

# **MICROSOUND SYSTEMS**

**NURSE CALL  
eight channels of music  
& ward TV input**

MANUAL

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## 1) Nurse Call Equipment

### a. General

The Microsound range of nurse call equipment has been designed to cover all the requirements for Hospitals, Clinics, Old Age Homes and Retirement Villages.

The systems provide the facilities for patients to call nurses for assistance plus the distribution of music to the patients. Various units cover requirements for different areas in a hospital. There are units for beds in general and private wards, children's wards, doctors and nurses rest rooms, nurse's stations and toilets. Mechanically the units are designed to clip in to 100 x 100 mm or 100 x 50 mm outlet boxes or flush mount on ducting systems.

Mechanically the units are designed to clip into the hospital ducting systems.

The Nurse Call system can be coupled to the Microsound SLSI or M20 intercom systems to provide audio communications between the nurse's station and patients bed unit, theatres, doctors, nurse's rest rooms and I.C.U.

The range has been designed to cover as many different requirements as possible so as to provide an off the shelf, reliable, high quality product. The product is locally designed, manufactured and serviced.

## 1) Central Equipment

The only equipment required is the Music Cabinet, which consists of radio tuners, a tape deck (if required) and monitor speaker. The radio tuners are connected to a FM/AM aerial mounted externally. The music cabinet distributes all the required music channels over twisted pairs of wire to the different sections or areas of the hospital. The music cabinet can distribute from four to eight channels of music to the whole hospital complex.

### a. Nurses Station Equipment

There are three main units that are situated at the nurse's station, the power supply, multiplex and the indication panel.

The power supply supplies D.C. to all bed units, toilets units, over door lights and indication panel in the wards associated with the particular nurses station. The power supply requires a 220v AC 15 amp outlet.

The multiplexer combines the individual music channels from the central music cabinet, and distributes the music on a common 75 ohm coax cable which is looped though each bed unit. The multiplexer has a maximum of 80 dB input channels and two co-ax outputs. Each output can drive a maximum of 20 bed units to a maximum distance of 200 meters. A system that has no music does not need a multiplexer.

The Indicator Panel consists of a number of a number of LED's to indicate from which bed/ward a call has be initiated plus a audible tone to draw the attention of the duty sister to the call. The visual, audible indication can only be cancelled from the point where the call has been made.

The indication panel can also include a crash call intercom point, whereby the sister can call for assistance to a central point in the hospital.

If the system has audio communication to each bed the nurse station will require a separate master station to select any required bed.

### b. Bed Head Unit

#### i) Functions on all bed head unit

1. Call/Emergency button: when pushed it initiates a call to the nurses station, lights the over door lamp and lights the reassurance lamp on the unit.

2. Cancel this button is pressed by the nurse to reset the call.
3. Pearpush socket: A pearpush (1,5 metre cable) with a remote call button can be plugged into it. This allows the patient to initiate a call by pressing the remote call button.

## **2) Installation Requirements**

### **a. Central Music Cabinet.**

A 220v 15-amp mains socket outlet is required. External FM/AM aerial input. A Co-ax cable must be installed between an external aerial and Music Cabinet. One pair 0,5 mm screened telephone cable pair per music channel to each multiplexer in the hospital. The music cable must be earthed at music cabinet the screen must extend to all multiplexers. Up to eight channels of music are available.

## **1) Multiplexer.**

Requires 24v DC regulated from P.S.U. Eight music input pairs from central cabinet. Provides two 75 ohm co-ax output. (Each end must be terminated). The music input cable must not be looped (jointed) in multiplex but in a separate DP Box spare multiplexer music input must not be left unused but connected to used inputs. The switch on the multiplexer is to switch off the music to the beds in the event of a problem in the music system. This should be pointed out to Hospital Maintenance. Each output must supply only half the beds in a ward, i.e. each output must be equally loaded. The Co-ax screen and center must be completely isolated from the building electrical earth, ducting or anything else. Good quality double screened 75 ohm flexible co-ax must be used, the co-ax must be connected into the BHU, loose wires must not be used to interconnect between the Co-ax and the BHU. All joints in the duct must be insulated. The Co-ax must loop from the multiplexer to the termination at the end via all BHU, no "T" off's can be made. The co-ax must run the shortest distance possible, where wards are back to back allow for a conduit connection between the ducts at the far end. The Multiplexer must have through flow ventilation for cooling.

### **a. Power Supply.**

A 220vac 15 amp mains socket outlet supplied by a separate circuit breaker is required. Supplies 24v via red and black power cable to all bed, toilet, bathroom, rest rooms and overdoor units. The P.S.U.'s are 100va maximum, but must only be loaded to 50va continuously. Where more than one P.S.U. is used the positive must not be connected to each other, the negative must be connected via the mains earth. The P.S.U. needs through flow ventilation for cooling. Regulated P.S.U. must be used for systems with music.

### **b. Lamp Panel**

A 24vdc power supply is required. The lamp panel indicates calls from the wards, individual beds, toilets and bathrooms. If equipment has crash call intercom system, one twisted pair is required to intercom central. Wall or desktop mountable.

### **c. Bed Head Unit with Music connections**

A Molex crimping tool must be used to crimp wires into the molex sockets, the conductor and the isolation must be crimped (ribbon cable must not be used)

Pin 1 P/S Positive 24v Dc input (red)

Pin 2 P/S GND input (black)

Pin 3 + 4 0/D (zone over door) input (1 core 0,5mm telephone cable) common to all beds in one ward.

Pin 5 L/P (lamp panel) input (1 core 0,5mm telephone cable) from each bed in a zone/ward wired back to indication panel.

Pin 6 EME (Optional) ALL BHU in a zone are communed up via the input to give a EMERGENCY call priority over a normal nurse call. (Only used if the system has emergency call).

Pin 7 reading lamp relay input

|       |                                   |
|-------|-----------------------------------|
| TV.   | TV audio from ward TV transformer |
| GND.  | TV transformer ground             |
| COAX. | Music co-ax center                |
| GND.  | Co-ax ground                      |

Bed unit with TV control connections

Pins 1 to 7 same as above.

|              |                                   |
|--------------|-----------------------------------|
| Blue wire.   | TV audio from bed TV transformer. |
| Yellow wire. | TV audio from bed TV transformer. |

#### **d. T.V. Sets**

The ward or bed TV audio must be isolated from the BHU with a double wound transformer mounted at the TV.

#### **e. Hand held unit with music HO5**

The HHU is wired directly to the BHU. It has hook to hook onto the duct, a speaker for music and TV sound and 5-button keypad for the following controls.

1. Nurse Call button with reassurance LED.
2. Reading light
3. Radio selection button for 8 channels and ward TV sound
4. Volume up
5. Volume down and off.

#### **f. Hand held unit with remote TV control HO7**

The unit is wired directly to the BHU. It has a hook to hook onto the duct, a speaker for the TV sound and 7 button keypad for the following controls.

1. Nurse call button with reassurance LED.
2. Reading light.
3. TV on off
4. Program up
5. Program down
6. Volume up
7. Volume down

The HHU must be factory programmed for a specific make of TV.

#### **g. Reading Light**

The HHU operates the reading light via a separate latching relay PCB. Not directly.

#### **h. Power requirements**

All measured at 24v DC.

- (a) Music Unit  
Nominally -65ma  
Max -75 ma  
With call active -125 ma
- (b) Call Cancel & Toilet Units  
Nominally - 30 ma  
With call active -80 ma
- (c) O/D Units when on - 125 ma
- (d) Indication Panel  
No lamps on - 50 ma  
With one LED on - 70 ma

## 2) Planning the Installation

### a. Wards

In most cases ducting is used to bring cables into the room and from the ducting a conduit makes the connection to the bed head trunking. There might be 2 rows of beds in which case 2 or more 25mm conduits must connect the overhead ducting with each bed head trunking. In some convenient place, near the main arterial ducting, place must be found for the Ward Distribution Box This is a 300 x 300mm by 50mm deep electrical box (bigger if more than 6 beds). Cables, from each piece of equipment in that ward, must go directly to the Ward Distribution Box via a dedicated conduit or via the common ducting/trunking system. These units include all the following with recommended conduit sizes in brackets: -

|                        |                        |
|------------------------|------------------------|
| Bed Head Units         | 1 x 25mm for each bed  |
| Bathroom/Toilets Units | 1 x 20mm for each unit |
| Overdoor Lights        | 1 x 20mm for each unit |

The Ward Distribution Box must also be connected to cables going to the nurses station distribution board, so connection to the corridor ducts must also be possible again via a conduit or via the common ducting system. At least a 25mm must be used here.

The most economical position for this Ward Distribution Box is somewhere in the ceiling next to or on the ward ducting near the arterial ducts, near the bathroom/overdoor lights. The most convenient position is at +- 1600mm AFL in the all outside in the passage or inside the ward near the door.

## 1) Nurses Stations

It is difficult to give precise instruction for this area because the design and the aesthetics of this area vary so much, however thought must be given to the type of equipment to be installed here.

Whatever type of system is to be installed, a central wire connection 'box' must be provided for, preferably about 800 x 600mm wide x 250mm deep mounted on or in a wall at 450mm AFL in a position close to the desk of the station. Vertical ducts 50mm x 50mm should connect the this distribution board with the corridor ducts in the passages. A 50mm duct should connect the distribution box to the position of the lamp panel/intercom unit. This could be scaled down depending upon the size of the unit and the number of cables required.

It might be possible to mount the control equipment in the distribution cabinet. If so, a power point is required in the cabinet. If not then some other space must be allocated to house thes equipment with a conduit connection to the distribution cabinet.

Equipment that could be fitted in this area is as follows: -

1. Power Supply Unit.
2. Music Multiplexer.

3. Intercom Controller.
4. Intercom Control Panel.
5. Mimic Panel.
6. Chimes Unit.
7. Day Night Switch.
8. Distribution Panel.

## 2) Cable Layout

### a. Wards

- i) Bed Head Unit.

Only one cable per bed should be installed from the Ward Distribution Box to the Bed Head Unit. This cable must have 6 flexible cores of .22mm or 5mm for systems without intercom and 8 cores if intercom is required.

In addition the music co-ax cable must pass each bed and a SHORT "T" in connection must be made using a piece of thin 75E co-ax. The place where this connection is made must be insulated using tape or some large sleeving. It is important that no part of the co-ax is in contact with the trunking. The connection must be of the soldered type.

- 1) Bathroom/Toilet Unit.

Only one cable of 5 cores is necessary to connect this unit to the Ward Distribution Box.

- 2) Overdoor Lights.

A single pair (ripcord) is needed back to the Ward Distribution Box.

Corridor.

Separate cables must be used for:

- |               |                                       |
|---------------|---------------------------------------|
| 1. Power      | 2.5mm Pair                            |
| 2. Nurse Call | 1 x 10 pair cable for 2 x 5 bed wards |
| 3. Intercom   | 1 x 10 pair cable for 2 x 5 bed wards |
| 4. Music      | 75E co-ax cable RG 59                 |

It is our suggestion that only 10 pair cables be used here to simplify connections at the distribution Box at the nurse's station.

## Terminations

### At the Bed Head Unit

The cable should arrive at the bed head unit directly from the Ward Distribution Box. The cables for the nurse call and power must be connected to the connecting plug for nurse call, while the intercom wires must be connected to the separate plug in connector on the Interco board if any.

In addition the co-ax connection for the Radio must also be connected to the connecting plug in the following way. As the main co-ax passes the bed position the cable must be cut and rejoined with a soldered connection and a short length of thin 2.5mm flexible co-ax cable must be added to this connection before the joint is covered with tape or sleeving. The other end of the thin co-ax must then be connected to the correct pins of the in-line connector mentioned above.

## **At the Ward Distribution Box**

All cables are terminated here on screw terminals. The cables can be screwed directly into the terminal blocks or preferably the individual wires will be fitted with crimped lugs and then the lugs will connect to the terminal blocks. The only cable, which is not connected via the Distribution box, will be the Radio co-ax cable.

## **At the Nurses Station**

All the cables that need termination at the Nurses position should arrive at the Nurses Termination Box where all the wires must be terminated including all the spare wires. The terminations must be done on 10 way Krone' strips in such a way that all the wires of one 10 pair cable are connected, in order, on a single strip. Stranded and solid core cable can be connected via the Krone' strip.

## **Intercom Terminations**

Intercom connections must be made on a separate group of Krone' strips. Interconnect wires must be introduced to connect the intercom connections to the field cable which, as mentioned above, should be terminated on its own strip elsewhere.

## **Labeling**

All cables arriving at the Nurses Station must be clearly labeled so that:

1. Installation can proceed without confusion.
2. The service engineer that has to fix the system in 5 years time will have no difficulty in understanding which cable goes where.

## **Radio Distribution**

### **Co-ax Cable Network**

The Co-ax cable which carries up to 8 channels of music must be routed past every Bed Head Unit. This cable should be kept as short as possible to reduce losses in the cable. Where there is a possibility of passing the co-ax cable through the wall from one bed head trunking to the next this is preferable compared to doubling up on the cable to take it out of the ward where it came in.

The routing of the co-ax cable must be planned in such a way that optimum use is made of both outputs of the Multiplexer. Both legs should be equal in length if possible although this requirement is not essential.

Radio Cabinet and distribution to the Multiplexer.

The Radio Cabinet should be installed a some convenient place in charge of some responsible person. The cable from the Radio cabinet to the multiplexer could be routed directly between the 2 units or be taken to some central point before distribution to several multiplexers.

### **Chimes and Alarms.**

The box containing the Chime and Alarm unit must be positioned so that it is near the Lamp indicator panels and at the same time it should not be too far from the Nurses Station Distribution Box. It has to be mounted in such a way that the sound is not too muffled.

Be sure to order the Mimic Panel with sufficient cable to reach from the correct position to the Nurses Station Distribution box. The cable should be terminated directly onto the field cable Krone strip.



Drawings for:

1. Production of the Mimic Panel.
2. Positioning and
3. Housing of the Mimic/Lamp panels

Must be obtained from the consultant as soon as possible after receiving the order so that these items do not hold up the installation.

## **Guarantee**

Equipment is guaranteed by the manufacture for a period of six months from the date of delivery against faulty components and workmanship (ex Factory).

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