

**ENABLING TECHNOLOGIES LABORATORY
WAYNE STATE UNIVERSITY**

**TASK SEQUENCING SYSTEM
VERSION 1.0**

INSTRUCTION SET

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TASK SEQUENCING SYSTEM VERSION 1.0

Introduction

The Task Sequencing System (TSS) was designed to assist the user with tasks requiring sequential operations. The TSS can be programmed to monitor up to 16 bins using Passive Infra-Red Sensor Units, and the bins are linked by communication packs.

The user is prompted to select items from the correct bin by indicator lamps (LEDs) on the top of each bin, As the TSS selects a bin, the LED on the top of the bin illuminates.

A voice output device, such as Cheap Talk 4 or Lynx, may also be incorporated for voice prompting.

With these directions, the user of the TSS will be able to:

- Setup the TSS correctly and safely
- Program the desired values
- Run the TSS correctly and safely

Equipment

TSS Monitor	MIDI Cables (5-Pin)
Communication Packs	Sensors
LEDs	TSS Bins
Voice Output Device (optional)	12-V AC Adapter

! CAUTION ! Only assemble/disassemble the TSS while the power supply is shut OFF. Doing otherwise may damage the equipment.

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SETUP PROCEDURES: TASK SEQUENCING SYSTEM

MATERIALS:

TSS Monitor	MIDI Cables
Communication Packs	Sensors
LEDs	TSS Bins
12-V AC Adapter	Voice Output Device (optional)

Linking the Communication Packs

1. Arrange the communication packs in sequential order from first to last. Each pack is labeled with a number, or refer to **chart 1** for each pack's switch configuration.

NOTE: When checking the configuration of a communication pack, hold the pack so that the red light on the top is on your left. Then, look at the 4 switches in the small box in the center. If a switch is facing UP, that indicates a 0. If a switch is facing DOWN, that indicates a 1 (Figure 1).

2. Plug one end of a MIDI cable to the MIDI jack on the TSS controller and the other end to either of the MIDI jacks on the **Bin 1** communication pack.
3. Use another cable to connect the Bin 1 communication pack to the Bin 2 communication pack, and another cable to connect Bins 2 and 3 until all of the packs have been linked. (Daisy Chain--Figure 2).

NOTE: One of the MIDI jacks on the last communication pack will be

BIN #	SWITCH CONFIG.	BIN #	BINARY CONFIG.
Bin 1	1111	Bin 9	1110
Bin 2	0111	Bin 10	0110
Bin 3	1011	Bin 11	1010
Bin 4	0011	Bin 12	0010
Bin 5	1101	Bin 13	1100
Bin 6	0101	Bin 14	0100
Bin 7	1001	Bin 15	1000
Bin 8	0001	Bin 16	0000

Chart 1: Switch Configurations for Communication Packs

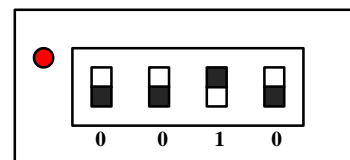


Figure 1: Switch Orientation

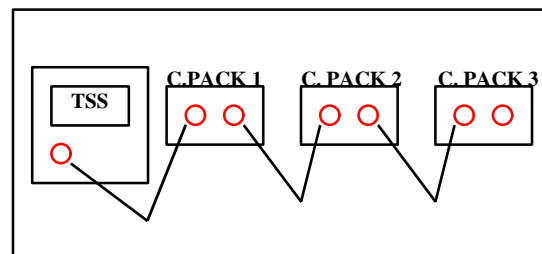


Figure 2: Daisy-chaining the communication packs

left open.

Attaching the LEDs, Sensors, and Power Supply

1. Attach one LED plug securely to the “L” jack (center) of each communication pack (Figure 3).

NOTE: The LED plugs are each 2.1-mm in diameter, and they will only fit securely into the “L” jack.

2. Velcro the LEDs to the top of each bin so that each LED is easy to see.
3. Velcro the *sensors* to the desired position on the inside of the bins. **BE SURE** that the sensors are positioned in a manner such that movements other than hand motions *inside of the bin* will not be detected. Tilt the sensors downward in the bins if necessary (Figure 4).
4. *After* the sensors have been mounted, attach one sensor plug to the “S” jack of each communication pack (Figure 3).

! CAUTION ! The sensors must be positioned before the power is turned on. Connecting the sensors before they are in the proper position may cause and undesirable operation.

5. Attach the **12-V AC** Adapter to the POWER jack on the TSS. The TSS POWER jack is located next to the “ON” switch. Then, plug the adapter into a wall outlet (Figure 5).

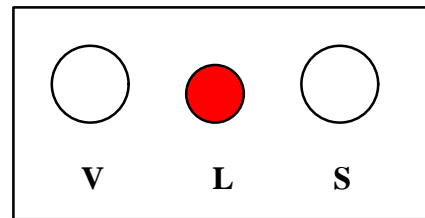


Figure 3: Side Jacks on Communication Packs

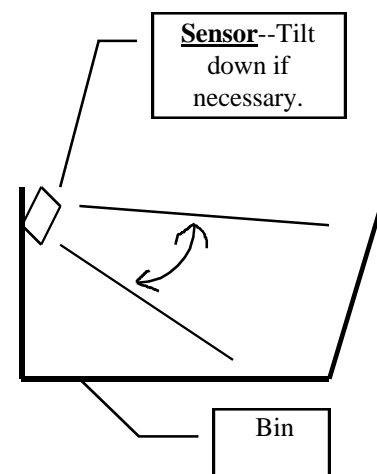


Figure 4: Side View of TSS Bin

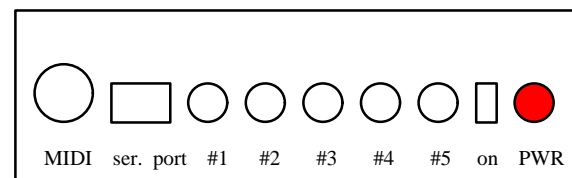


Figure 5: View of rear of TSS

Connecting the TSS Switch-Activated Output Devices

1. If a voice output device or other switch-activated output device is needed, establish the desired messages according to the instructions provided by the manufacturer of the output device, then attach the device to the TSS according to the specifications noted in Step 2.

2. Jacks 1 through 4 provide switch closures at different points in the TSS's operation:
 - **#1: "End of Operation" prompt**-- When the user has removed all of the parts from the bins, jack #1 will provide a 1 second switch closure. This switch closure will engage the CheapTalk, Lynx, or other switch-activated device.

 - **#2: "Timed Prompt"**-- If no input is received within the specified prompt delay time (see Page 6), jack #2 will provide a 1 second switch closure, allowing the switch-activated interface device to operate.

 - **#3: "Correct Bin" Prompt**-- When the user removes a part from the correct bin, jack #3 will also provide a 1 second switch closure that will support the "correct bin" prompt from the switch-activated interface.

- **#4: “*Wrong Bin*” Prompt--**
If the user removes a part from an incorrect bin, jack #4 will support the switch-activated “wrong bin” prompt.

Checking the Power Connections

1. Switch on the TSS using the switch on the back of the machine, and allow it to warm up for about 30 seconds. When the machine is turned on, a green light in the lower right corner of the machine will illuminate.

NOTE: If the green light does not appear, make sure that the AC adapter is connected securely into the power jack and the wall outlet.

2. After the power has been turned on, make sure that the red power lights on top of all of the communication packs are illuminated.

NOTE: If any of the red lights are not illuminated, *turn the power off* and make sure that all of the MIDI cables are tightly attached. Also check that the sensor unit connections are properly seated.

! CAUTION ! Always shut the machine off when making checks in the connections.

USING THE TASK SEQUENCING SYSTEM (TSS)

! CAUTION ! Before running the TSS, follow the setup instructions as listed on pages 1-4.

Programming Your Values

1. Turn the TSS on by using the power switch found on the back of the machine.
2. The first menu offers three functions: **RESET**, **PRESET**, and **EXIT** (Figure 1). **RESET** allows you to clear all values from past sessions and enter new values. **PRESET** allows you to view the values set during a prior session and to change those values if necessary. **EXIT** allows you to end your session.

NOTE: If **PRESET** is selected, skip to “Running the Program” on page 6. If **Exit** is selected, turn the TSS off.

3. Select **RESET** to input the number of bins you will use, the number of parts per bin, and your desired prompt time.
4. After selecting **RESET**, enter the *number of bins* that you will be using by using the **UP** and **DOWN** keys. Select **ACCEPT** when you are satisfied with your choice (Figure 2).
5. The next menu allows you to enter *the number of parts per each bin*.

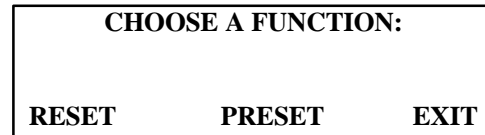


Figure 1

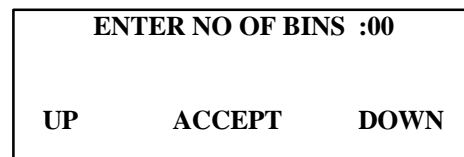


Figure 2

Use the UP and DOWN keys to input the value (Figure 3).

6. The next menu allows you to enter the desired *prompt time* before a switch-activated prompt alerts the user. Use the **UP** and **DOWN** arrows to input your value (Figure 4).
7. After entering your prompt time, a menu asking “ARE YOU SURE” will appear (Figure 5). If you are satisfied with the values that you inputted, select **YES** to save your configuration. If you desire to make changes in your values, select **NO** to return to earlier menus. To end the program, select **EXIT**.

Running the Program

1. A message reading “STT WAITING” will appear with the options of **START**, **RESET**, and **EXIT**. Select **START** to begin the program. Select **RESET** to make changes in your values. Select **EXIT** to end the program (Figure 6).
2. After **START** has been selected, the screen will display which **BIN** is being activated, how many **PARTS** have been used from each bin, as well as options to **PAUSE**, **RESET**, and **EXIT** the program (Figure 7).
3. The TSS will select the bins in sequential order. As a bin is selected, the lamp on the back of the bin will illuminate, and the #2 jack will provide a 1 second switch closure (*Timed Prompt*).

ENTER PARTS/BIN :00		
UP	ACCEPT	DOWN

Figure 3

PROMPT TIME (SECS) :00		
UP	ACCEPT	DOWN

Figure 4

ARE YOU SURE?		
YES	NO	EXIT

Figure 5

STT WAITING...		
START	RESET	EXIT

Figure 6

BIN :01	PART COUNT :01	
PAUSE	RESET	EXIT

Figure 7

4. When the user removes a part from the correct bin, the #3 jack will provide a 1 second switch closure (*“Correct Bin” prompt*), and the TSS will move to the next bin.
5. If the user selects an incorrect bin, the #4 jack will provide a switch closure. (*“Wrong Bin” prompt*)

NOTE: If the user selects an incorrect bin that is juxtaposed immediately *before* the *correct* bin, a delay will occur before the “wrong bin” prompt sounds. This delay will allow slower users to complete their earlier actions before the sensor detects another action.

6. Select **PAUSE** to pause the program while it is running. Select **CONTINUE** to resume the program.
7. Select **RESET** (center button) to reconfigure the values that you set for the program.
8. When all of the trials are complete, the TSS will display the message “ALL PARTS MADE!” and the green light in the lower right corner of the TSS will turn red. The machine will offer the options of **RESTART**, **RESET**, or **EXIT** the program, and two loud beeps will alert the user. The beeps will be followed by a switch closure from the #1 jack (*“End of operation” prompt*). (Figure 8)
9. Choose **RESTART** to run the TSS again with the same values. Choose **RESET** to establish new values. Choose **EXIT** to end the program.

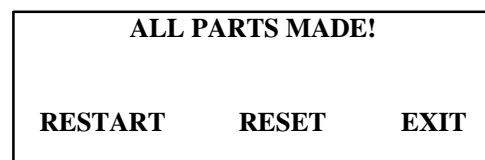


Figure 8



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REFERENCE GUIDE

If you have any problems with your Task Sequencing System, contact David Sant or Robert Erlandson at Wayne State University's **Enabling Technologies Laboratory** at (313) 577-1791. For questions regarding these instructions, contact Kristine Bradow at the same number.