# NTE7086
# Integrated Circuit
# Sync Deflection Circuit for CRT Display

## Description:

The NTE7086 is a sync•deflection circuit IC in a 20–Lead DIP type package dedicated to CRT display use. This device can be connected to the NTE1773/NTE1797 (for vertical output use) to form a sync•deflection circuit that meets every requirement for CRT display use.

So far, IC's for color TV use have been applied to the sync•deflection circuit for CRT display use and general–purpose IC's such as one–shot multivibrators, inverters, and a lot of transistors have been used to form the peripherals such as the sync input interface and horizontal phase shifter.

The NTE7086 contains these peripherals on chip and adopts a stable circuit for horizontal oscillation from 15kHz to 100kHz aiming at improving the characteristics required for CRT display use.

## Features:

- The Horizontal Oscillation Frequency can be Adjusted Stably from 15kHz to 100kHz.
- The Horizontal Display can be Shifted Right/Left.
- The Horizontal/Vertical Sync Input can be used intact Regardless of the Difference in Pulse Polarity and Pulse Width.
- The AFC Feedback Sawtooth Wave can be Obtained by Simply Applying a Flyback Pulse to the IC as a Trigger Pulse.
- Any Duty of the Horizontal Pulse Can be Set.
- Good Linearity because DC Bias at Vertical Output Stage is Subjected to Sampling Control within Retrace Time.

## On–Chip Functions:

### Horizontal Block

- AFC
- Horizontal OSC
- X–Ray Protector
- Horizontal Phase Shifter
- AFC Sawtooth Wave Generator
- Horizontal Pulse Duty Setting

### Vertical Block

- Vertical OSC
- Vertical Sawtooth Wave Generator
- Sampling Type DC Voltage Control

## Absolute Maximum Ratings: ($T_A$ = +25°C unless otherwise specified)

Maximum Supply Voltage, $V_{10}$max, $V_{20}$max . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 14V

Allowable Power Dissipation ($T_A \leq$ +65°C), $P_D$max . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 780mW

Operating Temperature Range, $T_{opr}$ . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . −20° to +85°C

Storage Temperature Range, $T_{stg}$ . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . −55° to +125°C

**Recommended Operating Conditions:** ($T_A$ = +25°C unless otherwise specified)

Operating Voltage Range, $V_{10}$opr, $V_{20}$opr  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .  9.0V to 13.5V

Recommended Supply Voltage, $V_{10}$, $V_{20}$  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .  12V

**Electrical Characteristics:** ($T_A$ = +25°C, $V_{CC}$10 = $V_{CC}$20 = 12V unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Current Dissipation | $I_{10}$ | $V_{CC}$10 | 12 | – | 30 | mA |
| | $I_{20}$ | $V_{CC}$20 | 5 | – | 12 | mA |
| Vertical Frequency Pull–In Range | $V_{p-in}$ | Vertical Sync 60Hz | 10 | – | 12 | Hz |
| Vertical Free–Running Frequency with Increased/Reduced Voltage | fv | $f_V$ center 55Hz | 50 | – | 60 | Hz |
| | $\Delta f_{Vv}$ | $V_{20}$ = 12V ±1V | –0.5 | – | 0.5 | Hz |
| Characteristic of Vertical Frequency Middle–Point Voltage Control | | 55Hz at 12V | 3.8 | – | 4.4 | V |
| **Threshold Level** | | | | | | |
| Vertical OSC Start Voltage | | | – | – | 4.0 | V |
| Temperature Coefficient of Amplitude Frequency | | $T_A$ = –10° to +60°C | –0.028 | – | 0.028 | Hz/°C |
| | | | 12 | – | 18 | dB |
| Vertical Driver Amplification Factor ($V_{GV}$) with Horizontal AFC Loop Current | $I_{AFC}$ | | ±1.0 | – | ±1.9 | mA |
| Horizontal Free–Running Frequency | $f_H$ | $f_H$ center 15.734kHz | –750 | – | 750 | Hz |
| Horizontal OSC Start Voltage with Increased/Reduced Voltage | | | – | – | 4 | V |
| | $\Delta f_{Hv}$ | $V_{10}$ = 12V ±1V | –50 | – | 50 | Hz |
| Characteristic od Horizontal Frequency with Temperature Characteristic of Horizontal Frequency | | 15.735kHz at 12V, $T_A$ = –10° to +60°C | –2.9 | – | 2.9 | Hz/°C |
| Comparison Wave Generation Input | $V_4$ | | 0.6 | – | 0.9 | V |
| **Operating Voltage** | | | | | | |
| Holddown Operation Start Voltage | $V_{13}$ | | 0.5 | – | 0.8 | V |
| Horizontal Drive Current | $I_{12}$ | | 6.0 | – | 12.0 | mA |

## Pin Connection Diagram

| | | | |
|---|---|---|---|
| Horiz Trigger Input | 1 | 20 | Vert Power Supply |
| Phase Adjust Time Constant | 2 | 19 | Vert Trigger Input |
| Sync Pulse Width Time Constant | 3 | 18 | Vert OSC Time Constant |
| FBP Trigger Input | 4 | 17 | Middle–Point Voltage Control Point |
| Sawtooth Wave Generating Cap | 5 | 16 | Vert Sawtooth Wave Generation |
| Comparison Voltage Generating Cap | 6 | 15 | Vert Drive Output |
| AFC Output | 7 | 14 | GND |
| Horiz OSC Time Constant | 8 | 13 | X–Ray Protect Input |
| Discharge Resistor | 9 | 12 | Horiz Drive Output |
| Horiz Power Supply | 10 | 11 | Horiz Drive Pulse Width Setting |

.280 (7.12) Max

.995 (25.3) Max

.300 (7.62)

.280 (7.1)

.100 (2.54)

.125 (3.17) Min

.385 (9.8)