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Infinitybox CAN Gateway Module
Part Number 852-952
Setup and Configuration Guide

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Overview

The Infinitybox CAN Gateway is a bidirectional CAN message translator capable of bridging Classic CAN and CAN FD networks. The gateway supports independent speed and protocol configuration per port, allowing seamless communication between networks operating at different bitrates or protocols.

The CAN Gateway features configurable whitelist filtering to control which messages are forwarded between ports. Hardware-based filters provide high-performance message screening with support for standard 11-bit IDs and extended 29-bit J1939 IDs. Four filter modes allow matching by exact ID, PGN only, Source Address only, or PGN and Source Address combination.

The gateway is completely configurable in the field using J1939 CAN commands. Port bitrates can be set independently for 250, 500, or 1000 kbps nominal rates. CAN FD mode supports data phase rates of 2 Mbps or 5 Mbps with payloads up to 64 bytes. All configurations are stored in non-volatile flash memory and persists across power cycles.

Warnings

THE INFINITYBOX CAN GATEWAY IS DESIGNED FOR USE IN VEHICLE CAN NETWORKS. PROPER CARE MUST BE TAKEN TO ENSURE CORRECT WIRING AND TERMINATION OF THE CAN BUS. IMPROPER INSTALLATION CAN CAUSE COMMUNICATION FAILURES OR DAMAGE TO CONNECTED DEVICES.

PROPER CARE MUST BE TAKEN TO ENSURE THAT POWER IS CORRECTLY APPLIED TO THE GATEWAY. REVERSING POLARITY TO THE POWER AND GROUND FEEDS WILL CAUSE IRREPARABLE DAMAGE TO THE MODULE AND WILL VOID THE WARRANTY.

THE CAN BUS MUST BE PROPERLY TERMINATED WITH 120Ω RESISTORS AT EACH END OF THE BUS. MISSING OR INCORRECT TERMINATION WILL CAUSE COMMUNICATION ERRORS AND MAY PREVENT THE GATEWAY FROM OPERATING.

WHEN BRIDGING NETWORKS OPERATING AT DIFFERENT SPEEDS, MESSAGE BUFFERING MAY OCCUR. SUSTAINED HIGH MESSAGE RATES FROM A FAST NETWORK TO A SLOW NETWORK MAY RESULT IN MESSAGE LOSS.

ADDING ANY ELECTRONICS MODULES TO A VEHICLE WILL INCREASE THE DEMAND ON THE BATTERY. CARE MUST BE TAKEN TO MAINTAIN A CHARGE ON THE BATTERY WHEN THE VEHICLE SITS IDLE FOR PERIODS OF TIME. THIS IS ESPECIALLY IMPORTANT WITH GEL-CELL AND AGM BATTERIES. WE STRONGLY RECOMMEND INSTALLING A DISCONNECT SWITCH THAT SEPARATES THE ELECTRICAL LOADS IN THE VEHICLE FROM THE BATTERY WHEN NOT IN USE.

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Technical Details

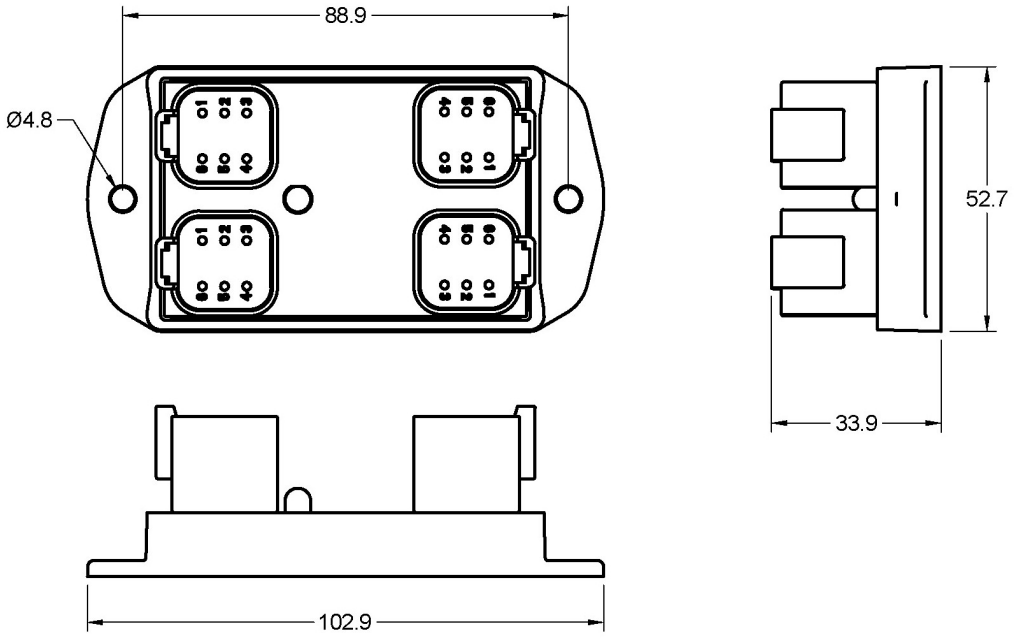
CAN Gateway Technical Details

Parameter	Value
Dimensions	103 mm × 53 mm × 34 mm / 4.1" × 2.1" × 1.3"
CAN Ports	2 independent ports (Port A and Port B)
Operating Voltage Range	7 to 32 VDC
Steady-State Current Draw	0.025 A Nominal
Operating Temperature Range	-40°C to +85°C
Enclosure Rating	Sealed to IP67
CAN Bus Compatibility	ISO 11898-2 (Classic CAN), ISO 11898-1:2015 (CAN FD)
Maximum CAN Cable Length	20 meters

Supported CAN Configurations

Nominal Rate	Data Rate	Mode	Description
250 Kbps	N/A	Classic	Standard J1939 bitrate
500 Kbps	N/A	Classic	High-speed Classic CAN
1 Mbps	N/A	Classic	Maximum Classic CAN speed
250 Kbps	2 Mbps	CAN FD	CAN FD with bit rate switching
500 Kbps	2 Mbps	CAN FD	CAN FD with bit rate switching
1 Mbps	2 Mbps	CAN FD	CAN FD with bit rate switching
250 Kbps	5 Mbps	CAN FD	CAN FD high-speed data phase
500 Kbps	5 Mbps	CAN FD	CAN FD high-speed data phase
1 Mbps	5 Mbps	CAN FD	CAN FD high-speed data phase

Infinitybox CAN Gateway Dimensions (In mm)



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Installation Steps

Mounting the Gateway

The CAN Gateway can be mounted in any orientation using the provided mounting holes. Select a location that is protected from direct exposure to water spray and excessive heat sources. The enclosure is sealed to IP67 but should not be submerged.

CAN Gateway Connector Details

- Mating connector: Amphenol ATP04-6S
- Connector Pinout
    1. Vehicle B+
    2. Ground
    3. Control Voltage
    4. CAN High
    5. CAN Low
    6. Cable Shield

The connectors on a given port (Port A or Port B) are electrically identical. You can use these two connectors on one port to bridge two CAN devices on a network together.

Supplying Power

The Gateway needs battery voltage and ground. Any of the ground terminals in the CAN connectors can be used to ground the module. The cable shield terminals connect to the ground bus on the Gateway printed circuit board.

The Gateway needs to be powered between 7 and 32 volts. It can be powered by either the Vehicle B+ pins or the Control Voltage pins. These connections are all diode isolated on the gateway printed circuit board. We recommend only powering the gateway from one of the port connectors. The power feed for the gateway should be properly fused to protect the gauge of wire supplying current.

Connecting Port A CAN Network
Connect the CAN HI (Yellow) and CAN LO (Green) wires from Port A to the first CAN network. Ensure the network is properly terminated with 120Ω resistors at each physical end of the bus.

Connecting Port B CAN Network
Connect the CAN HI (Yellow) and CAN LO (Green) wires from Port B to the second CAN network. Ensure the network is properly terminated with 120Ω resistors at each physical end of the bus.

CAN Bus Termination
Each CAN bus requires exactly two 120Ω termination resistors, one at each physical end of the bus. The gateway does not include internal termination. You can verify proper termination by measuring resistance between CAN HI and CAN LO with all devices powered off. The measurement should read approximately 60Ω (two 120Ω resistors in parallel).

Power-Up and LED Indicators

Normal Power-Up Sequence

When you apply power to the CAN Gateway:

1. LED flashes three times quickly (100ms on/off) - Device is booting
2. Heartbeat message appears on both CAN ports within 1 second
3. LED pulses briefly when messages are forwarded
4. Gateway begins forwarding messages based on whitelist configuration

LED Indicators

- Three Quick Blinks at Startup: Device has booted or reset. This pattern indicates the watchdog timer caused a reset if seen during operation.
- Short Pulse (50ms): Gateway message forwarded between ports. Normal activity indicator.
- Long Pulse (500ms): Configuration message processed. Indicates a read or write command was received and handled.
- LED Off: Idle state, no recent activity.

Watchdog Timer

The gateway includes a watchdog timer that automatically resets the device if the firmware becomes unresponsive. The watchdog timeout is approximately 2 seconds. If you observe repeated startup blink patterns, this may indicate a configuration or bus problem causing continuous resets.

Bus-Off Recovery

If a CAN port enters bus-off state due to excessive errors (disconnected cable, bus short, missing termination), the hardware automatically attempts recovery. During recovery, the affected port's status flag will indicate bus-off in the heartbeat message. The gateway continues operating normally on the unaffected port during recovery.

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CAN Communication Reference

Understanding Device Messages

The CAN Gateway communicates on both CAN ports using J1939-style extended CAN messages. The gateway transmits a heartbeat message for status monitoring and responds to configuration read/write commands. All configuration messages use a 0x77 guard byte for validation.

Default Message IDs

Function	Default CAN ID	PGN	Source Address
Heartbeat	0x18FF0680	0xFF06	0x80
Config Write Request	0x18FF1680	0xFF16	0x80
Config Read Request	0x18FF2680	0xFF26	0x80
Config Response	0x18FF3680	0xFF36	0x80
Diagnostic	0x18FF4680	0xFF46	0x80

All message IDs are configurable via EEPROM. The CAN ID is constructed as: Priority (0x18) + PGN High + PGN Low + Source Address.

Heartbeat Message

The heartbeat message is transmitted every 1 second on both CAN ports to indicate the device is operational and provide real-time status.

Message Identification

Default CAN ID: 0x18FF0680

- Priority: 0x18 (J1939 priority 6)
- PGN: 0xFF06 (65286 decimal)
- Source Address (SA): 0x80 (128 decimal)
- Period: 1000 ms

Data Bytes (8 bytes total)

Byte	Name	Description	Example
0	Firmware Major Version	Major version number	0x01 = v1.x
1	Firmware Minor Version	Minor version number	0x05 = v1.5
2	Rolling Counter	Increments 0→255, then wraps	0x2A = 42nd
3	Port A Status	Port A error flags	0x00 = no errors
4	Port B Status	Port B error flags	0x00 = no errors
5	Gateway Status	Configuration and system flags	0x01 = config valid
6	Uptime	(Uptime in seconds ÷ 10) mod 256	0x06 = 60 seconds
7	Reserved	Always 0x00	0x00

Port Status Flags (Bytes 3 and 4)

Bit	Flag Name	Meaning
0	BUS_OFF	CAN controller in bus-off state
1	ERR_WARN	Error warning (TEC or REC ≥ 96)
2	RX_OVERFLOW	Receive buffer overflow occurred
3	TX_PASSIVE	Transmitter in error passive state
4-7	Reserved	Always 0

Normal operation: All bits = 0 (0x00)

Gateway Status Flags (Byte 5)

Bit	Flag Name	Meaning
0	CONFIG_VALID	Configuration is valid (init stamp = 0xA5)
1	REBOOT_REQ	Reboot required to apply pending changes
2-7	Reserved	Always 0

Writing to EEPROM

The device configuration is stored in non-volatile flash memory. You can modify any configuration address using CAN write commands.

Write Request Message Format
Default CAN ID: 0x18FF1680

- Priority: 0x18 (J1939 priority 6)
- PGN: 0xFF16 (65302 decimal)
- Source Address: 0x80 (128 decimal)

Data Bytes

Byte	Name	Value	Description
0	Guard Byte	0x77	Required - Write command identifier
1	Address LSB	0x00-0xFF	Configuration address low byte
2	Address MSB	0x00-0x00	Configuration address high byte
3	Value	0x00-0xFF	Byte value to write
4-7	Don't Care	Any	Unused bytes

Write Procedure
Step 1: Construct the write command

Example: Write value 0x02 to address 0x0000 (change Port A bit rate to 500 kbps)

CAN ID: 0x18FF1680

Data: [77] [00] [00] [02] [FF] [FF] [FF] [FF]

Step 2: Transmit the message

Send the message on either CAN port at the current bitrate. The gateway accepts configuration commands on both ports.

Step 3: Wait for response

The device will reply within 50-100 ms with a response message on the same port that received the request.

Step 4: Verify success

Check the response status byte (byte 5) for success (0x01 or 0x02) or error code.

Important Notes
Guard Byte: The first byte must be 0x77. Any other value will be rejected with error code 0xE1.

Reboot Required: Changes to port bitrate, port mode, and whitelist filters require a power cycle to take effect. The response will return status code 0x02 to indicate reboot required.

Write Delay: Allow at least 50 ms between consecutive writes to avoid overwhelming the device.

Understanding the Response Message

After every configuration read or write command, the device sends a response message confirming the operation.

Response Message Format

Default CAN ID: 0x18FF3680

Byte	Name	Description
0	Firmware Major	Major version number (e.g., 0x01)
1	Firmware Minor	Minor version number (e.g., 0x05)
2	Value or Error	Value read/written, or error code if failed
3	Address LSB	Configuration address low byte (echo of request)
4	Address MSB	Configuration address high byte (echo of request)
5	Status	Success (0x01, 0x02) or error code
6	Reserved	Always 0x00
7	Reserved	Always 0x00

Status Codes (Byte 5)

Code	Name	Meaning
0x01	SUCCESS	Read or write completed successfully
0x02	REBOOT_REQUIRED	Success, power cycle required to apply
0x03	FLASH_ERROR	Flash write operation failed
0xE1	INVALID_GUARD	Guard byte was not 0x77
0xE5	VERIFY_FAILED	Write completed but verify read didn't match
0xE6	INVALID_ADDRESS	Address is out of range (>0x8B)
0xE7	INVALID_VALUE	Value not valid for this address

Reading from EEPROM

You can read any configuration address to verify settings or retrieve current values.

Read Request Message Format

Default CAN ID: 0x18FF2680

Byte	Name	Value	Description
0	Guard Byte	0x77	Required - Read command identifier
1	Address LSB	0x00-0xFF	Configuration address low byte
2	Address MSB	0x00-0x00	Configuration address high byte
3-7	Don't Care	Any	Unused bytes

Read Procedure

Step 1: Construct the read command

Example: Read address 0x0000 (Port A bitrate setting)

CAN ID: 0x18FF2680

Data: [77] [00] [00] [FF] [FF] [FF] [FF] [FF]

Step 2: Transmit the message

Send the message on either CAN port.

Step 3: Wait for response

The device will reply within 10-50 ms with a response message.

Step 4: Extract the value

The value is in byte 2 of the response message.

EEPROM Configuration Settings

Memory Organization

The CAN Gateway stores all configurations in non-volatile flash memory. The total configuration size is 140 bytes (addresses 0x00 to 0x8B). The memory is organized into system configuration, message PGN settings, and whitelist filter regions.

System Configuration (Addresses 0x00-0x09)

Address	Parameter	Default	Description
0x00	Port A Bitrate	0x02	0x01=250K, 0x02=500K, 0x03=1M
0x01	Port A Mode	0x00	0x00=Classic, 0x01=FD/2M, 0x02=FD/5M
0x02	Port B Bitrate	0x02	0x01=250K, 0x02=500K, 0x03=1M
0x03	Port B Mode	0x00	0x00=Classic, 0x01=FD/2M, 0x02=FD/5M
0x04	FW Major	0x01	Firmware major version (Read-only)
0x05	FW Minor	0x05	Firmware minor version (Read-only)
0x06	Gateway Mode	0x00	Reserved for future use
0x07	Init Stamp	0xA5	Initialization marker (0xA5 = valid)
0x08	Status Flags	0x00	Bit 0: Reboot required
0x09	Reserved	0x00	Reserved

Bitrate Values

Value	Bitrate	Description
0x01	250 Kbps	Standard J1939 bitrate
0x02	500 Kbps	High-speed applications (default)
0x03	1 Mbps	Maximum speed

Note: Invalid bitrate values default to 250 Kbps.

Mode Values

Value	Mode	Description
0x00	Classic CAN	CAN 2.0, 8-byte maximum payload
0x01	CAN FD / 2M	CAN FD with 2 Mbps data rate, 64-byte maximum
0x02	CAN FD / 5M	CAN FD with 5 Mbps data rate, 64-byte maximum

Power cycle required: Changes to bitrate or mode require a reboot to take effect.

Configuration PGN Settings

These addresses control the CAN message IDs used for configuration and status messages. Each message ID is constructed from a PGN (2 bytes) and Source Address (1 byte).

Address	Parameter	Default	Description
0x0A	Write PGN Low	0x16	Write request PGN low byte (PS)
0x0B	Write PGN High	0xFF	Write request PGN high byte (PF)
0x0C	Write SA	0x80	Write request source address
0x0D	Read PGN Low	0x26	Read request PGN low byte (PS)
0x0E	Read PGN High	0xFF	Read request PGN high byte (PF)
0x0F	Read SA	0x80	Read request source address
0x10	Response PGN Low	0x36	Response PGN low byte (PS)
0x11	Response PGN High	0xFF	Response PGN high byte (PF)
0x12	Response SA	0x80	Response source address
0x13	Diagnostic PGN Low	0x46	Diagnostic PGN low byte (PS)
0x14	Diagnostic PGN High	0xFF	Diagnostic PGN high byte (PF)
0x15	Diagnostic SA	0x80	Diagnostic source address
0x16	Heartbeat PGN Low	0x06	Heartbeat PGN low byte (PS)
0x17	Heartbeat PGN High	0xFF	Heartbeat PGN high byte (PF)
0x18	Heartbeat SA	0x80	Heartbeat source address

CAN ID Construction

The 29-bit extended CAN ID is constructed as:

CAN ID = 0x18000000 | (PGN_High << 16) | (PGN_Low << 8) | SA

Default Write ID: 0x18000000 | (0xFF << 16) | (0x16 << 8) | 0x80 = 0x18FF1680

Addresses 0x19-0x23 are reserved for future use and should not be modified.

Critical: If you change the Write or Read PGN/SA, you must use the NEW CAN ID for all future configuration commands. Changes take effect immediately.

Whitelist Configuration

The gateway supports hardware-based whitelist filtering to control which messages are forwarded between ports. Each direction has its own independent whitelist.

Whitelist Memory Regions

Direction	Address Range	Entries	Description
A → B	0x24 - 0x57	13	Messages from Port A forwarded to Port B
B → A	0x58 - 0x8B	13	Messages from Port B forwarded to Port A

Each whitelist entry is 4 bytes. The maximum of 13 entries per direction is a hardware filter limitation.

Whitelist Behavior

- If no valid entries exist (first entry has filter_ctrl = 0xFF), all messages are forwarded (pass-all mode)
- If one or more valid entries exist, only matching messages are forwarded
- The whitelist count is auto-detected by scanning entries until an invalid filter_ctrl (0xFF) is found

Entry Address Calculation

For A→B whitelist (entries 0-12): Entry address = 0x24 + (entry_number × 4)

For B→A whitelist (entries 0-12): Entry address = 0x58 + (entry_number × 4)

A→B Whitelist Address Map

Entry	Address Range	Byte 0	Byte 1	Byte 2	Byte 3
0	0x24 - 0x27	filter_ctrl	PF/ID_L	PS/ID_H	SA
1	0x28 - 0x2B	filter_ctrl	PF/ID_L	PS/ID_H	SA
2	0x2C - 0x2F	filter_ctrl	PF/ID_L	PS/ID_H	SA
3	0x30 - 0x33	filter_ctrl	PF/ID_L	PS/ID_H	SA
4	0x34 - 0x37	filter_ctrl	PF/ID_L	PS/ID_H	SA
5	0x38 - 0x3B	filter_ctrl	PF/ID_L	PS/ID_H	SA
6	0x3C - 0x3F	filter_ctrl	PF/ID_L	PS/ID_H	SA
7	0x40 - 0x43	filter_ctrl	PF/ID_L	PS/ID_H	SA
8	0x44 - 0x47	filter_ctrl	PF/ID_L	PS/ID_H	SA
9	0x48 - 0x4B	filter_ctrl	PF/ID_L	PS/ID_H	SA
10	0x4C - 0x4F	filter_ctrl	PF/ID_L	PS/ID_H	SA
11	0x50 - 0x53	filter_ctrl	PF/ID_L	PS/ID_H	SA
12	0x54 - 0x57	filter_ctrl	PF/ID_L	PS/ID_H	SA

B→A Whitelist Address Map

Entry	Address Range	Byte 0	Byte 1	Byte 2	Byte 3
0	0x58 - 0x5B	filter_ctrl	PF/ID_L	PS/ID_H	SA
1	0x5C - 0x5F	filter_ctrl	PF/ID_L	PS/ID_H	SA
2	0x60 - 0x63	filter_ctrl	PF/ID_L	PS/ID_H	SA
3	0x64 - 0x67	filter_ctrl	PF/ID_L	PS/ID_H	SA
4	0x68 - 0x6B	filter_ctrl	PF/ID_L	PS/ID_H	SA
5	0x6C - 0x6F	filter_ctrl	PF/ID_L	PS/ID_H	SA
6	0x70 - 0x73	filter_ctrl	PF/ID_L	PS/ID_H	SA
7	0x74 - 0x77	filter_ctrl	PF/ID_L	PS/ID_H	SA
8	0x78 - 0x7B	filter_ctrl	PF/ID_L	PS/ID_H	SA
9	0x7C - 0x7F	filter_ctrl	PF/ID_L	PS/ID_H	SA
10	0x80 - 0x83	filter_ctrl	PF/ID_L	PS/ID_H	SA
11	0x84 - 0x87	filter_ctrl	PF/ID_L	PS/ID_H	SA
12	0x88 - 0x8B	filter_ctrl	PF/ID_L	PS/ID_H	SA

Whitelist Entry Format

Each whitelist entry is 4 bytes. The format depends on the filter control byte (first byte of entry).

Filter Control Byte Values

Value	Name	Description
0x00	STANDARD	11-bit standard CAN ID, exact match
0x01	EXT_SA_ONLY	29-bit extended ID, match Source Address only
0x10	EXT_PGN_ONLY	29-bit extended ID, match PGN only (any SA)
0x11	EXT_PGN_SA	29-bit extended ID, match both PGN and SA
0xFF	INVALID	Empty entry (marks end of whitelist)

J1939 Extended ID Structure

For J1939 extended IDs, the 29-bit CAN ID is structured as:

Bits 28:26 = Priority (IGNORED by filters)

Bits 25:24 = Reserved/DP (assumed 0)

Bits 23:16 = PF (PDU Format)

Bits 15:8 = PS (PDU Specific)

Bits 7:0 = SA (Source Address)

PGN = (PF << 8) | PS = bits 23:8

Example: CAN ID 0x18FECA21

- Priority = 6 (bits 28:26, ignored by filter)
- PF = 0xFE (bits 23:16)
- PS = 0xCA (bits 15:8)
- SA = 0x21 (bits 7:0)
- PGN = 0xFECA

Filter Mode Matching Behavior

Mode	PF	PS	SA	Matches
EXT_PGN_SA (0x11)	Must match	Must match	Must match	Only exact PGN+SA
EXT_PGN_ONLY (0x10)	Must match	Must match	Ignored	Any SA with PGN
EXT_SA_ONLY (0x01)	Ignored	Ignored	Must match	Any PGN from SA

Configuration Examples

Example 1: Set Port A to Classic CAN 250 Kbps

Write bitrate = 250K (0x01) to address 0x00:

TX to 0x18FF1680: [77] [00] [00] [01] [FF] [FF] [FF] [FF]

Write mode = Classic (0x00) to address 0x01:

TX to 0x18FF1680: [77] [01] [00] [00] [FF] [FF] [FF] [FF]

Power cycle the gateway to apply changes.

Example 2: Set Port B to CAN FD 500K/2M

Write bitrate = 500K (0x02) to address 0x02:

TX to 0x18FF1680: [77] [02] [00] [02] [FF] [FF] [FF] [FF]

Write mode = CAN FD 2M (0x01) to address 0x03:

TX to 0x18FF1680: [77] [03] [00] [01] [FF] [FF] [FF] [FF]

Power cycle the gateway to apply changes.

Example 3: Add Standard ID 0x123 to A→B Whitelist (Entry 0)

Write filter_ctrl = Standard (0x00) to address 0x24:

TX to 0x18FF1680: [77] [24] [00] [00] [FF] [FF] [FF] [FF]

Write ID low byte = 0x23 to address 0x25:

TX to 0x18FF1680: [77] [25] [00] [23] [FF] [FF] [FF] [FF]

Write ID high byte = 0x01 to address 0x26:

TX to 0x18FF1680: [77] [26] [00] [01] [FF] [FF] [FF] [FF]

Write unused byte = 0xFF to address 0x27:

TX to 0x18FF1680: [77] [27] [00] [FF] [FF] [FF] [FF] [FF]

Power cycle to apply filters.

Example 4: Add J1939 Extended ID 0x18FECA21 (PGN+SA Match)

For CAN ID 0x18FECA21: PF=0xFE, PS=0xCA, SA=0x21

Write filter_ctrl = Extended PGN+SA (0x11) to address 0x24:

TX to 0x18FF1680: [77] [24] [00] [11] [FF] [FF] [FF] [FF]

Write PF = 0xFE to address 0x25:

TX to 0x18FF1680: [77] [25] [00] [FE] [FF] [FF] [FF] [FF]

Write PS = 0xCA to address 0x26:

TX to 0x18FF1680: [77] [26] [00] [CA] [FF] [FF] [FF] [FF]

Write SA = 0x21 to address 0x27:

TX to 0x18FF1680: [77] [27] [00] [21] [FF] [FF] [FF] [FF]

Power cycle to apply filters.

Example 5: Clear Whitelist (Return to Pass-All Mode)

Write filter_ctrl = Invalid (0xFF) to entry 0, address 0x24:

TX to 0x18FF1680: [77] [24] [00] [FF] [FF] [FF] [FF] [FF]

Power cycle to apply. With entry 0 invalid, all messages will be forwarded.

Protocol Translation

The CAN Gateway automatically handles protocol translation when messages are forwarded between ports configured for different protocols.

Forwarding Behavior

Source Mode	Destination Mode	Payload Size	Action
Classic CAN	Classic CAN	≤8 bytes	Copy as-is
Classic CAN	CAN FD	≤8 bytes	Copy as-is (Classic frame)
CAN FD	CAN FD	≤64 bytes	Copy full payload
CAN FD	Classic CAN	≤8 bytes	Clear FDF/BRS, copy data
CAN FD	Classic CAN	>8 bytes	Truncate to 8 bytes

CAN FD to Classic CAN Truncation

When a CAN FD message with more than 8 data bytes is forwarded to a Classic CAN port:

- Only the first 8 data bytes are transmitted
- The DLC is set to 8
- The FDF (FD Format) and BRS (Bit Rate Switch) bits are cleared
- The CAN ID is preserved unchanged

Example:

Source (CAN FD, 16 bytes):

ID: 0x18FECA21, DLC: 10 (16 bytes)

Data: AA BB CC DD EE FF 00 11 22 33 44 55 66 77 88 99

Destination (Classic CAN, truncated):

ID: 0x18FECA21, DLC: 8

Data: AA BB CC DD EE FF 00 11

Rate Mismatch Buffering

When the source port operates at a higher message rate than the destination port can transmit, messages are buffered in a 16-message deep FIFO. If the buffer overflows, the oldest messages are dropped. The heartbeat message RX_OVERFLOW flag indicates when overflow has occurred.

Troubleshooting

No Heartbeat Message Visible

Check:

1. Verify power is applied
2. Check CAN bus termination (should measure ~60Ω between CAN HI and CAN LO)
3. Verify your CAN tool is set to the correct bitrate (default 500 Kbps)
4. Confirm CAN HI and CAN LO wires are not swapped
5. Look for the three-blink startup pattern on the LED

Configuration Commands Not Responding

Check:

1. Verify guard byte is 0x77 (first byte of data)
2. Confirm you are using the correct CAN ID (default 0x18FF1680 for write, 0x18FF2680 for read)
3. Check that your CAN tool is sending extended (29-bit) frames, not standard (11-bit)
4. Verify the gateway heartbeat is visible (confirms basic communication)

Messages Not Being Forwarded

Check:

1. If whitelist is configured, verify the message ID matches a whitelist entry
2. Read back whitelist entries to confirm they are programmed correctly
3. To test, clear the whitelist (write 0xFF to address 0x24) and reboot to enable pass-all mode
4. Check heartbeat for error flags on source or destination port

LED Blinking Continuously at Startup

The three-blink pattern repeating indicates the watchdog timer is resetting the device. This can occur if the CAN bus has a fault preventing initialization or the configuration is corrupted. Try disconnecting both CAN buses and power cycling. If the LED stops blinking, reconnect one bus at a time to identify the problem. Perform factory reset if configuration is suspected.

Bus-Off Errors in Heartbeat

Port status byte bit 0 = 1 indicates bus-off condition. Common causes include missing 120Ω termination resistors, CAN cable disconnected or damaged, CAN HI/LO shorted together, or wrong bitrate configured. The gateway automatically attempts recovery. If the fault persists, the port will cycle between bus-off and recovery.

Factory Reset Procedure

To restore all settings to factory defaults:

Step 1: Write 0x00 to address 0x07 (Init Stamp)

TX to 0x18FF1680: [77] [07] [00] [00] [FF] [FF] [FF] [FF]

Step 2: Wait for success response

RX from 0x18FF3680: [01] [05] [00] [07] [00] [02] [00] [00]

Step 3: Power cycle the device

Remove power for at least 2 seconds, then reconnect.

Result:

- All system configurations restored to factory defaults
- Port A and Port B set to 500 Kbps Classic CAN
- All whitelist entries cleared (pass-all mode)
- All PGN/SA settings restored to defaults
- Device will initialize with default configuration

Quick Reference Tables

Default CAN IDs

Function	CAN ID	PGN	SA
Heartbeat	0x18FF0680	0xFF06	0x80
Write Request	0x18FF1680	0xFF16	0x80
Read Request	0x18FF2680	0xFF26	0x80
Response	0x18FF3680	0xFF36	0x80
Diagnostic	0x18FF4680	0xFF46	0x80

Status Codes

Code	Name	Meaning
0x01	SUCCESS	Operation completed
0x02	REBOOT_REQUIRED	Success, power cycle to apply
0x03	FLASH_ERROR	Flash write failed
0xE1	INVALID_GUARD	Guard byte not 0x77
0xE5	VERIFY_FAILED	Write verification failed
0xE6	INVALID_ADDRESS	Address out of range
0xE7	INVALID_VALUE	Value not valid

Filter Control Values

Value	Mode	Description
0x00	STANDARD	11-bit ID exact match
0x01	EXT_SA_ONLY	Match SA only
0x10	EXT_PGN_ONLY	Match PGN only
0x11	EXT_PGN_SA	Match PGN and SA
0xFF	INVALID	Empty entry

Warranty Information

Infinitybox, LLC ("Infinitybox") warrants against any defects in materials and workmanship to the Product's modules, wiring harnesses and accessory modules for a period of one (1) year from the first date of purchase. Subject to the terms of this warranty described below, Infinitybox will replace any such defective Product that is returned to Infinitybox within the one (1) year period from initial purchase. Replacement of any defective part or Product will not extend the applicable warranty period.

The warranty does not apply to: (i) any Product that is not installed in compliance with the applicable Product documentation; (ii) any defect in, or failure of, the Product resulting from an accident, shock, negligence, water immersion or misuse; (iii) any Product that has been modified, adjusted, repaired, or disassembled by any party other than Infinitybox; or (iv) any defect other than in materials and workmanship.

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