Application Note

300 to 1200 Baud Upgrade Procedure

Introduction

DATRAN QRTU and eXcel RTU hardware can be cheaply and simply upgraded from 300 to 1200 baud base communications.

300bps is an obsolete technology and 1200bps provides a greater "bandwidth" or throughput of communications. QTech recommends that all remaining 300bps systems are upgraded to provide both protection from an obsolescence issue and achieve higher speed/throughput communications.

Please remember that a 1200 baud channel will need to be set up at the base station in the usual way.

You may also like to take this opportunity to consider an even higher bandwidth network utilising the DATRAN high speed data interface, either now or as a future migration option.

Background

Older DATRAN RTUs were originally supplied with a single dual baud modem chip that provided support for both 300 and 1200 baud operation. Changing the baud rate on these RTUs was a simple operation that only required the user to select the new baud rate from inside the configuration software.

Over time the manufacturer of these modem chips stopped producing them and newer RTU hardware is now released with separate chips installed depending on whether the unit is being sold as a 300 or 1200 baud module. All new RTUs are fitted with chip sockets so the chips can be swapped at any time to change the baud rate of the RTU. There are, however, some jumper settings and minor adjustments that need to be made to ensure correct operation.

Before performing any 1200 baud upgrades, you will need to order a suitable quantity of modem chips, QTech part number IC-FX604.

Chip and Jumper Locations – Q22

On a DATRAN II eXcel motherboard (Q22), the modem chip sockets are located adjacent to the sticker that displays the Q22's serial number. The sockets are arranged in an overlapping fashion, but you will quickly see there is space for two different size chips to be inserted. The smaller of the two chips is the 1200 Baud, while the longer one is the 300 Baud chip.
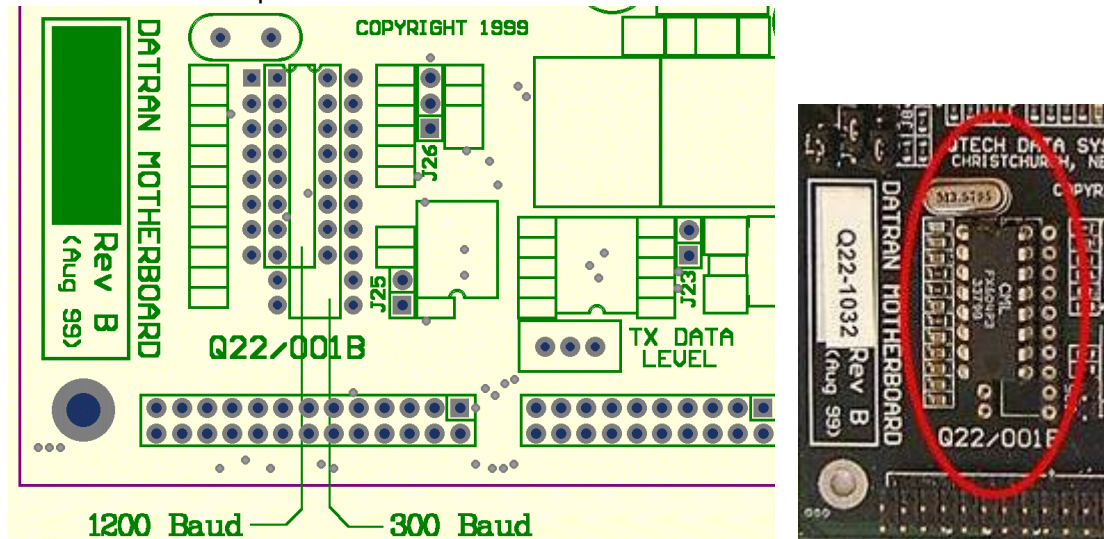
The diagram above show the locations on the left, and an installed 1200 baud modem on the right.

Carefully install the 1200 baud chip, QTech part number IC-FX604, making particular note of the orientation of pin 1.

There are some jumpers that will need to be set correctly for the different modes of operation. The possible options are:
- 1200 Baud
- 300 Baud Originate
- 300 Baud Answer

Normally a 300 baud base station comms channel will be set to 300 Bd Originate so 300 Baud Answer is almost always used for normal 300 Baud communications with a DATRAN Base Station.

However, it is possible that in some circumstances the RTU will have to be set to 300 Baud Originate, for example, when the RTU is communicating with a Q37 comms module rather than a base station if the comms module is set for 300 Baud Answer.

Jumper Settings – Q22

After using the diagram on the previous page to locate the jumpers, the following settings are needed for the various comms modes:

| FX604 – 1200 Baud Modem			
	J23	J25	J26
1200 Baud	Open	Open	1 & 2
MC145443 – 300 Baud Modem			
	J23	J25	J26
300 Baud Ans	Install	Install	2 & 3
300 Baud Orig	Install	Open	2 & 3

Note – In the diagram above Pin #1 on each jumper is indicated by a grey box around it. For Jumper 26 position 1&2 would mean that the jumper was connected such that it shorted the bottom two pins in the diagram.

QRTU

The latest version of the QRTU motherboard (Q20), version 1.6a is also fitted with this dual-chip socket arrangement. The chips and jumpers can be located adjacent to the small audio transformer on the Q20 board, close to the connectors that the CPU attaches to. The jumper numbers are different, but the instructions on their settings are silk-screened onto the Q20 board itself. All previous versions of Q20 are fitted with the older dual-baud chip and no jumper changes are necessary.

Q90 Configuration and setting the Tx Audio Level

Once the physical jumper settings have been changed Q90 needs to be used to instruct the RTU to start using the new baud rate. This can be done on the communications screen, under the FSK Modem Section.
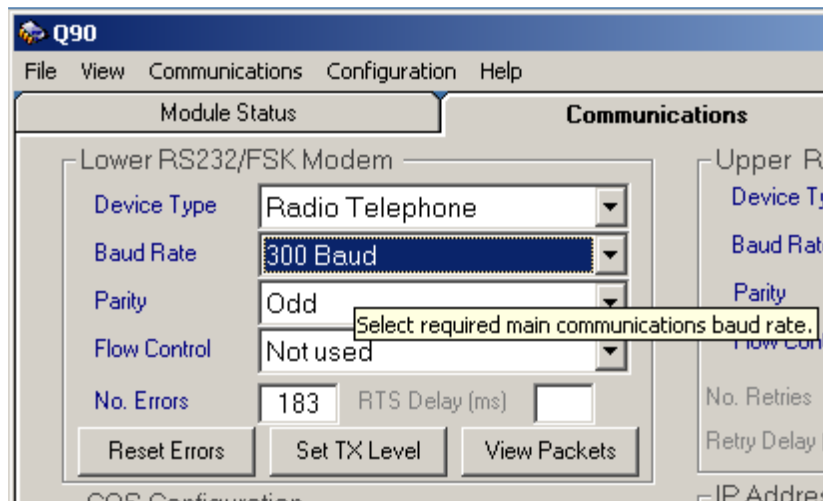
After the appropriate baud rate has been selected, the last thing that needs to be done is to adjust the transmit audio level out of the RTU. This is necessary because the two different types of modem chips have different gain characteristics.
This should also be checked every 12 to 24 months as part of planned maintenance checks as the level can drift over time.

The **Set Tx level** button in the screenshot above puts the RTU into a mode where it transmits a constant test tone so that the audio level can be adjusted. Note that if the RTU has just been reset, it will still attempt to do its initial COS message and retries

even if this mode is activated, so it is advisable to either let the RTU complete its retry attempts or adjust the number of short retries so it does not interfere with the test.

To test and set the Tx audio level, the RTU must be connected to a device that provides a 600 Ω load across the audio lines in the radio interface cable.
The RMS value of the signal across the audio lines is then measured and adjusted using the small potentiometer adjacent to J23, labelled **TX DATA LEVEL**, as shown below:
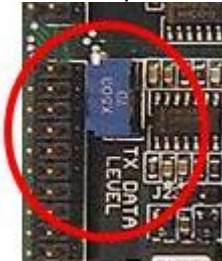
The level should be adjusted until the signal is: **-3dBm, or 547mV.**

The audio lines in a standard QTech radio interface cable with a circular DIN-6 connector are: Pin 1 - blue, Pin 2 - white.

An in-line test box that provides for easy connection into a multimeter and a push-button to force the radio to transmit can be provided by QTech on request.

Migrating a system from 300 to 1200 baud

Arguably, the easiest way to approach this migration is to set up a second channel at the base station. Whilst this may for a short period, double up on the required hardware, the hardware that ultimately gets removed can be put in to "system spares".