

Bibliografia

- [1] BATHE, K. J.. **Finite element procedures.** Prentice Hall, 1995.
- [2] BERKOFF, T. A.; KERSEY, A.. **Experimental demonstration of a fiber bragg grating accelerometer.** IEEE Photonics Technology Letters, 8:1677–1679, 1996.
- [3] BETZ, D.; STAUDIGEL, L. ; TRUTZEL, M. N.. **Test of a fiber bragg grating sensor network for commercial aircraft structures.** 15th Optical Fiber Sensors Conference Technical Digest (OFS), p. 55–58, 2002.
- [4] CASTRO, F. A.; CARNEIRO, S. R. M.; LISBOA, O. ; CARRARA, S. L. A.. **2-mode optical fiber accelerometer.** Optics Letters, 17:1474–1475, 1992.
- [5] COOK, R. D.. **Finite element modeling for stress.** John Wiley and Sons Ltd, 1995.
- [6] VALENTE, L. C. G.; NUNES, L. C. S.; BRAGA, A. M. B.; RIBEIRO, A. S.; REGAZZI, R. D. ; TRIQUES, A.. **Técnicas de leitura para sensores a fibra óptica baseados em redes de bragg.** 6 Conferência sobre tecnologia de equipamentos, 2002.
- [7] DIANA, G.. **Modelling of aeolian vibration of single conductors: assessment of the technology.** Électra, 181:53–69, 1998.
- [8] ERVIK, M.. **Report on aeolian vibration.** Électra, 124, 1998.
- [9] FRIEBELE, E. J.. **Fiber bragg grating strain sensors: present and future applications in smart structures.** Optics and Photonics News, p. 33–37, 1998.
- [10] IEE COMMITTEE. **Standardization of conductor vibration measurements.** IEEE Transactions on power apparatus and systems, 85:10–22, 1966.
- [11] INMAN, J.. **Engineering Vibration.** Prentice-Hall Inc., 1996.

- [12] VALENTE, L. C. G.; BRAGA, L. C. S. N. M. B.; RIBEIRO, A. S.; REGAZZI, R. D.; ECKE, W.; CHOJESTZKI, C. ; WILLSCH, R.. Combined time and wavelength multiplexing technique of optical fiber grating sensor arrays using commercial otdr equipment. *IEEE Sensors Journal*, 2003.
- [13] JONES. Accelerometer featuring fiber optic bragg grating sensor for providing multiplexed multi-axis acceleration sensing. United States Patent US 6.175.108 B1, 2001.
- [14] KALENIK, J.; PAJAK, R.. A cantilever optical-fiber accelerometer. *Sensors and Actuators*, 68:350–355, 1998.
- [15] KERSEY, A. D.; ET AL. Fiber grating sensors. *J. Lightwave Technology*, 15(8):1442–1463, 1997.
- [16] KIMURA, M.; TOSHIMA, K.. Vibration sensor using optical-fiber cantilever with bulb-lens. *Sensors and Actuators*, 66:178–183, 1998.
- [17] LEIDERMAN, R.; VALENTE, L. C. G.; BRAGA, A. M. B.; TAVARES, R. H. ; GAMA, A. L.. Low cost fiber bragg grating strain measurement system. Proceeding of the SEM Annual Conference, p. 452–455, 2000.
- [18] LOPEZ-HIGUERA, J.; MORANTE, M. ; COBO, A.. Simple low-frequency optical fiber accelerometer with large rotating machine monitoring applications. *Journal of Lightwave Technology*, 15:1120–1130, 1997.
- [19] MCCONNELL, K.. Vibration testing - theory and practice. John Wiley and Sons, 1995.
- [20] MEYDAN, T.. Recent trends in linear and angular accelerometers. *Sensors and Actuators*, 49:43–50, 1997.
- [21] MITA, A.; YOKOI, I.. Fiber bragg grating accelerometer for buildings and civil infrastructures. Proceedings of Smart Structures and Materials 2001, SPIE Proceedings 4330, 2001.
- [22] MORIKAWA, S. R. K.; RIBEIRO, A. S.; REGAZZI, R. D.; VALENTE, L. C. G. ; BRAGA, A. M. B.. Triaxial bragg grating accelerometer. The International Conference on Optical Fiber Sensors, 3, 2002.
- [23] NUNES, L. C. S.. Análise da técnica de demodulação baseada em filtros fixos para interrogação de sensores a rede de bragg em

- fibras óticas. Tese de doutorado, Departamento de engenharia mecânica, PUC-Rio, 2004.
- [24] NUNES, L. C. S.; VALENTE, L. C. G. ; BRAGA, A. M. B.. Analysis of a demodulation system for fiber bragg grating sensors using two fixed filters. *Optics and Lasers Engineering*, 2004.
- [25] POFFENBERGER, J. C.; STWART, R.. Differential displacement and dynamic conductor strain. *IEEE Transactions on power apparatus and systems*, 84:281–289, 1956.
- [26] WEBSTER, S.. *Mechanical vibrations*. Addison-Wesley Publishing Company, 1995.
- [27] REDDY, J. N.. *An introduction to finite element methods*. McGraw-Hill Book Company, 1984.
- [28] RIBEIRO, A. S.. Caracterização metrológica de acelerômetro triaxial utilizando redes de bragg como elementos sensores. Dissertação de mestrado, Departamento de engenharia mecânica, PUC-Rio, 2001.
- [29] SPAMMER, S.; FUHR, P.. Temperature insensitive fiber optic accelerometer using a chirped bragg grating. *Optical Engineering*, 39:2177–2181, 2000.
- [30] STORGAARD-LARSEN, T.; BOUWSTRA, S. ; LEISTIKO, O.. Optomechanical accelerometer based on strain sensing by a bragg grating in a planar waveguide. *Sensors and Actuators*, 52:25–32, 1996.
- [31] STRUB, H.. Guide to vibration measurements on overhead lines. *Électra*, 162:125–137, 1995.
- [32] TAKAHASHI, N.; YOSHIMURA, K.; TAKAHASHI, S. ; IMAMURA, K.. Characteristics of fiber bragg hydrophone. *IEICE Trans Electron*, (3):275–281, 2000.
- [33] THERIAULT, S.; HILL, K.; BILODEAU, F.; JOHNSON, D.; ALBERT, J.; DROUIN, G. ; BELIVEAU, A.. High-g accelerometer based on an in-fiber bragg grating sensor. *Optical Rev.*, 4:145–147, 1997.
- [34] TODD, M.; JOHNSON, G.; ALTHOUSE, B. ; VOHRA, S.. Flexural beam-based fiber bragg grating accelerometers. *Optical Rev.*, 10:1605–1607, 1998.

- [35] UNIVERSITY OF CALIFORNIA BERKELEY. **Tipos de acelerômetros.** Notas de aula. Disponível em: <<http://bits.me.berkeley.edu/beam/index1.html>>, 2000.
- [36] WEBSTER, J.. **The measurement, instrumentation and sensors handbook.** CRC Press - IEEE Press, 1999.
- [37] WEHRLE, G.; NOHAMA, P.; KALINOWSKI, H. J.; TORRES, P. I. ; VALENTE, L. C. G.. **A fiber optic bragg grating strain sensor for monitoring ventilatory movements.** Meas. Sci. Technology, 12:805–809, 2001.
- [38] YAMATE, T.; RAMOS, R. T.; SCHROEDER, R. J.; MADHAVAN, R.; BALKUNAS, S. C. ; UDD, E.. **Transversily loaded bragg grating pressure transducer with mechanically enhancing the sensitivity.** 15th Optical Fiber Sensors Conference Technical Digest (OFS), p. 535–538, 2002.

A

Apêndice

A.1 Desenhos em CAD

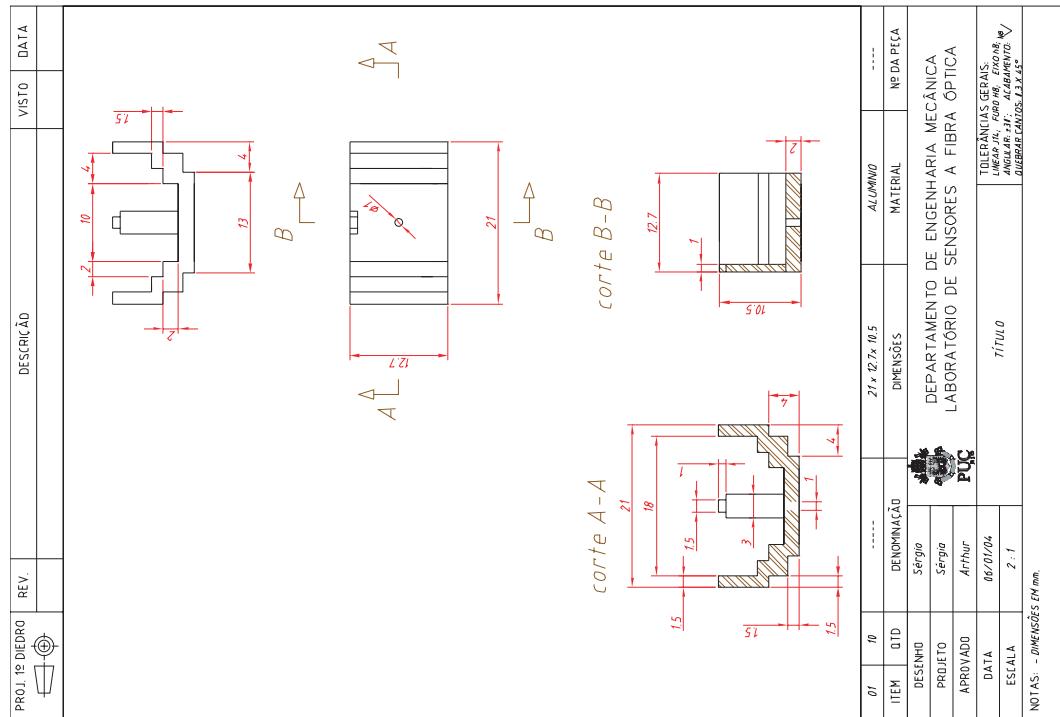


Figura A.1: Módulo do protótipo 5.

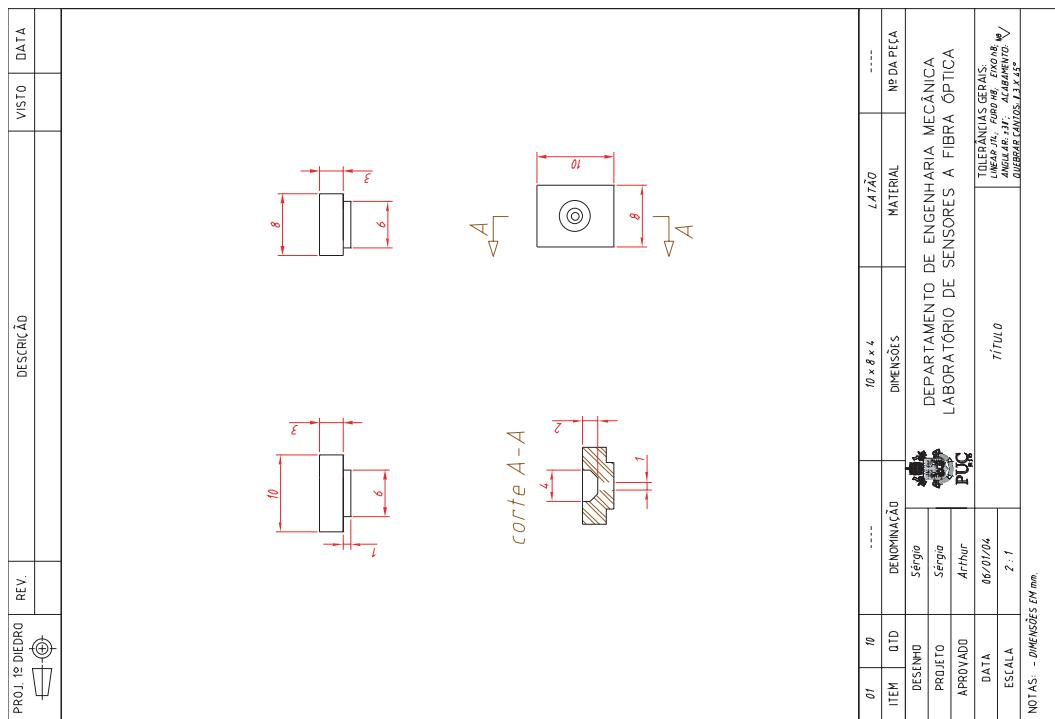


Figura A.2: Massa sísmica para o protótipo 5.

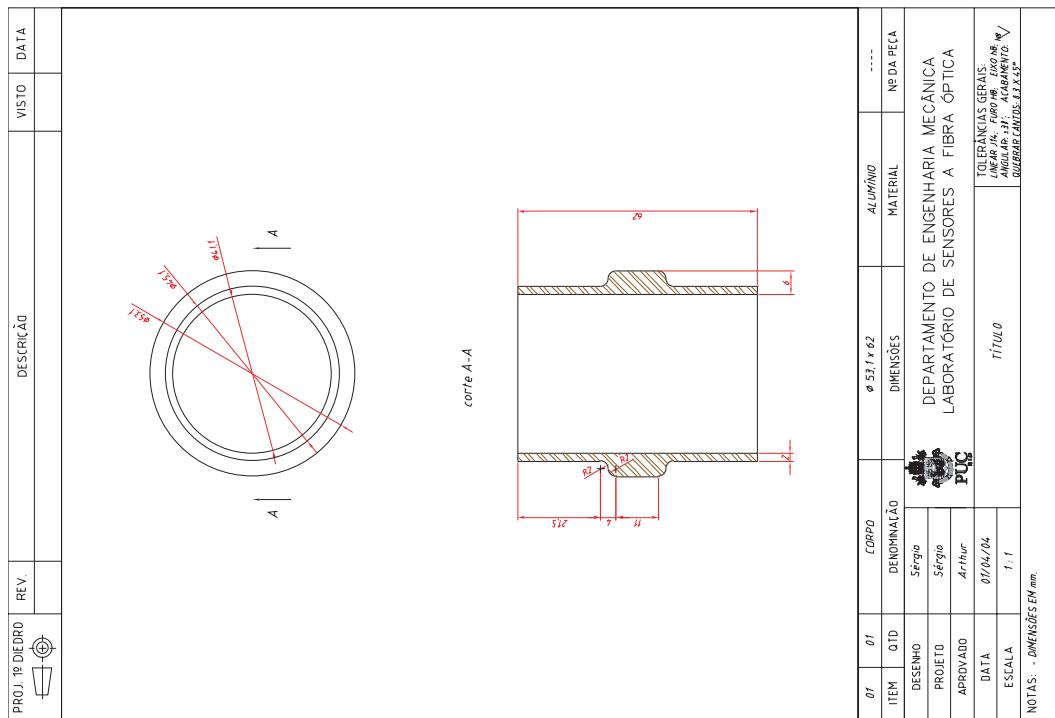


Figura A.3: Corpo para o encapsulamento do protótipo 5.

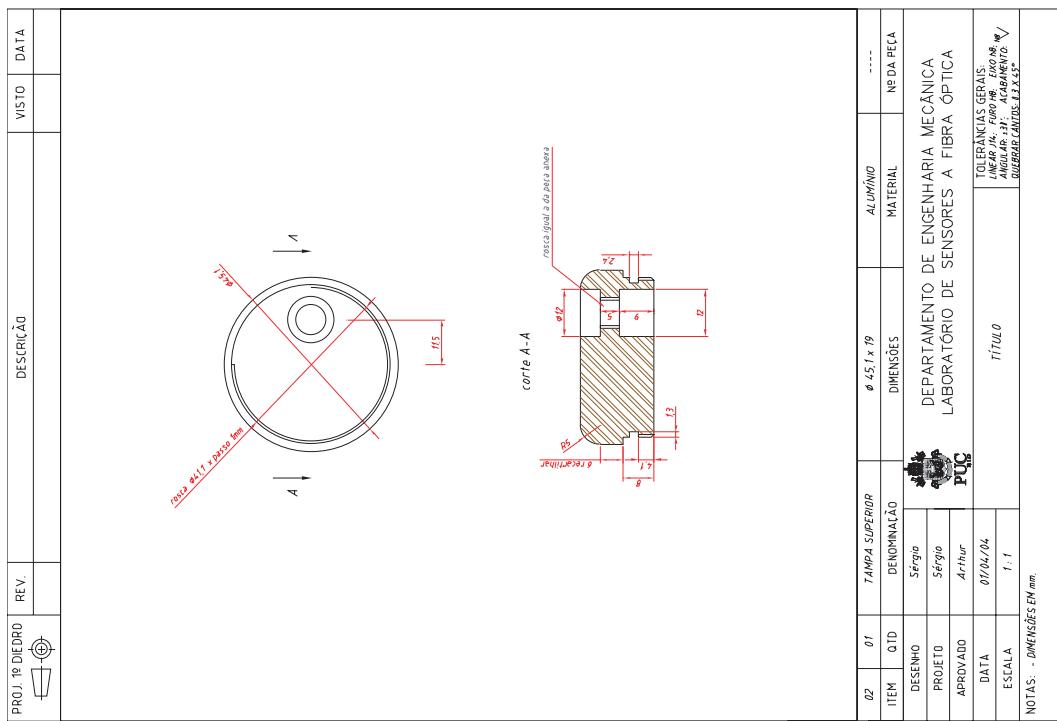


Figura A.4: Tampa de vedação superior.

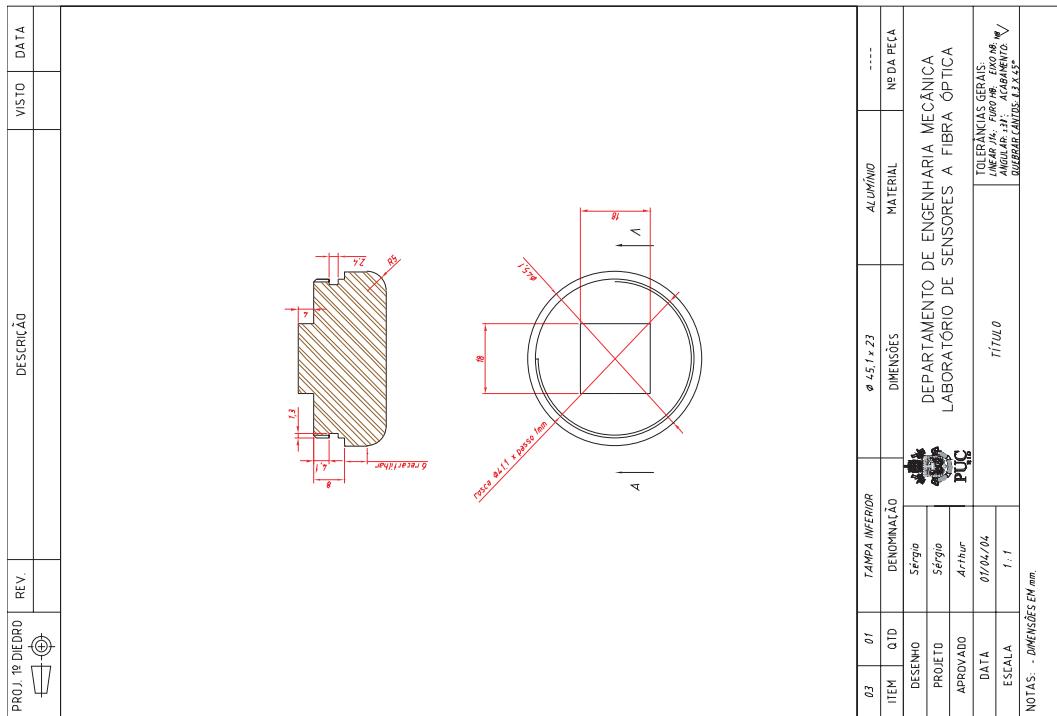


Figura A.5: Tampa de vedação inferior.

B Apêndice

B.1 Programa em LabVIEW

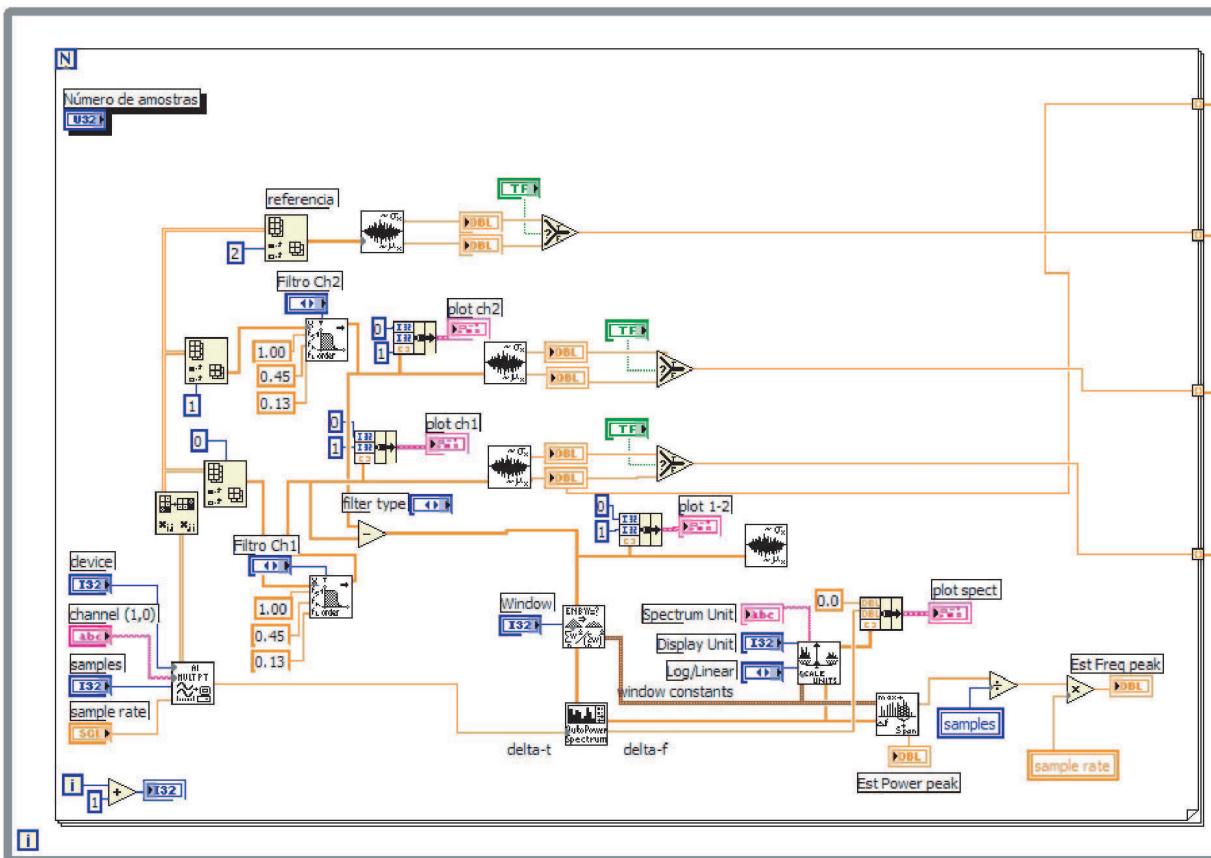


Figura B.1: Programa principal de aquisição de sinais em LabVIEW.

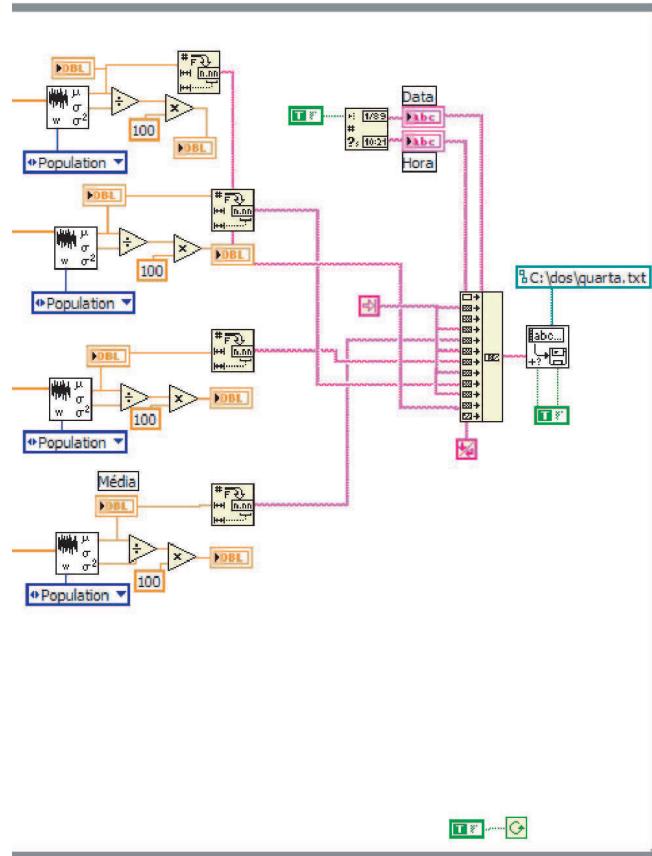


Figura B.2: Programa principal de aquisição de sinais em LabVIEW (continuação).