500MHz AD8307 Powermeter Software Description.

This program assumes you are using a PIC12F675.

The power meter acts as an I2C slave device, but because the PIC12F675 does not have hardware I2C slave support it is done in software.

The main loop of the program continuously reads the voltage from the AD8307 and converts it to a power reading and places the result into one of two buffers.

All I2C requests are handled by an interrupt service routine, which reads the power result from one of the two buffers.

Once the main routine has filled a buffer it flags that the buffer contains a valid power reading that the interrupt service routine can use, the main routine then starts filling the other buffer with a new power reading.

This way, the interrupt service routine always has access to a valid power reading.

The voltage from the AD8307 is a log reading of the power (dBm). The main routine
uses the log reading for all its calculations, but if required it can convert the log result of the power (dBm) to a linear result (Watts or Volts) using a lookup table.

The Watts conversion has a .1 dB resolution.
The Volts conversion has a .2 dB resolution.

This means the dBm results are the most accurate, followed by Watts, with Volts being the least accurate.

This power meter can be used with SweepGen v1.00 to v2.00.

7GHz AD8307 Powermeter Software Description.

This program assumes you are using a PIC12F675.

The power meter acts as an I2C slave device, but because the PIC12F675 does not have hardware I2C slave support it is done in software.

The main loop of the program continuously reads the voltage from the LTC5508 and converts it to a power reading and places the result into one of two buffers.

All I2C requests are handled by an interrupt service routine, which reads the power result from one of the two buffers.

Once the main routine has filled a buffer it flags that the buffer contains a valid power reading that the interrupt service routine can use, the main routine then starts filling the other buffer with a new power reading.

This way, the interrupt service routine always has access to a valid power reading.

This program is based on the AD8307 power meter software PowerMtr.ASM
Because of the limited code space of the PIC12F675 (only 1024 bytes) and the nonlinear nature of the LTC5508, (the V out is not a linear relation to the I/P power, the output changes with frequency and the matching between LTC5508 chips is
not very good. See the LTC5508 data sheet.) some functions of the power meter

had
to be sacreficed to fit the program into the PIC12F675.

The main changes are,

1) There are only 5 memories on the 7GHz power meter.
   Because the output from LTC5508 changes with frequency, assosiated with each memory is a lookup table to convert the LTC5508 O/P to the correct I/P power. Each lookup table has 17 power measurements made 2.5 dB apart from -27.5 dBm to 12.5 dBm. There is only anough EEPROM on the PIC12F675 for 5 memories, each with offset setting, attenuator setting and the 17 step power lookup table. The user is able to calibrate each memory at any frequency in the range
   0.3GHz to 7.0GHz. You can also save the frequency (2 digit) of the lookup table, this will be displayed as the memory number on the Sweep Gen LCD display. ie 0.3G, 1.2G 2.4G etc.
   The default tables corrospond to measurements made at 5 frequencies on a prototype power meter at 0.5G, 1.2G, 2.4G, 3.4G and 5.7G.

2) The calibration slope and calibration offset functions that were used with the
   AD8307 have been changed and are now used to enter the 17 step lookup tables. The offset and attenuator settings for each of the 5 memories are still avaliable.

3) The LTC5508 has a limited I/P range, -32 to +12 dBm. (not really useful below -27.5 dBm.
   The offset and attenuator settings for each of the 5 memories can be used to make allowences for an attenuator or amplifier fitted to the power meter input. This would allow the power meter to be used over a different I/P range.
   ie. if you wanted to do measurements at about +18 dBm, fitting a 20 dB attenuator, and adjusting the attenuator setting to 20 dB would allow the power meter to be used over the range -7.5 to +32 dBm.

5) The dBm power reading is rounded to 0.2 dB resolution.
   The Watts conversion has a .2 dB resolution.
   The Volts conversion has a .4 dB resolution.

   This means the dBm results are the most accurate, followed by Watts, with Volts
   being the least accurate.

This power meter can be used with SweepGen v2.00.

SweepGen v2.00 version has some minor changes to simplify the use of the LTC5508 7GHz power meter, and includes setup screens required for calibration.