IntelliBridge Installation Manual

Interfacing the tCOM+ with Philips Patient Monitoring Systems (PPMS)

(tCOM+ Software Version SMB SW-V01.02.00 or higher)

sentec.

Contents

Introduction

The tCOM+ supports communication with Philips Patient Monitoring Systems (PPMS) by using an IntelliBridge Interface or the legacy VueLink Interface Module Auxiliary Plus (Type B).

Note: The VueLink Interface Module has been discontinued by Philips and cannot be purchased for Philips patient monitors software version M or higher. VueLink module M1032A were only supported until the end of 2017. This document does not include detailed instructions for integration of the tCOM+ using a VueLink Interface Module.

Once the connection between the tCOM+ and the PPMS is established, the tCOM+ transfers all patient data (PCO_2, PO_2, SpO_2, PR, Absolute Heating Power (AHP) and the plethysmographic waveform) as well as most of the alert messages (alarms and inops (inoperable conditions)) to the PPMS online. Alarm limit violations of SpO_2, PCO_2, PO_2 and PR are transferred as yellow alerts.

Irrespective of the sensor position or operation mode/status of the tCOM+, only the parameters which are enabled in the tCOM+ profile are displayed on the PPMS including only the parameter specific messages of the tCOM+. In the Demo Mode, „tCOM+ DEMO MODE" replaces all messages (Note: DEMO mode is not available for all tCOM+ SW releases). AHP data are transferred to the PPMS if AHP or RHP Heating Power modes are selected on tCOM+.

The connection procedure must be followed only once, afterwards the tCOM+ and Philips monitor should communicate even after disconnecting / reconnecting the tCOM+ or after power OFF/ON.

Note: The VueLink or IntelliBridge Open Interface Protocol is unidirectional, i.e. a PPMS can display data received from the tCOM+ but cannot remotely control the tCOM+.

Note: Due to the specific features of the VueLink or IntelliBridge Open Interface Protocol the data transmission from the tCOM+ to PPMS may be delayed by several seconds.

Note: The tCOM+ has been validated with the English version of the VueLink or IntelliBridge Open Interface Protocol. If other languages are used on the PPMS while connected to the tCOM+, conflicts and unpredictable behavior may occur.

Note: The "Philips VueLink" and "Philips IntelliBridge" implementations support the PCO_2 units "mmHg" and "kPa".

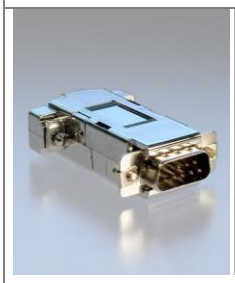
Note: The protocols "Philips VueLink" and "Philips IntelliBridge" enable the transfer of PCO_2 data up to 99.9 mmHg only with a resolution of "xx.x", whereas the protocols "Philips VueLink 2" and "Philips IntelliBridge 2" enable the transfer of PCO_2 data up to 200 mmHg with reduced resolution of "xxx".

Note: Accessory equipment (e.g., a PC) connected to the monitor's data ports must comply to IEC 60950-1 or IEC 62368-1. All resulting combinations of equipment must be in compliance with the IEC standard 60601-1 systems requirements. Anyone who connects accessory equipment to the tCOM+ configures a medical system and is, therefore, responsible for ensuring that the resulting system complies with the requirements of standard IEC 60601-1 and the electromagnetic compatibility standard IEC 60601-1-2.

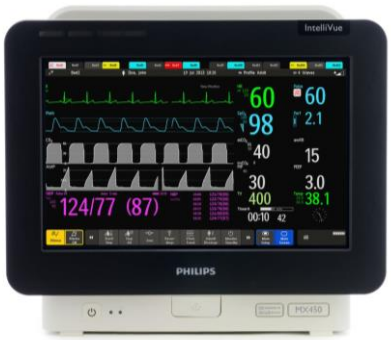
CAUTION: When connecting/mounting the tCOM+ to accessory equipment (e.g. PCs, PSG-Systems, (wireless) networks, roll stands, mounting plates, incubators, etc.), verify proper operation before clinical use of the tCOM+ and accessory equipment. In certain cases, it may be required that the tCOM+ and the accessory equipment must be connected to a grounded AC outlet. In case of doubt, consult qualified technicians.

Required Components / System Requirements

Components required from Sentec

	Sentec tCOM+ REF: 103164
 	VueLink Adapter (only needed for legacy VueLink Interface) Product Code: VL-A **Note:** The old (left side) adapter has been superseded by the new (right side) adapter. Both types can be used in equivalent fashion.

IntelliBridge Components required from Philips

	**Philips Patient Monitoring System (PPMS) with at least one module rack** Connection is possible to the following systems: - IntelliVue™ MP40/50/60/70/80/90 (Rev. H.15 or higher) and MX600/700/750/800/850 (Rev. H.15 or higher) - IntelliVue™ MX400/450/500/550 (all software versions)
	**Philips IntelliBridge EC10 Module** To be ordered from Philips Note: The IntelliBridge OpenInterface device driver ED101 must be available on the EC10 Note: The Philips IntelliVue™ MX400/450/500/550 have an optional IntelliBridge Interface port directly integrated in the monitor hardware that must be activated. For these models an IntelliBridge EC10 Module is not needed, if an integrated interface port is available.
	**Patch Cable, CAT5 or better, straight wired** To be ordered from Philips together with EC5, see below, (option L0X)
	**IntelliBridge EC5 ID Module (#101)** To be ordered from Philips

Sentec assumes no liability for correctness of stated Philips` order codes

Setting up the connection

Note: The instructions below refer to the Philips IntelliVue MX400 patient monitor. The procedure to set up the connection can slightly vary for other models.

Note: The instructions below describe the setup of the IntelliBridge interface only (the legacy VueLink interface is not described).

To set-up a connection of the tCOM+ to the PPMS proceed as follows:

1. Switch the Philips Patient Monitoring System OFF.

2. Localize the module rack on your Philips monitor and insert the IntelliBridge Interface Module in the module rack of the Philips Monitor
   Note: Not applicable for Philips IntelliVue™ MX400/450/500/550, as these models have a fully integrated IntelliBridge EC10 Module

3. Connect the EC5 ID Module to the IntelliBridge Patch Cable.

4. Connect the Connection Cable / Patch Cable to the Interface Module on the backside of the Philips Monitor

5. Connect the EC5 ID Module to the tCOM+ serial data port (use the screws to fix the EC5 ID Module to the tCOM+).

6. Switch the PPMS ON

7. On the tCOM+, set the menu-parameter "Advanced Settings / Interfaces / Serial " to
   - "Philips VueLink/IntelliBridge"
     (*supported PCO2 range from 0.1 mmHg to 99.9 mmHg, resolution "xx.x"*)
     or to
   - "Philips VueLink/IntelliBridge 2"
     (*supported PCO2 range from 0 to 200 mmHg, resolution "xxx"*)

8. The communication between the tCOM+ and PPMS should be established within approx. 45 seconds. Once the communication is established, the tCOM+ registers as "Sentec tCOM+" at the PPMS.

Note: Communication status is shown on module LED: blinking green: establishing communication, green: running communication, blue: communication error, check setup (e.g. dis- and reconnect cable)

Note: When activating/deactivating different sets of enabled parameters on the tCOM+ (e.g. PCO2 only or SpO2/PR only), or switching between the PCO_2 unit “mmHg” and “kPa” on the tCOM+, the communication between the tCOM+ and the PPMS will be interrupted for a short period of time, as the tCOM+ sends a new configuration file to the PPMS (IntelliBridge interface requirement).

Configurations

Configuration of the tCOM+

Set the menu-parameter "Advanced Settings / Interfaces / Serial " to:

- "Philips VueLink/IntelliBridge"
  (*supported PCO2 range from 0.1 mmHg to 99.9 mmHg, resolution "xx.x"*)
  or to
- "Philips VueLink/IntelliBridge 2"
  (*supported PCO2 range from 0 to 200 mmHg, resolution "xxx"*)

Configuration of the IntelliBridge EC10 Module

No configuration is necessary for the EC10 module.

Configuration of the Display of the PPMS

The following real-time data of the tCOM+ are available on the PPMS through the IntelliBridge Interface:

Parameter	Name on PPMS	Type
PCO_2	tcpCO2	Numeric
PO_2	tcpO2	Numeric
SpO_2	SpO2	Numeric
PR (Pulse Rate)	Pulse	Numeric
AHP	AHP	Numeric
Plethysmographic Waveform	Pleth	Wave

Each parameter can be selected or deselected individually, using the configuration screen "Sentec tCOM+" on the PPMS.

Note: A PPMS may accommodate several IntelliBridge interface modules at once. They are identified as "AUXILIARY PLUS 1", "AUXILIARY PLUS 2" etc. Be cautious to select the proper identifier.

Note: Regardless of whether `Absolute´ heating power (AHP) or `Relative´ heating power (RHP) is enabled on tCOM+, solely AHP data are transferred to PPMS when the parameter Heating Power is activated.

Alerts

The IntelliBridge Open Interface Protocol distinguishes between two types of alerts: alarms and inops (i.e. inoperable conditions).

Depending on the specific PPMS model, only one alert message text of each alert type may be displayed on the PPMS at a time. Thus, a priority is assigned to each alarm and inop. All other functions related to alerts (e.g. value blinking, marking with "?") of two or more active alerts may occur simultaneously.

Note: Alerts are deactivated in IntelliBridge by default. Their activation requires access to the configuration mode of the monitor and can be done by technical staff only.

Note: The IntelliBridge interface does not allow the PPMS to generate audible signals at the bedside for alarms and inops generated by the tCOM+.

Alarms

The IntelliBridge Open Interface Protocol defines two types of alarms:

Red alarms: Indicate potentially life-threatening situations. An immediate response is required.

Yellow alarms: Indicate less critical situations. A response is required, but of a less critical importance.

Data from the tCOM+ cause the following yellow alarms on the PPMS:

Message text	Explanation
tcpCO2 HI/LO	Alarm limit violation of $tcpCO_2$ (PCO_2) values
tcpO2 HI/LO	Alarm limit violation of $tcpO_2$ (PO_2) values
tCOM+ HI/LO SpO2	Alarm limit violation of SpO_2 values
tCOM+ HI/LO PR	Alarm limit violation of Pulse (PR) values

Note: Alarm limit violation of a parameter causes the respective numeric value to blink on the PPMS.

Note: If alarms are muted on the tCOM+ (in general or parameter specific), the PPMS displays an *alarm mute symbol* next to the respective numeric values of the tCOM+

Inops

The IntelliBridge Open Interface Protocol defines an inop as a notice for the medical staff triggered by the equipment. Inop notices are based on the determination of the current equipment status. Each inop carries additional information either on the validity of all related measurements (general inop) or on the validity of a specific numeric value. Depending on this validity/inop combination, the numeric may differently be shown on the PPMS.

Message text	Specific to	Corresponding Status Messages (Codes) on the tCOM+
tCOM+ BATTERY LOW		Battery low (LB) Battery critical (BC) Note: The tCOM+'s message "Battery critical" is only transmitted to the PPMS if the tCOM+ is not connected to AC power.
tCOM+ CALIB. SENS.	$tcpCO_2$, $tcpO_2$	Calibrate sensor (Csi, Cso)

Message text	Specific to	Corresponding Status Messages (Codes) on the tCOM+
tCOM+ CAL. RUNNING	$tcpCO_2$, $tcpO_2$	Calibration in progress (SC) Extended calibration (EC)
tCOM+ CHECK APPLI.	$tcpCO_2$, $tcpO_2$	Check sensor application (CA)
tCOM+ CONCT SENS.		Connect sensor (CoS)
tCOM+ DEMO MODE		DEMO MODE (DM) (not available for all tCOM+ SW versions)
tCOM+ HEAT REDUCD	$tcpCO_2$, $tcpO_2$	Heating reduced (HR)
tCOM+ INI. HEAT ON		No message (Temperature Icon yellow) (IH)
tCOM+ REMEMBR SENS	$tcpCO_2$, $tcpO_2$	Change sensor membrane (RS)
tCOM+ READY		Ready for use (RU)
tCOM+ REPLACE GAS	$tcpCO_2$, $tcpO_2$	Gas bottle empty (GE)
tCOM+ SENS OFF PAT		Sensor off patient (SO)
tCOM+ SITE TIMEOUT		Site time elapsed (TE)
tCOM+ SpO2 SIG. Q.	SpO_2, PR	Ambient light elevated (HA) Low SpO2 signal quality (MA) SpO2 low signal (LS)
tCOM+ SYSTEM FAULT		Incompatible sensor (IS) Monitor Fault xx (MFXX) Sensor Fault xx (SFXX) Replace sensor (LE)
tCOM+ SYSTEM MSG.		Atm. P. unstable (AU) Barometer fault (BF), SpO2, PR still valid Check sensor placement (CP) Clock battery low (LW) Docking station error (DF), SpO2, PR still valid Gas bottle loose, please tighten (BL) Gas leak in DS (GL), SpO2, PR still valid Humidity fault (HFt) Insert Sensor into DS (IDs) Leak test in progress (LT) Low life / usage time reminder (LL) Monitor Fault (MFXX) Monitor Problem (MPXX) Monitoring time < 15 min (TL) MPL date / time invalid (MP99) Open Docking Station door (OD) PCO2 sensitivity test (ST) PO2 Usage Time Elapsed (UE) Remote monitoring interrupted (RL) Sensor Problem SPXX • SP10-12, SP14, SpO2, PR still valid • SP15, tcpO2, SpO2, PR still valid • SP20, tcpCO2, tcpO2 and PR still valid • SP70-74, tcpCO2, SpO2, PR still valid

Message text	Specific to	Corresponding Status Messages (Codes) on the tCOM+
		Sensor in wrong docking station (DSSN) Sensor usage time low, Sensor lifetime low (LL) V-CareNeT™ required (VR)
tCOM+ TC MSG.	$tcpCO_2$, $tcpO_2$	Ambient light high, Ambient light elevated (SA) PCO2 slow (PS) Calibration Recommended (CS)
tCOM+ TC UNSTBL.	$tcpCO_2$, $tcpO_2$	PCO2 stabilizing (CE) PCO2/PO2 stabilizing (TS) PCO2 slow (PS) PO2 stabilizing (OE)
tCOM+ T LIM ACTIVE		Sensor exceeds temperature limits (OT)

Depending on the position of the connected sensor and/or the operation mode/status of the tCOM+ the data displayed on the PPMS are as follows.

	Sensor Position (Quality of parameter on tCOM+)	PCO_2	PO_2	SpO_2	PR	AHP	Pleth
Monitoring Mode	On Patient, respective parameter valid	Value	Value	Value	Value	Value	Wave
	On Patient, respective parameter questionable	Value ('?' before label)	Value ('?' before label)	Value ('?' before label)	Value ('?' before label)	n.a	n.a.
	On Patient, respective parameter unstable	-?-	-?-	-?-	-?-	n.a.	n.a.
	On Patient, respective parameter invalid	--	--	--	--	--	line
	Off Patient	--	--	--	--	--	line
	In Docking Station	--	--	--	--	--	line
Demo Mode	On Patient (not applicable, the Demo Mode automatically deactivates if the sensor is applied to the patient)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Off Patient (tCOM+ DEMO MODE)	Value	Value	Value	Value	Value	Wave
	In Docking Station (tCOM+ DEMO MODE)	--	--	--	--	--	line

Note: Irrespective of the sensor position or operation mode/status of the tCOM+, only the parameters which are enabled in the tCOM+ profile are displayed on the PPMS.

Care with Confidence

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