## Consumer Electronic Circuits

### In Brief . . .

These integrated circuits reflect Motorola’s continuing commitment to semiconductor products necessary for consumer system designs. This tabulation is arranged to simplify selection of consumer integrated circuit devices that satisfy the primary functions for home entertainment products, including television, hi-fi audio and AM/FM radio.

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## Table 1. Entertainment Receiver RF/IF

<table>
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<tr>
<th>Function</th>
<th>Features</th>
<th>Suffix/Package</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.T.R.® Front End</td>
<td>Mixer/VCO/Wideband AGC/IF Amp for Electronically Tuned AM Stereo Receivers</td>
<td>P/648, D/751B</td>
<td>MC13025</td>
</tr>
<tr>
<td>AMax® Front End</td>
<td>Mixer/VCO/Wideband AGC/IF Amp plus Audio Noise Blanking</td>
<td>DW/751D, P/738</td>
<td>MC13027</td>
</tr>
<tr>
<td>Dual Conversion AM Tuner</td>
<td>1st Mixer/OSC, 2nd Mixer/OSC, High Gain IF, AGC, Wideband AGC, Detector</td>
<td>DW/751F</td>
<td>MC13030</td>
</tr>
</tbody>
</table>

## Table 2. C–Quam® AM Stereo Decoders

<table>
<thead>
<tr>
<th>Function</th>
<th>Features</th>
<th>Suffix/Package</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Stereo Decoder</td>
<td>Medium Voltage 6 to 10 V, Basic Decoder</td>
<td>P/738</td>
<td>MC13020</td>
</tr>
<tr>
<td>Advanced AM Stereo Decoder</td>
<td>Medium Voltage 4 to 10 V, Decoder, IF Amp, Signal Quality Detector and Audio Blend</td>
<td>P/710, DW/751F</td>
<td>MC13022</td>
</tr>
<tr>
<td>Advanced AM Stereo Decoder</td>
<td>Medium Voltage 4 to 10 V, Decoder, IF Amp, Signal Quality Detector and Audio Blend, (MC13022A has 10 dB more audio output than MC13022.)</td>
<td>P/710, DW/751F</td>
<td>MC13022A</td>
</tr>
<tr>
<td>AM Stereo Tuner</td>
<td>Low Voltage 1.8 to 8 V for Manually Tuned Radio Mass Market</td>
<td>P/724, DW/751E</td>
<td>MC13024</td>
</tr>
<tr>
<td>Low Voltage AM Stereo Decoder</td>
<td>IF Amp/Decoder for Advanced C–Quam Receivers. 2.2 to 12 V Operation, Audio Blend, Adjustable Audio Output Levels</td>
<td>P/648, D/751B</td>
<td>MC13028A</td>
</tr>
<tr>
<td>Medium Voltage AM Stereo Decoder</td>
<td>IF Amp/Decoder for Advanced C–Quam Receivers. AM/FM Switch and Audio Mute Included, 4 to 10 V Operation.</td>
<td>DW/751D, H/738</td>
<td>MC13029A</td>
</tr>
<tr>
<td>AMax Stereo Decoder</td>
<td>AM Stereo Decoder with the features of the MC13022A plus an Audio Noise Blanker, To be used with the MC13027 AMax Front End device.</td>
<td>DW/751F, P/710</td>
<td>MC13122</td>
</tr>
</tbody>
</table>

## Table 3. Audio Amplifiers

<table>
<thead>
<tr>
<th>Function</th>
<th>PO (Watts)</th>
<th>VCC Vdc Max</th>
<th>VIN @ Rated PO mV Typ</th>
<th>ID mA Typ</th>
<th>RL (Ohms)</th>
<th>Suffix/Package</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini Watt SOIC Audio Amp</td>
<td>1.0 W</td>
<td>35</td>
<td>80</td>
<td>11</td>
<td>16</td>
<td>D/751</td>
<td>MC13060</td>
</tr>
<tr>
<td>Low Power Audio Amp</td>
<td>500 mW</td>
<td>16</td>
<td>–</td>
<td>2.5 mA</td>
<td>8 -- ∞</td>
<td>D/751, P/626, DTB/948J</td>
<td>MC34119</td>
</tr>
</tbody>
</table>
### Video Circuits

**Table 4. Video Circuits**

<table>
<thead>
<tr>
<th>Function</th>
<th>Features</th>
<th>Suffix/ Package</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Encoders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video Overlay Synchronizer</td>
<td>Complete Color TV Video Overlay Synchronizer, remote or local system control and RGB encoder.</td>
<td>P/711, FN/777</td>
<td>MC1378</td>
</tr>
<tr>
<td>Advanced RGB to PAL/NTSC Encoder</td>
<td>RGB and Sync inputs, Composite Video and S–VHS out; PAL/NTSC selectable; subcarrier from crystal or external source.</td>
<td>P/738, DW/751D</td>
<td>MC13077</td>
</tr>
<tr>
<td><strong>TV Decoder</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chroma 4 Multistandard Decoders</td>
<td>PAL/NTSC/SECAM decoding, Composite Video/S–VHS Inputs, RGB Outputs, horizontal and vertical drive outputs, geometry correction and beam current monitor, digital internal filters, no external tank, 16:9 capability, µP and crystal controlled.</td>
<td>P/711</td>
<td>MC440002</td>
</tr>
<tr>
<td>(TV Set)</td>
<td>Same as MC44002, but without SECAM decoding.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Video Capture Chip Sets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chroma 4 Multistandard Video Processor (Multimedia)</td>
<td>PAL/NTSC/S–VHS input, RGB/YUV outputs; horizontal and vertical timing outputs: all digital internal filters, no external tanks; µP and crystal controlled.</td>
<td>FN/777, FU/824E</td>
<td>MC44011</td>
</tr>
<tr>
<td>Chroma Digital Delay Line</td>
<td>For PAL and SECAM applications of the MC44011, MC44002, MC44007.</td>
<td>P/648, DW/751G</td>
<td>MC44140</td>
</tr>
<tr>
<td>Pixel Clock PLL/Sync Sep.</td>
<td>PAL/NTSC sync separator, 6.0–40 MHz pixel clock PLL.</td>
<td>D/751A</td>
<td>MC44145</td>
</tr>
<tr>
<td>Triple 8–Bit Video A/D</td>
<td>Video clamps for RGB/YUV, 18 MHz; High Z TTL outputs.</td>
<td>FN/777, FU/824A</td>
<td>MC44251</td>
</tr>
<tr>
<td><strong>TV Picture–in–Picture</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replay and Multiple Picture–in–Picture (PIP) Controller</td>
<td>Offers either multiple PIP windows or several seconds of replay. Used with external DRAM.</td>
<td>B/859</td>
<td>MC44463</td>
</tr>
<tr>
<td>Audio–Video Replay and Multiple PIP Controller</td>
<td>Up to 8 seconds Audio replay on Video replay as well as multiple PIP windows used with external DRAM.</td>
<td>B/859</td>
<td>MC44464</td>
</tr>
<tr>
<td>Multi–Standard PIP Controller</td>
<td>PAL/NTSC and SECAM operation, 50/60 Hz; 4:3 or 16:9; RGB/YUV I/O; external DRAM.</td>
<td>B/859</td>
<td>MC44465</td>
</tr>
<tr>
<td>YUV/RGB PIP Controller</td>
<td>Complete self–contained NTSC PIP function with YUV or RGB I/O compatibility. “V” chip parental control.</td>
<td>B/859</td>
<td>MC44466</td>
</tr>
<tr>
<td><strong>Comb Filters</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced Comb Filter</td>
<td>Fast 8–Bit A/D Converter, Two 8–Bit D/A Converters, Two Line–Delay Memories, utilizes NTSC Subcarrier Frequency clock, CMOS Technology.</td>
<td>FU/898</td>
<td>MC141620</td>
</tr>
<tr>
<td>Advanced Comb Filter (ACF)</td>
<td>Composite Video input; YC outputs in digital and analog form; all digital internal filters.</td>
<td>FU/898</td>
<td>MC141621A</td>
</tr>
<tr>
<td>Advanced Comb Filter – II (ACF–II)</td>
<td>Composite Video input; YC outputs in digital and analog form; all digital internal filters; vertical enhancer circuit.</td>
<td>P/898</td>
<td>MC141622A</td>
</tr>
<tr>
<td>Advanced Comb Filter – I (ACF–I)</td>
<td>Low cost Ith filter.</td>
<td>FU/873, SP/TBD</td>
<td>MC141624</td>
</tr>
<tr>
<td>Advanced PAL/NTSC Comb Filter</td>
<td>Composite Video input; YC outputs in digital and analog form; all digital internal filters.</td>
<td>FB/898</td>
<td>MC141627</td>
</tr>
<tr>
<td><strong>Deflection</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal Processor</td>
<td>Linear balanced phase detector, oscillator and predriver, adjustable DC loop gain and duty cycle.</td>
<td>P/626</td>
<td>MC1391</td>
</tr>
<tr>
<td><strong>TV IF Circuits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IF Amplifier</td>
<td>1st and 2nd video IF amplifiers, 50 dB gain at 45 MHz, 60 dB AGC range.</td>
<td>D/751, P/626</td>
<td>MC1350</td>
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### Table 4. Video Circuits (continued)

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<th>Features</th>
<th>Suffix/Package</th>
<th>Device</th>
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<td><strong>Tuner PLL Circuits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLL Tuning Circuits</td>
<td>1.3 GHz, 10 mV sensitivity selectable prescaler (MC44817), op amp,</td>
<td>D/751B</td>
<td>MC44817, B</td>
</tr>
<tr>
<td></td>
<td>4 band buffers, 3–wire bus interface, lock detect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 GHz, 10 mV sensitivity prescaler, op amp, 4 band buffers, I2C</td>
<td>D/751B</td>
<td>MC44818</td>
</tr>
<tr>
<td></td>
<td>interface, lock detect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Similar to MC44817, with lower power consumption, push–pull lock</td>
<td>DTB/948F</td>
<td>MC44827</td>
</tr>
<tr>
<td></td>
<td>detector output, no divide–by–8 bypass, in a TSSOP package.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Similar to MC44818, with lower power consumption, push–pull lock</td>
<td>DTB/948F</td>
<td>MC44828</td>
</tr>
<tr>
<td></td>
<td>detector output, in a TSSOP package.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 GHz prescaler, 10 mV sensitivity 50 to 950 MHz, op amp, 3 band</td>
<td>D/751A</td>
<td>MC44829</td>
</tr>
<tr>
<td></td>
<td>buffers, I2C Bus.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 GHz, 10 mV sensitivity selectable prescaler, op amp, 4 band buffers,</td>
<td>M/967</td>
<td>MC44864,</td>
</tr>
<tr>
<td></td>
<td>I2C interface, 3 DACs for automatic tuner alignment.</td>
<td></td>
<td>MC44868</td>
</tr>
<tr>
<td></td>
<td>Similar to the MC44828, with high speed I2C interface, on–chip dc/dc</td>
<td>DTB/948F</td>
<td>MC44871</td>
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<tr>
<td></td>
<td>converter.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Modulator</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color TV Modulator with</td>
<td>RF oscillator/modulator, and FM sound oscillator/modulator.</td>
<td>P/646</td>
<td>MC1374</td>
</tr>
<tr>
<td>Sound</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UHF TV Modulator</td>
<td>Multi–standard PLL tuned UHF TV modulator with AM or FM sound.</td>
<td>DTB/948E, DW/751D</td>
<td>MC44353, MC44354, MC44355</td>
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<tr>
<td><strong>Video Data Converters</strong></td>
<td></td>
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</tr>
<tr>
<td>Triple 8–Bit Video A/D</td>
<td>Video clamps for RGB/YUV, 18 MHz conversion, high Z outputs.</td>
<td>FN/777, FU/824A</td>
<td>MC44251</td>
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<tr>
<td></td>
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<tr>
<td>Triple 8–Bit Video DAC</td>
<td>TTL inputs, 75 Ω drive outputs.</td>
<td>FB/824</td>
<td>MC44200</td>
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</tr>
<tr>
<td><strong>Monitor Subsystem</strong></td>
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</tr>
<tr>
<td>Multimode Color Monitor</td>
<td>Adaptable to 30 kHz to 64 kHz horizontal, 45 to 100 Hz vertical</td>
<td>B/859</td>
<td>MC13081X</td>
</tr>
<tr>
<td>Processor</td>
<td>frequency, multiple sync including sync–on–green, horizontal and vertical</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>drive outputs, double PLL, 70 MHz RGB pre–amps, contrast and brightness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>controls.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGB Video Processor</td>
<td>80 MHz bandwidth, blank and clamp inputs, main contrast and</td>
<td>P/738</td>
<td>MC13280AY</td>
</tr>
<tr>
<td></td>
<td>subcontrast controls.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Same as above, except 100 MHz bandwidth.</td>
<td>P/738</td>
<td>MC13281B</td>
</tr>
<tr>
<td></td>
<td>Same as above, except 100 MHz bandwidth and pin compatible with</td>
<td>P/724</td>
<td>MC13281A</td>
</tr>
<tr>
<td></td>
<td>MC13282A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGB Video Processor with</td>
<td>100 MHz bandwidth, blank and clamp inputs, main contrast and</td>
<td>P/724</td>
<td>MC13282A</td>
</tr>
<tr>
<td>OSD Inputs</td>
<td>subcontrast controls, OSD inputs, OSD contrast control, pin compatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with MC13281A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Same as above, except 130 MHz bandwidth.</td>
<td>P/724</td>
<td>MC13283</td>
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<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcarrier Reference</td>
<td>Provides continuous subcarrier sine wave and 4x subcarrier, locked to</td>
<td>P/626, D/751</td>
<td>MC44144</td>
</tr>
<tr>
<td>Generator</td>
<td>incoming burst.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sync Separator/Pixel Clock</td>
<td>PAL/NTSC sync separator with vertical and composite sync output,</td>
<td>D/751A</td>
<td>MC44145</td>
</tr>
<tr>
<td>PLL</td>
<td>6 to 40 MHz pixel clock PLL.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual Video Amplifiers</td>
<td>Gain @ 4.43 MHz = 6.0 dB ±1.0 dB, fixed gain, internally compensated,</td>
<td>P/626, F/904</td>
<td>MC14576C</td>
</tr>
<tr>
<td></td>
<td>CMOS Technology.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gain @ 5.0 MHz = 10 dB max, 10 MHz = 6.0 dB max, adjustable gain,</td>
<td>P/626, F/904</td>
<td>MC14577C</td>
</tr>
<tr>
<td></td>
<td>internally compensated, CMOS Technology.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transistor Array</td>
<td>One differential pair and 3 isolated transistors, 15 V, 50 mA.</td>
<td>P/646, D/751A</td>
<td>MC3346</td>
</tr>
</tbody>
</table>

**Analog and Interface Integrated Circuits**

Motorola Master Selection Guide
Video Circuits (continued)

Video Capture Block Diagram

- **VCR**
- **Pix-In-Pix**
  - MC44461
  - MC44462
  - MC44463
  - MC44464
  - MC44465
  - MC44468

- **Chroma Delay Line**
  - MC44140

- **MC44140**

- **Set-Top Box**
  - DVE
  - MC44702

- **RGB or YC**

- **Video Memory**
  - MC44251

- **3 X ADC**
  - MC44251

- **Video Decoder**
  - MC44011

- **Comb Filter**
  - MC141620
  - MC141621A
  - MC141622A
  - MC141624
  - MC141627

- **IF**
  - MC44302
  - MC44306
  - MC44311

- **Tuner PLL**
  - MC44817
  - MC44818
  - MC44826
  - MC44827
  - MC44828
  - MC44829
  - MC44864
  - MC44865
  - MC44871

- **Tuner**
  - MC44361
  - MC44362
  - MC44365

- **Camera**

- **Satellite**

- **Antenna**

- **MCU**

- **I/O's**
  - I2C

- **Picture Processing**
  - Computer Generated Text and Graphics

- **RGB to Video Encoder**
  - MC13077

- **Digital Sound Section**
  - Stereo ADC
  - MC145073
  - DSP
  - Stereo DAC
  - MC145074+76

* In Development
Video Circuits (continued)

**Digitally Controlled Video Processor for Multimedia Applications**

**MC44011FN, FB**

Case 777, 824E

The MC44011, a member of the MC44xxx Chroma 4 family, is designed to provide RGB or YUV outputs from a variety of inputs. The inputs may be either PAL or NTSC composite video (two inputs), S–VHS, RGB, and color difference (R–Y, B–Y).

The MC44011 provides a sampling clock output for use by a subsequent analog to digital converter. The sampling clock (6.0 to 40 MHz) is phase–locked to the horizontal frequency. Additional outputs include composite sync, vertical sync, field identification, luminance, burst gate, and horizontal frequency.

Control of the MC44011, and reading of status flags is accomplished via an I²C bus.

- Multistandard Decoder, Accepts NTSC and PAL Composite Video
- Dual Composite Video or S–VHS Inputs
- All Chroma and Luma Channel Filtering, and Luma Delay Line are Integrated Using Sampled Data Filters Requiring no External components
- Digitally Controlled via I²C Bus
- Auxiliary Y, R–Y, B–Y Inputs
- Switched RGB Inputs with Separate Saturation Control
- Line–Locked Sampling Clock for Digitizing Video Signals
- Burst Gate Pulse Output for External Clamping
- Vertical Sync and Field Ident Outputs
- Software Selectable YUV or RGB Outputs Able to Drive A/D Converters
Video Circuits (continued)

**Triple 8–Bit A/D Converter**

**MC44251FN, FU**

Case 777, 824A

The MC44251 contains three independent parallel analog to digital converters. Each ADC consists of 256 latching comparators and an encoder. Input clamps allow for AC coupling of the input signals, and dc coupling is also allowed. For video processing performance enhancements, a dither generator with subsequent digital correction is provided to each ADC. The outputs of the MC44251 can be set to a high impedance state.

These A/Ds are especially suitable as front end converters in TV picture processing:
- 18 MHz Maximum Conversion Speed (MC44251)
- Input Clamps Suitable for RGB and YUV Applications
- Built-in Dither Generator with Subsequent Digital Correction
- Single 5.0 V Power Supply

![Simplified Diagram of One of the ADCs](image-url)
Video Circuits (continued)

Color TV Block Diagram

- Tuner PLL: MC44817, MC44818, MC44826, MC44827, MC44828, MC44829, MC44864, MC44868, MC44871
- IF: MC44302, MC44311
- Comb Filter: MC141620, MC141621A, MC141624, MC141627
- Chroma Delay Line: MC44140
- Chroma/Luma Processor: MC44002, MC44007
- Stereo Decoder Sound Processor: MC44131
- SMPS: MC44603A, MC44605, MJF18004(BIP), MTP3N60E(TMOS)
- Useful:
  - +200 V
  - +12 V
  - +5.0 V

- Optional:

* In Development
Multistandard Video/Timebase Processor
MC44002P, MC44007P
Case 711

The MC44002/7 is a highly advanced circuit which performs most of the basic functions required for a color TV. All of its advanced features are under processor control via an I2C bus, enabling potentiometer controls to be removed completely. In this way the component count may be reduced dramatically to allow significant cost savings and the possibility of implementing sophisticated automatic test routines. Using the MC44002/7, TV manufacturers will be able to build a standard chassis for anywhere in the world.

- Operation from a Single 5.0 V Supply; Typical Current Consumption Only 120 mA
- Full PAL/SECAM/NTSC Capability (MC44002 Only)
- MC44007 Decodes PAL/NTSC Only
- Dual Composite Video or S-VHS Inputs
- All Chroma/Luma Channel Filtering, and Luma Delay Line are Integrated Using Sampled Data Filters Requiring No External Components
- Filters Automatically Commutate with Change of Standard
- Chroma Delay Line is Realized with Companion Device (MC44140)
- RGB Drives Incorporate Contrast and Brightness Controls and Auto Gray Scale
- Switched RGB Inputs with Saturation Control
- Auxiliary Y, R–Y, B–Y Inputs
- Line Timebase Featuring H–Phase Control and Switchable Phase Detector Gain and Time Constant
- Vertical Timebase Incorporating the Vertical Geometry Corrections
- E–W Parabola Drive Incorporating the Horizontal Geometry Corrections
- Beam Current Monitor with Breathing Compensation
- 16:9 Display Mode Capability
**Advanced NTSC Comb Filter**

**MC141621FB**

Case 898

The MC141621 is an advanced NTSC comb filter for VCR and TV applications. It separates the luminance (Y) and chrominance (C) signals from the NTSC composite video signal by using digital signal processing techniques. This filter allows a video signal input of an extended frequency bandwidth by using a 4.0 \( F_{sc} \) clock. In addition, the filter minimizes dot crawl and cross color effects. The built-in A/D and D/A converters allow easy connections to analog video circuits.

- Built-in High Speed 8-Bit A/D Converter
- Two Line Memories (1820 Bytes)
- Advanced Combing Process
- Two 8-Bit D/A Converters
- Built-in Clamp Circuit
- On-Chip Reference Voltage Regulator for ADC
- Digital Interface Mode
Advanced Comb Filter–II (ACF–II)

MC141622AFU

Case 898

The Advanced Comb Filter–II is a video signal processor for VCRs and TVs. Its function is to separate the Luminance Y and Chrominance C signals from the NTSC composite video signal. The ACF–II minimizes dot–crawl and cross–color. A built–in PLL provides a 4xfsc clock from either an NTSC subcarrier signal or a 4xfs input. This allows a video signal input of an extended frequency bandwidth. The built–in vertical enhancer circuit improves the quality of the Luminance Y signal. The built–in A/D and D/A converters allow easy connection to analog video circuits.

- Built–in High Speed 8–Bit A/D Converter
- Two Line Memories (1820 Bytes)
- Advanced Comb–II Process
- Vertical Enhancer Circuit
- Two High Speed 8–Bit D/A Converters
- 4xfsc PLL Circuit
- Built–in Clamp Circuit
- Digital Interface Mode
- On–Chip Reference Voltage Regulator for A/D Converter
Video Circuits (continued)

Set-Top Block Diagram

*T In Development
PLL Tuning Circuits with 3–Wire Bus
MC44817BD, D
Case 751B

The MC44817/17B are tuning circuits for TV and VCR tuner applications. They contain on one chip all the functions required for PLL control of a VCO. The integrated circuits also contain a high frequency prescaler and thus can handle frequencies up to 1.3 GHz.

The MC44817 has programmable 512/1024 reference dividers while the MC44817B has a fixed reference divider of 1024.

The MC44817/17B are manufactured on a single silicon chip using Motorola’s high density bipolar process, MOSAIC™ (Motorola Oxide Self Aligned Implanted Circuits).

- Complete Single Chip System for MPU Control (3–Wire Bus). Data and Clock Inputs are IIC Bus Compatible
- Divide–by–8 Prescaler Accepts Frequencies up to 1.3 GHz
- 15 Bit Programmable Divider Accepts Input Frequencies up to 165 MHz
- Reference Divider: Programmable for Division Ratios 512 and 1024. The MC44817B has a Fixed 1024 Reference Divider
- 3–State Phase/Frequency Comparator
- Operational Amplifier for Direct Tuning Voltage Output (30 V)
- Four Integrated PNP Band Buffers for 40 mA (VCC1 to 14.4 V)
- Output Options for the Reference Frequency and the Programmable Divider
- Bus Protocol for 18 or 19 Bit Transmission
- Extra Protocol for 34 Bit for Test and Further Features
- High Sensitivity Preamplifier
- Circuit to Detect Phase Lock
- Fully ESD Protected
PLL Tuning Circuit with I²C Bus

MC44818D
Case 751B

The MC44818 is a tuning circuit for TV and VCR tuner applications. It contains, on one chip, all the functions required for PLL control of a VCO. This integrated circuit also contains a high frequency prescaler and thus can handle frequencies up to 1.3 GHz. The MC44818 is a pin compatible drop-in replacement for the MC44817, where the only difference is the MC44818 has a fixed divide–by–8 prescaler (cannot be bypassed) and the MC44817 uses the three wire bus.

The MC44818 has programmable 512/1024 reference dividers and is manufactured on a single silicon chip using Motorola's high density bipolar process, MOSAIC™ (Motorola Oxide Self Aligned Implanted Circuits).

- Complete Single Chip System for MPU Control (I²C Bus).
- Data and Clock Inputs are 3–Wire Bus Compatible
- Divide–by–8 Prescaler Accepts Frequencies up to 1.3 GHz
- 15 Bit Programmable Divider Accepts Input Frequencies up to 165 MHz
- Reference Divider: Programmable for Division Ratios 512 and 1024.
- 3–State Phase/Frequency Comparator
- Operational Amplifier for Direct Tuning Voltage Output (30 V)
- Four Integrated PNP Band Buffers for 40 mA (V_CC1 to 14.4 V)
- Output Options for the Reference Frequency and the Programmable Divider
- High Sensitivity Preamplifier
- Circuit to Detect Phase Lock
- Fully ESD Protected
PLL Tuning Circuit with 3–Wire Bus

MC44827DTB  
Case 948F  
The MC44827 is a tuning circuit for TV and VCR tuner applications. This device contains on one chip all the functions required for PLL control of a VCO. This integrated circuit also contains a high frequency prescaler and thus can handle frequencies up to 1.3 GHz.  
The MC44827 is controlled by a 3–wire bus. It has the same function as the MC44828 which is I2C bus controlled. The MC44827 and MC44828 can replace each other to allow conversion between 3–wire bus and I2C bus control.  
The MC44827 is manufactured on a single silicon chip using Motorola's high density bipolar process, MOSAIC™ (Motorola Oxide Self Aligned Implanted Circuits).  

PLL Tuning Circuit with I2C Bus

MC44828DTB  
Case 948F  
The MC44828 is a tuning circuit for TV and VCR tuner applications. This device contains on one chip all the functions required for PLL control of a VCO. This integrated circuit also contains a high frequency prescaler and thus can handle frequencies up to 1.3 GHz.  
The MC44828 is controlled by an I2C bus. It has the same function as the MC44827 which is 3–wire bus controlled. The MC44827 and MC44828 can replace each other to allow conversion between 3–wire bus and I2C bus control.  
The MC44828 is manufactured on a single silicon chip using Motorola's high density bipolar process, MOSAIC™ (Motorola Oxide Self Aligned Implanted Circuits).  

PLL Tuning Circuit with DC/DC Converter and I2C Bus

MC44871DTB  
Case 948F  
The MC44871 is a tuning circuit for TV, VCR and Multimedia tuner applications. This device contains on one chip all the functions required for PLL control of a VCO. This integrated circuit also contains a high frequency prescaler and therefore can handle frequencies up to 1.3 GHz.  
The MC44871 has an integrated dc/dc converter to generate the 30 V supply voltage for the tuning amplifier on the chip. A tuner using the MC44871 does not need an external 30 V supply.  
The MC44871 is controlled by a I2C bus, and has a chip address function. The MC44871 data format is the same as the MC44818/MC44828.  
The MC44871 is manufactured on a single silicon chip using Motorola's high density bipolar process, MOSAIC™ (Motorola Oxide Self Aligned Implanted Circuits).  

The MC44827 has the same features as MC44817 with the following differences:  
• Lower Power Consumption, 200 mW Typical  
• Improved Prescaler with Higher Margins for Sensitivity and Temperature Range. (A typical device is functional in a temperature range greater than –40 to 100°C.)  
• Lock Detector with Push–Pull Output  
• No Bypass of Divide–by–8 Prescaler  
• TSSOP Package  

The MC44828 has the same features as MC44818 with the following differences:  
• Lower Power Consumption, 200 mW Typical  
• Improved Prescaler with Higher Margins for Sensitivity and Temperature Range. (A typical device is functional in a temperature range greater than –40 to 100°C.)  
• Lock Detector with Push–Pull Output  
• TSSOP Package  

The differences compared with the MC44828 are described hereafter:  
• The Pin Called VCC2 for the MC44828 is Now Called CP (Charge Pump). This Pin is the Output of the dc/dc Converter; it Only Needs an External Capacitor (1.0 nF) Instead of the 30 V Supply Line  
• High Speed I2C Bus (500 kHz)  
• I2C Bus Read Mode for Lock Detector and A to D Converters  
• HF Input is Symmetric  
• MC44871 has Three PNP High Current (30 mA) Band Buffers (B0, B1, B2) and One NPN Low Current (5.0 mA) Band Buffer (B4)  
• The Tuning Voltage Pin Needs an External pull–up Resistor (560 kΩ)  
• Phase Comparator Output Current Has Been Decreased
PLL Tuning Circuit with $I^2$C Bus

**MC44829D**

The MC44829 is a tuning circuit for TV and VCR tuner applications. It contains, on one chip, all the functions required for PLL control of a VCO. This integrated circuit also contains a high frequency prescaler and thus can handle frequencies up to 1.3 GHz. The circuit has a band decoder that provides the band switching signal for the mixer/oscillator circuit. The decoder is controlled by the buffer bits.

The MC44829 has programmable 512/1024 reference dividers and is manufactured on a single silicon chip using Motorola’s high density bipolar process, MOSAIC™ (Motorola Oxide Self Aligned Implanted Circuits).

- Complete Single Chip System for MPU Control ($I^2$C Bus)
- Divide–by–8 Prescaler Accepts Frequencies up to 1.3 GHz
- 15 Bit Programmable Divider
- Reference Divider: Programmable for Division Ratios 512 and 1024
- 3–State Phase/Frequency Comparator
- Operational Amplifier for Direct Tuning Voltage Output (30 V)
- Four Programmable Chip Addresses
- Integrated Band Decoder for the Mixer/Oscillator Circuit
- Band Buffers with Low “On” Voltage (0.4 V Maximum at 5.0 mA)
- Fully ESD Protected to MIL–STD–883C, Method 3015.7 (2000 V, 1.5 kΩ, 150 pF)
Advanced PAL/NTSC Encoder
MC13077P, DW
Case 738, 751D

The MC13077 is an economical, high quality, RGB encoder for PAL or NTSC applications. It accepts red, green, blue and composite sync inputs and delivers either composite PAL or NTSC video, and S–Video Chroma and Luma outputs. The MC13077 is manufactured using Motorola’s high density, bipolar MOSAIC® process.
- Single 5.0 V Supply
- Composite Output
- S–Video Outputs
- PAL/NTSC Switchable
- PAL Squarewave Output
- PAL Sequence Resettable
- Internal/External Burst Flag
- Modulator Angles Accurate to 90°
- Burst Position/Duration Determined Digitally
- Subcarrier Reference from a Crystal or External Source
Consumer Electronic Circuits Package Overview

CASE 626 P SUFFIX
CASE 646 P SUFFIX
CASE 648 P SUFFIX
CASE 709 P SUFFIX
CASE 710 P SUFFIX
CASE 711 P SUFFIX
CASE 724 P SUFFIX
CASE 738 H, P SUFFIX
CASE 751 D SUFFIX
CASE 751A D SUFFIX
CASE 751B D SUFFIX
CASE 751D DW SUFFIX
CASE 751E DW SUFFIX
CASE 751F DW SUFFIX
CASE 751G DW SUFFIX
Consumer Electronic Circuits Package Overview

CASE 777
FN SUFFIX

CASE 824, 824A
FB, FU SUFFIX

CASE 824D
FTB SUFFIX

CASE 824E
FB SUFFIX

CASE 859
B SUFFIX

CASE 873
FU SUFFIX

CASE 898
FB, FU, P SUFFIX

CASE 904
F SUFFIX

CASE 948E
DTB SUFFIX

CASE 948F
DTB SUFFIX

CASE 948J
DTB SUFFIX

CASE 967
M SUFFIX