119-1029-00

TESTING CRYSTAL FILTERS FOR Ø LOCKS

A. Equipment Required

1 492/492P Spectrum Analyzer with Ø locked 2nd LO or 496/496P
1 Ø Lock Strobe test fixture
1 Ø Lock Crystal test jig 1 portable oven

B. Set Up

a. Hook up Ø lock strobe test fixture and crystal test jig to 492 Spectrum Analyzer as shown in Fig. 1 A & B and set switch to position "B".

b. Turn on power to 492 and allow 30 minute warm-up.

c. Set 492 front panel as follows

READOUT	- ON	ΔF	- OFF
GRAT. ILLUM.	- ON	CAL	- OFF
BASELINE CLIP	- OFF	VIDEO FILTER	- OFF
TRIGGERING	- FREE RUN	DIGITAL STORAGE	- VIEW A, VIEW B ON
SINGLE SWEEP	- OFF	AUTO RESOLUTION	- ON
TIME/DIV	- AUTO	MIN RF ATTEN	- 0dB
EXT. MIXER	- OFF	REFERENCE LEVEL	- -20dBm
MIN. NOISE	- OFF	FREQ. SPAN/DIV	- MAX
FINE	- OFF	FREQUENCY RANGE	- 0-4.2 (0-1.8 OPT. 1)
PULSE STRETCHER	- OFF	CENTER FREQUENCY	- 100MHz
VERTICAL DISPLAY	- 10dB/Div	PEAK AVERAGE	- CW

C. Test Crystal Filters - Preliminary Test

a. Insert crystal to be tested in test jig and throw switch to position "A".

b. Set 492 freq. span/div to 1MHz keeping the 100MHz signal at center screen with the center frequency control.

c. Depress the degauss pushbutton and center the 100MHz signal with the center frequency control.

d. Turn on 492 cal pushbutton and adjust center frequency control for a frequency readout of 100MHz.

e. Turn off cal pushbutton.

f. Set 492 frequency span/div to 500KHz and resolution bandwidth to 1MHz.

g. Adjust log cal for an 8 div. signal.

h. Depress 2db/div pushbutton and adjust amp cal for an 8 div signal.

i. Repeat steps g & h until signal amplitude is 8 div and does not change when switching between 10db/div and 2db/div.

j. Set 492 vertical display to 10db/div and set auto resolution button on.

k. Set frequency span/div to 5KHz keeping the signal at center screen with the center frequency control.

l. Set reference level to -30dbm and set min noise pushbutton to on.

m. Set signal on 1st division from left grat of CRT.

n. Set wide video filter on.

o. Check crystal filter display for any signs of noise bursts on signal or noise floor; any rise or fall in the noise floor level from one sweep to the next; shoulders on the signal or signal sidebands. Observe signal for 8 to 12 sweeps. If you suspect a filter to be bad or borderline, allow the filter to sweep and see if it breaks down within another 12 sweeps, or get the opinion of an engineer. If the filter is bad, reject it and mark an "X" on the bottom side. If it is good, mark "OK" on the bottom side and set it aside for cycle when you are through testing. Cycle all good crystals for 3 days. See fig. 2A and 2B for examples.

p. Set phase lock pushbutton off and when the light goes off, set switch on test fixture to position "B".

q. Remove crystal from test jig and insert next crystal to be tested.

r. Place switch on test fixture to position "A" and depress phase lock pushbutton on. When light goes on, re-position the signal and test crystal as before.

D. Testing Cycled Crystals

a. After a three day cycle period, test crystals with same set-up and test as in steps B and C.

b. Keep crystals hot in portable oven and test each crystal while hot. Place a crystal on the test jig and set frequency span/div to 5KHz keeping signal at center screen with the center frequency control.

c. Set reference level to -30dbm and set min. noise pushbutton to on.

d. Set signal on 1st division from left grat of CRT.

e. Set wide video filter on.

f. Check crystal filter display on 492 as the crystal cools down to operating temperature and note any changes in display. Allow at least 24 sweeps, as the crystal may not show signs of any problems until it has cooled down to it's operating temperature. If a crystal is real bad, it will show itself to be bad in the first 6 to 12 sweeps or less.

g. Look for same problems as with uncycled crystals and reject and mark with an "X" on bottom side of all bad crystals. See Fig. 2A and 2B for examples.

FIG. 1A

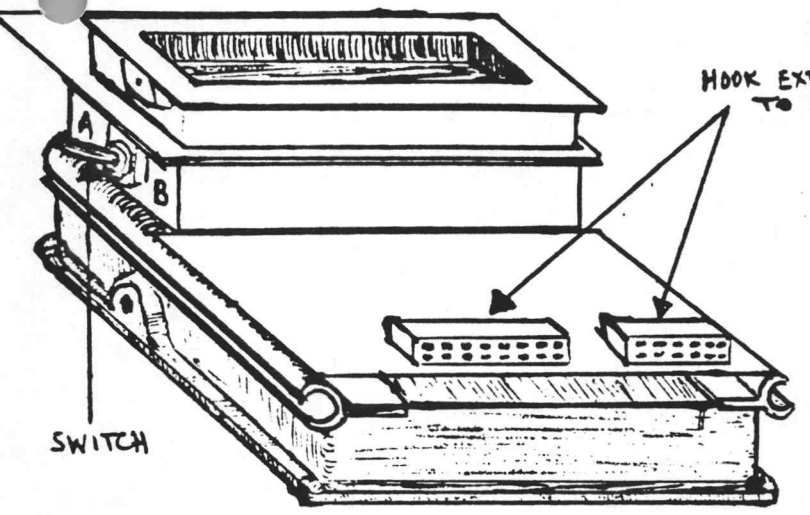

HOOK EXTENDER CABLES FROM THESE CONNECTORS TO 492 ⌀ LOCK
A
B
SWITCH

FIG. 1B

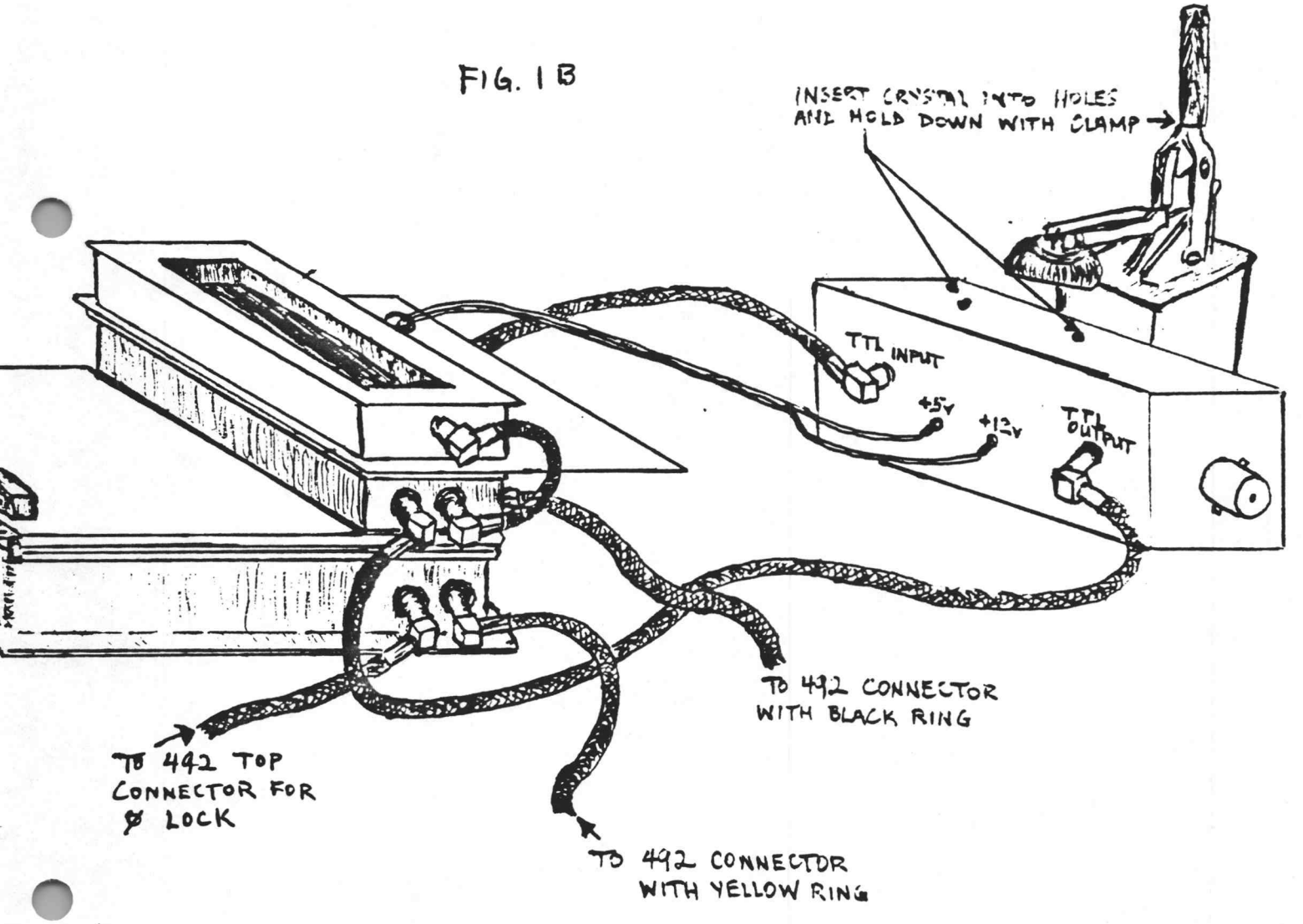
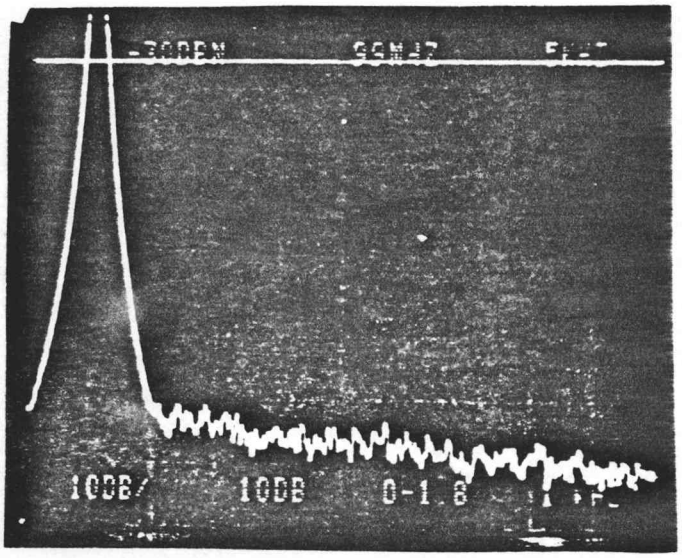
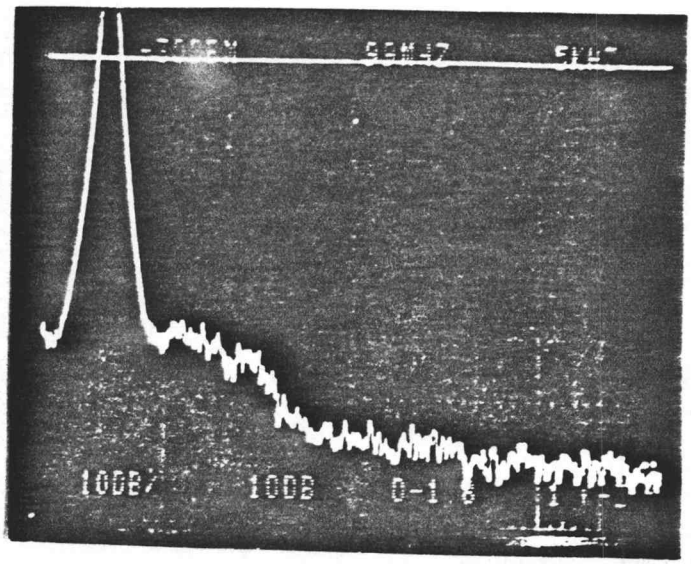

INSERT CRYSTAL INTO HOLES AND HOLD DOWN WITH CLAMP
TTL INPUT
+5v
+12v
TTL OUTPUT
TO 492 CONNECTOR WITH BLACK RING
TO 492 TOP CONNECTOR FOR ⌀ LOCK
TO 492 CONNECTOR WITH YELLOW RING

FIG. 2 A



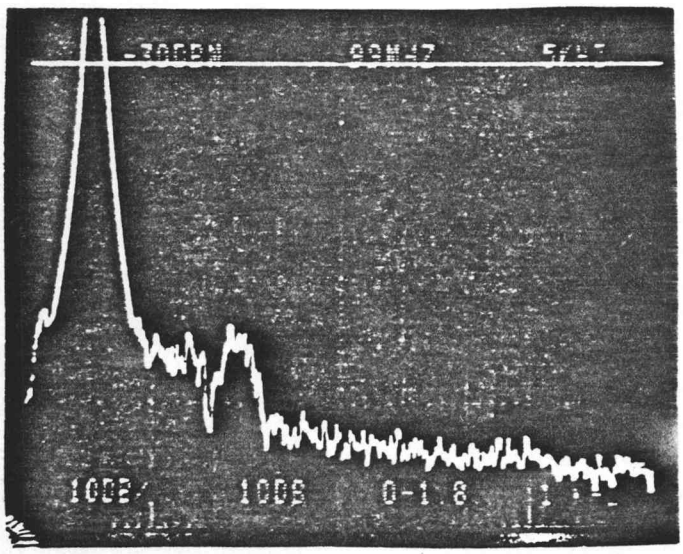
ACCEPTABLE



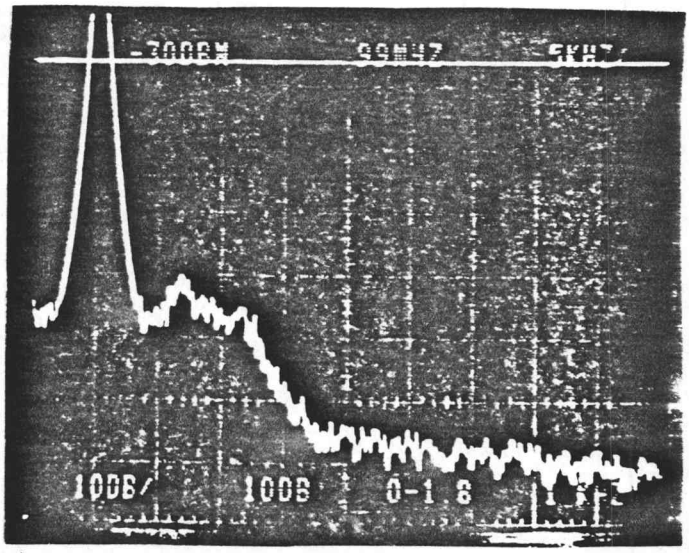
REJECT

Shoulder and noise floor of signal should not vary more than 4dB (2 minors) from one crystal to another typically. The shoulder on the signal on the right is unsatisfactory. Also, the shoulder and noise floor should not vary in level from one sweep to another on any one crystal being tested. It should be consistant.

FIG. 2 B



REJECT



REJECT

Examples of noise during a sweep interval, and unsatisfactory shoulder with noise during a sweep interval.