



# Generating Non-Standard Baud Rates With R6551 ACIA

## PURPOSE

This document describes how the R6551 Asynchronous Communication Interface Adapter (ACIA) can be used to generate baud rates other than the 15 selectable standard baud rates specified in R6551 Product Description Order No. 284.

## DESCRIPTION

The R6551 uses a 1.8432 MHz crystal as a reference frequency source. This frequency is then divided down by an internal counter to generate the desired baud rate. The divisor for the counter is selectable via the codes stored in the Control Register Bits 0 thru 3. Table 1 gives the divisor values for all the codes. By using crystals of different frequencies and selecting the

appropriate divisor, any baud rate within the range of 1 to 19,200 can be generated.

The Baud Rate generated by a crystal of Frequency F is then computed as:

$$\text{BAUD RATE} = \frac{\text{CRYSTAL FREQUENCY } F}{\text{DIVISOR}}$$

## EXTERNAL OSCILLATOR

If an oscillator with a suitable frequency exists elsewhere in the system, it may be used to drive the R6551. In this case, XTLI (Pin 6) must be used as the reference frequency input and XTLO (Pin 7) must be left "open".

Table 1. Divisor Selection For R6551 ACIA

Control Register Bits	Divisor Selected for the Internal Counter	Baud Rate Generated with 1.8432 MHz Crystal	Baud Rate Generated with a Crystal of Frequency (F)
3 2 1 0			
0 0 0 0	No Divisor Selected	16 × External Clock at Pin R × C	16 × External Clock at Pin R × C
0 0 0 1	36,864	$\frac{1.8432 \times 10^6}{36,864} = 50$	$\frac{F}{36,864}$
0 0 1 0	24,576	$\frac{1.8432 \times 10^6}{24,576} = 75$	$\frac{F}{24,576}$
0 0 1 1	16,769	$\frac{1.8432 \times 10^6}{16,769} = 109.92$	$\frac{F}{16,769}$
0 1 0 0	13,704	$\frac{1.8432 \times 10^6}{13,704} = 134.51$	$\frac{F}{13,704}$
0 1 0 1	12,288	$\frac{1.8432 \times 10^6}{12,288} = 150$	$\frac{F}{12,288}$
0 1 1 0	6,144	$\frac{1.8432 \times 10^6}{6,144} = 300$	$\frac{F}{6,144}$
0 1 1 1	3,072	$\frac{1.8432 \times 10^6}{3,072} = 600$	$\frac{F}{3,072}$
1 0 0 0	1,536	$\frac{1.8432 \times 10^6}{1,536} = 1,200$	$\frac{F}{1,536}$
1 0 0 1	1,024	$\frac{1.8432 \times 10^6}{1,024} = 1,800$	$\frac{F}{1,024}$
1 0 1 0	768	$\frac{1.8432 \times 10^6}{768} = 2,400$	$\frac{F}{768}$
1 0 1 1	512	$\frac{1.8432 \times 10^6}{512} = 3,600$	$\frac{F}{512}$
1 1 0 0	384	$\frac{1.8432 \times 10^6}{384} = 4,800$	$\frac{F}{384}$
1 1 0 1	256	$\frac{1.8432 \times 10^6}{256} = 7,200$	$\frac{F}{256}$
1 1 1 0	192	$\frac{1.8432 \times 10^6}{192} = 9,600$	$\frac{F}{192}$
1 1 1 1	96	$\frac{1.8432 \times 10^6}{96} = 19,200$	$\frac{F}{96}$

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