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Using the EIP 575B/578B Source Locking Counters with the HP 8350A/B and Its Family of Plug-ins

SCOPE: This document describes methods for using the EIP 575B/578B to phase lock the HP8350A and its family of plug-ins.

The HP 8350A with its 83XXX series plug-ins present some new challenges to the user who wants to combine them with our 575B and 578B counters.

The symptoms of the problems are no lock with the CW FILTER on and a very unstable frequency reading when locked with the CW FILTER off. If you were to look at the spectrum of the locked signal, it would have a large amount of residual FM.

These problems are actually caused by two things:

1. HP uses a crossover scheme on their FM input to produce linearity over frequency of modulation. This causes the low frequency modulation to be applied to the main coil while the higher modulation rates are AC coupled to the FM coil in the YIG oscillators.
2. When the large CW FILTER capacitor is removed from the YIG tuning circuit the residual FM on the output signal increases dramatically.

These problems can be overcome through the following procedures:

1. Set the A3S1 position 6 to the "1" state to dc couple the FM input on the HP sweeper plug-in. The A3S1 switch is on the top left hand side of the plug-in. (See operating manual supplied with plug-in.) This setting allows the CW filter to remain on during phase lock, thus producing a cleaner signal. This is all that is required to phase lock with no coarse tune.
2. For coarse tuning, short A8 K1 pins 1,14 to pins 7,8 to keep the CW FILTER on when the sweeper is in an external sweep mode. A8 K1 is the relay that switches the CW FILTER in and out of the circuit. Normally the CW FILTER is disabled in the sweep mode because it slows down the sweep function, but during phase lock it is desirable to have the CW FILTER on to reduce the residual FM in the sweeper.

SOURCE LOCKING THE HP 8350A WITH THE HP 83592A PLUG-IN

The first set of instructions are for phase lock only, while the second set of instructions are for phase locking with coarse tune.

1. Phase Lock Only (No Coarse Tune)

- A. Set A3S1 position 6 to the "1" state (pushed back). This causes the FM input to be directly coupled with a sensitivity of -20 MHz/volt. See page 3-16 of the HP 8350 manual.
- B. Connect a BNC cable from the PHASE LOCK OUT connector on the rear panel of the 575B/578B counter to the FM INPUT on the rear panel of the HP 8350A.
- C. To phase lock the sweeper, the counter needs a sample of the RF signal. Using a coupler or power splitter and a cable, connect a sample of the RF output from the sweeper to the appropriate band on the 575B/578B counter.
- D. Set the switches on the HP 8350A as follows:
 1. FREQUENCY SWEEP MODE CW
 2. INSTRUMENT STATE X
 3. FREQUENCY/TIME X
 4. SWEEP TRIGGER X
 5. SWEEP X
 6. SQUARE WAVE MODULATION OFF
 7. RF ON
 8. CW FILTER ON
 9. ALC X
 10. POWER SWEEP AS LONG AS POWER
MINIMUM IS >SENSITIVITY
- E. Set the frequency output of the sweeper to within 20 MHz of the desired frequency and instruct the counter to phase lock.

EXAMPLE: To phase lock the sweeper at 10 GHz:

1. Adjust the sweeper to within 20 MHz of 10 GHz.
2. Press: LOCK FREQ (Key # 3 on the 575B/578B)
10 (Frequency)
GHz (Frequency terminator)

2. Coarse Tune and Phase Lock

- A. Set A3S1 position 6 to the "1" state (pushed back). This causes the FM input to be directly coupled with a sensitivity of -20 MHz/Volt. See page 3-16 of the HP 8350 manual.
- B. Place a shorting clip on A8 K1 pins 1,14 to pins 7,8. (See Note.)
- C. Connect a BNC cable from the PHASE LOCK OUT connector on the rear panel of the 575B/578B counter to the FM INPUT on the rear panel of the HP 8350A.
- D. Connect a BNC cable from the COARSE TUNE OUT connector on the rear panel of the 575B/578B counter to the SWEEP IN/SWEEP OUT connector on the front or rear panel of the HP 8350A.
- E. To phase lock the sweeper, the counter needs a sample of the RF signal. Using a coupler or power splitter and a cable, connect a sample of the RF output from the sweeper to the appropriate band on the 575B/578B counter.
- F. Set the switches on the HP 8350A as follows:

1. FREQUENCY SWEEP MODE	START-STOP, DELTA F
2. INSTRUMENT STATE	X
3. FREQUENCY/TIME	X
4. SWEEP TRIGGER	X
5. SWEEP	EXTERNAL
6. SQUARE WAVE MODULATION	OFF
7. RF	ON
8. CW FILTER	X
9. ALC	X
10. POWER SWEEP	AS LONG AS POWER MINIMUM IS >SENSITIVITY

- G. Press the LOCK FREQ key on the 575B/578B and enter the desired frequency.

EXAMPLE: To phase lock the sweeper at 10 GHz:

Press: LOCK FREQ	(Key # 3 on the 575B/578B)
10	(Frequency)
GHz	(Frequency terminator)

NOTE:

With A8 K1 shorted out in this fashion, the CW FILTER is effectively ON all the time; therefore, the unit will not be able to be swept rapidly. To use the frequency sweep feature on the HP 8350A, remove the short on A8 K1.



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