H1c Monaco Specification

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Subject: H1c Monaco Specification

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	10th March 2006	Peter Goldsmith	First reviewed version.

Distribution

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List of References

Ref	Title	Document Number
1	Product Requirement Specification	C7032-RS-001
2	Architecture Specification	C7032-S-003
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4	H1c transceiver board design approach	C7478-TM-002
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6	MMI board	C7478-DL-006
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1 Introduction

This specification describes the Iridium H1c Monaco L-band satellite handset. This will be sold as a 9505A handset. This is the same description as the previous version of the handset, which will be referred to as the H1b Monaco.

The mechanical casework remains identical to the older Laguna 9505 handset.

The handset is housed in a plastic case and is powered by a Lithium ion battery. The user interface is provided by a keyboard and display mounted on the MMI board. In normal use, the handset is self-contained, with built in microphone and speaker for voice calls, plus a socket for a headset. However, certain audio and data interfaces are also presented on a custom connector, called the Butt Connector, on the base of the handset.

2 Headline Specification

Physical Specification	
Length	157mm (6.18”)
Width	63mm (2.48”)
Depth (without antenna)	41mm (1.61”)
Weight (approximate)	310g (with battery) 240g (without battery)
Environment Specification	
Operating Temperature Range	-20°C to +60°C
Operating humidity range	<85% RH
Storage temperature range	-40°C to +85°C
RF Interface Specification	
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
DC Power Specification	
Battery type	Lithium Ion
Battery voltage	3.6V nominal
Battery capacity	2230mAh

3 Interfaces

3.1 Antenna

The handset's antenna interface is presented on a custom mechanical interface, which is compatible with the existing Iridium handset antenna designs.

3.2 Butt Connector

The Butt Connector is a 20-way custom plug. The user interfaces carried on this connector are:-

- Power On/Off control signal
- Digital audio
- Digital Peripheral Link
- RS-232 (Data/Fax) Port
- 90ms Synchronization input

3.2.1 Power On/Off Control

An external on/off input is provided on a pin of the 20-way Butt Connector as shown in table 1 below.

The EXT_ON_OFF control input is connected in parallel with the On/Off button on the keypad and is used to turn the handset on and off in a toggle fashion. The handset contains a 10k O pull-up resistor from this input to the battery positive voltage.

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 handset to alternate from its current on/off state as shown in Table below

Handset Start State	**EXT_ON_OFF Control Input**	**Handset 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

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 µA.

3.2.2 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 [10].

3.2.2.1 DPL Control

The DPL control (sometimes referred to as DPL UART) port shall be presented on pins of the 20-way Butt Connector as shown in §3.2.5 below. These signals operate at 2.9V logic levels as specified in reference [10].

3.2.2.2 DPL Audio

The DPL digital audio port shall be presented on pins of the 20-way Butt Connector. These signals operate at 2.9V digital levels as specified in reference [10].

3.2.3 Data / Fax

The data / fax port from the transceiver port shall be presented on pins of the 20-way Butt Connector as shown in §3.2.5 below. This port shall operate at RS-232 standard signalling voltages, and provide the following signals:

- S_TX (transmit serial data input to handset),
- S_RX (receive serial data output from handset),
- DTR (data terminal ready input to handset),
- DSR (data set ready output from handset),
- RTS (request to send input to handset),
- CTS (clear to send output from handset),
- RI (ring indication output from handset), and
- DCD (data carrier detect output from handset).

3.2.4 90ms Synchronization Input

This input is used in testing only.

3.2.5 User Connector Pin Assignment

The 20-way Butt Connector which carries the major interfaces to the handset shall have a pin out as shown Table 1 below.

Contact	Signal	Description
1	EXT_11HZ	90ms “frame sync” signal (used in testing)
2	EXT_ON_OFF	External connection for On / Off key input to handset
3	DA_FS	PCM digital audio frame sync output from handset
4	DA_CLK	PCM digital 2.048MHz audio clock output from handset
5	DA_TX	PCM digital audio output from handset
6	DA_RX	PCM digital audio input to handset
7	0V	Signal ground, 0V signal reference and return
8	DF_S_TX	Data / Fax (UART) data input to handset
9	EXT_PWR	Do not use
10	DF_S_RX	Data / Fax data (UART) output from handset
11	DPL_TX	Digital Peripheral Link (UART) data output from handset
12	EXT_GND	Do not use
13	DPL_RX	Digital Peripheral Link (UART) data input to handset
14	0V	Signal ground, 0V signal reference and return
15	DF_RI	Data / Fax Ring Indication output from handset
16	DF_DTR	Data / Fax Data Terminal Ready input to handset
17	DF_RTS	Data / Fax Request to Send input to handset
18	DF_DSR	Data / Fax Data Set Ready output from handset
19	DF_DCD	Data / Fax Data Carrier Detect output from handset
20	DF_CTS	Data / Fax Clear to Send output from handset

Table 1: 20-way Butt Connector pin-out

3.3 Internal SIM

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

3.4 Microphone

The microphone capsule connects to the transceiver board via an elastomer disc with a row of “zebra” contacts across its diameter.

The voltage and signal levels from the microphone are:

DC supply to the centre terminal 2.5 V dc through 2 kO , ring terminal 2 kO to ground.

AC signal level 25 mV pk-pk at 89.3 dB SPL.

3.5 Speaker

Two pads on the MMI board make contact with spring contacts on the rear of the speaker.

3.6 Sounder

Two pads on the Antenna Latch board make contact with spring contacts on the rear of the sounder. The signal level driving the sounder is 4.5 Volts peak-to-peak differential (maximum) into a 32O load

3.7 Headset connector

The headset is connected using a 2.5 mm switched jack socket. The signals on this socket are shown below:

External contact	**Signal name**	**Signal function**	**Signal level**
Sleeve	Ground	Ground	
Ring	Speaker	Speaker drive	1.5V ptp max. into 32 O
Tip	Microphone	DC bias to microphone plus audio from microphone	DC bias 2.5 V through 2 kO Nominal signal level 3.2mV rms Clipping level 45mV rms

3.8 Battery Connection

The battery is connected through four raised metal loops, which are soldered to pads on the transceiver board. These make contact with four sprung contacts in the rear plastic moulding

Contact No.	**Signal name**	**Signal level**
Z1	BATT_DATA	Bi-directional, 2.9V CMOS
Z2	0V	0 V return
Z5	VBAT	+3.6 V nominal
Z6	Detect	Not used

The BATT_DATA line uses the Dallas 1-wire signalling protocol to allow the microprocessor to communicate with the ‘gas gauge’ IC in the battery.

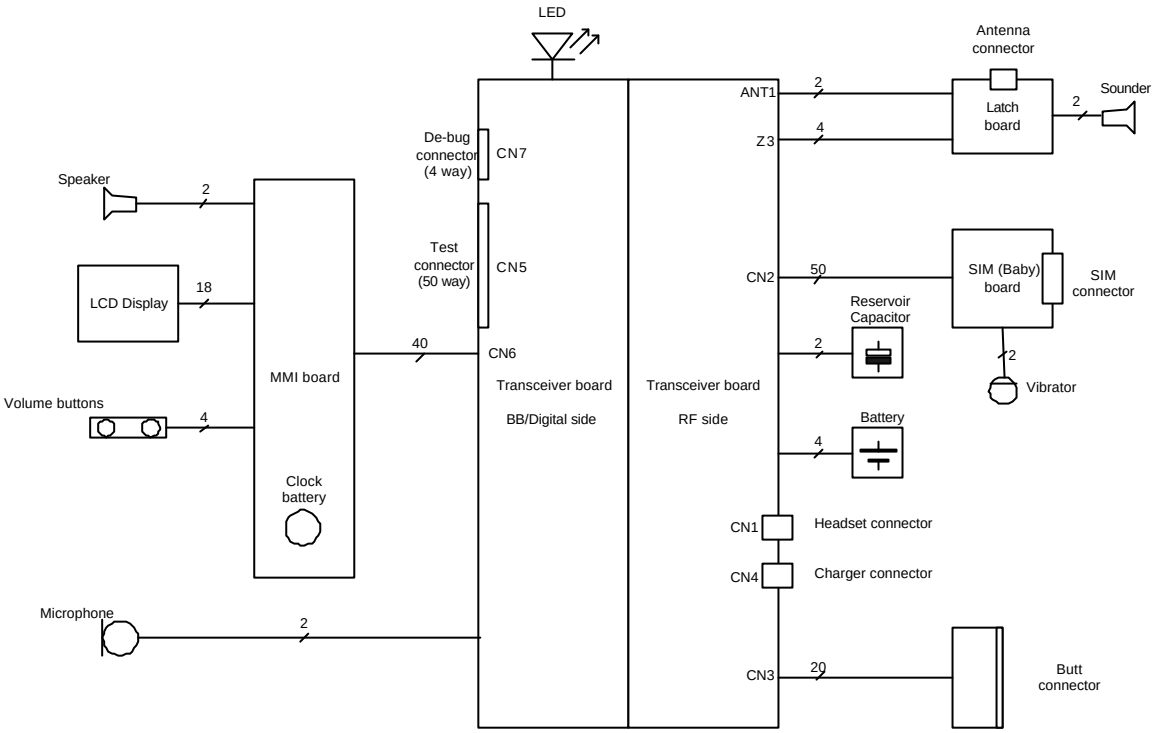
3.9 DC charging connector

The battery charger is connected via a 1mm DC power jack:

Pin No.	Signal name	Signal level
Centre	CHARGER_IN	+6V ± 0.3 V off-load
Ring	0V	0 V

4 Major functional blocks

The major functional blocks of the H1c Monaco handset are shown in the figure below.



4.1 Transceiver board

The transceiver board is the same as is used in the S1c LBT. The design approach is described in reference [4], the schematics are in reference [5].

4.2 MMI board

The MMI Board contains the keypad and the LCB display and is identical to that used in the H1b handset, but the components and materials are selected for RoHS compliance. The schematics are in reference [6].

4.3 SIM board

The SIM Board is identical to that used in H1b handset, but the components and materials are selected for RoHS compliance. The schematics are in reference [7].

4.4 Antenna Latch board

The antenna latch board is very similar to that used in H1b handset. Some unused components were removed and the components and materials are selected for RoHS compliance. The schematics are in reference [8].

4.5 Reservoir capacitor assembly

The reservoir capacitor assembly is identical to that used in the H1b handset, but the components and materials are selected for RoHS compliance. The schematics are in reference [9].