



ICR-116

Intercom Relay 16 Channel

Installation Manual

The ICR-116 Intercom Switching Relays are ruggedized intercom panels for use in harsh environments, such as correctional facilities. The ICR-116 provides high quality audio communication with complete flexible control. The unit has connections for 16 remote intercom Stations, each with their own Speaker and Call-in Switch. The Call-In and Relay Control connections are each 24-pin ribbon connectors.

A jumper option supports either Sinking or Sourcing Relay Drivers. Another Jumper Option allows the Call-in switches to be referenced to the Logic or Relay Power Source.

For convenience, all of the ICR-116 connections are connectorized. Remote Stations connect via 4-pin 0.1" Spring Cage Euro-Style Barrier Strips. Connections for Power, Intercom Amplifier, and Paging Amplifier, are Screw Terminal Euro-Style Barrier Strips.

Associated with each Station Selection Relay is a Station Status Indicator. The Station Indicators show the Technician which relay or relays are active. The indicators are intuitive, and easily interpreted. Each Station Indicator is either Off or On. When an Indicator is Off, there is no activity with that station. When an Indicator is On, that Station is selected for Communication.

Another product, the ICR-116EX, has a multi-pin connector on the opposite side of the PCB for access to the normally closed relay contacts. By using the "Back Contacts", multiple masters or priority switching can be achieved.

In applications where a more powerful Paging Amplifier is required, a Paging Relay(s) connects *Selected* Station(s) to a Paging Amplifier Output, such as the Tech Works PA-402.

BENEFITS

- Designed Specifically for Corrections
- High Quality Audio
- Options Designed for Corrections Industry
- Engineered & Built in U.S.A.
- 36-month Limited Warranty

Specifications:

- 16 Double Pole/Double Throw station audio relays
- 2 Double Pole/Double Throw page audio relays
- Relay Current 15MA
- Maximum Station Audio Power; 50 Watts @ 25 Volts
- Maximum Paging Audio Power; 100 Watts @ 25 Volts

Color: Grey powder coated metal chassis
Power: 24VDC, 0.3A, (Power Supply not included)
Weight: 5 lbs.
Dimensions: 19" W X 1.75" H X 8.6"D

Optional Accessories:

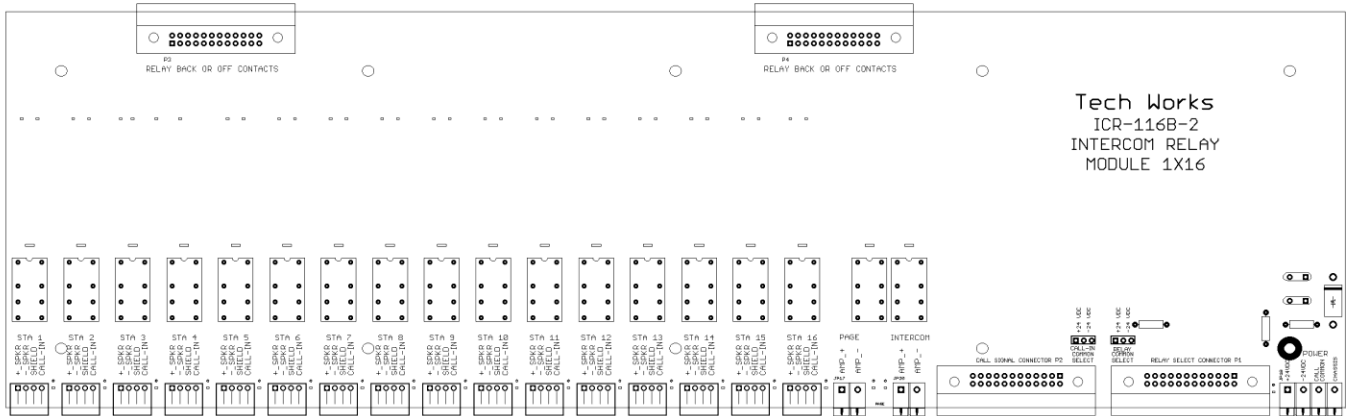
ICA-202D Dual Channel Intercom Amplifier
DODC Detention Operator Desk Console
PA-402 Paging Amplifier
ICR-44 Intercom Routing Relays
RC-24-10 Ribbon Cables
RC-BB-24 Screw Terminal Breakout Boards



Tech Works®

"Making Specialized Communication Easy"

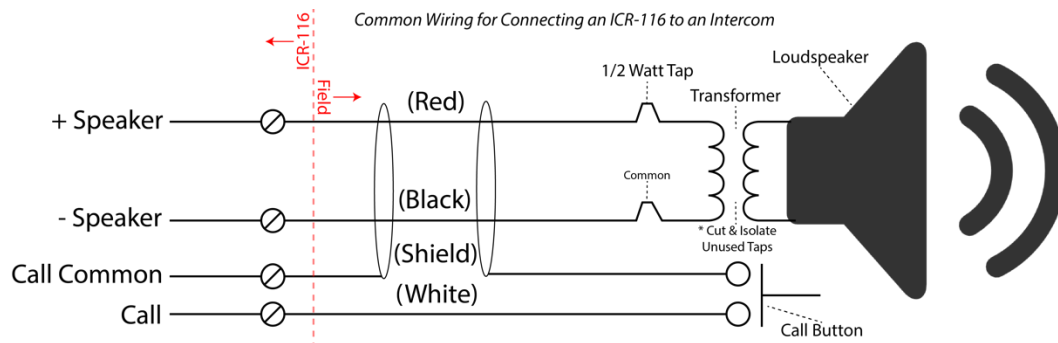
Connectors and Function:



Station Connectors (1-16)	Page Amp	IC Amp	Relay Select	Call Input	Power
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Station Connectors, 1-16, Euro-Style Barrier Strips (Pin 1, Left):

1	SPKR (+)
2	SPKR (-)
3	CALL COMMON / SHIELD
4	CALL SWITCH



SPKR connect to the Wiper of the Station Relays
 CALL COMMONS tie together, and go to the CALL SIGNAL CONNECTOR

Page Connector, Euro-Style Barrier Strip, (Pin 1, Left):

1	Amplifier OUT(+)
2	Amplifier OUT (-)

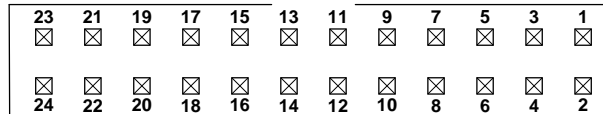
The Paging Amplifier is connected to the selected Stations when the Page Relay is selected

Intercom Amplifier Connector, Euro-Style Barrier Strip, (Pin 1, Left):

1	Remote SPKR (+)
2	Remote SPKR (-)

The Intercom Amplifier is connected to Stations when their Respective Station Relay is Selected

Relay Select Connector, 24 Pin Ribbon Wire Header, (Pin 1, Top-Right):



Ribbon Cable Color					Ribbon Cable Color
Yellow	SELECT-1	1	2	SELECT-2	Orange
Red	SELECT-3	3	4	SELECT-4	Brown
Black	SELECT-5	5	6	SELECT-6	White
Gray	SELECT-7	7	8	SELECT-8	Violet
Blue	SELECT-9	9	10	SELECT-10	Green
Yellow	SELECT-11	11	12	SELECT-12	Orange
Red	SELECT-13	13	14	SELECT-14	Brown
Black	SELECT-15	15	16	SELECT-16	White
Gray	SELECT-PAGE	17	18	N/C	Violet
Blue	N/C	19	20	N/C	Green
Yellow	(Return) -24 VDC	21	22	-24 VDC (Return)	Orange
Red	(Return) +24 VDC	23	24	+24 VDC (Return)	Brown

***NOTE:** For Source Drivers, “-24 VDC” is the circuit Return
For Sink Drivers, “+24 VDC” is the circuit Return

The Intercom Amplifier is connected to Stations when their Respective Station Relay is Selected.
The Paging Amplifier is connected to Unselected Stations when the Call Relay is energized.

Call Signal Connector, 24 Pin Ribbon Wire Header (Pin 1, Top-Right):

Ribbon Cable Color					Ribbon Cable Color
Yellow	CALL-1	1	2	CALL-2	Orange
Red	CALL-3	3	4	CALL-4	Brown
Black	CALL-5	5	6	CALL-6	White
Gray	CALL-7	7	8	CALL-8	Violet
Blue	CALL-9	9	10	CALL-10	Green
Yellow	CALL-11	11	12	CALL-12	Orange
Red	CALL-13	13	14	CALL-14	Brown
Black	CALL-15	15	16	CALL-16	White
Gray	N/C	17	18	N/C	Violet
Blue	N/C	19	20	N/C	Green
Yellow	CALL COMMON	21	22	CALL COMMON	Orange
Red	+24 VDC	23	24	+24 VDC	Brown

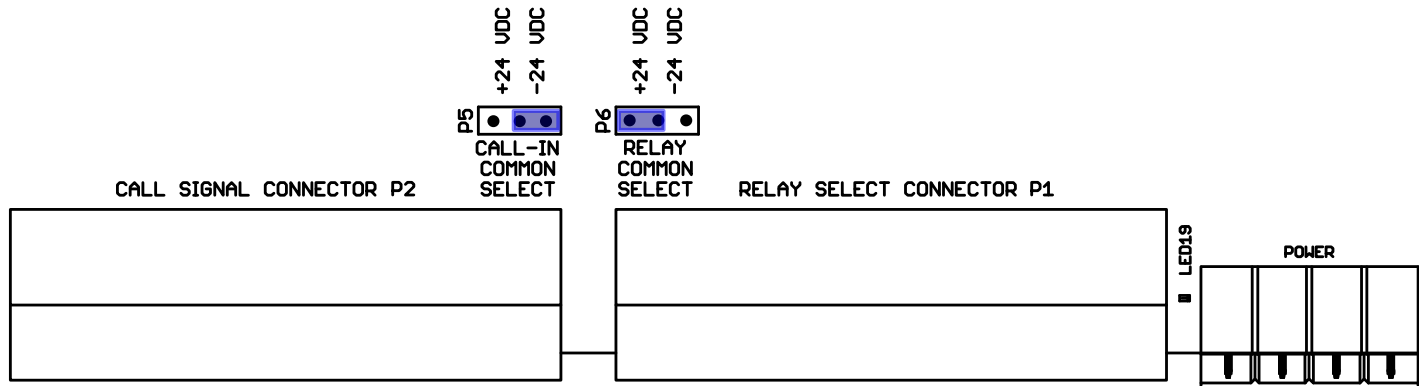
The CALL-X signal is connected to CALL COMMON, when its respective switch is closed

Power Connectors, Euro-Style Barrier Strip, (Pin 1, Left):

1	+24 VDC input (Return)
2	-24 VDC input (Return)
3	CALL COMMON
4	CHASSIS

***NOTE:** For Source Drivers, “-24 VDC” is the circuit Return
For Sink Drivers, “+24 VDC” is the circuit Return
See “Jumper Options” for Details

Jumper Options:



The ICR-116 has two sets of Configuration Jumpers to accommodate various PLC Control Options.

Both sides of the Relay Power Supply are connected to the ICR-116. When the Power Supply is connected properly, the Power Indication should be lighted Green.

CALL COMMON SELECT:

CALL COMMON is connected to all Station Connectors - Pin 4 and Pin 3 of the Power Connector. The CALL COMMON may be referenced to either Power Supply rail, allowed to float, or referenced to an external "Common".

In most Installations, the CALL COMMON is referenced to the Relay Power Supply. For Convenience the Jumper may be in either Position:

- +24 VDC CALL COMMON is connected to the +24 VDC Relay Power Supply Rail
- 24 VDC CALL COMMON is connected to the -24 VDC Relay Power Supply Rail

If the CALL COMMON Jumper is removed, the CALL COMMON pin on the POWER Connector floats and may reference to any source.

RELAY COMMON SELECT:

The Relay SELECT-X lines may be reference to either Rail of the Relay Power Supply

- +24 VDC Sinking Drivers, Relay indicators will light Green when a relay is energized
- 24 VDC Sourcing Drivers, Relay indicators will light Red when a relay is energized

NOTES:

- CALL COMMON is connected to CHASSIS with a 1MEG-Ohm resistor
- 24 VDC is connected to CHASSIS with another 1MEG-Ohm resistor
- The +24VDC has a 500MA Resettable Fuse for the Relays
- The +24VDC has another 500MA Resettable Fuse for the SELECT & CALL Connectors

Application Notes:

Please refer to the schematic for a better understanding of this section.

Refer to the ICA-202D Intercom Amplifier installation manual, (For application examples see pages 24 & 25). Refer to the PA-402 Power Amplifier installation manual.

The ICR-116 is suitable for any Intercom System requiring Multiple Station Selection. However, these examples refer to use with other Tech Works products.

Each Station consists of a Speaker, which is also used as a Microphone (Half-Duplex Operation) and a Call-In Switch.

Stations are selected by energizing that Stations Relay

Some control systems have Sinking Relay Drivers (Pull to Ground), while other control systems have Sourcing Relay Drivers (Pull to +24Volts). The ICR-116 accommodates either type driver (See Jumper Options).

When the Relay is energized, the Intercom Amplifier is connected to that Station's Speaker. *When a Relay is not energized, the Station Speaker is terminated by two 200-Ohm resistors tied to COMMON. The Termination serves two purposes; reducing crosstalk, bleeding off static electricity.*

When listening normally, only one relay is energized at a time. However, during (Zone) Paging, many or all relays may be energized simultaneously.

When stations are selected, **good design practice** sequences the Intercom Amplifier to avoid listening Pops. The ICA-202 has a Mute input, which simplifies this implementation. The selection sequence is Mute Intercom, Select Station, wait ~100mS, Un-Mute Intercom. The de-selection sequence is Mute Intercom, De-Select Station. The new selection sequence is Mute Intercom, Select new Station, wait ~100mS, Un-Mute Intercom.

Station Call-in Switches have a Common Return

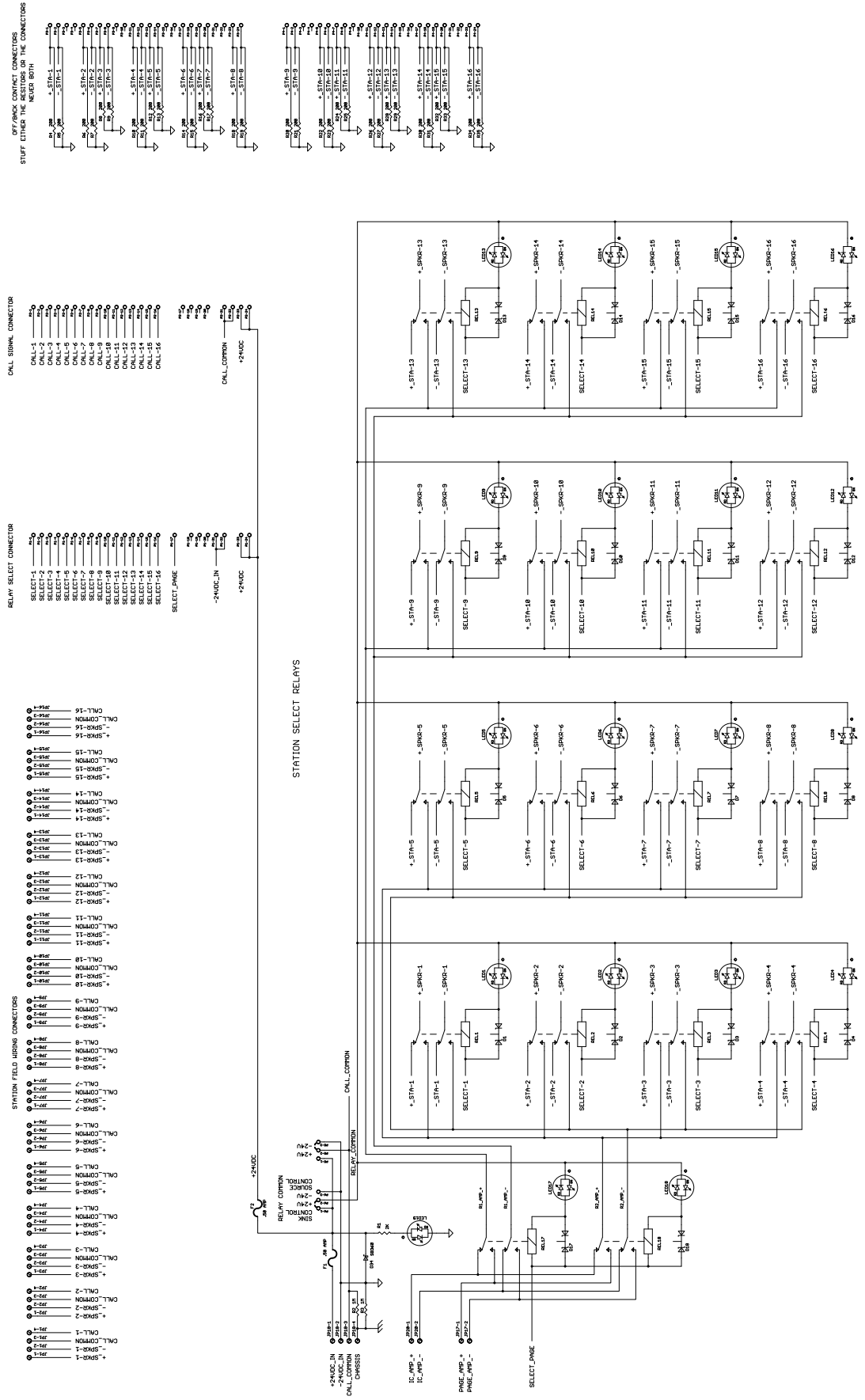
The Call-In Switches are separate circuits from the audio pathways. Some control systems Reference the Call-In Switched to the Relay Power Supply Negative Rail. Some control systems Reference the Call-In Switched to the Relay Power Supply Positive Rail. Some control systems Reference the Call-In Switched to a Logic (PLC) reference. The ICR-116B accommodates any type of reference (See Jumper Options).

The Paging Relay(s) may be used in systems where the Intercom Amplifier has insufficient Power

When the Paging Relay(s) are energized, selected Stations are connected to the Paging Amplifier output. This is especially easy to implement using Tech Works Intercom Products. The ICA-202D "Paging Audio Output" connects to the PA-402 Paging Amplifier "Paging Audio Input". The ICA-202D and PA-402 Page Logic control inputs are tied together. The PLC Energizes the Page & Station Relays, and then pulls the Page Logic inputs to Common.

Schematic Diagram:

ICR-116B-1 SCHEMATIC DIAGRAM





System Accessories

	DODC-1 - Operator Desk Console - This all steel console with brushed stainless steel faceplate and vandal resistant push buttons has an epoxy finished cold rolled steel base, a permanently attached gooseneck microphone provides clear, high quality page and intercom talk while a vandal resistant 3 inch speaker provides clear listening.
	DODC-2 - Operator Desk Console - This all steel console with brushed stainless steel faceplate and vandal resistant push buttons has an epoxy finished cold rolled steel base, a hidden flush mount microphone provides clear, high quality page and intercom talk while a vandal resistant 3 inch speaker provides clear listening.
	ICA-202D - Intercom Amplifier - 20 watts of clean audio power at 25-Volts it can do both the Intercom and most Paging functions. Automatic Level Control (ALC) assures the speaker level remains constant over a wide dynamic input range.
	RC-24-* and RC-BB-24 - 24-pin Ribbon Cable and Breakout Board - Designed to connect our Tech Works Intercom Relay panels with digital control equipment. The RC-24-* is available in various lengths (10 feet standard). The breakout board has mounting tabs for screw mounting wherever convenient.
	ICR-44 - Intercom Relay Module 4x4 - Tech Works makes a variety of intercom Relay modules for routing audio and calls in signals. The ICR-44 is a snap track mount 4 relay assembly designed to allow multiple master audio routing by a PLC.
	VPSS - Vandal Proof Speaker Station - a call-in station with integral speaker/micro- phone and momentary, normally open, push-to-call button. The faceplate is a 2 gang electric box mount, 12 gage, brushed stainless steel with security screens mounted between the faceplate and the loudspeaker. Tamper-resistant hardware is included.
	PA-402 Paging Amplifier - designed to add Power to the ICA-202D. It delivers 40 Watts to 25 Volts loads at very low noise and distortion. Perfect for Prisons or Security applications when covering large areas or All Page.
	PS2437A - Power Supply - 24V DC @ 3.7 Amps - is a regulated computer grade power supply. This unit is UL listed and includes a 6-foot removable power cord with a North American standard Edison connector. Includes wall mount bracket.

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