BASIC PROTOCOL V5.4

(D-Series)

Elekon Micro Systems Ltd.
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BASIC PROTOCOL FOR D-SERIES Version 5.4

Introduction

In the previous version (Ver 4.XX) of D-Series, the communication protocol is implemented in a high accuracy packet protocol format but it has disadvantages of complications. In order to make these capabilities as simple as possible, more users friendly; a new and easy protocol has been implemented. This manual is intended to provide full protocol information for users who want to write their own PC communication program to incorporate with our signs.

Structure of Protocol:

A very simple protocol structure is illustrated as follow:

<IDXX>...TXT/CMD.. [cr][lf]

Where :

<IDXX> Packet header also severed as destination identifier
< & > are ASCII code 3C & 3D,
ID are character "I" & "D" must be in Upper case
XX are the Hex number 00 to FF in ASCII format i.e.

00	=	display unit 0 (global call)
01	=	display unit 1
0A	=	display unit 10
10	=	display unit 16
FF	=	display unit 255

...TXT/CMD... Packet body either Display Data or Command
(refer to Page message & Command for details.)

[cr][lf] Packet end
[cr] = ASCII code 0D
[lf] = ASCII code 0A

Remarks: Each single packet only carries one Display Data or single Command, the followings will be ignored.

All packet(s) must consist of a unique ID number, except **SET *CLOCK*** command (see Command section).

An <IDxx> will answer after a successful transfer is made, except SET CLOCK command and global call.

Display Data:

A) Page message :

There are 26 pages available in the display sign, the length of each page is dynamic which includes text, graphics and European characters, their basic format as follow:

<Pn>....MSG.....[cr][lf]

<Pn> denotes which page this message belongs to :

<,P & > are ASCII character "<" "P" & ">" respectively
n is the page number in ASCII character, i.e.

A	=	Page A
B	=	Page B
:		:
:		:
Y	=	Page Y
Z	=	Page Z

*Remark: if no <Pn> is specified, page A is assumed as default.

....MSG..... Contents message data of this page including color information, character size information & display functions etc.

Text message:

ASCII characters:

Accept free format text, i.e. any character and symbols(96 ASCII printable characters 20H - 7FH).

European characters:

72 European characters is provided for multi-nation language applications, they are addressed as follow:

<UA>
<UB>
:

* For the European assignment table, please refer to **APPENDIX A**

Graphic Blocks:

26 User alterable graphic blocks is provided to enrich the visual effect, they are addressed as follow:

<BA>	Graphic A
<BB>	Graphic B
:	
<BY>	Graphic Y
<BZ>	Graphic Z

Color information:

26-color combination selection is allowed.

To define the color of the following character(s) a *color attribute indicator* must be placed before it, such as :

<CA>	Low Red
<CB>	Mid Red
<CC>	High Red
:	

The default character color is Rainbow <CP>.
Once the attribute indicator is placed then the following character(s) will be changed to the corresponding color until next attribute is encountered.

* For details please refer to color table in **APPENDIX B**

Character size:

Different size selection is possible for upto a single character. To define the size of the following character(s),8 combinations of character sizes are available and a *size attribute indicator* must be placed before it, such as:

<SA>	Normal size
<SB>	Double size
:	

The default character size is Normal <SA>.
Once the attribute indicator is placed then the following characters(s) will be changed to the corresponding size until next is encountered.

* For details please refer to size table in **APPENDIX C**

Display functions:

26 unique screen effects & function selections are allowed. To define what is the screen effect of the following character(s) a *function indicator* must be placed before it, such as:

<FA>	Auto Function
<FB>	
:	

The default function is SHIFT LEFT <FS>.

* For details please refer to Function in **APPENDIX D**

B) Timer (schedule) setting :

There are 10 Timers (schedules) available in the display sign, each of which consists of 32 entries and the basic format is as follow:

<Tn>WHHMMPPP....[cr][lf]

<Tn> denotes the Timer n, where n = A to J

<,T & > are ASCII character "<" "T" & ">" respectively

n is the Timer (schedule) number in ASCII character, i.e.

A	=	Timer A
B	=	Timer B
	:	
I	=	Timer I
J	=	Timer J

W denotes the day of week where this schedule activates, the valid values are as follow (in a single ASCII character form):

*	=	Every day of the week
0	=	Sunday
1	=	Monday
	:	
5	=	Friday
6	=	Saturday

HH denotes the Hour when this schedule activates, the valid values are as follow (in two ASCII character form, 24 hour notation):

**	=	Every hour of the day
00	=	00 hour mid night
01	=	01 hour mid night
	:	
13	=	1 o'clock afternoon
	:	
18	=	6 o'clock evening
	:	
23	=	11 o'clock night

MM denotes the minute when this schedule activates, the valid values are as follow (in two ASCII character form):

**	=	Every minute of the hour
00 to 59	=	minutes

PPP.... denotes the Page sequence in this schedule, the length of the sequence is dynamic upto 32 entries, the valid page number ranges from A to Z.

C) User alterable Graphic Block:

There are 26 (A - Z) user alterable graphic blocks available, the basic format is as follow:

<Gn>...CCC...[cr][lf]

<Gn> <,G& > = ASCII "<","G" & ">"
n= Block graphic number in ONE ASCII character (A - Z)

...CCC...
Bit pattern(with color) information of the graphic block is in fix length of 126 bytes i.e. 18 dots by 7 rows, where upper left dot is the first byte and the lower right is the last (126th) byte. The whole graphic block update will be ignored if any length is longerr than 126.

For each byte it can either be "**R**" (red), "**G**" (green), "**Y**" (yellow) or "**B**" (black) . Any characters other than "**R**","**G**","**Y**" & "**B**" are treated as Black.

Example : Updating graphic block Y with 1 & 2 rows in red, 3,4 & 5 rows in yellow 6 & 7 rows in green.

<ID01><IY>RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRYYYYYYYYYY
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGG[cr][lf]

Commands:

1) Delete Page(s):

<DPn>[cr][lf]

<,D,P& > = ASCII "<","D","P" & ">"

n Page number in ASCII character (A - Z & *)

<DP*> = Delete All pages
<DPA> = Delete page A
:
<DPZ> = Delete page Z

2) Delete Schedule:

<DTn>[cr][lf]

<,D,T& > = ASCII "<","D","T" & ">"

n Timer (Schedule) number in ASCII character (A - J & *)

<DT*> = Delete ALL timers
<DTA> = Delete TIMER A
:
<DTJ> = Delete TIMER J

3) Delete Graphic block(s):

<DGn>[cr][lf]

<,D,G& > = ASCII "<","D","G" & ">"

n Graphic block number in ASCII character (A - Z & *)

<DG*> = Delete All graphics
<DGA> = Delete Graphic block A
:
<DGZ> = Delete Graphic block Z

4) Delete ALL:

This command will delete all Page(s), Timer(s) and restore all default Graphic blocks.

<D*>[cr][lf]

<,D,*& > = ASCII "<","D","*" & ">"

5) Direct Run Page

<IDXX><RPn>[cr][lf]

<,R,P & > = ASCII “<“,”R”,”P” & “>“

n Page number in ASCII character (A - Z & *)

<RP*> = Restart
<RPA> = Run Page A
:
<RPZ> = Run Page Z

6) Temperature format (Fahrenheit / Celsius)

<IDXX><Kx>[cr][lf]

<, I, D, K & > = ASCII “<“,”I”, “D”,”K” & “>“

x = Fahrenheit or Celsius (F or C)

<KF> = Temperature show in Fahrenheit
<KC> = Temperature show in Celsius

7) 24 / 12 Hour format

<lDXX><Hx>[cr][lf]

<, I, D, H & > = ASCII “<”,”I”,”D”,”H” & “>“
x = 12 or 24 hour format
<K1> = Time display in 12 hour format
<K2> = Time display in 24 hour format

SET CLOCK command:

This is a special command to sync. or set the relative/real time clock of the display unit(s) and it is the only GLOBAL command in this set of protocol. The format as shown below:

<TYYMMDDWhhmmss>[cr][lf]

<, T & >ASCII "<", "T" & ">"

YY	Year (00 - 99)
MM	Month (01 - 12)
DD	Day (01 - 31)
W	Day of week (0 - 6)
hh	Hour (in 24 hour format, 00 - 23)
mm	Minute (00 - 59)
ss	Second (00 - 59)

DATE TO EVENT setting:

This is a command to set name of events the date of event happen.

<lDxx><MMDD…Message..>[cr][lf]

<, I,D & >	ASCII "<", "I" ,”D” & ">"
MM	Month (01 - 12)
DD	Day (01 - 31)
..Message..	Any message with Max 64 char. long

APPENDIX A European character table

U#	£	**UA**	Å	**UB**	Ä	**UC**	Á	**UD**	À
UE	Æ	**UF**	a	**UG**	Ç	**UH**	É	**UI**	È
UJ	ê	**UK**	Ì	**UL**	Í	**UM**	Ñ	**UN**	Ö
UO	Ó	**UP**	Ò	**UQ**	Ø	**UR**	Õ	**US**	Ü
UT	Ú	**UU**	Ù	**UV**	µ	**UW**	þ	**UX**	¿
UY	Đ	**UZ**	Ÿ						

U$	€	**Ua**	å	**Ub**	ä	**Uc**	á	**Ud**	à
Ue	æ	**Uf**	â	**Ug**	ç	**Uh**	é	**Ui**	è
Uj	ë	**Uk**	Ï	**Ul**	Î	**Um**	ñ	**Un**	ö
Uo	ó	**Up**	ò	**Uq**	ø	**Ur**	ô	**Us**	ü
Ut	ú	**Uu**	ù	**Uv**	û	**Uw**	ß	**Ux**	º
Uy	¥	**Uz**	Ý						

APPENDIX B Color Table for Multi-Color

CA	Dim RED	**CJ**	Dim LIME	**CS**	GRN/RED 3D
CB	RED	**CK**	Bright LIME	**CT**	GRN/YEL 3D
CC	Bright RED	**CL**	Bright GREEN	**CU**	GRN on RED
CD	ORANGE	**CM**	GREEN	**CV**	RED on GRN
CE	Bright ORANGE	**CN**	Dim GREEN	**CW**	ORG on GRN 3D
CF	LtYELLOW	**CO**	YEL/GRN/RED	**CX**	LIME on RED 3D
CG	YELLOW	**CP**	RAINBOW	**CY**	GRN on RED 3D
CH	Bright YELLOW	**CQ**	RED/GRN 3D	**CZ**	RED on GRN 3D
CI	LIME	**CR**	RED/YEL 3D		

Color Table for Mono Color

CA	RED
CB	RED REVERSE

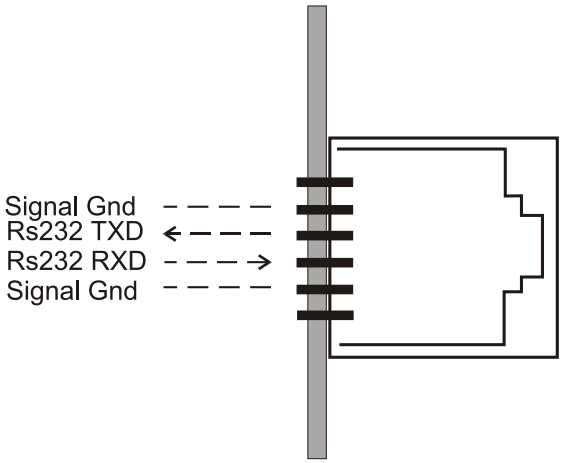
APPENDIX C Size Table

SA	Normal	**SB**	Bold	**SC**	Italic
SD	Bold Italic	**SE**	Flash Normal	**SF**	Flash Bold
SG	Flash Italic	**SH**	Flash Bold Italic		

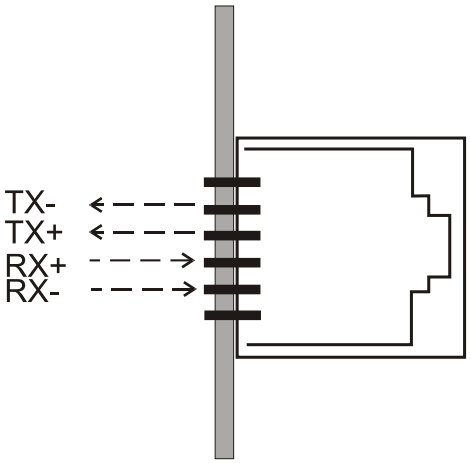
APPENDIX D Function Table

FA	AUTO	**FB**	OPEN <--->	**FC**	COVER <--->
FD	APPEAR	**FE**	CYCLING	**FF**	CLOSE <----
FG	CLOSE ---->	**FH**	CLOSE --><--	**FI**	SCROLL UP
FJ	SCROLL DOWN	**FK**	OVERLAP	**FL**	STACKING
FM	COMIC 1	**FN**	COMIC 2	**FO**	BEEP
FP	PAUSE	**FQ**	SLEEP	**FR**	RANDOM
FS	SHIFT <----	**FT**	TIME/DATE	**FU**	MAGIC
FV	THANK YOU	**FW**	WELCOME	**FX**	SPEED 1
FY	SPEED 2	**FZ**	SPEED 3	**F[**	Temperature
F	Days To New Year	**F]**	Days To Event		

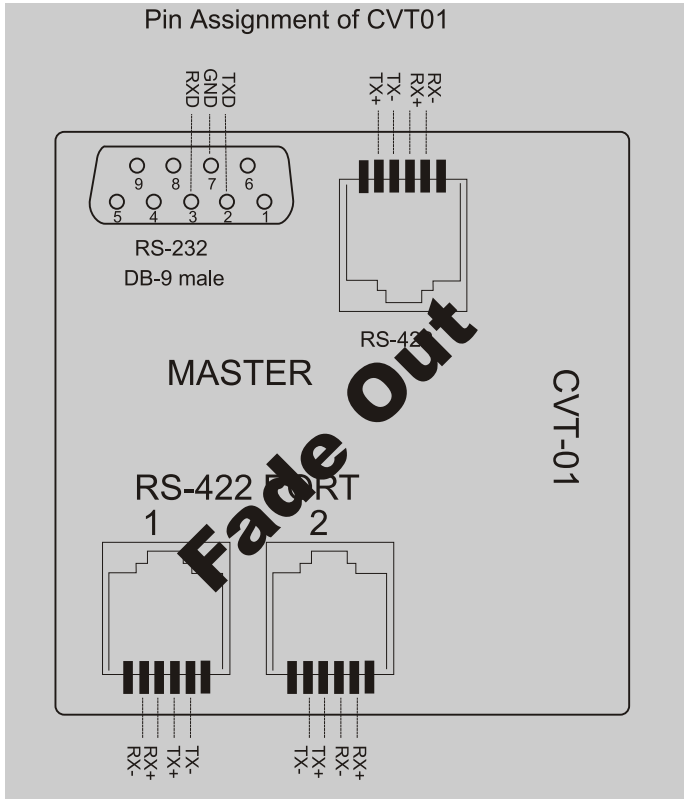
Pin assignment of DA & DX series
(RJ-11 Viewed via end-cap)

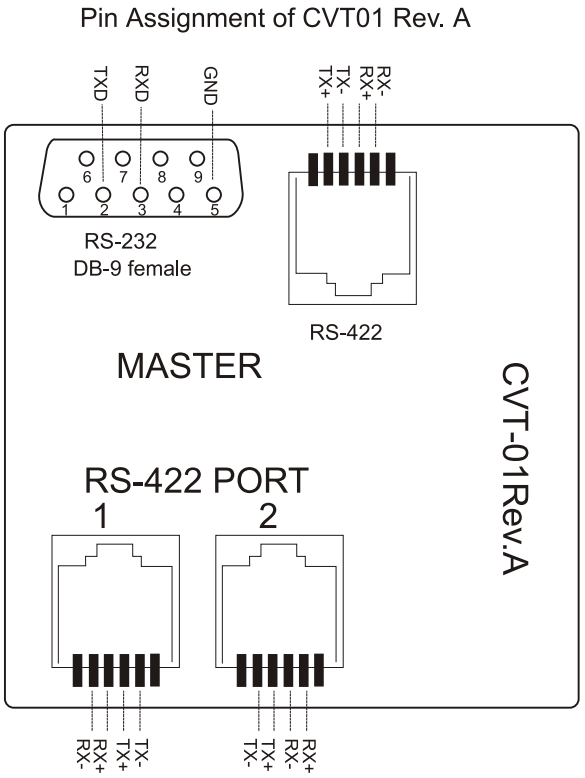


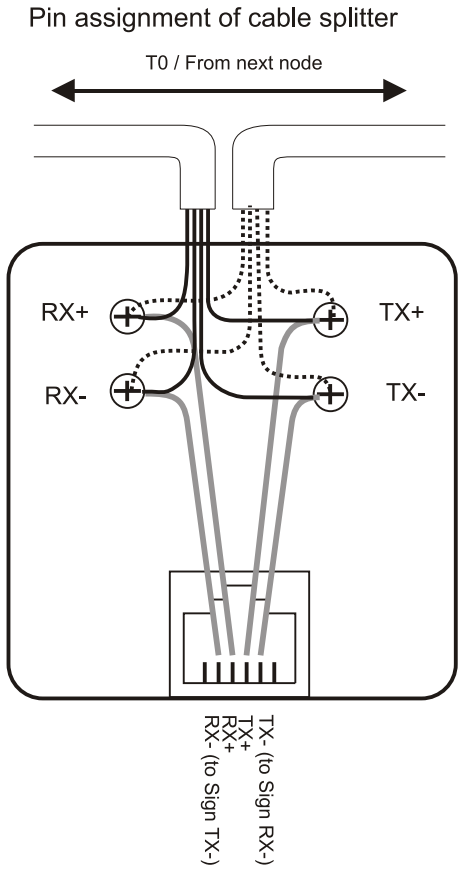
RS-232

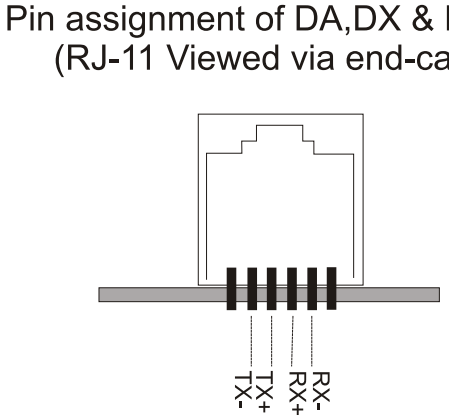


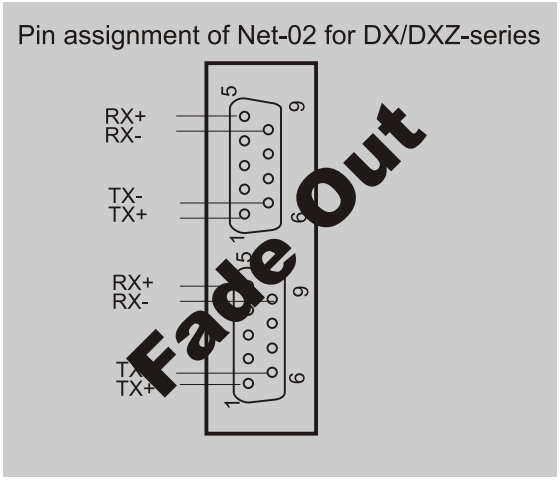
RS-485 (SA Option)

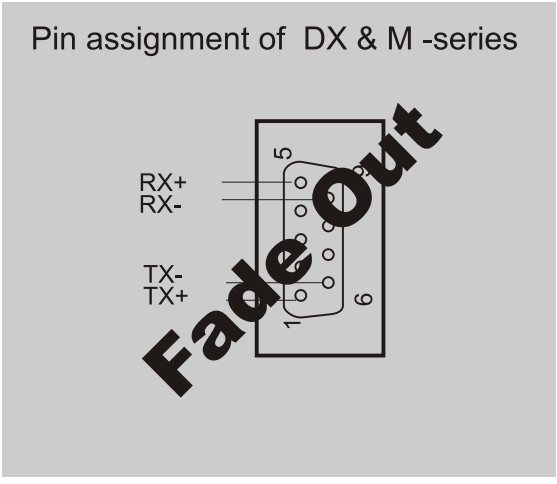






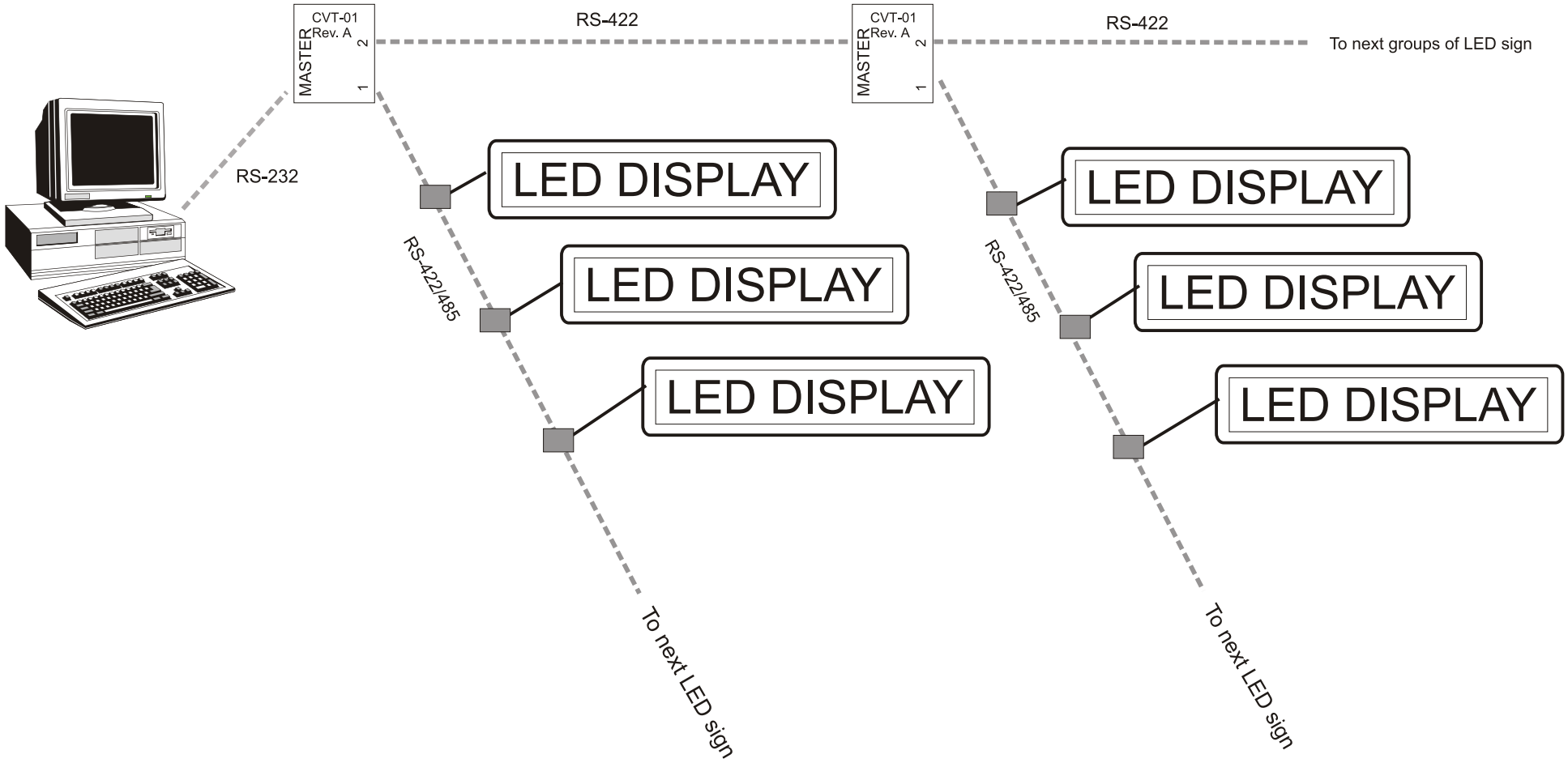






PIN ASSIGNMENTS OF D &M SERIES (RS-422/485),Cable Splitter and CVT-01 CONVERTER/DRIVER

Rev. 2.2
15 0ct., 2000



Legends :

Shielded 4 core Twisted pair cable (User provide)

Cable Splitter

4 core cable with RJ-11 jacks (Included with the sign)

Remarks:

Cable 05 (a cable splitter & 3m RJ-11 cable) is included with DA,DX & M series for RS-422/485 option.

Configuration example of D & M series, Cable Splitter and CVT-01 Rev. A

Rev. 2.2
15 Oct., 2000