SyncDgPl / ModPlg Wiring for Multi-deck Generators

Overview

When assembling large, multi-deck generators requiring power control, degas, and sync (of sweep) the SyncDgPl controller board is used. The SyncDgPl board controls multiple generator boards via interconnected ModPlg "daughter" boards which are placed on the generator boards.

Generator boards being controlled by a SyncDgPl are wired into "strings" of boards. A string may contain up to six (6) boards.

Each SyncDgPl controller is able to directly control up to five (5) strings of up to six (6) generator boards equipped with ModPlg boards.

There are five output connectors on a SyncDgPl board. The five output connectors on the SyncDgPl boards are interchangeable.

Five identical output connectors

Figure 1. SyncDgPl board with one output connected.

Note:
There is a provision to allow daisy-chaining SyncDgPl boards to permit unified control of multiple multi-deck generators but that is outside the scope of this document.

Connections between SyncDgPL and ModPlg or ModPlg to ModPlg boards are made with 6-conductor ribbon cables terminated at each end by a 2 row x 3 pin IDC connector.

Pin #1 orientation of cables to the connectors located on the ModPlg boards is critical for the generators to operate correctly.

Figure 2. Basic cabling: SyncDgPl to 1st board, 1st to 2nd board, and 2nd board to last board.

Details

Installing the ModPlg boards

Each individual generator board to be controlled by a SyncDgPl must be equipped with a ModPlg board that provides the necessary interface between the SyncDgPl controller and the generator boards.

The ModPlg boards plug into J3 and J5 on the generator boards, replacing any jumpers that otherwise would be there and straddling J4 (no connection is made to J4). One pin in the middle of J3 (Pin #6) is left unconnected.

Figure 3. ModPlg board plugged into generator board.

It is important that the ModPlg board not be "offset" when being plugged in. There should be no unconnected pins at either end of J3 or J5 when a ModPlg board is properly positioned on a generator board.

All ModPlg boards will always have a jumper at the leftmost end of J2 (Pins 2 and 3). A small white bar on the silk screen below J2 shows where the jumper should be placed. This jumper enables sweep frequency operation for the generator. See Figure 4.

If the ModPlg board is on the last generator board in a string there will only be one ribbon cable connected to the ModPlg board (at connector H1). The other connector (H2) will have three (3) jumpers connecting pins 1 & 3, 2 & 4, and 5 & 6. The position of these jumpers is called out on the ModPlg board's silk screen as well. See figure 4.

Figure 4. ModPlg board with jumper J1 (always present) and jumpers on H2 for last board in string.

When a ModPlg board is plugged into its generator board, there will be two nylon standoffs that support the long edge of the board that is away from generator board connectors J2 and J5. These standoffs "pop" into holes on the ModPlg board and on the generator board.

Nylon Standoffs

Figure 5. Nylon standoffs.

The standoffs originally selected for the application are no longer in production. The nearest equivalent standoffs have clips on their ends that are slightly larger than the original parts had. It may be difficult to push the ends of the standoffs into the holes on the boards. If higher force is objectionable, the holes on both boards (ModPlg and generator) may be opened about 0.005”- 0.010”.

Connecting the Cables

Generator boards, with their piggybacked ModPlg boards, are connected in series strings like Christmas lights.

Each ModPlg board has two connectors, labeled H1 (Sync IN) and H2 (Sync OUT).

H1 accepts the control signals from the previous board in the string. (A string consists of up to six boards.)

H2 passes the control signals to the next board in the string.

The first board in the string is connected to J1, or J2, or J3, or J4, or J5 on the SyncDgPl board. It does not matter which J1..J5 is used – all provide

identical control signals.

When connecting a cable to a board:

- The red stripe (on gray cables) or the brown stripe (on multi-color cables) must align with the Pin #1 end of the mating pins on a board.
- Be sure that all pins enter the female connector on the cable ends. Missing a pin will prevent proper operation and may damage the board.

Pin #1 end
#1 Stripe

#1 Stripe
Pin #1 end

Figure 6. Cable ends showing the Pin #1 stripes. (Red stripe on gray cable or brown stripe on multi-color cable.)

Figure 7. ModPlg board showing locations of connectors H1 and H2 and indicating the locations of Pin #1 on each connector.

Each deck in a multi-deck generator will holds two boards. The input to the first board (H1) will come from the previous (above) deck or the SyncDgPl board.

The output from the first board (H2) will go to the input of the second board (H1).

The output from the second board (H2 connector) will go the input of the first board on the next deck (down).

Output from

2nd board
to 1st board next deck

Output from
first board
to next board

Input to 2nd board

From first deck

Input to first board
From previous deck
Or SyncDgPl board

If a board is the last board in the string then jumpers must be applied to its H2 (connector) connecting 1&3, 2&4, and 5&6. (See Figure 4 and Figure 10.)

Note:
It doesn't matter which board is selected to be "first board" and "second board" on a deck. Most commonly, the right-most board is "first" and left-most board is "second".

Figure 9. Connector location and orientation on a single board.

Figure 10. Location and orientation of cable and jumpers on the last board in a string.

Figure #2 shows the connection of a simple system consisting of three boards with ModPlg piggybacks, a SyncDgPl board to control them all, and three interconnecting cables.

The signal goes from J1 on the SyncDgPl to H1 on the first board on the deck.

Then it goes from H2 on the first board to H1 on the second board.

Finally it goes from H2 on the second board to H1 on the third board. (Presumably on the next deck).

And H2 on the third (and final board) has three jumpers on H2 (1&3, 2&4, and 5&6).

Troubleshooting

Because the wiring is setup as a series string, a flaw at one board will effect all following boards.

A bad cable, bad ModPlg board or incorrectly plugged in cable will usually effect the generator board hosting the ModPlg board *as well as every board*

that follows it in the string.

To run down a problem:

- SyncDbPl boards may be configured for either 120v or 230v.
    - BEFORE APPLYING POWER verify that the board is correctly configured.
    - A board configured for 120v connected to 230v will be damaged.
    - A board configured for 230v connected to 120v will not operate correctly.
    - Power configuration may be easily changed even after traces have been cut.
- Set the SyncDbPl board to about mid power and turn the degas ON.
    - This makes it easy to find a problem area by checking generator board LEDs.
- Look down the deck to see which generator board's indicator lights are NOT flashing with the degas operation.
- If NO boards are flashing check the connection from the SyncDbPl board to the first board.
    - If the connection seems correct (Pin #1 to Pin#1) and no pins are missed by the cable's connectors then try replacing the cable.
    - If the cable itself is not the problem try using a different J (J1..J5) on the SyncDgPl board.
    - Check ModPlg board on the first generator board in the string by swapping in another ModPlg board.
- If all boards in a string, up to a point, are flashing, start debugging at that board and cable where the flashing stops.
- In very rare cases, it is possible for the generator board to be the problem.