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# MEMORANDUM

DATE: January 24, 2019

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| TO: | SQZ team |
| FROM: | Daniel Sigg, Marc Pirello |
| SUBJECT: | Modifications to the Voltage Controlled Crystal Oscillator |
| Refer to: | E1900017-v1 |

This document lists the modifications to the Voltage Controlled Crystal Oscillator Source board, [D1700017-v2](https://dcc.ligo.org/LIGO-D1700017), to update it to revision 3, see also [E1800041-v1](https://dcc.ligo.org/LIGO-E1800041). The chassis assembly drawing is [D1600500](https://dcc.ligo.org/LIGO-D1600500).

**Board modifications**

Change 1 (update to revision 2):

Adding a notch at 40 kHz to cancel a resonant feature in OCXO (500-30558 and 500-31474) tune.

For a revision 1 PCB, this circuit is patched onto the location of C15.

C56 → 15 nF

L1 → 1 mH

R63 → 49.9 Ω

Change 2:

Replace the OCXO with an AT cut crystal, Wenzel P/N 500-31474, to increase the tuning range.

U15 → OCXO, Wenzel 500-31474

Change 3:

Remove the odd gain in the input path.

R9 → 4.99 kΩ

R28 → 49.9 kΩ

R39 → 24.9 kΩ

Change 4:

Remove the 1.6 Hz/40 Hz pole-zero pair at the input to the OCXO.

R25 → NL

R30 → NL

R20 → 100 Ω

C46 → NL

C47 → NL

Change 5:

Remove the corresponding compensation in the readback path.

R43 → NL

C60 → NL

C47 → NL

R66 → 499 Ω

BOM (for 4 units, changes 1 through 5):

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| **Qty** | **Item** | **Distributor** | **Description** |
| 4 | 500-31474 | Wenzel | U15; OCXO |
| 10 | 1812LS-105XJLC | Coilcraft | L1; 1mH |
| 10 | 81-GRM3195C1H153FA1D | Mouser | C56; 15nF, 1% |
| 10 | P49.9DACT-ND | Digi-Key | R63; 49.9 Ω |
| 10 | P100DACT-ND | Digi-Key | R20; 100 Ω |
| 10 | P499DACT-ND | Digi-Key | R66; 499 Ω |
| 10 | P4.99KDACT-ND | Digi-Key | R9; 4.99 kΩ |
| 10 | P49.9KDACT-ND | Digi-Key | R28; 49.9 kΩ |
| 10 | P24.9KDACT-ND | Digi-Key | R39; 24.9 kΩ |