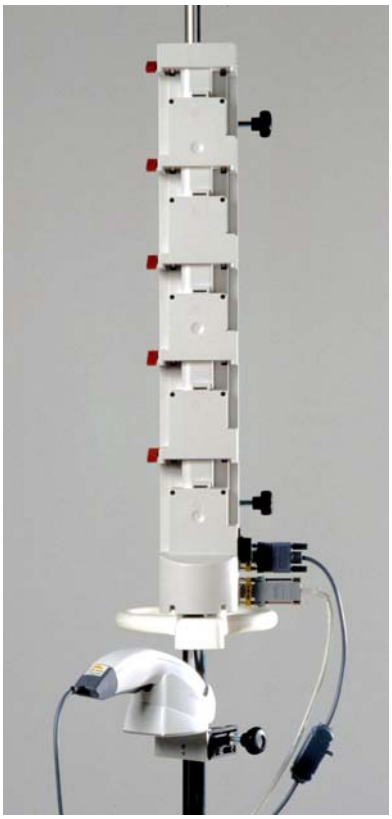
Service Manual

QUICK® 100 M Docking Station

Made in Switzerland

CE 0120



ARGUS Medical AG, CH-3627 Heimberg / Switzerland
(A member of the CODAN group)

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1. INTRODUCTION

1.1. General

IMPORTANT!
This service manual is intended for the exclusive use of authorized persons who have been trained by ARGUS Medical AG in the maintenance and repair of the QUICK® 100 M docking station.
The service manual is meant to be used together with the user manual.

IMPORTANT!
ARGUS Medical AG shall not assume any responsibility for any manipulations which have been carried out on the QUICK® 100 M docking station by a non-authorized person.

IMPORTANT!
The QUICK® 100 M docking station may only be used with the ARGUS 600 D Software V1.5X and/or ARGUS 414 D Software V1.3X, and/or ARGUS 707, ARGUS 708 Software V1.XX.

IMPORTANT!
The reading of the barcode (medicament name and infusion data's on a syringe or a fluid bag) and the data transfer to the pump are fail save. The data transfer from the QUICK® 100 M docking station to a PC is **not** fail safe.

This manual contains the latest data available. It is subject to further modifications in accordance with technical improvements.

2. BARCODE READER AND LABEL DATA

2.1. General

The barcode reader "Scan Plus 1800" (Intermec) including a gender changer may be ordered from ARGUS Medical AG (Art. no. 90.150). It should be connected to the appropriate plug of the QUICK® 100 M docking station marked with the sign.

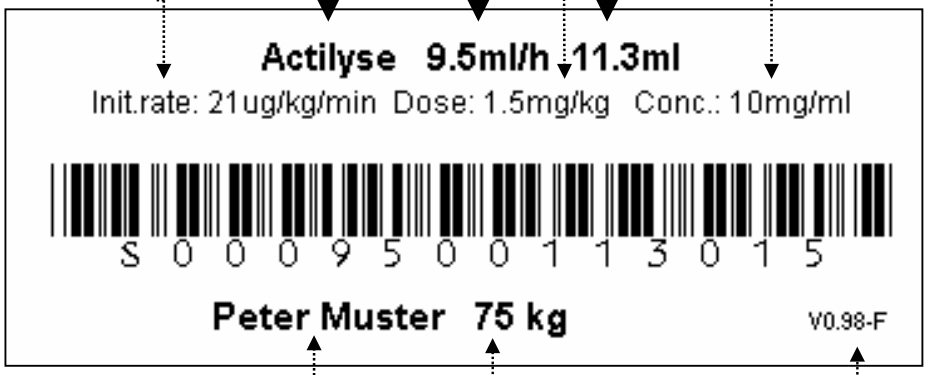
CAUTION!
The barcode reader "ScanPlus 1800" has been preconfigured and tested by ARGUS Medical AG for the use with the QUICK® 100 M docking station.

2.2. Label layout

ARGUS Medical recommends to use its own Excel tool named “Medication Bar-code Labels” to generate these barcode labels and bar-coded prescription sheets.

A medication barcode label holds the following relevant information:

1. The Medication concentration in the programmed unit
2. **The dose (ml total) in ml**
3. The dose in the programmed unit
4. **The infusion rate in ml/h**
5. **The medication name**
6. The initial rate in the programmed unit



7. The patient name
8. The patient weight in kg
9. A software version and an ARGUS check number

2.3. Barcode format

The used barcode standard corresponds to code 3 of 9 including check digit.
The barcode format is:

*	T	Rate 1E3	Rate 1E2	Rate 1E1	Rate 1E0	Rate 1E-1	Dose 1E3	Dose 1E2	Dose 1E1	Dose 1E0	Dose 1E-1	Med. HEX High digit	Med. HEX low digit	CD	*

T = Pump Type: “S” for syringe pump, “V” for volumetric pump
Med. = Medication number in HEX format (see pump service manual for details)
CD = Modulo 43 Check Digit

3. CONFIGURATIONS

3.1. Configuration of the docking station

A special software tool for the configuration of the docking station will be released soon. Please contact your local distributor or ARGUS Medical AG.

3.2. Pump configuration

CAUTION!
Every pump used with the QUICK® 100 M docking station has to be preconfigured with its corresponding serial number!
Thus the addresses #396 and #397 in the configuration of each pump must be programmed with the corresponding serial number. Please refer to the pumps respective service manual to change these addresses if necessary. In the case of an invalid serial number, the docking station will generate an alarm and the pump can not be programmed via barcode.

4. SOFTWARE UPDATES

4.1. General

4.1.1. Introduction

This chapter describes the procedure to perform a software update on the QUICK® 100 M docking station. To check the installed software release in your docking station you can either read out the history (chapter 5) or enquiry the docking station's status (chapter 6) over the serial interface.

Please refer to your local distributor or ARGUS Medical AG to determine the latest software release able to run on your device hardware.

The QUICK® 100 M contains a flash memory which can be updated easily via the serial interface of a PC. This flash memory is divided in 2 sectors:

- User Program Sector - Boot loader Sector

The User Program Sector contains the program which runs when the device is switched on normally. The Boot loader Sector contains the program which runs when the device is forced by the user, to enter this mode in order to update the flash memory.

4.1.2. Requirements for a software update

If you want to update an ARGUS Medical device please be sure you have the following items available:

1. Standard RS232 null modem serial interface cable, **connected to the barcode interface.**

2. File "AFlash_Dongle.txt" from your local distributor or from ARGUS Medical on your PC.

3. File "Q100_xxx.txt, if you want to update the user program. The file name contains the software release of the user program.

4. Terminal emulator e.g. Hyper Terminal included in Microsoft® Windows™.

4.1.3. Safety aspects

Be aware of the following points:

- For medical device traceability your local distributor or ARGUS Medical AG needs to be informed about every device updates (serial number) you performed!

- Do not make any software updates when the device is used and/or connected to a patient!

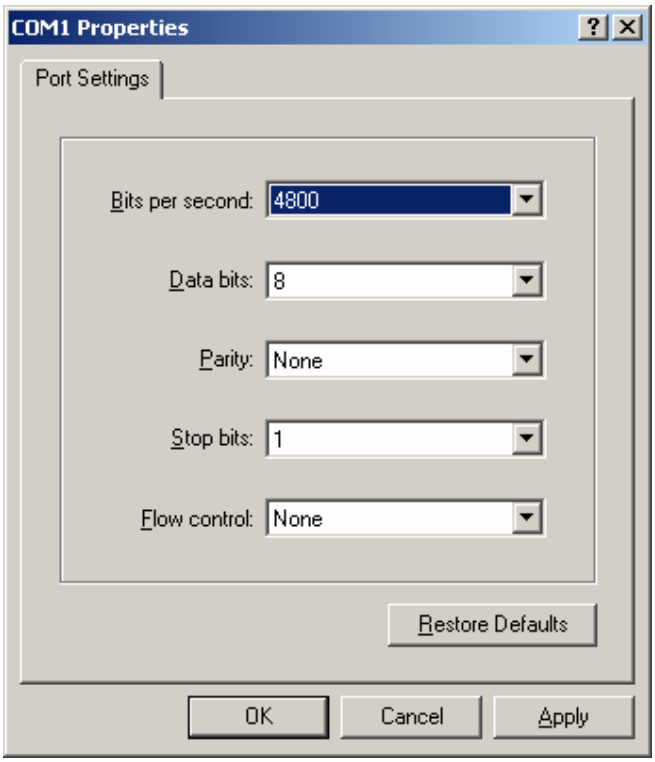
- Do not disconnect the data cable during the software update process!

4.1.4. Settings of the terminal program

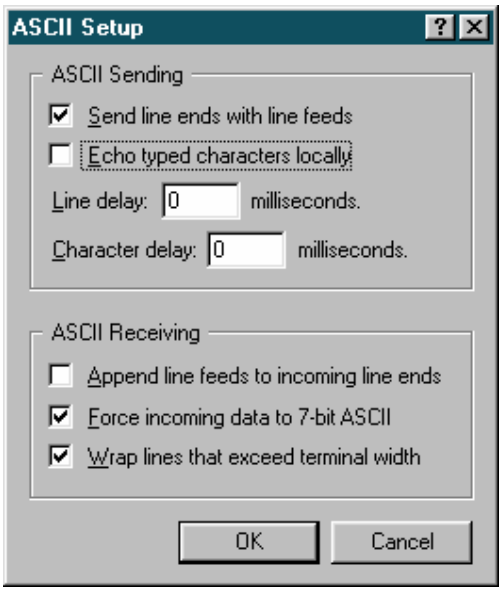
A software update can be done without additional software running on the PC. The only tool you need is a terminal program like the Hyper Terminal included in every Microsoft® Windows® Operating System.

Please ensure you have selected the right COM Port of your PC.

Please make the following settings in the Terminal Program to enable the communication with the pump and to ensure the right display information:



Please set also the following ASCII character settings to make the correct display settings in the terminal program.



4.1.5. How to enter the flash mode of the docking station

To enter the boot loader mode of the device please follow the procedure listed below:

1. **Unplug the mains power cord** from the QUICK® 100 M docking station to reset it **and remove all pumps**.
2. Connect the device to your PC.
3. Start the terminal program and make the settings as described in chapter 4.1.4.
4. Use the menu "Send text file..." in the menu "Transfer" of the Hyper Terminal program to send the dongle file "AFlash_Dongle.txt" to the QUICK® 100 M docking station (this file will send synchronisation characters for approx. 5 seconds).
5. After the start of the transmission, within 5 seconds **plug in the mains power cord** to the QUICK® 100 M docking station.
6. Wait several seconds until the terminal program displays the following text (if the device entered the boot loader mode correctly):
7. Follow the steps described in the next chapters based on the kind of update you want to perform.

```
ARGUS Medical AG
CH-3627 Heimberg
Bootloader V0.21
20030328 (C) AM


Loader for flashing ARGUS Medical devices.

1. Erase user program.
2. Update user program.
3. Erase bootloader.
4. Update bootloader.
```

4.2. Updating the User Program

To update the user program please go through the following steps to ensure a complete software download:

1. Select menu 1 in the main menu of the boot loader by typing a "1" in the terminal program.
   The boot loader will now clear the sectors containing the user program!
2. Select menu 2 in the main menu. The QUICK® 100 M docking station will now be ready to receive flash programming data.
3. Send the file "Q100_xxx.txt" as text to the QUICK® 100 M docking station by using the menu "Send text file..." in the menu "Transfer" of the Hyper Terminal program.
   This part will take some time until the entire data is flashed. The QUICK® 100 M docking station will flash the red LED as long as it's receiving data from the PC.
4. After a successful download, the QUICK® 100 M docking station will acknowledge the end by ringing the internal buzzer twice.
5. Select menu 5 to quit the boot loader mode of the device. You will be asked if you want to quit. After confirmation the QUICK® 100 M docking station will now run in the normal mode.

Important Remark:
Updating the user program does not have any influence on the boot loader software.
If you quit the boot loader mode without any valid user program in the flash memory, the device will always enter the boot loader mode.

4.3. Updating the Boot loader Program

We recommend updating the boot loader only if it's required by your local distributor or by ARGUS Medical.
To update the boot loader program please go through the following steps to ensure a complete software download:

1. Select menu 3 in the main menu of the boot loader by typing a "3" in the terminal program.
   The boot loader will now clear the sector which contains the boot loader program!
2. Select menu 4 in the main menu.
3. Send the file "AMLQ100_xxx.txt" as text to the QUICK® 100 M docking station by using the menu "Send Text File..." in the menu "Transfer" of the Hyper Terminal program. This part will take some time until the entire data is flashed. The QUICK® 100 M docking station will flash the red LED as long as it is receiving data from the PC.

4. After a successful download, the QUICK® 100 M docking station will acknowledge the end by ringing the internal buzzer twice.
5. Type a "5" in the main menu to quit the boot loader mode of the QUICK® 100 M docking station. You will be asked if you want to quit. After confirmation the QUICK® 100 M docking station will now run in the normal mode.

Important Remark:
Updating the boot loader program will not have any influence on the user program. Do not unplug the mains of the device during updating the boot loader or quit this mode without any valid boot loader in the flash memory. The device must contain a valid boot loader to operate correctly. If it is not the case, it will no longer be possible to enter the flash mode. In this case the main board M has to be replaced!

4.4. Important Notes

The user program performs an internal ROM-Test during the self test phase of the docking station. If an error occurred during the update process the device will enter the fail safe state (fault codes please refer to chapter 7.2).
Please refer to your local distributor or ARGUS Medical AG to determine the latest software release able to run on your device hardware.

5. HISTORY

5.1. General

The connection of the QUICK® 100 M docking station to a computer allows to read the history file stored in the flash memory.

5.2. Entering the docking station history read mode

To enter the history read mode please follow the procedure listed below:

1. **Switch off all docked in pumps**. **Unplug the mains power cord** from the QUICK® 100 M docking station and plug in the mains power cord again to reset it.
2. Connect the device to your PC.
3. Start the terminal program and make the settings as described in chapter 4.1.4.
4. Type "QUI;100" + ENTER. The history read mode program will be activated and the red LED lights up.
5. Type "HIS;" + Enter. The history will now be displayed on the screen (see examples below).
6. Exit the history read mode by unplugging the mains power cord again.

The events registered will be displayed in a chronological order; the most recent entry is displayed on top of the list. Please be aware that the time displayed in minutes refers always to the elapsed time since last power up of the QUICK® 100 M docking station.

5.3. History header

At the top of the history, a header will appear showing the device type, the software release and if configured, the inventory number and the last service date.

5.4. History events

Each registered event starts with a message line. See the list mentioned in chapter 5.6.
In case the docking station detects a technical failure, the last event line registered includes the failure number (fault code) which generated that technical failure. Please refer to chapter 7.2 for the complete list.

5.5. History example

```
/***** History *****/
Docking type:        QUICK(R)100 M
Inventory number: 0
Software release: V0.90  (030730-130A)
Last service date:

Pump docked out at place 2
Place 1              = A600       Status  = 40     Elapsed time = 0:01:12
Place 2              = No pump    Status  = 00
Place 3              = A600       Status  = 40
Place 4              = No pump    Status  = 00
Place 5              = A414       Status  = 40
Fail   = None

Pump in place 3 has alarm
Place 1              = A600       Status  = 40     Elapsed time = 0:01:01
Place 2              = A600       Status  = 40
Place 3              = A600       Status  = 4E
Place 4              = No pump    Status  = 00
Place 5              = A414       Status  = 40
Fail   = None

Pump docked in at place 3
Place 1              = A600       Status  = 40     Elapsed time = 0:00:14
Place 2              = A600       Status  = 40
Place 3              = A600       Status  = 42
Place 4              = No pump    Status  = 00
Place 5              = No pump    Status  = 00
Fail   = None

Pump in place 2 has failure
Place 1              = A600       Status  = 40     Elapsed time = 0:00:10
Place 2              = A600       Status  = 42
Place 3              = No pump    Status  = 00
Place 4              = No pump    Status  = 00
Place 5              = No pump    Status  = 00
Fail   = None

Pump docked in at place 2
Place 1              = A600       Status  = 40     Elapsed time = 0:00:08
Place 2              = A600       Status  = 42
Place 3              = No pump    Status  = 00
Place 4              = No pump    Status  = 00
Place 5              = No pump    Status  = 00
Fail   = None

Power up on docking station
Place 1              = No pump    Status  = 00     Elapsed time = 0:00:00
Place 2              = No pump    Status  = 00
Place 3              = No pump    Status  = 00
Place 4              = No pump    Status  = 00
Place 5              = No pump    Status  = 00
Fail   = None
```

5.6. History messages

Possible messages appearing in the first line of each history event:

No information available
Power up on docking station
Power off on docking station
Reserved
Reserved
Pump with invalid SN at place 1
Pump with invalid SN at place 2
Pump with invalid SN at place 3
Pump with invalid SN at place 4
Pump with invalid SN at place 5

Docking station has detected failure
Com. troubled with pump place 1
Com. troubled with pump place 2
Com. troubled with pump place 3
Com. troubled with pump place 4
Com. troubled with pump place 5
Pump in place 1 has alarm
Pump in place 2 has alarm
Pump in place 3 has alarm
Pump in place 4 has alarm

Pump in place 5 has alarm
Pump in place 1 has failure
Pump in place 2 has failure
Pump in place 3 has failure
Pump in place 4 has failure

Pump in place 5 has failure
Low pump supply voltage detected
Enter PC configuration mode
PC configuration done
PC configuration failure

Pump docked in at place 1
Pump docked out at place 1
Pump docked in at place 2
Pump docked out at place 2
Pump docked in at place 3
Pump docked out at place 3
Pump docked in at place 4
Pump docked out at place 4
Pump docked in at place 5
Pump docked out at place 5

Pump 1 programmed by barcode
Invalid barcode programming at pump 1
Pump 2 programmed by barcode
Invalid barcode programming at pump 2
Pump 3 programmed by barcode
Invalid barcode programming at pump 3
Pump 4 programmed by barcode
Invalid barcode programming at pump 4
Pump 5 programmed by barcode
Invalid barcode programming at pump 5

6. MONITORING

6.1. General

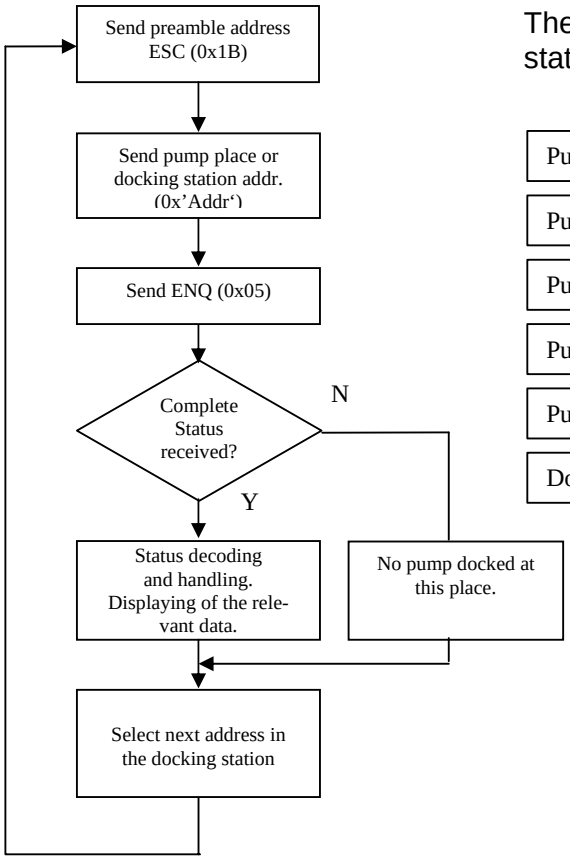
The RS 232 PC interface protocol of software release V1.00 is intended to be used only in combination with a PDMS (Patient Data Management System). For visualization and documentation purposes, the status of each docked-in pump and the status of the docking station itself can be requested through the serial interface.

CAUTION!
Those PC transmitted data are not intended to be used for diagnostic or remote controlling of the pumps or other devices.

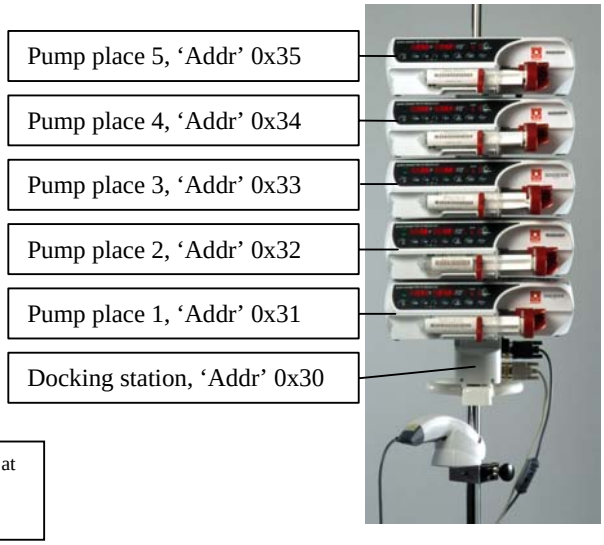
6.2. Serial communication protocol

6.2.1. Principle of the communication

The following flow diagram shows how a serial communication procedure could be implemented on the PC side to poll each pump placed on the docking station. Depending on which status is required by the PC, the docking station will transmit either the pump status or the status of the docking station itself.



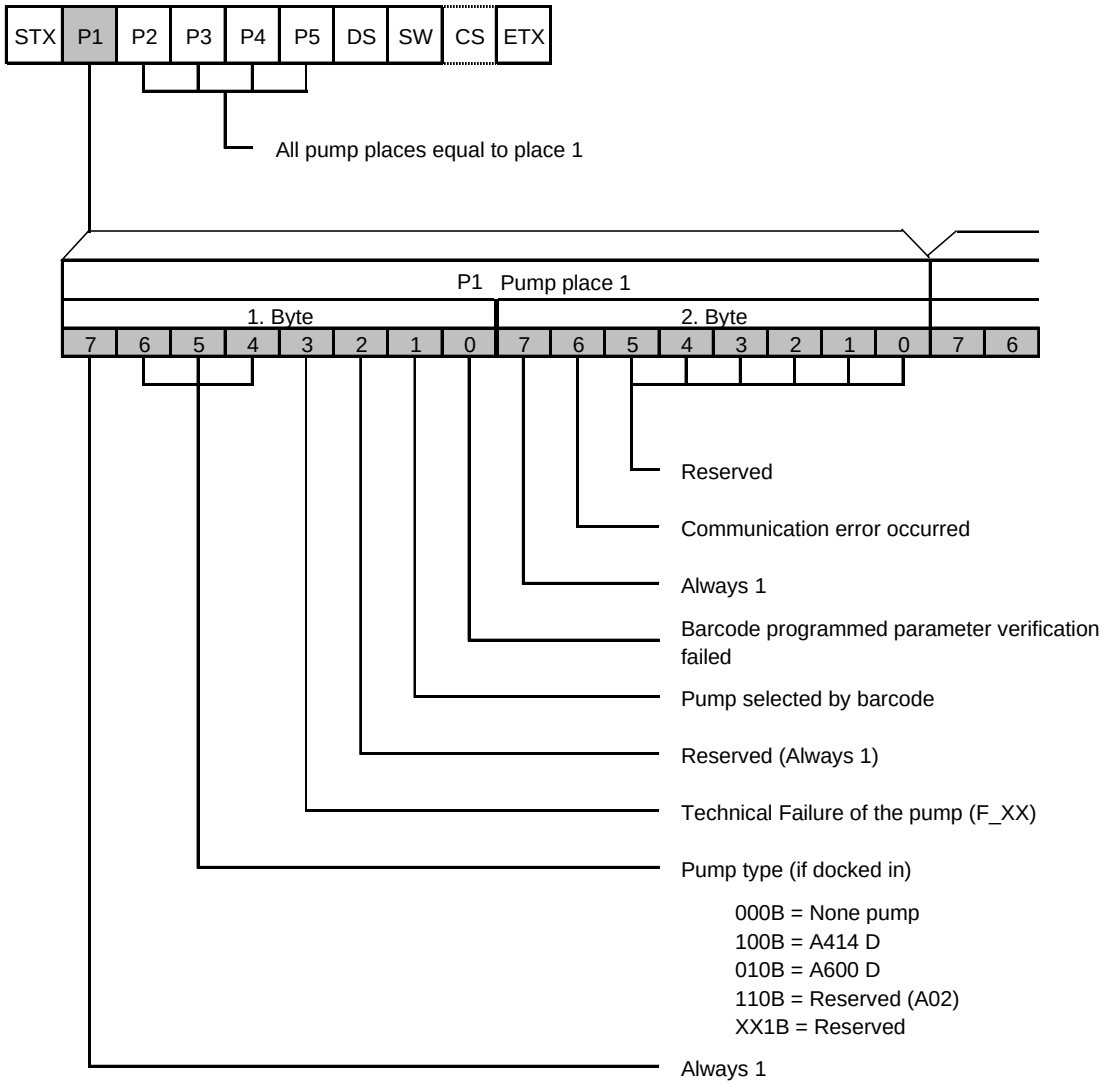
The pump places are labelled on the docking station housing and have the following value:



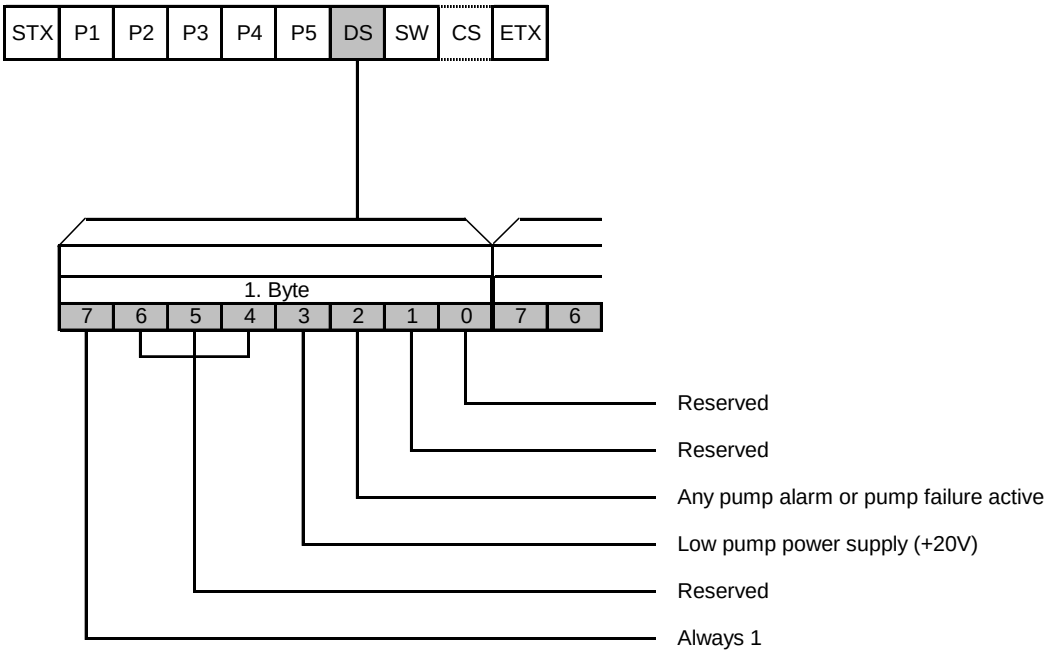
The protocol syntax of the status transmitted is part of the next chapters.

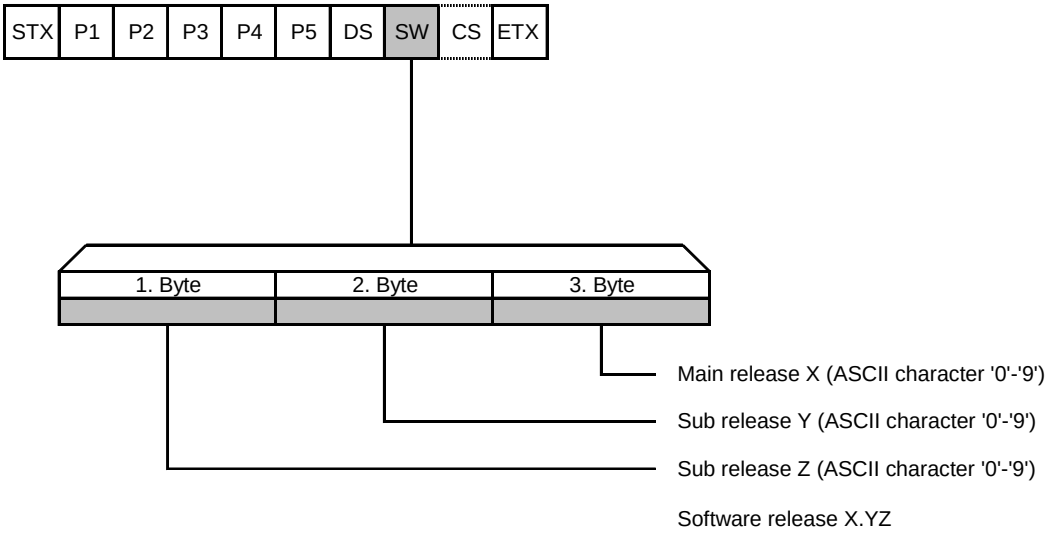
6.2.2. Docking station status

Software release: V1.00



STX : Start of text (0x02))
P1...P5 : Word boundaries for each pump place (16 Bit)
DS : Docking Station status (8 bit)
SW : Docking Station software release (24Bit)
CS : Checksum CRC (16 Bit, not implemented yet)
ETX : End of text (0x03)





6.2.3. Pump status

The transmitted pump status will be equal to the one described in the pump service manual.

An example of an ARGUS 600 D syringe pump status is shown below:

STX	0	1	2	0	0	2	0	0	0	0	1	0	0	9	0	0	0	0	A	B	C	D	E	ETX
	Rate 1E2	Rate 1E1	Rate 1E0	Rate 1E-1	Total 1E2	Total 1E1	Total 1E0	Total 1E-1	Infused sum 1E2	Infused sum 1E1	Infused sum 1E0	Infused sum 1E-1	PrL 1E3	PrL 1E2	PrL 1E1	PrL 1E0	Med. hex hi digit	Med. hex lo digit	Statusbyte-1	Statusbyte-2	Statusbyte-3	Statusbyte-4	Statusbyte-5	

7. MAINTENANCE AND FAULT FINDING

7.1. Maintenance

CAUTION!

Only authorized persons who have been instructed by ARGUS Medical AG or by the trained local distributor are allowed to service the QUICK® 100 M docking station. In case of repair request, send the unit to the local distributor with a report outlining the exact nature of the failure. More information is available from:

ARGUS Medical AG
CH-3627 Heimberg / Switzerland
E-mail: info@argusmedical.com

CAUTION!

The safety standard check has to be performed at least every 24 month or after 10'000 hours of operation. The check has to be done in accordance to the chapter 11.
No special maintenance of the QUICK® 100 M docking station is necessary. There are no wear and tear parts.

Interferences through external high frequency electromagnetic fields (e.g. in combination with surgical equipment) are unknown. In case of doubt we suggest that you contact your local distributor.

7.2. Fault code

The fault code in case of a technical failure is displayed in the history file, refer to chapter 5. The possible fault codes registered in the history event log file are listed in the table below:

Fault Code:	Failure:
21	ROM test
22	ROM check (Runtime)
23	RAM test/check
24	XRAM test/check
25	CPU test
26	Invalid state (in PC-Configuration mode)
27	Eeprom data invalid
32	5Volt supply out of range
33	20Volt supply out of range (delayed 5s)
44	Address invalid for config-eeprom
45	Address invalid for history-eeprom

Exceptionally a fault code not listed above may appear. In this case we recommend changing the main board.

7.3. Specifications

Please refer to the user manual for the specifications (cap. 7).

8. REPLACEMENT OF PARTS

8.1. Disassembling of the Docking Station

CAUTION!

Disconnect the mains cable from the power outlet before opening the housing! Observe the antistatic protection rules when disassembling the QUICK® 100 M docking station (the use of an antistatic table mat and a grounded clip are recommended).

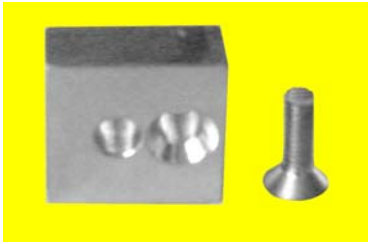
8.2. Replacement parts

CAUTION!

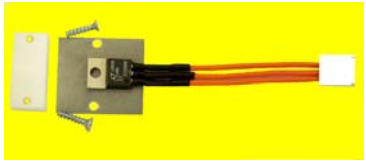
The QUICK® 100 M docking station may only be used with accessories and spare parts which have been approved by ARGUS Medical AG for safe technical use.

10.114 Cover

11.215 Casing



11.220 Centring fixation

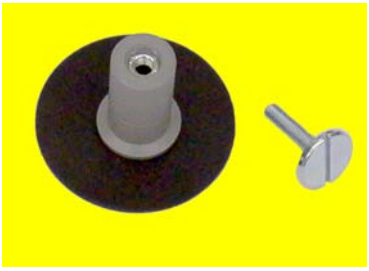


10.096 Voltage regulator

11.218 Coil spring

11.216 Handle with axle

11.217 Locking device

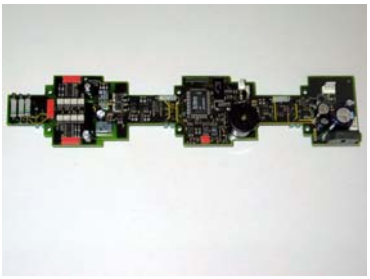


11.214 Transformer holder

12.008 Mains plug with filter

10.095 Extended board

10.097 Transformer 230V



10.115 Main board Quick 100M

10.116 Flat cable set Quick 100M

12.041 Interface cable

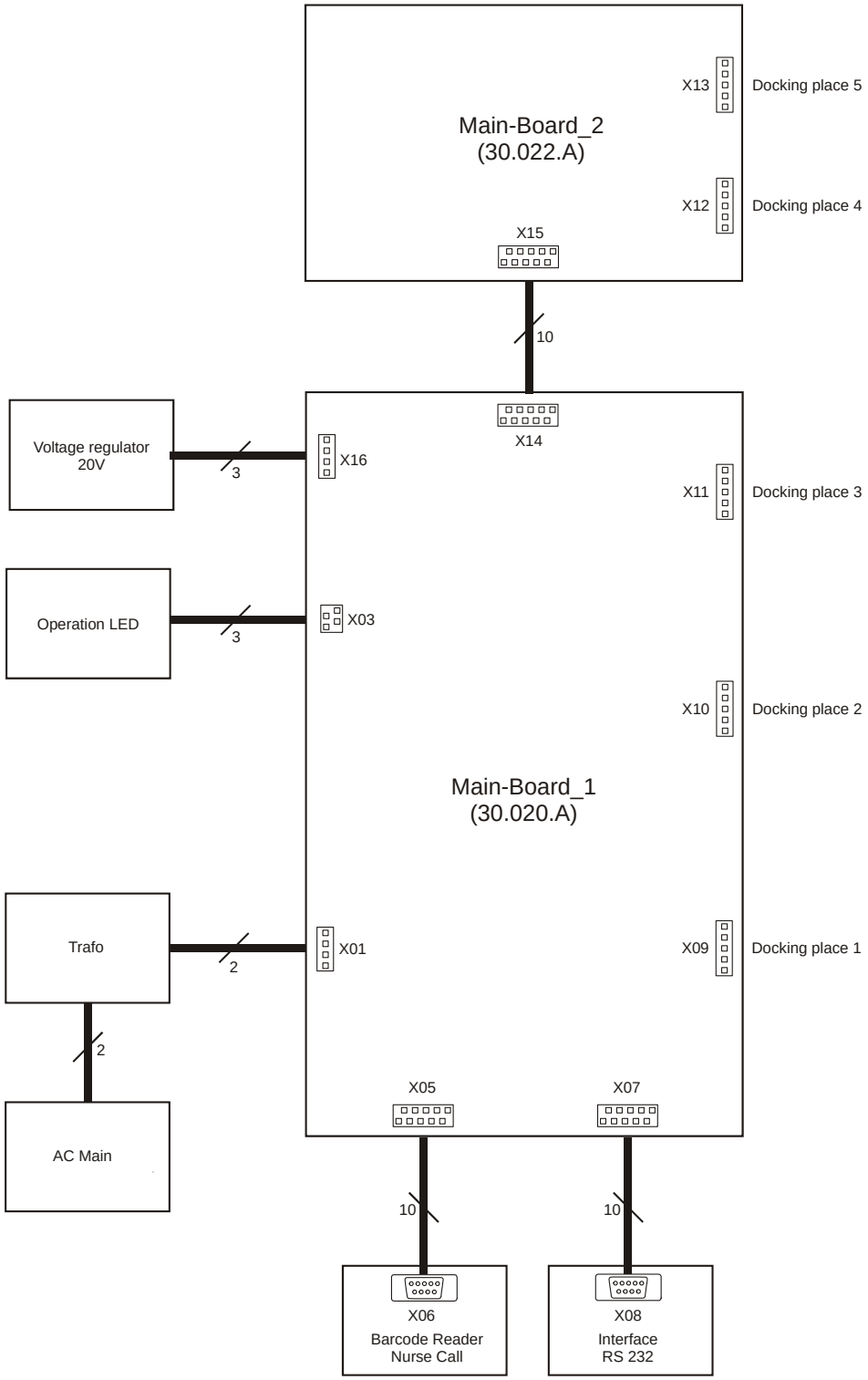
10.130 Barcode holder with clamp

12.043 Gender Charger

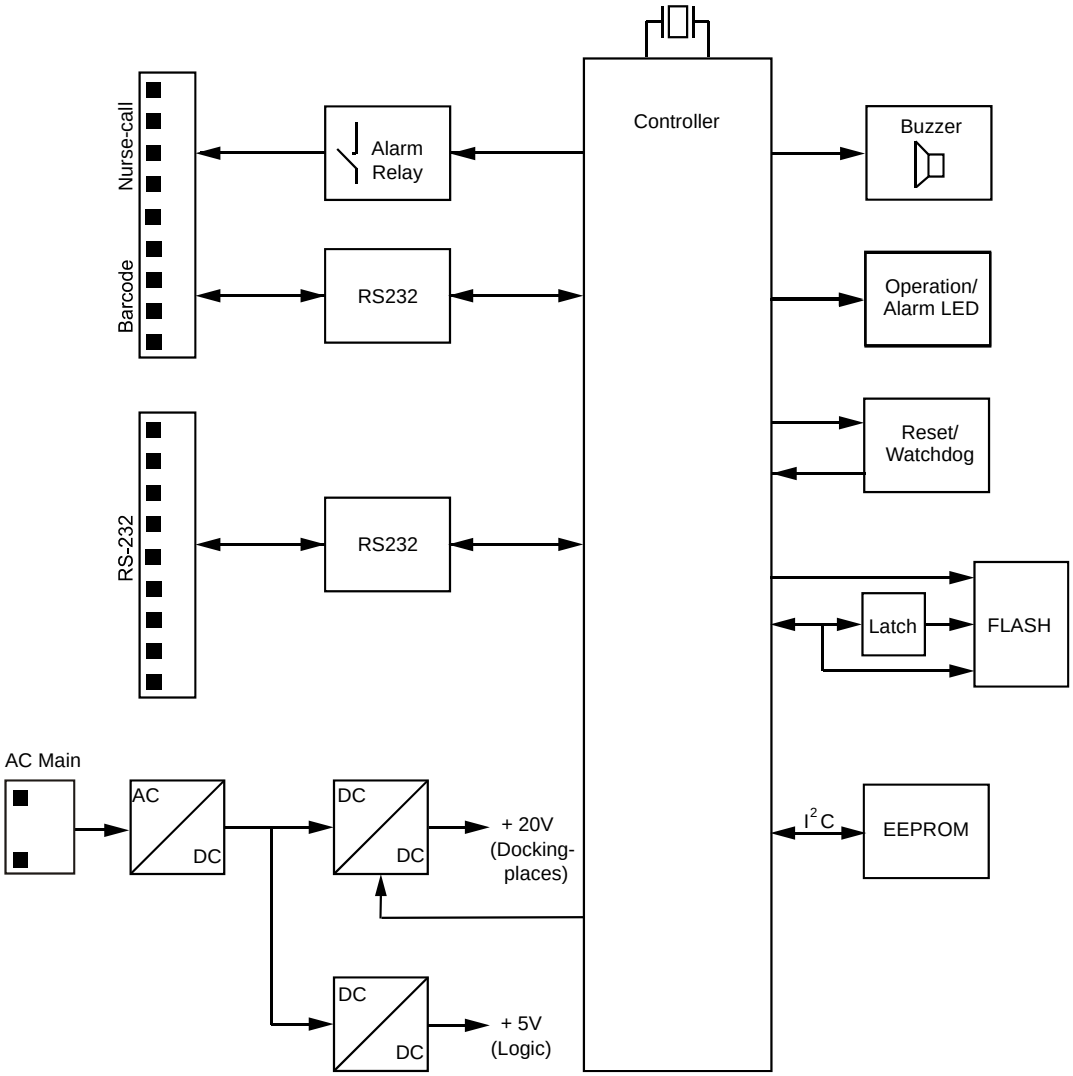
10.087 Combination clamp

90.041 Rail set (25x10mm)
90.042 Rail set (35x 8mm)

9. WIRING DIAGRAM



10. BLOC SCHEMATIC



11. SAFETY STANDARD CHECK

Safety standard check **QUICK® 100 M** **ARGUS Medical AG**

Serial-No.: _____

Hospital/Dept/Customer: _____

The safety standard check has to be performed at least every 24 months or after 10000 hours of operation.
The check has to be done in accordance to the operation and service manual.

1 Visual check for damage, cleanness and completeness:	- Housing, labels, accessories, connectors, cables, etc..?	
2 Plug in the mains of the docking station	- The green LED on the docking station lights up?	
3 Check each docking position with a switched **off** pump:	- Mechanical locking and unlocking ok ? - After docking the pump, its green power LED lights up?	
4 Check each docking position with a switched **on** pump:	- Buzzer sounds twice, ok? - LED on docking station flashes orange-red, ok?	
5 Chech the external connections:	- Computer interface ? - Barcode reader interface ? - Staff alerting system ?	
6 Electrical test according to EN60601-1: **Do not install any pump!** All measurements made with a 2.5 m power cord	- Measurements attached?	