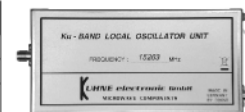


Oscillators and Beacon Transmitters

Oscillators

Type	Frequency	Output Power	Input Frequency	Application
MKU LO 95	9486 MHz	35 mW	internal oscillator *	for 76 GHz transverter
MKU LO 95 PLL	9486 MHz	35 mW	10 MHz	for 76 GHz transverter
MKU LO 12	11736 MHz 11952 MHz 12024 MHz 12096.45 MHz	35 mW	internal oscillator *	11736 MHz: for 47 GHz transverter 11952 MHz: for 24 GHz transverter 12024 MHz: for 24 GHz transverter USA 12096.45 MHz: for beacon 24192.9 MHz
MKU LO 12 PLL	11736 MHz 11952 MHz 12024 MHz 12648 MHz	35 mW	10 MHz	11736 MHz: for 47 GHz transverter 11952 MHz: for 24 GHz transverter 12024 MHz: for 24 GHz transverter USA 12648 MHz: for 76 GHz Transverter
MKU LO 24	24048.9 MHz 24192.9 MHz	5 mW	internal oscillator *	for beacon transmitter
MKU LO 13	13567 MHz	20 mW	141.3264 MHz, 1 mW	for 122 GHz transverter
MKU LO 76	7631.625 MHz	20 mW	119.2441 MHz, 1 mW	for 122 GHz transverter
MKU LO 15	15263.25 MHz	20 mW	119.2441 MHz, 1 mW	for 122 GHz transverter
MKU XO 2 OSC	Band 1: 120.000 MHz Band 2: 120.889 MHz	1 mW	internal oscillator *	switchable dual crystal oscillator for 2.3 GHz transverter
MKU XO 1 PLL	different frequencies	1 mW	10 MHz	for G and G2 series of transverters

*) Option 01: connector for external oscillator (without internal oscillator)



Beacon Transmitters

Type	Standard Frequency	Output Power	Keying
MKU 13 BAKE	1296.9 MHz	0.8 W	A1, F1
MKU 23 BAKE	2320.9 MHz	1.0 W	A1, F1
MKU 34 BAKE	3400.9 MHz	200 mW	A1, F1
MKU 57 BAKE	5760.9 MHz	150 mW	F1
MKU 10 BAKE	10368.9 MHz	200 mW	F1
MKU LO 24	24192.9 MHz 24048.9 MHz	5 mW	F1

Oscillator for stable frequency source

MKU XO 1 PLL - MKU LO 95 PLL - MKU LO 12 PLL

Features

- Fixed frequency PLL-stabilized crystal oscillator
- Input for external 10 MHz reference frequency
- Automatic activation of PLL if external 10 MHz signal is supplied
- Over voltage and reverse polarity protection

Applications

- Highly stable frequency source for transverter modules
- Can be used instead of OCXO



Specifications

Type	MKU XO 1 PLL	MKU LO 95 PLL	MKU LO 12 PLL
Available output frequencies	96.000 MHz, 98.8125 MHz, 103.500 MHz, 105.666 MHz, 106.500 MHz, 111.000 MHz, 116.000 MHz, 117.000 MHz, 120.000 MHz, 120.888 MHz, 122.250 MHz, 123.666 MHz, 124.500 MHz, 125.250 MHz, 126.000 MHz, 131.750 MHz, 135.666 MHz, 138.000 MHz, 139.9167 MHz, 141.32638 MHz	9486 MHz	11952 MHz, 11736 MHz, 12024 MHz, 12648 MHz
Output power	typ. 1 mW	min. 35 mW	min. 35 mW
Frequency stability (0 ... +40 °C)	typ. 2 ppm, max. 3 ppm (without 10 MHz reference frequency)	typ. 2 ppm, max. 3 ppm (without 10 MHz reference frequency)	typ. 2 ppm, max. 3 ppm (without 10 MHz reference frequency)
External reference frequency	10 MHz / 2 ... 10 mW	10 MHz / 2 ... 10 mW	10 MHz / 2 ... 10 mW
Supply voltage	+12...14 V DC	+12 ... 14 V DC	+12 ... 14 V DC
Current consumption	60 mA (without PLL operation) 70 mA (PLL locked) max. 120 mA	350 mA	260 mA
Input connector for 10 MHz, impedance	SMA-female, 50 ohms	SMA-female, 50 ohms	SMA-female, 50 ohms
Output connector, impedance	SMA-female, 50 ohms	SMA-female, 50 ohms	SMA-female, 50 ohms
Case	German silver	German silver	German silver
Dimensions (mm)	74 x 37 x 30	111 x 55 x 30	111 x 55 x 30
Weight	typ. 75 g	typ. 140 g	typ. 140 g

Oscillators for KU-Band and K-Band

MKU LO 95 - MKU LO 12 - MKU LO 24 - MKU LO 76 - MKU LO 13 - MKU LO 15

- German silver case, compact construction
- ‘Clean’ output signal by using helical filters and microstrip resonators
- High frequency stability provided by a compensated crystal oscillator
- External OCXO input is possible

Crystal oscillator - MKU XO 2 OSC

This is a switch-selectable dual crystal oscillator for operating with a 2.3 GHz transverter on 2304 and 2320 MHz. The crystals are temperature stabilized on 40.8°C with a precision crystal heater.

- German silver case, compact construction
- Dual crystal oscillator
- High frequency stability provided by a compensated crystal oscillator

Specifications

Type	MKU XO 2 OSC
Available output frequencies	Band 1: 120.000 MHz Band 2: 120.889 MHz
Output power	typ. 1 mW
Phase noise	max. -156 dBc @ 10 kHz
Frequency stability	typ. 1 ppm 0...40 °C
Supply voltage	+12...14 V DC
Current consumption	max. 180 mA
Coaxial connector	SMA-female / 50 ohms
Dimensions (mm)	74 x 55 x 30
Case	German silver

Specifications

	MKU LO 95	MKU LO 12	MKU LO 24	MKU LO 76	MKU LO 13	MKU LO 15
Type						
Available output frequencies	9486 MHz (for 76 GHz Transverter)	11952 MHz (24 GHz) 12024 MHz (24 GHz USA) 11736 MHz (47 GHz) 12096,45 MHz (Bake 24192.9 MHz)	24048.9 MHz (for Baken) 24192,9 MHz (for Baken)	7631.625 MHz (for 122 GHz Transverter)	13567 MHz (for 122 GHz Transverter)	15263.25 MHz (for 122 GHz Transverter)
Output power	min. 35 mW	min. 35 mW	min. 5 mW	min. 20 mW, typ. 40 mW	min. 20 mW, typ. 40 mW	min. 20 mW, typ. 40 mW
Input frequency				119.2441 MHz	141.3263 MHz	119.2441 MHz
Input power				1 mW / 0 dBm	1 mW / 0 dBm	1 mW / 0 dBm
Supply voltage	+12...14 V DC	+12...14 V DC	+12 ... 14 V DC	+12 ... 14 V DC	+12...14 V DC	+12 ... 14 V DC
Current consumption	250 mA	250 mA	280 mA	250 mA	typ. 250 mA	250 mA
Input connector	SMA-female	SMA-female	SMA-female	SMA-female	SMA-female	SMA-female
Output connector	SMA-female	SMA-female	SMA-female	SMA-female	SMA-female	SMA-female
Dimensions (mm)	111 x 55 x 30	111 x 55 x 30	111 x 55 x 30	111 x 55 x 30	111 x 55 x 30	111 x 55 x 30
Case	German silver	German silver	German silver	German silver	German silver	German silver
Weight	typ. 140 g	typ. 130 g	typ. 140 g	typ. 134 g	typ. 140 g	typ. 134 g
Options	Option 01 Option 02	Option 01 Option 02	Option 01 Option 02	Option 02	Option 02	Option 02
Option 01	SMA-female connector for external OCXO (without internal oscillator)					
Option 02	Aluminium case					

Versions for other frequencies on request.

Beacon Transmitters

MKU 13 BAKE	23 cm Band
MKU 23 BAKE	13 cm Band
MKU 34 BAKE	9 cm Band
MKU 57 BAKE	6 cm Band
MKU 10 BAKE	3 cm Band
MKU LO 24	1,2 cm Band



Features

- Temperature stabilized crystal oscillator for high frequency stability
- Optional: connector for external source (e.g. OCXO) - please request!
- Helical filters and microstrip filters for high spurious and harmonic rejection
- Compact construction in a German Silver case
- Optional: milled aluminium case - please request!

Applications

- Beacon transmitters to explore radio propagation (amateur radio)
- Signal source for measurement equipment

Important Notes

Please specify the required beacon frequency in your order. If the frequency is not specified, the standard frequency will be supplied (see table).

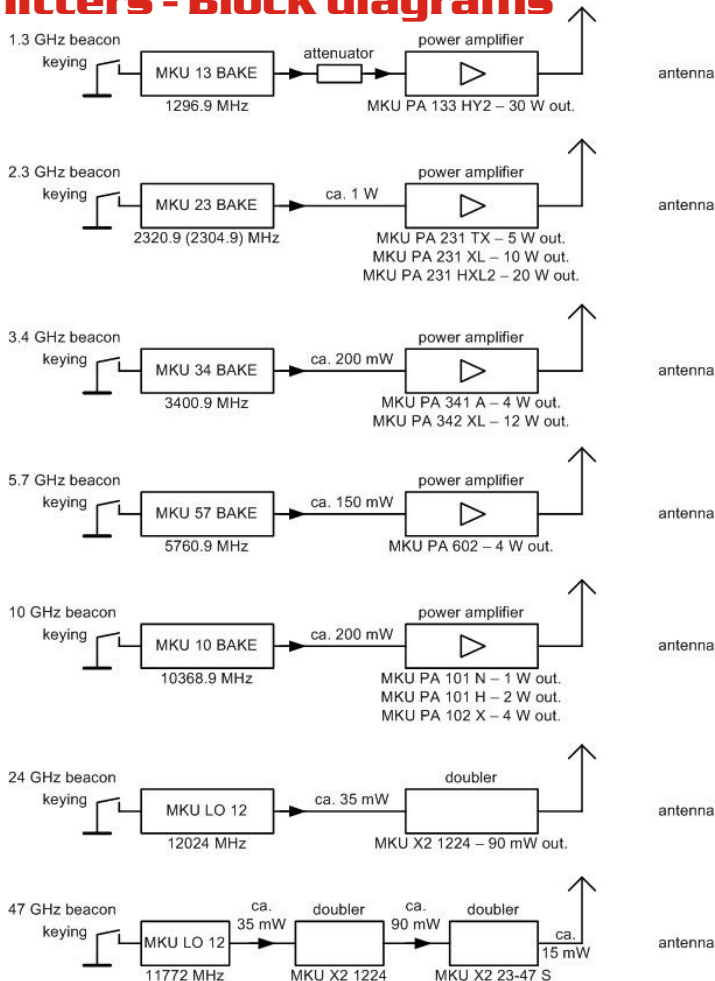
Options

- Option 01: SMA-female connector for external oscillator (without internal oscillator)
- Option 02: milled aluminium case

Specifications

Type	MKU 13 BAKE	MKU 23 BAKE	MKU 34 BAKE	MKU 57 BAKE	MKU 10 BAKE	MKU LO 24
Center frequency	1296.9 MHz	2320.9 MHz	3400.9 MHz	5760.9 MHz	10368.9 MHz	24192.9 MHz 24048.9 MHz
Output power	typ. 800 mW	typ. 1 W	typ. 200 mW	typ. 150 mW	typ. 200 mW	typ. 5 mW
Crystal frequency (standard)	108.075 MHz	96.704 MHz	125.959 MHz	120.019 MHz	108.009 MHz	126.005 MHz (for 24192.9 MHz) 125.255 MHz (for 24048.9 MHz)
Multiplication factor	12	24	27	48	96	192
CW keying (telegraphy)	A1, F1	A1, F1	A1, F1	F1	F1	F1
CW input connector	feed-through capacitor	feed-through capacitor	feed-through capacitor	feed-through capacitor	Feed-through capacitor	feed-through capacitor
Supply voltage	+12 ... 14 V DC	+12 ... 14 V DC	+12 ... 14 V DC	+12 ... 14 V DC	+12 ... 14 V DC	+12 ... 14 V DC
Current consumption	500 mA	typ. 500 mA	typ. 300 mA	typ. 360 mA	typ. 280 mA	typ. 280 mA
Output connector	SMA-female	SMA-female	SMA-female	SMA-female	SMA-female	SMA-female
Case	German Silver	German Silver	German Silver	German Silver	German Silver	German Silver
Dimensions (mm)	74 x 56 x 30	111 x 55 x 30	111 x 55 x 30	111 x 55 x 30	111 x 55 x 30	111 x 55 x 30
Weight	typ. 100 g	typ. 170 g	typ. 160 g	typ. 140 g	typ. 160 g	typ. 140 g

Beacon Transmitters - Block diagrams



Imprint

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MICROWAVE COMPONENTS

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using advanced technology
for microwave communications**

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SWIFT-Code: PBNKDEFF

Kreis- und Stadtparkasse Hof

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Account no.: 220 407 191
For bank transfer from abroad you have to use:
IBAN: DE27 7805 0000 0220 4071 91
SWIFT-Code: BYLADEM1HOF



Erfüllungsort ist / Place of performance and court of jurisdiction is Hof/Saale - Amtsgericht - HRB 3350
Geschäftsführerin / Manager: Jutta Kuhne

General Terms and Conditions of Business with Private Customers

Note: This is a translation of a German document into English language.

As we do business only under German Law, in cases of dispute only the German wording of the GTCs will apply.

1.Scope

The following general terms and conditions (GTCs) apply for all contracts, shipments, and other services between Kuhne electronic GmbH and private customers. Private customers in the sense of this document are natural persons which do or intend to do business with Kuhne electronic GmbH not practising a commercial or self-employed business thereby.

Kuhne electronic GmbH does not accept any conditions which are opposite to or deviating from these GTCs conflicting terms and conditions of a customer do not become valid unless the terms and conditions are explicitly and individually recognized in writing by Kuhne electronic GmbH.

2.Conclusion of Contract

The presentation of the products in the catalogue does not constitute a legally binding offer of Kuhne electronic GmbH but an invitation to order. By sending an order, customer enters into a legally binding offer for a respective contract. The contract will be concluded with our confirmation of the order within two weeks after dispatch of the order or by delivery of goods ordered.

3.Instruction on Right of Revocation

Right of Revocation

You may declare the revocation of your contractual statement in text form (e.g. letter, fax, email) or by returning the merchandise within a period of two weeks. The revocation does not have to contain any grounds. The revocation period commences upon receipt of this declaration of revocation in text form but not before receipt of merchandise (in cases of recurrent deliveries of uniform goods not before receipt of first instalment) and also not before fulfilment of our information obligation upon Art. 246 § 2 in conj. with §1 para 1 und 2 EGBGB as well as fulfilment of our obligations acc. To § 312 e para 1 BGB (German commercial Code) in conj. with Art. 246 § 3 EGBGB. The time-limit shall be deemed to be observed by the timely dispatch of the declaration of revocation or the return shipment.

*The revocation is to be addressed to:
Kuhne electronic GmbH, Scheibacker 3, D-95180 Berg
Telefax: + 49 (0)9293/800938
Email: info@kuhne-electronic.de*

Consequences of revocation

In case of a valid revocation, all mutually received performances as well as emoluments (e.g. interest) taken, if applicable, are to be restituted by either side. If you are unable or partially unable to reconstitute the merchandise to us or can only reconstitute it in a deteriorated condition, then you have to insofar compensate for its value. This does not apply if the deterioration is exclusively due to examining the merchandise – as for instance in a retail store. For a deterioration exclusively due to intended use of merchandise no restitution has to be made.

Goods that can be shipped by parcel are to be returned on our risk. You are obliged to bear the costs of the return shipment if the merchandise delivered corresponds to the merchandise ordered, and if the price of merchandise to be sent back does not exceed an amount of 40 € or if, where the price is higher, you have at the date of the revocation not yet rendered consideration or given a part

payment. In all other cases, the return shipment for you is free of charge. Things that cannot be shipped by parcel will be picked up. All reimbursement obligations must be fulfilled within 30 days. For you, time limit starts with sending of the declaration of revocation or merchandise, for us with their receipt.

End of revocation instruction

4.Dispatch and Delivery

The delivery of goods ordered will be effected within one to three workdays. The compliance with our delivery obligation furthermore requires the due and orderly performance of the customer's obligations in due time. The defence of non-performance of the contract is reserved.

Delivery times for customized products and goods not in stock are not binding unless seller committed itself to a binding delivery date in written form.

In case we are not able to keep bidding delivery dates due to reasons we are not responsible for (impossibility of performance, e.g. because our suppliers fail to deliver) we shall inform the buyer without delay and determine a new delivery period which appears reasonable according to the circumstances.

If performance continues to be impossible also within the newly determined period, we shall be entitled to cancel the agreement completely or partly; we shall thereupon immediately reimburse any already provided counter-performance. Cases of impossibility of performance include cases of force majeure (e.g. strike, business interruptions/restraints, or transport difficulties).

5.Prices and Payment

The prices stated are EURO-prices (including VAT). Shipping cost are not included.

We offer delivery against payment in advance, against invoice, direct debit, or credit card. For delivery to new customers or customers from outside Germany, payment has to be effected in advance. In case of purchase on account (invoice), customer is obliged to settle invoice within 21 days after receipt of goods in full unless otherwise agreed. For payments with credit card or debit credit, collection takes place before the goods are dispatched.

The buyer shall not be entitled to offset payment against counterclaims unless such claims are undisputed or finally established by court. Further, buyer is only authorized to exercise the right of retention to the extent as his counter claim is based on the same contractual relationship.

If you use your right of revocation, you have to bear regular cost of return if the merchandise delivered corresponds to the merchandise ordered, and if the price of merchandise to be sent back does not exceed an amount of 40 € or if, where the price is higher, you have at the date of the revocation not yet rendered consideration or given a part payment. In all other cases, the return shipment for you is free of charge.

6.Warranty

Palpable defaults in material or production including transport damages should be notified to us in writing within two weeks upon receipt. Failure of timely complaint does not effect your legal claims.

Buyer has the choice if supplementary performance is to be executed by remedial action or substitute delivery. Whereas, we are authorized to refuse chosen alternative if this is only feasible under disproportional cost and the other alternative does not stay with any substantial disadvantages. During supplementary performance, a reduction of price or rescission of contract are

General Terms and Conditions of Business with Private Customers

excluded. Supplementary performance deems to be failed when performed twice without success if from the mod of article or failure any other result can be drawn.

In addition, statutory provisions apply.

7.Retention of Title

We reserve title of all goods delivered until complete settlement of all contractual receivables. Also, extended reservation of title applies.

Upon any levy of execution or other respective third party actions we have to be immediately informed to execute our rights under § 771 BGB.

8.Final Provisions

All disputes resulting from this contractual relationship are solely governed by German law. If any regulation in these terms and conditions or within the scope of further agreements should become ineffective the effectiveness of all remaining regulations or agreements is not touched. The stipulation which is invalid in whole or in part shall be replaced by an arrangement which comes as closely as possible to the invalid stipulation in terms of its economic effect.

In case of any dispute of these GTCs, the German version of the GTCs will prevail over the English version.