
Inhaltsverzeichnis

MEPT - a WSPR beacon

Versionsgeschichte interaktiv durchsuchen
VisuellWikitext

Version vom 1. Juli 2009, 09:30 Uhr (Quelltext anzeigen)

Oe1mcu (Diskussion | Beiträge)

(→Ausstattung:)

← Zum vorherigen Versionsunterschied

Aktuelle Version vom 1. Juli 2009, 15:48 Uhr (Quelltext anzeigen)

Oe1mcu (Diskussion | Beiträge)

(→MEPT SWITCH Module)

(20 dazwischenliegende Versionen desselben Benutzers werden nicht angezeigt)

Zeile 1:		Zeile 1:	
[[Kategorie:Selbstbau]]		[[Kategorie:Selbstbau]]	
[[Kategorie:digitale_Betriebsarten]]		[[Kategorie:digitale_Betriebsarten]]	
-		+	== Vielseitige WSPR Bake für mobile und stationäre Anwendungen ==
-	== VERSATILE WSPR BEACON for MOBILE and FIXED applications ==		
	MEPT = Manned Experimental Propagation Transmitter		MEPT = Manned Experimental Propagation Transmitter
		+	Die MEPT [[WSPR]] Bake sendet für 2 Minuten die [[WSPR]] Bake und wechselt dann automatisch auf ein anderes Band. Die Zeit und den Locator holt sich die Bake vom angeschlossenen GPS Empfänger. Damit können alle Kurzwellen Amateurfunkbänder und 6m abgedeckt werden. Das Gerät ist kompakt aufgebaut und benötigt für den Betrieb keinen Computer was den Stromverbrauch signifikant senkt.
-	[[Bild:MEPT 1.jpg]] [[Bild:LCD position.jpg]]	+	[[Bild:MEPT 1.jpg]]

Es dauerte einige Monate - aber jetzt ist es (fast) fertig.

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A versatile beacon concept that consists of a number modules that can be combined according to the application.

Das Baken Konzept beruht auf getrennten Modulen die nach den speziellen Anforderungen kombiniert werden können.

== Anschlüsse: ==

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Zeile 18:

* ""USB interface"" für die Windows Konfigurations Software

Zeile 18:

* ""USB interface"" für die Windows Konfigurations Software

* ""serial interface"" zum Anschluss der GPS Maus

* ""serial interface"" zum Anschluss der GPS Maus

* ""SPI bus"" **to interconnect the modules**

* ""SPI bus"" **für die Datenübermittlung zwischen den Modulen**

* ""ICSP"" **for in circuit serial programming of the PIC processor**

* ""ICSP"" **zum programmieren des PIC Prozessors**

== Ausstattung: ==

== Ausstattung: ==

* **Configuration software for** Windows

* Windows **Konfigurationssoftware**

* **Beacon runs independent from** PC

* **Die Bake läuft unabhängig vom** PC

* **Time and Location can be derived from** GPS signal

* **Zeit und geographische Position werden hochgenau aus dem GPS Signal gewonnen**

* **Autonomous generation of** WSPR **data string in local microcontroller**

* **Unabhängige Generierung des WSPR Datensatz im Mikrocontroller der Bake**

* **Up to 8 different filters selectable through filter switch box**

* **Bis zu 8 verschiedene Filter über eine Filterschaltbox anwählbar**

* **Up to 4 Attenuator networks selectable through attenuator switch box**

* **Bis zu 4 Dämpfungsglieder Netzwerke durch die Abschwächer Box steuerbar**

* **Multiple DDS & PA modules attachable to one controller**

* **Mehrere DDS & PA Module an einem Controller anschließbar**

-	* DDS & PA module for 1.8-50MHz with up to 15W	+	* DDS & PA Modul für 1.8-50MHz mit bis zu 15W
-	* Bänder (80m / 40m / 30m / 20m/ 17m / 15m / 12m / 10m / 6m)	+	* Bänder (160m / 80m / 40m / 30m / 20m/ 17m / 15m / 12m / 10m / 6m)
Zeile 40:		Zeile 40:	
		+	== MEPT SWITCH Modul ==
		+	
		+	[[Bild:MEPT DDS Filter Controller v2.0.jpg thumb Controller board circuit]]
		+	[[Bild:MEPT DDS Filter Switch v2.0.jpg thumb Switch board circuit]]
		+	
		+	
		+	The switch module can hold up to 8 filter or attenuator boards. For bands from 160m to 6m elliptical low pass filters are ready. I am planning a band pass filter for 6m as the local oscillator signals are below the working frequency.
		+	When used with filters there is one additional slot that can hold an attenuator for using the system on an unmatched antenna.
		+	There will be another switch board with 4 instead of 8 positions that will be able to hold attenuator boards of the same size.
		+	
		+	
		+	[[Bild:MEPT 8.jpg]]
		+	

+ == MEPT CONFIGURATIONS ==

+

+ ""BASIC Configuration""

+

+ The beacon system can be configured in various scenarios. The most simple one is the CPU unit with the integrated PA used stand alone. In this setup a LPF filter module is installed within the CPU box. So beaoning is only possible on one band. Either fixed - with pre programmed Locator - or mobile where location information is derived from the GPS signal.

+

+ [[Bild:config1.jpg|400px]]

+

+

+ ""Multiband Configuration""

+

+ In this setup the filter module in the CPU/PA module is removed and a Filter Switch Module is installed in the signal path. Through the SPI bus the CPU controls the Filter Switch Module. The module can hold up to 8 filter boards, hence enabling the system to transmit on up to eight different bands. Additionally an attenuator module can be installed in the Filter Switch Module allow driving of a non resonant antenna. Again fixed and mobile operation is possible. In mobile applications usually a smaller number of bands will be choosen, optimizing probability to be heard at all.

+

+ [[Bild:MEPT Config2.jpg|400px]]

	+	
	+	
	+ '''Multiband Configuration with Attenuator Switch'''	
- Here you can find an overview of the possible configurations	+ Especially for fixed beacon operation transmission with variable power levels on multiple bands is desired. In this configuration the multiband config is amended by a Attenuator Switch Module. This module can hold up to 4 attenuator boards and is controlled by the CPU through the SPI bus.	
- [[MEPT CONFIGURATIONS]]	+ [[Bild:config3.jpg 400px]]	
	+ '''Multiband Configuration with Multiple DDS/PA Modules	
- A detailed description of the individual modules can be found here	+ When running the beacon in Multiband config with a filter box with 8 boards installed, one will only reach a TX time of 12,5%. To increase the TX time to 25% (or higher) with still covering 8 bands (or more) additional DDS/PA modules with individual Filter Switch Modules can be driven from a single CPU. These signal sources can be attached to different antennas as shown, or through a LPF/HPF signal combiner into a single antenna.	
	+ [[Bild:MEPT Config4.jpg 400px]]	
	+ 	
- [[MEPT CPU]]	+ == MEPT CPU Modul ==	

```

graph TD
    subgraph Left_Column [Left Column]
        L1[ ]
        L2[MEPT switch module]
        L3[ ]
        L4[ ]
        L5[I have a long list of improvements and additions I want to create to my beacon svstem. Here is a list of my plans Although I don't know yet where to find the time to do all that]
        L6[ ]
        L7[MEPT Development Plan]
    end

    subgraph Right_Column [Right Column]
        R1[MEPT CPU board circuit]
        R2[MEPT Display board circuit]
        R3[MEPT DDS & PA board circuit]
        R4[The main module holds the CPU with USB and GPS serial interface, the master oscillator and one DDS with a 15W PA module. It can be run stand alone and accepts one filter module on the RF unit board.]
        R5[ ]
        R6[ ]
        R7[<gallery>]
        R8[Bild:MEPT 4.jpg|Main Modul Innenansicht]
        R9[Bild:MEPT 5.jpg|Main Modul Innenansicht]
        R10[Bild:MEPT 6.jpg|GPS Satelliten Suche]
        R11[Bild:MEPT 7.jpg|Warten auf Sendeslot]
        R12[Bild:MEPT 3.jpg|Auf Sendung mit Frequenzanzeige]
        R13[</gallery>]
        R14[ ]
        R15[ ]
        R16[MEPT switch module]
        R17[ ]
    end

    L2 --- R1
    L2 --- R2
    L2 --- R3
    L2 --- R4
    L2 --- R5
    L2 --- R6
    L2 --- R7
    L2 --- R8
    L2 --- R9
    L2 --- R10
    L2 --- R11
    L2 --- R12
    L2 --- R13
    L2 --- R14
    L2 --- R15
    L2 --- R16
    L2 --- R17

```

The diagram illustrates the MEPT system architecture. On the left, a vertical column contains several modules, including a yellow box labeled "MEPT switch module". This module is connected to various components on the right. The right side features a series of blue boxes representing different hardware units: "MEPT CPU board circuit", "MEPT Display board circuit", "MEPT DDS & PA board circuit", and a detailed description of the main module. Below these are several white boxes, some containing gallery links like "<gallery>" and "</gallery>", and others with image references like "Bild:MEPT 4.jpg|Main Modul Innenansicht". At the bottom, another yellow box describes future improvements and additions to the beacon system, linked to a "MEPT Development Plan".

Weiter Informationen: <http://www.oe1ifm.at/>

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Vielseitige WSPR Bake für mobile und stationäre Anwendungen

MEPT = Manned Experimental Propagation Transmitter

Die MEPT **WSPR** Bake sendet für 2 Minuten die **WSPR** Bake und wechselt dann automatisch auf ein anderes Band. Die Zeit und den Locator holt sich die Bake vom angeschlossenen GPS Empfänger. Damit können alle Kurzwellen Amateurfunkbänder und 6m abgedeckt werden. Das Gerät ist kompakt aufgebaut und benötigt für den Betrieb keinen Computer was den Stromverbrauch signifikant senkt.



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Das Baken Konzept beruht auf getrennten Modulen die nach den speziellen Anforderungen kombiniert werden können.

Anschlüsse:

- **USB interface** für die Windows Konfigurations Software
- **serial interface** zum Anschluss der GPS Maus
- **SPI bus** für die Datenübermittlung zwischen den Modulen
- **ICSP** zum programmieren des PIC Prozessors

Ausstattung:

- Windows Konfigurationssoftware
- Die Bake läuft unabhängig vom PC
- Zeit und geographische Position werden hochgenau aus dem GPS Signal gewonnen
- Unabhängige Generierung des WSPR Datensatz im Mikrocontroller der Bake

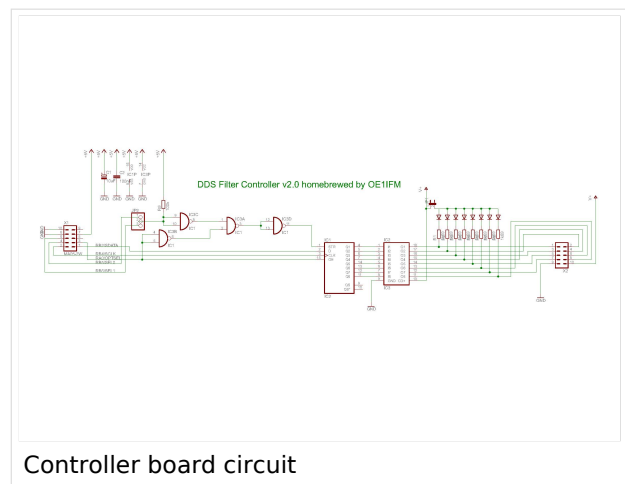
- Bis zu 8 verschiedene Filter über eine Filterschaltbox anwählbar
- Bis zu 4 Dämpfungsglieder Netzwerke durch die Abschwächer Box steuerbar
- Mehrere DDS & PA Module an einem Controller anschließen
- DDS & PA Modul für 1.8-50MHz mit bis zu 15W
- Bänder (160m / 80m / 40m / 30m / 20m/ 17m / 15m / 12m / 10m / 6m)

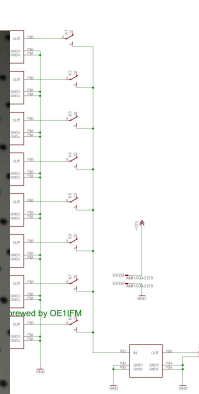
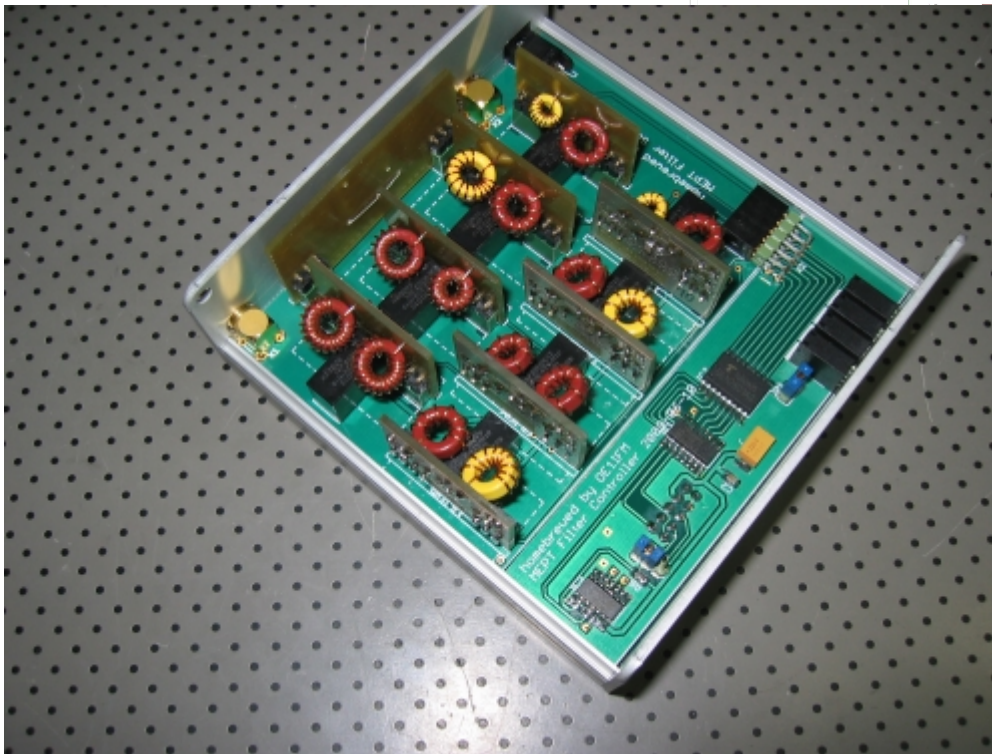
At the moment there are two modules. The CPU box with a DDS/PA module and a switch box that can hold up to 8 filter and one attenuator modules



MEPT SWITCH Modul

The switch module can hold up to 8 filter or attenuator boards. For bands from 160m to 6m elliptical low pass filters are ready. I am planning a band pass filter for 6m as the local oscillator signals are below the working frequency. When used with filters there is one additional slot that can hold an attenuator for using the system on an unmatched antenna. There will be another switch board with 4 instead of 8 positions that will be able to hold attenuator boards of the same size.





MEPT CONFIGURATIONS

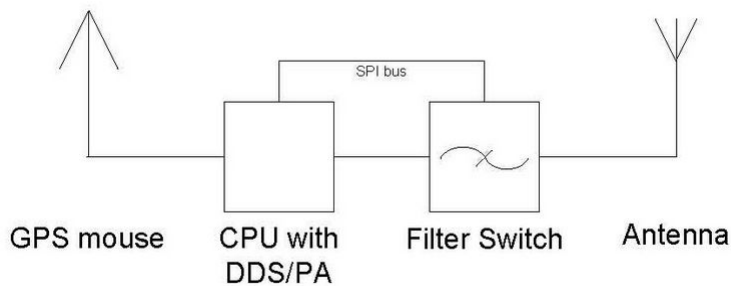
BASIC Configuration

The beacon system can be configured in various scenarios. The most simple one is the CPU unit with the integrated PA used stand alone. In this setup a LPF filter module is installed within the CPU box. So beaconing is only possible on one band. Either fixed - with pre programmed Locator - or mobile where location information is derived from the GPS signal.

400px

Multiband Configuration

In this setup the filter module in the CPU/PA module is removed and a Filter Switch Module is installed in the signal path. Through the SPI bus the CPU controls the Filter Switch Module. The module can hold up to 8 filter boards, hence enabling the system to transmit on up to eight different bands. Additionally an attenuator module can be installed in the Filter Switch Module allow driving of a non resonant antenna. Again fixed and mobile operation is possible. In mobile applications usually a smaller number of bands will be choosen, optimizing probability to be heard at all.



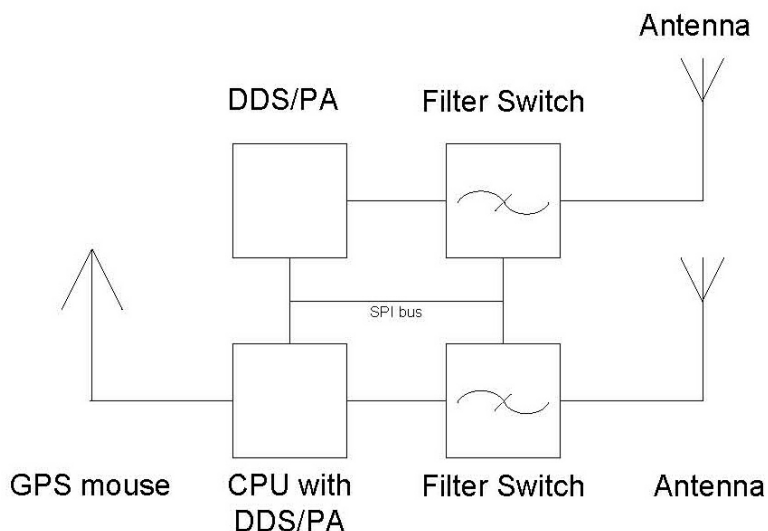
Multiband Configuration with Attenuator Switch

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400px

Multiband Configuration with Multiple DDS/PA Modules

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MEPT CPU Modul

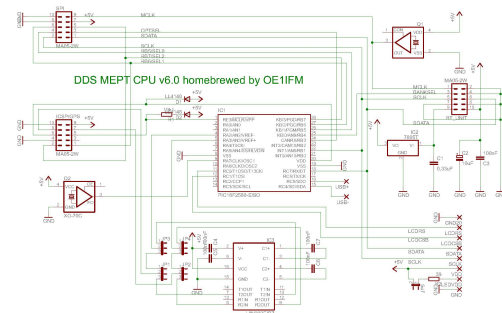
The main module holds the CPU with USB and GPS serial interface, the master oscillator and one DDS with a 15W PA module. It can be run stand alone and accepts one filter module on the RF unit board.



Main Modul
Innenansicht



Main Modul
Innenansicht



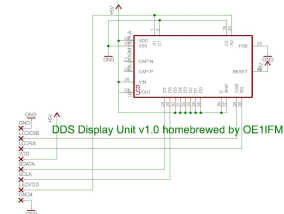
MEPT CPU board circuit



GPS Satelliten Suche



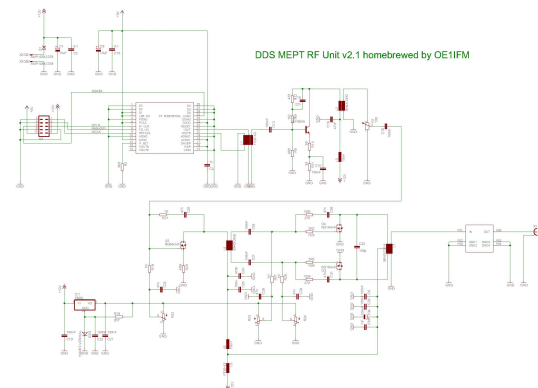
Warten auf
Sendeslot



MEPT Display board circuit



Auf Sendung mit
Frequenzanzeige



MEPT DDS & PA board circuit

MEPT switch module

Weiter Informationen: <http://www.oel1fm.at/>