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Confidentiality		Public <input checked="" type="checkbox"/>	Private <input type="checkbox"/>	
Hardware Compatibility	Product Line	AirPrime	Series	
			Q26xx	SL60xx
			SL80xx	WMPxx
Software Compatibility	Series		ALL	

1 Version

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2 Introduction

This Application Note (APN) is provided to Sierra Wireless distributors and clients to aid more rapid development of embedded applications using the Sierra Wireless portfolio of cellular solutions. To request a new application note, contact your regional Sierra Wireless Product Marketing Manager.

Fax is the term for the electronic transmission of printed documents over a phone line.

There are basically two Fax classes as defined below.

Class 1:

This includes Class 1 and Class1.0. Class 1 is a standard defined by EIA/TIA-578 (1990). Its implementation is fairly standard across manufacturers. Common Class 1 commands are "AT+FTH=3", "AT+FRM=146" and AT+FTS=7. Class 1.0 is a standard defined by ITU-T.31. This standard is almost identical to its predecessor, EIA/TIA-578 with the addition of a few advanced commands and, in its Amendment 1, defines a slightly different communication method to be used with V.34-Fax (SuperG3).

Class 2:

This includes Class 2, Class2.0 and Class 2.1. Class 2 is a standard defined by the unfinished 1990 draft of what shall later become EIA/TIA-592. Common Class 2 commands are "AT+FDR" (receive data), "AT+FDCC=?" (Describe DCE capabilities), and "AT+FDIS=?" (Describe DCE settings). Some manufacturers, most notably Rockwell, have derived a standard on this draft of the Class 2 standard years before it was published. Because this standard has significantly changed between 1990 and 1993 and there were so many Class 2 modems in use that supported the 1990 draft, a distinction has been made between Class 2 drafts. Class 2.0 is a standard defined by EIA/TIA-592 (1993). Common commands are "AT+FDR" (receive data), "AT+FCC=?" (Describe DCE capabilities), and "AT+FIS=?" (Describe DCE settings). Class 2.1 is a standard defined by ITU-T.32. It is an extension to Class 2.0. In addition to the features supported in Class 2.0, a Class 2.1 modem may support "extended" resolutions beyond normal and fine, and it may also support V.34-Fax.

3 Overview

Data communication from Sierra Wireless modules is done through the Data layer, which is a part of the firmware. Sierra Wireless modems support both Fax classes. They are implemented as a library in the Data layer. The Fax library manages all Fax related operations for the module.

Fax AT commands

All the Fax related AT commands are sent to the Data layer. The Data layer calls the Fax library function to handle the functionality. Fax related AT commands for different Fax classes are explained in section 5.

Fax session management

This includes management of call setup, release, disconnection, handover etc.

Fax parameter configurations

Parameters and other configurations are saved in EEPROM and RAM. The Fax library manages the same for its internal variables.

The Fax library also takes care of the data security. For this reason the transmission of Fax data must be in non-transparent mode.

4 Glossary

Initials	Definition
FCM	Flow Control Manager

5 Send/Receive Fax Using AT Commands

The Sierra Wireless module supports various AT commands for Fax-related operations. This section describes the AT commands to be used to configure various options and send/receive Fax.

5.1 Initial Configuration

The settings configuration on the transmitter side and receiver side are explained below:

5.1.1 Configuration On Transmitter Side

```
AT+CBST=6,0,0
```

```
OK
```

```
AT+FCLASS=1 // 2 should be used for Class 2
```

```
OK
```

```
AT+FCR=0
```

```
OK
```

```
AT+IPR=0
```

```
OK
```

5.1.2 Configuration On Receiver Side

```
AT+CBST=6,0,0
```

```
OK
```

```
AT+FCLASS=1 // 2 should be used for Class 2
```

```
OK
```

```
AT+FCR=1
```

```
OK
```

```
AT+IPR=0
```

```
OK
```

5.2 Send Fax

The sequence of commands to be used for sending a Fax is described below. Prior to issuing these commands, the sender side must be configured with the settings detailed in the previous section.

5.2.1 Send a Fax Class 2

```
AT+FCLASS=2 // Select Fax class 2
```

```
OK
```

```
AT+FLID= Local Fax
```

```
OK
```

```
ATD0601234567 // Call establishment
```

```
+FCON // Connection OK
```

```
[+FCSI: RemoteFax ]
```

```
+FDIS:0,3,0,2,0,0,0,0
```

```
OK
```

```
AT+FDT // Beginning of data transfer
```

```
+FDCS:0,3,0,2,0,0,0,0
```

```
CONNECT
```

```
<0x11h> // Send carrier
```

```
// First page data terminated by <0x10h><0x03h>
```

```
OK
```

```
Page transmitted
```

```
AT+FET=0 // Send another page
```

```
+FPTS:1 // First page acquitted
```

```
OK
```

```
AT+FDT
```

```
CONNECT
```

```
<0x11h> // Send carrier
```

```
// Second page data terminated by <0x10h><0x03h>
```

```
OK
```

```
Page transmitted
```

```
AT+FET=2 // No more page
```

```
+FPTS:1 // First page acknowledged
```

```
+FHNG:0 // Normal end of connection
```

```
OK
```

5.3 Receive Fax

The sequence of commands to be used to receive a Fax is described below. Prior to receiving responses, the receiver side must be configured with the settings mentioned in the previous section.

5.3.1 Receive a Fax class 2

```
AT+FCR=1
```

```
OK
```

```
AT+FLID= LocalFax
```

```
OK
```

```
RING           // Incoming call
```

```
ATA           // Answer
```

```
+FCON        // Connection OK
```

```
[+FTSI: RemoteFax ]
```

```
+FDCS:0,3,0,2,0,0,0,0
```

```
OK
```

```
AT+FDR
```

```
+FCFR
```

```
+FDCS:0,3,0,2,0,0,0,0
```

```
CONNECT
```

```
<0x12h>       // Receive page carrier
```

```
              // First page data terminated by <0x10h><0x03h>
```

```
+FPTS:1       // First page acknowledged
```

```
+FET:0        // To receive another page
```

```
OK
```

```
AT+FDR
```

```
CONNECT
```

```
<0x12h>       // Receive page carrier
```

```
              // Second page data terminated by <0x10h><0x03h>
```

```
+FPTS:1       // Second page acknowledged
```

```
+FET:2        // No more page to receive
```

```
OK
```

```
AT+FDR
```

```
+FHNG:0       // Normal end of connection
```

```
OK
```

6 Send/Receive Fax using Open AT Framework

Open AT Framework does not provide direct APIs to send/receive Fax. However, it can be achieved by using different Open AT Framework features along with the AT commands provided by Sierra Wireless to send and receive Fax. This section explains how an application must be implemented to be able to send/receive Fax.

6.1 Open AT Framework Features to Be Used

1. AT Command APIs

This feature is used to issue Fax related AT commands to the module. The configuration and AT commands set up mentioned in the previous section must be issued using the *AT command* APIs. The responses for these AT commands can be managed within the response handlers.

2. Flow Control Manager APIs

This feature is used to send and receive all Fax data sent to and from the GSM network. Hence, the user must subscribe to the GSM Flow feature. After the successful configuration and setup of the module to send and receive Fax, data can be sent and received using the Flow Control APIs.

3. Call APIs

This feature is used to answer the Fax call on the receiver side. The user must subscribe to the Call feature. This feature can also be used to make an outgoing Fax call for sending Fax.

6.2 Initial Configuration

The necessary settings on transmitter and receiver sides, detailed in section 5.1 must be configured using the AT command APIs. The API to be used is `adl_atCmdCreate ()`. The user must make sure that all the settings are entered correctly by managing the responses in the response handler.

6.3 Send a Fax

This section details the Open AT Framework APIs that must be used to send a Fax.

1. Set all the configurations required for the Fax transmitter as explained in the previous section, using AT Command APIs.
2. Set the following parameters using the AT command API `adl_atCmdCreate ()`. Make sure that all the commands are executed successfully by handling the responses in the respective response handlers.

```
AT+FCLASS=2      // Select Fax class 2
```

```
OK
```

```
AT+FLID= Local Fax
```

```
OK
```

```
ATD0601234567    // Call establishment
```

```
+FCON            // Connection OK
```

```
[+FCSI: Remote Fax ]
```

```
+FDIS:0,3,0,2,0,0,0,0
```

```
OK
```

```
AT+FDT          // Beginning of the data transfer
```

```
+FDCS:0,3,0,2,0,0,0,0
```

```
CONNECT
```

3. Before establishing the call, the user must subscribe to the GSM Flow using the Flow Control Manager (FCM) APIs. Data can be sent to the network using the `adl_fcmSendData ()` API. After getting the "CONNECT" indication, the user can send data to the receiver.
4. After the first page has been sent successfully, an OK response is received in the response handler of "AT+FDT" command. After the page is transmitted, the following commands must be sent if another page must be transmitted.

```
AT+FET=0          // Send another page
+FPTS:1           // First page acquitted
OK
```

```
AT+FDT
CONNECT
```

5. After getting the "CONNECT" indication the user can send data to the receiver. Data can be sent to the network using the `adl_fcmSendData ()` API. So the second page can be sent to the network. An "OK" response is received in the response handler of the "AT+FDT" command, after the second page has been transmitted successfully.
6. Issue the following commands using the `adl_atCmdCreate ()` API to end the transmission of the Fax.

```
AT+FET=2          // No more page
+FPTS:1           // First page acknowledged
+FHNG:0           // Normal end of connection
OK
```

7. The reception of the "OK" message in the response handler of "AT+FET=2" will confirm that the Fax has been sent successfully.

6.4 Receive a Fax

This section explains the APIs and features that must be used to receive a Fax.

1. Set all the configurations required for the Fax receiver as explained in the previous section, using AT Command APIs.
2. Set the following parameters using the AT command API `adl_atCmdCreate()`. Make sure that all the commands are executed successfully by handling the responses in the respective response handlers.

```
AT+FCR=1
OK
```

```
AT+FLID= LocalFax
OK
```

3. The user must subscribe to the GSM Flow using the FCM APIs before receiving the *RING* indication.
4. The Application waits for the *RING* indication. For this, the application subscribes for the Call feature and answers the call on receiving the "RING" event in the call handler. Then it issues the following AT commands to set up the Modem in receiver mode.

```
RING              // Incoming call
ATA               // Answer
+FCON             // Connection OK
[+FTSI: RemoteFax ]
+FDCS:0,3,0,2,0,0,0
```

OK

AT+FDR

+FCFR

+FDCS:0,3,0,2,0,0,0,0

CONNECT

5. After getting the "CONNECT" indication the user will receive Data in the Data Handler of the GSM FCM Flow.
6. The user must subscribe for +FPTS and +FET unsolicited responses. This will indicate whether the modem is due to receive more pages. Receiving unsolicited events "+FPTS:1" and "+FET:0" means that module is going to receive another page.
7. This page is again received in the GSM Data Handler after issuing the command "AT+FDR" using the adl_atCmdCreate () API.

AT+FDR

CONNECT

8. The second page is received in the GSM Data Handler. After the unsolicited responses "+FPTS:1" (the second page is acknowledged) and "+FET:2" (no more page to be received) the user must issue the commands "AT+FDR" to end the connection. The unsolicited response "+FHNG:0" will ensure a normal end of connection.

7 Information from Operator

This information will be required from the network operator in order to create a PPP dial up session.

- The GPRS APN, username & password.

8 Support

For direct clients: contact your Sierra Wireless FAE

For distributor clients: contact your distributor FAE

For distributors: contact your Sierra Wireless FAE

9 Document History

Level	Date	History
001	May 16, 2005	Creation
002	May 04, 2007	Updated
003	January 25, 2012	New reference: 2170020 Old reference: WM_ASW_OAT_APN_028

10 Legal Notice

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Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless modems may be used at this time.

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