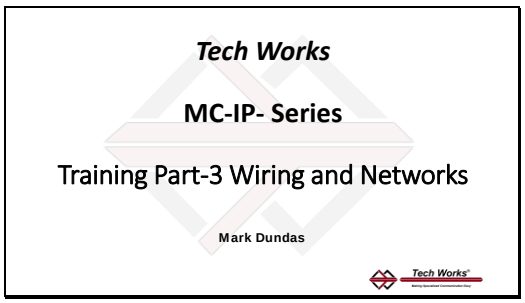
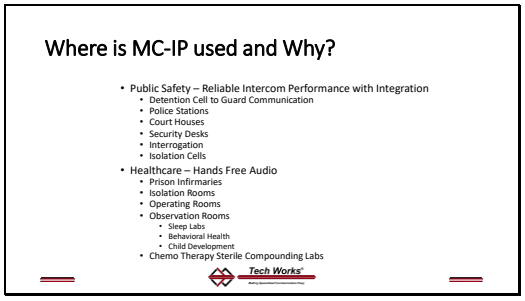
Slide 1



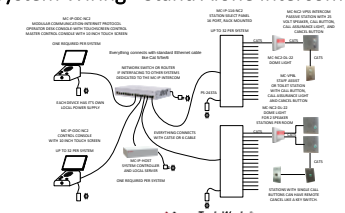
Slide 2

Slide 3



Slide 4

System Wiring - Stand Alone Intercom



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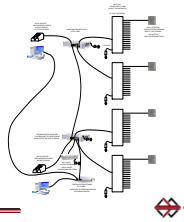
Slide 5

System Wiring - Integrated System



- MC-IP on its own Network
  - Prevent Latency of Audio
  - No Call Delays
- Single or Multiple IP Integration Points
  - You choose
    - One connection per Building
    - One Connection per System
- Easy API Commands
- Tech Works and OMRON

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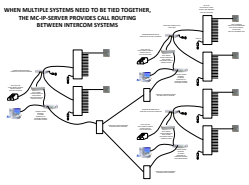
Slide 6

System Wiring - Server Based System



- One Server per Building
  - Redundancy
  - Local Control System Interface
- Everybody can Call Everyone
  - You Decide Who calls Who
  - You Decide How Calls are Answered
    - Operator to Operator Auto Answer
    - Operator to Operator Push To Talk
- 32 Networks =
  - 32 X 32 = 1,024 Operators
  - 32 X 32 X 16 = 16,384 Stations

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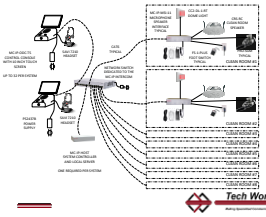
Slide 7

System Wiring - MC-IP-MSI-11



- Microphone Speaker Interface
- Professional Microphone Input
  - 24 Volt Phantom Power
  - Built In Equalization
  - Automatic Level Control
- 25 Volt, 10 Watt Speaker Output
- Foot Switch Call In
- Foot Switch Push To Talk
- Dome Light Interface for "You are being listened to"
- Interface to CI-Series Products
  - Add Headsets
  - Add Local Operator Monitoring
  - Add Music and Paging

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Slide 8

Network Connections

- All CAT6 Recommended
- TIA 568B Recommended
- Everything on the Network Side is Industry Standard Connectivity
- Some devices are POE (Power Over Ethernet)
- Most devices require local 24VDC power supplies (Sold Separately)

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Slide 9

Network ID

- Every box has a Network ID
- Inside the unit – Take the Lid off and find the Rotary Switch and the ID Shift Jumper. This is part of the "Installation" so that you can Program later.
- Rotary Switch Assigns a System Identification in HEX 0-F (A=10, B=11, C=12, D=13, E=14, F=15)
- ID Shift Jumper adds 16 to the Rotary Switch (Option 1)
- ID sets the IP address of the box
- HOST/SERVER Knows the Device Type by IP Addresses
  - MC-IP-HOST and MC-IP-SERVER Host Port (Default): 172.30.100.2
  - MC-IP-ODC #0-31: 172.30.100.20 – 172.30.100.51
  - MC-IP-116 #0-31: 172.30.100.84 – 172.30.100.115
  - MC-IP-MSI-11 #0-31: 172.30.100.116- 172.30.100.147
- HOST uses the IP to store and send all programming to each box when it is connected
- ***Static protection such as static bracelets MUST be used at all times when any of the products are opened and vulnerable to electrostatic discharge***

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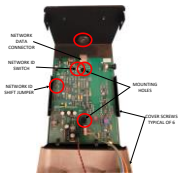
MC-IP-ODC Connections



- All Of the connections for the MC-IP-ODC are inside the console for security purposes
- Remove the cover screws on the sides of the ODC the top
- Tip the cover forward
- Run the CAT6 cable connector and if there is a Local Power supplied run the barrel connector through the grommeted opening at the back and plug it into the ODC. Never connect both POE and Local Power at the same time.
- 2 mounting holes are provided to secure the console to the counter top if desired. It is always best practice to install the counter mounting screw without power applied in case you drop a screw or a tool.
- Network ID rotary switch and the address shift jumper P4 labeled "OPT 1"
  - Rotary switch selects the address 0-15
  - OPT 1 switch to the "ON" position the rotary switch sets the ID to 16-31
- ***Static protection such as static bracelets MUST be used at all times when any of the products are opened and vulnerable to electrostatic discharge***

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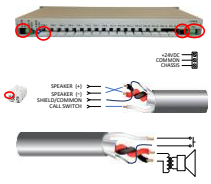
Slide 11

MC-IP-116 Connections



- All system components employ RJ45 connectors for a couple of purposes
  - For connection of Tech Works PA-Buss components such as the PA-402
  - For connection of components to the IP Network
- Either application assumes standard off the shelf CAT6 cables wired to EIA/TIA 568B
- Power connections are on both
  - Euro Style Screw Block
  - 2.00mm ID (0.079"), 5.50mm OD (0.217") Barrel connector for 24 VDC.
- Station field wiring is a 4-conductor compression clamp connector with 0.1 inch spacing and will connect to 18-24 AWG wire
  - The speaker pair is normally twisted and shielded
  - The Call In wire is an extra conductor outside of the shield
  - The Shield is connected to ground or common only at the amplifier or control module
  - Wires must be stripped of insulation approximately ¼ inch from the end before being inserted in the connector
  - Connect the station call button to the Shield and the call in wire (White) Do not connect the shield to the electrical box or conduit ground.
  - Connect the Twisted audio pair (Red/ Black) to the 25 Volt audio transformer on the speaker. Typically, the 25 Volt tap is either ½ or 1 Watt.
  - A slot above each connection allows the insertion of a 2.0 mm tech blade screw driver to release the clamp so that you can remove the wire if necessary.

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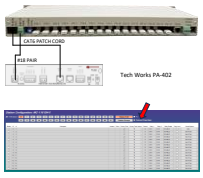
Slide 12

Connecting an External Paging Amplifier



- MC-IP-116 has a built in 20 watts = 1.25 Watts per port
- Day Room or Exercise Yard, you could have 20 watts of speakers hooked to one port
- Add up the watts of load attached to each port
  - If >20 Watts, add an external Paging Amp like the 40 Watts Tech Works PA-402
- Connecting an External Paging Amplifier
  - PA-Buss
    - CAT6 patch cable PA-Buss Output of the MC-IP-116 and into the PA-Buss Input on the PA-402 Amplifier
      - Line Level Audio connection
      - Activate signals to tell the PA-402 when the MC-IP-116 is Talking
  - The 25 Volt 40 Watt
    - Output screw terminals of the PA-402
    - External Page Amp Input screw terminals on the MC-IP-116
    - 18 gauge twisted pair wire
    - Speaker (+) to Speaker (+) and Speaker (-) to Speaker(-)
- Tell the system that it is to use and external Page Amp by checking the box in the station configuration screen for the MC-IP-116.
  - Check box in programming is set for each 116
  - Set "On" (Checked), then each time the 116 is told to page it will automatically connect the External Amplifier

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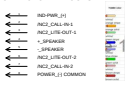
Slide 13

MC-IP-116-NC2 Connections

MC-NC2 STATION CONNECTOR PIN OUTS



- All wiring on the NC2 is the same as the standard 116 except the stations
- Station wiring is 16 - RJ45 connectors
- Analog not TCP/IP
- Standard CAT5 or CAT6 to each station
- Station Connector Wiring
  - Pin 1 Indicator Power +24VDC
  - Pin 2 Call in Button #1
  - Pin 3 Indicator Light #1
  - Pin 4 Speaker "+"
  - Pin 5 Speaker "-"
  - Pin 6 Indicator Light #2
  - Pin 7 Call in Button #2
  - Pin 8 Power "-" (Common)

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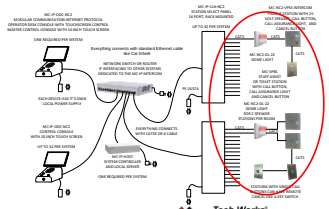
Slide 14

System Wiring – NC2



CAT5/6 to Each Room

CAT5/6 Station to Station

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Slide 15

MC-Station Wiring

- RJ45 connectors
  - Station In
  - Station Out
- MC-NC2-VPSS-2G - Local Cancel
  - Jumpers on the back of the
    - Normal Calls
    - Emergency level Calls and remote cancel
- MC-NC2-VPSS-2G-RC - Remote Cancel
  - Operator Cancel
  - Local Remote Switch Cancel
  - Switch +/-, Light +/-
- MC-VPBL
  - Jumpers on the back of the
    - Normal Calls
    - Emergency level Calls and remote cancel
- MC-VPBL-RC
  - Operator Cancel
  - Local Remote Switch Cancel
  - Switch +/-, Light +/-

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Slide 16

MC-Station Wiring

- Remote Cancel Options
  - VPBS-1 - Vandal Resistant Key Switch
  - VPBL Vandal Proof Button with Light
    - Pre-wired Connections
      - Screw terminals
        - Switch +/- Light +/-
- MC-NC2-DL-22 - 2 color Dome Light
  - 2 Station Ports can be connected
    - 2 Voice Paths in one room
    - 2 Call Levels per Port
  - 4 RJ45 connectors
    - 2 Station In
    - 2 Station Out
  - "Normal Call" illuminates the White Light
  - "Emergency Call" will light the Red Light
- MC-NC2-DL-44 - 4 color Dome Light
  - 4 Station Ports can be connected
    - 4 Voice Paths in one room
    - 2 Call Levels per Port
  - 8 RJ45 connectors
    - 4 Station In
    - 4 Station Out
  - 4 colors – 1 per Port Red, Yellow, Green, and White

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Slide 17

MC-IP-MSI-11 Connections

- Speaker Output
  - 25-Volts, 10-Watts Maximum
  - Speaker (+) / Speaker (-)
- Microphone Input:
  - Universal Microphone/Line Input (+) / (-)
  - Shield/Switch Common
  - Talk Switch (N.O.)
- Call Switch:
  - Call Switch (+) / (-), (N.O.)
- RJ-45, CI-BUSS, "Master" Connector
- RJ-45, CI-BUSS, "Slave" Connector
- Microphone ON (someone is listening to you)
  - Remote Indicator Output:
    - Current Limited 24VDC (+)
    - Common 24VDC (-)
    - Mic On – pull to common control
- Mic On local Indicator
- Network ID rotary switch and the address shift jumper P4 labeled "OPT 1"
  - Rotary switch selects the address 0-15
  - OPT 1 switch to the "ON" position the rotary switch sets the ID to 16-31.
- Shielded RJ-45 Ethernet Connector to MC-IP Network
- Power Connectors: (Two)
  - 2 - 3.5mm Barrel Connectors
  - 24 Volts, 1.5 Amps Maximum, depending on Speaker load

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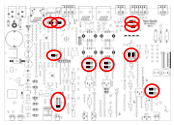
Slide 18

MC-IP-MSI-11 Many Jumper Options



Configuration Jumpers Shown in Red – Default Position

- P3 - Address Shift jumper +16
  - 0-15 - Rotary Switch sets the box ID to 0-15 (IP Address 172.30.100.116 - 172.30.100.132)
  - 16-31 - Rotary Switch sets the box ID to 16-31 (IP Address 172.30.100.133 - 172.30.100.167)
- P4 - Option 2 – NOT USED
- P2 - Force Boot Loader - Only used to restore software in the event of a problem
- P12 - Phantom – 24 VDC Power to a condenser microphone ON/OFF
- P13 - Gain Range – Pads the input signal down by 15 dB if it is too loud
- P14 - Hi CUT – Shapes the Microphone audio frequency response by rolling off the signal at ~ 3dB/Octave above 4K Hz
- P15 - MID CUT – Takes out the octave around 1K Hz by ~ 10dB which is typically the ringing sound in very hard acoustic environments
- CI-Buss SLAVE Connector Sources
  - P32 MA-INPUT – Do you want the audio from the CI Master Connector to go to the CI Slave Connector?
  - P33 MIC – Do you want the audio from this MSI Microphone to go to the CI-Slave Connector?
- CI-Buss MASTER Connector Sources
  - P34 SL-INPUT – Do you want the audio from the CI Slave Connector to go to the CI-Master Connector?
  - P35 MIC – Do you want the audio from this MSI Microphone to go to the CI-Slave Connector?
- Speaker Source
  - P27 MA-INPUT – Do you want the audio from the CI Master Connector to go to the Speaker?
  - P28 SL-INPUT – Do you want the audio from the CI Slave Connector to go to the Speaker?
- P6 - Software Configuration – No Jumpers, Full Bi-Directional Streaming Audio, No Privacy Tone
  - Jumper Position 1, Push To Talk Switch activates Microphone.
  - Jumper Position 2, Privacy Tone ON letting the listener know they are being monitored.
  - Jumper Position 3, 4, 5, Not Currently used.
  - By default the jumper is shipped in position 1

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Slide 19

Microphone Wiring – Mic Signals are Small

- Stranded Twisted Shielded Pair
  - Audio Twist is the most important thing to stop EMF Hum (1 Twist/Inch, 12 Twists/Foot)
  - Shield has 2 purposes
    - Static protection
    - Power Ground/Common for Phantom Power
  - Gauge Doesn't Matter Much (22 or Greater)
  - Good Connections Matter
- Don't Exceed 300 Feet

Slide 20

Speaker Wiring – 25 Volt Speakers

- 18 Gauge Stranded Twisted Pair
  - Audio Twist (1 Twist/Inch, 12 Twists/Foot)
  - No Shield
  - Gauge Matters – Shipping Power
    - The bigger the load
    - The longer the distance
  - Good Connections Matter
- Don't Exceed 300 Feet

Slide 21

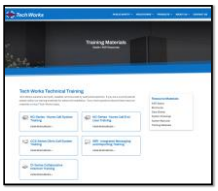
Tools to help you

- Online 24/7 X 365 www.TechWorks-USA.com
- Product Brochures
- Specifications for Architects & Engineers
  - Available on the website (specs and data sheets)
  - Custom specs written by request
- Design/Quoting assistance
  - Questionnaires to support the process
  - Design review
  - Quote development on solutions
  - Margin
- Technical Assistance
  - Training and Installation Manuals
  - Tech Support – Engineering and Field

Slide 22

Training and Certification On Line

- Thank you for taking the time to study the product
  - Your efforts will make all of our jobs easier
  - Please take the other training courses so that you are familiar with all Tech Works products
- Help us get the rest of your staff trained
  - Sales people should take parts 1 & 2 of each product group
  - Estimators/Engineers should take all parts
- Certification
  - All 4 parts of the Test
  - "Submit" Button



Slide 23

Making Specialized Communications Easy

Up Next Part 4
Programming and API Control