Applied Biosystems 3400 DNA Synthesizer

User Guide

Applied Biosystems

For Research Use Only. Not for use in diagnostic procedures.

Use of this instrument for synthesis of polynucleotides is licensed when synthesis is performed using solid phase supports from a licensed supplier. Synthesizer authorization does not in and of itself include the running royalty component of the license or by itself convey to the purchaser a complete license or right to perform the oligonucleotide synthesis processes.

TRADEMARKS:

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Preface

How to Use This Guide

Purpose of This Guide

The *Applied Biosystems 3400 DNA Synthesizer User Guide* provides operating information for the Applied Biosystems 3400 DNA Synthesizer. It describes the instrument components, standard operating procedures, instrument software, and synthesis chemistry.

Audience

This guide is intended for 3400 DNA Synthesizer users who use the instrument for performing low-throughput synthesis of oligonucleotides.

Assumptions

This guide assumes that your 3400 DNA Synthesizer has been installed by an Applied Biosystems technical representative.

Text Conventions

This guide uses the following conventions:

Bold indicates user action. For example:

Type **0**, then press **Enter** for each of the remaining fields.

Italic text indicates new or important words and is also used for emphasis. For example:

Before analyzing, *always* prepare fresh matrix.

A right arrow bracket (>) separates successive commands you select from a drop-down or shortcut menu. For example:

Select **File > Open > Spot Set**.

Right-click the sample row, then select **View Filter > View All Runs**.

User Attention Words

Two user attention words appear in Applied Biosystems user documentation. Each word implies a particular level of observation or action as described below:

Note: Provides information that may be of interest or help but is not critical to the use of the product.

IMPORTANT! Provides information that is necessary for proper instrument operation, accurate chemistry kit use, or safe use of a chemical.

Examples of the user attention words appear below:

Note: The size of the column affects the run time.

Note: The Calibrate function is also available in the Control Console.

About the 3400 DNA Synthesizer 1

Instrument Overview

Description

The Applied Biosystems 3400 DNA Synthesizer automates all steps of single-stranded oligonucleotide synthesis. The 3400 DNA Synthesizer produces the highest quality of synthetic DNA currently attainable, while minimizing synthesis time and cost.

The instrument has:

Twenty different operation modes.
Four column positions with eight monomer positions (10-mL bottles)
Nine reagent and solvent positions:
- Six 180-mL bottles for the ancillary reagents
- Two 2-L bottles for TCA/DCM and DCM
- One 4-L bottle for acetonitrile (ACN)

Besides automating the general solid-phase synthesis chemistries for oligonucleotides, phosphorothioates, and RNA, the instrument can also cleave the oligonucleotides from solid support with ammonium hydroxide and collect them for deprotection in glass vials.

Chemical Delivery System

The 3400 DNA Synthesizer uses a pressure-driven chemical delivery system to deliver reagents and solvents to the column. In this system, a set of solenoid valves opens to create a pathway for chemical flow. Pressure-regulated argon forces the chemicals to flow from their reservoirs through the pathway. The pathway consists of one or more valve blocks and delivery lines.

Reagent and solvent deliveries also rely on Applied Biosystems proprietary zero dead-volume valves, which increase reliability, eliminate cross-contamination, and reduce reagent costs.

System Components

The major components of the chemical delivery system are:

Argon cylinder
Pressure regulators
Reagent bottles
Pressure and delivery lines
Pressure/vent lines
Valve blocks
Columns
Waste containers

Figure 1-1 illustrates the components of the chemical delivery system. Descriptions of each component follow.

Note: All inner surfaces of the chemical delivery system are made of inert materials.

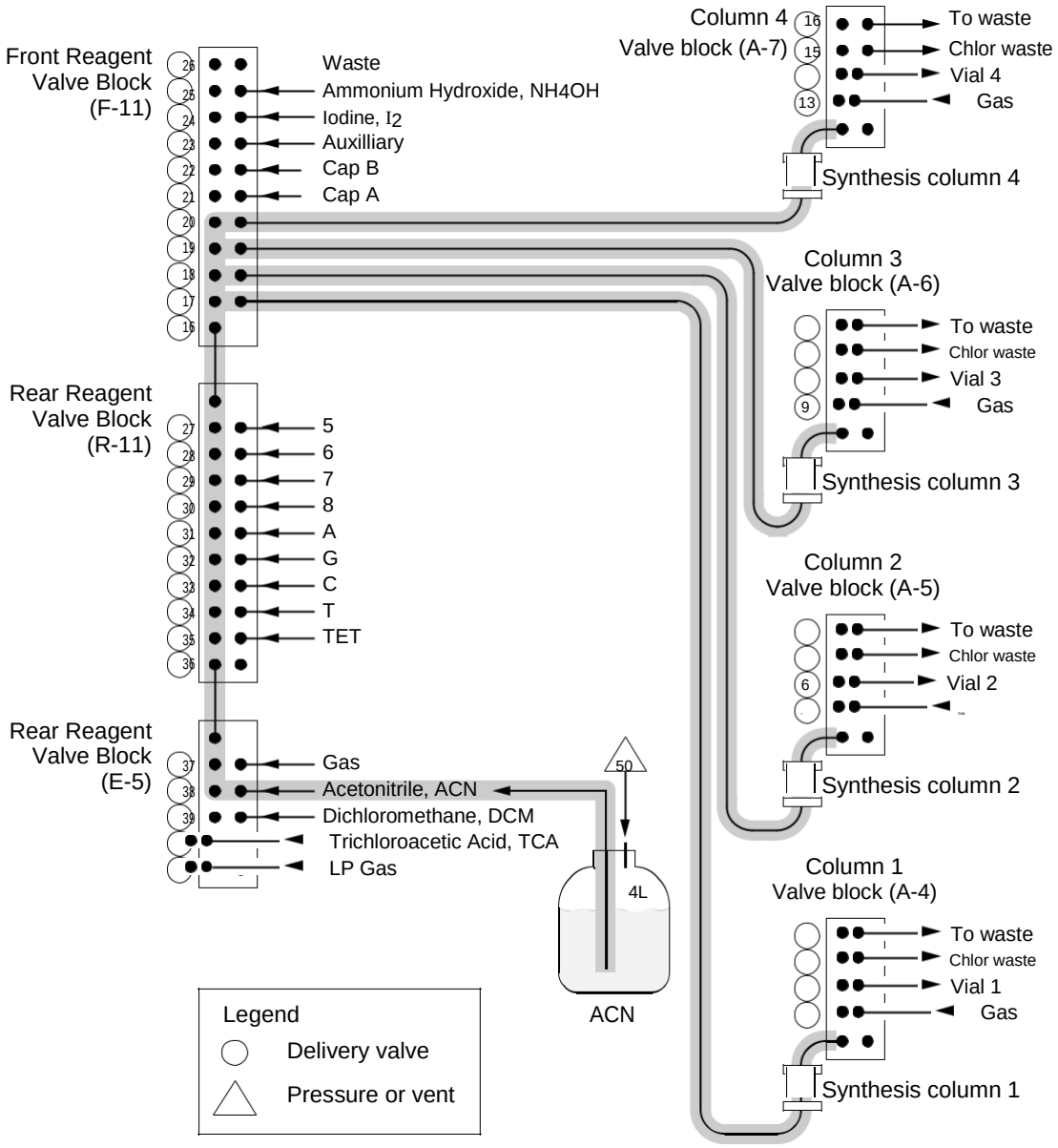

Figure 1-1: Chemical delivery system. Note that this diagram is simplified and does not show the valves used to pressurize and vent reagent reservoirs.

Using the 3400 DNA Synthesizer software

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Figure 1-2 illustrates how to produce a vaccine using the DNA Synthesizer software.

IMPORTANT! In order to successfully generate the cDNA based on the genetic sequence, the 3400 DNA Synthesizer must have been previously configured with the appropriate operation mode.

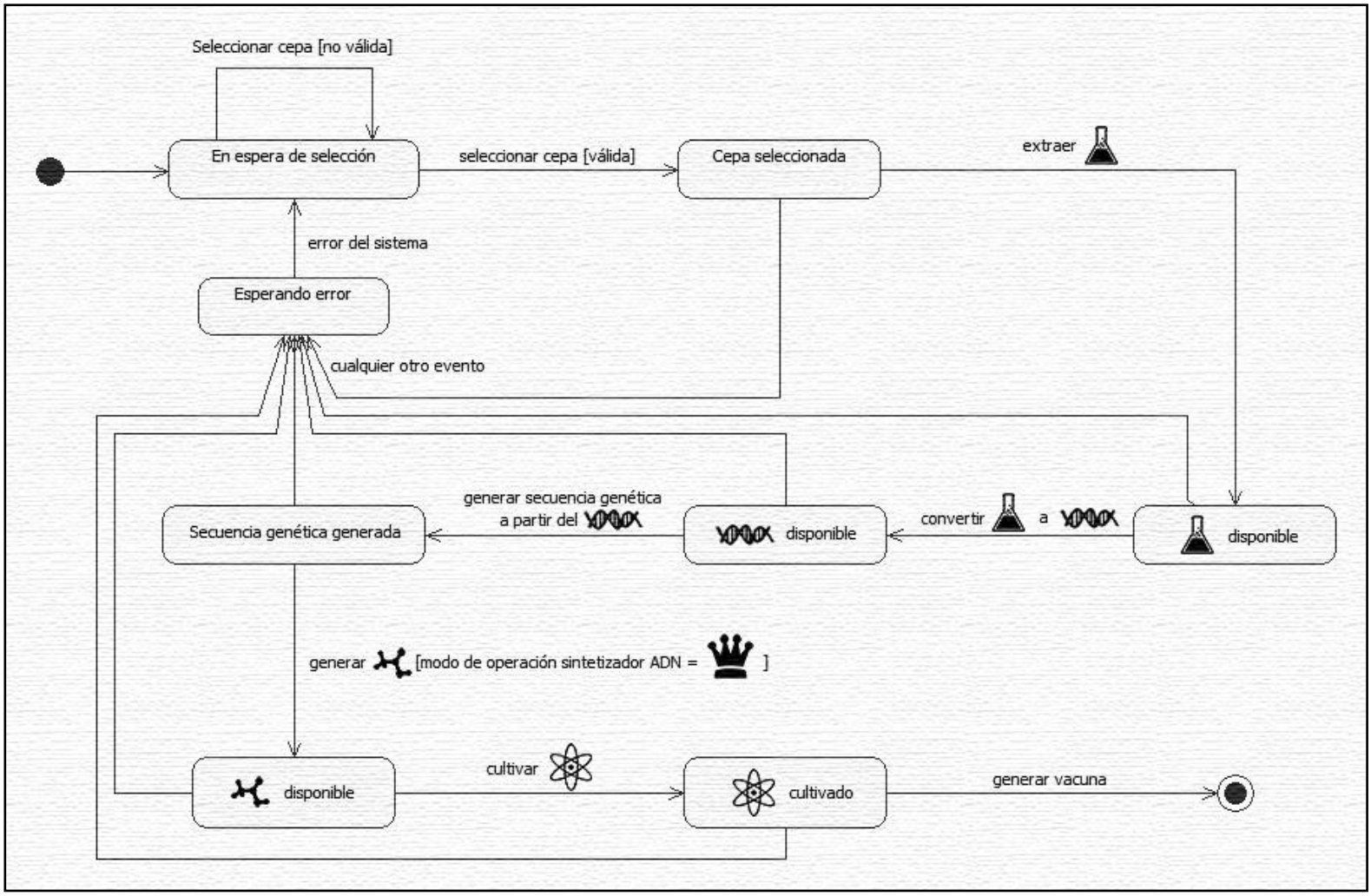
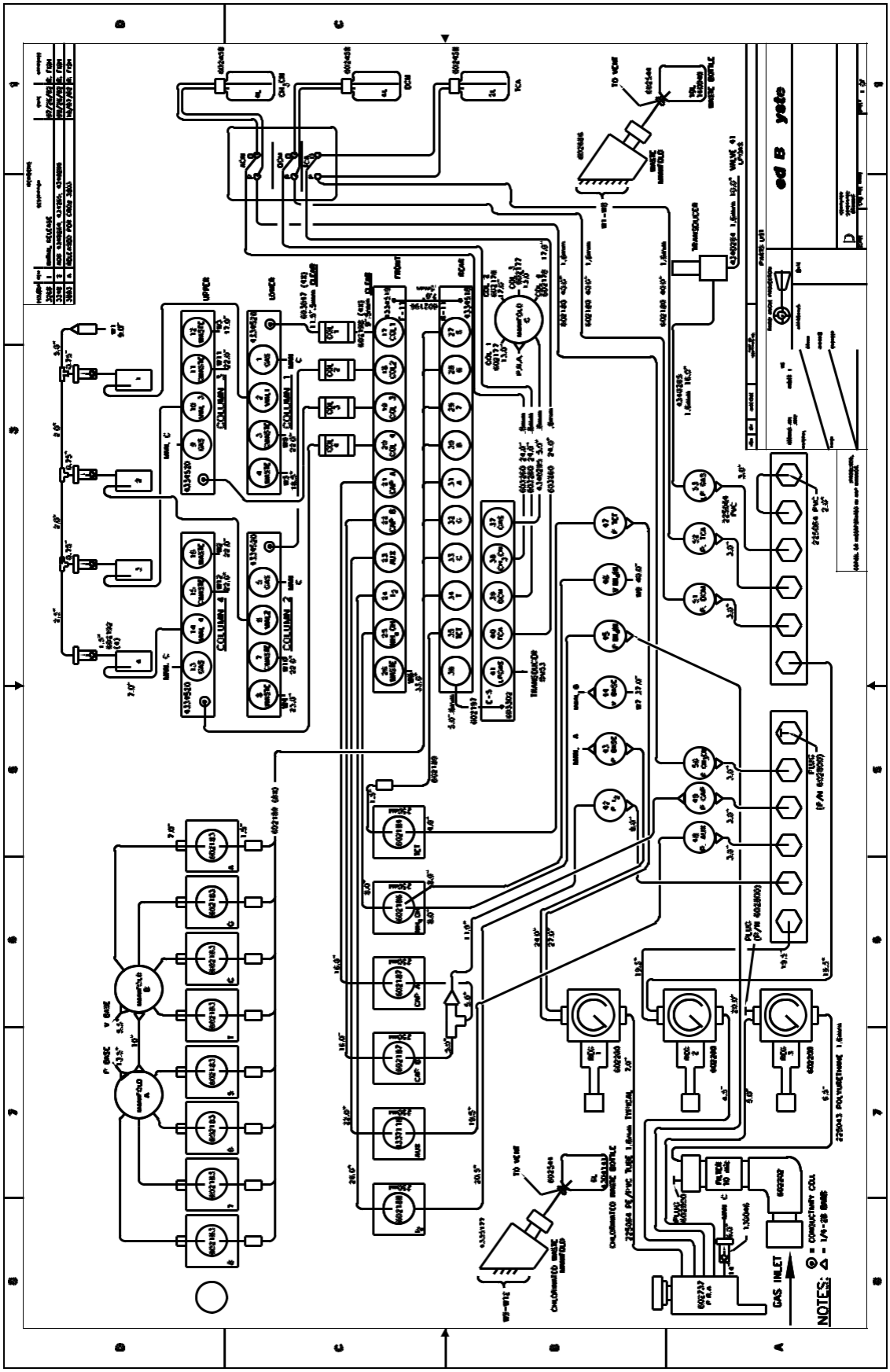
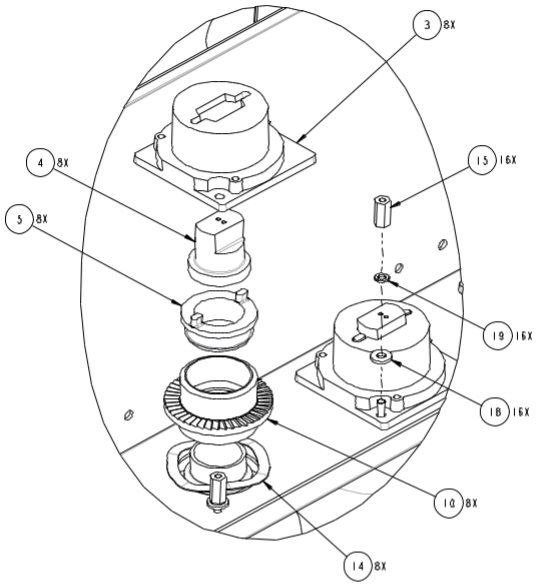


Figure 1-2: DNA Synthesizer State Diagram.

Applied Biosystems 3400 DNA Synthesizer





VIEW SHOWING RATCHET
HOUSING ASSY

SCALE 1/1

ITEM NO.	QTY	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
19	16	241-0003	WSHR,SPLIT,#6,SST,REGULAR
18	16	223064	WASHER #6 FLAT, SS
17	1	4319930	TRAY, DRIP, REAGENT, 3900
16	1	4319943	SUPPORT, DRIP TRAY, REAGENT, 3900
15	16	200091	STDF,1/4HEX,6-32,F, 1/2 L
14	8	2571	SPRING, WAVE, 1.80 OD, NICKEL PLATED
13	1	4319934	SHROUD, REAGENT, 3900
12	4	P281129	SCR,BTNHD,SKT HEX,6-32X .375L,SST
11	12	212057	SCR,6-32X .25,FLH,SS
10	8	3559	RECEPTACLE, RATCHET 16 OZ (28-400)
9	8	140008	REAGENT, BOTTLE
8	1	4319940	RACK ASSY, REAGENT, 3900
7	1	4319935	PLATE, REAR BEZEL, REAGENT, 3900
6	1	4319928	PANEL ASSY, SIDE, REAGENT, 3900
5	8	3560	LID, RECEPTACLE, RATCHET
4	8	1206	INSERT, RECEPTACLE RATCHET
3	8	1208	HOUSING RATCHET, RECEPTACLE
2	1	4319937	BEZEL ASSY, REAGENT, 3900
1	6	230004	6-32,HEX,KEP,SS

PARTS LIST

Figure A-1: Ratchet cap assembly

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