

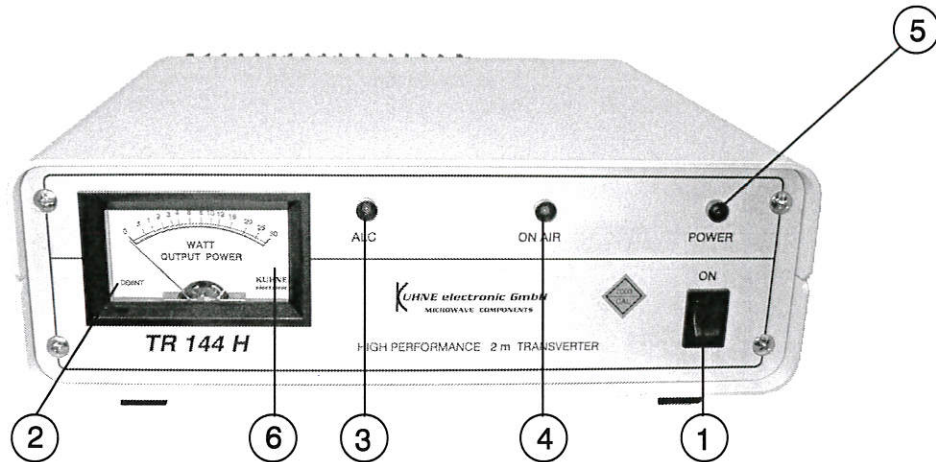
# *Handbook*

## DB 6 NT 144 MHz Transverter **TR 144 H**

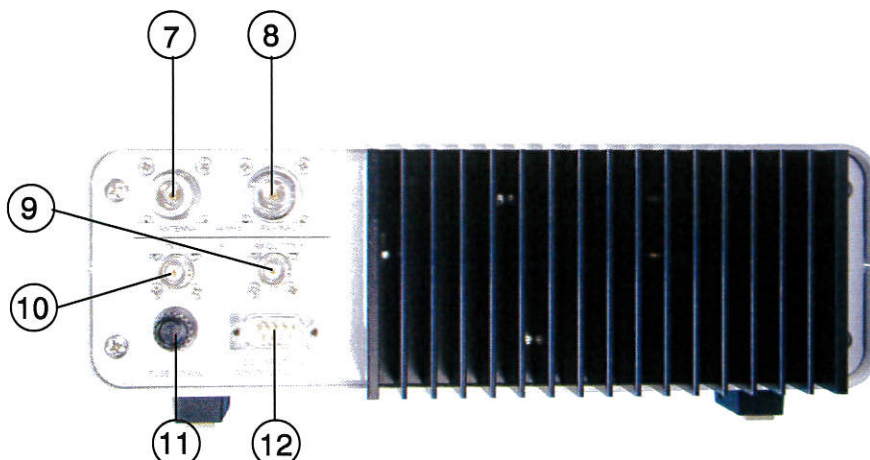


**KUHNE electronic GmbH**  
MICROWAVE COMPONENTS

## TR 144 H Connections and Indicators

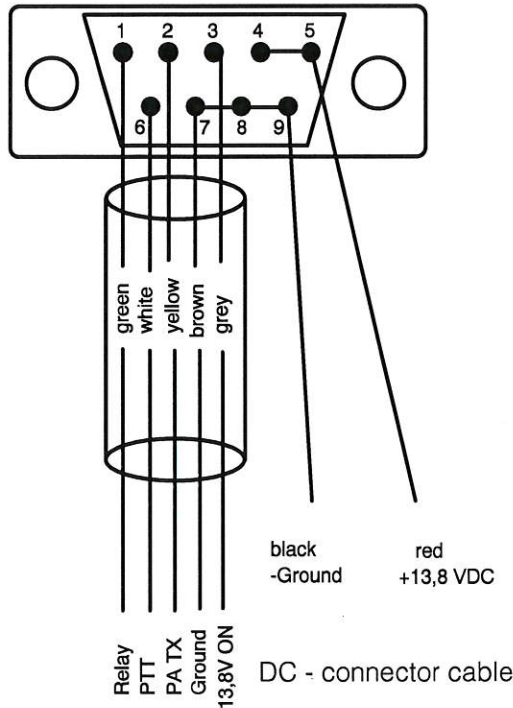


- 1.) ON / OFF switch
- 2.) Output meter  
Displays effective output power in Watts at 50 Ohms
- 3.) ALC indicator  
This indicator illuminates when the power limiter is active (too much IF drive)  
In order to assure a good transmit signal, IF drive power should be reduced to a point where the indicator does not light anymore. See section "Operation"
- 4.) ON AIR  
This indicator illuminates during transmit operation
- 5.) Power ON indicator
- 6.) The transmit unit of the Transverters has an protection circuit. During bad antenna matching the output stage switches for 3 seconds off. Active protection circuit is indicated by red shining of the power meter scale.
- 7.) Antenna connector
- 8.) Separate receiver input - for optional use (see "Operation")
- 9.) Transverter output RX OUT to HF transceiver, if two separate IF connectors are used.  
Transverter input and output RX OUT / TX IN, if one common IF connector is used.  
Internal switch configures the IF connectors of the transverter (see "Internal Switches CON SW / TX IF SW").
- 10.) Transverter input TX IN, if two separate IF connectors are used.  
**This connector has to be left open, if one common IF connector is configured!**  
  
Input power of the HF transceiver may be in the range 60 ... 1000 uW or the range 1 ... 50 mW.  
The proper power range has to be set inside the transverter (see "Internal Switches CON SW / TX IF SW").
- 11.) Miniature fuse 6.3 Amp. medium time lag (M)
- 12.) Power supply 13.8 VDC / controlling functions

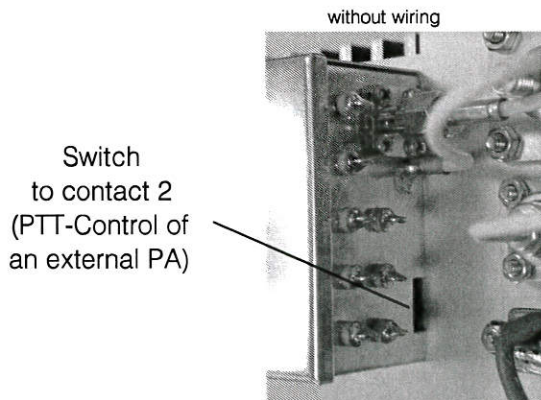
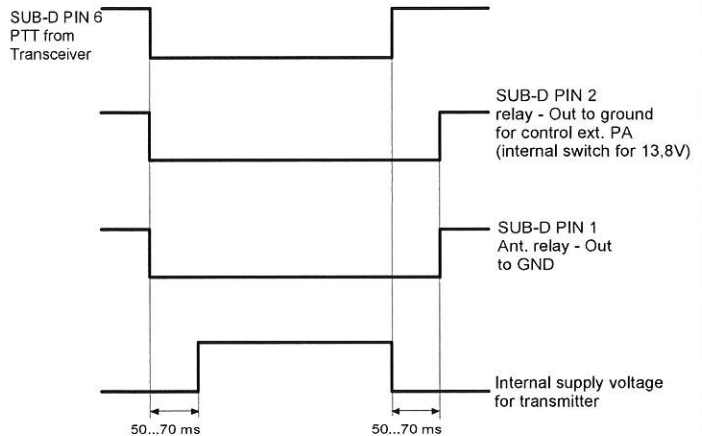
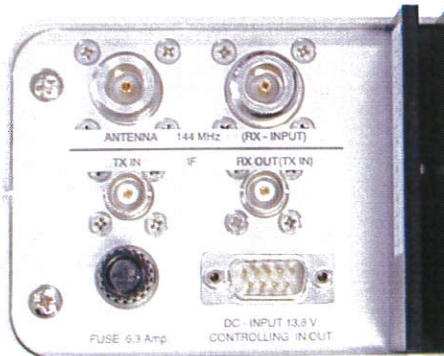


# TR 144 H Connector Wiring

Wiring of SUB-D plug-in connector

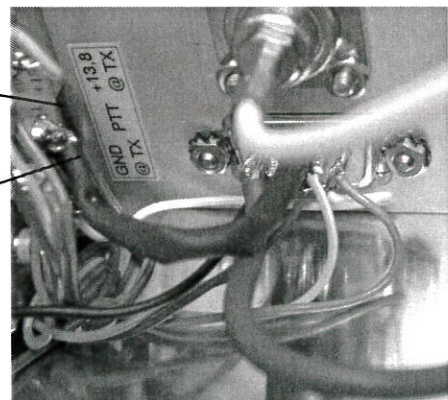


- 1.) Contacts 4 and 5 have wired in parallel for the +13.8 VDC connection.
- 2.) Contacts 7...9 have been wired in parallel and for minus connection = ground.
- 3.) Contact 6 is PTT-input. For the transmit mode this connection must be switched to ground (by an internal switch the function may be inverted to +13.8 VDC for transmitting).
- 4.) Pin 2 controls an external power amplifier. This connector close to ground (default setting) at transmit (internal switch for 13,8V). This output is protected with a resetting 400mA semiconductor safety device.
- 5.) During transmit mode contact 1 will be switched to ground via a power-FET (max. 0,4A). This output signal is also time-delayed and may be used to switched the antenna relay at the antenna. This output is also protected with an resetting 400mA semiconductor safety device. (The voltage of the used relay mustn't exceed 13.8V)
- 6.) Contact 3 can be used for switching of a IC 7800 into transverter-mode. It is decoupled through a diode and can source 1mA @ 12 V.



PTT +13,8V @ TX

PTT GND @ TX (default setting)



## Interne Schalter / Internal Switches CON SW / TX IF SW

### Schalter CON SW

Mit diesem Schalter werden die ZF-Buchsen des Transverters konfiguriert.  
Voreinstellung ab Werk siehe Messprotokoll.

#### CON SW Schalterstellung A

Beide ZF-Buchsen des Transverters sind aktiv (getrennte Buchsen für  
Sendung und Empfang).

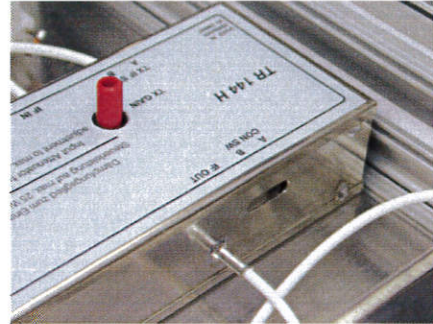
Der Transverterausgang des Kurzwellentransceivers wird an TX IN  
angeschlossen. Der Transvertereingang des Kurzwellentransceivers wird an  
RX OUT angeschlossen.

#### CON SW Schalterstellung B

Die ZF-Buchse RX OUT ist gemeinsame Buchse für Sendung und Empfang.  
Sie wird mit dem Kurzwellentransceiver verbunden.

**Wichtig: die zweite ZF-Buchse TX IN muss offen bleiben! Es darf nichts angeschlossen werden!**

Vor Inbetriebnahme muss unbedingt die PTT-Leitung vom Kurzwellentransceiver zum Transverter angeschlossen werden.  
Ansonsten kann der Transverter beschädigt werden!



### Switch CON SW

This switch configures the IF connectors of the transverter.  
See Test Certificate for default values.

#### CON SW position A

Both IF connectors of the transverter are active (separate connectors for receiving and transmitting).

The transverter output port of the HF transceiver has to be connected to TX IN. The receive input port of  
the HF transceiver must be connected to RX OUT.

#### CON SW position B

The IF connector RX OUT is the common connector for receiving and transmitting. It has to be  
connected to the HF transceiver.

**Important note: the second IF connector TX IN has to be left open! Nothing must be connected to that port!**

Before starting operation, the PTT cable of the HF transceiver must be connected to the transverter.  
Otherwise, the transverter may be damaged!

### Schalter TX IF SW

Mit diesem Schalter wird der Transverter-Sendezweig konfiguriert.  
Voreinstellung ab Werk siehe Messprotokoll.

#### TX IF SW Schalterstellung A

Der Kurzwellentransceiver liefert eine Sendeleistung im Bereich 60 ... 1000 uW.

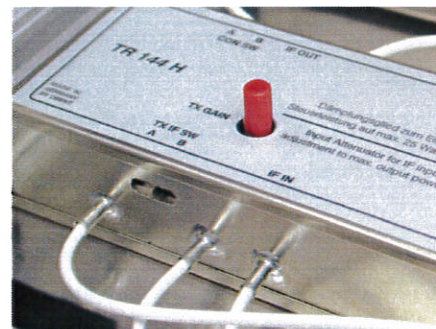
Intern wird ein zusätzlicher Verstärker in den Sendepfad geschaltet.

Die maximale Eingangsleistung darf 1000 uW nicht überschreiten!

#### TX IF SW Schalterstellung B

Der Kurzwellentransceiver liefert eine Sendeleistung im Bereich 1 ... 50 mW.

Der interne Zusatzverstärker ist nicht aktiv. Die maximale Eingangsleistung  
darf 50 mW nicht überschreiten!



### Switch TX IF SW

This switch configures the transverter transmit path.  
See Test Certificate for default values.

#### TX IF SW position A

The HF transceiver provides a transmit power in the range 60 ... 1000 uW.

An additional internal amplifier in the transmit path is activated. The maximum input power must  
not exceed 1000  $\mu$ W!

#### TX IF SW position B

The HF transceiver provides a transmit power in the range 1 ... 50 mW.

The additional internal amplifier is not active. The maximum input power must not exceed 50 mW!

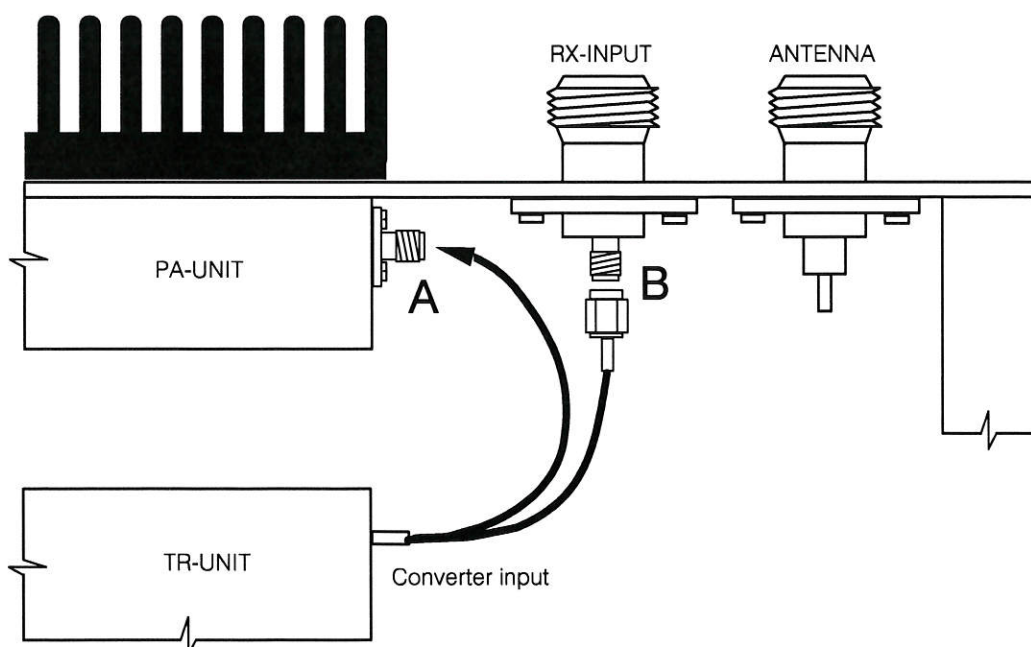
## TR 144 H Operation

- 1.) Connect the control cable. Please follow the description in the handbook of your HF transceiver
- 2.) Connect a suitable antenna or a dummyload (power meter) to the antenna connector.
- 3.) Open the transverter by removing the top cover (4 screws).
- 4.) Connect the HF transceiver. Note that the HF transceiver must have an output power in the correct power range. (see "Internal Switches CON SW / TX IF SW")
- 5.) Connect a 13.8 VDC / 6 Amp power supply to the transverter.
- 6.) Adjust the output power of the HF transceiver to maximum (after having switched the transceiver to transverter operation).  
**Important tip: The HF transceivers TS 850 and YAESU FT 1000 provide a distorted ("unclean") output signal to the transverter, if the power is adjusted to maximum. We recommend to adjust the power to minimum by turning the power knob CCW.**
- 6.) Switch the transceiver and the transverter to transmit; adjust the transverter to 25 W transmit power by turning the "drive power" control. The output meter of the transverter may be used for this step. When in SSB mode, a tone should be used to drive the transmitter to full output; a CW carrier would be preferable. Replace the top cover after the adjustments.
- 7.) Almost all HF transceivers feature the option of continuously adjustable output power. Option 04 includes power control on the front panel.

Adjustment control  
IF drive power



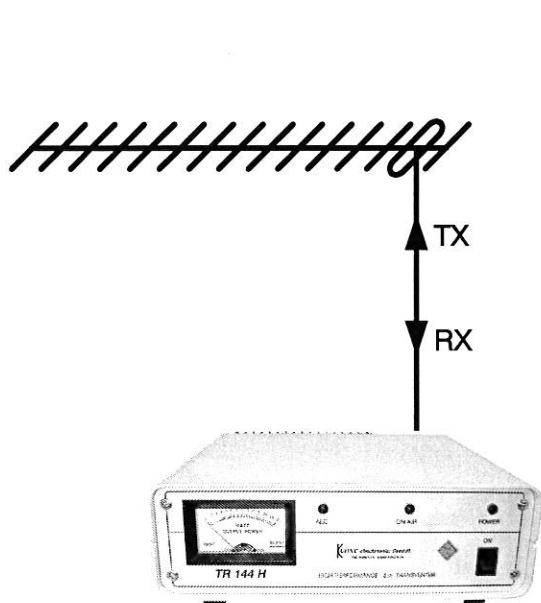
Changing the receiver input to a separate input connector



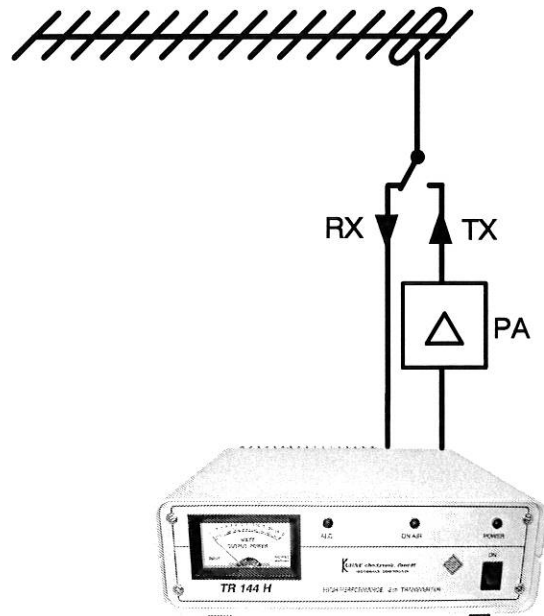
A = Normal receiver operation via antenna connector  
B = Receiver operation via separate input connector

# TR 144 H Transverter configurations

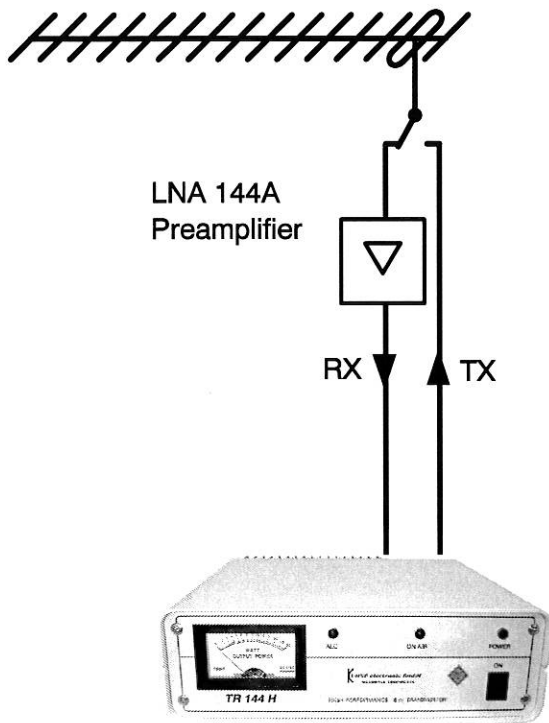
Some examples of transverter-configurations



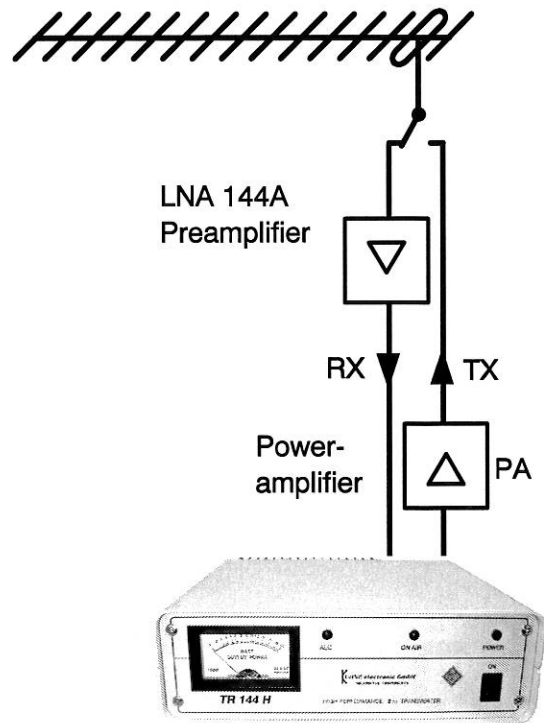
Version A: TR 144 H without additional amplifier



Version B: TR 144 H with antenna relay and power amplifier

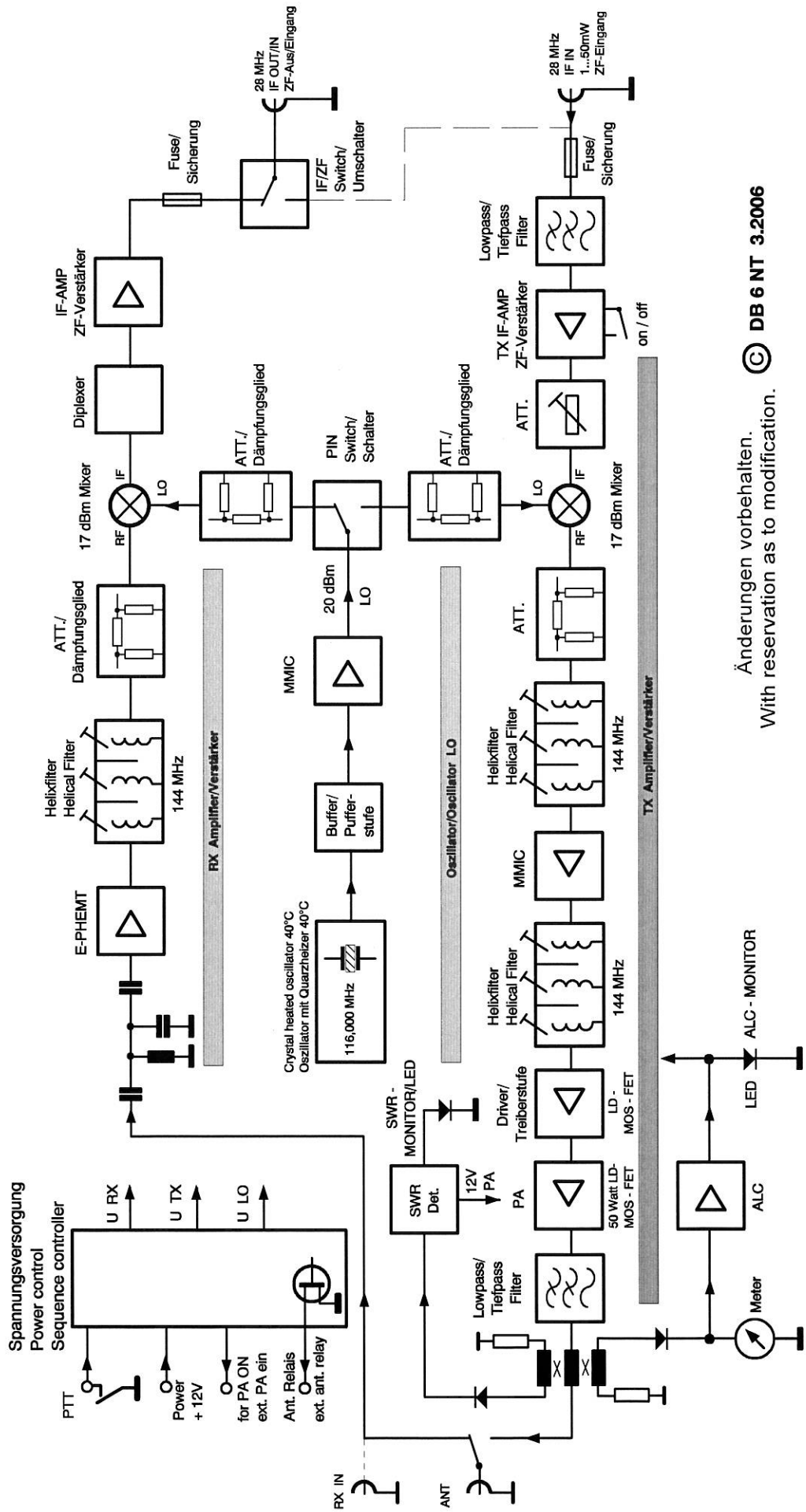


Version C: TR 144 H with antenna relay and receiver preamplifier at the antenna



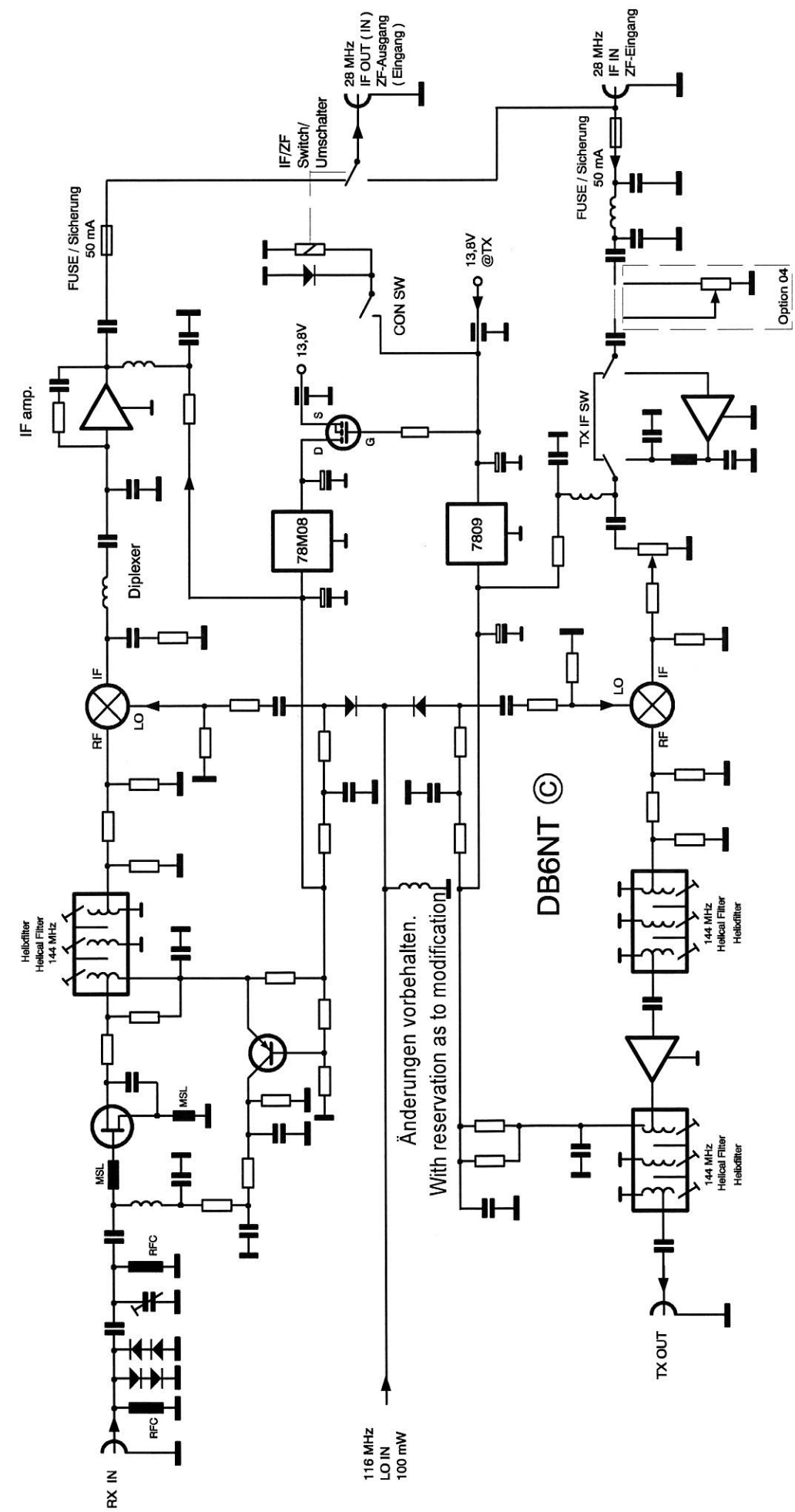
Version D: TR 144 H with antenna relay, receiver preamplifier at the antenna and power amplifier

# TR 144 H Transverter Blockdiagramm/blockdiagram



Änderungen vorbehalten. © DB 6 NT 3.2006  
With reservation as to modification.

# TR 144 H Transverter Schematic/Schaltung



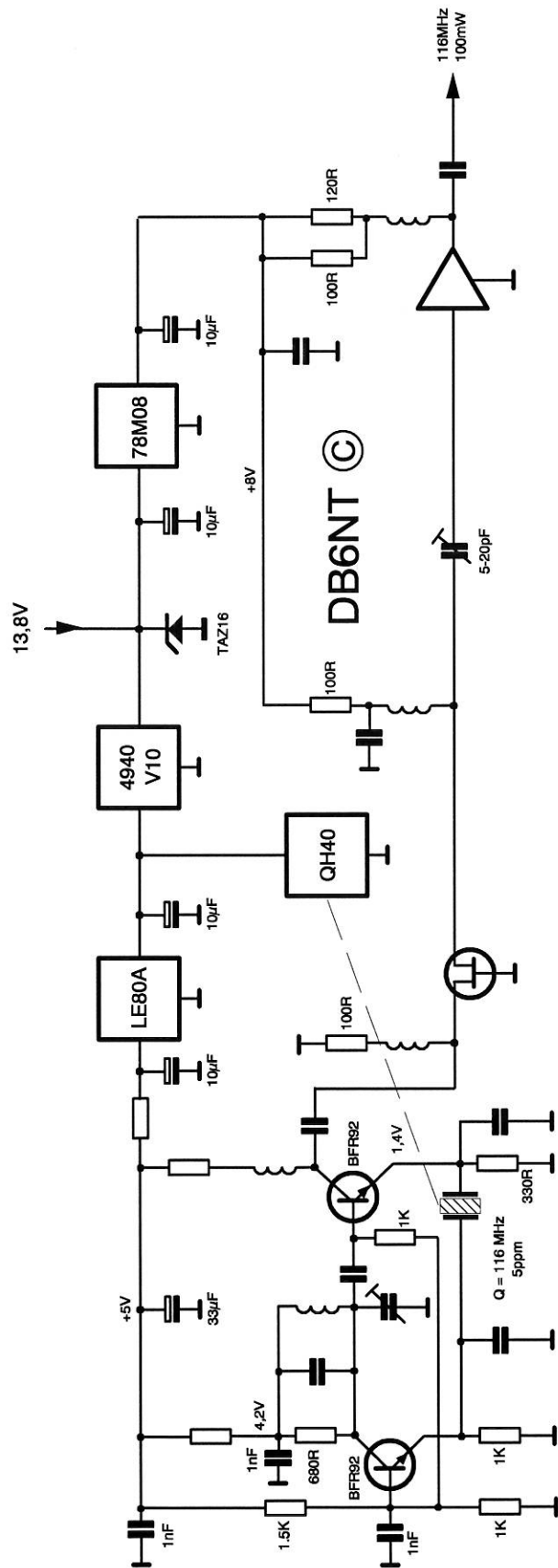
116 MHz  
LO IN  
100 mW

Änderungen vorbehalten.  
With reservation as to modification

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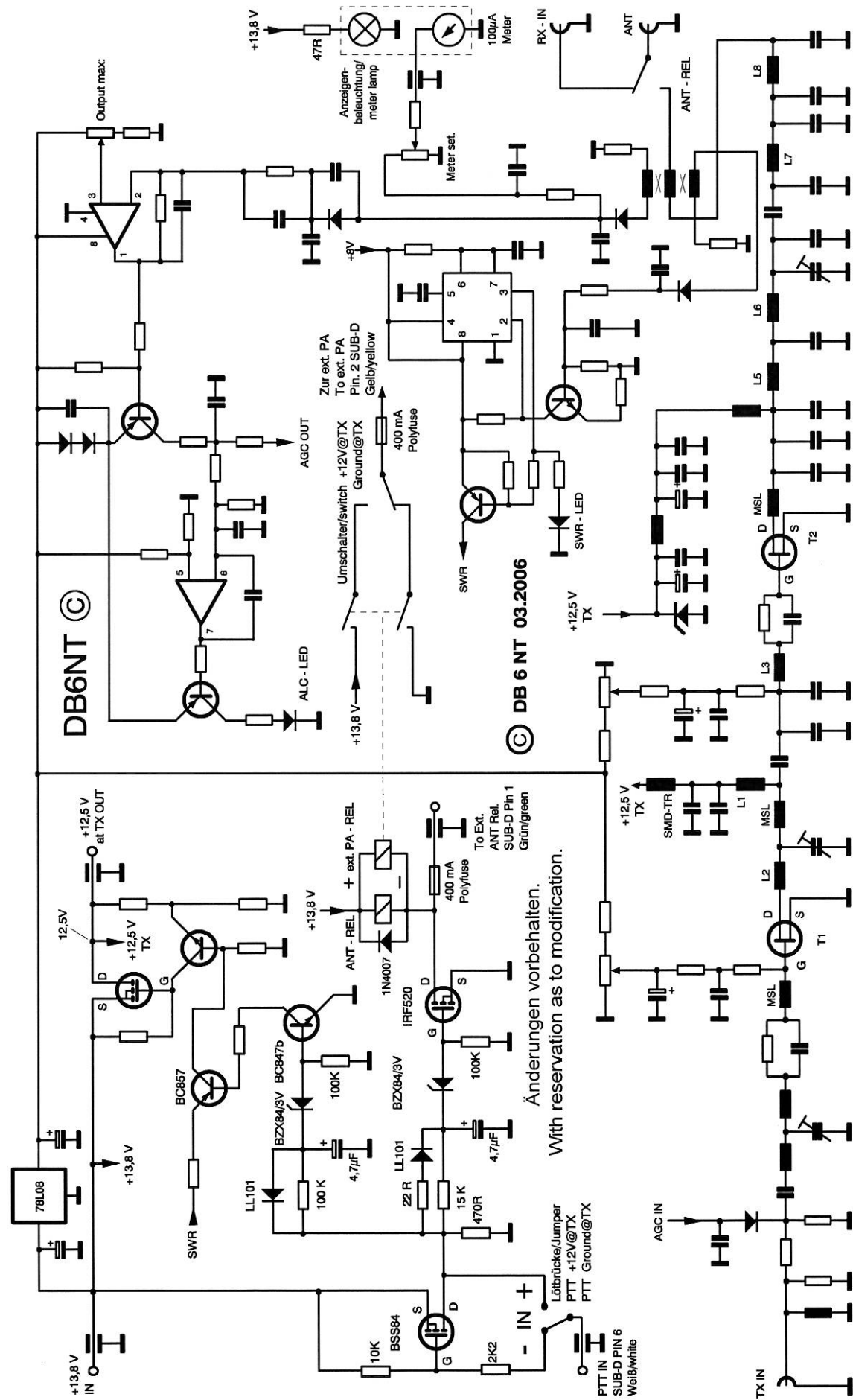


# TR 144 H Oscillator Schematic/Oszillatorschaltung



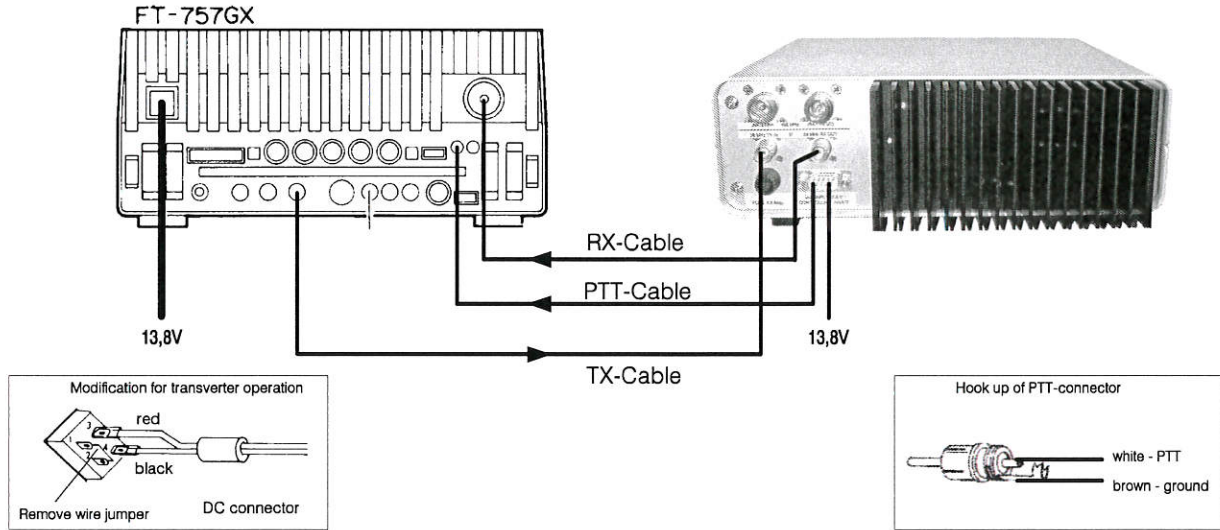
Änderungen vorbehalten.  
With reservation as to modification.

# TR 144 H PA and Control functions/und Steuerung



## TR 144 H with SW - Transceiver FT-757GX

When connecting the FT-757 GX with the transverter all modification instructions in the SW - transceiver manual must be observed. Especially important is the removal of the wire jumper which disables the power amplifier.



## TR 144 H with SW - Transceiver TS 850 S

When connecting the TS 850 S with the transverter all modification instructions in the SW - transceiver manual must be observed. Especially important is the provision of 12 VDC to the Drive output which disables the power amplifier. It is suggested to study the DJ 9 BV modification proposal published in DUBUS magazine 2/1992, page 30. **Important tip:** By using the device Kenwood TS850 experiences shows, that on maximum transceiver output power a distorted transmit signal will be delivered to the Transverter. We recommend by this transceiver to lower output power to a minimum (turn left).

The IF OUT power of the HF transceiver TS850 is significantly higher at the beginning of operation. After some time the internal temperature rises and the IF OUT power drops. Keep this effect in mind when adjusting the power levels for transverter operation!

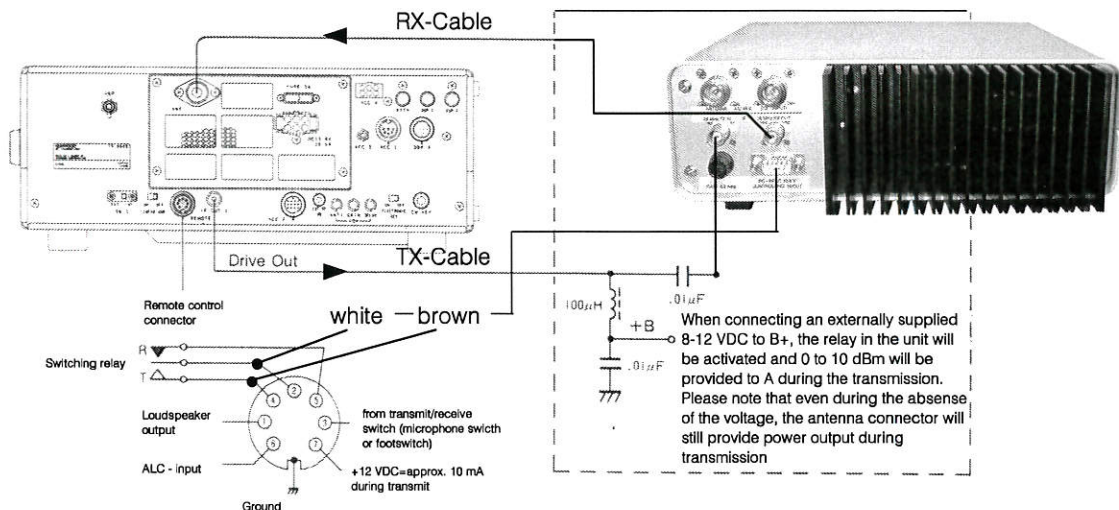
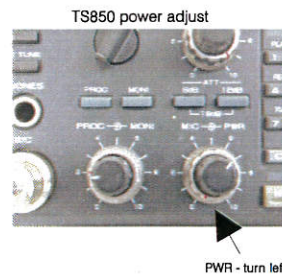
DUBUS article 02.1992:

<http://www.dl6nci.de/ts850-modification.htm>

Other links with Kenwood TS850 Modifications:

<http://www.mods.dk/>

<http://www.qsl.net/s55aw/>



## TR 144 H mit/with KW-Transceiver IC756 PRO II/III

Bei dem Verbinden der IC756PRO II/III mit dem Transverter sind die Betriebshinweise im Handbuch des KW-Transceivers zu beachten.

Der Schalter TX IF SW muss in Schalterstellung B stehen (siehe "interne Schalter CON SW / TX IF SW").

Inbesondere das Beschalten des ACC-2-Steckers muss gewissenhaft ausgeführt werden!  
Das am ACC-2-Stecker anliegende Signal schaltet den Transceiver in den Transvertermode und setzt die Transceiverendstufe außer Betrieb.

Eine Leistungseinstellung des Transverters ist am IC756PRO II mit dem "RF-Power"-Regler möglich.

Des weiteren sollte der Vorverstärker des IC756PRO II ausgeschaltet bleiben ("P.AMP" auf "0"), um die Großsignalfestigkeit des Systems voll ausnutzen zu können.

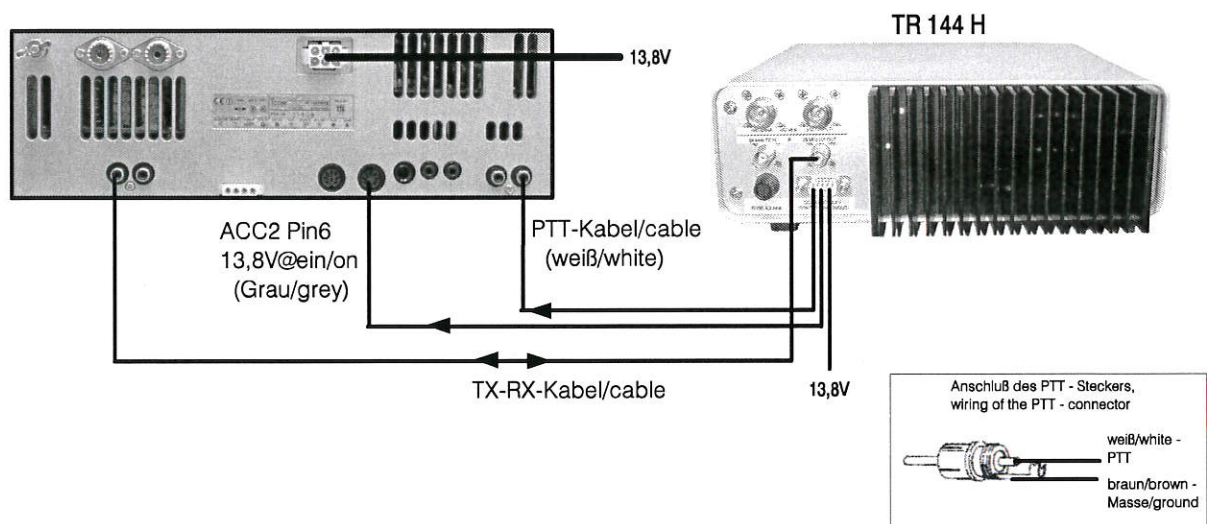
See the instructions in the IC756PRO II/III handbook on wiring with the transverter.

The switch TX IF SW must be set to position B (see "internal switch CON SW / TX IF SW").

Especially the wiring of the ACC-2-connector must be done carefully.  
The signal on the ACC-2-connector switches the transceiver in transverter mode and disables the transceiver-PA.

Adjust the transverter output power with the "RF-Power" control knob.

Switch the IC756PRO II ("P.AMP" to "0") preamp off to keep good large-signal performance.



## TR 144 H mit/with KW-Transceiver YAESU FT 1000 MP MARK V

Beim Verbinden des FT 1000 MP mit dem Transverter sind die Betriebshinweise im Handbuch des Kurzwellen-Transceivers zu beachten.

Der Schalter TX IF SW muss in Schalterstellung B stehen (siehe "interne Schalter CON SW / TX IF SW").

Für den Transverterbetrieb muss die im Transceiver eingebaute Kurzwellen-Endstufe deaktiviert werden. Dazu den Schalter unter der Deckelklappe auf TRV setzen und im Menü 8-3 die Endstufe auf "off" stellen. Der "RF Power"-Regler sollte auf Rechtsanschlag stehen und der "MIC Gain" Regler auf "9 Uhr". Um den TX GND Ausgang (PTT) verwenden zu können, muss der Schalter "LIN" an der Rückseite des Transceivers in Stellung "on" sein.

Eine Leistungseinstellung des Transverters ist am FT 1000 MP mit dem "RF-Power"-Regler möglich.

Des Weiteren sollte der Vorverstärker des FT 1000 MP ausgeschaltet werden ("IPO" auf "on"), um die Großsignalfestigkeit des Systems voll ausnutzen zu können.

Alle oben genannten Hinweise zum Betrieb des FT 1000 MP Mark V Field im Transvertermode sind ohne Gewähr.

To connect the FT 1000 MP to the transverter, please follow the instructions in your FT 1000 MP manual.

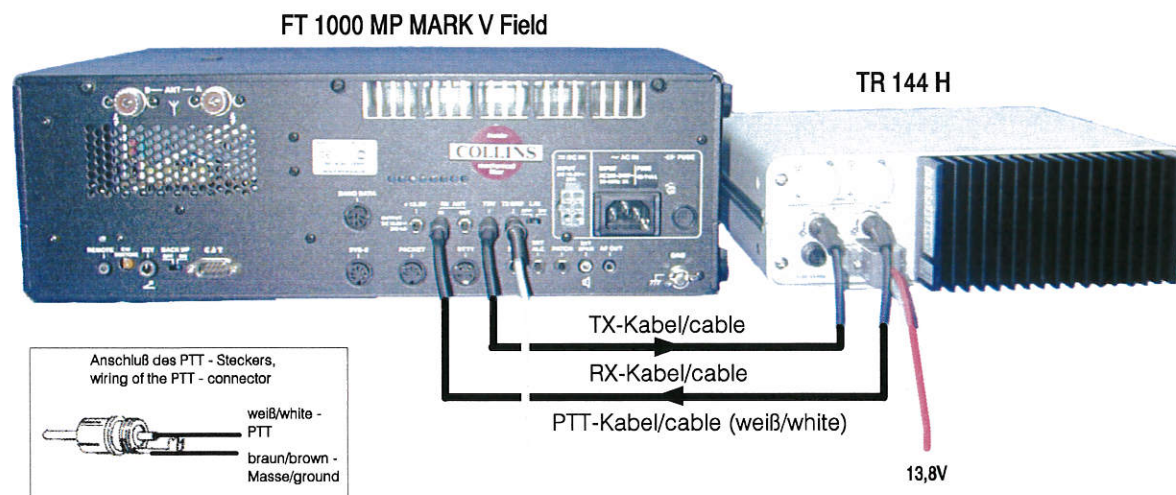
The switch TX IF SW of the transverter must be set to position B (see "internal switch CON SW / TX IF SW").

For transverter mode remove the small cover on the top of the HF transceiver. Set the little switch to position TRV. In the HF transceiver menu 8-3 the PA must be set "off". Turn "RF Power" control knob clockwise to the maximum and the "MIC Gain" control knob to about "9 o'clock". TX GND output (PTT) is usable if the "LIN" switch on the rear panel of the FT 1000 MP is set "on".

Adjust the transverter output power with the "RF-Power" control knob.

Switch the FT 1000 MP ("IPO" to "on") preamp off to keep good large-signal performance.

The described procedure may be different for other versions of the FT 1000 MP and even for other samples of the FT 1000 MP MARK V Field! We can not guarantee the correctness of this description.



## Sicherungswechsel / Fuse replacement

### Sicherungswechsel

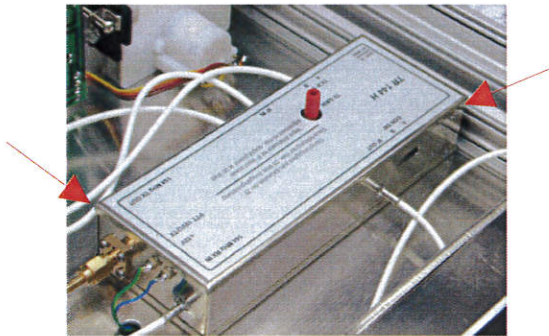
Im TR 144 H sind Sende- und Empfangszweig jeweils mit einer Schmelzsicherung versehen.

Zum Wechseln der Sicherungen muss der Deckel der Transvertermoduls geöffnet werden. Hierzu die zwei Lötunkte (siehe Pfeile) an den Seiten erhitzen und den Deckel öffnen.

### Fuse replacement

In the TR 144 H, two fuses protect transmit path and receive path.

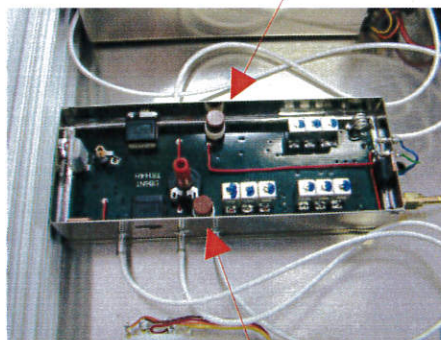
To replace one fuse, the cover of the internal case has to be opened. Therefore, heat the two solder points (marked with arrows) and remove the cover.



Kaputte Sicherung aus dem Sockel herausnehmen und durch neue Sicherung ersetzen.

Remove broken fuse and replace it by a new one.

Sicherung für den Empfangszweig (RX)  
fuse for the receive path (RX)



Sicherung für den Sendepfad (TX)  
fuse for the transmit path (TX)

