

DA1016.003 31 October, 2000

MAS1016

AM Receiver IC

- Wide Supply Voltage Range
- •Power Down and Power Up Control
- Control for AGC On

DESCRIPTION

The MAS1016 AM-Receiver chip is a highly sensitive, simple to use AM receiver specially intended to receive time signals in the frequency range from 40 kHz to 100 kHz. There are only a few external components needed. The circuit has a preamplifier,

wide range automatic gain control, demodulator and output comparator built in. The output signal can be processed directly with an additional digital circuitry to extract the data from the received signal.

FEATURES

- Wide Supply Voltage Range
- Power Down Control
- Only a Few External Components Needed
- Highly Sensitive AM Receiver
- Control for AGC On

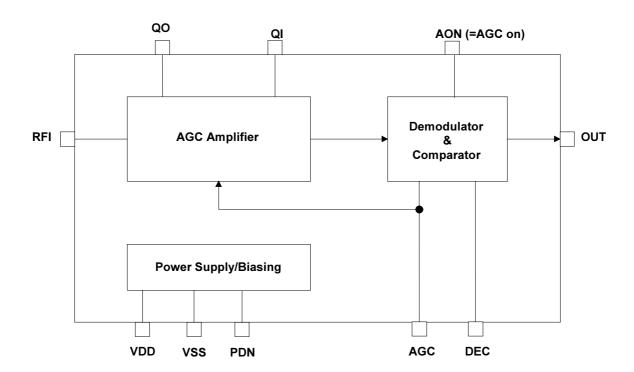
APPLICATIONS

Time Signal Receiver designed for MSF (British), WWVB (USA), JG2AS (Japan) and DCF77 (Germany)

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BLOCK DIAGRAM



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PAD LAYOUT

1788 μm VSS RFI PDN AON DEC MAS1016 1786 μm VDD QO QI AGC OUT

DIE size = 1.79 x 1.79 mm; PAD size = 100 x 100 μm Substrate is connected to Vdd. Note: Coordinates are calculated using Vdd as a centre point

Pad Identification X-coordinate Y-coordinate Name Note Power Supply Voltage VDD $0 \mu m$ DataSIO-HMU com QO **Quarz Filter Output** 306 μm $19 \mu m$ Quarz Filter Input QΙ $587 \mu m$ $19 \, \mu m$ **AGC Capacitor AGC** 866 μm $19 \mu m$ **Receiver Output** OUT 3 1143 μm 19 μm **Demodulator Capacitor** DEC 1436 µm 1111 μm AGC On Control AON 2 $868 \mu m$ 1436 μm **Power Down Input** PDN 551 μm 1436 μm Receiver Input RFI $309 \mu m$ 1436 µm Power Supply Ground VSS 16 μm 1415 μm

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Notes:

- 1) Level = VSS means receiver on; VDD = receiver off
- 2) Level = VSS means AGC hold; VDD = AGC on (working)
 - Internal pull-up with current < 1 μA which is switched off in power down
 - During AGC hold the receiver output OUT is hold down to VSS
- 3) 100% AM results in Level = VSS; 25% AM results in Level = VDD
 - the output is a current source/sink with |I_{OUT}| > 5 μA
 - at power down the output is tri-state

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DA1016.003 31 October, 2000

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Min	Max	Unit
Supply Voltage	V _{DD} -V _{SS}		-0.3	5.0	V
Input Voltage	V _{IN}		V _{SS} -0.3	V _{DD} +0.3	V
Power Dissipation	P _{MAX}			100	mW
Operating Temperature	T _{OP}		-20	70	°C
Storage Temperature	T _{ST}		-40	120	°C

ELECTRICAL CHARACTERISTICS

Operating Conditions: VDD = 1.4V, Temperature = 25°C

Parameter	Symbol	Conditions	Min	Тур	Max	Unit
Operating Voltage	V_{DD}		1.10		3.60	V
Current Consumption	I _{DD}			50	200	μΑ
Stand-By Current	I _{DDoff}				0.1	μΑ
Input Range	f _{IN}		40		100	kHz
Sensitivity	V _{IN}		0.001		50	mVrms
Input Levels I _{IN} <0.5 μA	V _{IL} V _{IH}		0.8 V _{DD}		0.2 V _{DD}	V
Output Current V _{OL} <0.2 V _{DD} ;V _{OH} >0.8 V _{DD}	I _{OUT}		5			μΑ
Output Pulse	T ₀		65		125	ms
	T ₁	DataSheet4U.com	150		220	ms
Startup Time	T _{Start}			8		S
Output Delay Time	T_{Delay}	_		50	100	ms

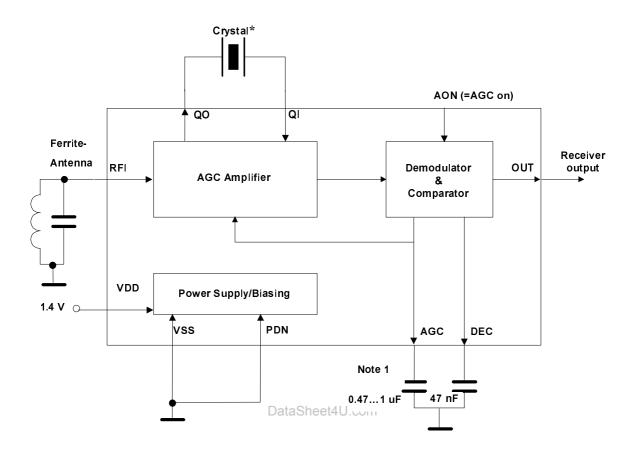
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TYPICAL APPLICATION



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Crystal frequencies:

77.503 kHz for DCF77 Receiver, 60 kHz for WWVB (USA) and MSF (British) Receiver 40 kHz JG2AS (Japan) Receiver

Note 1: AGC Capacitor

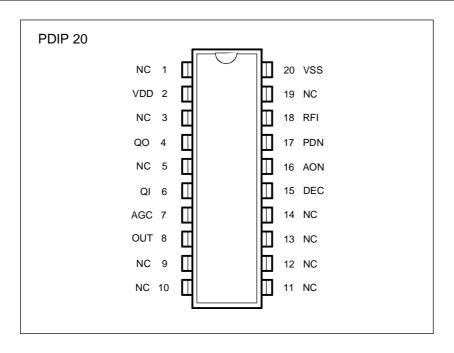
DCF77 Receiver 0.47 to 1.0 uF

WWVB (USA), MSF (British) and JG2AS (Japan) 220 nF (external control of AON (=AGC on)is needed, for more details see also DAEV1016)

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PACKAGE FOR SAMPLES



PIN DESCRIPTION

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Pin Name	Pin	Туре	Function	Note
NC	1		acheer o com	
VDD	2	Р	Positive Power Supply	
NC	3			
QO	4	AO	Quartz Filter Output	
NC	5			
QI	6	Al	Quartz Filter Input	
AGC	7	AO	AGC Capacitor	
OUT	8	DO	Receiver Output	3
NC	9			
NC	10			
NC	11			
NC	12			
NC	13			
NC	14			
DEC	15	AO	Demodulator Capacitor	
AON	16	DI	AGC On Control	2
PDN	17	Al	Power Down Input	1
RFI	18	Al	Receiver Input	
NC	19			
VSS	20	G	Power Supply Ground	

Notes:

- 1) Level = VSS means receiver on; VDD = receiver off
- 2) Level = VDD means receiver on; VSS = receiver off (PDN = VDD) Internal pull-down resistor > 1MOhm to VSS
- 3) 100 % AM results in Level = VSS; 25 % AM results in Level = VDD
 - the output is a current source/sink with [lout] >5 μA
 - at power down the output is tri-state

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DA1016.003 31 October, 2000

ORDERING INFORMATION

Product Code	Product	Package	Comments
MAS1016ATB1	AM-Receiver IC	Wafer, EWS-tested	Thickness 480 µm
MAS1016ATC1	AM-Receiver IC	Wafer, EWS-tested	Thickness 400 µm

Please contact Micro Analog Systems Oy for other wafer thickness options.

LOCAL DISTRIBUTOR			

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