

EM6 DCF 3V

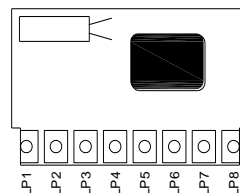
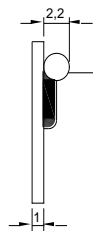
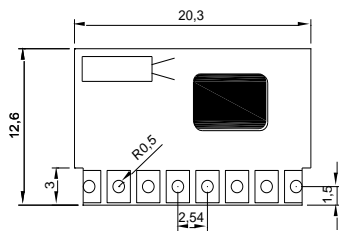
Receiver-Module DCF 77.5 kHz

Once the receiver module EM6 DCF is combined with a tuned ferrite antenna (77.5 kHz), then it constitutes a complete receiver- and demodulator-unit for the German time-code signal DCF77. In its standard configuration, the module is configured for a 3V-operating voltage and on its signal-output (LP6) the module supplies the demodulated DCF77-signal in the polarity of the original, broadcasted DCF77-signal (LOW active). The output-signal is able to be decoded afterwards by a corresponding microcontroller unit.

The flexible technical platform of that EM6-module allows its adaptation also to other application requirements [e.g.: 1.5V-operating voltage; signal-output polarity to be conform to the inverted DCF77-signal (HIGH-active)]. For details please refer to the application hints given at page 2.

Dimensions [mm]:

*Tolerances = ± 0.2 mm
PAD-size: 2.6 mm x 2 mm; hole Ø = 1 mm



LP1	-	GND
LP2	-	UB
LP3	-	ANT2
LP4	-	ANT1
LP5	-	PON
LP6	-	DCF
LP7	-	N.C.
LP8	-	TEST

Pad Assignment:

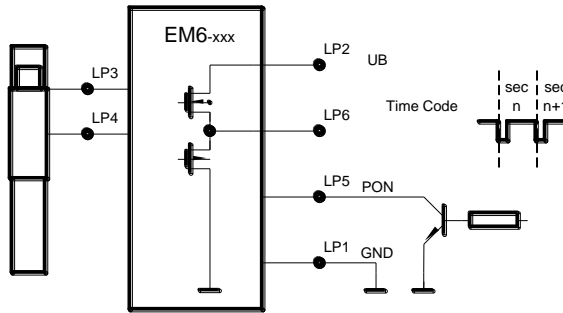
Technical parameters (If not defined otherwise, then the given values are valid for operating conditions: $U_B=3V$; $T_{amb}=25^\circ C$)

Parameter	Condition	Symbol	min.	typical	max.	Unit
Carrier frequency of signal to be received		f		77.5		kHz
Power supply voltage range	$T_{amb} = -10...60^\circ C$	U_B	2.2	3.0	3.6	V
Current consumption; receiver = OFF	$U_{PON} = \text{open}$; standby	I			2	μA
Current consumption; receiver = ON	$U_{PON} = 0V$; w/o any load!	I		0.1	0.15	mA
Control voltage @ (Pin PON) ²⁾	LOW activ	U_{PON}				V
receiver = OFF; standby mode			0.7* $U_{PON \text{ max.}}$		$U_{PON \text{ max.}}$	V
receiver = ON ; PON activ			0		0.3* $U_{PON \text{ max.}}$	V
$U_{PON \text{ max.}}$		$U_{PON \text{ max.}}$			U_B	V
Control current	$U_{PON} = 0V$	I_{PON}			20	μA
Setup time		t_{setup}			3	s
Minimum input voltage / sensitivity						
a) signal directly fed by signal generator		$V_{IN \text{ min.}}$		0.30	0.60	μV_{RMS}
b) signal received with antenna; w/o noise	¹⁾ ; e.g. with FTD02011R	E			25	$\mu V/m$
Antenna resonant impedance		$R_{Res.}$		500		k Ω
Input capacity (LP3 – LP4)	tolerance $C_{IN} : +/- 20\%$	C_{IN}		18		pF
Output stage (@ LP6)	C-MOS push-pull					
Output voltage		U_A	0		U_B	V
Output current (driving capacity)		I_{OUT}	-30		30	μA
Output signal level @ 100% 77.5kHz-carrier	U_B	U_{OUT100}	$U_B - 0.3$	U_B		V
Output signal level @ 25% 77.5kHz-carrier	U_B	U_{OUT25}		0	0.3	V
Output pulse width	@ received nominal pulse-with $t_{MOD} = 100ms$ $t_{MOD} = 200ms$	T_{WO100} T_{WO200}	70 170		130 230	ms ms
Operating temperature range		T_{amb}	-10		60	$^\circ C$
Storage temperature range		T	- 40		80	$^\circ C$

1) Ferrite bar antenna with ferrite rod dimension: length = 60 mm; cross section diameter = 10 mm
Antenna resonant circuitry: $L = 897 \mu H$; $C = 4.7nF$; $Q > 100$

2) Internal pull-up resistor ($R_{PON \text{ int.}}$ = about 1 M Ω) is switched to GND by external switch.

Standard-configuration: [UB = 3V; signal-output = DCF (active LOW) @ LP6]



Application hints:

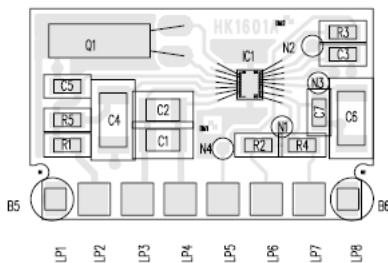
1) Pad LP8

If necessary, this pad can be used to “freeze” the internal regulation voltage of the receiver-IC on its current level. By this way can be masked periodically disturbances (e.g.: gearbox motor-pulses in analog watches/clocks), in order to reduced (or even to avoid) their influence onto the reception of timecode-signal. For more information please refer to the data-sheet of UE6015 receiver, HLD-function.

2) Modification of polarity of the output-signal

Based on the features offered by the used receiver-IC UE6015, it is possible to change (if necessary) the polarity of the supplied, demodulated TIME CODE – signal. Only some small modifications in the module assembly are needed to select between signal-output @ LP6 (active LOW) or @ LP7 (active HIGH). Please refer to the following configuration-table and to the component assembly scheme shown below.

type of module	R2	R3	R4	signal @ LP6	signal @ LP7
EM6 DCF 3V FBD13020	0R	0R	-	DCF	N.C.
EM6 DCFn 3V FBD130xx	-	-	0R	N.C.	/ DCF



Remarks:

Beside is shown the basic component assembly scheme of an EM6-module based on receiver-IC UE6015. It serves for the identification of pad-assignment and of some configuration components to support the reading of the configuration-table above.

The real assembly of different module-versions is different and uses only a part of the components shown beside.

If the demand is big enough and if your PO matches the time of a new started production run, then the module-version „EM6 DCFn 3V“ can be prepared already under mass-production condition for your application. Please contact us accordingly.

3) Module-version for operating voltage 1.5V

Based on the technical module-platform it is also possible to configure the EM6-module for applications using a 1.5V operating voltage. If the demand is big enough and if your PO matches the time of a new started production run, then the module-version „EM6 DCF 1.5V“ or „EM6 DCFn 1.5V“ can be prepared already under mass-production condition for your corresponding application. Please contact us accordingly.

Ordering information:

Notation: EM6 DCF 3V
Receiver module DCF 77.5 kHz
(RoHS-compliant)

part-no.: FBD13020R

Subject to be updated without notice.