all the configuration (appendix c) and the testing is done, one of the Cytech technician uploads a copy of the configuration file to the Sentinel Interface Server and Sentinel Interface Server gives a URL where the sentinel client application for the configuration file can be downloaded. Then the Cytech technician downloads and installs the CC application into all the users' mobile phone. Now the Cytech technician login to the sentinel management server and creates a user name and password for each user as well as a user name and password for the sentinel server. Now the Cytech technician uploads a copy of the configuration file and the user name and password into the sentinel server. Now connects the SS with CS using the UCM and restart the SS. Now the comfort system can be controlled by the mobile phone.

8 Mobile Platforms

8.1 Mobile Development Platforms

The requirement of the project was to build a home automation system that can be controlled using a low-end mobile phone. So first I have to decide which platform to use as there are many of them and with their own advantage and disadvantage. Below I compared most common platforms and provide reasons why I choose JAVA.

Some of the many mobile Development platforms

1. Java (Java Micro Edition)
2. Symbian (C++)
3. Python
4. Flash Lite (Action Script)
5. .NET Compact Framework (C#, VB.NET)
6. Micro Browser Based (XHTML (WAP 2.0), WML)
7. BREW (C)
8. and lots more

Different Platform Statistics

Different Mobile Platform VS total number (in millions) shifted at the end of 2005

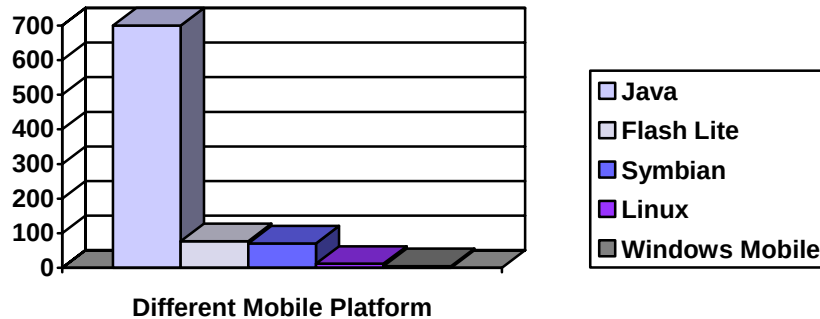


Figure 20: different platform statistics

The four main platforms out there that can be used to build mobile application

- 1) J2ME (java Micro Edition)
- 2) .NET Compact Framework
- 3) Flash Lite
- 4) Thin client using WAP

8.2 Comparison between .NET CF and J2ME (CDC and CLDC)

	.Net Compact Framework	J2ME Connected Device Configuration	J2ME Connected Limited Device Configuration
Portable code	Intermediate Language (IL)	Machine-independent byte code	
Security	Good	Good	
Portability	No	Yes	
Device requirement	Powerful	Powerful	Pervasive
Cost	High	High	Medium
Market focus	Enterprise	Enterprise	Consumer and enterprise
Platforms	Pocket PC, Windows CE	Major mobile platforms except Palm OS	All mobile platforms
Security model	Simplified .Net model	Full Java security manager	Limited Java 2 model supplemented by OTA specification
User interface	Rich subset of	Rich subset of	MIDP liquid crystal display

	Windows Forms	AWT (Abstract Windowing Toolkit), vendor-specific UI libraries	UI, PDA Profile subset of AWT, vendor-specific UI libraries
SMS	P/Invoke device SMS stack	Wireless Messaging API	Wireless Messaging API
Cryptography	Third-party APIs	Java Cryptography Extension and third-party libraries	Third-party libraries

Figure 20: comparison between J2ME and .NET CF

Both J2ME and .NET CF are excellent platform for developing mobile applications. Choosing any of the platforms depends on the type of application we are planning to develop. J2ME is the best platform for mobile solutions on low-end devices however developing and deploying applications can be both challenging and tedious. The .NET CF is simple and ensures low development cost. It is also well integrated within Microsoft's solutions and functionality. It is by far the platform of choice for developing high-end PDAs running on windows only platform. My aim is to build application for low end device with security and platform independent in mind. J2ME CLDC satisfies my requirements and will be the best option to choose it.

8.3 Comparison between Flash Lite and J2ME

The big advantage of Flash Lite is that in most cases it has the shorter development cycle compare to J2ME. The advantage with J2ME is that you can do lot more than what you can do with Flash Lite and it's widely supported. This is related to the level at which they work. J2ME is lower-level than the Flash Lite and requires to write more code but provide the flexibility to do more. For my purpose J2ME is the best option as it's widely supported and provides more functionalities than Flash Lite.

8.4 Comparison between WAP and J2ME

WAP is a browser based technology that allows user to browse WAP-enabled web sites. It is supported by almost all the modern phones and widely accepted. WAP supports some extra functionality like access to phone book where J2ME doesn't. The problem with WAP is that it's impossible to make nice interfaces with WAP. J2ME provides low-level graphics APIs than enable the programmer to control each pixel in the screen which makes it easy to make better user interface. It also provides high level graphics APIs which can be also used to make nice interfaces. The other problem with WAP is that the entire user interface has to be transmitted with the data, where in J2ME

only the data need to transmit and the J2ME client will already have the user interface information to display it. By only sending the data, we are able to reduce the usage charge. One of the new functionality in WAP 2.0 is WAP Push; WAP push allows the server to call the client. This WAP Push is a good way to send an alert to a client. The problem with WAP is that it takes time to set up the push proxy gateway (PPG); you may have to pay monthly fee to PPG provider and lots more issues we don't want to worry about. Instead I choose to use SMS push as an alternative to WAP Push.

8.5 Why did I choose J2ME?

1. Cross-Platform Development
2. Portable
3. Best platform for low-end mobile devices
4. shorter learning curve
5. free
6. large development community and support

The reason for choosing java is because it the best platform for low-end mobile devices and also has a large development community and support. The other reason is that is portable and shorter learning curve and also its free. All these characteristics make java as the ideal platform for my project.

9 Mobile Control Solutions (MCS Ltd)

This project is sponsored by the company called the Mobile Control Solution (MCS). MCS was founded in 2006 to develop new ways for humans to easily interact with their remote assets and information relating to important assets via mobile phone. MCS grew out of another business which was originally involved in remote weather stations utilized for crop weather and disease prediction models. Further development occurred in the utilization of short range radio monitoring systems and then cellular based remote monitoring and control prototypes. In 2005 a mobile phone based monitoring prototype was entered in the Prototype Section at the Mystery Creek Fieldays Innovation Park where it was selected for a Prototype Innovation Prize. From this encouraging start further work was done to improve designs and operation. In 2006 a patent was lodged for a text free way for humans to interact with remote assets via cell phone etc.

MCS is now engaged in developing products in the marine asset monitoring, mobile commerce, and remote control and monitoring sectors. The focus is on developing new and easier ways for humans to use their mobile phones/internet to remotely control, monitor and interact with remote assets, information and services. A number of hardware platforms are utilized to facilitate the operation of Sentinel Mobile products. Typically systems utilize a compact cell phone OEM module with integrated microprocessor, optimized I/O, power supply and several serial communications modalities including RS485, RS232 and Dallas 1 wire. MCS believes that mobile device technologies and related applications will continue to grow in many more areas. MCS major focus is the human interface to mobile devices. This involves optimizing informatics and human interface to mobile devices by the innovative use of application software in mobile phone and related devices.

10 Conclusion

I start this report by talking about different home automation systems that are in the market that can be controlled by a mobile phone and what are their disadvantages. My aim was to solve this and I achieve this by providing a nice graphical user interface so that the user doesn't have to remember the sms text message command and also using HTTP instead of sms to provide an instance feedback on the user request. The user interface looks good and doesn't freeze and also the look and feel of the user interface is described in the CSS file which means it's easily changeable. Then I talked about the need of the static IP address for the SS and the disadvantage of having it and how I solved this problem. Then I talked about SC and why the user interface is created dynamically and how it's created. Then I discussed about SMS and SS and then discussed why I choose Java as the development platform over the other possible options. These discussions describe the factors that driven me to design the system as it is and their advantage and disadvantage.

It was an interesting and a long project as it requires quit lot of planning and coding. The key thing I learned from this project is that clear picture of the project is a key determinant in completion of the project. Clear picture of the project is a key determinant in the completion of the project but clear design in the key determinant is the progress of the project. Why I am saying this is because I actually learn this from this project, if I don't have a clear picture of the project, then I cant plan the project which leads to unable to complete the project. Even if I have a clear picture, if I don't have a proper design, then I can't progress in my project because the code is so messed up that I don't even know what the hell is going on. These are the two main things I learned form the project, but there are some little things I learned including documentation (using Javadoc) and testing (using JUnit) which I never done before.

The project was a success from my point of view as I learned quite lots of things and got some experience in the industry. It was a success project from the company's point of view because the company is in the process of testing this system in a real environment. Even though I didn't fully complete the project, the company is keen on testing the system because they know that securing the communication line between SS and SMS can be done at a later time.

11 Reference

1. Name: Pacific LANWorks Pte Ltd
URL: https://store.pacificlanworks.net/hspc/plans.php?type_id=1
2. Name: Telecom
URL: http://telecom.custhelp.com/cgi-bin/telecom.cfg/php/enduser/std_alp.php?p_sid=m-OHszNi&p_accessibility=&p_lva=1270&p_no_ct=1&p_sp=cF9zcmNoPTEmcF9zb3J0X2J5PSZwX2dyaWRzb3J0PSZwX3Jvd19jbnQ9MjAmcF9wcm9kc20yMDImcF9jYXRzPSZwX3B2PTEuMjAyJnBfY3Y9JnBfcGFnZT0xJnBfc2VhcmNoX3RleHQ9U3RhZGljIEIQ&p_li=
3. Name: TINI Networked microcontrollers
URL: <http://www.maxim-ic.com/products/microcontrollers/tini/>
4. Name: The Rabbit 400 processor
URL: <http://www.rabbit.com/documentation/docs/manuals/Rabbit4000/UsersManual/index.htm>
5. Name: JStamp
URL: <http://jstamp.systronix.com/info.htm>
6. Name: Mobile development
URL: http://en.wikipedia.org/wiki/Mobile_development
7. Name: Advanced Encryption Standard
URL: http://en.wikipedia.org/wiki/Advanced_Encryption_Standard
8. Name: Bluetooth
URL: <http://en.wikipedia.org/wiki/Bluetooth>
9. Name: Mobile phone usage doubles since 200, but growth to slow
URL: <http://www.infosyncworld.com/news/n/5636.html>
10. Name: Home Automation SMS control with Compulogics LinkTx
URL: <http://www.slashphone.com/113/3087.html>
11. Name: DPS Promatic
URL: <http://www.dpspro.com/tcs.html>

12 Appendix

12.1 Appendix A (an example of user interface XML file)

```
- <comfort>
- <controlgroup ControlGroup="0" Phrase="Lights">
- <menu Menu="0" Phrase="All Lights" FeedbackType="None">
  <key Key="0" Phrase="Off" Response="AllLightsOff" />
  <key Key="1" Phrase="On" Response="AllLightsOn" />
</menu>
- <menu Menu="1" Phrase="Gate Front Light" FeedbackType="Zone"
  Feedback="GateFrontLight">
  <key Key="0" Phrase="Off" Response="GateLgtOff" />
  <key Key="1" Phrase="On" Response="GateLgtOn" />
</menu>
- <menu Menu="2" Phrase="Carporch Light" FeedbackType="Zone"
  Feedback="PorchLight">
  <key Key="0" Phrase="Off" Response="CarLgt1Off" />
  <key Key="1" Phrase="On" Response="CarLgt1On" />
</menu>
- <menu Menu="3" Phrase="Garage Light" FeedbackType="Zone"
  Feedback="GarageLight">
  <key Key="0" Phrase="Off" Response="CarLgt2Off" />
  <key Key="1" Phrase="On" Response="CarLgt2On" />
</menu>
- <menu Menu="4" Phrase="Living Room Scene" FeedbackType="None">
  <key Key="0" Phrase="All Off" Response="AllOffSOP1" />
  <key Key="1" Phrase="1" Response="S1OP1" />
  <key Key="2" Phrase="2" Response="S2OP1" />
  <key Key="3" Phrase="3" Response="S3OP1" />
  <key Key="4" Phrase="4" Response="S4OP1" />
  <key Key="5" Phrase="5" Response="S5OP1" />
</menu>
- <menu Menu="5" Phrase="Dining Room Scene" FeedbackType="None">
  <key Key="0" Phrase="All Off" Response="AllOffSOP2" />
  <key Key="1" Phrase="1" Response="S1OP2" />
  <key Key="2" Phrase="2" Response="S2OP2" />
  <key Key="3" Phrase="3" Response="S3OP2" />
  <key Key="4" Phrase="4" Response="S4OP2" />
  <key Key="5" Phrase="5" Response="S5OP2" />
</menu>
- <menu Menu="6" Phrase="Master Bedroom Scene" FeedbackType="None">
  <key Key="0" Phrase="All Off" Response="AllOffSOP3" />
  <key Key="1" Phrase="1" Response="S1OP3" />
  <key Key="2" Phrase="2" Response="S2OP3" />
  <key Key="3" Phrase="3" Response="S3OP3" />
```



```

<key Key="4" Phrase="4" Response="S4OP3" />
<key Key="5" Phrase="5" Response="S5OP3" />
</menu>
- <menu Menu="7" Phrase="Bedroom 3 Scene" FeedbackType="None">
  <key Key="0" Phrase="All Off" Response="AllOffSOP4" />
  <key Key="1" Phrase="1" Response="S1OP4" />
  <key Key="2" Phrase="2" Response="S2OP4" />
  <key Key="3" Phrase="3" Response="S3OP4" />
  <key Key="4" Phrase="4" Response="S4OP4" />
  <key Key="5" Phrase="5" Response="S5OP4" />
  </menu>
</controlgroup>
- <controlgroup ControlGroup="1" Phrase="Airconditioner">
- <menu Menu="10" Phrase="All Airconditioner" FeedbackType="None">
  <key Key="0" Phrase="Off" Response="AllACOff" />
  <key Key="1" Phrase="On" Response="AllACOn" />
  </menu>
- <menu Menu="11" Phrase="Living Airconditioner" FeedbackType="Zone"
  Feedback="LivingAirconditi">
  <key Key="0" Phrase="Off" Response="LRACOff" />
  <key Key="1" Phrase="On" Response="LRACOn" />
  </menu>
- <menu Menu="12" Phrase="Dining Airconditioner" FeedbackType="Zone"
  Feedback="DiningAirconditi">
  <key Key="0" Phrase="Off" Response="DRACOff" />
  <key Key="1" Phrase="On" Response="DRACOn" />
  </menu>
- <menu Menu="13" Phrase="Master Airconditioner 1" FeedbackType="Zone"
  Feedback="MasterAirconditi">
  <key Key="0" Phrase="Off" Response="MBAC1Off" />
  <key Key="1" Phrase="On" Response="MBAC1On" />
  </menu>
- <menu Menu="14" Phrase="Master Airconditioner 2" FeedbackType="Zone"
  Feedback="MasterAircondit0">
  <key Key="0" Phrase="Off" Response="MBAC2Off" />
  <key Key="1" Phrase="On" Response="MBAC2On" />
  </menu>
- <menu Menu="15" Phrase="Bedroom 2 Airconditioner" FeedbackType="Zone"
  Feedback="Bedroom2Aircondi">
  <key Key="0" Phrase="Off" Response="BR2ACOff" />
  <key Key="1" Phrase="On" Response="BR2ACOn" />
  </menu>
- <menu Menu="16" Phrase="Corridor Airconditioner" FeedbackType="Zone"
  Feedback="CorridorAircondi">
  <key Key="0" Phrase="Off" Response="2ndPorchACOff" />
  <key Key="1" Phrase="On" Response="2ndPorchACOn" />
  </menu>
- <menu Menu="17" Phrase="Bedroom 3 Airconditioner 1"
  FeedbackType="Zone" Feedback="Bedroom3Aircondi">
  <key Key="0" Phrase="Off" Response="BR3AC1Off" />

```

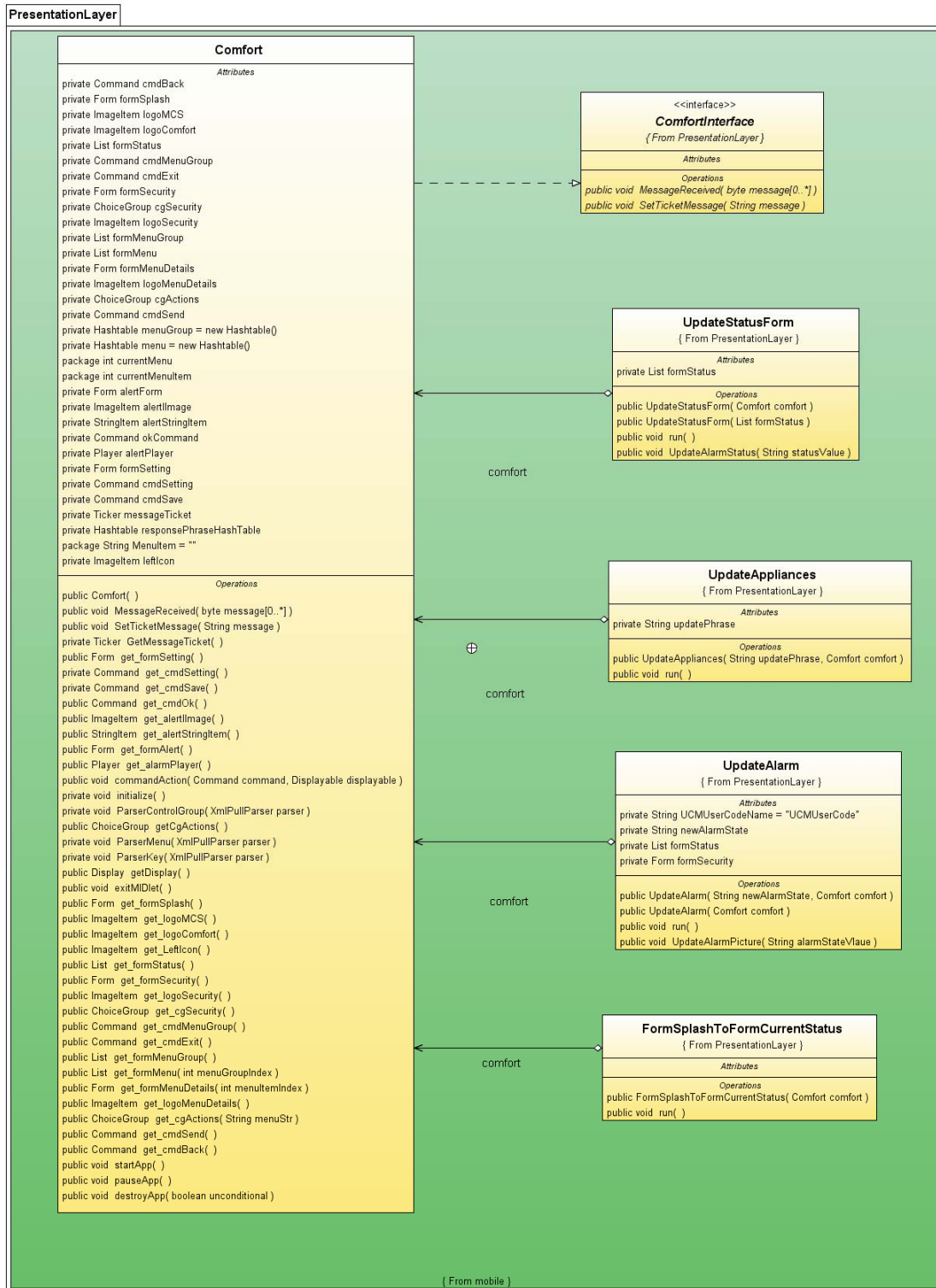
```

    <key Key="1" Phrase="On" Response="BR3AC1On" />
  </menu>
- <menu Menu="18" Phrase="Bedroom 3 Airconditioner 2"
  FeedbackType="Zone" Feedback="Bedroom3Aircond0">
  <key Key="0" Phrase="Off" Response="BR3AC2Off" />
  <key Key="1" Phrase="On" Response="BR3AC2On" />
  </menu>
</controlgroup>
- <controlgroup ControlGroup="2" Phrase="Gate">
- <menu Menu="20" Phrase="Main Gate" FeedbackType="None">
  <key Key="1" Phrase="Open Close" Response="GateClose" />
  </menu>
</controlgroup>
- <controlgroup ControlGroup="3" Phrase="Vergola">
- <menu Menu="30" Phrase="All Vergola" FeedbackType="None">
  <key Key="0" Phrase="Close" Response="AllVergolaClose" />
  <key Key="1" Phrase="Open" Response="AllVergolaOpen" />
  </menu>
- <menu Menu="31" Phrase="Carporch Vergola" FeedbackType="None">
  <key Key="0" Phrase="Close" Response="1stVergolaClose" />
  <key Key="1" Phrase="Open" Response="1stVergolaOpen" />
  </menu>
- <menu Menu="32" Phrase="Garden Vergola" FeedbackType="None">
  <key Key="0" Phrase="Close" Response="2ndVergolaClose" />
  <key Key="1" Phrase="Open" Response="2ndVergolaOpen" />
  </menu>
</controlgroup>
- <controlgroup ControlGroup="4" Phrase="Heater">
- <menu Menu="40" Phrase="All Heater" FeedbackType="None">
  <key Key="0" Phrase="Off" Response="AllHeatersOff" />
  <key Key="1" Phrase="On" Response="AllHeatersOn" />
  </menu>
- <menu Menu="41" Phrase="1st Floor Toilet Heater" FeedbackType="Zone"
  Feedback="1stFloorToiletHe">
  <key Key="0" Phrase="Off" Response="1stHeaterOff" />
  <key Key="1" Phrase="On" Response="1stHeaterOn" />
  </menu>
- <menu Menu="42" Phrase="Master Heater" FeedbackType="Zone"
  Feedback="MasterHeater">
  <key Key="0" Phrase="Off" Response="MBHeaterOff" />
  <key Key="1" Phrase="On" Response="MBHeaterOn" />
  </menu>
- <menu Menu="43" Phrase="Bath 2 Heater" FeedbackType="Zone"
  Feedback="Bath2Heater">
  <key Key="0" Phrase="Off" Response="BR2HeaterOff" />
  <key Key="1" Phrase="On" Response="BR2HeaterOn" />
  </menu>
- <menu Menu="44" Phrase="Bath 3 Heater" FeedbackType="Zone"
  Feedback="Bath3Heater">

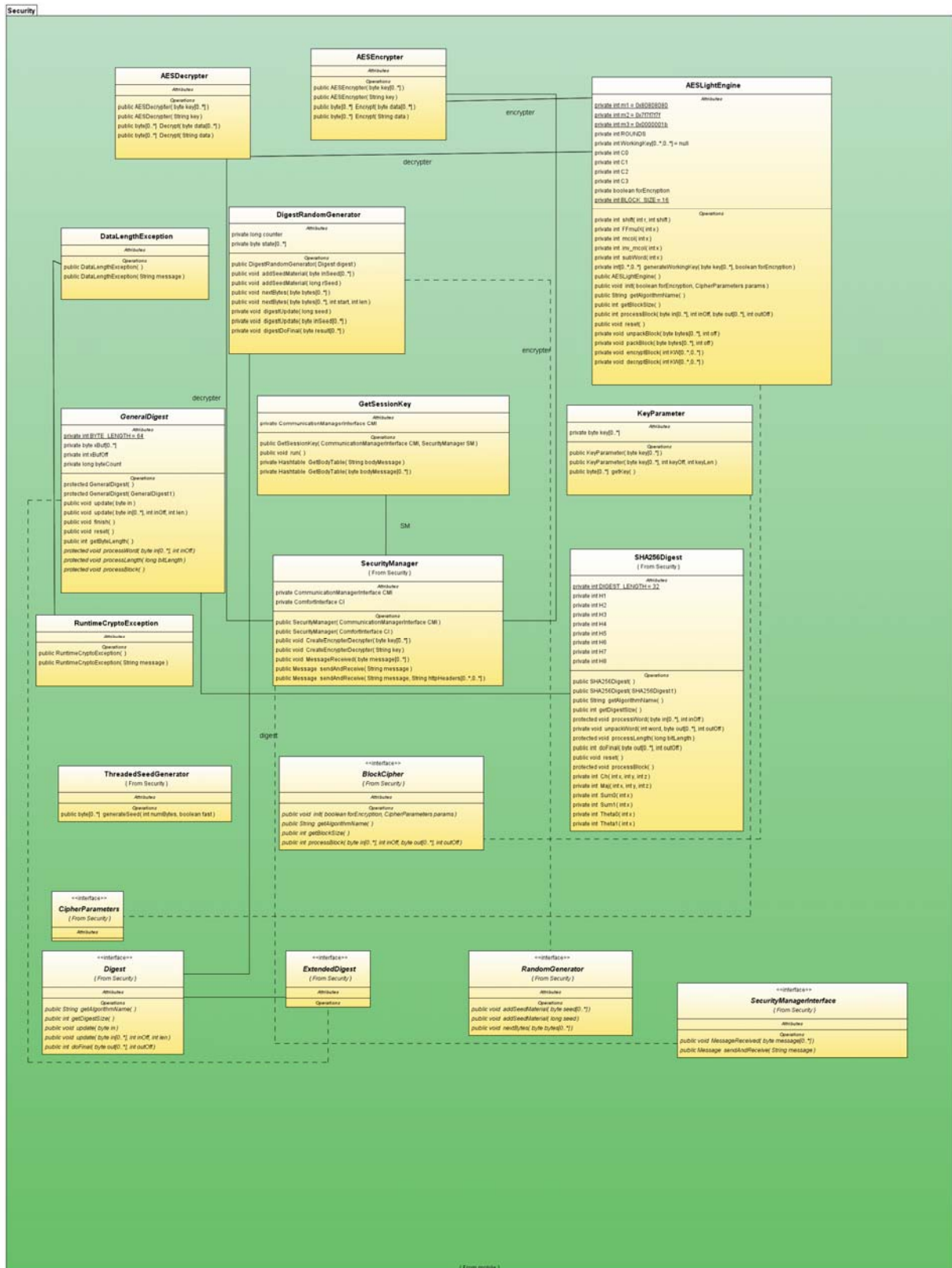
```

```
<key Key="0" Phrase="Off" Response="AtticHeaterOff" />
<key Key="1" Phrase="On" Response="AtticHeaterOn" />
  </menu>
</controlgroup>
</comfort>
```

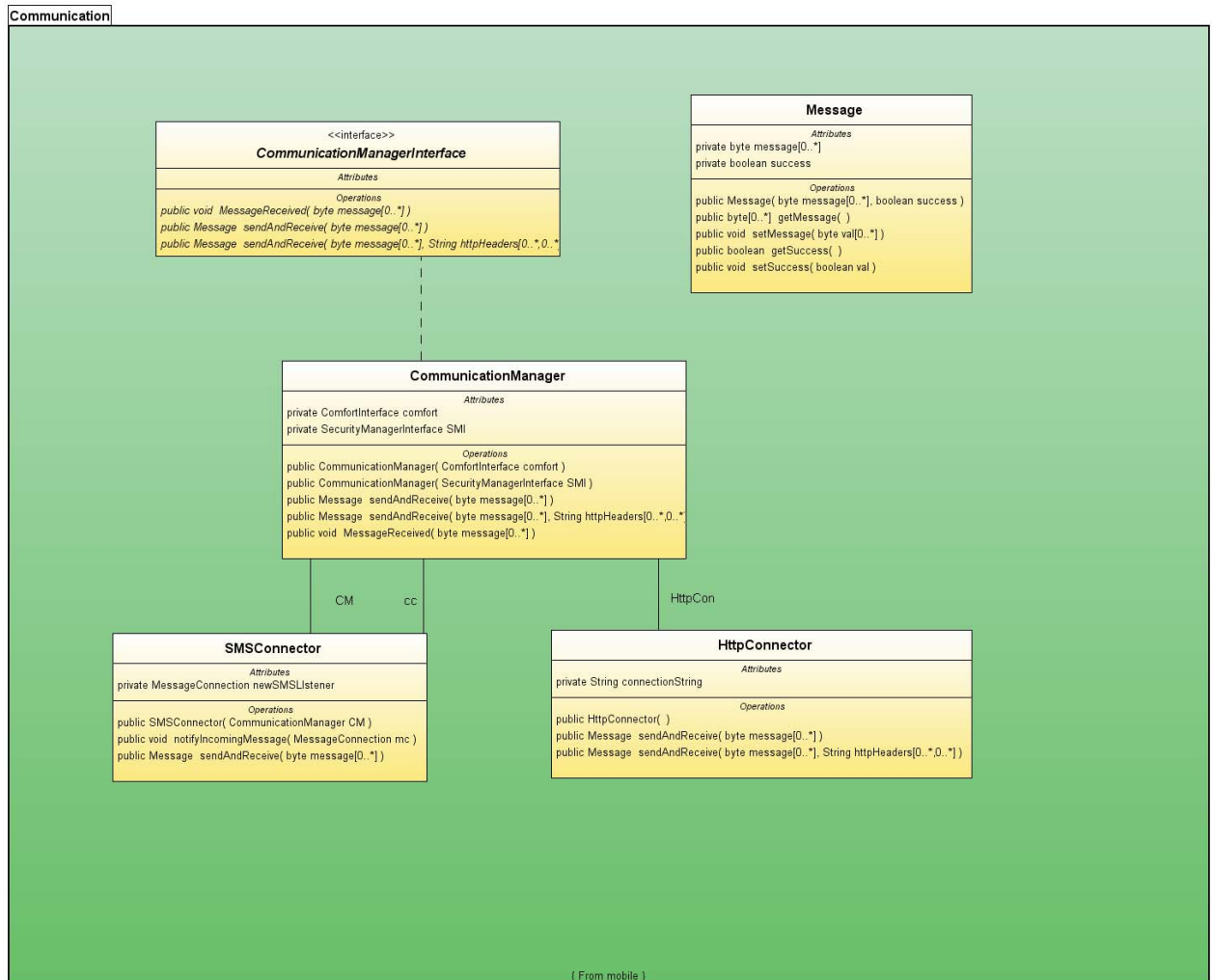
12.2 Appendix B (Sentinel Client Class Diagram)



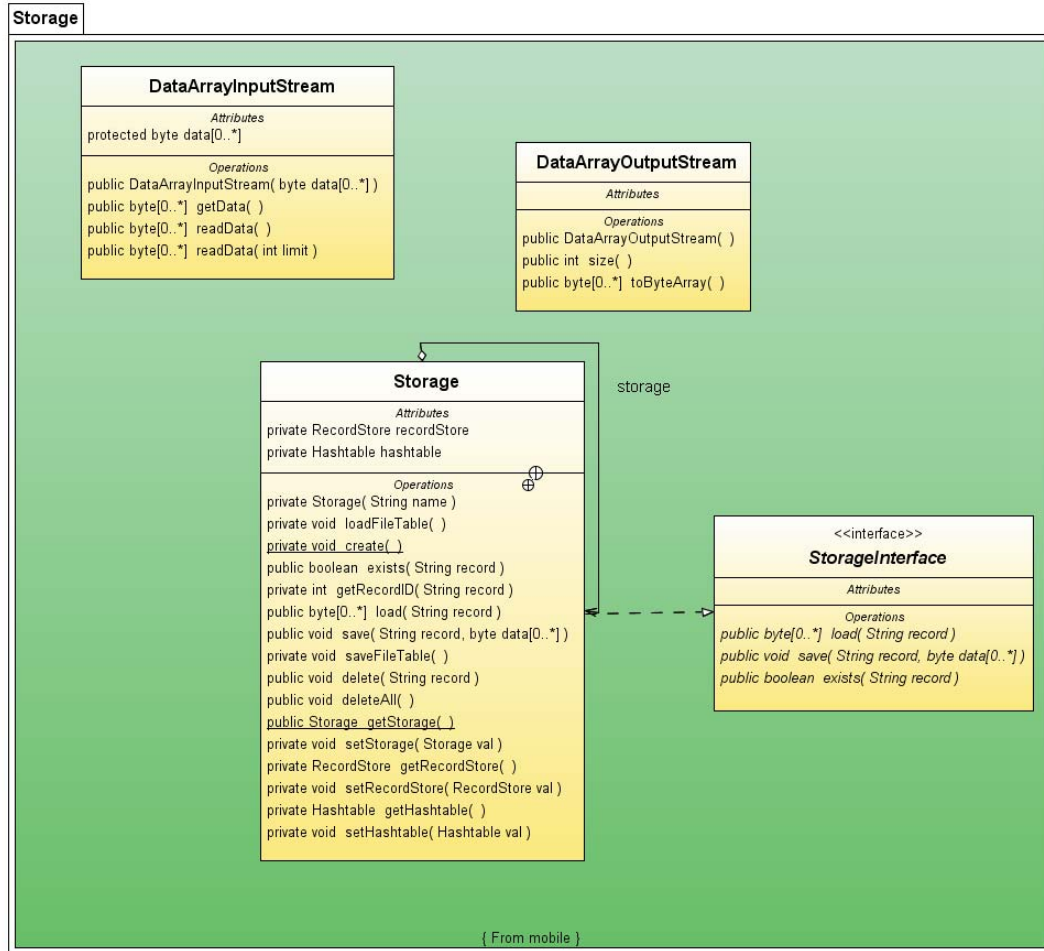
Reversed Engineered Presentation Layer



Reversed Engineered Security Layer



Reversed Engineered Communication Layer



Reversed Engineered Storage Layer

12.3 Appendix C (an example of CS configuration file)

```
! Comfort Version
! =====
Version=24

! Vocab
! =====
Vocab="Standard Residential"

! Installation Information
! =====
CustomerName=""
Address1=""
Address2=""
Address3=""
Address4=""
HomePhone=""
OfficePhone=""
Reference=""
Comments=""

! Modules
! =====
Slaves=1
DoorStations=0
Keypads=2
UCM=1
Switches=1
TimeAdjust=0

! Voice Settings
! =====
KPVoiceLevel=6
VoiceMenuVolume=6
VoiceMenuSpeed=6
OffWordNumber=229
RecordLevel=3
DSVoiceLevel=2

! Configuration Flags
! =====
WaitForDialTone=Yes
IgnoreLineCut=Yes
PABX=No
```


ForceArm=Yes
HearAnnouncements=No
SirenReverse=No
RGR02=Yes
PhoneVoltsFromRinger=Yes
SeizeLineForDialouts=No
DisableVoiceOnDS=Yes
LEM03=No
RepeatAlarmZoneOnKP=Yes
CallScreening=Yes
AnsweringMachineBypass=No

! IR Codes

! =====

IrCode=IrCode01, Device="Clipsal SceneMaster (CD)", Operation="Scene1"
IrCode=IrCode02, Device="Clipsal SceneMaster (CD)", Operation="Scene2"
IrCode=IrCode03, Device="Clipsal SceneMaster (CD)", Operation="Scene3"
IrCode=IrCode04, Device="Clipsal SceneMaster (CD)", Operation="Scene4"
IrCode=IrCode05, Device="Clipsal SceneMaster (CD)", Operation="Scene5"
IrCode=IrCode06, Device="Clipsal SceneMaster (CD)", Operation="All OFF"

! Tuning Parameters

! =====

Tuning=4, Value=11264
Tuning=5, Value=12
Tuning=6, Value=2
Tuning=7, Value=15
Tuning=8, Value=1
Tuning=9, Value=8192
Tuning=10, Value=8
Tuning=11, Value=-1
Tuning=12, Value=500
Tuning=13, Value=-1
Tuning=14, Value=-1
Tuning=15, Value=-1
Tuning=16, Value=8
Tuning=17, Value=-1
Tuning=18, Value=200
Tuning=19, Value=80
Tuning=20, Value=40
Tuning=21, Value=6
Tuning=22, Value=3
Tuning=23, Value=500
Tuning=24, Value=4
Tuning=25, Value=-1
Tuning=26, Value=1

Tuning=27, Value=82
Tuning=28, Value=-1
Tuning=29, Value=-1
Tuning=30, Value=-1
Tuning=31, Value=0
Tuning=32, Value=2047
Tuning=33, Value=2730
Tuning=34, Value=16000
Tuning=35, Value=281
Tuning=36, Value=16000
Tuning=37, Value=-16000
Tuning=38, Value=16000
Tuning=39, Value=-16000
Tuning=40, Value=1
Tuning=41, Value=1
Tuning=42, Value=6
Tuning=43, Value=-127
Tuning=44, Value=-127
Tuning=45, Value=-1
Tuning=46, Value=-1
Tuning=47, Value=-1
Tuning=48, Value=-1
Tuning=49, Value=-1
Tuning=50, Value=-1
Tuning=51, Value=-1
Tuning=52, Value=-1
Tuning=53, Value=-1
Tuning=54, Value=-1
Tuning=55, Value=-1
Tuning=56, Value=-1
Tuning=57, Value=-1
Tuning=58, Value=-1
Tuning=59, Value=-1
Tuning=60, Value=-1
Tuning=61, Value=-1

! Late Additions

! =====

! Inputs/Zones

! =====

Zone=FrontDoor,

Number=1, Type=EntryDoor, EntryPath=Yes, Restore=No, Phrase=Front+Door

Zone=MainGate,

Number=2, Type=SwitchNO, EntryPath=No, Restore=No, Phrase=Main+Gate

Zone=LivingHallEntry,

Number=3, Type=DoorWindow, EntryPath=No, Restore=No,
 Phrase=Living+Hall+Entry
 Zone=MasterBedroomWin,
 Number=4, Type=DoorWindow, EntryPath=No, Restore=No,
 Phrase=Master+Bedroom+Window
 Zone=Bedroom2Window,
 Number=5, Type=DoorWindow, EntryPath=No, Restore=No,
 Phrase=Bedroom+2+Window
 Zone=Bedroom3Door,
 Number=6, Type=DoorWindow, EntryPath=No, Restore=No,
 Phrase=Bedroom+3+Door
 Zone=AtticWindowAndDo,
 Number=7, Type=DoorWindow, EntryPath=No, Restore=No,
 Phrase=Attic+Window+And+Door
 Zone=BasementWindow,
 Number=8, Type=DoorWindow, EntryPath=No, Restore=No,
 Phrase=Basement+Window
 Zone=KitchenDoorAndWi,
 Number=9, Type=DoorWindow, EntryPath=No, Restore=No,
 Phrase=Kitchen+Door+And+Window
 Zone=GarageRainSensor,
 Number=10, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Garage+Rain+Sensor
 Zone=GardenRainSensor,
 Number=11, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Garden+Rain+Sensor
 Zone=LivingMovementDe,
 Number=12, Type=ImmediateAway, EntryPath=No, Restore=No,
 Phrase=Living+Movement+Detector
 Zone=PanicSwitch,
 Number=13, Type=Panic, EntryPath=No, Restore=No, Phrase=Panic+Switch
 Zone=GateFrontLight,
 Number=14, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Gate+Front+Light
 Zone=BasementGateLigh,
 Number=15, Type=SwitchNO, EntryPath=No, Restore=No,
 OnResponse=GateLgtSwitch1On, OffResponse=GateLgtSwitch1Of,
 Phrase=Basement+Gate+Light+Switch
 Zone=PorchLight,
 Number=16, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Porch+Light
 Zone=CorridorGateLigh,
 Number=17, Type=SwitchNO, EntryPath=No, Restore=No,
 OnResponse=GateLgtSwitch1On, OffResponse=GateLgtSwitch1Of,
 Phrase=Corridor+Gate+Light+Switch
 Zone=GarageLight,

Number=18, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Garage+Light
 Zone=SecurityOn,
 Number=19, Type=SwitchNO, EntryPath=No, Restore=No,
 OnResponse=AutoArmAway, Phrase=Security+On
 Zone=LivingAirconditi,
 Number=20, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Living+Airconditioner
 Zone=DiningAirconditi,
 Number=21, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Dining+Airconditioner
 Zone=MasterAirconditi,
 Number=22, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Master+Airconditioner+1
 Zone=MasterAircondit0,
 Number=23, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Master+Airconditioner+2
 Zone=Bedroom2Aircondi,
 Number=24, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Bedroom+2+Airconditioner
 Zone=CorridorAircondi,
 Number=25, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Corridor+Airconditioner
 Zone=Bedroom3Aircondi,
 Number=26, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Bedroom+3+Airconditioner+1
 Zone=Bedroom3Aircond0,
 Number=27, Type=DigitalNO, EntryPath=No, Restore=No,
 Phrase=Bedroom+3+Airconditioner+2
 Zone=1stFloorToiletHe,
 Number=28, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=1st+Floor+Toilet+Heater
 Zone=MasterHeater,
 Number=29, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Master+Heater
 Zone=Bath2Heater,
 Number=30, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Bath+2+Heater
 Zone=Bath3Heater,
 Number=31, Type=SwitchNO, EntryPath=No, Restore=No,
 Phrase=Bath+3+Heater
 Zone=SecurityOff,
 Number=32, Type=SwitchNO, EntryPath=No, Restore=No,
 OnResponse=Disarm, Phrase=Security+Off
 Zone=Untitled,
 Number=33, Type=, EntryPath=No, Restore=No, Phrase=

Zone=Untitled0,
Number=34, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled1,
Number=35, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled2,
Number=36, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled3,
Number=37, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled4,
Number=38, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled5,
Number=39, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled6,
Number=40, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled7,
Number=41, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled8,
Number=42, Type=, EntryPath=No, Restore=No, Phrase=
Zone=Untitled9,
Number=43, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledA,
Number=44, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledB,
Number=45, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledC,
Number=46, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledD,
Number=47, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledE,
Number=48, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledF,
Number=49, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledG,
Number=50, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledH,
Number=51, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledI,
Number=52, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledJ,
Number=53, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledK,
Number=54, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledL,
Number=55, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledM,
Number=56, Type=, EntryPath=No, Restore=No, Phrase=

Zone=UntitledN,
Number=57, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledO,
Number=58, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledP,
Number=59, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledQ,
Number=60, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledR,
Number=61, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledS,
Number=62, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledT,
Number=63, Type=, EntryPath=No, Restore=No, Phrase=
Zone=UntitledU,
Number=64, Type=, EntryPath=No, Restore=No, Phrase=

! Zone Types

! =====

ZoneType=DoorWindow,
HomeMode=Disabled, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Intruder,
AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
Hr24=No, Sensitivity=500
ZoneType=EntryDoor,
HomeMode=Disabled, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Intruder,
AlarmTypeTrouble=Intruder, EntryDoor=Yes, Digital=No,
NormallyOpen=No, Hr24=No, Sensitivity=500
ZoneType=AlertNightAway,
HomeMode=Disabled, AwayMode=Alert, NightMode=Alert, DayMode=Disabled,
AlarmTypeNormal=ZoneAlert, AlarmTypeTrouble=Intruder, EntryDoor=No,
Digital=No, NormallyOpen=No, Hr24=No, Sensitivity=500
ZoneType=AlertAway,
HomeMode=Disabled, AwayMode=Alert, NightMode=Disabled,
DayMode=Disabled, AlarmTypeNormal=ZoneAlert,
AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
Hr24=No, Sensitivity=500
ZoneType=InstantNightAway,
HomeMode=Disabled, AwayMode=Immediate, NightMode=Immediate,
DayMode=Disabled, AlarmTypeNormal=Intruder,
AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
Hr24=No, Sensitivity=500
ZoneType=AlertVibration,
HomeMode=Disabled, AwayMode=Alert, NightMode=Alert, DayMode=Alert,
AlarmTypeNormal=ZoneAlert, AlarmTypeTrouble=Intruder, EntryDoor=No,

Digital=No, NormallyOpen=No, Hr24=No, Sensitivity=50
ZoneType=ArmedVibration,
HomeMode=Disabled, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Intruder,
AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
Hr24=No, Sensitivity=50
ZoneType=SwitchNO,
HomeMode=Disabled, AwayMode=Disabled, NightMode=Disabled,
DayMode=Disabled, AlarmTypeNormal=, AlarmTypeTrouble=ZoneTrouble,
EntryDoor=No, Digital=No, NormallyOpen=Yes, Hr24=No, Sensitivity=100
ZoneType=MonitorNO,
HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=FamilyCare,
AlarmTypeTrouble=ZoneTrouble, EntryDoor=No, Digital=No,
NormallyOpen=Yes, Hr24=No, Sensitivity=500
ZoneType=FireNO,
HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Fire,
AlarmTypeTrouble=ZoneTrouble, EntryDoor=No, Digital=No,
NormallyOpen=Yes, Hr24=No, Sensitivity=500
ZoneType=GasNC,
HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Gas,
AlarmTypeTrouble=ZoneTrouble,
EntryDoor=No, Digital=No, NormallyOpen=No, Hr24=No, Sensitivity=500
ZoneType=Panic,
HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Panic, AlarmTypeTrouble=Tamper,
EntryDoor=No, Digital=No, NormallyOpen=No, Hr24=No, Sensitivity=500
ZoneType=ArmedTamper,
HomeMode=Disabled, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Tamper, AlarmTypeTrouble=Tamper,
EntryDoor=No, Digital=No, NormallyOpen=No, Hr24=No, Sensitivity=500
ZoneType=PerimNightAway,
HomeMode=Disabled, AwayMode=Perimeter, NightMode=Perimeter,
DayMode=Disabled, AlarmTypeNormal=Perimeter,
AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
Hr24=No, Sensitivity=500
ZoneType=GlassBreak,
HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
DayMode=Immediate, AlarmTypeNormal=Intruder,
AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
Hr24=No, Sensitivity=500
ZoneType=PerimVibration,
HomeMode=Disabled, AwayMode=Perimeter, NightMode=Perimeter,
DayMode=Perimeter, AlarmTypeNormal=Perimeter,

AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
 Hr24=No, Sensitivity=50
 ZoneType=MonitorNC,
 HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Immediate, AlarmTypeNormal=FamilyCare,
 AlarmTypeTrouble=ZoneTrouble, EntryDoor=No, Digital=No,
 NormallyOpen=No, Hr24=No, Sensitivity=500
 ZoneType=ImmediateAway,
 HomeMode=Disabled, AwayMode=Immediate, NightMode=Disabled,
 DayMode=Disabled, AlarmTypeNormal=Intruder,
 AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
 Hr24=No, Sensitivity=500
 ZoneType=24HourVibration,
 HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Immediate, AlarmTypeNormal=Intruder,
 AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
 Hr24=No, Sensitivity=50
 ZoneType=24HourTamper,
 HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Immediate, AlarmTypeNormal=Tamper, AlarmTypeTrouble=Tamper,
 EntryDoor=No, Digital=No, NormallyOpen=No, Hr24=No, Sensitivity=500
 ZoneType=DoorBell,
 HomeMode=Disabled, AwayMode=Immediate, NightMode=Disabled,
 DayMode=Disabled, AlarmTypeNormal=Doorbell,
 AlarmTypeTrouble=ZoneTrouble, EntryDoor=No, Digital=No,
 NormallyOpen=Yes, Hr24=No, Sensitivity=200
 ZoneType=Disarm,
 HomeMode=Disabled, AwayMode=Disabled, NightMode=Disabled,
 DayMode=Disabled, AlarmTypeNormal=Disarm,
 AlarmTypeTrouble=ZoneTrouble, EntryDoor=No, Digital=No,
 NormallyOpen=Yes, Hr24=No, Sensitivity=100
 ZoneType=FireNC,
 HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Immediate, AlarmTypeNormal=Fire,
 AlarmTypeTrouble=ZoneTrouble, EntryDoor=No, Digital=No,
 NormallyOpen=No, Hr24=No, Sensitivity=500
 ZoneType=SwitchNC,
 HomeMode=Disabled, AwayMode=Disabled, NightMode=Disabled,
 DayMode=Disabled, AlarmTypeNormal=, AlarmTypeTrouble=ZoneTrouble,
 EntryDoor=No, Digital=No, NormallyOpen=No, Hr24=No, Sensitivity=100
 ZoneType=Vibr100msArmed,
 HomeMode=Disabled, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Immediate, AlarmTypeNormal=Intruder,
 AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
 Hr24=No, Sensitivity=100
 ZoneType=24HourZoneNC,

HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Immediate, AlarmTypeNormal=Intruder,
 AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
 Hr24=No, Sensitivity=500
 ZoneType=24HourZoneNO,
 HomeMode=Immediate, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Immediate, AlarmTypeNormal=Intruder,
 AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No,
 NormallyOpen=Yes, Hr24=No, Sensitivity=500
 ZoneType=Vibr50msAwayNigh,
 HomeMode=Disabled, AwayMode=Immediate, NightMode=Immediate,
 DayMode=Disabled, AlarmTypeNormal=Intruder,
 AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
 Hr24=No, Sensitivity=50
 ZoneType=Vibr20msAwayNigh,
 HomeMode=Disabled, AwayMode=Disabled, NightMode=Disabled,
 DayMode=Disabled, AlarmTypeNormal=Intruder,
 AlarmTypeTrouble=Intruder, EntryDoor=No, Digital=No, NormallyOpen=No,
 Hr24=No, Sensitivity=20
 ZoneType=DigitalNC,
 HomeMode=Disabled, AwayMode=Disabled, NightMode=Disabled,
 DayMode=Disabled, AlarmTypeNormal=, AlarmTypeTrouble=, EntryDoor=No,
 Digital=Yes, NormallyOpen=No, Hr24=No, Sensitivity=100
 ZoneType=DigitalNO,
 HomeMode=Disabled, AwayMode=Disabled, NightMode=Disabled,
 DayMode=Disabled, AlarmTypeNormal=, AlarmTypeTrouble=, EntryDoor=No,
 Digital=Yes, NormallyOpen=Yes, Hr24=No, Sensitivity=100

! Alarm Types

! =====

AlarmType=Intruder,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=30, CmsRestoreCode=30, ClassCode=1, Phrase=101,
 Strobe=Yes, SirenType=Intruder, SirenDelay=No, AlarmState=Alarm
 AlarmType=Duress,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=21, CmsRestoreCode=FF, ClassCode=1, Phrase=103,
 Strobe=No, SirenDelay=No, AlarmState=Alarm
 AlarmType=LineCut,
 DialOut=No, CmsReportCode=FF, CmsRestoreCode=FF, ClassCode=3,
 Phrase=104, Strobe=No, SirenType=ShortTrouble, SirenDelay=No,
 AlarmState=Trouble
 AlarmType=ArmFail,
 DialOut=No, CmsReportCode=06, CmsRestoreCode=FF, ClassCode=4,
 Phrase=8, Strobe=Yes, SirenType=ArmFail, SirenDelay=No,
 AlarmState=Alarm

AlarmType=ZoneTrouble,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=70, CmsRestoreCode=70, ClassCode=3, Phrase=105,
 Strobe=No, SirenType=ShortTrouble, SirenDelay=No, AlarmState=Trouble
 AlarmType=ZoneAlert,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=32, CmsRestoreCode=FF, ClassCode=1, Phrase=106,
 Strobe=No, SirenDelay=No, AlarmState=Alert
 AlarmType=LowBattery,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=02, CmsRestoreCode=02, ClassCode=3, Phrase=108,
 Strobe=No, SirenType=ShortTrouble, SirenDelay=No, AlarmState=Trouble
 AlarmType=PowerFail,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=01, CmsRestoreCode=01, ClassCode=3, Phrase=109,
 Strobe=No, SirenType=ShortTrouble, SirenDelay=No, AlarmState=Trouble
 AlarmType=Panic,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=20, CmsRestoreCode=FF, ClassCode=1, Phrase=107,
 Strobe=Yes, SirenType=Intruder, SirenDelay=No, AlarmState=Alarm
 AlarmType=EntryAlert,
 DialOut=No, CmsReportCode=FF, CmsRestoreCode=FF, ClassCode=1,
 Phrase=121, Strobe=No, SirenType=ArmingTone, SirenDelay=No,
 AlarmState=Alert
 AlarmType=Tamper,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=37, CmsRestoreCode=37, ClassCode=1, Phrase=102,
 Strobe=Yes, SirenType=Intruder, SirenDelay=No, AlarmState=Alarm
 AlarmType=Fire,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=10, CmsRestoreCode=FF, ClassCode=1, Phrase=100,
 Strobe=Yes, SirenType=Fire, SirenDelay=No, AlarmState=Alarm
 AlarmType=Gas,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=51, CmsRestoreCode=FF, ClassCode=1, Phrase=113,
 Strobe=Yes, SirenType=Beep, SirenDelay=No, AlarmState=Alarm
 AlarmType=FamilyCare,
 DialOut=Yes, DialIndex=3+4+5+6+7+8, DialDelay=No, CmsReportCode=02,
 CmsRestoreCode=FF, ClassCode=1, Phrase=110, Strobe=Yes,
 SirenDelay=No, AlarmState=Idle
 AlarmType=Perimeter,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=31, CmsRestoreCode=FF, ClassCode=1, Phrase=111,
 Strobe=No, SirenDelay=No, AlarmState=Alert
 AlarmType=BypassZone,
 DialOut=No, CmsReportCode=70, CmsRestoreCode=70, ClassCode=5,

Phrase=197, Strobe=No, SirenDelay=No, AlarmState=Idle
 AlarmType=Disarm,
 DialOut=No, CmsReportCode=01, CmsRestoreCode=FF, ClassCode=4,
 Phrase=20, Strobe=No, SirenDelay=No, AlarmState=Idle
 AlarmType=CMSTest,
 DialOut=Yes, DialIndex=1+2, DialDelay=No, CmsReportCode=01,
 CmsRestoreCode=FF, ClassCode=6, Phrase=238, Strobe=No, SirenDelay=No,
 AlarmState=Idle
 AlarmType=SystemArmed,
 DialOut=No, CmsReportCode=01, CmsRestoreCode=FF, ClassCode=4,
 Phrase=191, Strobe=No, SirenDelay=No, AlarmState=Idle
 AlarmType=AlarmAbort,
 DialOut=No, CmsReportCode=06, CmsRestoreCode=FF, ClassCode=4,
 Phrase=131, Strobe=No, SirenDelay=No, AlarmState=Idle
 AlarmType=EntryWarning,
 DialOut=No, CmsReportCode=FF, CmsRestoreCode=FF, ClassCode=1,
 Phrase=198, Strobe=No, SirenType=Warning, SirenDelay=No,
 AlarmState=Alert
 AlarmType=SirenTrouble,
 DialOut=No, CmsReportCode=73, CmsRestoreCode=73, ClassCode=3,
 Phrase=229, Strobe=No, SirenType=Trouble, SirenDelay=No,
 AlarmState=Trouble
 AlarmType=VoiceFailure,
 DialOut=No, CmsReportCode=50, CmsRestoreCode=FF, ClassCode=4,
 Phrase=164, Strobe=No, SirenType=Trouble, SirenDelay=No,
 AlarmState=Alarm
 AlarmType=RS485Comms,
 DialOut=No, CmsReportCode=50, CmsRestoreCode=50, ClassCode=3,
 Phrase=248, Strobe=No, SirenType=ShortTrouble, SirenDelay=No,
 AlarmState=Trouble
 AlarmType=Doorbell,
 DialOut=No, CmsReportCode=FF, CmsRestoreCode=FF, ClassCode=6,
 Phrase=213, Strobe=No, SirenType=DoorBell, SirenDelay=No,
 AlarmState=Idle
 AlarmType=HomeSafe,
 DialOut=No, CmsReportCode=FF, CmsRestoreCode=FF, ClassCode=4,
 Phrase=119, Strobe=No, SirenDelay=No, AlarmState=Idle
 AlarmType=DialTest,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,
 CmsReportCode=01, CmsRestoreCode=FF, ClassCode=6, Phrase=238,
 Strobe=No, SirenDelay=No, AlarmState=Idle
 AlarmType=NotUsed,
 DialOut=No, CmsReportCode=FF, CmsRestoreCode=FF, ClassCode=6,
 Phrase=112, Strobe=No, SirenDelay=No, AlarmState=Idle
 AlarmType=NewMessage,
 DialOut=Yes, DialIndex=1+2+3+4+5+6+7+8, DialDelay=No,

CmsReportCode=FF, CmsRestoreCode=FF, ClassCode=6, Phrase=74,
Strobe=No, SirenDelay=No, AlarmState=Idle
AlarmType=EngineerDial,
DialOut=No, CmsReportCode=00, CmsRestoreCode=00, ClassCode=6,
Phrase=9, Strobe=No, SirenDelay=No, AlarmState=Idle
AlarmType=SigninTamper,
DialOut=Yes, DialIndex=1+2, DialDelay=No, CmsReportCode=13,
CmsRestoreCode=FF, ClassCode=4, Phrase=127, Strobe=No, SirenDelay=No,
AlarmState=Trouble

! Non-Detector Alarms

! =====

NDAlarm=Intruder, AlarmType=Intruder
NDAlarm=ZoneTrouble, AlarmType=ZoneTrouble
NDAlarm=LowBattery, AlarmType=LowBattery
NDAlarm=PowerFailure, AlarmType=PowerFail
NDAlarm=PhoneTrouble, AlarmType=LineCut
NDAlarm=Duess, AlarmType=Duess
NDAlarm=ArmFailure, AlarmType=ArmFail
NDAlarm=FamilyCare, AlarmType=FamilyCare
NDAlarm=Disarm, AlarmType=Disarm
NDAlarm=SystemArmed, AlarmType=SystemArmed
NDAlarm=Tamper, AlarmType=Tamper
NDAlarm=ForceArmed, AlarmType=VoiceFailure
NDAlarm=EntryWarning, AlarmType=EntryWarning
NDAlarm=AlarmAbort, AlarmType=AlarmAbort
NDAlarm=SirenTrouble, AlarmType=SirenTrouble
NDAlarm=Bypass, AlarmType=BypassZone
NDAlarm=Unused, AlarmType=
NDAlarm=DialTest, AlarmType=DialTest
NDAlarm=CMSDialTest, AlarmType=CMSTest
NDAlarm=EntryAlert, AlarmType=EntryAlert
NDAlarm=FireAlarm, AlarmType=Fire
NDAlarm=PanicAlarm, AlarmType=Panic
NDAlarm=DialFailure, AlarmType=NotUsed
NDAlarm=NewMessage, AlarmType=NewMessage
NDAlarm=DoorBell, AlarmType=Doorbell
NDAlarm=RS485CommsFail, AlarmType=RS485Comms
NDAlarm=SignInTamper, AlarmType=SigninTamper
NDAlarm=NonD, AlarmType=

! Siren Types

! =====

SirenType=Intruder,
SoundType=Intruder, Duration=300.0, Priority=No, DoorPhone=No,
Keypad=Yes, HighLevel=Yes, BellOutput=Yes, Permanent=No

SirenType=Fire,
 SoundType=Fire, Duration=600.0, Priority=Yes, DoorPhone=No,
 Keypad=Yes, HighLevel=Yes, BellOutput=Yes, Permanent=No
 SirenType=ArmingTone,
 SoundType=SlowBeeps, Duration=300.0, Priority=No, DoorPhone=Yes,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=AwayArmTrouble,
 SoundType=FastBeeps, Duration=600.0, Priority=No, DoorPhone=Yes,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=AwayArmed,
 SoundType=Armed2beeps, Duration=1.0, Priority=No, DoorPhone=Yes,
 Keypad=Yes, HighLevel=Yes, BellOutput=Yes, Permanent=No
 SirenType=Warning,
 SoundType=Warning, Duration=120.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=Yes, BellOutput=No, Permanent=No
 SirenType=ShortTrouble,
 SoundType=FastBeeps, Duration=10.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=AlternateSiren,
 SoundType=AlternateSiren, Duration=300.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=Yes, BellOutput=Yes, Permanent=No
 SirenType=Test,
 SoundType=Intruder, Duration=2.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=Yes, BellOutput=Yes, Permanent=No
 SirenType=DoorBell,
 SoundType=DoorChime, Duration=1.0, Priority=No, DoorPhone=Yes,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=Trouble,
 SoundType=FastBeeps, Duration=3276.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=Ring,
 SoundType=Ring, Duration=255.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=Beep,
 SoundType=AlternateBeep, Duration=300.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=ArmFail,
 SoundType=ArmFailbeeps, Duration=60.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=Yes, BellOutput=Yes, Permanent=No
 SirenType=Chime,
 SoundType=DoorChime, Duration=2.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=NightArmed,
 SoundType=Armed2beeps, Duration=1.0, Priority=No, DoorPhone=No,
 Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
 SirenType=AlternateChime,

SoundType=AlternateBeep, Duration=3.0, Priority=No, DoorPhone=No,
Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
SirenType=AutoArming,
SoundType=SlowBeeps, Duration=300.0, Priority=No, DoorPhone=No,
Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=No
SirenType=AutoArmTrouble,
SoundType=FastBeeps, Duration=300.0, Priority=No, DoorPhone=No,
Keypad=Yes, HighLevel=No, BellOutput=No, Permanent=Yes
SirenType=NotAssigned,
SoundType=, Duration=0.0, Priority=No, DoorPhone=No, Keypad=No,
HighLevel=No, BellOutput=No, Permanent=Yes

! Sound Types

! =====

SoundType=Intruder,
Tone1Frequency=505, Tone1Duration=0, Tone2Frequency=2021,
Tone2Duration=0, Sweep=Yes, Alternating=No, Repeat=No
SoundType=Fire,
Tone1Frequency=505, Tone1Duration=1000, Tone2Frequency=2021,
Tone2Duration=1000, Sweep=No, Alternating=Yes, Repeat=Yes,
RepeatCount=3
SoundType=SlowBeeps,
Tone1Frequency=505, Tone1Duration=50, Tone2Frequency=0,
Tone2Duration=1000, Sweep=No, Alternating=Yes, Repeat=No
SoundType=FastBeeps,
Tone1Frequency=505, Tone1Duration=200, Tone2Frequency=0,
Tone2Duration=200, Sweep=No, Alternating=Yes, Repeat=No
SoundType=Armed2beeps,
Tone1Frequency=505, Tone1Duration=100, Tone2Frequency=0,
Tone2Duration=400, Sweep=No, Alternating=Yes, Repeat=No
SoundType=Warning,
Tone1Frequency=1010, Tone1Duration=500, Tone2Frequency=0,
Tone2Duration=500, Sweep=No, Alternating=Yes, Repeat=No
SoundType=DoorChime,
Tone1Frequency=1010, Tone1Duration=500, Tone2Frequency=800,
Tone2Duration=500, Sweep=No, Alternating=Yes, Repeat=No
SoundType=AlternateSiren,
Tone1Frequency=1010, Tone1Duration=1000, Tone2Frequency=2021,
Tone2Duration=2000, Sweep=No, Alternating=Yes, Repeat=No
SoundType=ArmFailbeeps,
Tone1Frequency=1010, Tone1Duration=50, Tone2Frequency=0,
Tone2Duration=200, Sweep=No, Alternating=Yes, Repeat=No
SoundType=ZoneChime,
Tone1Frequency=609, Tone1Duration=1000, Tone2Frequency=800,
Tone2Duration=1000, Sweep=No, Alternating=Yes, Repeat=No
SoundType=Ring,

Tone1Frequency=711, Tone1Duration=400, Tone2Frequency=0,
Tone2Duration=200, Sweep=No, Alternating=Yes, Repeat=Yes,
RepeatCount=2
SoundType=AlternateBeep,
Tone1Frequency=700, Tone1Duration=1000, Tone2Frequency=0,
Tone2Duration=1000, Sweep=No, Alternating=Yes, Repeat=No

! Phone Numbers
! =====

! Telecoms
! =====
PABXDigit=9
CallReleaseTime=45
DialPauseTime=10
RedialTime=30
RedialTries=5
DialDelay=30
DetectStarTime=6

! Paging
! =====
PagerStartKey=*
PagerEndKey1=*
PagerEndKey2=*
PagerSpaceKey=#
PagerUpperFrequency=2133
PagerLowerFrequency=1833
PagerId=1234

! CMS
! ====
CMS1AccountCode=001234
CMS1Voice2Way=No
CMS1Format=CMS13
CMS2AccountCode=001234
CMS2Voice2Way=No
CMS2Format=CMS13
CMSDelay=0

! CMS Formats
! =====
CmsFormat=CMS1,
Description="Ademco Slow 4x2 10 pps 2 rounds", DataType=Pulse,
Verification=2Round, DataRate=10, DataFrequency=1900, IdDigits=4,
ReportDigits=2, Handshake1=1400, Handshake2=NoFreq, Kissoff=1400

CmsFormat=CMS2,
Description="Ademco Slow 4x2 10 pps checksum", DataType=Pulse,
Verification=Checksum, DataRate=10, DataFrequency=1900, IdDigits=4,
ReportDigits=2, Handshake1=1400, Handshake2=NoFreq, Kissoff=1400

CmsFormat=CMS3,
Description="Ademco Slow 3x1 10 pps 2 rounds", DataType=Pulse,
Verification=2Round, DataRate=10, DataFrequency=1900, IdDigits=3,
ReportDigits=1, Handshake1=1400, Handshake2=NoFreq, Kissoff=1400

CmsFormat=CMS4,
Description="Silent Knight 4x2 14 pps 2 rounds", DataType=Pulse,
Verification=2Round, DataRate=14, DataFrequency=1900, IdDigits=4,
ReportDigits=2, Handshake1=1400, Handshake2=NoFreq, Kissoff=1400

CmsFormat=CMS5,
Description="Franklin 4x2 20 pps 2 rounds", DataType=Pulse,
Verification=2Round, DataRate=19, DataFrequency=1800, IdDigits=4,
ReportDigits=2, Handshake1=2300, Handshake2=NoFreq, Kissoff=2300

CmsFormat=CMS6,
Description="Radionics 3x1 40 pps 2 rounds", DataType=Pulse,
Verification=2Round, DataRate=37, DataFrequency=1800, IdDigits=3,
ReportDigits=1, Handshake1=2300, Handshake2=NoFreq, Kissoff=2300

CmsFormat=CMS7,
Description="Radionics 4x2 40 pps 2 rounds", DataType=Pulse,
Verification=2Round, DataRate=37, DataFrequency=1800, IdDigits=4,
ReportDigits=2, Handshake1=2300, Handshake2=NoFreq, Kissoff=2300

CmsFormat=CMS8,
Description="Radionics 4x2 40 pps checksum", DataType=Pulse,
Verification=Checksum, DataRate=37, DataFrequency=1800, IdDigits=4,
ReportDigits=2, Handshake1=2300, Handshake2=NoFreq, Kissoff=2300

CmsFormat=CMS9,
Description="Radionics 3x1 40 pps checksum", DataType=Pulse,
Verification=Checksum, DataRate=37, DataFrequency=1800, IdDigits=3,
ReportDigits=1, Handshake1=2300, Handshake2=NoFreq, Kissoff=2300

CmsFormat=CMS10,
Description="Surgard 4x3 2 rounds", DataType=DTMF,
Verification=2Round, ZoneDigits=1, DtmfType=SurgardAdemcoExpress,
IdDigits=4, ReportDigits=1, Handshake1=2300, Handshake2=NoFreq,
Kissoff=2300

CmsFormat=CMS11,
Description="Surgard 4x3 checksum", DataType=DTMF,
Verification=Checksum, ZoneDigits=1, DtmfType=SurgardAdemcoExpress,
IdDigits=4, ReportDigits=1, Handshake1=2300, Handshake2=NoFreq,
Kissoff=2300

CmsFormat=CMS12,
Description="Ademco Express", DataType=DTMF, Verification=2Round,
ZoneDigits=1, DtmfType=SurgardAdemcoExpress, IdDigits=4,
ReportDigits=1, Handshake1=1400, Handshake2=2300, Kissoff=1400

CmsFormat=CMS13,
Description="Contact ID", DataType=DTMF, Verification=Checksum,
ZoneDigits=1, DtmfType=ContactId, IdDigits=4, ReportDigits=2,
Handshake1=1400, Handshake2=2300, Kissoff=1400

CmsFormat=CMS14,
Description="CMS14", DataType=DTMF, Verification=2Round,
ZoneDigits=1, DtmfType=ContactId, IdDigits=3, ReportDigits=1,
Handshake1=1400, Handshake2=1400, Kissoff=1400

CmsFormat=CMS15,
Description="CMS15", DataType=DTMF, Verification=2Round,
ZoneDigits=1, DtmfType=ContactId, IdDigits=3, ReportDigits=1,
Handshake1=1400, Handshake2=1400, Kissoff=1400

CmsFormat=CMS16,
Description="CMS16", DataType=DTMF, Verification=2Round,
ZoneDigits=1, DtmfType=ContactId, IdDigits=3, ReportDigits=1,
Handshake1=1400, Handshake2=1400, Kissoff=1400

! Sign-In Codes

! =====

SignIn=User01,
UserNo=1, CrypCode=05a6f9cffbb96f36, Program=Yes, HomeControl=Yes,
SecurityMenu=Yes, DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes,
LocalArm=Yes, LocalDisarm=Yes, MailboxPhone=0

SignIn=User02,
UserNo=2, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes, MailboxPhone=0

SignIn=User03,
UserNo=3, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes, MailboxPhone=0

SignIn=User04,
UserNo=4, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes, MailboxPhone=0

SignIn=User05,
UserNo=5, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes, MailboxPhone=0

SignIn=User06,
UserNo=6, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes, MailboxPhone=0

SignIn=User07,
UserNo=7, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,

LocalDisarm=Yes, MailboxPhone=0
SignIn=User08,
UserNo=8, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes, MailboxPhone=0
SignIn=User09,
UserNo=9, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User10,
UserNo=10, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User11,
UserNo=11, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User12,
UserNo=12, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User13,
UserNo=13, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User14,
UserNo=14, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User15,
UserNo=15, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User16,
UserNo=16, CrypCode=, Program=No, HomeControl=Yes, SecurityMenu=Yes,
DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes, LocalArm=Yes,
LocalDisarm=Yes
SignIn=User18,
UserNo=18, CrypCode=d08315ae991c7f01, Program=No, HomeControl=Yes,
SecurityMenu=Yes, DialoutDisarm=Yes, RemoteArm=Yes, RemoteDisarm=Yes,
LocalArm=Yes, LocalDisarm=Yes

! Security

! =====

EntryTime=30

ExitTime=30

EntryWarningTime=15
NightExitTime=5
ExitTimeAbort=5
AlarmAbortTime=90
AwayArmingMethod = FinalDoor
AlarmAbortTime=90
AlertTime=10
ArmedAlarmOutput=
HomeTroubleOutput=
DialOutOutput=
LineCutOutput=
LineCutTimer=60
BatteryTestInterval=24
BatteryTestDuration=2
AutoShunt=0
SirenDelay=3

! Control Menu Groups

! =====

ControlGroup=0, Phrase=Lights
ControlGroup=1, Phrase=Airconditioner
ControlGroup=2, Phrase=Gate
ControlGroup=3, Phrase=Vergola
ControlGroup=4, Phrase=Heater

! Control Menu

! =====

Menu=0,Phrase=All+Lights,FeedbackType=None

Key=0,Phrase=Off,Response=AllLightsOff

Key=1,Phrase=On,Response=AllLightsOn

End Menu

Menu=1,Phrase=Gate+Front+Light,FeedbackType=Zone,Feedback=GateFrontLight

Key=0,Phrase=Off,Response=GateLgtOff

Key=1,Phrase=On,Response=GateLgtOn

End Menu

Menu=2,Phrase=Carporch+Light,FeedbackType=Zone,Feedback=PorchLight

Key=0,Phrase=Off,Response=CarLgt1Off

Key=1,Phrase=On,Response=CarLgt1On

End Menu

Menu=3,Phrase=Garage+Light,FeedbackType=Zone,Feedback=GarageLight

Key=0,Phrase=Off,Response=CarLgt2Off

Key=1,Phrase=On,Response=CarLgt2On

End Menu

Menu=4,Phrase=Living+Room+Scene,FeedbackType=None

Key=0,Phrase=All+Off,Response=AllOffSOP1

Key=1,Phrase=1,Response=S1OP1
 Key=2,Phrase=2,Response=S2OP1
 Key=3,Phrase=3,Response=S3OP1
 Key=4,Phrase=4,Response=S4OP1
 Key=5,Phrase=5,Response=S5OP1
 End Menu
 Menu=5,Phrase=Dining+Room+Scene,FeedbackType=None
 Key=0,Phrase=All+Off,Response=AllOffSOP2
 Key=1,Phrase=1,Response=S1OP2
 Key=2,Phrase=2,Response=S2OP2
 Key=3,Phrase=3,Response=S3OP2
 Key=4,Phrase=4,Response=S4OP2
 Key=5,Phrase=5,Response=S5OP2
 End Menu
 Menu=6,Phrase=Master+Bedroom+Scene,FeedbackType=None
 Key=0,Phrase=All+Off,Response=AllOffSOP3
 Key=1,Phrase=1,Response=S1OP3
 Key=2,Phrase=2,Response=S2OP3
 Key=3,Phrase=3,Response=S3OP3
 Key=4,Phrase=4,Response=S4OP3
 Key=5,Phrase=5,Response=S5OP3
 End Menu
 Menu=7,Phrase=Bedroom+3+Scene,FeedbackType=None
 Key=0,Phrase=All+Off,Response=AllOffSOP4
 Key=1,Phrase=1,Response=S1OP4
 Key=2,Phrase=2,Response=S2OP4
 Key=3,Phrase=3,Response=S3OP4
 Key=4,Phrase=4,Response=S4OP4
 Key=5,Phrase=5,Response=S5OP4
 End Menu
 Menu=10,Phrase=All+Airconditioner,FeedbackType=None
 Key=0,Phrase=Off,Response=AllACOff
 Key=1,Phrase=On,Response=AllACOn
 End Menu
 Menu=11,Phrase=Living+Airconditioner,FeedbackType=Zone,Feedback=LivingA
 irconditi
 Key=0,Phrase=Off,Response=LRACOff
 Key=1,Phrase=On,Response=LRACOn
 End Menu
 Menu=12,Phrase=Dining+Airconditioner,FeedbackType=Zone,Feedback=Dining
 Airconditi
 Key=0,Phrase=Off,Response=DRACOff
 Key=1,Phrase=On,Response=DRACOn
 End Menu
 Menu=13,Phrase=Master+Airconditioner+1,FeedbackType=Zone,Feedback=Ma
 sterAirconditi

Key=0,Phrase=Off,Response=MBAC1Off
 Key=1,Phrase=On,Response=MBAC1On
 End Menu
 Menu=14,Phrase=Master+Airconditioner+2,FeedbackType=Zone,Feedback=MasterAircondit0
 Key=0,Phrase=Off,Response=MBAC2Off
 Key=1,Phrase=On,Response=MBAC2On
 End Menu
 Menu=15,Phrase=Bedroom+2+Airconditioner,FeedbackType=Zone,Feedback=Bedroom2Aircondi
 Key=0,Phrase=Off,Response=BR2ACOff
 Key=1,Phrase=On,Response=BR2ACOn
 End Menu
 Menu=16,Phrase=Corridor+Airconditioner,FeedbackType=Zone,Feedback=CorridorAircondi
 Key=0,Phrase=Off,Response=2ndPorchACOff
 Key=1,Phrase=On,Response=2ndPorchACOn
 End Menu
 Menu=17,Phrase=Bedroom+3+Airconditioner+1,FeedbackType=Zone,Feedback=Bedroom3Aircondi
 Key=0,Phrase=Off,Response=BR3AC1Off
 Key=1,Phrase=On,Response=BR3AC1On
 End Menu
 Menu=18,Phrase=Bedroom+3+Airconditioner+2,FeedbackType=Zone,Feedback=Bedroom3Aircond0
 Key=0,Phrase=Off,Response=BR3AC2Off
 Key=1,Phrase=On,Response=BR3AC2On
 End Menu
 Menu=20,Phrase=Main+Gate,FeedbackType=None
 Key=1,Phrase=Open+Close,Response=GateClose
 End Menu
 Menu=30,Phrase=All+Vergola,FeedbackType=None
 Key=0,Phrase=Close,Response=AllVergolaClose
 Key=1,Phrase=Open,Response=AllVergolaOpen
 End Menu
 Menu=31,Phrase=Carporch+Vergola,FeedbackType=None
 Key=0,Phrase=Close,Response=1stVergolaClose
 Key=1,Phrase=Open,Response=1stVergolaOpen
 End Menu
 Menu=32,Phrase=Garden+Vergola,FeedbackType=None
 Key=0,Phrase=Close,Response=2ndVergolaClose
 Key=1,Phrase=Open,Response=2ndVergolaOpen
 End Menu
 Menu=40,Phrase=All+Heater,FeedbackType=None
 Key=0,Phrase=Off,Response=AllHeatersOff
 Key=1,Phrase=On,Response=AllHeatersOn

```

End Menu
Menu=41,Phrase=1st+Floor+Toilet+Heater,FeedbackType=Zone,Feedback=1stFloorToiletHe
    Key=0,Phrase=Off,Response=1stHeaterOff
    Key=1,Phrase=On,Response=1stHeaterOn
End Menu
Menu=42,Phrase=Master+Heater,FeedbackType=Zone,Feedback=MasterHeater
    Key=0,Phrase=Off,Response=MBHeaterOff
    Key=1,Phrase=On,Response=MBHeaterOn
End Menu
Menu=43,Phrase=Bath+2+Heater,FeedbackType=Zone,Feedback=Bath2Heater
    Key=0,Phrase=Off,Response=BR2HeaterOff
    Key=1,Phrase=On,Response=BR2HeaterOn
End Menu
Menu=44,Phrase=Bath+3+Heater,FeedbackType=Zone,Feedback=Bath3Heater
    Key=0,Phrase=Off,Response=AtticHeaterOff
    Key=1,Phrase=On,Response=AtticHeaterOn
End Menu

```

! KP Functions

! =====

```

KPFunction=0, Response=EngineerCodeEnab, NeedCode=No
KPFunction=1, Response=BypassMenu, NeedCode=Yes
KPFunction=2, Response=HomeControlMenu, NeedCode=No
KPFunction=3, Response=TestMenu, NeedCode=No
KPFunction=4, Response=RecordMemoMenu, NeedCode=No
KPFunction=5, Response=EventLog, NeedCode=No
KPFunction=6, Response=ChangePhoneMenu, NeedCode=Yes
KPFunction=7, Response=ChangeCodeMenu, NeedCode=Yes
KPFunction=8, Response=IntercomRequest, NeedCode=No
KPFunction=9, Response=ChangeTimeProgr0, NeedCode=Yes
KPFunction=F, Response=NULLResponse, NeedCode=Yes
KPFunction=*, Response=AnsweringMachine, NeedCode=Yes
KPFunction=#, Response=UserCodesMenu, NeedCode=Yes
KPFunction=Away, Response=KEYARMAwayFromSe, NeedCode=No
KPFunction=Night, Response=KEYARMNightFromS, NeedCode=No
KPFunction=Day, Response=KEYARMDayModeFro, NeedCode=No

```

! X10 Responses

! =====

```

X10Response=A
X10Response=B
X10Response=C
X10Response=D
X10Response=E
X10Response=F

```

X10Response=G
X10Response=H
X10Response=I
X10Response=J
X10Response=K
X10Response=L
X10Response=M
X10Response=N
X10Response=O
X10Response=P

! SCS/RIO Responses
! =====

! Room Responses
! =====

RoomResponse=Room01,
 Number=1, Key1Response=LRACOn, Key2Response=LRACOff,
 Key3Response=DRACOff, Key4Response=DRACOn
RoomResponse=Room02,
 Number=2, Key1Response=AllMBACOn, Key2Response=AllMBACOff,
 Key3Response=MBHeaterOff, Key4Response=MBHeaterOn
RoomResponse=Room03,
 Number=3, Key1Response=BR2ACOn, Key2Response=BR2ACOff,
 Key3Response=BR2HeaterOff, Key4Response=BR2HeaterOn
RoomResponse=Room04,
 Number=4, Key1Response=AllBR3ACOn, Key2Response=AllBR3ACOff,
 Key3Response=AtticHeaterOff, Key4Response=AtticHeaterOn
RoomResponse=Room05,
 Number=5, Key1Response=2ndPorchACOn, Key2Response=2ndPorchACOff
RoomResponse=Room06,
 Number=6, Key1Response=CarLgt1On, Key2Response=CarLgt1Off,
 Key3Response=CarLgt2Off, Key4Response=CarLgt2On
RoomResponse=Room07,
 Number=7, Key1Response=GateLgtOn, Key2Response=GateLgtOff
RoomResponse=Room08,
 Number=8, Key1Response=1stVergolaClose, Key2Response=1stVergolaOpen,
 Key3Response=2ndVergolaOpen, Key4Response=2ndVergolaClose
RoomResponse=Room09,
 Number=9, Key1Response=S1OP3, Key2Response=S2OP3,
 Key3Response=S3OP3,
 Key4Response=S4OP3
RoomResponse=Room10,
 Number=10, Key1Response=S5OP3, Key2Response=AllOffSOP3
RoomResponse=Room11,
 Number=11, Key1Response=S1OP4, Key2Response=S2OP4,

Key3Response=S3OP4, Key4Response=S4OP4
RoomResponse=Room12,
Number=12, Key1Response=S5OP4, Key2Response=AllOffSOP4

! Received IR Codes

! =====

ReceivedIrCode=112, Response=S1OP1
ReceivedIrCode=113, Response=S2OP1
ReceivedIrCode=114, Response=S3OP1
ReceivedIrCode=115, Response=S4OP1
ReceivedIrCode=120, Response=S3OP2
ReceivedIrCode=121, Response=S4OP2
ReceivedIrCode=122, Response=S5OP2
ReceivedIrCode=123, Response=AllOffSOP2
ReceivedIrCode=124, Response=S5OP1
ReceivedIrCode=125, Response=AllOffSOP1
ReceivedIrCode=126, Response=S1OP2
ReceivedIrCode=127, Response=S2OP2

! Events

! =====

OpenDoorResponse=NULLResponse
OpenGateResponse=NULLResponse
DoorbellResponse=NULLResponse
PhoneRingResponse=NULLResponse
StartupResponse=NULLResponse
ACRestoreResponse=NULLResponse
PhoneTroubleRestoreResponse=NULLResponse
StartArmingResponse=NULLResponse
HourlyResponse=NULLResponse
HomeModeResponse=NULLResponse
AwayModeResponse=AllOff
NightModeResponse=NULLResponse
DayModeResponse=NULLResponse
OffhookResponse=NULLResponse
OnhookResponse=NULLResponse

! Responses

! =====

Response=GateOpen,
Number=1, Description="Gate Open O/P2"
Pulse Gate For 20
! ActionCodes=130,20,2,255
End Response

Response=GateClose,

Number=2, Description="Gate Close O/P2"
Pulse Gate For 20
! ActionCodes=130,20,2,255
End Response

Response=1stVergolaOpen,
Number=3, Description="1st Floor Vergola Open O/P10"
Pulse 1stVergolaOpen For 20
! ActionCodes=130,20,10,255
End Response

Response=1stVergolaClose,
Number=4, Description="1st Floor Vergola Close O/P11"
Pulse 1stVergolaClose For 40
! ActionCodes=130,40,11,255
End Response

Response=2ndVergolaOpen,
Number=5, Description="2nd Floor Vergola Open O/P12"
Pulse 2ndVergolaOpen For 20
! ActionCodes=130,20,12,255
End Response

Response=2ndVergolaClose,
Number=6, Description="2nd Floor Vergola Close O/P13"
Pulse 2ndVergolaClose For 40
! ActionCodes=130,40,13,255
End Response

Response=AllVergolaOpen,
Number=7, Description="All Vergola Open"
Do 1stVergolaOpen
Do 2ndVergolaOpen
! ActionCodes=74,3,74,5,255
End Response

Response=AllVergolaClose,
Number=8, Description="All Vergola Close"
Do 1stVergolaClose
Do 2ndVergolaClose
! ActionCodes=74,4,74,6,255
End Response

Response=GateLgtOn,
Number=9, Description="Gate Light On O/P14"
If Input GateFrontLight = 0 Then

```
    Toggle Output GateLgt
End If
! ActionCodes=79,14,13,78,14,255
End Response
```

```
Response=GateLgtOff,
Number=10, Description="Gate Light Off O/P14"
If Input GateFrontLight <> 0 Then
    Toggle Output GateLgt
End If
! ActionCodes=79,14,12,78,14,255
End Response
```

```
Response=GateLgtSwitch1On,
Number=11, Description="Gate Light Switch 1 On O/P14"
Toggle Output GateLgt
! ActionCodes=78,14,255
End Response
```

```
Response=GateLgtSwitch1Of,
Number=12, Description="Gate Light Switch 1 Off O/P14"
Toggle Output GateLgt
! ActionCodes=78,14,255
End Response
```

```
Response=CarLgt1On,
Number=13, Description="Carporch Light 1 On O/P16"
If Input PorchLight = 0 Then
    Toggle Output CarporchLght
End If
! ActionCodes=79,16,13,78,16,255
End Response
```

```
Response=CarLgt1Off,
Number=14, Description="Carporch Light 1 Off O/P16"
If Input PorchLight <> 0 Then
    Toggle Output CarporchLght
End If
! ActionCodes=79,16,12,78,16,255
End Response
```

```
Response=GateLgtSwitch2On,
Number=15, Description="Gate Light Switch 2 On O/P 14"
Toggle Output CarporchLght
! ActionCodes=78,16,255
End Response
```

```
Response=GateLgtSwitch2Of,  
  Number=16, Description="Gate Light Switch 2 Off O/P 14"  
  Toggle Output CarporchLght  
  ! ActionCodes=78,16,255  
End Response
```

```
Response=CarLgt2On,  
  Number=17, Description="Carporch Light 2 On O/P18"  
  If Input GarageLight = 0 Then  
    Toggle Output GarageLght  
  End If  
  ! ActionCodes=79,18,13,78,18,255  
End Response
```

```
Response=CarLgt2Off,  
  Number=18, Description="Carporch Light 2 Off O/P18"  
  If Input GarageLight <> 0 Then  
    Toggle Output GarageLght  
  End If  
  ! ActionCodes=79,18,12,78,18,255  
End Response
```

```
Response=CarLgt2SwitchOn,  
  Number=19, Description="Carporch Light 2 Switch On O/P18"  
  Toggle Output GarageLght  
  ! ActionCodes=78,18,255  
End Response
```

```
Response=CarLgt2SwitchOff,  
  Number=20, Description="Carporch Light 2 Switch Off O/P18"  
  Toggle Output GarageLght  
  ! ActionCodes=78,18,255  
End Response
```

```
Response=AllLightsOn,  
  Number=21, Description="All Lights On"  
  Do GateLgtOn  
  Do CarLgt1On  
  Do CarLgt2On  
  Do S1OP1  
  Do S1OP2 After 2 Seconds Using Timer01  
  Do S1OP3 After 3 Seconds Using Timer02  
  Do S1OP4 After 4 Seconds Using Timer03
```

!
ActionCodes=74,9,74,13,74,17,74,116,194,1,0,2,129,194,2,0,3,135,194,3,0,4,14
1,255
End Response

Response=AllLightsOff,
Number=25, Description="All Lights Off"
Do GateLgtOff
Do CarLgt1Off
Do CarLgt2Off
Do AllOffSOP1
Do AllOffSOP2 After 2 Seconds Using Timer01
Do AllOffSOP3 After 3 Seconds Using Timer02
Do AllOffSOP4 After 4 Seconds Using Timer03

!
ActionCodes=74,10,74,14,74,18,74,114,194,1,0,2,128,194,2,0,3,134,194,3,0,4,1
40,255
End Response

Response=LRACOn,
Number=29, Description="Living Room AC On O/P20"
If Input LivingAirconditi = 0 Then
Pulse LRAC For 20
End If
! ActionCodes=79,20,13,130,20,20,255
End Response

Response=LRACOff,
Number=30, Description="Living Room AC Off O/P20"
If Input LivingAirconditi <> 0 Then
Pulse LRAC For 20
End If
! ActionCodes=79,20,12,130,20,20,255
End Response

Response=DRACOn,
Number=31, Description="Dining Room AC On O/P21"
If Input DiningAirconditi = 0 Then
Pulse DRAC For 20
End If
! ActionCodes=79,21,13,130,20,21,255
End Response

Response=DRACOff,
Number=32, Description="Dining Room AC Off O/P21"
If Input DiningAirconditi <> 0 Then

```
    Pulse DRAC For 20
End If
! ActionCodes=79,21,12,130,20,21,255
End Response
```

```
Response=MBAC1On,
Number=33, Description="Master Bedroom AC 1 On O/P22"
If Input MasterAirconditi = 0 Then
    Pulse MBAC1 For 20
End If
! ActionCodes=79,22,13,130,20,22,255
End Response
```

```
Response=MBAC1Off,
Number=34, Description="Master Bedroom AC 1 Off O/P22"
If Input MasterAirconditi <> 0 Then
    Pulse MBAC1 For 20
End If
! ActionCodes=79,22,12,130,20,22,255
End Response
```

```
Response=MBAC2On,
Number=35, Description="Master Bedroom AC 2 On O/P23"
If Input MasterAircondit0 = 0 Then
    Pulse MBAC2 For 20
End If
! ActionCodes=79,23,13,130,20,23,255
End Response
```

```
Response=MBAC2Off,
Number=36, Description="Master Bedroom AC 2 Off O/P23"
If Input MasterAircondit0 <> 0 Then
    Pulse MBAC2 For 20
End If
! ActionCodes=79,23,12,130,20,23,255
End Response
```

```
Response=AllMBACOn,
Number=37, Description="All Master Bedroom AC On"
Do MBAC1On
Do MBAC2On
! ActionCodes=74,33,74,35,255
End Response
```

```
Response=AllMBACOff,
Number=38, Description="All Master Bedroom AC Off"
```

Do MBAC1Off
Do MBAC2Off
! ActionCodes=74,34,74,36,255
End Response

Response=BR2ACOn,
Number=39, Description="Bedroom 2 AC On O/P24"
If Input Bedroom2Aircondi = 0 Then
Pulse BR2AC For 20
End If
! ActionCodes=79,24,13,130,20,24,255
End Response

Response=BR2ACOff,
Number=40, Description="Bedroom 2 AC Off O/P24"
If Input Bedroom2Aircondi <> 0 Then
Pulse BR2AC For 20
End If
! ActionCodes=79,24,12,130,20,24,255
End Response

Response=2ndPorchACOn,
Number=41, Description="2nd Floor Porch (Foyer) AC On O/P25"
If Input CorridorAircondi = 0 Then
Pulse FoyerAC For 20
End If
! ActionCodes=79,25,13,130,20,25,255
End Response

Response=2ndPorchACOff,
Number=42, Description="2nd Floor Porch (Foyer) AC Off O/P25"
If Input CorridorAircondi <> 0 Then
Pulse FoyerAC For 20
End If
! ActionCodes=79,25,12,130,20,25,255
End Response

Response=BR3AC1On,
Number=43, Description="Bedroom 3 AC 1 On O/P 26"
If Input Bedroom3Aircondi = 0 Then
Pulse BR3AC1 For 20
End If
! ActionCodes=79,26,13,130,20,26,255
End Response

Response=BR3AC1Off,

Number=44, Description="Bedroom 3 AC 1 Off O/P 26"
If Input Bedroom3Aircondi <> 0 Then
Pulse BR3AC1 For 20
End If
! ActionCodes=79,26,12,130,20,26,255
End Response

Response=BR3AC2On,
Number=45, Description="Bedroom 3 AC 2 On O/P27"
If Input Bedroom3Aircond0 = 0 Then
Pulse BR3AC2 For 20
End If
! ActionCodes=79,27,13,130,20,27,255
End Response

Response=BR3AC2Off,
Number=46, Description="Bedroom 3 AC 2 Off O/P 27"
If Input Bedroom3Aircond0 <> 0 Then
Pulse BR3AC2 For 20
End If
! ActionCodes=79,27,12,130,20,27,255
End Response

Response=AllACOn,
Number=47, Description="All AC On"
Do LRACOn
Do DRACOn
Do MBAC1On
Do MBAC2On
Do BR2ACOn
Do 2ndPorchACOn
Do BR3AC1On
Do BR3AC2On
! ActionCodes=74,29,74,31,74,33,74,35,74,39,74,41,74,43,74,45,255
End Response

Response=AllACOff,
Number=50, Description="All AC Off"
Do LRACOff
Do DRACOff
Do MBAC1Off
Do MBAC2Off
Do BR2ACOff
Do 2ndPorchACOff
Do BR3AC1Off
Do BR3AC2Off

! ActionCodes=74,30,74,32,74,34,74,36,74,40,74,42,74,44,74,46,255
End Response

Response=AllBR3ACOn,
Number=53, Description="All Bedroom 3 AC On"
Do BR3AC1On
Do BR3AC2On
! ActionCodes=74,43,74,45,255
End Response

Response=AllBR3ACOff,
Number=54, Description="All Bedroom 3 AC Off"
Do BR3AC1Off
Do BR3AC2Off
! ActionCodes=74,44,74,46,255
End Response

Response=1stHeaterOn,
Number=55, Description="1st Floor Heater On"
If Input 1stFloorToiletHe = 0 Then
Toggle Output 1stHeater
End If
! ActionCodes=79,28,13,78,28,255
End Response

Response=1stHeaterOff,
Number=56, Description="1st Floor Heater Off"
If Input 1stFloorToiletHe <> 0 Then
Toggle Output 1stHeater
End If
! ActionCodes=79,28,12,78,28,255
End Response

Response=MBHeaterOn,
Number=57, Description="Master Bedroom Heater On"
If Input MasterHeater = 0 Then
Toggle Output MBHeater
End If
! ActionCodes=79,29,13,78,29,255
End Response

Response=MBHeaterOff,
Number=58, Description="Master Bedroom Heater Off"
If Input MasterHeater <> 0 Then
Toggle Output MBHeater
End If

! ActionCodes=79,29,12,78,29,255
End Response

Response=BR2HeaterOn,
Number=59, Description="Bedroom 2 Heater On"
If Input Bath2Heater = 0 Then
Toggle Output BR2Heater
End If
! ActionCodes=79,30,13,78,30,255
End Response

Response=BR2HeaterOff,
Number=60, Description="Bedroom 2 Heater Off"
If Input Bath2Heater <> 0 Then
Toggle Output BR2Heater
End If
! ActionCodes=79,30,12,78,30,255
End Response

Response=AtticHeaterOn,
Number=61, Description="Attic Heater On"
If Input Bath3Heater = 0 Then
Toggle Output BR3Heater
End If
! ActionCodes=79,31,13,78,31,255
End Response

Response=AtticHeaterOff,
Number=62, Description="Attic Heater Off"
If Input Bath3Heater <> 0 Then
Toggle Output BR3Heater
End If
! ActionCodes=79,31,12,78,31,255
End Response

Response=AllHeatersOn,
Number=63, Description="All Heaters On"
Do 1stHeaterOn
Do MBHeaterOn
Do BR2HeaterOn
Do AtticHeaterOn
! ActionCodes=74,55,74,57,74,59,74,61,255
End Response

Response=AllHeatersOff,
Number=65, Description="All Heaters Off"

Do 1stHeaterOff
Do MBHeaterOff
Do BR2HeaterOff
Do AtticHeaterOff
! ActionCodes=74,56,74,58,74,60,74,62,255
End Response

Response=AllOn,
Number=67, Description="All Lights and AC On"
Do AllLightsOn
Do AllACOn
! ActionCodes=74,21,74,47,255
End Response

Response=AllOff,
Number=74, Description="All Lights and AC Off"
Do AwayModeLightsOff
Do AllACOff
Do AllHeatersOff
Do GateLgtOn
! ActionCodes=74,159,74,50,74,65,74,9,255
End Response

Response=AutoDisarmFromNi,
Number=76,
Description="Auto Disarm from Night Mode only and not in Alarm"
If SecurityMode = NightMode Then
If AlarmState < Alarm Then
AutoArm SecurityOff
End If
End If
! ActionCodes=73,0,68,2,73,9,69,3,71,0,255
End Response

Response=X10AllUnitsAOff,
Number=68, Description="X10 All Units A Off"
X10 A0 AllUnitsOff
! ActionCodes=195,65,0,1,255
End Response

Response=X10AllLightsAOff,
Number=70, Description="X10 All Lights 'A' Off"
X10 A0 AllLightsOff
! ActionCodes=195,65,0,13,255
End Response

Response=DoorphoneChime,
Number=78, Description="Doorphone. Chime"
Activate DoorPhone
ExitTerminator
Say ZoneName
Siren DoorBell
! ActionCodes=9,6,1,64,10,255
End Response

Response=AutoArmAway,
Number=79, Description="Auto Arm Away"
AutoArm AwayMode
! ActionCodes=71,1,255
End Response

Response=AutoArmNightFrom,
Number=69, Fixed=Yes,
Description="Auto Arm Night from Security Off only"
If SecurityMode = SecurityOff Then
AutoArm NightMode
End If
! ActionCodes=73,0,13,71,2,255
End Response

Response=KEYARMVacModeFro,
Number=80, Description="KEY ARM Vac Mode from Security Off"
If SecurityMode = SecurityOff Then
KeySwitchArm VacationMode
End If
! ActionCodes=73,0,13,72,4,255
End Response

Response=KEYARMDayModeFro,
Number=71, Fixed=Yes, Description="KEY ARM Day Mode from Security Off"
If SecurityMode = SecurityOff Then
KeySwitchArm DayMode
End If
! ActionCodes=73,0,13,72,3,255
End Response

Response=KEYARMAwayFromSe,
Number=72, Fixed=Yes, Description="KEY ARM Away from Security Off"
If SecurityMode = SecurityOff Then
KeySwitchArm AwayMode
End If
! ActionCodes=73,0,13,72,1,255

End Response

Response=KEYARMNightFromS,
Number=73, Fixed=Yes,
Description="KEY ARM Night from Security Off or Day Mode"
If SecurityMode <> AwayMode Then
KeySwitchArm NightMode
End If
! ActionCodes=73,0,67,1,72,2,255
End Response

Response=ChimeSirenCondit,
Number=81,
Description="Chime Siren (Conditional) Operates if Flag 16=0"
If Flag Flag16 = 0 Then
Siren Chime
End If
! ActionCodes=132,16,2,13,64,15,255
End Response

Response=Disarm,
Number=82, Description="Disarm"
AutoArm SecurityOff
! ActionCodes=71,0,255
End Response

Response=AllOutputsX10AOf,
Number=83, Description="All Outputs & X10 A Off"
AllOutputs Off
X10 A0 AllUnitsOff
! ActionCodes=8,195,65,0,1,255
End Response

Response=CancelEntryDelay,
Number=84, Description="Cancel Entry Delay in Night Mode (entry door)"
If SecurityMode = NightMode Then
Cancel EntryDelay
End If
! ActionCodes=73,0,68,2,5,255
End Response

Response=VibrationAnalyse,
Number=85, Description="Vibration Analyser"
If Timer Timer08 = 0 Then
Do NullResponse After 30 Seconds Using Timer08
Set Counter07 = 0

```

End If
Increment Counter07
If Counter Counter07 >= 3 Then
    Stop Timer Timer08
Else
    Skip Alarm
End If
! ActionCodes=86,8,16,194,8,0,30,0,131,7,0,192,83,7,70,3,85,8,196,21,255
End Response

```

```

Response=DaylightSavingsT,
Number=88, Description="Daylight Savings Time"
If Day < 25 Then
    Exit Response
End If
If Month = 3 Then
    DSTAdjust +1
Else
    If Month = 10 Then
        DSTAdjust -1
    End If
End If
! ActionCodes=73,4,69,25,193,73,5,68,3,98,1,196,68,10,98,2,255
End Response

```

```

Response=IntelligentSetus,
Number=91,
Description="Intelligent Set (use in Zone Response for detector)"
If Arming <> 0 Then
    KeySwitchArm SecurityOff
    KeySwitchArm NightMode
End If
! ActionCodes=73,10,12,72,0,72,2,255
End Response

```

```

Response=DoorbellRecordin,
Number=92,
Description="Doorbell Recording M'box1 after 30s. Use in Alrm Type 25"
Record Mailbox 1 After 30 Seconds
! ActionCodes=135,1,30,255
End Response

```

```

Response=X10AllLightsHous,
Number=93,
Description="X10 All Lights Housecode 'A' ON (Downstairs Lights)"
X10 A0 AllLightsOn

```

! ActionCodes=195,65,0,3,255
End Response

Response=Flag16ON-ChimesA,
Number=94, Description="Flag 16 ON - Chimes.Announce OFF"
Set Flag Flag16
! ActionCodes=132,16,1,255
End Response

Response=Flag16OFF-Chimes,
Number=95, Description="Flag 16 OFF - Chimes. Announce ON"
Clear Flag Flag16
! ActionCodes=132,16,0,255
End Response

Response=AllOutputsOff,
Number=96, Description="All Outputs Off"
AllOutputs Off
! ActionCodes=8,255
End Response

Response=ArmSecuritySyste,
Number=97, Description="Arm Security System Menu"
Keypad Menu ArmSecurity
! ActionCodes=91,1,255
End Response

Response=BypassMenu,
Number=101, Fixed=Yes, Description="Bypass Menu"
Authorise SecurityMenu
Keypad Menu Bypass
! ActionCodes=99,32,91,8,255
End Response

Response=HomeControlMenu,
Number=102, Fixed=Yes, Description="Home Control Menu"
Authorise HomeControl
Keypad Menu HomeControl
! ActionCodes=99,64,91,4,255
End Response

Response=TestMenu,
Number=103, Fixed=Yes, Description="Test Menu"
Authorise SecurityMenu
Keypad Menu Test
! ActionCodes=99,32,91,7,255

End Response

Response=RecordMemoMenu,
Number=104, Fixed=Yes, Description="Record Memo Menu"
Keypad Menu RecordMemo
! ActionCodes=91,27,255
End Response

Response=EventLog,
Number=105, Fixed=Yes, Description="Event Log"
Authorise SecurityMenu
Keypad Menu EventLog Selection 0
! ActionCodes=99,32,134,6,0,255
End Response

Response=ChangePhoneMenu,
Number=106, Fixed=Yes, Description="Change Phone Menu"
Authorise Program
Keypad Menu ChangePhone
! ActionCodes=99,128,91,11,255
End Response

Response=ChangeCodeMenu,
Number=107, Fixed=Yes, Description="Change Code Menu"
Keypad Menu ChangeSignIn
! ActionCodes=91,24,255
End Response

Response=ChangeTimeProgra,
Number=98, Description="Change Time Program"
Authorise Program
Keypad Menu ChangeDate
! ActionCodes=99,128,91,10,255
End Response

Response=AnsweringMachine,
Number=109, Fixed=Yes, Description="Answering Machine Menu"
Authorise Program
Keypad Menu Answering
! ActionCodes=99,128,91,9,255
End Response

Response=EngineerCodeEnab,
Number=110, Fixed=Yes,
Description="Engineer Code Enable. Activate Alarm 30"
Engineer Enable

AlarmUser EngineerDial
! ActionCodes=92,1,88,30,255
End Response

Response=UserCodesMenu,
Number=111, Fixed=Yes, Description="User Codes Menu"
Authorise Program
Keypad Menu UserCodes
! ActionCodes=99,128,91,36,255
End Response

Response=ZoneMonitorKeypa,
Number=99, Description="Zone Monitor Keypad 1"
Voice Keypad 1
! ActionCodes=94,1,255
End Response

Response=ZoneMonitorKeyp0,
Number=100, Description="Zone Monitor Keypad 2"
Voice Keypad 2
! ActionCodes=94,2,255
End Response

Response=AssignPhoneToMai,
Number=108, Description="Assign Phone to Mailbox"
Keypad Menu AssignPhoneToMailbox
! ActionCodes=91,28,255
End Response

Response=ChangeTimeProgr0,
Number=115, Fixed=Yes, Description="Change Time Program"
Authorise Program
Keypad Menu TimeProgram
! ActionCodes=99,128,91,17,255
End Response

Response=Reminder8OnKeypa,
Number=112, Description="Reminder 8 on keypad 1"
Reminder 8 On Keypad 1
! ActionCodes=133,8,1,255
End Response

Response=StrobeOff,
Number=117, Fixed=Yes, Description="Strobe Off"
Strobe Off
! ActionCodes=66,0,255

End Response

Response=StrobeOnFor3Secs,
Number=118, Fixed=Yes,
Description="Strobe On for 3 secs (TMR 8) then Resp 117 (Strobe off)"
Strobe On
Do StrobeOff After 3 Seconds Using Timer08
! ActionCodes=66,1,194,8,0,3,117,255
End Response

Response=BabyMonitorKeypa,
Number=113, Description="Baby Monitor Keypad 2"
Baby Keypad 2
Keypad Menu BabyMonitor
! ActionCodes=93,2,91,25,255
End Response

Response=IntercomRequest,
Number=121, Fixed=Yes, Description="Intercom Request"
Keypad Intercom
! ActionCodes=22,255
End Response

Response=S12VOFFStartTime,
Number=122, Fixed=Yes, Description="S12V OFF. Start Timer"
Aux Off
Do S12VON After 3 Seconds Using Timer08
! ActionCodes=90,0,194,8,0,3,124,255
End Response

Response=S12VON,
Number=124, Fixed=Yes, Description="S12V ON"
Aux On
! ActionCodes=90,1,255
End Response

Response=AllOffSOP1,
Number=114, Description="All Off Scene RIO O/P 1"
IR Code IrCode06 To ScsRioOutput129
! ActionCodes=129,6,129,255
End Response

Response=S1OP1,
Number=116, Description="Scene 1 RIO O/P 1"
IR Code IrCode01 To ScsRioOutput129
! ActionCodes=129,1,129,255

End Response

Response=S2OP1,
Number=120, Description="Scene 2 RIO O/P 1"
IR Code IrCode02 To ScsRioOutput129
! ActionCodes=129,2,129,255
End Response

Response=S3OP1,
Number=125, Description="Scene 3 RIO O/P 1"
IR Code IrCode03 To ScsRioOutput129
! ActionCodes=129,3,129,255
End Response

Response=S4OP1,
Number=126, Description="Scene 4 RIO O/P 1"
IR Code IrCode04 To ScsRioOutput129
! ActionCodes=129,4,129,255
End Response

Response=S5OP1,
Number=127, Description="Scene 5 RIO O/P 1"
IR Code IrCode05 To ScsRioOutput129
! ActionCodes=129,5,129,255
End Response

Response=AllOffSOP2,
Number=128, Description="All Off Scene RIO O/P 2"
IR Code IrCode06 To ScsRioOutput130
! ActionCodes=129,6,130,255
End Response

Response=S1OP2,
Number=129, Description="Scene 1 RIO O/P 2"
IR Code IrCode01 To ScsRioOutput130
! ActionCodes=129,1,130,255
End Response

Response=S2OP2,
Number=130, Description="Scene 2 RIO O/P 2"
IR Code IrCode02 To ScsRioOutput130
! ActionCodes=129,2,130,255
End Response

Response=S3OP2,
Number=131, Description="Scene 3 RIO O/P 2"

IR Code IrCode03 To ScsRioOutput130
! ActionCodes=129,3,130,255
End Response

Response=S4OP2,
Number=132, Description="Scene 4 RIO O/P 2"
IR Code IrCode04 To ScsRioOutput130
! ActionCodes=129,4,130,255
End Response

Response=S5OP2,
Number=133, Description="Scene 5 RIO O/P 2"
IR Code IrCode05 To ScsRioOutput130
! ActionCodes=129,5,130,255
End Response

Response=AllOffSOP3,
Number=134, Description="All Off Scene RIO O/P 3"
IR Code IrCode06 To ScsRioOutput131
! ActionCodes=129,6,131,255
End Response

Response=S1OP3,
Number=135, Description="Scene 1 RIO O/P 3"
IR Code IrCode01 To ScsRioOutput131
! ActionCodes=129,1,131,255
End Response

Response=S2OP3,
Number=136, Description="Scene 2 RIO O/P 3"
IR Code IrCode02 To ScsRioOutput131
! ActionCodes=129,2,131,255
End Response

Response=S3OP3,
Number=137, Description="Scene 3 RIO O/P 3"
IR Code IrCode03 To ScsRioOutput131
! ActionCodes=129,3,131,255
End Response

Response=S4OP3,
Number=138, Description="Scene 4 RIO O/P 3"
IR Code IrCode04 To ScsRioOutput131
! ActionCodes=129,4,131,255
End Response

Response=S5OP3,
Number=139, Description="Scene 5 RIO O/P 3"
IR Code IrCode05 To ScsRioOutput131
! ActionCodes=129,5,131,255
End Response

Response=AlloffSOP4,
Number=140, Description="All Off Scene RIO O/P 4"
IR Code IrCode06 To ScsRioOutput132
! ActionCodes=129,6,132,255
End Response

Response=S1OP4,
Number=141, Description="Scene 1 RIO O/P4"
IR Code IrCode01 To ScsRioOutput132
! ActionCodes=129,1,132,255
End Response

Response=S2OP4,
Number=142, Description="Scene 2 RIO O/P4"
IR Code IrCode02 To ScsRioOutput132
! ActionCodes=129,2,132,255
End Response

Response=S3OP4,
Number=143, Description="Scene 3 RIO O/P 4"
IR Code IrCode03 To ScsRioOutput132
! ActionCodes=129,3,132,255
End Response

Response=S4OP4,
Number=144, Description="Scene 4 RIO O/P 4"
IR Code IrCode04 To ScsRioOutput132
! ActionCodes=129,4,132,255
End Response

Response=S5OP4,
Number=145, Description="Scene 5 RIO O/P4"
IR Code IrCode05 To ScsRioOutput132
! ActionCodes=129,5,132,255
End Response

Response=X10A3Bright4Step,
Number=146, Description="X10 A3 Bright 4 steps"
Start EntryDelay
X10 A3 Bright

! ActionCodes=4,195,65,3,11,255
End Response

Response=X10A4Dim4Steps,
Number=147, Description="X10 A4 Dim 4 steps"
Start EntryDelay
X10 A4 Dim
! ActionCodes=4,195,65,4,9,255
End Response

Response=X10A4Bright4Step,
Number=148, Description="X10 A4 Bright 4 steps"
Activate DoorPhone
X10 A4 Bright
! ActionCodes=9,195,65,4,11,255
End Response

Response=X10H1ONHeater,
Number=149, Description="X10 H1 ON (Heater) "
X10 H1 On
! ActionCodes=195,72,1,5,255
End Response

Response=X10H1OFFHeater,
Number=150, Description="X10 H1 OFF (Heater)"
X10 H1 Off
! ActionCodes=195,72,1,7,255
End Response

Response=DoorbellMacroegS,
Number=151,
Description="Doorbell Macro (e.g switch cameras - vacuum off)"
! ActionCodes=255
End Response

Response=NightArmOrTimedE,
Number=152, Description="Night Arm or Timed Exit & Rearm"
If AlarmState >= Alert Then
Exit Response
End If
If SecurityMode = NightMode Then
Siren ArmingTone
Bypass FrontDoor
Do UnbypassZone1Doo After 30 Seconds Using Timer07
Else
Do KEYARMNightFromS

```

End If
!
ActionCodes=73,9,70,2,193,73,0,68,2,64,3,75,1,194,7,0,30,155,196,74,73,255
End Response

Response=UnbypassZone1Doo,
  Number=155,
  Description="Unbypass Zone1 (Door) and Siren Off if idle state (Used with
Resp 225)"
  Unbypass FrontDoor
  If AlarmState = Idle Then
    Siren Off
  End If
  ! ActionCodes=76,1,73,9,13,7,255
End Response

Response=EntryAlertRespon,
  Number=156,
  Description="Entry Alert Response (7pm to 7 am. A1 light On)"
  If Hours < 19 Then
    If Hours >= 7 Then
      End If
    Else
      Do BR3AC1On
    End If
    ! ActionCodes=73,3,69,19,70,7,196,74,43,255
End Response

Response=GateGarageLtsON,
  Number=158, Description="Gate and Garage Lights ON"
  Do GateLgtOn
  Do CarLgt2On
  ! ActionCodes=74,9,74,17,255
End Response

Response=AwayModeLightsOF,
  Number=159, Description="Away Mode Lights OFF"
  Do CarLgt1Off
  Do CarLgt2Off
  Do AlloffSOP1
  Do AlloffSOP2 After 2 Seconds Using Timer01
  Do AlloffSOP3 After 3 Seconds Using Timer02
  Do AlloffSOP4 After 4 Seconds Using Timer03
  !
ActionCodes=74,14,74,18,74,114,194,1,0,2,128,194,2,0,3,134,194,3,0,4,140,25
5

```

End Response

Response=NightModeRespons,
Number=163,
Description="Switch off Carporch, Garage; Switch on Gatepole"
Do GateLgtOn
Do CarLgt1Off
Do CarLgt2Off
! ActionCodes=74,9,74,14,74,18,255
End Response

Response=untitledC,
Number=164, Description="untitled"
! ActionCodes=255
End Response

Response=untitledD,
Number=165, Description="untitled"
! ActionCodes=255
End Response

! Holidays
! =====

Holiday=NewYear, Month=1, Day=1
Holiday=Holiday02, Month=0, Day=0
Holiday=Holiday03, Month=0, Day=0
Holiday=Holiday04, Month=0, Day=0
Holiday=Holiday05, Month=0, Day=0
Holiday=Holiday06, Month=0, Day=0
Holiday=Holiday07, Month=0, Day=0
Holiday=Holiday08, Month=0, Day=0
Holiday=Holiday09, Month=0, Day=0
Holiday=Holiday10, Month=0, Day=0
Holiday=Holiday11, Month=0, Day=0
Holiday=Holiday12, Month=0, Day=0
Holiday=Holiday13, Month=0, Day=0
Holiday=Holiday14, Month=0, Day=0
Holiday=Holiday15, Month=0, Day=0
Holiday=Holiday16, Month=0, Day=0
Holiday=Holiday17, Month=0, Day=0
Holiday=Holiday18, Month=0, Day=0
Holiday=Holiday19, Month=0, Day=0
Holiday=Holiday20, Month=0, Day=0
Holiday=Holiday21, Month=0, Day=0
Holiday=Holiday22, Month=0, Day=0
Holiday=Holiday23, Month=0, Day=0

Holiday=Holiday24, Month=0, Day=0

! Answering

! =====

HomeRingCount=8

NightRingCount=8

AwayRingCount=3

DayRingCount=8

RecordTime=60

! Time Programs

! =====

TimeProgram=TimeProgram01,

Mon=Yes, Tue=Yes, Wed=Yes, Thu=Yes, Fri=Yes, Sat=Yes, Sun=Yes,

Hol=Yes, Hours=23, Minutes=0, Response=AutoArmNightFrom, Enabled=No

TimeProgram=TimeProgram02,

Mon=Yes, Tue=Yes, Wed=Yes, Thu=Yes, Fri=Yes, Sat=Yes, Sun=Yes,

Hol=Yes, Hours=0, Minutes=0, Response=AutoArmNightFrom, Enabled=No

TimeProgram=TimeProgram03,

Sat=Yes, Sun=Yes, Hol=Yes, Hours=0, Minutes=0,

Response=AutoArmNightFrom, Enabled=No

TimeProgram=TimeProgram04,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram05,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram06,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram07,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram08,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram09,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram10,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram11,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram12,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram13,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram14,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram15,

Hours=0, Minutes=0, Response=NULLResponse, Enabled=No

TimeProgram=TimeProgram16,
Hours=0, Minutes=0, Response=NullResponse, Enabled=No

! Reminders

! =====

Reminder=Reminder01,
Hours=0, Minutes=0, Mailbox=0, Enabled=No
Reminder=Reminder02,
Hours=0, Minutes=0, Mailbox=0, Enabled=No
Reminder=Reminder03,
Hours=0, Minutes=0, Mailbox=0, Enabled=No
Reminder=Reminder04,
Hours=0, Minutes=0, Mailbox=0, Enabled=No
Reminder=Reminder05,
Hours=0, Minutes=0, Mailbox=0, Enabled=No
Reminder=Reminder06,
Hours=0, Minutes=0, Mailbox=0, Enabled=No
Reminder=Reminder07,
Hours=0, Minutes=0, Mailbox=0, Enabled=No
Reminder=Reminder08,
Hours=0, Minutes=0, Mailbox=0, Enabled=No

! Vacation Programs

! =====

VacationProgram=VacProgram01,
Hours=0, Duration=0
VacationProgram=VacProgram02,
Hours=0, Duration=0
VacationProgram=VacProgram03,
Hours=0, Duration=0
VacationProgram=VacProgram04,
Hours=0, Duration=0
VacationProgram=VacProgram05,
Hours=0, Duration=0
VacationProgram=VacProgram06,
Hours=0, Duration=0
VacationProgram=VacProgram07,
Hours=0, Duration=0
VacationProgram=VacProgram08,
Hours=0, Duration=0

! Counters

! =====

Counter=Counter00, Number=0
Counter=Counter07, Number=7

! Flags

! =====

Flag=Flag01, Number=1

Flag=Flag16, Number=16

! Outputs

! =====

Output=Output01, Number=1

Output=Gate, Number=2

Output=Output03, Number=3

Output=Output04, Number=4

Output=Output05, Number=5

Output=Output06, Number=6

Output=Output07, Number=7

Output=Output08, Number=8

Output=Output09, Number=9

Output=1stVergolaOpen, Number=10

Output=1stVergolaClose, Number=11

Output=2ndVergolaOpen, Number=12

Output=2ndVergolaClose, Number=13

Output=GateLgt, Number=14

Output=Output015, Number=15

Output=CarporchLght, Number=16

Output=GarageLght, Number=18

Output=Output018, Number=19

Output=LRAC, Number=20

Output=DRAC, Number=21

Output=MBAC1, Number=22

Output=MBAC2, Number=23

Output=BR2AC, Number=24

Output=FoyerAC, Number=25

Output=BR3AC1, Number=26

Output=BR3AC2, Number=27

Output=1stHeater, Number=28

Output=MBHeater, Number=29

Output=BR2Heater, Number=30

Output=BR3Heater, Number=31

! Virtual Outputs

! =====

! Timers

! =====

Timer=Timer01, Number=1

Timer=Timer02, Number=2

Timer=Timer03, Number=3

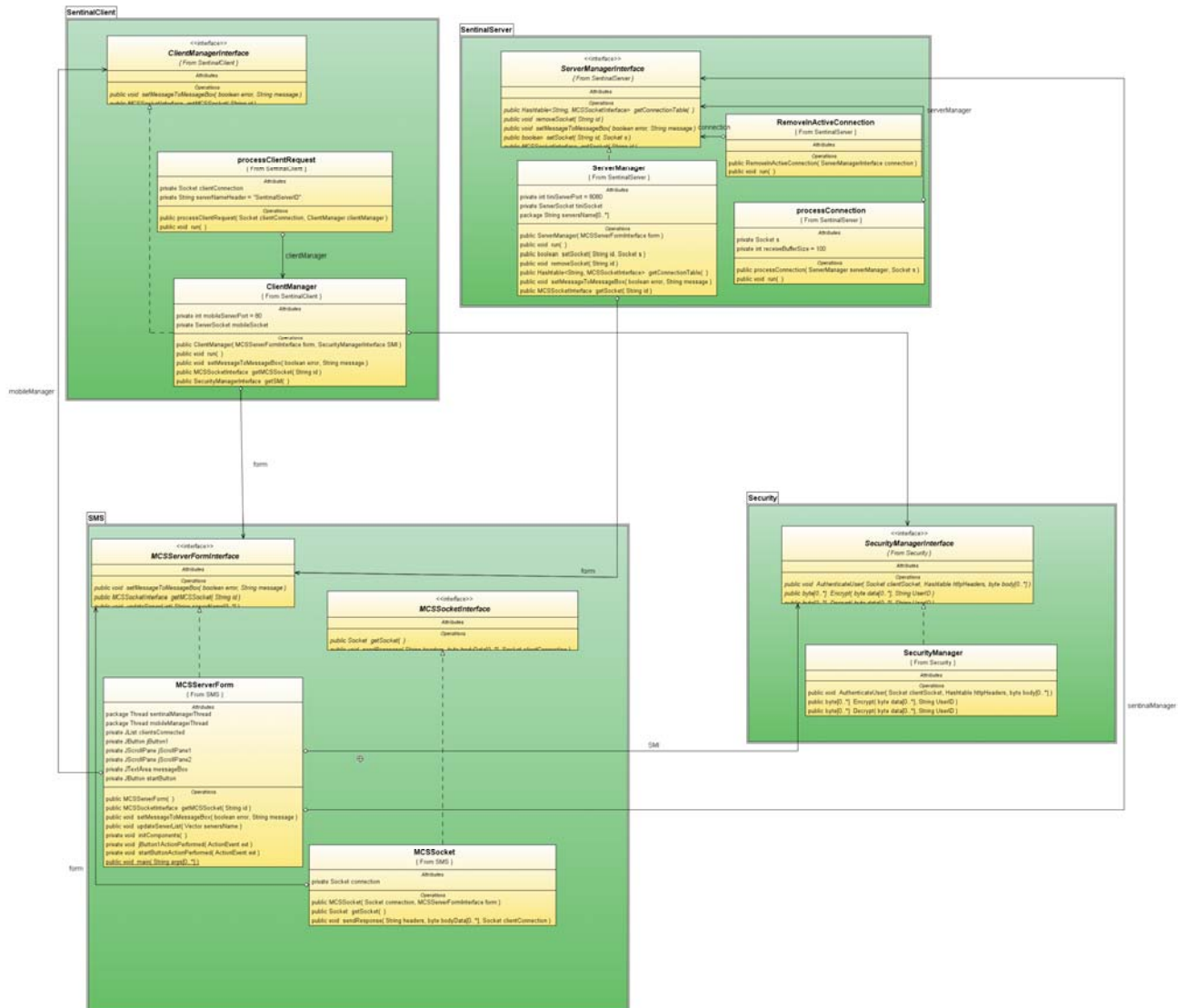
Timer=Timer07, Number=7
Timer=Timer08, Number=8

! UCMs

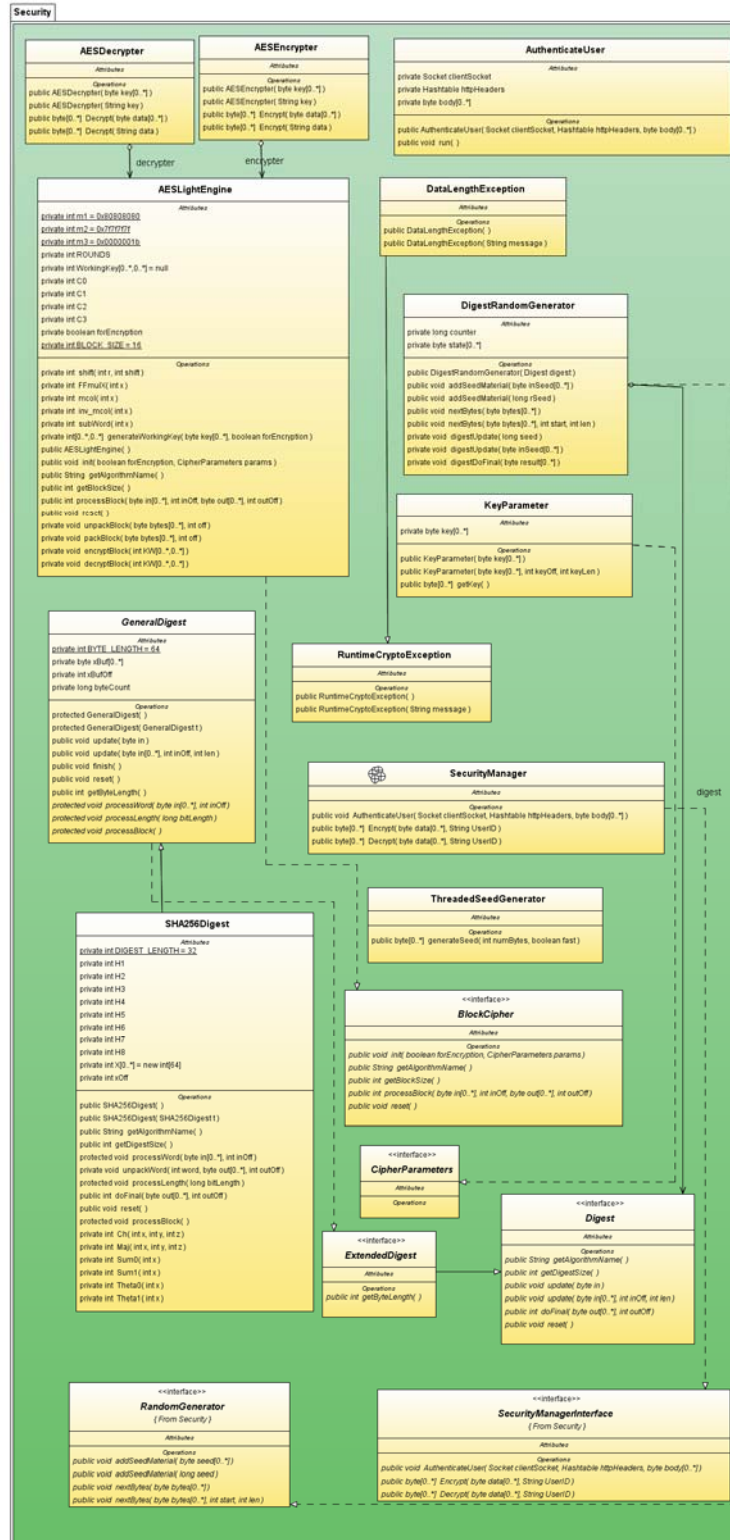
! =====

UCMX=UCM01, Number=1, Type=General
UCMX=UCM02, Number=2, Type=General
UCMX=UCM03, Number=3, Type=General
UCMX=UCM04, Number=4, Type=General
UCMX=UCM05, Number=5, Type=General
UCMX=UCM06, Number=6, Type=General
UCMX=UCM07, Number=7, Type=General
UCMX=UCM08, Number=8, Type=General

12.3 Appendix D (Sentinel Management Server Class Diagrams)

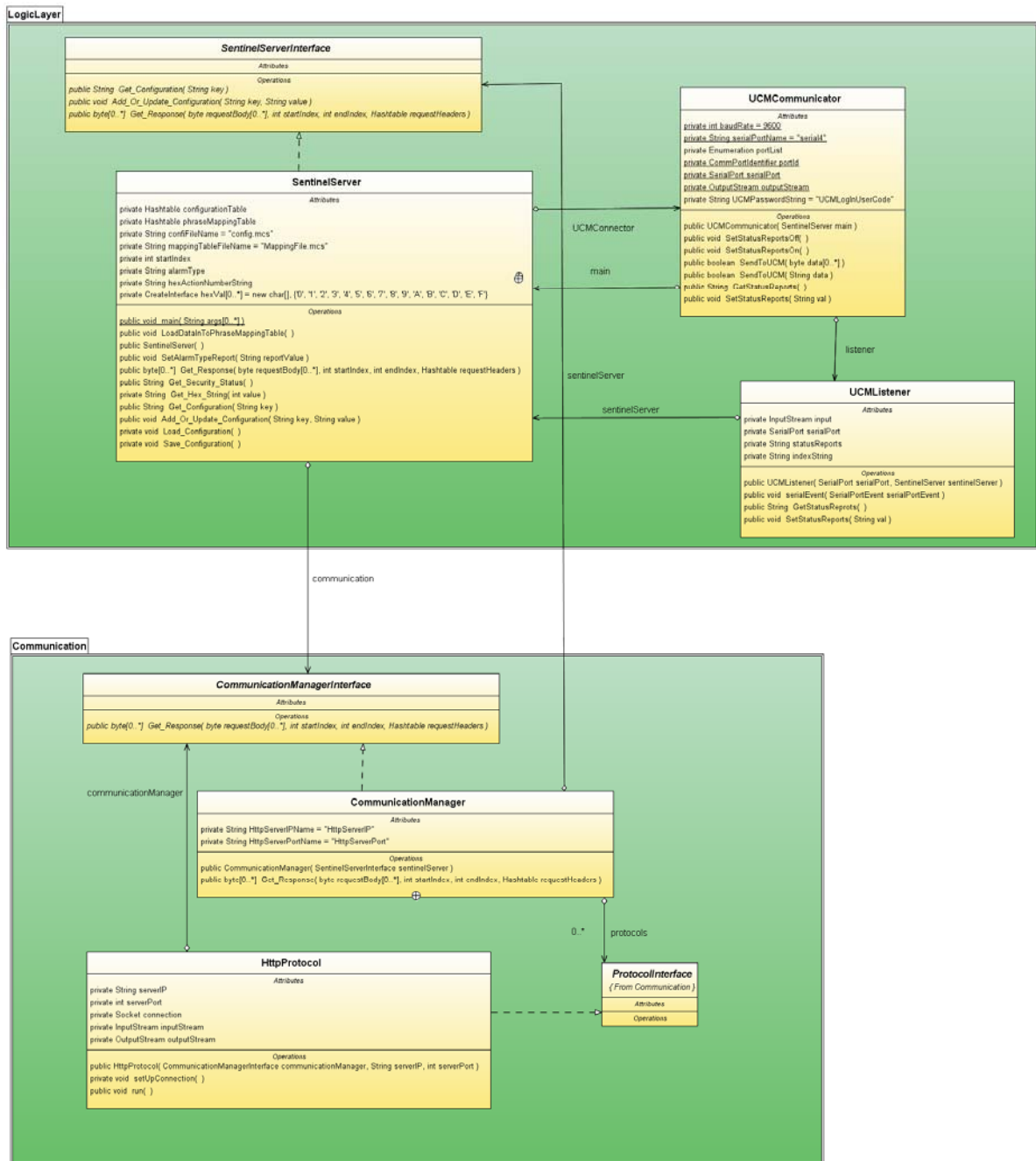


Reversed Engineered Class Diagram



Reversed Engineered Security Class Diagram

12.5 Appendix E (Sentinel Server Class Diagrams)



Reversed Engineered Class Diagram Of Sentinel Server