X5 Wired Quick Start Guide

X5 Wired Quick Start Guide - ptn0723-04

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1 Introduction

This document serves as a comprehensive guide to establish a simple yet fully operational X5 Wired sample system, encompassing all essential setup details.

INFORMATION

- This document is intended to supplement the X5 Wired User Manual and the JMobile User Manual by providing additional guidance and information. It is designed to complement, not replace, the product manuals.

1.1 Requirements

X5 products are based on Linux BSP UN75 version 1.3.xxx and require JMobile version 4.5.1.581 or later for programming activity.

INFORMATION

- X5 products are not compatible with programming using JMobile version 4.0 or earlier.

2 Security Features

The platform UN75 version 1.3.xxx is based on Linux and comes with built-in security features.

When starting a brand-new device, you must log-in before you can access System Settings.
Products are configured at manufacturing time with two users: “admin” and “user”
Each user has own password to authenticate the access.
At first power-up, the system will require users to replace the default password with a new one.
Default passwords are:

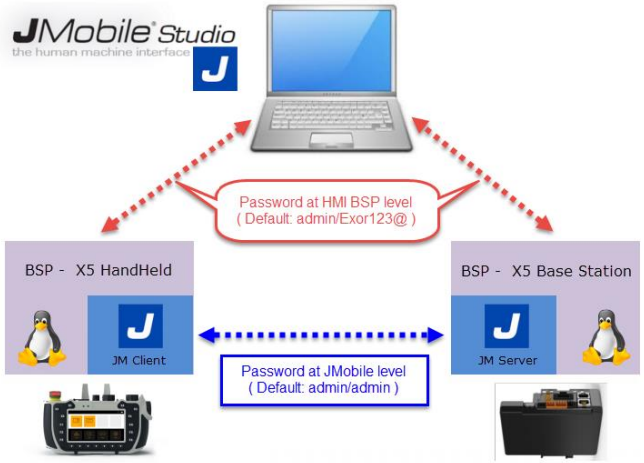
User	Password
admin	admin
user	user

The message you will see is:
Authentication/Users
Default password detected – please choose a more secure one. NOTE: system will reboot upon completion.
Minimum password requirements are specified on screen.
When entering passwords for the first time you will not be required to insert the old (default) password.
Keep note of the passwords you have defined. If you forget them, you must restore the X5 device to factory default, wiping out the whole configuration.

Please note that without authenticating as a valid user you cannot even access System Settings or Start-up page in your X5 devices.
Access the system as “admin” whenever you need to change any property in System Settings.

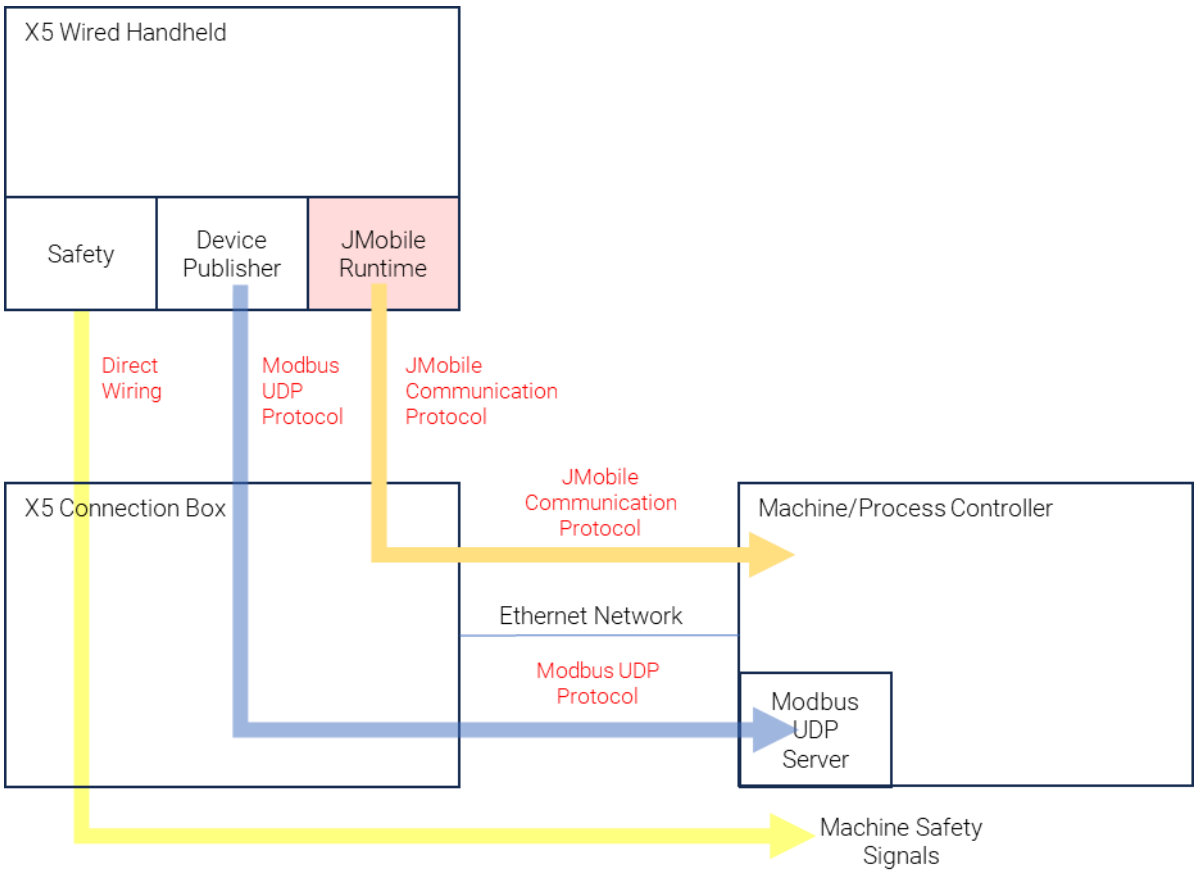
You can change again BSP passwords at later time; use the option “Authentication” in System Settings for this. Remind that you will be required to enter the old password to be able to change to a new one.

Remind that there are cases where the system may ask users logging-in with credentials different from these system credentials.
For instance, the connection JMobile Server <-> JMobile Client has its own credentials, defined using JMobile Studio. See figure as a reminder for these different user management options.



3 Applications with X5 Wired

JMobile runtime is running on X5 Wired handheld.
Safety signals are wired to the machine safety circuit through the X5 Connection Box.
Use of Device Publisher is optional.



4 Device Publisher

Device Publisher is a software application designed to provide fast transfer of certain device data from handheld to the PLC/controller.
This is an important requirement for applications where X5 is used for direct interaction with machines and fast and repetitive response time is a must.
Device Publisher uses Modbus TCP protocol in UDP mode and operates as client.
Data transfer uses Modbus Function Code 16, Write multiple registers.
Modbus addressing and register allocation are fixed.
Device Publisher cyclically sends data packets with a cycle time of about 10 ms.

Register assignment:

Holding Register	Name	Data Type	Range	Description / Notes
400001	version	unsignedShort	1	The version number of this register schema
400002	counter	unsignedShort	-	Current packet count (diagnostic information)
400003	elapsed	uint64	-	Number of elapsed milliseconds since service was started (Linux epoch timestamp)
400007	keys map	uint64	-	Binary map of keypad state
400011	wheel	unsignedShort	0..32767	Wheel counter
400012	pot 0	unsignedShort	0..255	Potentiometer
400013	pot 1	unsignedShort	0..255	Potentiometer
400014.0	Reserved	unsignedByte	-	
400014.1	reserved	unsignedByte	-	

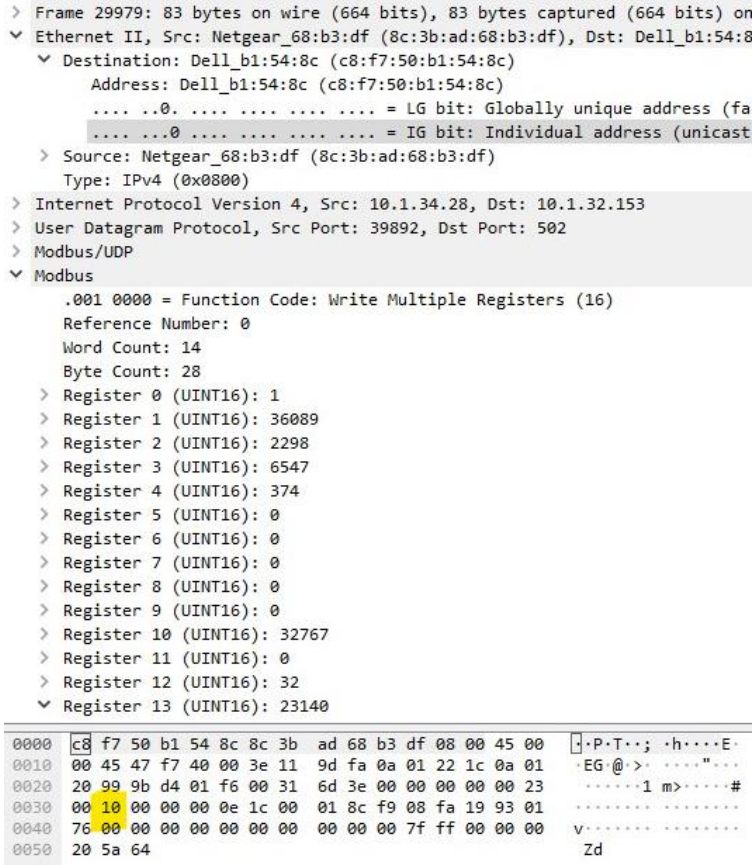
Byte order is big endian. Bit assignment for “keys map” 400007:

Key	Key ID	Bit Mask	HEX
F1	KEY_F1	00000000000000000000000000000001	00000001
F2	KEY_F2	00000000000000000000000000000010	00000002
F3	KEY_F3	00000000000000000000000000000100	00000004
F4	KEY_F4	00000000000000000000000000001000	00000008
F5	KEY_F5	00000000000000000000000000010000	00000010
F6	KEY_F6	00000000000000000000000000100000	00000020
K1	KEY_F7	00000000000000000000000001000000	00000040
K2	KEY_F8	00000000000000000000000010000000	00000080
K3	KEY_F9	00000000000000000000000100000000	00000100
K4	KEY_F10	00000000000000000000001000000000	00000200
K5	KEY_F11	00000000000000000000010000000000	00000400
K6	KEY_F12	00000000000000000000100000000000	00000800
dot1	KEY_F13	00000000000000000001000000000000	00001000
dot2	KEY_F14	00000000000000000010000000000000	00002000
dot3	KEY_F15	00000000000000000100000000000000	00004000
dot4	KEY_F16	00000000000000001000000000000000	00008000
dot5	KEY_F17	00000000000000010000000000000000	00010000
dot6	KEY_F18	00000000000000100000000000000000	00020000
dot7	KEY_F19	00000000000001000000000000000000	00040000

Note that Modbus in UDP mode is only sending out datagrams and does not expect response from the server. The protocol in Device Publisher does not establish communication sessions and does not provide error information, even in case the server is not present to receive data.

4.1 How to Receive Data from Device Publisher

Device Publisher uses Modbus TCP protocol in UDP mode to send X5 device information.
Port number 502, standard assignment to Modbus TCP and UDP, is used as default.
The software application uses only one data packet to send information using Modbus Function Code 16, Write Multiple Registers. Dimensions of the Modbus packets are fixed. Data section is 28 bytes. Modbus in UDP mode does not expect a response from the server receiving the data.
The format of the UDP packet in Device Publisher is shown in figure (produced with WireShark).



The payload of Device Publisher starts at byte offset 49; see it highlighted in yellow in figure.

The byte sequence of the payload is:

Modbus Function Code	|10|
Start/End Address	|00|00|00|0e|
Byte Length	|1c|
Version	|00|01|
Counter	|8c|f9|
Elapsed	|08|fa|19|93|01|76|00|00|
Key map	|00|00|00|00|00|00|00|00|
Wheel	|7f|ff|
Pot 0	|00|00|
Pot 1	|00|20|
-	|5a|
-	|64|

X5 data area is highlighted in yellow. Values shown are examples.

5 Using X5 Wired - Application Notes

5.1 X5 Keyboard Layout Compared to H3 Keyboard Layout

X5 Wired is the ideal candidate for replacing the older H3 handheld.
However, please note that X5 has a different keyboard layout compared to H3.
This difference may eventually impact on the migration of JMobile applications from H3 to X5. In addition, impact on end user documentation shall be properly addressed.
Table shows correspondence of keys between the two products.
Please note that JMobile used “Code” as a reference to keys. Note that “Code” is not associated with the physical position of the key in the layout.

X5		H3	
Key	Code	Key	Code
F1	0x1000030	H	0x48
F2	0x1000031	A-	0x1000030
F3	0x1000032	A+	0x1000031
F4	0x1000033	1	0x31
F5	0x1000034	2	0x32
F6	0x1000035	Enter	0x1000004
K1	0x1000036	F3 (dot1)	0x1000032
K2	0x1000037	F4 (dot2)	0x1000033
K3	0x1000038	F5 (dot3)	0x1000034
K4	0x1000039	F6 (dot4)	0x1000035
K5	0x100003a	F7 (dot5)	0x1000036
K6	0x100003b	F8 (dot6)	0x1000037
dot1	0x10000f1	F9 (dot7)	0x1000038
dot2	0x10000a9	Right	0x1000014
dot3	0x10000aa	Down	0x1000015
dot4	0x10000ab	Up	0x1000013
dot5	0x10000ac	-	0x2d
dot6	0x10000ad	+	0x2b
dot7	0x1000113	S	0x53

H3

X5 Wired/X5 Wireless

5.2 Using VNC Client for Easier Access to BS and Handheld

To enhance your testing experience with the X5, we recommend utilizing a VNC client on your computer. By employing VNC, you can conveniently access screen information from the X5 Wired handheld.
To get started with VNC, enable the VNC service in System Settings/Services. Remember to activate the VNC service on both the BS and the handheld.

5.3 Pressing Multiple Keys in X5 Wired Handheld

Keypad handler in X5 Wired handheld supports a maximum of 2 keys pressed at the same time.
If you press more than 2 keys at the same time, the handler will return a no-key-pressed status.

5.4 Haptic Response

X5 Wired handheld does not include a haptic response device.