



Fiber Optic Video & Data Transmission System

Installation and Operation Instructions



DT/DR-1U2F/2F2H6L-x Series

1-Ch. Video, 2-Ch. BI-DI RS-422 Data plus returning 2-Channel Open Collector and 6-Channel TTL Data

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1.0 Product Description

Meridian's product series DT-1U2F/2F2H6L and DR-1U2F/2F2H6L are fiber optic modems that transmits one channel of unidirectional digitized video, two channel of bi-directional RS-422 data, plus in return, two channel of unidirectional open collector, six channel of unidirectional TTL data signals over one optical fiber using digital-encoding transmission techniques. This product series uses Meridian's standard 2-slot wide chassis mount card assembly and plugs into the following Meridian chassis: SR-1002/S, SR-1600/S and SR-2001 & SR-2000 series 19" equipment chassis.

The digital modules consist of various plug-in personality function cards or SIMs. The top card is the optical card that contains the fiber optic interface. The bi-directional optical input/output connector is located on the right side of both the transmitter (DT) and receiver (DR) modules.

The two fiber units, if uplicable, have two optical ports. The port on the left side of the front panel is the transmit port, while the optical port on the right side of the module's front panel is the optical receive port. It is important to make sure that the optical ports of the modules are connected properly.

The second SIM contains the video coaxial interface. The third SIM card in Port 2 contains the bi-directional RS-422 data signals. The fourth SIM card in port 3 contains the open collector data. The bottom SIM card in port 4 contains the TTL data signals.

2.0 Installation

Series DT-1U2F/2F2H6L and DR-1U2F/2F2H6L products are two-slot wide cards and, as such, occupy two slots in Meridian's standard chassis. To install in the chassis, orient the card with the Meridian logo at the top of the module and slide onto the top and bottom card guides in the chassis. Press securely on the top and bottom of the module to ensure that it is fully seated in the chassis so that the electrical connector mates with the chassis-mounted motherboard. Once installed, manually tighten the two thumbscrews located at the top and bottom of the card. Do not use tools to secure these and do not over tighten.

Note: A fully loaded sub-rack should have forced-air cooling to avoid excessive heat generation inside the chassis. A fan assembly tray (P/N FA-2000) with three (3) fans is available and should be installed under the 19" SR-2000/1 whenever possible.

3.0 Product Signal Format & Specifications

The DT & DR-1U2F/2F2H6L series products transmit and receive the following signals:

Signal Type	Channels	DT-1U2F/2F2H6L-x	DR-1U2F/2F2H6L-x
NTSC/PAL video	1	Transmit	Receive
RS-422	2	Transmit/ Receive	Transmit/ Receive
Open Collector	2	Receive	Transmit
TTL Data	6	Receive	Transmit

The tables below identify the specifications for the various signals that these modems transmit/receive.

Video 10MHz, 10-bit	
Format	NTSC, PAL, SECAM
Voltage/Impedance	1Vp-p, 75 Ohm, 1.5Vp-p (max)
Differential Gain	<0.6%
Differential Phase	<0.3°
SNR	>67dB (weighted)
Return Loss	>30dB
Field Tilt	<0.5%

Open Collector	
Formats	Open Collector
Contact Rating	0.2A
Data Rate	DC to 125Kb/s
Connectors	High Density DB15 Female

TTL Data	
Formats	TTL
Data Rate	DC to 125Kb/s
Connectors	High Density DB15 Female

RS-422 Data	
Formats	RS-422
Data Rate	DC to 1Mb/s
Bit Error Rate (BER)	Better than 10 ⁻⁹

Connectors	
Video	75 Ohm BNC w/gold center pin
Open Collector & TTL	DB15 Female
RS-422 Data	DB9 Female
Optical	Single-mode – ST or FC Multimode – ST

Optical Specifications						
Fiber Type/Size (um)	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (dB)
Multimode (FP Laser) 62.5/125	-3	-24	21	850/1300	ST	22
Single-mode (FP Laser) 9/125	-3	-24	21	1310/1550	ST, FC	22

Refer to section 8.0 for CWDM wavelength selections.

4.0 Operating

Video –The BNC video connector accept a standard NTSC/PAL video input signal (DT module) and transmit these signals to the receive unit (DR module). The respective video output signal is located on the same channel (location) as the input video signal. Connect the input video signal to the appropriate BNC video input connector on the transmitter module and the output video connector on the associated port on the receiver module.

Data – Connect the data for each of the data channels to the appropriate data Tx/Rx pins on the connector as shown in section 5.0, 5.1 & 5.2

Each data input/output channel has two LED status indicators located under the associated data I/O connector. One LED is associated with each data input channel on the DR unit while the second LED is associated with the respective data output channel on the DT unit. The tables in sections 5.0-5.2 show the relationship between the connectors (I/O channels) and LEDs.

4.1 Status indicators

The figures at the end of this document show the connector and LED indicator locations for the various video & data status indicators on the transmitter and receiver modules. There are a number of diagnostic indicators on the front panel of each module. In addition, each of the video input/output channels has indicators associated with them to provide quick visual indications of the channel activity. These indicators for each of the video & data channels are listed below:

DT& DR-1U2F/2F2H6L-x Indicators		
Indicator	Location	Function
Power	Left side of module	Green – ON
Tx carrier	Under optical output connector	Optical output (Green – OK, Red – error)
Rx Optical signal	Under optical input connector	Optical input (Green – OK, Red – absent)
Rx Carrier	Under optical input connector	Optical Carrier input (Green – OK, Red – error)
Video #1	Under video in/out connector	Green – Sync received
Video #1	Under video in/out connector	Video signal – Green OK, Red – video overload

5.0 RS-422 SIM Signal Assignment (Pinouts) & Indicator Lights

There are one data SIM cards, one transmits & one receives two RS-485 (4-wire) data channels. The data SIM has a DB9 female connector. The table below shows the appropriate pinout for each of the connectors:

RS-422 Data Connector Pinout Assignment (PORT 2)		
Pin #	DT-1U2F/2F2H6L (PORT 2)	DR-1U2F/2F2H6L (PORT 2)
1	Ch1 IN (+)	Ch1 OUT (+)
2	Ch1 IN (-)	Ch1 OUT (-)
3	Ch2 IN (+)	Ch2 OUT (+)
4	Ch2 IN (-)	Ch2 OUT (-)
5	Gnd	Gnd
6	Ch1 OUT (+)	Ch1 IN (+)
7	Ch1 OUT (-)	Ch1 IN (-)
8	Ch2 OUT (+)	Ch2 IN (+)
9	Ch2 OUT (-)	Ch2 IN (-)

The table below shows the LED status indicators associated with RS-244 data

RS-422 Data Connector Status Indicators (PORT 2)		
LED #	DT-1U2F/2F2H6L (PORT 2)	DR-1U2F/2F2H6L (PORT 2)
1	Ch1 Data Input	N/A
2	N/A	Ch 1 Data Output
3	Ch2 Data Input	N/A
4	N/A	Ch2 Data Output
5	N/A	Ch 1 Data Input
6	Ch1 Data Output	N/A
7	N/A	Ch2 Data Input
8	Ch2 Data Output	N/A

There are no jumpers or switches for the user to configure for this data card.

5.1 Open Collector SIM Signal Assignment (Pinouts) & Indicator Lights

The tables below identify the input or output functions, associated connector pinouts and LED status indicators for Open Collector SIM card.

Open Collector Connector Pinout Assignment (PORT 3)		
Pin #	DT-1U2F/2F2H6L (PORT 3)	DR-1U2F/2F2H6L (PORT 3)
1	NA	Ch1 INPUT
2	Ch1 OUTPUT	Ch2 INPUT
3	NA	NA
4	Ch2 OUTPUT	NA
5	GROUND	GROUND
6	NA	NA
7	NA	NA
8	NA	NA
9	NA	NA
10	NA	NA
11	NA	NA
12	NA	NA
13	NA	NA
14	NA	NA
15	NA	NA

The table below shows the LED status indicators associated with Open Collector

Open Collector LED Status Indicators (PORT 3)			
LED #	DT-1U2F/2F2H6L (PORT 3)	LED #	DR-1U2F/2F2H6L (PORT 3)
1	Ch1 OUTPUT PRESENT	1	Ch1 INPUT PRESENT
2	Ch2 OUTPUT PRESENT	2	Ch2 INPUT PRESENT
3	NA	3	NA
4	NA	4	NA
5	NA	5	NA
6	NA	6	NA
7	NA	7	NA
8	NA	8	NA

There are no jumpers or switches for the user to configure for this data card.

5.2 TTL Data SIM Signal Assignment (Pinouts) & Indicator Lights

The tables below identify the input or output functions, associated connector pinouts and LED status indicators for TTL Data SIM card.

TTL Data Connector Pinout Assignment (PORT 4)		
Pin #	DT-1U2F/2F2H6L (PORT 4)	DR-1U2F/2F2H6L (PORT 4)
1	NA	Ch1 INPUT
2	Ch1 OUTPUT	Ch2 INPUT
3	NA	Ch3 INPUT
4	Ch2 OUTPUT	Ch4 INPUT
5	Ground	Ground
6	NA	Ch5 INPUT
7	Ch3 OUTPUT	Ch6 INPUT
8	NA	NA
9	Ch4 OUTPUT	NA
10	NA	NA
11	Ch5 OUTPUT	NA
12	NA	NA
13	Ch6 OUTPUT	NA
14	NA	NA
15	NA	NA

The table below shows the LED status indicators associated with TTL data

TTL Data LED Status Indicators (PORT 4)			
LED #	DT-1U2F/2F2H6L (PORT 4)	LED #	DR-1U2F/2F2H6L (PORT 4)
1	Ch1 OUTPUT PRESENT	1	Ch1 INPUT PRESENT
2	Ch2 OUTPUT PRESENT	2	Ch2 INPUT PRESENT
3	Ch3 OUTPUT PRESENT	3	Ch3 INPUT PRESENT
4	Ch4 OUTPUT PRESENT	4	Ch4 INPUT PRESENT
5	Ch5 OUTPUT PRESENT	5	Ch5 INPUT PRESENT
6	Ch6 OUTPUT PRESENT	6	Ch6 INPUT PRESENT
7	NA	7	NA
8	NA	8	NA

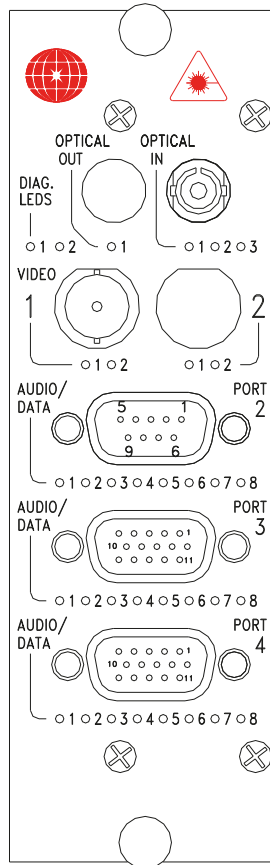
There are no jumpers or switches for the user to configure for this data card.

6.0 Front Panel Pinout Assignment Diagram

Figures 5.1 and 5.2 below show the front panel layout, connector location and pinout assignment for both the DT & DR modules.

DT-1U2F/2F2H6L-X PINOUT DIAGRAM

- DATA RS422 IN/OUT (PORT 2)**
(DB-9 FEMALE)
1. (CH.1) INPUT +
 2. (CH.1) INPUT -
 3. (CH.2) INPUT +
 4. (CH.2) INPUT -
 5. GND
 6. (CH.1) OUTPUT +
 7. (CH.1) OUTPUT -
 8. (CH.2) OUTPUT +
 9. (CH.2) OUTPUT -
- OPEN COLLECTOR OUT (PORT 3)**
(HD-15 FEMALE)
1. NA
 2. (CH.1) OUTPUT
 3. NA
 4. (CH.2) OUTPUT
 5. GND
 - 6.-15. NA
- TTL DATA OUTPUT (PORT 4)**
(HD-15 FEMALE)
1. NA
 2. (CH.1) OUTPUT
 3. NA
 4. (CH.2) OUTPUT
 5. GROUND
 6. NA
 7. (CH.3) OUTPUT
 8. NA
 9. (CH.4) OUTPUT
 10. NA
 11. (CH.5) OUTPUT
 12. NA
 13. (CH.6) OUTPUT
 14. NA
 15. NA



STATUS INDICATORS POWER

1. POWER (GREEN)
2. NA

STATUS INDICATORS OPTICAL PORT

OPTICAL OUT 1. TX CARRIER (GREEN)/ERROR (RED)

- OPTICAL IN
1. NA
 2. RX OPTICAL SIGNAL (GREEN)/ABSENT (RED)
 3. RX CARRIER (GREEN)/ERROR (RED)

STATUS INDICATORS VIDEO INPUT (CH.1)

1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

STATUS INDICATORS (PORT 2)

1. (CH.1) DATA INPUT
2. NA
3. (CH.2) DATA INPUT
4. NA
5. NA
6. (CH.1) DATA OUTPUT
7. NA
8. (CH.2) DATA OUTPUT

STATUS INDICATORS (PORT 3)

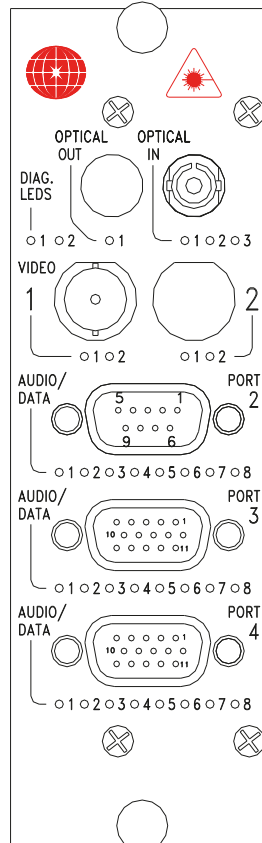
1. (CH.1) OUTPUT PRESENT
2. (CH.2) OUTPUT PRESENT
3. NA
4. NA
5. NA
6. NA
7. NA
8. NA

STATUS INDICATORS (PORT 4)

1. (CH.1) OUTPUT PRESENT
2. (CH.2) OUTPUT PRESENT
3. (CH.3) OUTPUT PRESENT
4. (CH.4) OUTPUT PRESENT
5. (CH.5) OUTPUT PRESENT
6. (CH.6) OUTPUT PRESENT
7. (CH.7) NA
8. (CH.8) NA

DR-1U2F/2F2H6L-X PINOUT DIAGRAM

- DATA RS422 IN/OUT (PORT 2)**
(DB-9 FEMALE)
1. (CH.1) OUTPUT +
 2. (CH.1) OUTPUT -
 3. (CH.2) OUTPUT +
 4. (CH.2) OUTPUT -
 5. GND
 6. (CH.1) INPUT +
 7. (CH.1) INPUT -
 8. (CH.2) INPUT +
 9. (CH.2) INPUT -
- OPEN COLLECTOR IN (PORT 3)**
(HD-15 FEMALE)
1. (CH.1) INPUT
 2. (CH.2) INPUT
 3. NA
 4. NA
 5. GND
 - 6.-15. NA
- TTL DATA INPUT (PORT 4)**
(HD-15 FEMALE)
1. (CH.1) INPUT
 2. (CH.2) INPUT
 3. (CH.3) INPUT
 4. (CH.4) INPUT
 5. GROUND
 6. (CH.5) INPUT
 7. (CH.6) INPUT
 - 8.-15. NA



STATUS INDICATORS POWER

1. POWER (GREEN)
2. NA

STATUS INDICATORS OPTICAL PORT

OPTICAL OUT 1. TX CARRIER (GREEN)/ERROR (RED)

- OPTICAL IN
1. NA
 2. RX OPTICAL SIGNAL (GREEN)/ABSENT (RED)
 3. RX CARRIER (GREEN)/ERROR (RED)

STATUS INDICATORS VIDEO OUTPUT (CH.1)

1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

STATUS INDICATORS (PORT 2)

1. NA
2. (CH.1) DATA OUTPUT
3. NA
4. (CH.2) DATA OUTPUT
5. (CH.1) DATA INPUT
6. NA
7. (CH.2) DATA INPUT
8. NA

STATUS INDICATORS (PORT 3)

1. (CH.1) INPUT PRESENT
2. (CH.2) INPUT PRESENT
3. NA
4. NA
5. NA
6. NA
7. NA
8. NA

STATUS INDICATORS (PORT 4)

1. (CH.1) INPUT PRESENT
2. (CH.2) INPUT PRESENT
3. (CH.3) INPUT PRESENT
4. (CH.4) INPUT PRESENT
5. (CH.5) INPUT PRESENT
6. (CH.6) INPUT PRESENT
7. (CH.7) NA
8. (CH.8) NA

7.0 Product Part Number Variations

The table below lists the various part numbers associated with different module types:

Basic module description:

Video: 1-channel, one way

Open Collector: 2-channel, one way

TTL Data: 6-channel, one way

RS-422 Data: 2-channel, bi-directional

Transmitter	Receiver	# Fibers & Type	Wavelength	Optical Connector
DT-1UC2F/2F2H6L-2	DR-1UC2F/2F2H6L-2	1 (MM)	1310/850nm	ST
DT-1UC2F/2F2H6L-5	DR-1UC2F/2F2H6L-5	1 (SM)	1310/1550nm	FC
DT-1UC2F/2F2H6L-5/ST	DR-1UC2F/2F2H6L-5/ST	1 (SM)	1310/1550nm	ST

For proper operation, it is necessary to match the transmitter (DT) with the associated receiver module (DR).

8.0 2-Fiber, CWDM Option

These cards are also available with a 2-fiber, CWDM option. In this configuration, 2 fibers on each unit are used for transmission of the bi-directional signals. The DT unit will transmit on one unique CWDM wavelength and receive on a 2nd wavelength while the DR unit transmits and receives on the complementary wavelengths. The table below shows these various wavelength combinations for this particular unit.

Please consult the part number label on the rear of the unit to properly identify the wavelengths for your specific cards.

Tx Part #	RX Part #	Transmit Wavelength	Receive Wavelength
DT-1U2F/2F2H6L-27/3	DR-1U2F/2F2H6L-27/3	1270nm	1270–1610 nm
DT-1U2F/2F2H6L-29/3	DR-1U2F/2F2H6L-29/3	1290nm	
DT-1U2F/2F2H6L-31/3	DR-1U2F/2F2H6L-31/3	1310nm	
DT-1U2F/2F2H6L-33/3	DR-1U2F/2F2H6L-33/3	1330nm	
DT-1U2F/2F2H6L-35/3	DR-1U2F/2F2H6L-35/3	1350nm	
DT-1U2F/2F2H6L-37/3	DR-1U2F/2F2H6L-37/3	1370nm	
DT-1U2F/2F2H6L-39/3	DR-1U2F/2F2H6L-39/3	1390nm	
DT-1U2F/2F2H6L-41/3	DR-1U2F/2F2H6L-41/3	1410nm	
DT-1U2F/2F2H6L-47/3	DR-1U2F/2F2H6L-47/3	1470nm	
DT-1U2F/2F2H6L-49/3	DR-1U2F/2F2H6L-49/3	1490nm	
DT-1U2F/2F2H6L-51/3	DR-1U2F/2F2H6L-51/3	1510nm	
DT-1U2F/2F2H6L-53/3	DR-1U2F/2F2H6L-53/3	1530nm	
DT-1U2F/2F2H6L-55/3	DR-1U2F/2F2H6L-55/3	1550nm	
DT-1U2F/2F2H6L-57/3	DR-1U2F/2F2H6L-57/3	1570nm	
DT-1U2F/2F2H6L-59/3	DR-1U2F/2F2H6L-59/3	1590nm	
DT-1U2F/2F2H6L-61/3	DR-1U2F/2F2H6L-61/3	1610nm	

When using in a system with a CWDM multiplexer/demultiplexer, it is essential that the specific wavelengths to and from these units be connected to the corresponding input/output wavelengths on the CWDM mux/de-mux units. Otherwise, the individual wavelengths will not pass through the CWDM mux/de-mux device.

When using higher power CWDM lasers, an external attenuator of 5dB minimum is required when performing short distance testing to eliminate optical overload at the Rx card.

9.0 Troubleshooting

Below is a listing of several problems that may arise during the installation & operation of the modules. If you are having difficulty installing or operating the modules please refer to this list below.

Problem: *Module does not fit in chassis slots*

Action: Check module orientation. Meridian “Globe” must be oriented on the top of the module
Make sure the card guides in the chassis are aligned with the extrusion on the module

Problem: *Card power LED does not light when power to the module/subrack is applied or power indicator turns on and off*

Action: Check power supply to ensure that it is plugged in and turned on. If flashing continues, move module to another chassis or location in the same chassis, if available.

Problem: *No video at output of module*

Action: Check to ensure that the video channel-specific LEDs are on (Green). Also, check to ensure that the optical LEDs are ON. If no video is still present, check to ensure that the monitor is ON and the video cable is connected to the correct video port on the Rx module.

Problem: *Video image is dark*

Action: Check the iris control on the camera to ensure that it is open to the proper amount for the conditions

Problem: *Video image is too bright and appears overexposed*

Action: Check the Video overload indicator on the Rx module. If it is Red, the video signal level is too high and the CCTV iris should be checked to ensure that it is open properly for the conditions.

Problem: No Open Collector transmission

Action: Check the individual Open Collector channel input status indicator lights #1 through 2 to ensure that the lights toggle on and off. These lights are located below the corresponding DB15. Also check the corresponding Open Collector output lights (#1 through 2) on the receiver module to see if the corresponding lights are activated when the corresponding input Open Collector. If not, please check the data input/output and fiber connections.

Problem: No TTL Data

Action: Check the individual Open Collector channel input status indicator lights #1 through 6 to ensure that the lights toggle on and off. These lights are located below the corresponding DB15. Also check the corresponding Open Collector output lights (#1 through 6) on the receiver module to see if the corresponding lights are activated when the corresponding input Open Collector. If not, please check the data input/output and fiber connections.

Problem: No RS-422 Data

Action: Check the data input status indicator light #1 on the transmit module to ensure it is on (indicating a data input signal). Also check the data output status indicator light #2 on the corresponding receiver module to ensure that the signal is being transmitted and received. If not, please check the data input/output and fiber connections.

If the problem still persists after reviewing the above items, please contact Meridian technical support (516-285-1000).

