

Eider – GSM SMS / GPRS Radio System

Introduction

The Eider hardware extends the capability of the existing OTS family. Osprey integrated a quad band GSM radio for global usage, furthermore it adds support of GPRS for lower cost solutions.

Using the GSM network allows remote radio controls to be linked up with plug and play ease on the day of an event. Data can be sent to the arena or even directly to the internet for live web results.

Data is collected from either SportIdent or EMIT timing hardware. Each packet received is stored in non-volatile memory and allocated a unique Record Number. This record is then transmitted via SMS or GPRS across the GSM network to any receiving device.

An Osprey Terminal can be configured as the destination of the SMS messages. When used in conjunction with the Windows™ Osprey Management software, a laptop PC can be configured to recreate the original SportIdent or EMIT data stream.



Figure 1: Eider Control

Eider Control Technical Specification

Quad band 850, 900, 1800 & 1900MHz GSM modem.

2200mAh Rechargeable Li-Ion Battery (2 day operating life)

Storage for 16380 Records

Supported SportIdent Timing Hardware:

BSM7-D-RS232 configured as an AutoSend Control Station operating at 4800 baud

BSM6-D-RS232 configured as an AutoSend Control Station operating at 4800 baud

Supported Emit Timing Hardware:

Online Control operating at 9600 baud

In addition to standard mode, here is also an extended EMIT mode. In Extended mode, the Eider unit inserts a TimeStamp into the EMIT packet to allow accurate time calculation on the receiving end. However the receiving software needs to support this mode.

Eider Control External Interfaces:

9Pin Serial RS232 Male Connector (For Timing Hardware)

Eider Control External Interfaces:

Battery Isolate Switch
SIM Card Socket
Power Connector

Ordering Information

Order Code	Description
GPP-EID-CTRL	Eider Control Kit
GPP-OSP-TERM	Osprey Terminal Kit

Eider Setup SMS

- 1) Open the waterproof lid of the Eider remote unit by releasing the 4 screws.
- 2) Charge the unit as detailed in the 'Eider Charging' section
- 3) Fit a SIM to the remote unit. Note: There must not be a PIN set on the SIM
- 4) Reset the flash memory
- 5) Configure the SMS base phone number

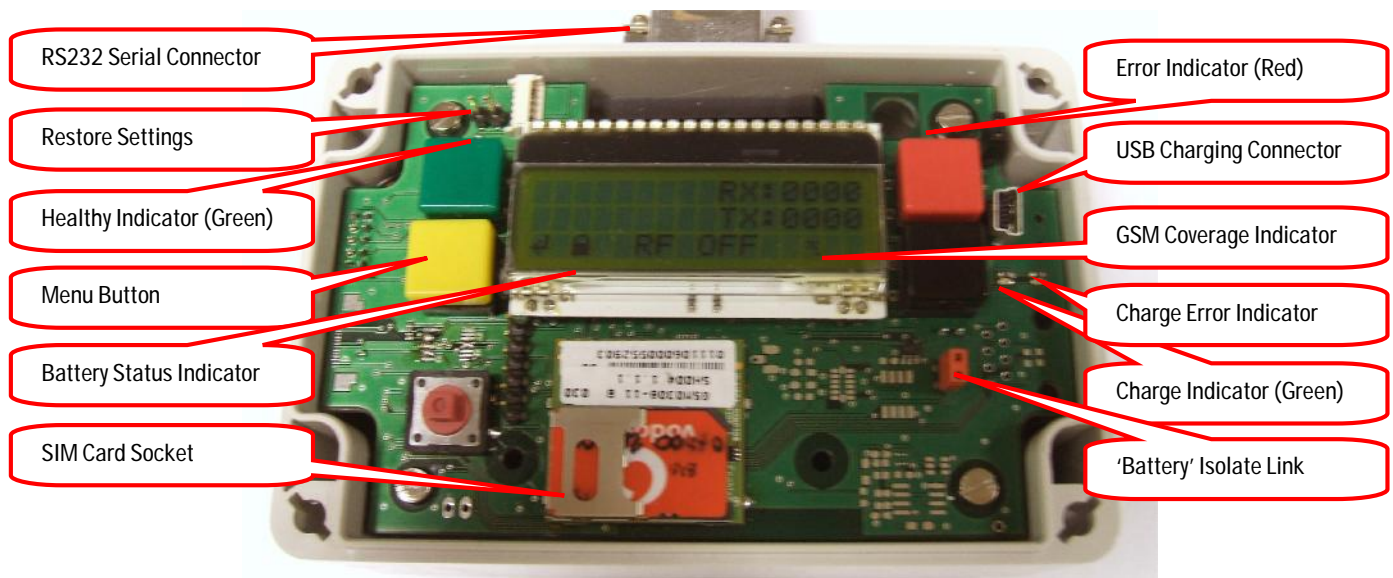


Figure 2: Anatomy of an Eider

Eider Charging

- 1) Charge the battery on the Eider remote unit
 - a. Connect the charging adaptor to the 'USB' socket of the Eider unit and fit the 'Battery' link on the Eider unit power switch in quick succession.
 - b. Confirm that within 30 seconds the battery indicator on the screen confirms that the battery is charging.
 - c. The green charging indicator will also become lit.
 - d. When fully charged the green indicator will be extinguished, The battery can be fully charged in less than 6 hours.
 - e. When charging is completed, remove the charger from the socket and remove the 'Battery' link.

Note: It is possible to charge the unit while it is running. In this case, the unit 'Battery' link should be connected first. When the unit has completed initialisation; connect the charging adaptor to the 'USB' socket of the unit.

- 2) Connect the Control to the serial port on the Eider remote unit.

Eider Configuration

Eider includes a menu driven configuration system. Typically the four buttons have consistent functions regardless of the menu system, these are as follows:

- Yellow – ‘Menu’ move to next menu item
- Green – ‘Default’ restore this setting to its factory default
- Red – ‘Up’ change the configuration up
- Black – ‘Down’ change the configuration down

Menu Hardware

This menu selects what hardware is connected to the RS232 serial input, options are:

- SportIdent
- Emit
- Emit – Insert Timestamp



Menu Communications

This menu selects what communication protocol is used to transmit the data over the GSM:

- SMS
- GPRS



Menu Flash Status

This menu shows the current record archive memory status including the number or records received and stored from the control unit and the number sent to the GSM network. From this menu you can adjust the ‘Sent’ number which will cause the most recently received records to be resent.



Menu Boot Count

The boot count is a number that helps in time correction (Primarily used in EMIT). Normally it does not need to be changed. However usefully the green button here provides a quick method to ‘Reset Flash’, this resets both the Stored and Sent counters to zero and returns you to the previous screen for confirmation.



Menu Base Number

This menu configures the telephone number of the receiving / base device. This is the number where SMS messages are sent.

The maximum length of this field is 14 characters, if you need less then set the character to a blank space.

Examples: 07777123456 or 00447777123456



Menu Primary IP

This is the real world IP address where data is sent when using GPRS. Note you should pad the number with zeros to make it 3 characters long.

Example: 12.34.56.7 becomes 012.034.056.007



Menu Secondary IP

This is the backup real world IP address where data is sent when using GPRS. Note you should pad the number with zeros to make it 3 characters long.

Example: 12.34.56.7 becomes 012.034.056.007



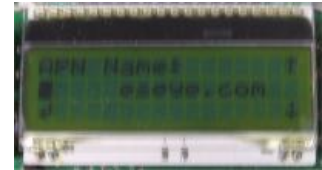
Menu UDP Port Number

This is the destination port number on the real world IP addresses, where the GPRS data is sent.



Menu GPRS APN

This menu configures the GPRS APN that can be used by this SIM card for bridging to the internet. We support up to 14 characters in the APN name, if your name is shorter then just append spaces to the front.



Menu GPRS APN Username

This menu configures the GPRS APN Username, this is provided to the network when logging onto the GPRS network. We support up to 8 characters in this field, if your username is shorter then just append spaces to the front



Menu GPRS APN Password

This menu configures the GPRS APN Password, this is provided to the network when logging onto the GPRS network. We support up to 8 characters in this field, if your password is shorter then just append spaces to the front



Menu Status Interval

The Eider unit can automatically send a status message over the GSM network after a given period of no activity. This allows the receiving device to know if it has received all the data packets and the current status of the Eider unit. To disable this feature set the interval to 0 minutes.



Menu Maximum Time Offline

The GSM modem in the Eider unit is normally offline / asleep, this increases the battery life of the radio control. However if the base wants to communicate with the Eider unit then it needs to periodically come online even if there are no new records to send. The Max Offline setting configures how often the modem comes online to see if the base is trying to communicate with it. The smaller this number the shorter the battery life, the longer this number then the longer you might have to wait for missing records to come through. Setting this time to 0 will cause the unit to stay online.



Menu Stay Awake Time

This GSM modem will remain online after sending a record to the base. When using power saving this provides a window of opportunity for the base to communicate with the Eider unit.



Eider Operation

The default screen for the Eider unit shows the status of the device.

RX: Indicates the number of punch records received / stored

TX: or SMS: Indicates the number of punch records delivered over the GSM network

The bottom edge of the LCD indicates the status of the battery, the connected status and the signal strength on the GSM network. (Note the signal strength indicator is only valid when the GSM modem is online)



The connected status can have the following states:

- RF OFF – The GSM radio is powered off and is asleep

- SEARCH – The GSM radio is searching for a network
- ONLINE – The Eider has registered on a network
- ROAM – The Eider has registered on a foreign network
- DENIED – The Eider has been unable to register on a GSM network (Is there a SIM card inserted?)
- STAT TX – A status message has been sent
- SMS TX – A SMS message has been sent
- SMS ERR – An SMS failed to send (Do you have credit available on the SIM?)
- ATTACH – The Eider unit has attached to the GPRS network and is attempting to log on
- GPRS – The Eider unit has successfully connected to the GPRS network

Eider SMS Protocol

Eider sends ASCII characters within the SMS packets. This is used for transferring the records and also configuring the unit.

DATA RECORD (Sent from Eider to the configured base number)

SMS Payload: "d33330A4142434445464748494A"

d = Data Record

3333 = Record Part | Record Number (e.g 0x3333)

Mask with 0x3FFF to give the record number

Mask with 0xC000 to give the Record Part

0x0000 = Full Record

0x4000 = Record First Half

0x8000 = Record Second Half

0A = Number of bytes following (e.g 0x0A)

41424344454647484950 = Record Data (e.g. 0x41 0x42 0x4A or "ABCDEFGHJIJ")

The protocol supports the splitting of individual records across SMS's. This is achieved by using the top two bits of the Record Number. So Record Number 0x0001 is a complete record 1. 0x4001 is the first half of record 1. 0x8001 is the second half of record 1. These bits are ignored when Re-requesting records.

RECORD REQUEST (Sent to the Eider unit)

SMS Payload: "r000200040007THRU30003002"

r = Record Request

0002 = Re-request Record Number 0x0002

0004 = Re-request Record Number 0x0004

0007THRU3000 = Re-records Records 0x0007 through to 0x3000

3002 = Re-request Record Number 0x3002

SET BASE NUMBER (Sent to the Eider unit)

SMS Payload: "sbB07920100100"

s = Set Request

b = Base Number

B = number of characters following in hex (e.g 0xB)

07920100100 = New Base Number

STATUS RECORD (Sent from Eider to the configured base number)

The Status record comprises the following Bytes:

srrrr11stbtimestcgb1

Where each character corresponds to a character in the message as described :

s Status Message. The character 's' indicating a status message

rrrr Packet id . 4 characters representing the packet id e.g. 1a06

st Status Message Two characters '73' indicating a status message

bt Boot Count Two characters indicating the number of times the unit has been power cycled e.g. 05. The value wraps at 0xff

timest Timestamp. Six ASCII characters giving a copy of the timestamp counter when the status message was sent. The timestamp counter is reset when the Osprey hardware is power cycled. The Time Stamp field counts up and wraps when it reaches 0xFFFFF.

The timestamp counter runs from an internal 32.768kHz clock and increments 0.0078125 mS (128Hz).

Cg Charging Status. The value '07' indicates that the battery is currently being charged

Bl Battery level The battery level indication in one of 5 steps 00, 14, .. 64 indicating battery remaining of 0%, 20% , ... , 100%

OVERTEMPERATURE RECORD (Sent from Eider to the configured base number)

The Status record comprises the following Bytes:

```
crrrrllstbttimestcgl
```

Where each character corresponds to a character in the message as described :

c Over Temperature Message. The character 'c' indicating an over temperature message

rrrr Packet id . 4 characters representing the packet id e.g. 1a06

st Status Message Two characters '73' indicating a status message

bt Boot Count Two characters indicating the number of times the unit has been power cycled e.g. 05. The value wraps at 0xff

timest Timestamp. Six ASCII characters giving a copy of the timestamp counter when the status message was sent. The timestamp counter is reset when the Osprey hardware is power cycled. The Time Stamp field counts up and wraps when it reaches 0xFFFFF.

The timestamp counter runs from an internal 32.768kHz clock and increments 0.0078125 mS (128Hz).

Cg Charging Status. The value '07' indicates that the battery is currently being charged

Bl Battery level The battery level indication in one of 5 steps 00, 14, .. 64 indicating battery remaining of 0%, 20% , ... , 100%

CRITICAL VOLTAGE RECORD (Sent from Eider to the configured base number)

The Status record comprises the following Bytes:

```
srrrrllstbttimestcgl
```

Where each character corresponds to a character in the message as described :

v Critical Voltage Message. The character 's' indicating a Critical Voltage message

rrrr Packet id . 4 characters representing the packet id e.g. 1a06

st Status Message Two characters '73' indicating a status message

bt Boot Count Two characters indicating the number of times the unit has been power cycled e.g. 05. The value wraps at 0xff

timest Timestamp. Six ASCII characters giving a copy of the timestamp counter when the status message was sent. The timestamp counter is reset when the Osprey hardware is power cycled. The Time Stamp field counts up and wraps when it reaches 0xFFFFF.

The timestamp counter runs from an internal 32.768kHz clock and increments 0.0078125 mS (128Hz).

Cg Charging Status. The value '07' indicates that the battery is currently being charged

Bl Battery level The battery level indication in one of 5 steps 00, 14, .. 64 indicating battery remaining of 0%, 20% , ... , 100% Normally 0% for a critical Voltage message.

EMIT Extended Mode

Since the EMIT online control packets do not contain a timestamp, if the commentary software wants to do any accurate timing calculations on the received data we recommend enabling the EMIT Extended Mode. In this mode the OTS hardware inserts a timestamp field into the EMIT packet immediately after the start of packet character.

```
<STX>"M"<OTS Hardware Address><Boot Count><Time Stamp><TAB><Rest of original EMIT packet...
```

<STX> = The original EMIT start of frame

<M> = Character 'M' to signify the Mode field

<OTS Hardware Address> = Two ASCII characters giving the OTS hardware address "30" = 0x30

This is used to identify the OTS hardware that inserted the Timestamp field

<Boot Count> = Two ASCII characters giving the Initialisation Counter "02" = 0x02. This is used to calculate the zero of the Timestamp field. This counter is stored in non-volatile memory and wraps when it reaches 0xFF.

<Time Stamp> = Six ASCII characters giving a copy of the timestamp counter when the packet was received. The timestamp counter is reset when the OTS hardware is rebooted and the boot count will be incremented at that moment

too. The Time Stamp field counts up and wraps when it reaches 0xFFFFFFFF. The timestamp is sent Most Significant Byte first.

The timestamp counter runs from an internal 32.768kHz clock and increments 0.0078125 mS (128Hz).

Electrical Characteristics

The Eider unit contains a rechargeable 2200mAH Li-Ion battery, and will operate from this for at least two days without needing to be recharged.

The charging / power input is 5V DC and will draw 500mA when charging the battery, the device can be charged from a computer USB port assuming it can deliver the 500mA current required.

Under normal operation when plugged in continuously the device will consume less than 1kW hour per year.