



# ADC-100 RANGE

## VIDEO FRONT-END MODULES

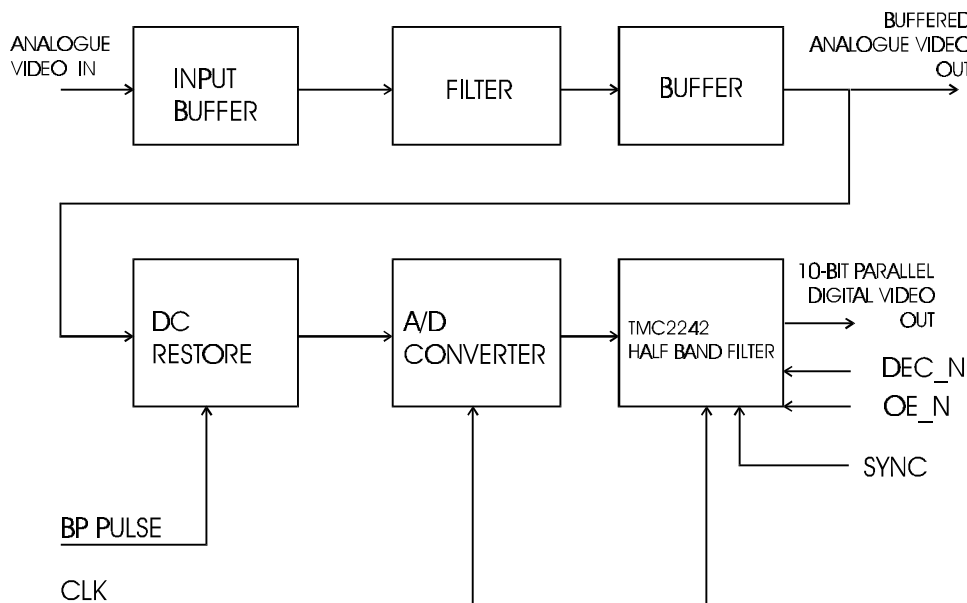
The ADC-100 range converts analogue video in various formats to 10 or 12 bit parallel digital video. The range provides a complete front end solution for the digitising of high quality component, composite or s-video. The module incorporates a tightly specified anti-aliasing filter, an A-D converter and a digital filter all on a board measuring no more than 1044mm<sup>2</sup> (1.65sq in).

### Features

- $\pm 5V$  operation
- High impedance input stage
- Filtered and buffered video o/p
- User just provides pixel clock and clamp pulse
- Choice of 10 or 12 bit A-D
- Matched digital delay Y,Pb/Pr units  
(to eliminate additional delay lines)

### Typical applications

- Video Broadcast and studio equipment
- Digital Cameras
- Telecommunications equipment
- Video Frame Grabber Cards for PCs
- Closed Circuit Security



**ADC-100 BLOCK DIAGRAM**

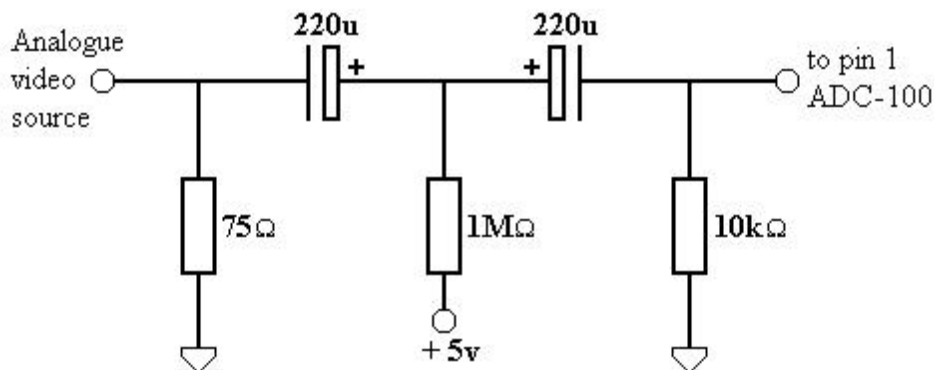
## Technical Description

The ADC-100 range of modules are a complete front end solution for digitising analogue video. They comprise all buffering and filtering components required - allowing the user to connect directly to the video source. A dc clamp is provided to ensure that the black level is accurately set before being presented to the A-D converter. The modules utilise 2x oversampling to minimise the size of the filter components and achieve high performance. The subsequent data is decimated by high performance low pass digital filters to provide output data with standard sampling rates.

All this is achieved transparently to the user; the only control signals required are a back porch clamp signal, a sync pulse to align the digital filter and an appropriate clock.

For further details of the digital filter functionality consult Fairchild datasheet TMC2242.

## Typical I/P circuit for minimal tilt



## Specification

| <b>High Spec. analogue filter</b>  | ADC-100, ADC-101,<br>ADC-120, ADC-122    | ADC-121                                   |
|------------------------------------|--|---|
| Analogue Filter Passband           | 6.0 MHz with ripple of $\pm 0.05$ dB.    | 2.75 MHz with ripple of $\pm 0.05$ dB.    |
| Analogue Filter Start of Stopband  | 21.0 MHz                                 | 10.5 MHz                                  |
| Analogue Filter Stopband rejection | 45 dB                                    | 45 dB                                     |
| Analogue Filter Group delay ripple | < 3 ns to 3.58 MHz<br>< 10 ns to 6.0 MHz | < 6 ns to 1.64 MHz<br>< 20 ns to 2.75 MHz |
| Differential gain                  | 1% typical                               | 1% typical                                |
| Differential phase                 | 1° typical                               | 1° typical                                |
| Supply current                     | + 300 mA +5v<br>20 mA -5v                | + 300 mA +5v<br>20 mA -5v                 |

| <b>Relaxed analogue filter</b>     | ADC-110R, ADC-111R,                      |  |
|------------------------------------|--|--|
| Analogue Filter Passband           | 6.0 MHz with ripple of $\pm 0.1$ dB.     |  |
| Analogue Filter Start of Stopband  | 21.0 MHz                                 |  |
| Analogue Filter Stopband rejection | 35 dB                                    |  |
| Analogue Filter Group delay ripple | < 3 ns to 3.58 MHz<br>< 16 ns to 6.0 MHz |  |
| Differential gain                  | 1.5% typical                             |  |
| Differential phase                 | 1.5° typical                             |  |
| Supply current                     | + 300 mA +5v<br>20 mA -5v                |  |

### Digital Filter details

|                        | ADC-100, ADC-101, ADC-110,<br>ADC-111, ADC-120, ADC-121 | ADC-122                   |
|------------------------|---|---------------------------|
| Filter Type            | TMC2242A  | TMC2242C                  |
| Passband               | $\pm 0.01$ dB to 0.22 fs                                | $\pm 0.014$ dB to 0.22 fs |
| Attenuation at 0.25 fs | - 6 dB  | - 6 dB                    |
| Stopband attenuation   | > 59 dB from 0.28 fs                                    | > 56 dB from 0.29 fs      |
| Data latency           | 34 clk periods  | 68 clk periods            |

**Note:** The ADC-122R uses the TMC2242C digital filter which features a double delay mode enabling the luminance module ( $f_s = 27$  MHz) to output data synchronously with the colour difference modules ( $f_s = 13.5$  MHz). This eliminates the need for a digital delay of the luminance data by 34 clock cycles. For further information consult Fairchild datasheet TMC2242C.

An absolute delay difference of 37 ns exists between the ADC-122R and ADC-121R due to the differences in the analogue filters.

## Module Details

| Order Code | Gain  | Black Level | Comments                                    | Application   | MMC Equivalent |
|------------|-------|-------------|---|---|----------------|
| ADC-100R   | 1.6   | 230         | 10-bit                                      | Composite, Luminance (S-video), digital video decoder front end. High performance applications. fs = 27 MHz                           | FE-100H10-1    |
| ADC-100B   | 1.6   | 230         | 12-bit                                      |   | FE-100H12-1    |
| ADC-101R   | 1.6   | 512         | 10-bit                                      | Chrominance, digital video decoder front end. High performance applications. fs = 27 MHz  | FE-100H10-2    |
| ADC-101B   | 1.6   | 512         | 12-bit                                      |   | FE-100H12-2    |
| ADC-110R   | 1.6   | 230         | 10-bit relaxed filter                       | Composite, Luminance (S-video), digital video decoder front end. fs = 27 MHz  | FE-100M-1      |
| ADC-111R   | 1.6   | 230         | 10-bit relaxed filter                       | Chrominance, digital video decoder front end fs = 27 MHz  | FE-100M-2      |
| ADC-120R   | 2.475 | 64          | 10-bit CCIR-601-2 levels                    | Y input (Component Video), Expanded active video range. fs = 27 MHz   | not available  |
| ADC-121R   | 2.475 | 512         | 10-bit CCIR-601-2 levels<br>2.75 MHz Filter | Pb,Pr input (Component video), Expanded active video range. fs =13.5 MHz  | not available  |
| ADC-122R   | 2.475 | 64          | 10-bit CCIR-601-2 levels<br>Double delay    | Y input (Component Video), Expanded active video range. fs = 27 MHz<br>Matched digital filter delay.<br><b>Note: PROVISIONAL DATA</b> | not available  |

The modules are fitted with a high performance 10-bit analogue to digital converter as standard (R-suffix) but they are also available with a 12-bit analogue converter (B suffix)

Devices are normally supplied with a Fairchild half band filter. The units can be optionally supplied with other compatible half band filters, or with no digital filter at the customers request.

## Application Notes

The ADC modules incorporate a clamp circuit which must be fed with a back porch signal derived on the users pcb. This can easily be generated using standard sync separators.

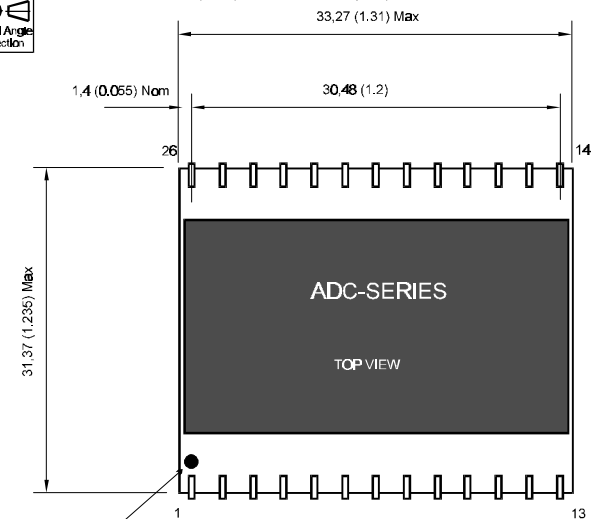
The user has control over digital filter inputs DEC\_N, OE\_N and SYNC appropriately. These inputs allow the user to synchronise the decimation of pixel data and multiplex the outputs from modules. For further details the user should consult the Fairchild datasheet TMC2242.

The insertion delay difference between the component modules ADC122R and ADC121R can be eliminated by latching the Luminance data for 1 clock cycle within the application.

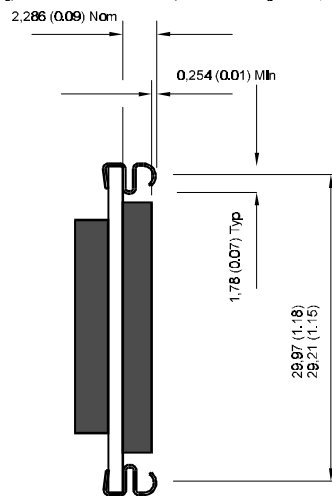
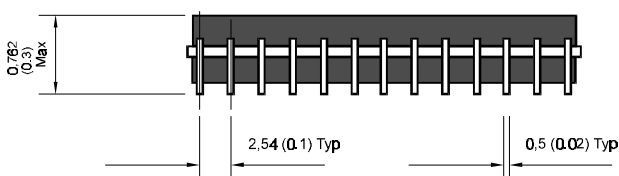
Note: This product is Aqueous Washable.



All dimensions in millimetres (inches). Gen Tolerance  $\pm 0.06$  (0.002) unless otherwise stated. DO NOT SCALE © Faraday Technology Ltd Croft Road Newcastle-U-Lyme ST5 0QZ, England Tel (044) 01782 661501 Fax 630101



Pin 1 identifier



Notes;

- Pins Matl; Beryllium copper tin/lead coated.
  - "Vid Buf" is a filtered and buffered output or sync separator inputs
  - "BP Pulse" is a positive-going back porch level pulse.
  - "DEC\_N", "OE\_N" and "SYNC" are pins on half-band filter. Refer to it's data sheet for details.
- |                  |                    |                   |
|------------------|--------------------|-------------------|
| Pin 1 = Video In | Pin 10 = D5        | Pin 19 = SYNC     |
| Pin 2 = Gnd.     | Pin 11 = D6        | Pin 20 = CLK      |
| Pin 3 = Vcc      | Pin 12 = D7        | Pin 21 = Gnd      |
| Pin 4 = Gnd      | Pin 13 = D8        | Pin 22 = Vcc      |
| Pin 5 = D0       | Pin 14 = D9        | Pin 23 = BP Pulse |
| Pin 6 = D1       | Pin 15 = D10       | Pin 24 = Vid Buf  |
| Pin 7 = D2       | Pin 16 = D11 (MSB) | Pin 25 = Vcc      |
| Pin 8 = D3       | Pin 17 = OE_N      | Pin 26 = Gnd      |
| Pin 9 = D4       | Pin 18 = DEC_N     |                   |

Template: DT00207



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|                 |                    |                |                          |          |
|-----------------|--------------------|----------------|--------------------------|----------|
| Change Note No: | Drawn: B A Knapper | Auth: S Jones  | Title:                   | Drg No:  |
| 857             | Date: 26/04/01     | Date: 26/04/01 | A-D CONVERTER ADC-SERIES | DR00207B |

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