



Embedded Computer Systems

Cable Assembly

4x4 Keypad and Serial Ports 1 & 2

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|---------------------------------------|-----------|-----------------|
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1.0 PURPOSE

This document describes how to build a cable to connect a keypad and serial ports 1 & 2 to J7 of the ADS Graphics Client, Graphics Client Plus and Graphics Master.

The cable includes a loopback of DCD/DTR/DSR (on the non-Graphics Client side) for full null-modem connectivity. A null-modem cable is required to connect to a PC.

The unused conductors of this cable can also be used for prototyping of other I/O functions on J7 (e.g. digital I/Os, RS-485/422).

2.0 TOOLS REQUIRED

- 2.1 IDC crimper
- 2.2 Wire cutters
- 2.3 Label printer

3.0 BILL OF MATERIALS:

| ITEM | QTY | ADS PART NO. | DESCRIPTION |
|------|-------|--------------|---|
| 1 | 1/2 | 610110-0209A | Samtec 40-pin connector and ribbon cable, P/N TCDS-20-D-24.00-01-N (connectors on both ends, 24-inch; cut cable into two 12-inch lengths) |
| 2 | 2 ea. | 210020-00904 | DB9 plug for ribbon cable attachment AMP #747321-4 or equivalent |
| 3 | 4 ea. | 210080-10001 | Socket, Crimp & Poke, Molex 16-02-0102 |
| 4 | 1 ea. | 210060-08010 | Connector Housing, 8 Pin, Crimp & Poke Molex 50-57-9008 |
| 5 | 1 ea. | 510030-00003 | 4x4 keypad (0-9,A-D,*,#) Grayhill 96BB2-006-R (or -F) |

4.0 ASSEMBLY INSTRUCTIONS:

- 4.1 Separate wires 1-25 in ribbon cable (Item 1) from each other. Pull apart as short a length as practical (usually about 1.5 inches).
- 4.2 Trim off ribbon cable wires that won't be used in the cable (9, 11, 13, 15, 22, 24-40).
- 4.3 Lay separated wires onto DB9 connectors as shown in the following table. Note that pins 1, 4 and 6 of both DB9s will require loopback wires. You can use one of the wires clipped off in the previous step.

| <i>Signal</i> | <i>J7</i> | <i>Serial 1</i> | <i>Serial 2</i> |
|----------------------|-------------------|-----------------|-----------------|
| | <i>2mm 30-pin</i> | <i>DB9M</i> | <i>DB9M</i> |
| <i>RXD1</i> | 12 | 2 | |
| <i>TXD1</i> | 14 | 3 | |
| <i>CTS1</i> | 16 | 8 | |
| <i>RTS1</i> | 18 | 7 | |
| <i>GNDCOM1</i> | 20 | 5 | |
| <i>DCD, DTR, DSR</i> | | 1, 4, 6 | |
| <i>(n/c)</i> | | 9 | |
| <i>RXD2</i> | 2 | | 2 |
| <i>TXD2</i> | 4 | | 3 |
| <i>CTS2</i> | 6 | | 8 |
| <i>RTS2</i> | 8 | | 7 |
| <i>GNDCOM2</i> | 10 | | 5 |
| <i>DTR, DSR</i> | | | 1, 4, 6 |
| <i>(n/c)</i> | | 9 | |

4.4 Crimp each of the DB9 connectors. Use wire strain relief, if available.

4.5 For each wire listed in the table below, strip ends of wire, crimp sockets (Item 3) onto wires and insert into header (Item 4)

| <i>Signal</i> | <i>J7: 2x20 2mm (Item 1)</i> | <i>Keypad 1x8 (Item 4)</i> |
|---------------|----------------------------------|--------------------------------|
| <i>ROW0</i> | 1 | 1 |
| <i>ROW1</i> | 3 | 2 |
| <i>ROW2</i> | 5 | 3 |
| <i>ROW3</i> | 7 | 4 |
| <i>COL0</i> | 17 | 5 |
| <i>COL1</i> | 19 | 6 |
| <i>COL2</i> | 21 | 7 |
| <i>COL3</i> | 23 | 8 |

4.6 Place permanent adhesive labels on the cable components as follows ("\ indicates a new line):

On ribbon cable: "J7\610110\40142" (you may have to use a band of clear tape wrapped around the cable to hold the label in place)

On Serial 1 DB9: "SERIAL\1"

On Serial 2 DB9: "SERIAL\2"

On keypad connector: "KEYPAD\CONNECT AS:\1 2 3 A", where the "1" is placed closest to pin 1 of the keypad and the "A" is toward pin 8.

4.7 Slide the keypad connector (Item 4) onto the keypad (Item 5) pins such that the "1" on the label is closest to the "1" key and the "A" is closest to the "A" key.

5.0 REVISION HISTORY

| LTR | DESCRIPTION | DATE | APPROVAL |
|-----|--|---------|----------|
| 1 | Initial release based originally on 610110-4007A | 4/11/01 | ak |
| 2 | Add Grayhill keypad part number Update ADS logo | 9/12/02 | ak |
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