Technical Memo

TO: KTL
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Date: May 30, 2000
Subject: Technical Description of the Halo Infant/ECO Tag
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1. Introduction

The purpose of this memo is to give a top-level technical description of the Infant/ECO tag. The tag is used with the EXI Halo protection system. The following sections describe the form and operation of the infant and ECO tags.

2. Operation

The Infant/ECO tag is an RF transceiver that receives a 307 KHz signal and replies with a 433.92 MHz signal. The tag upon entering a 307 KHz field wakes up and communicates its serial number to the controller (base station). The controller, over the 307 KHz field (channel), transmits wakeup and respond commands to the tag and also initiates and controls the serial number interrogation.

The Infant/ECO tag only operates when in the 307 KHz field. When a tag enters the field it is prompted to power up by the wake up word that is transmitted by the controller (over 307 KHz field). Once powered up the tag will respond to the next wake up word with a 350µs pulse. This pulse prompts the controller to issue the serial number interrogation protocol command (bit by bit) and the serial number is extracted from the tag by the controller. Figure 1and Figure 2 illustrate this communication. The top traces show the output from the tag (433.92 MHz) and the bottom traces show the transmissions from the controller (307 KHz). The entire communication takes approximately 120ms (this time varies slightly from tag to tag based on the serial number). Figure 2 illustrates that the tag transmitter is working for approximately 80 ms of these 120 ms. For more information on the bit by bit protocol please refer to document “Bit-by-Bit Interrogation: Protocol Description” document number 970-000001-000.

Now that the tag in the field is identified, the controller must periodically check to see if the tag is still in the field. Approximately every 12 sec. the tag will wake up and respond with a 350µs pulse when it sees the controller transmit a respond command. This communication is shown in Figure 3 and Figure 4. Figure 3 shows a bit by bit communication followed by a respond 11.47 seconds later and Figure 4 illustrates in detail the respond communication pulse. The respond communication will continue until the controller issues a reset command and re-interrogates all the tags in the field. The reset and re-interrogation occurs once per minute. Once again this behavior is detailed in the document “Halo communication Protocol” document number 970-000002-000.

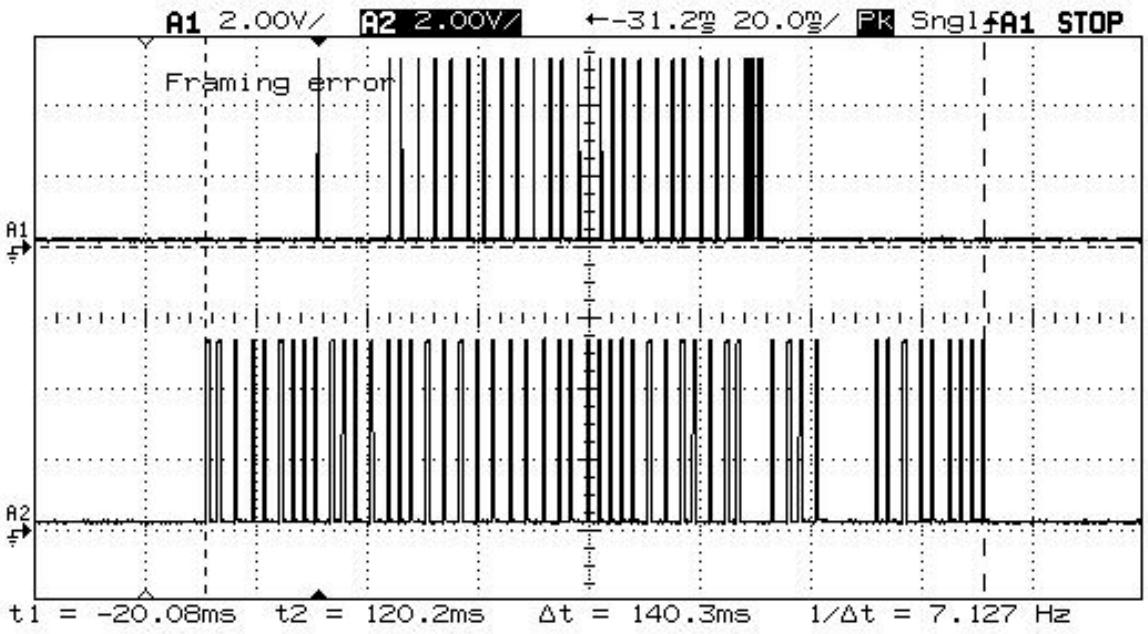

Figure 1: Bit by Bit communication example 1

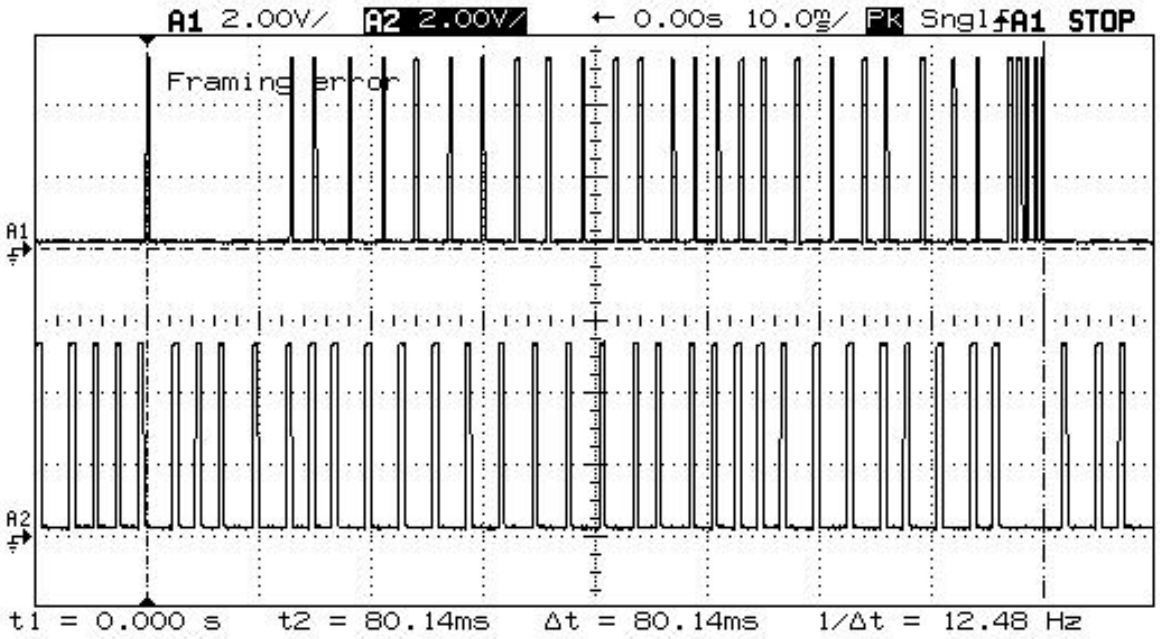

Figure 2: Bit by Bit communication example 2

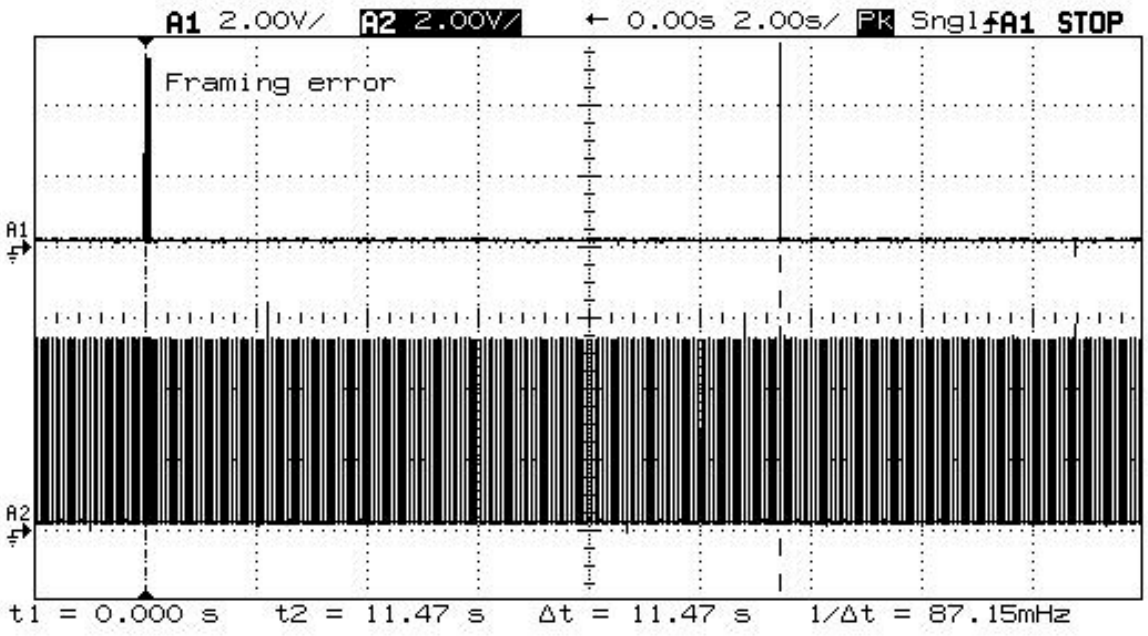

Figure 3: Bit By Bit communication followed by first respond

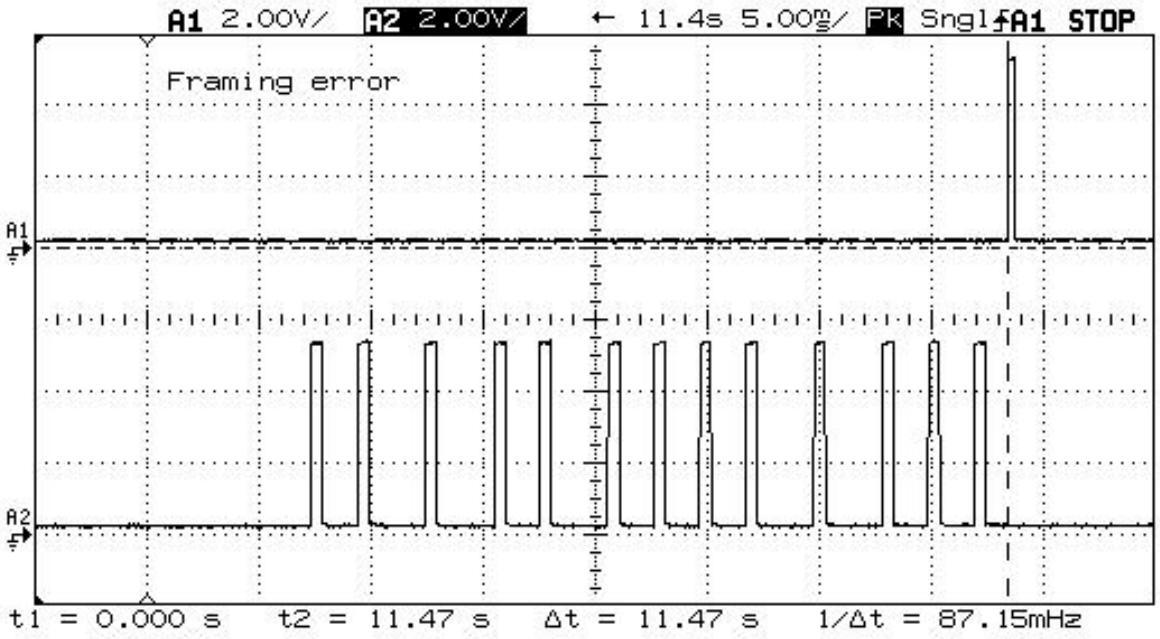

Figure 4: Respond Communication Example

3. Cases and markings

The tag comes in two forms, Infant (umbilical tag) and the ECO (wrist strap). The infant tag is intended to go onto an infant's umbilical cord and can be identified by the post protruding from the bottom side of the case. The other case is applied to a patient with a wrist strap. Both units will be using the same electronics. The following diagram, Figure 5, illustrates the two cases that will be used for these tags. The diagrams show where the FCC identifications will appear on the respective tags

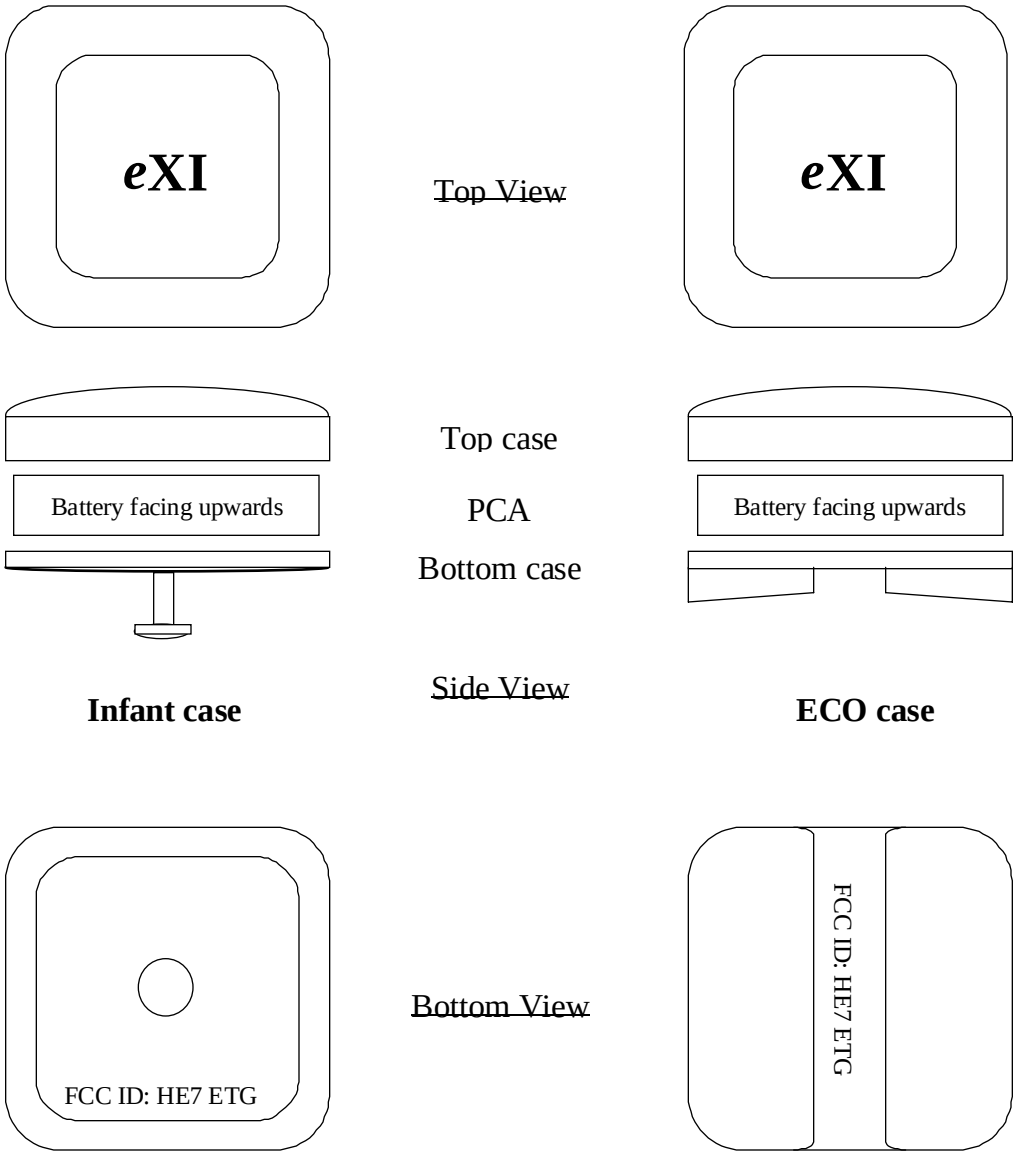

Figure 5: Cases and Markings for the Infant and ECO tags