MELD / PRODUCT DOCUMENTATION

MELD-2100

ARINC 429 / CONTROLLOGIX PLC
DATA RECORDER & ETHERNET INTERFACE

USER GUIDE • CONNECTIONS • BREAKOUT HARNESS



MELD-2100 • ARINC 429 / ControlLogix PLC Data Recorder & Ethernet Interface

MELD-2100 Product Manual

Revision A • 05 November 2026

IMPORTANT Follow the aircraft or equipment installation instructions and applicable safety procedures when connecting the MELD-2100. This user guide provides product operating information; it does not replace installation approval or aircraft maintenance documentation.

1 Product overview

The MELD-2100 is an enclosed MELD-2501-based data interface available with zero, two or four ARINC-429 receiver channels. Recording and a browser-based Wi-Fi HMI are standard functions on every MELD-2100, regardless of receiver population. The zero-channel configuration can record configured ControlLogix data; the two- and four-channel configurations can record received ARINC-429 data. The available data sources and network outputs depend on the installed receiver population and configured application. Every unit operates from 8–32 VDC and ships with a 128 GB microSD card for onboard storage.

1.1 Interface summary

Interface	Description / usage
Aircraft power	8–32 VDC input, with nominal 28 V aircraft power and dedicated DC return through J4. Verify polarity and supply protection before energizing.
ARINC-429	Depending on installed hardware: 0, 2 or 4 ARINC-429 receiver channels. Each fitted channel uses one differential A/B pair.
Ethernet	10/100 Ethernet PHY path exposed as TX+/TX-/RX+/RX- on J4; presented by the breakout harness at a female RJ45 jack.
Storage	Every unit ships with an installed 128 GB microSD card for recording, configuration and onboard reference documents.
Local service	Browser-based Wi-Fi HMI standard on every unit; wired Ethernet HMI also available. The housing identifies the Wi-Fi service IP address and hostname. Available data pages vary with the installed hardware and application.

1.2 Model and product configurations

MELD-2100 configurations provide zero, two or four ARINC-429 receiver channels. Every configuration includes onboard recording, an installed 128 GB microSD card and the Wi-Fi HMI. The channel count determines which ARINC-429 signals can be received; the connected system determines which data is available to record.

Board population	ARINC inputs	Recording and primary application
MELD-2501-0	0 channels	ControlLogix data acquisition and recording; standard Wi-Fi HMI.
MELD-2501-2	2 channels	Two ARINC-429 inputs with onboard recording and network data services; standard Wi-Fi HMI.
MELD-2501-4	4 channels	Four ARINC-429 inputs with onboard recording and network data services; standard Wi-Fi HMI.

Application profiles organize the available data sources and HMI pages. Recording and Wi-Fi are included in every profile. The DEV profile provides additional diagnostic and service pages.

Profile	ARINC RX	Primary data source / function	Startup page
PLC-0	0 required	ControlLogix tag acquisition and onboard recording; Wi-Fi HMI included	Recorder
REC-2	2	Two-channel ARINC-429 monitoring and onboard recording; Wi-Fi HMI included	ARINC-429
REC-4	4	Four-channel ARINC-429 monitoring and onboard recording; Wi-Fi HMI included	ARINC-429
DEV	Any supported population	Engineering and AFCS diagnostics; recording and Wi-Fi remain available	HSI / ATT

A four-receiver unit may operate with a two-channel profile; the reverse is not possible. Receiver population is a hardware characteristic, not a software-enabled feature. All units retain recording capability and their Wi-Fi HMI. Application profile changes are maintenance actions made from the wired HMI when the unit is idle; they do not disable recording hardware or Wi-Fi connectivity.

1.3 Data path

ARINC / PLC SOURCES → MELD-2100 → ONBOARD LOGS / ETHERNET

With fitted receivers, the product receives and processes ARINC-429 traffic; it does not originate ARINC messages. The zero-receiver version acquires supported PLC data instead. Upstream instruments and the downstream receiving equipment are configured separately.

1.4 Document contents

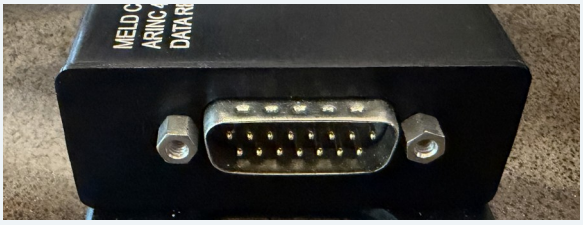
Section	Coverage
2	Safety and hardware identification
3	Bench connection and startup
4	DA-15 J4 electrical interface
5	Universal breakout harness
6	Operation, recording, microSD storage and Wi-Fi HMI
7	Troubleshooting and support information
Appendix A	Full-size Rev A breakout harness figure
Appendix B	Unit configuration and document revision

2 Safety and hardware identification

2.1 Safety rules

- Disconnect power before attaching, removing, or modifying the DA-15 harness.
- Do not interchange power ground (PWR GND) with chassis ground (CGND) without a verified installation grounding plan.
- Verify ARINC pair polarity and shield routing. A/B labels are not interchangeable.
- Use a protected, current-limited 8–32 VDC bench supply for first power-up (28 V typical). Confirm polarity before enabling output.
- Aircraft connections must follow the applicable installation instructions and authorized maintenance procedures.
- Protect flying-lead ends from shorts, moisture, abrasion and accidental contact with aircraft power.

2.2 Product identification photographs



MELD-2100 • J4 DA-15 connector and mounting base



MELD-2100 • front indicators, USB-C and microSD



MELD-2100 • serial number and network address label

2.3 Indicator functions

Indicator	Function
PWR	Illuminates when the unit is powered.
REC	Recorder indicator position; indication depends on the front-panel hardware and software version. Recording itself is available on every model.
RUN	Flashing processor heartbeat and operational status indication.

3 Bench connection and startup

Use the following sequence for a controlled bench setup or initial functional check. Aircraft installation and environmental qualification are outside the scope of this guide.

3.1 Connections

1. Inspect the housing, J4 contacts, mating DA-15 connector and harness for damage or debris.
2. Identify the breakout cable wires by both their printed signal labels and J4 pin numbers.
3. With power OFF, connect only the ARINC receiver A/B pairs fitted to this unit; leave unused leads individually insulated.
4. If Ethernet is required, connect the female RJ45 branch to a suitable cable and network equipment.
5. Connect chassis/shield according to the controlled installation wiring drawing.
6. Connect 8–32 VDC to J4 pin 11 (nominal +28 V supply lead) and power return to pin 12, using a protected supply. Confirm polarity before applying power.
7. Apply power and observe PWR and RUN indications. Confirm the Wi-Fi network is present, the browser HMI can be opened, and recording status is available. For units with fitted ARINC receivers, verify traffic using a known-good source.

3.2 Network first access

For wired Ethernet HMI access, connect the RJ45 breakout to the service computer or network and enter the Ethernet IP address assigned to the unit. The example enclosure label shows ETH: 192.168.100.250; use the address assigned to your unit.

For Wi-Fi HMI access, join the MELD Wi-Fi network with the supplied SSID and password. The Wi-Fi IP address and hostname are printed on the housing. The example label shows 192.168.4.1 and meld.local. Enter the labeled address in a browser; see Section 6.4.

3.3 Basic functional checks

Check	Expected observation
Power	PWR indication present; no abnormal supply current or heating.
Status	Firmware heartbeat/status indication consistent with the installed release.

Check	Expected observation
Ethernet	Link established; receiving computer/PLC can access the configured endpoint.
ARINC receive	Corresponding channel reports fresh labels when a valid source is active.
Recording	Recorder page/status accessible; start a permitted bench recording and confirm the log file is written to the installed microSD card.
Wi-Fi HMI	Local MELD Wi-Fi network visible; browser HMI opens at the IP address printed on the housing.

4 Electrical interface: J4 DA-15

The product-side J4 is a standard-density 15-contact, two-row DA-15 interface. The universal breakout harness uses a DA-15 female mating connector. Contact numbers below are PCB schematic assignments, not a diagram of a connector mating face or solder-cup view.

CONTACT IDENTIFICATION: J4 pin numbers identify electrical contacts, not a front-view drawing. The front and wiring sides of a D-sub connector are mirror images. Use the connector contact numbers when identifying pins.

J4 pin	Signal	Functional group
1	ETH TX+	Ethernet
2	ETH TX−	Ethernet
3	ETH RX+	Ethernet
4	ETH RX−	Ethernet
5	CGND	Chassis ground
6	ARINC 1-A	ARINC RX1
7	ARINC 1-B	ARINC RX1
8	ARINC 3-A	ARINC RX3
9	ARINC 2-A	ARINC RX2
10	ARINC 2-B	ARINC RX2
11	RAW_28V / VIN	8–32 VDC supply input; nominal 28 V
12	PWR GND	Power return
13	ARINC 4-A	ARINC RX4
14	ARINC 4-B	ARINC RX4
15	ARINC 3-B	ARINC RX3

ARINC-429 pair assignments: receiver 3 uses J4 contacts 8 (A) and 15 (B); receiver 4 uses contacts 13 (A) and 14 (B).

4.1 Ethernet notes

J4 contacts 1–4 carry Ethernet transmit and receive pairs. The universal breakout harness presents these at a female RJ45 jack. Connect a standard Ethernet patch cable to the harness jack. The separate harness assembly drawing governs the internal RJ45 wiring; the J4 pin table is not an RJ45 contact diagram.

5 Universal breakout harness

The universal breakout harness connects the MELD-2100 DA-15 interface to ARINC-429 sources, Ethernet and power. The breakout layout and individual branches are illustrated in Appendix A.

5.1 Harness branches

Branch	J4 contacts	Termination
Ethernet	1, 2, 3, 4	Female RJ45 jack for a standard Ethernet patch cable.
Power positive	11	Labeled +28 VDC / VIN flying lead; acceptable supply input 8–32 VDC.
Power return	12	Labeled PWR GND flying lead.
Chassis ground	5	Labeled CGND flying lead.

Branch	J4 contacts	Termination
ARINC RX1	6 A / 7 B	Shielded twisted pair, labeled flying leads.
ARINC RX2	9 A / 10 B	Shielded twisted pair, labeled flying leads.
ARINC RX3	8 A / 15 B	Shielded twisted pair, labeled flying leads.
ARINC RX4	13 A / 14 B	Shielded twisted pair, labeled flying leads.

5.2 What is a flying lead?

A flying lead is an individual wire with no connector attached at its free end. The breakout harness provides labeled ARINC and power leads so they can be connected to the installation wiring.

5.3 Harness handling

- Route each ARINC A/B pair together within its individual shield; keep untwisted breakout lengths short.
- Identify each wire by J4 contact and signal before trimming; heat-shrink labels are preferred.
- Terminate shield/drain wires only as specified by the approved installation drawing; the illustration is not a shield-bonding schematic.
- Provide backshell strain relief and secure the sleeved trunk to avoid loading DA-15 contacts.
- Insulate all unused flying leads separately. Do not bond any unknown or unused signal to chassis ground.

6 Operation and data access

6.1 ARINC-429 monitoring

With a valid source connected, each receive channel should present activity and decoded labels appropriate to the installed firmware. A missing or stale label can indicate source inactivity, polarity reversal, wrong receiver channel, speed mismatch, or wiring faults. Do not interpret a missing label as a sensor failure until transport and wiring are checked.

6.2 Ethernet communications

The wired Ethernet interface exchanges monitoring and application data with a configured host. Network addresses and data services depend on the connected system and the unit configuration. Use the Connection page and system connection settings to confirm the correct IP address and data destination.

6.3 Recording and removable storage

Recording is a standard MELD-2100 function for every hardware configuration. Each unit ships with a 128 GB microSD card installed for onboard logs, configuration files and reference documents. The zero-receiver configuration records configured PLC/ControlLogix data; the two- and four-receiver configurations record their applicable ARINC-429 inputs. Recording starts and stops through the applicable recorder controls; having a microSD card installed does not mean a recording session is already active. Use Files to inspect recorded files and downloads. Stop recording and allow file operations to finish before removing the card or interrupting power.

6.4 Wi-Fi HMI: access and overview

Every MELD-2100 includes a built-in Wi-Fi interface and browser-based HMI as a standard feature. The unit operates its local Wi-Fi service network for monitoring, recording controls and document/file access, without requiring a separate app or an Internet connection. The Wi-Fi service IP address and hostname are printed on the housing; use those markings for the particular unit. Displayed menus vary by application profile and connected data sources, but Wi-Fi access itself is not an optional configuration.

6.4.1 Connecting from a phone or computer

1. Apply 8–32 VDC and allow the unit to complete startup; check PWR and RUN indications.

2. On your phone, tablet or computer, select the unit's local MELD Wi-Fi network (SSID provided with the unit) and enter the assigned password if prompted. Read the service IP address and hostname printed on the housing; these identify the HMI address and are not necessarily the Wi-Fi network name.

3. Open Safari, Chrome or another browser and enter the Wi-Fi IP address printed on the housing (example: http://192.168.4.1). The labeled hostname (example: http://meld.local) also works when local name resolution is supported.

4. The Wi-Fi HMI opens to its configured startup page. Select Recorder, Files, Documents, or other applicable pages from the menu. The pages shown depend on the installed receiver population and application profile—not on whether Wi-Fi hardware is fitted.

5. When finished, disconnect from the MELD Wi-Fi network or return to the normal network. Internet access is not required for the local HMI.

A phone may report "No Internet Connection" on this Wi-Fi network. That is expected for a local device service network and does not, by itself, indicate a MELD fault.

6.4.2 HMI pages

Page / group	What it provides	Available profiles
Documents	View stored reference documents from the installed microSD card.	All
Files / Firmware	Browse recorded files and documents; view maintenance status. Firmware upload is handled over wired Ethernet.	All
Connection	Inspect or confirm current interface and connection information.	All
Display Settings	Supported display choices; wired HMI controls certain system settings.	All
ARINC-429	Live channel and received-label monitoring for installed receivers.	REC-2, REC-4, DEV (with RX hardware)
Recorder	Core function: recording controls, activity and stored log status.	All configurations
Tags	Live configured PLC tag values.	PLC-0, DEV
HSI / ATT, AI Supervisor, SIM, AFCS Diagnostics	Specialized engineering and AFCS functions, not general customer pages.	DEV only

6.4.3 Wi-Fi versus wired maintenance

Wi-Fi is included and operational on every model. It provides access to the HMI, recording status/controls, documents and supported live pages. The wired Ethernet HMI is used for firmware image uploads, changing the application profile and other intrusive maintenance in the current design. A data-specific page may be absent when its source hardware or application profile is not present; this does not mean the Wi-Fi HMI is optional.

6.4.4 If the HMI does not open

Confirm the MELD unit is powered and the local Wi-Fi network appears in the client's network list. Check that the client is connected to MELD Wi-Fi rather than another network; open the exact service IP address printed on the housing instead of relying solely on hostname resolution. If the network is missing, check the Wi-Fi service status and unit diagnostics. If pages open but values appear stale, compare with the wired HMI and record processor and Wi-Fi firmware versions for support.

6.5 Service connection and firmware

USB-C service and firmware loading functions depend on the installed firmware and hardware build. Product configuration, signed firmware packages and intrusive update actions are managed from the wired Ethernet HMI in the current design. A device presenting as a USB serial port does not necessarily provide USB mass-storage drive access; do not assume the microSD card will mount as a Windows drive until that firmware feature is verified.

6.6 Status and health checklist

Area	Practical check
Hardware	Enclosure secure, connector screws tight, wiring free of abrasion.
Power	8–32 VDC supply; stable current and no unexplained heating.

Area	Practical check
ARINC	All configured, installed receiver channels show fresh source data.
Network	Expected host link and traffic; correct IP configuration.
Storage	microSD file system healthy; recording and download checks pass on every unit.
Firmware	Record processor and Wi-Fi firmware versions before field troubleshooting.

7 Troubleshooting

Symptom	Checks / actions
No PWR indication	Remove power. Verify J4-11 receives 8–32 VDC, J4-12 is return, supply protection and connector seating.
No RUN heartbeat	Verify power first. Check installed firmware/LED configuration; use a supported service connection and maintenance procedure.
Ethernet no link	Check the breakout RJ45 connection, patch cable, and network equipment; confirm the host link and assigned IP address.
ARINC channel empty	Check source activity and polarity; verify J4 A/B pair, ARINC speed and channel assignment; compare with another known-good source.
ARINC labels intermittent	Inspect shields, termination strategy, wiring length, source integrity, power and timing; verify speed setting.
No new log files	Confirm recording was enabled, media present and not full/corrupt; check available firmware diagnostics.
Wi-Fi network / HMI unavailable	Verify unit power and Wi-Fi service status; use the hostname/IP label on the housing, check client network connection, and compare with wired HMI diagnostics.

7.1 Information to capture for support

- Product model, PCB revision and unit serial number.
- Processor firmware version and Wi-Fi firmware version (as shown on the maintenance/status pages).
- J4 harness revision, network settings and source channel wiring.
- Observed PWR / REC / RUN state and any repeatable fault condition.
- Relevant recording/log file name and date/time, or a note of any recording failure.

SERVICE BOUNDARY: This document does not authorize opening, modifying, repairing or testing installed aircraft wiring except through the operator's approved procedures and personnel.

Appendix A / MELD-2100 universal breakout harness

The universal breakout harness separates the J4 connector into Ethernet, ARINC-429 receiver pairs, power and chassis-ground connections. Refer to the J4 pin assignment table in Section 4 for contact identification.

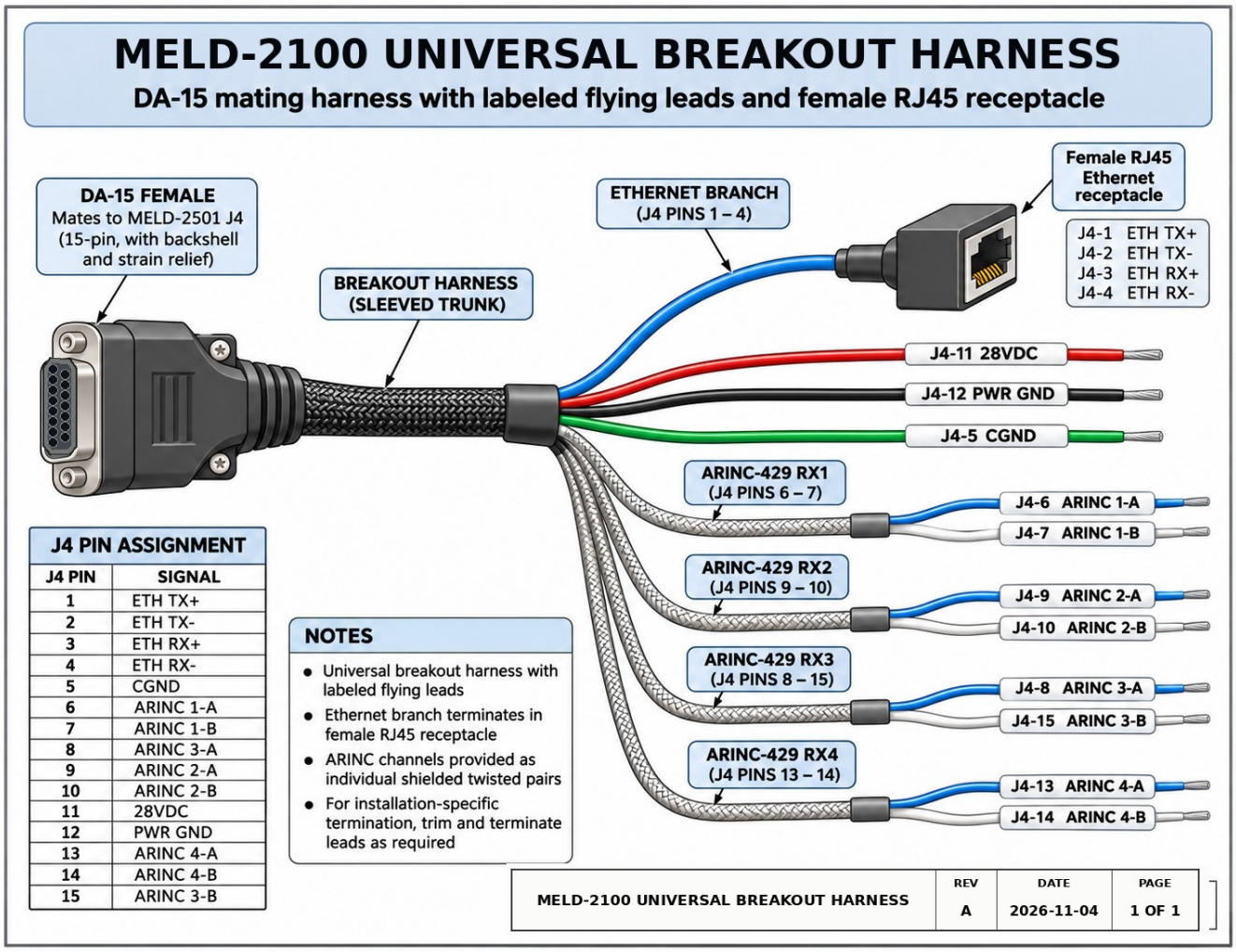


Figure A-1. MELD-2100 Universal Breakout Harness, Rev A.

Appendix B / Unit configuration record

B.1 Unit information

Field	As-installed value / check
Product model / S/N	_____
Processor software version	_____
Wi-Fi software version	_____
Wi-Fi firmware revision	_____
Network IP / mask	_____
Receiving host / protocol	_____
Harness drawing/revision	_____
ARINC sources, RX1-RX4	_____
Installation / service record	_____
MELD-2501 population	-0 / -2 / -4 (circle fitted hardware)
Configured application profile	PLC-0 / REC-2 / REC-4 / DEV
Wi-Fi network name	_____
Wi-Fi service IP / hostname (housing label)	IP: 192.168.4.1 Name: meld.local / verify unit label
microSD card as shipped	128 GB / S/N or card label: _____

B.2 Document revision history

Revision	Description
A • 05 NOV 2026	Product overview, model configurations, 8–32 VDC power, 128 GB microSD, Wi-Fi HMI, J4 electrical interface and universal breakout harness.