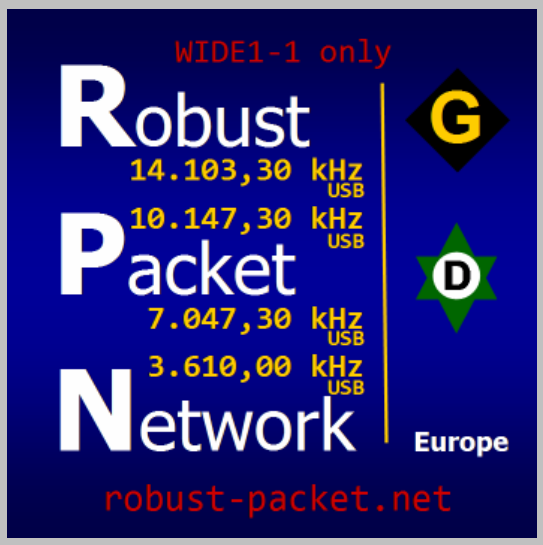
2017-05-29

Robust Packet Network

Manual

RPR-HF-APRS



compiled by SA7SKY

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Introduction

The following are the results and preliminary status quos of an open exchange between the RPR users summarized in this manual.

It is the goal of Robust-Packet-Network to make Robust Packet Radio more popular within the HF-APRS community and to strengthen the network.

Here the focus is set on frequencies and broadcast times in the network, as well as configurations of digipeaters, mobile and fixed stations. Settings in UI-View and the SCS Tracker / DSP Module II are represented here as an example.

All given datas and statements are matter of constant changes and will be varied towards the needs and requirements of all users.

Bulletin Board

• The 60m band is now available on frequency 5354.00 kHz USB.

• The Robust Packet Network now has its own Multimode Reflector named XLX147. This offers the ability to quickly have coordination and voice communication within the network. Main module is XLX147A. All modules can be use freely; the dashboard assignments are just a basic orientation. The motto behind the idea is:

" I see you on RPR-HF-APRS and can instantly talk to you ! "

Link in for D-Star via DCS147AL or XRF147AL or REF147AL .

• Latest SCS Tracker firmware is available here
http://robust-packet.net/SCS-Tracker-Firmware.zip
Latest TRConfig to use firmware can be found here
http://www.scs-ptc.com/en/Downloads.html

• If you like to operate reciprocal between FSK and RPR please note the following. This operational mode of the SCS Trackers is called *alternate mode* or *mixed mode* by some hams. SCS Tracker's manual uses the term ***toggle mode***. ***Toggle mode*** provides a power cut between beacons with a deaf receiver. The latest ***dual mode*** operates continuously on a main selected modulation. The beacon transmission then comes twice with the second one being the other modulation before jumping back to the main selected one. So you can listen and transmit continuously on RPR but (as safeguard) transmit a FSK beacon on top.

• www.Robust-Packet.net is 'on air'. If you like to obtain an email adress *callsign*@Robust-Packet.net feel free to request. An instant rerouting to your known standard email adress would immediately be in effect. To make RPN more popular please consider to implement http://robust-packet.net in your Comment [%AC] (SCS Tracker) / Beacon Comment (UI-View). Since it is quiet long for 300 baud operation a 2m transmission would help as well.

Daily developements and **corrections** can be found online here !
http://www.robust-packet.net/Robust-Packet-Network-Manual.pdf

RPR-Network Europe

RPN20 (Robust-Packet-Network on 20m)				
20 m	DB0UAL-10		non-standard 14102.00 kHz USB Bavaria	Gate/Digi RF-INT-RF H24 operational
20 m	PA3DFN-10		South Holland	Gate/- RF-INT-RF HX operational
RPN30 (Robust-Packet-Network on 30m)				
30 m	DH8HP-1		North Rhine-Westphalia	Gate/- RF-INT-RF HX operational
30 m	DK2EZ-10		Hesse	Gate/Digi RF-INT-RF H24 operational
30 m	EI5HBB-10		Kilkenny	Gate/- RF-INT-RF H24 operational
30 m	HB9ZF-10		Canton Zurich	Gate/Digi RF-INT-RF H12 operational
30 m	IQ2LB-7		Lombardy	Gate/- RF-INT-RF H24 operational
30 m	IR0UGN-10		Province of Rome	Gate/Digi RF-INT-RF H24 operational
30 m	OE3XUR		Lower Austria	Gate/- RF-INT-RF H24 operational
30 m	OH6DL-10		Western Finland	Gate/DIGI* RF-INT-RF HX [*DIGI: RPN1-1] operational
30 m	SA7SKY-10		Skåne	Gate/DIGI* RF-INT-RF HX [*DIGI: RPN1-1] operational
RPN40 (Robust-Packet-Network on 40m)				
40 m	DK2EZ-10		Hesse	Gate/Digi RF-INT-RF H24 operational
RPN60 (Robust-Packet-Network on 60m)				
60 m	OH6DL-10		Western Finland	Gate/DIGI* RF-INT-RF HX [*DIGI: RPN1-1] operational
60 m	SA7SKY-10		Skåne	Gate/DIGI* RF-INT-RF HX [*DIGI: RPN1-1] operational
60 m	DK2EZ-13		Hesse	Gate/Digi RF-INT-RF H24 operational
60 m	HB9ZF-10		Canton Zurich	Gate/Digi RF-INT-RF H24 operational
RPN80 (Robust-Packet-Network on 80m)				
80 m	DB0UAL-10		Bavaria	Gate/Digi RF-INT-RF H24 operational
80 m	HB9ZF-10		Canton Zurich	Gate/Digi RF-INT-RF HN operational

• H24 = 24 hours operation • H12 = except night hours • HX = variable times / on request • HN = night times

Comment

The interest in operating specific frequencies are as widely spread as the applications the users prefer.

Long-distance travelers focus 20 & 30 m band. Within Europe 80 m is regarded as a valuable band as well. First it means that HF-APRS activities are not over after sunset and second it lets participate lower class licensed hams. Long –distance mobile stations may claim antenna

problems but in an area between 500-1000 km even short monoband antennas have shown excellent results.

Agreement among all hams is not to loose each other on too many different frequencies. Anyway new activities raised up on 40 m. After changing IARU bandplan towards 7000-7200 kHz the digimode part in the IARU Region 1 went up as well. Till now no new specific frequencies have been announced. In order to stay clear of the CW area the new frequncies 7047.30 kHz USB for RPR respectively 7047.60 kHz USB for FSK (HFP) have been developed. Efforts to find a worldwide 40 m frequency failed due to IARU bandplan differences.

In theory there are APRS frequencies existing as well in the 10 m, 15 m and 17 m areas but no gate or digipeater infrastructor is to be found there. So in order to concentrate activities those frequencies are no longer mentioned in this document.

RPR-Frequencies Europe

20 m	**14103.30 kHz**	USB	DB0UAL 14102.00 kHz USB
30 m	**10147.30 kHz**	USB	
40 m	**7047.30 kHz**	USB	
60 m	**5354.00 kHz**	USB	
80 m	**3610.00 kHz**	USB	

Comment

14103.30 kHz USB – This frequency has become the second strongest frequency in use behind 30m. In order to exchange longpaths and intercontinental in general 20m it of great use.

10147.30 kHz USB – The only really common frequency worldwide including sideband selection. FSK frequency is 10.147,60 kHz USB and TOOGLE-MODE is possible as well.

7047.30 kHz USB – The specific Dial-QRG is a good reminder reflecting the 30 m one and fullfills the conditions according the IARU Region 1 bandplan.

5354.00 kHz USB – The latest frequency is in operation since 2017. Experience all still collected but it seems to be day & night usable.

3610.00 kHz USB – The traditional frequency from Bavaria. For years DB0UAL(-10) has done a reliable job single handedly. Meanwhile a wider interest is aroused. Especially after sunset many stations join a 'fly-in'. Since no specific path setting for DB0UAL(-10) is required any longer other gates enjoy the interaction.

HF-APRS Frequency Calculation

HF-APRS Dial Frequency Calculation RPR ⇔ FSK Tone Frequencies 1600/1800						
Region		**RPR**	USB=300 Hz lower than FSK	**FSK**	USB=300 Hz higher than RPR	side band
20 m	Europe	**14103.30 kHz**		**14103.60 kHz**		**USB**
30 m	**worldwide**	**10147.30 kHz**		**10147.60 kHz**		**USB**
40 m	Europe	**7047.30 kHz**		7047.60 kHz		**USB**
60m	Europe	**5354.00 kHz**		5354.30		**USB**
80 m	Europe	**3610.00 kHz**		3610.30 kHz		**USB**
	= no usage				**BOLD = active usage**	
www.robust-packet.net/tipsandtricks/HF-APRS-Frequency-Calculation.pdf for details						

Own Station

HF-APRS Dial Frequency Calkulation RPR ⇔ FSK Tone Frequencies _ _ _ _ / _ _ _ _						
Band		**RPR**	USB=300 Hz lower than FSK	**FSK**	USB=300 Hz higher than RPR	side band
20 m		**141 _ _ . _ _ kHz**		**141 _ _ . _ _ kHz**		**USB**
30 m		**101 _ _ . _ _ kHz**		**101 _ _ . _ _ kHz**		**USB**
40 m		**70 _ _ . _ _ kHz**		**70 _ _ . _ _ kHz**		**USB**
60 m		**53 _ _ . _ _ kHz**		**53 _ _ . _ _ kHz**		**USB**
80 m		**36 _ _ . _ _ kHz**		**36 _ _ . _ _ kHz**		**USB**

HF-APRS Frequencies Worldwide

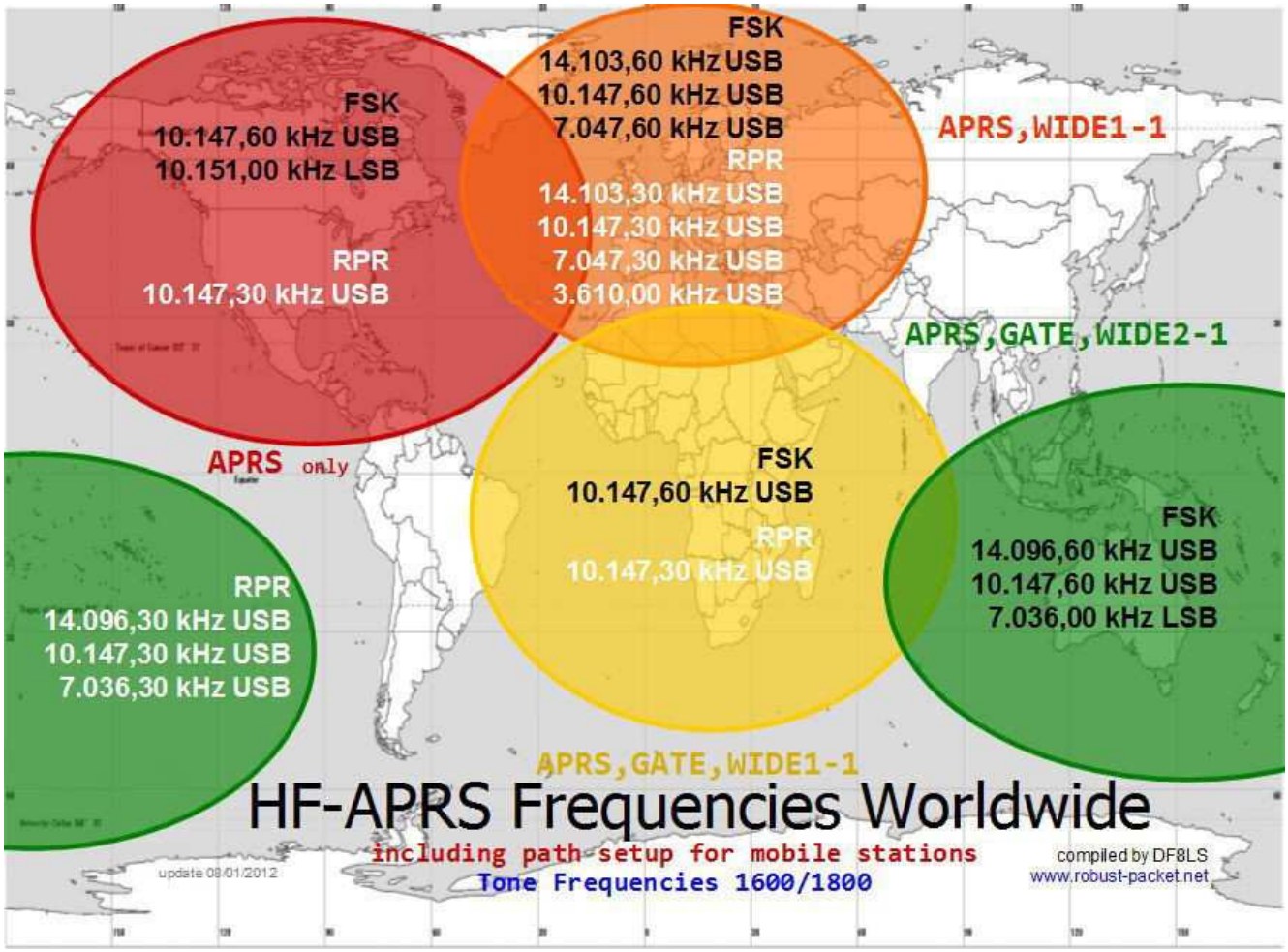


chart as download image under **www.robust-packet.net/hf-aprs-worldwide-chart.html**

Comment

North America (red) Main activities take place on the 30 m band. No further information could be found so far concerning the other bands. According to WA8LMF the density of gates in North America is such high that digipeating is undesirable. A point of view that can be found in Europe as well. Anyway we have to keep on mind that i.e. mobile stations with a distance of 100-200 km to each other would never learn their proximity. With flat tires in the middle of nowhere digipeating then gets a different touch...
When RPR traffic starts now in North America a path APRS,WIDE1-1 is recommended. FSK (HFP) traffic does not encounter any influence by RPR !

Europe (orange) – see comment on previous page

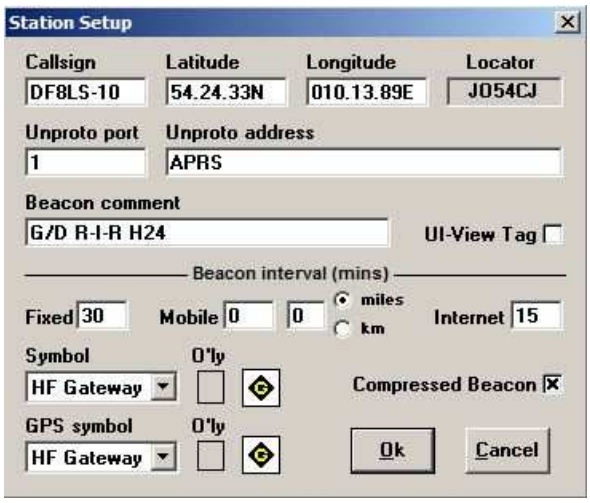
Africa (yellow) Only activities observed are on the 30 m band. It is known that RPR gates are offered as well. Whether that is upon request and therefore temporary only is matter of survey.

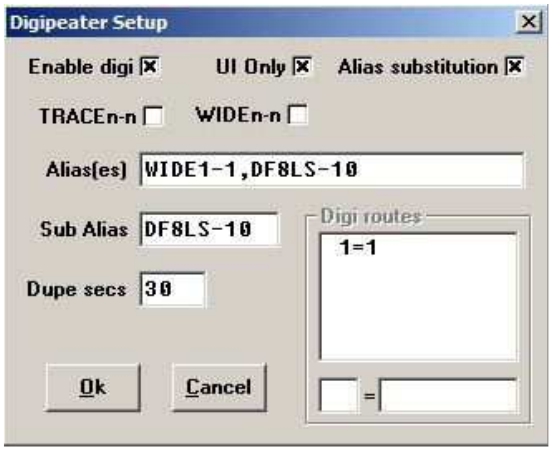
Oceania (green) – Driving force when it comes to HF-APRS are the Australian hams. Specifics here are the different frequencies on 20 m & 40 m compared to Europe and different side band selection as well. The historical developement doing HF-APRS came by the usage of old commercial radios. Those provided only USB and so 20 m was kept USB ever since. Shown RPR frequencies are theoretical entries only for the time being but hams down there are highly interested to enter the community of robust packet users.

General statement about path setting in South Africa and Australia – In those areas gating to the internet takes place via crossgating to the VHF-net. So by using GATE and then WIDEN-n results in the nessecary hops to the VHF IGATE.

RPR-IGATE

UI-View





[with unmodified original program] Visit
http://sa7sky.net/newn-n-paradigm-english.html

Beacon Comment – Service Code

features

G/D **G**ate & **D**igi available
-/D **D**igi only
G/- **G**ate only

connectivity

R-I-R **R**adio ⇨**I**nternet ⇨**R**adio connection
R-I **R**adio ⇨**I**nternet only
R **R**adio only / no internet i.e. Digi/p

time table

H24 24 hours operation
H12 except night hours
HX variable times / on request
HN night times

SCS-Tracker	UI-View	aprs.fi - presentation
Comment [%AC] under APRS Settings	**Beacon Comment** under Station Setup	**Comment text** *1. line (green) in the bubble* *http:// and mailto: links are always blue* mobiles show this in moving list http://aprs.fi/moving/
Report Text [%AR] under APRS Settings	**Status Text** under Status Text	**Status message** *2. line (magenta) in the bubble* *http:// und mailto: links are always blue* **not** shown in the moving list

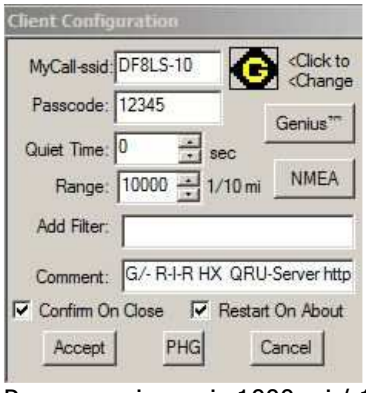
Result in the internet

APRSIS32

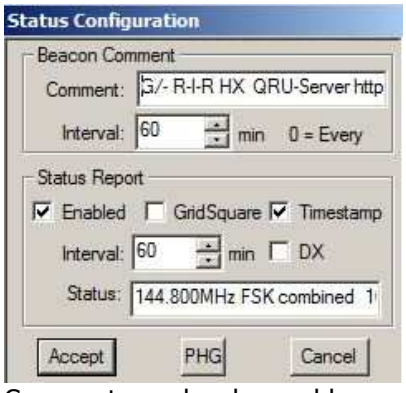
There are no specific entries to be done in the menus of the APRSIS32 program to operate RPR with the SCS Tracker. Even the 300 bauds are automatically selected as configured in the tracker itself when entering the KISS mode.

To reach the KISS mode you first create a new port with KISS as choice. The name 'SCS' is free selectable.
Then you exchange directly in the XML file anything between <OpenCmd> ... and ...</CloseCmd> with the actual example below. This is done straight with the txt editor.
If you wish to digipeat this is done in the XML as well in the line **after the very last radio port !!!** you created. (see example)

Menu Setting



Range maximum is 1000 mi / 1609 km
Unter Add Filter you may enter callsigns that go beyond that range i.e. b/KJ4ERJ*



Comment may be changed here as well

Crucial to the function as GATE is the tick in **RF to IS**. Whoever is ticking **IS to RF** becomes a bidirectional IGATE, though APRS-IS is configured in the same manner.

Without the **RF to IS** setting here in APRS-IS gating would not work. Corresponding **IS to RF** when the bidirectional function is desired. Don't forget to enable, either here or in the menu of the program.

SCS Tracker KISS Mode & Digipeating - XML file

<!--RFPort[0]--> *check your values!*
<RFPort Name="10.1473"> using this port name here i.e. for 30m results in DX reports incl. valid frequency
<Protocol>**KISS**</Protocol>
<Device>COM6:38400,N,8,1</Device> *check your values!*
<RfBaud>300</RfBaud>
<OpenCmd>^027~!!0</OpenCmd>
<OpenCmd>^064^075!!0</OpenCmd>
<CloseCmd>^192^255^192~!!1</CloseCmd>
<CloseCmd>^027~!!0</CloseCmd>
<QuietTime>0</QuietTime>
<Enabled>1</Enabled>
<XmitEnabled>1</XmitEnabled>
<ProvidesNMEA>1</ProvidesNMEA>
<RFtoISEnabled>1</RFtoISEnabled>
<IStoRFEnabled>1</IStoRFEnabled>
<MyCallNot3rd>0</MyCallNot3rd>
<BeaconingEnabled>1</BeaconingEnabled>
<BeaconPath></BeaconPath>
<BulletinObjectEnabled>1</BulletinObjectEnabled>
<DXEnabled>0</DXEnabled>
<DXPath>RFONLY</DXPath>
<MessagesEnabled>1</MessagesEnabled>
<MessagePath></MessagePath>
<TelemetryEnabled>0</TelemetryEnabled>
<TelemetryPath></TelemetryPath><!--DigiXform--> **do N O T change this line (under development)**
</RFPort>
<!--RFPort[0]--> *check your values!*

<!--RFPort[1]--> *check your values!*
<RFPort Name="...
...
<!--DigiXform--> **do N O T change this line (under development)**
</RFPort>
<!--RFPort[1]--> *check your values!*

<!--DigiXform--> **exchange this line with** <DigiXform>WIDE1-1=WIDE1*</DigiXform> **if you wish to digipeat. Otherwise leave it untoughed.**

Using the settings mentioned above lets the SCS Tracker easily enters KISS mode and exits back to stand alone operation. Anyhow, when restarting APRSIS32 it is vital to switch the tracker powerless for a second (under investigation).

SCS PTC-IIIusb / PTC-IIusb / TRXPTC KISS Mode - XML file

```
<!--RFPort[0]-->                                    check your values!
<RFPort Name="10.1473"> using this port name here i.e. for 30m results in DX reports incl. valid frequency
<Protocol>KISS</Protocol>
<Device>COM6:38400,N,8,1</Device>                   check your values!
<RfBaud>300</RfBaud>
<OpenCmd>^027~!!1</OpenCmd>
<OpenCmd>^M~!!1</OpenCmd>
<OpenCmd>QUIT!cmd:</OpenCmd>
<OpenCmd>PSKA 250</OpenCmd>                         check your values!
<OpenCmd>TONES 2</OpenCmd>
<OpenCmd>TRX Frequency 10147.3</OpenCmd>
<OpenCmd>PAC!pac:</OpenCmd>
<OpenCmd>BAUD r300!pac:</OpenCmd>
<OpenCmd>^064^075!!0</OpenCmd>
<CloseCmd>^192^255^192~!!2</CloseCmd>
<CloseCmd>^M~!pac:!1</CloseCmd>
<CloseCmd>QUIT!cmd:</CloseCmd>
<QuietTime>0</QuietTime>
<Enabled>1</Enabled>
<XmitEnabled>1</XmitEnabled>
<ProvidesNMEA>1</ProvidesNMEA>
<RFtoISEnabled>1</RFtoISEnabled>
<IStoRFEnabled>1</IStoRFEnabled>
<MyCallNot3rd>0</MyCallNot3rd>
<BeaconingEnabled>1</BeaconingEnabled>
<BeaconPath></BeaconPath>
<BulletinObjectEnabled>1</BulletinObjectEnabled>
<DXEnabled>0</DXEnabled>
<DXPath>RFONLY</DXPath>
<MessagesEnabled>1</MessagesEnabled>
<MessagePath></MessagePath>
<TelemetryEnabled>0</TelemetryEnabled>
<TelemetryPath></TelemetryPath>
<!--DigiXform-->
</RFPort>
<!--RFPort[0]-->                                    check your values!
```

SCS PTC-II & PTC-IIpro (with DSP-II module at port 1) KISS Mode - XML file

<!--RFPort[0]--> *check your values!*
<RFPort Name="10.1473"> using this port name here i.e. for 30m results in DX reports incl. valid frequency
<Protocol>**KISS**</Protocol>
<Device>COM6:38400,N,8,1</Device> *check your values!*
<RfBaud>300</RfBaud>
<OpenCmd>^027~!!1</OpenCmd>
<OpenCmd>^M~!!1</OpenCmd>
<OpenCmd>Q!cmd:</OpenCmd>
<OpenCmd>RESET!cmd:</OpenCmd>
<OpenCmd>TONES 4!cmd:</OpenCmd>
<OpenCmd>BRIGHT 6!cmd:</OpenCmd>
<OpenCmd>FSKA 450!cmd:</OpenCmd> *check your values!*
<OpenCmd>PSKA 550!cmd:</OpenCmd> *check your values!*
<OpenCmd>PAC TXL AFSK 800!cmd:</OpenCmd> *check your values!*
<OpenCmd>PAC!pac:!2</OpenCmd>
<OpenCmd>USER 0!pac:!1</OpenCmd>
<OpenCmd>PRBOX 0!pac:!1</OpenCmd>
<OpenCmd>BAUD R300!pac:!1</OpenCmd>
<OpenCmd>^064^075!!0</OpenCmd>
<CloseCmd>^192^255^192~!!2</CloseCmd>
<CloseCmd>^M~!pac:!1</CloseCmd>
<CloseCmd>Q!cmd:</CloseCmd>
<CloseCmd>BRIGHT 1!cmd:</CloseCmd>
<QuietTime>0</QuietTime>
<Enabled>1</Enabled>
<XmitEnabled>1</XmitEnabled>
<ProvidesNMEA>1</ProvidesNMEA>
<RFtoISEnabled>1</RFtoISEnabled>
<IStoRFEnabled>1</IStoRFEnabled>
<MyCallNot3rd>0</MyCallNot3rd>
<BeaconingEnabled>1</BeaconingEnabled>
<BeaconPath></BeaconPath>
<BulletinObjectEnabled>1</BulletinObjectEnabled>
<DXEnabled>0</DXEnabled>
<DXPath>RFONLY</DXPath>
<MessagesEnabled>1</MessagesEnabled>
<MessagePath></MessagePath>
<TelemetryEnabled>0</TelemetryEnabled>
<TelemetryPath></TelemetryPath>
<!--DigiXform-->
</RFPort>
<!--RFPort[0]--> *check your values!*

SCS PTC-IIex KISS Mode - XML file

<!--RFPort[0]--> *check your values!*
<RFPort Name="10.1473"> using this port name here i.e. for 30m results in DX reports incl. valid frequency
<Protocol>**KISS**</Protocol>
<Device>COM6:38400,N,8,1</Device> *check your values!*
<RfBaud>300</RfBaud>
<OpenCmd>^027~!!1</OpenCmd>
<OpenCmd>^M~!!1</OpenCmd>
<OpenCmd>Q!cmd:</OpenCmd>
<OpenCmd>TONES 4!cmd:</OpenCmd>
<OpenCmd>BRIGHT 6!cmd:</OpenCmd>
<OpenCmd>PSKA 250!cmd:</OpenCmd> *check your values!* (only diffence to PTC-II & IIpro)
<OpenCmd>PAC!pac1:</OpenCmd>
<OpenCmd>USER 0!pac1:</OpenCmd>
<OpenCmd>PRBOX 0!pac1:</OpenCmd>
<OpenCmd>BAUD R300!pac1:</OpenCmd>
<OpenCmd>^064^075!!0</OpenCmd>
<CloseCmd>^192^255^192~!!2</CloseCmd>
<CloseCmd>^M~!pac1:!1</CloseCmd>
<CloseCmd>Q!cmd:</CloseCmd>
<QuietTime>0</QuietTime>
<Enabled>1</Enabled>
<XmitEnabled>1</XmitEnabled>
<ProvidesNMEA>1</ProvidesNMEA>
<RFtoISEnabled>1</RFtoISEnabled>
<IStoRFEnabled>1</IStoRFEnabled>
<MyCallNot3rd>0</MyCallNot3rd>
<BeaconingEnabled>1</BeaconingEnabled>
<BeaconPath></BeaconPath>
<BulletinObjectEnabled>1</BulletinObjectEnabled>
<DXEnabled>0</DXEnabled>
<DXPath>RFONLY</DXPath>
<MessagesEnabled>1</MessagesEnabled>
<MessagePath></MessagePath>
<TelemetryEnabled>0</TelemetryEnabled>
<TelemetryPath></TelemetryPath>
<!--DigiXform-->
</RFPort>
<!--RFPort[0]--> *check your values!*

SCS P4dragon KISS Mode - XML file

<!--RFPort[0]--> *check your values!*
<RFPort Name="10.1473"> using this port name here i.e. for 30m results in DX reports incl. valid frequency
<Protocol>**KISS**</Protocol>
<Device>COM2:38400,N,8,1</Device> *check your values!*
<RfBaud>300</RfBaud>
<OpenCmd>^027~!!1</OpenCmd>
<OpenCmd>^M~!!1</OpenCmd>
<OpenCmd>Q!cmd:</OpenCmd>
<OpenCmd>TONES 4!cmd:</OpenCmd>
<OpenCmd>BRIGHT 6!cmd:</OpenCmd>
<OpenCmd>PAC!pac:</OpenCmd>
<OpenCmd>PRBOX 0!pac:</OpenCmd>
<OpenCmd>PRPort 1!pac:</OpenCmd>
<OpenCmd>USER 0!pac:</OpenCmd>
<OpenCmd>BAUD R300!pac:</OpenCmd>
<OpenCmd>TXLevel R 170!pac:</OpenCmd> *check your values!!*
<OpenCmd>^064^075!!0</OpenCmd>
<CloseCmd>^192^255^192~!!2</CloseCmd>
<CloseCmd>^M~!pac:!1</CloseCmd>
<CloseCmd>Q!cmd:</CloseCmd>
<QuietTime>0</QuietTime>
<Enabled>1</Enabled>
<XmitEnabled>1</XmitEnabled>
<ProvidesNMEA>0</ProvidesNMEA>
<RFtoISEnabled>0</RFtoISEnabled>
<IStoRFEnabled>0</IStoRFEnabled>
<MyCallNot3rd>0</MyCallNot3rd>
<NoGateME>0</NoGateME>
<BeaconingEnabled>1</BeaconingEnabled>
<BeaconPath>WIDE1-1</BeaconPath>
<BulletinObjectEnabled>1</BulletinObjectEnabled>
<DXEnabled>0</DXEnabled>
<DXPath>WIDE1-1</DXPath>
<MessagesEnabled>1</MessagesEnabled>
<MessagePath>WIDE1-1</MessagePath>
<TelemetryEnabled>0</TelemetryEnabled>
<TelemetryPath>WIDE1-1</TelemetryPath>
<!--DigiXform-->
</RFPort>
<!--RFPort[0]--> *check your values!*

AGW Packet Engine with SCS Tracker, PTC-IIseries, PTC-IIIseries, TRXPTC & P4dragon * - XML file

```
<!--RFPort[0]-->                                    check your values!
<RFPort Name="10.1473"> using this port name here i.e. for 30m results in DX reports incl. valid frequency
<Protocol>AGW</Protocol>
<Device>@localhost:8000</Device>
<RfBaud>300</RfBaud>
<!--OpenCmd-->
<!--CloseCmd-->
<QuietTime>0</QuietTime>
<Enabled>1</Enabled>
<XmitEnabled>1</XmitEnabled>
<ProvidesNMEA>0</ProvidesNMEA>
<RFtoISEnabled>0</RFtoISEnabled>
<IStoRFEnabled>0</IStoRFEnabled>
<MyCallNot3rd>0</MyCallNot3rd>
<NoGateME>0</NoGateME>
<BeaconingEnabled>1</BeaconingEnabled>
<BeaconPath>WIDE1-1</BeaconPath>
<BulletinObjectEnabled>1</BulletinObjectEnabled>
<DXEnabled>0</DXEnabled>
<DXPath>RFONLY</DXPath>
<MessagesEnabled>1</MessagesEnabled>
<MessagePath></MessagePath>
<TelemetryEnabled>0</TelemetryEnabled>
<TelemetryPath></TelemetryPath>
<!--DigiXform-->
</RFPort>
<!--RFPort[0]-->                                    check your values!
```

remark by SV1UY

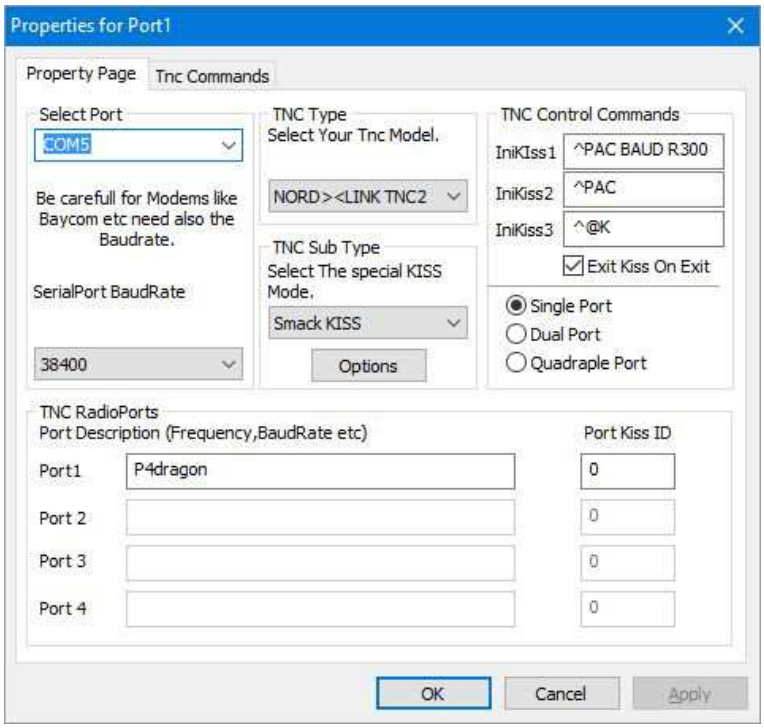
All PTC-IIseries (except PTC-IIe which does not support RPR or PTC-II without the DSP+ board/Extra RAM), PTC-IIIseries, TRXPTC and P4dragons should be setup as "NORD><LINK TNC2" Modems and use SMACK KISS Protocol in Packet Engine, Free or Pro. Then in Packet Engine's Setup, Radio Port Manager, Edit Radio Port, Property Page, TNC Control Commands: InitKiss1 field type "^PAC BAUD R300" without the quotes. In InitKiss2 filed type "^PAC" again without the quotes and leave InitKiss3 as is.

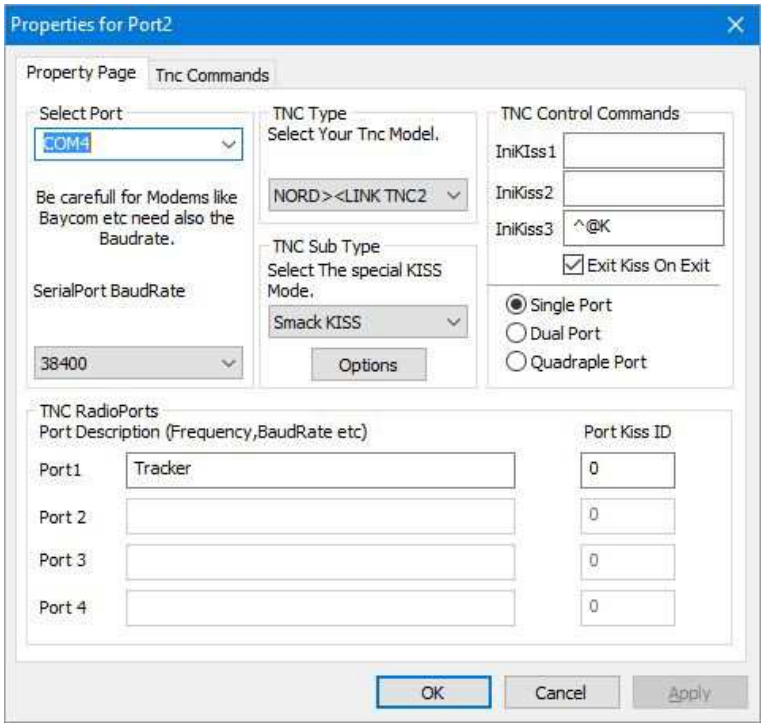
SCS Trackers should also be setup as a "NORD><LINK TNC2" Modems using SMACK KISS Protocol in Packet Engine, Free or Pro but in Packet Engine's Setup, Radio Port Manager, Edit Radio Port, Property Page, TNC Control Commands: InitKiss1 and InitKiss2 should be left blank if you are using an SCS Tracker and again leave InitKiss3 as is.

See next page for setup examples

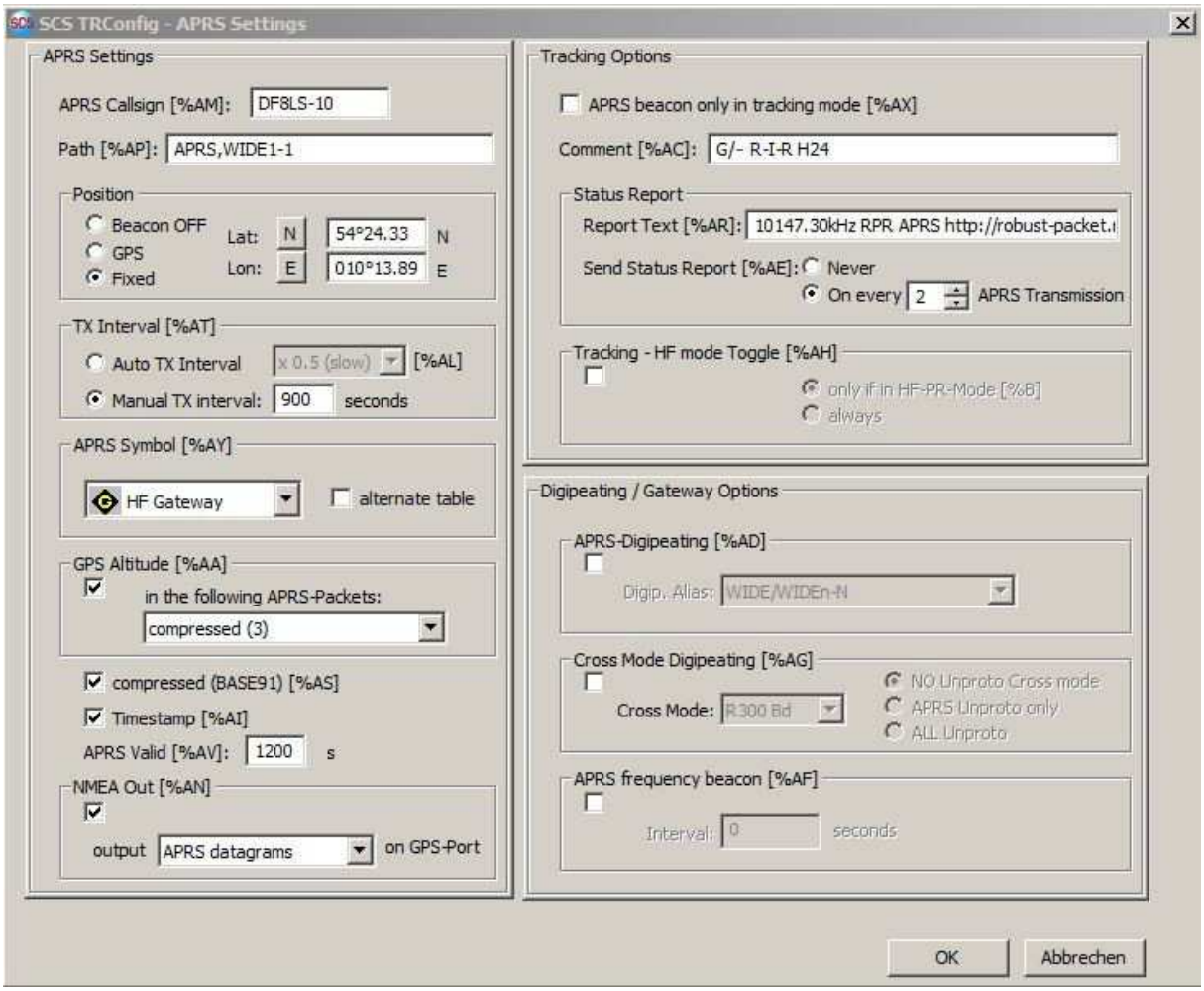
*except PTC-II without DSP+ board/Extended RAM & PTC-IIe which do not support RPR

(continue) remark by SV1UY

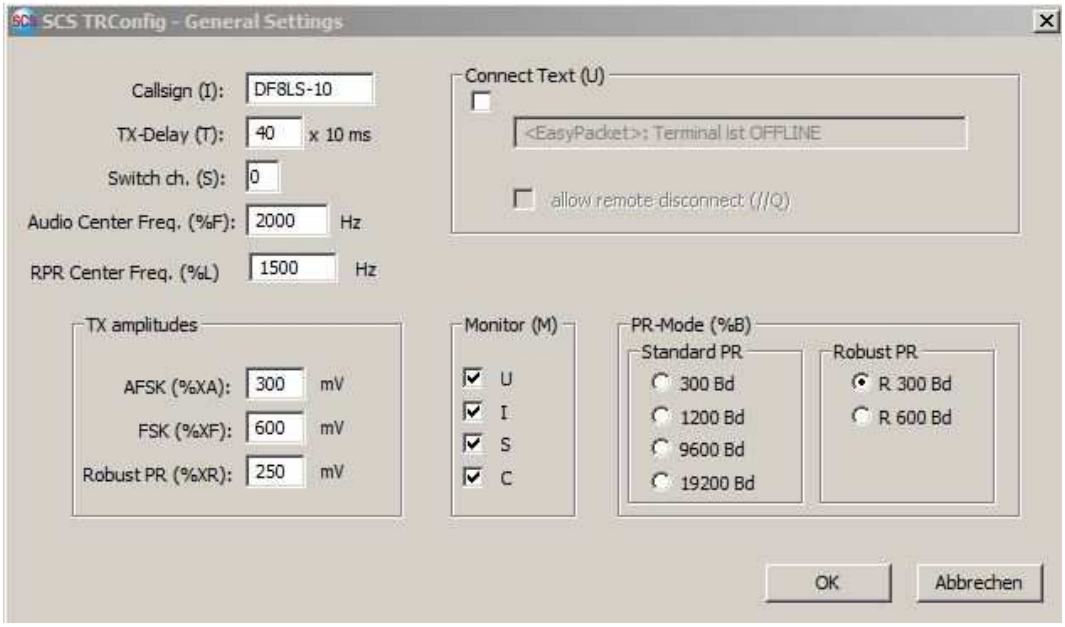




SCS Tracker



TRConfig Version 1.0.1.55



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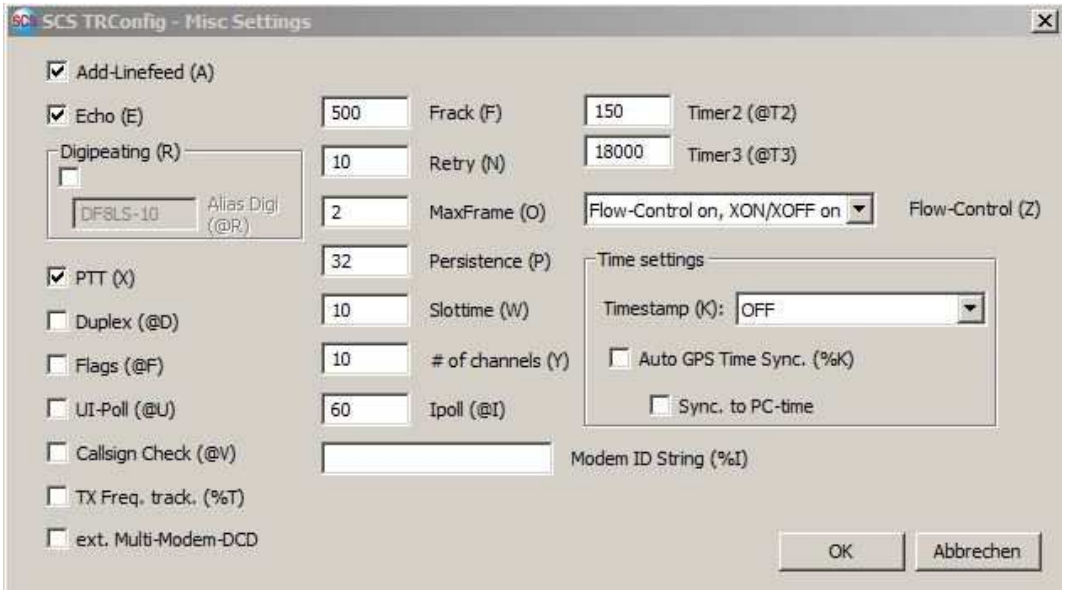
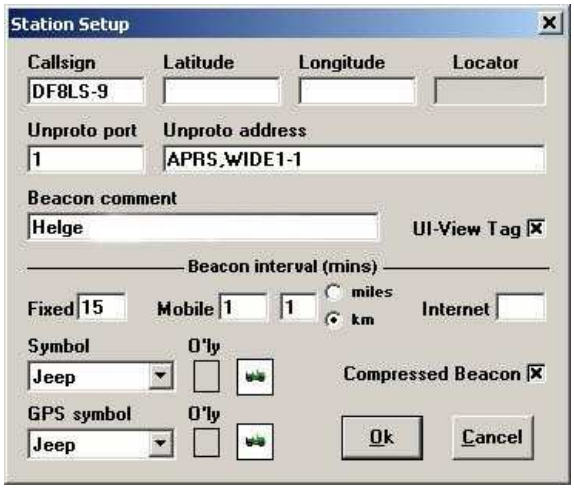
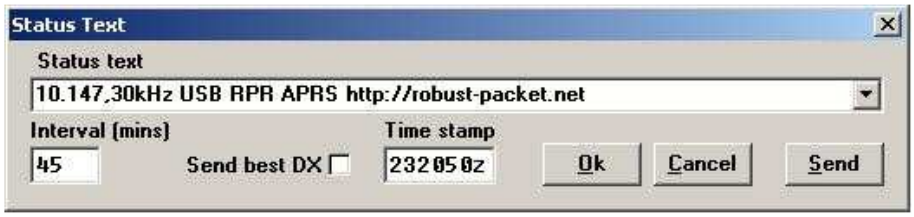


TRConfig Version 1.0.1.55

RPR-MOBILE

UI-View





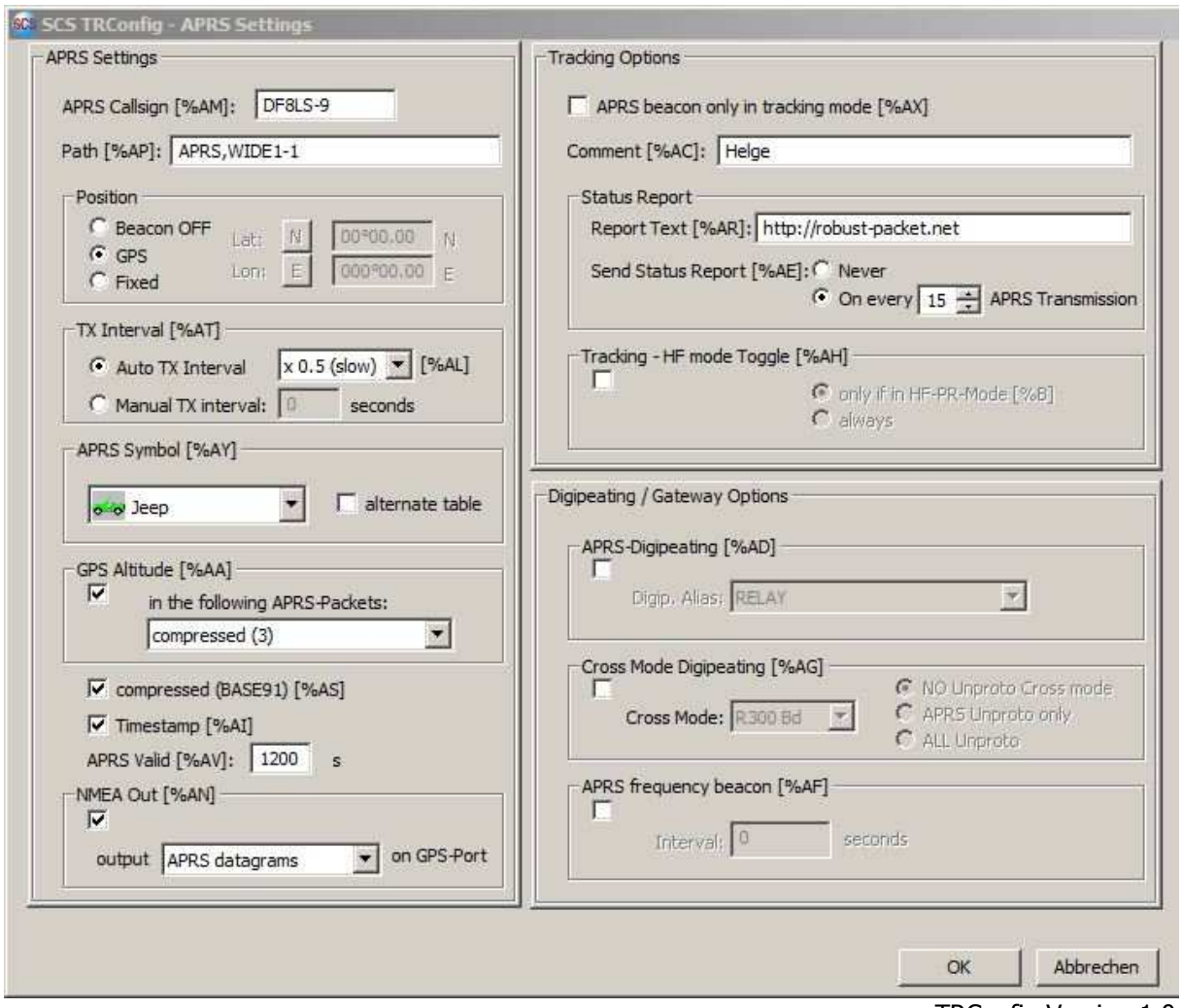
Comment

After longer discussions about pros and cons of digipeating the European answer is a YES for mobile stations and a NOT-NECESSARELY for gates & digis. But unlike 2 m operation the path should be set to WIDE1-1 allowing a single hop (remindes old ECHO).

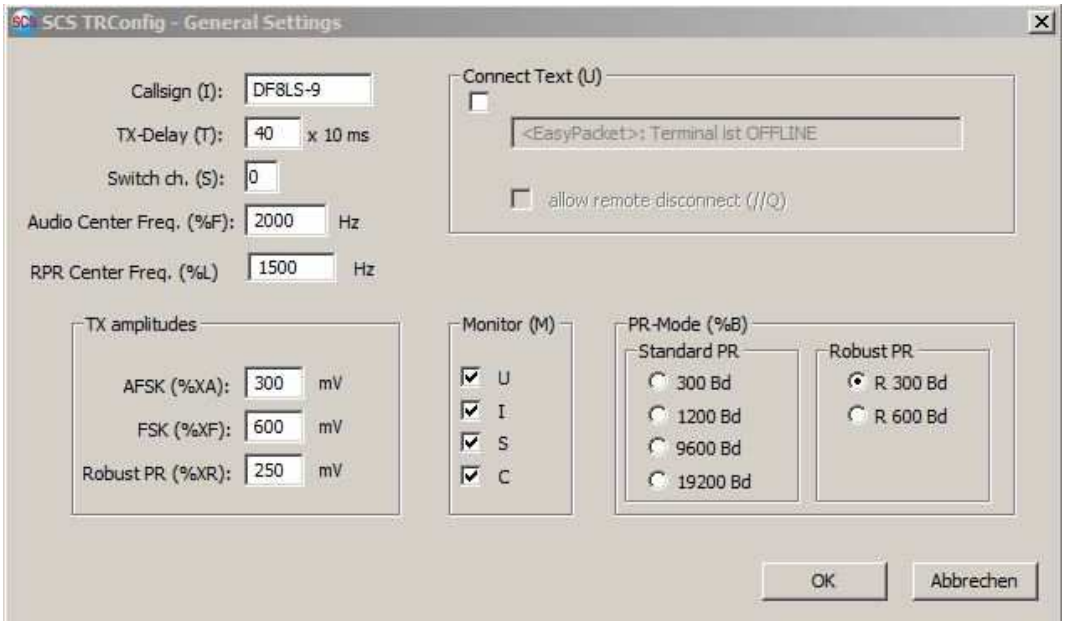
In case of difficult HF propagation conditions Status Text should be avoided or set to a high time interval.

Crosspeater operation *(according to DF8HL)*
Some Hardware i.e. Yaesu VX-8 have unproto adresses not starting with AP... Meaning that not even the first two letters are AP (except under specific circumstances) but more or less random ones. When hiking through the remote wilderness or doing a trip by canoe some hams use their mobile station as crossdigipeater and mode changer from 2m-FSK to HF-RPR. In order to pass even those non-AP... adresses digipeaters and gates should independently of all formats digipeat and igate anything they receive if the path holds in first place a not yet digipeated ALIAS like WIDE1-1 or the digipeaters station callsign.

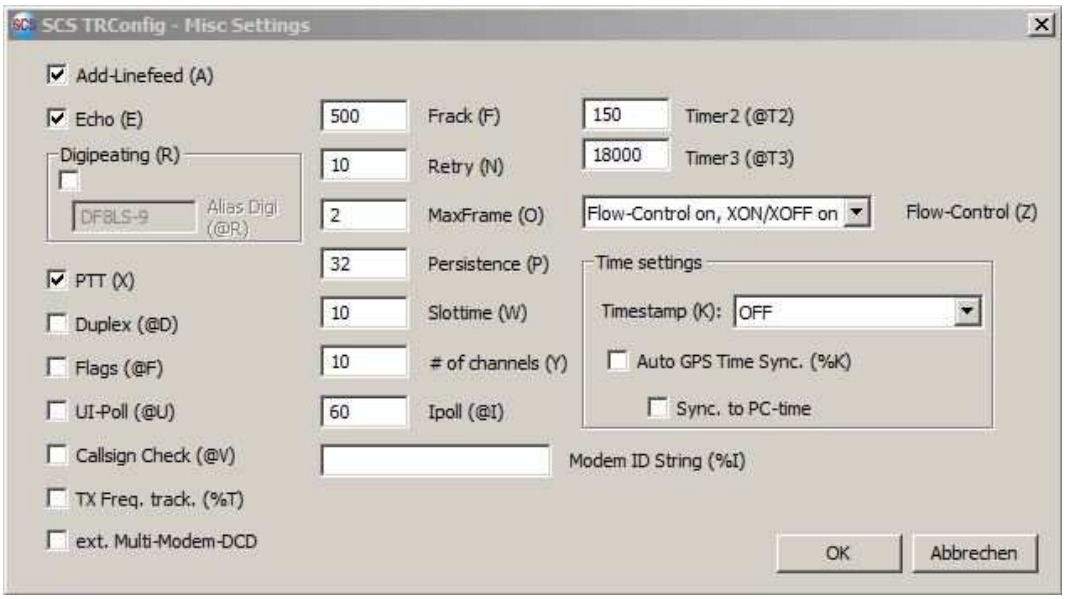
SCS Tracker



TRConfig Version 1.0.1.55



TRConfig Version 1.0.1.55



TRConfig Version 1.0.1.55

RPR – Theory

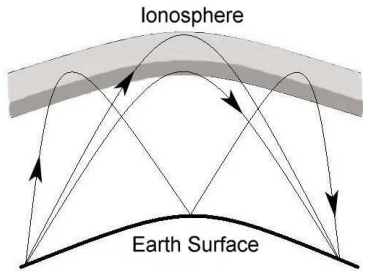
Why RPR-APRS?

Till now APRS-operation on shortwave was done by ordinary HF-packets (FSK 300 bd). Now what makes the difference towards RPR?
To answer that question we initially focus the properties of HF-channels and the specialties when transmitting digital signals via shortwave.

Properties of an HF-Channel
small bandwidth (< 3kHz) - multipath propagation - phase shift – band noise and other disturbances - fading – constant fluctuating conditions

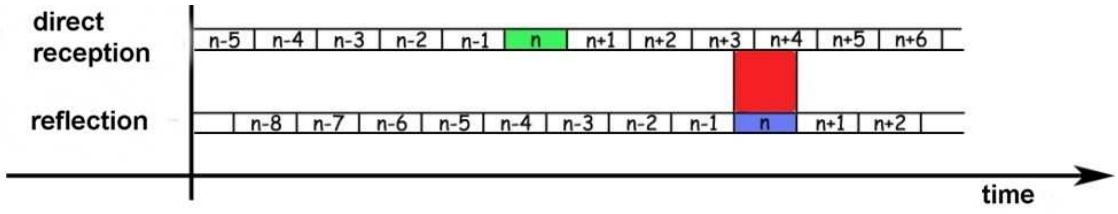
HF-transmission of digital signals

When transmitting digital signal via radio by using single carriers you nearly always encounter problems on shortwave by multipath propagation.



Run-time diffences caused by multipath propagation

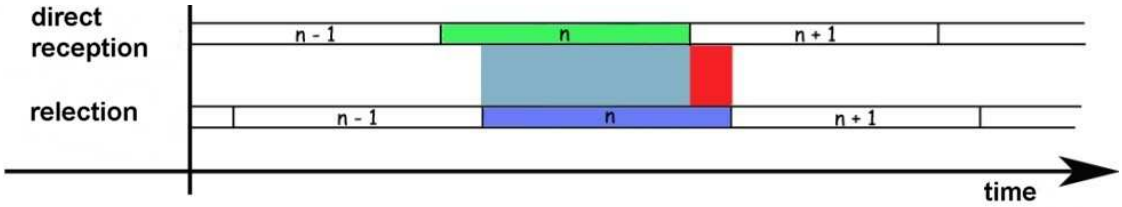
A signal reaches the receiver via different ways. The different pathes a signal has taken results in different delays of that signal. So a mixture of direct signals meet time-shifted and reflected echoed signals.
The effect of this mixture is shown in following figure.



Intersymbol-Interference by run-time distortion

This is a symbolic representation of the contents received. It is demonstrated that reflected signal are received such late that they put heavy influence on the direct signals.
Superposition following symbols by echoed preceded symbols are called Intersymbol-Interference (ISI). Under typical shortwave conditions a symbol will influence samples that follow.

To gentle the effect of ISI with the old FSK packets the length of symbols was prolonged (reduction to 300 bd). This leaded to an improvement of the relation between duration of a symbol and its echo. You simply allow the echo more time to fade.



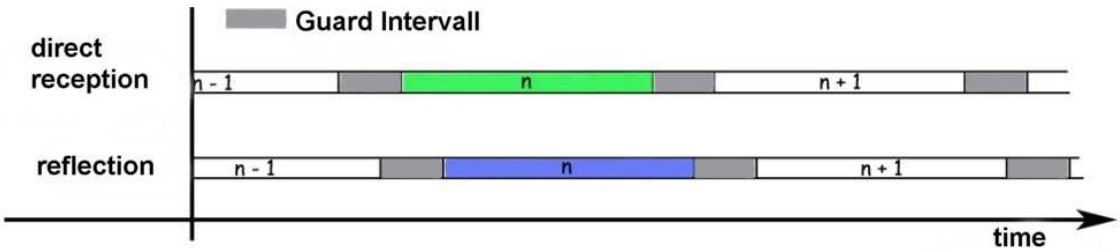
Improvement by extension of symbol length

But it is obvious that symbols which follow are still broken by reflection of the preceding onces. Even when reducing to 300 bd time is still too short to cover the effects of multi pathing on shortwave.

How can RPR do better?

The solution for the ISI problem is known since the 50th and has been used by military services for shortwave operation. It is the Multicarrier System. You take benefit of the Time-Bandwith Product (TBP): data stream is distributed to several subcarriers. Instead of transmitting symbols successively in sequence now mutiple and longer symbols are on air. The more subcarriers are used the longer the symbol can be. This method is called Frequency Division Multiplex (FDM).

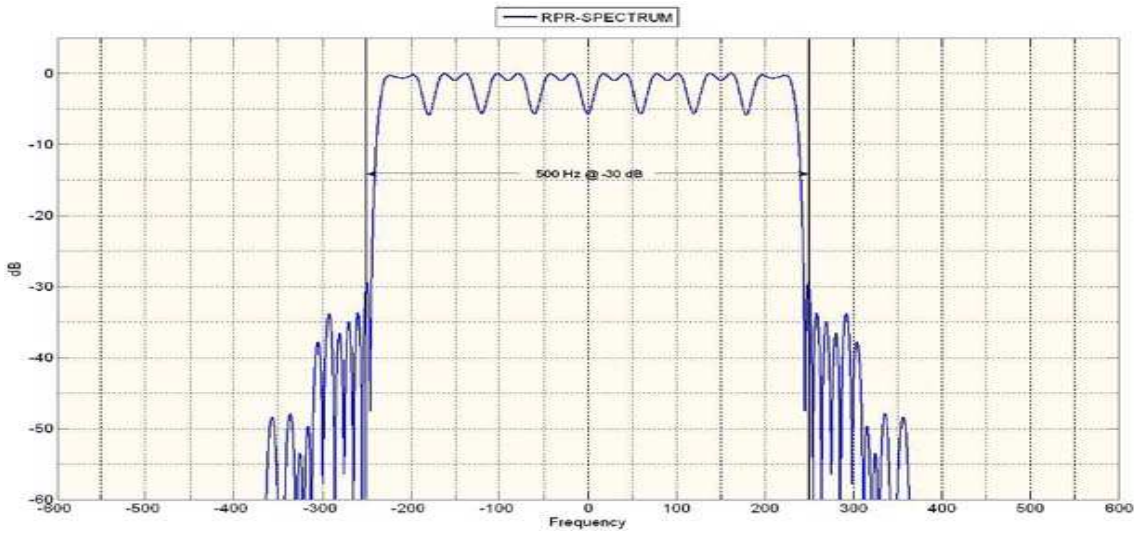
Despite this improvement of symbol duration-to-echo relation still ISI may interfere. To encounter that a pause is inserted behinde each symbol. This protective break is called Guard Interval.



Elimination of Intersymbol-Interference by usage of Guard Interval

The echo is now allowed to fade during the Guard Interval without breaking symbols that follow. Data stream ratio is nearly not effected but robustness against ISI substantialy improved.

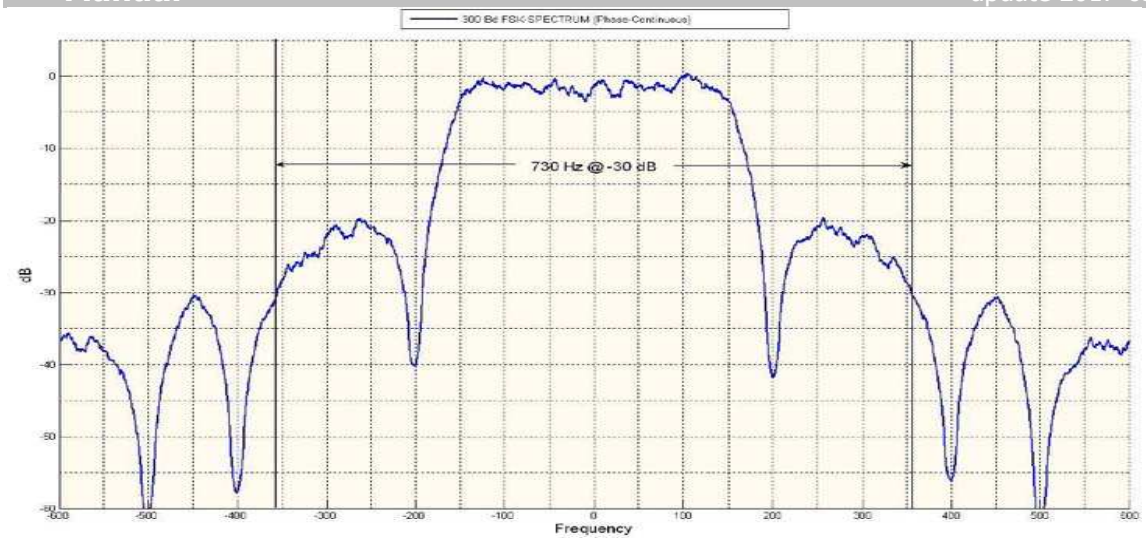
Anyway it is easy to imagine that realization of this method takes technical extravagance. To seperate the single subcarriers steep edge filters are needed.
That is why RPR uses a method called Orthogonal Frequency Division Multiplex (OFDM). Supported by digital signal processing steep edge filters are no longer required. RPR workes with 8 subcarriers with a 60 Hz tone gap. Average symbol length jumps to 20 ms in comparison to FSK with 3,3 ms. Without a doubt RPR can be called a multipath capable procedure appropriate for shortwave operation.



Spectum of RPR (graphic OE3MZC)

Regardless the 8 subcarriers spectrum of RPR is not wider than those ones of FSK300. The opposite is true: bandwidth is just 500 Hz.

In comparison find the FSK300 (old hf-packet) spectrum below. Bandwidth is significantly greater with a value of 730 Hz.



Spectrum of FSK300 (graphic OE3MZC)

The Problem of Channel Coding

Beside the discussed ISI multipath problem other uncertainties appear with APRS AX.25 and FSK operation: the missing channel coding.
In normal FSK-packet-radio-operation (same on VHF/UHF) a receiver rejects an error packet and requests a new transmission. Regarding the CRC-Checksum which is attached, an error packet is detected. This method is called ARQ (Automatic Repeat reQuest). It works fine with Packet Radio but when operating APRS this AX.25 automated request mechanism is overrided since we are transmitting unprotocolled (unproto) packets.

Just a tiny crack in the data packet makes it unusable. Receivers would detect it as an error packet and dump it. A lost transmission.

But even here RPR offers the solution with a suitable channel coding. This channel coding allows reveiver not only to detect an error but – up to a certain degree – to correct those themselves. This is possible by targeted reconstruction datas included in the package (Forward Error Correction). This method is good to correct single bit errors like caused by lightning and tiny band noise cracks.

But what happens when hole burst errors appear and complete blocks of related bits are lost? Not only 1 bit but i.e. a 10 bits group goes down the drain!? That cannot be corrected any more.

The trick then is the such called Interleaving: originally subsequent bits are scrabbled before transmission in such manner that they do not appear in their chronological order in the data block any longer.
Interleaving now produces out of 1 burst error a greater amount of single bit errors which then can be put together again by the Forward Error Correction.

In this way APRS-packets are protected effectively against transmission failures respectively in many cases can even be "repaired" by the receiving device.

intentionally left blank for editorial reasons

RPR-users Europe

[82] CCS7 / DMR-ID [39] [33]

Callsign	Operation	Remarks	email mobile	WLNK
DB1CH	RX gate	Christof	db1ch@gmx.de	no
DB2HTA	stationary	Herbert (Herby)	db2hta@yahoo.com	X
DC5KW	stationary	Hilmar	dc5kw@darc.de (262) 4357	no
DC6VA	stationary	Nicolai	dc6va@darc.de	no
DC7WOL	RX gate, digi	Wolfgang sysop DB0UAL	dc7wol@darc.de (262) 8160	no
DF1VK	stationary	Hermann	df1vk@darc.de	no
DF8HL	mobile, stationary	Bernd	df8hl@arcor.de	no
DG1BGS	gate	Stephan	dg1bgs@darc.de (262) 7261	no
DG2DAD	stationary	Walter	walter.michallek@freenet.de (262) 4238	no
DG9HR	gate,digi, (on request), mobile	Hartmut	dg9hr@darc.de (262) 2117	no
DH1TI	gate	Tobias	tobias.haber@t-online.de	no
DH3SF	mobile, stationary	Tom	at8friedrich@yahoo.com	X
DH5ABC	stationary	Matthias	dh5abc@darc.de	X
DH5DY	wx-stationary	Rainer	rainer@dh5dy.de	no
DH7AHK	stationary	Maximilian	dh7ahk@darc.de	no
DH8HP	gate, mobile	Hartmut	dh8hp@freenet.de (262) 4847	no
DJ0CU	stationary	Paul	pdharrison@rocketmail.com	no
DJ7UA	mobile, stationary	Mario	dj7ua@darc.de	no
DJ8KL	stationary	Klaus	dj8kl@dj8kl.de	no
DK2EZ LY2EZ	gate, digi, mobile	Uwe	moede@gmx.net	no
DK2OO	mobile	Reiner	rleuckel@gmx.net dk2oo@darc.de	X
DL1NZA	mobile	Hajo	dl1nza@gmx.de (262) 0100	no

DL2BWO DN4BAS	stationary	Wolfgang	dl2bwo@darc.de (262) 1106	no
DL2CST	stationary	Christian	dl2cst@gmx.de (262) 1164	X
DL3MSZ	stationary	Karl-Heinz	do1mkh@web.de	no
DL4DP	mobile	Dirk	dl4dp@gmx.de (262) 4059	no
DL5CG	gate, mobile	Andreas	DL5CG@Robust-Packet.net (262) 0026 dl5cg@gmx.net	X
DL5MCQ	stationary	Edgar	edgarschuell@web.de	X
DL5MET ex Z38D		Frank	dl5met@qsl.net	X
DL6MAA	gate, digi	Peter sysop DB0UAL	dl6maa@t-online.de	X
DL8BZ	mobile	Reiner	dl8bz@gmx.de	no
DL8RCB	stationary	Anatol	dl8rcb@gmx.de	no
DM4RW	gate	Robert	dm4rw@arrl.net	no
DO1HH	stationary	Jan	jtimmann@freenet.de (262) 2065	no
EI5HBB	stationary	Eoghan	ei5hbb@gmail.com	X
F1MHV DF1CHB	mobile	Cyril	f1mhv@free.fr (208) 9051 F1MHV (262) 4770 DF1CHB	X
F4AHV 6W7RV	mobile	Jean-François	jf.lorne@free.fr	no
F4FQN	stationary	Etienne	f4fqn66@gmail.com	X
G0HIX	stationary	Andy	g0hix@btopenworld.com	no
G0VNP	mobile	Bob	g0vnp@btinternet.com (234) 2090	X
G3UEQ	stationary	Andrew	g3ueq@pobroadband.co.uk (235) 2366	no
G4APL	stationary	Paul		no
G4IRX	gate	Nick	g4irx@nowindows.net (234) 1099	no
GM4WMM	gate	Stuart	gm4wmm@btinternet.com (235) 4052	no
HB9AUR	RPR RMS HB9AK	Martin	hb9aur@swiss-artg.ch	X
HB9DDF	gate	Christian	hc-retec@gmx.net	X

HB9FIX	stationary	Hans	hb9fix@bluewin.ch (228) 3059	no
HB9FKP	stationary	Patrick	hb9fkp@gmail.com (228) 3068	no
HB9FOU	stationary	Jean-Yves		no
HB9IJE	stationary	Dominique	(228) 1026	X
HB9JAQ	gate	Peter	hb9jaq@uska.ch (228) 3066	X
HB9MNP	gate	Ernst sysop HB9ZF-10	hb9mnp@hb9zf.ch (228) 8026	no
HB9TPR	stationary	Remo	hb9tpr@hispeed.ch (228) 8108 & 8027	no
IU4DTL	stationary	Francesco	iu4dtl@gmail.com (222) 4053	no
IW2OHX	gate	Marco sysop IQ2LB & IR2UFV	iw2ohx@iw2ohx.net (222) 2146	X
IZ0QWM	gate, mobile	Raffaello sysop IR0UGN-10	raffaello.dimartino@kwos.org (222) 0124	X
IZ1GCL	maritime mobile	Giuseppe	menga@polito.it	no
LA5VNA	stationary	Steinar	saanes@broadpark.no (242) 1032	X
M0HPP	mobile	Gerard 'Paul'	paul.fleming@tradewind35.co.uk (235) 2849	X
OE1CSC CN2CS	mobile	Clemens	clemens@schmikal.at (232) 1304	no
OE3MSU	gate, digi, mobile	Max sysop OE3XUR	oe3msu@kabsi.at (232) 3105	no
OE3MZC	mobile	Mike	oe3mzc@oevsv.at (232) 3401 & 3402	X
OE3RFA	mobile	Rudolf	oe3rfa@gmail.com M +4366473383744	no
OE5ERN	stationary	Erwin	oe5ern@arrl.net (232) 5141	X
OE7FTJ	stationary	Wolf	oe7ftj@oevsv.at (232) 7023	X
OE7TWI	mobile	Thomas	oe7twi@xoo5.at	X
OH6DL DL5NR	gate, mobile	Wolfgang	oh6dl@sral.fi dl5nr@darc.de	X
ON6YF	stationary	Didier	on6yf.didier@gmail.com	no
OZ1PMX 5P1PM	stationary	Peter	oz1pmx@gmail.com	X
PA3DFN	gate	Philip	philip@schroth.cx (204) 2003	no

PA3ECL	Gate	Rene	pa3ecl@amsat.org (204) 5062	no
PA3GJX	stationary	Jan	pa3gjx@amsat.org	X
PE0S	stationary	Steven	pe0s@ziggo.nl	no
PE1ITR	stationary	Rob	pe1itr@amsat.org (204) 5094	X
S51TA	maritime mobile	Ted (Tadej)	tadej.mezek@gmail.com	X
S57RA	stationary	Pavel	*open*	no
SA7SKY DF8LS	gate, mobile	Helge	helge@sa7sky.net M +46725488404 (240) 7094 SA7SKY (262) 2123 DF8LS	X
SM0RWO	stationary	Per	per@crusefalk.se	no
SM5RVH	stationary	Robert	sm5rvh@ssa.se (240) 5068	X
SM7DSE	stationary	Kent	kent.larsson@stherrestad.nu	no
SM7YBJ	stationary	Johann	hallhuber@hotmail.se	no
SV1UY	stationary	Demetre	sv1uy@yahoo.com (202) 1008	X

RPR-users outside Europe

[22] CCS7 / DMR-ID [9] [8]

Callsign	Betrieb	Bemerkungen	email	WLNK
AB1TZ	stationary	Mike	AB1TZ@Robust-Packet.net (312) 3005	no
AG6IF	gate, stationary	James	ag6if@arrl.net	no
C91PM	gate	Paulo	c91pm@yahoo.com	X
HS0ZIB G6JFY	gate	Simon	simonluttrell@yahoo.com	X
KB1EJH	gate	Carl RMS sysop (UHF)	kb1ejh@yahoo.com D-Star-Reg / CCS7 none	X
N1ZZZ VQ9ZZ	mobile	Jeremy	n1zzz@arrl.net (314) 2131	X
N3FCX	gate	Daniel	dan_n3fcx@yahoo.com	no
N7TTQ	gate	Jeffrey	*open*	no
PY4MAB	gate	Mauricio	py4mab@yahoo.com.br (724) 1018	no

UA9KDF	gate	Igor	ua9kdf@inbox.ru (250) 9002 & 9012	X
VA7DGP	gate	Donald	va7dgp@rac.ca	no
VE1YZ	gate	Neil RMS sysop	ve1yz@winlink.org	X
VE3XZT	gate	Dale	ve3xzt@rac.ca (302) 3434	no
VE6AB	mobile	Jerry	ve6ab@shaw.ca (302) 6074	no
VE6EN	gate	Andrew	ve6en@shaw.ca (302) 6042	no
VK2NA	stationary	David	vk2na@hotmail.com	no
VK3TBN	gate	Peter	vk3tbn@yahoo.com	no
W4VPI	gate	Anthony	w4vpi@excite.com	no
WA4ZKO	gate	Jeffrey sysop K4KPN-10 K4KPN (312) 1023 & 1024	wa4zko@outlook.com (312) 1022	X
W6KL	gate	David	w6kl@arrl.net (310) 6912	no
WB2LMV	gate	Glenn	wb2lmv@gmail.com	X
ZS6SS	gate	Selwyn	zs6ss@telkomsa.net	no