# CONSUMER CIRCUIT SELECTION GUIDE BY FUNCTION

## TV

| Function | Circuits |
|---|---|
| AFT | μA3064 |
| Sound IF Amp. Lim. Detector | μA3065 |
| Video Amplifier | TBA970 |
| Chroma Processing NTSC | μA746, μA780, μA781, μA787, μA788 |
| Chroma Processing PAL | TAA630S, TBA510, TBA520, TBA540, TBA560C, TBA990 |
| Chroma Matrix | TBA530 |
| Sync Separator Hor. Oscillator | μA1391, μA1394, TBA920 |
| Audio Output | TBA800, TBA810S |
| Video Tape Recorders | μA796 |



## AUDIO

| Function | Circuits |
|---|---|
| AM Radio | μA720 |
| AM-FM IF | μA721 |
| IF Amplifiers | μA703, μA753 |
| IF Amp. Lim. Detectors | μA2136, μA3075, μA3089 |
| Stereo Demodulators | μA732, μA758, μA767 |
| Audio Preamplifiers | μA739, μA749, μA7305 |
| Four-Channel Sound | μA1312, μA1314, μA1315 |
| Dolby Noise Reduction | μA7300 |
| Audio Amplifiers | μA706, TBA641, TBA800, TBA810S, TBA810DS |
| Tape Motor Speed Control | μA7391 |

# μA2136

## FM IF AMPLIFIER/LIMITER/DETECTOR

### FAIRCHILD LINEAR INTEGRATED CIRCUIT

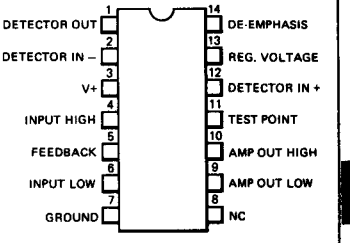
**GENERAL DESCRIPTION** – The 2136 is a monolithic three-stage limiting amplifier and FM detector circuit constructed using the patented Fairchild Planar* epitaxial process. The chip also contains a regulator which reduces parameter variations with temperature and applied supply voltage. The stabilized dc outputs of the regulator and the detector make the device especially suited for AFC applications using varactor diodes. The device is designed as a pin-to-pin substitute for the ULN2136. With minor changes in external components, it also serves as a replacement for the ULN2111 and similar products. In these applications the regulated output terminal (pin 13) is used as the supply terminal.

- **EXCELLENT AM REJECTION – 40 dB TYPICAL AT 10.7 MHz**
- **QUADRATURE DETECTOR EMPLOYING SINGLE TUNED CIRCUIT**
- **ACTIVE CIRCUITRY PERFORMANCE INSENSITIVE TO SUPPLY VARIATIONS**
- **TEMPERATURE STABILIZED VOLTAGE REGULATOR IS SHORT CIRCUIT PROTECTED**

**ABSOLUTE MAXIMUM RATINGS**

| | |
|---|---|
| Supply Voltage: | |
| (Used as μA2136) Supply on Pin 3 | +20 V |
| (Used as μA2111) Supply on Pin 13 | +15 V |
| Input Voltage (Pin 4) | +3.5 V |
| Power Dissipation (Note 1) | 670 mW |
| Regulator Output Current (Pin 13) | 30 mA |
| Operating Temperature Range | −40°C to +85°C |
| Storage Temperature Range | −55°C to +125°C |
| Lead Temperature | |
| Hermetic DIP (Soldering, 60 seconds) | 300°C |
| Molded DIP (Soldering, 10 seconds) | 260°C |

**CONNECTION DIAGRAM**
**14-LEAD DIP**
(TOP VIEW)
PACKAGE OUTLINES 6A 9A
PACKAGE CODES D P




**ORDER INFORMATION**

| TYPE | PART NO. |
|---|---|
| μA2136 | μA2136DC |
| μA2136 | μA2136PC |

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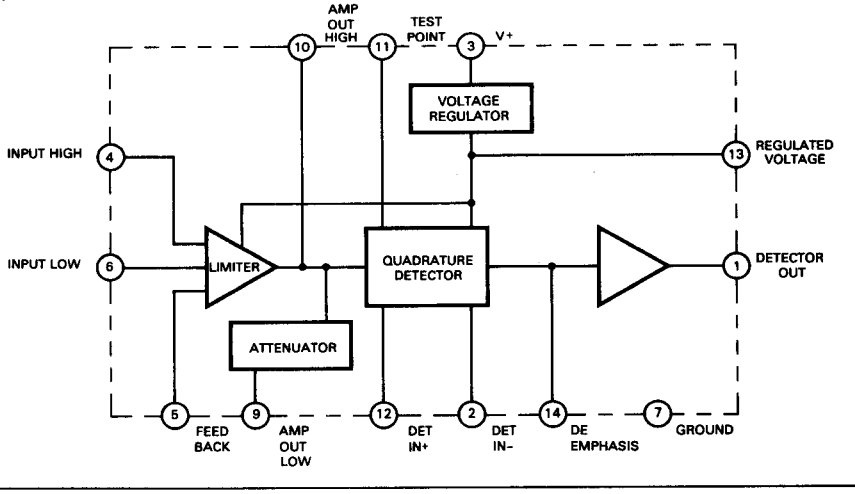
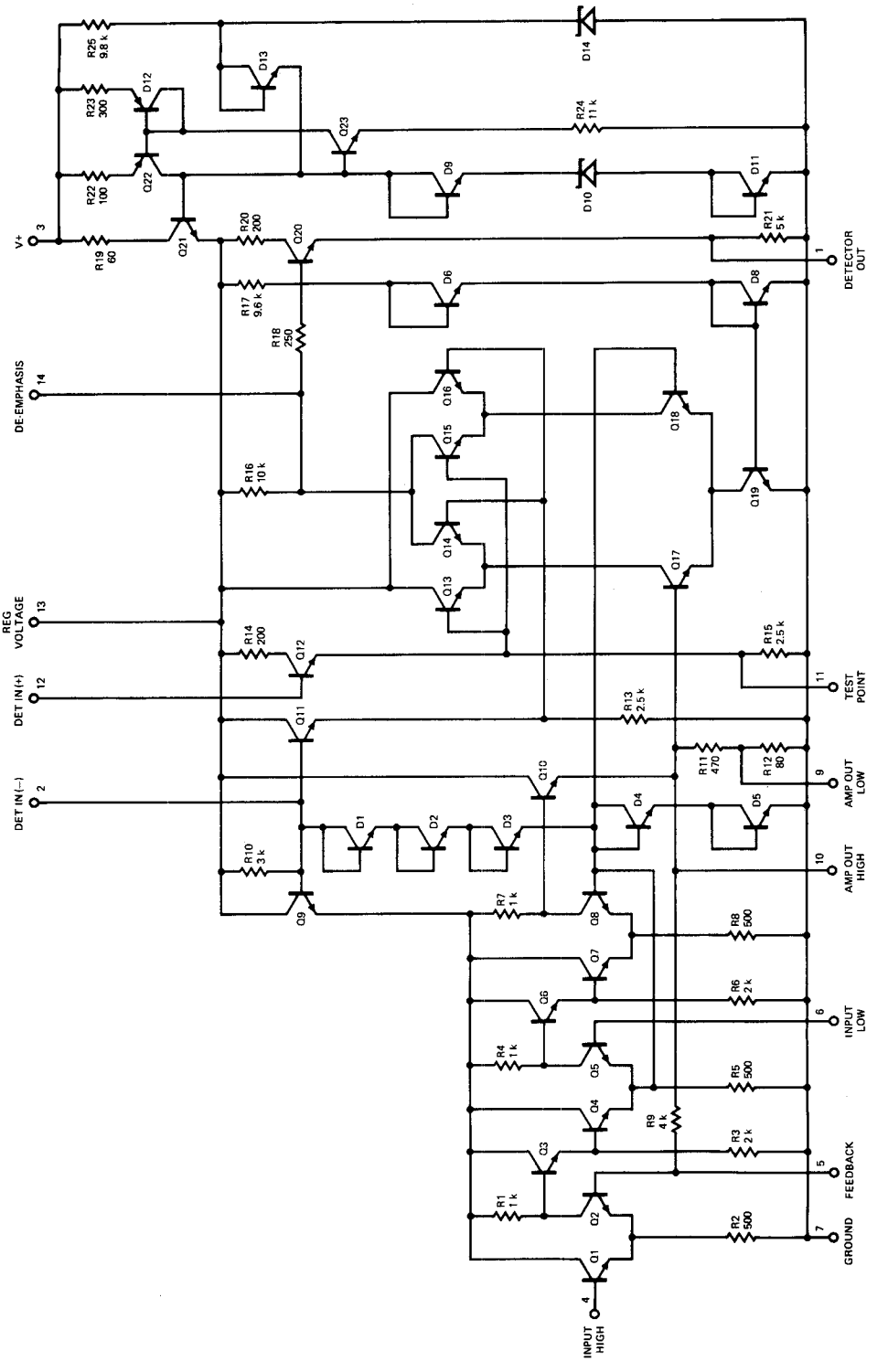
**BLOCK DIAGRAM**




*Planar is a patented Fairchild process.

## EQUIVALENT CIRCUIT



**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C, Supply Voltage - 12 V, See Test Circuit, Note 2, unless otherwise specified)

**DC CHARACTERISTICS** ($V_{IN}$ = 0 V)

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Supply Current | $I_3$ | Pin 13 open | 12 | 17 | 22 | mA |
| Detector Output Level | $V_1$ | | 3.0 | 3.8 | 4.6 | V |
| Temperature Sensitivity of $V_1$ | | $I_{13}$ = 20 mA | | +1.5 | | mV/°C |
| Temperature Sensitivity of $V_{13}$ | | $I_{13}$ = 20 mA | | +1.5 | | mV/°C |
| De-Emphasis Resistance | $R_{14}$ | | 7.0 | 10 | 13 | kΩ |
| Amplifier Input Resistance | $R_{IN4}$ | | | 5.0 | | kΩ |
| Amplifier Input Capacitance | $C_{IN4}$ | | | 11 | | pF |
| Detector Input Resistance | $R_{IN12}$ | | | 70 | | kΩ |
| Detector Input Capacitance | $C_{IN12}$ | | | 2.7 | | pF |
| Amplifier HIGH Output Resistance | $R_{OUT10}$ | | | 60 | | Ω |
| Detector Output Resistance | $R_{OUT1}$ | | | 200 | | Ω |

**AC CHARACTERISTICS** ($f_o$ = 10.7 MHz, Deviation = ±75 kHz, Modulation Frequency = 400 Hz)

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Amplifier Voltage Gain | $V_G = V_{10}/V_4$ | $V_{IN} < 0.3\ mV_{RMS}$ | | 56 | | dB |
| Input Limiting Threshold | $V_{TH}$ | Recovery Audio = $V_{OUT}$ −3.0 dB | | 450 | 800 | $\mu V_{RMS}$ |
| Recovered Audio Output | $V_{OUT}$ | $V_{IN}$ = 10 $mV_{RMS}$ | | 400 | | $mV_{RMS}$ |
| Output Distortion | THD | $V_{IN}$ = 10 $mV_{RMS}$ | | 1.0 | 3.0 | % |
| AM Rejection | AMR | (Note 3) | | 40 | | dB |
| Line Regulation | $\Delta V_{13}/\Delta V_3$ | $I_{13}$ = 20 mA | | 5.0 | 25 | mV/V |

NOTES:
1. Rating applies up to 70°C operating temperature. Derate 8.3 mW/°C between 70°C and 85°C.
2. The tank circuit parameters apply to the finished test jig. They are measured between pins 12 and 2 without IC inserted.
3. $AMR = 20 \log \frac{V_{OUT} \text{ at 10 mV FM, 100\% modulated with } f_m = 400 \text{ Hz}}{V_{OUT} \text{ at 10 mV AM, 10.7 MHz, 30\% modulated with } f_m = 400 \text{ Hz}}$
4. Tank circuit values: L = 1.5 − 3 μH, C = 120 pF, R = 3.9 kΩ, $Q_L$ = 20 ± 5%.

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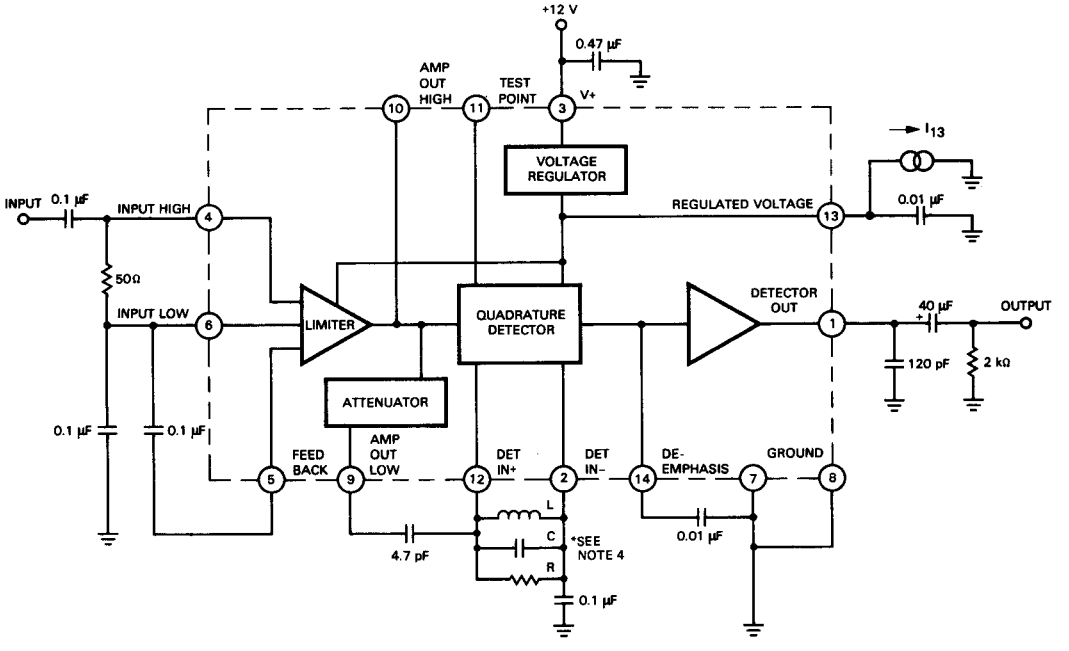
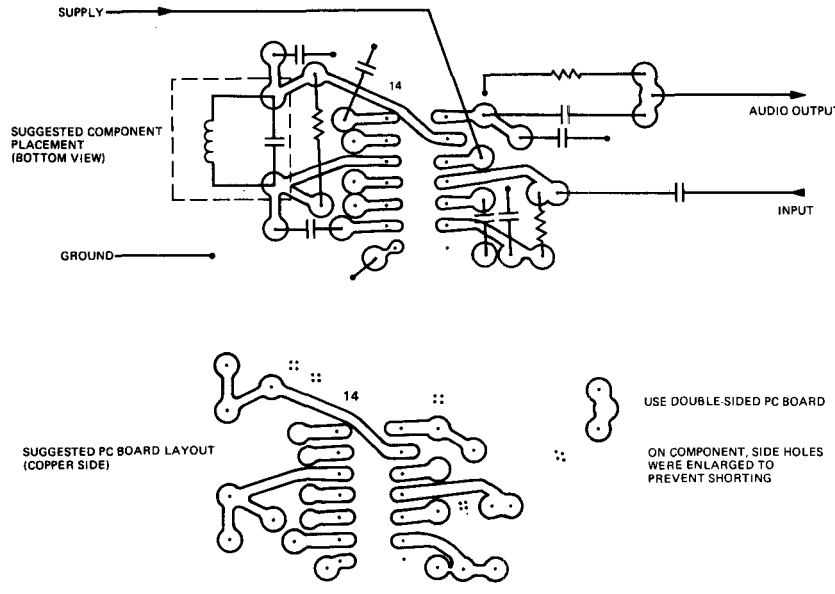
**TEST CIRCUIT**



## PC BOARD LAYOUT




## TYPICAL APPLICATIONS