Instructions for Master INCOM Network Translator

I.L. 17200

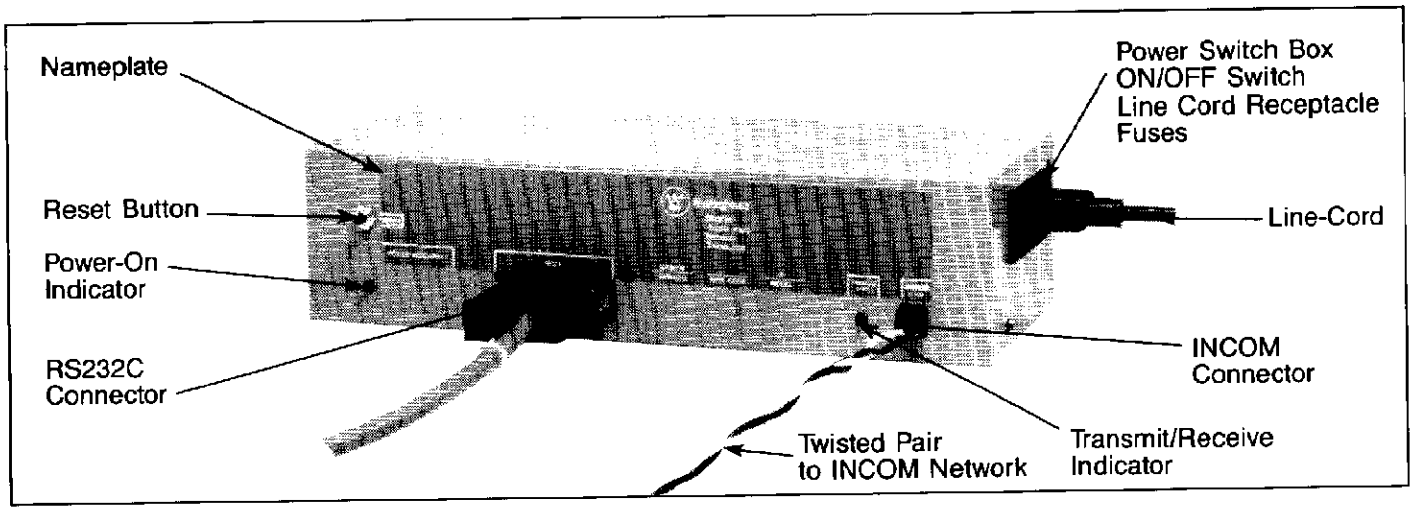

Fig. 1 Master INCOM Network Translator Assembly

Referenced Documents: (1) RS232C/INCOM Network Protocol Manual and (2) EIA Standard RS-232-C

MASTER INCOM NETWORK TRANSLATOR

The Master INCOM Network Translator (MINT) (depicted in Figure 1) translates the 33 bit binary message used on the Westinghouse INCOM local area network to and from a 10 byte ASCII encoded Hexadecimal RS232C message. The MINT enables any device with an RS232C port to function as an INCOM network master.

The MINT has a 25 socket "D" subminiature connector which allows connection of the MINT to an RS232C master device such as a personal or mainframe computer, programmable controller, etc. The MINT has a two-wire plug-in connector for connection to the INCOM network. (See Figure 2.)

MATERIAL LIST

Master INCOM Network Translator (MINT)
Plug-in Line Cord
Instruction Leaflet (this document)
Two-wire INCOM connector:
  Buchannan No. SSB4R02SNN
  Westinghouse No. 5281C28H49
Panel mounting bracket with #8-32 x ½" machine screws and washers for mounting

PHYSICAL SPECIFICATIONS

Power: 117 V AC +−10%, 0.8 Amperes
  Fused for 3.15 Amperes (Use 5 mm x 20 mm type fuse)
Temperature; Operating: 0 °C - 60 °C
  Storage: −20 °C - 80 °C
Weight: 6 pounds
Outline dimensions (including feet, buttons, and switches)
  With panel mounting bracket: 14" x 5⅜" x 3½"
Without panel mounting bracket: 12⅜" x 4¾" x 3½"

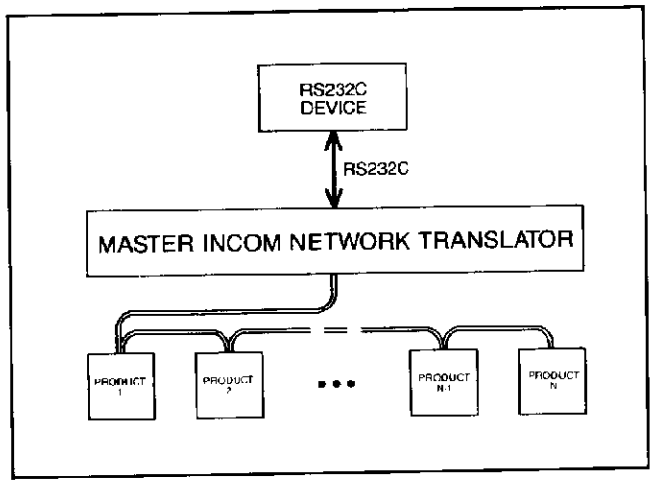

Fig. 2 Network Interwiring

PHYSICAL FEATURES

Refer to Figure 1.

Power Switch Box

Located at the right end of the enclosure, the power switch box incorporates the ON/OFF switch, the receptacle for the line cord, and the fuse clip.

ON/OFF Switch

The ON/OFF switch shows a red-colored block on top of the switch when it is switched ON.

Line Cord Receptacle

The receptacle accepts the line cord which is shipped with the MINT. The other end of the line cord mates to a standard 117 VAC line outlet.

PHYSICAL FEATURES (cont.)

Fuse Clip

The active fuse and one spare fuse reside in a plastic clip next to the line cord receptacle. The clip has an image of the fuse embossed into its surface. In order to remove the clip for fuse replacement, first unplug the line cord from its receptacle, then use a small flat-bladed screwdriver to pop the clip out.

Power-ON Indicator

The indicator is a red light emitting diode (LED) which is energized by the internal low-voltage power supply whenever the MINT power switch is switched ON with the line cord connected to 117 VAC power.

Reset Button

The reset button initializes and restarts the MINT. In the unlikely event of loss of MINT function, use the reset button as an attempt to recover operation.

Transmit Light

Whenever the MINT is servicing either the INCOM or RS232C communication channel, the red LED transmit light is energized. Observe the transmit light to determine if the network is active.

RS232C Connector

The RS232C connector is a 25 socket "D" subminiature connector that connects the MINT to the user's RS232C device using a user-supplied mating 25 pin "D" subminiature connector and cable. The configuration of the connector is as a subset of a data set as discussed in the RS232C standard. Refer to Figure 3.

INCOM Connector

The incom connector connects to the two-wire INCOM Network using the two-pin mating connector shipped with the MINT. The supplied connector has two screw terminals to accept the two INCOM Network wires.

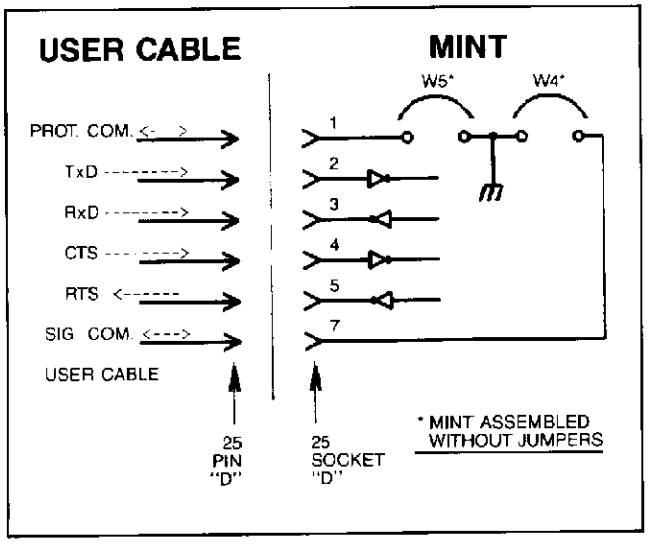

Fig. 3 RS232C Connector Definitions

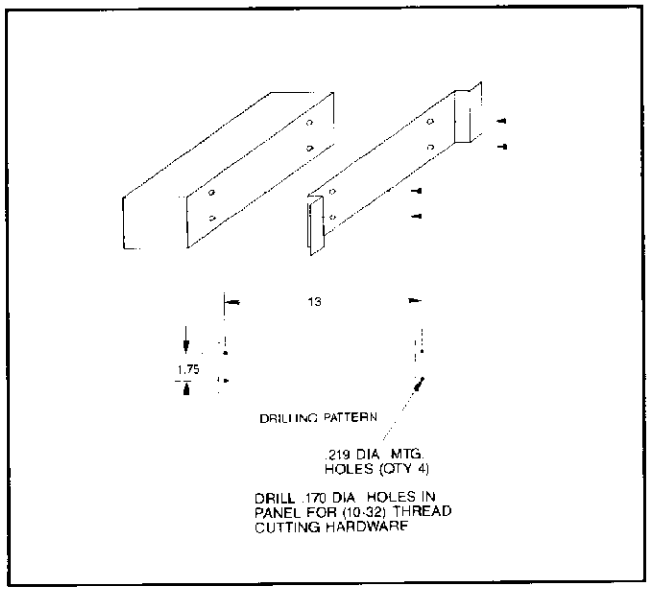

Fig. 4 Panel Mounting (Dimensions in inches)

MOUNTING

Bench or Table

The MINT has four rubber feet which make it suitable for operation on a bench or desk. Place the MINT on a flat surface and proceed as described under **OPERATION**.

Panel

A bracket is provided which attaches to the back of the MINT box, providing mounting tabs for bolting to a panel. See Figure 4 for clarification of the bracket installation and for the panel mounting-hole pattern. Always mount the MINT with its long axis horizontal and rubber feet down.

OPERATION

To put the MINT into operation (See Figure 1):

1. Plug the line cord provided into the line-cord socket at the right end of the MINT, and plug the other end of the cord into a 117VAC outlet.
2. Connect a user-provided RS232C cable to the MINT. Plug the other end into your RS232C master device. (See Figure 3.)
3. Connect the two-wire INCOM Network to the INCOM connector on the front panel using the plug-in connector provided. (See Figure 1 and Figure 2).
4. Turn ON the power switch next to the line cord on the right end of the MINT and observe that the power indicator LED turns ON.
5. You are ready for communication.

COMMUNICATION

Protocol

Communicate using the 10 byte protocol described in the RS232C/INCOM Network Protocol Manual. The

manual describes the structure of the RS232C messages and how to issue commands and request data buffers. An RS232C master device can issue commands to and request data buffers from devices on the INCOM Network.

Buffering

Because the MINT translates between protocols which have different information density and different data rates (BAUD), the potential impact on system performance make it important to consider buffering during initial application and installation.

Handshaking Lines

In order to help control data flow, the MINT provides the "handshaking" lines labeled CTS and RTS (pins 4 and 5) in Figure 3. These lines are defined similarly to but not exactly as in the RS232C standard. The sense of these lines is chosen to allow proper 3-wire operation if handshaking is not used. That is, connecting only pins 2, 3, and 7 will allow communication. An open line or a line with less than −3 volts applied is un-asserted. A line with more than +3 volts applied is asserted.

RS232C Message Buffering

As the RS232C master device is able to control its transmission in response to signals from the MINT, the MINT provides relatively little buffering for RS232C messages coming from the RS232C master device. Beyond one message, four additional bytes of the ten bytes of the next message are buffered if the INCOM message transmission has not been completed. If two of the four buffer bytes are received by the MINT, and the INCOM transmission is still incomplete, a CONTROL-S is sent by the MINT to the master RS232C device to request it to stop transmitting. If one more byte is received by the MINT from the master RS232C device, the MINT asserts pin 5 of the RS232C Cable in an attempt to invoke a hardware stop. If the master RS232C device continues to transmit to the MINT, bytes beyond 4 are lost. If the master RS232C device stops transmission when requested by the MINT then no data is lost.

When the INCOM channel completes its transmission and can accept another message, the MINT signals the RS232C master device that further transmissions are allowed by un-asserting pin 5 and/or by sending a CONTROL-Q.

INCOM Message Buffering

There is no way to stop the flow of buffer messages from a product on the INCOM network once it receives a request from the master RS232C device. Thus the MINT/RS232C master device combination must be able to handle the unrestricted data flow from the INCOM network if information is not to be lost.

The INCOM version of a message is 33 bits long, whereas the RS232C version of a message is 110 bits long. Consequently, even at the same baud, the INCOM channel will get ahead of the RS232C channel. That is, messages can flow into the MINT from the INCOM Network faster than translated RS232C messages can flow out of the MINT to the RS232C master device.

To prevent data loss, the MINT provides a 49 message First-In-First-Out (FIFO) buffer.

If the RS232C master device must temporarily cease servicing a data stream being received from the MINT, it may assert pin 4 of the RS232C cable, and the MINT will cease transmission. As long as the product being serviced is expected to send no more than 49 more messages or if re-asking for the data is acceptable, then this action is permissible.

In cases where the expected requirement for buffer size is greater than 49, the data rate difference between the RS232C channel and the INCOM network channel must be considered.

The maximum buffer size (in messages) which may be received from the INCOM network is a function of the differential rate between INCOM reception and translated RS232C transmission to the RS232C master device. The difference rate fills up the 49 message buffer. For 1200 baud INCOM and 1200 baud RS232C, the maximum buffer size is slightly over 65 messages. For 1200 baud INCOM and 2400 baud RS232C, the maximum buffer size is slightly over 115 messages. See **CHANGING BAUD.**

RS232C SYSTEM GROUNDING

The RS232C channel is electrically isolated from the INCOM channel and from the processor circuitry. A separate power supply is provided and the four active lines are optically coupled to the translating microprocessor circuit. Thus, no special grounding is necessary for MINT operation. If special system requirements other than the MINT operation dictate special grounding, the MINT has provision for the installation of jumpers to connect the PROTECTIVE COMMON to the MINT chassis and to connect the SIGNAL COMMON to the MINT chassis. Refer to Figure 3 for a schematic representation of the grounding jumper functions. Refer to Figure 5 for the jumper locations. Refer to Table I for a description of jumper function. Jumpers should be insulated solid wire of appropriate length to fit the gap between the jumper holes.

TABLE I — RS232 GROUNDING JUMPERS

RS232C GROUNDING SELECTION	JUMPERS W4	JUMPERS W5
*PROTECTIVE COMMON NOT TIED TO CHASSIS	OUT	
PROTECTIVE COMMON TIED TO CHASSIS	IN	
*SIGNAL COMMON NOT TIED TO CHASSIS		OUT
SIGNAL COMMON TIED TO CHASSIS		IN

* = Setting as supplied from factory

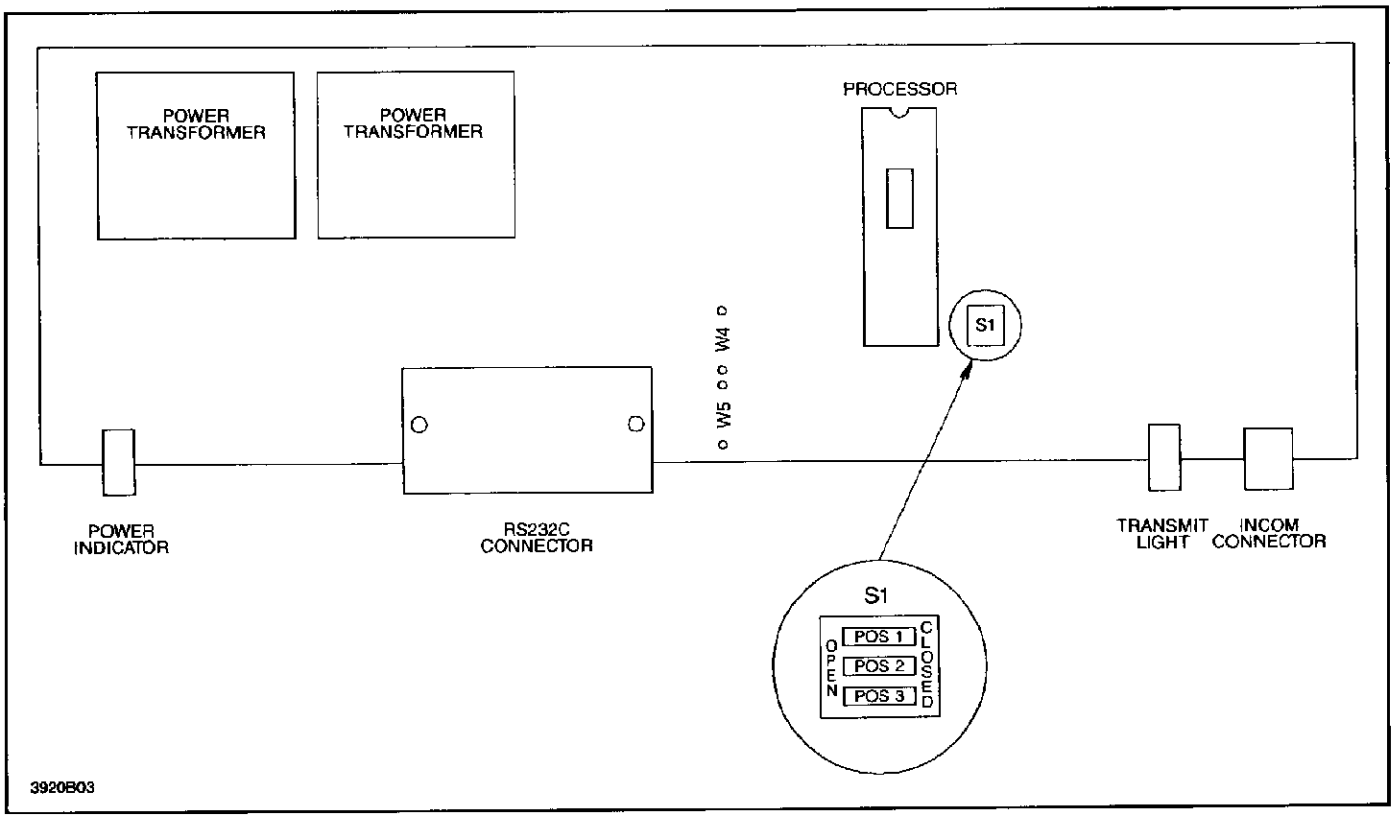

Fig. 5 Jumper Hole and Switch Location Inside MINT on Printed Wiring Board

CHANGING BAUD

The MINT is set up for a standard configuration as shipped from the factory at:

INCOM 1200 BAUD
RS232C 1200 BAUD

Alternative bauds are possible by removing the MINT case and changing the dual-in-line package (DIP) Baud Switch S1 (See Figure 5.)

Disassemble Case

To remove the case, remove the four screws and lock washers securing the upper half of the case. The screws are located two at the right end of the case and two at the left end of the case. Once the screws are removed, the top of the case slides forward and up. The power switch and the reset button are wired down into the printed circuit board which becomes visible when the case top is removed. Adequate service loops are provided for opening the case, however, take care to not stress the wires.

Change Baud Switch (S1)

Refer to Figure 5 and Table II. Change the switch positions using a pencil or a small screw driver.

Reassemble the Case

Reassemble the case by reversing the disassembly instructions. Take care to not crimp the wire service loops and to place the case top such that the LED indicators and connectors slide easily into their appropriate panel holes.

INSTALLATION, OPERATION, MAINTENANCE

This industrial type control is designed to be installed, operated, and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, checkout, safe operation, or maintenance. Care must be expressed to comply with local, state, and national regulations, as well as safety practices, for this class of equipment.

TABLE II — S1 FUNCTIONS

RS232C FUNCTION	POS2	POS1	INCOM FUNCTION	POS3
2400 BAUD	OPEN	OPEN	*1200 BAUD	CLOSE
*1200 BAUD	OPEN	CLOSE	300 BAUD	OPEN
600 BAUD	CLOSE	OPEN		
300 BAUD	CLOSE	CLOSE		

* = Setting as supplied from factory

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