Frequency Standard Test Facility Data Acquisition and Processing System

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The Interim Frequency Standards Test Facility tests all frequency standards used in the Deep Space Network. It is also the central testing facility for testing all ultrastable hydrogen maser frequency standards. This proposed data acquisition/processing system was designed to support the IFSTF, by acquiring and processing the large amounts of data generated there.

I. Introduction

With the increased testing of frequency standards at the Interim Frequency Standards Test Facility (IFSTF), a need has been demonstrated to automate the data acquisition and reduction for the numerous tests that are performed. This article describes the proposed Data Acquisition and Processing System designed for this effort.

II. Proposed System

In the proposed system (Fig. 1), analog and digital test data are read by the Hewlett-Packard 9835B controller at user-defined time intervals (i.e., 1, 10, 60 sec). The raw data are then time-tagged (a time code from the TRAK clock) and stored on external memory (disk) for later reduction/processing and/or archival storage.

The data reduction and processing is performed by a Hewlett-Packard 9845B desk-top computer. The acquisition of the raw data from the disk is time-shared via the HP-9835B controller. Data reduction and/or processing can be accomplished immediately or on request from the user. The output generated can be lists, graphs, and/or plots of one channel or a combination of many.

The proposed system has been divided into seven phases (Figs. 2-8). After each phase has been completed and tested, it will be installed at the IFSTF for further evaluation.

III. Conclusion

Presently, retrieving statistical and historical data has been limited by manpower, channel monitoring capabilities, and time. This proposed system has the capability of monitoring up to 6 units (frequency standard, oscillator, synthesizer) with a total of 300 channels in real-time. This will greatly increase the statistical and historical data needed for analysis.

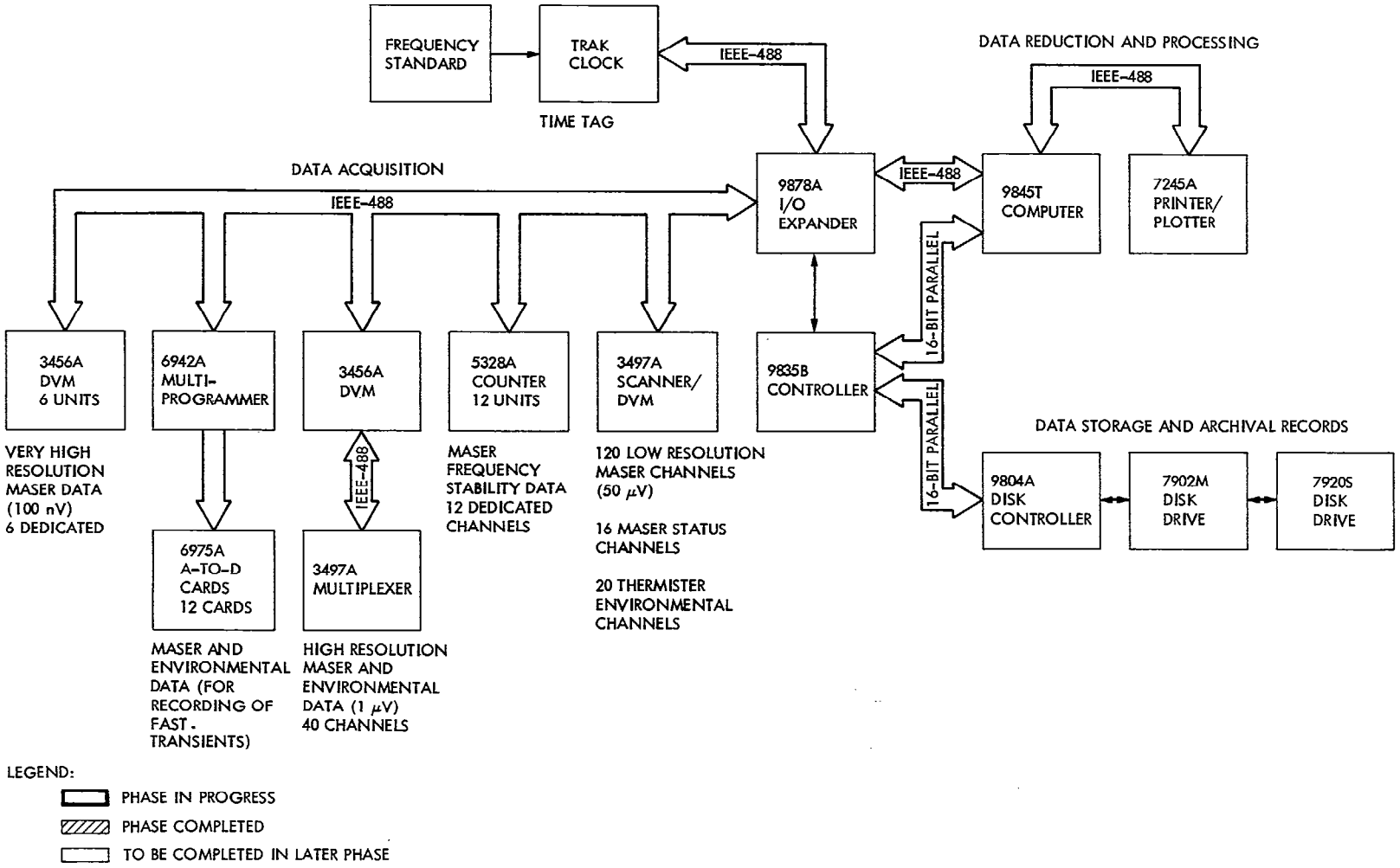

Fig. 1. Overall data acquisition system

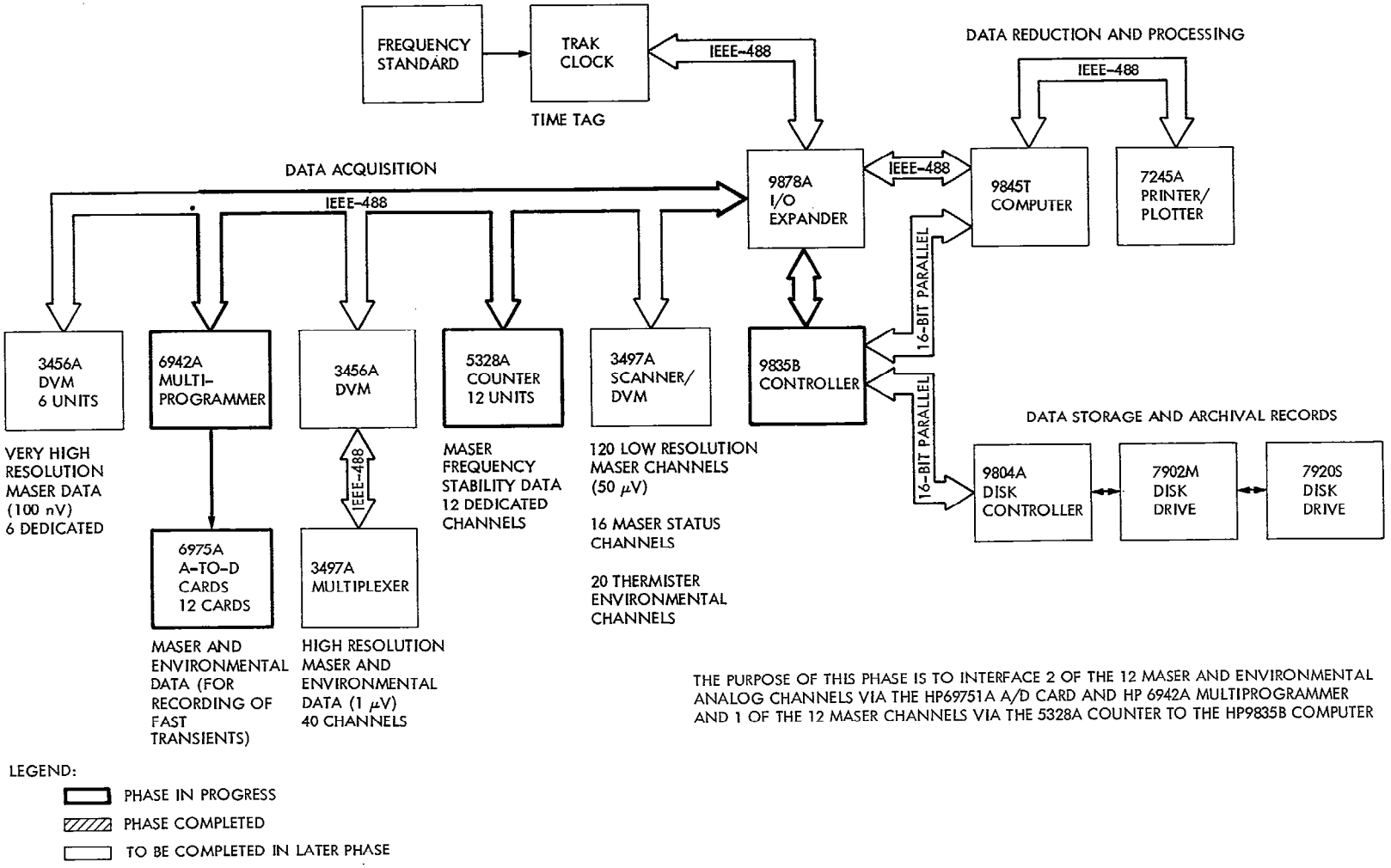

Fig. 2. Data acquisition system, phase 1

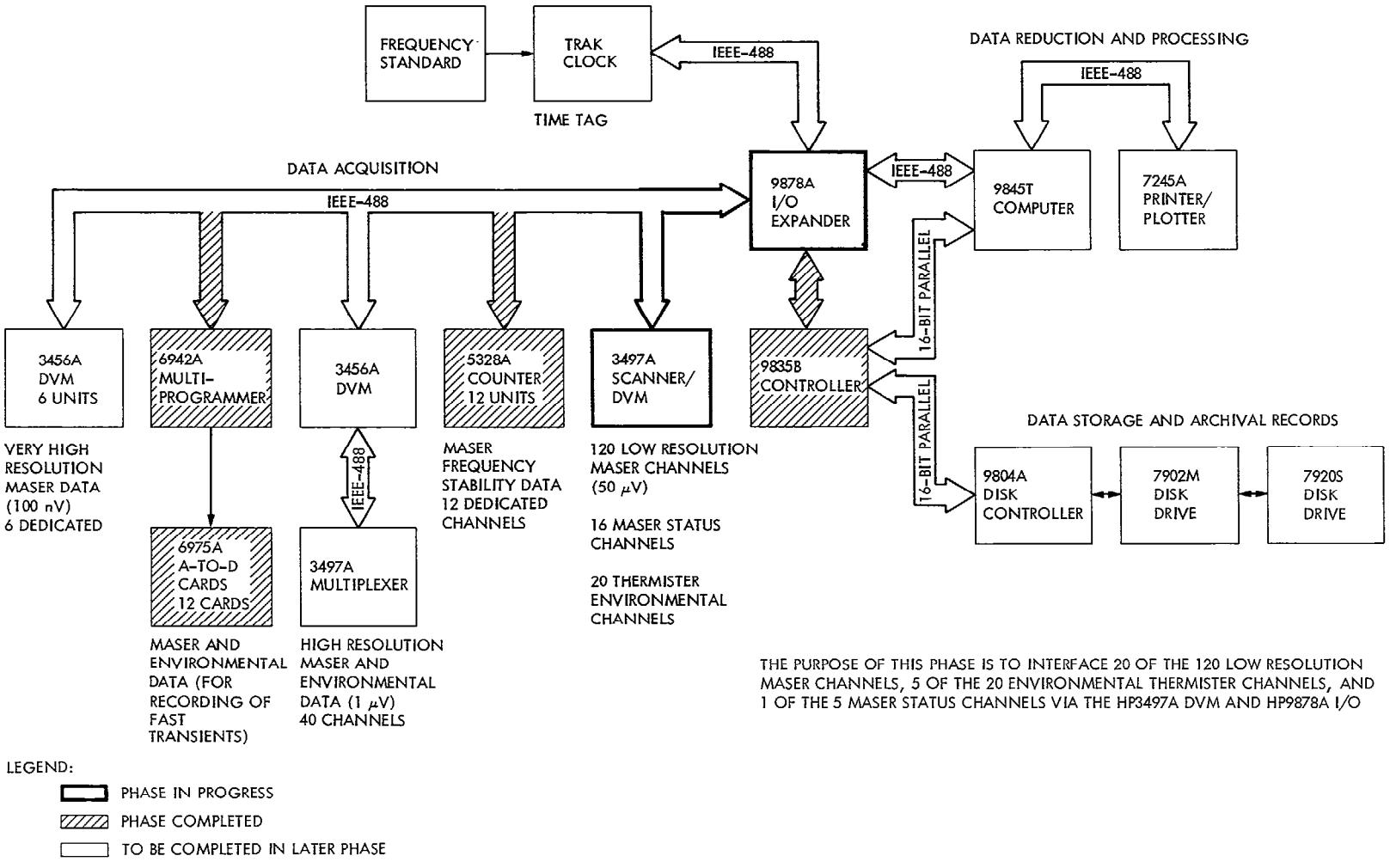

Fig. 3. Data acquisition system, phase 2

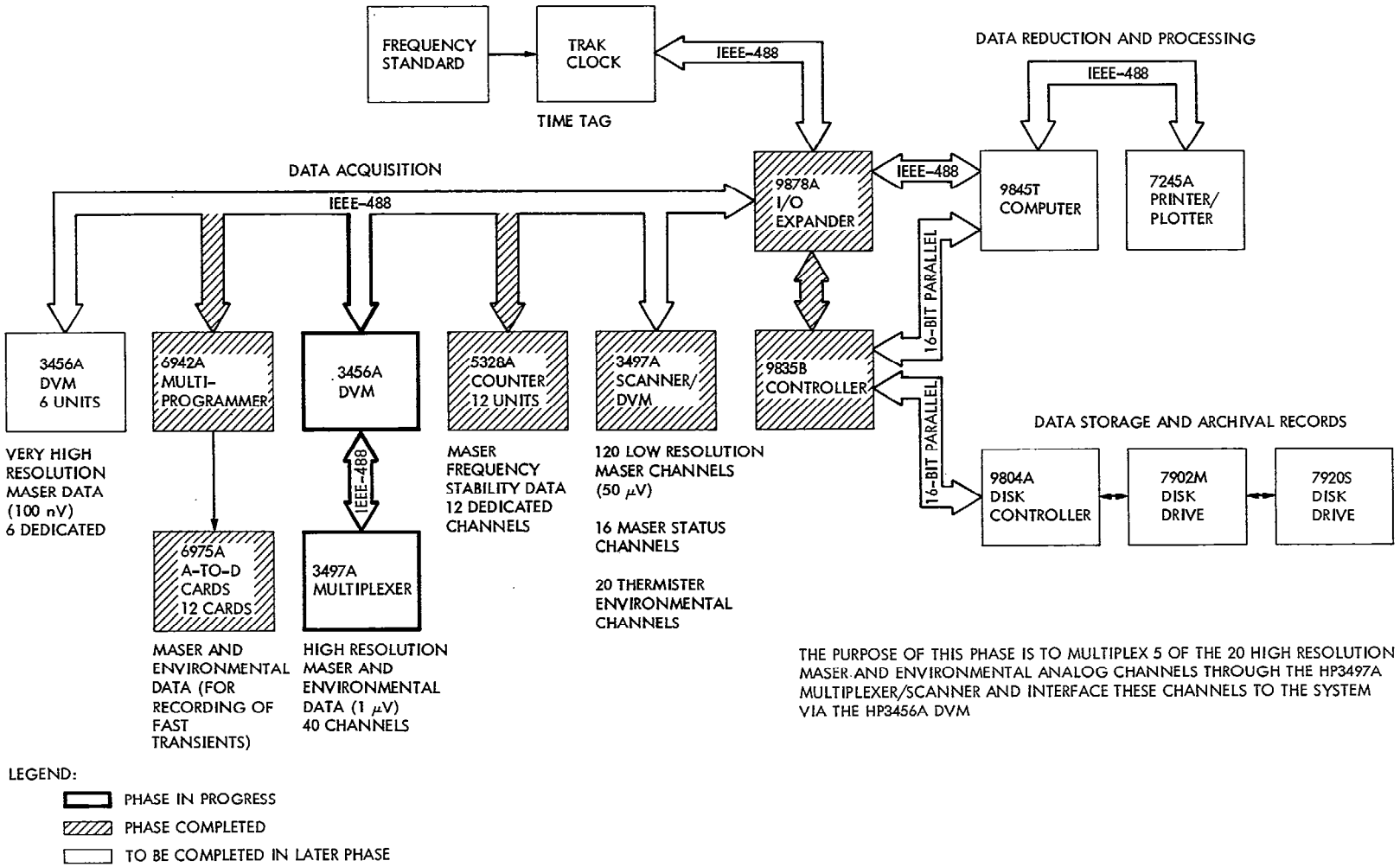

Fig. 4. Data acquisition system, phase 3

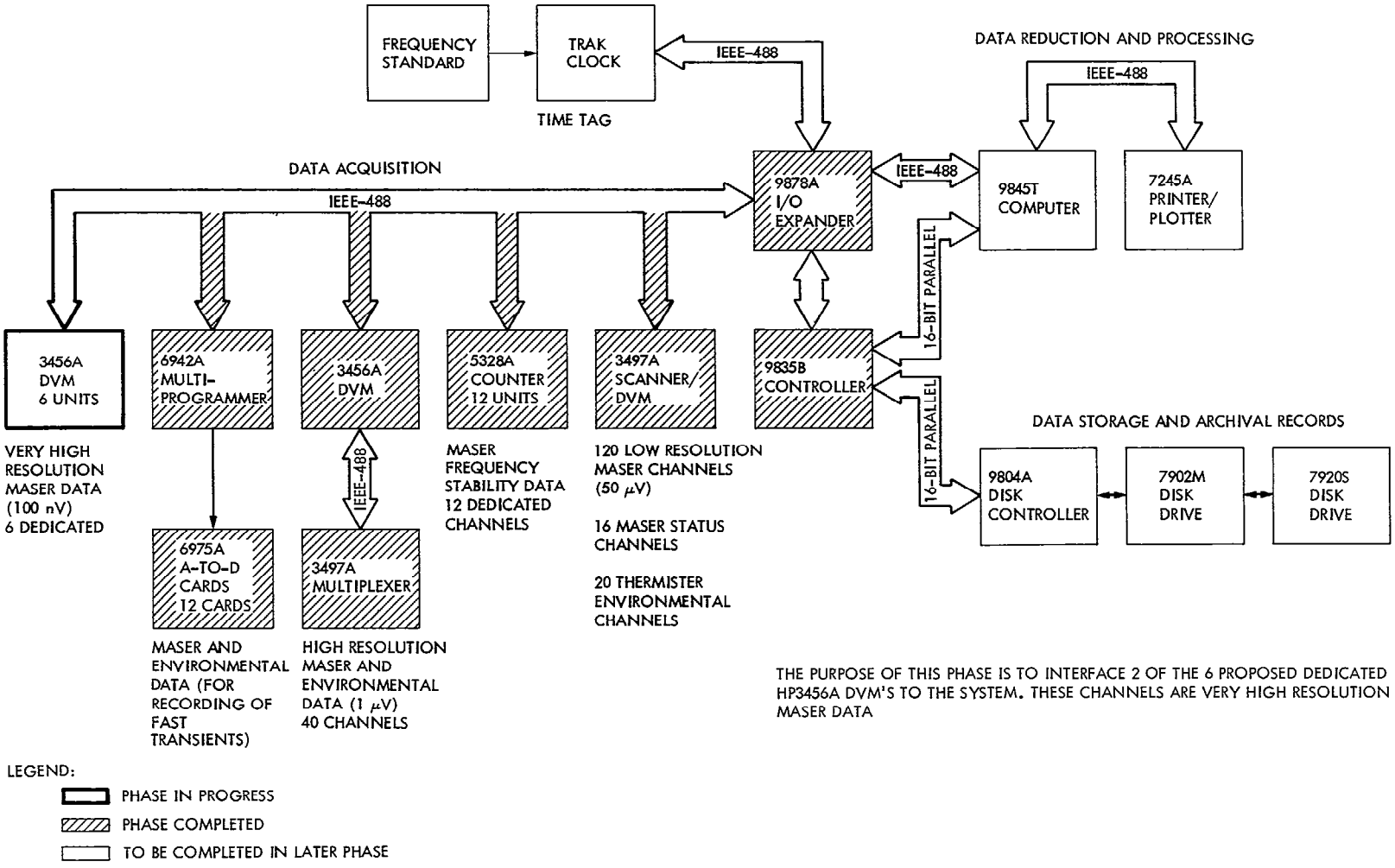

Fig. 5. Data acquisition system, phase 4

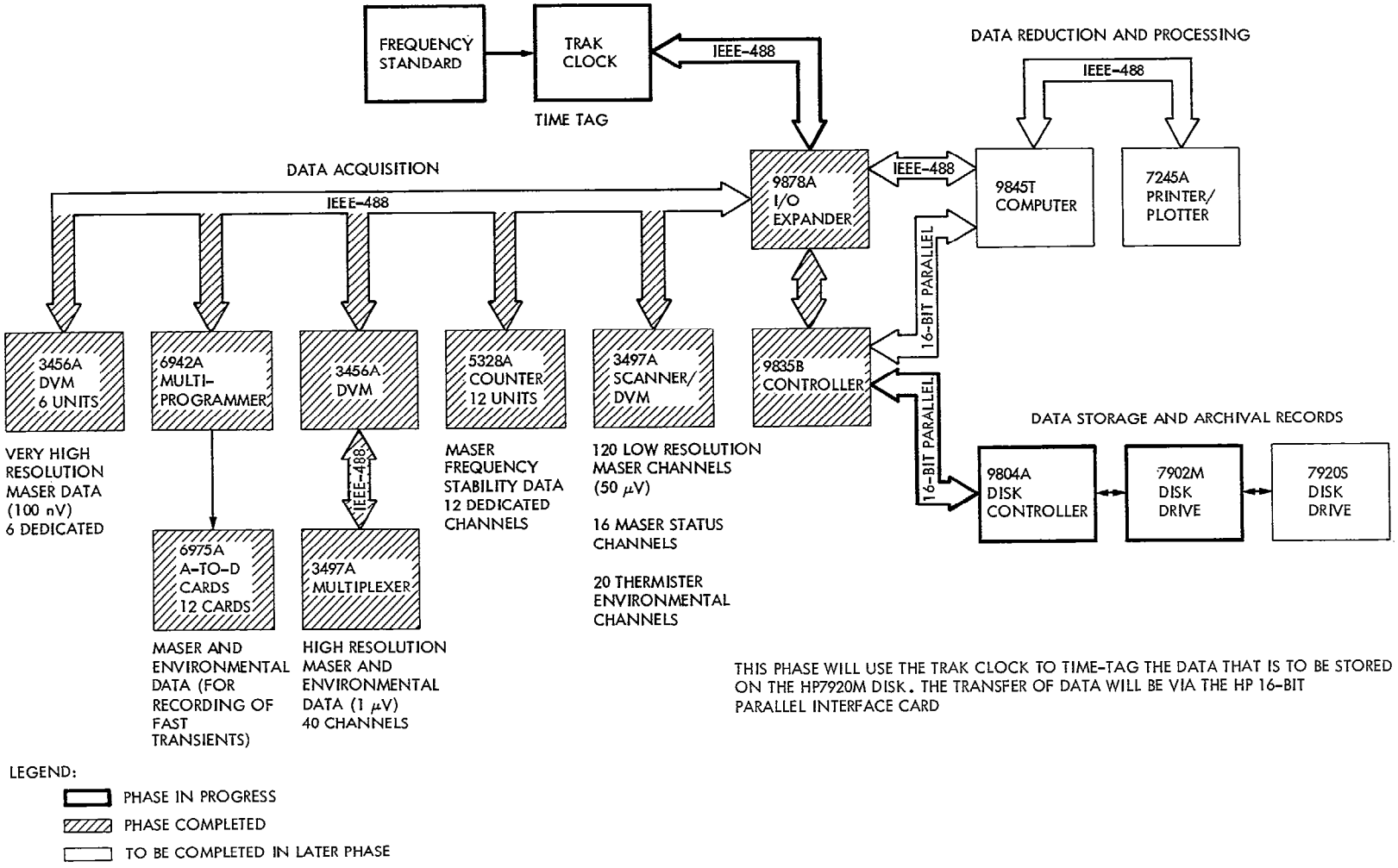

Fig. 6. Data acquisition system, phase 5

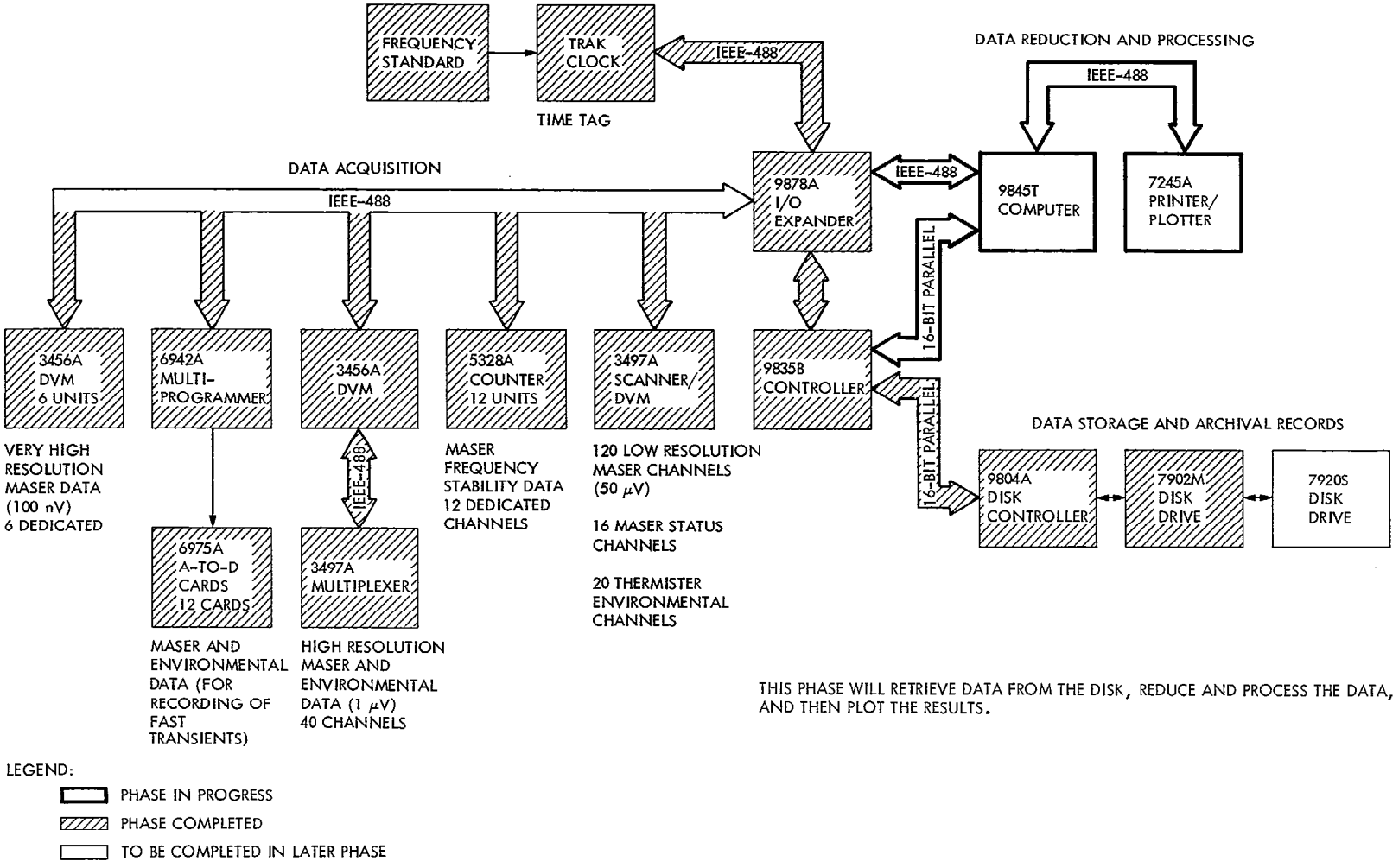

Fig. 7. Data acquisition system, phase 6

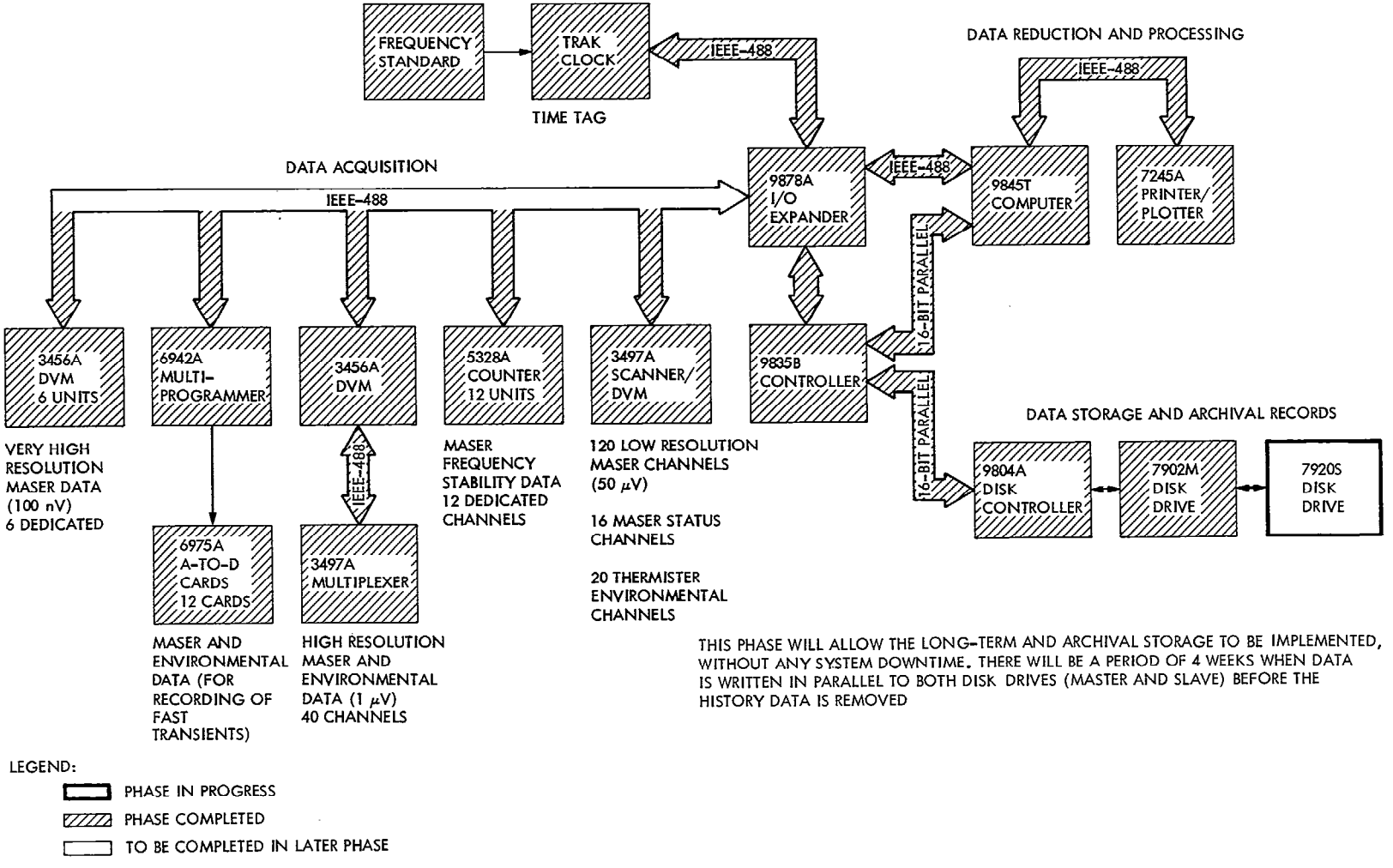

Fig. 8. Data acquisition system, phase 7