



AMPLIFIER CONTROL CARD

MULTIDROP COMMAND INTERFACE REFERENCE MANUAL

FIRMWARE VERSION 1.1



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MANUAL

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1 Multidrop Commands

1.1 Multidrop Command Structure

Multidrop commands are normally sent on an RS485 type bus. The basic structure of these commands is described in a separate document.

1.2 Class 0 Commands (common)

1.2.1 identity

Class: 0 Member: 0 Data: 0 Timeout: 50mS¹

Return version and other identification information.

1.2.2 identity_r

Class: 0 Member: 1 Data: 8

Byte	Description
0	Module Class Number
1	Major Revision
2	Minor Revision
3	Protocol Level Supported. This is level 1.
4	Unit Identifier (if more than one unit of this type, otherwise 0)
5,6	Serial Number
7	Receive Buffer Length (0 if not applicable).

1.2.3 reset

Class: 0 Member: 2 Data: 0 Timeout: n/a

Reset the hardware as near as possible to power-up state. **Do not expect a response.** Reset may take several seconds.

1.2.4 error

Class: 0 Member: 3 Data: 1+ Timeout: n/a

A unit returns this in response to a command that it has rejected. The sequence number of the ERROR message should match the sequence number of the command. The first byte of data gives the reason for rejection, followed bytes are implementation-dependant and may describe the rejection in more detail.

Value	Meaning
0	Unknown command.
1	Bad checksum.
2	Timeout receiving command. (optional)
3	Address mark received while receiving command. (optional)
4	Transient error, retry the command.
5	Packet format error

1.2.5 status

Class: 0 Member: 4 Data: 0 Timeout: 100mS

1.2.6 status_r

Class: 0 Member: 5 Data: 1

Response to a Request Status command. The first byte describes the current status of the unit. Following bytes are implementation-specific and may describe the status of the unit in more detail.

¹ The hardware is guaranteed to respond to the command within this time



Value	Meaning
0	OK
1	Not yet ready for commands. Will be at some time later.
2	Unit has encountered a transient error during operation.
3	Unit is faulty and error can not be cleared by a device reset.

1.3 Class 15 Commands (amplifier control card)

1.3.1 storenv

Class: 15 Member: 16 Data: 0 Timeout: 1000mS

All settable parameters are stored in microprocessor RAM for ordinary use. This information is loaded from non-volatile memory on power-up and can be saved in non-volatile memory all at once with the **storenv** command.

1.3.2 storenv_r

Class: 15 Member: 17 Data: 1

Byte	Description
0	0=OK, 255=Error

1.3.3 getstatus

Class: 15 Member: 22 Data: 0 Timeout: 50mS

Read various module specific status information.

1.3.4 getstatus_r

Class: 15 Member: 23 Data: 12

Byte	Description
0	Transmitter Enabled/Disabled (1=Enabled, 0=Disabled).
1	(not implemented)
2	Raw Line Voltage Reading (0..255) (not implemented)
3	Raw Forward Voltage Reading (0..255)
4	Raw Reflected Voltage Reading (0..255)
5	Internal Temperature (degrees C)
6	Internal Temperature fractional part (tenths of degrees C)
7	Temperature OK (1=OK, 0=bad)
8	Power OK (1=OK, 0=bad)
9	Duty Limit Exceeded (1=YES,0=NO) Flag latched until using this command.
10	(not implemented)
11	Mismatched Detected (1=YES,0=NO). Flag latched until using this command.

1.3.5 setfactors

Class: 15 Member: 32 Data: 12 Timeout: 50mS

Set the voltage scaling factors for the forward and reverse voltage monitoring. Note that *v fwd_scale* and *v ref_scale* must be non-zero otherwise the command will fail. This command is provided for display convenience only and can be set as the user desires without otherwise affecting amplifier functionality.

$$\text{real line voltage} = (\text{sampled line voltage} - \text{vrf_offset}) / \text{vrf_scale}$$

$$\text{real forward voltage} = (\text{sampled forward voltage} - \text{vfwd_offset}) / \text{vfwd_scale}$$

$$\text{real reverse voltage} = (\text{sampled reverse voltage} - \text{vref_offset}) / \text{vref_scale}$$

Note that the offset values are in 16-bit 2's complement format.

Byte	Description
------	-------------



0	vrf_offset low byte
1	vrf_offset high byte
2	v fwd_offset low byte
3	v fwd_offset high byte
4	vref_offset low byte
5	vref_offset high byte
6	vrf_scale integer part (0...255)
7	vrf_scale hundredths part (0...99)
8	v fwd_scale integer part (0...255)
9	v fwd_scale hundredths part (0...99)
10	vref_scale integer part (0...255)
11	vref_scale hundredths part (0...99)

1.3.6 setfactors_r

Class: 15 Member: 33 Data: 1

Byte	Description
0	0=OK, 255=Error

1.3.7 getfactors

Class: 15 Member: 34 Data: 0 Timeout: 50mS

Read the voltage scaling factors.

1.3.8 getfactors_r

Class: 15 Member: 35 Data: 12

Byte	Description
0	vrf_offset low byte
1	vrf_offset high byte
2	v fwd_offset low byte
3	v fwd_offset high byte
4	vref_offset low byte
5	vref_offset high byte
6	vrf_scale integer part (0...255)
7	vrf_scale hundredths part (0...99)
8	v fwd_scale integer part (0...255)
9	v fwd_scale hundredths part (0...99)
10	vref_scale integer part (0...255)
11	vref_scale hundredths part (0...99)

1.3.9 getparameters

Class: 15 Member: 36 Data: 0 Timeout: 50mS

Read the derived operating parameters: power, VSWR and line voltage. Note that the factors for this to return useful results are only set up for an amplifier with an LCD interface (see command **setfactors**).

1.3.10 getparameters_r

Class: 15 Member: 37 Data: 10

Byte	Description
0	Forward power [kW] - Integer Part
1	Forward power - Hundredths
2	Reflected power - Integer Part
3	Reflected power - Hundredths
4	VSWR - Integer Part
5	VSWR - Hundredths



- 6 Temperature - Integer Part
- 7 Temperature - Hundredths
- 8 Line voltage [V] - High byte
- 9 Line voltage - Low byte

1.3.11 setmultidropaddress

This command is typically sent using the broadcast destination address

Class: 15 Member: 38 Data: 2 Timeout: 50mS

- | Byte | Description |
|------|--|
| 0 | key byte – must be 0x69 |
| 1 | Multidrop Address (set in non-volatile memory) |

1.3.12 setmultidropaddress_r

Class: 15 Member: 39 Data: 1 Timeout: 50mS

- | Byte | Description |
|------|-----------------------------------|
| 0 | 0=OK, 255=Error, 254=Out of Range |

1.3.13 setserialnumber

Class: 15 Member: 40 Data: 1 Timeout: 50mS

- | Byte | Description |
|------|--|
| 0 | Key byte – must be 0x69 |
| 1 | Serial Number High Byte (set in non-volatile memory) |
| 2 | Serial Number Low Byte (set in non-volatile memory) |

1.3.14 setserialnumber_r

Class: 15 Member: 41 Data: 1 Timeout: 50mS

- | Byte | Description |
|------|-----------------|
| 3 | 0=OK, 255=Error |

1.3.15 getsupplyvoltages

Class: 15 Member: 42 Data: 0 Timeout: 50mS

Get the current state of the various system supply voltages

1.3.16 getsupplyvoltages_r

Class: 15 Member: 43 Data: 10 Timeout: 50mS

- | Byte | Description |
|------|-----------------|
| 0 | Supply 1 Units |
| 1 | Supply 1 Tenths |
| 2 | Supply 2 Units |
| 3 | Supply 2 Tenths |
| 4 | Supply 3 Units |
| 5 | Supply 3 Tenths |
| 6 | Supply 4 Units |
| 7 | Supply 4 Tenths |
| 8 | Supply 5 Units |



9 Supply 5 Tenths

1.3.17 setsupplyvoltage targets

The control card can be told what each of the monitored supply voltage lines should be. This is specified with units and tenths as for member 42. These voltages are not enforced, but provide the application software with useful information.

Class: 15 Member: 44 Data: 10 Timeout: 50mS

Byte	Description
0	Supply 1 Units
1	Supply 1 Tenths
2	Supply 2 Units
3	Supply 2 Tenths
4	Supply 3 Units
5	Supply 3 Tenths
6	Supply 4 Units
7	Supply 4 Tenths
8	Supply 5 Units
9	Supply 5 Tenths

1.3.18 setsupplyvoltage targets_r

Class: 15 Member: 45 Data: 1 Timeout: 50mS

Byte	Description
0	0=OK, 255=Error

1.3.19 getsupplyvoltage targets

Class: 15 Member: 46 Data: 0 Timeout: 50mS

1.3.20 getsupplyvoltage targets_r

Class: 15 Member: 47 Data: 10 Timeout: 50mS

Byte	Description
0	Supply 1 Units
1	Supply 1 Tenths
2	Supply 2 Units
3	Supply 2 Tenths
4	Supply 3 Units
5	Supply 3 Tenths
6	Supply 4 Units
7	Supply 4 Tenths
8	Supply 5 Units
9	Supply 5 Tenths

1.3.21 setbauddivisor

Class 15 Member 52 Data:1 Timeout: 50mS

This command enables a serial communications baud rate other than the default 9600bps to be used. The baud rate will revert back to 9600bps after a power cycle.

Caution: This is a new command and communication above 9600 baud has not been extensively field tested. Use with appropriate caution.

Formula for Baud rate= $16.0e6/32/(DIV+1)$

e.g. (25=19200, 51=9600, 103=4800, 207=2400)



1.3.22 setbauddivisor_r

Class:15 Member: 53 Data:1 Timeout: 50mS

Byte	Description
0	0=OK, 255=Error



Revision History:

Revision A: First Release

Revision B: For Version 1.1 Firmware

Added SetBaudDivisor Command

Updated SetMultiDropAddress Command Info.

Updated SetSerialNumber Command Info.

GetSupplyVoltages increased from 4 supplies to 5 supplies

Deleted Get/SetSupplyVoltageFactors

Added Get/SetSupplyVoltageTargets