

Patient Entertainment and Bedside Computing System

entertainment
+ care

TeleCall
DIGITAL

An integrated system
providing a high-resolution
TFT touch screen offering
entertainment to patients
and access to medical
records for staff.

The Wandsworth Group, established in 1904, has 55 year's experience of designing solutions for hospital beds, such as nurse call, patient entertainment and communication systems. The Tele-Call system has evolved from analogue technologies to the present fully IP solution and is used in hospitals worldwide.



Tele-Call is a patented, advanced patient entertainment system that is designed to provide hospital staff with computing facilities at each hospital bed. The fully IP solution provides a touch screen PC at each bedside, providing patients with digital TV and radio, telephony, internet access and interactive movies. The system can also integrate into the hospital IT system to allow clinical staff secure access to patient data and hospital information and administration systems at the point of care. The cost of providing and supporting the bedside computing system can be covered or subsidised by revenues from patient services.



Tele-Call is an important tool in the fight against hospital acquired infections by eliminating the need for hospital staff to carry or wheel portable IT devices from one patient bed to another.

affordable



System Description

The system comprises central head-end and bedside equipment and application software. The head-end equipment comprises application and content servers and appliances to manage the streaming of TV, radio and video-on-demand as IP packets over the hospital LAN. Wandsworth provides application software for the provision and management of the patient entertainment services, including payment software.

At the hospital bedside, a swivel arm is wall-mounted above each bed supporting a 17" touch screen terminal with an integral, fanless motherboard and optional telephone handset. The screen can be positioned either for patients and visitors or for hospital staff to use. The 17" screen configuration is optimised to provide the high-resolution (1280 x 1024 pixels) required for medical images and touch screen applications, whilst also being able to handle widescreen TV and movies. An alternative solution for private hospital rooms is the Tele-Call Set Top PC driving an LCD digital TV, operated by infra-red handsets and keyboards. Both bedside solutions can be used in the same hospital using common application software.

Between the Tele-Call head-end and bedside equipment, a modern high-speed 1000/100/10Mbps Ethernet is required using Ethernet switches that support IGMP multicasting. If telephone services are required at the bedside, a VOIP system running over the LAN is also required. The Ethernet and VOIP infrastructure can either be part of the hospital's existing networks or can be installed as a separate network interconnected with the hospital network via a firewall.

Wandsworth can advise customers on the suitability of existing networks and the design of new infrastructure.

Each Tele-Call terminal is supplied with an integral smartcard reader, which is used by clinicians for secure access to the hospital's IM&T systems. The terminal can also be Bluetooth enabled for use with Bluetooth smartcard holders or fitted with passive RFID readers to read Milfare format RFID cards. Smartcards can be

used in conjunction with PIN numbers/passwords or optional biometric readers to allow use of multiple strong authentication procedures.

The Tele-Call system allows hospitals to access their existing clinical and administrative software systems at the bedside. In order to accommodate the wide variety of hospital software systems, Tele-Call provides for the use of touch screen, USB, Infra-red or Bluetooth keyboards.

Bedside Equipment

The Tele-Call bedside hardware comprises:

- 1. Touchscreen PC**
 - 2. Swivel arm**
 - 3. Wall or ceiling mounting with power supply unit**
- Or where the above arrangement is not applicable:
- 4. A Set Top PC for use with LCD televisions**

1. Touchscreen PC

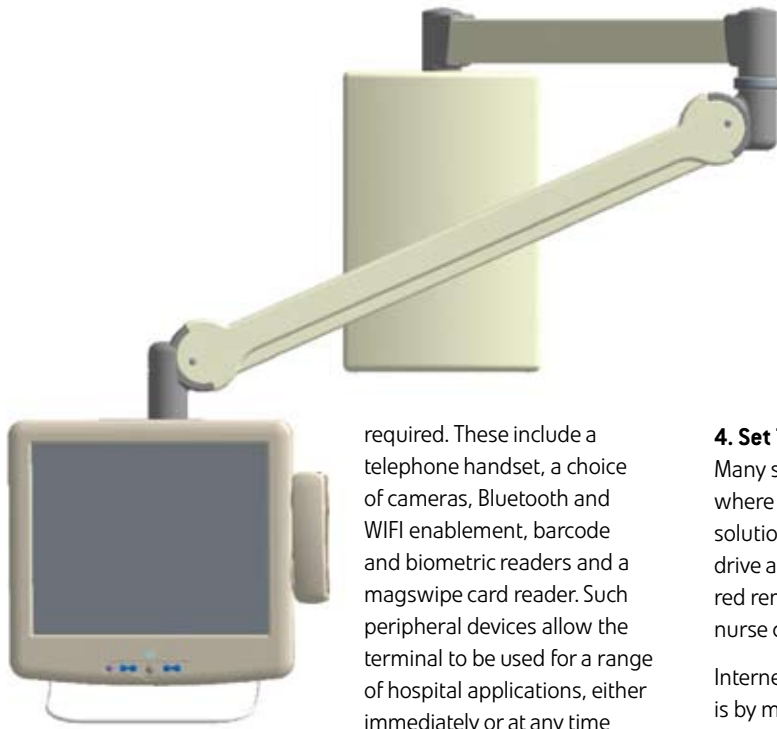
The Tele-Call patient terminal comprises a fanless, 1GHz Celeron M or 1.4GHz Pentium M processor driving a 17" resistive touch LCD screen. The terminal, with a 7-year minimum design life and the ability to withstand regular cleaning between users for infection control purposes, is specifically designed for the hospital environment. Key to infection control is a lack of hard edges and crevices where germs can be missed during wiping. The fanless motherboard design is essential, not only to eliminate noise in the hospital ward environment, but also to prevent the harbouring of dirt and germs inside the terminal by not requiring ventilation slots. The LCD screen is sealed to IP65 to prevent the ingress of cleaning fluids into the unit.

Full PC functionality is desirable when streaming TV and video over the network, as this enables the use of compression to reduce the load on the network by de-coding at the client. As a result Tele-Call IPTV and VOD streams require only 4 Mbps. The solution thus provides the hospital with full PC functionality at each bedside for either client based or server based applications.

For future flexibility, the standard Tele-Call patient terminal has a range of optional accessories. These are all external plug-in modules, which can easily be added if and when



flexibl



required. These include a telephone handset, a choice of cameras, Bluetooth and WIFI enablement, barcode and biometric readers and a magstripe card reader. Such peripheral devices allow the terminal to be used for a range of hospital applications, either immediately or at any time as required during its 7-year minimum life.

The Achilles heel of any PC, apart from the fan, is its hard drive. The Tele-Call terminal allows secure yet easy external access to the hard drive either for maintenance purposes or for major software upgrades.

A product data sheet is available for the Tele-Call TC200 series of touch screen terminals.

2. Swivel Arms

The purpose of the swivel arm is to position the touch screen to enable patients to view it from a lying or sitting position in the bed or from a chair at the bedside, as well as enabling clinicians to use it and turn it away from the patient when required. The swivel arm also allows the terminal to be parked against the wall when not in use or pushed out of the way in the event of medical emergencies.

Wandsworth provides a choice of swivel arms, either those with a fixed horizontal arm or a scissor type arm. The fixed horizontal arm is suitable for solid walls whilst the scissor arm is more suitable for partition or other light-duty walling or screens. Both arms are matched to the weight of the terminal and its accessories, to hold it securely whilst in use.

3. Wall Boxes

The wall box is essential when using the fixed horizontal type swivel arm in order to spread the lever loading on the wall fixings, in case a person uses the arm to pull themselves up from the bed or chair. The wall box also serves to house the low voltage power supply unit that powers the terminal. A small wall box is provided with the scissor type arm to locate the power supply unit.

4. Set Top PCs

Many single-bed hospital rooms are used for private patients where a hotel-type ambience is required. The Tele-Call solution for single-bedded rooms is to use a Set Top PC to drive a digital LCD television. The TV is operated from an infra-red remote control or, in some cases from a pillow speaker or nurse call handset.

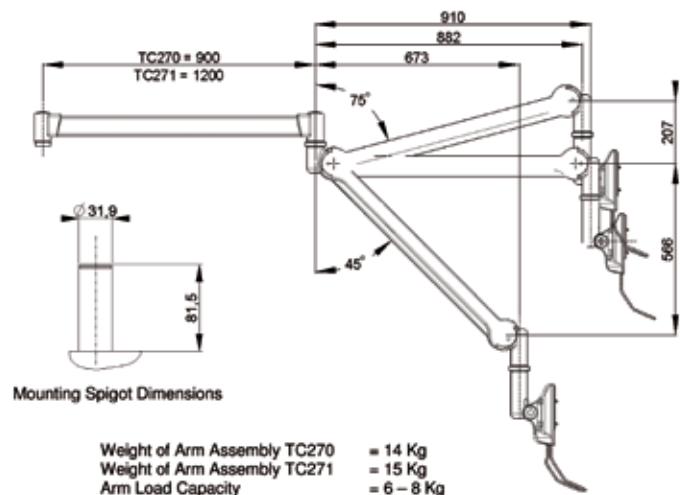
Internet access or access to clinical systems by hospital staff is by means of the Tele-Call infra-red, clinical grade keyboard. Set Top PCs and Touch Screen PCs can both be used in the same hospital as the application software is the same for both. Telephony is provided by using standard VOIP handsets when using LCD TVs.

A product data sheet is available for the Tele-Call Set Top PCs.

Safety and Emissions Standards

Tele-Call bedside terminals and PCs are available in two versions to meet International safety and emissions standards. The standard version is designed to meet IEC60950-1 standards for non-clinical equipment, whilst the IEC60601 version is designed to meet standards for clinical equipment. The power supply unit is different for each version.

TC270 / TC271 Arm Assembly Specification





Head-End Equipment

Wandsworth provides a head-end design service for each hospital. The Tele-Call head-end equipment comprises:

1. IPTV Receivers
2. Content Servers
3. Application Servers

1. IPTV Receivers

A range of receivers is available to convert all types of TV transmissions into MPEG2 IP packets for transmission over the hospital LAN. These include:

- **Digital to IP Converters** for use with unencrypted digital free-to-view transmissions, connecting directly to RF antenna or satellite dish
- **Encoders** for use with encrypted satellite or cable transmissions, connecting to the video output of a set top box
- **ProEncoders** for use with encrypted transmissions where the cable or satellite provider require the IPTV packets to be re-encrypted over the LAN.

All three devices are available as single units or as triple units designed for rack mounting.

2. Content Servers

Both 288GB and 576GB content servers are available with RAID 5 HDD configurations to enable safe storage of video and audio content and hot plugging for ease of maintenance. The size of the server is dependent on the quantity of content to be stored, number of simultaneous streams and the expected number of on-demand users in the hospital.

3. Application Servers

The Wandsworth application software can either share the same server as the on-demand content or can run on a dedicated server depending on the size of the hospital and the expected number of users of the content.

Infection Control

Hospital acquired infections, such as MRSA and C-Difficile, are major problems in hospitals all over the world. Effective measures have been introduced to prevent HAI outbreaks including intense ward cleaning regimes, isolation of infected patients, "bare below the elbow" initiatives to eliminate clothing and jewellery cross contamination, thorough hand washing between patients, and the cleaning of computer keyboards and mice before use. The elimination of PC trolleys and tablets that

need to be moved from one patient bed to another is another effective infection control measure enabled by Tele-Call. It is important that touch screens are cleaned between users, especially if the screen is shared between patients and hospital staff. The Tele-Call touch screen terminals have been designed for wipe sterilising with alcohol or other cleaning fluids between users. An optional software program is also available that prevents clinicians from logging onto hospital systems until the touch screen has been wiped. Tele-Call infra-red keyboards have a protective cover over the keys to allow wiping between users.

Clinical Applications

Most modern hospitals have existing electronic medical records, patient administration, digital imaging and other clinical software systems that are accessible from PCs at work stations. Tele-Call allows access to existing clinical systems at the patient bedside. In addition the hospital may deploy new proprietary systems for the application at the point of care, including:

- **Menu ordering**
- **Telemedicine**
- **Patient education videos**
- **Patient monitoring**
- **Patient tracking**
- **Bed management**
- **Medication control**

Application Software

Windows™ based Tele-Call software is provided for both the application server and the client devices, comprising:

- **Intuitive User Interface**
web browser based, customised for each hospital
- **IPTV and VOD Streaming s/w**
- **Softphone SIP application**
where VOIP is required
- **Payment s/w**
- **Management s/w**
- **Remote management s/w**
- **Reporting tools**

TC200 Series, Telecall Terminal Hardware Specification

There are currently five variants in the TC200 range, all of which are built around the same screen and case, with the main differences being the speed of the processor and the amount of memory installed on the (common) internal motherboard.

One key design principle of the terminal is that it should be easily cleaned and therefore minimise the risk of harbouring germs which pose an infection control problem.

In addition to the base terminal, a number of "add-on" peripherals are available, most of which are used to customise the terminal to allow the clinical staff to identify themselves (to enable access to the clinical services) in the way preferred by the installing institution.

Mechanical Specification

Dimensions (max)

- 95 x 380 x 75 mm (w x h x d)
 - without handset
- 408 x 380 x 72 mm (w x h x d)
 - with handset

Weight (max)

- 7.0 kg including telephone cradle and handset

Mounting

- Rear fixture to articulated arm
- Standard 75mm x 75mm VESA mounting

IP Rating

- Front – IP65
- Rear – IP54

Cleaning resistant

- Resistant to damage/discoloration by all normal sterilizing solutions
 - Glutaraldehyde 2%
 - Peracetic Acid 0.35%
 - Chlorine Dioxide
 - Alcohol 70%
 - Sodium Hypochlorite av. Chlorine 1000 ppm 10 mins

Power Specification

Power Supply

- 90 to 264VAC into AC adaptor

Power to Terminal

- 19V DC

Power Consumption

- 90 watts max

Cooling

- Fanless design with rear heat sink
- Meet ISO 13732-1 limits for external temperature of plastic enclosure

Environment Specification

Operating Temperature

- 0 to 35 degree C (Fanless)

Storage Temperature

- 0 to 60 degree C

Operating Humidity

- 5 to 95% RH

Storage Humidity

- 5 to 95% RH

Approvals

CE (EMC)

- EN 55022:2006 Class B
- EN 55024:1998 +A1:2001 +A2:2003
- EN 61000-3-2:2006 Class D
- EN 61000-3-3:1995 +A1:2001 +A2:2005

CE (Safety)

- EN 550950 (TBD)

FCC (EMC)

- Part 15, subpart B – Class B
- CISPR 22:1997 +A1:2000
- ICES-003:2004

UL/CUL (Safety)

- UL60950-1 (Information Technology Equipment) File Number E137361
- UL 60601-1 (File Number TBC)

A-Tick

- AS/ACIFS004:2004 (Voice Frequency Performance)

C-Tick (EMC)

- AS/NZS 60950.1:2003

C-Tick (Safety)

- AS/NZS CISPR 22:2005 +A1:200-5 +A2:2006

Screen Specification

Technology – TFT LCD

Size – 17"

Resolution – XGA (1280x1024)

Backlight – CCFL

Brightness – 300nits

Brightness control

20% – 100%+off, software controlled

Colour depth – 24 bit

Touch screen – Resistive (6-wire) Internal serial RS232 connection to CPU

Screen MTBF – 50,000hrs (for CCFL)

Audio/Telephone

Amplifier

- 50mW minimum RMS headphone output per channel
- 2 off 3 Watt peak RMS integral speakers
- Software speaker/headphone mute
- Independent control of all audio channels via internal mixer

Call Buzzer

- Incoming telephone call indication
- Volumes controllable, with Software mute
- Piezo ringer

Visual Call Indication

- LED on Phone handset cradle

On/Off hook detection – Magnetic switch

Handset cable

- Coiled/straight cable, extendable to 1.5m

Disability Features

- Inductive loop pickup for hearing aids (use lunder speaker)

Handset Mounting

- Cradle located on left side of terminal

I/O specification

Headphone Socket

- 3.5mm jack socket – mounted, bottom of front bezel Internal speakers muted on headset insertion

Microphone Socket

- 3.5mm jack socket – mounted, bottom of front bezel

Audio in

- 3.5mm jack socket (Line In) – mounted, rear IO panel

Phone Handset

- RJ11 socket – mounted, LHS under cover

Bluetooth

- USB-A socket – mounted, LHS under handset cover

Smart Card Reader

- Mounted underside of terminal
- Supporting credit card Chip & Pin
- USB interface (internal)

USB Ports

- 2xType-A, receptacle, USB2.0 – mounted, rear IO panel

IR Keyboard facility

- IrDA keyboard compatible
- IR receiver window in front of display module
- Connect to Serial port 2

15 pin D Connector

- DB-15 Female connector for remote controller
- This is used as the remote controller for Nurse Call

Front Panel Controls

- Membrane keyboard integrated on front of display module
- Keys: TV+, TV-, Vol+, Vol-, Power
- Power Button functionality:
 - System off -> Power on system
 - System on -> Turn off/on backlight
 - Press 4 seconds, force system power off

RJ11 socket

- Serial connection (Nurse call system) (hidden under ARM mount)

RJ45

- Ethernet connection 10/100MB (hidden under ARM mount)

Mini USB

- Receptacle, USB2.0 (hidden under ARM mount)

USB

- Type-A, receptacle, USB2.0 (hidden under ARM mount)

Computing Platform Specification

Graphic controller

- Intel 945 GM

System Memory

- DDR PC133, 2xSO-DIMM (max 1GB each)

Video Memory

- 8 to 64MB Frame buffer using system memory
- Configured via BIOS

LAN

- 10/100MB

Audio

- ALC202A

Thermal Protection

- CPU & System thermal sensor sense by G768B controller
- Access via SMBUS

Hard drive

- 40GB 2.5" HDD Ultra ATA (parallel interface)

Compact Flash

- Replaces HDD
- Slave on secondary IDE port

Operating System

- XP embedded, SP2
- XP professional, SP2
- Upgradeable to Vista/ Vista Embedded

Computing Specification

Model	Processor	Speed	Cache	DRAM	Notes
TC200	Intel Celeron M ULV	1.0GHz	0MB	512MB	For non-TV/video applications only
TC201	Intel Celeron M ULV	1.0GHz	512KB	512MB	
TC202	Intel Pentium M LV	1.4GHz	2MB	1GB	
TC203	Intel Pentium M LV	1.4GHz	2MB	2GB	Recommended for Vista
TC205	Intel Celeron M ULV	1.0GHz	512KB	512MB	As per TC201 but NO handset

Optional Additional Features

Bar code reader (TC244)

- Symbol MS-3207 2D Laser scanner – HIBC
- Bottom mounting

Camera (TC239)

- 1.3M pixels CCD camera module
- Active lamp indicator
- Optional rotating lens for privacy (TC240)
- Top mounting

Biometric finger print (TC243)

- Integrated reader
- Area type finger-printer module
- Side mounting

Magnetic stripe reader (TC242)

- ISO 3 tracks Magnetic Stripe Reader module
- Side mounting

Bluetooth (TC245)

- USB BT dongle + EDR
- Rear mounting (under handset connector cover)

Wireless connectivity (TC246)

- 802.11 a/b/g WLAN with built-in antennas
- Internal mounting

RFID Reader (TC241)

- Internal mounting, including aerial,
- USB connection
- Reads passive Mifare format cards
- Cards read at distances up to 0.1m

Note: Camera, Bluetooth, Bar code reader, Biometric and mag Swipe readers can be retro-fitted in the field. RFID and WiFi are factory fit options.

effective



Wandsworth Group Limited Albert Drive Sheerwater Woking Surrey GU21 5SE

Tel: +44 (0) 1483 713400 Fax: +44 (0) 1483 740384

Email: info@wandsworthgroup.com Web: www.wandsworthgroup.com



A British Manufacturer