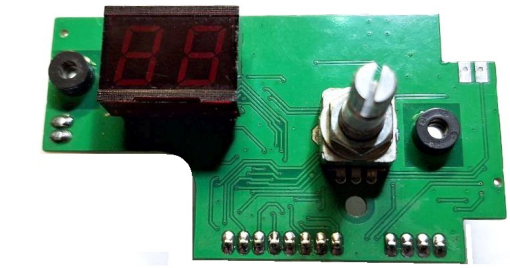
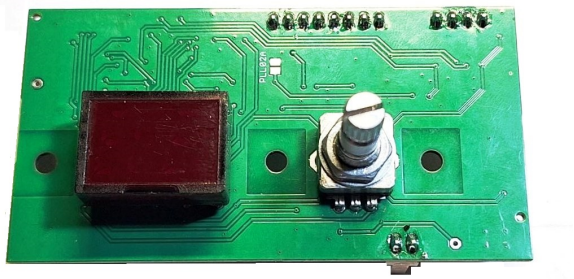
Stabo upgrade to 80 channels with scan function

Suitable for the XM/XF 4012n, XM 4012, 2500, 2200, and 2000 series



Moduel for XM (mobile)



Module for XF (base)

1. Compatibility

The board is suitable for various (Cybernet) systems, which differ only in their mechanical design and the PLL used. The board was developed for devices with the PLL03A or PLL08A (so it can also be used to convert identical 22-channel devices), for example, Stabo devices of the 22xx, 25xx, and 4012 series (without n).

It can also be used to convert Stabo devices of the 4012n series with the LC7132. However, for older versions (currently only new V3 versions are available), a small expansion board is required (which was included).

Devices with the PLL02A (Stabo 2000 and identical devices) can also be converted. There is a solder jumper on the display side that allows you to change this yourself.
For older modules (V2), additional software was required.

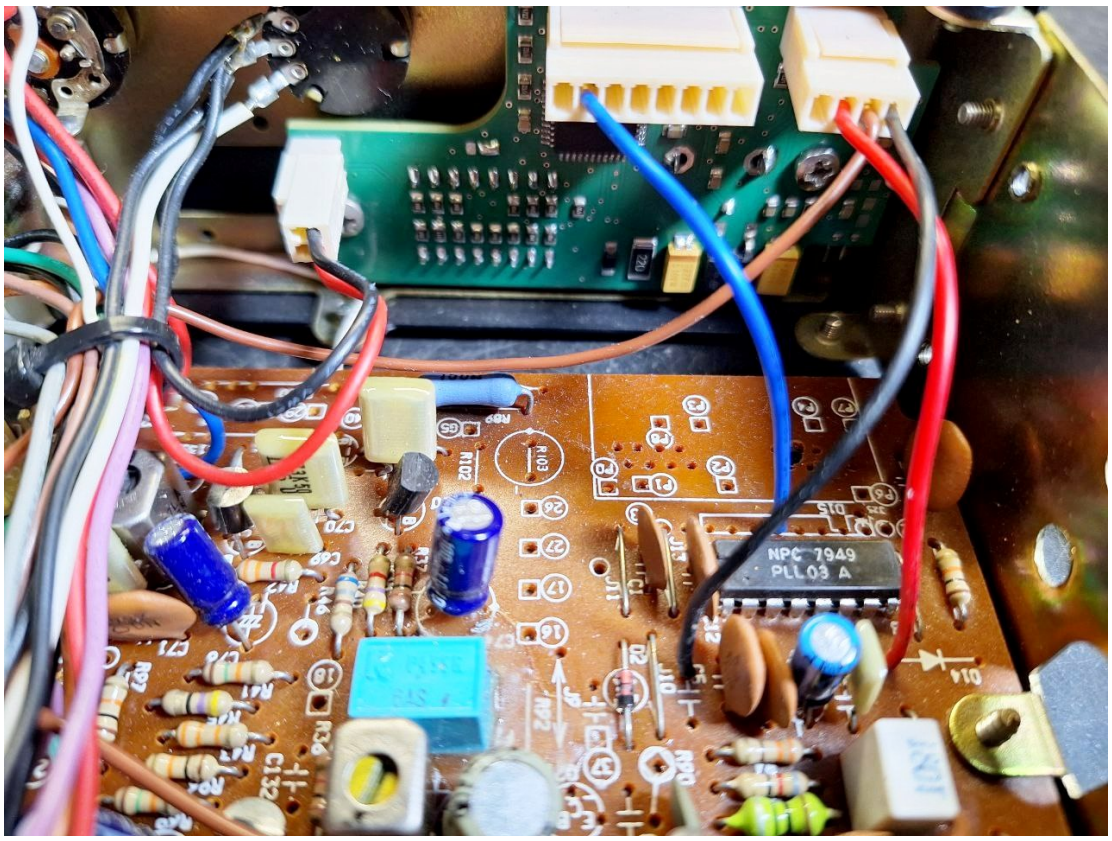
2. Mechanical Installation

For this conversion, the original LED board including the channel selector is removed and replaced with the new board. The display itself is plugged in and can be easily replaced if necessary. The two screw holes fit precisely into the chassis, and the board is mounted with two 4 mm plastic spacers and two M3x8 screws. A washer is required to ensure that the channel selector also sits flush with the housing. The board should not be distorted by the two screws or the channel selector, so precise spacing must be ensured.

Then, the selector should be screwed in place with the included nut. Since the knob is quite difficult to fit onto the new spindle, you need to drill out the knob a little bit with a 6 mm hole. Not too much, so it doesn't slip, but don't press it on too hard either.

3. Connection

3.1 Stabo 4012 (not n), 2500, 22xx and similiar with PLL03A, PLL08A



Pic 1: Connections PLL03A, PLL08A

First, capacitor C6 is removed and the black wire from the 4-pin connector (pin 1) is soldered as short as possible into the hole of C6 facing the PLL. A PLL08A (22-channel) can remain and does not need to be swapped for a PLL03A.

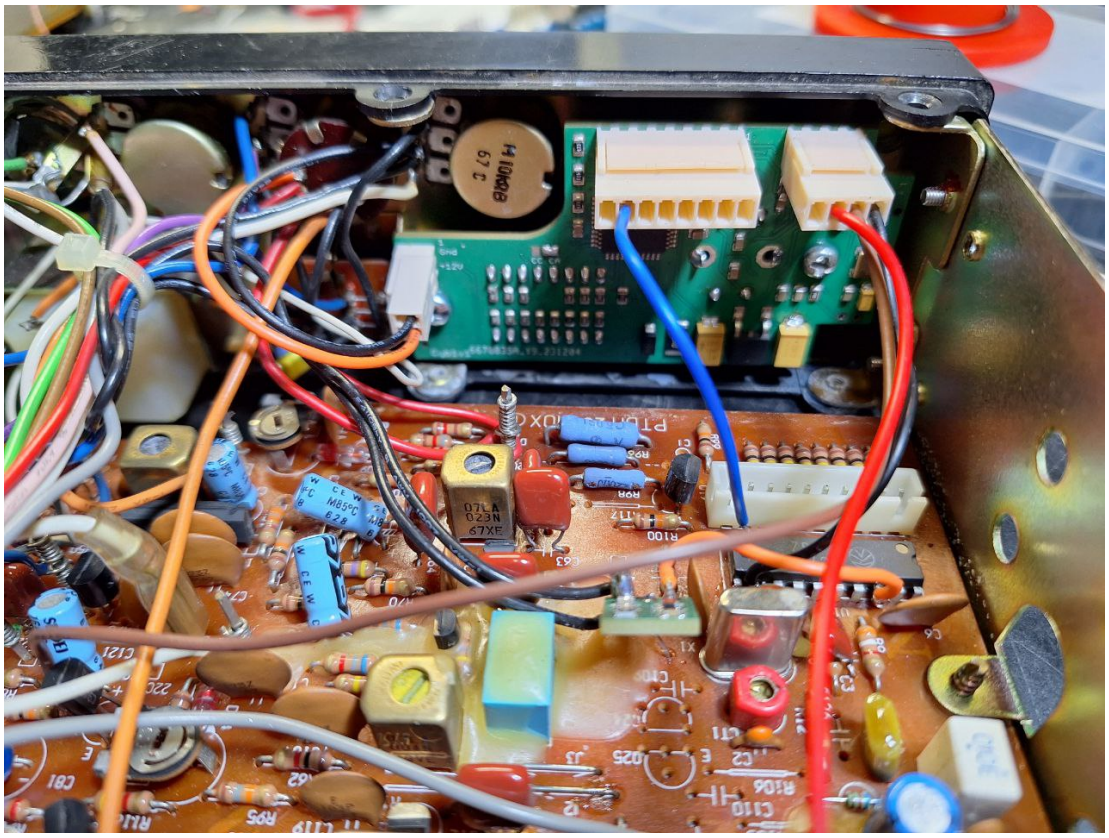
The red wire from the 4-pin connector (pin 3) is +Tx (found, for example, on R4, 3.3kΩ). The brown wire (pin 2) is the squelch signal for the scanner and is connected to the middle pin (collector) of transistor Q24.

The blue wire from the 8-pin connector (pin 7) is soldered to PLL pin 13 and connected (on the back of the device) to +6V (PLL pin 1) with a 1kΩ resistor. Also PLL pin 9 must be connected to PLL pin 1.
The purple wire (pin 8, not connected in the picture) can be connected to ground.

The additional functions of the 8-pin connector are described in section 4.

The extra "RX" pin on module V3 remains free.

3.2 Stabo 4012n, 4000(A) with LC7132



Pic 2: Connections LC7132

First, pins 11 and 12 of the LC7132 are separated, and the capacitor C1 (Stabo 4012n) on pin 11 must be removed.
The black cable from the 4-pin connector (pin 1) is now connected as briefly as possible to pin 11 or 12 of the LC7132.

The red cable from the 4-pin connector (pin 3) is +Tx (found, for example, on R12, 3.3k), the brown cable (pin 2) is the squelch signal for the scanner and is connected to the middle pin (collector) of transistor Q25.

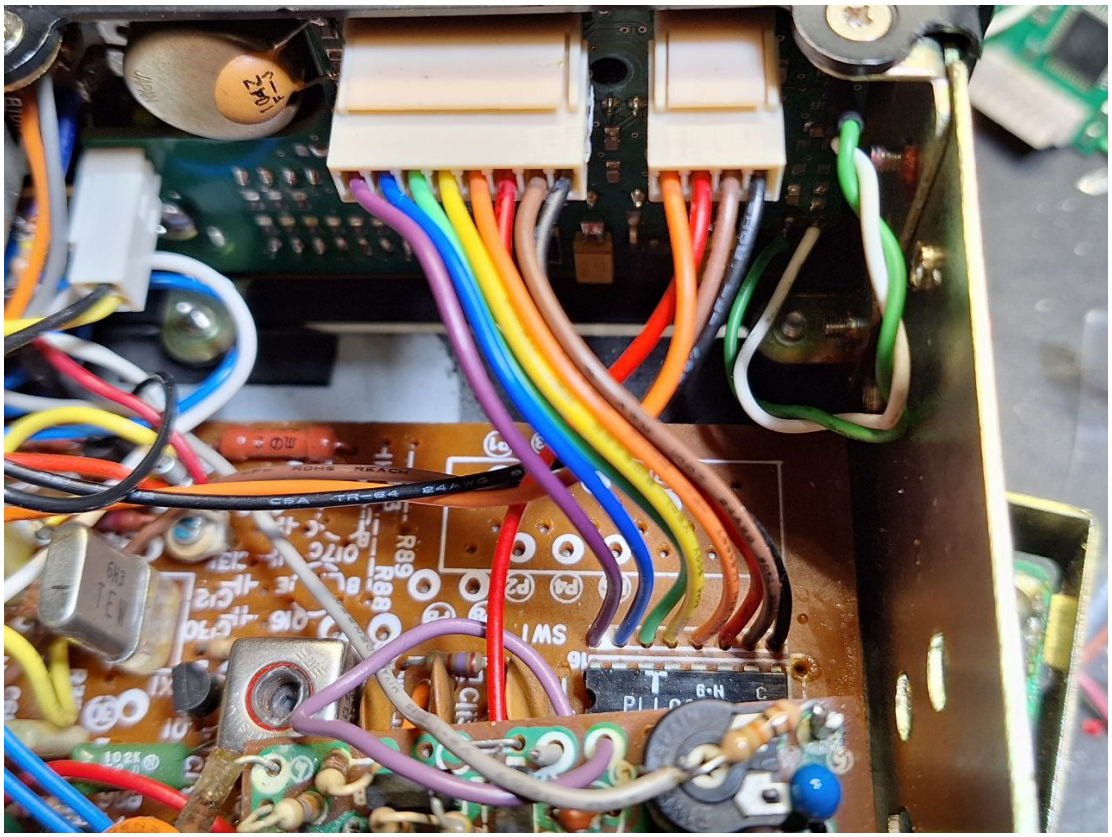
Pin 9 of the LC7132 is released, and pins 1-8 of the LC7132 are connected to ground.
The blue cable from the 8-pin connector (pin 7) is connected to the now free PLL pin 9 and (on the rear panel) connected to ground via a 1kΩ resistor. This resistor is already present on the Stabo 4000.
The purple wire (pin 8, not connected in the picture) can be connected to ground.

The other functions of the 8-pin connector are described in section 4.

The extra "RX" pin is connected to the now free end of the crystal. The coupling capacitor C57 for the mixer in the receiver is connected to the other end of the crystal, which also is connected to the variable capacitor.

If the module doesn't yet have an "RX" pin (V2), you'll need the included "OSC-SSB" add-on board, which has a middle pin for the free end of the crystal. The left pin goes to ground, the right pin to +8V.

3.3 Stabo 2000 and identical with PLL02A



Pic 3: Connections PLL02A (Stabo 2000)

On the module (V3), the solder jumper "PLL02A" on the display side must be closed.
The 8 wires of the 8-pin connector are connected straight (in sequence) to pins 18 to 11 of the PLL02A. Pin 8 (purple) is ground.

The black wire from the 4-pin connector (pin 1) is not used here and remains free (although it can be seen in the picture).
The red wire from the 4-pin connector (pin 3) is +Tx (found, for example, on pin 8 of IC3). The brown wire (pin 2) is the squelch signal for the scanner and is connected to the middle pin (collector) of transistor Q13.

No additional functions are possible here, as the 8-pin connector is already used for the PLL.

The extra "RX" pin on module V3 remains free.

4. Additional Functions

The 12-15V power supply is located on the 2-pin connector; + and - are marked.

When used with PLL03/08 and LC7132, several additional functions are located on the 8-pin connector. These do not need to be connected, except for pin 7 (see above).
These pins may only be connected to ground!

There is another solder pin on the module labeled "LED." An (existing) incandescent lamp (e.g., the one for FM or RX) can/should be connected here. The other lamp pin is connected to +12V via a series resistor of approximately 150 ohms. When using an LED, a larger series resistor is required. This indicates the scanning process.

4.1 Functions of the 8-pin connector

1 .. -5 kHz
2 .. +10 kHz
3 .. Relay function 40/41 (80s mode) or lower band (40s mode)
4 .. Upper band (27415 – 27855)
5 .. Channel 9
6 .. UK band (UK frequencies 27601.25 – 27991.25)
7 .. Detection and switching between PLL03 and LC7132, see above
8 .. Ground

4.2 Up/Down Function on the Mic

The last (free) pin of the 4-pin connector is an up/down function according to the Albrecht standard and can be connected to pin 4 when using a 6-pin mic socket.

4.3 Display

The 7-segment display is plugged in and can be easily replaced without soldering. If you want to use a different frequency than the one installed (common anode (CA) or cathode (CC), you must change the solder jumper on the back of the "CA/CC" module accordingly.

4.4 Other Variants

The board is also available for the Skyline SM-2009 and Hycom CB-4000 (22-channel devices) and similar models, but it does not fit an Alpha 4000. The connection is identical to the Stabo 4012 with PLL03A; only the designations for +Tx (R6) and the squelch transistor (Q14) in the device differ.

5. Adjustment

The module has a small, pre-adjusted adjustment knob that can be used to adjust the transmit frequency for the LC7132. The variable capacitor in the device is only responsible for reception and should be adjusted first. (10,240 MHz) as soon as the transmit frequency is correct.

TIP:
After detuning this 10,240 MHz oscillator by connecting a counter, it is recommended to receive a sufficiently strong, unmodulated station (or measurement signal) and set the receiver output to 455 kHz.

With the PLL03/08, no adjustment is necessary here; the regulator is already pre-adjusted (but reacts during both transmission and reception). These devices should still be adjusted using the variable capacitor in the device. However, it is always advisable to check whether the internal oscillator (pin 3 of IC2) is operating reasonably accurately at 10,240 MHz.

With the PLL02A, the regulator has no influence on the frequency at all; adjustment is carried out as usual.

When expanding to 80 or more channels, the transmitter and receiver must of course also be adjusted as usual.
Mostly, the bandwidth of these radios is not high enough for all options.

6. Operation

Turning the unit on while holding down the PTT button switches between 40-channel (EU) and 80-channel (DE) mode. "40" or "80" is displayed. After releasing the PTT button, the setting is saved, and the unit is immediately ready for use.

A brief press of the channel selector starts or stops the scanner, which is displayed accordingly if a light is connected. The scanner starts with the squelch closed and stops for 32 seconds when a signal is received, or continues after a 4-second wait after the signal disappears.
Pressing the PTT button also turns the scanner off.