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About This Guide

**IMPORTANT** Before using the instrument, read and understand the safety guidelines in this document. Failure to follow these guidelines may result in undesirable effects, injury to personnel, and/or damage to the instrument or to property.

**Purpose**

This guide describes how to use the Juno™ system, including the instrument and the system software. For complete instrument specifications and unpacking/installation instructions, see the Juno System Site Requirements Guide (PN 100-7072).

**Safety Alert Conventions**

**CAUTION** ABBREVIATED SAFETY ALERTS. Hazard symbols and hazard types specified in procedures may be abbreviated in this document. For complete safety information, see Appendix D.

Fluidigm documentation uses specific conventions for presenting information that may require your attention. Refer to the following safety alert conventions.

**Safety Alerts for Chemicals**

For hazards associated with chemicals, this document follows the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and uses indicators that include a pictogram and a signal word that indicates the severity level:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![]</td>
<td>Pictogram (see example) consisting of a symbol on a white background within a red diamond-shaped frame. Refer to the individual safety data sheet (SDS) for the applicable pictograms and hazards pertaining to the chemicals being used.</td>
</tr>
<tr>
<td><strong>DANGER</strong></td>
<td>Signal word that indicates more severe hazards.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>Signal word that indicates less severe hazards.</td>
</tr>
</tbody>
</table>

**Safety Alerts for Instruments**

For hazards associated with instruments, this document uses indicators that include a pictogram and signal words that indicate the severity level:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![]</td>
<td>Pictogram (see example) consisting of a symbol on a white background within a black triangle-shaped frame. Refer to the instrument user guide for the applicable pictograms and hazards pertaining to instrument usage.</td>
</tr>
<tr>
<td><strong>DANGER</strong></td>
<td>Signal word that indicates an imminent hazard that will result in severe injury or death if not avoided.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>Signal word that indicates a potentially hazardous situation that could result in serious injury or death if not avoided.</td>
</tr>
</tbody>
</table>
Safety Data Sheets

Read and understand the SDSs before handling chemicals. To obtain SDSs for chemicals ordered from Fluidigm, either alone or as part of this system, go to fluidigm.com/sds and search for the SDS using either the product name or the part number.

Some chemicals referred to in this user guide may not have been provided with your system. Obtain the SDSs for chemicals provided by other manufacturers from those manufacturers.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTION</td>
<td>Signal word that indicates a potentially hazardous situation that could result in minor or moderate personal injury if not avoided.</td>
</tr>
<tr>
<td>IMPORTANT</td>
<td>Signal word that indicates information necessary for proper use of products or successful outcome of experiments.</td>
</tr>
</tbody>
</table>
Chapter 1: Introducing the Juno System

The Juno System

The Juno™ system is used for preparing libraries for next-generation sequencing (NGS) and IFC preparation for gene expression, genotyping and digital PCR applications.

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

Library Preparation IFCs

The Juno system enables NGS library preparation for Illumina® sequencers. Juno performs sample and assay loading, mixing, thermal cycling, and harvesting automatically for further processing and sequencing.

- The LP 192.24 IFC facilitates parallel amplification and barcode indexing of up to 192 samples with up to 2,400 assays for targeted sequencing.
- The LP 48.48 IFC facilitates parallel amplification and barcode indexing of up to 48 samples with up to 4,800 assays for targeted sequencing.
- The LP 8.8.6 IFC contains 6 discrete partitions. Each partition processes up to 8 samples against 8 assay pools, which allows you to simultaneously process up to 6 sample sets with different assay panels. A user may fill an IFC with 1 panel or process multiple panels on a single IFC. Choose from a growing menu of Advanta™ NGS Library Prep Assays that includes panels for Solid Tumor* and RNA Fusions† or create custom panels through the D3™ assay design portal at fluidigm.com/d3.
- The 48.Atlas™ IFC enables the preparation of NGS-ready, dual-indexed, full-length cDNA libraries of poly(A) RNA utilizing total RNA isolated from human, mouse, or rat for subsequent sequencing analysis. The complete workflow is automated for 48 samples per IFC.

Genotyping, Digital PCR, and Gene Expression IFCs

Juno also processes all Fluidigm IFC formats that support genotyping, digital PCR and gene expression applications.

- The Juno 96.96 Genotyping IFC integrates preamplification and genotyping reactions of up to 96 samples and 96 genotyping assays in a single workflow.
- For genotyping experiments using Dynamic Array™ and Flex Six™ IFCs, Juno performs IFC priming, sample and assay loading, and thermal-cycling. For digital PCR experiments using Digital Array™ IFCs, Juno performs priming, sample and assay loading, and thermal-cycling. After being prepared on the Juno system, the IFC is scanned on the Biomark™ HD system or EP1™ system to collect data for later analysis.

---

* Requires the Advanta Solid Tumor NGS Library Prep Assay (Fluidigm PN 101-7033).
† Requires the Advanta RNA Fusions NGS Library Prep Assay (Fluidigm PN 101-8654).
• For gene expression experiments using Dynamic Array, and Flex Six IFCs, Juno performs IFC priming as well as sample and assay loading. After being prepared on the Juno system, the IFC is thermal-cycled and scanned on the Biomark HD system to collect data for later analysis.

**Consumables Ordering**

To reorder IFCs and reagents, contact your regional Fluidigm sales representative or distributor. Go to fluidigm.com/contact.html.

**Components of the Juno System**

![Figure 1. Front panel of the Juno instrument.](image)
Figure 2. Back panel of the Juno instrument. There are also 2 USB 2.0 ports on the side of the instrument.

Figure 3. Tray and thermal chuck of the Juno instrument. The white notch is used to orient the notched corner of the IFC in the tray.
Chapter 1: Introducing the Juno System

Components of the Juno System

Figure 4. Interface Plate Loading Fixture

Figure 5. MX Interface Plate
Interface Plates and IFCs

Table 1 shows the appropriate interface plate for the IFC you are using.

Table 1. Interface plates and supported IFCs

<table>
<thead>
<tr>
<th>Interface Plate Name</th>
<th>Label Color on Interface Plate</th>
<th>Supports…</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX</td>
<td>Black</td>
<td>48.48 Dynamic Array™ IFCs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LP 48.48 IFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LP 8.8.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>qdPCR 37K™ IFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48.770 Digital Array™ IFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.765 Digital Array IFC</td>
</tr>
<tr>
<td>SX</td>
<td>Silver</td>
<td>Juno 96.96 Genotyping IFC</td>
</tr>
<tr>
<td>HX</td>
<td>Green</td>
<td>96.96 Dynamic Array IFCs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flex Six™ Genotyping and Gene Expression IFCs</td>
</tr>
<tr>
<td>RX</td>
<td>Red</td>
<td>192.24 Genotyping and Gene Expression IFCs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24.192 Dynamic Array IFC for Gene Expression</td>
</tr>
<tr>
<td>TX</td>
<td>Blue</td>
<td>LP 192.24 IFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48.Atlas™ IFC</td>
</tr>
</tbody>
</table>

System Software

Ensure that you have installed the Juno system software v3.1 or later if you are using the Juno 96.96 Genotyping IFC. Install software v3.5 or later if you are using the Juno 96.96 Genotyping IFC or an IFC for the Targeted DNA Sequencing Library application. Install software v3.11.1 or later if you are using the 24.192 Dynamic Array IFC for Gene Expression. Install software v3.14.1 or later if you are using the 48.Atlas IFC. To get the latest system software, go to fluidigm.com/software.
## Scripts

### Basic Scripts

<table>
<thead>
<tr>
<th>Tab in Juno Software</th>
<th>Scripts for IFCs</th>
<th>Controller/Interface Plate to Use* (label color)</th>
<th>Script Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One Step LP-192.24 TX (blue)</td>
<td>One step load mix, PCR, and harvest of LP 192.24 IFC (192x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One Step LP-48.48 MX (black)</td>
<td>One step load mix, PCR, and harvest of LP 48.48 IFC (155x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One Step LP-8.8.6 MX (black)</td>
<td>One step load mix, PCR, and harvest of LP 8.8.6 IFC (156x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prime LP-48.48 MX (black)</td>
<td>Preparation of the LP 48.48 IFC (155x) for loading</td>
<td></td>
</tr>
<tr>
<td>Digital PCR</td>
<td>One Step 12.765 MX (black)</td>
<td>One step load and PCR of the 12.765 dPCR IFC (115x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One Step 48.770 MX (black)</td>
<td>One step load and PCR of the 48.770 dPCR IFC (148x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One Step qdPCR 37K MX (black)</td>
<td>One step load and PCR of the qdPCR 37K IFC (167x)</td>
<td></td>
</tr>
<tr>
<td>Tab in Juno Software (Continued)</td>
<td>Scripts for IFCs</td>
<td>Controller/Interface Plate to Use * (label color)</td>
<td>Script Descriptions</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------</td>
<td>-----------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>IFC Control</td>
<td>Load 12.765</td>
<td>MX (black)</td>
<td>Load the 12.765 dPCR IFC (115x)</td>
</tr>
<tr>
<td></td>
<td>Load 48.770</td>
<td>MX (black)</td>
<td>Load the 48.770 dPCR IFC (148x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix 192.24 GE</td>
<td>RX (red)</td>
<td>Prime, load, and mix the 192.24 GE IFC (169x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix 24.192 GE</td>
<td>RX (red)</td>
<td>Prime, load, and mix the 24.192 GE IFC (158x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix 48.48 GE</td>
<td>MX (black)</td>
<td>Load the 48.48 GE IFC (113x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix 96.96 GE</td>
<td>HX (green)</td>
<td>Load the 96.96 GE IFC (136x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix Flex Six GE</td>
<td>HX (green)</td>
<td>Load the Flex Six GE IFC (153x)</td>
</tr>
<tr>
<td></td>
<td>Load qdPCR 37K MX (black)</td>
<td>MX (black)</td>
<td>Load qdPCR 37K IFC (167x)</td>
</tr>
<tr>
<td></td>
<td>Post Run Flex Six GE</td>
<td>HX (green)</td>
<td>Preparation of the Flex Six GE IFC (153x) for storage</td>
</tr>
<tr>
<td></td>
<td>Post Run Flex Six GT</td>
<td>HX (green)</td>
<td>Preparation of the Flex Six GT IFC (154x) for storage</td>
</tr>
<tr>
<td></td>
<td>Prime 12.765 MX (black)</td>
<td>MX (black)</td>
<td>Preparation of the 12.765 dPCR IFC (115x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime 48.48 GE MX (black)</td>
<td>MX (black)</td>
<td>Preparation of the 48.48 GE IFC (113x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime 48.48 GT MX (black)</td>
<td>MX (black)</td>
<td>Preparation of the 48.48 GT IFC (124x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime 48.770 MX (black)</td>
<td>MX (black)</td>
<td>Preparation of the 48.770 dPCR IFC (148x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime 96.96 GE HX (green)</td>
<td>MX (black)</td>
<td>Preparation of the 96.96 GE IFC (136x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime 96.96 GT HX (green)</td>
<td>MX (black)</td>
<td>Preparation of the 96.96 GT IFC (138x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime Flex Six GE HX (green)</td>
<td>MX (black)</td>
<td>Preparation of the Flex Six GE IFC (153x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime Flex Six GT HX (green)</td>
<td>MX (black)</td>
<td>Preparation of the Flex Six GT IFC (154x) for loading</td>
</tr>
<tr>
<td></td>
<td>Prime qdPCR 37K MX (black)</td>
<td>MX (black)</td>
<td>Preparation of the qdPCR 37K IFC (167x) for loading</td>
</tr>
<tr>
<td>Tab in Juno Software (Continued)</td>
<td>Scripts for IFCs</td>
<td>Controller/Interface Plate to Use* (label color)</td>
<td>Script Descriptions</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------</td>
<td>-----------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Probe GT</td>
<td>Juno 96.96 Fast</td>
<td>SX (silver)</td>
<td>One step load and PCR of Juno GT IFC (180x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 192.24 Fast</td>
<td>RX (red)</td>
<td>One step load and fast PCR of 192.24 GT IFC (166x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 48.48</td>
<td>MX (black)</td>
<td>One step load and standard PCR of 48.48 GT IFC (124x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 48.48 Fast</td>
<td>MX (black)</td>
<td>One step load and fast PCR of 48.48 GT IFC (124x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 96.96 Fast</td>
<td>HX (green)</td>
<td>One step load and standard PCR of 96.96 GT IFC (138x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 96.96</td>
<td>HX (green)</td>
<td>One step load and fast PCR of 96.96 GT IFC (138x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step Flex Six Fast</td>
<td>HX (green)</td>
<td>One step load and standard PCR of Flex Six GT IFC (154x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step Flex Six</td>
<td>HX (green)</td>
<td>One step load and fast PCR of Flex Six GT IFC (154x) for probe GT chemistry</td>
</tr>
<tr>
<td>SNP Type</td>
<td>Juno 96.96</td>
<td>SX (silver)</td>
<td>One step load and PCR of Juno GT IFC (180x) for SNP Type™ chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 192.24</td>
<td>RX (red)</td>
<td>One step load and PCR of 192.24 GT IFC (166x) for SNP Type chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 48.48</td>
<td>MX (black)</td>
<td>One step load and PCR of 48.48 GT IFC (124x) for SNP Type chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step 96.96</td>
<td>HX (green)</td>
<td>One step load and PCR of 96.96 GT IFC (138x) for SNP Type chemistry</td>
</tr>
<tr>
<td></td>
<td>One Step Flex Six</td>
<td>HX (green)</td>
<td>One step load and PCR of Flex Six GT IFC (154x) for SNP Type chemistry</td>
</tr>
</tbody>
</table>

* The interface plates are distinguished by color labels and 2-letter names. See the scripts table on page 11.
## Advanced Scripts

NOTE To view advanced scripts on the instrument, log in as an administrator, tap Preferences, then select Enabled under Advanced Scripts.

<table>
<thead>
<tr>
<th>Tab in Juno Software</th>
<th>Scripts for IFCs</th>
<th>Controller/Interface Plate to Use* (label color)</th>
<th>Script Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targeted Seq</td>
<td>Load Mix LP-192.24 TX (blue)</td>
<td>TX (blue)</td>
<td>Load and mix samples and assays for LP 192.24 IFC (192x)</td>
</tr>
<tr>
<td></td>
<td>PCR Harvest LP-192.24 TX (blue)</td>
<td>TX (blue)</td>
<td>PCR and harvest of LP 192.24 IFC (192x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix LP-48.48 MX (black)</td>
<td>MX (black)</td>
<td>Load and mix samples and assays for LP 48.48 IFC (155x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix LP-8.8.6 MX (black)</td>
<td>MX (black)</td>
<td>Load and mix samples and assays for LP 8.8.6 IFC (156x)</td>
</tr>
<tr>
<td></td>
<td>PCR Harvest LP-48.48 MX (black)</td>
<td>MX (black)</td>
<td>PCR and harvest of LP 48.48 IFC (155x)</td>
</tr>
<tr>
<td></td>
<td>PCR Harvest LP-8.8.6 MX (black)</td>
<td>MX (black)</td>
<td>PCR and harvest of LP 8.8.6 IFC (156x)</td>
</tr>
<tr>
<td>Digital PCR</td>
<td>PCR 12.765 MX (black)</td>
<td>MX (black)</td>
<td>PCR of the 12.765 dPCR IFC (115x)</td>
</tr>
<tr>
<td>IFC Control</td>
<td>Load Mix 96.96 GT HX (green)</td>
<td>HX (green)</td>
<td>Load the 96.96 GT IFC (138x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix 48.48 GT MX (black)</td>
<td>MX (black)</td>
<td>Load the 48.48 GT IFC (124x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix Flex Six GT HX (green)</td>
<td>HX (green)</td>
<td>Load the Flex Six GT IFC (154x)</td>
</tr>
<tr>
<td></td>
<td>Load Mix 192.24 GT RX (red)</td>
<td>RX (red)</td>
<td>Prime, load, and mix the 192.24 GT IFC (166x)</td>
</tr>
<tr>
<td>Probe GT</td>
<td>Fast PCR 192.24 RX (red)</td>
<td>RX (red)</td>
<td>Fast PCR of 192.24 GT IFC (166x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>Fast PCR 48.48 MX (black)</td>
<td>MX (black)</td>
<td>Fast PCR of 48.48 GT IFC (124x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>Fast PCR 96.96 HX (green)</td>
<td>HX (green)</td>
<td>Fast PCR of 96.96 GT IFC (138x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>Fast PCR Flex Six HX (green)</td>
<td>HX (green)</td>
<td>Fast PCR of Flex Six GT IFC (154x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>PCR 96.96 HX (green)</td>
<td>HX (green)</td>
<td>Standard PCR of 96.96 GT IFC (138x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>PCR 48.48 MX (black)</td>
<td>MX (black)</td>
<td>Standard PCR of 48.48 GT IFC (124x) for probe GT chemistry</td>
</tr>
<tr>
<td></td>
<td>PCR Flex Six HX (green)</td>
<td>HX (green)</td>
<td>Standard PCR of Flex Six GT IFC (154x) for probe GT chemistry</td>
</tr>
<tr>
<td>SNP Type</td>
<td>PCR 192.24 RX (red)</td>
<td>RX (red)</td>
<td>PCR of the 192.24 GT IFC (166x) for SNP Type chemistry</td>
</tr>
<tr>
<td></td>
<td>PCR 48.48 MX (black)</td>
<td>MX (black)</td>
<td>PCR of the 48.48 GT IFC (124x) for SNP Type chemistry</td>
</tr>
<tr>
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<td>PCR 96.96 HX (green)</td>
<td>HX (green)</td>
<td>PCR of the 96.96 GT IFC (138x) for SNP Type chemistry</td>
</tr>
<tr>
<td></td>
<td>PCR Flex Six HX (green)</td>
<td>HX (green)</td>
<td>PCR of the Flex Six GT IFC (154x) for SNP Type chemistry</td>
</tr>
</tbody>
</table>

* The interface plates are distinguished by color labels and 2-letter names. See the scripts table on page 11.
Components Included in Shipping Box

The Juno system (PN 101-6455) includes the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juno system</td>
<td>Preparation of libraries for NGS sequencing and IFC preparation for gene expression, genotyping and digital PCR applications.</td>
</tr>
<tr>
<td>Power cable, &gt;10 A, 2 m, IEC C13</td>
<td>Country-specific power cable to connect the Juno instrument to the wall socket</td>
</tr>
<tr>
<td></td>
<td>The instrument has a connection to protective earth through the power cord provided by Fluidigm. Ensure that the electrical receptacle provides an earth ground before connecting the power cord.</td>
</tr>
<tr>
<td></td>
<td>Use only power cords provided by Fluidigm or power cords that meet the minimum ratings of 250V/10A, 16AWG and a length not exceed 2 meters (6 feet).</td>
</tr>
<tr>
<td>Cleaning plate</td>
<td>Clean the Juno instrument</td>
</tr>
<tr>
<td>Interface Plate Loading Fixture</td>
<td>The Interface Plate Loading Fixture is used to load interface plates into the Juno instrument. Store the loading fixture in its storage container when not in use.</td>
</tr>
<tr>
<td>MX Interface Plate</td>
<td>The MX Interface Plate (PN 101-6115) adapts Juno for use with the LP 48.48 and 8.8.6 IFCs, 48.48 Dynamic Array IFCs, and digital PCR IFCs. Store the interface plate in the storage container when not in use.</td>
</tr>
<tr>
<td>Barrier Tape Applicator and Adapter</td>
<td>The Barrier Tape Applicator applies barrier tape to the LP 192.24 IFC. The adapter fits onto the Barrier Tape Applicator to apply barrier tape to the LP 48.48 and 8.8.6 IFCs.</td>
</tr>
</tbody>
</table>

Optional Components

Depending on the type of IFC used with Juno, you will need additional interface plates.

<table>
<thead>
<tr>
<th>Component</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>SX Interface Plate (PN 101-6368)</td>
<td>Supports the Juno 96.96 Genotyping IFC and has a silver label.</td>
</tr>
<tr>
<td>TX Interface Plate (PN 101-6117)</td>
<td>Supports the LP 192.24 IFC and 48.Atlas IFC and has a blue label.</td>
</tr>
<tr>
<td>HX Interface Plate (PN 101-6116)</td>
<td>Supports 96.96 Dynamic Array™ and Flex Six™ IFCs and has a green label.</td>
</tr>
<tr>
<td>RX Interface Plate (PN 101-6114)</td>
<td>Supports 24.192 Dynamic Array IFC for Gene Expression and 192.24 Genotyping and Gene Expression IFCs and has a red label.</td>
</tr>
</tbody>
</table>
System Functions

The Juno system is an electrically and pneumatically operated desktop instrument. Its vacuum pump holds the IFC in position, and its embedded PC regulates the instrument's functions and monitors its performance. The system has a touch panel LCD display. All user-specific instructions and functions can be controlled through the touchscreen.

The system uses a thermal stack to provide rapid, accurate, uniform heating and cooling.

Air Options

The Juno system has an internal compressor to generate compressed air and draws in ambient air by default. To use in-house compressed air, attach 1/4-inch tubing into the air inlet on the back of the system. The allowable pressure input is listed on the back of the instrument.

For detailed instructions on enabling use of in-house air, see Enable In-House Air on page 47

Regulatory Compliance

The following directives and harmonized standards were used to evaluate the safety and performance of the Juno system:

General Regulations and Requirements

- 2014/35/EU European Parliament Low Voltage Directive

Harmonized Standards

- IEC/EN 61326-1
- IEC/EN 61010-1
- IEC/EN 61010-2-010
- IEC/EN 61010-2-081
- UL Standard Number 61010-1 2nd Edition
- CAN/CSA-C22.2 No. 61010-1-04
- CAN/CSA-C22.2 No. 61010-2-010:4
- CAN/CSA-C22.2 No. 61010-2-081-04
Conformity Symbols on the Instrument

The instrument is labeled with the following conformity markings:

<table>
<thead>
<tr>
<th>Conformity mark</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Image" alt="CE US" /></td>
<td>Indicates conformity with safety requirements for Canada and the United States.</td>
</tr>
<tr>
<td><img src="Image" alt="CE" /></td>
<td>Indicates conformity with European Union requirements for safety and electromagnetic compatibility.</td>
</tr>
</tbody>
</table>

Refer to the Juno System Site Requirements Guide (PN 100-7072) for more detailed information on the recommended environmental conditions.
Chapter 2: Getting Started with Juno

To run the basic features of Juno™, use the instrument as a guest. To use advanced features, log in as an administrator. (See Using Advanced Features of Juno on page 37.)

**NOTE** Ensure that you have installed the Juno system software v3.1 or later if you are using the Juno 96.96 Genotyping IFC. Install software v3.5 or later if you are using the Juno 96.96 Genotyping IFC or an IFC for the Targeted DNA Sequencing Library application. Install software v3.11.1 or later if you are using the 24.192 Dynamic Array™ IFC for Gene Expression. Install software v3.14.1 or later if you are using the 48.Atlas IFC. To get the latest system software, go to fluidigm.com/software.

**Start the Juno System**

1. Plug the power cable into the power socket. Connect to the network.

   ![Power switch](image)

   **NOTE** The instrument has a connection to protective earth through the power cord provided by Fluidigm. Ensure that the electrical receptacle provides an earth ground before connecting the power cord.

2. Power on the toggle switch on the back of the Juno system:

   ![Power switch](image)

   **NOTE** Switching the back power button on or off turns on or off all components of the system. In contrast, pushing the front power button for ~2 sec wakes up the instrument if it is in sleep mode and prompts the system to display the system shutdown menu. (See Shut Down the System and Then the Instrument on page 35.)
The startup screen displays after 10–15 sec:

Next, the Start screen displays:

The instrument initializes all system components, including communication protocol, vacuum and temperature sensors, software parameters, instrument configuration, and calibration data.
How to Use the Juno Touchscreen

Start a Run

Load an IFC

1. See the appropriate Fluidigm documentation to prepare an IFC for loading the instrument. For related documentation, go to fluidigm.com/documents

2. Install the appropriate interface plate according to Table 1 on page 11. (See Components of the Juno System on page 8, Install an Interface Plate on page 30, and Switch an Interface Plate on page 27.)
NOTE If you have not yet installed an interface plate, the screen displays “Interface plate is required.” (See the following figure.) If you tap OPEN without installing an interface plate, the No Interface Plate is Installed screen displays. Tap Install Interface Plate.

3 Tap OPEN.

4 Place the IFC onto the tray by aligning the notched corner of the IFC to the white notch on the tray. Barcode numbers on the IFC label face out:

CAUTION PINCH HAZARD. The instrument door and tray can pinch your hand. Make sure your fingers, hands, and shirtsleeves are clear of the door and tray when loading or ejecting an integrated fluidic circuit (IFC).
5 Tap **LOAD**:

The screen of available protocols or scripts displays, and the IFC barcode is on the bottom right of the screen:

### IMPORTANT
- If a barcode error message displays, check the IFC position and direction, then reload the IFC. If the instrument still fails to load the IFC, the instrument displays the Enter IFC Barcode screen. Enter the barcode manually, then tap **LOAD**.
- If the interface plate is incorrect for the IFC being loaded, a Load Error screen displays. Tap **SWITCH INTERFACE PLATE** to install the correct interface plate for the IFC (see Switch an Interface Plate on page 27):
Select a Script

1. Install the appropriate interface plate according to Table 1 on page 11. (See Switch an Interface Plate on page 27.)

2. After the IFC loads into the instrument, the system displays the scripts available for the installed interface plate and loaded IFC. You can scroll through them by tapping the bars (if displayed) at the bottom left of the screen or by swiping across the screen. For example:

3. Tap the script to display its Start screen.
Schedule the Harvest with the LP 192.24, LP 48.48, LP 8.8.6, or 48.Atlas IFC

1. Select the appropriate script to run the LP 192.24, LP 48.48, LP 8.8.6, or 48.Atlas IFC.
2. Slide the vertical marker along the bar to set the harvest time. For example:

![Targeted Seq: One Step LP-192.24](image)

Run a Script

**NOTE** You can run a script only if the script is on the instrument or it has been imported from a USB drive. Available scripts are defined by the IFC barcodes.

1. Tap **RUN**. For example:

![Probe GT: Juno 96.96 Fast](image)
A status bar at the bottom of the screen displays an estimated time to completion. To abort the run, tap **ABORT**:

2. At the end of the run, tap **EJECT** to remove the IFC:

3. Tap **CLOSE** at the bottom right of the screen to close the tray.

**NOTE** At the end of the One Step LP-192.24 run, the TX Interface Plate is designed to eject with the IFC. Remove the IFC and install or switch the interface plate to continue.
Switch an Interface Plate

You may need to switch interface plates when you change applications or IFCs on the Juno system. If there is no interface plate installed on the instrument, install the correct one. (See Install an Interface Plate on page 30 for more information.)

1. On the Start screen, tap TOOLS.
2. On the Tools screen, tap Interface Plate. The Interface Plate screen displays.
3. Tap SWITCH INTERFACE PLATE. The instrument ejects the interface plate:

4. Remove the ejected interface plate from the tray.
5. Clean the interface plate to remove any dust particles or debris. (See Clean an Interface Plate on page 52.) Store the ejected interface plate in its storage container.
6. Remove the Interface Plate Loading Fixture from its storage tray.
   - Swivel-style storage container: Pull the tray at the notch to swing out the loading fixture:
   - Box-style storage container: Take the loading fixture out of the labeled drawer.
7. Ensure that there is no IFC on the tray, then place the loading fixture on it in the direction of the arrows with THIS SIDE UP facing up. Barcode numbers on the fixture label face out:
8 Review the guidelines on the screen to select the correct interface plate. (Also see Interface Plates and IFCs on page 11 and Components of the Juno System on page 8):
9 Remove the interface plate to be installed from its storage container and ensure that it is clean. (See Clean an Interface Plate on page 52.)
   - Swivel-style storage container: Pull the tray at the notch to swing out the tray with the correct interface plate.
   - Box-style storage container: Take the interface plate out of the labeled drawer.

10 Seat the interface plate securely on top of the loading fixture. (The MX Interface Plate is an example.) Insert the interface plate in the direction of the arrows with THIS SIDE UP facing up:

11 On the Interface Plate screen, tap INSTALL. The instrument installs the interface plate and ejects the loading fixture.

   **IMPORTANT** If the instrument does not detect the Interface Plate Loading Fixture barcode, enter the barcode on the Enter Loading Fixture Barcode screen, then click LOAD. If the instrument still does not detect the Interface Plate Loading Fixture, remove the interface plate and re-install the fixture (repeat steps 6–11).

12 Remove the loading fixture and store it in its storage container.

13 Tap CLOSE.
Install an Interface Plate

Every IFC requires an interface plate. If there is no interface plate installed or you have tapped OPEN before installing an interface plate, follow this procedure to install one. If the IFC requires a different interface plate, see Switch an Interface Plate on page 27.

1. On the Start screen, tap TOOLS. If you tapped OPEN before installing an interface plate, skip to step 3.

2. On the Tools screen, tap Interface Plate.

3. Tap INSTALL INTERFACE PLATE:

The instrument ejects the tray:
4 Remove the Interface Plate Loading Fixture from its storage container.

5 Ensure that there is no IFC on the tray, then place the loading fixture on it in the direction of the arrows with THIS SIDE UP facing up. Barcode numbers on the fixture label face out:
6 Review the guidelines on the screen to select the correct interface plate (also see Interface Plates and IFCs on page 11 and Components of the Juno System on page 8):

![Interface Plate Selection Screen]

7 Remove the interface plate to be installed from its storage container and ensure that it is clean. (See Clean an Interface Plate on page 52.)

- Swivel-style storage container: Pull the tray at the notch to swing out the tray with the correct interface plate, then remove the interface plate. To swing out all of the trays at once, press the button on the top of the container and pull out the trays:

![Swivel-style Storage Container]

- Box-style storage container: Take the interface plate out of the labeled drawer.
8 Seat the interface plate securely on top of the loading fixture (the MX Interface Plate is an example). Insert the interface plate in the direction of the arrows with THIS SIDE UP facing up:

9 On the Interface Plate screen, tap INSTALL. The instrument installs the interface plate and ejects the Interface Plate Loading Fixture.

**IMPORTANT** If the instrument does not detect the Interface Plate Loading Fixture barcode, enter the barcode on the Enter Loading Fixture Barcode screen, then click LOAD. If the instrument does not detect the Interface Plate Loading Fixture, remove the interface plate and re-install the fixture (repeat steps 4–9).

10 Remove the fixture, and store it in its storage container.

11 Tap CLOSE.

**View System Information**

1 On the Start screen, tap TOOLS.

2 On the Tools screen, tap About This System. On the Diagnostics screen, you can view the system ID, supported IFCs, and firmware and software versions.
Export a Log

1. Plug a USB drive or equivalent storage device into a USB port of the instrument. Wait a few seconds for the instrument to recognize the USB drive.

   If the instrument cannot find the USB drive, the screen displays:

   **No USB drive is found.**

   Tap Back, insert a USB drive and try again.

2. On the Start screen, tap **TOOLS**.

3. On the Tools screen, tap **About This System**.

4. On the About screen, tap **EXPORT LOG**. The instrument confirms it has exported the log to the USB drive.

5. Unplug the USB drive from the instrument.
Shut Down the System and Then the Instrument

Perform the system shutdown procedure to safely shut down the computer system before turning OFF the instrument power.

1. Press and hold the power and standby indicator on the lower right front of the instrument for ≥2 sec until the System screen displays. (See Air Options on page 17.)

2. Tap YES to proceed with system shut down. When the system powers down, the computer shuts down:

![Shut down the system?](image)

**NOTE**
- If the system is busy, a screen displays to wait until a script completes running before trying to power down the system again.
- If you must power down the system due to an unrecoverable error, record the error code and tap SHUTDOWN. The computer shuts down (the screen goes dark). Report the error code to Fluidigm technical support.

3. Wait 10 sec (the screen goes dark). The computer shuts down only.

4. Toggle the power switch on the back of the instrument to OFF. This shuts down all components of the system.
Verify system and instrument shutdown by noting the power and standby indicator:

<table>
<thead>
<tr>
<th>Instrument State</th>
<th>Screen</th>
<th>Power and Standby Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal operation</td>
<td>On</td>
<td>Lit</td>
</tr>
<tr>
<td>Sleep mode</td>
<td>Off</td>
<td>Blinking</td>
</tr>
<tr>
<td>After system shut down</td>
<td>Off</td>
<td>Lit</td>
</tr>
<tr>
<td>After power shut down</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

**NOTE**  The instrument enters sleep mode if no script is running and is idle for >1 hr. To exit sleep mode, touch the screen.

To restart the system, toggle the power switch to ON. (See Start the Juno System on page 19.)
Chapter 3: Using Advanced Features of Juno

To use advanced operations on Juno™, such as managing users and scripts and updating the system, log in as an administrator. To run basic features, use Juno as a guest. (See Chapter 2: Getting Started with Juno on page 19.)

Log In

1. Tap LOG IN at lower left of the Start screen. The Log In screen displays.
2. Tap Admin in the appropriate tab (box) to log in as administrator, or log in with a specific user account.
3. If you log in as the administrator, tap Admin below the tabs (boxes). You do not need a password:

   ![Login Screen](image)

Log Out

1. On the Start screen, tap LOG OUT.
2. On the Login screen, tap LOG OUT.
Manage Scripts

With the Manage Scripts tool, you can:

- Enable Advanced Scripts
- Export Scripts to a USB
- Install Scripts from a USB on page 39

Enable Advanced Scripts

1. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)
2. On the Tools screen, tap Preferences.
3. Select Enabled under Advanced Scripts. (See Advanced Scripts on page 15.)

Export Scripts to a USB

NOTE: You can run a script only if the script is on the instrument or it has been imported from a USB.

1. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)
2. Plug a USB into a USB port of the instrument to copy or add scripts to the USB.
3. On the Start screen, tap TOOLS, then tap Manage Scripts to display the Manage Scripts screen:
4 Tap **Export**. The Modify screen displays:

5 Tap the script name to export (copy) the script from the instrument to a Scripts folder on the USB. A screen confirms copying was successful.

6 (Optional) Tap **EXPORT ALL** to export all scripts to the USB. A status screen displays to confirm the software/firmware was updated successfully. You may be asked if you want to overwrite a script. If you wish to do so, tap **Yes**.

7 Unplug the USB from the instrument.

**Install Scripts from a USB**

**NOTE** You can run a script only if the script is on the instrument or it has been imported from a USB.

1 Ensure that you have logged in to the system as administrator. (See **Log In** on page 37.)

2 Ensure that the scripts were copied on a USB into a “Scripts” folder.

3 Plug the USB with the scripts to be added to a USB port on the instrument.

4 On the Start screen, tap **TOOLS**, then tap **Manage Scripts** to display the Manage Scripts screen.

5 Tap **Install**. A list of scripts available on the USB displays.

6 Tap the script name to add it to the instrument. A screen confirms installation (import). You may be asked if you want to overwrite a script. If you wish to do so, tap **Yes**.

7 (Optional) Tap **INSTALL ALL** to copy all scripts from the USB to the local drive.

   If you are adding scripts to support a new IFC type, the new IFC barcodes are detected and a confirmation screen displays. Tap **YES**.

8 Unplug the USB from the instrument.
Modify Scripts

**IMPORTANT** You can change the properties of added and saved scripts. You cannot modify system scripts. You can only import modified scripts.

**To View the Scripts to Modify**

1. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)
2. (Optional) Enable Advanced Scripts. (See Enable Advanced Scripts on page 38.)
3. On the Start screen, tap **TOOLS**, then tap **Manage Scripts** to display the Manage Scripts screen.
4. Tap **Modify**.
5. Tap a tab to display the appropriate set of scripts:
6 Tap the script name to modify the general or thermal properties of the script:

![Modify 'Probe GT: Juno 96.96 Fast.1'. Interface](image)

**To Change General Properties of a Script**

1. On the Modify screen, tap the saved script to modify. (See To View the Scripts to Modify on page 40.)
2. Tap the edit button to change the category or description. Tap OK.
3. Tap SAVE to overwrite the script or SAVE AS to create a new script.

**To Change Thermal Properties of a Script**

1. On the Modify screen, tap the saved script to modify. (See To View the Scripts to Modify on page 40.)
2 Tap a PCR protocol, such as **Preamplification Step** or **PCR Step**:

![Image of Juno software interface showing modify options]

3 Change the properties as follows:

<table>
<thead>
<tr>
<th>Property</th>
<th>Steps to Change</th>
</tr>
</thead>
</table>
| Segment name and repeats (for example: Hot Start) | 1 Tap and hold the segment name.  
2 Tap an edit button.  
3 Enter a new name or number of repeats.  
4 Tap **OK**. |
| Slice (for example: temperature and duration) | 1 Tap a temperature or duration.  
2 Enter a new temperature in degrees Celsius or a new duration in seconds.  
3 Tap **OK**. |
| Ramp rate                          | 1 Tap the ramp rate on the left vertical axis.  
2 Select a new ramp rate.  
3 Tap **OK**. |
| Segments and slices                | 1 Tap and hold the name of the segment or slice.  
2 Tap  
   • **INSERT LEFT** or **INSERT RIGHT** to add a segment or slice to the left or right of the right-clicked segment or slice. Tap **BACK**.  
   • **REMOVE** to delete a segment or slice that you right-clicked, then tap **YES**.  
3 If necessary, slide the protocol to the left or right to view added segments and slices.  
4 Change the segment name and repeats. See **Segment name and repeats (for example: Hot Start)** in this table.  
5 Change the slice temperature and duration. See **Slice (for example: temperature and duration)** in this table. |

4 Tap **SAVE** to overwrite the script or **SAVE AS** to create a new script. Tap **OK**.
To Remove a Script

1. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)
2. On the Start screen, tap TOOLS, then tap Manage Scripts to display the Manage Scripts screen.
3. Tap Modify. A list of scripts available to modify displays.
4. Tap the added or saved script to be removed to view it.
5. Tap REMOVE, and then tap YES to confirm removal.

Manage Users

1. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)
2. On the Tools screen, tap Manage Users. The Manage User screen displays with the available user accounts:

   - Tap ALL or ADMIN to display all accounts or the administrator account.
   - (Optional) Tap NEW USER.
5 Tap **ADMIN** OR **STANDARD**, and then tap the edit button:

![Add a new user interface](image)

6 A keyboard displays. Enter the user name. Tap **OK**:

![Enter a new user name interface](image)

7 Next to Password, tap the edit button.

8 After the keypad displays, enter the alphanumeric user password, tap **OK**, and then **SAVE**.

9 (Optional) Edit existing user accounts by tapping the edit button by the user name.
Change the Date and Time

1. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)

2. On the Tools screen, tap Preferences. On the Preferences screen, the current date and time display.

3. To edit the date and time, tap the edit button:

4. Slide a value up or down to adjust the date and time, then tap OK.
Update the System

1. Copy the appropriate update package (*.pak) to a USB.
2. Plug the USB into a USB port of the instrument.
3. **(Optional)** On the Start screen, tap **TOOLS** to note the current version of the system software.
4. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)
5. On the Start screen, tap **TOOLS**.
6. On the Tools screen, tap **About This System**.
7. On the About screen, tap **UPDATE SYSTEM**.
8. On the Update System screen, tap **UPDATE**:

![Update System Screen](image)

The instrument reboots and displays the Start screen.

9. Tap **TOOLS** to ensure that the instrument installed the appropriate system software version.
10. Unplug the USB from the instrument.
Enable In-House Air

1. Ensure that you have logged in to the system as administrator. (See Log In on page 37.)

2. Connect 1/4-inch outside diameter tubing to the air inlet at the back of the Juno system:

3. From the system software, tap Tools.

4. Tap Preferences.

5. For Alternate Air Input, tap Enabled:
## Appendix A: Troubleshooting

### Powering ON/OFF

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Cause</th>
<th>Recommended Action</th>
</tr>
</thead>
</table>
| Juno™ system failed to power on                   | No AC power                           | • Verify that the power cable is properly connected to the power socket and the instrument.  
• Verify that the power socket has power.       
• Verify that the toggle switch on the back of the instrument is in the on position. |
| No display after power is turned on and fan is   | Juno system in sleep mode             | Touch the screen or push the front power button for ~2 sec to wake up the instrument. The system shutdown screen displays, which you can cancel by tapping **NO**. The system enters sleep mode when the start screen is displayed and there is no user input for 1 hr. |
| running                                          |                                       |                                                                                  |
| No display after power is turned on and fan is   | Juno system power supply not fully    | Turn off the Juno system power switch on the back panel. Wait 10 sec and reboot by turning on the power switch. All components power on. |
| not running                                      | reset                                 |                                                                                  |
| • System check error                              | Error during system calibration       | Reboot the system. If the system fails to recover, then contact Fluidigm technical support and note any error codes. |
| • Unrecoverable error                             |                                       |                                                                                  |
## Loading

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Cause</th>
<th>Recommended Action</th>
</tr>
</thead>
</table>
| • No or low vacuum. Message: "Insufficient vacuum. Clean the thermal chuck or load an IFC, and try again." | Dirty IFC or chuck surface | • Clean the chuck surface and the back of the IFC with 70% ethanol or 70% isopropyl alcohol and a lint-free cloth. (See Clean the Thermal Cycler Chuck on page 51.) Reload the IFC.  
• Insert the IFC when loading for a run. |
| • Message: "Load error" | | |
| • Carrier orientation error. Message: "The IFC is in the wrong orientation." | IFC placed incorrectly on the tray | Place the ejected IFC correctly on the tray. The notched corner of the IFC should align with the white notch on the tray. |
| • Message: "Load error" | | |
| Barcode read error. Message: "Enter loading fixture barcode." | Optical character recognition failed to read barcode on IFC or the Interface Plate Loading Fixture | • Ensure that the IFC barcode faces you.  
• Enter barcode manually in the Enter IFC barcode screen. |
| Load error. Message: "The carrier is not detected." | • Interface plate is not correct for the IFC  
• Interface plate not supported on system  
• Interface plate missing | • Switch or install the interface plate with an interface plate supported on the Juno system and that supports the IFC. (See Components of the Juno System on page 8, Install an Interface Plate on page 30, and Switch an Interface Plate on page 27.) If necessary, tap OPEN to remove the incorrect IFC, then re-load the correct IFC by tapping LOAD.  
• Position the ejected IFC and interface plate correctly. Ensure that the notched corner of the IFC aligns with the white notch on the tray. Insert the interface plate in the direction of the arrows with THIS SIDE UP facing up. Confirm that the loading map sticker has been removed from the bottom of the IFC. |
| Message: "Unrecoverable error." | Various | • Restart the system.  
• If the problem persists, contact Fluidigm technical support. |
Running

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Cause</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error messages</td>
<td>Various</td>
<td>1 Eject the IFC, and then eject the interface plate. (See Clean an Interface Plate on page 52.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 With a lint-free cloth, wipe the interface plate, underside of the IFC, barrier tape surface, and thermal chuck to remove any lint or particulates. Removing external debris could stop an air leak, which triggers error message P14. (See Clean the Thermal Cycler Chuck on page 51 and Clean an Interface Plate on page 52.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Reload the interface plate, and then the IFC, and restart the run. (See Clean an Interface Plate on page 52 and Run a Script on page 25.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 After 5–10 min, check the run.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 If the error message displays again, eject the IFC, and reboot the system. (See Shut Down the System and Then the Instrument on page 35.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 If the system fails to recover, note error codes, and contact Fluidigm technical support.</td>
</tr>
<tr>
<td>Screen does not display</td>
<td>Sleep mode</td>
<td>Touch the screen to display it.</td>
</tr>
</tbody>
</table>

Cleaning

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Cause</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to start the Clean System run</td>
<td>• Cleaning Plate missing</td>
<td>Eject the interface plate and put the Cleaning Plate into the tray. (See Clean the Juno System on page 54.)</td>
</tr>
<tr>
<td></td>
<td>• Interface plate not removed</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Preventive Maintenance, Decontamination, and Disposal

IMPORTANT Before using a cleaning or decontamination method other than those recommended by Fluidigm, verify with Fluidigm technical support that the proposed method will not damage the equipment.

Preventive Maintenance

This section describes how to clean and maintain your Juno™ system for optimal performance.

Preventive Maintenance Recommendations

For optimal performance of your Juno system, we recommend:

• Performing annual maintenance by a certified Fluidigm service technician.
• Ordering a replacement interface plate from Fluidigm when the plate is approaching its lifetime expectancy of 2,000 runs.
• Only using replacement parts supplied by Fluidigm Corporation.

Clean the Thermal Cycler Chuck

We recommend cleaning the thermal cycler chuck once a day.

1. Allow system to cool down by waiting at least 5 min after the completion of a run protocol.

   CAUTION HOT SURFACE HAZARD. The thermal cycler chuck gets hot and can burn your skin. Use caution when working near the chuck.

2. Tap OPEN on the Start screen.

3. Remove the IFC from the tray.

4. Moisten a lint-free cloth or soak lint-free swabs with 70% ethanol or 70% isopropyl alcohol.

   WARNING BIOHAZARD. If you are putting biohazardous material on the instrument, use appropriate personal protective equipment and adhere to Biosafety in Microbiological and Biomedical Laboratories (BMBL), a publication from the Centers for Disease Control and Prevention, and to your lab’s safety protocol to limit biohazard risks. If biohazardous materials are used, properly label the equipment as a biohazard. For more information, see the BMBL guidelines online at cdc.gov/biosafety/publications/index.htm.

5. With the cloth or swabs, remove debris from the thermal cycler chuck by gently wiping towards the vacuum holes according to the pattern of the chuck. Next, wipe along the perimeter of the chuck:
Clean an Interface Plate

We recommend cleaning the interface plate:

- Every time you switch interface plates in the instrument.
- Before you store an interface plate in the interface plate storage container.

1. On the Start screen, tap **TOOLS**.
2. On the Tools screen, tap **Interface Plate** to display the Interface Plate screen.
3. Tap **CLEAN INTERFACE PLATE**:

   ![Interface Plate Cleaning Screen]

   - **Manage interface plate.**
   - **Type:** SX interface plate
   - **Supported IFCs:** June 96.36 GT
   - **Completed Runs:** 0 runs since last interface plate cleaning
   - **Remaining Runs:** 50 single runs before cleaning interface plate

   - **CLEAN INTERFACE PLATE**
   - **SWITCH INTERFACE PLATE**
   - **BACK**

   The instrument ejects the interface plate.
4 Remove the interface plate from the tray.

5 Use a lint-free cloth and 70% ethanol or 70% isopropyl alcohol to gently wipe the bottom and top of the interface plate to remove any debris:

6 Insert the Interface Plate Loading Fixture on the tray in the direction of the arrows with THIS SIDE UP facing up. Barcode numbers on the fixture label face out:

7 Seat the cleaned interface plate on top of the fixture. (The MX Interface Plate is an example.) Insert the interface plate in the direction of the arrows with THIS SIDE UP facing up:
8 Tap **INSTALL**. The instrument installs the interface plate and ejects the fixture.

9 Remove the fixture and store it in the interface plate storage container.

10 Tap **CLOSE**, and then tap **BACK** twice to return to the Start screen.

**Clean the Juno System**

Clean the instrument after every 250 runs. After 250 runs, the instrument will not operate until the instrument is cleaned.

1 Ensure that you have a new or cleaned and dust-free Cleaning Plate.

2 On the Start screen, tap **TOOLS**.

3 On the Tools screen, tap **Clean System**.

4 On the System Clean screen, tap **CLEAN SYSTEM**. The Clean system screen displays. If there is an interface plate in the instrument, the instrument releases it.

5 If there is an interface plate in the tray, remove it.
6 Place the Cleaning Plate on the tray so that the notches are on the left side:

7 Tap **RUN** and then **CONFIRM**. The instrument begins system cleaning, and the Running “System cleaning” screen displays.

8 After system cleaning, remove the ejected Cleaning Plate.

9 Use a lint-free cloth and 70% ethanol or 70% isopropyl alcohol to gently wipe the top and bottom of the Cleaning Plate to remove any debris, or appropriately dispose of the Cleaning Plate.

10 If you want to install an interface plate in the instrument, proceed to the next step. If you do not want to install an interface plate, skip to step 15.

11 Insert the Interface Plate Loading Fixture on the tray in the direction of the arrows with **THIS SIDE UP** facing up. Barcode numbers on the fixture label face out.

12 Seat the desired and cleaned interface plate securely on top of the fixture. Insert the interface plate in the direction of the arrows with **THIS SIDE UP** facing up.

13 Tap **INSTALL**:

**NOTE** If you have aborted the Clean Instrument protocol, you must install the appropriate interface plate for the IFC to be run.
14 After the instrument installs the interface plate, remove the ejected Interface Plate Loading Fixture from the tray and store the fixture in the interface plate storage container.

15 Tap **CLOSE**.

16 Tap **BACK** to return to the Tools screen.

**Clean the Touchscreen**

Wipe down the touchscreen with a lint-free cloth as needed.

**IMPORTANT**

- Do not spray cleaning solution directly on the touchscreen, as it may penetrate the seams around the screen and cause damage. Spray cleaning solution on a lint-free cloth and then gently wipe instrument surface.
- Do not use bleach to clean the instrument as it is corrosive to metal.
- Before using a cleaning or decontamination method other than those recommended by Fluidigm, verify with Fluidigm technical support that the proposed method will not damage the equipment.

**Replace the Fuses**

No fuse replacement is required during installation. If either of the power fuses is found to be faulty, replace both fuses:

1 Toggle the main power switch on the rear of the instrument OFF, and unplug the instrument from the wall outlet.

2 Remove the fuse holder from the inlet power switch by pushing and releasing the fuse holder blocks.

3 Replace both fuses (8 A, 250 V type, time-lag T fuse), and reinstall the fuse holder. Follow the arrow marks in the fuse holder to match the casing.

4 Plug the instrument into the wall outlet, and toggle the main power switch **ON**.
Decontamination

**WARNING** BIOHAZARD. If you are putting biohazardous material on the instrument, use appropriate personal protective equipment and adhere to Biosafety in Microbiological and Biomedical Laboratories (BMBL), a publication from the Centers for Disease Control and Prevention, and to your lab’s safety protocol to limit biohazard risks. If biohazardous materials are used, properly label the equipment as a biohazard. For more information, see the BMBL guidelines online at cdc.gov/biosafety/publications/index.htm.

Ensure that the Juno system is cleaned and/or decontaminated prior to servicing the equipment, removing it from use, or transporting it for disposal. Refer to the instructions contained in this document and use only those materials specified.

**Biological Agents**

1. Using a soft cloth, apply 70% ethyl alcohol or 70% isopropyl alcohol to all accessible surfaces.
2. Keep surfaces wet for at least 5 min, then wipe dry.
3. Repeat steps 1 and 2 once.
4. Clean all decontaminated surfaces with a wet cloth to remove residual alcohol and wipe dry.

**Hazardous Chemicals**

1. Using a soft cloth, apply 70% ethyl alcohol or 70% isopropyl alcohol to all accessible surfaces.
   
   **IMPORTANT** Before use, ensure that alcohol is compatible with the chemicals used.
2. Keep surfaces wet for at least 5 min, and then wipe dry.
3. Repeat steps 1 and 2 once.
4. Clean all decontaminated surfaces with a wet cloth to remove residual alcohol and wipe dry.

**Radioactive Materials**

1. Using a soft cloth, apply an industry standard radioactivity decontaminant to all accessible surfaces.
2. Wipe the surfaces as directed by the decontaminant manufacturer.
3. Survey the instrument with an appropriate radioactivity measuring device.
4. Ensure that the survey results are at or below background level.
Disposal of Products

Used IFCs and reagents should be handled and disposed of in accordance with federal, state, regional, and local laws for hazardous waste management and disposal.

Do not dispose of this product in unsorted municipal waste. This equipment may contain hazardous substances that could affect health and the environment. Use appropriate take-back systems when disposing of materials and equipment.

Learn more at fluidigm.com/compliance
Appendix C: Related Documents

The latest Juno™ system usage and application-specific documentation is available for download at fluidigm.com.

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juno System Site Requirements Guide</td>
<td>100-7072</td>
</tr>
<tr>
<td>Juno Usage Quick Reference</td>
<td>100-7713</td>
</tr>
<tr>
<td>Control Line Fluid Loading Procedure Quick Reference</td>
<td>68000132</td>
</tr>
</tbody>
</table>
Appendix D: Safety

**IMPORTANT** For translations of the instrument safety information, see Safety Information for Genomics Instruments (101-6810).

**General Safety**

In addition to your site-specific safety requirements, Fluidigm recommends the following general safety guidelines in all laboratory and manufacturing areas:

- Use the appropriate personal protective equipment (PPE): safety glasses, fully enclosed shoes, lab coats, and gloves, according to your laboratory safety practices.

- Know the locations of all safety equipment (fire extinguishers, spill kits, eyewashes/showers, first-aid kits, safety data sheets, etc.), emergency exit locations, and emergency/injury reporting procedures.

- Do not eat, drink, or smoke in lab areas.

- Maintain clean work areas.

- Wash hands before leaving the lab.

**Instrument Safety**

The instrument should be serviced by authorized personnel only.

**WARNING** Do not modify this instrument. Unauthorized modifications may create a safety hazard.

**WARNING** BIOHAZARD. If you are putting biohazardous material on the instrument, use appropriate personal protective equipment and adhere to Biosafety in Microbiological and Biomedical Laboratories (BMBL), a publication from the Centers for Disease Control and Prevention, and to your lab's safety protocol to limit biohazard risks. If biohazardous materials are used, properly label the equipment as a biohazard. For more information, see the BMBL guidelines online at cdc.gov/biosafety/publications/index.htm.

**WARNING** PHYSICAL INJURY HAZARD. Do not attempt to lift or move any boxed or crated items unless you use proper lifting techniques. The weight of the crated instrument is 82 kg (180 lb). If you choose to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others. Use appropriate moving equipment and proper lifting techniques to minimize the chance of physical injury.

**CAUTION** PINCH HAZARD. The instrument door and tray can pinch your hand. Make sure your fingers, hands, and shirtsleeves are clear of the door and tray when loading or ejecting an integrated fluidic circuit (IFC).

**CAUTION** HOT SURFACE HAZARD. The thermal cycler chuck gets hot and can burn your skin. Use caution when working near the chuck.
Symbols on the Instrument

The following table describes the hazard symbols that may be used in this document or on labels on the instrument.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Hazard. Consult the user guide for further information.</td>
</tr>
<tr>
<td>🔥🔥🔥</td>
<td>Hot surface hazard. Do not touch; potential for personal injury.</td>
</tr>
<tr>
<td>🦠</td>
<td>Biohazard.</td>
</tr>
<tr>
<td>⚡️</td>
<td>Electricity hazard. Indicates high electricity levels and a threat of electric shock from machines and/or equipment in the vicinity. You may suffer severe injuries or death.</td>
</tr>
<tr>
<td>⚠️🛠️</td>
<td>Pinch hazard. Indicates where pinch hazards exist. Exercise caution when operating around these areas.</td>
</tr>
<tr>
<td>⚠️_man</td>
<td>Lifting hazard.</td>
</tr>
<tr>
<td>⚪️</td>
<td>Power and standby symbol.</td>
</tr>
<tr>
<td>⚪️</td>
<td>Power switch is in the Off position.</td>
</tr>
<tr>
<td>⚪️</td>
<td>Power switch is in the On position.</td>
</tr>
<tr>
<td>⚪️&lt;Sprite&gt;</td>
<td>Protective conductor terminal (main ground). It must be connected to earth ground before any other electrical connections are made to the instrument.</td>
</tr>
<tr>
<td>⚫️</td>
<td>To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision. Contact customer service for information about responsible disposal options.</td>
</tr>
</tbody>
</table>

Electrical Safety

**NOTE** The main power disconnect is on the rear panel of the instrument.

**WARNING** ELECTRICAL HAZARD. DO NOT REMOVE THE COVERS. Electrical shock can result if the instrument is operated without its protective covers. No internal components are serviceable by the user.

**WARNING** ELECTRICAL HAZARD. Plug the instrument into a properly grounded receptacle with adequate current capacity.
Chemical Safety

The responsible individuals must take the necessary precautions to ensure that the surrounding workplace is safe and that instrument operators are not exposed to hazardous levels of toxic substances. When working with any chemicals, refer to the applicable safety data sheets (SDSs) provided by the manufacturer or supplier.