

A SURVEY OF
MULTI PIN RGB CONNECTORS

By

Peter J. Suty

Table of Contents

Page

1	Introduction
2	DIN Connectors
3	EIAJ 8 pin
4	DB-9
5	Euroconnector
6	NTSC Broadband Interface Standard
7	Sony PX-34
8	Conclusions and Recommendations

RGB MULTI-PIN CONNECTOR SURVEY

(IN SEARCH OF A STANDARD)

It has become apparent that our new line of video products which use or generate analog RGB video signals needs a simple, convenient way to interface with each other and with video products by other manufacturers, such as monitors, frame stores, VCR's, etc.

Ideally a single cable with a multi-pin connector at each end would provide the simplest interface between units. By replacing the 3 or 4 BNC cables required by the majority of RGB video products you reduce the mess of cables behind your equipment and eliminate the possibility of error in making connections.

This would be a much easier decision to make if there were a standard multi-pin connector for analog RGB applications, unfortunately however, there is not. Due to this disappointing fact, most manufacturers have avoided using multi-pin connectors opting instead for the standard BNC connections. The majority of RGB monitors I surveyed used BNC's. These manufacturers included Brabury, Philips, RCA, Sony, Shiba Soku, Tektronics, and Videotek.

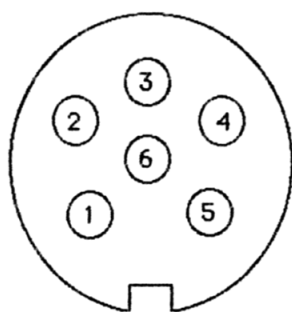
Of the manufacturers who did use multi-pin connectors it was rare to find two who used the same one. On the following pages I have pulled together a compendium of multi-pin connector's found on various manufacturers' monitors, they are listed in ascending order of pin counts and where possible I have included applicable pin assignments. I have also included TTL connectors here since some of these connectors are used as either analog RGB or TTL (or both) depending on the manufacturer

6 pin DIN connector (RGB Analog)

This connector is found on the Magnavox and Technica monitors. It is a fairly common connector for other applications and is readily available at retail outlets such as Radio Shack.

8 Pin DIN connector (TTL)

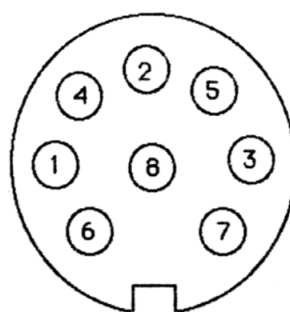
This connector, also found on the Magnavox and Technica monitors, is for digital RGB applications. It is not quite as common as the 6 pin DIN.



ANALOG RGB

PIN ASSIGNMENTS

- 1 Green
- 2 Horizontal Sync
- 3 Ground
- 4 Red
- 5 Blue
- 6 Vertical Sync



TTL INPUT

PIN ASSIGNMENTS

- 1. IBM Open/Apple Ground
- 2. Red
- 3. Green
- 4. Blue
- 5. Intensity
- 6. Ground
- 7. Horizontal Sync
- 8. Vertical Sync

RGB MULTI-PIN CONNECTOR SURVEY

(IN SEARCH OF A STANDARD)

It has become apparent that our new line of video products which use or generate analog RGB video signals needs a simple, convenient way to interface with each other and with video products by other manufacturers, such as monitors, frame stores, VCR's, etc.

Ideally a single cable with a multi-pin connector at each end would provide the simplest interface between units. By replacing the 3 or 4 BNC cables required by the majority of RGB video products you reduce the mess of cables behind your equipment and eliminate the possibility of error in making connections.

This would be a much easier decision to make if there were a standard multi-pin connector for analog RGB applications, unfortunately however, there is not. Due to this disappointing fact, most manufacturers have avoided using multi-pin connectors opting instead for the standard BNC connections. The majority of RGB monitors I surveyed used BNC's. These manufacturers included Brabury, Philips, RCA, Sony, Shiba Soku, Tektronics, and Videotek.

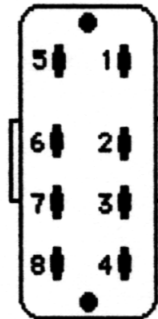
Of the manufacturers who did use multi-pin connectors it was rare to find two who used the same one. On the following pages I have pulled together a compendium of multi-pin connector's found on various manufacturers' monitors, they are listed in ascending order of pin counts and where possible I have included applicable pin assignments. I have also included TTL connectors here since some of these connectors are used as either analog RGB or TTL (or both) depending on the manufacturer

EIAJ 8 pin

This connector I have found on quite a few monitors but its use varies. Sony uses it as a VTR connector, Panasonic uses it as a TTL connector and Matsushita uses it as an analog RGB connector.

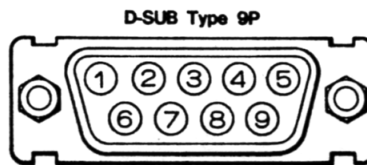
The pin assignment below is for analog RGB applications.

PIN 1 - GROUND
PIN 2 - RED
PIN 3 - GREEN
PIN 4 - BLUE
PIN 5 - GROUND
PIN 6 - GROUND
PIN 7 - CS
PIN 8 - VERT. DRIVE



DB-9 Connector

This connector is most generally used as a TTL RGB connector however there are a few analog versions around also. Below is a list of some of the various pin assignments. Note that IBM uses three different versions alone.



PIN ASSIGNMENT OF IBM GRAPHICS ADAPTER

IBM ADAPTERS PIN- ASSIGNMENT	COLOR GRAPHICS TTL 16 COLORS	ENHANCED GRAPHICS TTL 64/16 COLORS	PROFESSIONAL GRAPHICS ANALOG
1	GROUND	GROUND	* RED
2	GROUND	SECONDARY RED	* GREEN
3	RED	PRIMARY RED	* BLUE
4	GREEN	PRIMARY GREEN	COMPOSITE SYNC
5	BLUE	PRIMARY BLUE	MODE CONTROL
6	INTENSITY	SECONDARY GREEN /INTENSITY	RED GROUND
7	NON-CONNECTION	SECONDARY BLUE	GREEN GROUND
8	HORIZONTAL SYNC	HORIZONTAL SYNC	BLUE GROUND
9	VERTICAL SYNC	VERTICAL SYNC	GROUND

PIN ASSIGNMENT OF OTHER COMPUTERS

SIGNAL PIN- ASSIGNMENT	TTL			ANALOG		
	8 COLORS	16 COLORS	64 COLORS	SEPARATE SYNC.	COMPOSITE SYNC.	SYNC. ON GREEN
1	GROUND			* RED		
2	——		SECONDARY RED	* GREEN		⊙ GREEN H/V SYNC
3	RED		PRIMARY RED	* BLUE		
4	GREEN		PRIMARY GREEN	H. SYNC.	H/V SYNC.	——
5	BLUE		PRIMARY BLUE	V. SYNC.	——	
6	——	INTENSITY	SECONDARY GREEN	GROUND		
7	——		SECONDARY BLUE			
8	H. SYNC. / H/V SYNC.					
9	V. SYNC.					

“—” means GROUND or NON-CONNECTION

SIGNAL LEVEL

All signal level, except for those listed below, is TTL.

“*” means 0.6 Vp-p (VIDEO)

“⊙” means 0.6 Vp-p (VIDEO), 0.3 Vp-p (SYNC)

The Euroconnector (SCART)

This 20 pin connector was introduced in Europe by Philips as a versatile, straightforward connection between a variety of consumer video peripherals. A major advantage to the system is that the signal delivered to the TV set does not have to pass through the modulation/demodulation process, resulting in a higher quality picture and reducing costs. Below is a copy of the Philips specifications.

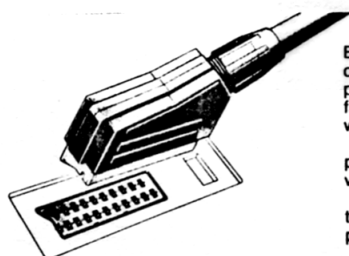
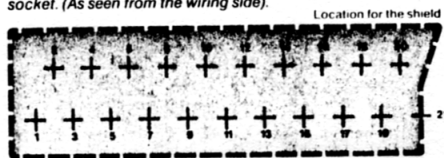


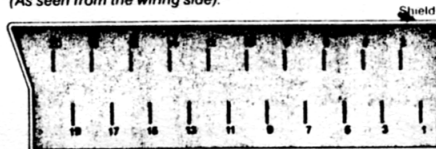
Diagram 4. The female EUROCONNECTOR socket. (As seen from the wiring side).



WHAT IS EUROCONNECTOR?
EUROCONNECTOR is a system of connecting consumer video peripherals to a tv set. This is facilitated by the EUROCONNECTOR which is made up as follows:

1. The female socket mounted permanently on the tv set and the video peripherals.
2. The male connector or plug at the end of the cable linking a peripheral to the tv set.

Diagram 5. The male EUROCONNECTOR plug. (As seen from the wiring side).



The female socket features 2 rows of 10 contacts in a staggered arrangement which accept the male 'blade' contacts. A 21st contact is made by the metal shield of the male plug.

THE CONNECTIONS

The full EUROCONNECTOR specification consists of the following connections.

- | | |
|--|-----------------------|
| 1 Audio out (right) | 500 mV//1K Ohm |
| 2 Audio in (right) | 500 mV//10K Ohm |
| 3 Audio out (left) | 500 mV//1K Ohm |
| 4 Audio earth | |
| 5 Blue earth | |
| 6 Audio in (left) | 500 mV//10K Ohm |
| 7 Blue in | 700 mV//75 Ohm |
| 8 Status CVBS | 0-2//10-12 V//10K Ohm |
| 9 Green earth | |
| 10 Intercommunication line D ² B inverted | |
| 11 Green in | 700 mV//75 Ohm |
| 12 Intercommunication line D ² B | |
| 13 Red earth | |
| 14 D ² B earth | |
| 15 Red in | 700 mV//75 Ohm |
| 16 Status RGB (fast blanking) | 0-0, 4 V/1-3 V// |
| 17 CVBS earth | |
| 18 RGB status earth | |
| 19 CVBS out | 1 V/75 Ohm |
| 20 CVBS in | 1 V/75 Ohm |
| 21 Socket earth | |

N.B. The above is the full EUROCONNECTOR specification. Each unit of video equipment will be equipped with a EUROCONNECTOR with a specification equal or less than the full EUROCONNECTOR listed above.

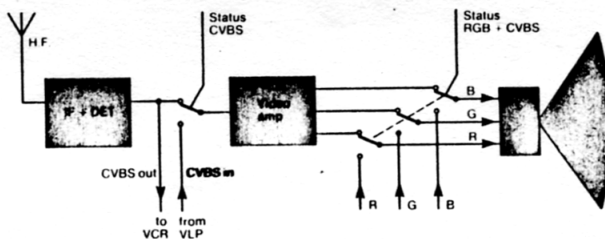


Diagram 6. Full EUROCONNECTOR specification

ADVANTAGES

1. All audio/video in and outputs are via the one connection.
2. The CVBS input by-passes the tv set's high frequency demodulator, so a modulator in the video peripherals is no longer necessary. This reduces the cost of the video peripherals.
3. As the signal delivered to the tv set does not pass through the modulation/demodulation process, a better quality picture results.
4. Using the EUROCONNECTOR system and a simple switchbox, it is possible to operate 2 video peripherals through the tv set simultaneously e.g. you can record a tv programme on the VCR directly from the tuner part of the tv set while watching a video disc.
5. When watching live tv transmissions or playback from a VCR or video disc, the set's status system operates automatically.
6. Via the CVBS output, it is possible to attach an external Teletext decoder whose signal is fed into the set via the RGB pins.
7. RGB sources such as a video camera or home computer can be connected directly to the RGB input pins (a video amplifier is no longer necessary). This is a very cheap method which will reduce the cost of such video peripherals.
8. A number of domestic systems such as the lighting and heating may be controlled and monitored on the tv set using the D²B facility.
9. EUROCONNECTOR is a simple connection system which the consumer will find easy to use.

PX-34 RGB Multi Connector

Again this connector is similar in intent to the Euroconnector and the proposed NTSC standard. It was, I believe, developed by Sony and touted by them to be the next world standard. However, Sony has dropped the use of this connector on its latest models.

Position number	Signal to be connected
1	+5V power supply
2	+5V power supply
3	Audio (R) input ground
4	Ground
5	Remote control ground
6	Composite video output ground
7	Audio (L) input ground
8*	Ground
9*	Ground
10*	Ground
11	Ground
12*	Ground
13*	Ground
14	Ground
15*	Ground
16	Ground
17	525/625 mode select
18	EXT/INT mode sync switch
19	Not in use
20	Audio (R) input
21	Analog/digital mode select
22	Remote control output
23	Composite video output
24	Audio (L) input
25*	Red input
26*	Green input
27*	Blue input
28	RGB level shift
29*	Blanking input
30*	H. sync or composite sync
31*	V. sync
32	Half blanking input
33	RGB/NORMAL mode select
34	Audio select

* For No. 25 and 8, 26 and 9, 27 and 10, 29 and 12, 30 and 13, or 31 and 15 connections, use a twisted-pair lead when the signal level is TTL, or a 75-ohm coaxial cable when the signal level is 1V p-p.

Conclusions and Recommendations

While there may be an urgent need for an accepted standard in multi-pin RGB connectors, I don't foresee one being adopted in the near future.

It seems other manufacturers have come to the same conclusion, as witnessed by the great variety of solutions on the market.

While in my opinion, the Euroconnector and the NTSC Broadband standards have a lot going for them, they are expensive and difficult to build up due to the complexity of the connectors.

The DB-9 and EIAJ 8 pin have so many different RGB uses that it would be confusing if we were to go either of those routes.

My recommendation is that we use the DIN 6 pin connector as the interface between our units and offer cables to convert to BNC's or other connectors as demand dictates. The DIN 6 pin is relatively inexpensive and readily available at places such as Radio Shack. The same is not true of most of the other connectors reviewed here.

Peter J. Sucky
Dept. 82
Systems Engineering Group
X62382