BROADCAST tools inc.

Installation and Operation Manual

for the

ICM-16 Intercom System

Software Version 030297D   Manual upgrade 03/01/99

ICM-16 Intercom System
Broadcast Tools, Inc.

INTRODUCTION

Thank you for your purchase of a Broadcast Tools, Inc., ICM-16 Intercom System. We re confident this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the unit.

✎   **NOTE:** This manual should be read thoroughly before installation and operation.

SAFTEY INFORMATION

Broadcast Tools products should be installed only by qualified personnel. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

Broadcast Tools Products, as any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

WHO TO CONTACT FOR HELP

If you have any questions regarding your product, or you need assistance, please contact your distributor from whom you purchased this equipment or Broadcast Tools.

If you would like more information about Broadcast Tools, Inc., products, you may reach us at:

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Thank you for choosing Broadcast Tools!

ICM-16 Intercom System
Broadcast Tools, Inc.

PRODUCT DESCRIPTION

The **ICM-16** offers connectivity for up to sixteen (16) studios, using easy to install standard, off-the-shelf Category 5, RJ-45 modular 10baseT-network cable. The eight-station controller connects up to eight studios with RJ-45 modular 10baseT-network cable. The system may be expanded by connecting one additional controller, for a total of 16 studio intercom stations. The controller is constructed in a one-rack unit high chassis. The rear-panel supports eight RJ-45 modular receptacles, corresponding to each of the eight studio intercom stations. The controller also provides send and receive talkback level controls for each studio intercom station. All active balanced send and receive talkback audio is switched with digitally controlled pro-level analog switch arrays, allowing each studio intercom station, single, group and all-call capabilities. Each studio intercom station is supported by two microprocessors. Data rates are preset at 9600 baud, utilizing RS-485 data protocol, which allows large distances between the controller and each studio intercom station.

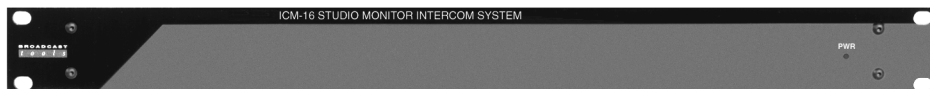## SIMPLIFIED SYSTEM BLOCK

Studio Intercom Station

--- DB-9 male, ICM-16/CM/DT/OEM/RM Intercom Station connections for Balanced Send talkback audio, balanced muted/unmuted receive talkback audio, mute control and studio call indication.

|
| Cat 5, 10/100BaseT (skinny) cabling. RS-485, 9600 baud. Up to 4000 feet of cable.
|
|1   2   3   4   5   6   7   8
| | | | | | | |

ICM-16 Controller

Each Controller handles eight (8) Studio Intercom Stations.
One additional controller may be added increasing the size to sixteen.

INTERCOM STATION FRONT PANEL DESCRIPTION

Each Intercom Station is equipped with 20-buttons and/or a keypad. Button/Keys one (1) through sixteen (16) represent each Intercom Station. Button/Keys 17 through 20 represent the following special functions:

♦ Button/Key 17 allows group calls to stations 1 to 5, minus the calling station.
♦ Button/Key 18 allows group calls to stations 6 to 10, minus the calling station
♦ Button/Key 19 allows group calls to stations 11 to 16, minus the calling station.
♦ Button/Key 20 allows ALL-CALL to ALL stations, minus the calling station.

✎ **NOTE:** Limiting the calling station during a call eliminates feedback.

POWER

ICM-16 Controller: Connect the 7 pin DIN power connector into the power receptacle on the ICM-16 Controller and the   Lump in the Line   multi-voltage transformer into a 120 Vac 50-60 Hz power source. The front panel green power LED indicates when power is applied to the unit.

ICM-16/RM intercom station: Connect the 2.1mm coaxial type power connector into the power receptacle on the ICM-16 Intercom Station and the 12 Vac @ 500ma or 1 amp wall transformer into a 120 vac 50-60 Hz power source. The GREEN power LED indicates when power is applied to the unit.

ICM-16/OEM, DT & CM Intercom Stations: Connect the 2.1mm coaxial type power connector into the power receptacle on the ICM-16 Intercom Station and the 9 vac @ 500ma wall transformer into a 120 Vac 50-60 Hz power source. The RED power LED indicates when power is applied to the unit.

INSTALLATION

The ICM-16 Intercom System is simple to install. Inputs, outputs and control signals are connected via the 9 pin D-sub connector on each intercom station.

Installation of the ICM-16 Intercom System consists of seven steps:

1. Inspection.
2. Bench test the system.
3. Installation of cable runs from each intercom station to the Controller.
4. Rack mount the controller.
5. Installation of each intercom station at the desired location.

6.   Label each intercom station
7.   Power-up the controller and check operation.

STEP 1: INSPECTION

Please examine your ICM-16 Intercom System carefully for any damage that may have been sustained during shipping. If any are noted, please notify the shipper immediately. Retain the packaging for inspection by the shipper. The package should contain the ICM-16 Intercom System Controller,   Lump in the Line   power transformer, 40 pin ribbon cable and this manual.

The ICM-16/OEM, DT & CM intercom stations include a 9 pin female D-sub solder connector/shell, 7 foot Cat 5 cable and 9 vac @ 500ma wall power transformer.

The ICM-16/RM will include a 9 pin female D-sub solder connector/shell, 7 foot Cat 5 cable and 12 vac @ 500ma or 1 amp wall power transformer.

STEP 2: BENCH TEST THE SYSTEM

Place the Intercom Controller and each of the Intercom Stations on a work area.
♦ Remove the four screws from each intercom station (Desk-top only)
♦ Remove the base (Desk-top only)
♦ Locate the RJ-45 (8-pin modular) and insert one end of the control cable.
♦ Take the other end of the control cable and insert it into the desired RJ-45 station connector on the controller.

✎   **NOTE:** The 8 - RJ-45 connectors are along the back side of the controller, as viewed from the rear. Intercom station ones (9) connector is on the far left, while intercom station eight (16) is on the far right. The corresponding send and receive level controls follow this same scheme, the far left trimmers being number one (9), while the far right is trimmers eight (16).

♦ Locate the supplied 9 pin D-sub connector on the ICM-16/DT/OEM or RM and wire your equipment to this connector. *NOTE: The ICM-16/CM pin-out is different.* Follow the pin out below:

1   Receive unmuted audio + / Active balanced, Low Z.
2   Receive unmuted audio   / Active balanced, Low Z.
3   Receive muted audio + / Active balanced, Low Z.
4   Receive muted audio   / Active balanced, Low Z.
5   Mute control. + 12 vdc @ 15 ma.
6   Station-Call open collector. 24 vdc @ 80 ma.
7 - Send audio + / Active balanced, 20K.
8   Send audio - / Active balanced, 20K.

9   Ground

♦   Locate the supplied 9 pin D-sub connector on the ICM-16/CM and wire your
equipment to this connector. Follow the pin out below:

1   Receive talkback audio + / Active balanced
2   Receive talkback audio   / Active balanced
3   Wiper contact, relay closes each time any button is pressed
4   N.O. contact, relay closes each time any button is pressed
5   Wiper contact, relay closes any time the station is called, the call LED also
lights
6   N.O. contact, relay closes any time the station is called, the call LED also
lights
7 - Send talkback audio + / Active balanced, 20K.
8   Send talkback audio - / Active balanced, 20K.
9   Ground

The send levels should be kept between   10 and +8dbm. The controller is
configured for unity. Adjust the send level trimmer for the desired send level. The
receive audio connection is active balanced. The receive level adjustment is from off to
unity gain. Unbalanced inputs should be tied to the + terminal and ground. Never
ground either of the receive terminals.

♦   After all connections have been made to the intercom stations, controller and
the user equipment, test the intercom. Plug in the controllers transformer and
verify that the front panel green   POWER   LED is lit.

Plugs in each of the intercom stations 9 or 12 Vac wall transformers and
verify that the power LED s are lit.

♦   Locate intercom stations one and two. On intercom station one, press and
hold button two. If things are working correctly, the audio that is present at
intercom station one should be heard at intercom station two. If all is well,
proceed checking all intercom stations.

STEP 3: INSTALLATION OF (UTP) CABLE RUNS FROM EACH INTERCOM STATION TO THE CONTROLLER

Each intercom station requires a connection between the RJ-45 connectors on the controller and the intercom station. Use off-the-shelf category 5 UTP pre-connectorized cables. Cable and/or connectors may be purchased from a host of vendors. Graybar, Jameco, JDR, Radio Shack, etc. Cable runs should be limited to 1000 feet. The cable-pairing scheme is as follows:

- Pair # 1   Pins 1(+) & 2 (-)   /   Receive unmuted audio.

- Pair # 2 - Pins 3 (+) & 6 (-)   /   Send audio.

- Pair # 3 - Pins 4 (+) & 5 (-)   /   RS-485, half-duplex 9600 baud data.

- Pair # 4   Pins 7 (+) & 8 (Gnd) /   Power supplied by stations
                                                              WALL WART

RJ-45 connector pin assignments

✎   **NOTE: Please note that all 10BASE-T Topology including category 5 UTP control wiring must comply with EIA/TIA568 standards.**

✎   **NOTE:** We have upgraded the workstation software to provide a logic high at solder pad   E2   whenever any key is pressed.

✎   NOTE: This relay is provided with the ICM-16/CM

✎   The circuit diagram below may be used to interface this logic to external
        equipment.   This feature may be used to mute a microphone channel (cough)
        during an intercom call as an example.

STEP 4: MOUNTING

The **ICM-16 Controller** is designed to be rack mounted in a 19 EIA format equipment
rack. It should be mounted in an area that is accessible from the rear and preferably
away from sources of heat. The intercom stations should be placed in the desired
location.

STEP 5: CONNECT YOUR EQUIPMENT

        Use the same wiring format that was outlined in the bench testing section.

STEP 6: LABEL EACH INTERCOM STATION

        Label each intercom station in the write-in area provided.

**STEP 7: POWER-UP THE CONTROLLER AND INTERCOM STATIONS AND
CHECK FOR CORRECT OPERATION.**

Plug the specified wall transformers into a stable source of power and recheck the system for correct operation.

SPECIFICATIONS

FREQUENCY RESPONSE: 20 Hz to 20 Khz; +/- 1.0 dB

SIGNAL/NOISE RATIO: >75 dB

THD: .01 %

RECOMMENDED LEVELS: -10 to +8 dbm

SWITCHING METHOD: Analog switch arrays

LOGIC: Microprocessor.

DATA FORMAT: 9600 baud, RS-485 Half Duplex.

CABLING: UTP, Category 5 (568A).

OPERATION CONTROL: 20 key, Keypad. 4 x 5 Switch Matrix.

STATION CALL & COUGH: CMOS, open collector output or SPST relay.
                           Trip level adjustable, Off to - 10 dB.

MUTE INPUT: 12 VDC @ 15 ma.

CONNECTORS: Station: RJ-45 connector, interconnect, 7 foot connectorized cable provided. User audio & control via 9 pin D-Sub. Mate & shell supplied.

POWER REQUIREMENTS: Controller : 34.5 Vac CT @ 500 ma / 10.5 Vac @ 1 amp, 120 Vac 50-60 hz Lump in the line power transformer. Supplied.
                           ICM-16/RM: 12 Vac @ 500ma or 1.0amp.
                           120 Vac 50-60 Hz Wall transformer. Supplied
                           ICM-16/OEM, DT & CM Intercom Stations:
                           9 Vac @ 500 ma. 120 Vac, 50-60 Hz wall transformer. Supplied

PHYSICAL DIMENSIONS: 19   X 1.75   X 10.0   (WHD). Controller

WEIGHT: 6.0 lb. Controller

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