

## IF AMPLIFIER WITH DEMODULATOR AND AFC

- SUPPLY VOLTAGE : 12 V TYP
- SUPPLY CURRENT : 50 mA TYP
- I.F. INPUT VOLTAGE SENSITIVITY AT  
F = 38.9 MHz : 85  $\mu$ V<sub>RMS</sub> TYP
- VIDEO OUTPUT VOLTAGE (white at 10 % of top  
synchro) : 2.7 V<sub>pp</sub> TYP
- I.F. VOLTAGE GAIN CONTROL RANGE : 64 dB  
TYP
- SIGNAL TO NOISE RATIO AT V<sub>I</sub> = 10 mV : 58 dB  
TYP
- A.F.C. OUTPUT VOLTAGE SWING FOR  
 $\Delta f$  = 100 kHz : 10 V TYP

They incorporate the following functions :

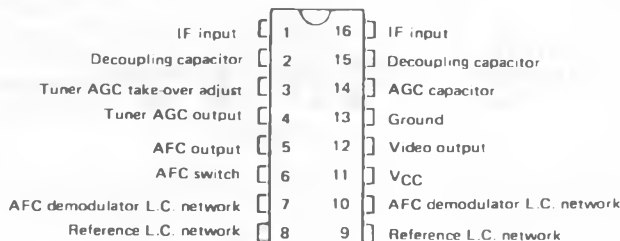
- Gain controlled amplifier
- Synchronous demodulator
- White spot inverter
- Video preamplifier with noise protection
- Switchable AFC
- AGC with noise gating
- Tuner AGC output (NPN tuner for 2540)-(PNP tu-  
ner for 2541)
- VCR switch for video output inhibition (VCR play  
back)

### DESCRIPTION

The TDA2540 and 2541 are IF amplifier and A.M. demodulator circuits for colour and black and white television receivers using PNP or NPN tuners. They are intended for reception of negative or positive modulation CCIR standard.

**TDA2540-TDA2541**  
**DIP16**  
(Plastic Package)

### PIN CONNECTIONS



E88TDA2540-01



## ABSOLUTE MAXIMUM RATINGS

| Symbol           | Parameter                     | Value         | Unit |
|------------------|-------------------------------|---------------|------|
| V (11–13)        | Supply Voltage                | 13.8          | V    |
| V (4–13)         | Tuner A.G.C. Voltage          | 12            | V    |
| P <sub>tot</sub> | Power Dissipation             | 900           | mW   |
| T <sub>stg</sub> | Storage Temperature           | – 55 to + 125 | °C   |
| T <sub>amb</sub> | Operating Ambient Temperature | 0 to + 70     | °C   |

## THERMAL DATA

|                      |                                       |    |      |
|----------------------|---------------------------------------|----|------|
| R <sub>th(j-a)</sub> | Junction - ambient Thermal Resistance | 70 | °C/W |
|----------------------|---------------------------------------|----|------|

## ELECTRICAL OPERATING CHARACTERISTICS

T<sub>amb</sub> = 25 °C; V (11 – 13) = 12 V; f = 38.9 MHz (unless otherwise specified)

| Symbol          | Parameter                                                        | Min. | Typ. | Max. | Unit            |
|-----------------|------------------------------------------------------------------|------|------|------|-----------------|
| V (11-13)       | Supply Voltage Range                                             | 10.2 | 12   | 13.8 | V               |
| I <sub>11</sub> | Supply Current                                                   |      | 50   | 60   | mA              |
| V (1-16)        | IF Input Voltage Sensitivity                                     | 60   | 85   | 180  | μVRMS           |
|                 | Max Input Voltage (pins 1-16)                                    |      | 140  |      | mV              |
| V (12-13)       | Video Output Voltage                                             |      | 2.7  |      | V <sub>pp</sub> |
| Z (1-16)        | Differential Input Impedance (in parallel with 2 pF)             |      | 2    |      | kΩ              |
| V (12-13)       | Zero Signal Output Level                                         | 5.7  | 6    | 6.3  | V               |
| V (12-13)       | Top Synchro Output Level                                         | 2.9  | 3.07 | 3.2  | V               |
| ΔG <sub>v</sub> | IF Voltage Gain Control Range                                    | 52   | 64   |      | dB              |
| S/N             | Signal to Noise Ratio (V <sub>i</sub> = 10 mV) (see note 1)      | 50   | 58   |      | dB              |
| B               | Bandwidth of Video Amplifier (~ 3 dB)                            |      | 6    |      | MHz             |
| dG              | Differential Gain                                                |      | 4    | 10   | %               |
| dφ              | Differential Phase                                               |      | 2    | 10   | %               |
| V (12-13)       | Carrier Signal at Video Output (V <sub>i</sub> = 10 mV)          |      | 4    | 30   | mVRMS           |
| V (12-13)       | 2nd Harmonic of Carrier at Video Output (V <sub>i</sub> = 10 mV) |      | 20   | 30   | mVRMS           |
|                 | Intermodulation at 1.1 MHz (blue)<br>(see figures 2 and 3)       | 46   | 60   |      | dB              |
|                 | Intermodulation at 1.1 MHz (yellow)<br>(see figures 2 and 3)     | 46   | 50   |      | dB              |
|                 | Intermodulation at 3.3 MHz (blue)<br>(see figures 2 and 3)       | 46   | 54   |      | dB              |

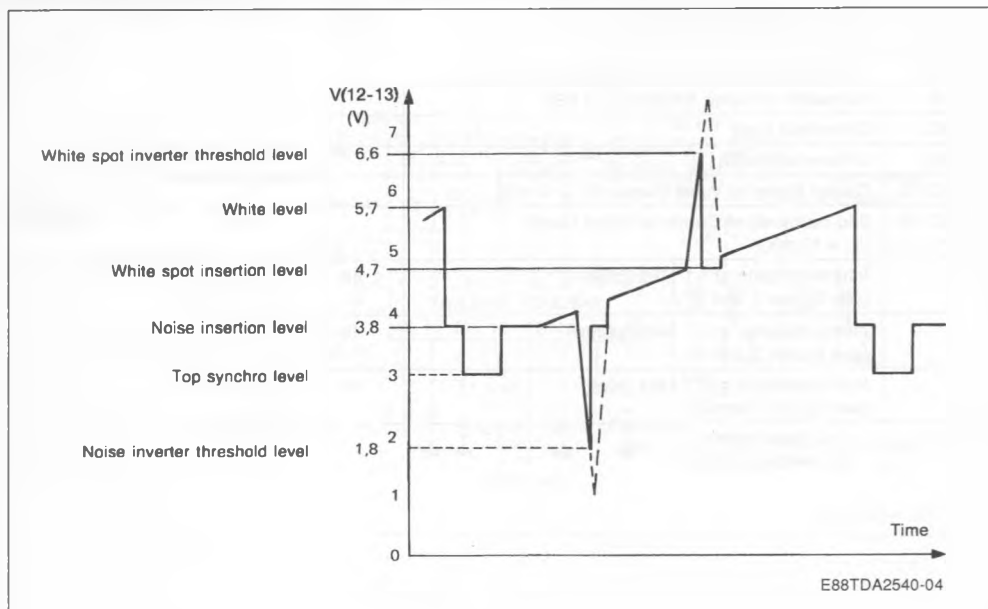
Note : 1.  $S/N = \frac{V_o \text{ (black to white)}}{V_N \text{ . (RMS at B = 5 MHz)}}$  (dB)

## ELECTRICAL OPERATING CHARACTERISTICS(continued)

| Symbol    | Parameter                                                                                                             | Min. | Typ.    | Max. | Unit |
|-----------|-----------------------------------------------------------------------------------------------------------------------|------|---------|------|------|
| V (14-13) | VCR Switches Off Output at : (VCR = low Level)                                                                        |      |         | 1.1  | V    |
|           | White Spot Inverter Threshold Level (see figure 1)                                                                    |      | 6.6     |      | V    |
|           | White Spot Insertion Level (see figure 1)                                                                             |      | 4.7     |      | V    |
|           | Noise Inverter Threshold Level (see figure 1)                                                                         |      | 1.8     |      | V    |
|           | Noise Insertion Level (see figure 1)                                                                                  |      | 3.8     |      | V    |
| I 4       | Tuner AGC output Current Range                                                                                        |      | 0 to 10 |      | mA   |
| V (14-13) | Tuner AGC Output Voltage                                                                                              |      |         | 0.3  | V    |
| I 4       | Tuner AGC Output Leakage Current<br>TDA2541 V 14-13 = 11 V<br>V 4-13 = 12 V<br>TDA2540 V 14-13 = 5 V<br>V 4-13 = 12 V |      |         | 15   | μA   |
| ΔV (5-13) | AFC Output Voltage Swing (Δf = 100 kHz)                                                                               | 10   | 11      |      | V    |
| Δf        | Change of Frequency at AFC Output (voltage swing of 10 V)                                                             |      | 100     | 200  | kHz  |
| V (6-13)  | AFC Switches OFF (AFC = low level) at :                                                                               |      |         | 2.5  | V    |
| V (6-13)  | AFC Switches LOW (AFC = High level) at :                                                                              | 3.2  |         |      | V    |
| V (5-13)  | AFC Zero = Signal Output Voltage (minimum gain)                                                                       | 4    | 6       | 8    | V    |

Note : 1.  $S/N = \frac{V_o \text{ (black to white)}}{V_N \text{ (RMS at B = 5 MHz)}} \text{ (dB)}$

Figure 1 : Video Output Waveform Showing White Spot and Noise Inverter Threshold Levels.



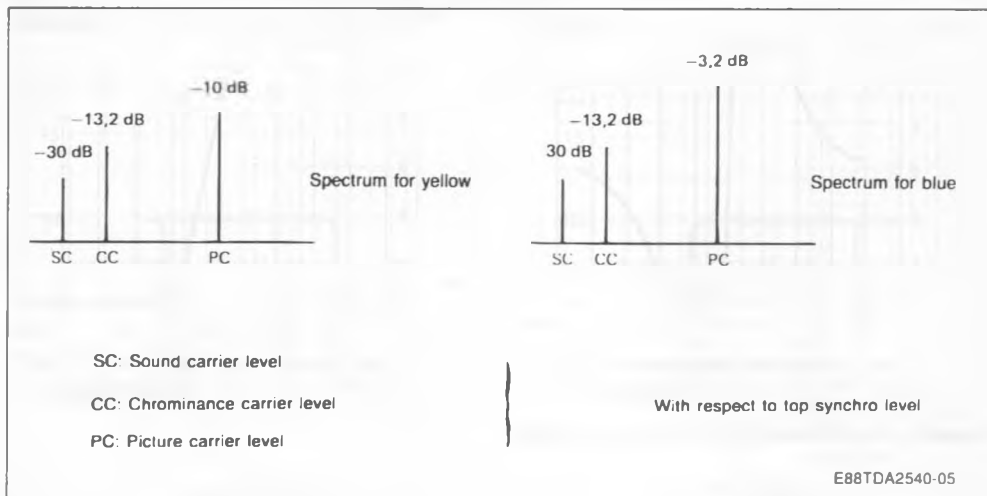
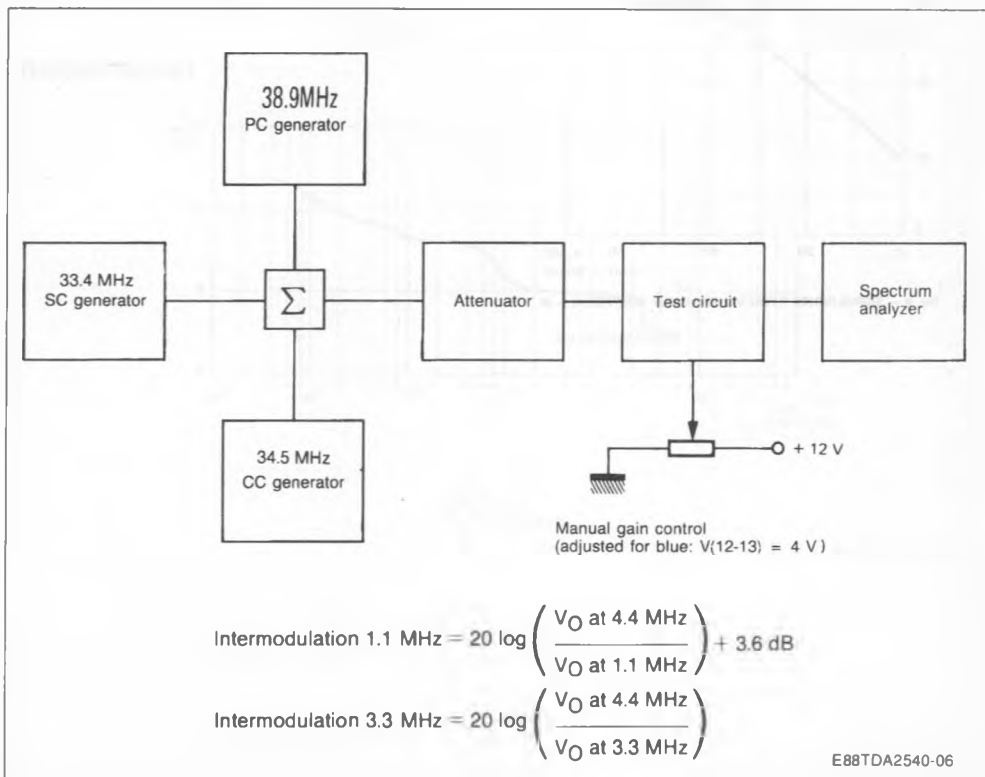
**Figure 2 :** Input Conditions for Intermodulation Measurements.**Figure 3 :** Test Set-up for Intermodulation.

Figure 4 : AFC Voltage Versus Frequency V(5-13).

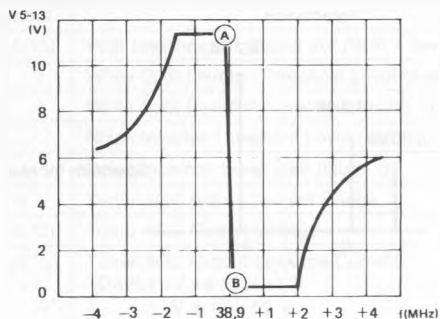


Fig. 4 — AFC VOLTAGE VERSUS FREQUENCY V 5-13  
E88TDA2540-07

Figure 5 : AFC Voltage Versus Frequency V(5-13).

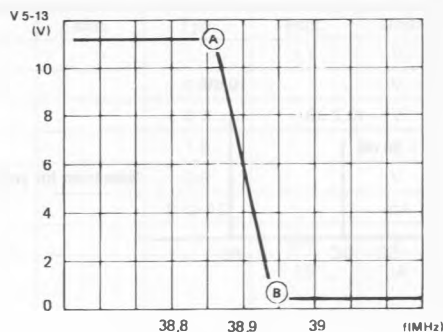


Fig. 5 — AFC VOLTAGE VERSUS FREQUENCY V 5-13  
E88TDA2540-08

Figure 6 : Signal/Noise Ratio Versus Input Voltage V(1-16).

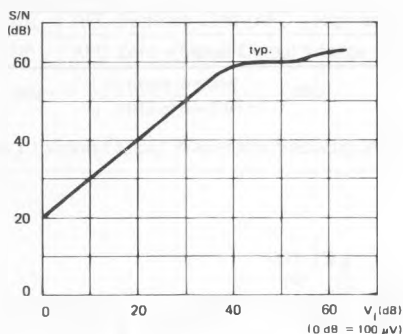
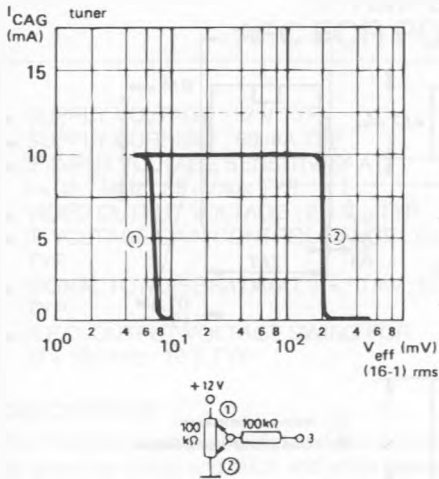


Fig. 6 — SIGNAL/NOISE RATIO VERSUS INPUT VOLTAGE V 1-16  
E88TDA2540-09

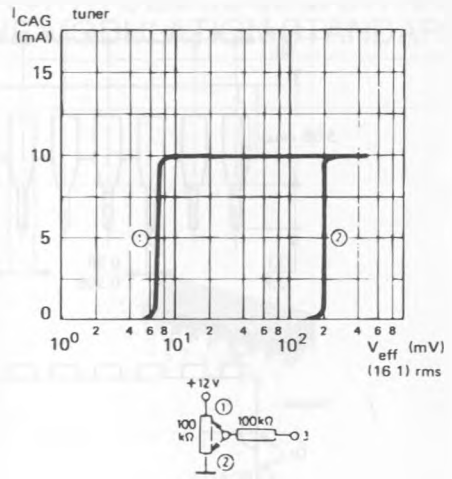
Figure 7 : AGC Tuner Current Curve.

TDA2540

TDA2541

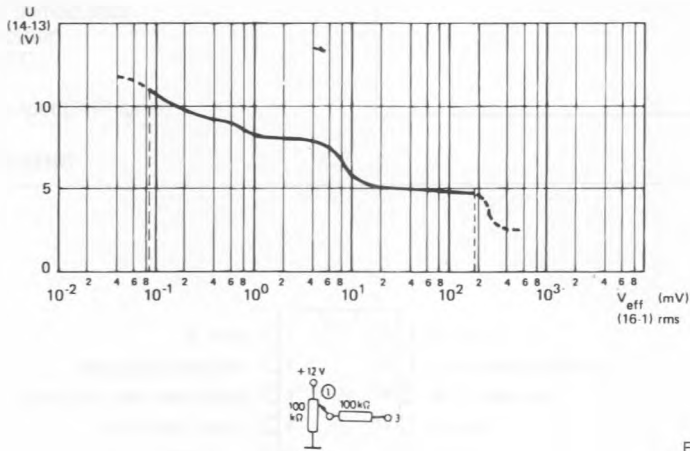


E88TDA2540-10



E88TDA2540-11

TDA2540-TDA2541



E88TDA2540-12

## PACKAGE MECHANICAL DATA

## 16 PINS – PLASTIC DIP

