

SOUND GRAPHICS STANDARDS

A PROJECT OF THE USITT SOUND COMMISSION

DRAFT VERSION 2, 12-17-07

THIS DOCUMENT PRESENTS GRAPHIC STANDARDS WHICH CAN BE USED BY SOUND DESIGNERS AND ENGINEERS TO COMMUNICATE THE SOUND SYSTEM TO BE INSTALLED FOR A PRODUCTION. THE STANDARD IS NOT INTENDED TO BE A COMPREHENSIVE DIRECTORY OF AUDIO AND ELECTRONIC SYMBOLS. INSTEAD, IT PROPOSES A FLEXIBLE FRAMEWORK OF SYMBOLS AND GRAPHIC TOOLS WHICH WILL BE A PRACTICAL COMMUNICATION TOOL.

THE INFORMATION WHICH A DESIGNER OR SYSTEM ENGINEER MUST COMMUNICATE TO OTHERS TAKES SEVERAL FORMS. PRINCIPAL AMONG THESE ARE SYSTEM DIAGRAMS, ALSO CALLED SCHEMATICS, SCALE DRAWINGS OF EQUIPMENT PLACEMENT AND RIGGING, AND SPREADSHEETS OR DATABASES OF EQUIPMENT OR CABLE ORDERS. THIS DOCUMENT FOCUSES ON THE SYSTEM DIAGRAMS WHICH ILLUSTRATE HOW THE EQUIPMENT TO BE USED IS CONNECTED. SCALE DRAWINGS SHOULD FOLLOW THE USITT SCENERY GRAPHIC STANDARDS FOR PLANS AND SECTIONS. EQUIPMENT LISTS AND CABLE ORDERS ARE STRAIGHTFORWARD NON-GRAPHIC INFORMATION WHICH IS OUTSIDE THE SCOPE OF THESE STANDARDS.

SYSTEM DIAGRAMS

AUDIO, VIDEO AND CONTROL SYSTEM DIAGRAMS ALL FOLLOW THE SAME BASIC FRAMEWORK. THE DIAGRAMS ARE DRAWINGS, NOT TO SCALE, WHICH SHOW THE DEVICES INCLUDED IN A SYSTEM AND HOW THEY ARE TO BE CONNECTED. THE DIAGRAMS ARE NOT PICTORIAL ELEVATIONS AND USE ONLY A FEW VISUAL CUES TO INDICATE EQUIPMENT TYPE. MORE TYPICALLY, DEVICES AND THEIR INPUTS AND OUTPUTS ARE SIMPLY LABELED.

DIAGRAMS GENERALLY READ FROM INPUTS ON THE LEFT TO OUTPUTS ON THE RIGHT FOR EACH DEVICE AND FOR THE SYSTEM AS A WHOLE. COMPLEX SYSTEM MAY REQUIRE MANY DRAWINGS TO SHOW ALL SYSTEM CONNECTIONS. THE LAYOUT OF THE DIAGRAMS AND WHERE TO BREAK CONNECTIONS ACROSS PAGES SHOULD BE CAREFULLY CONSIDERED TO MAINTAIN MAXIMUM INTELLIGIBILITY OF THE DESIGN. FOR LESS COMPLEX SYSTEMS, AUDIO, VIDEO AND CONTROL CAN BE SHOWN WITHIN THE SAME DIAGRAM. HOWEVER, FOR MORE COMPLEX SYSTEMS THE VARIOUS SIGNAL TYPES CAN BE SHOWN IN SEPARATE DIAGRAMS.

TEXT SHOULD ALWAYS BE USED AT A LEGIBLE SIZE, USUALLY NO LESS THAN 3/32". DRAWINGS SHOULD BE CREATED IN STANDARD ANSI SIZES FOR EASE OF PRINTING AND DUPLICATION. LINE WEIGHTS, BORDERS AND TITLE BLOCKS SHOULD CONFORM TO THE USITT SCENERY GRAPHIC STANDARDS.

DIAGRAM COMPONENTS

THE BASIC DIAGRAM COMPONENT IS THE DEVICE BLOCK, SEE FIGURES 1 AND 2. THE DEVICE BLOCK HAS TWO FORMS. FIGURE 1 SHOWS A DEVICE BLOCK WITH A RECTANGULAR BOTTOM WHICH INDICATES THAT THIS DEVICE IS ONLY SHOWN ONCE IN THE DIAGRAMS. FIGURE 2 SHOWS A DEVICE BLOCK WHOSE BOTTOM IS A BREAK LINE, WHICH INDICATES THAT THIS DEVICE IS ALSO SHOWN ELSEWHERE IN THE DIAGRAM.

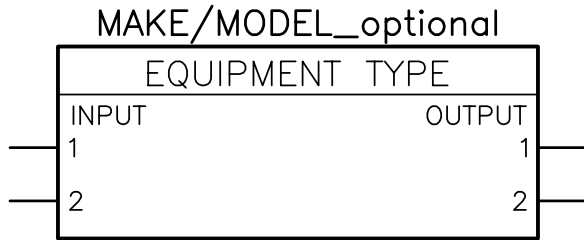
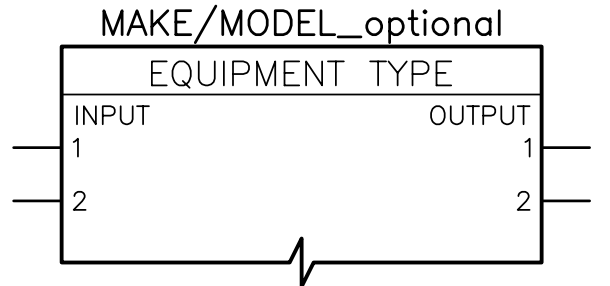


FIG. 1- COMPLETE DEVICE BLOCK



RE: OTHER LOCATION(S)_optional

FIG. 2- PARTIAL DEVICE BLOCK
ALTERNATE: CURVED BREAK LINE

THE DEVICE BLOCKS ALSO INCLUDE INFORMATION ABOUT THE TYPE OF DEVICE INDICATED AND THE INPUTS AND OUTPUTS BEING USED. FOR DEVICES WITH MANY INPUT AND OUTPUT OPTIONS, ONLY THOSE BEING USED SHOULD BE SHOWN. OPTIONAL INFORMATION INCLUDES THE MAKE AND MODEL OF THE DEVICE. THE DEVICE BOX CAN BE EXPANDED IN HEIGHT TO ACCOMODATE THE CONNECTIONS OF THE DEVICE.

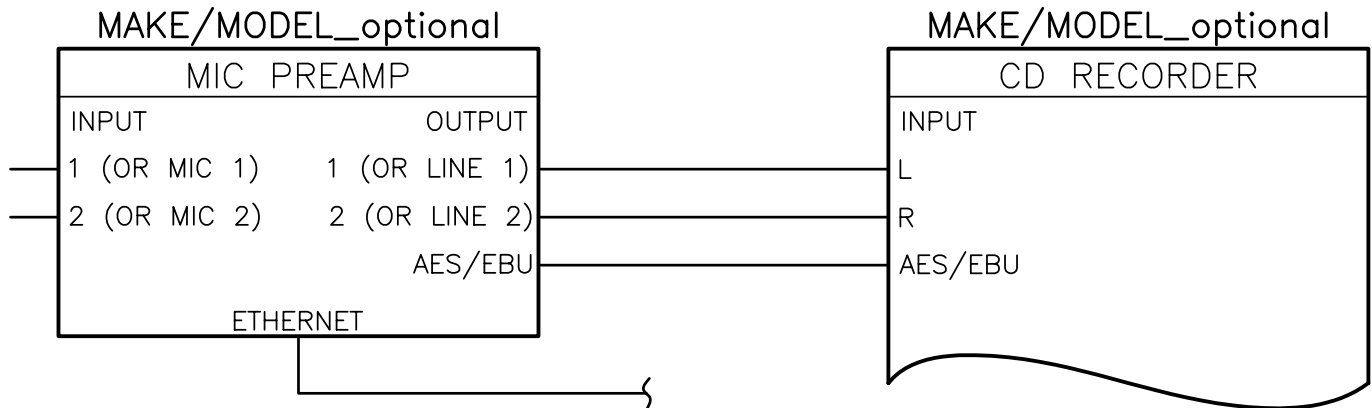


FIG. 3- TWO DEVICES CONNECTED

DEVICES ARE CONNECTED WITH LINES BETWEEN INPUT AND OUTPUT. INPUTS AND OUTPUTS SHOULD BE LABELED AS SIMPLY AS POSSIBLE. IN FIGURE 3 THE MIC INPUTS AND LINE OUTPUTS CAN BE SIMPLY NUMBERED, SINCE THE INPUT AND OUTPUT TYPE CAN BE ASSUMED BY TYPE. THE AES/EBU OUTPUT IS LABELED BY TYPE BECAUSE IT IS NOT TYPICAL. WHEN KNOWN, USE THE EXACT LABELING OF THE DEVICE, EX. 1-2 OR LEFT-RIGHT.

BI-DIRECTIONAL OR CONTROL CONNECTIONS MAY BE SHOWN ATTACHED TO THE BOTTOM, LEFT OR RIGHT OF THE BLOCK AS BEST SERVES CLARITY. FOR COMPLEX SYSTEMS THESE CONNECTIONS CAN BE SHOWN ON SEPARATE DRAWINGS.

FOR CLARITY, CONNECTOR AND CABLE TYPES CAN BE LABELED, SEE FIGURE 4. CONNECTORS SHOULD BE LABELED NEAR THEIR CONNECTION TO THE DEVICE BLOCK. ONLY ONE END SHOULD BE LABELED, PREFERABLY ON THE LEFT SIDE, UNLESS THE CONNECTOR IS DIFFERENT ON THE OTHER END. CABLE TYPES CAN BE LABELED NEAR THE MIDDLE OF THEIR LINE. CABLE SHOULD NOT BE LABELED IF IT CONFORMS TO THE SYSTEM'S GENERALLY USED CABLE, WHICH CAN BE LISTED IN A NOTE BLOCK ON THE DIAGRAM OR IN AN EQUIPMENT SCHEDULE.

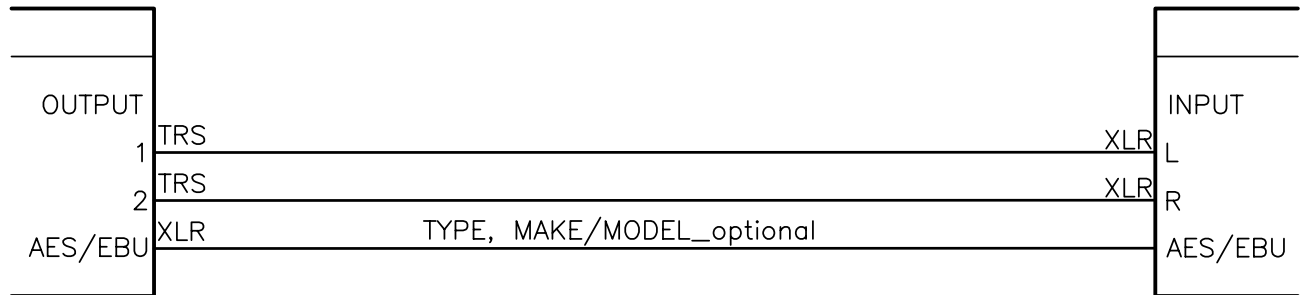


FIG. 4— CONNECTOR AND CABLE LABELS

SOME DEVICES, SUCH AS MIXERS, INCLUDE A LARGE NUMBER OF CONNECTIONS. FOR THESE DEVICES AND FOR PATCHBAYS, CONNECTIONS GREATER THAN 3 IN NUMBER MAY BE ABBREVIATED AS SHOWN IN FIGURE 5. ALSO NOTE THAT A LABEL, LIKE "MIC INPUTS" MAY BE CREATED TO AVOID MULTIPLE OCCURANCES OF THE WORD "MIC" AT EACH INPUT.

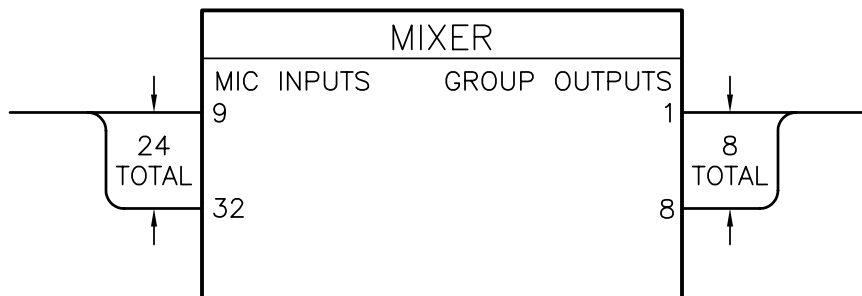


FIG. 5— CONNECTION GROUPING

PATCHBAYS ARE DEVICES WHICH DO NOT REQUIRE AS MUCH GRAPHIC SPACE AS MANY OTHER DEVICES. THEY CAN BE DRAWN AS SHOWN IN FIGURE 6. PATCHBAYS SHOULD BE LABELED ACCORDING TO SIGNAL TYPE AND MAY USE THE PARTIAL DEVICE MODEL WITH A BOTTOM BREAKLINE. PATCHBAY DRAWINGS SHOULD INDICATE WHETHER THE SIGNAL IS NOT-NORMALLED, HALF-NORMALLED OR FULL-NORMALLED AT THE PATCHBAY, AS SHOWN BELOW. A FORM OF FULL-NORMALS, SLEEVE-NORMALS, ARE INCLUDED FOR MIC PATCHBAYS, TO AVOID ERRANT PHANTOM POWER PATHS.

LOUDSPEAKER, VIDEO, NETWORK AND OPTICAL FIBER PATCHBAYS CAN BE SHOWN IN THE SAME MANNER AS THE LINE AND MIC EXAMPLES BELOW.

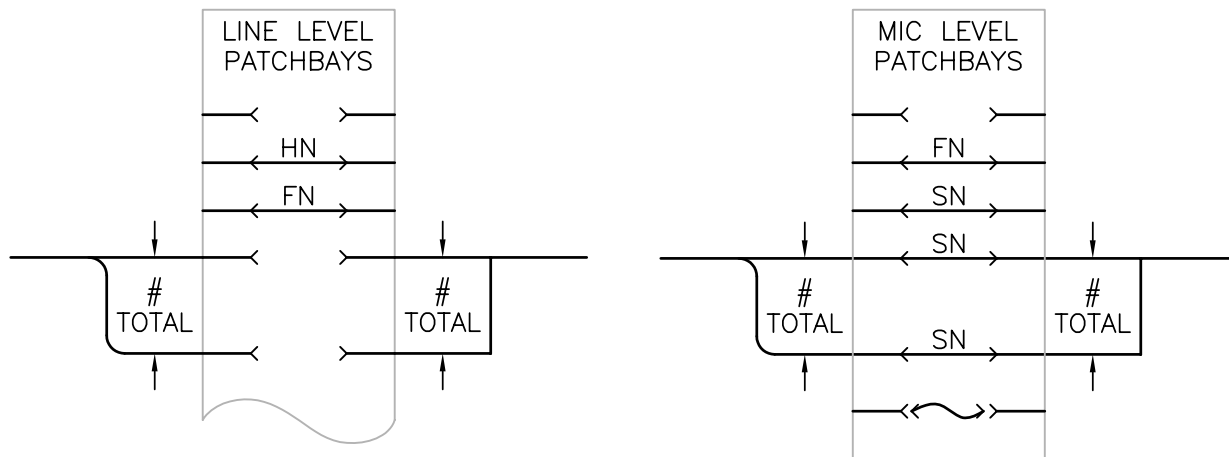


FIG. 6- PATCHBAY CONNECTIONS

IN THE MIC PATCHBAY DIAGRAM SHOWN ABOVE THE INPUT-SIDE PATCHPOINTS ARE SHOWN WITH CURVED CORNERS AND THE OUTPUT SIDE IS SHOWN WITH SHARP CORNERS. THIS DIFFERENCE INDICATES THAT THE INPUT CABLE IS A MULTI-SIGNAL CABLE AND THE OUTPUTS ARE A GROUP OF INDIVIDUAL CABLES. IN SOME CONTEXTS THIS DIFFERENCE WILL NOT BE SIGNIFICANT, SUCH AS INSIDE A RACK, BUT AT OTHER TIMES THE DIFFERENCE IS SIGNIFICANT, SUCH AS THE CONNECTION TO A STAGE BOX OR REMOTE RACK WHERE A "MULT" IS HIGHLY DESIREABLE. "MULTS" CAN ALSO BE LABELED AS SUCH TO AVOID CONFUSION.

NO-NORMAL, FULL-NORMAL, HALF-NORMAL AND SLEEVE-NORMAL ARE ALL IDENTIFIED ON THE PATCHBAY DIAGRAMS.

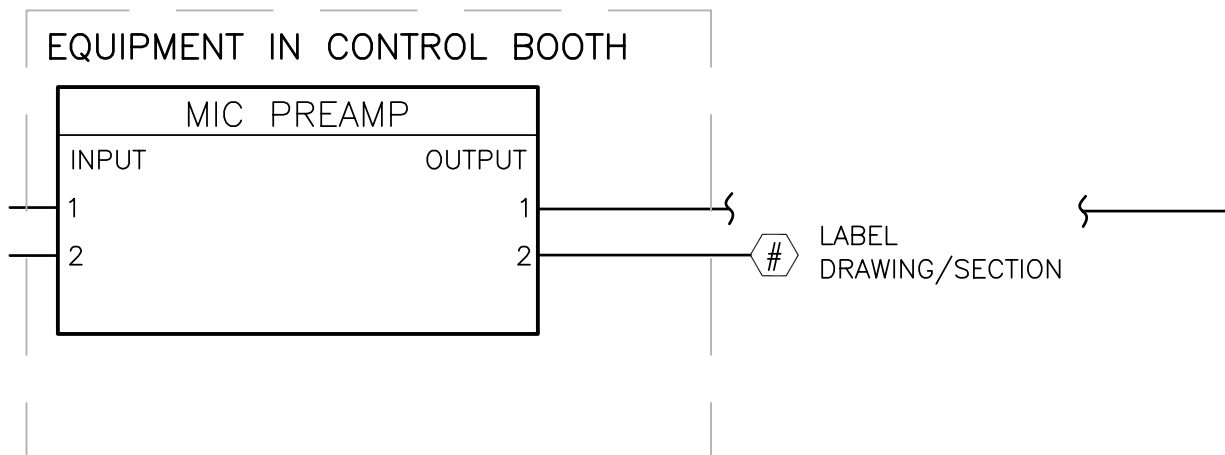


FIG. 7- OTHER CONNECTION CONVENTIONS

IN FIGURE 7, A DASHED LINE IS USED WITH A LABEL TO INFORM OF THE LOCATION OF THE DEVICE. THESE BOXES SHOULD BE USED TO INDICATE WHEN EQUIPMENT IS LOCATED AT SOME DISTANCE FROM OTHER DEVICES. OUTPUT 1 HAS A BREAK-LINE, WHICH MAY BE USED TO TEMPORARILY BREAK A LINE TO MAINTAIN CLARITY. THE LINE SHOULD ONLY BREAK OVER A SHORT DISTANCE AND THE OTHER SIDE SHOULD BE CLEARLY VISIBLE AS A CONTINUATION OF THE BROKEN LINE, OTHERWISE USE A FLYOFF WITH LABEL. IT IS NOT NECESSARY TO BREAK EVERY LINE WHICH CROSSES ANOTHER. THE BREAK-LINE IS USED WHEN NEEDED TO MAINTAIN THE CLARITY OF THE DRAWING.

OUTPUT 2 SHOWS A FLY-OFF. THE FLY-OFF IS USED WHEN A CONNECTION IS MADE TO ANOTHER SECTION OF A DIAGRAM OR ANOTHER DRAWING. THE FLY-OFF CAN ALSO BE USED WHEN A CONNECTION WOULD TRAVEL BACK TOWARD THE LEFT SIDE OF THE DRAWING AND MAKE READING THE ENTIRE DRAWING MORE DIFFICULT. THE FLYOFF SHOULD BE GIVEN A UNIQUE LETTER OR NUMBER DESIGNATION AND A LABEL DESCRIBING WHERE TO FIND THE OTHER SIDE OF THE FLY-OFF.

FIGURE 8 SHOWS OTHER USEFUL CABLING CONVENTIONS. A "TWO-FER" OR CONDUCTOR TO CONDUCTOR SPLICE IS SHOWN WITH A CIRCLE FOR CLEAR INDICATION THAT IT IS NOT JUST A SEPARATE CABLE BRANCHING OFF. ALSO, THE LENGTH OF A CABLE CAN BE SHOWN. THIS IS OFTEN IMPORTANT TO DEFINE, ESPECIALLY FOR STAGE BOXES AND CONNECTIONS FROM A MIXER TO ASSOCIATED RACK OR A STAGE BOX. THIS INFORMATION CAN ALSO BE CONVEYED IN A CABLE ORDER, IN WHICH CASE THE CABLE WOULD BE GIVEN A UNIQUE CODE FOR REFERENCE TO THE CABLE ORDER.

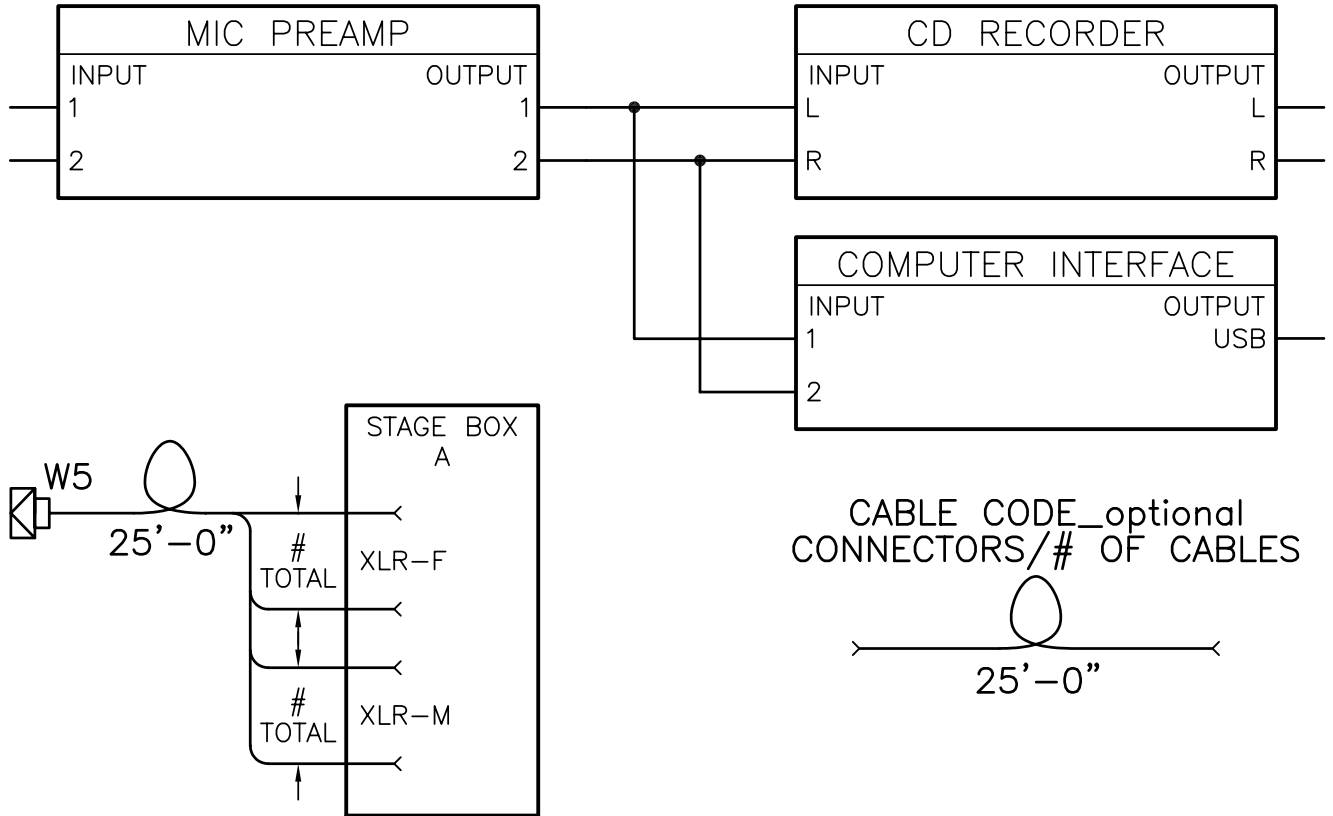


FIG. 8- OTHER CABLING CONVENTIONS

FIG. 9 SHOWS THE CONNECTIONS AT AN AV PANEL. IN SOME SYSTEMS, DEVICES ARE INTERFACED TO INSTALLED INFRASTRUCTURE. REFER TO FIGURE 9 TO SEE THE CONNECTIONS AT AN AV PANEL. ONLY CONNECTIONS WHICH WILL BE USED NEED TO BE SHOWN. THE CONNECTORS ARE INDICATED BY A SIDWAYS "V", SIMILAR TO THE PATCHBAY SYMBOL. CONNECTOR TYPES CAN BE LABELED ON THE CABLE. THIS PANEL SHOWS A "MULT" CONNECTOR WHOSE SYMBOL DISTINGUISHES IT FROM A SINGLE CABLE CONNECTION. CONNECTION PANELS CAN BE FOUND IN RACKS IN ADDITION TO WALL-MOUNTED PANELS

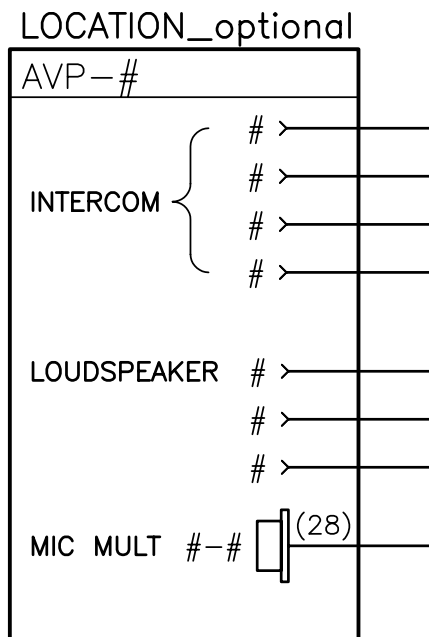


FIG. 9- AV PANEL CONNECTIONS

FIGURE 10 SHOWS SPECIAL SYMBOLS FOR AMPLIFIERS. THE SYMBOL ON THE UPPER LEFT IS A 2-CHANNEL AMPLIFIER. BOTH CHANNELS ARE SHOWN IN THE SAME DEVICE BLOCK FOR CLARITY. AMPLIFIER BLOCKS CAN ALSO USE A BREAK-LINE AT THE BOTTOM TO INDICATE THAT THE SAME AMPLIFIER IS SHOWN ELSEWHERE IN THE DIAGRAM. EXPANDED BLOCKS CAN BE CREATED FOR 4 AND 8-CHANNEL AMPLIFIERS. THE SYMBOL BELOW THE STEREO AMPLIFIER IS A PARALLEL OUTPUT AMP. BELOW THAT IS A BRIDGED AMPLIFIER, IN WHICH THE POWER FROM 2 CHANNELS ARE USED TO PRODUCE ONE OUTPUT. THE BLOCKS CAN ALSO BE EXPANDED TO INCLUDE MONITORING AND CONTROL CONNECTIONS AS REQUIRED. AMPLIFIER CHANNELS USING 70V OR OTHER OUTPUT VOLTAGES, RATHER THAN LOW IMPEDANCE, SHOULD BE CLEARLY LABELED.

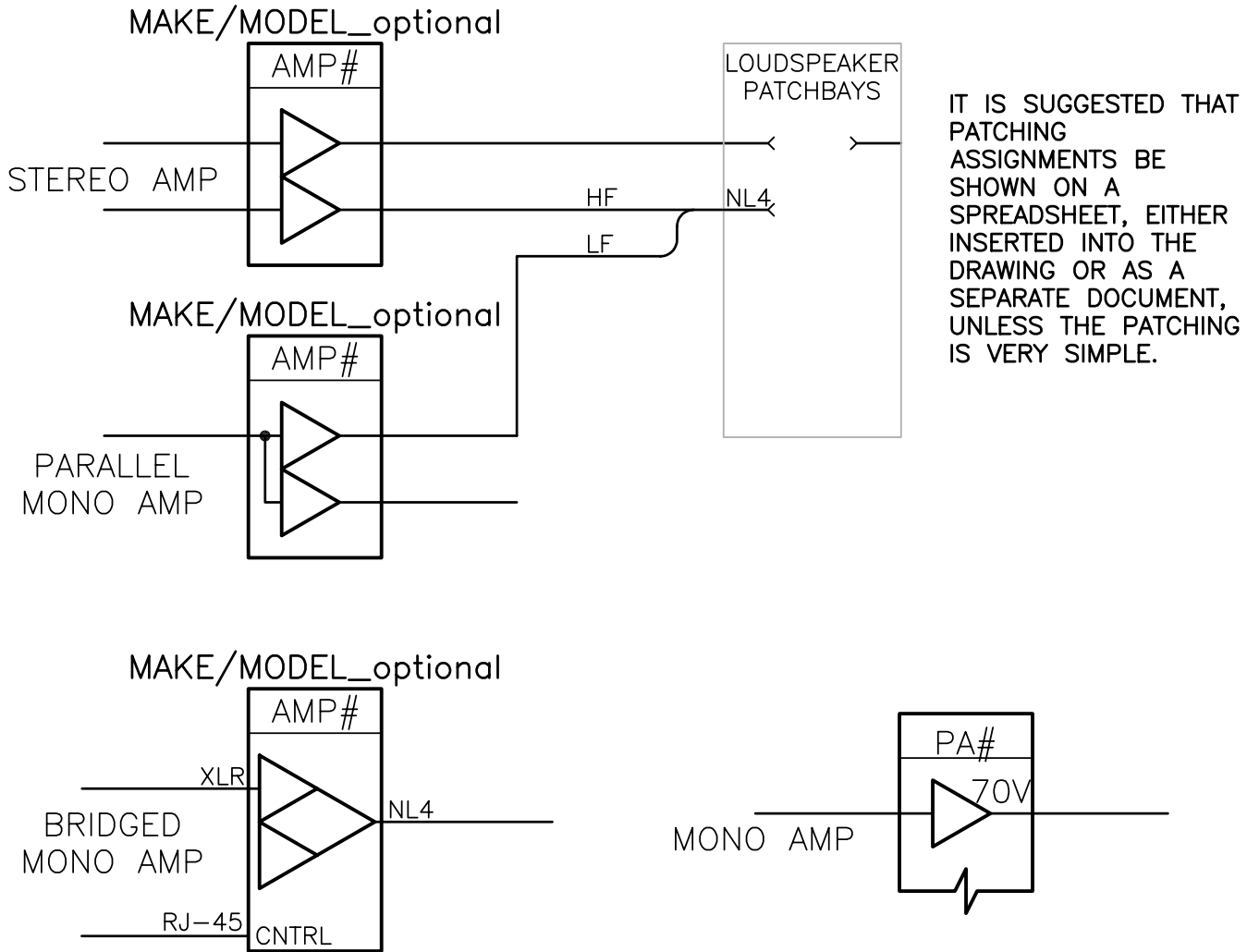


FIG. 10- AMPLIFIER SYMBOLS

FIGURE 11 SHOWS SPECIAL SYMBOLS FOR LOUDSPEAKERS. LOUDSPEAKERS ARE AMONG THE MOST COMPLEX DEVICES TO DEPICT BECAUSE THERE ARE A GREAT DIVERSITY OF CONFIGURATIONS. THE GOAL SHOULD BE A CLEAR EXPLANATION OF THE CONNECTION OF THE LOUDSPEAKERS, RATHER THAN THE INTERNAL DRIVER CONFIGURATION. A TWO-WAY LOUDSPEAKER WITH AN INTERNAL CROSSOVER CAN BE SHOWN WITH A SINGLE DRIVER SYMBOL. NOTES MAY BE REQUIRED TO CLEARLY EXPLAIN THE SIGNAL CONNECTIONS.

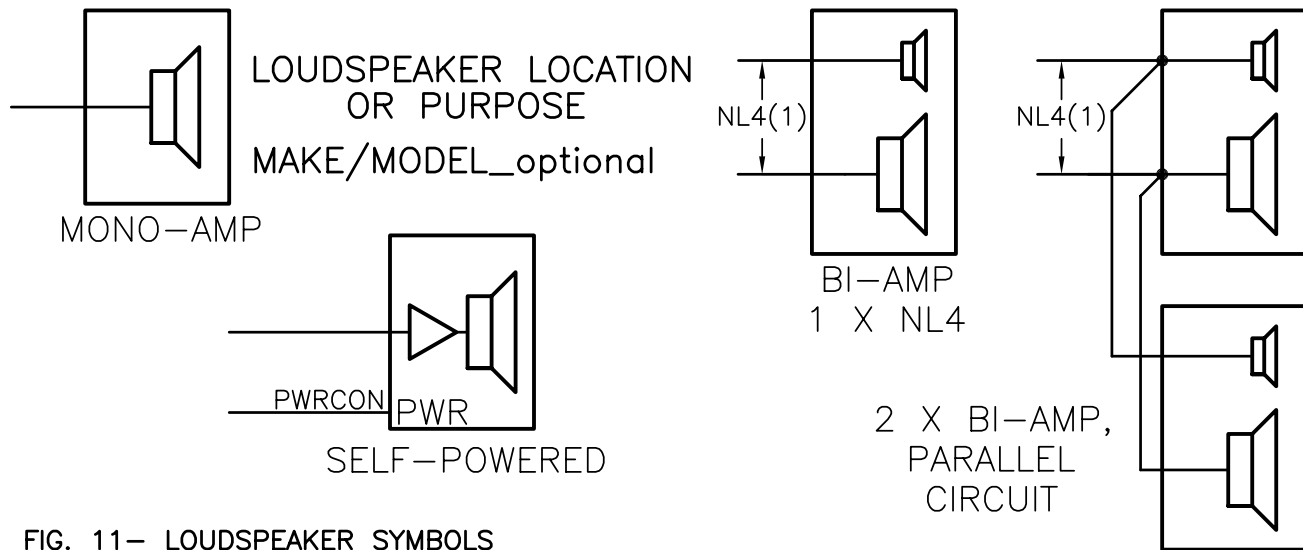
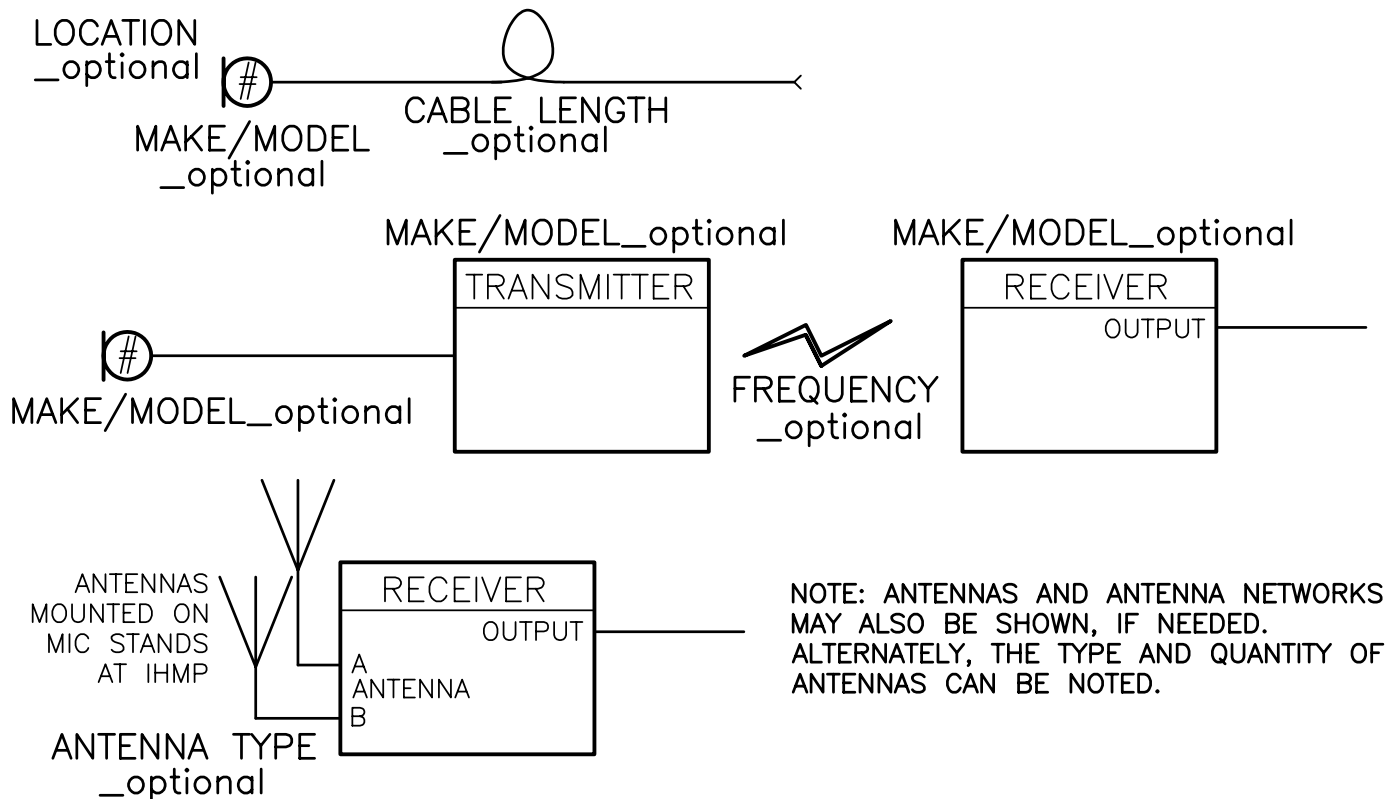


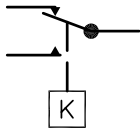
FIG. 11- LOUDSPEAKER SYMBOLS

FIGURE 12 SHOWS SPECIAL SYMBOLS FOR MICROPHONES AND WIRELESS MICROPHONES.

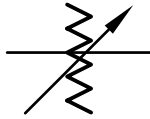


ALL OF THE PREVIOUS FIGURES FOR SYSTEM DIAGRAMS HAVE BEEN "ONE-LINE" OR "BLOCK" DIAGRAMS IN WHICH CABLES ARE INDICATED BY SINGLE LINES AND NOT INDIVIDUAL CONDUCTORS. HOWEVER, SOME SYSTEM DETAILS HAVE TO BE SHOWN AS "CIRCUIT" OR "SCHEMATIC" DIAGRAMS IN WHICH THE INDIVIDUAL CONDUCTORS ARE SHOWN. CIRCUIT DIAGRAM SECTIONS WITHIN A LARGER BLOCK DIAGRAM SHOULD BE CLEARLY LABELED AS SUCH. FIGURE 13 SHOWS USEFUL CIRCUIT DIAGRAM SYMBOLS. A LARGE LIBRARY OF SUCH SYMBOLS IS AVAILABLE IN ANSI/IEEE STD. 315/1975 AND 315A/1986.

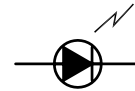
Single-Pole, Single
Throw Relay (SPST)



Potentiometer



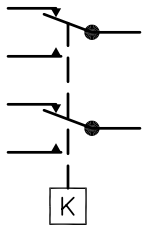
LED



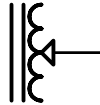
Transformer



Double-Pole, Double
Throw Relay (DPDT)



Auto-Transformer



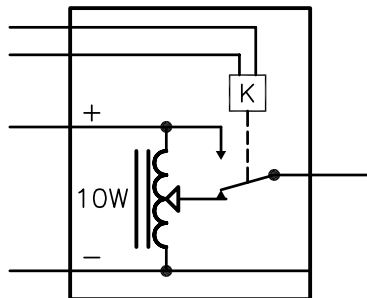
Diode



Switch (SPST)



VOLUME CONTROL,
PAGE OVERRIDE



LOGIC CONTROLLED
RELAY

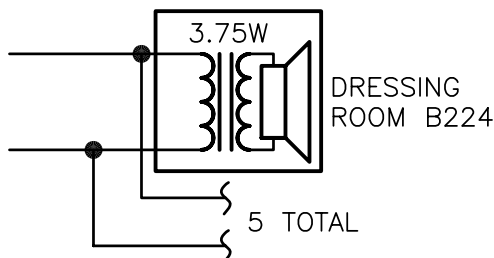
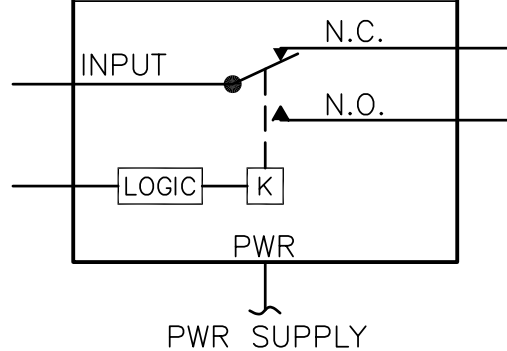


FIG. 13- CIRCUIT DIAGRAM SYMBOLS AND SAMPLE CIRCUITS