



## S1c Daytona Specification



## IRIDIUM

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## Revision History

(This table will be filled in from V1.0 onwards, V1.0 being the first complete version of this document.)

| Version | Date                       | Author         | Comment                 |
|---------|----------------------------|----------------|-------------------------|
| V1.0    | 6 <sup>th</sup> March 2006 | Richard Davies | First reviewed version. |
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## List of References

| Ref | Title                                     | Document Number |
|-----|-------------------------------------------|-----------------|
| 1   | Product Requirement Specification         | C7032-RS-001    |
| 2   | Architecture Specification                | C7032-S-003     |
| 3   | Baseband Electronics Design Specification | C7032-S-007     |
| 4   | H1c transceiver board design approach     | C7478-TM-002    |
| 5   | H1c transceiver board schematics          | C7478-DL-001    |
| 6   | Audio Interface pcb                       | C7032-DL-010    |
| 7   | Accessory Interface pcb                   | C7032-DL-009    |
| 8   | SIM board for LBT                         | C7478-DL-003    |
| 9   | Antenna Latch for LBT                     | C7478-DL-007    |
| 10  | 'SuperCap' Reservoir Capacitor pcb        | C7478-DL-005    |
| 11  | DPL Protocol and Hardware Specification   | C7032-S-018     |

## 1 Introduction

This specification describes the Iridium S1c Daytona L-band transceiver (LBT). This will be sold as a 9522A L-band transceiver. This is the same description as the previous version derived from the Monaco H1b handset. For the purposes of this document the previous version of the LBT will be referred to as the S1b Daytona.

The mechanical casework remains identical to the older Sebring 9522 LBT.

The LBT is housed in a metal case. It requires an external power supply and has no keyboard or display. The user interface takes the form of a 25-way D type connector which presents various audio and data interfaces. External systems such as data terminals or telephony handsets connect to this interface.

## 2 Headline Specification

| Physical Specification          |                 |
|---------------------------------|-----------------|
| Length (with antenna connector) | 216.1mm (8.51") |

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|                                     |                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------|
| Length (without antenna connector)  | 196.4mm (7.73")                                                               |
| Width                               | 82.6mm (3.25")                                                                |
| Depth                               | 39.0mm (1.54")                                                                |
| Weight (approximate)                | 610g                                                                          |
|                                     |                                                                               |
| <b>Environment Specification</b>    |                                                                               |
| Operating Temperature Range         | -20°C to +60°C                                                                |
| Operating humidity range            | <85% RH                                                                       |
| Storage temperature range           | -40°C to +85°C                                                                |
|                                     |                                                                               |
| <b>RF Interface Specification</b>   |                                                                               |
| Frequency Range                     | 1616MHz to 1626.5MHz                                                          |
| Duplexing method                    | TDD (Time Division Duplex)                                                    |
| Oscillator stability                | ±1 ppm                                                                        |
| Input/Output impedance              | 50 Ohms                                                                       |
| Multiplexing method                 | TDMA/FDMA                                                                     |
|                                     |                                                                               |
| <b>DC Power Input Specification</b> |                                                                               |
| Main input voltage range            | +4.0VDC to +4.8VDC                                                            |
| Main input voltage nominal          | 4.4VDC                                                                        |
| Main input voltage ripple           | 40mVpp                                                                        |
| Peak input current (maximum)        | 3 A @ 4.4VDC                                                                  |
| Main input active power (average)   | 4 Watts (Data call)<br>2 Watts typical voice call with good path to satellite |
| Main input standby power (average)  | 600mW                                                                         |

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## 3 Interfaces

### 3.1 Antenna

The Daytona LBT antenna interface shall be presented on a standard 50Ω TNC coaxial connector mounted on the end of the LBT case.

### 3.2 User Connector

The User Connector is a 25-way D-type plug. The user interfaces carried on this connector are:-

- DC power
- Analogue audio
- Digital audio
- Digital Peripheral Link
- RS-232 Port

#### 3.2.1 DC power

The LBT requires an external DC power source of  $4.4V \pm 0.4V$  which shall be capable of supplying current of at least 3A to meet the peak demand of the unit when transmitting at full output power.

When power is supplied to the Daytona it will turn on.

#### 3.2.2 Power On/Off Control

An external on/off input shall be provided on a pin of the 25-way D connector as shown in table 1 below.

The EXT\_ON\_OFF control input is used to turn a powered Daytona on and off in a toggle fashion. The EXT\_ON\_OFF control input is normally left “floating” (i.e. high). It is pulled to GND level (i.e. low) for at least 270 ms then released to cause the Daytona to alternate from its current on/off state as shown in Table below

| Daytona Start State                                    | EXT_ON_OFF Control Input                                     | Daytona End State                                      |
|--------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------|
| Power is supplied, EXT_ON_OFF is floating, unit is off | EXT_ON_OFF is pulled to GND for at least 270ms then released | Power is supplied, EXT_ON_OFF is floating, unit is on  |
| Power is supplied, EXT_ON_OFF is floating, unit is on  | EXT_ON_OFF is pulled to GND for at least 270ms then released | Power is supplied, EXT_ON_OFF is floating, unit is off |

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The signal shall be deemed to be asserted when the voltage level on this pin is 0.5V or less.

The leakage current from this pin in the floating state shall not exceed 10  $\mu$ A.

The voltage at this pin in the floating state will be approximately 0.4 Volts below the DC supply voltage.

This pin may be voltage driven provided a series resistor of at least 2.2 kOhms is used, and the logic high level is between ( $V_{\text{supply}} - 0.4$ ) Volts and 5.5 Volts.

### **3.2.3 Analogue Audio**

Analogue audio input and output ports shall be provided on pins of the 25-way D connector as shown in §3.2.7 below. These shall operate with same nominal levels and configuration as the equivalent ports on the Sebring LBT as follows.

The analogue audio input port shall be a single-ended (unbalanced) input, presenting a minimum impedance of 10k $\Omega$  to ground. Nominal input level shall be 110mVp-p, and the LBT shall be able to accept a maximum input level of 2.0Vp-p without signal distortion (provided that its internal gains are set appropriately).

The analogue audio output port shall be a single-ended (unbalanced) output, capable of driving an impedance of 600 $\Omega$  or more. Nominal output level shall be 110mVp-p and the LBT shall be able to deliver undistorted audio up to 2.0Vp-p at this port.

### **3.2.4 Digital Peripheral Link (DPL)**

The DPL interface is composed of two ports: a full duplex asynchronous serial link for control messages and a PCM digital audio link for audio traffic. The protocol used on these ports is identical to other Monaco family products, see reference [11].

#### **3.2.4.1 DPL Control**

The DPL control (sometimes referred to as DPL UART) port shall be presented on pins of the 25-way D connector as shown in §3.2.7 below. *At the transceiver board, these signals operate at 3.15V logic levels.*

By use of configuration links inside the Daytona case, it shall be possible to configure the DPL control port as presented at the 25-way connector to operate either at standard RS-232 signalling voltages or at 2.9V logic level.

#### **3.2.4.2 DPL Audio**

The DPL digital audio port shall be presented on pins of the 25-way D connector. These signals shall operate at 2.9V digital levels as specified in reference [11].

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### **3.2.5 Data / Fax**

The data / fax port from the transceiver port shall be presented on pins of the 25-way D connector as shown in §3.2.7 below. This port shall operate at RS-232 standard signalling voltages, and provide the following signals:

- S\_TX (transmit serial data input to LBT),
- S\_RX (receive serial data output from LBT),
- DTR (data terminal ready input to LBT),
- DSR (data set ready output from LBT),
- RTS (request to send input to LBT),
- CTS (clear to send output to LBT),
- RI (ring indication output from LBT), and
- DCD (data carrier detect output from LBT).

### **3.2.6 90ms Synchronization Input**

This input is used in testing only.

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### 3.2.7 User Connector Pin Assignment

The 25-way male D type connector which carries the major interfaces to the LBT shall have a pin out as shown Table 1 below.

| Contact | Signal     | Description                                                 |
|---------|------------|-------------------------------------------------------------|
| 1       | EXT_ON_OFF | External connection for On / Off key input to Daytona LBT   |
| 2       | EXT_11HZ   | 90ms “frame sync” signal (used in testing)                  |
| 3       | EXT_GND    | Power Ground input to Daytona LBT                           |
| 4       | EXT_PWR    | Power input to Daytona LBT                                  |
| 5       | SPKR_AUD   | Speaker audio output from Daytona LBT                       |
| 6       | DA_TX      | PCM digital audio output from Daytona LBT                   |
| 7       | DF_RI      | Data / Fax Ring Indication output from Daytona LBT          |
| 8       | DF_RTS     | Data / Fax Request to Send input to Daytona LBT             |
| 9       | DF_S_TX    | Data / Fax (UART) data input to Daytona LBT                 |
| 10      | DF_DCD     | Data / Fax Data Carrier Detect output from Daytona LBT      |
| 11      | DA_FS      | PCM digital audio frame sync output from Daytona LBT        |
| 12      | DA_CLK     | PCM digital 2.048MHz audio clock output from Daytona LBT    |
| 13      | DF_S_RX    | Data / Fax data (UART) output from Daytona LBT              |
| 14      | 0V         | Signal ground, 0V signal reference and return               |
| 15      | MIC_AUD    | Microphone audio input to Daytona LBT                       |
| 16      | EXT_PWR    | Power input to Daytona LBT                                  |
| 17      | EXT_GND    | Power Ground input to Daytona LBT                           |
| 18      | DPL_TX     | Digital Peripheral Link (UART) data output from Daytona LBT |
| 19      | DF_DTR     | Data / Fax Data Terminal Ready input to Daytona LBT         |
| 20      | DPL_RX     | Digital Peripheral Link (UART) data input to Daytona LBT    |
| 21      | DF_DSR     | Data / Fax Data Set Ready output from Daytona LBT           |
| 22      | DF_CTS     | Data / Fax Clear to Send output from Daytona LBT            |
| 23      | 0V         | Signal ground, 0V signal reference and return               |
| 24      | DA_RX      | PCM digital audio input to Daytona LBT                      |
| 25      | 0V         | Signal ground, 0V signal reference and return               |

**Table 1: 25-way connector pin-out**

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### 3.3 Internal SIM

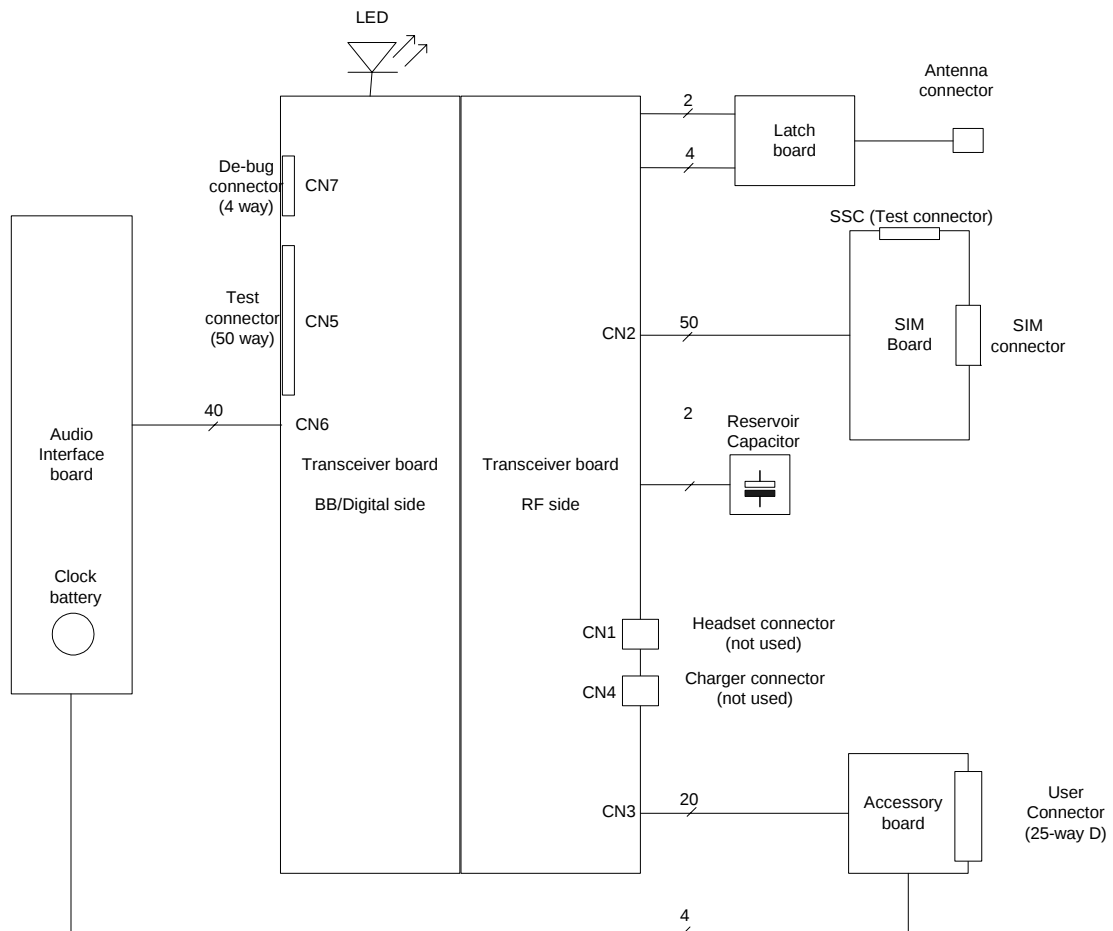
The LBT's internal SIM interface shall support small (postage-stamp) GSM-type SIM cards operating at 3V or 1.8V voltages.

### 3.4 Super Secret Connector (SSC)

The SSC connector on the baby board shall be used in the Daytona LBT for development and programming signals. The pin allocation of this connector is given in reference 3.

## 4 Major functional blocks

The major functional blocks of the S1C Daytona LBT are shown in the figure below.



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#### **4.1 Transceiver board**

The transceiver board is the same as is used in the H1c handset. The design approach is described in reference [4], the schematics are in reference [5].

#### **4.2 Audio interface board**

The Audio Interface Board is identical to that used in S1b Daytona, but the components and materials are selected for RoHS compliance. The schematics are in reference [6].

#### **4.3 Accessory board**

The Accessory Board performs the same functions as the Accessory board used in S1b Daytona. The only difference is that the signal ground and DC supply negative connection are kept separate on the new board. This takes best advantage of the improved grounding on the H1C transceiver board. The components and materials are selected for RoHS compliance. The schematics are in reference [7].

#### **4.4 SIM board**

The SIM Board is identical to that used in S1b Daytona, but the components and materials are selected for RoHS compliance. The schematics are in reference [8].

#### **4.5 Antenna Latch board**

The antenna latch board is very similar to that used in S1b Daytona. Some un-used components were removed and the components and materials are selected for RoHS compliance. The schematics are in reference [9].

#### **4.6 Reservoir capacitor assembly**

The reservoir capacitor assembly is identical to that used in the S1b Daytona and the handset, but the components and materials are selected for RoHS compliance. The schematics are in reference [10].