



# DATA RATES AND SYMBOL RATES

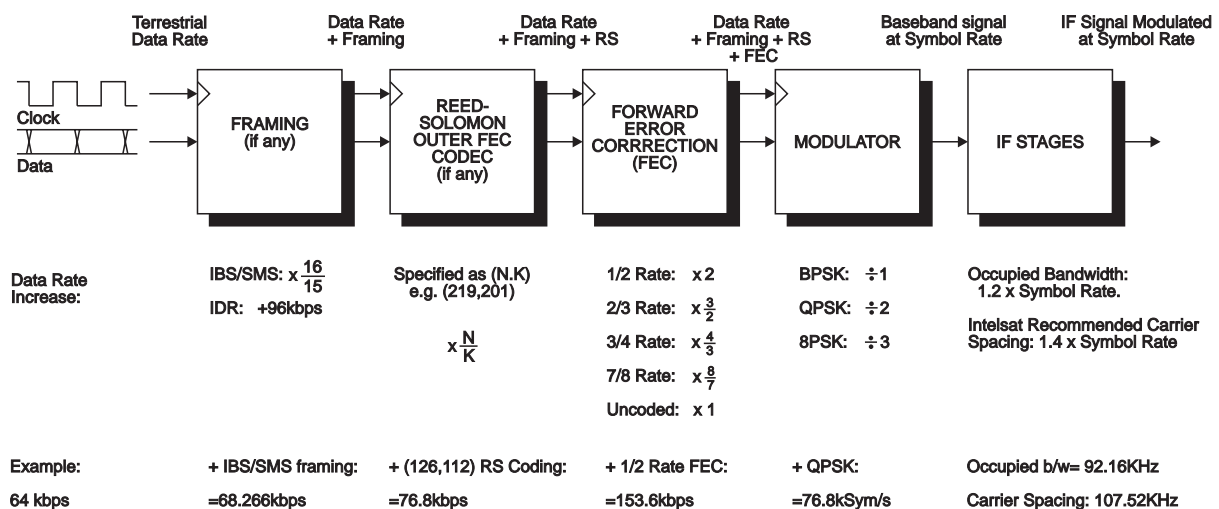
## NOTES ON DATA RATES & SYMBOL RATES

The normal constraint for a modem is the range of *Symbol Rates* over which the modem can operate correctly. The Symbol Rate range however is not of initial interest to most modem users, as they first need to know if the modem can operate at the terrestrial *Data Rate* they require. This section briefly explains the relationship between Data Rates and Symbol Rates.

The **Data Rate** is normally the frequency of the clock used on the terrestrial port however if Drop/Insert is active the Data Rate is 64kbps times the number of timeslots dropped/Inserted.

As the P300 Modem use PSK (Phase Shift Keying) the **Symbol Rate** is the rate of *phase changes* on the I.F. signal. Each phase change represents a new symbol to the demodulator, and depending on the modulation scheme that symbol may convey one (BPSK), two (QPSK), or three (8PSK) bits of information.

The diagram below shows how the symbol rate is built up from the data rate.



You will see that with 1/2 rate FEC and QPSK (a common combination), the Symbol Rate is the same as the Data Rate (assuming no Framing or Reed-Solomon). This is a useful combination to check on any data sheet, as this will give you the Symbol Rate limits of the modem, from which the Data Rate limits in all other modes and combinations can normally be derived.