Manual

ARC4 – USB Interface Access 2.0

P/N A4-2-USB-00

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1. Introduction

ARC4 - Arc Detector System 2.0 is a standalone device that can be successfully operated with standard preset parameters. All qualitative and logic parameters are already configured. Some parameters and logic programming can be set using the device's keypad. However, in order to take full advantage of all of its customization features, a connection to a PC is required. Using a serial connection set up by any terminal/telnet client software of your choice, you will be able to:

- Read parameters
- Adjust light sensitivity by changing detector threshold voltage
- Adjust auto-reset time
- Remotely change the combinational logic for up to four global arc output signals (depending on configuration of device).

The table below summarizes default factory settings of all adjustable parameters of the device.

Table 1.1: Default factory settings

Parameter		**Default Setting**
Signal Polarity	ADM	Inverted
	SIM	Inverted
Auto Reset	ADM	OFF
	SIM	OFF
Auto Reset Time	ADM	0.1 ms, if auto reset is activated
	SIM	0.1 ms, if auto reset is activated
Sensitivity Threshold	ADM	20 mV
GLBARC Logic	SIM	OR (16x) for all GLBARC groups (A, B, C, D)

This manual guides you step by step on how to set up your PC to properly connect to your ARC4 2.0 via USB. It also gives you a full list of available terminal commands and the syntax.

Scope of Supply:

AFT USB flash drive with password and manual.
1x USB cable type A to type B connector.

Software Downloads:

The following table shows appropriate terminal/telnet client software options (Windows) with links for free download; Status *February 2019*:

Table 1.2: Terminal client software options

Name	**Source, link**	**Note**
HTerm	http://www.der-hammer.info/terminal/	Free
PuTTY	https://www.putty.org/	Free
HyperTerminal	https://www.hilgraeve.com/hyperterminal-trial/	License required (free trial available)

2. Connecting via USB (Windows)

The ARC4 2.0 device communicates with a PC using a serial connection. Certain parameters of terminal/telnet client software has to be set for the connection to establish properly. The following steps present the procedure to follow under Windows.

1.) Unbox the device, plug it in to mains and switch power ON. Let the device boot – when ready, channel buttons for installed detector cards, GLBARC buttons for installed interface cards as well as “STATUS” LED should be green.

2.) Connect ARC4 to a PC by using the supplied USB cable type A to B or a similar one.

3.) Wait about 30 seconds until Windows recognizes the device. In the Device Manager it should be listed as “USB Serial Port (COMxx)”.

4.) Install and run the client software of your choice. *HTerm* for Windows is chosen by AFT for demonstration purpose.

5.) Choose the appropriate COM-Port from the drop-down-list and set connection parameters listed in Tab. 2.1. (independent of software used). In *HTerm* you will find it in the drop-down list of the main window, see **Fig.2.1.**

Table 2.1: Connection Parameters

Connection Parameter	Value
Baud rate	19200
Data bits	8
Stop bits	2
Parity	None
Flow control	Hardware
New line at	CR+LF
Show new line characters	no / unchecked
Send on “ENTER”	CR+LF

Click “Connect” in the upper left corner. “Received Data” window should be blank (Fig 2.1).

6.) Press Enter <CR> on your keyboard. You will get the following message:

```
Login-Password:
```

7.) To unlock access type the following command in the command line of the “Input Control” window (lower left) in Fig. 2.1 and press Enter:

```
123abc
```

The string “123abc” should be substituted by your individual password that can be found on the AFT USB flash drive in a text file named **USB*_password_SN123456.txt*.**

8.) Once you have unlocked access, you can use the commands listed in section 3.

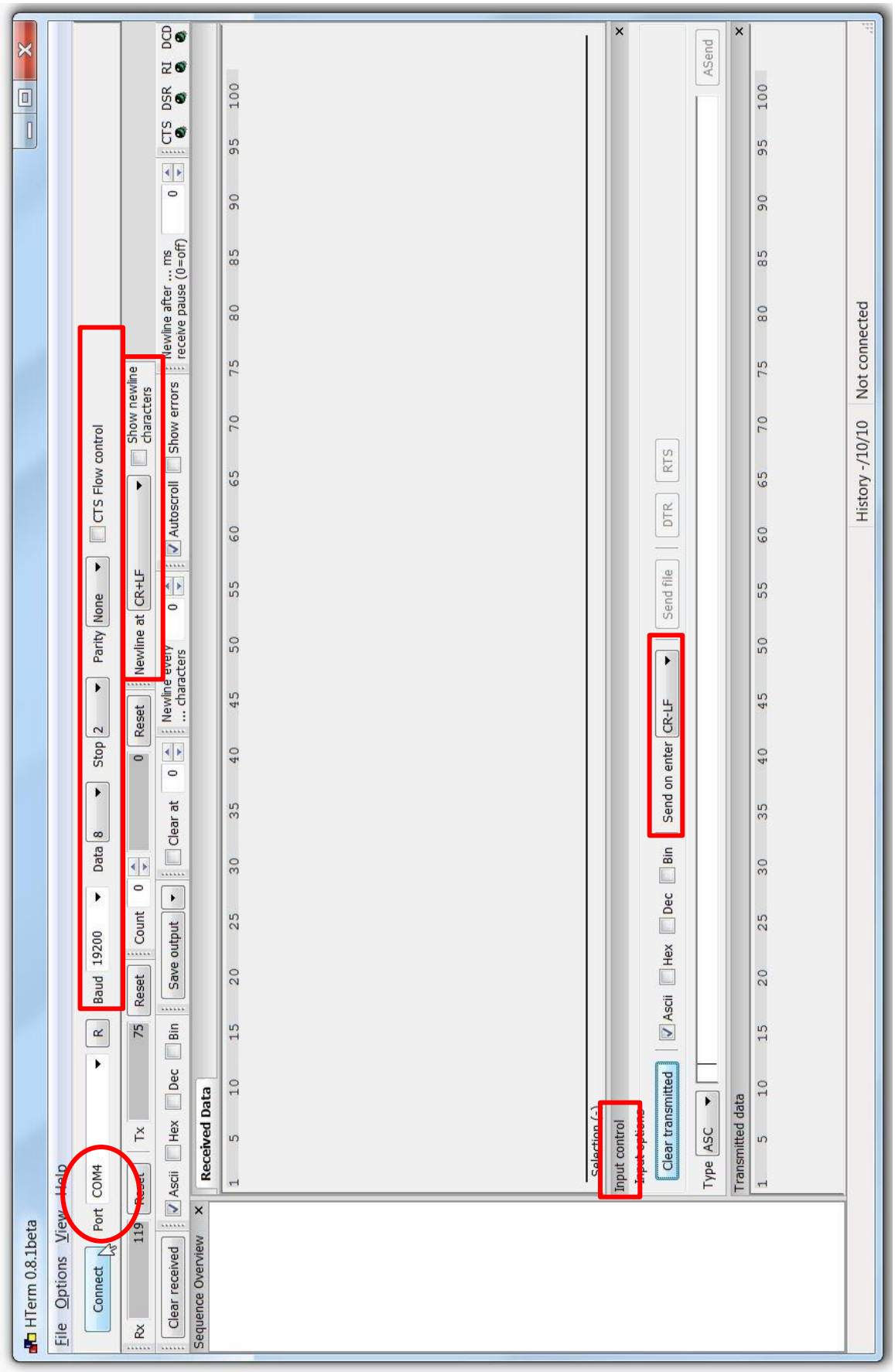

Fig. 2.1 Connection parameters for *HTerm* (Windows)

3. List of Commands

Presented below is a list of available terminal commands for reading and writing the device's parameters. Please note, that given the correct settings of terminal/telnet client software the string <CR><LF> should be equal to "Enter" key input.

3.1. Basic Commands

Table 3.1.: Basic commands

Syntax	Description
LOGIN-PASSWORD:123abc <CR><LF>	Log in with user password
LOGOUT<CR><LF>	Log out
INFO<CR><LF>	Show all basic device information
SAVE<CR><LF>	Save changes
RESTORE<CR><LF>	Cancel unsaved changes
TIME<CR><LF>	Show current time
TIME=12:00:45<CR><LF>	Set new time (hh:mm:ss)
DATE<CR><LF>	Show current date
DATE=18.07.2018<CR><LF>	Set new date (dd.mm.yyyy)
RESET<CR><LF>	Reboot device
NAME<CR><LF>	Show device identifier
NAME=XYZ<CR><LF>	Rename device to XYZ
HOSTNAME<CR><LF>	Show host name
HOSTNAME=XYZ<CR><LF>	Rename host to XYZ
DHCP<CR><LF>	Show current DHCP setting
DHCP=1<CR><LF>	Turn DHCP on (1) or off (0)
IP<CR><LF>	Show devices current IP address
IP=192.168.0.75<CR><LF>	Manually set IP address (only effective if DHCP is OFF)
GW<CR><LF>	Show gateway address
GW=192.168.0.1<CR><LF>	Manually set gateway address (only effective if DHCP is OFF)
SUB<CR><LF>	Show subnet mask
SUB=255.255.255.0<CR><LF>	Manually set subnet mask (only effective if DHCP is OFF)
PORT1<CR><LF> PORT2<CR><LF>	Show current setting for TCP/IP Port 1 or 2
PORT1=8000<CR><LF> PORT2=8000<CR><LF>	Set TCP/IP Port 1 or 2
DefaultSystem<CR><LF>	Reverts system settings to default
DefaultSetup<CR><LF>	Reverts parameters to default

3.2. Setting Parameters

3.2.1. ARC Detector Module Settings

General syntax for ARC Detector - read:

ARC[channel].[parameter]<CR><LF>

General syntax for ARC Detector - set:

ARC[channel].[parameter]=[value]<CR><LF>

[channel] = .ALL - all channels
[channel] = 1… 16 - individual channel

Table 3.2: Parameter syntax for ARC Detector Modules

Parameter name	Description	Values	Unit
ARESET	Auto reset	OFF/ON	
ARTIME	Auto reset time; in steps of 0.1 ms	0 … 2000.0	ms
OUTPUT	Output polarity	NORMAL/INVERTED	
THRESHOLD	Detector sensitivity threshold voltage; in steps of 1 mV	1 … 500*	mV

Note

*** Threshold values below 20mV (default) increase the optical sensitivity but may also increase sensitivity to EM noise and the risk for spurious trips.**
Therefore threshold values < 20mV are not recommended for reliable use of ARC4 2.0.

Examples:

ARC1.THRESHOLD=50 - set detector sensitivity threshold to 50 mV only for arc channel 1
ARC.ALL.THRESHOLD=50 - set detector sensitivity threshold to 50 mV for all arc channels
ARC.ALL.ARESET=ON - turn auto reset on for all channels
ARC.ALL.ARTIME=1000 - set auto reset time 1000ms for all arc channels

3.2.2. System Interface Module Setting

General syntax for GLBARC Logic Interface - read:

IF[logic_group].[parameter]<CR><LF>

General syntax for GLBARC Logic Interface - write:

IF[logic_group].[parameter]=[value]<CR><LF>

[logic_group] = .ALL - all GLBARC groups
[logic_group] = A… D - individual GLBARC group

Table. 3.3: Parameter syntax for System Interface Modules

Parameter name	Description	Values	Unit
ARESET	Auto reset	OFF/ON	
ARTIME	Auto reset time, in steps of 0.1ms	0 … 2000.0	ms
OUTPUT	Output polarity	NORMAL/INVERTED	
CH[.ALL/1-16]	Channels	OFF/ON	
GP[.ALL/1-8]	Logic sub-groups within one GLBARC group (pairs of channels: 1-2, 3-4, 5-6, … 15-16)	AND/OR	

Examples:

IF.ALL.ARESET=ON - turn auto reset on for all GLBARC groups (A,B,C,D)
IFC.ARESET=ON - turn auto reset on only for GLBARC C
IF.ALL.ARTIME=1000 - set auto reset time 1000ms for all GLBARC groups (A,B,C,D)

Examples – programming logic:

IF.ALL.CH.ALL=OFF - all ARC Channels in all GLBARC groups are inactive
IFA.CH1=ON - ARC Channel 1 is active in GLBARC group A
IFA.CH2=ON - ARC Channel 2 is active in GLBARC group A
IFA.GP1=AND - AND logic for sub-group 1 (channels 1 and 2) in GLBARC group A
IFB.CH.ALL=ON - all ARC Channels active in GLBARC group B
IFB.GP.ALL=OR - OR logic for all sub-groups (channels 1-16) in GLBARC group B

To set following logic:

GLBARC C = (CH1 **AND** CH2) **OR** (CH3 **AND** CH4) **OR** (CH5 **AND** CH6)

The following commands are used:

IFC.CH.ALL=OFF - all ARC Channels in GLBARC group C set inactive
IFC.CH1=ON - ARC Channel 1 set active in GLBARC group C
IFC.CH2=ON - ARC Channel 2 set active in GLBARC group C
IFC.CH3=ON - ARC Channel 3 set active in GLBARC group C
IFC.CH4=ON - ARC Channel 4 set active in GLBARC group C
IFC.CH5=ON - ARC Channel 5 set active in GLBARC group C
IFC.CH6=ON - ARC Channel 6 set active in GLBARC group C
IFC.GP1=AND - AND logic for sub-group 1 (ARC Channels 1-2) in GLBARC group C
IFC.GP2=AND - AND logic for sub-group 2 (ARC Channels 3-4) in GLBARC group C
IFC.GP3=AND - AND logic for sub-group 3 (ARC Channels 5-6) in GLBARC group C

Logic connection between sub-groups is always **OR**.

Revision History:

Revision	Date	Description
1.0	27.04.2018	initial
1.1	16.01.2019	recommended sensitivity threshold values
1.2	25.03.2019	terminal connection parameters, programming examples, default factory settings, text formatting
1.3	07.03.2022	Formal changes
1.4	12.04.2022	Password information added