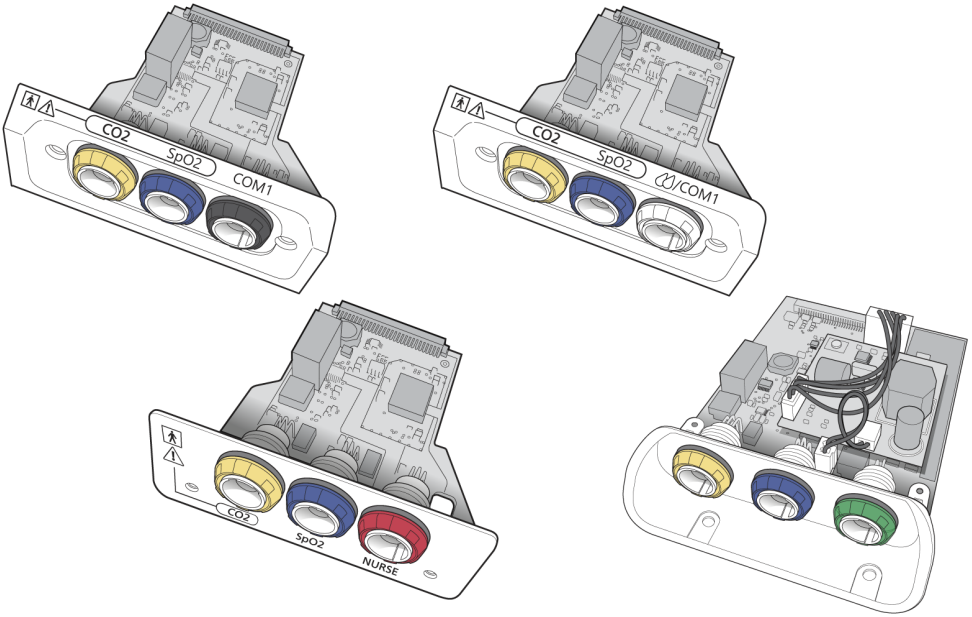


# Communication board

## User Guide

**REF** 160140, 161535, 161537, 161635, 161990, 161520, 161636, 160184, 160185, 10076964, 10076965

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HAMILTON MEDICAL

Intelligent Ventilation since 1983

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# Preface

### Conventions used in this guide

**⚠ WARNING**

Alerts the user to the possibility of injury, death, or other serious adverse reactions associated with the use or misuse of the device.

**⚠ CAUTION**

*Alerts the user to the possibility of a problem with the device associated with its use or misuse, such as device malfunction, device failure, damage to the device, or damage to other property.*

***NOTICE***

Emphasizes information of particular importance.

# 1 Overview

Hamilton Medical ventilators offer extended communication options using the communication boards described in the following tables.

Table 1. HAMILTON-C1/C2/C3/C6/T1 communication boards

| Communication board | REF | Description |
|---|---|---|
| **HAMILTON-C2, HAMILTON-C3** | | |
| CO2, SpO2, Nurse Call | 160140 | Support for CO2 monitoring and remote alarm capability |
| **HAMILTON-T1** | | |
| CO2, COM1, Nurse Call | 161535 | Support for CO2 monitoring, data transfer, and remote alarm capability |
| CO2 | 161537 | Support for CO2 monitoring |
| CO2, SpO2, /COM1[1, 2] | 10076965 | Support for CO2 and SpO2 monitoring, interface with HAMILTON-H900 humidifier, and data transfer[1] |
| CO2, SpO2, COM1[2] (red) | 161635 | Support for CO2 and SpO2 monitoring, and data transfer |
| CO2, SpO2, COM1[2] (gray) | 161990 | Support for CO2 and SpO2 monitoring, and data transfer |
| **HAMILTON-C1** | | |
| CO2, COM1, Nurse Call | 161520 | Support for CO2 monitoring, data transfer, and remote alarm capability |
| CO2, SpO2, /COM1[1, 2] | 10076964 | Support for CO2 and SpO2 monitoring, interface with HAMILTON-H900 humidifier, and data transfer[1] |
| CO2, SpO2, COM1[2] | 161636 | Support for CO2 and SpO2 monitoring, and data transfer |

[1] RS-232 connection over the /COM1 port is only available when using the communication Y-cable (PN 10077038).
[2] Available for HAMILTON-T1 ventilators with SN 3000 and higher, HAMILTON-C1 ventilators with SN 6000 and higher.

| Communication board | REF | Description |
|---|---|---|
| **HAMILTON-C6** | | |
| CO2, SpO2 | 160185 | Support for CO2 and SpO2 monitoring |
| CO2, SpO2, Aerogen | 160184 | Support for CO2, SpO2 and Aerogen nebulization data monitoring |

The communication boards are intended to be used for the following tasks:

Table 2. Supported communication options

| Using the connector... | The ventilator can... |
|---|---|
| CO2 | Monitor the patient's exhaled **CO2** with an attached CO2 sensor (*not included*). |
| SpO2[3,4] | *HAMILTON-C1/T1/C3/C6 only*. Monitor the patient's **SpO2**, pulse rate, and optional related pulse-oximetry data with an attached SpO2 adapter and sensor (*not included*). |
| COM | *HAMILTON-C1/T1 only*. Send monitored data, ventilator settings, and alarms to a patient monitor, patient data management system (PDMS), or other computer system.<br>On the HAMILTON-C6 ventilator, the COM ports are included as extended communication ports; the communication board is not required. |
| /COM1 | *HAMILTON-C1/T1 only*. Support remote access to status and controls of a connected HAMILTON-H900 humidifier (*not included*), and send monitored data, ventilator settings, and alarms to a patient monitor, patient data management system (PDMS), or other computer system over an RS-232 connection.[5] |

[3] Currently only available for HAMILTON-T1 ventilators with SN 3000 and higher, and HAMILTON-C1 ventilators with SN 6000 and higher.
[4] SpO2 monitoring and the COM connection are NOT supported on HAMILTON-C2 ventilators.
[5] RS-232 connection over the /**COM1** port is only available when using the communication Y-cable (PN 10077038).

| Using the connector... | The ventilator can... |
|---|---|
| Nurse Call | *HAMILTON-C1/T1/C2/C3 only*. Send alarm and timing signals to external stations.<br>On the HAMILTON-C6 ventilator, the **Nurse call** port is included as an extended communication port; the communication board is not required. |
| Aerogen | *HAMILTON-C6 only*. Support Aerogen nebulizer integration (*not included*). |

Table 3. HAMILTON-C1/T1 communication board configurations

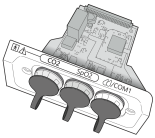
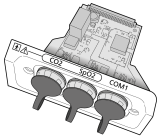
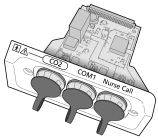
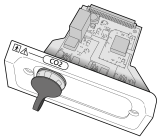
| **CO2, SpO2, /COM1** | **CO2, SpO2, COM1** |
|---|---|
|  |  |
| **CO2, COM1, Nurse Call** | **CO2**<br>*HAMILTON-T1 only* |
|  |  |

Table 4. HAMILTON-C2/C3 communication board configurations

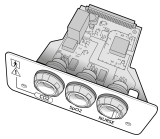
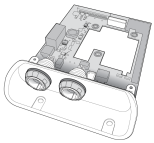
| **CO2, SpO2, Nurse Call**[4] |
|---|
|  |

Table 5. HAMILTON-C6 communication board configurations

| **CO2, SpO2** | **CO2, SpO2, Aerogen** |
|---|---|
|  |  |

# 2 Installing a communication board

**⚠ WARNING**

- Additional equipment connected to medical electrical equipment must comply with the respective IEC or ISO standards. All configurations must comply with the requirements for medical electrical systems, IEC 60601-1, clause 16.
- Anybody connecting additional equipment to medical electrical equipment configures a medical system and is responsible for ensuring that the system complies with the requirements for medical electrical systems. Local laws take priority over the above-specified requirements.

**⚠ CAUTION**

*To prevent damage to sensitive electronic circuits, do not touch the circuit board, and be sure to use ESD-protective gear.*

***NOTICE***

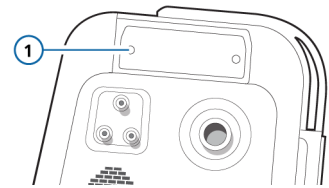
- The communication board must be installed by a Hamilton Medical authorized service engineer.
- Use only the original screws provided with the ventilator.
- The communication board includes protective covers for the connector ports. When a port is not in use, make sure the cover is in place, sealing the port.
- If you remove the communication board, be sure to reattach the cover plate to protect the connection components.
- All of the listed options are not supported on every ventilator model. See Table 1 to determine what is supported on your device.

### Before you begin

- Ensure the ventilator is turned off and disconnected from all power sources:
  - Disconnect the ventilator from external power.
  - Remove the batteries. For details, see your ventilator *Operator's Manual*.
- Have an appropriate screwdriver available.

### To install the communication board in a HAMILTON-C1/T1 ventilator

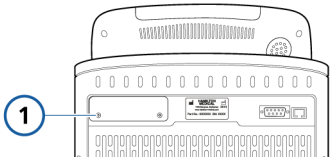
1. Perform the electrical safety text as described in the ventilator *Service Manual*.
2. Remove the cover plate from the ventilator by removing the two flathead screws (**1**).




3. Carefully insert the communication board into the open slot and secure the board using the same screws. Do not overtighten the screws.
4. Be sure to store the cover plate after removal for potential future use.

### To install the communication board in a HAMILTON-C2/C3 ventilator

1. Perform the electrical safety text as described in the ventilator *Service Manual*.
2. Remove the cover plate from the ventilator by removing the two Phillips screws (**1**).




3. Carefully insert the communication board into the open slot and secure the board using the same screws. Do not overtighten the screws.
4. Be sure to store the cover plate after removal for potential future use.

### To install the communication board in a HAMILTON-C6 ventilator

Installation of the communication board is only permitted by Hamilton Medical technical service personnel. Contact your Hamilton Medical technical representative for additional information.

### Next steps

- For additional required components, see Section 3.
- Options (CO2, SpO2) and sensors must be enabled on the ventilator before they are operational. For details, see the ventilator *Operator's Manual*.
- For more information, and when applicable, connector diagrams and pin assignments for the various cables (COM, Nurse Call), see the associated user guides and the ventilator *Operator's Manual*.

  – *Nurse Call Cable User Guide* PN 624344

  – *COM1 Cable User Note* PN 624442

# 3 Additional required components

The communication boards do not include any required cables, sensors, or other components required to enable the supported functionality.

This section describes the additional components required for each connection option, available from Hamilton Medical.

Table 6. Required components for use with communication boards

| Communication option | Additional required components |
|---|---|
| CO2 monitoring | Order the appropriate Hamilton Medical CO2 sensor:<br>• Capnostat 5 CO2 sensor (PN 281718)<br>• Capnostat 5 CO2 sensor with angled connector (PN 282157)<br>• LoFlow CO2 sidestream sensor (PN 281928) |
| SpO2 | *HAMILTON-C1/T1/C3/C6 only*.<br>• Masimo:<br>Masimo SpO2 Starter Kit (PN 950210, 950201, or 10104745) and the appropriate SpO2 sensors.<br>• Nihon Kohden SpO2 sensor adapter (PN 282010) and the appropriate SpO2 sensors.<br>For details, see the SpO2-measurement-related catalog. |
| /COM1 | *HAMILTON-C1/T1 only*.<br>Two communication cables are supported for HAMILTON-H900 humidifier integration:<br>• Communication cable to HAMILTON-H900 (PN 950473)<br>• Communication Y-cable to HAMILTON-H900 and with RS232 interface (PN 10077038)<br>RS-232 connection over the /**COM1** port is *only* available when using the communication Y-cable (PN 10077038). |
| COM | *HAMILTON-C1/T1 only*.<br>Order the COM cable (PN 161545, 161650). Additional third-party components may be required to connect to the target device.<br>For interface and connection details, see the ventilator *Operator's Manual*. |

| Communication option | Additional required components |
|---|---|
| Nurse Call | Order the appropriate Nurse Call cable for your requirements (PN 160166, PN 161761, or PN 161196).<br>For additional details, see *Nurse Call Cable User Guide*. |
| Aerogen | *HAMILTON-C6 only*.<br>Order an Aerogen nebulizer system. See the *Hamilton Medical e-catalog* for details. |

# 4 Enabling options on the ventilator

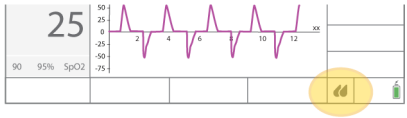
After installing the communication board, you must also enable the CO2 and/or SpO2 hardware, define SpO2 sensor settings (if applicable), and enable the sensors on the ventilator.

- In **Configuration**:
  - Enable the **CO2** and/or **SpO2** option.
  - Configure SpO2 sensor data settings, if needed.
- In the **System > Sensors On/off** window, enable CO2 and/or SpO2 monitoring.

These steps are described in detail in your ventilator *Operator's Manual* and the *Pulse Oximetry Instructions for Use*.

### HAMILTON-C1/T1, HAMILTON-H900 integration

By default, the humidifier integration interface is enabled. When integration is enabled, the humidifier droplets are displayed in the lower right corner of the ventilator main display.




If the droplets are absent, integration is disabled. In this case, the **Configuration > SW options** window lists the entry, **Humidifier GUI disabled**.

To enable the humidifer integration interface, see the *Software Installation Guide* and contact your Hamilton Medical technical representative for the appropriate option key.

# 5 Disposal

Dispose of all parts removed from the device according to your institution's protocol. Follow all local, state, and federal regulations with respect to environmental protection.

For more information:
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