Horizontal Deflection for 17", 64 kHz Monitors

Using Philips CU15/35 drive transformer & BU4522AF/AX transistor

Most 17" monitor designs for pc's are required to operate at frequencies up to 64 kHz; this Fact Sheet describes Philips Components & Semiconductors solution for the horizontal deflection circuit. This circuit uses the new CU15/35 drive transformer from Philips Components and the new BU4522AF/AX deflection transistor from Philips Semiconductors.

This circuit employs a new drive transformer designed specifically for optimum switching of Philips deflection transistors in multi-frequency monitor applications. The circuit is a complete solution to the horizontal output stage: the 'Hdrive' point can be attached to the output pin of most deflection/sync ic's. The concepts employed in this circuit are discussed in detail in the technical paper "Low power, low cost horizontal drive circuits with U15 core" (ETV/AN97002).

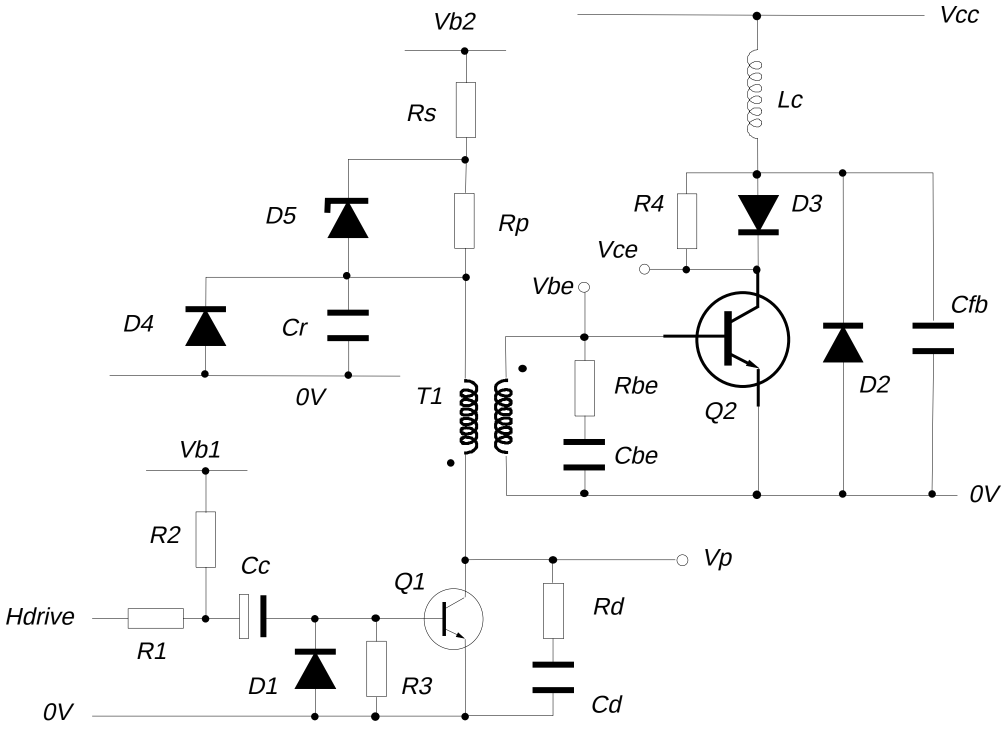

Fig. 1. Horizontal Deflection Circuit for 17", 64 kHz Monitors

Components and values: R1 = 100 Ω; R2 = 680 Ω; Vb1 = 12 V; Cc = 10 µF, 16 V; D1 = 1N4148; R3 = 18 kΩ; Rd = 390 Ω; Cd = 10 nF, 63 V; Vb2 = 18V; Cr = 470 nF; D4 = 1N4148; D5 = BZX79C6V8; Rp = 39 Ω, 1 W; Rs= 27 Ω, NFR25; Q1 = Philips BC337A; T1 = Philips CU15/35; Q2 Philips = BU4522AF/AX; D3 = BYV28-50; R4 = 47 Ω; Cbe = 150 nF; Rbe = 10 Ω; Lc = 140 uH; Cfb = 4.7 nF, 2 kV; D2 = Philips BY359X-1500S; Vcc = 130 V

Let's make things better.

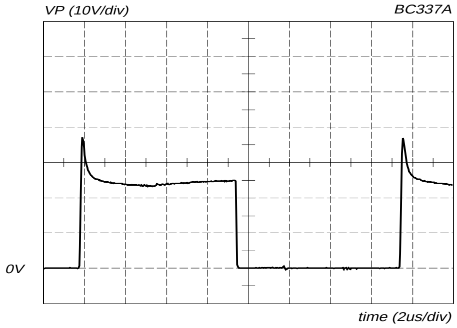

Fig. 2. BC337A V_P vs. time

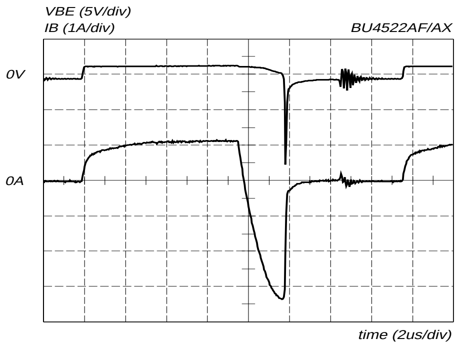

Fig. 3. BU4522AF/AX I_B & V_{BE} vs. time

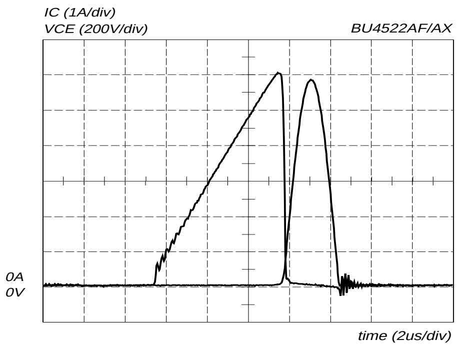

Fig. 4. BU4522AF/AX I_C & V_{CE} vs. time

$I_{B(end)} = 1.15 - 1.25$ A;
-3.0 A $\geq I_{B(off)} \geq -4.2$ A;
$I_{Cmax} = 6.0$ A @ 64 kHz;
$V_{CEmax} \leq 1200$ V

Table 1 Operating Conditions

Figs. 2-4 show the important waveforms in the horizontal deflection circuit. The base drive current has been optimised, in this example, for an application running with a 50% duty cycle drive, peak I_C up to 6.0 A at 64 kHz and peak V_{CE} up to 1350 V. The operating conditions are summarised in Table 1 above. The circuit will also work for all the lower frequency modes required. If the drive duty cycle is not 50% a small change to the I_B may be necessary, achieved by altering Rp and Rs only.

For applications with operating conditions different to those detailed above Table 2 below details the actions to be taken:

Condition	*Action*
$I_{Cmax} \leq 5.5$A	use BU4515AF/AX
$I_{Cmax} \geq 6.5$A	use BU4523AF/AX
f $\geq$ 64 kHz	use BU4523AF/AX

Table 2 Actions for Different Operating Conditions

A change in transistor type requires a change in value of resistors Rp and Rs only.

This circuit employs some new concepts which have very important benefits for monitor design:

1. Low total dissipation, ‘Green’ design.
2. Low component count.
3. Low voltage, low cost components.
4. Flexible design, easy to change for new designs.
5. Reliable design for fault & transient conditions.

The concepts in this circuit can easily be applied to any other multi-frequency monitor design.

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