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## **NTE1664**

### **Integrated Circuit**

### **TV Horizontal/Vertical Sync Signal Processor**

**Description:**

The NTE1664 is a silicon monolithic integrated circuit in a 22-Lead DIP type package designed for use as a horizontal deflection circuit and vertical deflection circuit for color TV sets. This device contains two synchronization signal separators, a vertical oscillator, vertical sawtooth shaper, vertical pre-driver, vertical retrace blanking pulse generator, horizontal AFC, horizontal oscillator, horizontal pre-driver, and an abnormal high voltage prevention circuit.

**Features:**

- Two Synchronous Signal Separators for Very Stable Synchronization (Horizontal and Vertical Signals are Independent of Each Other)
- Remarkably Improved Interlace Tracking due to Separate Wiring of Horizontal and Vertical Sections
- Wide Range of Vertical Retrace Blanking Time due to Adjust Pin
- Very Low Oscillation Frequency Drift of Vertical and Horizontal Oscillator Against Ambient Temperature

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C} \pm 3^\circ\text{C}$  unless otherwise specified)

|  |                                     |
|--|-------------------------------------|
| Vertical Power Supply Voltage, $V_{21}$ .....                | 15V                                 |
| Horizontal Power Supply Current Drain, $I_{11}$ .....        | 30mA                                |
| Vertical Output Current, $I_{14}$ .....                      | -30mA to +0mA                       |
| Horizontal Output Current, $I_{10}$ .....                    | -10mA to +10mA                      |
| Power Dissipation ( $T_A = +75^\circ\text{C}$ ), $P_D$ ..... | 600mW                               |
| Operating Temperature Range, $T_{opr}$ .....                 | $-20^\circ$ to $+75^\circ\text{C}$  |
| Storage Temperature Range, $T_{stg}$ .....                   | $-40^\circ$ to $+125^\circ\text{C}$ |

**Recommended Operating Conditions:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

|   |      |
|---|------|
| Vertical Power Supply Voltage, $V_{21}$ .....         | 12V  |
| Horizontal Power Supply Drain Current, $I_{11}$ ..... | 15mA |

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{21} = 12\text{V}$ ,  $I_{11} = 15\text{mA}$  unless otherwise specified)

| Parameter                                    | Symbol                  | Test Conditions  | Min       | Typ       | Max       | Unit                     |
|--|-------------------------|--|-----------|-----------|-----------|--------------------------|
| Vertical Power Supply Current                | $I_{21}$                | $V_{21} = 12\text{V}$  | 10.5      | 14.0      | 17.5      | mA                       |
| Horizontal Power Supply Voltage              | $V_{11}$                | $I_{11} = 15\text{mA}$   | 12.0      | 13.0      | 14.5      | V                        |
| Vertical Free-Running Frequency              | $f_{vo}$                | $C_{18} = 1\mu\text{F}$ , $R_{17} = 33\text{k}\Omega$  | 48        | 50        | 53        | Hz                       |
| Vertical Free-Running Frequency Drift        | $\Delta f_{vo}(V_{CC})$ | $\Delta f_{vo}(V_{CC}) =  f_{vo}(9.6\text{V}) - f_{vo}(14.4\text{V}) $                       | 0         | 0.8       | 1.0       | Hz                       |
|  | $\Delta f_{vo}(T_A)$    | $\Delta f_{vo}(T_A) =  f_{vo}(-20^\circ\text{C}) - f_{vo}(+75^\circ\text{C}) $               | 0         | 0.6       | 1.0       | Hz                       |
| Vertical Synchronizing Capture Frequency     | $f_{pv}$                |  | 46        | 48        | 50        | Hz                       |
| Output Middle Voltage                        | $V_{MID}$               | Output Power: NTE1676  | 12        | 13        | 14        | V                        |
| Output Middle Voltage Drift                  | $\Delta V_{MID}(T_A)$   | $\Delta V_{MID}(T_A) =  V_{MID}(-20^\circ\text{C}) - V_{MID}(+75^\circ\text{C}) $            | 0         | –         | 1.0       | V                        |
| Retrace Pulse Width                          | RPW (1)                 | $C_{13} = 0.047\mu\text{F}$ , $R_{13} = 30.75\text{k}\Omega$                                 | 0.95      | 1.0       | 1.05      | ms                       |
|  | RPW (2)                 | $C_{13} = 0.1\mu\text{F}$ , $R_{13} = 28.5\text{k}\Omega$                                    | 1.9       | 2.0       | 2.1       | ms                       |
| Retrace Pulse Voltage                        | RPV                     |  | 10        | 11        | –         | $V_{P-P}$                |
| Horizontal Power Supply Voltage Drift        | $\Delta V_{11}(T_A)$    | $\Delta V_{11}(T_A) =  \Delta V_{11}(-20^\circ\text{C}) - \Delta V_{11}(+75^\circ\text{C}) $ | –         | –         | 130       | mV                       |
| Horizontal Synchronizing Capture Frequency   | $f_{PH}$                | $C_5 = 5600\text{pF}$  | $\pm 500$ | $\pm 700$ | $\pm 900$ | Hz                       |
| Efficiency of Horizontal Oscillation Control | $\beta$                 |  | 38        | 40        | 45        | Hz/ $\mu\text{A}$        |
| AFC Detector Gain                            | $\mu$                   |  | 190       | 300       | 420       | $\mu\text{A}/\text{rad}$ |
| Horizontal Free-Running Frequency            | $f_{HO}$                | $C_5 = 5600\text{pF}$ , $R_5 = 14.5\text{k}\Omega$   | 15.00     | 15.75     | 16.50     | kHz                      |
| Horizontal Free-Running Frequency Drift      | $\Delta f_{HO}(I_{11})$ | $\Delta f_{HO}(I_{11}) =  f_{HO}(15\text{mA}) - f_{HO}(9\text{mA}) $                         | 0         | –         | 50        | Hz                       |
|  | $\Delta f_{HO}(T_A)$    | $\Delta f_{HO}(T_A) =  f_{HO}(-20^\circ\text{C}) - f_{HO}(+75^\circ\text{C}) $               | 0         | 40        | 100       | Hz                       |
| Horizontal Output Pulse Width                | PWH                     |  | 24.5      | 26.0      | 27.5      | $\mu$                    |
| Horizontal Output Pulse Voltage              | PWV                     |  | 10        | 11        | –         | $V_{P-P}$                |
| Horizontal Output Current                    | $I_{10}$                |  | –3.5      | –4.5      | –6.0      | mA                       |
| X-Ray Protector Input Voltage                | $V_6$                   | $V_7 = 6.2\text{V}$  | –0.1      | –         | +0.1      | V                        |

**Pin Connection Diagram**



