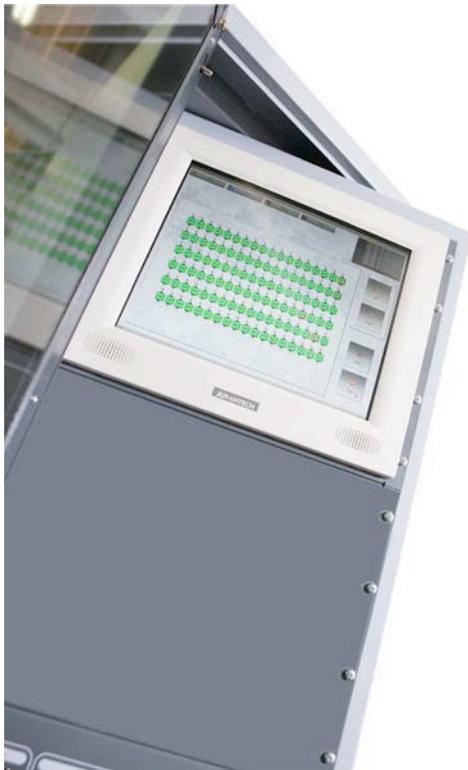




HDC MK2

Digital Control for Rigging System



WALL MOUNTED VERSION

PDA
WiFi

FEATURES

The **HDC MK2** is a **Rigging Control System** utilized for either **direct control of simple motorized rigging products** or **fully automated positioning controlled motorized devices** with either **REMOTE DIAGNOSTICS OF THE SAFETY SWITCHES** of the rigging devices (if the suspension is equipped with a distributed electronics) or **basic Positioning Control** (if the rigging device is equipped only with a positioning **SENSOR**).

The HDC MK2 is available either as full size Rack or Wall mounted enclosure that include a Key Lockable front door and an hinged frame holding the Touch Screen Panel PC and the components for the USERS access.

The HDC MK2 SYSTEM can be configured for different types of SYSTEM ARCHITECTURAL and the main differentiation is on the dislocation of the CAN BUS ELECTRONICS CARDS , that can be located within each RIGGING PRODUCT or located on SEPARATE BOXES.

The system incorporates a number of control facilities:

- System SET UP PARAMETERS from the TOUCH SCREEN.
- Temporary Groups & Fix Groups definition from TOUCH SCREEN & PDA.
- Hoist selection & Movement from the TOUCH SCREEN & PDA
- Geographical Display on Touch Screen;
- Feed back & Graphical Display of Machines Positioning;
- Positioning Recording and Playback (Positioning Cues handling).
- Full wireless remote control

The remote control scheme is based on the following double layers architecture:

- selection of the RIGGING PRODUCT through the layer Ethernet/CAN bus/local controller, issuing and ready to move status (data switching layer); the collection of the status and the position of the RIGGING PRODUCT through the same CAN bus/ Ethernet layers
- movement of the RIGGING PRODUCT by hard-wired UP / DOWN buttons on the front panel; each button is switching an own 24 Vdc wired line opto-connecting all the junction boxes in the studio

System Architecture & front ends

1.1 The Main Controller

The HDC MK2 Console is a Wall Mounted Cabinet (it is also possible to have a version for flash mount within a wall recess).



The MAIN CONTROLLER features a front transparent protection door with a key lock, for authorized personnel access, protecting a High Resolution Colour Monitor with SAW or Capacitive Touch Screen panel, to process and display the information, building a more intuitive control panel in terms of graphical layout and commands for the Users.

The Main Characteristics are:

Industrial FANLESS PC

- Intel/VIA CPU 1,2 GHz or more
- 1 Gbyte RAM
- SXGA LCD with 1280x1024 pixel
- SAW or Capacitive Touch Screen panel
- 4 USB 2.0 Port
- Rugged Aluminum die-cast housing with removable plastic front bezel

Front panel including:

- A System Turn ON/OFF switch with a LIGHT INDICATOR,
- An EMERGENCY Stop activator with a LIGHT INDICATOR
- A JOY STICK with DEAD MAN function.

1.2 The Wireless devices

HDC MK2 supports two kinds of wi-fi devices, the PDA and the Tablet PC (Optional).

1.2.1 The PDA

The HDC MK2 PDA is a Window CE based machine, that connects to the HDC MK2 Console via WI-FI (based on standard specifications).

It works as a remote access Interface to the HDC MK2 Console, without duplicating the console processing functions and therefore it requires the MAIN CONTROLLER to be active in order to function.

All the commands available at the console are possible as well at the PDA level (machines selection, move, positioning cues recording and playback).

From the PDA it is not possible to access the SYSTEM SET UP functions.

When the user decides to operate the system from the PDA, this takes priority at manipulation level over the console.

It includes EMERGENCY STOP and DEAD MAN FUNCTIONS.

The machines selection is available at either numeric keyboard entry or TOUCH SCREEN object oriented levels.

They are implemented in the control unit all of the safety features necessary for rigging motion controls.

The rugged enclosure, is designed for true-mobile field applications and for harsh environments



1.2.2 The Tablet PC (optional/alternative)

The HDC MK2 Tablet PC is a Window XP based machine connecting to the HDC MK2 hubs, according to the WI-FI specifications.

It can replace the Industrial PC of the MAIN CONTROLLER as it works as a stand-alone Device.



It provides all of the same services featured by the HDC MK2 Console, including the EMERGENCY STOP and the DEAD MAN FUNCTIONS, without requiring any support from other HDC MK2 consoles.

1.3 The Access Point

The HDC MK2 Access Point is the Network Interface for the WI-FI communication between the HDC MK2 Processor Unit and the Hand Held.

The Access Point is a network node with its own IP address which depends on the Studio Layout.

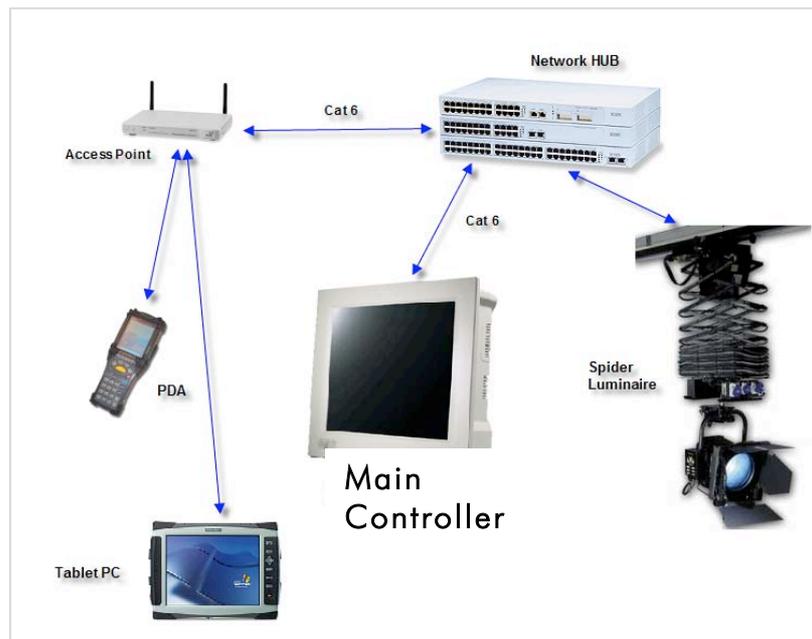
The HDC MK2 Access Point supports the standards 802.11a, 11b, 11g, working from 11 Mbps to 55 Mbps.



1.4 The Network

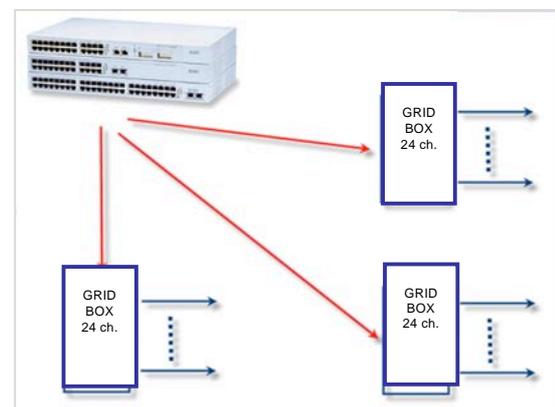
The HDC MK2 is based on a standard Ethernet network at 10/100/1000 Mbps that may be either a private or an enterprise networking infrastructure.

All the control devices are connected with their own IP Address and several possibilities are there to configure either simple or very sophisticated systems, all based on the known advantages of the standard LAN.



1.4.1a Network HUB in case of Can Bus Electronics separate from Rigging Product

In the systems where the CAN BUS ELECTRONICS is separate from the rigging product and there are GRID BOXES condensing the electronics for 24 RIGGING PRODUCTS each, the Network Hub is an ETHERNET SWITCH, providing LAN connections between the DISTRIBUTED GRID CONTROL BOXES, the MAIN CONTROLLER and the WI-FI Access point.

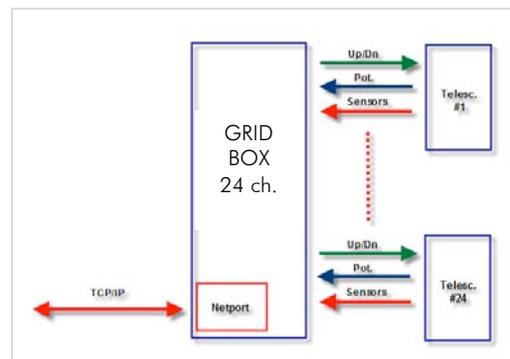


1.4.1b Can Bus Electronics separate from Rigging Product on Grid Boxes

These BOXES are foreseen for a distributed installation at GRID LEVEL, nearby a number of RIGGING DEVICES.

Each box can connect a maximum of 24 rigging products.

In the following picture it is shown the functional diagram of each GRID CONTROL BOX, with its own TCP/IP input and 24 interfaces for RIGGING PRODUCT each one provided with up/down local controls (BACK UP or SERVICE), positioning output and sensors outputs.



N.B. It is suggested to consider this system architecture only for those RIGGING PRODUCTS that contain one movement. In case of products containing also trolleys or rotation movements, it is recommended to choose the system with local electronics at the rigging product.

1.4.1c RIGGING INTERFACES CONTAINED IN THE GRID BOXES

The Rigging Products are fully controlled by the DISTRIBUTED GRID CONTROL BOXES, each one providing 24 interfaces.

Each Interface includes:

- Up/Down output lines at 24 Vdc
- Analog input from the RIGGING PRODUCT potentiometer, giving the vertical position
- Digital inputs from the sensors handling the load and the travel limits at the RIGGING PRODUCT.

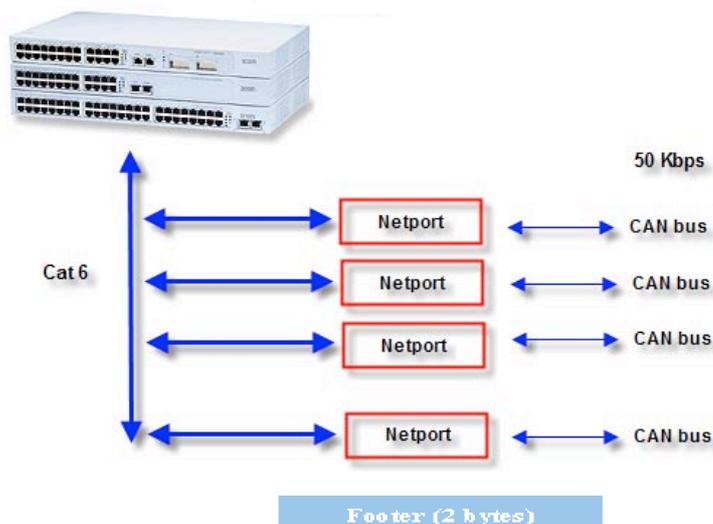
As an option a small PCB can be installed to display the position directly at the RIGGING PRODUCT.

1.4.2a Network HUB in case of Can Bus Electronics in the Rigging Product

The Icarus2000 Hub is a unit provided with Netports each supporting and interfacing an own CAN bus sub-network.

The Icarus2000 Netport is provided with one Ethernet port on the backbone side at 10/100/1000 Mbps and one CANbus port on the sub-network side at 50 Kbps. It supports UDP communications.

The Icarus2000 Netport decapsulates data objects coming from the console to the rigging devices and encapsulates data objects coming from rigging devices to the consoles. The data communication objects are based on a CAN bus 2.0 8-bytes data structure.



1.4.2b SUB NETWORKS with Can Bus Electronics in the Rigging Product

The Icarus2000 sub-Networks are based on CAN bus 2.0 networks that is an industry standard for automotive and manufacturing control system. It offers very interesting features like the following:

Physical layer : The transmission channel is a shielded twisted pair, providing a bidirectional communication

Data Rate : between 10 kbps to 1000 kbps to provide fast responses to real time processing systems

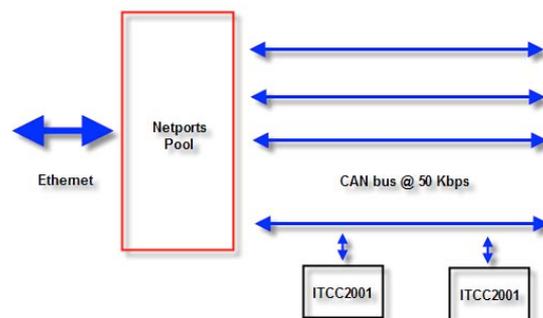
Short messages : to have a low latency when accessing to the network, for fast servicing of real time data exchange

Priority scheme : to provide each message with a priority level, for proper servicing of device prioritization

Data integrity : means an high resistance to electromagnetic interference, detection of erroneous messages and repetition. Faulty nodes are able to withdraw from bus communication on their own

Multi-master scheme : the bus has a linear structure with equal bus nodes, without any dependence with each others

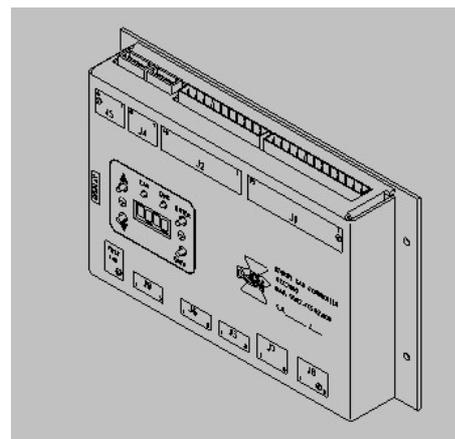
Multicast capability : the control systems needing a common data item are able to simultaneously receive this data item from the network



1.4.2c Can Bus Electronics in the Rigging Product

The HDC MK2/Icarus2000 Remote Controller is an intelligent gear providing both the services for data transmission and local processing. The main features are the following:

- 16-bit CPU SIEMENS 167CR, 20 MHz, with integrated CAN controller
- 4 digit display
- 4 key control panel to set and/or monitor the configuration
- integrated Monitor on RS232 communication port
- local and remote setting of operating parameters, with on board storage
- multi-tasking environment for concurrent processing of data items
- code produced with high level C language by Keil Corporation



1.5 The Emergency Stop control

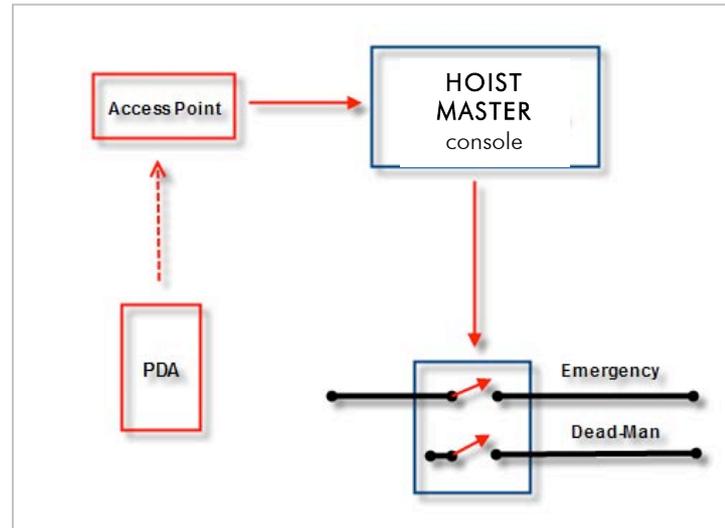
The HDC MK2 system has a set of safety circuits for emergency situations. The HDC MK2 console, in fact, houses the EMERGENCY BUTTON that can be activated, in case of necessity, and interrupt the power supply to all the peripheral units.

1.5.1 PDA emergency stop function

When using a PDA, the wired emergency control is integrated with a wireless remote control as shown in the following picture, where the mushroom red button is daisy chained with an Emergency control card.

The Emergency control card has the additional function to detect the status of the emergency line in order to display it at the console level.

In case of an EMERGENCY STOP ACTIVATION, with the above facility it is possible to QUIT THE FAILURE STATUS from either the console or the PDA, as required by the SAFETY STANDARDS.



The PDA is provided with two yellow control buttons in the sides of the shell: they are the Dead Man and the Emergency STOP functions, as shown in the following picture.

Every second, the PDA sends the status of both switches allowing the console to do the appropriate actions in the normal operations and in the emergency status.

The status of the emergency line will be displayed in the Layout panel for a fast and a correct information for the users .

The system is supplied with a Battery Charger DOCK IN cradle and a Spare Battery.



1.6 The software

The HDC MK2 software for the console is a Windows XP based package including the functions to control, monitor and configures the system devices.

The code has been developed using Microsoft Visual C++ version 6.0 to meet the actual industry standards in terms of software design and architecture and in order to support the most current features for user graphic interface and parallel processing.

Basically, the HDC MK2 software provides the user with the following services:

- the creation, the modification and the execution of the memories and cues;
- the display of the configuration (Preset) and the status of the Layout (Live);
- the initialization of trolleys and of suspensions, with embedded monitor to record data and display statistics;
- the monitoring of network traffic;
- the monitoring of rigging devices status;
- the on-line help.

1.7 Optional Control Devices

Thanks to the LAN infrastructure at control level, it is possible to add at anytime other standard control devices in the base system, such as LAPTOP or DESKTOP computers, dimensioned with the required features and properly loaded with the DE SISTI RIGGING CONTROL SOFTWARE.

It is anyway necessary to consult DE SISTI Lighting for implementing any required control device within the system, in order to take care of the SAFETY ASPECTS involving the required presence of both DEAD MAN and EMERGENCY STOP functions at any control post.

Laptop control



Desktop control

