

**Notes on using TMS3705A1DRG4 for
TI Low Frequency
Read Only & Read\Write Transponders**

MCU-RF Applications\System Team

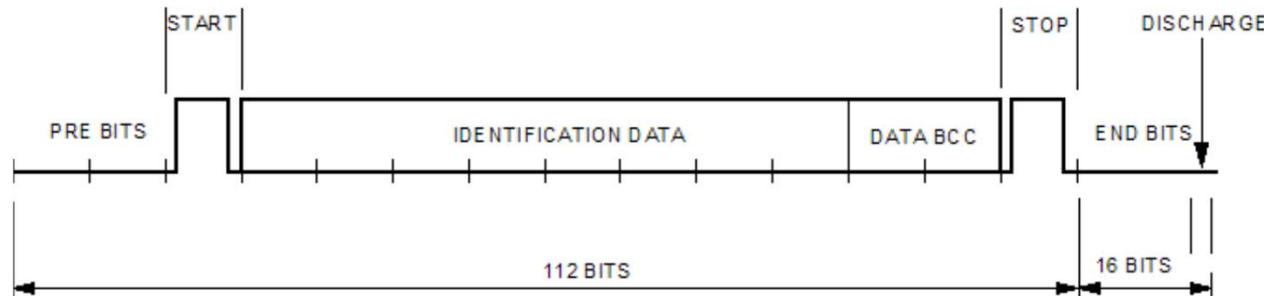
09\23\2010

Josh Wyatt

READ ONLY TAGS

Charge Only Read Sequence For Read-Only Tags (Overall Details)

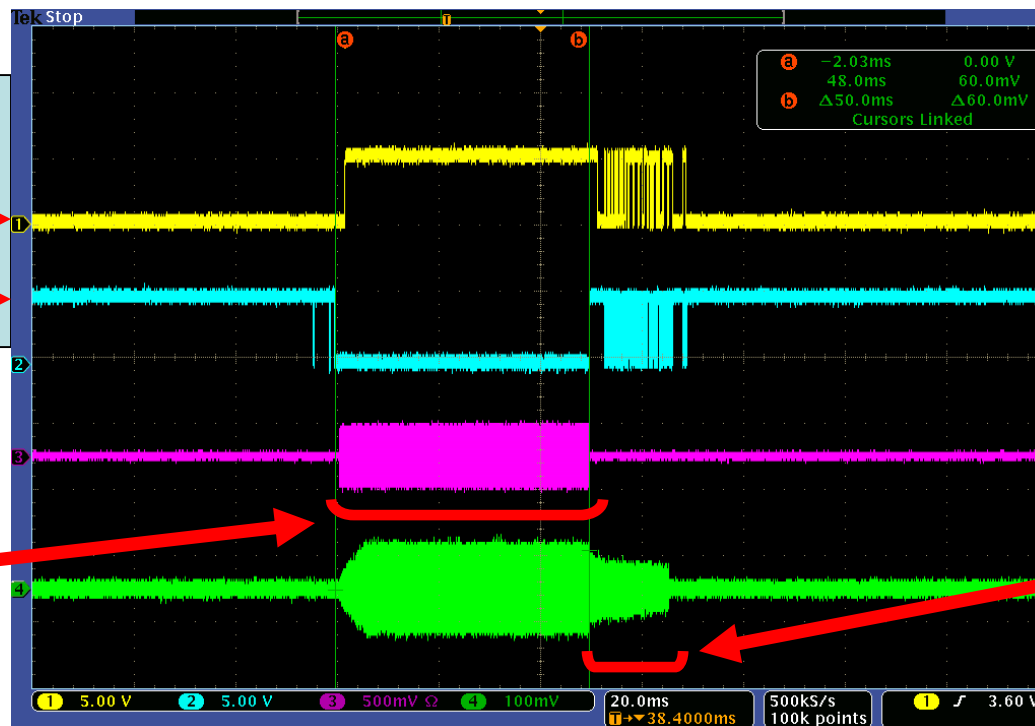
- TMS3705A1DRG4 generates 50mSec Charge Burst @ 134.2kHz. (using low on TXCT line)
- RO tag responds with Pre-Bits (0x0000), Start Byte (0x7E), Tag Data, CRC16 over that data, Stop Byte(0x7E) and End Bits



TMS3705A1DRG4
Digital Signals

SCIO Line →

TXCT Line →

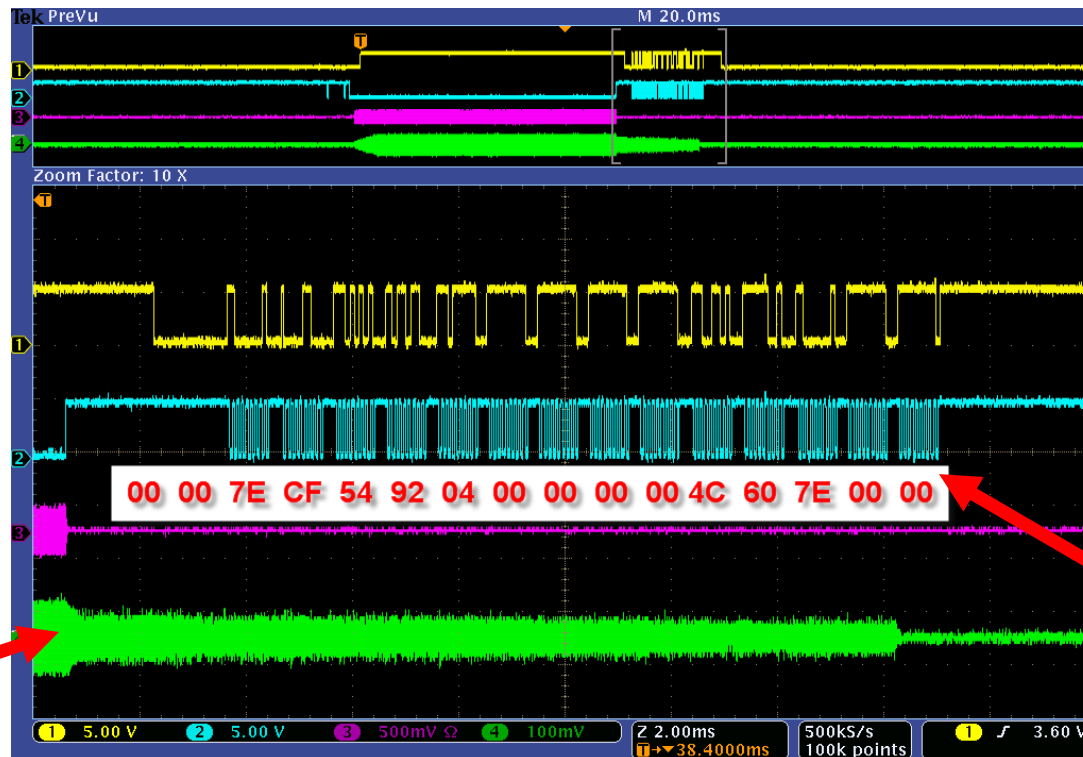


50mSec
Charge Burst
(over the air)

<20mSec Tag
Response
(over the air)

Charge Only Read Sequence for RO Tags (Overall Read Details)

- After 50mSec charge burst, RO tag responds with 128 bits total.
 - Pre-bits (16 bits, value will equal 0x0000)
 - Start Byte (8 bits, 0x7E)
 - Tag Data (64 bits)
 - CRC-16 (16 bits, over 64 bits of tag data, using polynomial of $x^{16}+x^{12}+x^5+x^1$, with start value of 0x0000). This CRC is calculated in the tag and returned for error checking purposes.
 - Stop Byte (8 bits, 0x7E)
 - End Bits (16 bits)
 - This particular tag is Read Only, has unique serial # of 00000000049254CF and a CRC of 604C



TMS3705A1DRG4
Digital Signals

SCIO Line →

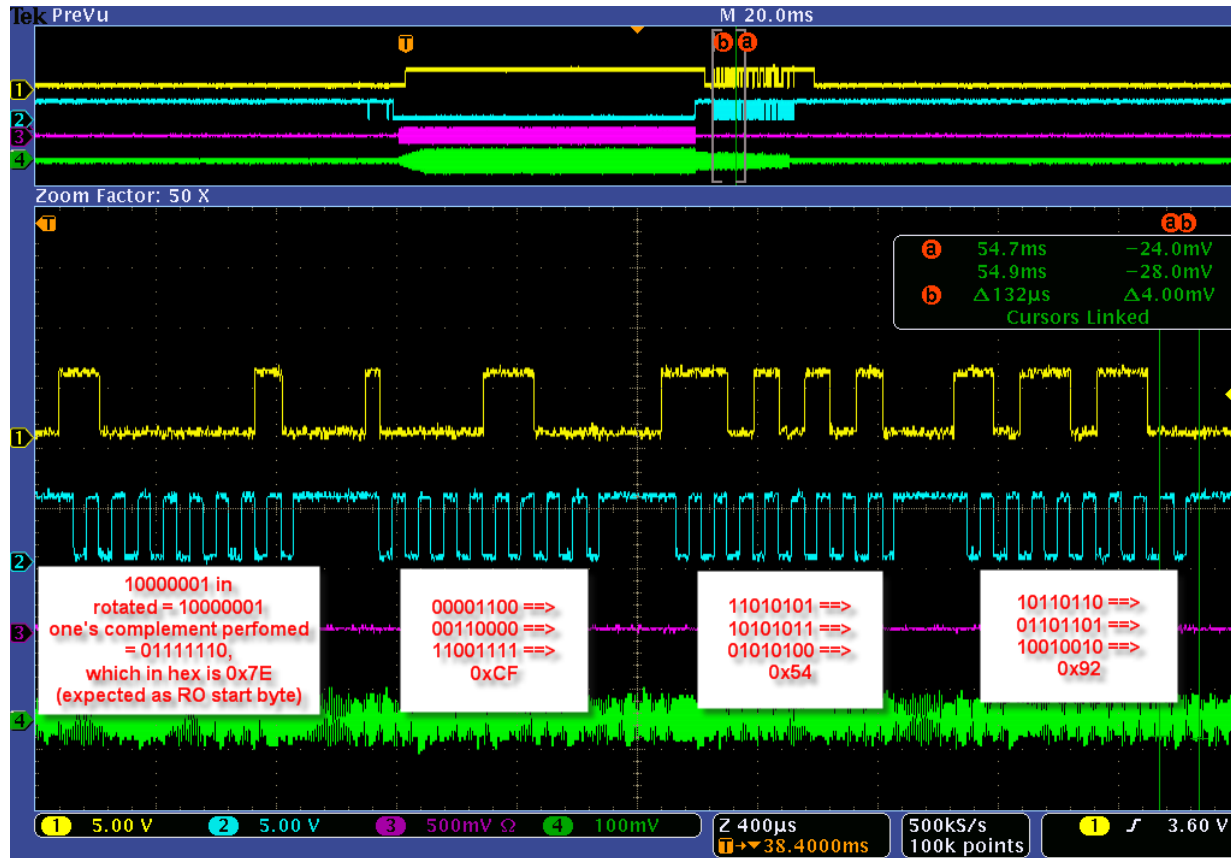
TXCT Line →

Tag Response
(over the air)

Complete Tag
Response
(in digital format and
converted to hex for
easy reading)

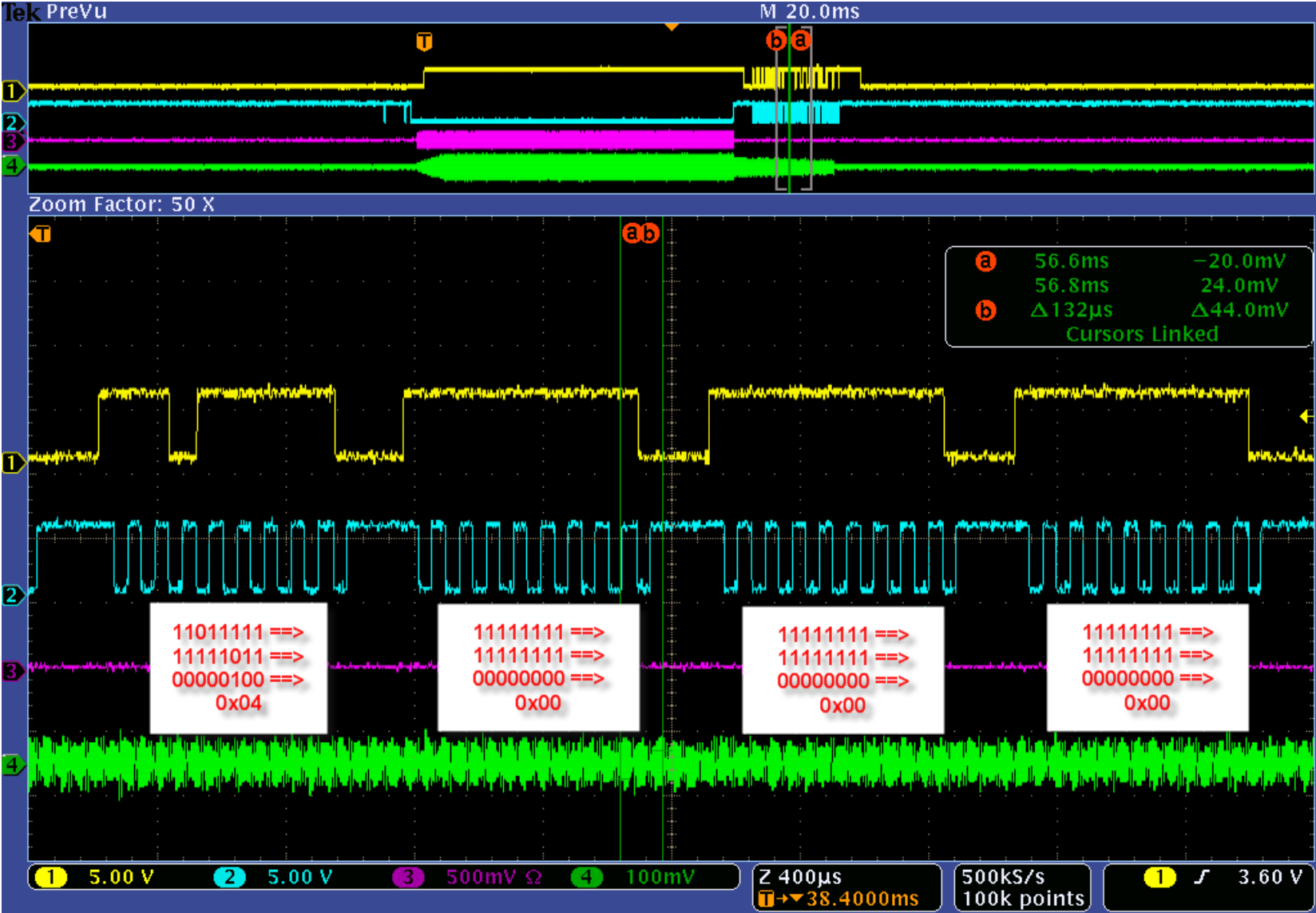
Reading TMS3705A1DRG4 Digital Response on Read Only Tag (using the TXCT and SCIO lines)

- TMS3705A1DRG4 uses TXCT and SCIO lines to pass demodulated and digitized tag response back to microcontroller.
- There are three basic rules to follow here when decoding the response in microcontroller.
 - Logic 1 = TXCT line goes high while SCIO line is high
 - Logic 0 = TXCT line goes high while SCIO line is low
 - Each byte group must be rotated as data comes in LSB first, then one's complement needs to be performed on the binary string to yield correct values.



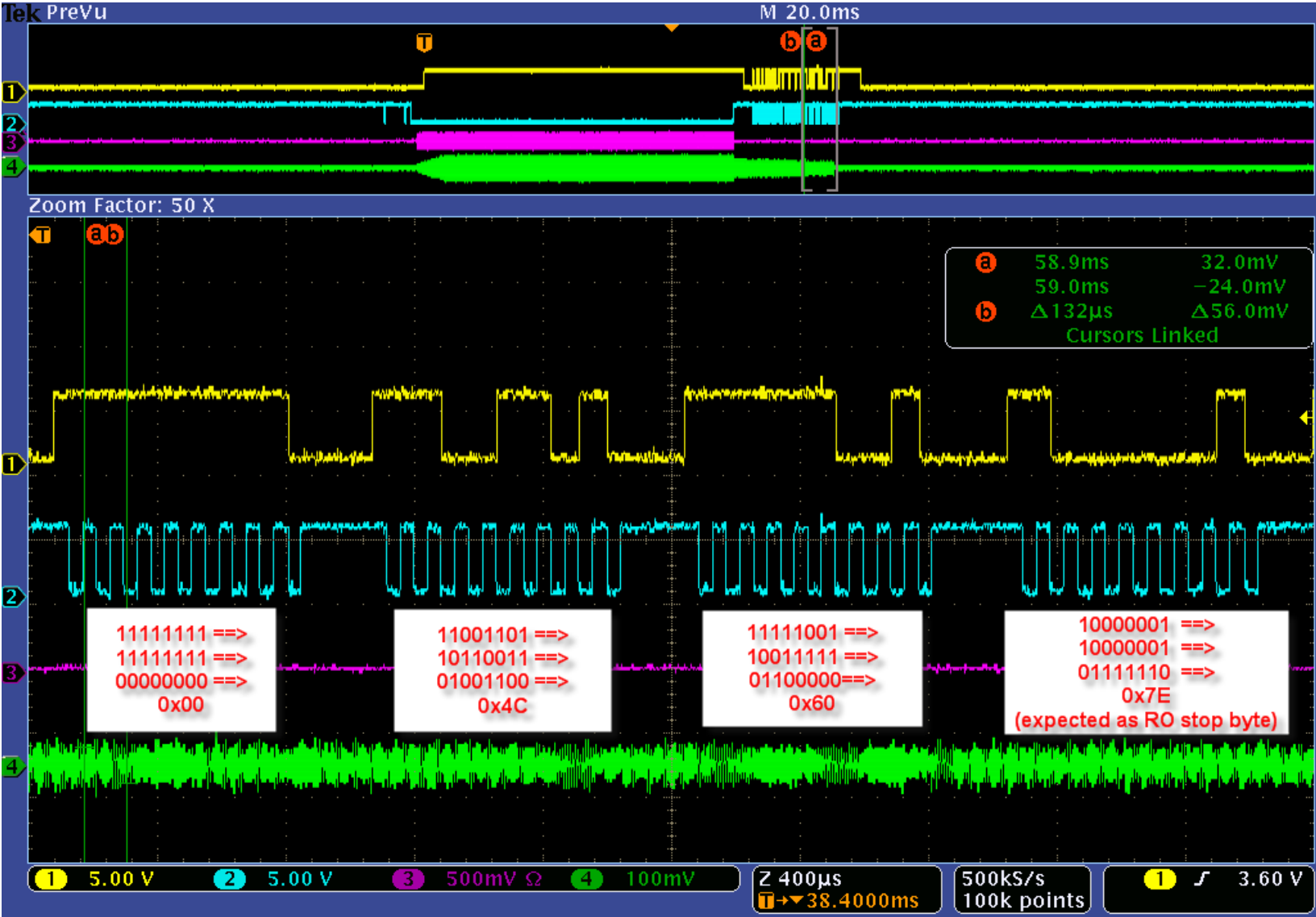
Reading TMS3705A1DRG4 Digital Response on Read Only Tag (using the TXCT and SCIO lines, cont.)

- Next four bytes in the string returned...



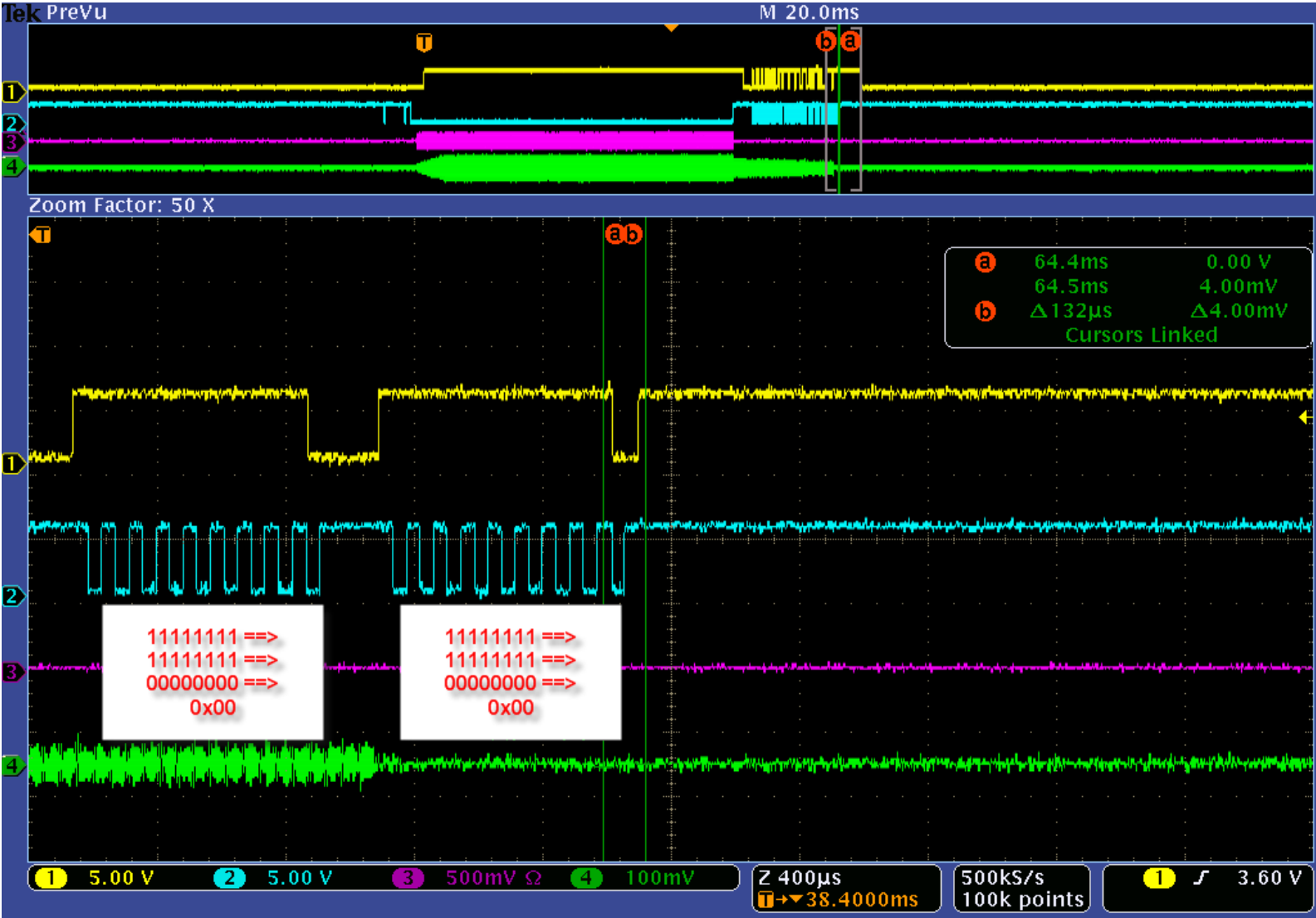
Reading TMS3705A1DRG4 Digital Response on Read Only Tag (using the TXCT and SCIO lines, cont.)

- Next four bytes in the string returned...



Reading TMS3705A1DRG4 Digital Response on Read Only Tag (using the TXCT and SCIO lines, cont.)

- Last two bytes in the string returned...



READ\WRITE TAGS

Charge Only Read Sequence For Read\Write Tags (Overall Details)

- TMS3705A1DRG4 generates 50mSec Charge Burst @ 134.2kHz. (using low on TXCT line)
- RW tag responds with Pre-Bits (0x0000), Start Byte (0xFE), 64 bits of Tag Data, CRC16 over that data, Stop Byte(0xFE) and End Bits

Note: RW tags are shipped with tag data of 5555555555555555_{16} preprogrammed into tag user memory area as part of the final test of the device.



Charge Only Read Sequence for RW Tags (Overall Read Details)

- After 50mSec charge burst, RW tag responds with 128 bits total.
 - Pre-bits (16 bits, value will equal 0x0000)
 - Start Byte (8 bits, 0xFE)
 - Tag Data (64 bits)
 - CRC-16 (16 bits, over 64 bits of tag data, using polynomial of $x^{16}+x^{12}+x^5+x^1$, with start value of 0x0000). This CRC is calculated in the tag and returned for error checking purposes.
 - Stop Byte (8 bits, 0xFE)
 - End Bits (16 bits, in this case 5555₁₆)
 - This is new RW tag with pre-programmed serial # of 5555555555555555₁₆ and a CRC of 852C

