Mosaic Industries

**Using an Array
to Store 1000 12 Bit Samples**

APPLICATION
NOTE
MI-AN-006

Summary

The following software shows how to store 1000 12 bit
sample using an array. Then convert the samples and
print it out.

```
        \ August 31, 1994 Mosaic Industries
        \ This example software shows how to use the 12 bit A/D
        \ converter to store 1000 samples continuously in an array,
        \ from a single channel.  The samples are then converted from
        \ 2 byte integers to floating point values.  Next, the
        \ floating point values are converted to volts and stored in
        \ a matrix.  Finally the matrix is printed out.
        \ Refer to the QED Hardware manual starting at page 6-6 for
        \ more information.

        \ 4 USE.PAGE                    \ Set up memory map to allow big arrays
        DECIMAL
        10 WIDTH !
        ARRAY:       SAMPLES
        MATRIX:      FSAMPLES
        \ Number of samples to take
        1000  CONSTANT   NSAMPLES
        \ 12 bit A/D conversion factor given 5V.
        5.0 4096.0 F/    FCONSTANT CNT>V.FACTOR

        : SAMPLES.INIT ( -- )
        \ Creates a NSAMPLES x 1 array, 2 bytes per array element
             NSAMPLES 1 2 ' SAMPLES DIMENSIONED
        ;

        : FSAMPLES.INIT  ( -- )
        \ Creates a NSAMPLES x 1 Matrix
             NSAMPLES 1 ' FSAMPLES DIMMED
        ;

        : CONVERT>VOLTS   ( A/D.SAMPLE -- VOLTS )
        \ Converts sample to a voltage value
             CNT>V.FACTOR F*
        ;

        : TAKE.SAMPLES ( channel -- )
        \ Fills array with samples
             LOCALS{ &channel }
             0 SAMPLES 0 NSAMPLES TRUE &channel A/D12.MULTIPLE
        \ Note, for QED-2A boards, type the following line instead:
        \     0 SAMPLES NSAMPLES TRUE &channel A/D12.MULTIPLE
        ;
```

```
        : SAMPLES>FSAMPLES   ( -- _
        \ Converts samples to floating point numbers
                NSAMPLES 0 DO
                        I SAMPLES @ FLOT  \ Fetch 2 byte int from array
                        CONVERT>VOLTS     \ Calls conversion routine
                        I 0 FSAMPLES F!   \ Stores value in matrix
                LOOP
        ;

        : INITIALIZE.SAMPLER  ( -- )
        \ Init array, matrix and 12bit A/D
                SAMPLES.INIT
                FSAMPLES.INIT
                INIT.A/D12&DAC
        ;

        : DEMO.SAMPLER  ( channel -- )
                INITIALIZE.SAMPLE       \ Initializes array, matrix & A/D
                TAKE.SAMPLES            \ Fills array with samples
                SAMPLES>FSAMPLES
        \ Converts samples to floting point and stores in matrix
                ' FSAMPLES M.           \ Prints matrix
        ;
```

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