

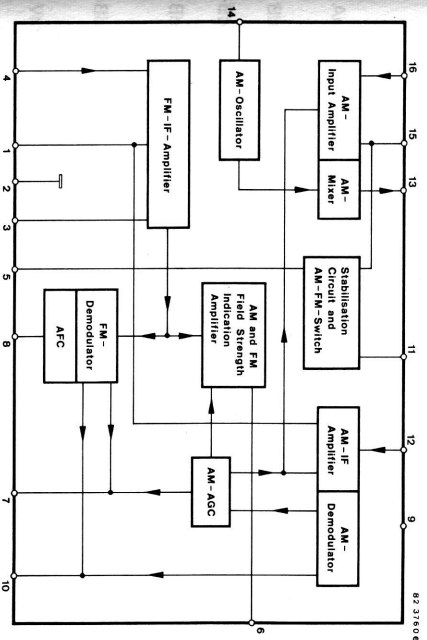


## Monolithic Integrated Circuit

Applications: AM/FM-IF-Amplifier for mains and battery operated radios

### Features:

- Large supply voltage range  
 $V_S = 3 \dots 16 \text{ V}$
- High AM-Sensitivity
- Limiting threshold voltage  $V_i = 30 \mu\text{V}$
- AFC-output with reference voltage connection
- AM-Oscillator for LW, MW and SW
- Single output for field strength indication of AM and FM
- Single pole ended AM-FM switch without high frequency voltages



- |                           |                          |                         |
|---------------------------|--------------------------|-------------------------|
| 1+3 IF-Decoupling         | 7 FM-Demodulator Circuit | 12 AM-IF-Input          |
| 2 Ground, Reference Point | and AM-AGC-Capacitance   | 13 AM-Mixer Output      |
| 4 FM-IF-Input             | 8 AFC-Output             | 14 AM-Oscillator Output |
| 5 FM-Reference Voltage    | 9 + $V_S$                | 15 AM-Decoupling        |
| 6 Field Strength          | 10 Demodulator Output    | 16 AM-Input             |
| Indication                | 11 AM-Reference Voltage  |                         |

Fig. 1 Block diagram and pin connections

### Description

The integrated circuit U 2416 B includes, with exception of the FM front end, a complete AM/FM-radio-circuit. To drive a tuning diode for FM, there is a possibility of a AFC-connection (current source) and reference voltage terminal.

Field strength for AM and FM can be read on one instrument.

**Absolute maximum ratings**

Reference point Pin 2, unless otherwise specified

Supply voltage range	Pin 9 $V_S$	16	V
Ambient temperature	$T_{amb}$	85	°C
Junction temperature	$T_J$	150	°C
Storage temperature range	$T_{sig}$	-25...+150	°C

**Thermal resistance**

Junction ambient	$R_{thJA}$	Min.	Typ.	Max.	K/W
				100	

**Electrical characteristics**

$V_S = 9$  V, reference point Pin 2, Fig. 2,  $T_{amb} = 25$  °C, unless otherwise specified

Supply voltage range	Pin 9 $V_S$	3	16	V
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**AM Amplifier**

$f_1 = 1$  MHz,  $f_{IF} = 455$  kHz,  $f_{mod} = 1$  kHz,  $m = 0.3$

Supply quiescent current	Pin 9 $I_{SB}$	14	mA
Signal to noise ratio	Pin 10 $\frac{S+N}{N}$	6	dB
$V_i = 1.5$ $\mu$ V	Pin 10 $\frac{S+N}{N}$	20	dB
$V_i = 10$ $\mu$ V	Pin 10 $\frac{S+N}{N}$	26	dB

**Regulation range**

$\Delta V_{oAF} / V_{oAF} = -10$ db, $V_i = 100$ mV	Pin 16 $\Delta V_i$	80	dB
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**AF voltage at demodulator output**

$V_i = 1$ mV	Pin 10 $V_{oAF}$	70	mV
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**Distortion**

$V_i = 1$ mV	Pin 10 $d$	0.8	%
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**Demodulator output voltage**

	Pin 10 $V_o$	1.2	V
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**FM-IF Amplifier**

$f_{IF} = 10.7$  MHz,  $\Delta f = \pm 22.5$  kHz,  $f_{mod} = 1$  kHz

Supply quiescent current	Pin 9 $I_{SB}$	14	mA
Limiting threshold (-3 dB)	Pin 4 $V_i$	30	$\mu$ V
Signal to noise ratio	Pin 10 $\frac{S+N}{N}$	6	dB
$V_i = 10$ $\mu$ V	Pin 10 $\frac{S+N}{N}$	26	dB
$V_i = 30$ $\mu$ V	Pin 10 $\frac{S+N}{N}$	65	dB
$V_i = 10$ mV	Pin 10 $\frac{S+N}{N}$	70	dB

**AF voltage at demodulator output**

$V_i = 10$ mV	Pin 10 $V_{oAF}$	70	mV
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Distortion	Pin 10 $d$	Min.	Typ.	Max.
$V_i = 3$ mV			0.8	%
AM-rejection	Pin 10 AMR		40	dB
$V_i = 10$ mV, $m = 0.3$			1.3	V
Demodulator voltage	Pin 10 $V_o$		2.45	V
Reference voltage FM	Pin 5 $V_o$		0.2	mA
Current from Pin 5	$I_o$			

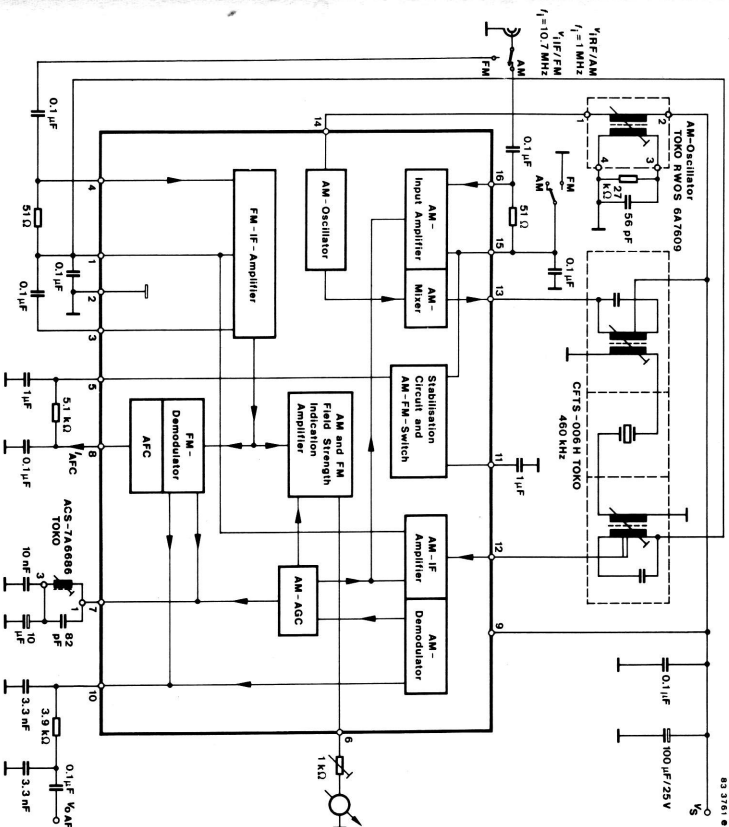
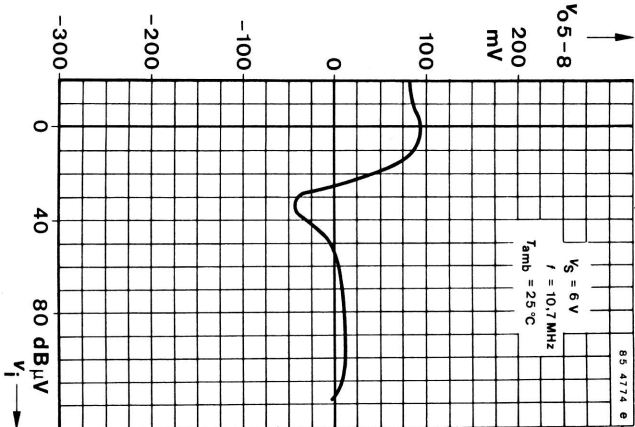
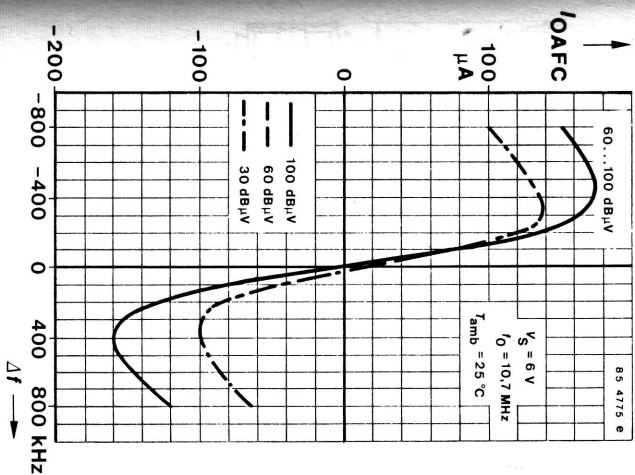
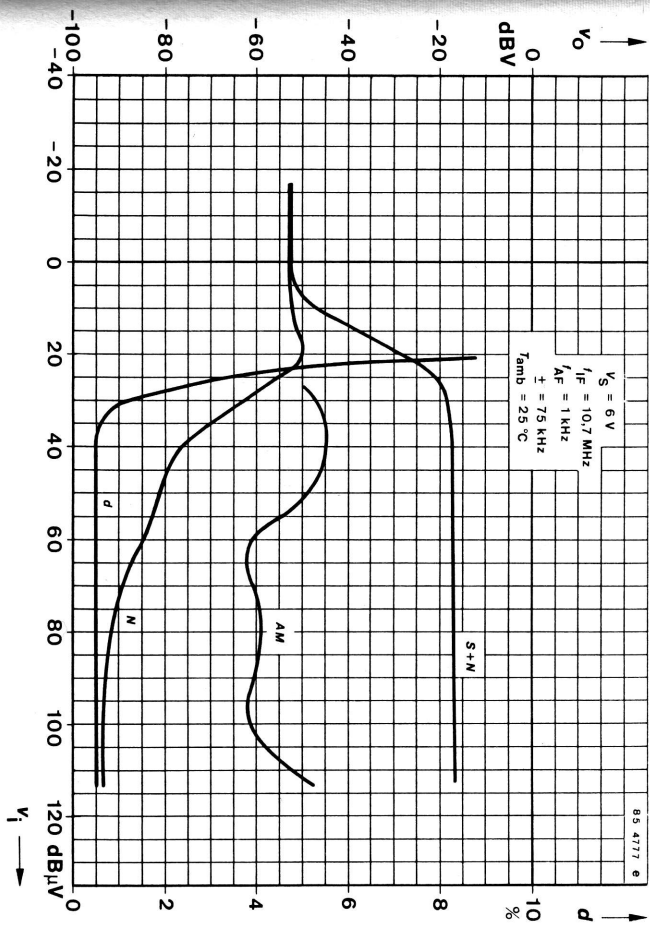
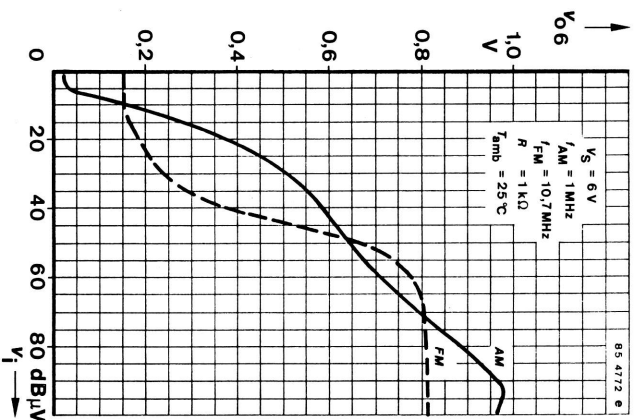
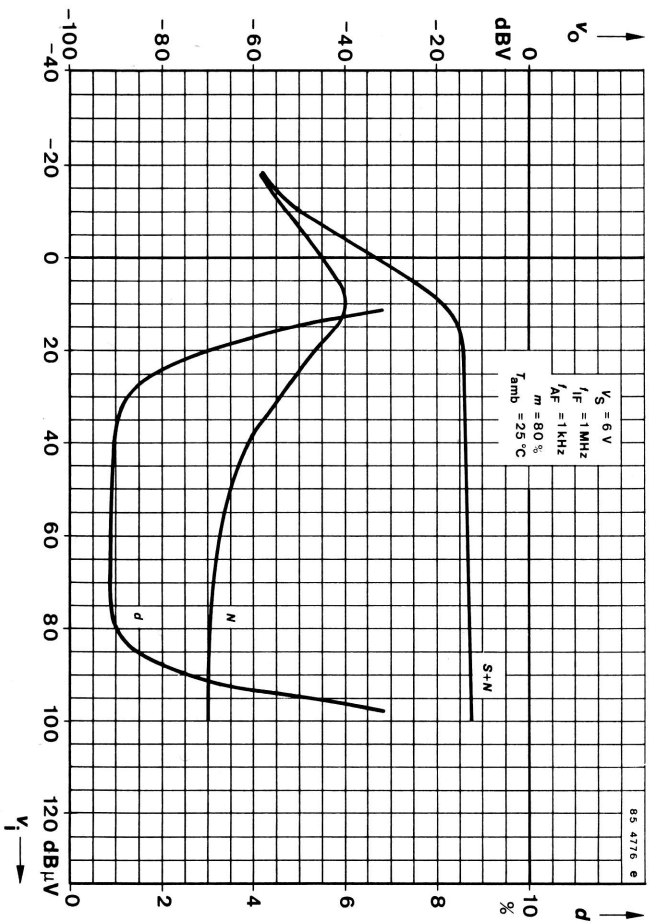
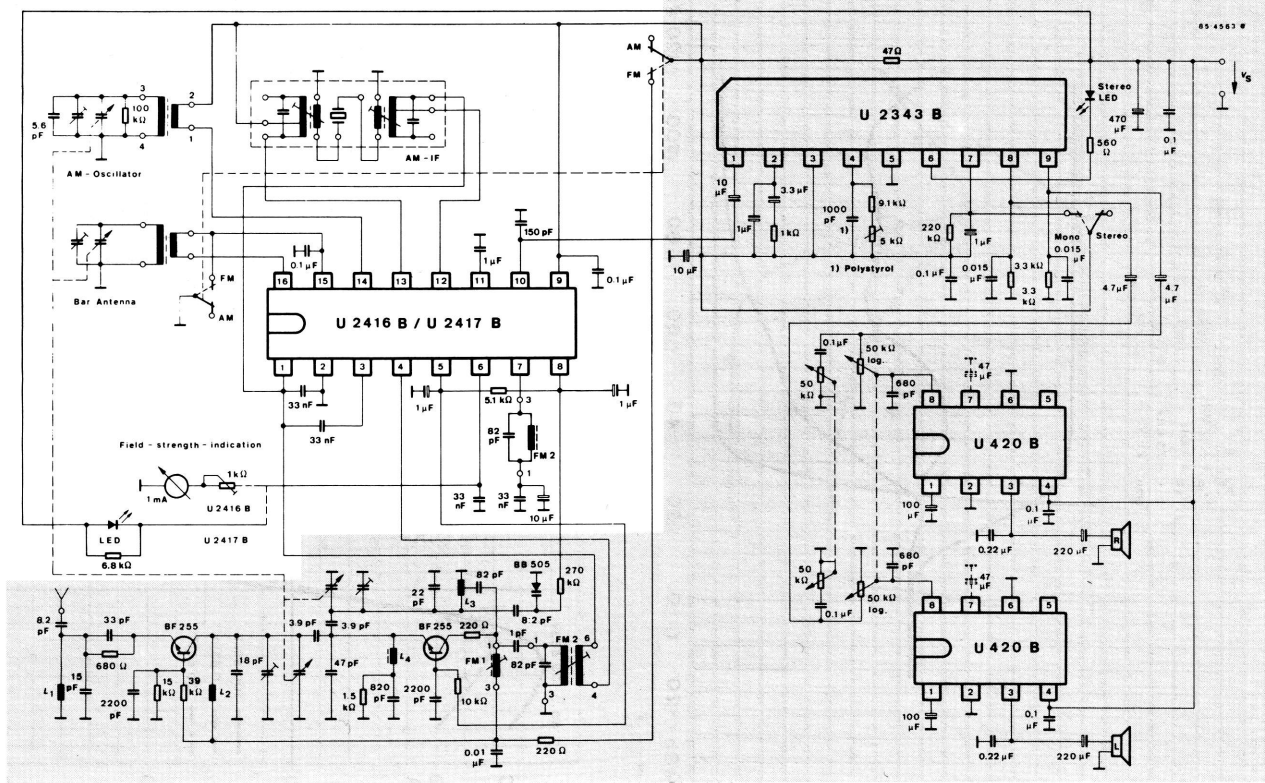


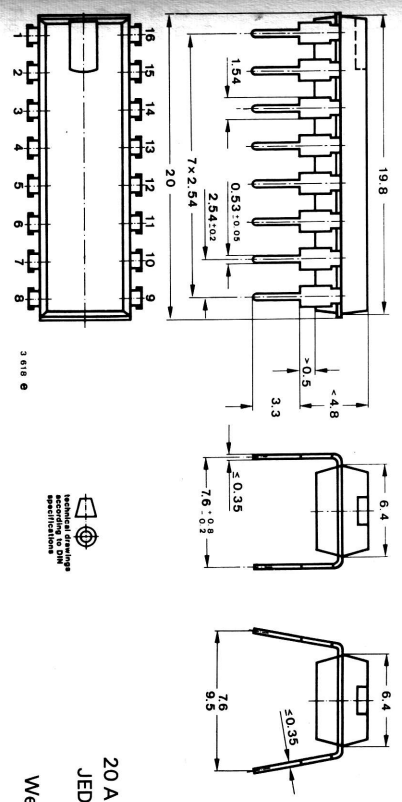
Fig. 2 Test circuit





Pin No.:	Typical	D. C. voltages for $V_S = 6\text{ V}$	
		AM	FM
1	IF-input decoupling	1.0	1.4
2	Ground	0	0
3	IF-input decoupling	1.0	1.4
4	FM-IF input	1.0	1.4
5	FM stabilised voltage	-	2.45
6	Field strength indication	0.15	0.15
7	FM-IF/AM-AGC	0.5	0
8	FM-AFC	-	2.3
9	Supply voltage, $+V_S$	6	6
10	Demodulator output	1.7	1.8
11	AM-stabilised voltage	2.45	-
12	AM-IF input	1.0	1.4
13	AM-mixer output	6	6
14	AM-oscillator	1.65	6
15	AM input decoupling	1.65	-
16	AM input	1.65	-

Dimensions in mm



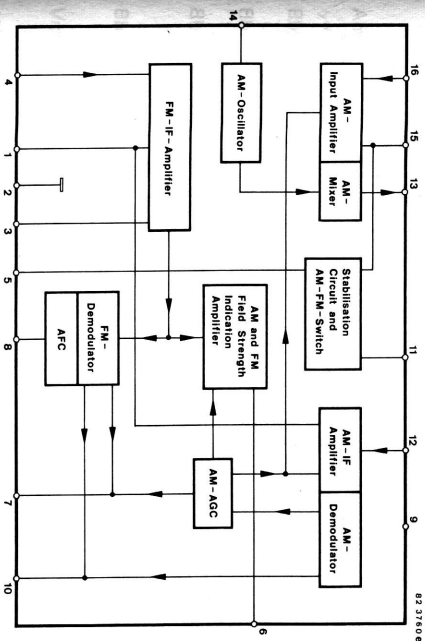
Case  
 20 A 16 DIN 41 866  
 JEDEC MO 015 AH  
 DIP 16  
 Weight max. 1.5 g

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| 2 Ground, Reference Point   | 8 AFC-Output                                    | 13 AM-Mixer Output       |
| 4 FM-IF-Input               | 9 + $V_S$                                       | 14 AM-Oscillator Circuit |
| 5 FM-Reference Voltage      | 10 Demodulator Output                           | 15 AM-Decoupling         |
| 6 Field Strength Indication | 11 AM-Reference Voltage                         | 16 AM-Input              |

Fig. 1 Block diagram and pin connections

**Description**

The integrated circuit U 2417 B includes, with exception of the FM front end, a complete AM/FM-radio-circuit. To drive a tuning diode for FM, there is a possibility of a AFC-connection (current source) and reference voltage terminal. Field strength for AM and FM can be read on one LED.

**Absolute maximum ratings**

Reference point Pin 2, unless otherwise specified

	Pin 9	Pin 10	Pin 5	Pin 10	Pin 5
Supply voltage range	$V_S$			$V_{oAF}$	
Ambient temperature	$T_{amb}$				
Junction temperature	$T_j$				
Storage temperature range	$T_{stg}$				
Thermal resistance					
Junction ambient	$R_{thJA}$				

**Electrical characteristics**

$V_S = 9\text{ V}$ , reference point Pin 2, Fig. 2,  $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified

	Pin 9	Pin 10	Pin 5	Pin 10	Pin 5
Supply voltage range	$V_S$			$V_{oAF}$	
Supply quiescent current	$I_{SB}$				
Signal to noise ratio	$\frac{S+N}{N}$				
AF voltage at demodulator output	$\Delta V_{oAF}$				
Distortion	$d$				
Demodulator output voltage	$V_o$				
FM-IF Amplifier					
Supply quiescent current	$I_{SB}$				
Limiting threshold (-3 dB)	$V_i$				
Signal to noise ratio	$\frac{S+N}{N}$				

Min. Typ. Max.

AF voltage at demodulator output	Pin 10	$V_{oAF}$	70	mV
AM-rejection	Pin 10	AMR	40	dB
Reference voltage FM	Pin 5	$V_o$	2.45	V
Current from Pin 5		$I_o$	0.2	mA

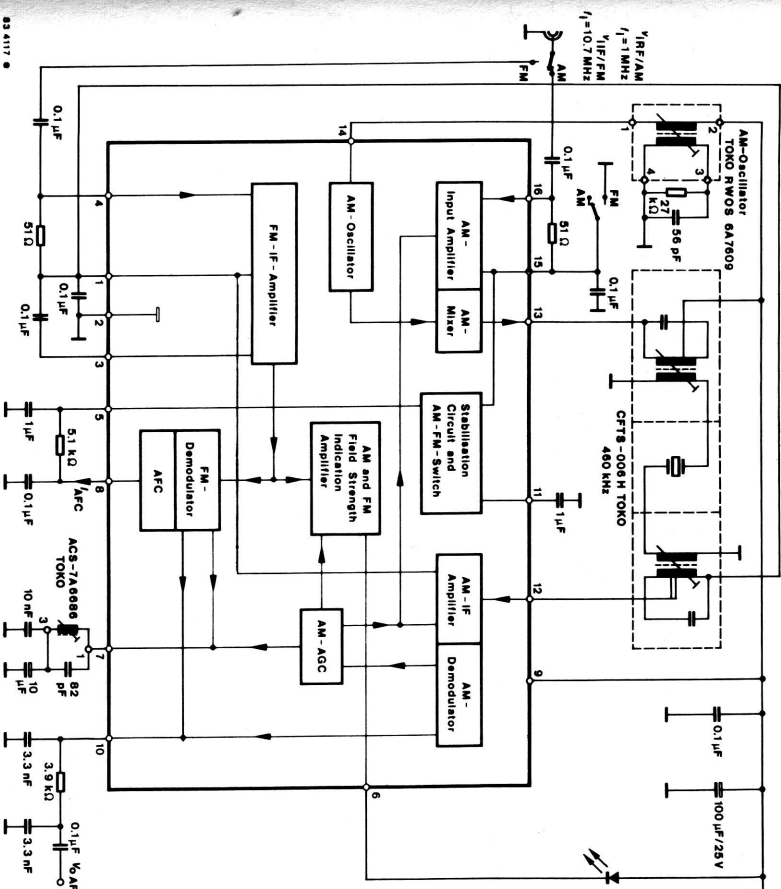
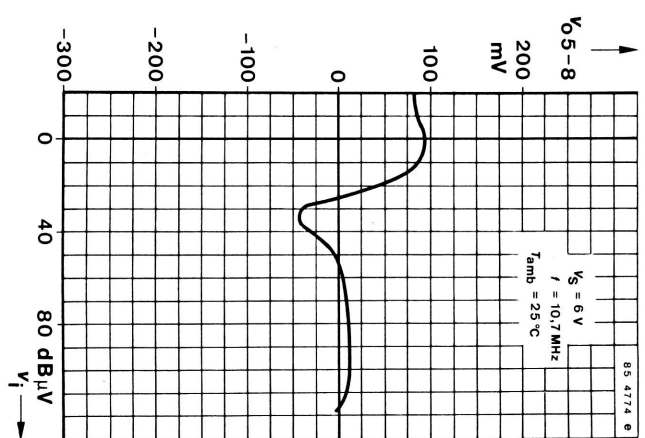
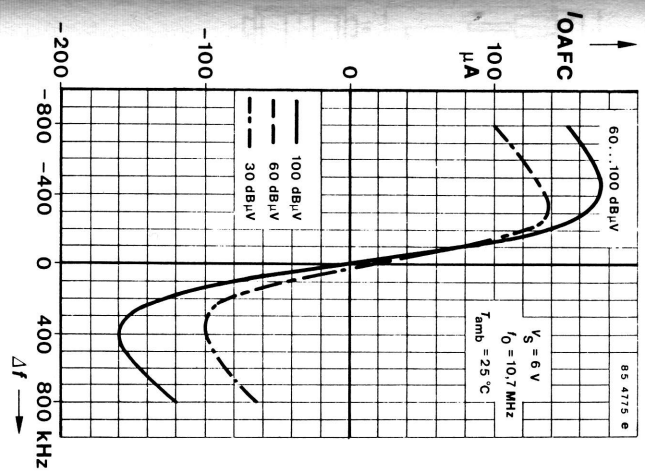
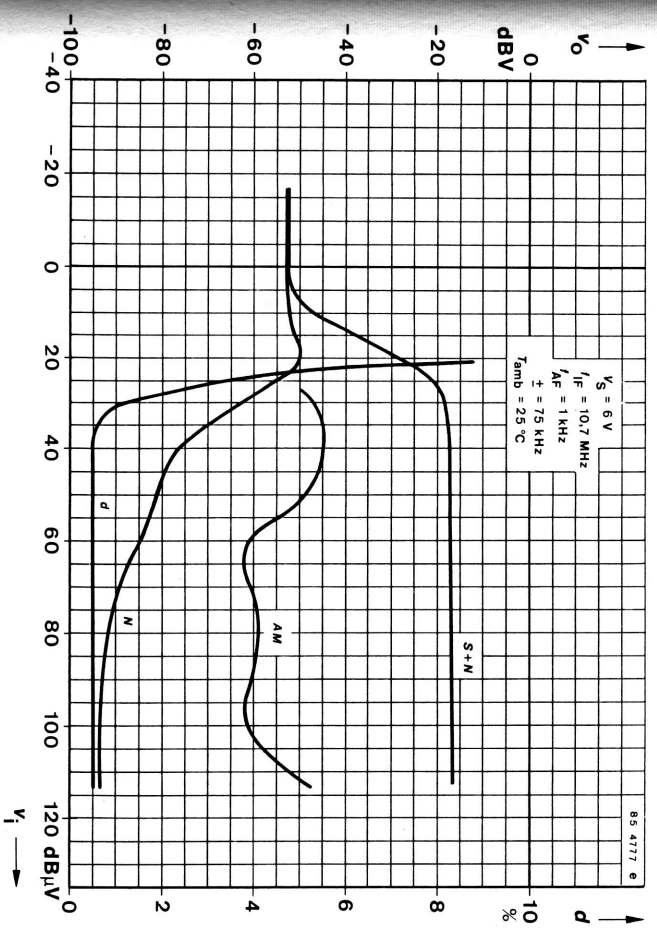
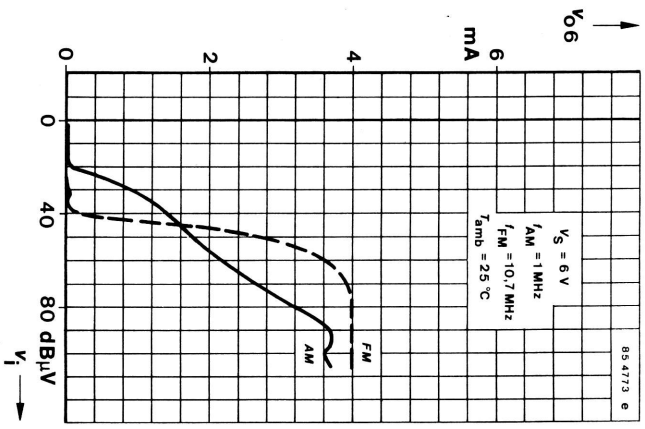
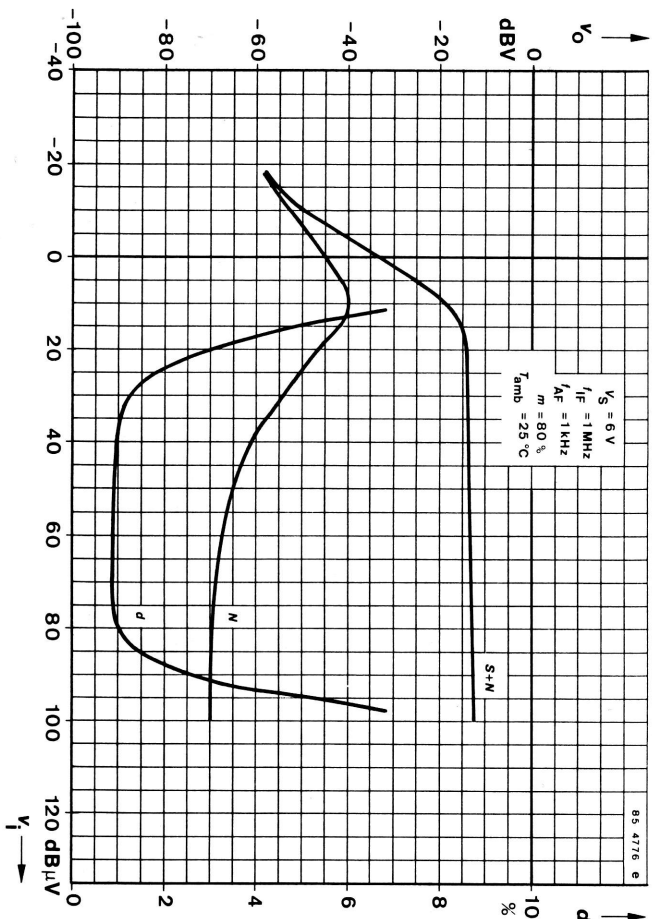
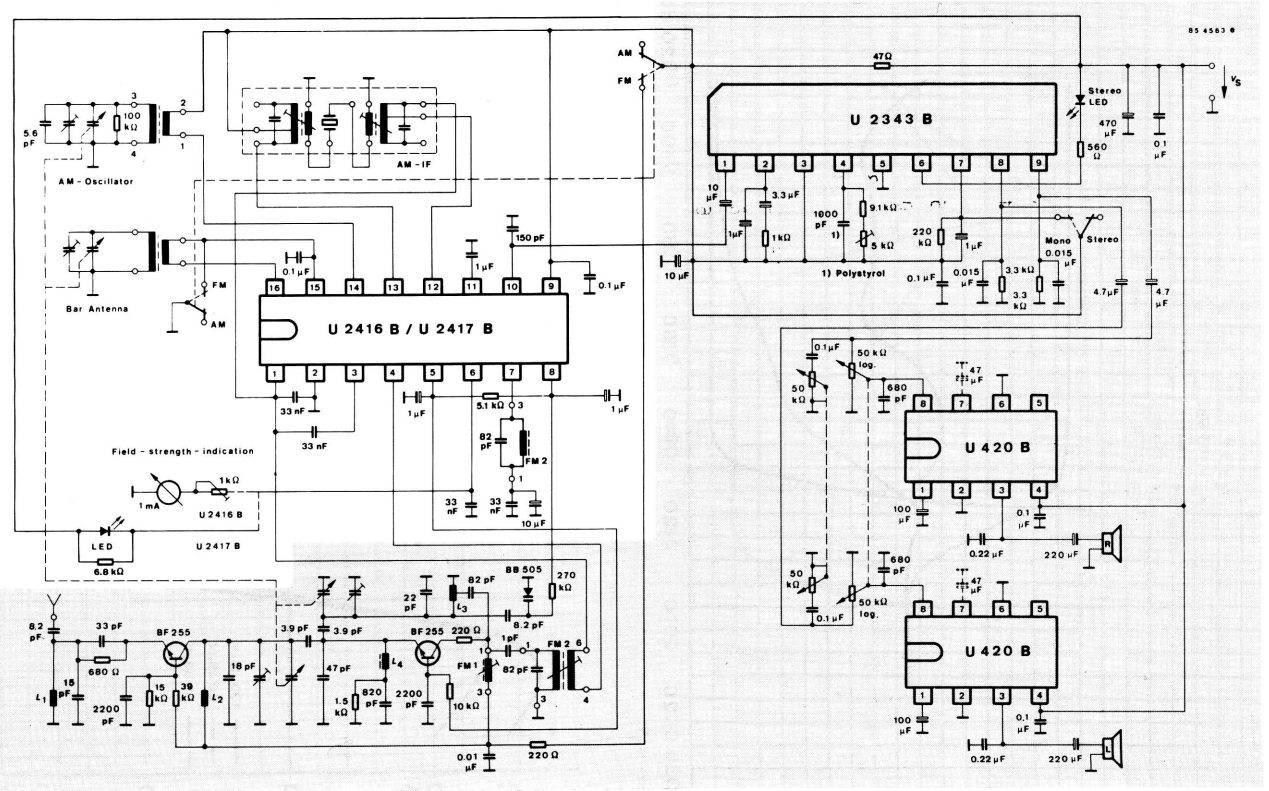


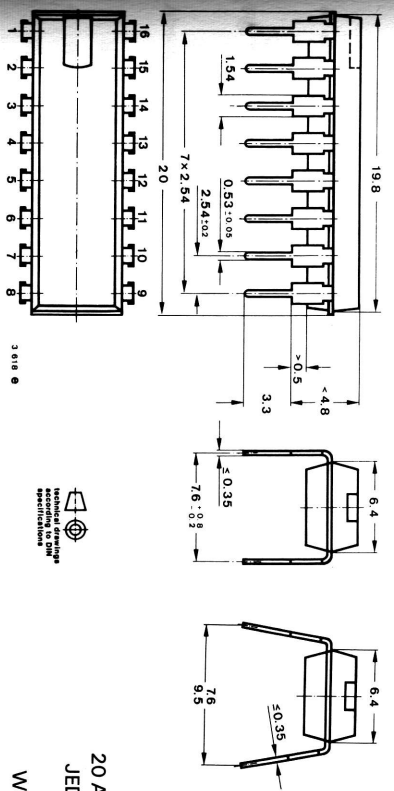
Fig. 2 Test circuit





Pin No:	Typical		Unit
	AM	FM	
1	1.0	1.4	V
2	0	0	V
3	1.0	1.4	V
4	1.0	1.4	V
5	-	2.45	V
6	6	6	V
7	0.5	0	V
8	-	2.3	V
9	6	6	V
10	1.7	1.8	V
11	2.45	-	V
12	6	6	V
13	6	6	V
14	6	6	V
15	1.65	-	V
16	1.65	-	V

Dimensions in mm



Case  
 20 A 16 DIN 41 866  
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 DIP 16  
 Weight max. 1.5 g