

P4dragon Firmware-Update

Description of the modifications / improvements

Firmware Version 2.10.00 (02/2015)

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Firmware Update Information on **P4dragon DR-7X00**

(P4dragon firmware 2.10.00, February 2015)

1.1 General information

The firmware 2.10 replaces the firmware 2.00 (and subsequent beta versions) and provides the new **Robust Packet Radio (RPR)** waveform. In addition, the new firmware allows for the integration of a secondary modem using the AUX port of the DR-7800. This option enables PACTOR and MIL-STD applications or the operation of a PC with a sound card “parallel” to a single transceiver. Several other improvements and corrections round off the new firmware.

2. New features

2.1 ROBUST PACKET RADIO (RPR)

General information

From firmware 2.10 upwards, the Dragon modems offer “Robust Packet Radio” (RPR) as an additional waveform for Packet Radio. RPR and PACTOR can also be operated “in parallel” via a single physical modem port (MAIN or AUX). This is mainly relevant for common “stand-by” operation.

However, it is important to note that the simultaneous use of the PTT and the transmit function of a transceiver will naturally cause collisions. If there is either an RPR or a PACTOR connection at the common RPR/PACTOR port, it is not advisable to make a simultaneous connection in the other mode. The modem itself does not disable this function.

If RPR is selected for the PR modulation at the main port (i.e. the PACTOR port), the FM-fax demodulator will be switched off. In practice, this restriction will normally be irrelevant.

Commands

No new commands are required for RPR. In the pac: menu, RPR is activated in the terminal mode by means of the baud rate command and in the host mode by means of the “%B” command. RPR allows the arguments **R300** and **R600**. R300 stands for speed level 1 and R600 for speed level 2 of the RPR waveform. See also the “Baudrate” command in the Dragon manual.

Examples:

```
pac: Baud R300
pac: Baud R600
%B R300
%B R600
```

The difference between R300 and R600 is only relevant for transmitting unproto packets (e.g. APRS beacons). In true AX.25 connections, the Dragon will automatically adapt the speed level to the current channel conditions.

The RPR level is set in the usual manner by means of the TXLevel command.

Example:

```
pac: TXLevel 400
```

This command sets a common transmission level for all Packet Radio waveforms. If only the RPR level is to be reset, the additional parameter “R” is allowed.

Example:

```
pac: TXLevel R 400
```

Display and LED information in RPR

DR-7800

- The DR-7800 displays “R1” or “R2” as the carrier detect symbol instead of “CD”, depending on the speed level currently being received.
- The symbol “TX”, which represents the current transmission activity, is extended to “TX1” or “TX2”, depending on the RPR speed level.

DR-7400

- **TFC/ERR** lights up in **red** when DCD is active at speed level 1 and in **orange** when DCD is active at speed level 2.
- **CON/ISS** lights up in **red** when an RPR signal is transmitted at speed level 1 and in **orange** when an RPR signal is transmitted at speed level 2.

Features of RPR implementation on P4dragon modems

In KISS operation with RPR modulation, Dragon modems (like the SCS DSPTNC/Tracker) maintain virtual connection lists so that, in KISS, the current speed level can be automatically adapted to match the channel conditions.

2.2 Connection of a secondary modem (to DR-7800)

From firmware version 2.10 upwards, it is possible to connect a secondary modem (e.g. a PC with a sound card or a MIL-STD modem etc.) to DR-7800 via the AUX port. The secondary modem and DR-7800 (e.g. PACTOR and RPR) use a single common transceiver which is connected to the MAIN port. PTT, audio-in and audio-out signals for the secondary modem are transferred between the MAIN port and the AUX port in order to allow the secondary modem to access the transceiver. However, native Dragon connections (PACTOR) always have priority over the secondary modem, i.e., PTT and audio-out signals are reliably suppressed as soon as a PACTOR connection (native Dragon connection) is made.

Additional commands

The following commands are available in the terminal mode (aud: menu):

COPY

Valid range: 0-1

Preset: 0

At setting 1, the audio-in signal (pin 4) is transferred from the MAIN port to the AUX port (pin 1) where it is available to a secondary modem. In addition, the reception signal is audible via the loud speaker connection (it is also transferred to the loud speaker amplifier). The audio signal is transferred virtually without modification, but the level is automatically adjusted by an AGC so that variations in volume may occur.

In order that a secondary modem can be connected, pin 11 serves as a PTT input (“active low”) at the TRX control port (Copy = 1). If this pin is set to ground level, the DR-7800 transfers the signal to the PTT output of the MAIN port which then becomes active and thus switches the applied PTT voltage against ground. In addition, when the secondary PTT is active, the audio-in signal from the AUX port (pin 4) is transferred to the audio-out pin (pin 1) of the MAIN port, i.e., the modulation signal from the secondary modem is transferred to the MAIN port.

In this way, Dragon and the secondary modem can both be connected to the transceiver by means of common wiring at the MAIN port. This function is only available when the Dragon is in stand-by mode; otherwise, the PTT input signal is ignored. (This is also true when the Dragon is in the aud: menu. Dragon does not regard this as a stand-by status.)

COPYGain

Valid range: 0-16

Preset: 0

By means of this command, it is possible to set the amplification of the audio signal which has been transferred from the AUX port to the MAIN port (modulation signal from the secondary modem). The amplification is calculated from the set value X as $\text{Gain} = X * 6 \text{ dB}$. Values greater than 0 are only necessary or useful when the secondary modem generates signal levels which are too low to generate the desired transmit output level.

AUXInput

Valid range: 0-1

Preset: 0

At setting 1, the audio-in signal for the AUX port is no longer read by pin 1 of the AUX socket, but by the MIC jack which is “more sensitive” than the direct AUX input and also has AGC, which means that even relatively high signal levels do not cause overdrive. However, this port is not really suitable for types of digital modulation which have a high proportion of amplitude modulation because signals may be distorted due to dynamic compression (caused by AGC).

If the MIC input (at Copy = 1) (secondary modem at the AUX socket) is used as the modulation input, it must be noted that AGC may also influence the effective transmission level.

If the AUX port and the MAIN port are to be generally swapped (aud: CHannel at 1), AUXInput is generally disregarded. In this case, the audio input is always at the relevant DIN-8 socket. The MIC input then has no general function.

3. Other improvements and corrections

- In RTTY operation, the auto decoder can now also demodulate a shift of approx. 85 Hz +/-10 Hz without compromise. This can be used, for example, to eavesdrop some RTTY channels (weather data) on long wave radio.
- Channel busy status is now correctly set when PMONitor (P3/P4 list mode) is active.
- New command sys: GPSspeed in Sys:menu, available parameters: 4800 and 9600. Default 4800. Defines the physical baud rate at the GPS/NMEA port. It is not normally necessary to reset the GPS/NMEA baud rate to 9600 Bd (only in exceptional circumstances, depending on the GPS device connected).
- During booting, all version numbers as well as the serial number of the modem are noted in the system log. The command "LOG READ" can now be augmented by a length argument and transmits a corresponding number of log bytes. Now, only a maximum of 10,000 characters are transmitted without an argument. "LOG READ BOOT" reads out the log from the time of the last boot.



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