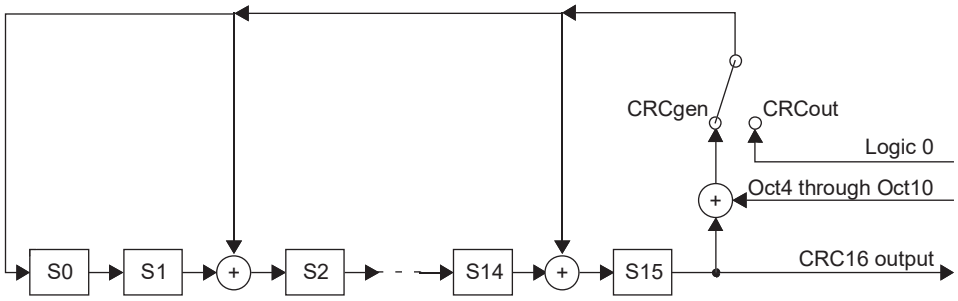

Figure 201–22—CRC16

Table 201–8—MDIO/PMA control variable mapping

MDIO control variable	PMA register name	Register/bit number	PMA control variable
Reset	PMA/PMD control 1 register/ MultiGBASE-T1/V1 PMA control register	1.0.15 / 1.2309.15	pma_reset
Transmit disable	MultiGBASE-T1/V1 PMA control register	1.2309.14	PMA_transmit_disable

Table 201–9—MDIO/PMA status variable mapping

MDIO status variable	PMA register name	Register/bit number	PMA status variable
Receive fault	MultiGBASE-T1/V1 PMA status register	1.2310.1	PMA_receive_fault

201.5.2.7 PHY Control function, LS_PATH

PHY Control generates the control actions that are needed to bring the PHY into a mode of operation during which frames can be exchanged with the link partner. PHY Control shall comply with the state diagram in Figure 201–24.

During PMA training (TRAINING state in Figure 201–24), PHY Control information is exchanged between link partners with a 65-bit Infofield, which is XORed with bits 195 to 259 of the PMA training frame, see 201.4.5. The link partner is not required to decode every Infofield transmitted but is required to decode Infofields at a rate that enables the correct actions prior to the training to data mode transition.

The 65-bit Infofield shall include the fields in 201.5.2.7.2 through 201.5.2.7.6, also shown in Figure 201–23. Infofield shall be transmitted at least 128 times with each change to octets 5 to 8.

201.5.2.7.1 Infofield notation

For all the Infofield notations in the following subclauses, Reserved<bit location> represents any unused values and shall be set to zero on transmit and ignored when received by the link partner. The Infofield is

PMA_state = 00

C/D octet 1	octets 2/3/4		octet 5	octets 6/7/8
1	0x5A	Reserved	Message	PHY Capability Bits

Figure 201–23—Infofield TRAINING format, LS_PATH

transmitted following the notation where the LSB of each octet is sent first and the octets are sent in increasing number order (that is, the LSB of Oct1 is sent first).

201.5.2.7.2 Start of Frame Delimiter

The start of Frame Delimiter consists of 9 bits [C/D<0>, Octet 1<7:0>] and shall use the hexadecimal value 0x15A.

201.5.2.7.3 Message Field

The Message Field is one octet. For the LEADER, this field is represented by Oct5{PMA_state<7:6>, loc_rcvr_status<5>, en_follower_tx<4>, reserved<3:0>}. For the FOLLOWER, this field is represented by Oct5{PMA_state<7:6>, loc_rcvr_status<5>, timing_lock_OK<4>, reserved<3:0>}.

The two state-indicator bits PMA_state<7:6> shall communicate the state of the transmitting transceiver to the link partner. PMA_state<7:6> = 00 indicates TRAINING.

All possible Message Field settings are listed in Table 201–5 for the LEADER and Table 201–6 for the FOLLOWER; however, the PMA_state<7:6> = 01 is not used by the LS_PATH. Any other value shall not be transmitted and shall be ignored at the receiver. The Message Field setting for the first transmitted PMA frame shall be the first row of Table 201–5 for the LEADER and the first or second row of Table 201–6 for the FOLLOWER. Moreover, for a given Message Field setting, the next Message Field setting shall be the same Message Field setting or the Message Field setting corresponding to a row below the current setting. When loc_rcvr_status = OK the Infofield variable is set to loc_rcvr_status<5> = 1 and set to 0 otherwise.

201.5.2.7.4 PHY capability bits

When PMA_state<7:6> = 00, then [Oct6<7:0>, Oct7<7:0>, Oct8<7:0>] contains the PHY capability bits. Each octet is sent LSB first. See Table 201–10 for the details.

Table 201–10—PHY capability bits, LS_PATH

octet 6								octet 7								octet 8							
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
VendorSpecificData																Reserved	InterleaverDepth		PrecodeSel		Reserved	Reserved	OAMen

The format of PHY capability bits is Oct8<2:1> = InterleaverDepth[1:0], Oct8<4:3> = PrecodeSel[1:0], Oct8<7> = OAMen, Oct6<7:0> = VendorSpecificData[7:0], and Oct7<7:0> = VendorSpecificData[15:8].

OAMen indicates 100M+MultiGBASE-T1/V1 OAM capability enable. The PHY shall indicate the support of this OAM capability by setting the OAMen capability bit to 1.

The optional 100M+MultiGBASE-T1/V1 OAM capability shall be enabled only if both PHYs set the capability bit OAMen = 1. InterleaverDepth indicates the requested data mode interleaving depth. PrecodeSel indicates the requested precoder, available for 10G only.

The capability bit values shall be considered as valid only when the loc_rcvr_status bit is 1.

The remaining bits shall be reserved and set to 0.

201.5.2.7.5 Reserved fields

[Oct2<7:0>, Oct3<7:0>, Oct4<7:0>] contains a reserved field and are reserved for future use.

201.5.2.7.6 PMA MDIO function mapping

The MDIO capability described in Clause 45 defines several variables that provide control and status information for and about the PMA. Mapping of MDIO control variables to PMA control variables is shown in Table 201–8. Mapping of MDIO status variables to PMA status variables is shown in Table 201–9.

201.5.2.8 PHY Control function, HS_PATH and LS_PATH

201.5.2.8.1 Startup Sequence

The startup sequence shall comply with the state diagram description given in Figure 201–24. If the Auto-Negotiation function is not implemented, or disabled (mr_autoneg_en = FALSE), PMA_CONFIG is predetermined to be LEADER or FOLLOWER via management control during initialization or via default hardware setup. The Auto-Negotiation function is optional for MultiG+100M/100M+MultiGBASE-T1/V1 PHYs. If the Auto-Negotiation function is implemented and enabled, Auto-Negotiation is the source of control (via link_control) and LEADER-FOLLOWER configuration; however, if Auto-Negotiation is either not enabled or is not implemented, the Link Synchronization function is the source of control (via sync_link_control) and LEADER-FOLLOWER configuration.

In the TRAINING state, PAM 2 transmission is used for the HS_PATH and DME is used for the LS_PATH. PHY capabilities are exchanged with Infofields as specified in 201.5.2.6.5.

At any time following the TRAINING state, if the local receiver status (indicated by loc_rcvr_status) transitions to NOT_OK, PHY Control returns to the SILENT state and attempts a retrain.

The startup timing shall comply with Table 201–11 for LEADER and Table 201–12 for FOLLOWER. See Table 201–1 for the definition of *S*.

201.5.2.8.2 State diagram variables

auto_neg_imp
: This variable indicates if an optional Auto-Negotiation sublayer is associated with the PMA.
Values:
TRUE: An optional Auto-Negotiation sublayer is associated with the PMA.
FALSE: An optional Auto-Negotiation sublayer is not associated with the PMA.