

4. Network connection (LAN)

Several FMA21 can be connected to a network. This enables that the FMA21 devices can change data between each other as well as with a central data server. To use this functionality each FMA21 has to be clearly identifiable in the LAN which can be done with IP addresses. Therefore, each device in the network must be given a unique IP address. If this is not provided the connected devices or the network may not operate properly. To start up a network properly please see chapter 4.2.

IP addresses in the network are static. This means that each device connected to the network must have a fixed IP address. The structure as well as the distribution of the IP addresses are defined. It is a class B net (172.20.x.x, 255.255.0.0) with the following sub groups:

Sub group 0: administration pc (server and result management)

Sub group 1: all network devices and scoring machines of piste 1

Sub group 2: all network devices and scoring machines of piste 2

Sub group 3: all network devices and scoring machines of piste 3

etc.

Within the sub groups the IP addresses are static as well and already defined.

Sub group 0:

| | |
|--------------------|--------------------------------------|
| 172.20.0.1 | Result server |
| 172.20.0.2 | allstar back end server |
| 172.20.0.20 – 39 | Ophardt control pc |
| 172.20.0.100 – 199 | Swiss Timing control pc and monitors |
| 172.20.0.240 – 249 | allstar managed switches |

Sub group 1:

| | |
|------------|--|
| 172.20.1.1 | Master FMA21 (main (master) scoring machine of piste 1) |
| 172.20.1.2 | Slave 1 FMA21 (display (slave) scoring machine of piste 1) |
| 172.20.1.3 | Slave 2 FMA21 (display (slave) scoring machine of piste 1) |
| 172.20.1.4 | Slave 3 FMA21 (display (slave) scoring machine of piste 1) |

etc.

Sub group 2:

| | |
|------------|--|
| 172.20.2.1 | Master FMA21 (main (master) scoring machine at piste 2) |
| 172.20.2.2 | Slave 1 FMA21 (display (slave) scoring machine at piste 2) |
| 172.20.2.3 | Slave 2 FMA21 (display (slave) scoring machine at piste 2) |
| 172.20.2.4 | Slave 3 FMA21 (display (slave) scoring machine at piste 2) |

etc.

Sub group x:

- 172.20.x.1 Master FMA21 (main (master) scoring machine at piste x)
- 172.20.x.2 Slave 1 FMA21 (display (slave) scoring machine at piste x)
- 172.20.x.3 Slave 2 FMA21 (display (slave) scoring machine at piste x)
- 172.20.x.4 Slave 3 FMA21 (display (slave) scoring machine at piste x)
- etc.

The following illustration explains the connection:

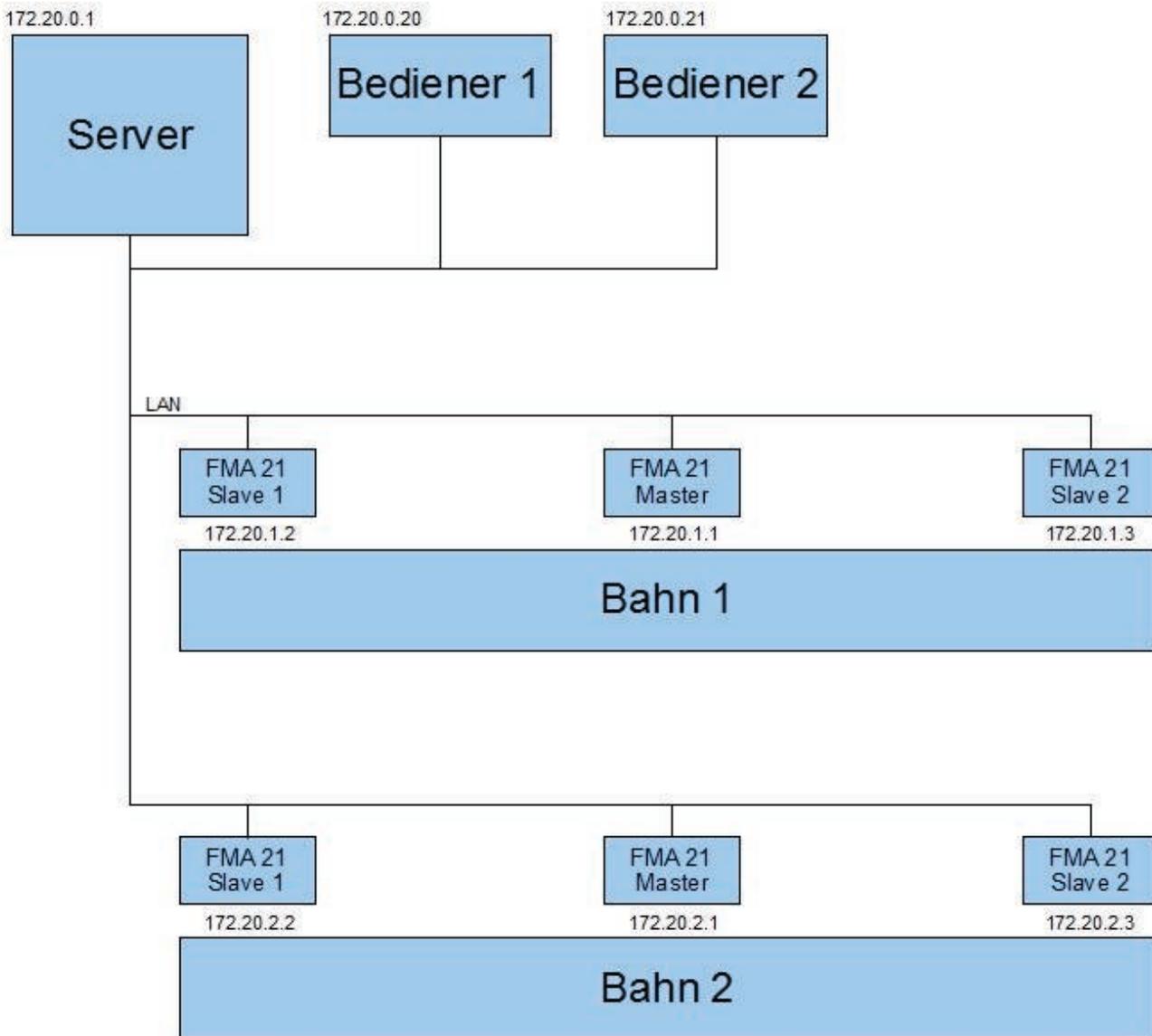


Fig 1: Typical network configuration

4.1 Network protocols

To transmit information within the network protocols are used as well. In this case, the standardised Cyrano protocol is used. This protocol transmits the standardised information from the result management server to the single piste servers. But the protocol does not comprehend all necessary data (as for example pictures, flags etc.). We therefore use a protocol extension which operates independently and does not influence the Cyrano protocol. Details regarding the various protocols were already explained in chapter 3.7 and 3.8.

The following illustrations show the typical configurations with or without allstar protocol extension.

The illustration below explains the information flow in a network configuration with Cyrano protocol. The two slave scoring machines do not have a direct connection to the server. They receive data by the respective master scoring machine of the piste via allstar protocol.

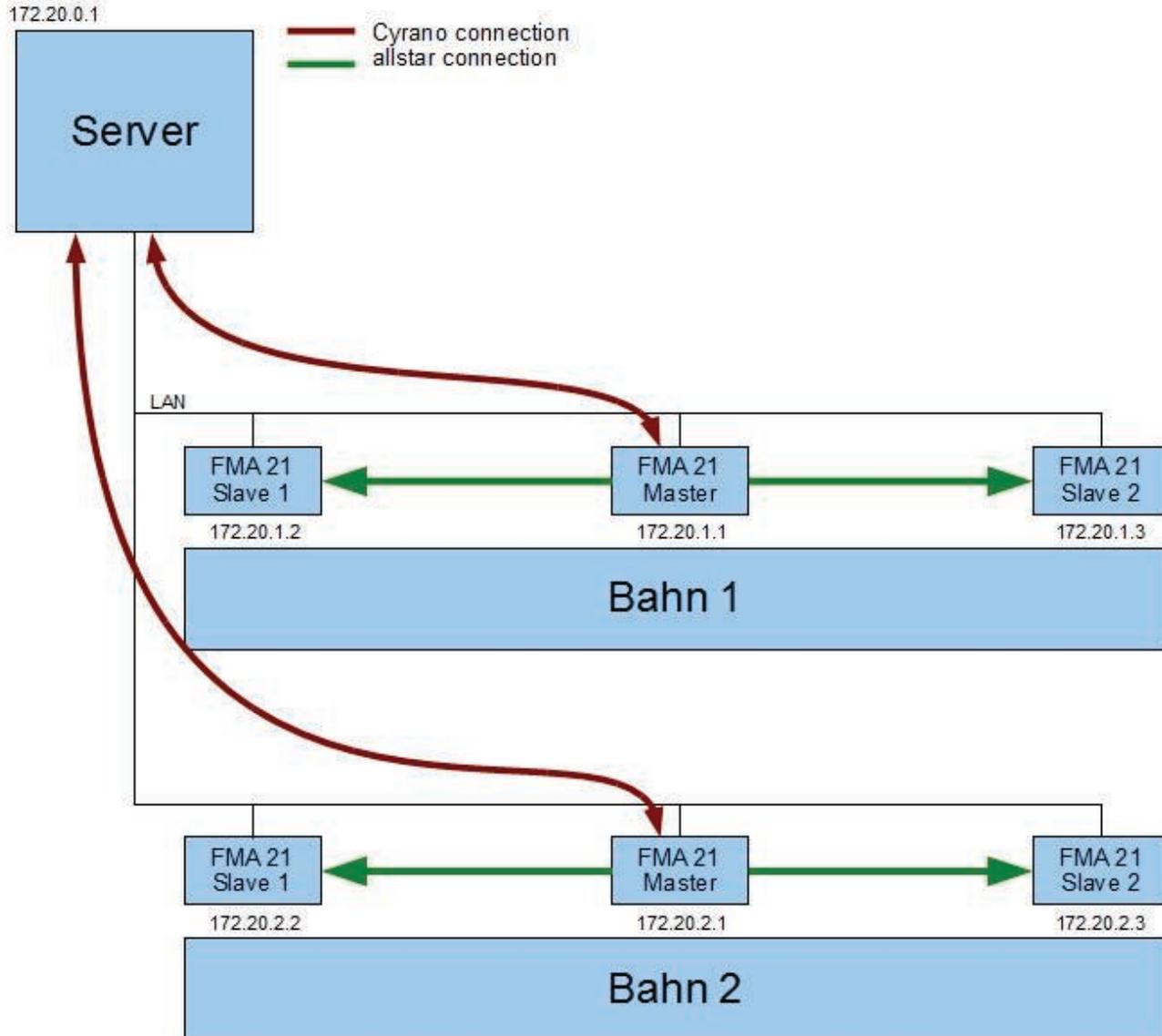


Fig 2: Network configuration with connection to result server via Cyrano

The following illustration explains the information flow for a network configuration with Cyrano and allstar protocol.

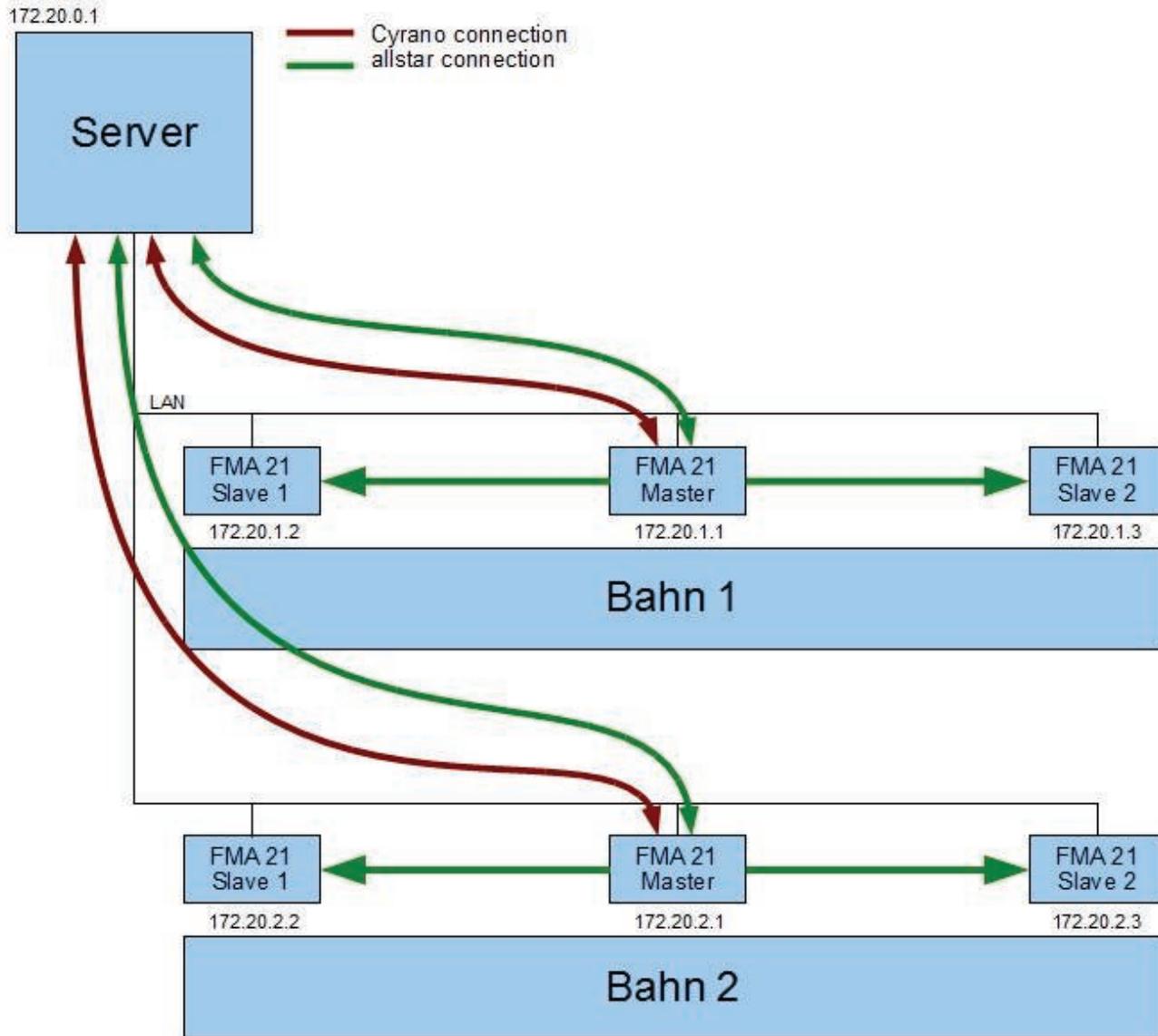


Fig 3: Network configuration with connection to result server via Cyrano and allstar

4.2 Network setup with FMA21

To setup a network the FMA21 scoring machine as well as all other network devices must have a unique IP address. If this is not provided the network may not work reliably. The IP address of the scoring machine is automatically generated from the piste number and if applicable from the slave number (for master scoring machines the IP address is 172.20.<piste no>.1; for the slave scoring machines the IP address is 172.20.< piste no >.<slave no + 1>). To operate a network successfully, to add another scoring machine or a different network-compatible device to the existing network the following steps have to be carried out:

1. Make sure that no scoring machine is connected to the network (If necessary, unplug the network cable). Carry out steps 2 – 8 for each scoring machine. For other network devices it is absolutely necessary to set the IP address **BEFORE** plugging in the network cable.
2. Position FMA21 on its stand and connect all cables **except network cable** to FMA21. It is important that the network cable (LAN cable) is not yet plugged in at that time.
3. Switch on FMA and wait until it has booted.
4. Please choose profile. If the scoring machine shall act as master of this piste please choose profile Cyrano or Cyrano + XX. XX is the choice of the result system supplier (for example Ophardt Team, Mask etc.). If the scoring machine shall act as slave device (copying the display of the master scoring machine) please choose profile 'Slave (net)' or 'Slave (net) inverted' (for example to show an inverted version of the master display on the opposite side). Before changing the profile you may have to enter a password which is 134241.
5. Please enter the piste number. If the scoring machine shall act as slave device the slave number must be set. Before changing the piste or slave number you may have to enter a password which is 134241.

Please note: The slave number can appear only once per piste. An automatic verification of already occupied pistes or slave numbers is not carried out at the moment.

6. Wait until the status message has disappeared.
7. Plug in the network cable (LAN).
8. Please choose the same profile as described under point 4.
9. The scoring machine tries to setup a connection. The master scoring machine tries to setup a connection to the result system server (172.20.0.1), the slave scoring machines to the corresponding master scoring machine of this piste. The successful connection can be checked by means of Cyrano status LED's (see pictures 4.1 – 3). A yellow lamp signifies the connection via Cyrano a green lamp signifies a connection via allstar protocol.

Please note: It may take up to 15 s to successfully setup a connection. If the connection breaks off it may take up to 40 s until the status bar disappears.



Fig 4.1: No connection available



Fig 4.2 Cyrano connection available



Picture 4.3 Cyrano & allstar connection available

4.3 State machine with Cyrano

The following illustration explains the function of the state machine by means of the Cyrano protocol:

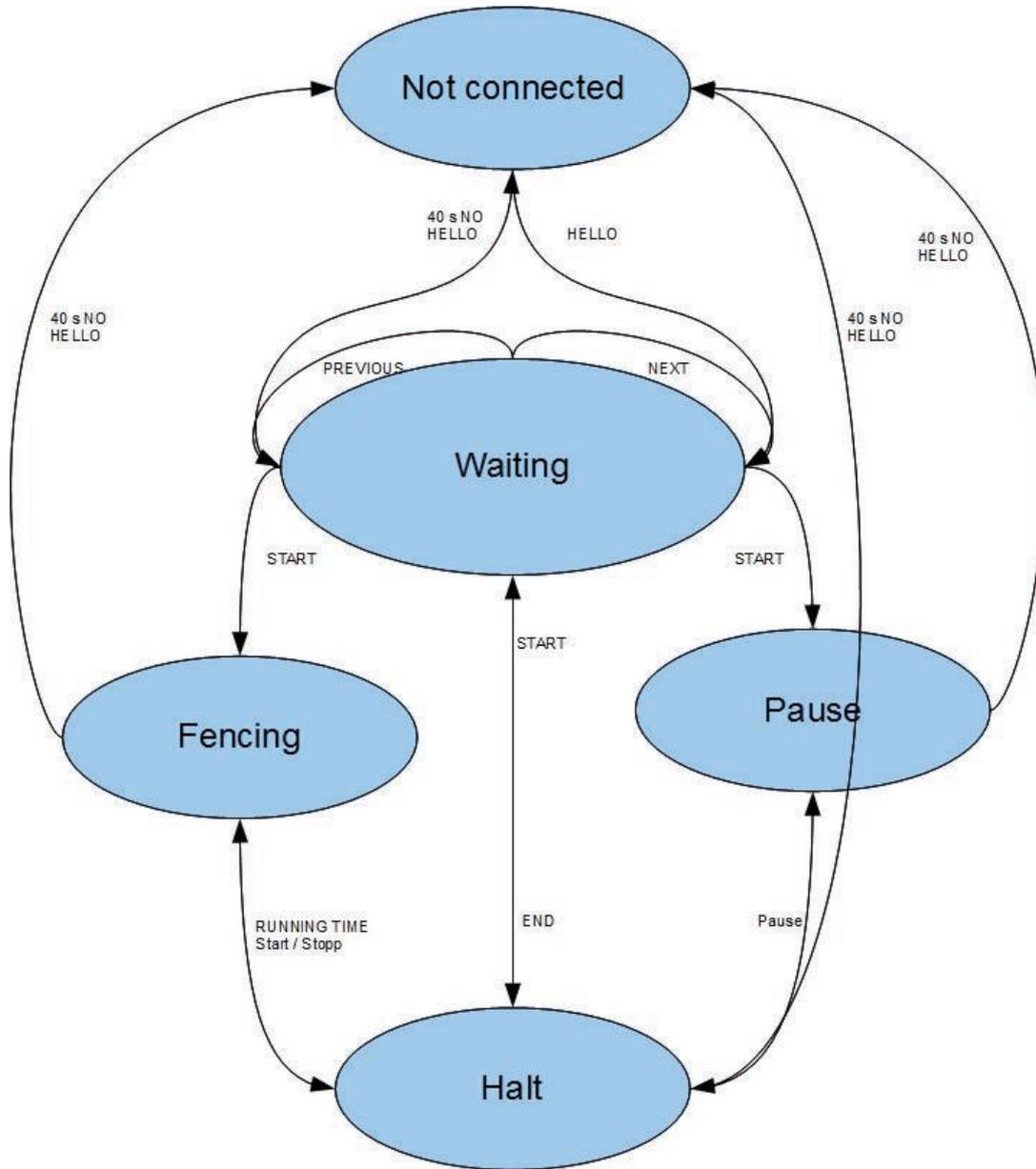


Fig 5: States of FMA21 with Cyrano protocol

The commands 'Start', 'End', 'Next' and 'Previous' are carried out by using buttons on the touch screen or by using key combinations on the remote control FB3a. As the current remote control does not have extra keys for Start, End, Next and Previous the following key combinations have to be used:

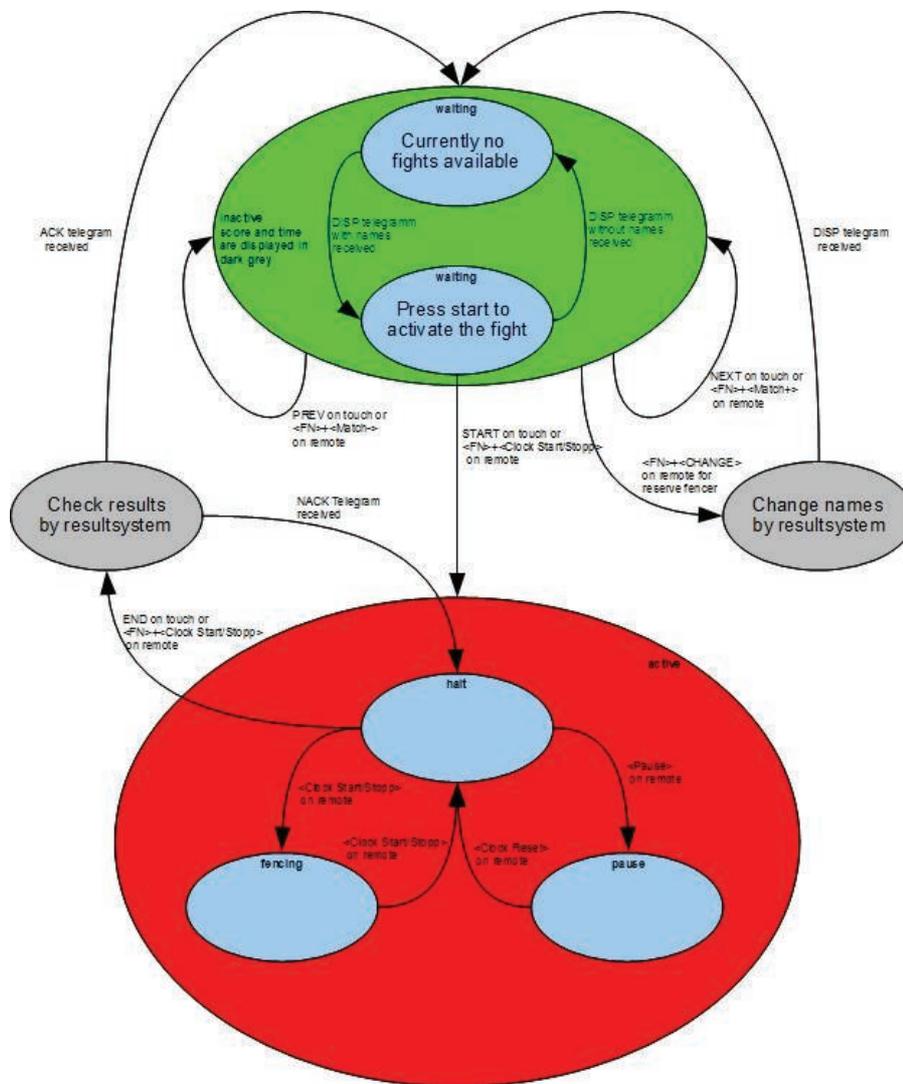
Start: <FN> + <Clock Start/Stop>

End: <FN> + <Clock Start/Stop>

Next: <FN> + <Match+>

Previous: <FN> + <Match->

The following illustration explains the different states with their commands in detail:



The above illustration shows that after starting FMA21 it is in the inactive state (green) 'waiting'. In this state the scoring machine can receive information from the result system. As long as it has not received current fight information (names) by means of the 'DISP' command the message 'No further match available' is visible on display. After receiving names the message 'Please press <Fn>+<Start> to activate the match' appears. Now, the fight can be activated by pushing the key combination on the remote control or the start button in the network menu. The scoring machine changes into the active state (red). An influence by the result system is not possible any more. To stop the fight the key combination <Fn>+<Start/Stop> on the remote control or the stop key in the network menu has to be pushed again. After confirming the scoring machine sends the command for saving to the result system and waits for data validation. With the ACK/NAK command the result system sends back the result to the scoring machine. In case of NAK the scoring machine reverts to the active state 'Halt' and the message 'Please check your results!' appears. Otherwise the scoring machine returns to the inactive state 'Waiting' and waits for new fights.

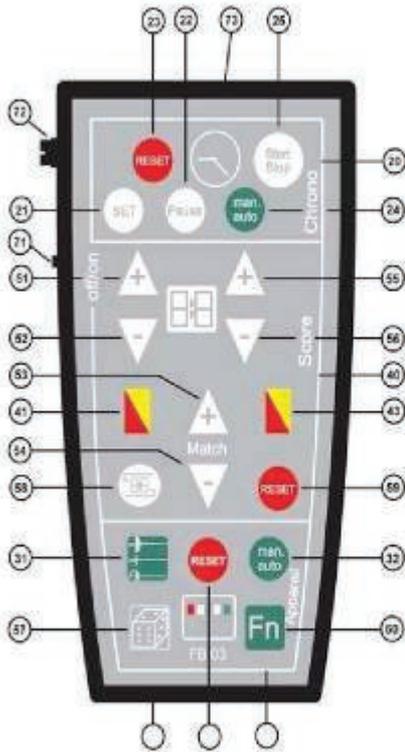
During the inactive state the key combinations <Fn>+<Match+> and <Fn>+<Match-> as well as the ,Next' and ,Prev' buttons in the network menu are used to scroll through the fights in one round or in the team competition.

If a spare fencer shall be replaced during a team competition the change is marked by the key combination <Fn>+<CHANGE> before activating the fight. Now the message 'To activate or delete spare fencer please press <Fn>+<Cards>' appears.

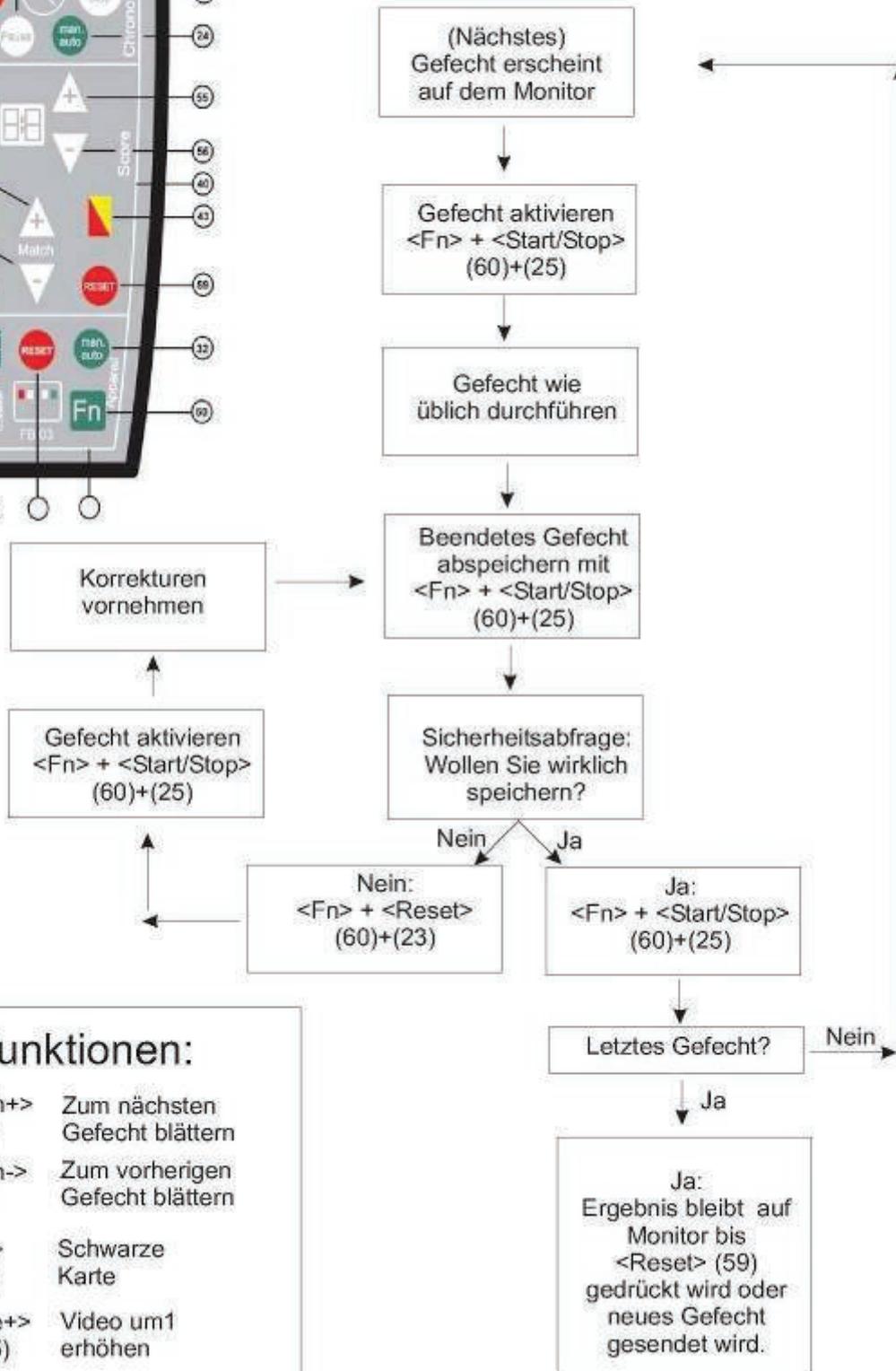
By pushing the corresponding key combination on the remote control the command is sent to the result system. This replaces the existing names by the spare fencers' names and sends the updated information with a ,DISP' message back to the scoring machine.

The result system takes care that for all following fights the correct names are transmitted. The same procedure is used to take back a spare fencer who was replaced by mistake.

FB 03



Typischer Gefechtsablauf mit Result-Management-System "Ophardt"



Neue Funktionen:

- <Fn>+<Match+> (60)+(53) Zum nächsten Gefecht blättern
- <Fn>+<Match-> (60)+(54) Zum vorherigen Gefecht blättern
- <Fn>+<card> (60)+(41/43) Schwarze Karte
- <Fn>+<Score+> (60)+(51/55) Video um1 erhöhen
- <Fn>+<Score-> (60)+(52/56) Video um1 vermindern