THE CLASSNET LINE MULTIPLIER AND LINE BOOSTER OPTION

USERS MANUAL

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CLASSNET LINE MULTIPLIER

Classnet Line Multiplier is Minicom's latest innovation. The Classnet Line Multiplier replaces the Classnet Line Booster in order to provide even stronger signals to all CPUs in the Classnet classroom.

This manual explains how to design a Classnet classroom, and install and operate the Classnet Line Multiplier.

Introduction

The standard Classnet classroom consists of one long bus used to transmit and receive signals. The Line Multiplier allows you to create up to eight smaller buses (or branches) within one classroom. These smaller buses provide a number of advantages over the standard Classnet bus.

Designing a Classnet Classroom using the Line Multiplier

The following example will explain how to setup a Classnet classroom of 30 students using one Line Multiplier Unit (see Figure 1).

> **!** **SPECIAL NOTE**

The installation and operating instructions used through out this manual is based on the following example. Your individual Classnet Classroom may be different.
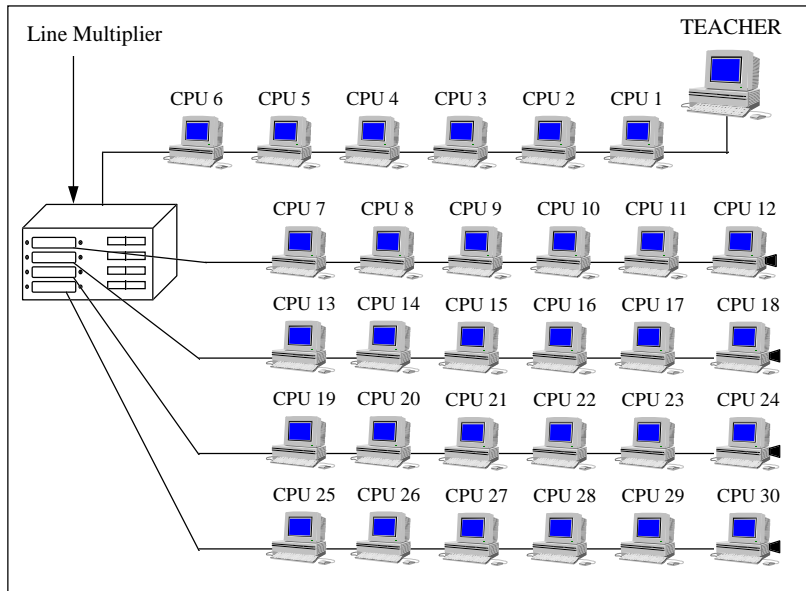
Figure 1 Typical Classnet classroom with 30 students being connected to one Line Multiplier Unit

In this example six Student Interface Units (SIUs) are connected directly to the Teacher Interface Unit (TIU). Student Number 6 is then connected to the *System In* port of the Line Multiplier Unit. Six more SIUs are connected to each *Branch* port of the Line Multiplier Unit (*Branch 1*, *Branch 2*, *Branch 3*, and *Branch 4*). A Terminator is then connected to the *System Out* port of the Line Multiplier Unit, and to the last SIU in each of the branches.

Installing the Classnet Line Multiplier

The Classnet Line Multiplier system consists of the following components:

- Classnet Line Multiplier Unit
- System Cable (2.0 m)
- Power Supply 9 VAC

Pre-Installation Precautions

The following pre-installation precautions need to be taken before hooking up the Classnet Line Multiplier.

- Turn OFF all CPUs.

Connecting the System

Below is diagram of the front and rear panels of the Classnet Line Multiplier Unit, and a block diagram of the system (see Figure 2, Figure 3, and Figure 4). These diagrams should be helpful is connecting the various cables.
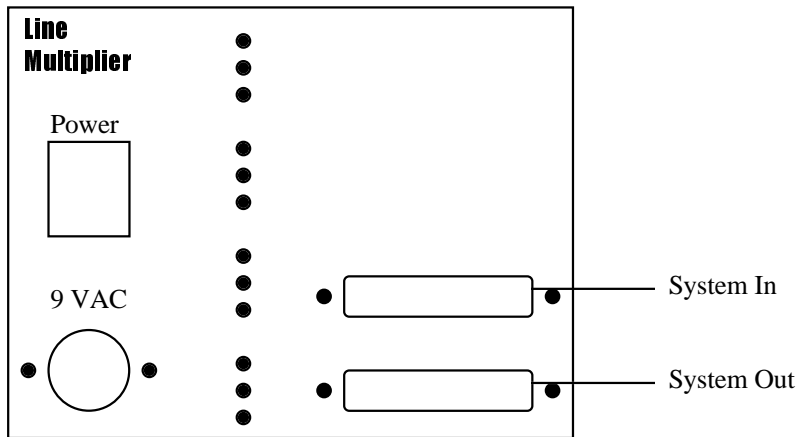
Figure 2 Front panel of the Classnet Line Multiplier Unit
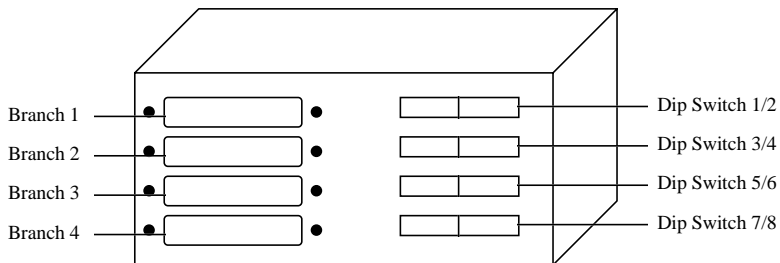
Figure 3 Rear panel of the Classnet Line Multiplier Unit

Classnet Line Multiplier and Line Booster
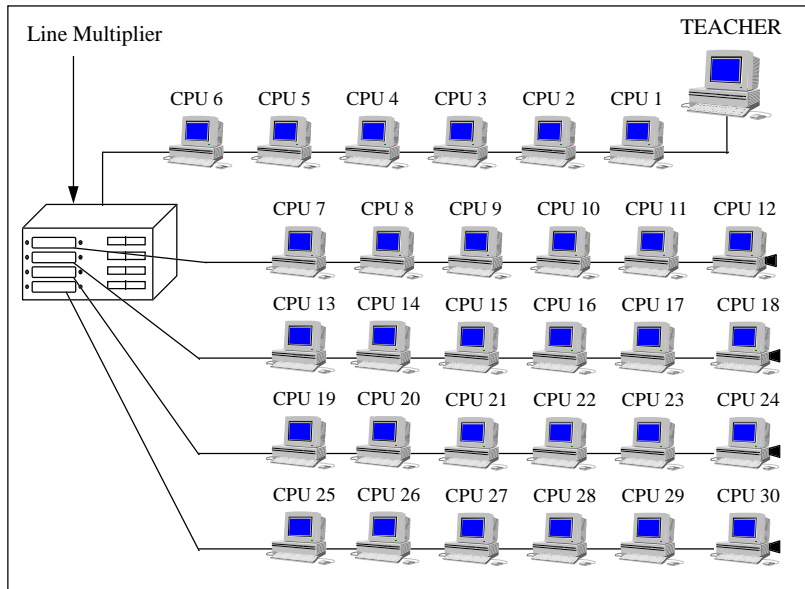
Figure 4 The Classnet Line Multiplier system

Connecting the Line Multiplier Unit

In order to connect the Line Multiplier Unit to the Classnet system do the following (see Figure 5 and Figure 6):

- Connect the DB25 male connector from the System Cable to the *System In* port of the Line Multiplier Unit.

Figure 5 System Cable

System Cable
to CPU 6

System In port

Line Multiplier Unit

Figure 6 *System In* port connection

Connecting Branch 1

The System Cable from SIU 7 is used to connect Branch 1 to the Line Multiplier Unit. In order to connect this cable do the following (see Figure 7 and Figure 8):

1. Connect the DB25 male connector of the System Cable to the *Branch 1* port of the Line Multiplier Unit.

2. Connect the other DB25 male connector of the System Cable to the *System* port of SIU 7 in Branch 1.

Figure 7 System Cable

System Cable

Branch 1 port   *System* port

Line Multiplier Unit   SIU 7

Figure 8 *System In* port connection

Connecting Branch 2

The System Cable from SIU 13 is used to connect Branch 2 to the Line Multiplier Unit. In order to connect this cable do the following (see Figure 9 and Figure 10):

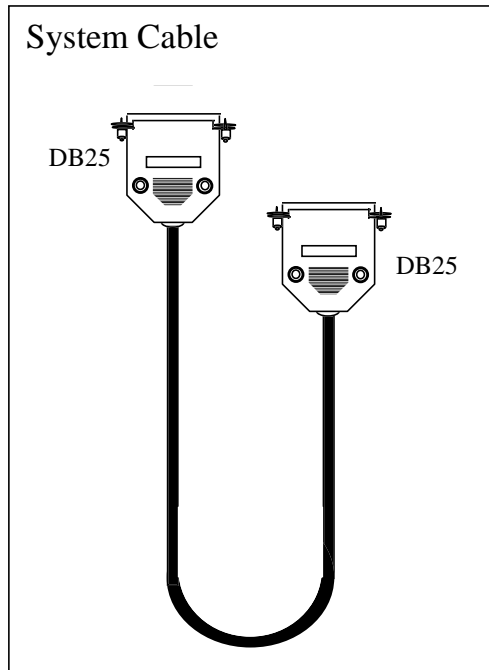1. Connect the DB25 male connector of the System Cable to the *Branch 2* port of the Line Multiplier Unit.

2. Connect the other DB25 male connector of the System Cable to the *System* port of SIU 13 in Branch 2.

Figure 9 System Cable

System Cable

Branch 2 port   ***System*** port

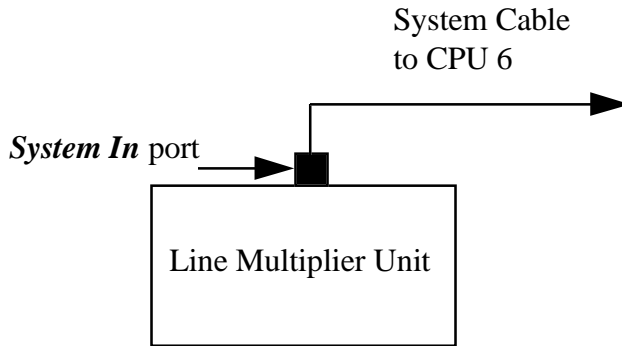Line Multiplier Unit   SIU 13
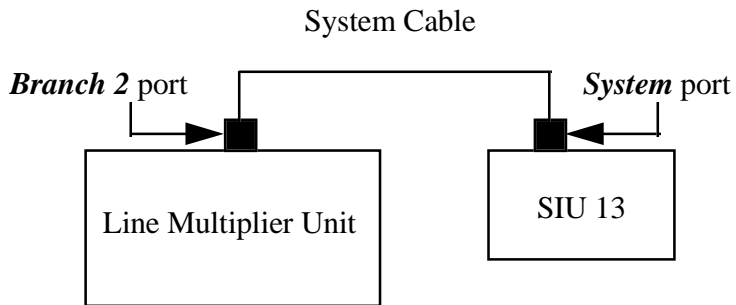
Figure 10   ***System In*** port connection

Connecting Branch 3

The System Cable from SIU 19 is used to connect Branch 3 to the Line Multiplier Unit. In order to connect this cable do the following (see Figure 11 and Figure 12):

1. Connect the DB25 male connector of the System Cable to the *Branch 3* port of the Line Multiplier Unit.

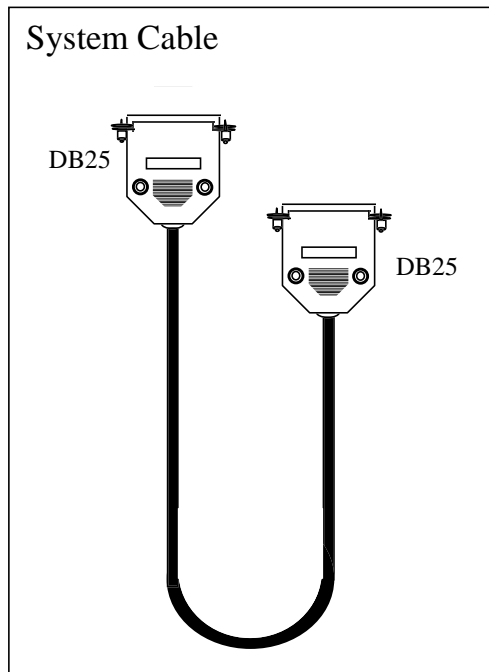2. Connect the other DB25 male connector of the System Cable to the *System* port of SIU 19 in Branch 3.

System Cable

DB25

DB25

Figure 11 System Cable

System Cable

Branch 3 port   *System* port
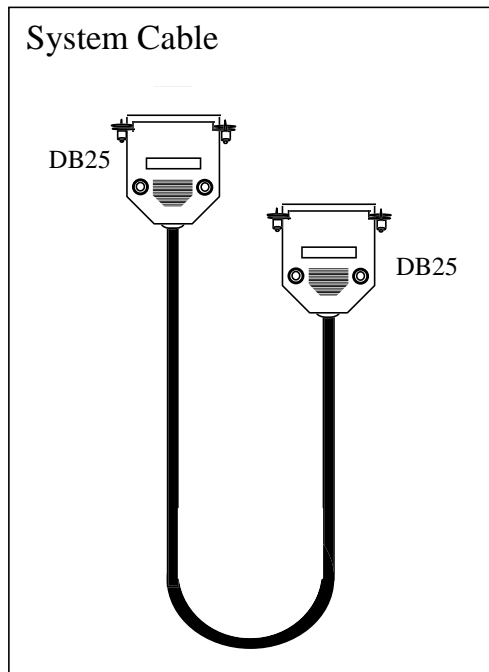
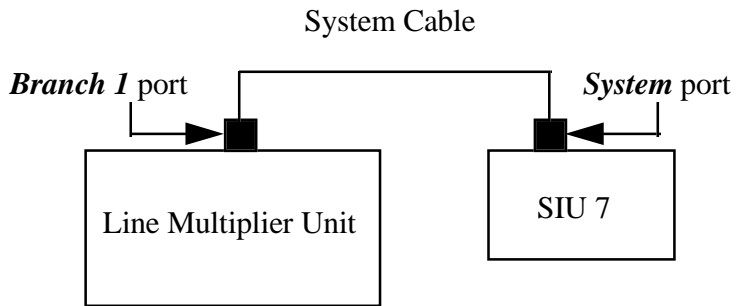Line Multiplier Unit   SIU 19
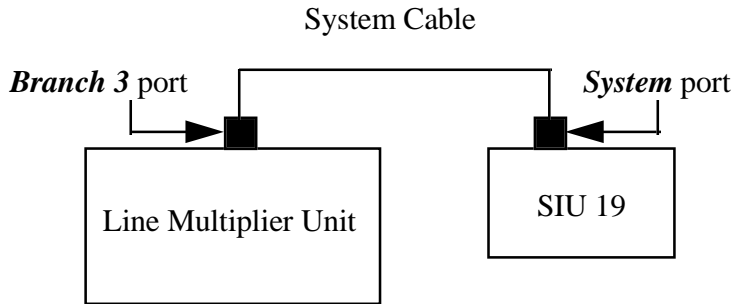
Figure 12 *System In* port connection

Connecting Branch 4

The System Cable from SIU 25 is used to connect Branch 4 to the Line Multiplier Unit. In order to connect this cable do the following (see Figure 13 and Figure 14):

1. Connect the DB25 male connector of the System Cable to the *Branch 4* port of the Line Multiplier Unit.

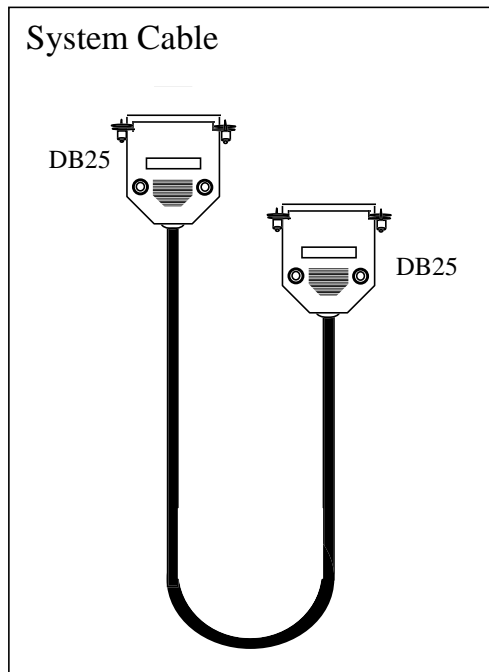2. Connect the other DB25 male connector of the System Cable to the *System* port of SIU 25 in Branch 4.

System Cable

DB25

DB25

Figure 13 System Cable

System Cable

Branch 4 port   ***System*** port

Line Multiplier Unit

SIU 25
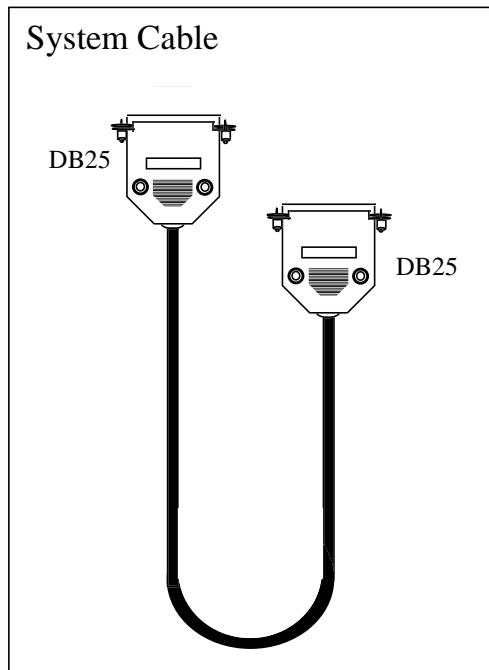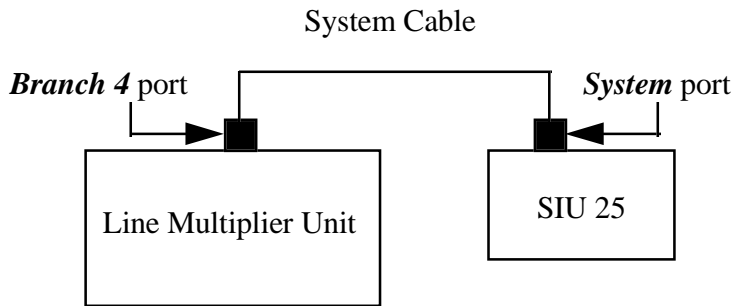
Figure 14 *System In* port connection

Connecting the Terminators

Terminators are connected to the *System* ports of the last SIU in each branch, and to the *System Out* port of the Line Multiplier Unit (see Figure 15).

Terminator

DB25M
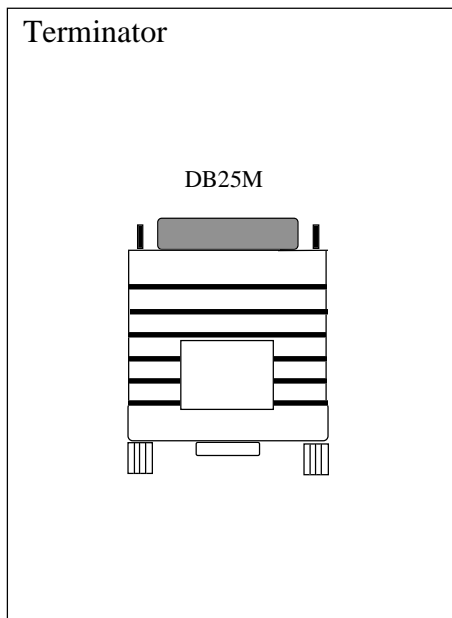
Figure 15 Terminator

Connecting the Power Supply

Insert the power supply plug into the *9 VAC* power port on the rear of the Classnet Line Multiplier Unit, and plug the cord into a wall socket (see Figure 16).

To Wall Socket

Power
Supply

Line
Multiplier
Unit
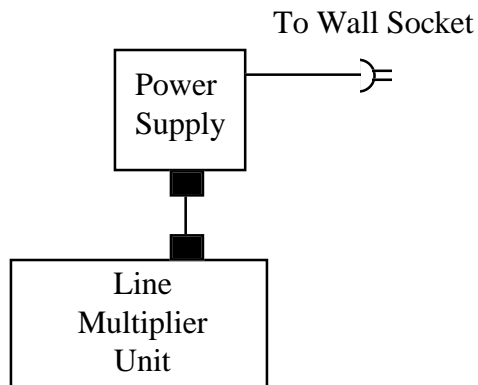
Figure 16 Power Supply connection

When all of the above connections have been made the Classnet Line Multiplier is fully operational.

Setting the Dip Switches

Each branch of the Classnet Line Multiplier contains two dip switches. These dip switches need to be set to the Student Number of the first and the last student in each branch. In the following example the dip switches would need to be set as follows (see Figure 17 and Table 1):
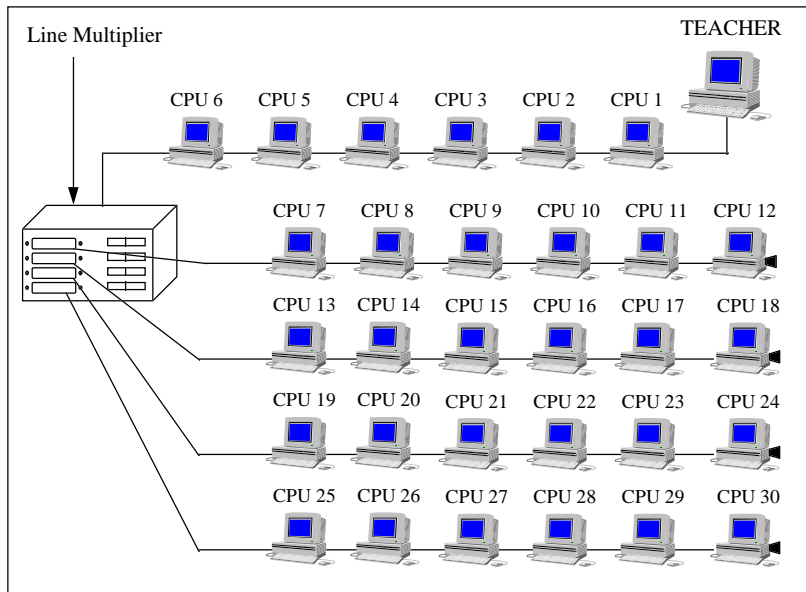
Figure 17 Typical Classnet classroom with 30 students being connected to one Line Multiplier Unit

Dip Switch Number	Dip Switch Setting
Switch 1	7
Switch 2	12
Switch 3	13
Switch 4	18
Switch 5	19
Switch 6	24
Switch 7	25
Switch 8	30

Table 1 indicates how to set the Line Multiplier dip switches in the above example

! **SPECIAL NOTE**

All unused branches of the Line Multiplier must have their dip switch's set to that of a *Virtual Branch* (ie. student station numbers that do not exist in the system).

If your system consists of 16 student stations (8 student stations connected to Branch # 1, and 8 student stations connected to Branch # 2) then the dip switch's on Branch # 3 and Branch # 4 should be set to 17/18 and 19/20 consecutively.

The table below shows how to set the Student Number

Student No.	Switch Number							
	1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0
2	0	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0
4	0	0	1	0	0	0	0	0
5	1	0	1	0	0	0	0	0
6	0	1	1	0	0	0	0	0
7	1	1	1	0	0	0	0	0
8	0	0	0	1	0	0	0	0
9	1	0	0	1	0	0	0	0
10	0	1	0	1	0	0	0	0
11	1	1	0	1	0	0	0	0
12	0	0	1	1	0	0	0	0
13	1	0	1	1	0	0	0	0
14	0	1	1	1	0	0	0	0
15	1	1	1	1	0	0	0	0
16	0	0	0	0	1	0	0	0
17	1	0	0	0	1	0	0	0
18	0	1	0	0	1	0	0	0
19	1	1	0	0	1	0	0	0
20	0	0	1	0	1	0	0	0
21	1	0	1	0	1	0	0	0
22	0	1	1	0	1	0	0	0
23	1	1	1	0	1	0	0	0
24	0	0	0	1	1	0	0	0
25	1	0	0	1	1	0	0	0
26	0	1	0	1	1	0	0	0
27	1	1	0	1	1	0	0	0
28	0	0	1	1	1	0	0	0
29	1	0	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
31	1	1	1	1	1	0	0	0
32	0	0	0	0	0	1	0	0
33	1	0	0	0	0	1	0	0
34	0	1	0	0	0	1	0	0

0 = OFF, 1 = ON

Classnet Line Multiplier and Line Booster

Student No.	Switch Number							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
35	1	1	0	0	0	1	0	0
36	0	0	1	0	0	1	0	0
37	1	0	1	0	0	1	0	0
38	0	1	1	0	0	1	0	0
39	1	1	1	0	0	1	0	0
40	0	0	0	1	0	1	0	0
41	1	0	0	1	0	1	0	0
42	0	1	0	1	0	1	0	0
43	1	1	0	1	0	1	0	0
44	0	0	1	1	0	1	0	0
45	1	0	1	1	0	1	0	0
46	0	1	1	1	0	1	0	0
47	1	1	1	1	0	1	0	0
48	0	0	0	0	1	1	0	0
49	1	0	0	0	1	1	0	0
50	0	1	0	0	1	1	0	0
51	1	1	0	0	1	1	0	0
52	0	0	1	0	1	1	0	0
53	1	0	1	0	1	1	0	0
54	0	1	1	0	1	1	0	0
55	1	1	1	0	1	1	0	0
56	0	0	0	1	1	1	0	0
57	1	0	0	1	1	1	0	0
58	0	1	0	1	1	1	0	0
59	1	1	0	1	1	1	0	0
60	0	0	1	1	1	1	0	0
61	1	0	1	1	1	1	0	0
62	0	1	1	1	1	1	0	0
63	1	1	1	1	1	1	0	0

0 = OFF, 1 = ON

Operating the Classnet Line Multiplier

In order to operate the Classnet Line Multiplier do the following:

1. Turn on all CPU s.

2. Turn on the *Power* switch on the rear of the Classnet Line Multiplier unit.

The LED Indicators

The front panel of the Classnet Line Multiplier contains three LED indicators for each branch. Below is a diagram of the front panel and a table explaining these LEDs (see Figure 18 and Table 2).
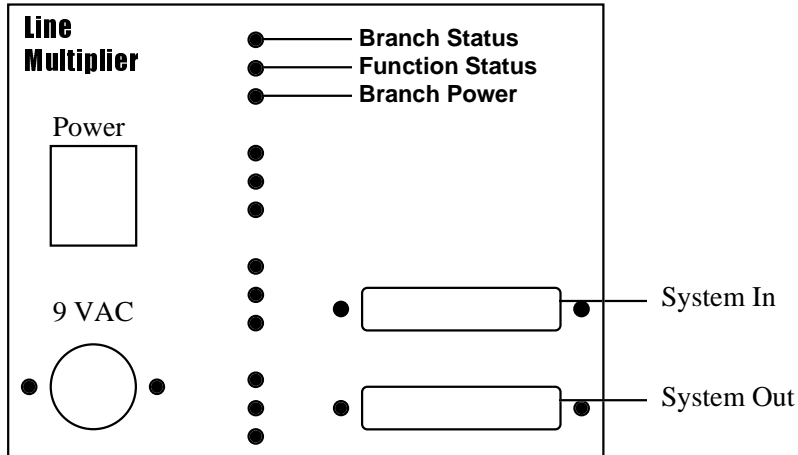
Figure 18 Front panel of the Classnet Line Multiplier

LED Name	LED Status: *ON*	LED Status: *OFF*
Branch Status	Indicates that the branch is functioning properly.	Indicates that the branch is *not* functioning properly.
Function Status	Indicates that a Classnet function is being performed on one of the CPUs' in the branch.	Indicates that *no* Classnet function is being performed on any of the CPUs in the branch.
Branch Power	Indicates that the branch is receiving power.	Indicates that the branch is *not* receiving power.

Table 2 An explanation of the different LED status's

Technical Specifications

INPUT:

Connector:	DB25 Female
Signal:	R, G, B Video Signals 200 MHz 1.6 Vpp
Sync:	H, V, TTL
Horizontal Sync Range:	Up to 100 KHz
Vertical Sync Range:	Up to 100 Hz

OUTPUTS:

Connectors:	DB25 Female
Video Gain:	R, G, B Video Signals 200 MHz 1.6 Vpp
Sync:	TTL

GENERAL:

Bandwidth:	200 MHz
Internal Jumpers:	Cancel Keyboard, Mouse Driver
Power Supply:	9 VAC CE and VL, CE and TVL approved
Dimensions:	155mm x 88.75mm x 113mm (6.10" x 3.49" x 4.45")
Optional Accessories:	Terminator, Power Supply

CLASSNET LINE BOOSTER

The Classnet Line Booster is used to amplify the signals in the Classnet system. This is necessary when there are more than 20 computers in the system, or when electrical conditions require. Each Line Booster Unit is used to amplify the signals transmitted to a specific group of SIUs. This section of the chapter explains how to connect the Line Booster(s) into the Classnet system.

Line Booster Components

The Line Booster consists of the following components:

• Classnet Line Booster Unit

• System Cable (1.0 m)

• Power Supply 9 VAC

Pre-Installation Precautions

The following pre-installation precautions need to be taken before hooking up the Line Booster.

- Set the "Position" dip switches on all Line Booster Units (see *Setting the "Position" Dip Switches on the Line Booster Unit* below).

Setting the "Position" Dip Switches on the Line Booster Unit

The Line Booster Unit has two "Position" dip switches located next to the *output* port. Switch number 1 (SW1) is the switch *closer* to the *output* port's DB25 female connector. Switch number 2 (SW2) is the switch *further* from the *output* port's DB25 female connector.

In order to set the "Position" dip switches do the following:

1. Determine exactly where in the system each Line Booster will be located (see Figure 19). This needs to be done in order to determine *the number of the first SIU in the group,* and *the number of the last SIU in the group* to have it's signal boosted by the Line Booster Unit.

2. Set SW1 to the *number of the lowest SIU in the group* (Refer to Appendix A "Setting the Student Unit Number").

3. Set SW2 to the *number of the highest SIU in the group* (Refer to Appendix A "Setting the Student Unit Number").

```
┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│ Line Booster    │───│ Student # 15    │───│ Student # ....  │
│ (# 15 / #30)    │   │                 │   │                 │
└────────┬────────┘   └─────────────────┘   └────────┬────────┘
         │                                            │
┌────────┴────────┐                        ┌──────────┴──────┐
│ Student # 14    │                        │ Student # 30    │
└─────────────────┘                        └─────────────────┘
```
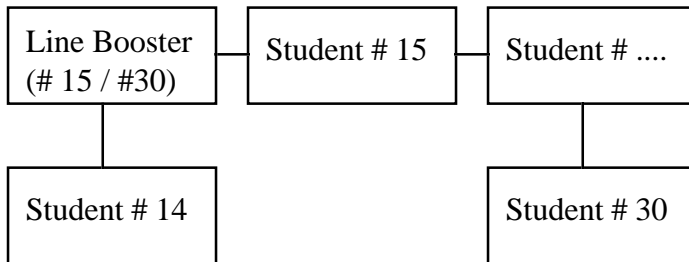
Figure 19 Typical Line Booster numbering

! NOTE

The following *must* be taken into account before installing the Line Booster(s):

1. **All Student Interface Units (SIUs) in the system before the Line Booster must be given numbers that are lower than that of the Line Booster.**

2. **All SIUs after the Line Booster must be given numbers that are equal to or higher than that of the Line Booster.**

3. **The order of the SIUs within a group, before or after the Line Booster, is not important.**

4. **The Teacher Interface Unit (TIU), whose number is always "00", must be installed in the system before the first Line Booster.**

Connecting the Cables

This section of the chapter deals with the wiring up of the different cables necessary to connect the Line Booster Unit. This section will detail the connection of each cable individually.

Below is a top view diagram of the Line Booster Unit (see Figure 20). This diagram should be helpful is connecting the various cables to the Line Booster Unit.

(SW2) (SW1)

POSITION   **OUTPUT**

CLASSNET
Line Booster

9 VAC   **INPUT**

Figure 20 Top View of Line Booster Unit

Connecting the System Cable

The System Cable is used to daisy-chain all student positions into one loop. This is done by connecting two System Cables to each Student Interface Unit. The other ends of the System Cables are connected to the Student Interface Units of the adjoining position. When the Classnet System requires a Line Booster the Line Booster Unit is inserted into the daisy-chain loop.

In order to connect the System Cable do the following (see Figure 21 and Figure 22):

1. Connect one of the DB25 male connectors of the System Cable to the *input* port on the Line Booster Unit.

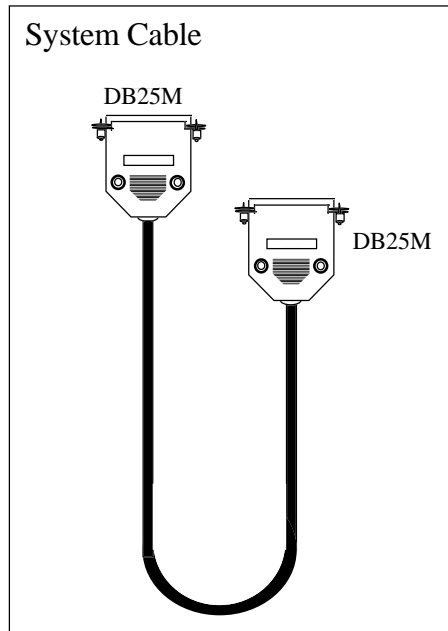2. Connect the other DB25 male connector of the System Cable to the *output* port of the Line Booster Unit.
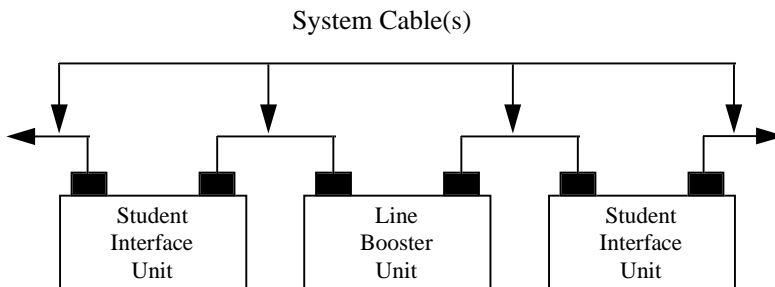
Figure 21 System Cable

System Cable(s)

Figure 22 System Cable connections

Connecting the Power Supply

Insert the power supply plug into the *9 VAC* power port on the rear of the Line Booster Unit, and plug the cord into a wall socket (see Figure 23).
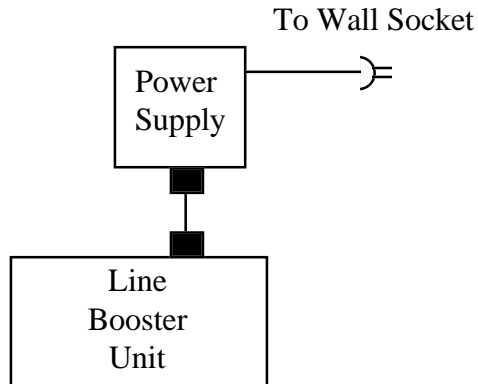

Figure 23 Power Supply connection

When all of the above connections have been made the Line Booster is fully operational.